

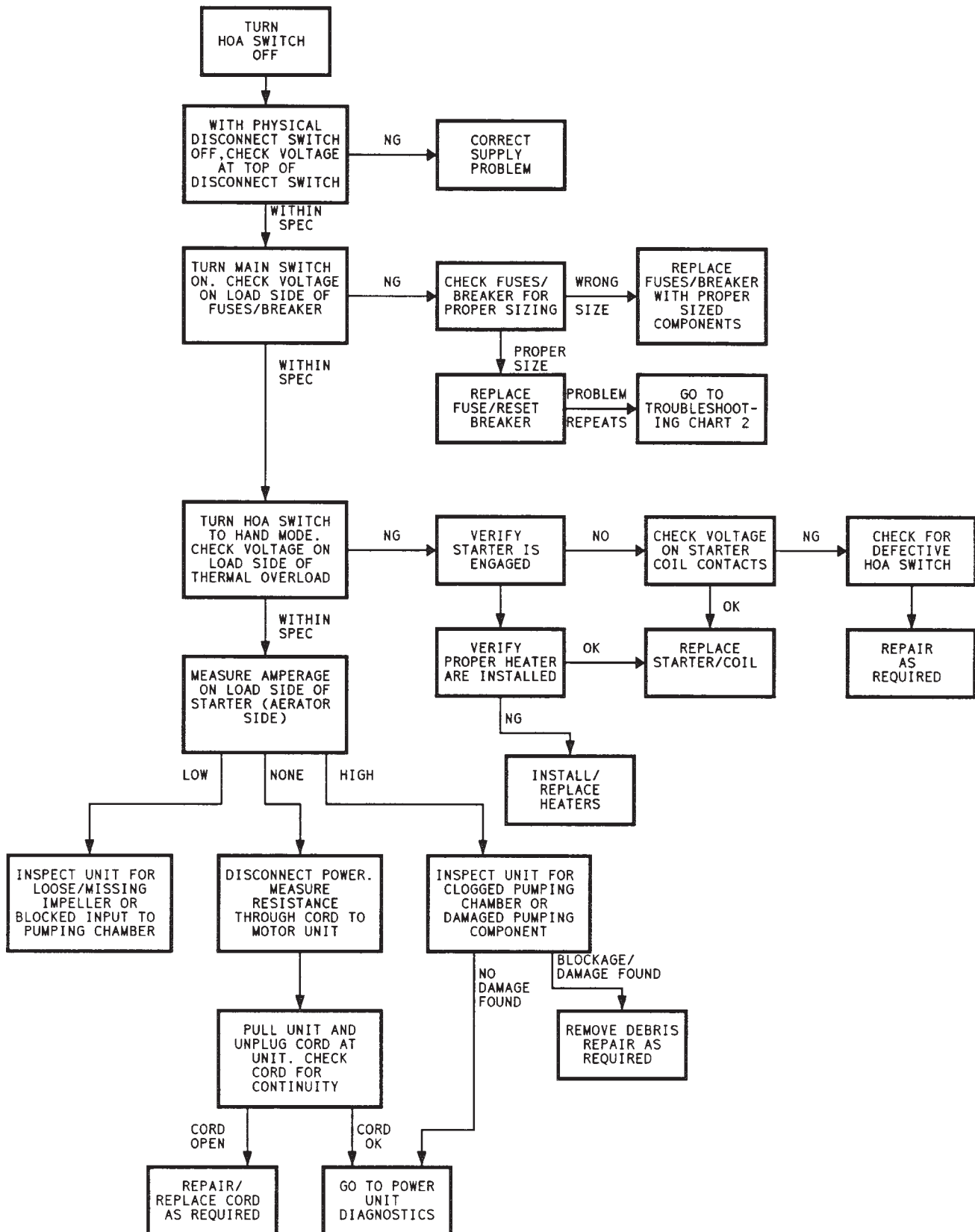
Trouble Shooting Chart Index

These troubleshooting charts are provided to serve as a guide in locating the cause of failure. The flowcharts are designed to locate the fault in an orderly manner. Other charts are formatted, listing the major symptoms, causes, and systematic order of repair.

Unit Not Operating -	No Symptoms	7
Unit Not Operating -	Circuit Breaker Trips/Fuse Blown/GFI Trips	8
Unit Not Operating -	Starter Trips	9
Unit Not Operating -	Unit Hums	10
Abnormal Operation -	High Amperage/Current	11
Abnormal Operation -	Low Amperage/Current	12
Abnormal Operation -	Operates in Manual Mode Only	13
Abnormal Operation -	Starter Relay Coil Chatters/Hums	14
Abnormal Operation -	Unit Rotates	15
Abnormal Operation -	Excessive Vibration	15
Abnormal Spray Pattern -	Thin/Weak Spray Pattern (Cavitation)	16
Abnormal Spray Pattern -	Uneven Spray Pattern (Sunburst Model)	17
Abnormal Spray Pattern -	Uneven Spray Pattern (Rocket/Phoenix Model)	18
Abnormal Spray Pattern -	Low Spray Pattern	19
Abnormal Spray Pattern -	Fluctuating Spray Pattern	20
Abnormal Spray Pattern -	Enlarged/Heavy Spray Pattern	21
Abnormal Spray Pattern -	No Spray	21
Quick Check -	Chart	22

