TO 34Y1-258-1

OPERATION AND SERVICE INSTRUCTIONS

COMPRESSOR, ROTARY, POWER DRIVEN, 250 CFM, 100 PSI, DIESEL ENGINE DRIVEN, 4 WHEEL TRAILER MOUNTED, TYPE MC-5 MODEL 21M250..... PART NO. 89150-1

Davey Compressor Co. Division of Keco Industries, Inc. (16004)
FO8635-93-C-0025

DAVEY™ COMPRESSOR

A Kēco Company

DATE 15 OCTOBER 1996

LIST OF EFFECTIVE PAGES

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SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this manual. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS AND ROTATING PARTS

Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustment inside the equipment with the unit turned on. To avoid casualties, always shut down the engine and remove battery power before inspecting and servicing.

Prohibit smoking except in designated areas. Prohibit matches and lighters in hazardous areas.

Never use fuel to wash the hands.

Avoid getting fuel on the skin; wash fuel from the skin as soon as possible with soap and water.

If fuel gets into the eyes or mouth, flush thoroughly with water (avoid swallowing), and get medical aid immediately.

Do not carry or wear loose items of clothing when working with or around moving equipment.

Avoid spilling fuel; clean up spills at once if they happen. Wipe up small spills or cover with dirt. Follow local emergency procedures for large spills. Treat the area as dangerous until the vapors have gone.

Report leaks to the proper authorities. Do not operate leaky equipment.

CARBON MONOXIDE
(EXHAUST GAS) CAN KILL YOU

Exposure to exhaust gases produces symptoms of headache, dizziness, loss of muscular control, drowsiness or coma. Brain damage or death can result from severe exposure.

Fumes from engines become concentrated with poor ventilation.

- Operate engine in a ventilated area only.
- While running engine, be alert for fumes. If someone is overcome, expose to fresh air; keep warm and still; give artificial respiration if needed. Seek MEDICAL attention. Administer oxygen, if available.

GOOD VENTILATION IS THE BEST DEFENSE
AGAINST EXHAUST POISONING.

Handling hot exhaust system can cause severe burns. Allow unit to cool before handling.

Disconnect the battery cable from the positive battery terminal before disconnecting any other electrical leads from the engine components. This will prevent shorts which could damage the alternator, voltage regulator, and other parts.

Before towing be sure the parking brake is released.

WARNING

When a lifting device is used, it must be capable of lifting a minimum of 8000 pounds.

WARNING

Do not operate the unit in a building or any enclosed area unless exhaust gases are piped outside. Inhalation of exhaust gases can result in serious illness or death.

Serious injury or death may result from using this equipment for respiration/breathing air. Use only for mechanical purposes.

To avoid injury to personnel, do not play with compressed air.

WARNING

Continued exposure to high, steady-state loud noises may result in loss of hearing. Personnel exposed to such noises should wear ear protection. One acceptable model is the Mine Safety Appliances Aural Protector, Sound, M-1 Commercial Noise Foe, Mark II Model with Foam Filled Seal Pads, NSN-4240-00-861-3612.

SAFETY SUMMARY - continued

CAUTION

After unloading and parking the unit, be sure to set parking brakes.

CAUTION

The unit should be located in an area as free of dust and dirt as possible. A highly contaminated atmosphere places an abnormal load on the air cleaner, oil filters, and compressor, and can result in an increase in maintenance problems.

CAUTION

Do not crank the engine for more than 15 seconds at a time. Allow the starting motor to cool for 1 minute between cranking intervals.

CAUTION

If engine oil pressure does not register within 10 seconds after starting, release safety pushbutton (8) and determine cause.

CAUTION

Do not allow equipment to operate unattended for prolonged periods. The operator should observe all gauges periodically to be certain unit is operating normally and listen to the unit for any abnormal noises. Observance of these precautions can prevent serious damage to the unit.

CAUTION

Block front wheels to prevent unit from slipping off jack while adjusting brakes.

CAUTION

The separator element cannot be cleaned and must be replaced.

SECTION I

INTRODUCTION AND GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This technical manual covers the operation and service instructions for the Type MC-5, 4-wheel trailer mounted, Diesel Engine Driven, 250 CFM, 100 PSI, Rotary Air Compressor. The units were manufactured by Davey Compressor Division of Keco Industries, Inc., Florence, KY 41042. Refer to figure 1-1 for identifying views. Instructions in this manual are for the guidance of personnel responsible for the operation and service of the equipment. Model number with part number and NSN are as listed below.

Model No.	Part No.	NSN
21M250	89150-1	4310-01-388-9808

1-3. Abbreviations used throughout this manual are in accordance with Military Standard, MIL-STD-12, or are defined at the first appearance in the text.

1-4. GENERAL INFORMATION.

1-5. The Type MC-5, Rotary Compressor unit is a trailer mounted four-wheel pneumatic tired, diesel engine driven, sliding blade type, rotary air compressor. The unit supplies 250 cubic feet of air per minute (CFM) at a discharge pressure of 100 pounds per square inch (PSI). The unit is enclosed in a sheet metal housing fastened to a frame and axle combination. The trailer unit is equipped with an inertia operated hydraulic brake system and a hand operated parking brake. When the unit is parked, the brakes are set manually using a hand lever provided. The compressor unit is self contained and capable of continuous operation, under normal conditions, for a period of eight hours without refueling. The unit is designed to supply compressed air for use in general construction work in conjunction with pneumatic tools and other equipment. A general description of the components which comprise this unit is outlined in the following paragraphs. A tabulated listing of Leading Particulars is found in table 1-1.

1-6. DESCRIPTION OF COMPONENTS.

1-7. HOUSING GROUP (1, figure 1-2). The engine, compressor, instrument panel, and other controls are enclosed in a sheet metal housing. Doors on both sides provide access to all areas and components such that normal maintenance of the compressor unit is readily accomplished. Other portions of the housing such as end panels and roof protect the compressor unit during use, storage or towing. Data and instruction plates are attached to the unit enclosure at the lower front road side.

1-8. HOSE REELS AND SERVICE VALVES (2,3, figure 1-2). Two revolving hose reels with locking devices are provided at the rear of the compressor unit (opposite the tow bar end). Each hose reel has a capacity of one 50 foot length of 3/4 inch inside diameter hose. Each hose reel is provided with a shutoff valve. The air discharge manifold is equipped with five individually controlled service outlets with hose couplings. These outlets consist of four each 3/4-inch size and one 1 1/2 inch size.

1-9. INSTRUMENT PANEL ASSEMBLY (29, figure 1-2). All of the operating controls and instruments are mounted on the rear of the enclosure at the curbside position. The controls and instruments can be categorized into three (3) groups: operation indicating group, control group and safety group. The operation indicating group consists of gauges or other visual display devices that indicate engine oil pressure, engine rpm, engine operating hours, engine water temperature, compressor oil temperature, receiver pressure, ammeter and compressor and engine filter restriction. The control group consists of the panel lamp switch, cold weather starting aid, engine idle, unloader and safety stop switch. The safety group consists of an oil pressure switch that shuts down the engine if the engine oil pressure drops below 4 psi, an engine water temperature switch that shuts down the engine if the water temperature exceeds 245° F, a compressor oil temperature switch that shuts down the engine and unloads the compressor if the oil temperature exceeds 250° F and the engine overspeed switch which shuts down the engine if its speed exceeds 2250 rpm.

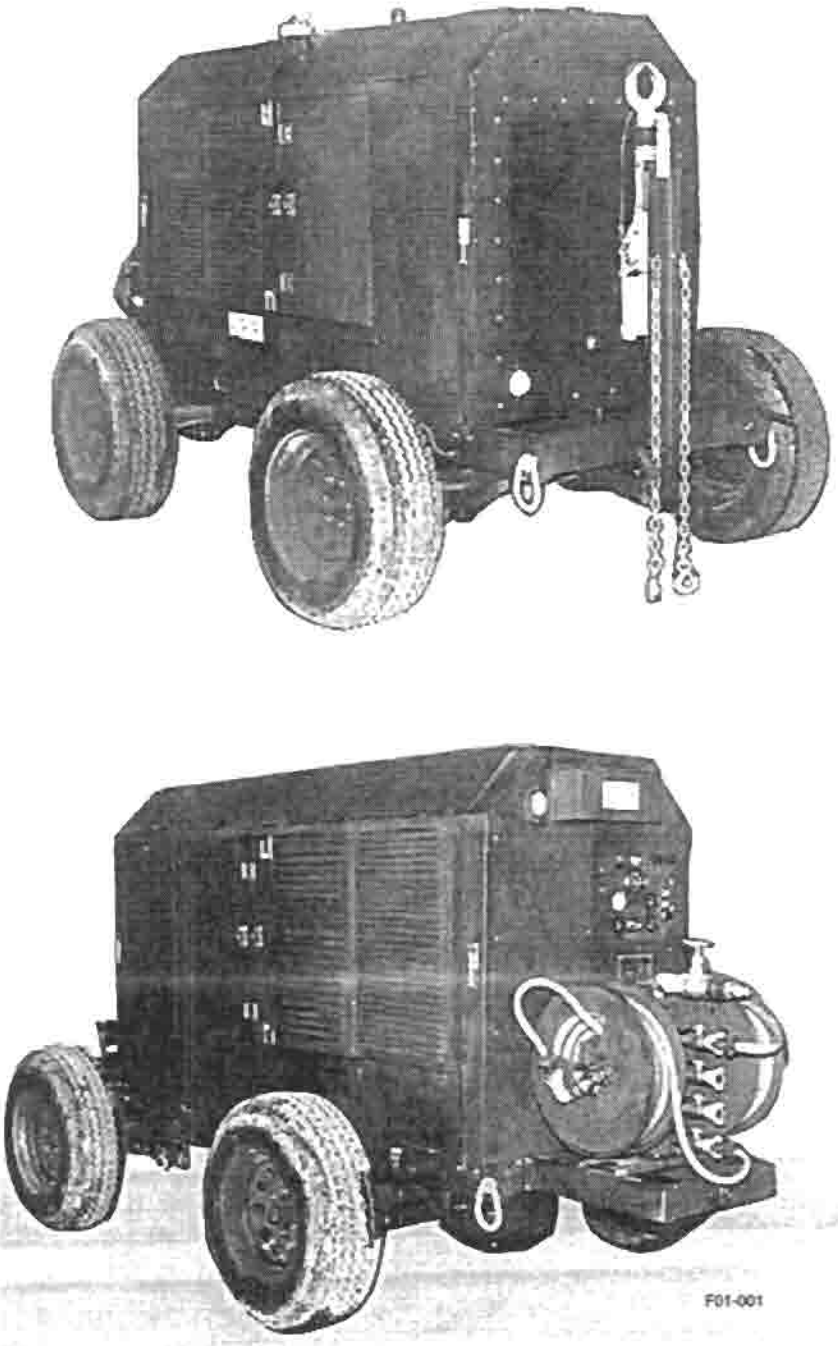


Figure 1-1. Rotary air compressor unit, Type MC-5

Table 1-1. Leading Particulars

ROTARY AIR COMPRESSOR:
- Manufacturer ..... Davey Div. - Keco
- Model 21M250
- Part Number 89150
- Type ..... Sliding Blade, Air, Rotary
- Stages ..... One
- Air Volume ..... 250 cfm
- Air pressure ..... 100 psi
- Electrical System 12vdc
- Prime Mover ..... Diesel Engine
- Mounting ..... Trailer Mounted w/4-Wheel Pneumatic Tires
- Brakes ..... Hydraulic Surge Type w/Mechanical Hand Brake
- Turning Angle ..... 40°
- Towing Speed (Max) ..... Highway 50 mph Off Road 5 mph
- Tire Size ..... 9.5 X 16.5 - 6 Ply
- Tire Pressure ..... 30 psi

Diesel Engine:
- Manufacturer ..... John Deere
- Engine Model No 4039T
- Type ..... 4 Cylinder In-Line 4-Cycle
- Fuel Type DF-2; JP-4; JP-5; JP-8
- Bore and Stroke ..... 4.19 x 4.33
- Displacement ..... 239 cu in.
- Firing Order 1-3-4-2
- Combustion System ..... Direct Injection
- Aspiration ..... Turbocharged
- Rated Speed ..... 2500 rpm
- Low Idle Speed ..... 850 rpm

Engine Accessories:

Starting Motor:
- Manufacturer ..... Deere and Company
- Part Number ..... (Ref) RE54874
- Rating ..... 12 v

Alternator:
- Manufacturer ..... Delco 12SI
- Part Number R100045B
- Rating 12v/78a

Fuel Injection Pump:
- Manufacturer ..... Stanadyne
- Part Number ..... RB 40402

Oil Filter:
- Manufacturer ..... Deere
- Part Number ..... Tl 19044

Air Cleaner (Compressor / Engine):
- Manufacturer ..... Donaldson Co., Inc.
- Part Number 6090183
- Element Number P182063

Compressor Oil Filter:
- Manufacturer ..... Davey
- Part Number 86810

Fluid Capacities:
- Fuel Tank ..... 32 gal
- Engine Crankcase ..... 13 qt (Add one quart for filter)
- Compressor Oil Separator ..... 33 qt
- Engine Cooling System ..... 8 qt

Overall Dimensions and Weight:
- Overal Length ..... 116.3 in.
- Overall Width ..... 74.0 in.
- Overall Height ..... 72.8 in.
- Shipping Volume ..... 403 cu ft
- Shipping Weight ..... 3840 lb

1. HOUSING GROUP
2. HOSE REELS
3. SERVICE VALVES
4. AIR CLEANERS
5. ENGINE AND ACCESSORIES
6. FUEL INJECTION PUMP AND FUEL SYSTEM
7. ALTERNATOR
8. COOLING SYSTEM
9. REAR AXLE ASSEMBLY
10. CHASSIS
11. FRONT AXLE ASSEMBLY
13. SAFETY CHAINS
15. HYDRAULIC BRAKE ACTUATOR
16. OIL PRESSURE SWITCH
18. WIRING HARNESS
19. OIL SEPARATOR ASSY
20. BLOWDOWN VALVE ASSY
21. WATER TEMP SENDER
22. BATTERY
23. SPEED CONTROL LINKAGE
26. ENGINE FUEL FILTER
27. ENGINE OIL FILTER
28. WATER TEMP SWITCH
29. INSTRUMENT PANEL ASSY
30. AIR COMPRESSOR SYSTEM
31. AIR CONTROL HOSE GROUP
32. COLD WEATHER STARTING AID (QUICK-START)
33. COMPRESSOR OIL FILTER AND THERMAL BYPASS VALVE
35. ENGINE FUEL TRANSFER PUMP
36. FUEL TANK
37. DIPSTICK GAUGE
38. ENGINE BREATHER TUBE
39. TURBOCHARGER
40. DRIVE BELTS
41. TIRES
42. SPRINGS
43. WHEEL BEARINGS

