

SECTION 6: Troubleshooting

6.1 GENERAL INFORMATION

The information contained in this section has been compiled over the years from the field. It contains symptoms and known causes for the most common types of issues which may occur. Each situation should be analyzed before making repairs or replacing components to help ensure the best known course of action is taken.

A visual inspection is worth performing when analyzing any issue and may identify and prevent unintended damage to the machine or components. Procedures which can be accomplished with the least amount of time and effort should be performed first as they may resolve the problem most quickly.

Vanair® strives to anticipate most circumstances that may occur during the operation of these machines. However, it is inevitable an issue may occur that was not anticipated or covered in this **Troubleshooting Guide**. Should a problem arise that remains unresolved after referring to this troubleshooting information, please contact the Vanair® Service Department for assistance.

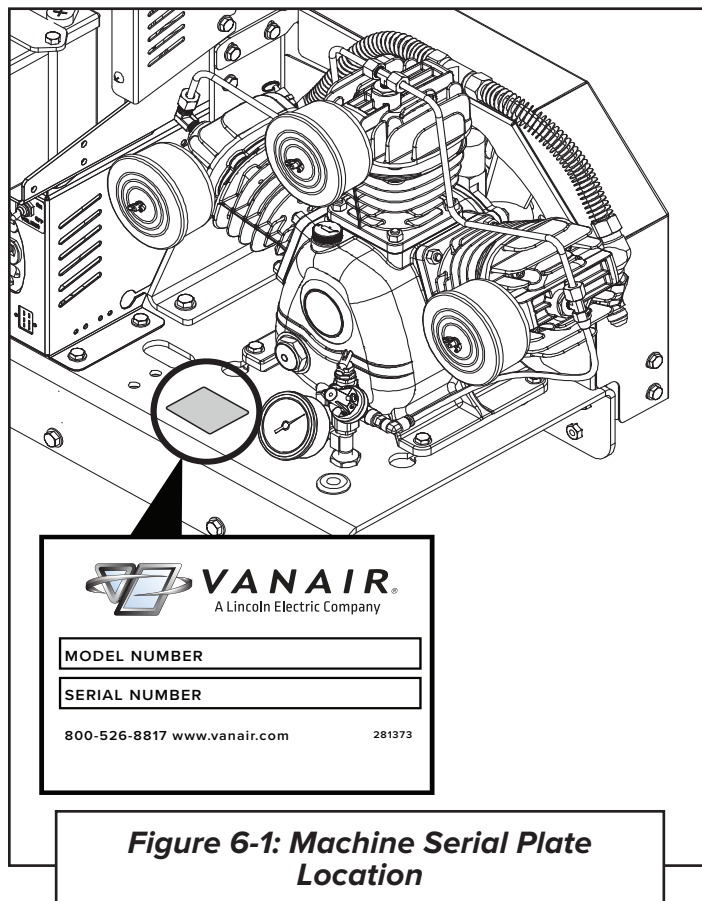


Figure 6-1: Machine Serial Plate Location

NOTICE

When contacting the Vanair® Service Department, please have the machine model and serial number available to expedite service. See Figure 6-1 for the location of your machine's serial number. The machine's serial number is shown on the display panel at Start-Up.

WARNING

Before starting the unit, performing maintenance, or replacing parts, relieve the system air pressure by opening Service Valve and the air tank's drain valve. This will vent the air pressure to the atmosphere.



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6.2 EXTREME CONDITIONS

Machine review and tasks on the maintenance schedule should be done more frequently when operating the equipment under harsh conditions or in a dusty or dirty environment.

See **“Table 6A: Troubleshooting Guide”** and **“Table 5A: Maintenance Schedule”**.

For additional information on the safe operation of this equipment under extreme conditions, consult **Section 4.7 Extreme Condition Operation** in this manual.

WARNING

Do NOT operate this machine when there are known unsafe conditions. Disable the machine by turning the engine OFF, depressurizing the air tank(s), relieving system pressure, and disconnecting the battery power. Lock and Tag Out to prevent others from using the machine until safe repairs can be made.

