*TM 10-4320-256-14&P

TECHNICAL MANUAL

OPERATOR, UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

FOR

PUMP ASSEMBLY, FLAMMABLE LIQUID, CENTRIFUGAL, SELF-PRIMING, GED, 2-IN., 100 GPM (MODEL FARE 3950) NSN 4320-00-427-0002

Approved for public release; distribution is unlimited.

This manaul supersedes TM 5-4320-256-14, 15 NOVEMBER 1974, including all Changes

HEADQUARTERS, DEPARTMENT OF THE ARMY
12 JUNE 1991

WARNING

DEATH or serious injury may result if personnel fail to observe safety precautions. Avoid spillage of fuel. When spillage occurs, cover the affected area with dry soil to reduce its rate of vaporization. Position a fire extinguisher at a readily accessible position around the pump assembly.

Do not smoke or use open flame in vicinity of pump assembly.

Do not drain fuel from the unit on the ground. Drain the unit into a metal container that can be closed.

WARNING

Avoid getting fuel on the body or clothing. If clothing becomes saturated, remove the clothing immediately and wash the body thoroughly with hot, soapy water.

Use protective equipment to prevent skin and eye contact with fuel. Some of the liquids this unit is capable of pumping are very caustic and will induce severe irrigation.

WARNING

Do not operate the pump assembly until it has been attached to a suitable ground.

WARNING

Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and properly. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F -138° F (38° C -59° C)

WARNING

If operating the engine and pump indoors insure that proper ventilation is provided. Carbon monoxide fumes are a colorless, odorless and deadly gas. These gases could cause permanent brain damage or death, if highly concentrated in any area. The symptoms are headache, dizziness, loss of muscular control, apparent drowsiness and coma. If exposure symptoms exist, move afflicted person or personnel to properly ventilated area and provide artificial respiration, if necessary.

WARNING

Death or serious injury could result if fuel is not handled carefully. Use in a well-ventilated area away from open flame, arching equipment, ignition sources, heaters or excessive heat. Engines must be turned off and allowed to cool before refueling. Do not smoke.

TECHNICAL MANUAL

NO. 10-4320-256-14&P

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 12 JUNE 1991

Operator, Unit, Direct Support and General Support Maintenance Manual (Including Repair Parts And Special Tools List) for Pump Assemby, Flammabe Liquid, Centrifugal, Self-Priming, GED, 2-in., 100 GPM (MODEL FARE 3950) (NSN 4320-00427-002)

Current as of 7 August 1990

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, U.S. Army Troop Support Command, ATTN: AMSTR-MMTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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HOW TO USE THIS MANUAL

Be sure to read all warnings before using your equipment.

This manual contains operating instructions and Operator, Unit, Direct Support and General Support Maintenance instruction for the 100 GPM Flammable Liquid Pump Assembly.

- Chapter 1- Introduces the to the equipment and gives you information such as weight, height, length, generally used abbreviations, cross reference information and principles of operation. The chapter is preceded by a full page illustration of the equipment.

- Chapter 2- Provides information necessary to identify and use the equipment's operating controls. Operating procedures tell you how to use the equipment in both usual and unusual weather conditions. In addition, preventive maintenance instructions provide information needed to inspect and service the 100 GPM Flammable Liquid Pump Assembly.

- Chapter 3- Provides operator maintenance instructions for troubleshooting equipment malfunctions and performing emergency repairs.

- Chapter 4- Provides unit maintenance instructions including service upon receipt, preventive maintenance and troubleshooting information; detailed maintenance and repair procedures for the Unit Maintenance repairer and storage and shipment instructions.

- Chapter 5- Provides direct support maintenance instructions.

Chapter 6-Provides general maintenance instructions.

- Appendix A gives you a list of frequently used forms and publications.

- Appendix B is the Maintenance allocation Chart (MAC). It identifies the type maintenance authorized for each maintenance organization.

- Appendix C describes components that makeup the end item and are shipped with the basic equipment. It also lists components that are not mounted on the equipment, but are required to make the system functional. All components in the Components of End Item and Bask Issue Items Lists are illustrated for easy identifaction.

- Appendix D provides you with information about expendable/durable supplies such as sealant, paint, lubricants, etc. that you will need when performing maintenance.

- Appendix E lists additional equipment authorized for your unit for use with the 100 GPM Flammable Liquid Pump, but are not supplied as part of system. This equipment list may include fire extinguishers, buckets, protective clothing.

- The Alphabetical Index is the last item in the TM. You will find it useful in bating page numbers about specific information or procedures.

Becoming familiar with this manual will enable you to operate and maintain the equipment in good working order.

CHAPTER 1

INTRODUCTION

OVERVIEW

This chapter contains general informatbn common o all Army equipmentand specific information per'tinenttothe equipment covered by this manual.

Section I. GENERAL INFORMATION

1-1. Scope. The scope of this manual is described in the following subparagraphs.

a. Type of Manual. This manual provides operator, unit, direct support and generalsuppod maintenance instructions for Pump Assembly, NSN 4320-00-427-0002. This is a gasoline-engine driven, self-priming centrifugal pump assembly for ONLY pumping flammable liquids (figure 1-1). These instructions include procedures for setting up and operating the equipment underusual and unusual conditions as well as inspection, Troubleshooting, repair and replacemenent of individual components at assemblies. This manual also providesa repair parts and special tools list contained in Appendix G.

b. Equipment Name. *Pump* Assembly, Flammable Liquid, Centrifugal, Self-Priming, GED, 2-in., 100 GPM, hereinafter referred to as the pump assembly.

c. Purpose of Equipment. The pump assembly is used to move flammable liquids, under pressure, from one location to another at height differentials no greater than 25 feet (7.62 meters).

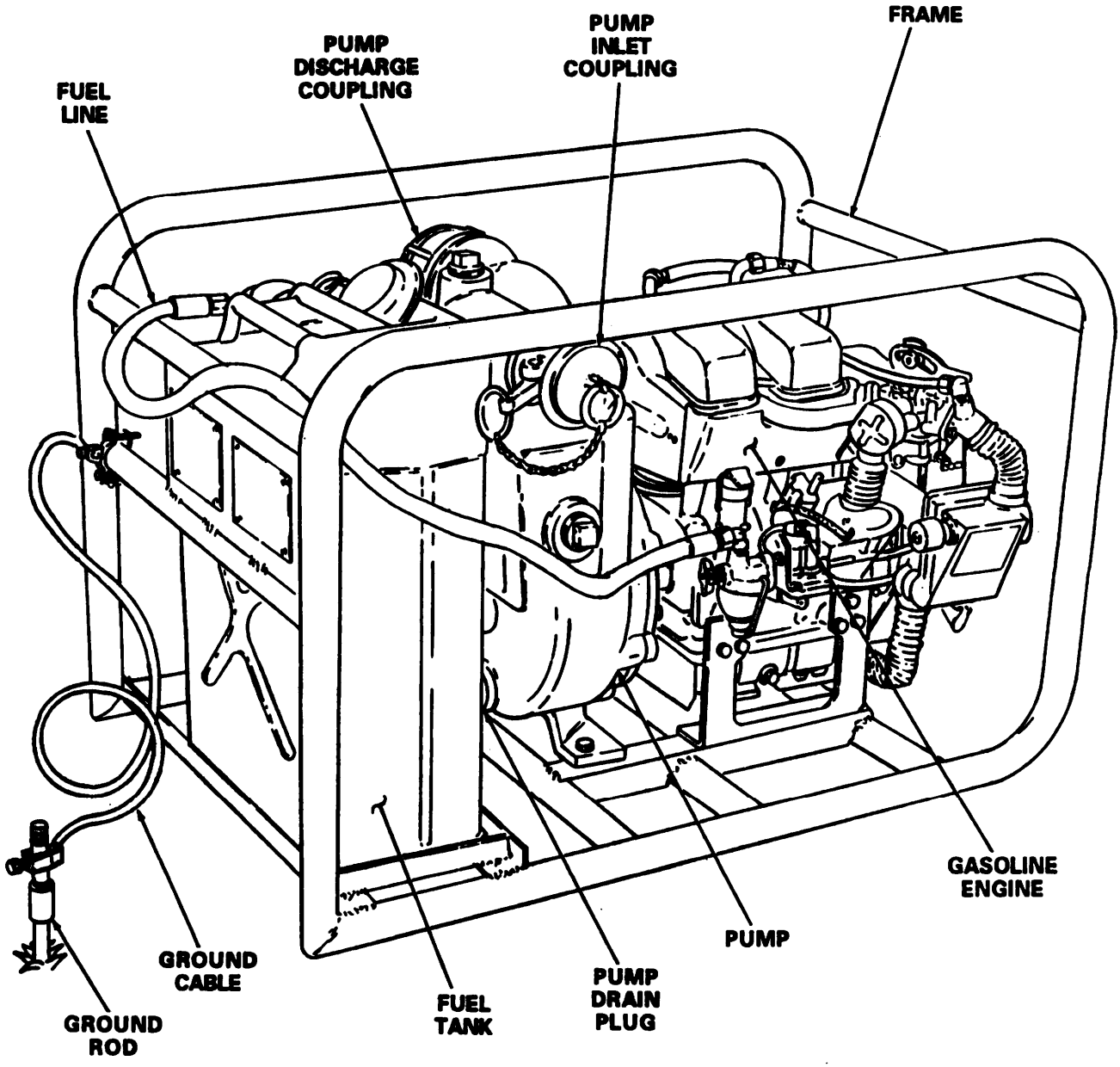


Figure 1-1 Pump Assembly, NSN 4320-00-427-002

1-2. Maintenance Forms and Records. Department of the Army forms and procedures used for equipment maintenance will be those prescribed in DA PAM 738-750, The Army Maintenance Management System.

1-3. Destruction of Army Materiel to Prevent Enemy Use. For information and instructions on destruction of Army materiel to prevent enemy use refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

1-4. Preparation for storage or Shipment. To prepare the pump assembly for storage or shipment refer to Chapter 4, section VI, of this manual.

1-5. Reporting Equipment Improvement Recommendations. If the design of the pump assembly needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 form (Product Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-QP, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120-1798. We will send you a reply.

Section II. EQUIPMENT DESCRIPTION AND DATA

Paragraph Page

1-6. Equipment Characteristics and Features. A summary of the characteristics, capabilities and features of the equipment is contained in the following subparagraphs.

a. Characteristics. The pump assembly (see figure 1-1) is designed to ONLY pump flammable liquids at the rate of 100 gallons (378.5 liters) per minute. It consists of a gasoline engine, fuel system and pump, mounted in a tubular frame.

b. Capabilities and features

(1) Self-priming

(2) Capable of pumping up to 100 gallons (378.5 liters) per minute

(3) Portable, complete assembly package 7.7 cu. ft. (0.2 cu. meters), weight 137 lbs (62.11 kg).