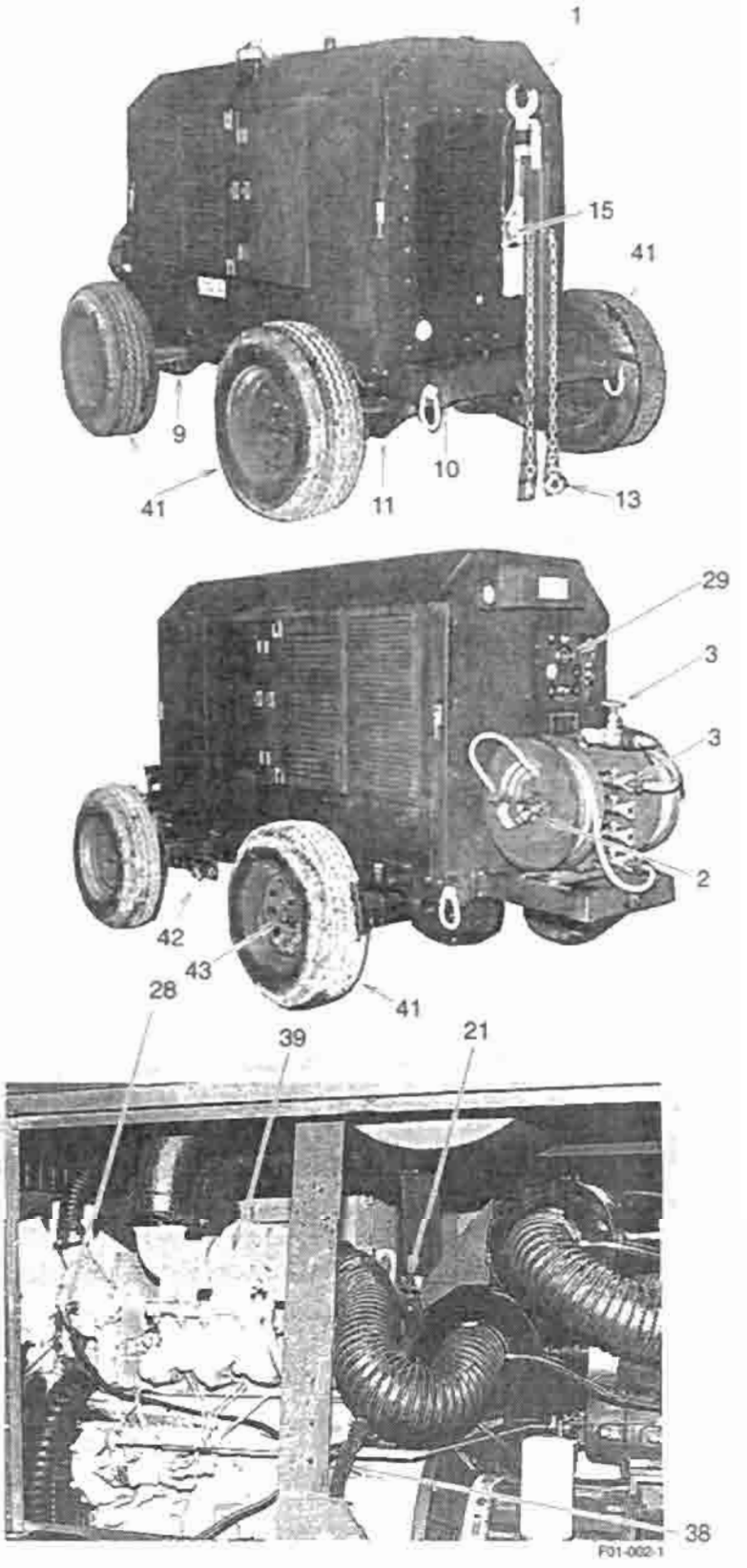


Figure 1-2. Major components of the Type MC-5, Model 21M250 (Sheet 1 of 2)

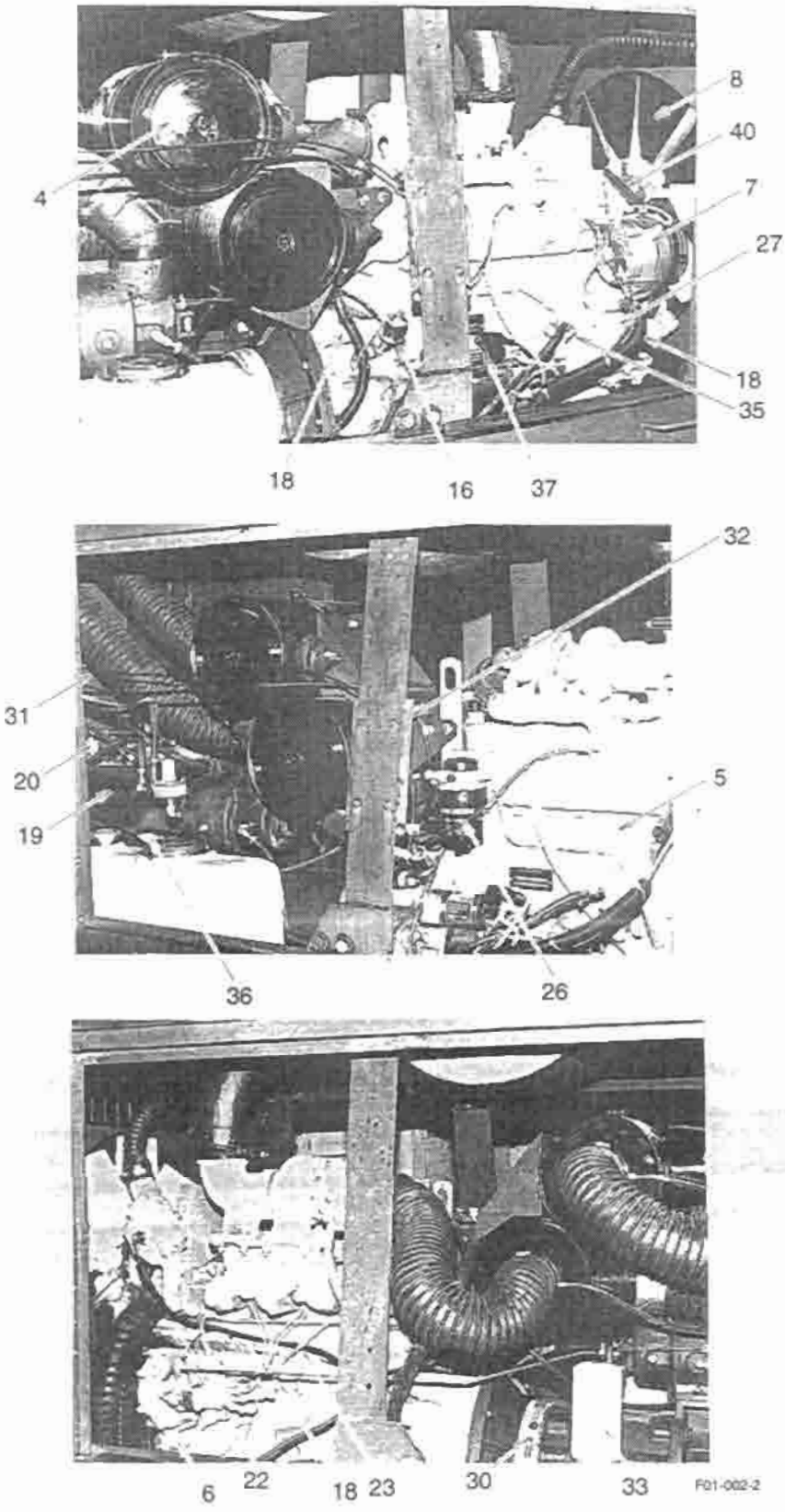


Figure 1-2. Major components of the Type MC-5, Model 21M250 (Sheet 2 of 2)

1-10. COOLING SYSTEM (8, figure 1-2). The air compressor unit cooling system consists of a radiator and oil cooler assembly, fan drive and fan assembly, coolant lines, hoses, and fittings. The engine has a 7 psi pressurized cooling system. An impeller-type water pump circulates the coolant through the engine components and the radiator. A suction fan draws ambient air in through the enclosure and oil cooler, reducing the temperature of the compressor oil. The air is then drawn through the radiator core, reducing the temperature of the engine coolant. The engine temperature is maintained by modulating the coolant flow using a coolant temperature regulator. A thermal bypass valve (33) mounted in the oil cooler assembly, controls the flow of compressor system oil such that when the temperature reaches approximately 150° F (66° C), the valve begins to open, mixing hot and cool oil to maintain a relatively constant minimum operating temperature.

1-11. AIR CLEANER (4, figure 1-2). Two air cleaners are provided to accommodate the engine intake air and compressor intake air. Each air cleaner is a two-stage design with a dry-type reusable element.

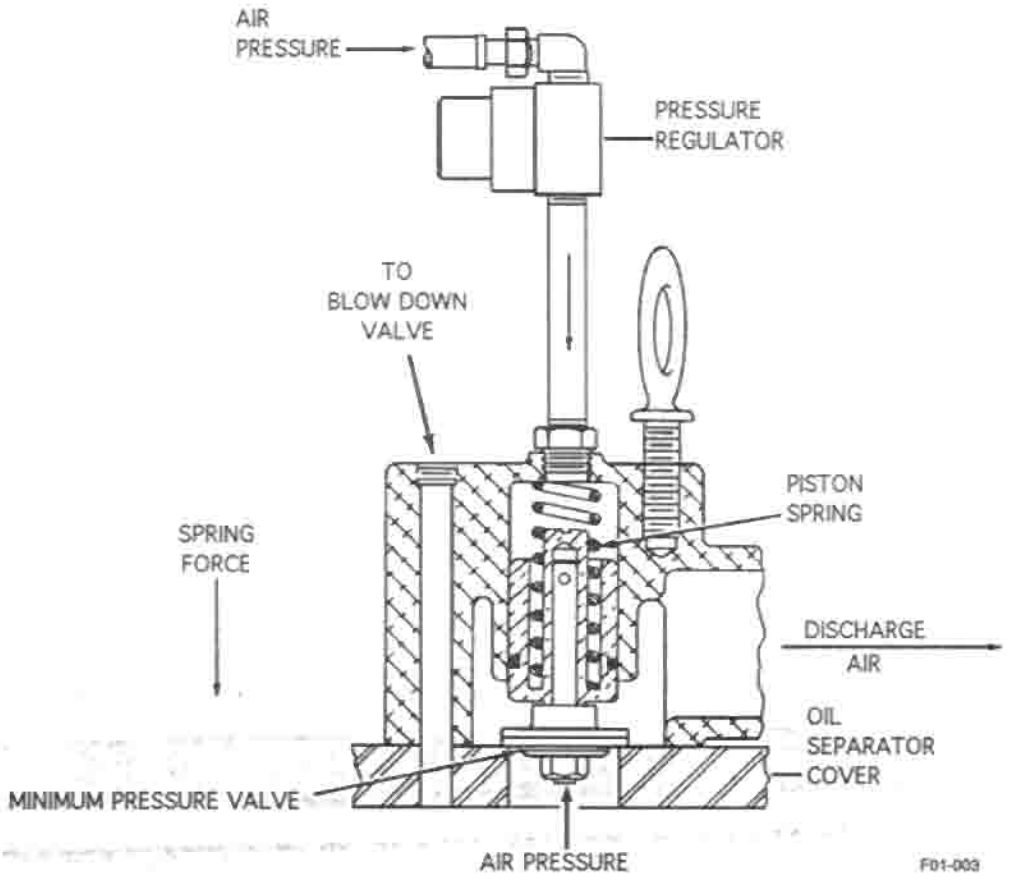


Figure 1-3. Operation of minimum pressure valve

1-12. AIR COMPRESSOR SYSTEM (30, figure 1-2). The air compressor system consists of a single-stage, sliding blade, air compressor assembly, oil separator assembly, blow down valve assembly, minimum pressure valve, thermal bypass valve, oil filter, speed control linkage, and air pressure regulator. Free air is drawn through the air cleaner into the compressor intake control. A valve in the intake control opens and closes to allow air to pass into the compressor stator according to the discharge air demand. When the intake valve is completely closed, the compressor is running unloaded. When the compressor is stopped, this 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 RPM as required to maintain the rated output. The single-stage rotor-stator assembly develops an output of 250 CFM at a discharge pressure of 100 PSI. During the compression cycle, oil is introduced into the rotor-stator assembly for sealing, cooling, and lubrication. The air-oil mixture passes from the rotor-stator assembly to the oil separator assembly. The oil separator assembly contains a labyrinth and filter arrangement which separates the oil from the air before the air passes through the minimum pressure valve. The minimum pressure valve consists of a valve, spring, and piston which maintains a minimum air pressure of 70 PSI within the oil separator when the compressor is running. This minimum air pressure is necessary to produce proper oil circulation in the system and efficient air-oil separation. See figure 1-3. The valve is held closed until air pressure reaches approximately 70 PSI, at which time the force of the air moves the valve open and the piston upward, allowing compressed air to flow to the air discharge service valves. When air pressure drops below 70 PSI, the force of the spring overcomes the separator air pressure and moves the piston downward closing the valve. A blow down valve automatically relieves air pressure from the system immediately after compressor shutdown. A safety valve on the separator tank opens automatically if the air pressure should exceed 125 PSI. A pressure regulator is connected between the oil separator and the intake-control. As the air load demand increases, the regulator controls a flow of air into the intake-control to open the valve. This action increases air input and engine speed. As the air pressure reaches the rated value, the pressure regulator causes the valve to close and the engine to return to the low idle speed. Refer to figure 1-4 for the pneumatic diagram.

1. HOSE ASSEMBLY
1A. HOSE ASSEMBLY
2. HOSE ASSEMBLY
3. HOSE ASSEMBLY
4. TEE
5. ELBOW
6. BLOW DOWN VALVE ASSEMBLY
7. HOSE ASSEMBLY
8. ORIFICE "Y"
9. STRAINER
10. O-RING
11. SCREEN ELEMENT
12. MINIMUM PRESSURE VALVE HOUSING
13. NIPPLE
14. NIPPLE
15. HOSE ASSEMBLY
16. CONNECTOR
17. STREET TEE
18. NIPPLE
19. PRESSURE REGULATOR
20. COMPRESSOR ASSEMBLY
21. HOSE ASSEMBLY
22. ELBOW
23. FLOW SIGHT GAUGE
24. ELBOW
25. COMPRESSOR INTAKE
26. OIL SEPARATOR ASSEMBLY

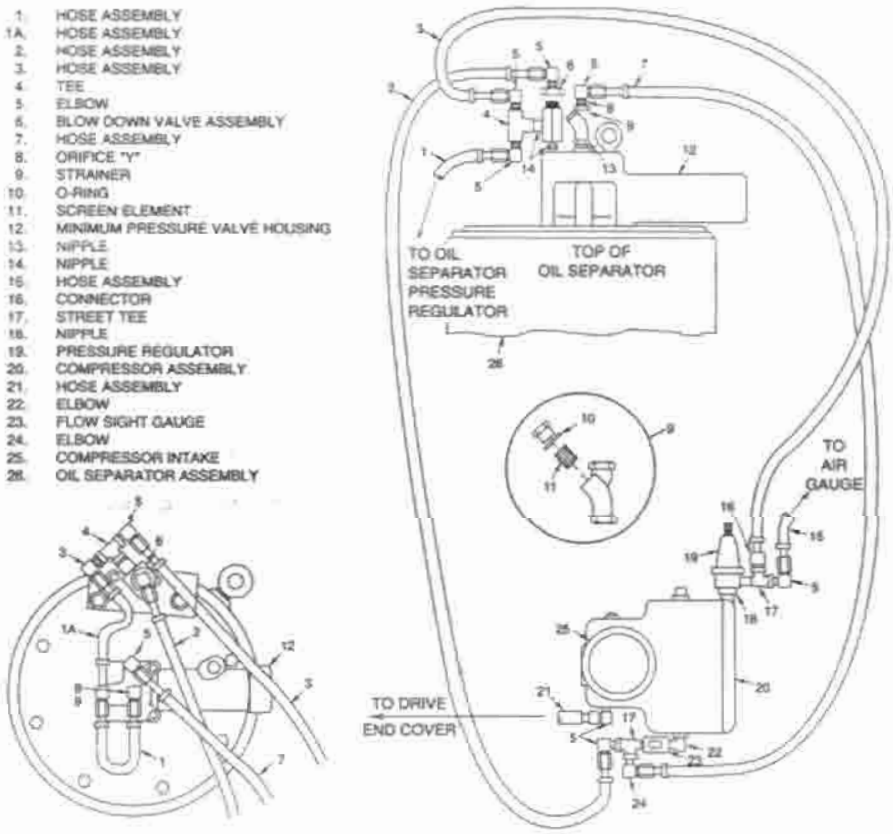


Figure 1-4. Pneumatic diagram

1-13. FUEL SYSTEM. The fuel system consists of a fuel tank, flexible fuel lines, and the engine fuel system. The engine fuel system consists of a fuel supply line, fuel pump, fuel filter, engine driven fuel injector pump, four (4) injector nozzles, a fuel return line and cold weather starting aid. Refer to Figure 1-5.

