E-TES 240 TROUBLESHOOTING

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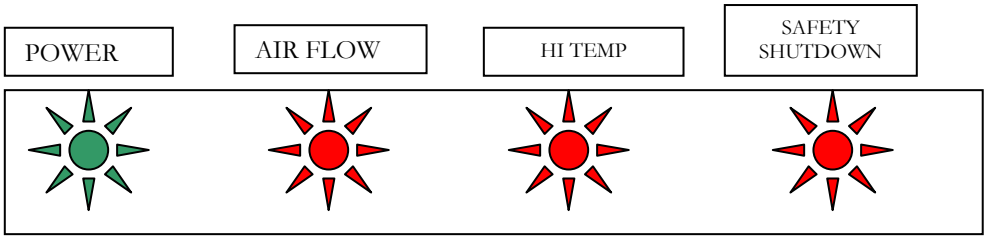
Indicates Light is OFF

Indicates Light is ON

Light Configurations

E-TES 240 TROUBLESHOOTING

LIGHT PANEL CONFIGURATION #1



Step # 1

Usually, when all the lights are ON as shown above, the heater is operating normally and the heating elements are receiving power. If you suspect that the heater is not heating properly even with the lights on, use a clamp-on amp meter to measure the amp draw of the E-TES 240.
(The actual amp draw will vary with the voltage available and the temperature of the heating elements.)

- If the amp draw is approximately 25 – 20amps the unit is working OK - Exit.
- If the amp draw is approximately 19-5amps, power is getting to the heating elements and at least one element is working, but one or more of the heating elements are disconnected or defective - Go to Step #2.
- If the amp draw is approximately 2-0amps all four heating element are disconnected or defective - Go to Step #3

Step # 2

Remove the heating elements and check the wiring which connects the four elements to assure that there is continuity between the three elements. Check each of the power terminals to be sure there is no continuity to ground. Replace any heating element that has a terminal shorted to ground. Re-install the heating elements into the E-TES 240 and test unit.

- If the amp draw is approximately 22 – 20amps the unit is working OK - Exit.
- If the amp draw is approximately 17-5amps continue with testing. Check the resistance between the two terminals on each individual heating element. Resistance should be 36 - 37 ohms. Replace any heating elements with resistance readings outside this range. Reconnect heating elements and check to assure that you have continuity between the inside terminals on all four heating elements. Then check to be sure there is continuity between the outside terminals on all four heating elements. Then check the resistance of the inside & outside terminals it should read approximately 9 ohms. If the resistance reads 12 ohms only three heating elements are connected. If the resistance reads 18 ohms only two elements are connected.

  Repair wires as needed to assure that all elements are connected properly and reinstall the elements into the E-TES 240 and test the unit.
  - If the amp draw is approximately 22 – 20amps the unit is working OK.
  - If the amp draw is approximately 17-5amps return to Step #1 and check everything again or check your incoming voltage. Amperage may read lower if the voltage is less than 208volts. Check voltage at source and at GFCI cord plug where it connects to the E-TES unit. Repair cord, repair voltage source or find new source as needed to deliver 240-208 volts and repeat testing.

Step # 3

With the power cord connected to the E-TES 240 unit, turn the switch to the ON position. If all the lights are on, check the voltage at terminal #5 and terminal #6 of the terminal block where the red & black wires from relay #2 connect to the wires going to the heating elements.

- Voltage found – Repair wires as needed to restore power to the heating elements and return to Step #1.
- No voltage found – Test for power at the two outlet power terminals #4 & #8 of relay #2 where the two wires from terminal #5 & #6 of the terminal block are connected.
    - Voltage found - Repair wires as needed to restore power to the terminal #5 & #6 and return to Step #1.
    - No voltage found – Test for power at the inlet power terminals #6 & #2 of relay #2 where the other 10ga. black & red wires are connected.
        - Voltage found – Check for power at the relay coil terminals #0 where the black wire is connected & #1 where the red & blue wires are connected.
            - Voltage found - Replace the relay and return to Step #1.
            - No voltage found – If there is no power at these terminals the red air flow light should not be on, unless black wire is damaged and not bringing the power from the rocker switch to the relay. Repair or replace the black wire as needed to restore power to the relay and return to Step #1.
        - No Voltage found – The red air flow light would not be on if Relay #1 was not working. So if there is no power to relay #2 there must be a loose wire. Since the red airflow light is on the red wire from relay #1 to terminal block #4 must be supplying power to terminal #4 of the terminal block. Check the continuity of the red wire from terminal #4 of the terminal block to relay #2 and repair or replace the red wire as needed. Now check for power at terminal #8 of relay #1 where the black wire is connected.
            - No voltage found – Repair or replace the black wire as needed to restore power to the relay and continue with testing.
            - Voltage found – Continue with testing.

