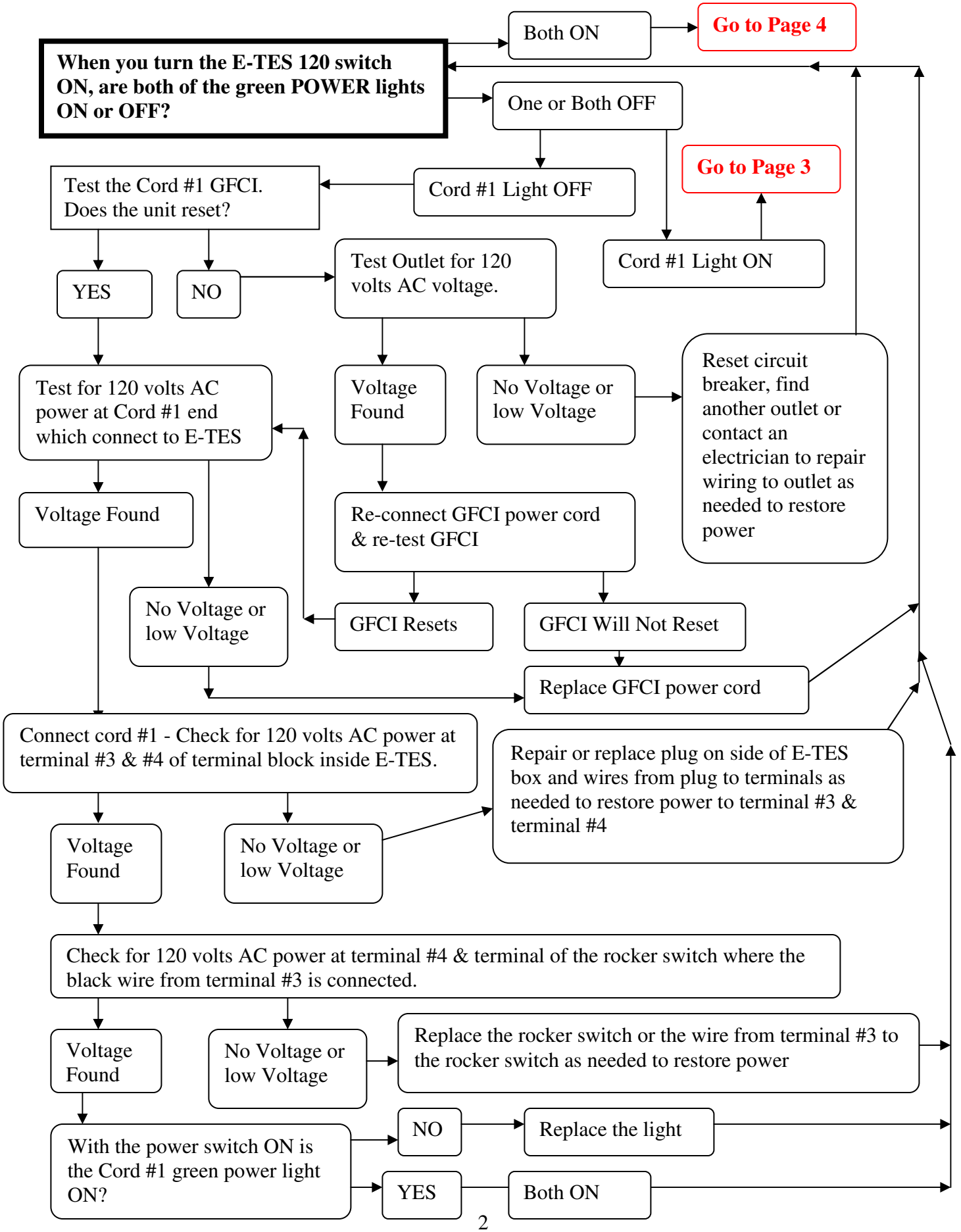
PAGE 1

This document outlines questions to ask and components to check during E-TES 120 troubleshooting. More detailed troubleshooting procedures are available in the E-TES 120 Troubleshooting Guide.