TROUBLESHOOTING CHART #1 UNIT NOT OPERATING - NO SYMPTOMS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

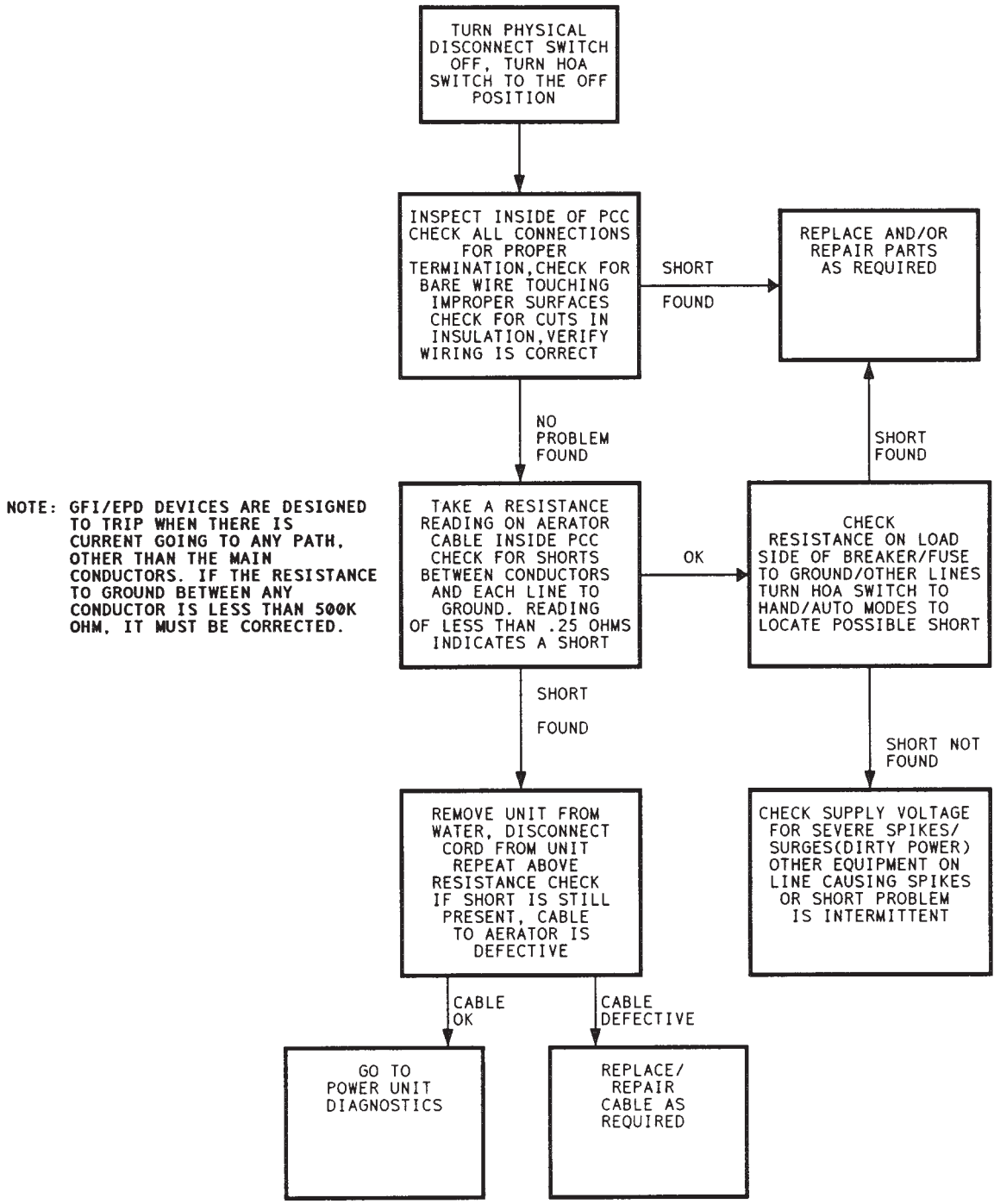


TROUBLESHOOTING CHART #2

UNIT NOT OPERATING - CIRCUIT BREAKER TRIPS/FUSE BLOWN GFCI/EPD DEVICE TRIPS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

