TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT,

AND GENERAL SUPPORT MAINTENANCE

DIESEL ENGINE DRIVEN

MODEL MSU-1, PART NO. C520-1000

(FSN 1730-855-6108)

This copy is a reprint which includes current pages from Changes 1 through 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1971

NO. 3

CHANGE HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C.,8 December 1987

Operator's, Organizational, Direct Support and General Support Maintenance for

**MOBILE SERVICING UNIT
DIESEL ENGINE DRIVEN
MODEL MSU-1 PART NO. C520-1000
(NSN 1730-00-855-6108)**

TM 55-1730-216-14, 1 December 1971, is changed as follows:

Page 4. Change Paragraph 1-2, TM 38-750 to read "DA PAM 738-751".
Page 4. Change Paragraph 1-3, line 6 to read "Commanding General, US Army Aviation Systems Command, ATTN: AMSAV-MPSD, 4300 Goodfellow Blvd., St. Louis, Mo. 63120-1798.

A reply will be furnished directly to you" Page 85. Figure NO. A-2, Item No. 64 is changed to read: '"National Stock Number 6140-00-406-2635' and '(97969) (53033)"' is changed to read "(81349) (M83769/3-1)".

Page 92. Item No. 106, Taillight is changed to read "National Stock Number 6220-00299-5647; Description Light, Marker, Clearance (81834) (200R) (See Figure A-25)".

Page 123. Add to Item 31, "National Stock Number 6625-01-086-9580, Ammeter (96906) (MS24532-2REVG)".

Page 210. Change title of Figure A-25 to read "Light, Marker Clearance".

Page 211. Change Fig. No. A-25 to read "National Stock Number 6220-00-299-5647; Description Light, Marker, Clearance (81834) (200P)".

Page 272. Add to the end of Paragraph 13-4a the following:

"The higher level of maintenance has the authority to determine: (1). If the lower level is capable of performing the work. (2). If the lower level will require assistance or technical supervision and on-site inspection. (3). If the authorization will be granted."

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United State Army
The Adjutant General

To be distributed in accordance with Form 12-31, -10 & CL, AVUM and AVIM maintenance requirements for All Fixed and Rotary Wing Aircraft.

CHANGE)
CHANGE }
NO. 2)

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 June 1983

Operator's, Organizational, Direct Support and General Support Maintenance

**MOBILE SERVICING UNIT
DIESEL ENGINE DRIVEN
MODEL MSU-1, PART NO. C520-1000
(NSN 1730-00-855-6108)**

TM 55-1730-216-14, 1 December 1971, is changed as follows:

Page 4. Paragraph 1-3 is superseded as follows:

1-3. Reporting Errors and Recommending Improvements.

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MPSD, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished directly to you.

Pages 185 through 188, Figure A-24, are superseded as follows:

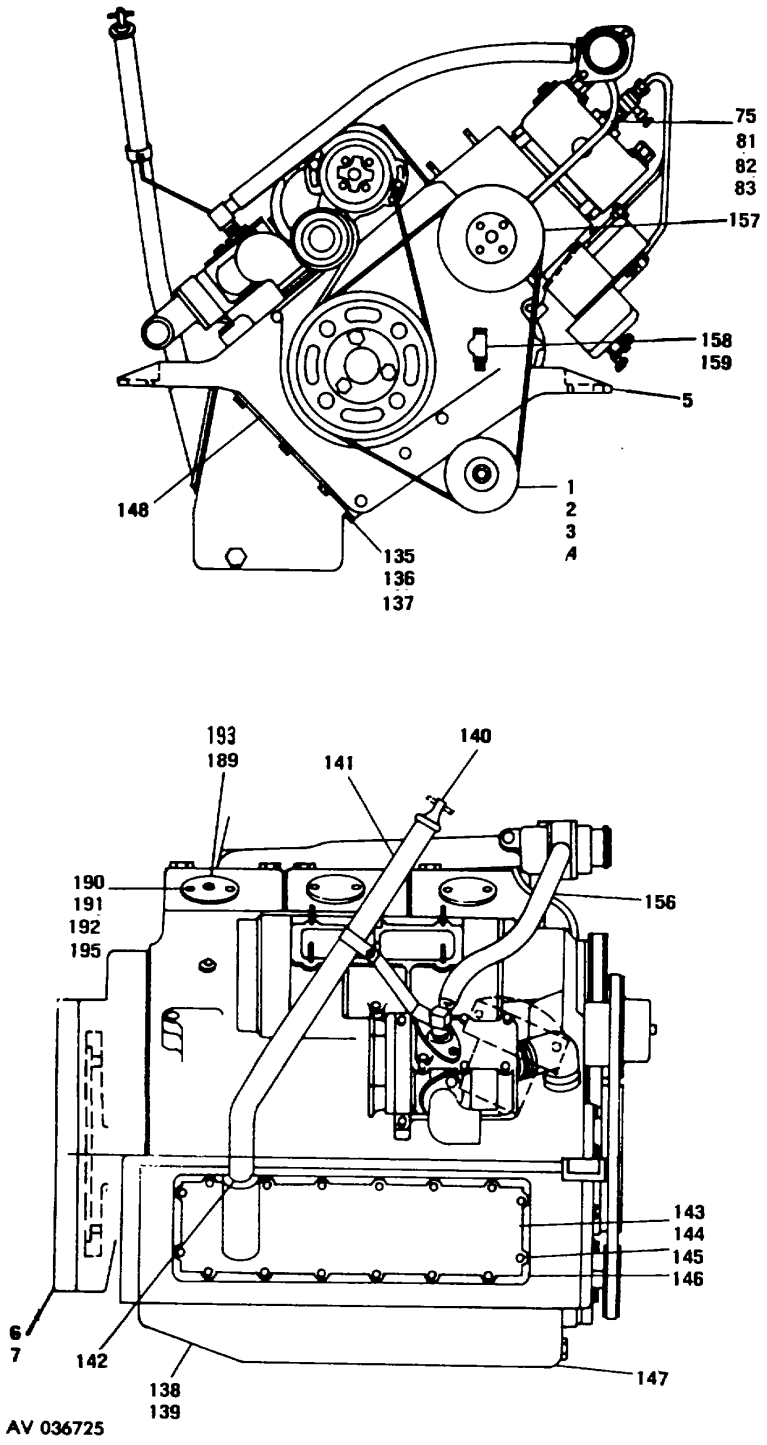


Figure A-24. Diesel Engine (Sheet 1 of 4)

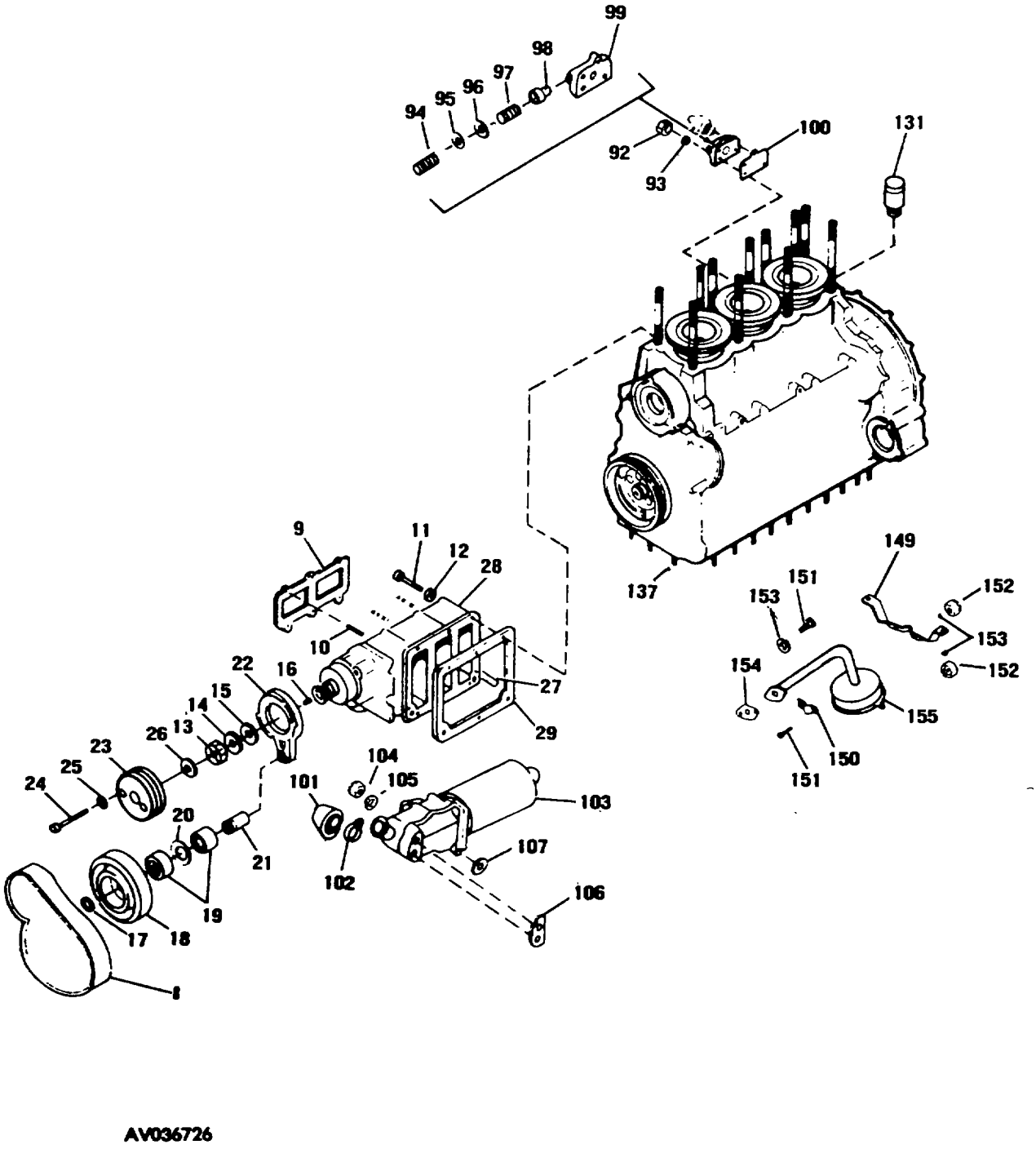


Figure A-24. Diesel Engine (Sheet 2 of 4)

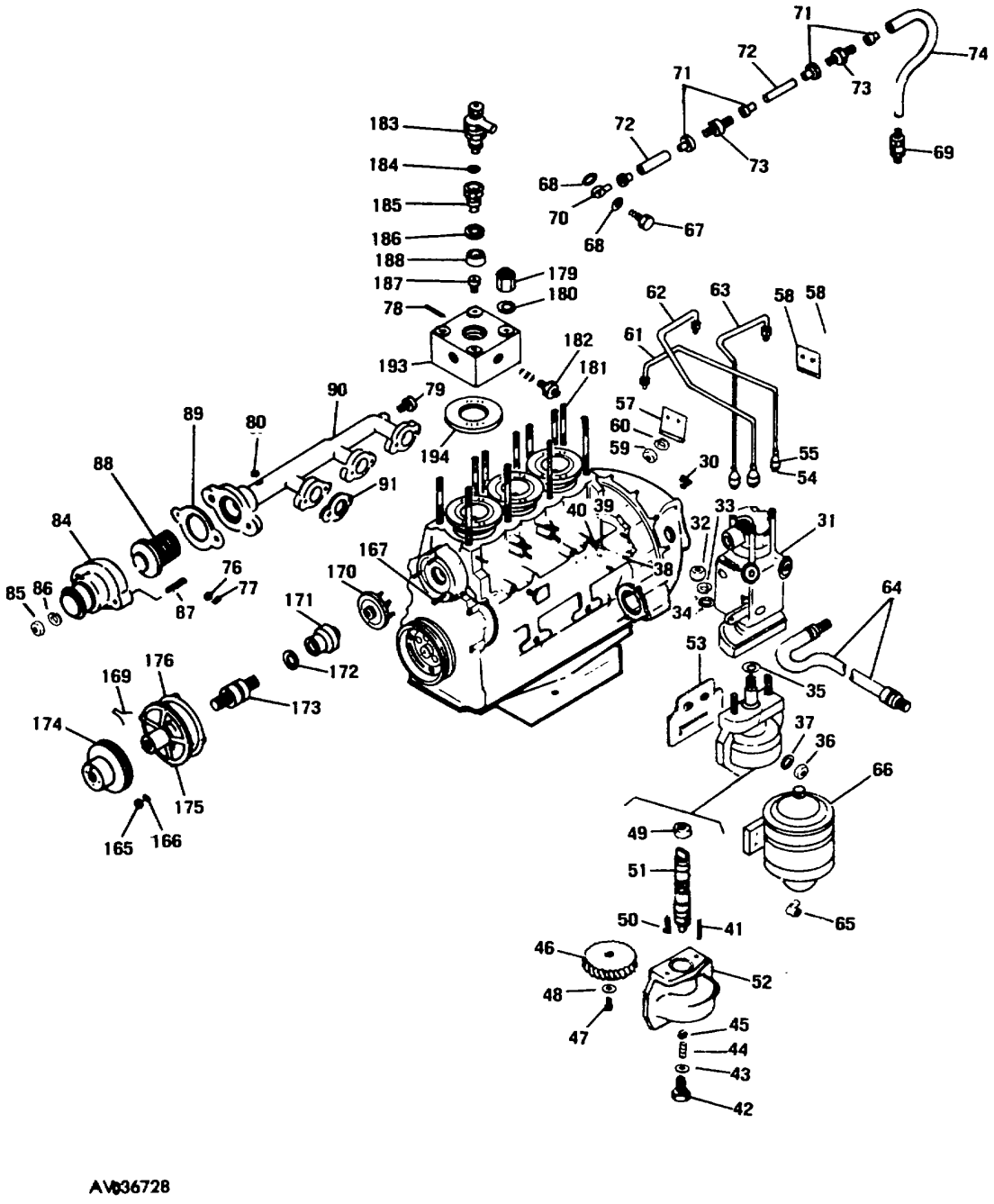


Figure A-24. Diesel Engine (Sheet 3 of 4)

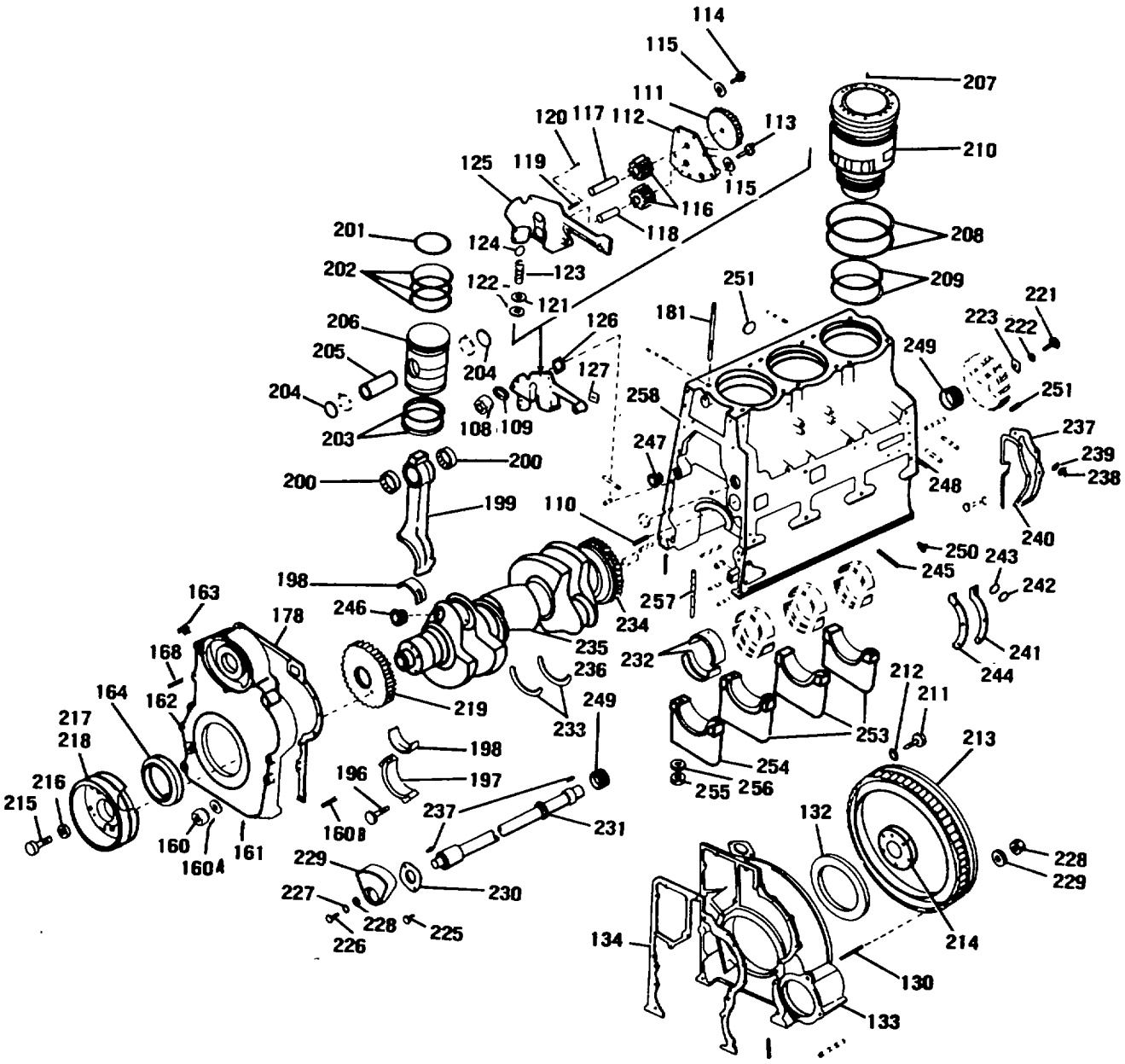


Figure A-24. Diesel Engine (Sheet 4 of 4)

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, Operator Maintenance Requirements for All Fixed and Rotor Wing Aircraft.

CHANGE

No. 1:

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC., 4 November 1980

Operator's, Organizational, Direct Support,
and General Support Maintenance

MOBILE SERVICING UNIT
DIESEL ENGINE DRIVEN
MODEL MSU-1, PART NO. C520-1000
(NSN 1730-00-855-6108)

TM 55-1730-216-14, 1 December 1971, is changed as follows.

Cover. Title is changed as shown above.

Page i. Title is changed as shown above.

Warning Page is added.

Page 4. Paragraph 1-3 is superseded as follows:

1-3. Reporting Errors and Recommending Improvements.

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedure, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publication and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MTT, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished to you.

Page 39, paragraph 3-9. The following Warning note is added after "3-9. Normal Starting."

WARNING

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

WARNING PAGE

WARNING AND PRECAUTIONARY DATA

Personnel performing operations, procedures, and practices which are included or implied in this technical manual shall observe the following warnings. Disregard of these warnings and precautionary information can cause serious injury, death or destruction of material.

FUEL SYSTEM. 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 generate as gasoline flows over the metal surfaces.

Never fill fuel tank while engine is in operation or hot, to avoid possibility of spilled fuel causing a fire.

CARBON MONOXIDE. Never operate engine in a closed building, unless the exhaust, which contains carbon monoxide, is piped outside. Inhalation of exhaust can cause serious illness or death.

FLUID BYPASS VALVE. Do not connect or disconnect any hoses with the fluid bypass valve closed and the test stand in operation.

BATTERY ACID. 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.

ADJUSTMENTS ON CONNECTED EQUIPMENT. Never make adjustments on equipment while it is connected to the engine, unless ignition switch is turned to the OFF position. Turn ing over the equipment by hand during adjusting or cleaning might start the engine and equipment with it, causing serious injury to the operator.

NOISE HAZARD. Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel wear ear muffs or earplugs which are fitted by a trained professional.

SAFETY PRECAUTIONS. The operating voltage of this test stand is dangerous to persons coming in contact with any part of the electrical system. Severe, possible fatal shock may result. Disconnect the power source before performing any maintenance or inspection, other than operating tests of the unit.

Do not remove any equipment being tested from the HIGH or LOW speed heads of the varidrive until the test stand has come to a complete stop. Serious injury could result to personnel and/or damage to the unit.

By Order of the Secretary of the Army:

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

E. C. MEYER
General, United States Army
Chief of Staff

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31 Operator Maintenance Requirements for All Fixed and Rotor Wing Aircraft.

This manual has not been prepared according to military specifications, but despite this limitation of its contents, the publication does provide the essential data needed to operate and to maintain the equipment.

TECHNICAL MANUAL

NO. 55-1730-216-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 December 1971

Operator, Organizational, Direct Support, and

General Support Maintenance

MOBILE SERVICING UNIT, DIESEL ENGINE DRIVEN,

MODEL MSU-1 PART NO. C520-1000

(FSN 1730-855-6108)

LIST OF ILLUSTRATIONS

SECTION I

INTRODUCTION AND DESCRIPTION

1-1. General
This technical manual contains operating and maintenance instructions with parts breakdown for die Mobile Servicing Unit, Diesel Engine Driven, model MSU-1, P/ N C520-100. The Mobile Servicing Unit will hereafter be referred to as the service unit throughout this manual.

1-2. Forms and Records
Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

1-3. Reporting of Improvements
Reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 {Recommended Changes to Publications) and forwarded direct to Commanding General, U. S. Army Aviation Systems Command, ATTN: AMSAV-M, P. O. Box 209, St. Louis, Ma. 63166.

1-4. Purpose
a. The service unit will supply regulated electric power up to 30 kv a at 0.8f, 120/ 208 volts, 3 phase, 400 cycle as for servicing, and maintaining helicopter and jet aircraft. A portion of the generated ac power is converted to supply 28 v dc at 400 amperes continuously for aircraft service and 800 amperes, current limited, for aircraft starting.

b The service unit is also a single system hydraulic pumping unit designed to quickly and accurately check the performance and operating characteristics of hydraulic systems installed in aircraft. As a portable, self-contained unit, the service unit will perform the following functional tests and operations:

(1) Provides a source of hydraulic fluid at controlled pressures to operate the hydraulic components without the necessity of starting the aircraft engine.

(2) Test the aircraft system for evidence of component malfunction and flow or pressure leakage.

(3) Drain, flush, and refill the aircraft hydraulic system with micronically filtered hydraulic fluid MIL-H-5606A.

(4) Provides a source of hydraulic power for static proof pressure testing of aircraft systems and components at pressures up to 5000 psi.

(5) Provides power for hydraulic starting of aircraft.

1-5. Capabilities
The serive unit is self-contained, requiring no external electrical or mechanical sources of power. It is capable of self-propulsion on an incline up to 15 degrees. The maximum self-propelled speed of the unit is 2 to 2.5 mph. It may be towed by a vehicle at speeds up to 20 mph. Rated efficiency of the service unit is not affected by operation on an incline of 15 degrees maximum in any direction from the horizontal or under an ambient temperature range of-25 degrees F to 125 degrees F-32° C to 52° C) and under relative humidity conditions up to 100 percent. The service unit will operate efficiently at altitudes ranging from sea level to 10,000 feet. The unit is designed to deliver a fluid volume of 20 gpm (nominal) at a pressure of 3200 psig and up to 10 gpm at 5000 psi. The unit is also capable of providing 22 gpm at 4000 psig under intermittent conditions of operation.

1-6. Leading Particulars
A quick reference listing of the leading particulars relating to major components and functional characteristics of the service unit is provided in table I.

Table I. Leading Particulars

TRAILER:	
Frame and running gear	Welded aluminum; leaf-type spring suspension; double Acting shriek absorbers, four aluminum wheels equipped with 6.00 x 9, 6 ply pneumatic tires and tubes; propulsion drive on two rear wheels.
Towbar	Lunette towing eye; hand lever for control of self-propelling motors:
Brakes	Hand lever operated mechanical parking brakes.
Inclosure	Welded aluminum; removable in two sections; hinged access doors.
ENGINE AND ACCESSORIES:	
Engine	Diesel; Cerlist Division of Waukesha Motor Co.; 3 cylinder; 2 cycle; inclined 45°; model 3; qualified to MIL-E-11276.

Table I. Leading Particulars (Cont)

Horsepower	79 at 3000 rpm (maximum).
Fuel	DF-1 and DF-2 Diesel fuels (VV-F-800) For conditions up to 150% overload. JP-4 and JP-5 fuels for up to 100% loads.
Fuel tank	Welded stainless steel; 15 US gallons capacity.
Fuel gage	Mechanical; dial markings; E, 1/4, 1/2, 3/4, F.
Air cleaner	Oil bath type. Oil capacity -3.5 pints.
Fuel pump	Roosa Master model DB injection pump, includes integral governor and transfer pump.
Fuel filter	Replaceable cartridge type.
Cooling	Water cooled; radiator and fan; cooling system capacity 15 US quarts.
Engine lubricant	Conforming to MIL-L-45199, series 3; above 10° F use SAE30; -25° F to 10° Fuse SAE 10; capacity (including filter and cooler) 11 quarts.
Engine lube oil filter	Replaceable cartridge type, Nefco Filter Corp. P / N 9706A
HYDRAULIC SYSTEM:	
Reservoir	Welded stainless steel; 17 US gallons capacity.
Hydraulic fluid	MIL-H-5606A.
Case drain filter	10 micron (nominal), 3000 psi; replaceable element AN6235-2A.
Low pressure filter	10 micron, 300 psi; replaceable element AN6236-3.
High pressure filter	3 micron (absolute); 5000 psi; replaceable primary throwaway element AC4650F; stainless steel secondary permanent element AC1600E-12.
Hydraulic starting system filter	10 micron, 3000 psi; replaceable element AN6235-4A.
Low pressure boost	Approximately 25 gpm at 115 psi; integral with high pressure pump.
High pressure pump	Axial piston type; variable volume, pressure compensated; 20 gpm at 3200 psi
Accumulator charging pump	Radial piston; 0.5 gpm at 3000 psi.
Hand pump	3000 psi maximum operating pressure; 0.66 cu in. displacement per stroke; single acting.
Accumulator	Piston type; nitrogen precharged, at 1000 psi.
Propulsion motor	10.3 cu in. displacement per revolution; 1800 in-lb torque at 1500 psi.
AC GENERATING SYSTEM:	
Ac generator	Develops 30 KV A at 0.8 PF, 120/208 volts, 3 phase, 4 wire, 400 cycles when operated at 2400 rpm.
Field excitation	Static type; field flashing automatic, supplied by 24-volt storage battery and self-excited battery charging generator.
Circuit breaker	3 pole, manual reset; OFF and trip ON positions.
Output power	120 / 208 volts, 3 phase, 400 cps, 30 KV A continuous (0.8 PF lag).
Output cable	AN3430-6
DC GENERATING SYSTEM:	
Dc converters	Two; MS28132-1
Output power	28 volts at 400 amperes continuous; 28 volts at 800 emperes aircraft starting.
Output cable	An2551-E-30
CONTROL CIRCUITRY:	
Battery	24-volt storage, lead acid, AN3154-1A.
Warning horn	Sounds when service unit is towed with clutches in self-propulsion position.
Taillights	Two ruby, battery powered, controlled by switch on panel; one tail/stop with interconnect cable to towing vehicle.
OVERALL DIMENSIONS:	
Height	48 3/4 inches
Width	51 inches.
Length	87 inches (excluding towbar).
Wheelbase	62 inches.
Weight	3000 pounds (dry)
OPERATING LIMITATIONS:	
Temperature range	-25 ° F to 125° F (-32°C to 52° C).
Relative humidity	100 percent
Altitude range	Sea level to 10,000 feet
Operating plane	Up to 150 maximum in any direction from horizontal.
Maximum towing speed	20 mph
Maximum self-propelled speed	2 to 2.5 mph
Maximum incline during self-propelled operation	Up to 15 degrees

1-7. Flow Divider Assembly

The flow divider assembly Sun Electric Corporation part number C614-8018 is designed to be used with the mobile service unit model MSU-1. With the addition of the flow divider, the mobile service unit is capable of testing simultaneously or singularly, aircraft containing dual systems.

NOTE

When dual systems are testing simultaneously the following limitations shall be observed:

a. Maximum pressure available to one system is set by the pump compensator control. Maximum pressure to the other system is set by the pressure regulating valve and must be less than pump compensator control setting.

b. System containing pressure regulating valve is suitable for system pressure to 3000 psi (maximum) and full flow of the test stand, 22 gpm. When operating the Test Stand Hydraulic System above 3000 psi this system must be turned off.

c. When operating in the flow-divider mode-the combined demand of both systems shall not exceed 20 gpm at 3000 psi.

d. The flow divider is capable of handling 20 gpm output of the test stand through one system.

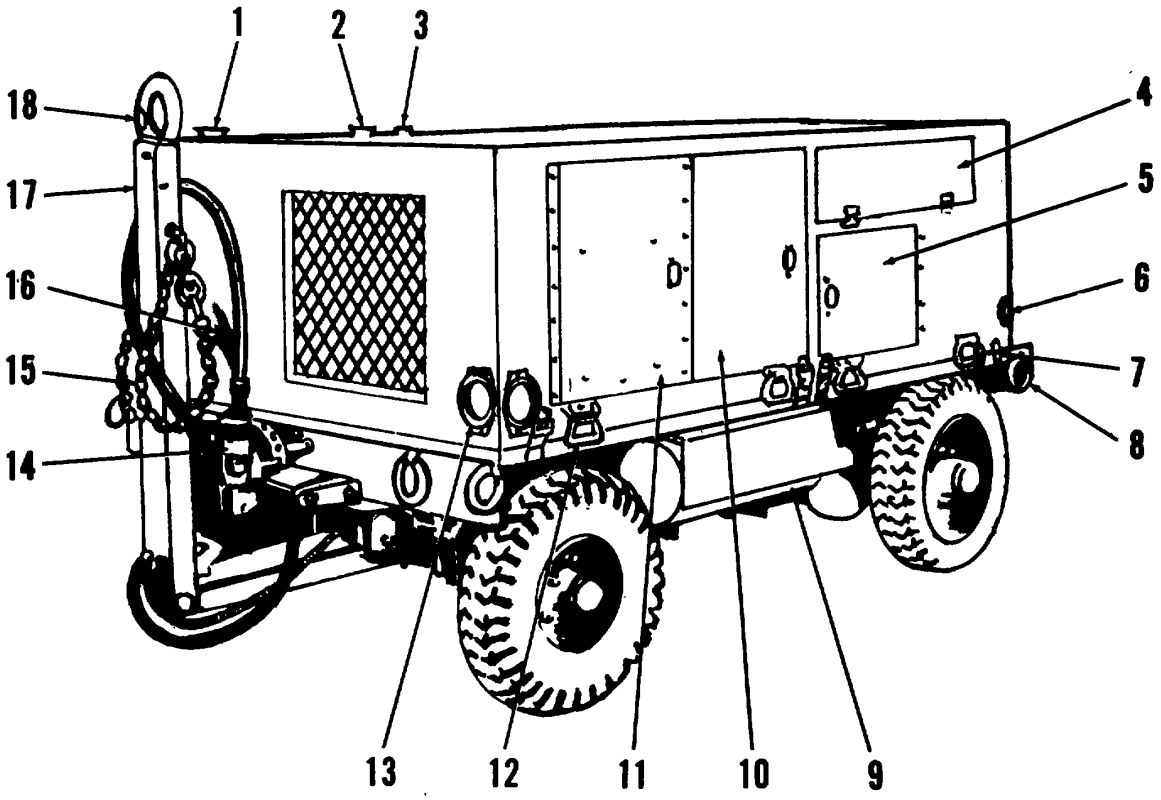
e. Major components of the flow divider assembly include; oil pressure gage 0-5000 psi, pressure reducing valve, needle valve, coupling assemblies, cap and chain assemblies, mounting bracket, and miscellaneous hydraulic fittings.

f. A scabbard with clamping device is used to secure the flow-divider to the test stand rear bumper. The flow divider is easily removable for storage when not in use.

1-8. Functional Description

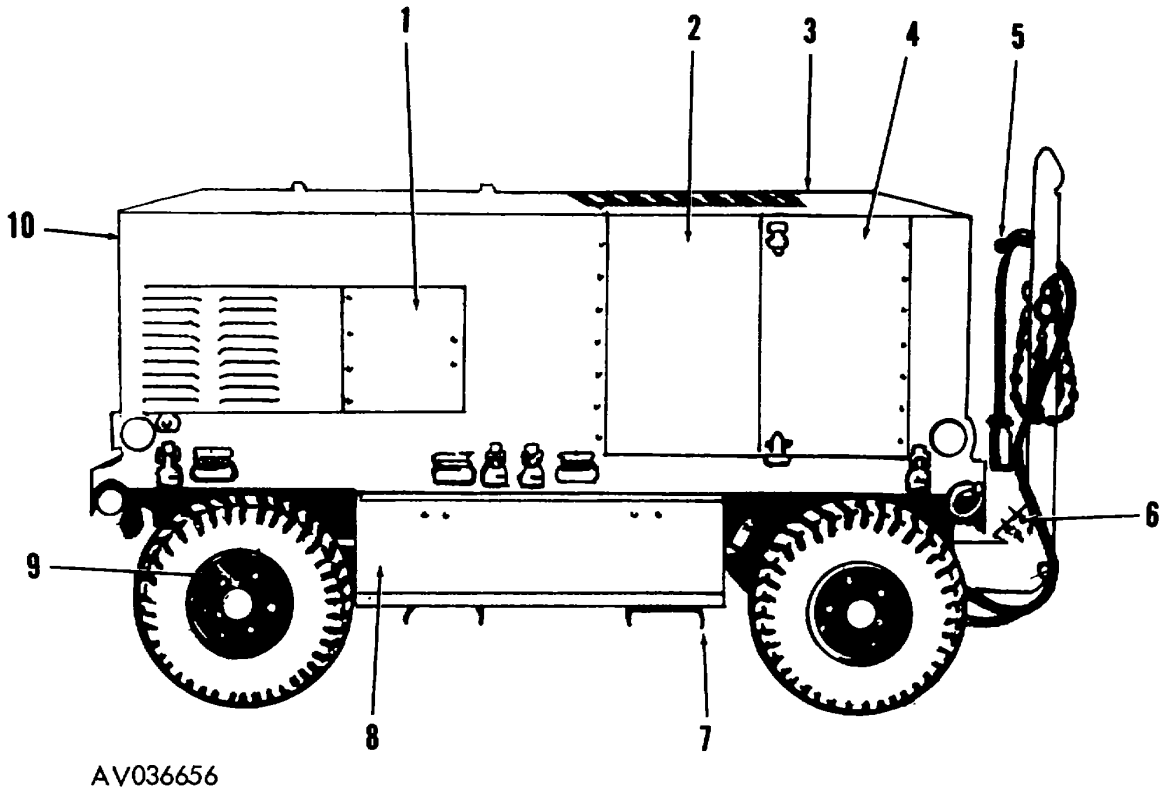
(figs. 1-1 through 1-5)

a. The service unit components are mounted on a four wheel trailer consisting of a welded aluminum chassis and running gear. The running gear has a towbar (17, fig. 1-11 used for vehicle towing at speeds up to 20 mph and for front wheel steering when self-propelled. Control of the unit when operating under self-propel is accomplished through a control lever (5, fig. 1-2) mounted on the towbar. Safety chains (15, fig. 1-1) are attached to the towbar for connection during towing operations and are also used to secure the towbar to tiedown rings for helicopter transportation. Mechanical expanding shoe-type brakes act upon the rear wheels when actuated by the handbrake lever (16, fig. 1-1) at the front of the unit. Two fluid propulsion motors (12, fig. 1-3) are geared to the rear wheels to self-propel the service unit forward or backward. The running gear rides on four 6.90 x 6.00, 6 ply pneumatic tires. Leaf type suspension springs on front and rear axles and double acting shock absorbers (13, fig. 1-4) minimize road shock while the unit is in motion. The engine is also shock mounted to the chassis bed to reduce operating vibration.



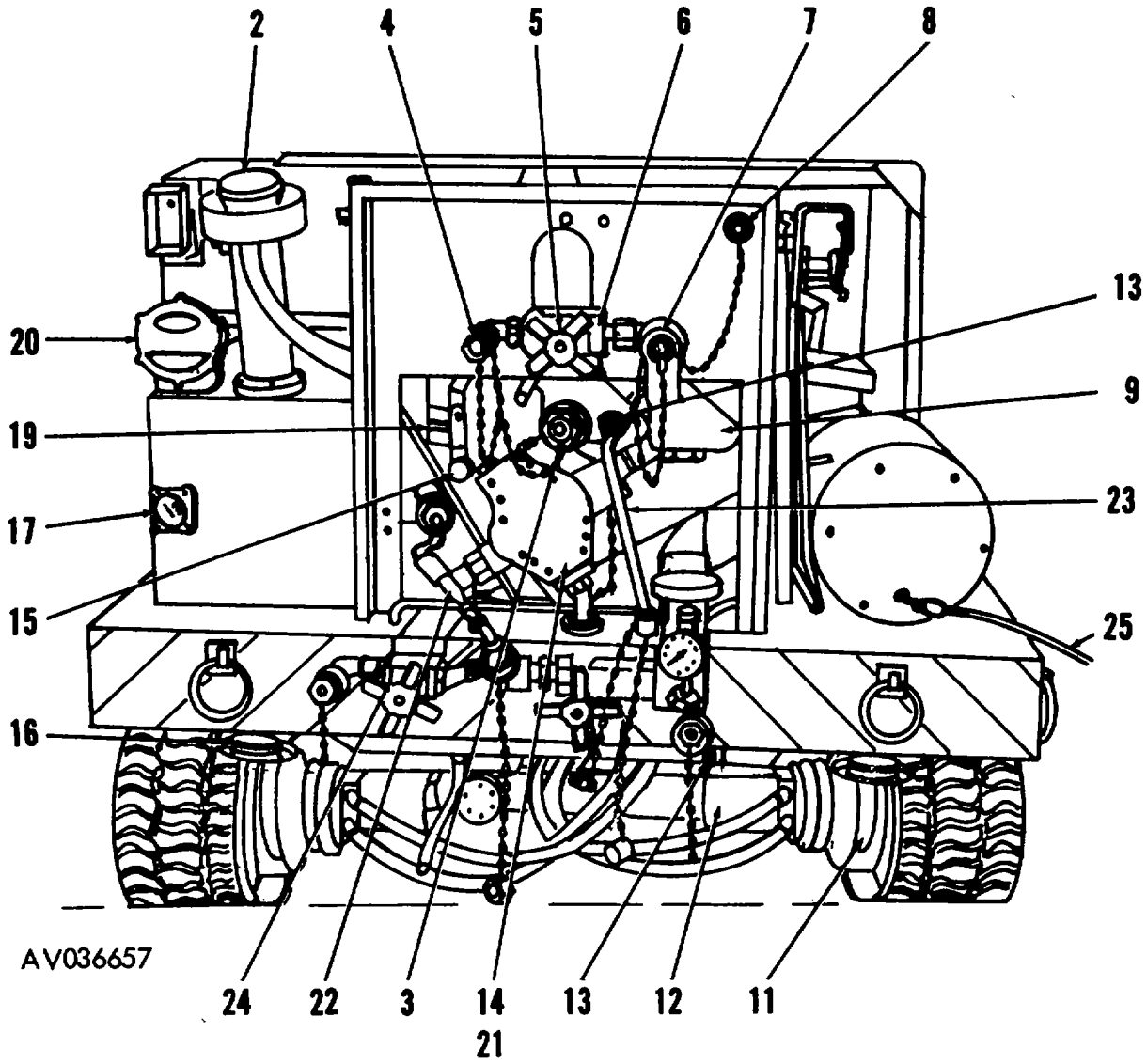
1. Hydraulic Reservoir Fill Access Door
2. Radiator Fill Access Door
3. Engine Oil Fill Access Door
4. Control Panel Access Door
5; Propulsion-Output Selector Valve Access Door
6. Red Reflector
7. Latch (Typical)
8. Tiedown Ring
9. Muffler
10. Buddy Start and Start Valve Access Door
11. Hand Pump Access Door
12. Handle (Typical)
13. Amber Reflector
14. Electrical Interconnect Cable
15. Safety Chain
16. Hand Brake Lever
17. Towbar
18. Flapper Switch

Figure 1-1. Service unit, left front view.



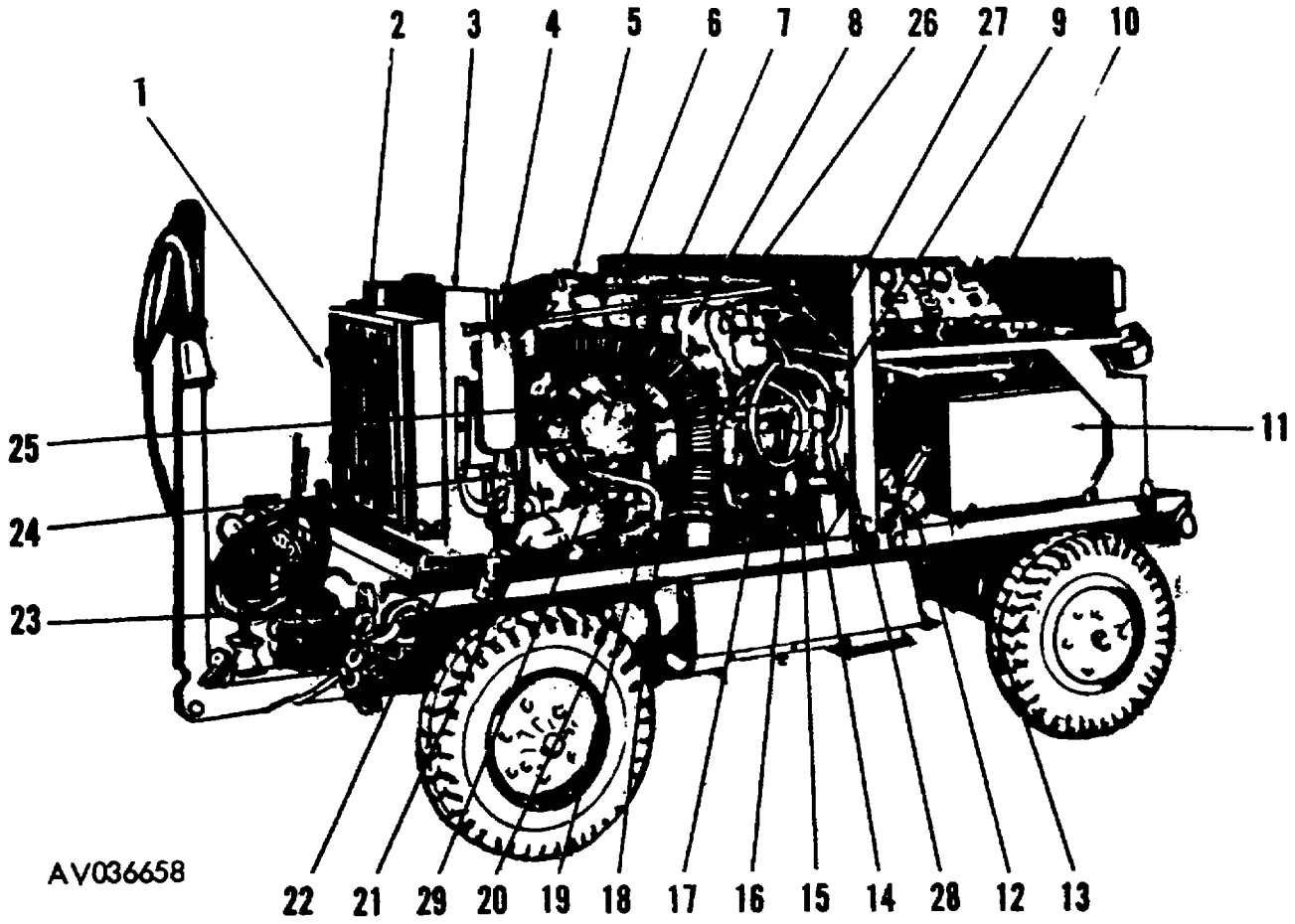
1. Circuit Breaker Access Door
2. Battery Access Door
3. Front Housing
4. Reservoir Selector Access Door
5. Propulsion Control Lever
6. Towbar Latch
7. Fork Lift Channels
8. Electrical Cable Storage Access Door
9. Wheel Drive Pin
10. Rear Housing

Figure 1-2. Service unit, right side view.



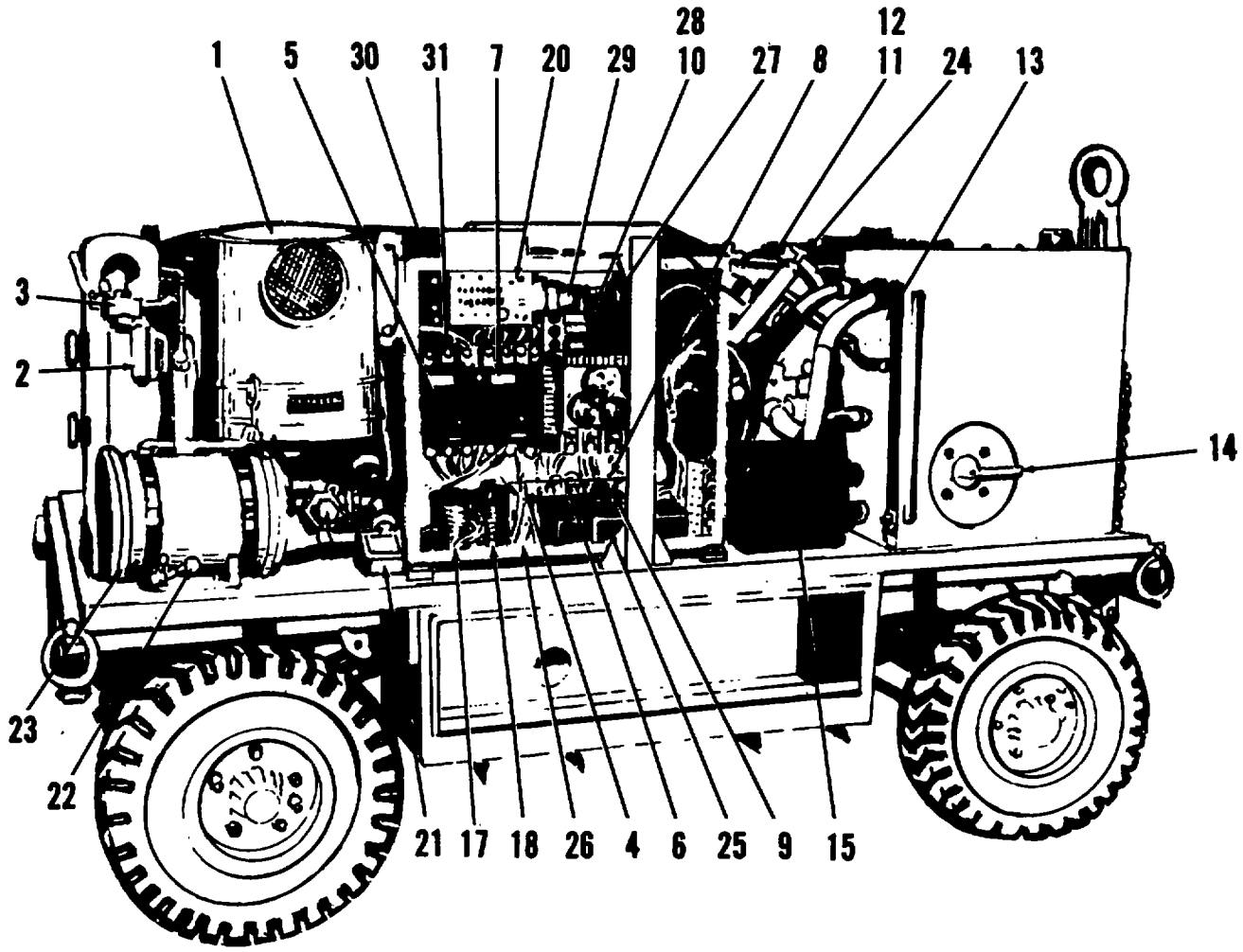
1. Fuel Fill Access Door (Not Illust)
2. Fuel Fill Cap
3. Hydraulic System Return Hose
4. Hydraulic Pressure Inlet Connection (Flushing)
5. Shutoff Valve
6. Flushing Manifold
7. Hydraulic Return and Fill Connection (Flushing)
8. Fill System Disconnect
9. High Pressure Filter
10. Hose Storage Access Door (Not Illust)
11. Drive Gear Box
12. Propulsion Motor
13. Flow Divider Pressure Regulator Return Connector
14. Boost Pump
15. Compensator Control
16. Ruby Tail Light
17. Fuel Gage
18. High Pressure Outlet Hose
19. High Pressure Pump Volume Control
20. Stop/Tail Light
21. High Pressure Pump
22. Flow Divider Supply Hose, 1/2 inch
23. Pressure Regulator Return Hose, 1/4 inch
24. Flow Divider Assembly
25. Low Pressure Filter Drain Hose

Figure 1-3. Service unit, rear view.



1. Reservoir, Hydraulic
2. Oil Cooler
3. Radiator
4. Ether Starting Aid Cylinder
5. Thermostat Housing
6. Air Vent
7. Fuel Filter
8. Diesel Engine
9. High Pressure Gage Shutoff Valve
10. Control Panel
11. Fuel Tank
12. Propulsion Selector Control
13. Shock Absorber
14. Buddy Start Pressure Disconnect
15. Buddy Start Return Disconnect
16. Accumulator Pressure Gage
17. Start Valve
18. Hand Pump
19. Bypass Valve
20. Accumulator
21. Ether Start Cylinder (Spare)
22. Hand Pump and Start Valve Extension Handle
23. Brake Cable Adjust
24. Starting Aid Solenoid (L4)
25. Charging Pump (Accumulator)
26. Starting System Filter
27. Fuel injector Pump
28. AC Generator
29. Engine Lube Oil Filter

Figure 1-4. Service unit, left front views, housings removed.



AV036659

1. Intake Air Cleaner
2. Pump Case Filter
3. Pressure Differential Switch (S16)
4. Relay (FK1)
5. Circuit Breaker (CB1)
6. Relay (FK2)
7. Circuit Breaker (CB2)
8. Relay (FK3)
9. Relay-FK4)
10. Voltage Regulator (VR1)
11. Battery Charging Regulator VR2)
12. Warning Horn (HN)
13. Reservoir Level Gage
14. Reservoir Selector Valve
15. Battery (BT1)
16. DC Output.Cable
17. Relay (TK1)
18. Relay (TK2)
19. AC Output Cable
20. Governor Control Module
21. Thermoswitch (S18)
22. Low Pressure Filter Drain
23. Low Pressure Filter
24. Engine Lube Oil Dipstick
25. Relay, Field Flash (K7)
26. Fault Tracer Module
27. Tachometer Power Unit
28. Printed Circuit Board
29. Rheostat (IRH)
30. Air Intake, Generator
31. Governor Current Transformers (CT4, CT5, CT6)

Figure 1-5. Service unit, right side, housings removed.

b. The chassis is equipped with tiedown rings (8, fig. 1-11 at the front and rear ends to secure the service unit while being transported by means other than towing or under its own power. These rings are also used for quick movement by helicopter. Forklift channels 17, fig. 1-2) are provided under the chassis for lifting the complete service unit from either side. Ruby taillights (16, fig. 1-3) at the rear of the unit are provided for night transportation. The lights are battery powered and controlled by a switch on the control panel. A combination stop and taillight (20, fig. 1-3) is installed at the rear and is provided with a cable (14, fig. 1-1 for connection to the electrical system of the towing vehicle. Red and yellow reflectors (6 and 13, fig. 11) installed at each corner of the service unit provide additional road warnings when the unit is being towed during darkness. A detachable light equipped with a 30-foot cable and powered by the 24-volt battery, and a detachable fire extinguisher are also provided with the unit.

c. All components of the service unit are protected by aluminum, weather-resistant front (3, fig. 1-2) and rear (10) housings. The housings may be lifted clear of the trailer without disconnecting or removing any components. Handles (12, fig. 1-1) facilitate lifting the housings off the trailer and positive lock fasteners (7, fig. 1-1 and locating pins secure the housings to the trailer when placed in position. Access doors in each housing are full length hinged and provided with latches. The control panel door is weather stripped to protect the control panel and internal instruments from inclement weather. A strap is provided to secure the door in open or operating position. The front housing covers the hydraulic reservoir, diesel engine, hydraulic start controls, radiator and cooler assembly, and battery charging alternator. Access doors contained in the front housing are: hand pump and ether (11,fig. 1-1) and buddy start and start valve access door (10, fig. 1-1), providing access to hand pump for charging accumulator, ether starting aid for replacing starting fluid cylinder, buddy start connections for starting engine without using hydraulic system, and engine start valve for starting engine; radiator fill access door (2, fig. 1-1) for checking level of, and refilling radiator; engine lube oil access door (3, fig. 1-1} for checking and adding engine oil; hydraulic reservoir access door 11, fig. 1-1) for replenishing hydraulic fluid supply; reservoir selector valve access door (4, fig. 1-2) providing access to selector valve for reservoir or aircraft operation. The rear housing covers the control panel, ac generator, high pressure pump, electrical box, fuel tank, air cleaner, and hydraulic filters. Access doors contained in the rear housing are; propulsion-output selector valve; access door (5, fig. 1-1) for access to propulsion-output selector valve; control panel door (4, fig. 1-1) providing access to all operating controls and gages; fuel fill access door (1, fig. 1-3) for replenishing diesel fuel tank; and hose access door (10, fig. 1-3) that, when opened, allows hose connection to aircraft.

d. The service unit is furnished with one ac output cable (19, fig. 1-5), and one dc output cable (16)-each provided with a suitable connector for attachment to the aircraft. The cables are stored in a compartment located at the lower right side of the service unit and are accessible by opening door (8, fig. 1-2). Pressure, return, and fill hoses each 25 feet long and equipped with quick disconnect fittings are located in a compartment at the rear of the unit behind access door (10, fig. 1-3).

1-9. Detailed Description

(figs. 1-1 through 1-5)

a. Major Assemblies. The service unit is composed of seven major assemblies or systems, the majority of which are interdependent both in operational and functional characteristics. The operator should thoroughly familiarize himself with the functions of these assemblies / systems before attempting to place the service unit in operation.

The seven assemblies/systems are

(1) Diesel engine and associated accessories.
(2) Hydraulic system.
(3) Ac generating system.
(4) Dc system.
(5) Electrical control circuitry.
(6) Instrument and control panel.
(7) Chassis and running gear.

b. Diesel Engine and Associated Accessories. Power for driving the ac generator and high pressure hydraulic pump is obtained from a 3cylinder, 2-cycle Cerlist diesel engine (8, fig. 1-4). The engine is shock mounted to the chassis at an inclination of 45 degrees to provide an overall height reduction of the service unit. This inclination does not affect the operating efficiency of the engine. The engine has a 4-inch bore, 4lh-inch stroke, 170-cubic inch displacement, and is capable of developing 79 brake horsepower at 3000 rpm. Accessories used with the engine include an oil bath air cleaner, ether starting aid, governor, cooling system, lube oil filter, and fuel supply system.

(1) Oil bath air cleaner. The oil bath air cleaner (1, fig. 1-51 removes dirt and foreign particles from the air being supplied to the diesel engine. It has a 3.5-pint oil capacity and prefilter unit.

(2) Ether starting aid. The ether starting aid is used to facilitate starting of the diesel engine at temperature below 40 degrees F or as required at any temperature with a cold engine, by injecting a highly volatile fluid into the air system through

a pipe or tube tapped into the air box. The ether system includes a fluid cylinder (4, fig. 1-4), solenoid valve (24) that provides delivery control of the fluid, a pushbutton switch located on the right side of control panel that, when pressed, activates the solenoid valve and a thermostat cutoff that prevents ether injection when engine exhaust manifold temperature is above 140 degrees F.

(3) *Governor*. During any hydraulic load transition the mechanical portion of the governor (2,0, fig. 1-5) returns to and maintains frequency within one percent of steady-state value within 0.4 second and holds frequency fluctuation within plus or minus 0.5 percent within 1 second. It will maintain steady-state regulation with 1/ of one percent of rated frequency at any constant load from no load to rated load with the electrical portion of the governor.

(4*)* *Cooling system*. The engine is water cooled. The coolant is stored in radiator (3, fig. 1-4) and is circulated by the engine mounted water pump through inlet and outlet hoses. A fan mounted at the front of the engine assists the cooling process. The coolant is controlled by a thermostat located in thermostat housing (5, fig. 1-4). The thermostat is set to crack open when coolant temperature reaches 165 degrees F. Temperature of the water is shown on a control panel mounted gage. A temperature sensitive switch installed in the cooling system will act to shut the unit down if coolant temperatures exceed safety limits. The cooling system has a capacity of 15 quarts.

(5) *Engine lube filter*. The engine lube filter (29, fig. 1-4) contains a replaceable 25 micron filtering element to clean the lubricating oil circulating through the engine.

(6) *Fuel supply system*. The purpose of the fuel supply system is to store, clean, and deliver diesel fuel to the engine for operation. The major components of this system are; fuel tank assembly with 24v electrical fuel pump, fuel filter, and fuel injector pump. The fuel tank (11, fig. 1-4) is welded steel constructed with a capacity of 15 US gallons. The tank is filled through a filler spout located under access door (1, fig. 1-3) and may be drained through a' plug at the bottom. A mechanical type level gage (17, fig. 1-3) is mounted at the end of the fuel tank to indicate the amount of fuel in the tank. A float switch is installed in the tank bottom to signal a low fuel condition and cause the engine to shut down. The fuel filter (7, fig. 1-4) cleans the fuel as it flows from the fuel tank to the fuel injector pump. It is a replaceable cartridge unit. The fuel injector (27, fig. 1-4), together with its integral transfer pump and governor, performs three important tasks: transfers fuel from the tank, meters and delivers fuel to the injectors, and controls the timing of the engine. The injector pump is driven at half engine speed by a drive shaft which remains in place in the engine when pump is removed. Basic timing of the engine is established by the keyed fit of the drive shaft in the pump. The pump is rotated slightly to obtain final engine timing which is set for the end of injection. The pump is a single cylinder, opposed plunger, inlet metering, distributor type. The driving member (drive shaft) engages the distributor rotor by means of a tang-in-slot arrangement and revolves the rotor in the hydraulic head. The drive end of the rotor has a diametric bore containing two plungers. The plungers are actuated toward each other simultaneously by an internal cam ring through rollers and shoes which are carried in guide slots in the flanged end of the rotor. The transfer or supply pump in the opposite end of the rotor from the pumping cylinder, is a positive displacement, vane type and is covered by the, end plate. The hydraulic head contains the bore in which the rotor revolves; the metering valve bore; and the outlet ports which are connected through appropriate fuel line connectors to injection pipes leading to the cylinders. The end plate located on the hydraulic head, houses the fuel inlet connections, fuel strainer, and transfer pressure regulating valve. The pump contains its own mechanical or flyweight type governor, capable of close speed regulation. The action of weights in their retainer is transmitted through a sleeve to the governor arm and through a positive linkage to the metering valve. The metering valve is dosed to shut off fuel through a solid linkage by an electrically actuated shutoff device.

c. Hydraulic system. The hydraulic system may be divided into three circuits all of which are supplied by the hydraulic reservoir (1, fig. 1-4). These circuits are-hydraulic starting system, selfpropelling system, and aircraft servicing system. The hydraulic reservoir has a capacity of 17 US gallons and supplies the necessary hydraulic fluid for the entire hydraulic system. A tube-type gage mounted on the reservoir side indicates level of fluid contained in the reservoir. A valve for draining the reservoir is located at the bottom. The reservoir selector valve (14, fig. 1-5) is a 4-way 2position valve used to select either service unit or aircraft reservoir as a source of hydraulic fluid.

(1) *Hydraulic starting system*. The diesel engine is started by the hydraulic starting system. Major components of this system are hand pump, engine driven accumulator pump, accumulator, filter, start valve, and starting motor.

(a) Hand pump. The hand pump (18, fig. 1-4) is a single acting manual pump with a 0.66cubic inch displacement per stroke and 3000 psi maximum operating pressure. It is used to build up

hydraulic pressure in the accumulator to between 2400 and 3000 psi for engine starting.

(b) Engine driven accumulator charging pump. The engine driven accumulator charging pump (25, fig. 1-4) recharges the accumulator hydraulic fluid pressure after the engine has started. The belt driven pump has an internal unloading valve which returns fluid to the reservoir when the accumulator is fully charged. The unloading valve cutout pressure is approximately 3000 psi and cutin pressure is 2500 psi.

(c) Accumulator. The accumulator (20, fig. 1-4) is a piston type, nitrogen precharged unit. It is capable of delivering 290 cubic inches of oil at 3000 psi down to 1000 psi. The inside of the accumulator is divided by a movable piston into two chambers. A 1000 psi nitrogen precharge is introduced to one chamber through a precharge valve. Hydraulic fluid at higher pressure than the nitrogen precharge will fill the second chamber and force the piston back until equilibrium is reached on both sides of the piston. This will set up compressibility of the nitrogen which provides the force necessary to move the piston. This force is instantly available the moment pressure drops in the system. The piston will move in proportion to the differential forces of the nitrogen and the hydraulic fluid. When a pressure drop occurs, piston movement will force hydraulic fluid out of the accumulator at the desired pressure. This pressure is used to drive the hydraulic starting motor.

(d) Starting system filter. The hydraulic starting system filter (26, fig. 1-4) cleans the hydraulic fluid flowing through the bypass line in the charging pump. It is a 10 micron filtering unit.

(e) Start valve. The start valve (17, fig. 1-4) is a pilot orifice type unit with a rating of 20 gpm at 3000 psi operating pressure. When this valve is depressed, hydraulic fluid under pressure from the accumulator is allowed to flow to the starting motor.

(f) Starting motor. The starting motor is used to crank the engine for starting purposes. It has a displacement of 1.35 cubic inch per revolution with a speed range of 0 to 7000 rpm. Maximum operating pressure is 3500 psi. A bendix type drive engages the engine flywheel to transmit the driving torque of the hydraulic motor section of the starter.

(2) *Buddy start*. A Buddy starting system is incorporated in the hydraulic starting system and consists of quick-disconnect couplings (14, 15, fig. 1-4) located between the ends of flexible hoses at the inlet and outlet lines of the hydraulic starting motor. This system permits the starting of a second service unit similarly equipped, whose hydraulic starting pressure is depleted, without resorting to hand pump usage.

(3) *Self-propelling hydraulic system*. The self-propelling hydraulic system is used to maneuver or transport the service unit at speeds up to 2 to 2.5 mph and on inclines up to 15 degrees. The major components of this system are; propulsion control valve, dual relief valve, main hydraulic pump and propulsion motors.

(a) Propulsion control valve. The propulsion control valve is a four way spool type valve with a 2000 psi operating pressure. It is operated by a control lever (5, fig. 1-2) located on the towbar and has a spring return to neutral position. The valve is used to control forward or reverse movement of the service unit.

(b) Dual relief valve. The dual relief valve consists of two relief valves; one relieving in each direction. The two valves are adjusted to 2100 psi +200-0 psi. Oil relieved from one line is added to the other line. The dual relief valve provides protection from dangerously high pressures that may result when propulsion motors are stopped or reversed suddenly and smoothes the starting and stopping of the service unit.

(c) Propulsion motor. The two propulsion motors (12, fig. 1-3) are geared to the service unit rear wheels and provide the driving force for forward and reverse movement of the unit.

(4) *Aircraft hydraulic servicing system*. Major components of the aircraft hydraulic servicing system are high-pressure pump, oil cooler, low-pressure filter, high-pressure filter, propulsion selector valve, and high-pressure relief valve.

(a) High-pressure pump. The highpressure pump (21, fig. 1-3) is an axial piston type, variable volume, pressure compensated unit with rated delivery at 20 gpm at 3200 psi to 10 gpm at 5000 psi. A pump volume control (19, fig. 1-3) is mounted on the high-pressure pump to adjust the volume of pump fluid delivery from zero to maximum. A pump pressure compensator control (15, fig. 1-3) is also mounted on the high-pressure pump and adjusts the pressure at which pump compensation occurs. Boost pump (14, fig. 1-3) is an integral part of the high-pressure pump and supplies a boosted hydraulic flow and pressure to the suction side of the high-pressure pump. The boost pump rated flow is somewhat higher than the maximum flow of the high-pressure pump thereby assuring adequate fluid flow to the high-pressure pump under maximum flow conditions.

(b) Oil cooler. The purpose of the oil-to-air cooler (2, fig. 1-4) is to remove heat from hydraulic fluid. The oil cooler is capable of dissipating 30,000 BTU per hour at maximum flow with the help of the engine cooling fan. A temperature controller consisting of a globe valve with the valve opening automatically positioned by a vapor-pressure operated bellows is located in the oil cooler bypass

line. The purpose of the temperature controller is to accelerate the warmup period of the hydraulic oil. The hydraulic oil bypasses the oil cooler until hot enough (100 degrees F), then the valve closes, directing hydraulic oil through the cooler. Its temperature sensing element is located downstream from the junction of the oil cooler and bypass outlets.

(c) Low pressure filter. The low-pressure filter (23, fig. 1-5) is located in the low-pressure line between the oil cooler and the inlet side of the highpressure pump. It is a 10 micron (nominal) filter with replaceable element. A low pressure differential switch is located in the hydraulic circuit across the low-pressure filter. This switch (S17) senses the pressure difference between the inlet and outlet of the low pressure filter and is set to actuate when a pressure difference of 50 psi occurs across the filter. The switch actuates an indicating light (DS13) on the control panel showing the filter is in need of service.

(d) High-pressure filter. The high-pressure filter (9, fig. 1-3) is located in the high-pressure line between the check valve and propulsion selector valve. It is a 3 micron unit with a replaceable primary. element and a cleanable secondary element. A high-pressure differential switch is located in the circuit across the high-pressure filter. This switch senses the pressure difference between the inlet and outlet of the high-pressure filter and is set to actuate when a pressure difference of 100 psi occurs across the filter. This switch (S15) actuates an indicating light (DS11) on the control panel showing the filter is in need of service. A solenoid valve also is energized by the closing of the highpressure differential switch. The energized solenoid valve unloads the high-pressure relief valve so that fluid is bypassed to the return line rather than going through the high-pressure filter. This protects the primary element from collapse due to low temperature operation or extremely dirty elements.

(e) Propulsion Selector Valve. The propulsion selector valve (12, fig. 1-4) is used to select either hydraulic output pressure or to divert the fluid to the propulsion valve for operation of the propulsion system. When in the propulsion mode, a switch used in conjunction with the valve controls engine speed to approximately 1200 rpm through throttle position solenoid IL3).

d. Ac Generating System. Major components of the ac generating system are ac generator, ac voltage regulator, over and under voltage relays, over and under frequency relays, and circuit breaker. Refer to paragraph 1-13 for further description of this system.

(1) *Ac generator*. The drive shaft of ac generator (28, fig. 1-4) is directly coupled to the engine flywheel to produce a 1-to-1 speed ratio. The high-pressure pump of the hydraulic system is coupled to and driven by the ac generator. The generator produces 30 KV A, 120/208 volts, 3 phase, 400 cps at the output connector for servicing aircraft and at the solid state converters to power the dc system.

(2) *Ac voltage regulator*. The silicon controlled rectifier static exciter voltage regulator (10, fig. 15) consists of a flat panel with numbered terminal board for external connection. The panel contains a printed circuit board with the reference, feedback stabilizing, and three phase firing circuit; three pulse transformers; the power silicon controlled rectifiers and heat sinks; three fuses; and an inclosed filter package for radio interference suppression. A separate voltage adjusting potentiometer is mounted on the control panel.

(3) *Over and under relays*. Four relays 13, 6, 8, and 9, fig. 1-5), over voltage, under voltage, over frequency, and under frequency, monitor the ac generator output and act to disconnect the electrical output if any of these conditions occur.

(4) *Circuit breaker*. A circuit breaker (CB1) (5, fig. 1-5) is installed in the ac generator output line for circuit protection.

e. Dc System. Major components of the dc system are-dc converters, and circuit breaker. Refer to paragraph 1-14 for further description of this system.

(1) *Dc converters*. Two 200-ampere static dc converters located on back of electrical box, and are electrically powered by the ac generator to produce 28 volts dc at the outlet connector for aircraft servicing and starting. These converters conform to design MS28132-1.

(2) *Circuit breaker.* Circuit breaker (CB2) (7, fig. 1-5) is a 35-ampere unit and is connected in series between the ac generator and the converters to protect the converter units.

f. Electrical Control Circuitry. The electrical control circuit is a battery operated dc circuit containing the following components or circuits: battery circuit, warning horn circuit, propulsion interlock circuit, tachometer power unit, field flashing circuit, fault sensing circuit, fault tracer circuit, indicating lights, and taillights.

(1) *Battery circuit*. The battery circuit contains battery, panel mounted battery charge indicator, battery charging generator, circuit breaker, voltage regulator and capacitor assembly. The battery is a 24-volt, 11-ampere-hour capacity, lead acid type. The state of charge of the battery is indicated on the control panel mounted battery charge indicator which is an expanded scale voltmeter. The battery charging generator is a belt driven permanent magnet, resonant repulsion regulating dc generator. It is self-excited, and regulated to a band width from 27.5 to 28.0 vdc at

any speed from engine idle to well over any normal operating engine speed, and at any output current from zero to 15 amperes. It is current limited at 15 amperes even under short circuit conditions. Because this generator is self-building the service unit will operate satisfactorily without a battery. The generator voltage regulator is battery polarity sensitive and will be permanently damaged if reverse battery polarity is applied. The battery operated control circuit is protected by a 15-ampere thermal trip circuit breaker with manual reset. The capacitor assembly serves the necessary function of reducing ripple 'voltage of the battery charging generator when unit is operated without battery.

(2) *Warning horn circuit*. This service unit must not be towed while rear wheel drive pins are engaged. Should the service unit be towed while pins are engaged, the wheel drive motors will act as pumps and generate destructive heating effects. To warn the operator of this condition, a battery operated horn is employed. This horn is connected in series with a lunette eye flapper switch and a drive motor hydraulic return line pressure sensor limit switch. When the lunette eye flapper switch is lifted (as is necessary to engage pintle hook of towing vehicle) and drive pins are engaged the drive motor return line pressure switch is closed, and the horn will sound.

(3) *Propulsion interlock circuit*. This circuit controls solenoid (L3) to position engine throttle to operate engine at 1200 rpm for propulsion system operation or at 2400 rpm for service operation.

(4) *Tachometer power unit*. The tachometer power unit performs three functions.

(a) Produces dc output proportional to engine speed to drive the panel mounted tachometer.

(b) Triggers the field flash silicon controlled rectifier into conduction at 2200 rpm engine speed.

(c) Triggers a silicon controlled rectifier into conduction at 2600 rpm engine speed to shut down engine on overspeed.

(5) *Field Flashing Circuit*. The field flashing circuit of the service unit is automatic. Whenever engine speed exceeds 2150 rpm, direct battery voltage is applied to the generator field through relay (K7) and diode(CR2).

(6) *Fault sensing circuit*. The service unit is equipped with several fault sensing circuits which either shut down the engine or discontinue electric power output, depending upon the nature of the fault. Engine shutdown faults are-high coolant temperature, low lube oil pressure, overspeed, low fuel level, and low boost pump pressure. Any of these faults will discontinue electrical output, open output contactors, and stop the engine. Other faults which will discontinue electrical output and open contactors are over and under ac output voltage and over and under ac output frequency.

