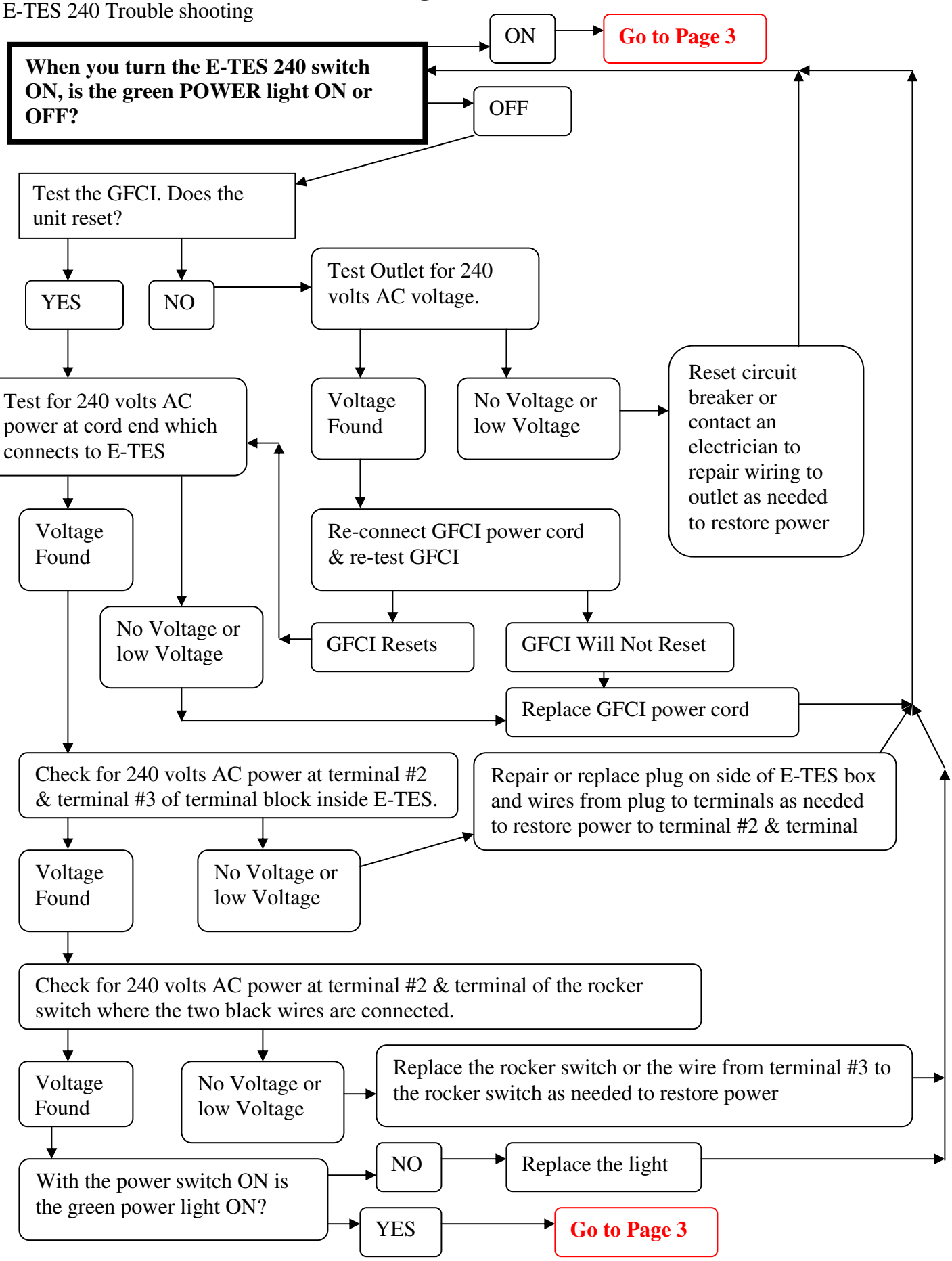
PAGE 1

This document outlines questions to ask and components to check during E-TES 240 troubleshooting. More detailed troubleshooting procedures are available in the E-TES 240 Troubleshooting Guide.

