DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DS, GS,

AND DEPOT MAINTENANCE MANUAL

COMPRESSOR, RECIPROCATING, POWER DRIVEN;
WHEEL MOUNTED; 2 WHEEL, PNEUMATIC TIRES,
W/TOWBAR AND LUNETTE EYE, GASOLINE ENGINE;
4.00 CFM, 3000 PSI
(STEWART-WARNER MODEL 3800219)
FSN 4310-728-2031
(STEWART-WARNER MODEL 3800219-1)
FSN 4310-930-0060

This copy is a reprint which includes current pages from Change 2.

H E A D Q U A R T E R S , D E P A R T M E N T O F T H E A R M Y

O C T O B E R 1 9 6 7

SAFETY PRECAUTIONS

LISTED BELOW IS EVERY "WARNING" CONTAINED IN THIS MANUAL, ALL PERSONNEL INVOLVED IN THE OPERATION AND MAINTENANCE OF THIS EQUIPMENT MUST FULLY UNDERSTAND THE 'WARNING" AND THE PROCEDURE BY WHICH THE HAZARD IS TO BE REDUCED OR ELIMINATED. PERSONNEL SHALL BECOME THOROUGHLY FAMILIAR WITHALL ASPECTS OF SAFETY OF PERSONNEL AND EQUIPMENT PRIOR TO THE OPERATION AND MAINTENANCE OF THE EQUIPMENT.

1. Operate the compressor package assembly only in well-ventilated areas or with the engine exhaust gases vented outdoors. Engine exhaust gas contains lethal carbon monoxide which is colorless and odorless. When inhaled, carbon monoxide will cause serious, and sometimes fatal, illness. If the exhaust gases enter the compressor intake, the air storage bottles being charged will be contaminated and the air unfit for breathing.
2. High-pressure air can cause serious injury to operating personnel. Always make certain the connecting tube assemblies, hoses and other component parts of the compressor package assembly are in good condition. In particular, never use an air hose assembly or filler attachments that are damaged or appear in questionable condition.
3. Never charge an air storage bottle or other pneumatic equipment with compressed air if the proof pressure or rating of the equipment is unknown. Never charge equipment to a pressure in excess of its known rating.
4. Severe explosion will result if a container partially filled with oxygen is charged with air. If any doubt exists as to the contents of a container, thoroughly vent the container and flush with water or air at zero pressure before charging.
5. The pressure relief valve assemblies are preadjusted to open and relieve system air pressure when the pressure exceeds a safe value. Operating personnel should never attempt to change the setting of the pressure relief valve assemblies.
6. When compressing breathing quality air, use only special medicinal grade, mineral base lubricating oil for compressor lubrication.
7. Always stop the gasoline engine before attempting to fill the fuel tank, and exercise extreme care to avoid spilling gasoline on a hot engine.
8. When operating the compressor package assembly at ambient temperatures below 40° Fahrenheit, connect a source of 27-volt direct current to the electrical connector on the instrument panel.
9. The oil-water -air emulsion which blows down when the push valve is pressed can cause painful injuries. Be extremely careful to stay clear of the blow down tube directly beneath the filter and separator assembly.
10. Be sure receiver shutoff valve is closed and system drain valve open before attempting to remove the line filter element.

Change in force: C 2

Change No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *9 July 1974*

Operator's Organizational, Direct Support, General Support, and Depot Maintenance Manual
COMPRESSOR, RECIPROCATING, POWER DRIVEN, AIR; WHEEL MOUNTED; GASOLINE ENGINE DRIVEN; 4 CFM, 3000 PSI
(STEWART-WARNER MODEL 3800219) FSN 4310-728-2031
(STEWART-WARNER MODEL 3800219-1) FSN 4310-930-0060

TM 5-4310-226-15, 20 October 1967, is changed as follows:

The title is changed to read as shown above.
Inside Front Cover. Add to Safety Precautions:

WARNING
This compressor is NOT SUITABLE for the supply of air for charging cylinders with BREATHABLE AIR.

WARNING
Operation of this equipment presents a NOISE HAZARD to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

WARNING
Cleaning solvent, PD-680, is a POTENTIALLY DANGEROUS CHEMICAL. Do not use it near an open flame,

Page 3, paragraph 1.1.2 is added:
1.1.2. You can help to improve this manual by calling attention to errors and by recommending improvements. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) should be mailed direct to: Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished directly to you.
Page 15, paragraph 2.1.2 is added.
2.1.2. Signs conforming to provisions of AR 385-30 will be erected in the area to provide notification of a noise hazard in accordance with TB MED-251. The signs should read:

WARNING
HEARING PROTECTION REQUIRED.
NOISE HAZARD EQUIPMENT.

Page 17. After the title in paragraph 2.6, add:

WARNING
Operation of this equipment presents a NOISE HAZARD to personnel in the area. Wear earmuffs or ear plugs which were fitted by a trained professional.

Before Paragraph 2.6.1.1, add:

WARNING
This compressor is NOT SUITABLE for the supply of air for charging cylinders with BREATHABLE AIR.

Page 19. After the title to paragraph 3.2, add:

* Supersedes Change 1, 31 August 1973.

WARNING

Dry-cleaning solvent, PD-680, used for cleaning is a POTENTIALLY DANGEROUS CHEMICAL. Do not use it near an open flame. The flash point of solvent is 100° F. - 138° F.

In paragraph 3.2.1., line 4, "P-S-661" is changed to read "PD-680". Throughout the maintenance portions of the manual, in the "Cleaning and Inspection" paragraphs, add the warning where the use of cleaning solvent is directed. Cleaning solvent "P-S-661" is changed to read "PD-680."

Page A-1. Appendix A is superseded as follows:

APPENDIX A
BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Section I. INTRODUCTION

A-1. Scope. This appendix lists items required by the operator for operation of the air compressor.

A-2. General. This list is divided into the following sections:

a. Basic Issue Items List Section II. Not applicable.

b. Items Troop Installed or Authorized List Section III. A list of items in alphabetical sequence which, at the discretion of the unit commander, may accompany the air compressor. These items are not subject to turn-in with the air compressor when it is evacuated.

3. Explanation of Columns. The following provides an explanation of columns in the tabular list of items troop installed or authorized, section III.

a. Source, Maintenance, and Recoverability Code (SMR). Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based; e.g., ft, ea, pr; etc.

e. Quantity Authorized. This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Federal stock number	Description	U/M	Qty auth
7520-659-9618	CASE: Operation and Maintenance Manuals	EA	1
4210-555-8837	EXTINGUISHER: Fire	EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 1225A (qty rqr block No. 2, Organizational Maintenance Requirement for Air Compressors, under 5 CFM.

TECHNICAL MANUAL

NO. 5-4310-226-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C.,20 October 1967

COMPRESSOR, RECIPROCATING, POWER DRIVEN. WHEEL MOUNTED; 2 WHEEL,PNEUMATIC TIRES,W/TOWBAR AND LUNETT EYE, GASOLINE ENGINE; 4.00 CFM, 3,000 PSI (STEWART-WARNER MODEL 3800219) FSN 4310-728-2031 (STEWART-WARNER MODEL 3800219-1) FSN 4310-930-0060

PART I. COMPRESSCR OPERATION AND MAINTENANCE

SECTION I. INTRODUCTION AND DESCRIPTION

SECTION II. OPERATING INSTRUCTIONS

SECTION III. PREVENTIVE MAINTENANCE

SECTION IV. REPAIR, OVERHAUL, ADJUSTMENT, TEST

PART II. ENGINE CPERATION AND MAINTENANCE

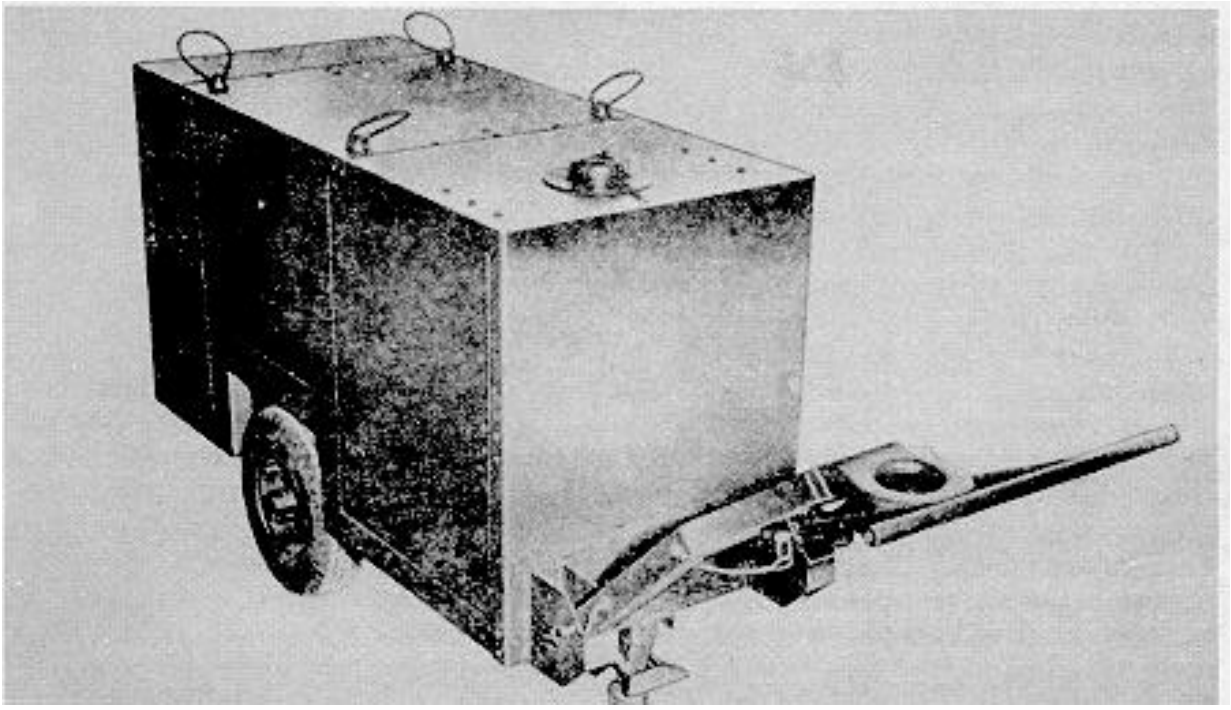


Figure 1-1. Compressor,-reciprocating, power driven, model 3800219 and 3800219-1, right front view.

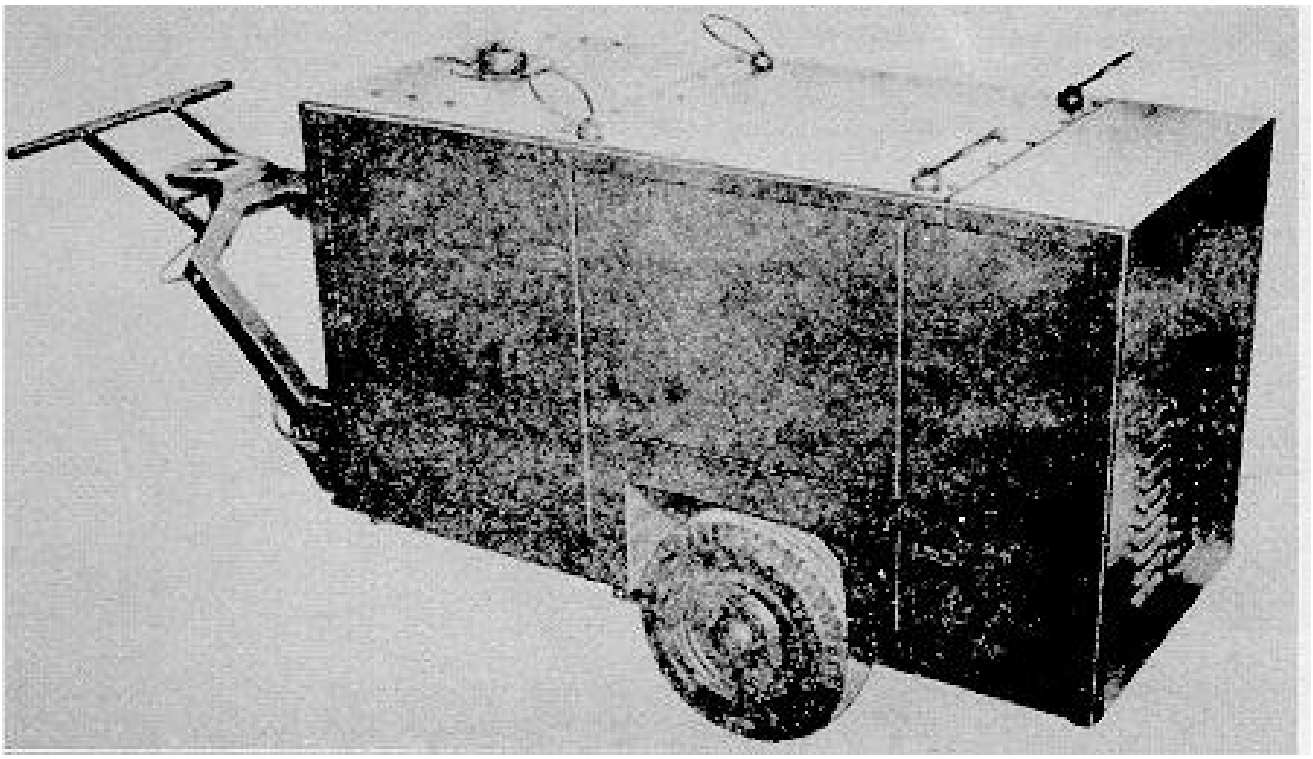


Figure 1-2. Compressor, reciprocating, power driven, model 3800219 and 3800219-1, left front view.

OPERATING INSTRUCTIONS

A. BEFORE OPERATION

1. Perform Pre-operating Inspections (refer to paragraph 2.2).
2. Check compressor oil level (refer to paragraph 2.3.1).
3. Check engine oil level (refer to paragraph 2.3.2).
4. Fill engine fuel tank (refer to paragraph 2.3.3).

B. OPERATION

1. Close high-pressure and low-pressure shutoff valves on instrument panel (see Figure 2-2).
2. Close drain valve adjacent to filter and separator assembly (see Figure 1-3).
3. Open receiver shutoff valve and line filter valve (see Figure 1-4).
4. Open fuel line shutoff valve (see Figure 1-4). Set engine choke lever as required. Set engine throttle at approximate midpoint.
5. Start engine and slowly open choke lever. After engine warm-up, adjust throttle to full open position.
6. Allow compressor to operate until receiver pressure gage indicates adequate charge as determined by requirements.
7. Adjust pressure regulator for required delivery pressure. Use low-pressure regulator for 0 to 200 psi delivery, and high-pressure regulator for 200 to 3300 psi delivery.
8. Connect air hose to applicable outlet fitting on instrument panel. Open corresponding shutoff valve.
9. While compressor is operating, press push valve on instrument panel for five seconds once every fifteen minutes.

C. SHUT DOWN

1. Move engine throttle to idle position. Press engine stop button.
2. Close shutoff valve on instrument panel. Disconnect air hose from outlet fitting.
3. Open drain valve adjacent to filter and separator assembly.

SECTION I

INTRODUCTION AND DESCRIPTION

1.1 CONTENTS OF MANUAL

1.1.1 This manual is published for the information and guidance of personnel responsible for Compressor, under 3800219 and 3800219-1. The manual describes the compressor assembly; contains instructions for operating, servicing, maintaining, overhauling and testing the overall equipment and component assemblies.

1.2 ORIENTATION

1.2.1 Throughout this manual, the terms "right," "left," "front," and "rear" are used to specify the location of various component parts of the equipment. "Front" indicates the end of the cart which mounts the tow bar (i. e., the forward end of the cart when being towed). "Rear" indicates the end opposite the front. "Left" and "right" designate the two sides when facing in the direction of normal travel (i.e., the instrument panel is on the left side of the cart).

1.3 GENERAL DESCRIPTION (See Figures 1-1 through 1-4)

1.3.1 Compressor Package Assembly, part number 3800219-1, is a compact, self-contained, mobile unit, specifically designed for supplying clean, dry compressed air as required for ground support maintenance of aircraft and similar equipment. The compressor package assembly is capable of delivering 4.0 cubic feet per minute of free air against a discharge pressure of 3300 pounds per square inch when operating at a nominal speed of 3550 revolutions per minute, and with sea level ambient air pressure at the inlet port of the compressor first stage cylinder.

1.3.2 The compressor package assembly consists basically of a radial, three-stage, reciprocating piston type air compressor which is directly coupled to, and driven by, a one-cylinder, four-cycle, air-cooled gasoline engine provided with a recoil starter mechanism. The complete package includes:

a. A filter and separator assembly which removes moisture and oil vapor from the high-pressure discharge air. The condensate collecting in the moisture separator is removed periodically during compressor operation by pressing a push valve located on the instrument panel, thus opening a dump valve installed in the bottom of the separator chamber.

b. A back pressure valve installed in the filter and separator outlet port prevents the flow of air to the receiver until the separator chamber is pressurized sufficiently to assure the efficient removal of moisture and oil vapor from the high-pressure air.

c. A check valve, installed in series with the back pressure valve, prevents reverse air flow from the receiver to the moisture separator. A system drain valve, installed in a tee fitting mounted on the check valve outlet port, allows air in the downstream pneumatic section to be relieved to atmosphere.

d. A dehydrator assembly containing a replacement desiccant cartridge is installed in the pneumatic line downstream from the check valve. The dehydrator provides a further drying action which assures the delivery of high-pressure air having a minimum moisture content.

e. A line filter containing a replaceable micronic filter element is installed downstream from the dehydrator. The line filter removes a minimum of 98 per cent of all particles larger than 10 microns from the high-pressure air.

f. Two pressure relief valves installed in the high-pressure pneumatic line open automatically to exhaust air to atmosphere if the pressure exceeds a predetermined value. The valves close (reseal) automatically, preventing the further escape of air, when normal pressures are restored. One pressure relief valve is installed in a port of the filter and separator; the other valve is mounted in a safety fitting located immediately upstream from the receiver.

g. Replaceable rupture discs installed in the cap of the filter and separator assembly and a safety fitting located at the inlet to the receiver provide a blowout relief factor which safeguards the pneumatic system against excessive air pressure in the event the relief valves fail to function.

h. The dry, high-pressure air is stored in a spherical receiver mounted at the front of the unit.

i. An instrument panel located on the left side of the unit mounts the various controls required to monitor and control the delivery of high-pressure air. These include: a pressure gage which measures receiver air pressure; a regulator, shutoff valve, pressure gage and outlet fitting which are used when servicing low-pressure equipment; a similar regulator, shutoff valve, pressure gage and outlet fitting for use when servicing high-pressure equipment; a push valve which controls operation of the filter and separator pneumatic dump valve; and an electric receptacle for connecting an external source of 27-volt dc.

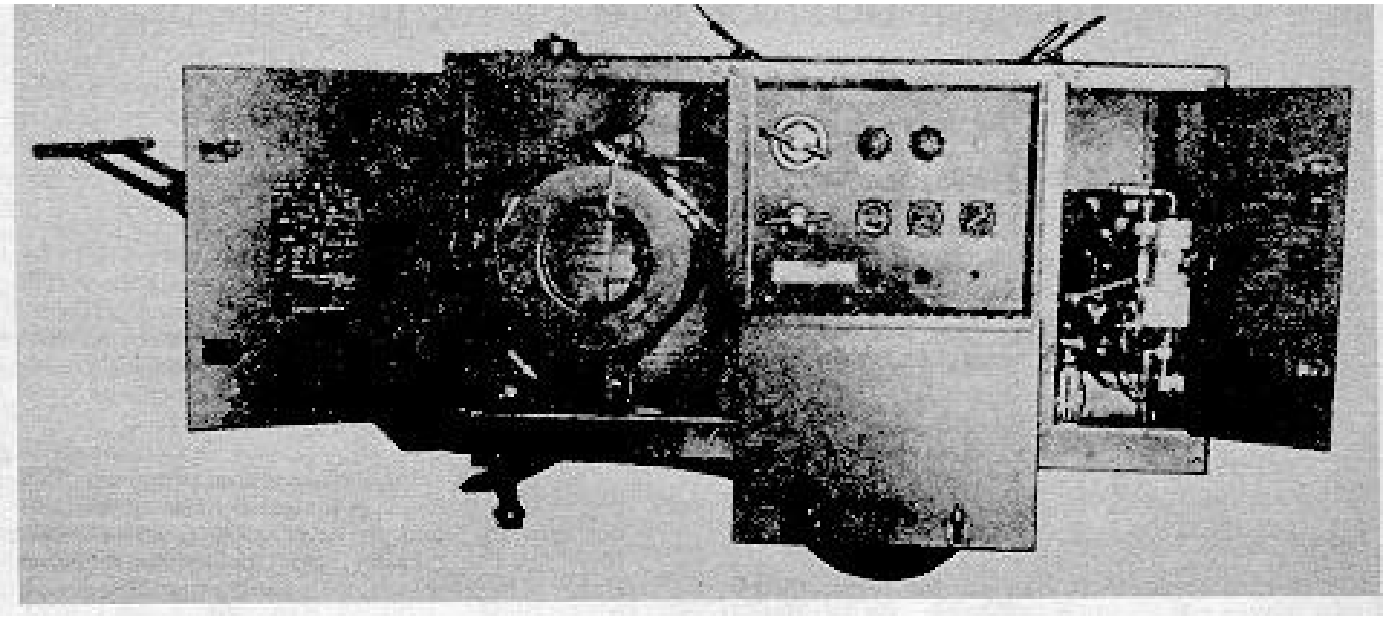


Figure 1-3. Left Side View with Access Doors Open

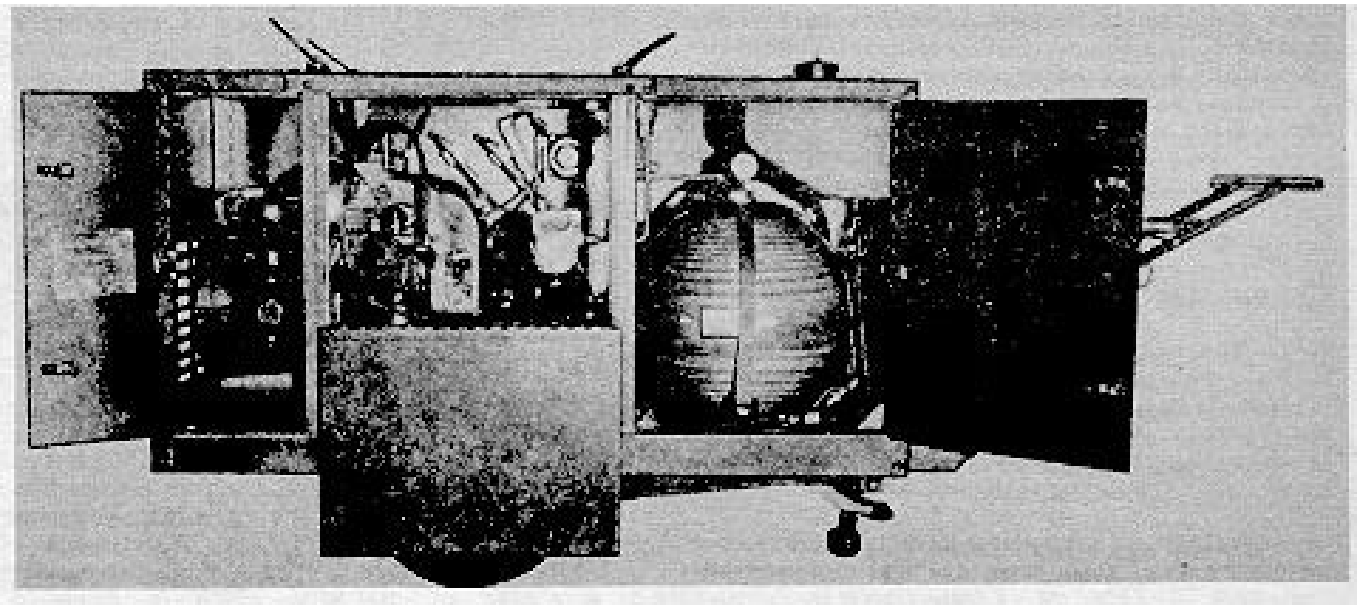


Figure 1-4. Right Side View with Access Doors Open

j. An air hose and chuck assembly, normally stored on a reel located adjacent to the receiver, enables pneumatic connections from the high-and/or low pressure outlet fitting to the equipment being charged.

k. An engine fuel tank is located at the top front of the unit.

1.3.3 All component parts and assemblies of the compressor package assembly are mounted on the rigid framework of a two-wheeled, pneumatic-tired cart.

A three-section aluminum cover provided with hinged, flush access doors and four tie-down rings completely encloses and protects the equipment. A tow bar mounted on the front of the cart enables the unit to be attached to all standard tow trucks, and a retractable handle on the tow bar facilitates manual positioning of the cart. A retractable landing foot drops down to support the front end of the cart, and automatically sets the wheel brakes, when the unit is stationary such as for storage or operation.

1.4 TABULATED DATA

1.4.1 The physical and operating characteristics of the compressor package assembly are listed in Table 1.

TABLE 1. TABULATED DATA

COMPRESSOR PACKAGE ASSEMBLY, GROUND SUPPORT CART	
Manufacturer	Stewart-Warner Corporation
Model	00219, 3800219-1
Overall Dimensions:	
Length (tow bar up)	51.50 in.
Length (tow bar extended; approx)	71.50 in.
Length (tow bar and handle extended; approx)	75.50 in.
Height	32.75 in.
Width	20.50 in.
Weight (dry)	260 lbs max
Tire Pressure	20 to 25 psig
BASIC COMPRESSOR ASSEMBLY	
Manufacturer	Stewart-Warner Corporation
Part Number	Model 3800219-1 3800400-6
Model	3800219 3800400-3-1
Type	Reciprocating piston
Number Stages	Three
Operating Speed (nominal)	3500 rpm
Discharge Air Pressure (rated)	3300 psig
Air Pumping Capacity (rated speed and discharge pressure; sea level inlet)	4.0 scfm
Second Stage Relief Valve Closing Pressures (min)	100 psig
Cooling	Air
Lubrication:	
Method	Pressure and mist
Lubricant	Specification MIL-L-6085A
Oil Sump Capacity (approx)	5 U.S. pints
GASOLINE ENGINE	
Manufacturer	Kohler Company
Manufacturer's Part Number	K141PT-SPEC 29230C
Stewart-Warner Part number	675-0001
Type	Four-cycle, gasoline, overhead valve, air cooler
Horsepower (3600 rpm)	6.25
Governor Speed Range	1200 to 3650 rpm
Radio Shielding	Specification MIL-I-11683
Fungus Proofing	Specification MIL-V-173A
FUEL TANK ASSEMBLY	
Manufacturer	Stewart-Warner Corporation
Part Number	4457-0012
Capacity	2.88 U.S. gals

TABLE 1. TABULATED DATA (Cont)

FILTER AND SEPARATOR ASSEMBLY
- Manufacturer ..... Stewart-Warner Corporation
- Part Number 4455-0018
- Filter Element ..... S-W 130B1759
- Rupture Disc Burst Pressure ..... 4500 to 5000 psig
- Heater Blanket:
  - Part Number 3810133
  - Voltage ..... 27 volts dc
  - Power ..... 140 watts
- Thermoswitch:
  - Part Number 45-0055
  - Contacts Open ..... 75° ± 5°F
  - Contacts Close ..... 45° ± 7°F

PNEUMATIC DUMP VALVE ASSEMBLY
- Manufacturer ..... Stewart-Warner Corporation
- Part Number 4465-0032
- Type ..... Spring loaded, air actuated
- Operating Pressure:
  - Low Pressure ..... 60 to 65 psig
  - High Pressure ..... 3300 ± 50 psig

PRESSURE RELIEF VALVE ASSEMBLY
- Manufacturer ..... Stewart-Warner Corporation
- Part Number 116-B-100-10
- Number Used ..... Two
- Opening Pressure ..... 3500 ± psig
- Reseal Pressure (min) ..... 3200 psig

BACK PRESSURE VALVE ASSEMBLY
- Manufacturer ..... Stewart-Warner Corporation
- Part Number 2670100-1
- Full Flow Inlet Pressure (zero back pressure) ..... 2650 + 50, -100 psig
- Full Flow Inlet Pressure (2400 psig back pressure) ..... 2450 psig max
- Increasing Pressure Leakage (to 2000 psig) ..... 5cc/min max
- Decreasing Pressure Leakage (to 2000 psig) ..... 0.15 scfm max

CHECK VALVE ASSEMBLY
- Manufacturer ..... Stewart-Warner Corporation
- Part Number 140B1100
- Opening Pressure ..... 2 to 8 psig
- Reverse Flow Leakage (3000 psi differential) ..... 3cc/hr max
- Reverse Flow Leakage (5 psi differential) ..... 3cc/min max

DEHYDRATOR ASSEMBLY
- Manufacturer ..... Stewart-Warner Corporation
- Housing Assembly Part Number 3370620
- Cartridge Assembly Part Number 3370170
- Desiccant Material ..... Silica gel
- Cartridge Life (min) ..... 50 hours

LINE FILTER
- Designation MS28720-4
- Type ..... Micronic line
- Filter Element. AN235-1A
- Particle Removal ..... 10 microns

TABLE 1. TABULATED DATA (Cont)

AIR RECEIVER

Manufacturer	Apex Electrical Manufacturing
Manufacturer's Part Number	65750
Stewart-Warner Part Number	657-0004
Rated Pressure	3300 psig
Burst Pressure	5500 psig
Capacity	1300 cu in.

HIGH PRESSURE REGULATOR

Manufacturer	Linde Division Union Carbide
Manufacturer's Part Number	R1775 #B-565895
Stewart-Warner Part Number	665-0007
Pressure Adjusting Range	200 to 3000 psig
Pressure Creep	50 psi max
Internal Leakage	cc/min max
External Leakage	3cc/hr max

LOW PRESSURE REGULATOR

Manufacturer	Linde Division Union Carbide
Manufacturer's Part Number	R2172 #B-565896
Stewart-Warner Part Number	665-0008
Pressure Adjusting Range	0 to 200 psig
Pressure Creep	10 psi max
External Leakage	3cc/hr max

PUSH VALVE

Manufacturer	Clippard Instrument Laboratory
Manufacturer's Part Number	MAV-2
Operating Pressure	0 to 300 psig
Leakage	Zero

AIR HOSE AND CHUCK ASSEMBLY

High Pressure Air Hose	MS28759E2400
Length	20 ft
Operating Pressure	3300 psig
Pressure Servicing Valve:	
Manufacturer	Superior Valve and Fittings
Manufacturer's Part Number	5669
Operating Pressure	3300 psig
Hose Extension:	
Manufacturer	Parker-Hannifin
Manufacturer's Part Number	3/16-4ABZ/00/1/4 AFZ
Chuck Assembly:	
Manufacturer	A. Schraders and Son
Manufacturer's Part Number	4784
Stewart-Warner Part Number	32-A-2124

1.5 FUNCTIONAL DESCRIPTION

1.5.1 The compressor package assembly is intended for use as a portable source of clean, dry, regulated, high-pressure air for ground servicing aircraft and other airborne equipment. The high-pressure air is supplied by a compact, reciprocating piston type, air compressor which is coupled directly to a light weight, four-cycle gasoline engine. The high-pressure air discarded from the compressor is purified and dehydrated by passing it through a moisture separator, a dehydrator and a micronic line filter prior to reaching a spherical receiver for storage. A back pressure valve, a check valve and two pressure relief valves installed in the pneumatic line between the compressor and receiver automatically control the flow of air and protect the system against inadvertent over-pressure.

1.5.2 The air compressor, gasoline engine, engine fuel tank and all components of the pneumatic system are mounted on an enclosed, two-wheel cart provided with a tow bar and a cart handle. A recessed instrument panel protected by a hinged door contains the controls and gages required to regulate and monitor the compressed air delivered to the using device from the receiver, and also mounts the outlet fittings to which the air hose couples. Additional hinged doors provide access to the air hose storage reel and the component assemblies of the equipment.

1.5.3 The pneumatic system of the compressor package assembly is illustrated schematically in Figure 1-5. The function of each component assembly used in the system is described in the following paragraphs.

1.5.4 BASIC AIR COMPRESSOR

1.5.4.1 The air compressor assembly consists of three cylinder and piston assemblies mounted radially on a crankcase and pneumatically connected in series. The pistons are attached to, and actuated by, a master rod mounted on a shaft which extends axially through the crankcase. One end of the shaft couples directly to the engine crankshaft, and the opposite end extends through the crankcase endbell and mounts a multiple blade fan which blows cooling air past the cylinders and interstage connecting tube assemblies. The shaft is ball bearing mounted at both ends, and needle bearings are used to minimize mechanical friction and wear at the pistons, connecting links and master rod.

1.5.4.2 The three cylinders and piston assemblies are graduated in size, the first stage having a relatively large bore, while the bores of the second and third stages are progressively smaller.

The first stage cylinder is provided with a silencer cover and an intake filter which removes particles of foreign matter from the ambient air drawn into the compressor. A connector nipple on the silencer cover accommodates a length of hose, enabling intake air to be drawn from a location remote from the package. Additional filtering is provided by a strainer and relief valve assembly installed in the inlet port of the second stage cylinder.

NOTE: A strainer and relief valve assembly is installed in inlet port of third stage cylinder on Model 3800219 only.

A fine mesh screen installed in the body of the unit traps solid particles present in the interstage air, and a spring loaded poppet functions as a pressure relief valve to prevent interstage air pressure from exceeding a predetermined value.

1.5.4.3 The intake and exhaust valves used in the first stage of the air compressor are spring steel, flapper type valves mounted on opposite sides of a valve plate installed between the cylinder head and the cylinder proper. The valves are spring loaded to seat against concentric rings of holes which are drilled through the valve plate and coincide with the inlet and outlet ports in the cylinder head.

1.5.4.4 With the engine operating to drive the compressor, and the first st stage piston moving toward the crankcase, the cylinder bore between the piston and valve plate is at a reduced pressure. This allows ambient air pressure to force the inlet valve away from the valve plate, and air enters the cylinder. At the conclusion of the intake cycle, the piston reverses direction and moves toward the cylinder head. The intake valve then closes, and the air trapped in the cylinder is compressed into a smaller volume by the advancing piston. As the piston approaches

the end of its compression stroke, the air pressure is sufficient to overcome the spring force holding the exhaust valve against the valve plate, and the compressed air escapes through the outlet ports and flows through the interstage connecting tube to the inlet port of the second stage cylinder.

1.5.4.5 The intake valve mechanisms of the second and third compressor stages each consists of a port in the side of the cylinder, holes drilled through the walls of the piston, and a poppet fitted into the forward end of the piston. The exhaust valves are hardened steel discs, carefully ground and lapped to seat against a lapped shoulder at the end of the cylinder bore. Compression springs installed between the valves and the cylinder normally maintain the valves seated against the shoulders.

1.5.4.6 Compressor timing is such that the second stage piston is moving toward the crankcase and approaching the bottom of its stroke when compressed air is exhausting from the first stage cylinder. This compressed air enters the second stage cylinder through the strainer and relief valve assembly installed in the inlet port, flows through the holes drilled in the piston, forces the poppet open, and fills the area of reduced pressure in the cylinder bore between the piston and the exhaust valve. When the piston reverses direction, the poppet valve is forced closed and the air trapped in the forward end of the cylinder is compressed by the advancing piston.

1.5.4.7 As the second stage piston approaches top dead center, the pressure of air compressed in the cylinder becomes sufficient to override the spring force holding the exhaust valve closed. When the exhaust valve opens, the compressed air escapes into the interstage connecting tube and is routed to the compressor third stage where the compression cycle is repeated and the air raised to its ultimate delivery pressure.

1.5.4.8 The strainer and relief valve assembly installed in the inlet port of the second stage cylinder normally serves only to strain the interstage air.

