

**GrimmerSchmidt
Compressors**

OPERATION AND MAINTENANCE MANUAL

Rotary Screw Series

375 D

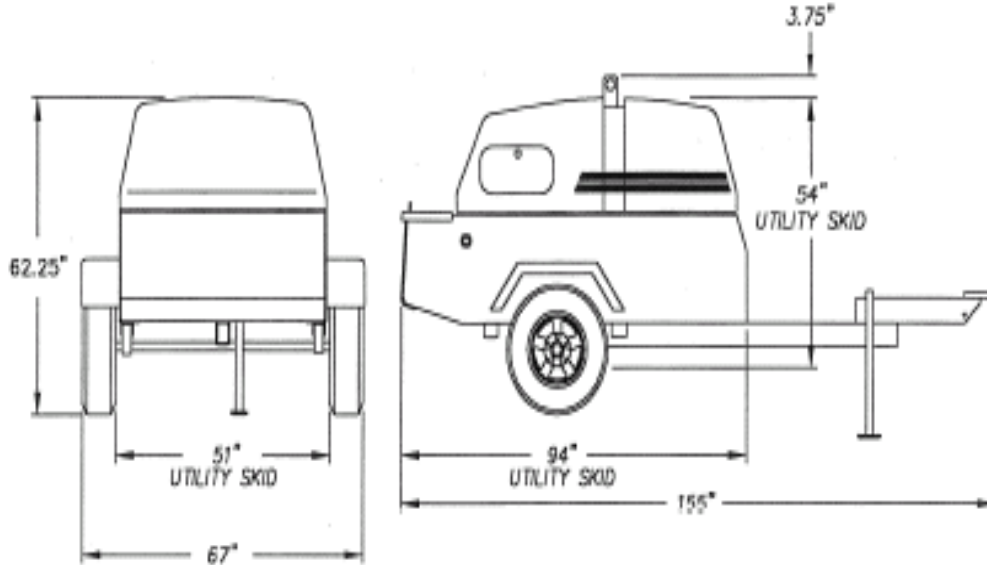
H300 DR

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its
Constituents are known to the State of
California to cause cancer, birth defects
and reproductive harm.

**PHYSICAL SPECIFICATIONS OF
PORTABLES AND UTILITY SKIDS**



Model	CFM @ 100 PSIG	COMP. OIL CAPACITY GAL (ltr)	ENGINE MFR & MODEL	OPERATING RANGE rpm	BHP @ GOVERNED SPEED	NO. OF CYL	PISTON DISPL CID (ltr)	ENG OIL CAPACITY QTS. (ltr)	COOLANT CAPACITY GAL (ltr)	FUEL CAPACITY GAL (ltr)	TIRE SIZE	WEIGHT DRY LB (kg)
375 D	375	9 (34.07)	JOHN DEERE 4045T	1500-2400	115	4	276 (4.52)	7.0 (6.6)	4 (15)	38 (144)	B78X15	2655 (1207)

Model	CFM @ 150 PSIG	COMP. OIL CAPACITY GAL (ltr)	ENGINE MFR & MODEL	OPERATING RANGE rpm	BHP @ GOVERNED SPEED	NO. OF CYL	PISTON DISPL CID (ltr)	ENG OIL CAPACITY QTS. (ltr)	COOLANT CAPACITY GAL (ltr)	FUEL CAPACITY GAL (ltr)	TIRE SIZE	WEIGHT DRY LB (kg)
H300 DR	300	9 (34.07)	JOHN DEERE 4045T	1500-2400	115	4	276 (4.52)	7.0 (6.6)	4 (15)	38 (144)	B78X15	2655 (1207)

UTILITY SKIDS WEIGH 100 LBS (45 kg) LESS THAN THE PORTABLE.

TABLE OF CONTENTS

	PAGE
OWNERS RESPONSIBILITY	6
USER MODIFICATION	7
SECTION 1 – SAFETY	
1.1 Towing	8
1.2 Parking	9
1.3 Before Starting the Compressor	9
1.4 Compressor Use and Compressed Air	10
1.5 Servicing	10
1.6 Lifting	11
SECTION 2 – DESCRIPTION	
2.1 Introduction	12
2.2 Rotary Compressor Components	12
2.3 Diesel Engine Components	14
2.4 Chassis	14
2.5 Fiberglass Hoods	15
2.6 Instrument Panel Door	15
SECTION 3 – OPERATION	
3.1 Start-up Preparation	16
3.2 Starting Procedure	16
3.3 Emergency Shutdown Procedure	16
3.4 Routine Shutdown Procedure	16
SECTION 4 – MAINTENANCE	
4.1 Engine Oil Specification	16
4.2 Engine Fuel Specifications	18
4.3 Engine Fuel Filter	19
4.4 Engine Oil Filter	19
4.5 Engine Cooling Specification	20
4.6 Engine Cooling System	21
4.7 Compressor Oil	21
4.8 Adding Compressor Oil	23
4.9 Changing Compressor Oil	23
4.10 Compressor Oil Filter	23
4.11 Compressor & Engine Air Filter Maintenance	24
4.12 Compressor Oil Thermostatic Valve	26
4.13 Compressor Air/Oil Separator	26
4.14 Expendable Part Replacement Numbers	27
4.15 Belts	27

TABLE OF CONTENTS (CON'T)

	PAGE
SECTION 4 – MAINTENANCE	
4.16 Controls – Operation and Adjustment	27
4.17 Instruments	30
4.18 Battery	32
4.19 Electrical Circuits	32
4.20 Wheel Bearings	34
4.21 Safety Chains	35
4.22 Maintenance Schedule	36
SECTION 5 – TROUBLESHOOTING	38
SECTION 6 – LOG	43

OWNER'S RESPONSIBILITY

Your new GrimmerSchmidt air compressor was engineered, built and tested to ensure the user both dependable and economical service. This compressor has also been certified as conforming to the applicable Noise Emission standards of the Environmental Protection Agency.

Continuation of the performance built into this unit depends upon the care it receives in use. Therefore, operation and maintenance procedures described in this manual should be followed carefully. The operator and service personnel responsible for the care of this unit should be thoroughly familiar with this information.

It is the owner's and/or operator's responsibility to perform all safety checks and to ensure that all lubrication, maintenance instruction, and recommended practices be followed for safe operation. If disassembly or replacement is required, particularly of internal parts, we recommend the owner see his dealer and not attempt the repair himself.

It is the owner's responsibility to ensure that the preventive maintenance program is flowed at the recommended intervals. Proper care and service will assure long service life with a minimum of problems and operation expenses.

We recommend that the owner and operator be thoroughly familiar with the contents of this manual.

If you encounter difficulties, which you cannot diagnose, our service personnel are prepared to help you. Our toll free number is 1-800-428-9703. Outside the continental United States and Canada our number is 317-736-8416.

○	BLUE	RED	○
GrimmerSchmidt Compressors Franklin, Indiana, U.S.A.			
Vehicle Identification No.			
Compressor	Rating:	PSIG	CFM
	Serial No.		RPM
Air End	Model:	Serial No.	
Air Tank	Serial No.		
Engine/Motor	Model/HP	Serial No.	
○	3,462,074 USA 4,232,997 5,056,601	Patents Canada 911,951 Mexico 109,254	Japan 790,189 U. K. 1,270,019 ○

The model and serial number information is requested on all correspondence. This information can be found on the Model Number Identification Place located in the engine compartment above the radiator on the forward bulkhead of the frame assembly. The information contained on this identification plate should be transferred to the Compressor Maintenance Log in Section 6 of this manual for future reference.

USER MODIFICATION

This GrimmerSchmidt compressor incorporates numerous features to minimize noise emissions from the unit during operation. This configuration has been tested for noise emissions at conditions specified by the U.S. Environmental Protection Agency. The resultant noise data and supporting records have verified, to the E.P.A., conformance to regulations contained in part 204 of Title 40 of the code of Federal Regulations. This regulation requires the incorporation of the following notification and definition in the OPERATION AND MAINTENANCE MANUAL.

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Federal law prohibits the following acts:

1. The removal, rendering inoperative, other than for purposes of maintenance, repair or replacement of any device or element of design incorporated into any new compressor for the purpose for noise control prior to its sale or delivery to the ultimate purchase or while it is in use or;
2. The use of the compressor after such device or element of design has been removed or rendered inoperative by any person.

Among the acts included in the prohibition against tampering are those listed:

1. Removal or rendering inoperative any of the following:
 - a. The engine exhaust system including the manifold, muffler or tailpipe
 - b. Any of the enclosure components and associated sound barrier materials
 - c. The sound baffles in the intake, exhaust and cooling system gas paths
 - d. The air intake system including the air cleaner, the intake ducting, valve cover and gaskets.
2. Removal of any of the following:
 - a. Engine mounts or other sound isolating barriers in the system
 - b. Fan shrouding and sound hood
3. Operation of the compressor with any of the enclosure doors open

NOTICE

THIS MANUAL IS AS CURRENT AS POSSIBLE AT THE TIME OF PRINTING AND IS SUBJECT TO CHANGE WITHOUT NOTICE. FOR INFORMATION NOT COVERED IN THIS MANUAL, CONSULT YOUR LOCAL DISTRIBUTOR OR GRIMMERSCHMIDT COMPRESSORS.

SECTION 1 SAFETY

1.1 TOWING

OVERVIEW

- *The hitch to coupler is a pinch point. Keep hands and fingers clear.
- *Check tow bar connections.
- *Secure safety chains – couple curbside chain shorter.
- *Connect lights (if provided).
- *Secure: Doors, hoods and tools.
- *Replacement tire should be of the same size and rating as the original equipment. Wheel lug bolts or wheel-bearing nuts must be tightened to a specified torque.
- *Raise third wheel or stand.
- *Don't exceed speed limits.
- *Remember your vehicle is longer than usual with compressor attached.
- *Never tow trailer unless all electrical lights and brakes are connects and working properly (if so equipped).