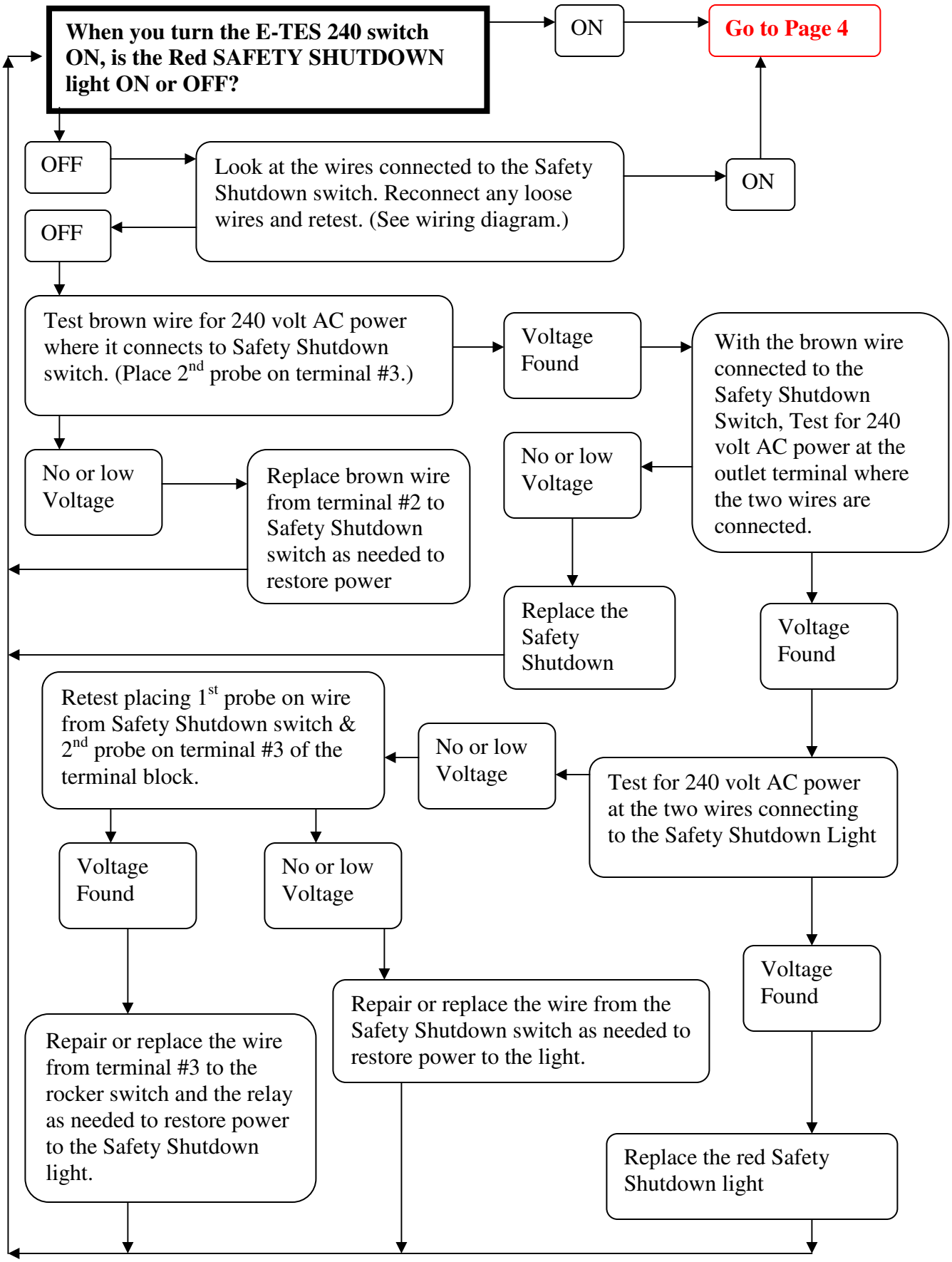
E-TES 240 Operation & Testing Guidelines:

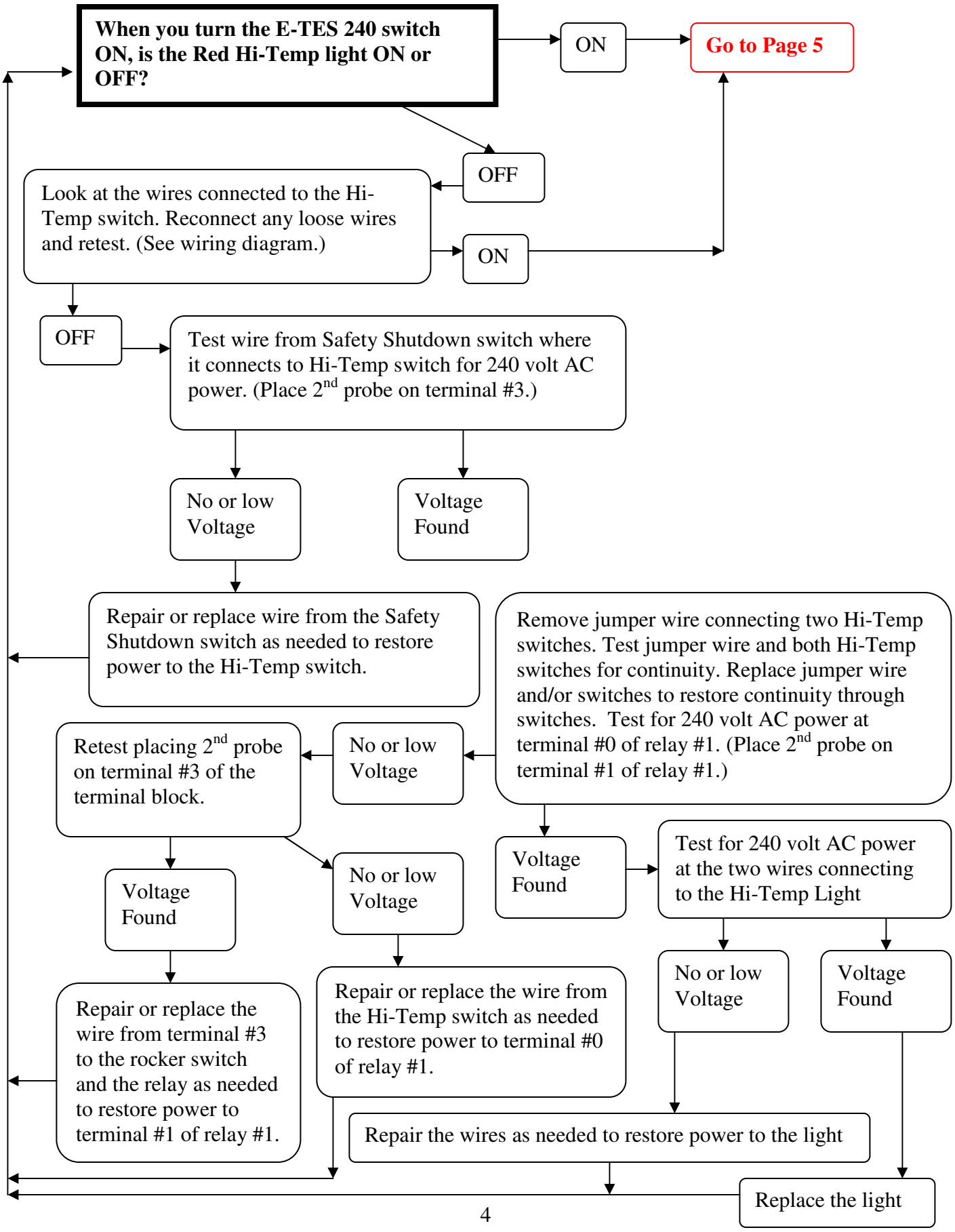
1. **Before Running TES 240 unit be sure you have a circuit with the correct voltage and amperage rating for operating the E-TES 240. (240 Volts AC – Minimum 30amp rating)**
2. **Air Mover must be the correct size to fit into the opening on top of the E-TES.**
3. **A clamp on amp meter is required to test amp draw.**
4. **A multimeter is required to check continuity, resistance & voltage.**
5. **Your outlet voltage may vary from 208 volts to 240 volts AC. The E-TES 240 will still operate, but heat output will be lower. The outlet voltage may affect some of the test readings. Test your outlet voltage & make adjustments to allow for differences in outlet voltage.**