NOTE: Model 3800219 has a 3rd stage strainer and relief valve assembly.

However, should air pressure within the elbow body exceed a predetermined value, the spring-loaded poppet is forced away from its seat, and air escapes to atmosphere through the drilled hole in the spring adjusting plug. The poppet reseats automatically, preventing further escape of air, when the internal pressure drops to the normal operating level.

1.5.4.9 Additional protection against inadvertent overpressurization is provided by rupture discs installed in the second and third stage cylinder caps.

The rupture discs, mounted in ports drilled through the cylinder caps, are designed to burst and exhaust air directly to atmosphere in the event of a sudden rise in pressure within the cylinders.

NOTE: Model 3800219 does not use a rupture disc in second stage cylinder cap.

The rupture discs can be replaced without removing the

cylinder caps or otherwise disassembling the equipment.

1.5.4.10 The air compressor assembly is lubricated by a combination of pressure and mist principles. The complete lubrication system includes an oil reservoir attached to the bottom of the crankcase, an oil pump cylinder mounted in the bottom of the reservoir, and oil pump piston which fits into the cylinder and is driven by the master rod. The oil level in the reservoir is shown on an indicator sight glass mounted on the side of the reservoir. A drain cock located at the bottom of the reservoir enables the oil to be drained during periodic servicing of the equipment.

1.5.4.11 During compressor operation, oil is drawn into the cylinder on the piston suction stroke through holes drilled in the cylinder wall. On the piston pressure stroke, the oil inlet holes are covered by the piston, preventing the escape of oil back to the reservoir. The oil trapped in the cylinder is forced through the hollowbore of the piston, passes through a drilled hole in the master rod, and lubricates the wear surfaces of the master rod and shaft. The oil thrown from these rapidly moving parts separates into a fine mist which fills the interior of the crankcase and provides adequate lubrication of the bearings, connecting links, pistons and other internal parts. Oil leakage from the crankcase is prevented by the use of endbell and oil reservoir gaskets and oil seals installed at each end of the shaft.

1.5.4.12 The heat which normally results from rapid compression of a gas is dissipated before it reaches a troublesome level by the use of finned cylinders and interstage connecting tubes. In addition, the high pressure air leaving the third stage cylinder is routed through a finned aftercooler which is attached to the underside of the fan guard. Thus, the cooling air circulated by the fan is drawn past the aftercooler, then blown back past the cylinders, interstage connecting tubes and engine.

1.5.5 FILTER AND SEPARATOR ASSEMBLY 1.5.5.1 The filter and separator assembly consists of a hollow aluminum shell, or tank, with a threaded, extruded port at one end. The opposite end of the shell is closed by a removable cap which screws into the shell and forms an air tight seal. Three tapped holes in the cap accommodate the pneumatic inlet and outlet fittings and a pressure relief valve assembly. The inlet port is cross-drilled to direct air directly into the shell. Outlet porting is such that air leaving the filter and separator assembly must first pass through a cup-shaped filter element attached to the inside of the cap.

1.5.5.2 High-pressure air from the compressor aftercooler is directed to the inlet port of the filter and separator assembly through a short connecting tube. As the high-pressure air enters the tank, the decrease in velocity and increase in ratio of surface area to volume cause the moisture and oil vapor to condense and settle to the bottom of the shell. These impurities are removed periodically by opening a dump valve mounted on the extruded port, allowing high pressure air to blow the accumulated moisture and oil condensate to atmosphere.

1.5.5.3 Freezing of the condensate in the filter and separator assembly during cold weather operation is prevented by wrapping a thermostatically controlled, electric heater blanket around the shell. The application of 27-volt direct current from an external source is controlled by a thermoswitch attached to the base of the separator shell. The thermoswitch is adjusted to close when the shell temperature reaches 45° ± 7° Fahrenheit and to open at a temperature of 75° ± 5° Fahrenheit.

1.5.5.4 Three additional ports are located in the top surface of the tank cap. One of the ports is not used in this application and is sealed with a pipe plug. The other two ports mount replaceable rupture discs which are designed to burst and exhaust air to atmosphere if pressure in the filter and separator assembly reaches a gage pressure of 4500 to 5000 pounds per square inch

1.5.6 PNEUMATIC DUMP VALVE

1.5.6.1 Condensate blow down from the filter and separator assembly is controlled by a pneumatic dump valve mounted in the extruded port at the base of the separator shell The dump valve consists essentially of a hollow body which contains a spring-loaded piston. The spring force is directed against the piston such that, under static conditions, a drilled passage at the separator end of the body is open. An adapter fitting at the opposite end of the body serves to restrict axial movement of the piston and also accommodates a tee fitting. One run of the tee fitting is connected to the outlet port of the compressor first stage cylinder; the other run is connected to the push valve mounted on the instrument panel.

1.5.6.2 With the compressor operating and the push valve closed, static air pressure in the line from the first stage cylinder is impressed on the dump valve piston. This pressure is sufficient to displace the piston against the spring force, thus closing the valve passage and preventing the blow down of high-pressure air from the filter and separator assembly. When the push valve is pressed (open), the static air pressure drops to zero, the spring force displaces the piston to open the valve passage, and high-pressure air in the separator exhausts to atmosphere, carrying with it the accumulated condensate. A metered orifice in the pneumatic line from the first stage outlet port restricts the flow of control air when the push valve is open, and no appreciable decrease in compressor output capacity occurs during the brief blow down periods.

1.5.7 PRESSURE RELIEF VALVE

1.5.7.1 Two pressure relief valves are used in the compressor package assembly: one valve is installed in the cap of the filter and separator assembly; the second valve is installed in the high-pressure line at the inlet to the receiver. The pressure relief valves are safety devices which open automatically and exhaust air to atmosphere should pressure in the system exceed a value of approximately 3500 psig. The relief

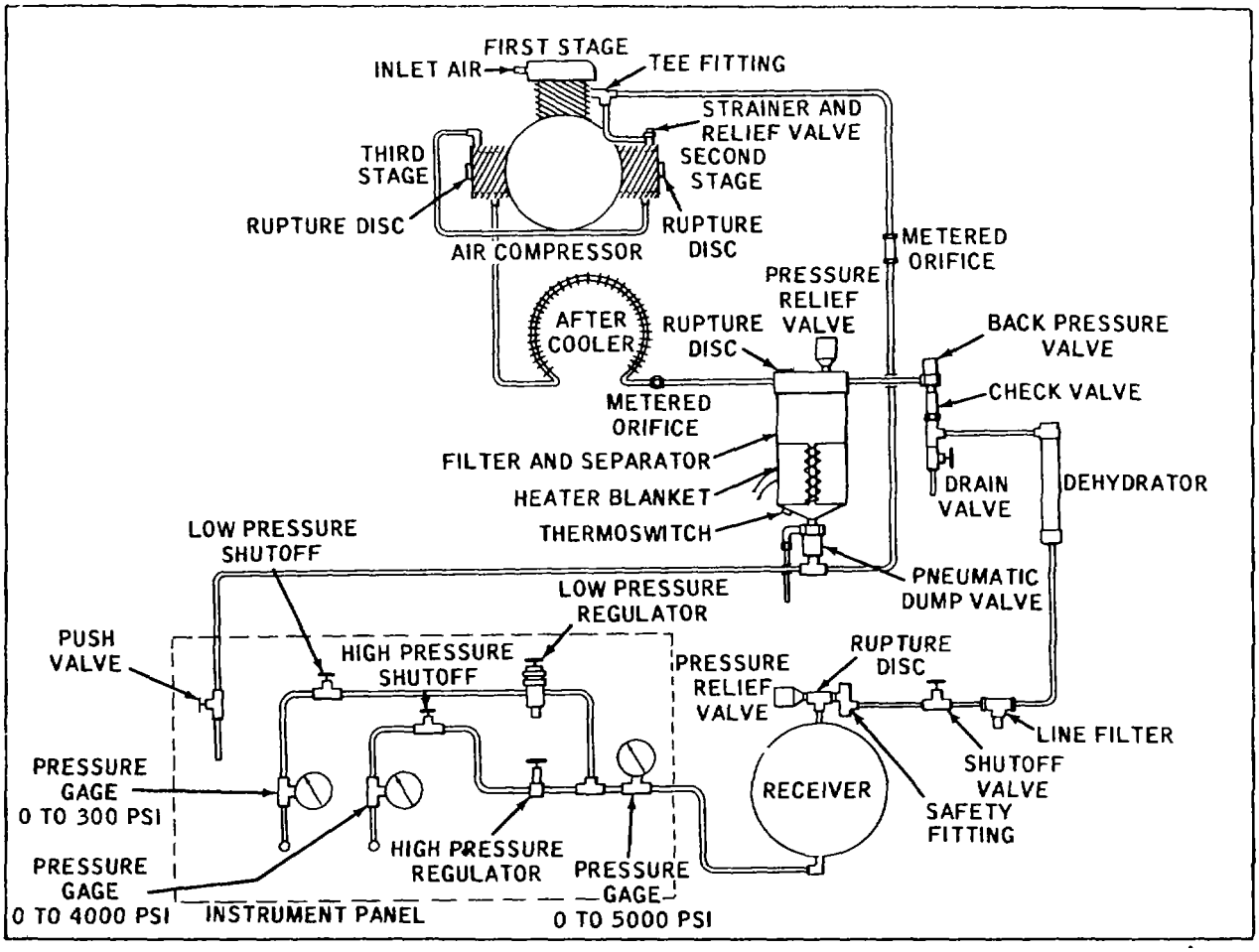


Figure 1-5. Pneumatic System Schematic Diagram (Model 3800219-1)

valve reseals (closes), preventing the further escape of air, when the pressure drops to about 3200 psig.

1.5.7.2 The pressure relief valve assembly consists of a cylindrically shaped, aluminum valve body which contains a spring-loaded piston, a ball-type valve, a stem and an adjusting screw. Under normal pressure conditions, the ball is seated against a nylon washer, or seat, installed in the bore of the piston, and no air escapes through the assembly. However, when air pressure in the system increases above a predetermined value, the spring-loaded piston and the ball are displaced until the ball rests against the end of the stem which extends into the piston bore. A further increase in pressure causes additional displacement of the piston, unseating the ball and allowing air to escape to atmosphere through the bore of the piston and holes drilled in the adjusting screw. When air pressure in the system is reduced to an appropriate level, the spring force moves the piston toward the ball, closing the valve passage and preventing the further escape of air.

1.5.8 BACK PRESSURE VALVE

1.5.8.1 The back pressure valve, mounted or. the outlet port of the filter and separator assembly, consists basically of an aluminum alloy valve body provided with an inlet fitting, an outlet fitting and an adjustable valve cap. A drilled passage connecting the inlet and outlet fittings contains a piston seat and a spring-loaded piston. The setting of the valve cap determines the force which the spring exerts to maintain the piston seated against the piston seat (i.e., valve closed).

1.5.8.2 The piston of the back pressure valve is held against the piston seat, preventing the flow of air from the filter and separator assembly, until the pressure in the separator shell reaches a predetermined value. When air pressure at the inlet of the back pressure valve is between 2450 and 2650 psig, depending on the back pressure at the outlet fitting, the piston is forced away from the piston seat, compressing the spring. Opening of the drilled passage through the piston seat allows high-pressure air to flow from the filter and separator assembly through the back pressure valve. When air pressure in the filter and separator assembly drops to approximately 2000 psig, the spring forces the piston back against the piston seat, effectively closing the back pressure valve and preventing the further flow of air.

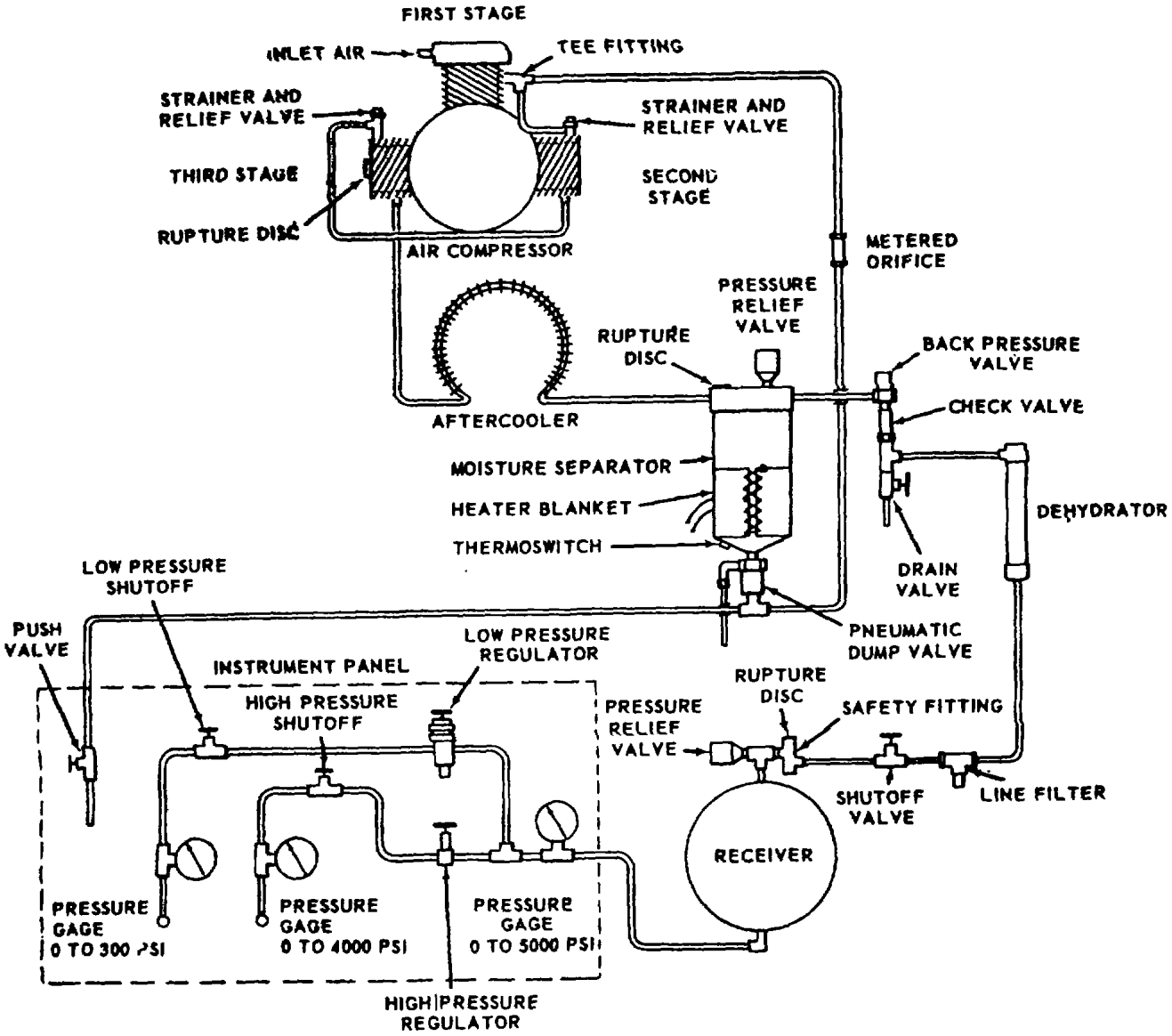


Figure 1-5.1 Pneumatic System Schematic Diagram (Model 3800219)

1.5.9 CHECK VALVE

1.5.9.1 A check valve mounted on the outlet fitting of the back pressure valve prevents reverse air flow from the receiver and resultant opening of the back pressure valve due to this down stream pressure. The check valve consists of a hollow, cylindrical valve body provided with integral threaded connection fittings at each end. The valve body contains a poppet, poppet guide, poppet return spring and valve seat which are held inside the body by a body screw.

1.5.9.2 The poppet of the check valve normally is held against the valve seat by the poppet return spring. However, an air pressure of 2 to 8 psig applied to the inlet port is sufficient to displace the poppet against the spring force. Air can then flow past the poppet, through fluted passages in the poppet guide, and exit through the outlet port. When air pressure downstream from the check valve exceeds upstream pressure, the poppet is forced firmly against the valve seat, closing the valve and preventing back flow.

1.5.10 SYSTEM DRAIN VALVE

1.5.10.1 A manual valve, installed in a tee fitting at the outlet port of the check valve, can be opened as necessary to relieve system air pressure downstream from the check valve.

1.5.11 DEHYDRATOR

1.5.11.1 The dehydrator is, in effect, a chemical drier which supplements the moisture separator in removing moisture from the compressed air before delivery to the receiver. The unit consists of a cylindrical housing which has removable caps provided with threaded ports at each end. A replaceable dehydrator cartridge filled with a chemical desiccant fits inside the housing such that compressed air travels the complete length of the cartridge. The desiccant used in the cartridge has a characteristic blue color which indicates its moisture absorbing qualities are satisfactory. As moisture is absorbed, the blue fades to indicate a replacement cartridge is required.

1.5.12 LINE FILTER

1.5.12.1 A replaceable element, micronic line filter is installed in the pneumatic line downstream from the dehydrator. The filter is a Military Standard type which uses a filter element which removes a minimum of 98 per cent of all particles whose two smallest dimensions are greater than 10 microns.

1.5.13 SAFETY FITTING ASSEMBLY

1.5.13.1 The safety fitting, mounted on the receiver inlet, contains a rupture disc of the same type used on the compressor second and third stages and the filter and separator assembly. If for any reason either of the two pressure relief valves should fail to operate, the rupture disc will burst at a pressure of 4500 to 5000 psig, exhausting air directly to atmosphere.

1.5.14 RECEIVER

1.5.14.1 The dehydrated, filtered, high-pressure air is stored in a spherical receiver securely strapped in a cushioned cradle at the front of the cart. Air pressure in the receiver is measured by a 0 to 5000 psig pressure gage mounted on the instrument panel.

1.5.15 PRESSURE REGULATORS

1.5.15.1 Two manually adjustable pressure regulators mounted on the instrument panel are used to regulate the pressure of air delivered to the using device from the receiver. The low pressure regulator, and its associated 0 to 300 psig pressure gage, shutoff valve and outlet fitting, is used for obtaining air at a pressure up to 200 psig. The high-pressure regulator, and its 0 to 4000 psig pressure gage, shutoff valve and outlet fitting, is used for supplying air at pressures above 200 psig. Both regulators are of the balanced pressure type and creepage from the pressure set point is minimum.

1.6 ELECTRICAL REQUIREMENTS

1.6.1 A two-pin electrical connector on the instrument panel is used for making connections to an external source of 27-volt direct current. This power is supplied to the moisture separator heater blanket and is controlled automatically by a thermoswitch as necessary to prevent freezing of the condensate in the filter and separator assembly. (See figure 1-6.)

1.7 GASOLINE ENGINE

1.7.1 Refer to Part II for description and tabulated data for the engine.

1.8 GROUND CART ASSEMBLY

1.8.1 The cart mounting frame is carefully constructed of aluminum alloy channels and structural members,

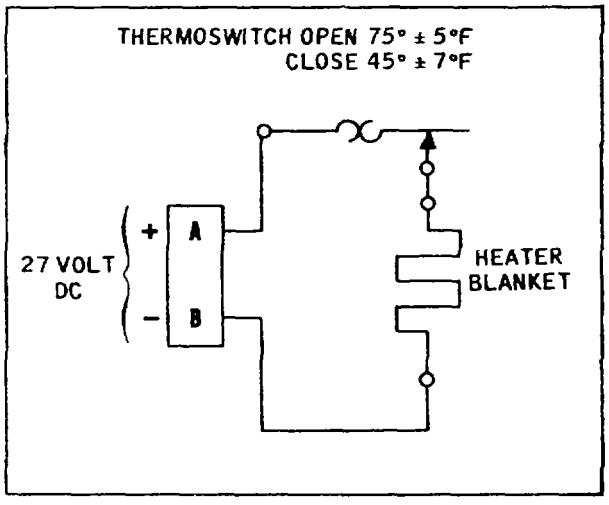


Figure 1-6. Electrical System Schematic Diagram

securely welded together to form a rigid assembly. Two pneumatic tired wheels, mounted a little to the rear of center, support the main weight of the equipment and provide the necessary mobility. A heavy duty tow bar attached to the front of the cart enables the equipment to be attached to a standard truck pintle for rapid transport. An auxiliary cart handle, pivoted to the tow bar, provides a manual means of maneuvering the cart. During storage and operation of the compressor package assembly, a foot extends downward from the front end of the cart to provide the necessary support.

1.8.2 The complete unit is enclosed by a three-piece cover fabricated of welded and reinforced sheet aluminum. Hinged doors located at both sides of the cover and equipped with spring type latches, provide easy access to the instrument panel and all component assemblies of the equipment. Louvers in the rear end of the cover permit a free flow of cooling air to the compressor and engine. Four tie-down rings bolted to the top of the cover are used for securing the equipment during shipment.

SECTION II

OPERATING INSTRUCTIONS

2.1 TOWING AND POSITIONING

2.1.1 The tow bar attached to the front of the cart enables the compressor package assembly to be attached to the pintle of most standard tow trucks. Always make sure the foot which supports the front ends of the cart is retracted and the wheel brakes released before attempting to tow the unit. Do not exceed a speed of 20 miles per hour when towing on pavement; reduce speed in accordance with the condition of the terrain. Secure the tow bar in the vertical position when it is not being used.

2.1.1 The cart handle attached to the tow bar allows the compressor package assembly to be moved manually for short distances and for proper positioning of the equipment. When the unit is located in its operating or storage location, step on the foot pedal at the front of the cart to drop the support foot and set the wheel brakes. Secure the cart handle in the vertical position.

2.2 PRE-OPERATING INSPECTIONS

NOTE

Refer to Instruction Decal on engine compartment access door.

2.2.1 Open all access doors and perform a thorough general inspection of the compressor package assembly, looking for obvious indications of damage such as oil or air leaks, loosely mounted or missing parts, bent or broken fins on the interstage connecting tubes and cylinders, damaged or improperly zeroed pressure gages, and broken safety wires. Check all pneumatic and fuel systems connections for tightness. Make certain all surfaces of the unit are free of obstructions and deposits that would impair the operation of the engine, compressor and other components, or prevent efficient cooling of the units. Examine the air hose, the pressure servicing valve and the chuck for damaged fittings, swelling, rupturing, and other indications of deterioration. Inspect the fuel tank for dents, cracks, leaks, and other damage.

2.2.2 Remove the attaching screws and lock washers and lift the silencer cover and intake filter from the compressor first stage cylinder head. If necessary, clean the filter by washing in ethyl alcohol (Federal Specification O-A-396) and allow the element to air dry. Use a clean cloth moistened with dry-cleaning solvent (Federal Specification P-S-661) to clean the inside of the silencer cover, then remove all residue by wiping with a clean, lint-free cloth. Replace the intake filter and silencer cover on the first stage cylinder head.

2.2.3 Inspect the fuel filter (see Figure 1-4); if necessary, empty and clean the sediment bowl. Check the engine assembly in accordance with the instructions contained in Part II: of this manual.

Make certain the tires are uniformly inflated to a pressure of 20 to 25 psig and that the wheel brakes are set.

2.3 PRE-OPERATING SERVICING

2.3.1 COMPRESSOR LUBRICATION (See Figure 3-1)

2.3.1.1 Make sure the compressor package assembly is as level as the terrain permits, then check the level of the oil in the compressor reservoir by observing the indicator sight mounted on the side of the reservoir. If necessary, remove the cover and filter assembly from the breather assembly installed in the compressor crankcase, and add oil to bring the level up to the FULL mark on the indicator sight. Approximately five pints of oil are required to fill the reservoir. Be sure to replace the cover and filter assembly.

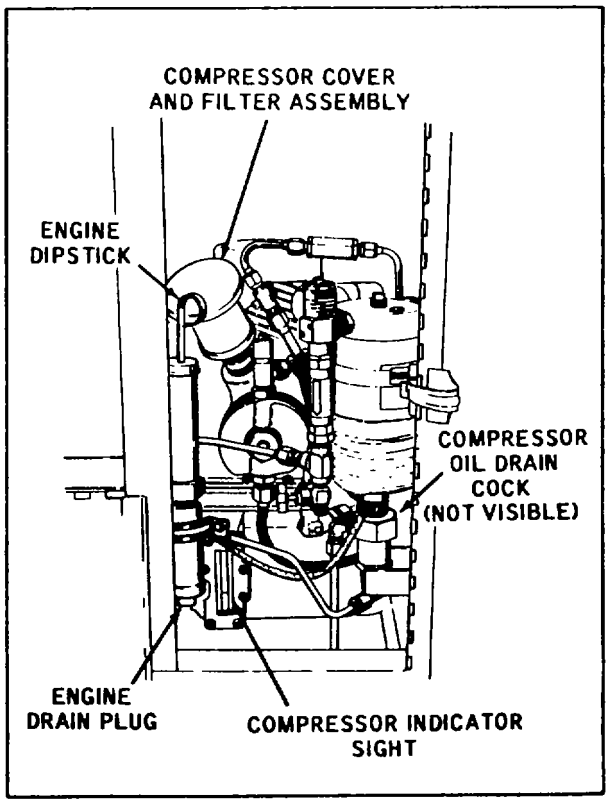


Figure 2-1. Compressor and Engine Lubrication Points

NOTE

For normal use of the compressor package assembly, including low temperature operation, use only aircraft instrument lubricating oil (Specification MIL-L-6085A).

If the compressor is to be used for compressing breathing quality air, use only special medicinal grade, mineral base lubricating oil supplied by Stewart-Warner as part numbers 130A1190 (one pint), 130A0657 (one quart), and 130A0656 (one gallon).

2.3.2 ENGINE LUBRICATION

2.3.2.1 Use the dipstick to check the oil level in the engine crankcase. Add oil (Specification MIL-L-2104) as necessary to bring the level up to the FULL mark on the dipstick. Do not overfill.

2.3.3 ENGINE FUEL

2.3.3.1 Fill the fuel tank with standard, automotive grade gasoline (Federal Specification W-M-561), and screw the filler cap down tight. Be sure the gasoline used is clean and fresh. Do not mix oil with the gasoline.

2.4 PNEUMATIC CONNECTIONS

2.4.1 Open the front, left-hand access door (see Figure 1-3) and remove the air hose and chuck assembly from the hose reel For low-pressure charging (up to 200 psig), connect the air hose half-coupling to the low pressure outlet fitting on the instrument panel (see Figure 2-2). For charging pressures above 200 psig, connect the half-coupling to the high-pressure outlet fitting. Close the pressure servicing valve at the opposite end of the air hose before connecting the chuck assembly to the inlet valve of the device to be charged. Be sure all connections are tight and there are no kinks or sharp bends in the air hose.

2.4.2 If required, slip one end of an inlet hose on the connector port of the compressor first stage silencer cover. Place the opposite end of the inlet hose in allocation such that engine exhaust gases, obnoxious or toxic fumes, dust, dirt, and excessively humid air will not be drawn into the compressor first stage cylinder. Make sure there are no sharp bends or kinks in the inlet hose, and that the inlet end is unobstructed.

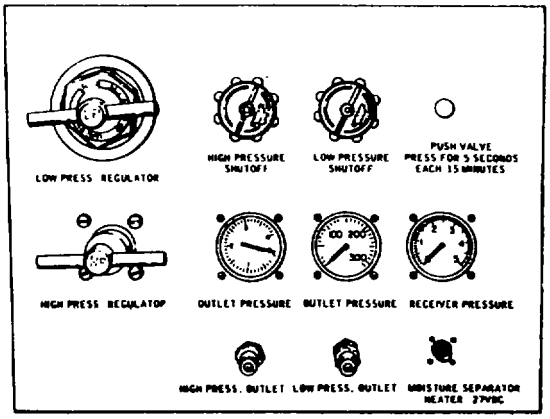


Figure 2-2. Instrument Panel

2.5 OPERATING PRECAUTIONS

2.5.1 The following precautions must be rigidly observed at all times when operating the compressor package assembly.

2.5.2 Operate the compressor package assembly only in well-ventilated areas or with the engine exhaust gases vented outdoors. Engine exhaust gas contains lethal carbon monoxide which is colorless and odorless. When inhaled, carbon monoxide will cause serious, and sometimes fatal, illness. If the exhaust gases enter the compressor intake, the air storage bottles being charged will be contaminated and the air unfit for breathing.

2.5.3 High-pressure air can cause serious injury to operating personnel. Always make certain the connecting tube assemblies, hoses and other component parts of the compressor package assembly are in good condition. In particular, never use an air hose assembly or filler attachments that are damaged or appear in questionable condition.

2.5.4 Never charge an air storage bottle or other pneumatic equipment with compressed air if the proof pressure or rating of the equipment is unknown. Never charge equipment to a pressure in excess of its known rating.

2.5.5 Severe explosion will result if a container partially filled with oxygen is charged with air. If any doubt exists as the contents of a container, thoroughly vent the container and flush with water or air at zero pressure before charging.

2.5.6 The pressure relief valve assemblies are preadjusted to open and relieve system air pressure when the pressure exceeds a safe value. Operating personnel should never attempt to change the setting of the pressure relief valve assemblies.

2.5.7 When compressing breathing quality air, use only special medicinal grade, mineral base lubricating oil for compressor lubrication (refer to paragraph 3.3.1.1).

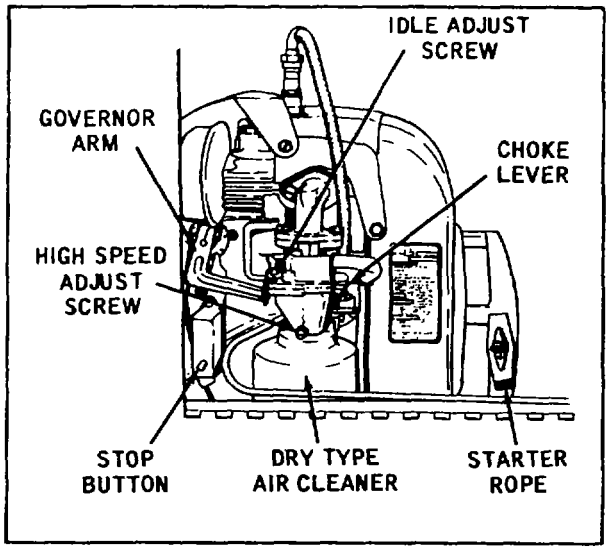


Figure 2-3. Engine Controls and Adjustments

2.5.8 Always stop the gasoline engine before attempting to fill the fuel tank, and exercise extreme care to avoid spilling gasoline on a hot engine.

2.5.9 When operating the compressor package assembly at ambient temperatures below 40° Fahrenheit, connect a source of 27-volt direct current to the electrical connector on the instrument panel (see Figure 2-2).

2.6 ROUTINE OPERATING INSTRUCTIONS

2.6.1 Operate the compressor package assembly in accordance with the following step-by-step procedure.

a. Inspect and service the unit in accordance with the instructions in paragraphs 2.2 and 2.3. Make pneumatic connections in accordance with instructions in paragraph 2.4.

b. Close the high-pressure and low-pressure shutoff valves located on the instrument panel (see Figure 2-2).

c. Close the system drain valve located adjacent to the filter and separator assembly (see Figure 2-3).

d. Open the receiver shutoff valve and the line filter valve (see Figure 1-4).

e. Open the fuel line shutoff valve(see Figure 1-4).

f. Set the engine choke lever (Figure 2-3) as required. Little or no choking will be needed .when the engine is warm. Experience will teach the degree of choking necessary under varying conditions of temperature, fuel grade, etc. Adjust the engine throttle to the approximate half open position.

g. Pull the starter rope (Figure 2-3) with a quick, steady motion in a straight line through the guides. If a second pull is necessary, set the choke lever at the original position. When the engine starts, slowly return the choke lever to the fully open position. After engine warm-up, adjust the throttle to the fully open position.

h. As the compressor package assembly operates, check the receiver pressure gage (see Figure 2-2) at regular intervals to make certain air pressure in the receiver is increasing at a steady rate. Allow the unit to operate until the receiver pressure is adequate to supply the charging requirements.

I. Adjust the applicable high or low pressure regulator (see Figure 2-2) for the required delivery pressure as indicated by the corresponding outlet pressure gage.

j. With the air hose and chuck assembly connected to the appropriate outlet fitting, open the corresponding high or low pressure shutoff valve (see Figure 2-2).

k. Connect the air hose chuck assembly to the device to be charged and open the pressure servicing valve.

l. During the charging procedure, press the push valve (see Figure 2-2) for approximately five seconds once every fifteen minutes of compressor operation. This will allow the high-pressure air in the filter and separator assembly to escape to atmosphere (blow down), carrying with it the oil and water condensate.

CAUTION

The oil-water-air emulsion which blows down when the push valve is pressed can cause painful injuries. Be extremely careful to stay clear of the blow down tube directly beneath the filter and separator assembly.

m. When the using device is charged to the required pressure, set the engine throttle to the idle position. Press the engine stop button (see Figure 2-3) to stop the engine.

n. Close the shutoff valve on the instrument panel (see Figure 2-2). Disconnect the air hose and chuck assembly from the outlet fitting and replace the hose on the hose reel.

NOTE

The pneumatic dump valve normally will open automatically when the compressor is stopped, allowing the condensate in the filter and separator assembly to blow down. However, it is good practice to press the push valve on the instrument panel at the conclusion of each charging cycle.

2.6.2 The procedure for charging a device can be stopped or restarted at any time without harmful effects.

However, If the procedure is interrupted, always close the shutoff valve on the instrument panel, disconnect the air chuck from the device being charged, and blow down the filter and separator assembly immediately upon stopping the engine. When resuming operations, be sure to allow the pressure in the receiver to build up to the pressure in the partially charged device before connecting the air chuck and opening the shutoff valve.

NOTE Continued effective filtering action is assured only if the filter and separator assembly is blown down at least once every fifteen minutes of continuous compressor operation, and at the end o: each charging cycle.

2.7 SHUT DOWN

2.7.1 At the conclusion of daily charging operations:

a. Close the fuel line shutoff valve.

b. Close the receiver shutoff valve.

c. Open the system drain valve.

d. Open one or other of the shutoff valves on the instrument panel to exhaust high pressure air in the receiver to atmosphere.

e. Close all access doors.

f. Refill the engine fuel tank.

2.8 OPERATION UNDER UNUSUAL CONDITIONS

2.8.1 EXTREME COLD. Operation of the compressor package assembly at temperatures below 30° Fahrenheit is the same as specified for routine operation except as follows:

a. Use the proper viscosity engine lubricating oil (refer to paragraph 2.3.2.1).

b. Make certain 27-volt direct current is applied to the unit (refer to paragraph 2.5.9).

2.8.2 EXTREME HEAT. The compressor package assembly can be operated at ambient temperatures up to 125° F (51° C) exactly as specified in paragraph 2.6.1.

2.8.3 EXTREME HUMIDITY. When operating the compressor package assembly under extremely humid climatic conditions, proceed as specified in paragraph 2.6.1 except reduce the intervals between condensate blow downs as necessary to assure the delivery of dry, pure air.

2.8.4 EXTREME DUST, SAND, GRIT. Although the compressor package assembly has been especially designed to operate efficiently under adverse climatic conditions, when the equipment is used in areas where airborne material is excessive, observe the following precautions:

a. Keep the intake end of the compressor air inlet hose off the ground and located such that a minimum amount of sand, dirt and other foreign material is drawn into the compressor along with ambient air.

b. Reduce the intervals between periodic cleaning of the overall equipment. Be especially careful to remove all caked deposits from between the cooling fins of the aftercooler, the interstage connecting tubes and the compressor cylinders.

c. Change the compressor lubricating oil and service the gasoline engine at more frequent intervals than for normal operating conditions.

d. Clean or replace the compressor intake filter as often as necessary to assure the efficient intake of air.

