TM 55-4920-226-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL WITH REPAIR PARTS AND SPECIAL TOOL LISTS

TEST STAND, AIRCRAFT, HYDRAULIC

MODEL AHT-5A-1 , TYPE D-5A

FSN 4920-710-6669

This copy is a reprint which includes current pages from Change 4

HEADQUARTERS, DEPARTMENT OF THE ARMY

SEPTEMBER 1964

SAFETY PRECAUTIONS

When handling gasoline, always provide a metal-to-metal contact between the container and tank. This will prevent a spark from being generated as gasoline flows over the metal surfaces.

Do not operate the hydraulic test stand in an inclosed building unless the exhaust gases are piped outside. The exhaust gases contain carbon monoxide, which is a colorless, odorless, and poisonous gas.

Maximum towing speed is 20 mph (miles per hour) over smooth paved surfaces.

When using the handcrank, keep the thumb on the same side of the crank handle as the fingers to avoid injury should the engine kickback. Never attempt to spin the engine with the handcrank.

*TM 55-4920-226-15
C 4

CHANGE
No. 4

HEADOUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *7 February* **1972**

Organizational, Direct Support, General Support, and
Depot Maintenance Manual With Repair Parts and Special Tool Lists

TEST STAND, AIRCRAFT, HYDRAULIC
MODEL AHT-5A-1, TYPE D-5A
FSN 4920-710-6669

TM 55-4920-226-15, 8 September 1964, is changed as follows:

Page 2, Table of Content 8. So much of Chapter 11, Section II, as reads "paragraph 215-219" is rescinded.

Page 14. (As added by C3, 17 Jul 67.) Caution is added after paragraph 40.

caution: If CH-47 aircraft are to be serviced, a three-micron filter kit, shall be installed on the test stand, if not already part of the integral test stand system. Reference TM 55-1520-209-20P and -35P manuals for part number of micron filter kit.

Pages 119 and 120. Paragraphs 215 thru 219, including figure 40, are superseded as follows:

(Refer TM 750-244-1-4 for demolition instructions.)

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

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

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31 (qty rqr block no. 94) requirements for Organizational Maintenance Instructions for all Fixed and Rotor Wing Aircraft.

*This change supersedes C3, 17 July 1967.

GPO 692-398

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TECHNICAL MANUAL
No. 55–4920–226-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 8 *September* 1964

ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL WITH REPAIR PARTS AND SPECIAL TOOL LISTS
TEST STAND, AIRCRAFT HYDRAULIC,
(MODEL AHT-5A-1, TYPE D-5A)
FSN 4920-710-6669

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the information and guidance of operating and maintenance personnel to whom the aircraft hydraulic test stand is assigned. They contain information on operation, lubrication, detailed preventive maintenance services, and maintenance of the equipment, its accessories and auxiliaries; also packing, preservation, storing, and shipping procedures.

b. Supply manuals, technical manuals, lubrication orders, and other publications applicable to the hydraulic test stand are listed in appendix I. Appendix II contains the Maintenance Allocation Chart. Appendix III contains the repair parts lists.

c. The direct reporting by the individual user of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to the Commanding General, U. S. Army Aviation Materiel Command, P. O. Box 209, Main Office, St. Louis, Me., 63166.

2. Equipment Records

The Army equipment record system and procedures established in TM 38–750 apply to this equipment. The applicable forms as required by TM 38–750 will be used.

Section II. DESCRIPTION AND DATA

3. Description

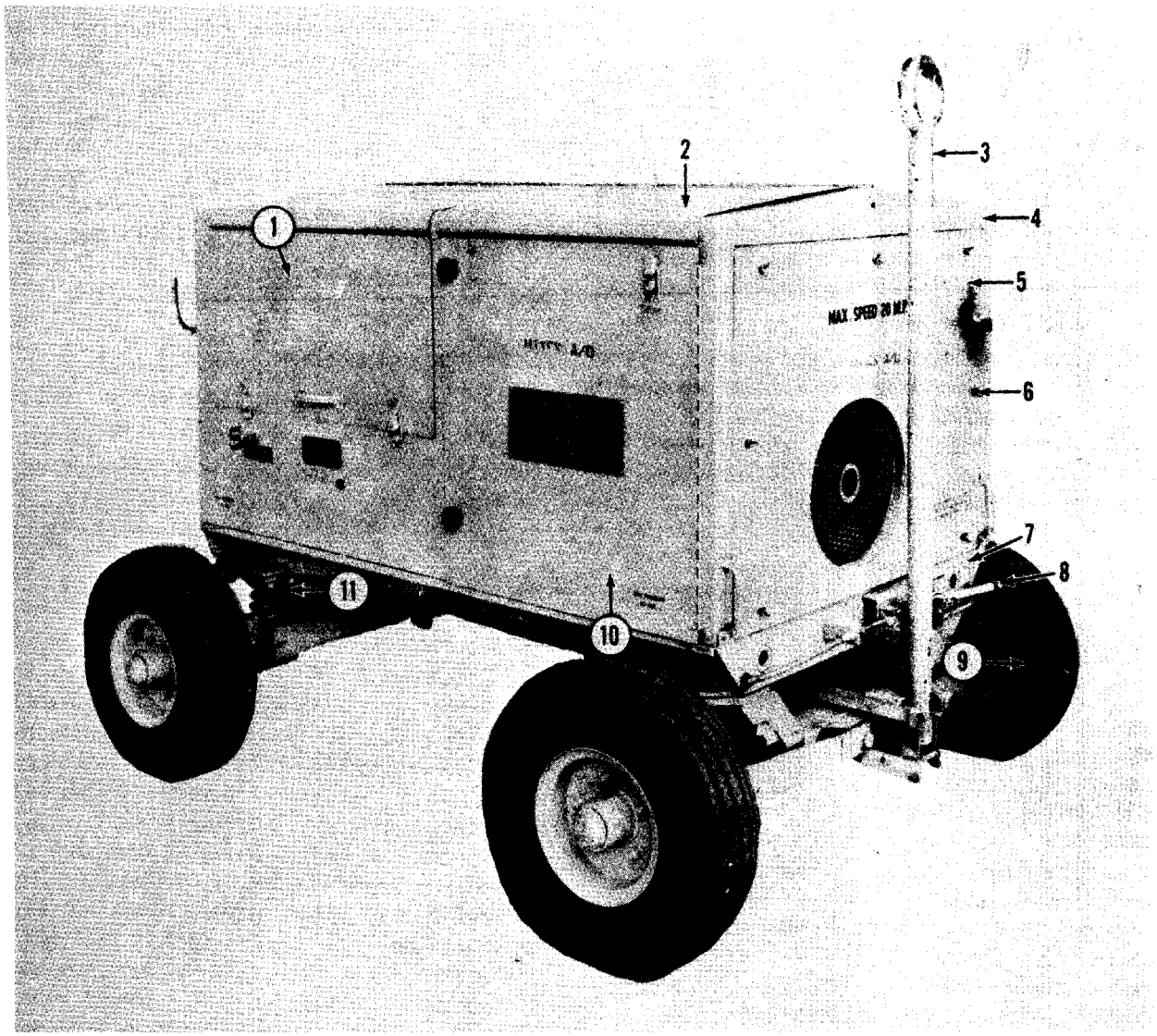
a. Hydraulic Test Stand. The aircraft hydraulic test stand consists of a gasoline engine driven, variable volume, variable pressure, axial piston-type hydraulic pump. The necessary controls and instruments are included to select and control the desired phase of operation. The entire unit is trailer mounted for mobility and protected from weather by a housing assembly fitted with hinged doors and access panel. The purpose of the aircraft hydraulic test stand is to perform the following test operations on aircraft hydraulic systems: flush or fill the system with micronically filtered hydraulic fluid, provide a source of hydraulic pressure for testing aircraft hydraulic systems without the necessity of operating the aircraft engine; and test all components of the aircraft hydraulic system, including aircraft with pressurized reservoir systems.

b. Trailer and Running Gear Assembly. The frame assembly (7, fig. 1) is of a welded steel construction furnished with a hinged drawbar assembly (3) suitable for vehicle towing. Individual springs (11) are provided to insure good riding qualities without materially increasing height. A knuckle-type steering apparatus, incorporating tie rods (14, fig. 2) and king pins, is used to provide positive steering. Rear wheels are equipped with mechanical-type parking brakes, set by the brake lever assembly (8, fig. 1) to hold the test stand in a fixed position during test operations. The trailer rolls on pneumatic tires (9). Provisions are made for attaching lifting or tie-down fittings to the frame assembly (7).

c. *Engine.* The engine is a V-type, 4 cylinder, 4 stroke cycle, air cooled unit. A 6 volt battery is employed to power the starter. Engine speed is held automatically at the selected rpm (revo-

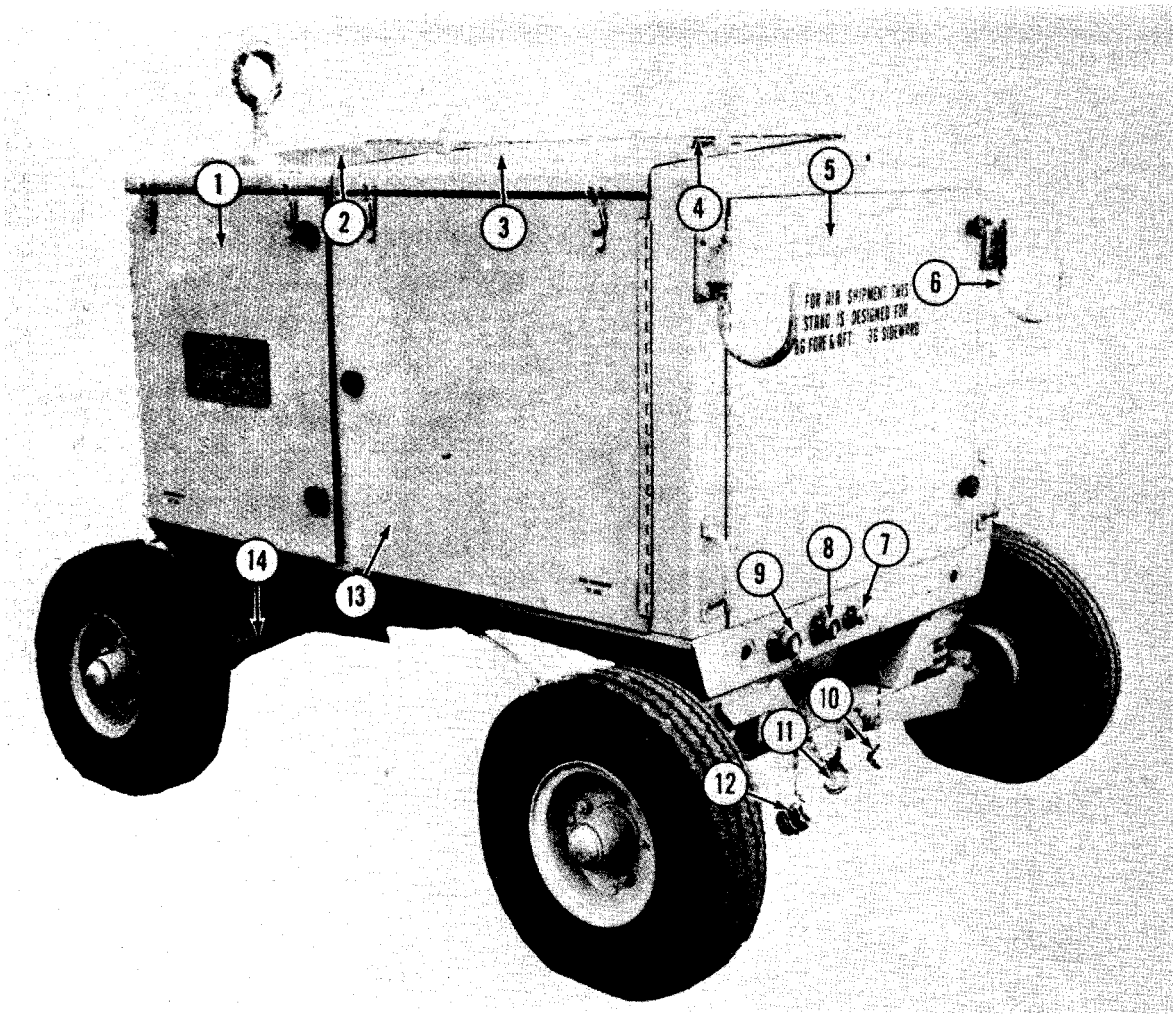
lutions per minute) by a centrifugal fly-weight governor which adjusts the throttle to compensate for changes in engine load. A handcrank, for manually cranking the engine, is secured to the frame in the engine compartment of the test stand. Controls for operating the engine are made accessible by opening the control panel door assembly (1, fig. 1). The f rent top door assembly (2), front right door assembly (10), and left front door assembly (1, fig. 2) are opened to gain access to the engine compartment.

d. Hydraulic Reservoir. The hydraulic reservoir is mounted in the upper left rear corner of the housing assembly with the reservoir fill cap (4, fig. 2) extending through the rear top



1 Control panel door assembly
2 Front top door assembly
3 Drawbar assembly
4 Housing assembly
5 Front panel assembly
6 Thumbscrew
7 Frame assembly
8 Brake lever assembly
9 Pneumatic tire
10 Right front door assembly
11 Spring

Figure 1. Aircraft hydraulic test stand, three-quarter, right front view.



1 Left front door assembly
2 Front top door assembly
3 Rear top door assembly
4 Reservoir fill cap
5 Rear door assembly
6 Hose support hook
7 Coupling half, ½ in.
8 Coupling half, ¾ in.
9 Coupling half, 1 in.
10 Dust protective cap, ½ in.
11 Dust protective cap, ¾ in.
12 Dust protective cap, 1 in.
13 Left rear door assembly
14 Tie rod

Figure 2. Aircraft hydraulic test stand, three-quarter, left rear view.

door assembly (3). A reservoir shutoff valve is provided for isolating the test stand reservoir from the hydraulic system when using fluid from the aircraft reservoir or when the test stand is utilized to drain the hydraulic system of the aircraft. Door assemblies (3 and 13) provide access to the reservoir for service and maintenance.

e. ***Hydraulic Pump.*** The hydraulic pump incorporates the following features: a pump volume control providing regulation of pump delivery from 0 to 10 gpm (gallons per minute) at operating pressures ranging from 200 to 5000 psi (pounds per square inch) output, and to 100 psi maximum input: an adjustable compensating control mounted on the control panel, which at the predetermined pressure, reduces pump delivery to the minimum requirement to maintain pressure in the system.

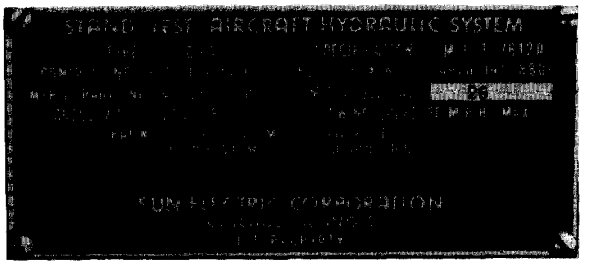


Figure 3. Aircraft hydraulic test stand identification plate.

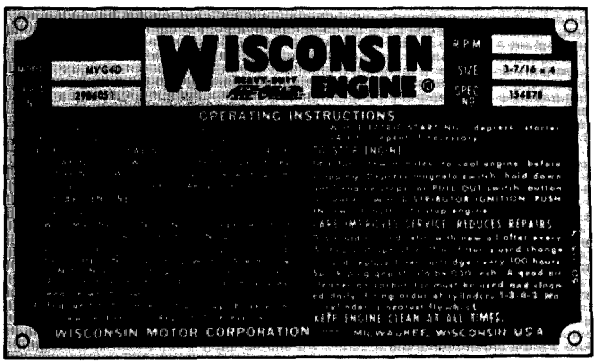


Figure 4. Engine identification plate.

4. Identification

a. The manufacturer's identification plate (fig. 3), is located in the lower right rear corner of the housing assembly and specifies type, specification, contract number, Federal stock number, manufacturer's part number, serial number, weight, towing speed, and rating of the hydraulic test stand.

b. The engine identification plate (fig. 4), mounted on the engine air shroud inside the engine compartment, specifies the make, model, serial number, and operating instructions of the engine.

5. Deviations in Models

This manual covers only the Sun Electric Corporation, Model AHT–5A–1, Type D5–A. No known unit differences exist for the model covered by this manual.

6. Tabulated Data

a. Aircraft Hydraulic Test Stand.

Manufacturer----------Sun Electric Corporation
Model----------AHT-5A-1
Operating range:
Altitude. ---------- Sea level to 6000 ft.
Ambient temperature ------20° F. to 130° F.
Humidity ----------95 to 100 percent
Deflection ---------- 8½° in any plane from horizontal.

b. Engine.

Manufacturer----------Wisconsin Motor Corp.
Model----------MVG4D
Cycle----------4 stroke
Cylinders----------4
Cooling----------Air
Cylinder bore----------3¼ in. (inch)
Stroke----------4 in.
Piston displacement----------l54 cu in (cubic inch)
Horsepower---------- ----------36 at 2200 rpm
Firing order----------1-3-4-2

c. Hydraulic Pump.

Manufacturer----------Denisen Engineering Company
Model----------PA072-564X201J
Type----------Axial piston, variable volume
Pressure output----------0 to 6000 psi
Volume output----------0 to 10 gpm

d. Capacities.

Engine crankcase----------5 qt (quart)
Engine fuel tank----------13 gal. (gallon)
Hydraulic reservoir----------26.8 gal.

e. Dimensions and weight.

Overall length ----------76 in.
Overall width----------57 in.
Overall height----------53 in.
Weight----------2200 lb. (pound)

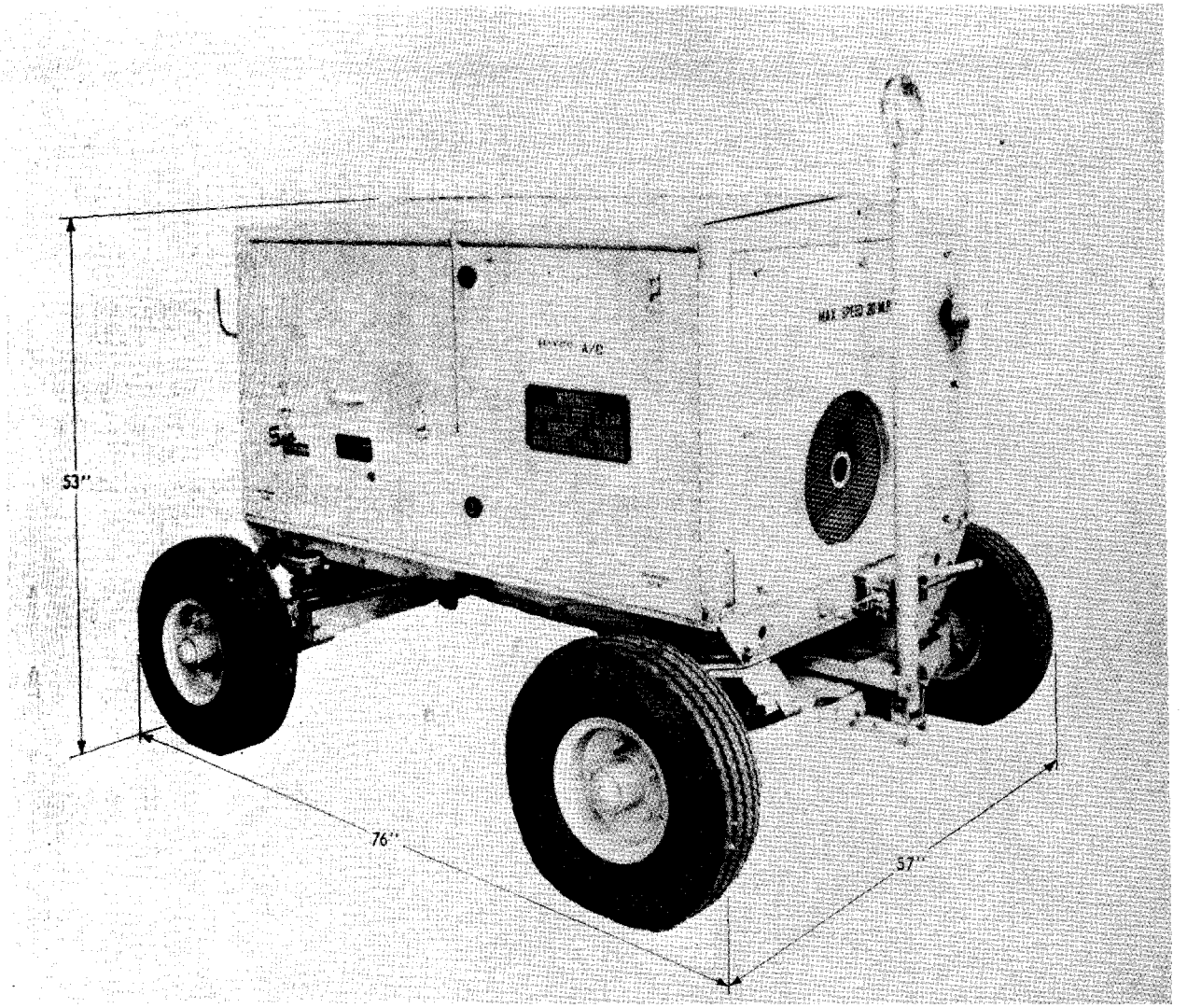


Figure 5. Shipping dimensions.

f. Schematic Hydraulic Diagrams. The schematic hydraulic diagram covers the complete hydraulic system of the test stand. It is included to aid in diagnosing and correcting malfunctions of the hydraulic system.

g. Schematic Wiring Diagram. The schematic wiring diagram illustrated in figure 7 covers the engine electrical system. It is included to aid in the maintenance and repair of the engine electrical system.

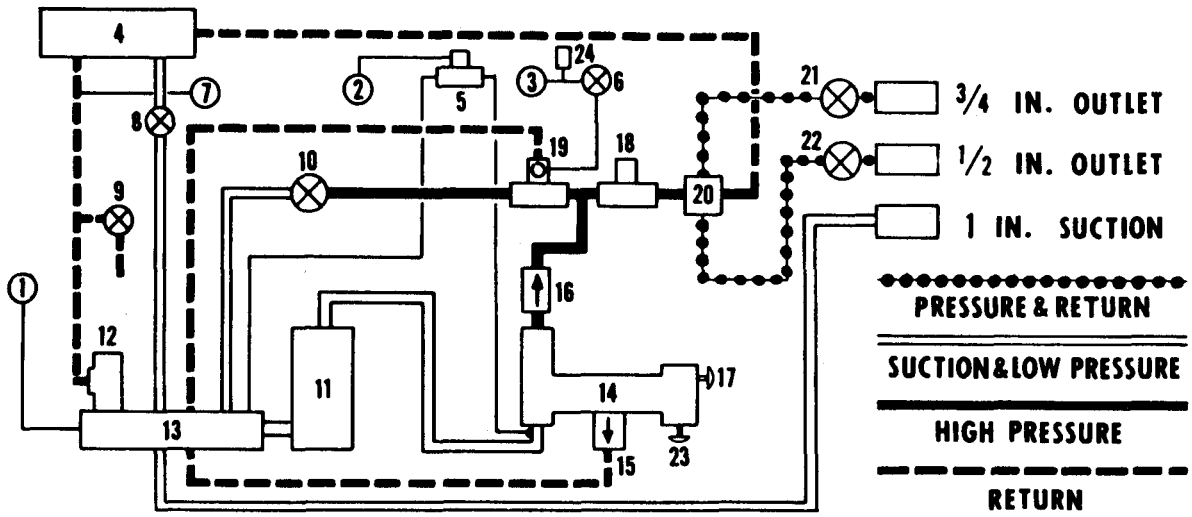


Figure 6. Schematic hydraulic diagram.

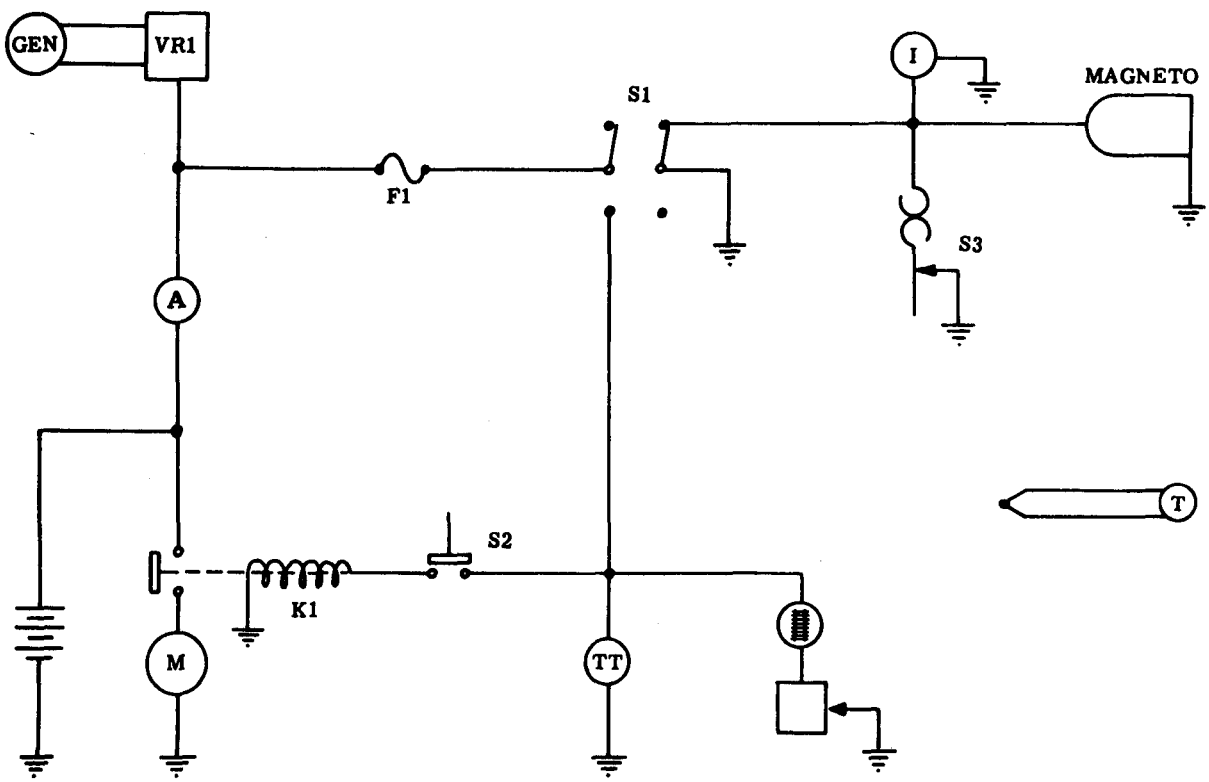


Figure 7. Schematic wiring diagram.

CHAPTER 2
OPERATING INSTRUCTIONS

Section 1. SERVICE UPON RECEIPT OF EQUIPMENT

7. Unloading and Unpacking of Equipment

a. Unloading.

(1) Disconnect tie-down straps.

(2) Where a lifting device of suitable capacity (over 3000 lb.) is available, install lifting eyebolts in the tapped holes provided in the frame, connect cable slings and lift the test stand from the carrier.

(3) When a lifting device is not available, build a ramp with suitable lumber and tow the test stand off the carrier.

b. Unpacking.

(1) Remove pressure sensitive tape from seams, doors, panels, screen, and ventilation ducts.

(2) Remove barrier material from ventilation ducts and screens.

(3) Remove bags of desiccant from inside test stand housing.

(4) Remove pressure sensitive tape from all sealed. openings.

(5) Use solvent specification PP–S-661 for removal of preservatives from exterior surfaces of the equipment.

8. Inspection of New Equipment

a. Perform the before-operation services described in paragraph 54.

b. Make a complete visual inspection of the test stand for dents, cracks, breaks, and loose or missing parts. Make sure all components are securely mounted.

c. Inspect control panels for cracked or broken glass and damaged parts.

d, Inspect the tires for cuts, fabric breaks, and excessively worn treads.

e. Correct all deficiencies or report them to organizational maintenance.

9. Servicing New Equipment

a. General. Perform the before-operation services as described in paragraph 54.

b. Lubrication. Lubricate the test stand in accordance with the lubrication chart table I.

c. *Fuel System.*

(1) Filling Fuel Tank. Remove the fuel tank cap (23, fig. 8) and fill the fuel tank to capacity with the proper grade fuel, specification MIL-G-3056. Use a clean container.

Warning: Always provide a metal-to-metal contact between the container and fuel tank when filling the tank with fuel. This will prevent a spark from being generated as gasoline flows over the metal surfaces.

(2) *Fuel Strainer.*

(a) Close the shutoff cock of the fuel strainer (1, fig. 27) by turning its handle fully clockwise.

(b) Loosen the thumbnut and cup, swing the clamp wire and stud to one side and remove the glass bowl, gasket, and filter screen from the bowl cover.

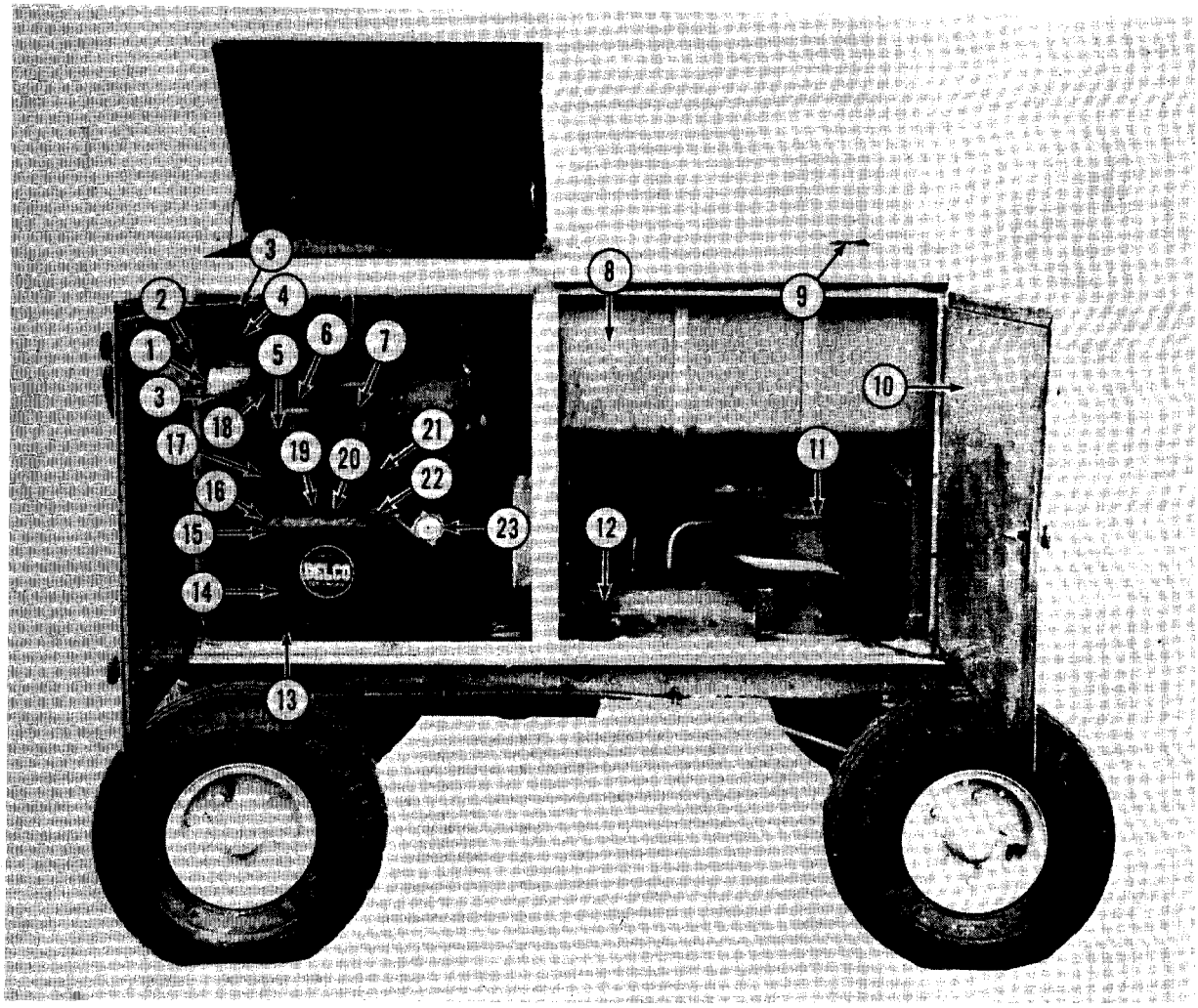
(c) Wash the bowl and screen in an approved cleaning solvent and wipe the bowl dry with a lint-free cloth.

(d) Install the screen, gasket, and bowl in the cover and secure with the clamp wire and the thumbnut.

(e) Open the shutoff cock and check the fuel strainer for leaks.

d. Battery.

(1) General. The battery (14, fig. 8) of a new test stand is shipped dry charged and must be filled with electrolyte before use. Fill each cell to the level indicator or $^{3}/_{8}$ inch over the plates.



1 Pipe nipple
2 Left front door assembly
3 Elbow
4 Pipe nipple
5 Engine accessory generator
6 Generator mounting plate
7 Shielded cable
8 Reservoir
9 Reservoir fill cap
10 Left rear door assembly
11 Low pressure filter
12 Manifold
13 Battery tray
14 Battery
15 Cover assembly
16 Nut (2 rqr)
17 V-belting
18 Generator adjusting arm
19 Battery terminal adapter, negative
20 Battery fill cap
21 Bolt
22 Battery terminal adapter, positive
23 Fuel tank cap

Figure 8. ***Aircraft hydraulic test stand, left side view.***

Warning: **Battery electrolyte contains sulfuric acid and can cause severe skin burns. If the electrolyte comes in contact with the body, clothing, or painted surfaces, rinse immediately with clean water.**

(2) *Removal.*

(a) Disconnect the two battery terminal adapters (19 and 33, fig. 8) from the terminals of the battery (14).

(b) Remove the 2 hex nuts (16), 2 lockwashers, and 2 flat washers that secure the cover assembly (15) and battery to the battery tray (13) and remove the battery.

(3) *Installation.*

(a) Place the battery in the battery tray, mount the cover assembly on the battery and secure with the 2 flat washers, and 2 lockwashers, and 2 hex nuts.

(b) Clean all corrosion from the battery

terminal adapters and terminals. Apply a thin film of grease to the terminals and adapters and connect the cables to the battery.

e. Tires. Check the tire inflation. Correct tire pressure is 30 psi.

f. Hydraulic System.

(1) Drain the preservative fluid from the system by removing the drain plug from the bottom of the low pressure filter (11, fig. 8).

(2) Install the drain plug. Remove the reservoir fill cap (9) and fill the reservoir with 20 gallons of hydraulic fluid, Specification MIL-O–5606.

Note. Do not overfill the hydraulic reservoir. The expansion space in the reservoir is necessary for satisfactory test stand operation.

(3) Bleed air from the hydraulic system as described in paragraph 70.

10. Inspection of Used Equipment

Inspect a used test stand, following the instructions contained in paragraph 8. Observe carefully the component parts that might be worn through use, such as connecting hose assemblies, tires, brakes, and drawbar assembly. Correct all deficiencies or report them to field maintenance.

11. Servicing Used Equipment

Service a used test stand as outlined in paragraph 9. Pay particular attention to the air cleaner, oil filter, fuel strainer, battery, and tires. Report all deficiencies, found during servicing, to field maintenance for correction.

Section II. CONTROLS AND INSTRUMENTS

12. General

This section describes, locates, illustrates and furnishes the operator with sufficient information pertaining to the various controls and instruments provided for proper operation of the aircraft hydraulic test stand.

13. Brake Lever Assembly

The brake lever assembly (8, fig. 1), mounted on the f rent of the frame assembly (7), sets the brake shoes in the rear wheels to secure the test stand in position for operation.

14. Reservoir Level Indicator

The reservoir level indicator (2, fig. 9) is located in the upper left-hand corner of the test stand control panel. It indicates the liquid level in the reservoir, reading from 0 to 27 gallons.

15. Reservoir Shutoff Valve

The reservoir shutoff valve (12, fig. 9) located in the lower right-hand corner of the test stand control panel is a gate valve, provided to control the flow of hydraulic fluid from the reservoir to the hydraulic system of the test stand. This valve must be closed when the reservoir of the hydraulic system under test is to be utilized.

16. Fluid Bypass Valve

The fluid bypass valve (27, fig. 9) is located directly below the filter pressure gage (6). It provides a means of directing the fluid discharge from the hydraulic pump into the reservoir. This valve must be open, creating a zero pressure condition, while starting the engine, connecting the test stand to the aircraft under test, and while setting the outlet selector valve.

17. Choke Control

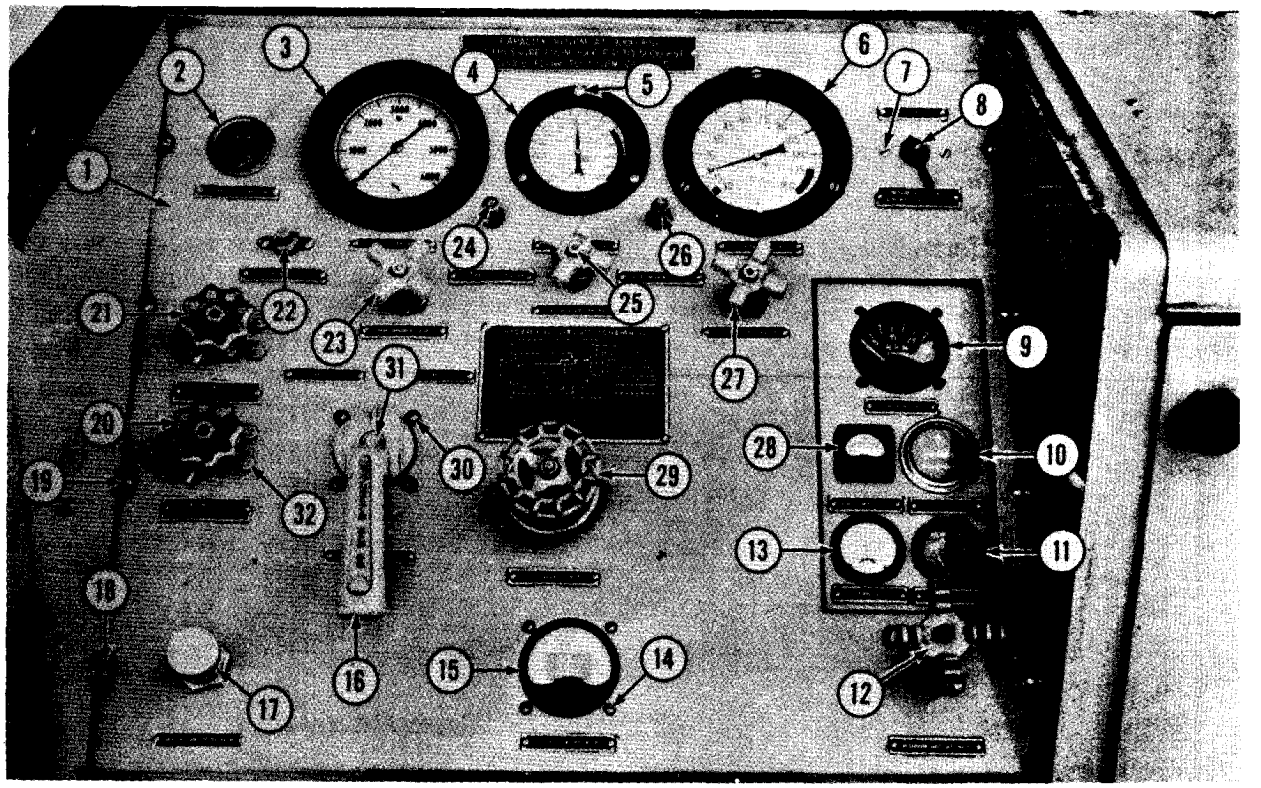
The choke control (5, fig. 10), located on the engine control panel, is a manually operated control that closes the butterfly in the carburetor, enriching the fuel mixture for starting a cold engine.

18. Throttle Control

The throttle control (4, fig. 10), located on the engine control panel, left of the choke control (5), is a push-pull, twist lock control used to set the governor for the desired engine rpm.

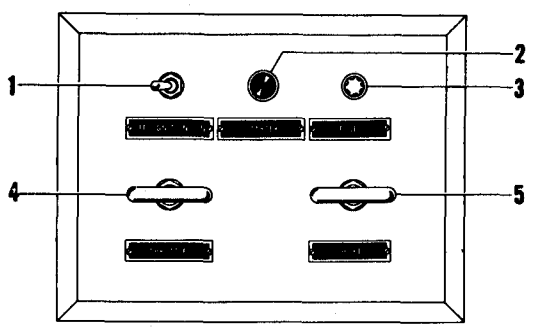
19. Ignition Switch

The ignition switch (1, fig. 10) is a double pole throw switch mounted in the upper left-hand corner of the engine control panel. When placed in the OFF position, the ignition switch grounds the magneto and interrupts power to



1 Panel
2 Reservoir level indicator
3 Fluid pressure gage
4 Fluid temperature gage
5 Screw (3 rqr)
6 Filter pressure gage
7 Screw (2 rqr)
8 Pressure selector valve
9 Tachometer
10 Hourmeter
11 Oil pressure gage
12 Reservoir shutoff valve
13 Ammeter
14 Screw (4 rqr)
15 Fluid flow indicator
16 Outlet selector valve
17 High pressure relief valve
18 Flat washer (8 rqr)
19 Screw (8 rqr)
20 Flow control valve, ½ in.
21 Flow control valve, ¾ in.
22 Gage dampener pre-charge valve
23 Gage snubber valve
24 Fluid pressure gage tap
25 Compensator control
26 Filter pressure gage tap
27 Fluid bypass valve
28 Head temperature gage
29 Fluid volume control
30 Screw (4 rqr)
31 Bolt
32 Bolt (8 rqr)

Figure 9. Controls and instruments, removal points.



1 Ignition switch
2 Starter switch
3 Fuse holder
4 Throttle control
5 Choke control

Figure 10. Engine control panel.

the hourmeter, armature relay, and the reservoir level indicator.

20. Starter Switch

The starter switch (2, fig. 10), mounted on the engine control panel, is a spring loaded, push-type switch. When pressed inward, it energizes the armature relay which in turn completes the electrical circuit between the battery and the starter.

21. Tachometer

The tachometer (9, fig. 9), mounted on the test stand control panel, is a needle-indicating, direct-reading instrument graduated from 0 to 3500 rpm in increments of 100 rpm. The tacho-

meter indicates the engine rpm. The normal operating speed is approximately 2200 rpm.

22. Oil Pressure Gage

The oil pressure gage (11, fig. 9), located on the test stand control panel, is a needle-indicating, direct-reading, pressure-actuated gage with the dial marked OFF, XX, and ON. Normal oil pressure is indicated when the needle is between XX and ON ranges.

23. Ammeter

The ammeter (13, fig. 9), mounted on the test stand control panel, is a needle-indicating, direct-reading, electrically actuated instrument. The dial is graduated in a 30–0–30 ampere scale. The ammeter indicates the amount of current flowing to or from the battery. With the engine in operation, the normal reading should be on the charge side of the 0.

24. Head Temperature Gage

The head temperature gage (28, fig. 9), located on the test stand control panel, is a needle-indicating, direct-reading, heat-actuated gage graduated from 0 to 600 degrees fahrenheit. With the engine in operation the needle should be approximately mid-scale.

25. Hourmeter

The hourmeter (10, fig. 9), mounted on the test stand control panel to the right of the head temperature gage (28), is an electrically driven, direct-reading indicator with five numbered wheels, which record engine operating time in hours and tenths of hours. The time recorded is a guide for making operating checks, periodic inspections, and filter cartridge replacements.

26. Flow Control Valves

The ½ in. and ¾ in. flow control valves (20 and 21, fig. 9), located on the left side of the test stand control panel, control the flow of hydraulic fluid to and from the hydraulic test stand. In addition to the valve handles, locking devices are provided to secure the valves in their closed or open position.

27. Fluid Volume Control

The fluid volume control (29, fig. 9), centrally located on the test stand control panel, positions the cam plate of the pump to obtain the desired volume output. The adjusted output is indicated by the fluid flow indicator (15). A locknut is provided to secure the fluid volume control in its adjusted setting.

28. Fluid Flow Indicator

The fluid flow indicator (15, fig. 9), mounted on the test stand control panel, indicates hydraulic pump delivery. The indicator is calibrated from 0 to 10 gpm.

29. High Pressure Relief Valve

The high pressure relief valve (17, fig. 9), located in the lower left-hand corner of the test stand control panel, is an adjustable, bypass-type relief valve with an operating range from 200 to 5000 psi. This valve serves as a safety device, protecting the hydraulic system under test from excessive pressure. A knurled locknut is provided to secure the valve in adjustment.

30. Compensator Control

The compensator control (25, fig. 9), located directly below the fluid temperature gage (4) on the test stand control panel, is adjusted for the desired discharge pressure of the test stand. A locknut is provided to secure the control in adjustment.

31. Fluid Pressure Gage

The fluid pressure gage (3, fig. 9), mounted on the test stand control panel, is a needle-indicating, direct-reading, pressure actuated gage. The dial is graduated from 0 to 6000 psi in increments of 50 psi. When the test stand is in operation the fluid pressure gage indicates the discharge pressure selected by the compensator control (25).

32. Gage Snubber Valve

The gage snubber valve (23, fig. 9), located below the fluid pressure gage (3) on the test stand control panel, is a needle-type valve provided to admit pressure to the fluid pressure gage.

33. Fluid Pressure Gage Tap

The fluid pressure gage tap (24, fig. 9), extending through the test stand control panel, is provided for the connection of a test pressure

gage to check the accuracy of the fluid pressure gage (3).

34. Filter Pressure Gage

The filter pressure gage (6, fig. 9), mounted on the test stand control panel, is a needle-indicating, direct-reading, pressure and vacuum actuated, compound-type gage. When used in conjunction with the pressure selector valve, the filter pressure gage indicates pressure drop through the low pressure filter. An indicated pressure drop of 20 psi necessitates replacement of the low pressure filter element.

35. Filter Pressure Gage Tap

The filter pressure gage tap (26, fig. 9), extending through the test stand control panel, provides a means of connecting a test gage to check the accuracy of the filter pressure gage (6).

36. Pressure Selector Valve

The pressure selector valve (8, fig. 9), located in the upper right-hand corner of the test stand control panel, is a two-way, plug-type valve utilized to switch the filter pressure gage connection from the inlet to the outlet side of the low pressure filter, thereby determining the condition of the filter element.

37. Gage Dampener Precharge Valve

The gage dampener precharge valve (22, fig. 9), extending through the test stand control panel, is provided to precharge the gage dampener with air to serve as a cushion in the hydraulic system, dampening pulsations.

38. Outlet Selector Valve

The outlet selector valve (16, fig. 9), mounted on the test stand control panel, is a 4-way, plug-type valve, providing a means of selecting either the ½ in. or ¾ in. outlet connections of the test stand.

39. Fluid Temperature Gage

The fluid temperature gage (4, fig. 9), centrally located at the top of the test stand control panel, is a needle-indicating, direct-reading temperature gage graduated from —20 to 240 degrees Fahrenheit in increments of 5 degrees. During operation the indicated fluid temperature should never exceed 160°.

Section III. OPERATION UNDER USUAL CONDITIONS

40. General

Instructions in this section are published for the information and guidance of personnel responsible for operation of the aircraft hydraulic test stand. It is essential that the operator knows how to perform every operation for which the equipment is capable.

41. Starting the Test Stand

a. Preparation for. Starting.

(1) Set the brake lever assembly (8, fig. 1) securing the test stand in position.

(2) Open the engine compartment and control panel door assemblies.

Caution: **Always keep engine compartment top and side doors open during operation.**

(3) Perform the before-operation services outlined in paragraph 54.

(4) Connect the coupling halves (7, 8, and 9, fig. 2) of the test stand to the corresponding outlets of the aircraft to be tested. Keep unused couplings capped with the dust protective caps (10, 11, and 12).

b. Electrical Starting.

(1) Open the fluid bypass valve (27, fig. 9) by turning the handle fully counterclockwise.

(2) Pull the choke control (5, fig. 10) out.

(3) Pull the throttle control (4) to one-quarter open position.

(4) Place the ignition switch (1) in the ON position.

(5) Push the starter switch (2) until engine starts.

(6) Open the choke control until the engine operates smoothly.

(7) Operate the engine at 1000 to 1400 rpm for approximately 10 minutes to warm engine up to normal operating temperature.

(8) Set the throttle control (4) for an engine speed of 1800 rpm indicated by the tachometer (9, fig. 9). Rotate the throttle clockwise to lock it in adjustment.

c. Manual Starting.

(1) Perform procedures in *b* (1) through (4) above.

(2) Insert the starting crank in the access hole in the front panel assembly (5, fig. 1). Engage the starting crank with the pin provided in the crank shaft and pull up on the crank.

Warning: **When using the starting crank, keep the thumb on the same side of the crank handle as the fingers to avoid injury should the engine kickback. Never attempt to spin the engine with the starting crank.**

(3) Open the choke control until the engine operates smoothly.

(4) After sufficient warm up, set the throttle for an engine speed of 1800 rpm.

42. Stopping the Test Stand

a. Open the fluid bypass valve (27, fig. 9) by turning handle of the valve fully counterclockwise.

b. Close the flow control valves (20 and 21).

c. Idle the engine for 5 minutes to normalize engine temperature.

d. Place the ignition switch (1, fig. 10) in the OFF position and close the reservoir shutoff valve (12, fig. 9).

43. Operating Details

a. Close the two flow control valves (20 and 21, fig. 9).

b. Open the gage snubber valve (23).

c. Adjust the pump delivery to requirements of the aircraft under test with the fluid volume control (29) as indicated by the fluid flow indicator (15). Turn the hand wheel clockwise to increase delivery, counterclockwise to decrease delivery. Tighten the knurled locknut to secure the fluid volume control in position.

d. Set the outlet selector valve (16) for the desired size outlet.

e. Slowly close the fluid bypass valve (27).

Warning: **Do not connect or disconnect any hoses with the fluid bypass valve closed and the test stand in operation.**

Caution: **Do not reposition the outlet selector valve with the fluid bypass valve closed and the test stand in operation.**

f. Adjust the high pressure relief valve (17) to relieve pressure at approximately 200 psi above the system pressure of the unit under test. Clockwise rotation of the relief valve knob increases pressure setting, counterclockwise rotation decreases pressure setting.

g. Adjust the compensator control (25) until the fluid pressure gage (3) indicates pressure slightly higher than the maximum pressure of the system being tested.

Caution: **Adjust the compensator control for a zero reading on the fluid pressure gage when the compensator is not in use.**

h. Open the flow control valves (20 and 21) and proceed with. the test operation as directed by the manufacturer's specifications for the system under test.

44. Movement to a New Work Site

a. Shut down and disconnect the test stand from the system being tested (par. 42). Coil the hose assemblies. and stow them in the rear compartment of the test stand.

b. Close and secure all doors and release the brake lever assembly (8, fig. 1).

c. Attach the drawbar assembly (3, fig. 1) to the prime mover and tow the test stand to the new work site.

Caution: **Maximum allowable towing speed is 20 mph over smooth paved surfaces.**

d. Set up the test stand for operation in accordance with instructions in paragraph 41.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

45. Operation in Extreme Cold

a. Lubricate the test stand in accordance with the lubrication chart.

b. Keep the electrolyte at the proper level in the battery, and the battery fully charged. If water is added to the battery, run the engine long enough to thoroughly charge the battery.

c. Close engine compartment doors as required to maintain satisfactory engine operating temperature.

d. Remove oil from the air cleaner (par. 52) and replace with the proper grade of oil.

46. Operation in Extreme Heat

a. Locate the test stand in a well ventilated area and keep all door assemblies open during operation.

b. Lubricate the test stand in accordance with the lubrication chart.

c. Keep the engine shrouding, cylinder heads, fins, and the air opening in the housing free of dirt and obstructions.

47. Operation in Dusty or Sandy Areas

a. Lubricate the test stand in accordance with the lubrication chart. Keep lubricants, grease gun, oil containers and fittings clean.

b. Protect the test stand from dust and sand as much as possible. Keep the unit clean and free of foreign matter.

c. Cover the unit with a tarpaulin when not in use.

d. If possible, wet down the area surrounding the operating site to keep down dust and sand.

e. Clean the engine air cleaner every 2 to 4 hours.

48. Operation Under Rainy or Humid Conditions

a. Lubricate the test stand in accordance with the lubrication chart.

b. Keep the fuel tank full to prevent accumulation of condensation.

c. Keep electrical components clean and dry. Watch closely for evidence of fungus growth and remove promptly.

d. Cover the test stand with a tarpaulin or similar protection when not in use.

49. Operation on Salt Water Areas

a. Lubricate the test stand in accordance with the lubrication chart.

b. Wipe all exposed areas frequently. Clean off salt water deposits with clear water and wipe dry.

c. Coat all exposed machined metal surfaces with a thin film of oil.

d. Retouch or repaint damaged paint surfaces to prevent corrosion of exposed metal.

e. Cover the test stand with a tarpaulin or similiar protection when not in use.

50. Operation at High Altitude

a. The amount of oxygen delivered to the carburetor is reduced when operating at high altitudes. Reduce the amount of fuel admitted by the carburetor by adjusting the fuel mixture (par. 122).

b. Keep air cleaner clean to assure maximum air passage to the carburetor.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL ORGANIZATIONAL TOOLS AND EQUIPMENT

No special tools or equipment are required to perform organizational maintenance of this aircraft hydraulic test stand.

Section II. LUBRICATION

51. General

This section contains lubrication instructions which are supplemental to and are not specifically covered in the lubrication chart.

52. Detailed Lubrication Information

a. Care of Lubricants. Replace covers on lubricant containers after use and store in a clean, dry place. Keep all containers, used in handling lubricating oil or gasoline, clean and ready for use.

b. Cleaning. Use an approved cleaning solvent to wipe all surfaces clean surrounding the point of application before applying the lubricant.

c. Points of Application. Follow the detailed lubrication instructions given in the applicable maintenance paragraphs and refer to the lubrication chart for type of lubricant and interval of application.

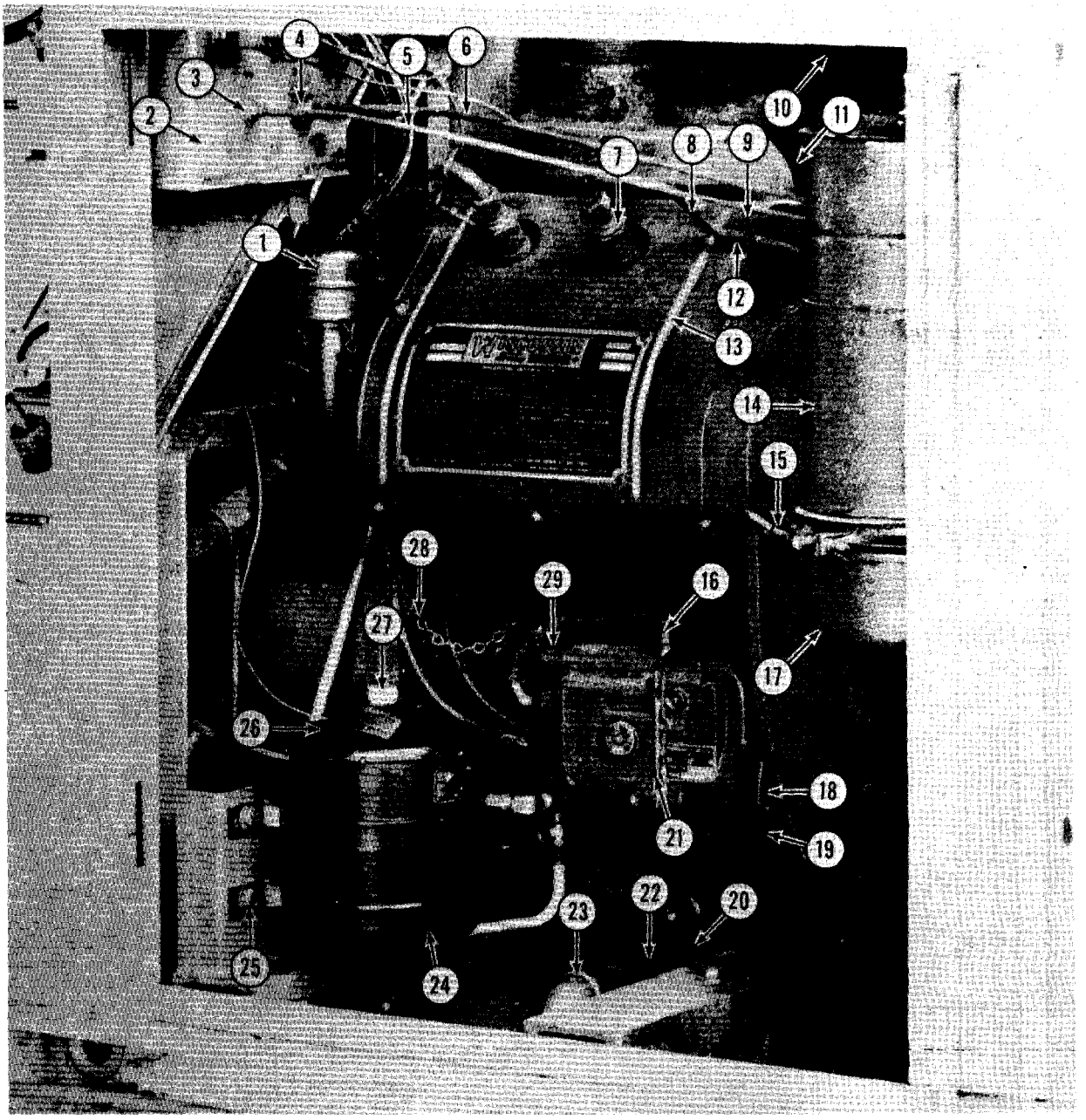
d. Operation After Lubrication. Operate the test stand for 5 minutes immediately after lubrication. Inspect the oil filter for leaks and correct as necessary. Stop the unit, wait 5 minutes, and check the oil level. Add oil to bring the oil level up to the FULL mark if necessary.

e. Oil Filter.

(1) Loosen the bolt (27, fig. 11) and remove the cover (26) from oil filter (24).

Table 1. Lubrication Chart

Lubricants	Expected Temperatures			Intervals
	Above +32° F.	+40° F to —10° F.	0° F. to —65° F.	
OE—OIL, Engine, Heavy Duty Engine Crankcase	OE30	OE10	OES	50 hours
Air Cleaner				50 hours
OES—OIL, Engine, Subzero				
2190—LUBRICATING OIL, General Purpose				
Flow Indicator				50 hours
Drawbar Assembly				100 hours
Door Hinges and Latches	2190	2110	2075	100 hours
Engine Generator				100 hours
GAA—GREASE, Automotive and Artillery				
Wheel Bearings	All Temperatures			100 hours
Tie Rod Ends				100 hours
Spindles				100 hours



1	Breather cap	11	Carburetor	21	Ignition magneto
2	Engine control panel	12	Clamp (4 rqr)	22	Pipe nipple
3	Nut	13	Cylinder head shroud	23	Elbow
4	Nut	14	Air cleaner assembly	24	Oil filter
5	Choke control	15	Thumbscrew	25	Bolt
6	Throttle control	16	Ground strap	26	Cover
7	Spark plug (4 rqr)	17	Oil cup	27	Bolt
8	Ignition cable (4 rqr)	18	Timing hole plug	28	Oil sabre
9	Screw, machine, ¼–20 x ⅜ in. (4 rqr)	19	Gear cover	29	Screw
10	Air intake cap	20	Crankcase bottom plate		

Figure 11. Oil filter, air cleaner, and ignition magneto, installed view.

(2) Remove the cartridge from inside the filter and discard.

(3) Wipe the inside of the filter with a lint-free cloth making' sure all dirt and sludge are removed.

(4) Insert a new cartridge in the filter body. Be sure the correct end of the cartridge is up.

(5) Install a new gasket in the cover (26). Place the cover on the oil filter (24) and tighten the bolt (27).

(6) Add one quart of oil to the engine crankcase to compensate for oil lost in servicing the oil filter. Refer to lubrication chart table 1 for the proper grade oil.

(7) Operate the unit immediately after servicing *(d* above).

f. Air Cleaner.

(1) Remove the air intake cap (10, fig. 11).

(2) Loosen the thumbscrew (15) and remove the oil cup (17) from the air cleaner assembly (14).

(3) Discard the oil in the oil cup. Wash the oil cup and air intake in an approved cleaning solvent and dry thoroughly.

(4) Fill the oil cup to the level mark with clean oil of the proper grade. Refer to the lubrication chart table 1. Install the oil cup on the air cleaner body and tighten the thumbscrew (15) to secure.

(5) Install the air intake cap on the top of the air cleaner assembly.

Section III. PREVENTIVE MAINTENANCE SERVICES

53. General

To insure that the equipment is ready for operation at all times, it must be inspected systematically before operation, during operation, and after operation, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services will be performed before operation. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. After-operation services will be performed by the operator after every operating period. After-operation services will be performed at intervals based on the normal operations of the equipment. Reduce interval to compensate for abnormal conditions. Defects or unsatisfactory operating characteristics beyond the scope of the operator to correct must be reported at the earliest opportunity to organizational maintenance. Responsibility for performance of preventive maintenance services rests not only with the operator, but with the entire chain of command from section chief to commanding officer (AR 750–5).

54. Operator's Daily Services

Intervals			Procedures
Before Operation	During Operation	After Operation	
X		X	*Visual inspection.* Make a general inspection of the entire unit for obvious deficiencies, such as oil or fuel leaks, loose or missing bolts, nuts, screws, loose connections, broken wires, and any damage that may have occurred since the equipment was last operated. Correct or report any deficiencies to field maintenance.
X			*Tampering.* Inspect the test stand for evidence of tampering or damage. Do not operate the unit until all defects are corrected or reported to direct and general support maintenance.
X		X	*Fuel.* Check the fuel supply. See that the fuel tank is full.
X		X	*Leaks.* Inspect for leaks, paying particular attention to the fuel line and connections. Correct all deficiencies noticed or report to direct and general support maintenance.

Intervals			Procedures
Before Operation	During Operation	After Operation	
X		X	*Oil.* Check the oil level in the engine crankcase. Add oil if the oil is not at the proper level.
X			*Air Cleaner.* Inspect the air cleaner for accumulated dirt. Clean if necessary.
X		X	*Battery.* Clean the battery and see that the terminal connections are tight. Check the level of the electrolyte. Add water as necessary to bring the level to three-eighths of an inch above the plates.
X		X	*Tires.* Inspect the tires for cuts, leaks, fabric breaks, and uneven wear. Check the tires for proper inflation. Correct tire pressure is 30 psi. Report a defective tire to direct and general support maintenance.
X		X	*Cooling System.* Inspect the condition of the fins on the engine. See that they are clean and free from dust and dirt. Inspect the engine shrouding for correct installation and loose or missing mounting bolts. Correct all deficiencies *or* report them to direct and general support maintenance.
X			*Fuel Strainer.* Inspect the bowl of the strainer for accumulation of water, dirt, and foreign matter. Clean the fuel strainer if necessary.
X			*Instruments.* Inspect all instruments for broken glass, improper operation, and insecure mounting. Report all deficiencies to direct and general support maintenance.

Section IV. TROUBLESHOOTING

55. General

This section provides information useful in diagnosis and correction, inspection, operation, or failure of the hydraulic test stand, or any of its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause.

56. Engine Hard to Start or Fails to Start

Probable cause	*Possible remedy*
Carburetor not choked sufficiently	Pull choke control further out.
Carburetor flooded.	Push in choke control and crank until engine fires.
Water or dirt in fuel strainer	Clean the fuel strainer (par. 9).
Battery cables loose or terminals corroded	Tighten battery cable connections or remove and clean cables as required (par. 9).

57. Engine Misses or Runs Erratically

Probable cause	*Possible remedy*
Water, dirt, or gum in the fuel	Clean the fuel strainer and drain fuel tank and fill with clean fuel (par. 9).
Air cleaner clogged	Service air cleaner (par. 52).
Carburetor out of adjustment	Report to direct and general support maintenance.

58. Engine Stops Suddenly

Probable cause	*Possible remedy*
Water or dirt in fuel strainer	Clean the fuel strainer and drain the fuel tank and fill with clean fuel (par. 9).
Air cleaner clogged	Service the air cleaner (par. 52).

59. Engine Overheats

Probable cause	*Possible remedy*
Crankcase oil level too low	Stop engine and add oil to proper level.

Probable cause	*Possible remedy*
Air shroud loose or damaged	Tighten air shroud. Report damaged shroud to direct and general support maintenance.
Cylinder cooling fins clogged with dirt	Report malfunction to direct and general support maintenance.

60. Engine Knocks or Develops Excessive Noise

Probable cause	*Possible remedy*
Crankcase oil level too low	Stop engine and add oil to proper level. Refer to lubrication chart.

61. Engine Oil Pressure Low

Probable cause	*Possible remedy*
Crankcase oil level too low	Stop engine and add oil to proper level. Refer to lubrication chart.
Oil pressure gage defective	Report malfunction to direct and general support maintenance.

62. Engine Exhaust Smoky

Probable cause	*Possible remedy*
Crankcase oil level too high	Drain off excess oil to correct level.
Carburetor choked excessively	Push in choke control.
Engine cold causing poor combustion	Allow sufficient time for engine warm up before operating the hydraulic system.

63. Fuel Consumption Excessive

Probable cause	*Possible remedy*
Choke control partially closed	Open choke control.
Dirty air cleaner	Service the air cleaner (par. 52).
Fuel leaks	Report to direct and general support maintenance.

64. Battery Needs Frequent Recharging

Probable cause	*Possible remedy*
Battery electrolyte level low	Add battery water to correct level (par. 9).
Battery defective	Replace defective battery (par. 9).