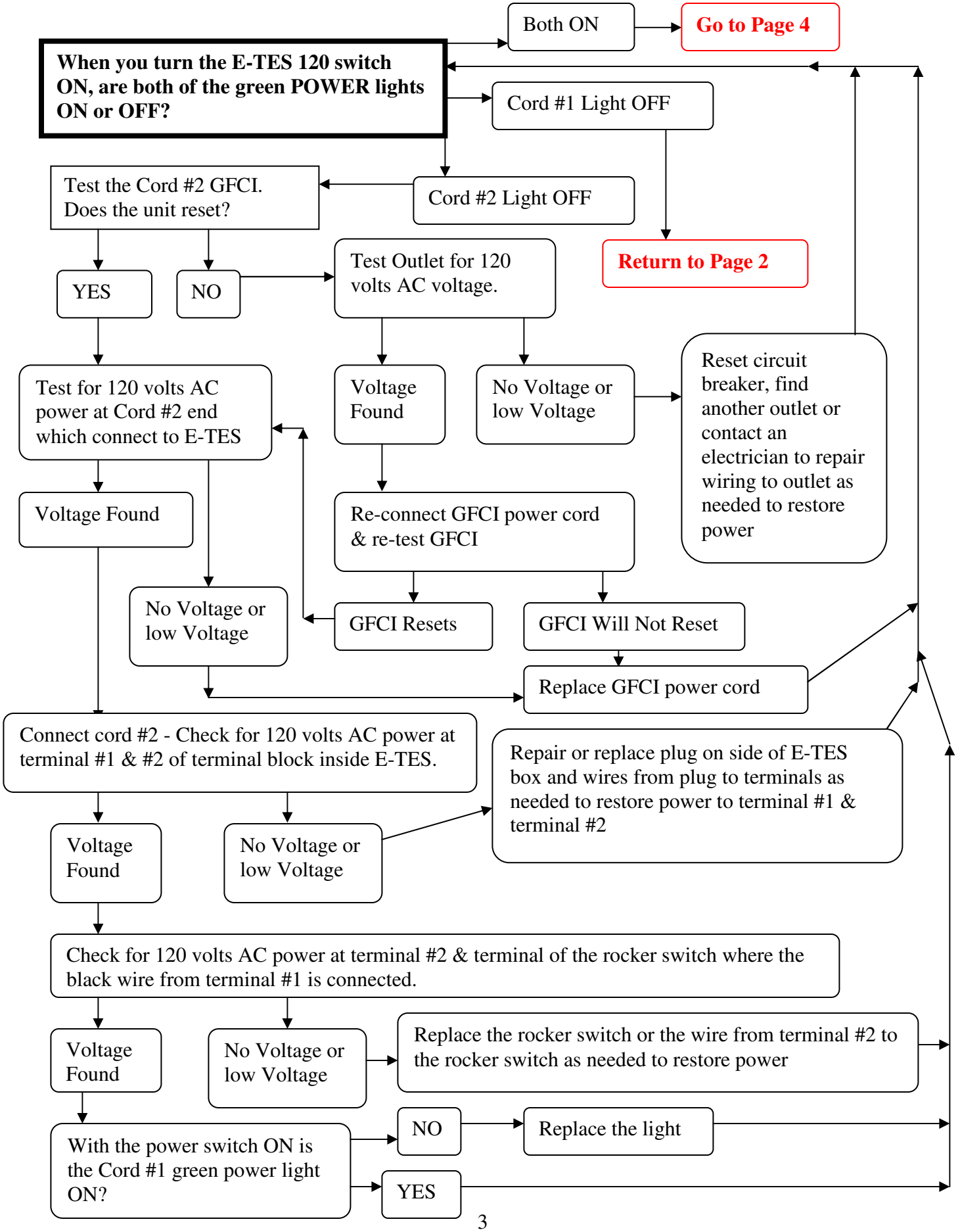
E-TES 120 Operation & Testing Guidelines:

1. **Before Running E-TES 120 unit be sure you have two separate circuits with the correct voltage and amperage rating for operating the E-TES 120. (120 Volts AC – Minimum 20amp rating)**
2. **Both power cords must be connected & powered to operate the E-TES 120.**
3. **Air Mover must be the correct size to fit into the opening on top of the E-TES.**
4. **A clamp on amp meter is required to test amp draw.**
5. **A multimeter is required to check continuity, resistance & voltage.**
6. **Your outlet voltage may vary. The E-TES 120 will still operate, but 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