(7) *Fault tracer circuit (26, fig. 1-5)*. The purpose of the fault tracer circuit is to retain a memory of the particular fault which initiated the protective measure. It consists of a solid state memory fault tracer module (located in electrical box , a fault tracer switch, fault indicator, and fault reset pushbutton all located on control panel (10, fig. 1-4). During normal operation, the fault tracer switch should be left in the RUN position. Upon occurrence of fault, the associated memory circuit will be energized and remain so until the fault reset pushbutton is depressed or the master switch turned of OFF. During the fault lockout condition, the fault indicator will light when fault tracer switch is in run position, and again when this switch is turned to the indicated fault position. The operator need only turn the fault selector switch to the position where the indicator lights to determine the cause for shutdown.

(8) *Lights.* The indicating lights, engine operating gages, panel lights, taillights, and flood light are all operated by the dc control circuit.

g. Instrument and Control Panel. Controls and instruments for operating the service unit are located on the control panel assembly (10, fig. 1-4). Four functional groups of instruments and controls comprise the control panel assembly. These groups are arranged for maximum operating compactness and visibility. The control panel is equipped with red panel lights for night operation. The four groups of controls are identified from left to right as: ac panel, dc panel, engine panel, and hydraulic panel.

(1) *Ac panel*. The controls/ instruments group on the ac panel consists of AC OUTPUT AMMETER, FREQUENCY METER, AC VOLTMETER, VOLTAMPERE PHASE SELECTOR SWITCH, AC VOLT ADJUST POTENTIOMETER, DROOP ADJUST POTENTIOMETER, AC OUTPUT indicating light, ac output ON switch, and ac output OFF switch and electrical output switch (S-14).

(2) *Dc panel*. The controls / instrument group on the dc panel consists of DC OUTPUT AMMETER, DC VOLTMETER, CIRCUIT CHECKOUT receptacle, FAULT INDICATOR light, FAULT SELECTOR switch, FAULT RESET switch, DC SERVICE/AIRCRAFT START toggle switch, DC OUTPUT indicating light, dc output ON switch, dc output OFF switch, and dc supply overheat indicating light, (DS17).

(3) *Engine panel*. The controls/instrument group on the engine panel consists of OIL PRESSURE gage, WATER TEMPERATURE gage. TACHOMETER, MASTER ON/OFF

toggle switch, GOVERNOR ON /OFF toggle switch, HOURMETER, BATTERY meter, PANEL LIGHTS switch, and TAILLIGHTS ON / OFF toggle switch.

(4) *Hydraulic panel*. The controls/instrument group on the hydraulic panel consists of H.P. GAGE TEST fitting, HIGH PRESSURE GAGE, FLUID TEMPERATURE GAGE, PRESSURE BYPASS VALVE, COMPOUND GAGE, L.P. GAGE TEST fitting, FLUID FLOW INDICATOR, SELECTOR VALVE FILTER BLEED sight tube and pushbutton, HIGH PRESS FILTER HIGH DIFF PRESS indicating light, PUMP CASE FILTER HIGH DIFF PRESS indicating light, LOW PRESS FILTER HIGH DIFF PRESS indicating light, and FLUID TEMP WARNING LIGHT.

h. Chassis and Running Gear. The chassis and running gear consists of a welded aluminum frame, front axle assembly, and rear axle assembly.

(1) *Front axle assembly*. The front axle assembly contains a welded lunette eye for towing the unit with a suitable towing vehicle. Front end steering incorporating a knuckle type steering mechanism insures a high degree of maneuverability with steering controlled by lateral movement of the towbar and associated linkage. A control lever for operating the forward or reverse movement of the unit under self propel is located on the towbar.

(2) *Rear axle assembly*. The rear axle assembly contains a gear box at each wheel for transmitting driving torque of the two propulsion motors to the rear wheels. Each rear wheel is coupled to the drive gear (11, fig. 1-3) by a clutch drive pin (9, fig. 1-2) which is pulled and rotated to engage or disengage the wheel with the drive.

1-10. Theory of Operation

See paragraphs 1-11 through 1-16.

1-11. Hydraulic System Operation

The service unit hydraulic system consists of three segments: the starting system, propulsion system, and service system. Basic operating principles of the hydraulic system are explained in a through d below and may be traced using the hydraulic schematic (fig. 1-6) to follow the description of fluid flow.

a. Starting System. The accumulator (52) is filled with a nitrogen precharge through nitrogen precharge valve (53). Hydraulic fluid is drawn from reservoir 1) by hand pump (49) to build up sufficient pressure in accumulator for initial diesel engine start. The hydraulic pressure of the accumulator is indicated on pressure gage (54). When start valve (55) is depressed, the pressurized fluid flows to the inlet of starting motor (56) to crank the engine and returns to the reservoir. The accumulator charging pump (51) pumps hydraulic fluid from the reservoir to charge the accumulator after the engine has started. The pump contains an internal unloading valve which passes the hydraulic fluid through filter (57) and back to reservoir (1) when accumulator is fully charged. Hand pump (49} is equipped with a bypass valve (50) for relieving system pressure when required. Quick disconnect couplings (58 and 59) are used to convert the unit for buddy start operations.

b. Propulsion System. Hydraulic fluid is pressurized for propulsion system operation by highpressure pump (15) and is diverted into the propulsion system by selector valve (27). From the selector valve, the fluid flows to control valve (28). When control valve (28} is in neutral position, hydraulic fluid is passed into the return line back to reservoir 1). Moving the control lever backward or forward directs hydraulic fluid through dual relief valve (41) to drive propulsion motors (42) in the selected direction. Pressure switch (60) senses the propulsion motor return line and will close at 50 psi to actuate the warning horn indicating the unit is being towed with propulsion system engaged. Propulsion interlock switch (43) controls solenoid (L3) to operate engine at 1200 rpm.

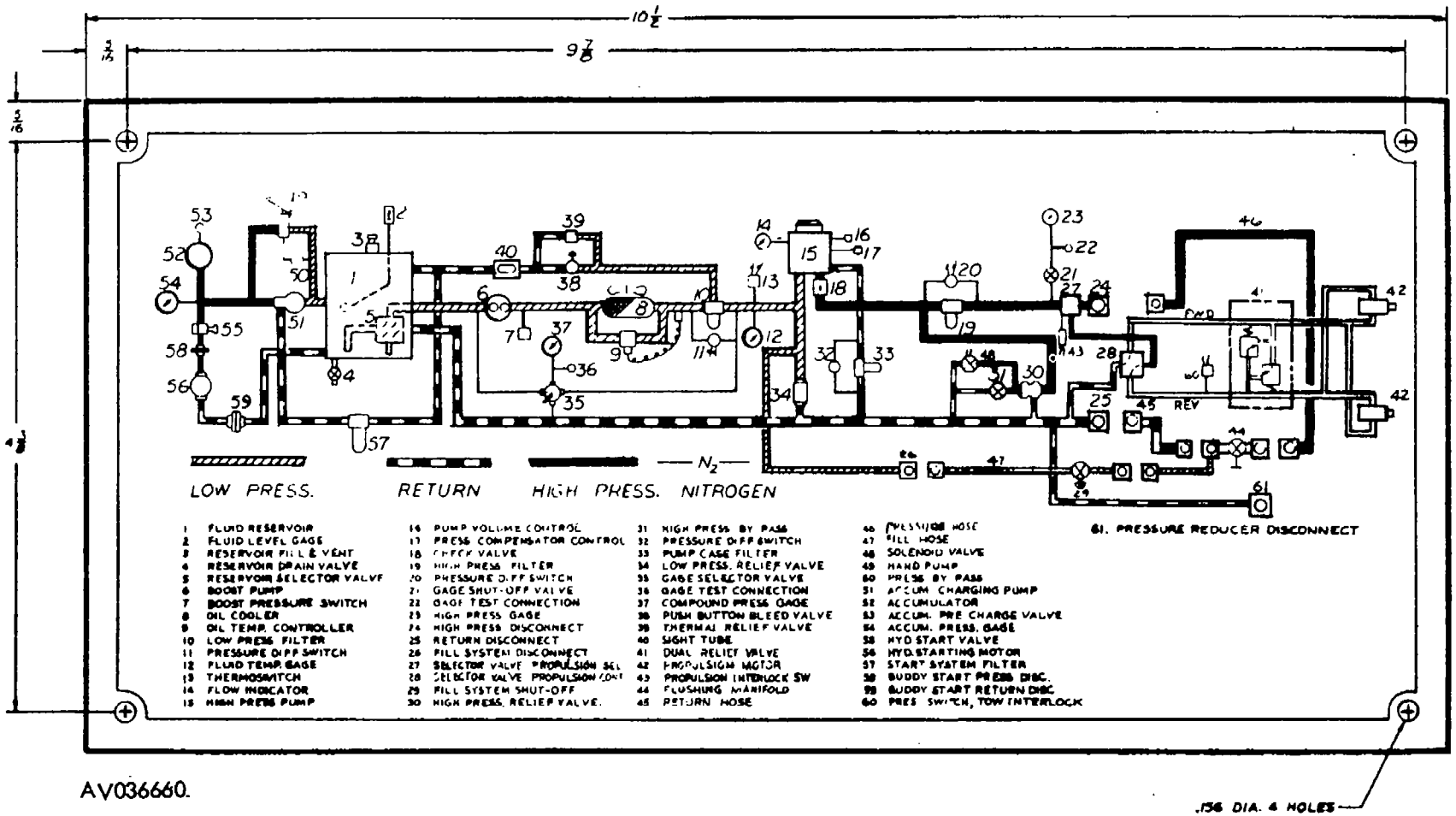


Figure 1-6. Hydraulic system

c. Hydraulic Service System. The hydraulic service system consists of two segments: the fill system and the high pressure system. The fill system serves the purpose of originally filling the aircraft system with fluid from the service unit reservoir and replenishing the aircraft system with fluid which may be lost during bleeding operations. The high-pressure system furnishes fluid under controlled conditions of flow and pressure to the aircraft system for performance of testing operations and for aircraft starting. Fluid to fill and bleed the service unit system is initially taken from reservoir (1) when reservoir selector valve (5) is in service unit reservoir position. Fluid then goes direct to boost pump (6) where it is pressurized to 125 psi. The boost pump delivers fluid through oil cooler (8) (or the bypass) and through 10 micron low-pressure filter (10) to the inlet port of high pressure pump (15). A thermal switch (13) at the inlet to the high pressure pump is actuated when temperature of fluid exceeds 160 degrees F. The temperature controller (9) routes fluid through the oil cooler or the bypass depending upon the fluid temperature. The low-pressure filter (10) has a differential pressure switch I11) installed across it to illuminate an indicator on the control panel should the differential pressure across the filter become excessive. An air bleed circuit with relief valve bypass is connected from filter (10) back to reservoir (1). The sight tube (40) and pushbutton (38) provide a means for bleeding entrapped air from the filter. An inline relief valve (39) relieves abnormal pressures which may build up in the low pressure filter and low-pressure system when service unit is subjected to high ambient temperatures while stored. At the inlet to high-pressure pump (15) there is a pressure relief circuit installed through the inline relief valve (34) to the return line. The high-pressure pump (15) delivers fluid through check valve (18) and high-pressure filter (19), propulsion selector valve (27), to the pressure port (24). High-pressure relief valve (30) is manually adjusted to 10 percent above the pressure compensator setting to protect hydraulic components from over pressure. The relief valve bypasses fluid to the return line when activated by system pressure or by manually controlled pressure bypass valve (31). Fluid is returned from the aircraft system through return port (25) to reservoir selector valve (5) which either connects the reservoir into the system or bypasses it. Return line fluid pressure may be read on compound gage (37) when it is connected to the return line through gage selector valve (35).

d. Fill System. Hydraulic fluid from low-pressure filter (10) flows through fill outlet port (26) and shutoff valve (29). The outlet pressure of the fill system is indicated on the compound gage (37) when gage selector valve (35) is placed in that position.

1-12. Electrical Control Circuitry Operation.

Refer to figures 1-7, 1-7a and 1-7b for schematic and wiring diagrams of electrical system. Electrical control circuitry operation is as follows:

a. The 24 vdc battery (BT 1) in conjunction with battery charging generator (g2) supplies the necessary voltage to operate the components of the electrical control circuit. The charge of discharge condition of battery (BT1) is shown on the battery indicator (M7). The control circuit is protected by circuit breaker (CB4). Capacitor bank (C1) reduces ripple voltage of generator (G2) when service unit is operated without battery.

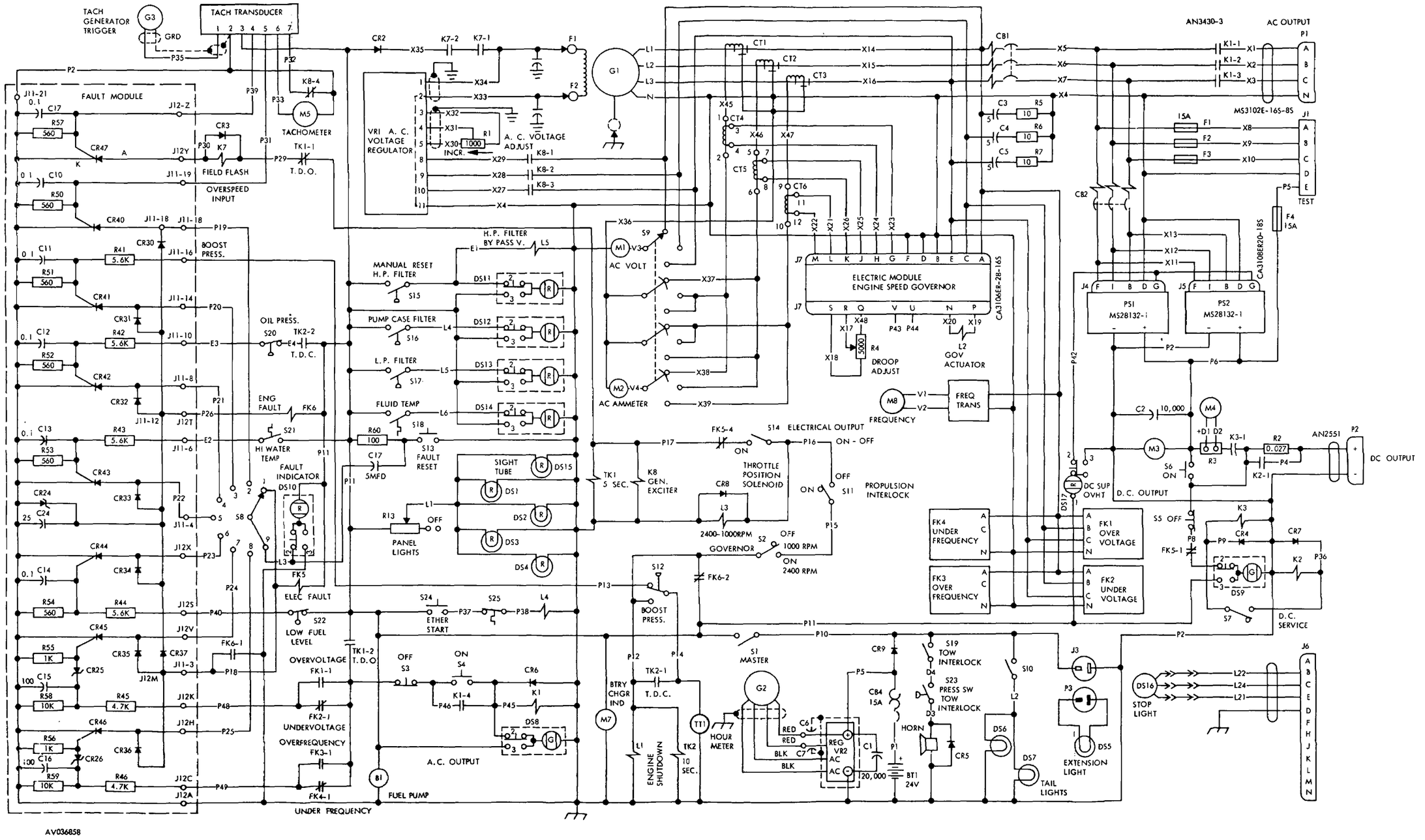


Figure 1-7. Electrical system, schematic diagram

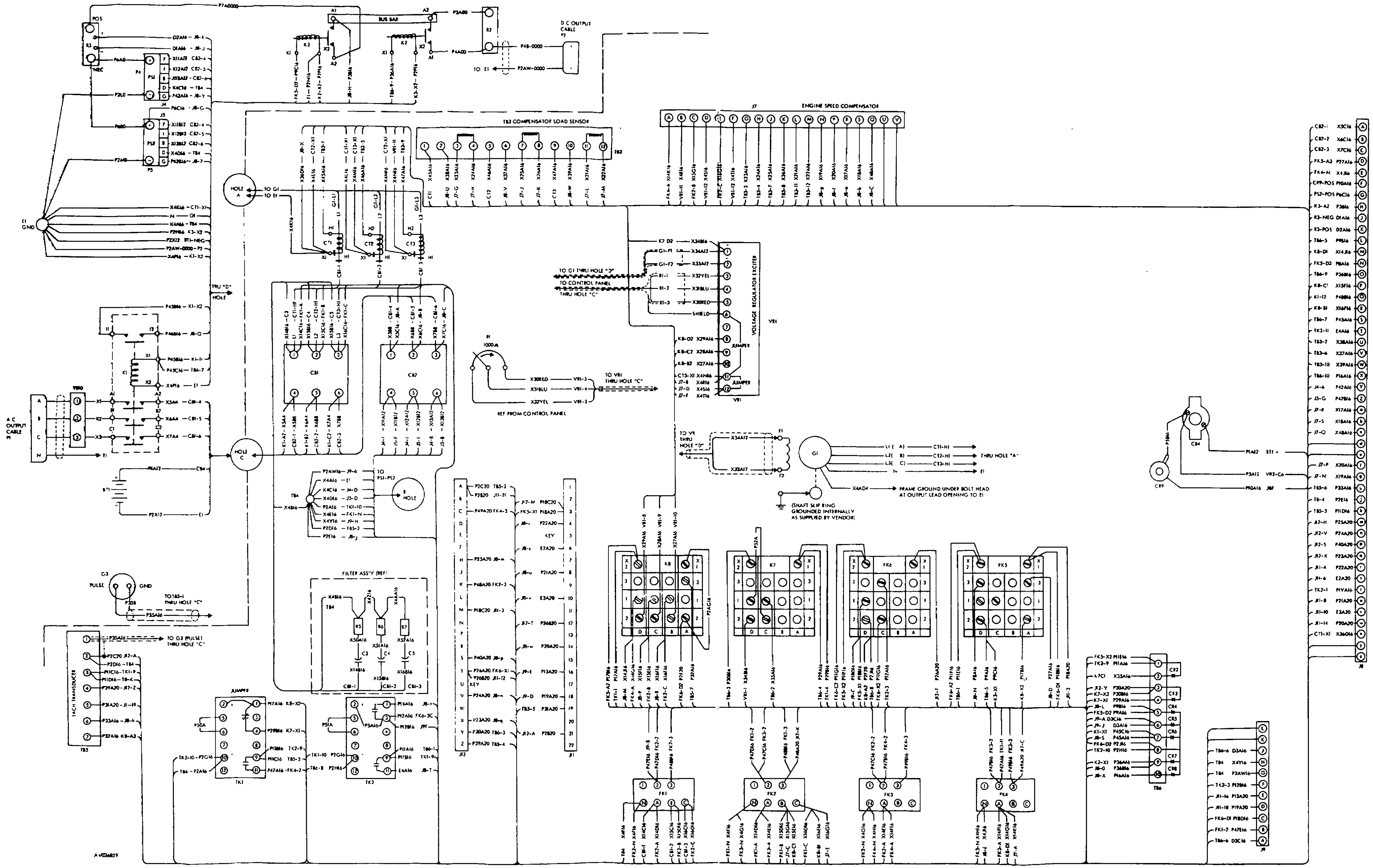


Figure 1-7a. Wiring Diagram, electrical box

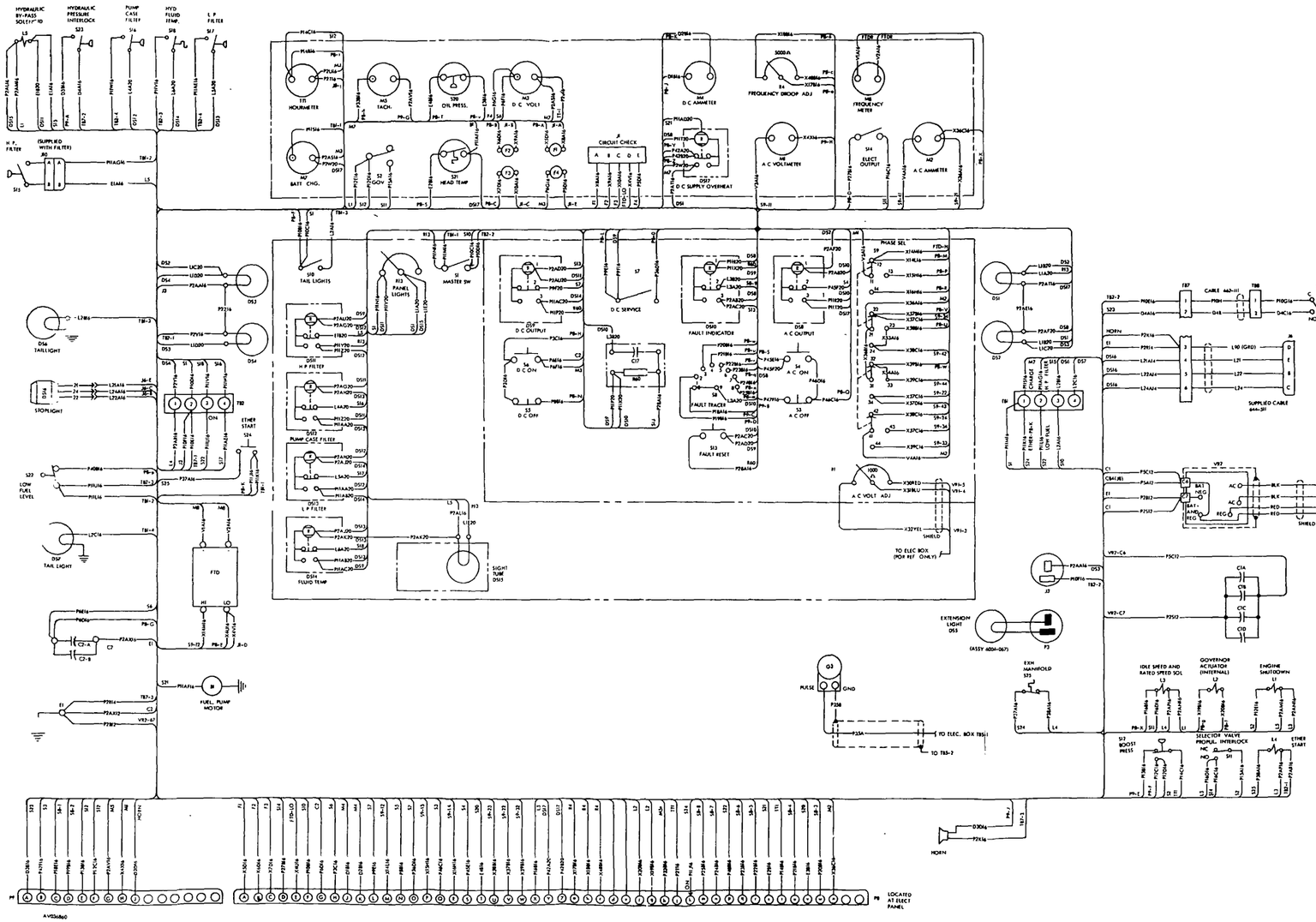


Figure 1-7b. Interconnecting wiring diagram.

b Master switch (S1) controls energization of all dc circuits except horn and extension light outlet (J3). This switch must be turned ON any time the unit is to be operated. Ether start switch (S24) activates solenoid (L4) to supply starting aid fluid to the engine for cold starting. Temperature switch (S25) prevents the use of starting aid when engine operating temperature is reached. When resistor switch (R13) in ON, panel lights (DS1 through DS41 and sight tube back light (DS15) are lighted. Switch (S10) when closed, energized taillights (DS6 and DS7). Power to light indicating lights (DS11 through DS14) which indicate the condition of hydraulic system filters and fluid temperature; (DS8) which indicates ac output cable is energized; (DS9) which indicates dc output cable is energized; and (DS10) fault indicating light is supplied by the dc circuit. When engine shutdown solenoid (L1) is energized during run condition, the engine fuel line is opened to allow fuel flow to the engine.

c The horn is connected in series with lunette eye flapper limit switch (S19) and pressure sensor limit switch (S23) and will sound whenever towing of the unit is attempted while the self-propulsion drive pins are connected, and energized with battery current.

d. Time delay relay (TK1) allows the generator field to be flashed from the battery for approximately 5 seconds, then it disconnects the field from the battery through relay (K7). Time delay relay (TK2) disconnects the low boost pressure switch (S12) and low engine oil pressure switch (S20) from the fault circuit on start up only. This time-delay allows the pressure switches to open without causing an erroneous fault indication. Pressure switch (S12) monitors the pressure of hydraulic low-pressure line and acts to shut down the diesel engine through fault module, relay contacts (FK6-2) and solenoid (L1) if boost pressure becomes too low. Governor switch (S2), when placed in ON position will bring the diesel engine from an idle state to governed speed and regulated output voltage. Switch (S2) is connected in series with propulsion interlock switch (S11) which in ON position allows engine to run at 1200 rpm for operation of the propulsion system. When switch (S1) is placed in OFF position, solenoid (L3 is actuated to position throttle to run engine at 2400 rpm.

e. The tachometer power unit performs three functions: it produces a dc output proportional to engine speed to drive tachometer (M51; it triggers the field flash silicon rectifier (CR47) into conduction at 2200 rpm engine speed; and it shuts engine down on overspeed. On increasing speed, the field flashing circuit will trigger at 2200 rpm, but will also remain ON at a speed considerably below engine idle (1000 rpm). To eliminate this problem, contact (K8-4) resets this circuit when engine is momentarily brought to an idle.

f. Field flashing on the service unit is automatic. When master switch (S1), propulsion interlock switch (S11), fault contact (FK5-4), governor switch (S2) and electrical output switch (S14) are all closed, field flash time relay (TK-1 will be energized. This relay is time delayed so that contact (TK1-1 remains in rest position for about 5 seconds before transferring. Generator exciter relay (K8) is also energized, connecting the voltage regulator by contacts K8-1 through K8-3, and disconnecting the tachometer field flashing reset through contact K84. When engine speed exceeds 2200 rpm, CR47 will be triggered into conduction by the tachometer power unit. Then, as long as contact (TK1-1) is closed, relay (K7) will be energized and its contacts (K7-1 and K7-2) will be closed. These contacts apply direct battery voltage to the generator (G1) through diode (CR2) thereby flashing the field. Afterward, the field is maintained by the voltage regulator.

NOTE

In very cold weather, engine speed may not come up to 2200 rpm in the 5 second interval, thus field will never flash. To reset for another time out, momentarily turn electrical output switch (S14) to OFF. This will reset relay TKI (17, fig. 1-5).

g The fault tracer module contains one silicon controlled rectifier for each fault condition. The output from each of the various fault sensing components will gate ON the proper associated silicon controlled rectifier. Once gated ON, the silicon controlled rectifier will remain in a conducting state until a negative pulse is applied to the gate from capacitor C 17 through fault reset switch S13.

h. If the silicon rectifiers for electrical faults are gated into a conducting state, relay (FK5) will pullin, causing FK5-1 and FKS-4 to transfer positions. Opening FK5-4 will de-energize exciter contactor (K8) which will drop output voltage. Relay (K1) will in turn be de-energized opening contacts (K1-1 through K1-4) to drop ac output. FK 5-1 will open to de-energize relay (K3) and drop dc output.

i. If the silicon rectifiers for engine faults are gated into a conducting state, both FK5 and FK6 will pull in. Pulling in FK6 will close FK6-1 initiating all shutdown procedures of h above. FK6-2 will open causing engine shutdown solenoid (LI I to bring engine to a stop.

1-13. Ac Generating System Operation.

Refer to figure 1-7 for schematic diagram of electrical system. Operation of the ac generating system is as follows:

a. Ac generator. The ac generator (G1) output is protected against overload and short by circuit breakers (CB1 and CB2). Preset over and under voltage relays (FK1 and FK2) and over and under frequency relays (FK3 and FK4) will activate the electrical fault circuit should the generator output voltage exceed or fall below the required limits, or if the generated frequency is over or under the specified range. Regulation of the ac voltage output is accomplished by voltage regulator (VR1).

b. Voltage Regulator. Refer to figure 1-8 for schematic diagram of the voltage regulator. Operation of the regulator is as follows:

(1) Generator field power is obtained from the three lines of the generator through terminals 8, 9, and 10 on the panel. Three filters are mounted in the suppression enclosure to prevent radio frequency interference from being conducted out of the panel to the generator and load. Each line is then fused to protect the exciter from overloads or short circuits. From the fuses, the lines are brought to heatsinks 1, 2, and 3.

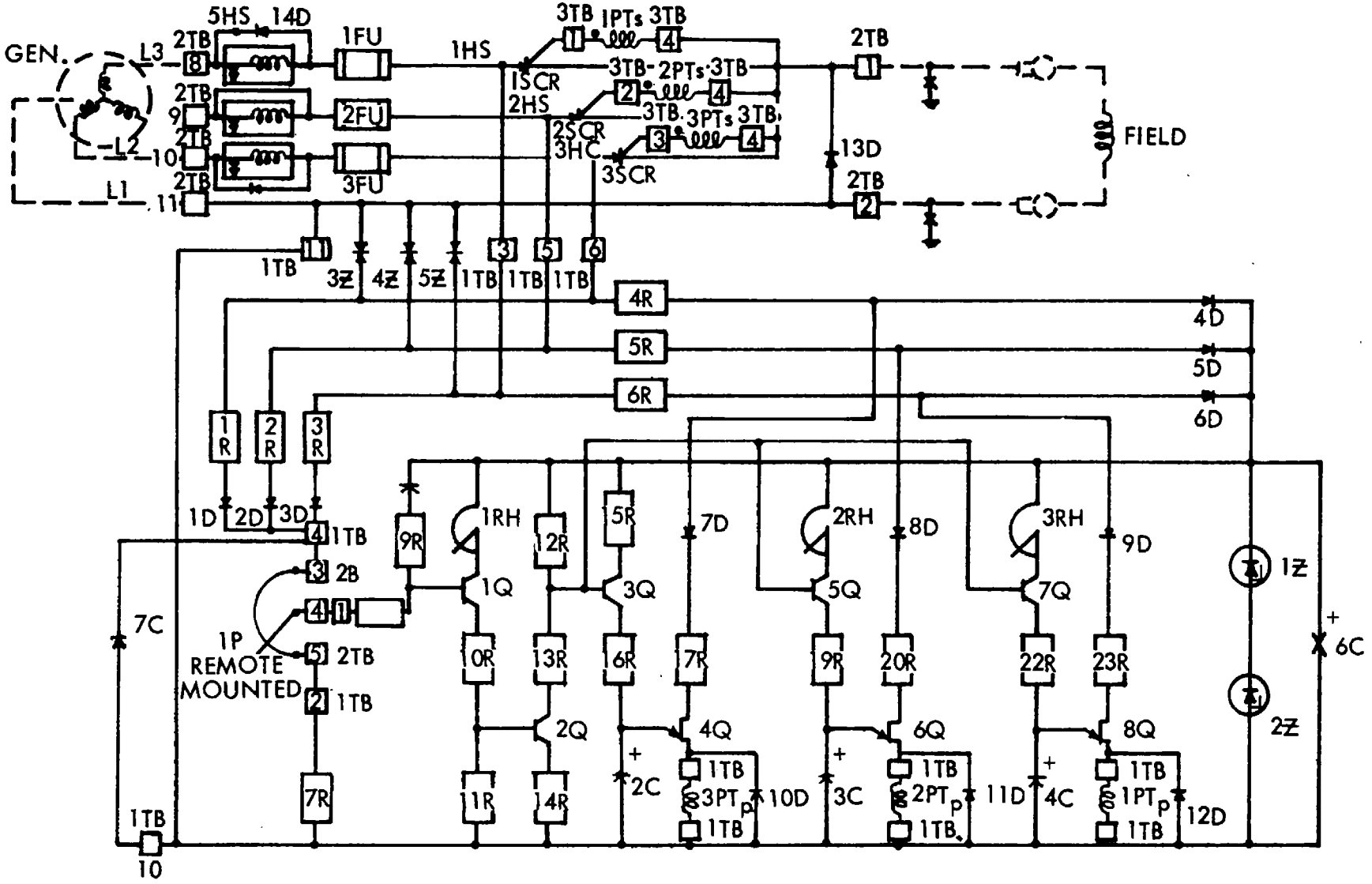


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Figure 1-8. Voltage regulator, schematic diagram.

(2) The silicon controlled rectifiers (SCR) provide the control function of maintaining the correct field voltage to maintain the generator voltage constant under the full range of operating load conditions. An SCR acts as an open circuit in both directions until the anode to cathode voltage is positive and a positive signal or pulse is applied to the gate of control lead. By controlling the phase of the gate pulse in respect to the line to neutral voltage seen by each SCR, the amount of conduction of "on" time of the SCR's can be controlled. Thus by applying the gate pulse early in the positive half cycle of line to neutral voltage, the field voltage will be high. By delaying the pulse until late in the half cycle, the net field voltage will be low. The SCR firing is arranged so that the firing pulse can be applied within the 180 degrees of positive voltage with each SCR's firing time spaced 120 degrees from each other: Thus the field voltage will contain three positive portions of the phase sine waves per cycle, with length controlled by the firing angle. The three pulse transformers (1PT, 2PT, and 3PT) provide isolation between the SCR and the firing circuit. Diode (13D) acts as a freewheeling diode which carriers the inductive field current during the interval when the SCR's are not conducting.

(3) The feedback or voltage sensing circuit consists of resistors (1R, 2R, 3R, and 7R): variable resistor (P1) (R1, fig 1-7) diodes (1D through 3D); and capacitors (7C and 8C). These parts (except 1P) are mounted on the printed circuit board. The circuit provides a 3-phase half-wave voltage on the arm of 1P which is a dc representation of the average of the three line to neutral generator voltages. The capacitors act as a ripple filter. The voltage on the arm of IP (R1, fig 1-7) is compared to the reference voltage which is formed by 4R through 6R, 4D through 6D, and 6C and temperature compensated Zener diodes 1Z and 2Z. Diodes 1Z and 2Z are each 10 volts giving a 20-volt reference voltage. By varying the setting of 1P a different portion of the generator voltage is compared to the reference. Thus, if 1P is rotated toward 7R, a smaller portion of the generator voltage is compared to 20 volts, and the generator voltage will be high. In the other direction, a larger portion is compared to 20 volts and the generator voltage will be reduced. Amplifier and stability circuit PNP transistor (1Q) acts as the error amplifier for the firing circuit. If the voltage at the base of the transistor introduced from IP through 8R becomes lower than the Zener voltage, 1Q becomes forward biased and allows current to flow into 10R, 11R, and the base of 2Q. If the base voltage of 1Q rises, 1Q will be turned off reducing the collector current. The stability circuit is comprised of 8R, 9R, and 1C providing the proper 30 lead and lag characteristics to provide stable operation of the circuit. Rheostat (IRH) is the gain control for the circuit. As the resistance of IRH is reduced, the circuit gain increases in that change in base voltage will provide a larger change in collector current. As IRH is increased, degenerate feedback is introduced to reduce the system gain. Transistor 12Q) acts as an amplifier and buffer stage between 1Q and the rest of the circuit. As 2Q is turned on, the voltage at the lower end of 12R is lowered providing the driving signal to the three individual firing circuits, one for each SCR.

(4) The firing pulses are provided by the three injunction transistors (4Q, 6Q, and 8QI. A injunction transistor has the property to maintain a high impedance between the emitter and base I until the emitter voltage reaches a fixed percentage of the base 2 voltage (approximately 70 percent). The emitter is shown schematically as the side electrode with the arrowhead. Base 1 is the lower element, base 2 the top element. The base 2 voltage is maintained at Zener voltage. Thus base 2 of 4Q will he 20 volts when voltage on 3SCR is positive. During the negative half cycle, the base 2 voltage will zero. Transistor (3Q) is controlled by the error amplifier and conducts current into capacitor (2C) as a function of the control signal. The amount of current applied to 2C determines how soon the capacitor voltage reaches the peak point of the injunction (4Q) and therefore, the time during the positive half cycle when 4Q fires into 3PT, turning the SCR on. During the negative half cycle, the voltage on 2C is kept at zero because of the zero voltage on base 2 of 4Q. Three phase tracking is accomplished by the fact that 3Q, 5Q, and 7Q are all controlled by the same signal. Variations in gain are compensated for by the emitter resistors (15R, 18R, and 21R). Diodes 10 D, 11D, and 12D) allow the pulse transformers to reset while preventing excessive negative voltages.

(5) Thyrectors (3Z, 4Z, and 5Z) are tied from each lint to neutral and suppress any low energy overvoltage transients preventing damage to both the control pump components and the SCR's.

c. Current Transformers. Current transformers (CT1 through CT6, fig. 1-7) reduce the ac generator current for operation of meter (M2) and for input to the electric module of the engine speed governor.

1-14. Dc System Operation

Refer to figure 1-7 for schematic diagram of electrical system. Ac output from generator (G1) is converted by two MS28132-1 static converters to 28 volts de at output connector (P2). When switch (S6) is pressed ON, contact K3-1 closes. If switch (S7) is in AIRCRAFT START position, current

will flow through series resistant load (R2} which will limit current at P2 to 800 amperes. If switch (S7) is in DC SERVICE position, relay (K2) will be energized, closing contacts (K2-1) thus bypassing the current limiting resistor (R2). An indicating light (DS17) on the control panel lights when the dc converters (PS1 and PS2) become overheated.

1-15. Governing System Operation

The electronic compensator is an accessory to the fuel injection pump. It is an electrical load sensing device used in electric generator applications where isochronous frequency regulation is desire. The compensator consists of a control module and external frequency droop potentiometer. In addition, it requires a current transformer in each phase of the generator output.

a. Frequency Adjustment and Control. Frequency adjustment and control is accomplished by the mechanical governor in the fuel pump. The functions of the compensator are

(1) To reduce the inherent regulation of the mechanical governor to zero.

(2) To pulse the fuel system in anticipation of a speed change when load is applied or rejected.

b. Load Sensing Circuit. The inputs to the load sensing circuit are the three-phase voltages and a current transformer voltage from each phase. By electrical addition of the current transformer voltage to its phase voltage and rectification of the vector summation, a dc voltage proportional to the in-phase component of load current is derived. This dc voltage is summed for all three phases and appears across test points TPI and TP4.

c. Output Signal. A dc voltage which is half-wave rectification of the generator voltage is supplied to an electro magnetic actuator in the cap of the fuel pump. Rectification is accomplished by a silicon controlled rectifier (SCR) which can be described as a solid state thyratron. A magnetic amplifier provides the gating signal for the SCR and the means for summing signals providing functions of bias, load anticipation, paralleling and load compensation. The output signal controls fuel flow in the injection pump by means of the electromechanical actuator. A change in output proportional to electrical load on the generator modifies the forces acting on the mechanical speed governor allowing it to operate at the same speed in spite of a mechanical displacement corresponding to the necessary fuel change. Ordinarily a fuel change would require a speed droop, to obtain the necessary displacement of the fuel metering linkage.

d. Load Compensation. To accomplish load compensation, the output signal to the actuator is changed inversely proportional to the electrical load. A decreasing current in the actuator results in increasing fuel. The load sensing signal TP 1 TP4 is applied to a signal winding on the magnetic amplifier in the proper polarity to obtain a decreasing output with increasing load. This function is adjustable by means of the externally mounted frequency droop adjust potentiometer (R4).

e. Load Anticipation. By means of a resistance capacitance network the rate-of-change of load is formed into a pulse of current in the actuator. This results in a pulse of fuel beyond the amount required for the load change. Since the engine generator has considerable inertia the signal reaches the fuel system before a speed change takes place and with a greater magnitude than would be derived from the flyball governor for anything less than a 1.0 percent speed variation.

f. Interconnection. An MS connector is provided for interconnection to external circuitry. Care should be taken to observe polarity and relationship of the phase voltage and current transformer inputs.

1-16. Electric Fuel Pump

An electric fuel pump is provided to insure a positive pressure to the fuel pump and to assist in bleeding the low-pressure portion of the fuel system after servicing this system such as filter replacement, etc. The pump is the plunger type, operating on 24 vdc and will operate up to a pressure of 4 psi.

SECTION II

PREPARATION FOR USE

2-1. Preparation for Use

a. Environment. The service unit is designed for use under varying conditions of temperature and climate. When preparing the unit for use where extreme variations of temperature exist or for prolonged use in arctic or tropical environments, the same precautions should be taken for the service unit as would be applicable to similar components installed in aircraft or support equipment systems.

b. Initial Delivery. For initial delivery of the service unit by rail, motor carrier, or air, the unit is shipped completely assembled and may be rolled or towed into position. Local movement may also be accomplished by forklifting the unit. When transporting by lift truck, care should be taken that all housing doors are closed and secured. It is advisable not to two the unit any great distance before performing the initial inspection procedures.

c. Initial Inspection. Upon receiving the service unit from the carrier and transporting it to a suitable area, the following program of receiving inspections and checks should be made.

CAUTION

The service unit should never, under any circumstances, be started until these initial inspection procedures have been accomplished.

(1) If the service unit has been encased in an envelope of weather-resistant paper, remove this covering.

(2) Strip the waterproof, pressure-sensitive tape from doors and other openings. Exercise care in removal of tape so as not to peel paint.

(3) Thoroughly inspect the exterior of housings for any damage which may have occurred during shipment. Open all doors and reclose, noting whether they latch securely.

(4) Remove cushioning material used to protect the control panel instruments during shipment. Inspect all instrument glasses and indicator light lenses for any evidence of cracks or damage.

(5) Check towbar and steering mechanism. Make certain that tie rods have not been bent or damaged and that steering mechanism properly controls the front wheels.

(6) Check the handbrake assembly by setting handbrake lever and testing the braking action of the rear wheels.

(7) Thoroughly inspect the complete unit for 32 security of connections, particularly fuel, hydraulic, and electrical systems. If connections, parts, bolts, nuts, or other hardware have been loosened during transit, tighten.

(8) Operate all movable control devices by hand to be sure they are operating freely.

(9) Inspect output cables and hoses for damage or deterioration.

d. Initial Service. Proceed as follows:

(1) Check tires for proper inflation of 50 psi.

(2) The storage battery (15, fig. 1-5) is shipped dry. It must be filled with electrolyte and fully charged in accordance with the using activity's recommended procedures. Electrolyte is not furnished with the equipment.

(3) Fill engine lubricating oil system with oil conforming to MIL-L-45199. For ambient temperatures above 10 degrees F use SAE 30 and for ambient temperatures between 10 and -25 degrees F, use SAE 10.

(4) Fill oil bath air cleaner reservoir with same type oil used in engine. Use SAE 20 in summer and SAE 10 or lighter in winter.

(5) Fill fuel tank with diesel fuel DF-1 or DF-2 (VV-F-8001 or JP-4 or JP-5)

NOTE

Use DF-1, DF-2 for conditions up to and including 150 percent overload; use JP-4, JP-5 for loads at 100 percent as indicated by test stand ratings. Do not adjust fuel setting for 150 percent overload using JP-4 and JP-5.

(6) Fill engine cooling system. A corrosion inhibitor should be added to the cooling system when water alone is used as the coolant. When ambient temperatures are below freezing, add required amount of ethylene-glycol base anti-freeze to water.

NOTE

Bleed entrapped air from system by loosening hose clamp on manifold-to-oil cooler hose at water manifold.

(7) Install a can of ether starting aid into bracket as follows: Screw starting aid cylinder onto valve of solenoid assembly and secure in place with cylinder clamp.

(8) Check lubricating oil level in drive wheel gearboxes and fill if necessary according to lubrication instructions in section IV. Check that sufficient lubrication exists at all lubrication points as outlined in section IV.

(9) If service unit hydraulic system has been filled with preservative fluid during shipment or storage, drain the unit hydraulic system as follows:

(a) Drain reservoir by opening reservoir drain valve at bottom.

(b) Drain hydraulic system components by removing drain plug from high-pressure pump case; draining from suction return and pressure outlet ports; and removing drain plug from hose line at bottom of low-pressure filter case.

(c) Replace all plugs and caps and close reservoir drain valve after system is completely drained.

NOTE

A small quantity of preservative oil (MILH-6083B) may remain in fluid lines which are lower than draining locations. This will have no functional effect upon operation of the service unit when it is filled with MILH-5606A hydraulic fluid. The high pressure pump case should be refilled before starting the service unit. Disconnect case drain hose at pump case filter and pour high-pressure pump case full of fluid.

(10) Fill service unit hydraulic reservoir with MIL-H-5606A hydraulic fluid.

2-2. Preparation for Storage

a. If the service unit is to be stored for an indefinite period of time, the following procedures are recommended, subject to the anticipated length of storage and approved methods of the using activity.

b Select a level, dry storage location, preferably indoors where ambient temperature variations will not be too pronounced. If unit is to be stored out of doors, cover with a tarpaulin or other waterproof material.

c. After storage site is selected, set handbrake lever firmly. Securely latch towbar in upright position.

d. Drain engine fuel system completely and refill with Valvoline Oil Company "Tectyl 503-C" rust preventive compound or equivalent, in accordance with MIL-P-1 16 or approved methods as established by the using activity.

e. Drain engine lubricant and refill with engine preservative oil in accordance with MIL-P-116 or approved methods as established by the using activity.

f. Drain engine cooling system and refill with corrosion inhibitor in accordance with MIL-P-116 or approved method as established by the using activity.

g. Depress starter valve handle (17, fig. 1-4) to crank engine and circulate fuel and engine preservative oils through fuel and lubricating systems.

h. Insert hand pump handle (22, 1-4) into bypass valve (19, fig. 1-4) of hand pump and slowly open bypass valve by turning counterclockwise. Allow accumulator pressure to drop to zero psi on gage (16, fig. l-4). Close bypass valve.

i. Drain hydraulic system and fill with hydraulic preservative fluid MIL-H-6083B in accordance with MIL-P-1 16 or methods approved by the using activity.

j. Drain lubricant from drive wheel gearboxes and refill with preservative oil in accordance with MIL-P-1 16 or approved methods as established by the using activity.

NOTE

Whenever fluid systems have been drained for operating fluids and refilled with preservative fluids, a suitable waterproof tag shall be affixed to the reservoir, tank, or engine, cautioning operator not to operate the service unit until system(s) have been drained and refilled with correct operating fluid as specified by this technical manual.

k. Remove battery from service unit.

l. Place all switches and controls in OFF position.

m. If compressed air is available, remove housings and clean service unit interior of road and operating dirt. Wipe outside of unit completely to remove operating film and dirt. Apply preservative to any exposed metal surfaces subject to corrosive action through prolonged nonusage. See MIL-P116 for preservative application data.

n. Check tire pressure; inflate to 50 psi.

o If service unit is to be stored in an area of high humidity, place several bags of desiccant conforming to specification MIL-D-3464 inside the unit.

p. Close all doors and secure. Seal all openings with waterproof paper.

CAUTION

Disengage clutch drive pins (9, fig. 1-2) so that Service Unit will not be towed with drive pins engaged and battery removed. .Warning horn is deactivated when battery is removed and serious damage to the propulsion system will result if Service Unit is towed with drive pins engaged.

2-3. Arctic Conditions

Where the service unit is to be stored under conditions which will subject it to prolonged periods of subzero temperatures, adequate protection should be afforded against the deteriorating effects of wind, snow, and ice formation. Steps a through p of paragraph 2-2 should be observed with special attention given to the providing of adequate exterior covering for the unit. When practical, the use of portable electric heaters placed inside the unit is

recommended to raise the ambient temperature to zero degrees F, and then removed before placing the service unit in operation.

2-4. Tropical Conditions

Prolonged exposure in environments of excessively high temperature and humidity requires special treatment of the service unit to insure serviceability of the instrumentation. Steps a through p of paragraph 2-2 should be observed with special emphasis placed upon the adequate use of desiccants to insure prevention of corrosive action due to high moisture content in the atmosphere. Special attention should be given to the storage site to take advantage of shade and air circulation.

2-5. Preparation for Shipment

When shipped domestically, the service unit does not normally require crating, skidding, or a solid external container. It may be shipped completely assembled, or for relatively short distances, may be towed by a vehicle at speeds not exceeding 20 mph. To prepare the service unit for shipping (other than by towing) follow the precautions noted below.

a. Pad instrument glasses with cushioning material as protection against shock and vibration before closing and fastening control panel door.

b. Apply pressure-sensitive, water-resistant tape conforming to specification PPP-T-60 to all doors and other openings of the housings.

c. To facilitate handling, the service unit may be anchored to a skid type base constructed to the general design as established in specifications MILC-104A and MIL-C-3774. Anchoring of the service unit to the base should be accomplished by passing 1¼1 inch (minimum) steel banding or 38 inch (minimum) cables through the tiedown rings of the trailer frame and securing to the skid base. Under no circumstances should the service unit be anchored by passing bands or cables over the superstructure.

d. When deemed advisable by the shipping activity, the service unit should be shrouded with waterproof paper or polyethylene material in such a manner as to prevent the entry of natural elements into the electrical and instrument areas. Application of the shroud should be accomplished to avoid the formation of water pockets or interfere with the mobility of the unit. Shrouding material should be of sufficient strength to preclude rupture or tearing when exposed to conditions encountered during open transportation.

2-6. Air Transportability

The service unit is designed to withstand without loss of serviceability. the normal flight and taxing acceleration "g" loads encountered in transporting by cargo aircraft. It can withstand 8 g fore, aft, and sideways and 41/2g downward. The service unit is provided with tiedown rings at each corner. Each tiedown ring has a capacity of 10,000 pounds. The unit may be transported by helicopter attached to the inboard tiedown rings only. When transporting by this method, secure towbar in upright position by attaching towing safety chains to the front tiedown rings.

2-7. Oversea Shipment

Preparation of the service unit for oversea shipment (by means other than cargo aircraft) should include the procedures covered in steps a through p of paragraph 2-2 and steps *a* through *d* of paragraph 2-5. The service unit may, at the discretion of the shipping activity, be crated in accordance with the specifications applicable to the packaging and packing of aircraft support equipment for oversea shipment. Mode of transportation, duration of transporting time, and environmental or handling conditions at the shipping destination will determine the need for crating the service unit.

SECTION III

OPERATING INSTRUCTIONS

3-1. General

Before placing the service unit in operation, the operating personnel should thoroughly familiarize themselves with the nature, location, and function of all switches, controls, and instruments on the service unit control panel as well as in other locations on the unit. No attempt should be made to connect the service unit to an aircraft until the operator(s) understands the layout and function of the control components.

3-2. Controls and Instrumentation.

See paragraphs 3-3 through 3-7.

3-3. Control Panel Assembly.

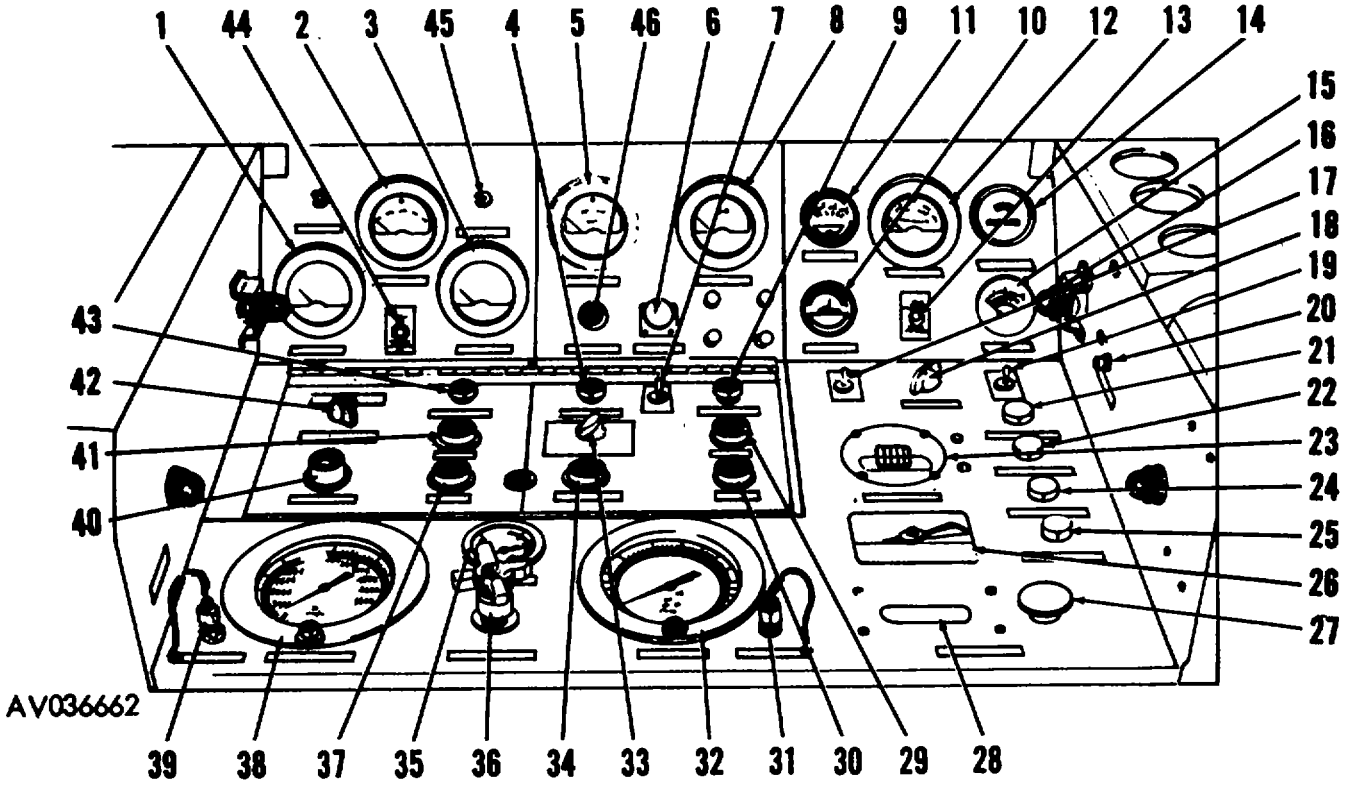
The ac controls, dc controls, engine controls, and hydraulic system controls are located on the control panel assembly. Table II identifies, describes, and briefly explains the functions of all control panel assembly components as shown in figure 3-1. Index numbers in the table correspond to the index numbers shown in the figure.

Table II. Control Panel Controls and Instruments

Index No.	*Description*	*Function*
	AC Panel	
1	AC Output Ammeter (M2)	Indicates load per phase of ac output of service unit.
2	Frequency Meter (M8)	Indicates frequency of ac output of service unit.
3	AC Voltmeter (M1)	Indicates line to neutral voltage of ac output.
37	AC Output OFF switch (S3)	Deenergizes relay (K1) to open circuit to output connector (P1).
40	AC Voltage Adjust Resistor (R 1)	Controls voltage output level.
41	AC Output ON	switch (S4) Energizes relay (K1) to close circuit to output connector (P1).
42	Volt-ampere Phase Selector Switch	Selects one of three ac phases for ac voltmeter and ammeter indications.
43	AC Output ON Indicating Light (DS8)	Illuminates to indicate ac output connector is energized.
44	Switch (S14)	Electrical output switch two positions (ON/OFF).
45	Resistor (R4)	Potentiometer to adjust frequency droop.
	DC PANEL	
4	Fault Indicator Light (DS10)	Illuminates to indicate excessive water temp, low fuel level, engine overspeed, low lubricating oil level, under or over voltage or frequency, or low boost pressure.
5	DC Output Ammeter (M4}	Indicates load of de output.
6	Circuit Checkout Receptacle (J1)	Used for connecting test equipment for checking circuit operation.
7	DC Service/Aircraft Start Toggle Switch (S7).	Selects proper de output characteristics for service or starting aircraft.
8	DC Voltmeter (M31	Indicates voltage of dc output.
9	DC Output ON indicating light (DS9)	Illuminates to indicate dc output connector (P2) is energized.
29	DC Output ON switch (S6)	Energizes relay (K3) to close circuit to output connector (P2).
30	DC Output OFF switch (S5)	Deenergizes relay (K3) to open circuit to output connector (P2).
33	Fault Tracer switch (S8)	Used to trace fault circuit responsible when fault indicator light illuminates.
34	Fault Reset switch (S13)	Resets fault tracer circuit.
46	Indicator Light (DS17)	Lights when the DC converters (PS1 and PS2) become overheated.
	ENGINE PANEL	
10	Engine Water Temp Gage and switch (S21)	Indicates temperature of coolant in engine cooling system.
11	Engine Oil Press Gage and switch (S20)	Indicates diesel engine lube oil system pressure.
12	Engine Tachometer (M5).	Indicates operating rpm of engine.
13	Governor ON/OFF switch (S2)	Controls energization of throttle position solenoid.
14	Hour meter (TT1)	Indicates total elapsed operating hours of service unit.
15	Battery meter (M7)	Indicates charge or discharge of battery.
16	Panel Lights (DS1 thru DS4)	Provide illumination for night operation.
17	Master ON/OFF switch (S1)	Controls Service Unit electrical circuitry.
18	Panel Light switch (R13)	Turns on and controls brightness of panel lights.
19	Taillights ON/OFF switch (S10)	Turns on taillights (DS6 and DS7)
20	Starting Aid switch (S24)	When pressed, supplies ether to engine to assist in cold weather starting.
	HYDRAULIX SYSTEM PANEL	
21	High-Pressure Filter Indicator (DS13)	Indicates when high-pressure filter element requires service.
22	Pump Case Filter Indicator (DS12)	Indicates when high-pressure pump case filter element requires service.
23	Fluid Flow Indicator	Indicates high-pressure pump volume delivery.
24	Low-Pressure Filter Indicator (DS13)	Indicates when low-pressure filter element requires service.

Table II. Control Panel Controls and Instruments (Cont)

Index No.	Description	Function
25	Fluid Temperature Warning Light (DS14).	Lights when fluid temperature increases to trip setting of thermo switch (160°F).
26	Pressure Selector Valve.	Provides selection of boost pump inlet, high pressure pump inlet, return line, or fill line readings on compound gage.
27	Bleed Pushbutton	Bleeds air from system at top of low-pressure filter.
28	Filter Bleed Sight Tube	Backlighted, glass sight tube for direct observation of fluid. Shows air bubbles and condition of hydraulic fluid during bleeding operation.
31	Low-Pressure Gage Test Fitting	Used for testing and calibrating compound gage.
32	Compound Gage	Indicates back pressure or suction in low-pressure return line, inlet to boost pump, and inlet to high-pressure pump.
35	Fluid Temperature Gage	Indicates temperature of hydraulic fluid going to inlet of high-pressure pump.
36	High-Pressure Bypass Valve.	When opened causes high pressure relief valve to dump fluid to return line at no pressure.
38	High-Pressure Gage	Indicates fluid pressure at pressure outlet port.
39	High-Pressure Gage Test Fitting	Used for testing and calibrating high-pressure gage.



1. AC Ammeter (M2)
2. Frequency Meter (M8)
3. AC Voltmeter (M1)
4. Fault Indicator Light (DS10)
5. DC Ammeter (M4)
6. Circuit Checkout Receptacle (J1)
7. Toggle Switch (S7)
8. DC Voltmeter (M3)
9. DC Output Indicator (DS9)
10. Water Temperature Gage
11. Engine Oil Pressure Gage
12. Tachometer (M5)
13. Toggle Switch (S2)
14. Hourmeter (TT1)
15. Battery Meter (M7)
16. Panel Lights (DS1 thru DS4)
17. Toggle Switch (S1)
18. Rheostat Switch (R13)
19. Toggle Switch (S10)
20. Starting Aid Switch (S24)
21. H.P. Filter Indicator (DS11)
22. Pump Case Filter Indicator (DS12)
23. Fluid Flow Indicator
24. L. P. Filter Indicator (DS13)
25. Fluid Temp Indicator (DS14)
26. Pressure Selector Valve
27. Filter Bleed Pushbutton
28. Filter Bleed Sight Tube
29. DC ON Switch (S6)'
30. DC OFF Switch (S5)
31. L. P. Gage Test Fitting
32. Compound Gage
33. Fault Tracer Switch (S8)
34. Fault Reset Switch (S13)
35. Fluid Temp Gage
36. Pressure Bypass Valve
37. AC OFF Switch (S3)
38. H. P. Gage
39. H.P. Gage Test Fitting
40. AC Voltage Adjust (R1)
41. AC ON Switch (S4)
42. Phase Selector Switch
43. AC Output Indicator (DS8)
44. Electrical Output Switch (S 14)
45. Frequency Droop Adjust (R4)
46. DC Supply Overheat (DS17)

Figure 3-1. Control panel controls and instruments.

3-4. Miscellaneous Controls and Instruments

The following controls and instruments are not panel mounted but are located at various positions in the service unit and are essential to the operation and maintenance of the unit.

a. Fluid Level Gage. The fluid level gage (13, fig. 1-5) is mounted on the hydraulic system reservoir and indicates the amount of fluid in the reservoir.

b. Reservoir Selector Valve. The reservoir selector valve (14, fig. 1-5) is a four-way, 2-position valve with a lever type handle for selecting operation using the service unit reservoir or the aircraft reservoir.

c. Hydraulic System Hand Pump. The hydraulic system hand pump (18, fig. 1-4) is used to charge the hydraulic accumulator to sufficient engine starting pressure as read on accumulator gage (16, fig. 1-4).

d. Pressure Bypass. The pressure bypass (19, fig. 1-4) is a crossbolt located at the base of the hand pump and is operated by the detachable handle of the pump. It bypasses pressurized fluid from the starting system back to the reservoir, and is used for depleting fluid from the accumulator.

e. Starting Valve. The starting valve (17, fig. 1-4) is a hand lever operated, spring return hydraulic valve, that allows pressurized fluid from the accumulator to flow to the hydraulic starting motor.

f. Fuel Level Gage. The fuel level gage (17, fig. 13) is mounted on the fuel tank and indicates the amount of diesel fuel contained in the tank.

CAUTION

Do not operate unit when fuel gage indicates less than 1/4 full.

g. Clutch Drive Pins. The clutch drive pins (9, fig. 1-2) engage the drive wheels for self-propulsion or disengage the drive wheels for towing.

h. Propulsion Control Lever. The propulsion control lever (5, fig. 1-2) positions the control valve to move service unit in forward or reverse direction.

i. Pump Controls. The pump volume control (19, fig. 1-3) is a handwheel type control with a locking lever and is mounted on the high pressure pump. It adjusts the volume of pump delivery from zero to maximum. The pump compensator control (15, fig. 1,3 D is also mounted on the high-pressure pump. It has a knurled knob with knurled locking nut and adjusts the pressure at which pump compensation occurs.

j. Filter Reset Pushbutton. The reset pushbutton is an integral part of the high pressure filter (9, fig. 1-3). When pressed it resets the switch to normally open position. It is accessible through the top of the housing.

k. Propulsion Selector Valve. The propulsion selector valve (12, fig. 1-4) selects either hydraulic output for testing aircraft or routes fluid to propulsion system for operation of self-propel components.

l. Governor Droop Adjust. The governor droop adjust is part of governor (20, fig. 1-5) and is used to adjust the governor to compensate for engine speed droop.

m. Circuit Breakers. Circuit breakers (5, and 7, fig. 1-5) protect the ac output circuitry and dc converters.

n. High-Pressure Gage Shutoff. The high -pressure gage shutoff valve (9, fig. 1-4) isolates high-pressure gage for testing and calibrating.

3-5. Preoperational Procedures

Perform the following inspections and operations before attempting to operate the service unit:

a Suitably locate the service unit where adequate operating room and ventilation for dissipation of engine heat and exhaust are available.

b. Set parking brakes securely. Latch towbar inupright position.

c. Open all necessary access doors.

d. Check hydraulic fluid (table I) level or reservoir. Level should be close to ¾ full as indicated on gage (13, fig. 1-5). Fill reservoir if required, to 3/4 full for best all around operation. A partially empty reservoir allows for 2 gallon discharge from charged accumulator.

CAUTION

Do not overfill hydraulic reservoir because of the 2 gallons of fluid in the accumulator.

e. Check level of diesel fuel (table I) on gage (17, fig. 1-3). Fill fuel tank if required.

f. Check radiator level. Fill with prescribed coolant if required.

g. Check engine lubricating oil level on dipstick gage (24, fig. 1-5). Fill with prescribed lubricating oil (table I) if required.

h. Check indication of hydraulic system pressure gage (16, fig. 1-4). Gage should register a minimum of 2000 psi for starting diesel engine. Operate hand pump (18, fig. 1-4) if necessary to charge accumulator to required pressure.

i. Place circuit breakers (5, and 7, fig. 1-5) in ON position.

j. Place master ON/OFF switch (17, fig. 3-1) to ON position. Check battery current by turning panel lights switch (18). If panel lights do not illuminate, check battery and connections. Press indicator lights (21, 22, 24, and 25) to test for operation. Return switches of OFF position.

k. Position service unit controls as shown in table III.

Table III. Initial Control Settings

Figure Ref	*Control*	*Setting*
1-4-9	High-Pressure Gage Shutoff Valve	Open 1/8 turn
3-1-36	Pressure Bypass Valve	Open 1 turn
3-1-26	Pressure Selector Valve	H.P. PUMP INLET position
1-5-14	Reservoir Selector Valve	SERVICE STAND RESERVOIR position.
14-12	Propulsion Selector Valve	HYDRAULIC OUTPUT position.
3-1-17	Master ON/OFF	Switch OFF
3-1-13	Governor ON/OFF Switch	OFF
3-1-33	Fault Tracer Switch	RUN position

3-6. Priming Fuel System.
Priming fuel system is necessary only for initial starting or for restarting after fuel tank has run dry or has been emptied. Prime fuel system as follows:

a. Open bleed valve located on top cover of fuel filter 17, fig. 1-4). After fuel flows from bleed valve, retighten.

b. Wrench crack nuts on fuel lines about the three injectors.

c. Crank engine by depressing starting valve handle (17,fig. 1-4) completely. Crank engine until fuel flows from fuel lines and flow is constant. If starting system pressure drops too low, use hand pump to bring pressure up. Repeat as required.

NOTE

The buddy starting system can be used to crank engine during priming (para 3-11). When using the buddy starting system for priming, the start valve handle on the running service unit must be depressed.

d. Retighten injector nuts about the fuel supply lines.

3-7. Circulating Hydraulic Fluid
Circulate hydraulic fluid through the Service Unit lines as follows:

CAUTION

If hydraulic system is newly filled make certain HP pump case is filled (3, -5, -1, -3). Make sure high-pressure case is filled with hydraulic fluid.

a. Connect output and return hoses to their respective outlet ports and to flushing manifold (6, fig. 1-3).

b. Crank engine by depressing starting valve handle. The cranking action will circulate fluid through hydraulic system.

NOTE

The buddy starting system can be used for cranking engine (para 3-11). When using buddy starting system for circulating hydraulic fluid, depress starting valve on running service unit.

c. Depress filter bleed pushbutton 1'7, fig. 3-1) until air is bled from system. See unit placard when not to bleed.

d. Repeat steps b and c above until hydraulic fluid appears in sight tube (28, fig. 3-1). If, during this procedure, the accumulator pressure has dropped too low, use hand pump to bring up pressure, or use a unit equipped with buddy start for starting service unit.

3-8. Starting Engine
See paragraphs 3-9 through 3-11.

3-9. Normal Starting
The following procedure should be observed when starting the engine in normal ambient temperatures.

a. Place MASTER ON/OFF switch (17, fig. 31) to ON position.

b. Depress ether start button and allow about 3 seconds before starting engine.

c. Start engine by depressing starting valve handle (17, fig. 1-4) with firm, steady stroke until starting motor pinion engages engine flywheel. Engagement of the pinion will be apparent by the sound of gears meshing. Immediately depress valve handle remainder of stroke to crank engine. Hold handle down until engine fires, then release. The starting sequence must be completed within 10 seconds or time-delay relay (TK2) will shut down engine on low boost or low engine oil pressure, and starting procedure must be repeated. If engine does not start after several trys, or it appears the hydraulic motor is not providing cranking power, refer to section VI.

NOTE

The starter valve is a dual orifice type. A smaller orifice provides fluid pressure for initially engaging the drive pinion while a larger orifice opened on the second phase of the stroke, cranks the engine.

CAUTION

Do not depress valve handle all the way down in a sudden stroke. Doing this, can result in damage to drive pinion or other components of starting motor drive. However, do not inch the valve handle down too slowly or pause between the initial and cranking stroke, or hydraulic accumulator pressure will be lost.

d. Observe tachometer (12, fig. 3-1); engine should idle at 1200 rpm. Allow engine to warm to approximately 110°F at idle speed before proceeding.

3-10. Cold Weather Starting

The following procedure should be observed when starting the engine in temperatures of 40 degrees F or below.

a. Press ether start pushbutton (20, fig. 3-1) once and release. Repeat if necessary.

b. Perform starting procedures outlined in paragraph 3-9.

c. f temperatures are below 0 degree F it may be advisable to close the housing access doors during the initial warmup period. Be sure to open doors when engine has reached operating temperature.

3-11. Buddy Starting

To use the buddy starting system, a second service unit which has a hydraulic starting system that is fully charged and is also equipped with a buddy starting system must be available.

a. Start engine of charged service unit and position the two units so that the front of one is in line with the rear of the other when the units are side by side.

b. Disconnect the quick disconnect couplings (14, and 15, fig. 1-41 of the two service units.

CAUTION

Do not depress starting valve handle on charged service unit while hoses are disconnected. This action allows pressurized fluid to enter starting valve hose and cause static lock at coupling half. Should static lock occur, relieve pressure by "cracking" hose and half coupling assembly at a point between hose nipple and half coupling body. Use two wrenches for this procedure; tighten when static lock is relieved.

c. Connect corresponding hose coupling halves of charged service unit to hose coupling halves of second unit.

d. Depress starting valves of charged unit. After second engine has started release starting valve handle.

NOTE

If during cranking procedure, the pressure in hydraulic starting system of charged service unit drops too low, release the starting valve handles for 2 or 3 minutes until pressure is returned to operating level.

e. After using buddy starting system, return coupling halves to original positions on their respective service units. Allow service units to run until hydraulic starting system pressure is above 2000 psi, or to 3000 psi fully charged condition.

3-12. Applying Electrical Output Load

See paragraphs 3-13 through 3-16.