PREPARING TO TOW

1. Carefully inspect the air compressor ball hitch or pintle, drawbar and chains, look for excessive wear, corrosion, cracked, bent, dented or otherwise deformed or degraded member, loose nuts, bolts or other fasteners. Do the same on the towing vehicle's hitch and related hardware. If inspection shows any worn or damaged parts **DO NOT TOW** the compressor until repairs are made.

TORQUE SPECIFICATIONS

HITCH FASTENERS 150 FT/LBS

WHEEL LUG FASTENERS 65/70 FT/LBS

SAFETY CHAIN FASTENER 50 FT/LBS

2. Chock or block the compressor wheels and raise the drawbar of the compressor to the approximate level of the towing vehicle hitch.
3. Back the towing vehicle to the compressor and lower the compressor on the hitch.
4. Engage, close, and lock the coupling device.
5. Attach safety chains, couple curbside chain so that it is shorter than the other chain.
6. Attach electrical and brake connections to connections on the tow vehicle, when so equipped.
7. Fully retract front screw jack and rear stabilizer legs if unit is so equipped. Place any retractable stand in a full up and locked with the stand horizontal.
8. Carefully inspect the tires and check the tire pressure.

SECTION 1 SAFETY

9. Test all running, tail, stop and directional lights. Make sure that all lights, reflectors and reflecting surfaces are clean and in good condition.
10. Disconnect and store service air hoses and tools in the tow vehicle.
11. Close and latch the hood and any access panels.
12. Set the parking brake in the towing vehicle. Only then release any compressor brake and remove chocks and blocks from compressor wheels.
13. Test running brake operation, if so equipped, including any breakaway switch.

TOWING

1. Never exceed 55 miles per hour (88 kilometer per hour).
2. Adjust speed to reflect weather and road conditions.

1.2 PARKING

CHOOSE A PARKING SITE

1. Park the compressor on a level, firm area. Never park on a grade of more than 15 degrees (27%). If you must park on any grade, park across the grade so that the compressor does not tend to roll.
2. Park so that the wind carries exhaust fumes and radiator heat away from the compressor inlet.
3. Park away from work site dust.
4. Stay clear of electrical power lines. Keep the towing vehicle or equipment carrier, compressor, hoses, tools and all personnel at least 10 feet from power lines and buried cables.

PARKING PROCEDURES

1. Chock or block the wheels and set the compressor brake, if so equipped.
2. Disconnect the brake and electrical connections, if so equipped.
3. Disconnect the safety chains and wrap them around or hook them to the Drawbar so that they are off the ground.
4. Lower any front jack or stabilizer legs, if so equipped.
5. Lower and lock any caster wheel.
6. Unhitch the compressor from towing vehicle.
7. Move the towing vehicle clear of the compressor.
8. Immediately erect hazard indicators, barricades and if working at night, light flares to keep others clear of the compressor.

1.3 BEFORE STARTING THE COMPRESSOR

1. Check fluid levels and for possible leaks.
2. Use adequate hose and couplings with safety locks or pins.
3. Remove all tools and/or loose items from engine compartment.
4. Relieve any pressure in receiver tank.

SECTION 1 SAFTEY

1.4 COMPRESSOR USE AND COMPRESSED AIR

1. Air from this machine is not fit for human consumption – do not use air for breathing or food processing.
2. Never operate in an enclosed area.
3. Never use compressed air to clean your clothes; and never direct it at another person – it can kill.
4. Always wear eye protection.
5. Install check valve (“OSHA”) upstream of hose to prevent hose whip in case of a rupture.
6. Keep doors or hoods closed on machines in operation.
7. Do not touch hot surfaces or moving parts, such as exhaust or fans.
8. Do not adjust or restrict relief valves.
9. Do not disconnect or alter shutdown sensors or switches.
10. Do not refuel while machine is running; shut down and allow to cool before refueling.
11. Do not jump-start with cable connections directly on battery.
12. To prevent back strain only the smallest air compressors should be unhitched by hand. Drawbars on all other units must be raised and lowered by a jack, chain fall, or other lifting device.
13. Do not use air at pressures higher than 30 PSIG (207 KPA) for cleaning purposes. Use of higher air pressures can cause injury to the operator.
14. Keep compressor hoods closed except when making repairs or adjustments or servicing the compressor.
15. Make sure all personnel are out of and clear of the compressor before starting or operating it.
16. Do not store ether cylinders or air line antifreeze compound in confined areas.

1.5 SERVICING

1. Before servicing compressor, relieve receiver pressure and allow to cool.
2. Be sure all opened doors and hoods are propped and secured.
3. Disconnect battery if mechanical work is to be performed.
4. Wipe up all spills resulting from servicing.
5. Disconnect the grounded (negative) battery connection before making repairs or cleaning inside the enclosure.
6. Do not use flammable solvents for cleaning the compressor.
7. Do not remove radiator cap quickly, it may cause spray of scalding coolant and severe burns to operator.
8. Make repairs only in clean, dry and well-lighted and well-ventilated areas.
9. Keep all parts of the body and any hand held tools or other metal objects away from exposed live parts of the electrical system.
10. Replace damaged fuel tanks or lines immediately. DO NOT WELD on or near fuel tanks or lines.

SECTION 1 SAFETY

11. Make sure all personnel are out of the compressor before closing and latching hoods.
12. Radiator coolant is under pressure. When checking coolant in radiator, loosen cap slowly to its first stop to relieve pressure before removing cap completely.

1.6 LIFTING

1. If the compressor is provided with a lifting bail, then lift by the bail. If no bail is provided, then lift by sling.
2. When lifting by helicopter, use a sling. Do not lift by unit lifting bail.
3. Inspect the entire lifting, rigging, and supporting structure to ensure it is in good condition and has a rated capacity of at least the gross weight of the compressor plus 10%.

SECTION 2 DESCRIPTION

2.1 INTRODUCTION

Your GrimmerSchmidt portable is a diesel driven rotary screw compressor unit that provides superior performance and reliability along with a minimal amount of required maintenance.

2.2 ROTARY COMPRESSOR COMPONENTS

COMPRESSOR DESCRIPTION

The compressor assembly is a positive displacement, oil flood lubricated, screw type unit employing one stage of compression to achieve the desired pressure. Components include a housing (stator), top screws (rotors), bearings and bearing supports.

In operation, two helical grooved rotors mesh to compress air. Inlet air entering the casing is compressed as the male lobes roll down the female grooves, pushing trapped atmospheric air along and compressing it in one stage of compression. This process delivers smooth-flowing air at full pressure to the receiver.

To illustrate the compression sequence, consider the action of the male lobe as similar to a ball. As a helix rotates, the ball (male lobe) meshes with the groove to start a compression cycle with trapped atmospheric air. As the ball moves down the groove, air is compressed. The compressed air is discharged as the ball reaches the end of the groove. Atmospheric air fills in behind the ball preparing the groove for another compression cycle as rotation continues and the male lobe again meshes with the groove.

During the compression cycle, oil is injected into the compressor for the purpose of lubricating, cooling and sealing. Compressed air laden with oil leaves the compressor

SECTION 2 DESCRIPTION

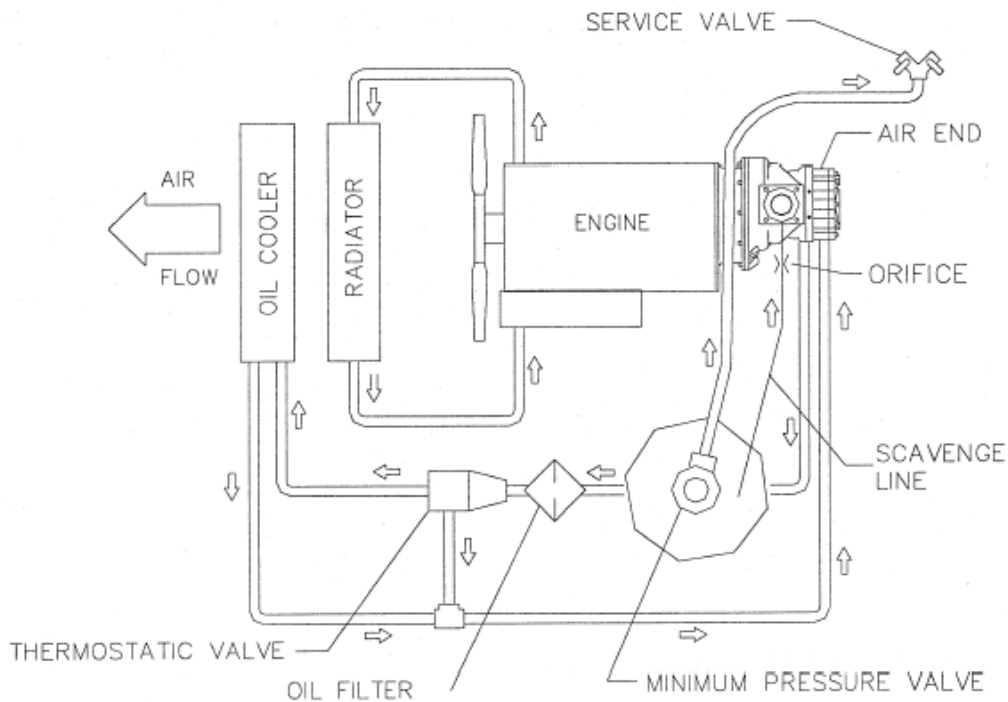
unit through a discharge port, which is designed to give optimum performance within the desired discharge pressure range.

AIR FILTER

The rotary screw compressor unit and engine are protected by a high efficiency two stage air-filtering system. This is a dry filter that requires maintenance when the air filter restriction gauge says it is time.

OIL COOLING

The compressor is an “oil flooded” compressor. The oil lubricates, seals and cools the internals of the compressor as it is injected into the compressor. See the flow diagram on page 13. The oil goes through the compressor with the air where it picks up the heat generated by the compression process then seals the spaces between moving parts and lubricates bearings. The hot oil must be cooled. It is separated from the air; passed



through the oil cooler (mounted next to the engine radiator), through a thermostatic valve (that helps to rapidly warm cold oil at start-up), then through a full flow oil filter, and then back into the compressor. See sections 4.10 and 4.13 for oil filter element and air/oil separation element servicing.

