TECHNICAL MANUAL

OPERATION, MAINTENANCE AND SERVICE, REPAIR INSTRUCTIONS, AND ILLUSTRATED PARTS BREAKDOWN

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

MODEL 3M750RPDQ

PART NO.80505

NSN 4310-00-143-5850

CONTRACT: DLA700-84-C-8023
MIPR: N00249-83-RC-DC080
USN REGISTRATION NOS. USN31-07016 AND USN31-07017
MANUAL STOCK NO. IH-7610-LL-L8A-3080

DAVEY COMPRESSOR CO. (FSCM 16004)
11060 Kenwood Road, Cincinnati, Ohio 45242

MPL-177 1 FEB 84

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INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

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Dates of issue for original and changed pages are:
Original ... 0 .... 1 FEB 84

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 128 CONSISTING OF THE FOLLOWING:

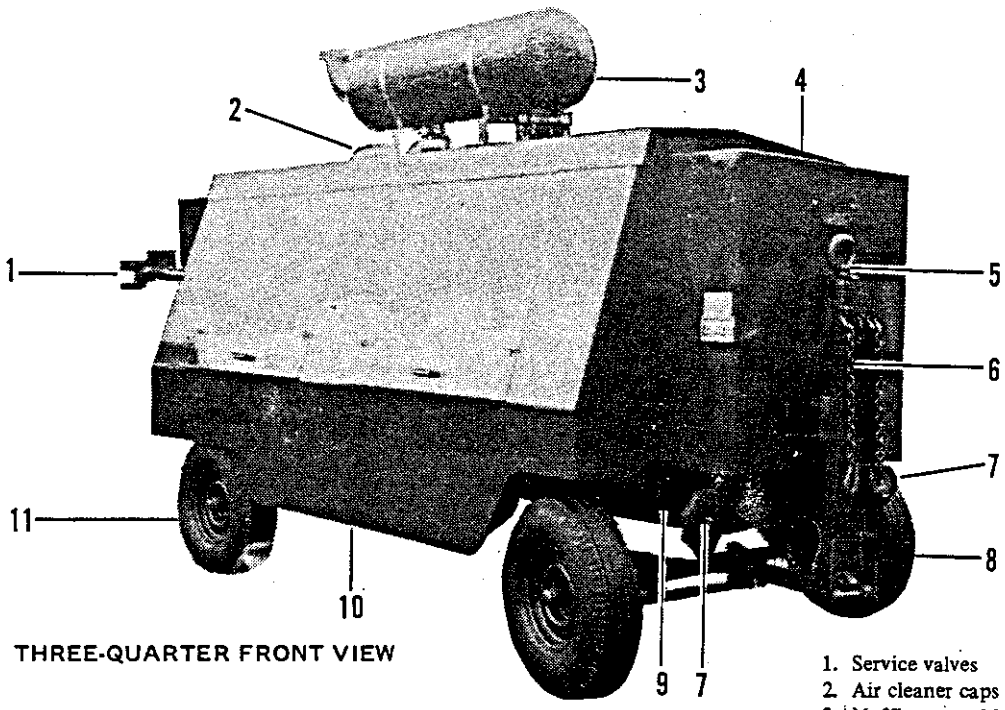
Page No.	*Change No.
Title	0
A	0
i - iv	0
1-1 - 1-8	0
2-1/3-1	0
3-2 - 3-6	0
4-1 - 4-7	0
4-8 Blank	0
5-1 - 5-17	0
5-18 Blank	0
6-1 - 6-19	0
6-20 Blank	0
7-1 - 7-3	0
7-4 Blank	0
8-1 - 8-57	0
8-58 Blank	0

*Zero in this column indicates an original page.

TABLE OF CONTENTS

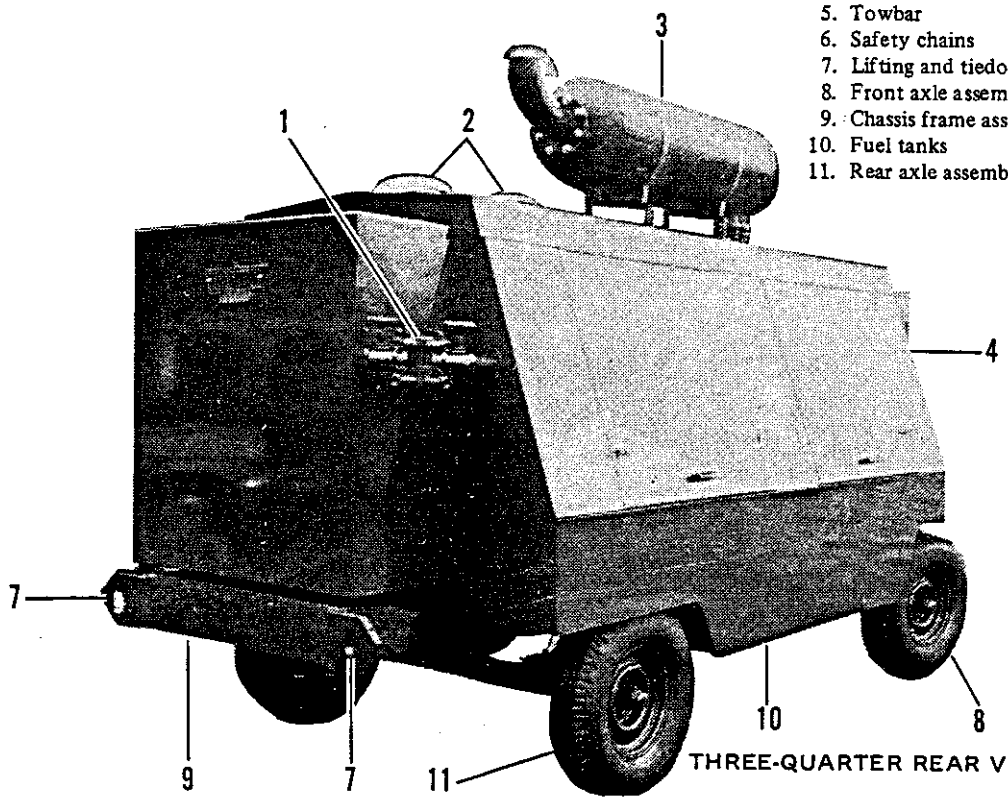
LIST OF ILLUSTRATIONS

LIST OF TABLES



THREE-QUARTER FRONT VIEW

1. Service valves
2. Air cleaner caps
3. Muffler assembly
4. Housing group
5. Towbar
6. Safety chains
7. Lifting and tiedown eyes
8. Front axle assembly
9. Chassis frame assembly
10. Fuel tanks
11. Rear axle assembly



THREE-QUARTER REAR VIEW

Figure 1-1. Rotary air compressor unit, Series 750 RPDQ, typical

1-10. AIR COMPRESSOR SYSTEM (11, 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 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.

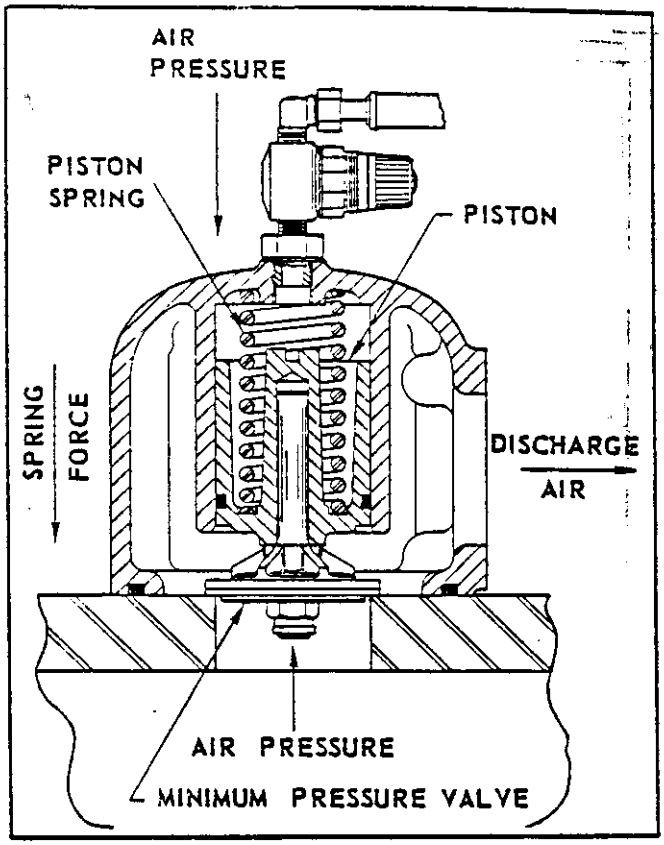


Figure 1-3. Operation of minimum pressure valve, typical

1-11. FUEL SYSTEM (10, 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 fuel injection pump. Before the fuel is delivered to the pump, it is filtered first by a water separator which removes dirt particles and any condensate, 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 the fuel 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 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.