3-13. Preparation for Loading

Prepare the service stand for . c or dc loading as follows:

a Check engine water temperature gage (10, fig. 3-1) for normal indication of 150-180 degrees F. Check engine lube oil pressure gage (11, fig. -3-1) for normal indication of 35-65 psi. Set switch (s14) to ON position.

b Connect ac or dc output cable (16 or 18, fig. 15} (whichever is to be used) to the aircraft. Position hydraulic controls as indicated in table III.

c. Place GOVERNOR ON/OFF switch (13, fig. 3-1) to ON position. Observe tachometer (12); engine speed should increase to approximately 2400 rpm.

3-14. Ac Power Output

Apply ac power output as follows:

a. Rotate AC VOLTAGE ADJUST knob (40, fig. 3-1) clockwise until AC VOLTMETER (3) indicates 115 volts.

b. Frequency as indicated on FREQUENCY METER (2, fig. 3-11 should be within 390 to 410 cycles.

c. Apply ac output to the cable by pressing AC OUTPUT ON pushbutton (41, fig. 3-1). This will cause OUTPUT ON indicating light (43) to illuminate.

d. Voltage, amperage, and frequency will be indicated on meters (1, 2, and 3, fig. 3-1).

e. VOLT-AMPERE PHASE SELECTOR switch (42) permits reading the voltage and amperage for each phase of ac output.

3-15. Dc Power Output Apply dc power output as follows:

a. Connect dc cable to aircraft. Set switch (S141 to ON position.

b. Place DC SERVICE/AIRCRAFT START switch (7, fig. 3-1) in DC SERVICE position for 28 vdc output or in AIRCRAFT START position for the necessary output to start jet and helicopter aircraft.

c. Depress DC OUTPUT ON pushbutton (29, fig. 3-1) to apply desired output to dc cable. This will cause the DC OUTPUT ON indicator (9) to illuminate.

d. Voltage and amperage will be indicated on meters (5 and 8).

3-16. Starting and Operating Sequence for Electrical Service

A summary of the starting and operating procedures for using the service unit for electrical service is as follows:

a. Perform preoperational procedures as outlined in paragraph 3-5.

b. Start engine as outlined in paragraphs 3-8 through 3-10.

c. Prepare service unit for loading as outlined in paragraph 3-13.

d Apply ac output load (para 3-141 or dc output load para 3-15).

3-17. Applying Hydraulic Output See paragraphs 3-18 through 3-20.

3-18. Preparation for Hydraulic Service Prepare the service unit for hydraulic output as follows:

a. Check engine water temperature gage and oil pressure gage for normal indications. Place GOVERNOR ON/OFF switch (13, fig. 3-1) in ON position. Observe tachometer (12); engine speed should increase to approximately 2400 rmp.

b. Prior to connecting service unit hydraulic system to aircraft, the system must be flushed with fluid and bled of entrapped air. Perform the following steps with loose ends of external hoses connected to flushing manifold (6, fig. 1-3) to form a closed loop.

(1) Open shutoff valve (5, fig. 1-3) and run service unit to flush and bleed hoses.

(2) Slowly close bypass valve (36, fig. 3-1).

(3) Adjust pump volume control handwheel (19, fig. 1-3) for the flushing flow desired as indicated on fluid flow indicator (23, fig. 3-1).

NOTE

Tighten lock handle behind valve handwheel securely or volume control setting may change.

(4) Depress filter bleed pushbutton (27, fig. 31) until no air bubbles appear in sight tube (28).

(5) Flush hoses for approximately 3 minutes.

c. Adjust the pressure compensator (15, fig. 1-3) and high-pressure relief valve as follows:

(1) Close shutoff valve (5, fig. 1-3) on flushing manifold, then slowly close pressure bypass valve (36, fig. 3-1).

CAUTION

Do not exceed 5500 psi at any time.

(2) Loosen knob locknut and back off (ccw) adjusting knob of high-pressure relief valve until needle of high-pressure gage (38, fig. 3-1) varies with knob movement (pressure increases or decreases with knob movement). This indicated the high-pressure relief valve setting. Adjust high pressure gage shutoff valve (9, fig. 1-4) until pointer of high-pressure gage stops pulsating and gives a steady reading.

(3) Turn pump compensator control knob (15, fig. 1-3) clockwise one or two turns.

(4) Turn knob of high-pressure relief valve clockwise until high-pressure gage reads 200 to 300 psi above desired compensator setting. Secure knob locknut of high-pressure relief valve.

(5) Back off compensator control counterclockwise until high-pressure gage reads desired pressure setting. Pump compensation can be detected by the change in sound and movement of fluid flow indicator (23, fig. 3-1) toward zero flow. Secure locknut of compensator control.

(6) Slowly open and close pressure bypass valve (36, fig. 3-1) to check compensator action and pressure setting. Adjust further if necessary.

3-19. Operating Hydraulic Service Unit With Aircraft After service unit hydraulic system has been filled with correct hydraulic fluid and bled of air, the unit is ready for connection to aircraft.

a. Check aircraft reservoir level. Aircraft reservoir should be filled to level specified in applicable aircraft instruction manual.

(1) Connect fill system outlet hose (8, fig. 1-3) to aircraft reservoir. Fill as required using shutoff valve (5, fig. 1-3).

(2) Disconnect fill system outlet hose.

b. Connect pressure outlet and return hoses (3 and 18, fig. 1-3) to aircraft.

c. Place reservoir selector valve (14, fig. 1-5) in SERVICE UNIT RESERVOIR or in AIRCRAFT RESERVOIR ONLY position as dictated by the aircraft testing procedure in applicable aircraft instruction manual.

d. Close pressure bypass valve (36, fig. 3-1) to generate pressure in the aircraft system.

e. Service unit is now ready for testing aircraft hydraulic system. Use procedures given in applicable aircraft instruction manual.

3-20. Starting and Operating Sequence for Hydraulic Service A summary of the starting and operating procedures for using the service unit for hydraulic service is as follows:

a. Perform preoperation procedures as outlined in paragraph 3-5. Position electrical controls as indicated in table III.

b. Start engine as outlined in paragraphs 3-8 through 3-10.

c. Prepare service unit for loading as outlined in paragraph 318.

d. Apply hydraulic output as outlined in paragraph 3-19.

3-21. Procedures During Operation See paragraphs 3-22 through 3-24.

3-22. Fault Indications The fault indicator light (4, fig. 3-1) will illuminate to alert the operator to any of the following detrimental operating conditions: a. Useable fuel supply exhausted (approximately 2 gallons remaining).

b. Ac output overvoltage (130 to 134 volts) or; undervoltage (93 to 103 volts).

c. Overfrequency output (432 to 448 cps) or; underfrequency(360 to 375 cps).

d. Excessive coolant temperature (220° ± 5°F).

e. Low lubricating oil pressure (20 to 25 psi).

f. Engine overspeed (1600 ± 25 rpm).

g. Low boost pressure (35 ± 5 psi).

h If the FAULT INDICATOR light illuminates to indicate an engine fault, fault relay (FK6) will shut down engine through engine shutdown solenoid (L1). If FAULT INDICATOR light illuminates to indicate an electrical fault, all electrical loads will be dropped, the generator will be deenergized, and the engine speed will remain at 2400 rpm. If fault indicators (21, 22, 24, and 25, fig. 3-1) illuminate, shut down unit and make necessary repairs. Under low temperature operation the filter difference pressure lights may illuminate. If high-pressure filter difference pressure light illuminates, fluid will circulate and pressure will not build up until fluid reaches 70-80°F. Reset switch on high pressure filter. Additional fault indicating lights which are not part of the fault tracer system are located on the right-hand side of the hydraulic control panel (21, 22, 24, and 25, fig. 3-1).

i. High-pressure filter high differential pressure indicator (21, fig. 3-1) set at 100 psi. A manual reset button is provided on the pressure switch to reset the contacts. The reset is accessible through an opening at top of the housing.

j. Pump case filter high differential pressure indicator (22, fig. 3-1) set at 50 psi.

k. Low-pressure filter high differential pressure indicator (24, fig. 3-1) set at 50 psi.

I. High hydraulic fluid temperature indicator (25, fig. 3-1) set at 160 degrees F.

3-23. Fault Tracer Switch The FAULT TRACER switch (33, fig. 3-1) enables the operator to determine which of the fault circuits has caused FAULT INDICATOR light (4) to illuminate and has shut the engine down or dropped electrical loads, and deenergized the generator.

NOTE

The FAULT TRACER switch should always be set in RUN position except when using the switch to determine which fault circuit has been activated by a fault.

a. To determine which fault circuit has been activated by a fault, rotate the FAULT TRACER switch until the FAULT INDICATOR light is reilluminated. The fault circuit indicated on the fault tracer switch nameplate for the position of the switch indicates the fault circuit responsible.

b. In order to clear the fault circuit, press FAULT RESET pushbutton (34, fig. 3-1).

3-24. Operating Precautions Observe the following precautions while operating the service unit in electrical or hydraulic service modes:

a. Avoid long periods of engine idling. If service unit is not being used, shut engine down.

b. Stop engine immediately if any parts fail. Practically all failures give some warning before the parts fail and ruin the engine. Heed warning signs such as sudden drop in oil pressure or an unusual engine noise, and immediately stop engine.

c. Place the DC SERVICE/AIRCRAFT START switch (7, fig. 3-1) in AIRCRAFT START position only when current and voltage for aircraft starting is desired.

d. Periodically check condition of hydraulic system fluid through sight tube (28, fig. 3-1). Bleed system if required.

e. If an emergency should arise while operating in hydraulic mode, (ruptured hydraulic hose in aircraft, etc) open bypass valve (36, fig. 3-1) to relieve pressure and stop flow of hydraulic fluid to aircraft.

f. When operating service unit in ambient temperatures over 100 degrees F, remove engine thermostat.

3-25. Stopping Service Unit See paragraphs 3-26 through 3-31.

3-26. Dropping Electrical Load. To drop either the ac or dc loads, or both, depress AC OUTPUT OFF pushbutton (37, fig. 3-1) or DC OUTPUT OFF pushbutton (30). Depressing the OFF pushbutton will cause the OUTPUT ON indicating lights (9 or 43) to go out.

3-27. Dropping Hydraulic Load To drop the hydraulic load, slowly open bypass valve (36, fig. 3-1). If hydraulic fluid is hot and it is desired to lower the temperature prior to shutdown, then allow fluid to circulate with pressure bypass valve open until temperature gage (35, fig. 3-1) reading decreases to desired value.

3-28. Securing Service Unit At the conclusion of loading operations, drop all electrical loads in accordance with paragraph 3-26 and the hydraulic load in .accordance with paragraph 3-27. Continue to secure service unit as follows:

a. Disconnect electrical output cables from aircraft and store in cable compartment.

b. Disconnect hydraulic output hoses from aircraft and store on hangers in hose storage compartment.

c. Shut down engine in accordance with paragraph 3-29.

d. Wipe exterior of unit to remove dirt, oil film, and operating grime. Close and secure all access doors.

3-29. Shutting Down Engine During normal operation, shut the engine down as follows:

a. Remove all ac, or dc electrical loads and all hydraulic loads as outlined in paragraphs 3-26 and 3-27.

b. Reduce engine speed to idle by placing GOVERNOR ON/OFF switch (13, fig. 3-1) in OFF position.

c. Allow engine to operate at idle speed for approximately 5 minutes to normalize engine temperature.

d. Place MASTERON / OFF switch (17, fig. 31) in OFF position.

e. Secure service unit in accordance with paragraph 3-28.

3-30. Operating Propulsion System. Operate the self-propel system as follows:

a. Start service unit in accordance with paragraph 3-8.

b. Place propulsion selector valve (12, fig. 1-41 in self-propel mode position. For maximum speed adjust volume control to maximum position, close bypass valve.

c. Engage clutch drive pins (9, fig. 1-2) for each rear wheel, by positioning them as indicated for engaged position in figure 3-2.

CAUTION

Engage clutch drive pins only when engine is operating at idle speed and handbrake lever is applied.

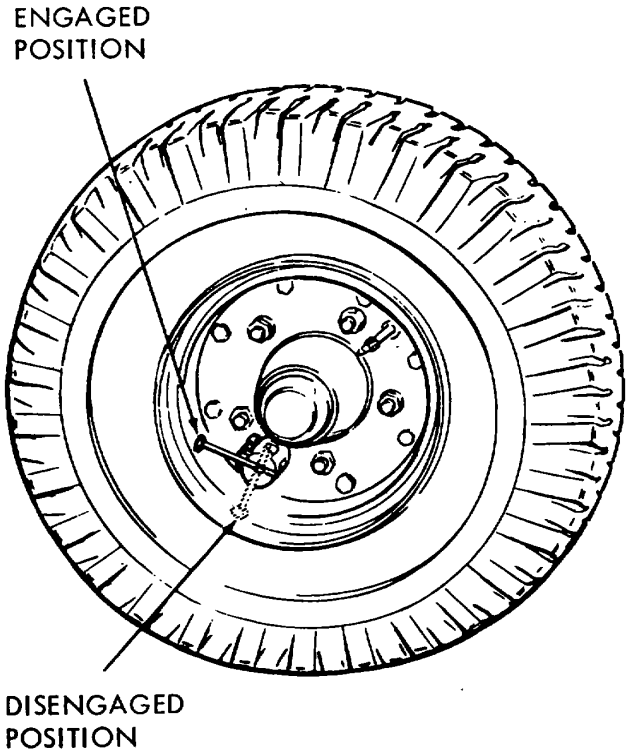


Figure 3-2. Engaging and disengaging wheel drive pins.

d. After engaging clutch drive pins, release handbrake lever and release towbar latch. Move vertical towbar into horizontal operating position. Actuate propulsion control lever (5, fig. 1-2) to rock unit a few inches forward and backward. Visually check the drive pins to make certain they are in fully engaged position.

e. Move propulsion control lever (5, fig. 1-2) in the direction of service unit movement desired. The amount of movement of the lever will control the speed at which service unit is propelled.

CAUTION

To prevent damage to propulsion system, accelerate and decelerate smoothly by moving the propulsion control lever gradually from and to the spring loaded neutral position.

f. When moving the service unit in darkness, it is

recommended that tail-lights be turned on using switch (19, fig. 3-1).

WARNING

When service unit is being self-propelled up or down an incline, always steer the unit from the uphill position.

g. When stopping the unit during self-propulsion, always set handbrake lever and latch towbar in upright position.

3-31. Towing Service Unit Prepare the service unit for vehicle towing as follows:

a. Disengage clutch drive pins (9, fig. 1-2) by positioning them as indicated fordisengaged position in figure 3-2.

b. Lift lunette eye flapper (18, fig. 1-1) and connect towbar to towing vehicle pintle. When this flapper is lifted, a warning horn will sound if towing is attempted and the drive pins are still engaged.

CAUTION

Never tow the service unit with the warning horn sounding. Stop the unit immediately and disengage the clutch drive pins. Failure to do so will result in serious damage to the self-propulsion system.

c. Connect towbar safety chains to towing vehicle.

d. Be sure all doors are closed and securely latched and that handbrake lever is released before towing the unit.

e. Connect interconnecting electrical cable (14, fig. 1-1) to towing vehicle electrical system to operate tail/stoplight (20, fig. 1-3).

SECTION IV

PERIODIC INSPECTION, MAINTENANCE, AND LUBRICATION

4-1. Periodic Inspection Periodic inspection consists of inspections to be performed daily and approximately every 100 and 250 hours of service unit operation. Operating time should be suitably logged in accordance with standard procedure employed by the using activity in order to accomplish the systematic inspections as called for in this section.

a. Daily Inspections. If the service unit is operated daily, the following inspections should be performed at the start of each operating period. If used intermittently, the daily inspection procedure should be observed each time the service unit is placed in operation. Table IV lists the areas to be covered in daily inspection procedure.

b. 100 Hours Inspection. Table V provides a list of inspections which should be performed every 100 operating hours as indicated on hour meter (14, fig. 3-1).

c. 250 Hours Inspection. Table VI provides a list of inspections which should be performed every 250 operating hours as indicated on hour meter (14, fig. 3-1).

Table IV. Daily Inspection Procedures

Item	*Figure reference*	*Inspection and service*
Towbar	1-1 (17)	Check for proper operation of towbar and propulsion control lever.
Brakes	1-1 (16)	Check operation of handbrake lever and cables.
Tires	-	Check for cuts and damage. Remove imbedded glass, nails, or stones. Check pressure at 50 psi.
Drive wheels	1-3 (11)	Check for lubrication leaks.
Access doors	-	Check for security of mounting, latches and ease of operation.
Power cables	1-5 (16) and (18)	Check for breaks, cuts, defective insulation, and evidence of overheating.
Controls and instruments	3-1	Check for cleanliness, operation, damage, and security.
Fuel supply	1-3 (17)	Check level and refill if required.
Air cleaner	1-5 (11)	Bring oil level up to mark.
Radiator	1-4(3)	Check coolant level. Refill if required.
Crankcase	1-5 (24)	Check oil level on dipstick. Refill if required.
Fluid reservoir	1-5 (13)	Check for fluid at sight gage. Refill to 104 if required.
Battery	1-5 (15)	Check level of electrolyte in cells. Check cables for corrosion and tightness.
Valves	3-1	Manually operate valves (without flow or pressure) to check for proper operation.
Engine drive	--	Check for proper belt tension. See paragraph 4-9.
Indicating lights	3-1	Press jewels of the press-to-test indicating lights to determine if lamps are good. Replace defective lamps.
Fuel filter	1-4 (7)	Remove drain plug from bottom filter case and drain until clean diesel fuel flows. Water and sludge will accumulate here.
Hydraulic Piping	--	Check for evidence of leaking.

Table V.100 Hours Inspection Procedure

Item	*Figure reference*	*Inspection and service*
Chassis	-	Inspect complete unit including running gear for loose hardware; tighten any loose hardware. Check unit for defects. Check for adequate lubrication.
Hoses and piping	-	Carefully inspect hydraulic piping, hoses, and connections for evidence of fluid leakage. Test and tighten hydraulic coupling nuts if required.
Service unit interior	-	Completely clean oil and dust film from interior of unit using cloths and compressed air.
Pressure gages	3-1	Calibrate pressure gages. See paragraph 4-10.
Fuel filter	1-4 (7)	Replace filter element. See paragraph 4-11.
Engine lube oil	-	Change oil in engine crankcase. Change lube oil filter with oil change. See paragraph 4-12.
Hydraulic starting system filter	1-4 (26)	Replace filter element. See paragraph 4-6.
Accumulator	1-4 (20)	Check that hydraulic starting system accumulator has a nitrogen precharge of 1000 psi. See paragraph 4-13.
Electrical wiring	-	Check wiring for evidence of broken or frayed insulation.

Table VL. 250 Hours Inspection Procedure

Item	*Figure Reference*	*Inspection and service*
Wheels		Remove, clean, and repack with fresh lubricant. Check for proper tracking. Realign if required.
Brakes	1-4 (23)	Inspect brakeshoes and linkage for excessive wear. Replace shoes and adjust linkage a required.
Enclosures	1-2 (31 and (10)	Check for cleanliness, dents, distortion, and corrosion. Paint as required.
.....		Check latches, knobs, and handles for proper attachment and operation.
.....		Check doors and hinges for distortion and security. Check panel and in-
.....		dictating lights for operating condition and cracked or broken glass, and
.....		secure attachment.
Control panel	3-1	Check control knobs and switches for free movement and security.
.....		Check switches for OFF and NORMAL position. Instruments for
.....		cleanliness, legibility, and security. Panel and indicating lights for
.....		operating condition, and cracked or broken glass. Wiring components in
.....		rear of panel for fraying, corrosion, looseness, or overheating. ID plates
.....		and placards for cleanliness, legibility and security.
Reservoir	1-4 (1)	Drain and remove cleanout access plate at the top. Clean out sludge
.....		and other contamination, being careful not to scratch or otherwise
.....		damage the inside surface and components. Use new gaskets when
.....		replacing cleanout access plate and avoid excessive torque in tightening
.....		plate mounting screws.
Oil cooler and radiator	1-4 (2) and (3)	Use compressed air to clean out cooler fins and radiator core. Inspect
.....		radiator for leakage. Check condition of hoses.

4-2. Maintenance Maintenance of the service unit is confined primarily to periodic inspections, lubrication, replacement of defective or worn parts, and adjustments as may be performed by operating personnel without the use of special tools or equipment.

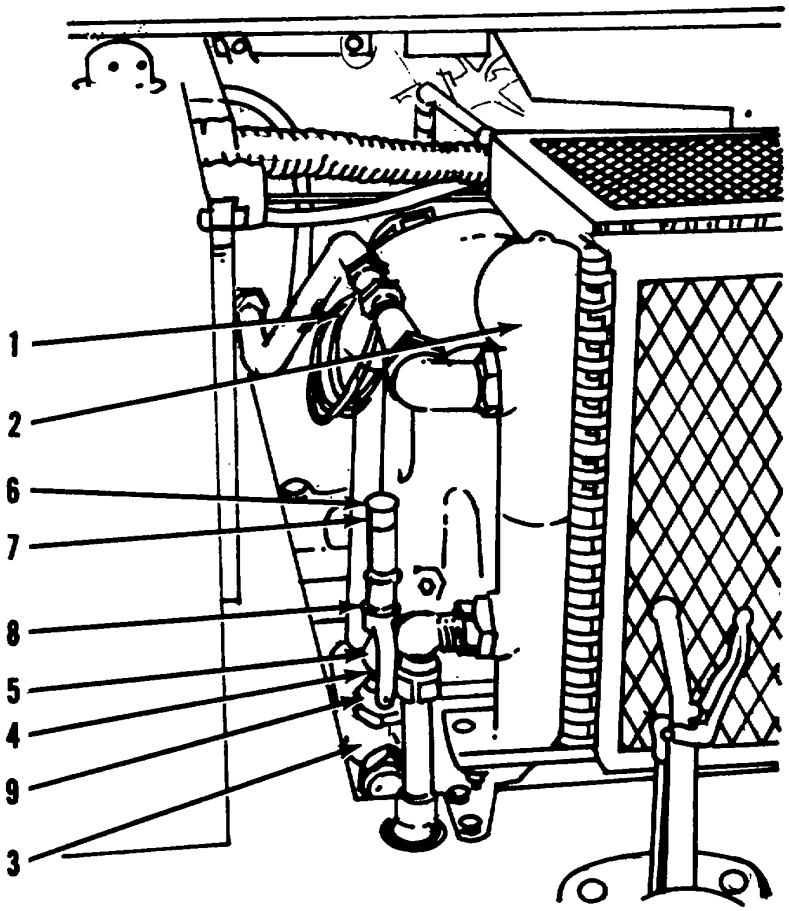
4-3. Temperature Controller Adjustment The self-operating temperature control valve (fig. 4-1) is normally-open type which allows fluid to bypass the oil cooler (2) until fluid becomes hot enough to require cooling. The valve is positioned automatically by a gas filled sensing bulb and capillary (1). The closing temperature is adjustable through a range of 100 to 200 degrees F as follows:

a. To decrease temperature setting, loosen knurled locknut (8) and turn spring adjuster (7) clockwise. Use a piece of 1/8-inch diameter rod to loosen and tighten locknut.

b. To increase temperature setting, loosen knurled locknut (8) and turn spring adjuster (?7 counterclockwise.

c. For examination of bellows in thermal element, place a wrench on hexagon portion of element (6) and turn counterclockwise for removal.

d. For examination of the valve trim, relapping of seating surfaces, or packing replacement, place a wrench on hexagon portion of bonnet (9), turn counterclockwise and lift complete upper portion from body. To insert packing, remove capscrews (5), lift packing flange (4) and follower and insert packing. To lap valve seating, loosen locknut (8) and turn spring adjuster (7) until seat ring does not contact bottom of bonnet and lap as required.



1. Sensing Bulb and Capillary
2. Oil Cooler
3. Temperature Control Valve
4. Packing Flange
5. Socket Head Capscrew
6. Hexagon Portion of Element
7. Spring Adjuster
8. Knurled Lock Nut
9. Bonnet

Figure 4-1. Temperature controller adjustment.

4-4. Replacing High-Pressure Primary Filter Element Replace the primary filter element of the high pressure filter (9, fig. 1-3) as follows:

a. Release fluid pressure at pressure bypass valve (3 6, fig. 3-11.

b. Loosen clamp around filter bowl.

c. Remove filter bowl (1, fig. 4-2) from filter head (8).

d. Remove primary throwaway element (4) and discard. Do not remove secondary element (5) during normal maintenance.

e. Install new filter element (4). Install new element preformed packing (3) if damaged.

f. Reassemble filter bowl (1) to filter head (8) by carefully raising filter bowl over element assembly (4) and screwing into head (8) until the bowl bottoms.

g Tighten clam. Press reset button (2, fig. 1-6).

4-5. Replacing Low-Pressure Filter Element Replace the element of low-pressure filter (23, fig. 1-5) as follows: a. Open filter drain (22, fig. 1-5); loosen nut at tee above filter and drain filter.

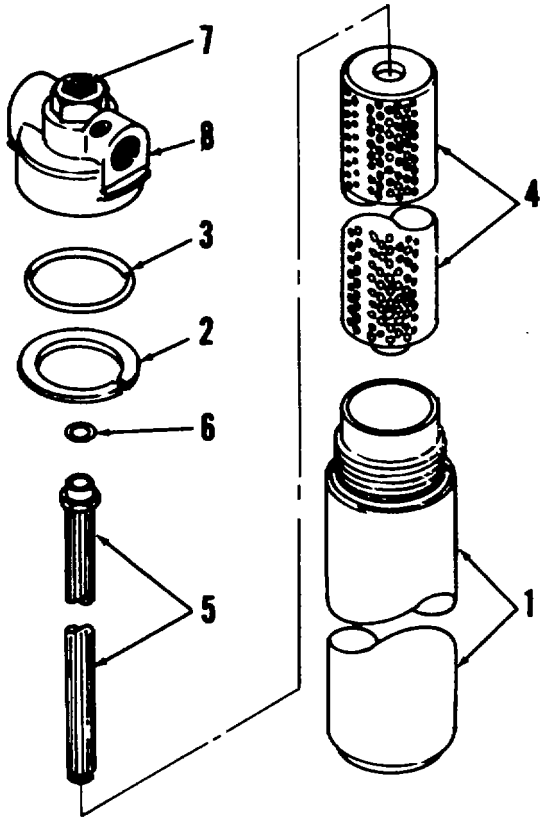
b. Remove cover plate (4, fig. 4-3) and preformed packing (7) from filter housing (19).

c. Cut safety wire and remove wing nuts (8), sealing washers (9), and preformed packings (10).

d. Slowly remove outer seal retainer (11) to allow entrapped fluid to drain.

e. Remove and discard filter element (12).

f. Clean inside of filter housing thoroughly with solvent and medium bristle brush. Allow to dry.



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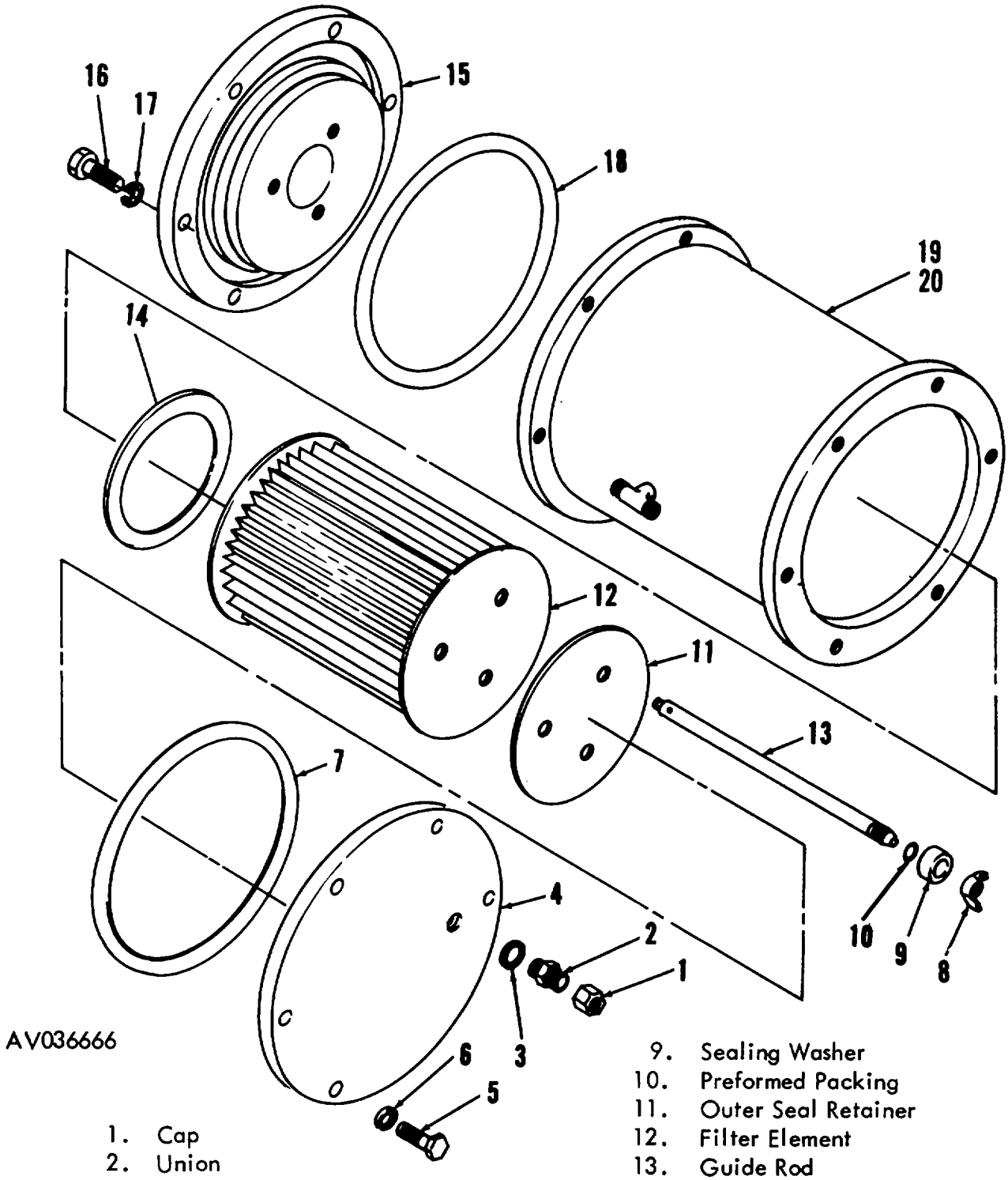
1. Filter Bowl
2. Backup Ring
3. Preformed Packing
4. Primary Filter Element
5. Secondary Filter Element
6. Preformed Packing
7. Pressure Switch
8. Filter Head

Figure 4-2. High-pressure filter.



1. Cap
2. Union
3. Packing
4. Cover
5. Screw
6. Lock Washer
7. Preformed Packing
8. Wing Nut
9. Sealing Washer
10. Preformed Packing
11. Outer Seal Retainer
12. Filter Element
13. Guide Rod
14. Gasket
15. Outlet Cover
16. Screw
17. Lock Washer
18. Preformed Packing
19. Filter Housing

Figure 4-3. Low-pressure filter.

g. Reassemble filter using AM6236-3 filter element. Rewire wingnuts (8) and replace housing cover plate (4).

4-6. Replacing Starting System Filter Element Replace the element of starting system filter (26, fig. 1-4) as follows:

a. Cut safety wire and unscrew bowl from head.

b. Remove and discard filter element. Thoroughly clean bowl. Install new filter element AN6235-4A and gasket if required.

c. Reassemble filter bowl and secure with safety wire.

4-7. Replacing Pump Case Filter Element Replace the element of pump case filter (2, fig. 1-5) as follows:

a. Unscrew filter bowl from head. Thoroughly dean bowl.

b. Remove and discard filter element. Replace with new AN6235-2A filter element.

c. Reassemble filter element and bowl.

4-8. Servicing Engine Air Cleaner Proceed as follows to service the engine air cleaner 11, fig. 1-5).

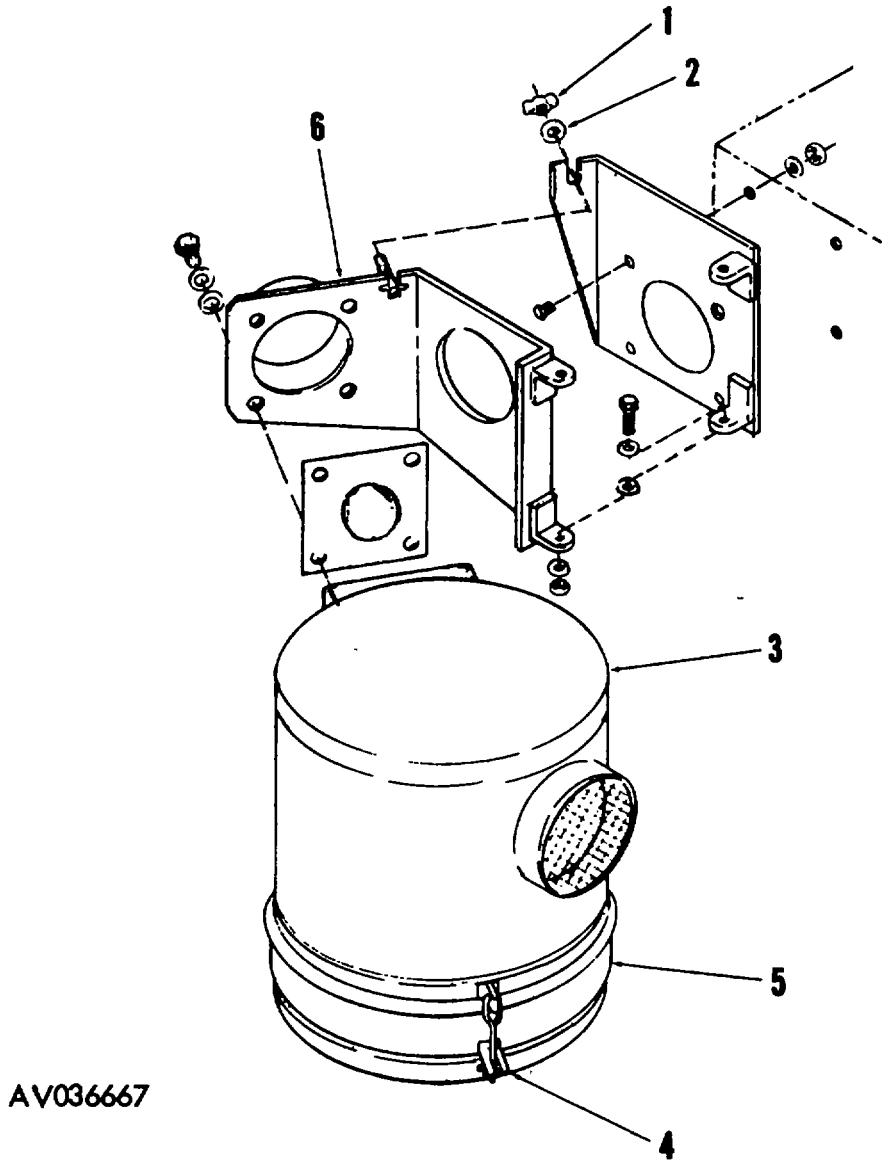
a. Remove wingnut (1, fig. 4-4) and flat washer (2). Swing air cleaner (3) outward from unit for accessibility.

b. Loosen wingnuts(4, fig. 4-4) and remove cup (5). Lift out vortex chamber from cup and empty oil.

c. Thoroughly wash cup and vortex chamber.

d. Remove prefilter from bottom of air cleaner body by turning to right or left. Wash prefilter in solvent.

e. Replace prefilter in body. Place vortex chamber in cup (5) and refill with oil to the indicated level.



1. Wing nut
2. Flat washer
3. Air cleaner
4. Wing nut
5. Cup
6. Support

Figure 4-4. Intake air cleaner.

f. Install cup (5) on body of air cleaner and secure wingnuts (4).

g. Swing air cleaner on riveted support (61 inward and secure support with flat washer (2) and wingnut (1).

4-9. Adjusting Belt Tension

Adjust engine blower belt tension as follows:

a. Loosen clamp locknut holding idler pulley bracket to support shaft until bracket can be rotated by using a suitable wrench applied to idler bracket. Tighten belt and lock clamp nut.

NOTE

Blower belt must be tight for proper operation.

b. Run engine at top speed and observe belt for flutter.

WARNING

Stop engine to adjust belt

4-10. Calibrating Pressure Gages.

(Not applicable)

4-11. Servicing Diesel Fuel Filter

Service the diesel engine fuel filter (7, fig. 1-4) as follows:

a. Remove drain plug and drain fuel from filter.

b. Remove cover assembly and pull element out of case.

c. Thoroughly clean case and cover. Install new filter element. Check condition of gasket and replace if necessary.

d. Install cover assembly to case. Install drain plug.

4-12. Servicing Engine Crankcase Oil Filter

At each engine crankcase lube oil change, the oil filter element should also be changed. Remove the filter case cover and filter element. Clean filter case thoroughly and install new element.

CAUTION

Filtering element is spring-loaded, use care when removing filter cap to prevent oil from spraying out.

4-13. Accumulator Precharge Pressure

The starting system accumulator should have a nitrogen precharge of 1000 psi. Check precharge as follows:

a. Start engine.

b. Relieve starting system pressure by turning pressure bypass (19, fig. 1-4) at base of hand pump (181 counterclockwise until starting system pressure gage (16) shows zero pressure. Then, turn pressure bypass clockwise, being sure to tighten it secure]) to prevent leakage.

CAUTION

Bleed down accumulator slowly to prevent damage to charging pump.

c. Observe pressure gage. The needle of pressure gage will rise from zero to an initial reading before slowly rising again. This initial reading indicates the nitrogen precharge pressure in accumulator.

NOTE

If needle does not rise from zero to the initial reading after a few moments, operate hand pump a number of times.

d. If nitrogen precharge in accumulator is low, bring up to 1000 psi as follows:

(1) Reopen bypass valve and permit accumulator pressure to bleed to zero.

(2) Connect an external source of nitrogen to accumulator precharge valve. The external charging system must be equipped with a pressure gage since the accumulator pressure gage will not indicate the precharging pressure.

(3) Precharge the accumulator to 1000 psi as read on the external gage.

(4) Disconnect the external source of nitrogen 52 and close bypass valve while observing accumulator pressure gage. It should indicate a rapid rise of pressure to 1000 psi.

(5) Check all hydraulic hoses and precharge fittings for evidence of leaks when accumulator has been fully charged. When checking for leakage of nitrogen, it is advisable to use a soap solution as some leaks may not be detected by the sound of escaping nitrogen.

4-14. Servicing Wheel and Brake

Service the wheel and brake assemblies as follows:

a. Adjusting Trailer Brakes. Brakes applied to rear wheels of trailer should be adjusted separately by shortening or lengthening each brake cable at the threaded rod end (23, fig. 1-4) located near the handbrake lever. Approximately 1 inch of adjustment is provided for each brake cable.

b. Brakeshoes. When cleaning and replacing wheel bearings, observe condition of brake linings at rear wheels. Replace with new shoe and lining assembly if excessively worn.

c. Front Wheel Alignment. Adjust toe-in on front wheels to /8 inch by turning tie rods. Replace fatigued springs or add shim washers.

4-15. Servicing Radiator And Thermostat

If temperature of engine deviates from range of 160 to 185 degrees F, in normal ambients, drain and flush radiator and remove and inspect or replace thermostat. To drain the radiator open drain cock and bottom of radiator, and drain plug at oil cooler. Open radiator cap for rapid draining.

a. Radiator Flushing.

(1) Completely drain cooling system.

(2) Close all drains. Partially fill system with dean, soft water. Add a recommended descaling solvent, and fill radiator. Start engine and run until maximum operating temperature has been reached, so that solvent circulates throughout cooling system.

(3) Stop engine and allow to cool. Drain solvent and refill radiator slowly to avoid rapid cooling. Add a neutralizer to the radiator, fill and again run engine.

(4) Repeat steps (1) and (21 above with clean, soft water only. Run engine for 15 minutes, cool and drain.

(5) Fill cooling system with clean, soft water to which a rust inhibitor or high boiling point type antifreeze has been added, make sure inhibitor is compatable with engine gaskets. After filling, inspect radiator, hose connections, and engine for cooling leaks.

NOTE

The vent (6, fig. 1-4) at top of thermostat housing should be opened during draining of cooling system and when filling, until coolant begins to spurt from the vent.

b. Thermostat Servicing.

(1) Drain coolant at thermostat housing and reserve drainage for replacement if radiator contains antifreeze solution.

(2) Remove two nuts and lockwashers and separate thermostat housing 15, fig. 1-4) from water manifold. Remove thermostat from housing.

(3) Inspect thermostat for rust and corrosion which would prevent its free operation.

(4) Test thermostat by immersing in water of approximately 155 degreesF. At this temperature the thermostat should remain closed. As the water is heated to 160 to 170 degrees F, the mechanism should begin to open, and should be fully open at 185 degrees F.

4-16. Fuel Injection Pump Repair And Replacement

The fuel injection pump (27, fig. 1-4) is of the inlet metering type. The amount of fuel entering the charging space between the pumping plungers depends on the matching up or registry of the charging ports, the length of time ports are in register, the governor control, and the primary fuel pressure. As the engine slows down under load or in response to operator control, the charging ports are in registry longer and more fuel might be expected to enter the charging space. If the primary pressure remained unchanged this would be true and would result. in excess fuel. To compensate for this characteristic, the primary fuel pressure is very carefully regulated from quite low to 100 pounds or more by means of the regulating valve, spring, and sleeve: All these components are in the injection pump end plate. The vane type transfer pump is built into the injection pump proper, just behind the end plate. Working together, the pump and regulating piston and sleeve provide a specific primary fuel pressure delivery curve matched to the engine and its requirements. Dirt, gum corrosion, air bubbles, leaks, or thickened fuel which might interfere with the primary fuel pressure control will reflect in engine performance. These conditions can be corrected as follows:

a. Unsatisfactory fuel flow may be caused by a clogged strainer in the transfer pump end plate section of the injection pump. Remove sleeve (fig. 4-5) and preformed packing. Remove strainer from sleeve and clean in diesel fuel using a fiber brush. Replace preformed packing when reassembling.

b. Inspect regulating spring and regulating piston. If partially gummed or stuck, free with solvent.

c. Examine pump liner and blades. Replace if badly worn or damaged.

d. Remove injection pump as follows:

(1) Disconnect all fuel lines and control connections from pump.

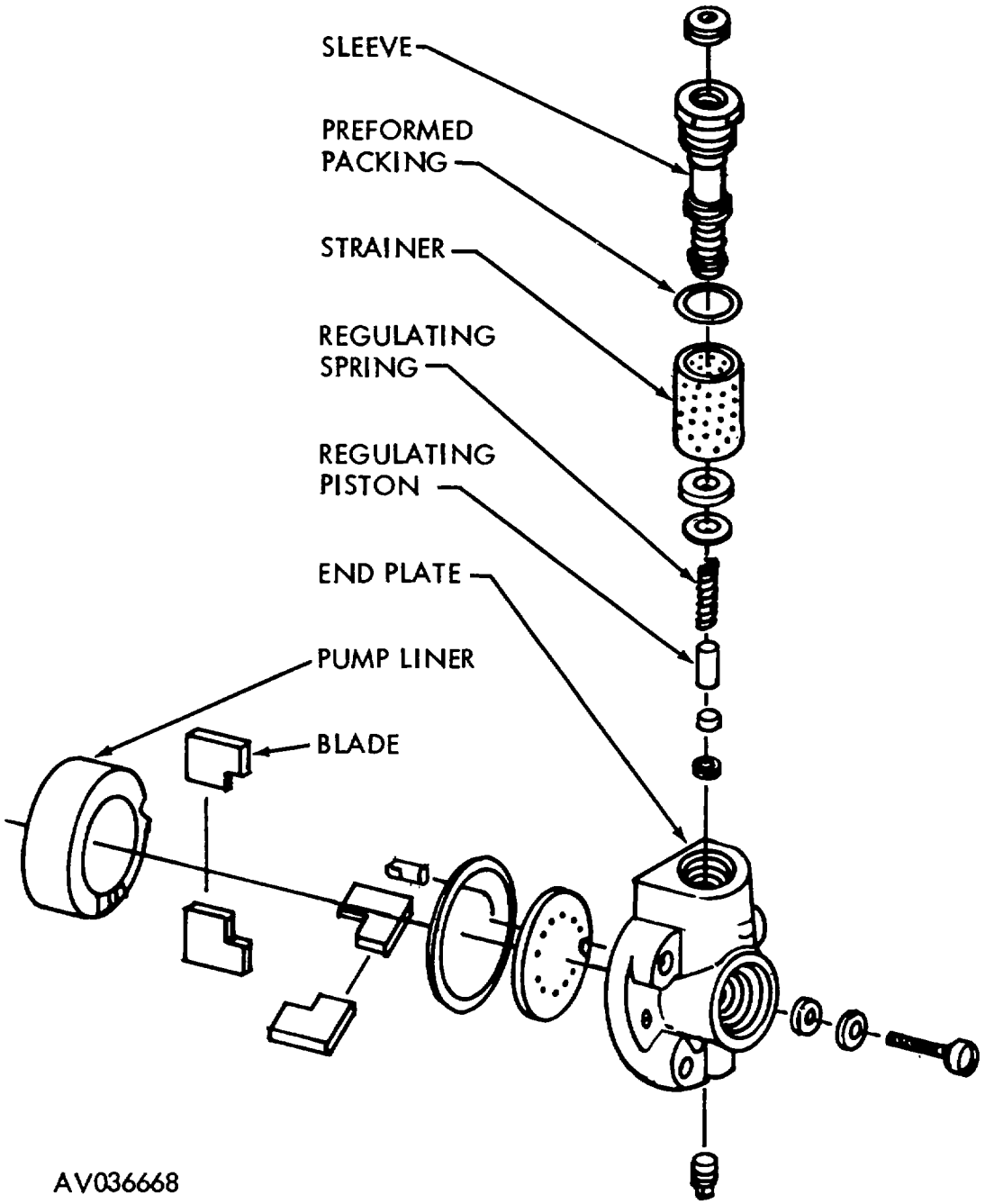


Figure 4-5. Injection pump end plate assembly.

(2) Rotate crankshaft to bring number one piston onto the fuel pump timing mark as shown by alignment of pointer on the front cover with the notch in the belt drive pulley rear flange (fig. 4-6).

(3) Remove two nuts holding the pump mounting flange to the drive assembly pad and gently lift pumpfree from the shaft which will remain in engine.

(4) Plug all openings to pump. If drive shaft and seals are to be left unattended for a significant length of i;4ie, they should be coated with protective oil or grease and covered to prevent corrosion and dirt accumulation.

e. Install injection pump as follows:

(1) Carefully inspect the injection pump drive shaft for evidence of wear, nicking, corrosion, or dirt accumulations. Examine used seals very carefully. Use new seals wherever possible. Inspect the mounting pad condition and manually test the pump drive shaft for excessive looseness or backlash which would indicate repair of pump drive assembly is needed.

(2) Grease injection pump drive shaft and seals with a light mineral grease to ease seal installation. The lips of seals must face outward away from each other.

(3) Be sure the fuel pump timing mark on belt drive pulley (4° ATC) is accurately aligned with pointer on front cover (fig. 4-6). When setting pulley on this mark always turn in direction of normal running rotation.

CAUTION

Do not turn pulley past timing mark and go back since this will introduce gear backlash into the setting.

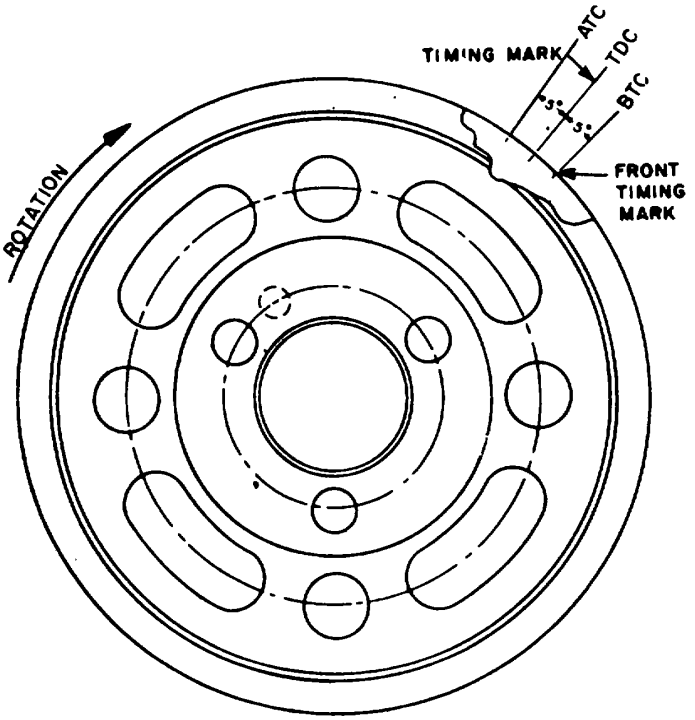


Figure 4-6. Timing marks.

(4) With window cover removed from side of injection pump, use a clean screwdriver or like tool to turn pump rotor until timing mark on cam is aligned with timing mark on weight retainer (fig. 4-7)

(5) Very carefully slide injection pump over drive shaft and seals and seat drive tang in pump internal slot. Install retaining nuts finger tight.

(6) Use a light if needed for clarity, and observe the pump timing marks through the window while shifting the pump slightly on the mounting studs to obtain perfect alignment of timing marks. Tighten retaining nuts.

NOTE

The fuel injection pump is timed for the END of injection rather than the beginning.

4-17. Fuel Injection Pump Timing

Time the fuel injection pump as described in paragraph 4-16. To check the operation of the automatic advance control, substitute a transparent plastic window for metal cover over the timing mark opening in pump. Increase engine speed to 3000 rpm and observe cam ring timing mark. The timing mark on cam ring should move 7 degrees against direction of rotation. At lower speeds it will assume intermediate positions. If this movement is not evident, pump repair is needed.

4-18. Checking and Servicing Injection Pump and Nozzles

Check for operation of the injection pump and fuel injectors using a cranking fuel supply pressure of at least 2 pounds and proceeding as follows:

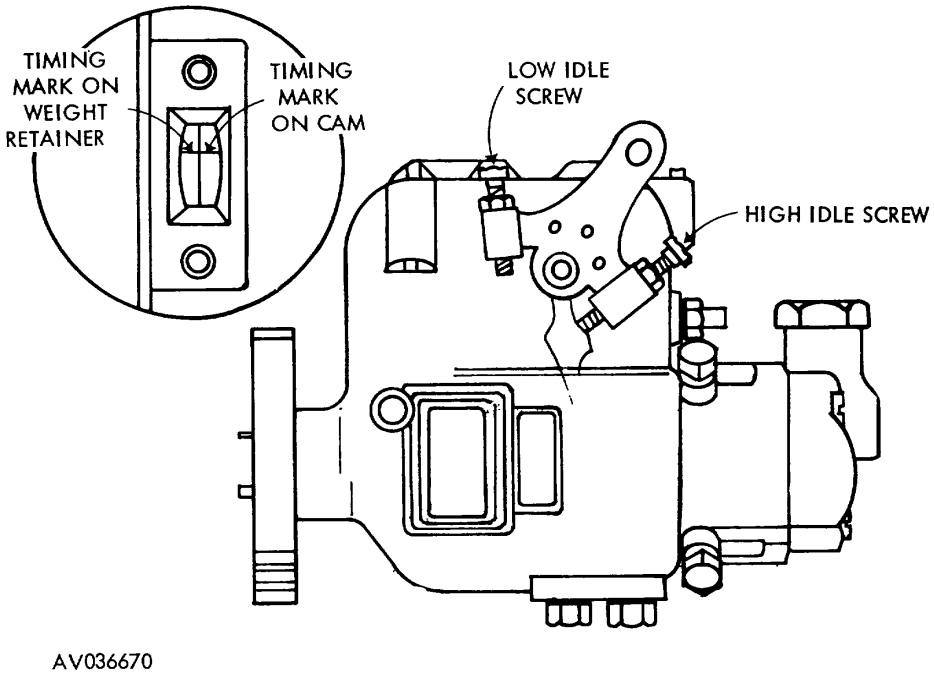


Figure 4-7. Timing mark and throttle screw location.

a. Loosen all injection nozzle nut connections and crank engine. If fuel does not flow from all loose connections, the injection pump must be replaced.

b. If fuel does flow from all nut connections, completely disconnect all nut connections and loosen all nut connections on injection pump. Reconnect injection nozzles and tighten all connections so that injection nozzles are hand free of the engine.

c. Crank engine and watch fuel spray from each nozzle. If any of the nozzles drip, they are defective. Replace as necessary.

d. If any nozzles fail to emit a spray, remove and connect in its place, a nozzle that worked. If this nozzle emits a spray, the first nozzle was defective. If the second nozzle (one that was known to be in working order) fails to emit a spray, the injection pump is defective.

WARNING

Do not allow nozzle to spray against skin. This may cause serious injury.

e. Replace a fuel injection nozzle as follows:

(1) Disconnect nut connection and unscrew injector from cylinder head. Take care to avoid introducing dirt into injector or engine.

CAUTION

The nozzle tip has a very small and delicate pintle which extends through the seat. This tip should never be struck since it is almost certain to be damaged.

(2) When removing or installing the bleed-off line, note the convex surface on one side of banjo fitting retaining nut (fig. 4-8). This surface must seat against the concave surface on the top side of banjo fitting. The groove on banjo fitting goes down and mates with opening in upper portion of nozzle holder body to permit escape of bleed-off fuel.

(3) Clean nozzles by running a cleaner through them using a nozzle tester. If nozzle still does not operate properly, replace.

(4) Install nozzles in cylinder head at 35-40 torque.

f. Loosen injector line at injector. Set throttle

about 1/4 open. Crank engine until fuel flows free of air. Tighten connection nut and start engine.

g. Retighten head to 125 ft-lb after 20 minutes of engine running time, and again after 1 hour of running time.

4-19. Relieving Air in Fuel System

Purge air from fuel system as follows:

a. Disconnect fuel return line connection and install a piece of clear plastic hose for easier observation of fuel condition.

b. Bleed fuel supply line to injection pump.

c. Loosen injection line couplings and crank engine over with starter until clear fuel flows at each coupling. Retighten couplings.

d. Bleed each injector by loosening the coupling nut with engine running.

e. Reconnect return line connection.

4-20. Adjusting Voltage Regulator Gain Control

If the generator is unstable at no load or at load, or oscillates after adding or rejecting load, reduce the pin by rotating rheostat (IRH) (29, fig. 1-5) counterclockwise until the system maintains good stability. If the response of the generator to changes in load is slow and the steady state regulation excessive, the gain should be advanced, taking care not to go too far that oscillatory or unstable operation is reached. The use of an oscilloscope, observing the output voltage of the generator while loads are added or rejected is recommended if gain adjustments are required. A sweep rate between 0.2 and 0.5 second per major division of the scope face, and observation of only the top half or quarter of the waveform are recommended. When adding a load increment, the voltage should dip initially and recover with no more than two overshoots. When load is rejected there should be one initial overshoot and no more than two undershoots.

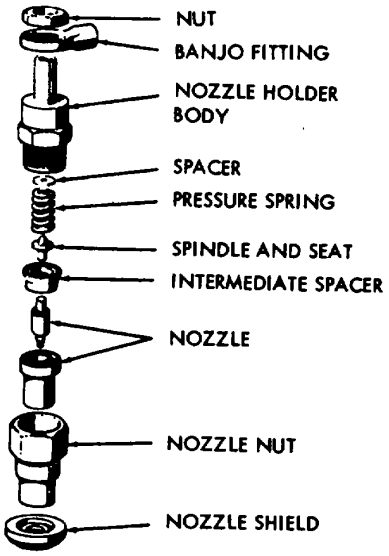


Figure 4-8. Nozzle.

4-20A. Engine Test and Adjustment of the Roosa-Tronic Compensator

Install a dc ammeter in series with the actuator and a dc voltmeter across test points 1 and 4 (fig. 4-9). Operate the generator at rated speed and voltage. Check to be sure the compensator is connected for the rated frequency of generator.

a. First check the regulation of the mechanical governor by removing one wire from the injection pump. Then checking to make sure that the sensitivity adjustment (knurled knob under the injection pump inlet) is turned fully counterclockwise, the frequency should read 408 cps at

no load. If it doesn't, adjust the high speed adjustment screw on the injection pump lever arm. Reconnect the wire to the actuator terminal on the injection pump through a dc ammeter for the remaining adjustments.

b. Observe the dc voltmeter across test points 1 and 4. With no load on the generator this voltage should be zero. Check test points 1 and 2, 2 and 3, and 3 and 4. All should be zero at no load. If not, adjust to zero with R1, R2, and R3. There is some interaction between these three, so it may be necessary to go over the three adjustments more than once. Adjust R6 to give a reading of 400 cps. This will produce .5 to .6 ampere (500 to 600 milliamperes) actuator current in a well functioning system.

c. Apply full load to the generator. The voltage from test points 1 and 4 should read 7-7.5 vdc, with the highest numbered test point most positive. Each of the three sections should be equal if the load is balanced between the three phases.

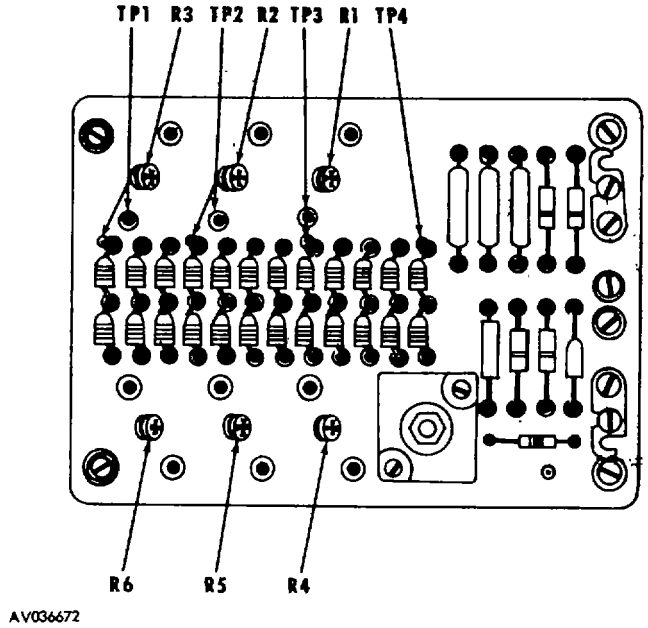


Figure 4-9. Roosa-tronic compensator adjustment.

d. Adjust the droop-adjust potentiometer (45, fig. 3-11 to give 400 cps at full load. Actuator current should not be more than 250 ma. lower than the no load point in a well-functioning system.

e. If a greater actuator current change is required to obtain 400 cps, check the regulation of the mechanical governor with the actuator circuit open, Regulation of the mechanical governor should be within 1.0 percent.

f. To adjust the characteristic of the transient on the load change, use R4. This changes the load anticipation signal.

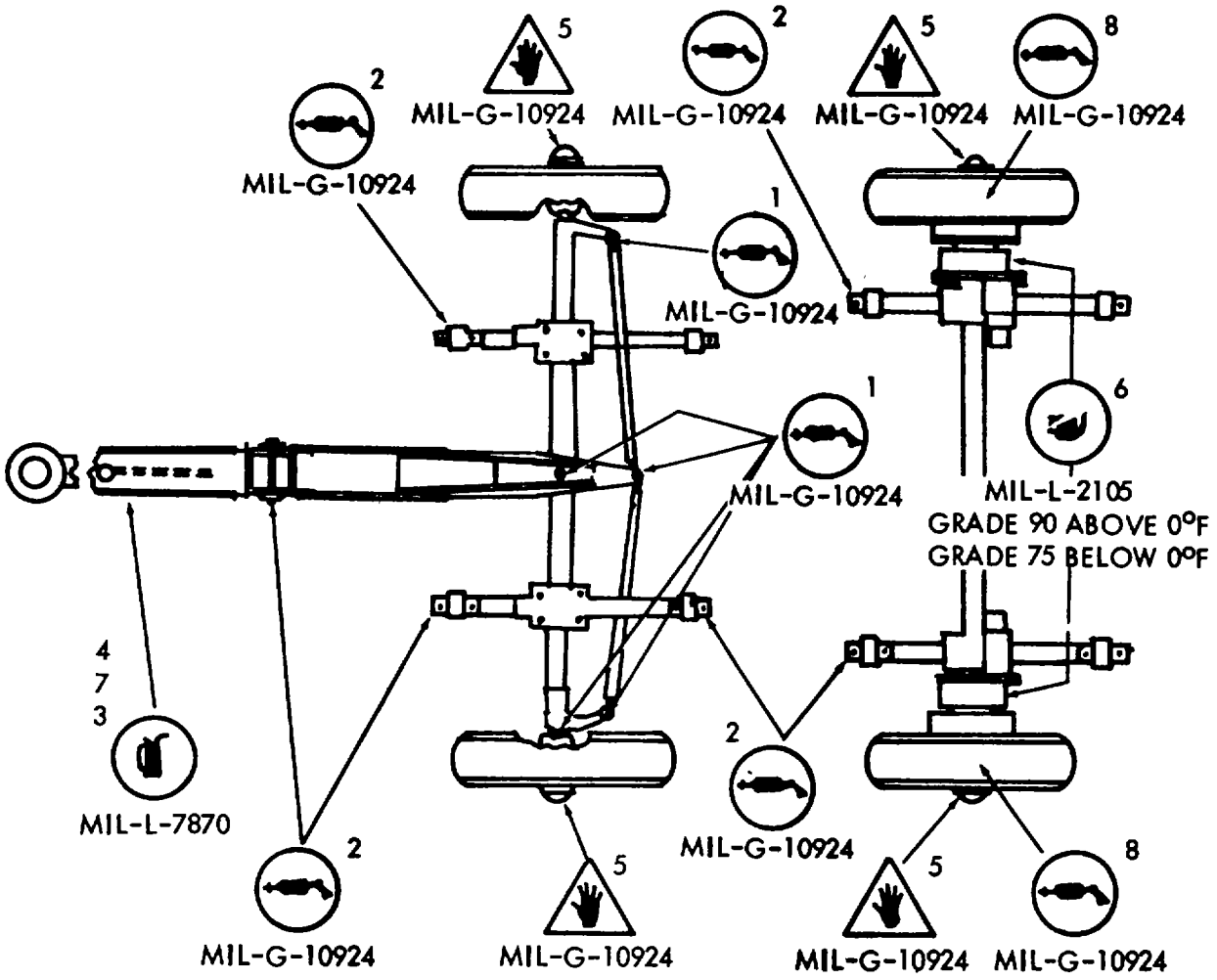
g. The R5 adjustment is for use in PARALLELING. Adjust R5 on both sets for operation without "hunting" while units are in parallel.

4-21. Lubrication

Lubricate the service unit components and assemblies in accordance with table VII (fig. 4-10).

Table VII. Lubrication

Component or assembly	*Lubricating internal*	*Lubricant specification*	*Lubrication point and application*
Engine crankcase	100 Hours	Series 3, MIL-L-45199 SAE 30 above 100 F SAE 10 below 10° F (to--25° Ft.	Drain and refill. Replace oil filter element. See paragraph 4-12.
Access doors	100 Hours	MIL-L-7870 or equivalent.	Apply several drops to hinges and fasteners.
Brake linkage	100 Hours	MIL-L-7870 or equivalent.	Apply several drops to lever ratchet and pivots.
Drive wheel gearboxes	100 Hours	MIL-L-2105 or equivalent. Above 0° F; SAE 20W, Below 0° F; SAE 10W.	Remove fill plug to check level. Add if required to fill plug level.
Rear wheel-drive pins	100 Hours	MIL-G-10924	Two lube fittings (1 per wheel).
Front and rear spring shackles	100 Hours	MIL-G-10924	One lube fitting at each spring.
Air cleaner	100 Hours	MIL-L-45199 (same as engine crankcase).	Empty and clean oil cup and filters. Refill.
Trailer wheels	250 Hours	MIL-G-10924 or equivalent.	Hand pack wheel bearings.
Wheel spindles	250 Hours	MIL-G-10924 or equivalent.	Apply to lube fittings on spindles, tie rod ends, and steering mechanism with grease gun.
Front wheel steering linkage	100 Hours	MIL-G-10924	Eight lube fittings.
Propulsion control linkage	300 Hours	MIL-L-7870	Oil at each pivot point.
Cooling system	Weekly		Check level in radiator.
Cooling system	180 Days		Drain, clean, flush, and refill with clean water or solution of water and ethylene glycol.
Radiator	Weekly		Using a Military approved cleaning solvent and compressed air, clean radiator fins of dirt and grease.



FREQUENCY SYMBOLS

100 HOURS OR 30 DAYS | SEMI-ANNUALLY | 500 HOURS OR 5 MONTHS | 300 HOURS OR 90 DAYS

AV036673

1. STEERING LINKAGE (8 LUB FITTINGS).
2. SPRING SHACKLES.
3. TOWBAR SPRINGS AND PIVOT PINS, HANDBRAKE PINS AND LINKAGE
4. PROPULSION CONTROL LINKAGE.
5. WHEEL BEARINGS.
6. GEAR BOXES.
7. BRAKE LINKAGE.
8. DRIVE PINS.

DOOR HINGES, LATCHES AND KNOBS (NOT ILLUSTRATED)(MIL-L-7870)(100 HOURS OR 30 DAYS).

Figure 4-10. Lubrication

SECTION V

TROUBLESHOOTING

5-1. Troubleshooting

The service unit operator should, familiarize himself with the operating characteristic. of major components in order to readily recognize and remedy ordinary faults due to either. incorrect operating procedures or component malfunctions. The information in table VIII is provided to enable the operator to identify and locate troubles and take the necessary corrective action. It is stressed that any evidence of malfunction, however minor in character, should be investigated and corrected before it develops into a major fault which may immobilize the service unit for lengthy and costly repairs. Reference to data contained in the preceeding sections of this manual will be helpful in locating and remedying malfunctions.

Table VIII. Troubleshooting Guide

	Probable cause	
Trouble	***FAULT INDICATIONS AND TROUBLES***	***Possible remedy***
Undervoltage or overvoltage fault indication.	Generator no-load voltage too low or too high.	Reset AC VOLTAGE ADJUST control (40, fig. 3-11.
	Malfunction in voltage regulator.	See VOLTAGE REGULATOR this section.
Overfrequency or underfrequency fault indication.	Incorrect drive speed. Engine speed not governed properly.	Check for engine malfunction. Check governor.
Fuel or water fault indication.	Fuel level in tank too low	Fill fuel tank.
	Engine coolant temperature above 215 degrees F.	See DIESEL ENGINE, this section.
	Low fuel level switch (S22) defective.	Replace switch.
	Engine overtemperature switch (S21) defective or set too low.	Readjust switch or replace.
Overspeed or oil fault indication.	Oil pressure switch (S20) defective or check valve about gage.	Replace switch. Dirt in check valve.
	Engine malfunction	See DIESEL ENGINE this section.
Engine does not shut down when an engine fault occurs.	Shutdown solenoid (LII binding or defective.	Free operation of LI or replace.
Low boost pressure fault indication.	Low hydraulic fluid supply.	Check and refill.
	Defective boost pump	Repair or replace boost pump.
High pressure filter indicator lights.	Clogged high-pressure filter	Clean high pressure filter. See paragraph 4-4. Clean or replace secondary element.
Pump case filter indicator lights	Clogged pump case filter.	Clean pump case filter. See paragraph 4-7.
Low pressure filter indicator lights.	Clogged low pressure filter	Clean low pressure filter. See paragraph 4-5.
High fluid temperature indicator lights.	Defective temperature gage	Replace.
	Temperature controller improperly set.	Adjust temperature controller. See paragraph 4-3.
Defective thermoswitch	Replace thermoswitch.	
	STARTING PROCEDURE TROUBLES	
Engine will not crank	Low accumulator pressure	Charge system as specified in paragraph 4-13.
	Hydraulic starting system not operating properly.	See HYDRAULIC STARTING SYSTEM, this section.
	Internal seizure in engine.	See DIESEL ENGINE, this section.
Engine cranks but will not start	Engine malfunction	See DIESEL ENGINE, this section.

Table VIII. Troubleshooting Guide (Cont)

Trouble	*HYDRAULIC SYSTEM*	*Possible remedy*
	OPERATING TROUBLES	
Hydraulic pump fails to deliver sufficient volume.	Incorrect setting of pump volume control.	Set pump volume control correctly. See paragraph 3-18.
	Bypass valve open.	Close bypass valve.
	High-pressure relief valve or compenastor set too low.	Correct setting of high-pressure relief valve. See paragraph 3-18.
Hydraulic pump fails to compensate.	Compensator control valve improperly adjusted.	Adjust compensator control valve to proper setting. See paragraph 3-18
	Compensator control valve inoperative.	Replace compensator control valve.
Service unit fails to deliver sufficient pressure.	Malfunction of high-pressure relief and / or incorrect setting.	Check high-pressure relief valve setting paragraph 3-18. Replace defective valve.
	Bypass valve open or leaking.	Close bypass valve. Replace leaking valve.
System pressure too high	High-pressure relief valve improperly adjusted.	Adjust high-pressure relief valve to proper setting for specified aircraft. (para 3-18).
	High-pressure relief valve inoperative.	Replace high-pressure relief valve.
	Compensator control valve set too high.	Adjust setting of compensator Control valve. See paragraph 3-18.
	HYDRAULIC STARTING SYSTEM	
Charging pump fails to raise pressure.	Air in system.	Purge system.
	Low fluid level.	Add fluid.
	Defective unloader valve.	Repair or replace valve.
	Drive belt loose or defective	Adjust belt tension. Replace defective belt. See paragraph 4-9.
	Suction line plugged.	Remove and clean suction line.
	Hand pump bypass valve leaking.	Tighten or replace bypass valve.
Hand pump fails to charge system.	Suction line plugged	Remove and clean suction line.
	Bypass valve open	Close bypass valve.
	Dirt in pump.	Clean ball seats and replace balls and spring. If still defective, replace pump.
	Piston seal rings damaged	Replace seal rings.
	Defective bypass valve.	Repair or replace bypass valve.
Starting motor does not crank engine at sufficient speed to start.	Inlet line plugged.	Remove and clean inlet line.
	Cold engine.	Use ether start.
	Fluid leakage. Pressure too low	Check all components, fittings and hose. Tighten or replace defective parts.
	Start valve not opening fully	Remove any obstruction preventing sufficient control valve handle travel.
Cranking cycle too short.	Accumulator not fully charged	Charge to 3000 psi using hand pump.
	Defective accumulator	Repair or replace accumulator.
	Defective unloader.	Replace unloader on charge pump.
	Leakage in hydraulic starting motor.	Disassemble motor. Check for cracked pistons or barrel and damaged seals.
Loss of fluid pressure when engine is not running.	Fluid leakage.	Check all components, fittings and hose. Tighten or replace any defective parts.
	Defective starting valve.	Repair or replace starting valve.
	Defective valve in charging pump or hand pump.	Replace.
	Loss of accumulator precharge.	Check air valve, accumulator seal rings and all connections for leaks. Repair or replace as necessary.