1-7. Location and Description of Major Components. The major components of the pump assembly, shown in figure 1-1, are described in the following subparagraphs. Specifications and data for the components of the pump assembly are provided in paragraph 1-9.

a. Pump The pump is self-priming, centrifugal type, capable of delivering up to 100 gallons (378.5 liters) per minute of flammable liquid. It consists of a housing, impeller, removable inlet and discharge couplings, a drain plug and a priming plug.

b. Engine Assembly . Power to drive the pump assebly is supplied by a *2-cycle* four cycle, air-cooled, 3-horsepower, gasoline-fueled military standard engine, which uses a pull starter.

c. *Fuel System.* the fuel system consists of a standard military 5-gallon fuel tank, mounted to the frame assembly, a fuel tank adapter and a fuel line to the engine assembly.

d. Grounding System. The grounding system consists of a 9-foot grounding rod assembly and a 6-foot grounding cable with a clamp on each end.

1-8. Equipment Data.

a. *Identification.* The pump assembly has two identification plates. Information contained in these plates is as

(1) The manufacturer's data, located on the side of the frame, contains information on the manufacturer, part number, serial number, dimensions, weight, and National Stock Number.

(2) The gasoline engine data plate contains information on the manufacturer, serial number, model, National Stock Number and displacement. it is boated on the upper side of the flywheel housing.

b. Tabulated Data. The following listing summarizes the specific capabilities and imitations of the equipment and other data needed by the unit, direct support and general support maintenance personnel for maintenance of the pump assemby.

(1) *End item.*

Manufacturer . . . . . Engineered Air Systems inc. (EASI)
Part No. 13219E3950
Seriai Number . . . . . RFE1001 and up
Length. . . . . .32 inches (81.28 cm)
Width . . . . . .20 inches (50.80 cm)
Height . . . .21 inches (53.34 cm)
Weight . . . . . 135 pounds(61.mkgm)
National Stock Number 4320-00-427-0002

(2) *Engine.*

Manufacturer . . . . Chrysler Outboard Corp.
Serial No 87051
Mode 2A016-3
National Stock Number 2805-00-072-4671
Type . . . .4cycle. gasoline owered. air cooled
Number of cyiinders 2
Horse power rating . . . .3 HP at 3600 r.p.m.
Displacement . . . .16 cuin. (262.2 cc)
Length . . . .18-3/4in. (46.62 cm)
Width. . . . . 18-5/16 in. (46.51 cm)
Height. . . . . .17-1/2 in. (44.45 cm)
Weight 46 1bs (20.864kgm)

(3) *Capacities.*

Rated Capacity . . . . . 100 gallons/minute (378.5 liters/minute)
Total head . . . . . 100 feet (30.5 meters)
Priming capacity pump . . . . 2 gallons(7.57 liters)

(4) *Operating pressures.*

Normal operating pressure . . . .35psi atfullflow
Maximum operating pressure 45psi

1-9. Safety, Care and Handling. The following paragraph ssummarize the safety, care and handling requirements for the pump assembly.

a. Safety It is imperative that you observe all safety precautions specified on the warning page in the front of this manual. You must also observe specific warnings and cautions specified throughout this manual. The warnings are provided to tell you how to protect yourself from death or serious injury.

b. Care and Handling Observe the following precautions:

(1) Use care in handling components of the pump assembly as metal parts could cause personal injury.

(2) Use every effort to protect the pump assembly from the weather elements, dust, dirt, oil, grease, and

Section III. PRINCIPLES OF OPERATION

1-10. Operating Principles. The output shaft of the gasoline engine is coupled directly to the impeller of the pump. When the engine is operating, it causes the impeller to rotate. If the pump housing contains fluid, the centrifugal action of the rotating impeller vanes forces the fluid under pressure to exit the pump housing through the discharge ports and to be directed to another location through a discharge hose. The fluid leaving the pump under pressure causes a partial vacuum (suction) to be formed at the suction port. If a non-collapsible (rigid-wall) fluid supply hose is connected to the suction port, fluid will be drawn into the pump housing, into the rotating impeller, and forced out of the discharge port under pressure in a continuous flow so long as the impeller is rotating and the supply hose is providing a fresh supply of fluid.

CHAPTER 2

OPERATING INSTRUCTIONS

OVERVIEW

This chapter contains information and procedures required to operate the pump assembly under usual and unusual conditions, and to inspect and service the equipment before, during and after operation It includes the following

a. A description of the operator's controls and indicators.

b. Preventive maintenance procedures to ensure continued serviceability of all components.

c. Procedures for starting, operating and stopping the equipment.

d. Procedures for operating the equipment in dusty or sandy areas, under rainy, humidor salt-air conditions, in extreme heat, at different altitudes, and in extreme cold.

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. Operator's controls. The controls required to start, operate and stop the engine, which powers the pump assembly, are shown in figure 2-1. Their use is described in the following subparagraphs.

a. *Starting Rope* (1) When the starling rope is wrapped around the starling capstan in a clockwise direction, and the toggle attached to the end of the rope is pulled sharply by hand, it rotates the engine shaft several revolutions causing the engine to start, when the other controls are in their normal starting position.

b. Ignition Switch (2) The ignition switch has two positions - RUN and OFF. When the switch is in t RUN position, the engine can be started and will continue to run until the ignition switch is positioned at OFF, the fuel control valve is closed, or the fuel supply is exhausted.

c. fuel Control Valve. (3) When the fuel control valve is in the OPEN position, it allows fuel to enter the engine; when it is in the CLOSED position, the fuel supply is cut off. The valve is closed by turning the knob clockwise (to the right) and opened by turning the knob counterclockwise (to the left).

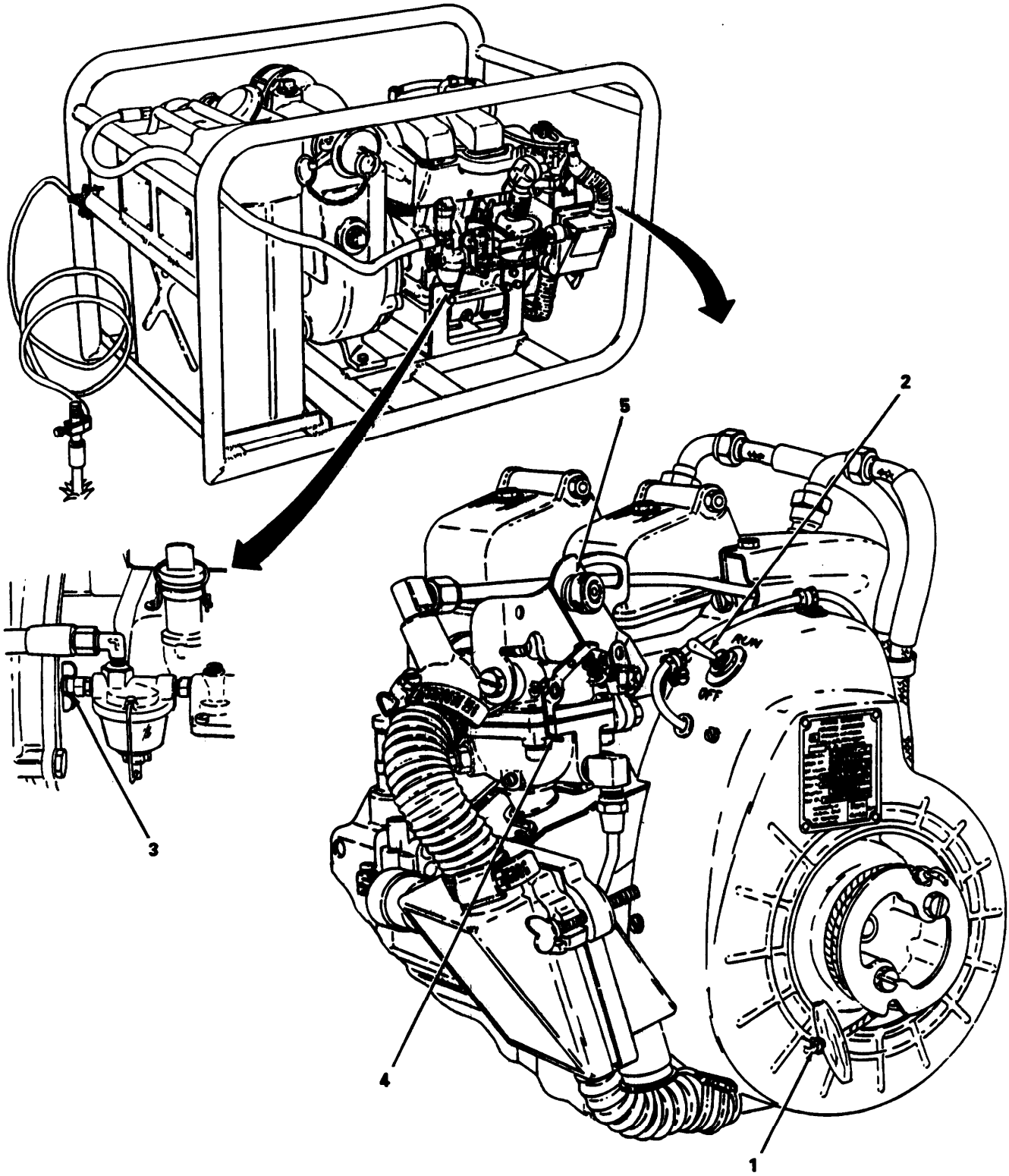


Figure 2-1. Operators Controls.

d . *Choke Control Lever.* (4) When the choke control lever is rotated counter clockwise, the choke valve in the engine carburetor is closed, which aids in starling a cold engine. As soon as the engine starts, manually open the choke.

e. *Throttle Control* (5) The throttle control adjusts the engine speed. As the throttle control is rotated counterclockwise the engine runs faster. As the control is rotated clockwise, the engine runs slower. The engine speed controls the discharge fluid flow of the pump assembly. As the speed is increased, the flow increases; as the speed is decreased, the flow decreases.

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-2. General. Operator PMCS are penformed to ensure that the pump assembly is ready for operation at all times. Perform the checks and services at the specified intervals.

a. Before you operate, perform you before (B) PMCS. Observe all CAUTIONS and WARNINGS.

b. While you operate, perform your during (D) PMCS. Observe all CAUTIONS and WARNINGS.

c. After you operate, be sure to perform your after(A) PMCS.

d. If your equipment fails to operate, refer to paragraph 3-3.

2-3. Purpose of PMCS Table. The purpose of the PMCS table is to provide a systematic method of inspecting and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the equipment to fail to complete its mission. The PMCS table is arranged with the individual PMCS procedures listed in sequence under assigned intervals. The most logical time (before, during, or after operation) to perform each procedure determines the interval to which it is assigned. Make a habit of doing the checks in the same order each time and anything wrong will be seen quickly. See paragraphs 2-4 and 2-5 for an explanation of the columns in table 2-1.

