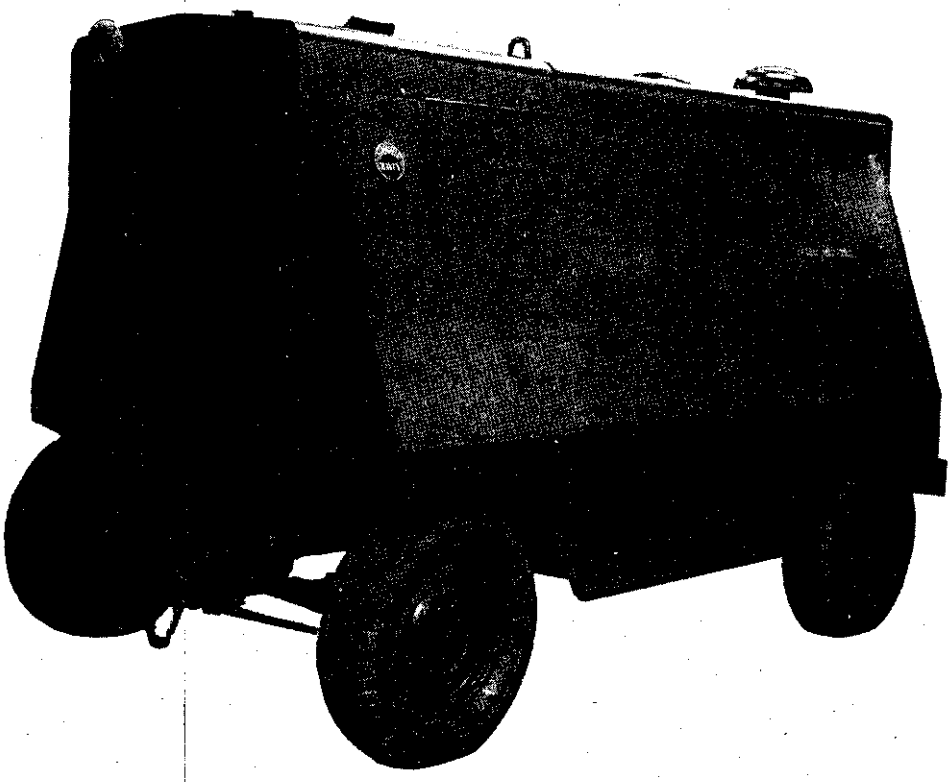
TECHNICAL MANUAL

OPERATION, SERVICE, AND OVERHAUL INSTRUCTIONS WITH ILLUSTRATED PARTS BREAKDOWN

COMPRESSOR, ROTARY, POWER DRIVEN, 750 CFM, 100 PSI, DIESEL ENGINE, TRAILER MOUNTED

MODEL 1M750PVC

PART NO. 64945



DAVEY
built to serve and endure

DAVEY COMPRESSOR COMPANY KENT, OHIO 44240

AN ALCO STANDARD CORPORATE PARTNER

PART 1

OPERATION AND SERVICE INSTRUCTIONS

PART 1

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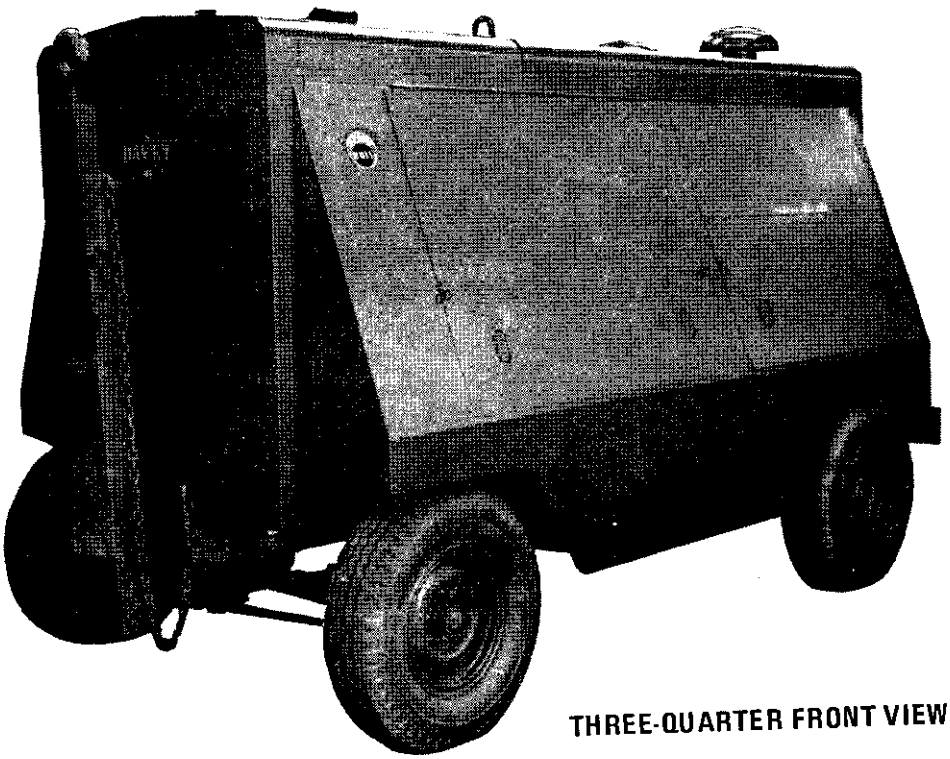
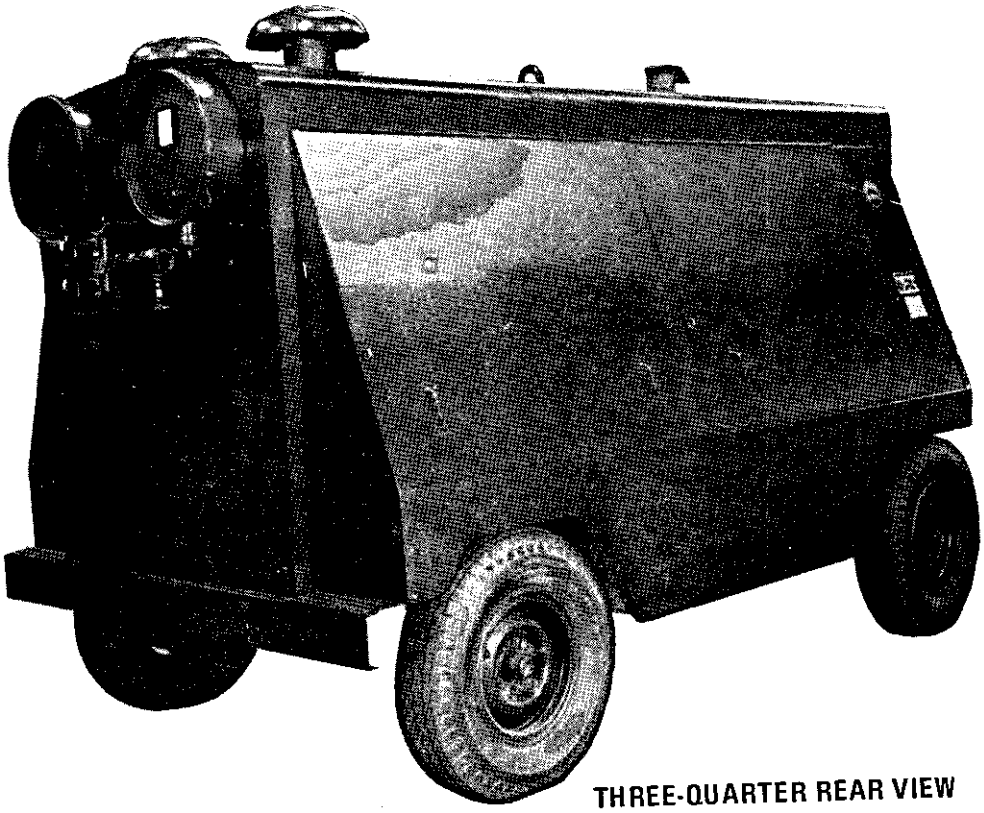


THREE-QUARTER FRONT VIEW



THREE-QUARTER REAR VIEW

Figure 1-1. Rotary air compressor unit, Model 1M750PVC

PART 1

OPERATION AND SERVICE INSTRUCTIONS

SECTION I
INTRODUCTION AND GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. Part 1 of this technical manual covers the operation and maintenance instructions for the Model 1M750PVC, Trailer Mounted, Diesel Engine Driven, 750 CFM, 100 PSI, Rotary Air Compressor manufactured by Davey Compressor Company, Kent, Ohio 44240. Their Part Number 64945 has been assigned to the unit. Refer to figure 1-1 for an identifying view. The instructions herein are for the guidance of personnel responsible for the operation of the equipment. Refer to Part 2 for overhaul instructions and Part 3 for the illustrated parts breakdown.

1-3. Abbreviations and Symbols. The abbreviations and symbols used throughout this manual are in accordance with Military Standards, MIL-STD-12, MIL-STD-15-1, and MIL-STD-17-1, or are defined at the first appearance in the text.

1-4. GENERAL INFORMATION.

1-5. The Model 1M750PVC, Rotary Compressor unit is a trailer mounted, four-wheel pneumatic tired, diesel engine driven, sliding blade type, rotary air compressor. The unit supplies 750 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 a hand operated parking brake system. 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 of the unit provide access to these components. In addition to the doors, the housing group consists of side and end panels, door and roof supports, a grille, trays, rails, and a three-section roof. Data and instruction plates are attached to the outside of the housing.

1-8. SERVICE VALVES (2, figure 1-2). The air discharge line is equipped with an air service manifold having individually controlled service outlets. These outlets consist of four 3/4-inch and two 1-1/2-inch sizes.

1-9. INSTRUMENT PANEL (3, figure 1-2). The operating controls and instruments are mounted on a sheet metal instrument panel located under the housing. The controls and instruments can be categorized into three groups: operation indicating group, control group, and safety group. The operation indicating group consists of gauges that indicate engine oil pressure, fuel pressure (located on engine fuel filter), fuel level, water temperature, air pressure, engine speed in RPM, hours of operation, and battery-alternator amperage. The control group consists of the engine stop cable, safety push button, engine HEAT-OFF-START switch, cold weather starting aid control (QUICK START), fuel priming pump (on engine), and panel lamp ON-OFF switch. Other controls supplied but not mounted on the control panel are the manual intake unloader for the compressor and the engine idle control. The safety group consists of the fuel pressure switch (located on the engine) which activates the safety system when the fuel pressure rises above 8 psi, and an oil pressure switch which shuts down the engine when engine oil pressure drops below 10 psi. (Other safety components supplied, but not mounted on the panel, are engine high water temperature shut down, and engine overspeed shut down.) The instrument panel is mounted with vibration mounts to minimize shock damage.

1-10. COOLING SYSTEM (4, 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 pressure cooling system. An impeller-type water pump circulates the coolant through the engine components and the radiator. Coolant temperature is reduced by ambient air being drawn through the radiator core by the suction-type fan. The engine coolant temperature regulator controls the flow of coolant through the engine cooler. The ambient air drawn through the radiator also passes over the oil cooler cores which reduces the temperature of the compressor oil. A

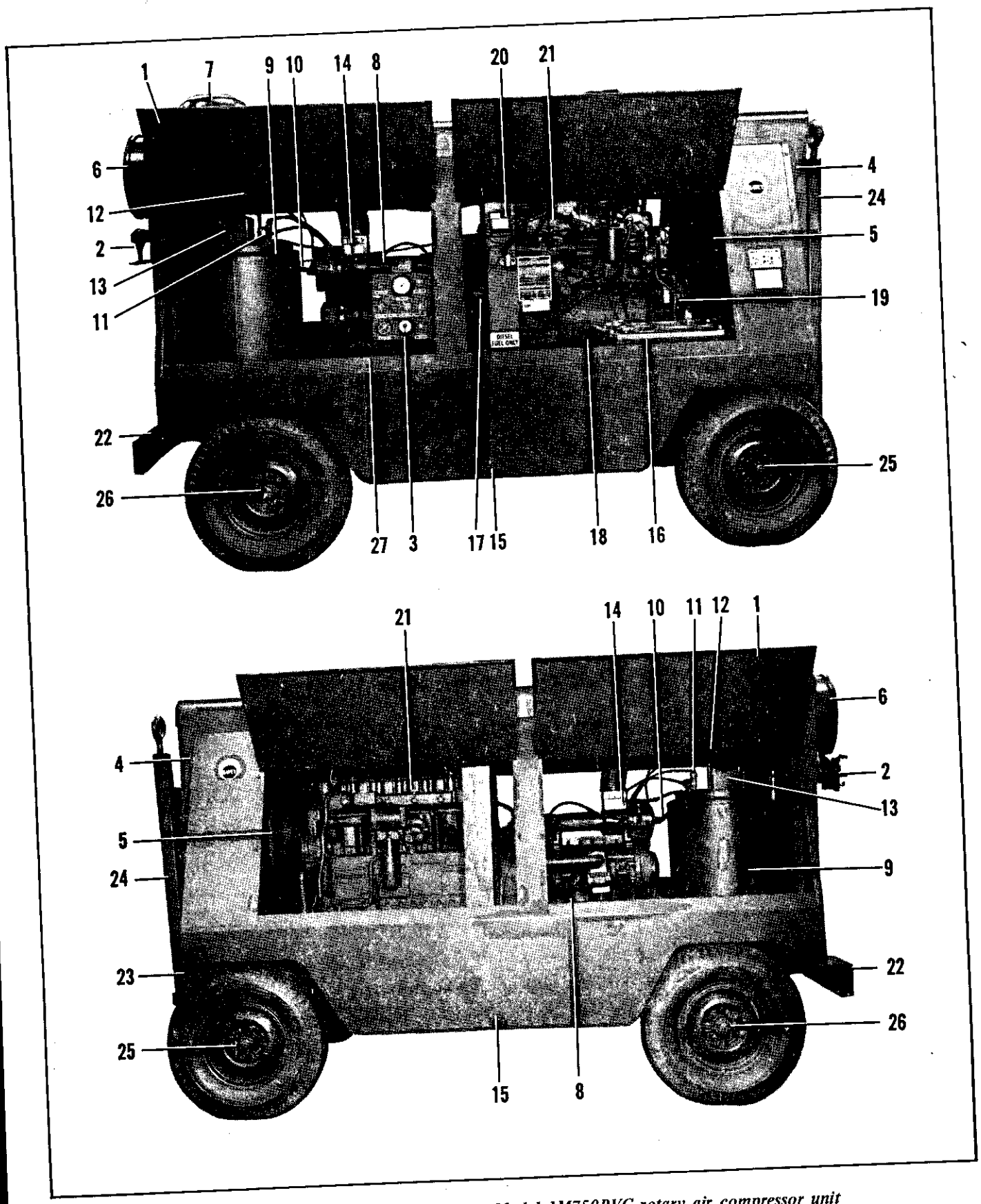


Figure 1-2. Major components of the Model 1M750PVC rotary air compressor unit

KEY to figure 1-2:

1. Housing group
2. Service valves and manifold
3. Instrument panel assembly
4. Radiator and oil cooler
5. Cooling fan
6. Air cleaners
7. Air cleaner caps
8. Compressor assembly
9. Oil separator assembly
10. Control linkage
11. Blowdown valve
12. Pressure regulator
13. Minimum pressure valve housing
14. Compressor intake control
15. Fuel tanks
16. Battery tray and batteries
17. Starting motor
18. Alternator regulator
19. Alternator
20. Overspeed switch
21. Engine assembly
22. Frame assembly
23. Parking brake handle
24. Towbar
25. Front axle assembly
26. Rear axle assembly
27. Cold weather starting aid

segmented fan guard is installed on the radiator and oil cooler assembly. A thermal bypass valve is mounted near the compressor to direct part or all of the compressor system oil through the oil cooler. When oil temperature reaches approximately 150°F, the valve begins to open, mixing hot and cool oil to maintain a relatively constant minimum operating temperature.

1-11. AIR CLEANERS (6, figure 1-2). Two identical air cleaners are provided: one to accommodate the engine intake air, the other for compressor intake air. These air cleaners are two-stage with dry-type reusable elements. The cleaners incorporate an automatic unloader which expells the larger particles of contaminates separated from the intake air by cyclonic action in the first stage. The air passes from this first stage filtration through the dry-type element which renders the air practically contaminant-free. The cleaners are equipped with raincaps on the inlet tubes.

1-12. AIR COMPRESSOR SYSTEM (8, figure 1-2). The air compressor system consists of a single-stage, sliding blade, air compressor assembly, oil separator assembly, blowdown valve assembly, minimum pressure valve, thermal bypass valve, speed control linkage, air pressure regulator, and compressor oil filter. 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 750 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 with regulated air assist arrangement 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

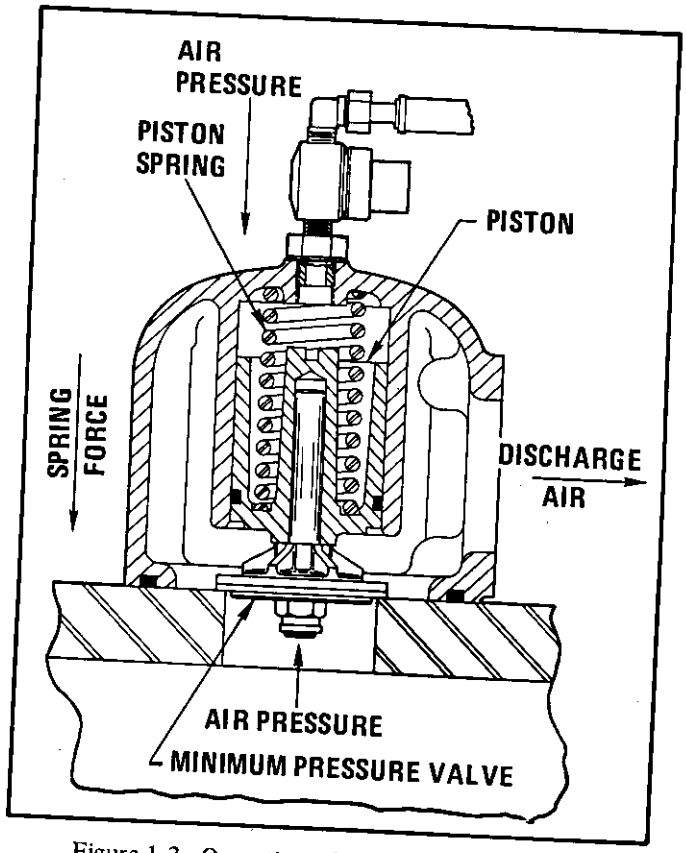


Figure 1-3. Operation of minimum pressure valve

Table 1-1. Leading Particulars

Rotary Air Compressor:

Manufacturer ..... Davey Compressor Company
Model 1M750PVC
Type ..... Sliding Blade, Air, Rotary
Part Number 64945
Air Volume ..... 750 CFM
Air Pressure ..... 100 PSI
Stages ..... One
Prime Mover ..... Diesel Engine
Mounting .....Trailer Mounted, 4-Wheel, Pneumatic Tires
Brakes ..... Mechanical Hand Brake
Tire Size ..... 7.50 x 16, 10 Ply
Tire Pressure ..... 70 PSI
Turning Angle ..... 35 Degrees
Towing Speeds (Max.) ..... Highway 20 MPH
Off Road 5 MPH
Electrical System ..... 24 VDC
Registration Numbers ..... USN31-05898 through USN31-05916 and USN31-05926 through USN31-05929
Serial Numbers ..... 7P408-19252 and 7P408-19431 through 7P408-19452

Diesel Engine:

Manufacturer ..... Caterpillar Tractor Company
Model DV39-3306
Type ..... Four-Stroke Cycle, Reciprocating, Turbocharged Diesel
Number of Cylinders ..... Six
Bore and Stroke ..... 4.75 IN. x 6.0 IN.
Displacement ..... 638 CU. IN.
Firing Order ..... 1 - 5 - 3 - 6 - 2 - 4
Governed Speed ..... 2100 RPM
Low Idle Speed ..... 1200 RPM
Oil Pressure Normal at 2100RPM ..... 45 - 55 PSI
Recommended Fuel Oil ..... No. 2 (ASTM Spec No. D396)

Engine Accessories:

Starting Motor ..... Delco Remy
Part Number 1114706
Rating ..... 24 VDC

Alternator:
Manufacturer ... Motorola Automotive Products, Inc.
Model No. 8MH3005F
Rating ..... 35 AMP, 24 Volt

Voltage Regulator:
Manufacturer ... Motorola Automotive Products, Inc.
Model No. TVR24-29C
Type ..... Heavy Duty Adjustable Voltage

Primary Fuel Filter:
Manufacturer ..... Caterpillar Tractor Company
Group Number 8H4681
Element Number 9M2341

Final Fuel Filter:
Manufacturer ..... Caterpillar Tractor Company
Group Number 7L261
Filter Assembly 1P2299

Oil Filter:
Manufacturer ..... Caterpillar Tractor Company
Group Number 2P6475
Filter Assembly 2P4004

Overspeed Governor Switch:
Manufacturer ..... MassTeck Div. of Curtis & Marble Corp.
Type ..... Electronic
Trip Speed ..... 1125 RPM
Control Number 06093
Model No. 1-SS2-12-M
Transmitter Model TR1-8

Air Cleaners (Compressor and Engine):

Manufacturer ..... Air-Maze Filter Products Division North American Rockwell Corp.
Model Number CD1623500
Element Number CD1626100-826

Compressor Oil Filter:

Manufacturer ..... Marvel Engineering Company
Part Number 255241-1500-576366-1110
Element Number 576366-1110

Capacities:

Fuel Tanks (2) ..... 59-1/2 GAL EA (APPROX)
Engine Crankcase ..... 29 Quarts
Compressor Oil Separator ..... 26 Gallons
Engine Cooling System ..... 16-1/2 GAL (APPROX)

Overall Dimensions and Weights:

Overall Length (Tow Bar Up) ..... 146 IN.
Overall Length (Tow Bar Down) ..... 214 IN.
Overall Width ..... 83 IN.
Overall Height ..... 93 IN.
Shipping Volume ..... 652 CU FT
Shipping Weight ..... 8155 LB

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 and regulated air assist overcomes the separator air pressure and moves the piston downward closing the valve. A blowdown 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 pneumatic diagram.

1-13. FUEL SYSTEM (15, figure 1-2). The fuel system consists of two interconnected fuel tanks, fuel level sending unit, flexible fuel lines, fuel level gauge and fuel pressure gauge, and the engine fuel system. The engine fuel system is a pressure type with separate injection pump and injection valve for each cylinder. Fuel is injected into a precombustion chamber, not directly into the cylinder. A transfer pump supplies fuel to the manifold from which the injection pumps get fuel. Before the fuel is delivered to the manifold, it is filtered first by a primary filter which removes dirt particles, and later by a final filter which removes more minute particles. The transfer pump can supply more fuel than is required for injection, so a bypass valve is built into the pump. The valve limits the maximum pressure within the supply system. The injection pumps receive fuel from the manifold and force it under high pressure to the injection valves. The injection valves spray atomized fuel into the precombustion chambers. An air vent valve in the system permits removal of air. Air is removed by opening the valve and pressurizing the fuel system. The system is pressurized by using the hand priming pump (mounted on the engine). The vent valve must be open until a stream of fuel, without air bubbles, flows from the vent line. Refer to figure 1-5 for fuel distribution diagram.

1-14. ENGINE ELECTRICAL SYSTEM (16-19, figure 1-2). The engine 24-volt electrical system consists of an alternator, alternator regulator, starting motor, and two 12 volt batteries. The alternator restores electrical energy to the batteries and supplies electrical power to meet the load demands of the engine and accessories when the air compressor unit is operating. The batteries supply power to the starting motor and to the electrical accessories when the unit is not operating. The alternator regulator opens and closes the field circuit, prevents overcharging of the batteries and damaging high voltage in the system, and maintains the alternator output within its rated limits. The starting motor engages the ring gear on the flywheel and turns the engine crankshaft for starting. Refer to wiring diagram figure 1-6.

1-15. COMPRESSOR UNIT ELECTRICAL GROUP (3, figure 1-2). The unit electrical group consists of the instrument panel wiring and interconnecting wiring harness. Refer to figure 1-6, wiring diagram.

1-16. ENGINE AND ACCESSORIES (21, figure 1-2). The engine is a four-stroke cycle, six cylinder, turbocharged, diesel engine. Inlet air, filtered by the dry-type air cleaner, is compressed by the turbocharger before entering the engine cylinders. The turbocharger is driven by the engine exhaust. A plunger and barrel-type injection pump meters and pumps filtered fuel to a precombustion chamber for each cylinder under high pressure. A hydra-mechanical governor controls the fuel injection pump out-put to maintain a constant engine RPM under varying work loads. A speed limiting device, in the governor, limits engine speed until engine oil pressure builds up. The starting system is direct electric and uses a 24-volt starting motor. Coolant for the engine is used to cool the engine lubricating oil. A full-flow temperature regulator, in the cylinder head at the front of the engine, provides for quick engine warm-up, and allows free circulation of coolant after operating temperature has been reached. Lubrication for the engine is supplied by a gear-type pump. The pump provides full pressure lubrication to the engine internal and external parts. The lubricating oil is both cooled and filtered. Bypass valves in the oil filter assembly provide unrestricted flow of lubricating oil to the engine parts when oil viscosity is high or, if either the oil cooler or the oil filter element should become clogged.

1-17. CHASSIS AND RUNNING GEAR (22-26, figure 1-2). The welded steel frame chassis, on which all major components are mounted, is supported by a four wheel trailer-type running gear. The chassis is provided with a centered lifting frame. The lifting frame permits attachment of cables for hoisting the complete unit vertically without damage. The running gear is equipped with leaf spring suspension and pneumatic tires. A towbar is attached to the front steerable axle assembly. The rear axle incorporates a hand operated parking brake. The towbar is equipped with a lunette eye and safety chains for attachment to the towing vehicle. The steerable front axle assembly is designed to provide a turning angle of 35^{o} either left or right.

1-18. COLD WEATHER STARTING AID (27, figure

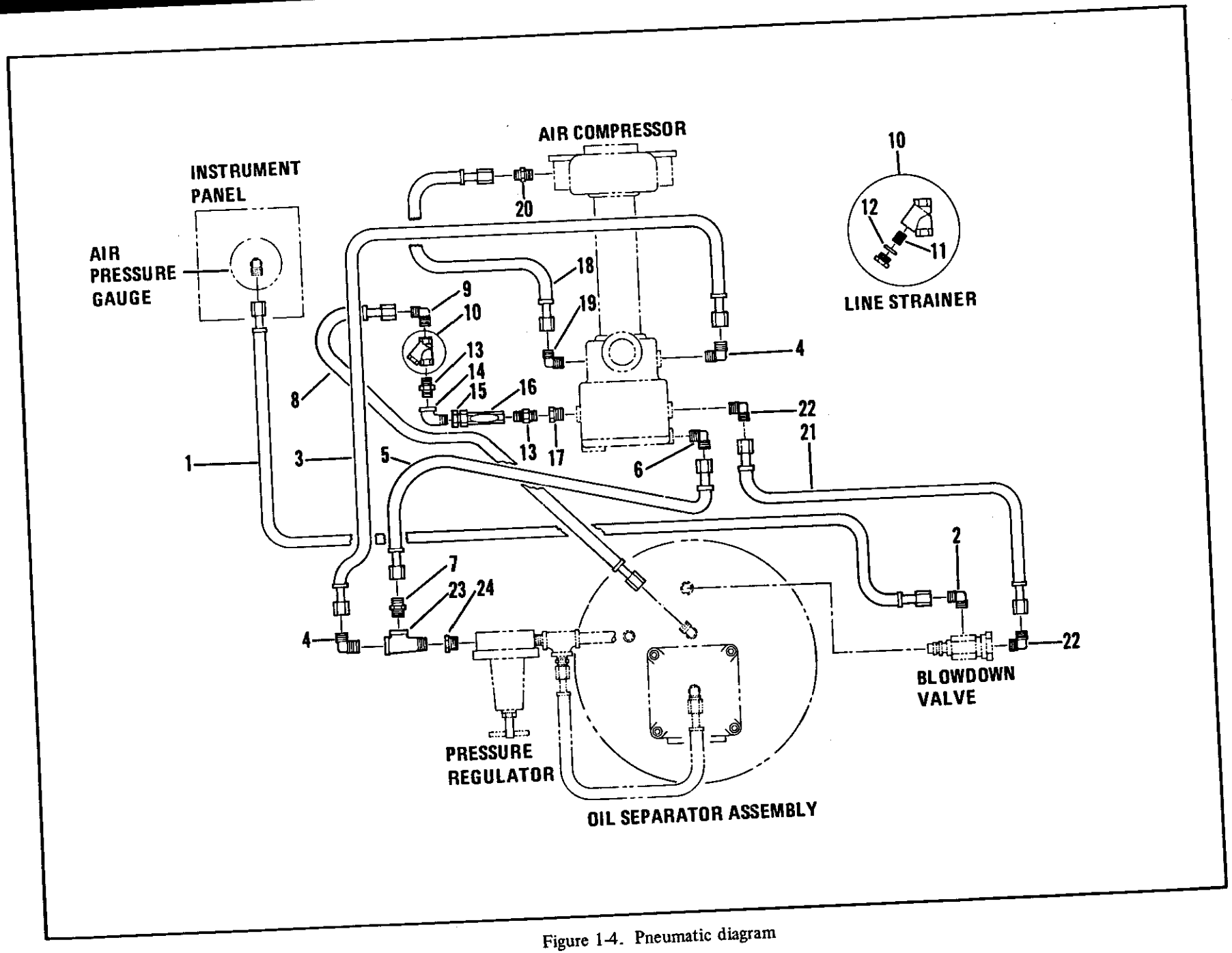


Figure 1-4. Pneumatic diagram

KEY to figure 1-4:

1. Hose assembly (blowdown valve to air pressure gauge)
2. Elbow
3. Hose assembly (pressure regulator to compressor intake)
4. Elbow
5. Hose assembly (pressure regulator to intake control)
6. Elbow
7. Connector
8. Hose assembly (separator to intake control)
9. Elbow
10. Line strainer
11. Screen element
12. Preformed packing
13. Nipple
14. Elbow
15. Restricted adapter
16. Flow sight gauge
17. Reducing bushing
18. Hose assembly
19. Elbow
20. Connector
21. Hose assembly (intake control to blowdown valve)
22. Elbow
23. Street tee
24. Reducing bushing

1-2). A cold weather starting aid is provided to aid in starting the engine when ambient temperature is below +32°F. This aid consists of a highly combustible ether base mixture stored in a metal cylinder. The cylinder has a capacity of 790 cubic centimeters and is approximately 95 percent expendable. The fuel cylinder mounts on a valve which is actuated by a control cable mounted to the instrument panel (QUICK START). Each actuation of the valve lever injects a measured shot of 5 cubic centimeters of atomized fuel into the engine intake air stream. The fuel mixture travels via copper tubing from the valve to an atomizer fitting on the engine intake manifold. The engine also incorporates an aid for faster starting. This aid is the glow plugs which are mounted with their tips projecting into the precombustion chamber. The glow plugs are actuated by turning the HEAT-OFF-START switch to the HEAT position. The glow plugs are used when ambient temperature is below +60°F. Operation of the glow plugs is covered in detail in the operation section of this manual.

1-19. CONSUMABLE MATERIALS.