SECTION III

PREVENTIVE MAINTENANCE

3.1 GENERAL

3.1.1 This Section contains instructions for performing the periodic servicing and preventive maintenance necessary to assure the continued efficient operation of the compressor package assembly and to minimize the possibility of inadvertent break-down of the equipment. Included are the recommended procedures and intervals for cleaning, inspecting, lubricating and testing the overall equipment. Where necessary, references are made to other sections of this service manual for more detailed instructions and/or additional information.

3.2 CLEANING

3.2.1 EXTERNAL SURFACES. Keep the external surfaces of the compressor package assembly clean at all times. Use clean, lint-free cloths dampened with dry-cleaning solvent (Federal Specification P-S-661) to remove all dust, dirt, oil, grease, and gummy substances from all component assemblies. Dry the surface with clean cloths and/or low-pressure compressed air. Be especially careful to remove all caked deposits from between the cooling fins of the compressor aftercooler, interstage connecting tubes and cylinders, and the cooling fins of the engine cylinder.

3.2.2 COMPRESSOR AIR INTAKE FILTER. At least once every 50 hours of accrued compressor operating time, or at shorter intervals if climatic conditions are excessively dry and dusty, remove the silencer cover and intake filter (see Figure 5-12) from the compressor first stage cylinder head. Thoroughly clean the intake filter by washing in ethyl alcohol (Federal Specification O-A-396) and allow to air dry. Discard the intake filter if it is damaged or cannot be completely cleaned. Use a clean cloth moistened with dry-cleaning solvent to wipe the inside of the silencer cover and the cylinder head, then remove all traces of residue with a clean, dry, lint-free cloth. Replace the intake filter and the silencer cover on the first stage cylinder head.

3.2.3 DEHYDRATOR CARTRIDGE. At least once every 50 hours of accrued compressor operating time, or at shorter intervals if climatic conditions are excessively humid, replace the dehydrator cartridge as follows:

a. With compressor inoperative, close receiver shutoff valve (see Figure 1-4) and open system drain valve (see Figure 1-3).

b. (See Figure 5-10.) Cut safety wire and remove outlet adapter cap (4) of dehydrator housing (13). Be careful not to damage quad ring packing (5), packing back-up ring (6) and filter disc (7) which are removed with cap.

c. Slip used dehydrator cartridge (14) out of dehydrator housing.

d. Remove desiccant indicator assembly from each end of replacement dehydrator cartridge.

NOTE

Desiccant indicator assemblies are installed on all replacement dehydrator cartridges to provide an air-tight seal that prevents exposure of desiccant in cartridge to moisture during shipment and storage. Examine desiccant indicators after removal. Do not use dehydrator cartridge if indicator desiccant is not blue in color.

e. Make certain preformed packing and lock ring are installed in grooves at outlet end of dehydrator cartridge (14). Install cartridge in dehydrator housing in accordance with instructions on cartridge body.

f. Screw adapter cap (4), together with filter disc (7), packing back-up ring (6) and quad ring packing (5), on dehydrator housing finger-tight, then use appropriate wrench to tighten cap with a torque of 10 pound feet.

g. Use 0.032 inch diameter Monel wire to safety wire adapter cap to housing as in original installation.

3.2.4 LINE FILTER. At least once every 100 hours of accrued compressor operating time, or at shorter intervals if climatic conditions are excessively dry and dusty, .Remove the filter element from the line filter (see Figure 1-4). Inspect the filter element carefully for cleanliness, damage and indications of deterioration. If the filter element is in good physical condition, wash it thoroughly in ethyl alcohol (Federal Specification O-A-396) and allow to air dry. Re-install the cleaned element, or a replacement element if required, in the line filter. Be sure the original equipment configuration is restored and the filter cap is properly safety wired.

CAUTION

Be sure receiver shutoff valve is closed and system drain valve open before attempting to remove the line filter element.

3.2.5 COMPRESSOR STRAINER AND RELIEF VALVE ASSEMBLY. At least once every 200 hours of accrued compressor operating time, remove the strainer from the strainer and relief valve assembly mounted on the compressor second stage cylinder

NOTE:

This also applies to the third stage strainer and relief valve used on Model 19 380219.

(see Figure 5-13). Thoroughly clean the strainer and the other internal parts of the assembly with dry-cleaning solvent (Federal Specification P-S-661) and dry with clean, lint-free cloths. Reassemble the parts and adjust the assembly in accordance with the instructions In paragraph 4.14. P.5

3.2.6 GASOLINE ENGINE. Clean the engine fuel filter, carburetor air cleaner and other component parts in accordance with the instructions contained in Part II of this manual.

3.3 PERIODIC INSPECTION

3.3.1 Inspect the compressor package assembly in accordance with Table 2. The Intervals specified are based on average use of the equipment under normal climatic conditions and should be reduced accordingly when the unit is operated continuously for long periods of time or under adverse conditions.

3.4 LUBRICATION

3.4.1 After each 50 hours of accrued compressor operating time, drain the lubricating oil from the oil reservoir and refill with fresh oil in accordance with the lubrication order (figure 3-1) and the following procedures:

a. Remove breather cover and filter assembly (see Figure 2-1).

TABLE 2. PERIODIC INSPECTION

Procedure	Interval	Reference
Inspect complete assembly for general condition; oil leaks; bent, cracked, broken, loose or missing parts; other damage.	Daily	
Check oil level in compressor oil reservoir. Add oil as necessary.	Daily	3.4.1
Check oil level in engine crankcase. Add oil as necessary.	Daily	Part II
Check engine fuel filter. Empty and clean as necessary.	Daily	Part II
Fill fuel tank and check fuel lines for tight connections and general condition.	Daily	Part II
Check air hose and chuck assembly for general condition and cleanliness.	Daily	
Inspect rupture discs in compressor second and third stage cylinder caps, top of filter and separator, and safety fitting for general condition and indications of leakage.	Daily	
Clean all cooling fins, shrouds and baffles of engine and compressor.	25 hours	
Drain engine crankcase and refill with fresh oil. Clean carburetor air cleaner.	25 hours	Part II
Drain compressor oil reservoir and refill with fresh oil.	50 hours	3.4.1
Inspect compressor intake filter. Clean or replace as necessary.	50 hours	3.2.2
Replace dehydrator cartridge.	50 hours	3.2.3
Check calibration of pressure gages.	100 hours	4.5.4
Clean or replace line filter element.	100 hours	3.2.4
Clean and reset engine spark plugs and breaker points.	100 hours	Part II
Check operation of pressure relief valve assemblies	200 hours	
Clean compressor interstage strainer and relief valve.	200 hours	3.2.5
Check operation of complete package by performing functional tests.	500 hours	3.6

LUBRICATION ORDER

LO5-4310-226-12

3 OCTOBER 1967

COMPRESSOR, RECIPROCATING: POWER DRIVEN WHEEL MOUNTED, 2 WHEEL PNEUMATIC TIRES, W/TOWBAR AND LUNETTE EYE GASOLINE ENGINE 4.00 CFM, 3000 PSI (STEWART-WARNER MODELS 3800219 AND 3800219-1) W/KOHLER ENGINE MODEL K141-PT

REFERENCE. C9100-IL

Intervals are based on normal hours of operations. Adjust to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing.

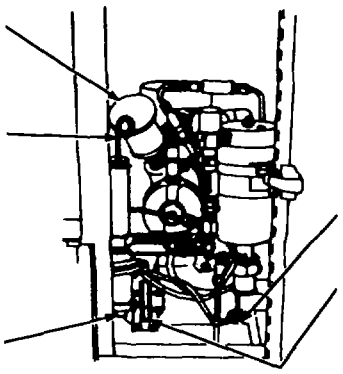
Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Drain crankcase when hot. Fill and check level.

FOLD

FOLD

LUBRICANT	INTERVAL		INTERVAL	LUBRICANT
Compressor Crankcase Fill and Breather Cover and Filter Assy (See Key) (See note 3)	OAI	50	1000 GAA	Wheel Bearings
Engine Oil Fill Cap and Level Gage (Check level) (See Key) CAUTION When OES oil is used, the level will be checked more often	OE	5		Engine Air Cleaner (Dry Type no lubrication required)
			50	Compressor Oil Drain Valve (Drain and refill)
			10	Compressor Oil Level Sight Gage (Check level)
Engine Oil Drain Plug (Drain and refill)		25		



4310-226-15/3-1 (1)

Figure 3-1 (1). Lubrication order.

— KEY —

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to −10°F	0°F to −65°F	
OE-OIL, Engine, Heavy Duty					
Engine Crankcase	1¼ qt	OE-30	OE-10	OES	Intervals given are in hours of normal operation.
Oil Can Points					
OES-OIL, Engine, Sub-Zero					
OAI-LUBRICATING OIL, Instrument					
Compressor Crankcase	2½ qt	ALL TEMPERATURES			
GAA-GREASE, Automotive & Artillery					

NOTES

1 FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F Remove lubricants prescribed in the key for temperatures above -10°F Relubricate with lubricants specified in the key for temperatures below -10°F.

2 OIL CAN POINTS Every 100 hours lubricate the door hinges, latches, control linkages, and all exposed adjusting threads with OE.

3. CRANKCASE FILL, BREATHER AND FILTER. Every 50 hours remove cap and clean Filter with Dry Cleaning Solvent

4 LUBRICANTS The following is a list of lubricants with the Military Symbols and the applicable specification numbers.

OE-MIL-L-2104 OES-MIL-L-10295
GAA-MIL-G-10924 OAI-MIL-L-6085

Copy of this Lubrication Order will remain with the equipment at all times. Instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

OFFICIAL:

KENNETH G. WICKMAN,
Major General, United States Army,
The Adjutant General.

FOLD FOLD

4310-228-15/3-1 (2)

Figure 3-1 (2). Continued.

b. Open drain cock and drain oil from compressor oil reservoir. Close (.rain cock.

NOTE

Refer to paragraphs 3.4.2 and 3.4.3 for types of lubricating oil, and paragraph 3.4.4 for changing types of oil.

c. Pour approximately five pints of lubricating oil, of same type previously used, into compressor crankcase through breather body assembly. Check level of oil in reservoir by observing indicator sight mounted on side of reservoir. Add oil as necessary to bring level up to full mark on indicator sight.

d. Wash breather cover and filter assembly in dry-cleaning solvent (Federal Specification P-S-661). Replace breather cover and filter assembly on breather body assembly.

3.4.2 The air compressor assembly is designed to operate with two types of lubricating oil. When compressing breathing quality air, use only special medicinal grade, mineral base lubricating oil (Stewart Warner part number 130A1190). For other applications, including operation at temperatures below 32° F (0°C), use only aircraft instrument lubricating oil (Specification MIL-L-6085A). DO NOT INTERMIX THE TWO TYPES OF OIL.

3.4.3 The two types of oil are easily distinguished by their color. Special medicinal grade, mineral base lubricating oil is a clear, colorless liquid. Aircraft instrument lubricating oil (Specification MIL-L-6085A) has an amber color. Both oils will tend to cloud after use but can still be recognized by their color.

3.44 The following procedure should be observed carefully when changing from aircraft instrument lubricating oil (Specification MIL-L-6085A) to special medicinal grade, mineral base lubricating oil. The procedure need not be followed when changing from medicinal grade oil to aircraft instrument oil.

a. Drain oil reservoir and refill with medicinal grade oil, and wash breather cover and filter assembly. (Refer to paragraph 3.4. 1).

b. Operate compressor package assembly for approximately 15 minutes.

c. Press push valve and allow condensate to blow to atmosphere. Stop compressor package assembly.

d. Drain oil reservoir and refill with medicinal grade oil. Compressor package assembly can now be used for compressing breathing quality air.

3.5. Refer to the lubrication order (figure 3-1) for engine lubrication instructions.

3.6 FUNCTIONAL TESTS

3.6.1 The following functional tests enable the operating capabilities of a new, repaired or overhauled compressor package assembly to be determined quickly and efficiently. Failure of a compressor package assembly to perform as specified indicates the need for adjustments and/or the repair or replacement of component assemblies.

3.6.2 Before starting the tests, perform the pre-operating inspections and servicing procedures as specified in paragraphs 2.2 and 2.3. Close the system drain valve and both shutoff valves located on the instrument panel; open the receiver shutoff valve. Start the engine in accordance with the instructions in paragraph 2.6 and allow an approximate 5 minute warm-up period.

3.6.3 LEAKAGE TEST. With the engine operating at full throttle and air pressure in the receiver increasing, brush a soap-water solution on all pneumatic system connection points and the joints of the component assemblies. Check for air leakage as indicated by bubbles. There shall be no visible indications of air leakage through the complete operating pressure range of 0 to 3300 psig. Eliminate all pressure leaks by tightening coupling nuts, fittings, connections, and/or replacing defective gaskets, packings or component assemblies.

3.6.4 PRESSURE REGULATOR AND GAGE TEST. Connect the air hose and chuck assembly to the low pressure outlet fitting on the instrument panel Open the pressure servicing valve on the air hose just enough to allow a slight air flow, then open the low pressure shutoff valve. Adjust the low pressure regulator to obtain outlet pressures from 0 to 200 psi as indicated by the low pressure gage. Close the low pressure shutoff valve, connect the air hose and chuck assembly to the high-pressure outlet fitting, and repeat the tests over the high pressure range (0 to 3300 psig). No erratic pressure gage indications, excessive pressure creepage, or evidence of pneumatic or mechanical malfunctions are permissible.

3.6.5 PUSH VALVE TEST. With the compressor operating and air pressure in the receiver at approximately 3000 psig, depress the push valve on the instrument panel for approximately 5 seconds. The condensate accumulated in the filter and separator assembly should blow down with a pronounced sound. Release the push valve. The pneumatic dump valve should close, preventing the further escape of air from the blow down tube.

3.6.6 BLOW DOWN ON SHUT DOWN. With the compressor operating and both pressure shutoff valves on the instrument panel closed, move the engine throttle to the idle position. Press the engine stop button. The condensate accumulated in the filter and separator assembly should blow down within 90 seconds after the engine stops.

3.6.7 SYSTEM DRAIN. With the unit inoperative, open the system drain valve to relieve air pressure to atmosphere. Open both shutoff valves on the instrument panel.

3.7 TROUBLE SHOOTING

3.7.1 Table 3 lists troubles that may occur in the compressor package assembly, the probable causes, and suggested remedies.

3.8 PREPARATION FOR STORAGE OR SHIPMENT

3.8.1 Start the engine in accordance with instructions in paragraph 2.6 and allow an approximately 5 minute warm-up period. With the engine running at idle speed, remove the silencer cover and intake filter from the compressor first stage cylinder head. Slowly inject approximately one ounce of aircraft instrument lubricating oil into the first stage air intake. Press the stop button to stop the engine within two seconds after the last of the oil is injected. Replace the intake filter and silencer cover on the compressor first stage cylinder. Tape or plug the silencer cover intake port.

3.8.2 Thoroughly clean the complete compressor package assembly in accordance with the instructions in paragraph 3.2. Drain the lubricating oil from the engine and compressor crankcases. Drain the engine fuel tank, fuel filter and fuel lines. Tie prominent warning tags on the compressor and engine stating the units require lubrication before being placed in operation. Close and latch all access doors. Inflate the tires to the specified pressure.

3.8.3 The compressor package assembly should be stored inside a weatherproof shelter, protected from dust, moisture, and all abrasive or corrosive liquids and gases. When stored outdoors, the compressor package assembly should be protected from the elements with a weatherproof cover.

TABLE 3. TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Insufficient air flow, low outlet pressure, or excessive pump-up time.	Air leaks.	Check all connecting tubes and fittings. Tighten connections and/or replace defective parts.
	Pressure relief valve(s) damaged or defective (open).	Check valves for escaping air. Remove, test, and repair or replace, as necessary.
	Leakage from pneumatic dump valve due to: a. Damaged or dirty parts. b. Defective push valve.	 a. Disassemble, clean, and replace parts, as necessary. b. Check, replace, if necessary.
	Rupture discs in second or third stage cylinders, filter and separator, or safety fitting leaking or blown out.	Install new rupture disc(s).
	Shut-off valve to receiver partially closed.	Open valve.
	Line filter element clogged.	Replace element.
	Restricted air inlet to compressor first stage cylinder. Compressor not operating at rated speed.	Check. Remove restriction. Clean or replace intake filter. Engine governor not properly adjusted See or engine operating erratically. Part II.
	Damaged or worn air compressor.	Remove air compressor. Repair or replace.
Air compressor uses excessive lubricating oil.	Oil leaks. .	Inspect for leakage. Repair or replace parts as necessary
	Excessive piston -to-cylinder-wall clearance in air compressor.	Remove, test, and repair or replace, as necessary.

TABLE 3. TROUBLE SHOOTING (Cont)

TROUBLE	PROBABLE CAUSE	REMEDY
Air compressor overheats.	Oil supply low.	Replenish supply of oil in reservoir.
	Insufficient or obstructed flow of cooling air.	Position cart to provide adequate flow of air through louvers. Open access doors.
	Clogged fins on cylinders or tubing.	Check. Clean thoroughly.
Excessive moisture or oil vapor in high pressure air.	Desiccant cartridge saturated.	Replace.
	Filter and separator assembly partially full or defective.	Press push valve to blow down condensate. Disassemble, clean, and replace parts ii filter separator assembly.
Gasoline engine not operating properly.	Refer to, Part II.	

SECTION IV

REPAIR, OVERHAUL, ADJUSTMENT, AND TEST

4.1 GENERAL

4.1.1 This Section contains instructions for repairing and/or overhauling all component assemblies of the compressor package assembly except the gasoline engine. For repair and overhaul instructions covering the engine, refer to Part II of this manual .

4.1.2 The basic information required for disassembling and reassembling the compressor package assembly and the pneumatic section components is provided by the exploded views in Section V of this manual. The items illustrated in each exploded view are numbered consecutively in a logical sequence of disassembly except that attaching parts follow, rather than precede, the part or assembly attached. Refer to the following detailed instructions for steps of removal, disassembly and reassembly not obvious from the illustrations or which require special procedures.

The parenthetical references appearing in the text are the index numbers of the items as shown in the applicable illustrations. Thus, the reference (5-1, 3) refers to Figure 5-1, item 3: pressure servicing valve.

4.1.3 When overhauling component assemblies of the compressor package assembly, use care to keep all parts free of dirt, grease, abrasives, and similar foreign material. Work benches and tools should be clean. Protect removed parts by storing in clean, covered containers until required for cleaning, inspection and reassembly. Do not intermix the parts removed from two or more similar assemblies; parts that are reusable should be replaced on the same assemblies from which they originally were removed.

4.2 SPECIAL TOOLS AND TEST EQUIPMENT

4.2.1 No special tools or test equipment are required for the repair, overhaul, adjustment, and testing of the compressor package assembly and its component assemblies.

4.3 PAINTED SURFACES

4.3.1 The complete compressor package assembly is painted an olive drab color (Number X-24087, Federal Standard 595). When repainting any scratched, chipped or damaged surfaces, first remove all flaked, blistered and oxidized paint from the area, and feather the edges by rubbing with fine sandpaper. Clean the surface, apply a prime coat, and spray the area with enamel in accordance with approved procedure.

4.4 AIR HOSE AND REEL

4.4.1 REMOVAL AND DISASSEMBLY. To remove the air hose and disassemble the hose reel (See Figure 5-1):

a. Unhook air hose retainer (9) and uncoil air hose and chuck assembly (items 1 through 8) from hose reel.

b. If disassembly of air hose and chuck assembly is required, unscrew chuck assembly (1), hose assembly (2), pressure servicing valve (3), reducer fitting (4), socket (8), bushing (7) and nipple (6) from ends of hose assembly (5).

c. Remove screws (11) and nuts (12) and separate front hose rack (10) from rear hose rack (23).

d. Remove screws (14 and 16), nuts (15 and 17), and reel bracket (13).

e. Remove screws (19 and 21), nuts (20 and 22), and hose reel brace (18).

f. Remove screws (24) and nuts (25) and lift rear hose rack from cart frame.

4.4.2 INSPECTION. Perform a thorough general inspection of all parts. Check particularly for cracked or chipped castings, damaged threads, and air hoses that are worn, cracked, frayed or show other signs of deterioration. Carefully examine the chuck assembly and pressure servicing valve, making sure both are in serviceable condition.

4.4.3 REASSEMBLY AND INSTALLATION. To reassemble and install the air hose and reel assembly, perform the removal procedure in reverse sequence.

4.5 INSTRUMENT PANEL ASSEMBLY

4.5.1 REMOVAL To remove the complete instrument panel assembly:

a. Disconnect receiver-to-regulator connecting tube (5-3, 66) from tee (5-2, 20) installed in low pressure regulating valve (5-2, 41).

b. Disconnect tee-to-push-valve connecting tube (5-3, 6) from adapter (5-2, 27) installed in push valve (5-2, 29).

c. Disconnect lead wires from pins of electrical receptacle (5-2, 31) installed on instrument panel.

d. Remove attaching screws(5-2, land 2)and nuts (5-2, 3) and slip complete instrument panel assembly free of cart frame.

4.5.2 DISASSEMBLY. Removal of the connecting tubes, fittings, controls and gages mounted on the

instrument panel is obvious from the exploded view, Figure 5-2. Disassembly should be limited to the removal of those items believed to be defective or in questionable condition.

4.5.3 INSPECTION. Inspect the connecting tube assemblies and all fittings for worn or damaged threads, cracks, dents and other defects. Pay particular attention to the flared ends of the connecting tubes as cracking is most apt to occur at the root of the flare. Do not attempt to reclaim a damaged connecting tube assembly by replacing component parts. Test the pressure gages and pressure regulators in accordance with the instructions in paragraphs 4.5.4 through 4.5.6, following.

4.5.4 PRESSURE GAGE TESTS. Each of three pressure gages should be checked for accuracy at least once every 100 hours of accrued compressor operating time, or whenever their operation is questionable. The tests shall be made by subjecting each gage to the pressures specified in Table 4, first with the pressure increasing, then with the pressure decreasing. During the tests, each gage should be mounted in the normal operating position (dial face in vertical plane). Two readings should be taken at each pressure: one before the gage is tapped, the second after the gage is lightly tapped. The difference of any two such readings (friction errors) shall not exceed plus or minus two per cent of the full scale reading.

4.5.5 LOW PRESSURE REGULATOR TESTS. Test the low pressure regulator in accordance with the following procedure once every six months or whenever its operation is questionable.

a. Connect pressure regulator to test set-up as shown schematically in Figure 4-1.

TABLE 4. PRESSURE GAGE SCALE ERRORS

Pressure Gage	Test Pressure (psi)	Tolerance (psi)
Low Outlet Pressure (0 to 300)	0	± 3.0
	50	± 3.0
	100	± 5.0
	150	± 5.0
	200	± 5.0
	250	± 6.0
	300	± 6.0
High Outlet Pressure (0 to 4000)	0	± 75
	1000	± 100
	2000	± 125
	3000	± 125
Receiver Pressure (0 to 5000)	4000	± 125
	5000	± 125

b. Close shut-off valve. Adjust inlet pressure regulator to obtain an inlet pressure of 3000 psig. Adjust handle of low pressure regulator to obtain an outlet pressure of 50 psig.

c. Open shut-off valve to pressurize air bottle. Regulated outlet pressure shall return to, and stabilize at, initial set pressure within 10 psi.

d. Repeat tests of steps b and c, preceding, at set pressures of 100, 150 and 200 psig.

e. Close shut-off valve. Adjust inlet pressure to 3000 psig and outlet pressure to 200 psig.

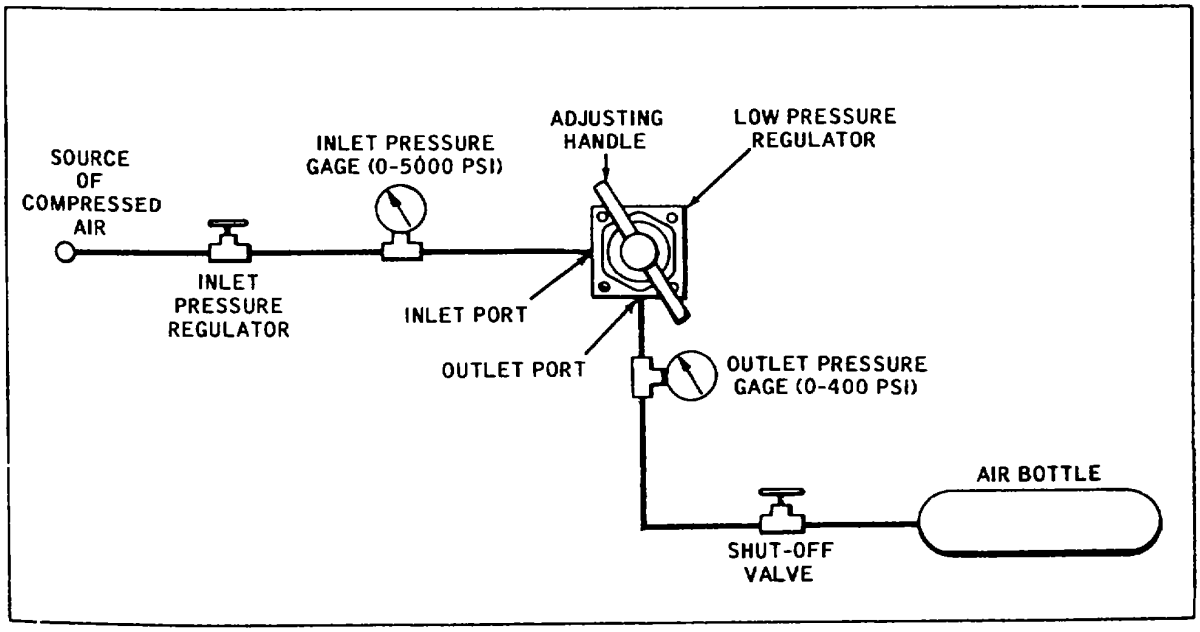


Figure 4-1. Set-up for Testing Low Pressure Regulator

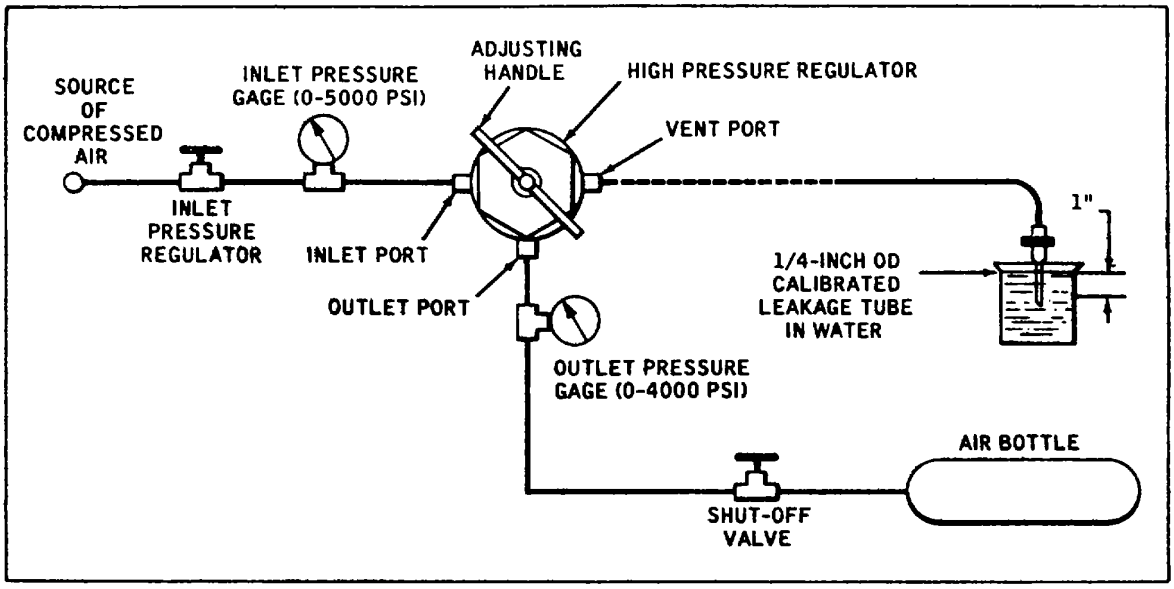


Figure 4-2. Set-up for Testing High Pressure Regulator

f. Brush a soap-water solution over entire surface of low pressure regulator except vent hole. External air leakage, as indicated by air bubbles, shall not exceed three cubic centimeters per hour.

NOTE

Air leakage from the vent hole can be checked by immersing the end of the regulator in a container of water.

g. Wipe all traces of soap-water solution from low pressure regulator, relieve air pressure in test setup, and disconnect test equipment.

4.5.6 HIGH PRESSURE REGULATOR TESTS. Test the high pressure regulator in accordance with the following procedure once every six months or whenever its operation is questionable.

a. Connect pressure regulator to test set-up as shown schematically in Figure 4-2.

b. Close shut-off valve. Adjust inlet pressure regulator to obtain an inlet pressure of 3000 psig. Adjust handle of high pressure regulator to obtain an outlet pressure of 200 psig.

c. Open shut-off valve to pressurize air bottle. Regulated outlet pressure shall return to, and stabilize at, initial set pressure within 50 psi. Leakage from vent port shall not exceed one cubic centimeter (10 air bubbles) per minute.

d. Repeat tests of steps b and c, preceding, at set pressures of 500, 1000, 1500, 2000, 2500 and 3000 psig.

e. Adjust handle pf high pressure regulator to reduce outlet pressure to 2500 psig. Outlet pressure shall stabilize at this set point. Repeat procedure for outlet pressures of 2000, 1500, 1000 and 500 psig.

f. Close shut-off valve. Adjust inlet pressure to 3000 psig. Adjust outlet pressure to 3000 psig.

g. Brush a soap-water solution over entire surface of high pressure regulator except vent hole. External air leakage, as indicated by air bubbles, shall not exceed three cubic centimeters per hour.

h. Wipe all traces of soap-water solution from high pressure regulator, relieve air pressure in test set-up, and disconnect test equipment.

4.5.7 REASSEMBLY. Reassembly of the instrument panel assembly is obvious from the exploded view, Figure 5-2. Make certain all items are securely mounted and all pneumatic and electrical connections are made in accordance with the original equipment configuration. When installing bulkhead type fittings (i. e., elbows, tees, etc. requiring fitting nuts) proceed as follows: a. Lubricate male threads, gasket back-up ring and tube fitting gasket with aircraft instrument lubricating oil (Specification MIL-L-6085A).

b. Screw fitting nut well up on second set of threads on fitting. Place gasket back-up ring in counterbore of nut. Place tube fitting gasket in groove between two sets of threads.

NOTE

Cover threads of fitting with thin shim stock or bullet-nose fixture to avoid damaging gasket and back-up ring during installation.

c. Screw fitting into mounting hole until tube fitting gasket located between two sets of threads contacts edge of hole. Screw fitting into mounting hole an additional 1-1/2 turns.

d. Position fitting as required and tighten fitting nut against mounting surface with a torque of 100 pound inches.

4.5.8 INSTALLATION. To install the instrument panel assembly, perform the removal procedure (paragraph 4.5.1) in reverse sequence.

4.6 PNEUMATIC LINES AND FITTINGS

4.6.1 Figure 5-3 illustrates the arrangement and location of all inter component connecting tubes, fittings and other pneumatic system components and provides the basic information required for removing and replacing these items. Carefully note the location of all clamps and the exact arrangement of all tubing before removing any pneumatic lines so that the original equipment configuration can be restored during installation. After removal, carefully inspect all connecting tubes and fittings for worn or damaged threads, cracks, dents, distortion and other defects that would impair the function of the parts. Pay particular attention to the flared ends of connecting tube assemblies since cracking is most apt to occur at the root of the flare. Do not attempt to reclaim damaged connecting tubes or other high pressure pneumatic fittings by repairing or replacing component parts.

NOTE

Refer to the procedural steps in paragraph 4.5.7 when installing bulkhead type fittings. Refer to subsequent paragraphs for specific instructions covering the removal, disassembly, and reassembly of component assemblies used in the pneumatic system.

4.7 FUEL LINES AND TANK

4.7.1 Figure 5-4 provides the basic information required for removing the fuel tank, fuel lines, and other component parts of the engine fuel system. Observe approved automotive procedures when removing all fuel lines and fittings. Always use new compression sleeves on flare less tubes. Make sure all connections are tight and leak-proof, and that all tubing is securely clamped to frame members as in the original equipment configuration. Discard all worn, damaged, and questionable parts, and install new items as required.

4.8 PRESSURE RELIEF VALVE ASSEMBLY 4.8.1 REMOVAL. Two pressure relief valves are used in the compressor package assembly. One valve is installed in the cap of the filter and separator assembly (see Figure 1-3); the other valve is mounted in a tee fitting installed at the inlet of the air receiver (see Figure 1-4). To remove either pressure relief valve, simply unscrew the complete assembly from its mounting port and slip the tube fitting gasket (5-5, 12) from the threaded end of the valve body.

4.8.2 DISASSEMBLY. To disassemble the pressure relief valve (see Figure 5-5):

a. Cut safety wire and remove wire and lead seal. Unscrew adjusting screw (2) and stem (3) from body (11).

b. Remove spring (4), shims (5), spring retainer (6) and piston assembly (7) from body (11).

NOTE

Do not disassemble piston assembly (7). The parts are installed and crimped within the retainer and cannot be removed without destroying the assembly.

d. Remove metal ball (8), ball return spring (9) and packing O-ring from body (11).

4.8.3 CLEANING AND INSPECTING PARTS. After the pressure relief valve is disassembled:

a. Wash all parts with dry-cleaning solvent (Federal Specification P-S-661) and dry thoroughly with clean, lint-free cloths. Use filtered, compressed air to blow solvent and residue from all crevices, springs and air passages.

b. Inspect parts for damaged screw threads, cracks, breaks or worn areas in anodized surfaces, and other obvious indications of wear, damage and deterioration.

c. Inspect finished surfaces of body, stem, adjusting screw and metal ball for scoring, scratches, nicks and signs of wear.

d. Do not attempt to repair damaged or questionable parts. Discard all such items and install new parts during reassembly.

4.8.4 REASSEMBLY. Reassembly is essentially the reverse of disassembly (see Figure 5-5).

a. Apply a thin film of pneumatic system grease (Specification MIL-L-4343) to new O-ring packing (10), packing groove in body (11), and mating surfaces of body and piston assembly (7).

b. Insert O-ring packing (10) in groove in bore of body (11). Install ball return spring (9) and metal ball (8) in bore of body.

c. Install piston assembly (7) in body (11) and down over metal ball (8) and spring (9).

d. Insert spring retainer (6), cupped side against piston assembly (7).

e. Place shims (5) and spring (4) in body (11). Screw adjusting screw (2) into body. Screw stem (3) into adjusting screw.

4.8.5 TEST AND ADJUSTMENT. Test and adjust the reassembled pressure relief valve as follows:

a. Install pressure relief valve in test set-up as illustrated schematically In Figure 4-3. Be sure to observe dimensions specified for approach and exit sections.

b. Close bleed valve. Adjust pressure regulator to apply a gradually increasing air pressure to approach section Relief valve should open (i. e., air flow from leakage tube exceed three cubic centimeters per hour) before applied pressure reaches 3600 psig.

c. If relief valve fails to open, remove collector cup, adjust stem of valve a small amount, replace collector cup, and repeat test. Repeat alternate adjustments and tests until relief valve opens, as indicated by a minimum air flow of two scfm, with an approach section pressure of 3600 psig maximum.

d. Close pressure regulator and open bleed valve slightly to slowly relieve air pressure in approach section Pressure relief valve should close (reseal) before approach section pressure drops below 3200 psi as indicated by pressure gage.

e. Repeat procedure of steps b, c and d. If required relief valve operation cannot be obtained by adjusting stem, change setting of adjusting screw installed in valve body, and repeat complete test and adjustment procedure. Final setting of adjusting screw and stem must allow installation of 0.025 inch diameter stainless steel safety wire and lead seal as in original valve configuration

f. Close pressure regulator, open bleed valve to relieve air pressure In test set-up and disconnect pressure relief valve from test equipment.