2-4. Explanation Of Columns. The following is a list of the PMCS table column headings with a description of the information found in each column.

a. Item no. This Column Shows the sequence in which the checks and sevices are to be performed, and is used to identify the equipment area on the Equipment inspection and Maintenance Worksheet, DA Form 2404.

b. Interval This column shows a dot l when each check is to be done.

c. Items to be inspected/procedures. This column identifies the general area or specific party where the check or service is to be done, and explains how to do them.

d. Equipment is Not Ready/Available if: See paragraph 2-5.

2-5. Equipment is Not Ready/Available if. This column lists conditions that make the equipment unailable for use beause it is unable to perform its mission, or beause it would represent a safety hazard. Do not accept or operate equipment with a condition in the equipment is Not Ready/Available if" column.

NOTE

The terms ready/available and mission capable refer to the same status: Equipment is on hand and is able to perform its mission. Refer to DA Parn738-750.

2-6. Reporting Deficiencies. K any problem with the equipment is discovered during PMCS or while it is being operated that cannot be corrected at the operator/crew maintenance level, it must be reported. Refer to DA Pam 738-750 and report the deficiency using the proper forms.

2-7. Special Instructions. Preventative maintenance is not limited to performing the checks and servivces in the PMCS PMCS table.

WARNING

Dry cieaning solvent PD-680 used to clean parts is potentially dangerous to personnei and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100- 138°F (38 - 60C).

a. *Keep it Clean.* Dirt grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use drycleaning solvent on all metal surfaces. Use soap and water to clean rubber or plastic material.

b. Bolts, Nuts and Screws. Check them all for obvious looseness, missing, bent, or broken condition. You can't try them all with a tool, but look for Chipped paint bare metal, or rust around bolt heads. if you find one you think is loose, tighten it, or report it to unit maintenance if you can't tighten it.

c.Fluid Lines Look for wear, damage, and leaks. Make sure damps and fittings are tight. Wet spots and stains around a fitting or connector can mean a leak. If a leak comes from a boss connector, tighten it. If something is broken or worn out, report it to unit maintenance.

d .leakage Definitions. It is necessary for you to know how fluid leakage affects the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with then. When in doubt, NOTIFY YOUR SUPERVISOR!

Leakage Definitions:

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.
Class Ill	leakage of fluid great enough to form drops that fall from the item being Checked inspected.

CAUTION

Equipment operation is allowable with minor leakage (Class I or II) of any fluid except fuel. Of course, consideration must be given to the fluid capacity in the item being checked/inspected. When in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid level more often than required in the PMCS.

Class Ill leaks should be reported to your supervisor or unit maintenance.

e. Painting. Touch-up pump assembly as needed. Refer to TM 43-0139 for specific painting procedures.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Servies (PMCS).

NOTE

Within designated interval, these checks are to be performed in the order listed.

If the equipment must be kept in continuous operation, check and sevice only those items that can be checked and serviced without disturbing the operation. Make the complete checks and services when the equipment can be shutdown.

B-Before D- During A-After W-Weekly M - Monthly

Item no.	Interval					Item to be inspected Procedure	Equipment is not ready/available if:
	B	D	A	W	M		
1	•				•	Engine	
						Service air cleaner and fuel filter, inspect for oil and fuel leaks. Notify unit maintenance if defects are found.	Dirty, low oil level, and/or fuel leaks.
2	•		•			Fuel System	
						Check fuel quantity and add as required; inspect fuel tank adapter and fuel lines for leaks and that connections are tight and leakproof. Notify unit maintenance if defects are found.	Low fuel level or fuel lines leak; connections not tight.
3	•	•				Exhaust System	
						Check spark arrestor for security, deterioration and spark suppression. Notify unit maintenance if defects are found.	Deterioration or looseness.

Table 2-1. Operator Preventative maintennace Checks and Sevies (PMCS) (cont).

B - Before D-During A-After *w - Weekly* M-Monthly

Item no.	Interval B	D	A	W	M	Item to be inspected Procedure	Equipment is not ready/available if:
4	•	•		•		Pump Assembly	
						Inspect for leaks around the impler housing. Notify unit maintenance If defects are found.	Leaking.
5	•		•	•		Suction and Discharge Couplings	
						Check dust caps and plugs for cracked or missing gaskets replace damaged gaskets (para. 3-6).	Dust caps and plugs cracked and or gaskets missing.
6	•	•		•		Ground Cable Assembly	
						Inspect cable for breaks or frayed cables, check clamps for cracks, and broken or hose screws.	Broken or frayed. Clamps are broken. Loose screws.
7				•		Frame	
						Inspect frame for brinks of bends. inspect for hose mounts. Notify unit maintenace if defects are found.	Broken or bent frame, hose mounts.

Section Ill. OPERATION UNDER USUAL CONDITIONS

Paragraph Page

2-8. General. This section contains instructions for starling, stopping and operating the pump assembly. Its important for the operator to know how to perform every procedure identified in paragraphs 2-9 through 2-13.

CAUTION

Once a pump has been used for one type of flammable liquid (gasoline), the pump must be drained and primed with new type of flammable liquid (diesel) to be pumped.

2-9. Preparing the Equipment for Operation.

a. Maintenance.

(1) Perform the (B) operation preventive maintenance checks and sevices (Table 2-1).

(2) Refer to the lubrication order (LO 9-2805-257-12) for information on lubricating the engine.

b. *Suction Line.*

(1) The pump assembly is equipped with a 2-inch (5.08 centimeters) quick disconnect female coupling on the suction (inlet) side of the pump.

(2) Connect a non-collapsible (rigid wall) hose to the suction side of the pump. Locate the pump assembly so as to keep the suction line as short as possible. Avoid laying the line over rises which will form pockets.

NOTE

Do not use a centrifugal pump for suction lifts in excess of 25 feet (7.62 meters). A small air leak in the suction line may prevent priming of the pump.

(3) Reduction in the pumping capacity becomes noticeable at lifts in excess of 15 feet (4.57 meters) and is very pronounced at 25 feet (7.62 meters). if the pump is operated at a high suction lift, verify that all hose connections are air-tight.

c. Discharge Line.

(1) The pump assembly is equipped with a 2-inch (5.08 centimeters) quick-disconnect male coupling (figure 1-1) on the discharge side of the pump.

(2) Connect the collapsible hose to the discharge side of the pump.

d. Grounding. Ground the pump assembly to a ground rod at least 96 in. (243.84 cm). Refer to figure 2-2 and proceed as follows.

(1) Install coupling (1) on ground rod (2) and install driving stud (3). Ensure driving stud (3) seats against ground rod (2).

(2) Drive rod (2) into ground until coupling (1) is just above surface of ground.

(3) Remove driving stud (3) and install ground rod (4) in coupling (1) making sure ground rods (2) and (4) seat against each other.

(4) Install coupling (5) on grounding rod (4).

(5) Install driving stud (3) in coupling (5) and ensure driving stud (3) seats against grounding rod (4).

(6) Drive ground rod (4) into ground until coupling (5) is just above surface.

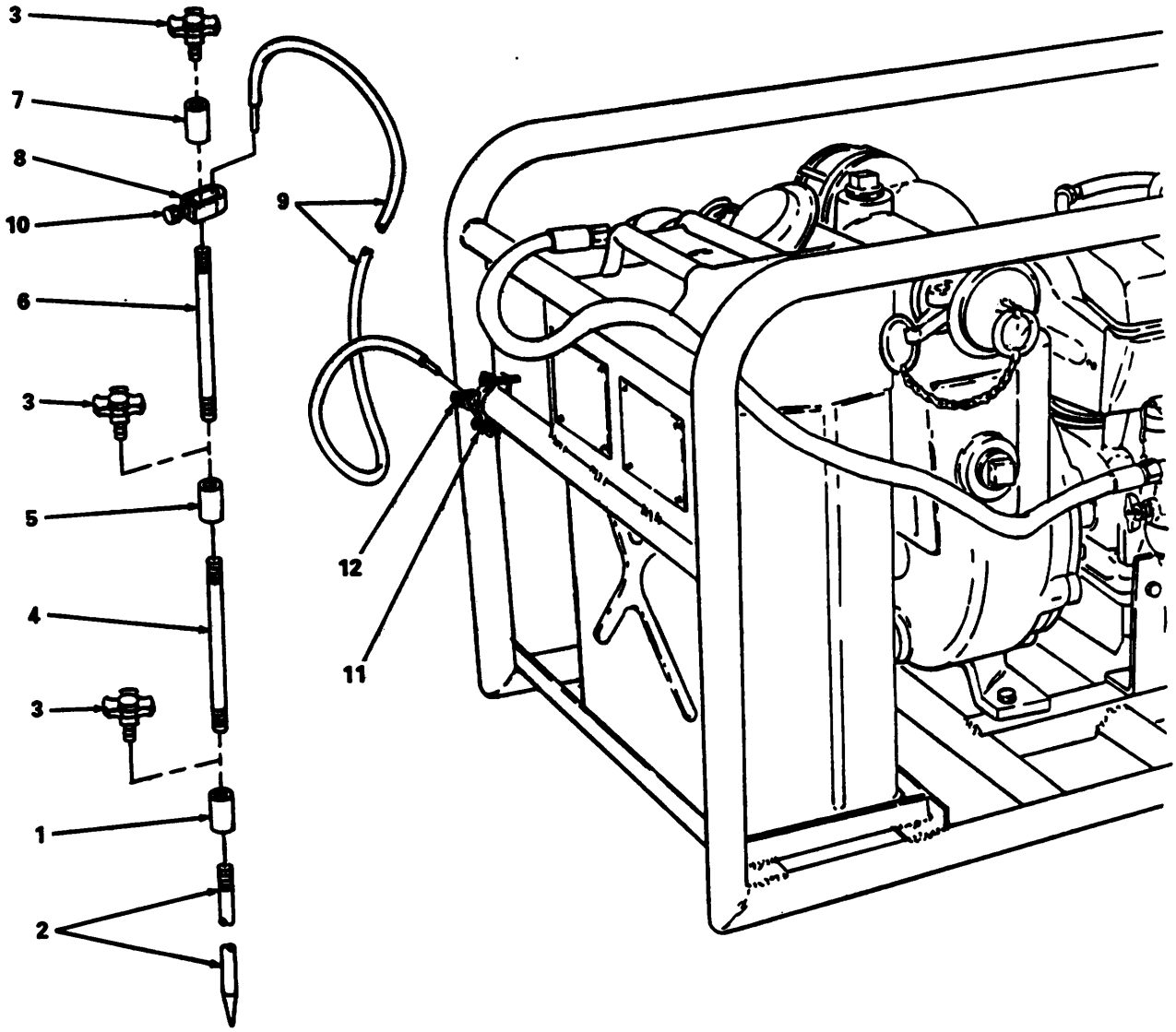


Figure 2-2. Grounding Procedures

(7) Remove drive stud *(3)* from coupling (5).

(8) Install ground rod (6) in coupling (5) and ensure ground rod (6) seats against ground rod (5).

(9) Install couping (7) on ground rod(6).

(10) Install driving stud (3) in couping (7) and ensure driving stud(3) seats against ground rod (6).