1-14. ELECTRICAL SYSTEM. The 12 volt electrical system consists of a 12 volt damp maintenance free charged battery (1, figure 1-6), an engine starter (2) and an engine driven alternator (3). The alternator restores electrical energy to the battery after engine start and provides the necessary power for the engine controls and instruments.

1-15. COMPRESSOR UNIT ELECTRICAL GROUP. The unit electrical group consists of one wiring harness which includes all engine, compressor and instrument panel wire bundles enclosed in a flexible environmentally-resistant plastic conduit. The only unit wires not included in the harness are the battery/starter wires which carry high current during start up and do not require the same level of protection afforded the control and instrumentation wires. Refer to figure 1-6.

1-16. ENGINE AND ACCESSORIES (5, figure 1-2). The engine is a four cycle, four cylinder multi-fuel diesel engine. Inlet air, filtered by the dry-type air cleaner, is ducted to the exhaust driven turbo charger and forced into each respective cylinder during the intake stroke. Fuel is finely atomized and sprayed into the cylinder as the piston is completing its compression stroke. Engine speed, other than at idle, is controlled by compressed air demand through a mechanical linkage connected to the compressor intake-unloader. As demand decreases, the throttle is commanded toward engine idle. The optimum engine operating temperature is maintained by the engine block mounted thermostat, a standard construction tube and fin radiator, and a multibladed molded nylon fan which draws air from outside the enclosure and pulls it through the radiator. Engine lubricating oil is cleaned and cooled as it is pumped through the block mounted replaceable oil filter.

1. HOSE ASSEMBLY FUEL SUPPLY
2. FUEL FILTER
3. INJECTOR TUBING (4)
4. INJECTOR NOZZLES (4)
5. INJECTOR RETURN LINE
6. BLEED OFF VALVE
7. FUEL INJECTOR PUMP
8. FUEL TANK
9. HOSE ASSEMBLY FUEL SUPPLY
10. HOSE ASSEMBLY FUEL RETURN
11. FUEL PUMP
12. HAND PRIMER LEVER

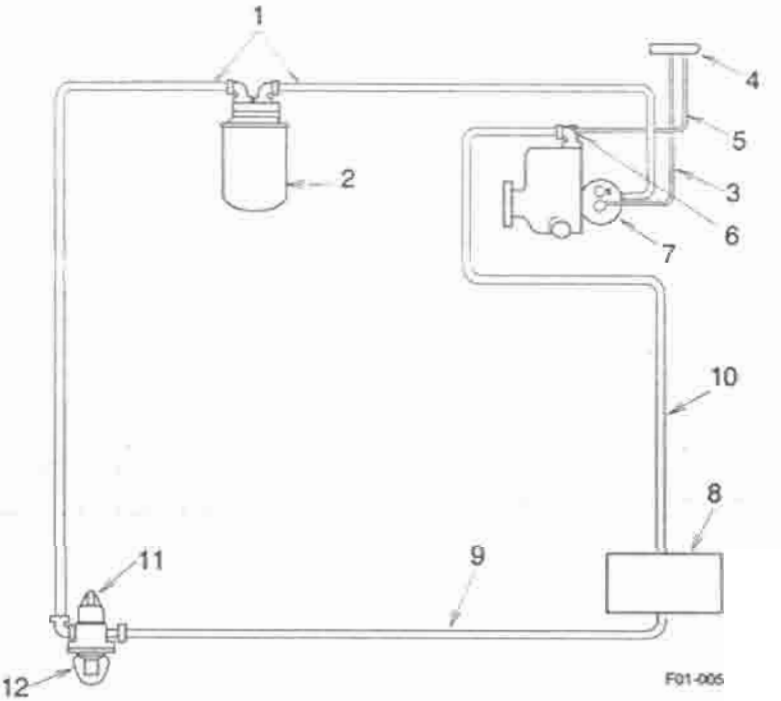


Figure 1-5. Fuel distribution diagram

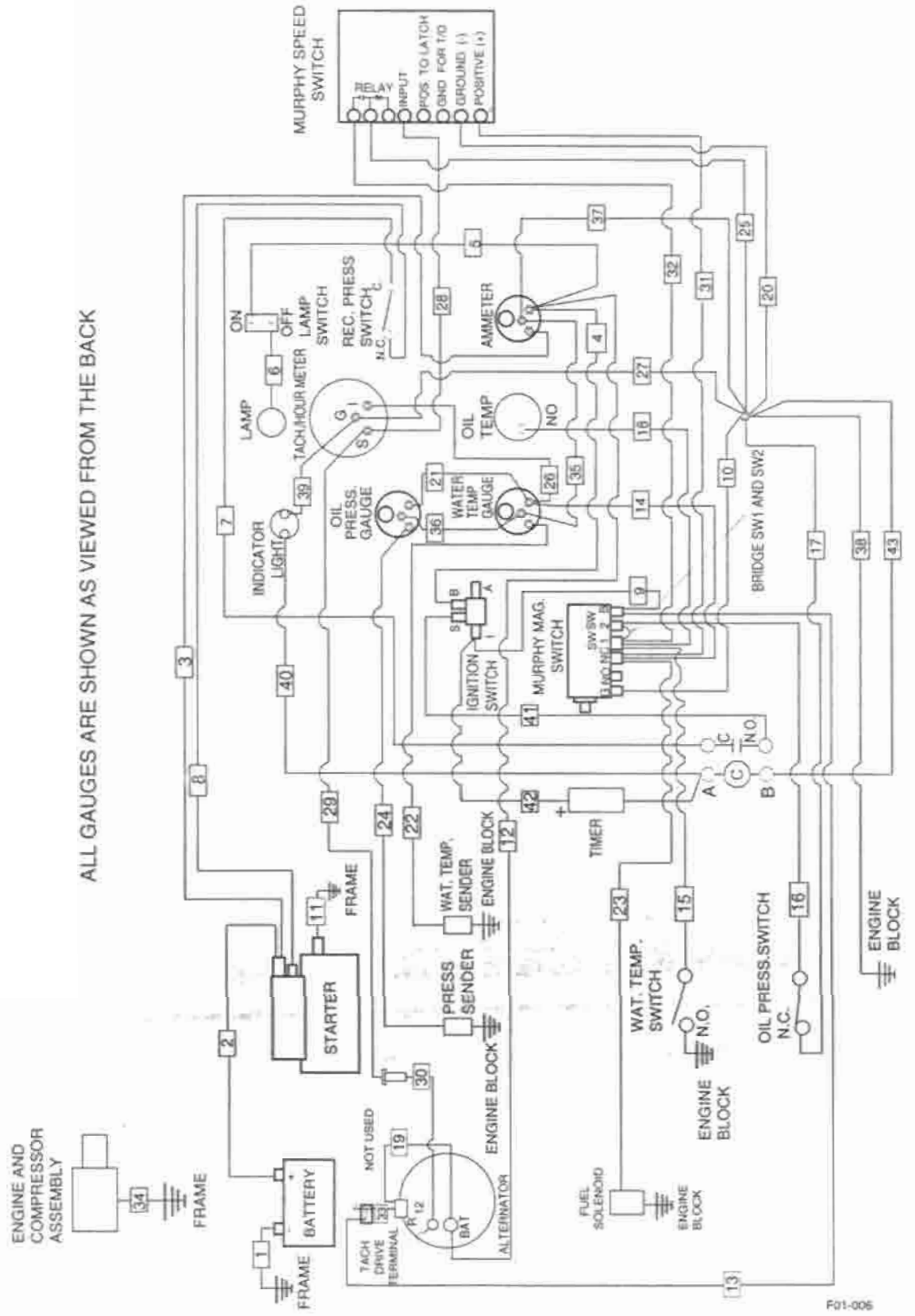


Figure 1-6. 21M250 Wiring diagram

1-17. COLD WEATHER STARTING AID (32, figure 1-2). A cold weather starting aid is provided to assure engine start when ambient temperature is below +32° F. This aid consists of a highly combustible ether base mixture stored in a metal cylinder. The fuel cylinder mounts with a valve which is actuated by the QUICKSTART control cable. Each actuation of the QUICK START control injects a measured shot of atomized ether into the engine intake manifold via a length of tubing.

1-18. CHASSIS AND RUNNING GEAR (9,10,11 figure 1-2). The chassis is a welded assembly of formed high strength alloy steel members on which all 21M250 components are mounted. The chassis assembly is carried on a four (4) wheel trailer-type running gear. The chassis is provided with four (4) 25,000 pound capacity tie down points at each corner for surface or air transportability and a single overhead provision for lifting the assembled unit, located at the top of the unit enclosure and positioned over the units' composite center-of-gravity (CG). The running gear is equipped with leaf spring suspension and high-flotation style pneumatic tires. The unit tow bar is attached to the front steerable axle assembly and is equipped with a surge-type hydraulic brake actuator and safety chains. An emergency breakaway cable is also included to actuate the hydraulic brake system in the event of a tow bar attachment / safety chain / towing vehicle pintle hook failure. In addition to the hydraulic brake system, the chassis also includes a hand operated parking brake. The steerable front axle assembly is designed to provide a turning angle of 40° in either direction (left or right) without damage to the unit. Some over-travel is also permitted in the tow bar without permitting damage to the front end alignment. Because the forward inertia of the unit continues when the towing vehicle begins to slow, the surge brake is activated in proportion to the deceleration of the towing vehicle. The unit brake system is self-contained. There is no connection, other than the safety chains and the break-away cable, to the towing vehicle. When backing the towing vehicle with the unit attached, accelerate steadily, applying the load slowly. If the surge brake holds initially, do not stop, but maintain a steady push. The brakes will release and the unit will begin to back. Refer to figure 1-7.

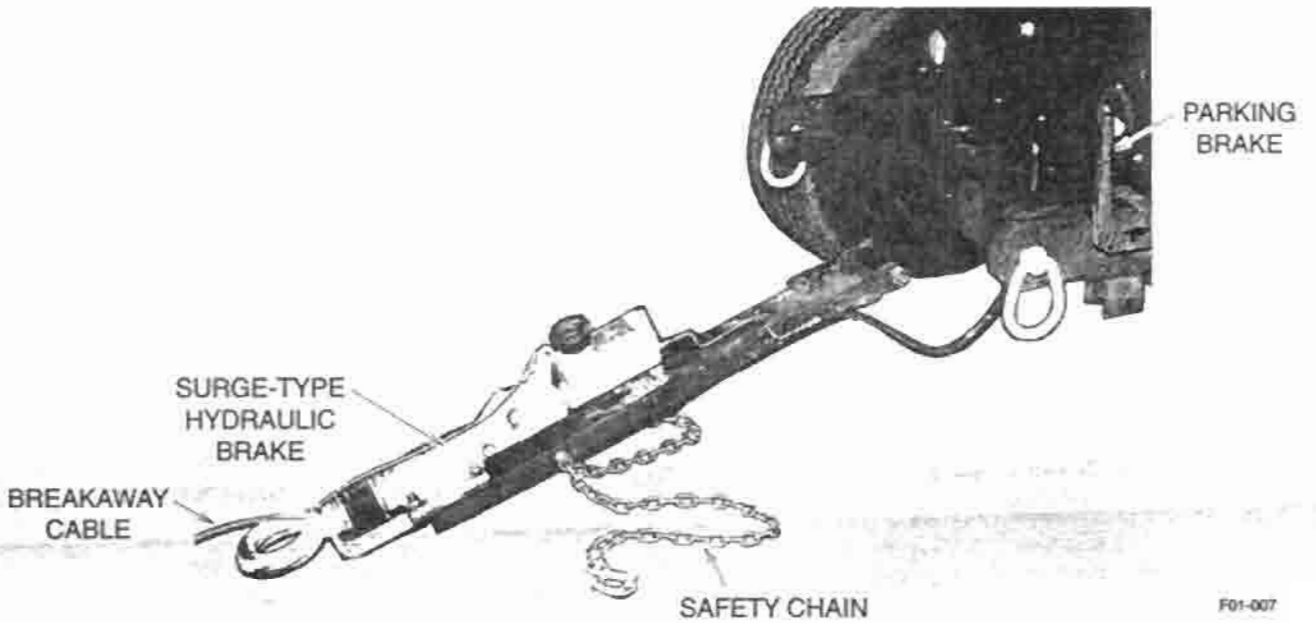


Figure 1-7. Hydraulic and manual brake connections

1-19. CONSUMABLE MATERIALS.

1-20. Consumable materials, and expendable items, required to accomplish prescribed maintenance are listed in table 1-2.

Table 1-2. Consumable materials

NOMENCLATURE	MATERIAL	SPECIFICATION NUMBER	GOVERNMENT STANDARD NO.	PART NUMBER
Cleaning	Solvent	P-D-680		
Oil separator tank	Oil, lubricating, Compressor	*	*	
Engine crankcase	Oil, lubricating, engine	*	*	
Lubrication fittings	Grease, automotive and artillery	MIL-G-10924	GAA	
Fuel tank	Oil, fuel, diesel	No. 2-D (ASTM Spec No. D-975)	MIL-T-562	
		JP4, JP5, JP8	MIL-T-83133	
Brake system	Fluid, brake, automotive	VV-B-680		
Radiator	Antifreeze, artic type	MIL-C-11755		
	Antifreeze, ethylene glycol, inhibited	0-A-548		
Air cleaners	Element			P182063 (Donaldson)
Engine oil filter	Element			TI19044 (Deere)
Compressor oil filter	Element			PH-299, PF-881, PH-977A, 51459
Engine fuel filter	Element			RE50455 (Deere)
Oil separator	Element			D64746, DV250-4
Air cleaner (Processing)	Barrier material	MIL-B-121		
	Tape, pressure sensitive	MIL-T-43115		
Battery cables and tray (processing)	Petrolatum, technical	VV-P-236		
	Sodium carbonate	O-S-571		
	Coating system, elastomeric	MIL-C-7439		

Table 1-2. Consumable materials - continued

NOMENCLATURE	MATERIAL	SPECIFICATION NUMBER	GOVERNMENT STANDARD NO.	PART NUMBER
Pulley grooves (processing)	Primer, coating	TT-P-664		
Chassis (processing)	Corrosion preventive (P-3) compound	MIL-C-16173 Grade III		
Compressor (processing)	Oil, lubricating Tape, pressure-sensitive Varnish, insulating, electrical	MIL-L-17331 MIL-T-22085 MIL-I-24092		
Engine (processing)	Oil, lubricating (P-10) Gum preventive compound	MIL-L-21260 VV-G-800		
Cooling system	Corrosion preservative	MIL-C-4339		
Electrical system	Glycerol, technical	O-G-491		

* Temperatures	+10° F to 105° F (-12° C to 41° C) use MIL-L-2104	OE/HDO-15/40 (Military) SAE 15W-40 (Commercial) 0-1236 (NATO)
	+50° F to 125° F (10° C to 52° C) use MIL-L-2104	OE/HDO-40 (Military) SAE-40 (Commercial)
	-67° F to +14° F (-55° C to -10° C) use MIL-L-46167	OEA (Military) 0-183 (NATO)

SECTION II

SPECIAL TOOLS AND TEST EQUIPMENT

2-1. SPECIAL TOOLS AND TEST EQUIPMENT.

