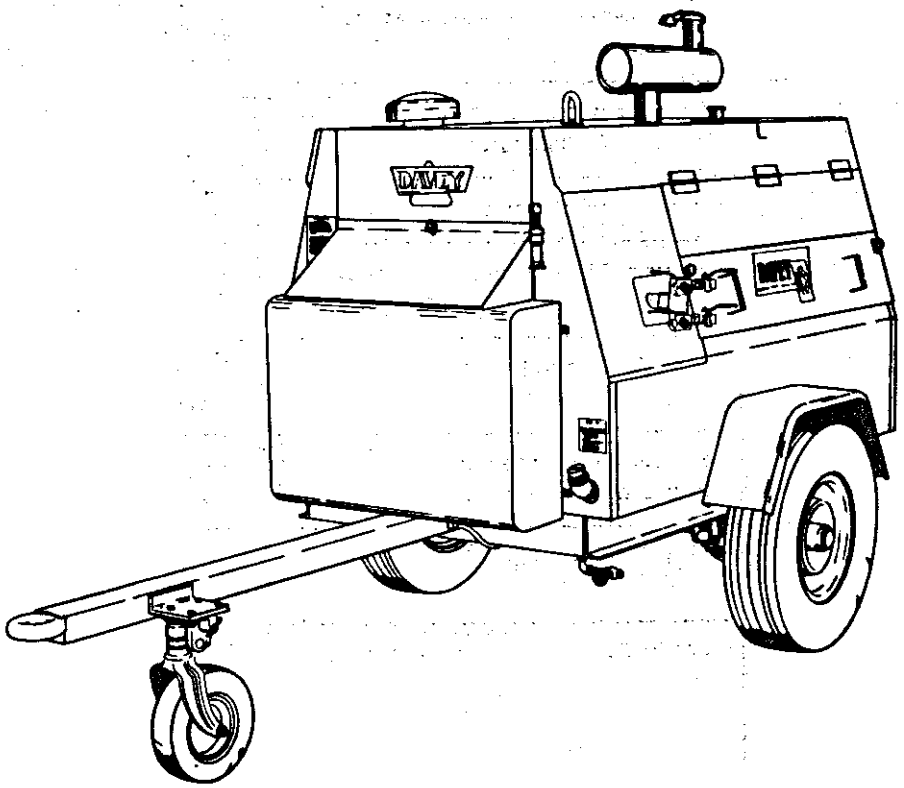
DAVEY
PERMAVANE® ROTARY AIR COMPRESSOR

MODEL 250 RPD

OPERATION AND MAINTENANCE MANUAL

WITH

PARTS LIST



DAVEY COMPRESSOR CO.
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FOREWORD

This publication contains operation instructions, and lubrication and maintenance information. Application of this information should maximize the performance and life of the air compressor.

The information contained in this publication is accurate as of the date of printing. Continuing improvement and advancement of product design may cause changes to your air compressor which may not be included in this publication. Each publication is reviewed and revised, as required, to update and include these changes in later revisions. Whenever a question arises regarding your air compressor, or this publication, please contact your Davey distributor or dealer for the latest available information.

It is the policy of Davey Compressor Company to continuously improve its products whenever it is possible and practicle to do so. Davey Compressor Company reserves the right to discontinue models at any time, or change specifications or design, without notice and without incurring any obligations to make such changes on products sold previously.

COMPRESSOR NOISE EMISSION CONTROL INFORMATION

THIS COMPRESSOR CONFORMS TO U.S. E.P.A. REGULATION 40 CFR § 204.50 et seq. FOR NOISE EMISSIONS APPLICABLE TO PORTABLE AIR COMPRESSORS. PURSUANT TO SECTION 204.58-2 OF THE REGULATION, THE FOLLOWING LIST OF TAMPERING ACTS OR THE CAUSING THEREOF BY ANY PERSON ARE PROHIBITED BY THE NOISE CONTROL ACT OF 1972.

1. REMOVAL OR RENDERING INOPERATIVE, OTHER THAN FOR THE PURPOSE OF MAINTENANCE, REPAIR, OR REPLACEMENT, ANY OF THE FOLLOWING;
   a. THE ENGINE EXHAUST SYSTEM OR PARTS THEREOF;
   b. THE RADIATOR INLET BAFFLE OR PARTS THEREOF;
   c. ENCLOSURE OR PARTS THEREOF.
2. REMOVAL OF ANY OF THE FOLLOWING;
   a. ENGINE MOUNTS;
   b. FACED GLASS FIBER SOUND ABSORPTION MATERIAL;
   c. GASKET BETWEEN FUEL TANK AND COVER.
3. OPERATION OF THE COMPRESSOR WITH ANY OF THE ENCLOSURE DOORS OPEN.

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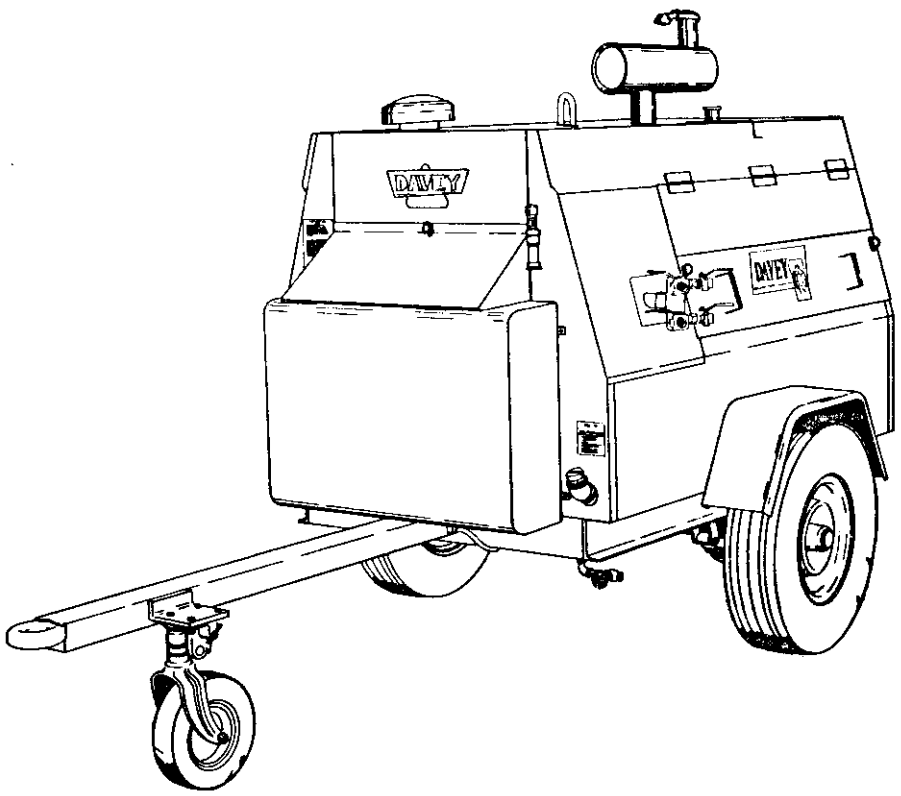

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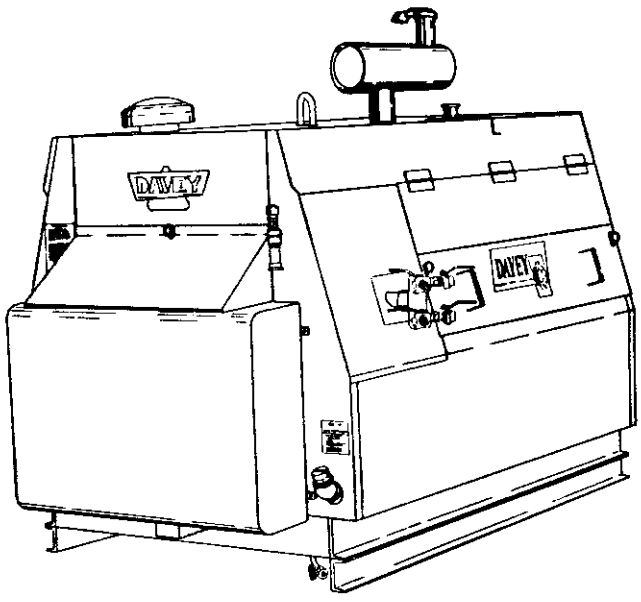


SKID MOUNTED

Figure 1-1. Air Compressor Unit Assembly, Model 250 RPD

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This manual comprises operation, maintenance instructions, and parts listing for Air Compressor Unit Assembly, Model 250 RPD, diesel powered, manufactured by Davey Compressor Company, Cincinnati, Ohio 45242. The air compressor unit assembly shall hereafter be referred to as air compressor unit. The illustrated parts list is provided for the identification and ordering of detailed parts.

1-3. PURPOSE.

1-4. The purpose of the air compressor unit is to provide a portable pneumatic power source for pneumatically powered tools and equipment.

1-5. GENERAL DESCRIPTION.

1-6. Air Compressor unit (see Figure 1-1) consists of a rotary type air compressor assembly directly driven by a heavy duty industrial type engine. The air compressor assembly and engine are mounted on a channel section welded steel frame. On trailer mounted units the running gear is attached to the steel frame. The running gear consists of a leaf spring mounted axle with two pneumatic tired wheels and a full swivel third wheel. A functionally designed housing with tool box and two doors provides weather protection. The physical, mechanical, and electrical characteristics of the air compressor unit are listed in Table 1-1.

1-7. COMPONENT DESCRIPTION.

1-8. Air compressor unit components include an engine, oil separator assembly, oil cooler, and instrument panel. Engine accessories include a cooling radiator, fuel supply tank, alternator, and muffler. A speed control is provided to regulate engine speed and compressor air intake in accordance with air delivery demand. See Figure 1-2 for air compressor unit component locations.

1-9. ENGINE ASSEMBLY (Figure 1-2). The prime mover is a diesel engine (11). For detailed engine data, refer to appropriate engine manufacturer's manual.

1-10. AIR COMPRESSOR ASSEMBLY (Figure 1-2). The air compressor (10) is an oil flooded, sliding vane, rotary type. The compressor is supported by an adaptor which is bolted to the flywheel housing of the engine. A pilot flange maintains proper alignment. The compressor rotor is mounted on a shaft which is supported at each end by roller bearings. The rotor is enclosed in a sealed eccentric-bored stator and is located such that the rotor is constantly concentric with a cutaway portion of the stator. The sliding vanes are inserted radially into slots along the longitudinal axis of the rotor. Oil injection provides cooling, compression sealing, and lubrication during the air compression cycle.

1-11. Thermal Bypass Valve (Figure 1-2). The thermal bypass valve (7) maintains a relatively constant minimum operating temperature. This valve bypasses the oil from the oil separator around the oil cooler directly to the compressor. When the temperature of the oil reaches approximately 150°F, the bypass valve starts to close and part of the oil is circulated through the oil cooler before entering the compressor.

1-12. Thermostatic switch (Figure 1-2). This is an automatic control located in the air discharge of the compressor. If the temperature of the compressor air discharge exceeds 235 ± 5°F, this switch (8) will energize closing an electrical circuit, causing the air compressor unit to shut down.

1-13. Speed Control Assembly. The speed control linkage is connected to the compressor assembly air intake control valve and adjusts the engine throttle to increase or decrease engine speed as required to maintain compressor rated output.

1-14. OIL SEPARATOR ASSEMBLY (Figure 1-2). The oil separator (4) contains a labyrinth and filter arrangement which separates the oil from the air before the air is discharged. A safety valve on the oil separator tank opens automatically if the air pressure should exceed the rating of the safety valve.