6.3 VISUAL INSPECTION

When something is not working as expected with your Air N Arc® 150 or Contractor, take a moment to visually inspect the machine. Before other troubleshooting operations such as cleaning, disassembly or replacing parts, look at the external appearance of the machine. There may be visible clues as to what may be causing an issue.

Is there oil present beneath the machine, or a leak? Lots of dust and dirt on the surface? Are any hoses or fittings loose or disconnected? Are any screws, nuts or bolts missing? Are vents and cooling fins obstructed or covered by any debris? Are there any signs of damaged, broken parts or loose wires? All observations offer clues of possible problems during your troubleshooting process.

After checking the external appearance of the machine, clean it of excess dust, dirt, debris, grease and oil spills using a clean soft cloth or soft brush as needed. Then proceed with the guidance in **“Table 6A: Troubleshooting Guide”**.

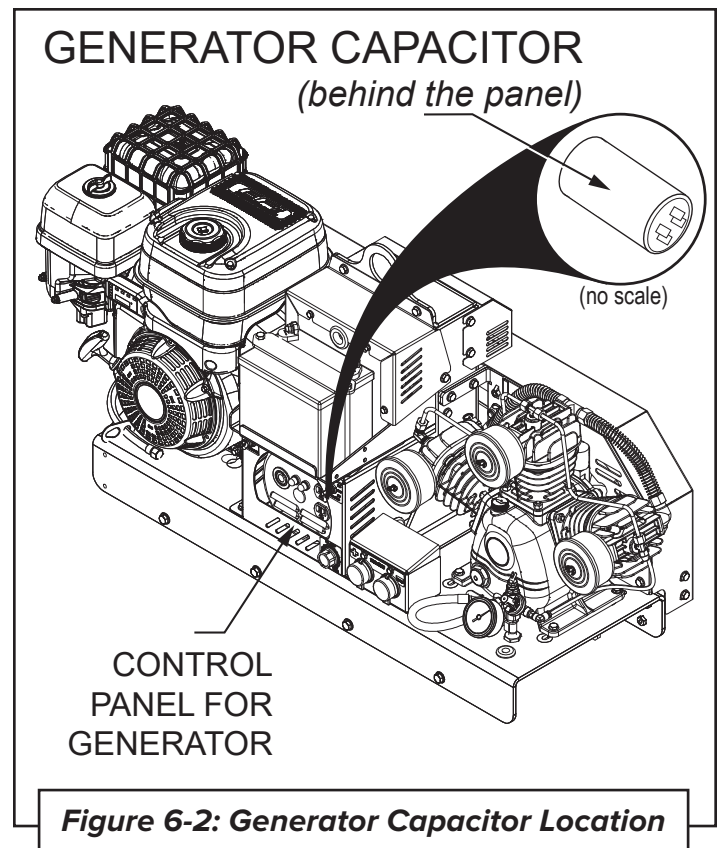


Figure 6-2: Generator Capacitor Location

6.3.1 AC GENERATOR CAPACITOR

- The main capacitor is an important component of all portable generators. If this goes bad, often the generator will not operate properly, or not at all. The capacitor should be diagnosed by a trained technician and if it is bad the capacitor should be replaced.
- When troubleshooting the AC generator unit, **“Table 6A: Troubleshooting Guide”** may point to a faulty or failed capacitor. When working with capacitors, be aware these electrical components may hold a substantial electrical charge even when the machine is not running. There is a risk of electrical shock. Please follow safety procedures to avoid personal injury and possible damage to other electrical components.
- When a capacitor goes bad it can result in either an electrical short (electrical signal follows an unintended path) or an electrical open condition (path is broken and the electrical signal is unable to reach its intended destination).