4.8.6 INSTALLATION, Install a new tube fitting gasket(5-5, 12)in the groove at the root of the valve body mounting boss. Screw the pressure relief valve into its appropriate mounting port, making sure the joint is air tight.

4.9 SAFETY FITTING ASSEMBLY

4.9.1 REMOVAL The safety fitting assembly is mounted in the tee fitting installed at the inlet of the air receiver (see Figure 1-4). To remove the safety fitting assembly (see Figure 5-3):

a. Disconnect valve-to-safety-fitting connecting tube (54) from safety fitting assembly.

b. Back off nut (57) and unscrew safety fitting assembly from union (58).

4.9.2 DISASSEMBLY. Disassemble the safety fitting assembly in accordance with the exploded view Figure 5-8.

4.9.3 CLEANING AND INSPECTING PARTS. Clean and Inspect the parts of the safety fitting assembly as follows:

a. Wash all parts In dry-cleaning solvent(Federal Specification P-S-661) and dry thoroughly with clean, lint-free cloths. Use filtered, compressed air to blow all residue from bore of fitting housing.

b. Inspect parts for damaged screw threads, cracks, and other indications of deterioration. Discard damaged and questionable parts.

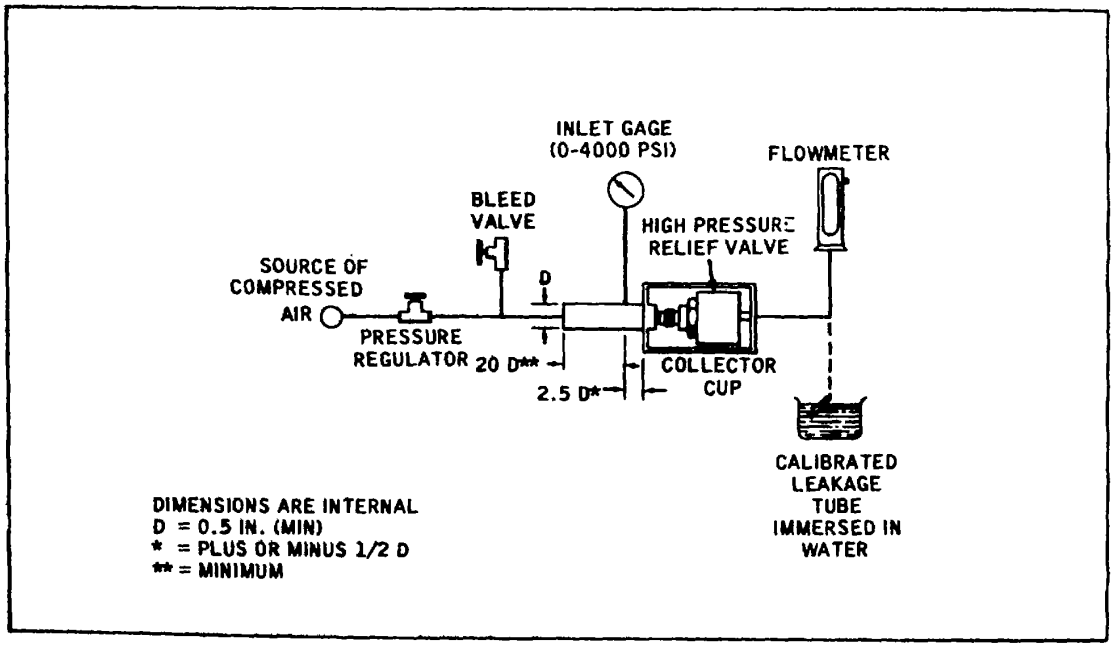


Figure 4-3. Set-up for Testing High Pressure Relief Valve

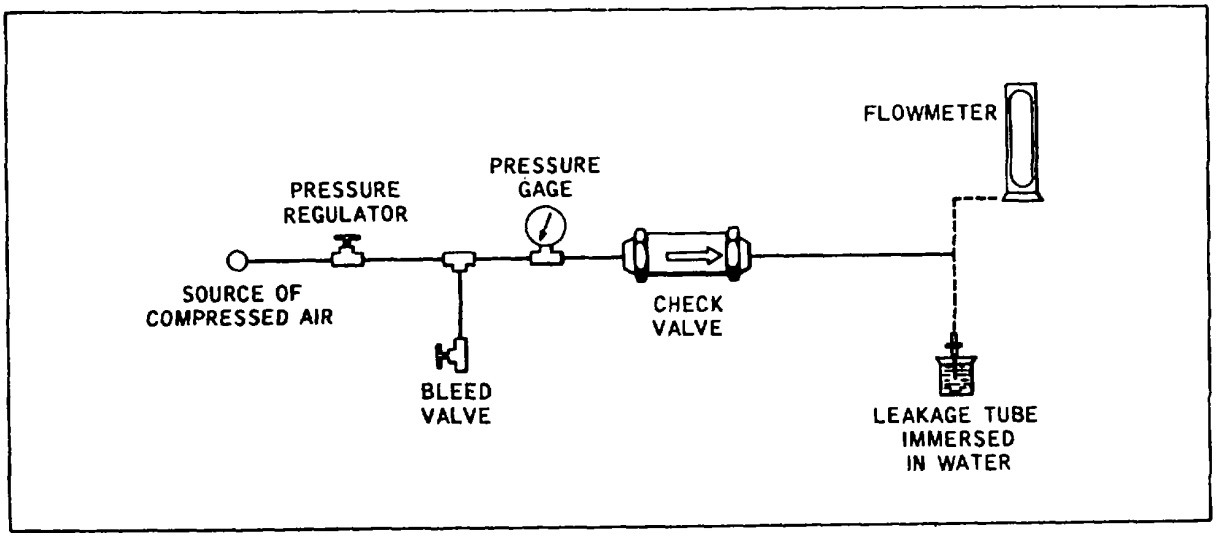


Figure 4-4. Set-up for Testing Check Valve

4.9.4 REASSEMBLY (Refer to Figure 5-6).

a. Install rupture disc (3), disc ring (2) and ring retainer cap (1) In shorter arm of fitting housing (6). Tighten ring retainer cap with a torque of 300 pound inches. Loosen and retighten cap three times.

b. Slip O-ring packing (5) on filter cap (4). Screw filter cap into fitting housing (6). Tighten filter cap with a torque of 375 pound-inches. Loosen and retighten cap three times.

c. Use 20 gage (0. 032 inch diameter) Monel wire to safety caps to fitting housing.

4.9.5 INSTALLATION. (Refer to Figure 5-3). Install safety fitting assembly on union (58) in accordance with instructions in paragraph 4.5.7. Reconnect valve-to safety-fitting connecting tube (54) to safety fitting assembly.

4.10 CHECK VALVE ASSEMBLY

4.10.1 REMOVAL. The check valve is mounted on the outlet fitting of the back pressure valve (see Figure 1-3). To remove the check valve (see Figure 5-3):

a. Disconnect dryer-to-tee connecting tube (31) from nipple (32) installed in tee (34).

b. Unscrew nipple (35), together with nipple (32), valve (33) and tee (34) from outlet port of check valve. Remove tube fitting gasket (36) from nipple.

c. Unscrew check valve from outlet fitting of back pressure valve. Remove tube fitting gasket (5-7, 10) from back pressure valve.

4.10.2 DISASSEMBLY. Disassemble the check valve assembly in accordance with the exploded view, Figure 5-7.

4.10.3 CLEANING AND INSPECTING PARTS. Clean and inspect the parts of the check valve assembly as follows:

a. Wash all parts in dry-cleaning solvent (Federal Specification P-S-661). Do not soak parts. Dry thoroughly with clean, filtered, compressed air or nitrogen.

b. Inspect parts for evidence of damage and wear such as stripped screw threads, scratches and scoring of finished surfaces, nicks and burrs on valve surfaces.

c. Check poppet return spring for deformation and damage. Spring must be cylindrical in shape with ends closed and square. Free length of spring should be 0.396 ± 0.005 inch.

d. Discard all damaged, worn, and questionable parts.

4.10.4 REASSEMBLY (Refer to Figure 5-7).

a. Apply a thin film of pneumatic system grease (Specification MIL-L-4343) to threads of body screw (2).

b. Install poppet guide (8), spring (7), poppet (6), seat retainer (5) and valve seat (4) in valve body (9).

c. Position O-ring packing (3) in groove of body screw (2). Screw body screw into valve body (9) and tighten with a torque of 600 ± 25 pound-inches.

4.10.5 TEST. Test the reassembled check valve as follows:

a. Install check valve in test set-up as shown schematically in Figure 4-4, except reverse valve so free flow arrow points toward air supply.

b. Adjust pressure regulator to apply an air pressure of 3000 psig to outlet of check valve. Leakage, as indicated by air bubbles escaping from submerged leakage tube, shall not exceed three cubic centimeters per hour.

c. With check valve connected as in step b, reduce applied air pressure to 5 psig. Leakage shall not exceed three cubic centimeters per minute.

d. Reverse test connections to check valve so free flow arrow points away from air supply.

e. Slowly open pressure regulator until air flow through check valve exceeds three cubic centimeters per minute. This shall occur when applied pressure is from 2 to 8 psig.

f. Disconnect check valve from test equipment.

4.10.6 INSTALLATION

a. Install tube fitting gasket (5-7, 10) in groove In outlet fitting of back pressure valve.

b. Screw check valve on outlet fitting of back pressure valve so that free flow arrow points away from back pressure valve (down).

c. (See Figure 5-3.) Re-install tube fitting gasket (36), nipple (35), tee (34), valve (33) and nipple (32) in outlet port of check valve.

d. (See Figure 5-3.) Reconnect dryer to the connecting tube (31) to nipple (32).

4.11 BACK PRESSURE VALVE ASSEMBLY

4.11.1 REMOVAL. The back pressure valve is installed in the outlet port of the filter and separator assembly(see Figure 1-3). To remove the back pressure valve:

a. Remove check valve. In accordance with instructions in paragraph 4.10.1.

b. Loosen nut (5-8, 16) and unscrew back pressure valve from outlet port of filter and separator assembly.

c. Remove tube fitting gasket (5-8, 14), back-up ring (5-8, 15) and nut (5-8, 16) from inlet fitting of back pressure valve.

4.11.2 DISASSEMBLY (Refer to Figure 5-8.)

a. Remove inlet and outlet fittings (3 and 4) and tube fitting gaskets (5) from valve body (13).

b. Unscrew valve cap (6) from top of valve body (13). Remove spring plates (7) and spring (8) from inside valve body.

c. Remove piston (9) and piston seat (10) from inside valve body (13). Remove O-ring packings (11) and back-up ring (12) from piston and valve seat.

4.11.3 CLEANING AND INSPECTING PARTS. Clean and inspect the parts of the back pressure valve assembly as follows: a. Wash all parts in dry-cleaning solvent (Federal Specification P-S-661) and dry thoroughly with filtered, compressed air or clean, lint-free cloths. Be sure

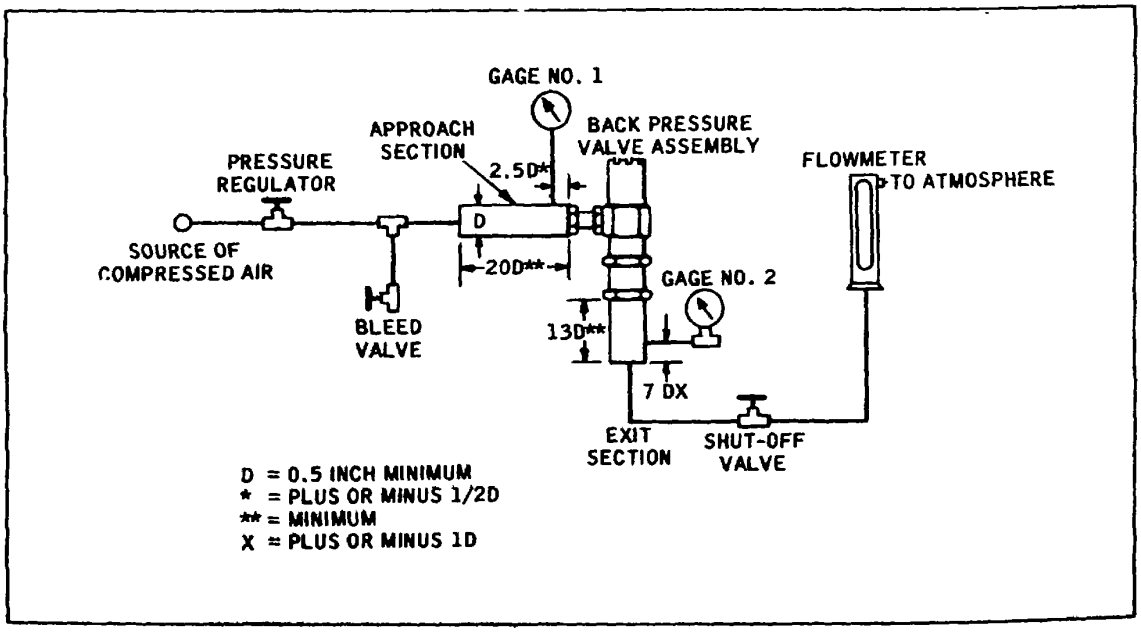


Figure 4-5. Set-up for Testing Back Pressure Valve

all residue is removed from crevices and packing ring grooves.

b. Inspect parts for evidence of damage and wear such as stripped screw threads, cracking of valve body, and finished surfaces that are scratched, scored or pitted.

c. Make sure seat surface of piston is smooth and undamaged; mating surface of piston seat must be sharp and without nicks or other signs of wear or damage.

d. Check spring for signs of set or out-of-round. Spring must be cylindrical in shape with ends closed, square and ground. Length of spring with a load of 86 pounds plus or minus 10 pounds should be 0.687 inch.

e. Discard all damaged, worn and questionable parts.

4.11.4 REASSEMBLY (Refer to Figure 5-8.)

a. During reassembly, apply a light film of pneumatic system grease (Specification MIL-L-4343) to all gaskets, packings and male threads.

b. Install back-up ring (12) and packing (11) in groove of piston (9). Install second packing (11) in groove of piston seat (10).

c. Install piston seat (10) and piston (9) in valve body (13).

d. Position tube fitting gaskets (5) in grooves of inlet and outlet fittings (3 and 4). Screw fittings into appropriate ports of valve body (13) and tighten with a torque of 45 pound-inches.

e. Place spring (8), flanked by two spring plates (7), into valve body (13). Screw valve cap (6) into valve body until top surface of cap is approximately flush with upper edge of valve body.

4.11.5 TEST AND ADJUSTMENT. Test and adjust the reassembled back pressure valve as follows:

a. Connect back pressure valve to test set-up as shown schematically in Figure 4-5. Be sure to observe dimensions shown for approach and exit sections.

b. Close bleed valve. Open shut-off valve. Adjust pressure regulator to gradually increase inlet pressure until flowmeter registers a flow rate slightly greater than two scfm. This should occur when approach section pressure is between 2550 and 2700 psig.

c. Partially close shut-off valve. Adjust pressure regulator and shut-off valve until gage No. 2 indicates 2400 psi and flowmeter registers a flow rate slightly greater than two scfm. Approach section pressure, as measured by gage No. 1, shall not exceed 2400 psig.

d. If back pressure valve does not operate as specified in step c, preceding, close pressure regulator, open bleed valve and change setting of adjusting cap installed in body of back pressure valve. Turn cap counterclockwise (out of body) to lower pressure at which valve opens. Turn cap clockwise (into body) to increase opening pressure. Continue alternate adjustments and tests until back pressure valve operates as specified.

e. Fully open shut-off valve. Starting with zero approach section pressure, slowly open pressure regulator until gage No. 1 indicates an approach section pressure of 2000 psi. Flow rate as measured by flowmeter shall not exceed five cubic centimeters per minute.

f. Adjust pressure regulator to increase approach section pressure to 2750 psig. Then close pressure regulator to gradually decrease approach section pressure to 2000 psig. Measured flow rate shall not exceed 0.15 scfm.

g. Close shut-off valve. Adjust pressure regulator to increase approach and exit section pressures to 4500 psig. Brush a soap-water solution over entire surface of back pressure valve. There shall be no visual indications of leakage as evidenced by air bubbles.

h. After completing all tests, close pressure regulator, open bleed valve and shut-off valve to relieve air pressure in test set-up, and disconnect test equipment. Safety wire adjusting cap to valve body with 0. 025 inch diameter stainless steel wire.

4.11.6 INSTALLATION. Install back pressure valve, tube fitting gasket (5-8, 14), back-up ring (5-8, 15) and nut (5-8, 16) on filter and separator assembly in accordance with instructions in paragraph 4.5.7. Install check valve and fittings as instructed in paragraph 4.10.6.

4.12 PNEUMATIC DUMP VALVE AND FILTER AND SEPARATOR ASSEMBLY

4.12.1 REMOVAL The pneumatic dump valve and the filter and separator assembly (see Figure 1-3) should be removed as a unit as follows: (refer to Figure 5-3):

a. Remove pressure relief valve (paragraph 4.8.1), check valve (paragraph 4.10.1) and back pressure valve (paragraph 4.11.1)from upper end of filter and separator assembly.

b. Disconnect lead wires from filter and separator heater blanket and thermostat switch

c. Disconnect aftercooler-to-separator connecting tube (22) from elbow (27) installed in inlet port of filter and separator assembly. Loosen nut (30) and remove elbow, tube fitting gasket (28) and back-up ring (29) from inlet port.

d. Unscrew nut (10) and remove drain tube (8), sleeve (9) and nut from elbow (11) installed in blowout port of pneumatic dump valve. Unscrew and remove elbow.

e. Disconnect tee-to-push valve (6) and filter-to metered-orifice (7) connecting tubes from tee (13) in bottom of pneumatic dump valve.

f. Back off fitting nuts (14) and unscrew tee (13), together with metering orifice (12), from bottom of pneumatic dump valve and nut (15). Remove tube fitting gasket (16).

g. Loosen clamp (7, Figure 5-9)and remove complete assembly.

4.12.2 DISASSEMBLY. The filter and separator assembly and pneumatic dump valve should be disassembled only when obvious indications of damage, malfunction, or improper operation are observed. Such indications include a burst rupture disc, air leaks, excessive moisture in high pressure discharge air, and Improper operation of the pneumatic dump valve. Observe the following disassembly procedure (see Figure 5-9):

a. Unscrew pneumatic dump valve (items 1 through 6) from bottom of separator shell (20).

b. To disassemble pneumatic dump valve, unscrew adapter (1) from body (e). Remove packing (2) from adapter. Drop piston (3) and spring (5) from bore of body. Remove packing (4) from groove in piston.

c. Unwrap tape and remove heater blanket (8) from around separator she!! (20).

d. Remove pipe plug (9) from tank cap (13). Unscrew disc ring retainers (10) and remove disc rings (11) and rupture discs (12) from ports in cap.

e. Unscrew tank cap (13) from separator shell(20). Slip gasket (14) from groove in cap.

f. Remove screw and plug assembly(16) and washer (17), and lift filter element (15) and gasket (18) from cap (13).

g. Do not remove thermostat switch (19) from recess in shell (20) unless a new switch is required. Switch is pressed into shell and will be unusable if removed.

4.12.3 CLEANING AND INSPECTING PARTS. Clean and inspect the parts of the disassembled pneumatic dump valve and filter and separator assembly as follows:

a. Wash all parts, except filter element, packings and gaskets, in dry-cleaning solvent (Federal Specification P-S-661). Dry parts thoroughly with clean, lint-free cloths and/or low-pressure compressed air.

b. Inspect parts for scoring, pitting, wear and other evidence of damage. Make sure all drilled passages are unobstructed.

c. Check operation of heater blanket and thermostat switch against performance requirements listed in Table 1.

NOTE

Refer to parts list for Figure 5-9 for part numbers and contents of Repair Kits available for use on the filter and separator assembly.

4.12.4 REASSEMBLY (Refer to Figure 5-9.)

a. Position gasket (18) and filter element (15) against Inner surface of tank cap (13) and secure in position with washer (17) and new screw and plug assembly (16).

b. Lubricate gasket (14) with pneumatic system grease (Specification MIL-L-4343) and place gasket in groove around tank cap (13). Screw cap into shell (20) until seam is closed.

c. Install rupture discs (12), disc rings (11), and disc ring retainers(10) in ports in tank cap (13). Tighten retainers with a torque of 350 pound-inches.

d. Install pipe plug (9) in center port of tank cap (13).

e. Test partially assembled filter and separator for leakage in accordance with Instructions in paragraph 4.12. 5 before continuing with reassembly.

f. After completing leakage test, wrap heater blanket (8) around shell (20) and secure in position with tape as in original configuration.

g. To reassembly pneumatic dump valve, position lubricated packing (4) in groove around piston (3). Install spring (5) and piston in body (6). Place lubricated packing (2) in groove in adapter (1). Screw adapter into body and tighten until flange bottoms.

h. Test assembled pneumatic dump valve in accordance with instructions in paragraph 4.12.6. After completing tests, screw valve into port at bottom of separator shell.

4.12.5 FILTER AND SEPARATOR LEAKAGE TEST. Test the filter and separator for leakage before attaching the heater blanket or thermostat switch, or installing the pneumatic dump valve.

NOTE

If the thermostat switch was not removed during disassembly, it must be protected against moisture by covering with waterproof tape.

a. Install pressure plugs in all ports except one. Connect variable source of compressed air to remaining port.

b. Pressurize filter and separator to 3000 psig. While maintaining this Internal pressure, brush a soap-water-solution on joints of assembly. Maximum allowable leakage, as evidenced by air bubbles, is one bubble per minute.

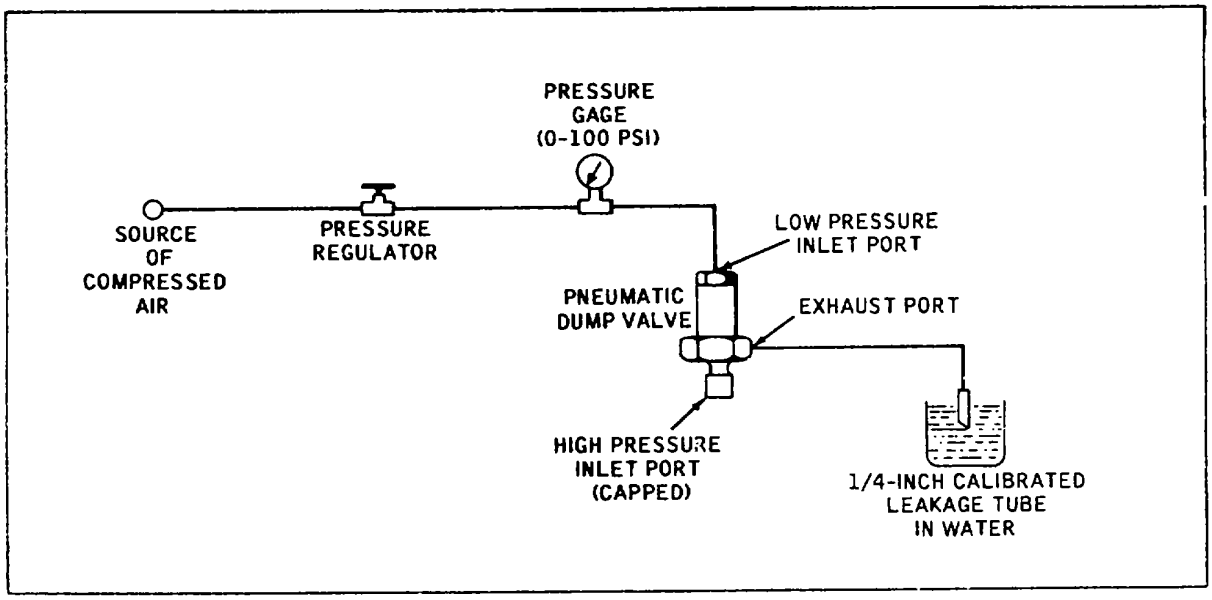


Figure 4-6. Set-up for Testing Pneumatic Dump Valve

c. If leakage rate exceeds one air bubble per minute, disassemble filter and separator and install new packing on cap.

4.12.6 PNEUMATIC DUMP VALVE LEAKAGE TESTS. Test the reassembled pneumatic dump valve as follows before installing the assembly on the filter and separator:

a. Make test connections to pneumatic dump valve as shown schematically in Figure 4-6.

b. Adjust pressure regulator to apply a pressure of 60 to 65 psig to low pressure inlet port.

c. Leakage from exhaust port shall not exceed three cubic centimeters per hour (one air bubble every two minutes).

d. Use same test set-up as illustrated in Figure 4-6 except disconnect leakage tube from exhaust port and connect an adjustable source of high pressure compressed air to high pressure inlet port of pneumatic dump valve.

e. With an air pressure of 60 to 65 psig applied to low pressure inlet port, apply a gradually increasing air pressure to high pressure inlet port. Increase pressure to 3300 ± 50 psig, then shut-off high pressure air supply.

f. Piston in pneumatic dump valve should remain closed to maintain high Inlet air pressure. When it is evident that piston is closed, connect a flowmeter to dump valve exhaust port. Measured leakage shall not exceed five cubic inches per minute.

g. After completing tests, relieve air pressure in test set-up, disconnect pneumatic dump valve and install on filter and separator assembly.

4.12.7 INSTALLATION. Install the filter and separator and pneumatic dump valve by performing the removal procedure (paragraph 4. 12. 1) in reverse sequence. Make sure the pressure relief valve, back pressure valve and check valve are reinstalled in accordance with their applicable installation instructions, and that all pneumatic connections are leak proof. Safety wire all parts in accordance with the original equipment configuration.

4.13 DEHYDRATOR ASSEMBLY

4.13.1 REMOVAL. Removal of the complete dehydrator housing assembly should seldom i-e required. However, when necessary, proceed as follows:

a. (See Figure 5-3.) Disconnect dryer to the connecting tube (31) from elbow (37) installed in bottom (inlet) of dehydrator housing. Loosen nut (40) and unscrew elbow from port. Remove gasket (38), back-up ring (39) and nut from elbow.

b. (See Figure 5-3.) Disconnect dryer-to-filter connecting tube (41) from union (42) installed at upper end of dehydrator housing. Remove union and gasket (43) from port.

c. (See Figure 5-10.) Loosen clamps (1) and remove complete dehydrator assembly from cart frame.

4.13.2 DISASSEMBLY (See Figure 5-10.)

a. Unscrew outlet adapter cap (4) from outlet adapter (8). Remove packing (5), back-up ring (6) and filter disc (7) from cap.

b. Remove dehydrator cartridge (14) from housing (13).

c. Unscrew outlet adapter (8) from housing (13). Remove packing (10) and back-up ring (11).

d. Unscrew inlet cap (9) from housing (13). Remove packing (10), back-up ring (11) and spring (12).

4.13.3 CLEANING AND INSPECTING PARTS. Clean and inspect parts of the dehydrator assembly as follows:

a. Wash all metal parts in dry-cleaning solvent (Federal Specification P-S-661). Dry parts with clean, lint-free cloths. Use filtered compressed air to blow residue from all crevices, threads and air passages.

b. Inspect all parts for obvious damage such as stripped threads, cracks and deformation.

c. Examine filter disc for cracks, chipping and other damage. Make sure spring is cylindrical in shape with ends closed and square.

d. Dehydrator cartridge is expendable. Do not attempt to repair or reactivate a used cartridge.

NOTE

Refer to parts list for Figure 5-10 for part numbers and contents of Repair Kit available for use on the dehydrator assembly.

4.13.4 REASSEMBLY (See Figure 5-10.)

a. Install back-up ring (11) and packing (10) in groove at inlet end of housing (13). Screw inlet cap (9) on housing and tighten with a torque of 30 pound-feet.

b. Install back-up ring (11) and packing (10) in internal groove at outlet end of housing (13). Screw outlet adapter (8) on housing and tighten with a torque of 30 pound-feet.

c. Drop spring (12) into housing (13).

d. Install back-up ring (6) and packing (5) in lower groove of outlet adapter cap (4). Make sure back-up ring does not overlap recessed section of outlet adapter cap that mates with outlet adapter (8). Screw cap into outlet adapter and tighten with a torque of 10 pound feet. Test reassembled housing for leakage in accordance with instructions in paragraph 4.13.15.

e. Remove desiccant indicator assembly from each end of replacement dehydrator cartridge (14). Make certain preformed packing and lock ring are installed in grooves at outlet end of cartridge. Install cartridge in housing (13) in accordance with instructions stamped on cartridge body.

f. Screw outlet adapter cap (4) into outlet adapter (8) and tighten with a torque of 10 pound-feet.

4.13.5 LEAKAGE TEST. Test there assembled dehydrator housing for leakage before installing the cartridge. Proceed as follows:

a. Seal port in outlet adapter with an appropriate pressure plug.

b. Connect source of clean, dry compressed air or nitrogen at a pressure of 3000 psig to port in inlet cap.

c. Slowly pressurize dehydrator housing to a maximum pressure of 3000 psig.

d. Brush a soap-water solution on all joints and seams of dehydrator housing. Check for air leaks as evidenced by air bubbles. Maximum allowable leakage is two cubic centimeters per hour.

e. After completing leakage test, wipe all soap water solution from surface of dehydrator housing. Relieve air pressure, disconnect test equipment and remove pressure plug from outlet adapter.

f. Remove outlet adapter cap and install dehydrator cartridge as instructed in paragraph 4.13.4, steps e and 4.

4.13.6 INSTALLATION. Reinstall the dehydrator assembly in the cart frame by performing the removal procedure (paragraph 4.13.1) in reverse sequence. Make sure all pneumatic connections are air tight. Safety wire components in accordance with the original equipment configuration.

4.14 BASIC AIR COMPRESSOR

4.14.1 REMOVAL. To remove the basic air compressor:

a. Remove housing assembly from compressor end of cart (see paragraph 4.17.1).

b. (See Figure 5-3.) Disconnect first-stage-to filter connecting tube (17) from compressor first stage outlet the. Disconnect aftercooler-to-separator connecting tube (22) from reducer (23) installed in aftercooler elbow (26).

c. (See Figure 5-12.) Remove screws (5) and lock washers (6) attaching nameplate (4) to compressor fan guard. Remove nameplate. Unscrew draw bolt (11) which extends through hub of compressor fan.

d. (See Figure 5-11.) Remove screws (4)and lock washers (5) attaching air compressor (3) to gasoline engine (20). Carefully pull compressor free of engine crankshaft.

NOTE

It may be necessary to remove the drain cock and street elbows (1 and 2, Figure 5-11) before the air compressor can be moved sufficiently to clear the crankshaft.

4.14.2 DISASSEMBLY. Complete disassembly of the basic air compressor is seldom required. Therefore, the following paragraphs contain instructions for removing and replacing those sections for which replacement-

parts are supplied in the form of Repair Kits (refer to parts list for Figure 5-12). Further disassembly of the air compressor is obvious by studying the exploded view, Figure 5-12.

NOTE

When repairing the applicable sections of the compressor, replace all parts removed in the process of disassembly, regardless of condition, with all like parts furnished in the kit.

4.14.3 REPLACING FIRST STAGE CYLINDER, PISTON AND VALVES

4.14.3.1 REMOVAL

a. Remove attaching screws (8) and lock washers (9) and lift silencer cover (7) and intake filter (10) from first stage cylinder head (71).

b. Loosen coupling nut and disconnect first-to-second-stage connecting tube (22) from the fitting (26) installed in first stage outlet port.

c. Loosen nut (29) and unscrew the fitting from first stage outlet port. Remove gasket (27), gasket back-up ring (28) and nut from the fitting.

d. Remove flat head screws (72) and lift first stage cylinder head (11), gasket (73), and complete valve mechani3m (items 74 through 83) free of first stage cylinder.

e. Remove valve retainer screw (75), nut (76), and flat washer (77), and separate intake valve spring (74), intake valve (78), valve plate (79), exhaust valve (80), exhaust spring (81), valve stop (82), and packing (83) from first stage cylinder head (71).

f. Unscrew four nuts (97) and slip first stage cylinder (96) free of piston and crankcase (117). Remove and discard cylinder -to-crankcase gaskets (98 and 99).

g. Remove two retaining rings (101) and push wrist pin (100) free of piston and master rod (113). Identify side of piston toward fan end of crankcase by scribing a small mark inside piston skirt.

4.14.3.2 INSPECTION. Carefully inspect all parts for obvious indications of damage such as damaged screw threads, finished surfaces that are scratched, pitted or worn, and broken cooling fins on the cylinder. Inspect the cylinder bore, piston, wrist pin, master rod and needle bearings for excessive wear, scoring and other damage. Refer to Table 5 for the original dimensions and permissible wear of these parts.

4.14.3.3 REASSEMBLY

a. Attach first stage piston (96) to master rod(113, and needle bearings (112) with wrist pin (100) and retaining rings (101).

b. Install steel gasket (99), flanked by two paper gaskets (98), against mounting flange of first stage cylinder (96).

c. Slip first stage cylinder (96) over installed piston and press into crankcase mounting hole. Cylinder must be installed with leading edge of cooling fins slanted toward fan end of compressor. Secure cylinder to crankcase with nuts (97), being sure to tighten nuts with an equal torque.

d. Use a depth micrometer or dial indicator to measure piston-head-to-valve-plate clearance. Required clearance is 0.021 to 0.026 inch. If necessary, remove cylinder and add or remove cylinder-to-crankcase gaskets to obtain required clearance.

NOTE

Overall thickness of steel gaskets can be reduced in increments of 0.002 inch by peeling off laminations. At least one paper gasket must remain on each side of steel gasket in final installation.

e. Install packing (83) in groove in first stage cylinder head (71). Assemble valve stop (82), exhaust spring (81), exhaust valve (80), valve plate (79), intake valve (78), and intake valve spring (74). Attach assembled parts to cylinder head with screw (75), flat washer (77), and nut (76).

f. Position first stage cylinder head and valve assembly and gasket (73) on first stage cylinder so that cooling fins all slant in same direction. Install flat head screws (72) and tighten with a torque of 25 pound inches.

g. Install the fitting (26), gasket (27), gasket backup ring (28) and nut (29) in outlet port of first stage cylinder head (refer to paragraph 4.5.7).

h. Attach intake filter (10) and silencer cover (7) to first stage cylinder head (71) with two screws (8) and lock washers (9).

i. Reconnect first-to-second-stage connecting tube (33) to the fitting (26).