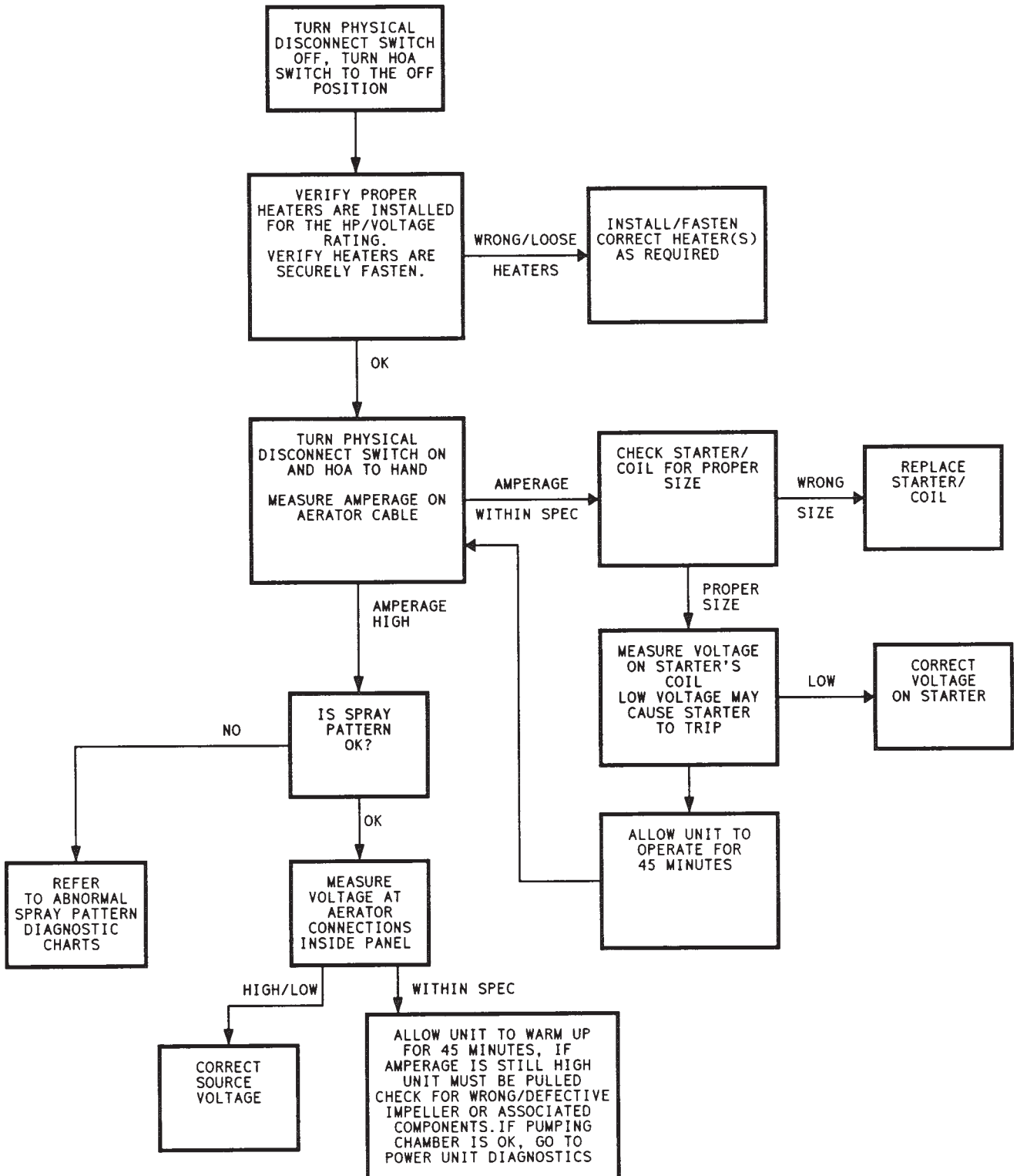
NOTE: CIRCUIT BREAKER AND FUSES ARE DESIGNED TO PROTECT AGAINST DIRECT SHORTS BETWEEN THE LINES OR TO GROUND IF THE PROBLEM IS INTERMITTENT, USE OF A FAST RESPONSE OHM METER IS RECOMMENDED TO LOCATE THE SHORT



TROUBLESHOOTING CHART #3 UNIT NOT OPERATING - STARTER TRIPS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

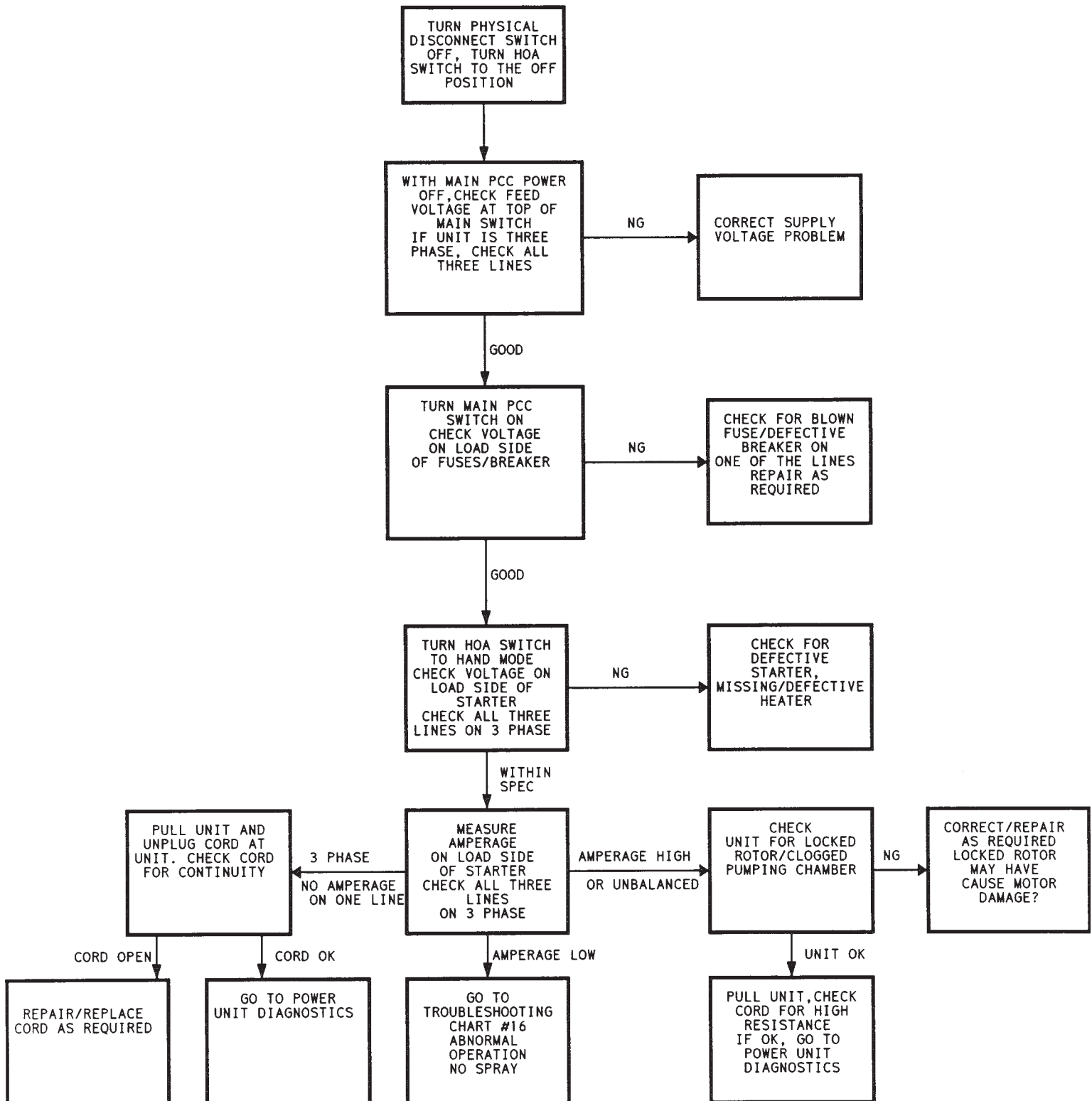
NOTE: THE THERMAL OVERLOAD IS DESIGNED TO PROTECT THE MOTOR FROM OPERATING AT HIGHER THAN NOMINAL CURRENT USING A THERMAL OVERLOAD OF A HIGHER RATING MAY CAUSE MOTOR FAILURE