6.3.1.1 STEPS TO CHECK THE HEALTH OF THE CAPACITOR:

1. Ensure that the engine is OFF.
2. The generator's capacitor is a small electrical component in the shape of a cylinder located behind the front control panel. (See Figure 6-2) The generator panel cover must be removed to access this.
3. After removal of the panel cover, look inside and visually locate the capacitor.
4. The capacitor used for this machine is a small cylinder type with 2 or 4 connectors at one end. (See inset shown in Figure 6-2.)
5. Visually check the capacitor. This alone may be sufficient to indicate whether the capacitor needs to be replaced or not.

What to look for:

- If the terminal end of the capacitor cylinder is deformed or shows a bulge, this is a good indication it has failed.
- The connectors on the end of a bad capacitor may appear loose or pushed out from the rest of the capacitor.
- Gel or oil is leaking from the capacitor.
(Do not touch this substance with bare hands.)
- You may also notice a smell of burnt plastic from an overheated capacitor.

WARNING

SHOCK RISK: The capacitor for the generator may hold a substantial electric charge, even when the machine is not running. Never touch the conductors of a capacitor with bare hands before it has been safely discharged. Use caution and follow the Discharge directions in **Section 6.3.1 item number 3.**

If any of the above conditions exist, the capacitor is likely bad and will have to be replaced. If no such visual indicators exist, the capacitor can be tested electrically. **See the following:**

1. When working with capacitors that have been in use, do not touch or bridge its connectors with bare hands. Any stored

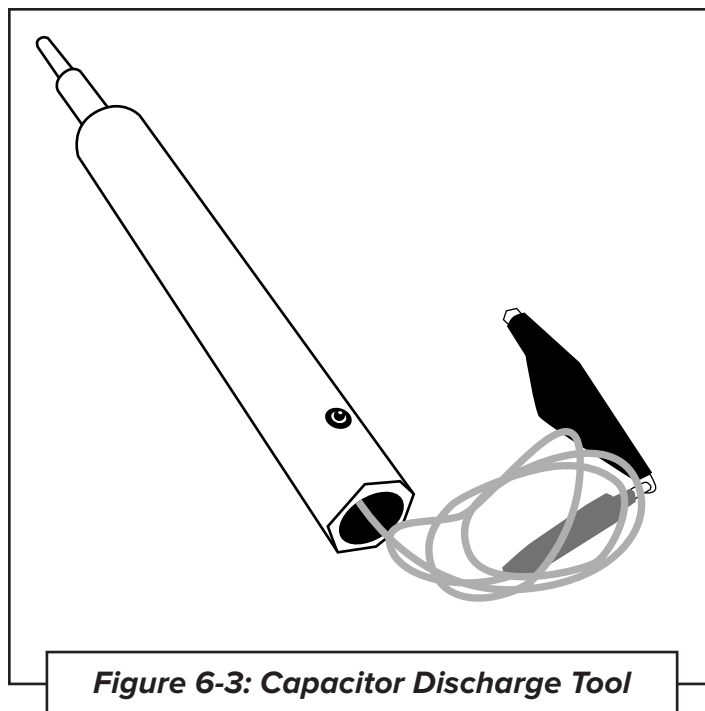


Figure 6-3: Capacitor Discharge Tool

energy in the component may discharge, resulting in an electric shock.

2. Carefully disconnect wires, one at a time from the connectors and remove the capacitor from the circuit.
(For added protection, wear non-conductive gloves and safety glasses.)
3. Discharge any residual electrical charge using an inexpensive capacitor discharge tool. See **Figure 6-3.**
4. Follow the manufacturer's directions for its use. If no discharge tool is available, use a screwdriver with an insulated handle to short the connectors manually. **Do Not touch the bare metal of the screwdriver. You will experience an electrical shock where your skin comes in contact with the metal.**
5. Connect or touch the discharge tool's connectors (or the metal part of the screwdriver) between both connectors on the capacitor. Hold in place for about 5 seconds. (There may be a spark if using a screwdriver, be aware of this.) Once the capacitor has been safely discharged, proceed to the following tests.

6.3.1.2 TEST THE CAPACITANCE.

The capacitor's rating should be printed on the side of the component in micro farads (μF).