65. Hydraulic Pump Fails to Deliver Sufficient Pressure

Probable cause	*Possible remedy*
High pressure relief valve out of adjustment	Adjust the high pressure relief valve (par. 43).
Compensator control incorrectly adjusted	Adjust the compensator control (par. 43).
Fluid bypass valve open	Close the fluid bypass valve.
Defective fluid pressure gage	Report to direct and general support maintenance,

66. Hydraulic Pump Fails to Deliver Sufficient Volume

Probable cause	*Possible remedy*
Fluid volume control incorrectly adjusted	Adjust the fluid volume control (par. 43).
Engine speed incorrect	Set throttle for an indicated 1800 rpm.

67. Hydraulic System Pressure too High

Probable cause	*Possible remedy*
High pressure relief valve set too high	Adjust high pressure relief valve (par. 43).
High pressure relief valve defective	Refer the malfunction to direct and general support maintenance.

68. Hydraulic Fluid Temperature too High

Probable cause	*Possible remedy*
Low pressure filter dirty	Report deficiency to direct and general support maintenance.
Reservoir fluid level low	Fill reservoir to correct level (par. 9).

Section V. HYDRAULIC SYSTEM

69. General

The hydraulic system of the test stand is comprised of the hydraulic pump, high and low pressure filters, pressure gages, flow indicator, and control valves. The necessary interconnecting hose assemblies and tubing are included for the hydraulic system to perform its intended function of delivering filtered hydraulic fluid, at the desired volume and pressure, to the aircraft hydraulic system under test.

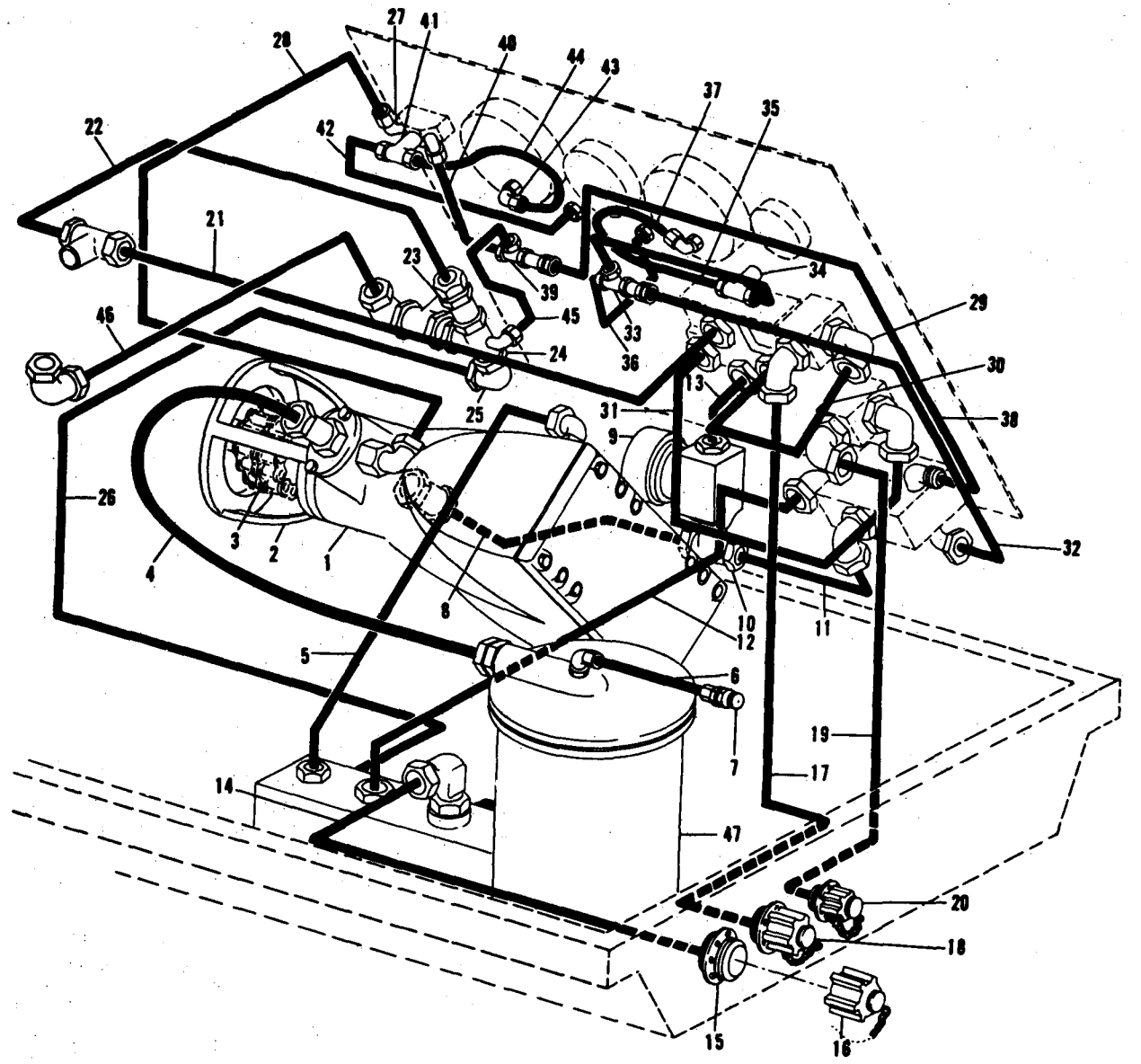


Figure 12. Hydraulic system installation.

1 Axial piston pump
2 Pump mount
3 Shaft coupling
4 Pump-to-low pressure filter hose assembly
5 Pump-to-manifold tubing
6 Low pressure filter-to-bleed valve tubing
7 Bleed valve
8 Pump-to-high pressure filter hose assembly
9 High pressure filter assembly
10 Flared tube tee
11 High pressure filter-to-relief valve tubing
12 High pressure relief valve-to-manifold tubing
13 High pressure filter-to-outlet selector valve tubing
14 Suction tubing
15 Coupling half, 1 in.
16 Dust protective cap, 1 in.
17 Flow control valve-to-outlet tubing
18 Dust protective cap, ¾ in.
19 Flow control valve-to-outlet tubing
20 Dust protective cap
21 Outlet selector valve-to-reservoir tubing
22 Relief valve-to-reservoir tubing
23 Relief valve
24 Tee
25 Flared tube elbow
26 Reservoir shutoff valve-to-manifold tubing
27 Flared tube elbow
28 Pressure selector valve-to-pump tubing
29 Flared tube elbow
30 Outlet selector valve-to-outlet tubing, ½ in.
31 Outlet selector valve-to-outlet tubing, ¾ in.
32 High pressure relief valve-to-snubber valve tubing
33 Flared tube tee
34 Flared tube tee
35 Damper valve-to-snubber valve tubing
36 Snubber valve-to-gage top tubing
37 Fluid pressure gage-to-dampener hose assembly
38 Relief valve-to-bypass valve tubing
39 Flared tube tee
40 Pressure selector valve-to-bypass valve tubing
41 Flared tube tee
42 Pressure selector valve-to-gage tubing
43 Flared tube elbow
44 Pressure selector valve-to-gage hose assembly
45 Bypass valve-to-reservoir shutoff valve tubing
46 Reservoir-to-shutoff valve tubing
47 Filter and manifold assembly

Figure 12—Continued.

70. Bleeding Air From the Hydraulic System

a. Fill the reservoir as outlined in paragraph 9.

b. Open the bleed valve (7, fig. 12) and allow air to escape from the low pressure filter. Close the valve when air bubbles no longer appear.

c. Connect the ½ inch hose assembly to the coupling half (7, fig. 2).

d. Set the outlet selector valve (16, fig. 9) in the ½ inch outlet position.

e. Open the flow control valve (20).

f. Remove the reservoir fill cap (9, fig. 8). Remove the coupling half from the opposite end of the attached ½ inch hose assembly and insert the open end into the reservoir being careful not to damage the screen in the filler neck of the reservoir.

g. Set the fluid voume control (29, fig. 9) at 2 gpm as registered on the fluid flow indicator (15).

h. Start the test stand (par. 41) and circulate hydraulic fluid through the system and back into the reservoir until all traces of air bubbles are gone from the fluid flowing into the reservoir.

i. Stop the test stand (par. 42) and disconnect the hose assembly. Cap both ends of the hose assembly and the coupling half of the test stand.

71. Filter Element Replacement

a. Inspecting Low Pressure Filters.

(1) Start the test stand (par. 41) and adjust the fluid volume control (29, fig. 9) for maximum pump delivery.

(2) Set the pressure selector valve (8) at FILTER INLET position and note the reading on the filter pressure gage (6).

(3) Set the pressure selector valve (8) at FILTER OUTLET position and note the reading on the filter pressure gage (6).

(4) The difference between the readings (2) and (3) above, represents the pressure drop across the low pressure filter. Replace the filter element, *b* below, should the pressure drop be 20 psi or greater.

b. Low Pressure Filter Element Replacement.

(1) Close the reservoir shutoff valve (12, fig. 9).

(2) Remove plug (28, fig. 13) from the bottom cover (26) and drain the hydraulic fluid from the low pressure filter.

(3) Disconnect the low-pressure filter-to-bleed valve tubing (6, fig. 12) and the pump-to-low pressure filter hose as-

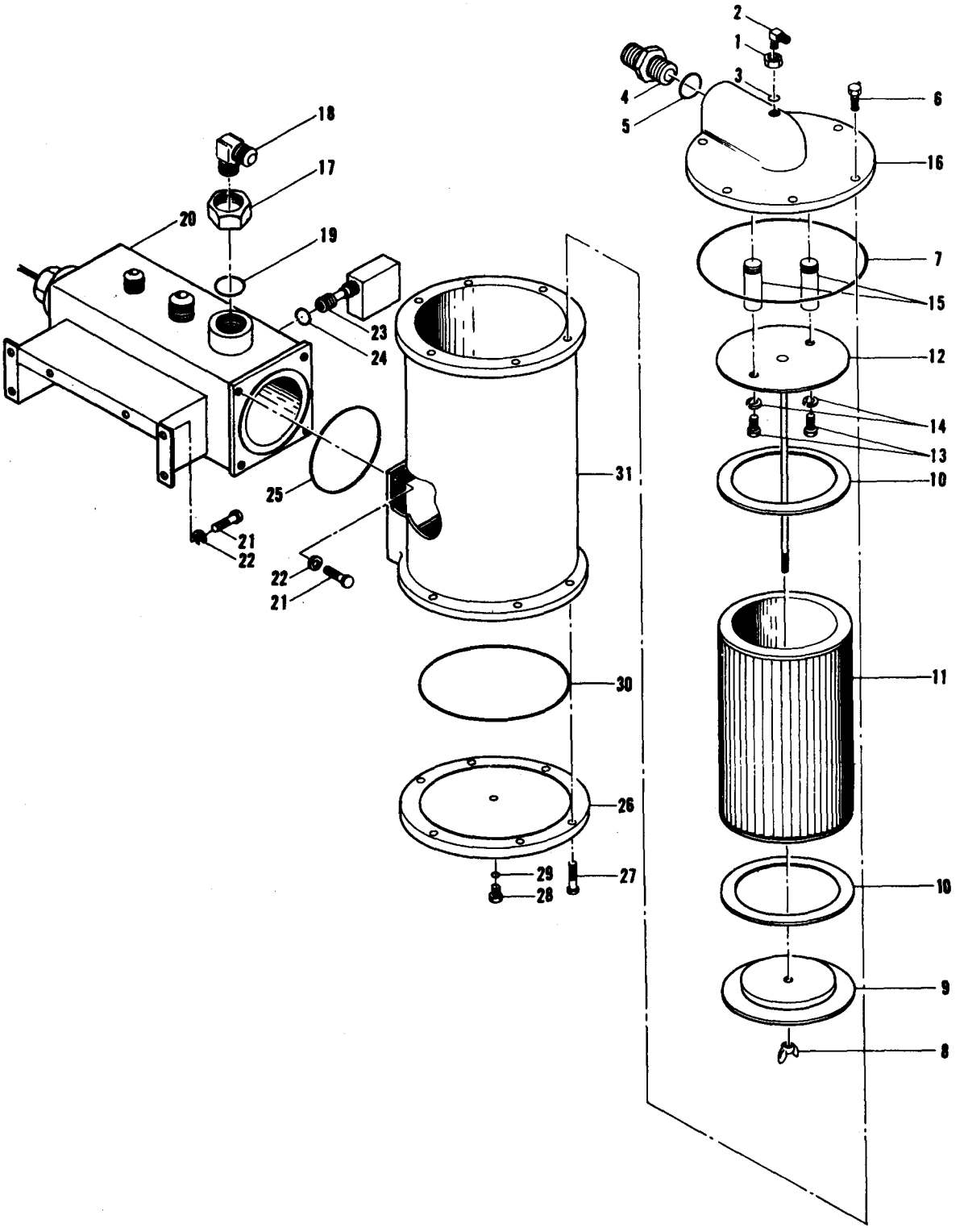


Figure 13. Filter and manifold assembly, exploded view.

1 Locknut
2 Flared tube elbow
3 Preformed packing
4 Flared tube union
5 Preformed packing
6 Bolt (6 rqr)
7 Preformed packing
8 Wingnut
9 Filter element cover
10 Gasket (2 rqr)
11 Filter element
12 Plate assembly
13 Bolt (2 rqr)
14 Lockwasher (2 rqr)
15 Spacer (2 rqr)
16 Top cover
17 Locknut
18 Flared tube elbow
19 Preformed packing
20 Manifold
21 Bolt (10 rqr)
22 Lockwasher (10 rqr)
23 Thermoswitch
24 Preformed packing
25 Preformed packing
26 Bottom cover
27 Bolt (6 rqr)
28 Plug
29 Preformed packing
30 Preformed packing
31 Filter housing

Figure 13—Continued.

sembly (4) from the top cover of the low pressure filter.

(4) Remove the six bolts (6, fig. 13) that secure the top cover (16) to the filter housing (31) and remove the cover with attached parts from the housing.

(5) Remove the wing nut (8) that secures the filter element cover (9), gasket (10), and the filter element (11) in place and remove the cover, gasket, and element.

(6) Wash all metal parts with an approved cleaning solvent and dry thoroughly.

(7) Place a new filter element (11) on the plate assembly (12) and secure with the gasket (10), filter element cover (9), and the wing nut (8).

(8) Position the preformed packing (7) and the top cover (16) on the filter housing (31) and secure with the six bolts (6) .

(9) Connect the pump-to-low pressure filter hose assembly (4, fig. 12) and the low pressure filter-to-bleed valve tubing. (6) to the installed top cover.

(10) Install the plug (28, fig. 13) in the bottom cover (26).

(11) Open the reservoir shutoff valve (12, fig. 9) and bleed air from the low pressure filter (par. 70).

(12) Fill reservoir as prescribed in paragraph 9.

c. High Pressure Filter Element Replacement. If the high pressure filter assembly (9, fig. 12) is clogged or dirty, replace the element as follows:

(1) Cut the safety wire and unscrew the element case from the filter head.

(2) Remove the old element and replace it with a new element.

(3) Reassemble the high pressure filter and secure with a safety wire.

(4) Fill reservoir as prescribed in paragraph 9.

72. Hose Assemblies

a. Removal.

(1) Remove the drain assembly from the bottom of the reservoir and drain the hydraulic system.

(2) Disconnect and remove the pressure selector valve-to-gage hose assembly (44, fig. 12), fluid pressure gage-to-dampener hose assembly (37), pump-to-high presure filter hose assembly (8), and the pump-to-low pressure filter hose assembly (4).

(3) Remove the 3 hose assemblies attached to the 3 coupling halves (7, 8, and 9, fig. 2). These hose assemblies are stored in the compartment at the rear of the test stand when not in use.

b. Cleaning and Inspection.

(1) Clean the hose assemblies in an approved cleaning solvent and dry thoroughly.

(2) Inspect the hose assemblies for frayed or worn hose. Inspect the fittings of the hose assemblies and the drain assembly for damaged threads. Replace a defective hose assembly or drain assembly.

c. Installation.

(1) Install the 3 hose assemblies on the 3 coupling halves (7, 8, and 9, fig. 2) or store them in the compartment at the rear of the test stand.

(2) Install the pump-to-low pressure filter hose assembly (4, fig. 12), pump-to-high pressure hose assembly (8), fluid pressure gage-to-dampener hose assembly (37), and the pressure selector valve-to-filter gage hose assembly (44).

(3) Install the drain assembly in the bottom of the reservoir and fill the reservoir (par. 9).

73. Pressure Gages

a. Testing Pressure Gages.

(1) Connect a pressure gage of known accuracy to the filter pressure gage tap (26, fig. 9).

(2) Start the test stand (par. 41) and compare the readings of both the test gage and the filter pressure gage (6). Replace a defective gage as outlined below.

b. Pressure Gage Replacement.

(1) *Removal.*

(a) Close the reservoir shutoff valve (12, fig. 9).

(b) Disconnect the hose from the back of the filter pressure gage (6).

(c) Remove the 3 nuts and 3 screws that secure the filter pressure gage to the panel and remove the gage.

(d) Remove the fluid pressure gage (3) in a similar manner.

(2) *Installation.*

(a) Position the filter pressure gage (6) in the panel (1) and secure with the 3 screws and 3 nuts.

(b) Connect the hose to the back of the filter pressure gage.

(c) Open the reservoir shutoff valve (12).

(d) Install the fluid pressure gage in a similar manner.

Section VI. RUNNING GEAR ASSEMBLY

74. Wheels

a. Removal.

(1) Remove the 5 hex nuts (30, fig. 14) and 5 lockwashers (31) that secure the wheel to the hub (51) and remove the wheel.

(2) Remove the remaining wheels in a similar manner.

---

1 Cotter pin (4 rqr)
2 Nut (4 rqr)
3 Lubrication fitting (4 rqr)
4 Tie rod end (2 rqr)
5 Tie rod end (2 rqr)
6 Nut (4 rqr)
7 Lockwasher (4 rqr)
8 Bolt (4 rqr)
9 Loop clamp (4 rqr)
10 Tie rod
11 Drawbar assembly
12 Headed grooved pin
13 Retaining ring
14 Steering arm assembly
15 Cotter pin
16 Nut
17 Thrust washer (2 rqr)
18 Shear bolt
19 Latch
20 Nut
21 Bolt
22 Cable assembly
23 Cable assembly
24 Elastic grommet (2 rqr)
25 Brake lever assembly
26 Stop bracket, right-hand (2 rqr)
27 Stop bracket, left-hand (2 rqr)
28 Bolt (8 rqr)
29 Lockwasher (8 rqr)
30 Nut, plain, hex (20 rqr)
31 Lockwasher (20 rqr)
32 Nut, plain, hex (32 rqr)
33 Lockwasher (32 rqr)
34 Bolt (32 rqr)
35 Wheel half (4 rqr)
36 Wheel half (4 rqr)
37 Pneumatic tire (4 rqr)
38 Inner tube
39 Tire valve cap (4 rqr)
40 Check valve (4 rqr)
41 Grease cap (4 rqr)
42 Cotter pin (4 rqr)
43 Nut (4 rqr)
44 Key washer (4 rqr)
45 Roller bearing cone (4 rqr)
46 Roller bearing cup (4 rqr)
47 Grease seal (4 rqr)
48 Roller bearing cone (4 rqr)
49 Roller bearing cup (4 rqr)
50 Ribbed neck bolt (10 rqr)
51 Hub (4 rqr)
52 Brake drum (2 rqr)
53 Spring (4 rqr)
54 Axle assembly
55 Bolt (8 rqr)
56 Lockwasher (8 rqr)
57 Kingpin (2 rqr)
58 Thrust washer (2 rqr)
59 Thrush washer (2 rqr)
60 Spindle assembly
61 Sleeve bearing (2 rqr)
62 Sleeve bearing (2 rqr)
63 Axle bracket
64 Bolt (8 rqr)
65 Lockwasher (8 rqr)
66 Brake assembly (2 rqr)
67 Nut (8 rqr)
68 Lockwasher (8 rqr)
69 Axle assembly
70 Support and arm assembly
71 Nut (12 rqr)
72 Lockwasher (12 rqr)
73 Flat washer (12 rqr)
74 Bolt (12 rqr)
75 Retaining ring (16 rqr)
76 Headless grooved pin (8 rqr)
77 Arm assembly
78 Sleeve bearing (8 rqr)
79 Rubber bumper (4 rqr)
80 Nut (4 rqr)
81 Lockwasher (4 rqr)
82 Flat washer (4 rqr)
83 Bolt
84 Support assembly
85 Sleeve bearing
86 Clamp
87 Frame assembly

Figure 14. Running gear and brake assembly, exploded view.

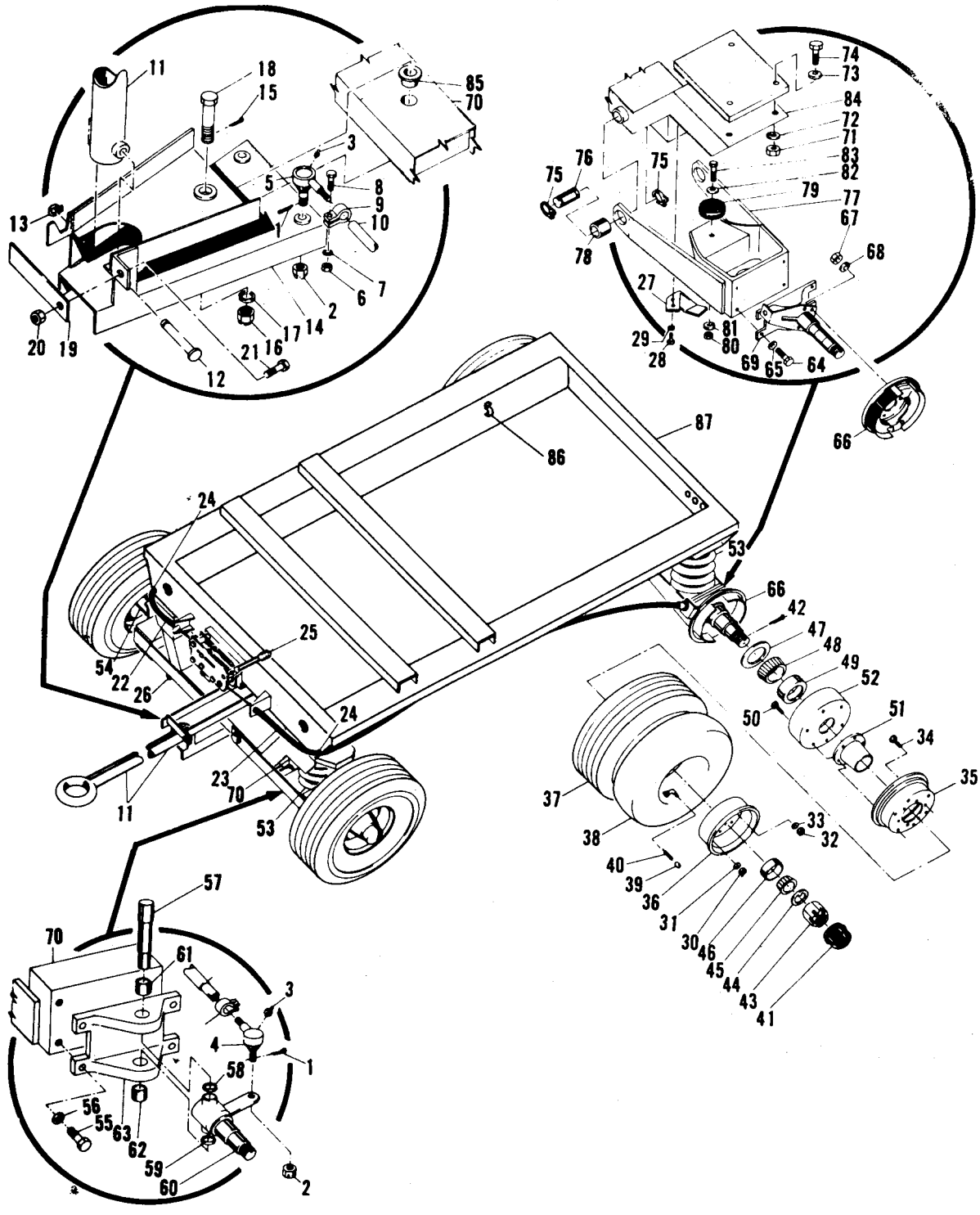


Figure 14—Continued.

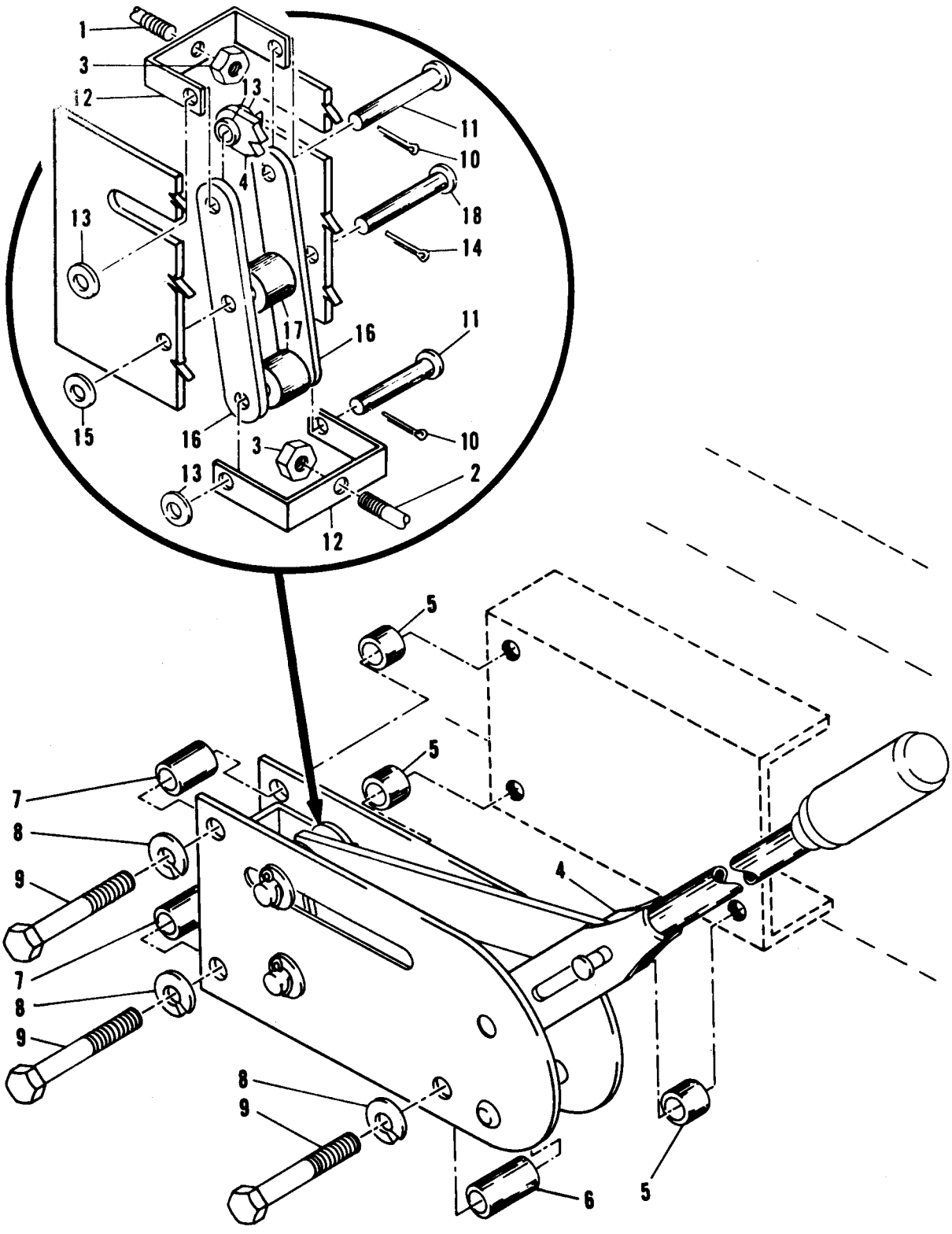


Figure 15. Brake lever assembly, exploded view.

1 Cable assembly, right-hand
2 Cable assembly, left-hand
3 Nut (3 rqr)
4 Lever assembly
5 Spacer (3 rqr)
6 Spacer
7 Spacer (2 rqr)
8 Washer (3 rqr)
9 Bolt (3 rqr)
10 Cotter pin (2 rqr)
11 Headed straight pin (2 rqr)
12 Rod end clevis (2 rqr)
13 Flat washer (3 rqr)
14 Cotter pin
15 Flat washer
16 Lever (2 rqr)
17 Spacer (2 rqr)
18 Headed straight pin

Figure 15—Continued.

b. Installation.

(1) Position the wheel on the hub (51) and secure with the 5 lockwashers (31) and 5 hex nuts (30).

(2) Install the remaining wheels in a similar manner.

75. Drawbar and Steering Arm Assemblies

a. Removal.

(1) Remove the hex nut (20, fig. 14) and bolt (21) that secure the latch (19) to the steering arm assembly (14) and remove the latch.

(2) Remove the retaining ring (13) and headed grooved pin (12) that secure the drawbar assembly (11) to the steering arm assembly and remove the drawbar.

(3) Remove the 2 cotter pins (1), and nuts (2) that secure the 2 tie rod ends (5) to the steering arm assembly and lift the tie rod ends out of the arm.

(4) Remove the cotter pin (15), nut (16), two thrust washers (17), and shear bolt (18) from the steering arm assembly and remove the steering arm from the support and arm assembly (70).

(5) Remove the sleeve bearing (85) from the support and arm assembly.

b. Cleaning and Inspection.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect the drawbar and steering arm assembly for cracks, breaks, and distortion.

(3) Inspect the thrust washer and sleeve bearing for nicks, burrs, distortion, and excessive wear.

(4) Inspect all attaching hardware for distortion and damaged threads.

(5) Replace all defective parts.

c. Installation.

(1) Install the sleeve bearing (85, fig. 14) in the support and arm assembly (70).

(2) Position the steering arm assembly (14) on the support and arm assembly and insert the shear bolt (18) in the alined holes of the arm and sleeve bearing. Install the two thrust washers (17), nut (16) and insert cotter pin (15) in the shear bolt.

(3) Insert the 2 tie rod ends (5) in the steering arm assembly and secure with the 2 nuts (2) and 2 cotter pins (1).

(4) Position the drawbar assembly (11) in the steering arm assembly and install the headed grooved pin (12) and the retaining ring (13).

(5) Place the latch (19) on the steering arm and install the bolt (21) and hex nut (20).

76. Brake Lever Assembly

a. Removal.

(1) Remove the 2 hex nuts (3, fig. 15) that secure the 2 cable assemblies (1 and 2) to the 2 rod end clevises (12) and pull cable ends out of the clevises.

(2) Remove the 3 bolts (9), 3 spacers (5), 2 spacers (7), the spacer (6) and 3 lockwashers (8) that secure the lever assembly (4) to the frame and remove the lever assembly.

b. Cleaning and Inspection.

(1) Clean the break lever assembly with an approved cleaning solvent and dry thoroughly.

(2) Inspect the brake lever assembly for cracks, breaks, and distortion. Check to see that the lever operates free without binding. Replace a defective brake lever assembly.

c. Installation.

(1) Position the 3 spacers (5, fig. 15) and the lever assembly (4) on the frame and secure with the 2 spacers (7), spacer (6), 3 lockwashers (8) and 3 bolts (9) .

(2) Insert the cable assemblies (1 and 2) in the rod end clevises (12) and secure with the 2 hex nuts (3).

d. Brake Adjustment. The brakes of the test stand are adjusted by rotating the knurled portion of the lever assembly (4, fig. 15). Clockwise rotation will set the brakes tighter while counter clockwise rotation will reduce set pressure.

CHAPTER 4
DIRECT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. SPECIAL DIRECT AND GENERAL SUPPORT MAINTENANCE TOOLS AND EQUIPMENT

No special tools are required to perform direct and general support maintenance of this hydraulic test stand.

Section II. PREVENTIVE MAINTENANCE SERVICES

77. General

Preventive maintenance is performed by direct and general support maintenance personnel at 50 and 100 hour intervals. The preventive maintenance services to be performed at these regular intervals are listed in paragraph 78. The first column headed "inspection", is provialed for the information of the person performing the inspection. An X in this column indicates that an inspection should be made of the listed items in accordance with instructions given in the text opposite. The indicated items and instructions constitute minimum inspection requirements for the equipment.

78. Direct and General Support Preventive Maintenance Services

Inspection	50 hour	100 hour	GENERAL
X	X	X	*Before-operation services.* Perform the services listed in daily before-operation services (par. 54).
X	X	X	*Lubrication.* Inspect for missing or damaged lubrication fittings and inspect for indications of improper lubrication. Inspect lubricant level in engine crankcase. Inspect for oil and grease leaks; also inspect for defective or damaged oil seals.
	X	X	Lubricate as necessary in accordance with the lubrication chart. Replace missing or damaged fittings. Correct all oil or grease leaks.
X	X	X	*Appearance.* Inspect the general appearance of the equipment, paying particular attention to cleanness, legibility of identification markings, and conditions of the paint. Correct all deficiencies noticed.
X	X	X	*Cylinder heads, manifold and muffler.* Inspect the cylinder heads, manifolds, and muffler for leaks, loose mounting and defective gaskets. Tighten loose manifolds and muffler mounting bolts and nuts. During the first weekly servicing of a new or reconditioned engine, inspect all the cylinder head bolts for tightness . After warming up the engine to operating temperature, tighten any loose bolts to 25 to 32 ft-lb torque. Replace defective cylinder head and manifold gaskets.
X	X	X	*Valve mechanism.* If the valves are noisy or loss of power is noticed, inspect the condition of the valve mechanism.
	X	X	Remove valves covers and adjust valve lifter clearance if necessary (par. 125). The correct clearance for the valve lifters is 0.0080 inch for the intake valves and 0.0160 inch for the exhaust valves. Replace cover gaskets if defective.
X		X	*Compression test.* Remove the spark plugs and test the cylinder compression by turning the engine over several times to stabilize gage reading. If the gage reading varies more than 10 pounds between the four cylinders, inspect the cylinder head bolts for tightness.

	50 hour	100 hour	
		X	Tighten any loose bolts and retest. If low compression or a variation in compression persists, the trouble lies with the cylinder head gasket, valves, or piston rings. Correct all deficiencies.
X	X	X	*Electrical System Magneto.* Inspect the ignition magneto for loose mounting bolts and wiring connections. Correct any deficiencies noted.
	X	X	Remove the end cap and inspect the distributor cap for cracks, and corroded terminals. Examine the breaker point gap. The correct gap is 0.015 inch at full separation of points.
X	X	X	*Spark plugs.* Inspect the spark plugs for looseness, bad connections, and dirty or broken insulators.
	X	X	Replace damaged spark plugs (par. 114). Clean dirty plugs and set the gap to 0.0300 inch (par. 114).
X	X	X	*Generator and starter.* Inspect the mounting of the generator and starting motor for loose connections. Examine the brushes, brush holders and springs. Inspect the commutators for dirt and scoring.
	X	X	Tighten loose mounting bolts. Replace generator brushes worn to one half their original length (par. 112). Replace starter brushes worn to one half their original length (par. 113).
X	X	X	*Engine generator regulator.* Inspect the generator regulator for proper operation, tight connections, and secure mounting. The generator regulator should allow an appreciable charge to go into the battery after the starter is used. After the battery is fully charged, the ammeter should read only a slight charge.
	X	X	Tighten loose mounting nuts and connections. Adjust or replace a defective engine generator regulator (par. 111).
			CONTROL PANEL
X	X	X	*Gages.* Examine the condition of all gages. See that all gages indicate correctly and that the glass is not cracked or broken.
	X	X	Tighten loose mounting screws and connections. Replace any defective or damaged gage.
X	X	X	*Meters.* See that all meters are securely mounted and operating properly and that the glass is not cracked or the indicators are not bent or broken.
	X	X	Tighten loose mounting screws and replace any defective or damaged meter.
X	X	X	*Control valves.* Inspect all control valves for packing leaks and proper operation. Sec that handwheels are securely mounted.
	X	X	Tighten packing or replace as required. Replace a defective or damaged control valve.
			RUNNING GEAR
X	X	X	*Tires.* Inspect all tires for under inflation, abnormal or uneven wear, cuts, embedded foreign matter, and missing valve caps.
	X	X	Remove any foreign matter from tires. See that tires are inflated to correct pressure and all valve caps are in place.
X	X	X	*Wheels.* Inspect for loose wheel mounting bolts. Inspect wheel bearings for proper adjustment.
	X	X	Tighten loose wheel bolts and adjust wheel bearings as required (par. 163).
X	X	X	*Axles.* Inspect the axle assemblies for secure mounting and proper alinement. Inspect the springs for cracks, breaks and weakened condition.
	X	X	Tighten all axle mounting bolts. Aline the front wheels as required (par. 163). Replace defective springs (par. 164).
X	X	X	*Brake assembly.* Inspect the brake assembly for correct adjustment. Inspect the cables for secure mounting.
	X	X	Tighten all brake assembly mounting bolts and adjust the brakes (par. 76).
			HYDRAULIC SYSTEM
X	X	X	*Hydraulic pump.* Inspect the hydraulic pump for loose mounting bolts and hydraulic connections. See that the drive coupling is securely mounted and alined.

Inspection	50 hour	100 hour	
	X	X	Tighten all mounting bolts and loose or leaking hydraulic connections. Replace a defective drive coupling (par. 153).
X	X	X	*Hose assemblies.* Inspect the hydraulic hose assemblies for loose connections. Inspect the hose for cracks, breaks, and for frayed or rotten fabric covering.
	X	X	Tighten hose connections and replace any defective hose assembly.
X	X	X	*Tubing.* Inspect all tubing for cracks, breaks, and distortion.
	X	X	Tighten all tube connections. Replace any damaged or defective tube or fitting.
X	X	X	*High pressure filter assembly.* Inspect the filter for dirty or clogged condition resulting in excessive pressure drop.
	X	X	Remove and replace the filter element.
X	X	X	*Thermoswitch.* Inspect the thermoswitch for correct temperature response and for secure installation.
	X	X	Replace a defective or damaged thermoswitch (par. 143).

Section ill. TROUBLESHOOTING

79. General

This section provides information useful in diagnosis and correction, inspection, operation, or failure of the hydraulic test stand, or any of its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause.

80. Engine Hard to Start or Fails to Start

Probable cause	*Possible remedy*
Battery defective	Charge or replace defective battery (par. 9).
Choking insufficient	Inspect the choke valve for full open or closed position (par. 122).
Battery cables loose on terminals	Tighten loose connections.
Ignition switch faulty	Replace switch (par. 138).
Battery cable loose on armature relay	Tighten loose connections.
Carburetor flooded	Remove spark plugs (par. 114) and crank the engine several times to drive out rich fuel mixture.
No ignition spark	Test the spark (par. 115).
Spark plugs defective	Clean and adjust or replace spark plugs (par. 114).
Magneto faulty	Repair or replace magneto contact point set (par. 115).

81. Engine Misses or Runs Erratically

Probable cause	*Possible remedy*
Carburetor gasket leaks	Tighten carburetor mounting bolts. Replace gasket if leak persists (par. 122).
Spark weak	Test spark (par. 115)
Spark gap incorrect	Measure and reset spark plug gap (par. 11.4) .
Ignition wiring loose	Tighten ignition wire connections.
Magneto contact points pitted or incorrectly adjusted	Clean, adjust, or replace contact points (par. 115).
Governor defective	Repair governor (par. 135).

82. Engine Stops Suddenly

Probable cause	*Possible remedy*
Fuel pump defective	Repair or replace fuel pump (par. 131).
Fuel line clogged	Remove and clean fuel line, replace if defective (par. 131).
Magneto contact set defective	Replace defective contact set (par. 115) .

83. Engine Overheats

Probable cause	*Possible remedy*
Cylinder cooling fins dirty	Clean dust and dirt from cooling fins.
Magneto timed late	Time the magneto (par. 115).
Air shroud partially removed from engine	Install the missing shroud (pars. 118 and 119).

84. Engine Knocks or Develops Excessive Noise

Probable cause	*Possible remedy*
Magneto timing advanced too far	Time the magneto (par. 115).
Carbon deposits on cylinder heads	Remove and clean cylinder heads (par. 124).
Flywheel loose	Tighten the flywheel (par. 118).

85. Engine Exhaust Smoky

Probable cause	*Possible remedy*
Carburetor incorrectly adjusted	Adjust the carburetor (par. 122).
Carburetor defective	Repair or replace carburetor (par. 122).

86. Engine Starter Fails to Operate

Probable cause	*Possible remedy*
Ignition fuse blown	Replace ignition fuse.
Starter brushes worn	Replace brushes (par. 113).
Electrical connections loose or corroded	Tighten connections or replace wiring (par. 113).
Starter switch contacts burned	Replace starter switch (par. 138).
Starter brushes defective	Replace starter brushes (par. 113).

87. Fuel Consumption Excessive

Probable cause	*Possible remedy*
Carburetor incorrectly adjusted	Adjust the carburetor (par. 122).
Fuel tank leaking	Repair or replace fuel tank (par. 132).
Carburetor defective	Repair or replace carburetor (par. 122).

88. Ammeter Shows No Charge or Discharge With Engine Operating

Probable cause	*Possible remedy*
Electrical connections loose or corroded	Clean and tighten electrical connections.
Generator regulator incorrectly adjusted or faulty	Replace generator regulator as required (par. 111).
Generator V-belt loose or broken	Adjust or replace V-belt as necessary (par. 112).
Generator inoperative	Replace worn brushes (par. 112).
Ammeter defective	Replace ammeter (par. 137).

89. Ammeter Shows Excessive Charge

Probable cause	*Possible remedy*
Battery run down	Charge battery.
Generator regulator defective	Replace a defective regulator (par. 111).
Generator field winding grounded	Replace generator (par. 112).

90. Ammeter Needle Fluctuates Rapidly

Probable cause	*Possible remedy*
Electrical connections shorted or loose	Repair short circuits and tighten loose connections.
Generator commutator has high mica	Report to depot maintenance.

91. Wheel Wobbles

Probable cause	*Possible remedy*
Wheel bent	Replace the wheel (par. 163).
Wheel loose on the hub	Tighten wheel mounting bolts.
Wheel bearing incorrectly adjusted	Adjust wheel bearing (par. 163).

92. Wheel Bearings Overheat

Probable cause	*Possible remedy*
Wheel bearings lack lubricant	Lubricate wheel bearings (par. 163).
Wheel bearings incorrectly adjusted	Adjust wheel bearings (par. 163).

93. Tire Wear Abnormal or Uneven

Probable cause	Possible remedy
Wheel loose on the hub	Tighten wheel mounting bolts.
Steering tie rod incorrectly adjusted	Adjust tie rods (par. 164).

94. Brake Does Not Hold

Probable cause	Possible remedy
Normal wear	Adjust brakes (par. 76).
Defective brake assembly	Repair or replace brake assembly (par. 167).

95. Hydraulic Pump Fails to Deliver Sufficient Pressure

Probable cause	Possible remedy
Defective high pressure relief valve	Repair or replace high pressure relief valve (par. 149).
Fluid pressure gage defective	Replace fluid pressure gage (par. 173).
Compensator control defective	Repair or replace compensator control (par. 153).
Hydraulic pump defective	Replace the pump (par. 153).

96. Hydraulic Pump Fails to Deliver Sufficient Volume

Probable cause	Possible remedy
Fluid volume control defective	Repair fluid volume control (par. 153).
Air in the hydraulic system	Bleed air from the system (par. 70).
Engine speed too low	Check engine with hand speed indicator. Replace tachometer if defective (par. 137).
Fluid flow indicator defective	Replace or repair fluid flow indicator (par. 146).
High pressure filter clogged	Replace high pressure filter (par. 142).
Fluid bypass valve leaking	Replace fluid bypass valve (par. 150).

97. Hydraulic System Pressure Too High

Probable cause	Possible remedy
High pressure filter clogged	Replace high pressure filter (par. 142).
High pressure relief valve defective	Repair or replace high pressure relief valve (par. 149).
Compensator control defective	Repair or replace compensator control (par. 153).
Fluid pressure gage defective	Repair or replace fluid pressure gage (par. 73).

98. Hydraulic Fluid Temperature Too High

Probable cause	Possible remedy
Fluid temperature gage defective	Replace fluid temperature gage (par. 147).
High pressure filter clogged	Replace high pressure filter (par. 142).
Thermoswitch defective	Replace the thermoswitch (par. 143).

Section IV. RADIO INTERFERENCE SUPPRESSION

99. Definition

a. Interference. The term "interference" as used herein applies to electrical disturbances in the radio frequency range which are generated by the test stand and which may interfere with the proper operation of radio receivers or other electronic equipment.

b. Interference Suppression. The term "interference suppression" as used herein applies to the methods used to eliminate or effectively reduce radio interference generated by the test stand.

100. Purpose of Interference Suppression

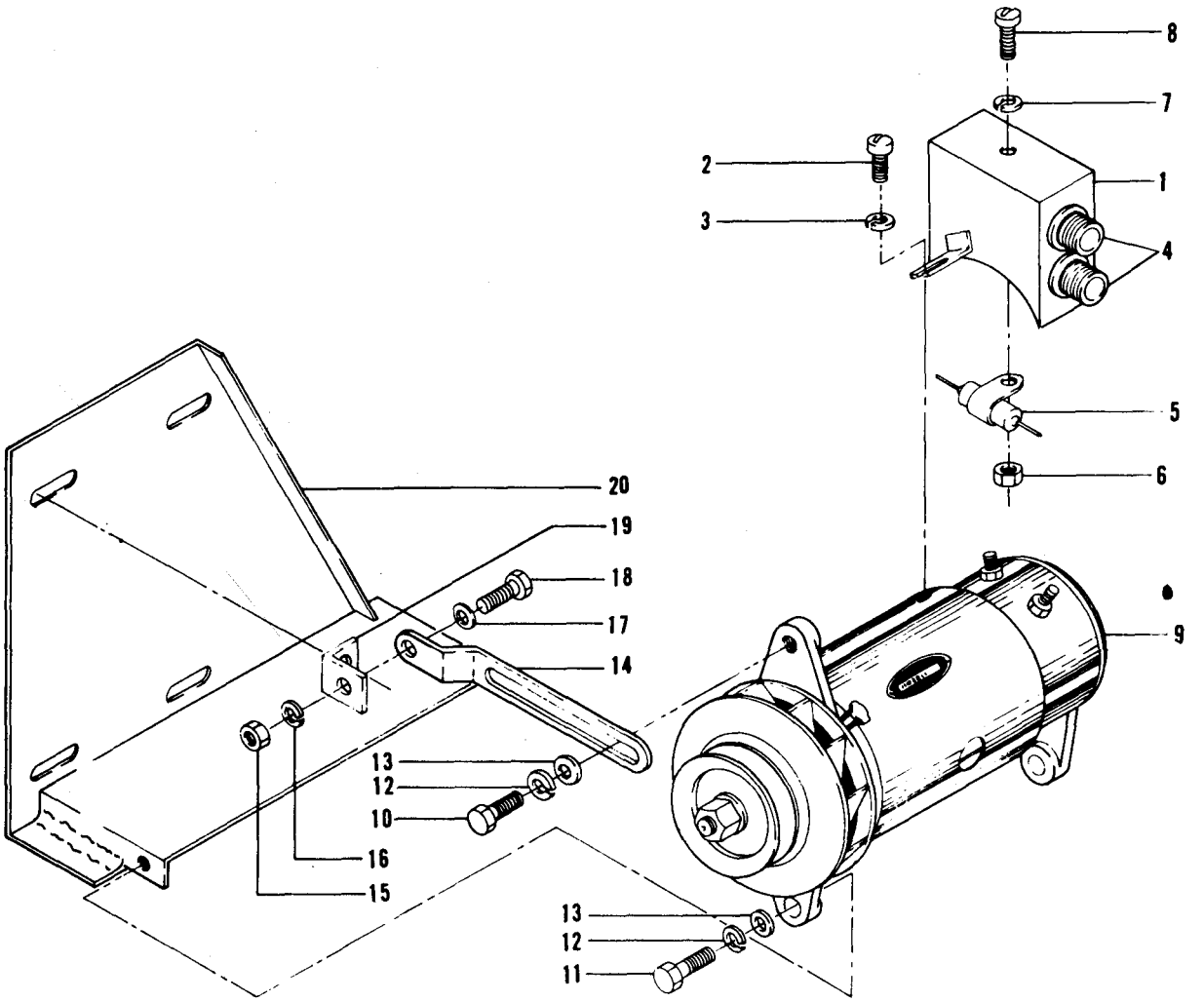
The tactical importance of effective interference suppression cannot be stressed too greatly. Since the electrical disturbances generated by the test stand are composed partly of electrical waves in the radio frequency range they must be suppressed for two important reasons. First, they will interfere with the proper operation of the friendly radio net, and second, they will enable the enemy to locate the equipment and its associated units.

101. General Sources of Interference

Generally, radio interference is generated anywhere a spark occurs or where a high-frequency current is present. A spark is a small amount of current jumping an air gap in response to the force of a relatively high voltage. The gasoline engine ignition system is a common source. Magneto breaker points, generator commutators, relay contacts, and static changes collecting on the frame are other common sources which in some way must be suppressed.

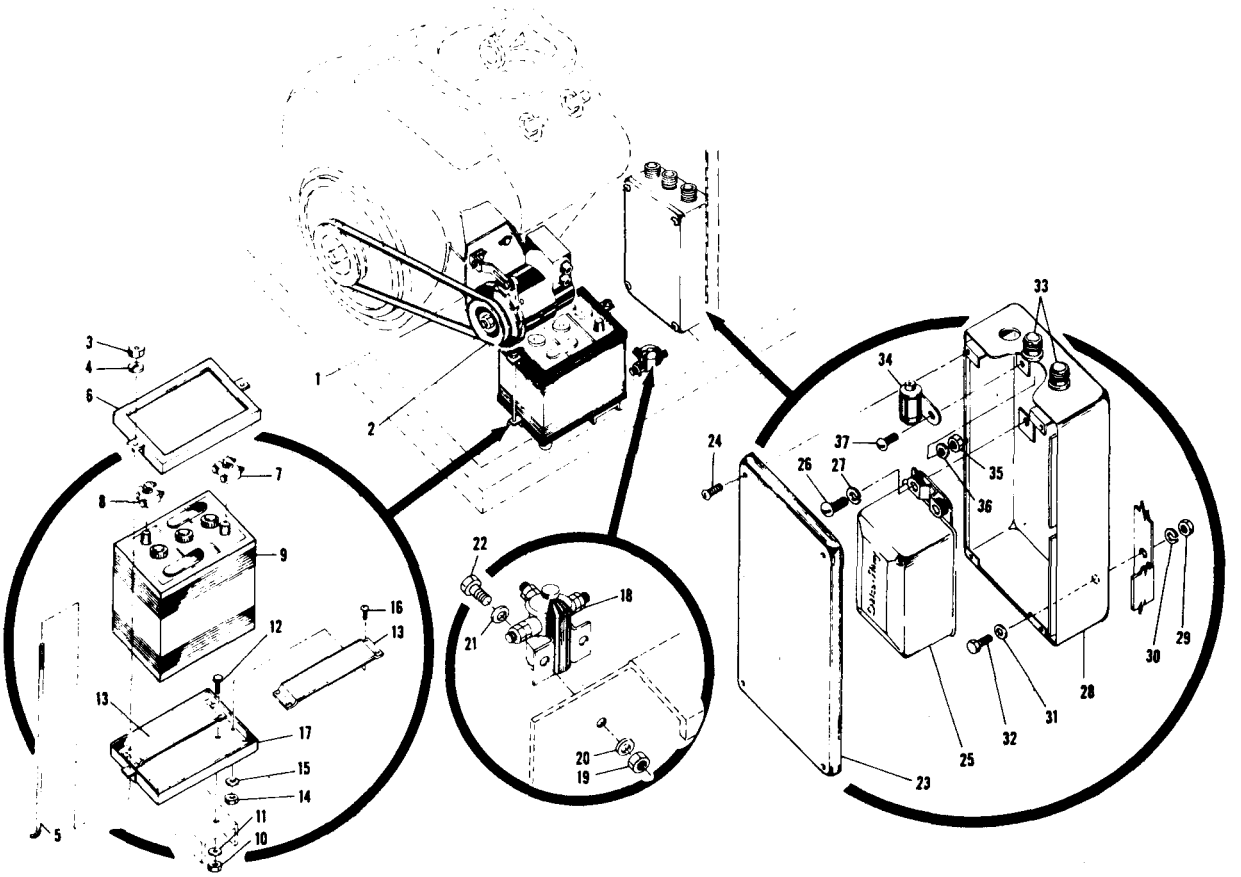
102. General Methods Used to Attain Proper Suppression

Essentially, suppression is attained by providing a low-resistance path to ground for the



1 Generator shield box
2 Screw
3 Lockwasher
4 Electrical plug connector
5 Capacitor, 0.5 μf, 100 V DC
6 Nut
7 Lockwasher
8 Screw
9 Engine accessory generator
10 Bolt
11 Bolt (2 rqr)
12 Lockwasher (3 rqr)
13 Flat Washer (3 rqr)
14 Generator adjusting arm
15 Nut
16 Lockwasher
17 Flat washer
18 Bolt
19 Angle bracket
20 Generator mounting plate

Figure 16. Generator and radio suppression capacitor, removal points.



1 V-belting
2 Generator and mounting bracket assembly
3 Nut (2 rqr)
4 Lockwasher (2 rqr)
5 Hook bolt (2 rqr)
6 Cover assembly
7 Battery terminal adapter, positive
8 Battery terminal adapter, negative
9 Battery
10 Nut (2 rqr)
11 Lockwasher (2 rqr)
12 Screw (2 rqr)
13 Battery support
14 Nut (8 rqr)
15 Lockwasher (8 rqr)
16 Bolt (8 rqr)
17 Battery tray
18 Armature relay
19 Nut (2 rqr)
20 Lockwasher (2 rqr)
21 Flat washer (2 rqr)
22 Bolt (2 rqr)
23 Cover
24 Screw, tapping, thread forming, No. 6 x 3/8 in. (4 rqr)
25 Engine generator regulator
26 Screw (3 rqr)
27 Lockwasher (3 rqr)
28 Box assembly
29 Nut (2 rqr)
30 Lockwasher (2 rqr)
31 Flat washer (2 rqr)
32 Bolt (2 rqr)
33 Electrical box connector
34 Capacitor, 0.5 μf, 100 V DC
35 Nut
36 Lockwasher
37 Screw

Figure 17. Electrical installation.

stray currents, The method used to attain suppression include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors where necessary.

103. Interference Suppression Components

a. A 0.5 $_{p}$f (microfarad), 100-volt dc, capacitor (5, fig. 16) is mounted on the inside of the generator shield box (1).

b. A 0.5 $_{p}$f 100-volt de capacitor (34, fig. 17) is mounted on the engine generator regulator (25) inside the box assembly (28).

104. Testing Radio Interference Suppression Components

Test the capacitors for leaks and shorts on a capacitor tester. Replace a defective capacitor. If test equipment is not available and interference is indicated, isolate the cause of interfer-

ence by trial and error method or replacing each capacitor in turn until the cause of interference is determined and eliminated.

105. Replacement of Interference Suppression Components

a. Engine Accessory Generator Capacitor.

(1) Remove the screw (2, fig. 16) and lockwasher (3) that secure the generator shield box (1) to the engine accessory generator (9),

(2) Carefully lift the shield box off the generator. Disconnect the leads of the capacitor (5).

(3) Remove the hex nut (6), lockwasher (7), and screw (8) that secure the capacitor in the shield box and remove the capacitor.

(4) Secure a new capacitor (5) in the shield box with the screw (8), lockwasher (7), and hex nut (6),

(5) Connect the leads of the capacitor. Position the shield box on the generator and secure with the lockwasher (3) and screw (2).

b. Engine Generator Regulator Capacitor.

(1) Remove the four screws (24, fig. 17) that secure the cover (23) to the box assembly (28) and remove the cover.

(2) Disconnect the electrical lead from the capacitor (34).

(3) Remove the hex nut (35), lockwasher (36), and the screw (37) that secures the capacitor in the box and remove the capacitor.

(4) Position a new capacitor (34) in the box assembly and secure with the screw (37), lockwasher (36), and hex nut (35).

(5) Connect the electrical lead to the capacitor.

(6) Place the cover (23) on the box assembly (28) and secure with the four screws (24).

Section V. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

106. Housing Assembly

a. *Removal.*

(1) Loosen the seven thumbscrews (6, fig. 1) and remove the front panel assembly (5) from the housing assembly (4).

(2) Remove the nine hex nuts, lockwashers and bolts that secure the housing assembly to the frame assembly and lift the housing assembly off the frame.

b. Installation.

(1) Mount the housing assembly (4) on the frame assembly (7) and secure with nine bolts, lockwashers, and hex nuts.

(2) Position the front panel assembly (5) on the housing assembly and tighten the seven thumbscrews (6) to secure.

107. Control Panel Assembly

a. Removal.

(l) *Remove* the housing assembly (par. 106).

(2) Open the drain valve in the reservoir and drain the hydraulic fluid into a suitable container. Remove the pipe plug in the bottom of the filter and manifold assembly (47, fig. 12) and drain the remaining hydraulic fluid from the system.

(3) Disconnect the pressure selector valve-to-pump tubing (28) , outlet selector valve-to-reservoir tubing (21), bypass valve-to-reservoir shutoff valve tubing (45), reservoir shutoff valve-to-manifold tubing (26), flow control valve-to-outlet tubing (17 and 19), high pressure relief valve-to-manifold tubing (12), and the pump-to-high pressure filter hose assembly (8).

(4) Tag and disconnect the electrical wires from the reservoir level indicator (2, fig. 9).

(5) Disconnect the sensing element of the fluid temperature gage (4) from the filter and manifold assembly (47, fig. 12).

(6) Remove the hex nut and handwheel from the reservoir shutoff valve (12, fig. 9).

(7) Remove the hex nut, handwheel, and the locknut from the fluid volume control (29).

(8) Remove the hex nut, handwheel, and locknut from the compensator control (25).

(9) Disconnect the steel cable linking the fluid flow indicator (15) to the hydraulic pump.

(10) Remove the eight screws (19) and flat washers (18) that secure the panel (1) to the reservoir and control panel support and lift the panel off the support.

b. Installation.

(1) Mount the control panel (1, fig. 9) on the resrvoir and control panel support and secure with the eight flat washers (18) and screws (19).

(2) Connect the steel cable which links the fluid flow indicator (15) to the hydraulic pump.

(3) Install the locknut, handwheel, and hex nut on the compensator control (25).

(4) Install the locknut, handwheel, and hex nut on the fluid volume control (29).

(5) Place the handwheel on the reservoir shutoff valve (12) and secure with the hex nut.

(6) Install the sensing element of the fluid temperature gage (4) in the filter and manifold assembly (47, fig. 12).

(7) Connect the electrical wires to the reservoir level indicator (2, fig. 9).

(8) Connect the pump-to-high pressure filter hose assembly (8, fig. 12), high pressure relief valve-to-manifold tubing (12), flow control valve-to-outlet tubing (17 and 19), reservoir shutoff valve-to-manifold tubing (26), bypass valve-to-reservoir shutoff valve tubing (45), outlet selector valve-to-reservoir tubing (21), and the pressure selector valve-to-pump tubing (28).

(9) Fill the hydraulic system (par. 9) and bleed air from the system (par. 70).

(10) Install the housing assembly (par. 106).

108. Engine

a. Removal.

(1) Remove the hydraulic pump (par. 153).

(2) Remove the engine accessory generator (par. 112).

(3) Remove the electrical engine starter (par. 113).

(4) Remove air cleaner (par. 116).

(5) Remove the muffler (par. 121).

(6) Remove the fuel tank (par. 132).

(7) Remove the pipe plug from the elbow (23, fig. 11) and drain the oil from the engine.

(8) Disconnect the throttle control (6) from the governor and the choke control (5) from the carburetor (11).

(9) Disconnect the fuel line tubing (fig. 18) outlet oil line tubing (2), inlet oil tubing (3), and the pressure gage oil line tubing (4).

(10) Remove the 4 bolts (25) and 4 lockwashers (26) that secure the engine (24) to the frame.

(11) Use a suitable lifting device and lift the engine off the frame.

b. Installation.

(1) Hoist the engine (24, fig. 18) with a suitable lifting device and place it on the frame of the test stand. Secure in place with the 4 lockwashers (26) and 4 bolts (25).

(2) Connect the pressure gage oil line tubing (4), inlet oil tubing (3), outlet oil line tubing (2), and the fuel line tubing (l).

(3) Connect the throttle control (6, fig. 11) to the governor and the choke control (5) to the carburetor (11).

(4) Install the fuel tank (par. 132).

(5) Install the muffler (par. 121).

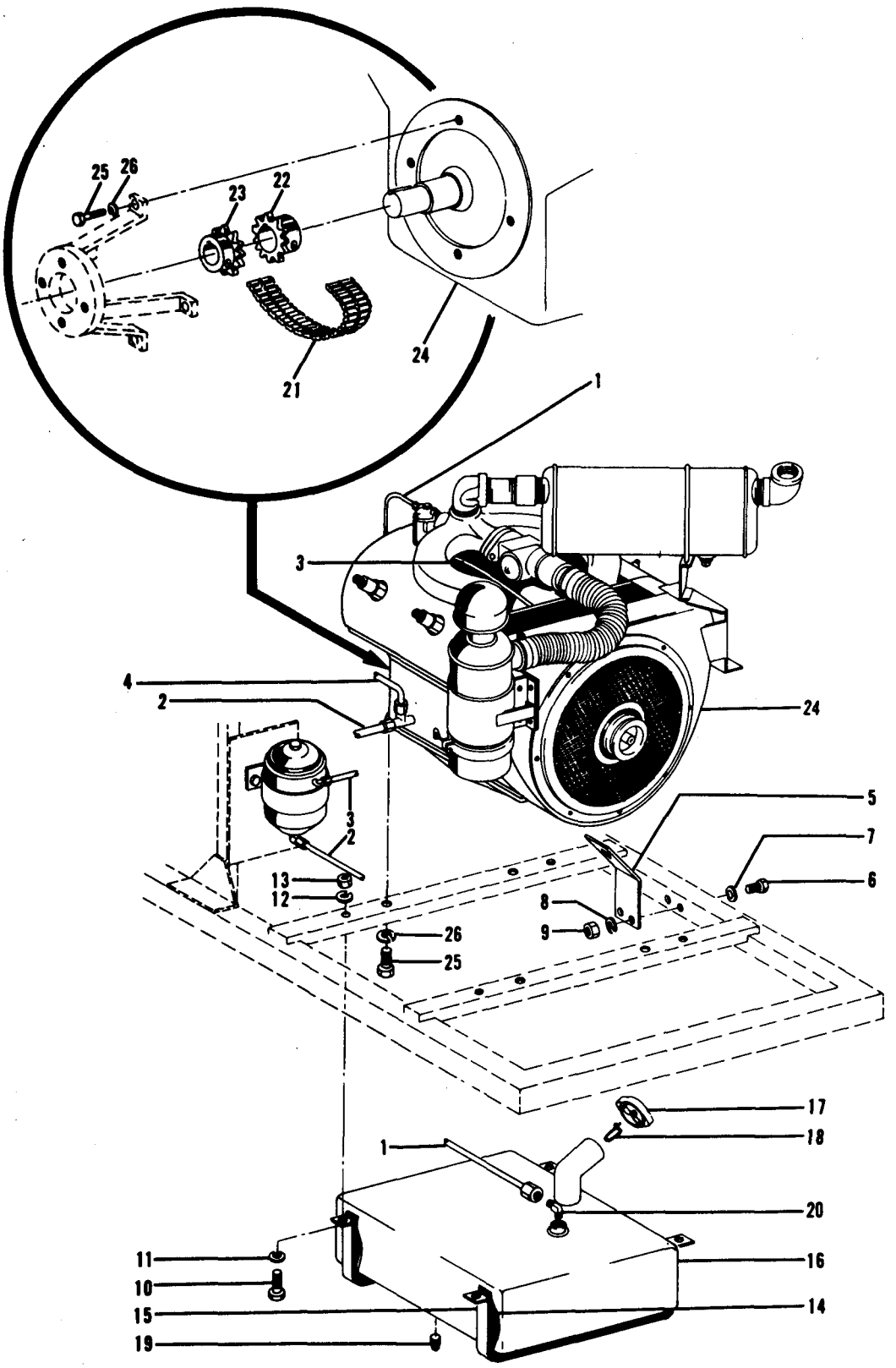


Figure 18. Engine and fuel tank, removal points.

1 Fuel line tubing
2 Outlet oil line tubing
3 Inlet oil line tubing
4 Pressure gage oil line tubing
5 Spout support
6 Bolt (2 rqr)
7 Flat washer (2 rqr)
8 Lockwasher (2 rqr)
9 Nut (2 rqr)
10 Bolt (4 rqr)
11 Flat washer (4 rqr)
12 Lockwasher (4 rqr)
13 Nut (4 rqr)
14 Strap liner (2 rqr)
15 Fuel tank strap (2 rqr)
16 Fuel tank
17 Fuel tank cap
18 Safety pin
19 Pipe plug
20 Elbow
21 Roller chain
22 Coupling half
23 Coupling half
24 Engine
25 Bolt (8 rqr)
26 Lockwasher (8 rqr)

Figure 18—Continued.

(6) Install the air cleaner (par. 116).
(7) Install the electrical engine starter (par. 113).
(8) Install the engine accessory generator (par. 112).
(9) Install the hydraulic pump (par. 157).
(10) Install the pipe plug in the elbow (23, fig. 11). Remove the breather cap (1) and fill the crankcase with oil. Refer to the lubrication chart table 1.

