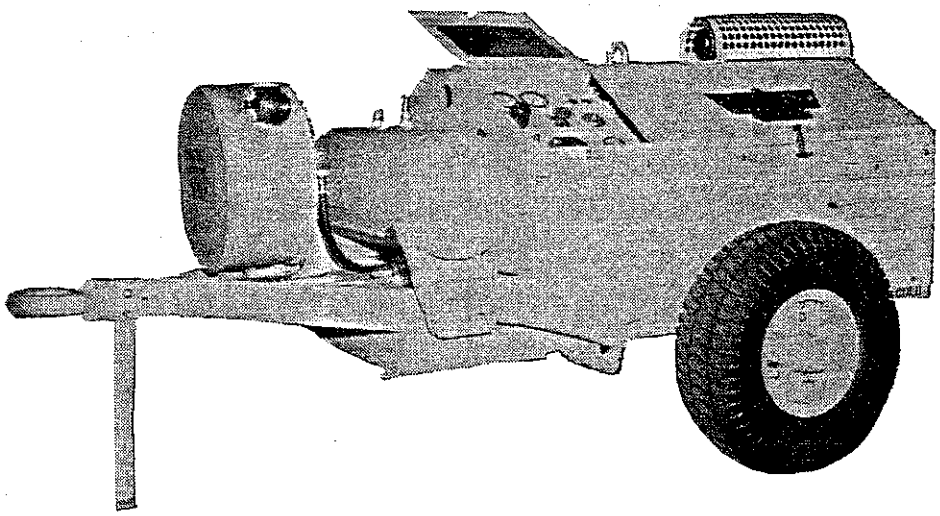
DAVEY ROTARY AIR COMPRESSORS

MODEL 6MC-2A

OPERATION AND MAINTENANCE INSTRUCTIONS WITH ILLUSTRATED PARTS BREAKDOWN



DAVEY COMPRESSORS

MPL-179 (MAR 81)

(CHANGE 1, 15 JUN 88)

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes in wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:
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WARNING

DO NOT USE COMPRESSED AIR FROM THIS EQUIPMENT FOR BREATHING AIR.

THIS COMPRESSOR IS DESIGNED FOR MECHANICAL USE ONLY.

SERIOUS INJURY OR DEATH MAY RESULT FROM USING THIS EQUIPMENT FOR RESPIRATION AIR.

Never fill fuel tank while engine is running.

To prevent serious burns when filling battery, take precautions against spilling electrolyte on clothing or allowing to come in contact with skin or eyes. Use rubber gloves, protective clothing, such as an apron, and face shield.

Always remove compressor oil filler and drain plugs with extreme caution. Make certain air pressure gauge on end of oil separator reads zero pressure.

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

Provide adequate ventilation when using Trichloroethane to clean electrical components. Avoid prolonged breathing of vapors and minimize skin contact.

Provide adequate ventilation when using Isopropyl Alcohol or Acetone when cleaning carburetor. Avoid prolonged breathing of vapors and minimize skin contact.

Do not attempt any air system component removal or repair with air pressure in the system. Observe the receiver pressure gauge and oil separator pressure gauge. Open receiver drain valve to relieve pressure from receiver tank. After shutdown, allow time for compressor to bleed down oil and air before attempting any disassembly. Oil separator pressure gauge must read zero to indicate compressor internal pressure has been relieved.

Do not attempt to lift any of the major components, such as the engine assembly and compressor assembly, by hand. Provide a suitable lifting device when removing heavy components. Handle with care using adequate hoists, chains, or straps to avoid injury to personnel and damage to equipment.

Air under pressure is dangerous. Use extreme care during testing of cooler for leaks to avoid injury.

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SECTION I

INTRODUCTION AND GENERAL INFORMATION

1-1. INTRODUCTION. This technical manual contains operation, maintenance, and repair instructions with illustrated parts breakdown for U.S.A.F. Type MC-2A Gasoline Engine Driven Air Compressor. The unit is manufactured by Davey Compressor Company (FSCM 16004), Cincinnati, Ohio 45242. Part number 49050A, Model 6MC-2A, is assigned to the unit assembly. Refer to figure 1-1 for identifying views.

a. Purpose. The air compressor unit is a two-wheel portable, gasoline engine driven, two stage rotary sliding vane air compressor. The unit is designed for operation of small pneumatic tools, paint spray guns, greasing equipment, tire inflation, and other similar uses where the use of electrical driven compressors would be impractical.

b. Arrangement. The manual is arranged into sections containing instructions for use of special tools and test equipment, preparation for use and shipment, operation instructions, maintenance instructions, repair instructions, and illustrated parts breakdown. Refer to Table of Contents for topics covered within these sections and page numbers where topics may be found.

c. Additional References. Abbreviations used throughout the manual are in accordance with Military Standard, MIL-STD-12, or are defined at their first appearance in text. Dimensions, weights, and measurements are given in U.S. measure followed in parentheses by the metric conversion. Other references in text are:

T.O.00-25-223 - Integrated Pressure Systems and Components (Portable and Installed).

T.O.34-1-221 - Work Cards (4310)

T.O.34Y1-1-171 - Installation, Operation, Maintenance and Inspection Instructions for Air Compressors.

T.O.35-1-4 - Processing and Inspection of Aero Space Ground Equipment for Storage and Shipment.

1-2. GENERAL INFORMATION. This unit is designed to produce 15 cubic feet of free air per minute (cfm) [0.425 cubic meters per minute (m^3/min)] at pressure of 200 pounds per square inch (psi)[14.06 kilograms per square centimetre (kgs/cm^2)] continuous operation. A gasoline engine is used to drive the compressor through a direct-connected coupling assembly. A tabulated listing of Leading Particulars is found in table 1-1.

NOTE

Throughout this manual, the use of terms front, rear, right-hand side and left-hand side are designated as follows: Front of unit is facing aftercooler and engine end; rear of unit is facing towbar and hose reel end; right-hand side is on the right facing the unit front end, and left-hand side is on the left facing unit front end. The unit is towed from the rear.

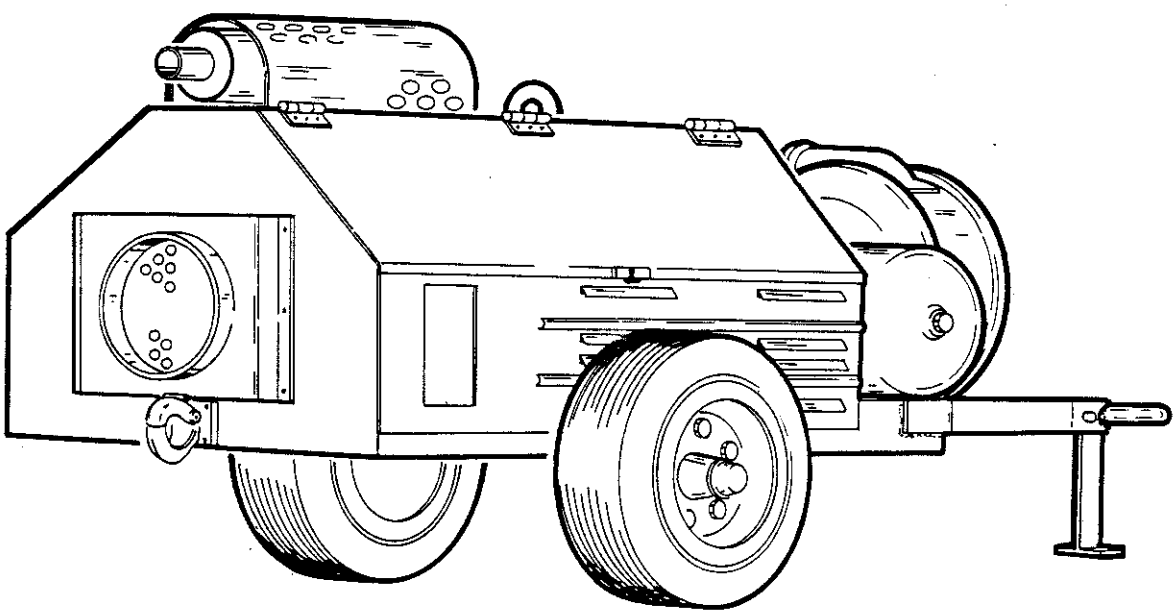
1-3. DESCRIPTION OF MAJOR COMPONENTS. Refer to figure 1-2 and the following paragraphs for description of major components.

a. Hose Reel Assembly (1, Figure 1-2). An enclosed type hose reel with a universal hose guide is provided. Hose capacity of the reel is 50-feet (15.3 m) of 1/2-inch (12.7 mm) outside diameter air hose. The reel incorporates a spring latch mechanism that allows the operator to stop hose unwind at any position. With a pull of the hose, the hose will rewind. The spring tension of the reel is adjustable to the desired rewind tension.

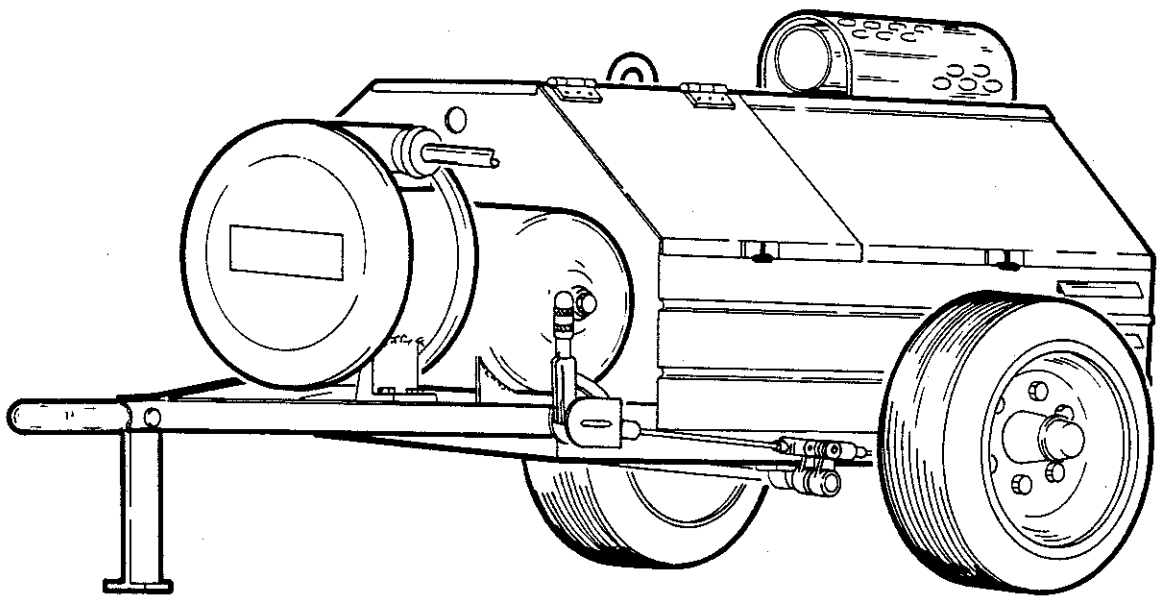
b. Air Receiver Assembly (2, Figure 1-2). The air receiver assembly is the reservoir for the compressed air. It has a capacity of 10 gallons or 1.337 cubic feet (37.85 liters or 0.379 cubic meters). The receiver is equipped with a safety valve set to open at 220 psi (1515.8 kilopascals (kPa) and a rupture disc designed to rupture at approximately 350 psi (2412 kPa). A drain valve is also provided to relieve receiver pressure.

c. Control Panel Assembly (3, Figure 1-2). The control panel assembly, located beneath access door at left rear of housing, contains all operating controls and gauges. Refer to figure 4-1 for identifying view of these controls.

d. Air Compressor (4, Figure 1-2). The rotary motion, sliding vane type, two-stage compressor is driven by the gasoline engine through an impeller-directly connected coupling. Compressor cooling is effected by the impeller portion of the coupling. Cooling air is directed over oil chamber fins by means of a cowl, drawn through an oil chamber support and expelled through an oil cooler. An oil separator assembly is mounted on top of the compressor and filters out all traces of oil from the compressed air. The oil separator contains a bleeder valve assembly which returns oil from separator to compressor via the compressor



THREE-QUARTER FRONT VIEW



THREE-QUARTER REAR VIEW

Figure 1-1. Identifying Views, Type MC-2A

Table 1-1. Table of Leading Particulars

ITEM	DESCRIPTION
AIR COMPRESSOR UNIT	
Power source	Gasoline engine
Type compressor	Rotary sliding vane, two-stage
Air volume	15 CFM (0.425 m^3/min)
Air pressure	0-200 PSI (0-1378 kPa)
Length	88-1/4 inches (2.24 m)
Width	48-1/2 inches (1.23 m)
Height	40 inches (1.02 m)
Weight (dry)	778 pounds (353 kgs)
Mounting	Two wheel trailer
Brakes	Mechanical hand brake
Tire size	6:00 x 9 inch - 6 ply
Tire pressure	15 PSI (103.4 kPa)
Electrical system	12 volt negative ground, direct current
Engine displacement	49.8 cu/in. (0.816 liters)
Engine horsepower	9.6 HP at 1800 RPM
Engine cooling	Air cooled
Engine oil capacity	3-1/2 quarts (3.31 liters)
Compressor oil capacity	3-1/4 quarts (3.08 liters)
Fuel tank capacity	7 gals. (26.5 liters)

intake. A thermal bypass valve is incorporated on the compressor to provide rapid warming of the compressor oil at initial start-up and to maintain relatively constant minimum operating temperature which minimizes formation of moisture condensate in the air system. Refer to figure 1-4 for air flow diagram.

e. Engine Assembly (5, Figure 1-2). The prime mover is a two cylinder, horizontally opposed, four stroke cycle, internal combustion, air cooled gasoline engine. Manual controls are provided for operation of the choke and fuel primer. Speed is controlled by an automatic governor. The unit is equipped with 12 volt, direct current, electric starter and alternator. Refer to figure 1-3 for wiring diagram.

f. Housing Assembly (6, Figure 1-2). The compressor, engine, and operating controls are protected from the weather by a housing fitted with hinged doors. These doors

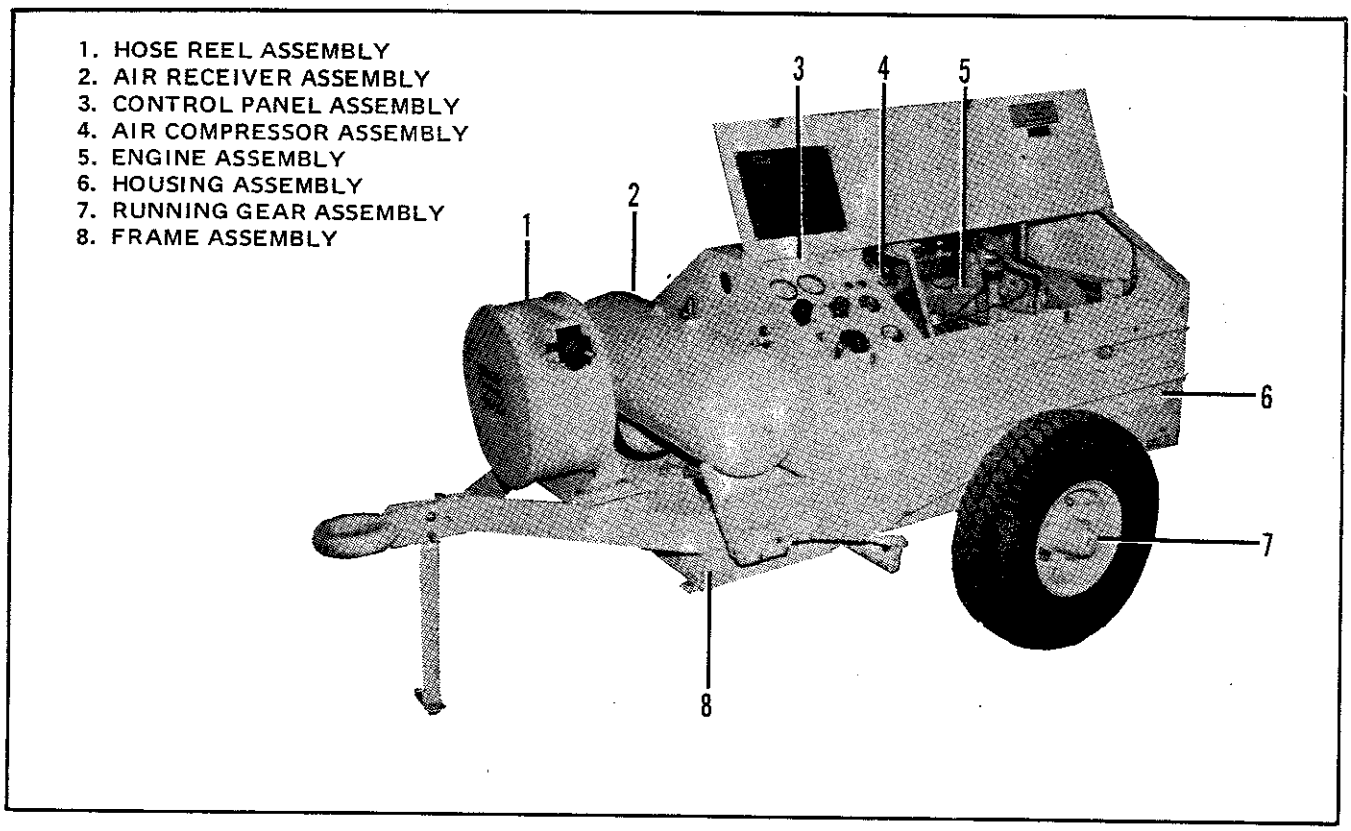


Figure 1-2. Major Components of Type MC-2A

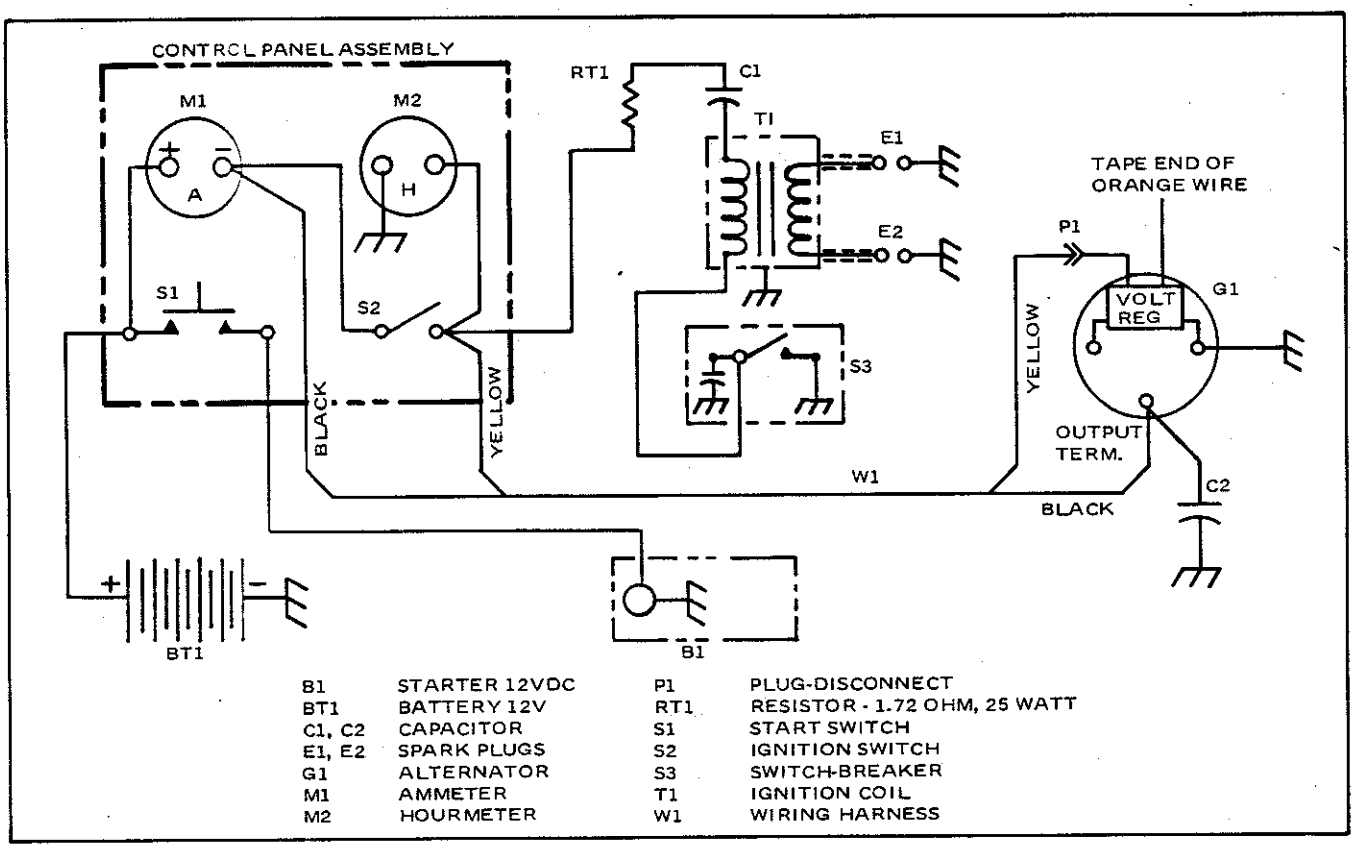
provide access for service, maintenance, adjustment and operator control of the unit. The left side rear door provides access to the control panel. A preheating air duct adapter is located on the front panel.

g. Axle, Running Gear and Brake Assembly (7, Figure 1-2). The axle, running gear and brake assembly is a self-contained unit attached to the frame assembly. The unit is equipped with pneumatic tires and expanding shoe type brake assembly on each wheel. The brakes are operated by pulling the handbrake lever toward the rear (towbar).

h. Frame Assembly (8, Figure 1-2). The welded steel frame assembly provides mounting for engine and compressor assembly, air receiver, fuel tank, hose reel, axle and running gear, and all other components of the air compressor unit.

1-4. CONSUMABLE MATERIALS LIST. A listing of consumable materials necessary for the operation and service of the Type MC-2A air compressor unit is found in table 1-2.

1-5. KIT CONCEPT. Many repair parts for equipment covered in this publication are provided in the form of kits. See Section VII, Illustrated Parts Breakdown for details. Activities shall replace all parts (regardless of condition) which are removed in the process of disassembly with all like parts furnished in the kit. Therefore, instructions for cleaning, inspecting, and reworking used parts have been omitted. If any parts in the kit must be cleaned, inspected, or tested prior to installation, instructions for performing these requirements are included in the manual. An installed part which is not defective need not be removed solely for the purpose of replacement by a corresponding kitted part. Residue from kits and removed parts in this category shall be administratively condemned.



B1	STARTER 12VDC	P1	PLUG-DISCONNECT
BT1	BATTERY 12V	RT1	RESISTOR - 1.72 OHM, 25 WATT
C1, C2	CAPACITOR	S1	START SWITCH
E1, E2	SPARK PLUGS	S2	IGNITION SWITCH
G1	ALTERNATOR	S3	SWITCH-BREAKER
M1	AMMETER	T1	IGNITION COIL
M2	HOURMETER	W1	WIRING HARNESS

Figure 1-3. Schematic Wiring Diagram

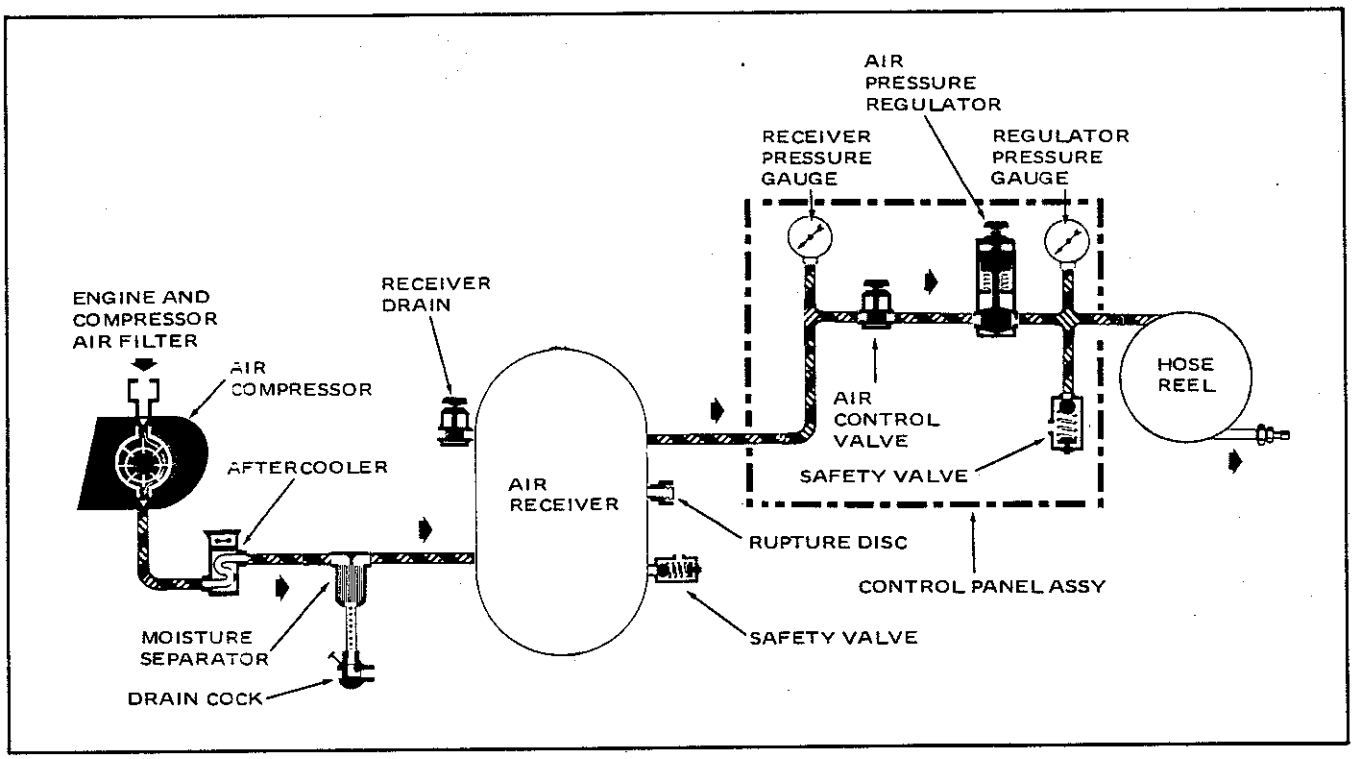


Figure 1-4. Air Flow Diagram

Table 1-2. Consumable materials

NOMENCLATURE	MATERIAL	SPECIFICATION NUMBER	GOVERNMENT STANDARD NO.	PART NUMBER
Cleaning	Solvent	P-D-680, Type II		
Compressor	Oil, Steam Turbine	MIL-L-17331	2190 TEP	
Engine	Oil, Engine	MIL-L-2104A		
Air filter	Oil, Engine	MIL-L-2104A		
Wheel bearing	Grease, Lubricating (lead soap base)	MIL-G-81322A		
Cleaning	Solvent, electrical equipment	Trichloroethane O-T-620		
Engine	Gasoline	MIL-G-3056		

SECTION II

SPECIAL TOOLS AND TEST EQUIPMENT

2-1. SPECIAL TOOLS AND TEST EQUIPMENT. 2-2. No special tools or test equipment are required.

SECTION III

PREPARATION FOR USE AND SHIPMENT

3-1. PREPARATION FOR USE. To prepare this portable air compressor for use, proceed as follows:

a. Open instrument panel cover and doors of unit.

b. Make a visual inspection of the unit. Check for possible damage in shipment such as broken lines or loosened parts.

c. Remove tape from air cleaner, mufiler outlet, fuel tank cap and the compressor and engine oil fill openings.

d. Check pneumatic tires and inflate to 15 pounds (103.4 kPa) pressure. If wheels have been removed, replace and secure. Install pintle hook assembly.

NOTE

Some export units have been processed with special oils. Units so prepared are tagged. Special instructions for removing oil accompany these units.

e. Fill compressor oil chamber and engine crankcase to correct capacity with clean lubrication oil. Specifications MIL-L-17331 and MIL-L-2104A, respectively, as shown in lubrication guide, table 5-2.

f. Fill air cleaner with lubrication oil. Specification MIL-L-2104A as shown in table 5-2.

g. Fill engine fuel tank nearly full with clean gasoline, Specification MIL-G-3056.

NOTE

A good commercial automotive type, unleaded or regular gasoline may be used in lieu of the specified MIL Spec gasoline under normal operating conditions. Do not use highly leaded premium fuels.

WARNING

Never fill fuel tank with engine running. Do not fill fuel tank entirely full.

h. Check unit thoroughly for lubricating oil, or fuel leaks.

WARNING

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

i. Service battery and connect battery cables. Battery should be negative grounded.

j. Open fuel shut-off cock at fuel tank.

3-2. PREPARATION FOR SHIPMENT (AND STORAGE). When the unit is stored for any period, it must be kept in a clean, dry atmosphere, free from dust. For storage of extended duration, the unit must be prepared in accordance with T.O.35-1-4. For shipment, unit should be placed in a box or crate similar to original packing. Refer to existing instructions and regulations that govern the shipping requirements for this type equipment.

SECTION IV

OPERATION INSTRUCTIONS

4-1. THEORY OF OPERATION. The prime mover of the Type MC-2A is an air cooled, gasoline engine. Starting and stopping controls for the engine are on the control panel assembly. After the engine is started, the speed is controlled by a governor which increases or decreases engine speed in direct relationship to power required for load and unload of the compressor. The engine is directly connected to the compressor by means of an impeller-drive coupling half mounted on the engine crankshaft and the coupling driven half mounted on the compressor rotor shaft. Air is drawn into the compressor through an oil bath type air filter which serves both the compressor and engine. The air enters the compressor first stage for partial compression; then, passes to the second stage for compression to the unit designed pressure. The compressed air passes from the second stage through an oil separator assembly where virtually all oil is removed from the air. Heat of compression is removed from the air by the air passing from the oil separator through an aftercooler, a moisture separator, and into the air receiver. A suction type fan draws air through the aftercooler passing over the cooling fins. The compressor lubricating oil is directed through an oil cooler where air is forced over the cooling fins by the impeller half of the coupling. Flow of compressed air at desired service pressure is controlled by the operator from the control panel assembly. Refer to figure 1-4 for an air flow diagram. Purpose and use of these controls are explained in detail in following paragraphs.

4-2. OPERATION INSTRUCTIONS. Following are instructions for complete start-to-stop procedures for operation of Type MC-2A air compressor.

a. Preliminary Procedures. Prior to operation of the unit, the following steps should be taken:

(1) Park the unit on a level surface and set parking brakes. Unit should not be operated on a surface that is out-of-level more than 15 degrees in either direction, front-to-back or side-to-side. Open control panel and unit side doors.

(2) Remove filler plug from compressor oil chamber and check oil level. Oil should be even with filler plug opening. Add oil as necessary, see table 5-2, and install filler plug.

(3) Remove oil fill indicator and cap from engine and check oil level. Level should be to full mark. Add oil as necessary, see table 5-2, and install oil fill indicator and cap. Do not overfill.

(4) Make visual inspection of unit checking for oil and fuel leaks. Check fuel level gauge on fuel tank. Add gasoline, MIL-G-3056, or equivalent, until tank is nearly full. Do not totally fill tank to allow for expansion due to heat.

(5) Visually inspect tires for proper inflation. Check level of battery electrolyte. Open moisture separator drain cock and compressor oil cooler drain cock to drain off any accumulated condensation. Then, close both drain cocks.

b. Connection Between Unit and System to be Charged. Pull service hose from hose reel and connect air chuck on end of hose by holding against valve stem of pneumatic system to be charged.

NOTE

The air chuck can be removed from service hose assembly to allow for direct connection of hose to system being charged if system does not have a valve stem. Use suitable adapter fittings as necessary.

c. Purpose and Use of Operating Controls. Purpose, use, and location of operating controls is as follows: (refer to figure 4-1.)

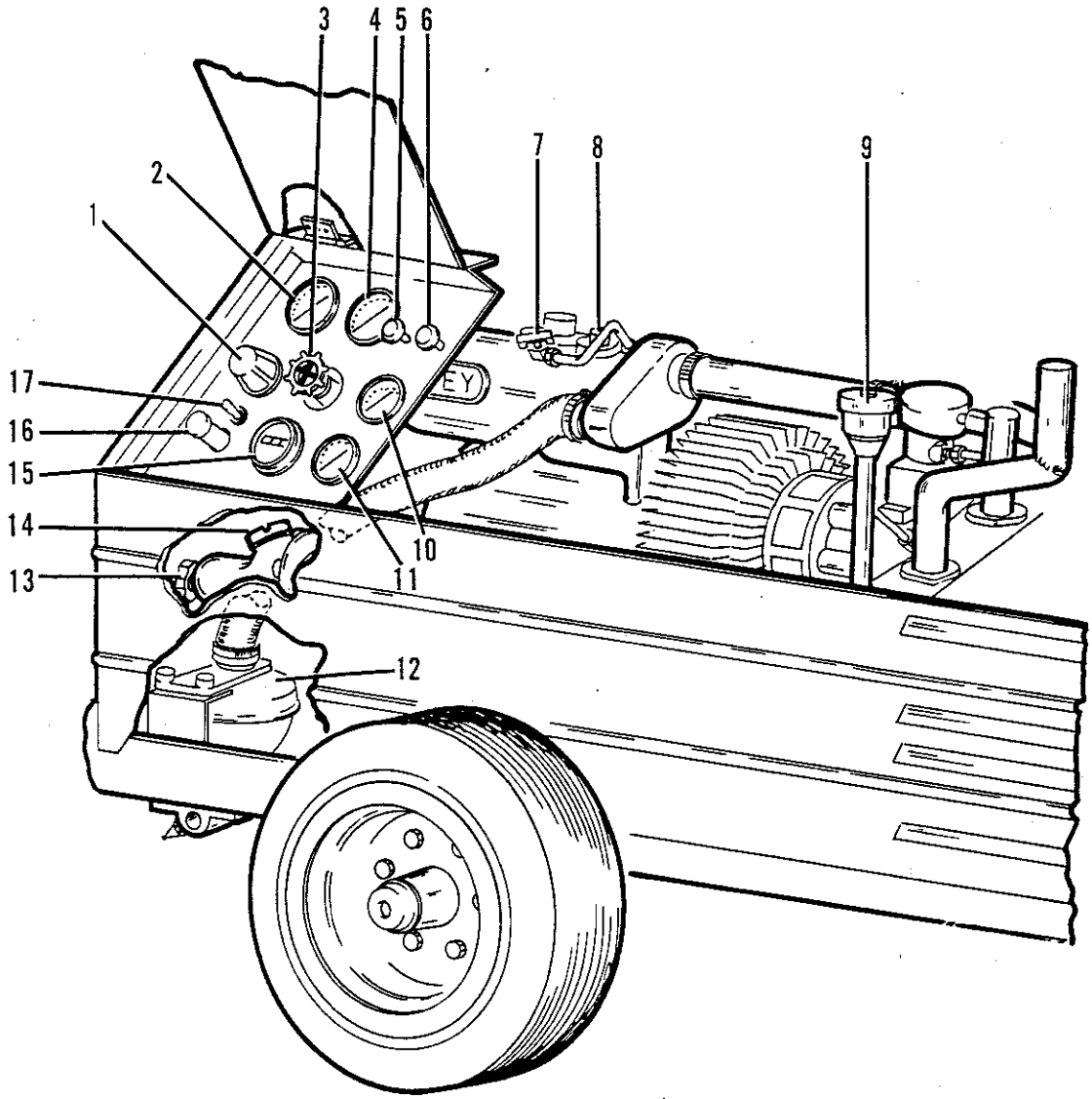
(1) Air pressure regulator (1, figure 4-1), located on control panel, is used to regulate air pressure being delivered to the hose reel for service air. Adjust the regulator to pressure required for system being charged.

(2) Regulator air pressure gauge (2, figure 4-1), located on control panel above air pressure regulator, registers the pressure at which the air pressure regulator is set and the service air pressure to the hose reel.

(3) Air control valve (3, figure 4-1), located on control panel, controls the flow of air from the air receiver to the pressure regulator (1).

(4) Receiver air pressure gauge (4, figure 4-1), located on control panel above control valve, registers the air pressure in the air receiver.

(5) The choke (5, figure 4-1) is located on the control panel and connected to the carburetor choke shaft lever. It is used to open the carburetor choke for engine starting.



1. AIR PRESSURE REGULATOR
2. REGULATOR PRESSURE GAUGE
3. AIR CONTROL VALVE
4. RECEIVER PRESSURE GAUGE
5. CHOKE
6. PRIMER
7. MANUAL UNLOADER VALVE
8. SIGHT GLASS
9. OIL FILL INDICATOR AND CAP
10. AMMETER GAUGE
11. OIL PRESSURE GAUGE
12. AIR FILTER
13. UNLOADER CONTROL KNOB
14. OIL FILLER PLUG
15. HOURMETER
16. STARTER SWITCH
17. IGNITION SWITCH

Figure 4-1. Operating Controls, Type MC-2A

(6) The primer (6, figure 4-1) is located on the control panel and connected to the fuel pump priming lever. It is used to manually pump fuel into lines, fuel pump, and carburetor for cold weather starting of the engine. It is also used to prime fuel lines, pump, and carburetor after removal, repair, and installation of any of these components.

(7) The manual unloader valve (7, figure 4-1) is located on the side of the compressor oil separator assembly. It is opened when starting to allow unit to warm-up at minimum load.

(8) Sight glass (8, figure 4-1) is located in the top of bleeder valve on compressor oil separator. It shows oil separation by visible percolating action which indicates pressure exists in the compressor. View through hole in roof section.

(9) Engine oil fill indicator and cap (9, figure 4-1) is the engine dipstick. It is used to check oil level in the engine oil base.

(10) Ammeter gauge (10, figure 4-1), on control panel, indicates alternator charging rate and battery reserve during operation.

(11) Oil pressure gauge (11, Figure 4-1), on control panel, indicates engine lubricating oil pressure during operation.

(12) Engine and compressor air filter (12, figure 4-1), attached to a bracket mounted on unit frame below control panel, is an oil bath type. It filters the incoming air; then, the air is directed through hoses to the carburetor and air compressor inlets.

(13) Constant speed unloader control (13, figure 4-1), knob on the end of air compressor, is used to set the compressor unload pressure.

(14) Compressor oil filler plug (14, figure 4-1), on top of filter housing on end of compressor, is removed to check oil level in compressor and adding oil when necessary.

(15) The hourmeter (15, figure 4-1), on control panel, indicates length of time unit has been in operation. Used to facilitate prompt inspection and servicing periods.

(16) Starter switch (16, figure 4-1), on control panel, is pressed to energize the engine starting circuit.

(17) Ignition switch (17, figure 4-1), on control panel, is used to make and break the engine ignition circuit; thereby, providing the on-off control of the unit.

(18) Oil separator air pressure gauge (not shown), located on end of separator assembly, viewed through hole in housing rear panel, indicates any existing pressure in the compressor oil chamber and separator when unit is stopped after an unloading cycle.

d. Starting the Equipment. Recheck paragraph 4-2.a to make certain all preliminary procedures have been accomplished; then, start equipment in sequence of steps following:

(1) Open receiver drain valve (see figure 1-4) to allow unit to warm-up at minimum load.

NOTE

For extremely cold weather starting, a preheating duct adapter is provided on the front housing panel. Also, a manual unloader valve (7, figure 4-1) is provided. Attach twelve-inch heater duct to front adapter and open manual unloader valve.

(2) Open fuel shut-off valve on fuel tank. Work primer (6, figure 4-1) in and out a few times to prime fuel lines, pump, and carburetor.

CAUTION

After priming, leave primer (6) all the way in so priming lever on fuel pump does not interfere with normal pump operation.

NOTE

The fuel pump primer is furnished to assist in cold weather starting of the engine. In locations where weather conditions permit, the primer cable may be removed. Under these conditions the cable need not be replaced at failure.

(3) Pull the choke (5, figure 4-1) out about three-quarters of full travel.

(4) Place ignition switch (17, figure 4-1) in the ON position. Push the starter switch (16) to start the engine. If engine does not start at first attempt, push choke (5) part way in and push starter switch again. Avoid over-choking.

NOTE

The amount of choking required depends on ambient temperature and whether engine is cold or hot. A warm engine requires little or no choking.

CAUTION

Immediately after engine starts, close the manual unloader valve (7, figure 4-1), if it was opened for cold weather starting.

CAUTION

Check engine oil pressure immediately after starting. Pressure should be indicated on oil pressure gauge (11, figure 4-1). Normal operating pressure is 20 to 35 psi (137.8 to 241.2 kPa), a little higher while engine is warming up.

(5) When engine starts, release starter switch (16, figure 4-1), adjust choke (5) position until engine is running smoothly. If engine lopes or hunts (alternately increasing and decreasing speed), the air-fuel mixture is too lean and needs more choking; if engine sputters and is sluggish, mixture is too rich and needs less choking.

(6) Push choke (5, figure 4-1) in gradually while engine is warming-up until choke (5) is all the way in. After choke is all the way in, engine speed is regulated by the governor. Allow engine and compressor to warm up thoroughly before applying full load.

(7) Make certain air control valve (3, figure 4-1) is closed (turn handle clockwise). Close receiver drain valve and allow compressor to fill air receiver to full working pressure. Observe receiver pressure on pressure gauge (4, figure 4-1).

(8) After receiver has reached working pressure, open air control valve (3, figure 4-1) and adjust air pressure regulator (1) for the service pressure required. Observe air pressure regulator setting on pressure gauge (2).

e. Constant Speed Unloader (13, figure 4-1). The constant speed unloader is set to automatically unload the compressor at 210 psi (1447 kPa) and to maintain this pressure within a 40 psi (276 kPa) range. A control knob (13, figure 4-1) is provided to reset the unloader. Reset, as necessary, as follows:

(1) The unloader should be adjusted to maintain the minimum psi required for the system being serviced but never should exceed 210 psi (1447 kPa). The higher psi maintained, the higher the compressor operating temperature, and consequently, more frequent maintenance requirements.

(2) To decrease unloading pressure, turn unloader control knob (13, figure 4-1) counterclockwise. To increase unloading pressure, turn knob (13) clockwise.

f. Stopping the Equipment. To stop the equipment follow the procedures below in sequence.

(1) Close the air control valve (3, figure 4-1) and allow compressor to unload at the preset pressure.

(2) Place ignition switch (17) in the OFF position. The engine will stop and the compressor will autometically unload.

(3) Slowly open receiver drain valve to bleed moisture from air receiver and relieve the equipment of remaining receiver air.

(4) Disconnect air service hose from system that was serviced. Pull on hose to release hose reel clutch and allow hose to slowly rewind into reel.

(5) Close and securely fasten all unit doors.

4-3. EMERGENCY STOPPING. To stop the equipment in case of an emergency, simply place ignition switch (17, figure 4-1) in OFF position; then, after unit has stopped, follow normal stopping procedures.

4-4. PRECAUTIONS TO BE OBSERVED. An air pressure gauge on the end of the oil separator is provided to indicate pressure within the compressor. This gauge is viewed through a hole in the rear end panel. Until this pressure gauge indicates air flow and pressure has stopped:

a. Do not attempt to restart the unit.

b. Do not remove filler or drain plugs.

c. Do not attempt disassembly of any part of the compressor.

WARNING

Always remove filler and drain plugs with extreme caution.

SECTION V

MAINTENANCE INSTRUCTIONS

5-1. MAINTENANCE INSTRUCTIONS. This section contains maintenance instructions for personnel authorized for organizational and intermediate levels. Maintenance beyond this level will be found in Section VI, Repair Instructions.

NOTE

Instructions contained herein apply as long as warranty period is in effect. Upon expiration of warranty period, appropriate work cards in T.O.34-1-221 WC5 or T.O.34-1-221 WC-6 will apply.

5-2. OPERATIONAL CHECKOUT. Operational checkout of this equipment is limited to the starting, operating, and stopping procedures outlined in paragraphs 4-2.a, 4-2.b, 4-2.d, 4-2.f, and all steps thereunder.

5-3. INSPECTION AND PREVENTIVE MAINTENANCE. Refer to table 5-1 for periodic inspection and preventive maintenance. Also, refer to table 5-2 for lubrication guide.

5-4. TROUBLESHOOTING. Refer to table 5-3 for possible troubles, their probable causes, and remedies.

5-5. REPAIR. Repair instructions, within the scope of this maintenance level (see para 5-1), are detailed in following paragraphs.

NOTE

Many repair parts for this equipment are provided in the form of kits. See Section VII, Illustrated Parts Breakdown, for details. Activities shall replace all parts (regardless of condition) which are removed in the process of disassembly with all like parts furnished in the kit. Therefore, instructions for cleaning, inspecting, and repair of used parts have been omitted from this publication. If any parts in the kit must be cleaned, inspected, or tested prior to installation, instructions for performing these requirements are included in the manual. An installed part which is not defective need not be removed solely for the purpose of replacement by a corresponding kitted part. Residue from kits and removed parts in this category shall be administratively condemned.

NOTE

Disassemble only to the extent necessary to obtain access to component, part, or parts requiring maintenance. Disassembly shall be only to the level authorized by organizational and intermediate maintenance. All other disassembly may be found in Section VI.

5-6. AIR COMPRESSOR. Check oil level before use, fill to overflow from filler plug hole. Run for several minutes; then, recheck oil level. Do not permit oil or dirt to accumulate in or around cooling fins on compressor oil chamber and oil cooler.

CAUTION

Under extremely dirty operating conditions, check oil in engine-compressor oil filter daily. Change oil and clean air filter daily, or as often as operating conditions dictate.

a. Oil Separator Felt Change. Change the oil separator felts as follows: (Felt change kit is available.)

(1) Loosen hose clamps (71, 73, figure 8-1) and remove two hoses (70, 72) from air filter adapter (74). Remove two cap screws attaching adapter to oil separator assembly and remove the adapter (74) and gasket (75). Disconnect tube assembly (17) from elbow (18). Remove nut and washer (2, 3, figure 8-4) and loosen separator bolt (1, figure 8-5). Remove oil separator assembly (1, figure 8-4) from compressor. Remove packing and gasket (4, 5, figure 8-4).

(2) Lift out separator bolt (1, figure 8-5) and remove o-ring (2). Remove cover assembly (34) from separator housing (40). Slide two grids (36), three felts (37) and two wire seal assemblies (38, 39) out of housing (40).

(3) Inspect felts (37) for dirt, shrinkage, and damage. Inspect for broken grids (36) and damaged wire seal assemblies (38, 39). Replace all damaged parts.