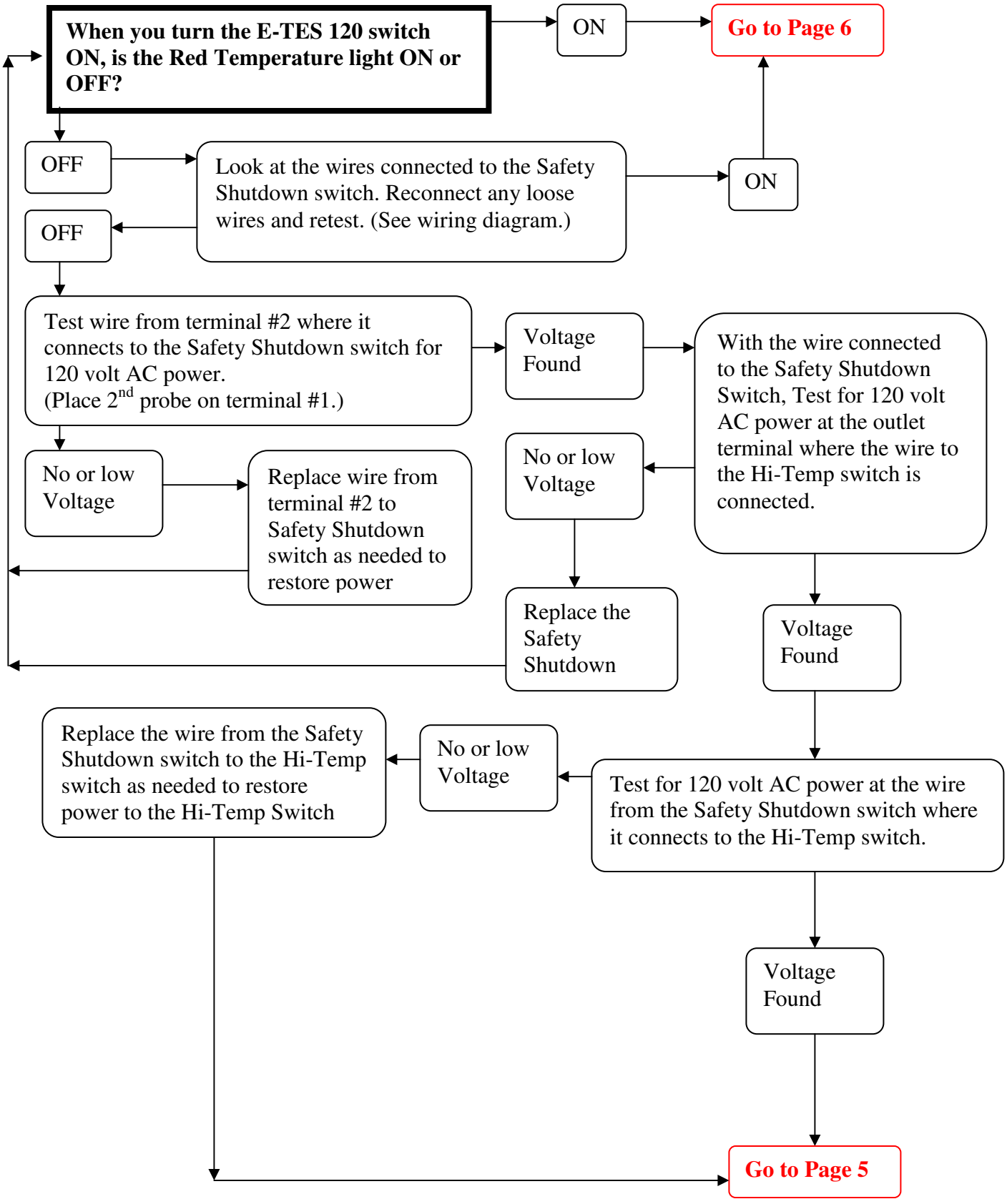

When you turn the E-TES 120 switch ON, are both of the green POWER lights ON or OFF?
Both ON
Go to Page 4
One or Both OFF
Go to Page 3
Cord #1 Light OFF
Cord #1 Light ON
Test the Cord #1 GFCI. Does the unit reset?
YES
NO
Test Outlet for 120 volts AC voltage.
Test for 120 volts AC power at Cord #1 end which connect to E-TES
Voltage Found
No Voltage or low Voltage
Reset circuit breaker, find another outlet 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
Connect cord #1 - Check for 120 volts AC power at terminal #3 & #4 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 #3 & terminal #4
Voltage Found
No Voltage or low Voltage
Check for 120 volts AC power at terminal #4 & terminal of the rocker switch where the black wire from terminal #3 is 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 Cord #1 green power light ON?
NO
Replace the light
YES
Both ON