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

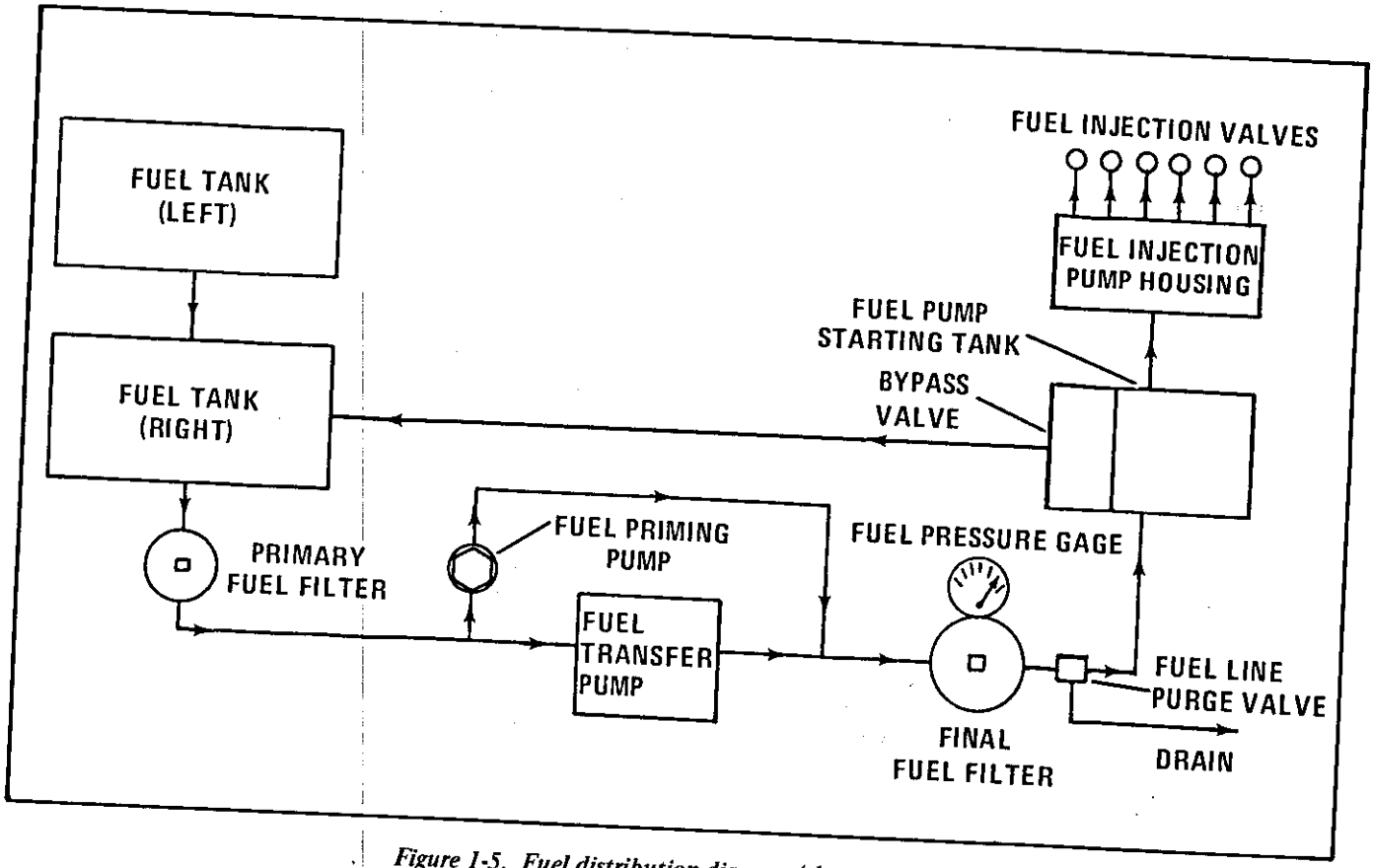
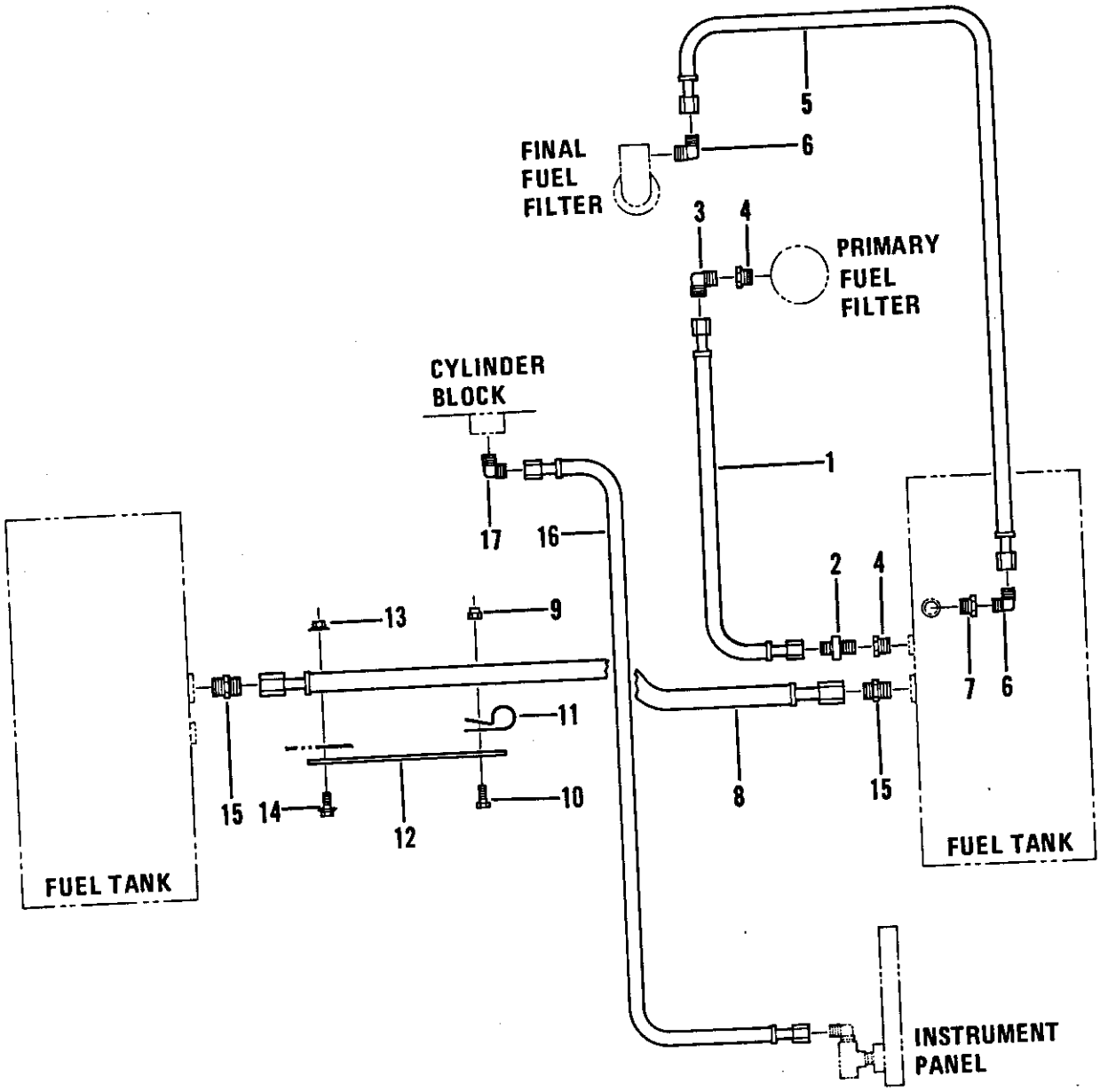
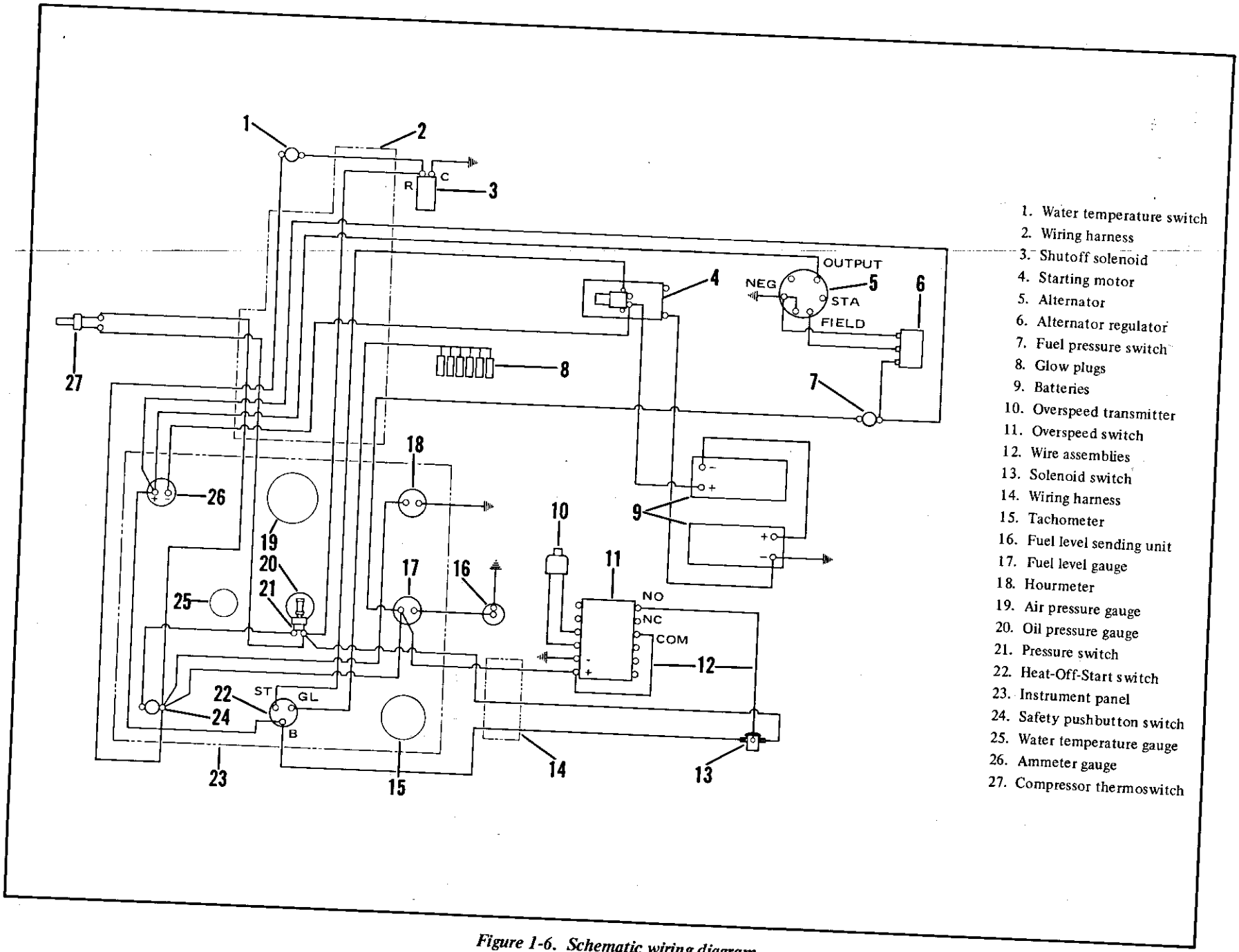


Figure 1-5. Fuel distribution diagram (sheet 1 of 2)



1. Hose assembly
2. Drain cock
3. Elbow
4. Bushing
5. Hose assembly
6. Elbow
7. Bushing
8. Hose assembly
9. Lock nut
10. Cap screw
11. Hose clip
12. Bracket
13. Nut
14. Screw
15. Adapter
16. Hose assembly
17. Elbow

Figure 1-5. Fuel distribution diagram (fuel hoses and fittings) (sheet 2 of 2)



1. Water temperature switch
2. Wiring harness
3. Shutoff solenoid
4. Starting motor
5. Alternator
6. Alternator regulator
7. Fuel pressure switch
8. Glow plugs
9. Batteries
10. Overspeed transmitter
11. Overspeed switch
12. Wire assemblies
13. Solenoid switch
14. Wiring harness
15. Tachometer
16. Fuel level sending unit
17. Fuel level gauge
18. Hourmeter
19. Air pressure gauge
20. Oil pressure gauge
21. Pressure switch
22. Heat-Off-Start switch
23. Instrument panel
24. Safety pushbutton switch
25. Water temperature gauge
26. Ammeter gauge
27. Compressor thermoswitch

Figure 1-6. Schematic wiring diagram

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	MIL-L-2104 MIL-L-2104 MIL-L-10295	OE/HDO 30 OE/HDO 10 OES	
Engine crankcase	Oil, lubricating, engine	MIL-L-2104 MIL-L-2104 MIL-L-10295	OE/HDO 30 OE/HDO 10 OES	
Lubrication fittings	Grease, multipurpose type	MIL-L-7866		
Fuel tank	Oil, fuel, diesel	No. 2 (ASTM Spec No. D396)		
Radiator	Antifreeze, arctic type	MIL-C-11755		
	Antifreeze, ethylene glycol, inhibited	O-A-548A		
Batteries	Electrolyte		MIL-STD-605	OS801
Air cleaner	Element			CD1626100-826
Engine oil filter	Element			2P4004
Final fuel filter	Element			1P2299
Oil separator	Element			48776

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 maintenance of the Model 1M750PVC Rotary Air Compressor Unit.

SECTION III
PREPARATION FOR USE AND SHIPMENT

3-1. PREPARATION FOR USE.

3-2. The Model 1M750PVC 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 12,000 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 unit lifting frame eye.

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. Remove and unpack the separately packed battery electrolyte.

WARNING

To prevent serious burns when filling batteries, take precautions against spilling electrolyte on clothing or allowing it to come in contact with skin or eyes. Use rubber gloves.

c. Remove battery cell filler caps and fill batteries with electrolyte to a level of approximately 3/8-inch above plates. Specific gravity must be 1.250 or higher when checked with a hydrometer. Install filler caps.

d. Refer to DA Form 2258, furnished with the unit, for depreservation.

e. 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.

f. Check tire pressure, refer to table 1-1.

g. Connect the battery cables, refer to figure 1-6.

h. Remove the fuel tank filler cap and fill fuel tanks. Fuel tanks are cross connected. Filling one will fill the other. Unit may be filled from either side. Refer to table 1-1 for capacity and recommended fuel. Install filler caps.

i. Remove radiator filler cap and fill radiator with coolant mixture in accordance with table 3-1. Coolant level shall be 2 inches below filler neck. Install filler cap. The unit is shipped from the factory with coolant drained from the radiator and engine. Refer to table 1-1 for capacity.

j. Perform all before operation maintenance services. Refer to table 5-1.

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

3-5. PREPARATION FOR SHIPMENT.

3-6. Preparation for shipment and storage of the air compressor unit shall be in accordance with DA Form 2258 furnished with the unit. Pertinent details are described below.

a. Raise tow bar to vertical position and latch. Secure safety chains to tow bar.

b. Remove radiator cap, open radiator drain and engine block drain; drain all coolant from the system. Leave drain valves open 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 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. Fill oil separator tank to operating level with type P-10 preservative oil and install filler plug.

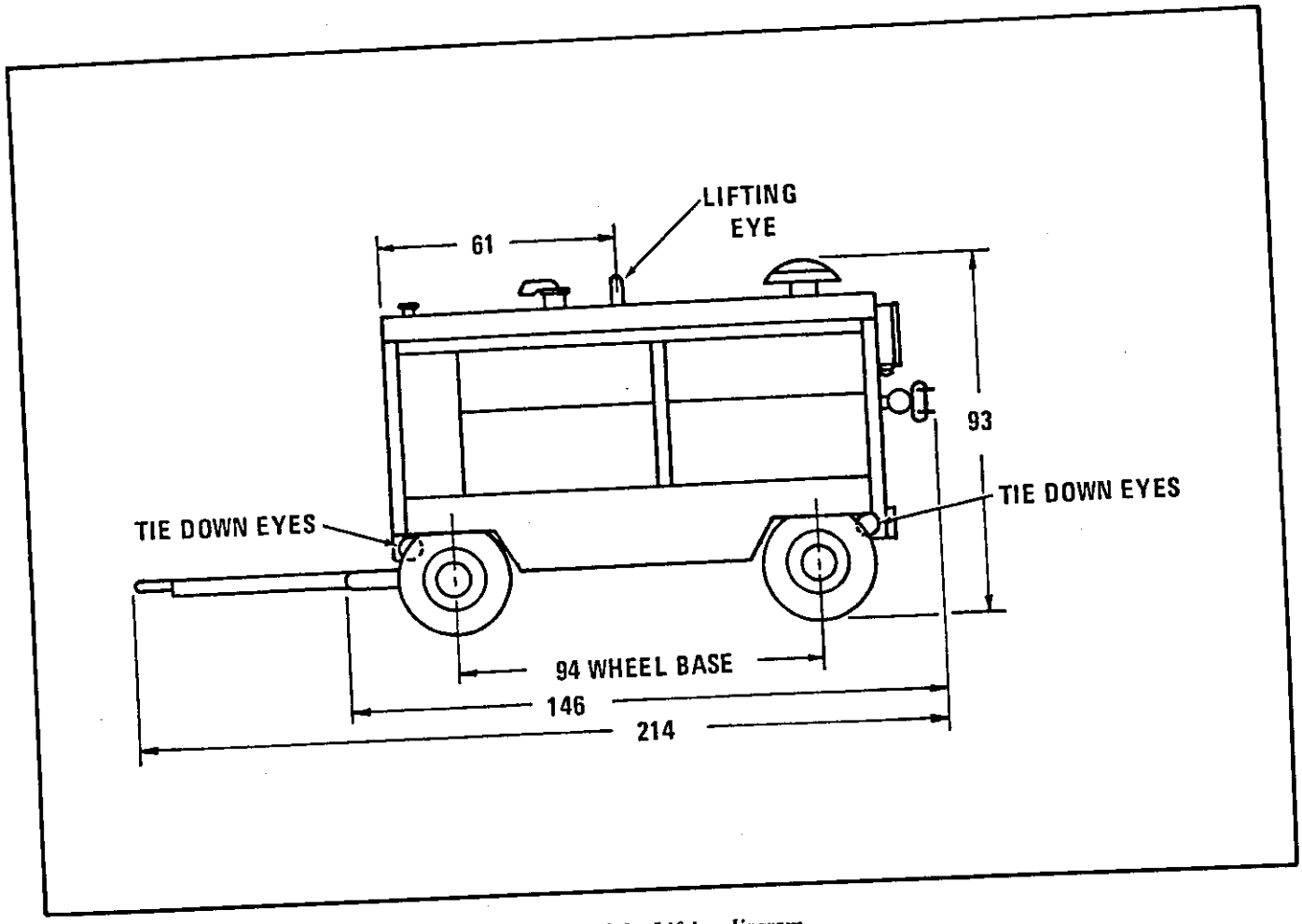


Figure 3-1. Lifting diagram

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

LOWEST EXPECTED AMBIENT TEMP. °F	PINTS OF INHIBITED GLYCOL PER GALLON OF COOLANT[1]	COMPOUND, ANTIFREEZE ARCTIC[2]	ETHYLENE GLYCOL SOLUTION SPECIFIC GRAVITY AT 68°F[3]
+20	1-1/2	Issued full strength and ready mixed for 0° to -65°F temperatures for both initial installation and replenishment of losses.	1.022
+10	2		1.036
0	2-3/4		1.047
-10	3-1/4		1.055
-20	3-1/2		1.062
-30	4		1.067
-40	4-1/4		1.073
-50	Arctic		
-60	Anti-	DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE	
-75	freeze		
	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 or drops below, to as low -90°F.

[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.

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

e. Remove filler caps from each of the two fuel tanks. Remove drain plugs from each of the fuel tanks and drain all fuel from the tanks. Install drain plugs. Fill each tank to capacity with type P-10, grade 2, preservative oil. Again remove drain plugs and allow all preservative oil to drain from the tanks. Allow to stand with drain plugs removed until all oil flow ceases, then install drain plugs. Coat the drain plugs and filler caps with the preservative oil and install the filler caps.

f. Open drain valves on primary and final fuel filters and drain off fuel. Close the drain valves.

g. 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 injector 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 injector 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; then, continue preservation.

h. Remove the engine rocker arm cover, intake manifold, and exhaust manifold.

i. 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.

j. Manually depress 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.

k. 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.

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

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

n. Install intake manifold, exhaust manifold, and rocker arm cover. Attach a warning tag in a conspicuous location bearing the information "ENGINE PRESERVED; DO NOT CRANK."

o. After 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."

p. Remove the two dry-type air cleaner elements and spray the interior of the air cleaner housings with type P-10 preservative oil. Install the elements.

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

r. Remove the batteries, empty and discard electrolyte, install batteries. Cover terminals, battery vent-holes in filler caps, and cable lugs with tape conforming to type III, class 1, Specification PPP-T-60. Secure a new supply of electrolyte packaged and packed in accordance with Specification MIL-P-207 to the unit under the housing at a convenient location.

s. Coat the interior surfaces enclosed within brake-drum, such as brake cams, anchor pins, adjusting screws, and braking surfaces of the face of the brake-drum with a thin film of primer conforming to Specification TT-P-664. Care shall be exercised to prevent primer from contacting brake lining and rubber impregnated parts. Attach a warning tag in a conspicuous location bearing the information "BRAKEDRUMS PRESERVED; DO NOT APPLY BRAKES WHEN VEHICLE IS BEING MOVED." Towing shall be with a rigid tow bar or similar arrangement.

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

u. Seal all openings with tape conforming to Specification PPP-T-60, such as relief valve, service valves, dipstick, air intakes, engine exhaust stack, etc.

v. For shipment by common carrier, tires shall be inflated to 10 PSI above recommended pressure for maximum load. For storage, vehicle shall be blocked clear of the ground and tire pressure reduced to 10 ± 2 PSI.

SECTION IV
OPERATION INSTRUCTIONS

4-1. THEORY OF OPERATION.

4-2. These trailer mounted Rotary Air Compressors are diesel engine driven through a direct connected coupling arrangement. The air compressor is designed to deliver 750 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 four-stroke cycle 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 compressor air cleaner. The incoming air enters the stator bore through ports in the end covers 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 discharge piping to the air manifold and service 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 to 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 carryout 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 thermal bypass assembly and full flow oil filter prior to being injected into the compressor. When the oil reaches operating temperature, the thermal bypass assembly directs part or all of the oil to flow through the oil cooler before entering the oil filter. 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 blowdown 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 Model 1M750PVC 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 cleaners, oil filters, and compressor, and can result in an increase in maintenance problems.

a. Tow the compressor trailer unit to worksight and

select a location as near level as possible. Out-of-level shall not exceed 15 degrees in any direction.

b. Set the parking brakes.

c. Disconnect the safety chains and towbar from the towing vehicle. Secure the safety chains in bracket provided.

CAUTION

When housing side doors are open, make certain that they are secured properly.

d. Open all housing side doors.

e. Connect air hoses to service valves and 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.

f. Setup of the compressor unit for indoor operation is the same as described in steps 4-12a through 4-12e and observe the warning above.

g. Perform the before operation maintenance checks and services, refer to 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. OIL PRESSURE GAUGE (2, figure 4-1). This gauge indicates the engine lubricating oil pressure. Normal oil pressure reading is 45 to 55 PSI at 2100 RPM.

4-16. FUEL GAUGE (12, figure 4-1). This gauge indicates the fuel level in the fuel tanks. The sending unit is energized when the unit is started.

4-17. AMMETER (6, figure 4-1). The ammeter gauge indicates the rate of charge or discharge of the batteries.

4-18. WATER TEMPERATURE GAUGE (7, figure 4-1). This gauge indicates the temperature of the engine coolant. Normal operating range after warmup is 170° to 190°F.

4-19. AIR 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 115 to 120 PSI when running unloaded.

4-20. TACHOMETER (11, figure 4-1). This gauge indicates the speed of the engine in revolutions per minute (RPM). Normal operating range is from 1200 RPM idle to 2100 RPM full load.

4-21. HOURMETER (1, figure 4-1). This gauge indicates the running time of the unit. The gauge is calibrated in hours and tenths of hours.

4-22. LAMP SWITCH (4, figure 4-1). This switch controls the illuminating and extinguishing of the instrument panel lamp. The switch plate indicates the ON and OFF positions.

4-23. HEAT-OFF-START SWITCH (10, figure 4-1). This is a three-position, springloaded, return-to-center (OFF) type switch. The HEAT position applies electrical power to the engine glow plugs. The START position energizes the starting motor solenoid for cranking the engine.

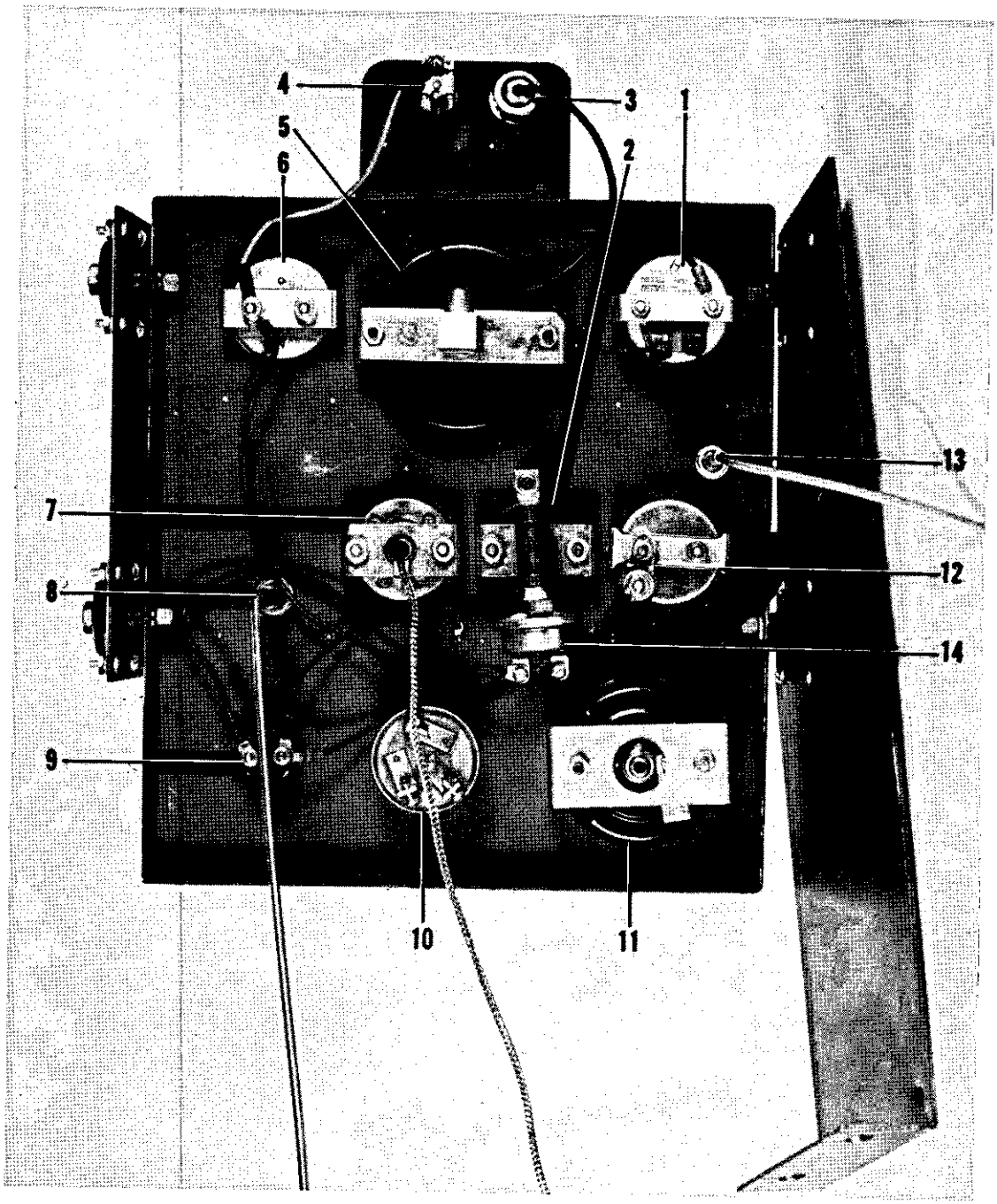
4-24. SAFETY PUSHBUTTON SWITCH (9, figure 4-1). This pushbutton type switch is pushed during starting and is used to override the engine oil pressure safety switch.

4-25. ENGINE STOP CONTROL CABLE (8, figure 4-1). This control cable shuts down the engine by mechanically moving the fuel rack to the extreme "fuel off" position when the cable handle is pulled to the full out position.

4-26. COLD WEATHER STARTING AID CONTROL CABLE (13, 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.

4-27. FUEL PRIMING PUMP (15, figure 4-1). This pump is used to purge air from the engine fuel lines by actuating the pump handle out and in.

4-28. ENGINE SPEED CONTROL LEVER (16, figure 4-1). This manually operated mechanical lever is turned to START position when starting the engine and turned to RUN position after warmup period. The action of the lever is to prevent engine from overspeeding when starting.



1. Hourmeter
2. Oil pressure gauge
3. Panel lamp
4. Lamp switch
5. Air pressure gauge
6. Ammeter gauge
7. Water temperature gauge
8. Engine stop control cable
9. Safety pushbutton switch
10. HEAT - OFF - START switch
11. Tachometer
12. Fuel level gauge
13. Starting aid control cable
14. Oil pressure switch
15. Fuel priming pump
16. Speed control lever
17. Unloader lever
18. Fuel pressure switch
19. Thermostatic switch
20. Water temperature switch
21. Overspeed switch

Figure 4-1. Controls and instruments (sheet 1 of 3)

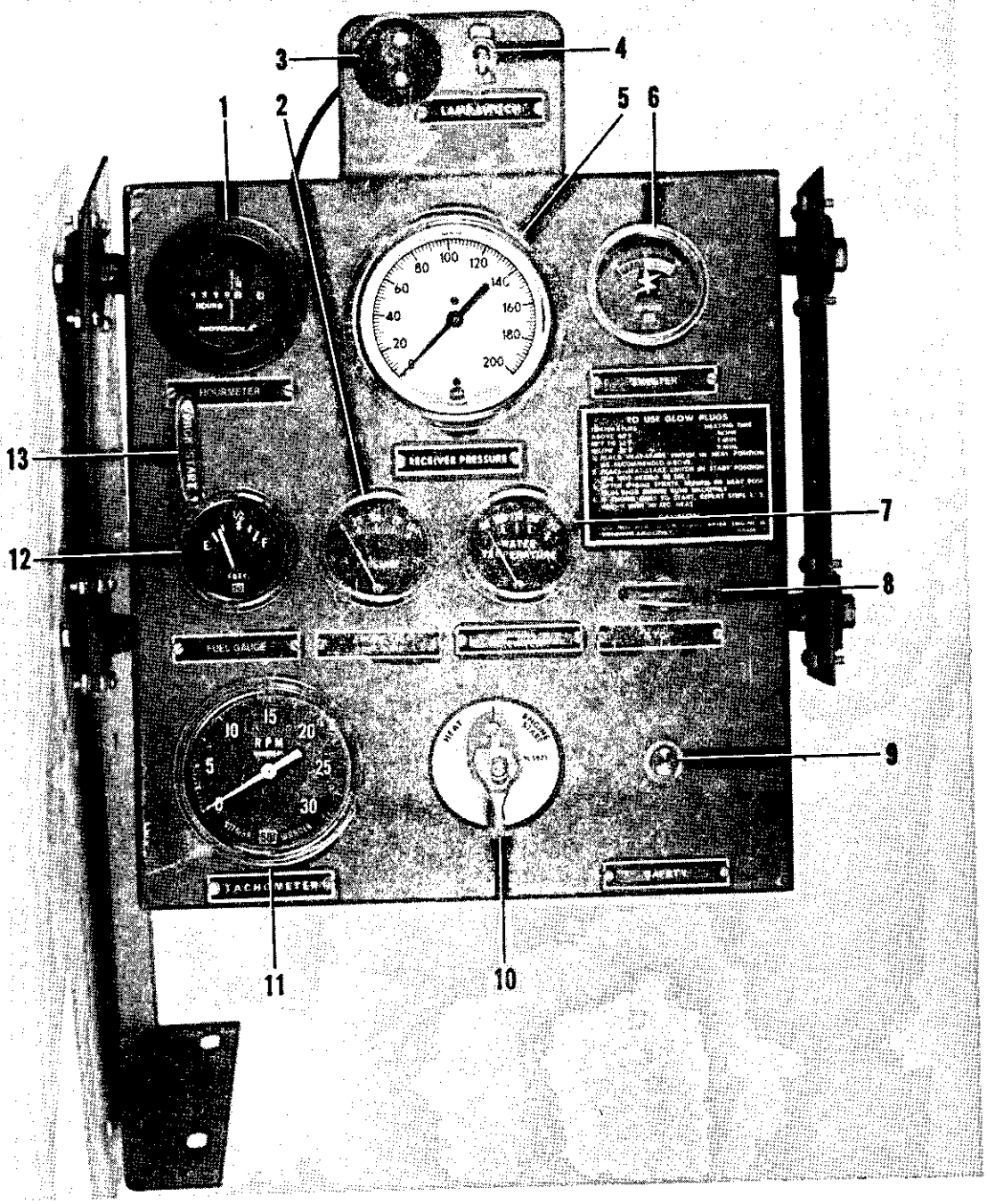


Figure 4-1. Controls and instruments (sheet 2 of 3)

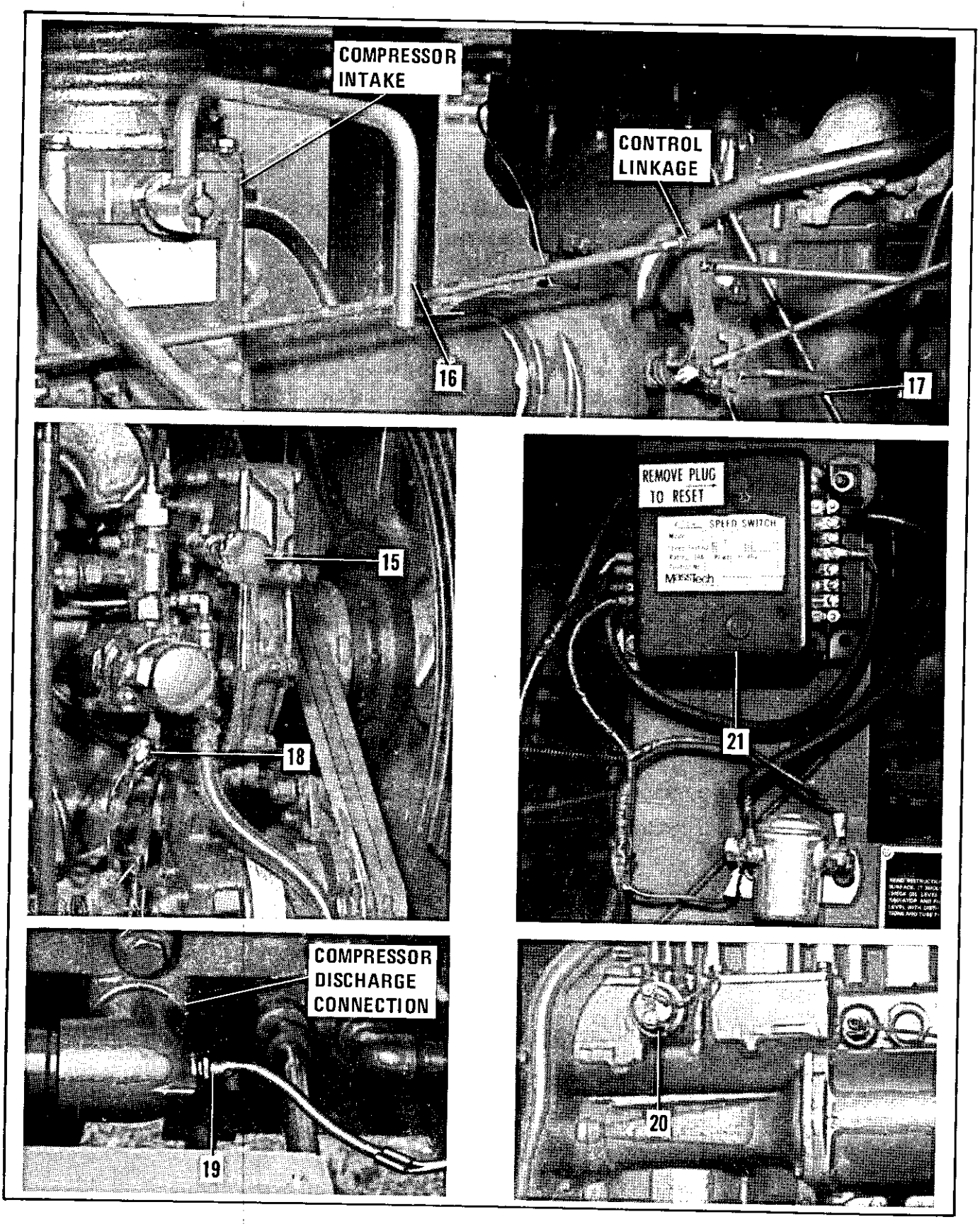


Figure 4-1. Controls and instruments (sheet 3 of 3)

4-29. COMPRESSOR UNLOADER LEVER (17, figure 4-1). This manually operated mechanical lever is turned to horizontal position to close intake damper valve permitting starting of engine with compressor in unloaded configuration. The lever is turned to vertical position after warm-up period. The action of the lever is for ease of starting.

4-30. SAFETY CIRCUIT SWITCHES.

4-31. The unit is equipped with safety devices which stop the engine when an adverse condition exists. These devices are explained in the following paragraphs.

4-32. FUEL PRESSURE SWITCH (18, figure 4-1). This pressure switch energizes when fuel pressure reaches 4 PSI and actuates the engine shutdown safety circuit. See figure 4-2.

4-33. ENGINE OIL PRESSURE SWITCH (14, figure 4-1). 4-1). This pressure switch is electrically connected to the engine fuel rack shutoff solenoid. The switch shuts the engine down when the engine oil pressure drops to an unsafe level. The safety pushbutton switch (10, figure 4-1) must be pressed when starting to override this switch.

4-34. THERMOSTATIC SWITCH (19, figure 4-1). This switch is a temperature sensing device which shuts down the engine if compressed air/oil mixture being discharged from the compressor reaches an unsafe temperature of 230°F to 240°F. The switch is connected to the engine fuel rack shutoff solenoid.