CHAPTER 5
ENGINE MAINTENANCE INSTRUCTIONS

Section I. ENGINE ACCESSORIES

109. General

The engine accessories consist of the ignition magneto, electrical engine starter, generator, and generator regulator. The magneto is a flange-mounted type. A permanent magnet, mounted on the rotor shaft, produces a high voltage current as its field passes through a fixed coil. The current produced is fed to the spark plugs at the proper instant by a distributor, The electrical engine starter is a 6-volt, 4-brush, bendix-drive type, The starter converts electrical energy from the battery into mechanical power and transmits this power to the engine flywheel for electrical starting. The engine accessory generator is a 6-volt, shunt wound, 2-bush, belt-driven, direct-current generator used to supply current for charging the 6-volt battery of the test stand. The generator regulator is a 6-volt unit provided to control the charging current from the generator to the battery.

110. Armature Relay Replacement

a. Removal.

(1) Tag and disconnect the electrical wires and cables from the terminals of the armature relay (18, fig. 17).

(2) Remove the two hex nuts (19), lockwashers (20), flat washers (21), and bolts (22) that secure the relay to the frame and remove the relay.

b. Installation.

(1) Position the armature relay (18) on the frame and secure with the two bolts (22), flat washers (21), lockwashers (20), and hex nuts (19).

(2) Connect the electrical wires and-cables to the armature relay.

111. Engine Generator Regulator

a. On-engine Testing. Defects in the generator or regulator are indicated on the ammeter by a continuous high-charging rate when the battery is fully charged, or by a low-or no-charging rate when the battery is low.

(1) When a high-charging rate is indicated, run the engine at operating speed and disconnect the lead. from the field terminal. If the output remains high, the trouble is in the generator. Replace or repair a defective generator (par. 112). If the output drops off, the trouble is in the regulator. Replace a defective regulator.

(2) When a low or no charging rate is indicated, inspect for loose connections, frayed or damaged wires, or a defective battery. If none of these conditions exist, operate the engine at medium speed and momentarily ground the field terminal of the regulator. No increase indicates a defect in the generator. Repair or replace a defective generator (par. 112). An increase indicates the regulator is faulty. Replace a defective regulator.

b. Removal.

(1) Disconnect the battery terminal adapters (7, and 8, fig. 17).

(2) Remove the four screws (24) that secure the cover (23) to the box assembly (28) and remove the cover.

(3) Tag and disconnect all electrical wires from the engine generator regulator (25).

(4) Remove the three screws (26) and lockwashers (27) that secure the regulator in the box assembly and remove the regulator.

c. Installation.

(1) Position the engine generator regulator (25, fig. 17) in the box assembly (28) and secure with the three lockwashers (27) and screws (26).

(2) Connect all electrical leads to the regulator in accordance with tags attached during removal,

(3) Place the cover (23) on the box assembly and secure with the four screws (24).

(4) Connect the two battery terminal adapters (7 and 8, fig. 17).

112. Engine Accessory Generator

a. Belt Adjustment.

(1) Loosen the bolt (10, fig. 16) that secures the engine accessory generator (9) to the generator adjusting arm (14).

(2) Swing the generator toward or away from the engine as required to obtain a ¾ to 1 inch deflection of the belt midway between the pulleys. Tighten the bolt (10) to secure.

b. Belt Replacement.

(1) Loosen the bolt (10, fig. 16), move the engine accessory generator (9) toward the generator mounting plate (20) and remove the belt from the pulleys.

(2) Place a new belt on the pulleys and adjust as prescribed in *a* above.

c. Removal.

(1) Remove the bolt (10, fig. 16) lockwasher (12), and flat washer (13), swing the engine accessory generator (9) in toward the generator mounting plate (20) and remove the V-belt from the pulley of the generator.

(2) Tag and disconnect the 2 shielded cables from the 2 electrical box connectors (4).

(3) Remove the two bolts (11), lockwashers (12), and flat washers (13) that secure the generator to the mounting plate and remove the generator.

(4) Remove the screw (2) and lockwasher (3) that secure the generator shield box (1) to the generator, Lift the box off the generator and tag and disconnect the leads from the generator.

d. Disassembly.

(1) Remove the hex nut (17, fig. 19) and lockwasher (16) that secure the pulley (15) and the fan (18) to the shaft of the armature (31).

(2) Remove the pulley and fan from the armature shaft.

e. Cleaning, Inspection and Repair.

(1) Clean the outside of the generator with a cloth dampened with an approved cleaning solvent and dry thoroughly. Clean all other metal parts in an approved solvent and dry with a lint-free cloth.

(2) Inspect the terminal studs for corrosion. Remove all corrosion and apply a thin film of grease.

(3) Inspect the brushes through the holes in the end bell. Replace brushes that are oil soaked or worn to less than half their original length. See *f* below.

(4) Inspect the pulley and fan for cracks, breaks, and distortion. Straighten a bent or distorted pulley and fan. Replace a pulley or fan damaged beyond repair.

(5) Inspect all attaching hardware for distortion and damaged threads. Replace if defective.

f. Brush Replacement.

(1) Remove the two bolts (2, fig. 19) and lockwashers (3) that secure the end bell (1) to the housing (44) and remove the end bell with attached brushes from the housing.

(2) Remove the screw (10) and lockwasher (11) that secures the lead of the brush (9) to the grounded brush holder assembly (4).

(3) Lift the brush arm (12) and remove the brush from the holder.

(4) Remove the remaining brush in a similar manner.

(5) Lift the brush arm (12) and install a new brush (9) in the grounded brush holder assembly (4).

(6) Secure the lead of the brush to the

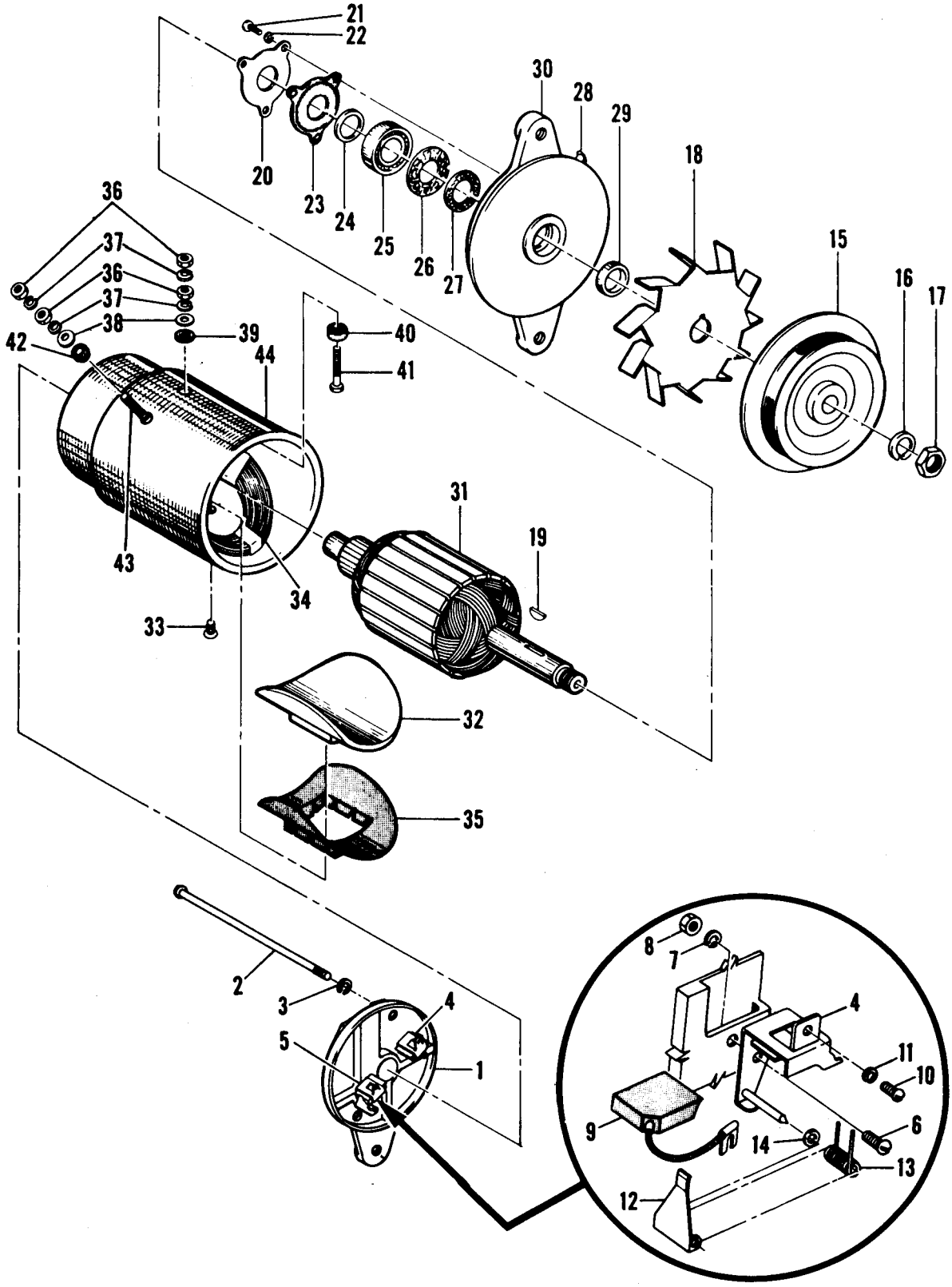


Figure 19. Engine accessory generator, exploded view.

1 End bell
2 Bolt (2 rqr)
3 Lockwasher (2 rqr)
4 Grounded brush holder assembly
5 Insulated brush holder assembly
6 Screw
7 Lockwasher
8 Nut
9 Brush (2 rqr)
10 Screw
11 Lockwasher
12 Arm (2 rqr)
13 Spring (2 rqr)
14 Flat washer (2 rqr)
15 Pulley
16 Lockwasher
17 Nut
18 Fan
19 Woodruff key
20 Bearing retaining plate
21 Screw (3 rqr)
22 Lockwasher (3 rqr)
23 Gasket
24 Flat washer
25 Ball bearing
26 Felt retainer plate
27 Preformed felt
28 Oiler
29 Collar
30 End bell
31 Armature
32 Pole piece (2 rqr)
33 Screw (2 rqr)
34 Field winding
35 Insulator plate (2 rqr)
36 Nut (4 rqr)
37 Lockwasher (4 rqr)
38 Flat washer (2 rqr)
39 Insulating washer
40 Bushing insulator
41 Stud terminal
42 Bushing insulator
43 Stud terminal
44 Housing

Figure 19—Continued.

holder with the lockwasher (11) and screw (10).

(7) Install the other brush in a similar manner.

(8) Position the end bell (1) on the housing (44) and secure with the two lockwashers (3) and bolts (2).

g. Reassembly.

(1) Mount the fan (18, fig. 19) and the pulley (15) on the shaft of the armature (31).

(2) Install the lockwasher (16) and hex nut (17) on the armature shaft.

h. Installation.

(1) Connect the leads of the shield box (1, fig. 16) to the terminals of the engine accessory generator (9) in accordance with tags attached during removal. Place shield box on the generator and secure with the lockwasher (3) and screw (2).

(2) Position the generator on the generator mounting plate (20) and secure with the two flat washers (13), lockwashers (12), and bolts (11).

(3) Install the belt on the pulleys and adjust the belt as prescribed in *a* above.

(4) Connect the 2 shielded cables to the ‘2 electrical plug connectors (4) in accordance with tags attached during removal.

113. Electrical Engine Starter

a. Removal.

(1) Remove the battery (par. 9).

(2) Disconnect the electrical cable from the starter.

(3) Remove two hex nuts and lockwashers that secure the starter support bracket (21, fig. 20) to the crankcase.

(4) Remove the three bolts and lockwashers that secure the starter in the flywheel shroud and remove the starter.

(5) Remove the screw (22) and flat washer (36) that secures the support bracket to the end bell (24) and remove the bracket from the starter.

b. Cleaning and Inspection.

(1) Clean the external surfaces of the starter with a cloth dampened in an approved cleaning solvent and dry thoroughly. Clean corrosion from the electrical terminal of the starter.

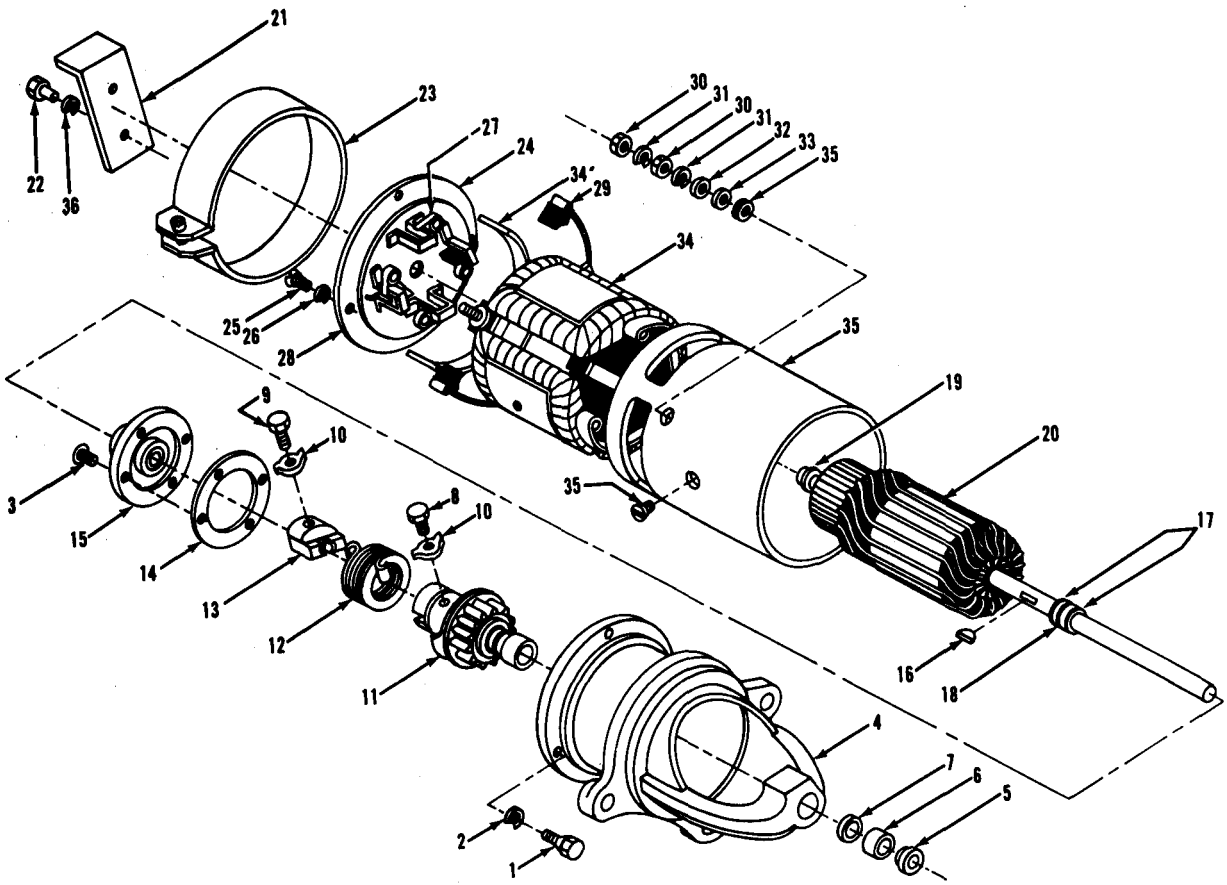
(2) Inspect the terminal of the starter for corrosion and damaged threads.

(3) Remove the brush access cover and inspect the starter internally for damage. Inspect the brushes for oil soaked condition and excessive wear. If the brushes are less than half their original length replace the brushes as directed in *c* below. Refer a defective starter to depot maintenance for overhaul.

c. Brush Replacement.

(1) Lift the four brushes (28 and 29) out of the brush holders.

(2) Remove the four screws (25) and lockwashers (26) that secure the end bell (24) to the housing assembly (35) and remove the end bell.



1 Bolt, machine No. 10–32 x 31/32 in. (4 rqr)
2 Washer, lock, No. 10 (4 rqr)
3 Screw, machine No. 8–32 x 3/8 in. (4 rqr)
4 Drive housing
5 Pillow block cap
6 Sleeve bearing
7 Plain seal
8 Shoulder bolt
9 Shoulder bolt
10 Key washer (2 rqr)
11 Shaft and pinion assembly
12 Spring
13 Driving head
14 Gasket
15 Bearing plate assembly
16 Woodruff key
17 Thrust washer (2 rqr)
18 Spring tension washer
19 Thrust washer
20 Armature
21 Starter support bracket
22 Screw, machine, No. 10–32 x 1/2 in.
23 Brush access cover
24 End bell
25 Screw, machine No. 10–32 x 3/8 in. (4 rqr)
26 Washer, lock No. 10 (4 rqr)
27 Spring (4 rqr)
28 Brush (2 rqr)
29 Brush (2 rqr)
30 Nut, plain, hex 5/16–24 (2 rqr)
31 Washer, lock 5/16 in. (2 rqr)
32 Washer, flat 5/16 in.
33 Insulator washer
34 Field winding assembly
35 Housing assembly
36 Washer, flat No. 10

Figure 20. Electrical engine starter, exploded view.

(3) Unsolder the leads of the two brushes (29) from the field winding assembly (34) .
(4) Unsolder the leads of the two brushes (28) from the brush holders.
(5) Solder the leads of four new brushes to the winding assembly and brush holders.
(6) Position the end bell (24) on the housing assembly (35) and secure with the four lockwashers (26) and screws (25).
(7) Insert the four brushes into the brush holders under the tension springs.
(8) Install the brush access cover (23) on the housing assembly.

d. Installation.

(1) Position the starter support bracket (21, fig. 20) on the end bell (24) and secure with the lockwasher (36) and screw (22).

(2) Install the starter in the flywheel shroud and secure with the three lockwashers and bolts.

(3) Secure the starter support bracket to the crankcase with two lockwashers and hex nuts.

(4) Connect the electrical cable to the terminal of the starter.

(5) Install the battery (par. 9).

114. Spark Plugs and Cables

a. Removal.

(1) Remove the screw (9, fig. 11) and clamp (12) that secures the ignition cable (8) to the cylinder head shroud (13).

(2) Tag and disconnect the ignition cable (8) from the spark plug (7) and the ignition magneto (21).

(3) Remove the spark plug and gasket from the cylinder head.

(4) Remove the three remaining spark plugs and ignition cables in a similar manner.

b. Cleaning, Inspection, and Repair.

(1) Clean the outside of the spark plugs and ignition cables with a cloth dampened in cleaning solvent and dry thoroughly.

(2) Inspect the ignition cables for cracked or frayed shielding, damaged threads, and broken or missing clamps. Replace broken or missing clamps and replace the cables if damaged.

(3) Clean the spark plugs with a suitable plug cleaner. Inspect the spark plugs for burned electrodes and for cracked porcelain. Replace a defective spark plug.

c. Installation.

(1) Install the gasket and spark plug (7, fig. 11) in the cylinder head and tighten to a 25 to 30 lb. torque.

(2) Connect the ignition cable (8) to the installed spark plug and ignition magneto (21).

(3) Secure the ignition cable to the cylinder head shroud (13) with the clamp (12) and screw (9).

(4) Install the three remaining spark plugs and ignition cables in a similar manner.

115. Ignition Magneto

a. Testing Magneto Spark.

(1) Tag and disconnect the four ignition cables (8, fig. 11) from the ignition magneto (21).

(2) Insert an insulated wire, bared at both ends, into one of the terminal posts of the magneto.

(3) Place the ignition switch (1, fig. 10) in the ON position and crank the engine with the starter. With the bared end of the wire held one-eighth inch away from the cylinder head shroud, an intense blue spark should be observed.

(4) Continue the test inserting the wire in the three remaining terminal posts of' the magneto.

(5) If no spark is observed, disconnect the switch-to-magneto lead by removing the screw (29, fig, 11). Retest for a spark. If a spark is now observed, the ignition switch is defective and must be replaced.

(6) If no spark is observed in the procedures outlined in (1) through (5) above, replace the breaker points as described in e below.

b. Removal.

(1) Disconnect the switch-to-magneto lead at the screw (29, fig. 11).

(2) Tag and disconnect the four ignition cables (8) from the magneto (21).

(3) Disconnect the ground strap (16) from the cylinder head.

(4) Remove the two hex nuts and the bolt that secures the magneto in place and remove the magneto and gasket.

c. Disassembly.

(1) Remove the 2 screws (2, fig. 21) that secure the capacitor (1) in the end cap (9) and remove the capacitor.

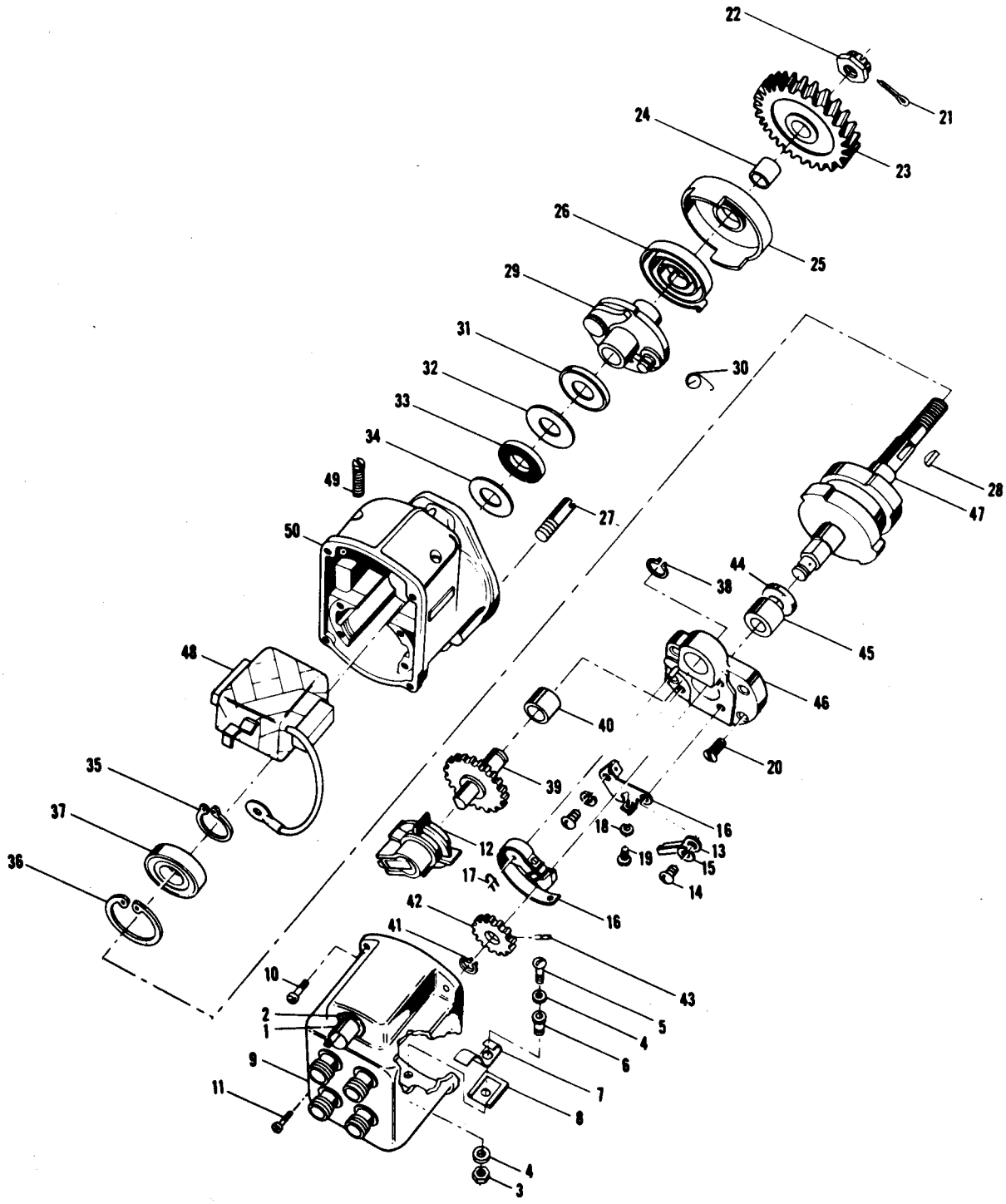


Figure 21. Ignition magneto, exploded view.

1 Capacitor
2 Screw, machine, No. 6–32 x 3/8 in. (2 rqr)
3 Nut (2 rqr)
4 Washer (2 rqr)
5 Screw (2 rqr)
6 Bushing insulator (2 rqr)
7 Electrical contact
8 Plate insulator
9 End cap
10 Screw, machine, No. 10–24 x 5/8 in. (2 rqr)
11 Screw, machine, No. 10–24 x 1 1/8 in. (2 rqr)
12 Distributor rotor
13 Wick and holder assembly
14 Screw (2 rqr)
15 Lockwasher (2 rqr)
16 Contact set
17 Retaining ring
18 Lockwasher (2 rqr)
19 Screw (2 rqr)
20 Screw, machine, No. 8–32 x 3/8 in. (4 rqr)
21 Cotter pin
22 Nut
23 Helical gear
24 Sleeve bushing
25 Housing
26 Spring
27 Threaded straight pin
28 Woodruff key
29 Magneto coupling
30 Spring
31 Packing retainer
32 Flat washer
33 Preformed packing
34 Flat washer
35 Retaining ring
36 Retaining ring
37 Ball bearing
38 Retaining ring
39 Spur gear
40 Sleeve bearing
41 Retaining ring
42 Spur gear
43 Threaded straight pin
44 Flat washer
45 Roller bearing
46 Contact breaker plate
47 Magneto rotor
48 Magneto coil
49 Setscrew 1/4–20 x 7/8 in. (2 rqr)
50 Magneto housing

Figure 21.—Continued.

(2) Remove the 2 screws (10) and 2 screws (11) that secure the end cap (9) to the magneto housing (50) and remove the end cap.

(3) Remove the distributor rotor (12) from the spur gear (39).

d. Cleaning, Inspection, and Repair.

(1) Clean the outside of the magneto, end cap, and rotor with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect the end cap and rotor for cracks, breaks or other visible damage. Replace a defective end cap and rotor.

(3) Inspect the points of the contact set for pitting or burning. Replace a defective contact set.

c. Contact Set Replacement.

(1) Remove and disassemble the ignition magneto as described in *b* and *c* above.

(2) Remove the screw (19, fig. 21) and lockwasher (18) that disconnect the electrical leads from the contact set, (16).

(3) Remove the retaining ring (17) that secures the movable member of the contact set to the contact breaker plate (46) and remove the movable contact.

(4) Remove the two screws (14) and lockwashers (15) that secure the wick and holder assembly (13) and the stationary member of the contact set (16) to the breaker plate and remove the contact and wick holder.

(5) Position the stationary member of the contact set (16) and the wick and holder assembly (13) on the contact breaker plate (46) and secure with the two lockwashers (15) and screws (14).

(6) Place the movable member of the contact set (16) on the pin of the contact breaker plate (46) and install the retaining ring (17).

(7) Connect the electrical leads of the magneto to the contact set (16) with the lockwasher (18) and screw (19).

(8) Adjust the breaker point gap setting as prescribed in *f* below.

(9) Reassemble and install the ignition magneto as outlined in *g* and *h* below.

f. Contact Set Adjustment.

(1) Remove and disassemble the magneto as described in *b* and *c* above.

(2) Loosen the two screws (14, fig. 21) and increase or decrease the clearance between the stationary point and the

movable point to obtain the proper clearance of 0.015 inch.

(3) Tighten the 2 screws (14) and reinspect the clearance.

(4) Reassemble and install the magneto as outlined in *g* and *h* below.

g. Reassembly.

(1) Install the distributor rotor (12, fig. 21) on the spur gear (39).

(2) Position the end cap (9) on the magneto housing (50) and secure with the 2 screws (10) and 2 screws (11).

(3) Insert the capacitor (1) in the end cap and secure with the two screws (2).

h. Timing and Installation.

(1) Remove the spark plug from the number 1 cylinder (par. 114).

(2) Crank the engine slowly until air blows from the spark plug hole, indicating start of the compression stroke. Continue cranking until the edge of the marked flywheel vane is in line with the mark on the shroud as shown in figure *22*.

(3) Remove the timing hole plug (18, fig. 11) from the gear cover (19).

(4) Turn the magneto drive gear clockwise so that when the magneto is positioned on the engine, its drive gear will engage the idler gear with the marked

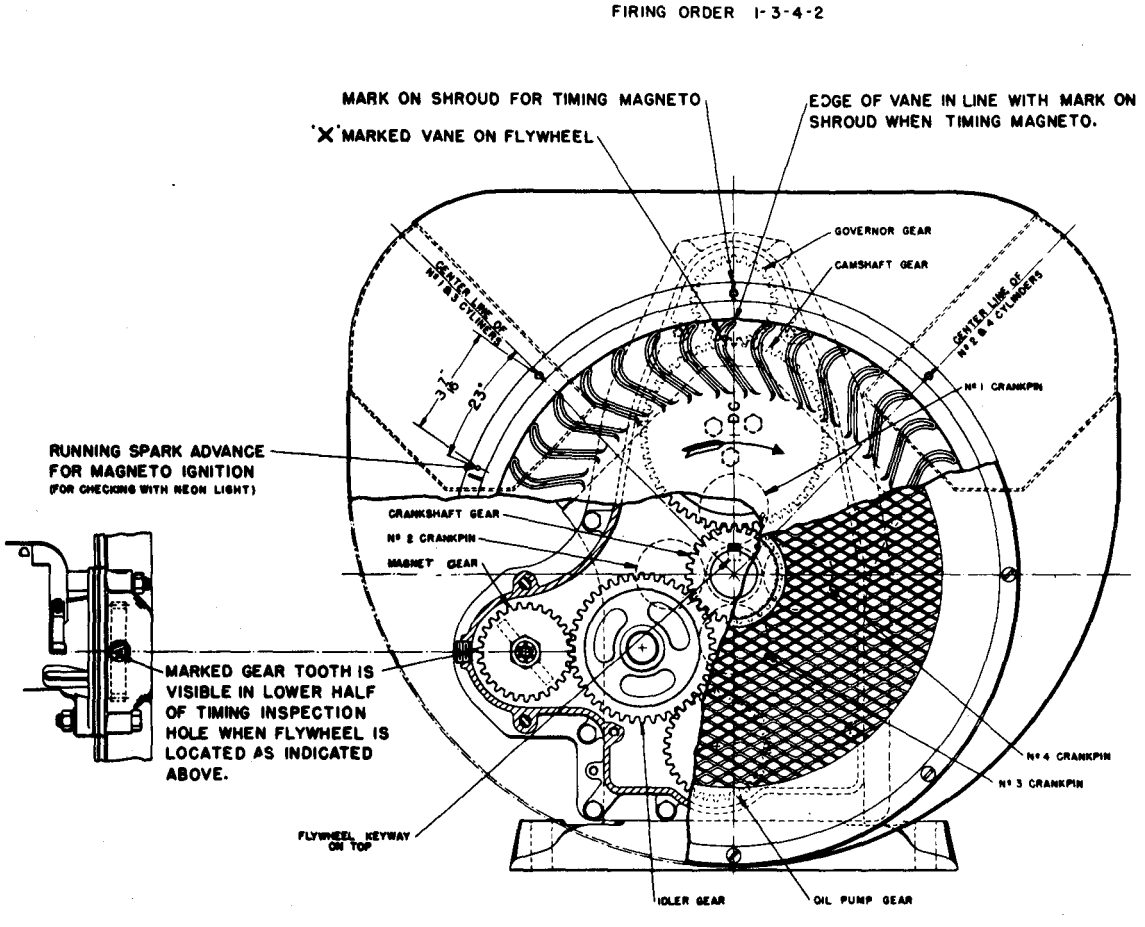


Figure 22. Engine timing marks.

tooth of the drive gear visible through the lower half of the inspection hole as illustrated in figure 22.

(5) Position a new gasket and the ignition magneto (21, fig. 11) in place on the engine and secure with the bolt and two hex nuts.

(6) Install the timing hole plug (18) in the hole of the gear cover (19).

(7) Connect the ground strap (16) to the cylinder head.

(8) Connect the four ignition cables (8) to the magneto.

(9) Connect the switch-to-magneto lead at the screw (29).

(10) Install the spark plug in the number 1 cylinder (par. 114).

116. Air Cleaner Assembly

a. Removal.

(1) Loosen the two hose clamps that secure the hose to the carburetor (11, fig. 11) and the air cleaner assembly (14) and remove the clamps, sleeve spacer and the hose from the air cleaner and the carburetor.

(2) Remove the four hex nuts, lockwashers, and bolts that secure the air cleaner assembly to the flywheel shroud and remove the air cleaner.

b. Cleaning and Inspection.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the hose for oil soaked condition and other visible signs of deterioration. Replace a defective hose.

(3) Inspect the air cleaner assembly for cracks, breaks, and distortion. Inspect the oil cup of the air cleaner for leaks. Replace a defective air cleaner assembly.

c. Installation.

(1) Position the air cleaner assembly (14, fig. 11) on the flywheel shroud and secure with four bolts, lockwashers, and hex nuts.

(2) Install the hose sleeve spacer and two hose clamps on the carburetor (11) and air cleaner and tighten the clamps.

(3) Service the air cleaner assembly as prescribed in paragraph 52.

Section II. AIR SHROUDING GROUP

117. General

The air shrouding group, made up of the flywheel shroud, heat deflectors, cylinder shrouds, and shroud covers, is incorporated to direct forced cooling air from the flywheel over the cooling fin surfaces of the cylinders and cylinder heads.

118. Flywheel and Flywheel Shroud

a. Removal.

(1) Remove the housing assembly (par. 106).

(2) Remove the electrical engine starter (par. 113).

(3) Remove the engine accessory generator (par. 112).

(4) Remove the muffler (par. 121).

(5) Remove the eight screws (2, fig. 23) and lockwashers (3) that secure the flywheel shroud screen (1) to the flywheel shrewd (18) and remove the screen from the shroud.

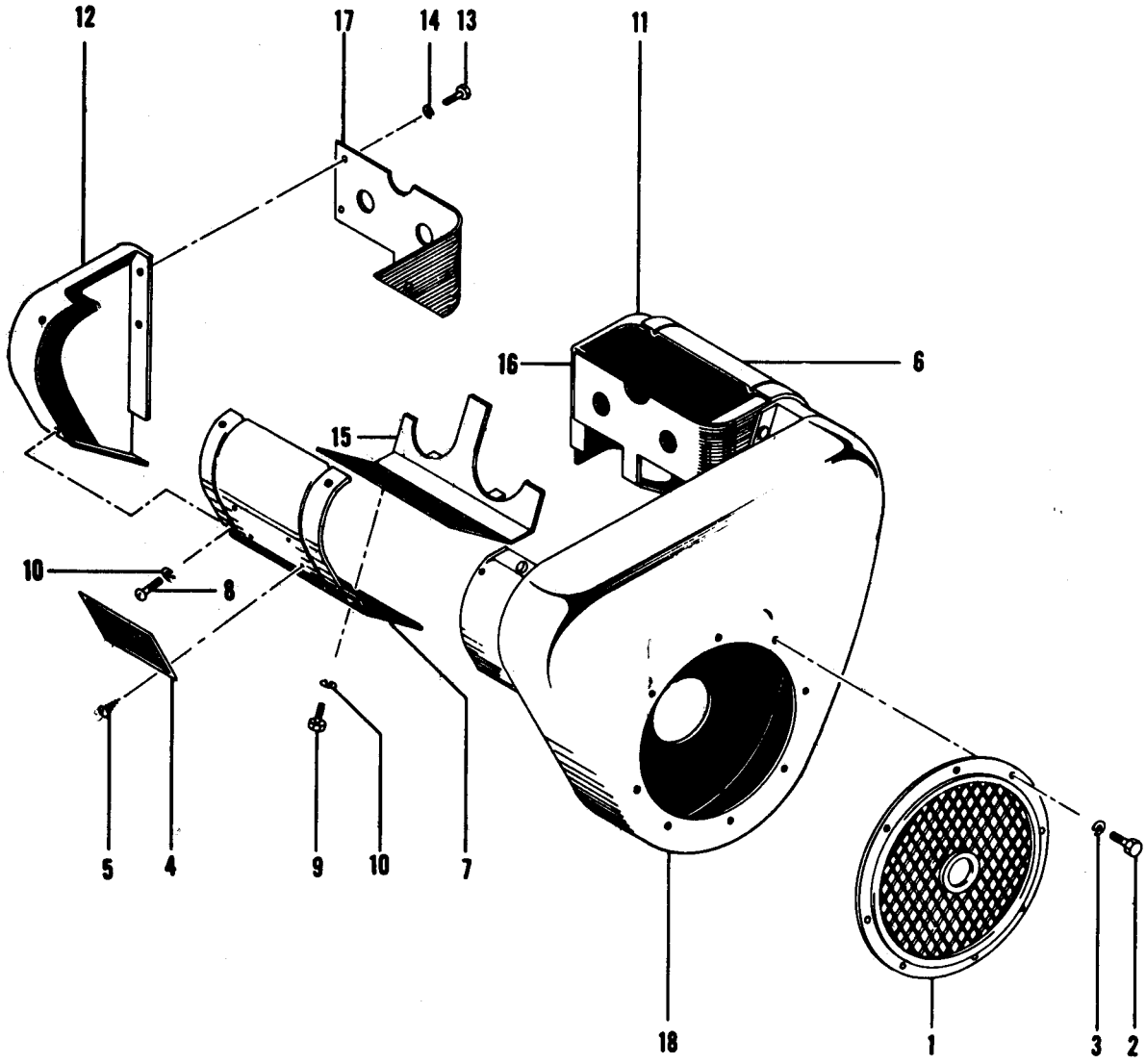
(6) Remove the six bolts (18, fig. 36) and lockwashers (19) that secure the generator drive sheave (17) to the flywheel (20) and remove the sheave.

(7) Remove the headless straight pin (14) from the crankshaft (34).

(8) Bend the locking ears of the lockwashers (16) away from the hex nut (15) and remove the nut from the crankshaft.

(9) Strike the end of the crankshaft with a soft hammer to dislodge the flywheel from the taper on the crankshaft. Remove the flywheel and woodruff key (21) from the crankshaft.

(10) Remove the eight bolts (9, fig. 23) and lockwashers (10) that secure the flywheel shroud to the cylinder head



1 Flywheel shroud screen
2 Screw, machine, ¼–20 x ⅜ in. (8 rqr)
3 Washer, lock, ¼ in. (8 rqr)
4 Identification plate
5 Screw, tapping, thread forming, No. 4 x ¼ in. (4 rqr)
6 Cylinder head shroud, right-hand
7 Cylinder head shroud, left-hand
8 Screw, machine, ¼–20 x ⅜ in. (13 rqr)
9 Bolt, machine, ¼–20 x ⅜ in. (8 rqr)
10 Washer, lock ¼ in. (13 rqr)
11 Rear shroud cover, right-hand
12 Rear shroud cover, left-hand
13 Bolt, machine, ¼–20 x ⅜ in. (2 rqr)
14 Washer, lock, ¼ in. (5 rqr)
15 Lower cylinder shroud
16 Cylinder heat deflector, right-hand
17 Cylinder heat deflector, left-hand
18 Flywheel shroud

Figure 23. Air shrouding group, exploded view.

shrouds (6 and 7), lower cylinder shrouds (15), and the cylinder heat deflectors (16 and 17).

(11) Remove the six bolts and lockwashers that secure the flywheel shroud to the gear cover and remove the flywheel shroud.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect the flywheel shroud and the screen for cracks, breaks, distortion, and damaged threads. Straighten a bent or distorted shroud and screen and repair cracks and breaks by welding. Replace a shroud or screen damaged beyond repair.

(3) Inspect the flywheel for cracks, breaks, and damaged threads. Replace a damaged flywheel.

c. Installation.

(1) Position the flywheel shroud (18, fig. 23) on the gear cover and secure with six lockwashers and bolts.

(2) Secure the flywheel shroud to the cylinder heat deflectors (16 and 17), lower cylinder shrouds (15), and cylinder head shrouds (6 and 7) with the eight lockwashers (10), and bolts (9).

(3) Insert the woodruff key (21, fig. 36) in the crankshaft (34). Install the flywheel (20) on the crankshaft and secure with the Iockwasher (16) and hex nut (15).

(4) Install the headless straight pin (14) in the crankshaft.

(5) Position the generator drive sheave (17) on the flywheel and secure with the six lockwashers (19) and bolts (18),

(6) Mount the flywheel shroud screen (1, fig. 23) on the flywheel shroud (18) and secure with the eight lockwashers (3) and screws (2).

(7) Install the muffler (par. 121).

(8) Install the engine accessory generator (par. 112).

(9) Install the electrical engine starter (par. 113).

(10) Install the housing assembly (par. 106).

119. Cylinder Shrouds and Heat Deflectors

a. Removal.

(1) Remove the ignition cables and spark plugs (par. 114).

(2) Remove the five screws (8, fig. 23) and lockwashers (10) that secure the cylinder head shroud (7) to the rear shroud cover (12), lower cylinder shroud (15), and the flywheel shroud (18) and remove the cylinder head shroud.

(3) Remove the two bolts (13), lockwashers (14), screw (8), and lockwasher (10) that secure the rear shroud cover (12) in place and remove the shroud cover.

(4) Remove the two bolts (9) and lockwashers (10) that secure the lower shroud (15) to the cylinder and remove the lower shroud.

(5) Remove the manifold (par. 123).

(6) Remove the screw (8) and lockwasher (10) that secure the cylinder heat deflector (17) to the flywheel shroud (18) and remove the heat deflector.

(7) Remove the remaining shrouds and heat deflector in a similar manner.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the various shrouds for dents, cracks, breaks, and damaged threads. Straighten minor dents and repair cracks and breaks by welding. Replace a shroud or heat deflector damaged beyond repair.

(3) Retouch or repaint all shrouds as required to protect metal surfaces.

c. Installation.

(1) Position the heat deflector (17, fig. 23) on the flywheel shroud (18) and secure with the lockwasher (10) and screw (8).

(2) Install the manifold (par. 123).

(3) Secure the lower shroud (15) to the cylinder with the two lockwashers (10) and bolts (9).

(4) Position the rear shroud cover (12) on the lower shroud and heat deflector and secure with the lockwasher (10), screw (8), 2 lockwashers (14) and 2 bolts (13).

(5) Place the cylinder head shroud (7) on the installed shroud cover and lower shroud and secure with the five lockwashers (10) and screws (8).

(6) Install the spark plugs and ignition cables (par, 114).

(7) Install the remaining shrouds and heat deflector in a similar manner.

Section III. MANIFOLD AND CYLINDER BLOCK GROUP

120. General

The manifold and cylinder block group, consisting of the carburetor, intake and exhaust manifold, cylinder heads, cylinder block assemblies, and the muffler, make up the upper portion of the engine where mixing and combustion of the fuel takes place. The carburetor meters fuel into the air stream passing into the manifold. The intake valves of the cylinder block assemblies admit the air-fuel mixture into their respective cylinders at the precise time for compression and combustion. The burnt gases pass out of the cylinder through the exhaust valves, manifold, and muffler.

121. Muffler

a. Removal.

(1) Remove the two pipe nipples (1 and 4, fig. 8) and elbow (3).

(2) Remove the elbow (6, fig. 24) from the muffler (7).

(3) Remove the two hex nuts (10), lockwashers (9), and the clamp (8) that secure the muffler to the muffler mount (11) and unscrew the muffler from the coupling (12).

(4) Remove the coupling, pipe nipple (13), and elbow (14) from the intake and exhaust manifold (24).

b. Cleaning, Inspection, and Repair.

(1) Clean rust and corrosion from the muffler and all fittings with a wire brush.

(2) Inspect the muffler for cracks, breaks, and damaged threads. Replace a defective muffler.

(3) Inspect the various fittings for cracks, breaks, distortion, and damaged threads. Repair damaged threads. Replace a fitting damaged beyond repair.

(4) Inspect all attaching parts for distortion and damaged threads. Replace all defective parts,

c. Installation.

(1) Install the elbow (14, fig. 24), pipe nipple (13), and coupling (12) in the intake and exhaust manifold (24).

(2) Install the muffler (7) in the coupling (12) and secure the muffler to the muffler mount (11) with the clamp (8), two lockwashers (9), and hex nuts (10).

(3) Install the elbow (6) on the muffler.

(4) Install the two pipe nipples (1 and 4, fig. 8) and the elbow (3).

122. Carburetor

a. Adjustment.

(1) Start the engine (par. 41) and allow the engine to warm up properly before making any adjustments on the carburetor.

(2) Close the throttle and adjust the throttle stop screw (14, fig. 25) for the desired idle speed.

(3) Turn the idle adjusting needle (20) counterclockwise until the engine rolls because of a rich mixture.

(4) Turn the needle clockwise until the engine runs irregularly because of a lean mixture.

(5) Turn the needle counterclockwise again as far as possible maintaining smooth engine operation.

Note. This adjustment will give a slower idling speed than a slightly leaner adjustment with the same throttle stop screw setting, but will give the smoothest performance.

(6) Readjust the throttle stop screw as necessary to obtain proper idle speed.

b. Removal.

(1) Disconnect the choke control (15, fig. 24) from the carburetor (18).

(2) Disconnect the fuel line from the carburetor.

(3) Disconnect the governor linkage from the throttle shaft assembly (16, fig. 25).

(4) Remove the hose of the air cleaner assembly (par. 116).

(5) Remove the two bolts (16, fig. 24) and lockwashers (17) that secure the carburetor (18) and gasket (19) to the intake and exhaust manifold (24) and remove the carburetor and gasket.

c. Disassembly.

(1) Remove the bolt (2, fig. 25) and gasket (3) that secure the fuel sediment bowl (1) and gasket (4) to the body (34) and remove the bowl and gasket.

(2) Remove the headless straight pin (6) and the float (5) from the body.

(3) Remove the valve assembly (7) from the body.

(4) Remove the main nozzle (8), gasket (9), and power jet (10) from the body.

(5) Remove the packing retainer (17) and preformed packing (18) from the body.

(6) Remove the idle adjusting needle (20) and the spring (21) from the body.

(7) Remove the screw (14) and spring (15) from the throttle shaft assembly (16).

(8) Remove the two screws (13) that secure the throttle fly (12) to the throttle shaft assembly (16) and remove the throttle fly. Remove the throttle shaft assembly from the body.

(9) Remove the two screws (23) that secure the choke fly (22) to the choke shaft assembly (28) and remove the choke fly.

(10) Remove the choke shaft assembly from the body (34). Remove the cotter pin (26) and choke swivel (25) from the shaft assembly. Remove the screw (24) from the swivel.

(11) Disconnect the spring (27) from the bracket assembly (30). Remove the two screws (31) that secure the bracket assembly to the body and remove the bracket and the preformed packing (32).

(12) Remove the two sleeve bushings (19) if defective or worn.

d. Cleaning, Inspection, and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly. Clear all fuel passages with compressed air.

(2) Inspect the body for cracks, breaks, distortion, and damaged threads. Inspect the fuel passages making certain they are not obstructed. Repair damaged threads. Replace a body damaged beyond repair.

(3) Inspect the float and sediment bowl for cracks and distortion. Repair cracks by soldering. Replace parts damaged beyond repair.

(4) Inspect the valve assembly for proper closing and seating. Replace a defective valve assembly.

(5) Inspect all other parts for distortion and damage. Replace all defective parts.

e. Reassemble.

(1) Install the two sleeve bushings (19, fig. 25) in the body (34).

(2) Insert the preformed packing (32) in the body. Position the bracket assembly (30) on the body and secure with the two screws (31). Attach the spring (27) to the bracket.

(3) Install the choke shaft assembly (28) in the body, Position the choke fly assembly (22) on the shaft assembly and secure with the two screws (23).

(4) Install the screw (24) in the choke swivel (25). Insert the swivel in the shaft assembly and install the cotter pin (26).

(5) Insert the throttle shaft assembly (16) in the body (34). Position the throttle

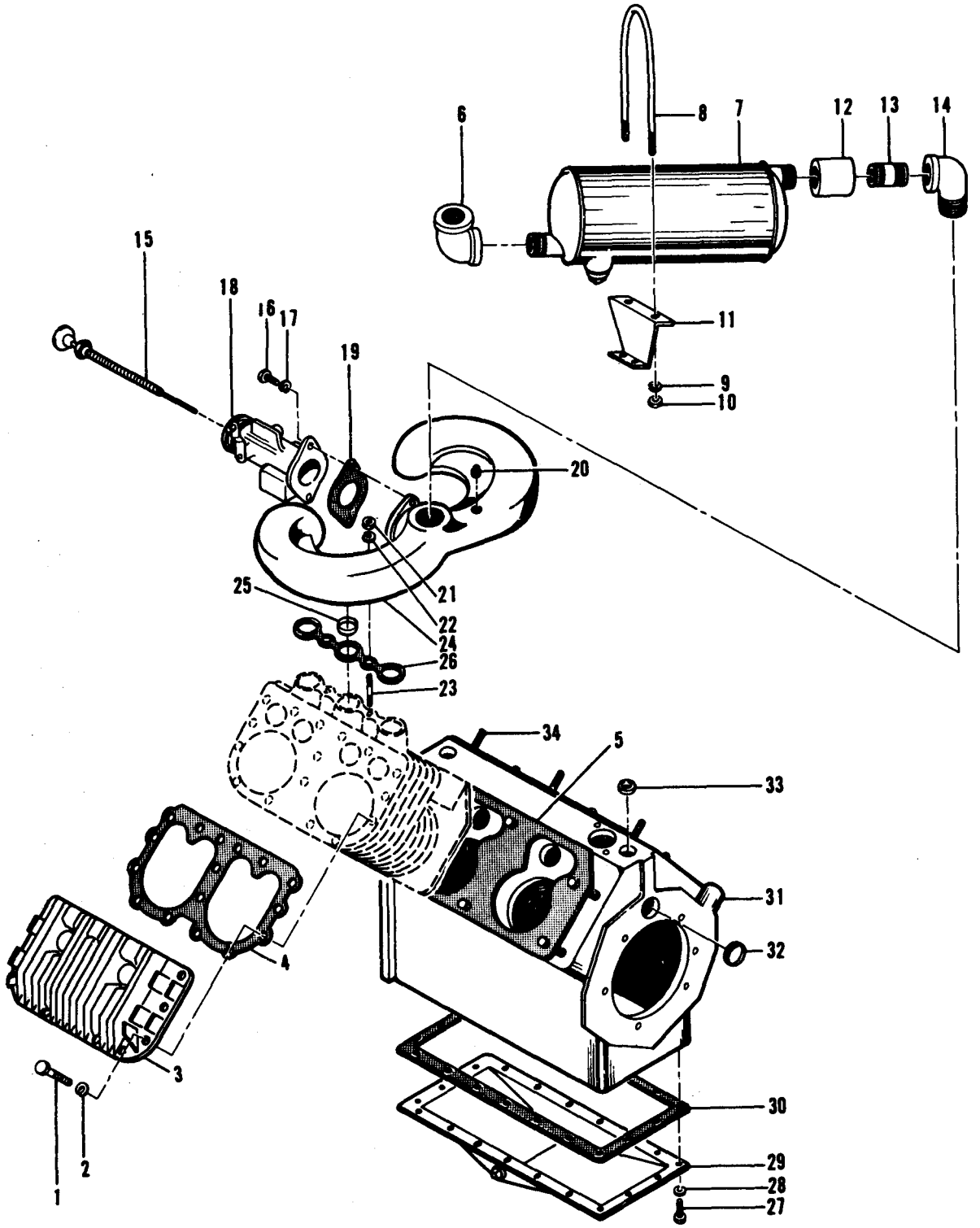


Figure 24. Manifold and crankcase group, removal points.

1 Bolt, machine, ⅜–16 x 1½ in. (34 rqr)
2 Washer, flat, ⅜ in. (34 rqr)
3 Cylinder block head assembly (2 rqr)
4 Gasket (2 rqr)
5 Gasket (2 rqr)
6 Elbow
7 Muffler
8 Clamp
9 Lockwasher (2 rqr)
10 Nut (2 rqr)
11 Muffler mount
12 Coupling
13 Pipe nipple
14 Elbow
15 Choke control
16 Bolt, machine, 5/16–18 x 1¼ in. (2 rqr)
17 Washer, lock 5/16 in. (2 rqr)
18 Carburetor
19 Gasket
20 Plug
21 Nut (4 rqr)
22 Lockwasher (4 rqr)
23 Stud (4 rqr)
24 Intake and exhaust manifold
25 Gasket insert (6 rqr)
26 Gasket (2 rqr)
27 Bolt, machine (14 rqr)
28 Lockwasher (14 rqr)
29 Crankcase bottom plate
30 Gasket
31 Crankcase assembly
32 Expansion plug
33 Expansion insert
34 Stud

Figure 24—Continued.

fly (12) on the shaft assembly and secure with the two screws (13).

(6) Install the screw (14) and spring (15) on the throttle shaft assembly.

(7) Install the preformed packing (18) and packing retainer (17) in the body.

(8) Install the spring (21) and the idle adjusting needle (20) in the body.

(9) Install a new gasket (9), main nozzle (8), and the power jet (10) in the body (34).

(10) Install the valve assembly (7) in the body.

(11) Position the float (5) on the body and install the headless straight pin (6).

(12) Secure a new gasket (4) and the fuel sediment bowl (1) to the body with a new gasket (3) and the bolt (2).

f. Installation.

(1) Secure a new gasket (9, fig. 24) and the carburetor (18) to the intake and exhaust manifold (24) with the two lockwashers (17) and bolts (16).

(2) Install the hose of the air cleaner assembly (par. 116).

(3) Connect the governor linkage to the throttle shaft assembly (16, fig. 25).

(4) Connect the fuel line to the carburetor.

(5) Connect the choke control (15, fig. 24) to the carburetor (18).

(6) Adjust the carburetor as outlined in *a* above.

123. Intake and Exhaust Manifold

a. Removal.

(1) Remove the muffler (par. 121).

(2) Remove the carburetor (par. 122).

(3) Remove the 4 hex nuts (21, fig. 24) and lockwashers (22) that secure the intake and exhaust manifold (24) and 2 gaskets (26) to the cylinder blocks. Remove the manifold, gaskets, and 6 gasket inserts (25) from the cylinder blocks.

(4) Remove the four studs (23) from the cylinder blocks if defective.

b. Cleaning and Inspection.

(1) Clean all rust and corrosion from the manifold with a wire brush.

(2) Inspect the manifold for cracks, breaks, distortion, and damaged threads. Replace a defective manifold.

(3) Inspect all attaching hardware for distortion and damaged threads. Replace if defective.

c. Installation.

(1) Install the four studs (23, fig. 24) in the cylinder blocks.

(2) Position the 6 gasket inserts (25), 2 new gaskets (26) and the intake and exhaust manifold (24) on the cylinder blocks and secure with the 4 lockwashers (22) and hex nuts (21). Tighten the nuts to 40 to 50 ft-lb torque.

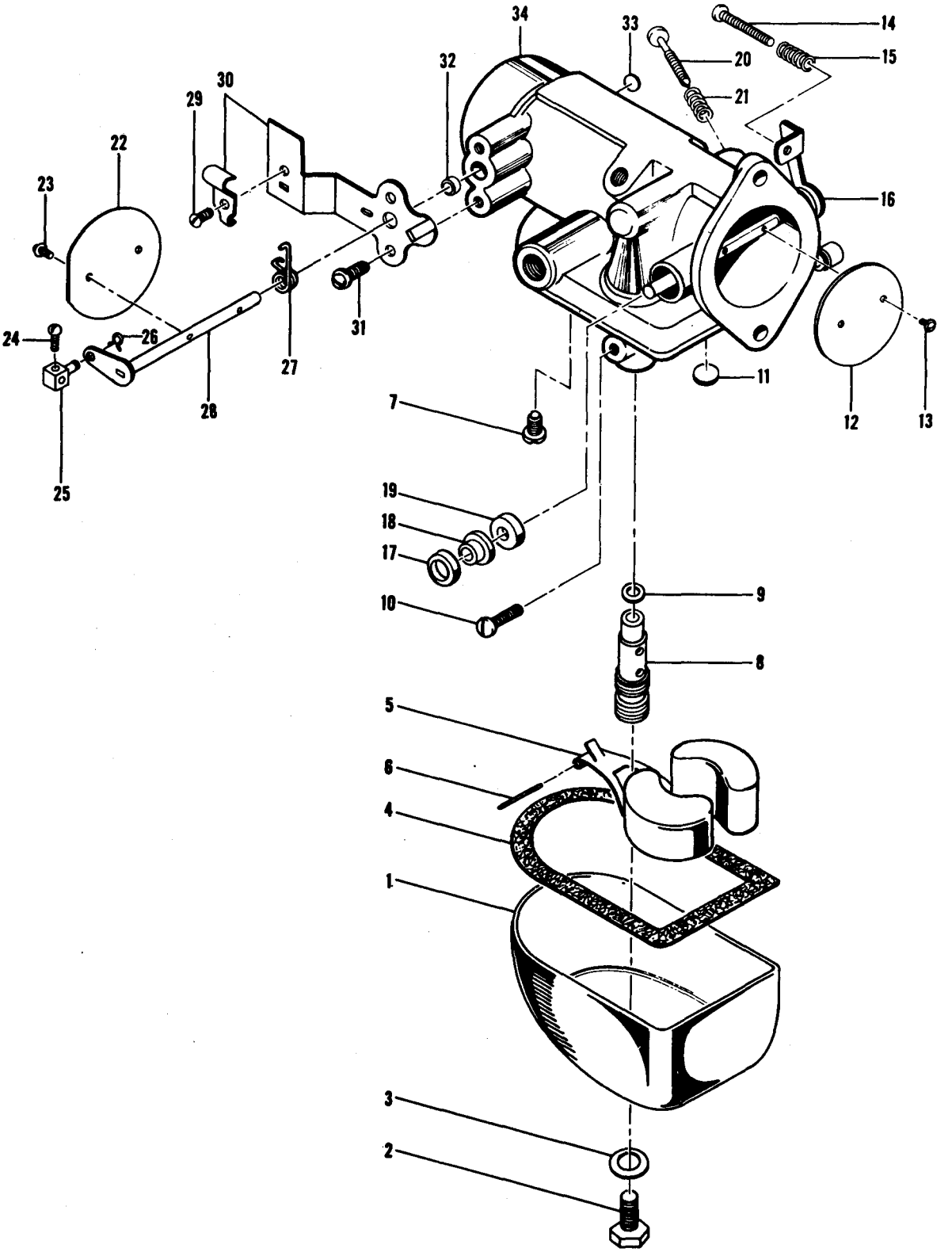


Figure 25. Carburetor, exploded view.

1 Fuel sediment bowl
2 Bolt
3 Gasket
4 Gasket
5 Float
6 Headless straight pin
7 Valve assembly
8 Main nozzle
9 Gasket
10 Power jet
11 Cup
12 Throttle fly
13 Screw, machine, No. 4–40 x 5/16 in. (2 rqr)
14 Screw, throttle stop, No. 8–32 x 3/4 in.
15 Spring
16 Throttle shaft assembly
17 Packing retainer (2 rqr)
18 Preformed packing (2 rqr)
19 Sleeve bushing (2 rqr)
20 Idle adjusting needle
21 Spring
22 Choke fly assembly
23 Screw, machine, No. 4–40 x 1/4 in. (2 rqr)
24 Screw, machine, No. 8 8–32 x 5/16 in.
25 Choke swivel
26 Cotter pin
27 Spring
28 Choke shaft assembly
29 Screw, machine, No. 8–32 x 5/16 in.
30 Bracket assembly
31 Screw, machine 8–32 x 3/8 in. (2 rqr)
32 Preformed packing
33 Cup
34 Body

Figure 25—Continued.

(3) Install the carburetor (par. 122).

(4) Install the muffler (par. 121).

124. Cylinder Heads

a. Removal.

(1) Remove the air shrouding group (pars. 118 and 119).

(2) Remove the 17 bolts (1, fig. 24) and flat washers (2) that secure the cylinder block head assembly (3) and the gasket (4) to the cylinder block and remove the head and gasket.

(3) Remove the other cylinder head in a similar manner.

b. Cleaning and Inspection.

(1) Clean all carbon deposits from the cylinder blocks. Clean the carbon from the tops of the pistons and blow carbon away with compressed air.

(2) Brush and scrape the carbon out of the cylinder heads.

(3) Wipe the cylinder heads and blocks with a cloth dampened with an approved solvent and dry thoroughly.

(4) Inspect the cylinder heads for cracks, breaks, or warping. Replace a defective cylinder head.

(5) Inspect the top of the cylinder blocks for cracks or breaks. Inspect the cylinder walls for scoring or pitting. Report a defective block to depot maintenance.

(6) Inspect the top of the valve seats. Report defective valves or seats to depot maintenance.

c. Installation.

(1) Position a new gasket (4, fig. 24) and the cylinder block head assembly (3) on the cylinder block and secure with the 17 flat washers (2) and bolts (1). Tighten the bolts to 25 to 32 ft-lb torque.

(2) Install the remaining cylinder block head assembly in a similar manner.

(3) Install the air shrouding group (pars. 118 and 119).

125. Valve Lifters

a. Valve Inspection Covers.

(1) *Removal.*

(a) Remove the governor (par. 135).

(b) Remove the bolt (2, fig. 26) and flat washer (3) that secures the valve inspection cover (1) and gasket (4) to the cylinder block (13) and remove the cover and gasket.

(c) Remove the three remaining covers in a similar manner.

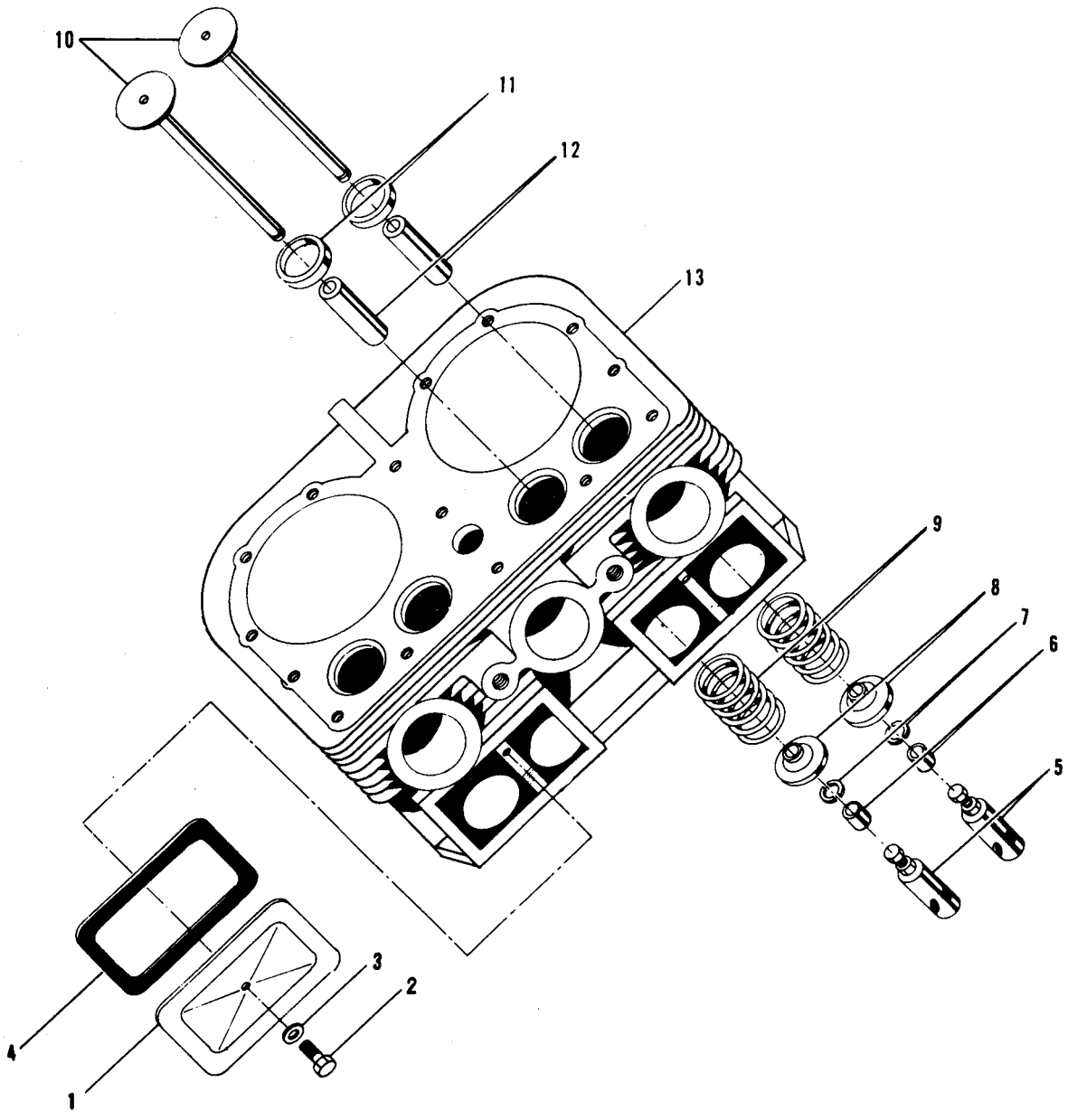
(2) *Cleaning and Inspection.*

(a) Clean the covers in an approved cleaning solvent and dry thoroughly.

(b) Inspect the covers for distortion and other visible damage. Replace a defective cover.

(3) *Installation.*

(a) Position the gasket (4, fig. 26) and the valve inspection cover (1) on the cylinder block (13) and secure with the flat washer (3) and bolt (2).



1 Valve inspection cover (4 rqr)
2 Bolt, machine, 5/16–18 x 1 5/8 in. (4 rqr)
3 Washer, flat, 5/16 in. (4 rqr)
4 Gasket (4 rqr)
5 Tappet assembly (8 rqr)
6 Rotator cap (8 rqr)
7 Retainer lock (16 rqr)
8 Valve spring seat (8 rqr)
9 Spring (8 rqr)
10 Valve (8 rqr)
11 Valve seat insert (8 rqr)
12 Valve stem guide (8 rqr)
13 Cylinder block (2 rqr)

Figure 26. Cylinder block assembly, exploded view.

(b) Install the three remaining covers in a similar manner.

(c) Install the governor (par. 135).

b. Valve Lifter Adjustment.

