SECTION 6: TROUBLESHOOTING

6.1 GENERAL INFORMATION

The information contained in this section has been compiled from years' worth of information gathered from the field. It contains symptoms and usual causes for the most common types of problems that may occur. All available data concerning the trouble should be systematically analyzed before undertaking any repairs or component replacement.

A visual inspection is worth performing for almost all problems and may avoid unnecessary additional damage to the machine. The procedures which can be performed in the least amount of time and with the least amount of removal or disassembly of parts should be performed first.

⚠ WARNING

Before starting, performing maintenance, or replacing parts, relieve the entire system pressure by opening a service valve, which will vent all pressure to the atmosphere.

Although Vanair® strives to anticipate situations that may occur during the operation life of the machine package, the Troubleshooting Guide may not cover all possible situations. Be aware that additional troubleshooting information may be found in other sources, such as the Engine Operator's Manual. Should the situation remain unresolved after exhausting available sources, contact the Vanair Service Department at:

Phone: 800-526-8817 (toll free)
Phone: 219-879-5100
Fax: 219-879-5335

NOTE

When contacting the Vanair Service Department, please have machine serial number on hand to quickly expedite service. See below for machine serial plate location.

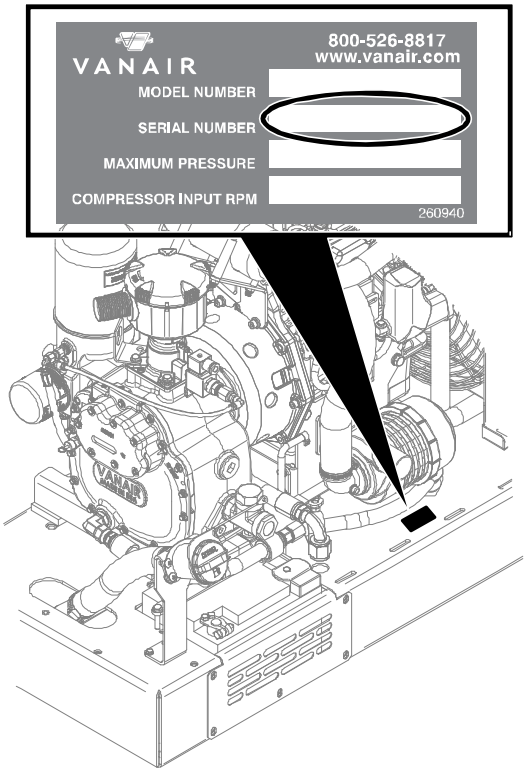

Figure 6-1: Machine Serial Plate Location

NOTE

Machine serial number also displays on instrument panel at start-up, on the hours screen.

6.2 TROUBLESHOOTING GUIDE

Fault/Malfunction	Possible Cause	Corrective Action
Machine does not start **Fault:** **Freq Sensor Error, Machine Will Not Run**	Controller is not receiving input from alternator connector	Check connection/continuity.
		During extremely cold weather, use of heater pads is required to get engine to spin fast enough to generate a usable signal. If no heater pads are installed, change crank sequence to Manual Crank (refer to **Section 4.6.3.1, Parameters**).
ENGINE		
Engine will not crank	Faulty battery connection.	Check for proper battery connections and battery charge.
	Battery out of power	Recharge or replace battery.
	Control module fuse blown	Check fuse; refer to **Section 7.9**.
	Machine hood shutdown safety switch prevents start-up of engine	Close hood panel or check if roof switch is faulty.
	Faulty starter or starter solenoid	Replace.
	Faulty 50A circuit breaker	Replace.
Engine will not start	Low fuel and/or oil supply	Check fuel gauge. Replenish as necessary. Consult the Engine Operator's Manual for additional information on engine maintenance.
	Pinched fuel line	Replace or reroute if necessary.
	Plugged fuel filter(s)	Replace if necessary. Refer to the Engine Operator's Manual for additional information on engine maintenance.
	Low battery voltage	Recharge or replace if necessary.
		Loose connections; tighten connections.
		Dirty connections; clean connections.
	Plugged engine air filter	Replace engine air filter. Refer to Engine Operator's Manual.
	Defective oil pressure switch	Check continuity, and replace if necessary.
	Defective engine temperature switch	Check continuity, and replace if necessary.
	Poor ground connection	Check and clean/renew connection.
Improper Control Operation: Engine does not speed up	Speed control actuator stuck	Lubricate; replace speed control actuator if necessary.
	Engine speed control lever stuck	Free lever and lubricate if necessary.