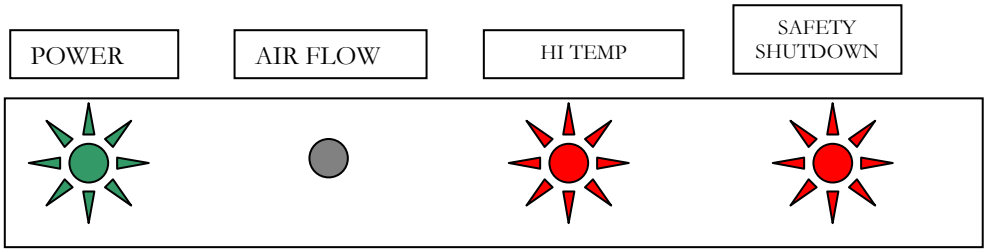
Test for power at terminal #6 of relay #1.

- No Voltage found – Replace the relay and continue with testing.
- Voltage found – Continue with testing.

Test for power at terminal #2 of relay #2.

- No voltage found – Repair or replace black 10ga. wire from terminal #6 of relay #1 to terminal #2 of relay #2 as needed to restore power to terminal #2 and then return to Step #1.
- Voltage found – Return to Step #1

LIGHT PANEL CONFIGURATION #2



Step #1

First look to see if the two blue wires are connected to the COM and NO terminals on the air flow switch. These are the two terminals closest to the front of the E-TES. The third terminal, which is closest to the back is the NC terminal and is not used. Once both blue wires are connected properly, turn the E-TES switch on and turn the air mover on.

Does the red air flow light come on?

- Yes the light comes ON – Is the unit heating up?
  - Yes it is heating – Exit.
  - No it is not heating – Go to Light Configuration #1.
- No the light is still OFF – Test for power at terminal #4 of the terminal block where the blue wire to the air flow switch is connected.
  - Voltage found – Proceed to Step #2.
  - No voltage found - Test for power at terminal #2 of relay #1.
    - Voltage found – Repair or replace the red wire from terminal #2 of relay #1 to terminal #4 of the terminal block and return to the beginning of Step #1.
    - No voltage found – Test for power at terminal #4 or relay #1.
      - No voltage found – Repair or replace the red wire from terminal #2 of the terminal block to relay #1 as needed to restore power to Terminal #4 of relay #1 and return to the beginning of Step #1.
      - Voltage found – Check the brown wire on terminal #0 and black wire on terminal #1 for power.
        - Voltage found – Replace the relay and return to the beginning of Step #1.
        - No voltage found - The fact that the red Hi-Temp light & red Safety Shutdown lights are on indicates that the power to activate Relay #1 is being sent to the relay. Check the brown wire from the temperature switches and the black wire from the rocker switch and repair as needed to restore power to terminal #0 & terminal #1 of relay #1 and return to the beginning of Step #1.

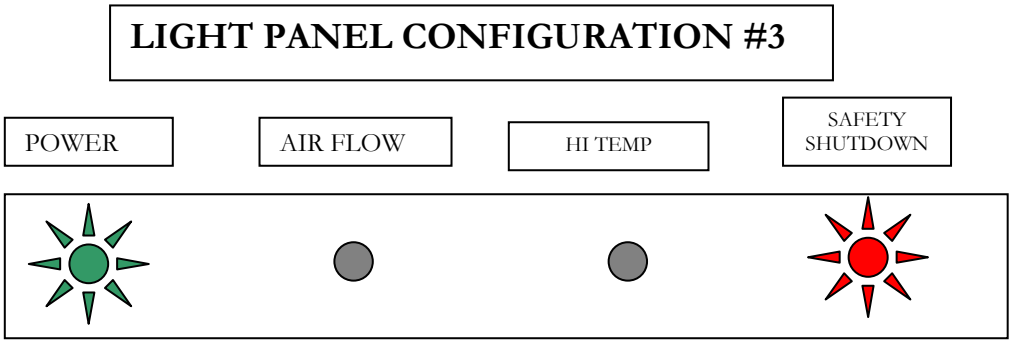
Step #2

Check the air flow switch. There should be no continuity between the COM terminal and the NO terminal when there is no air flow. When there is air flow or you push the paddle to simulate air flow there should be continuity between the two terminals. Replace air flow switch as needed and reconnect the blue wires to the COM and NO terminals, turn the E-TES switch ON and turn the air mover on. Does the red air flow light turn on?