PAGE 2

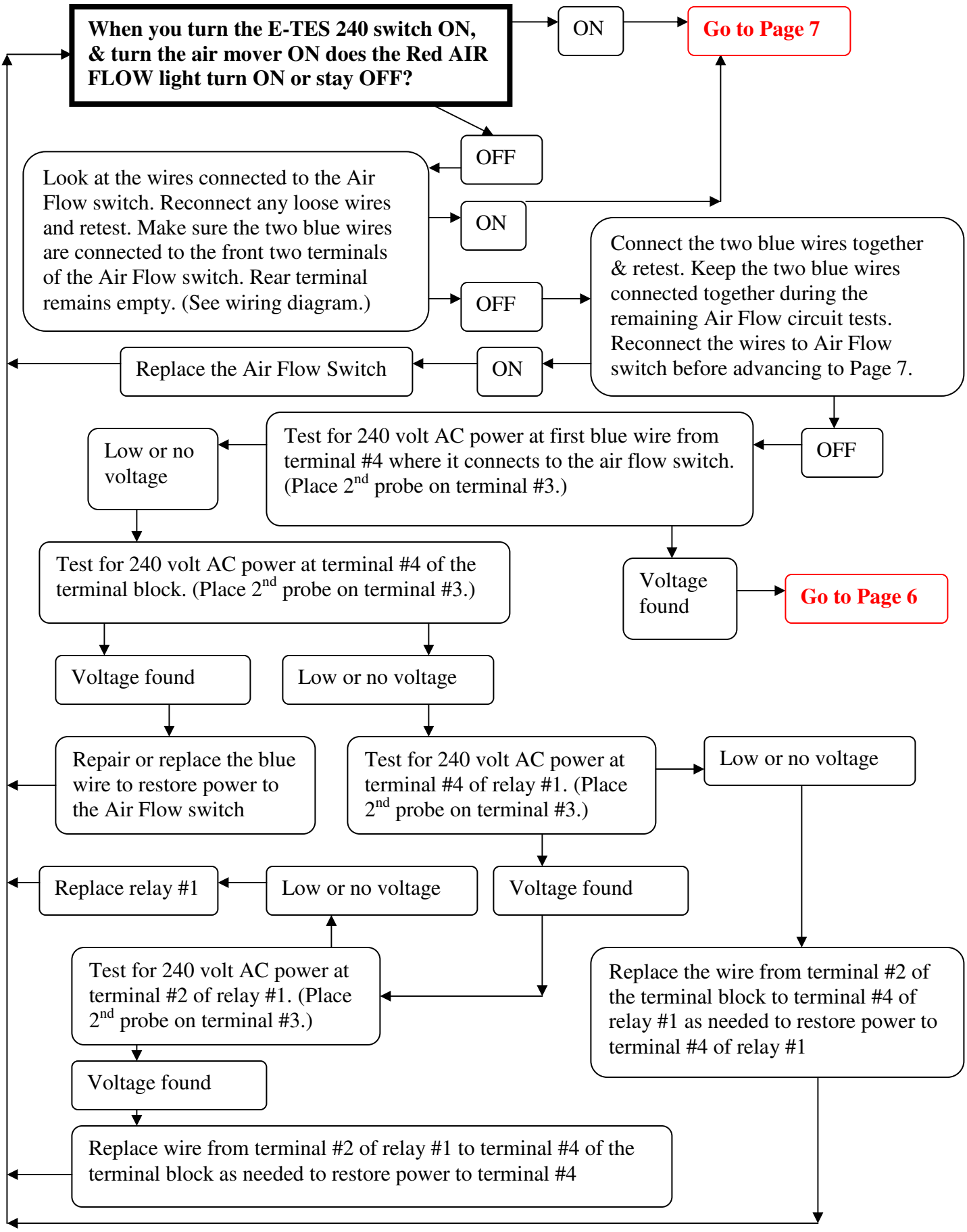

When you turn the E-TES 240 switch ON, is the green POWER light ON or OFF?
ON
Go to Page 3
OFF
Test the GFCI. Does the unit reset?
YES
NO
Test Outlet for 240 volts AC voltage.
Test for 240 volts AC power at cord end which connects to E-TES
Voltage Found
No Voltage or low Voltage
Reset circuit breaker or contact an electrician to repair wiring to outlet as needed to restore power
Voltage Found
Re-connect GFCI power cord & re-test GFCI
No Voltage or low Voltage
GFCI Resets
GFCI Will Not Reset
Replace GFCI power cord
Check for 240 volts AC power at terminal #2 & terminal #3 of terminal block inside E-TES.
Repair or replace plug on side of E-TES box and wires from plug to terminals as needed to restore power to terminal #2 & terminal
Voltage Found
No Voltage or low Voltage
Check for 240 volts AC power at terminal #2 & terminal of the rocker switch where the two black wires are connected.
Voltage Found
No Voltage or low Voltage
Replace the rocker switch or the wire from terminal #3 to the rocker switch as needed to restore power
With the power switch ON is the green power light ON?
NO
Replace the light
YES
Go to Page 3