Table VIII. Troubleshooting Guide (Cont)

Trouble	*HYDRAULIC STARTING SYSTEM (Cont)*	*Possible remedy*
	Hand pump bypass valve leaking.	Tighten or replace bypass valve.
High pressure in system	Defective gage.	Replace gage.
	Defective unloading valve	Clean, adjust, or replace unloading valve.
	DIESEL ENGINE	
Engine fails to turn	Water in cylinder.	Remove fuel injectors and check.
	Internal seizure.	Remove fuel injectors. Hand crank engine. If engine does not turn easily, seizure due to internal damage is indicated.
Engine turns but will not start or starts hard.	Lack of fuel.	Refill tank; bleed system. See paragraph 4-19.
	Air in fuel.	Seal incoming fittings.
	Defect in fuel injection pump	Repair or replace fuel injection pump. See paragraph 4-16.
	Blower belts broken or slipping.	Tighten or replace.
	Engine oil too heavy.	Change oil.
	Improper fuel	See table I.
	Intake or exhaust systems clogged.	Clean systems.
	Low compression.	Test compression.
	Incorrect compression ratio	Test and rebuild engine.
Engine does not develop full power.	Water in fuel.	Drain engine fuel system. Change fuel filter, paragraph 4-6. Refill with fuel oil and prime system.
	Fuel filter clogged	Clean fuel filter. See paragraph 4-
	Air cleaner clogged.	Remove and clean air cleaner. See paragraph 4-8.
	Poor fuel.	Drain and replace fuel oil.
	Injection pump not properly timed.	Time injection pump. See paragraph 4-17.
	Injection pump not operating properly.	Remove, check, repair or replace injection pump. See paragraph 4-16.
	Injectors not functioning properly.	Remove and repair injectors. See paragraph 4-18.
	Blower not functioning properly	Adjust belts. See paragraph 4-9.
	Cylinder head gasket leaking	Replace gasket.
	Exhaust back pressure too high	Check and remove restrictions in exhaust system.
	Rings worn or broken	Check for worn or broken rings.
Uneven running	Air in fuel system.	Bleed air from fuel system and check all fuel lines and connection for leaks.
	Faulty injector.	Remove and repair or replace. See paragraph 4-18.
	Incorrect timing of injection pump.	Time injection pump. See paragraph 4-17.
	Defective injection pump	Remove and repair or replace injection pump. See paragraph 4-
	Low compression	Check compression. Rebuild or repair engine.
	Gummy or sticky injection pump delivery valve or plunger.	Remove end repair injection pump. See paragraph 4-16.
	Coolant temperature below normal.	Remove and test thermostat. See paragraph 4-15.
Engine knocks	Air in fuel system	Bleed air from system.
	Injection pump timing incorrect	Time injection pump. See paragraph 4-17.
	Incorrect engine temperature	Keep temperature in working range.
	Access ether in air box.	Ether cutoff switch defective. Replace. Leaky starting aid system.
	One or more cylinders misfiring	Locate and correct cause. Check injector.

Table VIII. Troubleshooting Guide (Cont)

Trouble	*DIESEL ENGINE (Cont)*	*Possible remedy*
	Carbon deposits in combustion chamber.	Remove carbon.
Loose connecting rod.		Tighten connecting rod.
Engine misses	Air in fuel pump	Bleed air from fuel system and check all fuel lines and connections for leaks.
	Poor fuel.	Drain tank and refill with clean fuel.
	Injection nozzle valve dirty	Remove and clean nozzle valve. If defective, replace with serviceable unit. See paragraph 4-18.
	Insufficient air to engine.	Remove and clean air cleaner and air cleaner pipes.
	Blower not operating properly	Check and adjust belts. See paragraph 4-9.
Low compression	Cylinder head gasket leaking	Install new gasket
	Rings worn, broken or cracked	Check rings and replace.
	Cylinder sleeves worn.	Install new sleeves.
Excessive oil consumption	Oil level in crankcase too high	Maintain proper oil level.
	Oil seals or gaskets leaking	Replace.
	Piston rings not seating.	Install new rings.
	Piston rings worn or broken	Replace rings.
	Cylinder sleeves worn.	Install new sleeves.
Low oil pressure	Defective gage.	Replace.
	Oil level low.	Add oil.
	Oil diluted.	Change oil
	Oil cooler bypass valve defective.	Clean or reseat.
	Main oil gallery bypass defective.	Clean, reseat, or shim.
	Oil pump system defective	Overhaul.
	Worn crankshaft	Recondition crankshaft.
	Worn bearings	Replace bearings.
Engine overheats	Faulty gage	Replace gage.
	Insufficient water in cooling system.	Fill cooling system.
	Water hose collapsed	Replace hose.
	Fan and water pump belt slipping.	Adjust or replace belt.
	Cooling system clogged	Clean out radiator and engine.
	Defective thermostat	Remove and heat thermostat. See paragraph 4-15.
	Water pump defective	Repair or replace water pump.
Engine smokes black	Not enough air	Clean air cleaner, adjust blower belts.
	Fuel system out of time	Time fuel injection pump.
	Injection nozzle dirty	Clean or replace.
Engine smokes white	Low engine temperature	Defective thermostat; test and replace. See paragraph 4-15.
	Incorrect injection pump timing	Set timing. See paragraph 4-17.
	Low compression	Test; repair or overhaul.
Engine smokes blue	Too much oil in crankcase	Drain to proper level.
	Engine oil diluted	Change oil.
	Worn or badly scored cylinder liner.	Replace liner.
Engine too cold	Faulty gage	Replace.
	Thermostat defective	Test and replace. See paragraph 4-15.
Engine speed runs away	Air cleaner overfilled with oil	Drain to proper level.
	Oil seal in blower leaking	Replace oil seals or blower.
	AC AND DC OUTPUT TROUBLES	
No output from ac cable	Circuit breaker (CB1) is open	Reset or replace if defective.
	AC OUTPUT ON switch in-operative.	Replace switch (S4).
	Relay (K1) defective	Replace relay (K1).
No output from dc cable	Circuit Breakers (CB1 or CB2) open.	Reset or replace if defective.
	Malfunction in dc converters	Repair or replace dc converters.
	Relay (K3) defective.	Replace relay (K3).

Table VIII. Troubleshooting Guide (Cont)

Trouble	*AC AND DC OUTPUT*	*Possible remedy*
	TROUBLES (Cont)	
	DC OUTPUT ON switch in - operative.	Replace switch (S6).
Generator voltage unstable or regulation too fast or too slow.	Malfunction in voltage regulator	Adjust or repair voltage regulator. See VOLTAGE REGULATOR. this section.
De current limiting ON when switch (S7) is in DC SERVICE position.	Defective relay (K2	Replace relay (K2).
Field does not flash and no indication of current draw on charging meter.	Field flash relay (K7) defective.	Replace relay (K7).
	Defective tachometer power unit (TPU) or tachometer generator (G3).	Replace power unit or generator.
Generator field will not sustain itself.	Defective relay (K8)	Replace relay (K8).
	Malfunction in voltage regulator.	See VOLTAGE REGULATOR, this section.
Electrical meters inoperative	Loose or broken lead	Repair or replace.
	Defective meter	Check against a standard meter and replace if required.
	Defective current transformer (CT1 through CT3).	Replace defective current transformer.
	PROPULSION SYSTEM	
Warning horn sounds when unit is being self-propelled.	Towbar switch (S19) inadvertently actuated or defective	Make sure lunette flapper is centered in eye. Replace defective switch (S19).
Slow operation of propulsion motors	Worn motor	Replace worn parts or motor.
	Pump volume control not set at maximum.	Reset volume control.
Propulsion motor will not turn	Shaft seized in housing	Replace housing set
	Broken shaft	Replace shaft.
	ETHER STARTING SYSTEM	
System does not supply ether to engine.	Ether cylinder empty	Replace with full cylinder.
	Clogged filter screen	Clean filter screen.
	Clogged tubing or manifold fitting.	Use compressed air to clean tubing or replace tubing. Blow orifice of manifold fitting clean with compressed air.
	Defective solenoid (L4)	Replace defective solenoid.
	VOLTAGE REGULATOR	
Generator will not build up when flashed.	Blown fuses, (1FU, 2FU, 3FU, fig. 1-8.)	Replace blown fuses.
	Open silicon controlled rectifiers.	Replace defective rectifiers.
	Shorted or open diode (13D, fig. 1-8.	Replace diode.
	Printed circuit board (28, fig. 1-51 inoperative.	Replace board.
	Open filter chokes (1FN, 2FN, 3FN).	Replace defective filter chokes.
Fuses continue to blow	Shorted silicon controlled rectifier (1SCR, 2SCR, 3SCR).	Replace.
	Shorted diode (13D, fig. 1-81.	Replace.
	Shorted filter capacitors (1FN, 2FN, 3FN, 9C).	Replace.
Voltage goes to maximum and can not be controlled.	Shorted silicon controlled rectifies (1SCR, 2SCR, 3SCR).	Replace.
	Faulty AC VOLTAGE ADJUST (40, fig. 3-1).	Replace
	Printed circuit board inoperative (28, fig. 1-5).	Replace.
	Gain control (29, fig. 1-5) set too high.	Reduce setting. See paragraph 4-20.
Generator voltage	Gain control (29, fig. 1-5) set too high.	Reduce setting. See paragraph 4-20.

Table VIII. Troubleshooting Guide (Cont)

Trouble	*Probable cause*	*Possible remedy*
	VOLTAGE REGULATOR (Cont)	
	One fuse (1FU, 2FU, 3FU) blown.	Replace blown fuse.
Generator regulation excessive, response sluggish.	Gain control (29, fig. 1-5) set too low.	Increase setting. See paragraph 4-20.

APPENDIX A ILLUSTRATED PARTS BREAKDOWN

A-1. Scope

This appendix lists all replaceable parts of the service unit in figure and item number sequence.

A-2. Explanation of Columns

The following provides an explanation of columns in the tabular parts list:

a. Illustration Column 1. The *Figure number* subcolumn under the *Illustration* column indicates the figure number on which the item is found. Further, the Item number subcolumn shows the numbers that the item is keyed to on the indicated illustration.

b. Source, Maintenance, and Recoverability Codes (SMR)-(Column 2). Source codes indicate the selection status and source for the listed item, the lowest category of maintenance capable of installing or manufacturing the repair part, and expendability aspects of the repair part. An example of this code is P-O-R. The "P" indicates that the item is a mission stockage list repair part procured and stocked on a national program basis; the "O" indicates that the repair part is authorized to the organizational category of maintenance; the "R" indicates the part is an expendable and recoverable item.

c. Federal Stock Number-(Column 3). This column lists the Federal stock number assigned by the Cataloging Division, Armed Forces Supply Support Center.

d. Description-(Column 4). This column lists the Federal item name and any additional description required for supply operations. The material agency or manufacturer's part number is parenthetically listed at the end of each nomenclature.

e. Quantity Incorporated in Unit--(Column 5). The quantity shown in this column indicates the number of the listed item required for the particular use indicated. The quantity does not reflect the total quantity of the part required for the service unit.

A-3. Manufacturer's Symbols

Symbol	*Manufacturer*
00624	Aeroquip Corp., Aircraft Division, Jackson Plant, Jackson, Mich.
01843	American Bosch Div. of American Bosch Arma Corp., Springfield, Mass.
02639	Industrial Power Components, Division of Industrial Components and Materials Group, General Electric Co., Schenectady, N.Y.
03670	Ansul Chemical Co., Marinette, Wisc.
04009	Arrow-Hart and Hegeman Electric Co., Hartford, Conn.
04034	Gems Co., Inc. Newington, Conn.
05419	Barmatic Products Co;, Cleveland, Ohio
06008	New Departure Division of General Motors Corp., Meriden, Conn.
07707	United Shoe Machinery Corp., Fastener Division, Shelton, Conn.
08752	Parker Hydraulics Div of Parker Hannifin Corp, Cleveland, Ohio
09922	Burndy Corp., Norwalk, Conn.
10001	Bureau of Naval Weapons
12014	Chicago Rivet and Machine Co., Bellwood, Ill.
12027	Kline Mfg. Co., Galena, Ohio
12670	Electro Magnetic Industries, Inc., Sayville, N.Y.
14414	Trojan Division of Yale & Towne Mfg. Co,Batavia, N.Y.
15233	Cerlist Diesel Inc., Burlington, N.C.
24455	Lamp Division of Consumer Products Group, General Electric Co., Syracuse, N.Y.
28835	The Hobart Brothers Co., Troy, Ohio
38508	Marsh Instrument Co., Div of Colorado Oil and Gas Corp., Skokie, Ill.
43334	New Departure Div of General Motors Corp., Bristol, Conn.
46529	Perfex Corp., Milwaukee, Wise.
47296	William S. Pine Co., Los Angeles, Calif.
53591	Schwitzer Corp., Indianapolis, Ind.
60380	The Torrington Co., Torrington, Conn.
66295	Wittek Mfg. Co., Chicago, Ill.
70417	Amplex Div. of Chrysler Corp. Detroit, Mich.
70485	Atlantic India Rubber Works, Inc., Chicago, Ill.
70793	American Chain and Cable Co., Inc., Automotive and Aircraft Division, Los Angeles, Calif.
71286	Camloc Fastener Corp., Paramus, N.J. 71400 Bussman Mfg.Div of McGraw-Edison Co., St. Louis, Mo.
71744	Chicago Miniature Lamp Works, Chicago, Ill.
71785	Cinch Mfg. Co., Div of United-Carr Fastener Corp., Chicago, I11.
71951	Doray Lamp Co., Inc., Chicago, Ill.
72850	Eclipse Machine Div of Bendix Corp., Elmira, N.Y.
74400	John W. Hobbs Corp., Springfield, Ill.
75915	Littelfuse, Inc., Des Plaines, Ill.
76445	Monroe Auto Equipment Co., Monroe, Mich.
76700	Nelson Muffler Corp., Detroit, Mich.
78118	Split Ball Bearing Corp., Lebanon, N. H.
79136	Waldes Kohinoor, Inc., Long Island City, N.Y.
79160	Vortox Co., Claremont, Calif.
80372	United States Marine Corps
81073	Crayhill, Inc., LaGrange, Ill.
81300	Dayco Corp., Dayton, Ohio
81321	Purolator Products, Inc., Rahway, N.J.

Symbol	*Manufacturer*
81860	Barry Controls Div of Barry Wright Coep., Watertown, Mas.
82121	Electro Switch Corp., Weynouth, Mm.
82240	Simmons Fastener Corp., Albany, N.Y.
82386	Sun Electric Corp., Crystal Lake, Ill.
82484	Sprague Devicer, Inc., Michigan City, Imd.
84760	Hartford Machine Screw Co., Hartford, Conn.
86768	Republic Mfg. Co., Brooklyn, N.Y.
88044	Aeronautical Standards Group, Department of Navy and Air Force, Washington, D.C.
90005	Bendix Filter Div of Bendix Corp., Royal Oak, Mich.
90763	United Carr Fastener Corp., Chicago, Ill.
91435	Kittell Muffler and Engineering Co., Inc. Los Angeles, Calif.
91929	Minneapolis-Honeywell Regulator Co., Micro Switch Division, Freeport, Ill.
92867	Orscheln Brake Lever Mfg. Co., Moberly, Mo.
95026	United Mfg. Co., Cleveland, Ohio
96151	Char Lynn Co., Minneapolis, Minn.
96906	Military Standards
97545	Dukes Co., Inc., Chicago, Ill.
97969	Electric Storage Battery Co., Chicago, Ill.
99238	Air Force Standard Drawings
99246	Ram Meter, Inc., Ferndale, Mich.

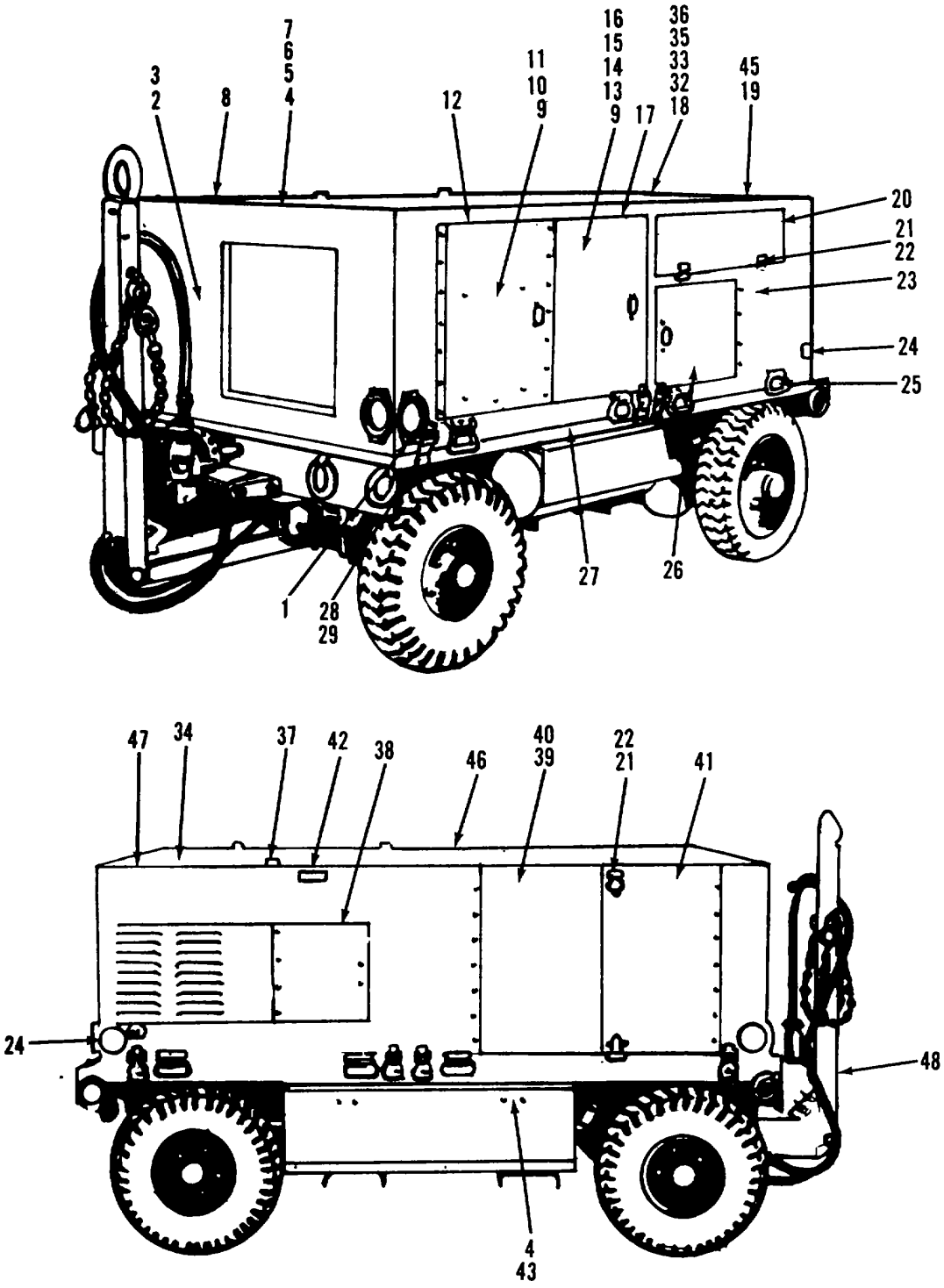


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Figure A-1. Mobile Service Unit (Sheet 1 of 2)

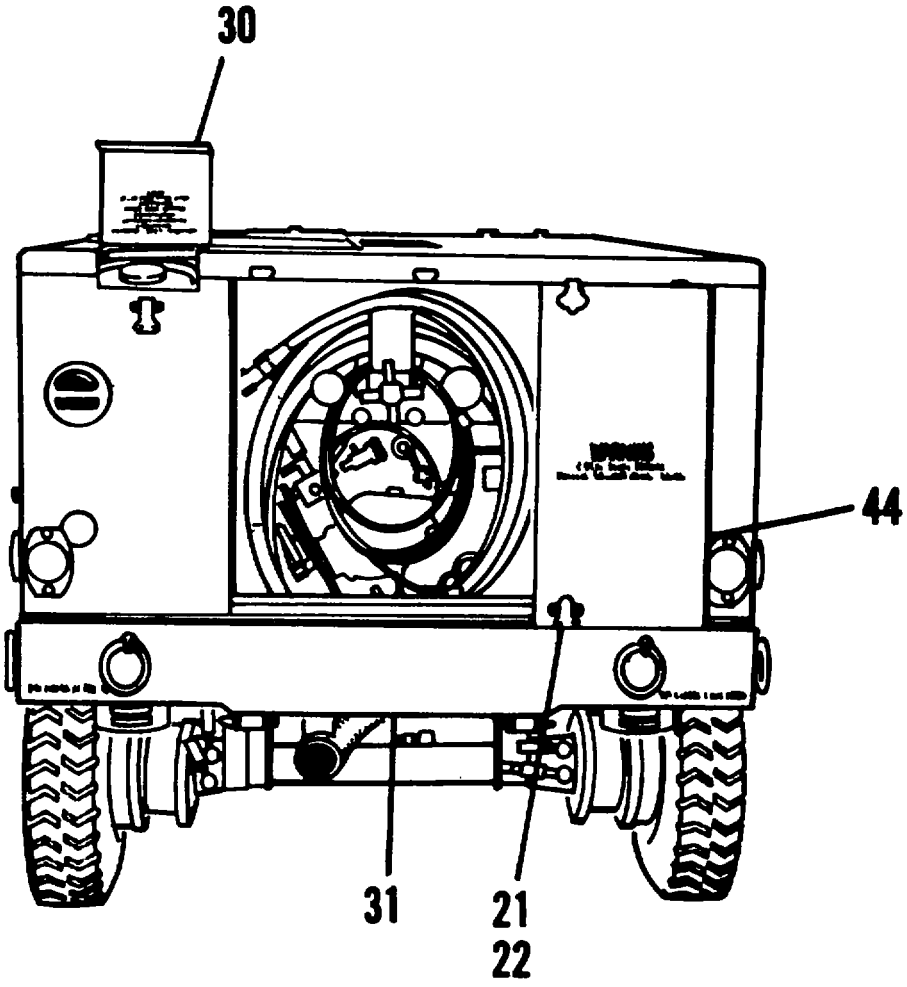

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Figure A-1. Mobile Service Unit (Sheet 2 of 2)

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
MOBILE SERVICE UNIT					
A-1		P1FR	1730-855-6108	MOBILE SB/VICE UNIT (82386) (C520-1000)	1
A-1	-1			REFLECTOR, Amber (71951) (100-0)	4
A-1				BODY (71951) (30090)	1
A-1				BASE (71951) (30091)	1
A-1				LENS, Plastic, amber (71951) (42022)	1
A-1	-2			FIRE EXTINGUISHER (03670) (K-10-E)	1
A-1	-3			PLATE, Backup (82386) (C614-3386)	1
A-1	-4			KNOB (82386) (1414-003)	9
A-1	-5			LATCH ASSY (82386) (1409-504)	9
A-1	-6			SLIDE, Strike (82386) (1409-901)	7
A-1	-7			STRIKE, Latch (82386) (1409-805)	7
A-1	-8			DOOR, Access (82386) (C614-2040-4)	3
A-1	-9			SPRING, Hinge (82386) (C809-177)	2
A-1	-10			LID, Data compartment (82386) (C614-3319)	1
A-1	-11			COMPARTMENT, Data (82386) (C614-3318)	1
A-1	-12			DOOR, Access (82386) (C614-3336)	1
A-1	-13			LAMP, Incandescent 30V, 50A (24455) (50A/RS30V)	2
A-1	-14			COVER, Lamp (82386) (C614-3372)	1
A-1	-15			WRAPPER, Lamp (82386) (C614-3373)	1
A-1	-16			STORAGE COMPARTMENT (82386) (C614-3374)	1
A-1				NUT (71286) (99N10-01A1)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
MOBILE SERVICE UNIT(CONT)					
A-1				RECEPTACLE (71286) (99R10-01A1l)	1
A-1				WASHER, Lock (71286) (99W10-01A1)	1
A-1				STUD, Fastener (71286) (99S10-03A1)	1
A-1				LAMP, Incandescent (24455) (356R) (Spare)	1
A-1				LAMP, Incandescent (24455) (1251) (Spare)	1
A-1				LAMP, Incandescent (24455) (656R) (Spare)	1
A-1				LAMP, Incandescent (1683) (Spare)	1
A-1				FUSE, Type ABC, 12A, 250V (Spare)	1
A-1				FUSE (82386) (739-022)(Spare)	1
A-1	-17			DOOR, Access (82386) (C614-1367)	1
A-1	-18			BUMPER, Rubber (70485) (1019)	4
A-1	-19			BOLT, Eye (82386) (2527)	2
A-1	-20			COVER, Control panel (82386) (C614-2038)	1
A-1	-21			HOOK, Latch (82240) (B-1900-334)	11
A-1	-22			LATCH (82240) (B-1900-377)	11
A-1	-23			PLATE, Identification (82386) (4055-5033)	1
A-1	-24			REFLECTOR, Red (71951) (100-0)	4
A-1				BODY (71951) (30090)	1
A-1				BASE (71951) (30091)	1
A-1				LENS, Plastic, red (71951) (42022)	1
A-1	-25			HANDLE, Lift (82386) (C614-3365)	9
A-1	-26			DOOR, Access (82386) (C614-2040-1)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
MOBILE SERVICE UNIT(CONT)					
A-1	-27			CHANNEL, Rubber (82386) (720-002)	AR
A-1	-28			HOOK, Latch (82386) (2397-102)	8
				(ATTACHING PARTS)	
A-1				RIVET, Solid (82386) (608-5002)	4
				---*---	
A-1	-29			CLIP, Cable assy (82386) (3994-5005)	2
A-1	-30			COVER, Fill (82386) (C614-2039)	1
A-1	-31			BUMPER'(82386) (1489-2)	1
A-1	-32			PLATE, Instruction (82386) (C520-3000)	1
A-1	-33			BOLT, Eye (82386) (2527)	2
A-1	-34			DOOR, Access (71286) (KM713-12-064)	1
				(ATTACHING PARTS)	
A-1				RIVET, Blind (80372) (SD32BS-DCD)	2
				---*---	
A-1	-35			STRAP ASSY (82386) (0144-5002) 1	1
A-1	-36			STRAP ASSY (82386) (0144-5001)	1
A-1	-37			BOLT, U (82386) (124-002)	2
A-1	-38			DOOR, Access (82386) (C614-2040-2)	1
A-1	-39			LIGHT ASSY, Extension (82386) (6004-067)	1
A-1	-40			DOOR, Access (82386) (C614-2047)	1
A-1	-41			DOOR, Access (82386) (C614-2048)	1
A-1	-42			SLEEVE, Air cleaner (82386) (C614-8007)	1
A-	-43			SLIDE, Strike (82386) (1409-903)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
MOBILE SERVICE UNIT(CONT)					
A-1	-44			DOOR, Access (82386) (0614-2037)	1
A-1	-45			PIATE, Instruction (82386) (C520-3001).....	1
A-1	-46			HOUSING ASSY, Front (82386) (C614-2041)	1
A-1	-47			HOUSING ASSY, Rear (82386) (C614-2015).....	1
A-1	-48			INTERINAL COMPONENTS ASSEMBLY ..... (82386) (C614-1001) (See figure A-2)	1

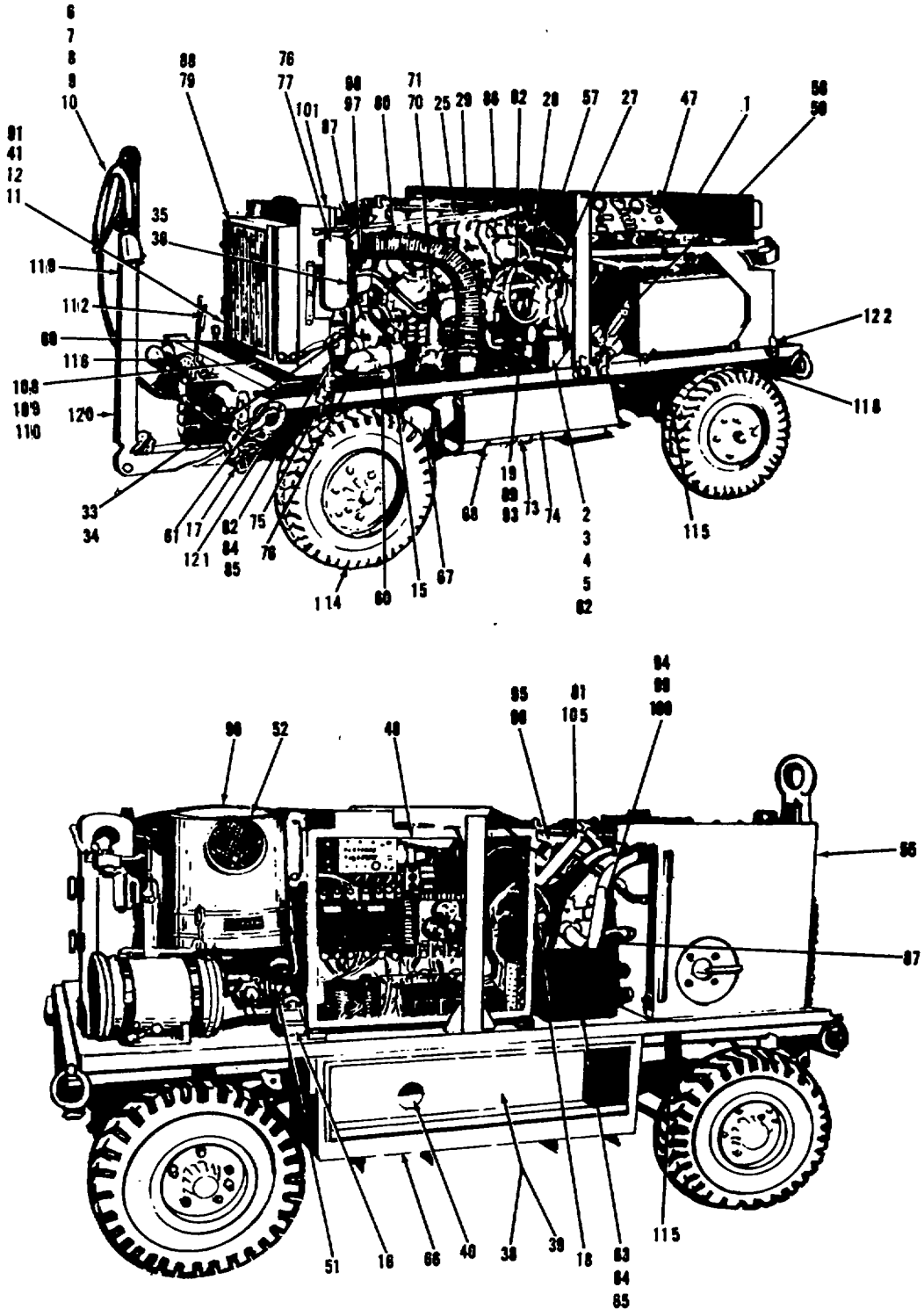

Figure A-2. Internal Components Assembly (Sheet 1 of 2).

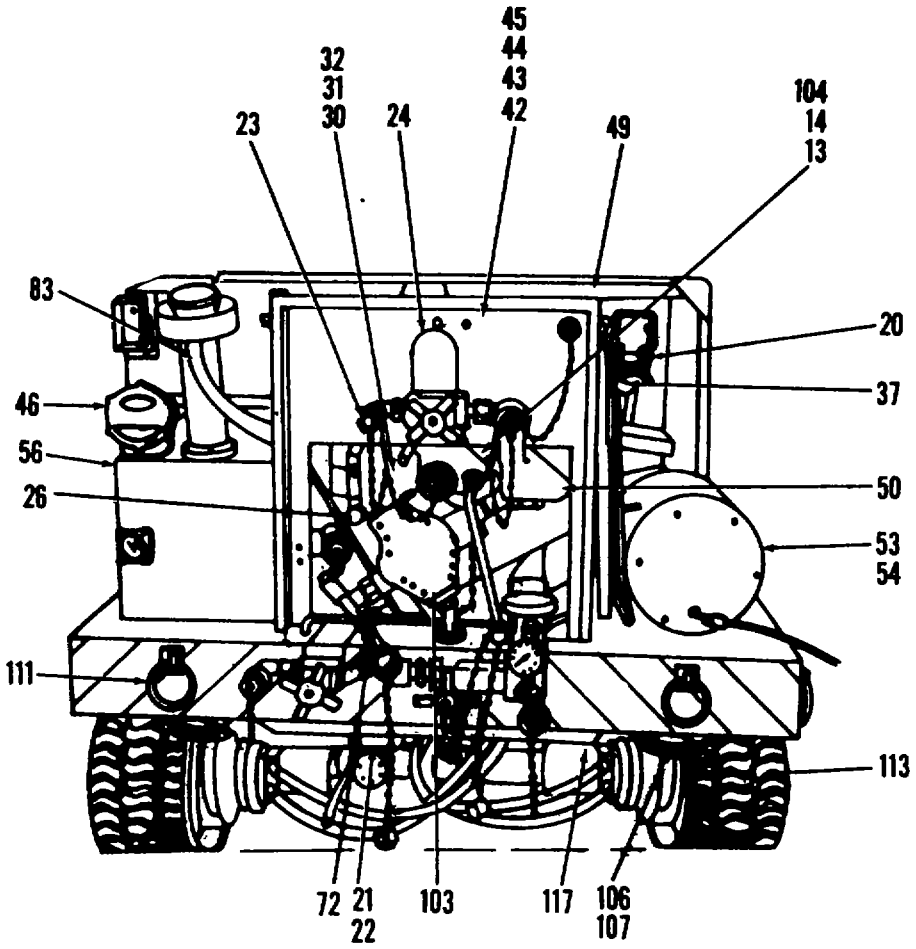

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Figure A-2. Internal Components Assembly (Sheet 2 of 2).

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY					
A-2				**INTERNAL COMPONENTS ASSEMBLY** ..... (82386) (0C614-1001) (See 48, figure A-1)	REF
A-2	-1			HYDRAULIC PIPING ASSEMBLY (82386) ..... (C614-3003) (See figure A-3)	1
A-2	-2			COUPLING HALF ASSEMBLY (00624) ..... (155-S5-12D) (See figure A-4	1
A-2	-3			COUPLING HALF ASSEMBLY (00624) ..... (145-S5-16D) (See figure A-4)	1
A-2	-4			COUPLING HALF ASSEMBLY (00624) ..... (TA155-S4-12D) (See figure A-4)	1
A-2	-5			COUPLING HALF ASSEMBLY(00624) ..... (A145-S4-16D) (See figure A-4)	2
A-2	-6			SHELL, Connector (82386) (4162-542)	3
A-2	-7			FERRULE (82386) (4162-541)	3
A-2	-8			WASHER, Connector (82386) (4162-540).....	3
A-2	-9			SHELL, Connector (82386) (4162-539)	3
A-2	-10			CABLE ASSEMBLY (82386) (644-510) ..... ATTACHING PARTS)	1
A-2				CLIP (82386) (4162-545)	2
A-2				CLAMP, Loop (82386) (4534-) ..... ---*---	1
A-2	-11			COVER, Capacitor bank (82386) (C614-3392).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2	-12	X2H		CAPACITOR, Fixed 5000 MFD, 50 WVDC ..... (82386) (679-275) (ATTACHIG PARIS)	6
A-2				STRAP, Capacitor bank (82386) (C614-3359)..... ---*---	1
A-2				BRACKET, Mounting (82386) (C614-3357)	1
A-2	-13			DUCT (82386) (3155-109) ..... (ATTACHING PARTS)	2
A-2				CLAMP, Loop (66295) (H-56H) ..... ---*---	4
A-2	-14			PORT GENERATOR, Air inlet (82386) ..... (0614-3316)	2
A-2	-15			TACHOMETER TRALSMITTER (82386) ..... (7077-0001) (ATTACHING PARTS) ---*---	1
A-2				DRIVE TANG, Tachometer (82386) (1285-15A)	1
A-2	-16	P1F		SWITCH, Temperature (82386) (4064-4)	1
A-2	-17			CHAIN ASSEMBLY (82386) (C614-3369)	2
A-2				HOOK, Swivel (82386) (8000-921)	1
A-2				LINK, Swing (82386) (2514-5003)	1
A-2				TUBING, Vinyl 29 inch (82386) (669-187)	1
A-2				CHAIN 28 inch (82386) (8000-922)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2	-18			HOSE ASSEMBLY (00624) (A1316-12-0520).....	2
A-2	-19			FILTER, Oil (76700) (F-1106) (See figure A-5).....	1
A.-2	-20	P1F		SWITCH, Pressure (82386) (A361-107150)	1
A-2	-21	P1F		SWITCH, Pressure (82386) (8012-003).....	1
A-2	-22	P1F		SWITCH, Pressure (82386) (8011-003).....	1
A-2	-23			MANIFOLD ASSEMBIY (82386) (C614-3364)	1
				(See figure A-6)	
				(ATTACHING PARTS)	
A-2				SCREW, Cap, hexagon head (96906).....	4
				(MS90726-8)	
A-2				NUT, Plain, hexagon (96906) (M35690-422)	4
A-2				WASHE, Lock (96906) (M35338-44)	4
A-2				WASHER, Flat (96906) (M627183-11)	4
				---*---	
A-2	-24			BRACKET, Mounting, manifold (82386)	1
				(C614-3360)	
A-2	-25			CLAMP, Hose	4
A-2	-26	X2H		VALVE, Relief, HP (82386) (A361-100).....	1
A-2	-27			HOSE (82386) (5506-008)	1
A-2	-28			HOSE, Pressure, buddy start (82386)	1
				(5500-036)	
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				BRACKET, Mounting (82386) (C614-3342).....	1
				---*---	
A-2	-29			FILTER, Fluid (81321) (50727) (See figure A-7:.....	1
				(ATTACHING PARTS)	
				---*---	
A-2				BRACKET, Mounting (82386) (C614-3350)	1
A-2	-30			CABLE ASSEMBLY (82386) (C614-3345).....	1
A-2				TERMINAL, Lug (82386) (676-251)	1
A-2				CONNECTOR (82386) (3841-1)	1
A-2				CABLE (82386) (671-183)	1
A-2	-31			SHEAVE, Groove (82386) (8017-053).....	1
A-2	-32			SHEAVE-BRACKET ASSEMBLY (82386)	1
				(C614-3347)	
A-2				SHEAVE (82386) (C614-3346).....	1
				(ATTACHING PARTS)	
A-2				SCREW, Machine (82386) (410-4617Z)	1
A-2				WASHER, Flat (96906) (MS27183-4)	2
A-2				NUT, Nylock (88044) (AN365-1032)	1
A-2				SCREW, Cap (82386) (0686-5005)	2
				---*---	
A-2				BRACKET, Mounting (82386) (C614-3349).....	1
A-2	-33			BELT, V (81300) (AX42)	1
A-2	-34			PULLEY, Groove (82386) (659-037)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2	-35	P1F		PUMP, Piston (01843) (RPA-308090) ..... (See figure A-8) ATTACHING PARTS)	1
A-2				SCREW (82386) (675-401)	1
A-2				NUT, Plain, hexagon (96906) (MS 35690-602)..... ---*---	1
A-2	-36			BRACKET, Pump mounting (82386) (C614-3352).....	1
A-2	-37			FILTER (88044) (AN6235-2A).....	1
A-2	-38	P1F		CABLE ASSEMBLY, AC (82386) (644-505)	1
A-2	-39	P1F		CABLE ASSEMBLY, DC (82386) (644-506)	1
A-2	-40			BUSHING, Strain relief (82386) (501-051) ..... (ATTACHING PARTS)	1
A-2				CLAMP, Loop (82386) (4656-035)..... ---*---	1
A-2	-41	P1H		VALVE, Temperature regulator (82386) ..... (329-020)	1
A-2	-42	P1F		HOSE ASSEMBLY (96906) (MS28741-16-3000)	1
A-2	-43			HOSE ASSEMBLY (82386) (5506-5002).....	1
A-2	-44			HOSE ASSEMBLY (82386) (5507-5001).....	1
A-2	-45			HOSE ASSEMBLY (96906) (MS28741-4-3000)	1
A-2	-46			STOP LIGHT, Vehicle (82386) (848-008)..... (ATTACHING PARTS)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				SCREW, Cap, hexagon head (96906)..... (MS35291-58)	2
A-2				WASHER, Lock (96906) (IM35338-46).....	2
A-2				WASHER, Flat (96906) (NM15795-214)..... ---*---	2
A-2	-47			PANEL, Control (82386) (C614-3300) (See..... figure A-9) (ATTACHING PARTS)	1
A-2				SCREW, Cap, hexagon head (96906)..... (Ms90725-34)	8
A-2				NUT, Plain , hexagon (96906) (MS35690-502).....	8
A-2				WASHER, Lock (96906) (bC35338-45).....	8
A-2				WASHER, Flat (96906) (MS15795-212)..... ---*---	8
A-2	-48			ELECTRICAL BOX ASSEMBLY (82386)..... (C614-500i) (See figure A-10) (ATTACHING PARTS)	1
A-2				SCREW Cap, hexagon head (96906)..... (MS90725-34)	3
A-2				NUT, Plain, hexagon (969306) (MS35690-502).....	2
A-2				WASHER, Lock (96906) (ilf,35338-145).....	3
A-2				WASHER, Flat (96906) (MS15795-212)..... ---*---	3

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2	-49			BIN, Hose, storage (82386) (C614-1070)	1
				(ATTACHING PARTS)	
A-2				BOLT, U (82386) (J24-017MZ)	2
				---*---	
A-2	-50			FILTER, High pressure (01414)	1
				(A1ES6814E9716) (See figure A-11)	
				(ATTACHIIG PARTS)	
A-2				BOLT, U (82386) (A840-7077)	1
				---*---	
A-2	-51			MANIFOLD ASSEMBLY, P (82386)	1
				(C614-3320)	
A-2	-52			CLEANER AND SUPPORT (82386) (C614-8000)	1
				(See figure A-12)	
				(ATTACHING PARTS)	
A-2				SCREW, Machine (96906) (MS35239-116)	4
A-2				NUT, Plain, hexagon (96906) (M35690-602)	4
A-2				WASHER, Lock (96906) (NS35338-46).....	4
A-2				WASHER, Flat (96906) (MSS15795-214)	4
				---*---	
A-2	-53			FILTER, Low pressure (82386) (301-091).....	1
				(See figure A-13)	
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				CLAMP, Loop (82386) (A387-1361)	2
				---*---	
A-2	-54			BRACKET, Mounting (82386) (C614-2003)	1
				(ATTACHING PARTS)	
A-2				SCREW, Cap, hexagon head (96906) (MS35292-6).....	4
A-2				NUT, Plain, hexagon (96906) (MS35690-422).....	4
A-2				WASHER, Lock (96906) (MS35338-44)	4
A-2				WASHER, Flat (96906) (MS27183-11).....	8
				---*---	
A-2	-55			TANK ASSEMBLY, Hydraulic (82386)	1
				(C614-1009) (See figure A-14)	
				(ATTACHING PARTS)	
A-2				SCREW, Cap, hexagon head (96906).....	4
				(NS35291-58)	
A-2				WASHER, Lock (96906) (MS35338-46)	4
A-2				WASHER, Flat (96906) (MS15795-214).....	4
				---*---	
A-2	-56			TANK ASSEMBLY, Fuel (82386) (C614-1066)	1
				(See figure A-15)	
A-2	-57			START VALVE MOUNTING ASSEMBLY (82386)	1
				(C614-1057) (See figure A-16)	
A-2	-58	P1F		SWITCH, Selector, valve (82386) (2207-014)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2	-59	P1F		VALVE, Selector (86768) (8052B-12-ES2) ..... (See figure A-17) (ATTACHING PARTS)	1
A-2				SPACER (82386) (401-) ..... ---*---	2
A-2	-60			BRACKET, Mounting (82386) (C614-3337)	1
A-2	-61			CLIP, Handle (82386) (1690-004).....	2
A-2	-62			BRACKET, Mounting (82386) (C614-2014)	1
A-2	-63			TUBE ASSEMBLY, Battery vent (82386) ..... (0669-o204)	1
A-2	-64	P1F	6140-497-1697	BATTERY, Storage (97969) (53033)	1
A-2	-65			BATTERY BOX ASSEMBLY (82386) ..... (C614-2001) (ATTACHING PARTS)	1
A-2				SCREW, Cap, hexagon head (96906)..... (MS35292-6)	4
A-2				NUT, Plain, hexagon (96906) (MS35690-422).....	4
A-2				WASHER, Lock (96906) (MS35338-44)	4
A-2				WASHER, Flat (96906) (MS27183-11)..... ---*---	8
A-2				BOLT, Eye (82386) (2527-004)	2
A-2				WASHER, Flat (82386) (400-66)	4

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				RIVET, (80372) (AD 68 BS)	2
A-2				SPACER (82386) (401-324)	2
A-2				NUT, Wing (96906) (MB35425-14)	2
A-2				WASH., Flat (82386) (400-83MZ)	2
A-2				PAN (82386) (C614-2001-1)	1
A-2	-66			BIN, Storage (82386) (C614-1081)	1
				(See figure A-18)	
				(ATTACHING PARTS)	
A-2				SPACER, Bin (82386) (401-7001)	2
				---*---	
A-2	-67	P1F	1650-403-8678	ACCUMJIATOR (01843) (ACC-20A-211)	1
				(See figure A-19)	
				(ATTACING PARTS)	
A-2				BRACKET, Mounting (01843) (BK200740)	2
				---*---	
A-2	-68			FORK LIFT ASSEMBLY (82386) (C614-1049)	1
A-2	-69			BRACKET, Support (82386) (C614-2013)	1
A-2	-70	P1F		PUMP, Hand (47296) (1000-3-4)	1
				(See figure A-20)	
A-2	-71			BRACKET, Mounting (10001) (61A95-C85)	1
A-2	-72			TAILPIPE (82386) (C614-3343)	1
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				CLAMP (82386) (4656-035)	2
A-2				CLAMP (66295) (H-56H)	1
				---*---	
A-2	-73	X2F		MUFFLER (91435) (7527-SMX3)	1
				(ATTACHING PARTS)	
A-2				CLAMP, Muffler (82386) (4656-034)	2
A-2				STRAP, Hanger (82386) (C614-2007)	2
A-2				CRADLE, Muffler (82386) (C614-2006)	1
				---*---	
A-2	-74			SHIELD, Muffler (82386) (C614-2005)	1
A-2	-75			LATCH ASSEMBLY, Housing (82386)	8
				(C614-3326)	
				(ATTACHING PARTS)	
A-2				SCREW, Machine (96906) (MB35224-66)	16
A-2				NUT, Plain, hexagon (96906) (MB35650-102)	16
A-2				WASHER, Flat (96906) (604-11Z)	16
A-2				WASHER, Flat (96906) (MS27183-8)	16
				---*---	
A-2	-76	P1F		CAN, Ether, spare (82386) (4479-926)	1
A-2	-77			ETHER START ASSEMBLY (TURNER)	1
				(L.P.-1756-2)	
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				CLAMP, Loop (82386) (4479-927).....	1
				---*---	
A-2	-78			BRACKET, Mounting (82386) (C614-3338)	1
A-2	-79			GRILLE, Metal (82386) (C614-3327)	1
A-2	-80			EXHAUST MANIFOLD ASSEMBLY (82386)	1
				(ATTACHING PARTS)	
A-2				NUT, Plain, hexagon (96906) (MS35690-522)	6
A-2				WASHER, Lock (96906) (MS35338-45).....	6
A-2				WASHER, Flat (96906) (MS15795-212)	6
A-2				CLAMP (66295) (H-56H)	2
				---*---	
A-2	-81	P1F		VALVE, Solenoid (86768) (963-F-1/4D2).....	1
A-2	-82			HOSE, Radiator overflow (82386) (669-119).....	1
A-2	-83			HOSE, Overflow (82386) (0669-0205)	1
A-2	-84			HOSE, Radiator drain (82386) (669-119)	1
A-2	-85	P1F		COCK, Drain (82386) (302-001)	1
A-2	-86			BRACE, Radiator (82386) (C614-2002).....	2
A-2	-87			HOSE, Radiator (82386) (3988-010)	2
				(ATTACHING PARTS)	
A-2				CLAMP, Loop (82386) ()4656-011)	4
				---*---	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2	-88	P1F		RADIATOR COOLER ASSEMBLY (46529)	1
				(P-6130)	
				ATTACHING PARTS)	
A-2				BPACKET, Radiator (82386) (C614-1046).....	1
A-2				SCREW CAP, Hexagon head (96906)	4
				(MS90726-8)	
A-2				NUT, Plain, hexagon (96906) (MS35690-422).....	4
A-2				WASHER, Lock (96906) (MS35338-44)	4
A-2				WASHER, Flat (96906) (MS27183-11).....	8
A-2				SHIM (1000) (6IA95-C79)	2
				---*---	
A-2	-89	P1H		PUMP, Fuel, electric (72850) (479029)	1
A-2	-90			HOSE, Engine air inlet (82386) (3155-)	1
				(ATTACHING PARTS)	
A-2				CLAMP, Hose (82386) (4656-019)	2
				---*---	
A-2	-91			BUS BAR (82386)	1
A-2	-92			FUEL INJECTOR RETURN BLOCK ASSEMBLY	1
				(82386) (C614-8021)	
A-2	-93	P1F	2990-018-6881	MOTOR, Start, hydraulic (01843)	1
				(CMD-308068A) (See figure A-21)	
				(ATTACHING PARTS)	
A-2				NUT, Plain, hexagon (96906) (MS35690-622).....	3

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				WASHER, Lock (96906) (MS35338-46)	3
A-2				WASHER, Flat (96906) (MS15795-214)	3
				---*---	
A-2	-94	P1F		SELF-EXCITED' ALTERNATOR (82386)	1
				(8030-011)	
				(ATTACEHING PARTS)	
A-2				SPACER (82386) (C614-3340)	1
A-2				BRACKET MOUNTING (82386) (C614-3348)	1
				---*---	
A-2	-95			MANIFOLD, Intake (82386) (8020-5018)	1
A-2	-96			GASKET, Manifold (82386) (5034-503)	1
A-2	-97	X2F		PULLEY, Groove (81300) (1AC63)	1
				(ATTACHING PARES)	
A-2				KEY, Machine (82386) (277-510)	1
A-2				PIN, Straight, headed (82386) (1672-26)	2
				---*---	
A-2	-98			SHEAVE ADAPTOR (82386) (8017-072)	1
A-2	-99	P1F		BELT, V (82386) (658-071)	1
A-2	-100	X2F		PULLEY, Groove (82386) (659-039)	1
A-2	-101			FAN ASSEMBLY (82386) (0587-5501)	1
A-2	-102			HUB, Fan spacer (10001) (61A95-C36)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2	-103	P1F		PUMP, High pressure (12027) (610541).....	1
				(See figure A-22)	
				(ATTACHING PARTS)	
A-2				NUT, Plain, hexagon (96906) (MS35690-622).....	12
A-2				WASHER, Lock (96906) (MS35338-46).....	12
A-2				WASHER, Flat (96906) (MS15795-214).....	12
				---*---	
A-2	-104	P1F	6115-103-8671	GENERATOR (02639) (5SJ4324P9Y1).....	1
				(See figure A-23)	
				(ATTACHING PARTS)	
A-2				SCREW, Cap, hexagon head (82386).....	4
				(675-5022)	
A-2				NUT, Plain, hexagon (82386) (409-130).....	4
A-2				WASHER, Lock (82386) (604-58).....	4
A-2				WASHER, Flat (82386) (0400-5012).....	8
A-2				BRACE, Isolator (82386) (C614-1045).....	2
A-2		P1H		MOUNT, Resilient (81860) (915-200).....	4
A-2				SCREW, Cap, hexagon head (96906).....	12
				(MS35292-60)	
A-2				NUT, Plain, hexagon (96906) (MS35690-622).....	8
A-2				WASHER, Lock (96906) (MS35338-46).....	27
A-2				WASHER, Flat (96906) (MS15795-214).....	27
A-2				SCREW, Cap, hexagon head (82386) (675-44).....	11

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				SCREW, Cap, hexagon head (96906)..... (MS90725-60)	8
				---*---	
A-2	-105	P1F		ENGINE, Diesel (82386) (4479-5003)..... (See figure A-22)	1
				(ATTACHING PARTS)	
A-2				SCREW, Cap, socket head (82386) (686-93).....	4
A-2				NUT, Plain, hexagon (82386) (409-130).....	4
A-2				SPACER, Isolator (10001) (61A95-B38).....	1
A-2				ISOLATOR, Vibration (81860) (915-200).....	2
A-2				SCREW, Cap, hexagon head (96906)..... (MS35292-60)	6
A-2				NUT, Plain, hexagon (96906) (M35690-622).....	4
A-2				WASHER, Lock (96906) (MS35338-46).....	4
A-2				WASHER, Flat (96906) (MS15795-214).....	4
A-2				WASHER, Nonmetallic .82386) (5661-5001).....	2
				---*---	
A-2	-106	P1F		TAILLIGHT (71951) (415) (See figure A-25).....	2
A-2	-107			BRACKET, Mounting (82386) (C614-3334).....	2
A-2	-108	P1F		CABLE, Push-pull (70793) (2-SNL-126-A).....	1
				(ATTACHING PARTS)	
A-2				NUT, Plain, hexagon (9606) (1B35690-1022).....	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				INTERNAL COMPONENTS ASSEMBLY (CONT)	
A-2				WASHER, Flat (96906) (MB15795-220)	2
				---*---	
A-2	-109			LEVER, Valve (82386) (C614-3363)	1
A-2	-110	P1F	4820-012-5828	VALVE, 4-way (82386) (4010-022)	1
				(See figure A-26)	
				(ATTACHING PARTS)	
A-2				BRACKET, Mounting (82386) (C614-3335)	1
A-2				SCREW, Cap, hexagon head (82386) (675-283)	4
A-2				SCREW, Cap, hexagon head (96906) (MS35292-60)	2
A-2				NUT, Plain, hexagon (96906) (MS35690-622)	6
A-2				WASHER, Lock (96906) (MS35338-46)	6
A-2				WASHER, Flat (96906) (MS15795-214)	6
				---*---	
A-2	-111			RING, Tie-lift (99238) (48B7796)	8
A-2	-112	X2F		HAND BRAKE ASSEMBLY (82386) (8000-9032)	1
				(ATTACHING PARTS)	
A-2				SCREW, Cap, hexagon head (82386) (675-325)	2
A-2				NUT, Plain, hexagon (96906) (MS35690-622)	2
A-2				WASHER, Flat (96906) (MS15795-214)	4
				---*---	
A-2		X1F		LEVER, Hand brake (82386) (1670-003)	1
A-2		X1F		BELLCRANK (82386) (8020-024)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				INTERNAL COMPONENTS ASSEMBLY (CONT)	
A-2		X1F		PIN, Straight, headed (82386) (122-002).....	2
A-2		X1F		PIN, Grooved (82386) (1672-29).....	1
A-2	X1F			PIN, Cotter (88044) (AN380-4-6).....	1
A-2	X1F			WASHER, Flat (96906) (MS27183-23).....	1
A-2	X1F			PIN, Straight, headed (82386) (5688).....	2
A-2	X1F			PIN, Cotter (88044) (AN380-3-4).....	2
A-2				WASHER, Flat (82386) (400-11MZ).....	2
A-2	-113			WHEEL-TIRE ASSEMBLY, Rear (82386)..... (C614-3362)	2
A-2	-114			WHEEL-TIRE ASSEMBLY, Front (82386)..... (5152-5001)	2
A-2				WHEEL (96906) (MS24325-2).....	1
A-2				TIRE AND TUBE (96906) (MIL-W-8005).....	1
A-2	-115	P1F		SHOCK ABSORBER (76445) (1058)..... (ATTACHING PARTS)	4
A-2				BRACKET, Mounting, rear, LH (82386)..... (C614-3333-2)	1
A-2				BRACKET, Mounting, rear, RH (82386)..... (C614-3333-1)	1
A-2				BRACKET, Mounting, Front (82386)..... (C614-3332)	2
A-2				BRACKET, Mounting, upper (82386)..... (C614-3331)	4

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				INTERNAL COMPONENTS ASSEMBLY	
A-2				SCREW, Cap, hexagon head (96906).....	8
				(MS35292-60)	
A-2				NUT, Plain, hexagon (96906) (MS35690-622).....	8
A-2				WASHER, Lock (96906) (MS35338-46).....	8
A-2				WASHER, Flat (96906) (MS15795-214).....	16
A-2				SCREW, Cap, hexagon head (82386) (675-272).....	4
A-2				WASHER, Lock (96906) (MS35338-45).....	4
A-2				WASHRER, Flat (96906) (MS15795-212).....	4
				---*---	
A-2	-116			BRACKET, Cable, mounting (82386).....	2
				(C614-3330)	
				(ATTACHING PARTS)	
A-2				SCREW, Cap, hexagon head (82386) (675-325).....	2
A-2				NUT, Plain, hexagon (96906) (MS35690-622).....	2
A-2				WASHER, Lock (96906) (MS35338-46).....	2
A-2				WASHER, Flat (96906) (MS15795-214).....	2
				---*---	
A-2	-117	X2H		REAR AXLE ASSEMBLY (82386) (C614-1092).....	1
				(See figure A-27)	
				(ATTACHING PARTS)	
A-2				BOLT, U (82386) (124-5004).....	4
A-2				NUT, Plain, hexagon (96906) (MS35690-802).....	8
A-2				WASHER, Lock (96906) (MS35338-48).....	8

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				WASHER, Flat (82386) (400-137)	8
A-2				PLATE, Spring (82386) (C614-1098)	2
				---*---	
A-2	-118	X2F		SPRING ASSEMBLY, Leaf (82386) (4083-503)	2
				(ATTACHING PARTS)	
A-2				BOLT., Shackle (82386) (8045-503)	6
A-2				LINK, Shackle (82386) (8045-005)	4
A-2				BRACKET, Spring mounting (82386)	2
				(C614-1047)	
A-2				HANGER, Spring (82386) (8025-070-01)	2
A-2				SCREW, Cap, hexagon head (96906)	8
				(MS90725-112)	
A-2				WASHER, Flat (82386) (400-137)	8
A-2				NUT, Plain, hexagon (96906) (MS35690-802)	8
A-2				WASHER, Lock (96906) (MS35338-48)	8
				---*---	
A-2	-119			BOLT, U (82386) (124-010)	2
A-2	-120	X2F		AXLE-STEERING ASSEMBLY (82386)	1
				(C614-1082) (See figure A-28)	
				(ATTACHING PARTS)	
A-2				BOLT, U (82386) (124-5005)	2
A-2				BOLT, U (82386) (124-5006)	2
A-2				NUT, Plain, hexagon (96906) (MS35690-802)	8

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INTERNAL COMPONENTS ASSEMBLY (CONT)					
A-2				WASHER, Lock (96906) (MS35338-48).....	8
A-2				WASHER, Flat (82386) (400-137).....	8
A-2				PLATE, Spring (82386) (0614-1097).....	2
				---*---	
A-2	-121	X2		SPRING ASSEMBLY, Leaf (82386) (4083-503).....	2
				(ATTACHING PARTS)	
A-2				BOLT, Shackle (82386) (8045-503).....	6
A-2				LINK, Shackle (82386) (8045-005).....	4
A-2				BRACKET, Spring mounting (82386).....	2
				(C614-1047)	
A-2				HANGER, Spring (82386) (8025-070-02).....	2
A-2				SPACER, Spring (82386) (C614-1048).....	2
A-2				SCREW, Cap, hexagon head (96906).....	4
				(MS90725-112)	
A-2				SCREW, Cap, hexagon head (96906).....	4
				(MS90725-115)	
A-2				NUT, Plain, hexagon (96906) (MS35690-802).....	8
A-2				WASHER, lock (96906) (MS35338-48).....	8
A-2				WASHER, Flat (82386) (400-137).....	8
A-2	-122			FRAME ASSEMBLY (82386) (0614-1027).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HYDRAULIC PUMPING ASSEMBLY	
A-3				HYDRAULIC PIPING ASSEMBLY (82386) (C614-3003) (See 1, figure A-2)	REF
A-3	-1			HOSE ASSEMBLY (82386) (5503-012)	2
A-3	-2			HOSE ASSEMBLY (82386) (5503-051)	1
A-3	-3			HOSE ASSEMBLY (82386) (5500-502)	1
A-3				HOSE (82386) (3990-015)	1
A-3				FITTING (82386) (5510-906)	1
A-3				FITTING (82386) (5510-904)	1
A-3	-4			HOSE ASSEMBLY (82386) (5503-049)	2
A-3	-5			HOSE ASSEMBLY (00624) (350-6-0160)	1
A-3	-6			HOSE ASSEMBLY (82386) (5503-050)	1
A-3	-7			HOSE ASSEMBLY (82386) (5500-503)	1
A-3				HOSE (82386) (3990-015)	1
A-3				FITTING (82386) (5510-906)	1
A-3				FITTING (82386) (5510-905)	1
A-3	-8			HOSE ASSEMBLY (96906) (MS28741-8-0204)	1
A-3	-9			HOSE ASSEMBLY (08752) (3/8-8-8-300606-1-160A)	1
A-3	-10			HOSE ASSEMBLY (00624) (350-6-0210)	1
A-3	-11			HOSE ASSEMBLY (00624) (390A-20D-0586)	2
A-3	-12			HOSE ASSEMBLY (96906) (M28741-8-0320)	4
A-5	-13			TUBE ASSEMBLY (82386) (C614-3501)	1
A-3	-14			TUBE ASSEMBLY (82386) (C614-3502)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HYDRAULIC PUMPING ASSEMBLY	
A-3	-15			TUBE ASSEMBLY (82386) (C614-3503).....	1
A-3	-16			TUBE ASSEMBLY (82386) (C614-3504).....	1
A-3	-17			TUBE ASSEMBLY (823S6) (C614-3505).....	3
A-3	-18			TUBE ASSEMBLY (82386) (C614-3506).....	1
A-3	-19			TUBE ASSEMBLY (82386) (C614-3507).....	1
A-3	-20			TUBE ASSEMBLY (82386) (C614-3508).....	1
A-3	-21			TUBE ASSEMBLY (82386) (C614-3509).....	1
A-3	-22			TUBE ASSEMBLY (82386) (C614-3510).....	1
A-3	-23			TUBE ASSEMBLY (82386) (C614-3511).....	1
A-3	-24			TUBE ASSEMBLY (82386) (C614-3512).....	1
A-3	-25			TUBE ASSEMBLY (82386) (C614-3513).....	1
A-3	-26			TUBE ASSEMBLY (82386) (C614-3514).....	1
A-3	-27			TUBE ASSEMBLY (82386) (C614-3515).....	1
A-3	-28			TUBE ASSEMBLY (82386) (C614-3516).....	1
A-3	-29			TUBE ASSEMBLY (82386) (C614-3517).....	1
A-3	-30			TUBE ASSEMBLY (82386) (C614-3519).....	1
A-3	-31			TUBE ASSEMBLY (82386) (C614-3520).....	1
A-3	-32			TUBE ASSEMBLY (82386) (C614-3521).....	1
A-3	-33			TUBE ASSEMBLY (82386) (C614-3522).....	1
A-3	-34			TUBE ASSEMBLY (82386) (C614-3523).....	1
A-3	-35			TUBE ASSEMBLY (82386) (C614-3524).....	1
A-3	-36			TUBE ASSEMBLY (82386) (C614-3525).....	1
A-3	-37			TUBE ASSEMBLY (82386) (C614-3526).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HYDRAULIC PIPING ASSEMBLY	
A-3	-38			TUBE ASSEMBLY (82386) (C614-3526)	1
A-3	-39			TUBE ASSEMBLY (82386) (C614-3527)	1
A-3	-40			TUBE ASSEMBLY (82386) (C614-3528)	1
A-3	-41			TUBE ASSEMBLY (82386) (C614-3529)	1
A-3	-42			TUBE ASSEMBLY (82386) (C614-3530)	1
A-3	-43			TUBE ASSEMBLY (82386) (C614-3531)	1
A-3	-44			TUBE ASSEMBLY (82386) (C614-3532)	1
A-3	-45			TUBE ASSEMBLY (82386) (C614-3533)	1
A-3	-46			TUBE ASSEMBLY (82386) (C614-3534)	1
A-3	-47			TUBE ASSEMBLY (82386) (C614-3535)	1
A-3	-48			TUBE ASSEMBLY (82386) (C614-3536)	1
A-3	-49			TUBE ASSEMBLY (82386) (C614-3537)	1
A-3	-50			TUBE ASSEMBLY (82386) (C614-3538)	1
A-3	-51			TUBE ASSEMBLY (82386) (C618-3539)	1
A-3	-52			TUBE ASSEMBLY (82386) (C614-3540)	1
A-3	-53			TUBE ASSEMBLY (82386) (C614-3541)	1
A-3	-54			TUBE ASSEMBLY (82386) (C614-3542)	1
A-3	-55			TUBE ASSEMBLY (82386) (C614-3543)	1
A-3	-56			TUBE ASSEMBLY (82386) (C614-3544)	1
A-3	-57			TUBE ASSEMBLY (82386) (C615-3545)	1
A-3	-58			TEE, Tube (82386) (4999-120)	1
A-3	-59			BUSHING (82386) (4939-10)	1
A-3	-60			UNION, Straight (88044) (AN815-12D)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HYDRAULIC PUMPING ASSEMBLY (CONT)					
A-3	-61			ELBOW, 90° (88044) (AN833-20D).....	1
A-3	-62			ELBOW, 90° (88044) (AN833-6D).....	1
A-3	-63			UNION, Straight (82386) (4924-20D).....	1
A-3	-64			ELBOW, 90° (88044) (AN939D20).....	1
A-3	-65			TEE (88044) (AN804-12D).....	1
A-3	-66			REDUCER (88044) (AN919-16D).....	1
A-3	-67			TEE (82386) (4942-4D).....	1
A-3	-68			ELBOW, 90° (88044) (AN833-12).....	1
A-3	-69			TEE (88044) (AN804-12).....	1
A-3	-70			TEE (88044) (AN833-4).....	1

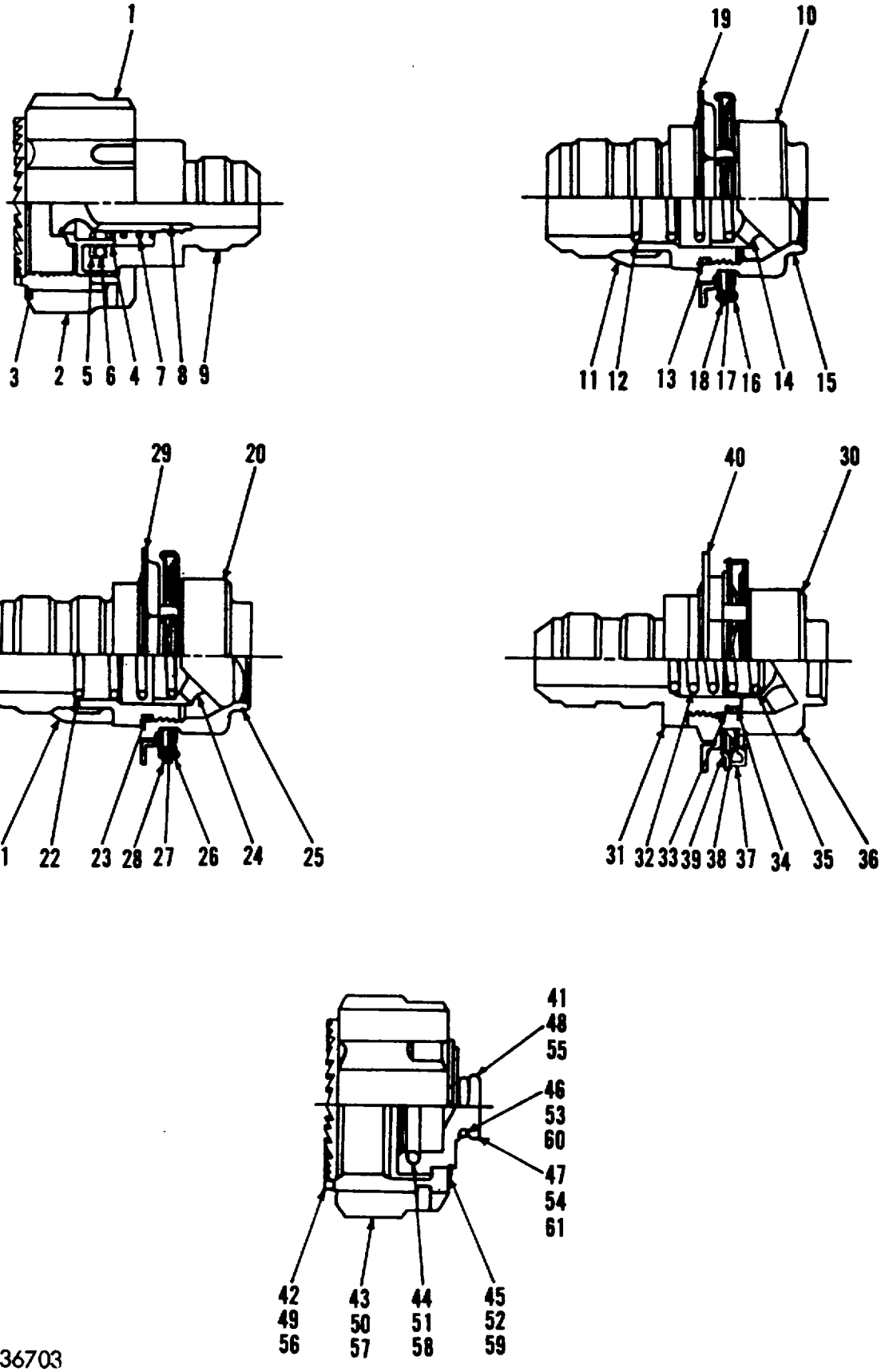

Figure A-4. Coupling Assemblies

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				COUPLING AND CAPS	
A-4	-1			COUPLINTG HALF ASSEMBLY (00624)..... (155-S5-12D) (See 2, figure A-2)	REF
A-4	-2			SLEEVE (00624) (155-25N-12D)..... (ATTACHING PARTS)	1
A-4				PIN (00624) (155-25D-16C)..... ---*---	2
A-4	-3			NUT, Union (00624) (155-25A-12D).....	1
A-4	-4			SLEEVE (00624) (150-13-12).....	1
A-4	-5			RING, Back-up (00624) (22526-19).....	1
A-4	-6			PACKING, Preformed (00624) (22500-19).....	1
A-4	-7			SPRING (00624) (150-27-12C).....	1
A-4	-8			VALVE, Tubular (00624) (150-12-12).....	1
A-4	-9			BODY (00624) (150-1-12D).....	1
A-4	-10			COUPLING HALF ASSEMBLY (00624)..... (145-S5-16D) (See 3, figure A-2)	REF
A-4				COUPLING HALF (00624).....	1
A-4	-11			ADAPTER (00624).....	1
A-4	-12			SPRING (00624).....	1
A-4	-13			PACKING, Preformed (00624).....	1
A-4	-14			VALVE, Poppet (00624).....	1
A-4	-15			BODY (00624).....	1
A-4				LOCK SPRING ASSEMBLY (00624).....	1
A-4	-16			SPRING, Lock (00624).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				COUPLINGS AND CAPS (CONT)	
A-4	-17			WASHER (00624)	1
A-4	-18			FLANGE, Lock spring (00624)	1
A-4	-19			FLANGE, Mounting (00624)	1
A-4	-20			COUPLING HALF ASSEMBLY (00624) (A145-S4-16D) (See 5, figure A-2)	REF
A-4				COUPLING HALF (00624) (145-52L-16D)	2
A-4	-21			ADAPTER (00624) (145-16-16D)	2
A-4	-22			SPRING (00624) (145-26-16C)	2
A-4	-23			PACKING, Preformed (00624) (22502-28)	2
A-4	-24			VALVE, Poppet (00624) (140-15-16D)	2
A-4	-25			BODY (00624) (145-17-16D)	2
A-4				LOCK SPRING ASSEMBLY (00624) (C155-37-16)	2
A-4	-26			SPRING, Lock (00624) (155-37B-16)	2
A-4	-27			WASHER (00624) (155-37C-16)	2
A-4	-28			FLANGE, Lock spring (00624) (155-37A-16)	2
A-4	-29			FLANGE, Mounting (00624) (150-22-16)	2
A-4	-30			COUPLING HALF ASSEMBLY (00624) (TA155-S4-12D) (See 4, figure A-2)	REF
A-4				COUPLING HALF (00624) (155-S2L-12D)	1
A-4	-31			ADAPTER (00624) (150-16-12D)	1
A-4	-32			SPRING (00624) (150-26-12C)	1
A-4	-33			RING, Back-up (00624) (22529-23)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				COUPLINGS AND CAPS (CONT)	
A-4	-34			PACKING, Preformed (00624) (22502-22).....	1
A-4	-35			VALVE, Poppet (00624) (150-15-12D).....	1
A-4	-36			BODY (00624) (155-17-12D).....	1
A-4				LOCK SPRING ASSEMBLY (00624) ..... (C155-37-12)	1
A-4	-37			SPRING, Lock (00624) (155-37B-12).....	1
A-4	-38			WASHER (00624) (155-37C-12).....	1
A-4	-39			FLANGE, Lock spring (00624) (155-37A-12).....	1
A-4	-40			FLANGE, Mounting (00624) (150-22-12).....	1
A-4	-41			CAP AND C HAIN ASSEMBLY (See 1, figure A-6) ..... (00624) (155-S7-8D)	REF
A-4				DUST CAP ASSEMBLY (00624) (155-S6-8D).....	1
A-4				UNION NUT ASSMBLY (00624) ..... (E155-25-8D)	1
A-4	-42			NUT, Union (00624) (155-25A-8D).....	1
A-4	-43			SLEEVE, Nut, union (00624)..... (155-25B-8D) (ATTACHING PARTS)	1
A-4				PIN, Nut, union (00624) (155-25D-8C)..... ---*---	
A-4	-44			PACKING, Preformed (00624) (22500-14).....	1
A-4	-45			RING, Retaining (00624) (21002-4).....	1
A-4	-46			CHAIN ASSEBLY (00624) (5100-S10-8).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				COUPLINGS AND CAPS (CONT)	
A-4				HOOK (00624) (5100-44-8).....	2
A-4				CHAIN (00624) (5100-43-9).....	1
A-4	-47			CAP, Dust (00624) (155-32-8D).....	1
A-4	-48			CAP AND CHAIN ASSEMBLY (00624)..... (155-S7-16D) (See 2, figure A-6)	REF
A-4				DUST CAP ASSEMBLY (00624) (155-S6-16D).....	1
A-4				UNION NUT ASSBULY (00624)..... (E155-25-16D)	1
A-4	-49			NUT, Union (00624) (155-25A-16D).....	1
A-4	-50			SLEEVE, Nut, Union (00624)..... (155-25D-16D) (ATTACHING PARTS)	1
A-4				PIN, Nut, union (00624) (155-25D-16C)..... ---*---	2
A-4	-51			PACKING, Preformed (00624) (22500-23).....	1
A-4	-52			RING, Retaining (00624) (21002-4).....	1
A-4	-53			CHAIN ASSEMBLY (00624) (5100-S10-12).....	1
A-4				HOOK (00624) (5100-44-8).....	1
A-4				HOOK (00624) (5100-44-12).....	1
A-4				CHAIN (00624) (5100-43-8).....	1
A-4	-54			CAP, Dust (00624) (155-32-16D).....	1
A-4	-55			CAP AND CHAIN ASSEMBLY (00624)..... (155-S7-5D) (See 12, figure A-6)	REF