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Fault/Malfunction	Possible Cause	Corrective Action
ENGINE (CONTINUED)		
Improper Control Operation: Engine does not speed up (continued)	Fuel filter partly plugged	Replace fuel filter. Refer the Engine Operator's Manual.
		Auxiliary fuel pump may be needed for remote fuel tank.
Improper Control Operation: Engine does not slow down	Speed control actuator stuck	Lubricate; replace speed control actuator if necessary.
	Engine speed control lever stuck	Free lever and lubricate if necessary. Refer to Engine Operator's Manual.
	Faulty pressure tranducers	Check and replace, if necessary.
Engine stops during operation **Fault:** **Engine High Temp Shutdown**	Located too close to obstruction	Move further from obstruction.
	Engine radiator plugged	Clear debris/dirt from engine radiator.
	Fault with engine cooling system	Consult Engine Operator's Manual.
	Ambient temperature too high	Consult ***Section 6.3.3, High Temperature Operation***.
	Faulty temperature switch	Replace.
Engine stops during operation **Fault:** **Low Engine Oil Pressure**	Low oil level	Check engine oil level; replenish as necessary. Consult the Engine Operator's Manual for additional information on engine maintenance.
	Engine shutdown switch activated	Confirm that access door is properly in place. Replace faulty engine shutdown switch.
	Faulty oil pressure switch	Replace.
	Engine oil filter plugged	Replace engine oil filter. Refer to the Engine Operator's Manual.
Gradual loss of engine power	Contaminated fuel	Drain and replace fuel supply.
	Engine air filter contaminated	Check air filter. Replace if necessary (refer to the Engine Operator's Manual).
	Fuel filter(s) contaminated	Check fuel filters. Refer to the Engine Operator's Manual for additional information on engine maintenance.
	Low fuel level	Add fuel.
	Overload	Reduce load; check load use, and reduce

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6.2 TROUBLESHOOTING GUIDE

Fault/Malfunction	Possible Cause	Corrective Action
ENGINE (CONTINUED)		
Gradual loss of engine power (continued)	Engine not warmed up	Allow engine to warm up.
For additional information concerning an engine problem, consult the Engine Operator's Manual.		
COMPRESSOR		
Compressor overheats **Fault:** **Compressor High Temp Shutdown**	Low compressor oil level	Check oil level and refill to proper level if necessary (ensure machine is parked on a level surface).
	Obstructed cooler fins	Clear/clean if required.
	Insufficient air flow over cooler	Check for obstructions (frame, body, etc.) to cooling air flow.
	Defective temperature thermistor	Check sensor; replace if necessary.
	Compressor oil filter plugged	Replace compressor oil filter.
	Defective compressor thermal valve	Replace valve.
Compressor will not build up pressure	Low compressor oil level	Check oil level and refill to proper level if necessary (ensure machine is parked on a level surface).
	Unload solenoid valve defective	Replace solenoid valve.
	Air demand too high	Check for leaks and take corrective action.
		Check air tools for wear, damage, or malfunctions. Replace or repair.
	Compressor capacity too low to accommodate demand	Substitute larger capacity compressor system.
	Compressor air filter plugged	Check air filter. Replace if necessary.
	Engine does not speed up: input RPM too slow	Check engine speed control actuator.
	Engine speed control lever stuck	Free lever and lubricate if necessary. Consult the Engine Operator's Manual.
	Service valve is open	Close service valve.
	Pressure transducer is malfunctioning	Replace as necessary.
		Check for proper operation with an auxiliary air source. Replace if necessary.
	Inlet valve fails to open	Repair/replace inlet valve.
	Inlet valve frozen shut	Repair/replace inlet valve.
	Leak in air control line	Check for leaks and take corrective action.

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6.2 TROUBLESHOOTING GUIDE

Fault/Malfunction	Possible Cause	Corrective Action
COMPRESSOR (CONTINUED)		
Compressor system over-pressures **Fault:** **Compressor High Press Shutdown or safety relief valve**	Unload solenoid valve defective	Replace solenoid valve.
	Restricted or plugged bleed orifice	Clean if soiled; if ice is present, clear and remove.
	Damaged/kinked control line	Check line for damage (wear, kinks, etc.). Re-route, re-tie or replace if necessary.
	Control line connections are not properly seated/poor connection quality	Check lines for proper seating/ensure line ends have been cut cleanly and are square (**DO NOT** use wire cutters: use a loom cutting tool or a clean, sharp razor blade).
	Inlet valve poppet not seating correctly.	Valve will need to be dis-assembled to check; consult with Service Department.
	Inlet valve piston is stuck in open position.	Check for proper operation with an auxiliary air source—replace or rebuild inlet valve.
	Compressor shaft seal is leaking	Replace shaft seal with available kit.
	Pressure transducer is malfunctioning	Check transducer for proper operation; replace if necessary and check controls.
	Defective safety valve	Replace safety valve.
	Plugged coalescer	Replace coalescer element.
No service air output (See also *Compressor will not build up pressure*)	If equipped, OSHA valve/velocity fuse, not functioning properly	Reset or replace OSHA valve.
	Minimum pressure/check valve is malfunctioning	Rebuild or replace check valve.
Low service air output (See also *Compressor will not build up pressure*)	Clogged compressor air filter	Check air filter. Replace if necessary.
	Solenoid valve sending continuous signal to inlet valve	Rebuild or replace solenoid valve if defective.
	Incorrect compressor speed	Adjust engine speed. Refer to ***Section 5.5.1, Adjusting the Engine Speed.***
	Minimum pressure/check valve is malfunctioning	Rebuild or replace check valve.
Compressor stalls	Idle speed is set too low	Adjust idle speed; consult factory.
Excess amount of oil in air discharge	Machine not on level surface	Move machine to level surface.