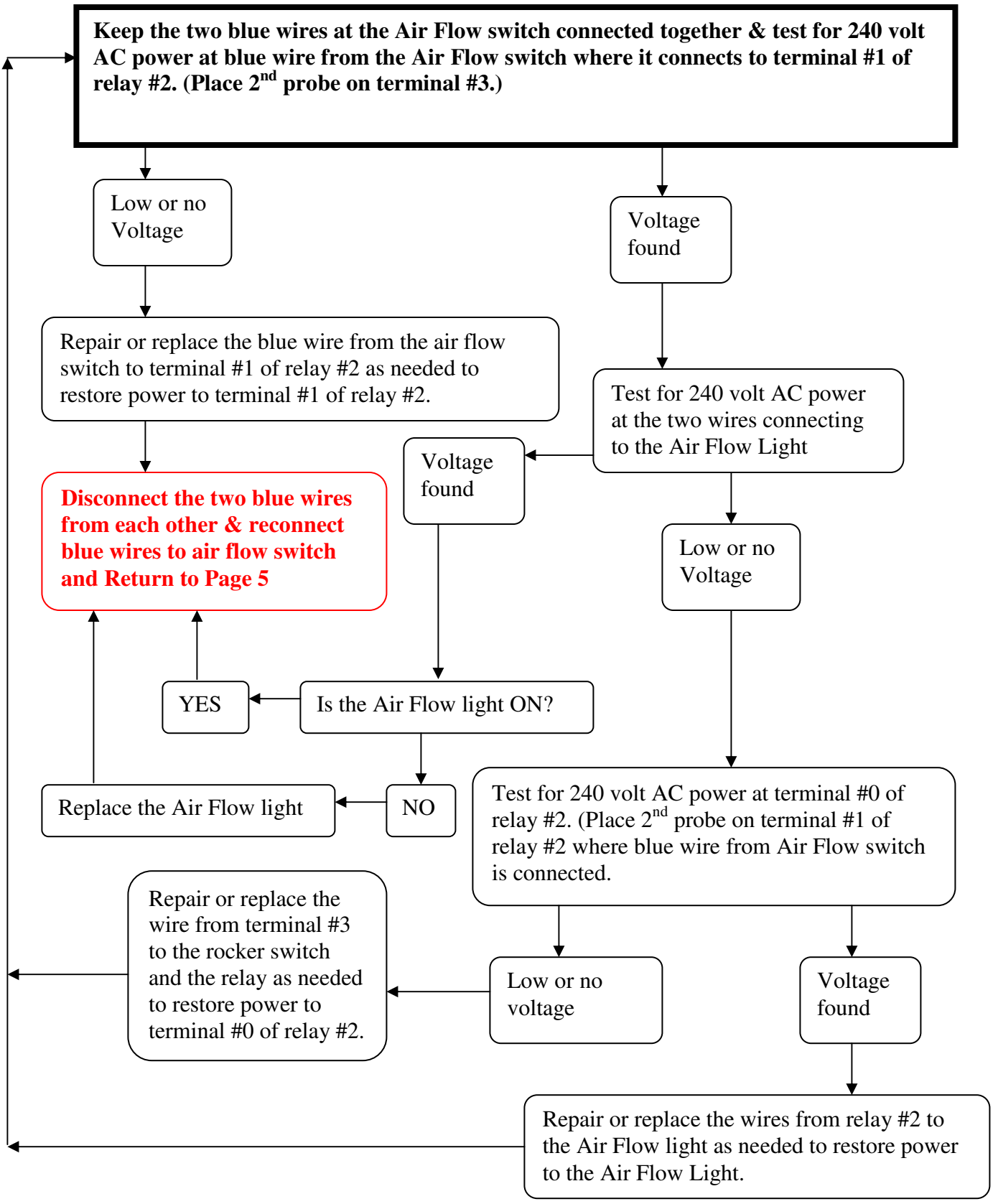
PAGE 3

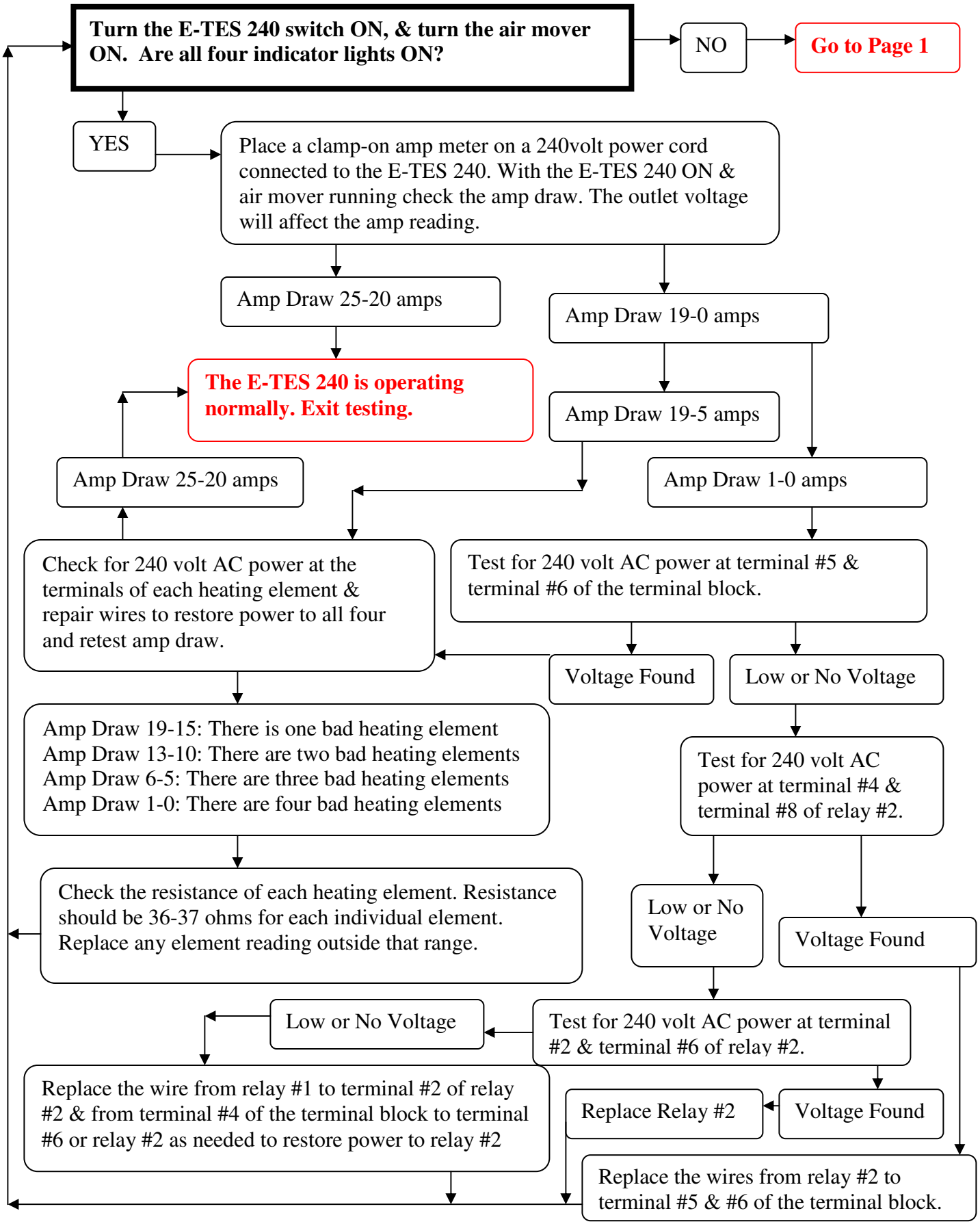

When you turn the E-TES 240 switch ON, is the Red SAFETY SHUTDOWN light ON or OFF?
ON
Go to Page 4
OFF
Look at the wires connected to the Safety Shutdown switch. Reconnect any loose wires and retest. (See wiring diagram.)
ON
OFF
Test brown wire for 240 volt AC power where it connects to Safety Shutdown switch. (Place 2nd probe on terminal #3.)
Voltage Found
With the brown wire connected to the Safety Shutdown Switch, Test for 240 volt AC power at the outlet terminal where the two wires are connected.
No or low Voltage
Replace brown wire from terminal #2 to Safety Shutdown switch as needed to restore power
No or low Voltage
Replace the Safety Shutdown
Voltage Found
Retest placing 1st probe on wire from Safety Shutdown switch & 2nd probe on terminal #3 of the terminal block.
No or low Voltage
Test for 240 volt AC power at the two wires connecting to the Safety Shutdown Light
Voltage Found
No or low Voltage
Voltage Found
Repair or replace the wire from terminal #3 to the rocker switch and the relay as needed to restore power to the Safety Shutdown light.
Repair or replace the wire from the Safety Shutdown switch as needed to restore power to the light.
Replace the red Safety Shutdown light