TROUBLESHOOTING CHART #4 UNIT NOT OPERATING - UNIT HUMS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

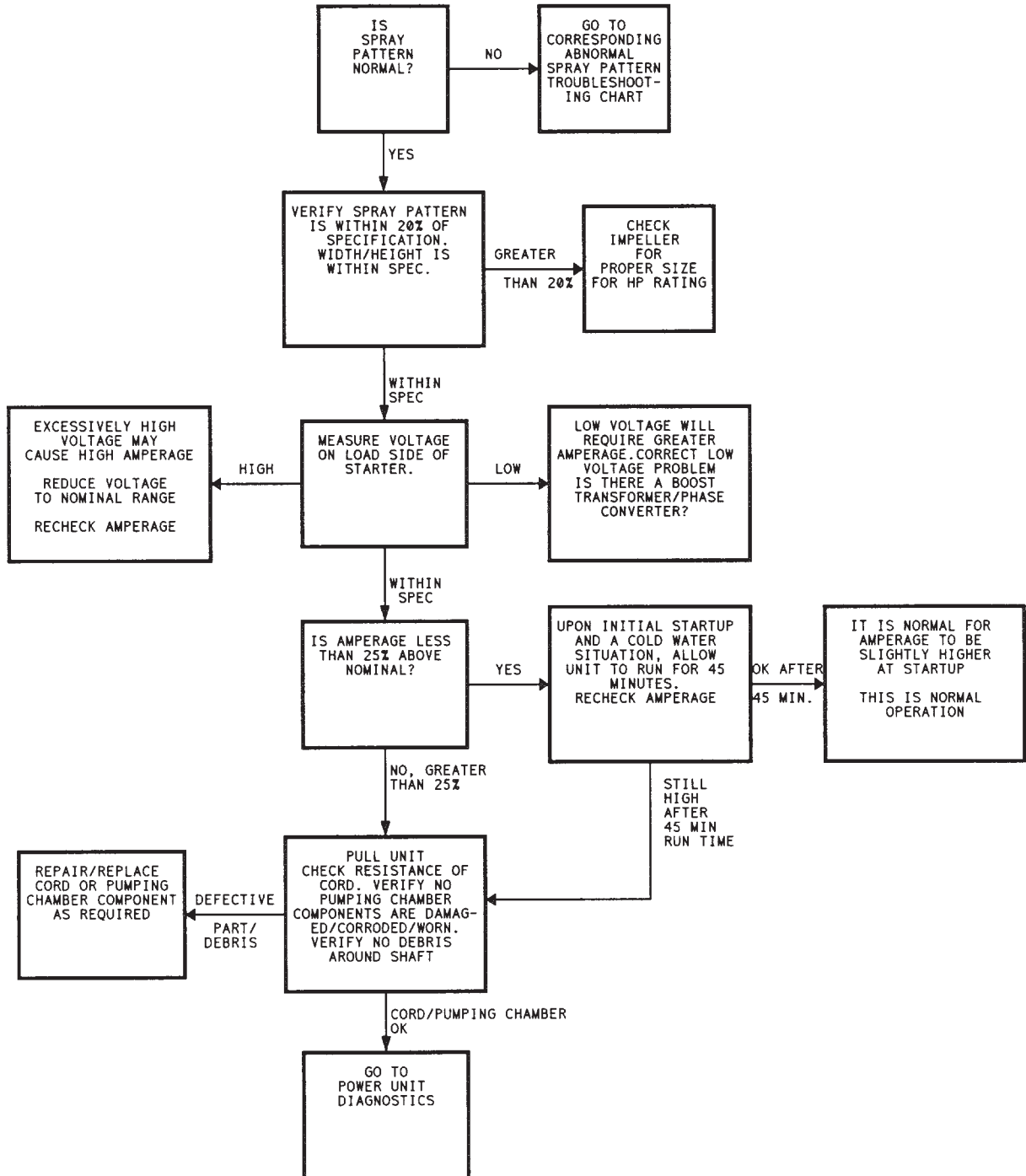
NOTE: IF THE UNIT HUMS AND NO SPRAY IS PRESENT, THE POWER SHOULD BE IMMEDIATELY DISCONNECTED TO PREVENT POSSIBLE DAMAGE TO THE UNIT
SINGLE PHASING ON THREE PHASE UNITS IS A MAJOR CAUSE OF THIS PROBLEM.