2-2. There are no special tools and test equipment required for the operation and service of the Type MC-5 compressor.

SECTION III

PREPARATION FOR USE, STORAGE, OR SHIPMENT

3-1. PREPARATION FOR USE.

3-2. The Type MC-5 Rotary Air Compressor is shipped by the manufacturer as a completely assembled four wheel, trailer mounted unit. Lifting, and tie-down provisions are incorporated on the unit as shown on figure 3-1 and on the Transportation Data plate.

WARNING

When a lifting device is used, it must be capable of lifting a minimum of 8000 pounds.

3-3. UNLOADING. The air compressor unit can be unloaded from the carrier by a lifting device or towed as outlined below.

a. If a lifting device is used, connect the device to the lifting and tie fittings only.

b. Remove all blocks and tie downs that secure the unit to the carrier. Release the parking brakes.

CAUTION

After unloading and parking the unit, be sure to set parking brakes.

c. Lift or tow the air compressor unit off carrier.

3-4. UNPACKING AND DEPROCESSING. When the unit is received and unloaded from the carrier, the following unpacking and deprocessing must be accomplished before the unit can be operated.

a. Remove all crating, blocking, and protective material.

b. Refer to T.O.35-1-4 for depreservation.

c. Inspect the unit for any damaged gauges, loose connections or mounting, loose or missing hardware, frayed insulation on wiring, or other damage. Check all piping, air tubing, and hoses for secure connection and any damage.

d. Check tire pressure,. Pressure should be 30 psi.

e. Locate the battery cable connected to the starter then unwrap connector on loose end of cable and connect to positive battery terminal. Locate the battery cable connected to the frame then unwrap connector on loose end of cable and connect to negative battery terminal.

f. Remove the fuel tank filler cap and fill fuel tank. Refer to table 1-1 for capacity and recommended fuel. Install filler cap.

g. Remove radiator filler cap and check level of coolant. The unit is shipped from the factory with coolant system filled to capacity with equal parts of water and ethylene glycol. Proper level is indicated by fluid surface being visible through the sight gauge on the side of the radiator. Fill radiator as necessary and install filler cap. Refer to table 3-1 for required coolant mixtures for different operating temperature conditions.

h. Perform all Before Operation maintenance services. Refer to table 5-1.

i. The unit is now ready for towing to work site and operation. Refer to section IV for starting and operating instructions.

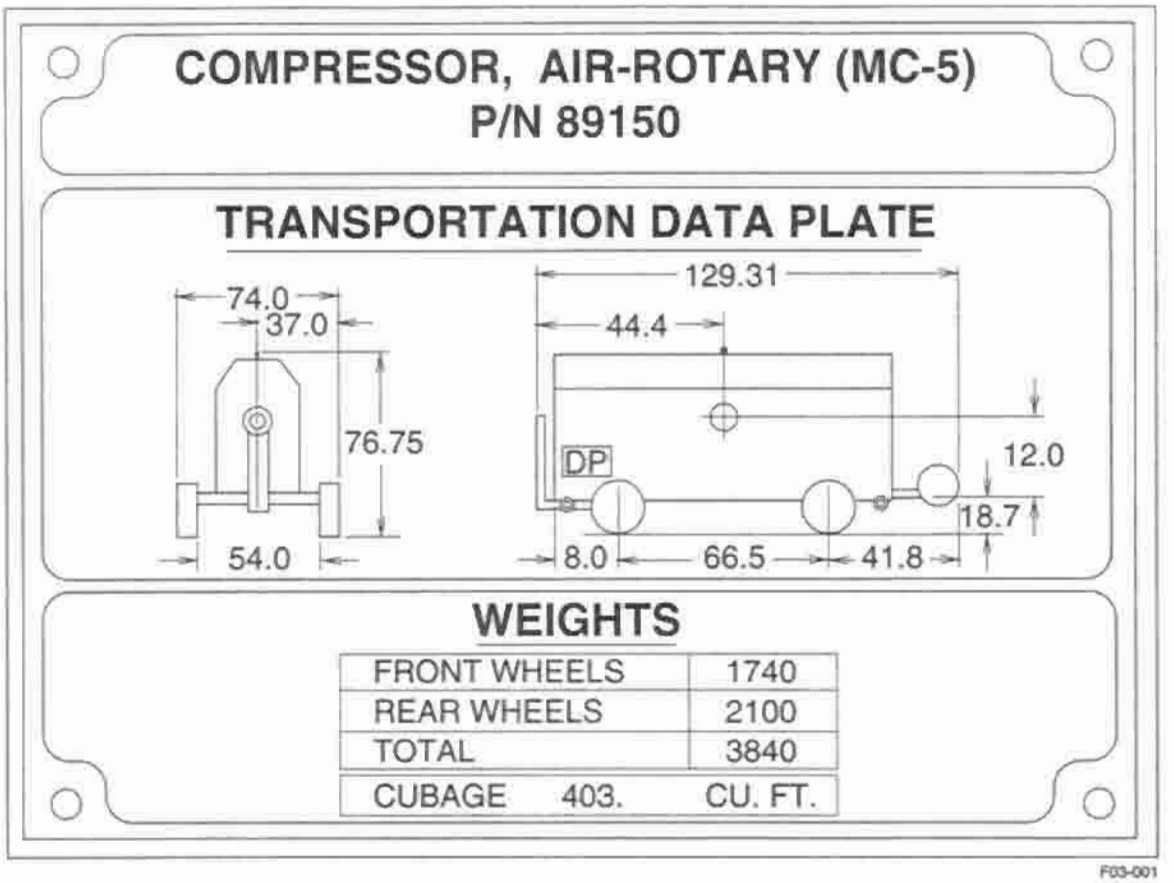


Figure 3-1. Lifting diagram

3-5. PREPARATION FOR SHIPMENT OR STORAGE. Preparation for shipment and storage of the air compressor unit shall be in accordance with T.O.35-1-4. Pertinent details are described below.

NOTE

The following instructions are recommended by the compressor manufacturer. For any conflicting procedures in storage, T.O.35-1-4 will take precedence.

a. Raise tow bar to vertical position and latch. Secure safety chains and safety break-away cable to tow bar.

b. Remove radiator cap, open radiator drain and engine block drain; drain all coolant from the system. Close the drain valves. Fill the cooling system with type MIL-L-16173, grade 3 (P-3) preservative and install radiator cap.

c. Remove engine crankcase oil drain plug and drain the oil from the engine. Install the drain plug when oil flow stops. Remove the engine oil filler cap and fill the engine with type MIL-L-21260 (P-10) preservative oil to operating level. Install oil filler cap.

d. Remove filler plug and drain plug from bottom of the compressor oil separator and drain all oil from the compressor system. Install drain plug when oil flow stops.

e. Disconnect the fuel inlet line from the fuel tank and attach this line to a portable container of diesel fuel conforming to Specification VV-F-800. Disconnect the fuel return line and provide a line connected to the fuel return line to a recovery container. Start the engine and run at idle until thoroughly warm. Accelerate engine to approximately 1500 RPM and at the same time switch the fuel supply line to a container of type P-9 preservative oil. Operate the engine until preservative oil is discharged out of fuel return line. Stop the engine and reconnect the fuel inlet line and return line to the fuel tank. Allow engine temperature to cool to at least 100° F and then continue preservation.

f. Remove the engine cylinder head cover, intake manifold, and exhaust manifold.

g. Make certain that the engine throttle is completely closed. Manually depress each intake valve and while the valve is held open, atomize spray one ounce of type P-10 preservative oil through the manifold covering the valve and seat to each cylinder.

h. Manually depress each exhaust valve and while valve is held open, atomize spray one ounce of type P-10 preservative oil through the manifold covering the valve and seat to each cylinder.

i. Using the starting motor, rotate the crankshaft at least two complete revolutions. Loosen belt tension and prime all pulleys completely (specification TT-P-664). Disconnect all batteries.

j. Repeat steps h and i above. DO NOT ROTATE CRANKSHAFT.

k. Atomize spray the rocker arm assemblies, valve springs, and inside of cylinder head cover with type P-10 preservative oil.

l. Install intake manifold, exhaust manifold, and cylinder head cover. Attach a warning tag in a conspicuous location bearing the information "ENGINE PRESERVED DO NOT CRANK."

m. After the engine is preserved, open radiator drain cock and cylinder block drain cock and drain the type P-3 preservative from the cooling system. Securely attach a warning tag in a conspicuous location bearing the information "CLOSE DRAIN COCKS AND FILL COOLING SYSTEM BEFORE OPERATING ENGINE."

n. Remove the engine dry-type air cleaner element and spray the interior of the air cleaner housings with type P-10 preservative oil. Install the element.

o. Open the air discharge service valves and fog two ounces of type P-10 preservative oil through the valves. Close the service valves.

p. Disconnect the battery cover terminals and cable lugs with tape conforming to type III, class 1, Specification PPP-T-75.

q. Coat exterior unpainted or threaded surfaces of the brake system, such as cables, clevises, and linkage, with type P-1 preservative.

r. Seal all upward facing openings with tape conforming to Specification PPP-T-75, such as relief valve, service valves, dipstick, air intakes, engine exhaust stack, etc. It is not necessary to seal the underside of the unit.

s. For shipment by common carrier, tires shall be inflated to 10 PSI above recommended pressure for maximum load. Refer to table 1-1 for tire pressure. For storage, vehicle shall be blocked clear of the ground and tire pressure reduced to 10 PSI.

Table 3-1. Freezing Points, Composition, and Specific Gravities of Military Antifreeze Materials

LOWEST EXPECTED AMBIENT TEMP. °F	°C	PINTS OF INHIBITED GLYCOL PER GALLON OF COOLANT[1]	COMPOUND, ANTIFREEZE ARCTIC[2]	ETHYLENE GLYCOL SOLUTION SPECIFIC GRAVITY AT 68° F (20° C)[3]
+20	-7	1-1/2	Issued full strength and ready mixed 0° to -65° F (-18° to -54° C) temperatures for both initial installation and replenishment of losses.	1.022
+10	-12	2		1.036
0	-18	2-3/4		1.047
-10	-23	3-1/4		1.055
-20	-29	3-1/2		1.062
-30	-34	4		1.067
-40	-40	4-1/4		1.073
-50	-46	Arctic	DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE	
-60	-51	Antifreeze		
-75	-59	preferred		

1 Maximum protection is obtained at 60 percent by volume (4.8 pints of ethylene glycol per gallon of solution).

2 Military Specification MIL-C-11755 Arctic type, nonvolatile antifreeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines. It is used for protection against freezing primarily in Arctic regions where ambient temperature remains for extended periods close to -40° F (-40° C) or drops below, to as low as -90° F (-68° C).

3 Use an accurate hydrometer. To test hydrometer, use 1 part ethylene glycol antifreeze to 2 parts water. This should produce a hydrometer reading 0° F (-17.8° C).

NOTE: Fasten a tag near the radiator filler cap indicating the type antifreeze.

SECTION IV

OPERATION INSTRUCTIONS

4-1. THEORY OF OPERATION.

4-2. The trailer mounted Rotary Air Compressor is diesel engine driven through a direct connected coupling arrangement. The air compressor is designed to deliver 250 CFM free air at a discharge pressure of 100 PSI.

4-3. When the unit is in the stopped configuration, the oil separator air discharge port and the compressor air intake valve are closed. When the engine is started, the compressor starts, momentarily unloaded, creating a vacuum in the intake housing. This vacuum opens the intake control valve and air is drawn in through the air cleaner. The incoming air enters the stator bore through ports in the end cover at a point where the sliding rotor blades are extended the maximum distance within the eccentric stator bore creating a pocket of maximum volume. As the rotor turns within the eccentric stator bore, the rotor blades are forced inward into the rotor slots decreasing the volume of the pocket, thereby compressing the trapped air.

4-4. At a point near midway in the compression cycle, oil is injected into the pocket. The injected oil serves three functions: (1) seals the pockets at the blade edges, (2) absorbs heat from the compressing air, (3) lubricates the moving parts of the compressor.

4-5. The mixture of compressed air and oil is discharged from the stator through ports 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.

4-6. 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 service valves, and hose reel valves.

4-7. When the air pressure in the separator tank builds up to approximately 100 PSI, the intake control valve closes. The intake control assembly, and engine speed, is regulated by the discharge air demand by means of a pressure regulator. When discharge air pressure opens the pressure regulator valve, air enters the intake control between the cover and a diaphragm and forces the intake valve closed. As the intake valve closes, control linkage to the engine decreases engine speed. As long as air pressure is held at 100 PSI, the intake valve remains closed and the engine will run at idle speed. When air demand reduces pressure, the air pressure regulator valve closes allowing the intake control valve to open and engine speed to increase.

4-8. 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 separator tank pressure of 70 PSI prevents any oil carry out with the discharge air.

4-9. The compressor system oil supply in the separator tank is circulated by air pressure differential. The oil flows from the separator tank through a full flow oil filter prior to being injected into the compressor. When the oil reaches operating temperature, the thermal by pass mounted in the oil cooler assembly directs part or all of the oil to flow through the oil cooler before being recirculated. This provides for rapid warming of compressor oil at initial start and maintains a relatively constant minimum operating temperature.

4-10. When the unit is shut down, a blow down valve releases the air pressure from the system to atmosphere. The separator tank is provided with a safety valve which opens automatically if the air pressure should exceed 125 PSI.

4-11. OPERATION INSTRUCTIONS.

4-12. Prior to operation of the Type MC-5 Rotary Air Compressor unit, the following procedures should be followed.

CAUTION

The unit should be located in an area as free of dust and dirt as possible. A highly contaminated atmosphere places an abnormal load on the air cleaner, oil filters, and compressor, and can result in an increase in maintenance problems.

a. Tow the compressor trailer unit to the work site and select a location as level as possible. Grade slope shall not exceed 15% (8.5°) in any direction.

b. Set the parking brakes.

c. Connect air hoses to service valves or deploy hose from reels and install air tools as required for work to be performed.

WARNING

Do not operate the unit in a building or any enclosed area unless exhaust gases are piped outside. Inhalation of exhaust gases can result in serious illness or death.

Serious injury or death may result from using this equipment for respiration/breathing air. Use only for mechanical purposes.

To avoid injury to personnel, do not play with compressed air.

d. Perform the Before Operation maintenance checks and services (table 5-1).

4-13. OPERATING CONTROLS AND INSTRUMENTS.

4-14. Before operating, the operator should be familiar with all of the controls and instruments supplied on the unit. Following are descriptions and functions of these components.

4-15. ENGINE OIL PRESSURE GAUGE (4, figure 4-1). This indicates the engine lubricating oil pressure. Normal oil pressure reading is 20 to 40 PSI at 1800 RPM.

4-16. AMMETER (12, figure 4-1). The ammeter gauge indicates the rate of charge or discharge of the battery.

4-17. WATER TEMPERATURE GAUGE (6, figure 4-1). This gauge indicates the temperature of the engine coolant. Normal operating range after warmup is 180° to 205° F (80° to 96° C).

4-18. RECEIVER PRESSURE GAUGE (5, figure 4-1). This indicates the air pressure in the oil separator tank. Normal operating range is 80 to 105 PSI when the compressor is running loaded and 110 to 115 PSI when running unloaded.

4-19. HOURMETER (13, figure 4-1). This gauge indicates the total running time of the unit. The gauge is calibrated in hours and tenths of hours. The hour meter is integrated with the tachometer (13, figure 4-1).

4-20. LAMP SWITCH (1, figure 4-1). This switch controls the illuminating and extinguishing of the instrument panel lamp. The switch plate indicates the ON and OFF positions.