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				COUPLING AND CAPS (CONT)	
A-4				DUST CAP ASSEMBLY (00624) (155-S6-5D).....	1
A-4				UNION NUT ASSEMBLY (00624)..... (E155-25-5D)	1
A-4	-56			NUT, Union (00624) (155-25A-5D).....	1
A-4	-57			SLEEVE, Nut, union (00624) (155-25B-5D)..... (ATTACHING PARTS)	1
A-4				PIN, Nut, union (00624) (155-25D-8C)..... ---*---	3
A-4	-58			PACKING, Preformed (00624) (22500-11).....	1
A-4	-59			RING, Retaining (00624) (21002-1).....	1
A-4	-60			CHAIN ASSEMBLY (00624) (5100-S10-5).....	1
A-4				HOOK (00624) (5100-44-8).....	1
A-4				HOOK (00624) (5100-44-5).....	1
A-4				CHAIN (00624) (5100-43-9-1/4).....	1
A-4	-61			CAP, Dust (00624) (155-32-5D).....	1

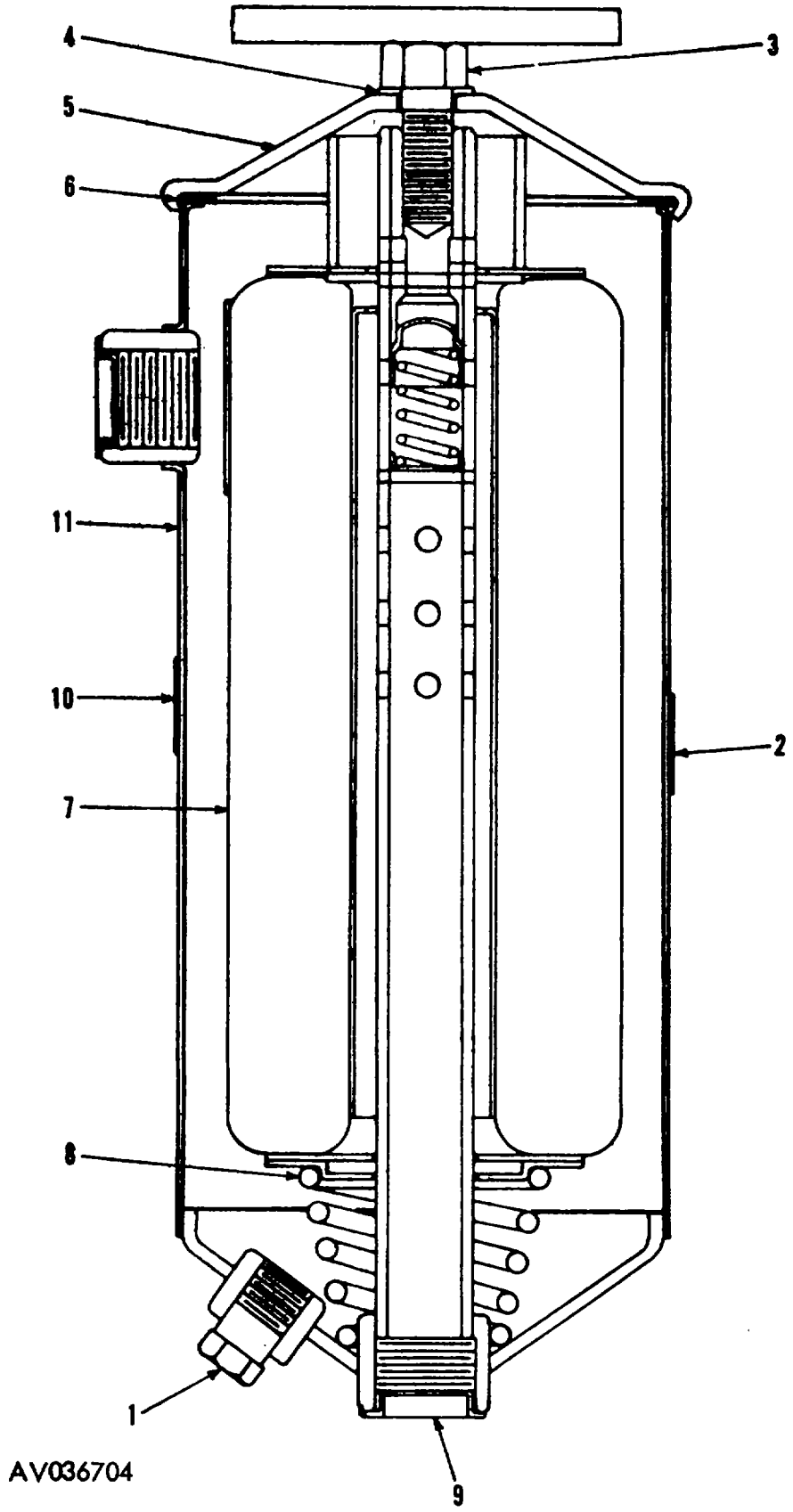

Figure A-5. Engine Oil Filter

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				OIL FILTER	
A-5				OIL FILTER (76700) (F-1106) (See 19, figure A-2)	REF
A-5	-1			PLUG, Drain (76700) (53518)	1
A-5	-2			PLATE, Identification (76700) (55106)	1
A-5	-3			BOLT, Cover (76700) (53528)	1
A-5	-4			GASKET, Copper (76700) (60504)	1
A-5	-5			COVE ASSEMBLY (76700) (57524)	1
A-5	-6			GASKET, Cover (76700) (58004)	1
A-5	-7			ELEMENT (96906) (MIL-3)	1
A-5	-8			SPRING RETAINER ASSEMBLY (76700) (62589)	1
A-5	-9			PLUG, Cap (76700) (70008)	2
A-5	-10			BRACKET, Mounting (76700) (53004)	2
A-5	-11			FILTER SHELL ASSEMBLY (76700) (51052)	1

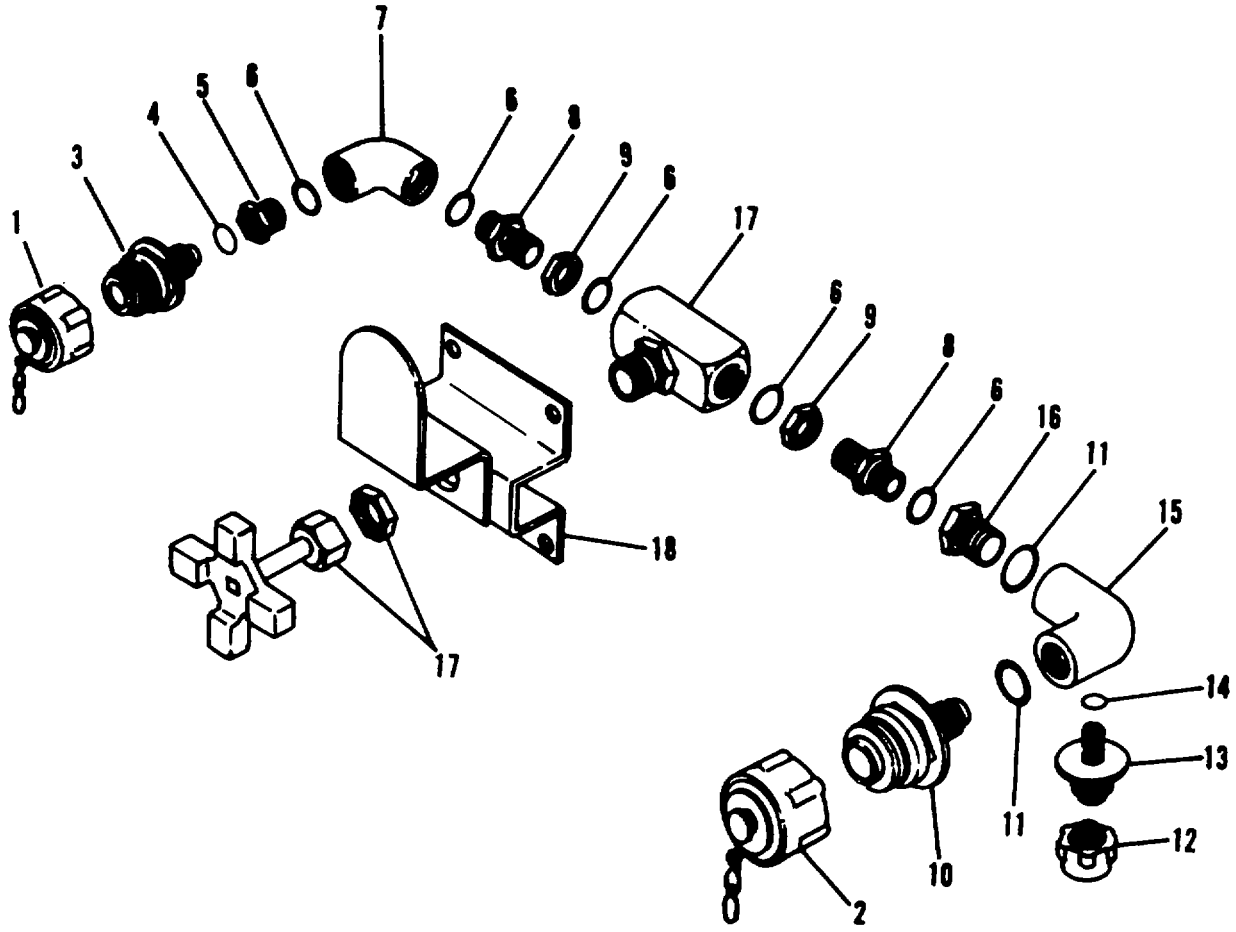

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Figure A-6. Manifold Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				MANIFOLD ASSEMBLY	
A-6				MANIFOLD ASSIMBLY (82386) (C614-3364)	REF
				(See 23, figure A-2)	
A-6	-1			CAP AND CHAIN ASSEMBLY (00624)	1
				(155-S7-8D) (See figure A-4)	
A-6	-2			CAP AND CHAIN ASSEMBLY (00624)	1
				(155-S7-16D) (See figure A-4)	
A-6	-3			COUPLIJG, Half (00624) (015519-S4-%).....1	
A-6	-4			PACKING, Preformed (96906) (MN28778-8)	1
A-6	-5			BUSHING (82386) (4939-050)	1
A-6	-6			PACKING, Preformed (96906) (nM28778-12)	5
A-6	-7			ELBOW (88044) (AN939-12)	1
A-6	-8			UNION, Bulkhead (88044) (AN832-12).....	2
A-6	-9			NUT, Tube (88044) (AN924-12).....	2
A-6	-10			COUPLING, Half (00624) (015503-S4-16D)	1
A-6	-11			PACKING, Preformed (96906) (MB28778-16)	2
A-6	-12			CAP AND CHAIN ASSEMBLY (00624)	1
				(155-S7-5D) (See figure A-4)	
A-6	-13			COUPLING, Half (00624) (015519-S4-4D)	1
A-6	-14			PACKING, Preformed (96906) (MB28778-4)	
A-6	-15			ELBOW (88044) (AT939-16)	1
A-6	-16			BUSHING (82386) (4939-014)	1
A-6	-17			VALV-E, Needle (82386) (4009-5007).....	1
A-6	-18			BRACKET, Manifold (82386) (C614-3360)	1

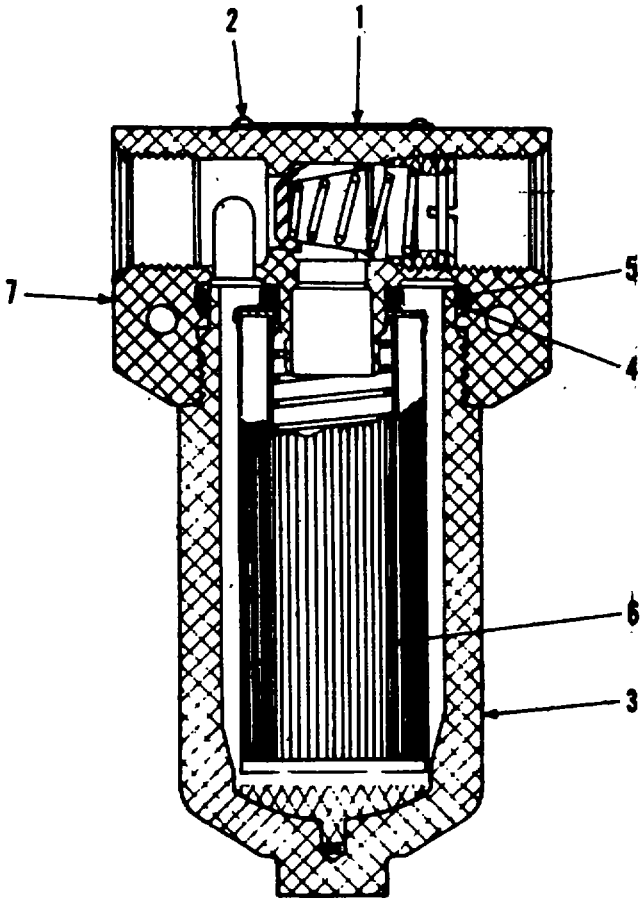

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Figure A-7. Fluid Filter

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				FLUID FIILER	
A-7				FLUID FILTER (81321) (50727)	REF
				(See 29, figure A-2)	
A-7	-1			PLATE, Identification (81321) (50748)	1
				(ATTACEING PARTS)	
A-7	-2			SCREW, Drive (81321) (30743)	4
A-7	-3			CASE ASSEMBLY (81321) (50746)	1
A-7	-4	P1F		RING, Back-up (88044) (AN6244-6)	2
A-7	-5	P1F		GASKET (88044) (AN6230-6)	1
A-7	-6	P1F		ELEMENET, Filter (88044) (AN6235-4A)	1
A-7	-7			HEAD ASSEMBLY (81321) (38045)	1

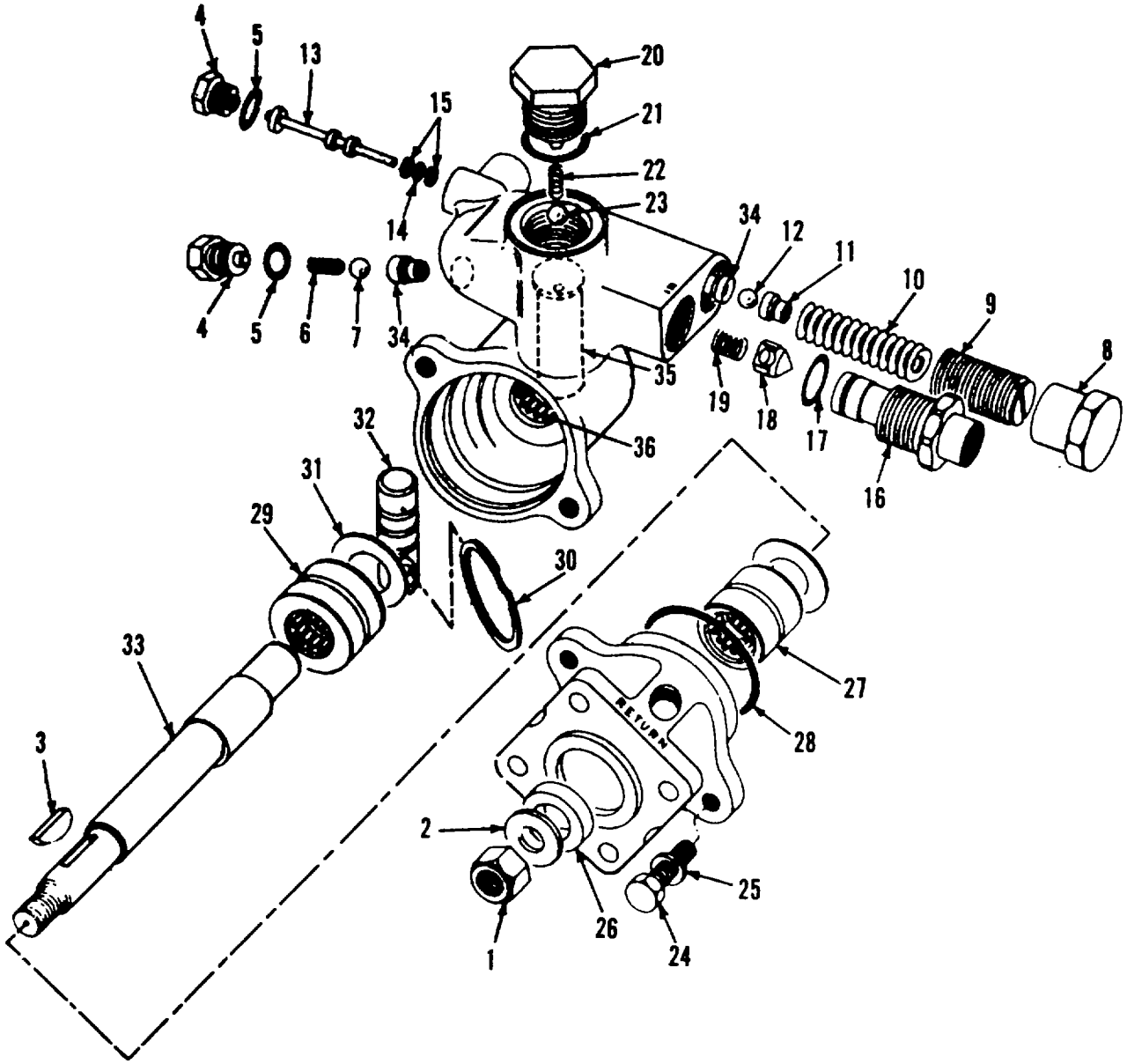

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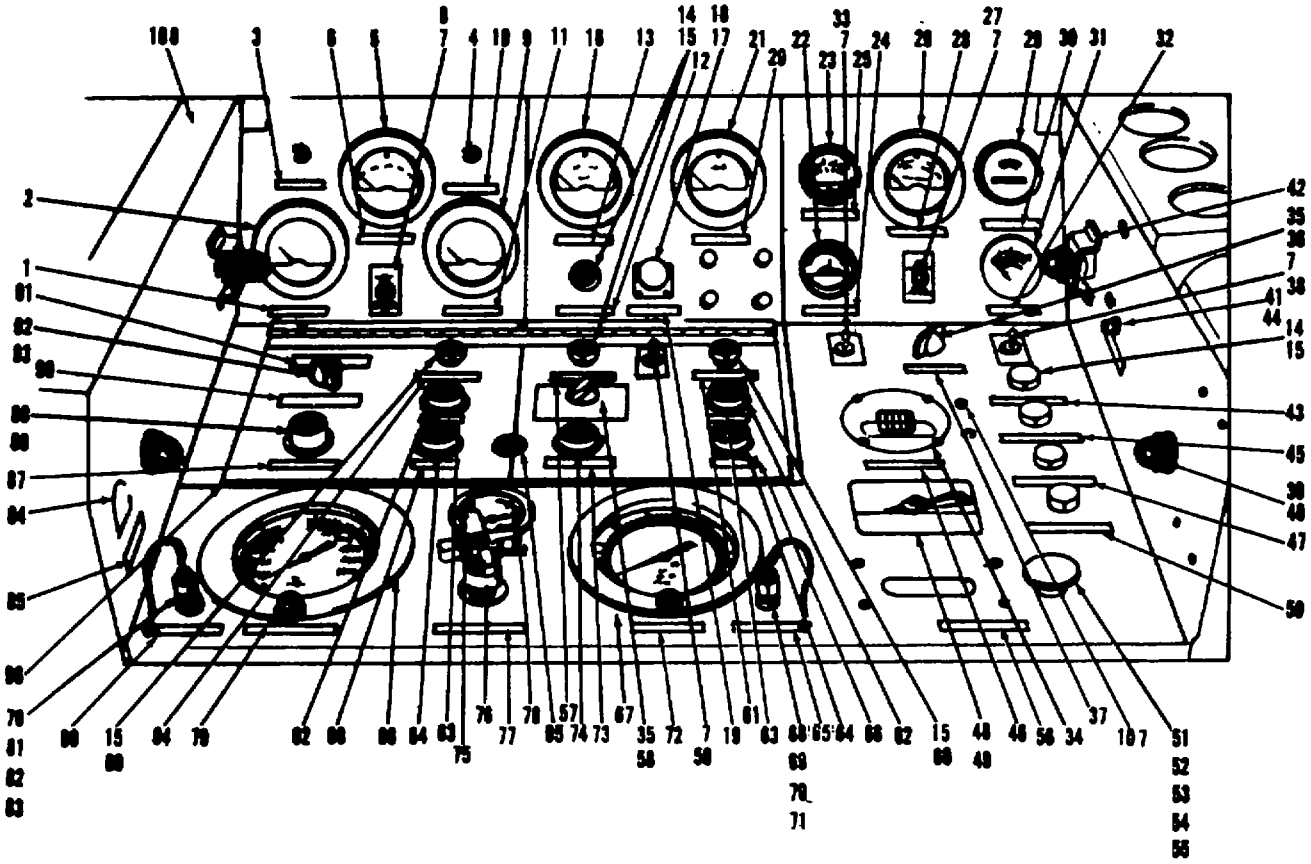
Figure A-8. Piston Pump

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				PISTON PUMP	
A-8				PISTON PUMP (01843) (RPA-303090)	REF
				(See 35, figure A-2)	
A-8	-1			NUP, Plain, hexagon (01843) (NT6-16CA)	1
A-8	-2			WASHER, Flat (01843) (WA1-17CA)	1
A-8	-3			KEY, Woodruff (01843) (KY3-6)	1
A-8	-4			PLUG, Hexagon (01843) (PG202614)	2
A-8	-5			PACKING, Preformed (01843) (GA129-1)	2
A-8	-6			SPRING, Helical, compression (01843)	1
				(SP202607)	
A-8	-7			BALL, Steel (01843) (BB100210)	1
A-8	-8			CAP, Valve (01843) (CP-202609)	1
A-8	-9			SCREW, Spring adjust (01843) (SC202610)	1
A-8	-10			SPRING, Helical, compression (01843)	1
				(SP22611)	
A-8	-11			SEAT, Valve (01843) (VS202612)	1
A-8	-12			BALL, Steel (01843) (BB100210)	1
A-8	-13			PLUNGER, Valve (01843) (PC202613)	1
A-8	-14			PACKING, Preformed (01843) (GAl129-7)	1
A-8	-15			RING, Back-up (01843) (RG100157)	2
A-8				PLATE, Identification (01843) (NP202652)	1
				(ATTACHING PARTS)	
A-S				SCREW, Drive (01843) (SC150-2)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				PISTON PUMP (CONT)	
A-8	-16			FING, Adapter (01843) (FI202617)	1
A-8	-17			PACKING, Preformed (01843) (GA129-4)	1
A-8	-18			VALVE, Inlet (01843) (VA202616)	1
A-8	-19			SPRING, Helical, compression (01843)	1
				(SP202615)	
A-8	-20			PLUG, Hexagon (01843) (PG202608)	1
A-8	-21			PACKING, Preformed (01843) (GA129-2)	1
A-8	-22			SPRING, Helical, compression (01843)	1
				(SP202022)	
A-8	-23			BALL, Steel (01843) (BB100210)	1
A-8				FIANGE ASSEMBLY (01843) (FI202603)	1
				(ATTACHING PARTS)	
A-8	-24			SCREW, Cap, hexagon head (01843) (SC1618)	2
A-8	-25			WASHER, Lock (01843) (WA5-1OCA)	2
A-8	-26			SEAL, Oil (01843) (SE100082)	1
A-8	-27			BEARING, Roller (01843) (BN1013)	1
A-8	-28			PACKING, Preformed (01843) (GAll29-5)	1
A-8	-29			BEARING, Needle (01843) (BN100257)	1
A-8	-30			RING, Retaining (01843) (RG1098)	2
A-8	-31			WASHER, Flat (01843) (WA1933)	2
A-8	-32			PISTON (01843) (PFr02606)	1
A-8	-33			SHAFT, Drive (01843) (SH202594)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				PISTON PUMP (CONT)	
A-8				HOUSING ASSEMBLY (01843) (HG202597)	1
A-8	-34			SEAT, Valve (01843) (vs202602)	2
A-8	-35			SLEEVE (01843) (SV202601)	1
A-8	-36			BEARING, Needle (01843) (BN100256)	1



AV036708

Figure A-9. Control Panel Assembly (Sheet 1 of 2)

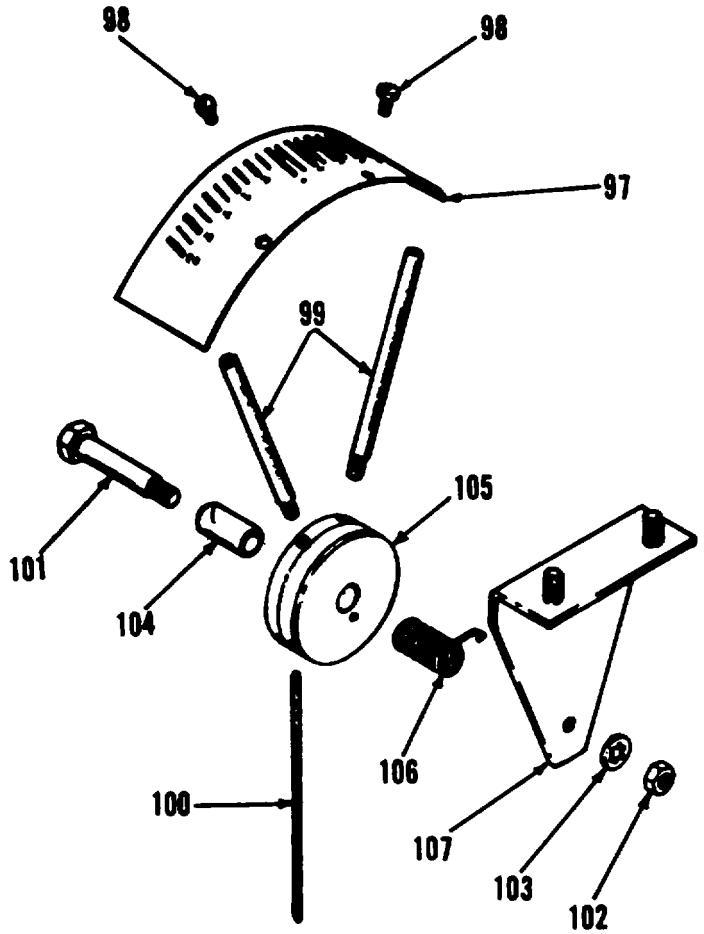


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Figure A-9. Control Panel Assembly (Sheet 2 of 2)

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				COOL PANEL ASSEMBLY	
A-9				CONTROL PANEL ASSEMBLY (82386)	REF
				(C614-3300) (See 47, figure A-a)	
A-9	-1			PLATE, Identification (82386) (4057-250).....	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (07707) (AD43BS)	2
				---*---	
A-9	-2	PIF	6625-811-1868	A/ (8131.9) (MR36'150AFAAn)	1
				(ATTACHING PARTS)	
A-9				SCREW, Machine (82386) (406-124)	3
				---*---	
A-9		-3		LAE, Identification (82°86) (4057-500)4)	1
				(ATTACHOIG PARTS)	
A-9				RIVET, Blind (07707) (AD43BS)	2
				----*----	
A-9	-4			PLATE, Identification (8238:&) (41312-5002)	1
A-9	-5	P1F	6625-016-4.519	METER, Frequency - (82386) (757-101)	1
				(ATTACHINRG PARTS)	
A-9				SCREW, Machine (82386) (406-124)	3
				---*---	
A-9	-6			PLATE, Identification (823P6) (4057-40)	1
				(ATTACHING PAR i3)	
A-9				RIVET, B13lind (07707) (AD413B)	2
				---*---	

Illust Fig No.	Illust Item No.	SMR Code	Federal Stock Number	Description	Qty Inc In Unit
				CONTROL PANEL ASSEMBIY (CONT)	
A-9	-7	P1F		SWITCH, Toggle (96906) (MS24523-22)	5
A-9	-8			PLATE, Identification (82386) (4062-5008)	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (07707) (AD43BS)	2
				---*---	
A-9	-9	P1F	6625-626-6155	VOLMETER (82386) (500-029)	1
				(ATTACHING PARTS)	
A-9				SCREW, Machine (82386) (406-124).....	3
				---*---	
A-9	-10			PLATE, Identification (82386) (4057-5001)	1
A-9	-11			PLATE, Identification (82386) (4057-252)	1
				(ATTACHING PARTS FOR 10 AND 11)	
-- A-9				RIVET, Blind (07707) (AD43BS)	4
				---*---	
A-9	-12			PLATE, Identification (82386) (4057-5002)	1
A-9	-13			PLATE, Identification (82386) (4057-251)	1
				(ATTACHING PARTS FOR 12 AND 13)	
A-9				RIVET, Blind (TT07707) (AD43BS)	4
				---*---	
A-9	-14			LIGHT, Indicator (96906) (N25331-9)	6
A-9	-15			LAMP, Incandescent (24455) (313)	8
A-9	-16	P1F		AMMETER (82386) (756-118)	1
				(ATTACHINO PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONROL PANEL ASSEMBLY (CONT)					
A-9				SCREW, Machine (82386) (406-124)	3
				---*---	
A-9	-17			CAP, Dust (96906) (MS25043-16C)	1
A-9	-18		5935-149-3236	RECETACLE, Electrical (96906)	1
				(MS3102A-168-8S)	
				(ATTACHING PARTS)	
A-9				SCREW, Machine (96906) (MS35223-16)	4
A-9				NUT, Plain, hexagon (96906) (M335649-42)	4
A-9				WASHER, Lock (96906) (MS35338-40)	4
A-9				WASHER, Flat (96906) (MS15795-204)	4
				---*---	
A-9	-19			PIATE, Identification (82386) (4057-254)	1
A-9	-20			PLATE, Identification (82386) (4057-253)	1
				(ATTACHING PARTS FOR 19 AND 20)	
A-9				RIVET, Blind (07707) (AD43BS)	4
				---*---	
A-9	-21		6625-857-4350	VOLTMETER (82386) (756-110)	1
				ATTACHING PARTS)	
A-9				SCREW, Machine (82386) (406-124)	3
				---*---	
A-9	-22			GAGE, Temperature (03479) (SR-21-C)	1
A-2	-23			GAGE, Off pressure (82386) (309-109)	1
A-9	-24			PLATE, Identification (82386) (4057-356)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONROL PANEL ASSEMBLY (CONT)					
A-9	-25			PIATE, Identification (82386) (4057-22)	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (07707) (AD43BS)	4
				---*---	
A-9	-26			TACHOMETER (82386) (756-119)	1
				(ATTACHING PARTS)	
A-9				SCREW, Machine (82386) (406-124)	3
				---*---	
A-9	-27			PLATE, Identification (82386) (4062-5002)	1
A-9	-28			PLATE, Identification (82386) (4057-21)	1
				ATTACHING PARTS FOR 27 AND 28)	
A-9				RIVET., Blind (07707) (AD43BS)	4
				---*---	
A-9	-29			MMER, Time totalizing (7440C) (MI-974)	1
A-9	-30			PLATE, Identification (82386) (4057-26)	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (07707) (AD43BS)	2
				---*---	
A-9	-31			AMMETER (96906) (M324532-2)	1
A-9	-32			PLATE, Identification (82386) (4057-361)	1
A-9	-33			PLATE, Identification (82386) (4062-5001)	1
				(ATTACHING PARTS FOR 32 AND 33)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONTROL PANEL ASSEMBLY (CONT)					
A-9				RIVET, Blind (07707) (AD43BS)	4
				---*---	
A-9	-34	PLF		DIAL, Indicator (82386) (8051-101)	1
				(ATTACHING PARTS)	
A-9				SCREW, Machine (96906) (MS35223-45)	11
A-9				NUT, Plain, hexagon (96906) (MS35649-82)	9
A-9				WASHER, Lock (96906) (MS35338-42)	12
A-9	-35			WASHER, Flat (96906) (M15795-207)	16
				---*---	
A-9	-35			KNOB (82386) (1492-8)	3
A-9	-36			RESISTOR, Variable (82386) (685-251)	1
A-9	-37			PLATE, Identification (82386) (4057-50)	1
A-9	-38			PLATE, Identification (82386) (4062-5006)	1
				(ATTACHING PARTS FOR 37 AND 38)	
A-9				RIVET, Blind (07707) (AD43BS)	4
				---*---	
A-9	-39			LIGHT, Panel (82386) (3956-005)	4
				(ATTACHING PARTS)	
A-9				SPACER, Sleeve 1/4W x 1-1/80D (82386)	1
				(COML)	
				---*---	
A-9	-40	P1F		LAMP, Incandescent, red (71744) (6S6R)	4
A-9	-41			TERMNAL BOARD (82386) (1039-018)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONTROL PANELS ASSEMBLY (CONT)					
A-9	-42			STRIP, Marker (96906) (.S-5-141.....	2
A-9	-43			PLATE, Identification (82386) (4058-580)	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (07707) (AD433BS)	2
				---*---	
A-9	-44			PLATE, Identification (82386) (4057-295).....	1
A-9	-45			PLATE., Identification (82386) (4058-581)	1
A-9	-46			PLATE, Identification (82386) (4056-16).....	1
A-9	-47			PLATE, Identification (82386) (4058-582)	1
				(ATTACKING PARTS FOR 44 THRU 47)	
A-9				RIVET, Blind (07707) (AD43BS)	8
A-9	-48	P1F	4820-767-7529	VALVE, Selector (82386y (A361-104)	1
				(ATTACHING PARTS)	
A-9				SCREW, Machine (82386) (406-124)	4
				---*---	
A-9	-49			PLATE, Identification (82386) (4058-16)	1
A-9	-50			PLATE, Identification (82386) 4058-176).....	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (07707) (AD43BS)	2
				---*---	
A-9	-51	P1F		LAMP, Incandescent (71744) (356R).....	1
A-9	-52			LAMP, Incandescent (82386) (910-07)	1
A-9	-53			SOCKET, lamp (90763) (160687)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONTROL PANEL ASSEMBLY (CONT)					
A-9	-54			EYELE (82386) (609-23).....	1
A-9	-55			TUBE, Sight (82386) (A361-142).....	1
				(ATTACHING PARTS)	
A-9				SCREW, Machine (96906) (MS35224-67)	2
A-9				SCREW, Machine (96906) (MS35224-64).....	2
A-9				NUT, Plain, hexagon (96906) (MS35650-102).....	2
A-9				NUT, Self-locking (96906) (1f20365-1032)	4
A-9				WASHER, Flat (96906) (MS15795-208).....	4
A-9				CLAMP, Loop (96906) (1B25281-6P).....	2
				---*---	
A-9	-56			PLATE, Identification (82386) (4058-71)	1
A-9	-57			PLATE, Identification (82386) (4057-274)	1
				(ATTACHING PARTS FOR 56 AND 57)	
A-9				RIVET, Blind (07707) (AD43BS)	4
				---*---	
A-9	-58	PLF		SWITCH, Rotary (81073) (24001-8)	1
				(ATTACHING PARTS)	
A-9				WASHER (81073) (12C1087)	1
				---*---	
A-9	-59			PLATE, Identification (82386) (4062-5005)	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (OT7707) (AD43BS)	2
				---*---	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONTROL PANEL ASSEMBLY (CONT)					
A-9	-60			LIGHT., Indicator (82386) (740-031)	2
A-9	-61			PLATE, Identification (82386) (4057-122)	1
				(ATTACHION PARTS)	
A-9				RIVET, Blind (07707) (AD43Bs)	2
				---*---	
A-9	-62	P1F	5930-548-8265	SW2CH,, Push button (04009) (OB-3)	3
A-9	-63			PLATE, Identification (82386) (4061-020)	2
				(ATTACING PARS)	
A-9				RIVET, Blind (07707) (AD43BS)	2
				---*---	
A-9	-64		5930-548-8264	SWITCH, Pushbutton (04009) (B-)	2
A-9	-65			PLATE, Identification (82386) (4057-110)	1
A-9	-66			PIATE, Identification (82386) (4061-01)	2
				(ATTACHING PARTS FR 65 AND 66)	
A-9				RIVET, Blind (07707) (AD3BS)	4
				---*---	
A-9	-67	PIF		GAGE, Pressure (82386) (309-015)	1
				(ATTACHING PARTS)	
A-9				SCREW, Machine (96906) (M335240-70).....	3
				---*---	
A-9	-68			CAP ASSEMBLY (88044) (A1929A4).....	1
A-9	-69			NMT, Bullhead (88044) (AN924-4D).....	1
A-9	-70			WASHER, Lock (96906) (MB35333-44).....	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONTROL PANEL ASSEMBLY (CONT)					
A-9	-71			TE, Bulkhead (88044) (AN804-4D)	1
A-9	-72			PLATE, Identification (82386) (4057-129)	1
A-9	-73			PLATE, Identification (82386) (4057-358)	1
				(ATTACHING PRTS FOR 72 AND 73)	
A-9				RIVET, Blind (07707) (AD43BS)	4
				---*---	
A-9	-74			SWITCH, Pushbutton (82386) (0799-5101)	1
A-9	-75	P1F		GAGE, Temperature (82386) (329-014)	1
A-9	-76			VALVE, Needle (38508) 0r629-1)	1
A-9	-77			PLATE, Identification (82386) (4058-410)	1
A-9	-78			PLATE, Identification (82386) (4058-18)	1
A-9	-79			PLATE, Identification (82386) (4058-486)	1
A-9	-80			PLATE, Identification (82386) (4057-111)	1
				(ATTACHING PARTS FOR 77 THRU 80)	
A-9				RIVET, Blind (07707) (AD43BS)	8
				---*---	
A-9	-81			CAP ASSEMLY (88044) (AN929A4C)	1
A-9	-82			NUT, Bulkhead (88044) (AN924-4)	1
A-9	-83			TEE, Bulkhead (88044) (AN804-4)	1
A-9	-84			RECEPTACLE, Electrical (82386) (648-211)	1
A-9	-85			PLATE, Identification (82386) (4057-366)	1
A-9	-86	P1F		GAGE, Pressure (82386) (309-087)	1
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONTROL PANEL ASSEMBLY (CONT)					
A-9				SCREW, Machine (96906) (M35240-70)	3
				---*---	
A-9	-87			PLATE, Identification (82386) (4057-363)	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (07707) (AD43BS)	2
				---*---	
A-9	-88			KNOB (82386) (506-801).....	1
A-9	-89			RESISTOR, .Variable (82386) (685-252)	1
A-9	-90			PLATE, Identification (82386) (4059-131)	1
A-9	-91			PLATE, Identification (82386) (4059-130).....	1
				(ATTACHING PARTS FOR 90 AND 91)	
A-9				RIVET, Blind (07707) (AD43BS).....	4
				---*---	
A-9	-92			KNOB (88044) (A 3220-3)	1
A-9	-93	P1F		SWITCH, Rotary (82121) (A26577).....	1
A-9	-94			PLATE, Identification (82386) (4057-369)	1
				(ATTACHING PARTS)	
A-9				RIVET, Blind (07707) (AD43BS)	2
				---*---	
A-9	-95			KNOB (82386) (758-105).....	1
				(ATTACHING PARTS)	
A-9				SCREW, Machine (96906) (1M35223-43)	1
A-9				WASHER, Lock (96906) ()635338-42)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONTROL PANEL ASSEMBLY (CONT)					
A-9				WASHER, Flat (96906) (MS15795-207)	1
				---*---	
A-9	-96			PANEL, Electrical (82386) (C614-3312)	1
				(ATACKING PARTS)	
A-9				SCREW, Machine (96906) (1i35223-45Y	7
A-9				NUT, Plain, hexagon (96906) (035649-382)	4
A-9				WASHER, Lock (96906) (S35338-1'2)	7
A-9				WASHER, Flat (96906) (1615795-207)	'7
				---*---	
A-9	-97			SCALE (32386) (8051-0204)	1
				(ATTACHLIG PARITS)	
A-9	-98			SCREW., Machine (82386) (404-61M)	2
				---*---	
A-9	-99			SPOKE (82386) (8023-063)	2
A-9	-100			CABLE ASSAIBLY (82386) (C6114-3345).....	1
A-9	-101			SCEW, Shoulder (32386) (4100-002).....	1
				(ATTACHING PARTS)	
A-9	-102			NUT, Plain, hexagon (96906) (MS35649-82).....	1
A-9	-103			WASHER, Lock (82386) (602-29M)	1
				---*---	
A-9	-104			BEARING, Sleeve (82386) (1.13-12).....	1
A-9	-105			HUB, Indicator (82386) (8023-062).....	1
A-9	-106			SPRNIG, Torsion (82386) (711-181)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CONTROL PANEL ASSEMBLY (CONT)					
A-9	-107			BRACKET, Indicator (82386) (8020-031) ..... (ATTACHING PARTS)	1
A-9				NUT, Cap (82386) (407-3)	2
A-9				WASHER, Lock (96906) (NB35333-39)	2
				---*---	
A-9	-108			PANEL AND BRIDGE (82386) (C614-3301)	1

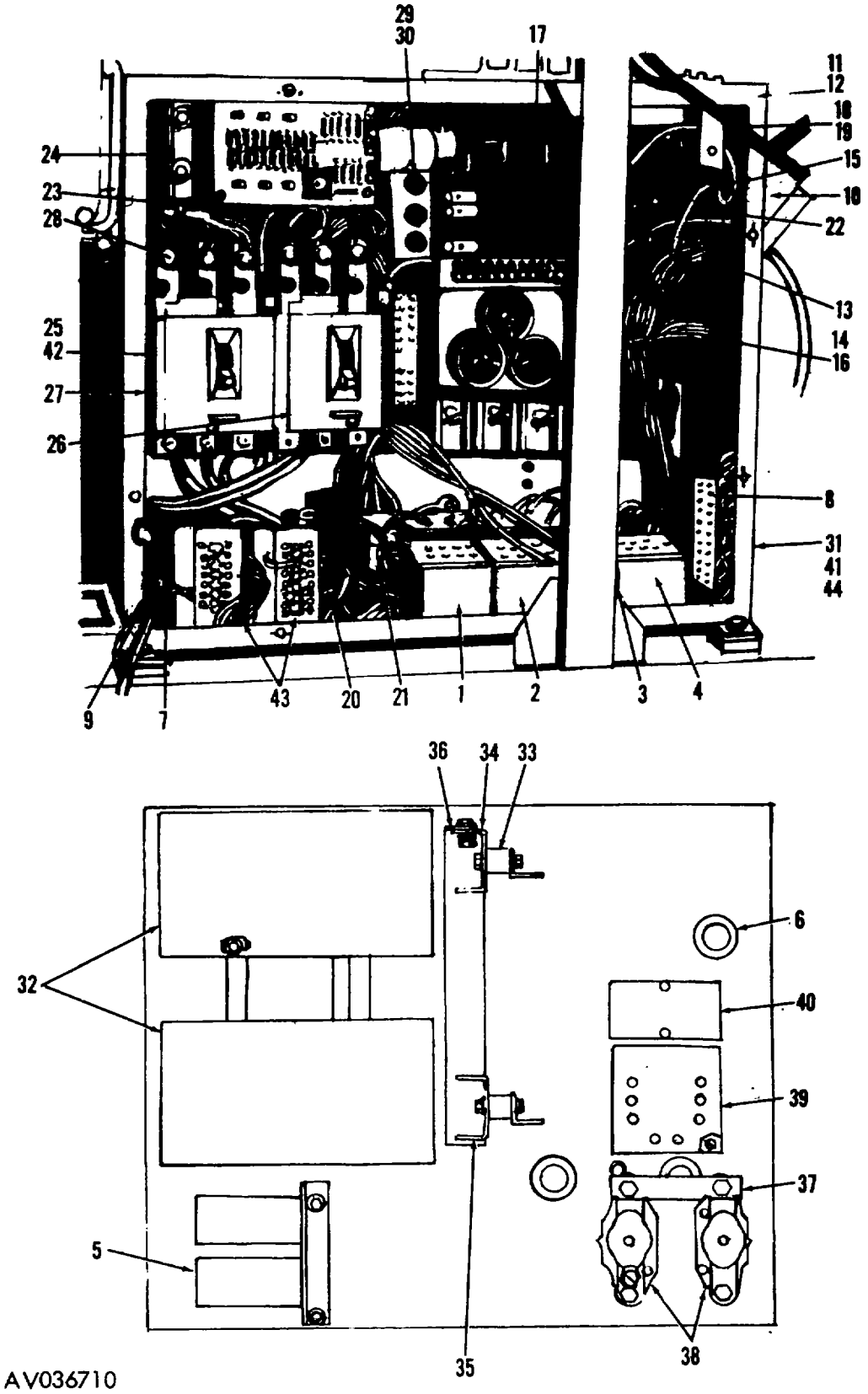

Figure. A-10. Electrical Box Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				ELECTRICAL BOX ASSEMBLY	
A-10				ELECTRICAL BOX ASSEMBLY (82386) ..... (C614-5001) (See 48, figure A-2)	REF
A-10	-1	P1F		MODULE, Over-voltage (28835) (D11226-1) ..... (See figure A-29)	1
A-10	-2	P1F		MODULE, Under-voltage (28835) (D11226-2) ..... (See figure A-29)	1
A-10	-3	P1F		MODULE, Over-frequency (28835) (D11226-3)..... (See figure A-29)	1
A-10	-4	P1F		MODULE, Under-frequency (28835) (D11226-4)..... (See figure A-29) (ATTACHING PARTS FOR 1 THRU 4)	1
A-10				SCREW, Machine (96906) (DE35223-46)	16
A-10				RIVNUT (82386) (0608-6001-15)	16
A-10				WASHER, Lock (96906) (I35338-42)	16
A-10				WASHER, Flat (96906) (1527183-7)	16
				---*---	
A-10	-5			CAPACITOR ASSEMBLY (82388) (C614-5403)..... (ATTACHING PARTS)	1
A-10				SCR EW, Cap, hexagon head (82386) (675-150).....	2
A-10				RIVNUT (82386) (0608-0001-38)	4
A-10				WASHER, Lock (82386) (604-14)	2
A-10				WASHER, Flat (82386) (400-20)	2
				---*---	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRICAL BOX ASSMBLY (CONT)					
A-10	-6			GROMMET (96906) (MS35489-52)	3
A-10	-7			CAPACITOR AND RESISTOR ASSEMBLY..... (82386) (614-5015) (ATTACHING PARTS)	1
A-10				SCREW, Machine (82386) (410-84)	4
A-10				RIVNUT NU (82386) (0608-6001-26)	4
A-10				WASHER, Lock (96906) (MS35338-43).....	4
A-10				WASHER, Flat (96906) (MS15795-208)	4
				---*---	
A-10	-8			DIODE PANEL ASSEMBLY (82386) (C614-5020) ..... (See figure A-32) (ATTACHING PARTS)	1
A-10				SCREW, Machine (96906) (MS35223-46).....	2
A-10				RIVNUT (82386) (0608-6001-15)	2
A-10				WASHER, Lock (96906) (MS35338-42)	2
A-10				WASHER, Flat (96906) (MS27183-7)	2
				---*---	
A-10	-9	P1H		TRANMWCER ASSEMBLY (82386) (6500-5002)..... (See figure A-30) (ATTACHING PARTS)	1
A-10				SCRET, Machine (96906) (MS35223-28)	2
A-10				WASHER, Lock (82386) (604-6MZ)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRIAL BOX ASSEMBLY (CONT)					
A-10				WASER, Flat (96906) (MS27183-6)	2
				---*---	
A-10	-10			RECTIFIER ASSEMBLY (82386) (8018-029)	1
				(See figure A-31)	
A-10	-11			HORN, Electric (96906) (MS1074- 1)	1
A-10	-12			BRACKET, Mounting (82386) (C614-5025)	1
				(ATTACHIG PARTS)	
A-10				SCREW., Cap, hexagon head (82386) (675-27).....	2
A-10				NUT, Cap (82386) (407-5302)	2
A-10				WASHER, Lock (82386) (604-14MZ)	2
A-10				WASHER, Flat (82386) (400-20MZ)	2
				---*---	
A-10	-13			CONNECTOR (82386) (4162-201)	1
				(ATTACHING PARTS)	
A-10				SCREW, Machine (82386) (406-93)	4
A-10				NUT, Plain, hexagon (82386) (409-10)	4
A-10				WASHER, Lock (96906) (MS35338-41)	4
A-10				WASHER, Flat (96906) (MS27183-6)	8
				---*---	
A-10	-14			CONNETOR (82386) (4162-5087)	1
				(ATTACHING PARTS)	
A-10				SCREW, Machine (82386) (404-65)	4

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRIAL BOX ASSEMBLY (CONT)					
A-10				NUT, Plain, hexagon (96906) (MS35649-42).....	4
A-10				WASHER, Lock (96906) (MS35338-40)	4
A-10				WASHER, Flat (96906) (MS27183-4)	4
				---*---	
A-10	-15	P1F		DIODE PANEL ASSEMBLY (82386) (C614-5024).....	1
				(ATTACHING PARTS)	
A-10				SCREW, Machine (96906) (MS35223-45).....	2
A-10				NUT, Plain, hexagon (96906) (MS35649-85).....	2
A-10				WASHER, Lock (96906) (MS35338-42)	2
A-10				WASHER, Flat (96906) (MS27183-7).....	4
				---*---	
A-10				REAT SINK (82386) (C614-5021).....	1
A-10				SEMIOCINDCTOR, Diode (82386) (771-0222)	1
A-10				WASHER, Nonmetallic (82386) (0771-0915)	2
A-10				WASHER, Nonmetallic (82386) (0771-0916)	1
A-10				TERMINAL, Lug (82386) (0771-0914).....	1
A-10	-16			CLAMP, Loop (82386) (718-310).....	1
				(ATTACHING PARTS)	
A-10				SCREW, Machine (96906) (MS35224-64).....	1
A-10				NUT, Plain, hexagon (96906) (MS535650-102).....	1
A-10				WASHER, Lock (82386) (604-11MZ)	1
A-10				WASHER, Flat (96906) (MS27183-8).....	1
				---*---	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRICAL BOX ASSEMBLY (CONT)					
A-10	-17	P1F		REGUIATOR, Voltage (82386) (506-)803-01)	1
				(ATTACHING PARTS)	
A-10				SCREW, Cap, hexagon head (96906) (MS90726-7)	4
A-10				RIVNUT (82386) (0608-6001-38)	4
A-10				WASHER, Lock (82386) (604-14MZ)	4
A-10				WASHER, Flat (82386) (400-20MZ)	4
				---*---	
A-10	-18			CIRCUIT BEAKER (82386) (1922-047)	1
				(ATTACHING PARTS)	
A-10				SCREW, Machine (96906) (MS35224-65)	2
A-10				NUT, Plain, hexagon (96906) (MS35650-102)	2
A-10				WASHIER, Lock (96906) (MS35338-43)	2
A-10				WASHER, Flat (96906) (MS15795-208)	4
				---*---	
A-10	-19			PLATE, Identification (82386) (4085-615)	1
				(ATTACHING PARTS)	
A-10				RIVET, Blind (80372) (AD41BS)	2
				---*---	
A-10	-20	P1F		FAULT TRACER MODILE (82386) (6500-081)	1
				(ATTACHING PARTS)	
A-10				SCREW, Machine (96906) (MS35223-28)	3
A-10				RIVNUT (82386) (0608-6001-09)	3

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				ELECTRICAL BOX ASSEMBLY (CONT)	
A-10				WASHER, Lock (96906) (MS35338-41).....	3
A-10				WASHE R, Flat (96906) (NB27183-6)	3
A-10				SPACER (82386) (0401-209)	3
A-10				CLAMP, Loop (82386) (718-303).....	1
				---*---	
A-10	-21			RELAY (96906) (MS625024-2)	4
				(ATTACHING PARTS)	
A-10				SCREW, Machine (96906) (MS35223-45)	16
A-10				RIVNUT (82386) (0608-6001-09)	18
A-10				WASHER, Lock (96906) (MS35338-41)	16
A-10				WASHER., Flat (96906) (MS27183-6)	16
				---*---	
A-10	-22			GROMMET (96906) (MS35489-52).....	1
A-10	-23			TRANSFORMER ASSEMBLY	REF
				(ATTACHING PARTS)	
A-1			0	SCREW, Machine (82386) (408-79)	2
A-1			0	RIVNUT (82386) (0608-6001-15)	2
A-10				WASHER, Lock (96906) (MS35338-42)	2
A-10				WASHER, Flat (96906) (MS27183-7)	2
				---*---	
A-10	-24			BRACKET, Mounting (82386) (C614-5004)	1
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRICAL BOX ASSEMBLY (CONT)					
A-10				SCREW, Cap, hexagon head (96906)..... (MS90726-7)	4
A-10				RIVIFT (82386) (0608-6001-33)	4
A-10				WASHER, Lock (32386) (604-14MZ).....	4
A-10				WASHER, Flat (82386) (400-20MZ)	4
A-10	-25			CIRCUIT BREAKER (82336) (1922-076)	1
A-10	-26	X2F		CIRCUIT BREAKER (82386) (1922-075) ..... (ATTACHING PARTS)	1
A-10				SCREW, Machine (82386) (410-86)	8
				---*---	
A-10	-27			BRACKET, Mounting (82386) (C614-5002) ..... (ATTACHING PARTS)	1
A-10				SCREW, Cap, hexagon head (96906)..... (MS90726-7)	4
A-10				RIVNUT (82386) (0608-6001-38)	4
A-10				WASHER, Lock (82386) (604-14MZ)	4
A-10				WASHER, Flat (82386) (400-20MZ)	4
				---*---	
A-10	-28	P1F		TRANSFORMER, Current (12670) (5101) ..... (ATTACHING PARTS)	3
A-10				SCREW, Machine (96906) (MS35224-63)	12
A-10				WASHER, Lock (96906) (MS35338-43)	12

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRICAL BOX ASSEMBLY (CONT)					
A-10				WASHER, Flat (96906) (MS15795-208)	12
				---*---	
A-10	-29	P1F		FUSE (75915) (414015)	4
A-10	-30			FUSE HOLDER (71400) (HKP-L)	1
				(ATTACHING PARTS)	
A-10				SCREW, Machine (82386) (406-51)	2
				---*---	
A-10	-31			COVER ASSEMBLY (82386) (C614-5017)	1
A-10				STUD (71286) (2700-7)	8
A-10				WASHER, Retaining (71286) (2600-LW)	8
A-10				COVER (82386) (C614-5017-1)	1
A-10	-32			CONVERTER:(96906) MS28132-1)	2
				(ATTACHING PARTS)	
A-10				SCREW, Cap, hexagon head (96906)	8
				(MS90726-7)	
A-10				NUT, Plain, hexagon (96906) (MS35690-442)	8
A-10				WASER, Lock (82386) (604-14MZ)	8
A-10				WASHER, Flat (82386) (400-20MZ)	8
				---*---	
A-10	-33			STAND-OFF (82386) (536-503)	7
				(ATTACHING PARTS)	
A-10				SCREW, Cap, hexagon head (82386) (675-3)	14
A-10				WASHER, Lock (82386) (604-14MZ)	14

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRICAL BOX ASSEMBLY (CONT)					
				WASHER, Flat (82386) (400-20MZ).....	14
				---*---	
A-10	-34			CHANNEL, Support (82386) (C614-5005-1).....	1
A-10	-35			CHANNEL, Support (82386) (C614-5005-2).....	1
				(ATTACHING PARTS FOR 34 AND 35)	
A-10				SCREW, Cap, hexagon head (96906).....	2
				(MS90726-10)	
A-10				NUT, Plain, hexagon (96906) (MS35690-442).....	2
A-10				WASHER, Lock (82386) (604-14MZ)	2
A-10				WASHER, Flat (82386) (400-20MZ)	2
				---*---	
A-10	-36			RESISTOR, Fixed, film (82386) (C614-5007)	1
A-10	-37			BUS BAR (82386) (C614-5026)	1
A-10	-38			RELAY (96906) (MS24185-D1)	2
				(ATTACHING PARTS)	
A-10				SCREW, Cap, hexagon head (96906).....	4
				(MS35223-46)	
A-10				RIVNUT (82386) (0608-6001-15)	4
A-10				WASHER, Lock (96906) (MS35338-42)	4
A-10				WASHER, Flat (96906) (MS27183-7).....	4
				---*---	
A-10	-39			RELAY (96906) (MS24168-D2)	1
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRICAL BOX ASSEMBLY (CONT)					
A-10				SCREW, Machine (96906) (MS35223-46)	4
A-10				RIVNUT (82386) (0608-6001-15)	4
A-10				WASER, Lock (96906) (MS35338-42)	4
A-10				WASHER, Flat (96906) (MS27183-7)	4
				---*---	
A-10	-40			SHUNT, Instrument (99246) (MSC102)	1
				(ATTACHING PARTS)	
A-10				SCREW, Machine (82386) (408-79)	2
A-10				RIVNUT (82386) (0608-6001-15)	2
A-10				WASHER, Lock (96906) (MS35338-42)	2
A-10				WASHER, Flat (96906) (MS27183-7)	2
A-10	-41			PLATE, Instruction (82386) (C614-5019)	1
A-10	-42			BUS BAR (82386) (C614-8010)	12
A-10	-43			RELAY (96906) (MS10223D-1)	2
				(ATTACHING PARTS)	
A-10				SCREW, Machine (82386) (406-50)	4
A-10				RIVNUT (82386) (0608-6001-09)	1
A-10				WASHER, Lock (96906) (MS35338-41)	4
A-10				WASHER, Flat (96906) (MS27183-7)	4
A-10	-44			BOX, Electrical (82386) (C614-5011)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
ELECTRICAL BOX ASSEMBLY (CONT)					
A-10				RECEPTACLE, Cam-loc (71286) (212-12N)	8
				(ATTACHING PARTS)	
A-10				RIVET, Blind (82386) (608-094)	16
				---*---	

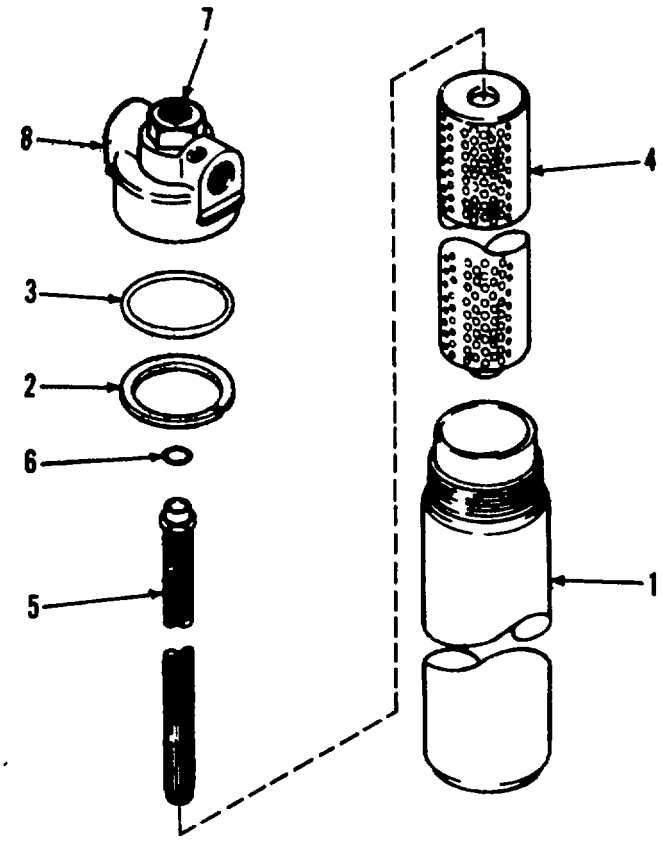

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Figure A-11. High Pressure Filter

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HIGH PRESSURE FILTER					
A-11				HIGH PRESSURE FILTER (01414) ..... (ADHS6814E9716) (See 50, figure A-2)	REF
A-11				PLATE, Identification (01414) ..... (AC-6814-GTD6)	1
A-11	-1			BOWL, Filter (01414) (AC-3335-Y2)	1
A-11	-2			RING, Backup (96906) (NB28774-243)	1
A-11	-3			PACKING, Preformed (01414) (243)	1
A-11	-4	P1F	4330-763-1268	ELEMENT, Primary (01414) (AC-4650F-12)	2
A-11	-5	P1F	4330-897-2259	ELEMENT, Secondary (01414) ..... (AC-1600E-12 1D40)	1
A-11	-6			PACKING, Preformed (01414) (912)	1
A-11	-7			SWITCH, Pressure (01414) (MC606E97016).....	1
A-1	-8			HEAD, Filter (Q1414) (AC-6814-1D1)	1

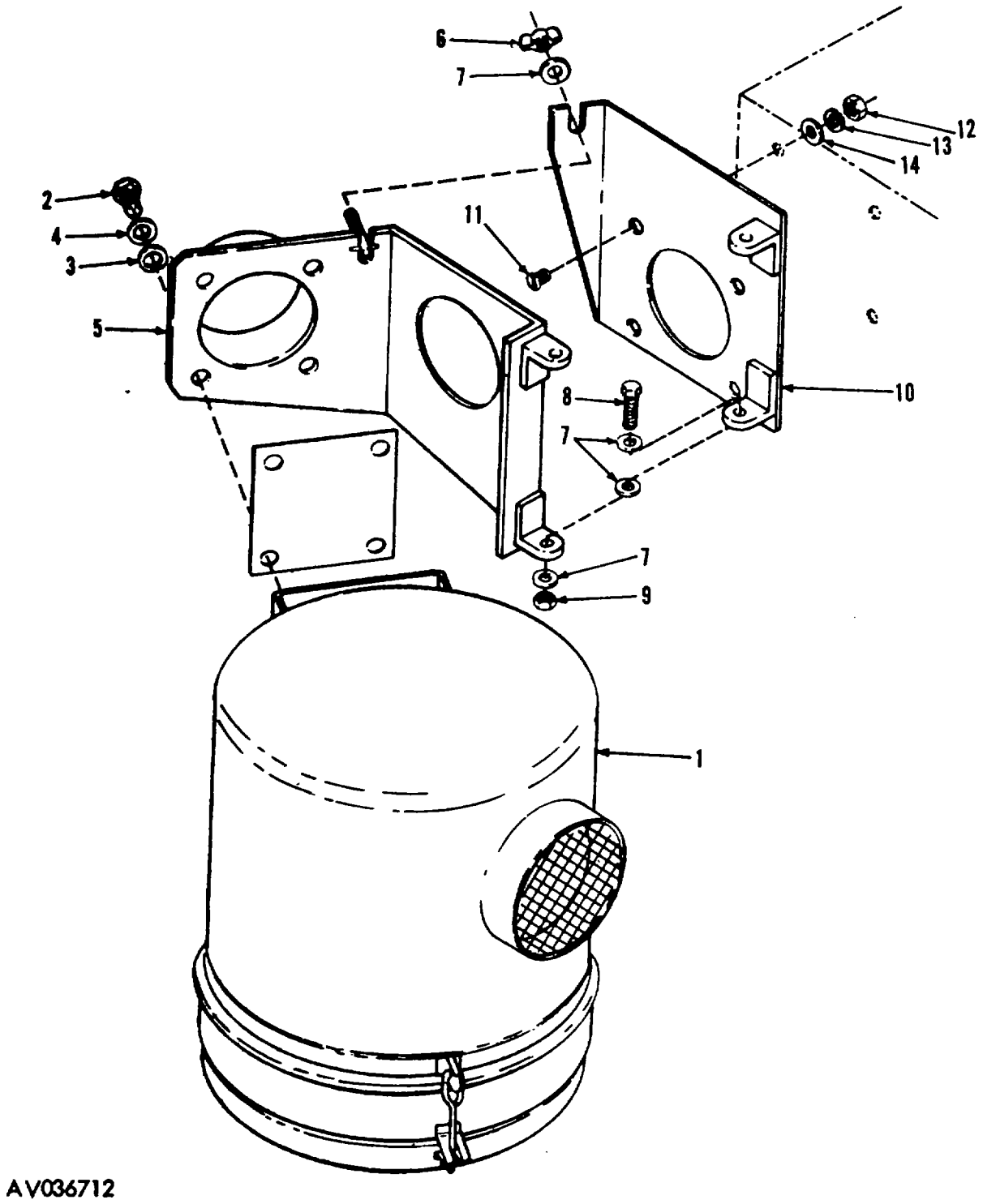

Figure A-12. Cleaner and Support

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CLEANER AND SUPPORT					
A-12				CLEANER AND SUPPORT (82386) (C614-8000) ..... (See 52, figure A-2)	REF
A-12	-1	X2F		CLEANER , Air (82386) (0102-5503) ..... (ATTACHING PARTS)	1
A-12	-2			SCREW, Cap, hexagon head (96906) ..... (MS90725-109)	4
A-12	-3			WASHER, Lock (96906) (MS35338-48)	4
A-12	-4			WASHER, Flat (96906) (MS15795-218)	4
A-12	-5			PANEL, Support (82386) (C614-8001) ..... (ATTACHING PARTS)	1
A-12	-6			NUT, Wing (82386) (407-18)	1
A-12	-7			WASHER, Flat (96906) (MS15795-214)	7
A-12	-8			SCREW, Cap, hexagon head (96906) ..... (MS90725-62)	2
A-12	-9			NUT, Self-locking (88044) (AN365-616)	2
				---*---	
A-12	-10			SUPPORT (82386) (C614-8002) ..... (ATTACHING PARTS)	1
A-12	-11			SCREW, Machine (82386) (675-178)	4
A-12	-12			NUT, Plain, hexagon (96906) (MS35690-602)	4
A-12	-13			WASHER, Lock (96906) (MS35338-46)	4

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
CLEANER AND SUPPORT (CONT)					
A- 12	-14			WASHER, Flat (96906) (6S15795-214).....	4
				---*---	