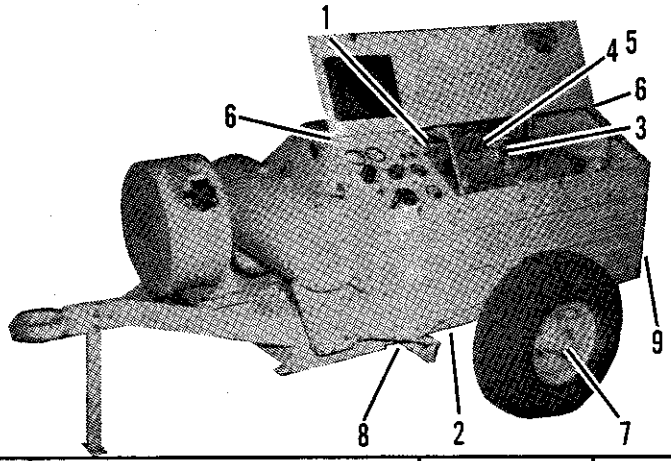
Table 5-1. Periodic Inspection and Preventive Maintenance

INSPECT AND SERVICE	BEFORE USE	150 HOURS	2000 HOURS
COMPRESSOR			
Drain moisture trap.	X		
Check all gaskets, packings and oil seals.		X	
Check cooling fins for cleanliness.		X	
Inspect air and oil cooler lines for leaks.		X	
Check attaching nuts and bolts for tightness.		X	
COMPRESSOR LUBRICATING SYSTEM.			
Check oil level at filler plug.	X		
Check oil cooler fins for cleanliness.		X	
Check oil filter screen for sludge.		X	
COMPRESSOR OIL SEPARATOR.			
Check felts for fit and cleanliness.		X	
Check screen on filter base in bleeder valve for cleanliness.			
DIRECT DRIVE ASSEMBLY.			
Check setscrew for tightness.		X	
ENGINE.			
Inspect air cleaner. Clean and service.		X	
Check cooling surfaces for cleanliness.	X		
Check crankcase, block, head, and gaskets for leaks.		X	
Check thoroughly for loose bolts, nuts, screws, and connections.		X	
ENGINE LUBRICATING SYSTEM.			
Check crankcase oil level and oil pressure.	X		
ENGINE IGNITION SYSTEM.			
Remove spark plugs and clean thoroughly, reset gap to 0.025 inch. (0.635 mm).		X	
Check battery fluid level, keep above separators.		X	
Remove cover from breaker box and inspect points.		X	
Check starter and alternator brushes and commutator.		X	

Table 5-1. Periodic Inspection and Preventive Maintenance - Continued

INSPECT AND SERVICE	BEFORE USE	150 HOURS	2000 HOURS
ENGINE IGNITION SYSTEM - Continued			
Inspect all wires and terminals for damage, wear or looseness.		X	
Inspect battery surfaces and terminals for cleanliness.		X	
ENGINE EXHAUST SYSTEM.			
Inspect all exhaust connections and muffler for leaks.		X	
ENGINE FUEL SYSTEM.			
Check the fuel supply	X		
Check choke and primer linkage, test action.		X	
Examine carburetor for cleanliness and adjust.		X	
INSTRUMENTS AND CONTROLS.			
Check tightness of all mounting bolts.		X	
Inspect for loose wires or connections.		X	
Check all instruments for security of mounting.		X	
Check all controls for security of mounting.		X	
HOSE ASSEMBLY			
Check for frayed or damaged hose and fittings. If condition warrants, hydrostatic test hose in accordance with T.O.34Y1-1-171 and 00-25-223.	X		
WHEEL, HUB AND BRAKE ASSEMBLY.			
Check pneumatic tires for proper air pressure.		X	
Check attaching nuts and bolts for tightness.		X	
Check condition of brake linings, as applicable.			X

Table 5-2. Lubrication Guide



INDEX	ITEM	ACTION	BEFORE USE	150 HOURS	2000 HOURS	LUBRI-CANT
1	COMPRESSOR	Check oil level - add if necessary. Drain and refill.	X	 X		OC OC
2	*AIR FILTER	Clean and refill with oil.		X		OE
3	ENGINE	Check oil level. Add if necessary Drain and refill.	X	 X		OE OE
4	GOVERNOR LINKAGE	Add one drop of oil at joints.		X		OE
5	CARBURETOR LINKAGE	Add one drop of oil at joints.		X		OE
6	HINGES	Add one drop of oil at joints.		X		OE
7	WHEEL BEARINGS	Repack.			X	WB
8	CROSS SHAFT BLOCKS	Lubricate grease fitting.		X		WB
9	PINTLE HOOK	Lubricate grease fitting.		X		WB

KEY AND NOTES

KEY	LUBRICANT	AMBIENT AIR TEMPERATURES			SPECIFICATION
		75 to 130°F (23.9 to 54.4°C)	32 to 75°F (0 to 23.9°C)	0 to 32°F (-18 to 0°C)	
OC	OIL, Steam Turbine	Grade 40	Grade 30	Grade 10	MIL-L-17331
OE	OIL, Engine (3½ qts)	Grade 40 or OE-50	Grade 30 or OE-30	Grade 10 or OE-10	MIL-L-2104A
WB	GREASE, Lubricating (lead soap base)	-	-	-	MIL-G-81322G

NOTE

Oil Chamber - Drain only when hot, refill to overflow and run for several minutes and recheck oil level. Never mix oil of different brands or specifications. Always use premium grade oil. Oil must be best quality turbine-type having rust, foam and oxidation inhibitors. To prevent accumulation of oil varnish, carbon and sludge with resulting overheating and internal failure, Therma-Solve Concentrate part number 1811 or equivalent (1 quart container) may be added to the compressor oil. Mixture is 20 percent oil concentrate (approximately 1 pint) to each oil change.

CAUTION

Do not remove filler or drain plugs until air flow and oil in sight glass of bleeder valve has stopped. Pressure exists in oil chamber as long as percolating action is visible or pressure is indicated on the oil separator pressure gauge.

*Dusty operating conditions - clean and service air filter as conditions dictate.

Table 5-3. Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
Compressor fails to pump up to pressure	Air tubing or fitting leaking.	Check fitting connections and tighten as necessary. Replace any defective tubing.
	Constant speed unloader improperly adjusted.	Check unloading pressure and adjust as necessary (para 4-2.e.). Refer to para 5-6.e. for detailed troubleshooting.
	Minimum pressure valve or bleeder valve jammed. (Located in oil separator assembly, figure 8-5.)	Clean, check, and repair or replace. See paragraphs 5-6.e. and 5-6.d.
	Thickening of oil due to excessively dirty conditions.	Drain oil, clean oil separator assembly and compressor filter screen. Service compressor (table 5-2).
	Defective safety valves.	Replace.
	Broken direct drive assembly.	Replace assembly.
Discharge air abnormally hot.	Compressor oil level too low.	Check oil level and fill as needed (table 5-2).
	Clogged compressor oil filter.	Remove and clean (para 5-6.b).
	Dirty oil cooler or aftercooler fins.	Clean.
Bearing failures	Lack of oil.	Check oil level. Check compressor oil filter and for clogged oil cooler tubes. Replace all defective parts.
	Improper grade of oil used or oil of improper viscosity.	Use proper grade of oil per table 5-2.
	Dirt or other foreign matter in lubricating oil.	Flush compressor oil system, clean oil filter, service with clean oil (table 5-2).
	Continuous operation in excess of rated pressure.	Reduce pressure by adjusting constant speed unloader (para 4-2.e).
	Bearings loose.	Repair compressor assembly.
Rapid stator or blade wear	Air filter not serviced properly.	Refer to table 5-2.
	Dirty oil.	Drain, flush and refill compressor oil chamber (table 5-2).

Table 5-3. Troubleshooting - Continued

TROUBLE	PROBABLE CAUSE	REMEDY
Rapid stator or blade wear - Continued	Lack of oil	Check oil level and fill as necessary. Check for clogged oil filter or oil cooler tubes. Clean, repair, or replace any defective parts.
	Improper grade of lubricating oil.	Use proper grade per table 5-2.
	Blades not properly fitted.	Repair compressor assembly.
Excessive oil consumption	Oil leaks at gaskets, connections, or oil seals.	Tighten loose connections. Repair compressor assembly as necessary.
	Oil separator felts shrunken or damaged. Interfelt seals shrunken or damaged.	Replace felts per para 5-6.a.
	Improper grade of oil.	Use proper grade oil per table 5-2.
Compressor fails to unload	Unloader valve seat burred or broken. Servo valve stuck in rotor-stator assembly.	See para 5-6.e.
Unloader mechanism cannot be adjusted.	Servo valve or unloader inoperative due to carbon, sludge, or corrosion.	See para 5-6.e.
Pressure in oil chamber and oil separator will not bleed off.	Faulty bleed valve (observe pressure gauge in end cover of oil separator).	Remove, clean, repair or replace bleed valve (para 5-6.c.).
	Faulty minimum pressure valve.	Remove, clean, repair or replace minimum pressure valve (para 5-6.d.).
Receiver pressure returning to compressor.	Faulty minimum pressure valve.	Remove, clean, repair or replace minimum pressure valve (para 5-6.d.).
Oil in air receiver	Oil separator felts shrunken.	Replace felts (para 5-6.a.).
	Faulty bleed valve.	Remove, clean, repair or replace bleed valve (para 5-6.c.).
Broken grids in oil separator	Clogged felts.	Replace felts and broken grids (para 5-6.a.).
Oil level rises in compressor oil chamber	Condensate moisture accumulating.	Drain moisture daily, refer to para 4-2.a.(5).
Compressor runs excessively hot	Oil level too low.	Add oil per table 5-2.
	Oil filter seal improperly installed (see figure 8-4-67).	Reinstall or replace seal.

Table 5-3. Troubleshooting - Continued

TROUBLE	PROBABLE CAUSE	REMEDY
Compressor runs excessively hot - Continued	Compressor oil filter clogged.	Remove, clean, repair or replace, as necessary. See paragraph 5-6.b.
	Faulty thermal bypass valve assembly.	Check, repair, or replace thermal bypass valve assembly.
	Oil cooler clogged.	Clean, check; replace as necessary.
	Drive coupling impeller broken.	Replace impeller.
Engine will not start	Out of fuel or incorrect grade of fuel.	Check fuel gauge. Refill with correct grade of fuel.
	Clogged fuel lines.	Clean fuel lines. Replace damaged lines.
	Fuel tank shut-off valve not open.	Open the shut-off valve.
	Vapor lock, after stopping unit, preventing restart of engine.	Allow engine to cool prior to restarting.
	Lack of fuel for proper carburetion. Defective carburetor float.	Remove carburetor, clean jets, inspect and repair as necessary. Assemble and adjust (para 5-7.b.).
	Faulty ignition. Breaker point cam sticking.	Remove, clean, adjust or replace breaker points, condenser, adjusting cam, spark plugs, ignition wiring, and time ignition, as required (para 5-7.a.).
	Cylinder flooded.	Remove spark plug and crank a few times. Ground spark plug cable.
	Poor compression.	Tighten cylinder head bolts and spark plugs. Make compression test, if low, repair engine.
	Engine timing gear damaged or out of time.	Repair engine.
Power drops under heavy load	Engine lacks power.	See remedies for ENGINE MISFIRES AT HEAVY LOAD.
	Poor compression.	Tighten cylinder head bolts and spark plugs.
		Make compression test, if low, repair engine.
	Faulty carburetion.	Clean and adjust the carburetor, as per paragraph 5-7.b.

Table 5-3. Troubleshooting - Continued

TROUBLE	PROBABLE CAUSE	REMEDY
Power drops under heavy load - Continued	Clogged air filter.	Clean the air filter and relubricate, see table 5-2.
	Choke partially closed.	See that it opens wide enough.
	Carbon in cylinder or in carburetor venturi.	Repair engine.
Engine misfires at light load	Carburetor adjustment set wrong or clogged.	Clean and adjust the carburetor. See paragraph 5-7.b.
	Spark plug gap too narrow.	Adjust to 0.025 inch gap (0.64 mm).
	Intake air leaks.	Tighten carburetor and intake manifold mounting bolts. If leaks persist, repair engine.
	Faulty ignition.	Remove, clean, adjust or replace breaker points, condenser, adjusting cam, spark plugs, ignition wiring and retime ignition. (Para 5-7.a.)
	Poor compression.	Tighten cylinder head bolts and spark plugs.
		Make compression test, if low, overhaul engine.
Engine misfires at heavy load	Defective spark plug.	Replace.
	Faulty ignition.	Remove, clean, adjust or replace breaker points, condenser, adjusting cam, spark plugs, ignition wiring and retime ignition. (Para 5-7.a.)
	Clogged carburetor.	Clean jets and readjust carburetor. (Para 5-7.b.)
	Clogged fuel lines.	Clean or replace.
Engine misfires at all speeds.	Defective, fouled or wrong spark plug.	Clean, adjust or replace as may be required.
	Sticking valves or broken valve spring.	Repair engine.
	Faulty ignition.	Remove, clean, adjust or replace breaker points, condenser, adjusting cam, spark plugs, ignition wiring and retime ignition. (Para 5-7.a.)

Table 5-3. Troubleshooting - Continued

TROUBLE	PROBABLE CAUSE	REMEDY
Low oil pressure	Oil too light or diluted from leaking fuel pump diaphragm.	Drain and refill with oil specified in table 5-2. If due to fuel pump, repair fuel pump.
	Oil too low.	Add oil specified in table 5-2.
	Badly worn engine, sludge on oil screen, badly worn oil pump or oil relief valve not seating.	Repair engine.
	Oil relief valve requires adjustment.	Adjust as specified in paragraph 5- 7.f.
	Defective oil pressure gauge.	Replace.
High oil pressure	Oil too heavy.	Drain and refill with oil specified in table 5-2.
	Clogged oil passage or oil relief valve stuck.	Clean oil passage or free stuck valve.
	Oil relief valve requires adjustment.	Adjust as specified in paragraph 5-7.f.
	Defective oil pressure gage.	Replace.
Engine backfires at carburetor	Lean fuel mixture.	Clean and adjust carburetor (para 5-7.b).
	Clogged fuel line.	Clean or replace.
	Air leaks at intake manifold or carburetor mounting flange.	Tighten intake manifold and carburetor mounting bolt.
	Poor fuel.	Refill with fresh fuel.
	Spark too early.	Reset breaker points and retime ignition (para 5-7.a.).
	Intake valve leaking.	Grind or replace valve.
Excessive oil consumption, light blue smoky exhaust	Poor compression, usually due to worn piston rings or cylinder. Too large bearing clearance. Worn intake valve guides or valve stems. Crankcase breather valve sticking.	Repair engine.
	Engine misfires.	Check spark plugs.

Table 5-3. Troubleshooting - Continued

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive oil consumption, light blue smoky exhaust - Continued	Faulty ignition.	Remove, clean, adjust or replace breaker points, condenser, adjusting cam, spark plugs, ignition wiring and retime ignition (para 5-7.a.).
	Engine operated at light or no load for long periods.	No remedy needed. However, the unit should be shut down until needed to perform its mission.
	Too much oil.	Drain excess oil.
	Air leak at oil filler cap.	See that cap fits tightly and that gasket is not damaged.
Black smoky exhaust, excessive fuel consumption, fouling or spark plugs with black soot, possible lack of power under heavy load	Fuel mixture too rich.	Adjust carburetor (para 5-7.b.).
	Faulty carburetor, other than dirty jets or adjustment.	Repair or replace carburetor.
	Choke not open.	See that choke opens properly.
	Dirty air filter.	Clean. Relubricate as specified in table 5-2.
Light pounding knock	Loose connecting rod bearing.	Tighten or replace rod.
	Low oil supply.	Add oil.
	Oil badly diluted.	Change oil.
Engine stops unexpectedly	Fuel tank empty.	Refill.
	Vapor lock.	Allow engine to cool.
	Defective ignition.	Repair or replace (para 5-7.a.).
Dull metallic thud. If not bad, may disappear after few minutes operation. If bad, increases with load.	Loose crankshaft bearings.	Repair engine.
Sharp metallic thud, especially when cold engine is first started	Low oil supply.	Add oil.
	Oil badly diluted.	Change oil.
Pinging sound when engine is rapidly accelerated or heavily loaded	Carbon in cylinder or improper valve clearance.	Clean and adjust.
	Spark too early.	Reset spark and check timing (para 5-7.a.).

Table 5-3. Troubleshooting - Continued

TROUBLE	PROBABLE CAUSE	REMEDY
Pinging sound when engine is rapidly accelerated or heavily loaded - Continued	Wrong spark plug. Spark plug burned or carboned.	Install new plug.
	Fuel stale or low octane.	Service with fresh fuel.
	Lean fuel mixture.	Clean and adjust carburetor (para 5-7.b.).
Tapping sound	Valve clearance too great or a broken valve spring.	Adjust valve or replace broken valve spring.
Hollow clicking sound with cool engine under load.	Loose piston.	If noise is only slight and disappears when engine warms up, no immediate action needed. Otherwise, repair engine.
Engine speed hunts	Improperly adjusted governor control.	Adjust as specified in para 5- 7.e.
Starter fails to operate	Loose or dirty cable connections.	Clean and tighten.
	Worn brushes.	Install new brushes. (para 5-7.d.).
	Battery discharged.	Recharge battery.
	Open or short circuits in armature or fields or worn armature.	Repair starter.
	Defective starter switch.	Replace starter switch.
Alternator has low or no output	Fully charged battery.	No action required.
	Dry battery.	Refill with distilled water.
	Open circuit in rotor or stator.	Repair or replace alternator.
	Worn brushes.	Install new brushes (para 5-7.c.).
	Rough, dirty slip rings or worn bearings.	Clean slip rings and/or replace bearings.
Moisture in air receiver	Condensation created in operation of unit.	Drain receiver daily while unit is operating.
Air leakage at connections	Fittings and connections loosened by prolonged operation.	Tighten.
Wheel squeaking	Lack of lubrication in bearings.	Remove wheel and lubricate. Refer to table 5-2.
	Wheel bolts have become loosened.	Tighten.
Rumbling noise in wheel hub.	Flat spot in wheel bearings.	Replace bearings.

Table 5-3. Troubleshooting - Continued

TROUBLE	PROBABLE CAUSE	REMEDY
Loss of lubricant in wheel hub.	Worn or leaking grease seal.	Remove wheel and replace grease seal.
Hose reel does not have desired retract tension or will not retract service hose.	Spring tension not adjusted properly.	Adjust spring tension. (para 5-10.d.).
	Broken tension spring or other internal parts.	Repair or replace.

NOTE

The available felt change kit contains all seals, felts, o-rings, and gaskets necessary for maintenance. It is recommended this kit be used to ensure continued serviceability.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

(4) Clean inside of cover (34, figure 8-5) and housing (40) with a clean, lint-free cloth dampened with solvent, Fed Spec P-D-680, Type II.

(5) Assemble two grids (36, figure 8-5), three felts (37), and two wire seal assemblies (38, 39) into housing (40). Use new o-ring (35) on cover (34) and assemble cover (34) in housing (40). Use new o-ring (2) and slide separator bolt (1) into housing, passing through holes in cover (34).

CAUTION

It may be necessary to use a small press to install cover assembly into housing to compress felts enough to allow separator bolt to pass through housing and cover holes. Exercise caution when using press so that pressure gauge in cover is not damaged.

(6) Use new gasket and packing (5, 4, figure 8-4) and assemble oil separator assembly (1) on oil chamber (74). Attach with washer and nut (3, 2) and tighten separator bolt. Attach air filter adapter (74, figure 8-1) to compressor intake using new gasket (75) and secure with two cap screws. Connect hoses (72, 70) to adapter (74) and tighten hose clamps (73, 71). Connect tube assembly (17) to elbow (18).

b. Compressor Oil Filter. Clean the compressor oil filter as follows:

(1) Remove oil filler plug (52, figure 8-4) and drain plug (14) to drain oil from compressor. Disconnect oil tube assembly (9) from filter housing (61) by removing tube bolt (10) and packing (11).

(2) Remove seven cap screws and lock washers (57, 58) and remove oil filter housing assembly from oil chamber (74). Remove gasket (62). Slide the oil filter (66) off of oil filter support (73).

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

(3) Clean oil filter (66, figure 8-4) with solvent, Fed Spec P-D-680, Type II. Inspect component parts in filter support (67 through 73) for need of cleaning. As necessary, disassemble these parts, clean thoroughly and reassemble in order shown on figure 8-4. Replace all parts showing any defect during inspection.

(4) Assemble oil filter (66, figure 8-4) over filter support (73). Use a new gasket (62), install oil filter housing assembly on oil chamber (74) and secure with seven lock washers and cap screws (58, 57). Connect oil tube assembly (9) to filter housing (61), using two new packing (11), and secure with tube bolt (10).

(5) Install drain plug (14), fill compressor with clean oil (table 5-2) and install filler plug (52).

c. Bleeder Valve Assembly. Remove bleeder valve assembly from oil separator assembly for cleaning and inspection as follows:

(1) Remove oil separator assembly (1, figure 8-4) as detailed in paragraphs 5-6.a.(1).

(2) Remove two cap screws (16, figure 8-5), turn oil separator assembly upside down and dislodge the bleeder valve assembly components (17 through 29) from separator housing (40). Remove gasket (30).

WARNING

Provide adequate ventilation when using solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

(3) Clean all parts of bleeder valve assembly in solvent, Fed Spec P-D-680, Type II. Give particular attention to filter assembly (27, figure 8-5). Inspect all bleeder valve parts for damage. Replace all defective parts.

(4) Assemble bleeder valve assembly in order shown on figure 8-5 (29 through 17). Use new gasket (30) and attach valve cover (17) to housing (40) with two cap screws (16).

NOTE

If bleeder valve assembly was excessively dirty, it would be advisable to remove and clean the minimum pressure valve assembly (5 through 14, figure 8-5) before oil separator is assembled onto compressor oil chamber. If minimum pressure valve is to be cleaned, pass step 5 below and proceed to paragraph d.

(5) Assemble oil separator assembly (1, figure 8-4) onto compressor oil chamber as detailed in paragraph 5-6.a.(6).

d. Minimum Pressure Valve Assembly. Remove minimum pressure valve assembly from oil separator assembly for cleaning and inspection as follows:

(1) If oil separator assembly (1, figure 8-4) is not already removed from oil chamber, remove the assembly as detailed in paragraph 5-6.a.(1).

(2) Remove, two each, cap screws (3, 4, figure 8-5). Make note of position of housing (14) outlet port. Remove the minimum pressure valve assembly (5 through 14) and gasket (15).

WARNING

Provide adequate ventilation when using clean cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

(3) Disassemble valve as shown on figure 8-5 and clean parts with solvent, Fed Spec P-D-680, Type II. Inspect all parts for damage. Replace all defective parts.

(4) Assemble minimum pressure valve assembly in order shown on figure 8-5 (5 through 14). Use a new gasket (15) and install the assembly to separator housing (40) with housing (14) outlet port in position noted at removal. Attach housing (14) with, two each, cap screws (3, 4).

(5) Assemble oil separator assembly (1, figure 8-4) onto compressor oil chamber as detailed in paragraph 5-6.a.(6).

e. Constant Speed Unloader. If compressor will not unload, or operating pressure cannot be adjusted, follow the procedures below to determine cause of failure.

NOTE

Troubles encountered with the constant speed unloader are usually induced by use of incorrect lubricating oil and not draining the condensate daily (paragraph 4-2.a.(5).

(1) Remove the air compressor assembly from the unit and place on a work bench.

(2) Drain oil from compressor and remove the oil filter assembly, paragraphs 5-6.b.(1) and (2).

(3) Remove bushing (2, figure 8-7), with plunger (3) and o-ring (4), from rotor-stator assembly.

(4) Stand compressor assembly upright so spacer (23, figure 8-7) and spring (28) will fall out.

(5) Use a ¼ inch steel rod, 12 inches long, with one end threaded ¼-20NC. Screw thread into servo valve (29) and extract the valve.

(6) Polish the servo valve (29) and the valve bore in the first stage stator (27).

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

(7) Thoroughly flush and clean servo valve bore in stator, clean servo valve and all removed parts with solvent, Fed Spec P-D-680, Type II. Inspect removed parts for damage and replace all defective parts.

(8) Assemble servo valve (29, figure 8-7), spring (28), and spacer (23) into stator (27). Install bushing (2), with plunger (3) and o-ring (4), in cover assembly (5).

(9) Install oil filter assembly and service the compressor, paragraphs 5-6.b.(4) and (5).

(10) Reassemble compressor assembly into unit and perform operational checkout, paragraph 5-2.

CAUTION

If procedural steps of paragraph 5-6.e do not correct difficulty, rotor-stator assembly repair is indicated. Refer to Section VI.

5-7. ENGINE ASSEMBLY. Check oil level of engine before use. Keep level to full mark on dipstick, refer to table 5-2. Keep cooling surfaces of engine as clean and free of dirt and grease as possible.

CAUTION

Under extremely dirty operating conditions, check oil in engine - compressor oil filter daily. Change oil and clean air filter daily, or as often as operating conditions dictate.

a. Breaker Box Assembly and Ignition System. Inspect the breaker points, located in breaker box assembly (12, figure 8-8), for pitting and burning as follows:

(1) Remove, two each, screws and washers (2, 3, figure 8-9), the breaker box cover (1), and cover gasket (4). If breaker points (6) are pitted or burned only slightly, they may be dressed with a point file or fine sandpaper.

(2) If points are stuck, deeply pitted or badly burned the breaker point assembly (6, figure 8-9) must be replaced. Remove the two spark plugs (24) so that engine may be cranked easily by hand. Disconnect the coil lead (8, figure 5-1) and condenser (5) lead from breaker point assembly. Remove two screws (7) and washers (6); lift out breaker point assembly. Remove screw (4) and condenser (5).

NOTE

Always replace condenser (5) when installing a new breaker point assembly.

(3) Install a new condenser (5) and attach with screw (4). Install new breaker point assembly and attach with two washers and screws (6, 7). Connect condenser (5) lead and coil lead (8) to top of breaker point assembly.

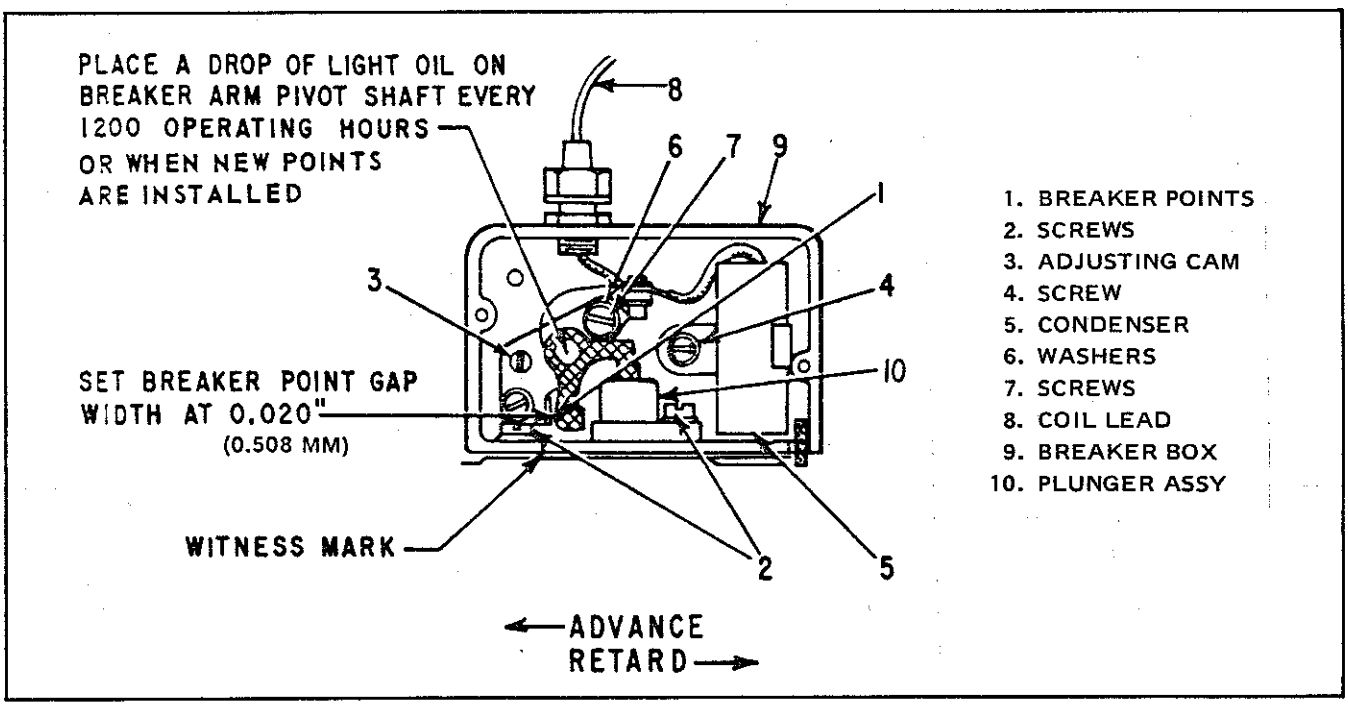


Figure 5-1. Breaker Point Replacement and Adjustment

(4) Crank engine slowly until breaker points (1) are fully open. Check the gap with a feeler gage. Gap should be 0.020 inch (0.508 mm). If gap is too wide, turn adjusting cam (3) clockwise. If gap is too narrow, turn cam (3) counterclockwise. Crank engine several times and recheck breaker point gap.

(5) Timing: Check that the witness mark on breaker box (9, figure 5-1) is aligned with witness mark on cylinder block assembly. When the two witness markers are aligned, timing is correct. Spark timing can be advanced or retarded by loosing two screws (2) and shifting the breaker box (9); then, tighten screws (2).

NOTE

Place a drop of light oil on breaker arm pivot shaft to prevent arm from sticking.

(6) Install cover gasket (4, figure 8-9), breaker box cover (1), and secure with two washers and screws (3, 2).

(7) Spark plugs: With spark plugs removed, clean and check electrode gap as needed. Gap should be 0.025 inch (0.635 mm). Replace plugs when electrodes become excessively burned or thin and if breaks appear in porcelain.

CAUTION

Do not over-torque spark plug leads. Hand tight plus one-eighth turn is sufficient.

(8) Install spark plugs (24, figure 8-9) and attach spark plug cables (22, 23) if removed.

b. Carburetor Assembly. Clean the carburetor assembly (28, figure 8-8) periodically to prevent gummy deposits from accumulating. The main adjusting needle and idle adjusting needle (see figure 5-2) can be removed and the jets cleaned by inserting a thin copper wire. After cleaning the jets, install the adjusting needles and set in accordance with the following note and procedures.

NOTE

Differences in gasoline used or extreme temperature variations may require readjustment of the carburetor. If the carburetor is completely out of adjustment, set the main adjustment needle at two turns open and the idle adjustment needle at one turn open. These settings are approximate only but will permit starting the engine. Do not force the adjusting needles tightly in their seat. Allow the engine to warm up thoroughly before making final adjustment.

(1) Carburetor adjustment: Start the engine and allow to warm up; adjust main adjusting needle (figure 5-2) at full engine load. Slowly turn main adjusting needle in until engine begins to lose power and speed; then, turn main adjusting needle outward slowly until engine runs smoothly at governed speed.

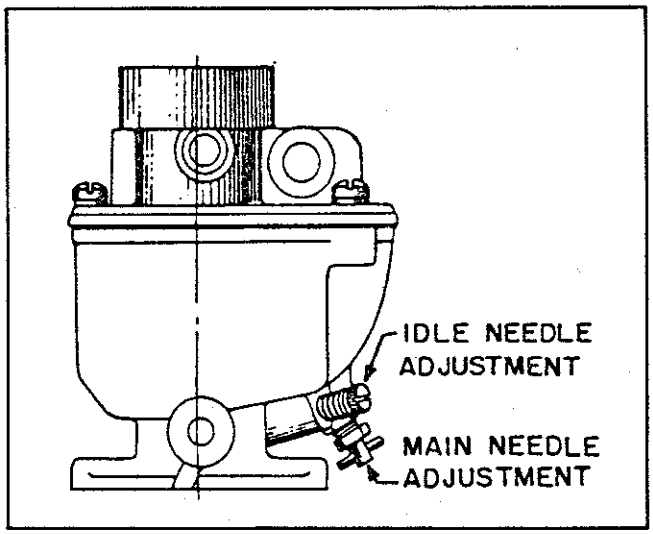


Figure 5-2. Carburetor Adjustment

(2) Adjust the idle needle with engine running at no load. Adjust in same manner as for the main adjusting needle.

(3) If engine tends to "hunt" (alternate increase and decrease in speed), open the main adjusting needle slightly. Do not turn more than ½ turn beyond the point of maximum power. If hunting condition cannot be corrected in this manner, adjust the governor for less sensitivity.

c. Alternator Assembly. Check the alternator brushes for excessive wear, chipping, and continuity as follows:

(1) Remove three screws (15, figure 8-11) that attach voltage regulator (14) to rear housing (32). Disconnect regulator leads and remove regulator.

(2) Remove two screws (17), brush holder cover (16) and dust shield (18). Pull the brush assembly (19) straight up and lift out of rear housing (32).

(3) Inspect brushes for excessive wear. Brush assembly may be reused if brushes are 3/16 inch (4.763 mm) long or longer, are not oil soaked or cracked. See figure 5-3.

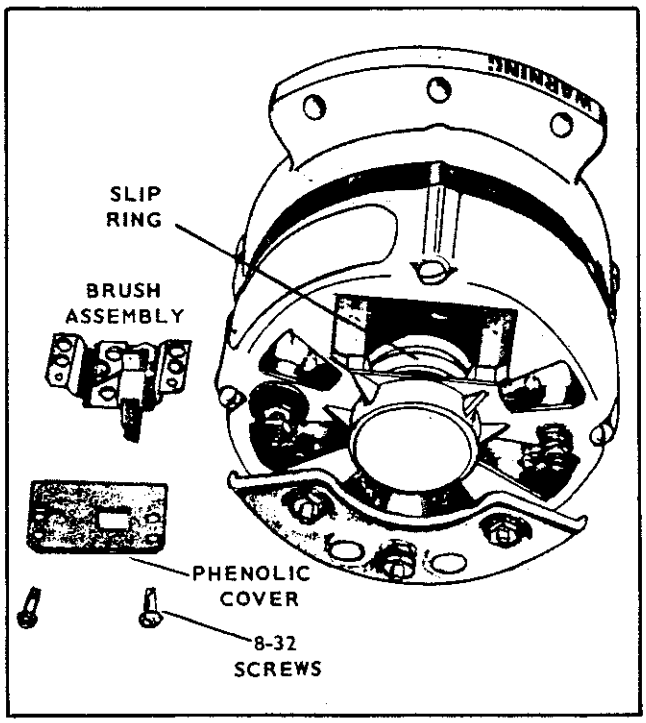


Figure 5-3. Alternator Brush Replacement

(4) Brush assembly tests: Connect an ohmmeter or test lamp (12 or 120 volts) to the field terminal and to the bracket. The test lamp should not light or resistance reading should be high (infinite). If not, there is a short and the brush assembly must be replaced. Move one ohmmeter lead from the bracket to the insulated brush. Use an alligator clip directly on the brush. Be careful not to chip the brush. Resistance reading should be zero (continuity). Connect the ohmmeter leads to the grounded brush and the bracket. Resistance should be zero (continuity). Replace a defective brush assembly.

(5) Assemble brush assembly (19, figure 8-11) into rear housing, install dust shield (18) and attach cover (16) with two screws (17).

(6) Connect voltage regulator leads and attach voltage regulator (14) to rear housing (32) with three screws (15).

d. Starter Assembly. Inspect the starter brushes for wear as follows:

(1) Remove nut (1, figure 5-4), screw (2) and slide cover band (3) off starter assembly (4).

(2) Pull the two brushes (5) out of starter assembly. Inspect for excessive wear, cracks, and chipping. If brushes are worn to less than 5/8 inch (15.875 mm) long, are chipped or cracked, they shall be replaced.

1. NUT
2. SCREW
3. BAND
4. STARTER ASSEMBLY
5. BRUSH
6. CLIPS

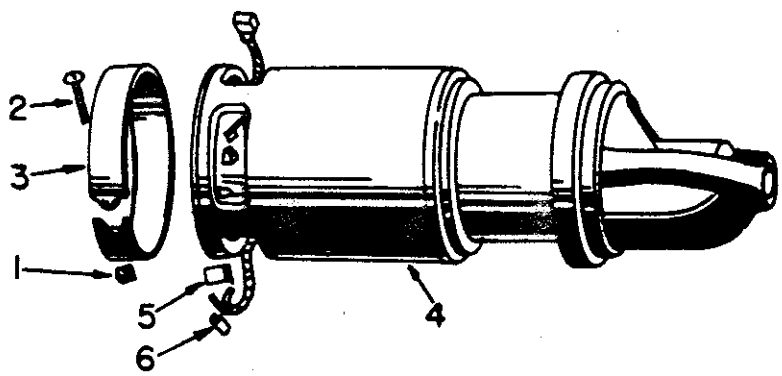


Figure 5-4. Starter Brush Replacement

(3) Remove the clips (6) from each lead and unsolder the brushes (5). Resolder new brushes (5) to the leads and secure new clips (6) on each lead.

(4) Reposition the brushes (5) in the starter assembly (4), slide the cover band (3) in position on starter and attach band (3) with screw (2) and nut (1).

e. Governor Adjustment. Work the governor arm back and forth to check for excessive wear or binding at connecting points. Action should be smooth and even, subject only to the tension of the governor spring. Adjustment is as follows:

NOTE

The governor controls the engine speed under various loads, preventing racing under light loads and slowing under heavier loads.

(1) Use a strobescope or hand tachometer to check engine speed. Turn speed adjusting nut to increase or decrease speed until engine speed is 1800 rpm. Refer to figure 5-5.

(2) Adjust sensitivity by sliding the sensitivity adjusting clip toward governor shaft to increase sensitivity or away from shaft to decrease. Engine speed drop from no load to full load must be within 100 rpm.

NOTE

A grooved head adjusting stud is supplied in lieu of adjusting clip on some engine models. To increase sensitivity turn adjusting stud clockwise; to decrease, turn counterclockwise.

NOTE

An adjustment for too much sensitivity will cause "hunting" and too lean a carburetor adjustment. Set sensitivity at a point which provides the best speed regulation without causing hunting. Any change in the sensitivity adjustment usually requires a slight compensating speed adjustment as specified in paragraph 5-7.e.(1) above.

(3) The carburetor throttle stop screw should be set at 1/32 inch (0.794 mm) distance from the

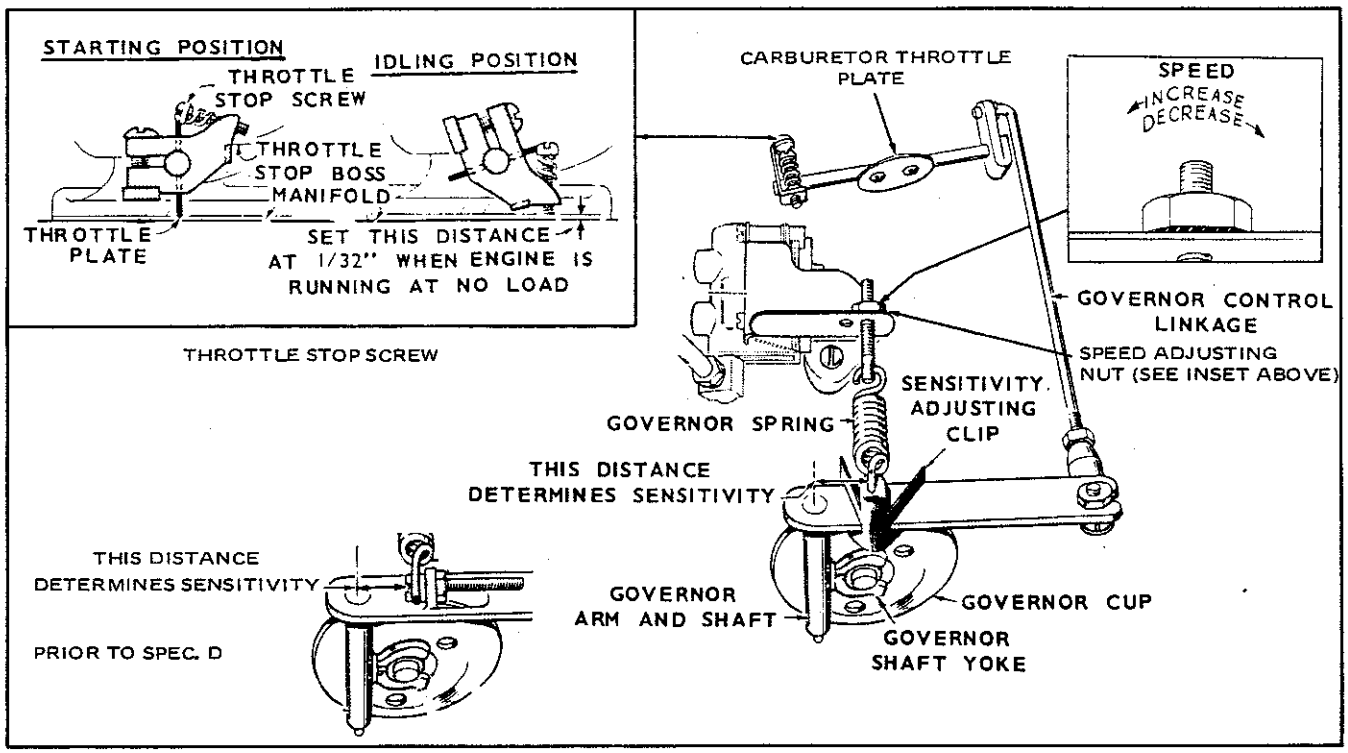


Figure 5-5. Governor and Throttle Stop Adjustment

manifold when engine is operating with no load (figure 5-5).

f. Engine Oil Pressure Adjustment. As needed, adjust engine oil pressure as follows:

(1) To increase oil pressure, loosen locknut and turn the adjusting stud inward (clockwise); then, tighten locknut. Refer to figure 5-6.

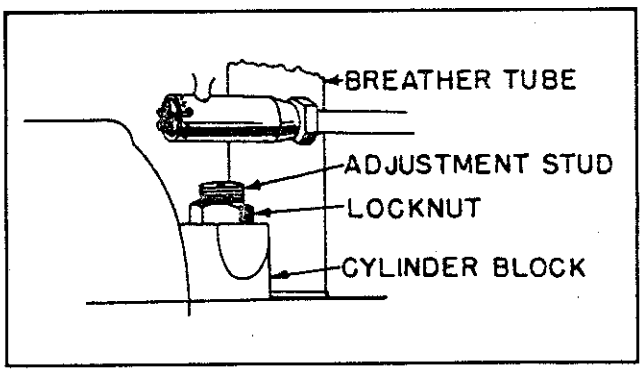


Figure 5-6. Oil Pressure Adjustment

(2) To decrease oil pressure, loosen locknut and turn adjusting stud outward (counterclockwise); then, tighten locknut.

CAUTION

Oil pressure maintained in excess of 35 psi (241.2 kPa) may cause main oil seal leakage.

NOTE

Oil pressure at operating temperature is normally 20 to 35 psig (137.8 to 241.2 kPa) on the oil pressure gauge (11, figure 4-1). Low oil pressure may indicate worn bearings, a broken relief valve spring, stuck bypass valve, or a defective oil pressure gauge.

5-8. BATTERY AND CABLES. Clean the battery, terminals, battery cables, and service the battery as follows:

WARNING

Always wear face shield, protective rubber gloves and apron when servicing battery.

CAUTION

Do not add water to battery if unit is to be idle. Water will not mix with electrolyte unless in operation and the alternator charging.

(1) Keep battery surfaces, terminals, and cables clean and dry. Check tightness of terminal connections. A light coating of grease or petroleum jelly on terminals will prevent oxidation.

(2) Inspect battery cables for cut, frayed, or burned insulation. Replace defective cables.

(3) Check electrolyte level in battery. Level should be above top of cell plates. Battery should be kept in a well charged condition to avoid freezing and to ensure ample cranking and ignition current.

5-9. AXLE ASSEMBLY. Maintenance of the axle assembly components is as follows:

a. Handbrake Lever Adjustment. Pull the handbrake lever toward towbar end of unit to apply brakes. If brakes cannot be applied with normal hand force, or lever goes all the way down and brakes do not apply, refer to figure 5-7 and adjust as follows:

(1) Turn adjusting knob on handle counterclockwise to reduce amount of pressure required to apply brakes. Turn knob clockwise to increase pressure required.

(2) If handbrake cannot be adjusted in this manner, effective stroke of brake rod may have to be shortened or lengthened. Remove cotter pin and yoke pin from yoke at cross shaft lever end of brake rod. Loosen nut that secures yoke on brake rod and turn yoke farther onto or off of rod, as required. Reinstall yoke pin connecting yoke to cross shaft lever. When adjusting is complete, install cotter pin in yoke pin and tighten nut against yoke.

b. Brake Adjustment. If brakes cannot be applied by adjusting handbrake lever, adjust brakes as follows:

(1) Remove cotter pin and yoke pin attaching brake rod yoke to brake actuating lever (figure 5-7). Loosen yoke nut and screw yoke farther on or off rod, as necessary. Then, connect yoke to actuating lever with yoke pin and cotter pin and tighten rod nut.