4.14.4 REPLACING SECOND STAGE CYLINDER, PISTON AND VALVE MECHANISM

4.14.4.1 REMOVAL

a. Disconnect connecting tubes (21 and 22) from fittings installed in inlet and outlet ports of second stage cylinder (85).

b. Loosen nuts (29 and 33) and unscrew elbow (25) and strainer and relief valve assembly (30) from ports of second stage cylinder. Remove gaskets (27 and 31), gasket back-up rings (28 and 32) and nuts from fittings. (Refer to paragraph 4.14.6.2 for disassembly of strainer and relief valve assembly.)

c. Unscrew cylinder cap and rupture disc assembly (63 through 66) and remove packing (67), spring

TABLE 5. COMPRESSOR ORIGINAL DIMENSIONS, WEAR LIMITS AND CLEARANCES

ITEM	ORIGINAL DIMENSIONS	WEAR LIMIT
FIRST STAGE CYLINDER AND PISTON ASSEMBLY		
Cylinder bore	2.3750 to 2.3751	
Piston to cylinder wall clearance	0.0003 to 0.0005	0.0005
Wrist pin hole	0.3754 to 0.3756	0.0005
Wrist pin diameter	0.3751 to 0.3756	0.0005
Piston head clearance	0.021 to 0.026	
SECOND STAGE CYLINDER AND PISTON ASSEMBLY		
Cylinder bore	0.9687 to 0.9688	
Piston to cylinder wall clearance	0.0002 to 0.0004	
Wrist pin hole	0.4366 to 0.4368	0.0003
Wrist pin diameter	0.4364 to 0.4365	0.0005
Piston head clearance	0.002 to 0.006	
Poppet lift (nominal)	0.022	
Exhaust valve lift	0.024 to 0.030	
THIRD STAGE CYLINDER AND PISTON ASSEMBLY		
Cylinder bore	0.40620 to 0.40623	
Piston to cylinder wall clearance	0.00020 to 0.00025	
Wrist pin hole	0.4366 to 0.4368	0.0003
Wrist pin diameter	0.4363 to 0.4365	0.0005
Piston head clearance	0.002 to 0.006	
Poppet lift (nominal)	0.034	
Exhaust valve lift	0.024 to 0.030	
COMPRESSOR CONNECTING LINKS AND MASTER ROD		
Connecting link wrist pin bearing hole	0.5615 to 0.5620	0.0005
Master rod connecting link hole	0.4366 to 0.4368	0.0003
First stage wrist pin bearing hole	0.5590 to 0.5594	
Shaft bearing hole	1.8750 to 1.8754	0.0003
ENDBELL		
Shaft seal bore diameter	1.499 to 1.500	
Bearing bore diameter	1.8502 to 1.8505	0.0002
COMPRESSOR SHAFT		
Shaft seal diameter (fan end)	0.934 to 0.940	0.001
Bearing diameter (fan end)	0.9842 to 0.9845	0.0001
Master rod journal diameter	1.8742 to 1.8728	0.0002
Bearing diameter (opposite fan end)	1.1809 to 1.1811	0.0001
Shaft seal diameter (opposite fan end)	1.059 to 1.065	0.001
OIL PUMP PISTON		
Large spherical diameter	0.5595 to 0.5605	0.0005
Small spherical diameter	0.3790 to 0.3795	0.0005
OIL PUMP CYLINDER		
Inner diameter	0.3798 to 0.3801	0.001

washer (68), exhaust valve spring (69) and exhaust valve (70) from second stage cylinder (85). If necessary, remove holddown screw (63), retainer ring (64) and rupture disc (65) from cylinder cap (66).

d. Remove attaching nuts (86) and carefully slip second stage cylinder (85) free Of piston and crankcase. Remove and discard cylinder-to-crankcase gaskets (87 and 88).

e. Remove cotter pin (90) and carefully push wrist pin (89) free of second stage piston and connecting link (95). Be careful not to lose 25 needle bearings (93) and two link washers (92) which drop free as piston is withdrawn from connecting link Scribe small mark inside piston skirt to identify side of piston toward fan end of crankcase.

f. Do not remove poppet pin and poppet from piston unless replacement parts are required. Nominal poppet lift should be 0. 222 inch.

4.14.4.2 INSPECTION. Inspect all parts in accordance with instructions in paragraph 4.14.3.2.

4.14.4.3 REASSEMBLY

a. Place 25 needle bearings (93) around edge of wrist pin hole at end of second stage connecting link (95). Place link washer (92) at each end of needle bearings. Carefully position second stage piston over connecting link and press wrist pin (89) through piston, link washers and bearings. Secure wrist pin with 5/8inch long cotter pin (90).

NOTE

Assembly of needle bearings and link washers in connecting links is simplified by coating parts with Petrolatum Federal SpecificationW-P-236).

b. Places the gasket (88), flanked by paper gaskets (87), on mounting flange of second stage cylinder (85). Carefully slip cylinder over piston and press firmly into crankcase mounting hole. Install nuts (86) on studs and tighten with equal torque.

c. Use same procedure specified in paragraph 4.14.3.3, step d, to measure and adjust piston-head to-valve-seat clearance. Required clearance is 0.002 to 0.006 inch.

d. Install rupture disc (65) and retainer ring (64) in cylinder cap (66). Screw holddown screw (63) into cap and tighten with a torque of 350 pound-inches.

e. Place packing (67) in groove of second stage cylinder cap (66). Install exhaust valve (70), spring (69) and spring washer (68) in second stage cylinder (85). Screw cylinder cap and rupture disc into cylinder and tighten with a torque of 300 to 350 pound inches.

f. Install elbow (25) and strainer and relief valve assembly (30) and their associated gaskets (27 and 31), gasket back-up rings (28 and 32) and fitting nuts (29 and 33) in inlet and outlet ports of second stage cylinder (85) in accordance with instructions in paragraph 4.5.7.

g. Reconnect interstage connecting tubes (21 and 22) to second stage fittings.

4.14.5 REPLACING THIRD STAGE CYLINDER, PISTON AND VALVE MECHANISM

4.14.5.1 Removal, inspection and reassembly of the third stage cylinder, piston and valve mechanism is essentially the same as for the second stage.

NOTE

Nominal poppet lift of third stage is 0.034 inch.

4.14.6 SECOND AND THIRD STAGE SMRAINE AND RELIEF VALVE NOTE: Third stage valve applicable on Mode1 3800219 only.

4.14.6.1 REMOVAL. Refer to paragraph 4.14.4.1, steps a and b.

4.14.6.2 DISASSEMBLY (See Figure 5-13).

a. Unscrew spring adjusting plug (1) and remove spring(2), poppet (3), seat (4), and seat retainer screw (5) from seat housing (6).

b. Remove seat retainer screw (5) and seat (4) from poppet (3).

c. Unscrew seat housing (6) from elbow body (10) and remove packing (7), spring (8) and strainer (9).

4.14.6.3 CLEANING AND INSPECTION. Clean all parts by washing in dry-cleaning solvent (Federal Specification P-S-661). Thoroughly dry parts with clean, lint-free cloths and/or filtered compressed air. Inspect parts for nicks, scratches, scoring and other damage or wear. Examine springs for signs of set or out-of-round. Springs must be cylindrical in shape with ends squared, closed and ground. Discard all worn, damaged or questionable parts.

4.14.6.4 REASSEMBLY (See Figure 5-13).

a. Slip packing (7) into groove of seat housing (6). Place strainer (9) and spring (8) in elbow body (10). Screw seat housing into elbow body and tighten with a torque of 250 pound-inches.

b. Place seat (4) in counterbore of poppet (3) and secure in position with screw (5).

c. Place poppet assembly and spring (2) in seat housing (6). Install spring adjusting plug (1).

4.14.6.5 ADJUSTMENT AND TEST

a. Connect a variable source of compressed air to one threaded port of elbow body. Connect a pressure gage to other port.

b. Slowly increase air pressure applied to strainer and relief valve assembly until valve opens, allowing air to escape to atmosphere through holes drilled in adjusting plug.

c. Place a collector cup over seat housing end of assembly. Connect a 1/4-inch inner diameter hose to collector cup and immerse opposite end of hose about one inch in a container of water.

d. Shut off air pressure applied to strainer and relief valve assembly. As applied pressure decreases, observe pressure gage and note pressure at which valve closes (i.e., leakage rate as indicated by escaping air bubbles is one bubble per second or less).

e. Second stage strainer and relief valve should close before applied pressure drops below 100 PSIG. Third stage strainer and valve should close before applied pressure drops below 700 PSIG.

f. If necessary, readjust sprig adjusting plug to obtain required operation of strainer and relief valve assembly. Turn plug clockwise to increase pressure, counterclockwise to lower closing pressure.

g. Repeat alternate tests and adjustments until strainer and relief valve functions as specified. Safety wire adjusting plug to seat housing with 0.025 inch diameter stainless steel wire.

4.14.6.6 INSTALLATION. Refer to paragraph 4.14.4.3, step f.

4.14.7 OIL PUMP, SIGHT INDICATOR AND RESERVOIR

4.1.7.1 REMOVAL (See Figure 5-12).

a. Make certain all lubricating oil is drained from crankcase. Remove drain cock and elbows (1 and 2, Figure 5-11) from drain hole in oil reservoir.

b. Remove eight screws and lift sight glass cup (35), gaskets (38 and 39) and sight indicator(37)from side of oil reservoir (46).

c. Remove four screws (41) and carefully slip oil pump housing (40) and gasket (42) from bottom of oil reservoir (46).

d. Remove two screws (44) and pull oil pump cylinder (43) and packing (45) from oil pump housing (45).

e. Remove fasteners (47) and pull oil reservoir (46) from compressor crankcase (117). Remove and discard oil reservoir gasket (48).

f. Cut safety wire and unscrew oil pump piston retainer (50) from master rod (113). Remove shims (51), oil pump piston (49), ball retainer (53) and master rod socket (54).

4.14.7.2 CLEANING AND INSPECTION. Clean all parts by washing In dry -cleaning solvent (Federal Specification PS-661). Dry parts with clean, lint-free cloths and/or compressed air. Be sure all drilled passages are clean and unobstructed. Inspect parts for scoring, scratches, corrosion, wear and other signs of damage. Refer to Table 5 for allowable wear. Discard all damaged, worn or questionable parts, and install new items during reassembly.

4.14.7.3 REASSEMBLY. Reassemble the oil pump, sight indicator and oil reservoir by performing the removal procedure in reverse sequence. Be sure all gaskets are in good condition and properly installed, and that all screws and nuts are tightened sufficiently to eliminate oil leaks. Install safety wire as in the original equipment configuration.

4.14.8 INSTALLING AIR COMPRESSOR (See Figure 5-11.

a. Align air compressor (3) with shaft of gasoline engine (20) and carefully mate units. Engage draw bolt (11, Figure 5-12) with tapped hole in engine crankshaft but do not tighten. Install cap screws (4) and lock washers (5) attaching compressor to engine, but do not tighten.

b. Slip spacers (6) between mating surfaces of compressor and engine. Tighten cap screws (4) as necessary to hold spacers in place. Tighten draw bolt with a torque of 125 to 150 pound-inches, then loosen cap screws and remove spacers. Retighten cap screws.

c. Attach nameplate (4, Figure 5-12) to compressor fan guard with screws and lock washers (5 and 6, Figure 5-12).

d. Reconnect aftercooler-to-separator connecting tube (22, Figure 5-3) to union installed in compressor aftercooler.

e. Reconnect first-stage-to-filter connecting tube (17, Figure 5-3) to the installed in compressor first stage cylinder head.

f. Replace housing on compressor end of cart (refer to paragraph 4.17).

4.14.9 COMPRESSOR PRELIMINARY LUBRICATION RUN

4.14.9.1 During normal compressor operation, the small quantity of oil vapor that passes from the first stage cylinder to the second and third stage cylinders along with the compressed air provides the necessary piston to cylinder lubrication. However, following overhaul of the air compressor assembly or replacement of any part of the assembly, the compressor must operate for an appreciable time before the lubricant is thoroughly circulated in this manner. To prevent damage to the second and third stage cylinder and piston assemblies during this initial period of operation, all repaired and/or overhauled air compressor assemblies first must be operated in accordance with the following instructions:

a. Disconnect first-to-second-stage connecting tube at second stage strainer and relief valve assembly.

b. Disconnect aftercooler -to-separator connecting tube from elbow.

c. Start gasoline engine and slowly introduce approximately one ounce of lubricating oil (Specification MIL-L-6085A) into second stage cylinder through strainer and relief valve body. Start injecting oil immediately after starting engine. Allow discharge air from third stage cylinder to exhaust to atmosphere.

d. Stop engine and reconnect first-to-second-stage connecting tube and aftercooler-to -separator tube.

4.14.10 COMPRESSOR FUNCTIONAL TESTS. Test a repaired or overhauled air compressor for satisfactory operation by performing the functional tests described in paragraph 3.6.

4.15 GASOLINE ENGINE

4.15.1 REMOVAL. To remove the complete engine assembly for repair or overhaul:

a. Remove air compressor (refer to paragraph 4.14.1).

b. Disconnect shut-off-valve-to-engine connecting tube (1, Figure 5-4) from engine fuel pump.

c. (See Figure 5-11.) Remove cap screws (7), nuts (8) and lock washers (9) and lift complete engine assembly from cart frame.

d. (See Figure 5-11.) Remove dipstick (10) and pipe plug (11), and drain oil from engine crankcase. Remove pipe extension (12), the (13), nipples (14) and elbow (15) from crankcase of gasoline engine (20).

e. (See Figure 5-11.) Remove cap screw (17), lock washer (18), spacer (19) and baffle plate (16) from gasoline engine (20).

4.15.2 REPAIR AND OVERHAUL OF GASOLINE ENGINE AND ACCESSORIES. Refer to Part II of this manual for repair and overhaul instructions on the engine.

4.15.3 **INSTALLATION**. To re-install the gasoline engine, perform the removal procedure (paragraph 4.15.1) in reverse sequence. Refer to paragraph 4.14.8 for installation of the air compressor.

4.16 CART HANDLE AND TOW BAR

4.16.1 REMOVAL. To remove the cart handle and tow bar (see Figure 5 -16):

a. Remove ball lock pins (11) used to secure cart handle (13) in position.

b. Remove retaining rings (14) and handlepins (15). Slip cart handle (13) free of brackets welded to towbar.

c. Remove ball lock pins (16) used to secure tow bar (18) in position.

d. Remove retaining rings (19) and tow bar pins (20). Lift tow bar (18) free of brackets.

e. Remove cap screws (22), lock washers(24) and nuts (23) attaching tow bar brackets (21) to cart frame.

4.16.2 INSTALLATION. Install the tow bar and cart handle by performing the removal procedure in reverse sequence.

4.17 ACCESS DOORS AND HOUSING.

4.17.1 REMOVAL. To remove the access doors and housing (see Figure 5-16):

a. Remove cart handle and tow bar (refer to paragraph 4.16. 1).

b. Remove bolts (33), nuts (34) and lock washers (35) and lift two center door assemblies (33) free of cart frame. Do not remove or disassemble door assemblies unless replacement parts are required.

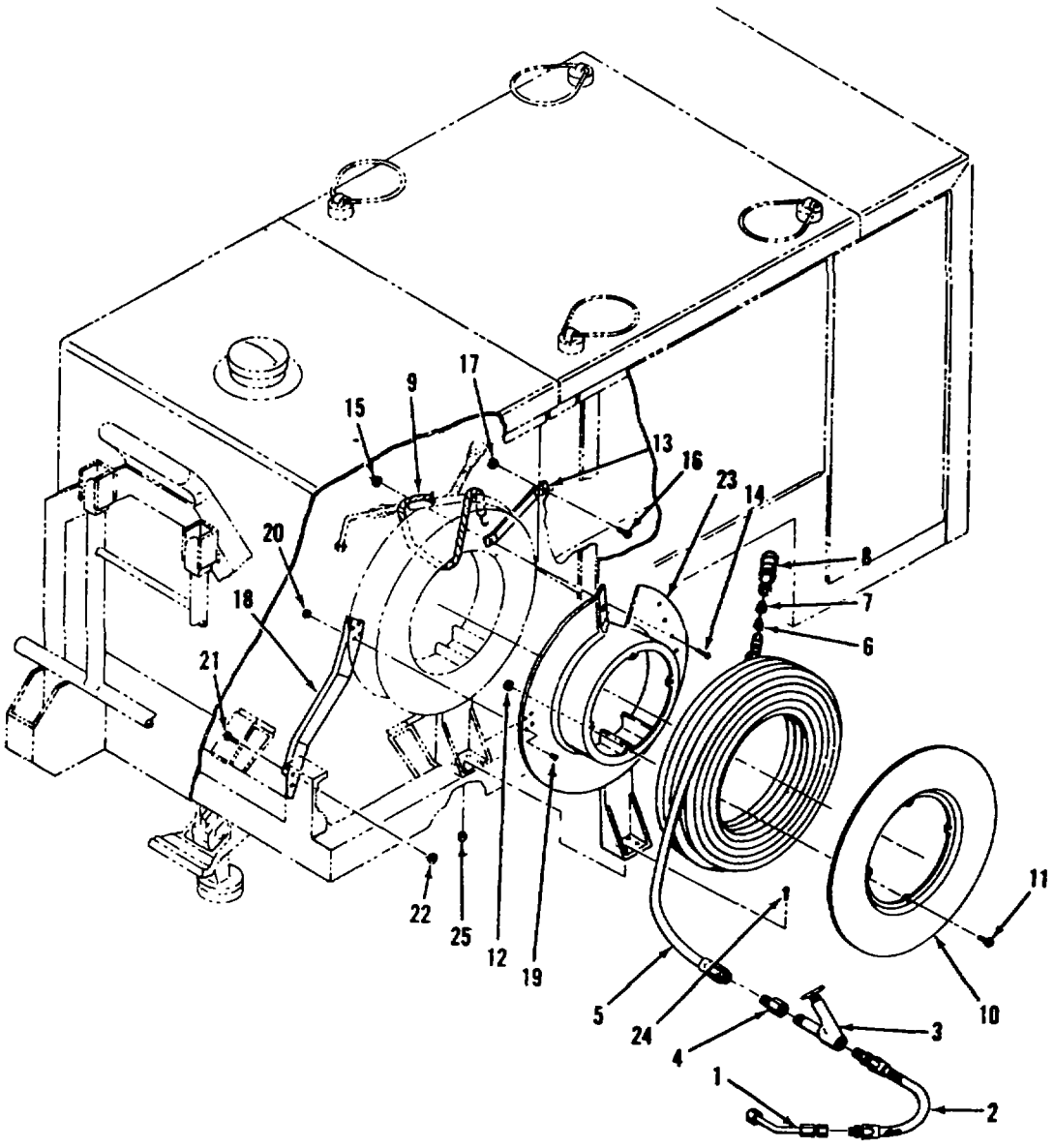
c. Do not remove front and rear door assemblies (28 and 30) or door retaining springs (25) unless replacement parts are required.

d. Remove nuts (8), flat washers (9) and cushion washers (10) and slip tie down rings (7) free of cart frame and housing.

e. Remove nuts (44 and 47), washers (45 and 46) and screws (43) securing housing assemblies (40, 41 and 42) to cart frame. Lift housings straight up until free of frame members.

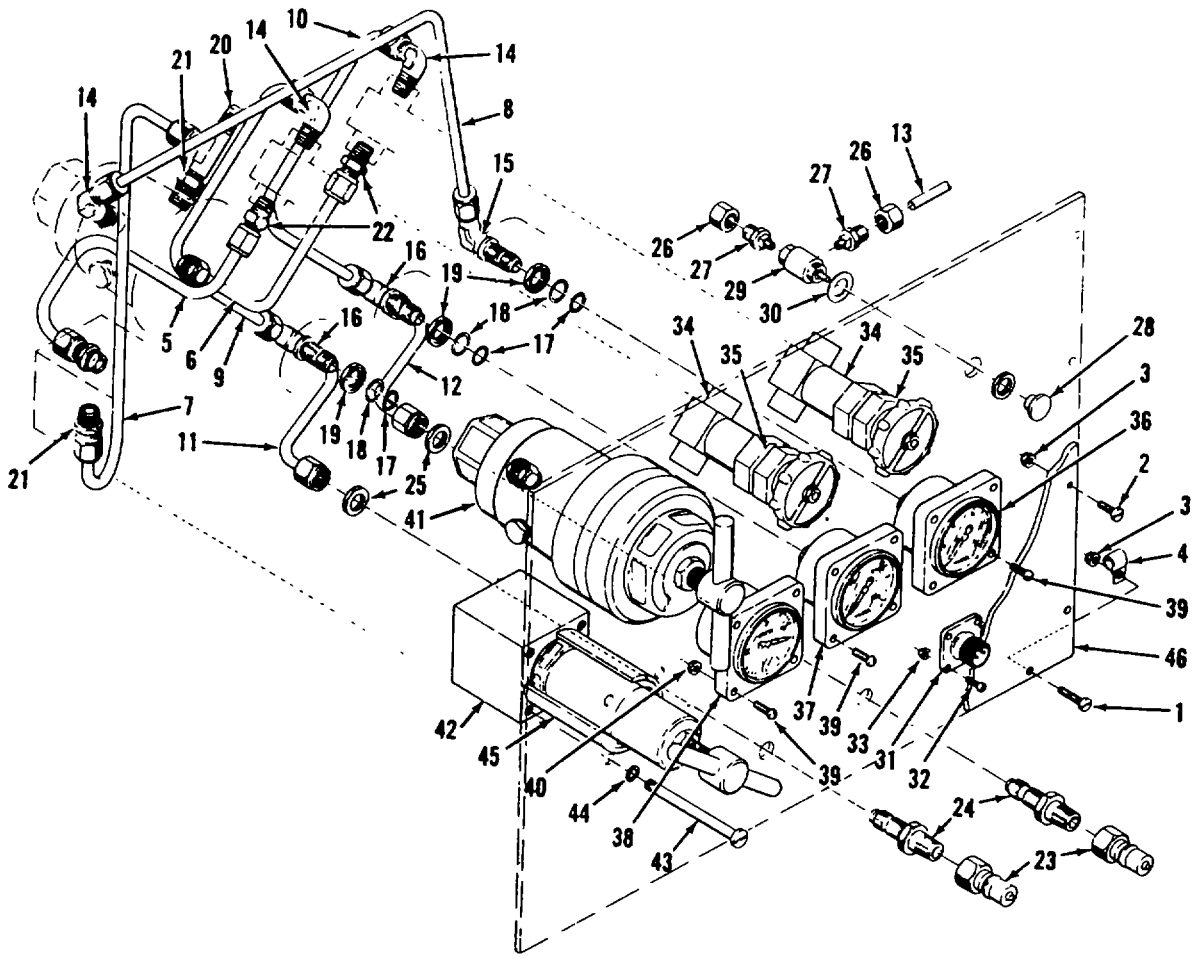
4.18 WHEELS AND BRAKES

4.18.1 Figure 5-18 shows the parts of the cart wheels and brake mechanism in exploded view form and provides the basic information required for removing and replacing component parts and assemblies. Observe standard automotive procedures when repairing these portions of the ground control cart, and make sure the original equipment configuration is restored.



1 Chuck Assembly
2 Hose Assembly
3 Valve, Pressure Servicing
4 Fitting, Reducer
5 Hose Assembly, High Pressure
6 Nipple
7 Bushing
8 Socket, Half Coupling
9 Retainer, Air Hose
10 Rack, Hose
11 Screw, Machine
12 Nut, Self Locking
13 Bracket, Reel
14 Screw, Machine
15 Nut, Self Locking
16 Screw, Machine
17 Nut, Self Locking
18 Brace, Hose Reel (Used on Model 3800219-1)
18 Brace, Hose Reel (Used on Model 3800219)
19 Screw, Machine
20 Nut, Self Locking
21 Screw, Machine
22 Nut, Self Locking
23 Rack, Hose
24 Screw, Machine
25 Nut, Self Locking

Figure 5-1. Air Hose and Reel Assembly - Exploded



1	Screw, Machine	24	Union Bulkhead
2	Screw, Machine	25	Nut, Flared Tube
3	Nut, Self Locking	26	Nut, Ferulle
4	Clamp, Cushioned	27	Adapter, Tube
5	Tube Assembly, Connecting	28	Button, Push
6	Tube Assembly, Connecting	29	Valve, Push
7	Tube Assembly, Connecting	30	Washer, Flat
8	Tube Assembly, Connecting	31	Receptacle, Electrical
9	Tube Assembly, Connecting	32	Screw, Machine
10	Tube Assembly, Connecting	33	Nut, Self Locking
11	Tube Assembly, Connecting	34	Valve, Shut-Off
12	Tube Assembly, Connecting	35	Nut, Check
13	Tube, Push Valve to Atmosphere	36	Gage, Pressure
14	Elbow, 90 Degree	37	Gage, Pressure
15	Elbow, 90 Degree	38	Gage, Pressure
16	Tee	39	Screw, Machine
17	Gasket, Tube Fitting	40	Nut, Self Locking
18	Ring, Gasket Back-up	41	Valve, Regulating
19	Nut, Flared Tube	42	Valve, Regulating
20	Tee	43	Screw, Machine
21	Bushing, Reducer	44	Washer, Lock
22	Nipple, Flared Tube	45	Spacer, Mounting
23	Plug, Coupling	46	Panel Assembly

Figure 5-2. Instrument Panel Assembly - -Exploded

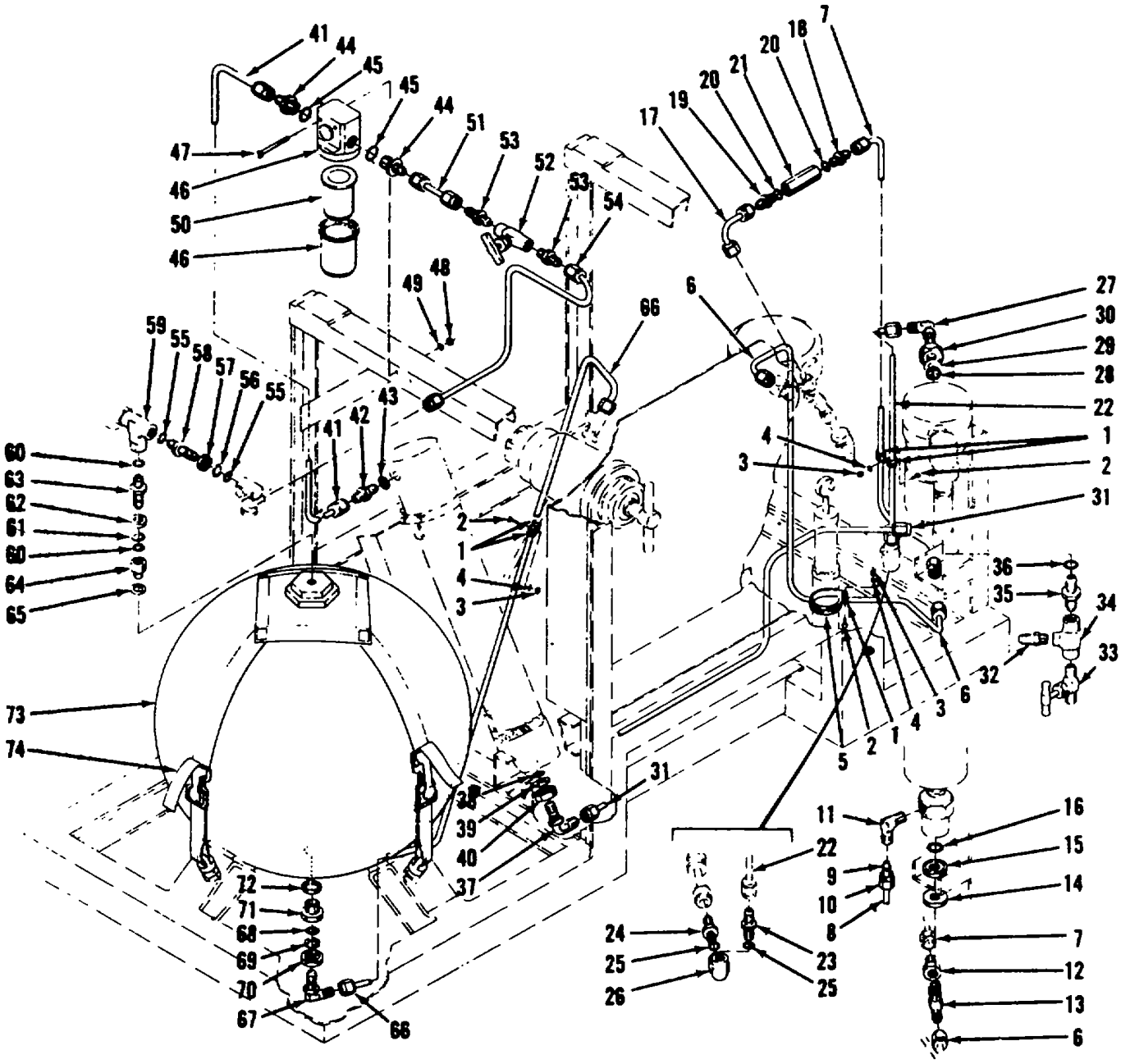
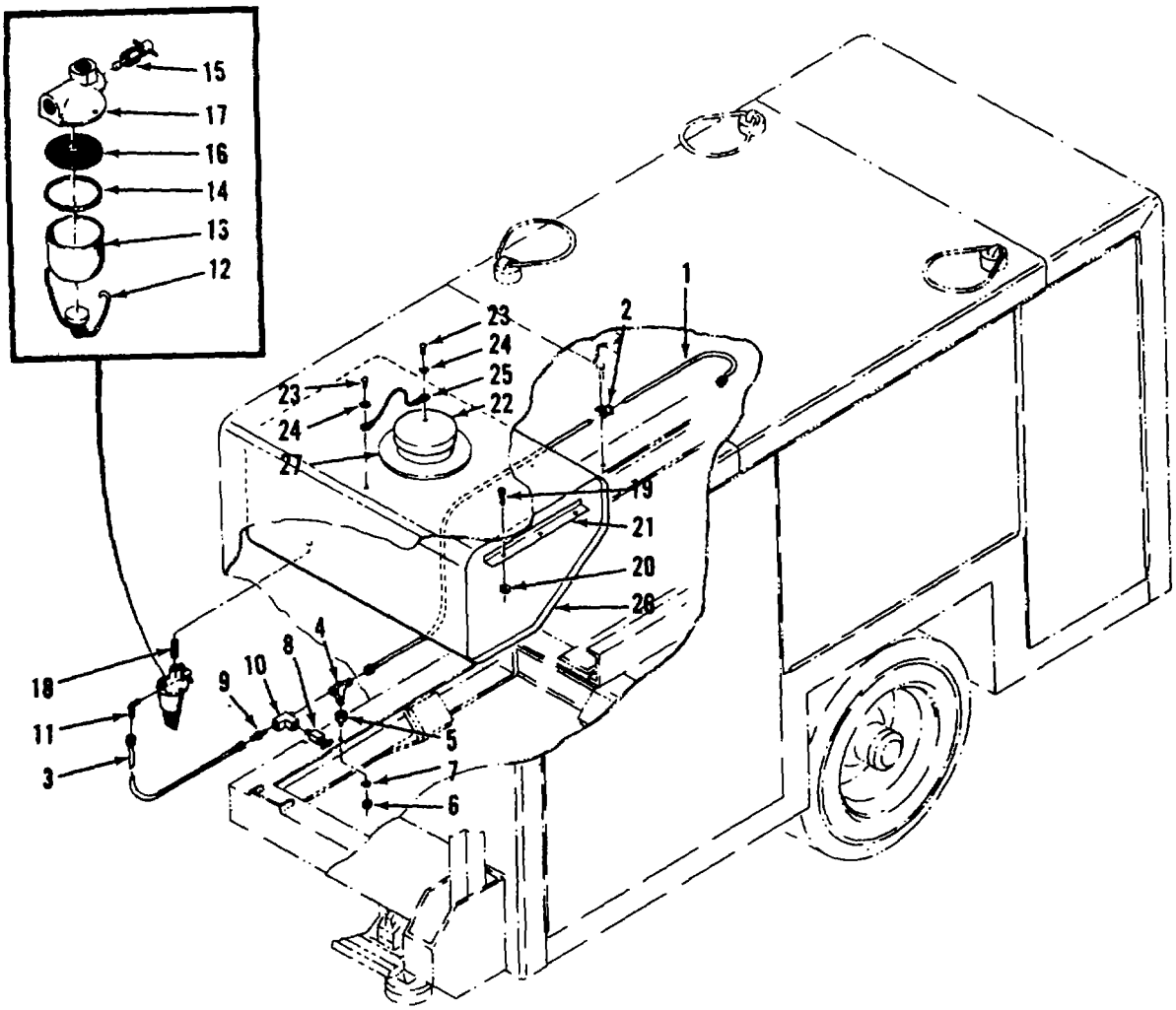


Figure 5-3. Pneumatic Lines and Fittings - Exploded

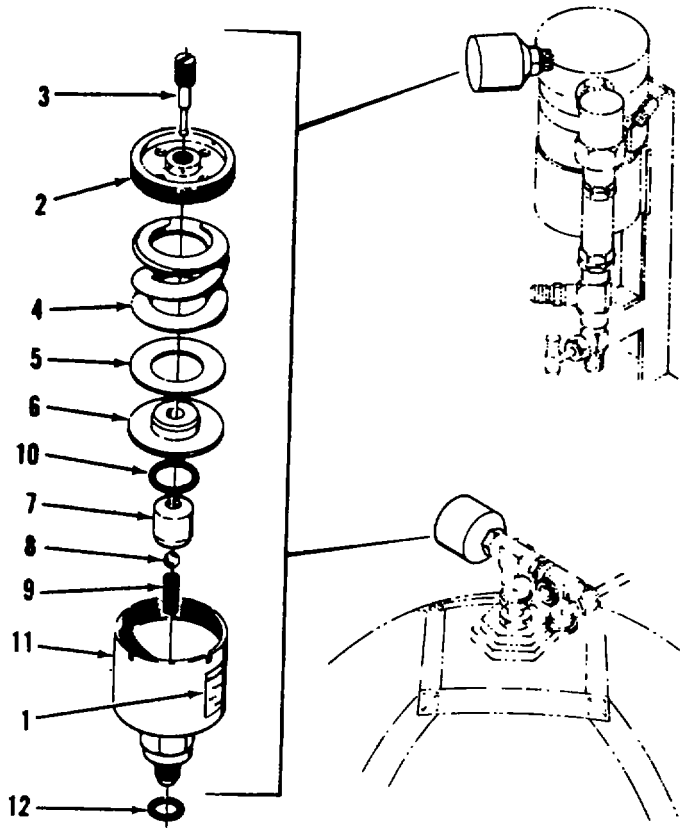
1 Clamp, Cushioned
2 Screw, Machine
3 Nut, Hex
4 Washer, Lock
5 Clamp, Cushioned
6 Tube Assembly, Connecting
7 Tube Assembly, Connecting
8 Tube, Separator Drain
9 Sleeve, Coupling
10 Nut, Coupling
11 Elbow, 90 Degree
12 Orifice, Metering
13 Tee
14 Nut, Flared Tube
15 Nut, Flared Tube
16 Gasket, Tube Fitting
17 Tube Assembly, Connecting
18 Filter, Union
19 Union, Flared Tube
20 Gasket, Tube Fitting
21 Coupling
22 Tube Assembly, Connecting
23 Reducer, Flared Tube
24 Filter, Union
25 Gasket, Tube Fitting
26 Elbow, 90 Degree
27 Elbow, 90 Degree
28 Gasket, Tube Fitting
29 Ring, Gasket Back-Up
30 Nut, Flared Tube
31 Tube Assembly, Connecting
32 Nipple
33 Valve
34 Tee
35 Nipple
36 Gasket, Tube Fitting
37 Elbow, 90 Degree
38 Gasket, Tube Fitting
39 Ring, Gasket Back-Up
40 Nut, Flared Tube
41 Tube Assembly, Connecting
42 Union, Flared Tube
43 Gasket, Tube Fitting
44 Union, Flared Tube
45 Gasket, Tube Fitting
46 Filter, Hydraulic Line
47 Screw, Machine
48 Nut, Hex
49 Washer, Plain
50 Element Filter
51 Tube Assembly, Connecting
52 Valve, Shut-Off
53 Nipple
54 Tube Assembly, Connecting
55 Gasket, Tube Fitting
56 Ring, Gasket Back-Up
57 Nut, Flared Tube
58 Union, Flared Tube
59 The
60 Gasket, Tube Fitting
61 Ring, Gasket Back-Up
62 Nut, Flared Tube
63 Union, Flared Tube
64 Bushing, Reducer
65 Packing, Preformed
66 Tube Assembly, Connecting
67 Elbow, 90 Degree
68 Gasket, Tube Fitting
69 Ring, Gasket Back-Up
70 Nut, Flared Tube
71 Bushing, Reducer
72 Packing, Preformed
73 Tank, Pressure
74 Harness Assembly, Receiver