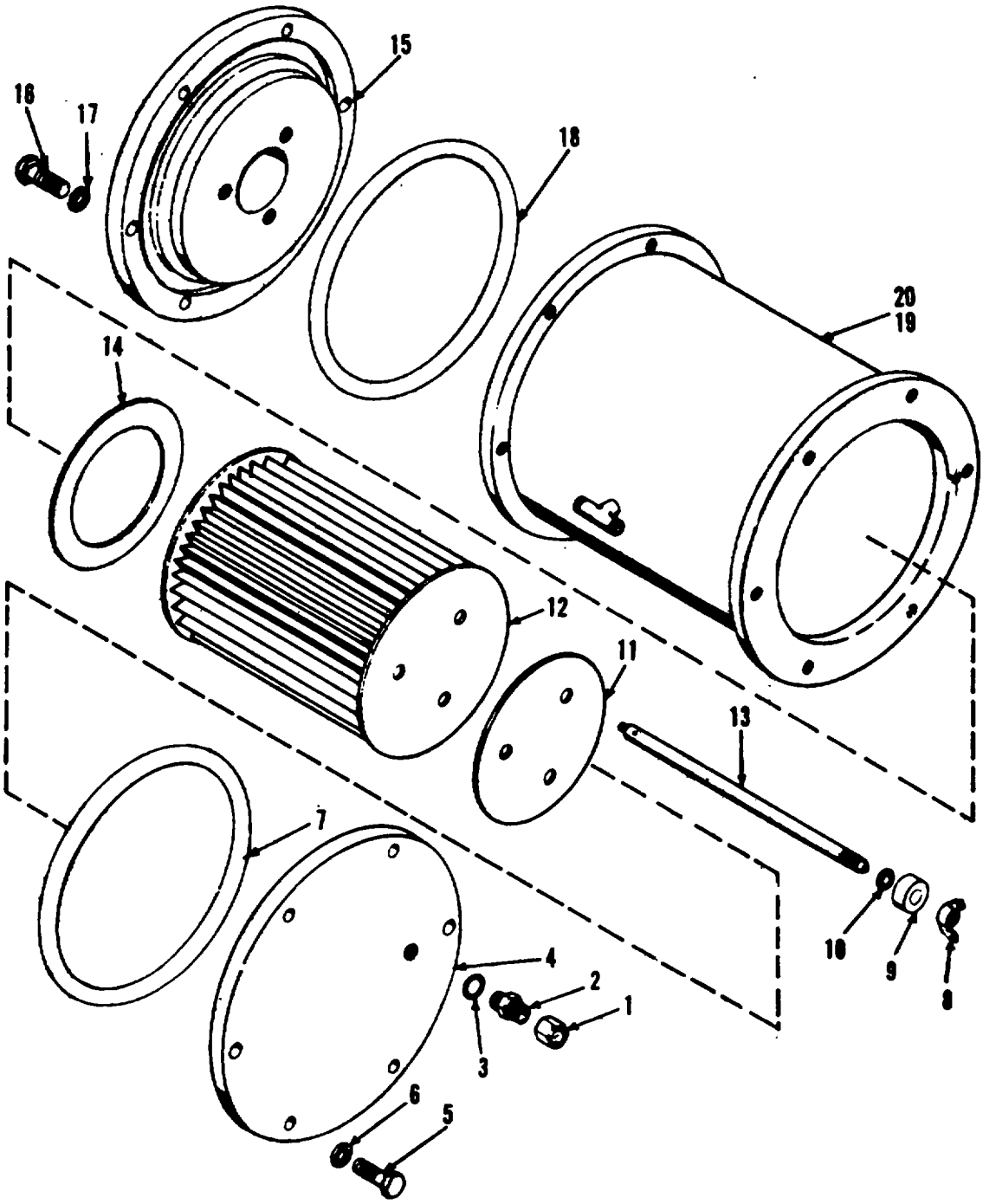

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Figure A-13. Low Pressure Filter

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				LOW PRESSURE FILTER	
A-13				LOW PESSURE FILTER (82386) (301-091) ..... (See 53, figure A-2)	REF
A-13	-1			CAP (88044) (AN929-4D)	1
A-13	-2			UNION (88044) (AY815-4D)	1
A-13	-3			PACKING, Preformed (96906) (MS28778-4).....	1
A-13	-4			COVEP, Inspection (82386) (8004-012) ..... (ATTACHING PARTS)	1
A-13	-5			SCREW, Cap, hexagon head (96906)..... (MS35303-36)	6
A-13	-6			WASHER, Lock (96906) (635338-45)..... ---*---	6
A-13	-7			PACKING, Preformed (96906) (628775-442).....	1
A-13	-8			NUT, Plain, wind (82386) (407-18)	3
A-13	-9			WASHEER, Sealing (82386) (4544)	3
A-13	-10			PACKING, Preformed (96906) (MS28778-4).....	3
A-13	-11			RETAINER, Seal (82386) (4543A)	1
A-13	-12	P1F		ELEMENT (88044) (AN6236-3)	1
A-13	-13			ROD, Guide (82386) (4541-3)	3
A-13	-14			GASKET (88044) (AN6238-1)	1
A-13	-15			COVER, Outlet (82386) (8004-013) ..... (ATTACHING PARTS)	1
A-13	-16			SCREW, Cap, hexagon head (96906)..... (MS35303-36)	6

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				LOW. PRESSURE FILTER (CONT)	
A-13	-17			WASHER, Lock (96906) (MS35338-45).....	6
A-13	-18			PACKING, Preformed (96906) (M28775-442).....	1
A-13	-19			HOUSBNE, Filter (82386) (8003-007).....	1

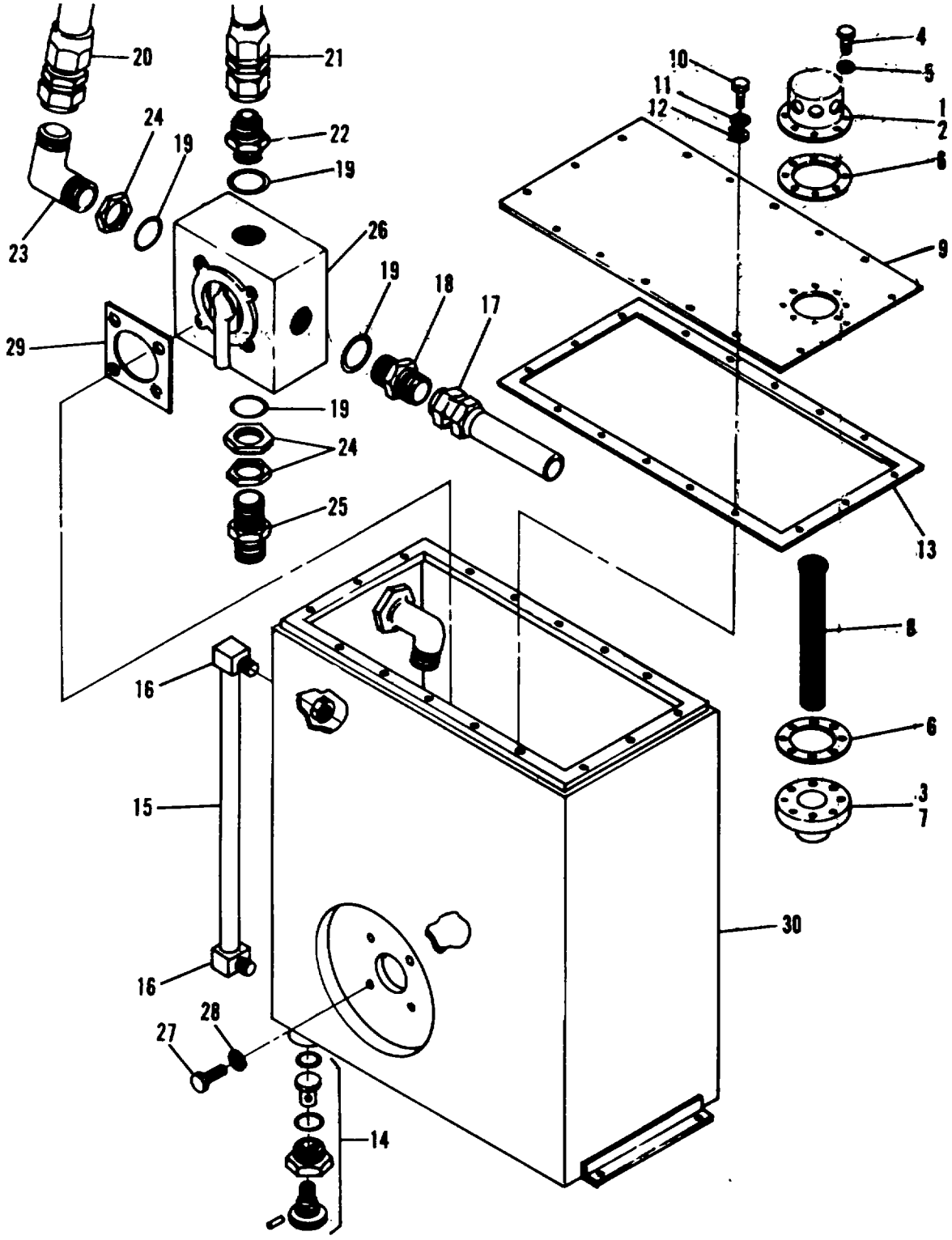

Figure A-14. Hydraulic Tank Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HYDRAULIC TANK ASSEMBLY					
A-14				HYIAULIC TANK AS!BLY (82386) ..... (c614-1009) (See 55, figure A-2)	REF
A-14	-1	P1F		CAP, Breather (90005) (1990-A).....	1
				(ATTACHING PARTS)	
A-14	-2			ROPE ASSEMBLY, Wire (82386) (667-303)	1
A-14	-3			NECK, Filler (82386) (4076-002)	1
				(ATTACHING PARTS)	
A-14	-4			SCREW, Machine (96906) (M35223-45)	8
A-14	-5			WASHER, Lock (96906) (1535333-38).....	8
A-14	-6	P1F		GASKET(82386) (A840-6046).....	2
A-14	-7			WELL, Neck (82386) (A840-6047).....	1
A-14	-8	P1F		STRAINER (82386) (324-006).....	1
A-14	-9			COVER, Access (82386) (C614-6040)	1
				(ATTACHING PARTS)	
A-14	-10			SCREW, Machine (96906) (MB35224-64).....	16
A-14	-11			WASHR, Lock (96906) (1M35338-43)	16
A-14	-12			WASHER, Flat (96906) (1M15795-208)	16
A-14	-13	PIF		GASKET (82386) (A840-6038).....	1
A-14	-14		4920-651-5578	VALVE, Drain (82386) (2-1668).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HYDRAULIC TANK ASSEMBLY (CONT)	
A-14	-15	P1F		GAGE, Level (82386) (108-010)	1
				(ATTACHING PARTS)	
A-14	-16	P1F		NUT, Expansion (82386) (108-901)	2
A-14	-17			TUBE ASSEMBLY (82386) (A840-3001)	1
A-14	-18			UNION (88044) (AN815-24D)	1
A-14	-19			PACKING, Performed (96906) (MS28778-21)	4
A-14	-20			HOSE ASSEMBLY (00624) (601-00024D-01OO00)	1
A-14				NIPPLE ASSEMBLY (00624) (526-24D)	2
A-14				SOCKET (00624) (516-24D)	2
A-l-4				HOSE (0062L) (601-24)	1
A-1	-21			HOSE ASSEMBLY (00624) (601-00020D-0105)	1
A-14				NIPPLE ASSEMBLY (0062)4) (526-20D)	2
A- 14				SOCKET (00624) (516-20D)	2
A-14				HOSE (00624) (601-20)	1
A-14	-22			UNION, Reducing (88o044) (Ai919-28D)	1
A-l4+	-23			ELBOW, Bulkhead (8880441) (Ai835-24D)	1
A-14L	-21			LOCK, Nut (80o44) (Ai1924-21D)	2
A-14	-25			UNION, Bulkhead (880441+) (AIC832-24D)	1
A-14	-26			VALVE (82386) (4010-028)	1
				(ATTACHING PEARTS)	
A-14	-27	X2F		SCREW, Special (823 (2 (803- 0,°)	4

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HYDRAULIC TANK ASSEMBLY (CONT)					
A-l14	-28			PACKING, Performed (96906) (MS28775-014)	4
A-14	-29	P1F		GASKET (82386) (AQ40-6039)	1
A-14	-30			TAIEK, Hydraulic (82386) (C614-1010)	1

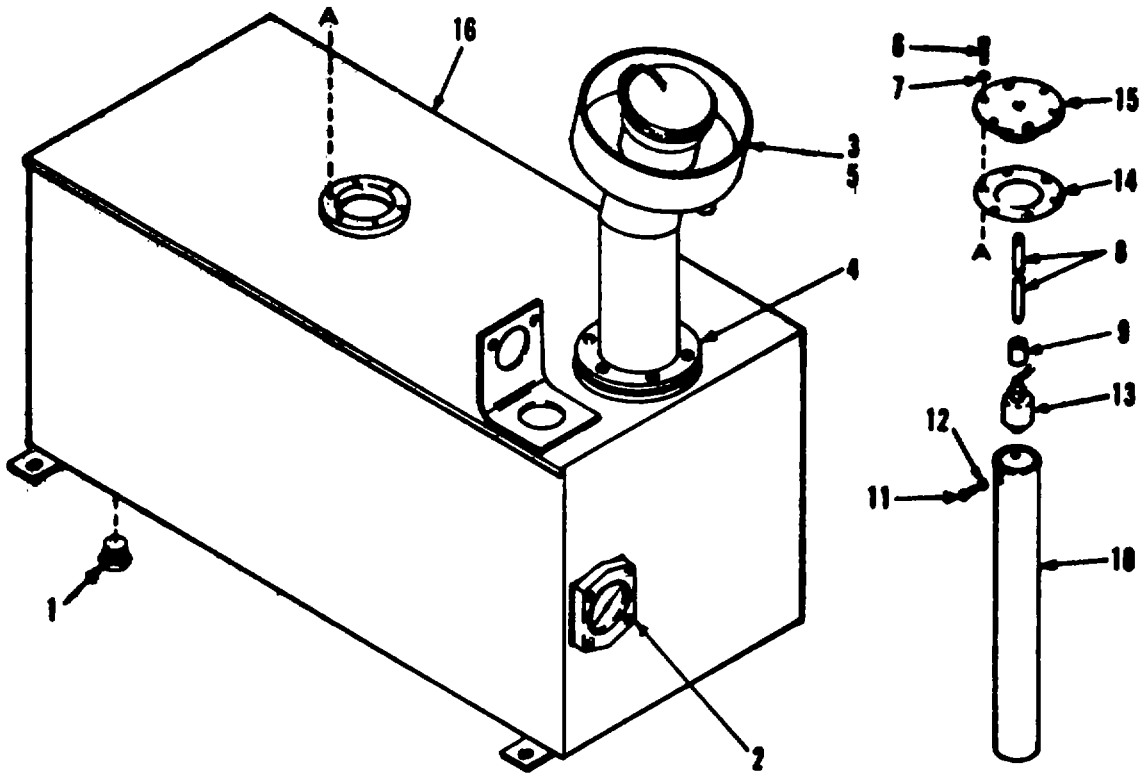

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Figure A-15. Fuel Tank Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				FUEL TANK ASSEMBLY	
A-15				FUEL TANK ASSEMBLY (82386) (C614-1066) ..... (See 56, figure A-2)	REF
A-15	-1			PLUG, Pipe (82386) (4972-6-i4)	1
A-15	-2	P1F		GAGE, Liquid (82486) (336-019)	1
A-15	-3			SPOUT ASSEMBLY (82386) (OM4-1067)	1
A-15	-4			GASKET (82386) (C614-0o651	1
A-15	-5			STRAINER, Fuel (82386), (-4-013)	1
A-15				SWITCH ASSEMBLY (82386) (C6314-1021) ..... (ATMACHING PARTS)	1
A-15	-6			SCREW, Machine (96906) (MS35224-63)	6
A-15	-7			WASHER, Lock (96906) (1635338-43).....	6
A-15	-8			NIPPLE, Pipe (82386) (4982-063).....	1
A-15	--9			COUPLING (82386) (4970-2)	1
A-15	-10			HOUSING, Switch (82386) (C614-1019) ..... (ATACHING PARTS)	1
A-15	-11			SCREW, Machine (96906) (1M35223-26)	3
A-15	-12			WASHER, Lock (96906) (1M3533S-41)	3
A-15	-13	P1F		FIDAT, Switch (04034) (IS-1701)	1
A-15	-14	P1F		GASKET (82386) (C511-2762).....	1
A-15	-15			FIANGE, Housing (82386) (C614-1020)	1
A-15	-16			TANK, Fuel (82386) (C614-1016).....	1

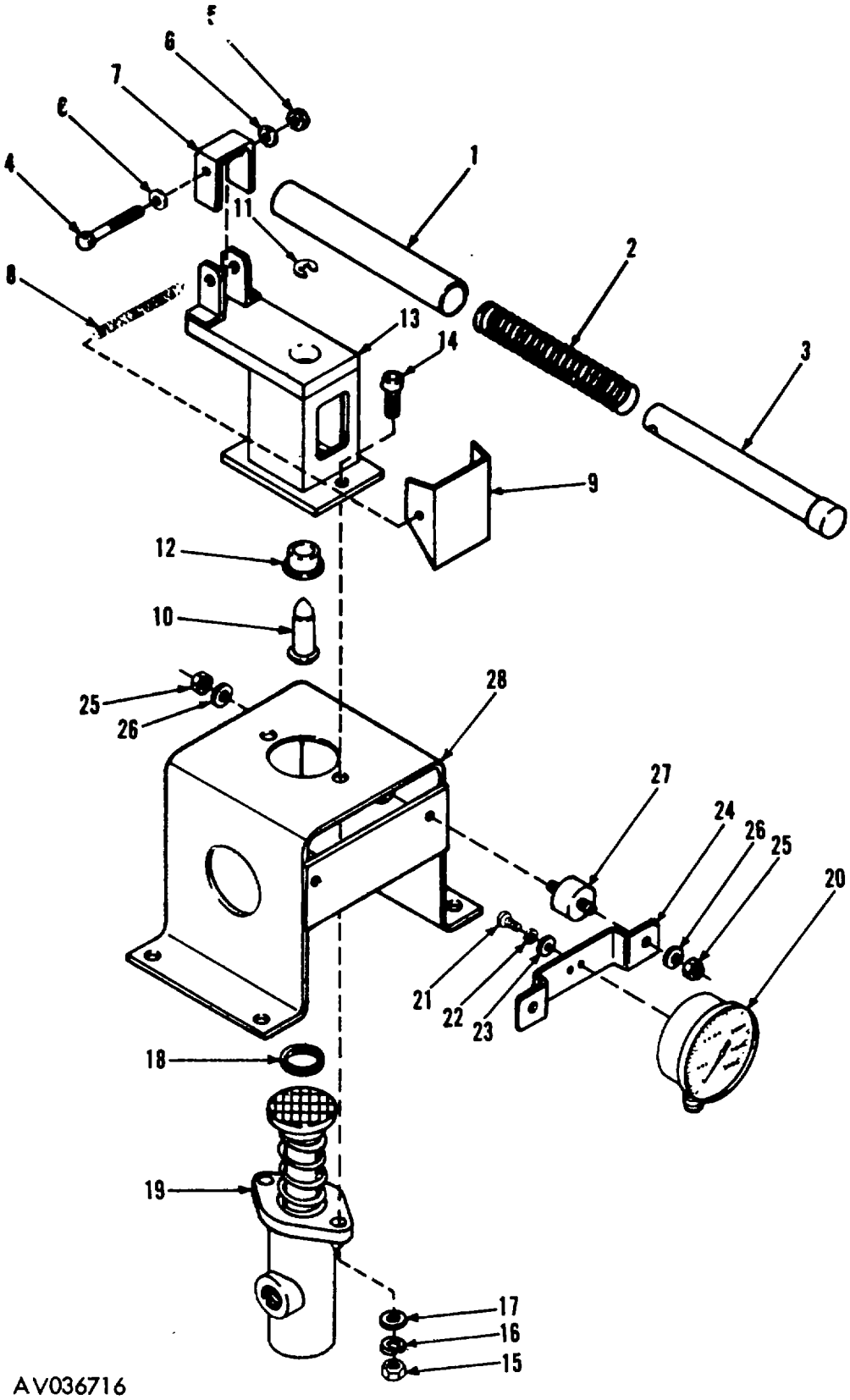

Figure A-16. Start Valve Mounting Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
START VALVE MOUNTING ASSEMBLY					
A-16				START VALVE MOUNTING ASSEMBLY ..... (82386) (C614-1057) (See 57, figure A-2)	REF
A-16	-1			E1XSION, Handle (82386) (C195-1802).....	1
A-16	-2			SPRING, Compression (82386) (711-144)	1
A-16	-3			HANDLE, Valve (82386) (C511-1801) ..... (ATIACHING PARTS)	1
A-16	-4			SCREW, Cap, hexagon head (96906)..... (MS35292-13)	1
A-16	-5			NUT, Self-locking (96906) (NB20365-428)	1
A-16	-6			WASHER, Flat (96906) (1527183-11)	2
A-16	-7			BRACKET, Strap (82386) (0614-3344).....	1
A-16	-8	P1F		SPRING, Extension (82386) (711-178)	1
A-16	-9			COVER, Access (82386) (C614-1058)	1
A-16	-10			SHAFT, Actuator (82386) (C511-0104) ..... (ATTACHING PARTS)	1
A-16	-11			RING, Retaining (79136) (5144-50).....	1
A-16	-12	P1H		BEARING (70417) (FF-707-5)	1
A-16	-13			BRACKET, Valve (82386) (C614-1055) ..... (ATTACHING PARTS)	1
A-16	-14			SCREW, Cap, socket head (82386) (686-56).....	2
A-16	-15			NUT, Plain, hexagon (96906) (MB3569 0-502)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
START VALVE MOUNTING ASSEMBLY					
A-16	-16			WASHE, Lock (96906) (MS35338-45)	2
A-16	-17			WASHER, Flat (96906) (MB15795-212)	2
A-16	-18			WASHER, Nonmetallic (82386) (400-340)	1
A-16	-19	P1H	4920-918-7699	VALVE, Start (01843) (VA202180)	1
				(See figure A-33)	
A-16	-20	P1F		GAGE, Pressure (82386) (30o;088)	1
				(ATTACHING PARTS)	
A-16	-21			SCREW, machine (96c)6) (MB35223-28)	2
A-16	-22			WASHE, Lock (96906) (M3133&41)	2
A-16	-23			WASHER, Flat (96906) (MB15795"206)	2
A-16	-24			BRACKET, Gage (82386) (C614-0072)	1
				(ATTACHING PARTS)	
A-16	-25			NUT, Plain, hexagon (96906) (AS35690-402)	4
A-16	-26			WASHB,, Flat (96906) (127n183-11)	4
A-16	-27	P1F		IBOLATOR (82386) (561-137)	2
A-16	-28	P1H		SUPPORT, Valve (82386) (C614-1 056)	1

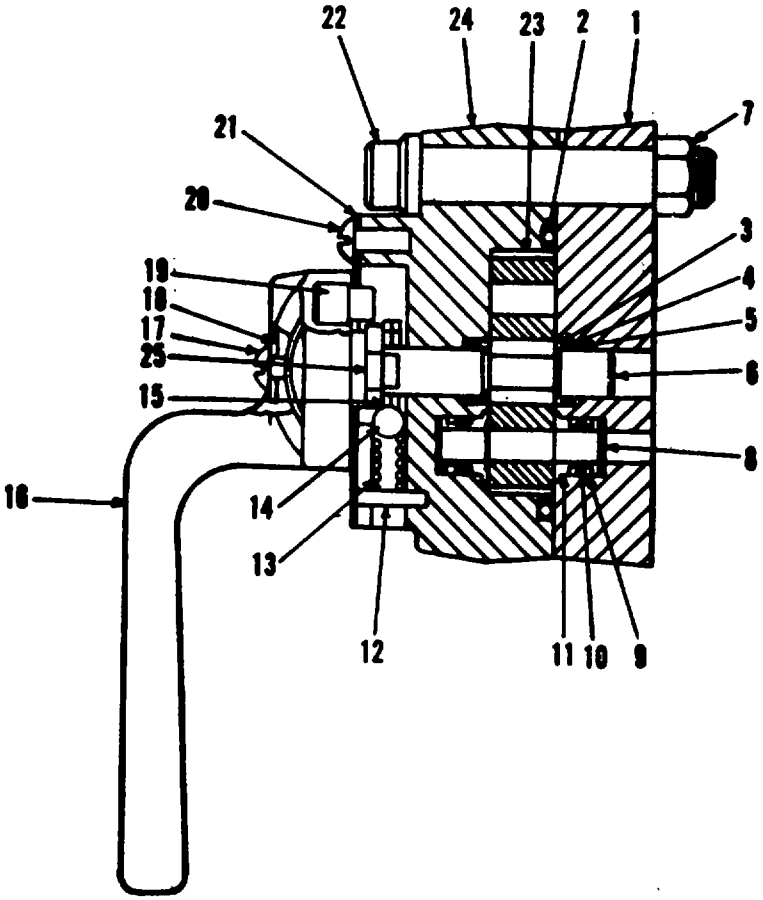

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Figure A-17. Selector Valve

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				SELECTOR VALVE	
A-17				SELECTOR VALVE (86768) (805B-12-HS2)	REF
				(Sce 59, figure A-2)	
A-17	-1			BODY (96768) (12-556-30-1)	1
A-17	-2	P1H		PACKING, Preformed ((96768) (SP100-154)	1
A-17	-3			WASHER (96768) (12-556-47)	2
A-17	-4	P1H		PACKING, Preformed (96768) (SP100-12)	2
A-17	-5	P1H		RING, Back-up (96768) (12-556-51)	2
A-17	-6			SHAFT (96768) (12-556-12)	1
A-17	-7			NUT, Plain, hexagon 1/2-20NF-2 (COPL)	4
A-17	-8	PLH		SPRG (96768) (3-2054-1)	6
A-17	-9	P1H		RIIG, Back-up (96768) (SP201-95)	12
A-17	-10	P1Hl		PACKING, Preformed (96768) (SP100-95)	6
A-17	-11	P1H		SEAL (96768) (12-1455-60-1)	6
A-17	-12			PIN, Grooved, type "D" 1/8 x 1/2 lf.(COML)	2
A-17	-13	P1H		SPRING (96768) (10-2861-7)	2
A-17	-14			BALL 5/16 Grade 200 (COML)	2
A-17	-]-5			PIATE, Detent (96768) (12-556-14)	1
A-17	-16	X2F		HANDLE (96768) (12-556-17)	1
A-17	-17			SCREW Nylok (96768) (M31A-S420R10CH)	1
A-17	-18			WASER (96768) (12-556-52)	1
A-17	-19			PIN, Stop (96768) (7-1563-4-3)	1
A-17	-20			SCR I 1/2-20I1F-2 x 3-1/2 (COML)	4
A-17	-21			PIATE, Identification (96768) (12-556-16)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
SELECTOR VALVE (CONT)					
A-17	-22			SCREW, Machine RD HD 1/4-20NC-2 x 3/8 ..... (COML)	4
A-17	-23			DIBK (96768) (12-1455-50-3)	1
A-17	-24			CAP (96768) (12-556-1-1)	1
A-17	-25			PIATE, Stop (96768) (9-1566-1-3)	1

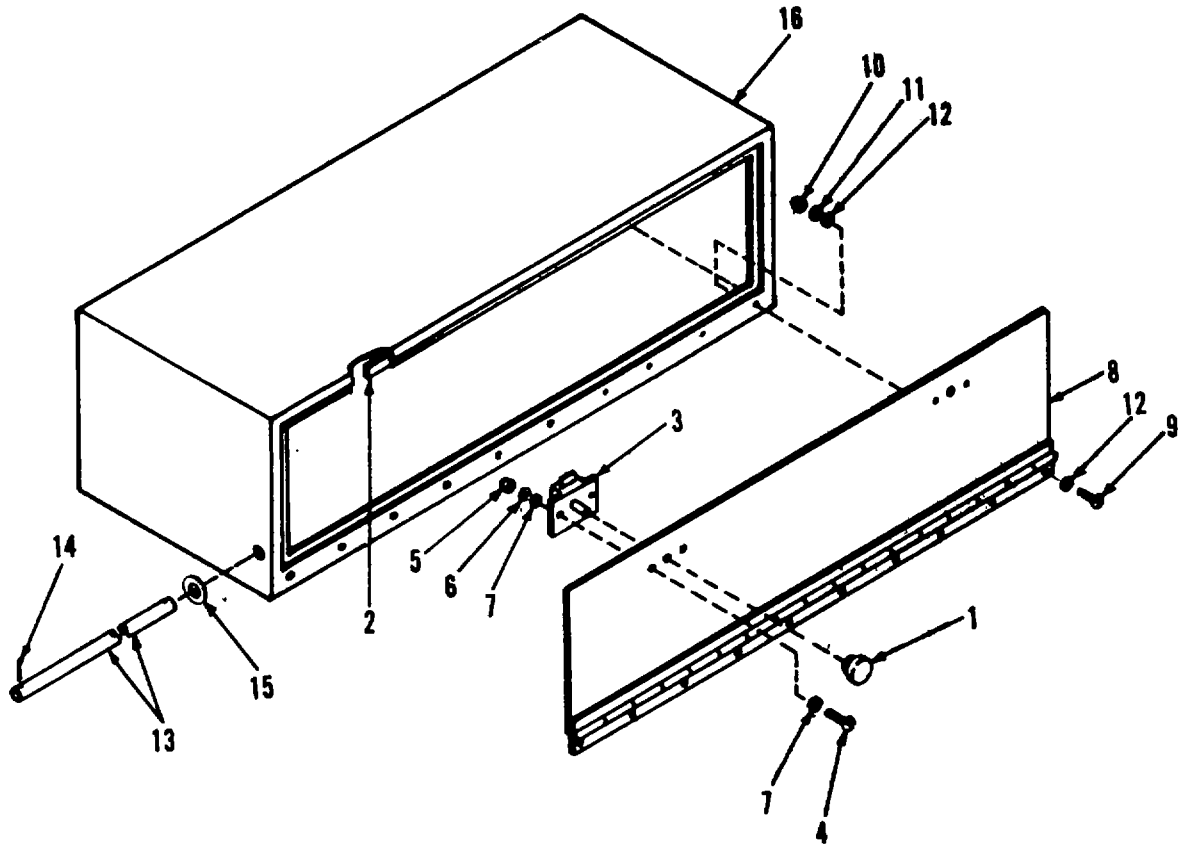

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Figure A-18. Storage Bin

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				STORAGE BIN	
A-18				STORAGE BIN (82386) (C614-1081)..... (See 66, figure A-2)	REF
A-18	-1	P1F		KNOB (82386) (1414-003)	2
A-18	-2			STRIKE (82386) (L1409-903).....	1
A-18	-3	P1F		LATCH ASSEMBLY (82386) (1409-504) ..... (ATTACHING PARTS)	2
A-18	-4			SCREW, Machine (96906) (IM35190-254)	4
A-18	-.5			NUT, Cap (82386) (407-2).....	4
A-18	-6			WASHER, Lock (96906) (MS35338-42)	4
A-18 :	-7			WASHER, Flat (96906) (kM27183-7)	8
A-18	-8			DOOR ASSEMBLY (82386) (C614-1099) ..... (ATTACHING PARTS)	1
A-18	-9			SCREW, Machine (96906) (MS35224-64).....	10
A-18	-10			NUT, Cap (82386) (407-3).....	10
A-18	-11			WASHER, Lock (82386) (604-llMZ)	10
A-18	-12			WASHER, Flat (96906) (MS27183-8).....	20
A-18	-13			SHAFT, Straight (82386) (C614-2000) ..... (ATTACHING PARTS)	1
A-18	-14			PIN, Cotter (82386) (695-5)	2
A-18	-15			WASHER, Flat (82386) (400-182MZ)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				STORAGE BIN (CONT)	
A-18		PIF		TUBE, Nonmetallic (82386) (623-015)	1
A-18	-16			BOX, Storage (82386) (C614-1078)	1

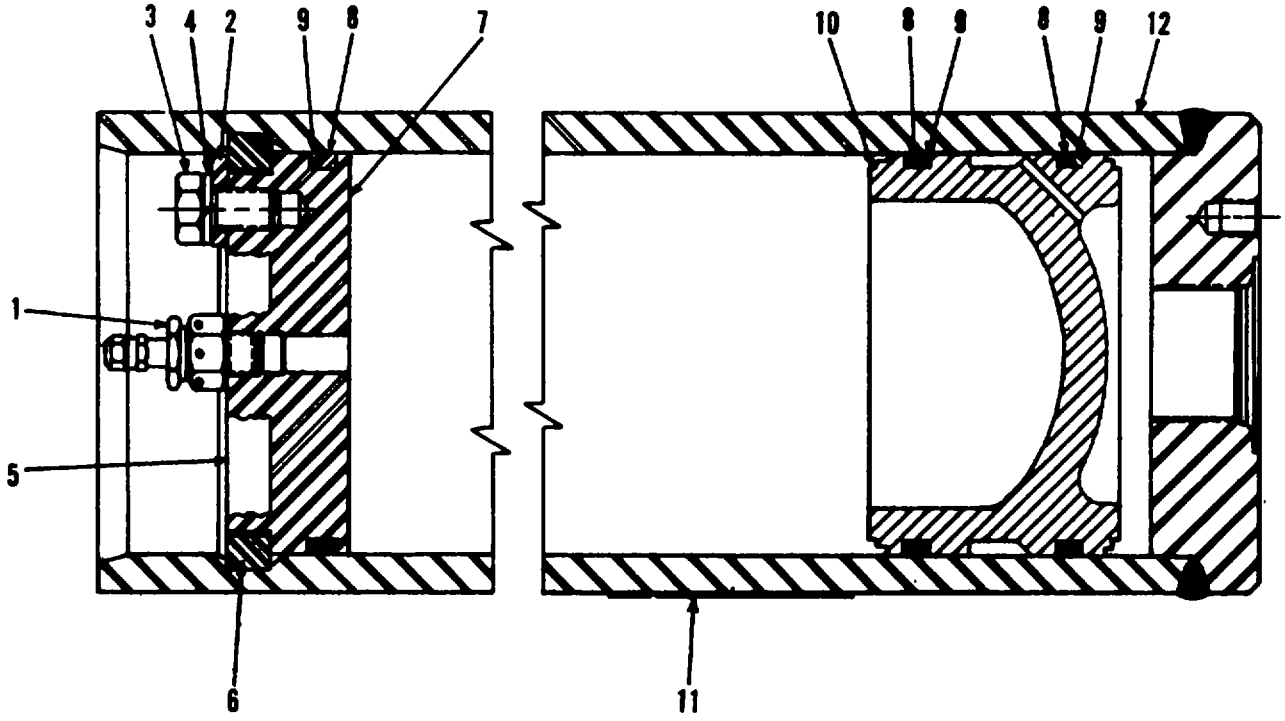

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Figure A-19. Accumulator

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				ACCUMULATOR	
A-19				ACCUMULATOR (01843) (ACC-20 A-211)	REF
				(See 67, figure A-2)	
A-19	-1	P1F		VALVE, Air (01843) (VA200932)	1
A-19	-2			PLATE, Retaining (01843) (PL202625)	1
				(ATTACHING PARTS)	
A-19	-3			SCREW, Cap, hexagon head (01843) (SC2023)	1
A-19	-4			WASHER, Lock (01843) (WA6-16)	1
A-19	-5			SEXMET, Retaining (01843) (RG202624-1)	2
A-19	-6			SEGMENT, Retaining (01843) (RG202624-2)	2
A-19	-7			CAP, Gas (01843) (CP202629)	1
A-19	-8	P1H		PACKING, Preformed (01843) (GA1l28-9)	3
A-19	-9	P1H		RING, Back-up (01843) (RG100155)	3
A-19	-10			PISTON (01843) (PT202627)	1
A-19	-11			PLATE, Identification (01843) (NP202634)	1
A-19	-12			HOUSING (01843) (HG202621-4)	1

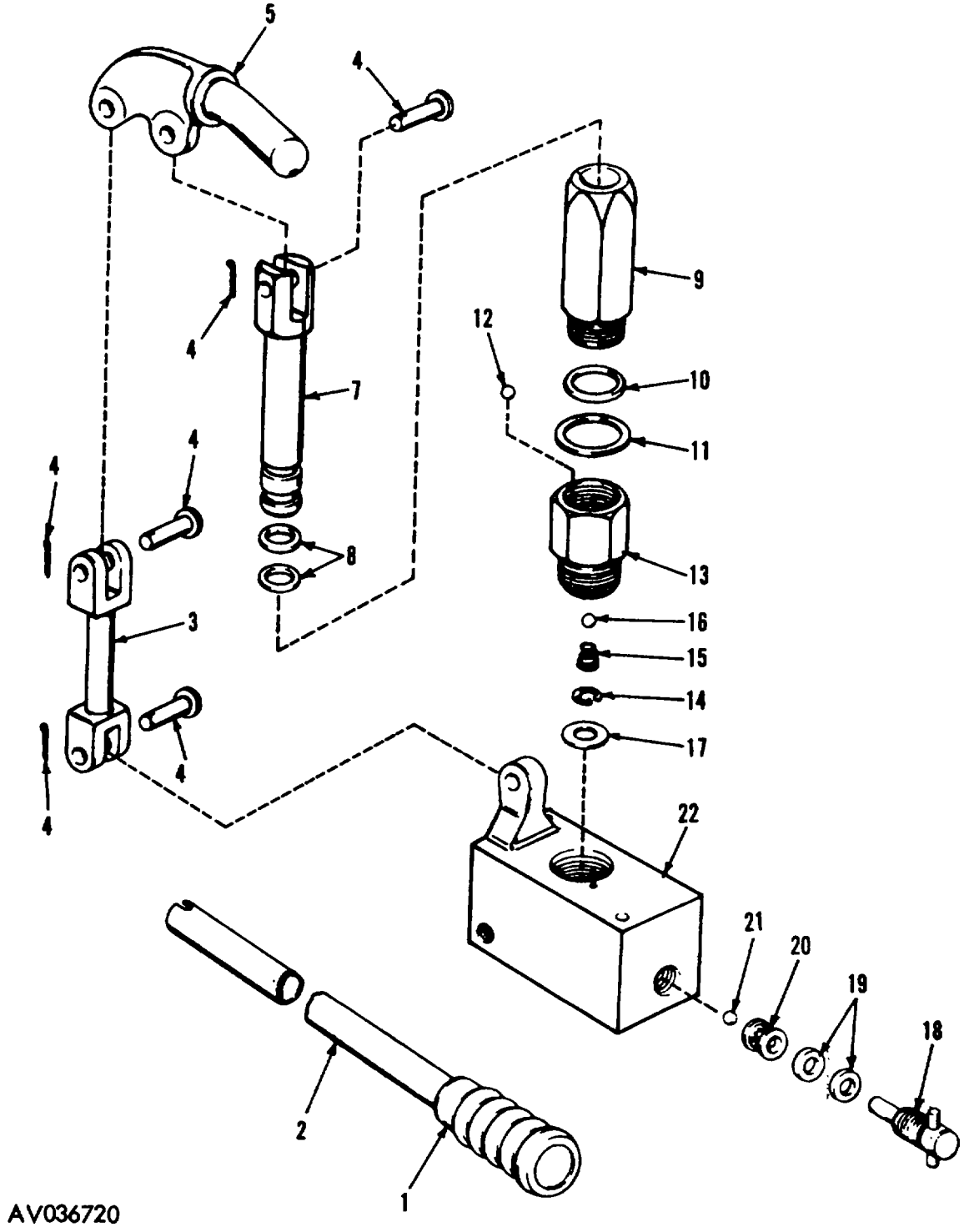

Figure A-20. Hand Pump

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HAND PUMP	
A-20				HAND PUMP (47296) (1000-3-4)	REF
				(See 70, figure A-2)	
A-20	-1			GRIP, Hand (47c96) (DU-1-50-6)	1
A-20	-2			HANDLE (47296) (1000-2-0)	1
A-20	-3			LINK, Pump (47296) (1000-15S)	1
A-20	-4			PIN ASSEMBLY (47296) (1000-13-0)	3
A-20	-5			LEVER (47296) (1000-1-0).....	1
				(ATTACIIING PARTS)	
A-20	-7			PISTON, Pump (47296) (1000-14-6)	1
A-20	-8			PACKING, Preformed (8804l4) (AN6227-11)	2
A-20	-9			BARREL, Pump (47296) (1000-9-5)	1
A-20	-10	P1F		PACKING, Preformed (47296) (1000-25-8)	1
A-20	-11	P1F		RING, Back-up (47296) (6246-11).....	1
A-20	-12			BALL, Check (47296) (1000-19-0).....	1
A-20	-13			BLOCK, Valve (47296) (1000-24-0)	1
A-20	-14			RING, Retaining (47296) (1000-22-0).....	1
A-20	-15			SPRING, Helical, compression (47296).....	1
				(1000-23-0)	
A-20	-16			BALL, Valve (47296) (1000-21-0).....	1
A-20	-17			WASHER (47296) (1000-17-0).....	1
A-20	-18			SCREW. Release (47296) (1000-5-0)	1
A-20	-19			WASHER (47296) (1000-6-0).....	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HAND PUMP (CONT)	
A-20	-20			CAGE, Ball (47296) (1000-4-O0).....	1
A-20	-21			BAIL., Release (47296) (1000-18-O).....	1
A-20	-22			BLOCK, Pump (47296) (1000-3-0).....	1

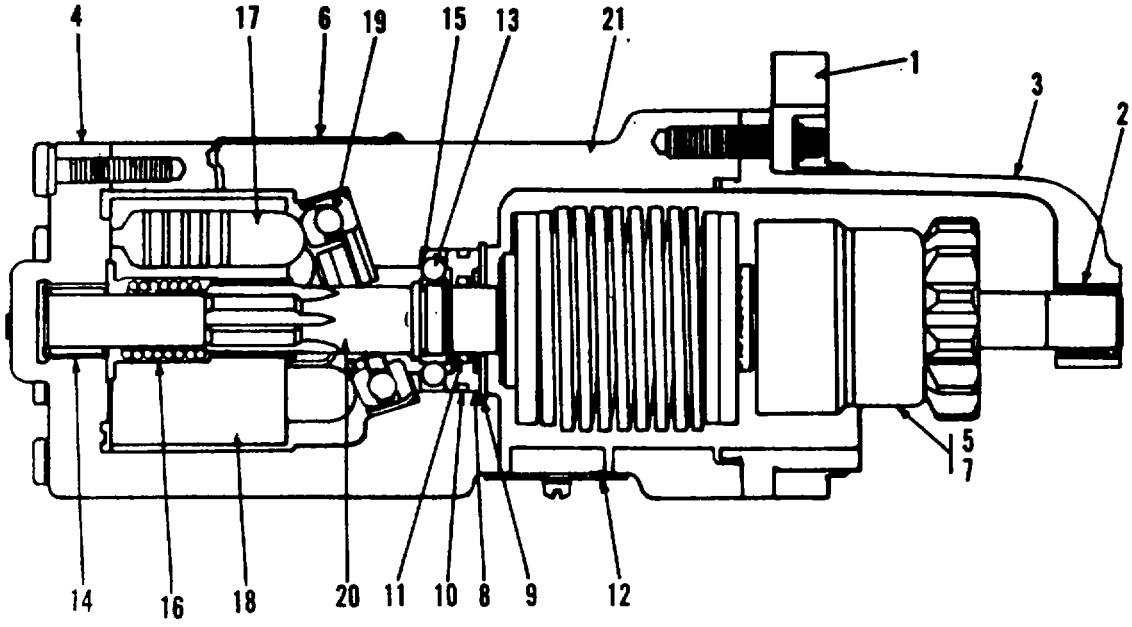

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Figure A-21. Hydraulic Start Motor

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HYDRAULIC STARTING MOTOR					
A-21				HYDRAULIC STARTING MOTOR (01843) ..... (CMC-308068A) (See 93, figure A-2)	REF
A-21	-1			FLANGE, Mounting (01843) (FI200547)..... (ATTACHING PARTS)	1
A-21				SCREW (01843) (SC100196).....	4
A-21				WASHER, Lock (01843) (WA6-1OBL)..... ---*---	4
A-21	-2	P1H		BEARING, Needle (01843) (BN100093).....	1
A-21	-3			HOUSING, Pinion gear (01843).....	1
A-21	-4			PLATE, Port (01843) (PI202162)..... (ATTACHING PARTS)	1
A-21				SCREW, Cap, hexagon head (01843) (SC1l434).....	8
A-21				WASHER, Lock (01843) (WA6-8BL)..... ---*---	8
A-21	-5			DRIVE, Bendix (01843) (DV200550).....	1
A-21	-6			PLATE, Identification (018l43) (NP200549)..... (ATTACHING PARTS) ---*---	1
A-21				SCREW, Drive (01843) (SC150-2)..... ---*---	2
A-21	-7			KEY, woodruff (01843) (KY2-5).....	1

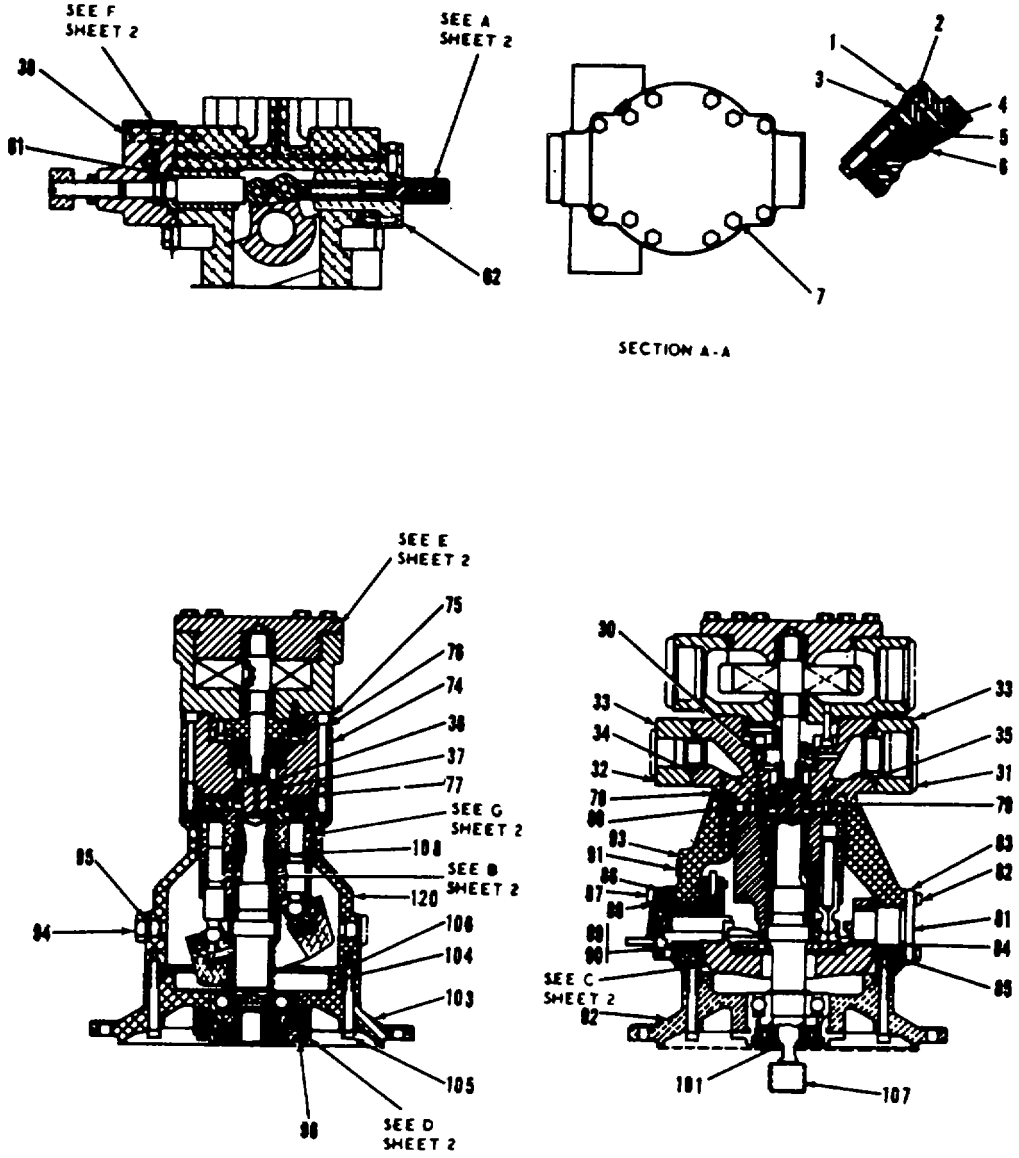

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Figure A-22. High Pressure Pump (Sheet 1 of 2)

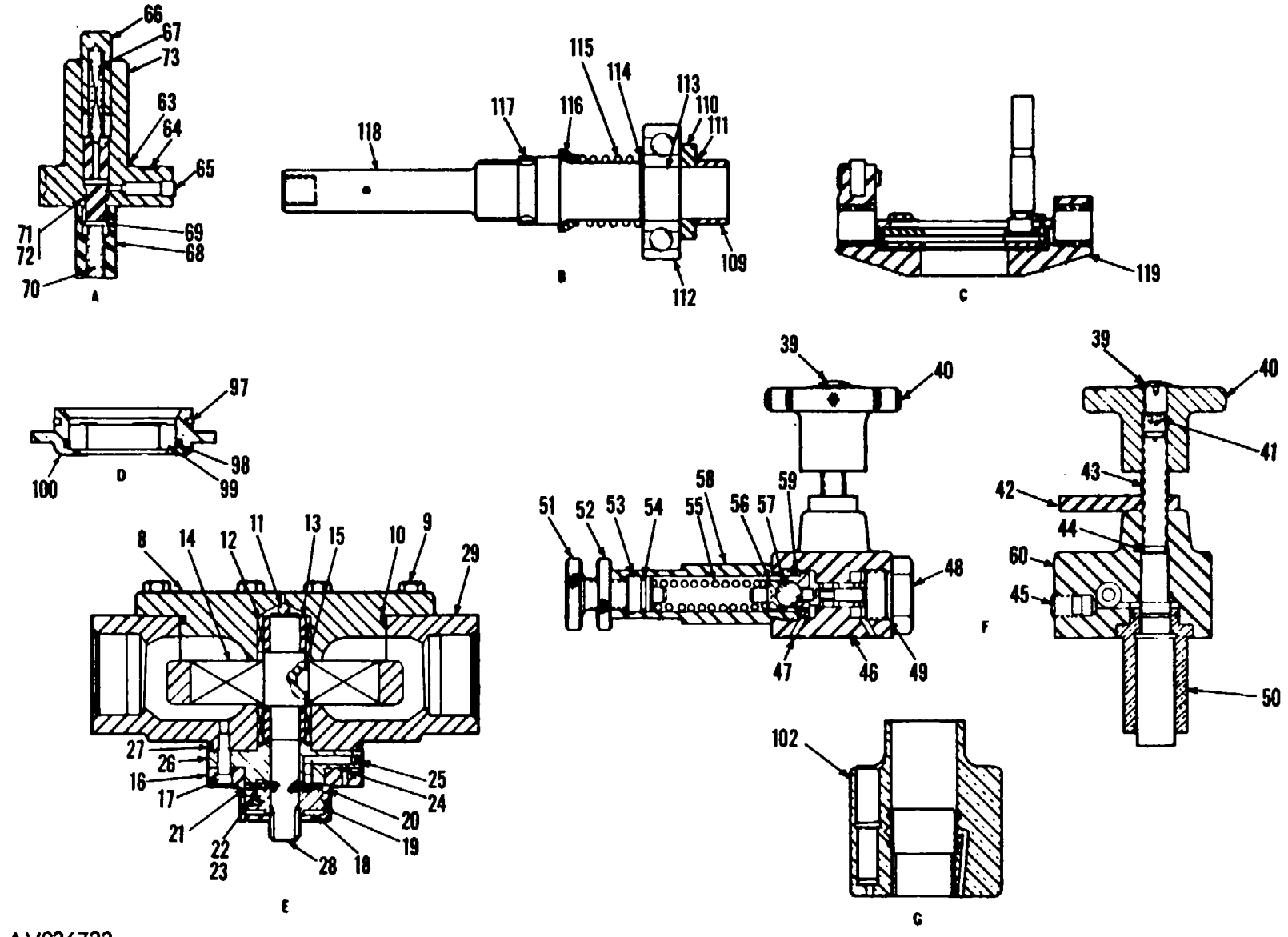

Figure A-22. High Pressure Pump (Sheet 2 of 2)

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HIGH PRESSURE PUMP	
A-22				HIGH PRESSURE PUMP (12027) (610541)..... (See 103, figure A-2)	REF
A-22	-1			PLUG (12027) (407902).....	1
A-22	-2	P1D		PACKING, Preformed (12027) (408612).....	1
A-22	-3			SETSCREW (12027) (407693).....	2
A-22	-4	P1D		SPRING, Helical, compression (12027)..... (408001)	1
A-22	-5	P1D		BALL, Steel (12027) (408006)	
A-22	-6			SEAT, Valve (12027) (353025).....	1
A-22	P1D			BOOST PUMP CAPSULE ASSEMBLY (12027)..... (7O3037)	1
				(ATTACHING PARTS)	
A-22	-7			SCREW, Cap, hexagon head (12027) (407690).....	4
A-22	-8			CAP (12027) (204084).....	1
				(ATTACHING PARTS)	
A-22	-9			SCREW, Cap, hexagon head (12027) (407691)..... ---*---	8
A-22	-10	P1D		PACKING, Preformed (12027) (40759).....	1
A-22	-11			BALL, Steel (12027) (408006).....	1
A-22	-12	P1D		BEARING, Needle (12027) (407767).....	2
A-22	-13			RACE, Bearing (12027) (407766).....	2
A-22	-14	P1D		ELEMENT, Gerotor (12027) (408059).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HIGH PRESSURE PUMP (CONT)					
A-22	-15			KEY, Woodruff (12027) (401117)	1
A-22	-16			CASE (12027) (353156)	1
				(ATTACHING PARTS)	
A-22	-17			SCREW, Cap, socket head (12027) (4l00783) ---*---	4
A-22	-18			SPRING, Disc (12027) (408017)	1
A-22	-19	P1D		PLATE, Port (12027) (204015)	1
A-22	-20			PIN, Straight, headless (12027) (407888)	1
A-22	-21	P1D)		RING, Eccentric (12027) (353036)	1
A-22	-22	P1D		ELEMENT, Gerotor (12027) (408018)	1
A-22	-23	P1D		PIN, Drive (353494)	1
A-22	-24	P1D		PACKING, Preformed (12027) (401267)	1
A-22	-25			PLUG (12027) (353041)	1
A-22	-26	X2		CAP (12027) (204083)	1
A-22	-27	P1D		PACKING, Preformed (12027) (402200)	1
A-22	-28			SHAFT, Drive (12027) (353155)	1
A-22	-29			BODY (12027) (204085)	1
A-22	-30			PACKING, Preformed (12027) (401267)	1
A-22	-31			FLANGE, Suction (12027) (353032)	1
A-22	-32			FLANGE, Pressure (12027) (353031)	1
				(ATTACHING PARTS)	
A-22	-33			SCREW, Cap, socket head (12027) (407645) ---*---	8

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HIGH PRESSURE PUMP (CONT)	
A-22	-34	P1D		PACKING, Preformed (12027) (401269).....	1
A-22	-35	P1D		PACKING, Preformed (12027) (401284).....	1
A-22	-36			RING, Retaining (12027) (401238).....	1
A-22	-37	P1D		BEARING, Needle (12027) (407757).....	1
A-22	X2			COMPENSATOR ASSEMBLY (12027) (703115).....	1
				(ATTACHING PARTS)	
A-22	-38			SCREW, Cap, socket head (12027) (407904).....	4
				---*---	
A-22	-39			PLUG, Button (12027) (407904).....	1
A-22	-40			KNOB (12027) (204120).....	1
				(ATTACHING PARTS)	
A-22	-41			SETSCREW (12027) (406656).....	1
				---*---	
A-22	-42			NUT, Locking (12027) (353014).....	1
A-22	-43	P1D		ROD, Adjusting (12027) (353239).....	1
A-22	-44	P1D		PACKING, Preformed (12027) (404547).....	1
A-22	-45			PLUG (12027) (400928).....	1
A-22	-46	P1D		PACKING Preformed (12027) (401273).....	2
A-22	-47	P1D		PACKING, Preformed (12027) (402664).....	2
A-22	-4&			PLUG (12027) (353245).....	1
A-22	-49	P1D		PACKING, Preformed (12027) (405411).....	2
A-22	-50	P1D		SLEEVE AND SPOOL (12027) (703311).....	1
A-22	-51			KNOB (12027) (353249).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HIGH PRESSURE PUMP (CONT)					
A-22	-52			LOCK, Adjusting (12027) (353248)	1
A-22	-53			GUIDE, Spring (12027) (353242)	1
A-22	-54	P1D		PACKING, Preformed (12027) (405952)	1
A-22	-55	X2D		SPRING, Helical, compression (12027) (408008)	1
A-22	-56			GUIDE, Ball (12027) (353243)	1
A-22	-57	P1D		BALL, Steel (12027) (407897)	1
A-22	-58			HOUSING Adjust (12027) (353250)	1
A-22	-59	PD		RETAINER (12027) (353244)	1
A-22	-60			HOUSING, Compensator (12027) (204118)	1
A-22	-61	P1D		PACKING, Preformed (12027) (401278)	1
A-22	P1D			CYLINDER ASSEMBLY (12027) (703132)	1
				(ATTACHING PARTS)	
A-22	-62			SCREW, Cap, socket head (12027) (407658)	4
				---*---	
A-22	-63	P1D		PACKING, Preformed (12027) (401278)	1
A-22	-64	P1D		PACKING, Preformed (12027) (401273)	1
A-22	-65			PLUG (12027) (400922)	1
A-22	-66			PISTON (12027) (353266)	1
A-22	-67			SPRING, Helical, compression (12027) (408078)	1
A-22	-68			NUT, Lock (12027) (353216)	1
A-22	-69			PIN, Straight, headless (12027) (401708)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HIGH PRESSURE PUMP (CONT)	
A-22	-70			STOP, Adjust (12027) (353226)	1
A-22	-71	P1D		PACKING, Preformed (12027) (404581)	1
A-22	-72			RING, Backup (12027) (407479)	1
A-22	-73			CYLINDER, Housing (12027) (353267)	1
A-22	-74			PORT (12027) (204086)	1
				(ATTACHING PARTS)	
A-22	-75			SCREW, Cap, socket head (12027) (405449)	8
A-22	-76			WASHER (12027) (408023)	8
				---*---	
A-22	-77	P1D		PACKING, Preformed (12027) (490111)	1
A-22	-78	P1D		PACKING, Preformed (12027) (401273)	1
A-22	-79			PIN, Straight, headless (12027) (490055)	1
A-22	-80	P1D		PLATE, Port (12027) (353100)	1
A-22	-81	X2D		TRUNNION (12027) (353013)	1
				(ATTACHING PARTS)	
A-22	-82			SCREW, Cap, socket head (12027) (407647)	4
A-22	-83			WASHER, Lock (12027) (407950)	4
				---*---	
A-22	-84	P1D		PACKING, Preformed (12027) (490097)	1
A-22	-85	P1D		WASHER, Trunnion (12027) (353015)	1
A-22	-86	P1D		TRUNNION, Indicator (12027) (703009)	1
				(ATTACHING PARTS)	
A-22	-87			SCREW, Cap, socket head (12027) (407658)	4

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HIGH PRESSURE PUMP (CONT)					
A-22	-88			WASHER, Lock (12027) (407950) ---*---	4
A-22	-89			PACKING, Preformed ('2027) (490097)	1
A-22	-90			WASHER, Trunnion (12027) (353015)	1
A-22	-91			PLATE, Identification (12027) (408060)	1
A-22	-92			PLATE, Designation (12027) (408011) (ATTACHING PARTS)	1
A-22	-93			SCREW, Drive (12027) (407644) ---*---	8
A-22	-94			PLUG ('2027) (407901)	1
A-22	-95	P1D		PACKING, Preformed (12027) (405331)	1
A-22				SEAL-RETAIN ASSEMBLY (132o7) (703003) (ATTACHING PARTS)	1
A-22	-96			SCREW, Cap, socket head (12027) (407689) ---*---	6
A-22	-97	P1D		PACKING, Preformed (12027) (401280)	1
A-22	-98	P1D		PACKING, Preformed (12027) (401280)	1
A-22	-99	P1D		SEAL (12027) (408013)	1
A-22	-100			RETAINER (12027) (353007)	1
A-22	-101	P1D		RING, Retaining (12027) (4{03586)	1
A-22	-102	P1D		CYLINDER BARREL ASSEMBLY (12027) (703021)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HIGH PRESSURE PUMP (CONT)	
-A-22	-103			FLANGE, Mounting (12027) (204087).....	1
				(ATTACHING PARTS)	
A-22	-104			SCREW, Cap, socket head (12027) (407664).....	8
A-22	-105			WASHER, Lock (12027) (407951).....	8
				---*---	
A-22	-106	P1D		PACKING, Preformed (12027) (401274).....	1
A-22	-107	P1D		SHAFT, Extension drive (12027) (353005).....	1
A-22	-108	X2D		SLEEVE, Internal drive (12027) (353094).....	1
A-22				SHAFT ASSEMBLY, Drive (12027) (703362).....	1
A-22	-109			SLEEVE (12027) (00254).....	1
A-22	-110	P1D		RING, Seal (12027) (00225).....	1
A-22	-111	P1D		PACKING, Preformed (12027) (002-99973).....	1
A-22	-112	PD		BEARING, Ball (12027) (004-99974).....	1
A-22	-113	P1D		BALL, Steel (12027) (008-99975).....	1
A-22	-114			RING, Retaining (12027) (007-99976).....	1
A-22	-115			SPRING, Helical, compression (12027).....	1
				(00417)	
A-22	-116			SEAT, Spring (12027) (00237).....	1
A-22	-117			SPACER, Sleeve (12027) (00253).....	1
A-22	-118			SHAFT, Drive (12027) (00340).....	1
A-22	-119			HANGER ASSEMBLY (12027) (703024).....	1
A-22	-120			HOUSING, Front (12027) (204012).....	1

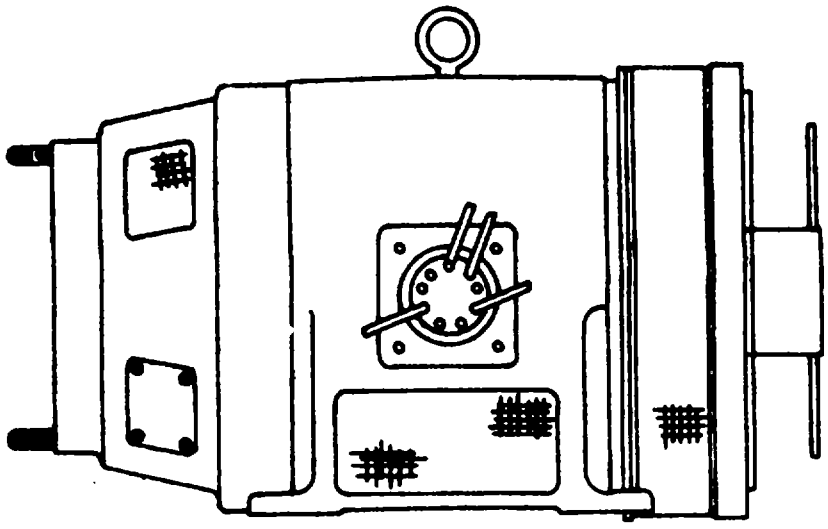

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Figure A-23. Generator

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				GENERATOR	
A-23				GENERATOR (02639) (5SJ4324P9Y1).....REF	
				(See 104, figure A-2)	
				NOTE **The following nonillustrated parts are the only recommended replacements for the generator.**	
A-23				STATOR COILS (03510) (17S938P1T1).....	1
A-23		P1D		BEARING (03510) (50BC02JDD).....	1
A-23				ROTOR SHAFT ASSEMBLY (03510) (17R9508G1).....	1
A-23				COLLECTOR (03510) (3300B52BOO16-GO1).....	1
A-23				BRUSH HOLDER (03510) (M6634853G4).....	3
A-23				STUD, Brush holder (03510).....	3
				(3300A61BOOll-G1)	
A-23				SPRING, Brush (03510) (153A904PT1).....	3
A-23				HUB AND LEVER (03510) (153A902G1).....	1
A-23		P1D		BRUSH, Electrical contact (3510)	4
				(3300A61A0008-GO1)	
A-23		P1D		BRUSH, Ground (03510) (3300A61A0008-00o4).....	2

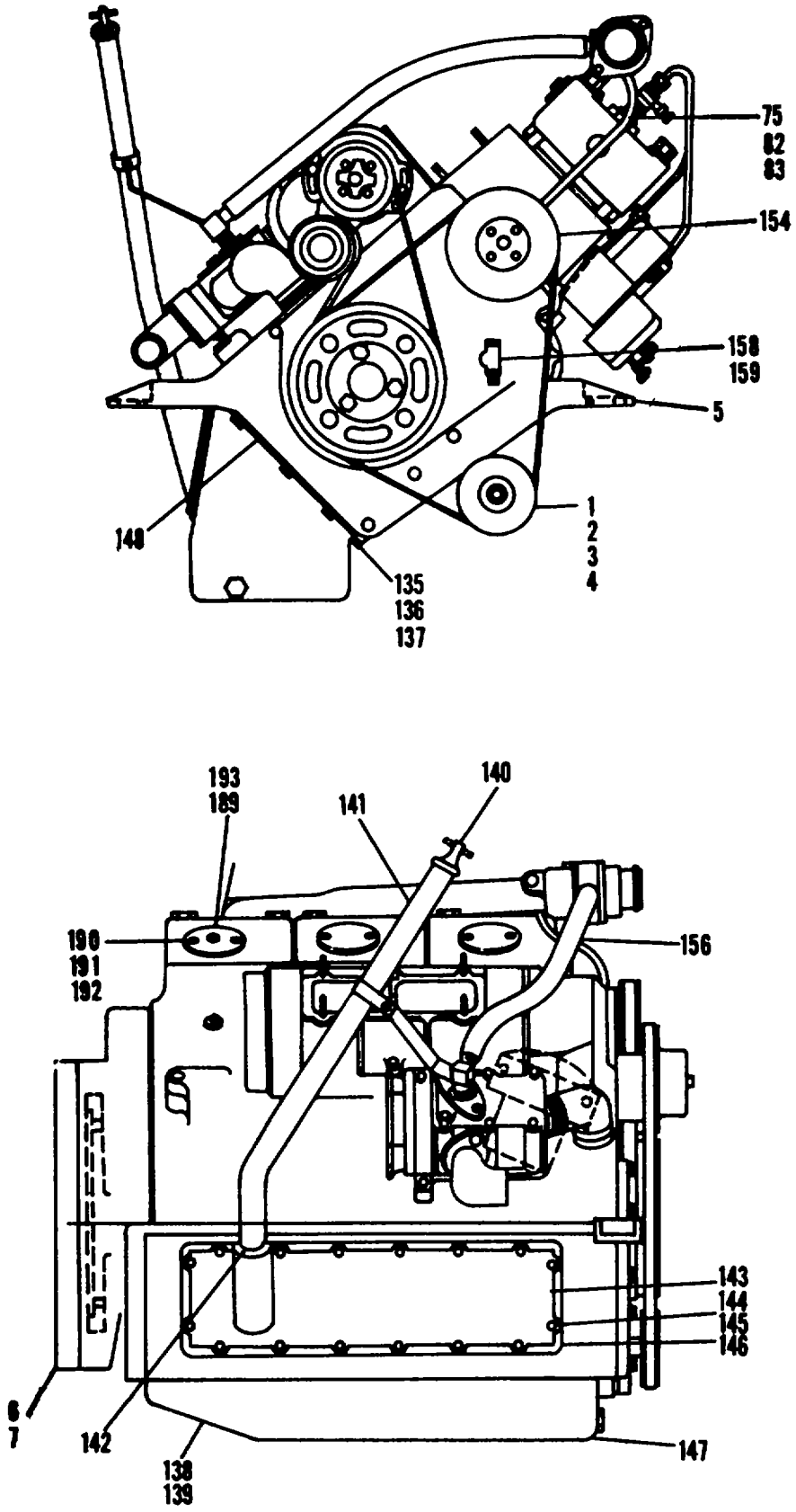

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Figure A-24. Diesel Engine (Sheet 1 of 4)

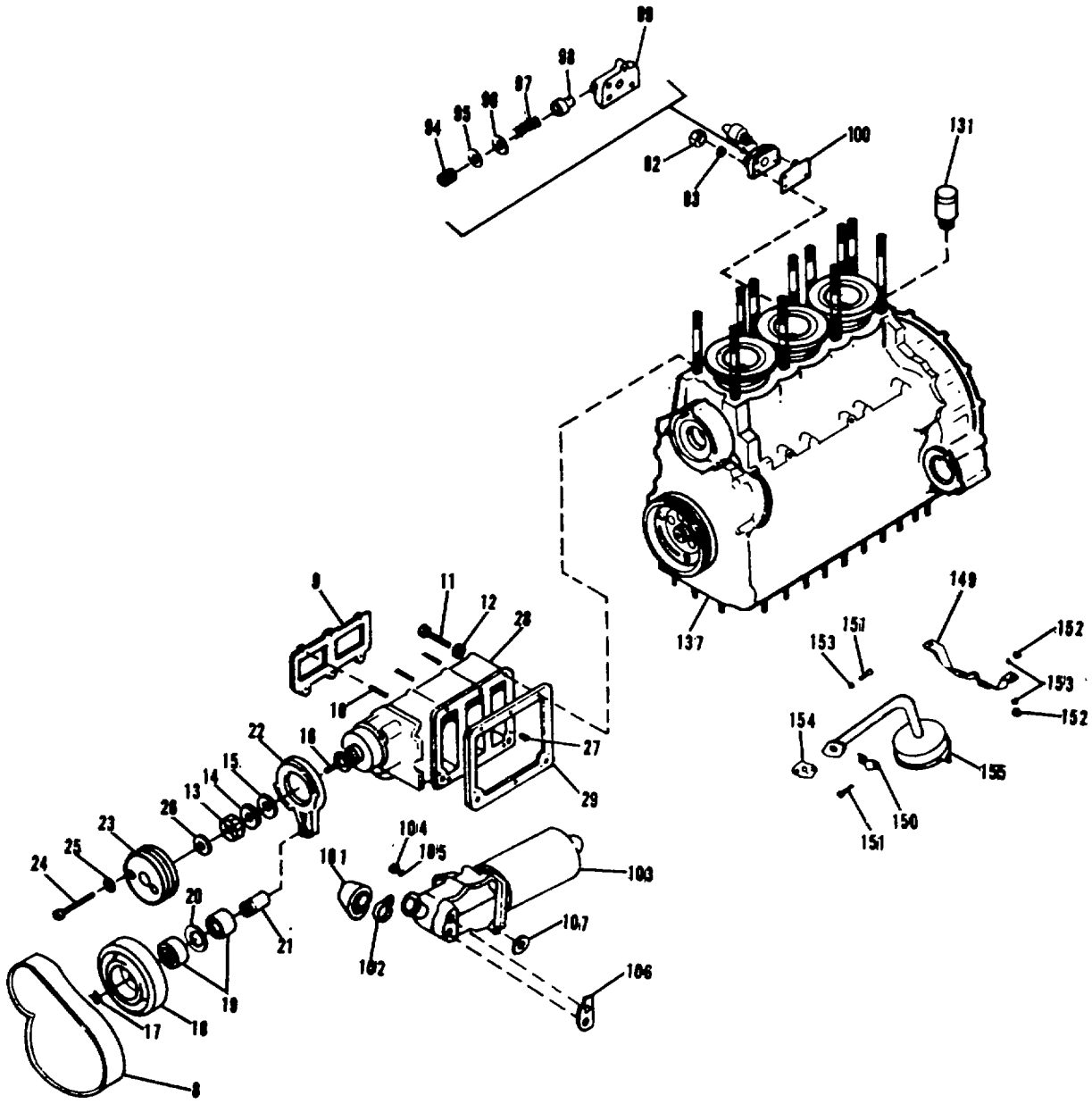

Figure A-24. Diesel Engine (Sheet 2 of 4)