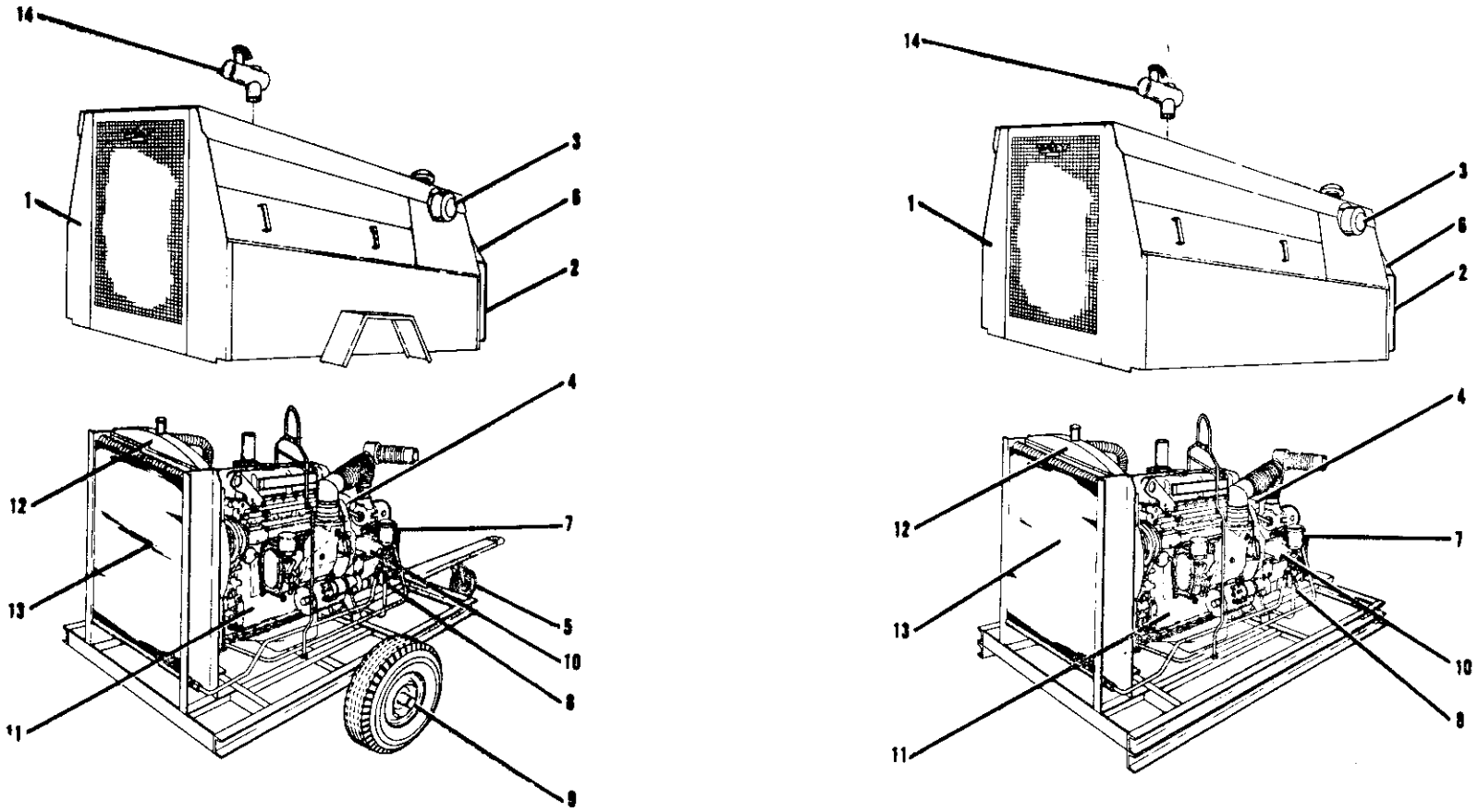
1-15. Blowdown Valve. The blowdown valve automatically relieves system air pressure after compressor shutdown.

1-16. Air Pressure Regulator. The air pressure regulator is connected between the oil separator and compressor air intake-control. As the air demand increases, the regulator controls the flow of air into the intake-control to open the intake control valve. This action increases air input volume and engine speed. As the air pressure reaches the rated value, the pressure regulator causes the intake control valve to close and the engine to return to idle speed.

1-18. OIL COOLER ASSEMBLY (Figure 1-2). The air compressor unit cooling system consists of a radiator and oil cooler assembly (13) and engine suction type fan assembly.

Table 1-1. Table of Leading Particulars

ITEM	PARTICULARS
AIR COMPRESSOR UNIT	
Air Compressor Type	Rotary
Air Volume	250CFM/7.08M^3/MIN
Air Pressure Rated	100PSI/7KG/CM^2
Power Source	Diesel Engine
Mounting	Trailer and Skid
Electrical System	12VDC NEG GRD
Dimensions	
Trailer Mounting	
Length (Incl-Tow Bar)	130 IN./3,300 MM
Width (OA)	71 IN./1,800 MM
Height	56 IN./1,420 MM
Skid Mounting	
Length	75 IN./1,905 MM
Width (OA)	52 IN./1,320 MM
Height	48 IN./1,220 MM
Wet Weight	
Skid Mounted	3,230 LBS/1,465KG
Trailer Mounted	3,550 LBS/1,610KG
Coolant Capacity	33 QTS/31 LTR
Fuel Capacity	40 GAL/151 LTR
ROTARY AIR COMPRESSOR	
Type	Sliding Vane
Oil Capacity	20 QTS/19LTR
ENGINE	
Make - Model	Detroit Diesel 4-53
General Description	4 Cylinder, 2 Cycle
Bore - Stroke	3.875 IN. x 4.5 IN./98.4 MM x 114.3 MM
Piston - Displacement	212.4 CU. IN./3.47 LTR
Horsepower	85 HP @ 1,800 RPM
Maximum Torque @ 1800 RPM	254 FT LBS./35.1 KG-M
Type of Oil Filter	Replaceable Cartridge
Type of Fuel Filter	Replaceable Cartridge
Oil-Capacity	14 QTS/13.2 LTR
Cooling Capacity	20 QTS/19 LTR



1. COMPRESSOR UNIT HOUSING
2. FUEL TANK
3. AIR CLEANER ASSEMBLY
4. OIL SEPARATOR
5. SWIVEL CASTER WHEEL
6. INSTRUMENT PANEL
7. OIL FILTER AND BYPASS ASSEMBLY
8. THERMOSWITCH
9. TWO WHEEL AXLE ASSEMBLY
10. AIR COMPRESSOR ASSEMBLY
11. DIESEL ENGINE
12. RADIATOR
13. OIL COOLER
14. MUFFLER

Figure 1-2. Air Compressor Unit Component Location

Ambient air is drawn through the radiator core and over the oil cooler core to reduce the temperature of the compressor oil.

1-19. INSTRUMENT PANEL (Figure 1-2). The instrument panel (6) contains all operating controls and indicators used to operate the air compressor unit.

1-20. OPTIONAL EQUIPMENT.

1-21. Refer to Table 1-2 for a list of optional equipment.

This manual contains operation, maintenance instructions, and parts listing for standard Air Compressor Unit Assemblies, Model 250 RPD. Operating instructions, maintenance instructions, and parts listing for optionally equipped units are provided in the Accessories, Operation and Maintenance with Parts List manual.

1-22. DIFFERENCE DATA.

1-23. Not applicable.

Table 1-2. List of Optional Equipment

DESCRIPTION	PART NUMBER
Hose reel with clamp, single or dual	60043 (SGL), 60044 (DBL)
Fuel level gauge	49272
Electric taillight	62153
License plate holder	41060
Special paint	No Number
Service brakes	64145 (HYDR), 74146 (ELEC)
Parking brake	64144
Safety chains	49500
Turn signals	49677
Reflector set	24338 (RED), 24606 (AMB)
Optional tires	8.25 x 15 In., 8 Ply
Quiet package	65433

SECTION 2

PREPARATION FOR USE

2-1. GENERAL.

2-2. The air compressor unit is shipped as a pretested, completely assembled unit. There, however, are certain steps which must be taken prior to putting the unit into operation. This section contains step-by-step procedures to be followed when preparing the unit for use.

2-3. SITE SELECTION.

2-4. The air compressor unit should be located such that the unit sets level on the operating site. The angle of out-of-level should not exceed 15° along the longitudinal axis or horizontal axis. Check engine and compressor oil levels before operating in the out-of-level condition. Both oil levels should be as specified, but should not exceed specified values. Perform the following procedures before starting the unit.

2-5. INSPECTION.

a. Check all of the equipment against the packing list. Examine identification plates for positive, identification of the equipment. Record the unit and compressor serial numbers for future reference.

b. Inspect for and tighten any loose nuts or bolts.

c. Inspect the controls, instruments, and gauges for damage or loose mountings.

d. If supplied, inspect the air hoses for kinks and loose connections.

e. Inspect the electrical wiring for cuts, fraying and loose connections.

f. Inspect all tubing and piping for loose connections or damage.

g. Check all accessories for damage and loose mountings.

2-6. SERVICING.

2-7. Perform the following procedures prior to operation of the unit.

a. Fill the fuel tank with the recommended grade of fuel and check the radiator for proper coolant level. (See manufacturer's engine manual).

b. Perform PREVENTIVE MAINTENANCE (Section 5), refer to Table 5-2.

2-8. LUBRICATION.

2-9. Refer to LUBRICATION (Section 5) for recommended lubricants and servicing intervals.

SECTION 3

OPERATING INSTRUCTIONS

3-1. GENERAL.

3-2. This section describes operating procedures and the operating controls and indicators for the air compressor unit.

3-3. OPERATING CONTROLS AND INDICATORS.

3-4. With the exception of the air service valves located to the right of the fuel tank, all controls and indicators necessary for the operation of the engine and air compressor are located on the instrument panel. See Figure 3-1.

3-5. STARTING THE UNIT.

3-6. To start the unit, proceed as follows:

a. Open air service valves. Pull ENG STOP control all the way out. Reset air shut off lever on engine's air inlet housing.

b. Turn engine over by pressing IGNITION-START switch for three seconds with ENG STOP control out. Then push ENG STOP control full in.

CAUTION

If the engine fails to start within 30 seconds, release the starter button and allow the starter to cool for 1 to 2 minutes before attempting another start.

c. Simultaneously press IGNITION-START switch and OIL PRESSURE BYPASS switch. In cool weather, pull compressor UNLOADER control all the way out.

d. Release IGNITION-START switch immediately after engine starts, but continue to hold OIL PRESSURE BYPASS switch in until engine oil pressure gauge registers pressure.

CAUTION

If engine oil pressure does not register within 15 seconds after starting, release OIL PRESSURE BYPASS switch and determine cause.

e. Adjust IDLE CONTROL to fast idle, turn handle clockwise to lock. Close air service valves.

f. Let unit run until engine temperature reaches 170°F, then push IDLE CONTROL and compressor UNLOADER control in.

CAUTION

Do not leave operating equipment unattended for prolonged periods.

g. Refer to Table 3-1 and check indications of all engine and compressor indicators. Unit is now ready for use.

3-7. NORMAL OPERATION.

3-8. To operate the unit, proceed as follows:

a. Connect air hoses to service valves and air tools as required for work to be performed.

b. Start air compressor unit, refer to STARTING THE UNIT (Section 3).