- No the light stays OFF – Continue with testing.
- Yes the light comes ON - Is the unit heating up?
  - Yes it is heating – Exit.
  - No it is not heating – Go to Light Configuration #1.

With the E-TES switch ON and the air mover on, test for power at terminal #1 of relay #2 where the blue wire is connected with the red wire to the air flow light.

- No voltage found – Repair or replace the blue wire from the air flow switch to relay #2 as needed to restore power to the red wire and terminal #1 of relay #2 and return to the beginning of Step #2.
- Voltage found – Test for power at the red & black wires where they connect to the air flow light.
    - Voltage found – Replace the air flow light and return to the beginning of Step #2.
    - No voltage found – Repair or replace the red wire from terminal #1 of relay #2 and the black wire from the rocker switch as needed to restore power to the air flow light and return to the beginning of Step #2.



Step #1

First look at the wires on the Hi-Temp switches to see if any wires are loose. Reconnect any loose wires to the Hi-Temp switches, the Safety Shutdown switch and relay #1.
Turn E-TES switch ON. Does the red Hi-Temp light turn on?

- No the light stays OFF – Continue with testing.
- Yes the light comes ON – Turn the air mover on. Does the red air flow light turn on?
    - No – Go to Light Configuration #2.
    - Yes - Is the unit heating up?
        - Yes it is heating – Exit.
        - No it is not heating – Go to Light Configuration #1.

On the outlet side of the Safety Shutdown switch are two wires, a red wire and a yellow wire. Since the safety shutdown light is on the must be power at the yellow wire. The red wire goes to the Hi-Temp switches. Test for power at the red wire where it connects to the first Hi-Temp switch.

- Voltage found – Continue with testing.
- No voltage found – Repair or replace the red wire from the safety shutdown switch to the Hi-Temp switches and continue with testing.

Remove the jumper wire connecting the two Hi-Temp switches. Test both Hi-Temp switches for continuity across their terminals and replace switches as needed to restore continuity through both switches. Examine the jumper wire and repair or replace the jumper wire to assure that you have a good connection between the two Hi-Temp switches. Reconnect the red wire from the safety shutdown switch to the first Hi-Temp switch. Turn the E-TES switch on and test for power at the outlet terminal of the second Hi-Temp switch.

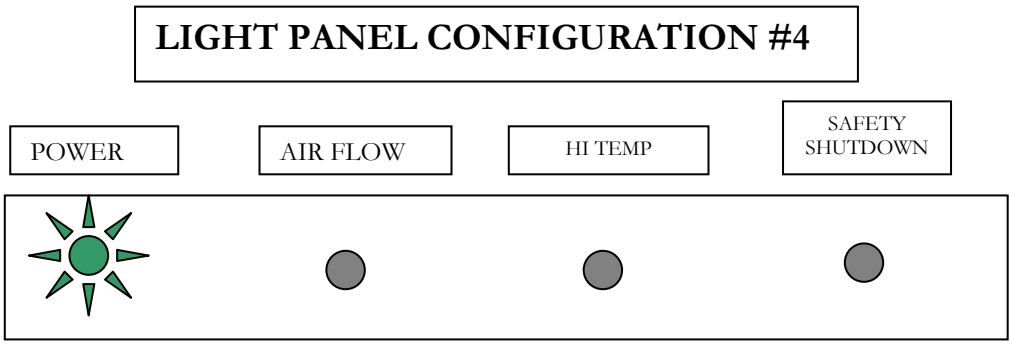
- Voltage found – Continue with testing.
- No voltage found – Return to the beginning of Step #1 and check everything again.

Reconnect the brown wire to the second Hi-Temp switch. Test for power at terminal #0 of relay #1 where the brown wire connects with the red wire to the Hi-Temp light.

- Voltage found – Continue with testing.
- No voltage found – Repair or replace the brown wire to relay #1 as needed to restore power to terminal #0 and continue with testing.

Test for power at the red & black wires where they connect to the Hi-Temp light.

- Voltage found – Replace the red air flow light and return to the beginning of Step #1.
- No voltage found – Repair or replace the red wire from terminal #0 of relay #1 and the black wire from the rocker switch as needed to restore power to the red air flow light and return to the beginning of Step #1.



Step #1

First look at the wires on the Safety Shutdown switch to see if any wires are loose. Reconnect any loose wires to the Safety Shutdown switch.
Turn E-TES switch ON. Does the red Safety Shutdown light turn on?