AIR/OIL SEPARATOR

At the compressor discharge the compressed air and the hot oil pass a discharge check valve and flow into a steel ASME coded pressure vessel (rated at 175 psig – 1206 kPa) that acts as a reservoir for the air and separates out the oil. From the bottom of this oil

SECTION 2 DESCRIPTION

sump, the oil leaves the vessel on its way to the oil cooler. The air and the slight oil mist still entrained in the airflow through the separator element, which removes the last of the oil from the air. The air passes on out to its final use and the separated oil goes through the scavenge line to the compressor intake to re-enter the system. As the compressed air leaves the receiver it goes through a minimum pressure valve that is set to maintain at least 80 psig (559kPa) in the receiver when the compressor is running. The purpose of this pressure is to insure that there is pressure to force the oil out of the bottom of the receiver, through the oil cooling system so that sufficient oil is injected into the compressor.

CONTROL SYSTEM

The Grimmer Schmidt portable compressor is simple to operate. Starting procedure is explained in Section 4 and on the instrument panel door of the compressor. Each machine has an on/off switch, push button start switch and a safety by pass switch that bypasses the safety shutdowns and holds speeds to idle during starting. Once the machine is “on line” and working its control is automatic. The control system senses the need for air and adjusts the speed of the engine and compressor as well as the opening of the compressor inlet valve to supply the amount of air needed. If the air demand is zero, the engine and compressor “idle” and the inlet valve is shut to control the air entering the compressor. If the demand is maximum then the opposite happens – full speed and wide-open inlet valve. Intermediate air demands give intermediate speeds and valve openings for maximum operating efficiency. Service and adjustments are in Section 5.10.

2.3 DIESEL ENGINE COMPONENTS

ENGINE DESCRIPTION

The diesel engine in each GrimmerSchmidt portable compressor is selected to have reserve horsepower and speed necessary to drive the compressor and all accessories when operating up to a discharge pressure of 100 psig (689kPa).

RADIATOR

The radiator is selected to handle the heat load of the engine. Mounted behind it is the compressor oil cooler. Cooling air is moved through these two coolers with a specially selected engine fan. The system is designed to handle extreme heat conditions.

FUEL SYSTEM

All units are supplied with fuel tank capacity adequate for a day’s normal operation, fuel filtering system and optional low fuel shutdown. See Section 5.9 for fuel filter servicing.

MUFFLER

A durable low restriction engine muffler reduces engine noise.

SECTION 2 DESCRIPTION

2.4 CHASSIS

FRAME

The entire compressor frame and body is “unitized” and constructed of 3/16” or 10 gauge steel plate, resulting in light weight while providing a much stronger body than conventional designs of light sheet metal over structural members.

TOWBAR AND HITCH

At the end of a rugged steel drawbar there is a ball hitch, a pintle hitch or a combined ball/pintle hitch – selection is made at time of purchase.

RUNNING GEAR

Axle, wheels and tires are all sized for their job. This unit is equipped with a single axle. The lightweight of the compressor plus the axle design make towing at highway speeds possible.

2.5 FIBERGLASS HOODS

Fiberglass never rusts or requires painting. It puts major service points within easy reach for routine maintenance or adjustment.

2.6 INSTRUMENT PANEL DOOR

Lockable instrument panel doors provide access to all controls and gauges. See Section 4 for instrument panel use.

SECTION 3 OPERATION

3.1 START UP PREPARATION

1. Check engine and compressor oil levels. Do not overfill.
2. Check coolant level in radiator. (Approximately 2” below top of filler neck.)
3. Check for fuel, oil and coolant leaks.
4. Check air cleaner, clamps and hoses.
5. Check battery connections.
6. Check and adjust tension of fan belts.
7. NOTE: this unit has minimum air pressure valve to assure compressor oil flow. There will be no airflow from the compressor if receiver pressure is less than 80 psig.

3.2 STARTING PROCEDURE

1. Open air service valve.
2. Place ON/OFF toggle switch in ON position.
3. Hold the switch in the up position for three to five seconds prior to starting. This is to allow the glow plug to warm the mixing chamber.

SECTION 3 OPERATION

4. While holding switch up, engage starter by pushing the start button. When engine starts, release start button. Continue to hold the switch until oil pressure gauge reads 40 PSI, then release by-pass switch.
5. Allow compressor to warm-up 3 to 5 minutes, close service valve and place by-pass, start/stop, and run switch in RUN position.
6. Open service valve(s) as needed for work.

3.3 EMERGENCY SHUTDOWN PROCEDURE

Move ON/OFF toggle switch to OFF position.

3.4 ROUTINE SHUTDOWN PROCEDURE

1. Close service valve and place by-pass, start/stop, and run switch to STOP position.
2. Allow compressor to run 2 to 3 minutes to cool.
3. Move on/off toggle switch to OFF position.

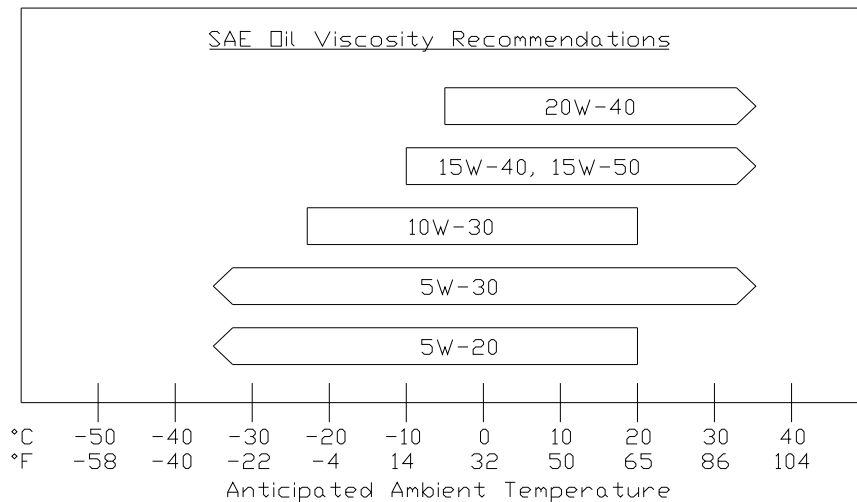
SECTION 4 MAINTENANCE

4.1 ENGINE OIL SPECIFICATION

The use of quality engine lubricating oils combined with appropriate oil drain and filter change intervals are critical factors in maintaining engine performance and durability. Use a premium 15W-30 multi-viscosity oil or equivalent meeting the following American Petroleum Institute (API) classifications: CC/SC for naturally aspirated engines and CD, CC/SF for turbocharged engines. Definitions of the CC and CD codes are:

CC – These oils provide low temperature protection from sludge and rust and are designed for moderate duty service. They also perform moderately well at high temperatures.

CD – These oils are designed for severe duty service. They provide protection from deposits and oxidation at high temperatures.



SECTION 4 MAINTENANCE

ADDITIONAL ENGINE OIL DATA

Additional information regarding lubricating oil availability throughout the world is available in the "E.M.A. Lubricating Oils Data Book for Heavy Duty Automotive and Industrial Engines." The data book may be ordered from the Engine Manufacturer's Association, One Illinois Center, 111 East Wacker Drive, Chicago, IL U.S.A. 60601. The telephone number is (312) 664-6610.

ARCTIC ENGINE OIL

If an engine is operated in ambient temperature consistently below -23 degrees C (10 degrees F) and there are no provisions to keep the engine warm when it is not in operation, use synthetic CC/CD engine oil with adequate low temperature properties such as 5W-20 or 5W-30. The oil supplier must be responsible for meeting the performance service specifications.

SYNTHETIC ENGINE OIL

CAUTION
THE USE OF A SYNTHETIC BASE OIL DOES NOT JUSTIFY EXTENDED OIL CHANGE INTERVALS. EXTENDED OIL CHANGE INTERVALS CAN DECREASE ENGINE LIFE DUE TO FACTORS SUCH AS CORROSION, DEPOSITS AND WEAR.

BREAK-IN OIL

Special "break-in" engine lubricating oils are not recommended for new or rebuilt engines. Use the same type of oil during the "break in" as that which is used in normal operation.

CAUTION
A SULFATED ASH LIMIT OF 1.85% HAS BEEN PLACED ON ALL ENGINE LUBRICATING OILS. HIGHER ASH OILS MAY CAUSE VALVE AND/OR PISTON DAMAGE AND LEAD TO EXCESSIVE OIL CONSUMPTION.

CHANGING ENGINE OIL

1. Drain engine oil (preferably warm) from engine.
2. Replace oil pan plug and secure.
3. Add required amount of oil through fill tube and check dipstick for proper level.
4. Run engine to check for engine oil pressure and check for leaks.

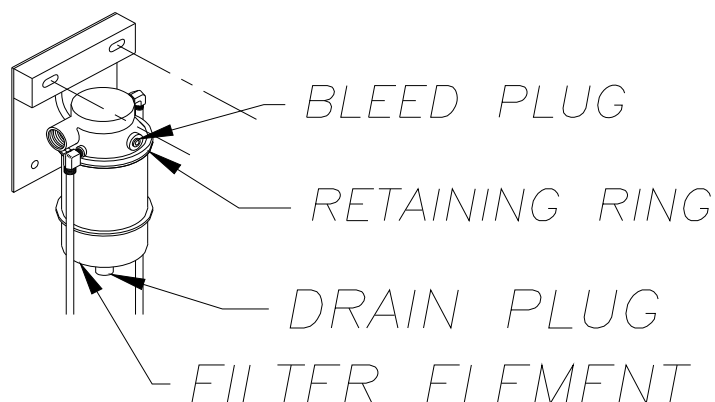
4.2 ENGINE FUEL SPECIFICATIONS

WARNING
DO NOT MIX GASOLINE OR ALCOHOL WITH DIESEL FUEL. THIS MIXTURE CAN CAUSE AN EXPLOSION.