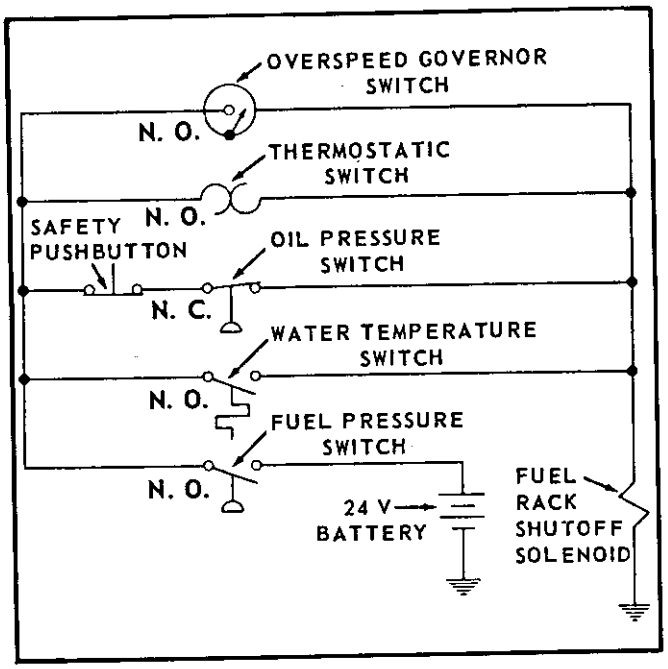


Figure 4-2. Engine shutdown safety circuit

4-35. ENGINE WATER TEMPERATURE SWITCH (20, figure 4-1). This switch is a temperature sensing device which shuts down the engine if coolant temperature reaches an unsafe high temperature. The switch is electrically connected to the engine fuel rack shutoff solenoid.

4-36. ENGINE OVERSPEED SWITCH (21, figure 4-1). This is an electronic device with transmitter connected to the tachometer drive adapter and is used to shut down the engine if the RPM reaches an unsafe level of RPM. The overspeed switch incorporates a manual reset button which must be pressed to reset switch if activated due to high speed.

4-37. STARTING THE EQUIPMENT.

4-38. When ready to start the equipment, all steps of paragraph 4-12 having been performed, the following procedures shall be followed in sequence.

WARNING

Continuous 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, FSN 4240-861-3612. Operator and crew should wear ear protection devices when working within 12 feet of the unit when the unit is in operation.

a. Open air discharge service valves.

b. Turn engine speed control lever to START position.

c. Pull the engine stop cable to full out position.

d. Turn compressor unloader lever to horizontal (closed) position.

e. Turn HEAT-OFF-START switch to START position and allow engine to crank for approximately three seconds. Release switch to OFF position. Push engine stop cable to full in position.

f. Open vent valve on top of final fuel filter. Unlock priming pump handle and actuate handle until a stream of fuel, without air bubbles, flows from vent line. Close vent valve. Actuate pump handle a few more times until pressure is indicated on fuel pressure gauge. Lock priming pump handle in rest position.

g. If ambient air temperature is below +60°F, turn HEAT-OFF-START switch to HEAT position as recommended in table 4-1.

h. After indicated HEAT time has elapsed, turn HEAT-OFF-START switch to the START position and press and hold the safety pushbutton switch. If ambient air temperature is +32°F or below, actuate the cold weather starting aid.

CAUTION

Do not heat glow plugs after engine is running smoothly or has reached operating temperature. If engine does not start after cranking for 30 seconds, release start switch and allow starting motor to cool for two minutes before attempting another start.

Table 4-1. Starting Aid Chart

AMBIENT TEMPERATURE	GLOW PLUG HEAT TIME	COLD WEATHER STARTING AID
Above +60°F	None	No
+60°F to +32°F	1 to 2 minutes	No
+32°F to 0°F	1 to 2 minutes	Yes*
Below 0°F	1 to 3 minutes	Yes*

* **CAUTION**

If ambient air temperature is +32°F or below, use only one shot of starting aid fuel. Excessive use of starting aid fuel can cause serious damage to the engine. Inject starting aid fuel ONLY when engine is cranking.

i. When engine starts, turn HEAT-OFF-START switch to HEAT position until engine is running smoothly, then release switch to OFF position. Release safety pushbutton switch when engine oil pressure is normal.

CAUTION

If engine oil pressure is not indicated within approximately three seconds after engine starts, pull the engine stop cable out and determine cause.

j. Allow engine to run for approximately five minutes to stabilize temperatures; then, close discharge service valves and turn engine speed control lever to RUN position.

k. When compressor unloads turn compressor unloader lever to vertical (open) position and allow unit to run unloaded until engine water temperature reaches 140°F. Check readings on all instrument panel gauges. The unit is now ready for use.

l. Under normal operating conditions, gauge readings should be as follows:

Engine RPM ..... 1200 idle-2100 full load

Engine oil pressure
normal at 2100 RPM ..... 45-55 PSI

Water temperature normal ..... 170°-190°F

Air pressure
normal range ..... 80-105 PSI Loaded
115-120 PSI Unloaded

m. While the unit is in use, operation is automatic in direct relation to air demand. As demand increases, the engine will accelerate and the compressor will replenish compressed air supply in separator tank. As demand decreases, or stops, engine will return to idle and compressor will run in an unloaded condition until demand for air again causes unit to load.

4-39. STOPPING THE EQUIPMENT.

4-40. 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. Unlock and pull engine stop cable to the full out position. This action moves the engine governor control lever to shut-off position.

d. When engine stops, the compressor will automatically blow down air from the compressor system. Push in and lock engine stop cable.

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

SECTION V
MAINTENANCE INSTRUCTIONS

5-1. MAINTENANCE INSTRUCTIONS.

5-2. This section contains instructions essential for maintenance of the Model 1M750PVC, Rotary Air Compressor unit within the scope of the operator, 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 4-38 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 tachometer indicates an idle speed higher than 1200-1300 RPM with air discharge valves closed and compressor running unloaded, adjust the speed control linkage as follows:

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

NOTE

Make certain that RUN-START speed control lever is in the RUN position.

b. Hold control rod, loosen lock nuts on each side of the block and move control as required to set engine idle speed at 1200 RPM. Observe speed on Tachometer. Tighten the lock 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 1200 RPM with compressor running unloaded. Readjust as described in steps above as necessary. Stop the unit (refer to paragraph 4-39).

5-6. AIR PRESSURE REGULATOR ADJUSTMENT. (See figure 5-2). If the air pressure gauge indicates a reading other than 115-117 PSI when unit is running in the unloaded configuration, and the engine idle speed is 1200 to 1300 RPM, make adjustment of air pressure regulator as follows:

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

NOTE

Make certain that RUN-START speed control lever is in the RUN position.

b. With air discharge service valves closed, and engine operating at idle speed of 1200 RPM, adjust air pressure regulator to obtain a reading of 115-117 PSI on air pressure gauge. If air pressure rises above 117 PSI, turn handle on regulator 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 (refer to paragraph 4-39).

5-7. INSPECTION AND PREVENTIVE MAINTENANCE.

5-8. Preventive maintenance checks, services, and inspection within the scope of operator, 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 engine is equipped with a service meter. The meter is located on the right side of the engine timing gear housing. It is geared to the engine, and when the crankshaft turns as many revolutions as are made in an hour at average operating speed on an average job application, the dial advances one number. There are some applications that will result in either a lower or higher than normal average engine speed. Under these conditions, the advance in the service meter reading will differ from the number of clock hours of operation. Maintenance and lubrication instructions are given in this manual in service hours and not clock hours.

5-9. LUBRICATION INSTRUCTIONS.

5-10. Points of lubrication, type of lubricant, application method, and interval is listed in table 5-2.

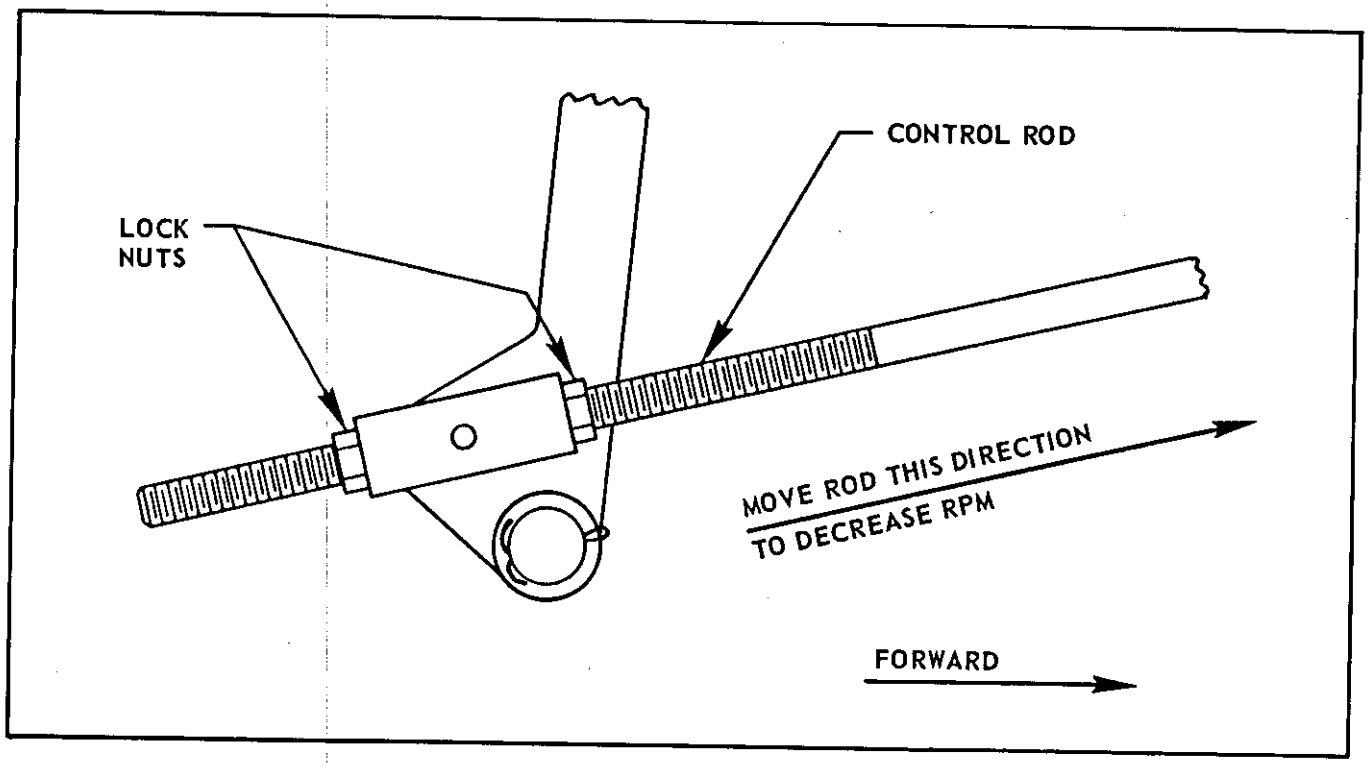


Figure 5-1. Speed control linkage adjustment

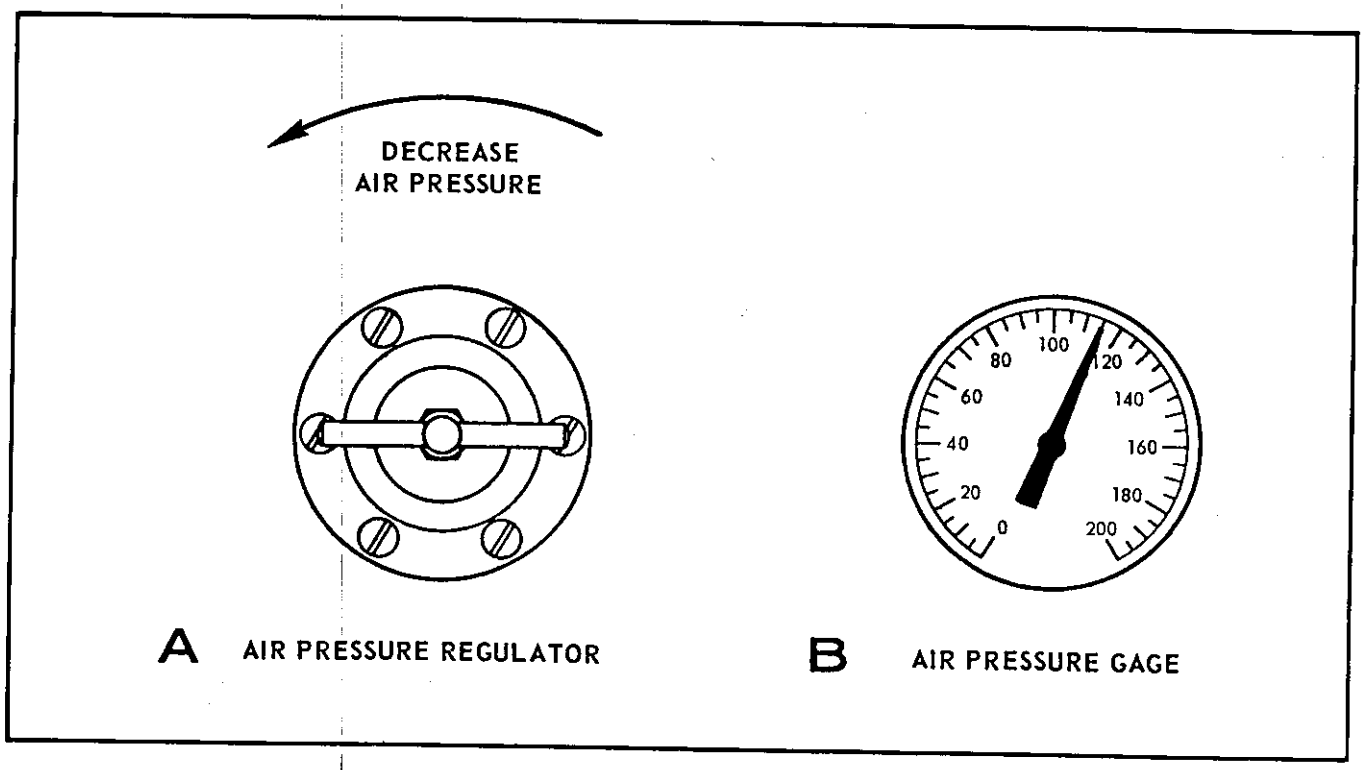


Figure 5-2. Air pressure regulator adjustment

Table 5-1. Preventive Maintenance Checks and Services

INTERVAL						B - Before operation D - During operation	A - After operation W - Weekly	M - Monthly Q - Quarterly
OPERATOR			ORG					
DAILY								
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE	
X						Radiator and oil cooler assembly.	Check engine coolant level. Proper level is 2 inches below filler neck.	
			X				Check radiator, hoses, and connections for leaks or defects.	
				X			Check antifreeze specific gravity when operating in temperatures below +32°F.	
X						Fuel tanks.	Check fuel level. Use gauge on instrument panel. Press safety pushbutton to energize sending unit.	
X						Engine crankcase.	Check oil level with dipstick gauge. Fill as necessary.	
				X	X		Change oil every 250 service hours. NOTE: If sulphur content of diesel fuel being used is greater than 0.4 percent, change oil every 125 service hours.	
				X	X		Clean crankcase breather. Wash with clean kerosene or diesel fuel.	
X						Oil separator.	Check oil level. Fill to overflow, as required.	
					X		Change oil every 500 service hours. Change element every 4000 hours.	
				X	X	Engine oil filters.	Change filter elements every 250 service hours (each time engine oil is changed).	
				X	X	Compressor oil filter.	Clean filter element every 100 service hours and each time compressor oil is changed.	
			X	X	X	Primary fuel filter.	Clean and inspect filter element every 100 service hours.	
			X	X	X	Final fuel filter.	Drain every 50 service hours when operating in temperatures of +32°F and above. Drain every 10 service hours when operating below +32°F.	

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			ORG					
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE	
				X		Final fuel filter (Cont).	Change filter element and gaskets.	
X				X	X	Drive belts.	Check for worn, frayed, or cracked belts.	
			X	X	X		Check for proper adjustment.	
			X	X	X	Batteries.	Check battery mountings and cable connections. Check electrolyte level. Correct level is 3/8-inch above plates. Remove corrosion from terminals and lubricate.	
			X				Clean filler cap vent holes. Make hydrometer test.	
X							Check general condition.	
X	X				X	Speed control linkage.	Check linkage for freedom of movement.	
			X	X	X		Lubricate linkage.	
				X	X		Check adjustment.	
			X	X	X	Air cleaners.	Clean element and body. Inspect element for damage. Replace element after eight cleanings.	
X		X		X	X	Controls and instruments.	Check for any damage and loose mounting.	
	X			X	X		Check for proper operation. Normal readings are: Engine oil pressure: 45-55 PSI Tachometer: Idle ..... 1200 RPM Governed speed ..... 2100 RPM Water temperature: 170° - 190°F Air pressure: 80-105 PSI (loaded) 115-117 PSI (unloaded)	
	X			X	X	Engine assembly.	Check for even running and exhaust smoke for improper combustion.	

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			ORG					
DAILY								
B	D	A	W	M	Q	ITEM TO BE INSPECTED	PROCEDURE	
				X	X	Engine assembly (Cont).	Check engine mounting. Check cylinder head bolt torque. Check and clean fuel injection valves. Check glow plugs for operation.	
					X		Check valve clearances and valve rotators every 2000 service hours or 1 year.	
	X		X	X	X	Tires.	Check inflation. Proper pressure is 70 PSI. Check for missing valve caps and tire wear.	
			X	X	X	Brake system.	Check parking brake operation and adjustment.	
				X	X		Lubricate parking brake mechanism.	
					X		Check lining wear. Check for cracks or defects. Make brake adjustment.	
				X	X	Axles and steering.	Check tierod adjustment and axles for damage. Lubricate steering components.	
				X	X	Springs.	Check for broken leafs or mounting hardware. Lubricate springs.	
					X	Wheel bearings.	Remove, clean, inspect, install, and pack with lubricant.	
X			X	X	X	Cold weather starting aid.	Weigh fuel cylinder. Full cylinder weighs 37 ounces. Fuel consumption is 5cc per shot, allow 39cc per ounce to determine shots remaining.	
X		X	X	X	X		Check cylinder for hand tightness in valve.	
			X	X	X		Clean orifice.	

Table 5-2. Lubrication Instructions

LUBRICATION POINT	LUBRICANT (SPECIFICATION)	APPLICATION (OR ACTION)	INTERVAL (SERVICE HOURS)
ENGINE:			
Dipstick		Check oil level.	10
Crankcase	* OE/HDO 30-Oil MIL-L-2104	Drain and change oil.	250
Oil filter		Change element.	250
Fan hub	Grease MIL-L-7866	Grease gun.	500
Tachometer drive	Grease MIL-L-7866	Grease gun.	1000
COMPRESSOR:			
Oil filter		Change element.	100
Control linkage	OE/HDO 30-Oil MIL-L-2104	Oil can (sparingly).	100
Service valve	OE/HDO 30-Oil	Oil can (sparingly).	100
Oil separator		Check oil level.	10
Separator tank	* OE/HDO 30-Oil MIL-L-2104	Drain and change oil.	500
Separator element		Replace.	4000
UNDERCARRIAGE:			
Hand brake lever and linkage	OE/HDO 30-Oil MIL-L-2104	Oil can (sparingly).	50
Steering tongue pivot	Grease MIL-L-7866	Grease gun.	250
Tie rod ball joints	Grease MIL-L-7866	Grease gun.	250
Center steering arm	Grease MIL-L-7866	Grease gun.	250
Steering knuckles	Grease MIL-L-7866	Grease gun.	250

Table 5-2. Lubrication Instructions (Cont)

LUBRICATION POINT	LUBRICANT (SPECIFICATION)	APPLICATION (OR ACTION)	INTERVAL (SERVICE HOURS)
UNDERCARRIAGE (Cont):			
Parking brake cables and actuating mechanism	Grease MIL-L-7866	Grease gun.	250
Wheel bearings	Grease MIL-L-7866	Hand pack.	1000

* OE/HDO 30 used in temperatures +125 to +32°F
OE/HDO 10 used in temperatures +32 to -10°F
OES MIL-L-10295 for temperatures -10° to -25°F

5-11. TROUBLESHOOTING.

5-12. Table 5-3 provides information useful in diagnosing and correcting unsatisfactory operation or failure of the Model 1M750PVC Rotary 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. Corrective action whichis beyond the scope of operator, organizational and intermediate maintenance personnel shall be referred to overhaul personnel.

5-13. REPAIR.

5-14. The following paragraphs cover disassembly, cleaning, inspection, repair or replacement, tolerances, assembly, and alignment of repairable components within the scope of operator, organizational and intermediate maintenance personnel. Repair beyond this scope shall be referred to overhaul personnel. Reference Overhaul Instructions, Part 2 and Illustrated Parts Breakdown, Part 3, of this manual.

5-15. GENERAL CLEANING.

5-16. Clean all metal parts using a cleaning solvent that is in accordance with Federal Specification P-D-680. Specific cleaning instructions which differ from this general method are described in the following paragraphs for that particular component.

5-17. DISASSEMBLY, INSPECTION, AND ASSEMBLY.

5-18. RADIATOR HOSES AND DRAIN (Figure 5-3). Remove the radiator cap to allow a free flow of coolant from radiator drain and disassemble parts in the following sequence, as necessary.

a. Open drain cock (1, figure 5-3) and drain coolant from radiator. As necessary, remove drain cock (1), coupling (2), nipple (6), elbow (7), nipple (8), elbow (9), nipple (10), and bushing (11). Remove lock nut (4), and cap screw (5) to remove bracket (3). Inspect fordamaged threads and cracks. Replace all damaged drain components.

b. Loosen hose clamps (13) and remove upper radiator hose (12). Inspect hose for breaks and hardening. Inspect clamps for damage. Replace defective hose and clamps.

c. Loosen hose clamps (23) and remove lower radiator hose (22). Inspect hose for breaks and hardening. Inspect clamps for damage. Replace defective hose and clamps.

d. If necessary because of leakage, remove cap screws (15), lock washers (16), and radiator flange (14). Replace gasket (17). Remove cap screws (19), lock washers (20), and blank plate (18). Replace gasket (21).

e. Assemble the radiator hoses and drain in the reverse of above disassembly. Replenish coolant supply, refer to paragraph 3.4.i.

5-19. ENGINE OIL FILLER ASSEMBLY (Figure 5-4). As necessary for repair disassemble engine oil filler in following sequence.

a. Unscrew and remove cap assembly (1, figure 5-4).

b. Remove cap screws (2), lock washers (3), and flat washers (4). Remove pipe (5) from engine. Remove gasket (6).

1. Drain cock
2. Coupling
3. Bracket
4. Lock nut
5. Cap screw
6. Pipe nipple
7. Pipe elbow
8. Pipe nipple
9. Pipe elbow
10. Pipe nipple
11. Reducing bushing
12. Upper radiator hose
13. Hose clamps
14. Radiator flange
15. Cap screw
16. Lock washer
17. Flange gasket
18. Blank plate
19. Cap screw
20. Lock washer
21. Gasket
22. Lower radiator hose
23. Hose clamps
24. Radiator

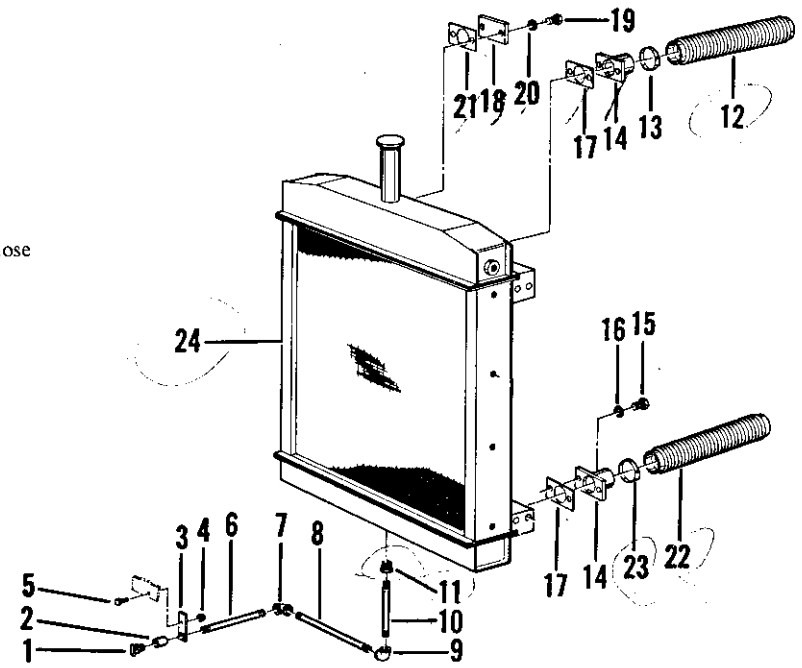


Figure 5-3. Radiator hoses and drain

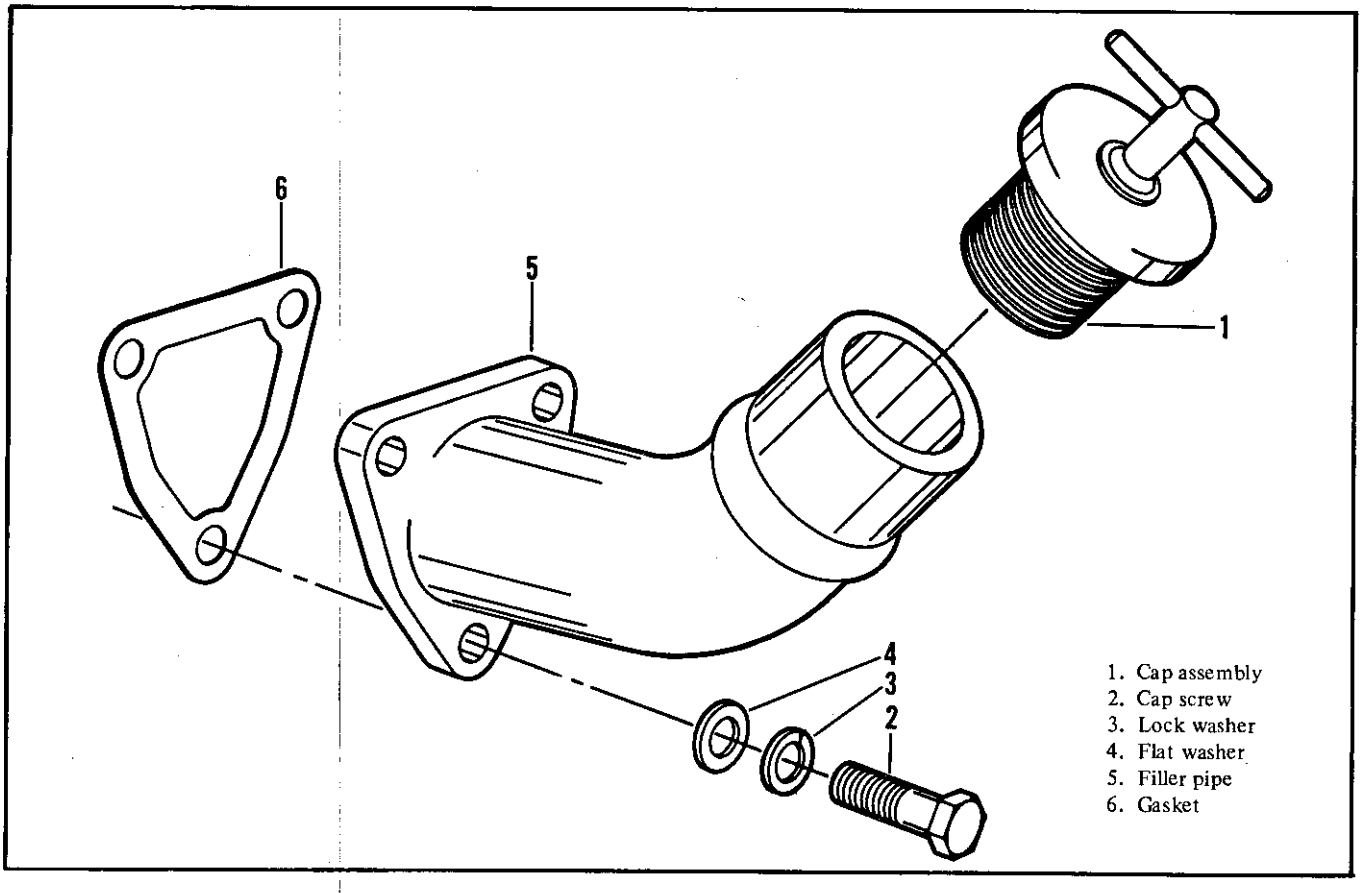


Figure 5-4. Engine oil filler assembly

Table 5-3. Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
Engine will not crank.	a. Weak or dead batteries.	a. Charge or replace batteries.
	b. Battery cable connections loose or terminals corroded.	b. Clean terminals and tighten connections.
	c. Defective HEAT-OFF-START switch.	c. Replace switch.
	d. Defective starting motor.	d. Repair starting motor.
Engine cranks but will not start or is hard to start.	a. Engine stop control is in stop position.	a. Push stop control cable in and lock.
	b. Fuel tanks empty.	b. Fill fuel tanks and prime fuel system.
	c. Water or dirt in fuel system.	c. Drain fuel tanks, fill with clean fuel, clean fuel lines, service fuel filters, and prime the fuel system.
	d. Clogged fuel filters.	d. Service the filters.
	e. Defective fuel transfer pump.	e. Repair the fuel transfer pump. Refer to overhaul.
	f. Air in fuel system.	f. Purge fuel lines using hand primer pump. Tighten connections.
	g. Overspeed switch tripped due to high engine speed.	g. Press reset button and overspeed switch.
	h. Engine air cleaner dirty or clogged.	h. Service air cleaner.
	i. Fuel rack solenoid sticking.	i. Repair or replace solenoid.
	j. Fuel bypass valve sticking open.	j. Replace fuel bypass valve.
	k. Valve clearances incorrect.	k. Adjust valve clearances.
	l. Defective turbocharger.	l. Repair turbocharger.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine cranks but will not start or is hard to start (Cont).	m. Safety pushbutton switch not being pushed with HEAT-OFF-START switch turned to START.	m. Push safety pushbutton simultaneously with the turning of switch to START position.
	n. No engine oil pressure.	n. Check oil level and fill as necessary. If oil pump defective, refer to overhaul.
	o. Defective safety shutoff system switches.	o. Replace all defective switches. Refer to figure 4-2.
Engine misses or runs erratically.	a. Engine too cold to run loaded compressor.	a. Allow engine to reach operating temperature before loading compressor.
	b. Water in fuel system.	b. Drain fuel system, service fuel filters, fill with clean fuel, and prime system with hand priming pump.
	c. Air in fuel system.	c. Purge lines using hand priming pump. Tighten connections.
	d. Defective fuel transfer pump.	d. Repair or replace pump. Refer to overhaul.
	e. Fuel lines leaking or cracked.	e. Tighten connections. Replace defective lines.
	f. Valve clearances incorrect.	f. Adjust valve clearances.
	g. Defective fuel injection nozzle or fuel injection pump.	g. Operate engine at speed where defect is most noticeable. Momentarily loosen fuel line nut on each injection pump, one at a time, to cut out that cylinder. If one is found where loosening nut makes no difference in irregular operation, replace nozzle or pump for that cylinder. Refer to overhaul.
	h. Defective fuel bypass valve.	h. Repair or replace fuel bypass valve.
Engine lacks power.	a. Fuel filters dirty or clogged.	a. Service fuel filters.
	b. Engine air cleaner clogged.	b. Service air cleaner.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine lacks power (Cont).	c. Valve clearances incorrect.	c. Adjust valve clearances.
	d. Air in fuel system.	d. Purge lines using hand priming pump.
	e. Defective fuel injection nozzle or fuel injection pump.	e. Operate engine at speed where defect is most noticeable. Momentarily loosen fuel line nut at each injection pump, one at a time, to cut out that cylinder. If one is found where loosening nut makes no difference in improper operation, replace nozzle or pump for that cylinder. Refer to overhaul.
	f. Fuel contaminated or improper grade.	f. Drain fuel system, service fuel filters, and fill with clean, proper grade of fuel.
	g. Defective fuel pump.	g. Repair fuel transfer pump. Refer to overhaul.
	h. Turbocharger carboned or otherwise dragging.	h. Repair turbocharger.
	i. Fuel bypass valve defective.	i. Repair fuel bypass valve.
	j. Speed control linkage out of adjustment.	j. Adjust speed control linkage.
Engine knocks, develops excessive noise, or vibration.	a. Engine oil level low.	a. Fill crankcase to full mark on dipstick.
	b. Improper fuel grade.	b. Drain fuel tanks. Fill tanks with proper grade of fuel.
	c. Valve clearances incorrect.	c. Adjust valve clearances.
	d. Low engine operating temperature.	d. Replace water temperature regulator.
	e. Engine mounting bolts loose.	e. Tighten engine mounting bolts.
	f. Compressor vibrating.	f. See Noisy Compressor Operation.
	g. Loose pulley and damper.	g. Tighten pulley and damper.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine knocks, develops excessive noise, or vibration (Cont).	h. Fan blade unbalanced.	h. Loosen or remove fan belts. Operate engine for short duration at affected speed range. If vibration is not present, replace fan.
	i. Defective fuel injection pump or nozzle.	i. Run engine at speed where defect is most noticeable. Momentarily loosen fuel line nut on each injection pump, one at a time, to cut out that cylinder. If one is found where loosening nut makes no difference in improper operation, replace nozzle or pump for that cylinder. Refer to overhaul.
Engine stops suddenly.	a. Out of fuel.	a. Fill fuel tanks with proper grade of fuel.
	b. Fuel filters dirty or clogged.	b. Service fuel filters.
	c. Water or dirt in fuel system.	c. Drain fuel tanks. Fill tanks with uncontaminated fuel. Clean fuel lines. Service fuel filters.
	d. Engine overheating (safety switch shutoff).	d. Check engine coolant level. Inspect radiator and hoses for leaks or obstructions. Check drive belt adjustment.
	e. Low oil pressure (safety switch shutoff).	e. Check crankcase oil level. Fill to full mark on dipstick.
	f. Overspeed switch defective or out of adjustment.	f. Adjust or replace overspeed switch.
	g. Air in fuel system.	g. Purge lines using hand priming pump. Tighten connections.
	h. Shutoff solenoid defective.	h. Replace shutoff solenoid.
Engine has low or no oil pressure.	a. Oil level in crankcase low.	a. Fill crankcase to full mark on dipstick.
	b. Improper lubricant.	b. Drain crankcase. Fill with proper lubricant.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine has low or no oil pressure (Cont).	c. Oil pressure gauge defective.	c. Replace oil pressure gauge.
Engine overheats.	a. Coolant level low.	a. Fill radiator.
	b. Dust or dirt collected on radiator core external surfaces.	b. Blow off all dust and dirt.
	c. Oil supply in crankcase low.	c. Fill crankcase to full mark on dipstick.
	d. Water pump defective.	d. Repair water pump.
	e. Water temperature regulator defective.	e. Replace water temperature regulator.
	f. Water temperature gauge defective.	f. Replace water temperature gauge.
	g. Fan drive belts slipping or broken.	g. Replace or adjust drive belts.
	h. Radiator hoses collapsed or deteriorated.	h. Replace radiator hoses.
	i. Radiator blocked.	i. Flush out radiator to remove blockage.
Engine exhaust excessively black or gray.	a. Air cleaner clogged.	a. Service air cleaner.
	b. Turbocharger carboned or defective.	b. Repair turbocharger.
	c. Fuel injection nozzle plugged or leaking.	c. Replace fuel injection valve nozzle.
Engine exhaust excessively white or blue.	a. Crankcase oil level too high.	a. Avoid overfilling. Determine cause and drain excess oil.
	b. Defective fuel injection nozzle or fuel injection pump.	b. Run engine at speed where defect is most noticeable. Momentarily loosen fuel line nut on each injection pump, one at a time, to cut out that cylinder. If one is found where loosening nut makes no difference in irregular operation, replace nozzle or pump for that cylinder. Refer to overhaul.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine exhaust excessively white or blue (Cont).	c. Valve clearances incorrect.	c. Adjust valve clearances.
	d. Improper fuel grade.	d. Drain fuel tanks. Fill tanks with proper grade of fuel.
	e. Engine operating temperature too low.	e. Replace water temperature regulator.
	f. Fuel transfer pump defective.	f. Repair fuel transfer pump. Refer to overhaul.
	g. Fuel bypass valve defective.	g. Repair fuel bypass valve.
	h. Air in fuel system.	h. Purge lines using hand priming pump. Tighten connections.
	i. Fuel filters dirty or clogged.	i. Service fuel filters.
Excessive engine oil consumption.	a. High crankcase pressure.	a. Service crankcase breather.
	b. External oil leaks.	b. Inspect for visible evidence of leaks and repair accordingly.
	c. Crankcase oil level too high.	c. Avoid overfilling. Determine cause and drain excess oil.
Engine fails to stop.	a. Engine stop cable broken or out of adjustment.	a. Adjust or replace engine stop cable.
Excessive fuel consumption.	a. Leak in fuel system.	a. Pressurize fuel tanks to 5 PSI maximum. Watch for evidence of leaks. Inspect all external lines and connections. Engine internal leaks will probably be accompanied by low engine oil pressure and increased level in oil sump.
	b. Fuel grade improper.	b. Drain fuel tanks. Fill tanks with proper grade of fuel.
	c. Fuel and combustion knock.	c. See corrective actions for "Misfiring and Low Power."
Engine stalls at low speed.	a. Air in fuel system.	a. Purge lines using hand priming pump. Tighten connections.
	b. Fuel bypass valve defective.	b. Repair fuel bypass valve.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine stalls at low speed (Cont).	c. Fuel filters dirty or clogged.	c. Service fuel filters.
	d. Fuel transfer pump defective.	d. Repair fuel transfer pump. Refer to overhaul.
	e. Fuel injection nozzle defective.	e. Replace fuel injection valve nozzle.
Valve train clicking noise.	a. Valve clearances incorrect.	a. Adjust valve clearances.
	b. Insufficient lubricant circulation.	b. Check lubrication in valve compartment. Should be very wet at high idle speed, but only damp at low idle. Oil passages should be cleaned, especially those leading to cylinder head.
	c. Engine oil level low.	c. Fill crankcase to full mark on dipstick.
Engine oil in coolant or coolant in engine oil.	a. Engine oil cooler defective.	a. Repair or replace engine oil cooler.
Little rocker arm movement and excessive valve clearances.	a. Insufficient lubricant circulation.	a. Check lubrication in valve compartment. Should be very wet at high idle speed, but only damp at low idle. Oil passages should be cleaned, especially those leading to cylinder head.
Premature engine wear.	a. Engine air cleaner defective.	a. Repair or replace engine air cleaner.
	b. Dirt in lubricating oil.	b. Locate and correct source of dirt entry. Change lubricating oil. Service oil filter.
Compressor overheats.	a. Dirty compressor oil filter element.	a. Service compressor oil filter.
	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.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
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. Service air cleaner.
	d. Safety valve on oil separator leaking.	d. Replace safety valve.
Compressor fails to load or unload.	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.
Condensate and/or emulsion in oil separator.	a. Unusually low oil temperature and high humidity.	a. If this is a climatic condition, replace compressor oil with a non-detergent oil.
	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. If low pressure caused by air demand, close service valves partially. Replace a faulty air-assist pressure regulator.
	c. Rapid, repeated load unload cycle.	c. Reduce air demand by closing service valves.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive compressor oil comsumption (Cont).	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.	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. Repair or replace as required.
	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.
Alternator overheats.	a. Defective wiring.	a. Check and repair or replace.
	b. Alternator regulator assembly defective.	b. Replace alternator regulator assembly.
	c. Alternator assembly defective.	c. Repair alternator 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.
Wheel bearing overheats.	a. Wheel bearing defective.	a. Replace bearing.
	b. Lack of lubrication.	b. Pack wheel bearings.
Tire wear abnormal.	a. Wheel loose on hub.	a. Tighten nuts.
	b. Improper tire inflation.	b. Inflate tires to proper pressure.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Tire wear abnormal (Cont).	c. Tie rod out of adjustment.	c. Adjust tie rod.
Brakes will not apply.	a. Brakes out of adjustment.	a. Adjust brakes.
	b. Brake shoes worn.	b. Refer to overhaul personnel.
Brakes apply but braking is not adequate.	a. Brake shoes and drums are wet.	a. 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 a long duration with brakes applied. Excessive friction will cause glazing of brake shoes.
	b. Brake drum broken or cracked.	b. Replace brake drum or refer to overhaul personnel.
Brakes will not release.	a. Parking brake actuator defective or out of adjustment.	a. Adjust parking brake or repair actuating mechanism.
Brakes release too slowly.	a. Shoe movement binding on backing plate.	a. Lubricate pivot points.
Brakes apply uneven or grab.	a. Grease or moisture on linings.	a. 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.
	b. Scored or cracked brake drum.	b. Replace drum. Refer to overhaul personnel.
	c. Loose wheel bearing.	c. Replace wheel bearing.
	d. Brake drum out of round.	d. Replace drum. Refer to overhaul personnel.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Parking brake does not hold.	a. Parking brake actuating mechanism not adjusted properly.	a. Adjust mechanism.
	b. Broken actuating cables or mounting.	b. Replace defective parts.
	c. Brakes out of adjustment.	c. Adjust brakes.