(1) Remove the valve inspection covers as outlined in ***a*** above.

(2) Crank the engine slowly until the number 1 piston rising in compression stroke blows air out of the spark plug hole. Continue until the marked vane on the flywheel alines with the number 1 centerline mark on the flywheel

shroud which is 45° counterclockwise from vertical as shown in figure 22.

(3) Insert a feeler gage between the cap of the tappet assembly (5, fig. 26) and the end of the valve (10) and measure the clearance. The proper clearance for the intake valves is 0.008 and 0.016 inch for the exhaust valves cold. The clearance is correct when there is a slight drag felt as the feeler gage is moved.

(4) Turn the cap of the tappet assembly until the correct clearance is obtained. The adjusting screw is self-locking and will hold this setting.

(5) Turn the crankshaft 180° clockwise and adjust the lifter clearance. of number 3 cylinder as in (3) above.

(6) Turn the crankshaft until the marked vane is in line with the number 2 cylinder centerline (fig. 22). Adjust the lifter clearance of the number 4 cylinder as in (3) above.

(7) Turn the crankshaft 180° clockwise and adjust the lifter clearance of the number 2 cylinder as in (3) above.

(8)Install the valve inspection covers as outlined in *a* above.

Section IV. OIL FILLER AND FILTER MOUNTING GROUP

126. General

The oil filler and filter mounting group, made up of the oil filter, oil filler tube, breather cap, and oil sabre, provides a means of maintaining a clean supply of lubricating oil in the engine crankcase.

127. Oil Filler Tube and Sabre

a. Removal.

(1) Remove the oil sabre (28, fig. 11) from the crankcase and remove the cork washer from the sabre.

(2) Pull the breather cap (1) off the oil filler tube and remove the tube and the oil filler screen from the crankcase.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the filler cap, filler tube, and sabre for cracks, breaks, and distortion. Inspect the sabre for legible oil level marks. Replace all defective parts.

(3) Inspect the screen for tears and clogged condition. Replace a defective screen.

c. Installation

(1) Install the oil filler screen and the oil filler tube in the crankcase and install the breather cap (1, fig. 11) on the filler tube.

(2) Install the cork washer on the oil sabre (28) and insert the sabre in the crankcase.

128. Oil Filter

a. Removal.

(1) Remove the filter element from the oil filter (par. 52).

(2) Disconnect the oil lines from each of the elbows in the oil filter (24, fig. 11) and remove the elbows from the oil filter.

(3) Remove the four hex nuts, lockwashers, and bolts (25) that secure the oil filter to the frame and remove the filter.

b. Cleaning and Inspection.

(1) Clean the oil filter with an approved solvent and dry thoroughly.

(2) Inspect the oil filter for cracks, breaks, distortion, and damaged threads. Replace a defective oil filter.

(3) Inspect all attaching parts for distortion and damaged threads. Replace all defective parts.

c. Installation.

(1) Position the oil filter (24, fig. 11) on the frame and secure with the four bolts (25), lockwashers, and hex nuts.

(2) Install the two elbows in the oil filter and connect the oil lines to the elbows.

(3) Install a new filter element in the oil filter (par. 52).

Section V. FUEL PUMP, FUEL STRAINER AND FUEL TANK

129. General

The fuel pump, fuel strainer, and fuel tank make up the major component of the fuel system. The fuel pump delivers fuel from the fuel tank to the carburetor through the fuel strainer. The fuel pump is mounted on the fuel pump adapter and is operated by an arm and plunger mechanism which is actuated by the eccentric on the camshaft.

130. Fuel Strainer

a. Removal.

(1) Disconnect the fuel line from the fuel strainer (1, fig. 27).

(2) Remove the fuel strainer from the pipe nipple (2) and remove the nipple and elbow (3) from the fuel pump (5).

b. Cleaning and Inspection.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect the fuel strainer for a cracked or broken glass. Inspect the strainer body for cracks, distortion, and damaged threads. Replace a defective fuel strainer.

(3) Inspect the nipple and elbow for distortion and damaged threads. Replace a defective part.

c. Installation.

(1) Install the elbow (3, fig. 27) and the pipe nipple (2) in the fuel pump (5).

(2) Install the fuel strainer (1) on the nipple.

(3) Connect the fuel line to the fuel strainer.

131. Fuel Pump and Adapter

a. Testing.

(1) Be sure the fuel tank is filled.

(2) Disconnect the fuel line (4, fig. 27) from the carburetor and actuate the primer handle lever (11). If fuel flows from the disconnected fuel line the fuel lines and pump are clear.

(3) If there is no flow of fuel or very little, perform the following steps:

(a) Service the fuel strainer (par. 9).

(b) Inspect all fuel lines from the fuel pump back to the fuel tank and tighten any loose connections.

(c) Inspect for clogged fuel lines between the pump and tank. Blow out with compressed air to clear.

(d) Inspect the fuel pump cover screw and tighten if necessary.

(4) Reinspect the fuel pump performance as directed in (2) above. If the pump operation is still unsatisfactory, repair or replace the fuel pump as outlined below.

b. Removal.

(1) Remove the fuel strainer (par. 130).

(2) Disconnect the fuel line (4, fig. 27) from the fuel pump (5) and the carburetor.

(3) Remove the two bolts (6) and lockwashers (7) that secure the fuel pump and gasket (8) to the fuel pump adapter (15) and remove the fuel pump,

(4) Remove the two screws (9) and lockwashers (10) that secure the pump adapter and the gasket (18) to the crankcase and remove the gasket and adapter.

(5) Lift the plunger cap (17) with attached plunger (16) from the crankcase and remove the cap from the plunger.

c. Disassembly.

(1) *Fuel Pump.*

(a) Remove the bolt (1, fig. 28) and gasket (2) that secure the pulsator dome (3), gasket (4), and fuel filter (5) to the fuel head (7) and remove the dome, gasket, and filter from the head.

(b) Match mark the head and the mounting bracket (22) to facilitate alining of mating parts during reassembly.

(c) Remove the six screws and lockwasher assemblies (6) that secure the head to the bracket and remove the head with attached valves.

(d) Remove the 3 screw and lockwasher assemblies (13) that secure the valve plate (12) and gasket (11) to the head and remove the valve plate, gasket, 2 valves (8), 2 springs (9), and spring retainer (10).

(e) To remove the diaphragm (14), hold the linkage (21) up by pressing down on the rocker arm (20). Press down on the diaphragm and disconnect the diaphragm from the linkage. Remove the diaphragm, spring (16) and gasket (15) from the mounting bracket (22).

(f) Compress and disengage the spring (17) from the rocker arm (20) and the mounting bracket.

(g) Drive the headless straight pin (18) out of the mounting bracket. Remove and separate the rocker arm (20), linkage (21), and the bushing (19).

(2) *Fuel Pump Adapter.*

(a) Remove the setscrew that secures the primer handle (11, fig. 27) in the primer shaft (14) and remove the handle and shaft from the fuel pump adapter (15).

(b) Remove the packing ring (13) and primer spring (12) from the adapter.

d. Cleaning, Inspection, and Repair.

(1) Clean all metal parts in an approved cleaning solvent and dry thoroughly. Clear all fuel passages with compressed air.

(2) Inspect the valve plate, dome, pump head, mouting bracket, and fuel pump adapter for cracks, breaks, distortion, and damaged threads. Replace defective parts.

(3) Inspect the rocker arm, linkage, primer shaft, and primer handle for cracks, breaks, and excessive wear. Replace all defective parts.

(4) Inspect the fuel filter for clogged or torn condition. Replace a defective filter.

(5) Inspect the springs for cracks, distortion and lack of tension. Replace a defective spring.

(6) Inspect all attaching hardware for distortion and damaged threads. Replace defective hardware.

e. Reassembly.

(1) *Fuel Pump Adapter.*

(a) Install the primer spring (12, fig. 27) and the packing ring (13) on the fuel pump adapter (15).

(b) Insert the primer shaft (14) in the adapter. Install the primer handle (11) in the shaft and secure with the set screw in the shaft.

(2) *Fuel Pump.*

(a) Assemble the rocker arm (20, fig. 28) and the linkage (21). Insert the bushing (19) in the alined holes of the arm and linkage.

(b) Position the arm and linkage in the mounting bracket (22) and drive the headless straight pin (18) into the alined holes of the bracket and bushing.

(c) Install the spring (17) between the bosses of the rocker arm and the mounting bracket.

(d) Position a new gasket (15), spring (16) and a new diaphragm (14) on the mounting bracket (22). Hold the rocker arm (20) down and depress the diaphragm to engage it with the hook end of the linkage (21).

(e) Install the spring retainer (10), 2 springs (9), 2 valves (8), gasket (11), and valve plate (12) on the fuel head (7) and secure the valve plate with 3 screw and lockwasher assemblies (13).

(f) Position the fuel head on the diaphragm (14) and mounting bracket (22) in accordance with match marks made during disassembly and secure with the six screw and lockwasher assemblies (6).

(g) Place the fuel filter (5), a new gasket (4), and the pulsator dome (3) on the fuel head and secure with the gasket (2) and bolt (1).

f. Installation.

(1) Install the plunger cap (17, fig. 27)

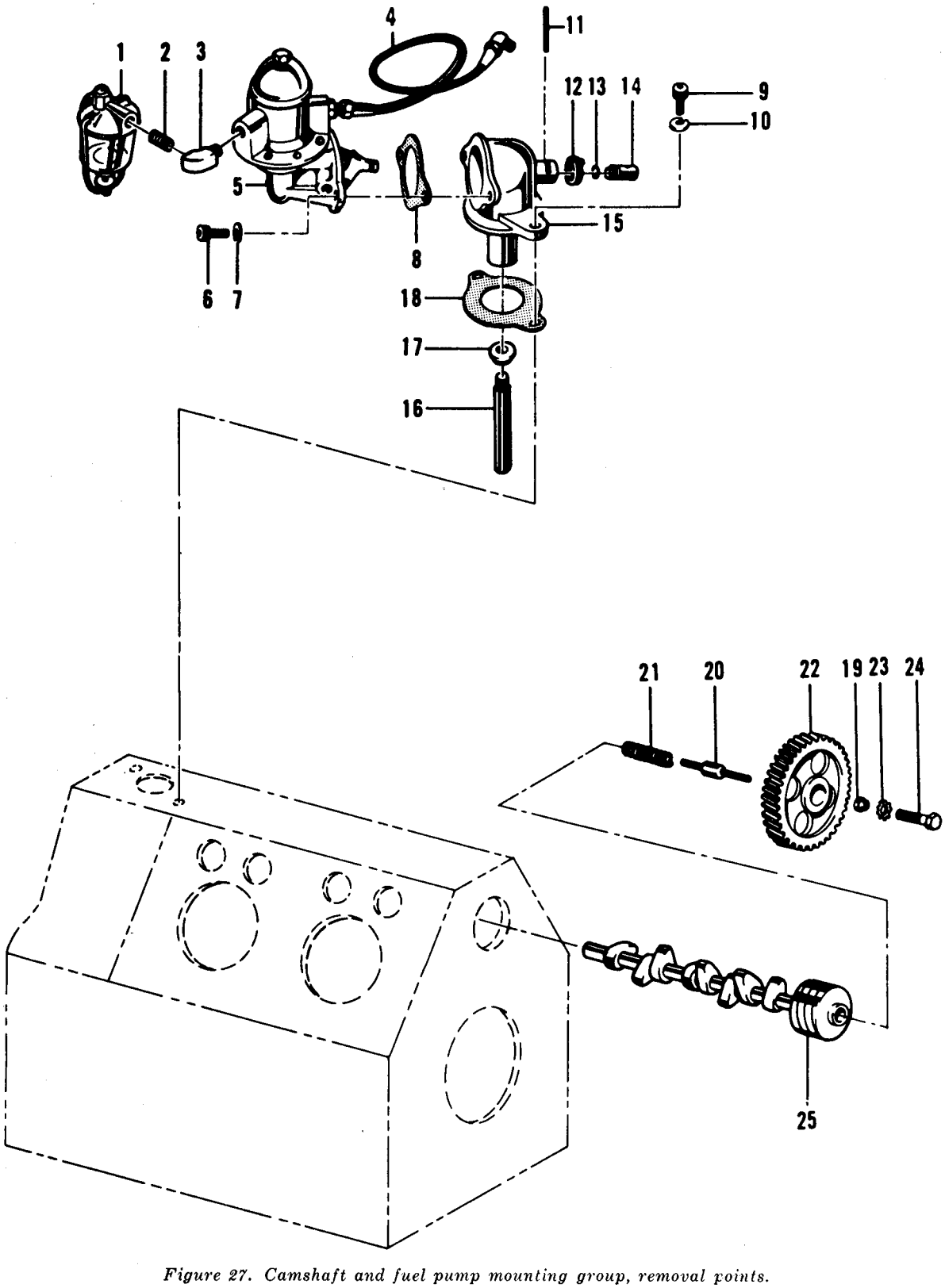
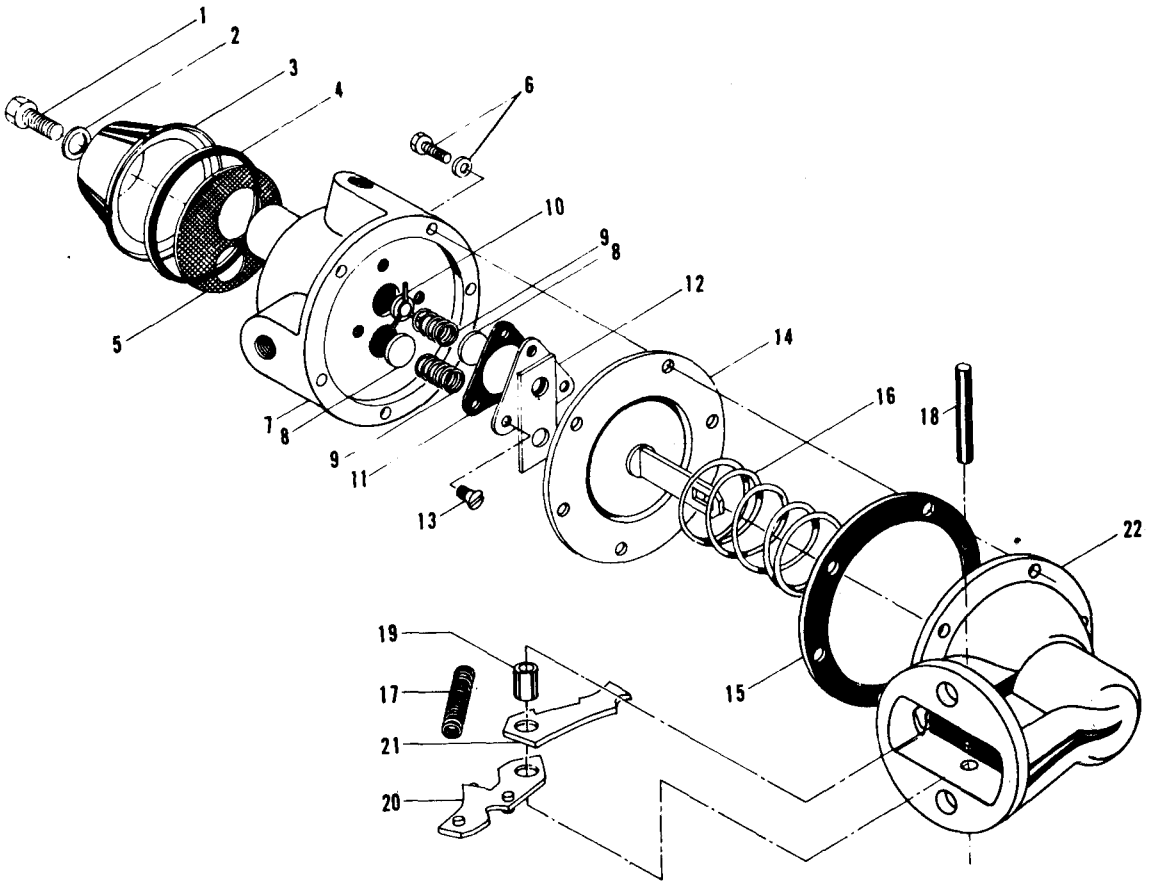


Figure 27. Camshaft and fuel pump mounting group, removal points.

Fuel strainer
Pipe nipple
Elbow
Fuel line
Fuel pump
Bolt, machine, 5/16–18 x 5/8 in. (2 rqr)
Washer, lock, 5/16 in. (2 rqr)
Gasket
Screw, cap, socket head, 1/4–20 x 3/4 in. (2 rqr)
Washer, lock, 1/4 in. (2 rqr)
Primer handle
Primer spring
Packing ring
14 Primer shaft
15 Fuel pump adapter
16 Plunger
17 Plunger cap
18 Gasket
19 Plunger button
20 Thrust plunger
21 Spring
22 Camshaft gear
23 Washer, lock 5/16 in. (3 rqr)
24 Bolt, machine, 5/16–18 x 1 in. (3 rqr)
25 Camshaft

Figure 27—Continued.



1 Bolt, machine
2 Gasket
3 Pulsator dome
4 Gasket
5 Fuel filter
6 Screw and lockwasher assembly (6 rqr)
7 Fuel head
8 Valve (2 rqr)
9 Spring (2 rqr)
10 Spring retainer
11 Gasket
12 Valve plate
13 Screw and lockwasher assembly (3 rqr)
14 Diaphragm kit
15 Gasket
16 Spring
17 Spring
18 Headless straight pin
19 Bushing
20 Rocker arm
21 Linkage
22 Mounting bracket

Figure 28. Fuel pump, exploded view.

on the plunger (16) and insert the plunger in the crankcase.
(2) Place a new gasket (18) and the fuel pump adapter (15) on the crankcase over the installed plunger and plunger cap and secure in place with the two lockwashers (10) and screws (9).
(3) Position a new gasket (8) and the fuel pump (5) on the fuel pump adapter (15) and secure with the two lockwashers (7) and bolts (6).
(4) Connect the fuel line (4) to the fuel pump and carburetor.
(5) Install the fuel strainer (par. 130).

132. Fuel Tank

a. Removal.
(1) Disconnect the fuel line tubing (1, fig. 18) from the elbow (20) and remove the elbow from the fuel tank (16).
(2) Remove the fuel tank cap (17) and the safety pin (18) from the fuel tank.
(3) Remove the pipe plug (19) from the fuel tank and drain the fuel into a suitable container.
(4) Remove the two hex nuts (9), lockwashers (8), flat washers (7), and bolts (6) that secure the spout support (5) to the test stand frame.
(5) Remove the 4 hex nuts (13), lockwashers (12), flat washers (11), and bolts (10) that secure the 2 fuel tank straps (15) and 2 strap liners (14) to the frame and remove the straps and the fuel tank.
(6) Slip the spout support (5) off the spout.

b. Cleaning, Inspection, and Repair.
(1) Rinse the tank interior thoroughly with an approved cleaning solvent. Clean the exterior of the fuel tank and all other metal parts with an approved cleaning solvent and dry thoroughly.
(2) Inspect the fuel tank for cracks, dents, damaged seams and threads and for weak or rusted spots. Repair minor leaks by soldering. Replace a tank damaged beyond repair.
(3) Inspect the straps and all attaching parts for damage and distortion. Replace a defective part.

c. Installation.
(1) Place the spout support (5, fig. 18) over the spout of the fuel tank (16).
(2) Secure the fuel tank, strap liners (14), and fuel tank straps (15) to the underside of the frame with the four bolts (10), flatwashers (11), lockwashers (12), and hex nuts (13).
(3) Position the spout support (5) on the frame and secure with the two bolts (6), flat washers (7), lockwashers (8) and hex nuts (9).
(4) Install the pipe plug (19) in the bottom of the fuel tank.
(5) Install the elbow (20) in the fuel tank and connect the fuel line (1).
(6) Fill the tank with the proper grade fuel and install the fuel tank cap (17) and safety pin (18) on the spout of fuel tank.

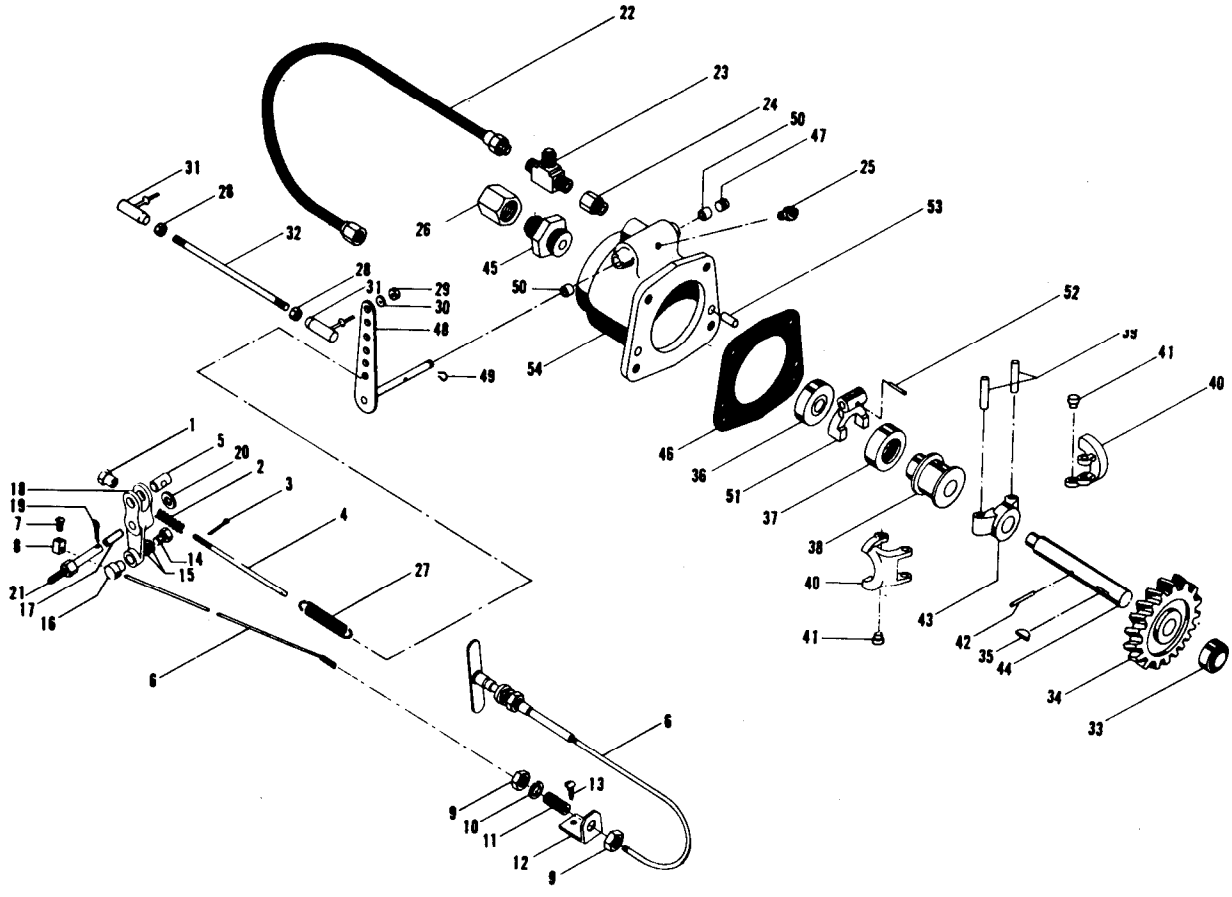
Section VI. GOVERNOR AND CONTROL ASSEMBLY

133. General

The centrifugal flyweight governor is located at the top and to the rear side of the gear cover, It is driven by the camshaft at one and one-eighth camshaft speed. Centrifugal action of the rotating flyweights causes the governor to pull the carburetor throttle toward the closed or idle position, This action is counteracted by the spring of the control assembly. The adjusted tension on this spring determines the engine speed the governor will maintain.

134. Governor Control Assembly

a. Removal and Disassembly.
(1) Disconnect the spring (27, fig. 29) from the adjusting screw (4) and the shaft and lever assembly (48).
(2) Remove the screw (7) that secures the throttle control (6) to the control stop (8) and pull the throttle control out of the swivel block (16).
(3) Pull the cotter pin (19) and remove the flat washer (20) and the lever



1	Adjusting screw locknut	19	Cotter pin	37	Bearing
2	Spring	20	Flatwasher	38	Thrust sleeve
3	Cotter pin	21	Lever support pin	39	Headless straight pin
4	Adjusting screw	22	Oil line assembly	40	Flyweight hub
5	Swivel pin	23	Tee	41	Headed straight pin
6	Throttle control	24	Bushing	42	Plain tapered pin
7	Screw, machine	25	Pipe plug	43	Flyweight hub
8	Control stop	26	Tachometer adapter cap	44	Drive shaft
9	Nut (2 rqr)	27	Spring	45	Tachometer adapter
10	Lockwasher	28	Nut (3 rqr)	46	Gasket
11	Control support	29	Nut	47	Expansion plug
12	Control bracket	30	Lockwasher (4 rqr)	48	Shaft and lever assembly
13	Screw, tapping, thread forming, No. 8 x ½ in. (2 rqr)	31	Control rod ball joint (2 rqr)	49	Preformed packing
		32	Control lever rod	50	Sleeve bearing
14	Bolt, machine, No. 12–24 x ½ in.	33	Hearing	51	Yoke
15	Washer, flat, No. 12 (2 rqr)	34	Helical gear	52	Pin, tapered, plain, No. 0 x ¾ in.
16	Swivel pin	35	Woodruff key	53	Headless straight pin
17	Adjustment screw bushing	36	Bearing	54	Housing
18	Lever				

Figure 29. Governor and control assembly, exploded view.

(18) with attached parts from the lever support pin (21).

(4) Remove the bolt (14), two flat washers (15) and the swivel block (16) from the lever.

(5) Remove the adjusting screw locknut (1) from the adjusting screw (4) and remove the screw and spring (2) from the swivel pin (5). Remove the cotter pin (3) from the adjustment screw.

(6) Remove the swivel pin (5) from the lever.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the lever, swivel pin, and lever support pin for cracks, breaks, and distortion. Replace all defective parts.

(3) Inspect the springs for cracks, distortion and lack of tension. Replace a defective spring.

(4) Inspect all other parts for distortion and damaged threads, Replace all defective parts.

c. Reassembly and Installation.

(1) Install the swivel pin (5, fig. 29) in the lever (18).

(2) Install the cotter pin (3) in the adjusting screw (4). Place the spring (2) on the adjusting screw and insert the screw in the swivel pin. Install the adjusting screw locknut (1) on the adjustment screw.

(3) Install the swivel block (16), two flat washers (15), and the bolt (14) in the lever (18).

(4) Position the lever with attached parts on the lever support pin (21) and install the flat washer (20) and cotter pin (19).

(5) Insert the throttle control (6) through the swivel pin (16) and secure in the control stop (8) with the screw (7).

(6) Connect the spring (27) to the adjusting screw (4) and the shaft and lever assembly (48).

(7) Adjust the governor as outlined in paragraph 135.

135. Governor

a. Governor Adjustment.

(1) Check and make certain the spring (27, fig. 29) is hooked in the number 6 hole of the shaft and lever assembly counting from the shaft outward.

(2) With the engine at rest, remove the hex nut (29) and lockwasher (30) from the control rod ball joint (31).

(3) Slip the ball joint out of the shaft and lever assembly (48) and push the control lever rod (32) toward the carburetor to fully open the throttle fly.

(4) With the externally threaded portion of the ball joint at a right angle to the control lever rod, the ball joint must be in exact alinement with the top hole in the shaft and lever assembly.

(5) Loosen the hex nut (28) and turn the ball joint on the rod to attain alinement specified in (4) above, Tighten the hex nut after adjustment.

(6) Install the ball joint in the shaft and lever assembly and secure with the lockwasher (30) and hex nut (29).

b. Removal.

(1) Disconnect the oil line assembly (22, fig. 29) from the tee (23).

(2) Disconnect the tachometer drive from the tachometer adapter (45).

(3) Remove the two control rod ball joints (31) with attached control lever rod (32) from the carburetor and governor.

(4) Disconnect the spring (27) from the shaft and lever assembly (48).

(5) Remove the four bolts and lockwashers that secure the housing (54) to the gear cover spacer and remove the governor and gasket (46).

c. Disassemly.

(1) Remove the drive shaft (44, fig. 29) with attached parts from the housing (54).

(2) Remove the two bearings (33 and 36) from the drive shaft.

(3) Remove the helical gear (34) and the woodruff key (35) from the drive shaft.

(4) Slide the thrust sleeve (38) with attached bearing (37) off the drive shaft and remove the bearing from the sleeve.

(5) Remove the 2 headed straight pin (41) from the 2 flyweights (40). Drive the 2 headless straight pins (39) out of the flyweights and remove the flyweights from the flyweights hub (43).

(6) Remove the plain tapered pin (42) that secures the flyweight hub to the drive shaft and remove the hub from the shaft.

(7) Remove the two headless straight pins (53) from the housing (54).

(8) Remove the tee (23), bushing (24) and the tachometer adapter (45) from the housing.

(9) Remove the pipe plug (25) from the housing.

(10) Remove the plain tapered pin (52) that secures the yoke (51) to the shaft and lever assembly (48) and remove the shaft and lever assembly preformed packing (49), and the yoke from the housing.

(11) Remove the expansion plug (47) from the housing.

(12) Remove the two sleeve bearings (50) from the housing if damaged or worn excessively. For inspection procedure see *d* below.

(13) Loosen the 2 hex nuts (28) that secure the 2 control rod ball joints (31) to the control lever rod (32) and remove the ball joints and hex nuts from the control rod.

d. Cleaning, Inspection, and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect the housing, flyweights, thrust sleeve, and yoke for cracks, breaks, distortion and damaged threads. Repair cracks or breaks by welding and repair damaged threads. Replace all parts damaged beyond repair.

(3) Rotate the bearings, inspecting for rough rolling elements and races. Replace a defective hearing.

(4) Inspect the oil line assembly for cracks, breaks, and damaged threads. Inspect the adapter, tee, and bushing for damaged threads.

(5) Inspect the drive shaft and gear for distortion and excessive wear.

(6) Inspect the shaft and lever assembly and the two sleeve bearings for distortion and excessive wear. Replace all damaged or defective parts.

(7) Inspect all attaching hardware for distortion and damaged threads. Replace any defective part.

e. Reassembly.

(1) Install the 2 hex nuts (28, fig. 29) and 2 control rod ball joints (31) on the control lever rod (32).

(2) Press the two sleeve bearings (50) into the housing (54).

(3) Install the expansion plug (47) in the housing.

(4) Position the yoke (51) in the housing. Place the preformed packing (49) on the shaft and lever assembly (48) and insert the shaft and lever assembly in the alined holes of the yoke and housing. Secure the **yoke** to the shaft with the plain tapered pin (52).

(5) Install the pipe plug (25), bushing (24), tee (23), and the tachometer adapter (45) in the housing (54).

(6) Install the two headless straight pins (53) in the housing.

(7) Install the thrust sleeve hub (38) on the drive shaft (44) and secure with the plain tapered pin (42).

(8) Position the 2 flyweights (40) on the flyweight hub and install the 2 headless straight pins (39) in the alined holes of the flyweights and hub. Install the 2 headed straight pins (41) in the 2 flyweights.

(9) Install the bearing (37) on the thrust sleeve (38) and slide the thrust sleeve on the drive shaft.

(10) install the woodruff key (35) and the helical gear (34) on the drive shaft.

(11) Install the two bearings (33 and 36) on the drive shaft.

(12) Install the drive shaft with Attached parts in the housing.

f. Installation.

(1) Position a new gasket (46, fig. 29) and the governor on the gear cover spacer and secure with the four lockwashers and bolts.

(2) Connect the spring (27) in the shaft and lever assembly (48).

(3) Install the two control rod ball joints (31) with attached control lever rod (32) on the governor and carburetor.

(4) Connect the tachometer drive to the tachometer adapter (45).

(5) Connect the oil line assembly (22) to the tee (23).

(6) Adjust the governor as outlined in *a* above.

Section VII. ENGINE CONTROLS AND INSTRUMENTS

136. General

All controls and instruments necessary for operation of the engine are located on the control panel. Controls and instruments must be replaced when they become inoperative or show signs of incorrect readings during normal operation. Damage can be caused by overloading, breakage, or wear. Before replacing any control or instrument, inspect all interconnections of tubing or electrical leads between the control or instrument and the component from which it operates, Always handle instruments with care, since they are sensitive. Any mishandling may damage them.

137. Engine Instruments

a. Tachometer.

(1) *Testing.* Inspect the accuracy of the tachometer by comparison with the reading indicated on a suitable hand held mechanical tachometer. Replace a defective or inaccurate tachometer as outlined below.

(2) *Tachometer Replacement.*

(a) Disconnect the tachometer drive from the tachometer (9, fig. 9).

(b) Remove the four nuts and screws that secure the tachometer to the panel and remove the tachometer.

(c) Position a new tachometer (9) on the panel and secure with four screws and nuts.

(d) Connect the tachometer drive to the tachometer.

b. Head Temperature Gage.

(1) *Testing.* Inspect the accuracy of the head temperature gage by comparison with the reading on a suitable thermocouple test instrument connected to the same terminals as the temperature gage. Replace a defective or inaccurate head temperature gage as outlined below.

(2) *Head Temperature Gage Replacement.*

(a) Remove the cylinder head shroud from the right hand cylinder head (par. 119).

(b) Disconnect the sensing element of the head temperature gage (28, fig. 9) from the cylinder head.

(c) Remove the four nuts and screws that secure the head temperature gage to the panel and remove the temperature gage.

(d) Position a new head temperature gage (28) on the panel and secure with the four screws and nuts.

(e) Attach the sensing element of the head temperature gage to the cylinder head.

(f) Install the cylinder head shroud (par. 119).

c. Hourmeter.

(1) *Removal.*

(a) Tag and disconnect the electrical leads from the back of the hourmeter (10, fig. 9).

(b) Remove the nuts, lockwashers, and bracket that secure the hourmeter to the panel and remove the hourmeter.

(2) *Installation.*

(a) Position the hourmeter (10) on the panel and secure with the bracket, lockwasher, and nuts.

(b) Connect the electrical leads to the terminals of the hourmeter.

d. Ammeter. Replace a defective ammeter in a similar manner as described in *c* above.

e. Oil Pressure Gage.

(1) *Removal.*

(a) Disconnect the oil line tubing from the oil pressure gage (11, fig. 9).

(b) Remove the nuts, lockwashers, and bracket that secure the oil pressure gage to the panel and remove the gage.

(2) *lnstallation.*

(a) Position the oil pressure gage (11)

in the panel and secure with the bracket, lockwashers, and nuts.

(b) Connect the oil line tubing to the oil pressure gage.

138. Engine Controls

a. Ignition Switch.

(1) *Testing.* Tag and disconnect the electrical leads from the ignition switch and test the switch for continuity with a suitable test lamp circuit.

(2) *Ignition Switch Replacement.*

(a) Tag and disconnect all electrical leads from the ignition switch (1, fig. 10).

(b) Remove the hex nut and lockwasher that secure the ignition switch to the panel and remove the switch.

(c) Position a new ignition switch (1) in the panel and secure with the lockwasher and hex nut.

(d) Connect the electrical leads to the ignition switch in accordance with tags attached during removal.

b. Starter Switch. Test the starter switch for serviceability and replace the starter switch in a manner similar to that described in *a* above.

c. *Fuse Holder.*

(1) *Removal.*

(a) Disconnect the electrical leads from the fuse holder (3, fig. 10).

(b) Remove the hex nut and lockwasher that secure the fuse holder in the panel and remove the fuse holder.

(2) *Installation.*

(a) Position a new fuse holder (3) in the panel and secure with the lockwasher and hex nut.

(b) Connect the electrical leads to the fuse holder.

d. Throttle.

(1) *Removal.*

(a) Disconnect the throttle control (6, fig. 11) from the governor control assembly.

(b) Remove the hex nut (4) that secures the throttle in the engine control panel (2) and remove the throttle.

(2) *Installation.*

(a) Insert the throttle control (6) in the engine control panel (2) and secure with the hex nut (4).

(b) Connect the throttle to the governor control assembly.

e. Choke Control. Remove and install the choke control (5, fig. 11) in a manner similar to that described in *d* above.

CHAPTER 6
HYDRAULIC SYSTEM MAINTENANCE INSTRUCTIONS

Section I. RESERVOIR AND SUPPORT

139. Reservoir

a. Removal.

(1) Remove the housing assembly (par. 106).

(2) Remove the drain assembly (15, fig. 30) from the reservoir (17) and drain the hydraulic fluid and discard.

(3) Disconnect the relief valve-to-reservoir tubing (22, fig, 12), outlet selector valve-to-reservoir tubing (21), and the reservoir-to-shutoff valve tubing (46) from the flared tube tee (16, fig. 30) and from the elbow in the reservoir.

(4) Remove the two straps that secure the reservoir to the reservoir and control panel support (18) and remove the reservoir from the support.

b. Disassembly.

(1) Remove the eight hex nuts, lockwashers, and flat washers that secure the cover assembly (1, fig. 30) and the gasket to the reservoir and remove the cover assembly.

(2) Remove the reservoir fill cap (2) from the tank filler neck (3). Remove the strainer (4) from the cover assembly.

(3) Remove the eight hex nuts, lockwashers, and flat washers that secure the cover assembly (5) and gasket to the reservoir and remove the cover assembly.

(4) Remove the rubber hose (10) from the filter element (9) and the tubing of the cover assembly.

(5) Remove the 2 hex nuts (6) and 2 lockwashers (7) that secure the filter element in the reservoir cover assembly (8) and remove the filter element.

(6) Remove the eight hex nuts, lockwashers, and flat washers that secure the cover assembly (11) and gasket to the reservoir and remove the cover assembly.

(7) Remove the four screws (13) and lockwashers (14) that secure the sending unit (12) to the cover assembly and remove the sending unit.

c. Cleaning, Inspection, and Repair.

(1) Rinse the inside of the reservoir thoroughly with an approved cleaning solvent. Clean the remaining metal parts in an approved solvent and dry thoroughly.

(2) Inspect the reservoir for dents, tears, and damaged and leaking seams. Repair minor leaks by soldering. Replace a reservoir damaged beyond repair.

(3) Inspect the cover assemblies for cracks, breaks, and distortion. Replace a defective cover assembly.

1 Cover assembly
2 Reservoir
3 Tank filler neck
4 Strainer
5 Cover assembly
6 Nut (2 rqr)
7 Lockwasher (2 rqr)
8 Cover assembly
9 Filter element
10 Rubber hose
11 Cover assembly
12 Sending unit
13 Screw, socket head 5/16–18 x 3/4 in. (4 rqr)
14 Washer, lock, 5/16 in. (4 rqr)
15 Drain assembly
16 Flared tube tee
17 Reservoir
18 Reservoir and control panel support
19 Engine control panel

Figure 30. Reservoir, exploded view.

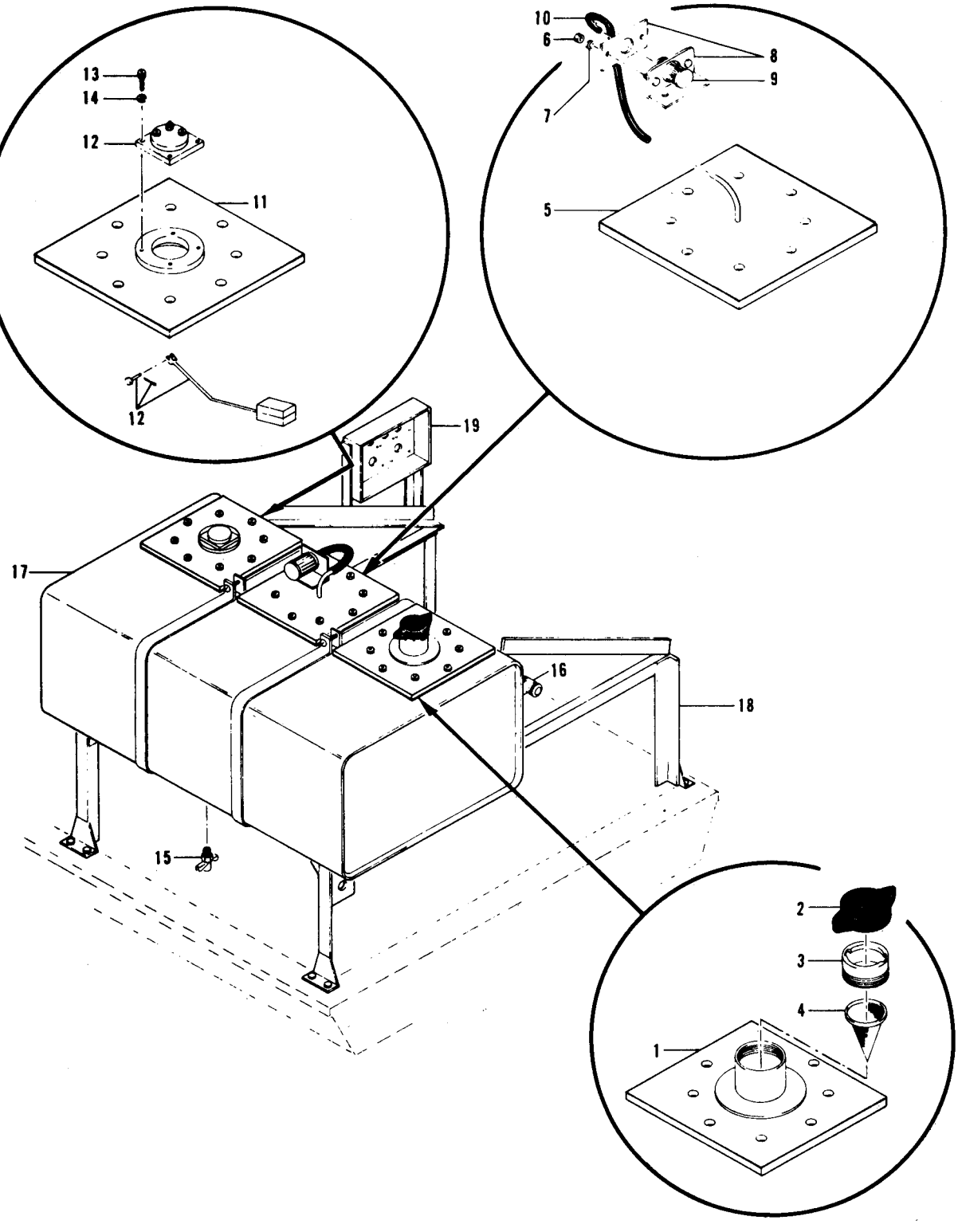


Figure 30—Continued.

(4) Inspect the strainer for torn and clogged condition. Replace a defective screen.

(5) Inspect all other parts for distortion and damage. Replace all defective or damaged parts.

d. Reassemble.

(1) Position the sending unit (12, fig. 30) on the cover assembly (11) and secure with the four lockwashers (14) and screws (13).

(2) Position a new gasket and the cover assembly (11) with attached parts on the reservoir and secure with the eight flat washers, lockwashers, and hex nuts.

(3) Place a new filter element (9) in the cover assembly (8) and secure with the two lockwashers (7) and hex nuts (6).

(4) Install the rubber hose (10) on the filter element and the tubing of the cover assembly (5).

(5) Position a new gasket and the cover assembly (5) on the reservoir and secure with eight flat washers, lockwashers, and hex nuts.

(6) Install the strainer (4) and tank filler neck (3) in the cover assembly (1). Install the reservoir fill cap (2) on the filler neck.

(7) Position a new gasket and the cover assembly (1) on the reservoir and secure with eight flat washers, lockwashers, and hex nuts.

e. Installation.

(1) Mount the reservoir (17, fig. 30) on on the reservoir and control panel support (18) and secure in place with the two straps.

(2) Connect the reservoir-to-shutoff valve tubing (46, fig. 12), outlet selector valve-to-reservoir tubing (21), and the relief valve-to-reservoir tubing (22) to the flared tube tee (16, fig. 30) and the elbow.

(3) Install the drain assembly (15) in the reservoir.

(4) Install the housing assembly (par. 106).

(5) Fill the reservoir with hydraulic fluid (par. 9).

140. Reservoir and Control Panel Support

a. Removal.

(1) Remove the control panel assembly (par. 107).

(2) Remove the engine controls (par. 138).

(3) Remove the reservoir (par. 139).

(4) Remove eight hex nuts, lockwashers, flat washers, and bolts that secure the reservoir and control panel support (18) to the frame and remove the support.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect the support for cracks, breaks, distortion, and damaged threads. Repair minor cracks and breaks by welding. Replace a support damaged beyond repair.

(3) Inspect all attaching hardware for distortion and damaged threads. Replace any defective hardware.

c. Installation.

(1) Position the reservoir and control panel support (18, fig. 30) on the frame and secure with eight bolts, flat washers, lockwashers, and hex nuts.

(2) Install the reservoir (par. 139).

(3) Install the engine controls (par. 138).

(4) Install the control panel assembly (par. 107).

Section II. FILTERS AND MANIFOLD ASSEMBLY

141. General

The high pressure and low pressure filters are incorporated in the test stand hydraulic system to assure delivery of the cleanest possible hydraulic fluid to the aircraft under test. The high pressure filter is installed in the pump discharge line located on the back side of the control panel, This filter has a throw away type

element. The low pressure filter is attached to the manifold which is mounted on the frame at the inside back corner of the test stand.

142. High Pressure Filter

a. Servicing. Service the high pressure filter as outlined in paragraph 71.

b. High Pressure Filter Replacement.

(1) Disconnect the high pressure filter-to-relief valve tubing (11, fig. 12), pump-to-high pressure filter hose assembly (8), and the high pressure filter-to-outlet selector valve tubing (13).

(2) Remove the flared tube tee (10) from the high pressure filter (9).

(3) Install the flared tube tee in a new high pressure filter (9).

(4) Connect the high pressure filter-to-outlet selector valve tubing (13), pump-to-high pressure filter hose assembly (8), and the high pressure filter-to-relief valve tubing (11).

143. Low Pressure Filter

a. Servicing. Service the low pressure filter as outlined in paragraph 71.

b. Removal.

(1) Close the reservoir shutoff valve (12, fig. 9).

(2) Remove the plug (28, fig. 13) from the bottom cover (26) and drain the hydraulic fluid from the filter housing (31) and manifold (20).

(3) Disconnect the suction tubing (14, fig. 12), high pressure relief valve-to-manifold tubing (12), pump-to-manifold tubing (5), reservoir shutoff valve-to-manifold tubing (26), and the low pressure filter-to-bleed valve tubing (6).

(4) Disconnect the electrical leads from the thermoswitch (23, fig. 13).

(5) Remove the sensing element of the fluid temperature gage (4, fig. 9) from the manifold (20, fig. 13).

(6) Remove the six bolts (21) and lockwashers (22) that secure the manifold housing to the frame of the test stand and remove the manifold with attached low pressure filter.

c. Disassembly.

(1) Loosen the locknut (1, fig. 13) and remove the flared tube elbow (2) from the top cover (16). Remove the locknut and preformed packing (3) from the elbow.

(2) Remove the flared tube union (4) and preformed packing (5) from the top cover.

(3) Remove the six bolts (6) that secure the top cover and the preformed packing (7) to the filter housing (31) and remove the top cover with attached parts from the housing.

(4) Remove the wing nut (8) that secures the filter element cover (9), two gaskets (10) and the filter element (11) to the plate assembly, (12) and remove the cover, gaskets, and element.

(5) Remove the 2 bolts (13) and lockwashers (14) that secure the plate assembly to the 2 spacers (15) and remove the plate assembly.

(6) Remove the two spacers from the top cover.

(7) Remove the six bolts (27) that secure the bottom cover (26) to the filter housing and remove the bottom cover and preformed packing (30).

(8) Remove the four bolts (21) and lockwashers (22) that secure the filter housing and preformed packing (25) to the manifold (20) and remove the filter housing and preformed packing.

(9) Remove the thermoswitch (23) and preformed packing (24) from the manifold.

(10) Loosen the tube fitting locknut (17) and remove the flared tube elbow (18) and the preformed packing (19) from the manifold. Remove the locknut from the elbow.

d. Cleaning and Inspection.

(1) Clean all metal parts with an approved cleaning solvent and dry with a lint-free cloth.

(2) Inspect the filter housing and manifold, top and bottom covers, filter element cover, and plate assembly for cracks, breaks, distortion and dam-

aged threads. Replace all defective parts.

(3) Inspect the tube fittings and locknuts for distortion and damaged threads. Replace a damaged fitting or locknut.

(4) Inspect all attaching hardware for distortion and damaged threads. Replace defective hardware,

e. Reassembly.

(1) Install the locknut (17, fig. 13) and a new preformed packing (19) on the flared tube elbow (18). Install the elbow in the manifold (20) and tighten the locknut to secure.

(2) Install a new preformed packing (24) and the thermoswitch (23) in the manifold.

(3) Position a new preformed packing (25) and filter housing (31) on the manifold and secure with the four lockwashers (22) and bolts (21).

(4) Place a new preformed packing (30) and the bottom cover (26) on the filter housing and secure with six bolts (27) .

(5) Install the two spacers (15) in the top cover (16).

(6) Position the plate assembly (12) on the installed spacers and secure with the two lockwashers (14) and bolts (13).

(7) Mount two new gaskets (10), a new filter element (11), and the filter element cover (9) on the plate assembly (12) and secure with the wing nut (8).

(8) Place a new preformed packing (7) and the top cover (16) on the filter housing (31) and secure with six bolts (6).

(9) Install a new preformed packing (5) and the flared tube union (4) in the top cover.

(10) Install the locknut (1) and a new preformed packing (3) on the flared tube elbow (2). Install the elbow in the top cover and tighten the locknut to secure.

f. Installation.

(1) Position the manifold (20, fig. 13) with attached parts on the frame of the test stand and secure with six lockwashers (22) and bolts (21).

(2) install the sensing element of the fluid temperature gage (4, fig. 9) in the end of the manifold.

(3) Connect the electrical leads to the thermoswitch.

(4) Connect the low pressure filter-to-bleed valve tubing (6, fig. 12), reservoir shutoff valve-to-manifold tubing (26), pump-to-manifold tubing (5), high pressure relief valve-to-manifold tubing (12), and the suction tubing (14).

(5) Install the plug (28, fig. 13) and a new preformed packing (29) in the bottom cover (26).

(6) Open the reservoir shutoff valve (12, fig. 9).

(7) Bleed air from the hydraulic system (par. 70).

Section III. HYDRAULIC SYSTEM INSTRUMENTS

144. General

The various instruments necessary for operation of the hydraulic system of the test stand are located on the control panel. Instruments must be replaced when they become inoperative or show signs of incorrect readings during normal operation. Damage may be caused by overloading, breakage, or wear. Before replacing any instrument, inspect all interconnections of tubing or electrical leads between the instrument and the component from which it operates.

145. Reservoir Level Indicator

a. Testing. Inspect the reservoir level indicator accuracy by draining the fluid from the reservoir and adding a measured, predetermined amount of fluid to the reservoir and observe the indicator reading. Replace a defective reservoir level indicator as outlined below.

b. Removal.

(1) Disconnect the electrical leads from the reservoir level indicator (2, fig. 9).

(2) Remove the nuts, lockwashers, and bracket that secure the indicator in the control panel (1) and remove the indicator.

c. Installation.

(1) Position a new reservoir level indicator (2) in the control panel (1) and secure with the bracket, lockwashers, and nuts.

(2) Connect the electrical leads to the reservoir level indicator.

146. Fluid Flow Indicator

a. Removal.

(1) Disconnect the flexible cable that links the fluid flow indicator (15, fig. 9) to the pump.

(2) Remove the four nuts and screws (14) that secure the flow indicator to the control panel (1) and remove the flow indicator.

b. Installation.

(1) Position a new fluid flow indicator (15) in the control panel (1) and secure with the four screws (14) and nuts.

(2) Connect the flexible cable between the fluid flow indicator and the pump.

147. Fluid Temperature Gage

a. Testing. A fluid temperature gage that returns to ambient temperature indications when the test stand is inoperative can be considered to be in proper operating condition. The temperature gage accuracy can be checked by inserting the sensing element of an accurate thermometer in the reservoir with test stand in normal operation and comparing the indicated temperatures. Replace a defective fluid temperature gage as outlined below.

b. Removal.

(1) Close the reservoir shutoff valve (12, fig. 9) and remove the plug in the bottom of the low pressure filter draining fluid from the filter and manifold assembly.

(2) Remove the sensing element of the fluid temperature gage (4) from the manifold.

(3) Remove the three nuts and screws (5) that secure the fluid temperature gage to the control panel (1) and remove the temperature gage.

c. Installation.

(1) Position a new fluid temperature gage (4, fig. 9) in the control panel (1) and secure with the three screws (5) and nuts.

Caution: **Exercise extreme care in handling the capillary tube and sensing element of the temperature gage. The slightest kink may render the gage inoperative.**

(2) Install the sensing element of the fluid temperature gage (4) in the manifold.

(3) Install the plug in the bottom of the low pressure filter and open the reservoir shutoff valve (12).

(4) Bleed air from the hydraulic system (par. 70).

Section IV. CONTROL VALVES AND PANEL

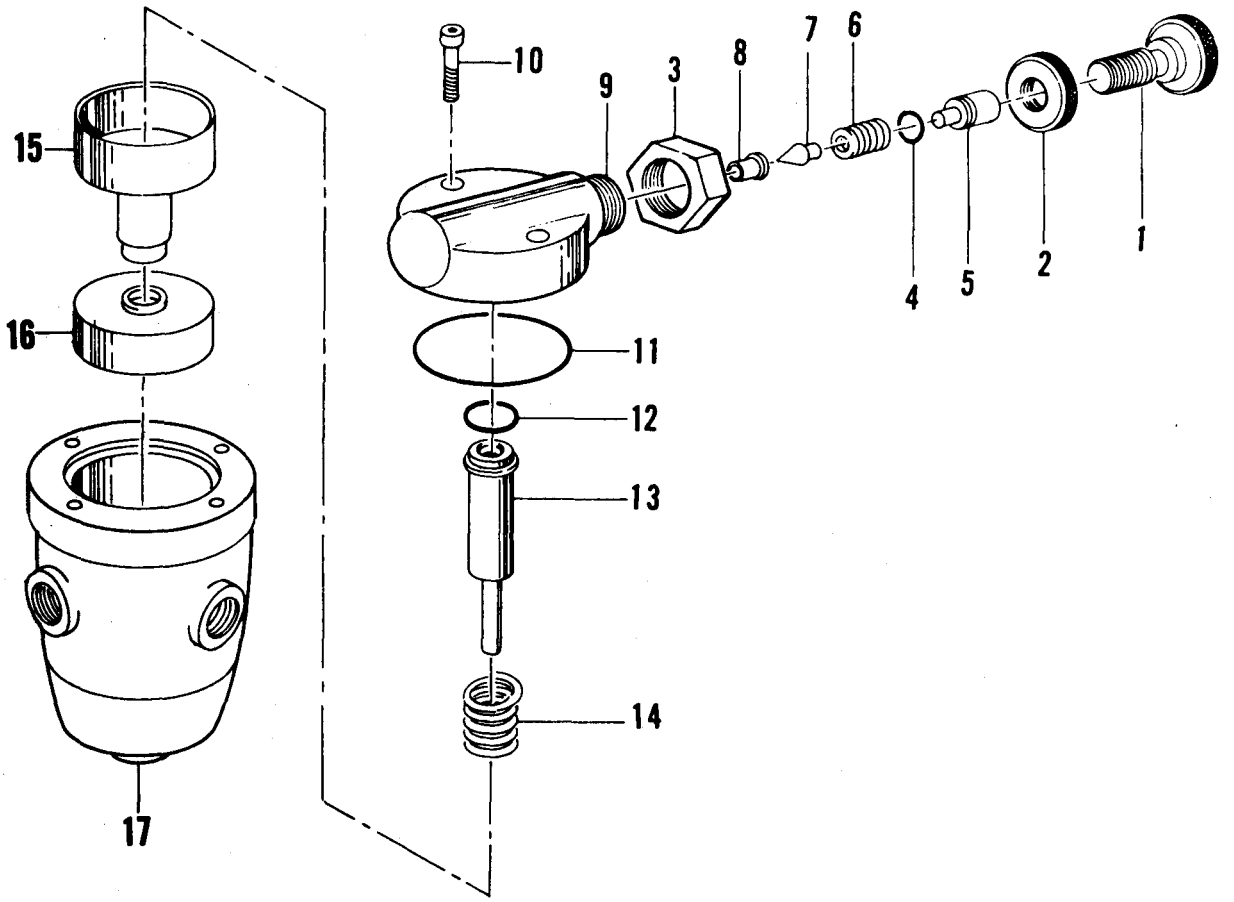
148. General

The various control valves of the hydraulic system are located on the control panel. When these control valves become damaged or inoperative they must be repaired or replaced as outlined in this section. After the removal of a control valve, inspect the interconnecting hose assemblies or tubing for damage or obstructions making certain the questionable control valve is the source of trouble.

149. High Pressure Relief Valve

a. Removal.

(1) Disconnect the high presure filter-to-relief valve tubing (11, fig. 12), high pressure relief valve-to-manifold tubing (12), high pressure relief valve-to-snubber valve tubing (32), and the relief valve-to-bypass valve tubing (38) .



1	Adjusting screw	7	Needle valve	12	Preformed packing
2	Locking nut	8	Seat	13	Plunger
3	Nut, plain, hex, 1–14	9	Cap	14	Spool spring
4	Gasket	10	Screw, machine, 5/16–24 x 1⅜ in. (2 rqr)	15	Spool
5	Valve spring guide			16	Seat
6	Pilot spring	11	Preformed packing	17	Body

Figure 31. High pressure relief valve, exploded view.

(2) Remove the adjusting screw (1, fig. 31) and locking nut (2) from the cap (9).

(3) Remove the hex nut (3) that secures the high pressure relief valve to the control panel and remove the relief valve.

b. Disassembly.

(1) Remove the valve spring guide (5, fig. 31), gasket (4), pilot spring (6), needle valve (7), and the seat (8) from the valve cap.

(2) Remove the two screws (10) that secure the cap and preformed packing (11) to the body (17) and remove the cap and packing.

(3) Lift the plunger (13) and spool spring (14) out of the spool (15) and remove the preformed packing (12) from the plunger.

(4) Remove the spool and the seat (16) from the body.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts in an approved cleaning solvent and dry with a lint-free cloth.

(2) Inspect the valve body and valve cap for cracks, breaks, and damaged threads. Retap damaged threads and remove nicks and burs from gasket seating surfaces. Replace a body or cap damaged beyond repair.

(3) Inspect the valve spring guide needle valve, seat, plunger, spool, and seat for nicks, burs, and distortion. Remove minor abrasions. Replace any part damaged beyond repair.

(4) Inspect the springs for cracks, distortion, and lack of tension, Replace a defective spring.

(5) Inspect all attaching parts for distortion and damaged threads. Replace all defective parts.

d. Reassembly.

(1) Insert the seat (16, fig. 31) and the spool (15) in the body (17).

(2) Install a new preformed packing (12) on the plunger (13) and place the spool spring (14) and the plunger in the spool.

(3) Position a new preformed packing (11) and the cap (9) on the body and secure with the two screws (10).

(4) Install the seat (8), needle valve (7), pilot spring (6), a new gasket (4), and the valve spring guide (5) in the cap.

e. Installation.

(1) Position the high pressure relief valve in the control panel and secure with the hex nut (3, fig. 31).

(2) Install the locking nut (2) on the adjusting screw (1) and install the screw in the relief valve.

(3) Connect the relief valve-to-bypass valve tubing (38, fig. 12), high pressure relief valve-to-snubber valve tubing (32), high pressure relief valve-to-manifold tubing (12), and the high pressure filter-to-relief valve tubing (11).

150. Flow Control, Gage Snubber, Fluid Bypass and Reservoir Shutoff Valves

a. Removal.

(1) Disconnect the flow control valve-to-outlet tubing (17, fig. 12) and the outlet selector valve-to-outlet tubing (31).

(2) Remove the hex nut that secures the handwheel on the flow control valve (20, fig. 9) and remove the handwheel and locking nut from the valve.

(3) Remove the four bolts (32) that secure the flow control valve to the control panel (1) and remove the valve.

(4) Remove the remaining flow control valve (21), gage snubber valve (23), fluid bypass valve (27), and reservoir shutoff valve (12) in similar manner.

b. Cleaning and Inspection.

(1) Clean the valves with an approved cleaning solvent and dry thoroughly. Blow the fluid passages of the valves clear with compressed air.

(2) Inspect the valves for damaged or broken handwheels, damaged threads, and for improper closing. Replace a defective valve.

(3) Inspect all attaching hardware for distortion and damaged threads. Replace defective or damaged hardware.

c. Installation.

(1) Position the flow control valve (20, fig. 9) in the control panel (1) and secure with the four bolts (32).

(2) Install the locking nut and handwheel on the flow control valve and secure with the hex nut.

(3) Connect the outlet selector valve-to-¾ in. outlet tubing (31, fig. 12) and the flow control valve-to-¾ inch outlet tubing (17).

(4) Install the remaining flow control valve (21, fig. 9), gage snubber valve (23), fluid bypass valve (27) and reservoir shutoff valve (12) in a similar manner.

151. Outlet Selector Valve and Pressure Selector Valve

a. Removal.

(1) Disconnect the high pressure filter-to-outlet selector valve tubing (13, fig. 12), outlet selector valve-to-reservoir tubing (21), outlet selector valve-to-outlet tubing (30 and 31).

(2) Remove the bolt (31, fig. 9) that secures the handle of the outlet selector valve (16) in place and remove the handle.

(3) Remove the four screws (30) that secure the valve to the control panel (1) and remove the valve.

(4) Remove the pressure selector valve (8) in a similar manner.

b. Cleaning and Inspection.

(1) Clean the valves with an approved cleaning solvent and dry thoroughly. Blow the fluid passages of the valves clear with compressed air.

(2) Inspect the valves for cracks, breaks, and damaged threads. Inspect the handles for free movement. Replace a defective or damaged valve.

(3) Inspect all attaching hardware for distortion and damaged threads. Replace any defective hardware.

c. Installation.

(1) Position the outlet selector valve (16, fig. 9) in the control panel (1) and secure in place with the four screws (30).

(2) Secure the handle of the outlet selector valve in place with the bolt (31).

(3) Connect the outlet selector valve-to-outlet tubing (30 and 31, fig. 12) outlet selector valve-to-reservoir tubing (21), and the high pressure filter-to-outlet selector valve tubing (13).

Section V. HYDRAULIC PUMP

152. General

The hydraulic pump is a variable volume, axial piston-type unit designed to deliver up to 10 gpm at a maximum 5000 psi. The volume of fluid delivered is varied by changing the length of piston strokes in the barrel. These piston strokes are controlled by the angle of the cam plate against which they ride, The thrust of the pistons is balanced by the admission of pressure through a drilled hole in the piston into an area in the surface of the piston shoe that contacts the cam plate. This area is slightly less than the effective piston area, which results from the shoe being supported on an oil film at all times. The cylinder barrel is supported on a port plate into which are machined support areas hydraulically balancing this portion of the pump, The radial load created by the angle of the cam plate is supported by a roller bearing. The cylinder barrel is driven by a spline shaft. The variable delivery controls are bolted to the pump housing in easily removable units. All working parts are submerged in a bath of hydraulic fluid.

153. Removal

a. Remove the control panel assembly (par. 107).

b. Drain and discard the hydraulic fluid from the pump by removing the plug in the pump case.

c. Disconnect the pump inlet-to-low pressure filter hose assembly (4, fig. 12) from the filter and manifold assembly (47) and pump (1).

d. Disconnect the pump-to-manifold tubing (5) from the manifold and from the pump case relief valve in the pump. Remove the relief valve from the pump.

e. Disconnect the pump-to-high pressure filter hose assembly (8) from the flared tube tee (10) and from the check valve in the pump (1). Remove the check valve from the pump.

f. Disconnect the pressure selector valve-to-pump tubing (28) from the flared tube elbow (27) and pump (l).

g. Remove the roller chain (21, fig. 18) from the two coupling halves (22 and 23).

h. Remove the four bolts (25) and lockwashers (26) that secure the pump mount to the

engine and remove the pump mount with attached pump from the engine.

154. Disassembly

a. Remove the two setscrews that secure the coupling half (23, fig. 18) to the shaft of the pump and remove the coupling halt' and woodruff key from the shaft.

b. Remove the four bolts and flat washers that secure the pump mount to the pump and remove the mount.

c. Remove the post of the fluid volume control with attached parts from the pump.

d. Remove the preformed packing, packing retainer, and flat washer from the pushrod and remove the screw and pushrod from the post.

e. Loosen the hex nut and remove the compensator control tube with attached parts from the pump.

f. Remove the bullet and 15 balls from the control tube.

g. Remove the hex nut, screw, and pushrod from the control tube.

155. Cleaning, Inspection, and Repair

a. Wipe the external surfaces clean with a cloth dampened with an approved cleaning solvent.

Caution: **Observe precautions necessary to prevent dirt from entering the various openings in the pump while cleaning externally.**

b. Clean all disassembled parts with an approved cleaning solvent and dry thoroughly.

c. Inspect the compensator control tube, pushrod, balls, and bullet for nicks, burs, and distortion. Inspect for free movement of the bullet and balls in the control tube. Remove nicks and burs from the pushrod and bullet. Replace any part damaged beyond repair.

d. Inspect the handles, locknuts, and screws for cracks, breaks, and damaged threads. Replace all defective parts.

e. Inspect the coupling halves and the roller chain for cracks, breaks, and excessive wear. Replace a defective coupling or chain.

f. Inspect all attaching parts for distortion and damaged threads. Replace any defective part.

156. Reassembly

a. Install the pushrod and the screw in-the compensator control tube. Install the hex nut on the control tube.

b. Apply a thin film of grease to the 15 balls and the bullet and install the balls and bullet in the control tube.

c. Install the compensator control tube in the pump and tighten the hex nut to secure.

d. Install the pushrod and the volue control screw in the post and install the flat washer, packing retainer, and preformed packing on the pushrod.

e. Install the post with attached parts in the pump.

f. Position the pump mount on the pump and secure with four flat washers and bolts.

g. Install the woodruff key in the shaft of the pump and slide the coupling half (23, fig. 18) on the shaft.