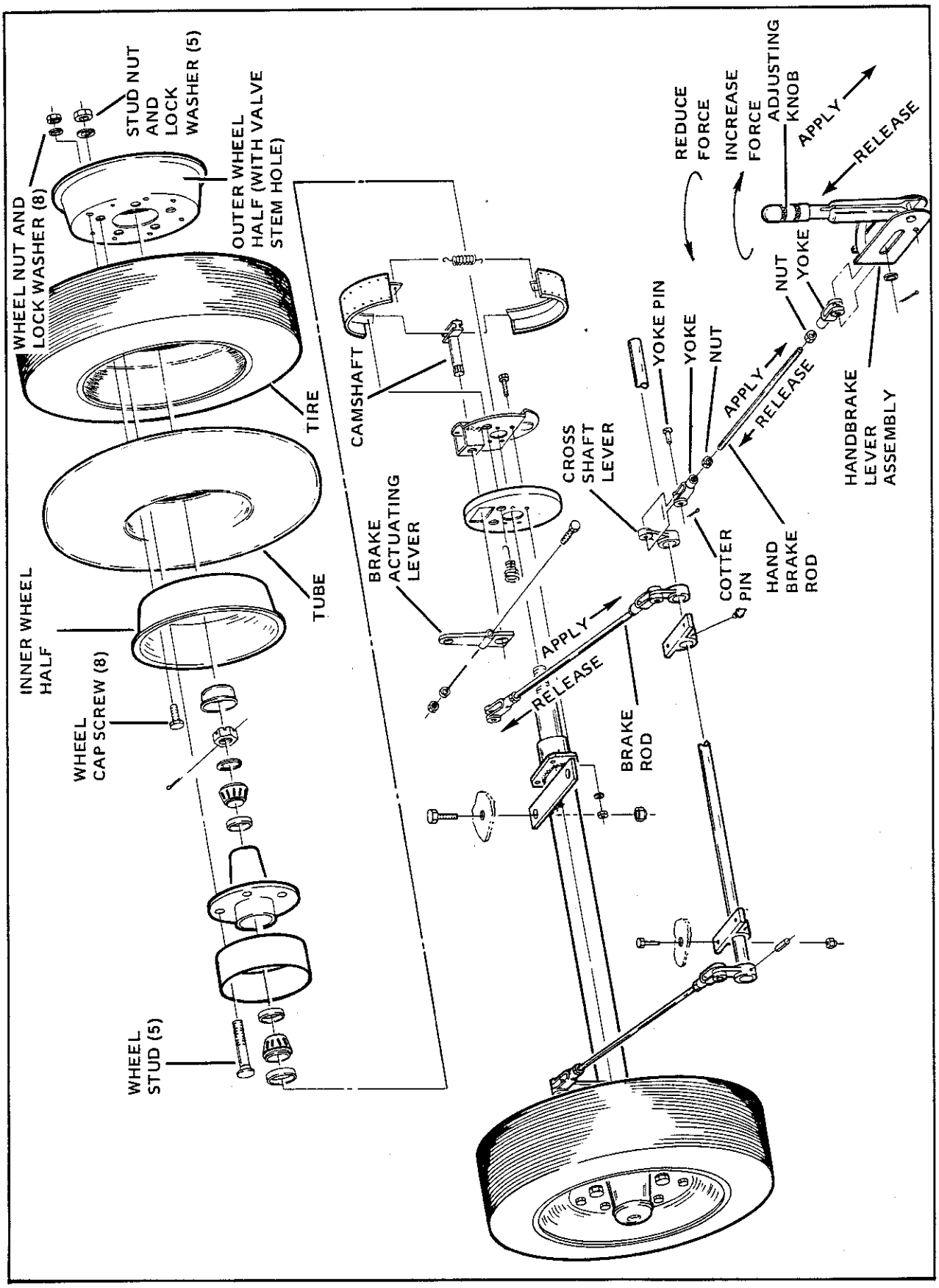


Figure 5-7. Brake Adjustment

(2) It may be necessary to change position of actuating lever on camshaft. Disconnect yoke from actuating lever as described in step (1) above. Loosen lever clamping nut and remove lever from camshaft serrated shaft end. Move lever position forward or backward, as necessary, on camshaft. Install lever, tighten clamping nut, and attach brake rod yoke to actuating lever.

c. Wheels, Tires and Tubes. To remove wheels, tires and tubes:

(1) Remove five wheel nuts and lock washers from wheel studs (see figure 5-7). Remove the wheel tire and tube from axle assembly.

(2) Relieve air pressure from tube. Remove eight nuts, washers, and cap screws that secure the two wheel halves together. Separate wheel halves and remove tire and tube.

(3) To assemble, place tube in tire and inflate with air enough to seat tube in tire. Assemble the two halves of wheel assembly on tire and tube, wheel half with valve stem hole is always outside half. Secure two wheel halves together with eight cap screws, lock washers and nuts. Install wheel, tire and tube assembly onto wheel studs and attach with five lock washers and nuts. Inflate tube to 15 psi (103.4 kPa).

5-10. HOSE REEL ASSEMBLY. When air service hose requires replacement or if retract of hose requires adjustment, service as follows:

a. Hose Removal. To remove the service hose for inspection or replacement:

(1) Pull hose assembly (9, figure 8-3) out of reel 8 to 10 feet (2.5 to 3.1 m) and latch. Remove four nuts (3) and pull cover and case assembly (2) off assembly. Remove hose bumper (1) from end of service hose and unwind hose from reel.

(2) Remove four locknuts (11) and screws (12) and two clamps (10). Disconnect hose assembly (9) from elbow (13) and remove hose assembly (9).

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning and Inspection. Wipe inside and outside of hose reel with a cloth dampened with solvent, Fed Spec P-D-680, Type II. Inspect hose assembly for breaks and the covering for deterioration and fraying. As necessary, hydrostatically test hose in accordance with T.O.34Y1-1-171 and T.O.00-25-223. Inspect all parts of reel assembly for broken or dented parts and for free movement of reel. Replace all damaged parts.

c. Assembly of Service Hose. Assemble service hose onto reel as follows:

(1) Wind sheave assembly (15, figure 8-3) clockwise facing swivel joint (14) until spring is tight. Back off sheave assembly two turns and latch.

(2) Insert hose assembly (9) through rollers (8), hose guide (4), through hole in case and cover assembly (2) and hole in sheave assembly (15). Connect hose end to elbow (13) and secure hose with two clamps (10), four screws (12) and locknuts (11). Attach hose bumper (1) to other end of hose about 12 inches (30.5 cm) from the end.

(3) Install cover and case assembly (2) on reel assembly and attach with four nuts (3).

(4) Pull on end of hose assembly (9) to release rotor latch and allow hose to slowly rewind. Do not let go of hose, rewind slowly to avoid a whipping action of hose end.

d. Hose Retract Adjustment. If increase or decrease of retract tension is required:

(1) Pull hose (9, figure 8-3) out of reel 8 to 10 feet (2.5 to 3.1 m) and latch.

(2) Remove four nuts (3) and pull cover and case assembly (2) off reel assembly.

(3) To increase tension, add hose wraps on reel, one at a time, until desired tension is obtained. To decrease tension, unwrap hose, one wrap at a time.

(4) When adjustment is completed, install cover and case assembly (2) and secure with four nuts (3). Pull on end of hose and retract slowly.

5-11. TESTING THE EQUIPMENT. Testing of the equipment after maintenance, within the scope of Section V, is limited to starting, operating, and stopping the equipment as described in Section IV.

5-12. CALIBRATION. None applicable to this equipment.

SECTION VI

REPAIR INSTRUCTIONS

6-1. PRELIMINARY PROCEDURES. This section contains complete disassembly, cleaning, inspection, repair or replacement, and assembly of the Type MC-2A air compressor unit. Disassembly should only be to the extent necessary for repair of a given component or part requiring maintenance. However, complete repair instructions for the entire unit are given in the following paragraphs. Prior to disassembly, the following preliminary procedures should be followed.

a. Tow the unit to maintenance work area and set the parking brakes with handbrake lever.

b. Disconnect the negative (ground) battery cable from the battery (29, figure 8-1).

WARNING

Do not attempt any air system component removal or repair with air pressure in the system. Observe the receiver air pressure gauge and oil separator pressure gauge. Open the receiver drain valve to relieve pressure from receiver tank. After shutdown, allow time for compressor to bleed down oil and air before attempting any disassembly. Oil separator pressure gauge must read zero to indicate compressor internal pressure has been relieved.

c. Open the receiver drain valve to make certain all air pressure is relieved from system.

d. Place a suitable container under the compressor drain plug (14, figure 8-4) and oil cooler drain cock (35). Remove drain plug (14), open drain cock (35) and drain oil from the compressor. When oil flow stops, close drain cock (35) and install drain plug (14).

e. Place a suitable container under the engine, remove drain plug (38, figure 8-13) and drain oil from engine. When oil flow stops, install plug (38).

f. Remove air filter assembly (89, figure 8-1) and discard oil from filter. Install filter assembly until ready for maintenance (covered in later paragraph).

WARNING

Do not attempt to lift any of the major components, such as engine assembly (79, figure 8-1) and compressor assembly (76), by hand. Provide a suitable lifting device when removing heavy components and handle with care using adequate hoists, chains, or straps to avoid injury to personnel and damage to equipment.

NOTE

Many repair parts for this equipment are provided in the form of kits. Refer to Section VII, Illustrated Parts Breakdown, and Section VIII, Maintenance Parts Lists, for details. Activities shall replace all parts (regardless of condition) which are removed in the process of disassembly with all like parts furnished in kits. Therefore, instructions for cleaning, inspecting, and repair of used parts found in kits have been omitted from this manual. If any kit parts must be cleaned, inspected, or tested prior to installation, instructions for performing these requirements are included at the appropriate detailed instruction location. An installed part which is not defective need not be removed solely for the purpose of replacement by a corresponding kitted part. Residue from kits and removed parts in this category shall be administratively condemned.

6-2. DISASSEMBLY OF MAJOR COMPONENTS. Disassemble the unit major components as follows:

a. Remove four lock nuts and screws and remove muffler guard (1, figure 8-1). Remove nut (4), washer, cap screw (3), and exhaust muffler (2).

b. Remove four locknuts and screws and remove control panel door (5). Remove six locknuts and screws, and remove side door (6). Remove six locknuts and screws, and remove side door (7). Only when replacement is necessary, remove the twelve rivets attaching three door latch and keepers (8). As necessary, remove locknut and screw attaching loop type clamp (9) on each of the two doors (6, 7).

c. Remove three lock nuts and screws securing roof (10). Remove two lock nuts and cap screws, six flat washers and two roof spacers (11). Remove roof (10).

d. Remove seven lock nuts and screws and side panel (12). Remove four lock nuts and screws and transition duct (13). Remove self-locking nut, loop clamp door support (15) and screw from each side panel (12, 14). As necessary, remove lock nut, screw, and loop clamp (16) from each side panel (12, 14).

e. Control panel assembly (14) is attached by seven lock nuts and screws. This component is not a true subassembly (see figure 8-2). To remove as a component, connecting tube assemblies, wiring harness, hose assemblies and cables must first be disconnected. The removal of these parts is covered in later steps. For removal of components of the control panel refer to paragraph 6-3.

f. Remove lock nut, screw, loop clamp, and tube assembly (17, figure 8-1). Remove elbow (18). Remove all attaching lock nuts, screws, loop clamps, and tube assembly (19) from aftercooler to moisture separator.

g. Remove two self-locking nuts and screws; remove front panel (20). Remove four self-locking nuts, four cap screws (25), flat washers, hot air duct adapter (21), aftercooler (22), four spacers (23), and fan shroud (24).

h. Loosen setscrew in hub of cooling fan (26) and remove the fan (26). Remove four cap screws (28), lock washers, and fan spacer (27).

i. Remove self-locking nut, internal-external tooth lock washer, cap screw, disconnect and remove battery ground cable (29). Remove self-locking nuts, cap screw, and loop type clamps (32), as necessary, disconnect and remove battery cable (30) and starter cable (31). Remove two wing nuts (34), flat washers (35), battery holddown (33), battery (37), battery bolts (36), and battery pad.

j. Remove elbow (39) from moisture separator, and as needed, drain cock, pipe coupling (42), pipe nipple (41), moisture separator (38) and pipe nipple (40). Remove tube assembly (43) and connector (44). Unscrew and remove receiver drain valve (46), safety valve (47) and rupture disc (48).

k. Remove four cap screws, lock washers, and the air receiver (45). Disconnect and remove hose assembly (49) and two elbows (50). Remove four self-locking nuts (52), cap screws (53), flat washers (54), and the hose reel assembly (51). Remove reducing bushing (55). Refer to paragraph 6-4 for hose reel (51) details.

l. Remove two lock nuts and screws and the rear panel (56). Disconnect and remove fuel tube assembly (57), fuel shut-off valve (58) and fuel level gauge (59). Remove four self-locking nuts, cap screws, flat washers, two fuel tank straps (62), fuel tank (60), as necessary, filler cap (61) and tank drain plug. Remove two pieces of fuel tank webbing (63) when necessary.

m. Remove two self-locking nuts (65), jam nuts (66) and the lifting bail (64).

n. Disconnect and remove compressor unloader tube assembly (67), elbow (68), and shut-off valve (69). Loosen two hose clamps (71) and remove air intake hose (70) and the clamps (71). Loosen two hose clamps (73) and remove engine air intake hose (72) and the clamps (73). Remove two cap screws, air intake adapter (74) and gasket (75).

o. Remove four lock nuts that attach air compressor assembly (76) to engine adapter (78) and remove the air compressor assembly (76). Refer to paragraphs 6-5 through 6-8 for compressor details.

p. Cut, remove, and discard lock wire securing impeller setscrews, loosen setscrews and remove impeller (77) from engine crankshaft. Remove four cap screws attaching engine adapter (78), remove the adapter (78) and, as necessary, the four engine adapter studs.

q. Remove four self-locking nuts and cap screws and remove the engine assembly (79). Refer to paragraphs 6-9 through 6-14 for engine details.

r. Only when necessary, remove four self-locking nuts, (81) and cap screws (82) and remove towbar assembly (80). Remove chain assembly pin (85), support pin (84) and front leg support (83).

s. If removal of pintle hook assembly (87) is required, remove four self-locking nuts, cap screws, and the pintle hook assembly (87). When necessary to remove axle assembly (86) from frame (97), refer to paragraph 6-15.

t. Remove air filter assembly (89), two self-locking nuts and cap screws and remove air filter bracket (88).

u. The rubber bumper (90), found on control panel door (5), need not be removed except for replacement. The document bag (91) is attached to side panel (14) with lock nut and screw; replace as needed. The flag decal (92), mounted on the roof (10), need not be removed except for replacement. To remove wiring diagram plate (93), instruction plate (94), and warranty plate (95), remove four blind rivets attaching each plate. The paint decal (96) should not be removed from door panel (6). The frame assembly (97) is now free of all components and attachments.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

v. Cleaning. Clean all metal parts with solvent, Fed Spec P-D-680, Type II. Wipe nonmetalic parts, such as o-rings, with a clean, lint-free cloth moistened slightly with solvent and air dry thoroughly. Specific cleaning of subassembly components is contained in detailed paragraphs for that component.

w. Inspection. In general, inspect each removed part as outlined below. Specific inspection for components of subassemblies is included in detailed paragraphs for each subassembly. General inspection is as follows:

(1) Inspect for visible wear, damage, distortion, cracks, breaks, and corrosion.

(2) Inspect threaded parts for stripped threads, cross-threading, and for nicks and burrs.

(3) Inspect hoses and tubing for evidence of leaks, cracks, pinching, damaged connecting nuts, and similar defects.

(4) Examine all electrical wiring for broken insulation, evidence of burning (indicating a short), loose connections, and damaged terminals.

(5) Inspect painted surfaces for chipping, peeling, or discolored paint.

x. Repair or Replacement. For the most part, repair of this equipment will be made by replacement of worn or damaged parts. Detailed repair and replacement procedures for specific parts are found in following subassembly paragraphs.

y. Refer to paragraph 6-16 for assembly of the major components after repair.

6-3. CONTROL PANEL ASSEMBLY. Refer to figure 8-2 and repair control panel assembly in following manner.

a. Disassembly. Disassemble the control panel assembly, to extent necessary, as follows:

(1) Disconnect and remove the choke and primer cables (1, figure 8-2). Disconnect and remove the two wire assemblies (2, 3) and wiring harness (4). As necessary, remove the two-wire connector from end of harness yellow wire. Disconnect and remove wire assembly (9). Place all terminal washers and nuts back onto terminals studs to prevent their loss.

(2) Remove the attaching hardware and clamp securing ammeter gauge (5), remove the gauge and assemble attaching hardware back onto gauge to prevent their loss.

(3) Remove nut attaching toggle switch (6) to panel (40), remove the switch (6) and indicating plate (7). Assemble plate (7) and mounting nut back onto switch (6) to prevent loss.

(4) Remove attaching hardware (12) securing hourmeter assembly (10) to panel, remove hourmeter (10) and assemble attaching hardware (12) to flange of hourmeter to prevent loss. As necessary only, remove wire terminals (11) from hourmeter (10) leads.

(5) Remove two nuts (16), lock washers (17), cap screws (18) and remove starter switch (15). Disconnect and remove two tube assemblies (19, 20) and two elbows (21). Remove attaching hardware and clamps and remove the two air pressure gauges (22). Assemble clamp and hardware back onto gauges to prevent loss.

(6) Disconnect and remove oil pressure tube assembly (23), adapter (24), remove attaching hardware and clamp securing oil pressure gauge (25), remove the gauge (24) and assemble clamp and hardware onto gauge to prevent loss.

(7) Remove four nuts (27) and cap screws (28). Remove mounting bracket (26) with fittings, valves, and regulator still attached to bracket (26).

(8) Remove elbow (29), two connectors (19.1,35), two reducing bushings (19.2,35.1) and tee (30). Remove valve (31) and nipple (32) from bracket (26). Unscrew and remove safety valve (33), street elbow (34), elbow (36), cross (37), nipple (38), regulator (39) and nipple (32). Panel (40) is now free of all parts.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean all metal parts with solvent, Fed Spec P-D-680, Type II, and dry thoroughly. Wipe other parts clean with a lint-free cloth moistened with solvent and air dry.

c. Inspection. Inspect removed control panel components as follows:

(1) Inspect gauges (5, 10, 22, 25, figure 8-2) for dents, broken faces, and proper operation.

(2) Inspect tube assemblies (19, 20, 23) for cracks, collapse of tube, and condition of threads in nuts and seating surfaces at each tube end.

(3) Inspect wire assemblies (2,-3,4,8,9) for frayed, cracked, or burned insulation. Examine terminal ends for tight connections and damage.

(4) Inspect choke and primer cables (1) for broken actuating wire and kinks or other damage to wire cable covering. Check operation of actuating handle.

(5) Check operation and continuity of toggle switch (6), hourmeter assembly (10), ammeter (5), and starter switch (15).

(6) Check for free operation of seating and opening of valve (31). Check for free operation of pressure regulator (39) adjusting handle.

(7) Inspect safety valve (33) for proper operation by testing in the following manner.

(a) Make a test setup similar to that shown in figure 6-1.

NOTE

The test pressure source should be capable of supplying 350 psi (2411.5 kPa) to the test system. A hydrostatic tester may be used in lieu of air or nitrogen.

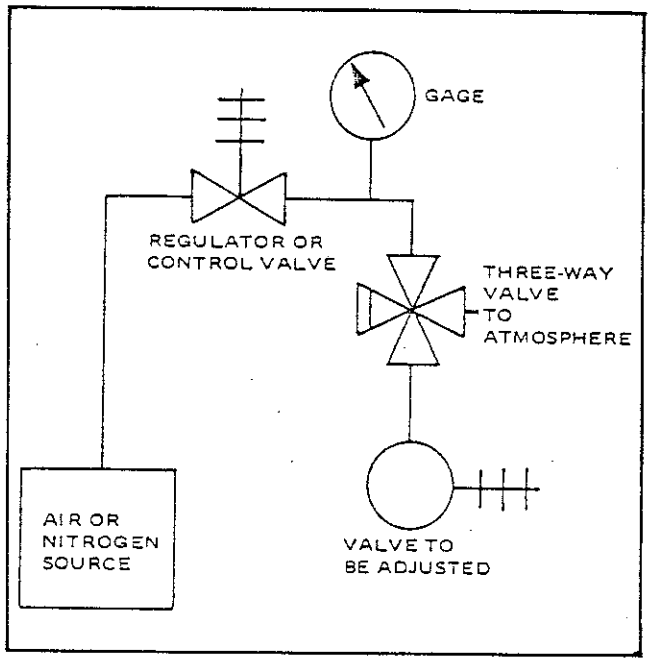


Figure 6-1. Safety Valve Test Setup

(b) Open the three way valve to the safety valve and the regulator valve from test pressure source. Adjust test pressure to 220 ± 5 psi (1515.8 ± 34.5 kPa) indicated on test setup pressure gauge.

(c) If the safety valve opens at this pressure setting, the valve is functioning properly. Close regulator valve and bleed off test air from system using the three-way valve. Remove safety valve from test setup.

(d) If safety valve does not open at this pressure setting, cut and remove sealing wire. Turn the valve cap clockwise to increase opening pressure or counterclockwise to lower opening pressure. Turn cap approximately one turn, increasing or lowering pressure as required and retest. Repeat this cap setting procedure until correct opening

pressure is obtained. Then, rewire valve cap to body with new sealing wire and remove valve from test setup.

d. Repair or Replacement. All parts found defective or damaged as result of above inspection procedures shall be replaced.

e. Assembly. Assemble the control panel components onto side panel (40, figure 8-2) as follows:

(1) Install two nipples (32) into mounting bracket (26), assemble regulator (39), nipple (38) and pipe cross (37). Assemble elbow (36), reducing bushing (35.1), connector (35), street elbow (34) and safety valve (33).

NOTE

As assembly is made, note the relative positioning of parts as shown on figure 8-2. When parts are assembled as shown, attaching tube assemblies, wire assemblies, etc. will fit with minimum adjustment of fitting angles.

(2) Assemble valve (31), tee (30), reducing bushing (19.2), connector (19.1), and elbow (29). Assemble this group of parts onto side panel (40) and attach mounting bracket (26) to panel (40) with four cap screws (28), flat washers (27.1), and nuts (27).

(3) Install oil pressure gauge (25) on panel (40), using clamp and hardware supplied with gauge. Install adapter (24) and connect oil pressure tube assembly (23) to adapter (24).

(4) Install the two air pressure gauges (22) on panel (40) using clamp and hardware supplied with gauge. Install the two elbows (21) in back of gauges (22) and assemble tube assemblies (20,19) to elbows (21), connector (35), and connector (19.1).

(5) Attach starter switch (15) with two cap screws (18), lock washers (17) and nuts (16).

(6) If removed, assemble terminals (11) on hourmeter (10) leads. Assemble hourmeter (10) to panel (40) using attaching hardware (12).

(7) Remove mounting nut from toggle switch (6), remove indicating plate (7), mount toggle switch (6) from rear of panel (40) and assemble indicating plate (7) on front of panel; secure indicating plate (7) and toggle switch (6) with mounting nut.

(8) Assemble ammeter gauge (5) on panel (40) and secure with clamp and hardware supplied with gauge.

(9) If two-wire connector was removed from wiring harness (4) yellow wire, install the connector. Install wiring harness (4), wire assemblies (9, 3, 2) referring to wiring diagram, figure 1-3.

(10) Install choke and primer cables (1, figure 8-2) and make connection to fuel pump primer lever and carburetor choke lever.

6-4. HOSE REEL ASSEMBLY. Repair of the hose reel assembly is as follows:

a. Disassembly. Disassemble hose reel assembly, figure 8-3, in following sequence.

(1) If attached, remove air chuck (41) from end of service hose (9). Remove the hose bumper (1) from the air service hose assembly (9). Remove four nuts (3) and pull off cover and case assembly (2).

(2) Remove four machine screws (5), lock washers (6), and the hose guide (4). Plug nuts (7) need not be removed. Remove pin and roller kit (8) from hose guide (4) by driving out the pins. This should be done only when replacement is necessary.

(3) Unwind the service hose assembly (9), remove four lock nuts (11), machine screws (12), and two hose clamps (10). Disconnect and remove service hose assembly (9). Remove street elbow (13) and swivel joint (14).

(4) Remove six nuts (16), lock washers (17), and the sheave assembly (15). Studs (18) need not be removed. Remove the drive spring (19). Loosen setscrew (21) and remove spring arbor (20).

(5) Remove retaining ring (22) and pull off the case and cam assembly (23). Remove jam nut (25) and spring stud (24) from case and cam assembly (23) if necessary.

(6) Remove retaining ring (27) and pull off latch rotor assembly (26) and spacing washers (28, 29). Remove two retaining rings (31), four cap screws (32) and lock washers (33); pull reel cover (30) off reel shaft (37).

(7) Remove nut (35), lock washer (36), and latch stud (34) from base (39). Loosen setscrew (38) and remove reel shaft (37) from base (39). Decal (40) need be removed from cover and case assembly (2) for replacement only.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean all parts with solvent, Fed Spec P-D-680, Type II, except hose bumper (1, figure 8-3) and hose (9). Wipe bumper and hose with a clean cloth moistened slightly with solvent and wipe dry.

c. Inspection. Inspect all parts for cracks, breaks, dents, and distortion. Examine screw threads for condition. Inspect hose assembly (9, figure 8-3) for frayed or cut covering. Test as necessary, and at least once a year, in accordance with T.O.34Y1-1-171 and T.O.00-25-223.

d. Repair or Replacement. Replace all damaged parts.

e. Assembly. Assemble hose reel (figure 8-3) in the following sequence.

(1) Slide reel shaft (37) into bore of hose reel base (39) and secure with setscrew (38). Install latch stud (34) in base (39) and secure with lock washer (36) and nut (35).

(2) Place reel cover (30) over shaft (37) against face of base (39) and attach with four lock washers (33) and cap screws (32). Install the two retaining rings (31) in shaft (37) grooves.

(3) Install spacing washers (29, 28) and latch rotor assembly (26) on latch stud (34) and install retaining ring (27).

(4) If removed, install spring stud (24) and secure to cam and case assembly (23) with jam nut (25). Slide cam and case assembly (23) onto shaft (37) and install retaining ring (22) on shaft (37). Install spring arbor (20) on shaft (37) and secure with setscrew (21).

(5) Attach end of drive spring (19) on spring stud (24) and over arbor (20). If studs (18) were removed, install six studs (18) in sheave assembly (15). Attach sheave assembly (15) to cam and case assembly (23) with six lock washers (17) and nuts (16).

(6) Install swivel joint (14) in end of shaft (37) and elbow (13) in swivel joint (14). Install hose assembly (9) on sheave assembly (15) with one end through hole in sheave assembly. Attach hose to elbow (13) and secure hose assembly to sheave assembly with two hose clamps (10), four screws (12) and lock nuts (11).

(7) If removed, assemble pin and roller kit (8) on hose guide (4). Attach hose guide (4) to cover and case assembly (2) with four plug nuts (7), lock washers (6), and screws (5). Wrap hose on sheave assembly (15) and lead end of hose assembly (9) through hose guide (4) and rollers (8).

(8) Install cover and case assembly (2) over sheave assembly (15) and secure to reel cover (30) with four nuts (3). Assemble hose bumper (1) on hose assembly (9). If removed, install decal (40) on cover and case assembly (2).

(9) Adjust hose retract tension in accordance with paragraph 5-10.d.

6-5. AIR COMPRESSOR ASSEMBLY. Repair the air compressor assembly (figures 8-4 through 8-7) as follows:

a. Disassembly. Disassemble air compressor assembly in following sequence.

(1) Remove nut (2) and lock washer (3) attaching oil separator assembly (1) to stud (6). Unscrew separator bolt (1, figure 8-5) to free separator assembly (1, figure 8-4) from oil chamber (74). Lift separator assembly (1) off compressor and remove gasket (5) and square section ring (4). Refer to paragraph 6-6 for oil separator disassembly.

(2) Remove separator stud (6) from oil chamber (74). If threads of insert (75) indicate any cross-threading or damage, remove the insert with a heli-coil removing tool. If no damage is evident the insert (75) should not be removed.

(3) Remove tube bolt (10), o-rings (11), loosen sealing screw (12) from thermal bypass valve (21), slide the sealing screw away from valve on tube (9), remove oil tube assembly (9), and o-ring (13).

(4) Remove drain plug (14), o-ring (15), banjo bolt (17) and o-rings (18). Loosen sealing screw (19) from thermal bypass valve (21), slide sealing screw away from valve on oil tube (16), remove the oil tube assembly (16) and o-ring (20).

(5) Unscrew two sealing screws (22) from oil cooler (36) and remove the thermal bypass valve assembly (21), sealing screws (22) and o-rings (23). Refer to paragraph 6-7 for thermal bypass valve disassembly.

(6) Loosen or remove, as necessary, nut (25), lock washer (26) and screw (27) that secure cowl clamp (28). Remove the cowl (24) and clamp (28). Unless replacement is necessary, screws (30, 32, 34) and plates (29, 31, 33) need not be removed from cowl (24). If not previously removed, remove the drain cock (35).

(7) Remove eight screws (38), lock washers (39), four clamps (37) and remove the oil cooler (36). Remove three cap screws (41), lock washers (42) and lantern (40). Remove dowel pin (43), as necessary.

(8) Remove two drive bushings (44) from drive coupling assembly (45). Remove cap screw (46), lock washer (47), special washer (48), drive coupling assembly (45), o-ring (49), and key (50).

(9) Carefully remove the rotor-stator assembly (51) from oil chamber (74). Refer to paragraph 6-8 for rotor-stator disassembly.

(10) Remove the oil filler plug (52) and o-ring (53) from housing (61). Remove screw (55), lock washer (56) and adjusting knob (54). Remove seven cap screws (57) and lock washers (58); pull oil filter housing (61) assembly off oil chamber (74). When necessary, remove bushing (59) and o-ring (60) from housing (61). Remove housing gasket (62).

(11) Remove push rod (63), spring (64), and adjusting pin (65). Remove oil filter (66) and oil filter seal (67). Remove the cotter pin (69), and disassemble connector (68), spring (70), collar (71), and seal (72) from oil filter support (73).

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean all matalic parts with solvent, Fed Spec P-D-680, Type II, and dry thoroughly. Wipe nonmetalic parts, such as o-ring, seals, and the like, with a clean, lint-free cloth moistened slightly with solvent and air dry.

NOTE

Any specific cleaning instructions for air compressor subassemblies will be found in paragraphs covering that subassembly.

c. Inspection. Inspect all parts for cracks, breaks, dents, thread condition and deterioration. Detailed inspection is as follows:

NOTE

Inspection of component parts of air compressor subassemblies are found in paragraphs covering that subassembly and in Table 6-1, Table of Limits.

(1) Inspect oil cooler (36, figure 8-4) fins for damage. Straighten with a locally manufactured tool for this purpose. Inspect cooler for leaks as follows:

WARNING

Air under pressure is dangerous. Use extreme care during testing of cooler for leaks to avoid injury.

(a) Connect inlet port of oil cooler (36, figure 8-4) to a controlled compressed air source that can be regulated in pressure range of 0-250 psi (0-1722.5 kPa). Connect a shutoff type valve to outlet port of cooler and close the valve. (The shutoff valve is used to relieve pressure after testing.)

(b) Submerge the cooler in water, open air source regulator and adjust test pressure to 200 psi (1378 kPa). Observe the water for evidence of leakage, indicated by bubbling of the water.

(c) Remove the cooler from water and mark any area of leakage. Shut off air supply and slowly open shutoff valve at cooler outlet port to relieve pressure. Repair leaks by silver soldering. Then, retest as above. When leaks cannot be repaired in this manner, replace the cooler.

(2) Inspect compressor oil filter (66, figure 8-4) for distortion, collapse, and for breaks in mesh.

(3) Inspect oil chamber (74) for stripped or otherwise damaged threads. Refer to repair paragraph d. if damage is found.

d. Repair. Repair of air compressor assembly is limited to replacement of parts found defective during inspection and details outlined below.

NOTE

Refer to detailed paragraphs for compressor subassemblies for required repair of those components.

(1) If threads in the oil chamber (74, figure 8-4) drive end, to which the lantern (4) is attached, are found to be stripped or otherwise damaged, drill the damaged hole with a 33/64-inch (13.09 mm) diameter bottom drill to a depth of 1-1/16 inches (26.975 mm). Countersink the hole 120° ± 5° to a diameter of 0.59 to 0.62 inch (14.986 to 15.748 mm).

(2) Use Heli-Coil spiral flute bottoming tap number 6905-8 H4 and tap holes to a depth of 0.830 inch (21.082 mm), minimum.

(3) Use Heli-Coil installing tool, conforming to Military Specification MIL-T-21309, and install inserts MS122125 (Heli-Coil number 1185-8CN 0750).

(4) If threads in oil chamber (74, figure 8-4) into which the banjo bolt (17) thread, are stripped or otherwise damaged, drill hole with a 21/32-inch (16.669 mm) diameter drill. Tap the drilled hole with a Heli-Coil tap number 848-6 to receive insert.

(5) Use Heli-Coil installing tool and install an insert number 327-6 (3/8-18 straight pipe thread).

(6) Countersink the hole 82° to a diameter of 13/16-inch (20.638 mm) for o-ring seat.

NOTE

When Heli-Coil installing equipment is not available for the 3/8-18 straight pipe thread hole, repair may be made by enlarging the hole with a 23/32-inch (18.256 mm) drill. Tap with a 1/2-14 NPT. Install a 1/2 x 3/8-inch NPT reducing pipe bushing. Drill out the bushing to 37/64-inch (14.684 mm) and tap with a 3/8-18 straight pipe tap. Cut top of bushing flush with oil chamber. Countersink 82° to a diameter of 13/16-inch (20.638 mm) for o-ring seat.

(7) If seating surface in oil chamber (74) for the two rotor-stator assembly o-rings (53, figure 8-7) is corroded, pitted, or scored, repair as follows:

(a) Use a rotary file and clean pits and scores.

NOTE

Depth shall not exceed 1/4-inch (6.35 mm) in the inner land and 1/8-inch (3.18 mm) in outer land.

(b) Fill with a solution of A1 Epoxey Cement, Part No. A1 ADHESIVE, and allow the cement to dry for eight hours.

(c) Use a rotary file and cut o-ring land to original diameter of 5.001 to 5.003-inches (127.025 to 127.076 mm).

e. Assembly. Assemble the air compressor (figure 8-4) in the following sequence.

(1) If bushing (59) was removed, place new o-ring (60) in oil filter housing (61) and press in a new bushing (59) flush with face of housing (61). Assemble adjusting pin (65) in housing (61) with small end through bushing (59). Attach adjusting knob (54) to adjusting pin (65) with lock washer (56) and screw (55).

(2) Assemble spring (70), collar (71), and seal (72) on connector (68). Place small end of connector (68) into support (73) and install cotter

pin (69). Position seal (67) against flange of support (73) and slide filter (66) over support (73) and against seal (67).

(3) Install packing (53) on filler plug (52) and install plug (52) in housing (61). Slide oil filter assembly (66 through 73) into housing (61). Slide push rod (63) into adjusting pin (65) and attach spring (64).

(4) Position gasket (62) against housing (61) and attach housing (61) to oil chamber (74) with seven lock washer (58) and screws (57).

(5) Carefully slide rotor-stator assembly (51) into oil chamber (74) so that o-rings on rotor-stator are not damaged. Make certain fiber thrust washer (49, figure 8-7) is in position and install key (50, figure 8-4) in rotor shaft extension. Install o-ring (49) in coupling assembly (45), slide coupling assembly (45) onto rotor shaft and secure with washer (48), lock washer (47), and cap screw (46). Install drive bushings (44) on coupling pins.

(6) If dowel pin (43) was removed from lantern (40), press a new pin (43) into lantern. Assemble lantern (40) to oil chamber (74) and secure with three lock washers (42) and cap screws (41).

(7) Install oil cooler (36) over lantern (40) and attach to lantern with four clamps (37) and eight lock washers (39) and screws (38). If drain cock (35) is not installed, install drain cock (35) in oil cooler (36).

(8) If plates (29, 31, 33) were removed from cowl (24), install with screws (30, 32, 34), two per plate. Slide cowl (24) in position over oil chamber (74) and attach with cowl clamp (28), screw (27), lock washer (26), and nut (25).

(9) Install o-rings (23) in oil cooler, slide the two sealing screws (22) onto thermal bypass valve assembly (21) tubes and attach thermal bypass valve assembly (21) to oil cooler (36) by screwing in the sealing screws (22).

(10) Install two o-rings (20,13) in thermal bypass valve assembly (21). Slide sealing screws (19,12) onto oil tube assemblies (16,9). Attach the oil tube assemblies (16,9) to thermal bypass valve assembly (21) by screwing in sealing screws; but, do not tighten sealing screws until opposite ends of oil tubes are attached.

(11) Install two o-rings (18), one on each side of oil tube (16), and attach oil tube to oil chamber (74) with banjo bolt (17). Tighten banjo bolt (17) and sealing screw (19) alternately until seal is attained at each end of oil tube (16). Install o-ring (15) on drain plug (14) and install drain plug (14) in banjo bolt (17).

(12) Install two o-rings (11), one on each side of oil tube (9), and attach oil tube to oil filter housing (61) with tube bolt (10). Tighten tube bolt (10) and sealing screw (12) alternately until seal is attained at each end of oil tube (9).

(13) If insert (75) and stud (6) were removed, install the insert and stud in oil chamber (74). Position gasket (5) over stud (6) and position square section ring (4) on oil chamber (74). Assemble oil separator assembly (1) on oil chamber (74) and secure with lock washer (3), nut (2), and screw separator bolt (1, figure 8-5) into oil chamber.

6-6. OIL SEPARATOR ASSEMBLY. Repair the oil separator assembly (figure 8-5) as follows:

a. Disassembly. Refer to paragraph 6-5.a.(1) for removal of oil separator assembly (1, figure 8-4) from air compressor assembly. Disassemble oil separator assembly (figure 8-5) in following sequence.

(1) Remove separator bolt (1) and o-ring packing (2).

(2) Remove two 7/8-inch long cap screws (3) and two 1-1/4-inch long cap screws (4) and remove the minimum pressure valve assembly from housing (40). Remove the gasket (15). Disassemble the minimum pressure valve assembly as follows:

(a) Remove retaining ring (5) and seat (6). Remove o-ring (7) from seat (6).

(b) Remove piston (8) and remove seal (9) from piston (8).

(c) Remove spring (10) and piston (11). Remove o-ring (12) from piston (11). Remove spring (13).

(3) Remove two cap screws (16). Turn the separator housing upside down and dislodge the bleeder valve assembly parts (17 through 29). Remove gasket (30). Disassemble bleeder valve in the following sequence:

(a) Remove cover (17), left out dish (19), remove window (18) and o-ring (20).

(b) Remove spring (21), piston (22), diaphragm (23), nozzle (24), plunger (25), and seat (26).

(c) Remove filter assembly (27), bleeder valve (28), and o-ring (29).

(4) Unscrew and remove safety valve (31). Pull cover assembly out of housing (40). Remove the nut that attaches gauge (32) to cover (34) and remove gauge from cover. Assemble nut back on gauge to prevent its loss. Remove o-ring (33) and o-ring (35) from cover (34).

(5) Remove the two grids (36), three felts (37), two seals (38), and seal wires (39) from housing (40). Note the sequence of removal of these parts for assembly reference.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean all parts except o-rings (2, 7, 12, 20, 29, 33, 35, figure 8-5), gaskets (15, 30), seals (9, 38), and felts (37) with solvent, Fed Spec P-D-680, Type II.

NOTE

Felt change kit is available. See figure 8-5 for kit components.

c. Inspection. Inspect all parts for cracks, breaks, distortion, and condition of threads. Detailed inspection is as follows:

(1) Inspect bleeder valve window (18, figure 8-5) for cracks and breaks. Inspect bleeder filter assembly (27) for corrosion and any other visible damage.

(2) Inspect air pressure gauge (32) for cracked or damaged gauge face and threaded connection for damaged threads. Check operation of gauge.

(3) Inspect safety valve (31) for proper operation as described in paragraph 6-3.c.(7), and steps thereunder, except adjust test pressure to 240 ± 5 psi (1653.6 ± 34.5 kPa).

(4) Inspect felts (37) for deterioration and shrinking.

(5) Inspect springs (10, 13, 21) for broken coils and for resiliency.

d. Repair. Repair of the oil separator assembly is limited to the replacement of all parts found defective during inspection.

e. Assembly. Assemble the oil separator assembly (figure 8-5) in the following sequence.

(1) Remove nut from gauge (32) and carefully press gauge into separator cover (34). Install o-ring (33) and secure gauge in cover with gauge nut. Assemble o-ring (35) on cover (34).

(2) Install wires (39) in new seals (38). Position grid (36) in housing (40) followed by felt (37), wire and seal (39, 38), felt (37), wire and seal (39, 38), felt (37), and grid (36).

(3) Assemble cover (34) in housing (40), aligning hole in cover with hole in housing for bolt (1). Install o-ring (2) on bolt (1) and install the bolt. Install safety valve (31).

(4) Assemble bleeder valve assembly to housing (40) as follows:

(a) Place o-ring (29) on valve seat (26) and install filter assembly (27), bleeder valve (28), valve seat (26), plunger (25), nozzle (24), diaphragm (23), piston (22), and spring (21) in housing (40).

(b) Place o-ring (20), dish (19), and window (18) in cover (17). Position gasket (30) on housing (40) and secure cover (17) to housing with two screws (16).

(5) Assemble minimum pressure valve assembly as follows:

(a) Place o-ring (12) on piston (11), seal (9) on piston (8), and o-ring (7) on seat (6).

(b) Assemble spring (13), piston (11), spring (10), piston (8), and seat (6) in housing (14). Secure these parts in housing (14) with retaining ring (5).

(c) Position gasket (15) on housing (40). Assemble minimum pressure valve assembly on housing (40) and secure with two screws (4) and two screws (3).

(6) Assemble oil separator assembly (1, figure 8-4) as instructed in paragraph 6-5.e.(13).

6-7. THERMAL BYPASS VALVE ASSEMBLY. Repair thermal bypass valve assembly (figure 8-6) as follows:

a. Disassembly. Refer to paragraph 6-5.a.(3), (4) and (5) for removal of thermal bypass valve assembly (21, figure 8-4) from air compressor assembly. Disassemble thermal bypass valve assembly (figure 8-6) in following sequence.

(1) Remove four screws (2), lock washers (3), and cover (1). Remove o-ring (4) from cover (1).

(2) Lift the shuttle assembly out of body (16) and remove the power element spring (14). Remove o-ring (13) from shuttle (12).

(3) To disassemble the shuttle assembly, remove cotter pin (5), adjusting nut (6) and plunger (8). Remove retaining ring (7), power element (9), shuttle guide (10) and spring (11) from shuttle (12).

(4) As necessary, remove the two tube assemblies (15) from body (16).

WARNING

Provide adequate ventilation when using dry cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean all parts, except o-rings (4, 13, figure 8-6) with solvent, Fed Spec P-D-680, Type II. Wipe o-rings (4, 13) with a clean, lint-free cloth.

c. Inspection. Inspect all parts for crack, breaks, and distortion. Inspect springs (11, 14, figure 8-6) for broken coils and resiliency. Check power element (9) for proper operation as follows:

(1) Use a suitable container (with controlled heating capability) of clean compressor oil with sufficient quantity of oil to immerse the sensing end of the power element in a holding device. Remove cotter pin from adjusting nut and place the power element, with plunger and nut, in holding fixture (sensing end of power element in the oil). See figure 6-2 for a typical setup.

(2) Place setup pin (2.000 inches (50.800 mm) long) next to test element, lower weighted cylinder (15 pounds (6.804 kg) onto setup pin. Turn adjusting nut until it just touches the weighted cylinder. Raise cylinder and install cotter pin through nut and plunger, turning nut only enough to align cotter pin holes. Remove setup pin and replace with checking pin (2.021 inches (51.333 mm) long). Lower weighted cylinder onto checking pin.

(3) Heat the container of oil and observe the action of plunger and nut. The plunger should begin to raise when temperature of oil reaches 150°F (66°C). When nut reaches the weighted cylinder, the element and plunger action will raise weighted cylinder off checking pin. At 185°F (85°C), piston will have reached travel maximum. Travel range is 0.140 to 0.170-inch (3.556 to 4.318 mm) in temperature range of 150°F to 185°F (66°C to 85°C).

d. Repair. Repair of thermal bypass valve assembly is limited to replacement of parts found defective during inspection. If power element (9, figure 8-6) is defective, replace entire shuttle assembly.

e. Assembly. Assemble the thermal bypass valve assembly (figure 8-6) in following sequence.

(1) If removed, assemble the two tube assemblies (15) to valve body (16).

(2) Assemble power element (9) into shuttle (12), assemble spring (11), guide (10), and retaining ring (7). Assemble adjusting nut (6) onto plunger (8) and assemble plunger into shuttle assembly.

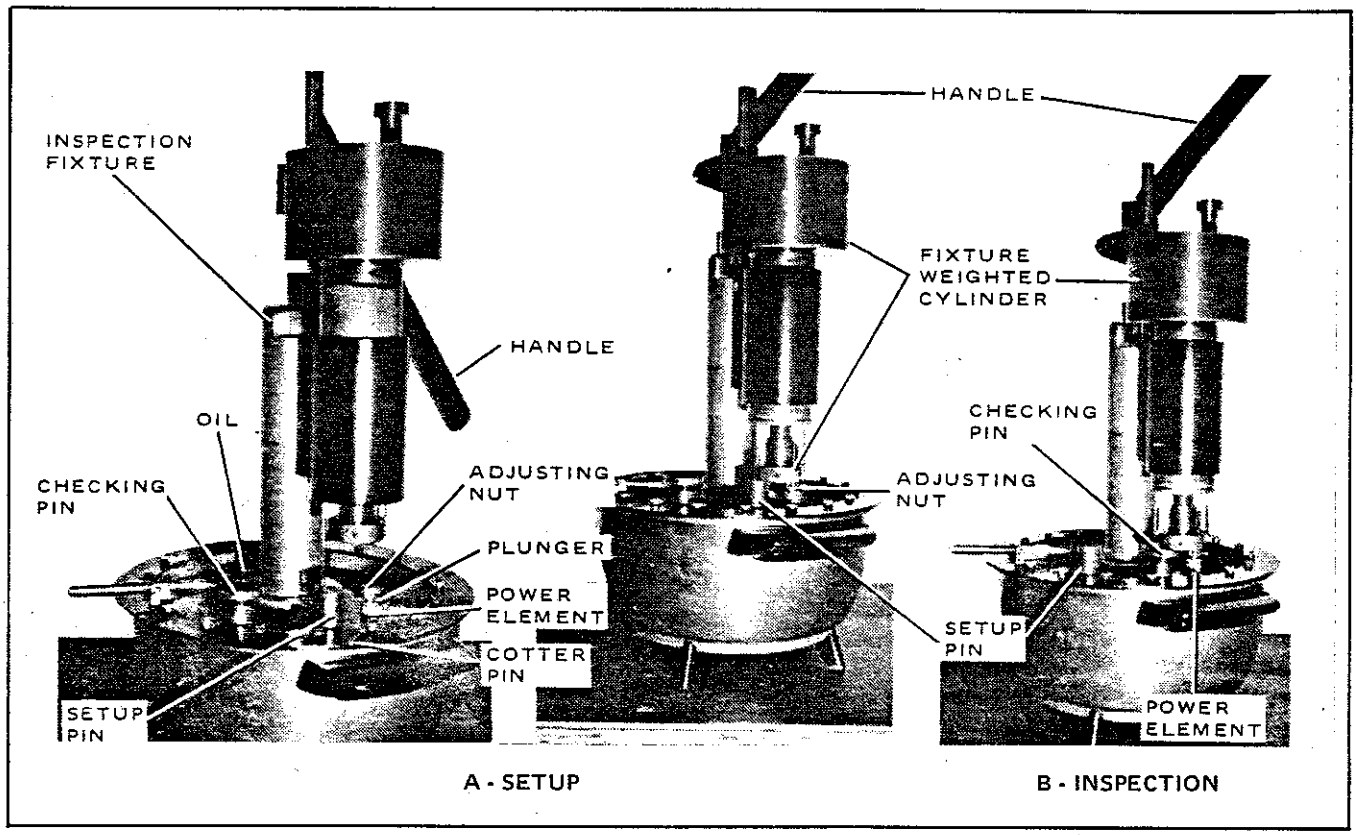


Figure 6-2. Shuttle Power Element Inspection

(3) Inspect and set the shuttle power element assembly as described in paragraph 6-7.c; then, install cotter pin (5).