c. Inspect cap assembly (1) for proper operation and damage. Replace as necessary. Replace gasket (6).

d. Assemble the filler assembly in the reverse of above disassembly.

5-20. ENGINE BREATHER ASSEMBLY (Figure 5-5). Disassemble the engine valve cover breather assembly as follows.

a. Remove cap screws (1), lock washers (2), and clamps (3).

b. Loosen hose clamps (4), remove breather tube (5), hose (6), and clamps (4).

c. Remove cap screw (7), copper washer (8),breather assembly (9), and preformed packing (10).

d. Flush breather assembly (9) in clean diesel fuel or solvent, P-D-680, or equivalent, until oil is removed from breather element. Shake breather assembly (9) to remove cleaning agent or blow dry with compressed air.Replace preformed packing (10) when necessary.

e. Install the engine breather assembly in the reverse of disassembly.

5-21. OIL SEPARATOR DRAIN AND FILLER (Figure 5-6). Remove filler plug (1) and preformed packing (2). Remove oil separator drain plug (3). If damaged, remove bushing (4) and elbow (5). Replace damaged parts and assemble in the reverse of disassembly.

5-22. OIL SEPARATOR ELEMENT (Figure 5-7). To remove oil separator element, perform the following disassembly in sequence.

a. Disassemble air cleaner assemblies from rear roof section (refer to paragraph 5-30).

b. Disassemble discharge manifold piping from oil separator minimum pressure valve housing (1, 2, figure 5-7).

c. Remove lock nuts and bolts securing rear roof section and remove roof section.

d. Disconnect all hose assemblies connected to separator cover (see figure 1-4). Tag hoses for assembly reference.

e. Attach chain hoist or other lifting device to lifting eyes (8) on separator cover.

f. Remove special bolts (4) and lock washers (5).

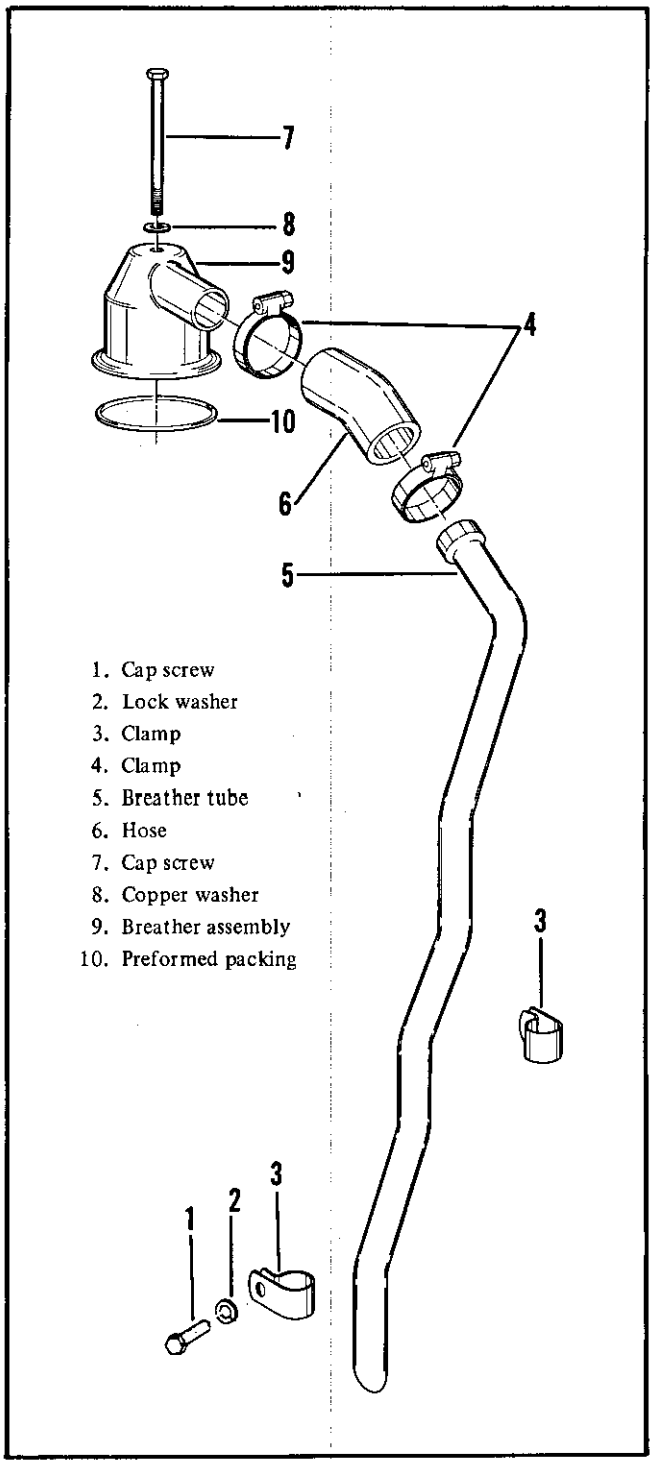
g. Lift cover assembly (3) upward until assembly clears the separator tank (7).

h. Lift the separator element (6) out of separator tank (7).

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

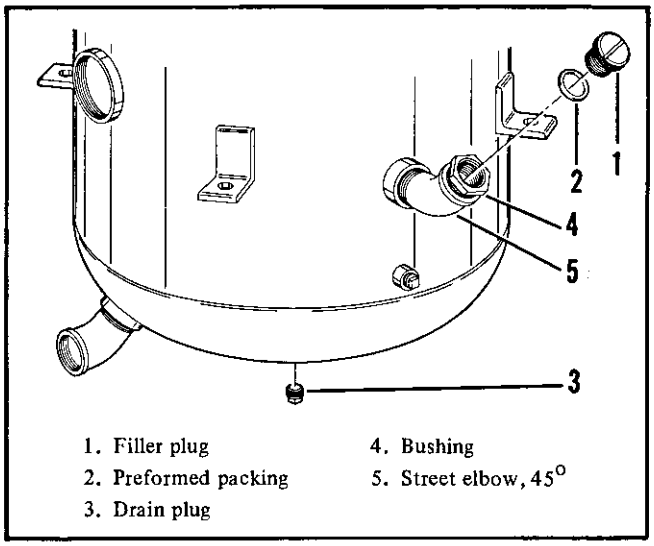
CAUTION

Do not replace special bolts (4, figure 5-7) with ordinary low carbon type. Unit is supplied with high tensile bolts to meet ASME requirements.



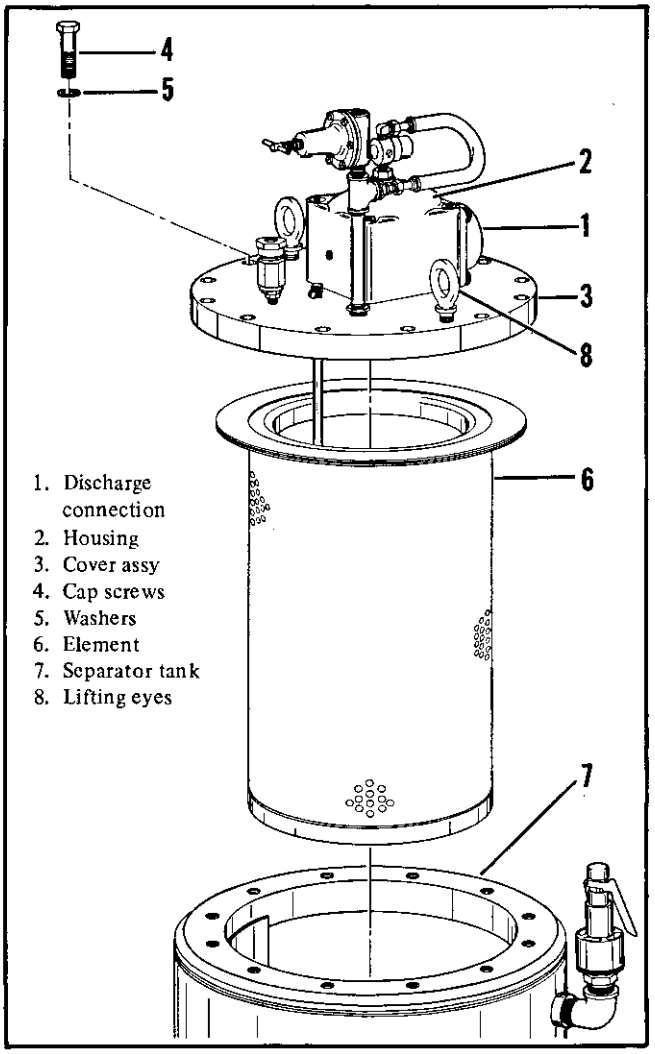
1. Cap screw
2. Lock washer
3. Clamp
4. Clamp
5. Breather tube
6. Hose
7. Cap screw
8. Copper washer
9. Breather assembly
10. Preformed packing

Figure 5-5. Engine breather assembly



1. Filler plug
2. Preformed packing
3. Drain plug
4. Bushing
5. Street elbow, 45°

Figure 5-6. Oil separator drain and filler



1. Discharge connection
2. Housing
3. Cover assy
4. Cap screws
5. Washers
6. Element
7. Separator tank
8. Lifting eyes

Figure 5-7. Oil separator element

CAUTION

Element is very easily damaged and should be kept in shipping container until ready for use. Do not strike any object or drop the element during assembly. Any break in the fiberglass wrap will cause oil carryover. When element is replaced at regular service interval of 4000 hours, destroy old element to prevent reuse even though it appears to be clean. Over pollution of metal salts collecting on the element can become a hazardous condition by lowering the flash point and causing a fire in the separator.

5-23. ENGINE OIL FILTER (Figure 5-8). Remove the engine oil filter as follows.

a. Place a container under filter to catch any oil that may be spilled.

b. Using a strap-type wrench, unscrew and remove filter assembly (1, figure 5-8) and gasket (2) from filter base (3). Make certain all of the old gasket is removed.

c. Wipe the filter base (3) with a clean cloth moistened with solvent, Federal Specification P-D-680, or equivalent.

d. If necessary to disassemble relief valve (4), remove cap screws (5), washers (6), cover (7), gasket (8), spring (9), and plunger (10).

e. When necessary to disassemble base assembly (3) from oil cooler, remove cap screw (11), cap screws (12), washers (13), and base assembly (3). Remove seals (14).

f. Assemble the engine oil filter in the reverse of above disassembly. Use new seals (4) as necessary. Use new filter assembly (1) and new gasket (2) at assembly.

5-24. COMPRESSOR OIL FILTER (Figure 5-9). Place a container under compressor oil filter and disassemble as follows.

a. Remove drain plug (4, figure 5-9) to drain off oil from housing (1).

b. Remove cap screws (2) and housing (1).

c. Remove element (5) and seal (3).

d. To remove head assembly (6) from compressor adapter, disconnect oil line between thermal bypass and oil filter. Remove cap screws (8), lock washers (9), and unscrew adapter (7). Remove gasket (10).

e. Clean the housing (1) and element (5), as shown in figure 5-9, sheet 2 of 2, in solvent, P-D-680 or equivalent. Dry the element with compressed air. Inspect element for cracks and enlarged holes. Replace element if damaged.

CAUTION

Agitate and soak element in solvent to clean. Do not scrape or wire brush as damage may occur.

NOTE

Each time the compressor oil filter is removed for cleaning, inspect element for varnish condition. A varnish condition will appear as a dark brown heavy sticky deposit. 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 improper oil, poor filter maintenance, operating above normal operating temperature, and over extended oil change periods. If a varnish condition exists, the compressor oil separator, oil cooler, and oil filter must be cleaned. Refer to the following for suggested special cleaning procedure if above condition exists.

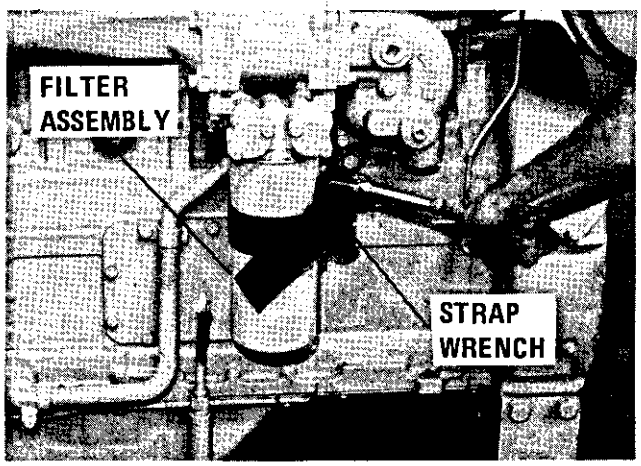
f. Mix a super detergent, such as THERMA-SOLVE CONCENTRATE manufactured by Pennsylvania Refining Company, Cleveland, Ohio, with the compressor oil in the separator in a ratio of one gallon of THERMA-SOLVE CONCENTRATE to each ten gallons of oil.

g. Operate the compressor under normal conditions for 40-60 hours allowing the treated oil to dissolve and suspend the varnish.

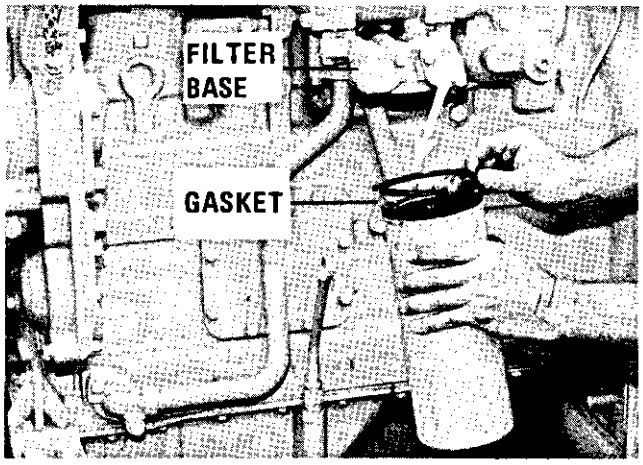
h. After the above period of operation, stop the compressor while running under full load.This procedure will allow maximum air to mix with the oil and force the maximum amount of oil from the oil cooler into the separator tank.

i. Place a container under the separator tank and while oil is still hot, remove separator drain plug and drain all of the oil from the tank. Install the drain plug.

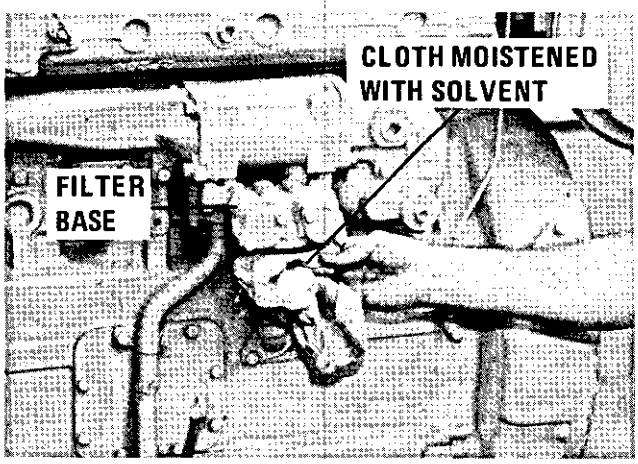
j. Remove and replace the separator element, reference



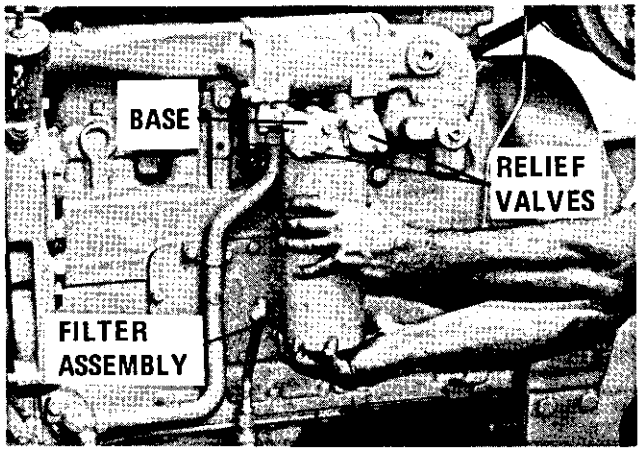
Unscrew and remove oil filter.



Remove gasket.

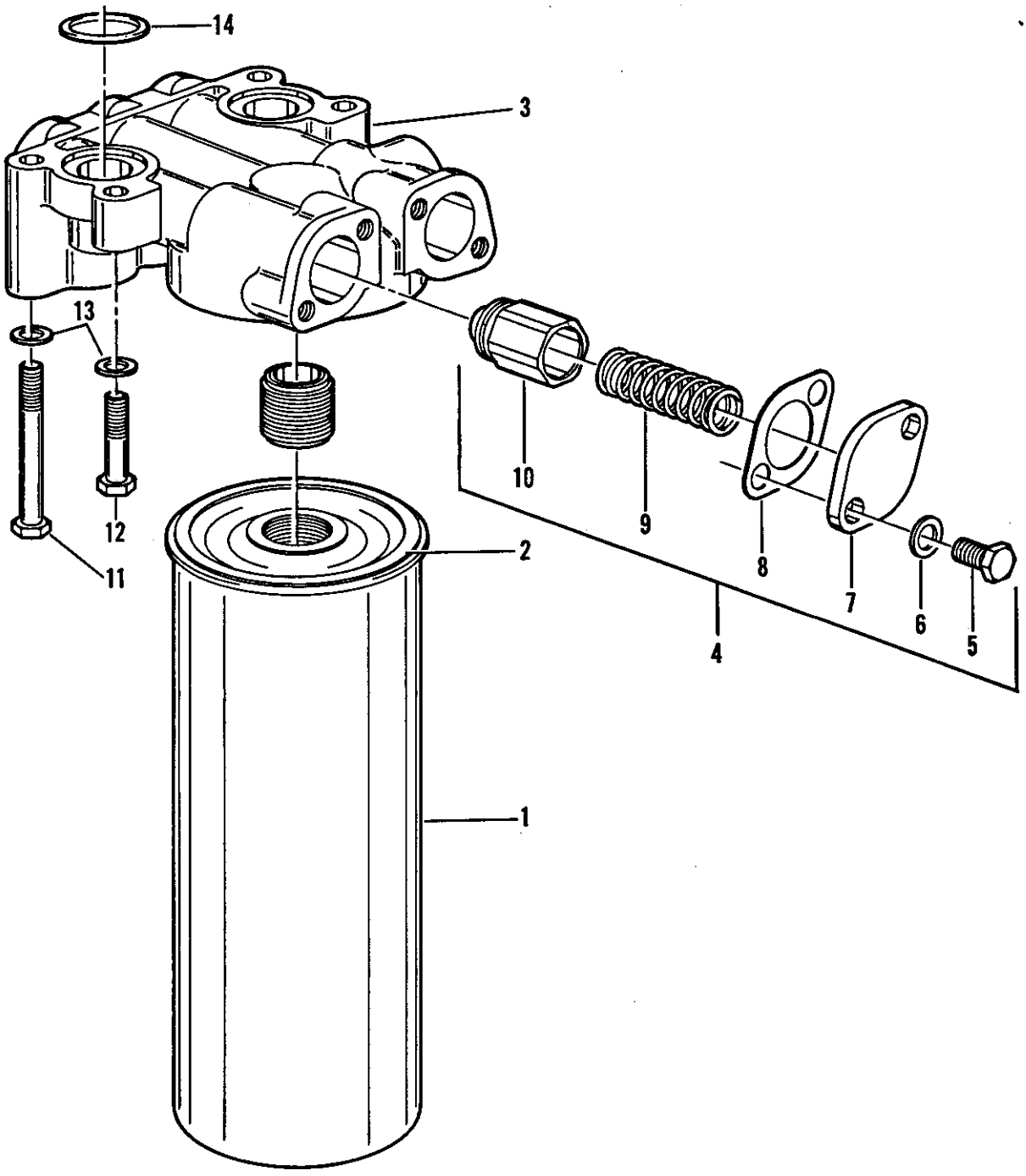


Wipe the filter base.



Apply light coating of clean oil to new gasket. Hand tighten new filter 1/2 to 3/4 turn after gasket contacts filter base.

Figure 5-8. Engine oil filter (sheet 1 of 2)



1. Filter assembly
2. Gasket
3. Base assembly
4. Relief valve
5. Cap screws
6. Washers
7. Cover
8. Gasket
9. Spring
10. Plunger
11. Cap screw
12. Cap screws
13. Washers
14. Seals

Figure 5-8. Engine oil filter (sheet 2 of 2)

paragraph 5-22. Clean the compressor oil filter as described in step e above.

k. Assemble the compressor oil filter in the reverse of disassembly.

l. Fill the separator tank to overflow with clean oil.

NOTE

As an aid in preventing varnish buildup, THERMA-SOLVE CONCENTRATE may be added to the compressor oil in a ratio of one quart of THERMA-SOLVE to each ten gallons of oil approximately 40 hours prior to scheduled oil change.

5-25. PRIMARY FUEL FILTER (Figure 5-10). Disconnect fuel hoses at primary filter and tag hoses for assembly reference. Remove elbows from inlet and outlet ports. Either plug fuel line from fuel tank or make certain open hose end is secured at a level above the fuel tank so that fuel does not drain from the tanks. Place a container under primary fuel filter to collect fuel drain off. Disassemble as follows.

a. Loosen cover nut (1, figure 5-10) and remove the housing (2) and element (3) from cover (4). Remove gasket (5).

b. Only when necessary for repair, remove retaining ring (6), retainer (7), and spring (8) from housing (2).

c. When necessary, remove retaining ring (9), cover nut (1), and gasket (10) from cover (4).

d. To remove cover (4) from bracket (11), remove nuts (12), washers (13), and cap screws (14).

e. Clean the element (3) and housing (2) in solvent, P-D-680 or equivalent.

f. Assemble the primary fuel filter in the reverse of disassembly. Install new gaskets (5, 10) as necessary.

g. Prime the fuel system using the hand priming pump, reference paragraph 4-38f and figure 5-11, sheet 1.

5-26. FINAL FUEL FILTER (Figure 5-11). Place a container under final fuel filter to collect fuel drain off. Disassemble as follows.

a. Wipe the filter assembly with a cloth moistened with solvent, P-D-680, or equivalent, to remove dirt (A, figure 5-11, sheet 1).

b. Using a strap-type wrench, unscrew and remove filter assembly (B, figure 5-11, sheet 1).

c. Make certain that all of the filter gasket is removed from filter base (C, figure 5-11, sheet 1).

d. Wipe the gasket sealing surface of the filter base with a clean cloth moistened with solvent, P-D-680, or equivalent (D, figure 5-11, sheet 1).

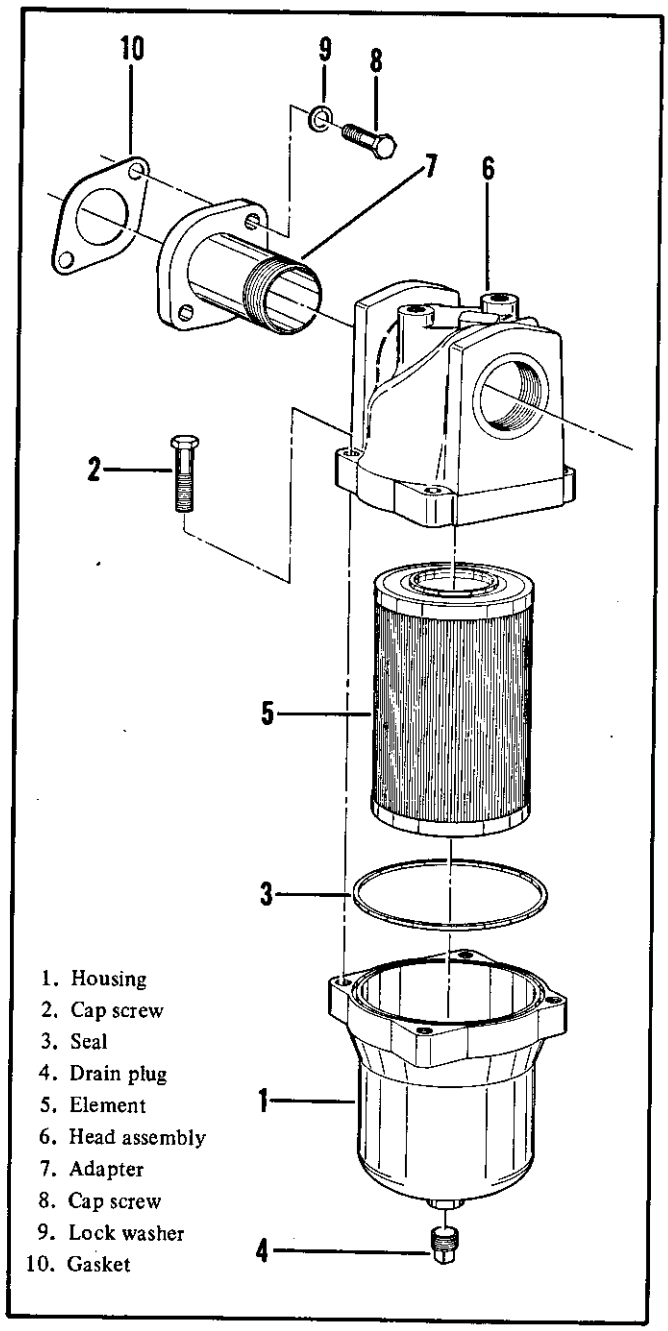
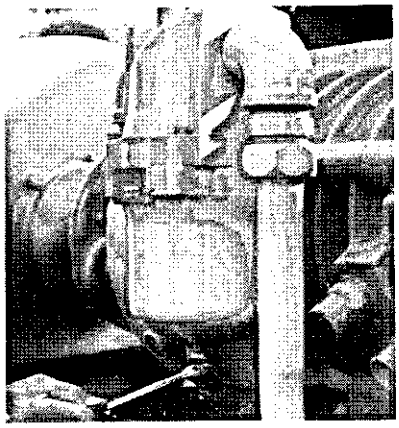
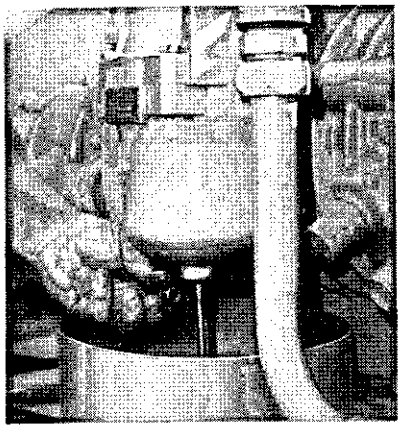


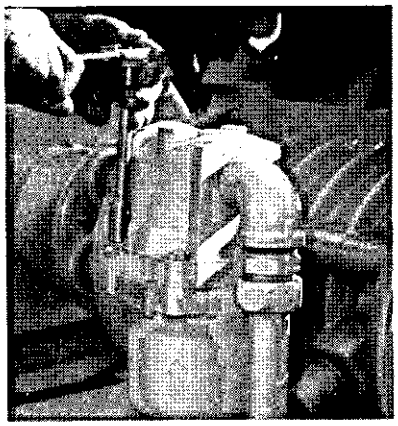
Figure 5-9. Compressor oil filter (sheet 1 of 2)



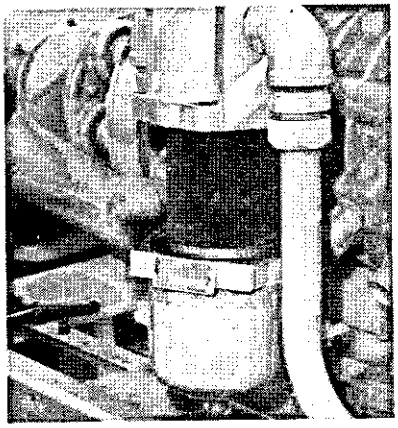
Loosen drain plug



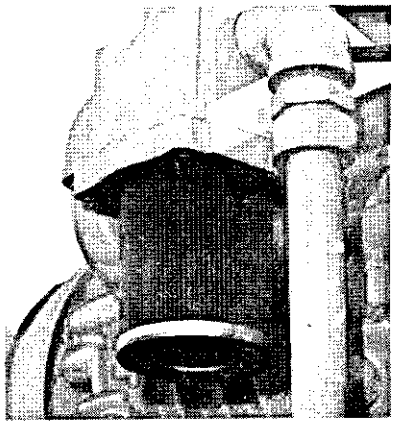
Drain oil filter



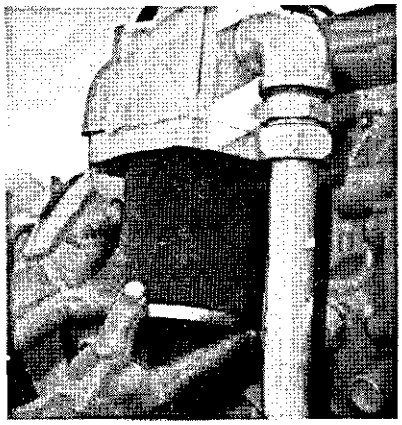
Remove head bolts



Remove housing



Element



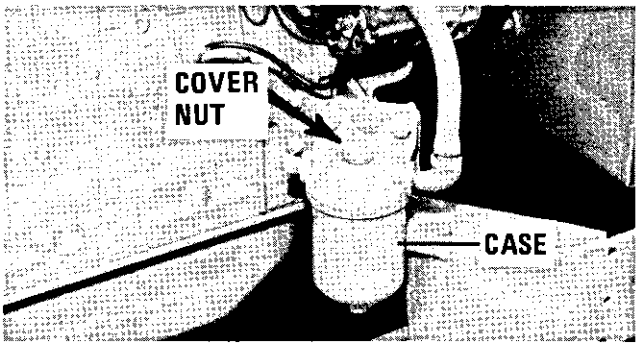
Remove element

Wash housing

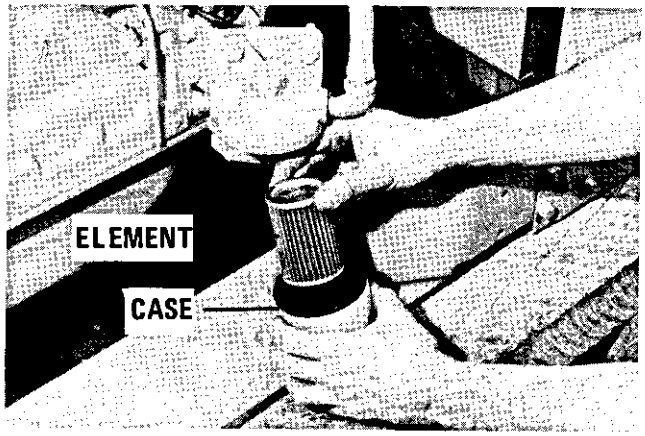
Wash element

Dry element

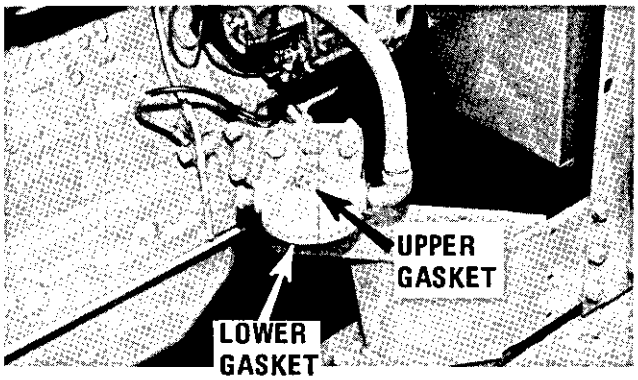
Figure 5-9. Compressor oil filter (sheet 2 of 2)