1-12. ENGINE ELECTRICAL SYSTEM (6-9, 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.

Table 1-1. Leading Particulars

Rotary Air Compressor:

Manufacturer	Davey Compressor Company
Series	750 RPDQ
Type	Sliding Blade, Air, Rotary
Air Volume	750 CFM
Air Pressure	100 PSI
Stages	One
Prime Mover	Diesel Engine
Mounting	Trailer Mounted, Pneumatic Tires
Brakes	Hydraulic, Mechanical Hand Brake
Tire Size (Running Gear)	H78-15ST, 6Ply
Tire Pressure	50 PSI
Electrical System	24 VDC

Diesel Engine:

Manufacturer	Caterpillar Tractor Company
Model	3306T Arrangement 7N3386
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 2100 RPM	70 - 75 PSI
Recommended Fuel Oil	No. 2 (ASTM Spec No. D396)

Air Cleaners (Compressor and Engine):

Manufacturer	Air-Maze Filter Products Division North American Rockwell Corp.
Model Number	CD1623500
Element Number	CD1626001-826 (Davey No. 62813)

Compressor Oil Filter:

Manufacturer	Marvel Engineering Company
Part Number	265241-1500-576366-1110 (Davey No. 61446)
Element Number	576366-1110 (Davey No. 61150)

Capacities:

Fuel Tanks (2)	59-1/2 gal. ea (approx)
Engine Crankcase	29 Quarts
Compressor Oil Separator	26 Gallons
Engine Cooling System	18 gal. (approx)

Overall Dimensions and Weights:

Overall Length	234 in.
Overall Width	79 in.
Overall Height	114 in.
Shipping Volume	876 cu. ft.
Shipping Weight	9900 lb.

The alternator regulator opens and closes the field circuit, prevents overcharging of the batteries, prevents damaging high voltage, 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.

1-13. COMPRESSOR UNIT ELECTRICAL GROUP (4, figure 1-2). The unit electrical group consists of the instrument panel wiring and interconnecting wiring harness. Refer to figure 1-6, wiring diagram.

1-14. 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 under high pressure to a precombustion chamber for each cylinder. A governor controls the fuel injection pump out-put to maintain a constant engine RPM under varying work loads. 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.

1-15. CHASSIS AND RUNNING GEAR (5,8,11,figure 1-1). The welded steel frame chassis, on which all major components are mounted, is supported by trailer-type running gear. The chassis is provided with lifting eyes at each corner of the frame. The lifting eyes permit attachment of cables for hoisting the complete unit vertically without damage. The running gear is

SECTION I

INTRODUCTION AND GENERAL INFORMATION

1-1. INTRODUCTION. This technical manual covers the operation, maintenance, service, and repair instruction, with illustrated parts lists for the Series 750 RPDQ Rotary Air Compressor. The unit is manufactured by Davey Compressor Company, Cincinnati, Ohio 45242. Refer to figure 1-1 for typical identifying views.

1-2. Abbreviations and Symbols. The abbreviations and symbols used throughout this manual are in accordance with Military Standards, MIL-STD-12 and MIL-STD-17-1, or are defined at the first appearance in the text.

1-3. GENERAL INFORMATION. The 750 RPDQ, Rotary Compressor unit is a trailer mounted, 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.

1-4. DESCRIPTION OF COMPONENTS.

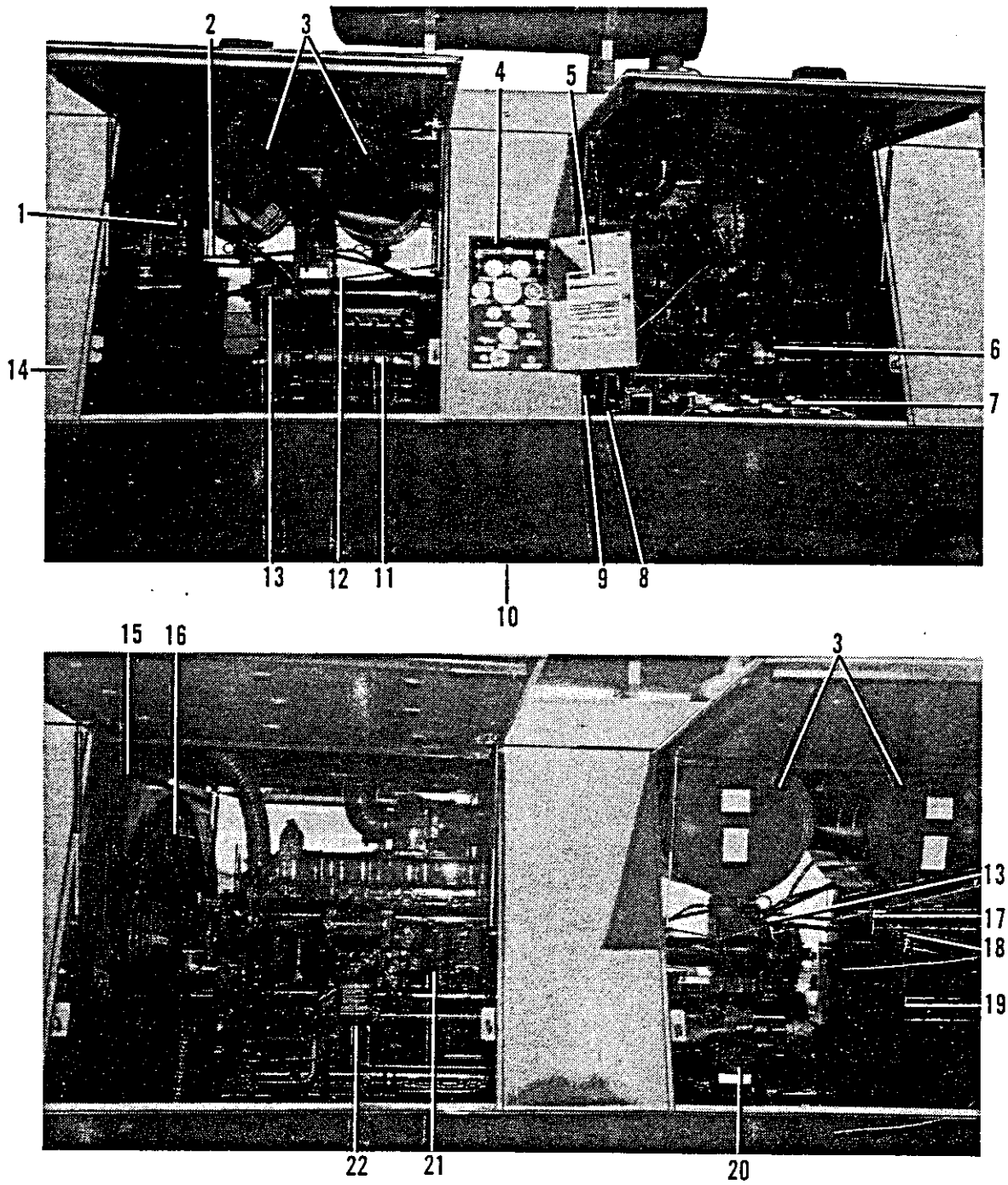
1-5. HOUSING GROUP (4, figure 1-1). The engine, compressor, instrument panel, and other controls are enclosed in a sheet metal housing. Doors on both sides of the unit provide access to these components. Data plates and instruction plates are attached to the housing .

1-6. SERVICE VALVES (2, figure 1-2). The air discharge line is equipped with individually controlled service outlets. These outlets consist of four 3/4-inch and two 1-1/2-inch sizes.

1-7. INSTRUMENT PANEL (4, figure 1-2). The operating controls and instruments are mounted on the instrument panel. The instruments consist of gauges that indicate engine oil pressure, fuel pressure (located on engine), fuel level, water temperature, air pressure, engine speed in RPM, hours of operation, compressor oil temperature and battery-alternator amperage. The controls consist of the engine stop cable, safety pushbutton, engine HEAT-OFF-START switch, fuel priming pump (on engine), and panel lamp ON-OFF switch. Other controls supplied but not mounted on the instrument panel are the manual intake unloader for the compressor and the engine idle control. A safety group is also supplied consisting of a low fuel pressure shutdown switch, low engine oil shutdown switch, engine coolant high temperature shutdown switch, and compressor air high temperature shutdown switch. Each of the safety group switches shut down the engine if a malfunction occurs.

1-8. COOLING SYSTEM (15, 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 passing through the radiator core. The engine coolant temperature regulator controls the flow of coolant through the engine cooler. The ambient air passing through the radiator also passes over the oil cooler cores which reduces the temperature of the compressor oil. 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.