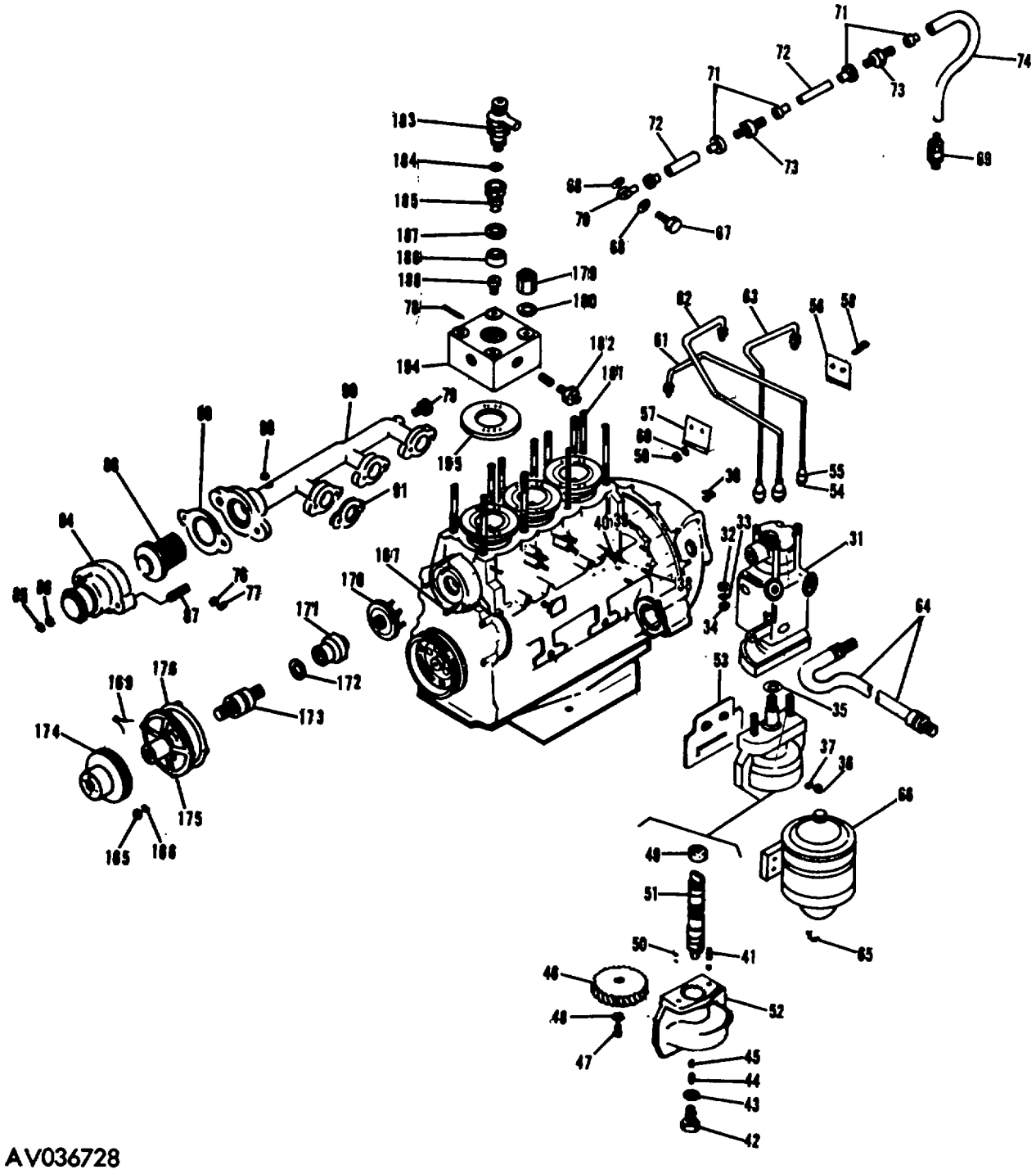

Figure A-24. Diesel Engine (Sheet 3 of 4)

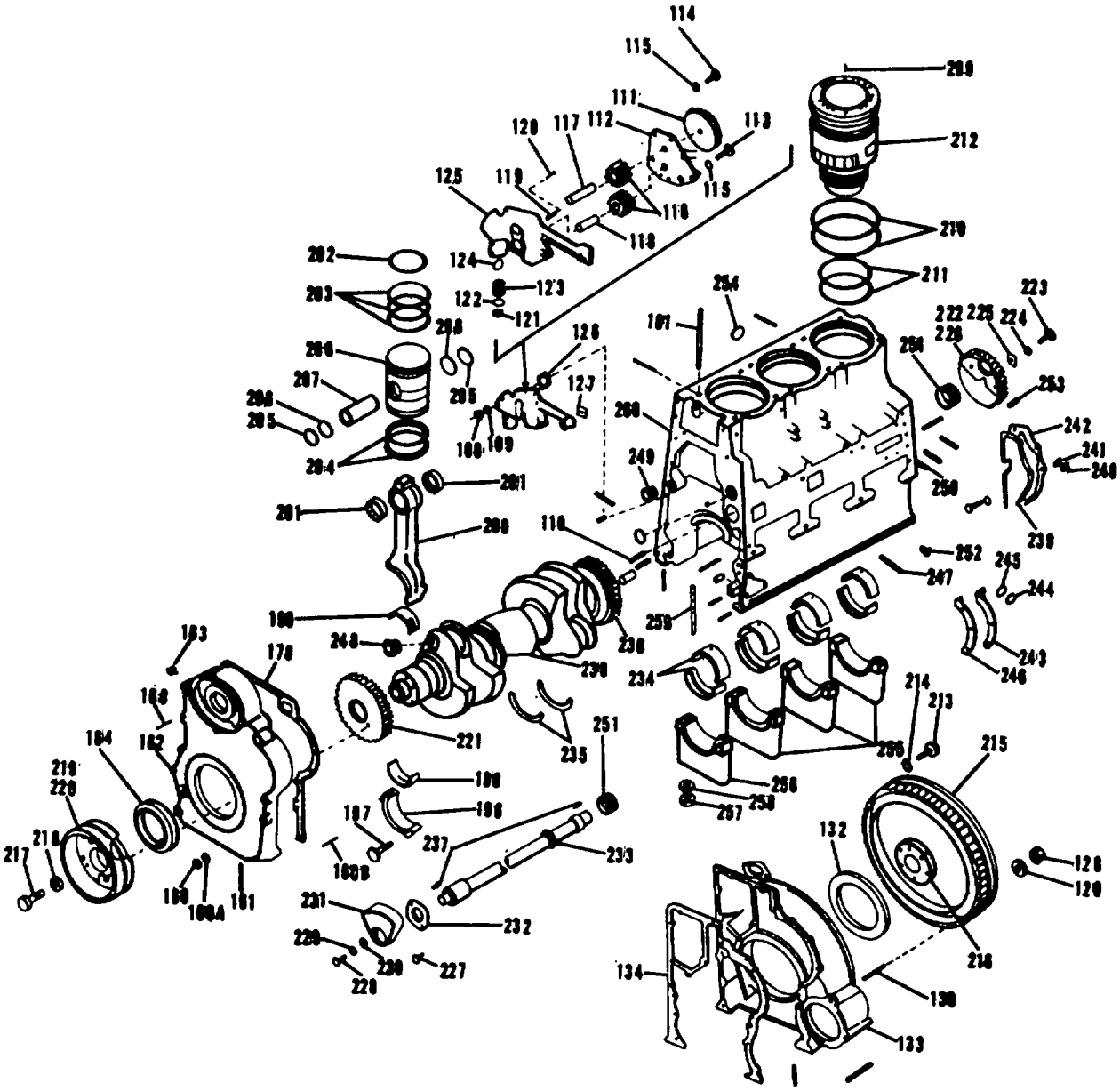

Figure A-24. Diesel Engine (Sheet 4 of 4)

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				DIESEL ENGINE	
.A-24				DIESEL ENGINE (82386) (4479-5003).....	REF
				(See lu5, figure A-2)	
A-24	-1	X2F		TIGHTENER ASSEMBLY, Belt (15233).....	1
				(G1162106)	
				(ATTACHING PARTS)	
A-24				SCREW, Cap, hexagon head (15233) (0025267).....	1
A-24				NUT, Plain, hexagon (15233) (218571).....	1
A-24				WASHER, Lock (15233) (114608).....	1
				---*---	
A-24	-2			PULLEY (15233) (1/21502).....	1
A-24	-3	P1F		BEARING (15233) (2220305).....	1
				(ATTACHING PARTS)	
A-24				SCREW, Cap, hexagon head (15233)' {0025202)	1
A-24				NUT, Plain, hexagon (15233) (218571).....	1
A-24				WASHER, Lock (15233) (1146o8).....	1
A-24	-4			BRACKET Idler (15233) (1111804).....	1
				(ATTACHING PARTS)	
A-24				SETSCREW (15233) (102449)	1
A-24				NUT, Plain, hexagon (15233) (220065).....	1
A-24				WASHER, Lock (15233) (114605).....	1
				---*---	
A-24				SPACER (15233) (1128402).....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24				SPACER (15233) (1128405).....	1
				---*---	
A-24				BRACKET, Front mounting (15233) (G3162146).....	1
A-24	-5			SUPPORT, Front (15233) (3162156).....	1
				(ATTACHING PARTS)	
A-24				NUT, Plain, hexagon (15233) (218564).....	5
A-24				WASHER, Lock (15233) (114605).....	5
A-24				STUD (15233) (0025756).....	5
				---*---	
A-24				ADAPTER ASSEMBLY (15233) (G2816141).....	1
A-24	-6			ADAPTER, Flywheel (15233) (2916137).....	1
				(ATTACHING PARTS)	
A-24				STUD (15233) (6025736).....	12
				---*---	
A-24	-7			ADAPTER, Housing (15233) (2816141).....	1
				(ATTACHING PARTS)	
A-24				NUT, Plain, hexagon (15233) (218565).....	12
A-24				WASHER, Flat (15233) (0026105).....	12
A-24				STUD (15233) (0025759).....	12
				---*---	
A-24				BLOWER AND DRIVE (15233) (1G2205603).....	1
A-24	-8	P1F	3030-962-2984	BELT, V (15233) (2221807).....	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGIZNE (CONT)	
A-24	_9	P1F		GASKET (15233) (P""05)	1
A-24	-10			STUD (15233) (0025702)	3
A-24		X1F		BLOWER AND IDLE (15233) (A2205603)	1
				(ATTACKING PAMS)	
A-24	-11			SCREW, Cap, hexagon head (15233) (239040)	6
A-24	-12			WASEW, Lock (15233) (114605)	6
				– – – * – – –	
A-24				HUB ASSMBLY, Idler (15233) (A2201802)	1
				(ATTACHING PAR1B)	
A-24	-13			NUT, Plain, hexagon (15233) (218564)	2
A-24	-14			WASHER Lock (15233) (114605)	2
A-24	-15			WASHER, Flat (15233) (103340)	2
A-24	-16			STUD (15233) (0025703)	2
A-24	-17			RING, Retaining (79136) (5101-78)	1
A-24	-18			PULLEY, Idler (15233) (2221510)	1
A-24	-19			BEARING, Ball (15233) (2220305)	2
A-24	-20			SHIM (15233) (2228501)	1
A-24	-21			PIN, Straight, headers (15233) (2218301)	1
A-24	-22			HOB, idler (15233) (211801)	1
A-24	-23			PULLEY, Blower (15233) (2221511)	1
				(ATTACKING PARTS)	

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-24			SCREW, Cap, hexagon head (15233)..... (100003)	4
A-24	-25			WASHER, Lock (15233) (114604).....	4
A-24	-26			SHIM (15233) (2228506)	AR
A-24				SHIM (15233) (228505)	AR
A-24	-27			PIN, Spring (15233) (00e4705).....	2
				– – – * – – –	
A-24	-28	X2F	2990-962-2982	ROOT BLOWER (15233) (2215603) ..... (See figure A-34)	1
A-24	-29	p1f		GASKET (15233) (2222201)	1
A-24				INSERT, Screw thread (15233) (0126601)	6
A-24		p1f		PUMP AND DIVE ASSDMB, (15233) ..... (G1605732)	1
A-24	-30			TEE, Pipe (15233) (0027538).....	1
A-24	-31			PUMP ASSEMBILY, Injection (84760) ..... (DBGVC329-1FT) (See figure A-35) (ATTACHING PARTS)	1
A-24	-32			NUT, Plain, hexagon (15233) (218565)	2
A-24	-33			WASHER, Lock (15233) (114606).....	2
A-24	-34			WASHER, Flat (15233) (1626006)	2
A-24	-35			PACKING, Preformed (15233) (1617001)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL EINGINE (CONT)	
A-24				DRIVE ASSEMBLY, Injection pump	1
				(15233) (A1602602)	
				(ATTACIHIG PARTS)	
A-24	-36			NUT, Plain, hexagon (15233) (218564)	5
A-24	-37			WASHER, lock (15233) (114605)	5
A-24	-38			STUD (15233) (0025766).....	1
A-24	-39			STUD (15233) (0025702)	4
A-24	-40			PIN, Spring (15233) (0024706).....	2
A-24	-41			STUD (15233) (0025769).....	2
A-24	-42			SCIREW (15233) (1624003)	1
A-24	-43			WASHER, Flat (15233) (1626005)	1
A-24	-44			SPIING, Helical., compression (15233)	1
A-24	-45			BUTTON, Thrust (15233) (1641401)	1
A-24	-46			GEAR, Helical (15233) (1617402)	1
				(ATTACHING PARTS)	
A-24	-47			SCREW (15233) (1624002)	1
A-24	-48			WASHER, Flat (15233) (1626004)	1
				– – – ✻ – – –	
A-21	-49			SEAL (15233) (1616801)	2
A-24	-50			KEY, 1Ichine (15233) (0027001)	1
A-24	-51			SHAFT (15233) (1618301) REF	
A-24	-52			HOUSING (15233) (1612603)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-53			GASKET (15233) (1622210)	1
A-24				INJECION S-T4, Fuel (15233) (G1504803)	1
A-24	-54			FERRULE (15233) (1527603).....	3
A-24	-55			NUT, Tube (15233).....	3
A-24				LINE AND CLAMP ASSEBLY (15233)	1
				(A1504803)	
A-24	-56			PLATE, Top (15233) (1514801).....	1
A-24	-57			PLATE, Bottom (15233) (1511!802)	1
				(ATTACHRIG PARTS)	
A-24	-58			SCREW, Cap, hexagon head (15233) (106274)	2
A-24	-59			NUT, Plain, hexagon (15233) (218563)	2
A-24	-60			WASHER, Lock (15233) (114604).....	2
A-24	-61			TUBE ASSEMBLY (15233) (A150410o)	1
A-24	-62			TUBE ASSEMBLY (15233) (A1504105)	1
A-24	-63			TUBE ASSEMBLY (15233) (A1504106)	1
A-24				NUT, Tube (15233) (1526304)	1
A-24				FERRULE (15233) (1527603)	1
A-24				NUT, Tube (15233) (1526303)	1
A-24				SPACER (15233) (1526003)	1
A-24				TUBING (15233) (1504119)	1
A-24	-64	p1f		HOSE ASSEMBLY (15233) (A1523009)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24				FERRULE (15233) (1527602)	2
A-24				FITTING, Swivel (15233) (0027536)	1
A-24				END, Hose (15233) (0027514)	1
A-24				HOSE (15233) (0023228)	1
A-24				FILTER AND ELBOW ASSE4BLY (15233) (A1502514)	1
A-24	-65			ELBOW, Tube (15233) (0027540)	1
A-24	-66			FILTER, Fuel (81321) (6656489) (See figure A-36)	1
A-24	p1f			LINE ASSEMBLY, Leak off (15233) (A1523010) (ATTACHING PARTS)	1
A-24	-67			SCREW, Hollow (15233) (1524002)	3
A-24	-68			GASKET, Copper (15233) (1522604)	6
				– – – * – – –	
A-24	-69			SWIVEL, Hose end (15233) (0027537)	1
A-24	-70			FITTIIG, Leak off (15233) (1527509)	1
A-24	-71			FERRULE (15233) (1527602)	6
A-24	-72			HOSE (15233) (0023217)	2
A-24	-73			FITMING, Leak off (15233) (1527508)	2
A-24	-74			HOSE (15233) (0023215)	1
A-24				MANIFOLD AND THERI0STAT (15233) (G1105321)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-75			HOSE, Water bypass (15233) (1123325)	1
				(ATTACHING PARTS)	
A-24				CLAMP, Hose (15233) (1123521)	2
				– – – ✻ – – –	
A-24				MANIFOLD ASSEMBLY, Water (15233) (A1l05321)	1
				(ATTACHING PARTS)	
A-24	-76			NUT, Plain, hexagon (15233) (218564)	6
A-24	-77			WASHER, Lock (15233) (114605)	6
A-24	-78			STUD (15233) (0025702)	6
				– – – ✻ – – –	
A-24	-79			PLUG, Pipe (15233) (444697)	1
A-24	-80			PLUG, Pipe (15233) (444691)	1
A-24	-81			PLUG, Pipe (15233) (444703)	1
A-24	-82			ELBOW (15233) (0025735)	1
A-24	-83			CONNECWOR, Hose (15233) (1127304)	1
A-24	-84			HOUSING, Thermostat (15233) (1112612)	1
				(ATTACHING PARTS)	
A-24	-85			NUT, Plain, hexagon (15233) (218564)	2
A-24	-86			WASHER, Lock (15233) (114605)	2
A-24	-87			STUD (15233) (0025702)	2
A-24	-88	p1f		THERMOSTAT 015233) (1114007)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	89	p1f		GASKET (15233) (112PP05)	1
A-24	90			MANIFOLD, Water (15233) (1115321)	1
A-24	-91			GASKET (15233) (1122205)	3
A-24				OIL PUMP, Cooler, valve assembly (15233)	1
				(2GO805706)	
A-24				VALVE ASSEMBLY, Pressure control (15233) (AO803305)	1
				(ATTACHING PARTS)	
A-24	-92			NUT, Plain, hexagon (15233) (218564)	3
A-24	-93			WASHIER, Lock (15233) (114605)	3
A-24				STUD (15233) (0025752)	3
A-24	-94			PLUG (15233) (0824904)	1
A-24	-95			WASHER, Flat (15233) (0822601)	1
A-24	-96			WASHER, Flat (15233) (0822605)	2
A-24	-97			SPRING, Helical, compression (15233) (0827811)	1
A-24	-98			VALVE (15233) (0813202)	1
A-24	-99			BODY, Valve (15233) (0813303)	1
A-24	-100			GASKET (15233) (0822215)	1
A-24	-101	2930-962-2997		ELBOW, Hose (15233) (1123320)	1
				(ATTACHING PARTS)	

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-102			CLAMP, Hose (15233) (1123519)	2
				– – – * – – –	
A-24	-103			OIL COOER ASSEMBLY (15233) ( )	1
				(See figure A-37)	
				(ATTACHING PARTS)	
A-24				SCREW, Cap, hexagon head (15233) (0025253)	1
A-24	-104			NUT, Plain, hexagon (15233) (218564)	3
A-24	-105			WASHER, Lock (15233) (114605)	4
A-24				STUD (15233) (0025755)	2
A-24				STUD (15233) (0025737)	1
				– – – * – – –	
A-24	-106			GASKET (15233) (0822214)	1
A-24				INSERT, Screw thread (15233) (0126601)	1
A-24	-107			GASKET (15233) (0822213)	2
A-24		p1f		PUMP ASSEMBLY, Lube oil (15233) (A0805706)	1
				(ATTACHING PARTS)	
A-24	-108			NUT, Self-locking (15233) (0026310)	3
A-24	-109			WASHER, Lock (15233) (114605)	3
A-24	-110			STUD (15233) (0025737)	3
				– – – * – – –	
A-24	-111	XID		GEAR (15233) (0817304)	1
A-24		X1D		PUMP ASSEMBLY, Oil (15233) (A0815706)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-112			COVER (15233) (0812212) ..... (ATTACING PAMS)	1
A-24	-113			SCREW, Cap, hexagon head (15233)..... (106327)	2
A-24	-114			SCREW, Cap, hexagon head (15233)..... (100122)	3
A-24	-115			WASHER, Lock (15233) (114605).....	5
				– – – ✻ – – –	
A-24	-116			GEAR (15233) (0817308).....	2
A-24	-117			SHAFT, Straight (15233) (0818301)	1
A-24	-118			SHAFT, Straight (15233) (081830)	1
A-24	-119			PIN, Dowel (15233) (0024501)	2
A-24	-120			PIN, Cotter (15233) (103398)	1
A-24	-121			WASHER, Flat (15233) (103340)	1
A-24	-122			WASHER (15233) (0826005)	1
A-24	-123			SPRING, Helical, compression (15233) ..... (0827C10)	1
A-24	-124			BALL, Steel (15233) (0829001)	1
A-24	-125			HOUSING, Pump (15233) (081206)	1
A-24	-126			GASKET (15233) (0822202)	1
A-24	-127			GASKET (15233) (0822203)	1
A-24				HOUSING ASSEMBLY, Flywheel (15233) ..... (G0702410)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24				HOUSING ASSEMBLY, Flywheel (15233) ..... (A0702410)	1
				(ATTACHING PARTS)	
A-24	-128			NUT, Plain, hexagon (15233) (218564)	14
A-24	-129			WASHER, Lock (15233) (114605).....	14
A-24	-130			STUD (15233) (0025753)	14
				– – – * – – –	
A-24	-131	X2F		BREA-FILLER (15233) (0802518)	1
A-24				EIBOW, Pipe (15233) (111145)	1
A-24	-132			SEAL, Oil (15233) (0516805)	1
A-24	-133			HOUSING, Flywheel (15233) (0712410)	1
A-24	-134			GASKET (15233) (0722206)	1
A-24				PAN ASSEMBLY, Oil (15233) (GO203122)	1
A-24				PAN, Oil (15233) (A0203122).....	1
				(ATTACHING PARTS)	
A-24	-135			NUT, Plain, hexagon (15233) (218564)	24
A-24	-136			WASHER, Lock (15233) (114605).....	24
A-24	-137			STUD (15233) (0025752)	24
				– – – * – – –	
A-24	-138	p1f		PLUG (15233') (0824901)	1
A-24	-139	p1f		PACKING, Preformed (15233) (0017001)	1
A-24	-140	X2F		GAGE ROD (15233) (0213011).....	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-141			TUBE, Dipstick (15233) (0228707).....	1
A-24	-142			WASHER, Flat, (15233) (0822601)	1
A-24,	-143			COVER, (15233) (0212201)	1
				(ATTACHING PARTS)	
A-24	-144			SCREW, Cap, hexagon bead (15233) (1218')	16
A-24	-145			WASHER, Lock (15233) (114604o).....	16.
				– – – * – – –	
A-24	-146			GASKET (15233) (0222302)	1
A-24	-147			PANT, OIL (15233) (0213115)	1
A-24	-148			GASKET (15233) (0222201)	1
A-21t	-149			BRACKET, Pipe (15233) (0814809)	1
A-24	-150			PLATE (15233) (08116803)	1
				(ATTACHING PARTS)	
A-24	-151			SCREW, Cap, hexagon head (15233) (100013).....	2
A-24	-152			NUT, Self-locking (15233) (0026310)	2
A-24	-153			WASHER, Lock (15233) (114605).....	1
				– – – * – – –	
A-24	-154			GASKET (15233) (0822216)	1
A-24	-155			SCREEN-PIPE ASSEMBLY (15233) ..... (A0804228)	1
A-24				FLANGE (15233) (0828205)	1
A-24	X2D			SCREEN-TUBE (15233) (0804229)	1
A-24				COVER ASSEMBLY, Front (15233) (G0402116)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-156			HOSE ASSEBLY (15233) (A0023004)	1
A-24				FITTING, Swivel (15233) (0027536)	1
A-24				END, Hose (15233) (0027514)	1
A-24				FERULE (15233) (1527602)	2
A-24				HOSE (15233) (0023206)	1
A-24	-157			PULLEY (15233) (1121510)	1
				(ATTAC2IMG PARTS)	
A-24				SCREW, Cap, hexagon head (15233) (106279)	4
A-24				WASHER, Lock (15233) (103320)	4
				– – – * – – –	
A-24	-158			DRIVE, Angle (15233) (3068103)	1
A-24	-159			TIP, Drive (15233) (3025601)	1
				(ATTACHING PATS)	
A-24				ADAPTE, Tach drive (15233) (3016105)	
A-24				GASKET (15233) (3022601)	1
A-24				COVER-PUMP ASSEMBLY (15233) (A0402116) (ATTACHING PARTS)	1
A-24	-160,			NUT, Plain, hexagon (15233) (218564)	8
A-24	-16Q0			WASHER,- Lock (15233) (114605)	8
A-24	-1603			STUD (15233) (0025753)	6
A-24	-161			STUD (15233) (0025715)	2

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-162			CONNECTOR, Hose (15233) (1127304)	1
A-24	-163			PLUG, Pipe (15233) (444687)	1
A-24	-164	PIF		SEAL, Oil (15233) (0516804)	1
A-24		p1f		PUMP ASSEMBLY, Water (15233) (A1105706)	1
				(ATTACHING PARTS)	
A-24	-165			NUT, Plain, hexagon (15233) (218564)	2
A-24	-166			WASHER, Lock (15233) (114605)	
A-24	-167			STUD (15233) (0025711)	1
A-24	-168			STUD (15233) (0025709)	1
				– – – * – – –	
A-24	-169			WIRE, Lock (15233) (1131102)	1
A-24	-170			IMPELLER (15233) (1113502)	1
A-24	-171			SEAL ASSEMBLY (15233) (1l16901)	1
A-24	-172			SLINGE (15233) (1117001)	1
A-24	-173			BEARING AND SHAFT (15233) (1120905)	1
A-24	-174			HUB, Fan (15233) (116501)	1
A-24	-175			HOUSING, Pump (15233) (1112601)	1
A-24	-176			GASKET (15233) (112903)	1
A-24	-177			COVER, Front (15233) (0412110)	1
A-24	-178			GASKET (15233) (042220)	1
A-24				CYLINDER ASSDBILY, Unit (15233) (GO301620)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24				HEAD ASSEMBLY, Cylinder 15233) ..... (A0301620) (ATTACHING PARTS)	3
A-24	-179	P1H		NUT, Special (15233) (0126301)	12
A-24	180			WASHER, Flat (15233) (0126001)	12
A-24	-181			STUD (15233) (0153)	12
				– – – * – – –	
A-24-	182	P1H		INJECTOR, Fuel (15233) (1519601).....	1
A-24	183	P1H		SHIELD, Nozzle (15233) (152C-01)	1
A-24	-184	P1H		INSERT Thread (15233) (326602).....	1
A-24	185	P1H		CHAMBER; Combustion, upper (15233)..... (0311711)	1
A-24	186	P1H		GASKET (15233) (032260)	1
A-24	187	P1H		CHAMER, Combustion, lower (15233) ..... (0311709)	1
A-24	-138			COVE (15233) (0312202).....	1
				(ATTACHING PARTS)	
A-24.	-189			NUT, Plain, hexagon (15233) (21856')	2
A-24	-190			WASHER, Lock (15233) (1146O5)	2
A-24	-191			STUD (15233) (0025752)	2
				– – – * – – –	
A-24	-192			GASKET (15233) (1122204)	1
A-24	-193	X2H		HEAD, Cylinder (15233) (0311614)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-194	P1H		GASKET (15233) (0322402)	3
A-24	X2D			ROD ASSEMBLY, Connecting (15233) (A0301620)	3
A-24	-195	X1D		NOZZLE (15233) (0319701)	1
A-24	-196	X1D		BOLT, Connecting rbd (15233) (0325201)	2
A-24	-197	P1D		BEARING, Rod, lower (15233) (0320202),	3
A-24	-198	P1D		BEARING, Rod, upper (15233) (0320201)	3
A-24	-199			ROD, Connecting (15233) (0311106)	1
A-24	-200	P1D		BUSHING (15233) (0320101)	2
A-24		X2D		PISTON ASSEMBLY (15233) (A0301205)	3
A-24	-201	P1D		RING, Keystone (15233) (0311416)	1
A-24	-202	P1D		RING, Piston, compression (15233) (0311415)	3
A-24	-203	P1D		RING, Piston, oil, (15233) (0311414)	2
A-24	-204	P1D		PLUG, Piston pin (15233) (0316402)	2
A-24	-205	P1D		PIN, Piston (15233) (0311301)	1
A-24	-206			PISTCON (15233) (0311208)	1
A-24		X2D		LINER ASSEMBLY, Cylinder (15233) (A0301001)	3
A-24	-207	X1D		PIN, Spring (15233) (0024709)	2
A-24	-208	P1D		PACKING, Preformed (15233) (0317006)	2
A-24	-209	P1D		PACKING, Preformed (15233) (0317005)	2
A-24	-210	X1D		LINER, Cylinder (15233) (0311001)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24				CRANKSHAFT-FLYWHEEL ASSEMBLY ..... (15233) (GO50010)	1
A-24	X2D			FLY WHEEL AND GEAR ASSEMBLY ..... (15233) (A0500813) (ATTACHING PARES)	1
A-24	-211			SCREW, Cap, hexagon head (15233)..... (0025234)	6
A-24	-212			WASHER, Lock (15233) (103325')	6
				– – – * – – –	
A-24	-213			GEAR, Ring (15233) (0517803)	1
A-24	-214			FLYWHEMEEL (15233) (0510819)	1
A-24				PULLEY-RING ASSEMBLY (15233) ..... (A0501506) (ATTACHING PARTS)	1
A-24	-215			SCREW, Cap, hexagon head (15233)..... (0025201)	3
A-24	-216			WASHER, Lock (15233) (103323).....	3
A-24				PIN, Spring (15233)	4
A-24	-217			RING, Seal (15233) (0528301)	1
A-24	-218			PULLEY, Front (15233) (0521528).....	1
A-24	-219		2815-962-2949	GEAR, Spur (15233) (0517303)	1
A-24	-220			GEAR, Spur (15233) (0517403) ..... (ATTACHING PARTS)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-221			SCREW, Cap, hexagon head (15233) (0025256)	1
A-24	-222			WASHER, Lock (15233) (114605).....	1
A-24	-223			WASHER, Flat (15233) (0526001)	1
				– – – ✻ – – –	
A-24	-224			KEY, Woodruff (15233) (0027102)	1
A-24				SHAFT ASSEMBLY, Balancer (15233)	1
				(A0508311)	
				(ATTACIING PARTS)	
A-24	-225			SCREW, Machine (15233) (0024001)	2
				– – – ✻ – – –	
A-24	-226			Screw, Tich drive (15233) (3024006)	1
A-24	-227			WASHER, Lock (15233) (114605).....	1
A-24	-228			WASHER, Flat (15233) (0526001)	1
A-24	-229			WEIGHT, Balancer (15233) (0510606)	1
A-24	-230			WASHER, Thrust (15233) (0520701)	1
A-24	-231			SHAFT, Balancer (15233) (0518308)	1
A-24	-232			BEARING, Sleeve (15233) (0520201)	8
A-24	-233	PID		WASHER, Thrust (15233) (0520703)	2
A-24				CRANKSHAFT ASSEMBLY (15233) A0500510).....	1
A-24	-234			GEAR, Spur (15233) (0517401)	1
A-24	-235			KEY, Woodruff (15233) (0027101)	1
A-24				PIN, Spring (15233) (0024707).....	2
A-24	-2			CRANKSHAFT (15233) (0510506)	1

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24				CRANKHOUSE ASSEMBLY (1233) (G0100i12)	1
A-24				PLATE, Identification (15233) (0640204)..... (ATTACHINIG PARTS)	1
A-24				SREW, Drive, (15233) (0024301)	4
				– – – * – – –	
A-24	-237			COVER Rear angle (15233) (0112209).....1,	
				(ATTACHING PARTS)	
A-24	-238			NUT, Plain, hexagon (15233) (218564)	4
A-24				SCREW, Cap, hexagon head (15233) (100121).....	3
A-24	-239			WASHER, Lock (15233) (114605).....	7
				– – – * – – –	
A-24	-240			GASKET (15233) (0122?10)	1
A-24	-241			COVER, Front angle	1
				(ATTACHING PARTS)	
A-24	-242			NUT, Plain, hexagon (15233) (218564)	4
A-24				SCREW, Cap, hexagon head (15233) (100121).....	3
A-24	-243			WASHER, Lock (15233) (114605).....	7
				– – – * – – –	
A-24	-244			GASKET (15233) (0122211)	1
A-24	-245			STUD (15233) (0025702)	8
A-24				CRANKCASE ASSEMBLY (15233) (A0100112).....	1
A-24				PLUG, Pipe (15233) (444703)	1
A-24	-246			PLUG, Pipe (15233) (444709)	3

Illus.		SMR Code	Federal Stock Number	Description	Qty Inc. In Unit
Fig No.	Item No.				
				DIESEL ENGINE (CONT)	
A-24	-247			PWG, Pipe (15233) (444687)	7
A-24	-248			PIN, Spring (15233) (0024706)	2
A-24	-249			BUSHING, Sleeve (15233) (0520102)	2
A-24	-250			COCK, Drain (15233) (1141001)	1
A-24	-251			PIN, Straight, headless (15233) (0024502)	4
A-24	-252			PLUG (15233) (0125004)	7
A-24				CRANKCASE ASSEMBLY (15233) (AO110l13)	1
A-24	-253			CAP, Bearing (15233) (0110202)	3
A-24	-254			CAP, Bearing (15233) (0110203)	1
				(ATTACING PARTS)	
A-24	-255			NUT, Special (15233) (0126301)	8
A-24	-256			WASHIER, Flat (15233) (0126001)	8
A-24	-257			PIN, Straight, headless (15233)	8
				(0125802)	
A-24	-258			CRANKCASE (15233) (0110103)	1
A-24		p1f		BELT (15233) (1121810)	
A-24				KIT, Overhaul, gasket (15233) (0090008)	1

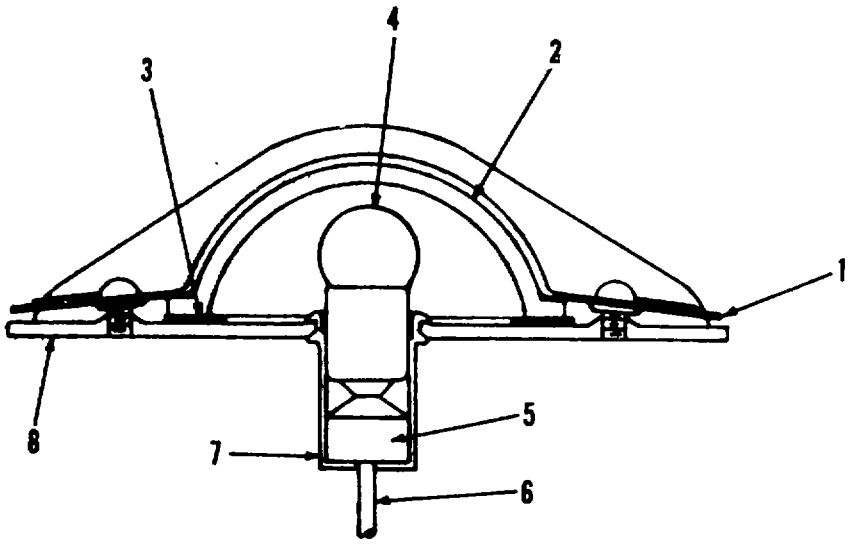

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Figure A-25. Taillight

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				TAILLIGHT	
A-25				TAILLIGHT (71951) (415) ..... REF (See 106, figure A-2)	
A-25	-1	X1F		GUARD (71951) (32045) ..... 2 (ATTACHING PARTS)	
A-25		X1F		SCREW, Machine (71951) (-4016) ..... 2 - - - * - - -	
A-25	-2	X1F		LENS (71951) (32077) 2	
A-25	-3	X1F		GASKET (71951) (32351) 2	
A-25	-4	P1F		BULB (71951) (41125) 2	
A-25	-5	X1F		SPRING (71951) (40014) 2	
A-25	-6			WIRE ASSEMBLY (71951) (51007) 2	
A-25	-7	X1F		SOCKET (71951) (40015) 2	
A-25	-8	X1F		BODY (71951) (32350) 1	

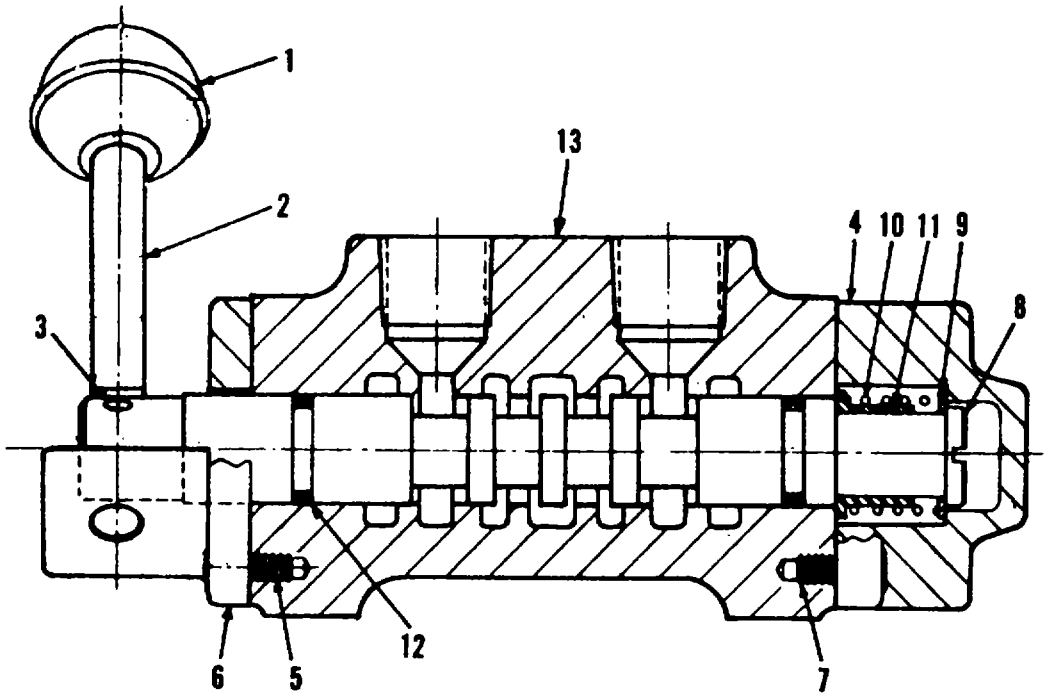

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Figure A-26. Four-Way Valve

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				FOUR-WAY VALVE	
A-26				VALVE, Four-way (82386) (4010-022)..... (See 110, figure A-2)	REF
A-26	-1			KNOB (97545) (10274) , ...	1
A-26	-2			HANDLE (97545) (1700-6) ..... (ATTACHING PARTS)	1
A-26	-3			PIN (97545) (1200-12) ..... - - - * - - -	1
A-26	-4			CAP, End (97545) (1700-4) ..... (ATTACHING PARTS)	1
A-26	-5			SCREW, Machine (97545) (10240) ..... - - - * - - -	4
A-26	-6			CAP, End (97545) (1700-3) ..... (ATTACH D G PARTS)	1
A-26	-7			SCREW, Machine (97545) (10240) ..... - - - * - - -	4
A-26	-8			END , Spool (97545) (1250-11)	1
A-26	-9			WASHER (97545) (i2So-6)	1
A-26	-10			SPRING (97545) (1250-12)	1
A-26	-11			SPACER (97545) (1200-3)	1
A-26	-12			SEAL (97545) (28015)	2
A-26	-13			BODY AND SPOOL ASSEMBLY (97545) ..... (1775-1S-TA)	1

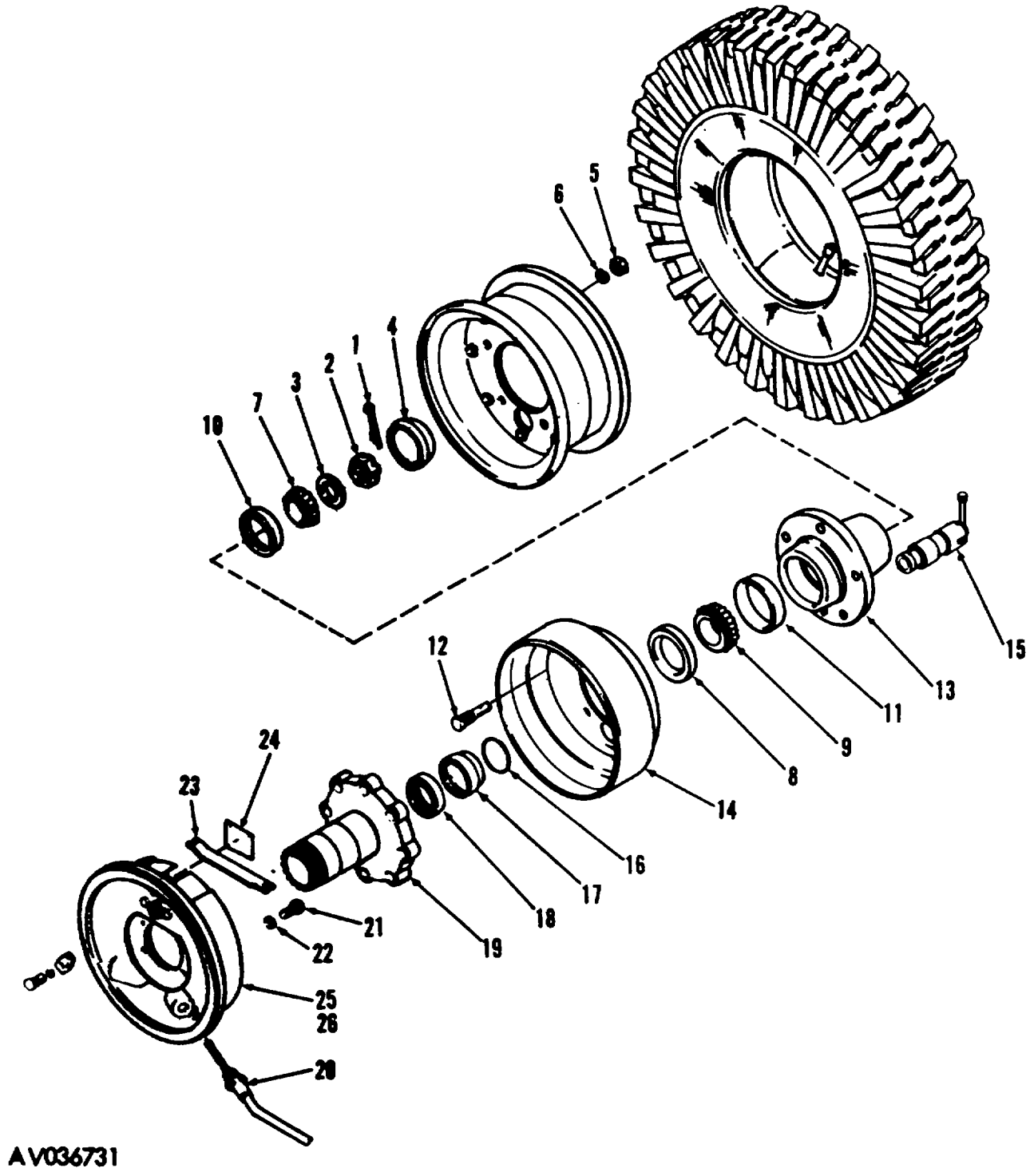

Figure A-27. Rear Axle Assembly (Sheet 1 of 2)

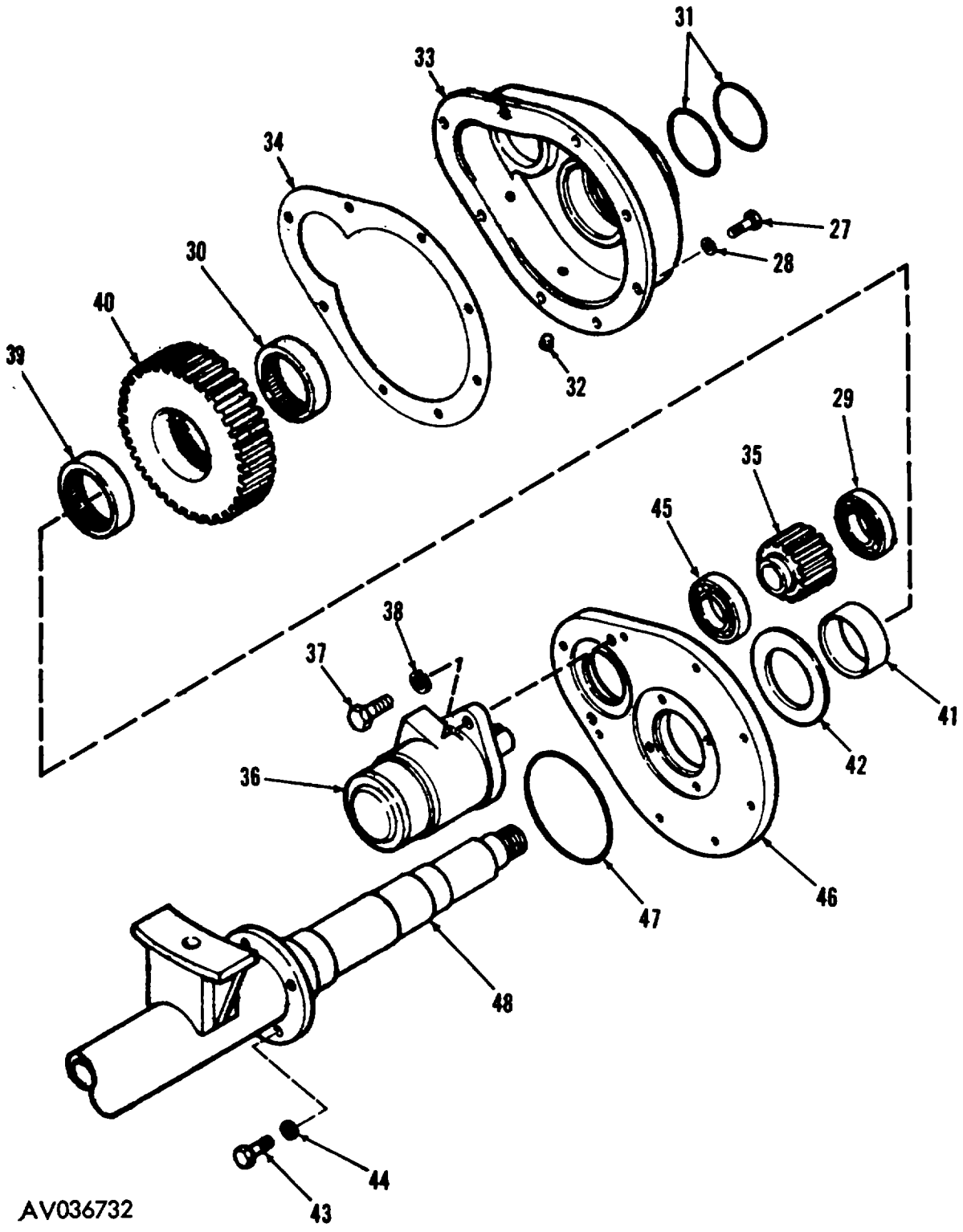

Figure A-27. Rear Axle Assembly (Sheet 2 of 2)

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				REAR AXLE ASSEMBLY	
A-27				REAR AXLE ASSEMBLY (82386) (C614-1092) ..... (See 117, figure A-2)	REF
A-27				HUB AND DRUM ASSEMBLY (82386) ..... (8000-9029) (ATTACHING PARTS)	2
A-27	-3			PIN, Cotter (96906) (MS24665-360).....	2
A-27	-2			NUT, Spindle (8804R) (AN320-16)	2
A-27	-3			WASHER, Spindle..... - - - * - - -	2
A-27	-4			CAP, Hub (95026) (15-1001) 2	
A-27	-5			NUT, Plain, hexagon (96906) (MS35690-822)	10
A-27	-6			WASHER, Lock (96906) (MS35388-E6).....	10
A-27	-7			CONE, Roller bearing (95026) (17X136).....	1
A-27	-8			SEAL (95026) (14-1000)	1
A-27	-9			CONE, Roller bearing (95026) (37X138)	1
A-27				HUB AND DRUM (82386) (8000-9030)	1
A-27	-10			CUP, Roller bearing.....	1
A-27	-11			CUP, Roller bearing.....	1
A-27	-12			STUD	5
A-27	-13			HUB.....	1
A-27	-14			DRUM, Brake-	1
A-27	-15	X2F		CLUTCH ASSEMBLY (62336) (8017-208)	2
A-27		P1H		DRIVE SHAFT ASSEMBLY (62386) (8000-9013)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
REAR AXLE ASSEMBLY (CONT)					
A-27	-16	P1H		PACKING, Preformed (96906) (MS28775-225)	1
A-27	-17			RETAINER, Bearing (95026) (K102-17)	8
A-27	-18	P1H		BEARING (60380) (B-308)	1
A-27	-19	X1H		DRIVE RING ASSEMBLY (82386) (8000-901-)	1
A-27	-20			BRAKE CABLE ASSEMBLY (92867) (TB142026)	2
A-27				BRAKE ASSEMBLY LH (82386) (8000-9020-02)	1
A-27				BRAKE ASSEMBLY RH (82386) (8000-9020-01)	1
				(ATTACHING PARTS)	
A-27	-21			SCREW, Cap, hexagon heed (95026) (5-417CA)	8
A-27	-22			WASHER, Lock (96906) (MS35338-46)	8
				- - - * - - -	
A-27	-23			STRUT (82386) (8000-9024)	1
A-27	-24			PLATE, Cover (82386) (3000-9025)	1
				(ATTACHING PARTS)	
A-27				RIVET (82386)	2
				- - - * - - -	
A-27	-25			BRAKE ASSEMBLY RH (95026) (6-8114)	1
A-27	-26			BRAKE ASSEMBLY LH (95026) (5-8144)	1
A-27				GEARBOX HOUSING ASSEMBLY (82356)	2
				(8000-9021)	
				(ATTACHING PARTS)	
A-27	-27			SCREW, Cap, hexagon head (96906)	16
				(MS35292-34)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
REAR AXLE ASSEMBLY (CONT)					
A-27	-28			WASHER, Lock (95026) (K102-49)	16
				- - - * - - -	
A-27	-29			BEARING, Ball (36003) (R-22)	1
A-27	-20			BEARING, Roller (60380) (NB4012)	1
A-27	-31			PACKING, Preformed (08752) (2-145).,	2
A-27	-32			PING, Pipe (82386) (4972-301)	2
A-27	-33			HOUSING, Gear, RH (82386) (8000-9027)	2
A-27	-33			HOUSING, Gear, LH (82386) (8000-9028)	2
A-27	-34	P1H		GASKET (82386) (8000-9019)	2
A-27	-35	P1H		GEM , Spur (82386) (8000-9012)	2
A-27	-36			DRIVE MOTOR, Hydraulic (96151) (20689-4)	2
				(See figure A-38)	
				(ATTACHING PARTS)	
A-27	-37			SCREW, Drilled head (82386)	4
A-27	-38			WASHER, Lock (96906) (MS35338-48)	4
				- - - * - - -	
A-27		P1H		GEAR ASSEMBLY (82386) (5000-9010)	2
A-27	-39	X1H		BEARING (60380) NB4012)	2
A-27	-40	X1H		GEAR (82386) (8000-9011)	2
A-27	-41			BEARING, Sleeve (95026) (Kl02-16)	2
A-27	-42			WASHER., Thrust (95026) (K102-19)	2
A-27				PLATE ASSEMBLY, Back (82386) (8000-9008)	2
				(ATTACHING PM TS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
REAR AXLE ASSEMBLY (CONT)					
A-27	-43			SCREW, Drilled head (88044) (AN6H7A)	8
A-27	-44	P1H		WASHER, Sealing (95026) (K102-50).....	8
				- - - * - - -	
A-27	-45	P1H		BEARING, Ball (43334) (R-22)	1
A-27	-46			PLATE, Back (82386) (8000-9009).....	1
A 27	-47	P1H		PACKING, Preformed (08752) (2-145)	2
A-27	-48	P1H		AXLE, Rear (82386) (C614-1093)	1

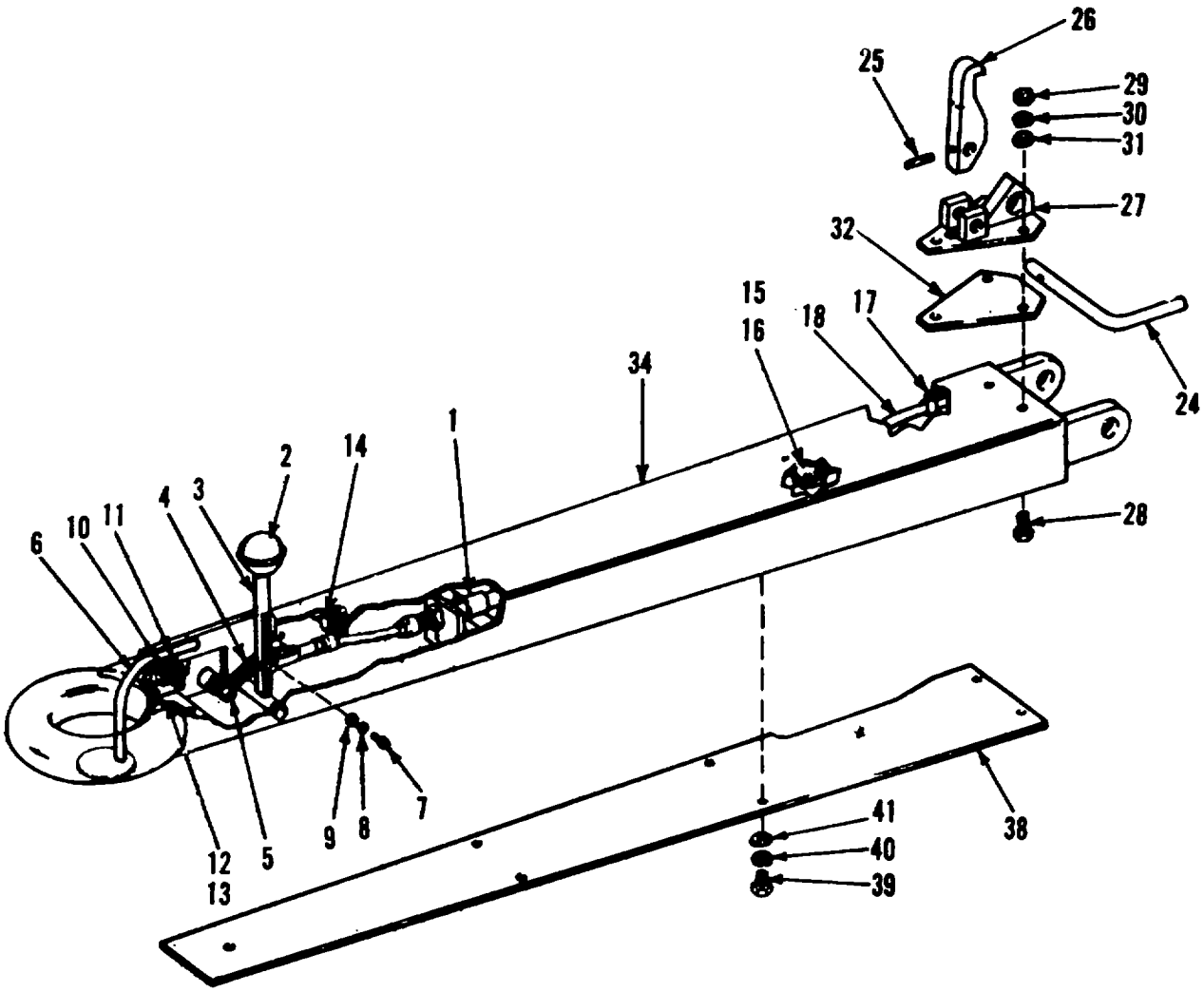

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Figure A-28. Axle and Steering Assembly (Sheet 1 of 2)

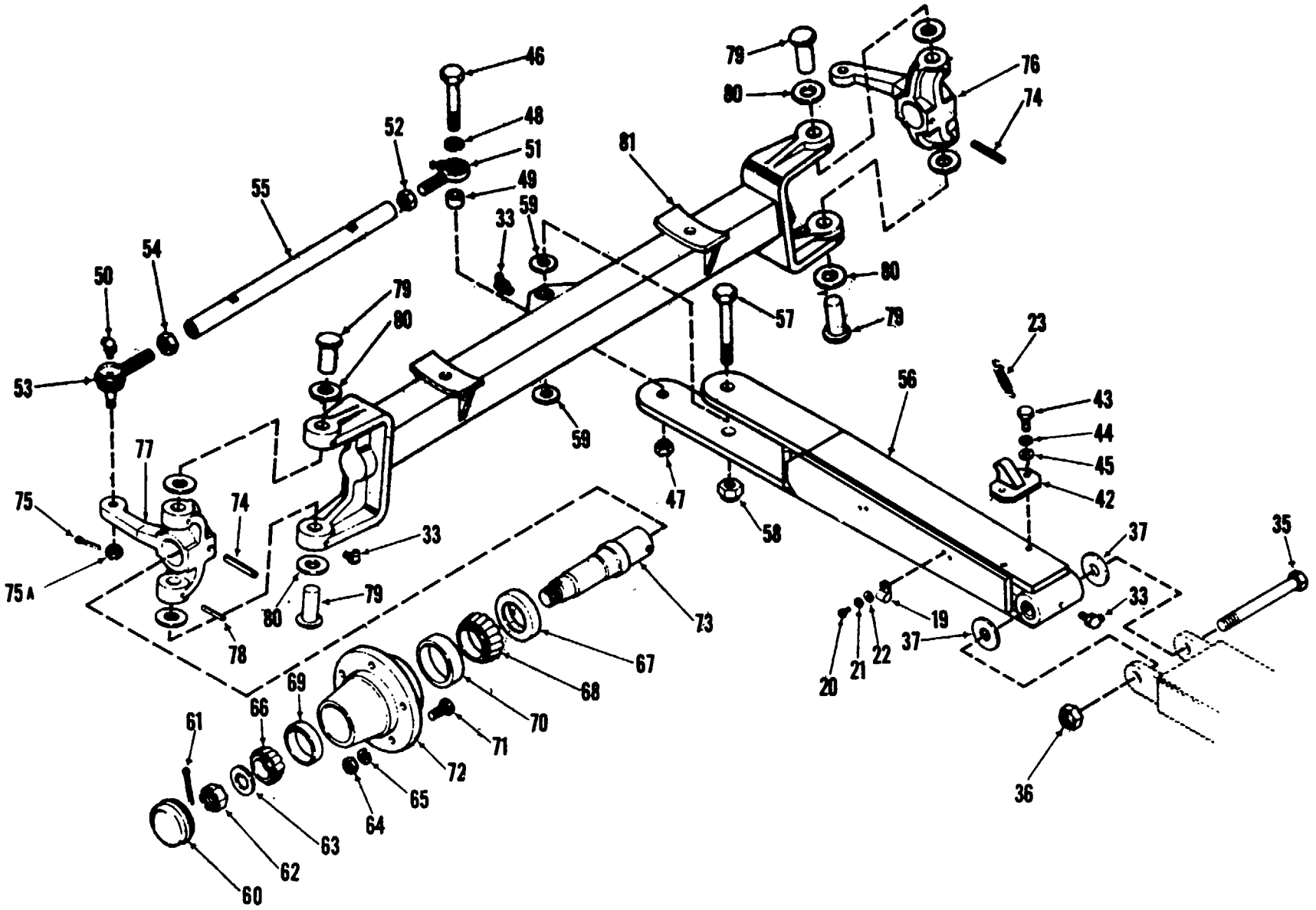

Figure A-28. Axle and Steering Assembly (Sheet 1 of 2)

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
AXLE AND STEERING ASSEMBLY					
A-28				AXLE AND STEERING ASSEMBLY (82386) ..... (C614-1082) (See 120, figure A-2)	REF
A-28	-1			CABLE..... (ATTACHING PARTS.)	REF
A-28				PIN, Cotter (88044) (AN380-2-2)	2
A-28				WASHER, Flat (82386) (400_89)	4
A-28				PIN, Straight, headed (& 386) (4045-2)	2
				- - - * - - -	
A-28	-2			KNOB	REF
A-28	-3	P1F		Control (82386) (C195-1776)..... (ATTACHING PARTS)	1
A-28				SCREW, Machine (82386) (675-11)	1
A-28				NUT, Cap (82386j (407-7MZ)	1
A-28				WASHER, Lock (82386) (604-14)	1
A-28				WASHER, Flat (82386) (400-89)	2
				- - - * - - -	
A-28	-4	P1F		SPRING, Extension (82386) (711-101)	1
A-28	-5			PIN, Warning bar (82386) (C195-7707)..... (ATTACHING PARTS)	1
A-28				NUT, Plain, hexagon (96906) (MS35690-522).....	1
A-28				WASHER, Lock (82386) (604-22MZ)	2
A-28				WASHER, Flat (82386) (400-11)	1
				- - - * - - -	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
AXLE AND STEERING ASSEMBLY (CONT)					
A-28	-6	X2F		ARM LUNETTE EYE (82386) (C195-2499)	1
				(ATTACHING PARTS)	
A-28	-7			SCREW, Machine (96906) (MS35223-46)	1
A-28	-8			WASHER, Lock (82386) (604-8)	1
A-28	-9			WASHER, Flat (82386) (400-183)	1
A-28	-10			P1F SWITCH, Sensitive (82386) (2207-013)	1
A-28	-11			ACTUATOR, Switch (91929) (JE-8)	1
				(ATTACHING PARTS FOR 10 and 11)	
A-28				SCREW, Machine (82386) (402-58)	2
A-28				NUT, Plain, hexagon (96906) (MS35649-25)	2
A-28				WASHER, Lock (82386) (602-36)	2
A-28				WASHER, Flat (82386) (400-7)	2
				- - - * - - -	
A-28	-12			BRACKET, Mounting (82386) (C195-7703)	1
				(ATTACHING PARTS)	
A-28				SCREW, Machine (82386) (406-93)	2
A-28				NUT, Plain, hexagon (96906) (MS20365-632)	2
A-28				WASHER, Flat (96906) (MS27183-6)	12
				- - - * - - -	
A-28	-13			STOP LUNETTE EYE (82386) (C195-2623)	1
A-28	-14			CLAMP (82386) (4534-043)	1
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
AXLE AND STEERING ASSEMBLY (CONT)					
A-28				SCREW, Machine (96906) (MS35223-46)	1
A-28				NUT, Plain, hexagon (96906) (MS35649-82)	1
A-28				WASHER, Lock (82386) (604-8)	1
A-28				WASHER, Flat (82386) (400-162)	2
				- - - * - - -	
A-28	-15			TERMINAL BOARD (82386) (1039-1)	1
				(ATTACHING PARTS)	
A-28				SCREW, Machine (82386) (406-50)	4
A-28				WASHER, Lock (82386) (604-6)	4
A-28				WASHER, Flat (96906) (MS27183-6)	4
				- - - * - - -	
A-28	-16			STRIP, Marker (82386) (1037-102)	1
A-28	-17			CLAMP, Loop (82386) (4534-22)	2
A-28	-18			HOSE (82386) (669-10)	1
A-28	-19			CLAMP (09922) (HP-8N)	4
				(ATTACHING PARTS)	
A-28	-20			SCREW, Machine (82386) (406-50)	4
A-28	-21			WASHER, Lock (82386) (604-6)	4
A-28	-22			WASHER, Flat (96906) (MS27183-6)	4
				- - - * - - -	
A-28	-23			SPRING (82386) (711-174)	2
A-28	-24			RELEASE, Latch (82386) (C614-1091)	1
				(ATTACHING PARTS)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
AXLE AND STEERING ASSEMBLY (CONT)					
A-28	-25			PIN, Grooved, headless (82386) (1672-2)	1
				- - - * - - -	
A-28	-26			HOOK, Tow bar (82386) (C614-1089)	1
A-28	-27			CRADLE, Latch (82386) (C614-1087)	1
				(ATTACHING PARTS)	
A-28	-28			SCREW, Cap, hexagon head (82386) (675-166MZ)	3
A-28	-29			NUT, Plain, hexagon (96906) (MS35690-622)	3
A-28	-30			WASHER, Lock (82386) (60413MZ)	3
A-28	-31			WASHER, Flat (82386) (400-136MZ)	3
				- - - * - - -	
A-28	-32			SPACER (82386) (C614-1090)	1
A-28	-33			FITTING, Lubrication (96906) (MS15003-1)	6
A-28	-34			DRAW BAR ASSEMBLY (82386) (C614-1086-1)	1
				(ATTACHING PARTS)	
A-28	-35	P1F		BOLT, Stripper (82386) (4100-003)	1
A-28	-36			NUT, Self-locking (82386) (407-087)	2
A-28	-37			WASHER, Thrust (82386) (114-011)	2
				- - - * - - -	
A-28	-38			COVER (82386) (C614-1086-11)	1
				(ATTACHING PARTS)	
A-28	-39			SCREW, Cap, hexagon head (82386) (675-36)	7
A-28	-40			WASHER, Lock (82386) (604-13)	7

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
AXLE AND STEERING ASSEMBLY (CONT)					
A-28	-41			WASHER, Flat (82386) (400-136)	7
				- - - * - - -	
A-28	-42			STRIKE, Latch (82386) (C614-1083)	1
				(ATTACHING PARTS)	
A-28	-43			SCREW, Cap, hexagon head (82386)	2
				(675-280MZ)	
A-28	-44			WASHER, Lock (82386) (604-13MZ)	2
A-28	-45			WASHER, Flat (82386) (400-136MZ)	2
				- - - * - - -	
A-28		P1F		TIE ROD ASSEMBLY (82386) (C614-8008)	2
				(ATTACHING PARTS)	
A-28	-46			SCREW, Cap, hexagon head (82386)	1
				(675-301MZ)	
A-28	-47			NUT, Self-locking (96906) (MS20365-1032)	1
A-28	-48			WASHER, Lock (82386) (604-36MZ)	1
A-28	-49			SPACER (82386) (0401-5004)	1
				- - - * - - -	
A-28	-50			FITTING, Lubrication (82386) (0273-002)	2
A-28	-51	X1F		BALL JOINT (05419) (64L)	1
				(ATTACHING PARTS)	
A-28	-52			NUT, Plain, hexagon (82386) (0409-5002MZ)	2
				- - - * - - -	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
AXLE AND STEERING ASSEMBLY (CONT)					
A-28	-53	X1F		END, Rod, steering (78118) (CM-10-B-8)	2
				(ATTACHING PARTS)	
A-28	-54			NUT, Plain, hexagon (82385) (0409-5003MZ)	2
				- - - * - - -	
A-28	-55	X1F		TIE ROD, Steering (82736) (C614-8009)	2
A-28	-56			TONGUE ASSEMBLY (82386) (C614-1085)	1
				(ATTACHING PARTS)	
A-28	-57	P1F		BOLT, Stripper (82386) (4100-5005)	1
A-28	-58			NUT, Self-locking (82386) (407-037)	1
A-28	-59			WASHER, Thrust (82386) (114-011)	2
				- - - * - - -	
A-28				HUB ASSEMBLY (82386) (5150-5001)	2
A-28	-60			CAP, Hub (95026) (15-1001)	2
A-28	-61			PIN, Cotter (96906) (MS24-665-360)	2
A-28	-62			NUT, Spindle (88044) (AN320-16)	2
A-28	-63			WASHER, Spindle	2
A-28	-64			NUT, Plain, hexagon (96906) (1MS35690-822)	10
A-28	-65			WASHERS Lock (96906) (MS35388-48)	10
A-28	-66			CONE, Roller bearing (95026) (17X136)	2
A-28	-67			SEAL (95026) (14-1000)	2
A-28	-68			CONE Roller bearing (95026) (17X138)	2
A-28	-69			CUP, Roller bearing	2
A-28	-70			CUP, Roller bearing	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
AXLE AND STEERING ASSEMBLY (CONT)					
A-28	-71			STUD	10
A-28	-72			HUB	2
A-28	-73			SPINDLE, Front (8c386) (8021-5001)	2
				(ATTACHING PARTS)	
A-28	-74	P1F		PIN, Grooved, headless (82386) (1672-5002)	2
				- - - * - - -	
A-28	-75			PIN, Cotter (88044) (AN380-4-6)	2
A-28	-75A			NUT, Castelated (82386) (407-37MZ)	1
A-28	-76	X2F		KNUCKLE ASSEMBLY, Steering LH (82386)	1
				(8023-5003-02)	
A-28	-77	X2F		KNUCKLE ASSEMBLY, Steering RH (82386)	1
				(8023-5003-01)	
				(ATTACHING PARTS FOR 76 AND 77)	
A-28	-78			PIN, Grooved, headless (72962)	4
				(52-048-250-1750)	
A-28	-79			PIN, Straight, headed (82386) (8023-5004)	4
A-28	-80			WASHER, Thrust (82386) (0114-5002)	8
				- - - * - - -	
A-28	-81	X1F		AXLE ASSEMBLY, Front (82386) (C614-1083)	1

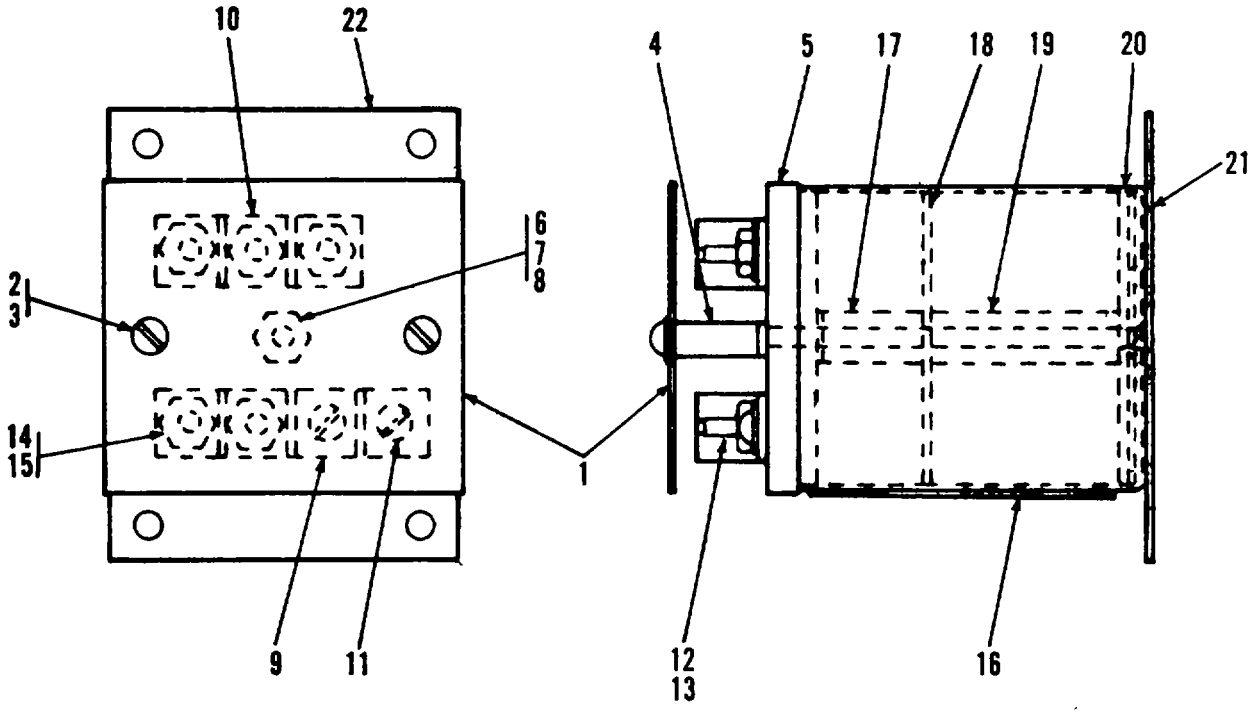

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Figure A-29. Over-load Modules