TROUBLESHOOTING CHART #5 ABNORMAL OPERATION - HIGH AMPERAGE/CURRENT

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST BE PERFORMED BY QUALIFIED PERSONNEL.

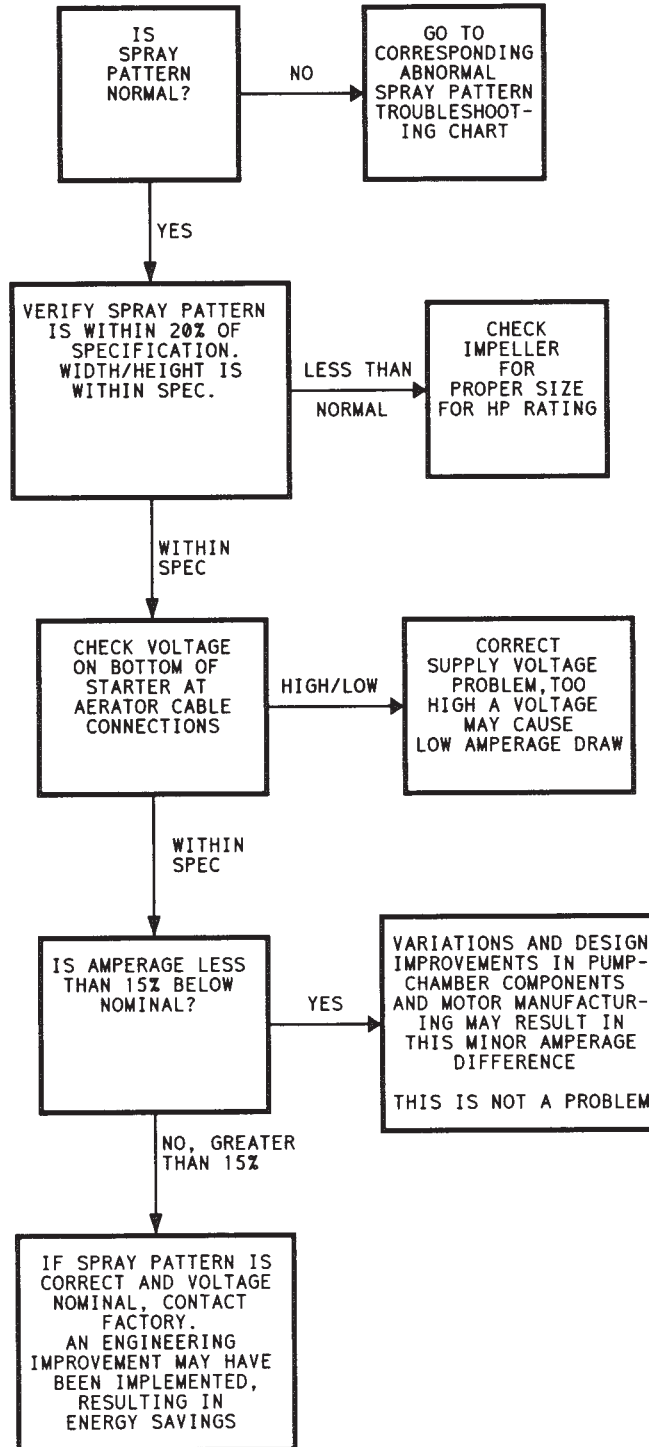
NOTE: A UNIT RUNNING CONSTANTLY AT HIGH AMPERAGE MAY CAUSE OVERHEATING. THERMAL OVERLOADS ARE DESIGNED TO DISCONNECT POWER WHEN HIGH AMPERAGE IS PRESENT. DO NOT CONTINUOUSLY RESET THE STARTER TO ALLOW UNIT TO OPERATE. VERIFY CORRECT HEATERS ARE INSTALLED SECURELY AND FIND CAUSE OF HIGH AMPERAGE