157. Installation

a. Position the pump mount with attached pump on the engine and secure in place with the four lockwashers (26, fig. 18) and bolts (25).

b. Position the coupling half on the pump shaft to allow clearance between the 2 halves and secure in place with the 2 setscrews. Install the roller chain (21) on the coupling.

c. Connect the pressure selector valve-to-pump tubing (28, fig. 12) to the flared tube elbow (27) and the pump (1).

d. Install the check valve in the discharge part of the pump (1) and connect the pump-to-high pressure filter hose assembly (8) to the check valve and the flared tube tee (10).

e. Install the pump case relief valve in the case of the pump and connect the pump-to-manifold tubing (5) to the relief valve and the manifold.

f. Connect the pump-to-low pressure filter hose assembly (4) to the filter and manifold assembly (47) and to the pump.

g. Fill the pump case with hydraulic fluid and install the plug in the case of the pump.

h. Install the panel assembly (par. 107).

CHAPTER 7

HOUSING AND RUNNING GEAR MAINTENANCE INSTRUCTIONS

Section I. HOUSING ASSEMBLY

158. General

The steel housing assembly consists of a welded steel frame, a four door roof assembly, and front and rear panel assemblies. The four roof doors are mounted to a hinge positioned at the top center, and running the length of the housing roof. These doors permit overhead access to the engine, hydraulic reservoir components, and control panel. The two front side doors hinged at the side, unlock and open out to permit access to both sides of the engine, battery, fuel tank, and other engine accessories. The other side door, also hinged at the side, permits access to the back of the control panel and the entire hydraulic system.

159. Removal and Disassembly

a. Remove the housing assembly (par. 106).

b. Remove the six hex nuts (32, fig. 32), lockwashers (33), and screws (34) that secure the gasket retaining ring (35) and gasket (36) to the rear top door assembly (44) and remove the ring and gasket.

c. Remove the screw (40) and lockwasher (41) that secure the rubber bumper (42) to the spacer (43) and remove the bumper.

d. Remove the hex nut, spacer, two lockwashers (39) and screws (38) that secure the door support (37) to the door. Remove the hex nut and bolt that secure the door support to the housing assembly (72) and remove the support.

e. Remove the seven hex nuts (45), lockwashers (46), and bolts (47) that secure the door to the butt hinge (59) and remove the door and neoprene strip (48).

f. Remove the remaining top door assemblies (30 and 50) in a similar manner as described in *a* through *e* above.

g. Remove the 6 hex nuts, lockwashers, and bolts that secure the 3 hinge retainer assemblies (57 and 58) to the housing assembly and remove the 3 retainers and 2 hinges (59 and 60).

h. Remove the hex nut (14) and clamp arm (15) from the clamp stud (20) and remove the spring (16), flat washer (17) and the stud with attached knob (18) from the door assembly (23). Loosen the setscrew (19) and remove the knob from the stud. Remove the seven remaining knobs in a similar manner.

i. Remove the four remaining door assemblies in a similar manner as described in *c* through *e* above.

j. Remove the headless straight pin (63) that retains the spring (64) and hose support hook (65) in the plate assembly (66). Remove the four bolts (61) and lockwashers (62) that secure the plate assembly to the housing and remove the plate assembly. Disassemble the other hanger assembly in a similar manner.

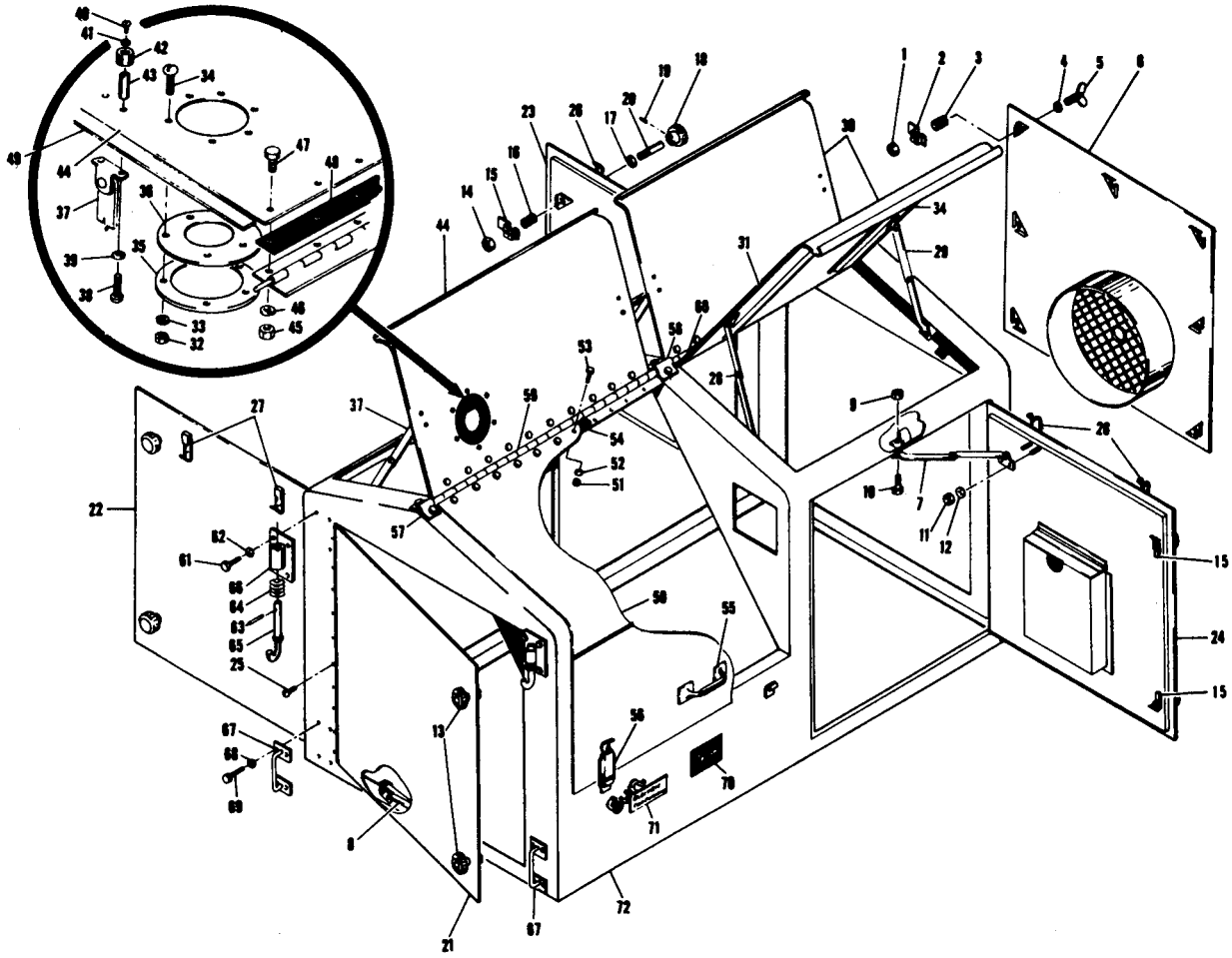
k. Remove the four hex nuts, lockwashers, flat washers (68) and screws (69) that secure the bow handle (67) to the housing assembly and remove the handle. Remove the remaining three bow handles in a similar manner.

160. Cleaning, Inspection, and Repair

a. Clean all metal parts with an approved cleaning solvent and dry thoroughly. Remove rust and corrosion from the housing and doors with a wise brush.

b. Inspect all sheet metal parts for dents, cracks, and tears. Straighten all minor dents and repair cracks by welding. Retouch or repaint exposed metal surfaces. Replace any sheet metal part damaged beyond repair.

c. Inspect the hinges for seized hinge pins and for bent or distorted condition. Replace a defective hinge.



1 Nut (7 rqr)
2 Clamp arm (7 rqr)
3 Spring (7 rqr)
4 Flatwasher (7 rqr)
5 Thumbscrew (7 rqr)
6 Front panel assembly
7 Door support
8 Door support
9 Nut (10 rqr)
10 Bolt (10 rqr)
11 Nut (18 rqr)
12 Lockwasher (18 rqr)
13 Door clamp assembly (8 rqr)
14 Nut (8 rqr)
15 Clamp arm (8 rqr)
16 Spring (8 rqr)
17 Flat washer (8 rqr)
18 Knob (8 rqr)
19 Setscrew (8 rqr)
20 Clamp stud (8 rqr)
21 Rear door assembly
22 Left rear door assembly
23 Left front door assembly
24 Right front door assembly
25 Screw (20 rqr)
26 Catch loop (6 rqr)
27 Catch lever (6 rqr)
28 Door support
29 Door support
30 Front top door assembly
31 Weather strip
32 Nut (6 rqr)
33 Lockwasher (6 rqr)
34 Screw (6 rqr)
35 Gasket retaining ring
36 Gasket
37 Door support
38 Screw, machine (12 rqr)
39 Lockwasher (12 rqr)
40 Screw (2 rqr)
41 Lockwasher (2 rqr)
42 Rubber bumper (2 rqr)
43 Spacer (2 rqr)
44 Rear top door assembly
45 Nut (28 rqr)
46 Lockwasher (28 rqr)
47 Bolt (28 rqr)
48 Neoprene strip (4 rqr)
49 Weather strip
50 Control panel door assembly
51 Nut (28 rqr)
52 Lockwasher (28 rqr)
53 Bolt (28 rqr)
54 Neoprene strip
55 Bow handle
56 Door catch (2 rqr)
57 Hinge retainer assembly (2 rqr)
58 Hinge retainer assembly
59 Butt hinge
60 Butt hinge
61 Bolt (8 rqr)
62 Lockwasher (8 rqr)
63 Headless straight pin (2 rqr)
64 Spring (2 rqr)
65 Hose support hook
66 Plate assembly (2 rqr)
67 Bow handle (4 rqr)
68 Flat washer (16 rqr)
69 Screw (16 rqr)
70 Identification plate
71 Identification plate
72 Housing assembly

Figure 32. Housing assembly, exploded view.

d. Inspect all attaching hardware for cracks, breaks, distortion, and damaged threads. Replace all damaged parts.

161. Reassembly and Installation

a. Position the bow handle (67, fig. 32) on the housing assembly (72) and secure with the four screws (69), flat washers (68), lockwashers, and hex nuts. Install the remaining bow handles in a similar manner.

b. Position the plate assembly (66) on the housing assembly and secure with the four lockwashers (62) and bolts (61). Place the spring (64) on the hose support hook (65), insert the hook in the plate assembly and install the headless straight pin (63) in the hook. Reassemble the remaining hose hanger assembly in a similar manner.

c. Position the 2 hinges (59 and 60) and the 3 hinge retainers (57 and 58) on the housing assembly and secure with the six bolts, lockwashers, and hex nuts.

d. Position the door assembly (44) and neoprene strip (48) on the butt hinge (59) and secure with the seven bolts (47), lockwashers (46), and hex nuts (45).

e. Position the door support (37) on the housing assembly and secure with the bolt and hex nut, Secure the other end of the support to the door assembly with the 2 screws (38), 2 lockwashers (39), spacer (43) and hex nut.

f. Assemble the remaining top door assemblies (30 and 50) in a similar manner as described in *d* and *e* above.

g. Install the rubber bumper (42) on the spacer (43) and secure with the lockwasher (41) and screw (40).

h. Install the four door assemblies (21, 22, 23, and 24) in a similar manner as described in *c* through *e* above.

i. Install the knob (18) in the clamp stud (20) and secure with the setscrew (19). Place the flat washer (17) on the stud, insert the stud in the door and install the spring (16), clamp arm (15), and hex nut (14) on the stud. Assemble the seven remaining door clamp assemblies in a similar manner,

j. Position the gasket (36) and gasket retaining ring (35) on the door assembly (44) and secure with the six screws (34), lockwashers (33), and hex nuts (32).

k. Install the housing assembly (par. 106).

Section II. WHEEL AND AXLE ASSEMBLIES

162. General

The wheels of the running gear are secured to cast iron hubs into which are pressed the outer races of the wheel bearings. Grease retainers are installed in the inner ends of the hubs to prevent lubricant leakage. The axles which carry the bearing cones and rollers are supported by the arm assemblies. The rear axles are secured directly to the arms, while the front axles are pivot mounted with a kingpin and connected to the steering gear with tie rods. Each arm assembly has independent coil spring suspension, pivoting on pins and bushings installed in the arm supports.

163. Wheels

a. Wheel Bearing Adjustment.

(1) Support the frame, at a point near the wheel to be adjusted, with a suitable jack.

(2) Remove the grease cap (41, fig. 14) from the hub (51).

(3) Remove the cotter pin (42) and tighten the nut (43) until a slight drag is felt when the wheel is rotated back and forth. This operation will seat the cones and rollers in the bearing cups.

(4) Loosen the nut just enough to line up the nearest slot in the nut with the cotter pin hole in the axle assembly (69). Install a new cotter pin.

(5) Install the grease cap and lower the jack.

b. Removal and disassembly.

(1) Release the brake lever assembly (25, fig. 14) and block a wheel to prevent the test stand from rolling.

(2) Remove the wheel (par. 74).

(3) Remove the tire valve cap (39) and check valve (40) from the inner tube (38) deflating the tube.

(4) Remove the 8 hex nuts (32), lockwashers (33), and bolts (34) and remove the 2 wheel halves (35 and 36) from the pneumatic tire (37). Remove the inner tube from the tire.

(5) Remove the grease cap (41) from the hub (51).

(6) Remove the cotter pin (42), nut (43), and key washer (44) from the axle assembly (69).

(7) Remove the roller bearing cone (45) and the hub with attached parts from the axle.

(8) Remove the hub from the brake drum (52) and remove the five rib neck bolts (50) from the brake drum.

(9) Remove the grease seal (47), roller bearing cone (48), and the two roller bearing cups (46 and 49) from the hub.

(10) Remove and disassemble the other wheels in a similar manner.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts in an approved cleaning solvent and dry thoroughly.

(2) Rotate the bearing cones in their respective cups inspecting rough or worn rolling elements and races. Replace a defective bearing.

(3) Inspect the wheel halves and brake drum for cracks and distortion. Replace a defective wheel half or brake drum.

(4) Inspect the tire for cuts, bruises, wear, and damaged cord inside the tire. Vulcanize cuts and bruises if possible. Replace a tire worn or damaged beyond repair.

(5) Inspect the tube for leaks by inflating with air and immersing in water. Repair a leaking tube with rubber patching material. Replace a tube damaged beyond repair.

(6) Inspect all attaching hardware for distortion and damaged threads. Replace all unserviceable hardware.

d. Reassembly and Installation.

(1) Install the two roller bearing cups (46 and 49, fig. 14), roller bearing cone (48), and the grease seal (47) in the hub (51).

(2) Press the five rib neck bolts (50) into the brake drum (52) and mount the drum on the hub.

(3) Install the hub with attached parts and the roller bearing cone (45) on the axle assembly (69).

(4) Install the key washer (44) and castellated hex nut (43) on axle, adjust the bearings as outlined in *a* above and install the cotter pin (42).

(5) Install the grease cap (41) in the hub.

(6) Insert the inner tube (38) in the pneumatic tire (37). Install the 2 wheel halves (35 and 36) in the tire and secure together with the 8 bolts (34), lockwashers (33), and hex nuts (32).

(7) Install the check valve (40) in the inner tube and inflate the tube to 30 psi. Install the tire valve cap (39) on the tube.

(8) Install the wheel (par. 74).

(9) Lower the jack, remove the wheel blocks and set the brake lever assembly (25).

164. Axles and Steering Tie Rods

a. Tie Rod Adjustment.

(1) Make sure the test stand is on a smooth and level surface.

(2) Lay the drawbar assembly (11, fig. 14) on the surface pointed straight ahead.

(3) Measure the distance between the kingpin (57) on each side to a center point on the end of the drawbar and move the drawbar as necessary to equalize these measurements.

(4) Measure the distance between each outer tie rod end (4) and the steering arm assembly (14). Equalize these measurements by loosening the bolts (8) in the loop clamps (9) and rotate the tie rods (10) as required. Tighten the bolts after the adjustment is made.

(5) Place a mark on the outside diameter of each front tire at a point level with the hub.

(6) Measure the distance between these marks. Move the test stand until the marks are level with the hub on the back side of the tires and measure the distance between the marks.

(7) The distance between the marks when at the front side of the tires should be one-fourth inch less than at the rear. Loosen the loop clamps (9) on each end of both tie rods (10) and rotate both tie rods equally until this adjustment is obtained, Secure the clamps after the adjustment is made.

b. Removal and Disassembly.

(1) Remove the wheels (par. 163).

(2) Disconnect the cable assembly (23), fig. 14 from the brake assembly (66).

(3) Remove the four hex nuts (67, fig. 14) and lockwashers (68) that secure the brake assembly to the axle assembly (69) and remove the brake assembly.

(4) Remove the four bolts (64) and lockwashers (65) that secure the axle assembly (69) to the arm assembly (77) and remove the axle.

(5) Remove the other rear axle in a similar manner.

(6) Remove the 2 cotter pins (1) and 2 nuts (2) that secure the 2 tie rod ends (4 and 5) in place and remove the tie rod ends with attached parts.

(7) Remove the 2 hex nuts (6), lockwashers (7), and bolts (8) that secure the 2 loop clamps (9) on the tie rod (10) and remove the tie rod ends and clamps from the tie rod.

(8) Disassemble the other steering tie rod assembly in a similar manner.

(9) Drive the kingpin (57) out of the 2 sleeve bearings (61 and ***62)*** and the spindle assembly (60) and remove the spindle and 2 thrust washers (58 and 59) from the axle bracket (63).

(10) Remove the four bolts (55) and lockwashers (56) that secure the axle bracket to the support and arm assembly (70) and remove the bracket.

(11) Press the two sleeve bearings out of the bracket if defective.

(12) Remove and disassemble the remaining spindle and bracket in a similar manner.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the axles and spindles for cracks, breaks, distortion, and damaged threads. Remove minor abrasions and repair damaged threads. Replace an axle or spindle damaged beyond repair.

(3) Inspect the axle brackets for cracks, breaks and distortion. Repair a cracked bracket by welding, Replace a bracket damaged beyond repair.

(4) Inspect the kingpins and sleeve bearings for nicks, burs, distortion, and excessive wear. Replace a defective or excessively worn kingpin and sleeve bearing.

(5) Inspect all attaching hardware for distortion and damaged threads. Replace all defective hardware.

d. Reassembly and Installation.

(1) Press the two sleeve bearings (61 and 62, fig. 14) into the axle bracket (63).

(2) Position the bracket on the support and arm assembly (70) and secure with the four lockwashers (56) and bolts (55) .

(3) Position the spindle assembly (60) and two thrust washers (58 and 59) in the bracket and drive the kingpin (57) into the spindle.

(4) Reassemble and install the remaining spindle and bracket in a similar manner.

(5) Install the 2 loop clamps (9) on the tie rod (10) and screw the 2 tie rod ends (4 and 5) into the tie rod. Secure the clamps with the 2 bolts (8), lockwashers (7), and hex nuts (6).

(6) Install the assembled tie rod in the spindle and the steering arm assembly and secure with the 2 nuts (2) and 2 cotter pins (1).

(7) Reassemble and install the remaining

tie rod and tie rod ends in a similar manner.

(8) Position the axle assembly (69) on the arm assembly (77) and secure with the four lockwashers (65) and bolts (64).

(9) Position the brake assembly (66) on the axle and secure with the four lockwashers (68) and hex nuts (67).

(10) Connect the cable assembly (23) to the brake assembly.

(11) Install the remaining axle assembly in a similar manner.

(12) Install the wheels (par. 163).

Section III. HANDBRAKE ASSEMBLY

165. General

The handbrake assembly is mounted on the rear axle and is mechanically operated, through cables, by the brake lever assembly. Moving the lever to a horizontal position actuates the expanding-type brake assemblies in the rear wheels, forcing the brake shoes out against the brake drums, which are mounted to the rear wheel hubs.

166. Brake Lever Assembly

a. Removal and Disassembly.

(1) Remove the brake lever assembly (par. 76).

(2) Remove the 3 cotter pins (10 and 14, fig. 15) from the 3 headed straight pins (11 and 18) and remove the headed straight pins and 5 flat washers (13 and 15) from the brake lever assembly.

(3) Remove the 2 rod end clevises (12), 2 levers (16), and 2 sleeve spacers (17) from between the side plates of the brake lever assembly.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the spacers, levers, and clevises for cracks, breaks, and distortion. Straighten minor bends and repair cracks by welding. Replace any part damaged beyond repair.

(3) Inspect the lever assembly for free movement between the side plates. Inspect the knurled knob at the outer end of the lever for free rotation. Replace a defective lever assembly.

(4) Inspect all hardware for distortion and damaged threads. Replace if defective.

c. Reassembly and Installation.

(1) Position the 2 sleeve spacers (17, fig. 15), 2 levers (16), and 2 rod end clevises (12) between the side plates of the brake lever assembly.

(2) Insert the 3 headed straight pins (11 and 18) in the alined holes of the spacers, clevices, levers, and 5 flat washers (13 and 15) and install the 3 cotter pins (10 and 14) in the headed straight pins.

(3) Install the brake lever assembly (par. 76).

167. Brake and Cable Assemblies

a. Removal and Disassembly.

(1) Remove the brake assemblies (par. 163).

(2) Disconnect the cable assemblies from the brake lever assembly (par. 76).

(3) Remove the 2 elastic grommets (24, fig. 14) that secure the cable assemblies (22 and 23) to the frame assembly (87) and remove the cable assemblies.

b. Cleaning, lnspection, and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Blow all dust and dirt from the brake assemblies with compressed air.

(3) Inspect the cable assemblies for free movement of the cables in their respective housings. Inspect the cable housings for visible signs of damage. Replace defective cable assemblies.

(4) Inspect the shoes of the brake assemblies for damage and excessive

wear. Replace worn brake lining on the shoes. Inspect the return springs for cracks, distortion and lack of tension. Replace a defective brake assembly.

c. Reassembly and Installation.

(1) Secure the 2 cable assemblies (22 and 23, fig. 14) to the frame assembly (87) with the 2 elastic grommets (24).

(2) Connect the cables to the brake lever assembly (par. 76).

(3) Install the brake assemblies (par. 163).

Section IV. FRAME ASSEMBLY

168. General

The frame assembly is a welded steel fabrication providing the mounting place for all major components of the test stand as well as the attachment point for the various parts of the running gear,

169. Arm and Support Assemblies

a. Removal and Disassembly.

(1) Remove the axle assembly (par. 164).

(2) Remove the two bolts (28, fig. 14) and lockwashers (29) that secure the stop bracket (27) to the support assembly (84) and remove the stop bracket releasing the spring (53).

(3) Remove the 4 retaining rings (75) from the 2 headless grooved pins (76) and remove the pins from the 2 sleeve bearings (78) releasing the arm assembly (77) from the support assembly,

(4) Remove the two sleeve bearings from the arm assembly if defective.

(5) Remove the hex nut (80), lockwasher (81), bolt (83), and flat washer (82) that secure the rubber bumper (79) to the arm assembly and remove the bumper.

(6) Remove the other arm assemblies in a similar manner.

(7) Remove the six hex nuts (71), lockwashers (72), flat washers (73) and bolts (74) that secure the support assembly to the frame assembly (87) and remove the support assembly.

(8) Remove the other support assembly in a similar manner.

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the arm and support assemblies for cracks, breaks, distortion, and damaged threads. Straighten bends and repair cracks and breaks by welding. Replace an arm or support assembly damaged beyond repair.

(3) Inspect the pins and bearings for nicks, burs, and excessive wear. Remove minor abrasions from the pins and bearings, Replace if defective or excessively worn.

(4) Inspect the rubber bumper for oil soaked condition or other visible signs of deterioration. Replace a defective rubber bumper.

(5) Inspect all attaching hardware for distortion and damaged threads. Replace any defective parts.

c. Reassembly and Installation.

(1) Position the support assembly (84, fig. 14) under the frame assembly (87) and secure with the six bolts (74), flat washers (73), lockwashers (72), and hex nuts (71).

(2) Install the other support assembly in a similar manner.

(3) Place the rubber bumper (79) on the arm assembly (77) and secure with the bolt (83), flat washer (82), lockwasher (81), and hex nut (80).

(4) Press the two sleeve bearings (78) into the arm assembly (77).

(5) Position the arm assembly on the support assembly and install the 2 head-

less grooved pins (76). Install the 4 retaining rings (75) in the grooves of the pins.

(6) Place the spring (53) over the rubber bumper on the arm assembly. Raise the arm assembly and secure the stop bracket (27) to the support assembly with the 2 lockwashers (29) and 2 bolts (28).

(7) Install the other arm assemblies in a similar manner.

(8) Install the axle assembly (par. 164).

CHAPTER 8

DEPOT MAINTENANCE INSTRUCTIONS

Section I. DEPOT MAINTENANCE SPECIAL TOOLS AND EQUIPMENT

No special tools or equipment are required to perform depot maintenance of this test stand.

Section II. TROUBLESHOOTING

170. General

This section provides information useful in diagnosis and correction, inspection, operation, or failure of the hydraulic test stand, or any of its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause.

171. Engine Hard to Start or Fails to Start

Probable cause	*Possible remedy*
Magneto defective	Repair or overhaul the magneto (par. 185).
Valves defective	Reseat or replace defective valves (par. 186).

172. Engine Misses or Runs Erratically

Probable cause	*Possible remedy*
Magneto defective	Repair or overhaul the magneto (par. 185).
Valves burned, warped, or broken	Grind or replace valves (par. 186).
Valve seats cracked	Reface valve inserts (par. 187).
Compression poor	Replace valves (par. 186). Replace pistons and/or piston rings (par. 195).

173. Engine Stops Suddenly

Probable cause	*Possible remedy*
Magneto defective	Repair or overhaul magneto (par. 185).
Connecting rod and crankshaft bearings seized due to lack of oil.	Replace bearing and repair or replace crankshaft (par. 196) .

174. Engine Will Not Idle Smoothly

Probable cause	*Possible remedy*
Valves burned, warped, or sticking	Grind or replace valves (par. 186).
Valve springs weak or broken	Replace defective valve springs (par. 186).
Piston rings worn	Replace piston rings (par. 195).
Pistons and cylinder walls scored	Rebore cylinder blocks and install oversize pistons and rings (pars. 195 and 199).

175. Engine Knocks or Develops Excessive Noise

Probable cause	*Possible remedy*
Connecting rod and crankshaft bearings defective	Replace worn or defective bearings (pars. 195 and 196).
Oil pump defective	Repair or replace oil pump (par. 193).

176. Engine Exhaust Smokey

Probable cause	*Possible remedy*
Pistons and/or piston rings defective	Replace pistons and/or piston rings (par. 195).

177. Engine Starter Fails to Operate

Probable cause	*Possible remedy*
Bendix drive spring broken	Replace spring (par. 184).
Commutator worn, burned or has high mica	Repair commutator (par. 184).
Armature or field coils defective	Overhaul starter (par. 184).

178. Ammeter Shows No Charge or Discharge With Engine Operating

Probable cause	*Possible remedy*
Generator regulator defective	Repair generator regulator (par. 182).
Generator defective	Repair or overhaul generator (par. 183).

179. Ammeter Needle Fluctuates Rapidly

Probable cause	*Possible remedy*
Generator commutator has high mica	Turn down commutator and undercut mica (par. 183).
Generator regulator points burned	Clean or replace defective regulator points (par. 182).

180. Hydraulic Pump Fails to Deliver Sufficient Pressure

Probable cause	*Possible remedy*
Pump pistons and cylinder barrel defective	Replace pistons and cylinder barrel (pars. 207-209).
Pump shaft assembly sheared	Replace drive shaft assembly (pars. 207-209).
Compensator control defective	Repair compensator control (pars. 202-206).

181. Hydraulic Pump Fails to Deliver Sufficient Volume

Probable cause	*Possible remedy*
Pump pistons and cylinder barrel defective or excessively worn.	Replace pistons and barrel assembly (pars. 207-209).
Port plate excessively worn	Replace port plate (pars. 207-209).

CHAPTER 9
ENGINE MAINTENANCE INSTRUCTIONS

Section I. ENGINE ACCESSORIES

182. Engine Generator Regulator

a. Removal. Remove the engine generator regulator (par. 111).

b. Cleaning and Inspection.

(1) Clean the outside of the regulator with a cloth dampened with an approved cleaning solvent and dry thoroughly,

(2) Remove the two screws (2, fig. 33) and flat washers (3) that secure the cover (1) and gasket (4) in place and remove the cover and gasket.

(3) Clean all leads, windings, insulators, resistors, and other parts with a clean, dry, lint-free cloth.

(4) Inspect the coils, resistors, and insulation for signs of burning. Replace a defective regulator.

(5) Inspect the contacts on all three units. In normal use, the contacts will become grayed. If the contacts are burned, dirty, or rough, file them with a contact point dresser. File just enough so the contacts present smooth surfaces toward each other. It is not necessary to remove all traces of burning. After filing, draw a piece of linen tape, moistened with carbon tetrachloride, between the contacts. Repeat with dry tape. If contact points are too badly burned to dress, replace contacts as described in *c* below.

(6) Adjust and test the regulator as instructed in *e* below.

(7) Position the cover (1) and gasket (4) on the regulator and secure in place with the two screws (2) and flat washers (3).

c. Contact Replacement.

(1) *Removal.*

(a) Remove the two screws (8) and lockwashers (7) that secure the armature (6) in place and remove the armature.

(b) Remove the two screws (11) and the lockwasher (12) that secure the contact (16) in place and remove the contact.

(c) Remove the remaining contact in a similar manner.

(2) *Installation.*

(a) Position the contact (16) insulator bushing (15), and insulator (13) on the bus bar (14) and secure in place with the lockwasher (12) and the two screws (11).

(b) Install the other contact in a similar manner.

(c) Install the armature (6) securing in place with the lockwashers (7) and screws (8).

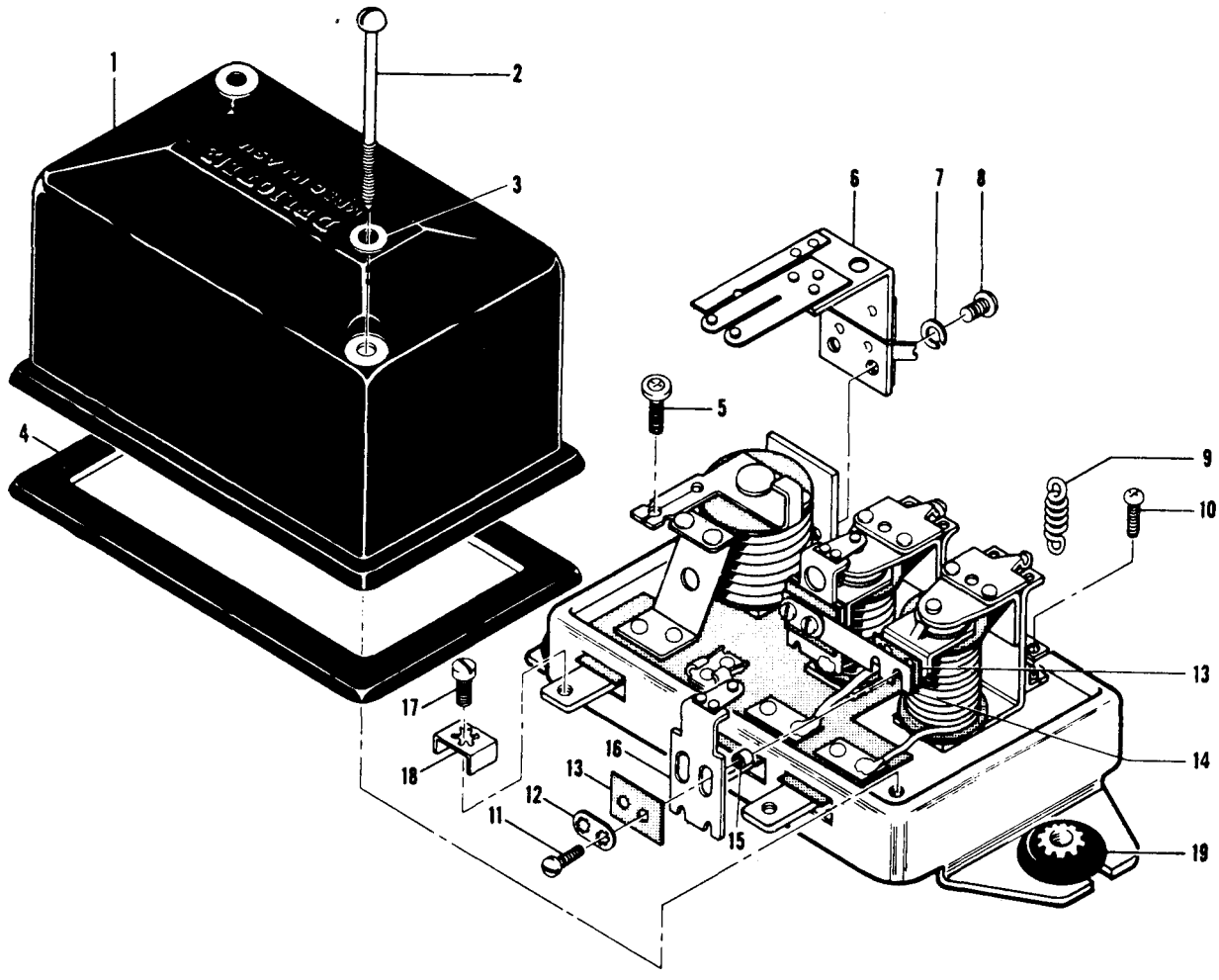
(d) Adjust and test the regulator as instructed in *d* below.

d. Testing and Adjustment.

(1) *Continuity Test.* Use a multimeter to test the series and field circuits of the regulator.

(a) To test the series circuits, remove the cover and touch test probes to the armature terminal (center terminal) and cutout relay armature (6). If the circuit is open, replace the regulator. Hold the cutout relay armature (6) down and test the armature terminal to the battery terminal (left terminal). If the circuit is open, clean and file the contact points. Test again, if the circuit is still open, replace the regulator.

(b) To test the field circuit, touch the test probes to the field terminal (right terminal) and regulator



1 Cover
2 Screw, machine, No. 8-32 x 2⅛ in. (2 rqr)
3 Washer flat No. 8 (2 rqr)
4 Gasket
5 Adjusting screw
6 Armature
7 Lockwasher (2 rqr)
8 Screw (2 rqr)
9 Spring
10 Screw, machine, No. 6-32 x ⅝ in. (2 rqr)
11 Screw (4 rqr)
12 Lockwasher (2 rqr)
13 Insulator (2 rqr)
14 Bus bar
15 Insulator bushing (4 rqr)
16 Contact (2 rqr)
17 Screw (3 rqr)
18 Clamp (3 rqr)
19 Grommet (3 rqr)

Figure 33. Engine generator regulator, exploded view.

base. The meter must show zero resistance. Open the contacts (16) of the voltage regulator unit. The meter must show the resistance of the shunt resistor. If the circuits do not test as above, file and clean the voltage and current regulator contacts (16) and repeat the test. If it tests faulty, replace the regulater.

(2) *Cutout Relay.* The cutout relay acts to close the circuit between the battery-charging generator and the battery when the voltage output is suffi-

cient to charge the battery, and acts to open the circuit as soon as reverse current flows from the battery to the generator.

(a) Air Gap Adjustment.

1. Be sure the regulator is disconnected from the battery.

2. Remove the regulator cover as described in *b* above.

3. Press down on the cutout relay armature (6) until contacts just close.

4. Measure the air gap with a feeler gage between the armature and the center core. The gap should be 0.020 inch. Adjust, if necessary, by loosening the two armature attaching screws (8) and raising or lowering the armature. Tighten the screws and measure the gap after adjustment.

Note. Be sure that both contacts are alined accurately and close simultaneously.

(b) Contact Gap Adjustment.

1. Measure the gap between the contact points on the cutout relay with a feeler gage. The gap should be 0.020 inch.

2. Adjust, if necessary, by bending the upper armature stop to give the proper contact gap.

(c) Closing Voltage.

1. Disconnect the battery lead from the regulator.

2. Mount the regulator on the unit, or on a regulator test stand if available, in the operating position. Connect the regulator to the generator. Connect a voltmeter lead to the armature terminal and ground the other voltmeter lead on the regulater.

3. Polarize the generator to prevent contacts from vibrating and burning by momentarily placing a jumper wire across the regulator terminals marked GEN and BAT. Do this after connecting all leads.

4. Start the engine and slowly increase its speed. Observe the voltmeter readings at which the cutout relay closes. They should close between 5.9 and 6.7 volts. Turn the closing voltage adjusting screw (5) clockwise to increase closing voltage or counterclockwise to decrease closing voltage until it is set at 6.0 volts.

Note. The regulator must be at operating temperature in order that proper values be obtained during testing. Operate the unit for 15 minutes at operating speed to bring up to normal operating temperature.

(3) *Voltage Regulator Unit.* The voltage regulator unit maintains a constant battery-charging generator voltage after the voltage has been allowed by circuit valves to build up to the operational setting.

(a) Air Gap Adjustment.

1. Be sure the regulator is disconnected from the battery.

2. Remove the cover as described in *b* above.

3. Press down on the armature of the voltage regulator unit until the contact points are just touching.

4. Measure the air gap between the armature and the center core. The air gap should be 0.075 inch. Adjust, if necessary, by loosening the screws (11) and raising or lowering the contact (16). Tighten the screws after adjustment is made.

(b) Voltage setting.

1. Disconnect the battery lead from the regulator.

2. Mount the regulator on the unit, or on a regulator test stand if available, in the operating position. Connect the regulator to the generator. Connect a voltmeter lead to the battery terminal on the regulator and ground the other voltmeter lead to the regulator. Connect a fixed resistor to the battery terminal of the regulator and ground it. Fixed resistance should be 0.75 ohm and must be capable of carrying 10 amperes without any change of resistance because of heat.

3. With the regulator cover in place, bring the regulator to normal operating temperature. Reduce engine

speed and then increase slowly again to operating speed. The indicated voltage should be 7.2 volts at a 70° ambient temperature.

4. Turn the voltage adjusting screw (5) clockwise to increase voltage setting and counterclockwise to decrease it. After each adjustment, install the cover before observing indicated voltage.

(4) *Current regulator unit.* The current regulator unit, centrally located on the regulator, limits the battery-charging generator current output to a predetermined maximum value.

(a) Air gap adjustment. The current regulator unit air gap is inspected and adjusted in the same manner as the voltage regulator unit as described in (3) *(a)* above.

(b) Current setting.

1. Mount the regulator on the unit or on a regulator test stand, if available, in the operating position. Connect the regulator to the generator. Connect an ammeter to the battery terminal of the regulator and to the ammeter lead. Connect a carbon pile or other suitable resistor across the battery to permit variation of current.

2. Polarize the generator as described in (2) (c) *3* above and allow it to attain normal operating temperature.

3. Slowly increase to operating speed. Adjust the resistor across the battery to allow 32 amperes to flow when the current regulator unit contacts are held shut.

4. Release the contacts and adjust them until the ammeter reads 30 amperes. Turn the current adjusting screw clockwise to increase the current setting and counterclockwise to decrease it.

Note. Replace the regulator if it will not respond to the adjustments outlined due to mechanical or electrical faults.

e. Install the engine generator regulator (par. 111).

183. Engine Accessory Generator

a. Removal. Remove the generator (par. 112).

b. Disassembly.

(1) Remove the pulley (15, fig. 19), fan (18), and brushes (9) as outlined in paragraph 112.

(2) Disconnect the spring (13) from the grounded brush holder assembly (4) and remove the brush arm (12), flat washer (14), and spring from the brush holder.

(3) Remove the hex nut (8), lockwasher (7), and screw (6) that secure the brush holder to the end bell (1) and remove the brush holder.

(4) Remove the insulated brush holder assembly (5) in a similar manner.

(5) Remove the end bell (30) with attached parts from the housing (44). Remove the woodruff key (19) and collar (29) from the armature (31).

(6) Press the armature out of the ball bearing (25).

(7) Remove the three screws (21) and lockwashers (22) that secure the bearing retaining plate (20) and gasket (23) to the end bell and remove the plate, gasket, flat washer (24), ball bearing, felt retainer plate (26) and preformed felt (27) from the end bell.

Note. Do not perform the instructions in (8), (9), and (10) below unless the tests in *d* below show the frame and field assembly defective.

(8) Remove the two hex nuts (36), lockwashers (37), flat washer (38), and the insulating washer (39) that secure the bushing insulator (40) and stud terminal (41) in the housing and push the stud out of the housing.

(9) Remove the remaining stud terminal in a similar manner.

(10) Remove the 2 screws (33) that secure the 2 pole pieces (32) to the housing and remove the pole pieces, 2 insulator plates (35), and windings (34) from the housing.

c. Cleaning, Inspection, and Repair.

(1) Clean a slightly dirty or discolored commutator with a strip of NO. 00 sand paper. Blow sand and dust out of the generator with clean, dry compressed air.

(2) Clean the housing and end bells with an approved cleaning solvent and dry thoroughly.

(3) Inspect the armature shaft and shaft bearing surfaces for nicks, burs, distortion and damaged threads. Replace a defective armature.

(4) Inspect the armature to be sure all windings are secure in the core slots and are properly soldered in the commutator segments. Replace a defective armature.

(5) Inspect the commutator for roughness arid high mica, Place the armature shaft bearing surfaces in v-blocks, and, with a dial indicator, check the commutator for out-of-round. Turn down a commutator that is scored, rough, has high mica, or is over 0.003 inch out-of-round.

(6) If the mica is high or the commutator has been turned, undercut the mica.

(7) Inspect the housing for cracks, faulty insulation, or damaged threads and replace if defective.

(8) Inspect and replace the brushes if necessary (par. 112).

(9) Rotate the ball bearing and inspect for rough rolling elements and races. Visually inspect the bearing for excessive wear. Replace a rough or worn ball bearing.

(10) Inspect all other parts for cracks, breaks, distortion, and damaged threads and replace if defective.

d. Testing. Test the armature for shorts, open circuits, and grounds using a suitable growler. Test the field windings for continuity and grounds with a test lamp circuit,

e. Reassembly.

(1) Before assembling the generator, paint its interior surfaces, with the exception of bearing surfaces and points of electrical contact, with fungicidal varnish.

(2) Position the field winding (34, fig. 19), 2 insulator plates (35), and 2 pole pieces (32) in the housing (44) and secure with the 2 screws (33).

(3) Place the bushing insulator (40) on the stud terminal (41) and insert the terminal in the housing. Install the insulating washer (39), flat washer (38), 2 lockwashers (37), and 2 hex nuts (36). Install the remaining stud terminal in a similar manner.

(4) Install the preformed felt (27), felt retainer plate (26), ball bearing (25) and flat washer (24) in the end bell (30). Position the gasket (23) and the bearing retaining plate (20) on the end bell and secure with the 3 lockwashers (22) and 3 screws (21).

(5) Press the armature (31) into the installed ball bearing (25).

(6) Install the armature and attached end bell in the housing. Place the collar (29) on the shaft of the armature and install the woodruff key (19).

(7) Position the grounded brush holder assembly (4) on the end bell and secure with the screw (6), lockwasher (7), and the hex nut (8).

(8) Install the flat washer (14), brush arm (12) and spring (13) on the brush holder (4) and connect the spring to apply tension to the brush arm.

(9) Install the insulated brush holder assembly (5) in a similar manner.

(10) Install the fan (18), pulley (15), and brushes (9) as outlined in paragraph 112.

f. Bench Testing the Generator. Test the assembled generator for current draw and output on a suitable generator test stand.

g. lnstallation. Install the generator (par. 112).

184. Electrical Engine Starter

a. Removal. Remove the starter (par. 113).

b. Disassembly.

(1) Remove the brush access cover (23, fig. 20) from the housing assembly

(35) and remove the brushes (par. 113).

(2) Remove the four bolts (1) and lockwashers (2) that secure the drive housing (4) to the housing assembly (35) and remove the armature (20) with attached parts from the housing.

(3) Remove the four screws (3) that secure the bearing plate assembly (15) and gasket (14) to the drive housing and remove the drive housing from the shaft of the armature.

(4) Remove the pillow block cap (5), sleeve bearing (6), and plain seal (7) from the drive housing if these parts are defective.

(5) Bend the tabs of the 2 key washers (10) away from the 2 shoulder bolts (8 and 9) and remove the bolts from the shaft and pinion assembly (11) and driving head (13).

(6) Remove the shaft and pinion assembly, spring (12), driving head, gasket, woodruff key (16), and bearing plate from the shaft of the armature.

(7) Remove the three thrust washers (17 and 19) and spring tension washer (18) from the armature shaft.

(8) Remove the two hex nuts (30), lockwashers (31), flat washer (32), and insulator washer (33) from the terminal stud of the field winding assembly (34).

(9) Remove the four screws that secure the winding assembly in the housing and remove the winding if defective.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts of the starter in the same manner as described in paragraph 183.

(2) Inspect the armature, field winding assembly and housing as outlined in paragraph 183.

(3) Inspect the sleeve bearing and the bearing plate assembly for nicks, burs, and distortion. Inspect the fit of the bearings on the armature shaft. Replace excessively worn bearings.

(4) Inspect the shaft and pinion assembly for damaged gear teeth and distorted threads and replace if defective.

(5) Inspect the spring for cracks and distortion. Replace a defective spring,

(6) Inspect all other parts for distortion and damaged threads and replace if defective.

d. Testing. Test the starter in a manner similar to that outlined in paragraph 183.

e. Reassembly.

(1) Position the field winding assembly (34) in the housing assembly (35) and secure with the four screws.

(2) Install the insulator washer (33), flat washer (32), 2 lockwashers (31), and 2 hex nuts (30) on the terminal stud of the winding assembly.

(3) Install the three thrust washers (17 and 19) and the spring tension washer (18) on the shaft of the armature (20).

(4) Apply a thin film of oil on the bearing surfaces of the armature shaft and slide the bearing plate assembly (15) on the shaft.

(5) Insert the woodruff key (16) in the armature shaft and slide the driving head (13), spring (12), and shaft and pinion assembly (11) on the armature shaft.

(6) Secure the spring (12), driving head (13) and shaft and pinion assembly (11) to the armature shaft with 2 new key washers (10) and the 2 shoulder bolts (8 and 9). Be sure the bolt (9) seats in the hole provided in the armature shaft.

(7) Press the plain seal (7), sleeve bearing (6), and pillow block cap (5) into the drive housing (4).

(8) Secure a new gasket (14) and the bearing plate assembly (15) to the drive housing with the four screws (3).

(9) Insert the armature with attached parts in the housing assembly (35) and secure the drive housing in place with the four lockwashers (2) and bolts (1) .

(10) Install the brushes (par. 113) and the brush access cover (23).

f. Bench-Testing the Starter.

(1) *No-load Test.* Connect a 100-ampere ammeter, a carbon-pile rheostat, and a 6-volt battery in series with the starter terminal and housing. connect a voltmeter from the terminal to the housing. With the voltage adjusted to 5.0 volts, the current should be 68 amperes maximum at 4,000 rpm. If the current and speed are both low, check for high resistance in the internal connections. If the current is high and the speed is low, check the armature for binding.

(2) *Stall Torque Test.* With the starter connected as in (1) above, fasten a torque arm and a spring scale to the armature at the drive end. Adjust the rheostat to give 2.0 volts. The correct current reading is 280 amperes maximum and a stall torque of 4.4 ft-lb minimum. Stall torque is the product of the spring scale reading in pounds, multiplied by the length of the torque arm in feet. If current and torque are both low, check the internal connections for high resistance and the brushes for proper contact. High current and low torque may be caused by a defective armature or field winding.

g. Installation. Install the starter (par. 113).

185. Ignition Magneto

a. *Removal.* Remove the magneto (par. 115).

b. Disassembly.

(1) Remove the distributor contact set (par. 115).

(2) Remove the retaining ring (41, fig. 21) and the threaded straight pin (43) that secure the spur gear (42) to the magneto rotor (47) and remove the gear.

(3) Remove the four screws (20) that secure the contact breaker plate (46) to the magneto housing (50) and remove the breaker plate and flat washer (44).

(4) Remove the retaining ring (38) that secures the spur gear (39) in the sleeve bearing (40) and remove the gear.

(5) Press the roller bearing (45) and the sleeve bearing (40) from the contact breaker plate (46) if defective.

(6) Remove the two setscrews (49) that secure the magneto coil (48) in the housing and remove the coil.

(7) Remove the cotter pin (21) and castellated hex nut (22) that secure the helical gear (23) and sleeve bushing (24) on the rotor and remove the gear and bushing.

(8) Using a suitable gear puller, remove the magneto coupling (29) with attached spring (26) and housing (25) from the rotor.

(9) Remove the housing and spring from the coupling, Remove the spring (30) from the coupling.

Warning: **Remove the housing from the spring carefully and slowly to prevent the rapid uncoiling of the spring.**

(10) Remove the woodruff key (28), packing retainer (31), flat washer (32), preformed packing (33), and flat washer (34) from the rotor.

(11) Remove the retaining ring (35) from the shaft of the rotor and press the rotor out of the ball bearing (37).

(12) Remove the retaining ring (36) and the ball bearing from the housing.

(13) Remove the threaded straight pin (27) from the housing.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Test the coil on a coil tester. The primary draw must be 1.6 amperes. Replace a defective coil.

(3) Test the capacitor on a capacitor tester for shorts, opens, and leakage and for capacitance that should test between 0.17 and 0.21 pf (microfarad). Replace a defective capacitor.

(4) Inspect the bearings for nicks, burs, and abrasions. Rotate the ball bear-

ing, inspecting for rough rolling elements and races. Replace defective bearings.

(5) Inspect the end cap and housing for cracks, breaks, and damaged threads. Replace a damaged end cap or housing.

(6) Inspect the rotor for cracks, breaks, and corrosion. Replace a defective rotor.

(7) Inspect the gears for wear, chipped or broken teeth. Check the fit of the gears on their respective shaft and bearings. Replace any defective part.

(8) Inspect the springs for distortion, cracks, and loss of tension. Replace a defective spring.

(9) Inspect the coupling for freedom of movement. Inspect the housing for cracks, breaks, and distortion.

(10) Inspect the rotor and shaft for nicks, burs, distortion, and damaged threads. Remove minor abrasions from the shaft of the rotor. Replace a defective rotor.

(11) Inspect all other parts for distortion and damage and replace if defective.

d. Reassembly.

(1) Install the threaded straight pin (27, fig. 21) in the magneto housing (50).

(2) Install the ball bearing (37) and the retaining ring (36) in the housing.

(3) Press the magneto rotor (47) into the ball bearing and install the retaining ring (35) on the shaft of the rotor.

(4) Install the coil (48) in the magneto housing (50) and secure with the two setscrews (49).

(5) Press the roller bearing (45) and sleeve bearing (40) into the contact breaker plate (46).

(6) Insert the spur gear (39) in the installed sleeve bearing and install the retaining ring (38).

(7) Install the flat washer (44) on the rotor. Position the breaker plate with attached parts in the housing, and secure with the four screws (20).

(8) Install the spur gear (42) on the rotor (47) alining the marked teeth of each spur gear and at the same time aline the pin holes of the gear and rotor shaft. Secure the gear in place with the threaded straight pin (43) and the retaining ring (41).

(9) Install the two springs (30) on the magneto coupling (29). Install the outer end of the spring (26) on the spring anchor in the housing (25). Engage the inner end of the spring in the long slot of the coupling. Wind one full turn clockwise and press the coupling into the housing.

(10) Install the assembled magneto impulse coupling on the shaft of the magneto rotor (47) alining key and keyway.

(11) Install the contact set (16) and distributor rotor (12) as outlined in paragraph 115.

(12) Rotate the magneto rotor (47) until the distributor rotor (12) is in position to fire No. 1 cylinder. Place the sleeve bushing (24) in the helical gear (23) and install the gear on the rotor shaft with the punch marked tooth alined with the threaded straight pin (27). Secure the gear in place with the castellated hex nut (22) and cotter pin (21).

(13) Install the end cap (9) and capacitor (1) as described in paragraph 115.

e. installation. Install and time the magneto (par. 115).

Section II. CYLINDER BLOCK GROUP

186. Valves

a. Removal.

(1) Remove the intake and exhaust manifold (par. 123).

(2) Remove the cylinder heads (par. 124).

(3) Use a valve spring compressor to compress the spring (9, fig. 26). Remove the pair of retainer locks (7), rotator cap (6), and the valve spring seat (8). Remove the spring compressor,

lift out the valve (10) and remove the spring from the cylinder block (13). Remove the seven other valves in the same manner.

Note. Tag or otherwise identify each valve and its related parts to assure reinstallation in the same valve chamber.

b. Cleaning and Inspection.

(1) Clean the valves with a wire wheel brush to remove carbon from the valve faces and gum deposits from the stems.

(2) Clean all other removed parts with an approved cleaning solvent and dry thoroughly.

(3) Clean the valve guides in the cylinder blocks and blow clean with compressed air.

(4) Clean the valve seat inserts in the cylinder blocks and the top of the blocks.

(5) Inspect the valves for burned, pitted, or cracked faces. Replace a defective valve.

(6) Inspect the valve springs for cracks or pitting. Replace cracked or pitted valve springs. Check spring tension with a dial-type spring tester. If the scale reading is less than 85 pounds when spring is compressed to $1^{7}/_{8}$ inches, replace the spring.

(7) Inspect the valve seat inserts for loose or worn condition. Replace loose valve seat inserts.

(8) Measure the clearance between the valve stems anti the valve guides, Replace the valve guides if the clearance exceeds 0.007 inch.

c. Valve *and Valve Seat Refacing.*

(1) Using a valve face grinder, reface the valves to a 45° angle. Replace any valve that measures less than 0.0625 inch from the top of the head to the edge of the refaced outer circle.

(2) Install a pilot in the valve guide. Set the stone at 45° and dress the stone. Grind the seat just enough to remove pits and abrasions.

d. Valve Grinding Procedure.

(1) Remove all traces of carbon from the face of the cylinder block.

(2) Lightly coat the entire seat with water-soluble valve grinding compound. Grind the valves by rotating them back and forth with a reciprocating advancing valve tool. Occasionally lift the valve and reseat it in a different position to insure a uniform seat. After the valves have been ground in evenly, remove them and clean the valves and blocks thoroughly with an approved cleaning solvent.

e. Installation.

(1) Position the spring (9, fig. 26) in the cylinder block (13) and insert the valve (10) in the valve stem guide (12).

(2) Compress the valve spring and install the valve spring seat (8), retainer locks (7), and the rotator cap (6) on the valve stem. Install the seven other valves in a similar manner.

(3) Adjust the valve lifters (par. 125).

(4) Install the cylinder heads (par. 124).

(5) Install the intake and exhaust manifold (par. 123).

187. Valve Seat Inserts and Valve Guides

a. Cleaning and Inspection.

(1) Remove the valves (par. 186).

(2) Use a valve guide cleaning tool to ream carbon from the valve guides. Blow carbon from the guides with clean compressed air.

(3) Clean the face of the valve seat inserts with a wire brush or buffing wheel.

(4) Clean the valve stem and insert the valve into the guide. Check the side play of the valve in the guide with a dial indicator. If. the clearance between the stem and the guide exceeds 0.007 inch replace the valve guide.

(5) Inspect the valve seat inserts for pitting, cracks, abrasions or uneven wear. If the inserts cannot be repaired by grinding (par. 186) they must be replaced.

b. Removal.

(1) Use a drift to drive the valve stem guide (12, fig. 26) down through the

block into the valve spring chamber. Remove the other valve stem guides in the same manner.

(2) Use a puller to remove the valve seat inserts (11).

c. Installation.

(1) Place the valve stem guide (12) in position with the countersunk end downward. Drive the guide into place with top of the guide flush with the valve chamber. Install the other valve stem guides in the same manner.

(2) Ream the counterbore to an inside, diameter of 0.004 inch smaller than the valve seat insert (11) to be installed.

(3) Chill each new insert in dry ice for ten minutes to reduce its diameter slightly.

(4) Use a pilot driver to tap the insert into place.

(5) Grind the valves to the new inserts (par. 186).

(6) Install the valves (par. 186).

Section III. GEAR COVER AND TIMING GEARS

188. General

The gear cover, located on the front of the engine, encloses the timing gear train. The timing gear train consists of the camshaft gear, crankshaft gear, idler gear, oil pump gear, and magneto gear. The governor and magneto gears can be removed from the gear train without removing the gear cover. The remaining gears, with the exception of the crankshaft gear, can be removed after removal of the gear cover.

189. Gear Cover

a. Removal.

(1) Remove the magneto (par. 115).

(2) Remove the air shrouding group (pars. 118 and 119).

(3) Remove the governor (par. 135).

(4) Drain the oil from the engine into a suitable container.

(5) Drive the two headless straight pins (1, fig. 34) from the gear cover (10).

(6) Remove the 10 bolts (5) and lockwashers (6) that secure the gasket (4) and the gear cover to the gear cover spacer (2). Remove two additional belts and lockwashers from the rear top side of the gear cover spacer and remove the cover and gasket from the spacer.

(7) Remove the timing hole plug (7) and plunger button (8) from the gear cover.

(8) Remove the oil seal (9) if defective.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect the gear cover for cracks, breaks, distortion, and damaged threads. Repair cracks by welding and retap damaged threads. Replace a gear cover damaged beyond repair.

(3) Inspect all other parts for distortion and damaged threads and replace if defective.

c. Installation.

(1) Install the plunger button (8, fig. 34) and the timing hole plug (7) in the gear cover (10).

(2) Press the oil seal (9) into the gear cover.

(3) Position a new gasket (4) and the gear cover (10) on the gear cover spacer (2) and install the two headless straight pins (1).

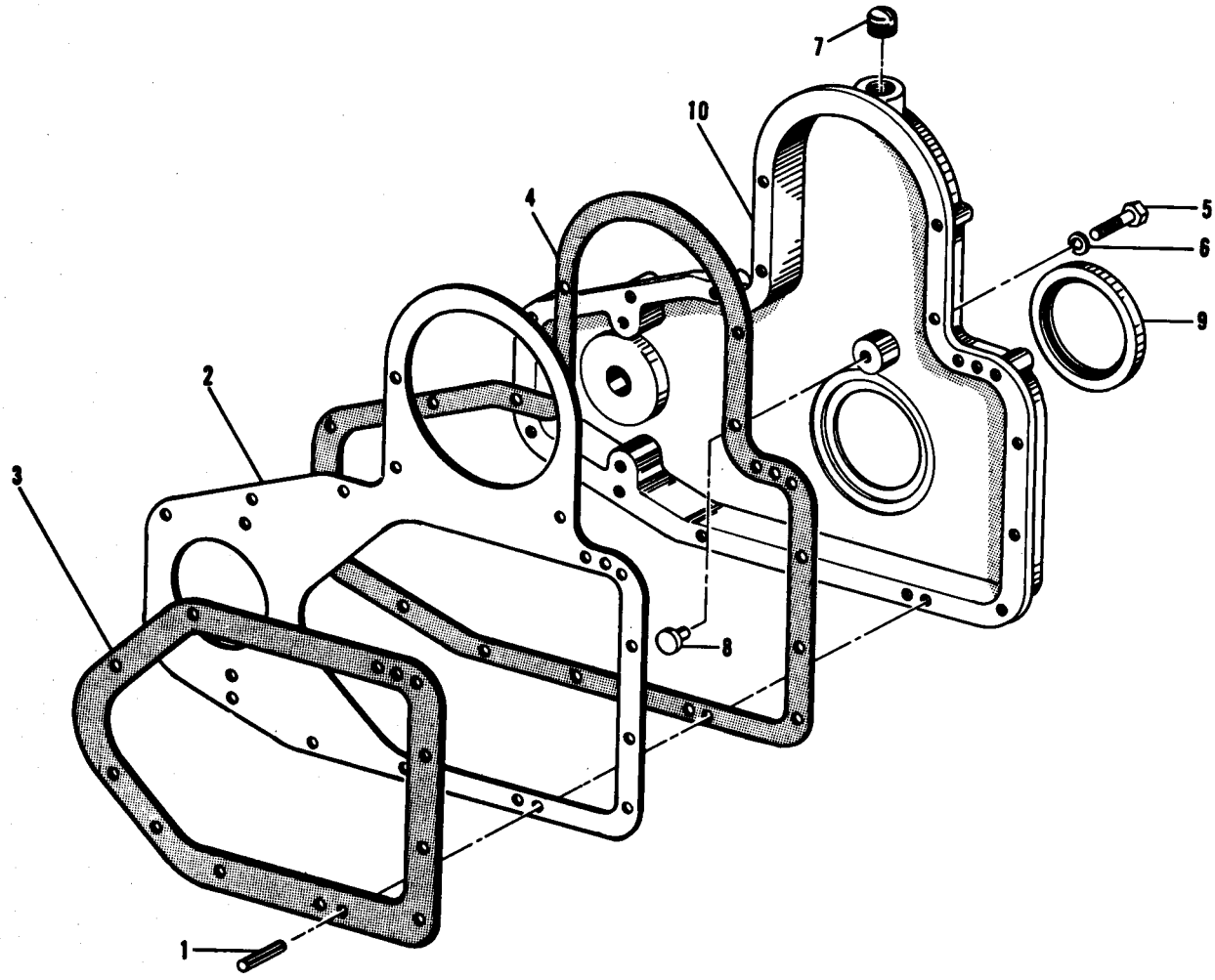
(4) Secure the cover in place with the 10 lockwashers (6) and bolts (5). Install the 2 remaining lockwashers and bolts from the rear top side of the gear cover. Tighten the bolts to 14 to 18 ft-lb torque.

(5) Fill the engine crankcase with the proper grade oil. Refer to table 1.

(6) Install the governor (par. 135).

(7) Install the air shrouding group (pars. 118 and 119).

(8) Install the magneto (par. 115).



1 Headless straight pin (2 rqr)
2 Gear cover spacer
3 Gasket
4 Gasket
5 Bolt, machine, 5/16–18 x 1¼ in. (10 rqr)
6 Washer, lock, 5/16 in. (10 rqr)
7 Timing hole plug
8 Plunger button
9 Oil seal
10 Gear cover

Figure 34. Gear cover group, exploded view.

190. Timing Gears

a. Removal.

(1) Remove the gear cover (par. 189).

(2) Remove the setscrew that secures the idler gear stud in the crankcase and remove the stud and the idler gear.

(3) Remove the plunger button (19, fig. 27), thrust plunger (20) and spring (21) from the camshaft (25).

(4) Remove the three bolts (24) and lockwashers (23) that secure the camshaft gear (22) to the camshaft and remove the gear from the camshaft.

(5) Remove the hex nut (1, fig. 35) that secures the oil pump gear (2) in place and remove the gear and woodruff key.

(6) Remove the eight bolts and lockwashers that secure the gear cover spacer (2, fig. 34) and the gasket (3) to the crankcase and remove the spacer and gasket.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the gears for cracked, broken, or chipped teeth. Replace a damaged or excessively worn gear.

(3) Inspect the idler gear stud, plunger, and plunger button for nicks, burs, and minor abrasions. Remove nicks and burs with fine emery cloth. Replace any part damaged beyond repair.

(4) Inspect the spring for cracks, distortion, and lack of tension. Replace a defective spring.

(5) Inspect all attaching hardware for distortion and damaged threads and replace if defective.

c. Installation.

(1) Position a new gasket (3, fig. 34) and the gear cover spacer (2) on the crankcase and secure with the eight lockwashers and bolts.

(2) Install the woodruff key and the oil pump gear (2, fig. 35) on the drive shaft (16) and secure in place with the hex nut (1).

(3) Position the camshaft gear (25, fig. 27) on the camshaft alining the holes of the gear and camshaft and at the same time aline the marked teeth of the crankshaft and camshaft gears. Secure the gear in place with the three lockwashers (23) and bolts (24).

(4) Insert the spring (21), camshaft thrust plunger (20), and plunger button (19) in the camshaft.

(5) Position the idler gear on the crankcase and install the idler gear stud in the alined holes of the gear and crankcase. Secure the stud in place with the setscrew.

(6) Install the gear cover (par. 189).

Section IV. CRANKCASE BOTTOM PLATE AND OIL PUMP

191. General

The crankcase cover is essentially the engine oil pan. It is an attached container into which the engine lubricating oil is returned after being circulated by the oil pump. A gear-type oil pump, driven from the idler gear in the timing gear train, draws oil from the oil pan through its screen. The oil pump delivers the oil under pressure to an oil header, which sprays oil against the fins of the connecting rod caps for rod bearing lubrication and directs oil through exterior oil lines to the governor and bypass-type oil filter. The cylinders are lubricated by the oil mist arising from the connecting rod caps. Lubrication and splash, plates are installed inside the crankcase to prevent excess lubrication of the cylinder walls.

192. Crankcase Bottom Plate

a. Removal.

(1) Drain the oil from the engine.

(2) Remove the fuel tank (par. 132).

(3) Remove the elbow (23, fig. 11) and pipe nipple (22) from the crankcase bottom plate (20).

(4) Remove the 14 bolts (27, fig. 24) and lockwashers (28) that secure the crankcase bottom plate (29) and gasket (30) to the crankcase assembly (31) and remove the plate and gasket.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the plate, elbow, and nipple for cracks, breaks, distortion, and damaged threads. Repair cracks or leaks in the plate by welding. Replace any part damaged beyond repair.

(3) Inspect all attaching hardware for distortion and damaged threads and replace if defective.

c. Installation.

(1) Position a new gasket (30, fig. 24) and the crankcase bottom plate (29) on the crankcase assembly (31) and secure with the 14 lockwashers (28) and bolts (27). Tighten the bolts to a torque of 6 to 7 ft-lb.

(2) Install the pipe nipple (22, fig. 11)

and the elbow (23) in the crankcase bottom plate (20).

(3) Install the fuel tank (par. 132).

(4) Fill the engine crankcase with oil. Refer to table 1.

193. Oil Pump

a. Removal.

(1) Remove the engine (par. 108).