(11) Drive ground rod (6) into ground until coupling (7) is approximately 1 foot (30.48 cm) above sutiace.

(12) Remove drive stud (3) and coupling (7).

(13) Install clamp (8) on ground rod (6) and install cable (9) between clamp (8) and ground rod (6) and tighten screw (10).

(14) Install cable (9) in clamp (11) and tighten screw (12).

e. *Priming.* Time the pump (refer to figure 2-3).

(1) Remove priming plug (1) from pump housing (2).

(2) Fill pump housing (2) with fluid being pumped. Fill until fluid reaches inlet (3) and outlet (4) ports.

(3) Install priming plug (1).

2-10. Starting the Gasoline Engine.

WARNING

Be sure the pump assembly is properly grounded (para. 2-9d.) before starting the gasoline engine.

CAUTION

Do not operate the pump assembly without first priming the pump (para. 2-9e)。

a. Prepare the equipment for operation (para. 2-9).

b. Open any valves in the suction and discharge lines.

c. Statt the gasoline engine (refer to figure 2-4).

(1) Open fuel control valve (1).

(2) Place ignition switch (2) in RUN position.

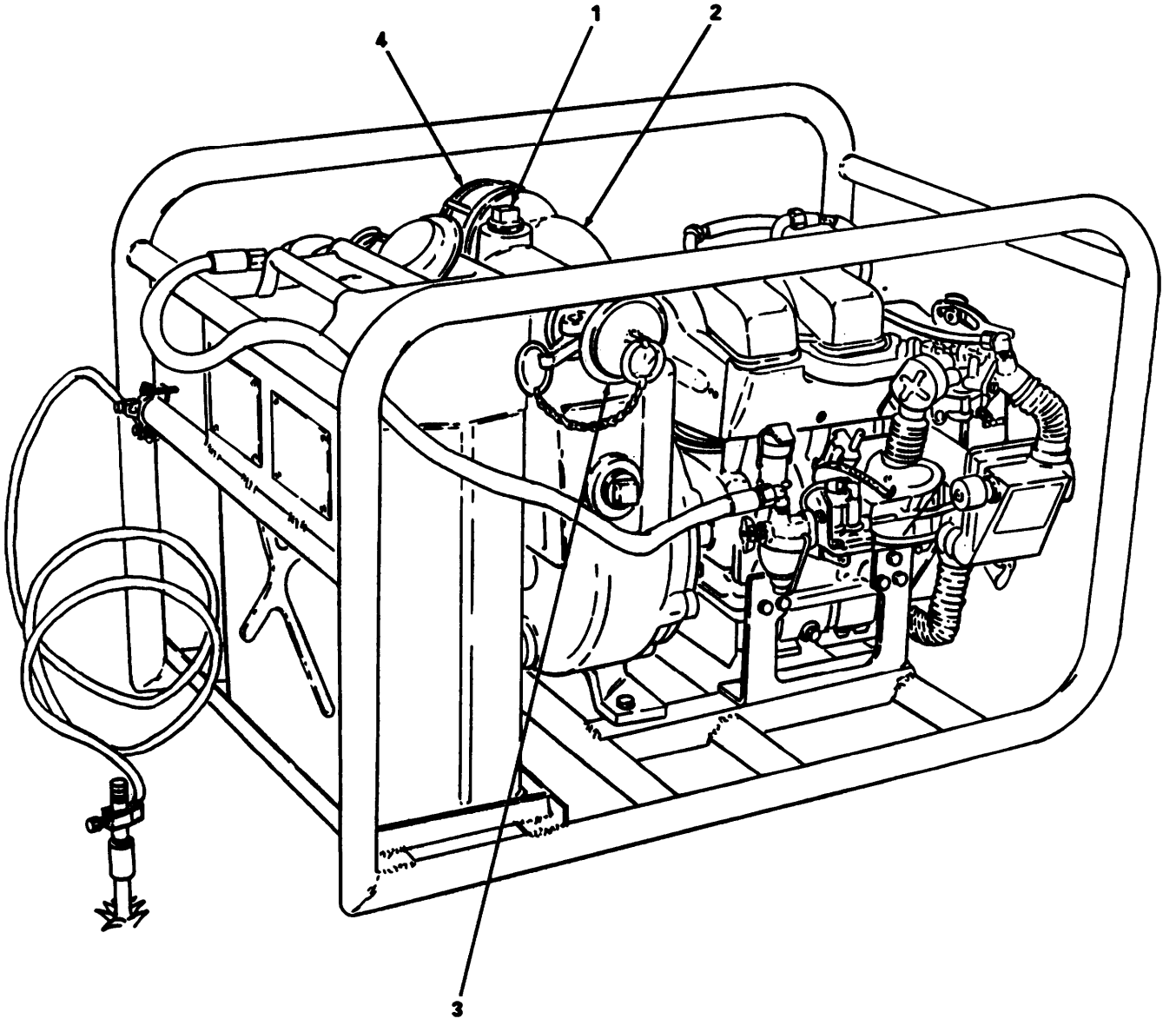
(3) Choke cold engine.

CAUTION

If the engine runs more than 2 minutes without pumping after the initial start, stop the engine and refer to the troubleshooting procedure in Chapter *3.*

(4) Pull starting rope (3) to start engine.

(5) Loosen knob (4) and set throttle control (5) to desired speed and tighten knob (4).



Fqure 2-3. Priming the Punp.

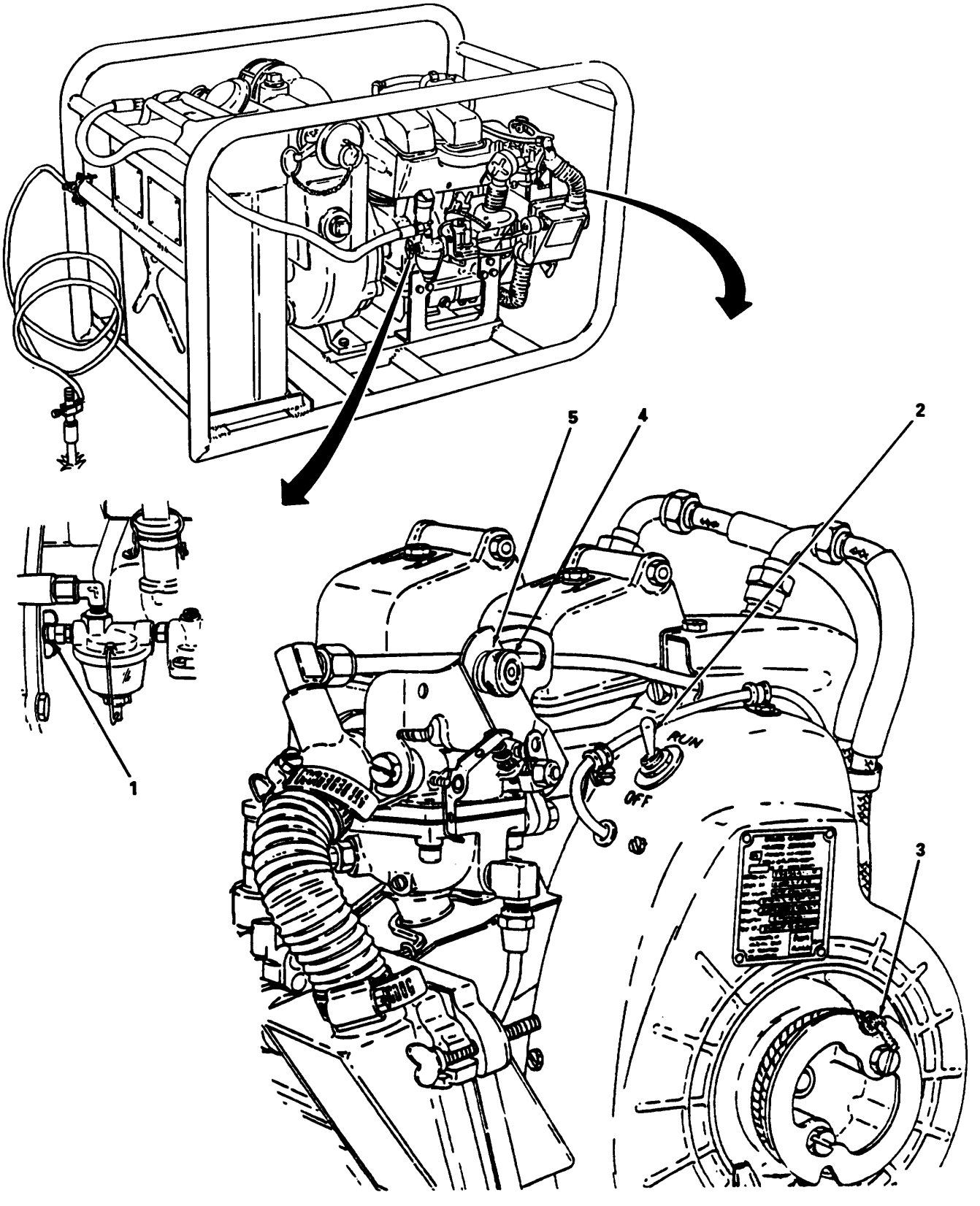


Figure 2-4 Starting thre gasoline Engine

2-11. Stopping the Gasoline Engine. Stop the gasoline engine (refer to figure 2-5).

a. Loosen knob (1) and adjust throttle control (2) and operate engine at idle speed for approximately three minutes.

b. Place ignition switch (3) in OFF position.

c. Close fuel control valve (4).

2-12. Operating the Pump Assembly.

a. Prepare the equipment for operation (para. 2-9).

WARNING

Extreme care must be taken to prevent fuel from coming in contact with the manifold or muffler before, during, and after operation. Fuel in contact with these areas may cause fire or explosion.

b. Start the gasoline engine (para. 2-10).

c. When the engine is warned up and the pump is pumping fluid, adjust the throttle control (figure 2-1) to obtain the maximum output of 100 gallons (378 liters) per minute.

2-13. Refueling Procedure. (Refer to figure 2-6).