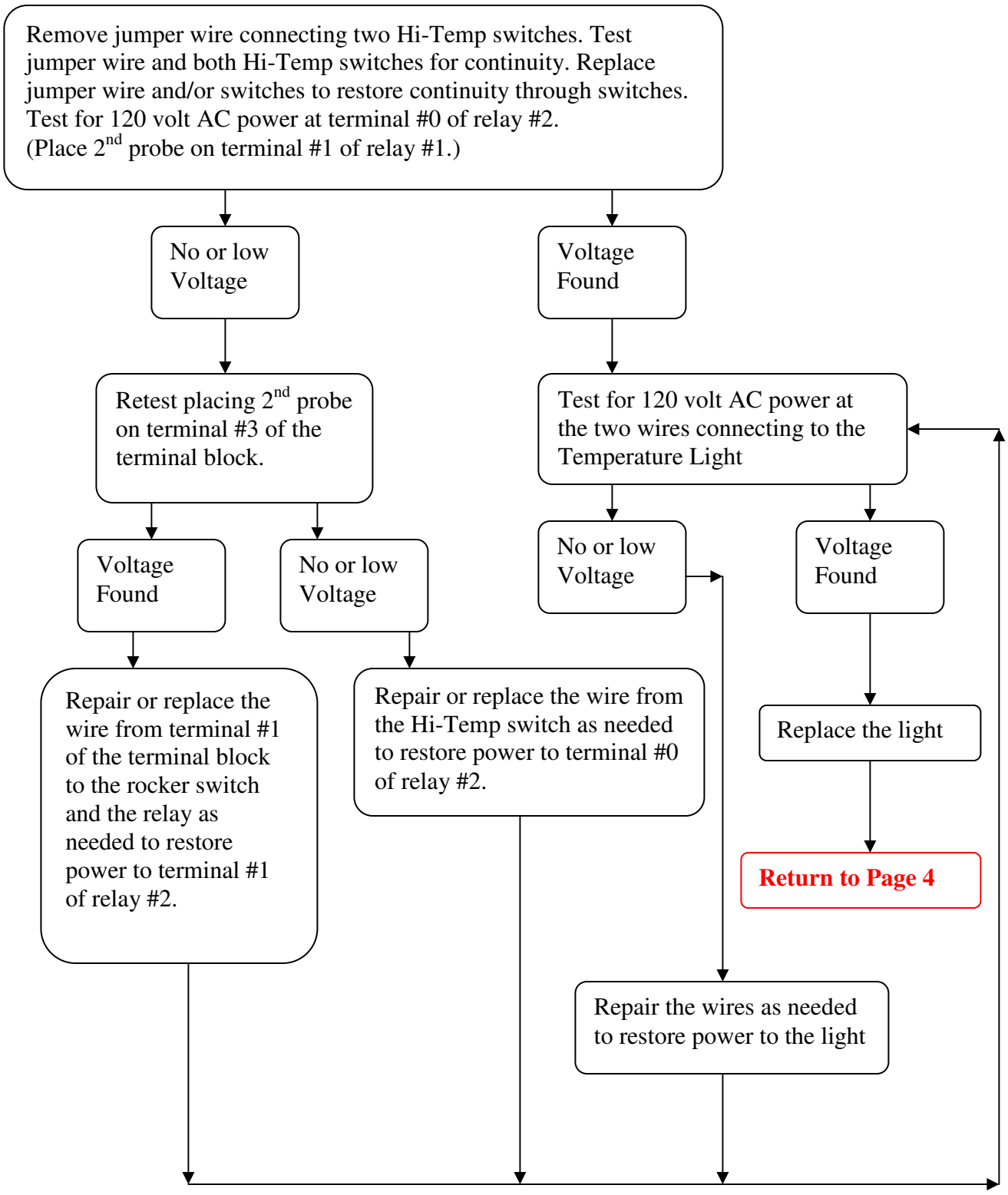
PAGE 3

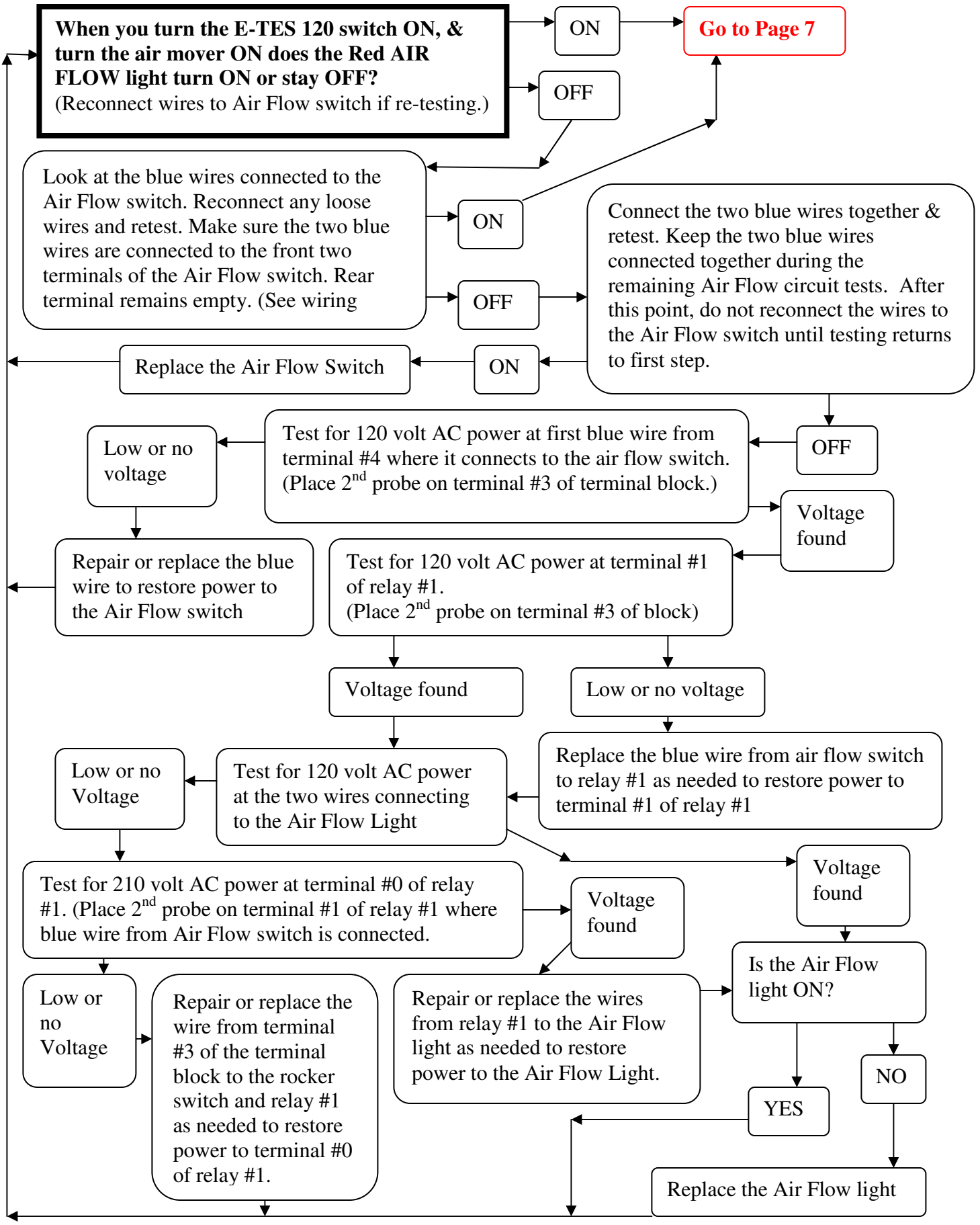

When you turn the E-TES 120 switch ON, are both of the green POWER lights ON or OFF?
Both ON
Go to Page 4
Cord #1 Light OFF
Cord #2 Light OFF
Return to Page 2
Test the Cord #2 GFCI. Does the unit reset?
YES
NO
Test Outlet for 120 volts AC voltage.
Voltage Found
No Voltage or low Voltage
Reset circuit breaker, find another outlet or contact an electrician to repair wiring to outlet as needed to restore power
Test for 120 volts AC power at Cord #2 end which connect to E-TES
Voltage Found
No Voltage or low Voltage
Re-connect GFCI power cord & re-test GFCI
GFCI Resets
GFCI Will Not Reset
Replace GFCI power cord
Connect cord #2 - Check for 120 volts AC power at terminal #1 & #2 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 #1 & terminal #2
Voltage Found
No Voltage or low Voltage
Check for 120 volts AC power at terminal #2 & terminal of the rocker switch where the black wire from terminal #1 is connected.
Voltage Found
No Voltage or low Voltage
Replace the rocker switch or the wire from terminal #2 to the rocker switch as needed to restore power
With the power switch ON is the Cord #1 green power light ON?
NO
Replace the light
YES

