

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.

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

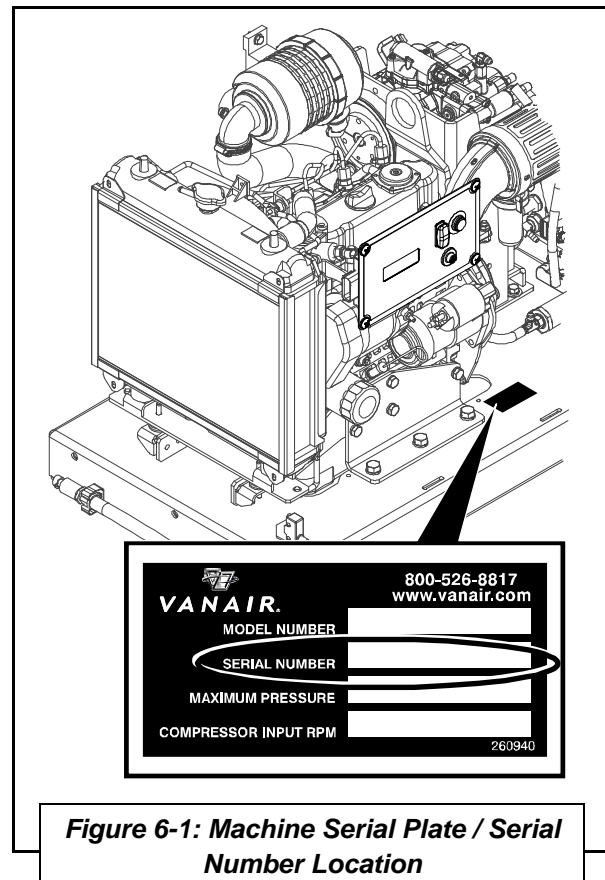


Figure 6-1: Machine Serial Plate / Serial Number Location

NOTE

When contacting the Vanair Service Department, please have machine serial number on hand to quickly expedite service. See Figure 6-1 for machine serial plate location.

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 can be 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 7.5 .
	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; refer to Figure 5-2 .
	Master input is not present	Check wiring.
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.
	Glowplugs not functioning	Fuse blown. Replace.
Fuel pump not functioning	Fuse blown. Replace.	

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6.2 TROUBLESHOOTING GUIDE

Fault/Malfunction	Possible Cause	Corrective Action
ENGINE (CONTINUED)		
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.
	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 transducers	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 6.3.2, High Temperature Operation .
	Faulty temperature switch	Replace.
Engine stops during operation Fault: Low Engine Oil Press	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.
	Engine oil filter plugged	Replace engine oil filter. Refer to the Engine Operator's Manual.
	Faulty oil pressure switch	Replace.
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.
<i>Continued on next page</i>		

6.2 TROUBLESHOOTING GUIDE		
Fault/Malfunction	Possible Cause	Corrective Action
ENGINE (CONTINUED)		
Gradual loss of engine power (continued)	Low fuel level	Add fuel.
	Overload	Reduce load; check load use, and reduce
	Engine not warmed up	Allow engine to warm up.
<i>For additional information concerning an engine problem, consult the Engine Operator's Manual.</i>		

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 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 **Section 5.3, Maintenance Schedule Table**.

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 COLD WEATHER OPERATION

Consult the information in **Table 6.3A** for preventative and/or repair measures. The 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.

6.3.2 HIGH TEMPERATURE OPERATION

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

Extra care should be taken to keep the engine 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.

6.3.3 HIGH DUST CONTENT OPERATION

Consult the information in **Table 6.3C** 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 6.3A COLD WEATHER OPERATION		
Symptom	Cause	Prevention / Corrective Action
<p>Water freezes in the fuel line</p> <p>Lubrication oil viscosity increases</p> <p>Diesel fuel turns to a gel-like consistency at temperatures around 0°F (-18°C)</p>	<p>WATER</p> <p>Water in the fuel can freeze at temperatures below 32°F (0°C), blocking fuel lines.</p> <p>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.</p> <p>GELLING</p> <p>The diesel forms wax crystals when the temperatures drop below 15°F (-9°C).</p> <p>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.</p>	<ul style="list-style-type: none"> • 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. • 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).