WARNING

Death or serious injury could result is fluid is not handled carefully. Use in a well-ventilated area away from open flame, arching equipment, ignition, sources, heaters or excessive heat. Engines must be turned off and allowed to COOl before refuellng. Do not smoke.

a. Stop engine (para. 2-11).

b. Lower lever (1) and remove fuel tank adapter (2).

c. Unstrap fuel tank (3) and remove.

d. Replenish fuel supply in tank (3).

e. Install fuel tank (3) and secure to frame (4).

f. install fuel tank adapter (2) and raise lever (1)

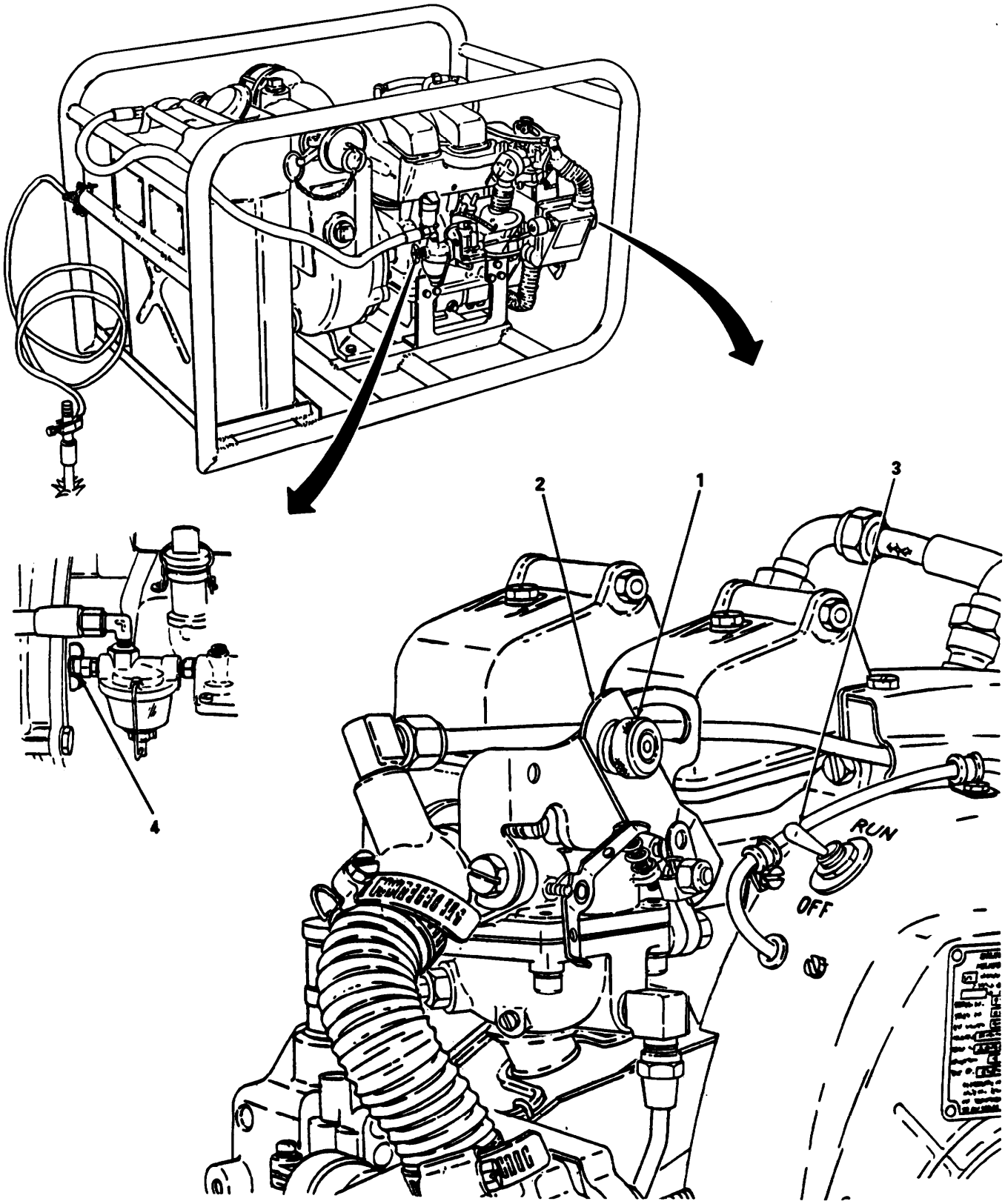


Figure 2-5. Stopping the Gasoline Engine.

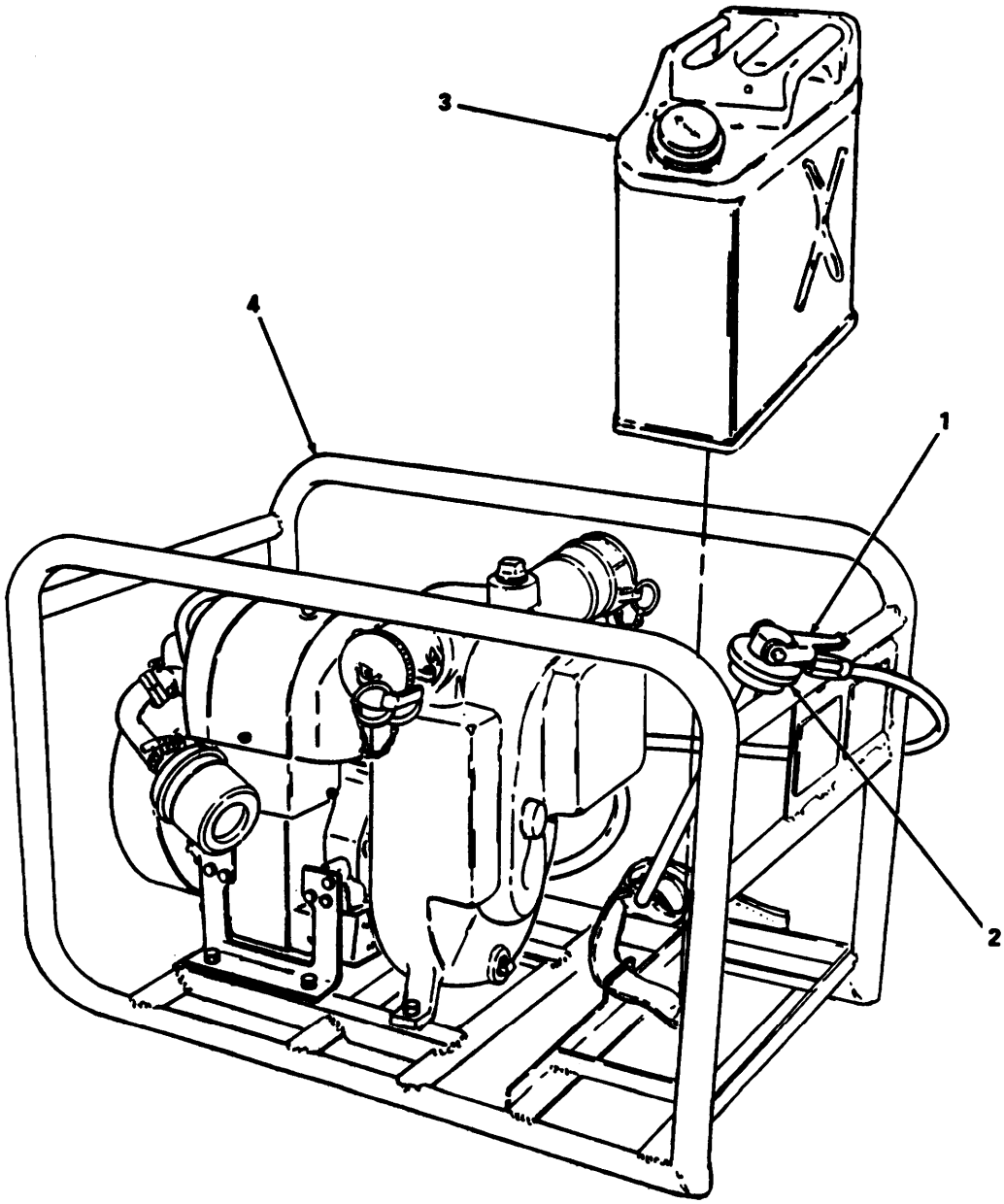


Figure 2.6 Refueling Procedures

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-14. Operation in extremly Cold (Below O°F).

a. General. At extreme low temperatures, the lubricants used for normal temperatures stiffen and lose much of their lubricating effect, while metals become more brittle and lose some of their ability to withstand shock.

b. Lubrication Refer to TM 9-2805-257-14 for information on lubrication of the gasoline engine.

c. Fuel Tank. Keep the fuel tank as full as possible at ail times to prevent condensation of moisture in the tank. Be sure to use the proper grade of fuel.

2-15. Operation in Extreme Heat.

a. General. Operating in extreme heat requires more frequent lubrication of the engine.

b. Lubrication. Refer to TM 9-2805-257-14 for information on lubricating the gasoline engine.

c. Fuel Tank Do not fill the fuel tank completely; allow room for expansion of fuel.

d. Make sure the engine is sufficiently vented.

e. Due to evaporation of fluid in extreme heat, check the pump casing for adequate priming fluid level. Reprime if necessary (para 2-9e.).

2-16. Operation in Sandy or Dusty Areas.

a. Operating in dusty or sandy areas requires more frequent and thorough service to the pump components to prevent damage caused by the dust and dirt.

CAUTION

Keep lubrication containers tightly sealed. Thoroughly clean the area around the engine oil filler cap before checking or adding oil.

b. Lubrication. Refer to TM 9-2805-257-14 and lubricate the gasoline engine more frequently. Clean ail lubrication points before and after lubrication.

c. Fuel Tank. Prevent the entry of dust and dirt into the fuel system. Refer to TM 9-2805-257-14 and clean the engine fuel filter and sediment bowl frequently. Check the air cleaner indicator at frequent intervals.

d Keep the engine air passages dean and free of accumulated dirt or sand that may obstruct the flow of air.

2-17. Operation In Rainy or Humid Conditions.

a. If the pump is installed outdoors in conditions of rain or high humidity, erect a shelter to protect the unit. Cover the unit with a tarpaulin when inoperative if erection of a shelter is not possible.

b. Keep the fuel tank as full as possible at all times to prevent condensation.

c. Inspect the unit closely for corrosive action. Clean and paint chipped areas.

d. Refer to TM 9-2805-257-14 and lubricate the gasoline engine frequently. Always lubricate after operation.

2-18. Operation in Salt Water Areas.

a. Keep all components as clean and free of moisture as possible. Keep a thin coat of oil on all exposed machined surfaces.

b. Clean and repaint all pre-painted surfaces as required.

c. If the pump assembly has been exposed to excessive salt water spray, wash all exposed areas with clean, fresh water as soon as possible.

2-19. Operation at High Altitudes.

a. *General.* As the altitude increases, the thinning of air decreases decreases engine efficiency, reducing the pumping efficiency. For this reason, it is important to maintain systems at peak efficiency to assure that all available power is applied to the pump.

b. Engine Carburetor. Decreased air pressure at high altitudes will upset the calibratibn of the carburetor, causing an excessively rich fuel-air mixture. Adjust the carburetor as instructed in TM 9-2805-257-14.

c. Engine Air Cleaner. Take care that the air cleaner is operating efficiently. Sevice the air cleaner as necessary (TM 9-2805-257-14)

d. Ventilation. Provide adequate fresh air supply to keep the engine from overheating.

d. Keep the engine air passages clean and free of accumulated dirt or sand that may obstruct the flow of air.

2-17. Operation in Rainy or Humid Conditions.

a. If the pump is installed outdoors in conditions of rain or high humidity, erect a shelter to protect the unit. Cover the unit with a tarpaulin when inoperative if erection of a shelter is not possible.

b. Keep the fuel tank as full as possible at all times to prevent condensation.

c. Inspect the unit closely for corrosive action. Clean and paint chipped areas.

d. Refer to TM 9-2805-257-14 and lubricate the gasoline engine frequently. Always lubricate after operation.