PAGE 4

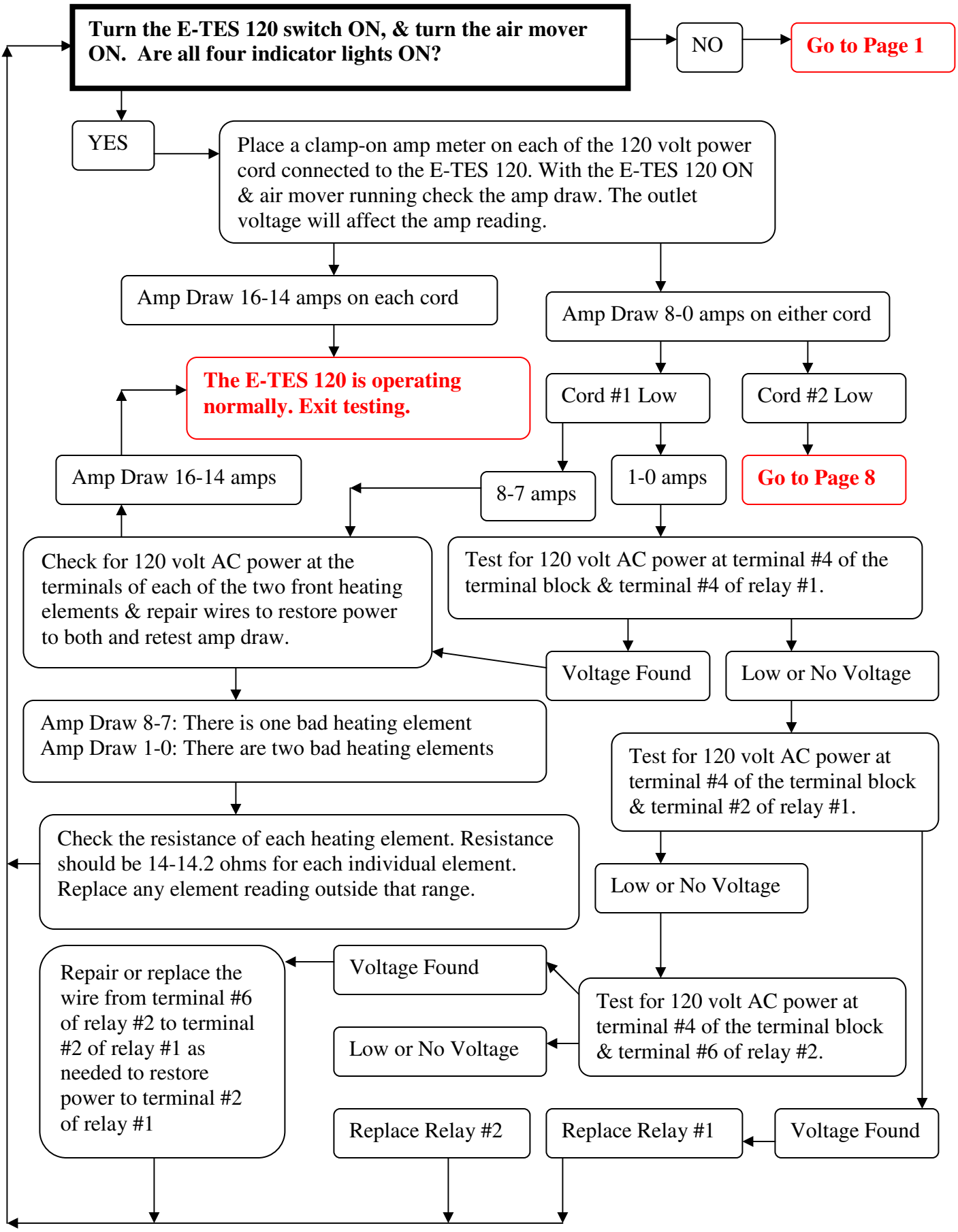
E-TES 120 Trouble shooting



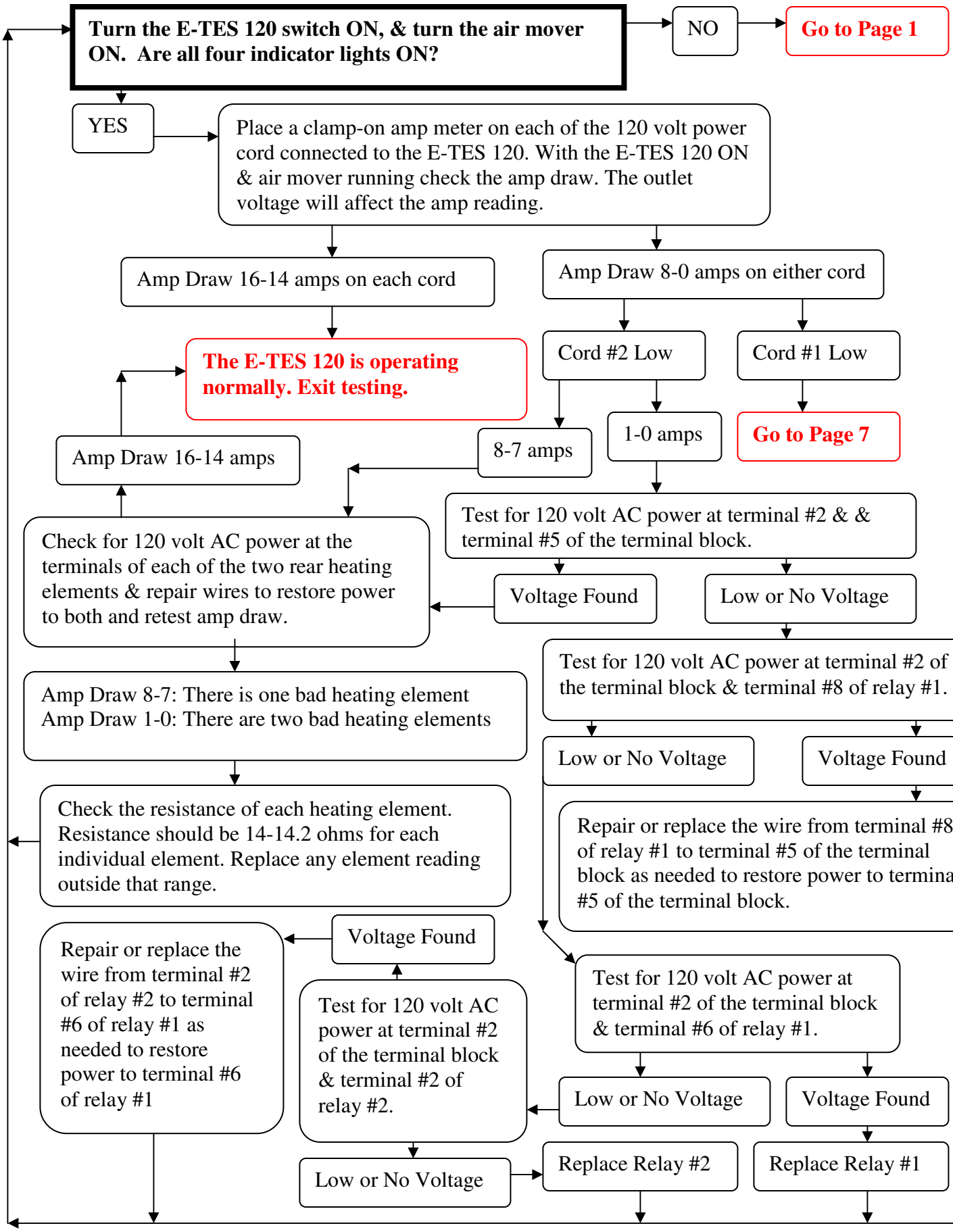

Remove jumper wire connecting two Hi-Temp switches. Test jumper wire and both Hi-Temp switches for continuity. Replace jumper wire and/or switches to restore continuity through switches. Test for 120 volt AC power at terminal #0 of relay #2. (Place 2nd probe on terminal #1 of relay #1.)
No or low Voltage
Voltage Found
Retest placing 2nd probe on terminal #3 of the terminal block.
Test for 120 volt AC power at the two wires connecting to the Temperature Light
Voltage Found
No or low Voltage
No or low Voltage
Voltage Found
Repair or replace the wire from terminal #1 of the terminal block to the rocker switch and the relay as needed to restore power to terminal #1 of relay #2.
Repair or replace the wire from the Hi-Temp switch as needed to restore power to terminal #0 of relay #2.
Replace the light
Return to Page 4
Repair the wires as needed to restore power to the light


When you turn the E-TES 120 switch ON, & turn the air mover ON does the Red AIR FLOW light turn ON or stay OFF?
(Reconnect wires to Air Flow switch if re-testing.)
ON
Go to Page 7
OFF
Look at the blue 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
ON
OFF