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6.2 TROUBLESHOOTING GUIDE

Fault/Malfunction	Possible Cause	Corrective Action
COMPRESSOR (CONTINUED)		
Excess amount of oil in air discharge (continued)	Compressor oil level too high	The correct oil level is is to the center of the sightglass.
	Scavenger system not operating	Inspect scavenger line for obstructions or leaks. Replace if necessary.
	Coalescer element plugged or damaged	Replace the coalescer element.
Excessive moisture in the compressed air	Moisture accumulating in air tank	Drain water from air tank (if applicable to installation).
System oil appears to be cloudy or milky	Excessive moisture in system oil; defective thermal valve	Check/replace thermal valve. Consult factory for assistance.

6.3 EXTREME CONDITION OPERATION

When operating in extreme cold or hot conditions, in the presence of high humidity, or at a high altitude, extra attention should be given to any indication that could lead to a serious problem. Engine power and compressor air output will be reduced at high altitude or hot ambient temperatures.

Machine review and maintenance check schedules should be more frequent than the normal suggestions given in the ***Maintenance Schedule Tables (*****Table 5.3A**, and **Table 5.3B** in **Section 5*)***.

Become acquainted with the situation-adjusted operation approaches given in this section before operating the power system package in any type of extreme ambient condition. For additional operation information consult the Engine Operator's Manual, or visit the engine manufacturer's web site given in that manual.

6.3.1 HIGH MOISTURE CONDITION: EMULSIFICATION OF OIL IN ROTARY SCREW COMPRESSOR SYSTEMS

Consult the information in **Table 6.3A** for preventative and/or repair measures. If machine is operating in a high moisture environment, water contamination may persists after following the regular preventative maintenance schedule and standard operating procedures.

TABLE 6.3A HIGH MOISTURE CONDITION OPERATION

Symptom	Cause	Prevention / Corrective Action
Emulsification of oil in compressor system: • Compressor oil is milky white in color • Compressor oil is broken down and lacks lubricity. • Compressor oil may develop solid chunks or clumps	**Operating the compressor system for short periods of time:** • Short cycling prevents the temperature of the oil from attaining a high enough temperature capable of vaporizing the moisture droplets. **Operating the compressor system unloaded without air flow from the service line for long periods of time:** • This can keep the oil temperature from getting hot enough to vaporize the moisture droplets, preventing the moisture from being able to escape the system. Additionally, there is no path for the moisture to escape the system. **The thermal valve is faulty and activating the cooling fan too soon:** • This prevents the oil from attaining a high enough temperature capable of vaporizing the moisture droplets. **The air filter is saturated with water:** • This forces moisture to be ingested by the compressor. **Any of the above causes will be exacerbated in especially humid environments.**	**RECOMMENDED CHANGES:** If the problem is not corrected by standard operating practices and regular preventative maintenance, consider the following: • Raise the average temperature of the compressor oil. • Change the operating procedure to allow for the compressor oil temperature to reach 180 °F before discharging any air. If the compressor isn't discharging any air, it's not ingesting any potentially humid air. It will build pressure upon initial startup, but then it will run closed and allow it to heat up. **REPAIR/MAINTENANCE:** Refer to **Section 5** of the Operator's Manual for inspection, cleaning, and repair instructions. 1. Once the compressor oil becomes emulsified, it must be replaced along with the oil filter. Depending on the severity, other parts might also need to be replaced. 2. Check that the separator element is in good, working condition. 3. Check that the scavenge line is working properly. If the system is badly contaminated, Vanair® recommends a lube flush that will help clean out any remaining contamination throughout the system. Consult Vanair Service Department for lube flush instructions. Check the moisture drain frequently on the air tank reservoir, to alleviate moisture build-up.