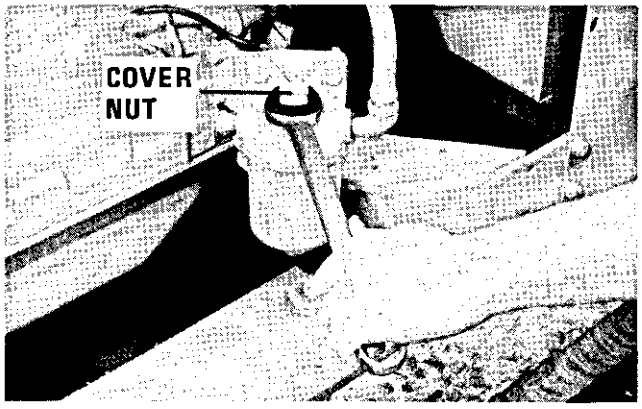
Loosen cover nut



Remove case and element

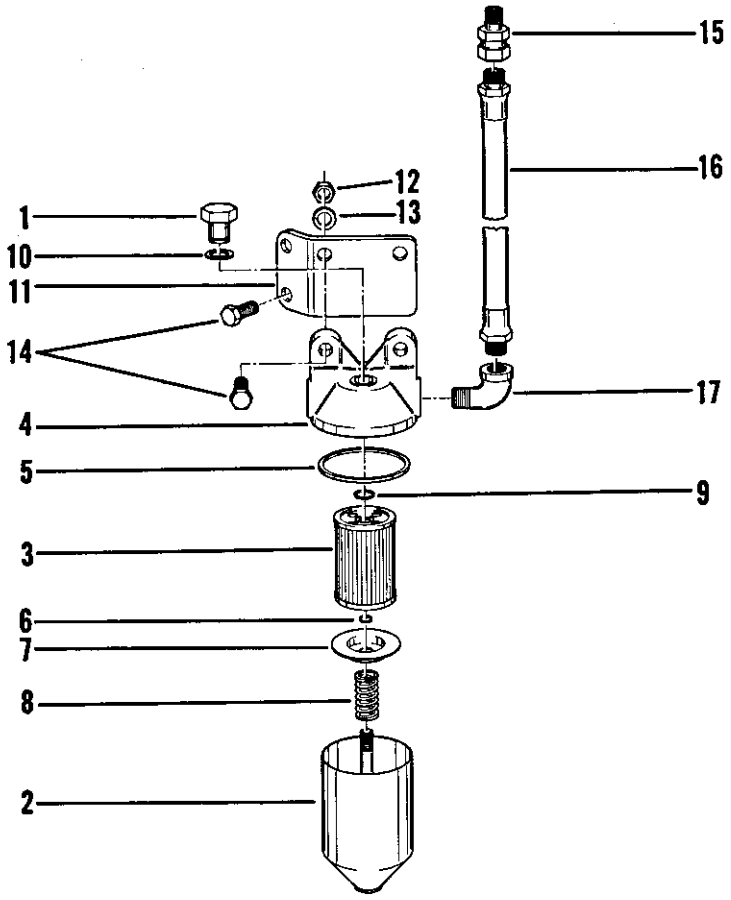


Inspect upper and lower gaskets



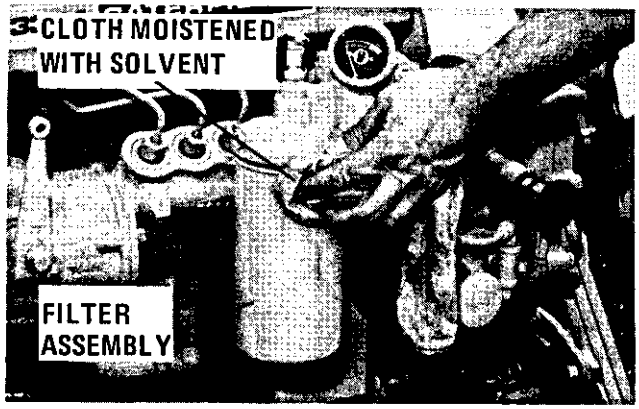
Install cleaned filter element and case

Figure 5-10. Primary fuel filter (sheet 1 of 2)

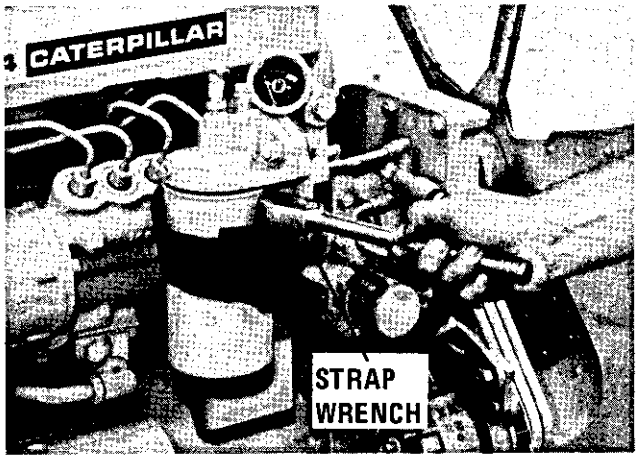


1. Cover nut
2. Housing
3. Element
4. Cover
5. Gasket
6. Retaining ring
7. Retainer
8. Spring
9. Retaining ring
10. Gasket
11. Mounting bracket
12. Nuts
13. Washers
14. Cap screw
15. Union
16. Hose assembly
17. Elbow

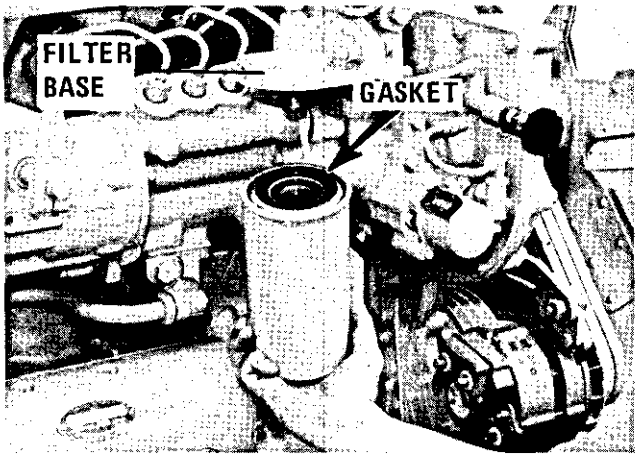
Figure 5-10. Primary fuel filter (sheet 2 of 2)



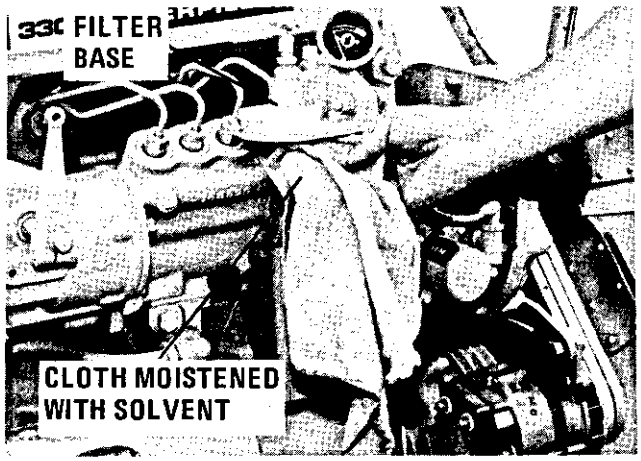
A



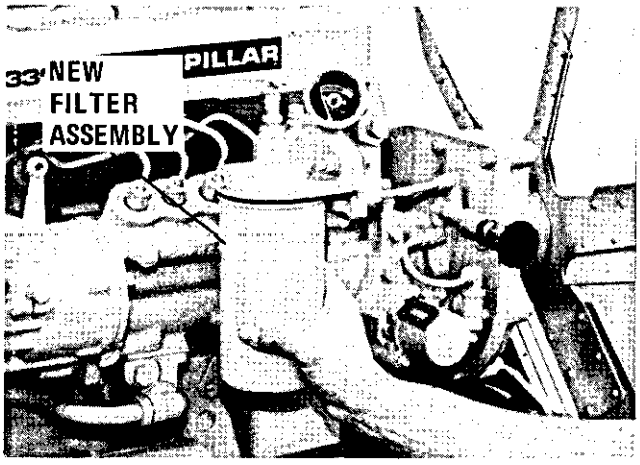
B



C

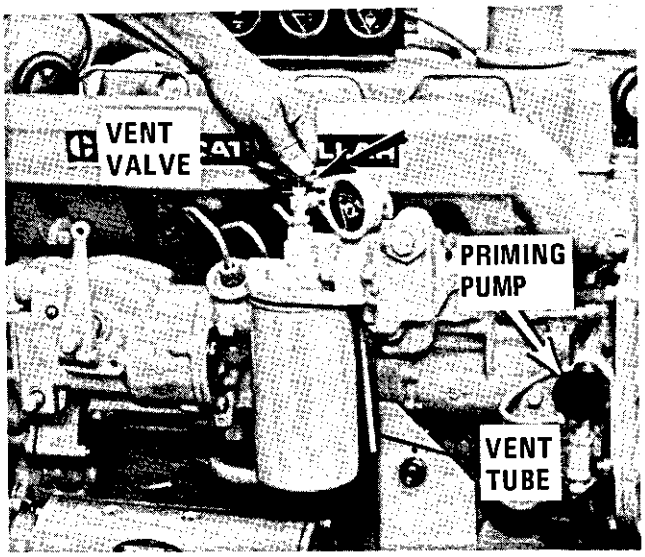


D

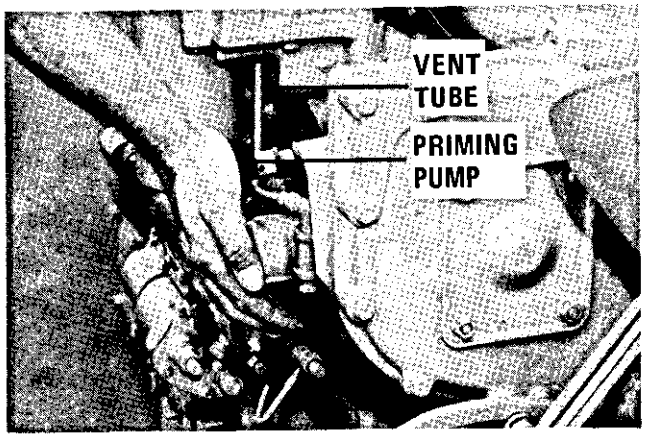


E

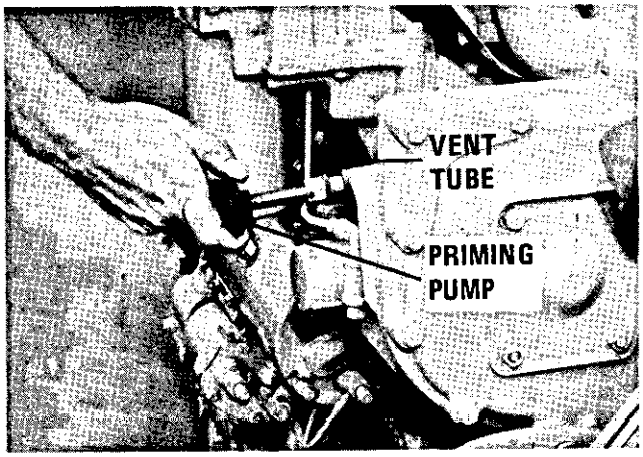
Figure 5-11. Final fuel filter (sheet 1 of 3)



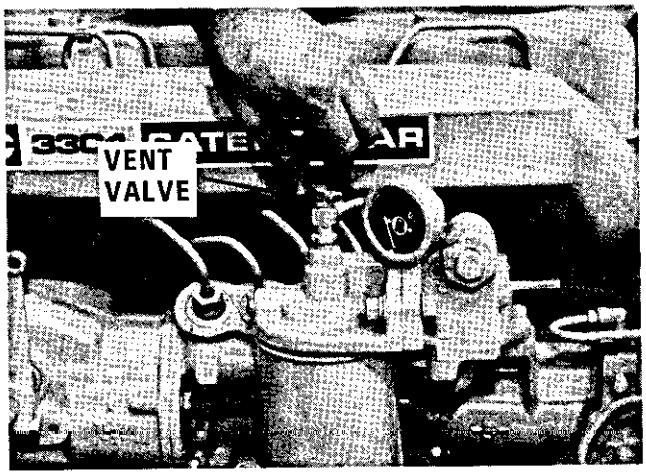
F



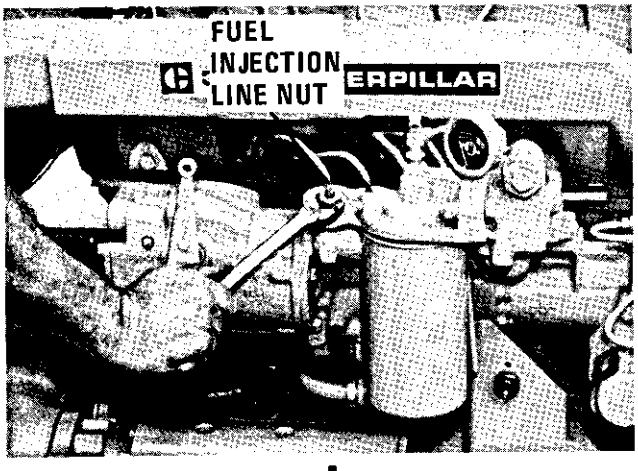
G



H

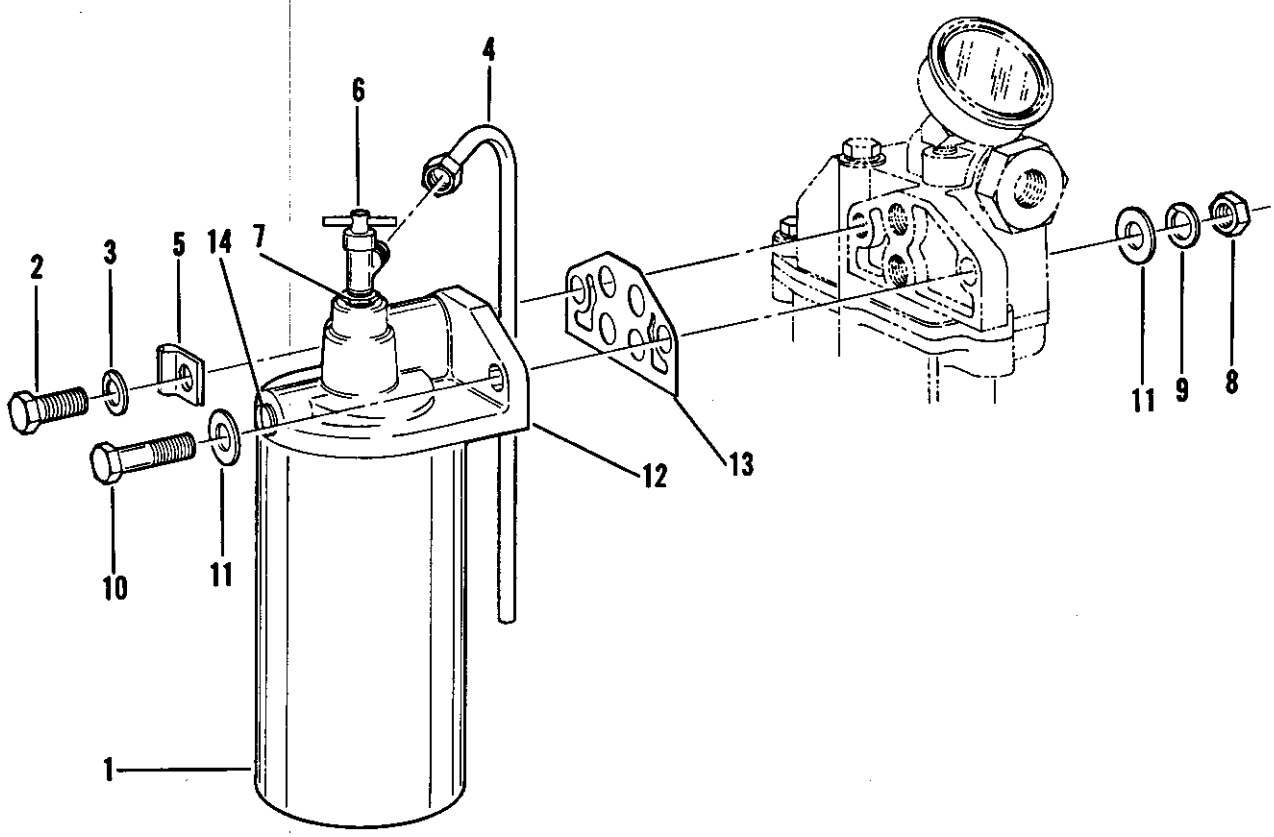


I



J

Figure 5-11. Final fuel filter (sheet 2 of 3)



1. Filter assembly
2. Cap screw
3. Lock washer
4. Vent tube
5. Tubing clip
6. Vent valve
7. Bushing
8. Nut
9. Lock washer
10. Cap screw
11. Washer
12. Base assembly
13. Gasket
14. Plug

Figure 5-11. Final fuel filter (sheet 3 of 3)

e. Lubricate the new filter gasket with clean diesel fuel. Assemble new filter on base. Tighten by hand until gasket contacts base; then, tighten 1/2 turn more (E, figure 5-11, sheet 1).

f. Move the governor control lever to the shut-off position. Open vent valve on top of filter base and prime the fuel system as instructed below (F, figure 5-11, sheet 2).

CAUTION

Operate the priming pump only when the vent is open.

g. Push in on the priming pump and turn counterclockwise to release from the locked position (G, figure 5-11, sheet 2).

h. Operate the priming pump with rapid strokes until the stream of fuel pumped out of the vent tube is free of air bubbles (H, figure 5-11, sheet 2).

i. Push in on the priming pump and turn clockwise to lock in the closed position. Close the vent valve (I, figure 5-11, sheet 2) and start the engine.

j. If the engine misfires or smokes, loosen a fuel injection line nut (J, figure 5-11, sheet 2). Allow the fuel to flow until free of air bubbles. Tighten the line nut. Open the next line nut. Vent each fuel line in this manner until the engine is running smoothly.

NOTE

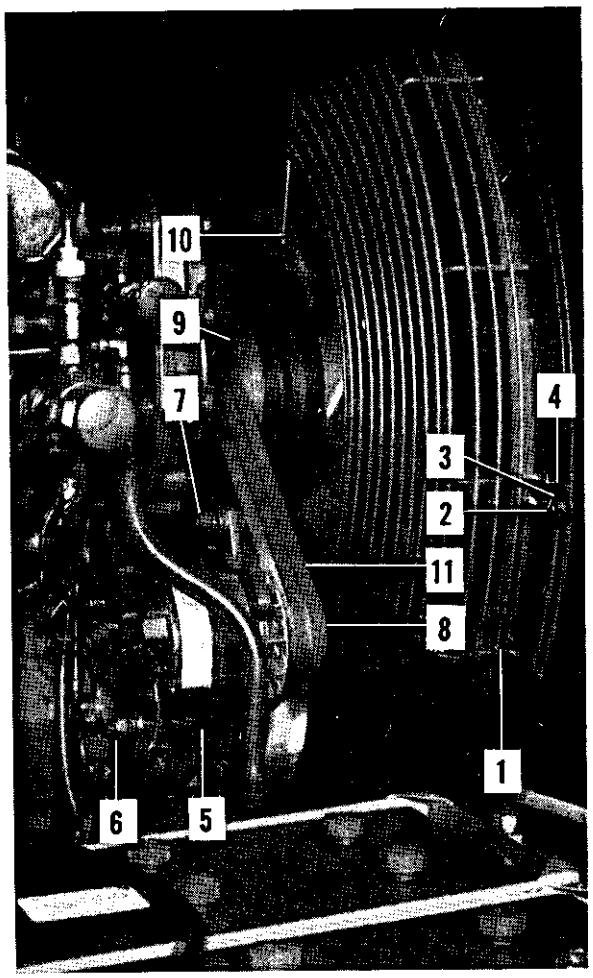
Avoid bleeding excessive amounts of fuel.

k. To disassemble complete final fuel filter, follow the sequence of index numbers assigned on figure 5-11, sheet 3.

l. Assemble in the reverse of disassemble.

5-27. DRIVE BELTS (Figure 5-12). Remove cap screws (2, figure 5-12), lock washers (3), flat washers (4) and fan guard (1). Loosen bolts (5), alternator pivot nut (6), and adjusting strap nut (7). Move alternator in direction to loosen drive belt set (11). Remove belts from alternator pulley (8), crankshaft pulley, and fan pulley (9). Remove belt set (11) by weaving over fan (10) blades. Assemble in the reverse of disassembly and adjust belt tension.

5-28. BATTERIES AND CABLES (Figure 5-13). Remove nut and lock washer securing ground cable to starter. Disassemble as follows.



1. Fan guard
2. Cap screw
3. Lock washer
4. Flat washer
5. Bolt
6. Pivot nut
7. Strap nut
8. Pulley
9. Fan pulley
10. Fan
11. Belt set

Figure 5-12. Drive belts

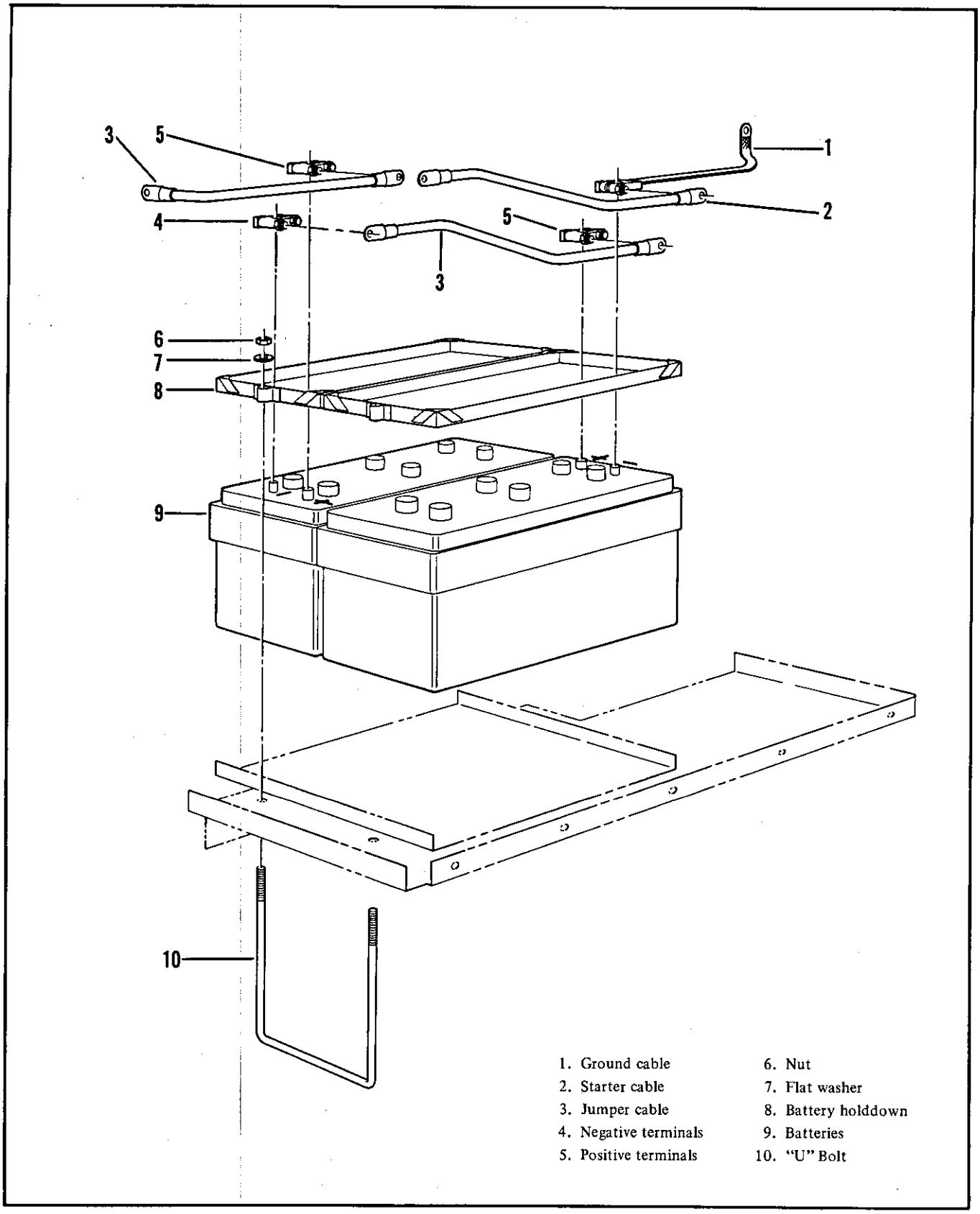


Figure 5-13. Batteries and cables

a. Loosen nut on negative terminal and remove ground cable (1) from battery.

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

c. Loosen nut on positive terminal and remove starter battery cable (2) from battery.

d. Loosen nuts on jumper cable (3) terminals and remove jumper cable (3). Disassemble negative terminals (4) and positive terminals (5) from cables only when necessary.

e. Remove the nuts (6) and flat washers (7). Lift off battery holddowns (8).

f. Lift out the batteries (9). Remove the "U" bolts (10) as necessary.

g. Assemble the batteries and cables in the reverse of disassembly.

CAUTION

System is negative ground.

5-29. SPEED CONTROL LINKAGE (Figure 5-14). Disassemble linkage to the extent necessary as follows.

a. Loosen set screw (2) and remove collar (1) and spring (3) from control rod (7).

b. Remove lock nuts (5) from the two stop blocks (4). Remove nuts (6) and stop blocks (4) from control rod (7).

c. Remove spring (8) from spring bracket (9) and arm assembly (21). Remove cap screw (10), lock washer (11), clamp (12), and spring bracket (9).

d. Remove lock nuts (14) from the two ball joints (13). Loosen nuts (15), remove ball joints (13) and nuts (15) from control rod (16).

e. Carefully drive pin (18) out of pivot clamp on compressor intake control. Remove flat washer (19) and control arm (17). Remove bushings (20) only as necessary.

f. Remove cotter pin (22), flat washer (23), arm assembly (21), and bushing (24) from shaft assembly (27).

g. Loosen set screw (26) securing collar (25) to shaft.

h. Pull shaft assembly (27) out of mounting bracket (31) removing collar (25) and spring (28) from shaft.

i. When necessary remove screws (30), and name plate (29) from mounting bracket (31).

j. Assemble the speed control linkage in the reverse of disassembly and adjust per paragraph 5-5.

5-30. AIR CLEANER ASSEMBLY (Figure 5-15). Remove the air cleaner caps from each air cleaner intake. Loosen hose clamps on air cleaner outlets and remove outlet hoses from air cleaners. Remove the nuts, cap screws, lock washers, and flat washers securing air cleaner mounting brackets to underside of rear roof section. Remove air cleaners from unit and disassemble as follows.

a. Loosen eye bolt of clamp (1). Remove cover (2) and clamp (1). Removal of decal (3) is not necessary except for replacement.

b. Remove wing bolt (5), seal washer (6), and element (4).

c. Remove unloader (7).

d. Remove nut (9), lock washer (10), and bolt (11). Remove mounting brackets (8) from body (12).

e. Wipe the inside of the air cleaner body (12) with a clean cloth dampened with solvent, P-D-680, and dry thoroughly.

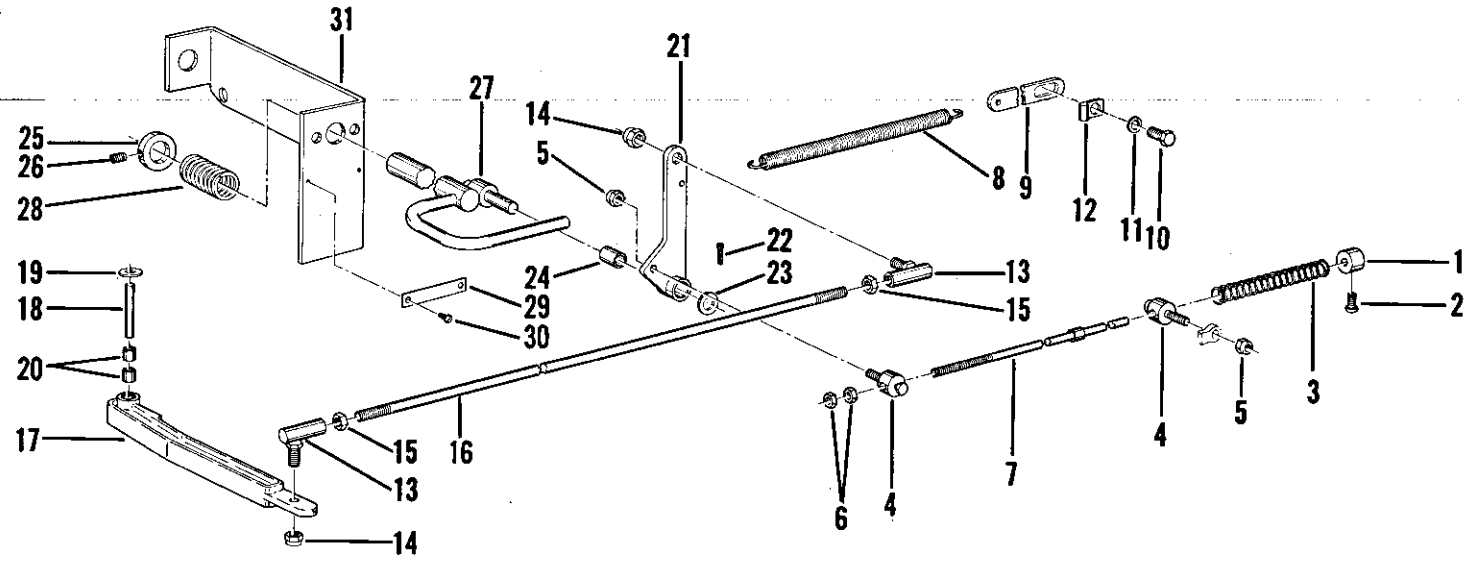
f. Immerse and clean element (4) in a container of water and low-sudsing household type detergent. Rinse thoroughly with clean water and air dry.

NOTE

The element should be replaced after eight cleanings.

g. Assemble the air cleaner in the reverse of disassembly.

5-31. CONTROLS AND INSTRUMENTS (Figure 5-16). Remove wires from component parts as required for disassembly (see figure 5-16, sheet 1 of 2). Disassemble controls and instruments as required for maintenance as follows.



1. Collar
2. Set screw
3. Spring
4. Stop block
5. Lock nut
6. Nut
7. Control rod
8. Spring
9. Spring bracket
10. Cap screw
11. Lock washer
12. Clamp
13. Ball joint
14. Lock nut
15. Nut
16. Control rod
17. Control arm
18. Pin
19. Flat washer
20. Bushing
21. Arm assembly
22. Cotter pin
23. Flat washer
24. Bushing
25. Collar
26. Set screw
27. Shaft assembly
28. Spring
29. Name plate
30. Self-tapping screw
31. Mounting bracket

Figure 5-14. Speed control linkage

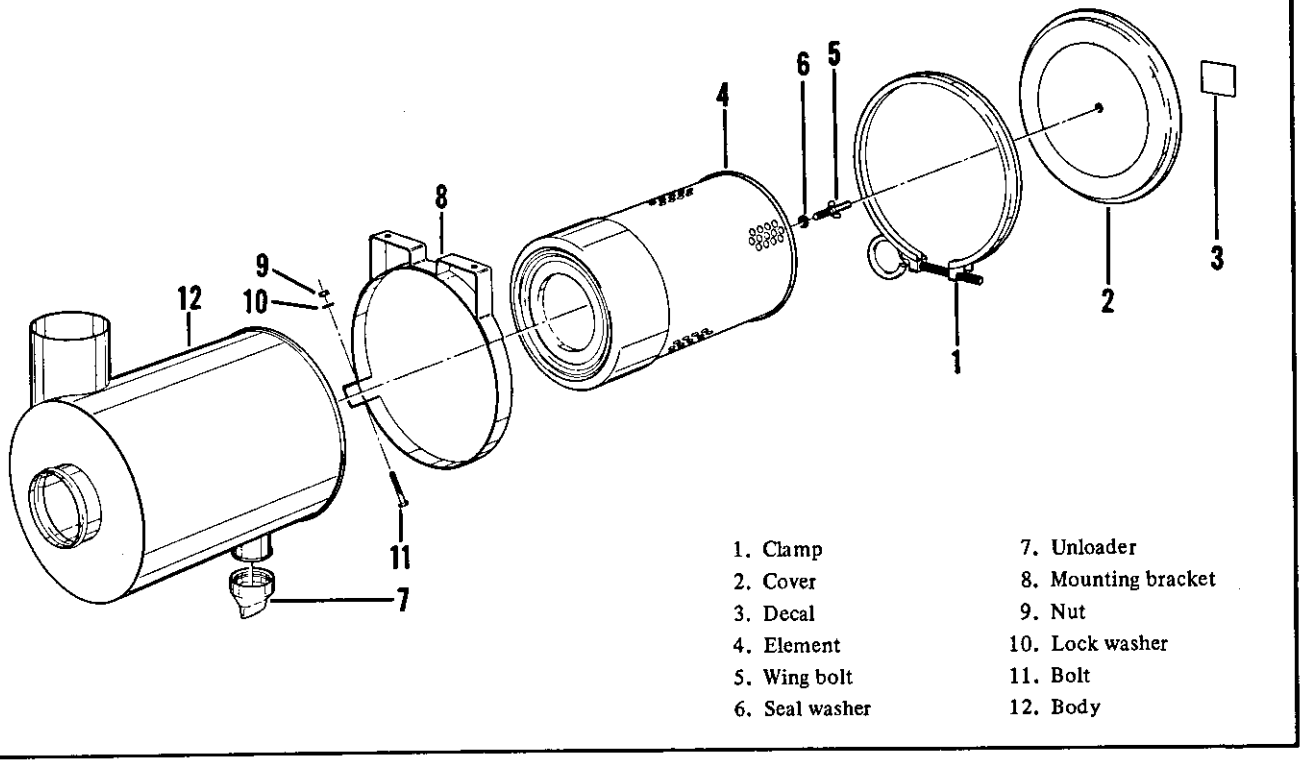


Figure 5-15. Air cleaner assembly

a. ENGINE OIL PRESSURE GAUGE. Disconnect oil pressure hose from elbow (19). Remove elbow (19), pressure switch (14), and tee (20). Remove nuts, lock washers, and clamp securing oil pressure gauge (2) to instrument panel (22). Remove gauge from panel and assemble clamp, lock washers, and nuts on gauge.

b. TACHOMETER. Disconnect tachometer drive cable from rear of tachometer (11). Remove nuts, lock washers, and clamp securing tachometer (11) to instrument panel (22). Remove tachometer from panel and assemble clamp, lock washers, and nuts on tachometer.

c. FUEL PRESSURE GAUGE. Unscrew the fuel pressure gauge from the top of the engine fuel priming tank located next to the final fuel filter.