1-9. AIR CLEANERS (3, 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. Blowdown valve
2. Air line system
3. Air cleaners
4. Instrument panel
5. Operating instructions
6. Alternator
7. Batteries and cables
8. Alternator regulator
9. Starting motor
10. Fuel tank
11. Compressor assembly
12. Control linkage
13. Compressor intake control
14. Housing group
15. Radiator and oil cooler
16. Cooling fan
17. Pressure regulator
18. Minimum pressure valve housing
19. Oil separator assembly
20. Compressor oil filter
21. Engine assembly
22. Engine oil filter

Figure 1-2. Major components of the Series 750 RPDQ unit assembly, typical

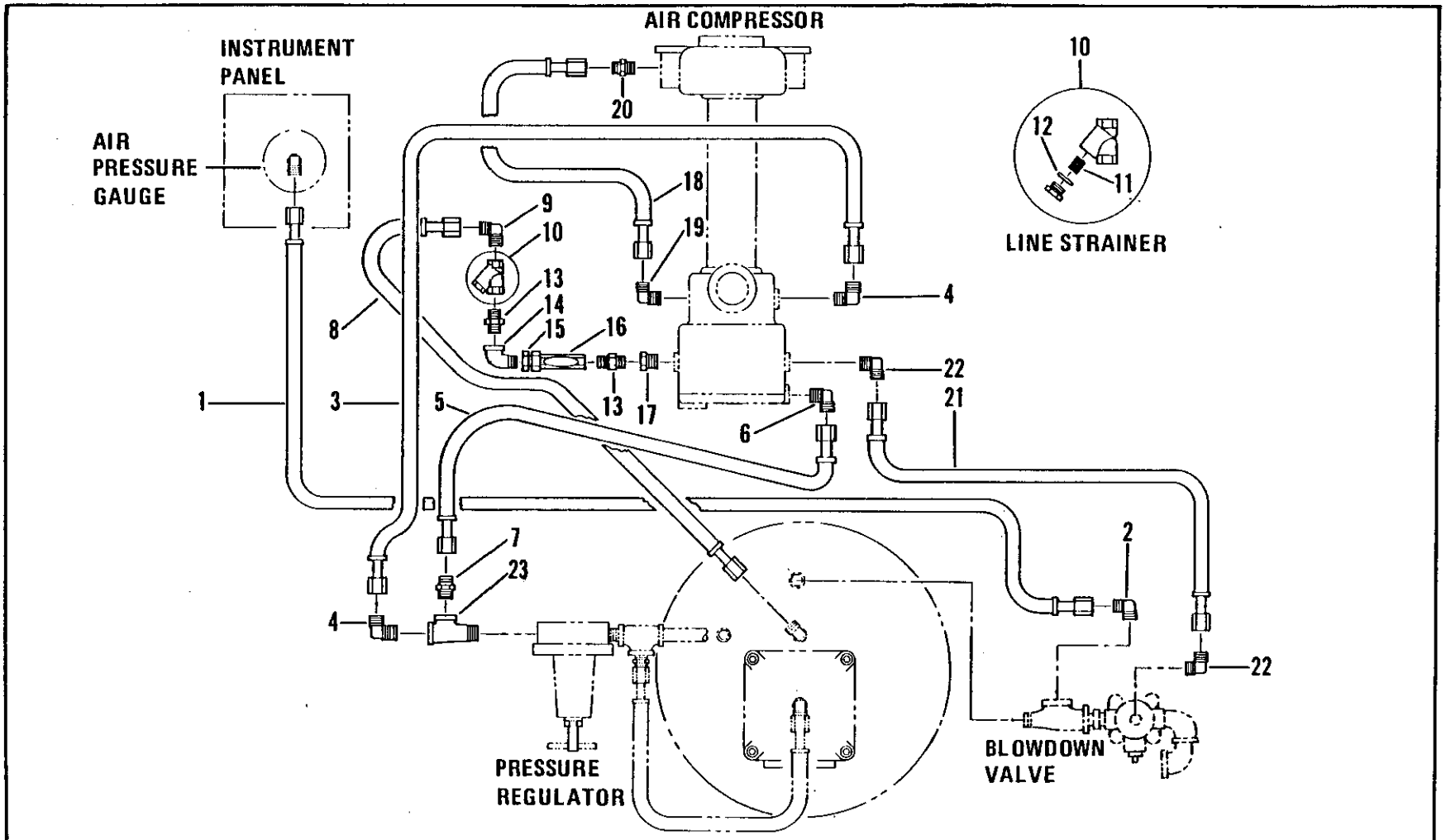


Figure 1-4. Pneumatic diagram

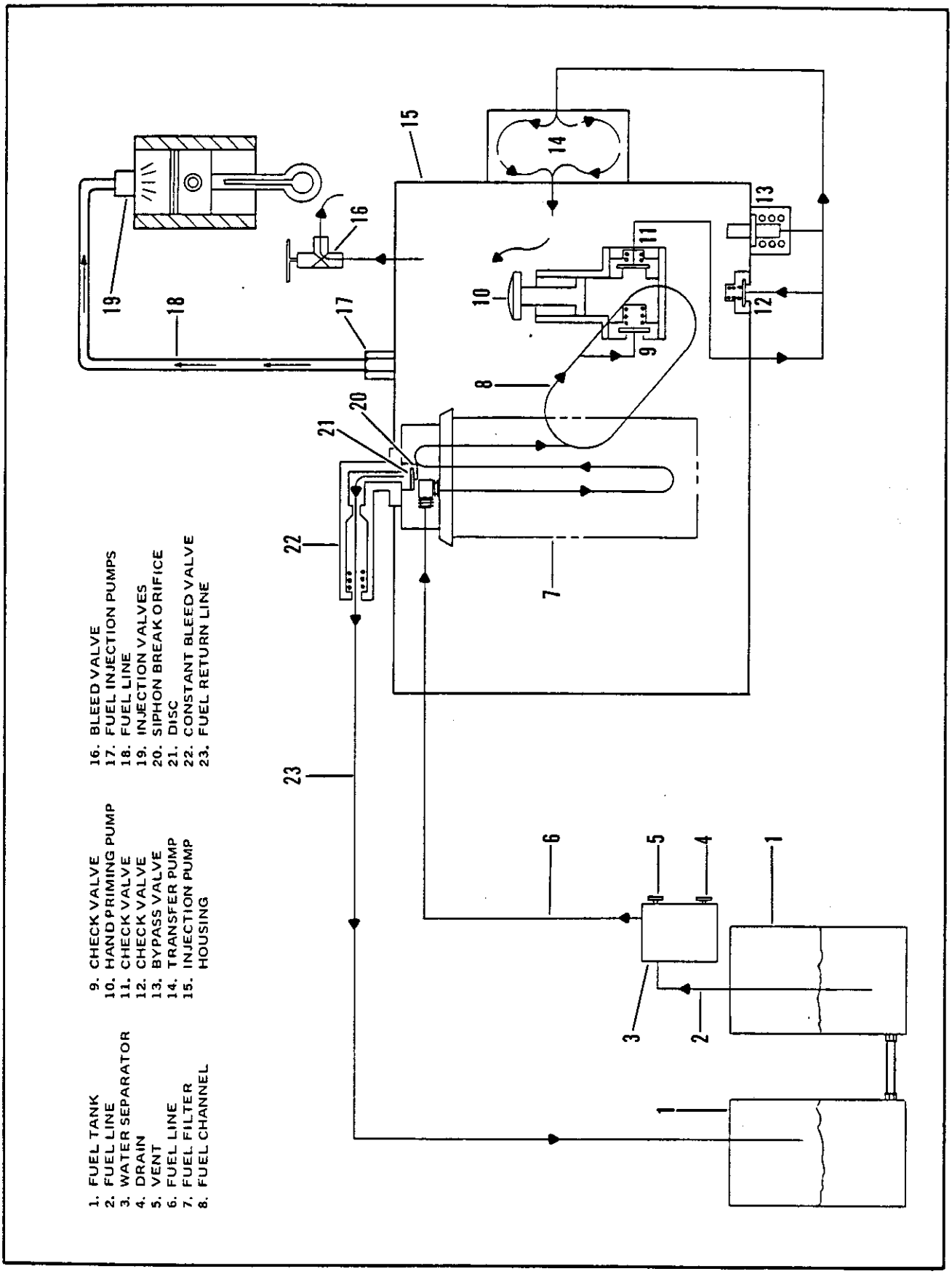


Figure 1-5. Fuel system schematic diagram

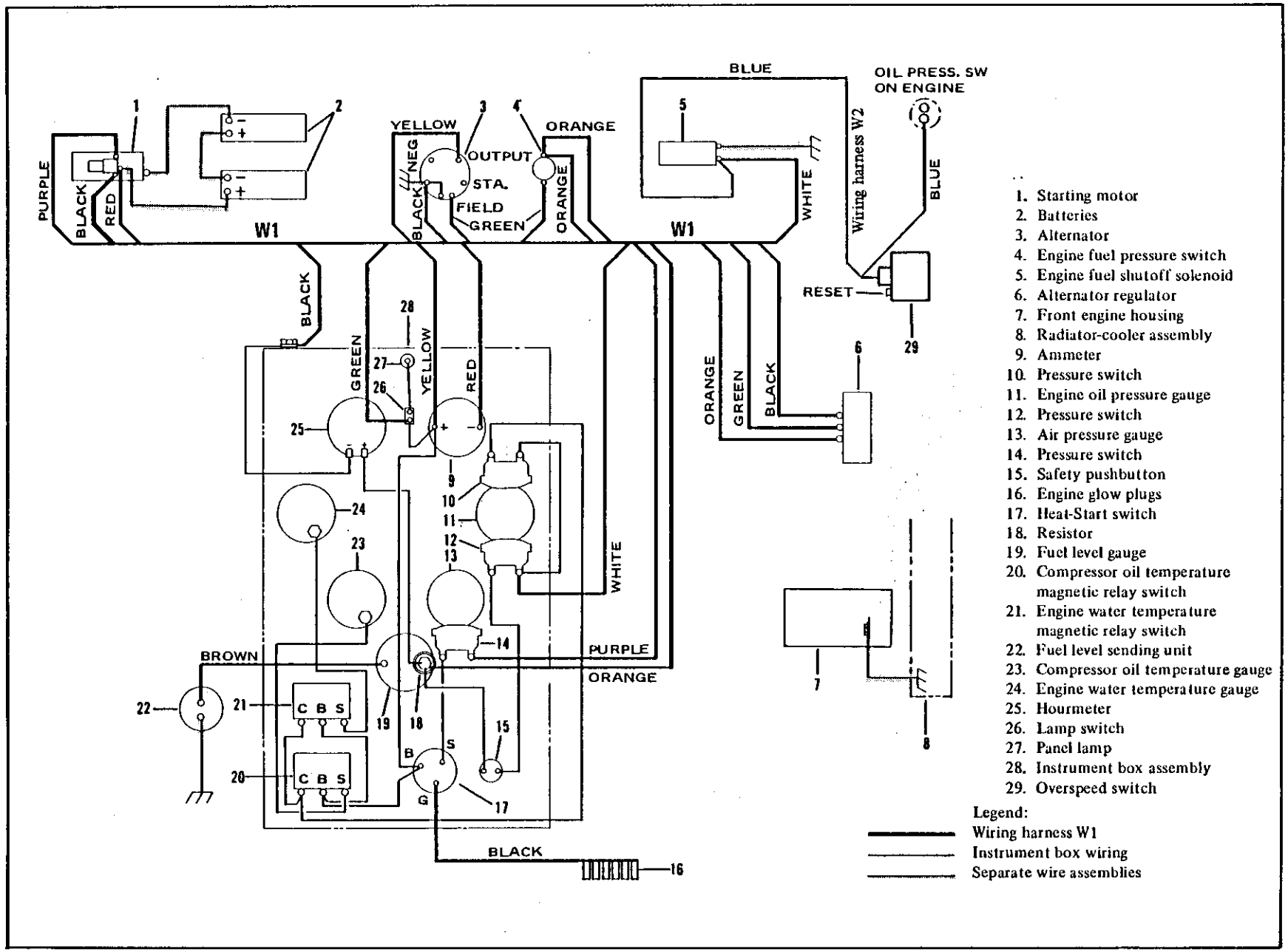


Figure 1-6. Schematic wiring diagram

equipped with leaf spring suspension and pneumatic tires. A towbar is attached to the front steerable axle assembly and is equipped with a surge-type hydraulic brake actuator. The actuator incorporates an emergency break-away cable for attachment to the towing vehicle. In such an emergency, the cable actuates a lever which sets the rear wheel hydraulic brakes. In addition to the rear axle hydraulic brakes, a hand operated parking brake lever is supplied. The towbar is equipped with a lunette eye and safety chains for attachment to the towing vehicle.

1-16. COLD WEATHER STARTING AID (10, figure 4-1). The engine 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 activated 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.

1-17. CONSUMABLE MATERIALS. Consumable materials, and expendable items, required to accomplish prescribed maintenance are listed in table 1-2.

Table 1-2. Consumable Materials

NOMENCLATURE	MATERIAL	SPECIFICATION NUMBER	GOVERNMENT STANDARD NO.	PART NUMBER
Cleaning	Solvent	P-D-680		
Oil separator tank	Oil, lubricating, compressor	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			CD1626001-826 (FSCM 00736) 62813 (FSCM 16004)
Engine oil filter	Element			2P4004 (FSCM 11083)
Final fuel filter	Element			1P2299 (FSCM 11083)
Oil separator	Element			48776 (FSCM 16004)

SECTION II

SPECIAL TOOLS AND TEST EQUIPMENT

2-1. SPECIAL TOOLS AND TEST EQUIPMENT. There are no special tools and test equipment required for the operation and maintenance of the Series 750 RPDQ Rotary Air Compressor Unit.

SECTION III

PREPARATION FOR USE, SHIPMENT AND STORAGE

3-1. PREPARATION FOR USE. The 750 RPDQ Rotary Air Compressor is shipped by the manufacturer as a completely assembled trailer mounted unit, except for exhaust muffler. Lifting, and tie down provisions are incorporated on the unit as shown on figure 3-1.