6.3.2 COLD WEATHER OPERATION

Consult the information in **Table 6.3B** for preventative and/or repair measures. The Diesel Viper's 25HP engine runs on diesel fuel, which can be more difficult to start in cold weather. Once the engine is started, the air density becomes larger and the intake efficiency also becomes higher. More output can be expected in cold areas. When the temperature is very low, extra care must be taken regarding fuel and oil changes in their viscosity, freezing of water contained in the piping, or of water adhering on the filter. Diesel fuel may gel at very cold temperatures.

TABLE 6.3B COLD WEATHER OPERATION

Symptom	Cause	Prevention / Corrective Action
Water freezes in the fuel line Lubrication oil viscosity increases Diesel fuel turns to a gel-like consistency at temperatures around 0°F (-18°C)	**WATER** Water in the fuel can freeze at temperatures below 32°F (0°C), blocking fuel lines. At an extremely cold temperature, the viscosity of lubrication oil may increase and the torque of starter may exceed its permissible value, hindering proper starting. **GELLING** The diesel forms wax crystals when the temperatures drop below 15°F (-9°C). As it gets colder, these wax crystals turn to gel. This thicker substance cannot pass the fuel filter, so the engine may run intermittently, or may not start at all.	• Park the vehicle or equipment indoors when not in use. • Use a block heater or glow plugs. • Maintain the battery; this will make it easier to start a diesel engine in cold weather. • In below zero temperatures a fuel line deicer product may need to be used. • Check the fuel filter regularly to insure that it contains no water. • Vanguard™ Premium Synthetic Oil is suitable for use from -40°F to 110°F (-40°C to 43°C). • For additional engine precautions, consult the Engine Operator's Manual. • Vanair® recommends installation of the cold weather heater option kit. Consult Vanair for details. • Keep the fuel tank full to prevent condensation from forming inside the tank and lessen the chances of water getting in the fuel line. • The standard recommendation of 15W-40 engine oil is suitable for temperatures down to -4°F (-20°C). If temperatures are consistently below 30°F (-1°C), it is recommended that 5W-30 oil be used. If temperatures are below -25°F (-32°C), a high-performance, fully synthetic oil, such as AMSOIL 5W-30 should be used which is suitable to temperatures of -55°F (-48°C).

6.3.3 HIGH TEMPERATURE OPERATION

Consult the information in **Table 6.3C** for preventative and/or repair measures. Reduce load duty cycle to less than 60% when operating in ambient temperatures above 104°F (40°C).

Extra care should be taken to keep the engine and air compressor clean and to not restrict the air flow around the unit. Consult the Engine Operator's Manual for fuel, lubrication oil and cooling requirements under extreme temperatures.

When operating the machine in high temperature areas, precautions should be taken to prevent overheating. At the minimum, all coolers, including air passage ways around the coolers, should be free of debris and dirt. The fan, driven by the engine,

is designed to run continuously to assure a constant flow of cooling air.

The operator should be aware that high temperatures can influence engine performance, which can directly effect some machine function capacity outputs.

TABLE 6.3C HIGH TEMPERATURE OPERATION

Symptom	Cause	Prevention / Corrective Action
Overheating/high compartment temperatures Diminished engine performance	High ambient temperatures, confined spaces, soundproof cases and other reasons. Among these the most important factor is the temperature of the intake and cooling air.	• Extra care should be taken to keep the engine and air compressor clean and to not restrict the air flow around the unit. • Consult the Engine Operator's Manual for fuel, lubrication oil and cooling requirements under extreme temperatures. • At the minimum, all coolers, including air passage ways around the coolers, should be free of debris and dirt. The fan, driven by the engine, is designed to run continuously to assure a constant flow of cooling air. The operator should be aware that high temperatures can influence engine performance, which can directly effect some machine function capacity outputs.

6.3.4 HIGH DUST CONTENT OPERATION

Consult the information in **Table 6.3D** for preventative and/or repair measures. When the machine is to be used in continuously dusty environments, special care must be taken with the engine's air cleaner and radiator.

TABLE 6.3D HIGH DUST CONTENT OPERATION

Symptom	Cause	Prevention / Corrective Action
Overheating System contamination Stalling	Machine components exposed to frequent or constant dust interaction, can result in diminished system performance, or machine cessation.	• The intake air must be cleaned with the air cleaner—inspect the air filter frequently for dust build-up and replace as needed. • Ensure that the radiator and oil cooler fins are kept clean to prevent overheating. • If the machine is not being used for an extended period of time, an additional precaution, such as covering the machine with a tarp, will help to keep the inside of the machine free of dust particle accumulation. • For extreme cases of high dust content environments, machine fluids may need to be replaced at more frequent intervals. Adjust maintenance schedule accordingly.

6.3.5 HIGH ALTITUDE OPERATION

Engine horsepower will decrease by 3.5% for every 1,000 feet over 6,000 feet increase in altitude. At high altitude overall unit performance will deteriorate, and care will need to be taken not to overload the engine.