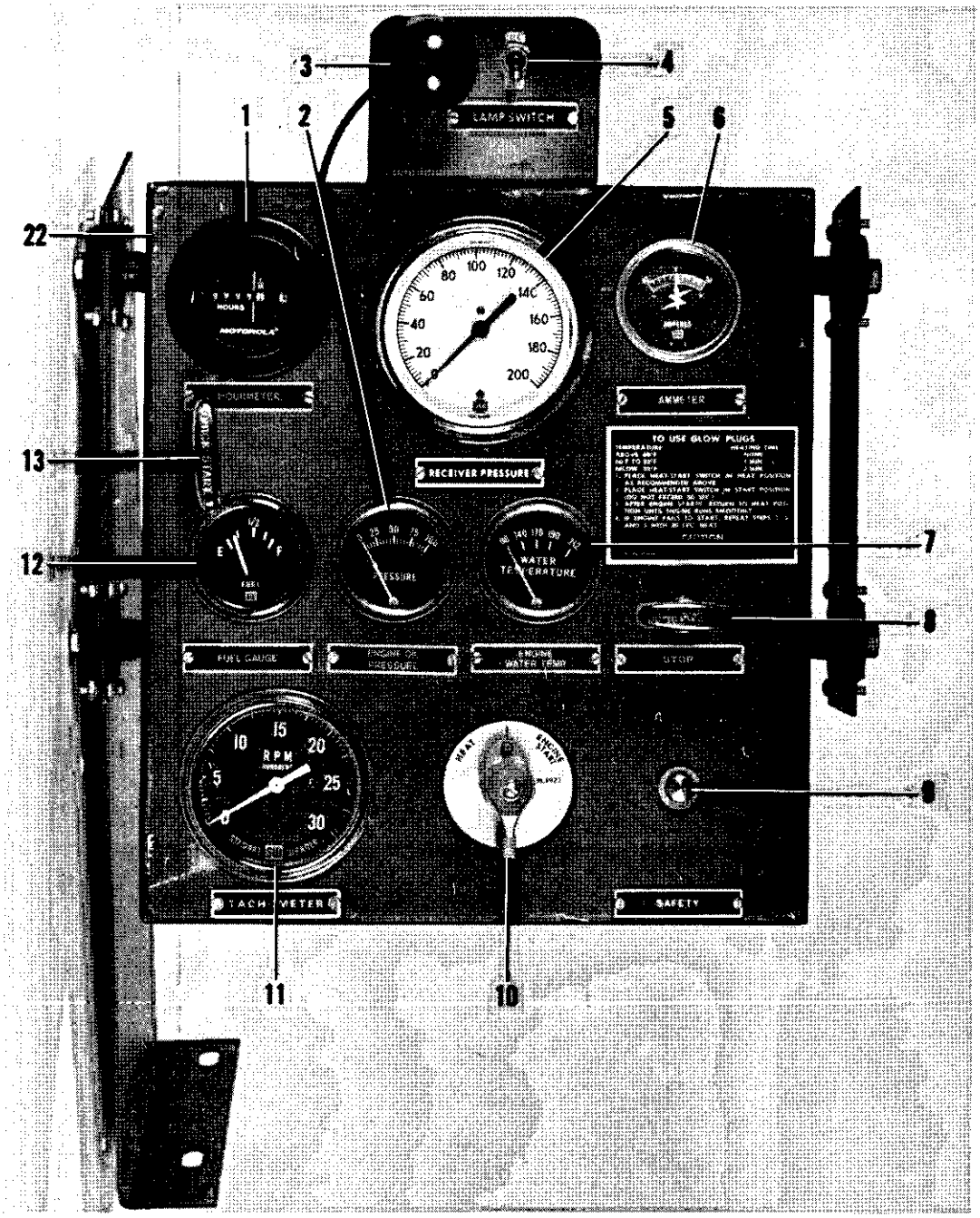
d. WATER TEMPERATURE GAUGE. Unscrew and remove temperature sensing bulb from engine cylinder block. Remove nuts, lock washers, and clamp securing water temperature gauge (7) to instrument panel (22). Remove gauge from panel and assemble clamp, lock washers, and nuts on water temperature gauge.

e. AIR PRESSURE GAUGE. Disconnect air hose from elbow (21); remove elbow (21). Remove nuts, lock washers, and clamp securing air pressure gauge (5) to instrument panel (22). Remove air pressure gauge from panel and assemble clamp, lock washers, and nuts on gauge.

f. FUEL LEVEL GAUGE. Disconnect wires from fuel level sending unit and from safety pushbutton. Remove nuts, lock washers, resistor (15), and clamp securing fuel gauge (12) to instrument panel (22). Remove fuel level gauge (12) from panel (22) and assemble clamp, lock washers, and nuts on gauge.

g. AMMETER. Remove nuts, lock washers, and clamp securing ammeter (6) to instrument panel (22). Remove wires from terminals and remove ammeter from panel. Assemble clamp, lock washers, and nuts on ammeter.

h. HOURMETER. Disconnect wire from safety pushbutton terminal and remove nuts, lock washers, and clamp securing hourmeter (1) to instrument panel (22). Remove hourmeter (1) from panel (22) and assemble clamp, lock washers, and nuts on hourmeter.



1. Hourmeter
2. Oil pressure gauge
3. Panel lamp assembly
4. Panel lamp switch
5. Air pressure gauge
6. Ammeter
7. Water temperature gauge
8. Stop control cable
9. Safety pushbutton
10. Heat-Off-Start switch
11. Tachometer
12. Fuel level gauge
13. Starting aid control cable
14. Oil pressure switch
15. Resistor
16. Wire assembly
17. Wire assembly
18. Wire assembly
19. Elbow
20. Tee
21. Elbow
22. Instrument panel

Figure 5-16. Controls and instruments (sheet 1 of 2)

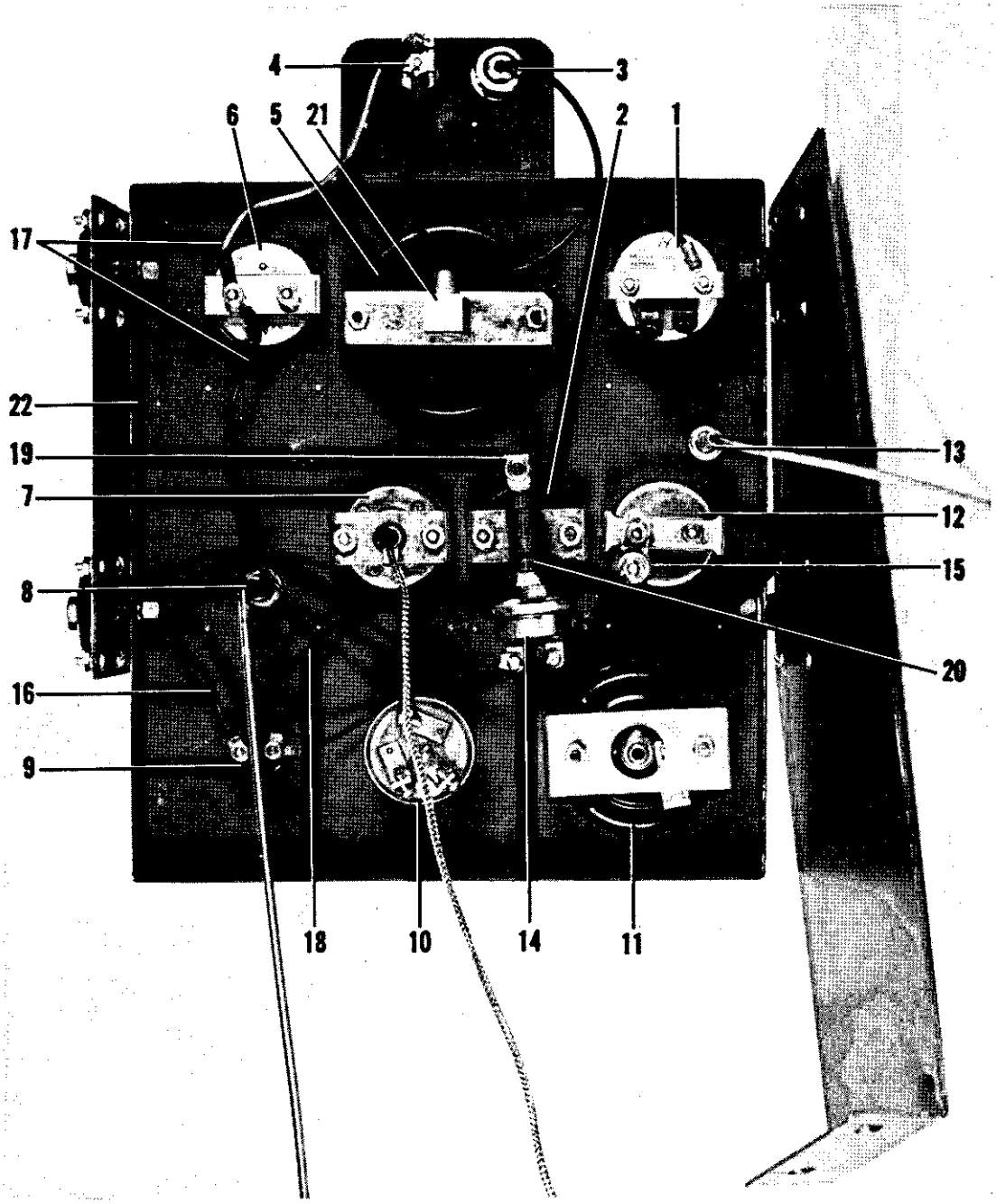


Figure 5-16. Controls and instruments (sheet 2 of 2)

i. COLD WEATHER STARTING AID CONTROL CABLE. Loosen the two screws securing control cable to starting aid actuating valve assembly. Unscrew and remove the cable retaining nut and lock washer. Remove the cold weather starting aid control cable (13) from instrument panel (22). Assemble the lock washer and retaining nut on control cable.

j. ENGINE STOP CABLE. Loosen screw on wire stop and remove wire stop from end of control cable actuating wire. Loosen screw on governor lever stop block, loosen cable clips, and pull cable through clips. Unscrew and remove control cable retaining nut and lock washer. Remove engine stop control cable (8) from instrument panel (22). Assemble lock washer and retaining nut on cable.

k. SAFETY PUSHBUTTON SWITCH. Disconnect wires from switch terminals. Unscrew and remove retaining nut. Remove safety pushbutton switch (9) from instrument panel (22). Assemble retaining nut on switch.

l. PANEL LAMP SWITCH. Disconnect wires from switch terminals. Remove switch retaining nut and On-Off plate. Remove panel lamp switch (4) from instrument panel (22). Assemble plate and retaining nut on switch.

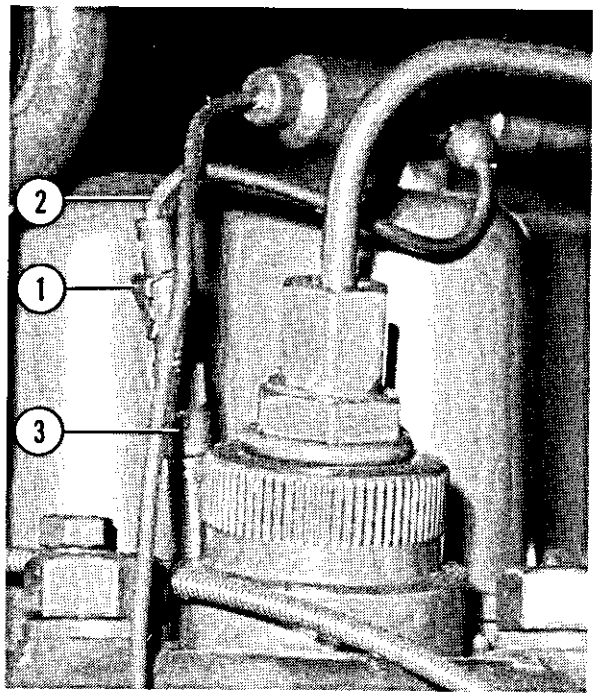
m. HEAT-OFF-START SWITCH. Disconnect wires from switch terminals. Remove handle retaining screw and switch handle. Unscrew and remove switch retaining nut and plate. Remove switch (10) from instrument panel (22). Assemble plate, retaining nut, handle, and handle retaining screw on switch (10).

n. PANEL LAMP ASSEMBLY. Disconnect wire from panel lamp switch. Unscrew and remove retaining nut and washer from lamp. Remove lamp assembly (3) from instrument panel (22). Assemble washer and retaining nut on lamp assembly (3).

o. FUEL PRIMING PUMP ASSEMBLY. Disconnect the inlet and outlet tube assemblies from fuel priming pump elbows and remove elbows. Remove nuts and lock washers securing priming pump bracket to engine gear cover. Remove priming pump and bracket from engine. Separate priming pump from bracket as necessary.

p. Assembly of the controls and instruments is the reverse of disassembly. See figure 1-6 for wiring diagram.

5-32. GLOW PLUGS (Figure 5-17). Disconnect wire assembly (2) and clip (1) from glow plugs (3). Unscrew and remove glow plugs (3). Assemble in the reverse of disassembly. Torque glow plugs to 108-132 pounds-inch when installing. Inspect glow plugs as follows.



1. Clip
2. Wire assembly
3. Glow plug

Figure 5-17. Glow plugs

a. With engine stopped, turn HEAT-OFF-START switch to the HEAT position and observe the ammeter reading.

b. Pull the lead from a glow plug and observe the ammeter reading. If the ammeter reading decreases, the glow plug is working properly. If ammeter reading does not change, the glow plug was not drawing current when connected and can be assumed to be defective. Defective glow plugs shall be replaced.

c. Release the switch from HEAT position to OFF position.

d. Connect the lead to the glow plug being checked.

e. Check each glow plug in the same manner and replace all defective glow plugs.

5-33. GLOW PLUG WIRING AND VALVE COVER (Figure 5-18). Disconnect wire assembly (1) from end of lead assembly (2). Remove cap screws (3), lock washers (4), and lead assembly (2). To remove valve cover (5), first remove the engine breather from cover (refer to

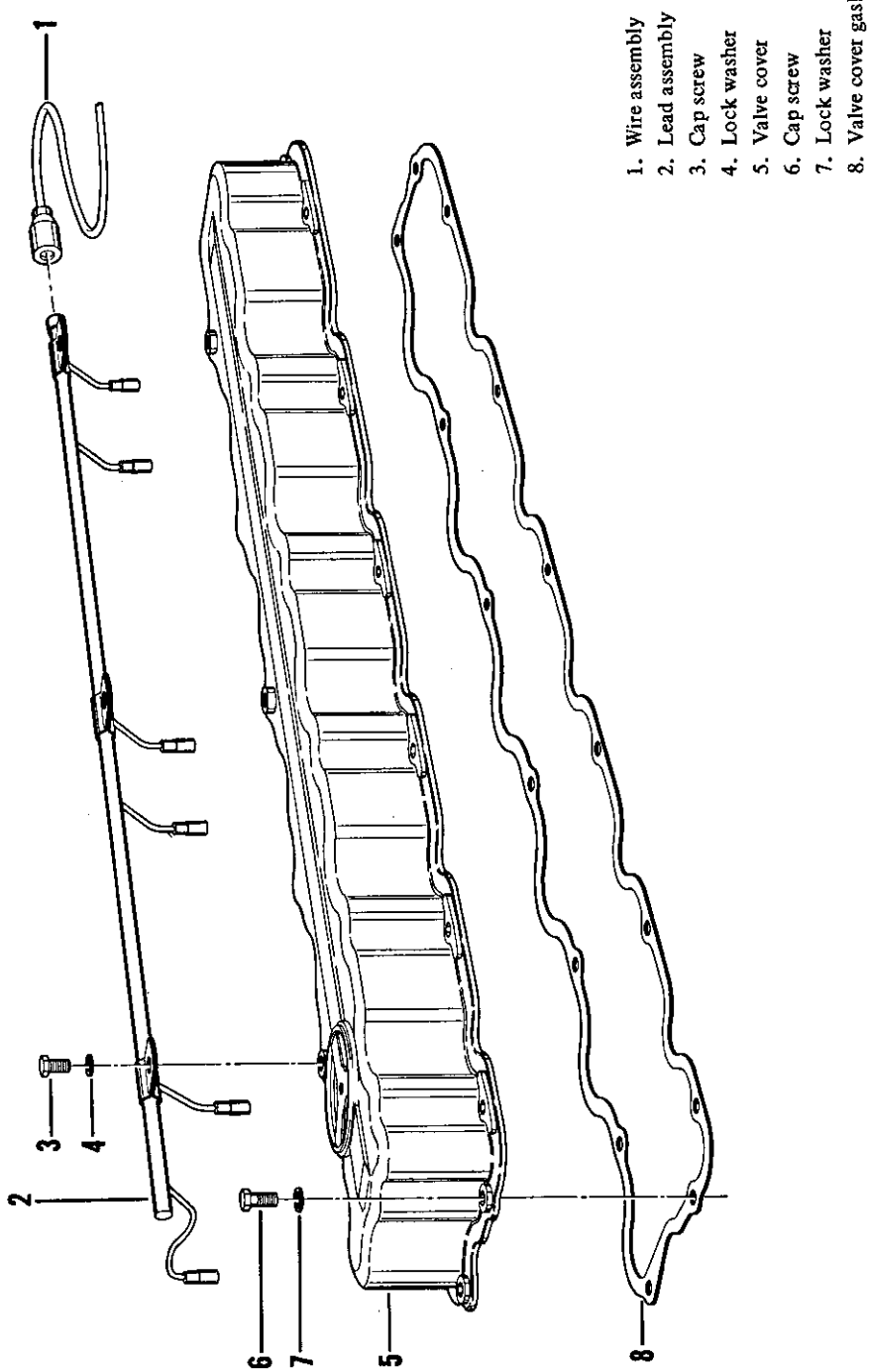


Figure 5-18. Glow plug wiring and valve cover

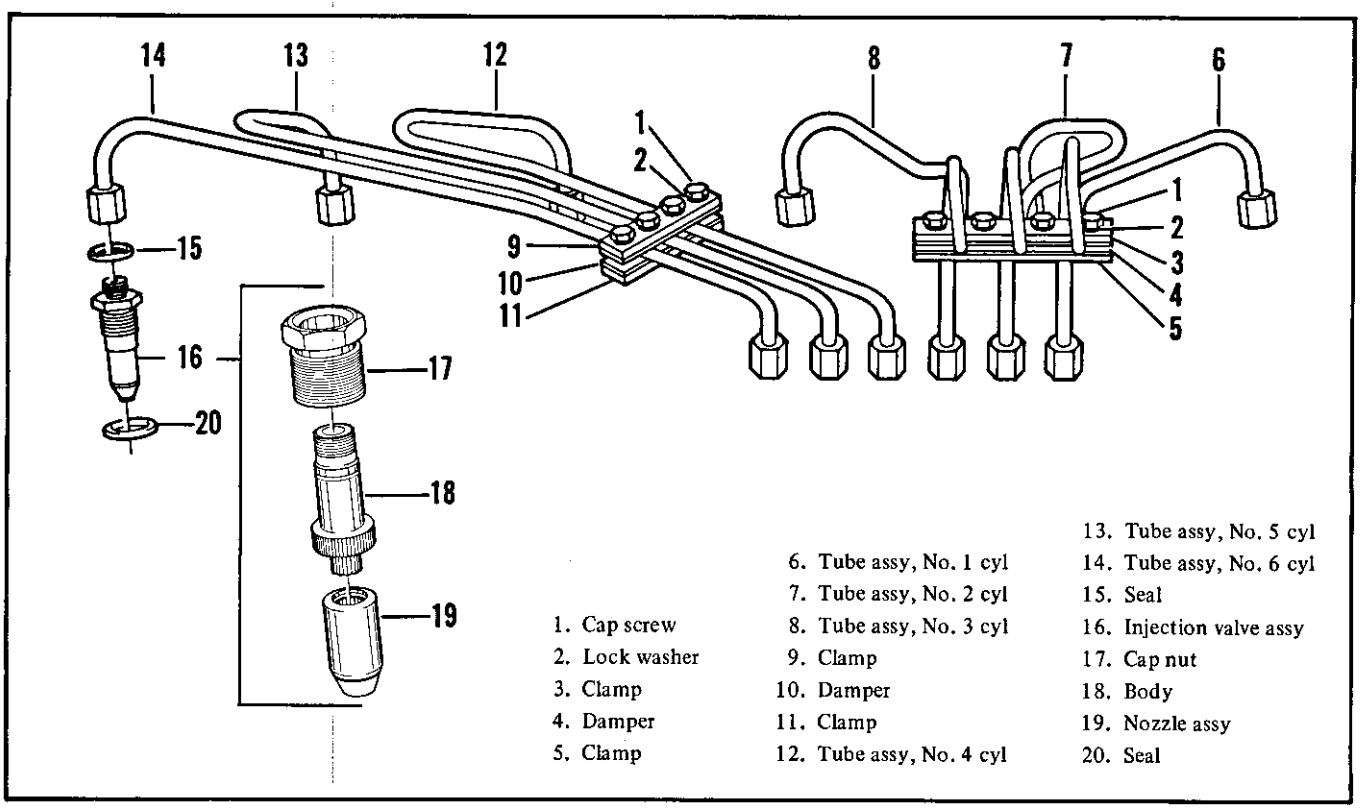


Figure 5-19. Fuel lines and fuel injection valves

paragraph 5-20); then, remove cap screws (6), lock washers (7), valve cover (5), and gasket (8). Assemble in the reverse of disassembly.

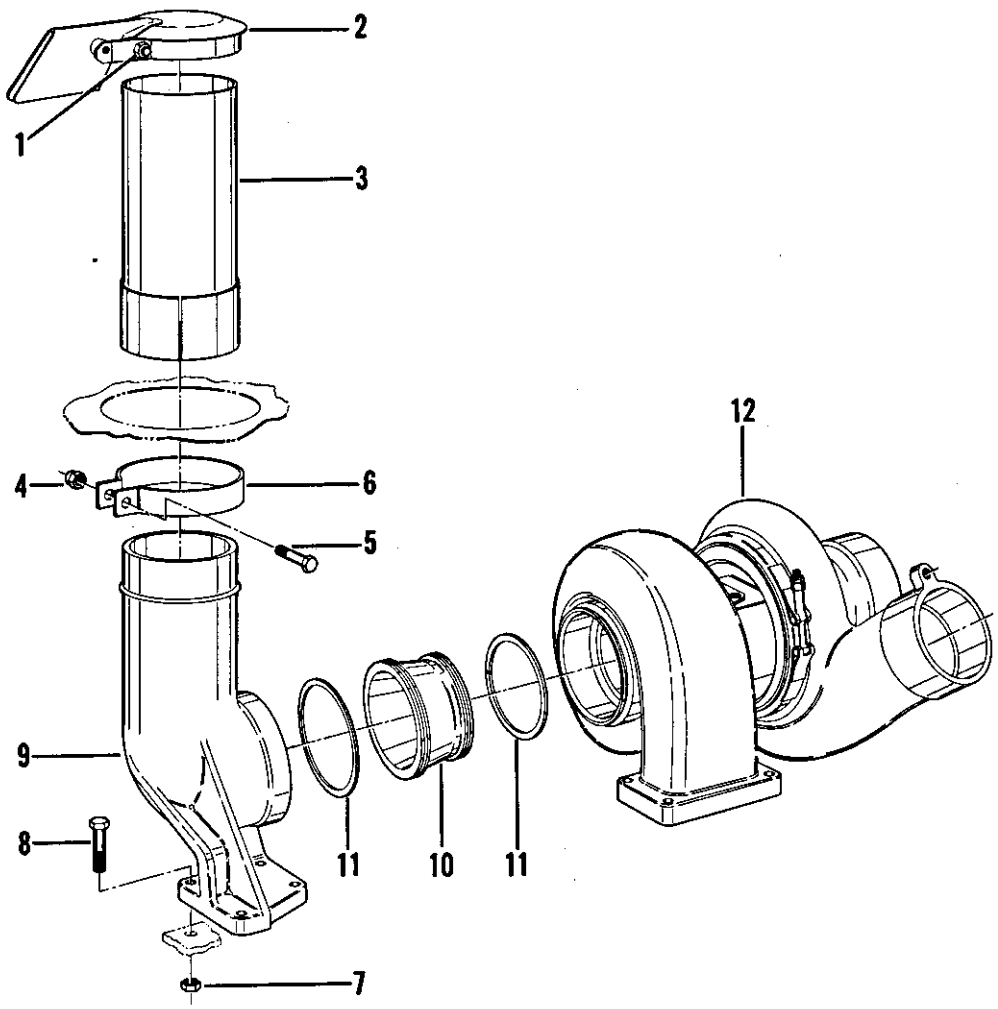
5-34. FUEL LINES AND FUEL INJECTION VALVES (Figure 5-19). Remove cap screws (1), lock washers (2), clamps (3, 5, 9, 11), and dampers (4, 10). Loosen tubing nuts on each end of each fuel line tube assembly and remove tube assembly (6, 7, 8, 12, 13, 14). Remove seals (15). Unscrew and remove fuel injection valve (16) and seals (20). If necessary, remove cap nut (17)and nozzle assembly (19) from body (18). Assemble in the reverse of disassembly. Torque cap nut (17) to 100-110 pound-feet when assembling in engine. Tighten nozzle assembly (19) finger tight on body (18). Torque tube assembly nuts to 30 pound-feet on injection valves (16).

5-35. ENGINE EXHAUST (Figure 5-20). Loosen nut (1) securing rain cap (2) to exhaust extension (3). Remove rain cap (2). Remove nut (4),cap screw (5), extension (3), and clamp (6). Remove nuts (7) and cap screws (8) securing exhaust elbow (9) to engine. Remove elbow and coupling (10) from turbocharger (12). Slide coupling (10) out of elbow (9) and remove seal rings (11) as necessary. Assemble in the reverse of disassembly.

5-36. ENGINE INTAKE (Figure 5-21). Unscrew and remove cold weather starting aid atomizer from air intake elbow (6). Remove cap screws (1, 3), lock washers (2, 5), plain washer (4), and inlet elbow (6). Remove gasket (7). Slide inlet elbow (8) out of turbocharger. Remove seal rings (9) from elbow (8). Assemble in the reverse of disassembly.

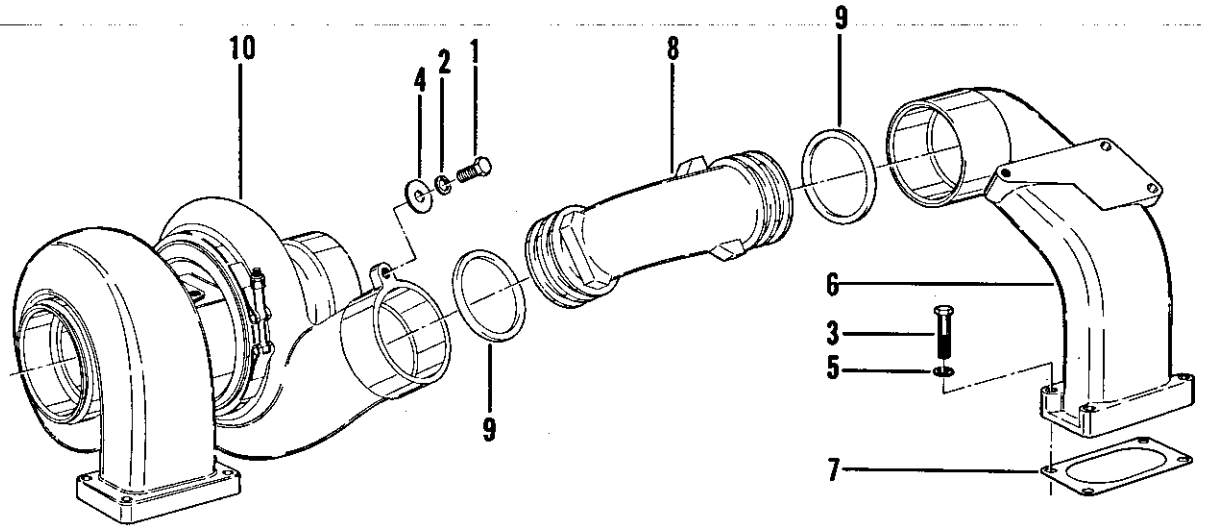
5-37. TURBOCHARGER ASSEMBLY (Figure 5-22). Loosen hose clamp securing engine air intake hose to turbocharger and disconnect hose from turbocharger. Disassemble engine intake (refer to paragraph 5-36). Remove cap screws (1, 5), lock washers (2, 6), tube assemblies (3, 7), and gaskets (4, 8) from turbocharger assembly (11). Remove lock nuts (9) and cap screws (10). Remove the turbocharger assembly (11) and gasket (12) from engine. Assemble in the reverse of disassembly.

5-38. WATER TEMPERATURE REGULATOR (Figure 5-23). Drain coolant and disconnect upper radiator hose from regulator housing (refer to paragraph 5-18). Remove cap screws (1) and housing (2). Remove temperature regulator (4) and gasket (5). Assemble in the reverse of disassembly.



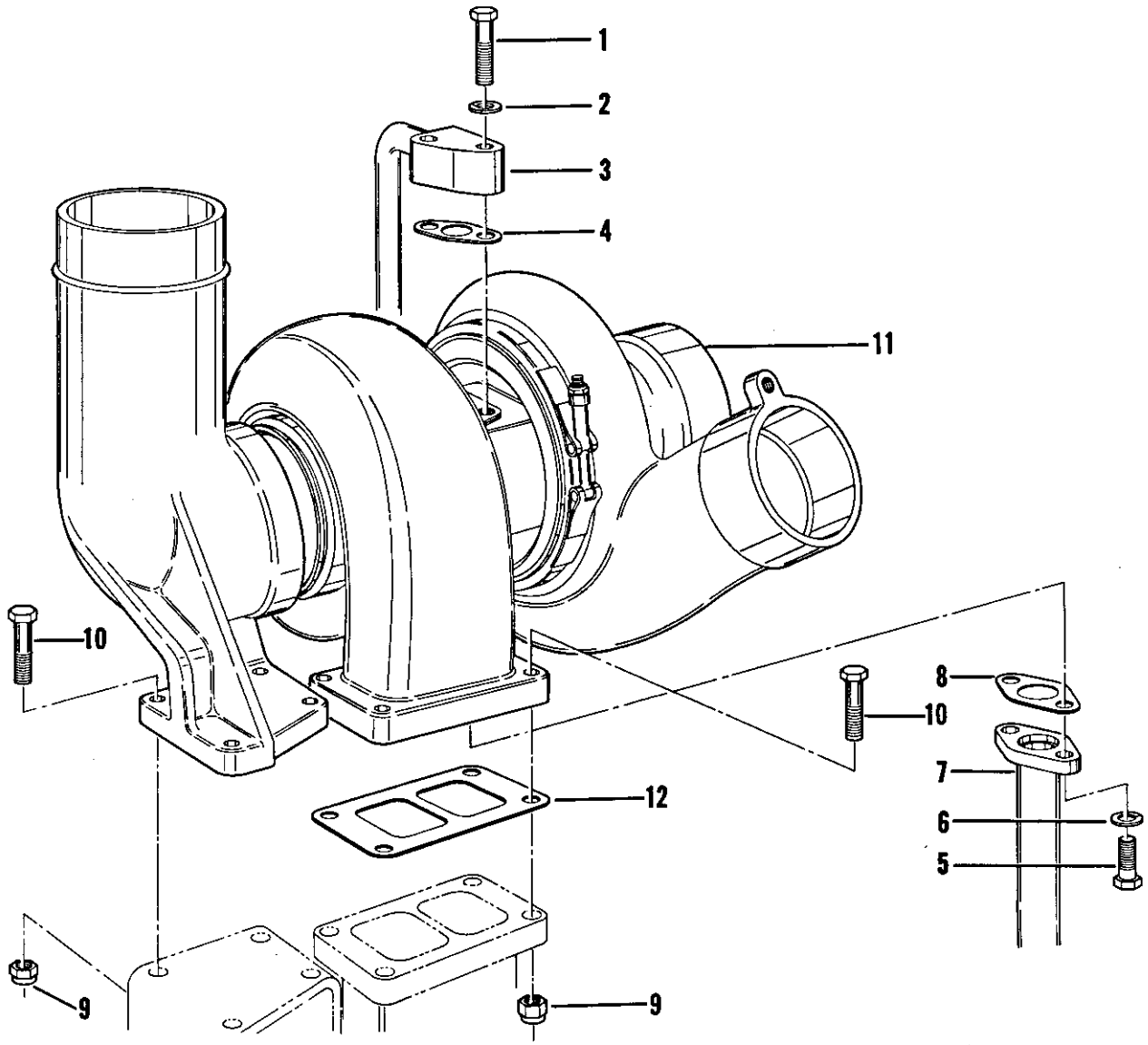
1. Nut
2. Rain cap
3. Exhaust extension
4. Lock nut
5. Cap screw
6. Clamp
7. Nut
8. Cap screw
9. Exhaust elbow
10. Coupling
11. Seal rings
12. Turbocharger

Figure 5-20. Engine exhaust



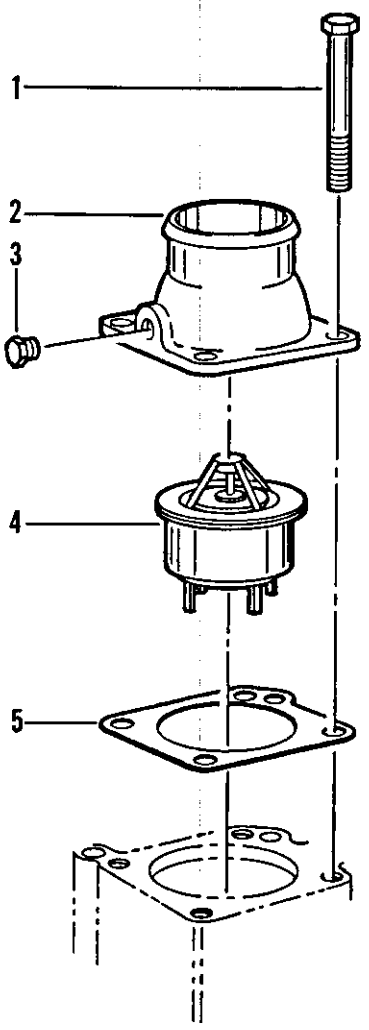
1. Cap screw
2. Lock washer
3. Cap screw
4. Plain washer
5. Lock washer
6. Elbow
7. Gasket
8. Elbow
9. Seal ring
10. Turbocharger

Figure 5-21. Engine intake



1. Cap screw
2. Lock washer
3. Tube assembly
4. Gasket
5. Cap screw
6. Lock washer
7. Tube assembly
8. Gasket
9. Lock nut
10. Cap screw
11. Turbocharger assy
12. Gasket

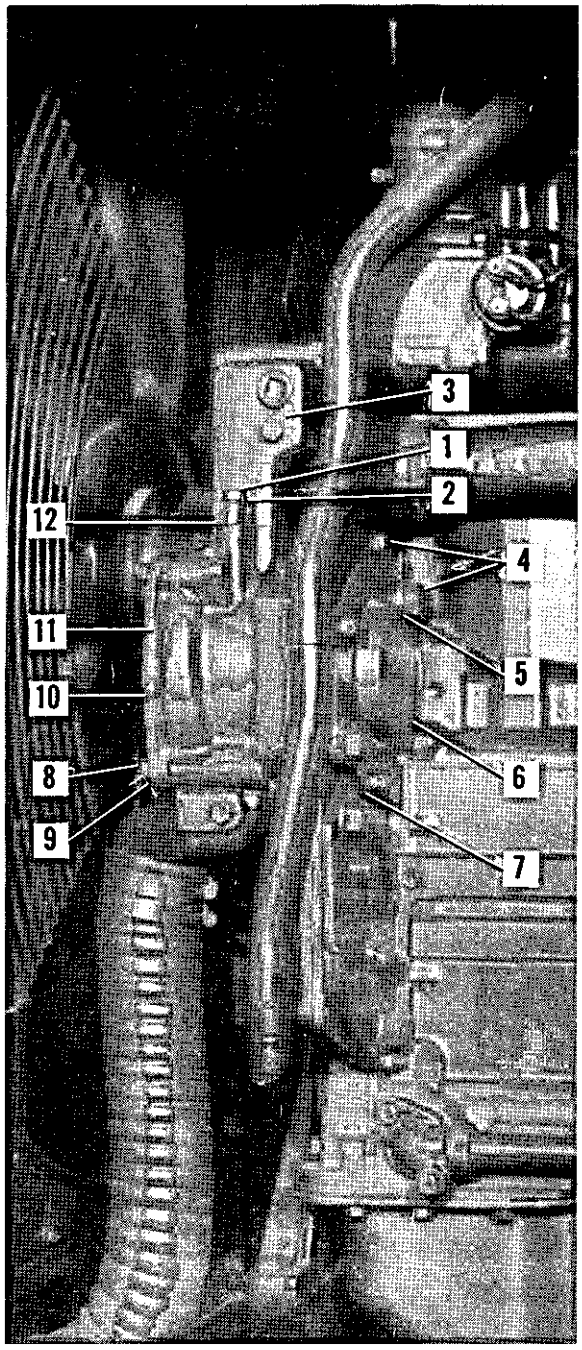
Figure 5-22. Turbocharger assembly



1. Cap screw
2. Housing assembly
3. Plug
4. Temperature regulator
5. Gasket

Figure 5-23. Water temperature regulator

5-39. ENGINE WATER PUMP (Figure 5-24). Remove fan guard, drain coolant from radiator and disconnect lower radiator hose from water pump (refer to paragraph 5-18). Remove cap screws (1) and lock washers (2) from water line elbow (3). Remove cap screws (4), lock washers (5), cover (6), and gasket (7) from rear of front housing. Remove cap screws (8), lock washers (9), water pump (10), and gaskets (11, 12) from front housing. Assemble in the reverse of disassembly.