- Use a multimeter or capacitance meter to measure the capacitance between the connectors. Red to positive (anode) lead, black to negative (cathode). Measured capacitance should be within $\pm 5 \mu\text{F}$ of the component's rating. If the reading does not fall within this tolerance, it may be time to replace the capacitor.
- (If the measured capacitance is slightly more than $\pm 5 \mu\text{F}$, connect a multimeter or an analog ohmmeter (with a needle) across the terminals. Set the meter to measure resistance (Ohms) with scale at R x100.)
- If capacitance falls within the $\pm 5 \mu\text{F}$ range, and also passed the visual checks, a faulty capacitor may not be the issue. Carefully reconnect wires, one at a time, to the connectors on the capacitor and reinstall the component.

- Use a 9V battery and jumper wires to charge the capacitor. (Positive to positive - negative to negative.) If the needle moves towards the right side, this indicates that there is an increase in resistance as the capacitor charges. Once fully charged (up to +9V), the resistance should remain constant, an indication that the capacitor is healthy. If so, disconnect from 9V battery, discharge the capacitor and reinstall.
- If resistance does not hold steady, the capacitor is bad and should be replaced.

6.4 ENGINE TROUBLESHOOTING

There are a number of abnormal machine behaviors that can arise from basic engine issues. If an engine fault is not covered in **"Table 6A: Troubleshooting Guide"**, please refer to the **VNR Engine Manual, Section 5: Troubleshooting** for additional troubleshooting information about the Vanair® VNR460VEI engine.

TABLE 6A: TROUBLESHOOTING GUIDE

FAULT/MALFUNCTION	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Engine will not crank	- Faulty battery connection - Battery out of power - Engine fuse is blown	- Check for proper battery connections and battery charge - Re-charge or replace the battery - Check the engine fuse (See 5.4.4)
Engine cranks, but will not start	- Low fuel and/or oil level(s) - Plugged fuel filter - Low battery voltage/Poor connection - Clogged engine air filter - Key/Ignition switch in OFF position - Faulty spark plug - Spark plug wire not connected - Bad/old fuel or water in fuel tank	- Add fuel and/or engine oil (See 5.5.1 and 5.5.3) - Clean or replace fuel filter (See 5.5.3.2) - Recharge or replace battery, Check and clean electrical connections - Clean and/or replace engine air cleaner (See 5.5.2) - Turn Key/Ignition switch to the ON position - Check the spark plug; clean, check gap, replace as needed (See 5.5.4) - Make sure the spark plug wire and boot are securely in place (Figure 5-23) - Siphon to remove bad fuel. Replace with fresh fuel
Improper Control Operation: Engine does not speed up	- Throttle solenoid stuck - Governor stuck - Dirty fuel filter - Operating pressure too high - Faulty pilot valve - Faulty pressure switch	- Lubricate; replace throttle solenoid if needed - Free governor and lubricate if necessary - Clean or replace fuel filter (See 5.5.3.2) - Adjust compressor cut-in/cut-out pressure (See 5.3.2) - Readjust or replace the pilot valve - Replace pressure switch
Improper Control Operation: Engine does not slow down	- Leak in control line - Faulty pressure switch - Faulty pilot valve - Governor stuck	- Check for leaks; replace line if needed - Replace pressure switch - Readjust or replace pilot valve - Free governor and lubricate as necessary
Engine overheats	- Oil level too low or too high - Air flow is being obstructed - Engine overloaded - Cooling system components clogged or restricted	- Check for proper engine oil level (See 5.5.1) - Move unit to unobstructed location, away from walls/buildings - Reduce load and demand; or use only one function at a time - Clear debris/dirt from cooler core, cooling fins and vents
Engine stops during operation	- Low oil level - Engine temperature too high - Engine overloaded - Dirty fuel filter	- Check for proper engine oil level (See 5.5.1) - Allow engine to cool (See above for Engine overheats) - Reduce load and demand; or use only one function at a time - Clean or repair fuel filter (See 5.5.3.2)
Severe Vibration	- Bent crankshaft - Loose compressor flywheel - Loose mounting bolts - Internal engine damage	- Remove and replace (Contact Vanair® for details.) - Inspect and secure flywheel - Check and tighten bolts as needed (Contact Vanair® Service Department)
Knocking noise	- Loose valve assembly - Piston hitting cylinder head - Worn connecting rod bearing - Worn crank shaft bearing	- Tighten valve bolt and lock nut (Contact Vanair® Service Department) - Replace connecting rod bearing - Replace crank shaft bearing

TABLE 6A: TROUBLESHOOTING GUIDE (CONT.)