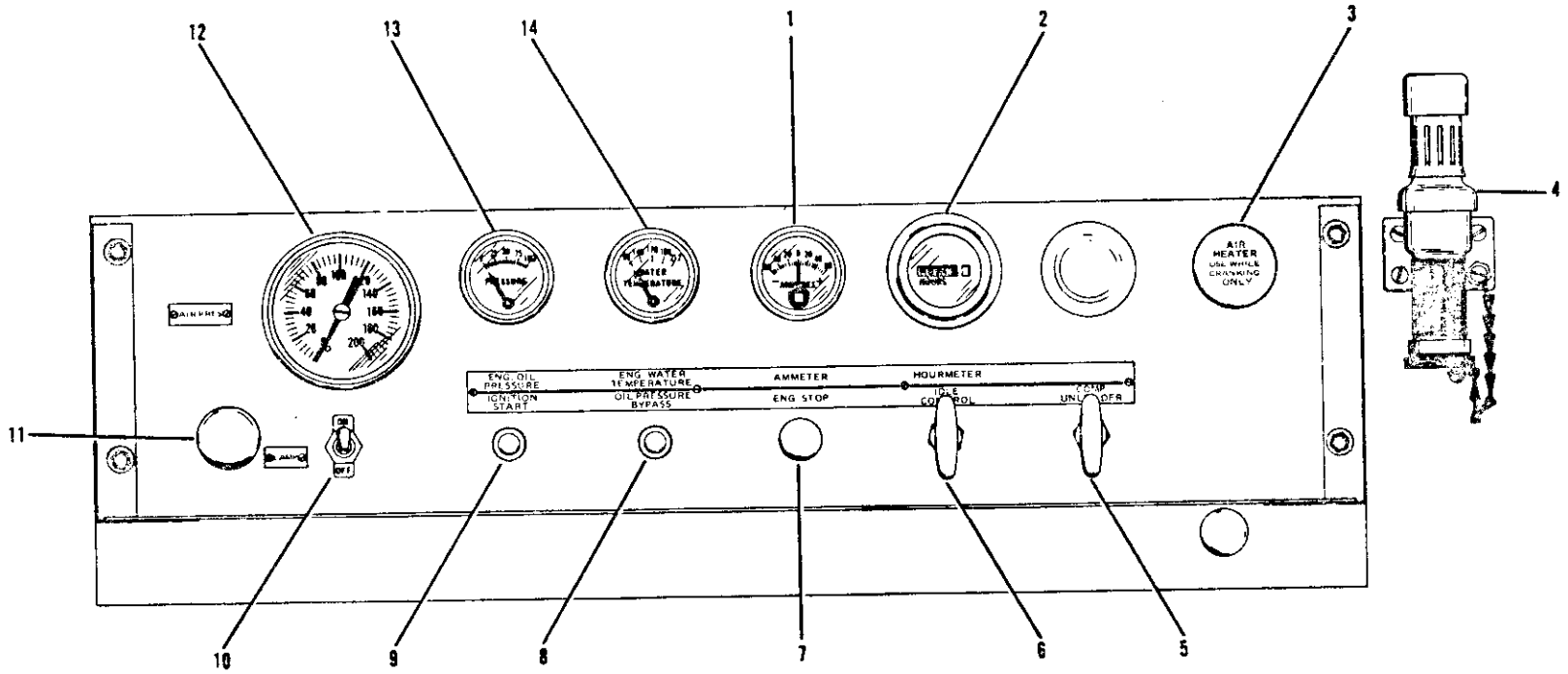
c. The unit is equipped with automatic safety devices which will stop the unit for one or more of the following conditions.

(1) Low engine oil pressure.

(2) High compressor air/oil discharge temperature.

Table 3-1. Operating Specifications

METER OR GAUGE	NORMAL INDICATION
Ammeter	+2.5 ± 2.5 Amps
Air Pressure Gauge	110 ± 2 PSI
Oil Pressure Gauge	50 ± 10 PSI
Water Temperature Gauge	170 ± 15°F



1. AMMETER
2. HOURMETER
3. PRESSURE PRIMER DISCHARGER PUMP
4. PRESSURE PRIMER DISCHARGER ASSY
5. COMPRESSOR UNLOADER CONTROL
6. IDLE CONTROL
7. ENGINE STOP CONTROL
8. OIL PRESSURE BYPASS SWITCH
9. IGNITION-START SWITCH
10. PANEL LAMP SWITCH
11. PANEL LAMP
12. AIR PRESSURE GAUGE
13. ENGINE OIL PRESSURE GAUGE
14. ENGINE WATER TEMPERATURE GUAGE

Figure 3-1. Operating Controls and Indicators

(3) High engine coolant temperature.

d. Check all instruments for proper indication.

3-9. OPERATION BELOW FORTY DEGREES FAHRENHEIT.

3-10. To operate unit below forty degrees fahrenheit, proceed as follows:

a. Lubricate the air compressor in accordance with the lubrication table.

b. If possible, preheat the equipment before starting. If preheating equipment is used, follow the instructions for the use of such equipment carefully.

CAUTION

Many oils will jell at extremely cold temperatures. It is essential that oil(s) used are fluid at the temperature being experienced. Check your oil supplier for pour point data if in doubt. A quick check is to momentarily remove the drain plug of the engine.

c. Pull compressor UNLOADER control all the way out.

d. Remove the cold weather starting aid threaded cap and insert a fluid capsule in an upright position within the container.

CAUTION

The starting fluid is toxic and inflammable. Use caution when handling.

e. Pull the piercing shaft all the way out and install and tighten the cap on the container.

f. Push the piercing shaft all the way down. This will rupture the capsule and fill the container with the starting fluid.

g. Pull the IDLE CONTROL all the way out.

h. Simultaneously push the IGNITION START switch and OIL PRESSURE BYPASS switch and at the same time pull the cold weather starting aid pump plunger all the way out. Push the plunger in slowly, forcing the starting fluid through the atomizing nozzle into the air intake. Continue to push the pump in until the engine starts. If the plunger is not all the way in when the engine starts, push plunger in slowly until plunger locks in the in position.

i. Unscrew the cap and remove the capsule.

NOTE

Do not leave the empty capsule in the container.

j. Replace the cap on the capsule container and make certain the piercing shaft is all the way down.

NOTE

The capacity of a battery is extremely limited in very cold weather. Difficulty in starting will be experienced if the battery is not fully charged.

3-11. OPERATION IN EXTREME HEAT.

3-12. To operate the unit under extreme heat conditions, proceed as follows:

a. Locate the air compressor in a well ventilated area and keep all doors open.

b. Keep the radiator assembly clean and full of coolant.

c. Lubricate the air compressor in accordance with lubrication table.

3-13. STOPPING THE UNIT.

3-14. To stop the unit, proceed as follows:

a. Close service valves and allow unit to run unloaded for five minutes.

CAUTION

If the unit was shut down automatically, do not attempt a restart until the cause of such failure has been determined.

b. Pull the ENG STOP control all the way out.

NOTE

If the unit stops because of one or more safety devices being actuated, correct the cause of the malfunction. Refer to TROUBLE SHOOTING (Section 5).

3-15. OPERATION PRECAUTIONS.

3-16. The following precautions are to be observed at all times while the unit is operating.

a. Do not remove, lubricate or adjust any parts while the unit is operating.

b. Do not play with compressed air. Pressurized air can cause serious injuries to personnel.

c. Watch all instruments for any indication that the unit is malfunctioning.

d. Provide sufficient ventilation. Exhaust gases contain carbon monoxide which is a colorless, odorless and deadly gas.

e. Allow three minutes after shutdown for pressure to bleed from system before loosening or removing any component(s).

f. Do not fill fuel tank with engine running.

g. Do not touch the muffler or engine with bare hands while the equipment is running. Shut down the unit and allow it to cool off before making repairs.

h. Keep compressor and engine oil and air filters clean to protect the unit against rapid wear and low output.

i. Do not attempt to start the engine until the unit has been checked for lubricating oil, water and fuel supply. (Also see engine Manufacturer's Maintenance manual.)

SECTION 4

PRINCIPLES OF OPERATION

4-1. GENERAL.

4-2. This section describes the operating principles of the air compressor unit. The description is presented in two parts: an overall functional description and a detailed description. The functional description explains the interrelationship of functional components at an operational level. Functions of individual components and unique assemblies are given in the detailed description.

4-3. FUNCTIONAL OPERATION.

4-4. AIR CYCLE. (Figure 4-1). Free air is drawn into the stator through the air cleaner and intake control. The air enters through large ports in the end cover at a point where the vanes are well out of the rotor slots, thus filling the space segments between the vanes with air. In rotation, the vanes are moved radially inward in their slots by the bore wall. The volume between the vanes decreases, thus compressing the trapped air. At the rated point of compression, the discharge ports are reached and the compressed air passes into the discharge chamber. Oil is injected during the above cycle to cool the air, seal all leakage and lubricate all rubbing parts. The discharge chamber is positioned at the bottom of the stator to favor natural oil drainage. The air is delivered into the receiver-oil separator where three stages of oil separation remove virtually all oil particles from the air before final discharge.

4-5. OIL CYCLE. (Figure 4-1). After oil is separated from the compressed air, the oil accumulates in the oil separator. The discharge air pressure forces oil into the thermal bypass valve which senses the temperatures of the oil. When the oil is cool, oil bypasses the cooler and is passed directly into the oil filter; when the oil warms up, oil is directed to the oil cooler for heat dissipation and then into the oil filter. The oil is then passed into the compressor where oil is injected under pressure into the rotor bore compartment and to the bearing and end faces.

4-6. Since the injected oil was cooled before being mixed with the air, the heat of compression is reduced. This provides a low final discharge temperature. The location and the combining of the engine radiator core and oil cooler core serves to cool the compressor oil and engine water with the engine fan.