2-18. Operation in Salt Water Areas.

a. Keep all components as clean and free of moisture as possible. Keep a thin coat of oil on all exposed machined surfaces.

b. Clean and repaint all pre-painted surfaces as required.

c. If the pump assembly has been exposed to excessive saltwater spray, wash all exposed areas with clean, fresh water as soon as possible.

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c. Engine Air Cleaner. Take care that the air cleaner is operating efficiently. Service the air cleaner as necessary (TM 9-2805-257-14)

d. *Ventilation.* Provide adequate fresh air supply to keep the engine from overheating.

CHAPTER 3

OPERATOR MAINTENANCE

OVERVIEW

This chapter contains maintenance for the pump assetily at the operatormaintenance level. In additiontothe Lubrication instructions and operato troubleshooting procedures, it includes proceduresforinspection and service of the fuel line,fuel tank, fuel tank adapter, pump, engine assembly, spark arrestor, frame and grounding assembly.

Section I. LUBRICATION INSTRUCTIONS

3-1. Lubrication Information.

a G*eneral.* Lubrication of the pump assembly consists of Lubricating the gasoline engine. Refer to LO 9-2805-257-12 for information on the lubrication of the engine. Keep all lubricants in closed containers and stored in a clean, dry place away from external foreign material that might inadvertently mix with lubricants. Keep all lubrication equipment clean and ready for use.

b. Cleaning. Keep all external parts not requiring lubrication clean and free of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubrication to prevent accumulation of foreign matter.

3-2. Lubrication Guidelines.

a. Service the lubrication points at the proper intervals in accordance with LO 9-2805-257-12.

b. Check the engine crankcase oil level frequently, as oil consumption may increase.

c. Under cold operating conditions the engine oil may require more frequent changing because of increased contamination by dilution and sludge formation.

Section II. OPERATOR TROUBLESHOOTING

3-3. General. This section contains troubleshooting procedures to help determine the probable cause of equipment malfunctions. Test and inspections are listed to help isolate the faulty component and corrective actions are provided to eliminate the malfunctions.

3-4 Operator Troubleshooting Procedures. Refer to the symptom index to locate the troubleshooting procedures for the observed malfunction.

a. Table 3-1 contains a listing of the common malfunctions that you may find during operation or maintenance of the pump assenbly and its components. Perform the test/inspeotbns in the order listed.

b. Table 3-1 cannot include all malfunctions that may occour, nor all tests or inspections and corrective actions. If a malfunction is not oorrected by listed corrective actions, notify your supervisor.

SYMPTOM INDEX

Table 3-1. operator Troubleshooting.

Malfunction Test or Inspection Corrective Action
1. ENGINE WILL NOT START OR IS HARD TO START
Step 1. Check position of ignition switch.
Place ignition switch in RUN position.
Step 2. Check choke position.
Choke should be in closed position for starting.
Step 3. Check for closed fuel control valve.
Open the fuel control valve.
Step 4. Check for empty fuel tank.
Refill the fuel tank (para. 2-13).
Step 5. Check for dirt in fuel system.
Service the fuel fitter (see TM 9-2805-257-14).
Step 6. Check for contaminated fuel.
Drain and refill fuel tank (para. 2-13).
2. ENGINE STARTS BUT WILL NOT CONTINUE TO RUN
Step 1. Check for insufficient fuel supply.
Refill the fuel tank (para. 2-13).
Step 2. Check for dirt in fuel system.
Service the fuel filter (see TM 9-2805-257-14)
Step 3. Check choke position.
If engine is cold, close choke.
If engine is warn, close choke half way.

Table 3-1. Operator trroubleshooting (cont).

Malfunction Test or inspection Corrective Action
2. ENGINE STARTS BUT WILL NOT CONTINUE TO RUN (cont)
Step 4. Cheek for closed fuel control valve.
Open the fuel control valve.
3. PUMP WILL NOT PRIME
Step 1. Cheek for air leak in suction line. Check gasket in male hose connection.
Tighten connections. Replace defective hose or gasket (para. 3-6).
Step 2. Check for plugged suction line.
Remove any obstruction in the suction hose.
Step 3. Check for proper priming of pump.
Prime the pump
Step 4. Check for sufficient engine speed.
Ajust throttle to increase speed.
4. PUMP OPERATION IS NOISY
Step 1. Check for excessively high suction lift.
Move pump closer to supply.
Step 2. Cheek for insufficient flow to pump.
Remove obstruction in suction line.
Step 3. Check for other causes.
Refer to unit maintenance.

Table 3-1. Operator Troubleshooting (cont).

Malfunction Test or Inspection Corrective Action
5. PUMP WILL NOT DELIVER RATED CAPACITY
Step 1. Check for leak in suction line. Check gasket in male hose connection.
Tighten connections. Replace defective hose or gasket.
Step 2. Check for excessively high suction lift.
Move pump closer to supply.
Step 3. Check for sufficient engine speed.
Adjust throttle to increase speed.

Section III. OPERATOR MAINTENANCE PROCEDURES

Paragraph Page

3-5. General. This section contains instructions for the information and guidance of the operator in maintaining the pump assembly. Maintenance consists of inspecting and servicing those items which could cause a malfunction or hazardous condition if uncorrected.

3-6. Pump Assembly.

This task covers: Repair

INITIAL SETUP

Material/Parts	*Equipment Condition:*
Gaskets, Coupling (Appendix G)	Gasoline engine shut down (para. 2-11) Engine cool.

Repair. (figure 3-1)

(1) Remove oap (1) from coupiing (2).

(2) Remove gasket (3)

(3) install new gasket (3).

(4) install cap (1) in coupling (2).

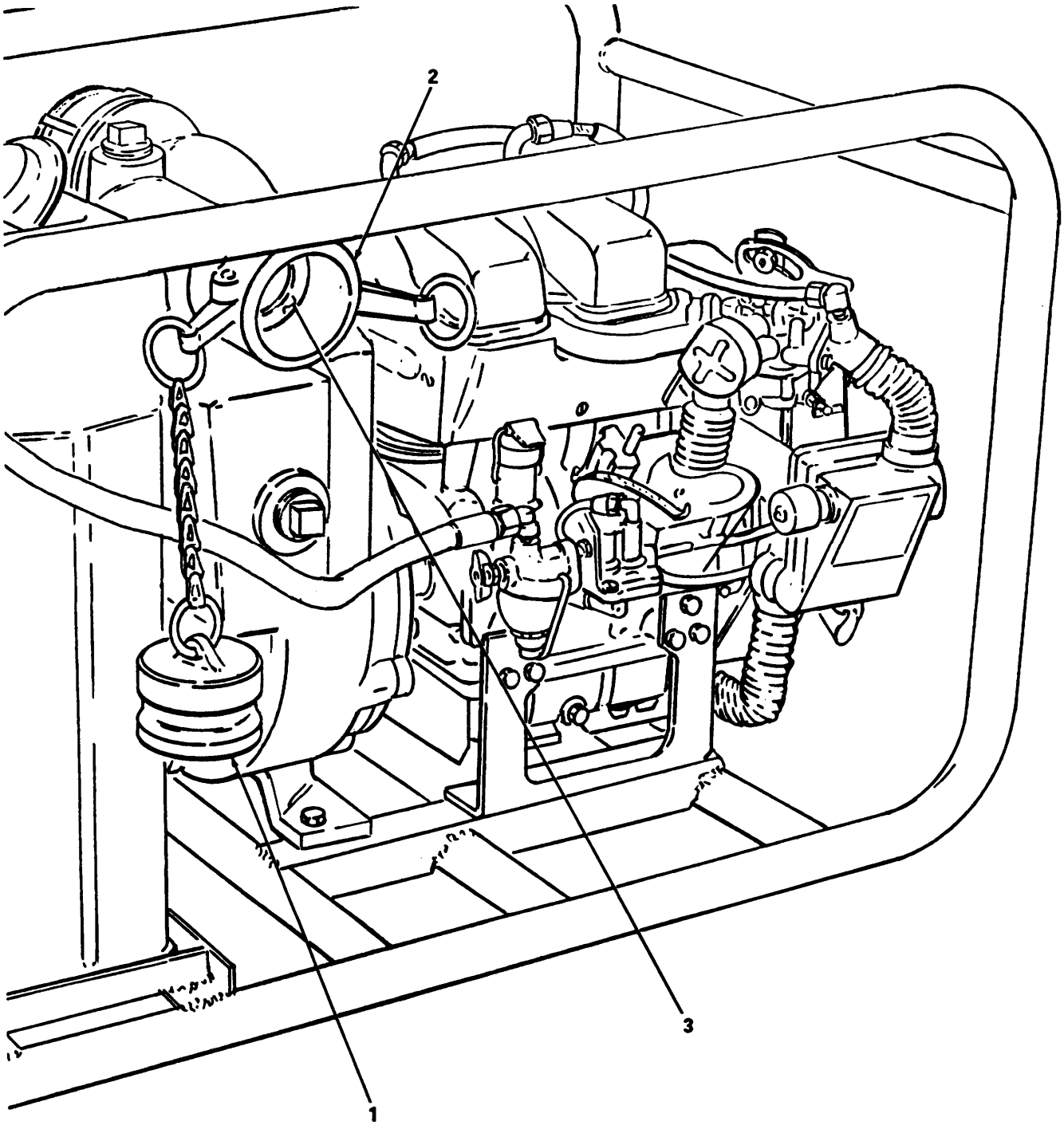


Figure 3-1. Pump Assembly, Repair.

CHAPTER 4

UNIT MAINTENANCE

OVERVIEW

This chapter contains maintenance procedures for unit level maintenance as assigned by the Maintenance Allocation Chart (MAC), Appendix B of this manual.

Section I. REPAIR PARTS, SPECIAL TOOLS, TEST, MEASUREMENT AND Diagnostic EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

4-1. Common Tools and Test Equipment. For authorized common tools and test equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-2. Speciai Tools, TMDE, and Support Equipment. No special tools, TMDE or support equipment are required for the pump. For a listing of special tools, TM DE, and support equipment for the gasoline engine refer to TM 9-2805-257-24P.

4-3. Repair Parts. Repair pads for the pump are listed and illustrated in the Repair Parts and Special Tools List, Appendix G of this manual. Repair parts for the gasoline engine are listed in TM 9-2805-257-24P.

Section II. SERVICE UPON RECEIPT

4-4. Inspection.

a. Make a compiete and thorough visual inspection of the equipment,checking for loss ordamagewhichmay have occurr shipment.

b. inspect the engine accessories to make sure they are securely mounted and in good working condition.

c. inspect all controls to make sure they are intact working properly.

4-5. Installation.

(1) If possibile, chose a location that is free of excess moisture and dust.

(2) install the pump assembly as level as possible. Provide ampiespace on all sides of the equipment for access in servicing. If possibie, provide a suitable rigid foundation.