1. Cap screw
2. Lock washer
3. Elbow
4. Cap screw
5. Lock washer
6. Cover
7. Gasket
8. Cap screw
9. Lock washer
10. Water pump assy
11. Gasket
12. Gasket

Figure 5-24. Engine water pump

5-40. OVERSPEED SWITCH ASSEMBLY (Figure 5-25). Disconnect transmitter leads (1), power leads (2), and harness leads (3) from switch terminals. Remove nuts (4) and lock washers (5) securing overspeed switch (6) to lifting frame. Assemble in the reverse of disassembly. Refer to figure 1-6 for wiring diagram.

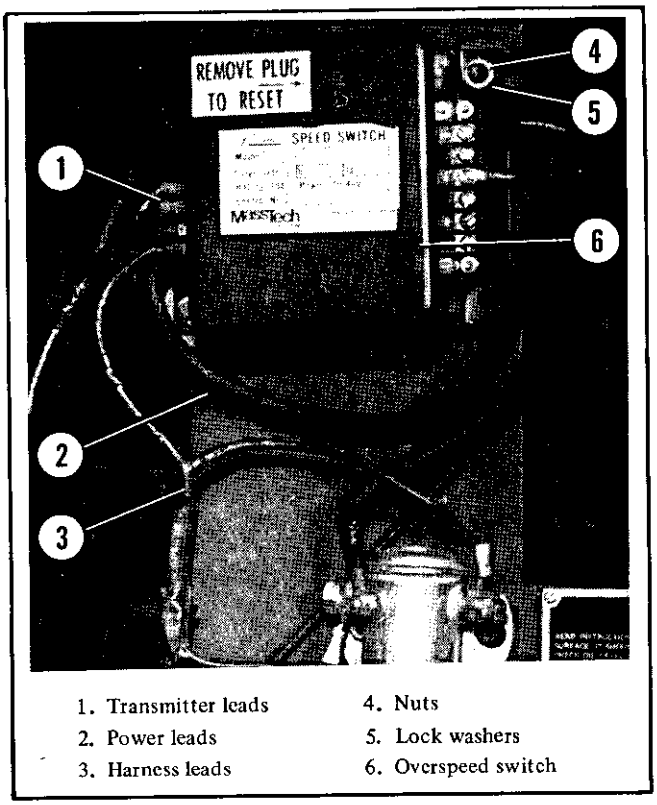
5-41. STARTING MOTOR ASSEMBLY (Figure 5-26). Disconnect ground cable (negative) from battery. Remove nut and lock washer and remove battery ground cable (1) from starter assembly (6). Remove nuts and lock washers and remove starter cable (2) and wiring harness leads (3) from starting motor solenoid. Remove cap screws (4), lock washers (5) and starting motor assembly (6). Assemble in the reverse of disassembly, refer to figure 1-6.

5-42. ALTERNATOR REGULATOR ASSEMBLY (Figure 5-27). Disconnect ground cable (negative) from battery. Unplug alternator harness (1) from regulator assembly (4). Remove cap screws (2), lock washers (3), and alternator regulator assembly (4). If necessary, remove cap screws (5), lock washers (6), and mounting bracket (7). Assemble in the reverse of disassembly.

5-43. ALTERNATOR ASSEMBLY (Figure 5-28). Disconnect ground cable (negative) from battery. Disconnect harness leads from alternator terminals. Remove drive belts from alternator pulley (refer to paragraph 5-27). Remove lead covers (1) as necessary. Remove cap screw (2), washer (3), and spacer (4). Remove nut (5), washer (6), cap screw (7), and adjusting strap (8). Remove cap screws (9) and mounting plate (10). Remove nut (11), washer (12), cap screw (13), spacer (14), and alternator assembly (15). If necessary for replacement, remove cap screws (16), washers (17), and bracket (18). Assemble in the reverse of disassembly and adjust drive belts, paragraph 5-27.

5-44. FUEL RACK SHUTOFF SOLENOID (Figure 5-29). Disconnect battery ground cable (negative). Disconnect ground wire (1) from solenoid terminal. Disconnect wiring harness lead (2) from solenoid terminal. Remove nuts (3), lock washers (4), cap screws (5), cover (6), and gasket (7). Tilt solenoid (8) up to unhook actuator from latch, remove solenoid (8) and gasket (9). Assemble in the reverse of disassembly, refer to figure 1-6.

5-45. SERVICE METER AND TACHOMETER DRIVE (Figure 5-30). Disconnect tachometer drive cable and overspeed switch transmitter from tachometer drive adapter. Unscrew and remove adapter from tachometer drive. To remove service meter (4), remove bolts (1), lock washers (2), and clamps (3). Pull service meter (4) out of tachometer drive (10) and remove seal (5). Remove bolts (6), lock washers (7), clamps (8, 9), and pull tachometer drive (10) off engine. Remove seal (11). Assemble in the reverse of disassembly.

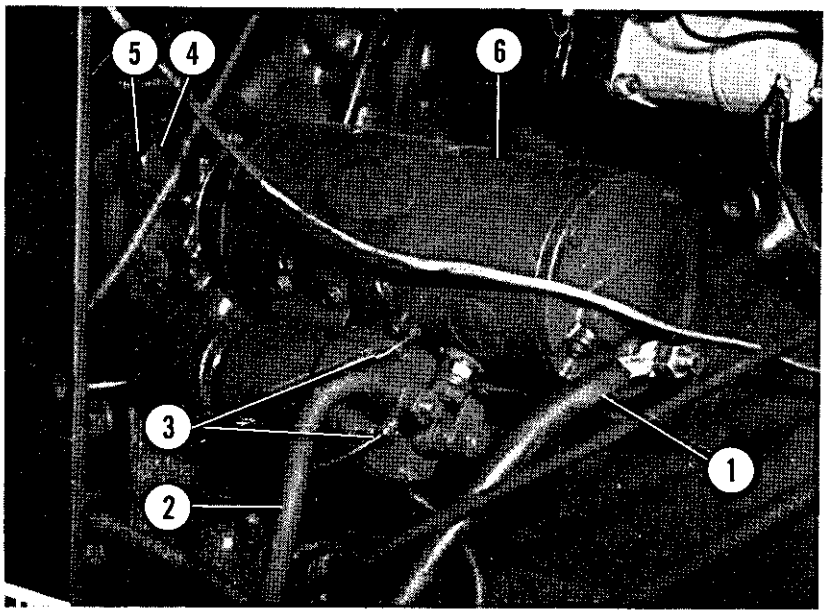


1. Transmitter leads
2. Power leads
3. Harness leads
4. Nuts
5. Lock washers
6. Overspeed switch

Figure 5-25. Overspeed switch assembly

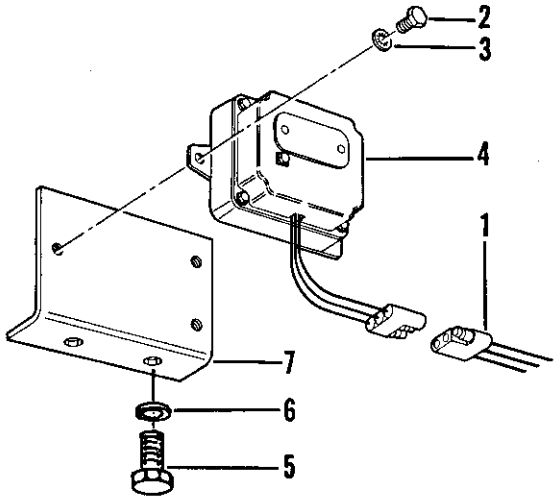
5-46. EXHAUST MANIFOLD (Figure 5-31). Remove engine exhaust (refer to paragraph 5-33), engine intake (paragraph 5-36), and turbocharger assembly (paragraph 5-37). Remove nuts (1), flat washers (2), and rear manifold (3). Remove nuts (4), flat washers (5), and front manifold (6). Remove nuts (7), flat washers (8), and center manifold (9). Remove gasket (10). Assemble in the reverse of disassembly.

5-47. FAN AND HUB ASSEMBLY (Figure 5-32). Remove the cap screws, lock washers, flat washers, and fan guards from the radiator and oil cooler assembly. Loosen the alternator adjusting strap cap screw and move alternator in direction to loosen drive belts; remove the belts (1). Remove cap screws (3), lock washers (4) and fan (2). Remove cap screws (6), lock washers (7), fan adapter (5) and adapter seal (8). Remove cap screws (21) and lock washers (22); remove fan drive group from engine. If necessary to disassemble the hub assembly, remove cap screws (10), lock plate (11), and retaining washer (9). Slide hub group off shaft. Remove pulley (17) from hub (16). Remove seal (14), bearings (12, 15), and spacer (13). Remove grease fitting (18) and spacer (19) from bracket (20) only when required. Assemble in the reverse of disassembly and tighten the drive belts.



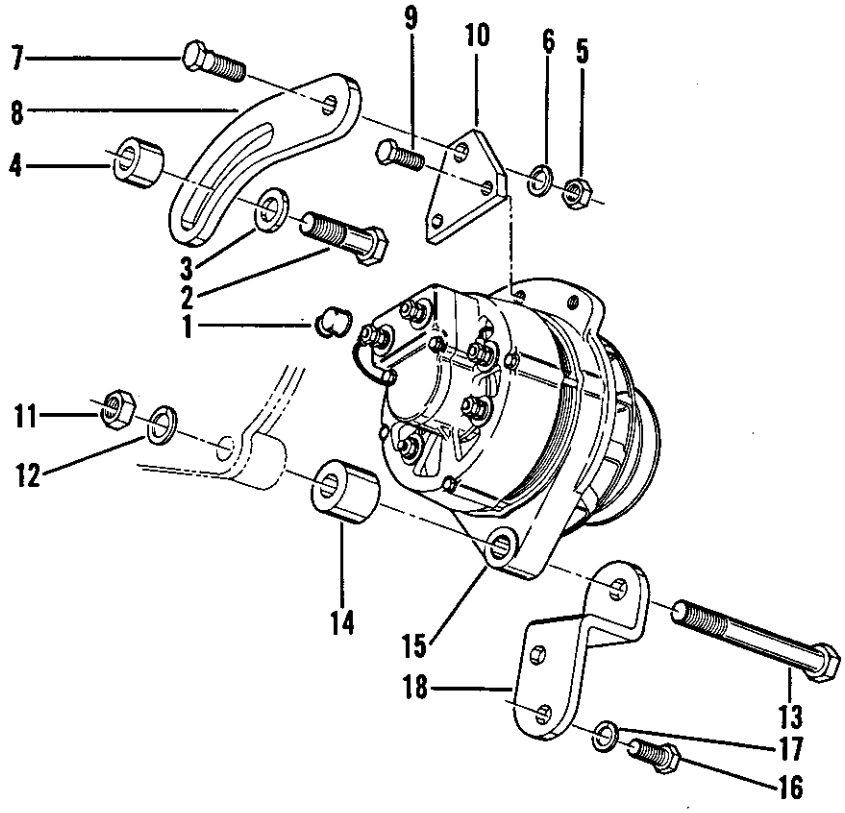
1. Battery ground
2. Starter cable
3. Wiring harness leads
4. Cap screw
5. Lock washer
6. Starter assembly

Figure 5-26. Starting motor assembly



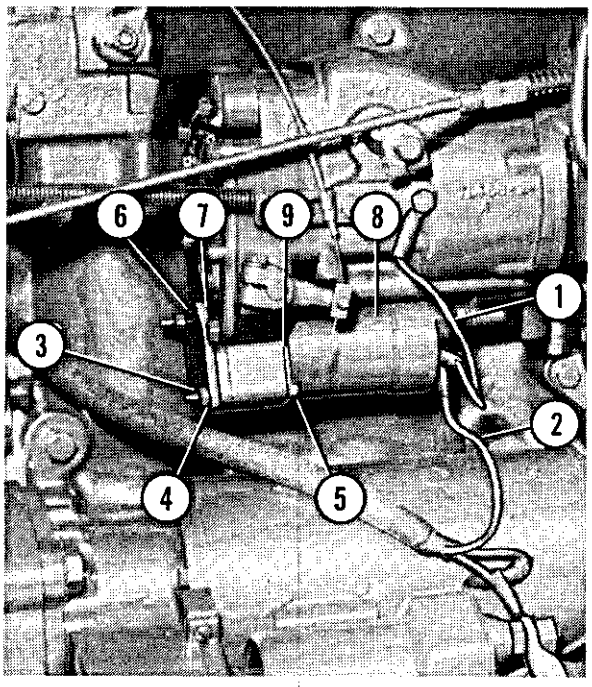
1. Alternator harness
2. Cap screw
3. Lock washer
4. Regulator assembly
5. Cap screw
6. Lock washer
7. Mounting bracket

Figure 5-27. Alternator regulator assembly



1. Lead cover
2. Cap screw
3. Washer
4. Spacer
5. Nut
6. Washer
7. Cap screw
8. Adjusting strap
9. Cap screw
10. Mounting plate
11. Nut
12. Washer
13. Cap screw
14. Spacer
15. Alternator assembly
16. Cap screw
17. Washer
18. Bracket

Figure 5-28. Alternator assembly

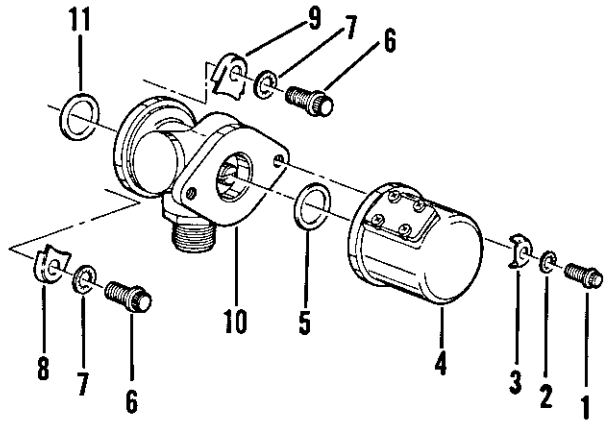


1. Ground wire
2. Harness lead
3. Nut
4. Lock washer
5. Cap screw
6. Cover
7. Gasket
8. Fuel rack shutoff solenoid
9. Gasket

Figure 5-29. Fuel rack shutoff solenoid

5-48. COLD WEATHER STARTING AID (Figure 5-33). Loosen wing nuts (1) on cylinder clamp (2) and unscrew cylinder (3) from valve assembly (14). Assemble cap (4) on valve assembly (14) to prevent foreign matter from entering valve. Loosen machine screws (5) and remove the control cable from wire stop (6) and valve body. Unscrew and remove atomizer (7) from engine air intake. Unscrew tubing nut (9) from adapter (11). Remove nut (9), sleeve (10), and atomizer (7) from fuel line (8) only as necessary. Remove adapter (11) from valve assembly (14). Remove lock nuts (12), lock screws (13), and valve assembly (14) from instrument panel (15). Only if necessary for replacement, remove cylinder clamp (2) from instrument panel (15). Assemble in the reverse of disassembly.

5-49. BLOWDOWN VALVE (Figure 5-34). Disconnect hose assemblies from blowdown valve and remove elbows. Unscrew and remove blowdown valve assembly from nipple in the separator cover. Remove bushing (1), spring (2), and ball (3). Unscrew and remove cap (4) and piston (5) from body (7). Remove preformed packing (6) from piston (5). Assemble in the reverse of disassembly.



1. Bolt
2. Lock washer
3. Clamp
4. Service meter
5. Seal
6. Bolt
7. Lock washer
8. Clamp
9. Clamp
10. Tachometer
11. Seal

Figure 5-30. Service meter and tachometer drive

5-50. THERMAL BYPASS VALVE ASSEMBLY (Figure 5-35). Disconnect the three oil tube assemblies from the thermal bypass valve assembly. Remove the nuts, lock washers, flat washers, and cap screws securing the assembly to the frame. Disassemble the thermal bypass valve assembly in the following sequence.

a. Remove cap screws (1), lock washers (2), and inlet cover (3). Remove gasket (4). Unscrew spring nut (5) and remove power element (6) and bushing (7) from cover (3).

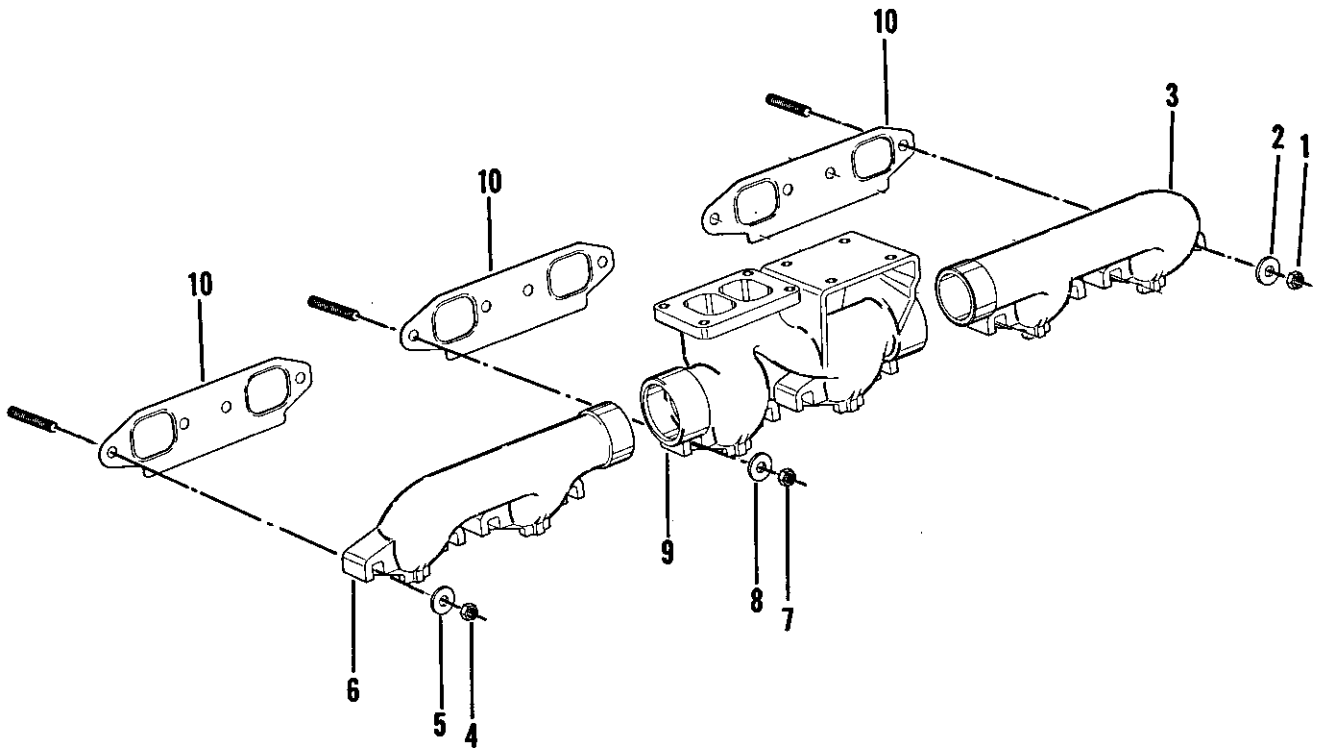
b. Remove outlet cover (8) and gasket (9). Unscrew and remove body (10), washer (11), spring (12), and seat (13), from cover (8).

c. Remove spring (14), cap screw (15), lock washer (16), guide (17). Remove plunger (18), spring (19), and shuttle (20).

d. Remove preformed packing (21) from body (22).

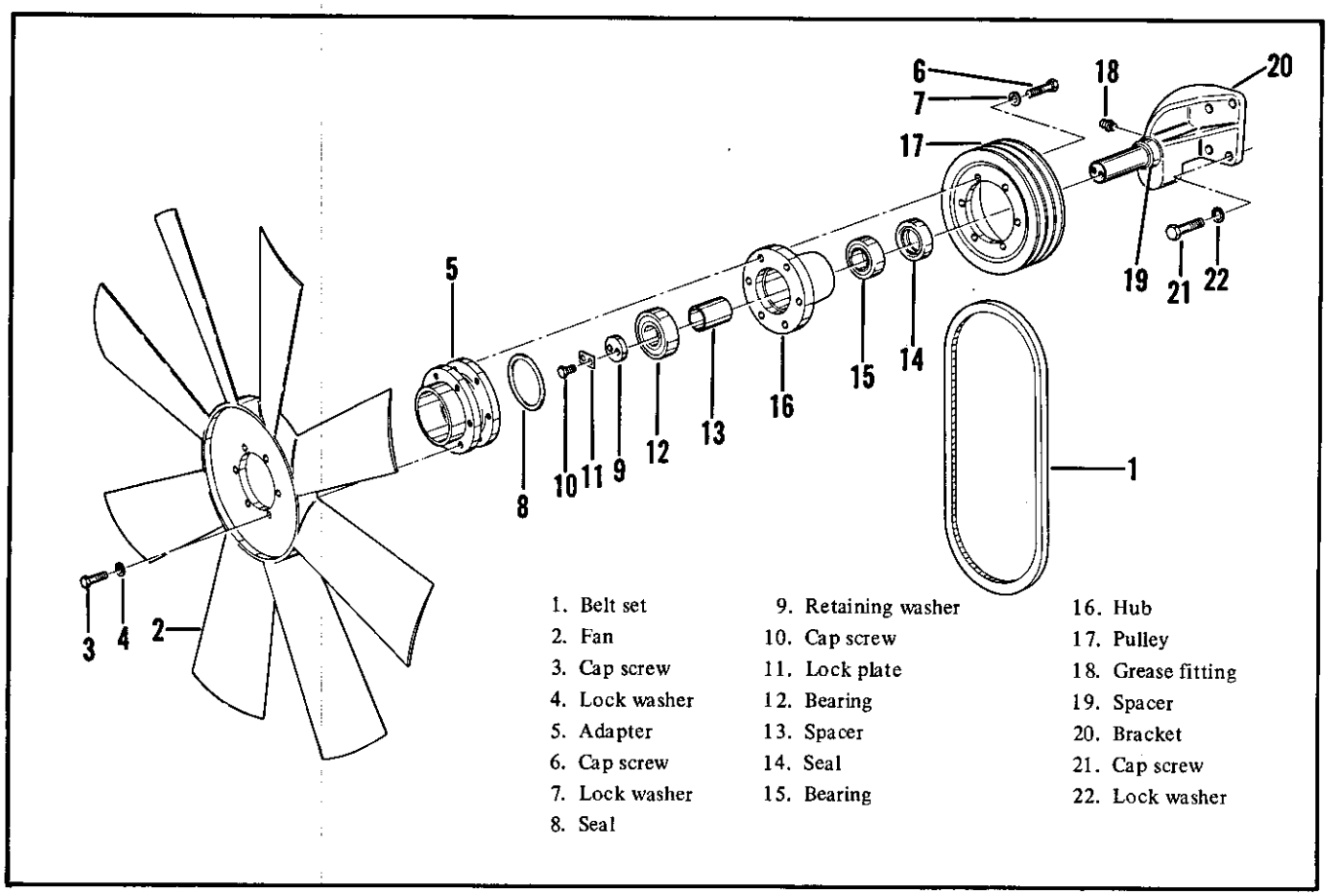
e. Assemble in the reverse of disassembly.

5-51. COMPRESSOR DISCHARGE CONNECTION (Figure 5-36). Disconnect thermostatic switch wire lead connectors from wiring harness. Unscrew and remove thermostatic switch (4) from discharge connection (5). Remove cap screws (6, 7) and lock washers (8). Unscrew discharge



1. Nut
2. Flat washer
3. Rear manifold
4. Nut
5. Flat washer
6. Front manifold
7. Nut
8. Flat washer
9. Center manifold
10. Manifold gasket

Figure 5-31. Exhaust manifold



1. Belt set
2. Fan
3. Cap screw
4. Lock washer
5. Adapter
6. Cap screw
7. Lock washer
8. Seal
9. Retaining washer
10. Cap screw
11. Lock plate
12. Bearing
13. Spacer
14. Seal
15. Bearing
16. Hub
17. Pulley
18. Grease fitting
19. Spacer
20. Bracket
21. Cap screw
22. Lock washer

Figure 5-32. Fan and fan hub assembly

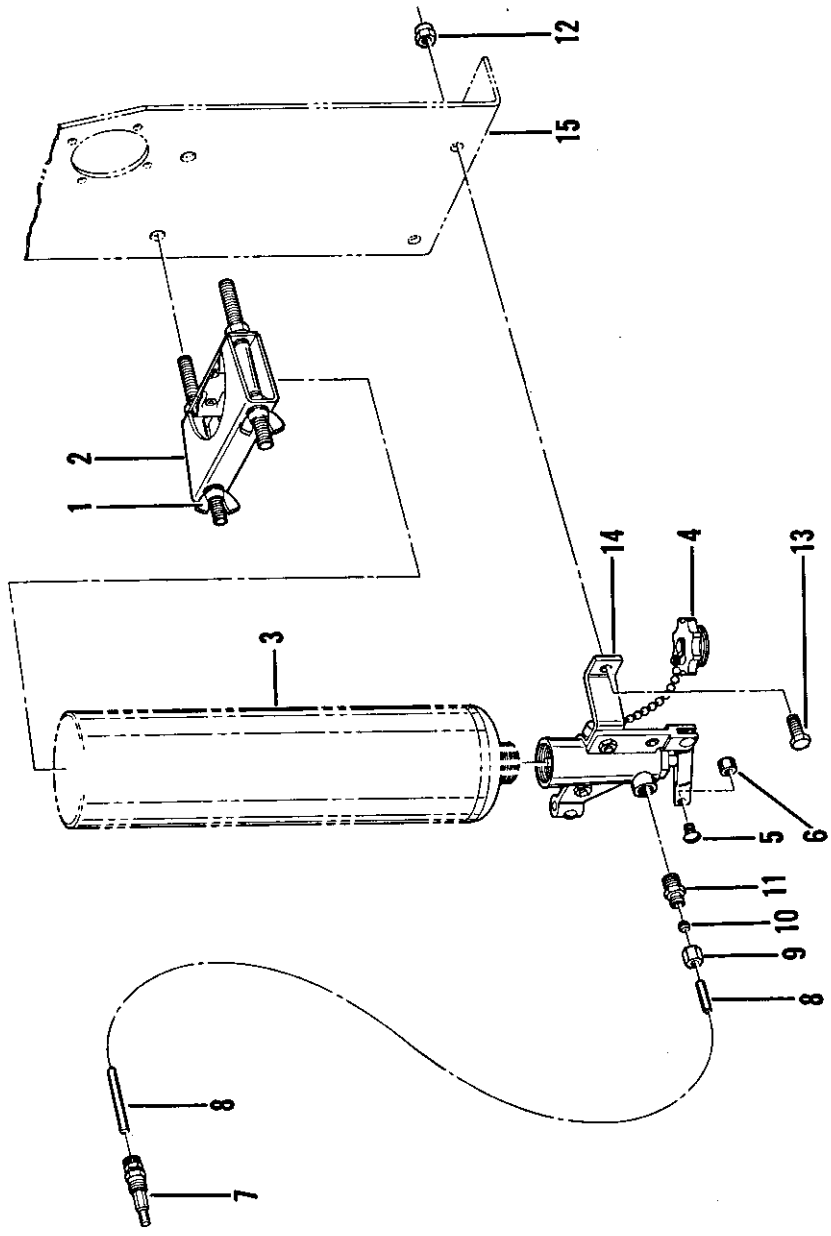
tube adapter (1) from oil separator connection. Remove discharge connection (5), preformed packing (9), discharge tube (2), and preformed packing (3). Assemble in the reverse of disassembly.

5-52. INTAKE CONTROL DIAPHRAGM (Figure 5-37). Remove lock nut securing control rod ball joint to speed control arm and disconnect control rod from arm. Disconnect hose assembly (1) from cover (4). Note position of speed control arm for reassembly. Remove cap screws (2), lock washers (3), and cover (4) from intake control. Remove diaphragm (5). Assemble in the reverse of disassembly.

5-53. MINIMUM PRESSURE VALVE HOUSING AND VALVE (Figure 5-38). Disconnect hose assembly from pressure regulator (1) and remove elbow from regulator. Unscrew and remove pressure regulator (1), close nipple (2), adapter (3), and seal washer (4). Remove socket head cap screws (5) and lock washers (6) securing discharge connection (7) to housing (8). Remove socket head cap screws (9) and lock washers (10) securing housing (8) to oil separator cover (11). Lift housing (8) and remove preformed packing (12, and 13). Remove valve assembly (14), piston (20), spring (21), and preformed packing (22). To disassemble valve assembly, remove lock nut (15), retaining washer (16), facing washer (17), and head (18) from stem (19). Assemble in the reverse of disassembly.

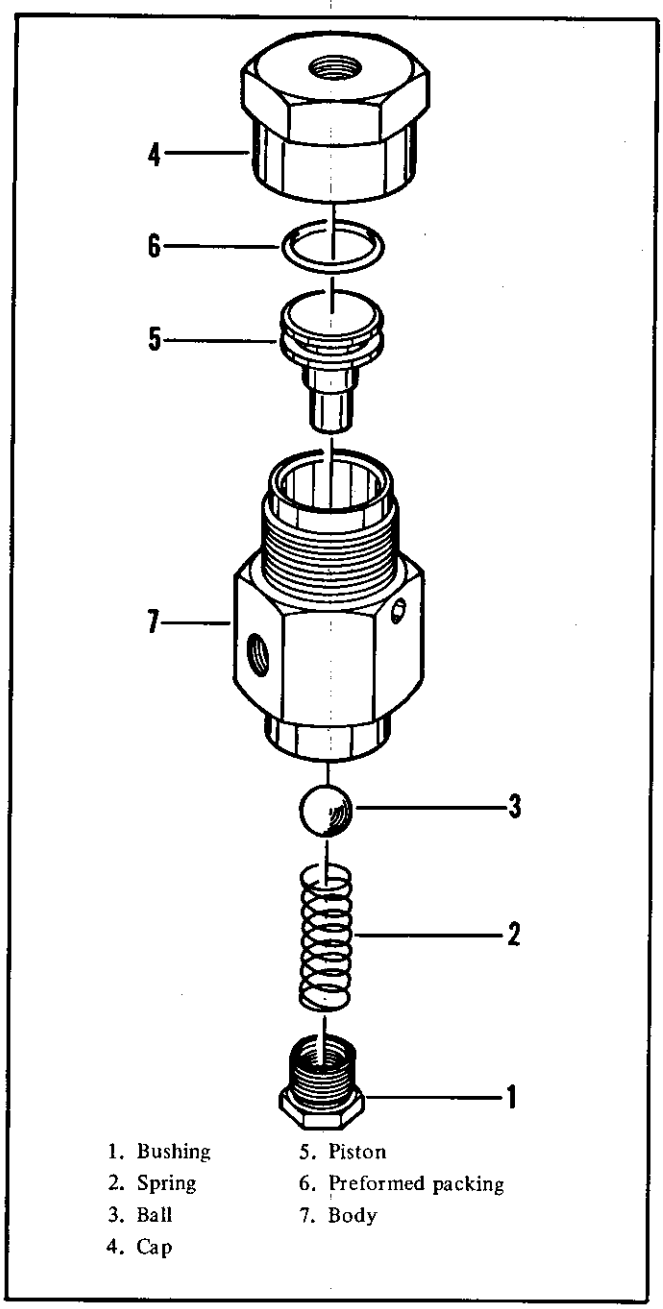
5-54. WHEEL ASSEMBLIES AND TIRES (Figure 5-39). Remove six nuts (1) from front wheels or bolts from rear wheels. Relieve all air pressure from tire; remove tire (2) and tube (3) from wheel (4). Assemble in the reverse of disassembly. See table 1-1 for air pressure of tires.