(4) After shuttle assembly is set, install o-ring (13) on shuttle (12), assemble spring (14) into body (16), and install the shuttle assembly.

(5) Install o-ring (4) onto cover (1), assemble the cover (1) to body and secure with the four lock washers (3) and screws (2).

(6) Refer to paragraph 6-5.e. (9) through (12) and assemble thermal bypass valve assembly on compressor.

6-8. ROTOR-STATOR ASSEMBLY. Repair the rotor-stator assembly (figure 8-7) as follows:

a. Disassembly. Refer to paragraphs 6-5.a. steps (1) through (9) and remove the rotor-stator assembly (51, figure 8-4) from the air compressor. Disassemble rotor-stator (figure 8-7) in following sequence.

(1) Remove the stator cap (1). Unscrew and remove the plunger bushing (2) and plunger (3). Remove o-rings (4), one from plunger and one from end cover (5).

(2) Remove five locknuts (6) and remove the non-drive end cover assembly (5) from second-stage stator (14).

NOTE

Tap the non-drive end cover (5) lightly with a fiber faced hammer to dislodge from dowels (9).

CAUTION

When removing dowels (9) from second-stage stator (14), use care so that dowel holes are not elongated or other damage to second-stage stator does not occur.

(3) If necessary to replace bearing (8), press the bearing (8) out of end cover (7). When necessary, remove the two dowels (9) from second-stage stator (14).

(4) Remove three screws (11), lock washers (12), valve guards (10), and reed valves (13). One of these groups of parts is on the second-stage stator (14); the other two are on the first-stage stator (27).

(5) Separate the second-stage stator (14) from the division plate (19) and remove the second-stage rotor blade set (16) (eight blades per set). Slide the second-stage rotor (15) off the shaft extension of the first-stage rotor (25) and remove the second-stage rotor key (17). Remove o-ring (18) from division plate (19) and separate division plate (19) from the first-stage stator (27).

NOTE

Tap division plate (19) lightly with a fiber faced hammer to dislodge from dowels (24). It is not necessary to remove either setscrew (20, 21) from division plate (19).

(6) Only if necessary to replace bearing (22), press the division plate bearing (22) out of the division plate (19).

CAUTION

When removing dowels (23), use care so that dowel holes in first-stage stator (27) are not elongated, or any other damage to stator does not occur.

(7) Slide the spacer (23) out of bore in stator (27). When necessary, remove the two dowels (24).

(8) Pull the first-stage rotor (25) out of stator (27) bore and remove the first-stage blade set (26) (twelve per set).

(9) Separate first-stage stator (27) from drive end cover (55).

NOTE

Tap the stator (27) lightly with a fiber faced hammer to dislodge from dowels (32).

(10) Remove spring (28), servo valve (29), servo valve plug (31) and o-ring (30) from stator (27).

CAUTION

When removing dowels (32) from drive end cover (55), use care so that dowel holes are not elongated or other damage to end cover does not occur.

(11) If necessary, remove two dowels (32) from drive end cover (55).

(12) Loosen or remove nut (33) and remove bushing lock screw (34). Remove two sealing screws (35). Remove the non-return valve assembly, valve washer (41), and the unloader valve assembly. To disassemble non-return valve assembly, remove retaining ring (36) and seat (37) from stem (40). When necessary, remove spring pin (38) and ball (39) from stem (40). To disassemble the unloader valve assembly, remove pin (42), spring stop (43), spring (44), and sleeve (45) from piston (46).

(13) If necessary, remove the five studs (47) from drive end cover (55). Remove the oil seal (48), thrust washer (49), sealing sleeve (50), and o-ring (51). When necessary, remove spring pin (52).

(14) Remove the two o-rings (53) from grooves on drive-end cover (55). When replacement of end cover bearing is necessary, press bearing (54) out of end cover bore.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean all metallic parts with solvent, Fed Spec P-D-680, Type II. Wipe non-metallic parts with a clean, lint-free cloth moistened slightly with solvent and dry thoroughly.

c. Inspection. Inspect all parts for cracks, breaks, and distortion. Refer to Table 6-1, Table of Limits for specific inspection.

d. Repair. Repair of rotor-stator assembly components is outlined below. Replace defective parts not specified for repair in following paragraphs.

(1) First-Stage Rotor (25, figure 8-7). Remove scores and grooves from end faces of first-stage rotor, not to exceed 0.005-inch (0.127 mm) each end. Undercut worn and scored rotor journals not to exceed 0.010-inch (0.254 mm) undersize. (See table 6-1). Worn rotor journals that will not clean up within the specified limits may be repaired as follows:

(a) Undercut the cast iron bearing journals to 0.125 ± 0.001-inch (3.175 ± 0.025 mm) undersize. Manufacture bearing journal sleeves using 4130 steel stock. The inside diameter of the sleeves should be of a size to allow 0.001-inch (0.025 mm) press fit when installed on the undercut journal. The outside diameter of the sleeves should be of a size to permit grinding to the original diameter of the journal, and the length should not exceed the width of the journal. Drill 3/32-inch (2.381 mm) diameter holes through the sleeves to match oil passage holes in rotor shaft journals. Press the sleeves onto journals aligning the sleeve and rotor oil holes. Solder the exposed end of the sleeves to the rotor shaft using silver solder.

NOTE

A 16 micro-inch finish is required on the ground surface of the sleeve.

(b) Grind the outside diameter of the sleeve to the original journal diameter (see table 6-1) and remove burrs from edge of sleeves and oil holes.

(2) End Covers and Division Plate. Remove scores and grooves from wear surfaces of the non-drive end cover (5, figure 8-7), drive end cover (55), and each side of division plate (19) (refer to table 6-1). If bearing bores of these three parts show evidence of wear beyond limits shown in table 6-1, press worn bearing out and replace with new bearings.

CAUTION

When installing new bearings (22, 54, figure 8-7) in division plate (19) and drive end cover (55), make certain that oil hole in bearing aligns with oil hole in mating part. Also, make certain that all bearings do not protrude beyond surfaces of end covers and division plate.

NOTE

When machining or grinding, remove only enough material to clean up wear and scores (usually 0.010 in.) (0.254 mm). However, additional material may be removed provided the minimum limits are maintained. A 65 micro-inch finish is required on the reworked surfaces.

(3) First-Stage Stator (27, figure 8-7). After rework of the first-stage rotor (25), end covers (5, 55) and division plate (19) is completed, it may be necessary to rework the stator (27) to assure that correct clearance is maintained (refer to table 6-1). Rework the stator, as required, as follows:

CAUTION

When reworking parts, exercise care to assure concentricity is maintained. The overall length of the first-stage rotor and stator should never be decreased more than 0.025-inch (0.635 mm) when rework is accomplished.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

(a) Clean the stator (27, figure 8-7) with solvent, Federal Specification P-D-680, Type II.

(b) Glass bead blast to remove rust.

(c) Magnetic particle inspect for cracks around dowel pin holes. Discard stator if cracks are found.

(d) Place stator in line boring machine, or a suitable substitute, and machine the large bore to 3.070 ± 0.001-inches (77.978 ± 0.025 mm) inside diameter.

(e) Machine the small radius to 1.325 ± 0.001-inches (33.630 ± 0.025 mm) inside diameter.

(f) Inspect large bore and small radius for defects. If defects are found, repeat machining procedure removing only sufficient material to clean up the surface. Do not exceed 3.095-inches (78.613 mm) inside diameter large bore and 1.332-inches (33.833 mm) inside diameter on small radius. A 65 micro-inch finish, or better, is required.

(g) Electric etch the number two on the flange outer edge after rework to indicate rework has been accomplished.

(4) Second-Stage Stator (14, figure 8-7). Rework the second-stage stator, as necessary, to maintain correct clearance (refer to table 6-1) as follows:

CAUTION

The overall length of the second-stage rotor (15, figure 8-7) and stator (14) should never be decreased more than 0.010-inch (0.254 mm) when rework is accomplished. A 65 micro-inch, or better, finish is required.

WARNING

Provide adequate ventilation when using dry cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

(a) Clean the stator (14) using solvent, Federal Specification P-D-680, Type II.

(b) Glass bead blast the stator to remove rust.

(c) Magnetic particle inspect for cracks around dowel pin holes. Discard stator if cracks are found.

(d) Place stator in boring machine, or a suitable substitute, and machine the large bore to 3.015 ± 0.001-inch (76.581 ± 0.025 mm) inside diameter. Machine small radius to 1.337 ± 0.001-inches (33.960 ± 0.025 mm) inside diameter.

(e) Inspect the bore and radius for defects. If defects are found, repeat maching procedure removing only sufficient material to clean up the defects. Do not exceed 3.030 +0.000, -0.001-inches (76.962 + 0.000, -0.025 mm) inside diameter in large bore and 1.340 + 0.000, -0.001-inches (34.036 + 0.000 -0.025 mm) in radius.

(f) Electric etch the number two on the outer flange of the stator to indicate rework has been accomplished.

(5) Servo Valve (29, figure 8-7). Before assembly, check the servo valve for any burrs or scores that may cause sticking in its bore in stator (27). Remove burrs and scores with fine crocus cloth. Insert the servo valve into the unloader valve bore in the stator and check for free movement. If sticking occurs, remove the servo valve from stator. Use a small cylinder hone or fine crocus cloth to remove burrs and scores from stator to assure free movement of the servo valve.

e. Assembly. Assemble rotor-stator (figure 8-7) in following sequence:

(1) If pin (52) was removed from stator drive end cover (55), press in a new pin.

(2) If bearing (54) was removed, press bearing into end cover (55). Assemble a new o-ring (51) on sealing sleeve (50), position sleeve and o-ring into bore of end cover (55); then, press in oil seal (48)

(3) If dowels (32) were removed, press the two dowels into end cover (55). Install the five studs (47) into end cover (55).

(4) Assemble sleeve (45), spring (44), and stop (43) onto unloader valve piston (46) and secure parts together by installing pin (42).

(5) Assemble ball (39) into non-return valve stem (40) and install pin (38). Assemble valve seat (37) onto stem (40) and install retaining ring (36).

(6) Install unloader valve assembly (42 through 46) into first-stage stator (27) and secure in place with two sealing screws (35), bushing lock screw (34) and nut (33). Assemble non-return valve assembly (36 through 40) into unloader valve assembly.

(7) Install spring (28), servo valve (29), o-ring (30), and servo valve plug (31) into stator (27).

NOTE

Assemble first-stage stator to drive end cover carefully so that non-return valve assembly or unloader valve assembly parts do not drop out of stator.

(8) If dowels (24) were removed from stator (27), install two new dowels (24).

(9) Carefully assemble stator (27) onto studs (47) and against the end cover.

CAUTION

Install blades (26) with radius edge toward stator bore.

(10) Insert first-stage rotor (25) carefully into bore of stator (27). Coat the twelve first-stage blades (26) liberally with clean compressor oil and install in rotor slots.

(11) Assemble spacer (23) into stator (27) so that it rests against spring (28).

(12) If bearing (22) was removed from division plate (19), press in a new bearing. If setscrews (20, 21) were removed, install setscrews in division plate (19). Assemble division plate onto dowels (24) and against stator (27). Install a new o-ring (18).

(13) Install key (17) into keyway in rotor (25) shaft extension. Assemble second-stage rotor (15) onto shaft extension and key. Assemble second-stage stator (14) over rotor (15) and onto dowels (24) and against division plate.

CAUTION

Install blades (16) with radius edge toward stator bore.

(14) Coat blades (16) liberally with clean compressor oil and install in rotor slots. Install three reed valves (13), two on first-stage stator (27) and one on second-stage stator (14), and secure with valve guards (10), lock washers (12), and screws (11).

(15) If dowels (9) were removed from stator (14), install two new dowels. If bearing (8) was removed from cover (7), press in a new bearing.

(16) Assemble non-drive end cover (5) onto dowels (9) and against stator (14). Secure end cover with five lock nuts (6). Torque the nuts to 6 foot-pounds (8.13 N.m).

(17) Install one o-ring (4) onto plunger (3), install plunger (3) into end cover and secure plunger bushing (2). Install one o-ring (4) on end cover (5). Assemble stator cap (1) onto end cover (5).

(18) Install two new o-rings (53) in the drive end cover (55) grooves and install the fiber thrust washer (49).

(19) Refer to paragraphs 6-5.e. steps (5) through (13) and install rotor-stator assembly (51, figure 8-4) into compressor.

f. Remote Testing of Air End Assembly. Test the completely assembled air end (figure 8-4) on a remote test stand in the following manner.

(1) Use a standard flowmeter with scale graduation of 1 to 30 CFM (0.03 to 0.85 m^3/min).

(2) Install the flowmeter on the air receiver service line outlet down stream of the service line shut-off valve.

(3) Install the compressor to be tested on the test stand and service with lubricating oil, MIL-L-17331.

(4) Before connecting air line to the air receiver, start the unit and operate for 15 minutes under no load. During this cycle, check for undue noise and oil leaks.

(5) Stop unit, allow air to bleed from the unit and install the compressor to receiver air line.

(6) Start the unit and allow the compressor to compress up to 100 PSI (689 kPa). Screw the unloader valve adjusting knob counterclockwise until compressor unloads. After the compressor unloads, allow it to cycle 15 minutes; check for oil leaks and undue noise in compressor.

(7) Turn the unloader adjusting knob clockwise until it seats. Allow compressor to pump 200 PSI (1378 kPa). Turn unloader adjusting knob counterclockwise until compressor unloads. Run compressor for 30 minutes.

(8) Open the valve between the air receiver and the flowmeter slowly until the flowmeter indicates 13 CFM (0.37 m^3/min). Observe the pressure on the air receiver gage. If the pressure drops on the receiver gage, slowly close the shutoff valve until a constant pressure of 170 PSI (1171 kPa) is attained in the receiver. Observe the flowmeter, if less than 13 CFM (0.37 m^3/min) is indicated, further repairs will be required. Allow unit to operate in this condition for one hour.

(9) A lower reading than 13 CFM (0.37 m^3/min) indicates excessive tolerance. If this condition exists remove, disassemble and correct the deficiency.

(10) The above test procedures cover the test after overhaul or repair and apply to the air end test only. The flowmeter is suitable for end item testing.

6-9. ENGINE ASSEMBLY. Refer to figure 8-8 and repair engine assembly as follows.

NOTE

Each of the repairable subassemblies of the engine assembly are covered in separate paragraphs appearing later in this section.

a. Disassembly. Disassemble the engine assembly in following sequence as necessary for repair.

(1) Remove four cap screws (2, figure 8-8) and lock washers (3); remove exhaust manifold (1) and two gaskets (4).

(2) Disconnect all leads of ignition coil assembly (5) and remove two spark plugs (24, figure 8-9). Remove cap screw (7, figure 8-8), lock washer (8), two screws (9) and washers (10), ignition coil bracket (6), and fitting (11). Remove two screws (13), lock washers (14), plain washers (15), lock washers (16), and breaker box assembly (12). Refer to paragraph 6-10 for breaker box assembly details.

(3) Disconnect and remove tube assembly (17) and two fittings (18). Remove two cap screws (20), washers (21), lift off fuel pump assembly (19), and remove two gaskets (22) and pump spacer (23).

(4) Loosen clamps (25, 26) and remove sleeve (27) and carburetor inlet (24). Remove two cap screws (29) and washers (30); lift off carburetor assembly (28) and remove gasket (31). Refer to paragraph 6-11 for carburetor details.

(5) Remove lock nut and screw attaching condensor (32), disconnect and remove the condensor (32). Loosen hardware securing alternator (33) to mounting bracket (38) and adjusting bracket (34). Move alternator (33) toward engine to relieve tension on drive belt (44) and remove the belt (44).

(6) Remove lock nut (37), screw (35), hardware attaching alternator assembly (33) and adjusting bracket (34). Remove the adjusting bracket (34) and alternator assembly. Refer to paragraph 6-12 for alternator details.

(7) Remove three cap screws (39), lock washers (40), flat washers (41), mounting bracket (38) and brace (43).

(8) Remove alternator drive pulley (45), four screws (47), lock washers (48), flat washers (49), blower scroll (46), and blower wheel (50). Remove three cap screws (53), lock washers (54), blower housing (52), and as necessary, plug (51).

(9) Remove two cap screws (56), lock washers (57), and starter assembly (55). Refer to paragraph 6-13 for starter assembly details. Remove two cap screws (59), lock washers (60) and starter mounting flange (58).

(10) Remove screws (63) and the cylinder housings (61, 62). Remove crankshaft key (64). Remove two cap screws (67), lock washers (68), intake

manifold (66) and two gaskets (69). Refer to paragraph 6-14 for engine cylinder block and head assembly and governor and throttle group details.

WARNING

Provide adequate ventilation when using dry cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Thoroughly clean engine parts with solvent, Fed Spec P-D-680, Type II. Special cleaning instruction for removed subassemblies are found in separate paragraphs for that subassembly.

c. Inspection. Inspect removed parts for cracks, breaks, distortion, and corrosion. Refer to table 6-1 and detailed paragraphs for subassemblies for specific inspection procedures.

d. Repair. Repair of engine components shown on figure 8-8 is limited to replacement of parts found defective during inspection. Refer to subassembly paragraphs for detailed repair instructions.

e. Assembly. Assemble the engine (figure 8-8) in the following sequence.

(1) Install two new gaskets (69) and assemble intake manifold (66) attaching with two lock washers (68) and cap screws (67). Install crankshaft key (64) and tape in place until ready to install impeller. Install the cylinder housings (61, 62) and attach with screws (63).

(2) Position starting motor flange (58) and attach with two lock washers (60) and cap screws (59). Attach the starter assembly (55) with two lock washers (57) and cap screws (56).

(3) If removed, install plug (51), assemble blower housing (52) and install three lock washers (54) and cap screws (53). Assemble blower wheel (50), blower scroll (46), flat washers (49), lock washers (48), cap screws (47) and drive pulley (45).

(4) Assemble alternator mounting bracket (38), brace (43), flat washers (41), lock washers (40) and cap screws (39).

(5) Install alternator assembly (33), attaching with hardware removed at disassembly, install adjusting bracket (34), screw (35) and lock nut (37).

(6) Install drive belt (44) on drive pulley (45) and alternator pulley. Adjust tension on belt (44) by moving alternator (33) away from engine; then, tighten adjusting bracket (34) screws.

(7) Attach condensor (32) with screw and lock nut and connect condensor lead.

(8) Assemble new carburetor gasket (31) and the carburetor assembly (28); attach with two lock washers (30) and cap screws (29). Connect carburetor inlet (24) and sleeve (27) attaching with clamps (25, 26).

(9) Assemble two new gaskets (22), pump spacer (23), install fuel pump assembly (19) and attach with two washers (21) and cap screws (20). Install two fittings (18) and connect tube assembly (17).

(10) Attach breaker box assembly (12) with two external tooth lock washers (16), plain brass washers (15), internal tooth lock washers (14), and screws (13). Install fitting (11) and attach ignition coil bracket (6) with washers (10), screws (9), lock washer (8) and cap screw (7). Install spark plugs and connect all ignition coil (5) leads.

(11) Assemble two new exhaust manifold gaskets (4), the exhaust manifold (1), and attach with four lock washers (3) and cap screws (2).

6-10. BREAKER BOX ASSEMBLY. Repair breaker box assembly (figure 8-9) as follows.

a. Disassembly. Disconnect and remove the short and long spark plug cables (22, 23) from coil assembly (19) and the two spark plugs (24). Disassemble breaker box group in following sequence:

(1) Remove two screws (2), washers (3), cover (1), and gasket (4). Remove mounting gasket (5). Disconnect leads inside breaker box (16).

(2) Remove two screws (7), washers (8), breaker point assembly (6) and adjusting cam (9).

(3) Remove special screw (11) and condenser (10). Press out breaker plunger assembly (12). Plug (13) need not be removed.

(4) Remove shield nipple (14) and gasket (15) from breaker box (16). Remove screw (18), two nuts (29), screws (28) and wire assembly (27). When necessary to disassemble capacitor (17) from coil assembly (19), remove the attaching nuts and lock washers and remove the capacitor.

(5) As needed, remove four screws (20), lock washers (21) and coil assembly (19). Disconnect and remove breaker box lead (25). When necessary remove resistor (26).

WARNING

Provide adequate ventilation when using dry cleaning solvent (Federal Specification P-D-680, Type II) and/or trichloroethane. Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean metallic parts with solvent, Fed Spec P-D-680, Type II. Remove any accumulation of rust and corrosion from electrical parts using 1, 1, 1-Trichloroethane solvent, Federal Specification O-T-620A.

c. Inspection. Inspect all parts for crack, breaks, distortion, and corrosion. Inspect components as follows.

(1) Inspect breaker points (6, figure 8-9) for burned or pitted condition.

(2) Check condenser (10) using a standard condenser tester.

(3) Examine all leads for deterioration, broken insulation, evidence of shorts, and damaged terminal connectors.

(4) Inspect spark plugs (24) for cracks, breaks, and burned electrodes. Check with standard automotive type plug tester.

d. Repair. Replace all parts found defective during inspection. Set spark plug (24) electrode gap to 0.025 inch (0.635 mm). When breaker point assembly (6) is replaced, always replace condenser (10).

e. Assembly. Assemble breaker box assembly group (figure 8-9) in following sequence.

(1) If removed, install resistor (26). Install breaker box lead (25) into coil assembly (19). If removed, assemble capacitor (17) onto coil assembly (19) and secure with two lock washers and nuts.

(2) Assemble coil assembly (19) onto mounting bracket and install four lock washers (21) and screws (20). Connect wire assembly (27) to capacitor (17) and resistor (26) with screws (18, 28) and nuts (29).

(3) Assemble gasket (15) and shield nipple (14) on breaker box (16). If removed, install plug (13). Press in plunger assembly (12); attach condenser (10) with special screw (11). Install adjusting cam (9) and assemble breaker point assembly (6) in breaker box (16) with two washers (8) and screws (7). Make all lead connection.. (Refer to paragraph 5-7.a and figure 5-1 for breaker point adjustment and timing.)

(4) Install mounting gasket (5) when breaker box (16) is mounted on engine. Assemble cover gasket (4) and cover (1); attach cover with washers (3) and screws (2).

(5) Install spark plugs (24) and connect spark plug cables (22, 23).

6-11. CARBURETOR ASSEMBLY. Repair the carburetor assembly (figure 8-10) as follows.

a. Disassembly. Disassemble carburetor assembly, to extent necessary, in following sequence.

NOTE

A gasket kit and overhaul kit is available. Refer to Maintenance Parts List 8-10 for details.

(1) Remove two screws (2) and choke fly (1) from choke shaft (3) and pull choke shaft (3) from choke sleeve cover (4).

(2) Remove screws (5, 6), remove cover (4) and gasket (7). Remove bracket (8) and, only when replacement is necessary, remove plug (9).

(3) Press float shaft (11) out of cover (4) and remove float and lever assembly (10). Remove

float valve assembly (12) and gasket (13).

(4) Remove two screws (15) and throttle fly (14) from throttle shaft (21). Remove throttle stop lever assembly from end of throttle shaft (21) by removing nut (17) and screw (18). Remove screw (19) and spring (20) from lever (16). Pull throttle shaft (21) from body (33).

(5) Unscrew and remove idle adjusting needle (22) and spring (23). Remove nozzle (24) and gasket (25). To disassemble main adjusting needle assembly, disassemble needle retainer (26), packing retainer (27), adjusting needle (28), and needle packing (29).

(6) Remove nozzle nut and jet (30) and gasket (31). Only when necessary, press the two bushings (32) out of body (33).

WARNING

Provide adequate ventilation when using dry cleaning solvent (Federal Specification P-D-680, Type II), Isopropyl Alcohol and Acetone. Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Remove gum deposits from parts by soaking in alcohol or acetone. Use a fine, soft wire to clean jets. Wash all metal parts in solvent, Fed Spec P-D-680, Type II.

c. Inspection. Inspect all parts for cracks, breaks, distortion, and corrosion. Inspect components as follows.

(1) Inspect float assembly (10, figure 8-10) for ruptures, breaks, cracks, and leaks.

(2) Examine tip of each needle (22, 28) for pits and blunted or grooved condition.

(3) Inspect needle seats in body (33) for pits and grooves.

d. Repair. Replace all defective parts found during inspection. Use gasket kit and overhaul kit. (Refer to Maintenance Parts List 8-10.)

e. Assembly. Assemble the carburetor (figure 8-10) in following sequence.

(1) If removed, press bushings (32) into body (33). Install gasket (31) and nozzle nut and jet (30).

(2) Assemble needle packing (29), adjusting needle (28), packing retainer (27), and needle retainer (26). Install gasket (25) and nozzle (24) in body (33). Install spring (23) and idle adjusting needle (22).

(3) Position throttle shaft (21) in body (33); install throttle stop lever (16) onto shaft (21) and secure with screw (18) and nut (17). Assemble spring (20) onto screw (19) and install screw (19) on lever (16). Attach throttle fly (14) to shaft (21) with two screws (15). Check shaft (21) for free movement in body.

(4) Assemble gasket (13) and float valve assembly (12) in cover (4). Attach float (10) to cover with float shaft (11).

(5) If removed, install plug (9). Place gasket (7) on body (33) and assemble cover (4) on body with choke bracket (8) in position. Attach cover (4) with screws (5, 6).

CAUTION

Tighten screws (5, 6) alternately and evenly to prevent warpage of cover (4) and resulting fuel leakage.

(6) Position choke shaft (3) in cover (4) and attach choke fly (1) to shaft (3) with two screws (2).

NOTE

Refer to paragraph 5-7.b for carburetor adjustment after installing carburetor assembly on engine.

6-12. ALTERNATOR ASSEMBLY. Repair alternator assembly (figure 8-11) as follows.

a. Disassembly. Disassemble alternator assembly, to extent necessary, in following sequence.

(1) Place alternator in a vise with soft jaws, holding on mounting ear of front housing (7, figure 8-11). Remove pulley nut (2), washer (3), pulley (1), fan (5), key (4) and spacer (6).

(2) Remove four square nuts (8) and through bolts (9). Carefully insert two screwdriver blades in opposite openings between stator (26) and front housing (7) and pry apart. Do not allow screwdriver blades to touch stator windings. Do not insert blades more than 1/16-inch (1.59 mm). Separate stator (26) and housing (7) producing two subassemblies. One of the rear housing (32) and stator (26); the other of front housing (7) and rotor assembly (13).

(3) Compress ears of front bearing retainer (10), lift retainer free of recess in housing (7). Tap threaded end of rotor assembly (13) shaft on a wooden block to separate front housing (7). Remove housing (7) and, using bearing puller, remove bearings (11, 12) from rotor shaft.

(4) Remove three screws (15) and separate voltage regulator (14) from rear housing (32). Disconnect leads of regulator and remove voltage regulator (14). Remove screws (17), brush holder cover (16), dust shield (18), lift out brush assembly (19).

(5) Remove isolation diode assembly (20) terminal nuts, washers, insulators, and sleeves (21 through 25); remove isolation diode assembly (20).

(6) Place open end of stator (26) on clean work surface. Carefully and evenly tap rectifier diodes (27, 28) on studs separating rear housing (32). Remove insulator sleeves and washers (30, 29). Remove rear bearing retainer (31) from housing (32).

(7) Unsolder stator (26) leads from diode assemblies (27, 28). Mark leads for assembly reference. Use a heat sink, such as needle nose pliers, placed between top of diode and diode body to protect it from heat damage.

b. Cleaning.

WARNING

Provide adequate ventilation when using trichloroethane, or equivalent, to clean electrical components. Avoid prolonged breathing of vapors and minimize contact with skin.

CAUTION

Do not use steam or water to clean any electrical component.

(1) Use trichloroethane, or equivalent, to clean electrical components of alternator assembly. Dry thoroughly before testing or reassembly.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

(2) Clean nonelectrical components, such as pulley (1), fan (5), and the like using solvent, Fed Spec P-D-680, Type II.

CAUTION

Bearings (11, 12, figure 8-11) are sealed and contain lubrication for the life of the bearing. Do not clean bearings in solvent that might dissolve lubricant.

c. Inspection and Repair. Inspect and repair alternator components as follows.

(1) Inspect length of brushes (19, figure 8-11). They shall be at least 3/16 inch (4.76 mm) long and free of cracks. Brushes should not be oil soaked. Replace faulty or worn brush assembly (19).

(2) Using multimeter, test isolation diode assembly (20) to determine if diodes will allow current flow in one direction. Reverse test leads, diodes should oppose current flow in the opposite direction. Replace faulty diode assembly.

(3) Using multimeter test all diodes in the negative diode assembly (27) for forward current flow. Reverse test leads, there should be no reverse current flow. Replace the complete diode assembly (27) if any diode in the assembly is open or shorted.

(4) Using multimeter test all diodes in the positive diode assembly (28) for forward current flow.

Reverse test leads, there should be no reverse current flow. Replace the complete diode assembly (28) if any diode in the assembly is open or shorted.

(5) Inspect stator winding (26) for discoloration of the winding insulating enamel. Discoloration is an indication of an overheated stator that may result in shorted or grounded windings.

(6) Using multimeter, check each stator circuit winding for continuity. Also, check for infinite resistance from each winding lead to laminated stator. Replace stator if test indicates open or grounded windings.

(7) Inspect rotor assembly (13) for the following conditions:

(a) Stripped threads on shaft

(b) Worn key slot

(c) Worn or dry bearings (11, 12).

(8) Replace rotor assembly (13) if any of the above indications are noted.

(9) Clean rotor slip ring assembly brush contacting surfaces with fine crocus cloth per Federal Specification P-C-458, or equivalent, wipe away residue. If surfaces are worn beyond this restoration, replace rotor assembly (13).

(10) Inspect rear housing (32) for a cracked or broken casting, stripped threads or evidence of severe wear in the bearing bore due to worn bearing retainer (31) or rotor bearing (12).

(11) Inspect all other parts for cracks, breaks, damaged screw threads, or any other defect. Replace all defective parts.

d. Assembly. Assemble alternator assembly (figure 8-11) in the following sequence.

(1) Connect diode assemblies (27, 28) to stator (26) leads by soldering the leads together as marked at disassembly.

(2) Install bearing retainer (31) in rear housing (32). Place insulator washers and sleeves (29, 30) on diode assembly studs. Assemble diode assemblies (27, 28) and stator (26) in housing (32). Assemble isolation diode assembly (20) with sleeves, insulators, washers, and nuts (25 through 21) as shown on figure 8-11.

(3) Assemble brush assembly (19), dust shield (18), cover (16), and install two screws (17). Connect voltage regulator leads and attach voltage regulator (14) with three screws (15).

(4) Press bearing (12) on rotor assembly (13). Press bearing (11) into housing (7) and install retainer (10). Assemble front housing (7) onto rotor assembly (13) (threaded shaft end). Assemble rotor assembly (13) with housing (7) into stator (26) and housing (32) subassembly. Install four through bolts (9) and square nuts (8).

(5) Install fan spacer (6), key (4), fan (5), pulley (1), and secure on rotor shaft with washer (3) and nut (2).

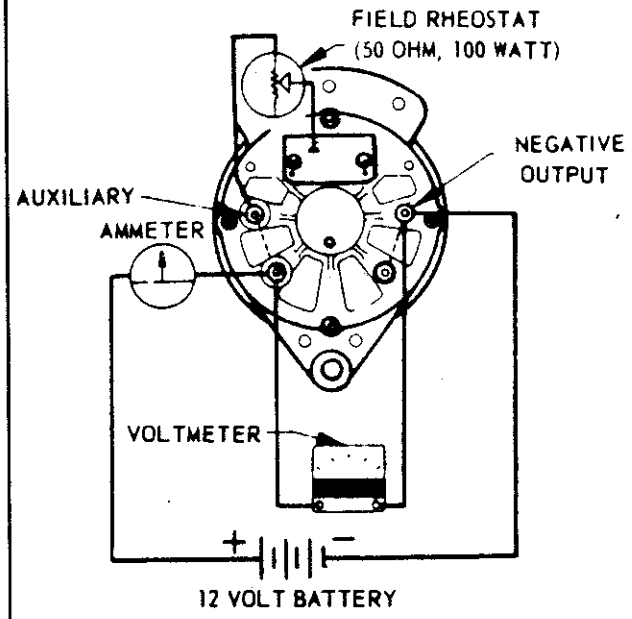
e. Testing After Assembly. With regulator (14, figure 8-11) and isolation diode assembly (20) removed, the alternator may be tested to determine charging ability. Mount the alternator on a test bench, or on the engine, and make electrical connections shown on figure 6-3. Set rheostat at maximum resistance. Operate the alternator, in proper direction of rotation, at 3000 to 4000 rpm. Gradually reduce resistance of rheostat and observe that charging starts. Reduce resistance until output of 35 amperes is obtained. Stop test immediately after reaching 35-amperes output. Replace the alternator if output is not at least 25 amperes. Install voltage regulator (14, figure 8-11) and isolation diode assembly before further testing as described below.

CAUTION

Do not operate alternator for above testing for more than a few minutes due to lack of voltage control.

NOTE

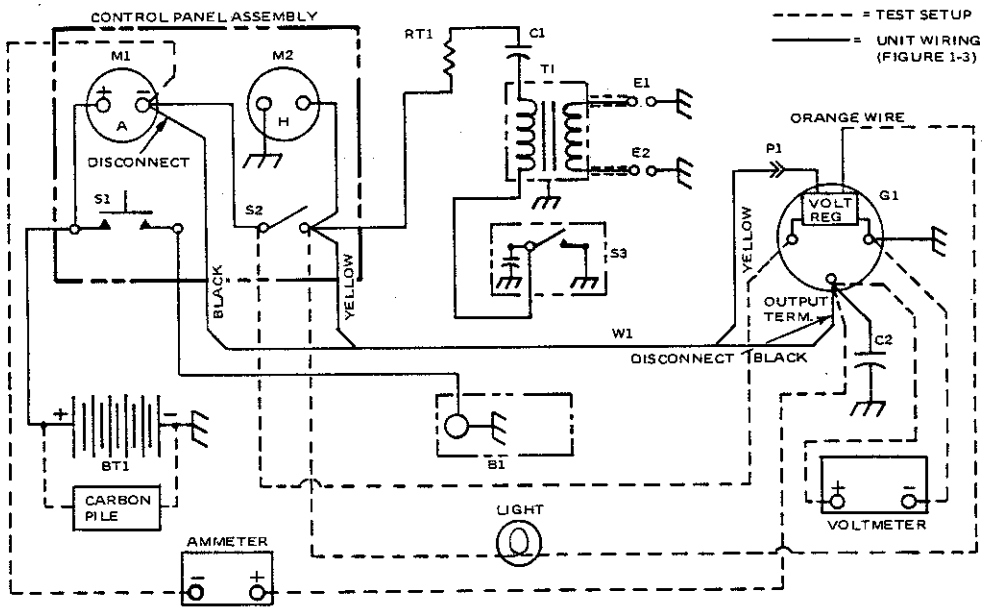
The alternator/regulator may be installed on the engine or on a test bench for the following tests. If installed on the engine, make test connections shown on figure 6-4. If tested on a test bench, all connections shown on figure 6-4 must be made.



ALTERNATOR TEST EQUIPMENT REQUIRED

Nomenclature	Part Number	National Stock Number
Multimeter	AN/PSM-6	6625-00-643-1686
Carbon Pile Load	BST-11 (Mfd by 82386)	
Voltmeter	622 (Mfd by 65092)	6625-00-193-6944
Resistor, Series, 0.25 ohm, 100 Watts	None	
Rheostat, Wirewound, 0-50 Ohms, 100 Watts	None	

Figure 6-3. Alternator Charging Test



TEMPERATURE EFFECT ON OUTPUT VOLTAGE

Ambient Temperature	°F °C	0 -18	20 -6.6	40 4.5	60 15.5	80 26.6	100 38	120 49
Output Terminal Voltage (8 to 10 Ampere Load)		15.40 14.60	15.25 14.45	15.08 14.26	14.92 14.13	14.75 13.95	14.60 13.80	14.45 13.65

Figure 6-4. Alternator/Regulator Test Schematic

(1) Connect instruments and carbon pile as shown in figure 6-4. Test output as follows:

NOTE

When testing on engine, disconnect black lead of wiring harness at output terminal on alternator and negative terminal of control panel mounted ammeter.

(a) Drive alternator at approximately 2250 rpm. Charge indicator lamp should be on.

(b) If ammeter shows less than 10 amperes, increase load with carbon pile (lower resistance) to reach that value.

(c) Run at these conditions for 5 minutes to stabilize temperature.

(d) Move voltmeter positive to battery positive terminal. If this voltage is less than previous voltage by more than 0.2 volt, inspect wiring for poor connections, defective insulation, or short circuit and repair as necessary.

(e) Reconnect voltmeter to alternator positive output, increase alternator speed to 3000 to 4000 rpm and increase carbon pile load so that alternator reaches maximum output. This should be approximately 35 amperes but not less than 25 at normal room temperature.

(f) Observe that voltage is between 13.0 and 15.0 volts during testing.

(2) With connections as in figure 6-4 except that carbon pile is disconnected, and ignition switch off, observe that ammeter reads zero and voltmeter shows battery voltage. Current flow indicates isolation diode assembly (20, figure 8-11) is shorted. Continue as follows:

(a) Move voltmeter positive lead to auxiliary terminal. If meter shows voltage, diode assembly (20) is shorted or wire terminal at positive output is shorting the stud to diode assembly.

(b) Replace isolation diode assembly if defective.

(3) With connections as in figure 6-4 except that carbon pile is disconnected and voltmeter positive lead is connected to auxilliary terminal, turn ignition switch on and observe that voltmeter reads 1.5 to 2.5 volts. If voltage exceeds 2.5 volts, rotor or regulator may be defective. Turn switch off and proceed as follows:

(a) Remove regulator mounting screws and washers. Do not disconnect field lead from brush terminal.

(b) Place short jumper cable, with insulation piercing alligator clips, between auxilliary terminal and alternator brush terminal. Do not allow clips to contact alternator or regulator casting.

(c) Turn ignition switch on. If voltage is now correct (1.5 to 2.5 volts), replace the regulator.

(d) If voltage still exceeds 2.5 volts, replace the rotor.

(4) With connections as in paragraph (3) above, start engine and run for a few minutes at speed to give approximately 2250 rpm at alternator. Observe that voltmeter reads 0.8 to 1.2 volts higher than the temperature corrected output voltage given in figure 6-4. (It will be necessary to switch positive voltmeter lead between auxiliary and output terminal a few times to determine voltage.) If auxiliary terminal voltage is correct, but output terminal shows only battery voltage, the isolation diode assembly (20, figure 8-11) is open and must be replaced.

(5) During test of paragraph (4) above, if the ammeter showed current of 8 to 10 amperes, the voltage at the output terminal is the regulator setting. Refer to figure 6-4 for effect of ambient temperature on output voltage.

(a) If current exceeds 10 amperes, insert a 1/4-ohms resistor in series with the output terminal. Stop alternator to insert resistor and provide a heavy shorting jumper around resistor for starting engine. After engine has run a few minutes, remove jumper and read voltage at output terminals.

(b) If voltage is too high with resistor in circuit, use a short jumper with insulation

piercing alligator clips to bypass auxiliary and negative output terminal connections. Repair faulty leads or connections if found.

(c) If leads or connections are satisfactory (paragraph (b) above), but voltage is high, replace regulator.

6-13. STARTER ASSEMBLY. Repair starter assembly (figure 8-12) as follows.

a. Disassembly. Disassemble the starter in following sequence.

(1) Remove screws and washers attaching housing (6) to frame and field assembly (11) and remove the housing (6). Remove setscrew and remove Bendix drive (8), intermediate bearing assembly (9), thrust washers (5) and key from armature (10) shaft. Press bearing (7) from housing (6) only when necessary.

(2) Loosen nut and screw attaching cover band (1) and remove the band (1). Remove screws and washers attaching commutator head assembly (2) to frame and field assembly (11). Lift brushes from holders and remove head assembly (2).

(3) Pull armature (10) from frame and field assembly (11) and remove thrust washer (5) from commutator end shaft. When necessary for replacement only, remove nuts, washers, terminal washers, and insulating washers that comprise the terminal stud package (12).

(4) Frame and field assembly (11) need not be disassembled. When inspection indicates faulty field windings, replace the assembly.

WARNING

Provide adequate ventilation when using dry cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean all metal parts with solvent, Fed Spec P-D-680, Type II. Clean armature (10, figure 8-12) with a soft brush moistened slightly with solvent. Remove all copper chips, solder, or foreign matter from armature. Clean foreign matter from frame and field assembly (11) by blowing dry, filtered, low-pressure compressed air through the assembly. Wipe with a dry, clean, lint-free cloth.

c. Inspection. Inspect all parts for cracks, breaks, distortion, and corrosion. Inspect components as follows.

(1) Inspect gear teeth of Bendix drive (8, figure 8-12) for chipping, wear, or any other damage.

(2) Inspect thrust washers (5) for scoring and wear.

(3) Inspect armature (10) commutator surface for burns, grooves, and scoring. Inspect each commutator bar for burned or blackened condition. Check that no two adjacent bars are joined electrically by copper chips, solder, or carbon dust. Check for shorted windings with a growler. Inspect for grounded armature using an ohmmeter. A reading on the meter indicates a grounded armature winding.

(4) Inspect brushes for excessive wear. Refer to paragraph 5-7.d for brush replacement.

(5) Inspect frame and field assembly (11) for visible damage to wires and insulation. Check field windings for ground by connecting one terminal of a 110 volt test lamp circuit to one of the field leads and the other terminal to the frame. Check the other lead the same way. If test lamp lights, even dimly, grounded field coil is indicated.

d. Repair. Replace all parts found to be defective during inspection.

e. Assembly. Assemble the starter (figure 8-12) in following sequence.

(1) If disassembled, assemble insulating washers, terminal washers, washers, and nuts which comprise the terminal stud package (12).

(2) Carefully insert armature (10) into frame and field assembly (11). Place thrust washer (5) on commutator end shaft of armature.

(3) Install commutator head assembly (2) and secure to frame with washers and screws removed at disassembly. Insert brushes in brush holders of head assembly (2). Install cover band (1) and tighten nut and screw to secure the band in position.

(4) If removed, press bearing (7) into housing (6). Install key in armature shaft keyway, assemble thrust washers (5), intermediate bearing (9), Bendix drive (8), install setscrew. Carefully assemble pinion housing (6) against frame and secure with washers and screws removed at disassembly.

6-14. ENGINE CYLINDER BLOCK AND HEAD ASSEMBLY. Repair of the engine cylinder block and head assembly group (figure 8-13) is as follows.

a. Disassembly. Disassemble cylinder block and head assembly group (figure 8-13) to extent necessary as follows:

(1) Remove breather tube cap (1), breather valve (2) and carefully pull out breather tube (3).

(2) Remove screw (4), lock washer (5), flat washer (6) and use a puller, such as Onan No. 420-0100, or equivalent, to remove flywheel assembly (8, 9); remove key (7) from crankshaft keyway.

(3) Disconnect and remove rod end clip (1, figure 8-14), governor arm link (2), ball joint (3), adjusting nut (4), spring stud (5) and governor spring (6). Remove two screws (8) and spring bracket (7).

CAUTION

When removing gear cover assembly (13 through 24, figure 8-13), tap gently with a soft faced hammer to loosen from cylinder block. Do not use a pry bar or screwdriver as cover may be broken.

(4) Remove four cap screws (10), cap screw (11) and five flat washers (12). Tap gear cover (24) gently with a soft faced hammer and remove gear cover assembly (13 through 24).

(5) Press oil seal (13) out of cover (24). Remove yoke retaining ring (18), yoke assembly (16), pull arm and shaft assembly (14) out of cover (24) and remove sensitivity clip (15). Remove upper needle bearing (20), lower needle bearing (21), oil seal (19) and thrust ball bearing (22). Remove ball pin (23).

(6) As necessary remove two gear cover locating pins (26) and remove all gasket (27) material that may have stuck to mounting surfaces.

(7) Remove two cap screws (29), copper washers (30), valve compartment covers (28), and cover gaskets (31). Pull out oil fill indicator and cap (32) and remove cap gasket (33). Remove two cap screws (35), lock washers (36), oil fill tube (34), and tube gasket (37).

(8) Remove drain plug (38), four cap screws (40) and lock washers (41), oil base (39) and base gasket (42).

(9) Remove oil bypass stud and nut (43), copper washer (44), spring (45), and bypass valve (46). Remove retaining ring (47) and washer (48). Remove retaining ring (49), governor cup assembly (50) and catch the ten governor fly balls (51) as the cup assembly (50) is removed. Remove spacer (53) and plate (54). Pull timing gear and camshaft (52, 101) out of cylinder block (104). Press timing gear (52) off camshaft (101) and remove thrust washer (55) and key (56).

(10) Use a suitable gear puller and puller ring, Onan No. 420-0248, or equivalent, and remove crankshaft timing gear (54A).

(11) Remove two cap screws (58), lock washers (59) and the oil pump assembly (57). Remove oil pump gasket kit (60).

NOTE

Make note of thickness and quantity of shim gaskets (60) removed for reassembly reference.

(12) Disconnect oil pump intake (61). (Oil pressure tube assembly (62) and gauge adapter (64) are shown on figure 8-13 for reference only. They were previously removed.) As necessary, remove oil line elbow (63).

CAUTION

When removing cylinder heads (65, 66), do not use pry bar or screwdriver to loosen from cylinder block (104). Rap sharply with a soft faced hammer, taking care not to break cooling fins.

(13) Remove eight cap screws (67), ten cap screws (68) and eighteen flat washers (69). Rap each cylinder head (65, 66) sharply with soft faced hammer on side to loosen and remove cylinder heads (65, 66). Remove the two cylinder head gaskets (70).

(14) Use a conventional type valve spring lifter tool and remove intake valve spring retainer locks (71), remove spring washers (72), pull intake valves (76) out and remove valve springs (73). Remove valve guides (74) and tappets (77).