TROUBLESHOOTING CHART # 6

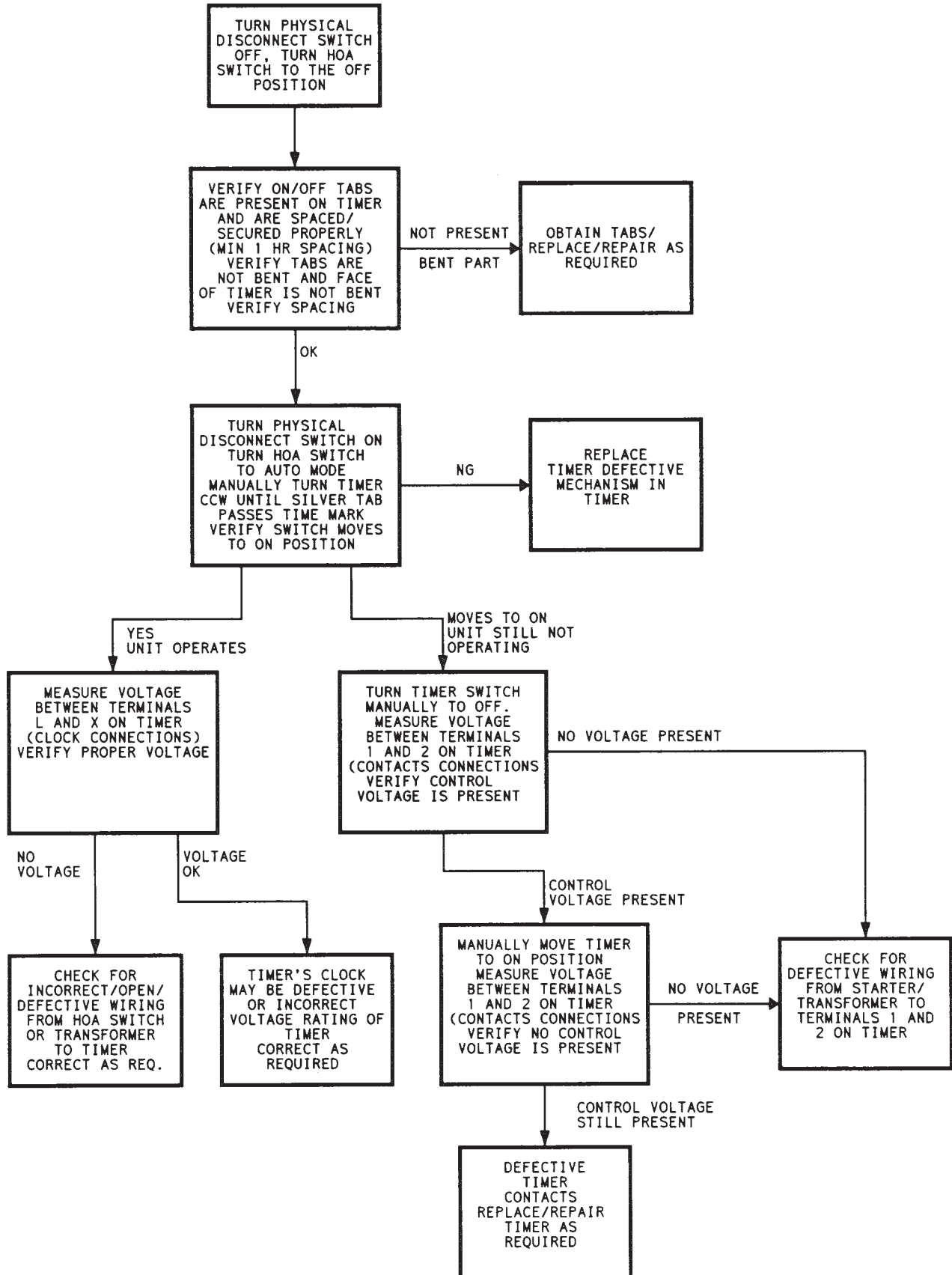
ABNORMAL OPERATION - LOW AMPERAGE/CURRENT

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.



TROUBLESHOOTING CHART #7 ABNORMAL OPERATION - OPERATES IN HAND MODE ONLY

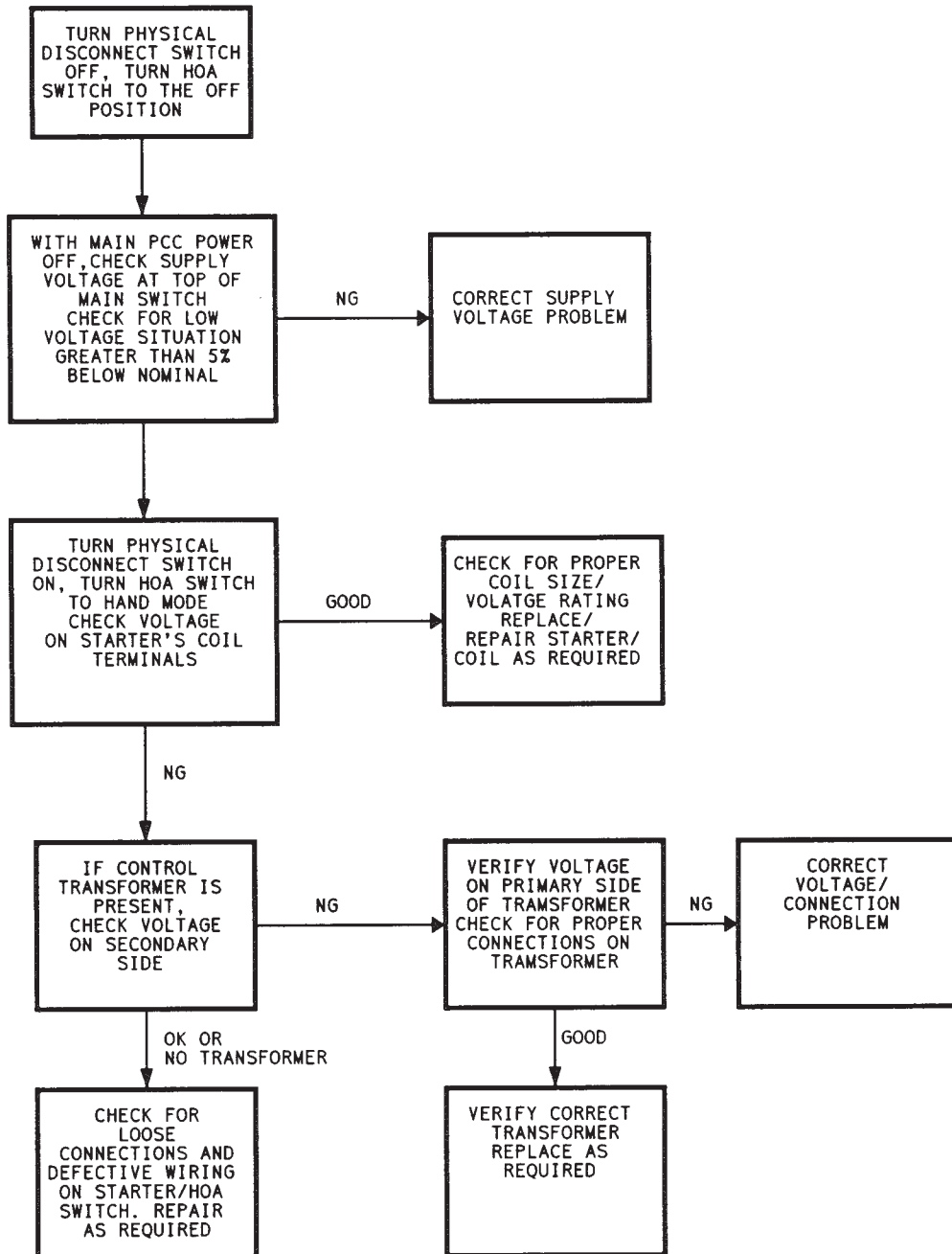
!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.