SECTION 4 MAINTENANCE

CAUTION

DUE TO THE PRECISE TOLERANCES OF DIESEL INJECTION SYSTEMS, IT IS EXTREMELY IMPORTANT THAT THE FUEL BE KEPT CLEAN AND FREE OF DIRT OR WATER. DIRT OR WATER IN THE SYSTEM CAN CAUSE SEVERE DAMAGE TO BOTH THE INJECTION PUMP AND THE INJECTION NOZZLE.



Use ASTM No. 2D fuel with a minimum Cetane number of 40. No. 2 diesel fuel gives the best economy and performance under most operating conditions. Fuels with Cetane numbers higher than 40 may be needed in high altitudes or extremely low ambient temperatures to prevent misfires and excessive smoke.

MODEL 185DR JOHN DEERE FUEL FILTER REPLACEMENT (Figure B)

1. When equipped, close the fuel shut-off valve.
2. Loosen retaining ring and remove filter element.
3. When equipped, remove filter element from glass sediment bowl. Clean sediment bowl and reinstall a new element onto bowl.
4. Position new element in correct location, then hand tighten the retaining ring.
5. Open fuel shut-off valve and bleed fuel system. Tighten bleed plug.

COLD WEATHER FUEL

At operating temperatures below 0 degrees C (32 degrees F), use a blend of No. 1D and No. 2D fuels, also known as “winterized” No. 2D. NOTE: No. 1D fuel can be used; however, fuel economy will suffer.

Use low sulfur content fuel having a cloud point that is at least 10 degrees below the lower expected fuel temperature. Cloud point is the temperature at which wax crystals begin to form in diesel fuel.

SECTION 4 MAINTENANCE

The viscosity of the fuel must be kept above 1.3 centistrokes to provide adequate fuel system lubrication.

4.3 ENGINE FUEL FILTER

The engine fuel filter(s) should be changed every 200 to 500 hours or as needed. It is essential that the filter(s) be maintained since loss of power due to dirty filter(s) will prevent proper compressor operation.

WARNING
KEEP HANDS AND FINGERS CLEAR OF FITTING. HIGH PRESSURE OF THE FUEL CAN CAUSE PENETRATION OF THE SKIN. SEEK IMMEDIATE MEDICAL ATTENTION IF THE FUEL SPRAY BREAKS SKIN.

4.4 ENGINE OIL FILTER

Engine oil filters should be changed every 100 hours of operation and more often under extremely dirty or hot conditions.

OIL FILTER REPLACEMENT

1. Clean the area around the lubricating filter head.
2. Remove the filter.
3. Clean the gasket surface of the filter head.

NOTE: THE O-RING CAN STICK ON THE FILTER HEAD. MAKE SURE IT IS REMOVED.

4. Apply a light film of lubricating oil to the gasket-sealing surface before installing the filter.
5. Install the filter as specified by the filter manufacturer.

CAUTION
MECHANICAL OVER-TIGHTENING MAY DISTORT THE THREADS OR DAMAGE THE FILTER ELEMENT SEAL.

4.5 ENGINE COOLING SPECIFICATIONS

Diesel engines require a balanced coolant mixture of water and ethylene glycol base antifreeze. This protects the engine cooling system from corrosion as well as freezing damage. The GrimmerSchmidt portables are shipped from the factory with a 50/50 mixture of water and ethylene glycol. In tropical climates where freeze protection is not required, glycol engine coolant should still be used. It will help prevent corrosion and pitting of cylinder liners.

SECTION 4 MAINTENANCE

MIXTURES

Antifreeze concentration level should not exceed recommended levels. To do so can cause cooling system failure.

- ◆ Use high quality, low silicate antifreeze.
- ◆ A mixture of 50 percent antifreeze and 50 percent water is required for temperatures above –37 degrees C (-34 deg. F).
- ◆ A mixture of 60 percent antifreeze and 40 percent water is required for environments below –37 degrees C (-34 deg. F). This provides protection to –54 degrees C (-65 deg. F).
- ◆ Never exceed a 60 percent antifreeze and 40 percent water mix.

COOLANT RECOMMENDATIONS

GrimmerSchmidt Corporation recommends the use of low silicate ethylene glycol type antifreeze meeting either of the following requirements:

- A. The antifreeze should meet Engineering Standard GM 6038-M.
-OR-
- B. The antifreeze should contain no more than 0.1 percent anhydrous alkali metasilicate and meet either reengineering Standard GM 1825-M or GM 1899-M, which are performance specifications.

General Motors established the above engineering standards for ethylene glycol type antifreeze; however, many commercially available types of antifreeze meet these standards. It is not the intent of GrimmerSchmidt Corporation to endorse or recommend a specific manufacture's antifreeze. GM standards are referred to because there are not industry standards for antifreeze formulations as there are for lubricating oils.

4.6 ENGINE COOLING SYSTEM

All engines have a pressurized cooling system that contains a 50/50 mixture of water and ethylene glycol. Daily maintenance of the system includes a check of the coolant level, proper belt adjustment of fan and water pump drives, soundness of fan and cleanliness of the radiator and coil cooler to permit airflow. Further cooling system maintenance is defined in the engine maintenance manual.

COOLANT LEVEL

Before each start-up, WHEN RADIATOR IS COLD, the coolant should be checked. WHEN NEEDED, refill with a 50/50 solution of water and ethylene glycol, DO NOT use 100% antifreeze for "topping off".

WARNING
CHECK THE COOLANT LEVEL ONLY WHEN THE ENGINE IS STOPPED AND THE TEMPERATURE IS BELOW 160 DEGREES F (70 DEG. C). FAILURE TO DO SO CAN CAUSE PERSONAL INJURY FROM HEATED COOLANT SPRAY.

SECTION 4 MAINTENANCE

FAN

Check the fan for cracks, loose rivets and bent or loose blades. Make sure it is securely mounted. Tighten the cap screws if loose. Replace damaged fans.

WARNING
NEVER USE THE FAN TO ROTATE THE ENGINE. THE BLADE (S) CAN BE DAMAGED CAUSING A FAN FAILURE, WHICH CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

RADIATOR PRESSURE CAP

If coolant continually spills from radiator through the overflow then the radiator cap should be tested and/or replaced with a cap of the same pressure rating, generally 13 psi. Be sure cap is turned to the proper secure position.

RADIATOR

Any sign of leakage from the radiator may justify a pressure test to assure its soundness. Only qualified service people should repair radiator leaks. Dirt that clogs the cooling fans of the radiator should be removed. The use of an air stream or high-pressure steam cleaner should be done with caution so as to not damage the delicate fins. Bent cooling fins will reduce the cooling capability of the radiator.

4.7 COMPRESSOR OIL

The life and proper operation of the compressor is dependent on adequate and clean compressor oil. Chevron AW ISO 32 hydraulic oil is supplied with the new machine and should be used for proper level maintenance and for oil changes. We recommend that you use Chevron AW ISO 32 hydraulic oil.

WARNING
DO NOT REMOVE CAPS, PLUGS OR OTHER COMPONENTS WHEN COMPRESSOR IS RUNNING OR PRESSURIZED. BEFORE DOING SO, STOP COMPRESSOR AND RELIEVE ALL INTERNAL PRESSURE.

COMPRESSOR OIL SPECIFICATIONS

It is permissible to use oils other than the hydraulic oil shown above, such as automatic transmission fluid. If they are used then they must have at least the following minimum properties:

ISO Grade	32
CPS No.	255675
AGMA Grade	-
API Gravity	32.6
Viscosity, Kinematic	
cSt at 40 deg. C	33.6
cSt at 100 deg. C	5.5
Viscosity, Say bolt	
SUS at 100 deg. F	173
SUS at 210 deg. F	45
Viscosity Index	98
Flash Point, Deg. C (deg. F)	204 (399)
Pour Point, Deg. C (deg. F)	-33 (-27)
Oxidation Stability, Hours to 2.0 mg KOH/g acid number ASTM D 943	>6000

SECTION 4 MAINTENANCE

Special Note: Chevron Hydraulic Oils AW should not be used in high-pressure systems in areas subject to fire hazard.

The advantage in using hydraulic oil in the compressor is that it is good lubricant suitable to its application and it is readily available. There are other oils that may be used that have longer life. They are better able to stand the extreme operating conditions. Whether or not to use these oils is a decision that depends upon the operation conditions. Very frequent oil changes are necessary in extremely hot, dirty operating conditions and if the compressor is operating in a remote, difficult-to-reach and service location, then perhaps it would be better to use the hydraulic oil because of availability and cost. If, however, service is convenient and attentive so that the oil can be used for as long as it will provide good protection, then higher quality oils may be used that will extend the life of the compressor.

GrimmerSchmidt portable compressors can take advantage of several types of compressor oil. GrimmerSchmidt has carefully selected one compatible oil: Dexron III Automatic Transmission Fluid. Dexron III ATF meets or exceeds the specifications of the initial fill hydraulic oil.

WARNING

GRIMMERSCHMIDT DOES NOT RECOMMEND MIXING DIFFERENT TYPES OF OILS. WHEN CHANGING TO DIFFERENT TYPE OIL, CLEAN COOLER, AIR/OIL RECEIVER AND LINES THOROUGHLY

4.8 ADDING COMPRESSOR OIL

1. Level the compressor to assure oil level indicator will be accurate.
2. Remove any dirt around fill cap, which is located on or near the air/oil receiver and then remove the fill cap itself.
3. Inspect the O-ring in the fill cap for damage and cleanliness. Replace if necessary.
4. Proper oil can then be added till the oil level reaches halfway in the sight-level tube or the "bulls eye."
5. 5. Replace fill cap securely – never put cap on without tightening immediately.

CAUTION

DO NOT REPLACE FILL CAP WITH A PIPE PLUG. SERIOUS INJURY OR DAMAGE COULD RESULT. THE THREADS ARE DIFFERENT. ALWAYS INSURE A STRAIGHT THREAD FILL CAP IS USED.