5-55. WHEEL HUB AND BRAKE DRUM (Figure 5-40). Remove wheel assembly and tire (para 5-54). Pry off grease cap (1), remove cotter pin (2), spindle nut (3), and washer (4). Pull hub assembly (5) off front spindle or hub and drum assembly (6) off rear spindle. Remove outer hub bearing (7), grease seal (8), and inner hub bearing (9) from wheel hub (12) or hub and drum (11). Studs (10) need not be removed from hub (12) unless replacement is necessary. Assemble in the reverse of disassembly.



1. Wing nuts
2. Cylinder clamp
3. Fuel cylinder (ref)
4. Valve cap
5. Machine screw
6. Wire stop
7. Atomizer
8. Fuel line
9. Tubing nut
10. Sleeve
11. Adapter
12. Lock nut
13. Lock screw
14. Valve assembly
15. Instrument panel (ref)

Figure 5-33. Cold weather starting aid



1. Bushing
2. Spring
3. Ball
4. Cap
5. Piston
6. Preformed packing
7. Body

Figure 5-34. Blowdown valve

5-56. ENGINE VALVE LASH SETTING.

NOTE

Engine valve lash setting must be made when engine is cold and not running.

a. Remove the valve cover (paragraph 5-33).

b. Remove the flywheel housing timing cover as shown in figure 5-43.

c. Using a crowbar or equivalent, rotate the engine crankshaft counterclockwise (viewed from flywheel end) at least 60°. Continue rotating until "TC-1" timing mark on the flywheel aligns with the flywheel housing timing pointer.

d. Observe the rockers for cylinder No. 1. Determine if piston is on compression or exhaust stroke. If on compression stroke, both inlet and exhaust valve rockers, or roller arms, can be easily moved with finger pressure. If on exhaust stroke, only inlet valve rockers, or roller arms, can be moved freely with finger pressure.

e. Refer to table 5-4 below and set only those valves specified in the appropriate table.

f. Loosen locknut on the adjusting screw. Hold the locknut and turn adjusting screw to obtain clearance of 0.015 inch on inlet valves and 0.025 inch on exhaust valves. Hold adjusting screw and tighten locknut. Recheck the clearance.

g. Rotate the crankshaft one complete revolution in counterclockwise direction until "TC-1" timing mark is aligned with timing pointer.

h. Set the remaining valves as specified above.

i. After setting valve lash, start the engine and maintain low idle speed. Observe the serrations on each valve retainer. Each valve retainer should turn slightly each time the valve closes.

j. If valve retainers do not rotate refer trouble to overhaul personnel.

k. If all valves rotate, stop the engine and install timing cover and valve cover.

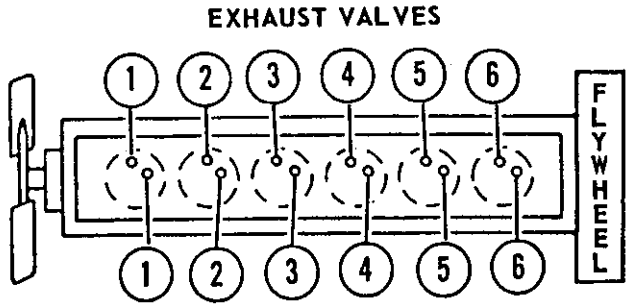
5-57. PARKING BRAKE ADJUSTMENT. If the parking brake fails to apply properly, adjust as follows.

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

Table 5-4. Cylinder Numbering and Valve Identification



COMPRESSION STROKE		EXHAUST STROKE	
VALVE	CYLINDERS	VALVE	CYLINDERS
Inlet Exhaust	1-2-4 1-3-5	Inlet Exhaust	3-5-6 2-4-6

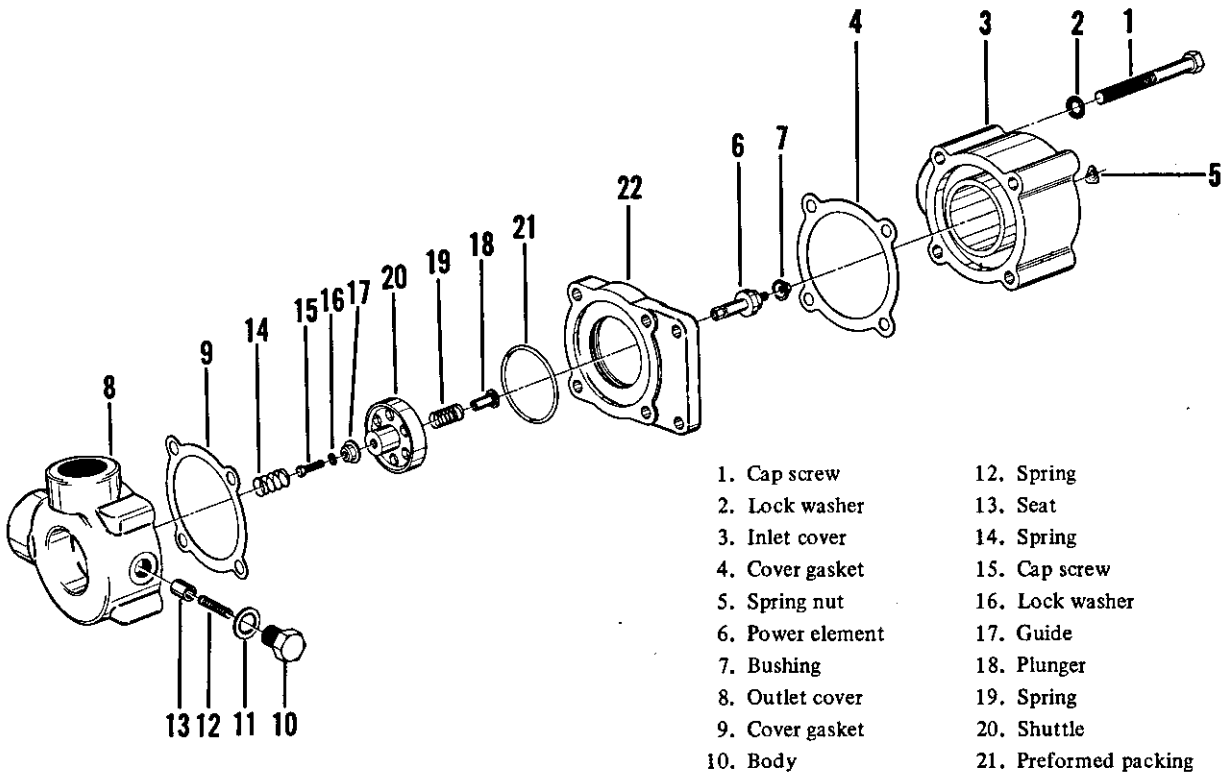
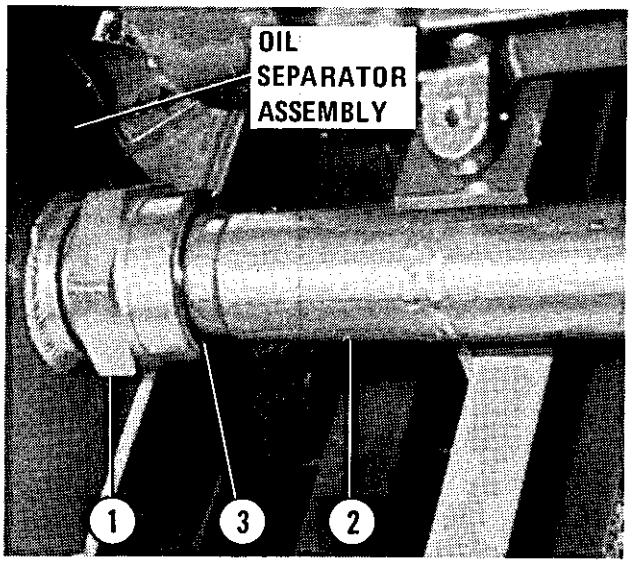
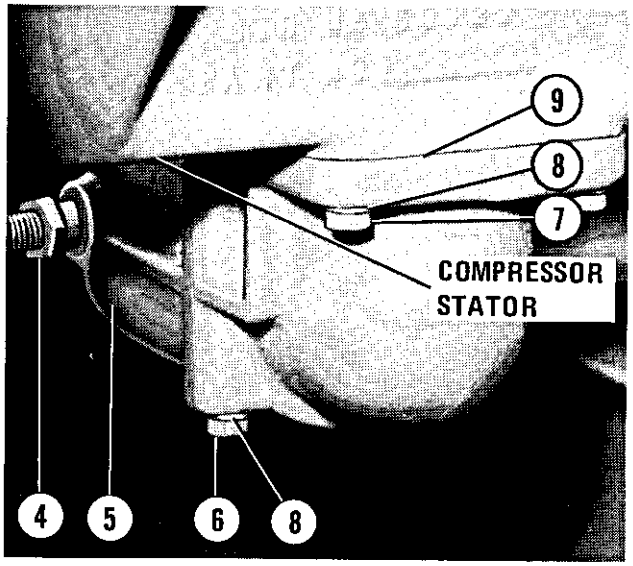


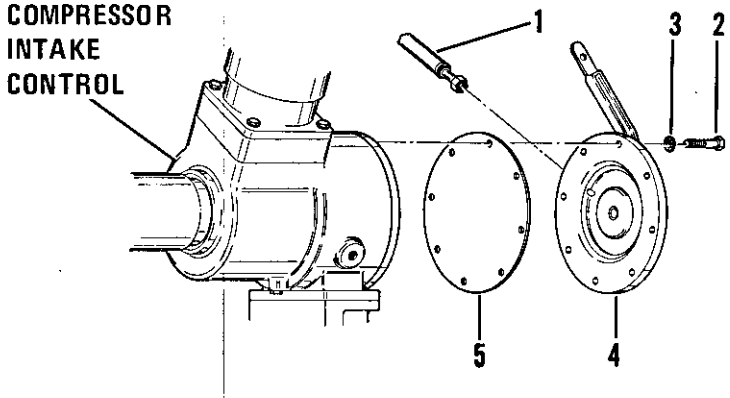
Figure 5-35. Thermal bypass valve assembly





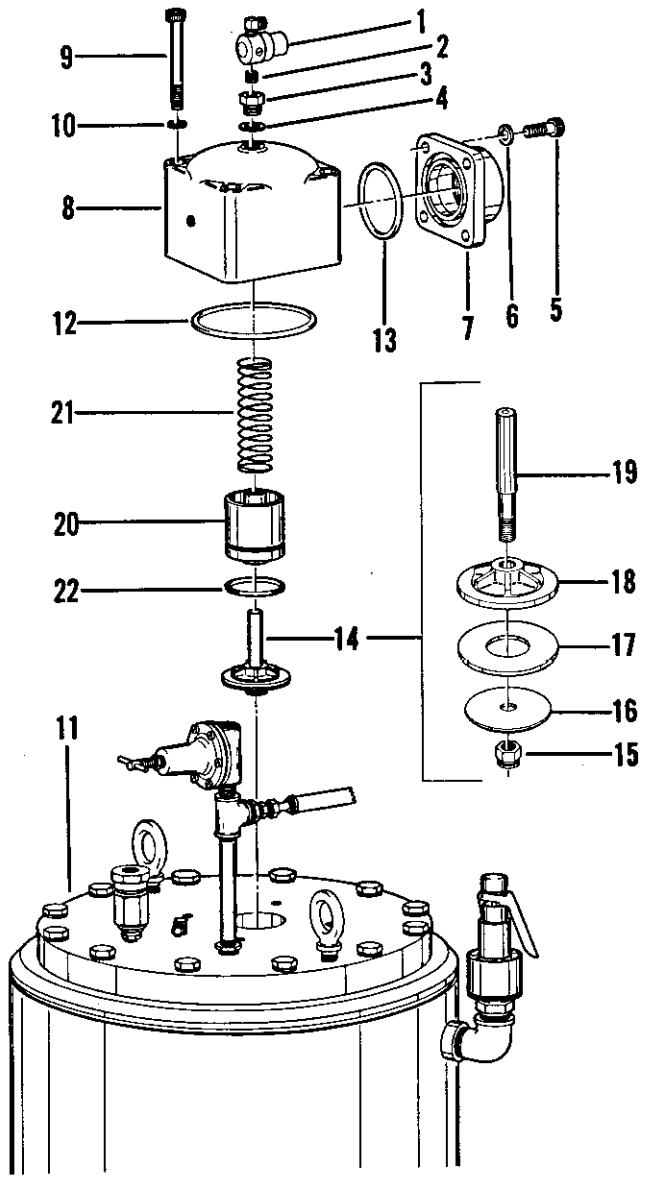
1. Discharge tube adapter
2. Discharge tube
3. Preformed packing
4. Thermostatic switch
5. Discharge connection
6. Cap screw
7. Cap screw
8. Lock washer
9. Preformed packing

Figure 5-36. Compressor discharge connection



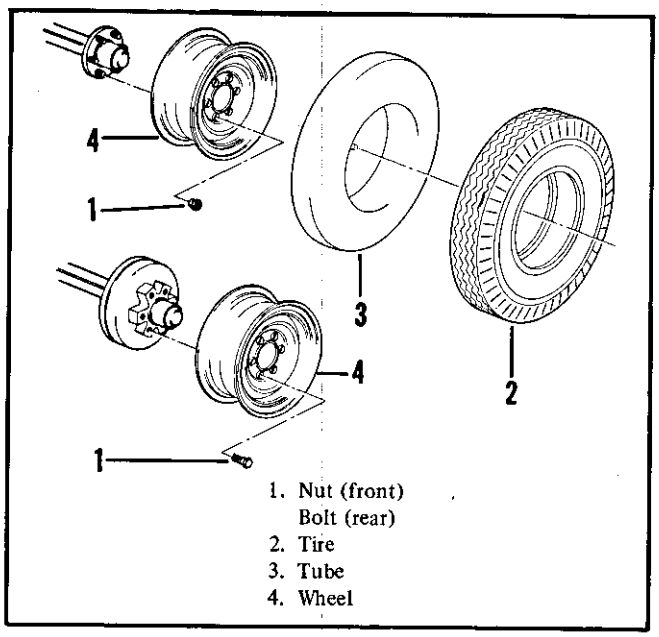
1. Hose assembly
2. Cap screw
3. Lock washer
4. Cover
5. Diaphragm

Figure 5-37. Intake control diaphragm



1. Pressure regulator
2. Close nipple
3. Adapter
4. Seal washer
5. Socket head cap screw
6. Lock washer
7. Discharge connection
8. Housing
9. Socket head cap screw
10. Lock washer
11. Oil separator cover
12. Preformed packing
13. Preformed packing
14. Valve assembly
15. Lock nut
16. Retaining washer
17. Facing washer
18. Head
19. Stem
20. Piston
21. Spring
22. Preformed packing

Figure 5-38. Minimum pressure valve housing and valve



1. Nut (front)
   Bolt (rear)
2. Tire
3. Tube
4. Wheel

Figure 5-39. Wheel assemblies and tires

brake lever fully counterclockwise; then, turn the knob four or five turns clockwise.

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

e. Turn the yoke on the end of the operating rod farther onto the rod threaded end to shorten the effective length of the rod.

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

g. Adjust the brakes for lining wear semi-annually or any time brake application is insufficient or uneven. Adjust as follows.

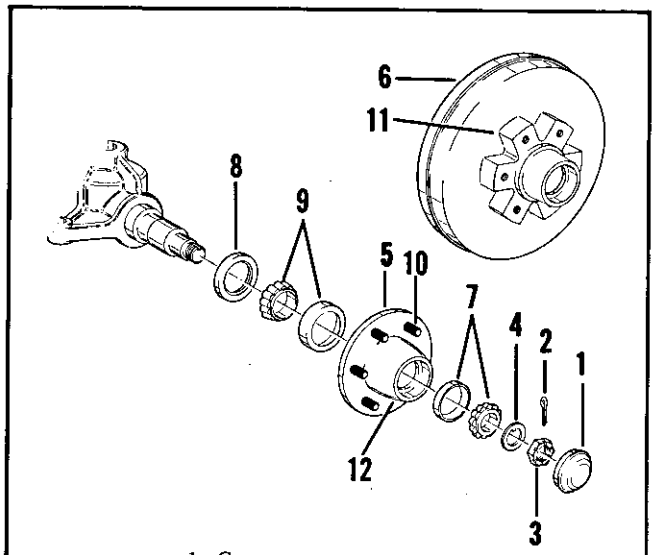
CAUTION

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

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

i. Release brakes completely.

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



1. Grease cap
2. Cotter pin
3. Nut
4. Washer
5. Hub assembly (front)
6. Hub and drum assembly (rear)
7. Outer hub bearing
8. Grease seal
9. Inner hub bearing
10. Stud
11. Hub and drum (rear)
12. Hub (front)

Figure 5-40. Wheel hub and brake drum

k. 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.

l. 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.

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

n. Adjust the brake lining on the other wheel in the same manner.

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

5-58. WHEEL ALIGNMENT. Quarterly, or if the tires wear unevenly, check alignment of front wheels to rear wheels as follows.

a. Place the trailer on a hard, flat, and level surface with the front wheels placed in the straight ahead position.

b. Use a long straightedge positioned across the sides of the front and rear wheels to check that the front wheels align with the rear wheels, except for a small amount of toe-in (described in paragraph 5-59 below).

c. If the front and rear wheels are not aligned, remove the cotter pins and nuts that secure the ball joints to the spindle and knuckle assembly. Disengage the ball joint from the spindle and knuckle assembly.

d. Using the straightedge, align the front and rear wheels so that they are in line on each side of the vehicle, except for a slight toe-in of the front wheels (paragraph 5-59 below).

e. Loosen the nuts that secure the ball joints to the tie rods. Turn the ball joints on the tie rods until the ball joints align with the steering knuckle holes. Tighten the nuts on the tie rods securing the ball joints in position.

f. Assemble the nuts and cotter pins on ball joints securing them to the steering knuckles.

g. Recheck wheel alignment as described above and front wheel toe-in (paragraph 5-59).

5-59. FRONT WHEEL TOE-IN ADJUSTMENT. Check wheel alignment as described above in paragraph 5-58; then, adjust front wheel toe-in as follows:

a. Insert thumbtack or pin markers into the front center of the tire tread on each front wheel. Carefully measure the distance between the markers.

b. Push the vehicle backwards in a straight line until the markers are positioned at the back of the wheel. Again carefully measure the distance between the markers. The measured distance when markers are at the rear must not exceed the distance between markers when at the front by more than 1/4 inch.

c. If toe-in is not correct, remove cotter pins and nuts from ball joints. Disengage ball joints from steering knuckles.

d. Using a straightedge along the sides of the front and rear wheels, position the front wheels so that proper toe-in is obtained.

e. Loosen nuts that secure the ball joints to the tie rods and turn ball joints in or out on the tie rods until the ball joint end aligns with steering knuckle hole.

f. Insert ball joint end through steering knuckle hole; tighten nut securing ball joint on tie rod. Recheck toe-in as described in above steps. When toe-in is correct, assemble nuts and cotter pins securing ball joints to steering knuckles.

5-60. REPAIR OR REPLACEMENT.

See table 5-5.

5-61. ALIGNMENT.

5-62. No alignment is required of components or parts replaced within the scope of the operator or service personnel in Part 1 of this manual. Alignment within this scope has been covered in detailed paragraphs.

5-63. TEST.

5-64. Tests to be performed after repair of the unit, within the scope of the operator and service personnel in Part 1 of this manual, are limited to the actual running of the equipment detailed in paragraph 4-38 and steps thereunder.

5-65. CALIBRATION/ACCURACY ADJUSTMENT.

5-66. Due to the design of the equipment, the calibration/accuracy adjustments, within the scope of the operator and service personnel in Part 1 of this manual, are limited to the adjustment of the speed control linkage (paragraph 5-5) and adjustment of the air pressure regulator (paragraph 5-6).

Table 5-5. Inspection, Repair, or Replacement

COMPONENT	INSPECTION	REPAIR OR REPLACEMENT
Radiator and cooler assembly	a. Inspect core fins and headers for evidence of leakage. b. Inspect for obstructions such as accumulated dirt, leaves, etc. c. Inspect hoses and clamps for cracks, breaks, and leakage.	a. Solder closed any small holes. Replace radiator or oil cooler if damaged beyond solder repair. b. Remove obstructions and clean with compressed air. c. Replace the damaged parts.
Cooling fan	a. Inspect fan for bent blades, free rotation, and wobble.	a. Replace fan if blades are bent. Replace bearings if fan does not rotate freely or wobbles excessively.
Drive belts	a. Inspect for fraying and deterioration. b. Check for proper adjustment.	a. Replace belts as a set. b. Adjust to proper tension by moving alternator. Refer to figure 5-41.
Engine temperature regulator	a. Inspect temperature regulator for opening temperature by performing test shown in figure 5-42. Apply heat to pan of water while stirring water to maintain uniform temperature. Observe temperature when regulator begins to open. Opening temperature should be 175°F. Full open temperature should be approximately 195°F.	a. Replace temperature regulator if faulty.
Water pump	a. Inspect water pump for evidence of leaking, cracks, and breaks. b. Inspect pump impeller for breaks, cracks, and freedom of rotation.	a. Replace gaskets and pump assembly if damaged. b. Repair pump if defective.
Turbocharger	a. Inspect housing for cracks and breaks. b. Check impeller for freedom of rotation and shaft end clearance. End clearance shall be 0.006 to 0.011 inch.	a. Repair turbocharger assembly if damaged. b. Repair a defective turbocharger assembly.
Alternator	a. Inspect alternator housing and terminals for cracks, breaks, tightness of connections, and any other damage. b. Inspect drive pulley for freedom of rotation and for cracks and chipping of grooves.	a. Repair a damaged alternator. b. Replace a damaged pulley.

Table 5-5. Inspection, Repair, or Replacement (Cont)

COMPONENT	INSPECTION	REPAIR OR REPLACEMENT
Alternator (Cont)	c. Observe ammeter and determine if alternator is delivering charge to batteries when batteries are low.	c. Repair alternator if not charging properly.
Alternator regulator	a. Inspect cable connectors for damage and cable for fraying. Inspect for dents and breaks.	a. Replace regulator if damaged in any way.
Engine breather	a. Inspect engine breather tube for dents and deterioration of hose. b. Inspect breather for clogging,dents, cracks, and breaks.	a. Replace damaged parts. b. Clean breather every 250 service hours. Replace if damaged.
Engine oil filter	a. Inspect filter for dents and breaks. b. Check relief valve for proper operation.	a. Replace if damaged. b. Replace all defective parts.
Compressor oil filter	a. Inspect oil filter housing for cracks and breaks. b. Inspect oil filter head assembly for cracks and breaks and for leakage at mounting flange and threads. c. Inspect element for cracks and enlarged holes.	a. Replace housing if damaged. b. Replace sealing gaskets as necessary. Replace head assembly if defective. c. Replace element if damaged.
Primary fuel filter	a. Inspect filter body for cracks, breaks, and dents. b. Inspect element for cracks and breaks. c. Inspect cover for cracks and breaks.	a. Replace body if damaged. b. Replace defective element. c. Replace cover.
Final fuel filter	a. Inspect case assembly for dents, cracks, breaks, and broken spring. b. Inspect head assembly for cracks and breaks.	a. Replace a damaged case assembly. b. Replace a damaged head assembly.
Fuel bypass valve	a. Inspect fuel bypass valve spring for defective coils, cracks, and breaks. b. Inspect bypass valve for nicks, cracks, and distortion.	a. Replace defective spring. b. Repair damaged bypass valve.
Fuel lines and fittings	a. Inspect all fuel lines and fittings for kinks, distortion, and damaged threads.	a. Replace all damaged lines and fittings. Tighten fuel line nuts to torque of 25-35 pound-feet.

Table 5-5. Inspection, Repair, or Replacement (Cont)

COMPONENT	INSPECTION	REPAIR OR REPLACEMENT
Fuel injection valves	a. Inspect all parts for nicks, cracks, distortion or other damage.	a. Replace a damaged fuel injection valve. Tighten fuel injection valve nut to a torque value of 100-110 pound-feet.
Air cleaners and caps	a. Inspect air cleaner caps and air cleaner body for dents and cracks. b. Inspect elements for breaks. c. Inspect automatic unloader for cuts and deterioration.	a. Replace damaged parts. b. Replace damaged element. c. Replace a damaged automatic unloader.
Batteries and cables	a. Inspect battery cables for frayed insulation and evidence of burning. b. Inspect batteries for cracks and loose posts. c. Check level of electrolyte. Proper level is approximately 3/8-inch above plates.	a. Replace all defective cables. b. Replace a damaged battery. c. Fill batteries to proper level and check specific gravity with hydrometer.
Starter	a. Inspect starter clutch for chipped or cracked teeth. Inspect case and terminals for cracks and damaged threads. Inspect brushes and springs for excessive wear, cracks, or other defect.	a. Repair starter if defect is detected.
Service meter and tachometer drive	a. Inspect service meter and tachometer drive for cracks, breaks, and damaged cable.	a. Replace all damaged parts.
Overspeed switch	a. Inspect overspeed switch for cracks, breaks, and loose terminals. Check reset button for proper operation.	a. Replace a defective overspeed switch.
Shutoff solenoid	a. Inspect shutoff solenoid for cracks, breaks, and loose terminals.	a. Replace a defective shutoff solenoid.
Glow plugs	a. Check glow plugs for defect as outlined in paragraph 5-32.	a. Replace all defective glow plugs. Apply anti-seize compound to threads and tighten glow plug to a torque of 10-12 pound-feet.
Engine valve lash	a. Check engine valve lash every 2000 service hours or as necessary.	a. Set valve lash as outlined in paragraph 5-56.
Blowdown valve	a. Inspect spring for defective coils, cracks, and distortion.	a. Replace spring.

Table 5-5. Inspection, Repair, or Replacement (Cont)

COMPONENT	INSPECTION	REPAIR OR REPLACEMENT
Blowdown valve (Cont)	b. Inspect ball for scoring and proper seating.	b. Replace ball.
	c. Inspect piston and preformed packing for cracks, nicks, and distortion.	c. Replace all defective parts.
Thermal bypass assembly	a. Inspect thermal bypass assembly for evidence of leaking, cracks, breaks, or other damage.	a. Repair the thermal bypass assembly if damage is detected. Replace gaskets as necessary.
Compressor air discharge connection	a. Inspect connection on bottom of compressor and to oil separator for evidence of leakage.	a. Replace preformed packing as necessary.
	b. Inspect discharge connection for cracks and breaks.	b. Replace connection.
Compressor intake control	a. Inspect control arm for cracks, breaks, and bending.	a. Replace a damaged control arm.
	b. Inspect diaphragm for cuts, tears, and deterioration.	b. Replace defective diaphragm.
Non-Return valve	a. Inspect spring for defective coils, cracks, and distortion.	a. Replace a defective spring.
	b. Inspect preformed packing for nicks and deterioration.	b. Replace preformed packing.
	c. Inspect valve stem for cracks and distortion. Inspect facing washer and piston for evidence of wear, cracks, or any other defect.	c. Replace all defective parts.
Parking brakes	a. Check brakes for even operation of each brake on the rear wheels. Check for lining wear.	a. Adjust the brakes as outlined in paragraph 5-57. Refer to overhaul personnel for lining replacement.
Wheels	a. Inspect tires on wheels for uneven wear.	a. Adjust front wheel toe-in and alignment as outlined in paragraphs 5-58 and 5-59.
	b. Inspect tie rods for bending, cracks, or any other damage.	b. Replace defective tie rods and adjust front wheel toe-in and wheel alignment.
Control panel gauges	a. Inspect all gauges for broken faces and secure connections.	a. Replace all broken gauges.

Table 5-5. Inspection, Repair, or Replacement (Cont)

COMPONENT	INSPECTION	REPAIR OR REPLACEMENT
Control panel gauges (Cont)	b. Check operating gauges for proper readings. Correct readings are: Engine oil pressure: 45-55 PSI at 2100 RPM Water temperature gauge: 170° - 190°F normal Air pressure: 80-105 PSI loaded 115-120 PSI unloaded Tachometer: 1200-1300 RPM idle 2100 RPM full load	b. Replace all faulty gauges.

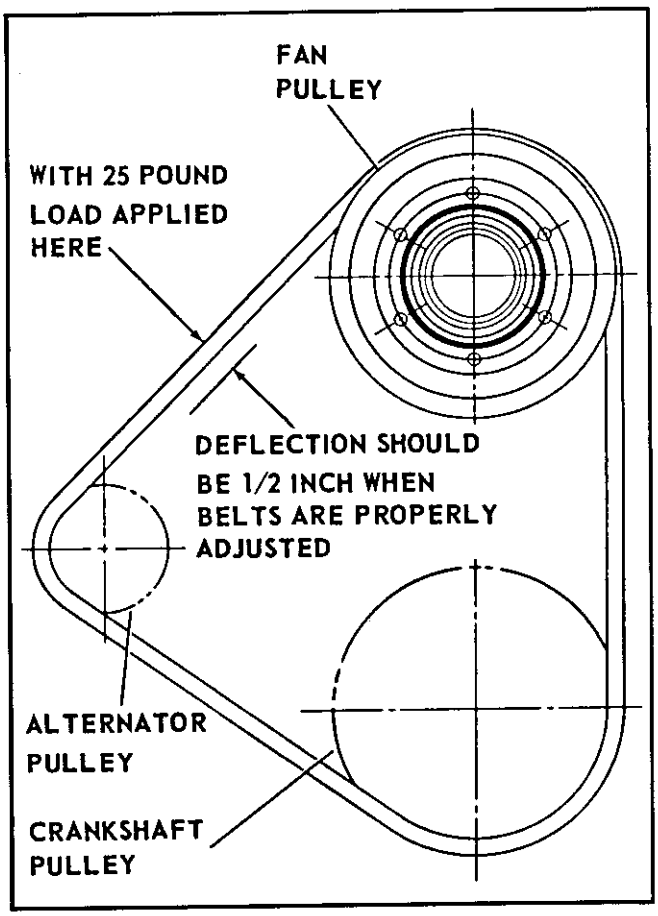


Figure 5-41. Drive belt adjustment

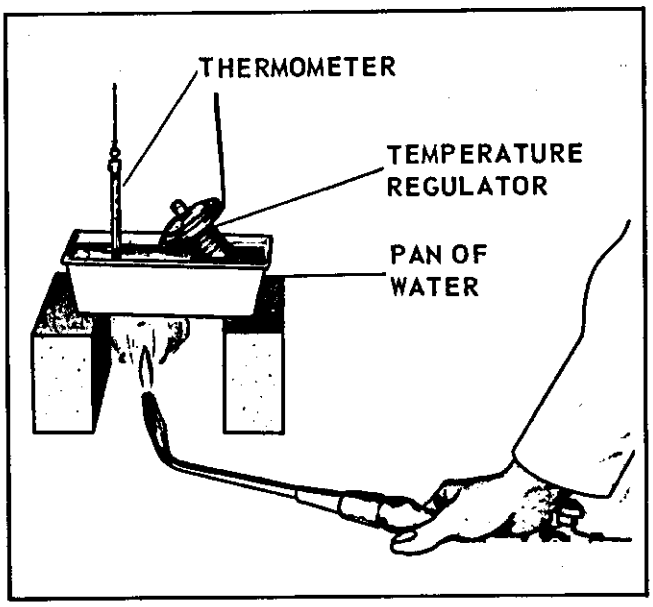
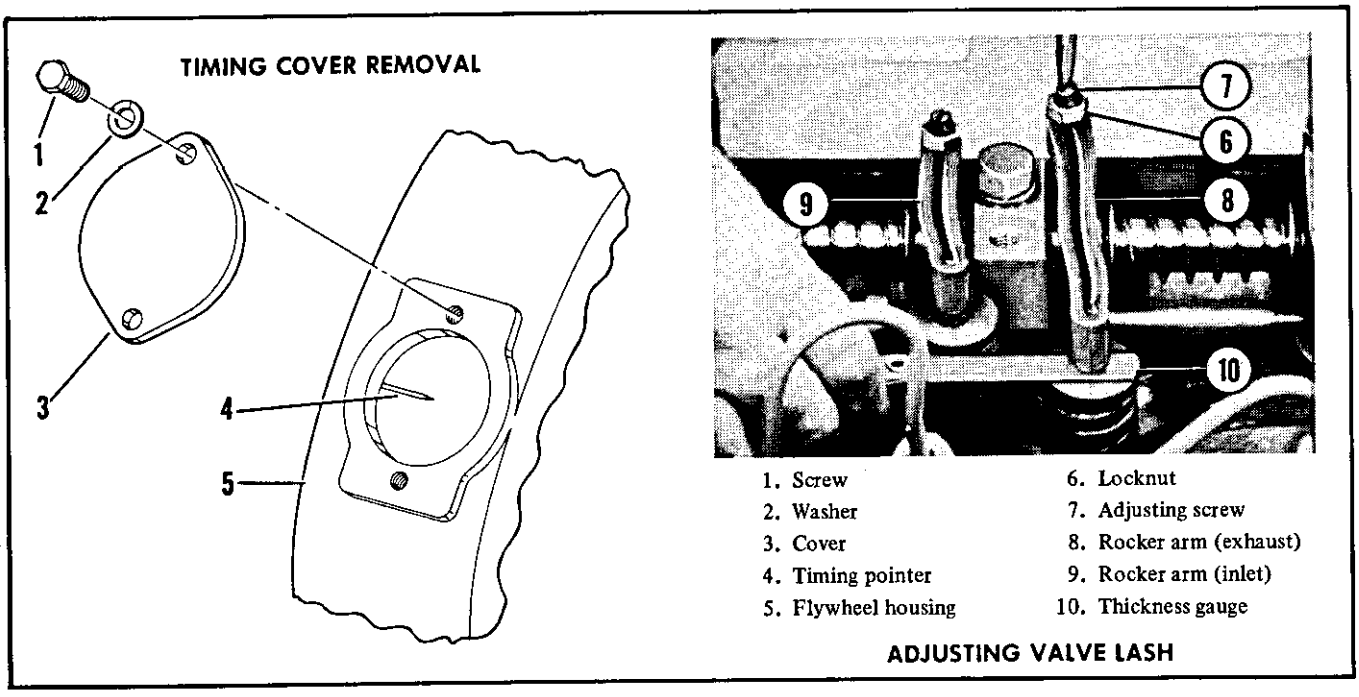


Figure 5-42. Engine water temperature regulator testing



1. Screw
2. Washer
3. Cover
4. Timing pointer
5. Flywheel housing
6. Locknut
7. Adjusting screw
8. Rocker arm (exhaust)
9. Rocker arm (inlet)
10. Thickness gauge

ADJUSTING VALVE LASH

Figure 5-43. Adjusting valve clearance