(15) Use conventional type valve spring lifter tool and remove exhaust valve spring retainer locks (78), exhaust valve rotocaps (79), pull out exhaust valves (82) and remove exhaust valve springs (80). Remove valve guides (81) and tappets (83). As necessary, press out exhaust valve seat inserts (83A).

(16) Free each connecting rod assembly (84) from crankshaft (99) by removing screws (85) freeing rod caps. Slide each rod assembly (84), with piston (87) attached, out through top of cylinder. Remove piston ring set (90) from pistons. Remove retaining rings (89) and slide piston pin (88) out freeing piston (87) from rod (84). Remove connecting rod bushing (86) and connecting rod bearings (86A). Assemble rod caps back onto rod from which it was removed. Keep connecting rod bearings (86A) with their respective connecting rod assemblies (84).

(17) Remove five cap screws (92) and lock washers (93) and remove rear bearing plate (91). Remove the crankshaft (99) from cylinder block (104). Press oil seal (95) and bearing (96) out of bearing plate (91). If bearing stop pins (97) are damaged, pull out of plate (91). Also, press other bearing (96) out of cylinder block (104) and remove the other stop pins (97) as necessary. Remove bearing plate gasket kit (98).

CAUTION

Drive or press crankshaft bearing (96) and camshaft bearings (102) from the outside toward the inside of cylinder block (104). Avoid damaging cylinder block (104) during removal of bearings.

(18) Remove expansion plug (100) and press the two camshaft bearings (102) out of cylinder block (104). Crankcase oil tube (103) should be removed only if replacement is necessary.

WARNING

Provide adequate ventilation when using cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Thoroughly clean all engine parts of oil, dirt, gasket material, and carbon deposits using solvent, Fed Spec P-D-680, Type II.

c. Inspection. Refer to Table 6-1, Table of Limits, for tolerance limits and torque limits. Specific inspection is as follows.

(1) Inspect governor spring (6, figure 8-14) for broken coils and for resiliency.

(2) Inspect flywheel ring gear (8, figure 8-13) teeth for cracks, breaks, chips, and wear. Inspect for evidence of slippage on flywheel.

(3) Inspect governor cup (50), spacer (53), and plate (54) for any damage or wear that would interfere with movement of fly balls (51) when reassembled.

(4) Inspect timing gears (52, 54A) for damaged or worn teeth. Check gear backlash at assembly.

(5) Check oil pump assembly (57) thoroughly for damaged or worn parts. Check oil pump gear backlash at reassembly.

(6) Inspect cylinder heads (65, 66) for any deep scratches, nicks, and cracks. Inspect cylinder bores in block (104) for limits shown in table 6-1.

(7) Check that valves (76, 82) are not pitted, burned, or warped. Examine valve seats, valve face and stems for scratches, nicks, burrs and similar damage. Check valve stem clearances in guides (74, 81). Check valve seat width and angle and valve face angle. Refer to table 6-1.

(8) Inspect connecting rods (84) and pistons (87) for deep scratches, nicks and other damage. Check that rods are not twisted. Refer to table 6-1 for limits.

(9) Inspect ring set (90) for fit in piston grooves, for tension, and for seating on cylinder walls. Check ring gap.

(10) Inspect crankshaft (99) bearing journals for any scoring. Check that drilled oil passages are not plugged. Refer to table 6-1 for limits.

(11) Check camshaft (101) for nicks, burrs, excessive wear, or other damage. See table 6-1 for limits.

d. Repair. Make the following general repairs to cylinder block and head group (figure 8-13).

(1) Replace all o-rings, seals, and gaskets and all parts which are damaged or worn beyond limits shown in table 6-1.

NOTE

Engine gasket kits are available. See Maintenance Parts Lists 8-8 and 8-13 for details. Also, it is recommended that all bearings be replaced at major overhaul.

(2) If crankshaft (99) bearing journals are not within required limits (table 6-1), refinish journals following good automotive shop practice.

NOTE

Undersize precision type crankshaft bearings (96, figure 8-13) and connecting rod bearings (86A) are available. Refinish crankshaft journals to accommodate undersize bearings to be used.

(3) If cylinder bores are not within required limits (table 6-1), rebore and hone cylinders, using good standard automotive shop practice, to accommodate oversize pistons and ring set. See Maintenance Parts List 8-13 for available sizes of pistons (87) and ring sets (90).

(4) Repair valves (76, 82) and valve seats as follows.

(a) Grind valve seats in the cylinder block with an automotive type seat grinding machine. Use a 45 degree stone and grind seat to 45 degree angle with seat band of 1/32 to 3/64 inch (0.794 to 1.191 mm) wide. Grind only enough to assure proper seating of valve.

(b) Reface valves to a 44 degree angle using a conventional automotive type valve grinding machine. Grind only enough material to assure proper seating.

NOTE

The valve face angle of 44 degrees and seat angle of 45 degrees provides a one degree interference angle. This results in a sharp seating surface between valve and top of valve seat. The valves should not be lapped since the sharp contact may be destroyed.

(c) Remove all grinding dust from cylinder block seats and from the valves.

(d) Check each valve for tight seat using an air pressure type testing tool. If such a tool is not available, make pencil marks at intervals across the face of the valve and observe if marks rub off uniformly when valve is rotated part of a turn against the seat in cylinder block.

e. Assembly. Assemble engine cylinder block and head assembly group (figure 8-13) in following sequence.

(1) Press the two camshaft bearings (102, figure 8-13) into cylinder block (104) bores as shown in figure 6-5. Coat the bearings with clean engine oil to reduce friction. Press the front bearing in position with oil holes aligned. Press front bearing into block flush with outside of bearing bore. Press rear bearing in until past ignition plunger hole.

(2) If removed, install crankcase oil tube (103, figure 8-13) in cylinder block (104).

(3) If bearing stop pins (97) were removed, install new pins. Before installing new crankshaft bearings (96) place cylinder block (104) and bearing plate (91) in hot water or an oven heated to 200°F (93°C) to expand bearing bore. If practical, cool the bearings (96) to shrink it for easy installation.

CAUTION

If a torch is used to heat bores, apply only a little heat evenly to prevent warpage and loss of temper in the steel.

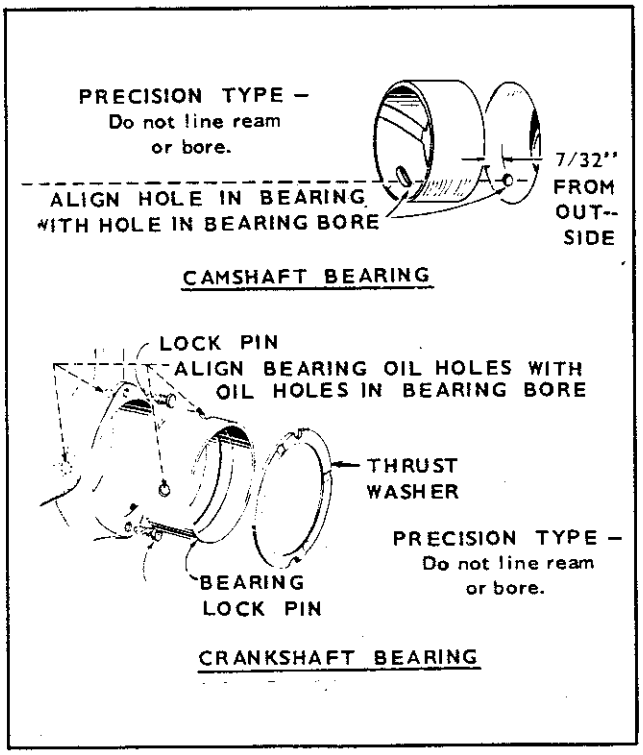


Figure 6-5. Engine Bearing Installation

(4) Align oil holes in bearings with oil holes in bearing bores (refer to figure 6-5). The oil passage must be at least 1/2 open. Oil the bearings and install in position tapping lightly. Install bearings flush with inside end of bore. Make certain notches fit over stop pins. Allow to cool.

(5) Install expansion plug (100, figure 8-13). Press new oil seal (95) into rear bearing plate (91) as shown in figure 6-6.

NOTE

Refer to table 6-1 for torque limits as assembly progresses. Gaskets (98, figure 8-13) may have to be changed to produce proper crankshaft end play. Checking end play is covered after assembly of crankshaft.

(6) Coat crankshaft bearings (96, figure 8-13) with clean engine oil and slide crankshaft (99) into position in cylinder block (104). Assemble gasket (98) and slide rear bearing plate (91) on end of crankshaft and attach with five lock washers (93) and cap screws (92). Check crankshaft end play (table 6-1). Remove rear bearing plate and change gaskets (98) to produce proper end play.

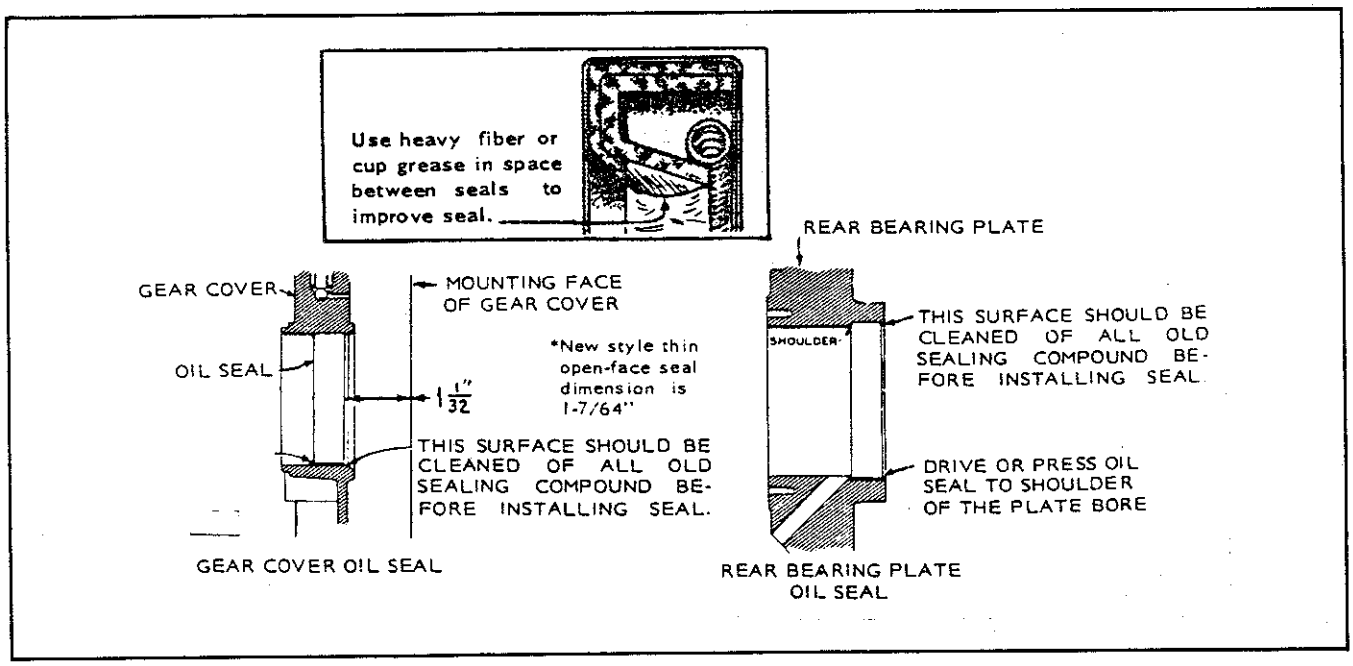


Figure 6-6. Oil Seal Installation

(7) Place thrust washer (55) on camshaft (101) and key (56) in camshaft keyway. Make certain that gear (52) is started straight and press onto camshaft assembly (101). Install plate (54) and press spacer (53) on camshaft. Position ten governor fly balls (51) and slide governor cup (50) on camshaft center pin. Install retaining ring (49) as shown in figure 6-7.

NOTE

The camshaft center pin extends out 3/4 inch (19.050 mm) from the end of the camshaft. This distance provides an in and out travel distance of 7/32 inch (5.556 mm) for the governor cup, as illustrated. Hold the cup against the flyballs when measuring. If the distance is less (the engine may race, especially at no load), remove the center pin and press a new pin in only the required amount. Otherwise, grind off the hub of the cup as required. The camshaft center pin cannot be pulled outward or removed without damage. If the center pin extends out too far, the cup will not hold the flyballs properly.

(8) Assemble camshaft assembly (101, figure 8-13) into cylinder block (104).

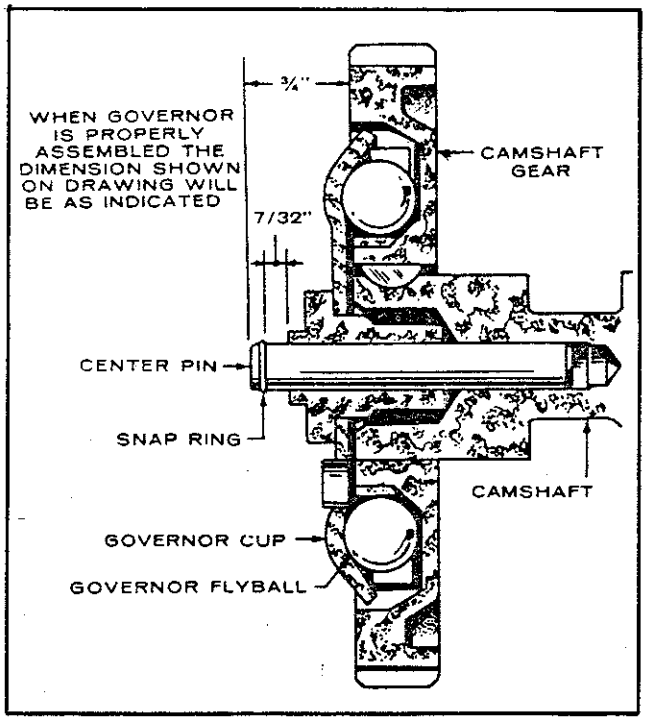


Figure 6-7. Governor Cup Installation

(9) Before installing new ring set (90) on each piston (87), check ring gap by placing each ring squarely in the cylinder, that it is to function in, at a position corresponding to the bottom of its travel. Gap between end of ring should be within limits specified in table 6-1. Rings which are slightly oversize may be filed as necessary to obtain correct gap. Do not use rings which require too much filing.

NOTE

Standard size rings may be used on a 0.005 inch (0.127 mm) oversize piston. The other available oversize rings are to be used with pistons of respective oversize dimensions. (See Maintenance Parts List 8-13). Rings of the tapered type are usually marked "TOP" on one side, or identified in some other manner, and the ring must be installed with this mark toward the closed end of the piston (87, figure 8-13). Space each ring gap one third of the way around the piston from the preceding one, with no gap directly in line with the piston pin (88). The bottom piston ring groove, on the piston (87) should be fitted with the expander and oil control ring, of the ring set (90), and the two upper grooves in the piston, should be fitted with the compression rings of the ring set. If a chrome faced ring is used, it will be in the top groove of the piston.

(10) Position connecting rod (84) in piston (87) and slide full floating type piston pin (88) into position. Secure piston pin (88) by attaching ring (89) on each side of piston pin (88). Slide assemblage of parts (84, 87, 88, 89 and 90) into cylinder. Check for correct piston to cylinder clearance to limits specified in table 6-1. Remove piston and rod assembly from cylinder and align before reassembly in engine.

CAUTION

The aligning should be done on an accurate aligning gage, with the technician following standard automotive shop practice for proper alignment procedures. Misalignment may cause rapid wear of piston (87), piston pin (88), cylinder bore and connecting rod (84).

(11) Slide each piston and rod assembly into position in cylinder block assembly (104). Install

the connecting rod bearings (86A), connecting rods and caps (84) with raised lines (witness marks) aligned and with the caps facing toward the oil base. Attach caps to connecting rods with cap screws (85). The rod and cap numbered 2 fits on the crankshaft journal nearest the bearing plate. Coat the crankshaft journal bearing surfaces with engine oil before installing the rods. Crank the engine by hand to see that the rods are free. If necessary, rap the connecting rod cap screws sharply with a soft-faced hammer to set the rod square on the journal.

(12) Check bearing clearance with Plastigauge, or equivalent, as follows:

NOTE

Make certain that all parts are marked or identified so that they are reinstalled in their original positions.

(a) Place a piece of correct size Plastigauge in the bearing cap the full width of the bearing insert about 1/4 inch (6.35 mm) off center (figure 6-8).

(b) Rotate the crank about 30 degrees from bottom dead center and reinstall the bearing cap. Tighten the bolts to the torque specified in table 6-1. Do not turn the crankshaft.

(c) Remove the bearing cap. Leave the flattened Plastigauge on the part to which it has adhered and compare the widest point with the graduations on the Plastigauge envelope to determine bearing clearance.

(d) If clearance is not within limits shown in table 6-1, refer to Maintenance Parts List 8-13 for undersize bearings.

(13) Position two valve tappets (83), for exhaust valves, in cylinder block assembly (104). Press two valve guides (81) into position. Lightly coat stems of two exhaust valves (82) with clean engine oil and install each as follows: Position and compress valve spring (80). Slide exhaust valve (82), stem down, into exhaust port. Position exhaust rotocap (79) and two rotocap locks (78) and relieve pressure on valve spring (80).

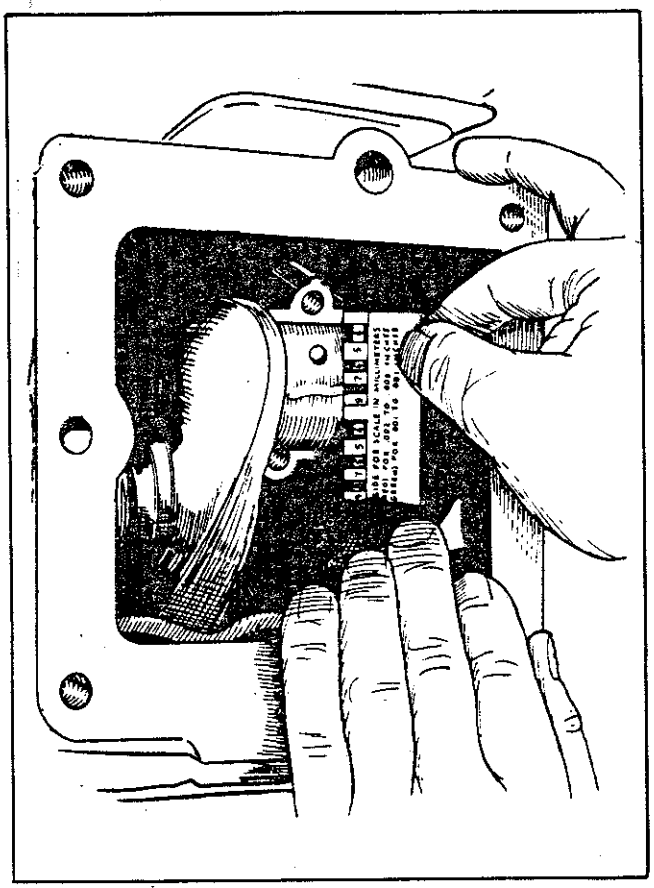


Figure 6-8. Measuring Bearing Clearance

(14) Position two valve tappets (77), for intake valves, in cylinder block assembly (104). Press two valve guides (74) into position. Lightly coat stems of two intake valves (76) with clean engine oil and install each as follows: Position and compress valve spring (73). Slide intake valve (76), stem down, in inlet port. Position spring washer (72) and two locks (71) and relieve pressure on valve spring (73).

(15) Facing flywheel position of engine, crank engine over slowly by hand until left hand intake valve opens and closes. Continue about one half turn. This should place the left hand piston at the top of its compression stroke, the position it must be in to properly adjust valve for the left hand cylinder. Using a feeler gage, turn adjusting screws on valve tappets (77 and 83) until they are set to the clearance specified in table 6-1.

NOTE

For each valve the thinner feeler gage (minimum) should pass freely between the valve stem and valve tappet but the thicker feeler gage (maximum) should not.

(16) Adjustment of tappets on right hand cylinder is the same as those specified in step (15) after turning the engine over by hand until right hand piston is at top of its compression stroke.

(17) Position head gasket (70, figure 8-13) and left hand cylinder head (65). Attach with nine washers (69), five screws (68) and four screws (67). Position head gasket (70) and right hand cylinder head (66). Attach with nine washers (69), five screws (68) and four screws (67). Torque all screws (68 and 67) to the limits specified in table 6-1. The cylinder head should be tightened in the order designated per figure 6-9 to a torque of 5 foot-pounds, then 10 foot-pounds, etc. until all are torqued to 29 to 31 foot-pounds (39.3 to 42.0 N.m).

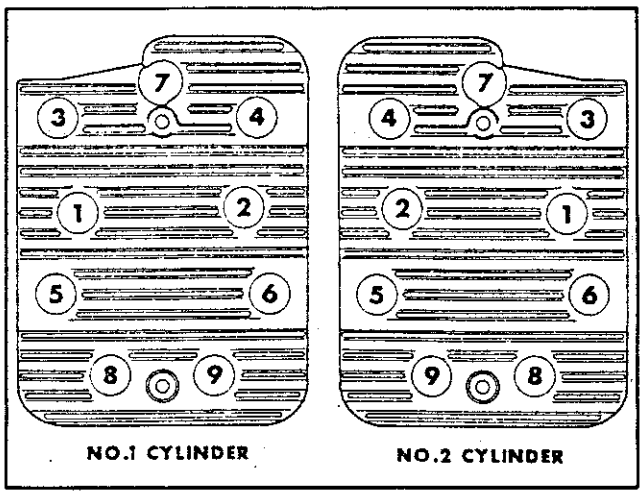


Figure 6-9. Head Bolt Tightening Sequence

(18) Screw oil pump assembly (57, figure 8-13) and intake (61) together. Oil the pump to prime it before attaching in the engine; Use oil, Military Specification MIL-L-2104A. Position oil pump assembly (57) and mounting shim gaskets (60); use the same amount and thickness of gaskets (60) previously noted at time of disassembly. Attach oil pump assembly with two washers (59) and two cap screws (58). Connect elbow (63).

(19) Turn the camshaft until the "O" mark on large timing gear (52) is in position to mate with "O" mark on small timing gear (54A) when it is pressed on the crankshaft (99). Position key (56) and press small timing gear (54A) on crankshaft. Make sure "O" marks on the timing gears are properly aligned. Position washer (48) and attach snap ring (47). Slide bypass valve (46) and spring (45) into position in cylinder block assembly (104). Position washer (45) and screw stud and nut (44) into cylinder block assembly (104).

NOTE

The stud and nut (43) are used to adjust oil pressure. Oil pressure at operating temperature is normally 20 to 35 pounds (137.8 to 241.2 kPa). To increase oil pressure, loosen nut and turn stud inward. To decrease oil pressure, turn stud outward. Be sure to tighten nut securely after making an adjustment.

(20) Position oil base gasket (42) on oil base (39). Place cylinder block assembly (104) on oil base (39) and attach with four washers (41) and four bolts (40). Position mounting gasket (37) and oil fill tube (34) on oil base (39) and attach with two washers (36) and two screws (35). Position cap gasket (33) on indicator and cap (32). Slide indicator and cap (32) into oil fill tube (34). Screw pipe plug (38) into oil base (39).

(21) Position two valve cover gaskets (31) and valve covers (28) on cylinder block assembly (104) and attach with two washers (30) and two cap screws (29).

(22) Press two locating pins (26) in cylinder block assembly (104). Press ball pin (23) in gear cover (24). Install oil seal (13) in gear cover (24) as shown in figure 6-6. Press upper needle bearing (21, figure 8-13) and oil seal (19) in gear cover (24). Position ball (22) and lower needle bearing (21) in cup inside the gear cover (24). Slide arm and shaft assembly (14) in gear cover. Slide yoke (16) in arm and shaft assembly (14). Attach the retaining ring (18). Slide clip (15) on arm and shaft (14).

(23) Position gear cover gasket (27) and install gear cover (24). Make sure that ball pin (23) engages chamfered hole in governor cup (50). Turn governor cup (50) so that chamfered hole is at three o'clock position. Turn arm and shaft assembly clockwise as far as possible and hold in this position until gear cover is installed flush against crankcase. Attach with five washers (12), one cap screw (11) and four cap screws (10).

(24) Press the ring gear (8) on the flywheel (9). Position key (7) and slide flywheel (9) on crankshaft (99). Position washers (6 and 5) and attach with screw (4). Torque screw (4) to limits specified in table 6-1.

(25) Press breather tube (3, figure 8-13) into cylinder block assembly (104). Slide valve (2) into top of breather tube (3) and position cap (1).

(26) Attach spring bracket (7, figure 8-14) to the engine with two screws (8).

(27) Position stud (5) in any one of four positions provided on spring bracket (7) and attach nut (4).

(28) Hook one end of spring (6) to hole in clip (15, figure 8-13) and other end to hole in end of stud (5, figure 8-14).

(29) Screw link (2) into ball joint (3) and slide rod end clip (1) on end of link (2). Position ball joint in slot provided in arm and shaft assembly.

6-15. AXLE ASSEMBLY. Repair the axle assembly (figure 8-15) as follows.

a. Disassembly. Disassemble the axle assembly, to extent necessary, in following sequence.

(1) Disconnect handbrake lever (9, figure 8-15) from frame by removing two nuts (1), lock washers (2), cap screws (4), four flat washers (3), and two spacers (13).

(2) Disconnect cross shaft bearings (22) from frame by removing four self-locking nuts (5) and cap screws (6).

(3) Disconnect axle beam (59) from frame by removing four self-locking nuts (7) and cap screws (8). The entire axle assembly may now be removed from the unit.

(4) Remove cotter pin (10), flat washer (11), yoke pin (12) and remove handbrake lever (9).

(5) Remove five each cotter pins (15) and yoke pins (16), loosen six nuts (17) and remove six brake rod yokes (14). As necessary, remove six nuts (17), two each from brake rod (18) and the two brake rods (19).

(6) Press out three spring pins (21) and remove three cross shaft levers (20). Slide two cross shaft bearings (22) off of cross shaft (24). As necessary, remove lubrication fittings (23) from cross shaft bearings (22).

(7) Remove five wheel nuts (25) and lock washers (26) attaching each of the two wheel assemblies and remove the assemblies. Refer to paragraph 5-9.c. for wheel separation and tire and tube removal and assembly (27 through 33).

(8) Remove hub cap (34), cotter pin (35), spindle nut (36) and washer (37). Remove outer bearing cone (38) and pull hub and drum assembly from axle spindle.

(9) Press grease seal (39) out of hub (45) and remove inner bearing cone (40). When necessary, press wheel studs (44) out of hub and drum assembly and separate brake drum (43) and hub (45). Press bearing cups (41, 42) out of hub (45).

(10) Remove four nuts (46), lock washers (47) and cap screws (48). Pull brake assembly off axle. Remove shoe springs (49), holddown springs (51) and brake shoes (50). Remove nut (53), lock washer (54), cap screw (55) and pull actuating lever (52) off serrated end of actuating camshaft (56). Separate camshaft (56), support plate (57) and dust shield (58).

NOTE

Wheel assemblies, hub and drum assemblies, and brake assemblies are the same on both ends of axle beam (59). Disassemble both as described in above paragraphs.

WARNING

Provide adequate ventilation when using dry cleaning solvent (Federal Specification P-D-680, Type II). Avoid prolonged breathing of vapors and minimize skin contact.

b. Cleaning. Clean all parts except tires (32, figure 8-15), tubes (33), grease seals (39), and brake shoes (50) with solvent, Fed Spec P-D-680, Type II.

c. Inspection. Inspect all parts for cracks, breaks, distortion, and corrosion. Check springs (49, 51, figure 8-15) for broken coils and resiliency. Inspect brake shoes (50) for excessive wear of lining and that shoe is secure on backing plate. Inspect bearing cups and cones (38, 40, 41, 42) for gritty action and evidence of cup (41, 42) slippage in hub (45). Inspect axle beam spindle ends for scoring, pitting, nicks, and burrs. Inspect serrated end of actuating camshaft (56) for excessive wear that would cause slippage of lever (52). Check action of handbrake lever (9). There should be no binding. Inspect tires and tubes (32, 33) for wear and cuts.

d. Repair. All parts found defective during inspection shall be replaced.

e. Assembly. Assemble the axle assembly (figure 8-15) in the following sequence.

(1) Assemble dust shield (58), support plate (57), actuating camshaft (56), install lever (52) on serrated end of camshaft (56) and secure with cap screw (55), lock washer (54), and nut (53).

(2) Assemble brake shoes (50), holddown springs (51) and shoe springs (49). Attach brake assembly to axle beam with cap screws (48), lock washers (47) and nuts (46).

(3) Press inner bearing cup (41) and outer bearing cup (42) into hub (45). Assemble brake drum (43) to hub (45) and press in wheel studs (44). Apply grease (table 5-2) on inner bearing cone (40), install in hub and drum assembly and press in new grease seal (39) with sealing lip facing toward cone (40). Fill hub cavity between cup (41) and cup (42) approximately 1/3 full with grease (table 5-2).

(4) Slide hub and drum assembly onto axle spindle. Assemble outer bearing cone (38), spindle washer (37) and spindle nut (36). Install cotter pin (35) and hub cap (34).

(5) Refer to paragraph 5-9.c. and assemble tube, tire, and wheel assembly (33 through 27). Assemble wheel assembly onto wheel studs (44) and attach with lock washers (26) and nuts (25).

NOTE

Assemble the brake assembly, hub and drum assembly, and wheel assembly in the same sequence on both ends of axle.

(6) Attach the axle beam (59) to unit frame with four cap screws (8) and self-locking nuts (7).

(7) Slide two cross shaft bearings (22) onto cross shaft (24). If removed, install lubrication fittings (23) in bearings (22). Position three cross shaft levers (20) on cross shaft (24) and press in spring pins (21).

(8) Attach the two cross shaft bearings (22) to unit frame with four cap screws (6) and self-locking nuts (5).

(9) Attach handbrake lever (9) to unit frame with two cap screws (4), four flat washers (3), two lock washers (2) and nuts (1), with two spacers (13) on cap screws (4) between side plates of handbrake lever.

(10) If removed, screw two nuts (17), one on each end, onto the two brake rods (19) and brake rod (18). Screw yokes (14) on each end of these brake rods. Attach brake rods (19) to cross shaft levers (20) and brake actuating levers (52) with yoke pins (16) and cotter pins (15).

(11) Attach brake rod (18) to cross shaft lever (20) with yoke pin (16) and cotter pin (15). Attach other end to handbrake lever (9) with yoke pin (12), flat washer (11), and cotter pin (10).

(12) Refer to paragraph 5-9.a. for handbrake lever adjustment and paragraph 5-9.b. for brake adjustment.

6-16. ASSEMBLY OF MAJOR COMPONENTS. Assembly of the unit major components is essentially the reverse of disassembly in following sequence.

a. If paint decal (96, figure 8-1) was removed, install new decal (96) on door panel (6). Install warranty plate (95), instruction plate (94) and wiring diagram plate (93) with four blind rivets each plate. Install flag decal (92) on roof (10). Attach document bag (91) to side panel (14) with screw and lock nut after unit is assembled. If removed, install new rubber bumper (90) on control panel door (5).

b. Install air filter bracket (88) onto frame with two cap screws and self-locking nuts. Install air filter assembly (89).

c. Instructions for mounting axle assembly (86) onto frame (97) are found in paragraph 6-15.e. Attach pintle hook assembly (87) to frame with four cap screws and self-locking nuts. Attach towbar assembly (80) to frame with four cap screws (82) and self-locking nuts (81). Assemble front leg support (83) onto towbar with support pin (84) and chain assembly pin (85).

d. Mount the engine assembly (79) on frame and attach with four cap screws and self-locking nuts. If engine adapter studs were removed from engine, install the four studs. Attach adapter (78) to engine (79) with four cap screws. Install impeller (77) on engine crankshaft with impeller keyway aligned with crankshaft key. Push impeller onto crankshaft to a position where face of impeller hub toward compressor is 4-1/2 inches (114.3 mm) from mounting face of engine adapter (78). Tighten setscrews in impeller hub and lock the setscrews with new lock wire.

e. Align compressor drive pins with impeller drive bores and mount air compressor assembly (76) on adapter (78). Attach with four lock nuts.

f. Install a new gasket (75) and attach air intake adapter (74) to compressor with two cap screws. Place hose clamps (71) on each end of air intake hose (70) and install hose (70) between air filter bracket (88) and adapter (74); tighten clamps (71). Place hose clamps (73) on each end of engine air intake hose (72), install hose between adapter (74) and engine carburetor; tighten hose clamps (73). Install shut-off valve (69) and elbow (68) in compressor oil separator housing and connect unloader tube assembly (67).

g. Place jam nuts (66) on lifting bail (64), install lifting bail (64) on frame and attach with self-locking nuts (65).

h. Use a suitable adhesive on one side of the two pieces of webbing (63) and position webbing, adhesive side down, on frame. Install fuel tank (60) and secure on frame with two tank straps (62), four flat washers, cap screws, and self-locking nuts. Install drain plug in bottom of fuel tank, install fuel level gauge (59) and fuel shut-off valve (58). Install fuel filler cap (61).

i. Install rear panel (56) and secure with two screws and lock nuts. Install fuel tube assembly (57) between shut-off valve (58) and engine fuel pump.

NOTE

As assembly progresses, install loop clamps to secure tube assemblies and wire assemblies in quantity and locations noted at disassembly.

j. Install reducing bushing (55) in hose reel assembly (51). Mount hose reel assembly (51) and attach with four cap screws (53), flat washers (54) and self-locking nuts (52). Install two tubing elbows (50) and connect hose assembly (49).

k. Position air receiver (45) on frame and attach with four lock washers and cap screws. Install rupture disc (48), safety valve (47) and drain valve (46) in air receiver. Install connector (44) and attach tube assembly (43).

l. Assemble pipe nipple (40), moisture separator (38), elbow (39), pipe nipple (41), pipe coupling (42) and install moisture trap drain cock in coupling (42).

m. Install battery pad, set in battery (37), place battery bolts (36) in position, install battery holddown (33) and secure with flat washers (35) and wing nuts (34) on battery bolts (36).

n. Attach battery ground cable (29) with cap screw, lock washer, internal-external tooth lock washer, and self-locking nut. Do not connect ground cable to battery until ready to test after assembly. Connect battery cable (30) and starter cable (31), attaching with loop type clamps (32) cap screws, and self-locking nuts in quantity and locations as removed at disassembly.

o. Install fan spacer (27) and attach with four cap screws (28) and lock washers. Install fan (26) and tighten setscrew in fan hub.

p. Assemble fan shroud (24), four spacers (23), aftercooler (22) and hot air duct adapter (21) to front panel (20) with four cap screws (25), flat washers, and self-locking nuts. Install front panel (20) on frame and attach with two screws and self-locking nuts.

q. Connect tube assembly (19) at moisture separator elbow (39) and at aftercooler (22) outlet. Install elbow (18) in compressor outlet and connect tube assembly (17) to elbow and at aftercooler inlet. Secure the tube assemblies with loop type clamps, screws, and lock nuts in quantity and locations as removed at disassembly.

r. With control panel assembly (14) preassembled as outlined in paragraph 6-3.e, install control panel assembly (14) onto unit and attach with seven screws and lock nuts. Make wiring connections, hose connections, cable connections, tubing connections, and wiring harness connections to rear of controls on panel (refer to air flow diagram and schematic wiring diagram, figures 1-4 and 1-3 respectively).

s. Install loop clamp (16, figure 8-1) on each side panel (14, 12) and secure with screw and lock nut. Install door supports (15) on each side panel (14, 12) with screw, loop clamp, nut, and self-locking nut. Do not overtighten lock nut. Door support (15) and loop clamp must be able to pivot. Attach transition duct (13) with four screws and lock nuts. Attach side panel (12) to unit with seven screws and lock nuts.

t. Install roof (10), position two spacers (11) between roof and lifting bail and secure the roof with two cap screws, six flat washers, and two lock nuts at roof spacers (11) and with three additional screws and lock nuts.

u. Attach loop type clamp (9) on each door (7, 6) with screw and lock nut. Install door latch and keeper (8) on each of the three doors (7, 6, 5), attaching with blind rivets. Attach side door (7) to unit with six screws and lock nuts. Attach side door (6) to unit with six screws and lock nuts. Attach control panel door (5) with four screws and lock nuts.

v. Install exhaust muffler (2) and assemble cap screw (3), washer and nut (4) to support end of muffler. Attach muffler guard (1) with four screws and lock nuts.

w. Connect choke and primer cables to carburetor and fuel primer levers. Connect battery cables not already connected. Check that all wiring and tubing connections have been made.

6-17. LUBRICATION. Refer to table 5-2 and service the engine, air compressor, and air filter.

6-18. TESTING AND ADJUSTING. This paragraph covers the end item testing and adjusting after overhaul.

a. Engine. Test the engine as follows:

CAUTION

Always open manual unloader valve (7, figure 4-1) before starting engine. This will allow engine to reach full RPM under no load, thereby reducing heavy strain on the engine starter and the battery.

(1) Refer to paragraphs 5-7.a.(4), (5) and (6) for breaker point setting and engine timing. Refer to paragraphs 5-7.b.(1), (2) and (3) for carburetor adjustment. Refer to paragraphs 5-7.e.(1), (2) and (3) for governor adjustment.

(2) Start engine and check for oil pressure between 20 and 35 pounds (137.8 to 241.2 kPa) at normal operating temperature. If oil pressure is not in this range, proceed as follows:

(a) Loosen lock nut on slotted adjustment stud (43, figure 8-13) located near breather tube (3, figure 8-13).

(b) Turn adjustment stud in (to increase) or out (to decrease) oil pressure as necessary.

(c) If oil pressure returns to proper range, tighten lock nut to secure adjustment stud taking care to avoid disturbing setting. If oil pressure does not return to proper range proceed as follows:

(d) Low Oil Pressure: Check oil. If oil is too light or diluted, drain and refill as specified in table 5-2. If oil pressure remains low, check for, and correct, sludge on oil screen, badly worn oil pump, relief valve not seated properly, or defective pressure gage.

(e) High Oil Pressure: Check oil. If oil is too heavy drain and refill as specified in table 5-2. If oil pressure remains high, check for, and correct, clogged oil passage, oil relief valve stuck, or defective pressure gage.

b. Compressor. Test the compressor as follows:

(1) Refer to paragraphs 4-2.e.(1) and (2) for constant speed unloader adjustment.

(2) With engine started, bring compressor up to 100 pounds pressure (689 kPa).

(3) Check piping and seals for any oil leaks. If oil leak is noted, check for and tighten all fasteners and/or fittings.

(4) Check action of bleeder valve in window at top of oil separator. A distinct percolating action indicates normal oil separation. If distinct percolating action is not evident, check for and correct defective or inoperative bleeder valve. If oil level is low, remove filler plug and bring oil level to overflowing. Replace filler plug.

CAUTION

Never remove drain or filler plugs from compressor when oil separation is indicated in bleeder valve. Pressure exists in unit when this separation is active.

(5) Release all air pressure from receiver.

(6) Bring compressor up to highest pressure it will maintain at full load of engine. As power load falls, increase pressure until engine is at full load again. Repeat this procedure until the operating pressure of 200 psi (1378 kPa) is reached.

6-19. TABLE OF LIMITS. Refer to table 6-1 for engine and compressor adjustment, inspection, torque, and dimensional limits.

Table 6-1. Table of Limits

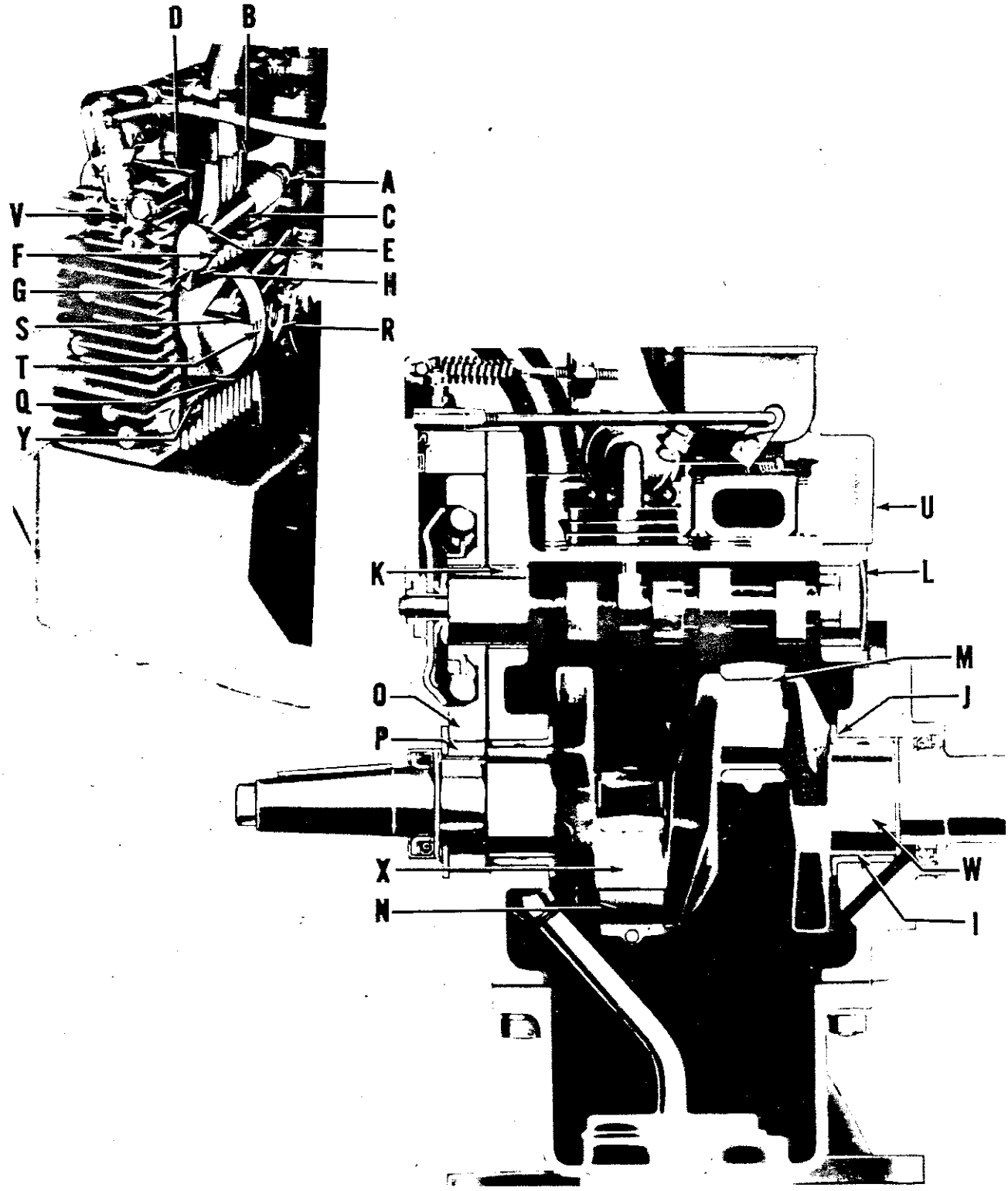


Table 6-1. Table of Limits - Continued

ENGINE DIMENSIONAL LIMITS

REF LETTER	ITEM	INCH (MIN) (mm)	INCH (MAX) (mm)
A	Intake valve tappet clearance at 70°F (21.1°C)	0.0015 (0.038)	0.0030 (0.08)
B	Exhaust valve tappet clearance at 70°F (21.1°C)	0.0015 (0.038	0.0030 (0.08)
C	Intake valve stem clearance in guide	0.0010 (0.03)	0.0025 (0.06)
D	Exhaust valve stem clearance in guide	0.0025 (0.06)	0.0040 (0.10)
E	Valve seat width	1/32 (0.794)	3/64 (1.191)
F	Valve FACE angle		44°
G	Valve SEAT angle		45°
H	Valve INTERFERENCE angle		1°
I	Crankshaft main bearing clearance	0.0024 (0.061)	0.0042 (0.10)
J	Crankshaft end play	0.006 (0.15)	0.012 (0.30)
K	Camshaft bearing clearance	0.0015 (0.04)	0.0030 (0.08)
L	Camshaft end play	0.003 (0.08)	- -
M	Connecting rod bearing	0.0005 (0.01)	0.0023 (0.06)
N	Connecting rod end play	0.002 (0.05)	0.016 (0.41)
O	Timing gear backlash	0.002 (0.05)	0.003 (0.08)
P	Oil pump gear backlash	0.002 (0.05)	0.005 (0.13)
Q	Piston to cylinder, strut type (measured below oil control ring - 90° from pin) clearance	0.0025 (0.06)	0.0045 (0.11)
R	Piston pin clearance in piston at 70°F (21.1°C)		Push fit
S	Piston pin clearance in rod at 70°F (21.1°C)	0.0001 (0.0025)	0.0006 (0.0152)
T	Piston ring gap in cylinder	0.010 (0.254)	0.023 (0.584)
	Piston ring side clearance	0.0020 (0.05)	0.0080 (0.20)
U	Breaker point gap at full separation		0.020 (0.508)
V	Spark plug gap		0.025 (0.635)
W	Crankshaft main bearing journal - standard size	1.9992 (50.779)	2.000 (50.8)
X	Crankshaft rod bearing journal - standard size	1.6252 (41.280)	1.6260 (41.300)

Table 6-1. Table of Limits - Continued

ENGINE DIMENSIONAL LIMITS - Continued			
REF LETTER	ITEM	INCH (MIN) (mm)	INCH (MAX) (mm)
Y	Cylinder bore - standard size.....	3.2490 (82.525)	3.2500 (82.550)