Connect the two blue wires together & retest. Keep the two blue wires connected together during the remaining Air Flow circuit tests. After this point, do not reconnect the wires to the Air Flow switch until testing returns to first step.
Replace the Air Flow Switch
ON
OFF
Low or no voltage
Test for 120 volt AC power at first blue wire from terminal #4 where it connects to the air flow switch. (Place 2nd probe on terminal #3 of terminal block.)
Voltage found
Repair or replace the blue wire to restore power to the Air Flow switch
Test for 120 volt AC power at terminal #1 of relay #1. (Place 2nd probe on terminal #3 of block)
Voltage found
Low or no voltage
Low or no Voltage
Test for 120 volt AC power at the two wires connecting to the Air Flow Light
Replace the blue wire from air flow switch to relay #1 as needed to restore power to terminal #1 of relay #1
Voltage found
Test for 210 volt AC power at terminal #0 of relay #1. (Place 2nd probe on terminal #1 of relay #1 where blue wire from Air Flow switch is connected.
Voltage found
Is the Air Flow light ON?
Low or no Voltage
Repair or replace the wire from terminal #3 of the terminal block to the rocker switch and relay #1 as needed to restore power to terminal #0 of relay #1.
Repair or replace the wires from relay #1 to the Air Flow light as needed to restore power to the Air Flow Light.
NO
YES
Replace the Air Flow light