Figure 5-3. Pneumatic Lines and Fittings - Exploded



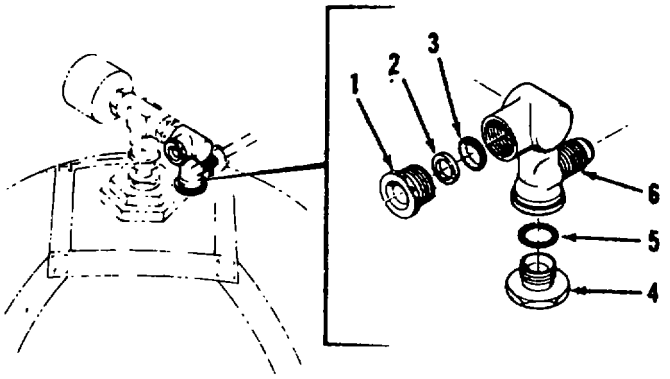
1 Tube Assembly, Connecting
2 Clamp, Cushioned
3 Tube, Connecting
4 Tee
5 Stud, Mounting
6 Nut, Hex
7 Washer, Lock
8 Cock, Drain
9 Connector, Male
10 Tee, Street
11 Elbow
Filter Assembly, Fuel
12 Bail Assembly
13 Bowl, Glass
14 Gasket
15 Valve Assembly, Needle
16 Screen
17 Top, Filter
18 Nipple, Pipe
Tank Assembly, Fuel
19 Screw, Machine
20 Nut, Cinch
21 Bracket, Support
22 Cap Assembly, Tank
23 Rivet, Blind
24 Washer, Flat
25 Chain, Bead
26 Tank, Fuel
27 Grommet, Tank Filler

Figure 5-4. Fuel Lines and Tank - Exploded



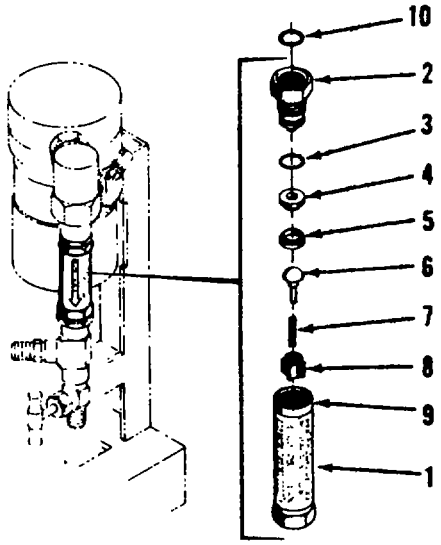
1 Nameplate
2 Screw, Adjusting
3 Stem
4 Spring
5 Shim, Spring
6 Retainer, Spring
7 Piston Assembly
8 Ball, Metal
9 Spring, Ball Return
10 Packing, O-Ring
11 Body
12 Gasket, Tube Fitting

Figure 5-5. Pressure Relief Valve Assembly - Exploded



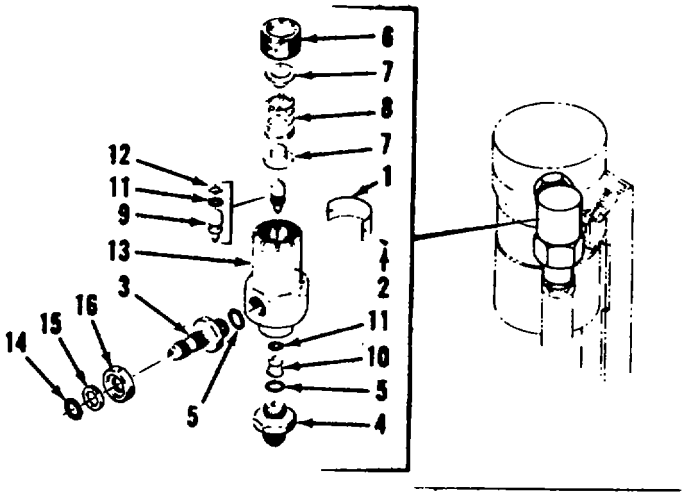
1 Cap, Ring Retainer
2 Ring, Disc
3 Disc, Rupture
4 Cap, Filter
5 Packing, O-Ring
6 Housing, Fitting

Figure 5-6. Safety Fitting Assembly - Exploded



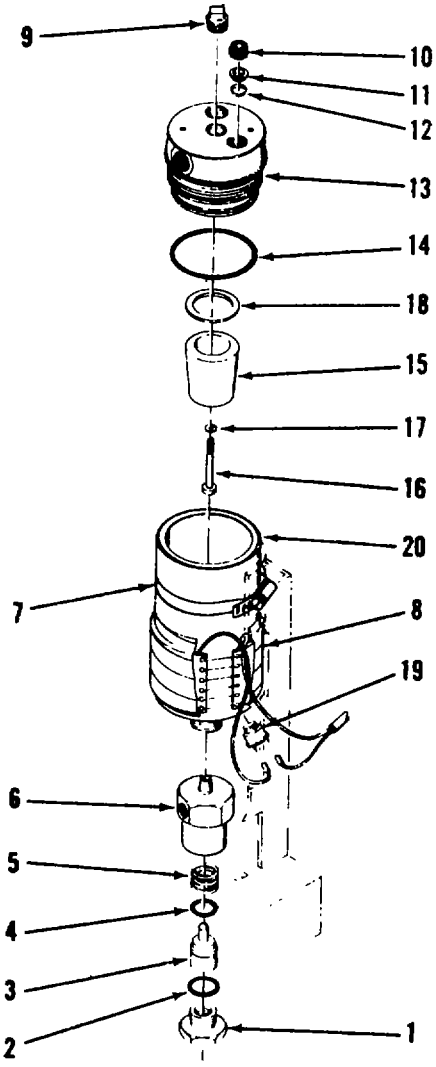
1 Nameplate
2 Screw, Body
3 Packing, O-Ring
4 Seat, Valve
5 Retainer, Seat
6 Poppet
7 Spring, Poppet Return
8 Guide, Poppet
9 Body, Valve
10 Gasket, Tube Fitting

Figure 5-7. Check Valve Assembly - Exploded



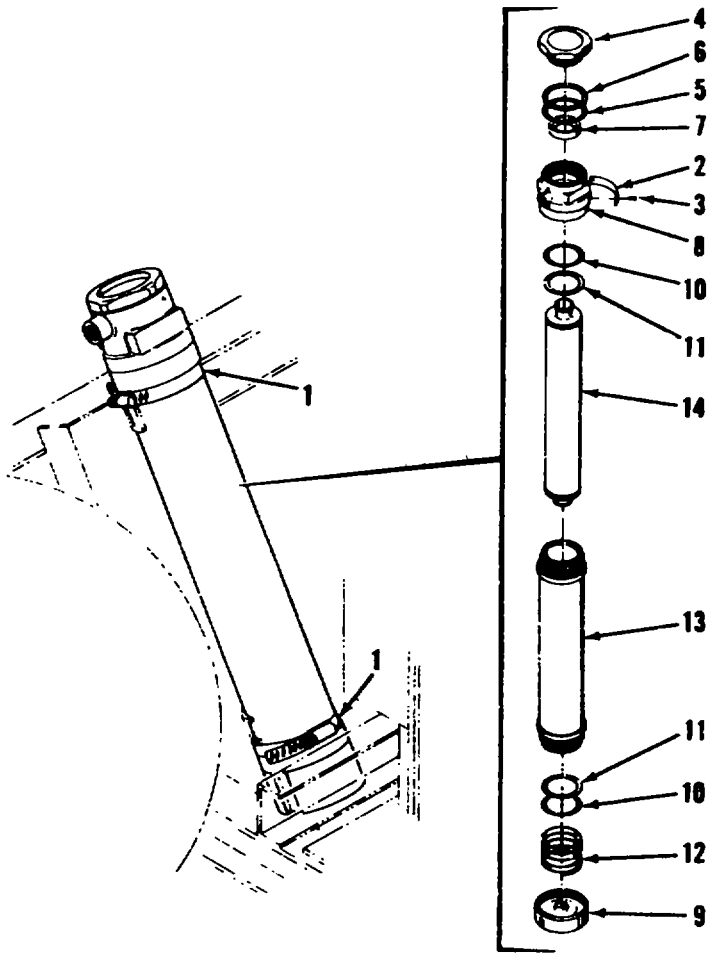
1	Nameplate	9	Piston
2	Screw, Drive	10	Seat, Piston
3	Fitting, Inlet	11	Packing, O-Ring
4	Fitting, Outlet	12	Ring, Packing Back-Up
5	Gasket, Tube Fitting	13	Body, Valve
6	Cap, Valve	14	Gasket, Tube Fitting
7	Plate, Spring	15	Ring, Gasket Back-Up
8	Spring	16	Nut, Flared Tube

Figure 5-8. Back Pressure Valve Assembly - Exploded



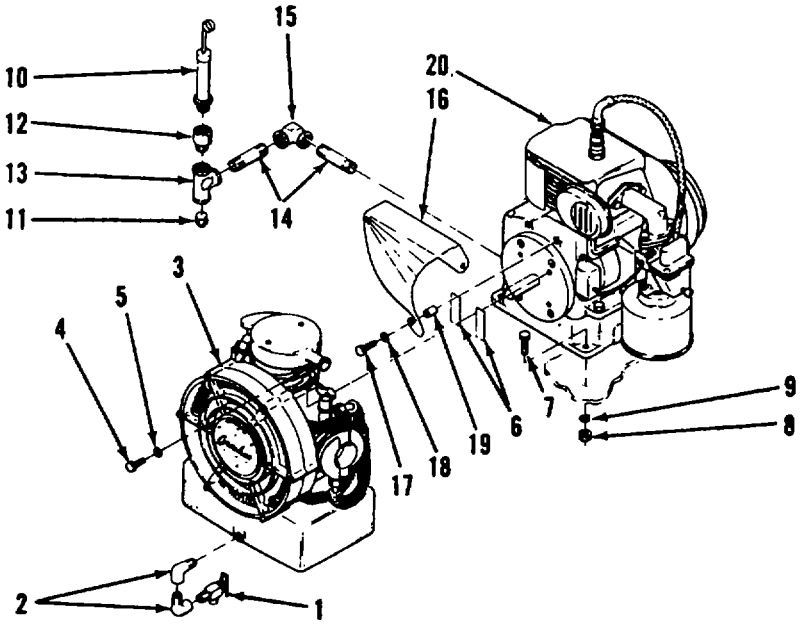
1 Adapter, Tube Fitting
2 Packing, Preformed
3 Piston, Dump Valve
4 Packing, Preformed
5 Spring, Dump Valve
6 Body, Dump Valve
Filter and Separator Assembly
7 Clamp, Hose
8 Blanket, Heater
9 Plug, Pipe
10 Retainer, Disc Ring
11 Ring, Disc
12 Disc, Rupture
13 Cap, Tank
14 Gasket, Tube Fitting
15 Element, Filter
16 Screw and Plug Assembly
17 Washer
18 Gasket
19 Switch, Thermostat
20 Shell
Kit, Repair
Kit, Repair

Figure 5-9. Pneumatic Dump Valve Assembly and Filter Separator Assembly - Exploded



1 Clamp, Hose
2 Nameplate
3 Screw, Drive
4 Cap, Adapter
5 Packing, Quad Ring
6 Ring, Packing Back-Up
7 Disc, Filter
8 Adapter, Outlet
9 Cap, Inlet
10 Packing, Preformed
11 Ring, Packing Back-Up
12 Spring
13 Housing, Dehydrator
14 Cartridge Assembly, Dehydrator
Kit, Repair

Figure 5-10. Dehydrator Housing Assembly and Cartridge - Exploded



1	Cock, Drain	11	Plug, Pipe
2	Elbow, Street	12	Extension, Pipe
3	Compressor Assembly	13	Tee, Pipe
4	Screw, Cap	14	Nipple, Pipe
5	Washer, Lock	15	Elbow, 90 Degree
6	Spacer, Drive Pad Engine Assembly	16	Plate, Baffle
7	Screw, Cap	17	Screw, Cap
8	Nut, Hex	18	Washer, Lock
9	Washer, Lock	19	Spacer, Baffle Plate
10	Dipstick	20	Engine, Gasoline

Figure 5-11. Engir and Compressor Assembly - Exploded

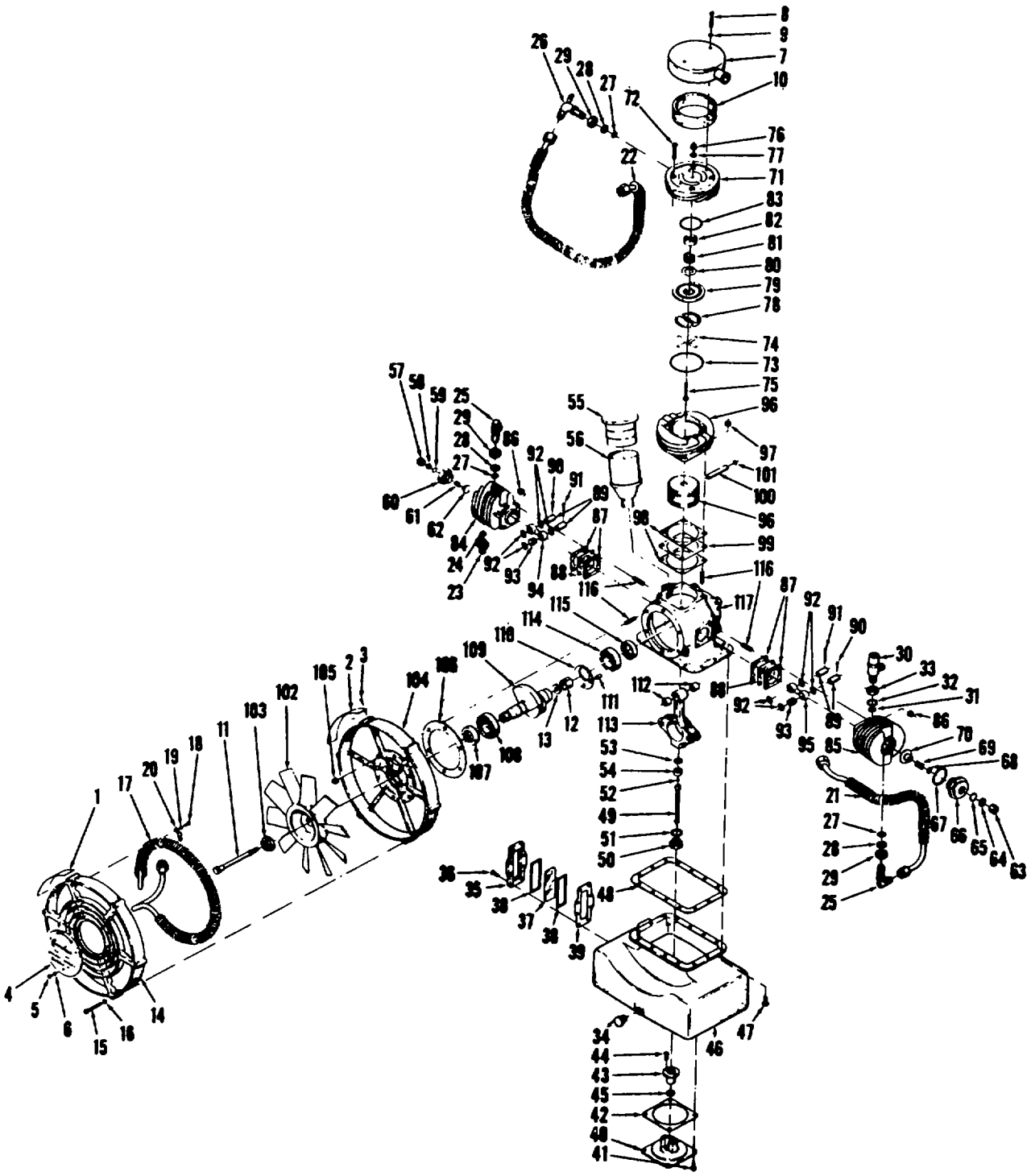


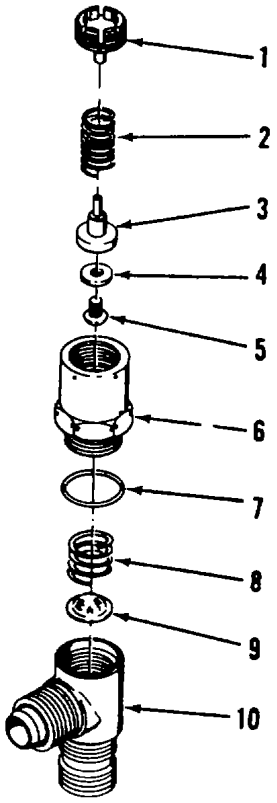
Figure 5-12. Air Compressor Assembly - Exploded

	Compressor Assembly, Air
	Compressor Assembly (Used on Model 3800219 only)
1	Plate, Instruction
2	Plate, Identification
3	Screw, Drive
4	Nameplate, Fan Guard
5	Screw, Machine
6	Washer, Lock
7	Cover, Silencer
8	Screw, Machine
9	Washer, Lock
10	Filter, Intake
1	Bolt, Draw
12	Bushing, Drive
13	Washer, Thrust
14	Guard, Fan and Aftercooler
15	Screw, Machine
16	Washer, Lock
17	Aftercooler
18	Screw, Machine
19	Washer, Lock
20	Clasp, Aftercooler
21	Tube Assembly, Connecting
22	Tube Assembly, Connecting
23	Reducer
24	Seal
25	Elbow
26	Tee, Fitting
27	Gasket, Tube Fitting
28	Ring, Gasket Back-Up
29	Nut, Flared Tube
30	Strainer and Relief Valve Assy
	Strainer and Relief Valve Assy (Used on Model 380219 only)
31	Gasket, Tube Fitting
32	Ring, Gasket Back-Up
33	Nut, Flared Tube
34	Plug, Pipe
35	Cap, Sight Glass
36	Screw
37	Indicator, Sight
38	Gasket, Sight Indicator
39	Gasket, Cap
40	Rousing, Oil Pump
41	Screw, Machine
42	Gasket, Oil Pump
43	Cylinder, Oil Pump
44	Screw, Machine
45	Packing, Preformed
46	Reservoir, Oil
47	Fastener, Seas
48	Gasket, Oil Reservoir
49	Piston, Oil Pump
50	Retainer, Piston
51	Shim, Oil Pump
52	Ball, Metal
53	Retainer, Ball
54	Socket, Master Rod
	Breather Assembly
55	Cover and Filter Assembly
56	Body, Breather
57	Retainer, Disc Ring
58	Ring, Disc
59	Disc, Rupture
60	Cap, Cylinder
61	Spring, Exhaust
62	Valve, Exhaust
	Cap and Rupture Disc Assembly, Cylinder
63	Screw, Holdown
64	Ring, Retainer
65	Disc, Rupture
66	Cap, Cylinder
	Cap (Used on Model 3800219 only)
67	Packing, Preformed
68	Washer, Spring
69	Spring, Exhaust
	Spring (Used on Model 3800219 only)
70	Valve, Exhaust
	Valve (Used on Model 3800219 only)
71	Head, Cylinder
72	Screw, Machine
73	Gasket, Valve Plate
74	Spring, Intake Valve
75	Screw, Valve Retainer
76	Nut, Self Locking
77	Washer, Flat
78	Valve, Intake
79	Plate, Valve
80	Valve, Exhaust
81	Spring, Exhaust Valve
82	Stop, Valve
83	Packing, Preformed
84	Cylinder and Piston Assembly
	Cylinder and Piston Assy, 3rd Stage (Replaced by 3260581 - NOTE: Use Master Rod Assy, P/N 4417-0013

Figure 5-12- Air Compressor Assembly - Exploded

only with this Cylinder and Piston Assy) (Used on Mode1 3800219 only)
85 Cylinder end Piston Assembly, Second Stage
86 Nut, Flexloc
87 Gasket
88 Gasket
89 Pin, Wrist
90 Pin, Cotter
91 Pin, Cotter
92 Washer, Link
93 Bearing, Needle
94 Link, Connecting
95 Link, Connecting
96 Cylinder and Piston Assembly, First Stage
97 Nut, Flexloc
98 Gasket
99 Gasket
100 Pin, Wrist
101 Ring, Retaining
102 Fan
103 Nut, Elastic Stop
104 Endbell
105 Nut, Flexloc
106 Gasket, Endbell
107 Seal, Oil
108 Bearing, Ball.
109 Crankshaft
110 Plate, Retainer
111 Pin, Retainer
Rod Assembly, Master
Master Rod Assy. (Replaced by 4417-0013 - NOTE: To be used with Cylinder and Piston Assy P/N 3260581 only) (Used on Model 3800219 only)
112 Bearing Needle
113 Rod, Master
Rod, Master (Replaced by 417-0059) (Used on Model 380019 only)
114 Bearing, Ball
115 Seal, Oil
116 Stud
117 Crankcase
Kit, Repair
Kit, Repair
Kit, Repair
Kit, Repair
Kit, Repair
Kit, Repair
Kit, Repair
Kit, Repair
Kit, Repair
Kit, Repair, Third Stage, (Used on Model 3800219 only)
Kit, Repair, Second Stage, (Used on Model 3800219 only)

Figure 5-12. Air Compressor Assembly - Exploded



1	Plug, Spring Adjusting	6	Housing, Seat
2	Spring, Inner Adjusting	7	Packing, O-Ring
3	Poppet	8	Spring
4	Seat	9	Strainer
5	Screw, Seat Retainer	10	Body, Elbow

Figure 5-13. Second Stage Strainer and Relief Valve - Exploded

Figure 5-14. - Not Applicable

Figure 5-15. - Not Applicable

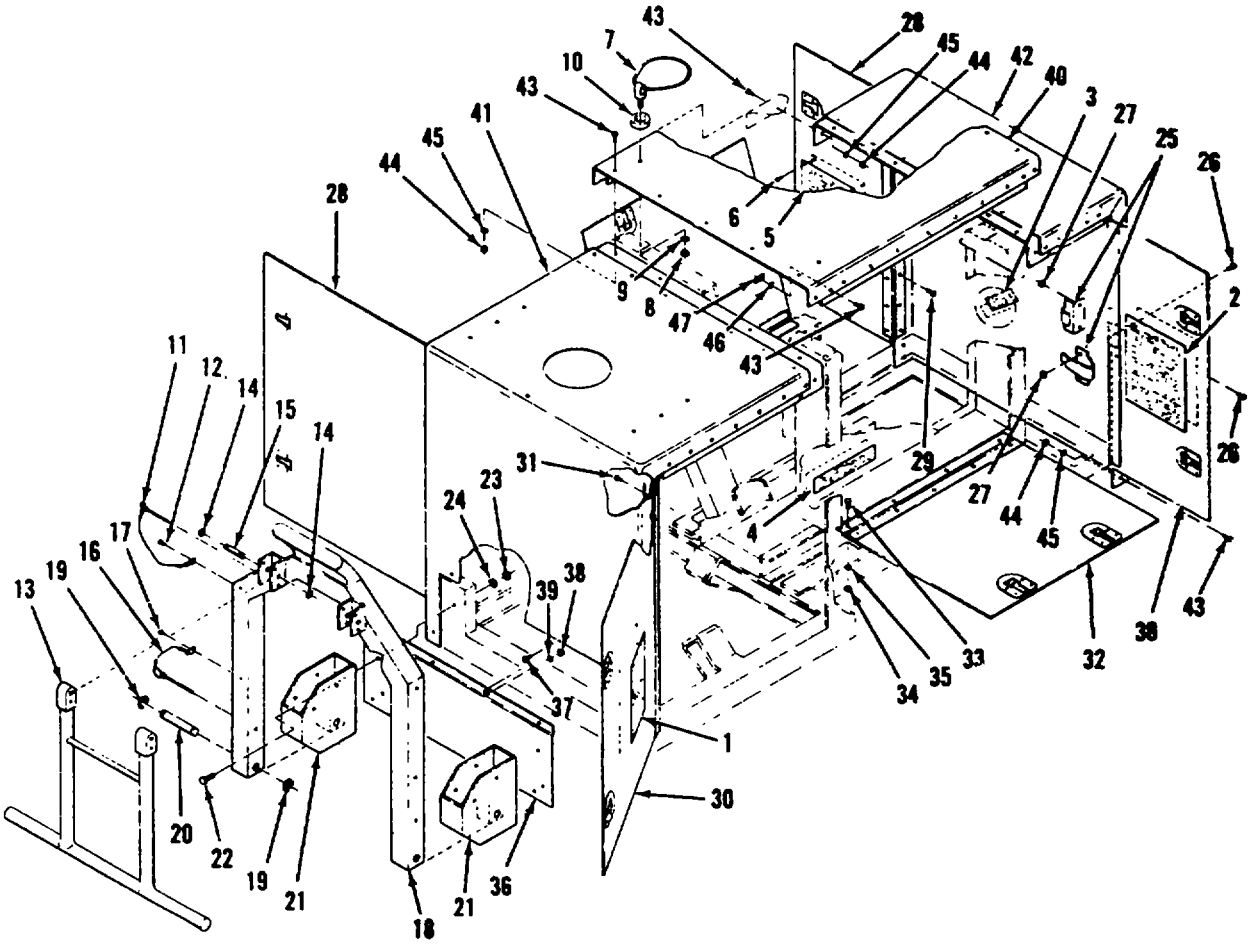


Figure 5-16. Decals, Doors, Tow Bar, Housing - Exploded

1 Decal, Schematic
2 Decal, Instruction
3 Decal, Compressor Oil
4 Decal, Caution
5 Plate, Identification
6 Rivet, Blind
7 Ring, Tie Down
8 Nut, Flexloc
9 Washer, Flat
10 Washer, Cushion
11 Pin, Ball Lock
12 Rivet, Blind
Rivet (Used on Model 3800219 only)
13 Handle, Cart
14 Ring, Retaining
15 Pin, Handle
16 Pin, Ball Lock
17 Rivet, Blind
Rivet (Used on Model 3800219 only)
18 Bar, Tow
Tow Bar (Used on Model 3800219 only)
19 Ring, Retaining
20 Pin, Tow Bar
21 Bracket, Tow Bar
22 Screw, Cap
23 Nut, Hex
24 Washer, Lock
25 Spring, Door Retaining
26 Screw, Machine
27 Nut, Self Locking
28 Door Assembly, Rear
Door Assy, Rear (Used on Model 3800219 only)
29 Rivet, Blind
(Change Qty Used) (Used on Model 3800219 only)
30 Door Assembly, Front
Door Assy, Front, Right (Used on Model 3800219 only)
31 Rivet, Blind
(Change Qty Used) (Used on Model 3800219 only)
32 Door Assembly, Center
Door Assy, Center (Used on Model 3800219 only)
33 Bolt, Machine
34 Nut, Hex
35 Washer, Lock
36 Panel, Housing
37 Screw, Cap
38 Nut, Hex
39 Washer, Lock
40 Housing Assembly, Center
Cover Assy, Compressor Package (Used on Model 3800219 only)
41 Housing Assembly, Rear
Cover Assy, Compressor Package (Used on Model 3800219 only)
42 Housing Assembly, Front
Cover Assy, Compressor Package (Used on Model 3800219 only)
43 Screw, Cap
(Change Qty Used) (Used on Model 3800219 only)
44 Nut, Hex
(Change Qty Used) (Used on Model 3800219 only)
45 Washer, Lock
(Change Qty Used) (Used on Model 3800219 only)
46 Washer, Flat
47 Nut, Speed

Figure 5-16. Decals, Doors, Tow Bar, Sousing - Exploded

Figure 5-17. - Not Applicable

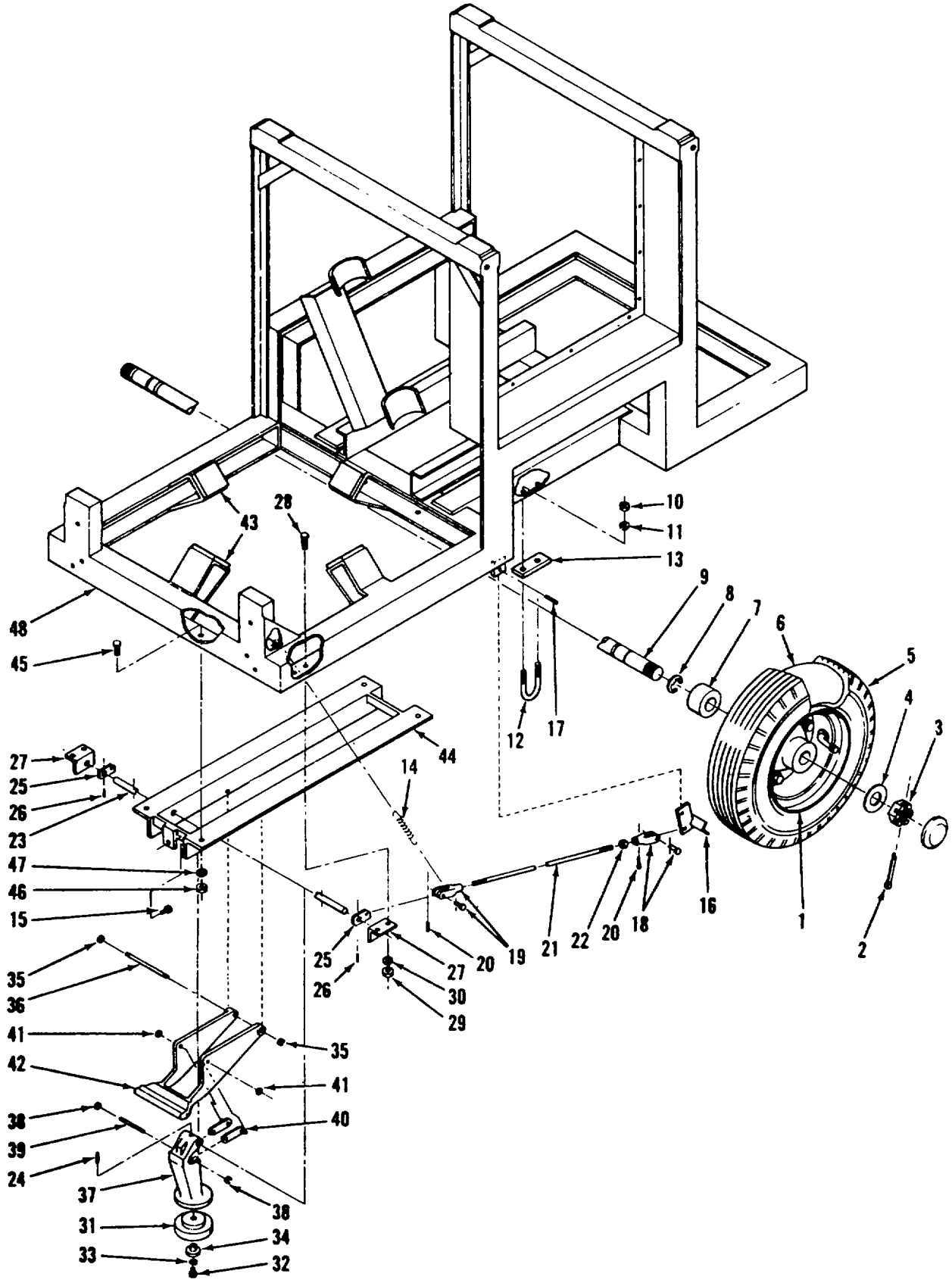


Figure 5-18. Cart Chassis and Wheel Assembly - Exploded

Cart Chassis and Wheel Assembly
Chassis and Wheel Assy (Used on Model 3800219 only)
1 Wheel and Hub Assembly
2 Pin, Cotter
3 Nut, Castellated
4 Washer, Flat
5 Tire
6 Tube
7 Spacer, Back-Up
8 Ring, Retaining
9 Shaft, Axle
10 Nut, Rex
11 Washer, Lock
12 U-Bolt
13 Spacer, Axle
Spacer, Rubber (Used on Model 3800219 only)
14 Spring, Brake
15 Screw, Cap
16 Shoe, Brake
17 Pin, Spring
18 Yoke, Brake
19 Yoke, Brake
20 Pin, Cotter
21 Rod, Brake
22 Nut, Hex
23 Shaft, Brake
24 Pin, Spring
25 Lever, Brake
26 Pin, Spring
27 Bracket Assembly, Brake
28 Screw, Cap
29 Mat, Hex
30 Washer, Lock
31 Foot, Compressor Base
32 Screw, Cap
33 Washer, Lock
34 Washer, Spacer
Pedal and Foot Assembly
35 Ring, Retaining
36 Pin, Pedal
37 Foot, landing
38 Ring, Retaining
39 Pin, Foot
40 Link and Pin Assembly
41 Ring, Retaining
42 Pedal, Brake and landing Foot
43 Cushion, Air Receiver
44 Support, Brake
45 Screw, Cap
46 Nut, Hex
47 Washer, Lock
48 Chassis Assembly
Chassis Assembly (Used on Model 3800219 only)

Figure 5-18. Cart Chassis and Wheel Assembly - Exploded

PART II. ENGINE OPERATION AND MAINTENANCE

OPERATION INSTRUCTIONS

IMPORTANT
Before servicing engine, READ THE FOLLOWINIG INFORMATION CAREFULLY and keep handy for reference.

1. BEFORE STARTING

a. Remove oil filler cap and fill crankcase with 2 1/2 pints of oil.

(Reference lubrication order, fig 3-1)

b. Fill the fuel tank with clean, fresh regular grade gasoline (octane rating of 90 or higher). Do not mix oil with the gasoline. Be sure that vent hole in cap is open.

c. If engine is equipped with oil bath air cleaner remove cleaner bowl and add oil until level reaches arrow marked on air cleaner bowl.

CAUTION:
Do not attempt to put oil in dry type air cleaners.

2. TO START

MANUALLY CRANKED ENGINE

a. Open valve on fuel tank or sediment bowl.

b. Close choke lever. More or less choking may be necessary due to variations in temperature, grade of fuel, etc. Little or no choking will be needed when engine is warm. Experience will teach you the degree of choking necessary under varying conditions. If engine is equipped with remote throttle control cable, open throttle about half way until engine starts, then set at desired speed.

c. Using recoil starter give quick steady pull. If a second pull is necessary, return choke to its original position. Do not jerk or pull retractable starter to end of cable return handle slowly. Pull starter cable in straight line through guides. Refer to page 18 for recoil starter operating tips.

d. Slowly return choke to open position immediately after engine has started.

3. TO STOP

Whenever possible, remove load and let engine idle before stopping.

a. Press breaker point "STOP"' button and hold until engine is completely stopped.

b. If engine is to be taken out of service for a considerable length of time see instructions for storing.

4. Precautions

Stop engine before filling fuel tank. Avoid spilling gasoline on a hot engine. Use fresh, clean gasoline.

a. To avoid injuries *disconnect spark plug cable before making any adjustments on equipment powered by engine.*

b. Be sure crankcase and air cleaner are properly serviced at all times. Dirt drawn through an improperly serviced air cleaner can ruin an engine in a few operating hours. Dry paper element type cleaners can be cleaned by removing the element and tapping it lightly on a flat surface, causing loose dirt to fall off. The element should be replaced if dirt does not drop off easily or if power loss is still evident, after cleaning.

c. Allow engine to warm up before applying load.

d. Keep cylinder block, flywheel and cylinder head cooling fins and rotating air screen clean. This is very important for proper air circulation on air cooled engines.

e. Do not operate at speeds greater than governor setting or run continuously at wide open throttle.

MAINTENANCE

1. Each Day

a. Check fuel supply and oil level in crankcase. Add oil only is needed to keep the level between the marks on the dipstick. (Use type of oil specified on engine instruction plate.)

b. Clean oil and dirt from external surfaces of power unit.

2. Every 25 Operating Hours

a. Change oil in crankcase. (Change more often under extremely dusty conditions. Be sure there are no air leaks at gasket. Joints between air cleaner, carburetor and cylinder block.

b. Remove. Clean and replace sediment bow:

c. Wipe oil and dirt from engine block, spark plug and oil fill.

d. Remove and clean dry air cleaner.

3. Every 100 Operating Hours.

In addition to regular 25 hour inspection and maintenance:

a. Check spark plug and reset gap to .025. Set radio shielded spark plugs at .020.

b. Remove, clean and replace sediment bowl.