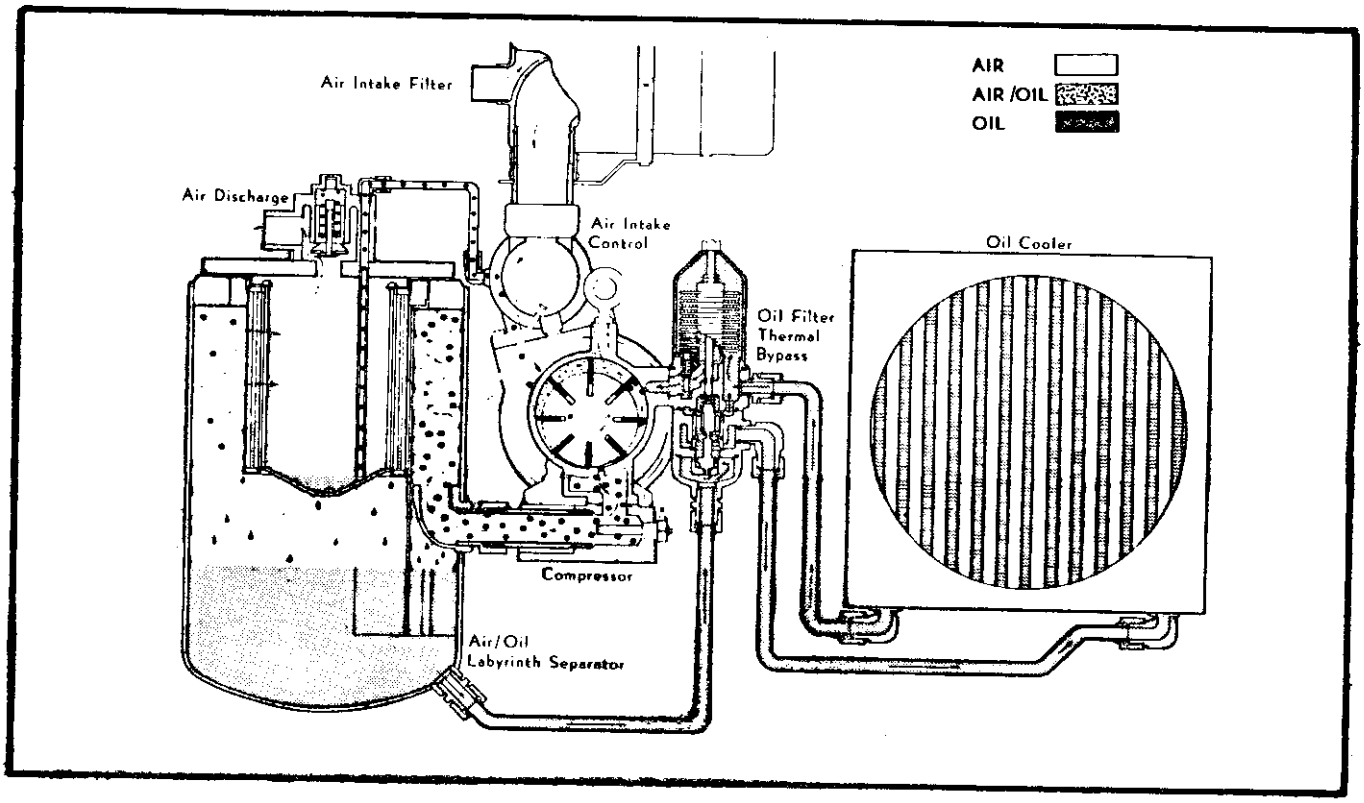


Figure 4-1. Air and Oil Cycle Flow Diagram

4-7. DETAILED OPERATION.

4-8. AIR COMPRESSOR ASSEMBLY. Air enters through the air intake through the air intake filter, then through the air intake control and into the compressor. The rotor is rotating in a counterclockwise direction inside a stationary stator. Centrifugal force forces the rotor blades out of the slots in the rotor, the blades ride on the wall of the stator. This forms wedge shapped pockets. Incoming air is trapped in these pockets and as rotation progresses, the size of the pockets diminishes, compressing the trapped air. The compressed air then moves through the oil separator to the air discharge.

4-9. The intake control valve in the compressor intake control opens and closes to allow air to pass into the compressor stator chamber according to the discharge air demand. When the intake control valve is completely closed, the compressor is running unloaded. When the compressor unit is stopped, intake control valve closes to prevent oil and air from the stator from being vented to the atmosphere. The speed control linkage is connected to the intake control valve and moves the engine throttle to increase or decrease engine RPM as required to maintain the rated output.

4-10. THERMAL BYPASS FILTER GROUP. The compressor unit oil supply in the oil separator tank is circulated by air pressure differential. The oil flows from the separator tank through the thermal bypass valve and full flow oil filter prior to being injected into the compressor. When the oil reaches operating temperature, the thermal bypass valve directs part of the oil through the oil cooler before entering the oil filter. This provides rapid warming of compressor oil at initial startup and maintains a relatively constant minimum operating temperature.

4-11. OIL SEPARATOR GROUP. The mixture of compressed air and oil is discharged from the stator through a port near the bottom of the stator at a point where the air pocket volume reaches near zero. The compressed air-oil mixture passes then to the oil separator where the oil is removed from the air. This removal is accomplished in three stages: (1) through a labyrinth where most of the oil is removed; (2) through a filter element; (3) by impingement on the filter elements exterior metal screen. Oil removed from the air passing through the labyrinth falls to the bottom of the separator tank. Oil removed by the filter element is removed from the element base by a scavenger tube and returned to the compressor via the intake control.

4-12. When air pressure within the oil separator tank reaches approximately 70 PSI, the minimum pressure valve opens allowing the filtered air to flow through the discharge piping to the air manifold and service valves. When the air pressure in the separator tank builds up to approximately 100 PSI, the air intake control valve closes. The air intake control assembly, and engine speed, is regulated by the discharge air demand by means of a air pressure regulator. When discharge air pressure opens the pressure regulator valve, air enters the air intake control between the cover and a diaphragm and forces the air intake valve closed. As the air intake valve closes, speed control linkage to the engine decreases engine speed. As long as air pressure is held to 100 PSI, the air intake control valve remains closed and the engine will run at idle speed. When air demand reduces pressure, the air pressure regulator valve closes allowing the air intake control valve to open and engine speed to increase. If air demand is excessive, causing separator tank pressure to drop to 70 PSI, the minimum pressure valve closes until this minimum tank pressure is again attained. The minimum oil separator tank air pressure of 70 PSI prevents any oil carryout with the discharge air.

4-13. ELECTRICAL SYSTEM (Figure 4-2). A 12 volt DC negative ground electrical system is utilized by the air compressor unit. The electrical system consists of two primary circuits: the starting circuit and ignition control and charging circuit. The starting circuit functions to start the diesel engine assembly. Pressing OIL PRESSURE BYPASS switch S2 while simultaneously pressing IGNITION-START switch S3 completes the circuit path to the starter motor B1. Current will then flow from the positive terminal of battery BT2 through the closed contacts of S3 to B1. Starting motor B1 will turn the engine crankshaft until the engine's oil pressure reaches 10 PSI, at which time oil pressure switch S4 will open causing engine shutdown solenoid L1 to deenergize. When L1 deenergizes, fuel is allowed to flow from the fuel pump to the injectors. Once the engine is running S2 and S3 are released. To stop the engine the STOP control must be pulled all the way out.

4-14. The ignition and control circuit restores electrical energy to batteries BT1 and B2 and protects the air compressor unit from excessive discharge air heat, engine overheating, and loss of engine oil pressure. If the temperature of the compressor air discharge exceeds 235 ± 5°F, air temperature switch S5 will close energizing engine shutdown solenoid L1. This will activate the engine's shutdown mechanism and stop the engine. A loss of coolant or an increase in coolant temperature to approximately 203°F will close the contacts of water temperature switch S6, thus energizing L1 and activating the shutdown mechanism. If oil pressure drops below 10 ± 2 PSI, oil pressure switch S4 will close energizing L1 and activating the shutdown mechanism.

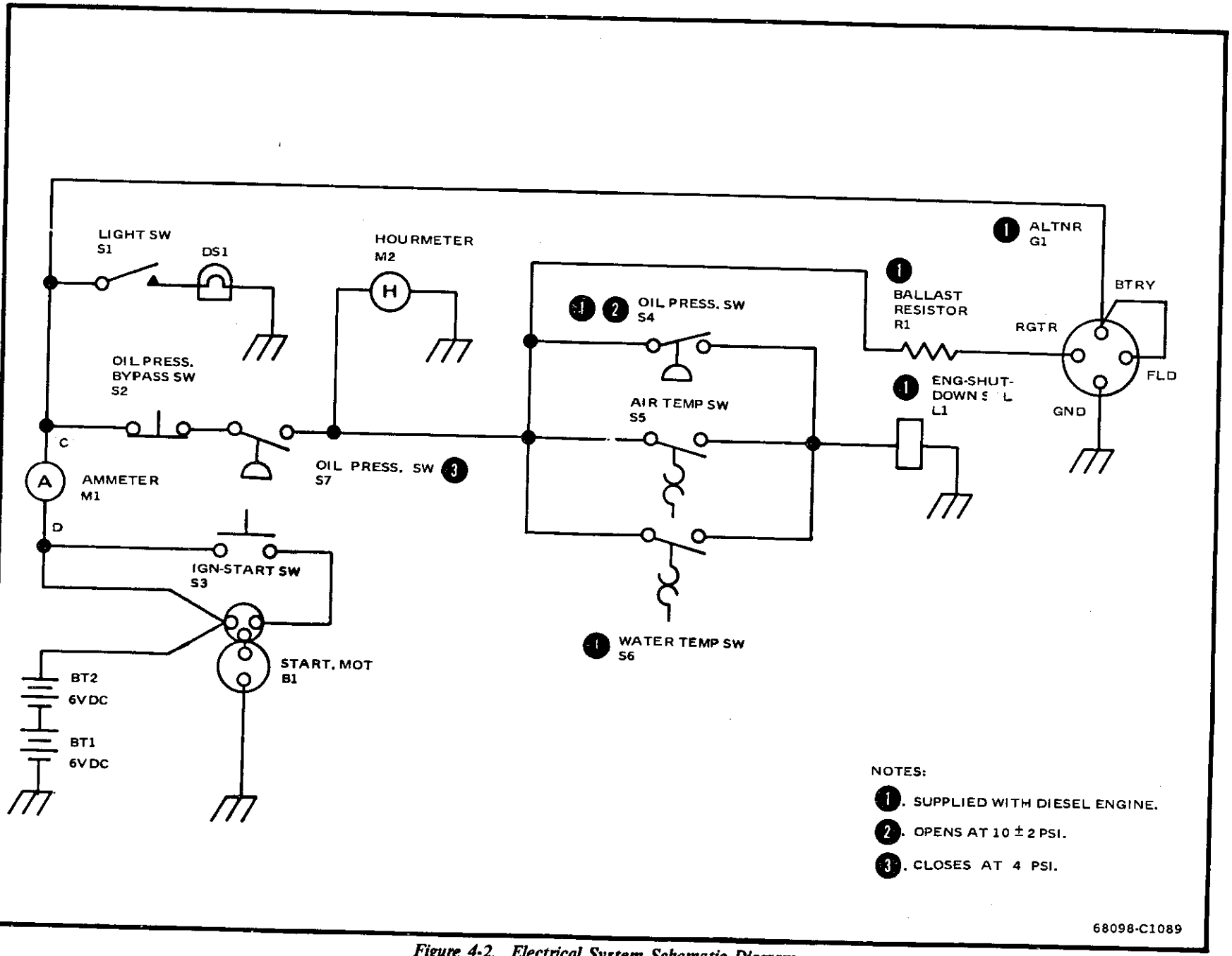


Figure 4-2. Electrical System Schematic Diagram

SECTION 5

MAINTENANCE

5-1. GENERAL.

5-2. This section contains instructions pertaining to preventive and corrective maintenance. Preventive maintenance includes all routine tasks performed to prevent future breakdown of the equipment, such as cleaning, inspection, lubrication, or routine checks. Corrective maintenance includes everything that must be performed on the air compressor unit to restore the unit to normal operation after a malfunction or failure occurs. Refer to engine manufacturer's maintenance manual for all engine maintenance procedures.

5-3. PREVENTIVE MAINTENANCE.

5-4. The necessary preventive maintenance services will be performed before operation. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation of the unit which would damage the equipment if operation were continued. After-operation services will be performed at intervals based on the normal operation of the equipment. Reduce interval to compensate for abnormal conditions.

5-5. INSPECTION. To ensure that the equipment is ready for operation at all times, it must be inspected systematically by the operator before operation, during operation, after operation, weekly, monthly and every 500 hours (quarterly) of operation (refer to Table 5-1). The weekly interval will be equivalent to a maximum of 50 hours of use. The monthly interval will be equivalent to 4 weeks of a maximum of 250 hours of use, whichever occurs first. In this manner, defects will be discovered and corrected before they result in serious damage or failure.

5-6. CLEANING. Make certain air compressor unit is clean and free of grease, oil, and dirt on all surfaces. Clean with nonflamable cleaning solvent and wipe dry.

5-7. LUBRICATION. Refer to Table 5-2 for the manufacturer's recommended lubricants and service intervals.