WARNING

When lifting device is used, it must be capable of lifting a minimum of 15,000 pounds.

3-2. 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 frame lifting eyes. Use spreader bars as necessary.

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.

NOTE

The surge-type brake actuator automatically applies the trailer hydraulic brakes in sychronization with the braking action of the towing vehicle. Because the forward surge of the trailer activates the trailer brakes, the braking action is in exact proportion to the deceleration of the towing vehicle. The trailer brake system is self-contained with no connection required to the towing vehicle except for the emergency break-away cable. When backing the towing vehicle with trailer attached, apply the load steadily. Do not accelerate rapidly. If brakes hold initially, do not release load, but maintain a steady push. The brakes will release and the trailer will begin to back.

3-3. 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 all separately packed items.

c. Install the engine exhaust muffler as follows:

1. Remove eight (8) clips and blank cover from engine exhaust bellows extending above roof.

WARNING

Take extreme care when removing exhaust muffler from shipping location and assembling on support brackets. Muffler weight is approximately 200 pounds. Use a suitable lifting device, such as a chain hoist, when handling muffler assembly.

2. Support the exhaust muffler with a lifting device and cut straps securing muffler to underside of frame at the rear of unit.

3. Remove eight (8) clips and blank cover from muffler inlet flange. Remove tape from rain cap.

CAUTION

Make certain gasket (part no. 81919 supplied in mounting kit) is used between muffler flange and exhaust bellows flange when installing muffler.

4. Hoist muffler into position on roof of unit. Install flange gasket between muffler flange and exhaust bellows. Secure the two flanges together with eight (8) 3/4 - 10 NC x 2-1/2 in. lg hex head cap screws, 3/4 in. split lock washers, and 3/4 - 10 NC hex nuts supplied in mounting kit.

5. Secure muffler mounting bands to support brackets with four (4) 3/8 - 16 NC x 1 in. lg hex head cap screws, 3/8 in. split lock washers, and 3/8 in. flat washers supplied in mounting kit. Adjust muffler mounting bands as necessary to align mounting holes of bands with mounting holes in supports so that unnecessary strain is not placed on mounting cap screws.

NOTE

Retain blank covers and clips removed in step 1 and 3 for use in reshipment.

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.