4-21. SAFETY PUSHBUTTON SWITCH (8, figure 4-1). This pushbutton type switch is pushed during starting and is used to override the engine oil pressure safety switch.

4-22. START SWITCH (2, figure 4-1). The three position switch is used to make or break the unit electrical circuit. The switch is pulled outward for starting and when the engine starts the spring loaded switch is released to return to the run position. Pushing the switch inward from the run position opens the circuit stopping the unit. The safety override switch (paragraph 4-21) must be pressed simultaneously with this switch in the start position.

4-23. QUICK-START (3, figure 4-1). This control cable is used to inject cold weather starting aid fuel into the engine air intake. Do not leave cylinder installed in unit in warm weather. Accidental use could result in engine damage.

4-24. COMPRESSOR UNLOADER CABLE (9 figure 4-1). This manually operated cable is pulled outward to close the intake valve permitting starting of the engine with the compressor in the unloaded configuration. The cable is pushed in after the warm-up period. The action of the cable is for ease of starting.

4-25. AIR CLEANER RESTRICTION INDICATORS. (14, figure 4-1). The air restriction indicators will show red when the filter is clogged to a condition where cleaning or replacement is required. There is a separate indicator for each filter (engine and air compressor).

1. LAMP SWITCH
2. START SWITCH
3. QUICK START
4. OIL PRESSURE GAUGE
5. RECEIVER PRESSURE GAUGE
6. WATER TEMPERATURE GAUGE
7. COMPRESSOR OIL TEMPERATURE GAUGE
8. SAFETY PUSHBUTTON SWITCH
9. COMPRESSOR UNLOADER CABLE
10. LAMP
11. IDLE CONTROL
12. AMMETER
13. TACHOMETER/HOURMETER
14. AIR CLEANER RESTRICTION INDICATOR
15. START INDICATOR LAMP

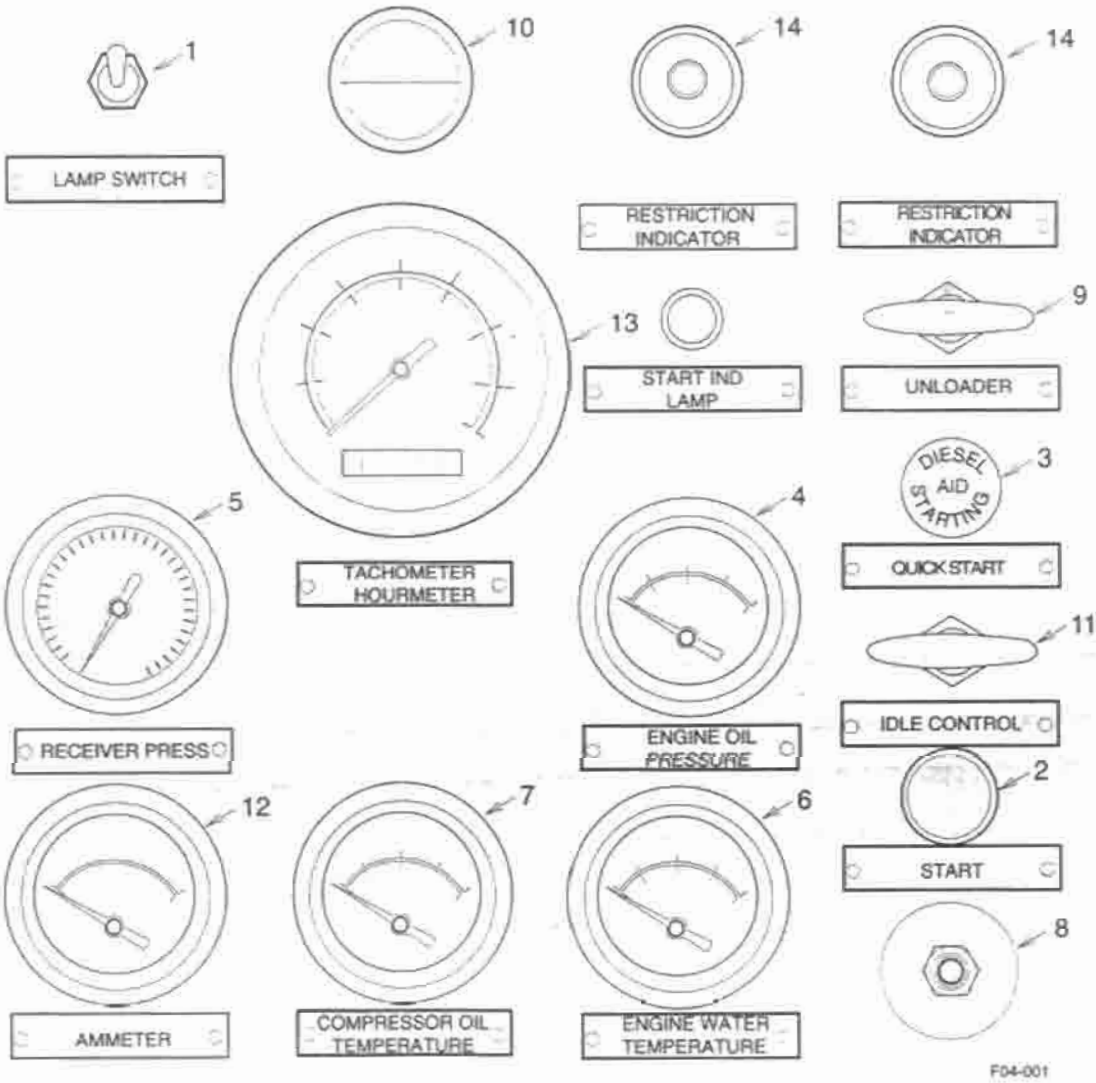


Figure 4-1. Controls and instruments

4-26. TACHOMETER (13, figure 4-1). A tachometer is provided to readily check performance and Operational Checkout as described in paragraph 5-5. The tachometer indicates engine speed in rpm. An hourmeter (reference paragraph 4-19) is mounted integrally with the tachometer.

4-27. START INDICATOR LAMP (15, figure 4-1). This lamp illuminates after an approximate 90 second delay when attempting to start the engine. A relay interrupts power to prevent starting until the timer cycles and the lamp illuminates.

4-28. SAFETY CIRCUIT SWITCHES.

4-29. The unit is equipped with safety devices which stop the engine when an adverse condition exists. These devices are explained in the following paragraphs.

4-30. ENGINE OIL PRESSURE SWITCH
This pressure switch is electrically connected to the fuel injection pump electrical shut-off device and will cause the engine to shut down when the engine oil pressure drops to 4 PSI. The safety pushbutton switch (8, figure 4-1) must be pressed when starting to override this switch. See figure 1-6 for wiring diagram.

4-31. COMPRESSOR OIL TEMPERATURE SWITCH (Located in the compressor discharge connection). This switch is a temperature sensing device that shuts down the engine if the oil discharged from the compressor reaches a temperature of 240° to 250° F (116° to 121° C). See figure 1-6 for wiring diagram.

4-32. ENGINE WATER TEMPERATURE SWITCH (28, figure 1-2). This switch is a temperature sensing device which shuts down the engine if engine coolant temperature exceeds 245° F (118° C). See figure 1-6 for wiring diagram.

4-33. ENGINE OVERSPEED SWITCH.
This switch shuts the engine off at 2250 rpm.

4-34. STARTING THE EQUIPMENT.

4-35. When ready to start the equipment (all steps of paragraph 4-12 having been performed) the following procedures shall be followed in sequence.

a. Close air discharge service valves.

b. Verify all access doors closed.

c. Check the receiver pressure gauge. If the gauge shows an air pressure greater than 5 psig abort starting the unit until the pressure drops to or below 5 psig.

d. In cool weather (below 40° F), turn compressor unloader handle (9) counterclockwise to unlock it. Pull out and lock by turning handle clockwise.

e. Pull start switch (2) out to its second (on) position and wait until the green indicator light (15) turns on (approximately 90 seconds).

f. Pull start switch (2) out to its third (start) position to crank engine for approximately three seconds to ensure there is no binding. After three seconds, push the ignition switch to its first (off) position..

WARNING

Continued exposure to extremely high, steady-state loud noises may result in significant loss of hearing. Personnel exposed to such noises should wear ear protection. One acceptable model is the Mine Safety Appliances Aural Protector, Sound, M-1 Commercial Noise Foe, Mark II Model with Foam Filled Seal Pads, NSN-4240-00-861-3612. Operator and crew should wear ear protection devices when working within 12 feet of the unit when the unit is in operation. This Warning applicable to model 21M250.

CAUTION

Do not crank the engine for more than 15 seconds at a time. Allow the starting motor to cool for 1 minute between cranking intervals.

g. Pull start switch (2) out to its second (on) position and wait until the green indicator light (15) turns on (approximately 90 seconds).

h. In cool weather (below 32° F (0° C)) pull quick start (3) handle out and push in when start switch (2) is pulled.

i. Pull start switch (2) out to its third (start) position and push relay reset button (8) simultaneously. When engine starts, release start but continue to hold the relay reset button until at least 15 psig engine oil pressure is indicated on gauge (4).

CAUTION

If engine oil pressure does not register within 10 seconds after starting, release relay reset button (8) and determine cause.

j. After engine starts, in cool weather (below 40° F), unlock idle control (11) by turning handle counterclockwise and pull handle out to fast idle. Lock handle by turning clockwise. Allow engine to run at fast idle until engine water temperature reaches approximately 140° F (60° C).

k. When operating temperature is reached, unlock compressor unloader handle (9) and idle control handle (11). Push both handles in and lock by turning clockwise. Open the air outlet service valves.

CAUTION

Do not allow equipment to operate unattended for prolonged periods. The operator should observe all gauges periodically to be certain unit is operating normally and listen to the unit for any abnormal noises. Observance of these precautions can prevent serious damage to the unit.

NOTE

This unit is equipped with safety devices to automatically stop the unit in the event of low engine oil pressure, high engine coolant temperature, high compressor oil temperature, and engine overspeed. Do not attempt to restart unit until cause for such automatic stop has been determined.

l. Check the readings on all gauges. Normal operating readings are:

Air pressure .....90 - 100 PSI
Engine oil pressure.....20 - 65 PSI
Engine water temperature.....180° - 205° F (80° - 96° C)

m. Unit is now ready for use and will cycle through load and unload automatically in relation to air demand.

4-36. STOPPING THE UNIT.

4-37. Perform the following procedures in sequence to stop the unit.

a. Close all air discharge service valves. Engine will return to idle and the compressor will operate unloaded.

b. Allow unit to run at idle for five minutes.

c. Push engine start switch fully inward.

d. When engine stops, the compressor will automatically blow down air from the compressor system. Turn lamp switch (1) OFF. Open service valves

e. Stow all tools and hoses as necessary. Close and latch the unit side doors.

SECTION V

MAINTENANCE INSTRUCTIONS

5-1. MAINTENANCE INSTRUCTIONS.

5-2. This section contains instructions essential for maintenance of the Type MC-5, Rotary Air Compressor unit within the scope of the organization and intermediate maintenance activities.

5-3. OPERATIONAL CHECKOUT.

5-4. Operational checkout of this unit is limited to the actual running of the equipment and observation of the instrument panel gauges for proper readings. (Refer to paragraph 4-32 and all steps thereunder.) Following are the only operational adjustments necessary if readings observed indicate unit is not functioning at design requirements.

5-5. SPEED CONTROL LINKAGE ADJUSTMENT (See figure 5-1). If a tachometer indicates an idle speed higher than 1200 RPM with air discharge valves closed and compressor running unloaded, adjust the speed control linkage as follows.

a. Start unit and allow to operate until operating temperature (140° F (60° C) engine water temperature) is attained.

b. Hold control rod (figure 5-1), loosen locking nuts and move control rod as required to set engine idle speed at 1100 to 1200 RPM. Observe speed on a tachometer. Tighten the locking nuts.

c. Cycle the air compressor several times by opening and closing the air discharge service valves. Observe tachometer each time to ensure engine idle remains at 1150±50 RPM with compressor running unloaded. Readjust as described in steps above as necessary. Stop the unit (refer to paragraph 4-36).

5-6. AIR PRESSURE REGULATOR ADJUSTMENT (see figure 5-2). If the air pressure gauge indicates a reading other than 115-117 PSI maximum when unit is running in the unloaded configuration, and the engine idle speed is 1150±50 RPM make adjustment of air pressure regulator as follows:

a. Start unit and allow to operate until operating temperature (140° F (60° C) engine water temperature) is attained.

b. With air discharge service valves closed, and engine operating at idle speed of 1100 to 1200 RPM, adjust air pressure regulator to obtain a reading of 115-117 PSI on the air pressure gauge. If air pressure rises above 117 PSI, turn 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 115-117 PSI.

c. 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 (paragraph 4-36).

5-7. INSPECTION AND PREVENTIVE MAINTENANCE.

5-8. Preventive maintenance checks, services and inspection within the scope of organization and intermediate maintenance personnel are listed in table 5-1. The table is prepared in intervals of daily, weekly, monthly, and quarterly inspections. If a check, service, or inspection procedure should be accomplished at an interval other than these, the time interval is listed in the procedure column. As an aid in recording service and maintenance intervals, the unit is equipped with an hourmeter. The hourmeter is integral with the engine tachometer on the control panel and records only engine operating hours of the unit. Maintenance and lubrication instructions are given in this manual in engine operating hours.

5-9. FILLING AND BLEEDING BRAKE SYSTEM. Raise and support the tow bar to a level position. Make certain that the surge brake actuator master cylinder is filled to the indicator below the filler opening; then, bleed system as outlined below. Remove any supports from tow bar.

a. Use a wood or metal bar approximately 4 feet long to serve as a lever to manually operate surge brake actuator mechanism. Place the bar through the lunette eye. Use a loop of the safety chain as a fulcrum about 8 inches below the lunette eye.

b. Purge one wheel cylinder at a time. Connect a bleeder hose (transparent tubing is preferable) to wheel cylinder bleeder screw. Using a clean jar or can of fluid, submerge free end of bleed line in the fluid. Loosen wheel cylinder bleeder screw and bleed until emerging fluid is free of air bubbles. Purge the remaining wheel cylinders in a like manner.