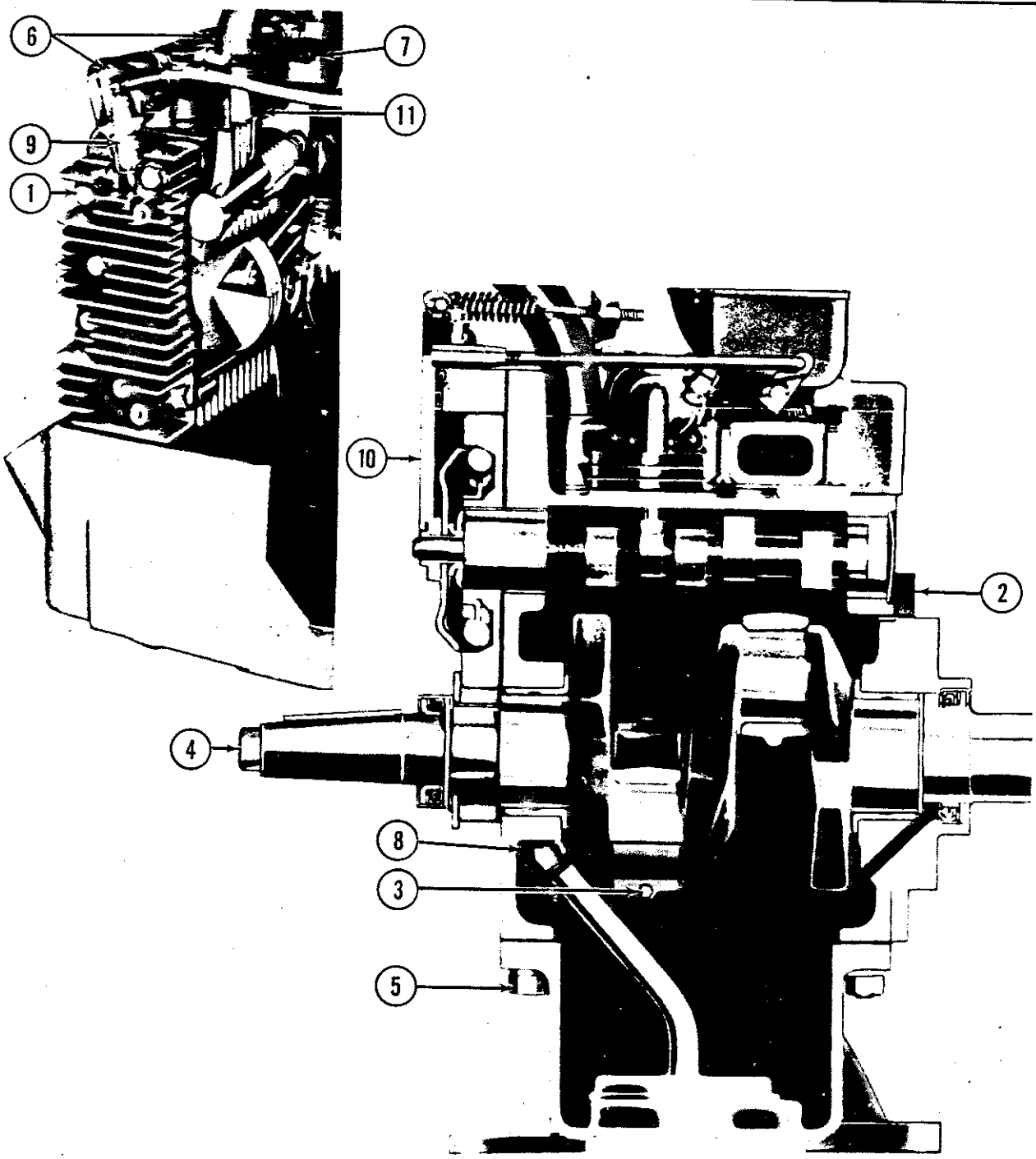


Table 6-1. Table of Limits - Continued

ENGINE TORQUE LIMITS

REF NO.	ATTACHING PART	TORQUE (Ft-Lbs)	TORQUE (N·m)
1	Cylinder head screws	29 - 31	39.3 - 42.0
2	Rear bearing plate screws	20 - 25	27.1 - 33.9
3	Connecting rod screws	27 - 29	36.6 - 39.3
4	Flywheel mounting screw	35 - 40	47.5 - 54.2
5	Oil base screws	43 - 48	58.3 - 65.1
6	Intake and exhaust manifold screws	15 - 20	20.3 - 27.1
7	Fuel pump mounting screws	5 - 6	6.8 - 8.1
8	Oil pump mounting screws	7 - 9	9.5 - 12.2
9	Spark plugs	25 - 30	33.9 - 40.7
10	Timing gear cover screws	10 - 13	13.6 - 17.6
11	Valve cover screws	4 - 8	5.4 - 10.9
-	Blower housing screws	8 - 10	19.9 - 13.6
-	Starter mounting screws	25 - 28	33.9 - 37.9

COMPRESSOR DIMENSIONAL LIMITS

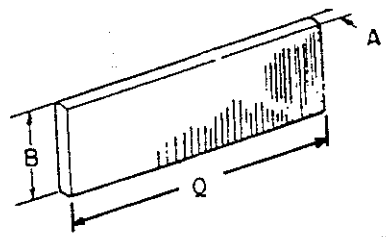
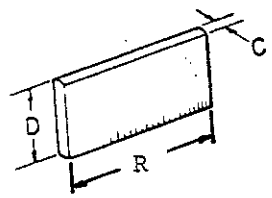
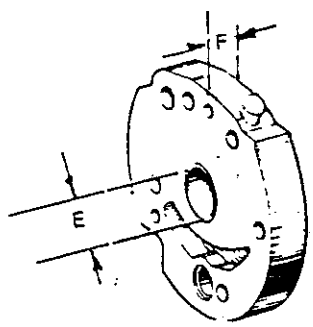
REF	COMPONENT	LIMITS MIN IN.	(mm)	MAX IN.	(mm)	REPRESENTATIVE ILLUSTRATED DIMENSIONS
A	First Stage Blade	0.1480	(3.759)			
B	(26 fig 8-7)	0.7120	(18.085)	0.7140	(18.136)	
Q		2.6867	(68.242)	2.6872	(68.255)	
C	Second Stage Blade	0.1480	(3.759			
D	(16 fig 8-7)	0.6660	(16.916)	0.6670	(16.942)	
R		1.4980	(38.049)	1.4985	(38.062)	
E	Division Plate	1.002	(25.451)	1.005	(25.527)	
F	(19 fig 8-7	0.763	(19.380)	-	-	

Table 6-1. Table of Limits - Continued

COMPRESSOR DIMENSIONAL LIMITS - Continued

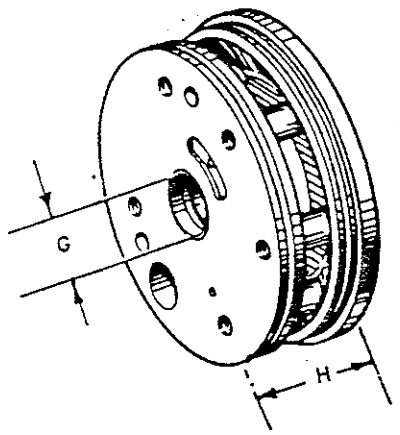
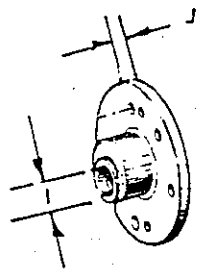
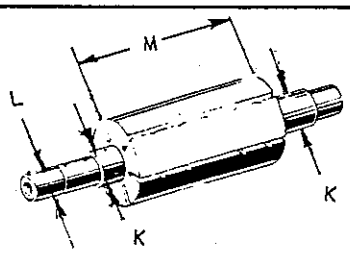
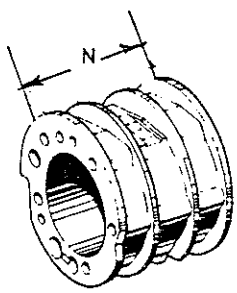
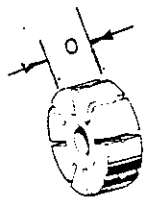
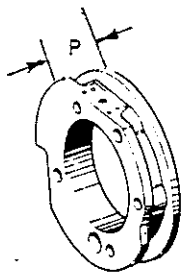
REF	COMPONENT	LIMITS MIN IN.	(mm)	MAX IN.	(mm)	REPRESENTATIVE ILLUSTRATED DIMENSIONS
G	Drive End Cover	1.002	(25.451)	1.005	(25.527)	
H	(55 fig 8-7)	1.710	(43.434)	-		
I	Non-Drive End Cover	0.7498	(19.045)	0.7502	(19.055)	
J	(5 fig 8-7)	0.350	(8.89)			
K	First Stage Rotor (25 fig 8-7)	0.9982	(25.354)	0.9990	(25.375)	
L		0.7485	(19.012)	0.7492	(19.030)	
M		5.3740	(136.500)	5.3745	(136.512)	
N	First Stage Stator (27 fig 8-7)	5.3775	(136.589)	5.3780	(136.601)	

Table 6-1. Table of Limits - Continued

COMPRESSOR DIMENSIONAL LIMITS - Continued

REF	COMPONENT	LIMITS MIN IN.	(mm)	LIMITS MAX IN.	(mm)	REPRESENTATIVE ILLUSTRATED DIMENSIONS
■ O	Second Stage Rotor (15 fig 8-7)	1.4985	(38.062)	1.4990	(38.075)	
■ P	Second Stage Stator (14 fig 8-7)	1.5025	(38.164)	1.5030	(38.176)	

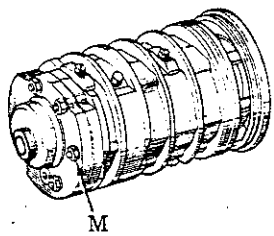
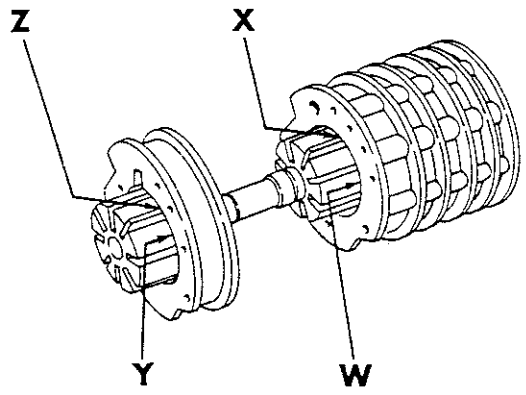
REFERENCE	TORQUE TENSION LIMITS ATTACHING PART	TORQUE foot pounds	(N-m)	ILLUSTRATED TORQUE POINT
M	Nut (6, figure 8-7)	6	(8.13)	

Table 6-1. Table of Limits - Continued

COMPRESSOR DIMENSIONAL LIMITS - Continued

ASSEMBLY LIMITS

REF NO.	DESCRIPTION	ALLOWANCE Min.In. (mm)	ALLOWANCE Max.In. (mm)
W	First Rotor to First Stator	0.0030 (0.076)	0.0040 (0.102)
X	First Blades to First Stator	0.0030 (0.076)	0.0045 (0.114)
Y	Second Rotor to Second Stator	0.0035 (0.089)	0.0045 (0.114)
Z	Second Blades to Second Stator	0.0040 (0.102)	0.0050 (0.127)



SECTION VII

ILLUSTRATED PARTS BREAKDOWN

7-1. MODEL COVERED. This illustrated parts breakdown covers the Model 6MC-2A, Type MC-2A, engine driven portable air compressor. The unit is manufactured by Davey Compressor Company (FSCM 16004), Cincinnati, Ohio 45242. Part number 49050A is assigned to the unit assembly.

7-2. PARTS THAT ARE LISTED. In general, the assemblies and parts installed at the time the end items were manufactured are listed and identified in this manual. When an assembly or part (including vendor items), which is different from the original, is installed during repair, the assembly or part must match form, fit and function. Interchangeable and substitute assemblies and parts are not listed in this manual. Such items are identified by information available through the Interchangeable and Substitute (I & S) Data Systems. When a standard size part can be replaced with an oversize or undersize part, the latter parts, showing sizes, are also listed. Repair Parts Kits and Quick Change Units are listed when they are available for replacement.

7-3. LISTING OF SIMILAR ASSEMBLIES. When similar assemblies contain approximately 51% or more of identical parts, the assemblies are combined and listed as follows.

a. The assemblies are listed first followed by detail parts.

b. A part common to all assemblies in the same quantity is listed once.

c. A part common to all assemblies in differing quantities is listed once for each quantity and identified to which assembly each listing pertains.

d. Parts peculiar to an assembly are listed once and identified to which assembly each pertains.

7-4. PARTS IN KITS. This publication reflects the listing of repair parts kits. Certain replacement parts are stocked only in kits. Standard parts and parts having multi-application are stocked in kits. Kit parts should not be ordered from separate stock to make up a kit.

7-5. When replacement parts of an assembly are available in the form of kits, the words (Repair kit available) follows the description of the applicable assembly. The detail parts of the assembly that are contained in the kit are identified by a symbol before the part number. A footnote follows the Maintenance Parts List (MPL) to define the symbol. The kit listing follows the last detail part of the assembly in the same indentation as the assembly.

7-6. SYMBOLS AND ABBREVIATIONS. Symbols and abbreviations used in the MPL are in accordance with Military Standard, MIL-STD-12, or are defined below.

(AP) - This abbreviation, found in the Description column, indicates the part is an "attaching part" for the next higher assembly or part.

F - This abbreviation is used in conjunction with a figure and index number, such as F8-1-5. It is assigned to a part listed having no index number assigned in the MPL. The abbreviation means the item so listed "follows" that figure and index number (example: the listed item follows index number 5 on figure 8-1).

\# - This symbol, inserted flush right following a part number in the MPL for Government Furnished Equipment (GFE) and Contractor Furnished Equipment (CFE), means that detail parts are listed in a separate manual. Refer to "Related Publications" paragraph of this Introduction for publication number, when applicable.

* - This symbol, inserted flush right following a part number in the MPL, means "Requisition this marking in accordance with the requirements of AFR 6-4." The symbol is applied to identifying drawing numbers for decalcomanias, metalcals, and vinyl film markings. When symbol is inserted in front of a part number, footnote at end of parts list should be referenced.

† - This symbol, also ††, inserted in front of a part number in the MPL, indicates the footnote at the end of the parts list for that assembly should be referenced. In general, the symbol is used to indicate a component of a kit.

@ - This symbol inserted in front of a part number in the .MPL indicates the footnote at the end of the parts list should be referenced. In general, the symbol is used to indicate a component of a kit.

7-7. FEDERAL SUPPLY CODES FOR MANUFACTURERS (FSCM). These five digit code numbers are used to identify the actual manufacturer of vendor items used in this equipment. The code appears in parentheses in the Description column following the description of the part involved. The applicable codes are listed below. The prime contractor's code is also listed below. The absence of a manufacturer's code in the Description column of the MPL means that the part is the end item manufacturer's part number or commercial off-the-shelf type item that should be ordered by complete description. The following codes have been excerpted from Cataloging Handbook H4-1 and H4-2, Federal Supply Code for Manufacturers.

CODE	MANUFACTURER'S NAME AND ADDRESS
00736	Air-Maze Div. of Incom International Inc. 25000 Miles Rd. Cleveland, OH 44123
01556	Mite Corporation Heli-Coil Products Div. Shelter Rock Lane Danbury, CT 06810
08484	Breeze Corporations Inc. 700 Liberty Ave. Union, NJ 07083
09393	Rochester Gauges Inc. of Texas P.O. Box 20180 Dallas, TX 75220
09527	Faria, Thomas G. Corp. Pink Row P.O. Box 0983 Uncasville, CT 06382
11583	Champion Spark Plug Co. 900 Upton P.O. Box 910 Toledo, OH 43601
14892	Bendix Corp. The Brake and Steering Div. 401 N. Bendix Dr. South Bend, IN 46619
15605	Cutlet-Hammer Inc. 4201 N. 27th St. Milwaukee, WI 53216
16004	Davey Compressor Co. 11060 Kenwood Rd. Cincinnati, OH 45242
19728	Prestolite Co., The Div. of Eltra Corp. 511 Hamilton St. P.O. Box 931 Toledo, OH 43601
22938	Prototype Development Inc. 7750 Hub Parkway Cleveland, OH 44125
24617	General Motors Corp. 3044 Grand Blvd. W. Detroit, MI 48202
31211	Motorola Automotive Products Div. 1299 E. Algonquin Rd. Motorola Center Schamburg, IL 60196
32874	Black Sivalls and Bryson Inc. BS and B Safety Systems Div. 7455 E. 46th Dr. P.O. Box 45590 Tulsa, OK 74145
34494	Kunkle Valve Co. Inc. P.O. Box 1740 Fort Wayne, IN 46801
44940	Onan Corp. Onan Div. 1400 73rd Ave. N.E. Minneapolis, MN 55432
53477	Scovill Mfg. Co. Fluid Power Div. U.S. Rt. 1 Wake Forest, NC 27587
60038	Timken Co., The 1835 Dueber Ave. S.W. Canton, OH 44706
72850	Facet Enterprises Inc. Motor Components Div. 18th Street and Oakwood Ave. Elmira, NY 14903

74410 Holland Hitch Co.
430 W. 18th St.
Holland, MI 49423

78189 Illinois Tool Works, Inc.
Shakeproof Division
St. Charles Road
Elgin, IL 60120

78252 Stolper Industries, Inc.
W156 N9073 Stolper Dr.
P.O. Box 190
Menomonee Falls, WI 53051

79136 Waldes Kohinoor Inc.
47-16 Austel Place
Long Island City, NY 11101

79227 Watts Regulator Co.
P.O. Box 628
10 Embankment St.
Lawrence, MA 01842

79470 Weatherhead Co. The
300 East 131st St.
Cleveland, OH 44108

81263 Douglas Components Corp.
Sub of Orion Planning
Group Inc.
141 Railroad St.
Bronson, MI 49028

81349 Military Specifications Promulgated by
Military Departments/Agencies Under
Authority of Defense Standardization
Manual 4120 3-M

86107 Central Brass Mfg. Co.
2950 East 55th St.
Cleveland, OH 44127

88044 Aeronautical Standards Group
Dept. of Navy and Air Force

88419 Cornell-Dubilier Electronics
Div. of Federal Pacific
Electric Co.
118 E. Jones
Fuquay-Varina, NC 27526

94222 Southco Inc.
Lester, PA 19113

96906 Military Standards
Promulgated by Military
Departments Under Authority
of Defense Standardization
Manual 4120 3-M

98963 Wilkerson Corp.
1201 W. Mansfield Ave.
Englewood, CO 80110

7-8. USABLE ON CODES. Only one configuration of the Type MC-2A air compressor unit is covered in this publication. Usable On Codes will be assigned to additional configurations as necessary. The absence of a code in the Usable On Code column of the MPL indicates that parts listed are usable as replacements on all configurations covered by this publication.

7-9. RELATED PUBLICATIONS. Publications used in conjunction with this Illustrated Parts Breakdown are:

T.O.00-25-223 - Integrated Pressure Systems and Components (Portable and Installed).

T.O.34-1-221 - Work Cards (4310)

T.O.34Y1-171 - Installation, Operation, Maintenance and Inspection Instructions for Air Compressors.

T.O.35-1-4 - Processing and Inspection of Aero Space Ground Equipment for Storage and Shipment.

7-10. NUMERICAL INDEX. A numerical index of part numbers contained in the Maintenance Parts Lists (MPL) is found at the end of the MPL. The index is arranged in part number alpha-numeric sequence begining at the extreme left and continuing left to right, one position at a time. The first character of a part number precedence is letters, second and succeeding character precedence is diagonal (/), period (.), dash (-), letters, and numerals. The Figure and Index column lists the figure and index numbers where each part number may be located within the MPL.

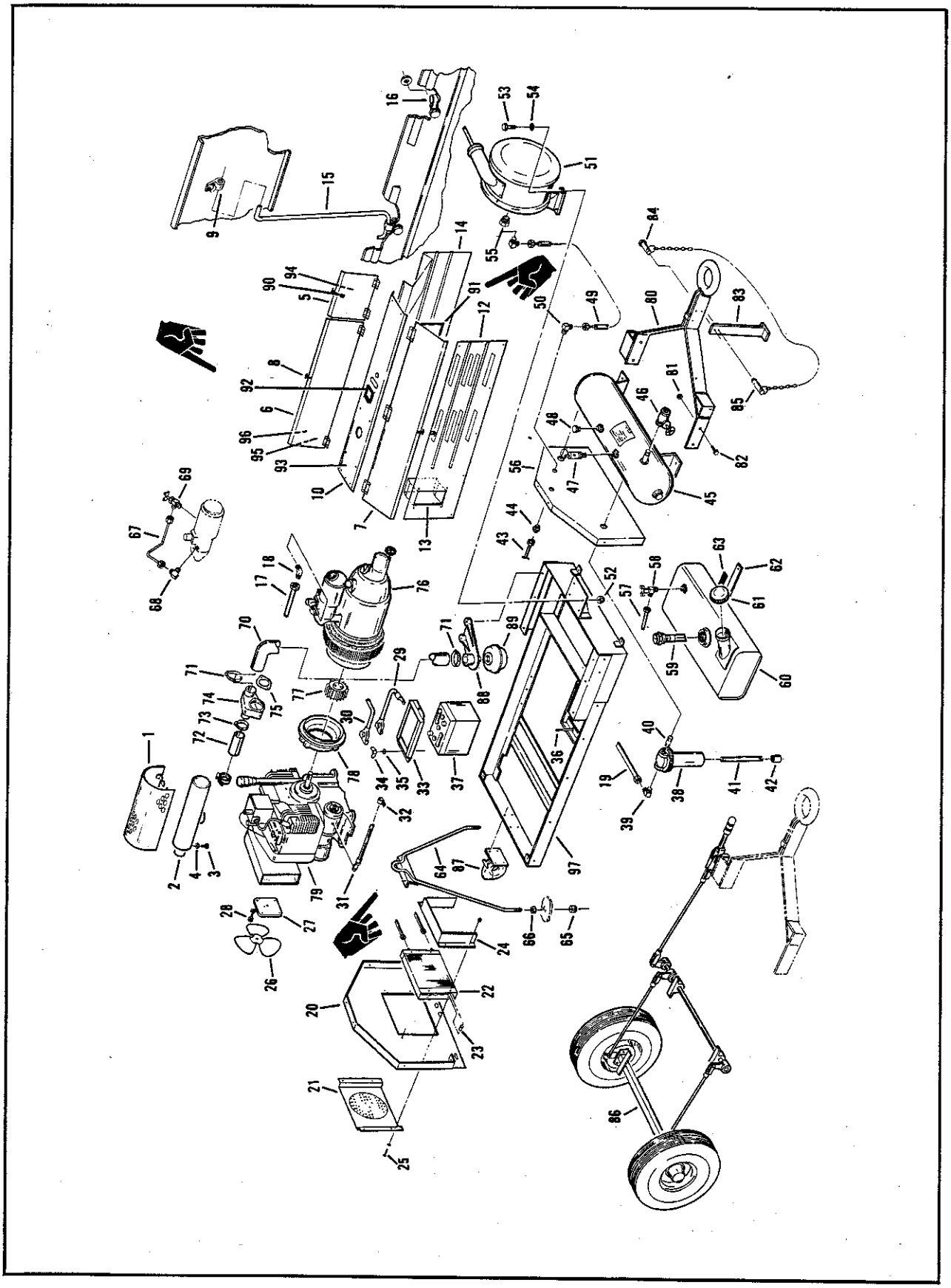


Figure 8-1. Air Compressor Assembly, Type MC-2A

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-1-	49050A	COMPRESSOR ASSEMBLY, Air, gasoline engine driven, .. Type MC-2A, Model 6MC-2A	1	
-1	81719	. GUARD, Muffler	1	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20UNCx3/4 in. lg[AP]	2	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	2	
-2	81948	. MUFFLER, Exhaust	1	
-3	9415803	. SCREW, Cap, hex hd, 1/4-20UNCx1-3/4 in. lg [AP]...	1	
	25942	. WASHER [AP]	2	
-4	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	2	
-5	69873	. DOOR, Control panel	1	
	9411893	. NUT, Lock, hex, wshr insert, no. 10-32 [AP]	4	
	80747	. SCREW, Mach, hex hd, no.10-32x3/4 in. lg [AP]	4	
-6	69872	. DOOR, Side	1	
	9411893	. NUT, Lock, hex, wshr insert, no. 10-32 [AP]	6	
	80747	. SCREW, Mach, hex hd, no.10-32x3/4 in. lg [AP]	6	
-7	69874	. DOOR, Side	1	
	9411893	. NUT, Lock, hex, wshr insert, no. 10-32 [AP]	6	
	80747	. SCREW, Mach, hex hd, no. 10-32x3/4 in. lg [AP] ...	6	
-8	37-10-071-10	. LATCH AND KEEPER, Door [94222][16004 PN 80031] ...	3	
	69738	. RIVET, Blind [AP]	12	
-9	11032	. CLAMP, Loop type, 3/8 in. [AP]	2	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	2	
	9419376	. SCREW, Hex hd, serr wshr, 1/4-20UNCx1 in. lg [AP].	2	
-10	69851	. ROOF	1	
	9616918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	6	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20UNCx3/4 in. lg[AP]	4	
	9419376	. SCREW, Hex hd, serr wshr, 1/4-20UNCx1 in. lg [AP].	2	
-11		DELETED		
-12	69853	. PANEL, Side	1	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	7	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20UNCx3/4 in. lg[AP]	7	
-13	81722	. DUCT, Transition	1	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	4	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20UNCx3/4 in. lg[AP]	4	
-14	69877	. PANEL ASSEMBLY, Control [see figure 8-2]	1	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	7	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20UNCx3/4 in. lg[AP]	7	
	66281	. CLAMP, Loop type, primer cable [AP]	1	
	11030	. CLAMP, Loop type, primer cable [AP]	6	
-15	81723	. SUPPORT, Door	1	
	81723-1	. SUPPORT, Door	1	
	443331	. NUT, Self-locking, hex, 1/4-20UNC [AP]	2	
	11033	. CLAMP, Loop type, 1/2 in. [AP]	1	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	2	
	9419376	. SCREW, Hex hd, serr wshr, 1/4-20UNCx1 in. lg [AP].	2	
-16	11032	. CLAMP, Loop type, 3/8 in. [AP]	2	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	2	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20UNCx3/4 in. lg[AP]	2	
-17	87977	. TUBE ASSEMBLY, Compressor to aftercooler	1	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	1	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
	274825	. SCREW, Hex hd, serr wshr, 1/4-20UNCx3/4 in. lg[AP]	1	
	11032	. CLAMP, Loop type, 3/8 in. [AP]	1	
8-1-18	7205x6x8	. CONNECTOR, Tube [79470][16004 PN 45229]	1	
-19	87976	. TUBE ASSEMBLY, Aftercooler to moisture separator..	1	
-20	69816	. PANEL, Front	1	
	120376	. NUT, Hex, 5/16-18UNC [AP]	2	
	120214	. WASHER, Lock, split, 5/16 in. [AP]	2	
	120393	. WASHER, Flat, 5/16 in. [AP]	2	
	122017	. SCREW, Hex hd, 5/16-18UNCx1 in. lg [AP]	2	
-21	69900	. ADAPTER, Hot air duct	1	
-22	27542	. AFTERCOOLER	1	
-23	27715	. SPACER, Cooler	4	
-24	27543	. SHROUD, Fan	1	
	443331	. NUT, Self-locking, 1/4-20UNC [AP]	4	
-25	121954	. SCREW, Cap, hex hd, 1/4-20UNCx2 in. lg [AP]	4	
	120392	. WASHER, Flat, 1/4 in. [AP]	4	
-26	69732	. FAN, Cooling	1	
	139011	. SETSCREW, 1/4-28UNF x 3/8 in. lg [AP].....	1	
-27	69727	. SPACER, Fan	1	
-28	121966	. SCREW, Cap, hex hd, 1/4-20UNCx2-1/2 in. lg [AP]...	4	
	120380	. WASHER, Lock, split, 1/4 in. [AP]	4	
-29	81621	. CABLE, Battery, ground	1	
	443331	. NUT, Self-locking, 1/4-20UNC [AP]	1	
	48442	. WASHER, Lock, internal-external tooth, 1/4 in.[AP]	1	
	121893	. SCREW, Cap, hex hd, 1/4-20UNCx7/8 in. lg [AP].....	1	
-30	81622	. CABLE, Battery, positive post to starter switch ..	1	
-31	81623	. CABLE, Starter switch to starter	1	
-32	11032	. CLAMP, Loop type, 3/8 in. [AP]	4	
	443331	. NUT, Self-locking, 1/4-20UNC [AP]	2	
	121887	. SCREW, Cap, hex hd, 1/4-20UNCx3/4 in. lg [AP].....	2	
	11033	. CLAMP, Loop type, 1/2 in. [AP]	4	
-33	44830	. HOLDDOWN, Battery	1	
-34	126032	. NUT, Wing, 3/8-16UNC [AP]	2	
-35	120394	. WASHER, Flat, 3/8 in. [AP]	2	
-36	48647	. BOLT, Battery holddown [AP]	2	
-37	44814	. BATTERY, 12 volt	1	
	60463	. PAD, Battery	1	
-38	F10-02-M00	. SEPARATOR, Moisture [98963][16004 PN 65428]	1	
-39	B7417x6	. ELBOW, Tubing [79470][16004 PN 28843]	1	
-40	192053	. NIPPLE, Pipe, 1/4 NPT x 2 in. lg	1	
-41	219616	. NIPPLE, Pipe, 1/8 NPT x 8 in. lg	1	
-42	144067	. COUPLING, Pipe, 1/8 NPT	1	
	MS35782-4	. DRAIN COCK, Moisture trap	1	
-43	60456	. TUBE ASSEMBLY, Receiver to regulator	1	
-44	B68x5x4	. CONNECTOR, Tube [79470] [16004 PN 43024]	1	
-45	69854	. RECEIVER, Air	1	
	122119	. SCREW, Cap, hex hd, 3/8-16UNCx3/4 in. lg [AP]	4	
	120382	. WASHER, Lock, split, 3/8 in. [AP].....	4	
-46	600	. VALVE, Globe, 1/4 NPT [86107][16004 PN 27679]	1	
-47	FIG48-1/4-220	. VALVE, Safety, 220 psi [34494][16004 PN 24687]....	1	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-1-48	77DCP-006	. VALVE, Safety [32874] [16004 PN 27615]	1	
-49	61087	. HOSE ASSEMBLY, Regulator to hose reel	1	
-50	B69x6	. ELBOW, Tube [79470] [16004 PN 28890]	2	
-51	68420	. REEL ASSEMBLY, Hose [see figure 8-3]	1	
-52	443335	. NUT, Self-locking, 3/8-16UNC [AP]	4	
-53	120918	. SCREW, Cap, hex hd, 3/8-16UNCx1-1/2 in. lg [AP]...	4	
-54	120394	. WASHER, Flat, 3/8 in. [AP]	8	
-55	144038	. BUSHING, Reducing, 1/2 to 1/4 NPT	1	
-56	69850	. PANEL, Rear	1	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	2	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20UNCx3/4 in. lg[AP]	2	
-57	81570	. TUBE ASSEMBLY, Fuel tank to fuel pump	1	
-58	A555	. VALVE, Fuel shut-off [79470][16004 PN 27164].....	1	
-59	8680-5-1/4	. GAUGE, Fuel level [09393] [16004 PN 66558]	1	
-60	69997	. TANK, Fuel	1	
-61	23020017	. . CAP, Filler, fuel tank [78252]	1	
	143933	. PLUG, Pipe, tank drain, 1/4 NPT, sq hd	1	
-62	27518	. STRAP, Fuel tank [AP]	2	
	443333	. NUT, Self-locking, 5/16-18UNC [AP]	4	
	120227	. SCREW, Cap, hex hd, 5/16-18UNCx1-1/4 in. lg[AP]...	4	
	120393	. WASHER, Flat, 5/16 in. [AP]	4	
-63	27656	. WEBBING, Fuel tank	2	
-64	27614	. BAIL, Lifting	1	
-65	443339	. NUT, Self-locking, 1/2-13UNC [AP]	2	
-66	120238	. NUT, Jam, hex, 1/2-13UNC [AP]	2	
-67	49042	. TUBE ASSEMBLY, Compressor unloader	1	
-68	B69x4	. ELBOW, Tube [79470] [16004 PN 28889]	1	
-69	A555	. VALVE, Shut-off [79470] [16004 PN 27164]	1	
-70	87975	. HOSE, Air intake	1	
-71	M28H	. CLAMP, Hose [AP] [08484] [16004 PN 61038]	2	
-72	27595	. HOSE, Engine air intake	1	
-73	M28H	. CLAMP, Hose [AP] [08484] [16004 PN 61038]	2	
-74	27432	. ADAPTER, Air intake	1	
	138205	. SCREW, Cap, hex sch, 1/4-20UNCx1-3/4 in. lg [AP]..	2	
-75	26312	. GASKET, Adapter	1	
-76	68157	. COMPRESSOR ASSEMBLY, Air [see figure 8-4]	1	
	67861	. NUT, Flexlock, 1/2-13UNC [AP]	4	
-77	26666	. IMPELLER.....	1	
	27686	. WIRE, Lock [AP]	1	
	83115	. SETSCREW [AP]	2	
-78	26938	. ADAPTER, Engine	1	
	454474	. SCREW, Cap, hex sch, 3/8-16UNCx2-1/2 in. lg [AP]..	4	
	67922	. WASHER, Flat, S.A.E., 1/2 in. [AP].....	4	
	27085	. STUD [AP]	4	
-79	CCKM-MS/2504G	. ENGINE ASSEMBLY, Gasoline [44940] [16004 PN 49576] [see figure 8-8]	1	
	443339	. NUT, Self-locking, 1/2-13UNC [AP]	4	
	122446	. SCREW, Cap, hex hd, 1/2-13UNCx1-3/4 in. lg [AP]...	4	
-80	69838	. TOWBAR ASSEMBLY	1	
-81	443339	. NUT, Self-locking, 1/2-13UNC [AP]	4	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-1-82	122433	. SCREW, Cap, hex hd, 1/2-13UNCx1-1/2 in. lg [AP]...	4	
-83	27601	. SUPPORT, Front leg	1	
-84	27610	. PIN, Support [AP]	1	
-85	27677	. PIN, Chain assembly [AP]	1	
-86	347	. AXLE ASSEMBLY [22938] [16004 PN 68750][see figure 8-15]	1	
-87	T-60-A	. PINTLE HOOK ASSEMBLY [74410][16004 PN 24804]	1	
	443339	. NUT, Self-locking, 1/2-13UNC [AP]	4	
	122446	. SCREW, Cap, hex hd, 1/2-13UNCx1-3/4 in. lg [AP]...	4	
-88	27607	. BRACKET, Air filter	1	
	443331	. NUT, Self-locking, 1/4-20UNC [AP]	2	
	121926	. SCREW, Cap, hex hd, 1/4-20UNCx1-1/2 in. lg [AP]...	2	
-89	FN80S	. FILTER ASSEMBLY, Air [00736][16004 PN 27578]	1	
	FN80S-07	. . ELEMENT, Air filter [00736]	1	
-90	65995	. BUMPER, Rubber	1	
-91	81620	. BAG, Document	1	
	9416918	. NUT, Lock, hex serr flg, 1/4-20UNC [AP]	1	
	274473	. SCREW, Hex hd, serr wshr, 1/4-20UNCx5/8 in. lg[AP]	1	
-92	82756	. DECAL, Flag	1	
-93	69849	. PLATE, Wiring diagram	1	
-94	69848	. PLATE, Instruction	1	
-95	69989	. PLATE, Warranty	1	
	69065	. RIVET, Blind [AP]	12	
-96	69992	. DECAL, Paint	1	
-97	69834	. FRAME ASSEMBLY	1	

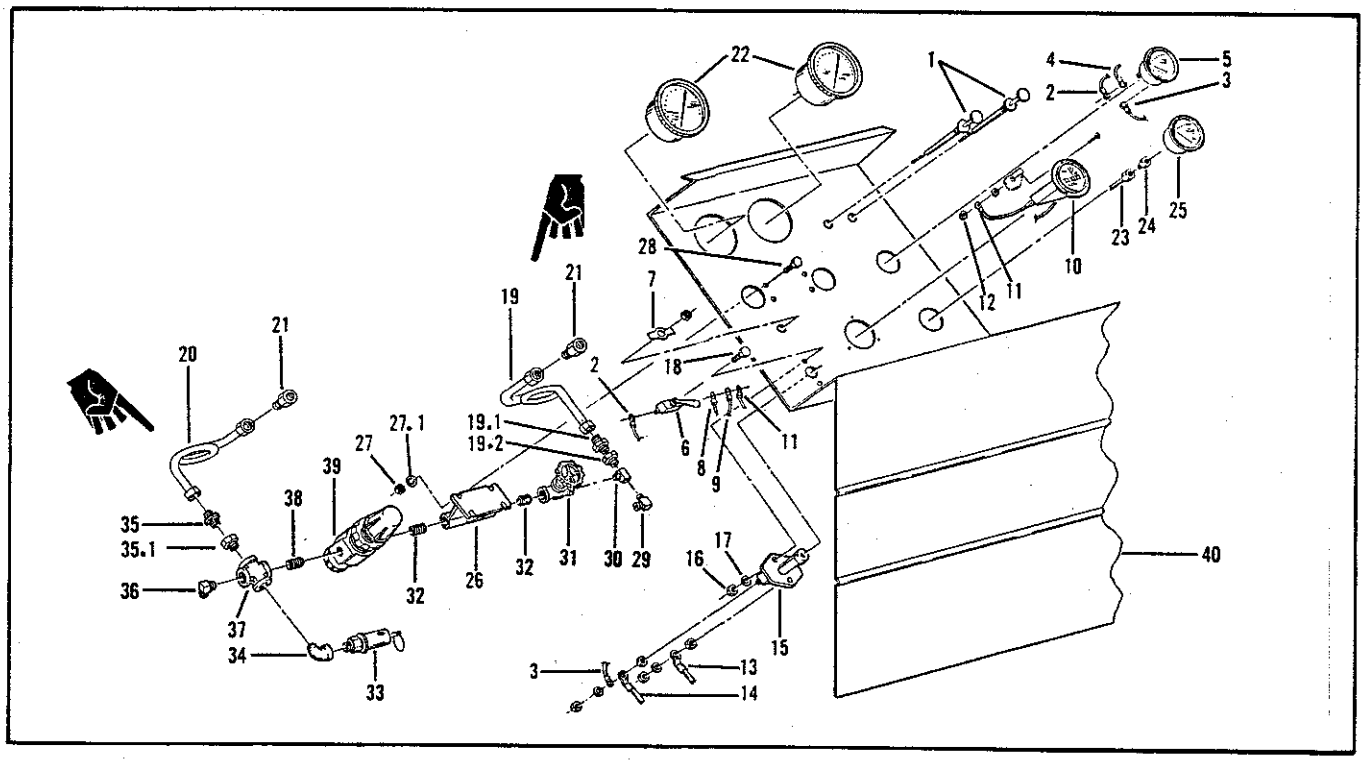


Figure 8-2. Control Panel Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-2-	69877	PANEL ASSEMBLY, Control (see figure 8-1-14 for NHA).	REF	
-1	65065	. CABLE, Choke and primer	2	
-2	27639	. WIRE ASSEMBLY, Ignition switch to ammeter	1	
-3	27642	. WIRE ASSEMBLY, Starter switch to ammeter	1	
-4	60289	. WIRING HARNESS ASSEMBLY, Black wire, alternator .. to ammeter	1	
-5	AM0098	. AMMETER GAUGE (09527) (16004 PN 48271)	1	
-6	8801-K22	. SWITCH, Toggle, ignition (15605) (16004 PN 27670)	1	
-7	827-228-F3	. PLATE, Indicating (15605) (16004 PN 27671)	1	
-8	60289	. WIRING HARNESS ASSEMBLY, Yellow wire, ignition ... switch to alternator (see index 4 above)	REF	
-9	60290	. WIRE ASSEMBLY, Ignition switch to resistor	1	
-10	7HM5101W	. HOURMETER GAUGE (31211) (16004 PN 60135)	1	
-11	27383	. TERMINAL, Wire, 14/16 ga, no. 6	2	
-12	114524	. NUT, Hex, no. 6-32 (AP)	1	
	138526	. WASHER, Lock, no. 6 (AP)	1	
	121839	. SCREW, Mach, rd hd, no. 6-32 x 5/16 in. lg (AP)...	1	
-13	81623	. CABLE, Switch to starter(see figure 8-1-31 for NHA)	REF	
-14	81622	. CABLE, Battery, pos post to starter switch (see .. figure 8-1-30 for NHA)	REF	
-15	4001	. SWITCH, Starter (19728) (16004 PN 08151)	1	
-16	9419454	. NUT, Hex, 1/4-20UNC (AP)	2	
-17	120380	. WASHER, Lock, split, 1/4 in. (AP)	2	
-18	121887	. SCREW, Cap, hex hd, 1/4-20UNC x 3/4 in. lg (AP)...	2	
-19	87967	. TUBE ASSEMBLY	1	
-19.1	B7217x2	. CONNECTOR, Tube (79470) (16004 PN 28834)	1	
-19.2	65980	. BUSHING, Reducing, 1/4 to 1/8 NPT	1	
-20	87968	. TUBE ASSEMBLY	1	
-21	B7267x2	. CONNECTOR, Tubing (79470) (16004 PN 67955)	2	
-22	J6058EFN	. GAUGE, Air pressure (38506) (16004 PN 27561)	2	
-23	60291	. HOSE ASSEMBLY, Oil pressure	1	
-24	B66x4	. ADAPTER, Oil line to gauge (79470) (16004 PN 29880)	1	
-25	2550-658	. GAUGE, Oil pressure (09393) (16004 PN 62085)	1	
-26	27673	. BRACKET, Mounting	1	
-27	9419454	. NUT, Hex, 1/4-20UNC (AP)	4	
-27.1	120392	. WASHER, Flat, 1/4 in. (AP)	4	
-28	121893	. SCREW, Cap, hex hd, 1/4-20UNC x 7/8 in. lg (AP)...	4	
-29	69x5x4	. ELBOW (79470) (16004 PN 44209)	1	
-30	3600x4	. TEE, Male branch (79470) (16004 PN 60163)	1	
-31	600	. VALVE, Globe (86107) (16004 PN 27679)	1	
-32	3081x4	. NIPPLE, Hex (79470) (16004 PN 65810)	2	
-33	48-1/4-220	. VALVE, Safety, 220 psi (34494) (16004 PN 24687)...	1	
-34	144112	. ELBOW, Street, 90 deg, 1/4 NPT	1	
-35	B7217x2	. CONNECTOR, Tubing (79470) (16004 PN 28834)	1	
-35.1	65980	. BUSHING, Reducing, 1/4 to 1/8 NPT	1	
-36	B69x6	. ELBOW (79470) (16004 PN 28890)	1	
-37	27587	. CROSS, Pipe, 1/4 NPT	1	
-38	192050	. NIPPLE, Pipe, close, 1/4 NPT	1	
-39	R10-02	. REGULATOR, Air pressure (79227) (16004 PN 24792)..	1	
-40	69852	. PANEL, Side	1	

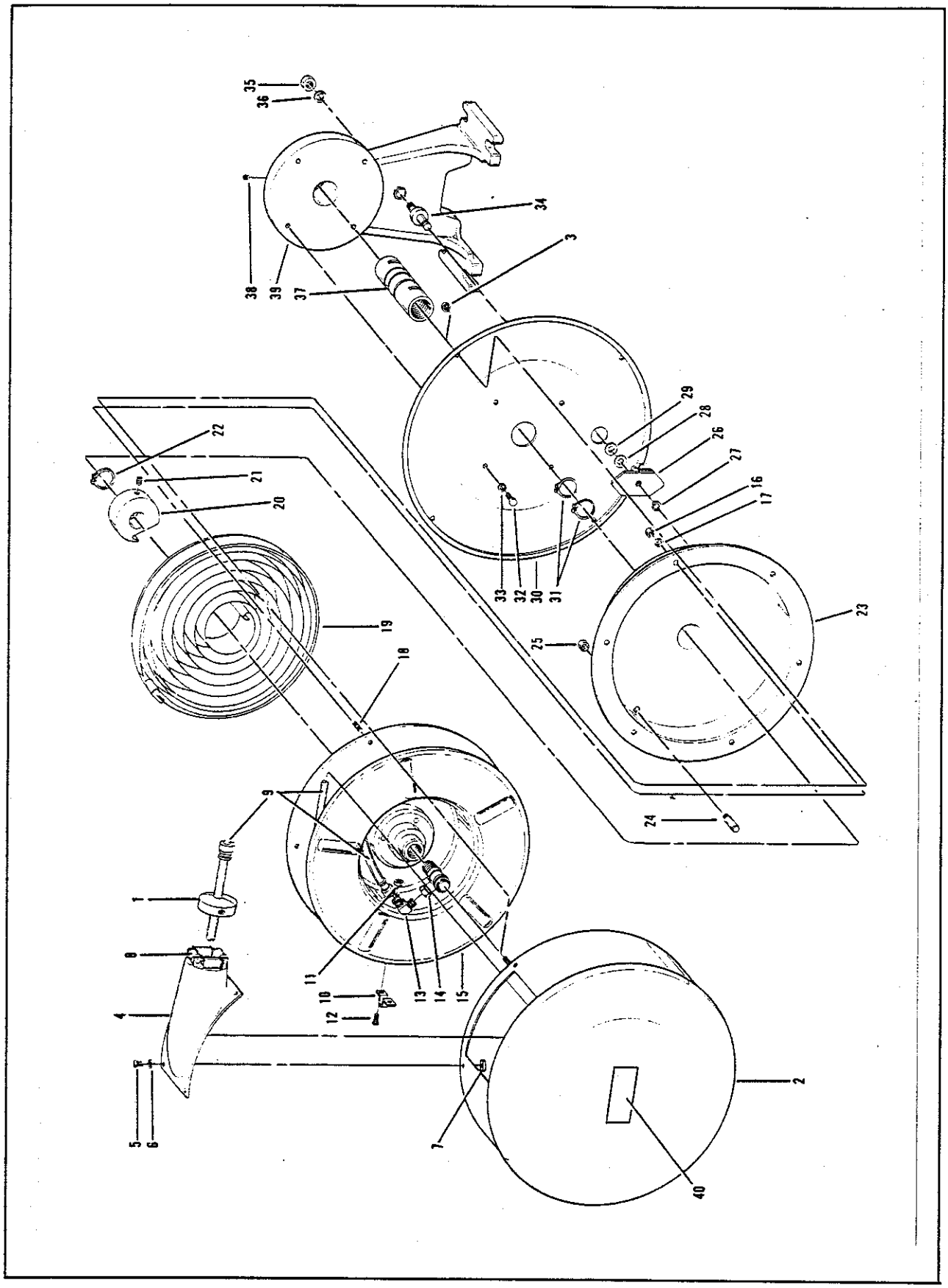


Figure 8-3. Hose Reel Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-3-	68420	HOSE REEL ASSEMBLY (See figure 8-1-51 for NHA)	REF	
-1	68538	. BUMPER, Hose	1	
-2	68532	. COVER AND CASE ASSEMBLY	1	
-3	120375	. NUT, Hex (AP)	4	
-4	68535	. GUIDE, Hose	1	
-5	132903	. SCREW, Machine (AP)	4	
-6	120217	. WASHER, Lock (AP)	4	
-7	67120	. NUT, Plug (AP)	4	
-8	67111	. PIN AND ROLLER KIT	1	
-9	66883	. HOSE ASSEMBLY, Service	1	
-10	68534	. CLAMP, Hose (AP) U-BOLT/NUTS	2	
-11	9411893	. NUT, Lock (AP)	4	
-12	132903	. SCREW, Machine (AP)	4	
-13	66881	. ELBOW, Street	1	
-14	66882	. JOINT, Swivel	1	
-15	68531	. SHEAVE ASSEMBLY	1	
-16	115295	. NUT, Hex (AP)	6	
-17	120217	. WASHER, Lock (AP)	6	
-18	67115	. STUD, Sheave assembly	6	
-19	66880	. SPRING, Drive	1	
-20	67113	. ARBOR, Spring	1	
-21	139414	. SETSCREW, Sch (AP)	1	
-22	67109	. RING, Retaining	1	
-23	67110	. CASE AND CAM ASSEMBLY, Spring	1	
-24	67112	. STUD, Spring	1	
-25	124925	. NUT, Jam (AP)	1	
-26	67104	. LATCH ROTOR ASSEMBLY	1	
-27	67107	. RING, Retaining (AP)	1	
-28	67105	. WASHER, Spacing	1	
-29	67106	. WASHER, Spacing	1	
-30	68533	. COVER, Reel	1	
-31	67109	. RING, Retaining (AP)	2	
-32	120229	. SCREW, Cap (AP)	4	
-33	120214	. WASHER, Lock (AP)	4	
-34	67103	. STUD, Latch	1	
-35	120371	. NUT, Hex (AP)	1	
-36	120384	. WASHER, Lock (AP)	1	
-37	68536	. SHAFT, Reel	1	
-38	139455	. SETSCREW (AP)	1	
-39	68540	. BASE, Hose reel	1	
-40	68633	. DECAL, Maximum pressure	1	
-41	5499	AIR CHUCK (53477) (16004 PN 14506) (not shown)	1	