4. Every 500 Operating Hours

Perform regular 25, and 100, hour service an(d in addition:

a. Check ignition timing.

b. Check valve tappet clearance and clean carbon from valve stems.

c. Remove head and clean out deposits.

d. Check magneto.

e. Clean carburetor.

f. Check engine compression

INSTRUCTIONS FOR STORING

If engine is to be out of service for a considerable length of time the following is recommended:

a. Drain oil from crankcase while engine is still hot and flush with clean, light oil. Refill crankcase.

b.. Drain fuel tank and carburetor.

c. Remove, clean and replace sediment bowl.

d. Clean exterior of engine.

e. Spread a light film of oil over any exposed surfaces of engine subject to corrosion.

f. Pour tablespoon of oil into spark plug hole crank engine slowly by hand and replace spark plug.

g.Store in dry place.

TROUBLE SHOOTING

Following is a list of troubles which may occur through average use and normal wear.

1. Hard Starting

a. Faulty Ignition
   (1) Loose or grounded high tension or breaker point leads.
   (2) Improper breaker point gap.
   (3) Defective breaker points.
   (4) Faulty spark plug or improper gal).
   (5) Faulty condenser or coil.
   (6) Incorrect spark timing.

b. Faulty Carburetion
   (1) Gas not getting to carburetor.
      (a) Dirt or gum in fuel line.
      (b) Faulty fuel pump.
   (2) Dirty carburetor.
   (3) Carburetor improperly adjusted.
   (4) Defective fuel pump.

c. Compression loss.
   (1) Valves leaking or sticking.
   (2) Rings worn.
   (3) Head gasket leaking.

2. Overheating

a. Lack of cool air
b. Dirty air intake screen, shroud or cooling fins.
c. Improper fuel.
d. Fuel mixture too lean.
e. Improper ignition timing.
f. Excessive amount of oil in crankcase.

3. Backfiring

a. Fuel mixture too lean.
b. Sticky intake valve.
c. Improper ignition timing.

4. Occasional Missing Under Load

a. Spark plug gap too wide.
b. Improper carburetor setting or lack of fuel.
c. Wrong type spark plug.
d. Improper ignition timing.
e. Partially fouled spark plug.
f. Pitted breaker points.

5. Knocking

a. Fuel octane rating too low.
b. Overheated engine.
c. Improper ignition timing.
d. Loose connecting rod.
e. Excessive carbon in combustion chamber.
f. Lack of lubrication.
g. Fuel mixture too lean.
h. Excessive camshaft end clearance.

6. Operating Erratically

a. Clogged fuel line.
b. Water in fuel.
c. Faulty choke control.
d. Improper fuel mixture.
e. Loose ignition system connections.
f. Air leaks in manifold or carburetor connections.
g. Carburetor jets clogged.
h. Leaking carburetor or manifold gaskets.
i. Sticking or leaking valves.
j. Weak coil or condenser.
k. Loose ignition system connections.

7. Engine Will Not Idle

a. Improper carburetor idling adjustment.
b. Carburetor jets clogged.
c. Spark plug gap too small.
d. Leaking carburetor or manifold gaskets.
e. Sticking or leaking valves.
f. Weak coil or condenser.

SERVICE PROCEDURE

possible, discuss with the engine owner the type of application and the length of time engine has been in service.

Inspect engine in owner's presence and try to determine, as nearly as possible, the extent of repairs.

When an engine has been reconditioned, the owner has a right to expect the same performance he would normally receive from a new engine. It is impossible to over-emphasize the importance of good service. Failure in providing quality service discourages new and repeat sales.

Repair and maintenance of **K141** engines will not be difficult if the owner or repairman will thoroughly familiarize himself with the following instructions.

Compression and crankcase vacuum checks should be taken when engine is losing power or running unevenly and when carburetion and ignition adjustments do not remedy the situation.

COMPRESSION CHECK

After removing spark plug lead spin flywheel against compression. If engine has adequate compression, flywheel will "bounce" back. To check this on engines equipped with Automatic Compression Release, the flywheel must be spun in reverse direction.

To accurately check compression a commercial compression testing gage should be used in the manner indicated by the manufacturer. The engine should be "motored" to 1000 R.P.M, which should give a reading of 110 to 120 psi for an engine in top mechanical condition.

When this figure falls below 100 psi. it indicates leaking rings or valves; or deposits in the combustion chamber which limit the charge entering the combustion chamber. *See Reconditioning Section.*

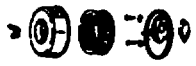
CRANKCASE VACUUM CHECK

The crankcase breather maintains a partial vacuum in the crankcase. It may be checked with a water U-tube manometer or vacuum gage. Connect meter to crankcase through a tube and cork inserted at oil filler hole. A vacuum of 5 to 10 inches water column or 1/2 to 1" mercury should be present when engine is running.

Lack of vacuum would indicate a faulty breather, excessive engine blowby, leaky valves or worn oil seals. *See Reconditioning Sections*.

AIR CLEANER

The air cleaner is one of the most important parts of the engine from the standpoint of engine life. If dirty air gets into the engine, it can wear out a set of piston rings within a few operating hours.



DRY TYPE

Dry paper element type cleaners can be cleaned by removing the element and tapping lightly, causing loose dirt to fall off. The element Should be replaced if dirt does not drop off easily.

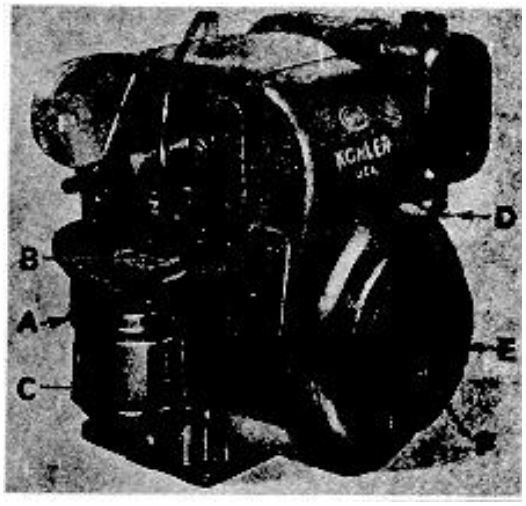


Figure 2

K141 Engine with Dry Type Air Cleaner

A - "STOP" Button	D - Fuel Shut-off Valve
B - Choke Lever	E - Starter Pulley
C - Dry Type Air Cleaner	F - Cooling Air Screen

The paper element should be handled with care to avoid perforations. Removing the dirt with compressed air can rupture the paper element.

The time between changes will vary with air conditions. Check to ensure that gasket surfaces of element are not bent or damaged in any way. Gasket surfaces must seal tightly at top and bottom of cleaner shell to prevent foreign matter from entering the carburetor.

Whenever air cleaner is removed, cover air intake hole to prevent dirt from falling into air horn or carburetor. The gasket between air horn and carburetor must fit tightly to prevent unfiltered air from entering carburetor.

FUEL SYSTEM

Service difficulties with fuel systems usually originate from improper carburetor adjustments or dirt in one of the components. If gum forms in the components it will be necessary to completely disassemble and thoroughly clean the carburetor.

1. Carburetor Adjustments

The carburetor is adjusted at the factory and under normal operating conditions will not require readjusting. If readjustment is necessary because of fuel and air conditions, the following procedure is recommended:

a. Turn high speed adjustment screw (D, Fig. 4) counter-clockwise two turns from closed position and start engine.

b. After engine has reached normal operating temperature, accelerate and check response. Place engine under full load and adjust high speed adjustment screw for leanest mixture that will still allow satisfactory acceleration and steady governor operation.

c. If engine misses and backfires under full load, high speed mixture is too lean. The high speed adjustment screw must be turned counterclockwise 1/4 turn at a time until condition is corrected.

d. If engine shows sooty exhaust and is sluggish under full load, high speed mixture is too rich. The high speed adjustment screw must be turned clockwise 1/4 turn at a time until condition is corrected.

e. Final check of high speed adjustment; operate engine under full load and make any corrections necessary for smooth operation.

f. Idle adjustment screw (A, Fig. 4) adjustments should be made at the same time as high speed adjustment screw adjustments, as each effects the other.

g. The final idle adjustment should be made at an engine speed of not less than 1000 RPM. Adjust until smoothest idle is obtained.

Warning:
Do not use force on high speed adjustment screw or idle mixture screw---they will be damaged.

2. Disassembly of Carburetor-Up Draft

a. Remove carburetor from engine.

b. Remove bowl cover and gasket.

c. Remove float pin, float, needle, and needle seat. Check float pin for wear.

d. Remove idle mixture screw ("A", figure 4) and high speed adjustment screw ("D", figure 4) and springs. Do not remove choke valve and shaft unless replacement of these parts is necessary

3. Cleaning Carburetor Parts

a. Clean all parts in solvent. Gum is easily removed with an alcohol or acetone solvent.

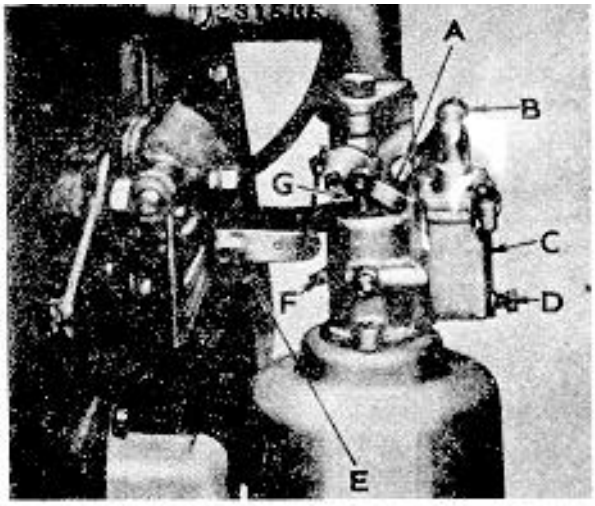


Figure 4

Up-Draft Carburetor

A - Idle Adjustment Screw
B - Fuel Line
C - Carburetor Bowl
D - High Speed Adjustment Screw
E - Governor Arm
F - Choke Lever
G - Idle Speed Screw

b. Be sure any carbon deposits are removed from bore, especially where throttle valve seats in casting.

c. Blow out all passages with compressed air.

d. Replace all worn and damaged parts. *Always use new gaskets*

4. Assembly of Carburetor--Up Draft

a. Install throttle shaft and valve. Elongated side of valve should be towards top.

b. Install needle seat. A 5/16 socket should be used.

Caution:
Do not over tighten. Torque to 25 to 30 inch-pounds.

c. Install needle, float. and float pin.

d. Set float level. With bowl cover casting inverted and float resting lightly against needle in its seat, there should be 7/16 clearance between machined surface casting and free end of float (side opposite needle seat).

e. Adjust by bending lip of float with small screwdriver.

f. Install new bowl cover gasket, bowl cover and bowl cover screws. Tighten securely.

g. Install high speed adjustment screw ("D" figure 4.) Turn in until screw seats in nozzle and back out two turns.

h. Install idle mixture screw ("A", figure 4.) Back out approximately 1/2 turns after seating lightly against jet.

i. Install idle speed regulating screw and spring. Adjust desired idling speed with engine running.

GOVERNOR

The K141 engine **is** equipped with governors and operating speed is determined by throttle control setting. The governor maintains engine speed tinder varying loads and serves as a top speed limiting device. Engines on some applications such as electric plants hive constant speed settings.

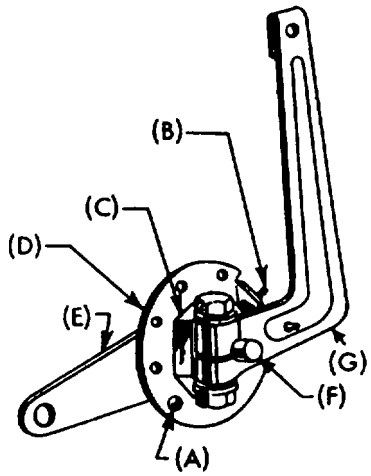


Figure 5

A - Drive Pin
B - Governor Spring
C - Bushing Nut
D - Speed Control Disc
E - Throttle Bracket
F - Governor Shaft
G - Governor Arm

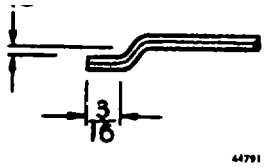


Figure 6
Throttle Wire Actual Size

VARIABLE SPEED APPLICATION OR THROTTLE CONTROL

Installation and Adjustment:

a. Bend end of throttle wire as shown in Figure 6.

b. With control handle in an open position, insert throttle wire into speed control disc hole nearest throttle bracket. (Fig. 7).

c. Install cable clamp and bolt to throttle bracket.

d. Remove drive pin (A Fig. 5) from speed control disc (D Fig. 5) and operate control handle, rotating disc from idle to full speed. See further instructions below.

e. Operating speed range can be changed by moving throttle as shown in Figure 8.

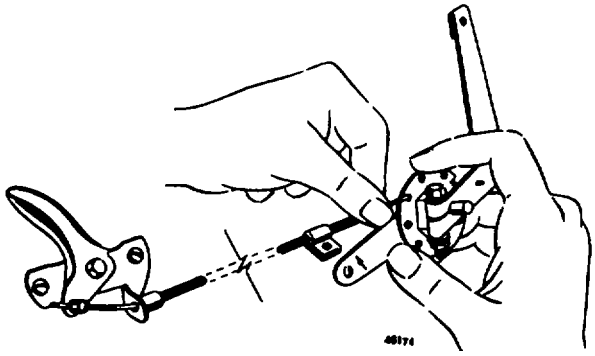


Figure 7
Inserting Throttle Wire

GOVERNOR ADJUSTMENT

Governors are set when the engines wire assembled and should not require readjustment unless governor arm is loosened or removed from governor shaft.

a. To reset governor (Fig. 9) loosen nut which holds governor arm (I) to shaft (H).

b. Turn shaft counter clockwise as far as possible with a pair of pliers.

c. Pull arm (I) all the way to the left (away from carburetor). Tighten nut. Check for freedom of movement.

MAXIMUM THROTTLE SPEED ADJUSTMENT

In many cases on variable speed applications, a drive pin is used as a maximum speed stop on the governor. In this case, the drive pin is located on the opposite side of the throttle bracket as shown in Figure 5. This would be in the approximate position of the arrow head on reference D.

To adjust this type of governor:

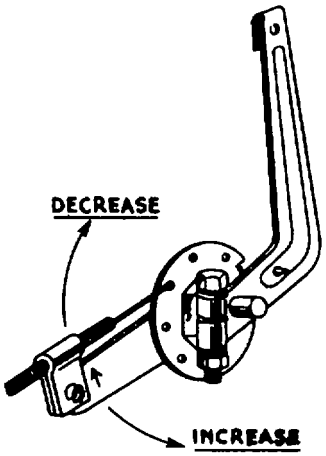


Figure 8
Speed Range Adjustments

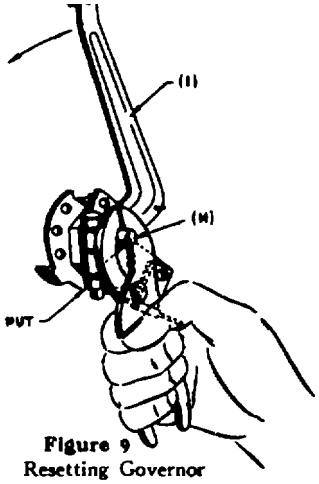


Figure 9
Resetting Governor
H - Governor Shaft
I - Governor Arm

a. Turn the speed control disc all the way to the left-drive pin will strike throttle bracket.

b. Attach throttle cable to disc and fasten cable clamp to throttle bracket.

c. Bring control handle to full throttle position and adjust cable length so that drive pin continues to touch throttle bracket. This is full throttle position.

IGNITION SYSTEM

1. Spark Plug

a. Service periodically to reduce fouling. The deposits are hard to remove if allowed to remain longer than 100 operating hours.

b. Degrease wet or oily plug and dry thoroughly.

c. File electrode sparking areas to obtain bright, flat surfaces.

d. Set gap at .025. Radio shielded .020.

e. Use new gasket when installing new or serviced spark plug. Torque to recommended 27 ft. lbs.

2. Breaker Assembly

a. Breaker points are operated by a cam on engine camshaft.

b. Dirty contact points can be cleaned with gasoline. Wipe dry and make sure that no lint or oil film is left between breaker point surfaces.

c. Pitted or burned points should be replaced. See Timing Section for proper setting.

d. If poor ignition persists, check condition of coil and condenser.

3. Testing Magneto

a. Check magneto output by placing end of spark plug cable about 1/8” from crankcase and crank engine at normal speed.

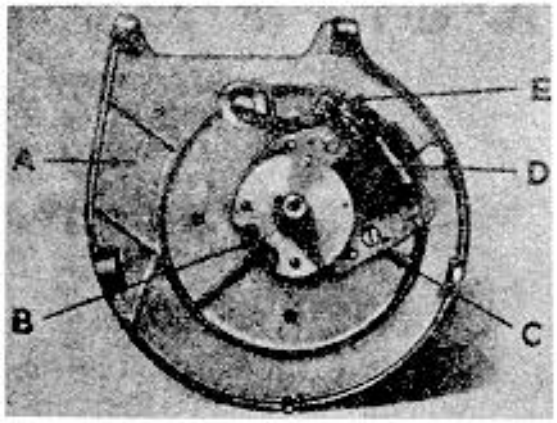


Figure 11
Phelon Magneto

A - Bearing Plate
B - Magneto Rotor
C - Pole Shore
D - Magneto Coil
E - Condenser

b. If there is no spark, check breaker points.

c. To test magneto, use a good commercial tester. Refer to tester manufacturer's instructions for acceptance limit of coils.

4. Testing Condenser

Check condenser with reliable commercial condenser tester.

5. Magneto

a. The K141 engine is equipped with the Phelon magneto as shown in figure 11.

b. The rotating magnet in both cases is mounted directly on the crankshaft. Clearance between the rotating magnet and pole shoes should be about .002-.005.

c. Rotating magnet and flywheel are positioned on the crankshaft with a single 1/4" square key.

6. Ignition Timing

a. Current production engines are equipped with a timing sight hole in left side of bearing plate, when viewed from power-take-off side of engine.

b. If a timing light is available, set breaker point gap while engine is running between 1200 and 1800 RPM. Adjust until "SP" or first mark on flywheel is centered in sight hole. See figure 12.

Note:

The first or "SP" or "S" mark will ;appear 20° before top dead center. The second mark is top dead center and is stamped with "DC" or "T" below the mark.

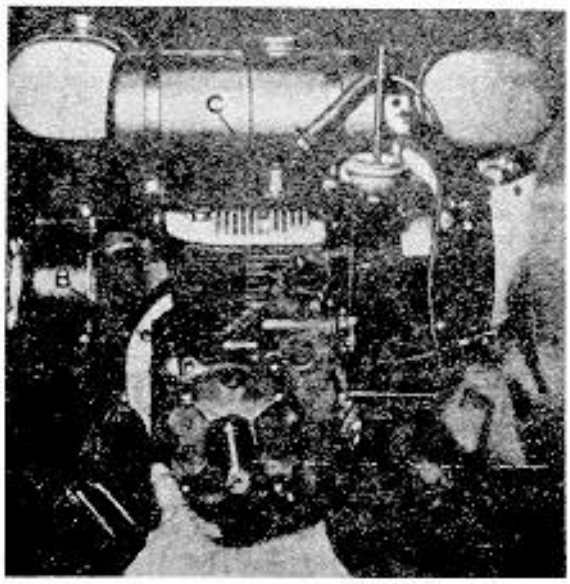


Figure 12
Setting Breaker Points with Timing Light

A - Breaker Points
B - Timing Sight Hole
C - Timing Light Attached to Spark Plug

c. On earlier engines without timing sight hole, point gap should be set at .020 when fully opened. Figure 13.

d. Point clearance should be approximately .020 fully opened. Clearance may vary a few thousandths to achieve exact timing. This variation is permissible.

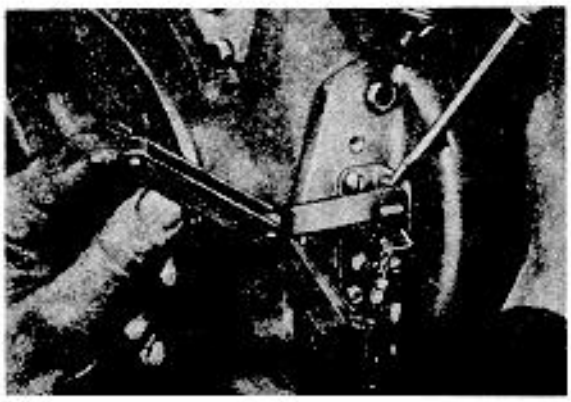


Figure 13
Adjusting Points

DISASSEMBLY OF ENGINE

1. Disconnect spark plug wire. Remove spark plug.

2. Close valve on sediment bowl, remove fuel line.

3. Remove air cleaner from carburetor intake.

4. Remove carburetor.

5. Remove fuel tank. Sediment bowl and brackets remain attached to tank.

6. Remove blower housing, cylinder baffle and head baffle.

7. Remove rotating screen and starter pulley.

8. The flywheel is mounted on a tapered shaft and can be removed without the use of a special puller. If flywheel does stick on shaft, screw flywheel nut flush with end of shaft and rap sharply with a hammer. Figure 14.

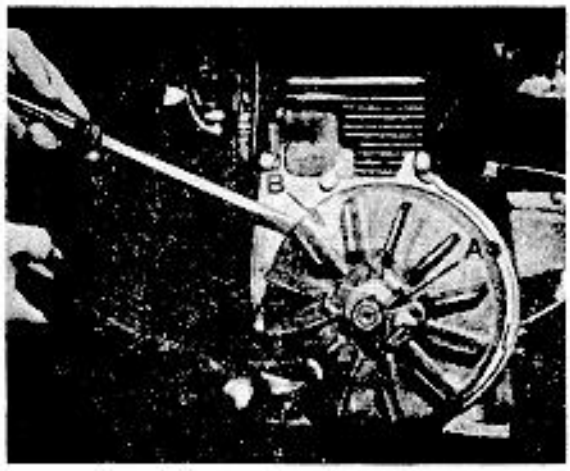


Figure 14
Removing Flywheel
A - Flywheel Nut B - Flywheel

9. Remove breaker point cover, breaker point lead, breaker assembly and push rod.

10. Remove magneto plate assembly.

11. Remove breather plate assembly.

12. Remove cylinder head. Before re-assembling, check cylinder head for warpage by placing on a face plate. Check to see that gasket surfaces make good contact at all points.

13. Raise valve springs with a spring compressor and push valve keepers off valve stems. Remove valve spring retainers, springs and valves.

14. Remove oil base and unscrew connecting rod cap. Remove piston assembly from cylinder block.

15. Remove crankshaft, oil seals and, if necessary, main ball bearings. It may be necessary to press crankshaft out of cylinder block. Bearing plate should be removed first if this is done.

16. Turn cylinder block upside down and, using a small punch, drive out camshaft pin from power-take-off side of engine. The pin will slide out easily after it is driven free of power-take-off side of cylinder block.

17. Remove camshaft and valve tappets.

18. Loosen and remove governor and snap ring from governor shaft.

19. Unscrew governor bushing nut and remove throttle bracket and speed control disc. The governor shaft can now be removed from inside of cylinder block.

20. Loosen screw located to lower right of governor bushing nut until governor gear is free to slide off stub shaft. *DO NOT REMOVE SCREW.*

INSPECTION OF PARTS

1. Clean all parts and Inspect them to determine which parts are reusable.

2. Reboring Cylinder Block

a. The cylinder should be rebored if badly scored, tapered, or out of round more than .005.

b. Always hone or rebore to exactly .010, .020, or .030 over standard bore size of 2.875 for K141 engines.

c. Use an inside micrometer or dial gauge to determine cylinder size and condition before and during honing.

d. If honed to nearest available oversize mentioned in "b", oversize piston and ring assemblies can be used without additional fitting.

e. Any commercial cylinder hone can be used with either a drill press or a portable electric drill. The drill press is preferred, for it is important to keep bore in alignment with crankshaft crossbore.

f. Finish by washing with soap and water. Cover cylinder wall with oil to prevent rust.

3. Crankshaft

a. Check for score marks and metallic pick-up. Superficial score marks can be cleaned up with crocus cloth soaked in oil.

b. With a micrometer, check journal for out of round. Correct crankpin size is 1.186. If out of round, replace shaft or regrind to .010 undersize.

c. Check gear, keyway and tapered part of shaft for wear. If worn, replace shaft.

4. Connecting Rod

a. Check rod for wear, score marks, running clearances, and side clearance. Replace rod if worn beyond high limit of clearances shown in table on page 23.

b. Connecting rod bearings are an integral part of the rod and not separately replaceable.

c. Connecting rods .010 undersize are available for reground crankshafts.

5. Piston

a. If cylinder block does not require reboring and old piston is free of score and scuff marks, check piston ring grooves and lands.

b. Clean grooves and fit NEW rings.

c. With rings in place, check clearance with a feeler gauge. Replace piston if a .005 feeler can be inserted between ring and land.

d. When inserted in cylinder, piston ring end clearance should be between .007 and .017.

e. Never re-use old rings.

6. Piston Pins

a. Very little wear takes place on piston pin or in piston bosses.

b. Assemble piston to connecting rod. Use a commercial rod aligner. Piston must be square with cylinder bore and crankshaft.

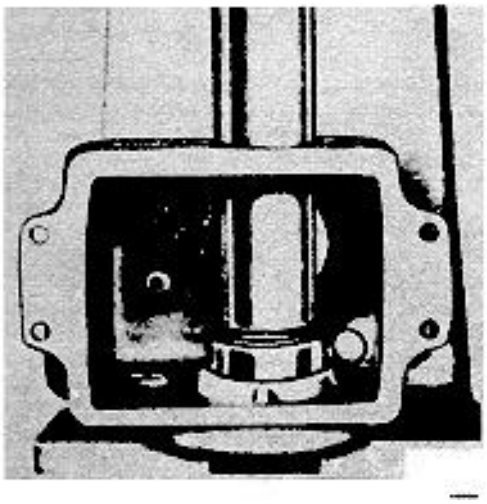


Figure 15
Installing Rear Main Bearing

7. Valves, Seats and Guides

a. Check clearance of old valve stems in guides.

b. If worn, replace valve guides. To remove, guides, we recommend that they be driven down into the valve chamber and carefully broken, taking care to not damage cylinder block. It will be necessary to ream guides to gain correct fit.

c. Consult Parts Identification Section for correct valve number. Some applications require special valves.

d. Intake valve seat is normally machined into block. Separate inserts are sometimes used.

e. The exhaust valve seat is a moly-nickel chrome or Stellite insert.

f. The seating surfaces should be held as nearly as possible to 1/32" in width. Seats with more than 1/16" seating surface should be reconditioned with 45° and 15° cutters and ground to form proper seat.

ASSEMBLY OF ENGINE

1. Install rear main bearing by pressing it into cylinder block with shielded side facing to inside of block. Figure 15.

2. Governor Shots

a. Current production engines have a cross shaft with an extension riveted in place to line up with governor gear. Figure 16. A needle bearing is provided (in block) to hold cross shaft in alignment.

b. Engines manufactured before serial No. 202305 have a short-angle arm and use bushing nut for a bearing and for shaft alignment. Figure 17.

3. To Install Governor

a. Place cylinder block on its side. Slide governor shaft into place from inside of block.

b. Place speed control disc on governor bushing nut and thread bushing nut into block, clamping throttle bracket into place.

c. The governor shaft can be adjusted for end clearance by moving needle bearing in block. Set bearing to allow a slight back-and-forth movement of the shaft.

d. Before serial 202305, a lock ring is used to hold governor shaft in place.

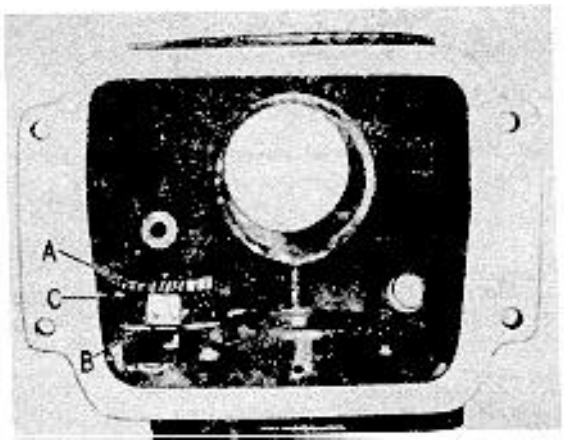


Figure 16
A - Governor Gear Assembly B - Governor Gear Shaft C - Governor Stop Screw

e. Place space flasher on stub shaft and slide governor gear assembly into place.

f. Tighten bolting screws from outside of cylinder block. This screw prevents governor gear from sliding off stub shaft during assembly.

g. Rotate governor gear assembly to be sure holding screw does not contact weight section of gear.

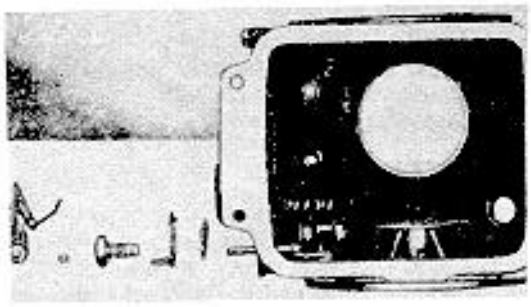


Figure 17
Early Style

4. Valve Tappets and Camshaft

a. Turn cylinder block upside down and place valve tappets in tappet guides. On Automatic Compression Release engines, be sure the shorter tappet is used on the exhaust side.

b. Before installing camshaft assembly in block, breaker cam must be correctly inserted between springs of spark advance systems to insure proper spark timing. Spark timing marks (A and B, Fig. 18) on cam and spark-advance side of camshaft gear must coincide. Spread springs in direction indicated) by arrows on flyweight and insert cam. Figure 18.

Note:
Automatic Compression Release engines do not have a spark advance mechanism.

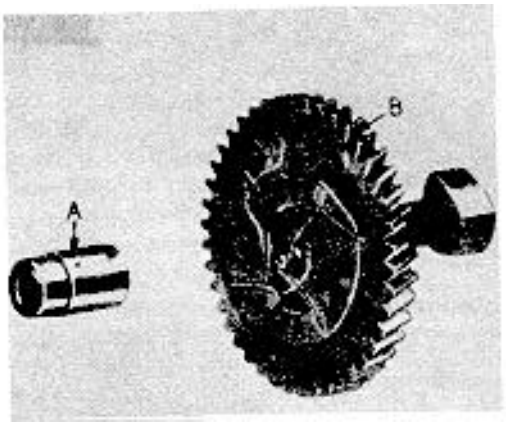


Figure 18
Installation of Breaker Cam on Camshafts
A and B are Timing Marks

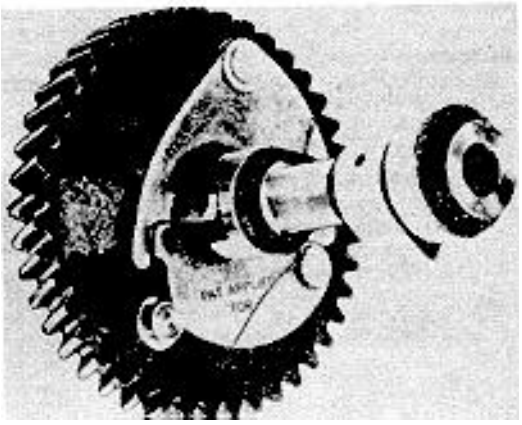


Figure 19
Automatic Compression Release camshaft.

c. With camshaft in position, slide camshaft pill through from bearing plate side and press into power-take-off side of block. Figure 20.

d. Check camshaft end clearance. End clearance should be from .005 to .010. Use spacer washers to shim camshaft to .005 to .010.

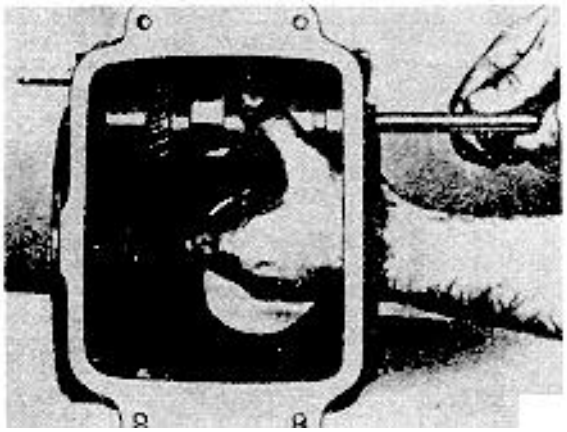


Figure 20
Installing Camshaft

5. Installation of Crankshaft

a. The installation of crankshaft in cylinder block is illustrated in Figure 21.

b. Timing marks are provided on crankshaft and camshaft gears for correct timing of engine. When in place, mark between teeth of camshaft (B, Fig. 21) must line up with mark on shoulder of crankshaft (A, Fig. 21). (Chalk timing mark positions for ease of viewing (during assembly.

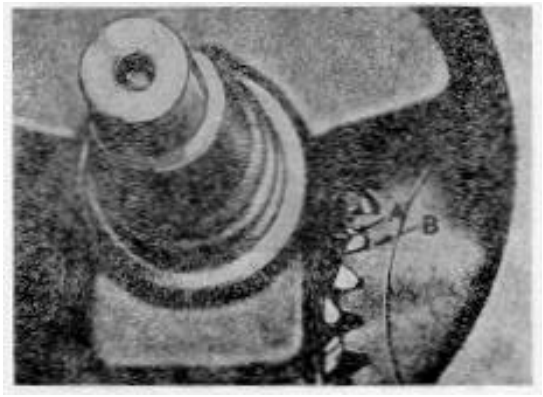


Figure 21
Crankshaft Installation
A and B are Timing Marks

6. Bearing Plate

a. Press front main bearing, shielded side up, into bearing plate. Figure 22.

b. Place bearing plate and gasket on crankshaft.

c. Carefully press bearing plate assembly onto crankshaft and into block.

d. Install four cap screws with copper washers. Draw cap screws up evenly.

Figure 22
Front Bearing Installation

7. Piston and Rod Assembly

a. Assemble piston to connecting rod and secure piston pin with retainer rings. Always use *new* retainer rings. Be sure retainer rings carefully engaged in grooves in piston bosses.

b. Before placing piston rings on piston, position rings in cylinder bore to be sure there is a ring gap of from .007 to .017.

c. Piston rings must be installed according to their markings. Install compression ring with groove or bevel up. Oil control rings can be installed either way. Install rings properly to gain correct ring functions.

Figure 23
Installing Piston Assembly

d. After rings are in proper position in correct grooves, oil complete assembly, stagger ring gaps so they are not in line and insert complete assembly into cylinder bore. Be sure connecting rod marking (A, Fig. 24) is toward flywheel side of engine. Use a ring compressor to prevent ring breakage during installation. Figure 23.

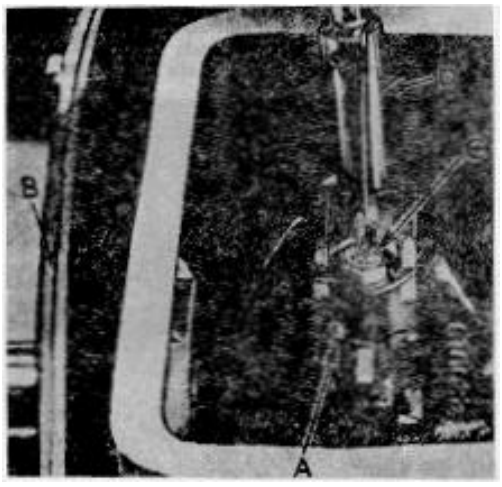


Figure 4
Tightening Connecting Rod Cap Screws

A - Connecting Rod Marks C - Cap Screw
B - Flywheel Side D - Socket

8. Attaching Rod to Crankshaft

a. After Piston Assembly is installed, place block on end and oil connecting rod and crank pin.

b. It is important that marks on connecting rod and cap (A, Fig. 24) line up and face flywheel end of engine. (B, Fig. 24) c. Connecting rod cap, lock and cap screws ;ire then attached to connecting rod.

d. Use a torque wrench to tighten cap screws to 220 inch pounds. Back off screws and tighten to 200 inch pounds. This two-step procedure will assure a tight fit of rod to crankshaft and avoids possibility of screws tightening in threads while rod remains loose on shaft.