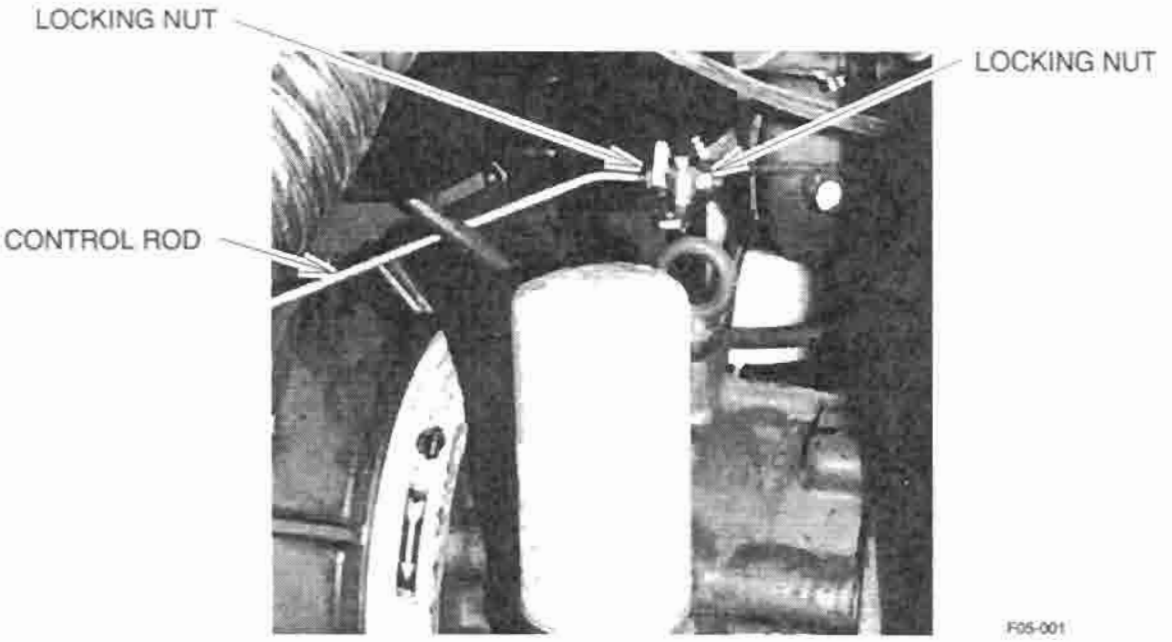


Figure 5-1. Speed control linkage adjustment

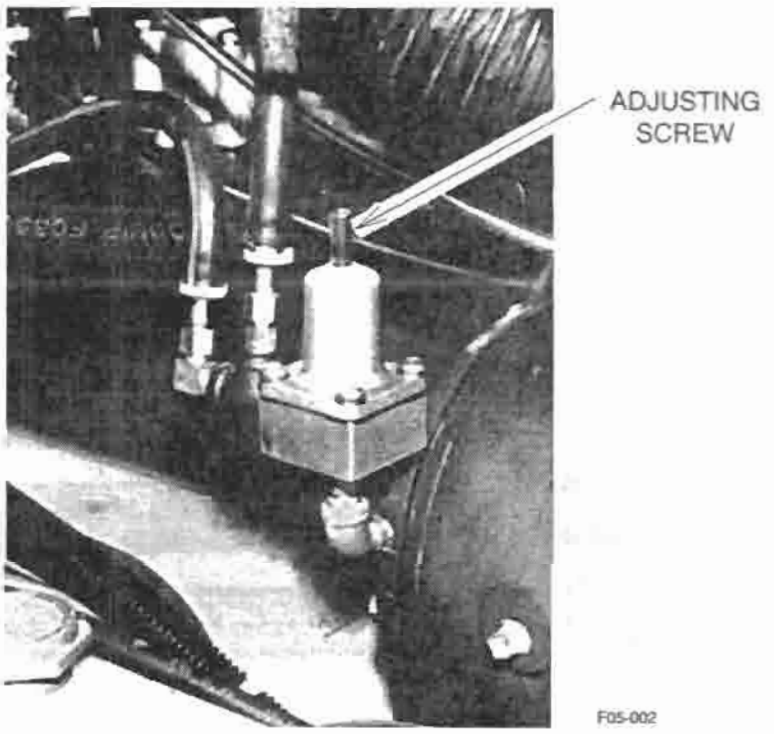


Figure 5-2. Air pressure regulator adjustment

Table 5-1. Preventive Maintenance Checks and Services

INTERVAL						B - Before operation A - After operation M - Monthly D - During operation W - Weekly Q - Quarterly	
OPERATOR			ORG				
DAILY							
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE
X						Radiator and oil cooler assembly. Refer to figure 1-2, item 8.	Check engine coolant level through sight gauge. Proper level is indicated by fluid surface being visible through sight gauge (approximately 2 inches below filler neck).
				X	X		Check radiator, hoses, and connections for leaks or defects.
				X			Check antifreeze specific gravity when operating in temperatures below +32° F (0° C).
				X	X		Clean any debris from radiator and cooler cores by blowing air through cores in opposite flow of cooling air.
X						Fuel tanks. Refer to figure 1-2, item 36.	Check fuel level. Fill fuel tank.
					X		Drain fuel tank to remove accumulated water and sediment.
X						Engine crankcase. Refer to figure 1-2, items 37 and 38.	Check oil level with dipstick gauge. Fill as necessary.
			X				Change oil every 100 hours. NOTE: If sulphur content of diesel fuel being used is greater than 0.4 percent, change oil every 50 hours (para 5-18).
			X	X	X		Inspect/clean engine breather tube every 50 hours.
X						Engine Turbocharger. Refer to figure 1-2, item 39.	Check oil drain tube and engine breather tube for damage or restriction.
X						Oil separator. Refer to figure 5-8.	Check oil level. Fill to overflow, as required.
					X		Change oil every 500 hours or spring and fall. Change element every 4000 hours or once a year, whichever comes first (para 5-21).
			X			Engine oil filter. Refer to figure 1-2, item 27.	Change filter elements every 100 hours (each time engine oil is changed) (para 5-19).
				X	X	Compressor oil filter. Refer to figure 1-2, item 33.	Change filter element every 100 hours and each time compressor oil is changed (para 5-20).
				X		Fuel filter. Refer to figure 1-2, item 26.	Change filter element every 100 hours (para 5-14).
X				X	X	Drive belts. Refer to figure 1-2, item 40.	Check for worn, frayed, or cracked belts.
			X	X	X		*Check for proper adjustment (para 5-12).*
			X	X	X	Battery. Refer to figure 1-2, item 22.	Check battery mountings and cable connections.
				X	X		Check general condition.
X	X				X	Speed control linkage. Refer to figure 5-1.	Check linkage for freedom of movement.
			X	X	X		Lubricate linkage.
				X	X		Check adjustment (para 5-5).
			X	X	X	Air cleaners. Refer to figure 1-2, item 4.	Clean element and body every 50 hours. Inspect element for damage. Replace element after six cleanings (para 5-13).

Table 5-1. Preventive Maintenance Checks and Services - continued

INTERVAL						B - Before operation A - After operation M - Monthly D - During operation W - Weekly Q - Quarterly	
OPERATOR			ORG				
DAILY							
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE
X		X		X	X	Controls and instruments. Refer to figure 4-1.	Check for any damage and loose mounting.
	X			X	X		Check for proper operation. Normal readings are: Engine oil pressure: 20-65 PSI at 1800 RPM Water temperature 180° - 205° F (80° - 96° C) Air pressure: 90-100 PSI (loaded) 110 - 115 PSI (unloaded)
	X			X	X	Engine assembly. Refer to figure 1-2, item 5.	Check for even running and exhaust smoke for improper combustion.
					X		Check engine mounting.
	X		X	X	X	Tires. Refer to figure 1-2, item 41.	Check inflation. Proper pressure is 30 PSI. Check for missing valve caps and tire wear.
X			X	X	X	Brake system. Refer to figure 1-7.	Check hydraulic lines and connections. Check fluid level (para 5-9).
			X	X	X		Check parking brake operation and adjustment (para 5-11).
				X	X		Lubricate parking brake mechanism.
				X	X	Axles and steering. Refer to figure 1-2, item 11.	Check tie rod adjustment and axles for damage. Lubricate steering components.
				X	X	Springs. Refer to figure 1-2, item 42.	Check for broken leafs or mounting hardware. Lubricate springs.
					X	Wheel bearings. Refer to figure 1-2, item 43.	Remove, clean, inspect, install, and pack with lubricant.
X		X	X	X	X	Lighting system.	Turn on the control panel illumination light. If the light does not come on, check and repair wiring to socket as necessary. If light still does not come on, replace lamp. If the engine start indicator light does not come on when engine is ready to start, check and repair wiring to socket as necessary. If light still does not come on, replace lamp.
X		X	X	X	X	Cold weather starting aid. Refer to figure 1-2, item 32.	Check cylinder for hand tightness in valve.
			X	X	X		Clean orifice.

c. After all wheels are bled, loosen bleeder on master cylinder to check that no air is trapped in the accumulator. When fluid is free of air bubbles, tighten the bleed fitting.

NOTE

Be careful not to pump master cylinder reservoir empty or air will be introduced into the system. Brakes will not function properly unless all air is removed from system.

d. When system is completely bled, apply pressure to surge brake actuator and check for possible leaks. Recheck and refill fluid level in master cylinder.

5-10. SERVICE BRAKE ADJUSTMENT. Adjust the service brakes for lining wear semi-annually or any time brake application is insufficient or uneven. Adjust as follows.

CAUTION

Block front wheels to prevent unit from slipping off jack while adjusting brakes.

a. Jack up the unit so that the wheel to be adjusted is off the ground. Actuate brakes several times to center shoes on the drum.

b. Release brakes completely. Make certain that actuator is in free towing position (fully extended).

c. Pry the cover from the adjusting hole in the brake backing plate with a screwdriver.

d. Insert the screwdriver through the adjusting hole so that the end of the blade engages the brake star wheel. While rotating the trailer wheel, turn the star wheel tightening the brake shoes against the drum until the wheel will not turn.

e. Rotate the star wheel in the opposite direction only until the brakes are fully released, with no brake lining drag against the inside of the drum when trailer wheel is rotated.

f. Install the cover in the adjusting hole in the backing plate.

g. Adjust the service brake lining on the remaining wheels in the same manner.

h. If proper adjustment cannot be made, the brake linings must be replaced.

5-11. PARKING BRAKE ADJUSTMENT. If the parking brake fails to apply properly, adjust as follows.

a. Turn the adjusting knob on the end of the lever handle clockwise to increase the force applied by the parking brake cable and mechanism.

b. If excessive force is required to apply the parking brake, turn the adjusting knob on the end of the lever counterclockwise until lever can be moved to the applied position with normal hand force.

c. If the brake lining wear is such that the parking brake lever cannot be adjusted properly, it may be necessary to adjust the parking brake linkage. To make this linkage adjustment, turn the adjusting knob on the end of the brake lever fully counterclockwise; then, turn the knob four or five turns clockwise.

d. Remove the cotter pin and clevis pin that secure the yoke to the parking brake lever.

e. Turn the yoke farther onto the rod end of the cable, or onto operating rod, to shorten the effective length of the operating mechanism.

f. Reconnect the yoke to the lever with the clevis pin and cotter pin. Readjust the parking brake lever as described above.

5-12. DRIVE BELTS (Figure 5-3). Inspect drive belts for proper deflection. The belts deflection is correct when thumb pressure midway between pulleys deflects the belts 1/2 to 3/4 inch. To adjust belts loosen bolt (1) on the adjustment arm and loosen alternator pivot bolt (2). With proper leverage device position alternator so that 1/2 to 3/4 inch belt deflection is achieved. Tighten all bolts.

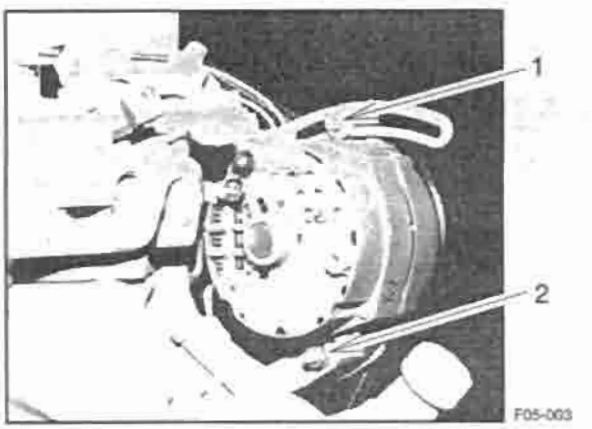


Figure 5-3. Drive belts.

5-13. AIR CLEANER ASSEMBLIES (Figure 5-4). Each air cleaner should be inspected periodically and individually when specific restriction indicator (14, figure 4-1) shows red, indicating obstruction, to maintain maximum engine and compressor protection and maximum service life. Inspect each air cleaner assembly as follows:

a. Inspect the air transfer duct between the air cleaner and the engine or between the air cleaner and the compressor inlet to be sure all clamps are tight, all flange joints are tight, and there are no cracks in the ducting.

b. Air cleaner mounting bolts and clamps must be tight to hold each air cleaner securely.

c. Inspect the dust cup to make sure it is sealing 360° around each air cleaner body.

d. Inspect for dents and damage to both air cleaners which could mean a leak.

e. Make sure each inlet is free from obstructions and securely mounted.

f. Remove the primary element by removing assembled wing nut and cover (1) and internal wing nut (2) and cover (3). Slide element (4) from housing (5).

NOTE

Do not remove secondary element unless it is to be replaced. Do not attempt to clean secondary element.

g. Thoroughly clean all dirt from inside of housing.

h. Squeeze the dust unloader nozzle (6) to release any trapped dirt particles.

i. Cleaning the element with compressed air is recommended when the element will be reused immediately. In using compressed air, direct the air through the element in the direction opposite to normal air flow through the element. Move air nozzle up and down while rotating element. Keep nozzle at least one inch from pleated paper. Maximum air pressure to prevent damage of element is 30 PSI.

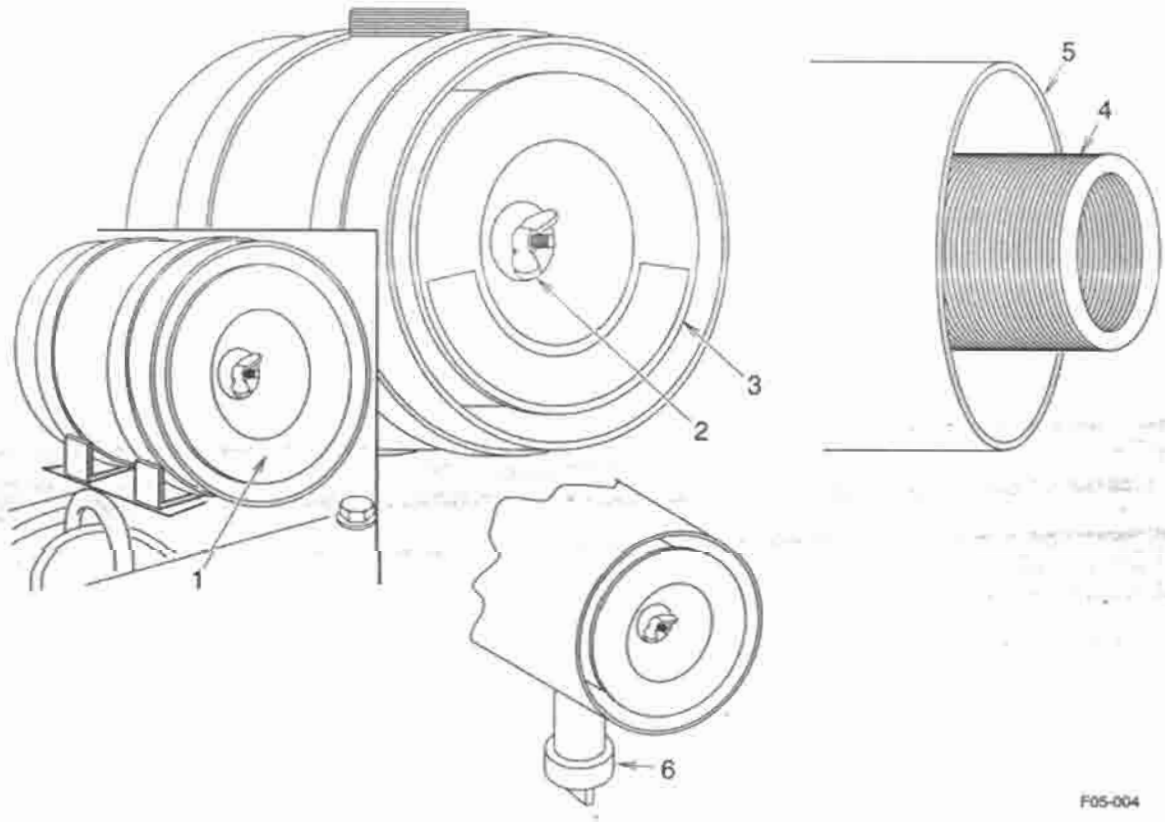


Figure 5-4. Air Cleaner Assembly

j. Washing the element in a solution of water and mild detergent is the best way to remove soot and carbon. Soak the element 15 minutes or more. Rinse with clean water until water is clear, with water pressure at no more than 40 PSI. Air dry or use warm flowing air no hotter than 160° F (71° C). Do not use compressed air or light bulbs.

k. After cleaning, inspect element by placing a bright light inside element and rotate element slowly. If any rupture, holes or damaged gaskets are discovered, replace element. Replace element after six cleanings.

l. Insert air cleaner primary element (4) into housing (5) and reinstall cover (3) and wing nut (2). Reinstall cover and wing nut assembly (1).

m. Verify all connections are secure.