- No the light stays OFF – Continue with testing.
- Yes the light comes ON – Does the red Hi-Temp light turn on?
  - No – Go to Light Configuration #3.
  - Yes - Turn the air mover on. Does the red air flow switch turn on?
    - No – Go to Light Configuration #2.
    - Yes - Is the unit heating up?
      - Yes it is heating – Exit.
      - No it is not heating – Go to Light Configuration #1.

There must be power at terminal #2 of the terminal block, since this terminal provides power to light the Power light. The brown wire from terminal #2 connects to the Safety Shutdown switch. Test the brown wire for power where it connects to the Safety Shutdown switch.

- Voltage found – Continue with testing.
- No voltage found – Repair or replace the brown wire as needed to restore power to the Safety Shutdown switch and continue with testing.

With the brown wire connected to one terminal of the Safety Shutdown switch, disconnect the two wires from the other terminal. Test for power on the outlet terminal of the Safety Shutdown switch.

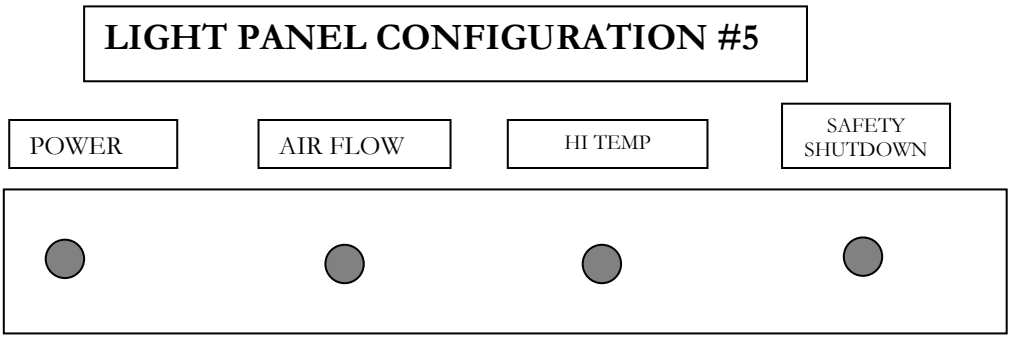
- Voltage found – Continue with testing.
- No voltage found – Replace the Safety Shutdown switch and continue with testing.

Reconnect the two wires to the outlet terminal of Safety Shutdown switch. Turn the E-TES switch on. Does the Safety Shutdown light turn on?

- No the light stays OFF – Continue with testing.
- Yes the light comes ON – Return to the beginning of Step #1.

Test for power at the yellow & black wires where they connect to the Safety Shutdown light.

- Voltage found – Replace the Safety Shutdown light and return to the beginning of Step #1.
- No voltage found – Repair or replace the yellow wire from Safety Shutdown switch and the black wire from the rocker switch as needed to restore power to the air flow light and return to the beginning of Step #1.



Step #1

The power supply to the TEX unit has been cut off. Check the building 240v circuit breaker and the GFCI and reset as needed. Test for power at the 240v outlet and at the receptacle end on the GFCI cord where it connects to the E-TES to assure that power is getting to the E-TES. Once you are sure that there is power being supplied to the E-TES, turn the E-TES switch on. Does the green power light turn on?

- No the light stays OFF – Continue with testing.
- Yes the light comes ON – Does the red Safety Shutdown light turn on?
    - No – Go to Light Configuration #4.
    - Yes - Does the red Hi-Temp light turn on?
        - No – Go to Light Configuration #3.
        - Yes - Turn the air mover on. Does the red air flow switch turn on?
            - No – Go to Light Configuration #2.
            - Yes - Is the unit heating up?
                - Yes it is heating – Exit.
                - No it is not heating – Go to Light Configuration #1.

Test for power at terminal #2 & terminal #3 of the terminal block.

- Voltage found – Continue with testing.
- No voltage found – Repair or replace the red & black wires from the flanged inlet power plug as needed to restore power to terminal #2 & terminal #3 of the terminal block and continue with testing.

Test for power at terminal #2 & the black wire from terminal #3 where it connects to the rocker switch.