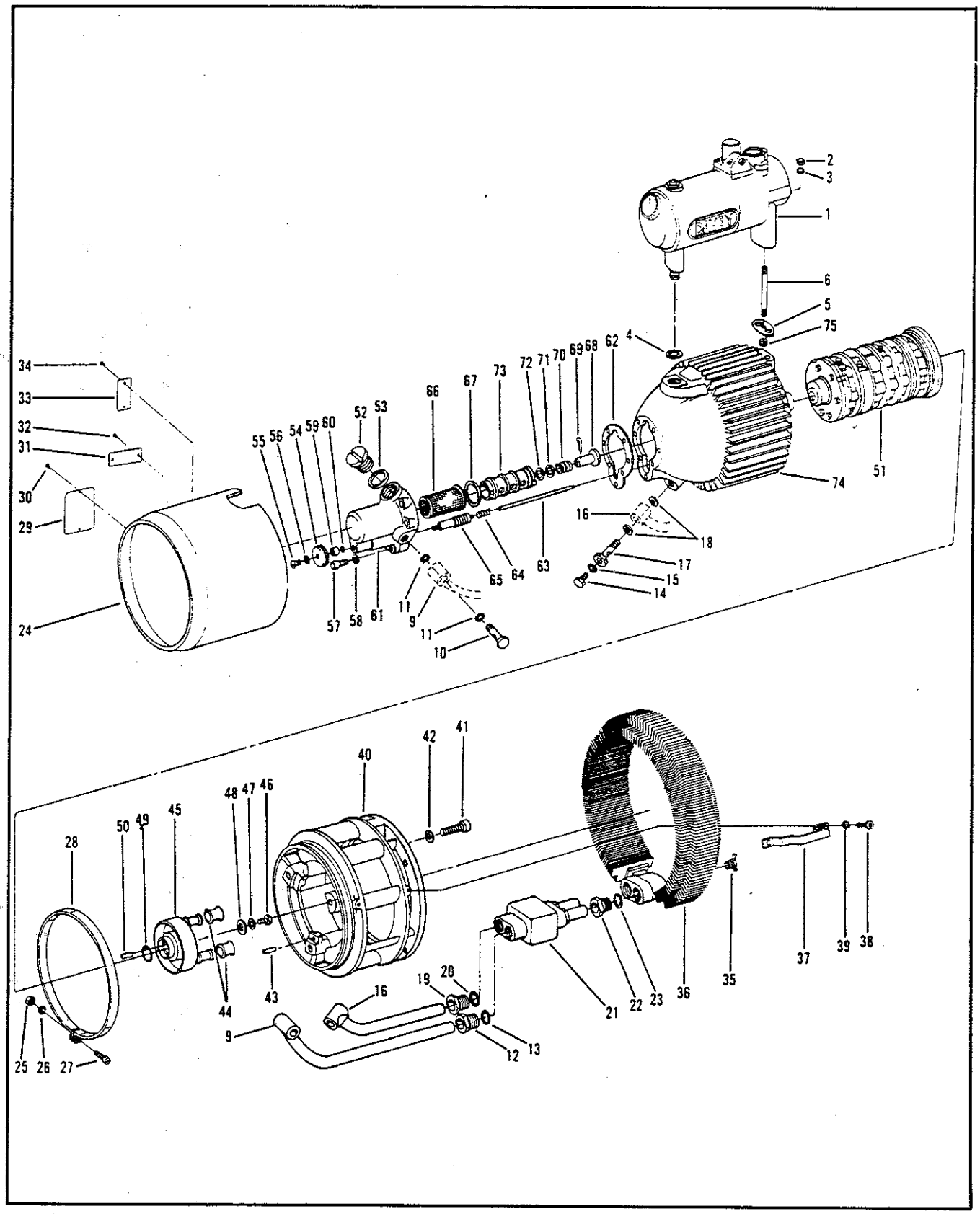


Figure 8-4. Air Compressor Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-4-	68157	COMPRESSOR ASSEMBLY, Air [see figure 8-1-76 for NHA] [repair kits available]	REF	
-1	26703	. SEPARATOR ASSEMBLY, Oil [see figure 8-5]	1	
-2	120375	. NUT, Hex [AP]	1	
-3	28148	. WASHER, Lock [AP]	1	
-4	@*27623	. PACKING, Preformed, square section ring	1	
-5	@*25706	. GASKET, Separator	1	
-6	25941	. STUD, Separator	1	
-7		DELETED		
-8		DELETED		
-9	40774	. TUBE ASSEMBLY, Oil	1	
-10	25698	. BOLT, Tube [AP]	1	
-11	*24963	. PACKING, Preformed, o-ring	2	
-12	25751	. SCREW, Sealing [AP]	1	
-13	*24504	. PACKING, Preformed, o-ring	1	
-14	25705	. PLUG, Drain	1	
-15	*24649	. PACKING, Preformed, o-ring	1	
-16	40773	. TUBE ASSEMBLY, Oil	1	
-17	25697	. BOLT, Banjo [AP]	1	
-18	*24963	. PACKING, Preformed, o-ring	2	
-19	25751	. SCREW, Sealing [AP]	1	
-20	*24504	. PACKING, Preformed, o-ring	1	
-21	40769	. VALVE ASSEMBLY, Thermal bypass [see figure 8-6]...	1	
-22	25751	. SCREW, Sealing [AP]	2	
-23	*24504	. PACKING, Preformed, o-ring	2	
-24	68295	. COWL, Oil chamber	1	
-25	120375	. NUT, Hex [AP]	1	
-26	28148	. WASHER, Lock [AP]	1	
-27	132277	. SCREW, Cap, fil hd [AP]	1	
-28	25695	. CLAMP, Cowl	1	
-29	41180	. PLATE, Name	1	
-30	68749	. SCREW, Self-tapping, no. 4-40 x 1/4 in. lg [AP]...	2	
-31	28040	. PLATE, Instruction, oil	1	
-32	68749	. SCREW, Self-tapping, no. 4-40 x 1/4 in. lg [AP]...	2	
-33	18806	. PLATE, Rotation	1	
-34	68749	. SCREW, Self-tapping, no. 4-40 x 1/4 in. lg [AP]...	2	
-35	A655	. DRAIN COCK, Oil cooler [79470][16004 PN 28038]....	1	
-36	26654	. COOLER, Oil	1	
-37	26662	. CLAMP, Cooler [AP]	4	
-38	132033	. SCREW, Mach, rh [AP]	8	
-39	28150	. WASHER, Lock [AP]	8	
-40	26615	. LANTERN	1	
-41	9406822	. SCREW, Cap, sch [AP]	3	
-42	28145	. WASHER, Lock [AP]	3	
-43	25679	. PIN, Dowel	1	
-44	25673	. BUSHING, Drive	2	
-45	26657	. COUPLING ASSEMBLY, Drive	1	
	25672	. . PIN, Drive	2	
	26656	. . COUPLING, Drive	1	
-46	120854	. SCREW, Cap [AP]	1	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-4-47	28148	. WASHER, Lock [AP]	1	
-48	25942	. WASHER, Special [AP]	1	
-49	*24628	. PACKING, Preformed, o-ring	1	
-50	24962	. KEY	1	
-51	27775	. ROTOR-STATOR ASSEMBLY [See figure 8-7]	1	
-52	26323	. PLUG, Oil filler	1	
-53	*24964	. PACKING, Preformed, o-ring	1	
-54	27028	. KNOB, Adjusting	1	
-55	132830	. SCREW, Truss hd [AP]	1	
-56	28150	. WASHER, Lock [AP]	1	
	60469	. HOUSING ASSEMBLY, Oil filter	1	
-57	9421706	. SCREW, Cap, sch [AP]	7	
-58	28147	. WASHER, Lock [AP]	7	
-59	26981	. . BUSHING, Adjusting pin	1	
-60	*24498	. . PACKING, Preformed, o-ring	1	
-61	26980	. . HOUSING, Oil filter	1	
-62	*25707	. GASKET, Housing	1	
-63	26704	. ROD, Push	1	
-64	25686	. SPRING, Adjusting pin	1	
-65	26982	. PIN, Adjusting	1	
-66	25688	. FILTER, Oil	1	
-67	*25689	. SEAL, Oil filter	1	
-68	25690	. CONNECTOR	1	
-69	121222	. PIN, Cotter [AP]	1	
-70	25693	. SPRING, Connector	1	
-71	25692	. COLLAR	1	
-72	*25691	. SEAL	1	
-73	25687	. SUPPORT, Oil filter	1	
-74	68416	. CHAMBER, Oil	1	
-75	1185-4CN3-8	. . INSERT, Heli-coil [01556][16004 PN 24816]	1	
	28275	KIT, Overhaul, compressor, complete air end	AR	

* = Component of kit number 28275
@ = Component of kit number 81842

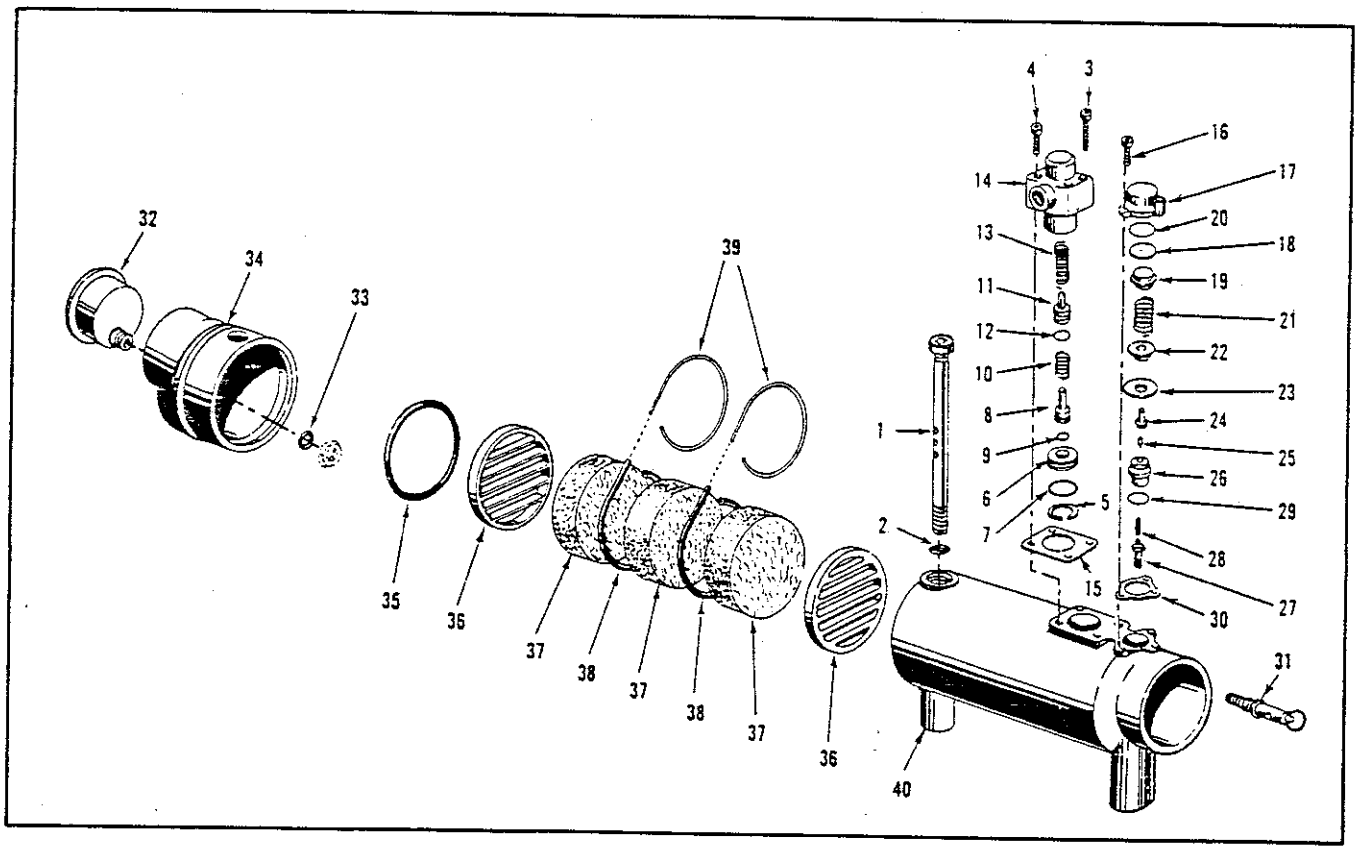


Figure 8-5. Oil Separator Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-5-	26703	SEPARATOR ASSEMBLY, Oil [see figure 8-4-1 for NHA].. [repair kit available]	REF	
-1	25725	. BOLT, Separator	1	
-2	@*24505	. PACKING, Preformed, o-ring	1	
	26346	. VALVE ASSEMBLY, Minimum pressure	1	
-3	427190	. SCREW, Cap, sch [AP]	2	
-4	454480	. SCREW, Cap, sch [AP]	2	
-5	24803	. . RING, Retaining	1	
-6	26340	. . SEAT, Valve	1	
-7	*24506	. . PACKING, Preformed, o-ring	1	
-8	26339	. . PISTON, Valve	1	
-9	26341	. . SEAL, Piston	1	
-10	26488	. . SPRING, Piston	1	
-11	25975	. . PISTON, Valve	1	
-12	*24649	. . PACKING, Preformed, o-ring	1	
-13	26343	. . SPRING, Piston	1	
-14	26342	. . HOUSING, Discharge elbow	1	
-15	*25730	. GASKET, Housing	1	
	28320	. VALVE ASSEMBLY, Bleeder	1	
-16	426816	. SCREW, Cap, sch [AP]	2	
-17	25747	. . COVER, Valve	1	
-18	25746	. . WINDOW, Valve	1	
-19	25744	. . DISH, Valve	1	
-20	*24794	. . PACKING, Preformed, o-ring	1	
-21	25749	. . SPRING, Piston	1	
-22	25740	. . PISTON, Valve	1	
-23	25745	. . DIAPHRAGM, Valve	1	
-24	25742	. . NOZZLE, Valve	1	
-25	25741	. . PLUNGER, Valve	1	
-26	26670	. . SEAT, Valve	1	
-27	26672	. . FILTER ASSEMBLY	1	
-28	26671	. . VALVE, Bleeder	1	
-29	*24562	. . PACKING, Preformed, o-ring	1	
-30	*25743	. . GASKET, Cover	1	
-31	FIG48-1/4-240	. VALVE, Safety [34494][16004 PN 27315]	1	
	26702	. COVER ASSEMBLY, Separator	1	
-32	26701	. . GAUGE, Air pressure, with nut	1	
-33	*24627	. . PACKING, Preformed, o-ring	1	
-34	26606	. . COVER, Separator	1	
-35	@*24031	. PACKING, Preformed, o-ring	1	
-36	25724	. GRID, Felt	2	
-37	@25722	. FELT, Separator	3	
-38	@*25852	. SEAL, Felt	2	
-39	@25853	. WIRE, Seal	2	
-40	25726	. HOUSING, Separator	1	
	81842	KIT, Felt change	AR	

* = Component of kit number 28275
@ = Component of kit number 81842

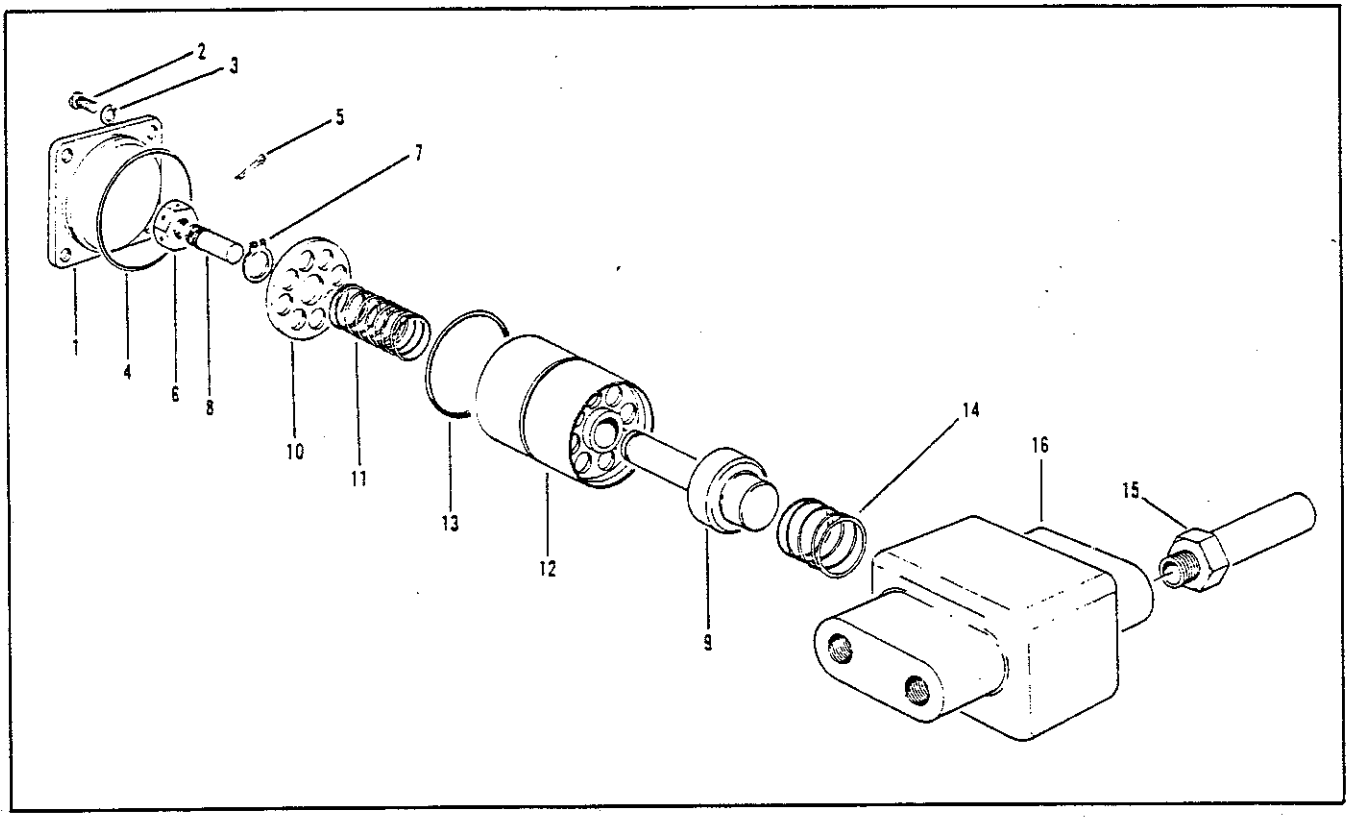


Figure 8-6. Thermal Bypass Valve Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-6-	40769	VALVE ASSEMBLY, Thermal bypass [see figure 8-4-21 .. for NHA]	REF	
-1	40759	. COVER, Valve	1	
-2	132830	. SCREW, Mach, rh [AP]	4	
-3	120217	. WASHER, Lock [AP]	4	
-4	40805	. PACKING, Preformed, o-ring	1	
	40762	. SHUTTLE ASSEMBLY	1	
-5	137141	. . PIN, Cotter	1	
-6	40666	. . NUT, Adjusting	1	
-7	16037	. . RING, Retaining	1	
-8	40665	. . PLUNGER	1	
-9	40764	. . ELEMENT, Power	1	
-10	40761	. . GUIDE, Element	1	
-11	40766	. . SPRING, Shuttle	1	
-12	40760	. . SHUTTLE	1	
-13	29061	. PACKING, Preformed, o-ring	1	
-14	40767	. SPRING, Power element	1	
-15	40768	. TUBE ASSEMBLY	2	
-16	40758	. BODY, Valve, thermal bypass	1	

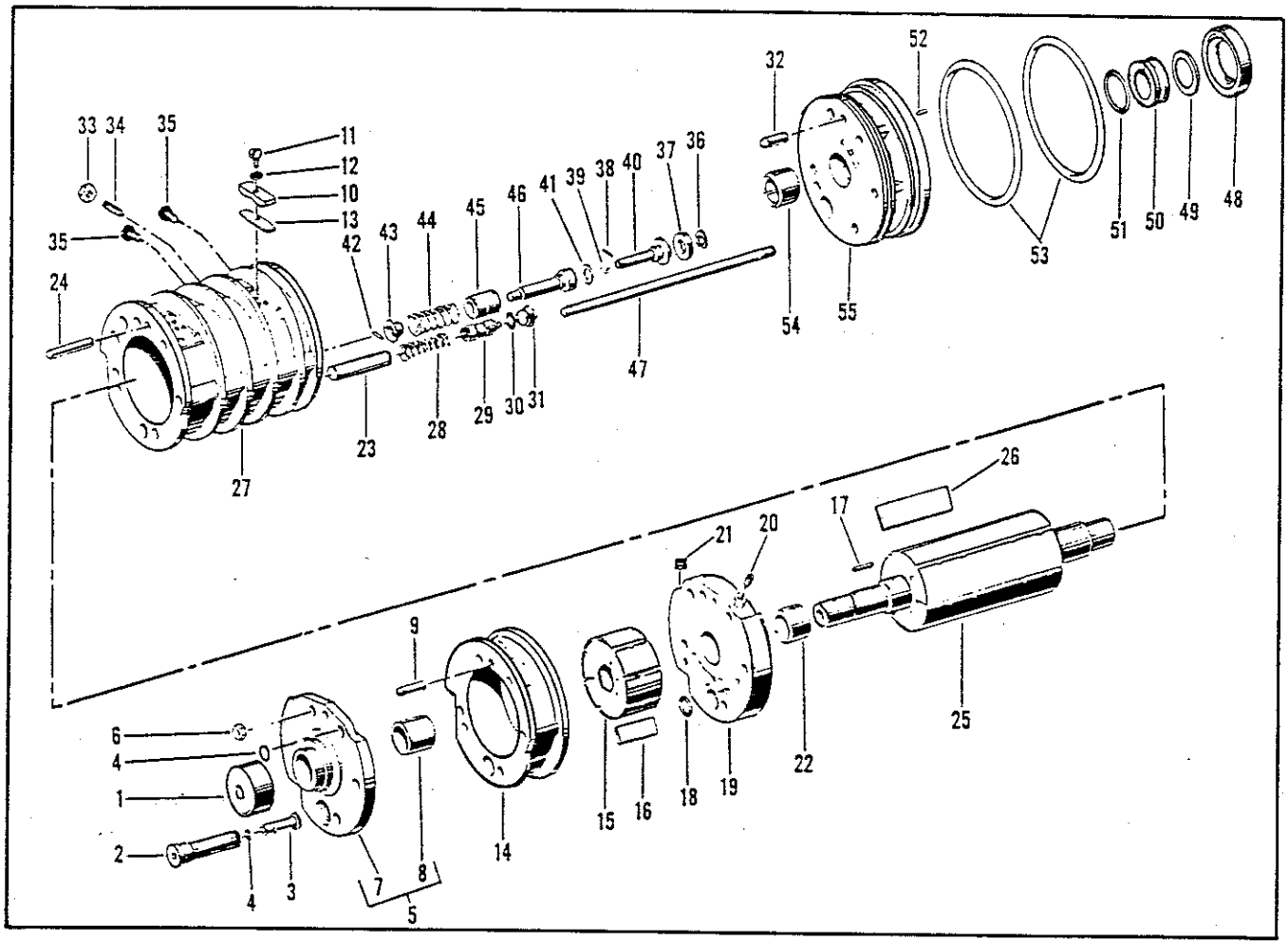


Figure 8-7. Rotor-Stator Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-7-	27775	ROTOR-STATOR ASSEMBLY [See figure 8-4-51 for NHA]... [repair kits available]	REF	
-1	26697	. CAP, Stator	1	
-2	26646	. BUSHING, Plunger	1	
-3	26647	. PLUNGER	1	
-4	**24497	. PACKING, Preformed, o-ring	2	
-5	26613	. COVER ASSEMBLY, Non-drive end	1	
-6	443331	. NUT, Lock [AP]	5	
-7	No Number	. . COVER, End [not procurable separately]	1	
-8	**24495	. . BEARING, End cover	1	
-9	24965	. DOWEL	2	
-10	26644	. GUARD, Valve	3	
-11	120687	. SCREW, Fil hd [AP]	3	
-12	28150	. WASHER, Lock [AP]	3	
-13	26643	. VALVE, Reed	3	
-14	26694-4	. STATOR, Second stage	1	
-15	26705-4	. ROTOR, Second stage	1	
-16	26867-4	. BLADE, Second stage, set of 8	1	
-17	24962	. KEY, Rotor, second stage	1	
-18	**24505	. PACKING, Preformed, o-ring	1	
-19	27776	. PLATE ASSEMBLY, Division	1	
-20	182926	. . SETSCREW, Sch	1	
-21	139137	. . SETSCREW, Sch	1	
-22	***24496	. . BEARING, Division plate	1	
-23	26698	. SPACER	1	
-24	24966	. DOWEL	2	
-25	26616-8	. ROTOR, First stage	1	
-26	26866-4	. BLADE, First stage, set of 12	1	
-27	27777-8	. STATOR, First stage	1	
-28	25665	. SPRING	1	
-29	25666	. VALVE, Servo	1	
-30	**24498	. PACKING, Preformed, o-ring	1	
-31	25668	. PLUG, Servo valve	1	
-32	24965	. DOWEL	2	
-33	120375	. NUT, Hex	1	
-34	25718	. SCREW, Bushing lock	1	
-35	27858	. SCREW, Sealing	2	
	26639	. VALVE ASSEMBLY, Non-return	1	
-36	26642	. . RING, Retaining	1	
-37	25715	. . SEAT, Valve	1	
	26641	. . STEM ASSEMBLY, Valve	1	
-38	41888	. . . PIN, Spring	1	
-39	41887	. . . BALL, Steel	1	
-40	41879	. . . STEM, Valve	1	
-41	25713	. WASHER, Valve	1	
	26262	. VALVE ASSEMBLY, Unloader	1	
-42	25708	. . PIN	1	
-43	25709	. . STOP, Spring	1	
-44	25711	. . SPRING, Unloader valve	1	
-45	25712	. . SLEEVE, Valve	1	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-7-46	25710	. . PISTON, Unloader valve	1	
-47	26206	. STUD	5	
-48	**48015	. SEAL, Oil	1	
-49	**26337	. WASHER, Fiber, thrust	1	
-50	26336	. SLEEVE, Sealing	1	
-51	**24502	. PACKING, Preformed, o-ring	1	
-52	24576	. PIN, Spring	1	
-53	**24500	. PACKING, Preformed, o-ring	2	
-54	***24496	. BEARING, Cover, drive end	1	
-55	25653	. COVER, Drive end	1	
	*41375	KIT, Repair, rotor-stator	AR	
	42337	KIT, Repair, bearing	AR	

* = Component of kit number 28275
** = Component of kit number 41375
*** = Component of kit number 42337

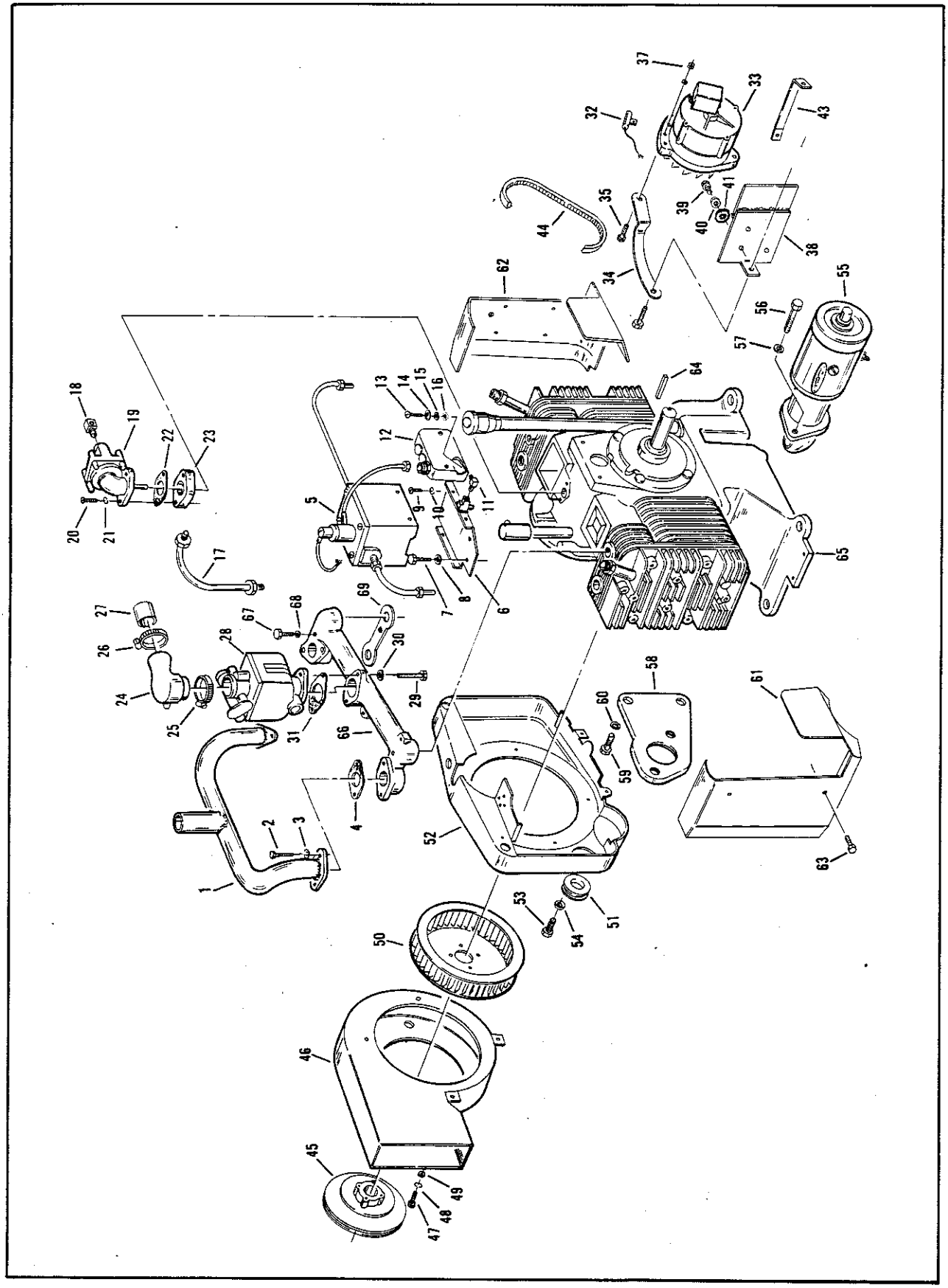


Figure 8-8. Gasoline Engine Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-8-	CCKM-MS/2504G	ENGINE ASSY, Gasoline, air cooled, 2 cylinder, 4 cycle (44940) . . . . . (16004 PN 49576)(see figure 8-1-79 for NHA)(repair kit available)	REF	
-1	81949	. MANIFOLD, Exhaust	1	
-2	MS90725-32	. SCREW, Cap, hex hd, 5/16-18NC x 3/4 in. lg (AP) (96906). . . . . (16004 PN 122007)	4	
-3	MS35338-26	. WASHER, Lock, split, 5/16 in. (AP) (96906) (16004 PN 120214). . . .	4	
-4	††154-0360	. GASKET, Exhaust manifold (44940)	2	
-5	166-0382	. COIL ASSY, Ignition (44940) (see figure 8-9-19).	REF	
-6	166-0482	. BRACKET, Ignition coil (44940).	1	
-7	MS90725-68	. SCREW, Cap, hex hd, 3/8-16NC x 2-1/2 in. lg (AP) (96906) . . . . . (16004 PN 122194)	1	
-8	MS45904-76	. WASHER, Lock, internal-external tooth, 3/8 in. (AP) (96906). . . . . (16004 PN 178551)	1	
-9	AN520-10-6	. SCREW (AP) (88044)	2	
-10	AN935-10	. WASHER (AP) (88044)	2	
-11	502-0003	. FITTING, Oil line adapter (44940).	1	
-12	160-0621	. BOX ASSEMBLY, Breaker (44940) (see figure 8-9)	1	
-13	802-0034	. SCREW, Sch, 1/4-20NC x 3/4 in. lg (AP) (44940)	2	
-14	850-0040	. WASHER, Lock, internal tooth, 1/4 in. (AP) (44940)	2	
-15	114-0947	. WASHER, Plain, brass, 1/4 in., 1/32 in. thick (AP) (44940).	2	
-16	114-0604	. WASHER, Lock, external tooth (AP) (44940)	2	
-17	149-1100	. TUBE ASSEMBLY, Fuel (44940)	1	
-18	502-0002	. FITTING (44940)	2	
-19	149-0693	. PUMP ASSEMBLY, Fuel (44940) (overhaul kit available).	1	
-20	806-0009	. SCREW, Cap, 1/4-20NC x 1-1/4 in. lg (AP) (44940)	2	
-21	850-0040	. WASHER, 1/4 in. (AP) (44940).	2	
-22	†149-0003	. GASKET, Fuel pump (44940)	2	
-23	149-0045	. SPACER, Pump (44940).	1	
-24	145-0150	. INLET, Carburetor (44940).	1	
-25	503-0107	. CLAMP (AP) (44940)	1	
-26	503-0280	. CLAMP (AP) (44940)	1	
-27	140-0211	. SLEEVE, Hose, air inlet (44940)	1	
-28	142-0426	. CARBURETOR ASSEMBLY (44940) (see figure 8-10)	1	
-29	800-0009	. SCREW, Cap, hex hd, 1/4-20NC x 1-1/2 in. lg (AP) (44940)	2	
-30	850-0040	. WASHER, 1/4 in. (AP) (44940).	2	
-31	†141-0078	. GASKET, Carburetor (44940)	1	
-32	CA33KFB504	. CONDENSOR (81349) (44940 PN 312-0168)	1	
	9416918	. NUT, Lock, hex serr flg, 1/4-20NC (AP) (24617).	1	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20NC x 3/4 in. lg (AP) (24617)	1	
-33	RA12NON450	. ALTERNATOR ASSEMBLY (31211)(44940 PN 191-1233) . . . . . (see figure 8-11)	1	
	MS51967-14	. NUT, Hex, 1/2-13NC (AP) (96906) (16004 PN 120378)	1	
	MS35338-29	. WASHER, Lock, split, 1/2 in. (AP) (96906) (16004 PN 120384)	1	
	MS90725-117	. SCREW, Cap, hex hd, 1/2-13NC x 2-1/2 in. lg (AP) (96906) . . . . . (16004 PN 122472)	1	
	274825	. SCREW, Hex hd, serr wshr, 1/4-20NC x 3/4 in. lg (AP) (24617)	2	
	MS35338-25	. WASHER, Lock, split, 1/4 in. (AP) (96906) (16004 PN 120380)	1	
	MS27183-10	. WASHER, Flat, 1/4 in. (AP) (96906) (16004 PN 120392)	1	
-34	191-0535	. BRACKET, Alternator adjusting (44940)	1	
-35	274825	. SCREW, Hex hd, serr wshr, 1/4-20NC x 3/4 in. lg (AP) (24617)	1	
-36		. DELETED		
-37	9416918	. NUT, Lock, hex serr flg, 1/4-20NC (AP) (24617).	1	
-38	60114	. BRACKET, Alternator mounting.	1	
-39	MS90725-34	. SCREW, Cap, hex hd, 5/16-18NC x 1 in. lg (AP) (96906). . . . . (16004 PN 122017)	3	
-40	MS35338-26	. WASHER, Lock, split, 5/16 in. (AP) (96906) (16004 PN 120214). . . .	3	
-41	MS27183-12	.. WASHER, Flat, 5/16 in. (AP) (96906) (16004 PN 120393).	3	
-42		. DELETED		
-43	49985	. BRACE, Alternator bracket	1	
-44	65982	. BELT, Alternator drive.	1	

† - Component of kit 168-0103

†† - Component of kit 168-0095 and 168-0103

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-8-45	191-0134	. PULLEY, Alternator drive (44940)	1	
-46	134-3041	. SCROLL, Blower (44940)	1	
-47	800-0002	. SCREW, Hex hd, 1/4-20NC x 3/8 in. lg (AP) (44940)	4	
-48	MS35338-25	. WASHER, Lock, split, 1/4 in. (AP) (96906) (44940 PN 853-0013)	4	
-49	526-0015	. WASHER Flat, 9/32ID x 9/16 OD x 1/16 thk (AP) (44940)	4	
-50	134-0565	. WHEEL, Blower (44940)	1	
-51	517-0035	. PLUG (44940)	1	
-52	134-1576	. HOUSING, Blower (44940)	1	
-53	MS90725-3	. SCREW, Cap, hex hd, 1/4-20NC x 1/2 in. lg (AP) (96906) (16004 PN 120706)	3	
-54	MS35338-25	. WASHER, Lock, split, 1/4 in. (AP) (96906) (16004 PN 120380)	3	
-55	MBG-4134AT	. STARTER ASSEMBLY (19728) (44940 PN 191-0511) (see figure 8-12)	1	
-56	102-0455	. SCREW, Cap, hex hd, 3/8-16NC x 1-1/4 in. lg (AP) (44940)	2	
-57	850-0050	. WASHER, Lock, split, 3/8 in. (AP) (44940)	2	
-58	191-0508	. FLANGE, Starter mounting (44940)	1	
-59	800-0050	. SCREW, Cap, hex hd, 3/8-16NC x 1 in. lg (AP) (44940)	2	
-60	850-0050	. WASHER, Lock, split, 3/8 in. (AP) (44940)	2	
-61	134-0674	. HOUSING, Cylinder, RH (44940)	1	
-62	134-0589	. HOUSING, Cylinder, LH (44940)	1	
-63	9416612	. SCREW, Self-tapping, hex hd, 1/4-20NC x 1/2 in. lg (AP) (24617)	4	
-64	515-0202	. KEY, Crankshaft, 1/4 x 1/4 x 3-1/4 in. lg (44940)	1	
-65	*No Number	. CYLINDER BLOCK AND HEAD ASSY (44940) (see figure 8-13)	1	
-66	154-0356	. MANIFOLD, Intake (44940)	1	
-67	800-0054	. SCREW, Cap, hex hd, 3/8-16NC x 2-1/2 in. lg (AP) (44940)	2	
-68	850-0050	. WASHER, Lock, split, 3/8 in. (AP) (44940)	2	
-69	††154-0013	. GASKET, Intake manifold (44940)	2	
	168-0103	KIT, Engine gasket (44940)	AR	
	149-0526	KIT, Fuel pump overhaul (44940)	AR	
	168-0095	KIT, Gasket, carbon removal (44940)	AR	

* - Not procurable as separate part

†† - Component of kit 168-0095 and 168-0103

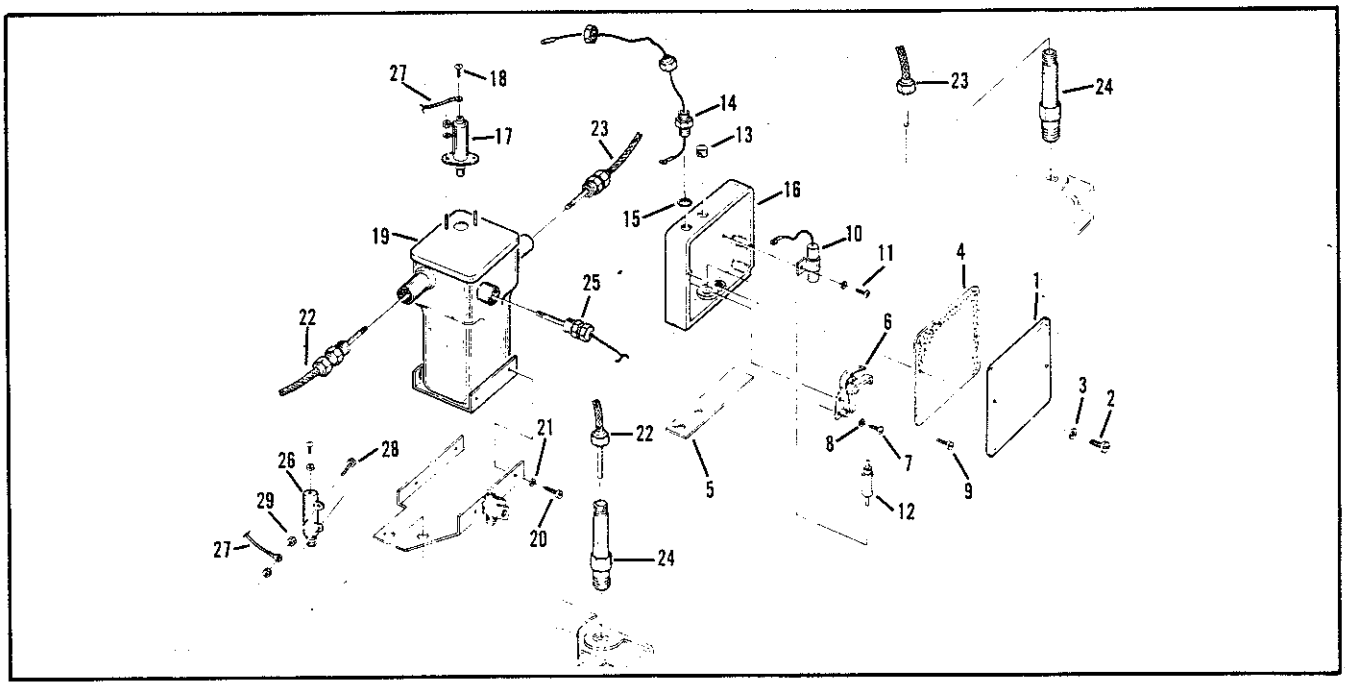


Figure 8-9. Breaker Box Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-9-	160-0621	BOX ASSEMBLY, Breaker (44940) (see figure 8-8-12 for NHA) (repair kit available)	REF	
-1	160-0152	. COVER, Breaker box (44940)	1	
-2	814-0077	. SCREW, Fil hd, no. 8-32NC x 3/8 in. lg (AP) (44940)	2	
-3	854-0007	. WASHER, Countersunk (AP) (44940)	2	
-4	160-0440	. GASKET, Cover (44940)	1	
-5	†160-0043	. GASKET, Mounting (44940)	1	
-6	††160-0002	. BREAKER POINT ASSY (44940)	1	
-7	812-0075	. SCREW, Round head, no. 8-32NC x 1/4 in. lg (AP) (44940)	2	
-8	853-0005	. WASHER, Shakeproof, no. 8 (AP) (44940)	2	
-9	160-0075	. CAM, Breaker point adjusting (44940)	1	
-10	††312-0069	. CONDENSER, Breaker point, 0.3 mfd (44940)	1	
-11	518-0049	. SCREW, Special (AP) (44940)	1	
-12	160-0262	. PLUNGER ASSEMBLY, Breaker (44940)	1	
-13	517-0061	. PLUG (44940)	1	
-14	167-0061	. NIPPLE, Shield (44940)	1	
-15	167-0009	. GASKET, Nipple (44940)	1	
-16	160-0595	. BOX, Breaker (44940)	1	
-17	NF10264-1	. CAPACITOR (88419)	1	
-18	813-0096	. SCREW, No. 10-32NF x 1/4 in. lg (AP) (44940)	1	
	860-0006	. NUT, No. 5-40NC (AP) (44940)	2	
	854-0006	. WASHER, Lock, no. 5 (AP) (44940)	2	
-19	166-0382	. COIL ASSY, Ignition (44940) (see figure 8-8-5 for NHA)	1	
-20	AN520-10-6	. SCREW (AP) (88044)	4	
-21	178-0378	. WASHER, Lock, no. 10 (AP) (44940)	4	
-22	MS51011-1	. CABLE, Spark plug, rh, short (96906) (44940 PN 167-1457)	1	
-23	MS51011-7	. CABLE, Spark plug, lh, long (96906) (44940 PN 167-1476)	1	
-24	AR5S	. PLUG, Spark (11583)(44940 PN 167-0715)	2	
-25	336-0954	. LEAD, Coil to breaker box (44940)	1	
-26	304-0397	. RESISTOR, Ignition, 1.72 ohm, 25 watt (44940)	1	
-27	27639	. WIRE ASSEMBLY, Resistor to capacitor	1	
-28	132636	. SCREW, Mach, no. 4-40NC x 3/8 in. lg (AP) (24617)	2	
-29	134524	. NUT, No. 4-40NC (AP) (24617)	2	
	160-0836	KIT, Ignition tune-up (44940)	AR	