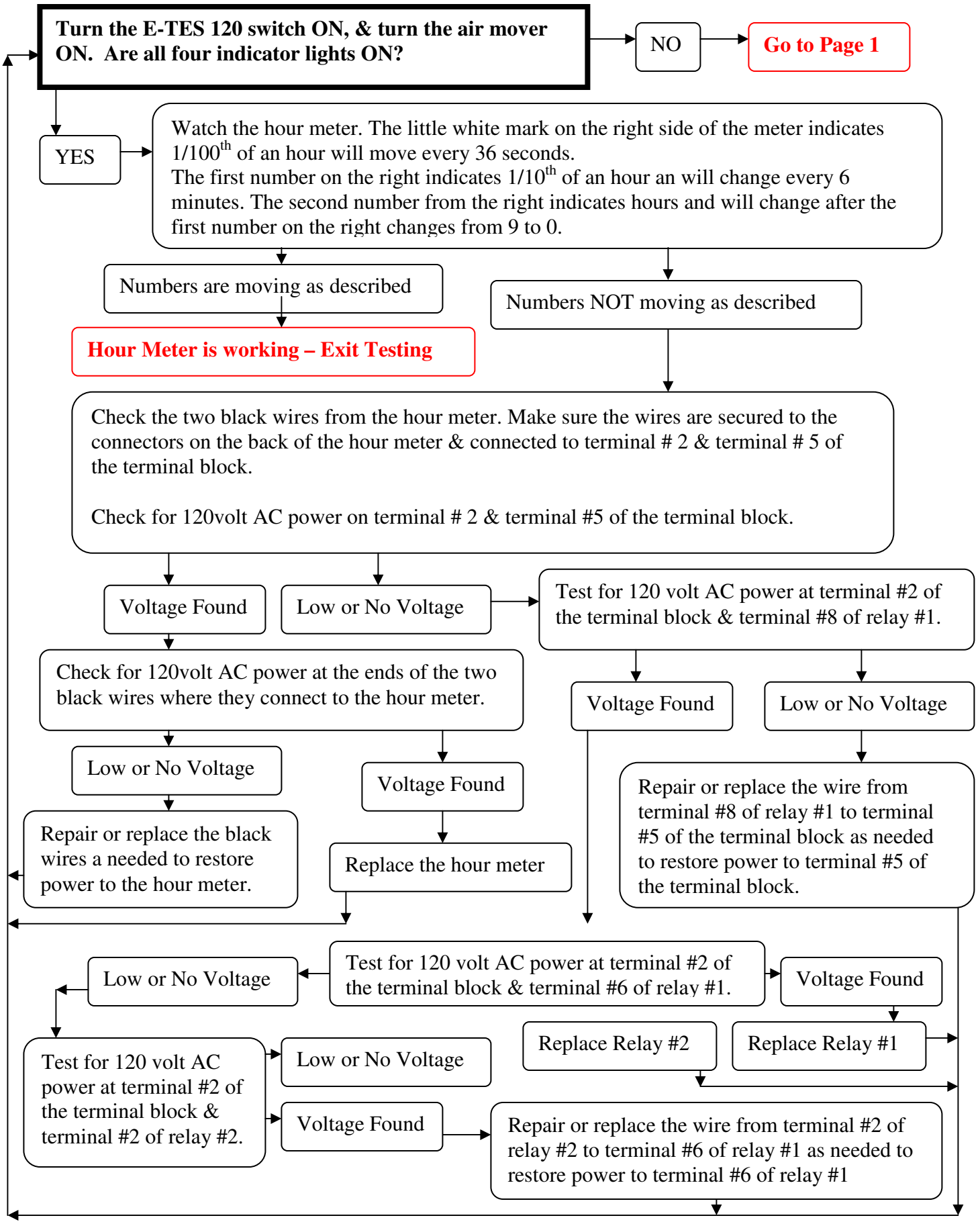
PAGE 7


Turn the E-TES 120 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 each of the 120 volt power cord connected to the E-TES 120. With the E-TES 120 ON & air mover running check the amp draw. The outlet voltage will affect the amp reading.
Amp Draw 16-14 amps on each cord
Amp Draw 8-0 amps on either cord
The E-TES 120 is operating normally. Exit testing.
Cord #1 Low
Cord #2 Low
Amp Draw 16-14 amps
8-7 amps
1-0 amps
Go to Page 8
Check for 120 volt AC power at the terminals of each of the two front heating elements & repair wires to restore power to both and retest amp draw.
Test for 120 volt AC power at terminal #4 of the terminal block & terminal #4 of relay #1.
Voltage Found
Low or No Voltage
Amp Draw 8-7: There is one bad heating element
Amp Draw 1-0: There are two bad heating elements
Test for 120 volt AC power at terminal #4 of the terminal block & terminal #2 of relay #1.
Check the resistance of each heating element. Resistance should be 14-14.2 ohms for each individual element. Replace any element reading outside that range.
Low or No Voltage
Repair or replace the wire from terminal #6 of relay #2 to terminal #2 of relay #1 as needed to restore power to terminal #2 of relay #1
Voltage Found
Test for 120 volt AC power at terminal #4 of the terminal block & terminal #6 of relay #2.
Low or No Voltage
Replace Relay #2
Replace Relay #1
Voltage Found