(2) Remove the crankcase bottom plate (par. 192).

(3) Remove the oil pump (par. 190).

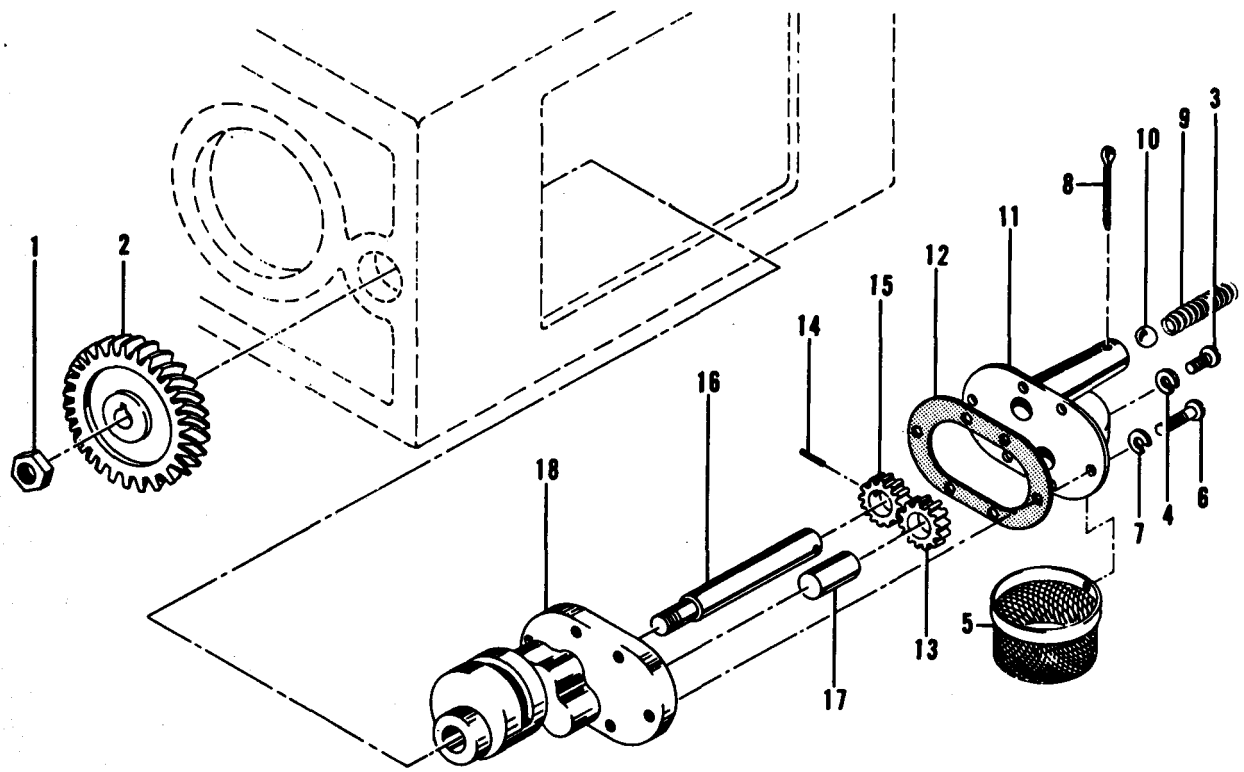
(4) Remove the pipe plug and the oil pump lockscrew that secure the oil pump assembly in the crankcase and remove the oil pump.

b. Disassembly.

(1) Remove the four screws (3, fig. 35) and lockwashers (4) that secure the screen (5) to the cover (11) and remove the screen.

(2) Pull the cotter pin (8) from the cover releasing the spring (9) and bearing ball (10).

(3) Remove the six screws (6) and lockwashers (7) that secure the cover and gasket (12) to the body (18) and remove the cover and gasket.



1 Nut
2 Oil pump gear
3 Screw, machine, No. 10–32 x ⅜ in. (4 rqr)
4 Washer, lock, No. 10
5 Screen
6 Screw, machine, No. 10–32 x ½
7 Washer, lock, No. 10
8 Cotter pin
9 Spring
10 Bearing ball
11 Cover
12 Gasket
13 Spur gear
14 Headless straight pin
15 Spur gear
16 Drive shaft
17 Stub shaft
18 Body

Figure 35. Oil pump assembly, exploded view.

(4) Remove the spur gear (13) and stub shaft (17) from the body.

(5) Remove the drive shaft (16) with attached spur gear (15) from the pump body. Drive the headless straight pin (14) out of the gear and press the drive shaft out of the gear.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly. Blow oil passages clean with compressed air.

(2) Inspect the gears for cracked, chipped, or excessively worn teeth. Replace a defective gear.

(3) Inspect the cover and body for cracks, breaks, distortion and damaged threads. Replace a defective cover or body.

(4) Inspect the shafts for nicks, burs, and distortion. Remove minor abrasions. Check the fit of the stub shaft in the gear. Replace a defective shaft. Check the fit of the drive shaft in the pump body. Replace an excessively worn shaft or pump body.

(5) Inspect the bearing ball for pits and proper seating in the cover. Replace a defective ball.

(6) Inspect the spring for cracks, distortion, and for lack of tension. Replace a defective spring.

(7) Inspect all attaching hardware for distortion and damaged threads and replace if defective.

d. Reassembly.

(1) Press the drive shaft (16, fig. 35) into the spur gear (15) and install the headless straight pin (14). Insert the drive shaft with attached gear in the body (18).

(2) Install the stub shaft (17) and spur gear (13) in the body.

(3) Position a new gasket (12) and the cover (11) on the pump body and secure with the six lockwashers (7) and screws (6).

(4) Insert the bearing ball (10) and spring (9) in the cover, compress the spring and install the cotter pin (8).

(5) Mount the screen (5) on the cover and secure with the four lockwashers (4) and screws (3).

e. Installation.

(1) Install the oil pump assembly in the crankcase and secure with the oil pump lockscrew and pipe plug.

(2) Install the oil pump gear (par. 190).

(3) Install the crankcase bottom plate (par. 192).

(4) Install the engine (par. 108).

Section V. CRANKSHAFT AND CAMSHAFT GROUP

194. General

The crankshaft is supported at both ends by roller bearings. The outer race of the bearing at the power take off end of the engine, is carried in the main bearing retainer plate, which is secured to the crankcase. Shims are installed between the bearing plate and crankshaft to provide a means of adjusting crankshaft end play. The connecting rods, which are installed on the crankshaft, are drop forgings fitted with shell-type bearings. The pistons are made of cast iron with four rings fitted to each piston. Two compression rings are in the two top grooves, followed by a scraper ring and an oil ring in the other grooves. The camshaft is driven through gears by the crankshaft. The camshaft, through the valve lifters, operates the intake and exhaust valves at the precise time in relation to engine cycle.

195. Connecting Rod and Piston

a. Removal.

(1) Remove the oil pump (par. 193).

(2) Remove the cylinder heads (par. 124).

(3) Turn the crankshaft until the lower end of the desired connecting rod (12, fig. 36) is accessible.

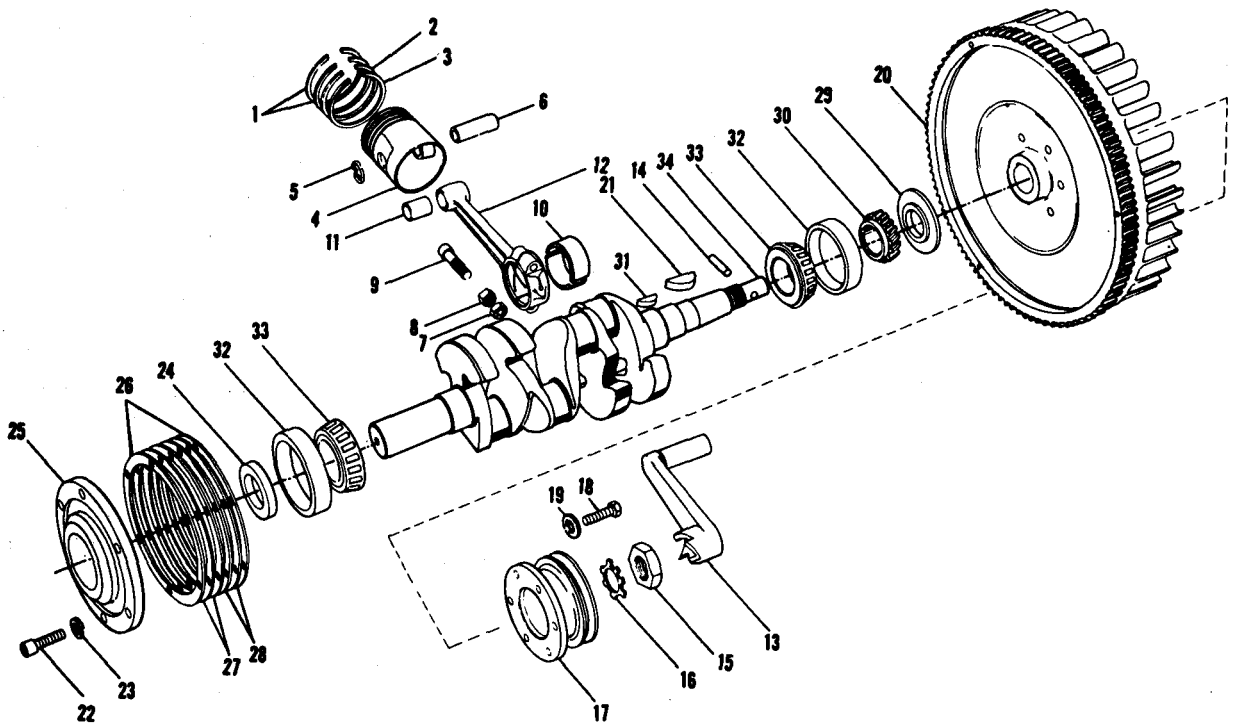
(4) Remove the 2 stamped nuts (7), 2 hex nuts (8), and 2 bolts (9) that secure the cap of the connecting rod in place, remove the cap and push the connecting rod with attached piston (4) out through the top of the cylinder block. Reassemble the cap and bearing on the connecting rod to prevent damage or loss.

(5) Remove the three remaining connecting rods and pistons in a similar manner.

Note. The connecting rods, bearings, and caps are marked and must be paired together to insure correct installation.

b. Disassembly.

(1) Remove the two retaining rings (5) and the piston pin (6) from the piston



1 Piston ring (8 rqr)
2 Piston ring (4 rqr)
3 Piston ring (4 rqr)
4 Piston (4 rqr)
5 Retaining ring (8 rqr)
6 Piston pin (4 rqr)
7 Stamped nut, ⅜–24 (8 rqr)
8 Nut, plain, hex, ⅜–24 (8 rqr)
9 Bolt (8 rqr)
10 Sleeve bearing (8 rqr)
11 Sleeve bearing (4 rqr)
12 Connecting rod
13 Starting crank
14 Headless straight pin
15 Nut
16 Washer, lock
17 Generator drive sheave
18 Bolt (6 rqr)
19 Lockwasher (6 rqr)
20 Flywheel
21 Woodruff key
22 Bolt, machine, ⅜–16 x 1¼ in. (6 rqr)
23 Washer, lock, ⅜ in. (6 rqr)
24 Oil seal
25 Bearing plate
26 Gasket (2 rqr)
27 Shim (2 rqr)
28 Shim (2 rqr)
29 Oil slinger
30 Crankshaft gear
31 Woodruff key
32 Bearing cup (2 rqr)
33 Bearing cone (2 rqr)
34 Crankshaft

Figure 36. Crankshaft, piston and connecting rod group, exploded view.

(4) and remove the piston from the connecting rod.

(2) Remove the piston rings (1, 2, and 3) from the piston.

(3) Press the sleeve bearing (11) out of the connecting rod if defective or unserviceable.

(4) Disassemble the other pistons and connecting rods in the same manner.

c. Cleaning, Inspection, and Repair.

(1) Clean carbon from the top of the pistons. Wash all parts with an approved cleaning solvent and dry thoroughly.

(2) Use an inside micrometer to measure the cylinder bores for wear. All cylinders should measure 3.504 to 3.505 inches. Remove, rebore, and hone the the cylinder blocks (par. 199) whose measurement exceeds the allowable wear of 0.005 inch and install oversize pistons and rings.

(3) To measure the piston ring gap, place the ring in the cylinder bore in the approximate operating position and measure the gap with a feeler gage. The piston ring gaps should measure between 0.010 and 0.015 inch. If the gap is too great replace the piston ring with an oversize ring. If the gap is too small remove stock by filing.

(4) Place two strips of 0.002 inch shim stock 1/2 inch wide, on opposite sides of the piston. Invert the piston and slide it into the cylinder bore. Attach a spring pull scale to one of the pieces of shim stock and pull up on the scale. A pull of 4 to 8 pounds should be required to pull the stock out. If the shim stock pulls out too freely replace the piston with an oversized one. Rebore and rehone the cylinder bore as necessary.

(5) Measure the piston ring side clearance. Replace the piston when clearance exceeds 0.003 inch in the three top grooves or 0.004 inch in the bottom groove.

(6) Measure the piston pin fit in the piston. If the clearance exceeds 0.0005 inch, replace the piston and piston pin.

(7) Check the piston pin sleeve bearing for wear, scoring, and out-of-round. The clearance between the piston pin and bearing should not exceed 0.001 inch. Replace a defective bearing.

(8) Inspect the bearing halves for wear or scoring. Replace both bearing halves if either is unserviceable. Measure the bearing-to-crankshaft clearance by installing a piece of 0.001 inch shim stock on each bearing half. Assemble the connecting rod and cap with shimmed bearing to its respective crankshaft journal and tighten the nuts to a torque of 14 to 18 ft-lb. A slight drag on the shaft, when turned by hand indicates proper clearance. The connecting rod bearing should not bind using shim stock with a minimum thickness of 0.0005 inch.

d. Reassembly.

(1) Press the sleeve bearing (11, fig. 36) into the connecting rod (12). Ream and hone new bearings (11) to provide a clearance of from 0.0005 to 0.001 inch between the piston (6) and the bearing.

Note. Be sure to aline the oil holes of the connecting rod and bearing.

(2) Position the piston on the connecting rod and install the piston pin (6) and the two retaining rings (5).

(3) Install the oil piston ring (3) in the bottom groove of the piston (4) with its scraper edge down. Install the scraper piston ring (2) in the adjacent groove with its scraper edge down. Install the two remaining piston rings (1) in the upper grooves. Stagger the ring gaps around the piston.

(4) Reassemble the three remaining pistons and connecting rods in a similar manner.

e. Installation.

(1) Place a ring compressor on the piston.

(2) Insert the connecting rod (12, fig. 36) with attached piston in its respective cylinder bore and push piston out of the ring compressor into the cylinder block.

Note. When installing the pistons in the cylinders, install those in numbers 1 and 3 cylinders so the slits in the piston skirts face toward the center of the engine. The slits in pistons 2 and 4 face away from the center of the engine.

(3) Apply a thin film of oil to the crankshaft journal to which the rod is to be connected. Position the rod and cap with installed sleeve bearing (10) on the journal of the crankshaft (34) and install the 2 bolts (9), 2 hex nuts (8), and 2 stamped nuts (7). Tighten the hex nuts to a torque of 14 to 18 ft-lb.

Note. Be sure the oil hole in the cap of the connecting rod faces the spray nozzle in the oil header of the crankcase.

(4) Install the four remaining pistons and connecting rods in the same manner.

(6) Measure the side clearance between the sleeve bearing (10) and the crankshaft with a feeler gage. It should measure at least 0.004 inch and not more than 0.016 inch.

(6) Install the cylinder heads (par. 124).

(7) Install the oil pump (par. 193).

196. Crankshaft

a. Removal.

(1) Remove the oil pump (par. 193).

(2) Remove the connecting rods and pistons (par. 195).

(3) Remove the oil slinger (29, fig. 36) from the front end of the crankshaft (34).

(4) Remove the six bolts (22) and lockwashers (23) that secure the bearing plate (25) to the crankcase and remove the bearing plate with attached oil seal (24) and bearing cup (32), gaskets (26) and shims (27 and 28).

(5) Remove the cup and oil seal from the bearing plate if defective.

(6) Carefully remove the crankshaft with attached parts through the rear opening in the crankcase.

(7) Press the crankshaft gear (30) off the crankshaft and remove the woodruff key (31) from the crankshaft.

(8) Press the two bearing cones (33) off the crankshaft.

(9) Remove the six bolts and lockwashers (23) that secure the bearing retainer plate to the crankcase and remove the retainer plate.

(10) Remove the bearing cup (32, fig. 36) from the crankcase if defective.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the connecting rod journals of the crankshaft for scoring. Hone a crankshaft to remove scores or replace a defective crankshaft.

(3) Measure the journals. Replace the crankshaft if the journals measure less than 2.125 inches.

(4) Inspect the bearing plate for cracks and breaks. Replace if defective.

(5) Inspect the oil seal for damage or signs of wear. Replace a defective oil seal.

(6) Inspect the bearing cones and cups for rough rolling elements and races. Replace if defective.

(7) Inspect all attaching hardware for distortion and damaged threads and replace if defective.

c. Installation.

(1) Install the bearing cup (32, fig. 36) in the crankcase.

(2) Position the bearing retainer plate on the crankcase and secure with the 6 lockwashers and 6 bolts.

(3) Press the two bearing cones (33, fig. 36) onto the crankshaft (34).

(4) Insert the woodruff key (31) in the crankshaft and press the crankshaft gear (30) onto the crankshaft.

(5) Carefully insert the crankshaft in the crankcase through the rear opening.

(6) Press the oil seal (24) and the bearing cup (32) into the bearing plate (25).

(7) With a thin film of grease, position one gasket (26) on the crankcase, the other on the bearing plate. Position the shims (27 and 28) and the bearing plate on the crankcase and secure with 6 lockwashers (23) and 6 bolts (22).

Tighten the bolts to a torque of 25 to 30 ft-lbs.

(8) Clamp a dial indicator on the crankcase with its plunger touching the end of the crankshaft. Pry the crankshaft back and forth while noting the indicator reading. Add or delete shims (27 and 28) as necessary to obtain end play between 0.002 and 0.004 inch.

(9) Install the oil slinger (29) on the crankshaft.

(10) Install the connecting rods and pistons (par. 195).

(11) Install the oil pump (par. 193).

197. Camshaft

a. Removal.

(1) Remove the valves (par. 186).

(2) Remove the crankshaft (par. 196).

(3) Remove the 8 tappet assemblies (5, fig. 26) from the 2 cylinder blocks (13). Tag the tappets to assure installation in their respective bores.

(4) Remove the crankshaft gear (par. 190).

(5) Remove the camshaft (25, fig. 27) from the crankcase.

(6) Remove the 6 bolts and lockwashers that secure the 2 splash plates in place and remove the splash plates from inside the crankcase.

(7) Remove the expansion plug (32, fig. 24) if defective.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the bearing surfaces and cam lobes of the camshaft for nicks, burs, and scores. Remove minor abrasions with fine emery cloth. Replace a defective camshaft.

(3) Inspect the tappet assemblies for nicks, burs, distortion, and damaged threads. Replace a defective tappet assembly.

(4) Inspect the expansion plug in the crankcase for signs of oil leaks. Remove and replace if defective.

c. Installation.

(1) Install the expansion plug (32, fig. 24) in the crankcase.

(2) Position the 2 splash plates in the crankcase and secure with the 6 lockwashers and 6 bolts.

(3) Install the camshaft (25, fig. 27) in the crankcase.

(4) Install the camshaft gear (par. 190).

(5) Insert the 8 tappet assemblies (5, fig. 26) in the 2 cylinder blocks (13).

(6) Install the crankshaft (par. 196).

(7) Install the valves (par. 186).

Section VI. CYLINDER BLOCKS AND CRANKCASE

198. General

The cylinder blocks are cast in pairs and are provided with cooling fins. The valve stem guide bores are machined in the blocks. The cylinder blocks are secured to the crankcase with studs and hex nuts. The crankcase is a one-piece casting with an integral cast oil vane on the left-side into which are installed the oil nozzles.

199. Cylinder Blocks

a. Removal.

(1) Remove the valves (par. 186).

(2) Remove the connecting rods and pistons (par. 195).

(3) Remove the six hex nuts and lockwashers that secure the cylinder block to the crankcase and remove the block and gasket (5, fig. 24) from the crankcase.

(4) Remove the six studs (34) from the crankcase, if defective.

(5) Remove the other cylinder block in the same manner.

b. Cleaning, Inspection, and Repair.

(1) Use a wire brush, compressed air, and an approved cleaning solvent to clean the fins of the cylinder blocks.

(2) Inspect the cylinder bores of the cylin-

der blocks for scores. Rebore and hone a scored cylinder block and install oversized pistons (par. 195).

(3) Inspect the cylinder block for cracks, breaks, distortion and damaged threads. Replace a defective cylinder block.

(4) Inspect all attaching hardware for distortion and damaged threads and replace if defective.

c. Installation.

(1) Install the six studs (34, fig. 24) in the crankcase.

(2) Position a new gasket (5) and the cylinder block on the crankcase and secure with the six lockwashers and hex nuts. Tighten the nuts to a torque of 62 to 78 ft-lb.

(3) Install the connecting rods and pistons (par. 195).

(4) Install the valves (par. 186).

(5) Install the other cylinder block in the same manner.

200. Crankcase

a. Removal.

(1) Remove the timing gears (par. 190).

(2) Remove the camshaft (par. 197).

(3) Remove the cylinder blocks (par. 199).

b. Cleaning, Inspection, and Repair.

(1) Clean the crankcase with an approved cleaning solvent and dry thoroughly. Blow the oil header clear with compressed air.

(2) Inspect the crankcase for cracks, breaks, distortion, and damaged threads. Replace a defective crankcase.

c. Installation.

(1) Install the cylinder blocks (par. 199).

(2) Install the camshaft (par. 197).

(3) Install the timing gears (par. 190).

CHAPTER 10
HYDRAULIC SYSTEM AND RUNNING GEAR MAINTENANCE INSTRUCTIONS

Section I. PRESSURE COMPENSATOR CONTROL

201. General

The pressure compensator control is similar in operation to a pressure relief valve. As the pressure is increased in the system, the flow from the compensator valve is applied directly against a piston, pressing this piston against the hanger mechanism, reducing the angle of the cam plate. The greater the pressure, the greater the distance the hanger is depressed, reducing the volume while maintaining the pressure. The volume will continue to reduce until the bottom stop is encountered. This minimum stop is used only when it is not desirable to go to zero volume delivery.

202. Removal

a. Remove the pump (par. 153).

b. Remove the compensator and volume hand controls (par. 154).

c. Disconnect the tube (1, fig. 37) from the two tube fittings (2) and remove the fittings from the control cap (9) and the pressure flange (39).

d. Remove the four screws (6) that secure the control cap to the hanger housing assembly (13) and remove the control cap and gasket (12).

e. Remove the 20 screws (4) that secure the end cap (3) and gasket (5) to the hanger housing assembly (13) and remove the end cap and gasket.

f. Remove four screws (7) that secure the stop body assembly (10) and gasket (12) to the hanger housing and remove the stop body and gasket.

g. Remove the four screws (8) that secure the clevis (11) in place and remove the clevis.

203. Disassembly

a. Remove the stop spool (1, fig. 38) and O-ring packing (2) from the control cap (21).

b. Pull the control sleeve (5) with attached parts out of the control cap. Remove the retaining ring (3) and O-ring packing (4) from the control sleeve.

c. Remove the control piston (6), spring (7), and spring retainer (8) from the control cap.

d. Remove the lockwasher (9) and preformed packing (10) from the adjustment housing (15).

e. Remove the adjustment housing and preformed packing (16) from the control cap, Remove the seal piston (11), spring (12), ball support (13), and ball (14) from the adjustment housing.

f. Remove the control sleeve (19) with attached parts from the control cap (21), Remove the control piston (17) from inside the sleeve and remove the retaining ring (18) and preformed packing (20) from the control sleeve.

g. Remove the two screws (22) that secure the control cap (21) to the control housing (26) and remove the control cap, O-ring packing (23), and O-ring gasket (24). Remove the piston (25) from the control housing.

h. Remove the 2 dowel pins (35 and 37) and the 2 bearings (36 and 38) from the clevis (39).

i. Remove the nut (27) from the stop body (34). Pull the tongue (29) out of the stop body and remove the O-ring packing (28) from the tongue.

j. Unscrew the stop (32) from the stop body (34). Remove the spring (33). Remove the roll pin (30) and piston (31) from the stop.

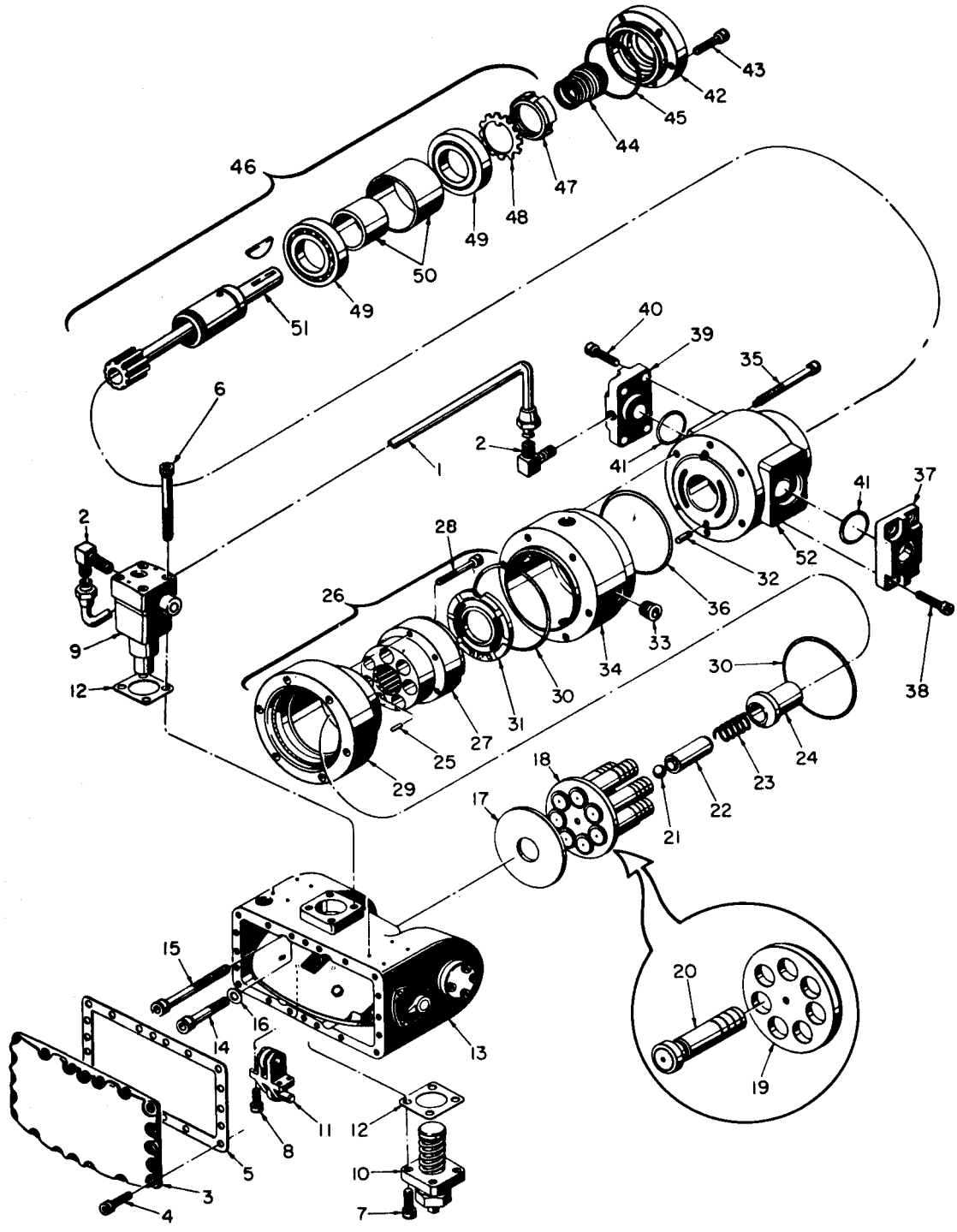


Figure 37. Pump, exploded view.

1 Tube
2 Tube fitting (2 rqr)
3 End cap
4 Screw, socket head, ¼–20 x ⅞ in. (20 rqr)
5 Gasket
6 Screw, socket head, 7/16–14 x 1 in. (4 rqr)
7 Screw, socket head, 7/16–14 x 1 in. (4 rqr)
8 Screw, socket head, 5/16–18 x 1 in. (4 rqr)
9 Control cap
10 Stop body assembly
11 Clevis
12 Gasket (2 rqr)
13 Hanger housing assembly
14 Screw, socket head, ⅜–16 x 2½ in. (2 rqr)
15 Screw, socket head, ⅜–16 x 2½ in. (4 rqr)
16 Gasket (6 rqr)
17 Creep plate
18 Retainer, piston and shoe assembly
19 Shoe retainer
20 Piston and shoe assembly
21 Ball
22 Spring socket
23 Spring
24 Spring retainer
25 Spring retainer pin
26 Bearing and barrel assembly
27 Cylinder barrel
28 Screw, socket head, ¼–20 x 1½ in. (7 rqr)
29 Bearing
30 O-ring gasket (2 rqr)
31 Port plate
32 Dowel pin
33 Plug (5 rqr)
34 Pump body
35 Screw, socket head, ⅜–16 x 2¾ in. (6 rqr)
36 O-ring gasket
37 Suction flange
38 Screw, socket head, ⅝–11 x 2 in. (4 rqr)
39 Pressure flange
40 Screw, socket head, ⅝–11 x 2 in. (4 rqr)
41 O-ring gasket (2 rqr)
42 Seal retainer
43 Screw, socket head, No. 10–24 x ½ in. (6 rqr)
44 Seal
45 O-ring packing
46 Shaft assembly
47 Locknut
48 Washer
49 Ball bearing
50 Spacers
51 Shaft and sleeve assembly
52 Port block

Figure 37—Continued.

204. Cleaning, Inspection, and Repair

a. Clean all parts with an approved cleaning solvent and dry with a lint free cloth.

b. Inspect the control sleeves, pistons, tongue, stop, and ball support for nicks, burs, scores, and distortion. Remove minor abrasions. Replace a damaged or defective part.

c. inspect the control cap, control housing, stop body, and clevis for cracks, breaks, distortion, and damaged threads. Replace a defective part.

d. Inspect the springs for cracks, distortion, and for lack of tension. Replace a defective spring.

e. Inspect the bearings for rough rolling elements and races. Replace a defective bearing.

f. Inspect all attaching hardware for distortion and damaged threads and replace if defective.

205. Reassembly

a. Insert the piston (31, fig. 38) in the stop (32) and install the roll pin (30). Place the spring (33) on the stop and screw the stop into the stop body (34).

b. Install the O-ring packing (28) on the tongue (29) and slide the tongue into the stop body. Install the nut (27) on the stop body.

c. Position the 2 bearings (36 and 38) on the clevis (39) and install the 2 dowel pins (35 and 37).

d. Place new O-ring packing (23) and O-ring gasket (24) on the control housing (26). Position the control cap (21) on the housing and secure with the two screws (22). Insert the piston (25) in the housing.

e. Install a new preformed packing (20) and the retaining ring (18) on the control sleeve (19). Insert the control piston (17) in the control sleeve and install the sleeve with attached parts in the control cap.

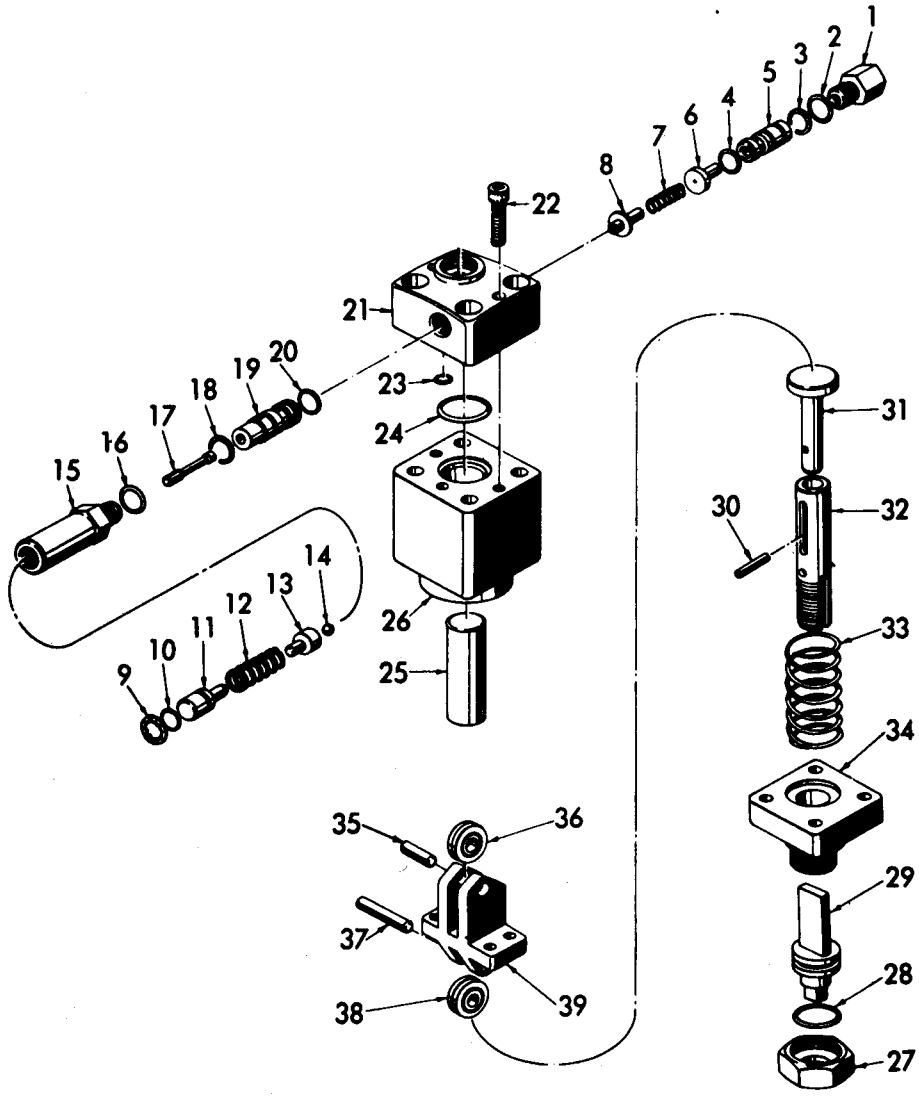
f. Insert the ball (14), ball support (13), spring (12) and seal piston (11) in the adjustment housing (15) and install the housing and a new preformed packing (16) in the control cap.

g. Install a new preformed packing (10) and the lockwasher (9) in the adjustment housing.

h. Insert the spring retainer (8), spring (7), and the control piston (6) in the control cap.

i. Install a new O-ring packing (4) and retaining ring (3) on the control sleeve (5) and slide the sleeve into the control cap.

j. Install a new O-ring packing (2) and the stop spool (1) in the control cap.



1	Stop spool	15	Adjustment housing	27	Nut
2	O-ring packing	16	Preformed packing	28	O-ring packing
3	Retaining ring	17	Control piston	29	Tongue
4	O-ring packing	18	Retaining ring	30	Roll pin
5	Control sleeve	19	Control sleeve	31	Piston
6	Control piston	20	Preformed packing	32	Stop
7	Spring	21	Control cap	33	Spring
8	Spring retainer	22	Screw, socket head, No. 10–24 x ½ in. (2 rqr)	34	Stop body
9	Lockwasher			35	Dowel pin
10	Preformed packing	23	O-ring packing	36	Ball bearing
11	Seal piston	24	O-ring gasket	37	Dowel pin
12	Spring	25	Piston	38	Ball bearing
13	Ball support	26	Control housing	39	Clevis
14	Ball				

Figure 38. Pressure compensator control, exploded view.

206. Installation

a. Secure the clevis (11, fig. 37) in place with the four screws (8).

b. Position a new gasket (12) and the stop body assembly (10) on the hanger housing assembly (13) and secure with the four screws (7).

c. Position a new gasket (5) and the end cap (3) on the hanger housing and secure with 20 screws (4).

d. Position a new gasket (12) and the control cap (9) on the hanger housing and secure with the four screws (6).

e. Install the two tube fittings (2) in the pressure flange (39) and control cap and connect the tube (1) to the fittings.

f. Install the compensator and volume hand controls (par. 156).

g. Install the pump (par. 157).

Section II. HYDRAULIC PUMP

207. Removal and Disassembly

a. Remove the pressure compensator control (par. 202).

b. Remove the 4 screws (15, fig. 37), 2 screws (14), and 6 gaskets (16) that secure the hanger housing assembly (13) and O-ring gasket (30) to the bearing (29) and remove housing and O-ring. Remove the creep plate (17) from the index plate (15, fig. 39).

c. Remove the screw (2) that secures the indicator link (1) to the indicator shaft (7) and remove the link from the shaft.

d. Remove the pin (4) that secures the indicator (3) to the shaft and remove the indicator.

e. Remove the three screws (6) that secure the indicator plate (5) to the hanger housing (26) and remove the plate.

f. Remove the indicator shaft (7) from the housing and remove the O-ring packing (8) from the shaft.

g. Remove the 8 screws (10) that secure the 2 end plates (9) and 2 gaskets (11) to the housing and remove the plates and gaskets.

h. Remove the two trunnion pins (12) from the housing releasing the hanger (23) and remove the hanger from the housing. Remove the two O-ring packings (13) from the trunnion pins.

i. Remove the two trunnion spacers (14) from the housing.

Caution: **Exercise extreme care in handling the trunnion spacers to prevent scratching the bearing surfaces.**

j. Match mark the index plate (15) and the hanger (23) to assure alinement during reassembly. Remove the screw (16) that secures the index plate to the hanger and remove the index plate and two dowel pins (17) from the hanger.

k. Remove the bolt (18), two setscrews (19 and 21), and the indicator operating pin (20) from the hanger.

l. Press the two needle bearings (22) out of the hanger (23) if defective.

m. Remove the two plugs (24 and 25) from the hanger housing (26).

n. Remove the outer race of bearing (29, fig. 37) from the inner race and remove the O-ring gasket (30) from the pilot of the pump body (34).

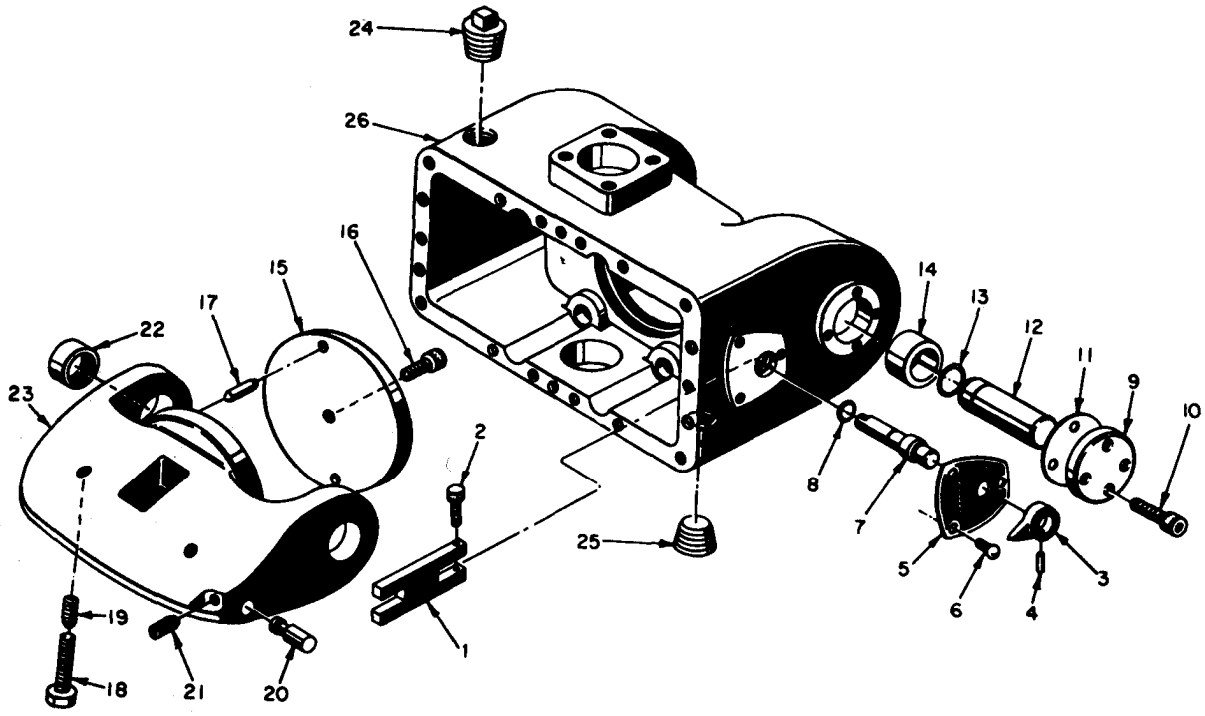
o. Remove the retainer, piston and shoe assembly (18) from the cylinder barrel (27).

Note. Mark each piston to make certain it is installed in the same bore from which it was removed.

p. Remove the ball (21), spring socket (22), spring (23), spring retainer (24), and spring retainer pin (25) from the cylinder barrel.

q. Slide the cylinder barrel (27) with attached inner race of bearing (29) out of the pump body (34). Remove the seven screws (28) that secure the bearing inner race to the barrel and remove the bearing. The port plate (31) may stick to the cylinder barrel during its removal. Use caution to prevent port plate from dropping. Remove the port plate if it has remained in the pump body.

r. Remove the six screws (35) that secure the pump body (34) to the port block (52) and remove the body, O-ring gasket (36) and the dowel pin (32) from the port block. Remove five plugs (33) from the pump body.



1 Indicator link
2 Screw, socket head, No. 10–32 x ½ in.
3 Indicator
4 Pin
5 Indicator plate
6 Screw, machine (3 rqr)
7 Indicator shaft
8 O-ring packing
9 End plate (2 rqr)
10 Screw, socket head, ¼–20 x ½ in. (8 rqr)
11 Gasket (2 rqr)
12 Trunnion pin (2 rqr)
13 O-ring packing (2 rqr)
14 Trunnion spacer (2 rqr)
15 Index plate
16 Screw, socket head, ¼–20 x ⅝ in.
17 Dowel pin
18 Bolt
19 Setscrew
20 Indicator operating pin
21 Setscrew, ¼–20 x ⅜ in.
22 Needle bearing
23 Hanger
24 Plug
25 Plug
26 Hanger housing

Figure 39. Hanger housing assembly, exploded view.

s. Remove the six screws (43) that secure the seal retainer (42) to the port block (52) and remove the seal retainer. Remove the O-ring packing (45) from the seal retainer. Remove the seal (44) from the seal retainer only if defective.

t. Remove the shaft and sleeve assembly (51) with attached bearings from the port block. Bend the tabs of the washer (48) away from the lock nut (47) and remove the nut and washer.

u. Mark the position of the ball bearings (49) on the shaft and sleeve assembly and press the shaft out of the bearings and spacers (50).

Caution: **Note the bearing surfaces contacting the spacers. These are preloaded bearings and must be reassembled exactly as removed.**

v. Remove the 8 screws (38 and 40) that secure the suction flange (37) and the pressure flange (39) to the port block (52) and remove the flanges and 2 O-ring gaskets (41).

208. Cleaning, Inspection, and Repair

a. Clean all metal parts with an approved cleaning solvent and dry with a lint free cloth.

b. Rotate the bearings and inspect for rough rolling elements and races. Replace a defective or worn bearing.

c. Inspect the creep plate for pits, scores and scratches. Replace a defective creep plate.

d. Inspect the piston and shoe assembly, and the cylinder barrel for pits, scratches, and abrasion. If either item is found to be defective the barrel and bearing assembly must be replaced as a matched set.

e. Inspect the port plate for scratches and distortion. Remove scratches by lapping. Replace a port plate damaged beyond repair.

f. Inspect the shaft seal lip for cracks and scratches. Replace a damaged seal or one that has been leaking.

g. Inspect the splines of the shaft and sleeve assembly for cracked or chipped teeth. Replace a damaged shaft and sleeve assembly.

h. Inspect the index plate for nicks, burs, scratches and abrasion. Replace a defective index plate.

i. Inspect the port block for cracks, breaks, and damaged threads. Check the face which mates with the port plate for irregular surface. Reface by crown grinding, the center being 0.0002 to 0.0004 inch high. Replace a port block damaged beyond repair.

j. Inspect all other parts for cracks, breaks, distortion, and damaged threads and replace if defective.

209. Reassembly and Installation

a. Place 2 new O-ring gaskets (41, fig. 37) on the port block (52). Position the suction and pressure flanges (37 and 39) on the port block and secure with the 8 screws (38 and 40).

b. Press the 2 ball bearings (49) and 2 spacers (50) onto the shaft and sleeve assembly (51) and secure with the washer (48) and locknut (47).

c. Install the shaft and sleeve assembly in the port block.

d. Install the seal (44) in the seal retainer (42). Place a new O-ring packing (45) on the seal retainer, insert the retainer in the port block (52) and secure with the six screws (43).

e. install plugs (33) in the pump body (34). Install the dowel pin (32) in the port block (52). Place a new O-ring gasket (36) and the pump body on the port block and secure with the six screws (35).

f. Apply a film of hydraulic oil to the port plate (31). Install the port plate in the pump body (34) over the splined end of the shaft and sleeve assembly. Turn the port plate in the direction of pump rotation until the last of the three holes in the back of the port plate engages the dowel pin (32). Make certain the port plate will move slightly and freely.

g. Position the inner race of bearing (29) on the cylinder barrel (27) and secure with the seven screws (28). Apply a film of hydraulic oil to the barrel and bearing and slide the barrel into the pump body.

h. Install the spring retainer pin (25), spring retainer (24), spring (23), spring socket (22), and ball (21) in the cylinder barrel.

i. Install the retainer, piston and shoe assembly (18) in the cylinder barrel (27). Make certain the pistons enter the same bore from which they were removed.

j. Place a new O-ring gasket (30) on the pilot of the pump body and install the outer race of the bearing (29) on the inner race.

k. Install the two plugs (24 and 25, fig, 39) in the hanger housing (26).

l. Press the two needle bearings. (22) into the hanger (23).

m. Install the indicator operating pin (20), two setscrews (19 and 21), and the bolt (18) in the hanger.

n. Install the two dowel pins (17) and the index plate (15) on the hanger (23) and secure with the screw (16). Make certain the index plate is installed in accordance with marks made during disassembly.

o. Install the two trunnion spacers (14) in the hanger housing (26).

p. Install two new O-ring packings (13) on the two trunnion pins (12). Position the hanger (23) with attached parts in the hanger housing and insert the two trunnion pins in the alined holes of the spacers and needle bearings.

q. Place two new gaskets (11) and the two end plates (9) on the housing and secure with the eight screws (10).

r. Install a new O-ring packing (8) on the indicator shaft (7) and insert the shaft in the housing.

s. Position the indicator plate (5) on the hanger housing over the shaft and secure with the three screws (6).

t. Install the indicator (3) on the indicator shaft and secure with the pin (4).

u. Set the indicator on zero. Position the indicator link (1) on the indicator shaft with the slot of the link horizontal or pointing to the rear of the pump and secure with the screw (2).

v. Install the creep plate (17, fig. 37) on the index plate.

w. Place a new O-ring gasket (30) and the hanger housing assembly (13) on the bearing (29) and secure with the 6 gaskets (16), 2 screws (14), and 4 screws (15).

x. Install the compensator control (par. 205).

Section III. FRAME ASSEMBLY

210. General

In the event the welded steel frame of the running gear should become damaged beyond repair, it is the responsibility of depot maintenance to replace the damaged frame. This constitutes the removal of all major components of the test stand.

211. Removal

a. Remove the pump (par. 153).

b. Remove the engine (par. 108).

c. Remove the steering gear (par. 75).

d. Remove the arm assemblies and arm supports (par. 169).

212. Installation

a. Install the arm assemblies and arm supports (par. 169).

b. Install the steering gear (par. 75).

c. Install the engine (par. 108).

d. Install the pump (par. 157).

CHAPTER 11

SHIPMENT AND LIMITED STORAGE AND DEMOLITION OF MATERIAL TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

213. Preparation of Equipment for Shipment

a. Remove the drain plug from the fuel tanks and drain the fuel into a suitable container.

b. Drain the carburetor and fuel lines into a container.

c. Disconnect the battery cables from the battery and wrap the clamps with tape. Drain the electrolyte from the battery.

d. Drain the hydraulic system by removing the drain plug from the bottom of the low pressure filter (par. 9).

e. Replace drain plug and refill the system with preservative hydraulic oil.

f. Drain the hydraulic pump (par. 153) and refill the pump with preservative hydraulic oil.

g. Drain the engine crankcase (par. 108) and refill with corrosion preventive compound.

h. Cap all inlet and outlet parts and fasten cabinet doors securely.

i. Place several bags of desiccant in the cabinet interior.

214. Limited Storage

a. Locate the test stand so there will be sufficient room on all sides to perform the inspection and maintenance necessary while it is in storage. Jack up the test stand to get the tires off the surface and place suitable blocks under the frame.

b. Perform a monthly inspection while the equipment is in storage and inspect for evidence of physical damage, such as rusting, accumulation of water, pilferage, or leakage.

Section II. DEMOLITION OF TEST STAND TO PREVENT ENEMY USE

215. General

When capture or abandonment of the unit to the enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all air compressors and all corresponding repair parts.

216. Demolition to Render the Equipment Inoperative

a. Demolition by Misuse.

(1) Cut the fan belt.

(2) Drain the oil from the engine crankcase and pour sand in the oil filler opening.

(3) Start the engine and remove the governor control rod. Allow the engine to run at ungoverned speed until it fails.

(4) Pour sand into the hydraulic reservoir and let the sand be drawn through the hydraulic system.

b. Demolition by Mechanical Means. Use a sledge hammer, pickaxe, or other heavy tool and destroy the following:

(1) Manifold and Carburetor

(2) Cylinder block

(3) Battery

(4) Relief valves

(5) Control panel

(6) Low pressure filter

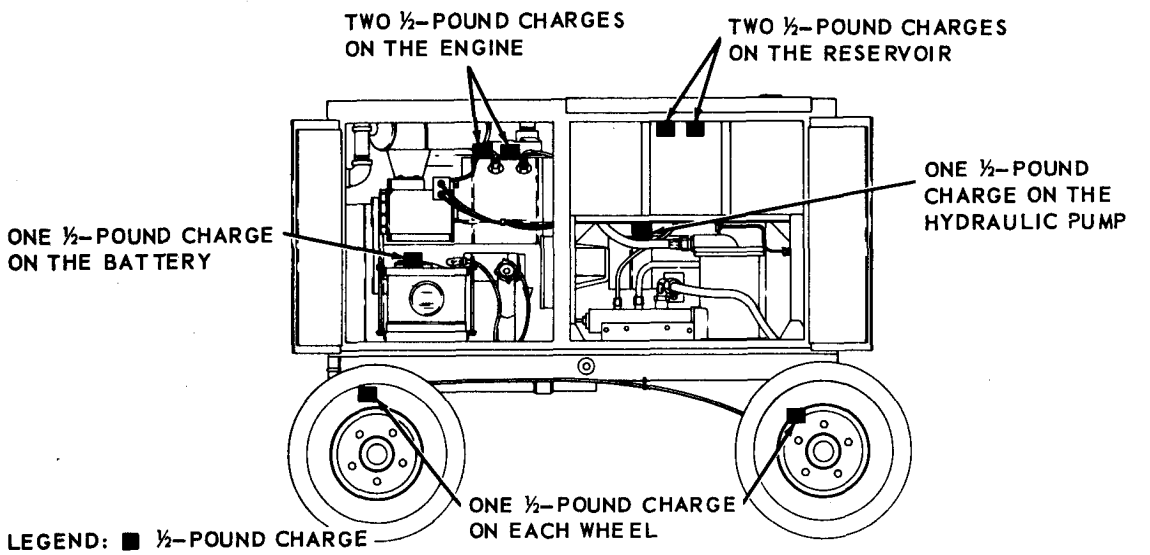


Figure 40. Placement of charges.

217. Demolition by Explosives or Weapons' Fire

a. Demolition By Explosives. Place the following charges, and detonate them simultaneously with detonating cord and a suitable detonator.

(1) One ½ pound charge on each wheel.
(2) Two ½ pound charges on the engine.
(3) One ½ pound charge on the battery.
(4) Two ½ pound charges on the hydraulic pump.
(5) Two ½ pound charges on the reservoir.

b. Demolition By Weapons' Fire. Fire on the test stand with the heaviest suitable weapons available.

218. Other Demolition Methods

a. Demolition by Scattering and Concealment. Remove all easily accessible vital parts from the engine and from the pump. Scatter these parts through dense foliage or throw them in a lake, stream, or other body of water.

b. Demolition By Burning. Pack rags, clothing, or canvas around the engine, fuel tank, control panel, battery, and pump. Saturate this packing with gasoline, oil, or diesel fuel, and ignite.

c. Demolition By Submersion. Totally submerge the test stand in a body of water to provide water damage and concealment.

219. Training

All operators should receive thorough training in the destruction of the test stand (FM 5–25). Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment, and be able to carry out demolition instructions without reference to this or any other manual.

APPENDIX I
REFERENCES

1. Dictionaries of Terms and Abbreviations

AR 320-50	Authorized Abbreviations and Brevity Codes.
AR 320–5	Dictionary of United States Army Terms.

2. Fire Protection

TM 5-687	Repairs and Utilities; Fire Protection Equipment and Appliances; Inspections, Operations, and Preventive Maintenance.
TM 9–1799	Ordnance Maintenance: Fire Extinguishers.

3. Preventive Maintenance

AR 750-5	Organization, Policies, and Responsibilities for Maintenance Operation.

4. Painting

TM 9-213	Painting Instructions For Field Use.

5. Publication Indexes

DA Pam 108–1	Index of Army Motion Pictures, Film Strips, Slides, Tapes, and Phonorecordings.
DA Pam 310–1	Index of Administrative Publications.
DA Pam 310–2	Index of Blank Forms.
DA Pam 310–3	Index of Training Publications.
DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 4, 6, 7, 8, and 9), Supply Bulletins, Lubricated Orders, and Modification Work Orders.
DA Pam 310–5	Index of Graphic Training Aids and Devices.

6. Training Aids

FM 5-25	Explosives and Demolition.
FM 21-5	Military Training.
FM 21-6	Techniques of Military Instruction.
FM 21-30	Military Symbols.

APPENDIX II
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

This Maintenance Allocation Chart lists all maintenance and repair operations authorized for the various levels of maintenance.

2. Maintenance

Maintenance is any action taken to keep materiel in a serviceable condition or to restore it to serviceability when it is unserviceable. Maintenance of materiel includes the following:

a. Service. To clean, to preserve, and to replenish fuel and lubricants.

b. Adjust. To regulate periodically to prevent malfunction.

c. Inspect. To verify serviceability and to detect incipient mechanical failure by scrutiny.

d. Test. To verify serviceability and to detect incipient mechanical failure by use of special equipment such as gages, meters, and so on.

e. Replace. To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.

f. Repair. To restore to a serviceable condition by replacing unserviceable parts or by any other action required utilizing tools, equipment, and skills available, to include welding, grinding, riveting, straightening, and adjusting.

g. Overhaul. To restore an item to a completely serviceable condition by inspecting, disassembling its assemblies and subassemblies as necessary, replacing parts, and performing necessary boring, grinding or machining operations, followed by reassembly and final inspection.

3. Explanation of Columns

a. Components and Related Operation. This column contains the functional index grouping heading, subgroup headings, and a brief description of the part starting with the noun name. It also designates the operation to be performed such as service, adjust, inspect, test, replace, repair, and overhaul.

b. Level of Maintenance.

(1) *Operator Maintenance.* Operator maintenance performed by the user or operator of the equipment, such as servicing, cleaning, lubricating, and limited adjustments. It also includes removal and replacement of items to accomplish servicing and lubrication.

(2) *Organizational Maintenance.* organizational maintenance is that maintenance performed by trained personnel provided for that purpose in the using organization, such as replacement of all items in the organizational maintenance column, limited parts fabrication from bulk material, adjustments, and repair of assemblies, components, and end items that can be accomplished without extensive disassembly.

(3) *Direct Support Maintenance.* Direct support maintenance is that maintenance performed by specially trained units in direct support of the using organization, such as replacement of all items in the organizational and direct support maintenance columns; repair of assemblies, components, and end items; and fabrication of parts from bulk material.

(4) *General Support Maintenance.* General support maintenance is that maintenance performed by units organized as semifixed or permanent shops to serve lower levels of maintenance

within a geographical area, such as replacement of items in the organizational, direct support, and general support columns; repair of end items; overhaul of assemblies and components; and fabrication of general use common hardware and parts.

(5) *Depot Maintenance.* Depot maintenance is that maintenance authorized to overhaul assemblies, components, end items, and replacement of all parts in the organizational, direct support, general support, and depot maintenance columns.

c. Symbol X. The symbol X indicates the lowest level of maintenance responsible for performing that particular maintenance operation, but does not necessarily indicate repair parts will be stocked at that level.

d. Remarks. The remarks column is used to explain why maintenance, that would normally be done at a lower level of maintenance, is moved to a higher level of maintenance because of some peculiarity in the construction of the end item.

Section II. MAINTENANCE ALLOCATION CHART

Group No.	Component and related operations	O/C	O	DS	GS	D	Tools required	Remarks
1.0	TEST STAND, AIRCRAFT HYDRAULIC							
	Service		X					
	Ad just		X					
	Aline			X				
	Calibrate				X			
	Inspect		X					
	Test				X			
	Replace			X				
	Repair				X			
	Overhaul					X		
2.0	ELECTRICAL SYSTEM							
2.1	Battery:							
	Service		X					
	Replace			X				
	Repair			X				
2.2	Ignition Harness:							
	Inspect		X					
	Replace			X				
	Repair				X			
2.3	Generator:							
	Service		X					
	Inspect		X					
	Replace			X				
	Repair				X			
	Overhaul					X		
2.4	Voltage Regulator:							
	Adjust			X				
	Replace			X				
	Repair				X			
	Inspect		X					
2.5	Starter:							
	Service		X					
	Inspect		X					
	Replace			X				
	Repair				X			
	Overhaul					X		

Group No.	Component and related operations	O/C	O	DS	GS	D	Tools required	Remarks
2.6	Thermo Switch:							
	Inspect		X					
	Replace			X				
2.7	Pilot Lights:							
	Inspect		X					
	Replace			X				
2.8	Fuses:							
	Inspect		X					
	Replace			X				
3.0	HYDRAULIC SYSTEM							
3.1	Lines, Tubing, Fittings:							
	Inspect		X					
	Replace			X				
3.2	Fluid Reservoir:							
	Service		X					
	Inspect		X					
	Replace			X				
	Repair			X				
3.3	Pump:							
	Service		X					
	Inspect		X					
	Replace				X			
	Repair				X			
	Calibrate				X			
	Overhaul					X		
3.4	Controls:							
	Inspect		X					
	Replace			X				
3.5	Filter Elements:							
	Inspect		X					
	Replace		X					
3.6	Coupling Half:							
	Inspect		X					
	Replace		X					
3.7	Hose Assemblies:							
	Inspect		X					
	Replace		X					
3.8	Pressure Gage:							
	Inspect		X					
	Replace		X					
	Calibrate				X			
3.9	O-Rings:							
	Replace			X				
3.10	Valves:							
	Replace			X				
	Repair				X			
	Overhaul					X		
3.11	Dampener:							
	Replace				X			
3.12	Compensator Control:							
	Replace				X			
	Repair				X			
3.13	Drain Assembly, Petcock:							
	Replace		X					
3.14	Neck, Tank Filler:							
	Replace			X				
3.15	Send Unit:							
	Replace			X				

Group No.	Component and related operations	O/C	O	DS	GS	D	Tools required	Remarks
3.16	Filter Housing:							
	Replace			X				
	Repair				X			
3.17	Control Panel and Accessories:							
	Replace				X			
	Repair				X			
4.0	NGINE							
4.1	Manifold:							
	Replace				X			
4.2	Instruments:							
	Replace			X				
	Calibrate				X			
4.3	Spark Plugs:							
	Replace			X				
4.4	Magneto:							
	Replace			X				
	Repair				X			
	Overhaul					X		
4.5	Oil Filter:							
	Replace			X				
4.6	Muffler:							
	Replace			X				
	Repair			X				
4.7	Air Shroud:							
	Replace			X				
	Repair			X				
4.8	Governor:							
	Replace			X				
	Repair				X			
4.9	Fuel Pump:							
	Replace			X				
	Repair			X				
4.10	Gaskets:							
	Replace			X				
4.11	Carburetor:							
	Replace			X				
	Repair			X				
	Overhaul				X			
4.12	Fuel Strainer:							
	Replace			X				
4.13	Oil Filter:							
	Replace			X				
4.14	Manifold Assembly:							
	Replace				X			
	Repair				X			
4.15	Cylinder Block and Components:							
	Replace				X			
	Repair					X		
	Overhaul					X		
4.16	Camshaft and Components:							
	Replace					X		
	Repair					X		
	Overhaul					X		
5.0	ISCELLANEOUS							
5.1	Tires:							
	Replace		X					

Group No.	Component and related operations	O/C	O	DS	GS	D	Tools required	Remarks
5.2	Fuel Tank:							
	Replace				X			
	Repair				X			
5.3	Thermometer:							
	Replace			X				
5.4	Lubrication Fittings:							
	Service		X					
	Replace			X				
5.5	Brake Assembly:							
	Inspect		X					
	Replace			X				
	Repair				X			
5.6	Tie Rod Assembly:							
	Inspect			X				
	Replace			X				
	Repair			X				
5.7	Drawbar Assembly:							
	Replace		X					
	Repair			X				
5.8	Steering Arm Assembly:							
	Replace		X					
	Repair			X				
5.9	Brake Lever Assembly:							
	Replace		X					
	Repair			X				
5.10	Latch, Steering Arm:							
	Replace		X					
	Repair			X				
5.11	Wheel and Hub Assembly:							
	Replace			X				
	Repair			X				
5.12	Inner Tube:							
	Replace			X				
5.13	Brake Drum:							
	Replace			X				
	Repair			X				
5.14	Springs:							
	Replace			X				
	Repair				X			
5.15	Axles Assemblies:							
	Replace				X			
	Repair				X			
5.16	Kingpin, Steering Knuckle:							
	Replace				X			
5.17	Bearing Sleeves:							
	Inspect			X				
	Replace				X			
5.18	Bumper, Rubber:							
	Replace			X				
5.19	Support Assemblies:							
	Replace			X				
	Repair			X				
5.20	Cable Assembly, Brake:							
	Inspect		X					
	Replace			X				
	Repair			X				

Group No.	Component and related operations	O/C	O	DS	GS	D	required Tools	Remarks
5.21	Frame Assembly:							
	Replace					X		
	Repair				X			
5.22	Bearings:							
	Service			X				
	Replace			X				
5.23	Bearing Race:							
	Replace			X				
5.24	Brackets:							
	Replace			X				
	Repair			X				
5.25	Spacers:							
	Replace			X				

APPENDIX III
REPAIR PARTS LIST

Section I. INTRODUCTION TO GROUP ASSEMBLY PARTS LIST

1. General

This portion of the manual lists the repair parts and special tools authorized for operator, organizational, direct support, general support, and depot maintenance of Test Stand, Hydraulic System, Aircraft, Type D-5A, Model AHT-5A-1, Sun Electric Corp. This is the authority to requisition for operator and organizational maintenance, and the authority to requisition and issue for direct support, general support, and depot maintenance. It serves as a guide to determine the quantity of items authorized for initial stockage in accordance with AR 700–70 and AR 711-16. It supplements tables of equipment, allowances, and other applicable authorization documents.

2. Arrangement

All repair parts are listed in disassembly order and indented when required to indicate relationship to the next higher assembly.

3. Tools

No special tools are required.

4. Explanation of Columns

a. AMC Materiel Code. (Formerly Technical Service Code). Materiel basic number. Items which are the logistic responsibility of a commodity command, other than U. S. Army Aviation Materiel Command (USAAVCOM), are indicated by the basic number assigned to the commodity command.

The basic numbers are:

3—Chemical Materiel
5—Engineer Materiel
8—Medical Materiel
9—Ordnance Materiel
10—Quartermaster Materiel
1l—Signal Materiel

b. Source Codes. Source codes are shown in this column as assigned to items by USAAVCOM. The code symbols indicate the selection status and source of supply for each repair part as defined hereafter.

(1) Code P applies to high mortality repair parts which are stocked in or supplied from the commodity command depot system, and authorized for use at indicated maintenance echelons.

(2) Code P1 applies to repair parts which are low mortality parts, stocked in or supplied from commodity command depots, and authorized for installation at indicated maintenance echelons.

Note. General use, common hardware and bulk material listed herein are not assigned source, maintenance, or recoverability codes.

c. Maintenance Level Code. The code symbol used in the maintenance level column indicates the lowest maintenance level authorized to install the repair parts. Capabilities of higher maintenance levels are considered equal or better.

(1) Code O—Operator and Organizational Maintenance
(2) Code F—Direct Support Maintenance
(3) Code H—General Support Maintenance
(4) Code D—Depot Maintenance

d. Recoverability Code. Recoverability codes reflect the recoverability or repairability characteristics of repair parts upon removal from equipment at time of maintenance, repair, or overhaul.

(1) Code R applies to repair parts and assemblies which are economically reparable at direct and general support

maintenance activities and are normally furnished by supply on an exchange basis.

(2) Code U applies to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high dollar value, reusable casings or castings, etc.

(3) Repair parts and assemblies not assigned a recoverability code shall be considered "throwaway" items.

e. Federal Stock Number. The Federal Stock Number consists of the applicable 4-digit FSC Code Number plus the 7-digit Federal Item Identification Number, and is utilized for requisitioning, storage and accountability purposes.

f. Description. This column furnishes the item name, a brief description when necessary, and authorized abbreviations or dimensions when required to provide further identification.