When you turn the E-TES 240 switch ON, is the Red Hi-Temp light ON or OFF?
ON
Go to Page 5
OFF
Look at the wires connected to the Hi-Temp switch. Reconnect any loose wires and retest. (See wiring diagram.)
ON
OFF
OFF
Test wire from Safety Shutdown switch where it connects to Hi-Temp switch for 240 volt AC power. (Place 2nd probe on terminal #3.)
No or low Voltage
Voltage Found
Repair or replace wire from the Safety Shutdown switch as needed to restore power to the Hi-Temp switch.
Remove jumper wire connecting two Hi-Temp switches. Test jumper wire and both Hi-Temp switches for continuity. Replace jumper wire and/or switches to restore continuity through switches. Test for 240 volt AC power at terminal #0 of relay #1. (Place 2nd probe on terminal #1 of relay #1.)
Retest placing 2nd probe on terminal #3 of the terminal block.
No or low Voltage
Voltage Found
Test for 240 volt AC power at the two wires connecting to the Hi-Temp Light
Voltage Found
No or low Voltage
Voltage Found
No or low Voltage
Repair or replace the wire from terminal #3 to the rocker switch and the relay as needed to restore power to terminal #1 of relay #1.
Repair or replace the wire from the Hi-Temp switch as needed to restore power to terminal #0 of relay #1.
Repair the wires as needed to restore power to the light
Replace the light