4.9 CHANGING COMPRESSOR OIL

1. Oil and air filter changes will help prolong oil life. If the oil appears dirty or it has a foul smell it should be replaced.
2. Remove fill cap and drain oil from the bottom of the air/oil receiver. Oil will drain more quickly and completely if it is warm from operation.

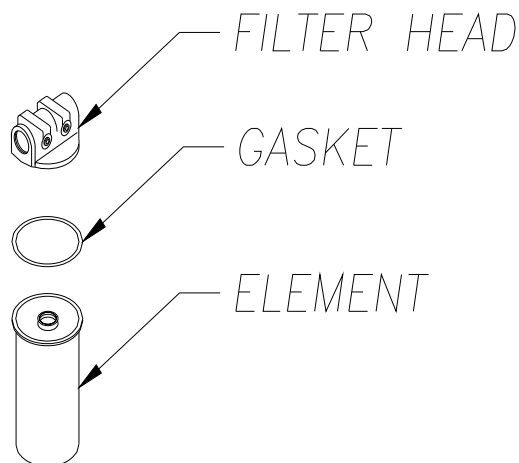
SECTION 4 MAINTENANCE

3. Close all drains and replace oil with fresh oil to proper level. Replace fill cap and run unit to see if more oil needs to be added and to insure there are no leaks.

4.10 COMPRESSOR OIL FILTER

The main oil filter in the compressor lubrication system is one of the full flow renewable canister types. Initially the filter should be replaced after the first 50 hours, then every 200 hours or sooner if indicated. A dirty oil filter can restrict oil flow, causing high oil temperature shutdown switch to shut unit down; hence, oil filter change is thus indicated.

CAUTION
SUBSTITUTE FILTERS MAY HAVE INADEQUATE WORKING PRESSURE RATINGS, RESULTING IN ELEMENT LEAKAGE OR RUPTURE. REPLACEMENT FILTERS MUST BE THE SAME QUALITY AND TYPE AS THE ORIGINAL GRIMMERSCHMIDT FILTER.



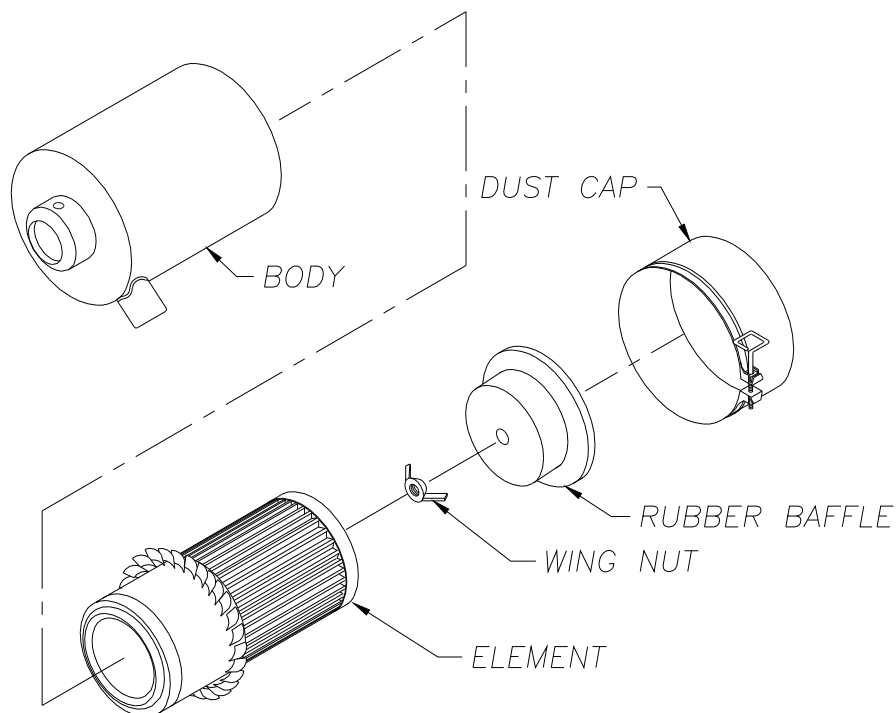
OIL FILTER ELEMENT REPLACEMENT

1. Using a strap wrench, remove the old element and gasket.
2. Clean gasket seating surface.
3. Apply a light film of oil to the new gasket.
4. Hand tighten new element until new gasket is seated in the gasket groove.
5. Continue tightening element by hand an additional $\frac{1}{2}$ or $\frac{3}{4}$ turn.
6. Restart machine and check for leaks.

CAUTION
MECHANICAL OVER-TIGHTENING MAY DISTORT THE THREADS OR DAMAGE THE FILTER ELEMENT SEAL.

SECTION 4 MAINTENANCE

4.11 COMPRESSOR & ENGINE AIR FILTER MAINTENANCE



ELEMENT REPLACEMENT

1. Loosen the clamp, which secures the dust cup to the body and remove the cover.
2. Remove the rubber baffle from the inside of the dust cup and empty the dirt from the dust cup.
3. Remove the wing nut from the end of the element and remove the element.
4. Clean the canister and dust cap with a damp cloth inside and out. Do not blow dirt out with compressed air.
5. At this time clean or replace the element.
6. Replace the wing nut after installing the element.
7. Reposition the cover and tighten the clamp, **INSTALL WITH ARROW UP**.
8. Reset the air filter restriction indicator and the machine will be ready for operation.

CAUTION

WHEN CLEANING AN ELEMENT, THE ELEMENT WILL BE DAMAGED IF YOU EXCEED THE RECOMMENDED MAXIMUM PRESSURE FOR COMPRESSED AIR (30 PSI/200 KPA).

CAUTION

DO NOT STRIKE THE ELEMENT AGAINST ANY HARD SURFACES AND POSSIBLY RUPTURE THE ELEMENT. NEVER BLOW DIRT OUT OF THE INTERIOR OF THE FILTER HOUSING. THIS MAY INTRODUCE DUST DOWNSTREAM OF THE FILTER. INSTEAD, USE A CLEAN DAMP CLOTH. DO NOT OIL THE ELEMENT.

SECTION 4 MAINTENANCE

AIR FILTER ELEMENT CLEANING

The air filter element is cleanable by using compressed air. The maximum amount of times that an element should be cleaned is six (6) times; however, the element should be used no longer than a period of one (1) year without changing.

Prior to cleaning an element, check the element for damage. Damaged elements must be replaced.

When cleaning the element with compressed air, never let the air pressure exceed 30 psig (200kPa). Reverse flush the element by directing the compressed air up and down the pleats in the filter media from the "clean side" of the element. Continue reverse flushing until all dust is removed. Should any oil or greasy dirt remain on the filter inspect thoroughly prior to installation. (See element inspection).

ELEMENT INSPECTION

1. Place a bright light inside the element to inspect for damage or leak holes. Concentrated light will shine through the element and disclose any holes. Discard any element that shows the slightest hole.
2. Inspect all gaskets and gasket contact surfaces of the housing. Should faulty gaskets be evident, correct the condition immediately. If the clean element is to be stored for later use, it must be stored in a clean container.
3. After the element has been installed, inspect and tighten all air inlet connections prior to resuming operation.

4.12 COMPRESSOR OIL THERMOSTATIC VALVE

The oil thermostatic valve acts as a thermostatically controlled by pass valve and allows varying amounts of oil depending upon the temperature, to by pass the cooler during the warm-up period. When circulated oil reaches a temperature of 160 degrees F, the valve closes the by pass completely and all the oil is circulated through the cooler. The oil cooler by pass is restricted enough to cause some warm oil to flow through the cooler during the warm-up period, maintaining a higher average compressor oil temperature. This reduces condensation in the oil system and also reduces the possibility of a slug of cold oil from the cooler; causing a momentary high restriction and a temporary reduction in the oil pressure, hence oil flow.

CLEANING OIL THERMOSTAT

1. If it becomes necessary to take the thermostat apart and clean it, disassemble at the bolted flange and remove the element.
2. If coated or dirt, clean as necessary. The element and rubber seal ring should be cleaned only with hot water and caustic or oakite solution. Trichlorethylene or paint removers will damage them.
3. Inspect the element for bent or dented parts.
4. Replace any damaged part during cleaning and assembling. The pipe openings should be closed with tape or plugs until pipe connections are made.

**SECTION 4
MAINTENANCE**

4.13 COMPRESSOR AIR/OIL SEPARATOR

WARNING
DO NOT REMOVE CAPS, PLUGS OR OTHER COMPONENTS WHEN COMPRESSOR IS RUNNING OR PRESSURIZED; PERSONAL INJURY WILL RESULT. BEFORE DOING SO, STOP COMPRESSOR AND RELIEVE ALL INTERNAL PRESSURE.

The separator element is located in the top end of the air-oil receiver/separator tank. Here the oil mist contained in the air is removed prior to the final discharge of air. Air should be taken only from the outlet service valves on the center of the top end of the separator – never directly from the receiver/separator fittings on the side of the tank. When the oil vapor in the discharge air becomes excessive, the separator element may need replacing. This should not be necessary more than once a year under normal operating condition.

SEPARATOR ELEMENT REPLACEMENT

1. Remove the head from the top of the separator and pull the element out. **Only a factory element should be used as replacement.**
2. The separator element flange must have a gasket on each side to seal to the head on one side and the vessel on the other. The staple in each gasket must be left in the gasket-it acts as a static ground.
3. Re-torque the head bolts uniformly to a specification of 220 ft-lb (dry) or 17 ft-lb (wet), when replacing the separator head.

4.14 GRIMMERSCHMIDT EXPENDABLE PART REPLACEMENT NUMBERS

ENGINE FILTERS

Model	Oil	Fuel	Air	Water
375 D	630-65547	630-62545	124-25730	_____

COMPRESSOR FILTERS

Model	Oil	Air	Element Separator
375 D	124-28093	124-27739	124-22414

4.15 BELTS & BELT ADJUSTMENT

Visually inspect the belts. Replaces belts if cracked or frayed. Check engine manual for proper belt tension.