(1) *Part numbers.* Three basically different kinds of part numbers are found within this column.

(a) Identification of manufacturer, e.g., 4776–4.

(b) Government standard or Military part numbers which begin with the letters AN, AF, MS, NAF, NAS, etc.

(c) Miscellaneous vendor or commercial part numbers.

(2) *Manufacturer's code number.* The manufacturer's code number is a 5-digit Federal Supply Code identifying a particular manufacturer.

g. Unit of Issue. This column lists the standard or minimum basic quantity in which the item is issued (each, pound, set, etc.).

h. Quantity Per Assembly. Quantities in this column are those required for one assembly only. When similar assemblies are broken down together, the quantities are those required for one assembly only. When attaching parts are shown as attaching two or more items, the quantities of the attaching parts are those necessary to attach only one of the items.

i. Allowance Factors. An asterisk (*), code contained within an allowance factor subcolumn indicates that the item is authorized for use at that maintenance level, but is not authorized to be stocked. When such an item is required, it must be requisitioned for immediate use only. An AR code within an allowance factor subcolumn indicates that the item is authorized for use at that level, but is to be requisitioned as required and a minimum quantity to be stocked. This code applies only to common hardware and bulk material.

j. Illustrations. This column lists the figure number of the items illustrated and when applicable, the item number. When no item number is reflected for an item, it indicates the item is included in the referenced figure, but is not visible in the presented view.

5. Federal Supply Code for Manufacturers

Code	*Manufacturer and location*
00624	------ Aeroquip Corp., Aircraft Division, Jackson Plant, Jackson, Mich.
00724	------ Air Associates, Inc., Electronic Division, Orange, N. J.
01930	------ Amerock Corp., Rockford, Ill.
04198	------- Ashcroft Gauge Co., Bridgeport, Conn.
06499	----- Volta Battery Corp., Chicago, Ill.
10100	------ Flow Products, Inc., Chicago, Ill.
11583	------ Champion Spark Plug Co., Toledo, Ohio
11862	------ Chevrolet Motor Division of General Motors Corp., Detroit, Mich.
15605	----- Cutler Hammer, Inc., Milwaukee, Wis.
16764	----- Delco Remy Division of General Motors Corp., Anderson, Ind.
16954	----- Denisen Engineering Co., Columbus, Ohio
18265	------ Donaldson Co., Inc., St. Paul, Minn.
19728	----- Electric Auto-Lite Co., Toledo, Ohio
21387	----- Fairbanks, E. and T., and Co., Chicago, Ill.
30327	----- Imperial-Eastman Corp., Chicago, Ill.
38508	----- Marsh Instrument Co., Division of Colorado Oil and Gas Corp., Skokie, Ill.
41615	----- Morse Chain Co., Detroit, Mich.
42689	------ National Lock Co., Rockford, Ill.
43766	----- Nice Bail Bearing Co., Nicetown, Philadelphia, Pa.
51240	------ American-Standard Controls Division of American Radiator and Standard Sanitary Corp., Rochester, N. Y.
56289	------- Sprague Electric Co., North Adams, Mass.
60038	------- Timken Roller Bearing Co., Canton, Ohio
60380	------- Torrington Co., The, Torrington, Conn.
66289	Wisconsin Motor Corp., Milwaukee, Wis.
66295	Wittek Mfg. Co., Chicago, Ill.
70417	Amplex Division of Chrysler Corp., Detroit, Mich.
70485	--------- Atlantic India Rubber Works, Inc., Chicago, Ill.
70955	--------- Blackstone Mfg. Co., Chicago, Ill.
73370	--------- Fram Corp., Providence, R. I.

code	*Manufacturer and location*
73809	------ Geneva Metal Wheel Co., Geneva, Ohio
74400	------ Hobbs, John W., Corp., Springfield, Ill.
75915	------ Littelfuse, Inc., Chicago, Ill.
77060	----- Packard Electric Division of General Motors Corp., Warren, Ohio
77344	------ Potter Co., Chicago, Ill.
78439	------ Porter, H. K., Co. of Delaware, Thermoid Division, Thermoid Works, Trenton, N. J.
78480	------- Tillotson Mfg. Co., The, Toledo, Ohio
78500	------ Rockwell-Standard Corp., Transmission and Axle Division, Detroit, Mich.
78553	------- Tinnerman Products, Inc., Cleveland, Ohio
79470	------- Featherhead Co., The, Cleveland, Ohio

Code	***Manufacturer and location***
79934	----- Tire and Rim Association, Inc., The, Akron, Ohio
80089	------ R B M Mfg. Co., Logansport, Ind.
82386	------- Sun Mfg. Co., Chicago, Ill.
85925	------ Electro Mechanical Instrument Co., Perkasie, Pa.
86768	------ Republic Mfg. Co., Cleveland, Ohio
87541	------ Stanley Hardware Co., Philadelphia, Pa.
88234	------- United Electric Controls Co., Watertown, Mass.
90005	------ Bendix Filter Division of Bendix Corp., Royal Oak, Mich.
96152	----- Marvel Schebler Products Division of Borg-Warner Corp., Decatur, Ill.
98441	------- Stratoflex, Inc., Ft. Worth, Tex.

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST CONTROLS AND INSTRUMENTS									
	P	F	R	4920-710-6669	TEST STAND: hydraulic systems, gasoline engine driven (P/N AHT-5A-1)	EA		1		*	*	*	1	
					PANEL ASSEMBLY: control (P/N A426-7-3200)	EA		1	*	*	*	*	9	
					PANEL (P/N A426-4-3211A)	EA		1	*	*	*	*	9	1
	P1	O		6680-991-8579	GAGE: level (P/N 4060)	EA		1	*	*	*	*	9	2
	P1	O		6685-585-4511	GAGE: pressure (P/N 1377)	EA		1	*	*	*	*	9	3
11	P1	O		6685-783-6616	THERMOMETER: indicating, model DFFM (P/N A280-3016)	EA		1	*	*	*	*	9	4
					SCREW: machine (P/N AN520-10-8)	EA		3	AR	AR	AR	AR	9	5
	P1	O		6620-783-6614	GAGE: compound, model FMS (P/N A280-3014)	EA		1	*	*	*	*	9	6
					SCREW: machine (P/N AN505-10-8)	EA		2	AR	AR	AR	AR	9	7
	P1	F	R	4920-783-6857	VALVE: 2-way (P/N A361-2-103)	EA		1		*	*	*	9	8
5	P1	O	R	6630-515-5910	TACHOMETER (P/N 2-214-10)	EA		1	*	*	*	*	9	9
	P1	O	R	6645-557-8035	METER: time totalizing (P/N ML-972)	EA		1	*	*	*	*	9	10
	P1	O	R	6620-377-6805	GAGE: oil pressure (P/N 2550)	EA		1	*	*	*	*	9	11
					VALVE ASSEMBLY: shut-off (P/N A280-2-3206)	EA		1	*	*	*	*	9	12
11	P1	O	R	6625-783-6615	AMMETER (P/N NF2C)	EA		1	*	*	*	*	9	13

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY REQUIRED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CONTROLS AND INSTRUMENTS (CONTINUED)									
6	P1	F	R	6680-532-2915	INDICATOR: flow (P/N 2-1183)	EA		1		*	*	*	9	15
					VALVE: outlet (P/N 8042B-10HB)	EA		1	*	*	*	*	9	16
	P1	F	R	4920-793-0645	VALVE: high pressure relief (P/N A361-100)	EA		1		*	*	*	9	17
					WASHER: lock (P/N AN935-416)	EA		8	AR	AR	AR	AR	9	18
					SCREW: socket head cap (P/N 686-80)	EA		8	*	*	*	*	9	19
					VALVE: flow control (P/N 2-1158-8)	EA		2	*	*	*	*	9	20
	P1	F		4920-713-4705	DAMPENER: pulsation (P/N A361-2-108)	EA		1		*	*	*	9	22
					VALVE ASSEMBLY: needle (P/N 4009-4A)	EA		1	*	*	*	*	9	23
					CAP ASSEMBLY: seal (P/N AN929-4S)	EA		1	AR	AR	AR	AR	9	24
					COMPENSATOR CONTROL ASSEMBLY (P/N 2-1253)	EA		1	*	*	*	*	9	25
					CAP ASSEMBLY: seal (P/N AN924-4S)	EA		1	AR	AR	AR	AR	9	26
					VALVE ASSEMBLY: needle (P/N 4009-4A)	EA		1	*	*	*	*	9	27
11	P1	O	R	6685-704-0845	GAGE: temp (P/N A300-5079)	EA		1	*	*	*	*	9	28
					CONTROL ASSEMBLY: vol (P/N A280-2-3071-1)	EA		1	*	*	*	*	9	29
					SCREW: machine (P/N AN515-416-12)	EA		4	AR	AR	AR	AR	9	30

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE CONTROL PANEL									
11	P1	O		5930-655-1582	SWITCH: toggle (P/N AN3027-3)	EA		1	AR	AR	AR	AR	10	1
	P1	O	U	5930-132-8283	SWITCH: push (P/N 1996041)	EA		1	*	*	*	*	10	2
					HOLDER: fuse (P/N 342001)	EA		1	*	*	*	*	10	3
	P	O		5920-011-7142	FUSE: 3 AG (P/N 311010)	EA		1	*	*	*	*	10	3
					CAP: filler (P/N LO-60)	EA		1	*	*	*	*	11	1
					CAP: intake (P/N 2X-1674-1)	EA		1	*	*	*	*	11	10
9	P1	O		2940-799-7687	AIR CLEANER (P/N A-552)	EA		1	*	*	*	*	11	14
					FILTER: oil (P/N F21-P)	EA		1	*	*	*	*	11	24
					BOLT: machine (P/N AN65-4-6)	EA		4	AR	AR	AR	AR	11	25
					COVER (P/N 11559)	EA		1	*	*	*	*	11	26
					SCREW (P/N 11580)	EA		1	*	*	*	*	11	27
					SABRE: oil (P/N RJ-153A-S1)	EA		1	*	*	*	*	11	28
					HYDRAULIC SYSTEM INSTALLATION (P/N A280-4-4000)	EA		1	*	*	*	*	12	
	P1	F	R	4320-787-2586	PUMP: axial piston, variable vol, model PA072564X2010 (P/N A280-4-3001)	EA		1		*	*	*	12	1

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 6TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE CONTROL PANEL (CONTINUED)									
					MOUNT: pump (P/N 2-1143-2)	EA		2	*	*	*	*	12	2
	P1	F		4720-990-9012	HOSE ASSEMBLY: pump inlet to low pressure filter (P/N A426-2-3220)	EA		1		*	*	*	12	4
					TUBING: pump relief valve to low pressure manifold (P/N A426-2-3265A)	EA		1	*	*	*	*	12	5
					TUBING: top low pressure filter to bleed valve (P/N A280-2-3350A)	EA		1	*	*	*	*	12	6
					VALVE: bleed (P/N A361-2-117)	EA		1	*	*	*	*	12	7
	P1	F		4720-990-9015	HOSE ASSEMBLY: high pressure filter to pump outlet (P/N A426-2-3221)	EA		1		*	*	*	12	8
					FILTER ASSEMBLY: high pressure (P/N A280-4-3220)	EA		1	*	*	*	*	12	9
					TEE (P/N AN834-12)	EA		1	AR	AR	AR	AR	12	10
					TUBING: high pressure filter to high pressure relief valve (P/N A280-2-3336)	EA		1	*	*	*	*	12	11
					TUBING: high pressure relief valve to low pressure manifold (P/N A426-2-3264A)	EA		1	*	*	*	*	12	12
					TUBING: 4-way valve to high pressure filter (P/N A280-2-3334A)	EA		1	*	*	*	*	12	13
					TUBING: suction inlet to low pressure filter manifold (P/N A426-2-3260A)	EA		1	*	*	*	*	12	14
					COUPLING HALF (P/N 145-S4-16D)	EA		1	*	*	*	*	12	15
					CAP: protective (P/N 145-S7-16D)	EA		1	*	*	*	*	12	16
					TUBING: flow control valve to 3/4 in. outlet (P/N A280-2-3322)	EA		1	*	*	*	*	12	17

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE CONTROL PANEL (CONTINUED)									
					CAP: protective (P/N 155-87-12D)	EA		1	*	*	*	*	12	18
					TUBING: flow control valve to 1/2 in. outlet (P/N A280-2-3332A)	EA		1	*	*	*	*	12	19
					CAP: protective (P/N 155-87-8D)	EA		1	*	*	*	*	12	20
					TUBING: 4-way valve to reservoir tee (P/N A280-2-3348A)	EA		1	*	*	*	*	12	21
					TUBING: relief valve to reservoir tee (P/N A426-2-3262A)	EA		1	*	*	*	*	12	22
5	P	O		4820-783-6670	VALVE: relief (P/N A280-3005)	EA		1	*	*	*	*	12	23
					TEE (P/N A280-3219)	EA		1	*	*	*	*	12	24
					ELBOW (P/N AN833-16)	EA		1	AR	AR	AR	AR	12	25
					TUBING: reservoir shut-off valve to low pressure manifold (P/N A426-2-3261A)	EA		1	*	*	*	*	12	26
					ELBOW (P/N AN833-4)	EA		1	AR	AR	AR	AR	12	27
					TUBING: filter selector valve to pump inlet (P/N A426-2-3263A)	EA		1	*	*	*	*	12	28
					ELBOW (P/N AN833-12)	EA		3	AR	AR	AR	AR	12	29
					TUBING: 4-way valve to 1/2 in. outlet (P/N A280-2-3316A)	EA		1	*	*	*	*	12	30
					TUBING: 4-way valve to 3/4 in. outlet (P/N A280-2-3318A)	EA		1	*	*	*	*	12	31
					TUBING: high pressure relief valve to gage snubber valve (P/N A280-2-3306A)	EA		1	*	*	*	*	12	32

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 3RD ECHELON	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE CONTROL PANEL (CONTINUED)									
					TEE (P/N AN804-4)	EA		1	AR	AR	AR	AR	12	33
					TEE (P/N AN834-4)	EA		1	AR	AR	AR	AR	12	34
					TUBING: damper valve to tee in snubber valve (P/N A280-2-3320A)	EA		1	*	*	*	*	12	35
					TUBING: gage, snubber valve to fluid gage tap (P/N A280-2-3304A)	EA		1	*	*	*	*	12	36
	P1	O		4720-990-9014	HOSE ASSEMBLY: high pressure gage to tee in gage dampener (P/N A280-2-3300)	EA		1	*	*	*	*	12	37
					TUBING: relief valve to by-pass valve (P/N A280-2-3308A)	EA		1	*	*	*	*	12	38
					TEE (P/N AN804-4)	EA		1	AR	AR	AR	AR	12	39
					TUBING: selector valve to by-pass valve (P/N A280-2-3312A)	EA		1	*	*	*	*	12	40
					TEE (P/N AN834-4)	EA		1	AR	AR	AR	AR	12	41
					TUBING: selector valve to filter gage (P/N A280-2-3310A)	EA		1	*	*	*	*	12	42
					ELBOW (P/N AN833-4)	EA		2	AR	AR	AR	AR	12	43
	P1	O		4720-990-9011	HOSE ASSEMBLY: selector valve to filter gage (P/N A280-2-3302)	EA		1	*	*	*	*	12	44
					TUBING: tee in by-pass valve to tee in reservoir shut-off valve (P/N A280-2-3314A)	EA		1	*	*	*	*	12	45
					TUBING: reservoir to reservoir shut-off valve (P/N A280-2-3328A)	EA		1	*	*	*	*	12	46
					FILTER AND MANIFOLD ASSEMBLY (P/N A280-4-3216)	EA		1	*	*	*	*	12	47

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) FILTER AND MANIFOLD ASSEMBLY									
					LOCKNUT (P/N AN924-4)	EA		1	AR	AR	AR	AR	13	1
					ELBOW (P/N AN833-4)	EA		1	AR	AR	AR	AR	13	2
					PACKING: preformed (P/N AN6290-4)	EA		1	AR	AR	AR	AR	13	3
					UNION (P/N AN815-16)	EA		1	AR	AR	AR	AR	13	4
					PACKING: preformed (P/N AN6290-16)	EA		1	AR	AR	AR	AR	13	5
					BOLT: machine (P/N 65-5-10)	EA		6	*	*	*	*	13	6
9	P1	F		5330-197-9611	PACKING: preformed (P/N AN6227-69)	EA		1		AR	AR	AR	13	7
					NUT: wing (P/N AN350-1032)	EA		1	AR	AR	AR	AR	13	8
					COVER: element (P/N 4235)	EA		1	*	*	*	*	13	9
9	P	D		5330-285-9705	GASKET (P/N GH15190-16-2)	EA		1				*	13	10
	P1	F		1650-242-9425	FILTER ELEMENT (P/N AN6236-3)	EA		1		AR	AR	AR	13	11
					PLATE ASSEMBLY (P/N 4234A)	EA		1	*	*	*	*	13	12
					BOLT: machine (P/N 65-4-12)	EA		2	*	*	*	*	13	13
					WASHER: lock (P/N AN935-416)	EA		2	AR	AR	AR	AR	13	14
					SPACER (P/N 401-160)	EA		2	*	*	*	*	13	15

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
									15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP					
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) FILTER AND MANIFOLD ASSEMBLY (CONTINUED)									
					COVER: top (P/N 7-193-1)	EA		1	*	*	*	*	13	16
					LOCKNUT (P/N AN924-16)	EA		1	AR	AR	AR	AR	13	17
					ELBOW (P/N AN833-16)	EA		1	AR	AR	AR	AR	13	18
					PACKING: preformed (P/N AN6290-16)	EA		1	AR	AR	AR	AR	13	19
					MANIFOLD (P/N A280-4-3068)	EA		1	*	*	*	*	13	20
					BOLT: machine (P/N 65-5-7)	EA		10	*	*	*	*	13	21
					WASHER: lock (P/N AN935-516L)	EA		10	AR	AR	AR	AR	13	22
	P	F		5930-607-6280	THERMOSWITCH (P/N 4738-2) (Modified from G-R441)	EA		1		*	*	*	13	23
9	P	F		5330-285-9842	PACKING: preformed (P/N AN6290-10)	EA		1		AR	AR	AR	13	24
	P	F		5330-815-1712	PACKING: preformed (P/N AN6230-14)	EA		1		AR	AR	AR	13	25
					COVER: bottom (P/N 4-490-1)	EA		1	*	*	*	*	13	26
					BOLT: machine (P/N AN65-5-10)	EA		6	AR	AR	AR	AR	13	27
					PLUG: machine (P/N AN814-3)	EA		1	AR	AR	AR	AR	13	28
9	P	F		5330-835-7485	PACKING: preformed (P/N AN6290-3)	EA		1		AR	AR	AR	13	29
	P	F		5330-197-9611	PACKING: preformed (P/N AN6227-69)	EA		1		AR	AR	AR	13	30

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
NAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) RUNNING GEAR AND BRAKE ASSEMBLY									
					HOUSING (P/N A280-7-3211)	EA		1	*	*	*	*	13	31
					RUNNING GEAR AND BRAKE ASSEMBLY (P/N 10-103)	EA		1	*	*	*	*	14	
					PIN: cotter (P/N AN380-2-3)	EA		4	AR	AR	AR	AR	14	1
					NUT: castellated (P/O tie rod end, P/N 3692952)	EA		4	*	*	*	*	14	2
					FITTING: lubrication (P/N MS15002-2)	EA		4	AR	AR	AR	AR	14	3
	P1	F		2530-495-4341	TIE ROD END (P/N 3692951)	EA		2		*	*	*	14	4
	P1	F		4920-589-3517	TIE ROD END (P/N 4005-1) (Modified from P/N 3692952)	EA		2		*	*	*	14	5
					NUT: hex (P/N AN335-5)	EA		4	AR	AR	AR	AR	14	6
					WASHER: lock (P/N AN935-516)	EA		4	AR	AR	AR	AR	14	7
					BOLT: machine (P/N AN65-5-10)	EA		4	AR	AR	AR	AR	14	8
					CLAMP: loop (P/N 599234)	EA		4	*	*	*	*	14	9
	P1	F		2530-859-5767	TIE ROD (P/N 4480-4)	EA		2		*	*	*	14	10
					DRAWBAR ASSEMBLY (P/N 5780)	EA		1	*	*	*	*	14	11
					PIN: grooved, headed (P/N 5781)	EA		1	*	*	*	*	14	12
					RING: retaining (P/N 619-19)	EA		1	*	*	*	*	14	13

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
									18 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP					
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) RUNNING GEAR AND BRAKE ASSEMBLY (CONTINUED)									
					ARM ASSEMBLY: steering (P/N 4-690)	EA		1	*	*	*	*	14	14
					PIN: cotter (P/N AN380-4-6)	EA		1	AR	AR	AR	AR	14	15
					NUT: castellated (P/N AN330-10)	EA		1	AR	AR	AR	AR	14	16
					WASHER: thrust (P/N TRC-1220)	EA		2	*	*	*	*	14	17
					BOLT: shear (P/N 5807)	EA		1	*	*	*	*	14	18
					LATCH (P/N 5803)	EA		1	*	*	*	*	14	19
					NUT: self-locking (P/N AN365-6-16)	EA		1	AR	AR	AR	AR	14	20
					BOLT: machine (P/N AN65-6-10)	EA		1	AR	AR	AR	AR	14	21
					GROMMET: brake cable (P/N AN931-9-13)	EA		2	AR	AR	AR	AR	14	24
					BRAKE LEVER ASSEMBLY	EA		1	*	*	*	*	14	25
					BRACKET: stop, rh (P/N 5693)	EA		2	*	*	*	*	14	26
					BRACKET: stop, lh (P/N 5693-1)	EA		2	*	*	*	*	14	27
					BOLT: machine (P/N AN65-4-6)	EA		4	AR	AR	AR	AR	14	28
					WASHER: lock (P/N AN935-416)	EA		4	AR	AR	AR	AR	14	29
					NUT: hex (P/N AN325-8)	EA		20	AR	AR	AR	AR	14	30

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) RUNNING GEAR AND BRAKE ASSEMBLY (CONTINUED)									
					WASHER: lock (P/N AN935-816)	EA		20	AR	AR	AR	AR	14	31
					NUT: hex (P/N AN325-6)	EA		32	AR	AR	AR	AR	14	32
					WASHER: lock (P/N AN935-616)	EA		32	AR	AR	AR	AR	14	33
					BOLT: machine (P/N AN60-6-6)	EA		32	AR	AR	AR	AR	14	34
					WHEEL HALF: w/hole for valve stem	EA		4	*	*	*	*	14	35
					WHEEL HALF: w/o hole for valve stem	EA		4	*	*	*	*	14	36
	P1	O	U	2610-050-9840	TIRE: pneumatic (P/N MS35389-6)	EA		4	AR	AR	AR	AR	14	37
9	P	F		2610-269-7354	TUBE: inner (P/N MS35392-52)	EA		4		AR	AR	AR	14	38
					CAP: valve	EA		4	*	*	*	*	14	39
					VALVE: check (P/N 150.135)	EA		4	*	*	*	*	14	40
					CAP: hub (P/N C447)	EA		4	*	*	*	*	14	41
					PIN: cotter (P/N AN380-4-7)	EA		4	AR	AR	AR	AR	14	42
					NUT: castellated (P/N AN320-16)	EA		4	AR	AR	AR	AR	14	43
					WASHER: key (P/N 4102)	EA		4	*	*	*	*	14	44
	P	O		3110-626-9463	CONE: bearing, outer (P/N 15123)	EA		4	*	*	*	*	14	45

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) RUNNING GEAR AND BRAKE ASSEMBLY (CONTINUED)									
9	P	D		3110-198-2170	CUP: bearing, outer (P/N 15245)	EA		4				*	14	46
					WASHER: seal (P/N 5731)	EA		4	*	*	*	*	14	47
9	P	O		3110-100-3537	CONE: bearing, inner (P/N 24780)	EA		4	*	*	*	*	14	48
	P1	O		3110-100-0542	CUP: bearing, inner (P/N 24720)	EA		4	*	*	*	*	14	49
					BOLT: lug, wheel mtg, 1/2-20 x 1-7/8 in. lg	EA		20	*	*	*	*	14	50
	P1	F		2530-533-2650	HUB (P/N B448)	EA		4		*	*	*	14	51
9	P1	F	R	2530-528-9090	DRUM: brake (P/N 3719-R-44)	EA		2		*	*	*	14	52
					SPRING: coil (P/N 4083-1)	EA		4	*	*	*	*	14	53
					AXLE ASSEMBLY: front, rh (P/N 4-698)	EA		1	*	*	*	*	14	54
					AXLE ASSEMBLY: front, lh (P/N 4-698-1)	EA		1	*	*	*	*	14	54
					BOLT: machine (P/N AN65-8-12)	EA		4	AR	AR	AR	AR	14	55
					WASHER: lock (P/N AN935-816)	EA		4	AR	AR	AR	AR	14	56
9				2930-362-9155	KINGPIN (P/N 5796)	EA		1	*	*	*	*	14	57
9				3120-661-6270	WASHER: thrust, upper (P/N 400-272)	EA		1	*	*	*	*	14	58
	P1	F		3120-684-5681	WASHER: thrust, lower (P/N TRD1625)	EA		1		*	*	*	14	59

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	18 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) RUNNING GEAR AND BRAKE ASSEMBLY (CONTINUED)									
					WASHER: thrust, lower (P/N 400-268)	EA		1	*	*	*	*	14	59
					SPINDLE: rh (P/N 4-756)	EA		1	*	*	*	*	14	60
					SPINDLE: lh (P/N 4-756-1)	EA		1	*	*	*	*	14	60
9	P1	F		3120-580-4514	BEARING: sleeve, upper (P/N AA1154-1)	EA		1		*	*	*	14	61
					BEARING: sleeve, lower (P/N AA1108-1)	EA		1	*	*	*	*	14	62
9	P1	F		3120-489-4244	BEARING: sleeve, lower (P/N A1133-2)	EA		1		*	*	*	14	62
					BRACKET: rh (P/N 4-689)	EA		1	*	*	*	*	14	63
					BRACKET: lh (P/N 4-689-1)	EA		1	*	*	*	*	14	63
					BOLT: machine (P/N AN65-8-12)	EA		4	AR	AR	AR	AR	14	64
					WASHER: lock (P/N AN935-816)	EA		4	AR	AR	AR	AR	14	65
	P1	F	R	2530-541-3003	BRAKE ASSEMBLY (P/N A4-3736-R-70)	EA		1		*	*	*	14	66
					NUT: hex (P/N AN345-616)	EA		4	AR	AR	AR	AR	14	67
					WASHER: lock (P/N AN935-616)	EA		4	AR	AR	AR	AR	14	68
					AXLE: rh (P/N 4-685)	EA		1	*	*	*	*	14	69
					AXLE: lh (P/N 4-685-1)	EA		1	*	*	*	*	14	69

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
									15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP					
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) RUNNING GEAR AND BRAKE ASSEMBLY (CONTINUED)									
					SUPPORT AND ARM ASSEMBLY: front (P/N 4-693)	EA		1	*	*	*	*	14	70
					SUPPORT AND ARM ASSEMBLY: rear (P/N 4-694)	EA		1	*	*	*	*	14	70
					NUT: hex (P/N AN335-10)	EA		6	AR	AR	AR	AR	14	71
					WASHER: lock (P/N AN935-1016)	EA		6	AR	AR	AR	AR	14	72
					WASHER: flat (P/N AN960-1016)	EA		12	AR	AR	AR	AR	14	73
					BOLT: machine (P/N 675-143)	EA		6	*	*	*	*	14	74
					RING: retaining (P/N 619-20)	EA		8	*	*	*	*	14	75
					PIN: grooved headless (P/N 5786-1)	EA		4	*	*	*	*	14	76
					ARM ASSEMBLY: rh (P/N 4-672-2)	EA		1	*	*	*	*	14	77
					ARM ASSEMBLY: lh (P/N 4-672-3)	EA		1	*	*	*	*	14	77
					ARM ASSEMBLY: rh (P/N 4-673-2)	EA		1	*	*	*	*	14	77
					ARM ASSEMBLY: lh (P/N 4-673-3)	EA		1	*	*	*	*	14	77
	P1	F		2805-992-0585	BEARING: sleeve (P/N AA1339-2)	EA		4		*	*	*	14	78
9	P1	F		5340-664-5785	BUMPER: rubber (P/N 613)	EA		2		*	*	*	14	79
					NUT: hex (P/N AN335-6)	EA		2	AR	AR	AR	AR	14	80
					WASHER: lock (P/N AN935-616)	EA		2	AR	AR	AR	AR	14	81

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) BRAKE LEVER ASSEMBLY									
					WASHER: flat (P/N AN960-616)	EA		2	AR	AR	AR	AR	14	82
					BOLT: machine (P/N AN65-6-14)	EA		2	AR	AR	AR	AR	14	83
					SUPPORT ASSEMBLY: front (P/N 7-224-1)	EA		1	*	*	*	*	14	84
					SUPPORT ASSEMBLY: rear (P/N 7-226-1)	EA		1	*	*	*	*	14	84
					BEARING: sleeve (P/N FF838-3)	EA		2	*	*	*	*	14	85
					CLAMP (P/N A426-1001)	EA		1	*	*	*	*	14	86
					FRAME ASSEMBLY: trailer (P/N A426-4-1800)	EA		1	*	*	*	*	14	87
	P1	F		4920-785-5243	CABLE ASSEMBLY: rh (P/N 2-1671)	EA		1		*	*	*	15	1
	P1	F		4920-785-5242	CABLE ASSEMBLY: lh (P/N 2-1671-1)	EA		1		*	*	*	15	2
					NUT: l[illegible]k (P/N AN345-516)	EA		2	AR	AR	AR	AR	15	3
					LEVER ASSEMBLY (P/N 2-1670)	EA		1	*	*	*	*	15	4
					SPACER: sleeve (P/N 401-198)	EA		3	*	*	*	*	15	5
					SPACER: sleeve (P/N 401-205)	EA		1	*	*	*	*	15	6
					SPACER: sleeve (P/N 401-197)	EA		2	*	*	*	*	15	7
					WASHER: lock (P/N AN935-616)	EA		3	AR	AR	AR	AR	15	8
					BOLT: machine (P/N AN65-6-24)	EA		3	AR	AR	AR	AR	15	9

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	18 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) GENERATOR AND RADIO SUPPRESSION CAPACITOR									
					PIN: cotter (P/N AN380-4-4)	EA		2	AR	AR	AR	AR	15	10
					PIN: straight, headed (P/N 5688)	EA		2	*	*	*	*	15	11
					CLEVIS: cable (P/N 5692)	EA		2	*	*	*	*	15	12
					WASHER: flat (P/N AN960-516)	EA		4	AR	AR	AR	AR	15	13
					PIN: cotter (P/N AN380-4-4)	EA		1	AR	AR	AR	AR	15	14
					WASHER: flat (P/N AN960-616)	EA		1	AR	AR	AR	AR	15	15
					LEVER (P/N 5687)	EA		2	*	*	*	*	15	16
					SPACER: sleeve (P/N 401-196)	EA		2	*	*	*	*	15	17
					PIN: straight, headed (P/N 5688-2)	EA		1	*	*	*	*	15	18
					BOX: shield (P/N 2-1152)	EA		1	*	*	*	*	16	1
					SCREW (P/N AN501-416-7)	EA		1	AR	AR	AR	AR	16	2
					WASHER: lock (P/N MS35338-44)	EA		1	AR	AR	AR	AR	16	3
					CONNECTOR: box (P/N 946-1)	EA		2	*	*	*	*	16	4
11	P1	O		5910-609-7473	CAPACITOR: fixed, 0.50 uf (P/N Z2020)	EA		2	*	*	*	*	16	5
					NUT: hex (P/N AN340-6)	EA		2	AR	AR	AR	AR	16	6

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST. (CONTINUED) ELECTRICAL INSTALLATION									
					WASHER: lock (P/N AN936A6)	EA		2	AR	AR	AR	AR	16	7
					SCREW: machine (P/N AN526-632-5)	EA		2	AR	AR	AR	AR	16	8
	P1	F	R	2920-623-0409	GENERATOR ASSEMBLY (P/N 1102811)	EA		1		*	*	*	16	9
					BOLT: machine (P/N AN65-5-6)	EA		1	AR	AR	AR	AR	16	10
					BOLT: machine (P/N AN101208)	EA		2	AR	AR	AR	AR	16	11
					WASHER: lock (P/N AN935-516L)	EA		3	AR	AR	AR	AR	16	12
					WASHER: flat (P/N 400-11M)	EA		3	*	*	*	*	16	13
					ARM: generator adjusting (P/N 4134-1)	EA		1	*	*	*	*	16	14
					NUT: hex (P/N AN335-5)	EA		1	AR	AR	AR	AR	16	15
					WASHER: lock (P/N AN935-516L)	EA		1	AR	AR	AR	AR	16	16
					WASHER: flat (P/N 400-11M)	EA		1	*	*	*	*	16	17
					BOLT: machine (P/N AN65-5-10)	EA		1	AR	AR	AR	AR	16	18
					BRACKET: angle (P/N 4136-1)	EA		1	*	*	*	*	16	19
					PLATE: mtg (P/N 2-1259)	EA		1	*	*	*	*	16	20
					ELECTRICAL INSTALLATION	EA		1					17	

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ELECTRICAL INSTALLATION (CONTINUED)									
5	P	1	O	30-251-7484	BELTING, V (P/N 5L470)	EA		1	*	*	*	*	17	1
					GENERATOR AND MOUNTING BRACKET ASSEMBLY	EA		1					17	2
					NUT: hex (P/N AN335-6)	EA		2	AR	AR	AR	AR	17	3
					WASHER: lock (P/N AN935-616)	EA		2	AR	AR	AR	AR	17	4
					BOLT: hook (P/N A426-1709)	EA		2	*	*	*	*	17	5
					COVER: holddown, battery (P/N A426-1806)	EA		1	*	*	*	*	17	6
					ADAPTER: terminal (P/N 5292849)	EA		1	*	*	*	*	17	7
					ADAPTER: terminal (P/N 5292850)	EA		1	*	*	*	*	17	8
11	P	1	O	6140-785-1098	BATTERY: storage (P/N K-171-G)	EA		1	*	*	*	*	17	9
					NUT: hex (P/N AN335-4)	EA		2	AR	AR	AR	AR	17	10
					WASHER: lock (P/N AN935-416)	EA		2	AR	AR	AR	AR	17	11
					SCREW: machine (P/N AN515-416-16)	EA		2	AR	AR	AR	AR	17	12
					SUPPORT: battery (P/N A426-1810)	EA		2	*	*	*	*	17	13
					NUT: hex (P/N AN345-10)	EA		4	AR	AR	AR	AR	17	14
					WASHER: lock (P/N AN935-10)	EA		4	AR	AR	AR	AR	17	15

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) EXPENDABILITY	(6) QTY INC IN UNIT	(7) ALLOWANCES				ILLUSTRATIONS	
									15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP			QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON		
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY						2ND ECHELON	3RD ECHELON	4TH ECHELON		FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ELECTRICAL INSTALLATION (CONTINUED)									
					BOLT: machine (P/N AN101008)	EA		4	AR	AR	AR	AR	17	16
					TRAY: battery (P/N A426-1811)	EA		1	*	*	*	*	17	17
	P1	C		30-991-7052	RELAY: armature (P/N 70-103224)	EA		1	*	*	*	*	17	18
					NUT: hex (P/N AN335-4)	EA		2	AR	AR	AR	AR	17	19
					WASHER: lock (P/N AN935-416)	EA		2	AR	AR	AR	AR	17	20
					WASHER: flat (P/N AN945-4P)	EA		2	AR	AR	AR	AR	17	21
					BOLT: machine (P/N AN65-4-4)	EA		2	AR	AR	AR	AR	17	22
					COVER: box (P/N 2-1073-11)	EA		1	*	*	*	*	17	23
					SCREW: tapping (P/N 610-47)	EA		4	*	*	*	*	17	24
					SCREW: machine (P/N AN515-416-10)	EA		3	AR	AR	AR	AR	17	26
					WASHER: lock (P/N AN935-416)	EA		3	AR	AR	AR	AR	17	27
9	P1	O	R	2920-394-5988	REGULATOR: generator (P/N 1118300)	EA		1	*	*	*	*	17	28
					BOX ASSEMBLY: regulator (P/N 4-445-5)	EA		1	*	*	*	*	17	28
					NUT: hex (P/N AN335-4)	EA		2	AR	AR	AR	AR	17	29
					WASHER: lock (P/N AN935-416)	EA		2	AR	AR	AR	AR	17	30
					WASHER: flat (P/N AN945-4P)	EA		2	AR	AR	AR	AR	17	31

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 6TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE AND FUEL TANK									
					BOLT: machine (P/N AN65-4-6)	EA		2	AR	AR	AR	AR	17	32
					CONNECTOR: box (P/N 946)	EA		2	*	*	*	*	17	33
11	P1	O		5910-538-3232	CAPACITOR: fixed (P/N 48P18)	EA		1	*	*	*	*	17	34
					NUT: hex (P/N AN345-10)	EA		1	AR	AR	AR	AR	17	35
					WASHER: lock (P/N AN935-10)	EA		1	AR	AR	AR	AR	17	36
					SCREW: machine (P/N AN520UB10-6)	EA		1	AR	AR	AR	AR	17	37
					ENGINE INSTALLATION	EA		1					18	
					TUBING: fuel line (P/N A426-2-1712A)	EA		1	*	*	*	*	18	1
					TUBING: oil, outlet (P/N A426-2-1713A)	EA		1	*	*	*	*	18	2
					TUBING: oil, inlet (P/N A426-2-1714A)	EA		1	*	*	*	*	18	3
					TUBING: oil, tee to gage (P/N A426-2-1722A)	EA		1	*	*	*	*	18	4
					SUPPORT: spout (P/N A426-1720A)	EA		1	*	*	*	*	18	5
					BOLT: machine (P/N AN65-4-5)	EA		2	AR	AR	AR	AR	18	6
					WASHER: flat (P/N AN945-4P)	EA		2	AR	AR	AR	AR	18	7
					WASHER: lock (P/N AN935-416)	EA		2	AR	AR	AR	AR	18	8

(1) SOURCE MAINT. & RECOVER-ABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
									15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP					
MAT CODE	SOURCE	MAINT LEVEL	RECOVER-ABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE AND FUEL TANK (CONTINUED)									
					NUT: hex (P/N AN335-4)	EA		2	AR	AR	AR	AR	18	9
					BOLT: machine (P/N AN65-8-14)	EA		4	AR	AR	AR	AR	18	10
					WASHER: flat (P/N AN960-816)	EA		8	AR	AR	AR	AR	18	11
					WASHER: lock (P/N AN935-816)	EA		4	AR	AR	AR	AR	18	12
					NUT: hex (P/N AN335-8)	EA		4	AR	AR	AR	AR	18	13
					LINER: strap (P/N A426-1707)	EA		2	*	*	*	*	18	14
					STRAP: tank (P/N A426-1717)	EA		2	*	*	*	*	18	15
					TANK: fuel (P/N 4-483)	EA		1	*	*	*	*	18	16
					CAP: fuel (P/N 4077-1)	EA		1	*	*	*	*	18	17
					PIN: safety (P/N 4537)	EA		1	*	*	*	*	18	18
					PLUG: pipe, brass, 1/8 (P/N 650-257)	EA		1	*	*	*	*	18	19
					ELBOW: male (P/N 69F)	EA		1	*	*	*	*	18	20
	P1	F		3010-793-3455	CHAIN: roller (P/N 116055)	EA		1		*	*	*	18	21
					COUPLING HALF (P/N 116649)	EA		1	*	*	*	*	18	22
					COUPLING HALF (P/N 116650)	EA		1	*	*	*	*	18	23

(1) SOURCE, MAINT. & RECOVERABILITY CODE				(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) EXPENDABILITY	(6) QTY INC IN UNIT	(7) ALLOWANCES				ILLUSTRATIONS	
									10 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP					
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY						2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE ACCESSORY GENERATOR									
	P1	F	R	2805-679-3594	ENGINE: gasoline, model MFG4D	EA		1		*	*	*	18	24
					BOLT: machine (P/N 65-4-10)	EA		8	*	*	*	*	18	25
					WASHER: lock (P/N AN935-1016)	EA		8	AR	AR	AR	AR	18	26
					END BELL (P/N 1923069)	EA		1	*	*	*	*	19	1
					BOLT: thru (P/N 809763)	EA		2	*	*	*	*	19	2
					WASHER: lock (P/N MS35338-45)	EA		2	AR	AR	AR	AR	19	3
					HOLDER ASSEMBLY: grounded brush (P/N 192288)	EA		1	*	*	*	*	19	4
					HOLDER ASSEMBLY: insulated brush (P/N 192289)	EA		1	*	*	*	*	19	5
					SCREW (P/N AN515-6-7)	EA		2	AR	AR	AR	AR	19	6
					WASHER: lock (P/N AN935-5L)	EA		2	AR	AR	AR	AR	19	7
					NUT: hex (P/N AN340-6)	EA		2	AR	AR	AR	AR	19	8
	P1	F		5977-553-4418	BRUSH (P/N 1923295)	EA		2		*	*	*	19	9
					SCREW (P/N AN515-6-4)	EA		2	AR	AR	AR	AR	19	10
					WASHER: lock (P/N 1904377)	EA		2	*	*	*	*	19	11
					ARM: brush (P/N 1878183)	EA		2	*	*	*	*	19	12

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE ACCESSORY GENERATOR (CONTINUED)									
					SPRING: brush (P/N 1908829)	EA		2	*	*	*	*	19	13
					WASHER: flat (P/N 1857412)	EA		2	*	*	*	*	19	14
					PULLEY: groove (P/N 1913926)	EA		1	*	*	*	*	19	15
					WASHER: lock (P/N 804000)	EA		1	*	*	*	*	19	16
					NUT: hex (P/N 806915)	EA		1	*	*	*	*	19	17
					PAN (P/N 1866400)	EA		1	*	*	*	*	19	18
				5315-012-4545	KEY: woodruff (P/N AN280R405)	EA		1	AR	AR	AR	AR	19	19
					PLATE: bearing retaining (P/N 1911263)	EA		3	*	*	*	*	19	20
					SCREW (P/N 1904370)	EA		3	*	*	*	*	19	21
					WASHER: lock (P/N 1880781)	EA		1	*	*	*	*	19	22
	P1	H		2920-285-3818	GASKET (P/N 1912008)	EA		1			*	*	19	23
					WASHER: flat (P/N 809945)	EA		1	*	*	*	*	19	24
9	P1	H		3110-151-8140	BEARING: ball (P/N 954378)	EA		1			*	*	19	25
					PLATE: felt retainer (P/N 819961)	EA		1	*	*	*	*	19	26
9	P1	H		5330-171-3613	WASHER, NONMETALLIC (P/N 809961)	EA		1			*	*	19	27

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE ACCESSORY GENERATOR (CONTINUED)									
					OILER: hand (P/N 125609)	EA		1	*	*	*	*	19	28
	P1	H		2920-362-6772	SPACER SLEEVE (P/N 1858603)	EA		1			*	*	19	29
					END BELL (P/N 1910404)	EA		1	*	*	*	*	19	30
9	P1	H	R	2920-358-6283	ARMATURE (P/N 1912599)	EA		1			*	*	19	31
	P1	H		5999-502-1857	POLE PIECE (P/N 1912725)	EA		2			*	*	19	32
					SCREW (P/N 1843646)	EA		2	*	*	*	*	19	33
	P1	H		2920-669-6139	WINDING: field (P/N 1922702)	EA		1			*	*	19	34
					INSULATOR: plate (P/N 1912073)	EA		2	*	*	*	*	19	35
					NUT: hex (P/N 121743)	EA		4	*	*	*	*	19	36
					WASHER: lock (P/N 1904661)	EA		4	*	*	*	*	19	37
					WASHER: flat (P/N 1881409)	EA		2	*	*	*	*	19	38
					WASHER: insulating (P/N 1858753)	EA		1	*	*	*	*	19	39
					INSULATOR: bushing (P/N 1885090)	EA		1	*	*	*	*	19	40
					TERMINAL: stud (P/N 1921860)	EA		1	*	*	*	*	19	41
					INSULATOR: bushing (P/N 1921362)	EA		1	*	*	*	*	19	42

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
SMR CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ELECTRICAL ENGINE STARTER									
					TERMINAL: stud (P/N 1921369)	EA		1	*	*	*	*	19	43
					HOUSING	EA		1	*	*	*	*	19	44
	P1	O		2920-507-3205	MOTOR: starter (P/N MZ-4184-T)	EA		1	*	*	*	*	20	
					BOLT: machine (P/N MZ-52B)	EA		4	*	*	*	*	20	1
					WASHER: lock (P/N AN935-10)	EA		4	AR	AR	AR	AR	20	2
					SCREW: machine (P/N AN505-8-6)	EA		4	AR	AR	AR	AR	20	3
					HOUSING, DRIVE (P/N PS1330A)	EA		1	*	*	*	*	20	4
					CAP: pillow block (P/N MZ-358A)	EA		1	*	*	*	*	20	5
	P1	F		2920-592-3979	BEARING (P/N MZ-364)	EA		1		*	*	*	20	6
9	P1	F		5330-508-1111	SEAL: plain (P/N XA-832)	EA		1		*	*	*	20	7
					BOLT: shoulder (P/N EB-8507A)	EA		1	*	*	*	*	20	8
					BOLT: shoulder (P/N EB-8506A)	EA		1	*	*	*	*	20	9
					WASHER: key (P/N EB-108A)	EA		2	*	*	*	*	20	10
	P1	F		2920-367-4255	SHAFT AND PINION (P/N EBB-4511A)	EA		1		*	*	*	20	11
9	P1	F		5340-353-6994	SPRING: torsion (P/N EBA-405A)	EA		1		*	*	*	20	12

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ELECTRICAL ENGINE STARTER (CONTINUED)									
					HEAD: driving (P/N EB-8503A)	EA		1	*	*	*	*	20	13
	P1	F		5330-559-6862	GASKET (P/N MZ-359A)	EA		1		*	*	*	20	14
					PLATE: bearing (P/N MZ-1360A)	EA		1	*	*	*	*	20	15
					KEY: woodruff (P/N AN260-505)	EA		1	AR	AR	AR	AR	20	16
					WASHER: thrust (P/N MZ-357)	EA		2	*	*	*	*	20	17
					WASHER: spring (P/N MZ-365)	EA		1	*	*	*	*	20	18
					WASHER: thrust (P/N MU-54)	EA		1	*	*	*	*	20	19
9	P1	F		2920-505-5108	ARMATURE (P/N MZ-2366-T)	EA		1		*	*	*	20	20
					BRACKET (P/N PG-515-A)	EA		1	*	*	*	*	20	21
					SCREW: machine (P/N AN520-10-6)	EA		2	AR	AR	AR	AR	20	22
					WASHER: flat (P/N PH-194)	EA		2	*	*	*	*	20	22A
					COVER: brush (P/N MZ-1024AD)	EA		1	*	*	*	*	20	23
					END BELL (P/N MZ-2002G)	EA		1	*	*	*	*	20	24
					SCREW: machine (P/N AN501A-10-6)	EA		4	AR	AR	AR	AR	20	25
					WASHER: lock (P/N AN935-10)	EA		4	AR	AR	AR	AR	20	26

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) IGNITION MAGNETO									
					SPRING (P/N MZ-19C)	EA		4	*	*	*	*	20	27
	P1	F		5977-627-3579	BRUSH (P/N MZ-1034CS)	EA		2		*	*	*	20	28
	P1	F		5977-391-4031	BRUSH (P/N MZ-12D)	EA		2		*	*	*	20	29
					NUT: hex (P/N AN325B5)	EA		2	AR	AR	AR	AR	20	30
					WASHER: lock (P/N AN935-516)	EA		2	AR	AR	AR	AR	20	31
					WASHER: flat (P/N AN960B516)	EA		1	AR	AR	AR	AR	20	32
					INSULATOR	EA		1					20	33
					FIELD	EA		1					20	34
					HOUSING	EA		1					20	35
	P1	F	R	2920-656-7336	MAGNETO: ignition (P/N FM-XZE4B-7)	EA		1		*	*	*	21	
	P1	H		2920-799-7683	CAPACITOR: fixed (P/N MX2433X)	EA		1			*	*	21	1
					SCREW: machine (P/N AN515-6-6)	EA		2	AR	AR	AR	AR	21	2
					NUT: hex (P/N AN340-6)	EA		1	AR	AR	AR	AR	21	3
					WASHER: lock (P/N AN935-6)	EA		2	AR	AR	AR	AR	21	4
					SCREW: machine (P/N AN515-6-8)	EA		1	AR	AR	AR	AR	21	5

(1) SOURCE MAINT. & RECOVERABILITY CODES				(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) EXPENDABILITY	(6) QTY INC IN UNIT	(7) ALLOWANCES				ILLUSTRATIONS	
									15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP					
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY						2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) IGNITION MAGNETO (CONTINUED)									
					BUSHING: insulator (P/N G2457AX)	EA		1	*	*	*	*	21	6
					CONTACT (P/N H2514)	EA		1	*	*	*	*	21	7
					PLATE: insulator (P/N W2514)	EA		1	*	*	*	*	21	8
					CAP: end (P/N MX2430A)	EA		1	*	*	*	*	21	9
					SCREW: machine (P/N AN501AC10-10)	EA		2	AR	AR	AR	AR	21	10
					SCREW: machine (P/N AN501AC10-18)	EA		2	AR	AR	AR	AR	21	11
9	P1	H		2920-377-6723	ROTOR (P/N X2765X)	EA		1			*	*	21	12
					WICK AND HOLDER (P/N G2788)	EA		1	*	*	*	*	21	13
					SCREW: machine (P/N 508-8-6)	EA		1	*	*	*	*	21	14
					WASHER: lock (P/N AN935-8)	EA		1	AR	AR	AR	AR	21	15
	P1	H		2910-640-7794	CONTACT SET (P/N W2437X)	EA		1			*	*	21	16
					RING: retaining (P/N T1498)	EA		1	*	*	*	*	21	17
					SCREW: machine (P/N AN506-6-6)	EA		2	AR	AR	AR	AR	21	18
					WASHER: lock (P/N AN935-6L)	EA		2	AR	AR	AR	AR	21	19
					SCREW: machine (P/N AN507C832-6)	EA		4	AR	AR	AR	AR	21	20

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) IGNITION MAGNETO (CONTINUED)									
					PIN: cotter (P/N 5931A)	EA		1	*	*	*	*	21	21
					NUT: castellated, hex (P/N M2570)	EA		1	*	*	*	*	21	22
					GEAR: drive (P/N GD-103)	EA		1	*	*	*	*	21	23
					BUSHING (P/N A2572)	EA		1	*	*	*	*	21	24
					HOUSING: coupling (P/N Y5957)	EA		1	*	*	*	*	21	25
					SPRING: spiral (P/N E2565)	EA		1	*	*	*	*	21	26
					PIN: thd (P/N A2568)	EA		1	*	*	*	*	21	27
					KEY: woodruff (P/N AN280R405)	EA		1	AR	AR	AR	AR	21	28
9	P1	F		2920-566-7395	COUPLING (P/N BW2563C)	EA		1		*	*	*	21	29
					SPRING: spiral (P/N B5963)	EA		1	*	*	*	*	21	30
					RETAINER: packing (P/N E2303)	EA		1	*	*	*	*	21	31
					WASHER: flat (P/N A2492A)	EA		1	*	*	*	*	21	32
9	P1	F		2920-356-1221	PACKING: preformed (P/N G3861)	EA		1		*	*	*	21	33
					WASHER: flat (P/N A2492C)	EA		1	*	*	*	*	21	34
					RING: retaining (P/N C1498D)	EA		1	*	*	*	*	21	35

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) IGNITION MAGNETO (CONTINUED)									
					RING: retaining (P/N B1498B)	EA		1	*	*	*	*	21	36
9	P1	F		110-144-8998	BEARING: ball (P/N C5949)	EA		1		*	*	*	21	37
					RING: retaining (P/N D1498)	EA		1	*	*	*	*	21	38
					GEAR: spur (P/N Q5939)	EA		1	*	*	*	*	21	39
					BEARING: sleeve (P/N D5950C)	EA		1	*	*	*	*	21	40
					RING: retaining (P/N G1498)	EA		1	*	*	*	*	21	41
					GEAR: spur (P/N F5952)	EA		1	*	*	*	*	21	42
					PIN: thd (P/N F2533)	EA		1	*	*	*	*	21	43
					WASHER: flat (P/N A2492C)	EA		1	*	*	*	*	21	44
	P1	F		2920-844-7154	BEARING: roller (P/N D5949A)	EA		1		*	*	*	21	45
					PLATE: breaker (P/N UX4631)	EA		1	*	*	*	*	21	46
					ROTOR: magnetic (P/N T52480)	EA		1	*	*	*	*	21	47
	P1	F		2920-656-7411	COIL (P/N R82477C)	EA		1		*	*	*	21	48
					SETSCREW (P/N 2585L4A)	EA		1	*	*	*	*	21	49
					HOUSING (P/N WW2425)	EA		1	*	*	*	*	21	50

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) AIR SHROUDING GROUP									
					AIR SHROUDING GROUP	EA		1					23	
H	P1	F		2805-397-9648	SCREEN: flywheel (P/N SE-48-1)	EA		1		*	*	*	23	1
					SCREW: machine (P/N AN515C416-16)	EA		8	AR	AR	AR	AR	23	2
					WASHER: lock (P/N AN935-416)	EA		8	AR	AR	AR	AR	23	3
					PLATE: identification & instruction (P/N SD-115-N)	EA		1	*	*	*	*	23	4
					SCREW: tapping (P/N AN530-4-4)	EA		4	AR	AR	AR	AR	23	5
					SHROUD: cylinder head, rh (P/N SE-127)	EA		1	*	*	*	*	23	6
					SHROUD: cylinder head, lh (P/N SE-127-A)	EA		1	*	*	*	*	23	7
					SCREW: machine (P/N AN515C416-6)	EA		6	AR	AR	AR	AR	23	8
					BOLT: machine (P/N 65-4-4)	EA		2	*	*	*	*	23	9
					WASHER: lock (P/N AN935-416)	EA		10	AR	AR	AR	AR	23	10
					SHROUD: rear, rh (P/N SE-125)	EA		1	*	*	*	*	23	11
					SHROUD: rear, lh (P/N SE-125-A)	EA		1	*	*	*	*	23	12
					BOLT: machine (P/N 65-4-4)	EA		4	*	*	*	*	23	13
					WASHER: lock (P/N AN935-416)	EA		10	AR	AR	AR	AR	23	14

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 3RD ECHELON	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) MANIFOLD AND CRANKCASE GROUP									
					SHROUD: lower cylinder, lh (P/N SE-126-A)	EA		1	*	*	*	*	23	15
					DEFLECTOR: heat, rh (P/N SE-128-B)	EA		1	*	*	*	*	23	16
					DEFLECTOR: heat, lh (P/N SE-128-C)	EA		1	*	*	*	*	23	17
					SHROUD: flywheel (P/N SE-124-Y)	EA		1	*	*	*	*	23	18
					MANIFOLD AND CRANKCASE GROUP	EA		1					24	
					BOLT: machine (P/N AN65-6-14)	EA		34	AR	AR	AR	AR	24	1
					WASHER: flat (P/N AN945-6)	EA		34	AR	AR	AR	AR	24	2
					HEAD ASSEMBLY: cylinder (P/N AB-7B-2-S1)	EA		2	*	*	*	*	24	3
9	P1	F		2805-399-6984	GASKET: head (P/N QD-631)	EA		2		*	*	*	24	4
9	P1	F		2805-428-2159	GASKET: block (P/N QD-632)	EA		2		*	*	*	24	5
					ELBOW: pipe, 1-1/2 x 90 deg (P/N 650-209)	EA		1	*	*	*	*	24	6
9	P1	F		2990-540-5066	MUFFLER (P/N WD50A)	EA		1		*	*	*	24	7
					CLAMP: muffler (P/N 4141)	EA		1	*	*	*	*	24	8
					WASHER: lock (P/N AN935-416)	EA		2	AR	AR	AR	AR	24	9
					NUT: hex (P/N AN340-416)	EA		2	AR	AR	AR	AR	24	10

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) MANIFOLD AND CRANKCASE GROUP (CONTINUED)									
					MOUNT: muffler (P/N 4140)	EA		1	*	*	*	*	24	11
					COUPLING: pipe, 1-1/2 (P/N 650-211)	EA		1	*	*	*	*	24	12
					NIPPLE: pipe, 1-1/2 x 3-1/2 (P/N 650-212)	EA		1	*	*	*	*	24	13
					ELBOW: pipe, street, 1-1/2 x 90 deg (P/N 650-210)	EA		1	*	*	*	*	24	14
9	P1	F		2990-816-5714	CHOKE CONTROL (P/N VE-435-E)	EA		1		*	*	*	24	15
					BOLT: machine (P/N AN65-5-12)	EA		2	AR	AR	AR	AR	24	16
					WASHER: lock (P/N AN935-516)	EA		2	AR	AR	AR	AR	24	17
9	P1	F		2910-255-2298	CARBURETOR: model VH-69-A (P/N 10-3774)	EA		1		*	*	*	24	18
	P1	F		2805-624-9940	GASKET (P/N QF-91)	EA		1		*	*	*	24	19
					PLUG: pipe (P/N XK-1)	EA		1	*	*	*	*	24	20
					NUT: hex (P/N 325B7)	EA		4	*	*	*	*	24	21
					WASHER: lock (P/N AN935-716)	EA		4	AR	AR	AR	AR	24	22
					STUD: manifold (P/N PC-251)	EA		4	*	*	*	*	24	23
					MANIFOLD (P/N LD-240-18)	EA		1	*	*	*	*	24	24
9	P1	H		2805-292-3984	INSERT: gasket (P/N QB-83)	EA		6				*	24	25

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CARBURETOR									
9	P1	H		2805-399-6982	GASKET: manifold (P/N QC-62)	EA		2			*	*	24	26
					BOLT: machine (P/N AN65-5-5)	EA		14	AR	AR	AR	AR	24	27
					WASHER: lock (P/N AN935-516)	EA		14	AR	AR	AR	AR	24	28
					PLATE: bottom, crankshaft (P/N BH-155-C)	EA		1	*	*	*	*	24	29
9	P1	H		2805-428-2162	GASKET (P/N QD-635)	EA		1			*	*	24	30
					CRANKCASE ASSEMBLY (P/N BA-49A-8-S1)	EA		1	*	*	*	*	24	31
					PLUG: exp, 1-3/8 (P/N SA-58)	EA		1	*	*	*	*	24	32
					INSERT: exp (P/N SA-26)	EA		2	*	*	*	*	24	33
					STUD: block mtg (P/N PC-435)	EA		12	*	*	*	*	24	34
					BOWL: sediment (P/N 65-172)	EA		1	*	*	*	*	25	1
					BOLT: machine (P/N 80-166)	EA		1	*	*	*	*	25	2
9	P1	F		5330-291-7918	GASKET (P/N 16-4)	EA		1		*	*	*	25	3
	P1	F		2910-522-5358	GASKET (P/N 16-A105)	EA		1		*	*	*	25	4
	P1	F		2910-429-2155	FLOAT (P/N 30-666)	EA		1		*	*	*	25	5
					PIN (P/N 32-27)	EA		1	*	*	*	*	25	6

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 3RD ECHELON	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CARBURETOR (CONTINUED)									
					VALVE ASSEMBLY: float (P/N 233-536)	EA		1	*	*	*	*	25	7
	P	F		2805-992-0579	NOZZLE: main (P/N 47-395)	EA		1		*	*	*	25	8
	P	F		5330-496-5413	GASKET (P/N 16-456)	EA		1		*	*	*	25	9
					POWER JET (P/N 49-253)	EA		1	*	*	*	*	25	10
					CUP: idle (P/N 55-316)	EA		1	*	*	*	*	25	11
					THROTTLE FLY (P/N 14-214)	EA		1	*	*	*	*	25	12
					SCREW: machine (P/N 15-A46)	EA		2	*	*	*	*	25	13
					SCREW: machine (P/N AN5000AC8-12)	EA		1	AR	AR	AR	AR	25	14
					SPRING (P/N 24-262)	EA		1	*	*	*	*	25	15
					SHAFT ASSEMBLY: throttle (P/N 13-956)	EA		1	*	*	*	*	25	16
					RETAINER: packing (P/N 55-231)	EA		2	*	*	*	*	25	17
					PACKING: preformed (P/N 44-63)	EA		2	*	*	*	*	25	18
					BUSHING: sleeve (P/N 60-439)	EA		2	*	*	*	*	25	19
					NEEDLE: idle (P/N 43-129)	EA		1	*	*	*	*	25	20
					SPRING (P/N 24-485)	EA		1	*	*	*	*	25	21

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CYLINDER BLOCK ASSEMBLY									
					CHOKE FLY (P/N 27-559)	EA		1	*	*	*	*	25	22
					SCREW: machine (P/N 15-A47)	EA		2	*	*	*	*	25	23
					SCREW: machine (P/N AN500C8-5)	EA		1	AR	AR	AR	AR	25	24
					SWIVEL: choke (P/N 28-49)	EA		1	*	*	*	*	25	25
					PIN: cotter (P/N 82-16)	EA		1	*	*	*	*	25	26
					SPRING (P/N 24-213)	EA		1	*	*	*	*	25	27
					SHAFT ASSEMBLY: choke (P/N 26-720)	EA		1	*	*	*	*	25	28
					SCREW: machine (P/N 15-A99)	EA		1	*	*	*	*	25	29
					BRACKET ASSEMBLY: choke (P/N 29-537)	EA		1	*	*	*	*	25	30
					SCREW: machine (P/N 15-A93)	EA		2	*	*	*	*	25	31
	P1	F		5330-726-0220	PACKING: preformed (P/N 44-38)	EA		1		*	*	*	25	32
					CUP: shaft (P/N 55-230)	EA		1	*	*	*	*	25	33
					BODY (P/N 10-3685)	EA		1	*	*	*	*	25	34
					CYLINDER BLOCK ASSEMBLY (P/N AA-90A-2-S1)	EA		1	*	*	*	*	26	
					COVER: valve (P/N BH-103)	EA		2	*	*	*	*	26	1

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CAMSHAFT AND FUEL PUMP MOUNTING GROUP									
					BOLT: machine (P/N AN65-5-14)	EA		2	AR	AR	AR	AR	26	2
					WASHER: flat (P/N AN960B516)	EA		2	AR	AR	AR	AR	26	3
	P1	H		2805-536-8804	GASKET: cover (P/N QD-482)	EA		2			*	*	26	4
9	P1	H		2805-674-4865	TAPPET ASSEMBLY: valve (P/N F-65-S1)	EA		1			*	*	26	5
	P1	H		2805-374-9746	ROTATOR CAP (P/N MS13998-1)	EA		4			AR	AR	26	6
	P1	H		2805-528-6097	LOCK: retainer (P/N MS13997-1)	EA		8			AR	AR	26	7
					SEAT, SPRING (P/N AG-30)	EA		4	*	*	*	*	26	8
					SPRING: valve (P/N AF-49A)	EA		4	*	*	*	*	26	9
9	P1	H		2805-382-8033	VALVE: poppet (P/N MS13999-8)	EA		4			AR	AR	26	10
9	P1	H		2805-424-2806	INSERT: seat (P/N HG-150D)	EA		4			*	*	26	11
	P1	H		2805-574-8856	GUIDE: valve (P/N AD-42A)	EA		4			*	*	26	12
					CYLINDER BLOCK (P/N AA-90A-2)	EA		1	*	*	*	*	26	13
					CAMSHAFT AND FUEL PUMP MOUNTING GROUP	EA		1					27	
	P1	O		4730-142-1741	STRAINER: fuel (P/N OW-418T)	EA		1	*	*	*	*	27	1
					NIPPLE: pipe (P/N RF-794-A)	EA		1	*	*	*	*	27	2

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CAMSHAFT AND FUEL PUMP MOUNTING GROUP (CONTINUED)									
					ELBOW: street, 90 deg (P/N RP-996)	EA		1	*	*	*	*	27	3
9	P1	F		2910-447-9285	FUEL LINE (P/N RM-1049A)	EA		1		*	*	*	27	4
	P1	F		2910-339-4836	FUEL PUMP (P/N GI-195-C)	EA		1		*	*	*	27	5
					BOLT: machine (P/N AN65-5-5)	EA		2	AR	AR	AR	AR	27	6
					WASHER: lock (P/N AN935-516)	EA		2	AR	AR	AR	AR	27	7
9	P1	F		5330-599-5966	GASKET: fuel pump (P/N 24240)	EA		1		*	*	*	27	8
					SCREW: cap, socket head (P/N XB-75)	EA		2	*	*	*	*	27	9
					WASHER: lock (P/N AN935-416)	EA		2	*	*	*	*	27	10
					HANDLE (P/N TA-115)	EA		1	*	*	*	*	27	11
					SPRING (P/N PM-145)	EA		1	*	*	*	*	27	12
	P1	F		5330-050-1218	RING: packing (P/N JK-50)	EA		1		*	*	*	27	13
					SHAFT (P/N TA-114)	EA		1	*	*	*	*	27	14
					ADAPTER (P/N TB-105-B)	EA		1	*	*	*	*	27	15
					CAP: plunger (P/N TA-116)	EA		1	*	*	*	*	27	16
					PLUNGER (P/N TA-111-A)	EA		1	*	*	*	*	27	17