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

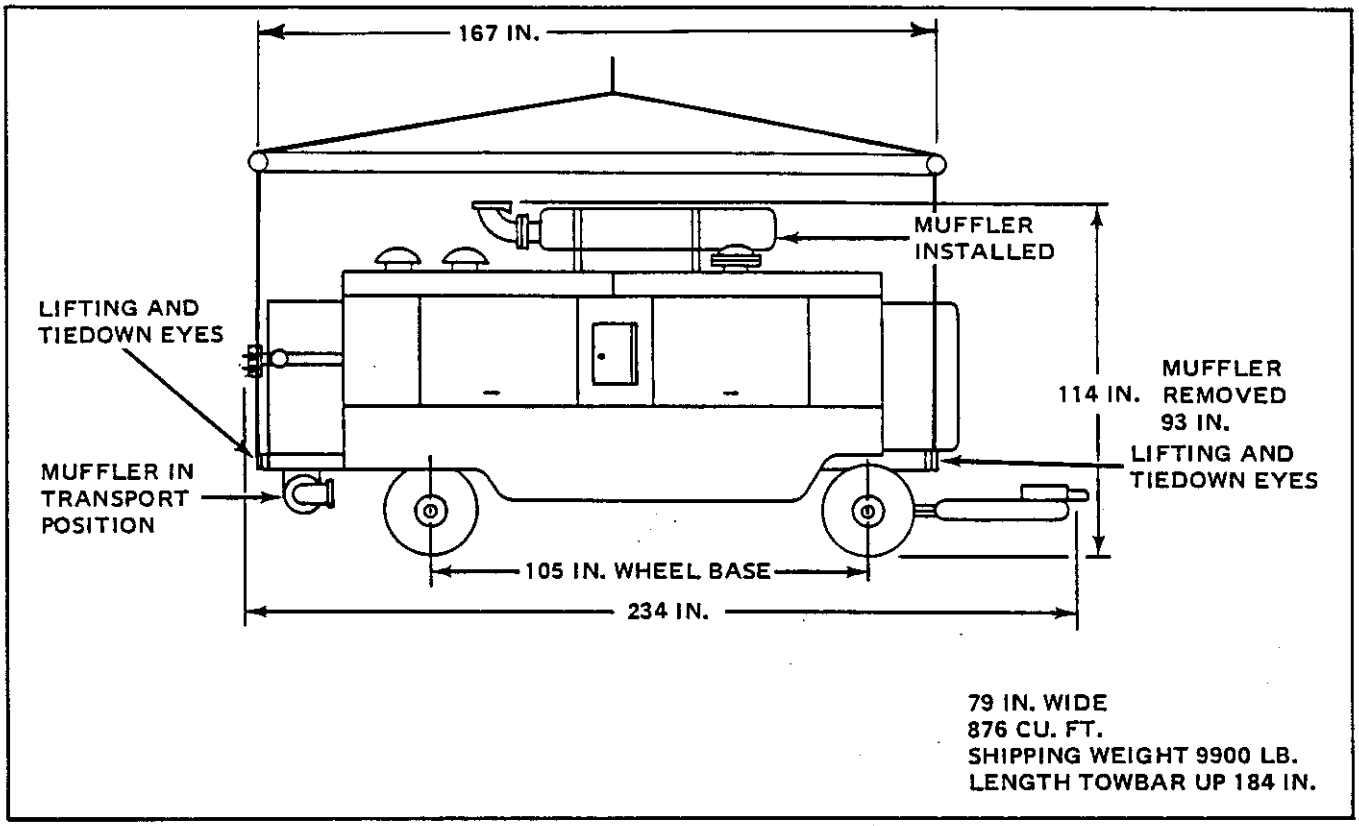


Figure 3-1. Lifting and tiedown diagram

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

f. 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.

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

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

i. 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.

j. Remove radiator filler cap and fill radiator as needed with coolant mixture in accordance with table 3-1. Coolant level shall be 2 inches below filler neck. Install filler cap. Refer to table 1-1 for capacity.

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

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

3-4. PREPARATION FOR SHIPMENT AND STORAGE. 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 towbar to vertical position and latch. Secure safety chains.

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.

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

LOWEST EXPECTED AMBIENT TEMP. °F	LOWEST EXPECTED AMBIENT TEMP. °C	PINTS OF INHIBITED GLYCOL PER GALLON OF COOLANT[1]	COMPOUND, ANTIFREEZE ARCTIC[2]	ETHYLENE GLYCOL SOLUTION SPECIFIC GRAVITY AT 68°F (20°C)[3]
+20	- 7	1-1/2	Issued full strength and ready mixed for	1.022
+10	-12	2	0° to -65°F (-18° to -54°C) tempera-	1.036
0	-18	2-3/4	tures for both initial installation and	1.047
- 10	-23	3-1/4	replenishment of losses.	1.055
- 20	-29	3-1/2		1.062
- 30	-34	4		1.067
- 40	-40	4-1/4		1.073
- 50	-46	Arctic	DO NOT DILUTE WITH WATER OR	
- 60	-51	Anti-	ANY OTHER SUBSTANCE	
- 75	-59	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 (-40°C) or drops below, to as low as -90°F (-68°C).

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

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

c. Open engine crankcase oil drain valve and drain the oil from the engine. Close the drain valve 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..Open drain valve and drain all oil from the compressor system. Close valve and install drain plug when oil flow stops. Fill oil separator tank to operating level with type P-10 preservative oil and install filler plug.

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 vent and drain valves on water separator and drain off fuel. Close vent and drain valves. Remove drain plug from fuel injection pump housing cover, open injection pump vent; drain off fuel from pump. Close vent and install drain plug.

g. Disconnect the fuel supply line from the fuel tank and attach this line to a portable container of diesel fuel conforming to Specification VV-F-800. Disconnect the injection pump 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-10 preservative oil. Operate the engine until preservative oil is discharged out of fuel return line. Stop the engine and reconnect the fuel supply 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 teminals, 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 "BRAKE DRUMS 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, due to height of unit, the engine exhaust muffler must be removed. Remove as follows:

WARNING

Take extreme care when removing exhaust muffler. The muffler weighs approximately 200 pounds. Use suitable lifting device, such as a chain hoist when handling muffler assembly.

1. Attach suitable lifting device to exhaust muffler. Remove four (4) 3/8 - 16 NC x 1 in. lg hex head cap screws, 3/8 in. split lock washers, and 3/8 in. flat washers that secure muffler mounting bands to supports. Place mounting hardware in a suitable bag or box and mark MUFFLER MOUNTING KIT.

2. Remove eight (8) 3/4 - 10 NC hex nuts, 3/4 in. split lock washers, and 3/4 - 10 NC x 2-1/2 in. lg hex head cap screws that secure the muffler inlet flange to engine exhaust bellows. Hoist muffler, remove flange gasket, and lower muffler from roof. Place hardware in MUFFLER MOUNTING KIT. If reusable, place flange gasket in kit. If not reusable place a new gasket, part number 81919, in the kit for use at installation.

3. Place a blank cover over exhaust bellows flange and exhaust muffler flange. Secure with suitable clips or wire. Tape muffler rain cap closed.

4. Using a hoist, position the exhaust muffler assembly under the rear of chassis frame and attach with banding straps or other suitable means. See figure 3-1.

5. Stow the mounting kit in the unit for use at next installation of muffler.

w. 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

OPERATING INSTRUCTIONS

4-1. THEORY OF OPERATION. 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.

4-2. When the unit is in the stopped configuration, the oil separator air discharge port and the compressor air intake valve are closed. When the engine is started, the compressor starts, momentarily unloaded, creating a vacuum in the intake housing. The 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.

4-3. 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.

4-4. 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.

4-5. 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 service valves.

4-6. 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.

4-7. 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.

4-8. 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.

4-9. 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.

4-10. OPERATING INSTRUCTIONS. Prior to operating the 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 worksite 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, safety breakaway cable, and towbar from the towing vehicle. Secure the safety chains and cable.

d. Open all housing side doors until unit is serviced and ready to operate.

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 4-10a through 4-10e and observe the warning above.

g. Perform the "Before Operation" maintenance checks and services, refer to table 5-1.

4-11. OPERATING CONTROLS AND INSTRUMENTS. 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.

4-12. OIL PRESSURE GAUGE (2, figure 4-1). This gauge indicates the engine lubricating oil pressure. Normal oil pressure reading is 70 to 75 PSI at 2100 RPM.

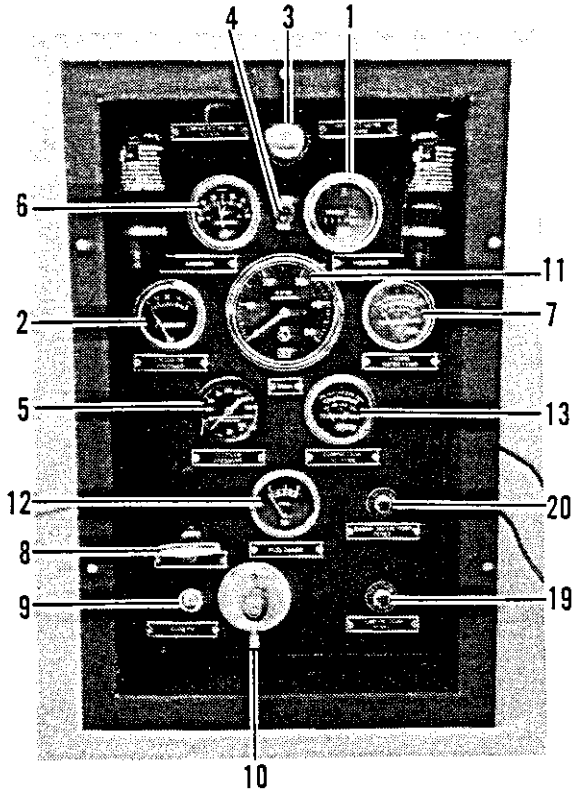
4-13. FUEL GAUGE (12, figure 4-1). This gauge indicates the fuel level in the fuel tanks. The sending unit is energized when the unit is started.

4-14. AMMETER (6, figure 4-1). The ammeter gauge indicates the rate of charge or discharge of the batteries.