† - Component of kit 168-0103
†† - Component of kit 160-0836

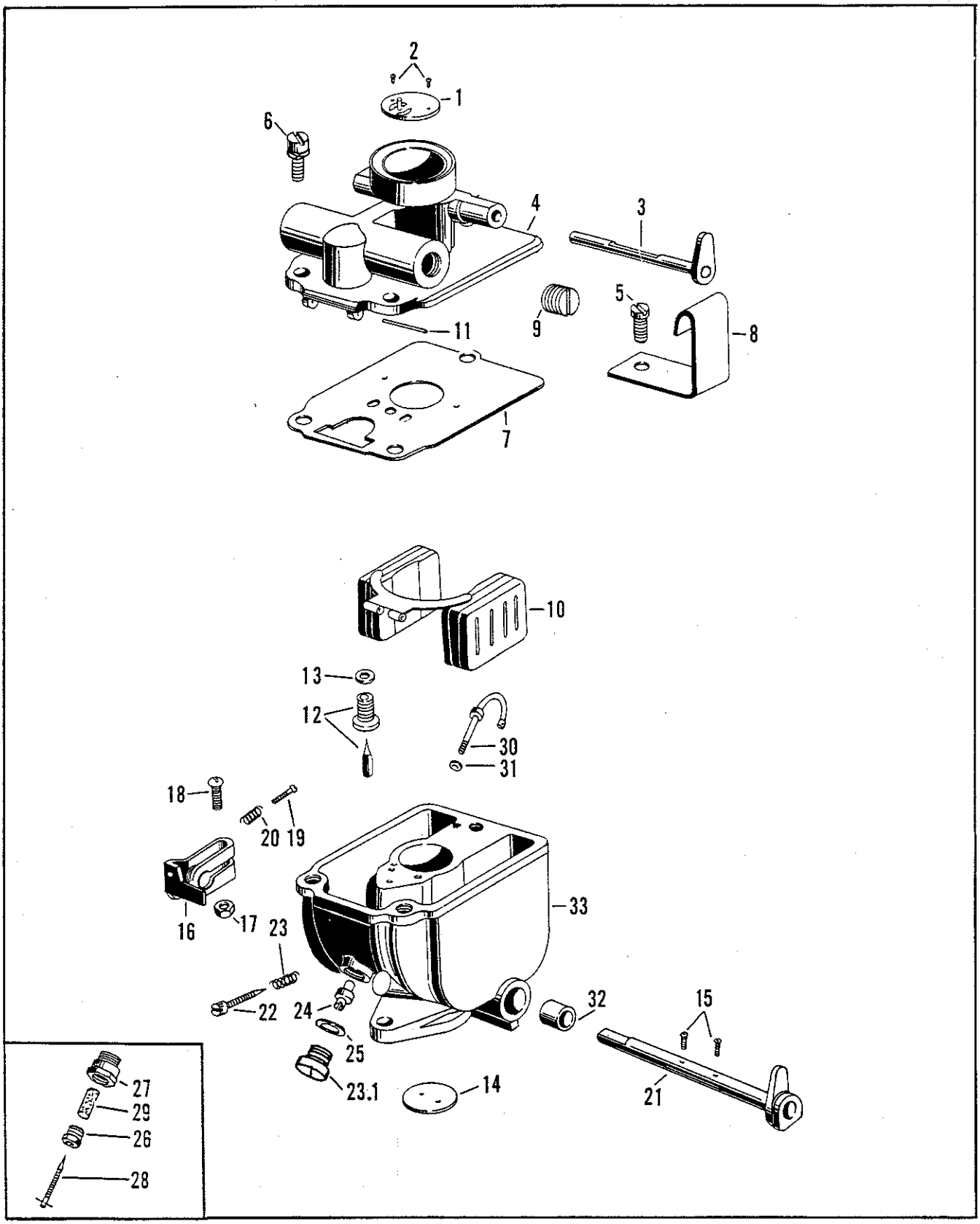


Figure 8-10. Carburetor Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-10-	142-0426	CARBURETOR ASSEMBLY (44940) (see figure 8-8-28 for NHA) (repair kits available)	REF	
-1	142-0055	. CHOKE FLY (44940)	1	
-2	815-0091	. SCREW, Round hd, no. 4-40NC x 3/16 in. lg (AP) (44940)	2	
-3	142-0217	. SHAFT, Choke (44940)	1	
-4	142-0205	. SLEEVE, Choke (cóver) (44940)	1	
-5	815-0103	. SCREW, Cover, no. 10-24NC x 1/2 in. lg (AP) (44940)	1	
-6	815-0109	. SCREW, Cover, no. 10-24NC x 5/8 in. lg (AP) (44940)	2	
-7	††142-0031	. GASKET, Cover (44940)	1	
-8	153-0263	. BRACKET, Choke to carburetor (44940)	1	
-9	505-0008	. PLUG, Gas inlet (44940)	1	
-10	†142-0361	. FLOAT AND LEVER ASSY (44940)	1	
-11	†142-0039	. SHAFT, Float (AP) (44940)	1	
-12	†142-0049	. VALVE ASSEMBLY, Float (44940)	1	
-13	††148-0017	. GASKET, Valve (44940)	1	
-14	†142-0369	. THROTTLE FLY (44940)	1	
-15	815-0072	. SCREW, Round hd, no. 4-40NC x 1/4 in. lg (AP) (44940)	2	
	142-0324	. LEVER ASSY, Throttle stop (44940)	1	
-16	145-0008	. . LEVER, Throttle stop (44940)	1	
-17	870-0053	. . NUT, Hex, no. 10-32 NF (AP) (44940)	1	
-18	813-0103	. . SCREW, Round hd, no. 10-32NF x 3/4 in. lg (AP) (44940)	1	
-19	812-0063	. . SCREW, Round hd, no. 6-32 NC x 1/2 in. lg (44940)	1	
-20	142-0035	. . SPRING (44940)	1	
-21	†142-0368	. SHAFT, Throttle	1	
-22	†142-0040	. NEEDLE, Idle adjusting (44940)	1	
-23	†142-0282	. SPRING (44940)	1	
-24	142-0285	. NOZZLE (44940)	1	
-25	††142-0032	. GASKET, Nozzle (44940)	1	
	142-0042	. NEEDLE ASSEMBLY, Main adjusting (44940)	1	
-26	†142-0046	. . RETAINER, Needle (44940)	1	
-27	†142-0045	. . RETAINER, Packing (44940)	1	
-28	†142-0041	. . NEEDLE, Main adjusting (44940)	1	
-29	†142-0206	. . PACKING, Needle (44940)	1	
-30	†142-0370	. NUT AND JET, Nozzle (44940)	1	
-31	††148-0017	. GASKET (44940)	1	
-32	†142-0343	. BUSHING (44940)	2	
-33	*No Number	. BODY (44940)	1	
	142-0393	. JET, Main, fixed (44940)	1	
	142-0015	. PLUG, Nozzle (44940)	1	
	142-0033	KIT, Gasket, Carburetor (44940)	AR	
	142-0371	KIT, Overhaul, carburetor (44940)	AR	

* - Not procurable as separate part
†† - Component of kit 142-0371
††† - Component of kit 142-0033

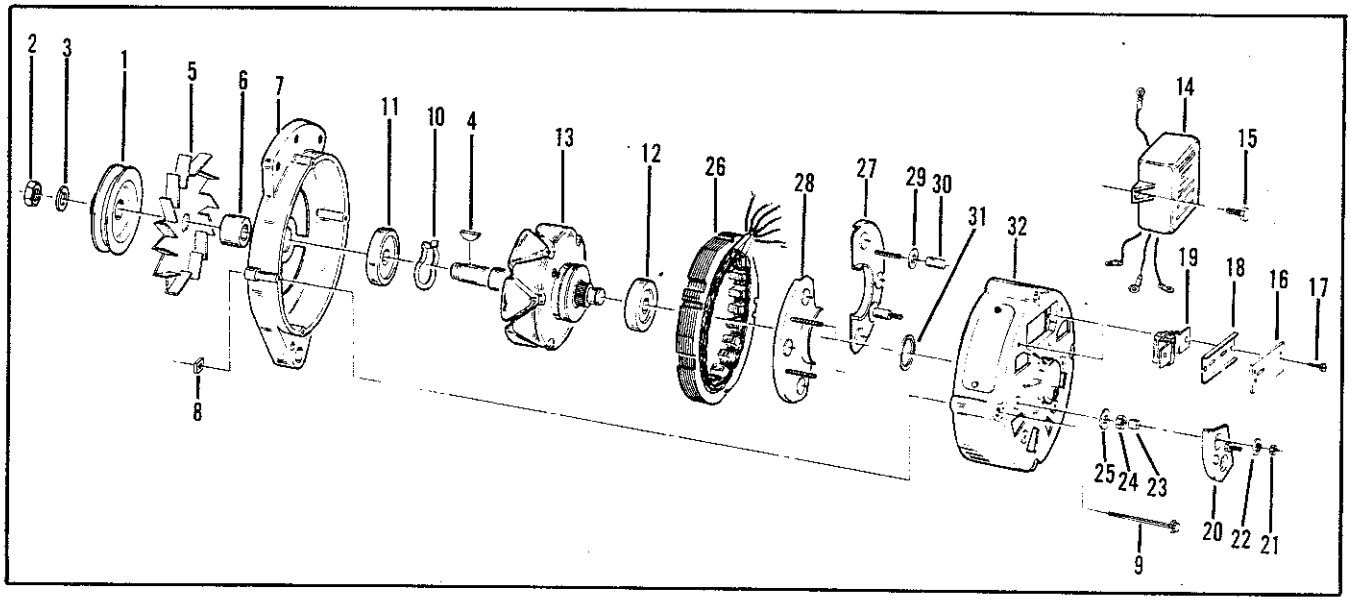


Figure 8-11. Alternator Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-11-	RA12NON450	ALTERNATOR ASSEMBLY (31211) (44940 PN 191-1233) (see figure 8-8-33 for NHA)	REF	
-1	191-0623	. PULLEY, Alternator (44940)	1	
-2	20-136	. NUT, Pulley mounting (AP) (31211)	1	
-3	20-5	. WASHER, Pulley mounting (AP) (31211)	1	
-4	20-7	. KEY, Woodruff no. 5 (AP) (31211)	1	
-5	7-8	. FAN, Alternator (31211)	1	
-6	20-92	. SPACER, Fan (31211)	1	
-7	14-3	. HOUSING, Front (31211)	1	
-8	20-3	. NUT, Square, no. 10-32 NF (AP) (31211)	4	
-9	20-1	. BOLT, Through (AP) (31211)	4	
-10	11-3	. RETAINER, Front bearing (31211)	1	
-11	11-21	. BEARING, Front (31211)	1	
-12	11-23	. BEARING, Rear (31211)	1	
-13	12-1	. ROTOR ASSEMBLY (31211)	1	
-14	5-46	. REGULATOR, Voltage (31211) (44940 PN 191-1243)	1	
-15	20-99	. SCREW, Tapping/lockwasher (AP) (31211)	3	
-16	3-6	. COVER, Brush holder (31211)	1	
-17	20-32	. SCREW, Tapping (AP) (31211)	2	
-18	3-13	. SHIELD, Dust (31211)	1	
-19	3-1	. BRUSH ASSEMBLY (31211) (44940 PN 191-0659)	1	
-20	1-29	. DIODE ASSY, Isolation (31211) (44940 PN 191-0671)	1	
-21	20-33	. NUT, Hex, 10-24 NC (AP) (31211)	2	
-22	15-4	. WASHER, Insulator (AP) (31211)	2	
	20-146	. NUT, Hex, 1/4-20NC (AP) (31211)	1	
	20-62	. WASHER, Lock, 1/4 in. (AP) (31211)	1	
-23	15-2	. SLEEVE, Insulator (31211)	1	
-24	20-34	. NUT, Hex, no. 10-24NC (31211)	1	
-25	15-3	. WASHER, Insulator (31211)	1	
-26	13-1	. STATOR ASSEMBLY (31211)	1	
-27	1-2	. DIODE ASSY, Rectifier, negative (31211) (44940 PN 191-0662)	1	
-28	1-1	. DIODE ASSY, Rectifier, positive (31211) (44940 PN 191-0661)	1	
-29	15-3	. WASHER, Insulator (31211)	4	
-30	15-1	. SLEEVE, Insulator (31211)	2	
-31	11-25	. RETAINER, Rear bearing (31211)	1	
-32	14-56	. HOUSING, Rear (31211)	1	

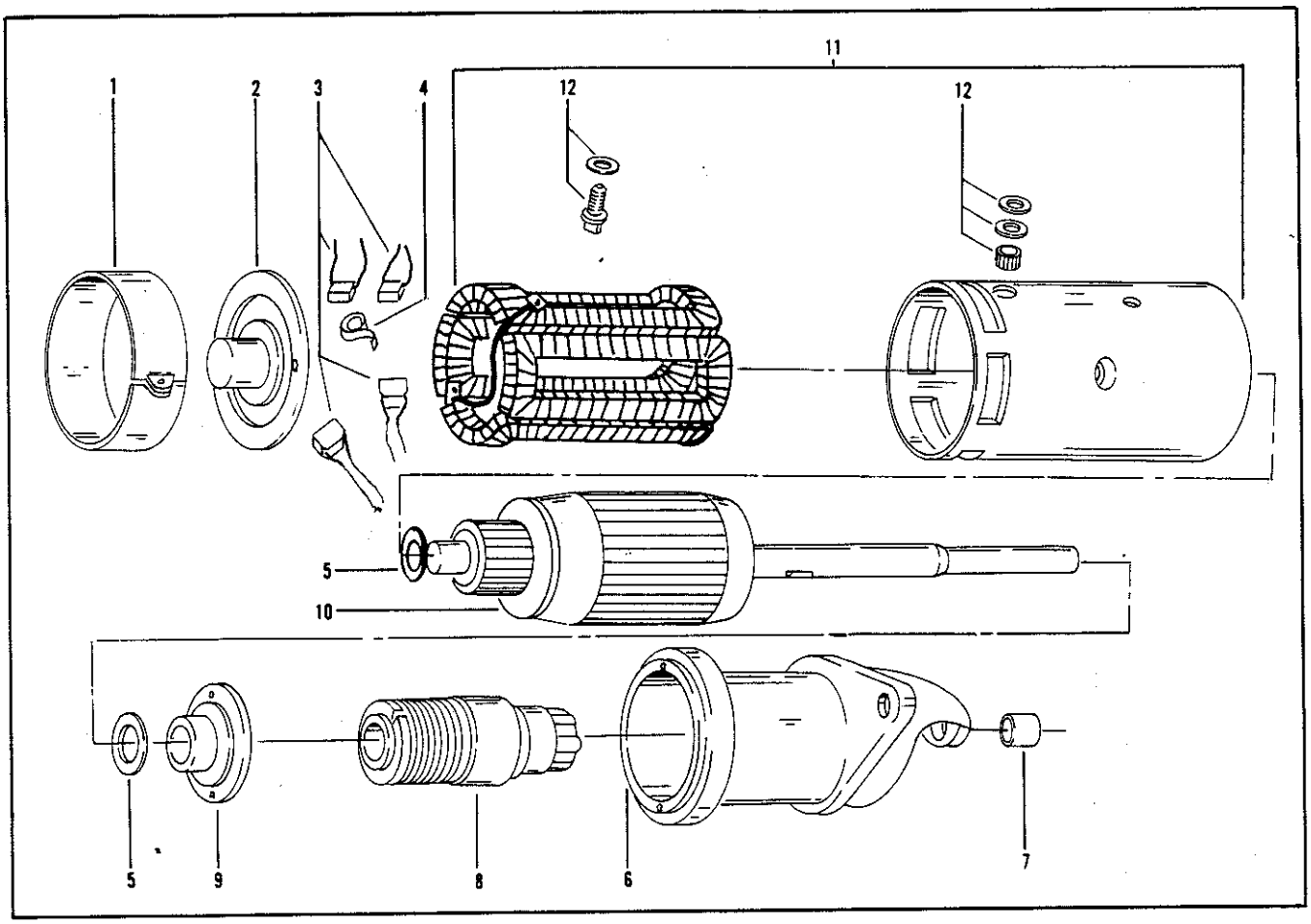


Figure 8-12. Starter Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-12-	MBG-4134AT	STARTER ASSEMBLY (19728) (44940 PN 191-0511) (see figure 8-8-55 for NHA)	REF	
-1	MZ-24U	. BAND, Cover (19728)	1	
-2	MZ-2002T	. HEAD ASSY, Commutator end (19728) (44940 PN 191-1018)	1	
-3	MBG-2012BS	. . BRUSH SET (19728) (44940 PN 191-0513)	1	
-4	MZ-19CS	. . SPRING SET, Brush (19728) (44940 PN 191-1020)	1	
-5	90-263	. THRUST WASHER PACKAGE (19728). (44940 PN 191-1021) consisting of:	1	
	MU-54	. . WASHER, Thrust, CE, 1/32 in. thk (19728)	AR	
	MU-54B	. . WASHER, Thrust, CE, 3/64 in. thk (19728)	AR	
	MU-54K	. . WASHER, Thrust, CE, 0.080 in. thk (19728)	AR	
	MU-54	. . WASHER, Thrust, Drive end, 1/32 in. thk (19728)	1	
-6	PS-1428A	. HOUSING ASSY, Pinion (19728)	1	
-7	MG-77A	. . BEARING, ABS bronze (19728) (44940 PN 191-0735)	1	
-8	EBB-40A	. BENDIX DRIVE (19728) (72850 PN 480345) (44940 PN 191-0271)	1	
-9	MAW-2129B	. BEARING ASSY, Intermediate (19728) (44940 PN 191-1019)	1	
-10	MZ-2023T	. ARMATURE (19728) (44940 PN 191-0517)	1	
-11	MBG-2022C	. FRAME AND FIELD ASSY (19728)	1	
-12	90-743	. . TERMINAL STUD PACKAGE (19728) (44940 PN 191-1022)	1	

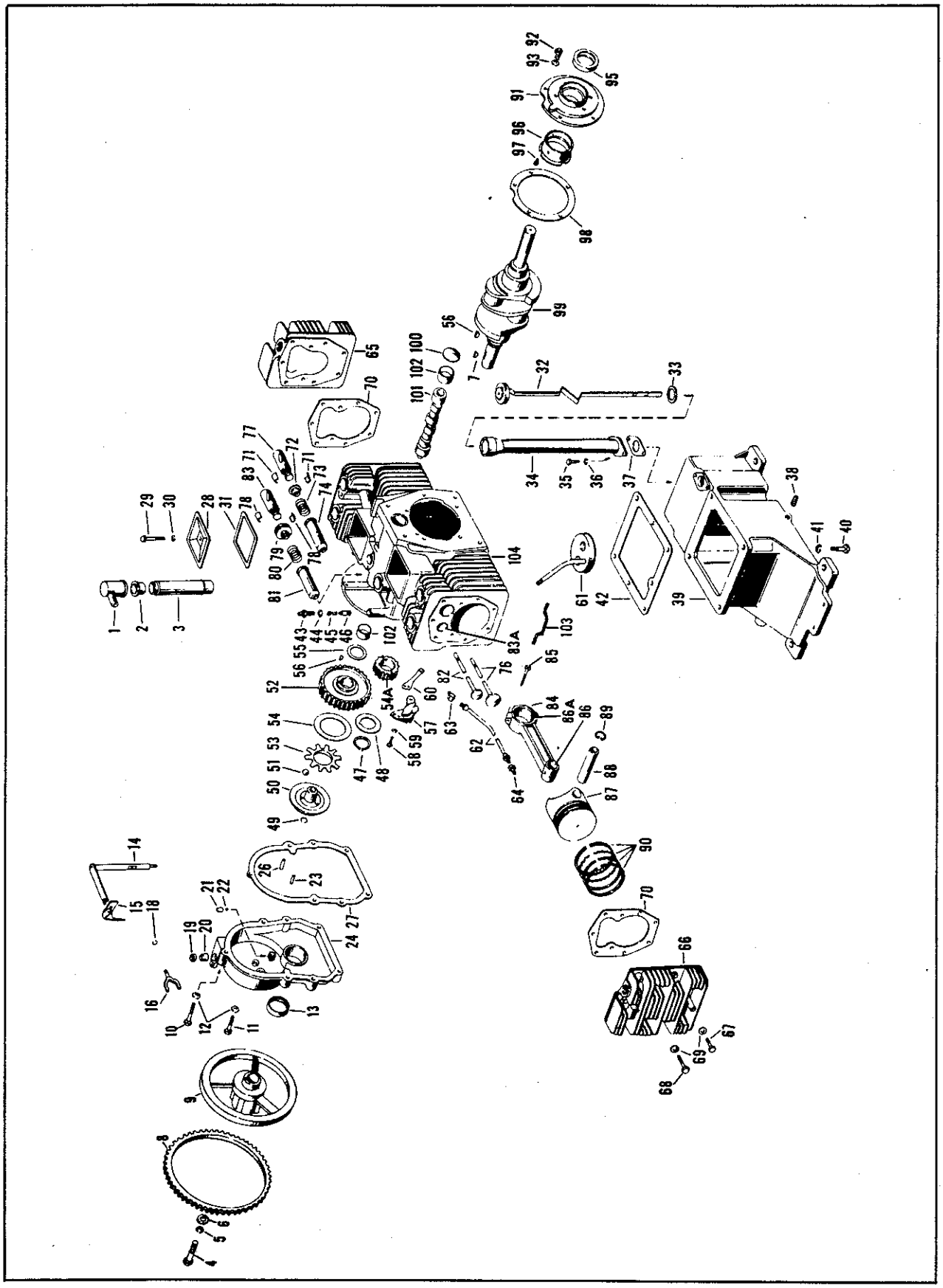


Figure 8-13. Engine Cylinder Block and Head Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-13-	*No Number	ENGINE CYLINDER BLOCK AND HEAD ASSY (44940) . . . . . (see figure 8-8-65 for NHA) (repair kit available)	REF	
-1	123-0293	. CAP, Breather tube (44940)	1	
-2	123-0104	. VALVE, Breather (44940)	1	
-3	123-0129	. TUBE, Breather (44940)	1	
	104-0302	. FLYWHEEL ASSEMBLY (44940)	1	
-4	104-0170	. SCREW, Flywheel mounting (AP) (44940)	1	
-5	MS35338-28	. WASHER, Lock, split, 7/16 in. (AP) (96906) (16004 PN 120383)	1	
-6	526-0017	. WASHER, Flat (AP) (44940)	1	
-7	515-0002	. KEY, Flywheel mounting (AP) (44940)	1	
-8	134-0673	. . GEAR, Ring, flywheel (44940)	1	
-9	*104-0499	. . FLYWHEEL (44940)	1	
	*No Number	. GOVERNOR AND THROTTLE GROUP (44940) (see figure 8-14) . . .	1	
	103-0207	. COVER ASSEMBLY, Gear (44940)	1	
-10	MS90725-39	. SCREW, Cap, hex hd, 5/16-18NC x 1-3/4 in. lg (AP) (96906) . . . . . (16004 PN 122052)	4	
-11	MS90725-41	. SCREW, Cap, hex hd, 5/16-18NC x 2-1/4 in. lg (AP) (96906) . . . . . (16004 PN 120696)	1	
-12	MS27183-12	. WASHER, Flat, 5/16 in. (AP) (96906) (16004 PN 120393)	5	
-13	†509-0040	. . SEAL, Oil (44940)	1	
	150-0710	. . ARM AND SHAFT ASSY, Governor (44940)	1	
-14	105-0377	. . . ARM AND SHAFT (44940)	1	
-15	150-0678	. . . CLIP, Sensitivity adjusting (44940)	1	
-16	150-0620	. . . YOKE ASSY, Governor (44940)	1	
-17		. . . DELETED		
-18	518-0129	. . . RING, Yoke retaining (44940)	1	
-19	†509-0008	. . SEAL, Oil, shaft (44940)	1	
-20	510-0013	. . BEARING, Needle, shaft, upper (44940)	1	
-21	510-0008	. . BEARING, Needle, shaft, lower (44940)	1	
-22	510-0014	. . BEARING, Ball, thrust (44940)	1	
-23	516-0130	. . PIN, Ball (44940)	1	
-24	103-0197	. . COVER, Gear (44940)	1	
-25		. DELETED		
-26	516-0141	. PIN, Locating, gear cover (44940)	2	
-27	†103-0011	. GASKET, Gear cover (44940)	1	
-28	110-0666	. COVER, Valve compartment (44940)	2	
-29	MS90725-14	. SCREW, Cap, hex hd, 1/4-20NC x 2 in. lg (AP) (96906) . . . . . (16004 PN 121954)	2	
-30	526-0063	. WASHER, Cover, copper (AP) (44940)	2	
-31	††110-0667	. GASKET, Cover (44940)	2	
-32	123-0527	. INDICATOR AND CAP, Oil fill (44940)	1	
-33	†123-0191	. GASKET, Oil fill cap (44940)	1	
-34	123-0508	. TUBE, Oil fill (44940)	1	
-35	MS90725-5	. SCREW, Cap, hex hd, 1/4-20NC x 5/8 in. lg (AP) (96906) . . . . . (16004 PN 120854)	2	
-36	MS35338-25	. WASHER, Lock, split, 1/4 in. (AP) (96906) (16004 PN 120380)	2	
-37	†141-0078	. GASKET, Oil fill tube (44940)	1	
-38	505-0056	. PLUG, Pipe, oil base drain (44940)	1	
-39	102-0339	. BASE, Oil (44940)	1	
-40	MS90725-62	. SCREW, Cap, hex hd, 3/8-16NC x 1-1/4 in. lg (AP) (96906) . . . . . (16004 PN 122145)	4	
-41	MS35338-27	. WASHER, Lock, split, 3/8 in. (AP) (96906) . . . . . (16004 PN 120382)	4	
-42	†102-0158	. GASKET, Oil base (44940)	1	
-43	120-0145	. STUD, Oil bypass valve (44940)	1	
	868-0003	. NUT, Stud, oil bypass valve (44940)	1	
-44	526-0066	. WASHER, Copper (44940)	1	
-45	120-0140	. SPRING, Oil bypass (44940)	1	
-46	120-0398	. VALVE, Oil bypass (44940)	1	
-47	518-0014	. RING, Retaining, crankshaft gear (44940)	1	

*- Not procurable separately
† - Component of kit 168-0103
†† - Component of kit 168-0095 and 168-0103

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-13-48	104-0043	. WASHER, Gear retaining (44940)	1	
-49	150-0078	. RING, Retaining, timing gear (44940)	1	
-50	150-1695	. CUP ASSY, Governor (44940)	1	
	150-1519	. . HUB, Cup (44940)	1	
	150-1520	. . CUP, Governor (44940)	1	
-51	510-0015	. BALL, Governor fly (44940)	10	
-52	105-0332	. GEAR, Timing (44940)	1	
-53	150-1257	. . SPACER, Flyball (44940)	1	
-54	150-0077	. . PLATE, Flyball (44940)	1	
-54A	104-0032	. GEAR, Timing, crankshaft (44940)	1	
-55	105-0004	. WASHER, Thrust (44940)	1	
-56	515-0001	. KEY, Timing gear mounting (44940)	2	
-57	120-0491	. PUMP ASSEMBLY, Oil (44940)	1	
-58	MS90725-8	. SCREW, Cap, hex hd, 1/4-20NC x 1 in. lg (AP) (96906) (16004 PN 121900)	2	
-59	MS35338-25	. WASHER, Lock, split, 1/4 in. (AP) (96906) (16004 PN 120380)	2	
-60	†120-0161	. GASKET KIT, Oil pump (44940)	1	
-61	120-0648	. INTAKE, Oil pump (44940)	1	
-62	60291	. TUBE ASSEMBLY, Oil pressure (see figure 8-2-23 for NHA)	REF	
-63	502-0020	. ELBOW, Oil line (44940)	1	
-64	B66X4	. ADAPTER, Oil line to gauge (79470) (see figure 8-2-24 for NHA)	REF	
-65	110-0891	. HEAD, Cylinder, no. 1, LH (44940)	1	
-66	110-0890	. HEAD, Cylinder, no. 2, RH (44940)	1	
-67	110-0879	. SCREW, Cap, hex hd, hardened, 5/16-18NC x 1-1/4 in. lg (AP)(44940)	8	
-68	114-0022	. SCREW, Cap, hex hd, hardened, 5/16-18NC x 1-3/4 in. lg (AP)(44940)	10	
-69	526-0122	. WASHER, Flat (AP) (44940)	18	
-70	††110-0892	. GASKET, Cylinder head (44940)	2	
-71	110-0639	. LOCK, Valve spring retainer (44940)	4	
-72	110-0893	. WASHER, Spring retainer, intake (44940)	2	
-73	110-0539	. SPRING, Valve, intake (44940)	2	
-74	110-0902	. GUIDE, Valve (44940)	2	
-75		. DELETED		
-76	110-0881	. VALVE, Intake (44940)	2	
-77	115-0006	. TAPPET, Valve (44940)	2	
	115-0006-05	. TAPPET, Valve, 0.005 in. oversize (44940)	AR	
-78	110-0639	. LOCK, Valve spring retainer (44940)	4	
-79	110-0904	. ROTOCAP, Exhaust valve (44940)	2	
-80	110-0539	. SPRING, Valve, exhaust (44940)	2	
-81	110-0902	. GUIDE, Valve (44940)	2	
-82	110-0880	. VALVE, Exhaust (44940)	2	
-83	115-0006	. TAPPET, Valve (44940)	2	
	115-0006-05	. TAPPET, Valve, 0.005 in. oversize (44940)	AR	
-83A	110-0872	. INSERT, Exhaust valve seat, standard (44940)	2	
	110-0872-02	. INSERT, Exhaust valve seat, 0.002 in. oversize (44940)	AR	
	110-0872-05	. INSERT, Exhaust valve seat, 0.005 in. oversize (44940)	AR	
	110-0872-10	. INSERT, Exhaust valve seat, 0.010 in. oversize (44940)	AR	
	110-0872-25	. INSERT, Exhaust valve seat, 0.025 in. oversize (44940)	AR	
-84	114-0203	. ROD ASSEMBLY, Connecting (44940)	2	
-85	805-0010	. . SCREW, Connecting rod (44940)	4	
-86	114-0036	. . BUSHING, Connecting rod (44940)	2	
-86A	114-0145	. BEARING, Connecting rod, standard (44940)	4	
	114-0145-02	. BEARING, Connecting rod, 0.002 in. undersize (44940)	AR	
	114-0145-10	. BEARING, Connecting rod, 0.010 in. undersize (44940)	AR	
	114-0145-20	. BEARING, Connecting rod, 0.020 in. undersize (44940)	AR	
	114-0145-30	. BEARING, Connecting rod, 0.030 in. undersize (44940)	AR	
-87	112-0136	. PISTON AND PIN ASSY, Standard (44940)	2	
	112-0136-05	. PISTON AND PIN ASSY, 0.005 in. oversize (44940)	AR	
	112-0136-10	. PISTON AND PIN ASSY, 0.010 in. oversize (44940)	AR	
	112-0136-20	. PISTON AND PIN ASSY, 0.020 in. oversize (44940)	AR	
	112-0136-30	. PISTON AND PIN ASSY, 0.030 in. oversize (44940)	AR	
	112-0136-40	. PISTON AND PIN ASSY, 0.040 in. oversize (44940)	AR	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-13-88	112-0069	. . PIN, Piston (AP) (44940)	1	
-89	112-0003	. . RING, Retaining, piston pin (AP) (44940)	2	
-90	113-0152	. RING SET, Piston, standard (44940)	2	
	113-0152-05	. RING SET, Piston, 0.005 in. oversize (44940)	AR	
	113-0152-10	. RING SET, Piston, 0.010 in. oversize (44940)	AR	
	113-0152-20	. RING SET, Piston, 0.020 in. oversize (44940)	AR	
	113-0152-30	. RING SET, Piston, 0.030 in. oversize (44940)	AR	
	113-0152-40	. RING SET, Piston, 0.040 in. oversize (44940)	AR	
-91	101-0316	. PLATE, Rear bearing (44940)	1	
-92	800-0512	. SCREW, Cap, hex hd, 5/16-18NC x 1 in. lg (AP) (44940)	5	
-93	850-0045	. WASHER, Lock, split, 5/16 in. (AP) (44940)	5	
-94		. DELETED		
-95	†509-0041	. SEAL, Oil, bearing plate (44940)	1	
-96	101-0450	. BEARING, Crankshaft, standard (44940) (includes thrust washer 104-0575)	2	
	101-0450-02	. BEARING, Crankshaft, 0.002 in. undersize (44940) (includes thrust washer 104-0575)	AR	
	101-0450-10	. BEARING, Crankshaft, 0.010 in. undersize (44940) (includes thrust washer 104-0575)	AR	
	101-0450-20	. BEARING, Crankshaft, 0.020 in. undersize (44940) (includes thrust washer (104-0575)	AR	
	101-0450-30	. BEARING, Crankshaft, 0.030 in. undersize (44940) (includes thrust washer 104-0575)	AR	
-97	516-0072	. PIN, Bearing stop (44940)	4	
-98	101-0115	. GASKET KIT, Rear bearing plate (44940) (consists of 101-0040 washer and 101-0041 gasekt)	1	
-99	104-0669	. CRANKSHAFT (44940)	1	
-100	517-0048	. PLUG, Expansion (44940)	1	
-101	105-0140	. CAMSHAFT AND PIN ASSY (44940)	1	
	150-0075	. . PIN, Camshaft center (44940)	1	
-102	101-0367	. BEARING, Camshaft, front and rear (44940)	2	
-103	120-0386	. TUBE, Crankcase oil (44940)	1	
-104	110-1516	. BLOCK ASSY, Cylinder (44940)	1	

† - Component of kit 168-0103

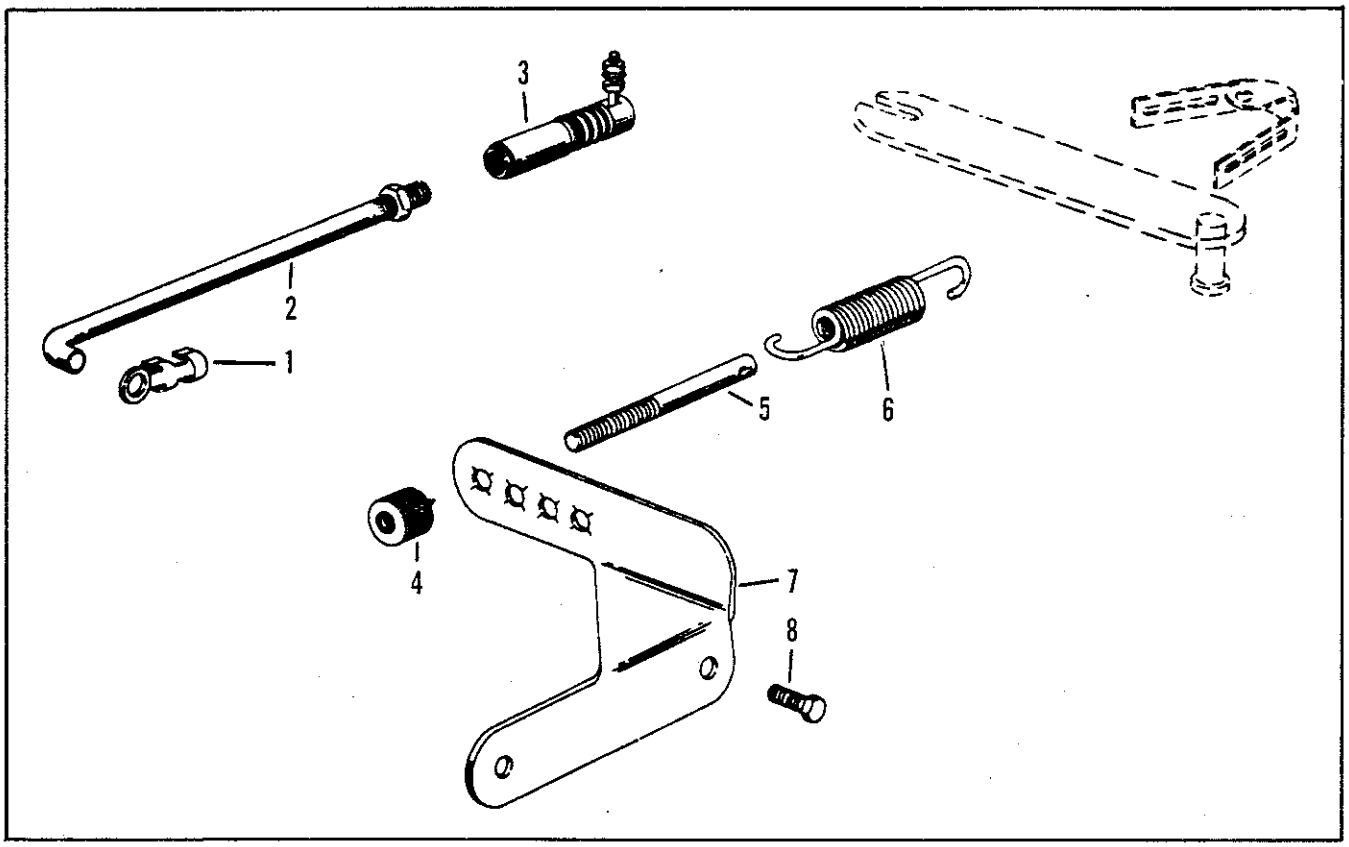


Figure 8-14. Governor and Throttle Group

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-14-	*No Number	GOVERNOR AND THROTTLE GROUP (44940) (see fig F8-13-9 for NHA)	REF	
-1	518-0006	. CLIP, Rod end (44940)	1	
-2	150-0629	. LINK, Governor arm to carburetor (44940)	1	
-3	150-0639	. BALL JOINT, Governor link (44940)	1	
-4	870-0131	. NUT, Speed adjusting (44940)	1	
-5	150-0096	. STUD, Spring tension (44940)	1	
-6	150-0098	. SPRING (44940)	1	
-7	150-0040	. BRACKET, Spring (44940)	1	
-8	150-0136	. SCREW, No. 8-32NC x 1 in. lg (AP) (44940)	2	

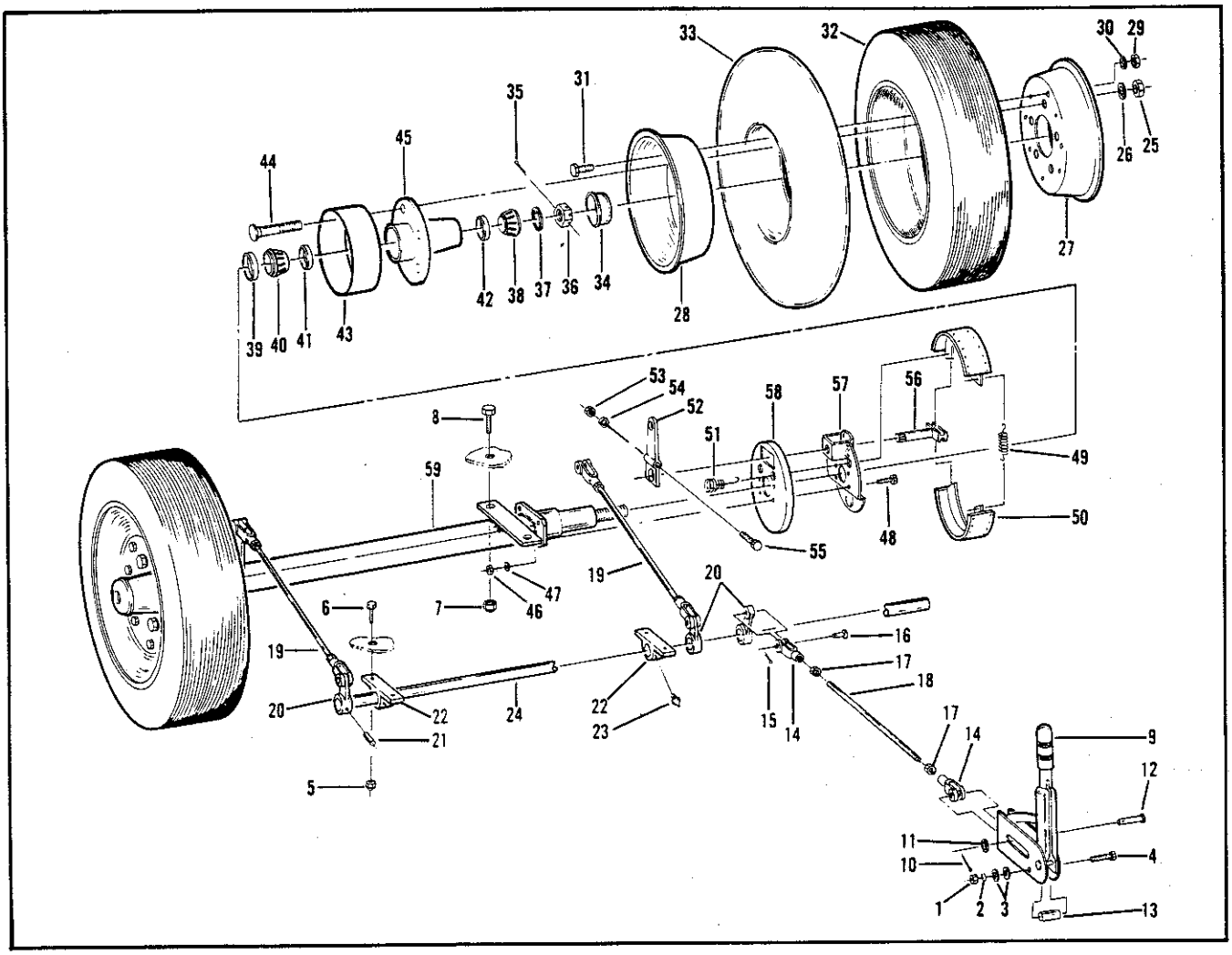


Figure 8-15. Axle Assembly

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-15-	347	AXLE ASSEMBLY [22938][16004 PN 68750][see figure ... 8-1-66 for NHA]	REF	
-1	120377	NUT, Hex, 3/8-16UNC [AP]	2	
-2	120382	WASHER, Lock, split, 3/8 in. [AP]	2	
-3	120394	WASHER, Flat, 3/8 in. [AP]	4	
-4	122188	SCREW, Cap, hex hd, 3/8-16UNC x 2-1/4 in. lg [AP]...	2	
-5	443335	NUT, Self-locking, 3/8-16UNC [AP]	4	
-6	122145	SCREW, Cap, hex hd, 3/8-16UNC x 1-1/4 in. lg [AP]...	4	
-7	443333	NUT, Self-locking, 5/16-18UNC [AP]	4	
-8	122017	SCREW, Cap, hex hd, 5/16-18UNC x 1 in. lg [AP]	4	
	347-5901	. HANDBRAKE LEVER AND CROSS SHAFT ASSEMBLY [22938]..	1	
-9	2-5919	. . LEVER, Handbrake [22938]	1	
-10	4800-2	. . PIN, Cotter [AP] [22938].....	1	
-11	120394	. . WASHER, Flat, 3/8 in. [AP]	1	
-12	5206	. . PIN, Yoke [AP][22938].....	1	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
8-15-13	5204	. . SPACER, Lever [22938]	2	
-14	5205	. . YOKE, Brake rod [22938]	6	
-15	4800-2	. . PIN, Cotter [AP] [22938]	5	
-16	5206	. . PIN, Yoke [AP] [22938]	5	
-17	4601-5	. . NUT, Hex, 3/8-24UNF [22938]	6	
-18	8300-100	. . ROD, Brake, 10 in. lg [22938]	1	
-19	8300-144	. . ROD, Brake, 14-1/2 in. lg [22938]	2	
-20	5909	. . LEVER, Cross shaft [22938]	3	
-21	5000-2	. . PIN, Spring, 5/16 in. dia x 1-1/4 in. lg [AP]	3	
-22	5908-1	. . BEARING, Cross shaft [22938]	2	
-23	5800	. . FITTING, Lubrication [22938]	2	
-24	5910-347	. . SHAFT, Cross [22938]	1	
	MS24325-1	. WHEEL ASSEMBLY [96906]	2	
-25	4601-6	. NUT, Wheel, 1/2-20UNF [AP][22938]	10	
-26	4700-5	. WASHER, Lock, split, 1/2 in. [AP] [22938]	10	
-27	3712-1	. . WHEEL DISC, Outer, with valve hole [22938]	1	
-28	3712-2	. . WHEEL DISC, Inner, without valve hole [22938]	1	
-29	4601-47	. . NUT, Hex, 3/8-24UNF [AP] [22938]	8	
-30	4700-4	. . WASHER, Lock, split [AP] [22938]	8	
-31	4901-34	. . SCREW, Cap, hex hd, 3/8-24UNF x 7/8 in. lg [AP]. [22938]	8	
-32	69213	. TIRE, Pneumatic, 6.00 x 9	2	
-33	69212	. TUBE, Inner, 6.00 x 9	2	
	347-1346	. AXLE ASSEMBLY [22938]	1	
-34	6312	. . CAP, Hub [22938]	2	
-35	4800-5	. . PIN, Cotter, spindle nut [22938]	2	
-36	4600-2	. . NUT, Spindle, castle, 1-14UNF [22938]	2	
-37	4702-2	. . WASHER, Spindle [22938]	2	
	2-3613	. . HUB AND DRUM ASSEMBLY [22938]	2	
-38	15123	. . . CONE, Bearing, outer [60038]	1	
-39	6311	. . . SEAL, Grease [22938]	1	
-40	24780	. . . CONE, Bearing, inner [60038]	1	
	3613-2	. . . HUB AND DRUM SUBASSEMBLY [22938]	1	
-41	24720	. . . . CUP, Bearing, inner [60038]	1	
-42	15245	. . . . CUP, Bearing, outer [60038]	1	
-43	8221	. . . . DRUM, Brake [22938]	1	
-44	6251-9	. . . . STUD, Wheel [AP] [22938]	5	
-45	3613	. . . . HUB, Wheel [22938]	1	
	1-8209	. . BRAKE ASSEMBLY [22938]	2	
-46	MS51968-8	. . NUT, Hex, 3/8-24UNF [AP] [96906]	8	
-47	MS35338-27	. . WASHER, Lock, split, 3/8 in. [AP] [96906]	8	
-48	MS90726-60	. . SCREW, Cap, hex hd, 3/8-24UNF x 1 in. lg [AP] [96906]	8	
-49	310960	. . . SPRING, Shoe [14892]	2	
-50	317849	. . . SHOE, Brake [14892]	2	
-51	310959	. . . SPRING, Holddown [14892]	2	
-52	317686	. . . LEVER, Brake, actuating [14892]	1	
-53	MS51968-5	. . . NUT, Hex, 5/16-24UNF [AP] [96906]	1	
-54	MS35338-26	. . . WASHER, Lock, split, 5/16 in. [AP] [96906]	1	
-55	MS90726-38	. . . SCREW, Cap, hex hd, 5/16-24UNF x 1-1/2 in. lg	1	

FIG. & INDEX NO.	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE
		[AP] [96906]		
8-15-56	312853	. . . CAMSHAFT, Shoe actuating [14892]	1	
-57	310949	. . . PLATE, Brake support [14892]	1	
-58	317684	. . . SHIELD, Dust [14892]	1	
-59	347-1346-2	. . AXLE BEAM [22938]	1	

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