5-14. FUEL FILTER (figure 5-5). The fuel filter removes solid particles and some entrained water from the fuel, preventing the contamination from damaging or clogging the fuel injection pump or the fuel injectors.

a. Position a suitable receptacle beneath the filter and open the drain plug (3), allowing all fuel and water within the filter element (2) and associated fuel lines to exit through the drain.

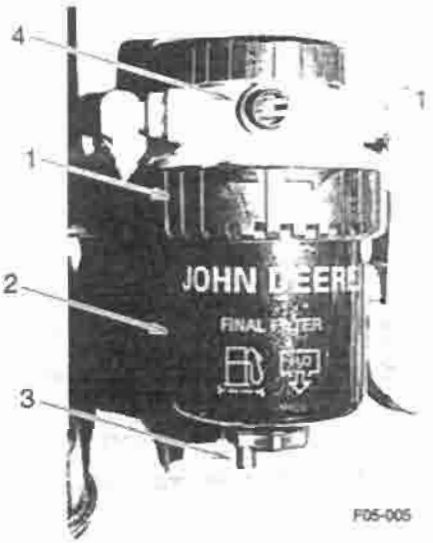


Figure 5-5. Fuel Filter

b. Loosen retaining ring (1) and remove filter element (2).

c. Inspect filter housing for additional dirt or other contamination.

d. Position new element in correct location and hand tighten retaining ring (1).

e. Loosen bleed plug (4) and bleed the fuel system.

f. To insure quick engine starts after filter changes it is necessary to purge all air from the fuel system. This is accomplished by priming the fuel system. To prime the fuel system place the manual stop control to the STOP position and open the bleed valve at the fuel injection pump inlet.

g. Using the hand priming lever on the fuel transfer pump, purge air from the fuel system. The fuel system is sufficiently purged when air-free fuel flows from the bleed valve.

h. Close the bleed plug (4) and place the manual stop control in RUN position. Using a clean cloth, wipe excessive fuel oil from fuel injection pump and adjacent engine components where spillage has occurred.

5-15. BATTERY AND CABLES. Inspect battery mountings and cable connections for security of attachment.

a. Remove nut and lock washer securing ground cable to starter.

CAUTION

System is negative ground.

b. Loosen nut on negative terminal and remove ground cable from battery.

c. Remove nut and washer from starter terminal, remove starter cable from terminal and reassemble washer and nut on starter terminal.

d. Loosen nut on positive terminal and remove starter battery cable from battery.

e. Remove the nuts and lift off battery hold down bracket.

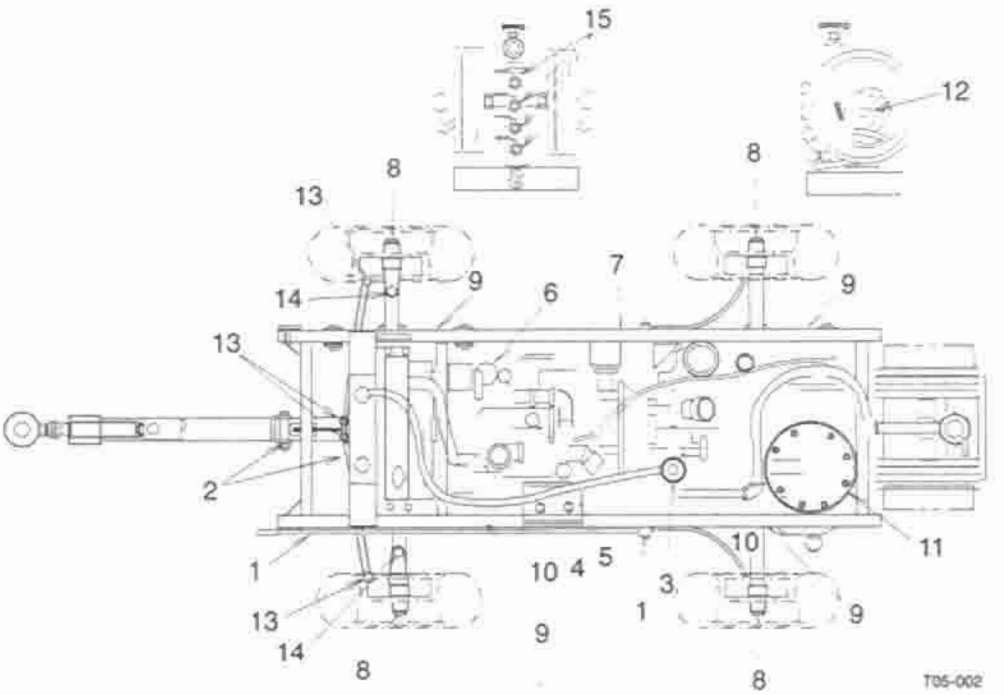
f. Lift out the battery. Remove the "J" bolts as necessary.

g. Assemble the battery, the battery hold down bracket, and cables in the reverse of disassembly.

5-16. LUBRICATION INSTRUCTIONS.

5-17. Points of lubrication, type of lubricant, application method, and interval is listed in table 5-2.

Table 5-2. Lubrication chart



REF NO.	LUBRICATION POINT	LUBRICANT (SPECIFICATION)	APPLICATION (OR ACTION)	INTERVAL (SERVICE HOURS)
1	Hand brake lever and linkage	OE/HDO 30-Oil MIL-L-2104	Oil can (sparingly)	250
2	Steering tongue pivot	OE/HDO 30-Oil MIL-L-2104	Oil can (sparingly)	250
3	Compressor oil filter		Change element	100
4	Engine dipstick		Check oil level	10
5	Engine crankcase	*	Drain and change oil and filter element	100
6	Engine oil filter		Change element w/oil change	100
7	Door hinges/latches	OE/HDO 30-Oil MIL-L-2104	Oil can (sparingly)	250
8	Wheel bearings	GAA-Grease MIL-G-10924	Handpack	1000
9	Springs	OE/HDO 30-Oil MIL-L-2104	Brush on (sparingly)	1000
10	Control linkage	OE/HDO 30-Oil MIL-L-2104	Oil can (sparingly)	100
11	Oil separator		Check oil level	10
	Separator element		Replace	4000 hours or 1 year, whichever comes first.

Table 5-2. Lubrication chart - continued

REF NO.	LUBRICATION POINT	LUBRICANT (SPECIFICATION)	APPLICATION (OR ACTION)	INTERVAL (SERVICE HOURS)
11 cont	Separator tank	*	Drain and change oil	500 hours or spring and fall, whichever comes first.
12	Hose reels (2 places)	GAA-Grease MIL-G-10924	Grease gun	250
13	Tie rod pins (4 places)	GAA-Grease MIL-G-10924	Grease gun	250
14	Steering knuckles (4 places)	GAA-Grease MIL-G-10924	Grease gun	250
15	Service valves	OE/HDO 30-oil MIL-L-2104	Oil can (sparingly)	100

* Temperatures	+10° F to 105° F (-12° C to 41° C) use MIL-L-2104	OE/HDO-15/40 (Military) SAE 15W-40 (Commercial) 0-1236 (NATO)
	+50° F to 125° F (10° C to 52° C) use MIL-L-2104	OE/HDO-40 (Military) SAE-40 (Commercial)
	-67° F to +14° F (-55° C to -10° C) use MIL-L-46167	OEA (Military) 0-183 (NATO)

5-18. ENGINE OIL DRAIN AND FILLER (Figure 5-6). The engine oil is stored in the oil pan (3, figure 5-6) which is also the cover for the bottom of the crankcase.

NOTE

Drain oil after engine has been operating. Oil flows more freely and quickly when engine temperatures have been reached.

a. Place a suitable size container directly under the drain plug (1), remove drain plug and gasket (2) and let oil drain from the oil pan (3).

b. While oil is draining from oil pan, inspect drain plug for foreign particles such as small metal chips. If an unusual quantity appears, examine the Engine Oil Filter (Ref 5-19) and notify maintenance personnel.

c. Clean the drain plug with P-D-680 and inspect for damaged threads. Clean and inspect gasket. Replace gasket if damaged.

d. Install drain plug and gasket. Tighten as required.

e. Replace oil filter before placing unit back into service.

f. Refill engine with clean oil through the oil filler tube (7).

5-19. ENGINE OIL FILTER. (figure 5-6). The engine uses a full-flow oil filter employing a 'spin-on' type oil filter element. Remove/replace the engine oil filter element as follows:

a. Place an empty container under the filter (6, figure 5-6) to catch any oil that may be spilled.

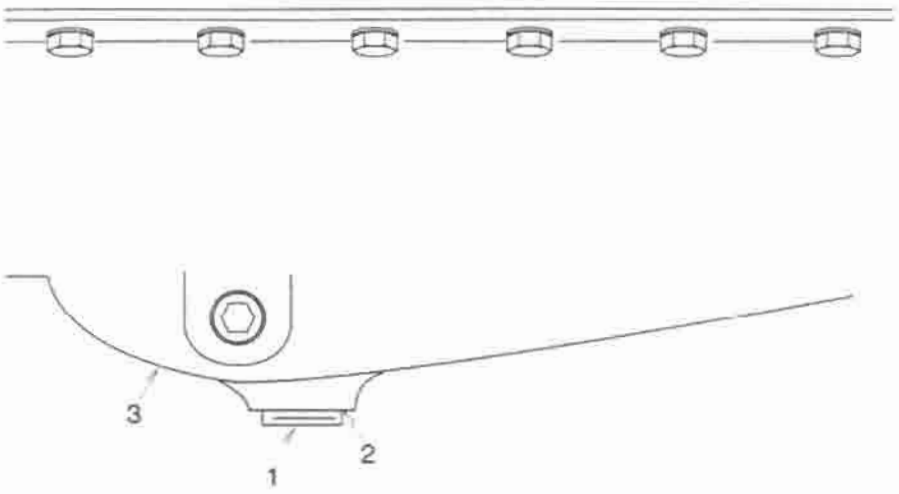
b. Using a strap-type wrench, loosen the filter (6) by turning the filter counterclockwise. Remove wrench and continue turning filter by hand. Remove filter from stud. Discard filter.

c. Wipe filter base assembly with a clean cloth moistened with solvent P-D-680 or equivalent.

d. Inspect base assembly and stud threads for damage. Make certain filter seal is on filter and not stuck to base assembly.

e. Examine oil line(s) (5) for any damage and replace as necessary.

f. Spread a small amount of oil on filter seal. Install new filter on stud. Tighten 3/4 turn after seal seats in base assembly.



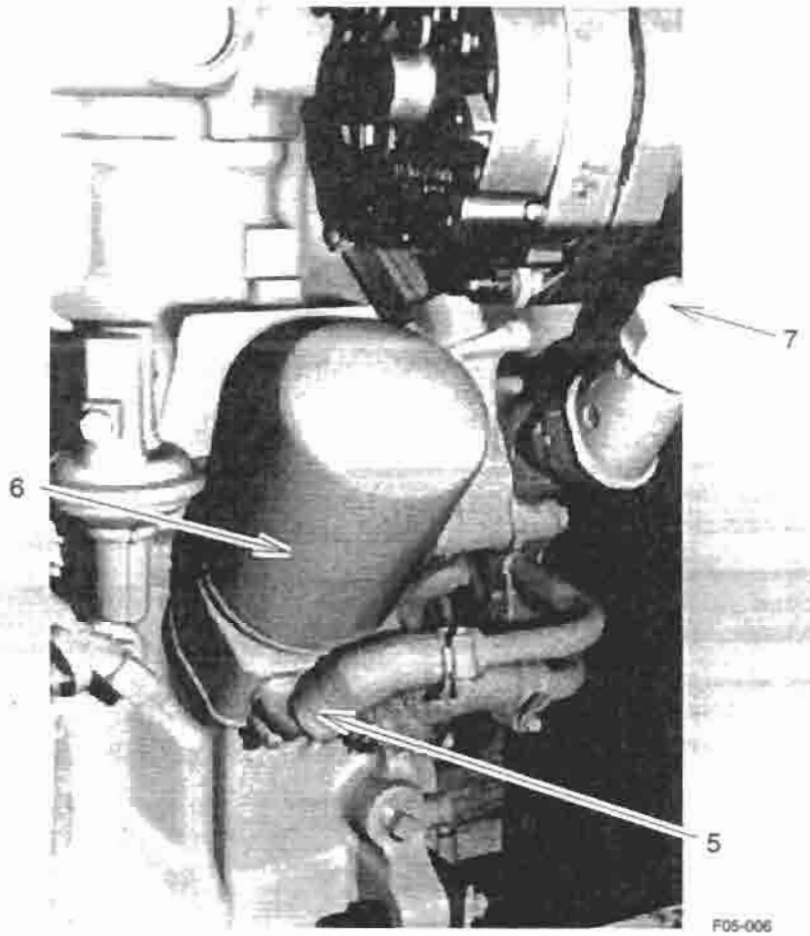


Figure 5-6. Engine oil filter and drain

g. Fill engine crankcase through filler opening in top of rocker arm cover.

h. Crank engine for 30 seconds without permitting engine to start.

i. Start engine. Verify proper oil pressure with no leaks.

j. Stop engine and verify proper oil level.

5-20. COMPRESSOR OIL FILTER. (figure 5-7). The compressor uses a full-flow oil filter employing a 'spin-on' type oil filter element similar to the engine oil filter element. Remove/replace the compressor oil filter element as follows:

a. Place a cloth or other absorbent material around the base of the filter element.

b. Using a strap-type wrench, loosen the filter (1) by turning the filter element counter-clockwise. After filter has been sufficiently loosened, remove the strap wrench and finish removal by hand. Discard filter element.

c. Wipe filter element mounting base with a clean cloth moistened with solvent P-D-680 or equivalent.

d. Inspect mounting base for damage. Make certain old filter element seal is not still attached to mounting base (2).

e. Spread a small amount of compressor oil on the filter element seal and install new filter element. Tighten an additional 3/4 turn after seal seats on mounting base.

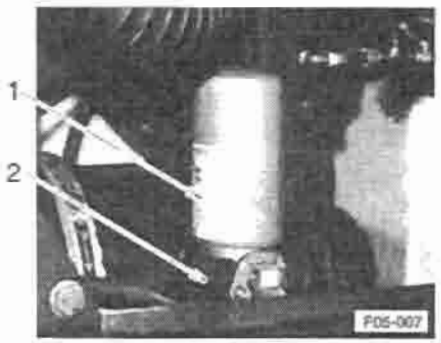


Figure 5-7. Compressor oil filter

5-21. OIL SEPARATOR DRAIN AND FILLER (Figure 5-8).

a. It is recommended that approximately 50 hours prior to a scheduled oil change that the compressor oil filter be inspected for a varnish condition. A varnish condition will appear as a dark brown, heavy, sticky deposit.

b. When a varnish condition exists, the separator, oil cooler, piping, and compressor oil filter must be cleaned. Varnishing is a malfunction and the cause must be corrected or serious damage to the compressor can occur. Varnishing can be the result of the use of incorrect oil, poor filter maintenance, operating above normal operating temperatures, and overextended oil change intervals.

c. A suggested method of cleaning is to use a super detergent mixed with the compressor oil. Operate the compressor with this mixture under full load approximately 40 hours and then drain the oil. This cleaning method will dissolve and carry into suspension the sludge and varnish build-up within the system. After oil is drained, the separator element must be replaced and the separator tank refilled with clean oil.