FAULT/MALFUNCTION	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Basic Compressor Troubleshooting		
Compressor Overheats	• Low compressor oil level • Unloader valve(s) sticking or faulty • Obstructed or restricted air flow	• Check for proper compressor oil level (See 5.4.1) • Valves may need to be cleaned, rebuilt or replaced (Consult Vanair® Service Department for details) • Check for obstructions that may limit air flow to compressor, check, clean, or replace compressor air filter elements (See 5.4.2)
Compressor Will Not Build-Up Air Pressure	• Worn or broken valve plate • Valve plate dirty • Leaks from safety valve • Leaks from bolt holes • Uneven valve seat surface • Excessive blow by on piston rings • Pressure control out of adjustment or malfunctioning • Obstructed or restricted intake air flow • Belt(s) slipping • RPM is too slow • Leak in the air system • Service valve is open • Faulty pilot valve • Pilot valve switch open	• Valve may need to be replaced (Consult Vanair® Service Department for details) • Valves may need to be cleaned, rebuilt or replaced (Consult Vanair® Service Department for details) • Repair or replace safety valve • Evenly tighten nuts to ensure a good seal with gasket • Remove and lap the surface • Replace with new rings (Consult Vanair® Service Department for details) • Pressure setting may need to be reset (See 5.3.2) • Check for dirty or clogged air filter elements. Clean or replace. • Check compressor belt(s) for wear and proper sizing. (See 5.3.3) • Bring engine speed up to proper RPM setting. • Inspect air system for leaks, loose fittings, or fasteners, and correct • Close service valve • Replace or rebuild the pilot valve • Check pilot valve, make sure it is closed during operation
Compressor Belts Slipping	• Working pressure too high • Improper belt tension • Oil on belt(s) • Worn belt(s)	• Lower working pressure • Adjust belt tension (size); Check for wear, replace as needed (See 5.3.3) • Clean and dry belts, sheave and pulley treads • Replace old, worn belts with new ones (See 5.3.3)
Pressure Gauge Not Accurate	• Pressure gauge malfunctioning	• Check connections; replace gauge as needed
Excessive Moisture in the Compressor Air	• Water accumulation in the tank	• Drain water from the tank (See 5.3.5)
Compressor System Over-Pressures and/or Relief Valve Opens	• Damaged or kinked control line • Restriction in control line • Control line connections not properly seated or poor connection • Pilot valve out of adjustment or malfunctioning • Defective safety valve • Unloader Valve sticking • Damaged reed valve • Internal compressor damage	• Check line for signs of damage or kinks; re-route, re-tie, or replace as needed. (See 7.23 "Hose Installation Guide") for assistance in running or checking hose lines). • Clean if soiled; if ice is present, clear and remove • Check the lines for proper seating, ensure line ends have been cut cleanly and are squared not angled (Do NOT use wire cutters; use a loom cutting tool or a clean, razor-sharp blade). • Pressure settings may need to be reset (See 5.3.2). • Replace safety valve • (Check air filters) Free the unloader, clean or replace as needed. • Replace reed valve • (Consult Vanair® Service Department for more information.)

TABLE 6A: TROUBLESHOOTING GUIDE (CONT.)