TABLE 6.3B HIGH TEMPERATURE OPERATION		
Symptom	Cause	Prevention / Corrective Action
<p>Overheating/high compartment temperatures</p> <p>Diminished engine performance</p>	<p>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.</p>	<ul style="list-style-type: none"> • Extra care should be taken to keep the engine 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. <p>The operator should be aware that high temperatures can influence engine performance, which can directly effect some machine function capacity outputs.</p>

TABLE 6.3C 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.	<ul style="list-style-type: none"> 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.

6.3.4 HIGH ALTITUDE OPERATION

Refer to diagram shown in **Figure 6-2** for altitude and humidity causal effects on diesel engines.

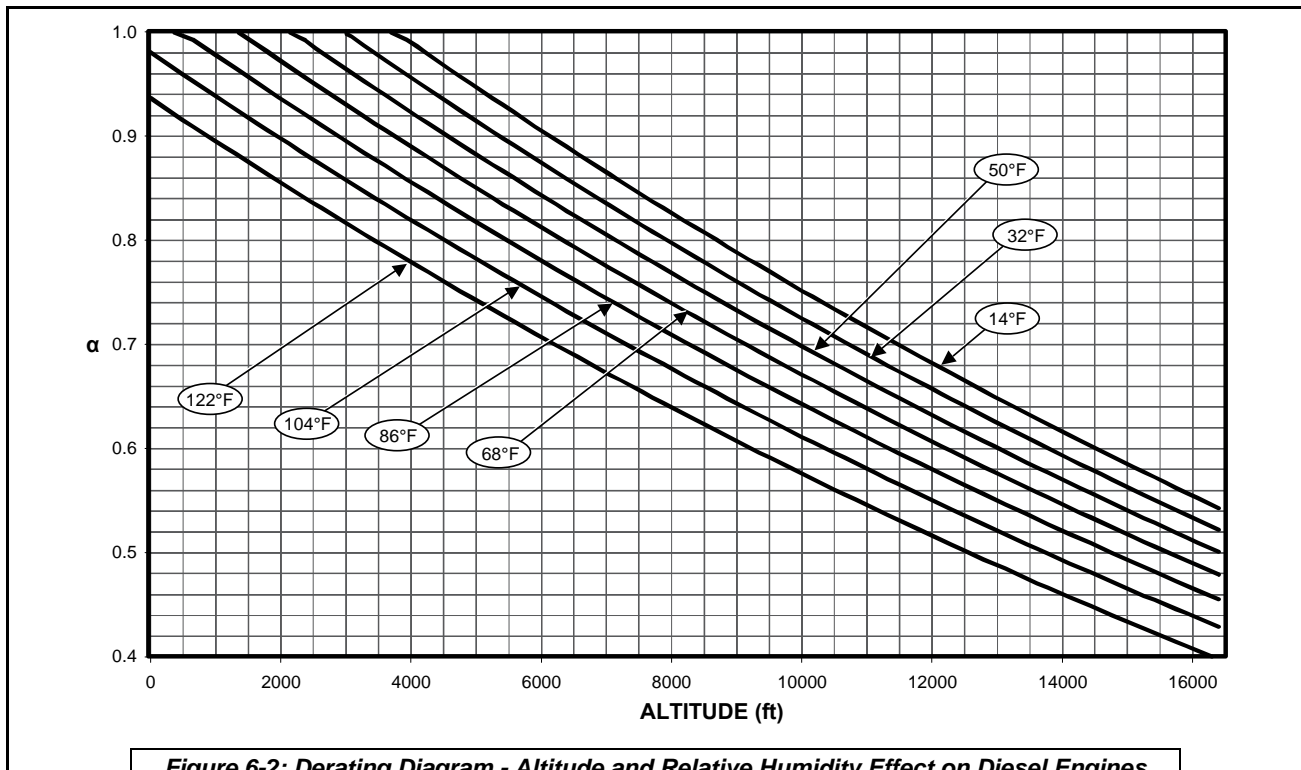


Figure 6-2: Derating Diagram - Altitude and Relative Humidity Effect on Diesel Engines