5-8. OPERATIONAL CHECKOUT. Operational checkout of this unit is limited to the actual running of the equipment and observation of the instrument panel gauges for proper indications. Following are the only operational adjustments necessary if observed indications are as specified in Table 3-1.

Table 5-1. Preventive Maintenance Checks and Services

INTERVAL						B - Before operation D - During operation	A - After operation W - Weekly	M - Monthly Q - Quarterly
OPERATOR			PERIODIC					
DAILY								
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE	
X		X				Visual Inspection	Make a general inspection of the entire unit for obvious deficiencies, such as oil leaks, loose or missing bolts, nut, screws, loose connections, broken wires, and any damage that may have occurred since the equipment was last operated. Inspect for a bent or cracked housing or frame. Correct any deficiencies.	

Table 5-1. Preventive Maintenance Checks and Services (Cont)

INTERVAL						B - Before operation D - During operation	A - After operation W - Weekly	M - Monthly Q - Quarterly
OPERATOR DAILY			PERIODIC					
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE	
X						Tampering	Inspect the air compressor for evidence of tampering or damage. Do not operate the unit until defects are corrected.	
	X					Leaks	Inspect all air lines and fittings for air leaks. Correct all deficiencies.	
X						Lubrication	Lubricate the air compressor in accordance with the lubrication chart, Table 5-2.	
X						Air Cleaner	Inspect air cleaner assembly. Replace a clogged or defective air cleaner element.	
X		X				Cooling System	Inspect the condition of the fins on the radiator assembly. See that they are clean and free from dust and dirt. Backwash with water or blow air through radiator and cooler fins to remove dust.	
X	X	X				Instruments	Inspect the instruments for broken glass, improper operation, and insecure mounting. Replace any defective instruments. When the compressor is operating, the gauges should give satisfactory indications.	
X	X	X				Air Hoses	Inspect the air hoses for breaks, wear or leaks. Replace defective air hose.	
		X				Protection	Protect the unit by covering it and placing it in a sheltered place to protect it from tampering and weather.	
X		X				Battery	Check level of electrolyte in the batteries. Use distilled water to maintain proper level.	
			X			Engine Oil Filter	Replace engine oil filter at time interval specified in Table 5-2.	
			X			Hardware	Tighten any loose connections or mounting hardware. Replace a clogged or defective compressor air cleaner element.	

Table 5-1. Preventive Maintenance Checks and Services (Cont)

INTERVAL						B - Before operation D - During operation	A - After operation W - Weekly	M - Monthly Q - Quarterly
OPERATOR DAILY			PERIODIC					
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE	
			X			Tires	Check air pressure; maintain at 36 PSI.	
			X			Regulators, Valves, and Gauges	Inspect the condition of all gauges, valves and safety valves. Start the air compressor and see that all gauges indicate correctly and that the glass is not cracked. Inspect the condition of all safety valves to see they are working properly.	
			X			Hardware	Tighten any loose mounting screws and connections. Replace any defective or damaged gauges, check valves, and safety valves.	
			X			Fan and Shroud	Inspect the engine fan assembly for insecure mounting and improper operation. Check fan and generator belts for proper tension.	
				X		Lubrication	Drain oil in rotary compressor and engine and refill with clean oil of type and grade specified in lubrication chart, Table 5-2.	
			X			Compressor Oil Filter	Replace compressor oil filter at time interval specified in Table 5-2.	
				X		Appearance	Inspect the general appearance of the air compressor, paying particular attention to dirt, illegible markings of identification, and poor condition of the paint surfaces.	
				X		Housing Assembly	Inspect the doors, side panels, and cover panels for loose or missing nuts and screws and damaged hinges, latches, and panels.	
				X		Controls and Wiring	Inspect all controls and instruments on the control panel for damaged or improper operation. Inspect all controls and instruments for loose mountings and connections and damaged wiring. Clean the accumulated dust and dirt from the control panel. Tighten any loose connections and replace damaged controls instruments or wiring.	

Table 5-1. Preventive Maintenance Checks and Services (Cont)

INTERVAL						B - Before operation D - During operation	A - After operation W - Weekly	M - Monthly Q - Quarterly
OPERATOR DAILY			PERIODIC					
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE	
				X		Engine	Check battery voltage and recharge if voltage is low. If condition persists, check ignition system per Engine Manual.	
					X	Axle Assembly	WHEEL BEARINGS Remove, clean out old grease and repack per lubrication chart, Table 5-2.	

5-9.. ENGINE SPEED CONTROL LINKAGE ADJUSTMENT (Figure 5-1). Start the unit, refer to STARTING THE UNIT (Section 3). Using a tachometer check engine idle speed, if speed is not 1,875 ± 25 RPM with the air service valves closed and compressor running unloaded, adjust the speed control linkage as follows:

a. Allow unit to operate until operating temperatures are attained.

b. While holding speed control rod (3), loosen, lock nuts (1 and 4) and rotate control rod (3) in or out of stop block (2) and ball joint (5) as required to set engine idle speed at 1,875 ± 25 RPM. Observe speed on tachometer.

c. Cycle the air compressor several times by opening and closing the air service valves. Observe tachometer each time to ensure engine idle remains at 1,875 ± 25 RPM with compressor running unloaded. Readjust as described in steps above as necessary. Stop the unit, refer to STOPPING THE UNIT (Section 3).

5-10. AIR PRESSURE REGULATOR ADJUSTMENT. (Figure 5-2). If the air pressure gauge indicates other than 110 ± 2 PSI when unit is running in the unloaded configuration, and the engine idle speed is 1,875 ± 25 RPM, adjust the air pressure regulator as follows:

a. Start the unit, refer to STARTING THE UNIT (Section 3).

b. Allow unit to operate until operating temperatures are attained.

c. With air discharge service valves closed, and engine operating at proper idle speed, adjust air pressure regulator to obtain an indication of 110 ± 2 PSI on the air pressure gauge.

d. If air pressure rises above 112 psi, turn the adjusting screw counterclockwise to decrease pressure. Bleed off excess air by opening air discharge service valve. After excess air has been discharged, close service valve and readjust air pressure regulator, as necessary, to obtain 110 ± 2 PSI.

e. Cycle the air compressor several times by opening and closing the air discharge service valves. Observe air pressure gauge each time to ensure pressure setting remains stable. Stop the unit, refer to STOPPING THE UNIT (Section 3).

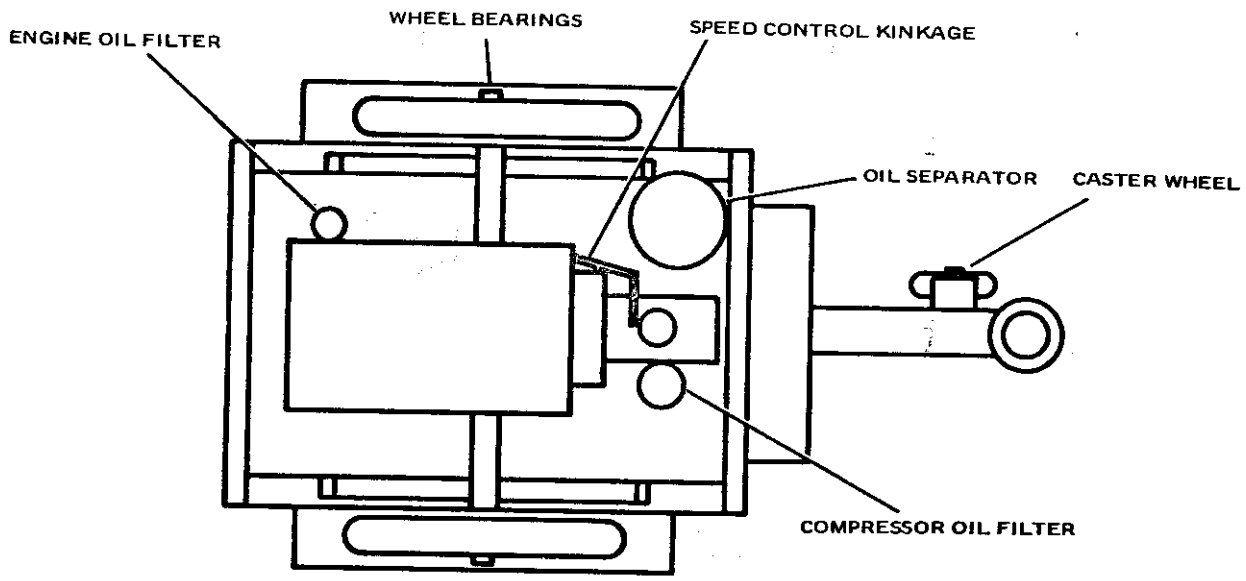
5-11. CORRECTIVE MAINTENANCE.

5-12. TROUBLESHOOTING. Table 5-3 provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air compressor unit. The table covers possible troubles, probable causes, and corrective action to be taken to return the unit to acceptable operational performance standards.

NOTE

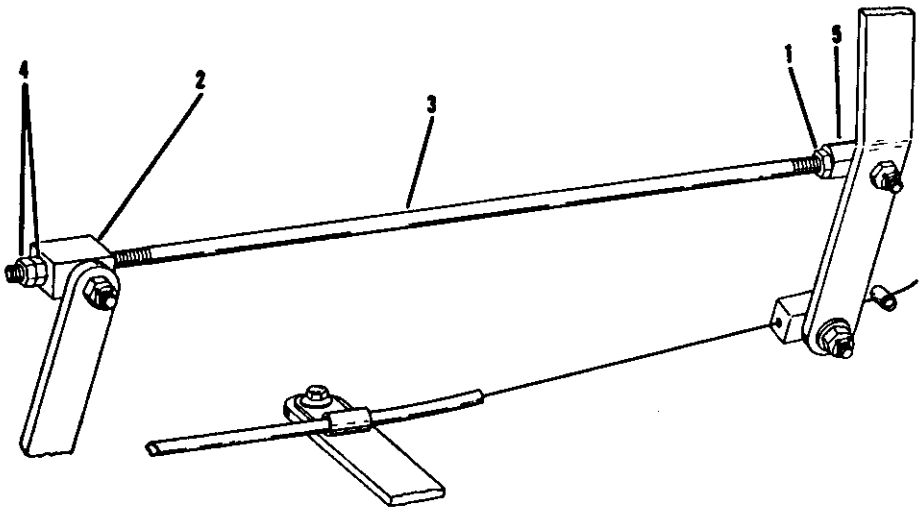
To diagnose and correct unsatisfactory operation or failure of the diesel engine, refer to engine manufacturer's maintenance manual.