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) FUEL PUMP									
	P1	F		2805-366-6351	GASKET (P/N QD-67)	EA		1		*	*	*	27	18
					BUTTON (P/N FF-52)	EA		1	*	*	*	*	27	19
	P1	F		2805-366-6248	PLUNGER (P/N FF-101)	EA		1		*	*	*	27	20
	P1	F		2805-366-6249	SPRING (P/N PM-108)	EA		1		*	*	*	27	21
					GEAR: camshaft (P/N GB-46)	EA		1	*	*	*	*	27	22
					BRACKET: mtg (P/N GI-22)	EA		1	*	*	*	*	27	22
					BOLT: machine (P/N AN65-5-10)	EA		3	AR	AR	AR	AR	27	23
					WASHER: lock (P/N AN936B516)	EA		3	AR	AR	AR	AR	27	24
9	P1	F		2805-524-9552	CAMSHAFT (P/N EA-112)	EA		1		*	*	*	27	25
					BOLT, MACHINE (P/N FP-765)	EA		1	*	*	*	*	28	1
	P1	F		5330-656-7475	GASKET (P/N FP-766)	EA		1		*	*	*	28	2
					DOME (P/N FP-754)	EA		1		*	*	*	28	3
	P1	F		5330-656-7474	GASKET (P/N FP-614)	EA		1		*	*	*	28	4
	P1	F		2910-684-4405	FILTER: fuel (P/N FP-657)	EA		1		*	*	*	28	5
					SCREW AND LOCKWASHER ASSEMBLY (P/N FP-762)	EA		6	*	*	*	*	28	6

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) FUEL PUMP (CONTINUED)									
					FUEL HEAD (P/N GI-46)	EA		1	*	*	*	*	28	7
					VALVE (P/N FP-756)	EA		2	*	*	*	*	28	8
					SPRING (P/N FP-644-7)	EA		2	*	*	*	*	28	9
	P1	F		2805-992-0851	RETAINER: spring (P/N FP-757)	EA		1		*	*	*	28	10
	P1	F		5330-991-7008	GASKET (P/N FP-613)	EA		1		*	*	*	28	11
					PLATE: valve (P/N FP-750)	EA		1	*	*	*	*	28	12
					SCREW AND LOCKWASHER ASSEMBLY (P/N FP-759)	EA		3	*	*	*	*	28	13
	P1	F		2910-958-7663	DIAPHRAGM (P/N LQ-21-E)	EA		1		*	*	*	28	14
	P1	F		5330-991-7010	GASKET (P/N FP-615)	EA		1		*	*	*	28	15
					SPRING: diaphragm (P/N FP-642S)	EA		1	*	*	*	*	28	16
	P1	F		5340-237-2275	SPRING: rocker arm (P/N FP-645)	EA		1		*	*	*	28	17
					PIN: straight headless (P/N FP-553)	EA		1	*	*	*	*	28	18
					BUSHING (P/N FP-498)	EA		1	*	*	*	*	28	19
					ARM: rocker (P/N FP-5455)	EA		1	*	*	*	*	28	20
					LINKAGE (P/N FP-505)	EA		1	*	*	*	*	28	21

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 8TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) GOVERNOR AND CONTROL ASSEMBLY									
					GOVERNOR ASSEMBLY	EA		1					29	
					LOCKNUT (P/N PD-173-A)	EA		1	*	*	*	*	29	1
					SPRING (P/N PM-111)	EA		1	*	*	*	*	29	2
					PIN: cotter (P/N AN381-2-8)	EA		1	AR	AR	AR	AR	29	3
					SCREW: adjusting (P/N P1-145-1)	EA		1	*	*	*	*	29	4
					PIN: swivel (P/N TC-368-A)	EA		1	*	*	*	*	29	5
9	P1	F		2990-818-3962	CONTROL ASSEMBLY (P/N VE-527-WV)	EA		1		*	*	*	29	6
					SCREW: machine (P/N AN515C5-4)	EA		1	AR	AR	AR	AR	29	7
					STOP: wire (P/N VE-339-A)	EA		1	*	*	*	*	29	8
					NUT: hex (P/N AN335-6)	EA		2	AR	AR	AR	AR	29	9
					WASHER: lock (P/N AN935-616)	EA		1	AR	AR	AR	AR	29	10
					SUPPORT (P/N VE-556)	EA		1	*	*	*	*	29	11
					BRACKET (P/N PG-475)	EA		1	*	*	*	*	29	12
					SCREW: tapping (P/N AN530C8-8)	EA		2	AR	AR	AR	AR	29	13
					BOLT: machine (P/N PB-163)	EA		1	*	*	*	*	29	14

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) GOVERNOR AND CONTROL ASSEMBLY (CONTINUED)									
					WASHER: lock (P/N PW-293-A)	EA		2	*	*	*	*	29	15
					BLOCK: swivel (P/N VE-598)	EA		1	*	*	*	*	29	16
					BUSHING (P/N HC-203)	EA		1	*	*	*	*	29	17
					LEVER (P/N VB-134A-9)	EA		1	*	*	*	*	29	18
					PIN: cotter (P/N AN381-2-8)	EA		1	AR	AR	AR	AR	29	19
					WASHER: flat (P/N AN960C516)	EA		1	AR	AR	AR	AR	29	20
					PIN: support (P/N TC-365-D)	EA		1	*	*	*	*	29	21
9	P1	F		2805-371-4615	OIL LINE ASSEMBLY (P/N BM-536)	EA		1		*	*	*	29	22
					TEE: oil line (P/N HF-1281)	EA		1	*	*	*	*	29	23
					BUSHING: red (P/N HF-1165)	EA		1	*	*	*	*	29	24
					NIPPLE: pipe (P/N HF-269)	EA		1	*	*	*	*	29	25
					CAP: tachometer adapter (P/N TC-403)	EA		1	*	*	*	*	29	26
					SPRING: extension (P/N PM-76)	EA		1	*	*	*	*	29	27
					NUT: hex (P/N AN345-10)	EA		3	AR	AR	AR	AR	29	28
					NUT: hex (P/N PD-115-A)	EA		1	*	*	*	*	29	29

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II. GROUP ASSEMBLY PARTS LIST (CONTINUED) GOVERNOR AND CONTROL ASSEMBLY (CONTINUED)									
					WASHER: lock (P/N AN935-10)	EA		4	AR	AR	AR	AR	29	30
					BALL JOINT (P/N VE-674-A)	EA		2	*	*	*	*	29	31
					ROD: control lever (P/N VE-689-A)	EA		1	*	*	*	*	29	32
9	P	H		3110-117-0587	BEARING: shaft (P/N 123)	EA		1			*	*	29	33
					GEAR: helical (P/N GD-95-A)	EA		1	*	*	*	*	29	34
					KEY: woodruff (P/N AN280H404)	EA		1	AR	AR	AR	AR	29	35
9	P	H		3110-117-0575	BEARING: housing (P/N 120)	EA		1			*	*	29	36
	P	H		3110-120-4464	BEARING (P/N 607)	EA		1			*	*	29	37
					SLEEVE (P/N TC-348A)	EA		1	*	*	*	*	29	38
					PIN: straight headless (P/N PA-340)	EA		2	*	*	*	*	29	39
					FLYWEIGHT (P/N TC-322D-S1)	EA		2	*	*	*	*	29	40
					PIN: headed (P/N TC-328-D)	EA		2	*	*	*	*	29	41
					PIN: tapered (P/N AN385A2P10)	EA		1	AR	AR	AR	AR	29	42
					HUB: flyweight (P/N TC-346-B)	EA		1	*	*	*	*	29	43
					SHAFT: drive (P/N TA-112-A)	EA		1	*	*	*	*	29	44

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) RESERVOIR									
					ADAPTER: tachometer (P/N TB-109)	EA		1	*	*	*	*	29	45
9	P	H		2805-358-4789	GASKET (P/N QD615A)	EA		1			*	*	29	46
					PLUG: exp, 5/8 in. (P/N SA-26)	EA		1	*	*	*	*	29	47
					SHAFT AND LEVER ASSEMBLY (P/N TC-398-15)	EA		1	*	*	*	*	29	48
					PACKING: preformed (P/N JK-52)	EA		1	*	*	*	*	29	49
					BEARING: sleeve (P/N ME-153)	EA		1	*	*	*	*	29	50
					YOKE (P/N VB-98A-5)	EA		1	*	*	*	*	29	51
					PIN: tapered (P/N XH-1)	EA		1	*	*	*	*	29	52
					PIN: straight headless (P/N PA-294)	EA		2	*	*	*	*	29	53
					HOUSING (P/N TC-363B-2)	EA		1	*	*	*	*	29	54
					RESERVOIR INSTALLATION	EA		1					30	
					COVER ASSEMBLY (P/N A280-3030A)	EA		1	*	*	*	*	30	1
					CAP: filler (P/N 4078-1)	EA		1	*	*	*	*	30	2
					NECK: filler (P/N 39B4233)	EA		1	*	*	*	*	30	3
	P	O		2805-992-0575	STRAINER: reservoir (P/N 4080)	EA		1	*	*	*	*	30	4

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II. GROUP ASSEMBLY PARTS LIST (CONTINUED) RESERVOIR (CONTINUED)									
					COVER ASSEMBLY (P/N A280-3029-1A)	EA		1	*	*	*	*	30	5
					NUT: hex (P/N AN345-10)	EA		2	AR	AR	AR	AR	30	6
					WASHER: lock (P/N AN936B10)	EA		2	AR	AR	AR	AR	30	7
					COVER ASSEMBLY (P/N A280-3227A)	EA		1	*	*	*	*	30	8
	P	O		4330-024-9665	FILTER ELEMENT (P/N AN6237-1)	EA		1	AR	AR	AR	AR	30	9
	P	O		4720-992-0537	HOSE: 6 in. lg (P/N 669-119)	EA		1	*	*	*	*	30	10
					COVER ASSEMBLY (P/N A280-3028A)	EA		1	*	*	*	*	30	11
	P	F		6680-786-9283	TRANSMITTER, LIQUID QUANTITY (P/N A280-5006) (Modified from P/N 4110)	EA		1		*	*	*	30	12
					SCREW: socket head cap (P/N 686-89)	EA		4	*	*	*	*	30	13
					WASHER: lock (P/N AN936B516)	EA		4	AR	AR	AR	AR	30	14
					DRAIN ASSEMBLY (P/N 2-1668)	EA		1	*	*	*	*	30	15
					TEE (P/N AN834-16)	EA		1	AR	AR	AR	AR	30	16
					RESERVOIR (P/N A280-4-3006)	EA		1	*	*	*	*	30	17
					SUPPORT (P/N 7-222-2)	EA		1	*	*	*	*	30	18
					ENGINE CONTROLS INSTALLATION	EA		1					30	19

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II. GROUP ASSEMBLY PARTS LIST (CONTINUED) HOUSING ASSEMBLY									
					HOUSING ASSEMBLY: trailer (P/N A426-4-1805)	EA		1	*	*	*	*	32	
					NUT: hex, self-locking (P/N AN365-420)	EA		7	AR	AR	AR	AR	32	1
					ARM: clamp (P/N 5665)	EA		1	*	*	*	*	32	2
					SPRING (P/N 5629)	EA		1	*	*	*	*	32	3
					WASHER: flat (P/N AN960[illegible])	EA		7	AR	AR	AR	AR	32	4
					THUMBSCREW (P/N 675-218)	EA		1	*	*	*	*	32	5
					PANEL ASSEMBLY: front (P/N 4-634-1)	EA		1	*	*	*	*	32	6
	P1	O		4920-707-5676	SUPPORT: door (P/N 50-927LH)	EA		1	*	*	*	*	32	7
	P1	O		4920-707-3126	SUPPORT: door (P/N 50-927RH)	EA		1	*	*	*	*	32	8
					NUT: hex, self-locking (P/N AN364-832)	EA		4	AR	AR	AR	AR	32	9
					BOLT: shoulder (P/N 4100)	EA		4	*	*	*	*	32	10
					NUT: hex (P/N AN340-6)	EA		3	AR	AR	AR	AR	32	11
					WASHER: lock (P/N AN935-8)	EA		6	AR	AR	AR	AR	32	12
					CLAMP ASSEMBLY: door (P/N 5666-4)	EA		8	*	*	*	*	32	13
					CLAMP ASSEMBLY: door (P/N 5666-6)	EA		2	*	*	*	*	32	13

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES					ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON		FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) HOUSING ASSEMBLY (CONTINUED)										
					NUT: hex, self-locking (P/N AN365-420)	EA		3	AR	AR	AR	AR		32	14
					ARM: clamp (P/N 5664) (U/O P/N 5666-4)	EA		6	*	*	*	*		32	15
					ARM: clamp (P/N 5665) (U/O P/N 5666-6)	EA		2	*	*	*	*		32	15
					SPRING (P/N 5629)	EA		8	*	*	*	*		32	16
					WASHER: flat (P/N AN960B416)	EA		8	AR	AR	AR	AR		32	17
					KNOB (P/N 1185)	EA		8	*	*	*	*		32	18
					SETSCREW (P/N AN565D8H5)	EA		8	AR	AR	AR	AR		32	19
					STUD: clamp (P/N 5663-1)	EA		8	*	*	*	*		32	20
					DOOR ASSEMBLY: rear (P/N 2-1677)	EA		1	*	*	*	*		32	21
					DOOR ASSEMBLY: left rear (P/N 2-1128-2)	EA		1	*	*	*	*		32	22
					DOOR ASSEMBLY: left front (P/N 2-1127-2)	EA		1	*	*	*	*		32	23
					DOOR ASSEMBLY: right front (P/N 2-1126-2)	EA		1	*	*	*	*		32	24
					SCREW: machine (P/N AN510-10-8)	EA		5	AR	AR	AR	AR		32	25
					SCREW: machine (P/N AN510-10-8)	EA		15	AR	AR	AR	AR		32	25
					LOOP: catch (P/N 2397-4)	EA		6	*	*	*	*		32	26

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) HOUSING ASSEMBLY (CONTINUED)									
					LEVER: catch (P/N 2397-5)	EA		6	*	*	*	*	32	27
					SUPPORT: door (P/N 61-3653RH)	EA		2	*	*	*	*	32	28
					SUPPORT: door (P/N 61-3653LH)	EA		2	*	*	*	*	32	29
					DOOR ASSEMBLY: front, top (P/N 2-1117A)	EA		2	*	*	*	*	32	30
					STRIP: weather (P/N X-197)	EA		4	*	*	*	*	32	31
					NUT: hex (P/N AN340-8)	EA		6	AR	AR	AR	AR	32	32
					WASHER: lock (P/N AN935-8)	EA		6	AR	AR	AR	AR	32	33
					SCREW: machine (P/N AN515-8-8)	EA		6	AR	AR	AR	AR	32	34
					RING: retaining (P/N 4323)	EA		1	*	*	*	*	32	35
					GASKET: reservoir (P/N 4324)	EA		1	*	*	*	*	32	36
					SUPPORT: door (P/N 61-3653LH)	EA		1	*	*	*	*	32	37
					SUPPORT: door (P/N 61-3653RH)	EA		1	*	*	*	*	32	37
					SCREW: machine (P/N AN515-8-12)	EA		1	AR	AR	AR	AR	32	38
					WASHER: lock (P/N AN935-8)	EA		1	AR	AR	AR	AR	32	39
					SCREW: machine (P/N AN515U8-5)	EA		1	AR	AR	AR	AR	32	40

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) HOUSING ASSEMBLY (CONTINUED)									
					WASHER: lock (P/N AN935-8)	EA		1	AR	AR	AR	AR	32	41
					BUMPER: rubber (P/N 1489-2)	EA		1	*	*	*	*	32	42
					SPACER (P/N A426-1601)	EA		1	*	*	*	*	32	43
					DOOR ASSEMBLY: rear, top (P/N 2-1118-3A)	EA		1	*	*	*	*	32	44
					NUT: hex (P/N AN340-416)	EA		7	AR	AR	AR	AR	32	45
					WASHER: lock (P/N AN935-416)	EA		7	AR	AR	AR	AR	32	46
					BOLT: machine (P/N AN65-4-4)	EA		7	AR	AR	AR	AR	32	47
					STRIP: weather (P/N 671-173-28.875)	EA		1	*	*	*	*	32	48
					STRIP: weather (P/N X-197)	EA		2	*	*	*	*	32	49
					DOOR ASSEMBLY: control panel (P/N 2-1120-1)	EA		1	*	*	*	*	32	50
					NUT: hex (P/N AN340-416)	EA		7	AR	AR	AR	AR	32	51
					WASHER: lock (P/N AN935-416)	EA		7	AR	AR	AR	AR	32	52
					BOLT: machine (P/N AN65-4-4)	EA		7	AR	AR	AR	AR	32	53
					STRIP: weather (P/N 671-173-28.875)	EA		1	*	*	*	*	32	54
					HANDLE: bow (P/N 3282)	EA		1	*	*	*	*	32	55

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) HOUSING ASSEMBLY (CONTINUED)									
					CATCH: door (P/N 2397-3L)	EA		2	*	*	*	*	32	56
					RETAINER ASSEMBLY: hinge (P/N 4043-1)	EA		2	*	*	*	*	32	57
					RETAINER ASSEMBLY: hinge (P/N 4044-1)	EA		1	*	*	*	*	32	58
					HINGE: butt (P/N 4041-1)	EA		1	*	*	*	*	32	59
					HINGE: butt (P/N 4042-1)	EA		1	*	*	*	*	32	60
					BOLT: machine (P/N AN65-6-10)	EA		8	AR	AR	AR	AR	32	61
					WASHER: lock (P/N AN935-616)	EA		8	AR	AR	AR	AR	32	62
					PIN: headless (P/N 5747)	EA		2	*	*	*	*	32	63
					SPRING (P/N 5695)	EA		2	*	*	*	*	32	64
					HOOK: support (P/N 5744A)	EA		2	*	*	*	*	32	65
					PLATE ASSEMBLY (P/N 5833)	EA		2	*	*	*	*	32	66
9	P	1	O	5340-687-5300	HANDLE: bow (P/N 2-1428)	EA		2	*	*	*	*	32	67
					WASHER: flat (P/N AN960-10L)	EA		8	AR	AR	AR	AR	32	68
					SCREW: machine (P/N AN510-10-8)	EA		8	AR	AR	AR	AR	32	69
					PLATE: identification, test stand (P/N 4055-3)	EA		1	*	*	*	*	32	70

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) ENGINE GENERATOR REGULATOR									
					PLATE: identification, mfg (P/N 4330)	EA		1	*	*	*	*	32	71
					HOUSING ASSEMBLY: trailer (P/N 4-472-2)	EA		1	*	*	*	*	32	72
					COVER (P/N 1878514)	EA		1	*	*	*	*	33	1
					SCREW: machine (P/N 1878499)	EA		2	*	*	*	*	33	2
					WASHER: flat (P/N 813731)	EA		2	*	*	*	*	33	3
					GASKET (P/N 1875510)	EA		1	*	*	*	*	33	4
					SCREW: adjusting (P/N 1812159)	EA		1	*	*	*	*	33	5
	P1	H		2920-259-1695	ARMATURE (P/N 1878467)	EA		1			*	*	33	6
					SCREW: machine (P/N AN515-6-5)	EA		2	AR	AR	AR	AR	33	7
					WASHER: lock (P/N AN935-6L)	EA		2	AR	AR	AR	AR	33	8
9	P1	H		2920-512-1788	SPRING: extension (P/N 1912176)	EA		2			*	*	33	9
					SCREW: machine (P/N 1922408)	EA		2	*	*	*	*	33	10
					SCREW: machine (P/N AN515-3-6)	EA		4	AR	AR	AR	AR	33	11
					WASHER: lock (P/N 1878505)	EA		2	*	*	*	*	33	12
					INSULATOR (P/N 1878507)	EA		1	*	*	*	*	33	13

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) GEAR COVER GROUP									
					BAR: bus (P/N 1878504)	EA		1	*	*	*	*	33	14
					BUSHING: insulator (P/N 1878506)	EA		4	*	*	*	*	33	15
9	P1	H		2920-378-0420	CONTACT (P/N 1878493)	EA		2			*	*	33	16
					SCREW: machine (P/N AN520-10-8)	EA		3	AR	AR	AR	AR	33	17
					CLAMP: terminal (P/N 1878503)	EA		3	*	*	*	*	33	18
					GROMMET (P/N 1879663)	EA		3	*	*	*	*	33	19
					GEAR COVER GROUP	EA		1					34	
					PIN: straight headless (P/N PA-291)	EA		2	*	*	*	*	34	1
					SPACER (P/N WE-243-1)	EA		1	*	*	*	*	34	2
9	P1	H		2805-536-8818	GASKET (P/N QD-633)	EA		1			*	*	34	3
9	P1	H		2805-428-2161	GASKET (P/N QD-634)	EA		1			*	*	34	4
					BOLT: machine (P/N AN65-5-12)	EA		10	AR	AR	AR	AR	34	5
					WASHER: lock (P/N AN935-516)	EA		10	AR	AR	AR	AR	34	6
					PLUG: timing hole (P/N PF-25)	EA		1	*	*	*	*	34	7
					BUTTON: thrust (P/N PF-52)	EA		1	*	*	*	*	34	8

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) OIL PUMP ASSEMBLY									
9	P1	H		5330-579-3545	SEAL: oil (P/N PH-269)	EA		1			*	*	34	9
					COVER (P/N HD-101)	EA		1	*	*	*	*	34	10
					OIL PUMP ASSEMBLY (P/N K-95-D)	EA		1	*	*	*	*	35	
					NUT: hex (P/N PD-195)	EA		1	*	*	*	*	35	1
					GEAR: drive (P/N GD-94-C)	EA		1	*	*	*	*	35	2
					SCREW: machine (P/N AN520-10-8)	EA		6	AR	AR	AR	AR	35	3
					WASHER: lock (P/N AN935-10)	EA		6	AR	AR	AR	AR	35	4
9	P1	H		2805-332-3722	SCREEN (P/N RD-112)	EA		1			*	*	35	5
					SCREW: machine (P/N AN520-10-6)	EA		1	AR	AR	AR	AR	35	6
					WASHER: lock (P/N AN935-10)	EA		1	AR	AR	AR	AR	35	7
					PIN: cotter (P/N AN381-4-16)	EA		1	AR	AR	AR	AR	35	8
9	P1	H		2805-253-6919	SPRING (P/N PM-111)	EA		1			*	*	35	9
9	P1	H		3110-100-6151	BALL: bearing (P/N ME-60)	EA		1			*	*	35	10
					COVER (P/N KB-42)	EA		1	*	*	*	*	35	11
9	P1	H		2805-448-3433	GASKET (P/N QD-535)	EA		1			*	*	35	12

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT. LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CRANKSHAFT, PISTON AND CONNECTING ROD GROUP									
					GEAR: spur (P/N KC-56-2)	EA		1	*	*	*	*	35	13
					PIN: straight headless (P/N PA-64)	EA		1	*	*	*	*	35	14
					GEAR: spur (P/N KC-56-1)	EA		1	*	*	*	*	35	15
					SHAFT: drive (P/N KD-121)	EA		1	*	*	*	*	35	16
					STUB SHAFT (P/N KD-122)	EA		1	*	*	*	*	35	17
					BODY (P/N KA-61A-1)	EA		1	*	*	*	*	35	18
					CRANKSHAFT, PISTON AND CONNECTING ROD GROUP	EA		1					36	
					RING: composition, std (P/N MS13933-7)	EA		4	AR	AR	AR	AR	36	1
9	Pl	H		2805-554-3950	RING: composition, 1020 (P/N MS13933-8) (Use as necessary)	EA		4			AR	AR	36	1
9	Pl	H		2805-554-3952	RING: composition, 1040 (P/N MS13933-9) (Use as necessary)	EA		4			AR	AR	36	1
					RING: composition, std (P/N MS13932-7)	EA		4	AR	AR	AR	AR	36	2
	Pl	H		2805-554-3954	RING: composition, .020 (P/N MS13932-8) (Use as necessary)	EA		4			AR	AR	36	2
	Pl	H		2805-554-3953	RING: composition, .040 (P/N MS13932-9) (Use as necessary)	EA		4			AR	AR	36	2
					RING: oil, std (P/N MS13931-10)	EA		8	AR	AR	AR	AR	36	3
	Pl	H		2805-554-3956	RING: oil, .020 (P/N MS13931-11) (Use as necessary)	EA		8			AR	AR	36	3

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
SOURCE CODE	MAINT LEVEL	RECOVERABILITY		FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CRANKSHAFT, PISTON AND CONNECTING ROD GROUP (CONTINUED)									
P1	H			2805-554-3955	RING: oil, .040 (P/N MS13931-12) (Use as necessary)	EA		8			AR	AR	36	3
P1	H			2805-554-9255	PISTON ASSEMBLY: std (P/N MS13957-1)	EA		4			AR	AR	36	4
P1	H			2805-554-9822	PISTON ASSEMBLY: 1020 outside (P/N MS13957-2) (Use as necessary)	EA		4			AR	AR	36	4
P1	H			2805-540-5299	PISTON ASSEMBLY: .040 outside (P/N MS13957-3) (Use as necessary)	EA		4			AR	AR	36	4
					RING: retaining (P/N MS13962-1)	EA		8	AR	AR	AR	AR	36	5
					PIN: piston (P/N MS13996-6)	EA		4	AR	AR	AR	AR	36	6
					NUT: stamped (P/N AN356-624)	EA		8	AR	AR	AR	AR	36	7
					NUT: hex (P/N AN345-616)	EA		8	AR	AR	AR	AR	36	8
					BOLT: machine (P/N FB-146-1)	EA		8	*	*	*	*	36	9
P1	H			2805-374-9738	BEARING: rod (P/N MS13993-1)	EA		8			AR	AR	36	10
P1	H			2805-386-3257	BEARING: piston pin (P/N MS13963-1)	EA		4			AR	AR	36	11
P1	H			2805-624-9951	ROD: connecting (P/N DA-66A-4)	EA		4			*	*	36	12
					CRANK: starting (P/N U230-B)	EA		1	*	*	*	*	36	13
					PIN: straight headless (P/N PA-334)	EA		1	*	*	*	*	36	14
					NUT: hex (P/N PD-157)	EA		1	*	*	*	*	36	15

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) CRANKSHAFT, PISTON AND CONNECTING ROD GROUP (CONTINUED)									
					WASHER: lock (P/N PE-65-1)	EA		1	*	*	*	*	36	16
					PULLEY: drive (P/N MD-285)	EA		1	*	*	*	*	36	17
					BOLT: machine (P/N AN65-8-12)	EA		6	AR	AR	AR	AR	36	18
					WASHER: lock (P/N AN935-816)	EA		6	AR	AR	AR	AR	36	19
					FLYWHEEL ASSEMBLY (P/N NC-146-C2-S1)	EA		1	*	*	*	*	36	20
					KEY: woodruff, #29 (P/N PL24)	EA		1	*	*	*	*	36	21
					BOLT: machine (P/N AN65-6-12)	EA		6	AR	AR	AR	AR	36	22
					WASHER: lock (P/N PE-5-41	EA		6	*	*	*	*	36	23
9	P1	H		2805-383-3549	OIL SEAL (P/N PH-202)	EA		1			*	*	36	24
					PLATE: bearing (P/N BG-193A)	EA		1	*	*	*	*	36	25
9	P1	H		2805-600-7101	GASKET (P/N QD-636-A)	EA		2			*	*	36	26
9	P1	H		5340-584-1613	SHIM (P/N QF-67-C)	EA		2			*	*	36	27
9	P1	H		5340-584-1612	SHIM (P/N QF-67-B)	EA		2			*	*	36	28
9	P1	H		2805-353-5912	SLINGER: oil (P/N RK-173)	EA		1			*	*	36	29
					GEAR (P/N GA-35A-1)	EA		1	*	*	*	*	36	30

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 8TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) PUMP									
					KEY: woodruff (P/N PL-49)	EA		1	*	*	*	*	36	31
					CUP: bearing (P/N 453A)	EA		2	*	*	*	*	36	32
					CONE: bearing (P/N 455S)	EA		2	*	*	*	*	36	33
	P1	H		2805-992-0578	CRANKSHAFT (P/N CA-69D-4)	EA		1			*	*	36	34
					TUBE (P/N 803-04035)	EA		1	*	*	*	*	37	1
					FITTING: tube (P/N 4-4-CBTX-5)	EA		2	*	*	*	*	37	2
					CAP: end (P/N 035-18438)	EA		1	*	*	*	*	37	3
					SCREW: socket head cap	EA		20	*	*	*	*	37	4
	P1	F		4320-631-4047	GASKET: cap (P/N 035-18437)	EA		1		*	*	*	37	5
					SCREW: socket head cap	EA		4	*	*	*	*	37	6
					SCREW: socket head cap	EA		4	*	*	*	*	37	7
					SCREW: socket head cap	EA		4	*	*	*	*	37	8
					CAP: control	EA		1					37	9
					BODY ASSEMBLY: stop	EA		1					37	10
	P1	F		4935-886-0312	GASKET (P/N 035-12279)	EA		2		*	*	*	37	12

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) EXPENDABILITY	(6) QTY INC IN UNIT	(7) ALLOWANCES				ILLUSTRATIONS	
									15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP					
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY						2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) PUMP (CONTINUED)									
					HOUSING ASSEMBLY: hanger	EA		1					37	13
					SCREW: socket head cap	EA		2	*	*	*	*	37	14
					SCREW: socket head cap	EA		4	*	*	*	*	37	15
	P1	H		5310-271-7442	GASKET (P/N 035-22733)	EA		6			*	*	37	16
	P1	H		1450-815-1373	PLATE: creep (P/N 035-14074)	EA		1			*	*	37	17
					RETAINER: piston & shoe assy (P/N 25-1523)	EA		1	*	*	*	*	37	18
					RETAINER (P/N 035-11826)	EA		1	*	*	*	*	37	19
	P1	H		2805-992-0574	PISTON AND SHOE ASSEMBLY (P/N 25-1525)	EA		1			*	*	37	20
	P1	H		3110-992-0547	BALL (P/N 201-24001)	EA		1			*	*	37	21
	P1	H		4320-631-0146	SOCKET: spring (P/N 035-13342)	EA		1			*	*	37	22
	P1	H		4320-712-4640	SPRING (P/N 035-22174)	EA		1			*	*	37	23
					RETAINER: spring (P/N 035-11818)	EA		1	*	*	*	*	37	24
					PIN: retainer (P/N 035-12481)	EA		1	*	*	*	*	37	25
	P1	H		2805-992-0572	BEARING AND BARREL ASSEMBLY (P/N 015-00113)	EA		1			*	*	37	26
					BARREL: cylinder (P/N 035-11816)	EA		1	*	*	*	*	37	27

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) PUMP (CONTINUED)									
					SCREW: socket head cap	EA		7	*	*	*	*	37	28
					BEARING (P/N 035-11897)	EA		1	*	*	*	*	37	29
	P1	H		4920-511-8335	GASKET (P/N 035-11899)	EA		2			*	*	37	30
					PLATE: port (P/N 035-18543)	EA		1	*	*	*	*	37	31
					PIN: dowel (P/N 324-21208)	EA		1	*	*	*	*	37	32
					PLUG: pipe, socket	EA		5	*	*	*	*	37	33
					BODY: pump (P/N 035-11811)	EA		1	*	*	*	*	37	34
					SCREW: socket head cap	EA		6	*	*	*	*	37	35
	P1	F		5330-054-6390	PACKING: preformed (P/N AN6320B32)	EA		1		AR	AR	AR	37	36
					FLANGE: suction (P/N 535-19425)	EA		1	*	*	*	*	37	37
					SCREW: socket head cap	EA		4	*	*	*	*	37	38
					FLANGE: pressure (P/N 035-19246)	EA		1	*	*	*	*	37	39
					SCREW: socket head cap	EA		4	*	*	*	*	37	40
	P1	H		5330-576-9732	PACKING: preformed (P/N MS28775-226)	EA		2			AR	AR	37	41
					RETAINER: seal (P/N 035-21934)	EA		1	*	*	*	*	37	42

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II. GROUP ASSEMBLY PARTS LIST (CONTINUED) PRESSURE COMPENSATOR CONTROL									
					SCREW: socket head cap	EA		6	*	*	*	*	37	43
	Pl	H		4920-775-4921	SEAL (P/N 10402)	EA		1			*	*	37	44
	P	F		5330-815-1712	PACKING: preformed (P/N MS28775-236)	EA		1		AR	AR	AR	37	45
	Pl	H	R	2805-992-0571	SHAFT ASSEMBLY (P/N 015-02556)	EA		1			*	*	37	46
					NUT: lock (P/N 035-17681)	EA		1	*	*	*	*	37	47
					WASHER: lock (P/N 350-01010)	EA		1	*	*	*	*	37	48
	Pl	H		3110-992-0527	BEARING: ball (P/N 20210BX1A)	EA		2			*	*	37	49
					SPACERS: matched set (P/N 015-99889)	EA		1	*	*	*	*	37	50
					SHAFT AND SLEEVE ASSEMBLY (P/N 25-3466)	EA		1	*	*	*	*	37	51
					BLOCK: port (P/N 535-11812)	EA		1	*	*	*	*	37	52
					STOP: spool (P/N 035-12562)	EA		1	*	*	*	*	38	1
	Pl	F		5330-808-0794	PACKING: preformed (P/N AN6290-8)	EA		1		AR	AR	AR	38	2
					RING: retaining (P/N 364-15885)	EA		1	*	*	*	*	38	3
	Pl	F		5330-584-0265	PACKING: preformed (P/N MS28775-10)	EA		1		AR	AR	AR	38	4
					SLEEVE (P/N 035-13981)	EA		1	*	*	*	*	38	5

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) PRESSURE COMPENSATOR CONTROL (CONTINUED)									
					PISTON (P/N 035-13973)	EA		-	*	*	*	*	38	6
					SPRING (P/N 035-22051)	EA		1	*	*	*	*	38	7
					RETAINER (P/N 035-13976)	EA		1	*	*	*	*	38	8
					WASHER: lock, internal (P/N 1228)	EA		1	*	*	*	*	38	9
					PACKING: preformed (P/N AN6227-7)	EA		1	AR	AR	AR	AR	38	10
					PISTON: seal (P/N 035-11712)	EA		1	*	*	*	*	38	11
	P1	F		4320-779-0200	SPRING (P/N 035-12289)	EA		1		*	*	*	38	12
	P1	F		2805-992-0570	SUPPORT: ball (P/N 035-11697Z)	EA		1		*	*	*	38	13
	P1	F		3110-992-0546	BALL (P/N 201-08801)	EA		1		*	*	*	38	14
					HOUSING: adjustment (P/N 035-12555)	EA		1	*	*	*	*	38	15
	P1	F		5330-618-0801	PACKING: preformed (P/N MS28775-114)	EA		1		AR	AR	AR	38	16
					PISTON (P/N 035-13973)	EA		1	*	*	*	*	38	17
					RING: retaining (P/N 356-15885)	EA		1	*	*	*	*	38	18
					SLEEVE (P/N 035-13982)	EA		1	*	*	*	*	38	19
					PACKING: preformed (P/N AN6227-7)	EA		1	AR	AR	AR	AR	38	20

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) EXPENDABILITY	(6) QTY INC IN UNIT	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY						15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP			QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 6TH ECHELON	FIG NO. (A)	ITEM NO. (B)
									2ND ECHELON	3RD ECHELON	4TH ECHELON			
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) PRESSURE COMPENSATOR CONTROL (CONTINUED)									
					CAP: control (P/N 035-17993)	EA		1	*	*	*	*	33	21
					SCREW (P/N 308-10200)	EA		2	*	*	*	*	33	22
	Pl	F		5330-684-2380	PACKING: preformed (P/N MS28775-008)	EA		1		AR	AR	AR	33	23
	Pl	F		5330-297-6290	PACKING: preformed (P/N AN6230-3)	EA		1		AR	AR	AR	33	24
					PISTON (P/N 035-14082)	EA		1	*	*	*	*	32	25
					HOUSING (P/N 015-02247)	EA		1	*	*	*	*	33	26
					NUT (P/N 035-14752)	EA		1	*	*	*	*	33	27
	Pl	F		5330-196-5382	PACKING: preformed (P/N AN6227-13)	EA		1		AR	AR	AR	33	28
					TONGUE (P/N 035-14751)	EA		1	*	*	*	*	33	29
					PIN: roll (P/N 325-12150)	EA		1	*	*	*	*	33	30
					PISTON (P/N 035-15072)	EA		1	*	*	*	*	33	31
					STOP (P/N 035-15071)	EA		1	*	*	*	*	33	32
					SPRING (P/N 035-22413)	EA		1	*	*	*	*	33	33
					BODY: stop (P/N 035-15070)	EA		1	*	*	*	*	33	34
					PIN: dowel (P/N 324-24022)	EA		1	*	*	*	*	33	35

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) EXPENDABILITY	(6) QTY INC IN UNIT	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY						15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP			QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
									2ND ECHELON	3RD ECHELON	4TH ECHELON			
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) HANGER HOUSING ASSEMBLY									
	P1	F		3110-791-3557	BEARING: ball (P/N MO-10-N)	EA		1		*	*	*	38	36
					PIN: dowel (P/N 324-24048)	EA		1	*	*	*	*	38	37
					BEARING: ball (P/N M-10-N)	EA		1	*	*	*	*	38	38
					CLEVIS (P/N 035-15821)	EA		1	*	*	*	*	38	39
					LINK: indicator (P/N 035-14391)	EA		1	*	*	*	*	39	1
					SCREW: socket head cap	EA		1	*	*	*	*	39	2
					INDICATOR (P/N 035-12871)	EA		1	*	*	*	*	39	3
					PIN: 1/8 x 3/4, type A	EA		1	*	*	*	*	39	4
					PLATE: indicator (P/N 035-12870)	EA		1	*	*	*	*	39	5
					SCREW (P/N AN515-10-6)	EA		3	AR	AR	AR	AR	39	6
					SHAFT: indicator (P/N 035-12956)	EA		1	*	*	*	*	39	7
					PACKING: preformed (P/N AN6227-7)	EA		1	AR	AR	AR	AR	39	8
					PLATE: end (P/N 035-12610)	EA		2	*	*	*	*	39	9
					SCREW: socket head cap	EA		8	*	*	*	*	39	10
	P1	H		4935-886-0320	GASKET (P/N 035-15090)	EA		2			*	*	39	11

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) HANGER HOUSING ASSEMBLY (CONTINUED)									
					PIN: trunnion (P/N 035-12955)	EA		2	*	*	*	*	39	12
9	F1	H		5330-292-0570	PACKING: preformed (P/N AN6227-15)	EA		2			AR	AR	39	13
					SPACER: trunnion (P/N 035-12958)	EA		2	*	*	*	*	39	14
					PLATE: index (P/N 035-15206)	EA		1	*	*	*	*	39	15
					SCREW: socket head cap	EA		1	*	*	*	*	39	16
					PIN: dowel (P/N 324-21610)	EA		2	*	*	*	*	39	17
					BOLT (P/N AN65-8-10)	EA		1	AR	AR	AR	AR	39	18
					SETSCREW (P/N AN565D816H14)	EA		1	AR	AR	AR	AR	39	19
					PIN: operating (P/N 035-14857)	EA		1	*	*	*	*	39	20
					SETSCREW	EA		1	*	*	*	*	39	21
	P1	H		2505-992-0592	BEARING: needle (P/N NC162416)	EA		2			*	*	39	22
					HANGER (P/N 035-15205)	EA		1	*	*	*	*	39	23
					PLUG (P/N AN913-6D)	EA		1	AR	AR	AR	AR	39	24
					PLUG: pipe, socket	EA		1	*	*	*	*	39	25
					HOUSING: hanger (P/N 035-12951)	EA		1	*	*	*	*	39	26

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 8TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II · GROUP ASSEMBLY PARTS LIST (CONTINUED) REQUISITION BY PART NUMBER. ITEMS NOT ASSIGNED FSN.									
					PART NUMBER — ITEM NAME									
					AN345B516 — NUT									
					AN6227-8 — PACKING									
					A280-2-3229 — RING, SHOCK MOUNT									
					A280-2-3332A — TUBING									
					A280-3207 — GASKET									
					A280-3217 — BUSHING									
					A280-4-3223 — HOSE ASSEMBLY, HYDRAULIC									
					A280-4-3224 — HOSE ASSEMBLY									
					A280-4-3225 — HOSE ASSEMBLY, HYDRAULIC									
					A361-112-2 — BODY									
					A361-112-3 — POPPET									
					A361-112-4 — RETAINER									
					A361-112-5 — SPRING									
					A361-117-2 — BODY									
					A361-117-3 — STEM									
					A426-1600 — DOOR STOP ASSEMBLY									
					A426-1703 — PAD AND STRAP									
					A426-1718 — PIPE									
					A426-1719 — ELBOW									
					A426-1809 — TRAY ASSEMBLY									
					A426-3253 — HANDLE									
					BD-101-S1 — COVER ASSEMBLY									
					BG-193A-S1 — PLATE ASSEMBLY									
					BG-223 — PLATE, RETAINER									
					C-21P — CARTRIDGE									
					CA-69D-4-S1 — CRANKSHAFT ASSEMBLY									
					CZ2563 — HUB ASSEMBLY									

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)

SECTION II

GROUP ASSEMBLY PARTS LIST (CONTINUED)

REQUISITION BY PART NUMBER. ITEMS NOT ASSIGNED FSN. (CONTINUED)

PART NUMBER	ITEM NAME
C106-436-24	NUT
DA-66A-4-S1	CONNECTING ROD ASSEMBLY
DR-25	RING SET
DR-25-S20	RING SET
DR-25-S40	RING SET
EBB-45A	DRIVE ASSEMBLY
GC-26	GEAR, IDLER
GH-43	GEAR
HF-454	SPACER
KA-61A-1-S1	BODY ASSEMBLY
KB-42-S2	COVER ASSEMBLY
KD-121-S1	DRIVE SHAFT ASSEMBLY
LJ-300M	TUBE, FILLER
LK-3	CLAMP
LL-120	HOSE
ME-98	BEARING ASSEMBLY
MS24322-5A6	WHEEL AND HUB ASSEMBLY
MS24325-1	WHEEL ASSEMBLY
MS24328-1	HUB ASSEMBLY
MS28740-16	CONNECTOR
MS28740-4	CONNECTOR
MS28741-16-1200	HOSE ASSEMBLY
MS28759-12-1200	HOSE ASSEMBLY
MS28759-8-1200	HOSE ASSEMBLY
MS28760-12	ADAPTER
MS28760-8	ADAPTER
MS35649-32	NUT

SECTION II

GROUP ASSEMBLY PARTS LIST (CONTINUED)

REQUISITION BY PART NUMBER. ITEMS NOT ASSIGNED FSN. (CONTINUED)

(1) SOURCE MAINT. & RECOVERABILITY CODE: MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	(2) FEDERAL STOCK NUMBER	PART NUMBER	(3) DESCRIPTION: ITEM NAME	(4) UNIT OF ISSUE	(5) EXPENDABILITY	(6) QTY INC IN UNIT	(7) ALLOWANCES: 15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 8TH ECHELON	ILLUSTRATIONS: FIG NO. (A)	ITEM NO. (B)
					MZ-2001-LS	HOUSING AND FIELD ASSEMBLY									
					MZ-2012ES	BRUSH SET									
					MC-146-C2	FLYWHEEL									
					OW-352	SCREEN									
					OW-361	COVER									
					OW-363	BOWL									
					OW-432	COCK									
					OW-446	CLAMP WIRE AND STUD									
					OW-447	CLAMP ASSEMBLY									
					OW-462	THUMBNUT AND CUP									
					PB-24	BOLT									
					PC-112	STUD									
					PC-396	STUD									
					PC-429	STUD									
					PF-18	PLUG, PIPE									
					PG-512	BAND									
					PH-245	WASHER, CORK									
					PJ-105	STUD, GEAR									
					QD-595-A	GASKET									
					QD-616	GASKET									
					Q0653	GASKET									
					RC-91	SCREEN, OIL									
					RF-270	ELBOW, 90 DEGREE									
					RF-270-4	ELBOW, RESTRICTED, 90 DEGREE									
					RK-181	PLATE, SPLASH									
					SA-65-A	PAD, COVER									
					SE-126	SHROUD									

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) REQUISITION BY PART NUMBER. ITEMS NOT ASSIGNED FSN. (CONTINUED)									
					PART NUMBER — ITEM NAME									
					TA-112A-S — DRIVE SHAFT ASSEMBLY									
					TB155-S4-12D — COUPLING HALF									
					TB155-S4-8D — COUPLING HALF									
					TC-343A-S1 — SLEEVE AND BEARING ASSEMBLY									
					TC-363B-2-S1 — HOUSING ASSEMBLY									
					TF-96-4 — ADAPTER AND PRIMER ASSEMBLY									
					TT-61F-3 — CONTROL ASSEMBLY									
					TT-54H-1 — GOVERNOR ASSEMBLY									
					X-179 — STRIP									
					XE-17 — SETSCREW									
					XE-3 — SPARK PLUG									
					XK-7-A — PLUG									
					96137 — BOWL									
					102153 — STRAP									
					1046-3 — BALL									
					111-161 — HOSE									
					111-4-L — HOSE									
					112-12 — HOSE									
					112-4 — HOSE									
					11382A — GASKET									
					11562 — SPACER									
					11582 — GASKET, COVER									
					11583 — SPRING									
					11584 — PLUG, DRAIN									
					11584 — NUT, SQUARE									
					144-S1-16D — COUPLING HALF									
					150-S3-12D — CAP, SEAL									

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) REQUISITION BY PART NUMBER. ITEMS NOT ASSIGNED FSN. (CONTINUED)									
					PART NUMBER — ITEM NAME									
					150-S9-3D — CAP, SEAL									
					155-SL-12D — COUPLING HALF									
					155-S1-8D — COUPLING HALF									
					15535-12D — NUT, UNION									
					15535-8D — NUT, UNION									
					15900 — HANDLE									
					15900-1 — HANDLE, VALVE									
					1672-17 — PIN									
					1900PM-FFG-1/4 — VALVE, NEEDLE									
					2-1249 — TUBE									
					2-1249A — TUBE ASSEMBLY									
					2-1678 — HANGER ASSEMBLY									
					2397-4A — CATCH ASSEMBLY									
					25-5871 — CONTROL									
					275-2 — GROMMET									
					29-914 — GROMMET									
					313-12 — CONNECTOR									
					313-4 — CONNECTOR									
					4-699 — AXLE AND BRAKE ASSEMBLY									
					4-699-1 — AXLE AND BRAKE ASSEMBLY									
					400-11 — WASHER									
					400-210 — WASHER									
					407-19 — NUT, WING									
					4081-2 — COUPLING									
					4089 — PUSHROD									
					409-121 — NUT									
					4095 — POST									

(1) SOURCE MAINT. & RECOVERABILITY CODE				(2)	(3)	(4)	(5)	(6)	(7) ALLOWANCES				ILLUSTRATIONS	
MAT CODE	SOURCE	MAINT LEVEL	RECOVERABILITY	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	EXPENDABILITY	QTY INC IN UNIT	15 DAYS MAINTENANCE ALLOWANCE PER 100 EQUIP: 2ND ECHELON	3RD ECHELON	4TH ECHELON	QUANTITY RECOMMENDED FOR REBUILD OF 100 EQUIPMENTS 5TH ECHELON	FIG NO. (A)	ITEM NO. (B)
					SECTION II GROUP ASSEMBLY PARTS LIST (CONTINUED) REQUISITION BY PART NUMBER. ITEMS NOT ASSIGNED FSN. (CONTINUED)									

PART NUMBER	ITEM NAME
4200A	LEVEL ASSEMBLY
4205	LOCKNUT
4413	BULLET
4414	PUSHROD
4415	SCREW
4723	LOCKNUT
5100-S10	CHAIN ASSEMBLY
5121	HANDLE
5241	COVER ASSEMBLY
5310	BODY, FILTER
5666-3	CLAMP ASSEMBLY
569412	FILTER
5817	BODY
5818	STEM
5819	KNOB
671-173-16	STRIP
671-173-255	STRIP
72-F	CONNECTOR
9510	GROMMET

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PART NO.	MANUFACTURERS CODE	FEDERAL STOCK NO.	ITEM NAME	FIGURE AND INDEX NO.
A-552	16954	2940-799-7687	AIR CLEANER	11-14
AA-90A-2	66289		CYLINDER BLOCK	26-13
AA-90A-2-S1	66289		CYLINDER BLOCK ASSEMBLY	26
AA1108-1	70417		BEARING	14-62
AA1154-1	70417	3120-580-4514	BEARING	14-51
AA1339-2	70417	2805-992-0585	BEARING	14-78
AB-7B-2-S1	66289		HEAD ASSEMBLY	24-3
AD-42A	66289	2805-574-8856	GUIDE	26-12
AF-49A	66289		SPRING	26-9
AO-30	66289		SEAT SPRING	26-8
AHT-5A-1	82386	4920-710-6669	TEST STAND	1
AN101008			BOLT	17-16
AN101208			BOLT	18-11
AN121503			NUT	
AN280-505			KEY	20-16
AN280H204			KEY, WOODRUFF	
AN280H404			KEY	29-35
AN280R405	21387	5315-012-4545	KEY	19-19,21-28
AN3027-3	88044	5930-655-1582	SWITCH	10-1
AN320-16			NUT	14-43
AN325-10			NUT	
AN325-5			NUT, HEXAGON	
AN325-6			NUT	14-32
AN325-8			NUT	14-30
AN325B5			NUT	20-30
AN330-10			NUT	14-16
AN335-10			NUT	14-71
AN335-4			NUT	17-10,17-19, 17-29,18-9
AN335-5			NUT	14-6,16-15
AN335-6			NUT	14-80,17-3,29-9
AN335-8			NUT	18-13
AN340-416			NUT	24-10, 32-45, 32-51
AN340-6			NUT	16-6,19-8,21-3, 32-11
AN340-8			NUT	32-32
AN345-10			NUT	17-14,17-35, 29-28,30-6
AN345-516			NUT	15-3
AN345-616			NUT	14-67,36-8
AN345B516			NUT	
AN350-1032			NUT	13-8
AN356-624			NUT	36-7
AN364-832			NUT	32-9
AN365-420			NUT	32-1,32-14
AN365-6-18			NUT	14-20
AN380-2-3			PIN	14-1
AN380-4-4			PIN	15-10,15-14
AN380-4-6			PIN	14-15
AN380-4-7			PIN	14-42
AN381-2-8			PIN	29-3,29-19
AN381-4-16			PIN, COTTER	35-8
AN385A2P10			PIN	29-42
AN500A10-18			SCREW, MACHINE	
AN500C8-5			SCREW	25-24
AN5000AC8-12			SCREW	25-14
AN501-416-7			SCREW	16-2
AN501A-10-6			SCREW	20-25

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PART NO.	MANUFACTURERS CODE	FEDERAL STOCK NO.	ITEM NAME	FIGURE AND INDEX NO.
AN501AC10-10			SCREW	21-10
AN501AC10-18			SCREW	21-11
AN504-6-4			SCREW	
AN505-10-8			SCREW	9-7
AN505-8-6			SCREW	20-3
AN507C832-6			SCREW	21-20
AN508-6-6			SCREW	21-18
AN510-10-8			SCREW	32-25,32-69
AN510C10-12			SCREW	
AN515-10-6			SCREW	39-6
AN515-3-6			SCREW	33-11
AN515-416-10			SCREW	17-26
AN515-416-12			SCREW	9-30
AN515-416-16			SCREW	17-12
AN515-416-28			SCREW	
AN515-416-48			BOLT, MACHINE	
AN515-6-4			SCREW	19-10
AN515-6-5			SCREW	33-7
AN515-6-6			SCREW	21-2
AN515-6-7			SCREW	19-6
AN515-6-8			SCREW	21-5
AN515-8-12			SCREW	32-38
AN515-8-8			SCREW	32-34
AN515C416-16			SCREW	23-2
AN515C416-40			SCREW	
AN515C416-6			SCREW	23-8
AN515C5-4			SCREW	29-7
AN515U88-5			SCREW	32-40
AN520-10-20			SCREW	
AN520-10-6			SCREW	20-22,35-6
AN520-10-8			SCREW	9-5,33-17,35-3
AN520C10-12			SCREW	
AN520C10-14			SCREW	
AN520UB10-6			SCREW	17-37
AN526-1032-6			SCREW	
AN526-632-5			SCREW	16-8
AN526-832-6			SCREW	
AN530-4-4			SCREW	23-5
AN530C8-8			SCREW	29-13
AN535-6-4			SCREW, TAPPING	
AN535-614			SCREW, TAPPING	
AN565A516H6			SETSCREW	
AN565D8H5			SETSCREW	32-19
AN565D816H14			SETSCREW	39-19
AN60-6-6			BOLT	14-34
AN6227-10		5330-350-9013	PACKING	
AN6227-15		5330-292-0570	PACKING	39-13
AN6227-19		5330-196-5382	PACKING	38-28
AN6227-26		5330-198-6187	PACKING	
AN6227-69		5330-197-9611	PACKING	13-7,13-30
AN6227-7			PACKING	38-10, 38-20, 39-8
AN6227-8	88144	5330-050-1211	PACKING	
AN6230-14	45681	5330-815-1712	PACKING	13-25,37-45
AN6230-3		5330-297-6290	PACKING	38-24
AN6236-3		1650-242-9425	FILTER ELEMENT	13-11
AN6237-1	88044	4330-024-9665	FILTER ELEMENT	30-9
AN6246-8			RETAINER	
AN6289-12			LOCKNUT	

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PART NO.	MANUFACTURERS CODE	FEDERAL STOCK NO.	ITEM NAME	FIGURE AND INDEX NO.
AN6289-4			LOCKNUT	
AN6290-10		5330-285-9842	PACKING	13-24
AN6290-12		5330-251-8839	PACKING	
AN6290-16		5330-285-9843	PACKING	13-5,13-19
AN6290-3		5330-835-7485	PACKING	13-29
AN6290-4	98441	5330-805-2966	PACKING	13-3
AN6290-8		5330-808-0794	PACKING	38-2
AN6291-12			RETAINER	
AN6291-4			RETAINER	
AN6320B32	88044	5330-054-6890	PACKING	37-36
AN65-4-4			BOLT	17-22,32-47, 32-53
AN65-4-5			BOLT	18-6
AN65-4-6				11-25,14-28, 17-32
AN65-5-10			BOLT	13-27,14-8, 16-18,27-23
AN65-5-12			BOLT	24-16,34-5
AN65-5-14			BOLT	26-2
AN65-5-5			BOLT	24-27,27-6
AN65-5-6			BOLT	16-10
AN65-5-7			BOLT	
AN65-6-10			BOLT	14-21,32-61
AN65-6-12			BOLT, MACHINE	36-22
AN65-6-14			BOLT	14-83,24-1
AN65-6-24			BOLT	15-9
AN65-6-7			BOLT	
AN65-8-10			BOLT	39-18
AN65-8-12			BOLT	14-55,14-64, 36-18
AN65-8-14			BOLT	18-10
AN804-4			TEE	12-33,12-39
AN814-3			PLUG	13-28
AN815-16			UNION	13-4
AN815-4			UNION	
AN832-4			NIPPLE, TUBE	
AN833-12			ELBOW	12-29
AN833-16			ELBOW	12-25,13-18
AN833-4			ELBOW	12-27 ,12-43, 13-2
AN834-12			TEE	12-10
AN834-16			TEE	30-18
AN834-4			TEE	12-34,12-41
AN837-12			ELBOW	
AN913-6D			PLUG	39-24
AN919-20			REDUCER	
AN924-16			LOCKNUT	13-17
AN924-4			LOCKNUT	13-1
AN924-48			CAP ASSEMBLY	9-26
AN929-48			CAP ASSEMBLY	9-24
AN931-8-13			BONNET	14-24
AN935-10			WASHER	17-15,17-36, 20-2,20-26, 29-30,35-4, 35-7
AN935-1016			WASHER	14-72,18-26

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AN935-5L			WASHER	19-7
AN935-516			WASHER	14-7,20-31, 24-17,27-7, 34-6
AN935-516L			WASHER	13-22,16-12, 16-16
AN935-6			WASHER	21-4
AN935-6L			WASHER	21-19, 33-8
AN935-616			WASHER	14-33,14-68, 14-81,15-8, 17-4,29-10, 32-62
AN935-716			WASHER	24-22
AN935-8			WASHER	21-15,32-12, 32-33,32-39, 32-41
AN935-816			WASHER	14-31,14-56, 14-65,18-12, 36-19
AN936A6			WASHER	16-7
AN936A716			WASHER, LOCK	
AN936B10			WASHER	30-7
AN936B516			WASHER	27-24,30-14
AN936B616			WASHER	
AN945-4P			WASHER	17-21,17-31, 18-7
AN945-5P			WASHER	
AN945-6			WASHER	24-2
AN960-10L			WASHER	32-68
AN960-1016			WASHER	14-73
AN960-516			WASHER	15-13,24-28
AN960-616			WASHER	14-82,15-15
AN960-8			WASHER	
AN960-816			WASHER	18-11
AN960B416			WASHER	32-4,32-17
AN960B516			WASHER	20-32,26-3
AN960C516			WASHER	29-20
A1133-2	12204	3120-489-4244	BEARING	14-62
A2492A	21387		WASHER	21-32
A2492C	21387		WASHER	21-34,21-44
A2568	21387		PIN	21-27
A2572	21387		BUSHING	21-24
A280-2-3071-1	82386		CONTROL ASSEMBLY	9-29
A280-2-3206			VALVE ASSEMBLY	9-12
A280-2-3221		4920-793-0667	VALVE ASSEMBLY	
A280-2-3229	82386		RING, SHOCK MOUNT	
A280-2-3300		4720-990-9014	HOSE ASSEMBLY	12-37
A280-2-3302	82386	4720-990-9011	HOSE ASSEMBLY	12-44
A280-2-3304A	82386		TUBING	12-36
A280-2-3306A	82386		TUBING	12-32
A280-2-3308A	82386		TUBING	12-38
A280-2-3310A	82386		TUBING	12-42

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A280-2-3312A	82386		TUBING	12-40
A280-2-3314A	82386		TUBING	12-45
A280-2-3316A	82386		TUBING	12-30
A280-2-3318A	82386		TUBING	12-31
A280-2-3320A	82386		TUBING	12-35
A280-2-3322	82386		TUBING	12-17
A280-2-3328A	82386		TUBING	12-46
A280-2-3332A	82386		TUBING	12-19
A280-2-3334A			TUBING	12-13
A280-2-3336	82386		TUBING	12-11
A280-2-3348A	82386		TUBING	12-21
A280-2-3350A	82386		TUBING	12-6
A280-3005	82386	4820-783-6670	VALVE	12-23
A280-3014	82386	6620 -783-6614	GAGE	9-6
A280-3016	82386	6685-783-6616	GAGE	9-4
A280-3028A			COVER ASSEMBLY	30-11
A280-3029-1 A	82386		COVER ASSEMBLY	30-5
A280-3030A	82386		COVER ASSEMBLY	30-1
A280-3207	82386	5330-991-8569	GASKET	
A280-3217	82386		BUSHING	
A280-3219			TEE	12-24
A280-3227A	82386		COVER ASSEMBLY	30-8
A280-3231			ELBOW 90 DEGREE	
A280-4-3001	82386	4320-787-2586	PUMP	12-1
A280-4-3006	82386		RESERVOIR	30-17
A280-4-3068			MANIFOLD	13-20
A280-4-3210			VALVE ASSEMBLY	
A280-4-3216	82386		FILTER AND MANIFOLD ASSEMBLY	12-47
A280-4-3220	82386		FILTER ASSEMBLY	12-9
A280-4-3222			PLATE, NAME, HYDRAULIC CIRCUIT SCHEMATIC	
A280-4-3223	82386	4720 -793-0558	HOSE ASSEMBLY, HYDRAULIC	
A280-4-3224	82386	4920-790-8109	HOSE ASSEMBLY	
A280-4-3225	82386	4920-790-8108	HOSE ASSEMBLY, HYDRAULIC	
A280-4-4000	82386		HYDRAULIC SYSTEM INSTALLATION	12
A280-5006	51240	6680-786-9283	TRANSMITTER	30-12
A280-7-3211	82386		HOUSING	13-31
A300-5079		6685-704-0845	GAGE	9-28
A361 -100		4920-793-0645	VALVE	9-17
A361-100-10		4920-991-6999	PLUNGER	
A361-100-11		2805-992-0588	SPRING , SPOOL	
A361-100-12		2805-992-0589	SPRING, PILOT	
A361-100-13			SEAT, INSERT	
A361-100-3			CAP, VALVE	
A361-100-4		2805-992-0586	VALVE, NEEDLE	
A361-100-5			NUT	
A361-100-6			SCREW	
A361-100-8		2805-992-0587	GUIDE, SPRING	
A361 -103-3		2805-992-0590	FILTER	
A361-103-4			PIN	
A361 -103-5			STEM	
A361-103-6			PLUG	
A361 -103-7			RETAINER, SPRING	
A361 -103-8		2805-992-0591	SPRING	
A361-112-2	82386		BODY	
A361-112-3	82386		POPPET	

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A361-112-4	82386		RETAINER	
A361-112-5	82386		SPRING	
A361-117-2	82386		BODY	
A361-117-3	82386		STEM	
A361-2-100-2			BODY, VALVE	
A361-2-100-7			SEAT, SPOOL	
A361-2-100-9			SPOOL	
A361-2-103		4920-783-6857	VALVE	9-8
A361-2-103-2			BODY	
A361-2-108		4920-713-4705	DAMPENER	9-22
A361-2-112		4820-783-6678	VALVE	
A361-2-117	82386		VALVE	12-7
A4-3736-R-70	78500	2530-541-3003	BRAKE ASSEMBLY	14-66
A426-1001	82386		CLAMP	14-86
A426-1600	82386		DOOR STOP ASSEMBLY	
A426-1601	82386		SPACER	32-43
A426-1703	82386		PAD AND STRAP	
A426-1707	82386		LINER	18-14
A426-1709	82386		BOLT	17-5
A426-1717	82386		STRAP	18-15
A426-1718	82386		PIPE	
A426-1719	82386		ELBOW	
A426-1720A	82386		SUPPORT	18-5
A426-1806	82386		COVER	17-6
A426-1809	82386		TRAY ASSEMBLY	
A426-1810	82386		SUPPORT	17-13
A426-1811			TRAY	17-17
A426-2-1712A	82386		TUBING	18-1
A426-2-1713A	82386		TUBING	18-2
A426-2-1714A	82386		TUBING	18-3
A426-2-1722A	82386		TUBING	18-4
A426-2-3220	82386	4720-990-9012	HOSE ASSEMBLY	12-4
A426-2-3221	82386	4720-990-9015	HOSE ASSEMBLY	12-8
A426-2-3260A	82386		TUBING	12-14
A426-2-3261A	82386		TUBING	12-26
A426-2-3262A	82386		TUBING	12-22
A426-2-3263A	82386		TUBING	12-28
A426-2-3264A	82386		TUBING	12-12
A426-2-3265A	82386		TUBING	12-5
A426-3213			BRACKET	
A426-3250			PLATE, NAME, OUTLET 1/2 INCH	
A426-3251			PLATE, NAME, OUTLET 3/4 INCH	
A426-3253	82386		HANDLE	
A426-4-1800	82386		FRAME ASSEMBLY	14-87
A426-4-1805	82386		HOUSING ASSEMBLY	32
A426-4-3210			PANEL ASSEMBLY	
A426-4-3211A			PANEL	9-1
A426-7-3200			PANEL ASSEMBLY, CONTROL	9
A426-7-3202			PLATE, CONTROL PANEL	
BA-49A-8-S1	66289		CRANKCASE ASSEMBLY	24-31
BD-101	66289		COVER	34-10
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BG-193A	66289		PLATE, BEARING	36-25
BG-193A-S1	66289		PLATE ASSEMBLY	
BG-223	66289		PLATE, RETAINER	
BH-103	66289		COVER	26-1
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B448		2530-533-2650	HUB	14-51
B5963	21387		SPRING	21-30
C-21P	73370	2940-141-9025	CARTRIDGE	
CA-69 D-4	66289	2805-992-0578	CRANKSHAFT	36-34
CA-69D-4-S1	66289		CRANKSHAFT ASSEMBLY	
CZ2563	21387		HUB ASSEMBLY	
C106-436-24	78553		NUT	
C1498D	21387		RING	21-35
C447	73809		CAP	14-41
C5949	21387	3110-144-8998	BEARING	21-37
DA-66A-4	66289	2805-624-9951	ROD, CONNECTING	36-12
DA-66A-4-S1	66289		CONNECTING ROD ASSEMBLY	
DR-25	66289	2805-654-4274	RING SET	
DR-25-S20	66289		RING SET	
DR-25-S40	66289	2805-992-0576	RING SET	
D1498	21387		RING	21-38
D5949A	21387	2920-844-7154	BEARING	21-45
D5950C	21387		BEARING	21-40
EA-112	66289	2805-524-9552	CAMSHAFT	27-25
EB-108A	19728		WASHER	20-10
EB-8503A	19728		HEAD	20-13
EB-8506A	19728		BOLT	20-9
EB-8507A	19728		BOLT	20-8
EBA-405A	19728	5340-353-6994	SPRING	20-12
EBB-45A	19728		DRIVE ASSEMBLY	
EBB-4511A	19728	2920-367-4255	SHAFT AND PINION ASSEMBLY	20-11
E2303	21387		RETAINER	21-31
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FF838-3	70417		BEARING	14-85
FM-XZE4B-7	21387	2920-656-7336	MAGNETO	21
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FP-505	70955		LINKAGE	28-21
FP-5455	70955		ARM	28-20
FP-553	70955		PIN	28-18
FP-613	70955	5330-991-7008	GASKET	28-11
FP-614	70955	5330-656-7474	GASKET	28-4
FP-615	70955	5330-991-7010	GASKET	28-15
FP-6428	70955		SPRING	28-16
FP-644-7	70955		SPRING	28-9
FP-645	70955	5340-237-2275	SPRING	28-17
FP-657	70955	2910-684-4405	FILTER	28-5
FP-750	70955		PLATE	28-12
FP-754	70955		DOME	28-3
FP-756	70955		VALVE	28-8
FP-757	70955	2805-992-0851	SPRING	28-10
FP-759	70955		SCREW AND LOCKWASHER ASSEMBLY	28-13
FP-762	70955		SCREW AND LOCKWASHER ASSEMBLY	28-6
FP-765	70955		BOLT	28-1
FP-766	70955	5330-656-7475	GASKET	28-2
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1911263	16764		PLATE	19-20
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2530-528-9080	DRUM	78500	3719-R-44	14-52
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By Order of the Secretary of the Army:

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