FAULT / MALFUNCTION	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Basic Compressor Troubleshooting (Cont.)		
No Service Air Output	- If equipped, valve/velocity valve, not functioning properly - Pinched or plugged service line - Damaged check valve	- Reset or replace the OSHA (service) valve - Eliminate the kink in the line, or remove obstacle in line - Replace check valve
System Operating Pressure is Below Specified Minimum	- Pressure control out of adjustment or malfunctioning - Compressor capacity too low to accommodate demand - Clogged compressor air filter(s) - System leaks or damaged - Input RPM is too low - Pilot valve is stuck open - Unloader valve sticking	- Pressure settings may need to be reset (See 5.3.2, Adjusting Cut-in/Cut-out pressure) - Reduce demand, or use a larger compressor system with higher capacity - Clean or replace compressor air filter elements (See 5.4.2) - Inspect unit for leaks, repair and/or replace damaged parts as needed - Adjust to proper setting - Inspect valve, clean or replace if needed (Check air filters) Free the unloader valve, clean or replace as needed
Excessive Amount of Oil in the Air Discharge	- Compressor oil level is too high - Worn piston rings	- Check oil level and drain enough to bring to proper level (See 5.4.1) - Replace piston rings (Consult Vanair® Service Department for more information)
Excessive Compressor Oil Consumption	- Worn piston rings - Oil leaks - Wrong oil being used	- Replace piston rings (Consult Vanair® Service Department for more information) Note: This may indicate that the compressor unit itself may need to be replaced) - Check for any source of oil leaks, and repair - Use correct oil for the compressor; drain and refill with proper compressor oil
Basic AC Generator Troubleshooting		
No AC Generator Output	- Generator belt slipping or damaged, Serpentine belt slipping or damaged, Air N Arc® 150 only) - Faulty AC generator relay - Failed capacitor - Tripped breaker - Faulty generator	- Re-seat belt in track, adjust belt tension if needed. If belt is damaged, replace; make sure the belt and pulleys are clean and free of oil (See 5.3.3.7 through 5.3.3.12 and Figures 5-12 and 5-14) - Check, replace if necessary - Check, replace if necessary (See 6.3) - Inspect and correct any obvious causes; reset breaker (See 4.5.1 and Figures 4-1 or 4-2, callout [E]) (Consult Vanair® Service Department - generator may need to be replaced)
Low AC Voltage	- Engine speed too low for demand - Faulty capacitor - Generator belt slipping	- Adjust speed control (See 5.3.1) - Check; replace if necessary (See 6.3.1) - Check generator belt for wear or damage; (See 5.3.3.8)
High AC Voltage	Engine speed too high for demand	Adjust engine speed control (See 5.3.1)

TABLE 6A: TROUBLESHOOTING GUIDE (CONT.)

FAULT / MALFUNCTION	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
DC Generator - Basic Welder Troubleshooting (Air N Arc® Only)		
Welder and/or Battery Charger Behaves Erratically	• Connection cables or receptacles are soiled or contaminated • Welding function is not drawing enough operating power	• Check for twisted cables, dirty or loose connections; Untwist and straighten any suspected cable tensions; Carefully wipe off any contaminants on cable connectors before reconnecting; Replace worn or damaged receptacles (if function continues to be erratic, Contact Vanair® Service Department for more information). • If running more than one function together, avoid use of another function during welding
No Welder Output	• Check power to welder • Incorrect voltage from battery • Serpentine belt out of position or malfunctioning • Welder 6-pin connector not making proper connection • Loose or bad welder connections • Internal fuse blown in welder module	• Press power button on welder lead • Check battery voltage for minimum output of 11VDC • If belt is damaged, replace. Otherwise, re-seat belt. Adjust belt to proper tension (See 5.3.3.12 and 5.3.3.13, Figure 5-12 [B]). • Check the welder's 6-pin connector. Make sure it is fully inserted. Look for bent or broken pins in plug; Clean connection as needed. • Inspect and re-seat all welder connections • (Contact Vanair® Service Department for more information)
Display Not Working	• Loose or faulty wiring/connections • Display is damaged, or faulty	• Check wiring and connectors are secure; Replace if faulty • Check for damage; If wires and connections appear good, the display may need to be replaced.