Table 5-2. Lubrication Instructions



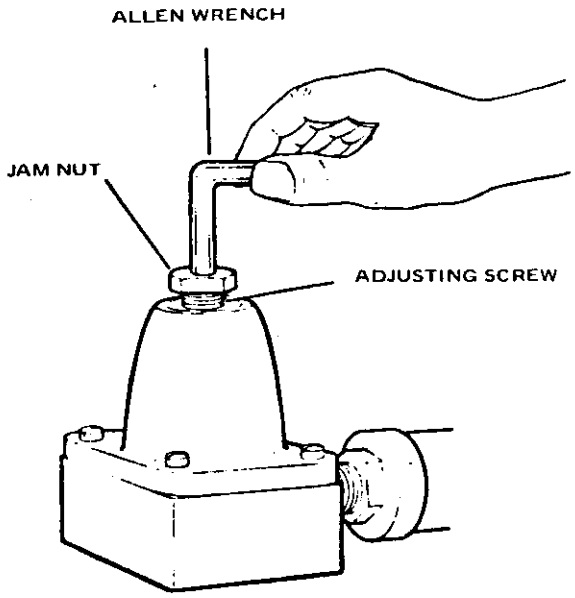
LUBRICATION POINT	LUBRICANT (SPECIFICATION)	APPLICATION (OR ACTION)	INTERVAL (SERVICE HOURS)
ENGINE:			
Dipstick		Check oil level.	10
Crankcase	SAE 30-Oil*	Drain and change oil.	100
Oil filter		Change element.	100
Fan hub	Grease**	Grease gun.	500
COMPRESSOR:			
Oil filter		Change element.	100
Control linkage	SAE 30-Oil*	Oil can (sparingly).	100
Service valve	SAE 30-Oil*	Oil can (sparingly).	100
Oil Separator		Check oil level.	10
Separator tank	SAE 30-Oil*	Drain and change oil.	500
Separator element		Replace	4,000
AXLE:			
Wheel bearing	Grease**	Hand pack.	1,000
Caster wheel	Grease**	Grease gun.	1,000

LUBRICANT	Below 32°F	32°F to 75°F	Above 75°F
*Heavy duty motor oil - Series 3 or supplement 1 (MS - Motor Serve designation)	SAE 10	SAE 20	SAE 30
**General purpose grease	No. 0	No. 0	No. 1



1. HEX. NUT
2. STOP BLOCK
3. SPEED CONTROL ROD
4. HEX. NUT
5. BALL JOINT

Figure 5-1. Engine Speed Control Linkage



1. LOOSEN JAM NUT.
2. USING 3/16 IN. ALLEN WRENCH, ADJUST ADJUSTING SCREW UNTIL DESIRED PRESSURE INDICATION IS OBTAINED.
3. TIGHTEN JAM NUT.

Figure 5-2. Air Pressure Regulator Adjustment

Table 5-3. Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
Compressor overheats.	a. Dirty compressor oil filter element.	a. Replace compressor oil filter element.
	b. Dust or dirt collected on oil cooler core external surface.	b. Blow off all dirt and dust.
	c. Low compressor oil level.	c. Refill oil separator to overflow.
	d. Faulty thermal bypass valve	d. Repair thermal bypass valve.
	e. Oxidized (varnished) oil.	e. Clean oil supply system, refer to Cleaning (Section 5).
	f. Vane(s) damaged or stuck in slot(s).	f. Clean or replace vanes, refer to INSPECTION (Section 5).
Noisy compressor operation.	a. Low compressor oil level.	a. Refill oil separator to overflow.
	b. Air pressure regulator assembly defective.	b. Repair air pressure regulator assembly.
Compressor not operating to full capacity or pressure.	a. Air pressure regulator assembly defective or out of adjustment	a. Adjust or repair air pressure regulator assembly.
	b. Leak in air hoses, piping, or connections.	b. Check all air hoses, piping and connections for leaks while unit is operating. Use soapy water solution on areas. Tighten or replace as required.
	c. Compressor air cleaner dirty or clogged.	c. Replace air cleaner
	d. Safety valve on oil separator leaking.	d. Replace safety valve.
Compressor fails to load or	a. Dirt buildup on intake-unloader valve seat.	a. Clean valve seat.
	b. Unloading pressure too high or too low.	b. Adjust air pressure regulator assembly.
	c. Air hose between intake-unloader and air pressure regulator assembly damaged or leaking.	c. Replace air hose.
Compressor unloads but engine will not idle.	a. Speed control linkage defective.	a. Adjust or replace speed control linkage.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Condensate and/or emulsion in oil separator.	a. Unusually high humidity.	a. If this is a climatic condition, replace compressor oil with a non-detergent oil, or factory can supply thermal bypass elements with higher settings. If used oil is changed every 200 hours.
	b. Faulty thermal bypass valve.	b. Repair thermal bypass valve.
Excessive compressor oil consumption.	a. Compressor oil system leaking.	a. Repair leaks as necessary.
	b. Low separator pressure (below 70 PSI).	b. Replace faulty minimum pressure valve.
	c. Rapid, repeated load unload cycle.	c. Reduce air demand by closing service valves.
	d. Clogged line from separator to intake orifice or clogged orifice.	d. Remove line and orifice, clean, and replace.
	e. Ruptured separator element.	e. Replace element.
Compressor unit hunts.	a. Air pressure regulator assembly defective. Sticky or binds.	a. Repair air pressure regulator assembly.
Ammeter indicates low or no-charging rate when batteries are low or discharged.	a. Defective or loose wiring in charging circuit.	a. Isolated and repair malfunction, see figure 5-3.
	b. Ammeter defective.	b. Replace ammeter.
	c. Alternator regulator assembly defective.	c. Adjust or replace alternator regulator assembly.
	d. Alternator assembly defective.	d. Repair alternator assembly.
	e. Loose or broken drive belts.	e. Tighten or replace belts.
Ammeter indicates excessive charge rate when batteries are fully charged.	a. Defective wiring in charging circuit.	a. Repair or replace as required.
	b. Ammeter defective.	b. Replace ammeter.
	c. Alternator regulator assembly defective.	c. Adjust or replace alternator regulator assembly.
Wheel wobbles.	a. Wheel bent.	a. Replace wheel.
	b. Wheel loose on hub.	b. Tighten nuts.
	c. Wheel bearing defective.	c. Replace wheel bearing.

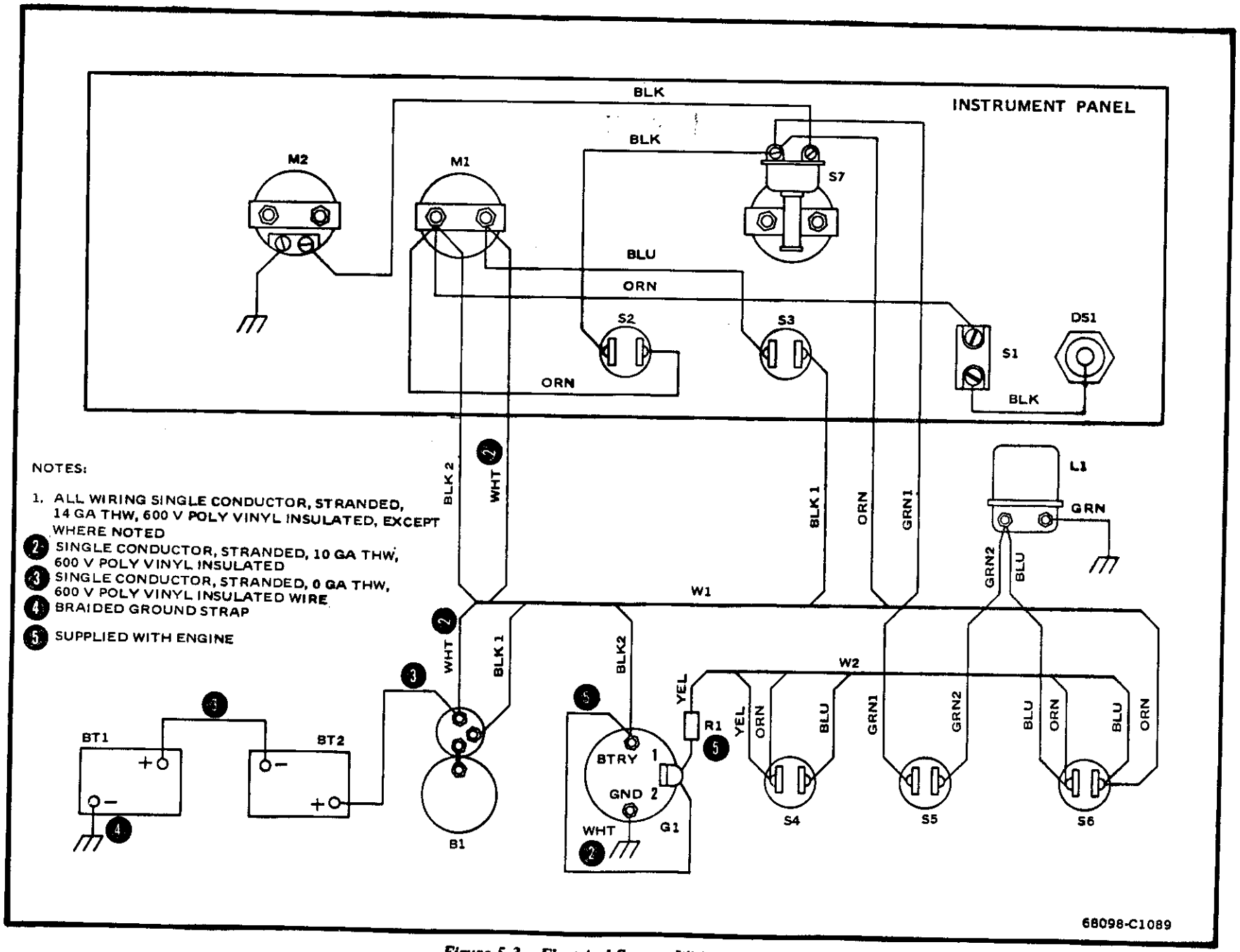


Figure 5-3. Electrical System Wiring Diagram

5-13. DISASSEMBLY, INSPECTION, REPAIR, AND ASSEMBLY. These procedures include all instructions necessary to restore the unit to normal operation after a malfunction has been isolated to a component.

5-14. Air Pressure Regulator (Figure 5-4). To remove the pressure regulator from the oil separator and disassemble the regulator, proceed as follows:

a. Disconnect blow down valve tube nipple from regulator base (8).

b. Remove air intake control elbow from regulator base (8).

c. Remove four screws (10) and lock washers (9) from base (8).

d. Separate spring housing (3), diaphragm (7), base (8).

e. Clean all components by washing components in standard cleaning solvent.

f. Inspect diaphragm (7) for cuts, tears, and deterioration.

g. Inspect spring (5) distortion.

h. Inspect spring seat (4) and spring tube wear and burring.

i. Lightly lubricate spring seat (4), spring (5), spring tube (6), diaphragm (7), with compressor oil.

j. Reassemble regulator in reverse order of disassembly.

5-15. Thermal Bypass Valve (Figure 5-5). To remove the bypass valve from the compressor housing and disassemble the valve, proceed as follows:

a. Remove oil filter (REF) and all oil lines from valve, and remove two bolts (REF) and lock washers (REF) attaching bypass connector (1) to air compressor.

b. Remove four bolts (7) and lock washers (8) from body (13).

c. Separate cover (9), body (13), and bypass connector (1).

CAUTION

Do not dismantle element (14) as temperature setting will be disturbed.