(3) If equipment is to be installed inside a building, make sure adequate ventilation is provided to carry off engine exhaust gases.

b

WARNING

Weight of the pump exceeds one person lift limit. Maximum height of lift for two persons is 2.8 feet (85.3 centimeter).

(1) Remove the pump assembly from the carrier and place it in position.

(2) Locate the pump so as to keep the suction line as short as possible.

(3) Connect the suction and discharge lines (para. 2-9b and 2-9c).

(4) Ground the puump assembly (para. 2-9d).

4-6. Lubrication. Refer to lubrication instructions, Chapter 3, Section i, and service the engine.

4-7. Testing. Perform unit level PMCS and operator Before (B) PMCS before operating pump assembly. Operate equipment (Chapter 2, Section III) for at least 15 minutes. Observe the equipment during operation. if any malfunctions arise, troubleshoot in accordance with Section IV.

4-8. Dismantling for Movement.

(1) Disconnect the suction and discharge hoses from the pump assembly.

(2) Install the dust plug on the suction female coupling and the dust capon the discharge male coupling of the pump.

(3) Disconnect the ground cable from the grounding rod and remove the rod.

b. Securing for Movement

WARNING

Weight of the pump exceeds one person lift limit. Maximum height of lift for two persons is 2.8 feet (85.3 centimeters).

(1) Place the pump assembly on the carrier bed.

(2) Secure the equipment to the carrier bed and transport to the new worksite.

Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph Page

4-9. General. Unit level PMCS are done to ensure that the pump assembly is in top operating condition. A comprehensive PMCS program reduces equipment downtime and increases the operational readiness of the pump assembly.

4-10. PMCS Procedures. Unit level PMCS is contained in table 4-1. The numbers in the Item NO. column show the order in which the check or service should be done. These numbers should be used when recording deficiencies and short comings on DA Form 2404, Equipment Inspection and Maintenance Worksheet. The dot (.) in the Interval column indicates when the check or service should be done.

Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS)

Q-Quarterly

Item no.	Interval Q	Item to be inspected Procedure	Equipment is not ready/available if:
1	I	Sediment Bowl (Engine Fuel Fitter) Check sediment bowl for moisture, dirt, or sediment. Service as required (refer to TM 9-2805-257-14).	 Bowl contains moisture, dirt, or sediment.

Section IV. UNIT TROUBLESHOOTING

Paragraph Page

4-11. General. This section contains troubleshooting procedures detemine the probable cause of obewd equipment malfunctions. Tests or inspections are provided to isolate the faulty components and corrective actions are provided to eliminate the malfunction.

4-12. Unit Troubleshooting Procedures. Refer to the symptom index to locate the troubleshooting procedure for the observed malfunction. Table 4-2 contains a listing of the common malfunctions that may occur during the operation or maintenance of the pump assembly. Perform the tests or inspections, and the recommended corrective action, in the order listed in the troubleshooting table. If the malfunction is corrected by a specific corrective action, do not continue with the remaining steps, if any, of the troubleshooting procedure. If the malfunction is not corrected by the listed corrective actions, notify your supervisor.

SYMPTOM INDEX

Symptom Page

Table 4-2. *Unit Troubleshooting/shooting Procedures.*

Malfunction Test or Inspection Corrective Action
1. FAULTY ENGINE OPERATION
Step 1. Check for defective fuel line or fuel tank adapter.
Replace defective fuel line or fuel tank adapter (para. 4-15 and 4-16).
Step 2. Refer to TM9-2805-257-14 for detailed troubleshooting procedures for the engine
2. PUMP FAILS TO PRIME
Step 1. Check for loss of proper engine speed.
Adjust engine speed (para. 2-10c).
Step 2. Check casing for low level priming.
Prime the pump (para. 2-9e).
Step 3. Check for defective suction hose.
Replace the defective hose.
Step 4. Check for defective coupling and gasket.
Replace defective coupling gasket (para. 3-6).
Replace pump (para. 4-18).
3. NOISY PUMP OPERATION
Step 1. Check for excessively high suction lift or insufficient flow to pump.
Move pump closer to supply or remove obstruction from hose.
4. FUEL LEAKAGE AT PUMP
Step 1. Check for defective hose.
Replace defective hose.
Step 2. Check for defective coupling and gasket.
Replace defective coupling gasket (para. 3-6).
Replace pump (para. 4-18).

Section V. UNIT MAINTENANCE PROCEDURES

4-13. General. This section contains unit level maintenance procedures as authorized by the MAC, Appendix B, Section ll of this manual. Refer to Appendix F,Toque Limits.

4-14. Radio interference Suppression. Radio interference suppression is attained by providing a low-resistance path to ground for stray currents radiated from the gasolineengine electrical system while the engine is running. Methods used include shielding the ignition and high frequency wires of the engine, grounding the frame with bonding straps, and using resistors and capacitorsas filters.

a. *Interference* Suppression Components. There are two types of interference suppression components- primary and secondary.

(1) Primary suppression components are those whose prirnary functbnistosuppressrad& interference.

(2) Secondary suppression components have radio interference suppressing functions which are incidental and secondary to their primary functions.

b. Replacement of Interference Suppression Comonents. Refer to TM 9-2805-257-14 for information on the interference suppression components used on the gasoline engine.

4-15. Fuel Line.

This task covers: Replace

INITIAL SETUP

Tools:

General Mechanic's Tool Kit (Appendix B Section III, Item 1.)

Equipment Condition:

Pump shut down.

Replace (figure 4-1)

(1) Disconnect fuel line (1) from elbow (2) on fuel filter (3) and from nipple (4) on fuel tank adapter (5).

(2) Obtain a replacement fuel line (1) from stock and reconnect to elbow (2) on fuel filter (3) and to nipple (4) on fuel tank adapter (5).

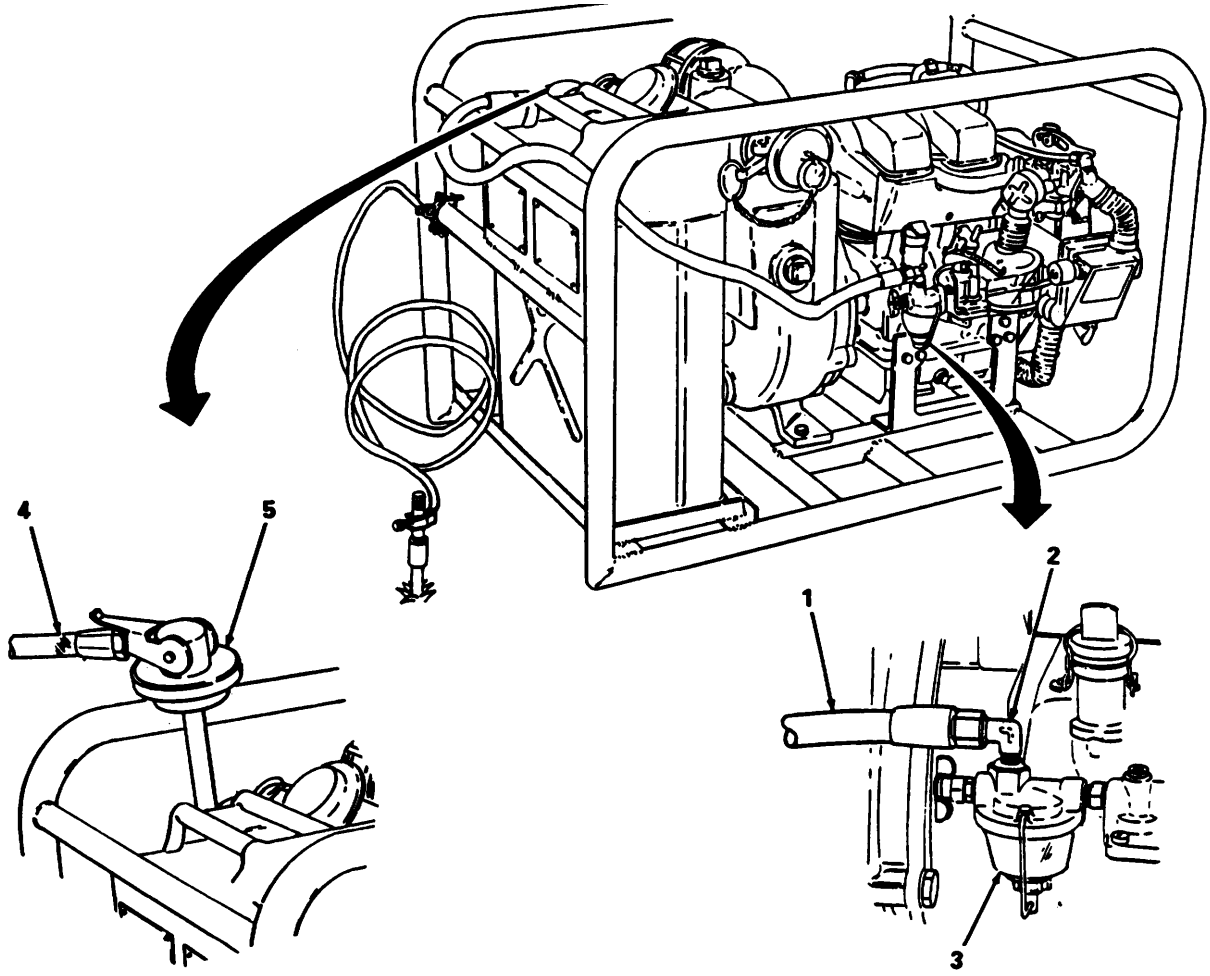


Figure 4-1. Fuel Line, Replace.

4-16. Fuel Tank Adapter.

This task covers: Replace

INITIAL SETUP

Tools:	*Equipment Condition:*
General Mechanic's Tool Kit (Appendix & B, Section Ill, Item 1)	Pump shut down.

Replace (figure 4-2)

(1) Disconnect fuel line (1) from fuel tank adapter (2).

(2) Release clamp *(3) and* remove adapter (2) from fuel tank (4).

(3) Obtain replacement adapter from stock and install in fuel tank (4) and secure clamp (3)

(4) Reconnect fuel line (1) to fuel tank adapter (2).