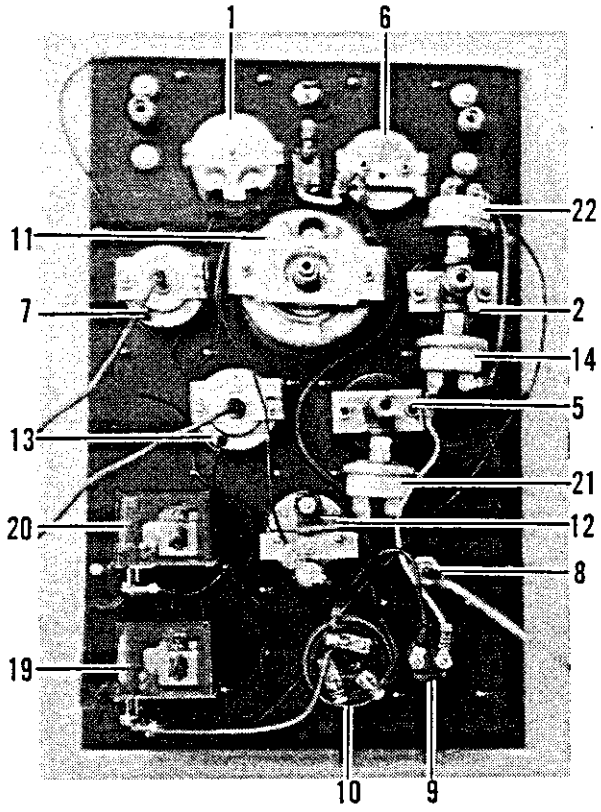
4-15. WATER TEMPERATURE GAUGE (7, figure 4-1). This gauge indicates the temperature of the engine coolant. Normal operating range after warmup is 170° to 190°F. The gauge incorporates a safety shutdown feature to shut down the engine should coolant temperature become too high. The engine water temperature reset button on front of instrument panel must be pressed before starting after shutdown reason has been corrected. Shutdown temperature is 240°F.

4-16. 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.

INSTRUMENT BOX ASSEMBLY



FRONT VIEW



REAR VIEW

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

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

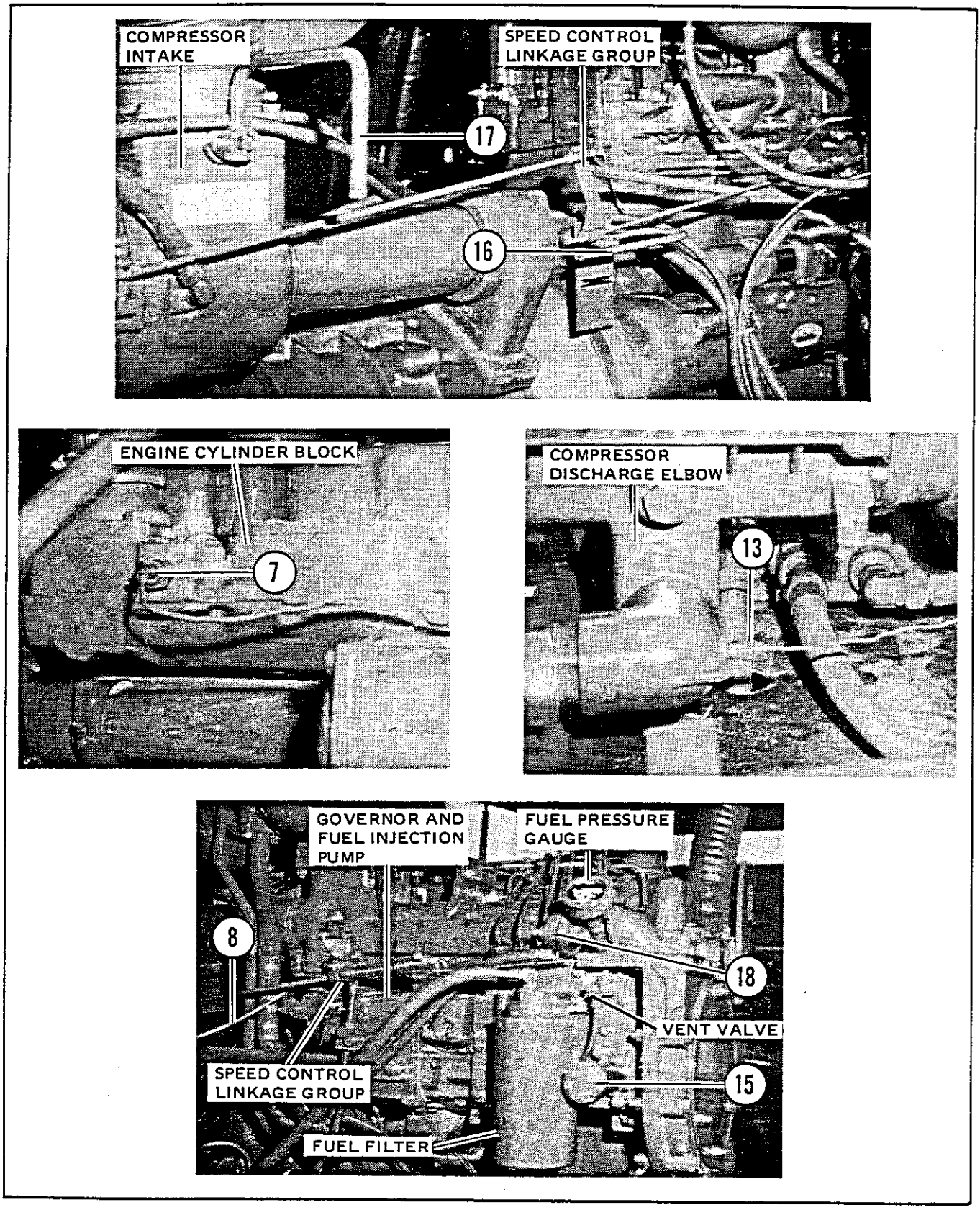


Figure 4-1. Controls and instruments (sheet 2 of 2)

4-17. 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.

4-18. HOURMETER (1, figure 4-1). This gauge indicates the running time of the unit. The gauge is calibrated in hours and tenths of hours.

4-19. 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.

4-20. 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.

4-21. 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.

4-22. ENGINE STOP CONTROL CABLE (8, figure 4-1). This control cable shuts down the engine by mechanically moving the governor control shaft to the extreme "fuel off" position when the cable handle is pulled to the full out position.

4-23. COMPRESSOR OIL TEMPERATURE GAUGE (13, figure 4-1). This gauge indicates the temperature of compressor air/oil mixture as it leaves the compressor discharge. Normal operating range after warmup is 180° - 200° F. The gauge incorporates a safety shutdown feature to shut down the engine should compressor oil temperature become too high. The compressor oil temperature reset button on instrument panel must be pressed before starting after shutdown reason has been isolated and corrected. Shutdown temperature is 250°F.

4-24. 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.

4-25. 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.

4-26. 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 warmup period. The action of the lever is for ease of starting.

4-27. SAFETY CIRCUIT SWITCHES. The unit is equipped with safety devices which stop the engine when an adverse condition exists. These devices are explained in the following paragraphs. (See figure 4-2.)

4-28. FUEL PRESSURE SWITCH (18, figure 4-1). This pressure switch energizes when fuel pressure reaches 20 PSI and activates the engine shutdown safety circuit.

4-29. ENGINE OIL PRESSURE SWITCH (14, figure 4-1). This pressure switch is electrically connected to the engine 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. A second pressure switch (22), normally open, is used to protect the magnetic switches (19, 20).

4-30. COMPRESSOR OIL TEMPERATURE MAGNETIC SWITCH (19, figure 4-1). This switch is activated by the high temperature setting of the compressor oil temperature gauge. Should compressor oil temperature become too high (refer to para 4-23) this switch will activate the engine shutoff solenoid. The switch must be manually reset.

4-31. ENGINE WATER TEMPERATURE MAGNETIC SWITCH (20, figure 4-1). This switch is activated by the high temperature setting of the engine water temperature gauge. Should engine coolant temperature become too high (refer to para 4-15) this switch will activate the engine shutoff solenoid. The switch must be manually reset.

4-32. AIR PRESSURE SWITCH (21, figure 4-1). This normally closed pressure switch opens when air pressure drops to 10 psi and interupts the starting circuit; thereby, preventing starting with pressurized system.