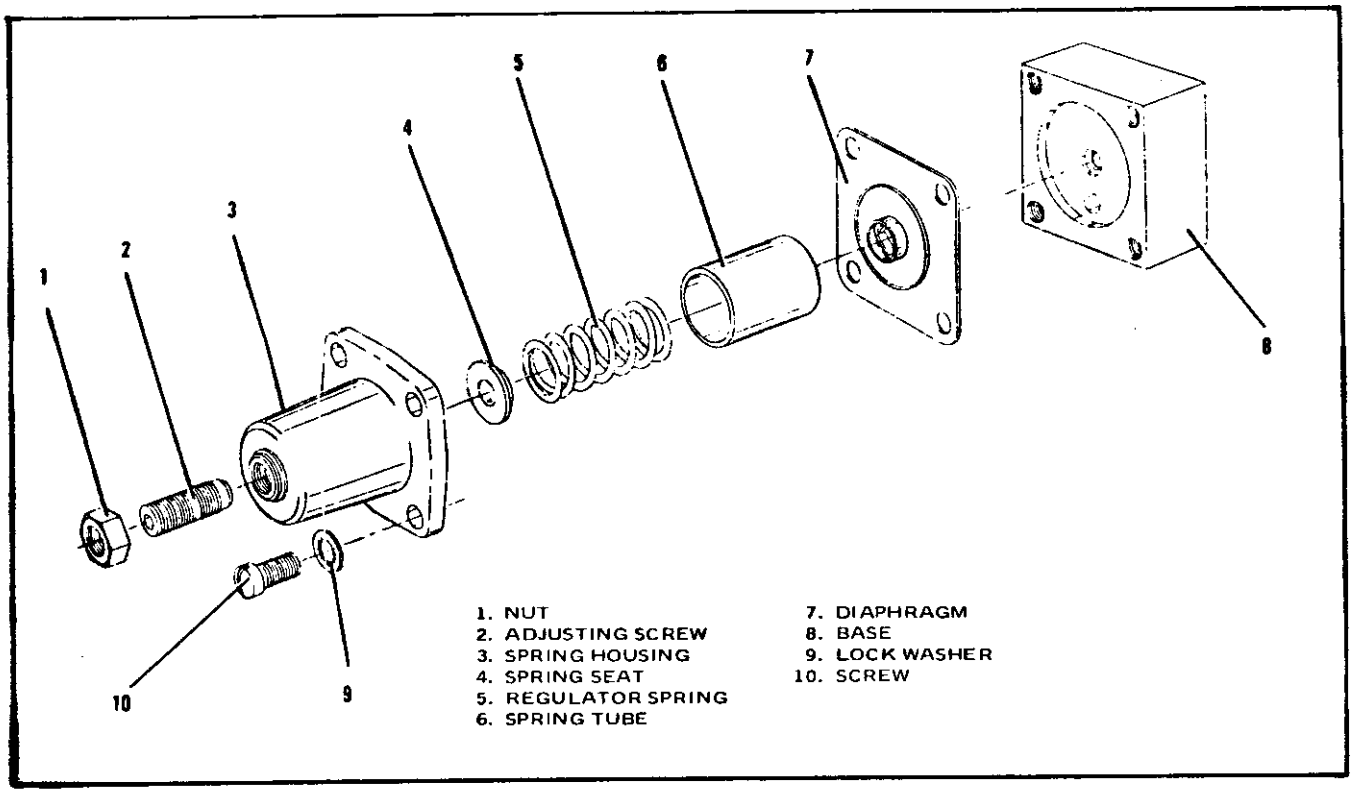


Figure 5-4. Air Pressure Regulator Exploded View

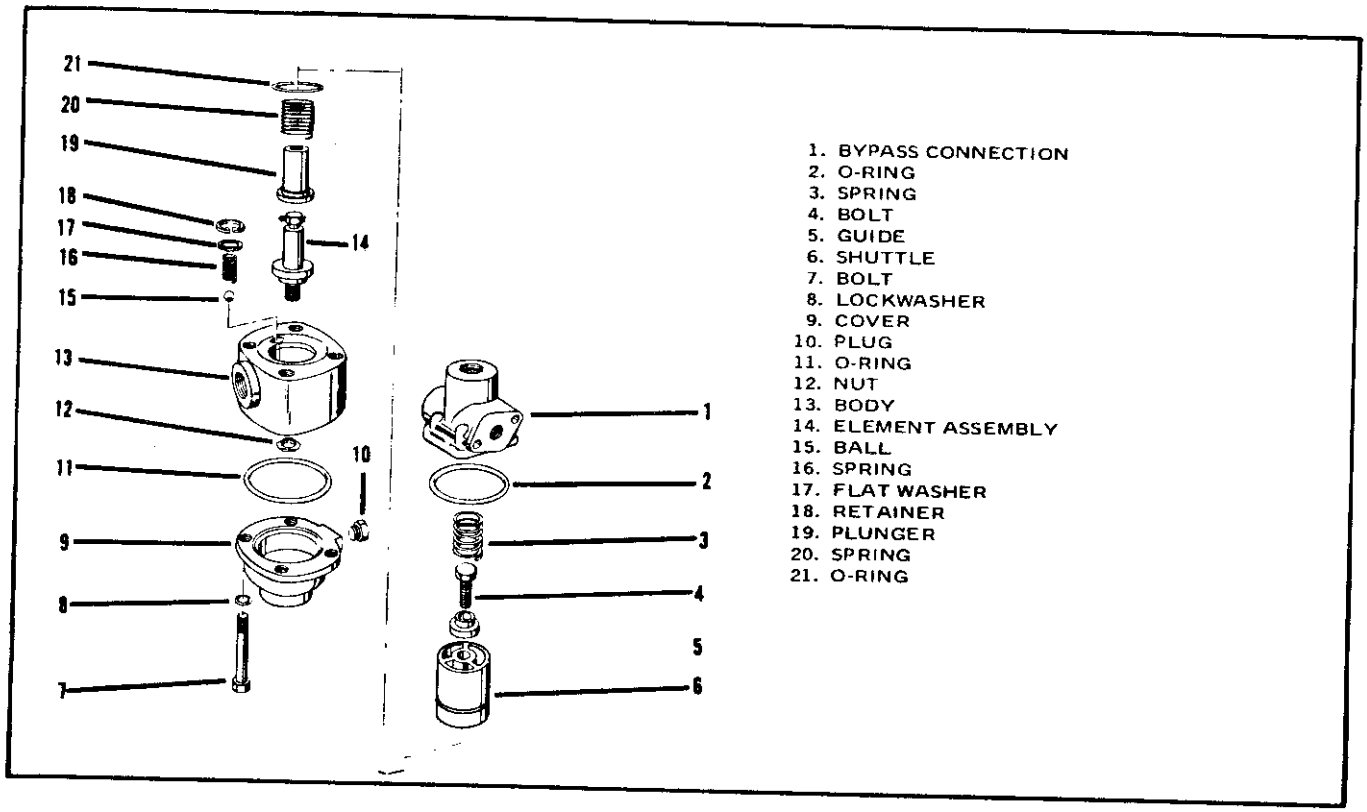


Figure 5-5. Thermal Bypass Valve Exploded View

d. Remove nut (12) from element assembly (14), remove element (14) from body (13).

e. Remove shuttle (6) from body (13).

f. Remove bolt (4) from guide, (5), remove guide (5) from shuttle (6).

g. Remove ball (15) and spring (16) from body (13).

NOTE

Bore of body (13) is coated with Teflon. Do not use sharp instrument to clean as Teflon may be damaged.

h. Clean all components by washing components in standard cleaning solvent.

i. Inspect element (14) for distortion, jamming, or other defects.

j. Inspect springs for broken or distorted coils.

k. Replace all defective parts (2, 11 and 21).

l. Lightly lubricate all parts with compressor oil.

m. Reassemble bypass valve in reverse order of disassembly.

5-16. Oil Separator (Figure 5-6). Before attempting to replace oil separator element, inspect the compressor oil filter for varnish condition. A varnish condition will appear as a dark brown heavy sticky deposit.

CAUTION

The separator element can not be cleaned and must be replaced.

If a varnish condition exists, the compressor separator, oil cooler piping, and filter must be cleaned. Varnishing is a malfunction and the cause must be corrected or serious damage will occur to the compressor. Varnishing can be the result of the use of improper oil, poor filter maintenance, operating above normal operating temperatures, and over extended oil change periods.

CAUTION

Follow the detergent manufacturer's instructions for using and handling procedures. Use only when varnish condition exists.

5-17. A suggested method of removing varnish is to use a super detergent (Thermo-Solve or equivalent) mixed into the compressor oil with the contaminated separator element. Operate the compressor under full load for approximately 40 hours and then drain the oil. This should dissolve and carry into suspension the sludge and varnish build up within the system. Drain the oil, inspect separator, and replace the separator element.

5-18. To replace the oil separator element, proceed as follows:

a. Disassemble discharge manifold piping from oil separator minimum pressure valve housing.

b. Disconnect all hose assemblies connected to separator cover. Tag hoses for assembly reference.

c. Remove special bolts and lock washers.

d. Lift cover assembly upward until assembly clears the separator tank.

e. Lift the separator element out of separator tank.

CAUTION

Do not replace special bolts with ordinary low carbon type. Unit is supplied with high tensile bolts to meet ASME requirements.

f. Reassemble the oil separator element in the reverse of above disassembly procedure. Make hose connections as tagged at disassembly.

g. Refill with oil.

5-19. Air Compressor (Figure 5-7). To inspect the air compressor rotor blades, procede as follows:

a. Remove locknut and disconnect stop block from speed control arm.

b. Disconnect control cables from speed control and compressor unloader.

c. Disconnect air hoses from oil separator, intake ur loader, and blowdown valve.

d. Remove hose clamps and hose from air intake control.