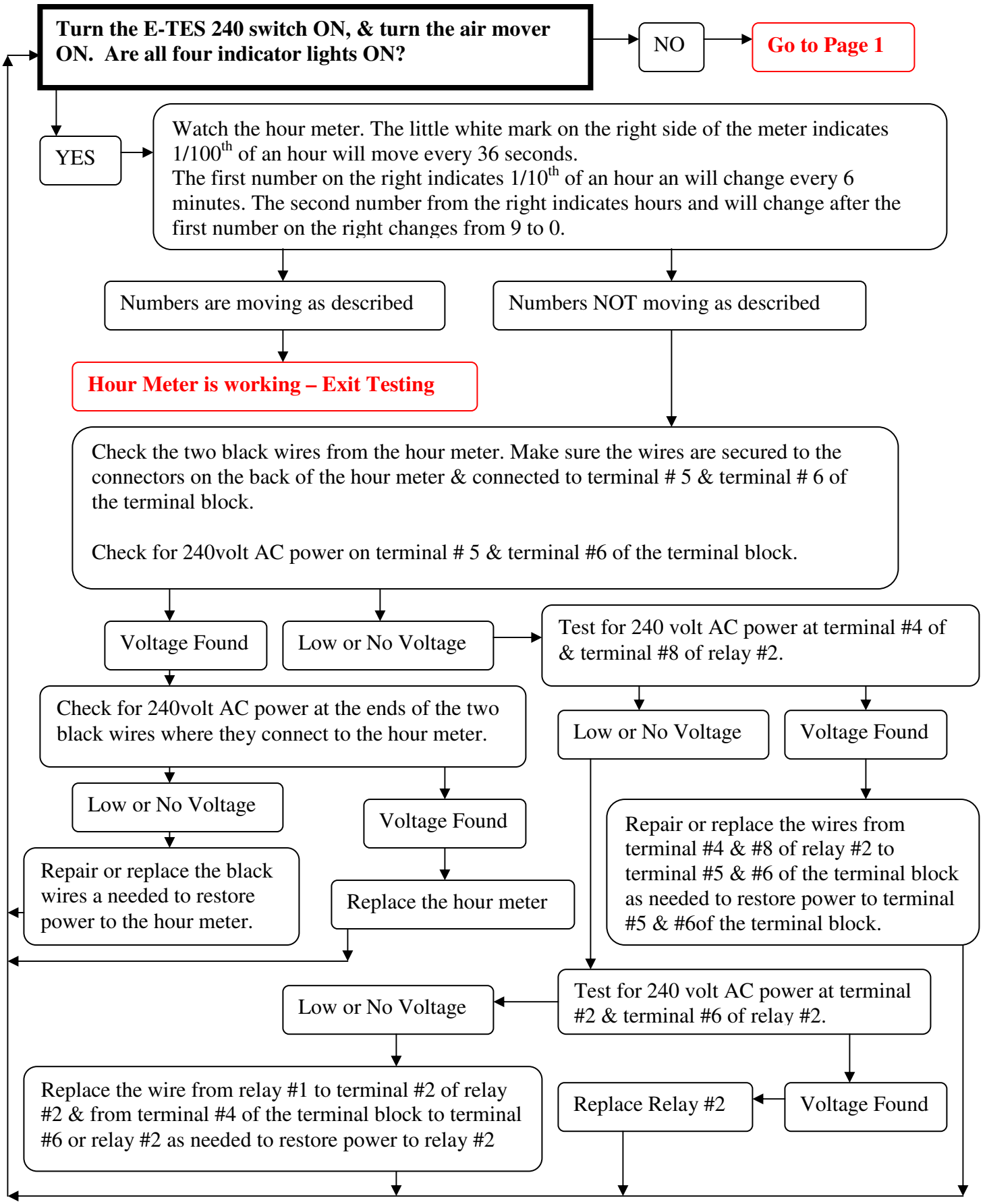
PAGE 5


When you turn the E-TES 240 switch ON, & turn the air mover ON does the Red AIR FLOW light turn ON or stay OFF?
ON
Go to Page 7
OFF
Look at the wires connected to the Air Flow switch. Reconnect any loose wires and retest. Make sure the two blue wires are connected to the front two terminals of the Air Flow switch. Rear terminal remains empty. (See wiring diagram.)
ON
OFF
Connect the two blue wires together & retest. Keep the two blue wires connected together during the remaining Air Flow circuit tests. Reconnect the wires to Air Flow switch before advancing to Page 7.
Replace the Air Flow Switch
ON
OFF
Low or no voltage
Test for 240 volt AC power at first blue wire from terminal #4 where it connects to the air flow switch. (Place 2nd probe on terminal #3.)
Test for 240 volt AC power at terminal #4 of the terminal block. (Place 2nd probe on terminal #3.)
Voltage found
Go to Page 6
Voltage found
Low or no voltage
Repair or replace the blue wire to restore power to the Air Flow switch
Test for 240 volt AC power at terminal #4 of relay #1. (Place 2nd probe on terminal #3.)
Low or no voltage
Replace relay #1
Low or no voltage
Voltage found
Test for 240 volt AC power at terminal #2 of relay #1. (Place 2nd probe on terminal #3.)
Replace the wire from terminal #2 of the terminal block to terminal #4 of relay #1 as needed to restore power to terminal #4 of relay #1
Voltage found
Replace wire from terminal #2 of relay #1 to terminal #4 of the terminal block as needed to restore power to terminal #4


Keep the two blue wires at the Air Flow switch connected together & test for 240 volt AC power at blue wire from the Air Flow switch where it connects to terminal #1 of relay #2. (Place 2nd probe on terminal #3.)
Low or no Voltage
Voltage found
Repair or replace the blue wire from the air flow switch to terminal #1 of relay #2 as needed to restore power to terminal #1 of relay #2.
Test for 240 volt AC power at the two wires connecting to the Air Flow Light
Voltage found
Disconnect the two blue wires from each other & reconnect blue wires to air flow switch and Return to Page 5
Low or no Voltage
YES
Is the Air Flow light ON?
Replace the Air Flow light
NO
Test for 240 volt AC power at terminal #0 of relay #2. (Place 2nd probe on terminal #1 of relay #2 where blue wire from Air Flow switch is connected.
Repair or replace the wire from terminal #3 to the rocker switch and the relay as needed to restore power to terminal #0 of relay #2.
Low or no voltage
Voltage found
Repair or replace the wires from relay #2 to the Air Flow light as needed to restore power to the Air Flow Light.


Turn the E-TES 240 switch ON, & turn the air mover ON. Are all four indicator lights ON?
NO
Go to Page 1
YES
Place a clamp-on amp meter on a 240volt power cord connected to the E-TES 240. With the E-TES 240 ON & air mover running check the amp draw. The outlet voltage will affect the amp reading.
Amp Draw 25-20 amps
Amp Draw 19-0 amps
The E-TES 240 is operating normally. Exit testing.
Amp Draw 19-5 amps
Amp Draw 25-20 amps
Amp Draw 1-0 amps
Check for 240 volt AC power at the terminals of each heating element & repair wires to restore power to all four and retest amp draw.
Test for 240 volt AC power at terminal #5 & terminal #6 of the terminal block.
Voltage Found
Low or No Voltage
Amp Draw 19-15: There is one bad heating element
Amp Draw 13-10: There are two bad heating elements
Amp Draw 6-5: There are three bad heating elements
Amp Draw 1-0: There are four bad heating elements
Test for 240 volt AC power at terminal #4 & terminal #8 of relay #2.
Check the resistance of each heating element. Resistance should be 36-37 ohms for each individual element. Replace any element reading outside that range.
Low or No Voltage
Voltage Found
Low or No Voltage
Test for 240 volt AC power at terminal #2 & terminal #6 of relay #2.
Replace the wire from relay #1 to terminal #2 of relay #2 & from terminal #4 of the terminal block to terminal #6 or relay #2 as needed to restore power to relay #2
Replace Relay #2
Voltage Found
Replace the wires from relay #2 to terminal #5 & #6 of the terminal block.