SECTION 4 MAINTENANCE

4.16 CONTROLS – OPERATION AND ADJUSTMENT

Automatic control of the compressor is maintained by the control system. The system is designed to match air supply with demand and prevent excessive pressure with no air demand.

The components of the control system are: the blown down valve, start-run valve, compressor inlet valve, pressure regulator and an air cylinder.

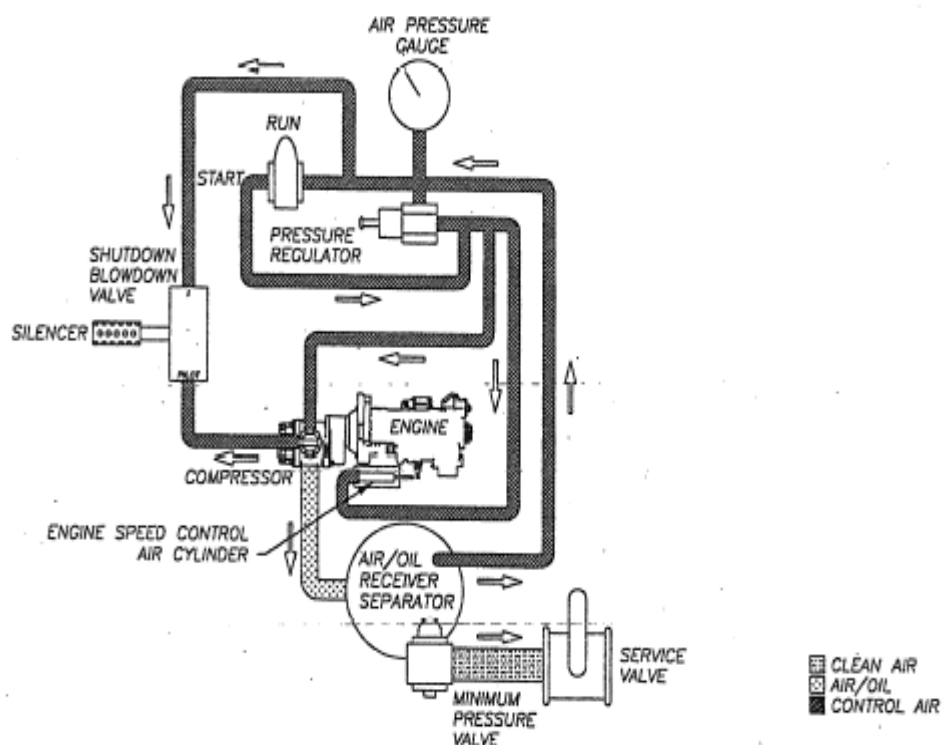
The shutdown/blow down valve blows down the system on shutdown.

The start-run valve in the start position allows air to by-pass the pressure regulator. This puts air directly to the compressor inlet valve, closing it, and the air cylinder, holding the throttle at idle. When switched to the run position, it is closed, shutting off the by-pass air. Control air now has to go through the pressure regulator. The compressor inlet valve controls the volume of air by opening and closing with air demand. This valve is controlled by an air signal from the pressure regulator. With no air demand, the signal air from the regulator closes the inlet valve. When an air demand is present, the air signal is removed allowing the inlet valve to open to match air demand, if maximum air is required, the inlet will be fully open. With less than maximum air demand, the inlet valve will open as required to match demand.

The pressure regulator is a positive type. As pressure increases, it opens, allowing air to pass. As pressure decreases, the regulator closes, stopping airflow. The regulator is located in-line between the receiver/separator and the inlet valve. As pressure increases in the receiver, the regulator opens, allowing air to flow to the inlet valve, closing the valve. When an air demand is sensed, the pressure decreases and the regulator starts to close, restricting the airflow to the inlet valve. An orifice in the regulator bleeds the air out of the control line between the regulator and inlet valve, allowing the inlet valve to open. When air demand is removed, receiver pressure increases, opening the regulator and allowing air to flow to inlet valve, which closes the inlet valve.

The control system also includes an engine air cylinder. This engine air cylinder is connected to the throttle arm on the engine injection pump. The air cylinder receives an air signal from the pressure regulator, thus controlling the engine speed. With no air demand present, the regulator is open, allowing air to flow to the air cylinder, causing the cylinder to extend, moving the throttle to idle. When an air demand is present, the regulator closes, stopping airflow to the air cylinder. The orifice inside the regulator allows the air in the control line between air cylinder and regulator to bleed out. An internal spring retracts the air cylinder, moving the throttle arm to increase engine speed, matching engine speed ort air demand.

SECTION 4 MAINTENANCE



ADJUSTMENT

When performing control adjustments care must be taken in regard to safety, as the compressor must be running. Be aware of moving parts as well as hot items such as fan, belts and exhaust components.

IDLE OR UNLOAD SPEED ADJUSTMENT

With the compressor warmed up and all service valves closed, move start-run switch to run position. Air pressure will build to 120 psig. If air pressure is less than 120 psig, adjust regulator by turning the adjusting screw clockwise. If air pressure is greater than 120 psig, adjust regulator down by turning the adjusting screw counter-clockwise. Check engine speed with a photo tachometer.

If idle speed is not listed in specifications, adjustment will be required.

IDLE SPEED ADJUSTMENT PROCEDURES

On the injection pump throttle arm, there are two adjusting screws. Also an air cylinder connected to the throttle arm, this air cylinder moves throttle to increase and decrease engine speed with air demand. When adjusting idle speed, the air cylinder should be

fully extended moving throttle arm towards front of engine. To adjust idle speed, loosen locknut on adjusting screw towards rear of engine. Turning adjustment screw clockwise will increase speed. If proper speed cannot be obtained with the adjustment

SECTION 4 MAINTENANCE

screws, it may require loosening the locknut on air cylinder shaft and adjusting clevis. By turning clevis onto shaft speed will increase, by turning clevis out, speed will decrease. After proper speed is set, tighten all lock nuts.

PRESSURE REGULATOR ADJUSTMENT

After setting idle speed and compressor is in run position, the pressure regulator adjustment can be checked and adjusted if required.

The air cylinder (which receives an air signal from the pressure regulator) controls engine speed with air demand. To adjust pressure regulator, put the compressor in the run position, open service valve slightly to allow air to bleed out. By watching air pressure gauge note when air cylinder starts to retract, this should be approximately 105 psig. If cylinder does not start to retract until at a lower pressure, the regulator is set to low. The regulator has a locknut and adjustment screw. By loosening locknut and turning adjustment screw clockwise, pressure will increase. Turning screw counter clockwise decreases pressure. After adjustment is complete, tighten locknut.

RATED SPEED ADJUSTMENT

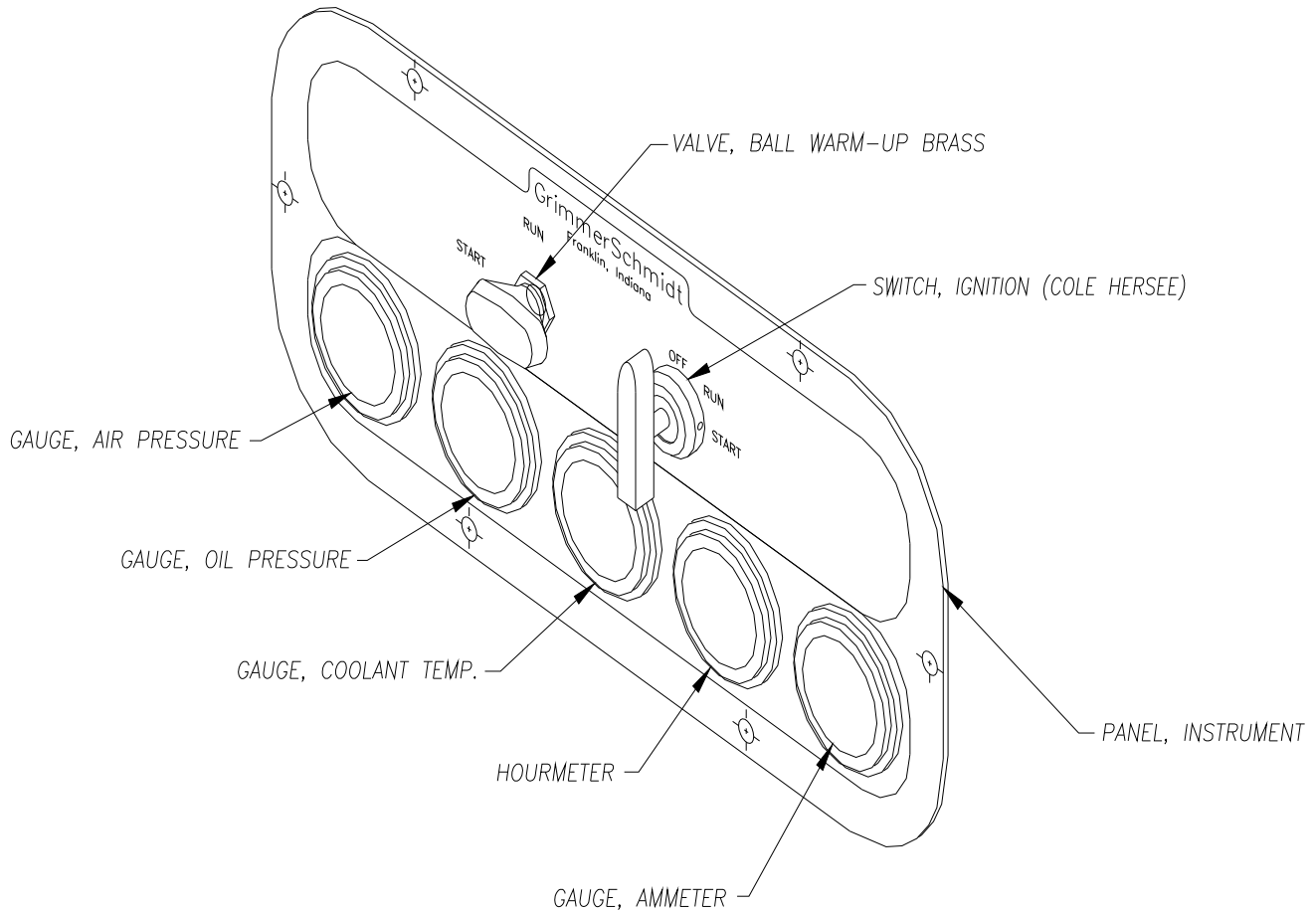
With compressor in run position open service valve slowly until pressure gauge is reading 100 psi. Check that air cylinder is fully retracted, moving throttle arm to full speed and check the engine speed. Adjust the speed to within the specifications in the front of this manual. To adjust there are two adjusting screws on throttle arm, the adjusting screw towards rear of engine is the high-speed adjustment. Loosen locknut on adjustment screw, by turning screw counter clockwise, speed increases, after setting speed to specifications, tighten locknut, close service valve and allow compressor to unload and return to idle.