KEY to figure 4-2:

1. Compressor oil temp switch, N.O., Close 250°F
2. Magnetic relay switch, N.O.
3. Manual reset button
4. Engine fuel shutoff solenoid. Energize to shut down.
5. Battery, 24 volt
6. Safety pushbutton, N.C.
7. Pressure switch, N.O., Close 4 PSI
8. Engine oil pressure switch, N.C., Open 10 PSI
9. Engine water temp switch, N.O., Close 240°F
10. Overspeed switch, flyball type
11. Ammeter

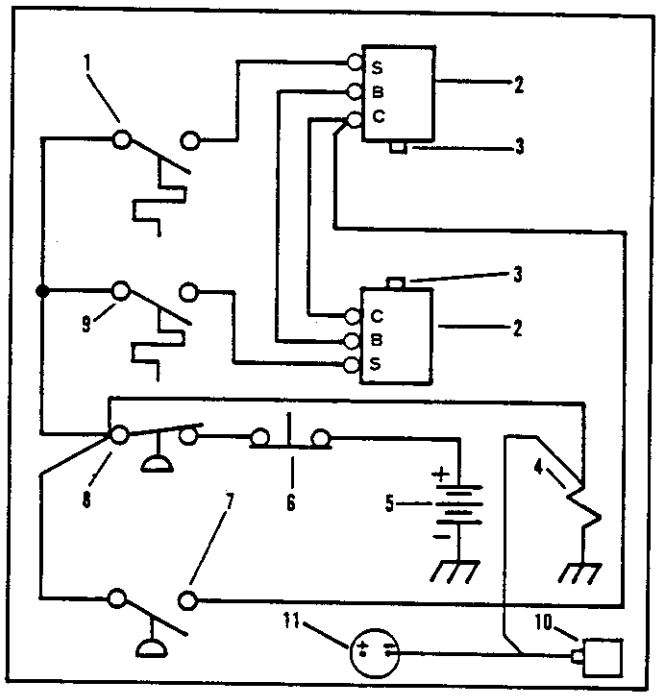


Figure 4-2. Engine shutdown safety circuit schematic diagram

4-32.1. OVERSPEED SWITCH (10, figure 4-2). This flyball type switch is operated by a cable attached to the dual tachometer drive. Should engine speed reach an unsafe rpm, the switch energizes the engine fuel shutoff solenoid. The switch must be manually reset after an overspeed shutdown. Determine cause of overspeed before restarting unit.

4-33. STARTING THE EQUIPMENT. When ready to start the equipment, all steps of paragraph 4-10 having been performed, the following procedures shall be followed in sequence.

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 fuel injection pump. 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 instructed on decal mounted on inside of instrument panel door.

h. After indicated HEAT time has elapsed, turn HEAT-OFF-START switch to the START position and press and hold the safety pushbutton switch.

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.

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 registers on gauge.

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	70-75 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.

n. Close and latch housing side doors while unit is operating to reduce noise level.

4-34. STOPPING THE EQUIPMENT. 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. Stow all tools and hoses as necessary. Close instrument panel door.

SECTION V

MAINTENANCE AND SERVICE INSTRUCTIONS

5-1. MAINTENANCE AND SERVICE INSTRUCTIONS. This section contains instructions essential for maintenance and service of the Series 750 RPDQ, Rotary Air Compressor unit within the scope of the operator, organization and intermediate maintenance activities.

5-2. OPERATIONAL CHECKOUT. Operational checkout of this unit is limited to the actual running of the equipment and observation of the instrument panel gauges for proper readings. (Refer to paragraph 4-33 and all steps thereunder.) Following are the only operational adjustments necessary if readings observed indicate unit is not functioning at design requirements.

5-3. 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 locking nuts and move control as required to set engine idle speed at 1200 RPM. Observe speed on tachometer. Tighten the 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 4-34).

5-4. 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 counter-clockwise 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 4-34).

5-5. INSPECTION AND PREVENTIVE MAINTENANCE. 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 on the

rear end of fuel injection pump. 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.

5-6. LUBRICATION INSTRUCTIONS. Points of lubrication, type of lubricant, application method, and interval is listed in table 5-2.

5-7. TROUBLESHOOTING. Table 5-3 provides information useful in diagnosing and correcting unsatisfactory operation or failure of the 750 RPDQ Rotary 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 which is beyond the scope of operator, organizational, and intermediate maintenance personnel shall be referred to overhaul personnel.