CAUTION

The separator element cannot be cleaned and must be replaced.

d. There are many brands of detergents available. One such brand is THERMA-SOLVE CONCENTRATE. Check with your industrial oil dealer for THERMA-SOLVE or equivalent. THERMA-SOLVE may be obtained through your Davey dealer or from the factory service department. THERMA-SOLVE CONCENTRATE is manufactured by Penreco, 2686 Lisbon Road, Cleveland, Ohio 44104.

CAUTION

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

e. Use the above cleaning method first when varnish condition is indicated. If this fails to remove the varnish condition, the compressor and separator must be disassembled and each part cleaned.

1. FILLER PLUG
2. PREFORMED PACKING
3. SEPARATOR FILLER
4. MAGNETIC DRAIN PLUG

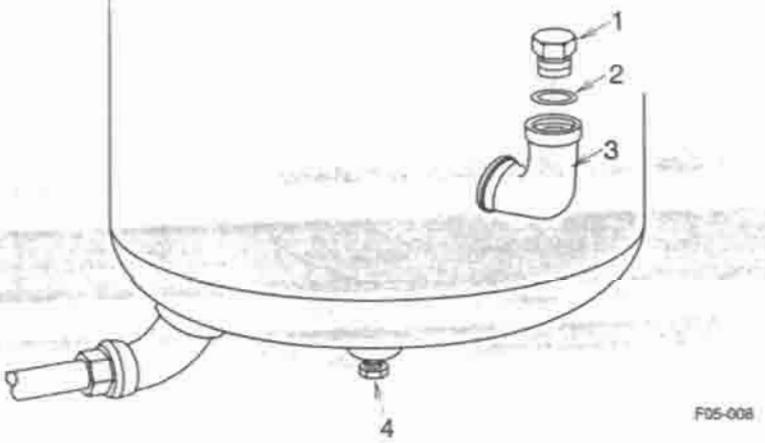


Figure 5-8. Oil Separator Drain and Filler

f. Remove filler plug (1) and preformed packing (2). Using an appropriate size catch pan, remove magnetic drain plug (4) and drain oil. Inspect magnetic drain plug (4) for foreign particles. If an unusual amount of metal particles appear, notify maintenance personnel. Clean and replace magnetic drain plug (4). Pour clean oil into separator filler (3) until filler is full. Examine o-ring (2) for conformity. If damaged, replace. Install filler plug (1) and tighten securely. Operate compressor unit for five minutes in order to circulate clean oil throughout system. Stop the unit and top off oil level up to separator filler cap/plug.

5-22. CHASSIS LUBRICATION (Table 5-2). Refer to the Lubrication Chart, table 5-2, for recommended lubricants and servicing intervals.

5-23. TROUBLESHOOTING.

5-24. Table 5-3 provides information useful in diagnosing and correcting unsatisfactory operation or failure of the Type MC-5 Rotary Air Compressor unit. The table covers possible troubles, probable causes and possible remedies to return the unit to acceptable operational performance standards. Corrective action which is beyond the scope of organizational and intermediate maintenance personnel shall be referred to overhaul personnel.

Table 5-3. Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
Engine will not crank when start switch is pulled.	Battery charge too low, cable connections loose or corroded.	Check and charge battery as necessary. Clean and tighten all connections.
	Start switch inoperative.	Check wiring connections and tighten as necessary. Inspect for defective wire assemblies and repair or replace frayed or burned wire assemblies. Replace a defective start switch.
	Starting motor inoperative or defective.	Inspect starter cables and terminals for loose connections and tighten as necessary. Replace broken or burned cables. Replace a defective starting motor.
	Engine defective, such as seized pistons and the like.	Refer to overhaul personnel.
Engine cranks but will not start.	Safety control button not being pushed with start button.	Push safety control button simultaneously with start button and hold until engine oil pressure above 4 psi is indicated on oil pressure gauge.
	No fuel in tank.	Fill fuel tank with proper grade of fuel. Refer to table 1-1.
	Fuel contaminated with water or sediment.	Drain fuel from tank and fill with clean fuel of proper grade. Change fuel filter.
	Clogged fuel filter or fuel lines.	Replace fuel filter and clean fuel line. Purge system of air after filter replacement (para 5-14).
	Air in fuel injection system.	Purge system of air with hand priming lever (para 5-14).
	Air cleaner restricted.	Service the air cleaner (para 5-13).

Table 5-3. Troubleshooting - continued

TROUBLE	PROBABLE CAUSE	REMEDY
Engine cranks but will not start. - continued	Starting circuit open due to safety device shutdown. (Low engine oil pressure, high temperature of coolant, high temperature of compressor oil, or engine overspeed.)	Check safety circuit for device that caused shutdown. If low engine oil pressure, add oil as necessary or if defective oil pump, repair pump. High temperature requires no reset action. Check coolant level in radiator and add as necessary. Check and replace engine thermostat if required. High temperature of oil shutdown requires no reset action, other than allowing temperature to drop. Check oil level in separator and add oil as necessary. If oil level was not low, check, clean, and repair thermal bypass as necessary. Engine overspeed shutdown requires manual reset. On Model 21M250 press reset button on end of overspeed switch. Check controls and engine for reason of overspeed.
	Defective fuel transfer pump.	Repair or replace fuel transfer pump.
	Fuel injection pump improperly timed.	Time the fuel injection.
	Fuel nozzles dirty.	Remove and clean fuel nozzles.
	Valves sticking or adjusted improperly.	Refer trouble to overhaul.
Engine stops during operation.	Out of fuel or improper grade of fuel being used.	Fill fuel tank with proper grade of fuel.
	Fuel filter clogged.	Service the fuel filter (para 5-14).
	Air leaks in fuel system.	Purge system of air using hand priming pump (para 5-14, g).
	Coolant temperature too high causing safety circuit to shut down engine.	Check coolant level in radiator; add as necessary. If coolant level not low check and replace thermostat as necessary. Check for clogged radiator cooling fins; clean if necessary.
	Low engine oil pressure causing safety circuit to shut down engine.	Check level of oil in engine and add proper grade of oil to full mark on dipstick. If oil level is not low, check operation of oil pressure switch and replace switch if defective.
	Compressor oil temperature too high causing safety circuit shut down of engine.	Refer to "Compressor Overheating" trouble in this table.
	Engine overspeed switch causing safety circuit shut down of engine.	Check high speed control adjustment of fuel injection pump. Adjust as necessary. Check setting of overspeed control switch and adjust as necessary. If switch is defective, replace.

Table 5-3. Troubleshooting - continued

TROUBLE	PROBABLE CAUSE	REMEDY
Loss of engine oil pressure.	Low engine oil level.	Add engine oil to proper level.
	Clogged engine oil filter.	Service the engine oil filter (para 5-19).
	Engine oil leaks.	Inspect engine and repair as necessary.
	Incorrect grade of oil.	Change oil and use grade specified in Lubrication Chart. Refer to para 5-18.
	Defective engine oil pressure gauge.	Replace oil pressure gauge.
	Damaged engine oil pressure hose from engine to gauge.	Repair or replace hose assembly as necessary.
Engine overheats.	Low radiator coolant.	Fill radiator with coolant. Check for leaks and repair or replace hoses, clamps, or defective parts.
	Fan belt loose.	Check and adjust fan belt tension (para 5-12).
	Dirt or debris clogging radiator.	Clean radiator fins.
	Insufficient engine lubricating oil.	Fill to proper level with correct grade of oil.
	Defective thermostat.	Replace thermostat.
	Defective water pump.	Replace water pump.
Battery discharging.	Loose battery connections.	Check and clean terminals and tighten connections.
	Short circuits.	Check wiring connections and wiring harness for defects. Repair or replace as necessary. Refer to figure 1-6.
	Defective voltage regulator in alternator.	Replace the alternator.
	Alternator not charging.	Check and adjust drive belt as necessary. Replace a defective alternator.
	Defective battery.	Replace the battery.
Alternator not charging.	Loose drive belt.	Adjust belt tension as necessary (Para 5-12).
	Defective voltage regulator.	Replace alternator.
	Defective alternator.	Replace the alternator.
Compressor overheats	Separator oil level too low.	Fill separator to overflow with proper grade of oil (para 5-21).
	Dirty compressor oil filter.	Service the oil filter (para 5-20).
	Faulty thermal bypass valve.	Replace the thermal bypass valve located in the heat exchanger.
	Dirt or debris clogging oil cooler.	Clean the oil cooler and radiator or fins of all dirt and debris.
	Compressor defective.	Overhaul the compressor.

Table 5-3. Troubleshooting - continued

TROUBLE	PROBABLE CAUSE	REMEDY
Compressor operation is noisy.	Low separator oil level.	Fill separator to overflow with proper grade of oil (para. 5-21).
	Air pressure regulator defective or out of adjustment.	Adjust air pressure regulator or repair as necessary (para 5-6).
	Loose, worn, or damaged compressor parts.	Overhaul the compressor if normal service and tightening of external components does not remedy noisy operation.
Compressor not operating to full capacity or pressure.	Air pressure regulator out of adjustment or defective.	Adjust or repair air pressure regulator (para 5-6).
	Leaks in air hoses or connections.	Check air hoses and connection while unit is operating. Use soapy water solution applied with brush. Tighten connections or replace defective hoses or fittings.
	Air cleaner dirty or clogged.	Service the air cleaner (para 5-13).
	Safety valve on oil separator leaking.	Replace faulty safety valve.
	Air service valves leaking.	Replace defective air service valves.
Compressor fails to load or unload.	Dirt buildup on intake-unloader valve seat.	Clean the intake-unloader valve and seat.
	Unloading pressure set too high or too low.	Adjust the air pressure regulator (para 5-6).
	Control air hoses damaged or leaking.	Tighten connection and replace damaged hoses.
	Moisture in control hose assemblies.	Disconnect hose assemblies, clean, and reconnect.
Compressor unloads but engine does not idle.	Speed control linkage out of adjustment.	Adjust the speed control linkage and replace any damaged parts (para 5-5).
Engine returns to idle, compressor does not unload.	Faulty compressor intake control.	Check for defective diaphragm, sticking intake valve, damaged or plugged hose assemblies to intake-control.
Condensate and/or emulsion in oil separator.	Unusually low oil temperature and high humidity.	If a climatic condition, change separator oil to proper grade for operating condition.
	Faulty thermal bypass valve.	Repair/replace the thermal bypass valve.

Table 5-3. Troubleshooting - continued

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive compressor oil consumption.	Leak in oil system.	Check and repair oil lines and connections.
	Low separator pressure (below 70 psi).	Defective minimum pressure valve spring or pressure regulator. Replace all defective minimum pressure control components.
	Clogged line from separator to intake orifice or clogged orifice.	Remove hose assembly and orifice, clean, and reinstall.
	Ruptured oil separator element.	Replace element.
Engine stalls at idle.	Idle speed set too low.	Adjust idle to 1100 RPM minimum (para 5-5).
	Speed control linkage out of adjustment.	Adjust linkage. Replace any defective parts (para 5-5).
Compressor output too low.	Intake-control valve sticking or worn.	Inspect intake-control valve, clean, or replace if worn.
	Speed control out of adjustment.	Adjust speed control to correct operating speed (para 5-5).
	Damaged rotor blades.	Replace damaged blades.
Excessive oil in air discharge.	Clogged oil return hose or saturated oil separator element.	Remove, clean, and install oil return hose. Should this not remedy condition, replace separator element.
	Minimum pressure valve assembly and/or pressure regulator on oil separator faulty causing separator pressure to drop below 70 psi. Drop in separator pressure will allow oil blowout when service air demand exceeds separator pressure.	Inspect minimum pressure valve assembly components and pressure regulator. Replace all defective parts.
Parking brake will not set or release.	Parking brake handle out of adjustment.	Adjust by turning handle as necessary to tighten or loosen tension (para 5-11).
	Brakes out of adjustment.	Adjust brakes (para 5-10).
	Brake shoes worn.	Replace brake shoes.
	Broken actuating cable.	Replace broken cable.
Surge brake will not function.	Broken or disconnected hydraulic line.	Connect or replace hydraulic line.
	Hydraulic fluid low.	Fill master cylinder with clean hydraulic fluid (para 5-9).
	Brakes out of adjustment.	Adjust brakes (para 5-10).
	Brake shoes worn.	Replace brake shoes.
	Surge brake actuator defective.	Repair surge brake actuator.

Table 5-3. Troubleshooting - continued

TROUBLE	PROBABLE CAUSE	REMEDY
Brakes apply but braking is not adequate.	Brake shoes and drums are wet.	Allow unit to set until brakes dry or apply brakes slowly and tow unit until heat from braking evaporates moisture. CAUTION Do not tow unit for long duration with brakes applied. Excessive friction will cause glazing of brake shoes.
	Hydraulic fluid low.	Fill master cylinder with clean hydraulic fluid (para 5-9).
	Air in hydraulic system.	Bleed air from hydraulic lines (para 5-9).
	Surge brake actuator leaking.	Repair surge brake actuator.
	Brake drum broken or cracked.	Replace brake drum.
Brakes apply too slowly.	Air in hydraulic system.	Bleed air from hydraulic lines (para 5-9).
	Restricted hydraulic line.	Remove hydraulic line and clear restriction or replace line. Install and bleed air from line (para 5-9).
	Hydraulic fluid low.	Fill master cylinder with clean hydraulic fluid (para 5-9).
	Surge brake actuator defective.	Repair surge brake actuator.
Brakes will not release.	Brakes out of adjustment.	Adjust brakes (para 5-10).
	Parking brake actuator defective or out of adjustment.	Adjust parking brake or repair actuating mechanism (para 5-11).
Brakes release too slowly.	Restriction in hydraulic line.	Remove hydraulic line and clear restriction or replace line. Install and bleed air from line (para 5-9).
	Shoe movement binding on backing plate.	Lubricate pivot points.
Brakes apply uneven or grab.	Grease or moisture on linings.	Clean grease from linings and drums. If wet, allow unit to sit until brakes dry or apply brakes slowly and tow unit until heat from brakes evaporates moisture. CAUTION Do not tow unit for a long duration with brakes applied. Excessive friction will cause glazing of brake shoes.
	Scored or cracked brake drum.	Replace drum.
	Loose wheel bearing.	Replace wheel bearing.
	Brake drum out of round.	Replace drum.

Table 5-3. Troubleshooting - continued

TROUBLE	PROBABLE CAUSE	REMEDY
Wheel wobbles.	Wheel bent.	Replace wheel.
	Wheel loose on hub.	Tighten nuts.
	Wheel bearing defective.	Replace wheel bearing.
Wheel bearing overheats.	Wheel bearing defective.	Replace bearing.
	Lack of lubrication.	Pack wheel bearings.
Tire wear abnormal.	Wheel loose on hub.	Tighten nuts.
	Improper tire inflation.	Inflate tires to proper pressure. Refer to table 1-1.
	Tie rod out of adjustment.	Adjust tie rod.

Table 5-4. Battery Testing Chart

VOLTMETER TEST	CONDITION	REMEDY
If the voltage drop is more than 0.2 volt (2-10 vdc) between the cranking motor cable and the frame while cranking, look for:	Poor contact between terminal and frame or between clamp terminal and battery post:	Locate the high resistance. Repair or replace.

The presence of short circuits in the wiring can be determined by switching off all electrical equipment and, with the ground strap connected, tapping the other cable terminal against its battery post. Sparking will be produced if there is a substantial short circuit in the wiring. To detect a very slight short circuit, place a low reading ammeter in the circuit.