4.17 INSTRUMENTS

The standard control panel has gauges for air pressure, oil pressure, coolant temperature, ammeter and hour meter. Also included are an ignition switch, start/run switch and safety bypass switch. The safety bypass switch cuts out the low oil pressure switch to permit starting. The low oil pressure switch is normally open and closes upon activation. Safety shutdowns are also provided for high compressor oil temperatures and high engine coolant temperature. These switches are normally closed and open upon activation. If the compressor will not start or shuts down while in operation without an obvious malfunction, each switch can be checked individually by connecting a jumper wire across the terminal posts one switch at a time. If the compressor starts, the switch is defective. The defective switch must be replaced.

SECTION 4 MAINTENANCE

NOTE: The existing wiring harness must be connected to the safety switches while making the above check.



4.18 BATTERY

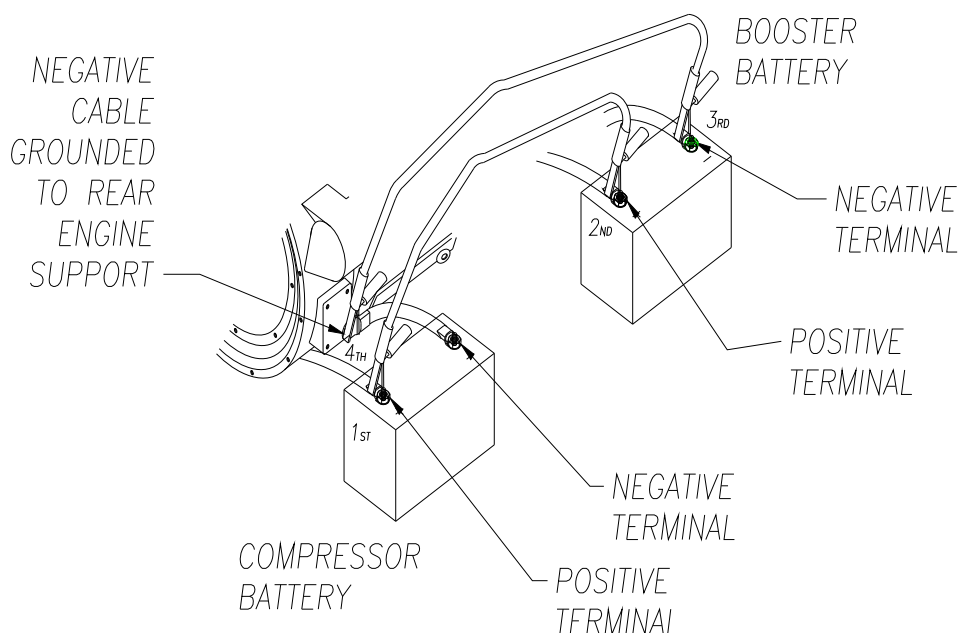
Batteries supplied with GlimmerSchmidt Compressors are selected to have ample cold cranking amperes for quick starts in inclement weather. Keep them fully charged and if replacement is necessary the replacement must be of equal capacity.

MAINTENANCE AND TROUBLESHOOTING

If the unit will not crank when a "START" is attempted, DO NOT jump-start with out first considering the following:

SECTION 4 MAINTENANCE

WARNING
BATTERY GAS CAN EXPLODE CAUSING ACID BURN TO SKIN AND BLINDNESS.
DO NOT OVERCHARGE OR JUMP THE BATTERY INCORRECTLY.



- ◆ If there is obvious battery damage such as a cracked or broken case, replace battery.
- ◆ Check for loose battery cables. Tighten if necessary.
 - ◆ Check terminals for corrosion, clean if necessary.
- 1. Connect the first jumper cable from positive “+” (red) terminal of the discharged battery to the positive “+” (red) terminal on the booster battery. NEVER connect “+” (red) to “-” (black). DO NOT PERMIT vehicles to touch each other as this could establish a ground connection and counteract the benefits of this procedure.
- 2. Connect one end of second jumper cable to the grounded negative “-” (black) terminal of the booster battery. Connect the other end of this jumper cable to a solid, stationary, metallic point on the compressor with the discharged battery but at a point AWAY FROM THE BATTERY (at least 18 inches or more) if possible. DO NOT CONNECT DIRECTLY TO THE NEGATIVE POST OF THE DISCHARGED BATTERY.
- 3. Disconnect positive battery terminal whenever using a high rate charge. Start the compressor in accordance with normal procedure. When the engine is operating smoothly disconnect the jumper cable end at the engine block before disconnecting the jumper cables from the other positions.

SECTION 4 MAINTENANCE

4.19 ELECTRICAL CIRCUITS

The following pages show the schematic wiring diagrams for the different model GrimmerSchmidt compressors. These diagrams show the color of the wires to help identify their use and destination. (The colors are correct for later models but may not be correct for earlier units) Before deciding that there is an error in the wiring, check a few wires point to point to determine if they agree with the drawing. To make any change of wires or connections, check electrically, with an ohmmeter or circuit tester to make sure you are correct.

WARNING
OPERATING WITHOUT SAFETY SWITCHES FUNCTIONAL COULD CAUSE SEVERE PERSONAL INJURY OR DEATH AND CAUSE SIGNIFICANT PROPERTY DAMAGE. IT WILL VOID EXISTING WARRANTIES. ALWAYS INSURE THAT ALL SAFETY SYSTEMS ARE FUNCTIONAL.

SECTION 4 MAINTENANCE

4.20 WHEEL BEARING

Wheel bearings leave the factory properly packed and adjusted and under normal circumstances should require inspection every six months or so, depending upon use.

INSPECTION

Clean exterior of wheel bearing cap before removal. Remove cap and check bearing from damage, adequate grease, cleanliness, rust and end play. Endplay should be between .001 and .012" (.025 to .03 mm). Correct whatever is deficient and replace damaged bearings.

GREASE THE BEARINGS

1. Remove the rubber plug from the end of the grease cap.
2. Place a standard grease gun onto the grease zerk located in the end of the spindle. Make sure the grease gun nozzle is fully engages on the fitting.
3. Pump grease into the zerk. The old displaced grease will begin to flow back out the cap around the grease gun nozzle.
4. When the new, clean grease is observed, remove the grease gun, wipe off any excess, and replace the rubber plug in the cap.

MANUFACTURER

RECOMMENDED WHEEL BEARING LUBRICATION SPECIFICATIONS

Grease:

Thickener Type.....	Lithium Complex
Dropping Point.....	230°C (446°F) minimum
Consistency.....	NLGI No. 2
Additives.....	EP, Corrosion & Oxidation Inhibitors
Base Oil.....	Solvent Refined Petroleum Oil
Base Oil Viscosity.....	@40°C (104°F) 150cSt (695 SUS) Min.
Viscosity Index.....	80 Minimums
Pour Point.....	-10°C (14°F) Minimum

Approved Sources:

Mobil Oil.....Mobil grease HP

Approved Sources:

Exxon/Standard.....Ronex MP
Kendall Refining Co.....Kendall L-427
Ashland Oil Co.....Valvoline Val-plex EP Grease
Pennzoil Prod. Co.....Premium Wheel Bearing Grease 707L

CLEANING AND REPACKING

1. If needed, remove bearing from spindle and clean in solvent. Remove all dirt and old grease from bearing, spindles and bore of hub.

CAUTION

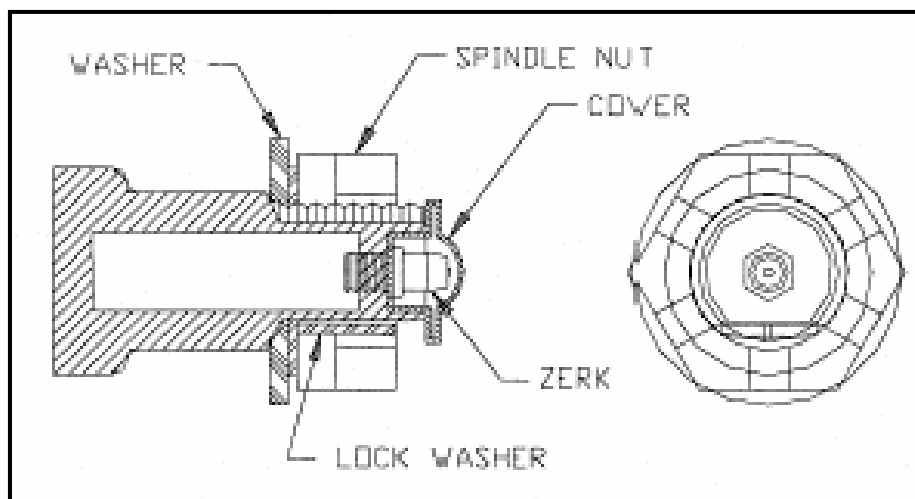
**DO NOT SPIN BEARING WITH AIR HOSE BLASTS, AS THIS WILL DESTROY
PRECISE BEARING SURFACES.**

SECTION 4

MAINTENANCE

2. Pack grease in new or cleaned bearing with wheel bearing repacked or manually so that grease is driven solidly in between bearing rollers.
3. Place cleaned hub on spindle followed by either new or cleaned repacked bearing, washer and nut.
4. Tighten spindle to 50 ft. lbs (7kg m) while rotating hub to seat the bearing.
5. Loosen the nut to remove preload torque. Do not rotate hub.
6. Finger tighten the nut and place lock tab in the first nut castellation which lines up with the lock tab.