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				OVER-VOLTAGE MODULE	
A-29				MO W LE, Over-voltage (28835) (D11226-1)	REF
				(See 1, figure A-10)	
A-29				MD W LE, Under-voltage (28835) (11-26-2)	REF
				(See 2, figure A-10)	
A-29				MD W LE, Over-frequency (28835) (D" 226-3)	REF
				(See 3, figure A-10)	
A-29				MO W 4E, Under-frequency (28835) (D11226-4)	REF
				(See 4, figure A-10)	
A-29	-1			COVER, Box (28835) (75GXP-233)	1
				(ATTACHING PARTS)	
A-29	-2			SCREW, Machine (28835) (U-1 1110_7)	2
A-29	-3			WASHER, Lock (28835) (W-11254-1).....	2
A-29	-4			SPACER', Cover (28835) (75GXP-234)	2
A-29	-5			LID, Box (28835) (lOD8-876B-1)	1
				(used on D11226-1 and D11226-12)	
A-29	-5			LID, Box (28835) (382489-2)	1
				(used on D11226-3 and D11226-4)	
				(ATTACHING PARTS)	
A-29	-6			SCREW, Machine (28835) (W-11215-3)	1
A-29	-7			NUT, Plain, hexagon (28835) (W-11287-2)	1
A-29	-8			WASHER, Flat (28835) (W-11242-2)	1
				- - - * - - -	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
OVER VOLTAGE MODULE (CONT)					
A-29	-9			STRIP, Insulator (28835) (75(GP-231)	1
A-29	-10			STRIP, Insulator (28835) (75HIP-232)	1
				(ATTACHING PARTS)	
A-29	-11			SCREW, Machine (28835) (W-lo10-4)	2
				(used on D11226-3 and D11996-4 only)	
A-29	-12			SCREW, Machine (28835) (W-110-7)	5
A-29	-13			WASHER, Lock (28835) (W-11254-1)	5
A-29	-14			NUT, Plain, hexagon (28835) (W-1l87-2)	7
A-29	-15			WASHER, Flat (28835) (W-11242-2)	10
				--------*-------	
A-29	-16			PLATE, Identification (28835) (380624)	1
				(used on D11226-1)	
A-29	-16			PLATE, Identification (28835) (380625)	1
				(used on D11226-2)	
A-29	-16			PLATE, Identification (28835) (380626)	1
				(used on D1l226-3)	
A-29	-16			PLATE, Identification (28835) (380627)	1
				(used on D11226-4)	
A-29	-17			SPACER, Fiber (28835) (10i-939)	1
A-29	-18			DECK, Top (28835) (103I-885-1)	
				(used on DU1226-1)	
A-29	-18			DECK, Top (28835) (10oi-884-1)	1
				(used on D11226-2)	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
OVER-VOLTAGE MODULE (CONT)					
A-29	-18			DECK, Top (28835) (0Ioi-882-1)	1
				(used on D11226-3)	
A-29	-18			DECK, Top (28835) (10H-883-1)	1
				(used on D11226-4)	
A-29	-19			SPACER, Fiber (28835) (10nH-938)	1
A-29	-20			DECK, Bottom (28835) (10EH-887)	1
				(used on D11226-1)	
A-29	-20			DECK, Bottom (28835) (10oD-886)	1
				(used on Dl1226-2)	
A-29	-20			DECK, Bottom (28835) (10oi-888)	1
				(used on D11226-3 and D11226-4)	
A-29	-21			BOARD, Insulating (28835) (10IH-937)	1
A-29	-22			BOX, Mounting (28835) (10DE-875)	1

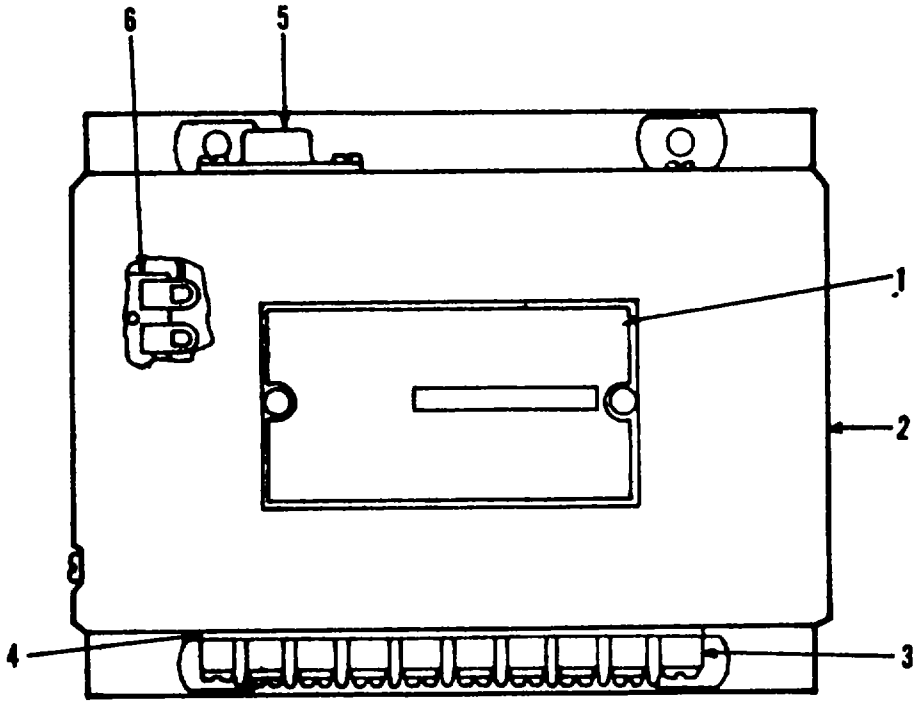

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Figure A-30. Transducer Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				TRANSDUCER ASSEMBLY	
A-30				TRANSDUCER ASSEMBLY (82386)	REF
				(6500-5002) (See 9, figure A-10)	
A-30	-1			PLATE, Identification (82386) (4055-5037)	1
				(ATTACHING PARTS)	
A-30				RIVET (12014) (R-3486)	2
A-30	-2			COVER (82386) (7003-216)	1
				(ATTACHING PARTS)	
A-30				SCREW, Machine (82386) (610-85M)	4
A-30	-3			TERMINAL BOARD (82386) (1039-5024)	1
				(ATTACHING PARTS)	
A-30				SCREW, Machine (82386) (406-68)	4
A-30				NUT, Plain, hexagon (82386) (409-9)	6
A-30				WASHER, Lock (96906) (NS35333-37).....	7
A-30	-4			STRIP, Marker (82386) (1037-357)	1
A-30	-5			TRANSISTOR (JEDEC) (2N3766)	1
				(ATTACHING PARTS)	
A-30				SCREW, Machine (82386) (406-39)	2
A-30				NUT, Plain, hexagon (82386) (409-9)	2
A-30				WASHER, Lock (82386) (602-26)	1
A-30				WASHER, Flat (82386) (400-27)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				TRANSDUCER ASSEMBLY (CONT)	
A-30				WASHER, Shoulder (82386) (1935-010)	2
A-30				WASHER, Nonmetallic (82386) (776-909)	1
				----*----	
A-30	-6			TERMINAL STRIP ASSE4BLY (82386)	1
				(6501-5016)	
				(ATTACHING PARTS)	
A-30				SCREW, Machine (83-6) (406-39)	2
A-30				NUT, Plain, hexagon (82386) (o09-9)	2
A-30				WASHER, Lock (82386) (602-26)	2
				----*----	

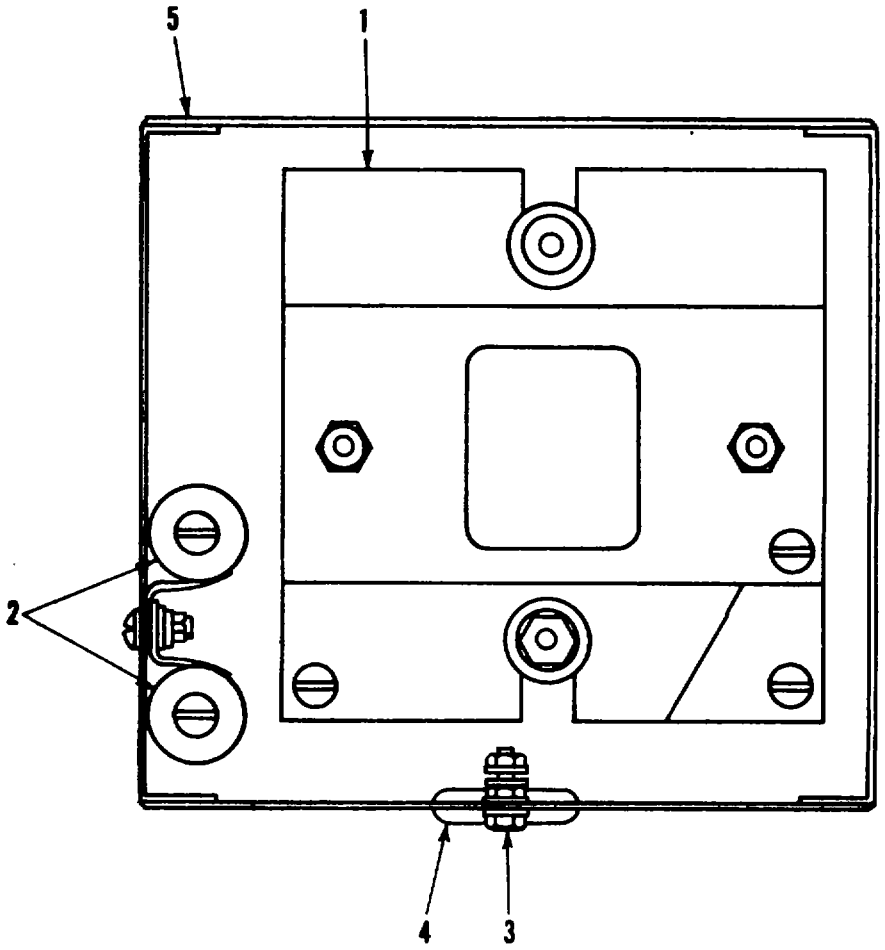

Figure A-31. Rectifier Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				RECTIFIER ASSEMBLY	
A-31				RECTIFIER ASSEMBLY (82386) (8018-029)	REF
				(See 10, figure A-10)	
A-31	-1	P1H		RECTIFIER (82386) (506-802)	1
				(ATTACHING PARTS)	
A-31				SCREW, Machine (96906) (NB3522t-71.)	2
A-31				NUT, Plain, hexagon (96906) (MS35650-102).....	2
A-31				WASHER, Lock (82386) (604-L1M)	2
A-31				WASHER, Flat (82386) (400-238)	2
A-31				SPACER (82386) (02401-5001)	2
A-31	-2	P1H		CAPACITOR, Fixed (82386) (679-341)	2
				(ATTACHING PARTS)	
A-31				SCREW, Machine (96906) (MS35224-61).....	1
A-31				NUT, Plain, hexagon (96906) (MS35650-1C2)	1
A-31				WASHER, Lock (82336) (604-11)	3
A-31				WASHER , Flat (32386) (400-238)	2
A-31	-3			SCREW, Cap, hexagon head (323-6)	1
				(4110-0994)	
				(ATTACHING PARTS)	
A-31				NUT, Plain, hexagon (96906) (£'35650-102)	2
A-31				WASHER, Lock (82386) (603-29G)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				RECTIFIER ASSEMBLY (CONT)	
A-31				WASHER, Flat (82386) (400-238)	2
				----*----	
A-31	-4			GROMMET (96906) (MS35489-16)	1
A-31	-5			SHIELD, Rectifier (82386) (8004-014)	1

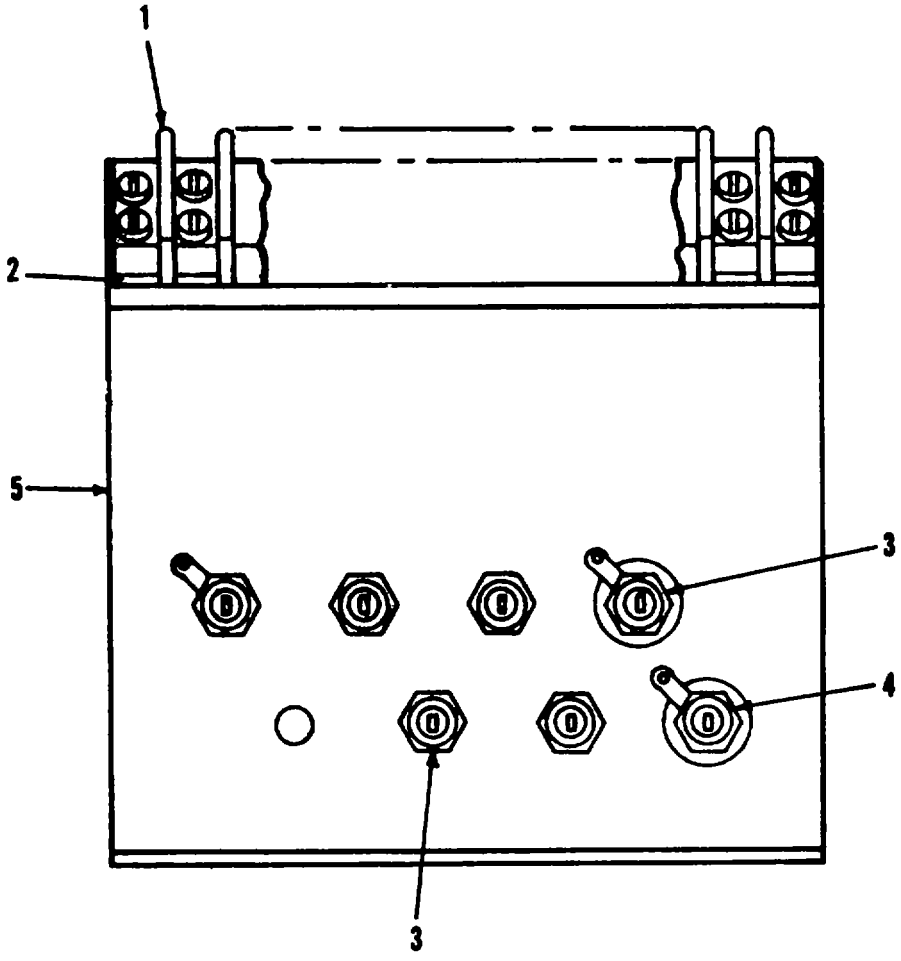

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Figure A-32. Diode Panel Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				DIODE PANEL ASSEMBLY	
A-32				DIODE PANEL ASSEMBLY (82386)	REF
				(C614-5020) (See 8, figure A-10)	
A-32	-1			STRIP, Terminal (82386) (1039-0004)	1
				(ATTACHING PARTS)	
A-32				SCREW, Machine (82386) (0406-0050j	4
A-32				WASHER, Lock (82386) (0602-0026).....	4
A-32	-2			STRIP, Marking (82386) (1037-0110).....	1
A-32	-3			SEMICONDUCTOR, Diode (82386) (0771-0222)	6
A-32	-4			SEMICONDUCTOR, Diode (82386) (0771-0221)	1
				(ATTACHING PARTS)	
A-32				WASHER, Nonmetallic (82386) (0771-0915)	2
A-32				WASHER, Nonmetallic (82386) (0771-0916)	2
A-32				TERMINAL, Lug (82386) (0771-0914).....	3
A-32	-5			PANEL, Diode (82386) (C614-5018)	1

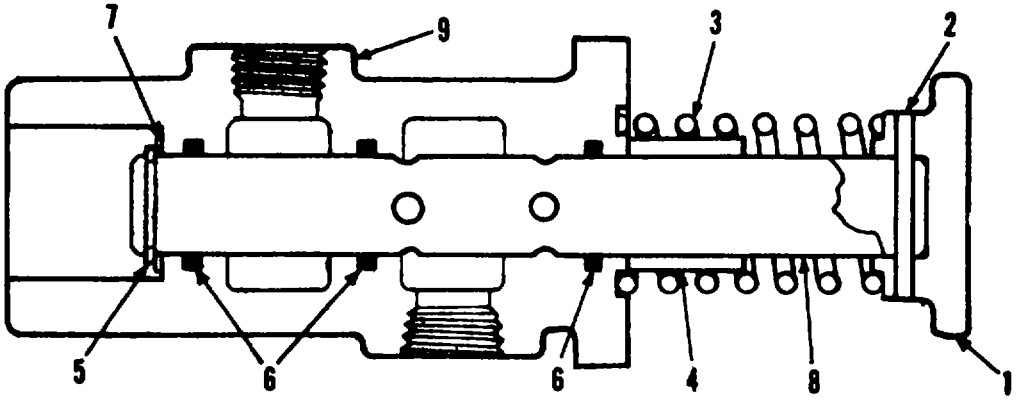

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Figure A-33. Start Valve

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				START VALVE	
A-33				VALVE, Start (01843) (VA202180)	REF
				(See 19, figure A-16)	
A-33	-1			PEDAL, Foot (01843) (KN200524)	1
				(ATTACHING PARTS)	
A-33	-2			PIN, Straight, headless (01843) (PN100154).....	1
				-----*------	
A-33	-3			SPRING, Valve (01843) (SP200943)	1
A-33	-4			SPACER (01843) (SR200952)	1
A-33	-5			RING, Retaining (01843) (RG100253).....	1
A-33	-6			PREFORMED PACKING (01843) (GA100106)	3
A-33	-7			STOP, Valve (01843) (ST200942)	1
A-33	-8			VALVE, Control (01843) (VA202181)	1
A-33	-9			HOUSING, Valve (01843) (HG202188)	1

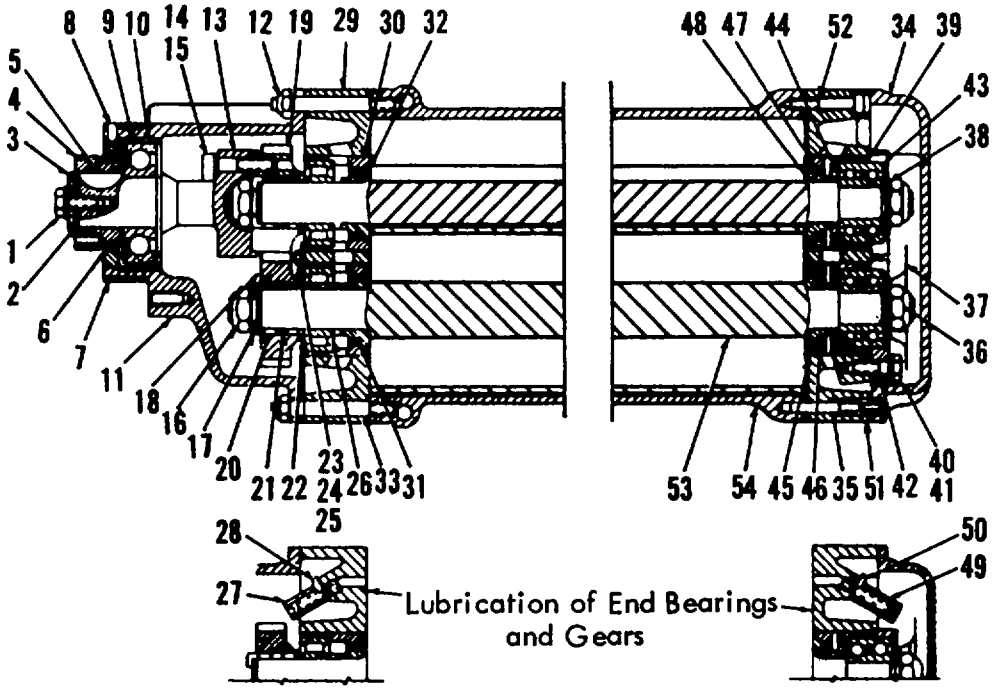

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Figure A-34. Rootblower

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				ROOTBLOWER	
A-34				ROOTBLOWER (15233) (2215603)	REF
				(See 228, figure A-24)	
A-34	-1			SCREW, Cap, hexagon head (15233) (222?!006).....	1
A-34	-2			WASHER, Loci; (15233) (e222610).....	1
A-34	-3			WASHER, Flat (15233) (2226105)	1
A-34	-4			HUB, Drive (15233) (2262502)	1
A-34	-5			KEY, Woodruff (15233) (2226901)	1
A-34	-6	P1H		SEAL, Oil (15233) (22163)04) 2	
A-34	-7			BUSHING, Sleeve (15233) (2220131)	1
A-34	-8			SETSCREW(15233) (2224004)	1
A-34	-9	P1H		HOUSING, Seal (15233) (2212607)	1
A-34	-10	P1H		BEARING Ball, annular (15233) (2220307)	1
A-34	-11			COVER, Front (15233) (221'102)	1
				(ATTACHING PARTS)	
A-31i	-12			NUT, Self-locking, (15233) (2223,0_)	16
				----*----	
A-34	-13			SHAFT, Drive (15233) (221O604)	1
				(ATTACHING PARTS)	
A-34	-14			SCREW,, Cap, socket Lead (15233) (222 005).....	6
A-341	-15			WASHER, Lock (15233) (2226lo1).....	6
				----*----	
A-34	-16			NUT, Self-locking (15233) (2226302)	2
A-34	-17			RING, Adjusting (15233) (2211501)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				ROOTBLOWER (CONT)	
A-34	-18			GEAR, Spur (15233) (2217403)	1
A-34	-19			GEAR, Spur (15233) (2217404)	1
A-34	-20			SPRING (15233) (2227801)	4
A-34	-21			SPACER, Sleeve (15233) (2228408)	2
A-34	-22			SPACER (15233) (2228407)	2
A-34	-23			SCREW, Cap, hexagon head (15233) (2224002)	2
A-34	-24			WASHER, Lock (15233) (2226104)	2
A-34	-25			WASHER., Position (15233) (2226107)	1
A-34	-26			BEARING, Plain, roller (15233) (2220401)	2
A-34	-27			NOZZLE (15233) (2219702)	1
				(ATTACHING PARTS)	
A-34	-28			PLATE, Locking (15233) (2211904)	1
				---*---	
A-34	-29			PLATE, End (15233) (2211903)	1
A-34	-30	P1H		HOUSING, Seal (15233) 2212606)	2
A-34	-31	P1H		SEAL, Oil (15233) (2216803)	4
A-34	-32	P1H		HOLDER, Seal (15233) (2226702)	2
A-34	-33			STUD, Plain (15233) (2225714)	16
A-34	-34			COVER, Rear (15233) (2212202)	1
				(ATTACHING PARTS)	
A-34	-35			PIN, Tapered (15233) (2224601)	6
				---*---	
A-34	-36			NUT, Self-locking (15233) (2226302)	2

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				ROOTBLOWER (CONT)	
A-34	-37			SLINGER, Oil (15233) (2213702).....	1
A-34	-38			WASHER, Flat (15233) (2226106)	2
A-34	-39			BUSHING (15233) (2220102)	2
				(ATTACHING PARTS)	
A-34	-40			SCREW, Cap, hexagon head (15233) (2224001).....	4
A-34	-41			WASHER, Lock (15233) (2226108).....	4
				---*---	
A-34	-42			SHIM (15233) (2228507)	AR
A-34	-43	P1H		BEARING, Ball (15233) (2220306)	4
A-34	-44			RING, Adjusting (15233) (2211502)	2
A-34	-45	P1H		HOUSING Seal (15233) (2212604)	2
A-34	-46			SEAL, Oil (15233) (2216803)	4
A-34	-47	P1H		HOLDER, Seal (15233) (2226701)	2
A-34	-48			RING, Seal (15233) (2216b05)	4
A-3	-49			NOZZLE (i53j) (2219701)	1
				(ATTACHING PARTS)	
A-34	-50			PLATE, Locking (15233) (2211904)	1
A-34	-51			PLATE, End (15233) (2211903)	1
				(ATTACHING PARTS)	
A-34	-52			SCREW, Cap, socket head (15233) (2224003).....	4
				---*---	

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				ROOTBLOWER (CONT)	
A-34	-53	X1F		ROTOR ASSEMBLY (15233) (2215504)	2
A-34	-54			HOUSING (15233) (2212605)	1

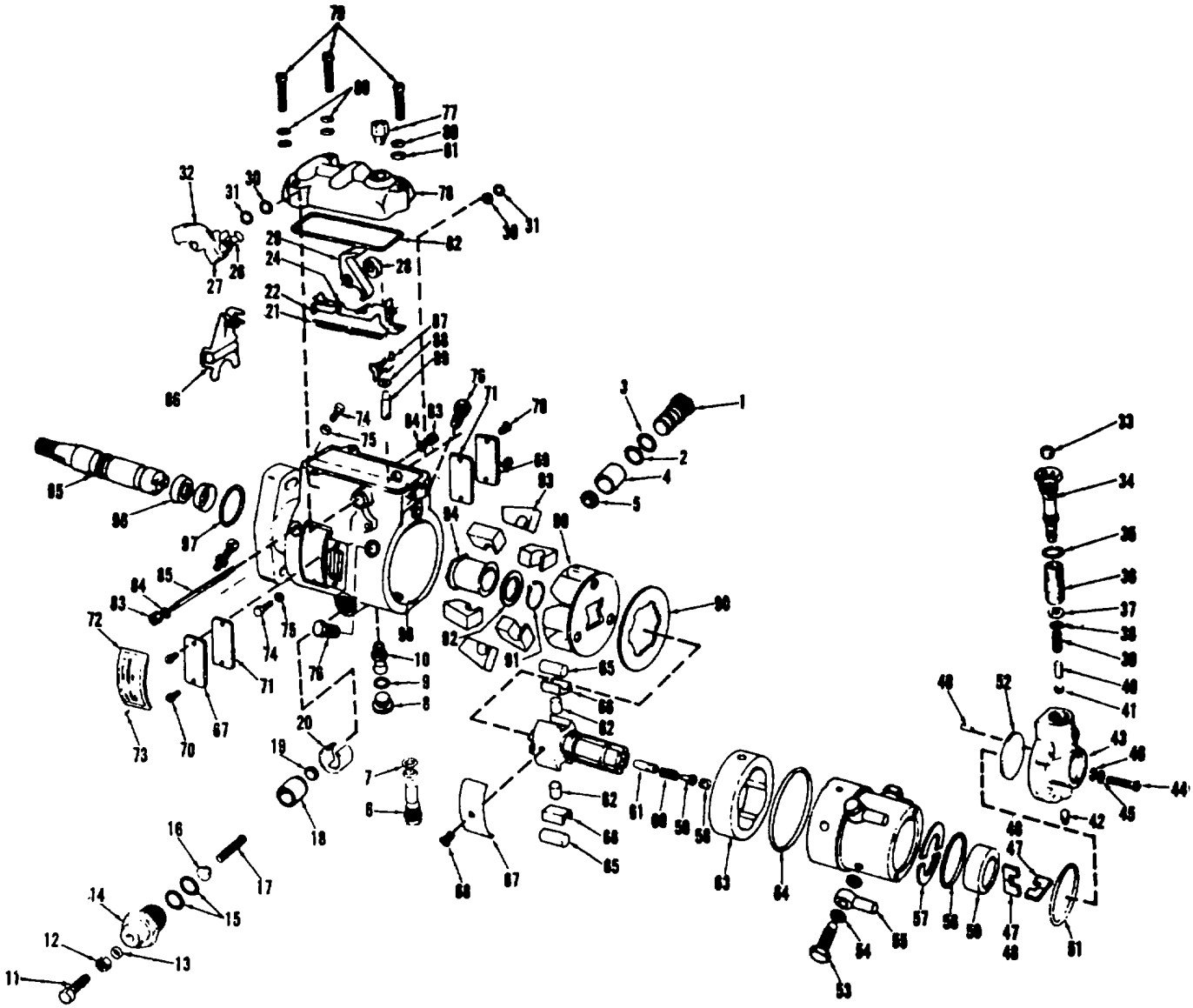

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Figure A-35. Injection Pump Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				INJECTION PUMP ASSEMBLY	
A-35				PUMP ASSEMBLY, Injection (84760) ..... (DBGVC329-L1T) (See 31, figure A-C4)	REF
A-35	-1			PLUG, Piston (34760) (.L.l1)	1
A-35	-2			SEAL, Piston ring (84760) (15750)	1
A-35	-3			RING, Piston (84760) (153,).....	1
A-35	-4			PISTON, Power (-3)-760) (16241)	1
A-35	-5			WASHER, Slide (84760) (12622)	1
A-35	-5			SCREW ASSEMBLY (8c47'O) (15479)	1
A-35	-7			PACKING, Preformed (84760) (11507)j	2
A-35	-8			PLUG, Screw (84760) (12765)	1
A-35	-9			PACK15G, Preformed (8)4760) (12766).....	1
A-35	-10			SCREW, Cam advance (84$760) (15438).....	1
A-35	-11			SCREW, Cap, hexagon head (84760) (163o0).....	1
A-35	-12			NUT, Plain hexagon (84760) (13807)	1
A-35	-13			PACKING, Preformed (347560) (120l.0)	1
A-35	-14			PLUG, Piston (84760) (14941)	1
A-35	-15			PACKING, Preformed (84760) (127641)	4
A-35	-16			GUIDE, Spring (81760) (14940)	1
A-35	-17			SPRING, Helical, compression (o 7560) ..... (14713)	1
A-35	-18			PISTON, Spring (84760) (12756)	1
A-35	-19			WASHER, Slide (84760) (12622)	1
A-35	-20			RETAINER, Washer (81760) (15101)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				INJECTION PUMP ASSEMBLY (CONT)	
A-35	-21			SPRING, Helical, extension (84760) (11919)	1
A-35				HOOK ASSEMBLY (84760) (14560)	1
A-35	-22			LINK ASSEMBLY (84760) (12358)	1
A-35	-23			SCREW, Machine (84760) (12360)	1
A-35	-24			WASHER, Lock (84760) (14658)	1
A-35	-25			HOOK, Linkage (84760) (14559)	1
A-35	-26			SCREW, Cap, hexagon head (84760) (12972)	1
A-35	-27			NUT, Plain, hexagon (84760) (12174)	1
A-35				SCREW, Machine (84760) (12957)	1
A-35				SCREW, Machine (84760) (12998)	1
A-35				WASHER, Flat (84760) (13459)	1
A-35				WASHER, Flat (84760) (12258)	1
A-35				SCREW, Cap, hexagon head (84760) (12165)	3
A-35				NUT, Plain, hexagon (84760) (12174)	3
A-35				SHAFT ASSEMBLY, Shutoff (84760) (12230)	1
A-35				SPACER, Throttle shaft lever (84760) (16587)	2
A-35				LEVER, Adjustable throttle (84760) (12992)	1
A-35				WASHER, Flat (84760) (12049)	1
A-35				SCREW, Machine (84760) (!2051)	1
A-35				SCREW, Machine (84760) (12998)	1
A-35				WASHER, Flat (84760) (11582)	1
A-35	1-28			CAM, Shutoff (84760) (12249)	1

Illust		SMR	Federal	Description	Qty

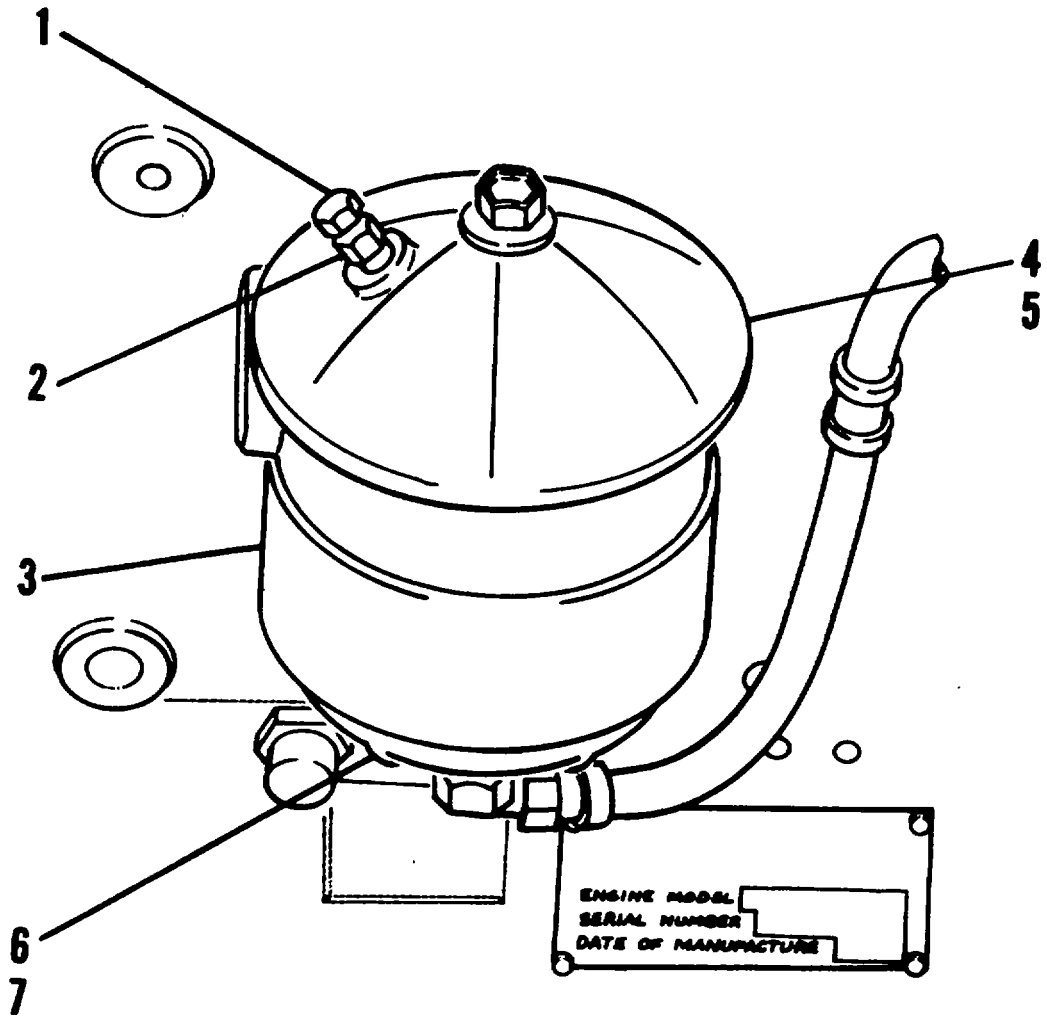
Fig No.	Item No.	Code	Stock Number		Inc In Unit
			INJECTION PUMP ASSEMBLY (CONT)		
A-35	-29			LEVER, Throttle (84760) (12221)	1
A-35	-30			PACKING, Preformed (84760) (12040)	2
A-35	-31			WASHER, Seal (847650) (14408)	2
A-35	-32			SHAFT ASSEMBLY, Throttle (84760) (12012)	1
A-35	-33			PLUG, Pipe (84760) (15228)	1
A-35	-34			SLEEVE, End plate (84760) (17058)	1
A-35	-35			PACKING, Preformed (84760) (12406)	1
A-35	-36			ELEMENT, Filter (84760) (15225)	1
A-35	-37			PACKING, Preformed (84760) (15627)	1
A-35	-38			PACKING, Preformed (84760) (11507)	1
A-35	-39			SPRING, Helical, compression (84760) (15701)	1
A-35	-40			PISTON, Regulating (84760) (11508)	1
A-35	-41			SEAL, Piston (84760) (17056)	1
A-35	-42			PLUG, Pipe (84760) (15821)	1
A-35	-43			PIATE, End (84760) (15877)	1
A-35	-44			SCREW, Machine (84760) (11532)	4
A-35	-45			WASHER, Lock (84760) (11582)	4
A-35	-46			WASHER, Flat (84760) (13521)	4
A-35	-47			BIADE, Pump (84760) (18137)	4
A-35	-48			SPRING, Helical, compression (84760) (15699)	2
A-35	-49			PIN, Straight, headless (84760) (11525)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				INJECION PUMP ASSEMBLY (CONT)	
A-35	-50			LINER, Pump (84760) (16753)	1
A-35	-51			PACKING, Preformed (84760) (11329)	1
A-35	-52			PLATE, Thrust (84760) (15875)	1
A-35	-53			SCREW, Fuel line (84760) (11346)	3
A-35	-54			WASHER, Fuel line (84760) (16225)	6
A-35	-55			CONNECTOR, Fuel line (84760) (11339)	3
A-35	-56			RING, Retaining (84760) (11208)	1
A-35	-57			RETAIER, Rotor (84760) (11212)	2
A-35	-58			SETSCREW (84760) (13837)	1
A-35				WIRE, Vent (84760) (11437)	1
A-35				WIRE, Retaining (84760) (11439)	1
A-35				SCREW, Head plug (84760) (12216)	1
A-35				SCREW, Head plug (84760) (11438)	2
A-35	-59			STOP, Valve (84760) (16440)	1
A-35	-60			SPRING, Helical, compression (84160) (13839)	1
A-35	-61			VALVE, Delivery (84760) (13827)	1
A-35	-62			PILNGER, Rotor (84760) (11056)	2
A-35	-63			RING, Cam (84760) (10386)	1
A-35	-64			PACKING, Preformed (84760) (11304)	1
A-35	-65			ROLLER, Cam (84760) (11141)	2
A-35	-66			SHOE, Cam roller (84760) (11136)	2
A-35	-67			SPRING, Leaf (84760) (11197)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INJECTION PUMP ASSEMBLY (CONT)					
A-35	-68			SCREW, Machine (84760)	1
A-35	-69			COVER, Timing (84760) (10569)	2
A-35	-70			SCREW, Machine (84760) (10584)	4
A-35	-71			GASKET (84760) (10574)	2
A-35	-72			PLATE, Identification (84760) (1039,)	1
A-35	-73			SCREW, Drive (84760) (10401)	2
A-35	-74			SCREW, Cap, hexagon head (84760) (12259)	2
A-35	-75			WASHER, Flat (84760) (10464)	2
A-35	-76			SCREW, Cap, hexagon head (84760) (11331)	2
A-35	-77			CONNECTOR, Fuel line (84760) (15830)	1
A-35	-78			COVER, Governor control (84760) (16410)	1
A-35	-79			SCREW, Machine (84760) (12202)	3
A-35	-80			WASHER, Lock (8yf760) (11582)	3
A-35	-81			WASH]R, Flat (84760) (13521)	3
A-35	-82			GASKET (84760) (12054)	1
A-35	-83			NUT, Pivot shaft (81760) (12288)	2
A-35	-84			PACKING, Preformed (84760) (11588)	2
A-35	-85			SHAFT, Pivot (84760) (12214)	1
A-35	-86			ARM, Governor (84760) (16573)	1
A-35				NUT, Terminal contact (84760) (12519)	2
A-35				NUT, Lock (84760) (14760)	2
A-35				WASHER, Insulating (84760) (12500)	2
A-35				SPRING, Actuator arm (84760) (13805)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INJECTION PUMP ASSEMBLY (CCNT)					
A-35				SCREW, Machine (84760) (12505)	1
A-35				ARM, Actuator keeper (84760) (13809)	1
A-35				SPACER, Actuator keeper arm (84760) (13810)	1
A-35				EASHER, Actuator core (84760) (13803)	1
A-35				ARM ASSEMBLY, Actuator (84760) (16590)	1
A-35				TUBE, Terminal insulating (84760) (12513)	2
A-35				FRAME ASSEMBLY, Solenoid (84760) (16359)	1
A-35	-87			ARM ASSEMBLY, Metering valve (84760) (14681)	1
A-35	-88			SHIM (84760) (11610)	1
A-35	-89			VALVE, Metering (84760) (11560)	1
A-35				SPACER, Metering valve (84760) (16575)	1
A-35				SHIM, Metering valve (84760) (16576 thru 16583)	AR
A-35				CAP ASSEMBLY, Adjusting (84760) (13567)	1
A-35				SEAL, Adjusting cap (84760) (12966)	1
A-35				GUIDE, Control rod (84760) (16629)	1
A-35				WASHER, Control rod guide (84760) (13572)	1
A-35				SEAL, Control rod guide (84760) (13550)	1
A-35				PIN, Control spring (84760) (13554)	1
A-35				ROD ASSEMBLY, Control (84760) (13529)	1
A-35				SPRING, Control (84760) (16615)	1

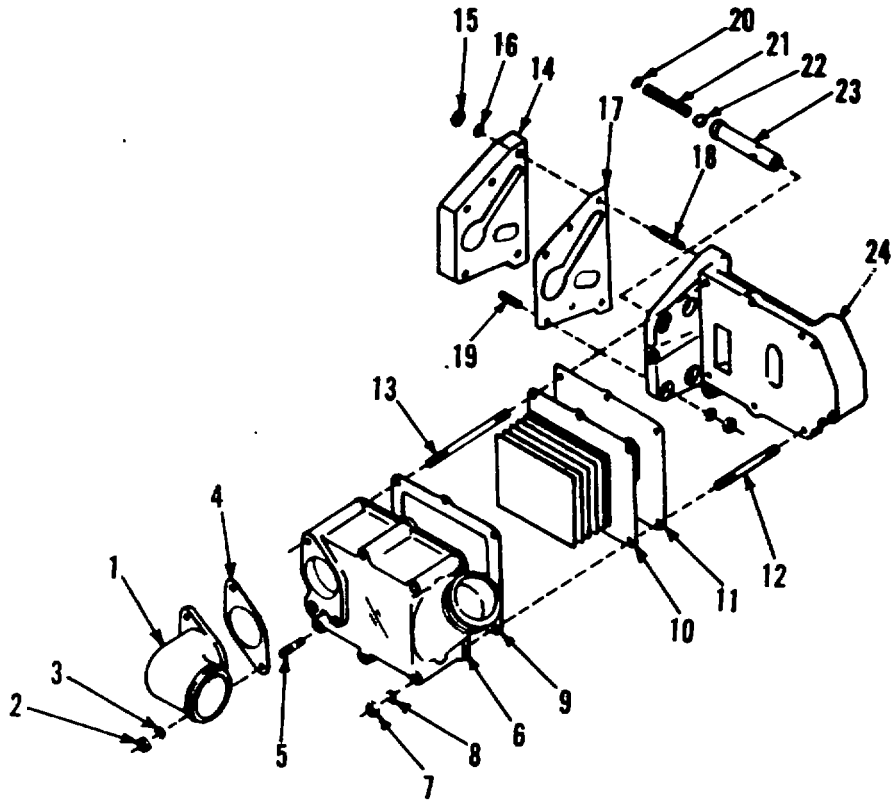
Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
INJECTION PUMP ASSEMBLY (CONT)					
A-35				BARREL ASSEMBLY, Damper (84760) (16568).....	1
A-35				PISTON ASSEMBLY, Damper (84760) (16572).....	1
A-35				SPRING, Damper (84760) (16574)	1
A-35	-90			RETAINER ASSEMBLY (84760) (17852).....	1
A-35				RING, Retaining (84760) (17513)	1
A-35				RETAINER ASSEMBLY (S4'760) (.7514)	1
A-35				RETAINER (84760) (14264)	1
A-35				HUB ASSEMBLY (84760) (14266)	1
A-35	-91			RING, Retaining (84760) (12285)	1
A-35	-92			WASHER, Thrust (84760) (11620)	1
A-35	-93			WEIGHT, Governor (84760) (11658)	6
A-35	-94			SLEEVE, Governor thrust (84760) (11443)	1
A-35	-95			SHAFT, Drive (84760) (15757)	1
A-35	-96			SEAL, Oil (84760) (!'0.53)	2
A-35	-97			PACKING, Preformed (84760) (10519)	1
A-35				WASHER, Thrust (834760) (3.Oll)	1
A-35	-98			HOUSING ASSEMBLY (84760) (15761)	1
A-35				BUSHING, Sleeve (84760) (15093)	2
A-35				TUBE, Pilot (84760) (10421).....	1



AV036742

Figure a-36. Fuel Filter

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
FILTER AND ELBOW ASSEMBLY					
A-36				FILTER AND ELBOW ASSEMBLY (81321) (6656489) (see 66, figure A-24)	REF
A-36	-1			PLUG, Vent (81321) (15002)	1
A-36	-2			PLUG, Pipe (81321) (7600)	1
A-36	-3			BRACKET ASSEMBLY (81321) (20380)	1
A-36	-4			COVER ASSEMBLY (81321) (6663700)	1
A-36	-5	P1F		GASKET (81321) (19954-5)	1
A-36	-6	P1F	2910-287-1930	ELEMENT, Filter (81321) (6663116)	1
A-36	-7			CASE (81321) (6657135)	1

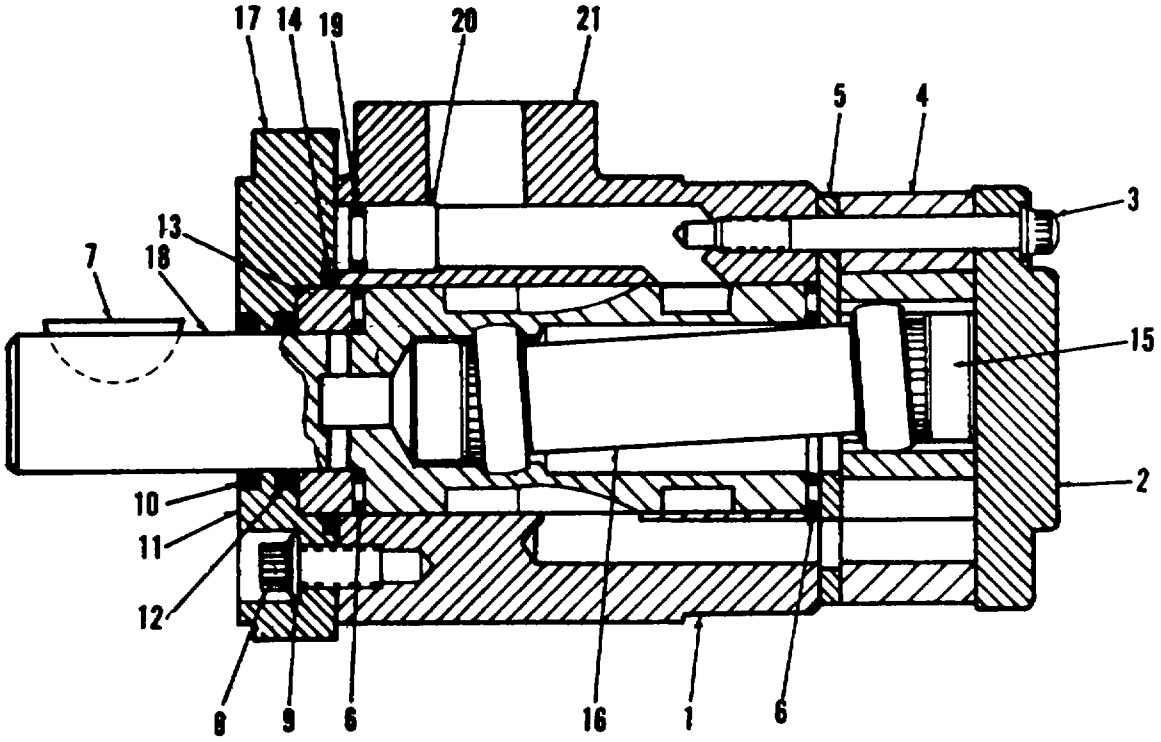


AV036743

Figure A-37. Oil Cooler Assembly

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				OIL COOLER ASSEMBLY	
A-37				OIL COOLER ASSEMBLY (15233) ( ) ..... (See figure A-24)	REF
A-37	-1			FLANGE, Elbow (15233) (0828209) ..... (ATTACHING PARTS)	1
A-37	-2			NUT, Plain, hexagon (15233) (128564)	2
A-37	-3			WASHER, Lock (15233) (114605).....	2
A-37	-4			GASKET (15233) (0822225)	1
A-37	-5			STUD (15233) (0025702)	2
A-37	-6			COVER (15233) (0812211) ..... (ATTACHING PARTS)	1
A-37	-7			NUT, Plain, hexagon (15233) (21856)4)	6
A-37	-8			WASHER, Lock (15233) (114605).....	6
A-37	-9			GASKET (15233) (0822212)	1
A-37	-10			COOLER, Oil (15233) (0869001)	1
A-37	-11			GASKET (15233) (0822211)	1
A-37	-12			STUD (15233) (0025715)	5
A-37	-13			STUD (15233) (0025756)	1
A-37	-14			ADAPTER, Engine oil filter (82386) ..... (4479-5003-02) (ATTACHING PARTS)	1
A-37	-15			NUT, Plain, hexagon (15233) (218564)	6

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
OIL COOLER ASSEMBLY (CONT)					
A-37	-16			WASHER, Lock (15233) (114605)	6
A-37	-17			GASKET (15233) (0822210)	1
A-37	-18			STUD (15233) (0025711)	2
A-37	-19			STUD (15233) (0025752)	4
A-37	-20			WASHER (15233) (103339)	1
A-37	-21			SPRING, Helical, compression (15233) (0827804)	1
A-37	-22			BALL, Steel (15233) (0829002)	1
A-37	-23			SEAT, Valve (15233) (0813302)	1
A-37				SCREW, Cap, hexagon head (15233) (100157)	1
A-37				GASKET (15233) (0822606)	1
A-37	-24			BRACKET, Cooler (15233) (0862110)	1

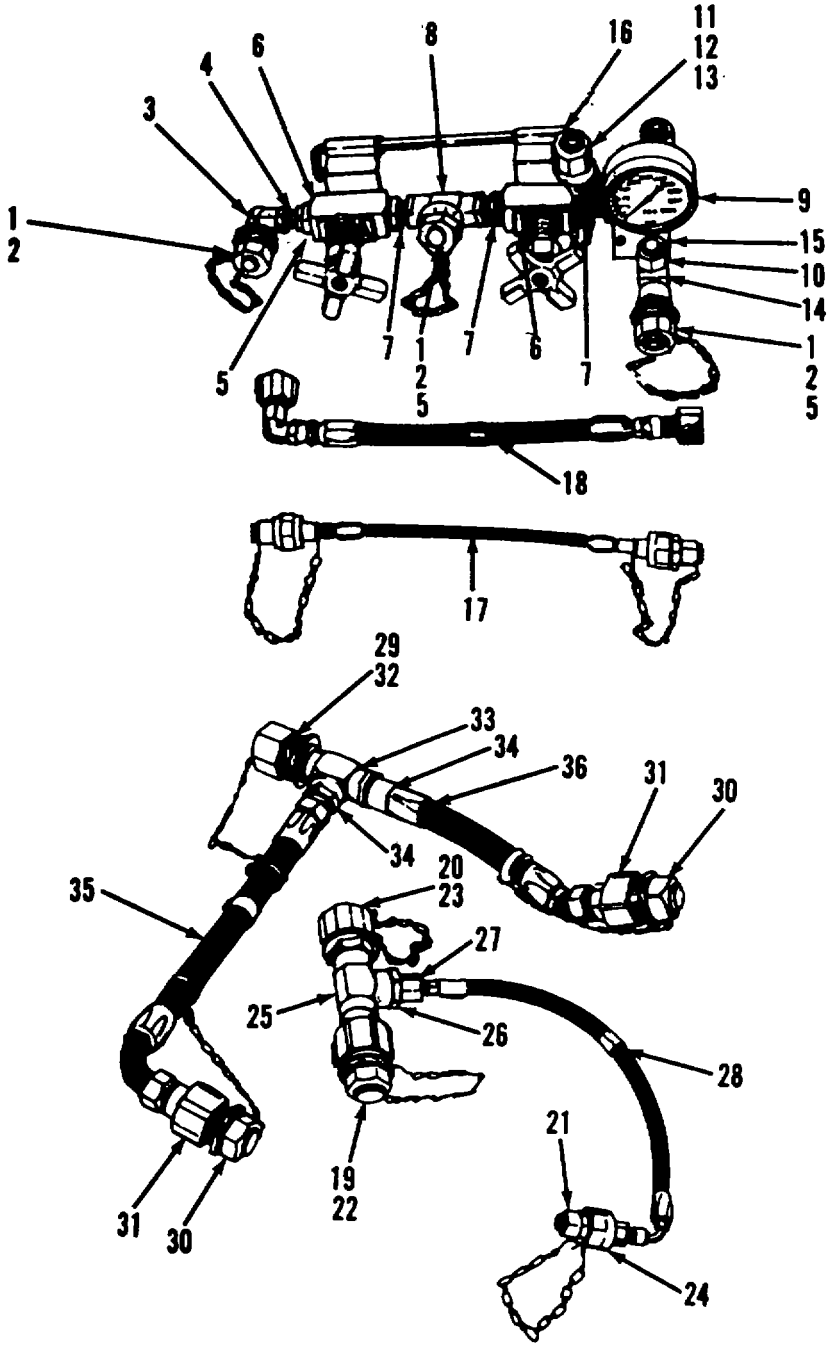


AV036744

Figure A-38. Hydraulic Drive Motor

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
				HYDRAULIC DRIVE MOTOR	
A-38				HYDRAULIC DRIVE MOTOR (96151) ..... (20689-4) (See 36, figure A-27)	REF
A-38	-1			CAP, End (96151) (21176) ..... (ATTACHING PARTS)	1
A-38	-2			SCREW, Cap, socket head (96151) (5389-4) ..... ---*---	7
A-38	-3			GEROTOR SET (96151) (5387-4)	1
A-38	-4			SPACER (96151) (619)	1
A-38	-5			BEARING, Thrust (96151) (867)	2
A-38	-6			KEY, Woodruff (96151) (20652)	1
A-38				FILANGE ASSEMBLY, Mounting (96151) (891)..... (ATTACHING PARTS)	1
A-38	-7			SCREW, Cap, socket head (96151) (21046-1).....	4
A-38	-8			WASHER, Lock (96151) (5417) ..... ---*---	4
A-38	-9			SEAL, Oil (96151) (844)	1
A-38	-10			FLANGE, Mounting (96151) (871)	1
A-38	-11			SEAL, oil (96151) (20599)	1
A-38	-12			RACE, Bearing (96151) (866)	1
A-38	-13			BACKING, Preformed (96151) (20783)	1
A-38	-14			DRIVE (96151) (616)	1
A-38	-15			PIN, Rolled (96151) (20835).....	4
A-38	-16			SHAFT, Output (96151) (5367)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
HYDRAULIC DRIVE MOTOR					
A-38				HOUSING ASSEMBLY (96151) (54182)	1
A-38	-17			PACKING, Preformed (96151) (15007)	1
A-38	-18			PLUG, Housing (96151) (208.7)	1
A-38	-19			HOUSING (96151) (5416-2)	1



AV036745

Figure A-39. Flow Divider and Return Adapters

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
FLOW DRIVE ADAPTOR ASSEMBLY					
A-39				ADAPTOR ASSEMBLY, Flow divider ..... (82386) (C614-8018)	1
A-39	-1			CAP AND CEAIN ASSEMBLY (00624) ..... (155-S7-8D) (See figure A-4)	3
A-39	-2			COUPIING HALF (82386) (3991-5017)	3
A-39	-3			ELBOW (82386) (4944-8)..... (ATTACHING PARTS)	1
A-39				PACKING, Preformed (96906) (NB287T8-8)	3
A-39	-4			UNICN, Bulkhead (82386) (4924-8) ..... (ATTACHING PARTS)	1
A-39				NUT, Flared tube (82386) (5008-4)	1
A-39	-5			BUSHING (82386) (4939-050) ..... (ATTACHING PARTS)	3
A-39				PACKING, Preformed (96906) (MB28778-12)	3
A-39				PACKING, Preformed (96906) (MS28778-8)	2
A-39	-6			VALVE, Needle (38508) (1900-PM-FFG-12)	2
A-39	-7			UNION, Bulkhead (82386) (4924-12) ..... (ATTACHING PARTS)	3
A-39				NUT, Flared tube (82386) (5008-12).....	3

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
FLOW DIVIDER ADAPTOR ASSEMBLY (CONT)					
A-39				PACKING, Preformed (96906) (MB28778-12)	6
				---*---	
A-39	-8			TEE (82386) (4942-12)	1
A-39	-9			GAGE, Oil pressure (82386) (0309-5021)	1
A-39	-10			CAP, Special (82386) (C614-8019)	1
A-39	-11			CAP AND CHAIN ASSEMBLY (00624)	1
				(155-S7-50) (See figure A-4)	
A-39	-12			COUPLING HALF (82386) (3991-5019)	1
A-39	-13			ELBOW (82386) (4944-4D)	1
				(ATTACHING PARTS)	
A-39				NUT, Flared tube (82386) (5008-4D)	1
A-39				UNION, Bulkhead (82386) (4924-4D)	1
A-39				PACKING, Preformed (96906) (MS28778-4).....	3
A-39	-14			TEE (82386) (5001-012)	1
				(ATTACHING PARTS)	
A-39				NUT, Flared tube (82386) (5008-12)	1
A-39				PACKING, Preformed (96906) (MS28778-12).....	1
A-39	-15			VALVE, Pressure reducing (82386).....	1
				(0131-5005)	
A-39	-16			BRACKET, Flaw divider (82386) (C614-8041)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
FLOW DIVIDER ADAPTOR ASSEMBIY (CONT)					
A-39	-17			HOSE ASSEMBLY, Valve drain (82386) ..... (C614-8020)	1
A-39				DUST PLUG AND CHAIN ASSEMBLY ..... (00624) (155-S9-5D)	2
A-39				COUPLING HALF (00621b) (15,-S5-4D).....	2
A-39				HOSE ASSEMBLY (82386) (5503-013).....	1
A-39	-18			HOSE ASSEMBLY, Pressure (82386)..... (C614-8017)	1
A-39				FITTING, Swivel (32386) (51'2-0106)	1
A-39				DUST PLUG AND CHAIN ASSEMBLY (00624) ..... (155-S9-5D)	2
A-39				COUPLING HALF (006214) (155-S5-8D)	2
A-39				HOSE ASSEMBLY (82386) (,500-037)	1
A-39				ADAPTOR, Return (82386) (C614-8012)	1
A-39	-19			PLUG AND CHAIN ASSEMBLY (00624) ..... (155-S'7-16)	1
A-39	-20			CAP AIND CHAIN ASSEMBLY (00624) ..... (155-S7-16D)	1
A-39	-21			PLUG AND CHAIN ASSEMBLY (00621) ..... (155-S7-6)	1
A-39	-22			COUPLING HALF (00624) (155-S5-16D)	1
A-39	-23			COUPLING HALF (82386) (3991-5020)	1
A-39	-24			COUPLING HALF (82386) (3991-5026)	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
FLOW DIVIDER ADAPTOR ASSEMBLY (CONT)					
A-39	-25			TEE (82386) (4942-16D) ..... (ATTACHING PARTS)	1
A-39				PACKING, Preformed (96906) (MB28778-16) ..... ---*---	3
A-39	-26			REDUCER (88044) (AN919-22D)	1
A-39	-27			BUSHING (82386) (4936-10-6D) ..... (ATTACHING PARS)	1
A-39				PACKING, Preformed (96906) (NB287T8-10) ..... ---*---	1
A-39	-28			HOSE ASSEMBLY (82386) (5510-5004)	1
A-39				ADAPTOR, Return (82386) (C614-8011)	1
A-39	-29			CAP AND CHAIN ASSEMBLY (00624) ..... (155-S7-16D)	1
A-39	-30			PLUG AND CHAIN ASSEMBLY (00624) ..... (155-S7-16)	2
A-39	-31			COUPLING HALF (00624) (155-S5-16D)	2
A-39	-32			COUPLING HALF (82386) (3991-5020)	1
A-39	-33			TEE (82386) (4942-16D)..... (ATTACHING PARTS)	1
A-39				PACKING, Preformed (96906) (M28T778-16) ..... ---*---	3
A-39	-34			UNION, Straight (88044) (AN815-16D) 2.....	2
A-39	-35			HOSE ASSEMBLY (82386) (5510-5002) 1.....	1

Illust		SMR Code	Federal Stock Number	Description	Qty Inc In Unit
Fig No.	Item No.				
FLOW DIVIDER ADAPTOR ASSEMBLY (CONT)					
A-39	-36			HOSE ASSEMBLY (82386) (5510-5001).....	1

VENDOR PART NO.	*VENDOR CODE*	*FIG. & INDEX NO.*	*MFR'S. PART NO.*
ACC-20A-211	01843	A-2-67	322-006
ADHS6814E9716	01414	A-2-50	301-073
AD41BS	80372	A-10-	608-203
AD43BS	07707	A-9-	608-205
AD68BS	80372	A-2-	608-216
AX42	81300	A-2-33	658-039
A1316-12-0520	00624	A-2-18	5501-041
A145-S4-16D	00624	A-2-5	3991-12
A26577	82121	A-9-93	762-107
B-1900-334	82240	A-1,21	6052-1H
B-1900-377	82240	A-1-22	6052-1L
B-308	60380	A-27-18	0688-5501
BK200740	01843	A-2-	322-901
CM-10-B-8	78118	A-28-53	4005-5002
CMO-308068A	01843	A-2-93	363-002
D11226-1	28835	A-10-1	783-253
D11226-2	28835	A-10-2	783-254
D11226-3	28835	A-10-3	783-255
D11226-4	28835	A-10-4	783-256
F-1106	76700	A-2-19	0301-5018
FF-707-5	70417	A-16-12	113-040
H-56H	66295	A-2-	4656-016
HKP-L	71400	A-10-30	1417
HP-8N	09922	A-28-19	718-307
HSA120B	79160	A-12-1	0102-5503
JE-8	91929	A-28-11	2207-509
K-10-E	03670	A-1-2	153-004
KM713-12-064	71286	A-1-34	1374-503
K102-16	95026	A-27-41	0113-5008
K102-17	95026	A-27-17	8000-9018
K102-19	95026	A-27-42	0114-5006
K102-49	95026	A-27-28	0604-5003
K102-50	95026	A-27-44	4313-5014
L-1775-T-SC-S1	97545	A-2-110	4010-022
LP-1756-2		A-2-77	4479-9003
LS-1701	04034	A-15-13	546-006
MI-974	74400	A-9-29	4070-006
MR36W150AFAAR	81349	A-9-2	500-030
MSC102	99246	A-10-40	744-003
EPN-638-DX	77890	A-2-101	0587-5501
NB4012	60380	A-27-30	0688-5502
P-6130	46529	A-2-88	011-5701
R-22	06008	A-27-29	0688-5004
RPA-308090	01843	A-2-35	303-060
SD32BS-DCD	80372	A-1-	608-301
SR-21-C	03479	A-9-22	329-024
TA155-S4-12D	00624	A-2-4	3991-13
TB142026	92867	A-27-20	123-028
VA202180	01843	A-16-19	313-701
OB-1	04009	A-9-64	799-131
OB-3	04009	A-9-62	799-132
OL629-1	38508	A-9-76	4009-008
015503-S4-16D	00624	A-6-10	3991-5020
015519-S4-4D	00624	A-6-13	3991-5019
015519-S4-8D	00624	A-6-3	3991-5017
1AC63	81300	A-2-97	659-038
100-0	71951	A-1-24	1599-005
100-3-4	47296	A-2-70	303-035
1019	70485	A-1-18	1489-1
1058	76445	A-2-115	561-404
12C1087	81073	A-9-	762-901

VENDOR PART NO.	*VENDOR CODE*	*FIG. & INDEX NO.*	*MFR'S. PART NO.*
145S5-5-16D	00624	A-2-3	3991-031
155-5-12D	00624	A-2-2	3991-017
155-57-16D	00624	A-6-2	3993-9
155-S7-5D	00624	A--12	3993-11
155-S7-8D	00624	A-61	3993-1
160687	90763	A-9-53	909-010
1683	24455	A-l-	910-6
1990-A	9005	A-14-1	301-055
2-SNL-126-A	70793	A-2-108	154-009
2-145	08752	A-27-31	0617-5002
20689-4	96151	A-27-36	363-008
212-12N	71286	A-10-	5696-004
24001-8	81073	A-9-58	762-115
2600-LW	71286	A-10-	5699-008
2700-7	71286	A-10-	5699-016
3 / 8.0-300606-1-160A	08752	A-3-9	5500-037
313	24455	A-9-15	910-6
350-6-0160	00624	A-3-5	5500-035
350-6-0210	00624	A-3-10	5500-034
356R	24455	A-1-	910-7
390A-20D-0586	06624	A-3-11	5502-013
414015	75915	A-10-29	739-079
415	71951	A-2-106	1599-501
42022	71951	A-1-	1842
479029	72850	A-2-89	303-6003
48B7796	99238	A-2-111	3966-005
5-417CA	95026	A-27-21	0675-5020
5-8144	95026	A-27-26	8000-9023
5SJ4324-941	02639	A-2-104	506-504
50A/ RS30V	24455	A-1-13	910-024
50727	81321	A-2-29	301-005
5101	12670	A-10-28	778-310
5144-50	79136	A-16-11	619-049
53033	97969	A-2-64	768-108
6-8144	95026	A-27-25	8000-9022
601-00020D-0105	00624	A-14-21	5502-007
601-0024D-0100	00624	A-14-20	5505-024
61A95-B38	10001	A-2-	A840-2718
61A95-C36	10001	A-2-102	A840-6049
61 A95-C79	10001	A-2-	A840-0071
61A95-C85	10001	A-2-71	A840-6079
610541	12027	A-2-103	303-068
64L	05419	A-28-51	4005-5001
7527-SMX3	91435	A-2-73	0102-5003
8052B-12-HS2	86768	A-2-59	4010-031
915-200	81860	A-2-	561-117
963-F-1 / 4D2	86768	A-2-81	304-026
99N10-01A1	71286	A-1-	5699-5901
99R10-01A1	71286	A-1-	5698-5001
99S10-03A1	71286	A-1-	5699-5004
99W10-01A1	71286	A-1-	5699-5902

APPENDIX B
MAINTENANCE ALLOCATION CHART

B-1. Purpose.

The purpose of the maintenance allocation chart is to provide all activities with maintenance functions to be performed at each level of maintenance.

B-2. Definitions.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Functional Group. Column 2 lists the noun names of components, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Column 3, Maintenance Functions. Maintenance functions will be limited to and defined as follow s:

(1) Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

(2) Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.,

(3) Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

(4) Adjust. To rectify to the extent necessary to bring into proper operating range.

(5) Align. To adjust specified variable elements of an item to bring to optimum performance.

(6) Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

(7) Install. To set up for use in an operational environment such as an emplacement, site, or vehicle.

(8) Replace. To replace unserviceable items with serviceable assemblies, subassemblies, or parts.

(9) Repair. To restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.

(10) Overhaul. To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards prepared and published for the specific item to be overhauled.

(11) Rebuild. To restore an item to a standard as nearly as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

(12) Symbols. The symbol 0, F, H, or D placed in the appropriate column indicates the level responsible for performing that particular maintenance function. The symbol "% %" which applies to organizational maintenance indicates the level responsible for performing that particular maintenance function may be performed provided it is specifically authorized by the direct support maintenance officer. Use of the symbol will apply only to replacement of major assemblies and time consuming operations which are within the capabilities of organization, but over which control by the commodity commands is considered essential. In no case will the direct support maintenance officer require the accomplishment of a "% %" maintenance function by an organization or unit, and in no case will a ",%r 9b " function authorize stockage of parts at organizational level.

d. Column 4, Tools and Equipment. This column will be used to specify, by code, those tools and test equipment required to perform the designated function.

e. Column 5, Remarks. Self-explanatory.

B-3. General.

a. A maintenance function assigned to a maintenance level, which for any reason is beyond its capability, becomes the responsibility of the next higher maintenance level.

b. The authority to perform a maintenance function does not constitute authority to requisition or otherwise secure necessary repair parts specified in current supply directives.

B-4. Deviations.

a. Normally, there will be no deviations from the assigned maintenance level. In cases of operational necessity, a maintenance function assigned to a maintenance level may, on a one-time basis and at the request of the lower maintenance level, be authorized to the lower maintenance level by the maintenance officer of the level to which the function assigned.

b. The furnishing of special tools, equipment and the like, required by the lower maintenance level to which the function is assigned.

B-5. Additional Information.

a. Changes in the maintenance allocation chart will be based on continuing evaluation and analysis by responsible technical personnel and on Maintenance Request Forms DA 2407 received from field activities.

b. All maintenance prescribed herein will be performed in accordance with applicable publications.

c. In any instance of conflict with current tool and equipment lists or current supply manuals, this maintenance allocation chart will be the final authority. Each such instance should be promptly reported by Maintenance Request Form DA 2407.

MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
01	Multi-Service Unit													
02	Trailer													
	Front Axle Assembly	0		0						F				
	Rear Axle Assembly	0		0						F		D		
	Tie Rod Assembly	0		0		F			F					
	Spindle Assemblies	0		0					F					
	Steering Assembly	0		0						F				
	Handbrake Assembly	0			0				F	F				
	Wheel Assemblies	0		0	F				F					
	Drive Gear Assembly	0		F					H		D			
	Housing and Door Assemblies	0		F					F	F				
	Brakes	0			F				F					
	Tires0							0	F					
	Brake Cables	0							F	F				
03	Engine Assembly													
	Diesel Engine			0					H	F	D			
	Crankcase	0		0										
	Injection Pump	0							F	H				
	Injection Nozzles	F		F					F					
	Fuel Injectors	F		F					F					
	Temperature Controller	0			F									
	Oil Pump and Cooler			0						D	D	D		
	Drive Belts	0			0				F					
	Air Filter	0		0					F					
	Fuel Filter	0		0					F					
	Ether Starting System			F						F				
	Radiator Assembly	0		0					F	H				
	Thermostat		0	0					0					
	Tanks, Lines, Fittings	0		0					F					

MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
04	Hydraulic System													
	Accumulator			F					F	F			Press Gage	
	Valves				F				F		D			
	Hydraulic Reservoir	0		0						F				
	Hydraulic Piping	0							F	F				
	Fluid Pressure Filter	0		0										
	High Pressure Filter	0		0					F					
	tow Pressure Filter	0		0					F					
	Oil Cooler Assembly	0							F	H				
	Starting System Filter			0					F					
05	AC Generating System													
	Generator	H	H						H	H	H		Oscilloscope	
	Voltage Regulator				H				H	H				
06	DC Generating System													
	Converters		H						H	H	h			
	Compensator		H		H					H				
07	Electrical Control Circuitry													
	Battery	0	F	0					F					
	Electrical Wiring	0								F				
	Motor, Propulsion	F							F	H				
08	Instrument and Control Panel 0													
	High Pressure Gage	F			F				F					
	Fluid Temperature Cage	F			F				F					
	Compound Gage	F			F				F					
09	Miscellaneous Electrical Components													
	Cable Assemblies	0	F							F				

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

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P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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