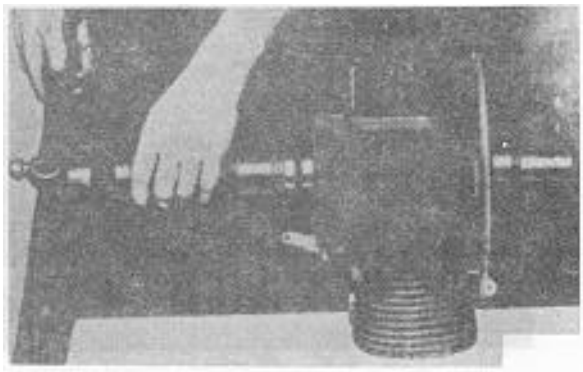


Figure 25
Installing Oil Seals

9. Installation of Oil Seals on Crankshaft

a. Figure 25 shows two oil seals on crankshaft.

b. Guide oil seals into position on crankshaft without damaging lips of seals. Any foreign matter on knife-like edge or any bending of seal may cause damage and an oil leak can result.

c. After oil seals are started on shaft, place block on its side. The oil seals may now be driven squarely into bearing plate and cylinder block.

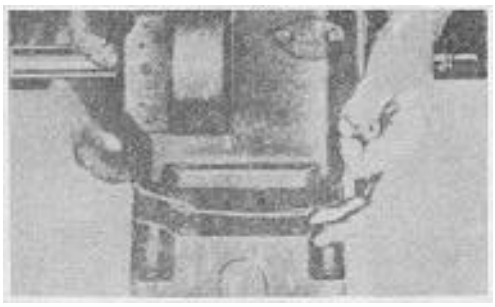


Figure 26
Installing Oil Base

10. Oil Base

a. Assemble oil base to block with four screws. Figure 26.

b. It is important that a new gasket be used to prevent oil leakage.

c. Use 3/16" pilot studs to align cylinder block, gasket and oil base.

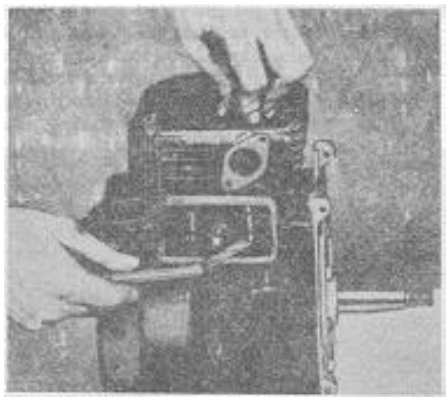


Figure 27
Checking Valve Clearance

11. Installing and Setting Valves

a. Valves, valve seats and ports should be thoroughly cleaned. Valves should be ground and lapped-in to obtain a good valve seat. Keep valve seat from 1/32" to 1/16" in width.

b. Figure 27 illustrates checking valve clearance. Intake valve clearance should be .006/.008 cold. Exhaust valve clearance should be .015/.017 cold. Valves that do not have the correct clearance must be removed and ends ground until desired clearance is obtained. ENDS MUST BE GROUND SQUARE AND ALL BURRS MUST BE REMOVED.

c. After correct clearance is obtained, remove valves and install valve springs and retainers and rotors. Replace valves, compress springs and place locking key in grooves of valve stems.

12. Cylinder Head

a. Always use a new gasket when head has been removed for service work. Figure 28. Head gasket should be soaked in water before assembly.

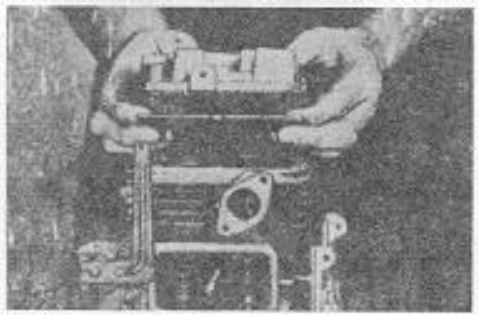


Figure 28
Cylinder Head Assembly

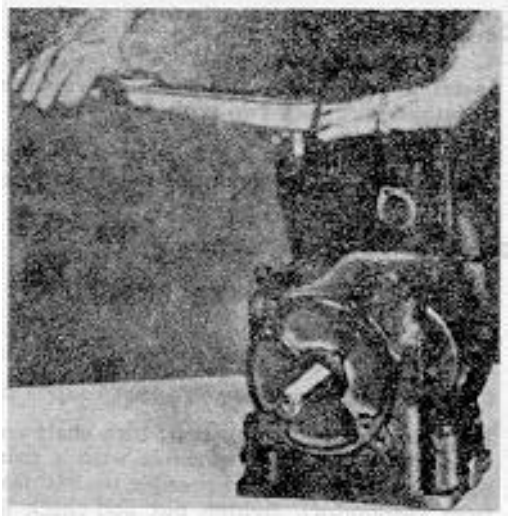


Figure 29
Tightening Cylinder Head Cap Screws

b. Check cylinder head on face plate to be sure gasket surfaces make good contact at all points.

c. It is important that head cap screws be tightened evenly and in steps until 200 inch pounds torque is reached. Figure 29.

d. Install new spark plug and gasket and tighten to 27 foot pounds torque. Spark plug gap should be .025, or .020 for radio shielded spark plugs.

13. Breather Assembly

a. The reed type breather valve maintains a slight vacuum in engine crankcase. All parts must be clean and in good condition. Parts can be replaced as necessary.

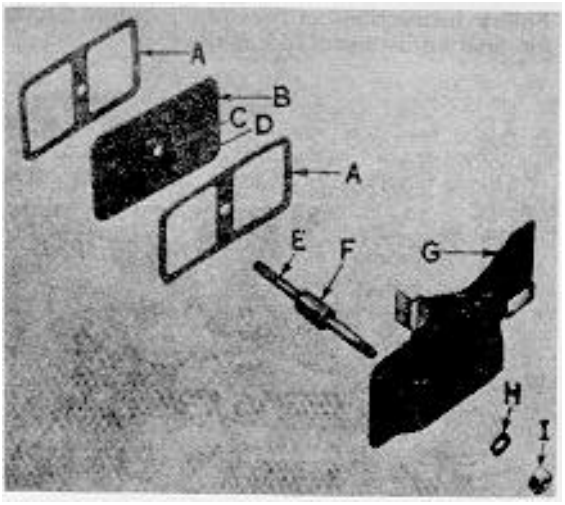


Figure 30
Breather Installation

A - Gaskets	D - Hole	G - Cover
B - Plate	E - Stud	H - Washer
C - Reed	F - Spacer	I - Nut

b. The correct order for assembly of lire; breather is as follows: (Fig. 30) A-Gasket, B-Plate and Reed, (D-small drilled hole must be at bottom of plate), A-Gasket, F-Stud, F-Rubber spacer. C-Cover, H-Lock washer and I-Nut.

c. Cover must be tight to prevent oil leaks.

14. Magneto

a. Install square key in slot of crankshaft.

b. Figure 31 shows magneto installation. Note how breaker lead and high tension spark plug cable are pulled through plate opening.

c. After magneto assembly has been fastened to bearing plate, rotating magnet is pressed onto crankshaft. Magnet is marked "ENGINE SIDE" for correct assembly.

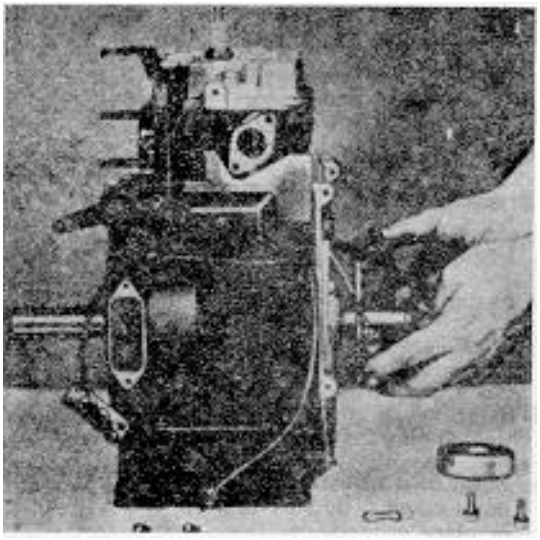


Figure 31
Assembly of Magneto

15. Flywheel

a. Place wave washer on crankshaft and place flywheel in position. The square key holds flywheel on shaft.

b. Install starter pulley, lock washer and holding nut. Insert a bar between flywheel fins (B, Fig. 32) and torque holding nut to 75 foot pounds (A, Fig. 32).

c. The rotating screen is fastened to starter pulley with either screws and spacers or a wire retainer.

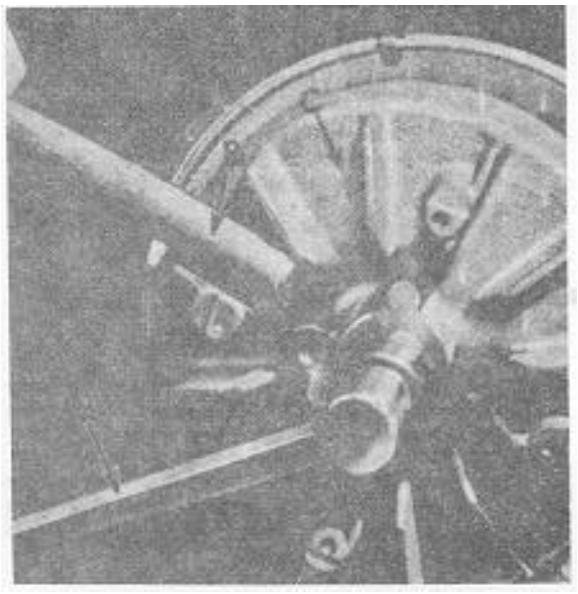


Figure 32
Torquing Flywheel Nut

A - Torque Wrench B - Bar C - Flywheel

16. Breaker Points

a. Install push rod.

b. Fasten breaker in place with two screws.

c. Place cover gasket in. position and attach magneto lead.

d. Set breaker gap at .020. For precision ignition setting refer to Ignition Section, page 9.

e. Make final adjustments before installing breaker point cover. Be sure breaker lead grommet is in place.

17. Carburetor

a. Insert a new gasket and assemble carburetor to intake port with two screws.

b. Refer to section on Carburetor Adjustment, page 6, for carburetor adjustment procedure.

18. Governor Arm and Linkage

a. Insert carburetor linkage in throttle arm.

b. Connect governor arm to carburetor linkage and slide governor arm onto governor shaft.

c. Position governor spring in speed control disc

d. Before tightening clamp bolt, turn shaft counter-clockwise as far as possible with a pair of pliers, pull arm as far as possible to left (away from carburetor), tighten nut and check for freedom of movement.

19. Slower Housing and Fuel Tank

a. The engine is now ready for blower housing, cylinder baffles and head baffle. These parts are fastened to engine by 1/4" cap screws which attach to cylinder head and bearing plate.

b. Gasoline fuel tank and brackets are installed at the same time as baffles and shrouds.

c. Connect fuel line between filter and carburetor.

FINAL ADJUSTMENTS

1. Refer to Starting Instruction on page 3.

2. Follow instructions in Service Procedure Section for final adjustments of engine.

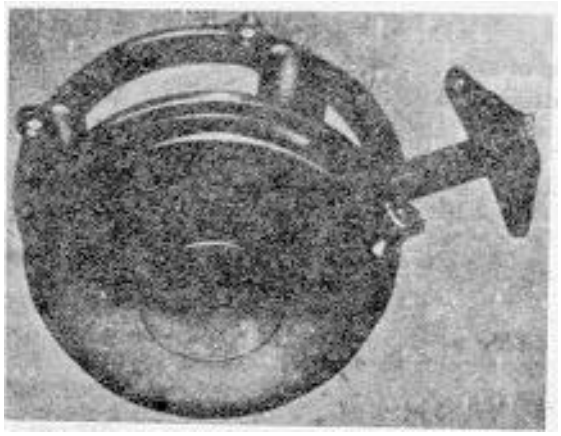


Figure 33
Recoil Starter

RECOIL STARTER

1. To Align Starter

a. Position starter on blower housing with centering pin engaged in center hole of crankshaft. If there is no centering pin, place starter over drive cup and pull handle so all lugs engage.

b. Press starter into position and install machine screw with lock washers and flat washers.

c. Hold starter in centered position, tighten screws.

2. Operating Tips

a. Be sure starter screen is kept clean when operating engine or serious engine damage can result from lack of cooling air.

b. After engine has started, do not allow starter cable to snap back into starter housing. Continue to hold handle and allow starter cable to rewind slowly.

Note:
Releasing handle when starter cable is extended will shorten life of starter.

c. Do not use starter in a rough manner, such as jerking or pulling starter cable all the way out. A smooth, steady pull will start engine under normal conditions.

d. Always pull starter handle straight out so that cable will not receive excessive wear from friction against guide. Proper procedure will prevent unnecessary wear.

e. If recoil starter should ever fail, starter assembly can be removed and engine cranked with a rope. The starter drive cup will serve as a pulley for emergency purposes.

FUEL PUMP

Fuel pumps are furnished on engine anti electric plants when fuel supply tank is separately mounted below level of carburetor.

a. To determine if pump is working, disconnect fuel line .it carburetor and crank engine after removing wire from spark plug.

b. Be sure fuel lines ire clear of obstructions and fittings are tight.

c. If pump fails, refer to Parts Identification Section for new pump or repair kit.

TABLE OF ENGINE CLEARANCES

Crankshaft end clearance	.002/.023
Connecting rod-large end	.011/.002
Connecting rod-large end side clearance	.005/.016
Piston skirt clearance at thrust face - Top of skirt	.006/.008
Bottom of skirt	.003/.006
Piston ring end clearance	.007/.017
Intake valve stem in guide	0010/.I)025
Exhaust valve stem in guide	0025/.0040
Tappet in block	.0005/.0020
Camshaft running clearance	.001/.0035
Camshaft end clearance.	.005/.010
Valve clearance-intake (cold)	.006/.008
Valve clearance-exhaust (cold)	.015/.017
Crankpin size	1.186
Cylinder bore - K141	2.875

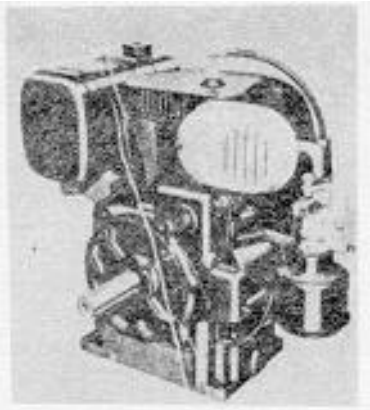
Breaker points	.018/.022
Spark plug, standard, 14 mm	.025
Spark plug, shielded14 mm	.020
Spark run	20° B. T. D. C.
Spark retard	30° B. T. D. C.

TABLE OF TORQUE VALUES

Spark plug	27 ft. lbs
*Connecting rod cap screw	220 in. lbs. to 200 in. lbs., see p. 15
*Cylinder head cap screw	200in. lbs.
Flywheel nut	75 ft. lbs.

*Lubricate with grease at assembly.

Always use torque wrench on above parts.



K141

3.7 HP at 1800 RPM
5.0 HP at 2400 RPM
5.9 HP at 3000 RPM
6.25 HP at 3600 RPM

SPECIFICATIONS

K141

BORE AND STROKE: 2 7/8 x 2 1/2 inches.
PISTON DISPLACEMENT: 16.22 cubic inches.
IGNITION: High voltage flywheel magneto. Spark plug 14 mm.
OIL CAPACITY: 2 1/2 pints.
MAIN BEARING: Anti-friction ball bearing on power take-off end of crankshaft. Copper lead backed sleeve bearing on front end.
CRANKSHAFT: Heat treated ductile iron casting with integral counterweights and induction hardened crankpin.
CONNECTING ROD: Aluminum alloy with large bearing area.
PISTON: Low expansion aluminum alloy.
PISTON RINGS: Two compression, one oil control.
VALVES: High heat resistant, one piece, steel alloy.
CYLINDER HEAD: Aluminum alloy with deep fins closely spaced for efficient cooling.
DIRECTION OF ROTATION: Counterclockwise viewed from power take off side.

MODIFICATIONS

FUEL PUMP: Limited to 4' vertical lift and 25' horizontal draw.
SPECIAL EXHAUST MANIFOLD: One inch IPS threaded outlet.
THREADED EXHAUST PORT: One inch threaded exhaust port for connection to remote muffler.
STELLITE EXHAUST VALVE: For increased valve life.
Standard equipment on K141P engines.
STELLITE INTAKE VALVE: Intake valve and intake valve seat insert are long life stellite.
VALVE ROTATOR: Positive type, insuring rotation of stellite faced valves.

APPENDIX A

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

A-1. Scope

This appendix lists items which accompany the compressor or are required for installation, operation, or operator's maintenance.

A-2. General

This Basic Issue Items List is divided into the following sections:

a. Basic Issue Items-Section II. A list of items which accompany the compressor or are required for the installation, operation, or operator's maintenance.

b. Maintenance and Operating Supplies--Section III. A listing of maintenance and operating supplies required for initial operation.

A-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items, Section II.

a. Source, Maintenance, and Recoverability Codes (SMR), Column 1:

(1) Source Code, indicates the selection status and source for the listed item. Source codes are:

Code	*Explanation*
P	Applied to repair parts which are stocked in or supplied from GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.
M	Applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance categories.
A	Applied to assemblies which are not pro cured or stocked as such, but made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.
X	Applied to parts and assemblies which are not procured or socked, the mortality of which is normally below that of the applicable end item, and the failure of which should result in retirement of the end item from the supply system.
X1	Applied to repair parts which are not procured or stocked, the requirement for which will be supplied by use of the next higher assembly or components.
X2	Applied to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.
C	Applied to repair parts authorized for local procurement. If not obtainable from local procurement, such repair parts will be requisitioned through normal supply channels with a supporting statement of non-availability from local procurement.
G	Applied to major assemblies that are procured with PEMA (Procurement Equipment Missile Army) funds for initial issue only to be used as exchange assemblies at DSU and GSU level or returned to depot supply level.

Note

Source code is not shown on common hardware Items known to be readily available in Army supply channels and through local procurement.

(2) Maintenance Code, indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Operator/crew
O	Organizational maintenance

(3) Recoverability Code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	*Explanation*
R	Applied to repair parts and assemblies which are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
T	Applied to high dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.
U	Applied to repair part specifically selected for salvage by reclamation units because of precious metal content, critical materials, high dollar value reusable casings and castings.

b. Federal Stock Number, Column 2. This column indicates the Federal stock number for the item.

c. Description, Column 3. This column indicates the Federal item name and any additional description of the item required. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parentheses. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

d. Unit of Issue, Column 4. This column indicates the unit used as a basis for issue, e.g., ea, pr, ft, yd, etc.

e. Quantity Incorporated in Unit Pack, Column 5. This column indicates tie actual quantity contained in the unit pack.

f. Quantity Incorporated in Unit, Column 6. This column indicates the quantity of the item used in the functional group.

g. Quantity Furnished With Equipment, Column 7. This column indicates the quantity of an item furnished with the equipment.

h. Quantity Authorized, Column' 8. This column indicates the quantity of an item authorized the operator/crew to have on hand or to obtain as required. As required items are indicated with an asterisk.

i. Illustration, Column 9. This column is divided as follows:

(1) Figure Number, column 9a. Indicates the figure number of the illustration in which the item is shown.

(2) Item Number, column 9b. Indicates the callout number used to reference the item in the illustration.

A-4. Explanation of Columns

The tabular List of Maintenance and operating supplies is provided in, Section III.

a. Component Application, Column 1. This column identifies the component application of each maintenance or operating supply item.

b. Federal Stock Number, Column 2. This column indicates the Federal stock number for the item and will be used for requisitioning purposes.

c. Description, Column 3. This column indicates the item and brief description.

d. Quantity Required for Initial Operation, Column 4. This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

e. Quantity Required for 8 Hours Operation, Column 5. This column indicates the estimated quantities required for an average eight hours of operation.

f. Notes, Column 6. This column indicates informative notes keyed to data appearing in a preceding column.

A-5. Abbreviations

Abbreviations	Explanation
Qt.	Quart
Gal.	Gallon
lb.	Pound

A-6 Federal Supply Code for Manufacturers

Code	Manufacturer
09523	Parker Aircraft Co.
53477	A. Schraders and Son
58-53	Superior Valve and Fittings Co.
78385	Southwind Div. of Stewart-Warner Corp.
88044	Aeronautical Stasmdds Group, Dept, of Navy and Air Force Military Standard

SECTION II.
BASIC ISSUE ITEMS LIST

(1) Source, maint, and recov code (A) S	(B) M	(C) R	(2) Federal stock No.	(3) Description	(4) Unit of issue	(5) Qty inc in unit pack	(6) Qty inc in unit	(7) Qty furn with equip	(8) Qty auth	(9) Illustration (A) Fig No.	(B) Item No.
				GROUP 31 BASIC ISSUE ITEMS MANUFACTURER INSTALLED							
				3100—BASIC ISSUE ITEMS MANUFACTURER OR DEPOT INSTALLED							
P	O	--	7520-559-9618	CASE, MAINTENANCE AND OPERATIONAL MANUALS: Cotton Duck, Water Repellent	Ea.	--	--	1	1		
P	O	--	7510-889-3494	BINDER, LOG	Ea.	--	--	1	1		
				DEPARTMENT OF THE ARMY OPERATOR, ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL. TM 5-4310-310-226-15	Ea.	--	--	1	1		
P	O	--	4820-678-9467	Valve Servicing (58553) 5669 (Repair Parts Group 2202)	Ea.	--	--	1	1		
P	O	--	4720-946-8220	Hose Assy, Air (96906) MS 28759-E2400 (Repair Parts Group 2202)	Ea.	--	--	1	1		
P	O	--	4730-909-9249	Socket, Half Coupling (78385) 407-0208 (Repair Parts Group 2202)	Ea.	--	--	1	1		
P	O	--	4730-536-3486	Chuck Assy, Air (53477) 4784 (Repair Parts Group 2202)	Ea.	--	--	1	1		
X2	O	--	4730-187-0840	Nipple (88044) AN816-4 (Repair Parts Group 2202)	Ea.	--	--	1	1		
X2	O	--	4730-278-3905	Bushing, Reducer (88044) AN912-1C (Repair Parts Group 2202)	Ea.	--	--	1	1		
X2	O	--	----------	Fitting, Reducer (78385) 3800366 (Repair Parts Group 2202)	Ea.	--	--	1	1		
P	O	--	----------	Hose Assy, 10" Long (09523) 3/16-4ABZ 10 1/4 AFZ (Repair Parts Group 2202)	Ea.	--	--	1	1		
				GROUP 32—BASIC ISSUE ITEMS TROOP INSTALLED							
				3200—BASIC ISSUE ITEMS TROOP INSTALLED OR AUTHORIZED							
P	O	--	4210-889-2221	Extinguisher, Fire	Ea.	--	--	*	1		
P	O	--	5120-223-7396	Pliers, Slip Joint: 6 inch	Ea.	--	--	*	1		
P	O	--	5120-277-9491	Screwdriver: Flat Tip, Tip 1/4 inch wide	Ea.	--	--	*	1		
P	O	--	5120-449-8083	Wrench, Open End, Adjustable, 10 inch long	Ea.	--	--	*	1		

SECTION III
MAINTENANCE AND OPERATING SUPPLIES

Item	Component application	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	0101—Engine Crankcase	9150-265-9435 (1) 9150-265-9428 (1) 9150-265-7602 (1)	Oil, Lubricating: 5 Gal Pails as follows: OE–30 OE–10 OES	 1 1/4 Qt. 1 1/4 Qt. 1 1/4 Qt.	 (2) (2) (2)	(1) See C9100–IL for additional data and requisitioning Procedure
2	0306—Tank, Fuel	9130-160-1813	Fuel, Gasoline: bulk as follows: Automotive	2.88GL (3)		
3	5001—Compressor Crankcase	9150-223-4129 (1)	Oil, Lubricating OAI 1 Qt. Can	2 1/2 Qt.	(2)	(2) See Current LO 5–4310–226–12 for grade application and replenishment intervals.
4	1311—Wheel	9150-190-0904 (1)	Grease, Automotive GAA 1 Lb. Can	(2)	(2)	(3) Tank Capacity

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. No special tools and test equipment required.

B-2. Explanation of Columns in Section II

a. Group Number, Column 1. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 75093-1, Functional Grouping Codes) are listed on the MAC in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Functional Group. Column 2. This column ca s a brief description af the components of each functional group.

c. Maintenance Functions. Column S. This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

C	-	Operator or crew
0	-	Organizational maintenance
F	-	Direct support maintenance
H	-	General support maintenance
D	-	Depot maintenance

The maintenance functions are defined as follows:

A-INSPECT.

To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B-TEST.

To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C-SERVICE.

To clean, to preserve, to charge, to pant, and to add fuel, lubricants, cooling agents, and air.

D-ADJUST.

To rectify to the extent necessary to bring into proper operating range.

E-ALIGN.

To adjust specified variable elements of an item to bring to optimum performance.

F-CAILIBRATE.

To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of comparisons of two instruments; one of which is a certified standard of known accuracy, to direct and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

G-INSTALL

To set up for use in an operational environment such as an emplacement, site, or vehicle.

H-REPLACE.

To replace unserviceable items with serviceable assemblies, subassemblies, or parts.

I-REPAIR.

To restore an item to serviceable condition.

This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting and strengthening.

J-OVERHAUL.

To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards using the Inspect and Repair Only as Necessary (IROAN) technique.

K-REBUILD.

To restore an item to a standard as nearly as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all pats or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

d. Tools and Equipment. Column 4. This column is provided for referencing by code the special tools and test equipment, required to perform the maintenance functions (Section II).

e. Remarks. Column 5. This column is provided for referencing by code the remarks Section III) pertinent to the maintenance functions.

B-3. Explanation of Columns in Section III

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to Section II. The first letter references column 5 and the second letter references a maintenance function, column 3, A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as 4indicated on the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild		
01	ENGINE													
0100	Engine Assembly	C	O	C	--	--	--	--	F	O	H	--	--	A
0101	Crankcase, Block Cylinder Head:													
	Block Assembly, Cylinder	--	--	--	--	--	--	--	F	F				
	Crankcase Assembly	--	--	--	--	--	--	--	F					
	Head, Cylinder	--	--	--	--	--	--	--	O					
0102	Crankshaft	--	--	--	--	--	--	--	F					
0103	Flywheel Assembly	--	--	--	--	--	--	--	O					
0104	Pistons, Connecting Rods	--	--	--	--	--	--	--	F	F				
0105	Valves, Camshafts and Timing System:													
	Valves and Inserts	--	--	--	--	--	--	--	F	F	--	--	--	B
	Guides, Springs, Cap	--	--	--	--	--	--	--	F					
	Cover, Valve Chamber	--	--	--	--	--	--	--	O					
	Lifter; Valve; Camshaft	--	--	--	O	--	--	--	F					
	Gears and Cover; Timing	--	--	--	--	--	--	--	F					
0106	Engine Lubrication System:													
	Breather	--	--	C	--	--	--	--	O					
	Gage, Bayonet, Oil Level	--	--	--	--	--	--	--	C					
0107	Engine Starting System:													
	Starter Assy, Recoil	--	--	--	--	--	--	--	O	O				
03	FUEL SYSTEM													
0301	Carburetor	--	--	O	C	--	--	--	O	F	--	--	--	C
0304	Air Cleaner	--	--	C	--	--	--	--	O					

(1) Group No.	(2) Functional group	(3) Maintenance functions A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
0306	Tanks, Lines, Fittings													
	Line Assemblies, Fuel	--	--	--	--	--	--	--	O	O				
	Tank, Fuel	--	--	C	--	--	--	--	O					
0308	Engine Speed Governor and Controls:													
	Governor, Gasoline Engine	--	--	--	O	--	--	--	F	F				
	Control Assembly	--	--	--	--	--	--	--	O	O				
0309	Fuel Filters:													
	Strainer, Sediment	--	--	C	--	--	--	--	O	--	--	--	--	D
0312	Throttle or Choke Control	--	--	--	--	--	--	--	O					
04	EXHAUST SYSTEM													
0401	Muffler and Pipes	--	--	--	--	--	--	--	O					
06	ELECTRICAL SYSTEM													
0606	Ignition Components:													
	Magneto, Ignition	--	--	--	O	--	--	--	O	O	--	--	--	E
	Spark Plug	--	O	O	O	--	--	--	O					
	Cable Assemblies	--	--	--	--	--	--	--	O					
11	REAR AXLE													
1100	Rear Axle Assembly	--	--	--	--	--	--	--	O	O				
12	BRAKES													
1206	Rods, Shaft, Springs, Pedal	--	--	--	--	--	--	--	O					
13	WHEELS													
1311	Wheel Assembly	--	--	C	--	--	--	--	O	O				
1313	Tires, Tubes	--	--	C	--	--	--	--	O	O				
15	FRAME													
1501	Frame Assembly	--	--	--	--	--	--	--	O					
1503	Pintle and Towing Attachments	--	--	C	--	--	--	--	O					
1507	Support Stand	--	--	--	--	--	--	--	O	F				
18	BODY, CAB, HOOD AND HULL													
1801	Body, Cab, Hood:													
	Door Assemblies, Hood Housing Panels and Sill Assemblies	--	--	--	--	--	--	--	O	F				
22	BODY CHASSIS OR HULL, AND ACCESSORY ITEMS													
2202	Accessory Items	--	--	--	--	--	--	--	O					
2210	Data Plates:													
	Plates, Identification, *Instruction*	--	--	--	--	--	--	--	O					
	Plates, Data	--	--	--	--	--	--	--	F					
47	GAGES (NON-ELECTRICAL) WEIGHING AND MEASURING DEVICES													
4702	Gages, Lines and Fittings	--	--	--	--	--	--	--	O					
50	PNEUMATIC EQUIPMENT													
5000	Air Compressor Assembly	--	--	C	--	--	--	--	F	F	H			
5001	Crankcase, Cylinder, Cylinder Head:													
	Crankcase	--	--	--	--	--	--	--	H					
	Cylinders	--	--	--	--	--	--	--	H					
	Head	--	--	--	--	--	--	--	F					
5002	Crankshaft	--	--	--	--	--	--	--	H					
5004	Pistons, Connecting Rods	--	--	--	--	--	--	--	H	H				
5005	Valves	--	--	--	--	--	--	--	F	F				

(1) Group No.	(2) Functional group	(3) Maintenance functions A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
5006	Lubrication System:													
	Plate Assembly, Oil Pump	--	--	--	--	--	--	--	F					
	Cover and Filter Assy	--	--	O	--	--	--	--	O					
	Gage, Bayonet	--	--	--	--	--	--	--	O					
	Oil Pump Kit	--	--	--	--	--	--	--	H					
5007	Compressor Drive Bushing	--	--	--	--	--	--	--	F					
5008	Air Intake:													
	Cleaner Assembly, Air	--	--	C	--	--	--	--	O					
5009	Unloader System Components:													
	Filter Assembly, Hydraulic	--	--	O	--	--	--	--	O					
	Dehydrator Unit and Valves	--	--	--	--	--	--	--	O	F				
	Chamber Assemblies, Condensation; Desicant Container	--	--	--	--	--	--	--	O					
	Valve, Pressure Regulating	--	--	--	--	--	--	--	O					
	Lines Assemblies	--	--	--	--	--	--	--	O	O				
	Valves; Pressure Relief Check, Dump Back Pressure	--	--	--	--	--	--	--	O	F				
5010	Compressor Cooling and Heating:													
	Fan	--	--	--	--	--	--	--	F					
	Blanket, Heater	--	--	--	--	--	--	--	F					
	Intercooler-Aftercooler Assy	--	--	--	--	--	--	--	F					
5013	Hose Reel	--	--	--	--	--	--	--	O					
5014	Air Receiver:													
	Tank, Pressure	--	--	C	--	--	--	--	F					
	Cushion	--	--	--	--	--	--	--	F					
	Safety Head; Valve Assembly	--	--	--	--	--	--	--	O					
	Line Assembly	--	--	--	--	--	--	--	O					
5015	Air Discharge System:													
	Line Assemblies	--	--	--	--	--	--	--	O					
76	FIRE FIGHTING EQUIPMENT COMPONENTS													
7603	Fire Extinguisher	--	--	O	--	--	--	--	O					

Section III. MAINTENANCE FUNCTIONS FOR COMPRESSOR RECIPROCATING.

Reference code	Remarks
A-B	Test of Engine Includes Operation and Compression.
B-H	Repair of Valves Includes Refacing.
C-C	Service of Carburetor Includes Replacing Bowl Gasket
D-C	Service of Strainer Includes Replacing Glass Bowl and Gasket.
E-I	Repair of Magneto Includes Replacing, Capacitor, Contact Set, and Rotor.

By Order of the Secretary. of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
ACSI (1)
DCSLOG (1)
CNGB (1)
TSG (1)
CofEngrs (3)
GC-E (1)
Dir of Trans (1)
CofSptS (1)
USAMB (1)
USA Arty Bd (2)
USA Armor Bd (2)
USAIB (2)
USARADBD (2)
USAAESWBD (2)
USAAVNTBD (2)
USCONARC (3)
OS Maj Comd (5) except
USARJ (1)
USASETAF (2)
USAMC (1)
USACDCEC (10)
USAMECOM (46)
MDW (1)
Armies (2)
Corps (2)
USAC (1)
Div (2)
Engr Bde (1)
USMA (2)
Svc Colleges (2)
Br Svc Sch (2) except
USAES (3)
Gen Dep (10)
Engr Dep (10)
Army Dep (2) except
TOAD (3)
USA Tml Comd (2)
Army Tml (1)
Div Engr (2)
Engr Dist (2)
Engr Cen (5)
Engr Fldms (2)
Ft Knox FLDMS (10)
MAAG (1)
JBUSMC (1)
Army Attaches (1)
Mil Msn (1)
AMS (3)
USACOMZEUR (2)
USAREUR Engr Proc Cen (2)
USAREUR Engr Sup Con Agcy (10)
Units org under fol TOE:-2 ea UNOINDC
1-100
1-102
5-48
5-237 (5)
5-262 (5)
5-267 (1)
5-278 (5)
5-279
17-46
17-98
67

NG: None.

USAR: Same as Active Army except allowance is one (1) copy for each unit

For explanation of abbreviations used, see AR 32060.

☆ U.S. GOVERMENT PRINTING OFFICE: 1990 00 - 262-912 (30050)

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH PUBLICATION

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

This fine document...

Was brought to you by me:

Liberated Manuals -- free army and government manuals

Why do I do it? I am tired of sleazy CD-ROM sellers, who take publicly available information, slap “watermarks” and other junk on it, and sell it. Those masters of search engine manipulation make sure that their sites that sell free information, come up first in search engines. They did not create it... They did not even scan it... Why should they get your money? Why are not letting you give those free manuals to your friends?

I am setting this document FREE. This document was made by the US Government and is NOT protected by Copyright. Feel free to share, republish, sell and so on.

I am not asking you for donations, fees or handouts. If you can, please provide a link to liberatedmanuals.com, so that free manuals come up first in search engines:

<A HREF=http://www.liberatedmanuals.com/>Free Military and Government Manuals</A>

- Sincerely
  Igor Chudov
  http://igor.chudov.com/
- Chicago Machinery Movers