PAGE 8


Turn the E-TES 240 switch ON, & turn the air mover ON. Are all four indicator lights ON?
NO
Go to Page 1
YES
Watch the hour meter. The little white mark on the right side of the meter indicates 1/100th of an hour will move every 36 seconds.
The first number on the right indicates 1/10th of an hour an will change every 6 minutes. The second number from the right indicates hours and will change after the first number on the right changes from 9 to 0.
Numbers are moving as described
Numbers NOT moving as described
Hour Meter is working – Exit Testing
Check the two black wires from the hour meter. Make sure the wires are secured to the connectors on the back of the hour meter & connected to terminal # 5 & terminal # 6 of the terminal block.
Check for 240volt AC power on terminal # 5 & terminal #6 of the terminal block.
Voltage Found
Low or No Voltage
Test for 240 volt AC power at terminal #4 of & terminal #8 of relay #2.
Check for 240volt AC power at the ends of the two black wires where they connect to the hour meter.
Low or No Voltage
Voltage Found
Low or No Voltage
Voltage Found
Repair or replace the black wires a needed to restore power to the hour meter.
Replace the hour meter
Repair or replace the wires from terminal #4 & #8 of relay #2 to terminal #5 & #6 of the terminal block as needed to restore power to terminal #5 & #6of the terminal block.
Test for 240 volt AC power at terminal #2 & terminal #6 of relay #2.
Low or No Voltage
Replace the wire from relay #1 to terminal #2 of relay #2 & from terminal #4 of the terminal block to terminal #6 or relay #2 as needed to restore power to relay #2
Replace Relay #2
Voltage Found

Not Heating: What lights are ON?

No Lights (Page 2):

Circuit Breaker – No power at Outlet
GFCI Not reset
GFCI cord bad
Bad wires
Loose wires
Bad Rocker switch
Bad Power Light (GREEN)

The most common cause would be the failure to reset the GFCI on the power cord or plugging into an outlet which is not powered. If the outlet has power the GFCI should be set & tested before the GFCI cord is connected to the E-TES 240. If the GFCI does not reset, the cord will need to be replaced. (NM4402) After checking outlets & cords, proceed to other tests as needed.

Power Light Only (Page 3):

Loose Wires
Safety Shutdown Switch
Bad Wires
Bad Safety Shutdown Light (RED)

The power to all the indicator lights flows through the Safety Shutdown switch first. Check for loose wires & test the continuity through the Safety Shutdown switch. Replace wires, switch & light as needed.

Power Light & Safety Shutdown Only (Page 4):

Loose Wires
Hi-Temp Switches
Bad Wires
Bad Hi-Temp Light (RED)

If the safety shutdown light is ON you know the power is getting through the Safety Shutdown switch but may not be getting through the Hi-Temp switches to activate the Hi-Temp light & relay #1. Check for loose wires & test the continuity through the Hi-Temp switches. Replace wires, switches & light as needed.

Power Light, Safety Shutdown & Hi-Temp Only (Page 5):

No Air Flow
Air Flow Switch
Relay #1 Bad
Loose Wires
Bad Wires
Bad Air Flow Light (RED)

First make sure there is adequate air flow to activate the air flow switch. If using an Octi-Dry or Duct kit the flow may be restricted. Open one end of the Octi-Dry or add extra ducts to increase the air flow.

If the Hi-Temp light is ON you know the power is getting through the Safety Shutdown switch and the Hi-Temp switches to activate the Hi-Temp light & relay #1. Relay #1 may be defective and not allowing the power through to the Air Flow Switch. Check for loose wires & test the continuity through the Relay #1 to terminal #4 of the terminal block. Replace wires & relay #1 as needed to restore power to the air flow switch. Then test operation of air flow switch & wires to relay #2 & the air flow light. Replace wires, air flow switch & light as needed.

E-TES 240 Trouble shooting

All Lights ON – Not Heating (Page 7):

Relay #2 Bad
Loose Wires
Bad Wires
Bad Heating Elements

Use a clamp on amp meter to test the amp draw of the unit when the heating light is on. If the cord is drawing 25-20 amps it is heating OK. The amp reading will tell you if there is one two, three or four elements which are not heating. If the amp draw is low, test for power to the heating elements. Power found – replace the element or if no power is found Relay #2 may be bad. The resistance of each heating element can be tested to determine if it is functional.

The normal E-TES 240 outlet temperature should be 30-40 degrees higher than the ambient air temperature entering the air mover. Turning the speed of the air mover to its lowest setting and restricting the air flow will slow the velocity of the air flow through the heating elements allowing the temperature to increase more, as long as there is still sufficient flow to keep the air flow switch activated.