- Voltage found – Continue with testing.
- No voltage found – Repair or replace the black wire from terminal #3 of the terminal block as needed to restore power to the rocker switch and continue with testing

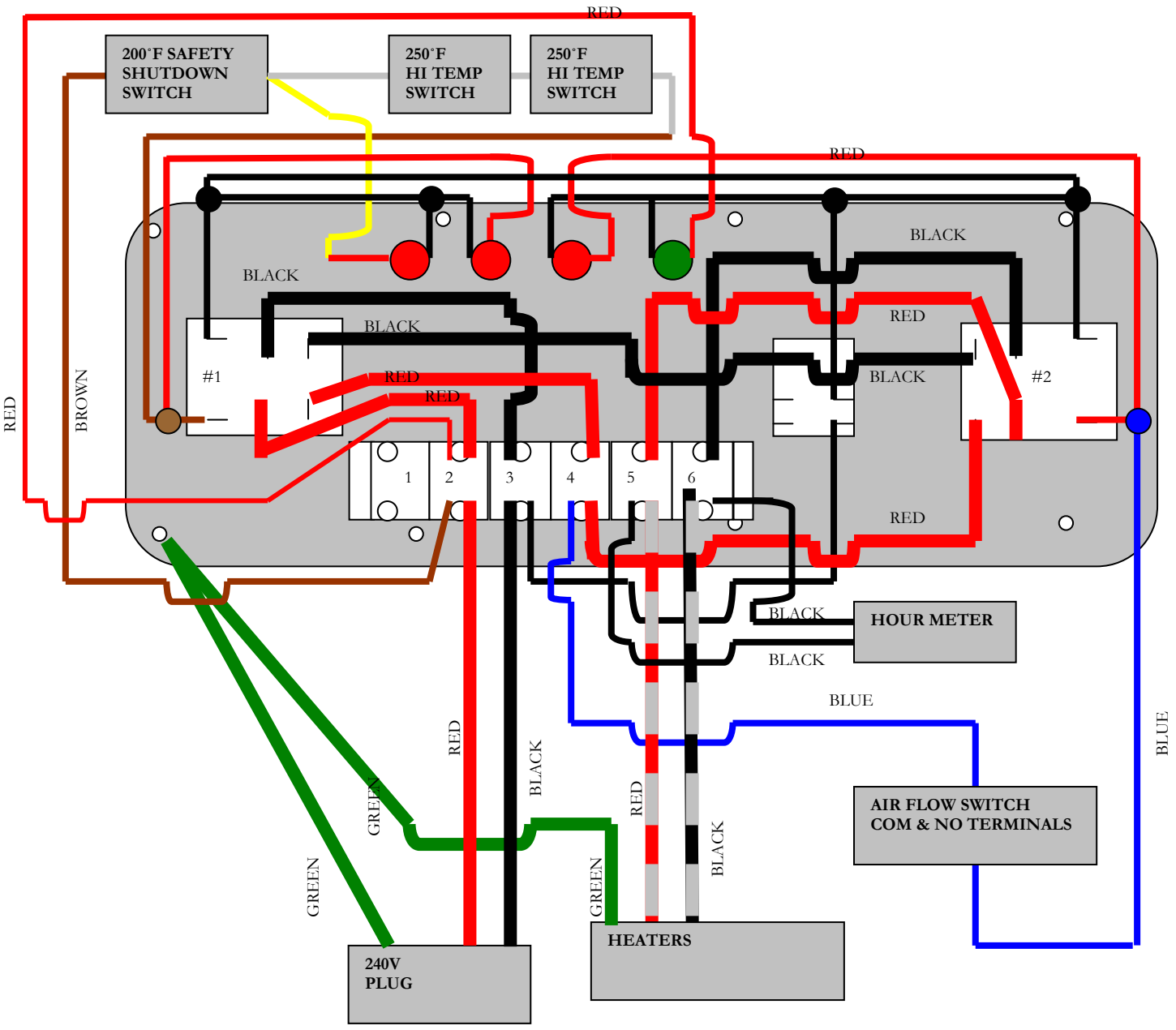
With the rocker switch in the on position, test for power at the other terminal of the rocker switch where the two black wires are connected.

- Voltage found – Continue with testing.
- No voltage found – Replace the rocker switch and continue with testing.

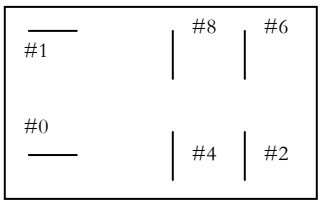
Test for power at the red & black wires where they connect to the Power light.

- Voltage found – Replace the Power light and return to the beginning of Step #1.
- No voltage found – Repair or replace the red wire from terminal #2 of the terminal block and the black wire from the rocker switch as needed to restore power to the Power light and return to the beginning of Step #1.

Heater Wiring



RELAY #1



Relay #1 coil – 240vac
Relay #2 coil – 240vac
(Coil Terminals are #1 & #0)

Both relays are: DPST - NO

RELAY #2