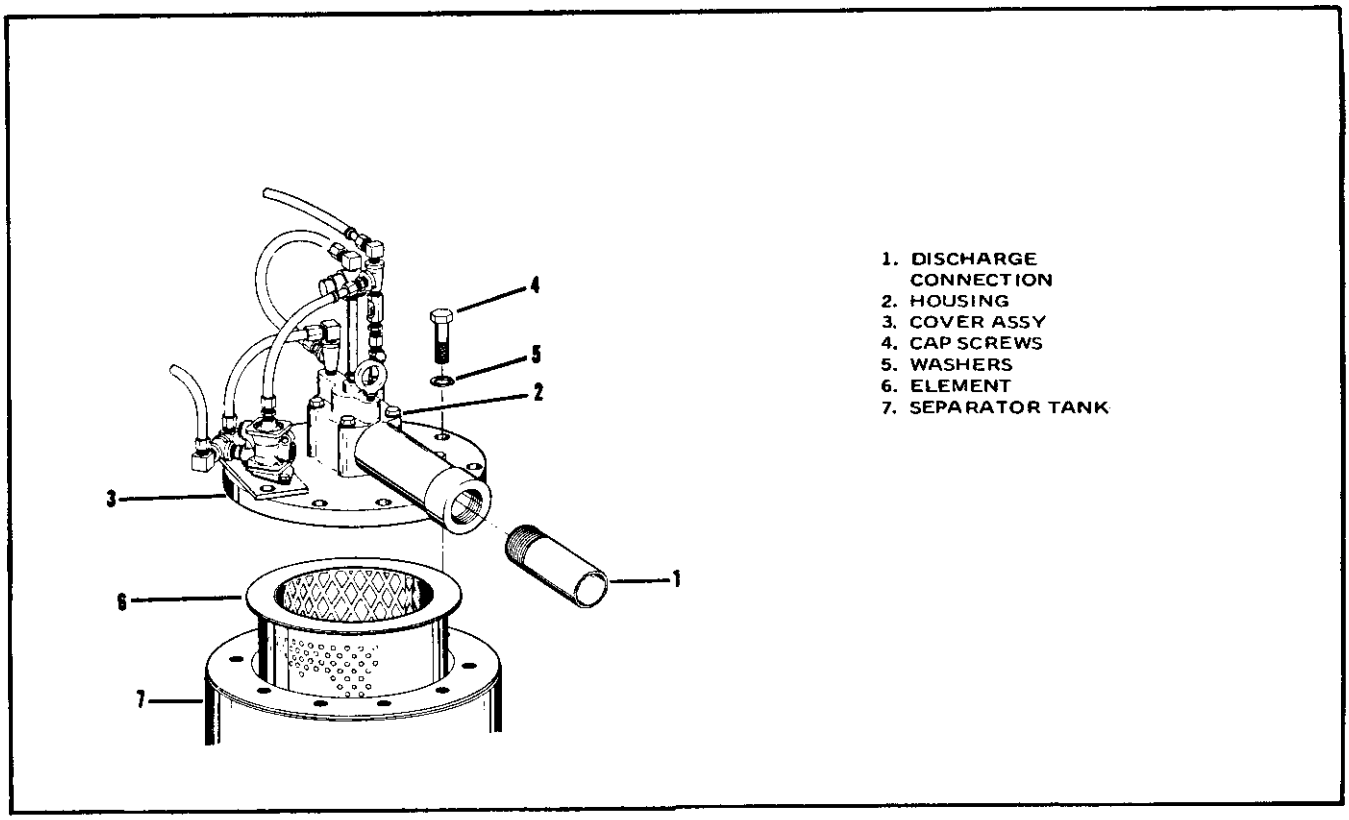


Figure 5-6. Oil Separator Exploded View

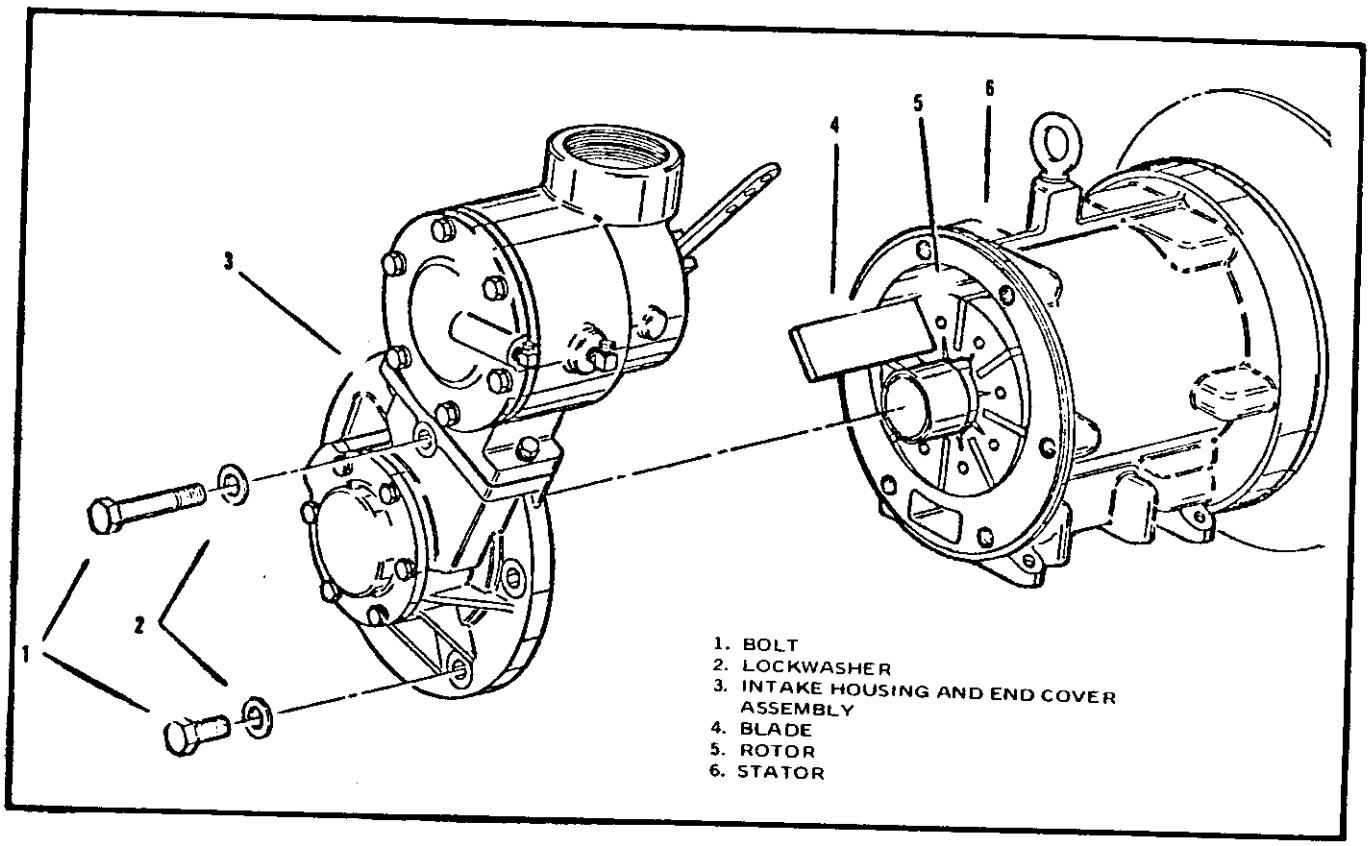


Figure 5-7. Air Compressor Exploded View

e. Drain fuel from fuel tank, remove fuel tank cover and fuel tank.

f. Disassemble compressor non-drive end in numerical sequence shown in Figure 5-7. Use a wire bent into a hook on one end to extract rotor blades from slots at top of rotor. To bring blades into position at top of rotor, rotate engine by repeatedly engaging starter.

g. Inspect blades for evidence of excessive wear. See Figure 5-8. Blades are excessively worn when 25 per cent of covering per side has been removed, and shiny metal exposed. Blades worn on one side only can be turned around and reused. Replace blades which have suffered a loss of 1/16-inch in height due to wear. See Figure 5-8. Replace blades worn on both sides. Replace blades damaged by scores or chips.

h. Dip new o-ring and new blades in clean compressor oil before installing.

i. Reassemble compressor non-drive and in reverse numerical sequence shown in Figure 5-7.

j. Install fuel tank and fuel tank cover, fill fuel tank.

k. Install hose and hose clamps on air intake control.

l. Attach instrument panel assembly to compressor housing, (if removed during disassembly).

m. Connect air hoses to blowdown valve, intake unloader, and oil separator assembly.

n. Connect control cables to compressor unloader, and speed control.

o. Connect stop block to speed control arm and secure with locknut.

p. Start unit and check compressor and air lines for leaks or other malfunctions. Correct any malfunction by referring to table 5-3.

5-20. TEST.

5-21. Tests to be performed after repair of the unit are limited to the actual running of the equipment, refer to OPERATIONAL CHECKOUT (Section 5).

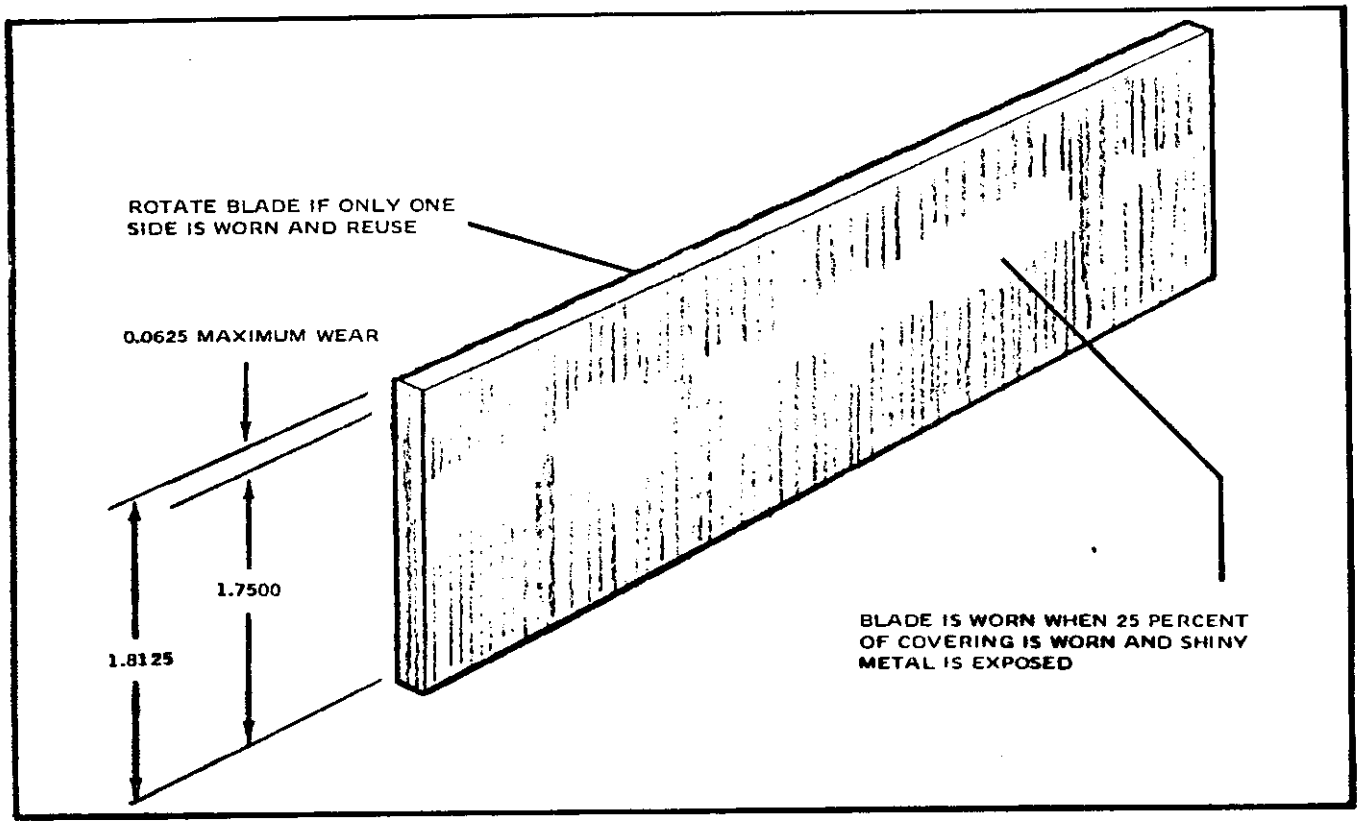


Figure 5-8. Rotor Blade Inspection

Compressor Air End Warranty

The manufacturer warrants each new compressor air end, which is comprised of the rotor, stator, blades, bearing, shaft, and end covers which is sold by the manufacturer (through one of its authorized dealers) to be free of defects in material and workmanship, and against loss of performance due to wear, for a period of 24 months from the first day of service.

The unit will be replaced or repaired as a result of such defects.

This warranty does not cover damage caused by misuse or neglect, nor shall it apply to a compressor upon which repairs or alterations have been made by other than an authorized dealer or Davey representative.

All other parts, excluding the prime mover, which is covered by the original manufacturer's warranty, are warranted for a period of three (3) months, subject to the same conditions above.

Warranty for the compressor air end is transferable by notifying Davey Compressor Company at Cincinnati, Ohio, of new owner's name and address, with the model number and unit serial number of the machine.

DAVEY COMPRESSOR COMPANY SHALL IN NO EVENT BE LIABLE FOR CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES ARISING OUT OF THE FAILURE OF ANY COMPRESSOR TO OPERATE PROPERLY.

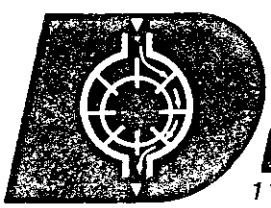
Retain for your own record.

THIS MANUAL IS FOR MY DAVEY UNIT MODEL.....UNIT SERIAL NO. ..... COMP. MODEL .....

The above information, which will be found on the data plate mounted above the instrument panel, should be filled in. For prompt shipment of repair parts, this information should be supplied when ordering parts.

DAVEY COMPRESSOR COMPANY

Cincinnati, Ohio 45242



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