TROUBLESHOOTING CHART #8 ABNORMAL OPERATION - STARTER RELAY CHATTERS/HUMS

!! CAUTION !! THIS DIAGNOSIS REQUIRES MEASUREMENTS OF VOLTAGES AND CURRENTS TO BE MADE WITH THE POWER PANEL OPEN. THIS PROCEDURE MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL.

NOTE: IF THE STARTER CHATTERS OR HUMS IS NORMALLY CAUSED BY LOW VOLTAGE ACROSS THE COIL OR THE COIL IS THE IMPROPER SIZE/RATING



Trouble Shooting Chart #9
Abnormal Operation - Unit Rotates

SYMPTOMS

- When unit is turned on, it rotates continually
- Units spins over 125 degrees when power is applied

CAUSES

- Improper anchoring / mooring of unit

SYSTEMATIC ORDER OF REPAIR

- Check that all anchor/mooring lines are attached
- Verify anchor/mooring lines are attached per installation guidelines. Float must be free only to rotate a maximum of 90 degrees.
- Verify unit is not touching bottom
- Check that the anchors are not too close together, refer to installation guidelines for minimum distance between anchors

Trouble Shooting Chart #10
Abnormal Operation - Excessive Vibration

SYMPTOMS

- While operating, excessive vibration is detected (unit shaking)
- High amperage draw

CAUSES

- Loose/broken motor mount bolts
- Bent motor shaft/impeller
- Broken impeller/slinger disc/support arm
- Debris caught on motor shaft
- Wrong size/type impeller

SYSTEMATIC ORDER OF REPAIR

- Inspect impeller/pumping chamber for debris/damage
- Verify proper components in pumping chamber. Verify parts are assembled correctly
- Inspect support arms assembly. Is assembly intact, bolts snug, no cracks?
- Inspect motor shaft. Is it bent?

Trouble Shooting Chart #11 **Thin/Weak Spray Pattern - Cavitation**

SYMPTOMS

- Very weak and wispy looking spray
- Bubbles escaping from beneath float
- Lower than normal amperage draw (low amps)
- Spray pattern will look normal then suddenly become weak and wispy
- When aerator is turned off and back on, spray will return to normal for some period of time

CAUSES

Air is building up inside the pumping chamber until the chamber becomes air blocked, resulting in ventilation and/or cavitation created by:

- Improper impeller/slinger disc/spacer (SNB)
- Clogged/damaged pumping chamber/screen
- Unit is resting on bottom
- Vent hole in throat clogged (SNB)
- Air entering chamber between throat sections (SNB)
- Excessive wave action (high winds/boat traffic)
- Improper anchoring or mooring

SYSTEMATIC ORDER OF REPAIR

- Verify anchor/mooring lines are attached per owner's manual. One side may be pulling the float down in the water, float must be free to rotate 90 degrees. High waves may cause air to enter beneath float if not anchored/moored properly
- Verify unit is not touching bottom
- Inspect for clogged screen/pumping chamber
- Inspect throat assembly. Verify silicon sealant is intact around throat sections. Verify 1/8" vent hole in throat is open to relieve any trapped air (SNB)
- Inspect impeller assembly for proper size, missing washer or wrong size spacer
- Inspect impeller assembly for damage. Replace (not repair) any bent or damaged components

Trouble Shooting Chart #12A
Uneven Spray Pattern (Sunburst Models)

SYMPTOMS

- Spray pattern is not centered around float
- Spray pattern is higher on one side

CAUSES

- Unit is anchored/moored improperly
- Impeller assembly is not centered in throat
- Unit is resting on bottom

SYSTEMATIC ORDER OF REPAIR

- Verify anchor/mooring lines are attached per owner's manual. One side may be pulling the float down in the water, float must be free to rotate 90 degrees.
- Verify unit is not touching bottom, if touching shorter support arms are available
- Inspect impeller and throat assembly. Verify impeller is centered in throat. If not:
 - a) If unit has adjustable support arm, adjust as required to center impeller
 - b) For units without adjustable arm, remove support arms and rotate throat assembly and/or arms to obtain best centering of impeller