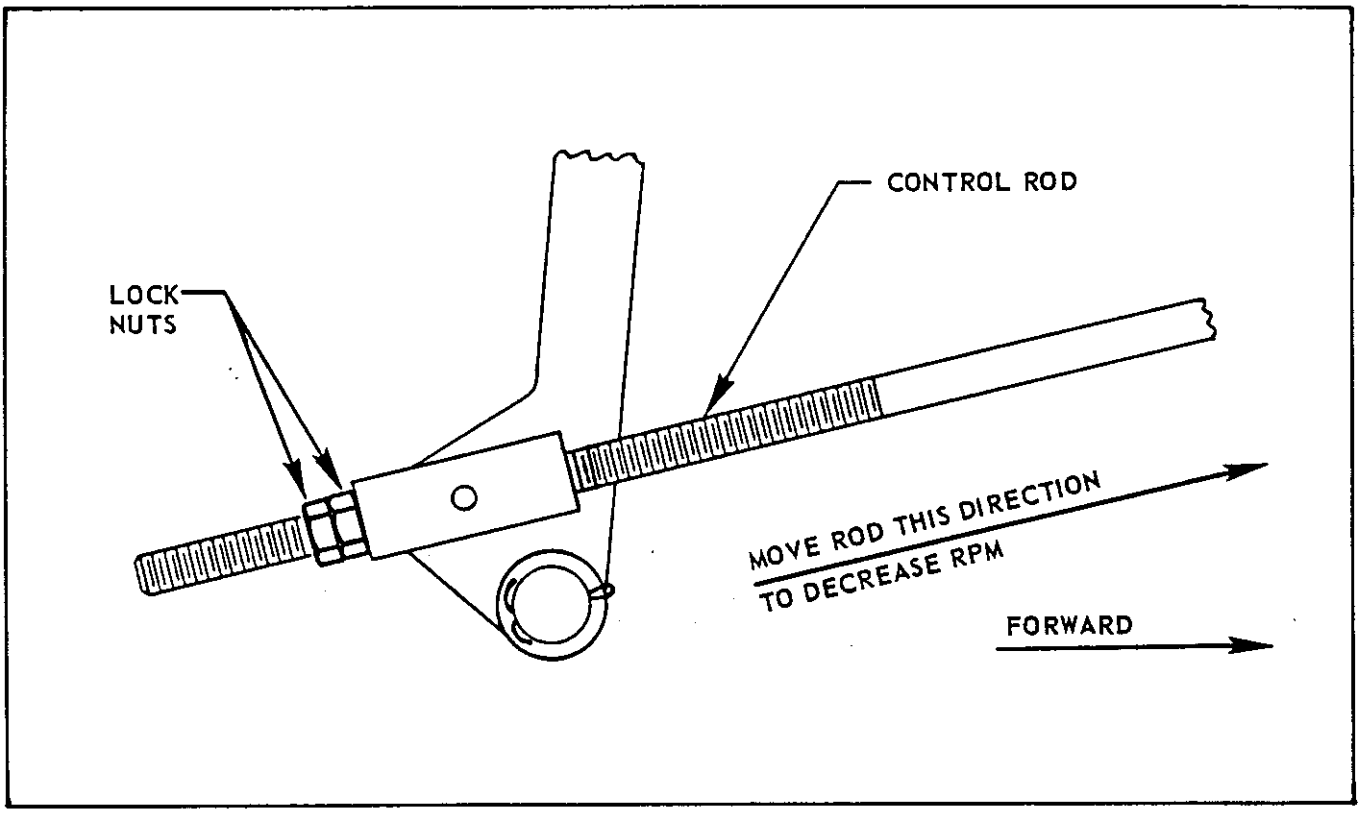


Figure 5-1. Speed control linkage adjustment

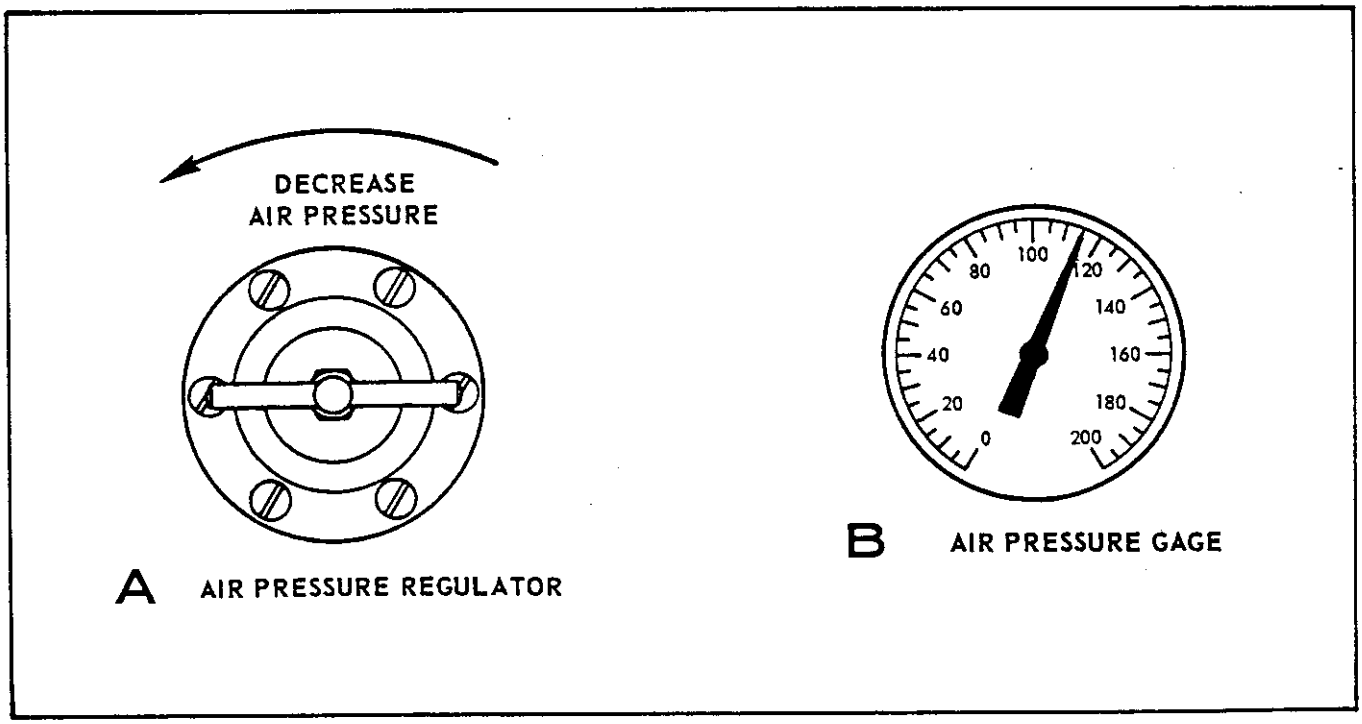


Figure 5-2. Air pressure regulator adjustment

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 or spring and fall. Change element every 4000 hours or 1 year whichever occurs first.	
				X	X	Engine oil filter.	Change filter element 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. Replace element if damaged.	
X			X	X	X	Water separator.	Drain water from separator before starting engine. When glass becomes dirty and water level cannot be seen, replace the separator element.	
			X	X	X	Final fuel filter	Replace element when pressure gauge on fuel injection pump indicates OUT. (Red band area.)	

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	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: 70-75 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.	
				X	X		Check engine mounting. Check cylinder head bolt torque. Check and clean fuel injection valves. Check glow plugs for operation.	

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	Engine assembly (Cont)	Check valve clearances and valve rotators every 2000 service hours or 1 year.	
	X		X	X	X	Tires.	Check inflation. Proper pressure is 50 PSI. Check for missing valve caps and tire wear.	
			X	X	X	Parking 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	Hydraulic brake system.	Check hydraulic lines and connections. Check fluid level.	

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
Parking brake cables and actuating mechanism	Grease MIL-L-7866	Grease gun.	250
Wheel bearings	Grease MIL-L-7866	Hand pack.	1000
Surge brake sleeve	Grease MIL-L-7866	Grease gun.	1000
Surge brake actuator	Motor vehicle brake fluid S.A.E. j 1703 (Artic j 1702)	Check and fill master cylinder	1000
HOSE REELS:	Grease MIL-L-7866	Grease gun	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

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 or replace starting motor. Refer to engine manual.
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 filter and water separator, and prime the fuel system.
	d. Clogged fuel filter.	d. Service the filter.
	e. Defective fuel transfer pump.	e. Repair the fuel transfer pump. Refer to engine manual.
	f. Air in fuel system.	f. Purge fuel lines using hand primer pump. Tighten connections.
	g. Engine air cleaner dirty or clogged.	g. Service air cleaner.
	h. Engine shutoff solenoid sticking.	h. Repair or replace solenoid.
	i. Fuel bypass valve sticking open.	i. Replace fuel bypass valve.
	j. Valve clearances incorrect.	j. Adjust valve clearances. Refer to engine manual.
	k. Defective turbocharger.	k. Repair turbocharger. Refer to engine manual.
	l. Safety pushbutton switch not being pushed with HEAT-OFF-START switch turned to START.	l. Push safety pushbutton simultaneously with the turning of switch to START position.
	m. No engine oil pressure.	m. Check oil level and fill as necessary. If oil pump defective, refer to engine manual.
	n. Defective safety shutoff system switches.	n. Replace all defective switches. Refer to figure 4-2.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
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 filter and water separator. 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 engine manual.
	e. Fuel lines leaking or cracked.	e. Tighten connections. Replace defective lines.
	f. Valve clearances incorrect.	f. Adjust valve clearances. Refer to engine manual.
	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 engine manual.
	h. Defective fuel bypass valve.	h. Replace fuel bypass valve.
Engine lacks power.	a. Fuel filter dirty or clogged.	a. Service fuel filter.
	b. Engine air cleaner clogged.	b. Service air cleaner.
	c. Valve clearances incorrect.	c. Adjust valve clearances. Refer to engine manual.
	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 engine manual.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine lacks power (Cont)	f. Fuel contaminated or improper grade.	f. Drain fuel system, service fuel filter and water separator and fill with clean, proper grade of fuel.
	g. Defective fuel transfer pump.	g. Repair fuel transfer pump. Refer to engine manual.
	h. Turbocharger carboned or otherwise dragging.	h. Repair turbocharger. Refer to engine manual.
	i. Fuel bypass valve defective.	i. Replace 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. Refer to engine manual.
	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.
	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 engine manual.
Engine stops suddenly.	a. Out of fuel.	a. Fill fuel tanks with proper grade of fuel.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine stops suddenly. (Cont)	b. Fuel filter dirty or clogged.	b. Service fuel filter.
	c. Water or dirt in fuel system.	c. Drain fuel tanks. Fill tanks with uncontaminated fuel. Clean fuel lines. Service fuel filter and water separator. Prime fuel system.
	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. Air in fuel system.	f. Purge lines using hand priming pump. Tighten connections.
	g. Engine shutoff solenoid defective.	g. Replace shutoff solenoid.
	h. Air compressor overheating (safety switch shutoff.)	h. Fill oil separator tank to overflow. Check oil filter and clean element as necessary. Remove any obstruction of oil cooler and radiator.
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.
	c. Oil pressure gauge defective.	c. Replace oil pressure gauge.
	d. Defective oil pump.	d. Repair or replace oil pump. Refer to engine manual.
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. Refer to engine manual.
	e. Water temperature regulator defective.	e. Replace water temperature regulator.
	f. Water temperature gauge defective.	f. Replace water temperature gauge.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine overheats. (Cont)	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. Refer to engine manual.
	c. Fuel injection nozzle plugged or leaking.	c. Replace fuel injection valve nozzle. Refer to engine manual.
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 engine manual.
	c. Valve clearances incorrect.	c. Adjust valve clearances. Refer to engine manual.
	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 engine manual.
	g. Fuel bypass valve defective.	g. Replace fuel bypass valve.
	h. Air in fuel system.	h. Purge lines using hand priming pump. Tighten connections.
	i. Fuel filter dirty or clogged.	i. Service fuel filter.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
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. Replace fuel bypass valve.
	c. Fuel filter dirty or clogged.	c. Service fuel filter.
	d. Fuel transfer pump defective.	d. Repair fuel transfer pump. Refer to engine manual.
	e. Fuel injection nozzle defective.	e. Replace fuel injection valve nozzle. Refer to engine manual.
Valve train clicking noise.	a. Valve clearances incorrect.	a. Adjust valve clearances. Refer to engine manual.
	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.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Engine oil in coolant or coolant in engine oil.	a. Engine oil cooler defective.	a. Repair or replace engine oil cooler. Refer to engine manual.
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. b. Dirt in lubricating oil.	a. Repair or replace engine air cleaner. b. Locate and correct source of dirt entry. Change lubricating oil. Service oil filter.
Compressor overheats.	a. Dirty compressor oil filter element. b. Dust or dirt collected on oil cooler core external surface. c. Low compressor oil level. d. Faulty thermal bypass valve.	a. Service compressor oil filter. b. Blow off all dirt and dust. c. Refill oil separator to overflow. d. Repair thermal bypass valve.
Noisy compressor operation.	a. Low compressor oil level. b. Air pressure regulator assembly defective.	a. Refill oil separator to overflow. b. Repair air pressure regulator assembly.
Compressor not operating to full capacity or pressure.	a. Air pressure regulator assembly defective or out of adjustment. b. Leak in air hoses, piping, or connections. c. Compressor air cleaner dirty or clogged. d. Safety valve on oil separator leaking.	a. Adjust or repair air pressure regulator assembly. 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. Service air cleaner. d. Replace safety valve.
Compressor fails to load or unload.	a. Dirt buildup on intake-unloader valve seat. b. Unloading pressure too high or too low.	a. Clean valve seat. b. Adjust air pressure regulator assembly.

Table 5-3. Troubleshooting (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Compressor fails to load or unload. (Cont)	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 and/or broken minimum pressure valve spring.
	c. Rapid, repeated load unload cycle.	c. Reduce air demand by closing service valves.
	d. Clogged line from separator to intake orifice or clogged orifice.	d. Remove line and orifice, clean, and replace.
	e. Ruptured separator element.	e. Replace element.
Compressor unit hunts.	a. Air pressure regulator assembly defective.	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. Refer to engine manual.
	d. Alternator assembly defective.	d. Repair alternator assembly. Refer to engine manual.
	e. Loose or broken drive belts.	e. Tighten or replace belts.