PAGE 8


Turn the E-TES 120 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 each of the 120 volt power cord connected to the E-TES 120. With the E-TES 120 ON & air mover running check the amp draw. The outlet voltage will affect the amp reading.
Amp Draw 16-14 amps on each cord
Amp Draw 8-0 amps on either cord
The E-TES 120 is operating normally. Exit testing.
Cord #2 Low
Cord #1 Low
Amp Draw 16-14 amps
8-7 amps
1-0 amps
Go to Page 7
Test for 120 volt AC power at terminal #2 & & terminal #5 of the terminal block.
Check for 120 volt AC power at the terminals of each of the two rear heating elements & repair wires to restore power to both and retest amp draw.
Voltage Found
Low or No Voltage
Test for 120 volt AC power at terminal #2 of the terminal block & terminal #8 of relay #1.
Amp Draw 8-7: There is one bad heating element
Amp Draw 1-0: There are two bad heating elements
Low or No Voltage
Voltage Found
Check the resistance of each heating element. Resistance should be 14-14.2 ohms for each individual element. Replace any element reading outside that range.
Repair or replace the wire from terminal #8 of relay #1 to terminal #5 of the terminal block as needed to restore power to terminal #5 of the terminal block.
Repair or replace the wire from terminal #2 of relay #2 to terminal #6 of relay #1 as needed to restore power to terminal #6 of relay #1
Voltage Found
Test for 120 volt AC power at terminal #2 of the terminal block & terminal #2 of relay #2.
Test for 120 volt AC power at terminal #2 of the terminal block & terminal #6 of relay #1.
Low or No Voltage
Voltage Found
Low or No Voltage
Replace Relay #2
Replace Relay #1

PAGE 9


Turn the E-TES 120 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 # 2 & terminal # 5 of the terminal block.
Check for 120volt AC power on terminal # 2 & terminal #5 of the terminal block.
Voltage Found
Low or No Voltage
Test for 120 volt AC power at terminal #2 of the terminal block & terminal #8 of relay #1.
Check for 120volt AC power at the ends of the two black wires where they connect to the hour meter.
Voltage Found
Low or No Voltage
Low or No Voltage
Voltage Found
Repair or replace the wire from terminal #8 of relay #1 to terminal #5 of the terminal block as needed to restore power to terminal #5 of the terminal block.
Repair or replace the black wires a needed to restore power to the hour meter.
Replace the hour meter
Low or No Voltage
Test for 120 volt AC power at terminal #2 of the terminal block & terminal #6 of relay #1.
Voltage Found
Test for 120 volt AC power at terminal #2 of the terminal block & terminal #2 of relay #2.
Low or No Voltage
Voltage Found
Replace Relay #2
Replace Relay #1
Repair or replace the wire from terminal #2 of relay #2 to terminal #6 of relay #1 as needed to restore power to terminal #6 of relay #1

E-TES 120 Trouble shooting

Not Heating: What lights are ON?

No Lights are ON (Page 2):

Circuit Breaker – No power at Outlets
GFCI's not reset
GFCI cords bad
Loose wires / Bad wires
Bad Rocker switch
Bad Cord #1 Power Light (GREEN)
Bad Cord #2 Power Light (GREEN)

Cord #1 Power Light OFF (Page 2):

Circuit Breaker – No power at Outlet
GFCI not reset
GFCI cord bad
Loose wires / Bad wires
Bad Rocker switch
Bad Cord #1 Power Light (GREEN)

Cord #2 Power Light OFF (Page 3):

Circuit Breaker – No power at Outlet
GFCI not reset
GFCI cord bad
Loose wires / Bad wires
Bad Rocker switch
Bad Cord #2 Power Light (GREEN)

The most common cause would be the failure to reset the GFCI's on the power cords, or plugging into outlets which are not powered. The E-TES 120 will not operate unless power is supplied by both cords. If the outlets have power the GFCI's should be set & tested before the GFCI cords are connected to the E-TES. If the GFCI's do not reset, the cords will need to be replaced. (NM4407)

After checking outlets & cords, proceed to other tests as needed.

Temperature Lights OFF (Page 4):

Safety Shutdown Switch Bad
Hi-Temp Switches Bad
Loose Wires / Bad Wires
Bad Temperature Light (RED)

The power from Cord #2 goes to terminal #2 of the terminal block & has to flow through both the Safety Shutdown temperature switch and both of the 250˚F temperature switches to turn on the Temperature light. Check the continuity through the switches & replace the switches, wires or light as needed.

E-TES 120 Trouble shooting

Air Flow Light OFF (Page 6):

No or low Air Flow
Air Flow Switch
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. The power from Cord #1 goes to terminal #4 of the terminal block & has to flow through the air flow switch to turn on the Air Flow light. Check the continuity through the switch & replace the switches, wires or light as needed.

All Lights ON – Not Heating (Page 8):

Relay #1 Bad
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 14-17amps per cord the unit is operating properly. If the amp draw is low, test for power to the heating elements. Power found – replace the element or if no power is found the relays may be bad. Cord #1 & Relay #1 power the front two heating elements while Cord #2 & Relay #2 power the back two heating elements. The resistance of each heating element can be tested to determine if it is functional. The power flow though each relay can & switching power to the relay can be tested to see if the relays are functional.

The normal E-TES 120 outlet temperature should be 20-30 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.