Nut should be free to move with the only restraint being the lock tab. Endplay must be between .001 to .012" (.025 to .3 mm).



4.21 SAFETY CHAINS

Safety chains should be attached on opposite sides of the compressor tongue and crossed under the tongue when passed forward to the towing vehicle so as to cradle the tongue in the event of a breakaway. Slack should be sufficient to permit full turns.

4.22 MAINTENANCE SCHEDULE

A good maintenance program is the key to long machine life. Follow a regular schedule of inspection and servicing, based on operating hours. Keep an accurate logbook of maintenance, servicing and operating time. Use the factory recommended periodic maintenance schedule based on favorable operating conditions) to serve as a guide to get long and efficient machine life. Regular service periods are recommended for normal service and operating conditions. For engine maintenance, refer to the engine manual where a detailed description of service instructions is given. For continuous duty, extreme temperature, etc., service more frequently. Neglecting routine maintenance can result in machine failure or permanent damage.

WARNING

DO NOT REMOVE CAPS, PLUGS OR OTHER COMPONENTS WHEN COMPRESSOR IS RUNNING OR PRESSURIZED. SEVERE PERSONAL INJURY MAY RESULT. STOP COMPRESSOR AND RELIEVE ALL INTERNAL PRESSURE BEFORE DOING SO.

SECTION 4

MAINTENANCE

DAILY OPERATION

Prior to starting the machine, it is necessary to check the oil level in the sump. Should the level be low, add the necessary amount. If the addition of oil becomes too frequent, a simple problem may have developed which is causing this excessive loss. See the Troubleshooting Section under excessive oil consumption for a probable cause and remedy. Also check the linkage prior to starting.

NOTE: The radiator and engine cooling system must be drained and flushed every two years. Replace the coolant with a mixture of 50% ethylene glycol and 50% water. Do not use a leak sealing type of antifreeze. Should a 100% water solution be used, a rust inhibitor must be added.

After a routine start has been made, observe the instrument panel gauges. After the machine has warmed up, it is recommended that a general check on the overall machine and instrument panel be made to assure the compressor is running properly. Also check the air filter maintenance indicators (if supplied). Should the indicators show red, clean or replace the elements immediately.

AFTER INITIAL 50 HOURS OF OPERATION

After the initial 50 hours of operation a few maintenance requirements are needed after break-in. Perform the following maintenance operations, as the machine ages, to prevent unnecessary problems.

EVERY 100 HOURS

Change engine oil and filter.

EVERY 200 HOURS

NOTE: Inspect and repack the axle wheel bearings every 5 months. Change fuel filter (or as needed). Change air filter elements engine and compressor or if equipped when indicate shows red or 20" of restriction. Check fan belt tension. Change compressor oil filter. Clean the radiator and cooler exterior.

NOTE: Depending on how contaminated the atmosphere may be, more frequent cooler and radiator cleaning may be necessary.

CAUTION

HIGH PRESSURE STEAM CLEANERS CAN DAMAGE FINS ON RADIATORS AND COOLERS – USE WITH MUCH CARE.

EVERY 600 HOURS

Check valve clearance on engine at 600 hours. (See Valve Adjustment Section of engine manual)

SECTION 4 MAINTENANCE

EVERY 1000 HOURS

Change oil separator element.
Check switches and gauges.

EVERY 2000 HOURS

Change compressor oil.

SECTION 5 TROUBLESHOOTING

The information contained in the troubleshooting chart has been compiled from field report data and factory experience. It contains symptoms and usual causes for the described problems; however, do not assume that these are the only problems that may occur. All available data concerning the trouble should be systematically analyzed before undertaking any repairs or component replacement procedures.

A detailed visual inspection is worth performing for almost all problems and may avoid unnecessary additional damage to the machine.

- ◆ Check for loose wiring.
- ◆ Check for damaged piping.
- ◆ Check for parts damaged by heat or an electrical short circuit, usually apparent by discoloration or a burnt odor.

Should your problem persist after making the recommended checks, consult your nearest GrimmerSchmidt distributor or the GrimmerSchmidt factory by calling toll free 1-800-428-9703.

SYMPTOM	CAUSE	REMEDY
Machine will not crank.	Faulty battery connections.	Check battery terminals for tightness and corrosion.
	Low battery voltage.	a. Check voltage and charge or replace the battery. b. Unit may be jump-started.
	Faulty ignition switch.	Replace the switch.
	Starter solenoid connections are loose or corroded.	Clean and tighten connections.
	Faulty starter solenoid or starter.	Repair or replace the faulty components.
Machine cranks but will not start.	No fuel	a. Check fuel level and add if necessary. b. If the unit has run out of fuel it may be necessary to prime the fuel system.
	Air in the fuel system.	a. Check fuel line connections and tighten or repair. b. Prime the fuel system.
	Defective safety bypass switch.	Replace switch.

SECTION 5 TROUBLESHOOTING

SYMPTOM	CAUSE	REMEDY
Machine cranks but will not start (continued).	Fuel solenoid inoperative.	a. With ignition and safety bypass on check for voltage at the solenoid. Replace if no voltage. b. Check safety switches and wiring.
Machine shuts down with air demand present.	Out of fuel.	Check fuel level and add fuel if necessary.
	Fuel filter restricted.	Change fuel filter.
	Safety shutdown switches activated.	a. Engine coolant level low; add coolant. b. Compressor oil and radiator flow restricted; clean coolers. c. Fan belts slipping or broken; repair or replace. d. Compressor oil low; add oil. e. Engine oil level low; add oil. f. Compressor oil filter restricted; change the filter. g. Engine oil filter restricted; change the filter.
	Defective safety shutdown switch.	Check the shutdown switches.
	Thermostatic valve malfunctioning.	Clean or replace the thermostatic element.
Machine will not build up pressure.	Defective gauge.	Replace the gauge.
	Air demand too great.	Check service lines for leaks or open valves.
	Blow down valve open.	a. Check to see if the blow down valve is getting a pilot signal. b. Repair or replace valve.
	Faulty coupling.	Replace the coupling.

SECTION 5 TROUBLESHOOTING

SYMPTOM	CAUSE	REMEDY
With no demand the compressor builds excessive pressure.	Defective gauge.	Replace the gauge.
	Air cylinder not fully extending.	a. Check for restrictions in the control lines. b. Repair or replace control air cylinder. c. Check that the inlet valve is closing.
	Pressure regulator not properly adjusted or faulty.	a. Adjust the regulator b. Repair or replace the regulator.
Insufficient air delivery.	Compressor undersized for the air requirement.	Recheck maximum air requirement.
	Engine speed low.	Check speed and adjust as necessary.
	Air intake restricted.	a. Check air filters for dirt and make sure the indicator is working. b. Look for obstructions in the filter and inlet piping. c. Check that the inlet valve is opening fully.
	Faulty drive coupling.	Replace the coupling.
Excessive compressor oil consumption.	Oil reservoir over filled.	Drain to the proper level.
	Leak in the compressor oil system.	Check all piping lines and connections; repair as necessary.
	Oil scavenge line not removing the oil from the separator element.	a. Check scavenges line and its check valve for restrictions; clear as necessary. b. Make sure that the scavenge line reaches the bottom of the separator element.
	Separator element damaged.	Replace the element.

SECTION 5 TROUBLESHOOTING

SYMPTOM	CAUSE	REMEDY
Excessive compressor oil consumption (con't).	Compressor undersized for the air requirement.	Operating at low pressures increases the oil carryover; recheck the load requirements.
Compressor overheating.	Unit being operated in an area with limited fresh air.	Reposition the unit or open up the confinement.
	Fan belts are loose or broken.	Tighten or replace.
	Dirt built up on the coolers.	Clean the cooler thoroughly. Be careful not to damage the fins.
	Compressor level low.	Check and fill to proper level.
	Compressor oil filter dirty.	Replace the filter.
	Thermostatic valve malfunctioning.	Clean or replace the element.
	Restriction in the compressor oil lines.	Clean or replace the lines.
	Restriction inside the oil cooler.	Clean internal tubes of the cooler.
	Operating the compressor with the hood open.	Close the hood.
Engine overheating.	Unit being operated in an area with limited fresh air.	Reposition the unit or open up the confinement.
	Fan belts are loose or broken.	Tighten or replace.
	Defective gauge or sender.	Replace the gauge or sender as necessary.
	Dirty radiator fins.	Clean radiator fins, be careful not to damage fins.
	Thermostat not opening.	Replace the thermostat.
	Radiator internally restricted.	Clean and flush the radiator.
	Faulty or incorrect radiator cap.	Check the cap and replace as required.
	Faulty water pump.	Repair or replace the water pump.
	Incorrect engine timing.	Adjust timing to engine manual specifications.

**SECTION 5
TROUBLESHOOTING**

SYMPTOM	CAUSE	REMEDY
Engine overheating (con't).	Operating the compressor with the hood open.	Close the hood.
	Coolant level low.	Add coolant to the proper level.
High fuel consumption.	Leaks in the fuel system.	Check all the fuel lines and connections; repair or replace as necessary.
	Engine not at correct operating speed.	Adjust the engine to its proper speed.
	Pressure regulator set too high.	Adjust regulator to correct pressure for the unit.
	Engine air intake is restricted.	Inspect the air intake system checking for any restriction; clean repair or replace as necessary.
	Incorrect injection timing.	Adjust to specifications in the engine manual.