Trouble Shooting Chart #12B
Uneven Spray Pattern (Phoenix/Rocket Models)

SYMPTOMS

- Spray pattern is not full
- Side spray in addition to center spray is present (RKT)
- Outer spray pattern is heavy on one side. Center spray is off axis (PHX)
- Outer spray pattern is empty at some locations (PHX)
- Outer pattern is not centered around float (PHX)

CAUSES

- Unit is anchored/moored improperly
- Clogged pumping chamber
- Unit is resting on bottom
- Improper assembly of diffuser plate
- Diffuser plates o-ring missing or damaged (RKT)
- Badly deteriorated diffuser plate

SYSTEMATIC ORDER OF REPAIR

- Verify anchor/mooring lines are attached per owner's manual. One side may be pulling the float down in the water, float must be free to rotate 90 degrees.
- Verify unit is not touching bottom, shorter support arms are available
- Inspect diffuser plate. Check for damaged plate/ debris in holes. Clean/replace as required. Do not over tighten nylon lock nut.
- Inspect diffuser o-ring. Replace as necessary (RKT)

Trouble Shooting Chart #13

Low Spray Pattern

SYMPTOMS

- Spray pattern has good shape, but is 75% or less of the specified dimensions
- Draws less than normal amperage (low amps)
- Unit has a lower than specified pumping rate
- Unit is only bubbling out water at a decreased rate

CAUSES

- Clogged screen
- Unit riding high in water, resting on bottom of body of water
- Slinger disc is missing (SNB)
- Unit is operating backwards (3 phase units)
- Clogged lower decorative prop chamber (RKT,PHX)
- Unit has the wrong size impeller or damaged impeller

SYSTEMATIC ORDER OF REPAIR

- Verify unit is not setting on bottom
- Check amperage draw
- Inspect screen assembly and pumping chamber for debris. Clean as required.
- Inspect impeller assembly, replace or repair as required
- Verify slinger disc is present and of proper size, verify spacer is of proper size (SNB)
- On 3 phase units, check rotation of impeller. Verify impeller is turning counter clock wise when looking down at impeller.

Trouble Shooting Chart #14 **Fluctuating Spray Pattern**

SYMPTOMS

- Spray pattern suddenly drops and/or fades, then comes back to original size/shape.
- Spray pattern decreases and increases sporadically.

CAUSES

- High winds
- Low voltage, dirty power, (brown outs)
- Ventilation (HV)
- Debris caught in pumping chamber, very dirty water
- Clogged lower decorative prop chamber (RKT,PHX)
- Unit touching bottom of body of water

SYSTEMATIC ORDER OF REPAIR

- Check weather conditions, when unit's spray is fluctuating. Winds will blow spray pattern. A rocket will appear to drop and fall. A sunburst will either fall or appear distorted.
- Check for fluctuating water level; verify unit is not sporadically touching bottom
- Examine for uncommon amount of debris in water (leaves, vegetation, twigs)
- Verify slinger disc is in good shape (SNB)
- In high volume units (HV), there is a phenomenon called "ventilation". This occurs when the unit actually pushes more water than available and chokes itself. This incident normally corrects itself, if not refer to thin/weak spray pattern chart.
- Check site voltage. Is unit on same line as other equipment? Does site have history of brown outs?

Trouble Shooting Chart #15 Enlarged/Heavy Spray Pattern

SYMPTOMS

- Larger Spray Than Specification >20%
- Thicker Pattern Than Normal
- High Amperage Draw

CAUSES

- Wrong Impeller
- Throat damaged/missing (SNB)
- Diffuser Plate Openings Worn, Oversized (RKT,PHX)
- Damaged impeller/pumping chamber component
- Wrong spacer/slinger disc (SNB)
- Wrong power unit

SYSTEMATIC ORDER OF REPAIR

- Inspect diffuser plate; Are openings worn/deteriorated beyond specifications (RKT/PHX)
- Inspect impeller assembly; Does unit have correct size impeller/slinger disc/spacer?
- Check for damaged impeller assembly/throat

Trouble Shooting Chart #16 No Spray

SYMPTOMS

- Unit operates, but no spray can be detected
- Low amperage draw (low amps)

CAUSES

- Impeller missing/loose
- Unit has damaged shaft (SNB)
- Unit riding high in water, sitting on bottom of body of water

SYSTEMATIC ORDER OF REPAIR

- Verify unit is not setting on bottom
- Inspect impeller assembly, replace or repair as required

Trouble Shooting Guide

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>	<u>CORRECTION</u>
1) No bubbles in water discharge (Aspirating model only)	Clogged air hose Cut or broken hose Motor running clockwise Unit too deep	Remove debris Replace Hose Have electrician switch two wires at motor starter Move unit to shallower water
2) No water discharge	Debris around impeller Broken impeller	Remove debris Replace impeller
3) Aerator is wandering	Broken mooring line Loose mooring line Unit requires anchors	Replace broken line Tighten mooring line Add anchor kit
4) Severe vibration	Unit resting on bottom Broken impeller	Move to deeper water Replace impeller
5) Motor will not start	Blown fuse/breaker Relay has tripped Broken or disconnected wires GFCI device has tripped Short in power cable	Check fuses or breaker at P.C.C. Check if overload relay tripped Replace or connect wires Reset and test GFCI device. If device trips again, call electrician or authorized service center. Check condition of power cable

Note: Most problems will be found by pulling the aerator out of the water.

WARNING: DISCONNECT THE UNIT FROM THE POWER SOURCE BEFORE SERVICING THE UNIT!