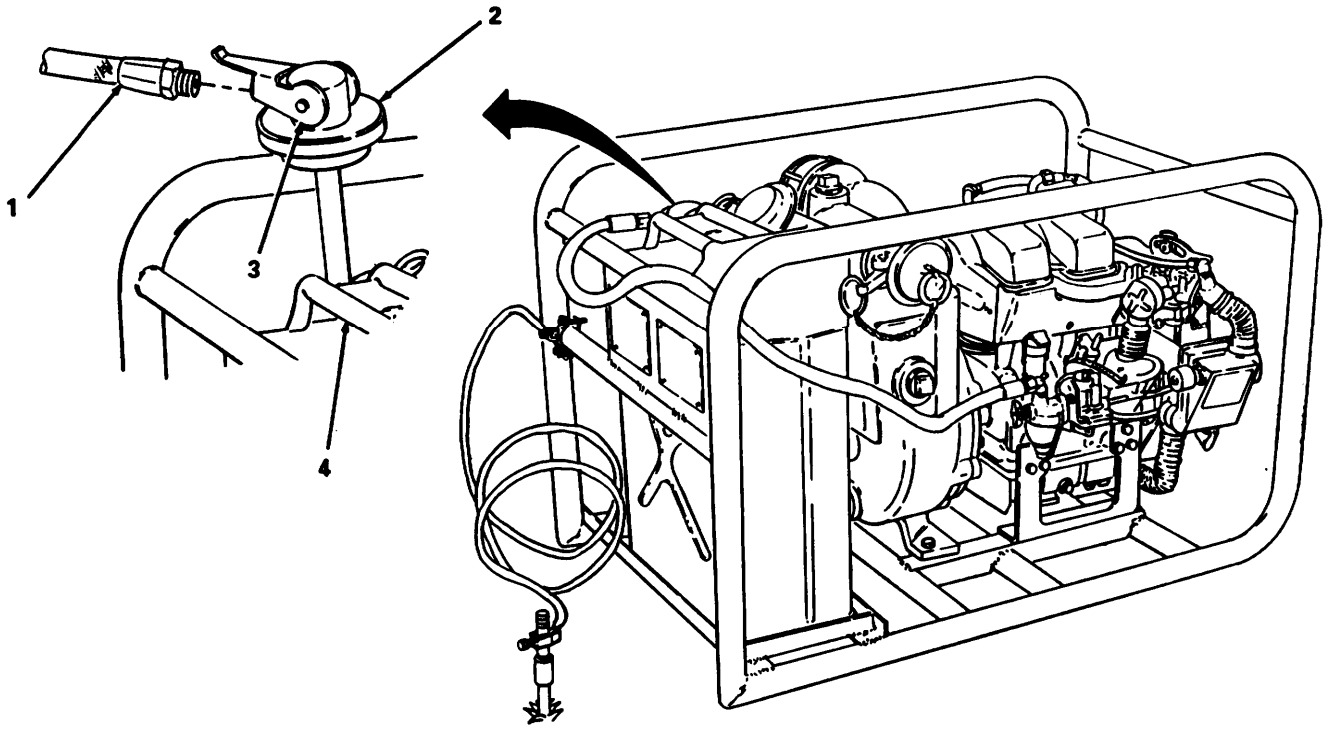


Figure 4-2. Fuel Tank Adapter, Replace.

4-17. Fuel Tank.

This task covers: Replace

INITIAL SETUP

Tools:		*Equipment Conditions*
General Mechanic's Tool Kit (Appendix B Item 1)	Section Ill,	Pump shut down.

Replacement (figure 4-3)

(1) Release clamp (1) on fuel tank adapter (2).

(2) Remove fuel tank adapter (2) from fuel tank (3).

(3) Remove strap (4) Securing fuel tank (3) to frame (5).

(4) Remove fuel tank (3) from frame (5).

(5) Obtain a replacement fuel tank from stock.

(6) Position fuel tank (3) on frame (5) and secure with strap (4).

(7) Install fuel tank adapter (2) in fuel tank (3).

(8) Secure clamp (1) on fuel tank adapter (2).

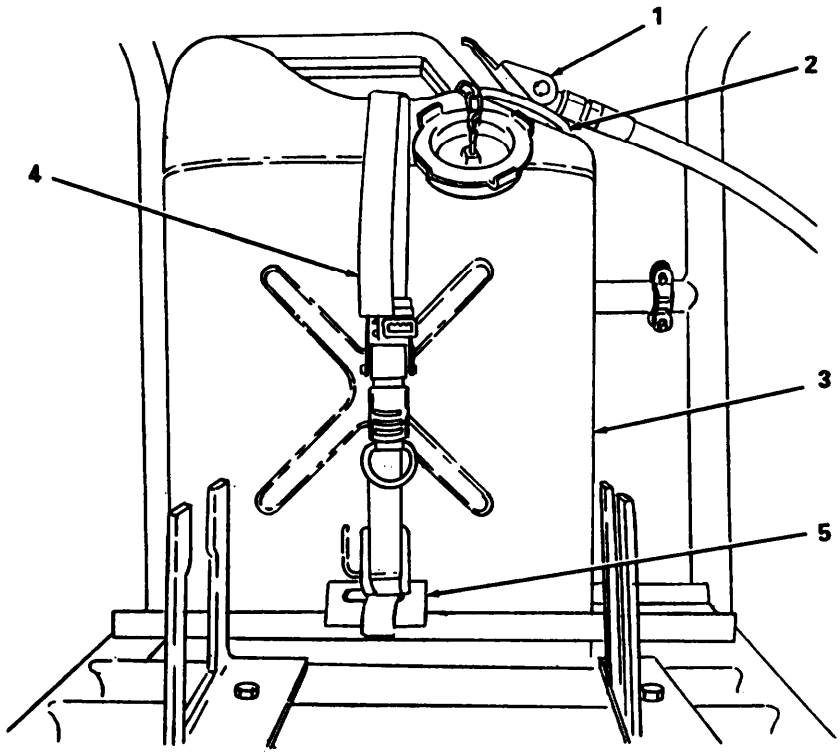


Figure 4-3. Fuel Tank, Replace.

4-18. **Pump Assembly.**

This task covers: a. Remove b. Install

INITIAL SETUP

Tools:

General Mechanic's Tool Kit (Appendix B, Section Ill, Item 1)
Wrench, Torque (Appendix B, Section Ill, Item 2)
Puller Kit, Mechanical (Appendix B, Section Ill, Item 2)

Material/Parts:

O-ring (Appendix G)
LockWashers (Appendix G)

Equipment Condition:

Fuel tank removed (para. 4-17).
Fuel line removed (para. 4-15).

a. Remove. (figure 4-4)

(1) Remove pump drain plug (1) and drain fuel from pump into suitable container.

(2) Remove eight bolts (2) securing the pump housing (3) to the impeller housing (4).

(3) Remove two nuts (5), two washers (6) and two bolts (7) securing the pump housing (3) to the frame (9).

(4) Pull the pump housing (3) and O-ring (8) from the frame (9).

(5) Remove bolt (10) and washer (11) securing impeller (12) on pump shaft (13) and remove impeller (12), spring (14), and key (15). Unless corroded, the impeller will slip off the shaft without using force.

(6) Remove four bolts (16) and Iockwashers (17) securing impeller housing (4) to gasoline engine (18).

(7) Using puller remove impeller housing (5) and seal (19).

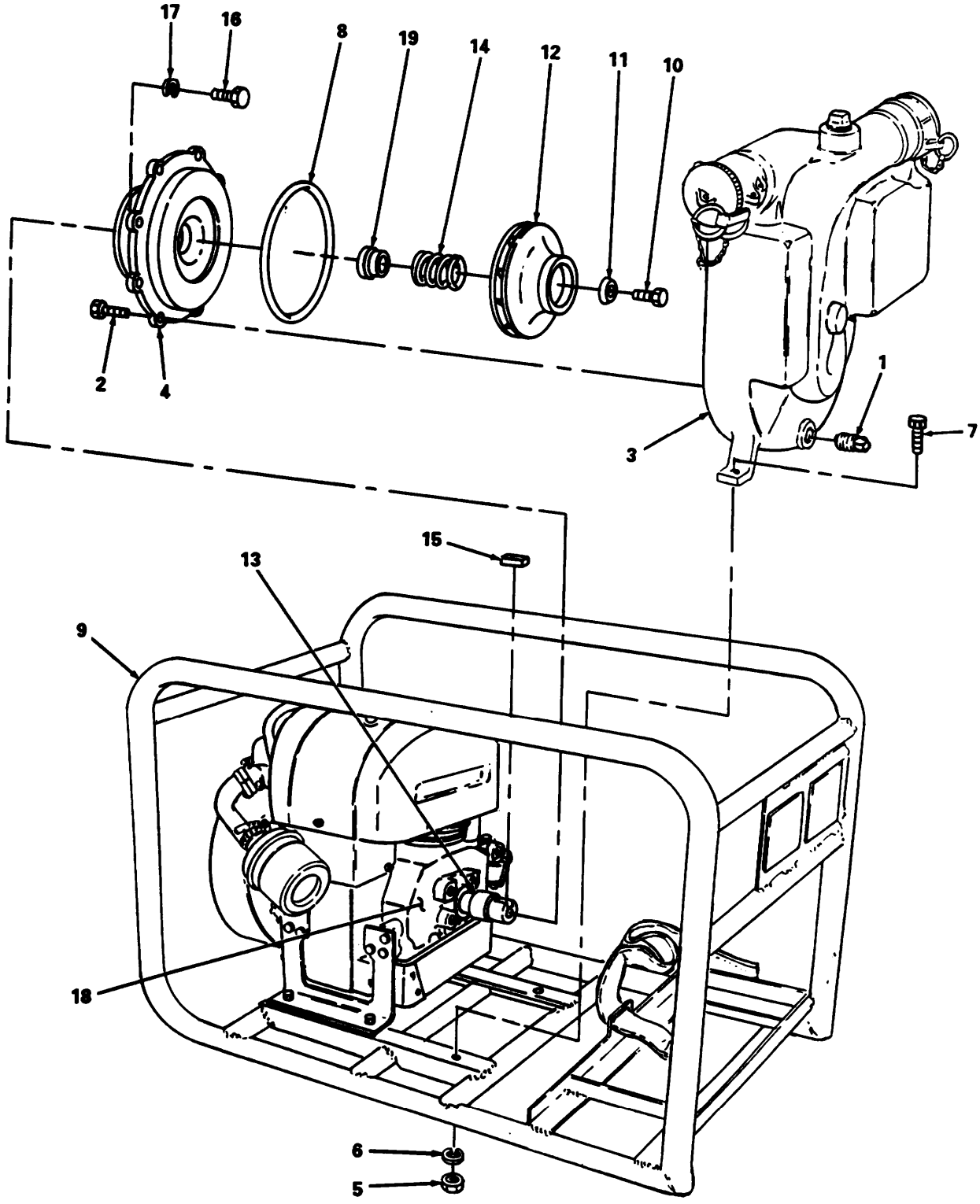


Figure 4-4. Pump Assembly, Removal.

4-18. Pump Assembly (cont)

b. Install (figure 4-5)

(1) Install impeller housing (4) and secure with four bolts (16) and lockwashers (17)

(2) Install seal (19) on pump shaft (13).

(3) Install key (15), spring (14), and impeller (12) and secure with washer (11) and bolt (10). Refer to Appendix F for torque limits.

(4) Install pump housing (3) and 0-ring (8) and secure loosely with two bolts (7), lockwashers (6), and nuts (5).

(5) Secure pump housing (3) to impeller housing (4) with eight bolts (2). Refer to Appendix F for torque limits.

(6) Tighten two bolts (7) securing pump housing (4) to frame (9).

FOLLOW ON MAINTENANCE
(1) Install fuel tank (para. 4-17).
(2) Install fuel line (para. 4-15).

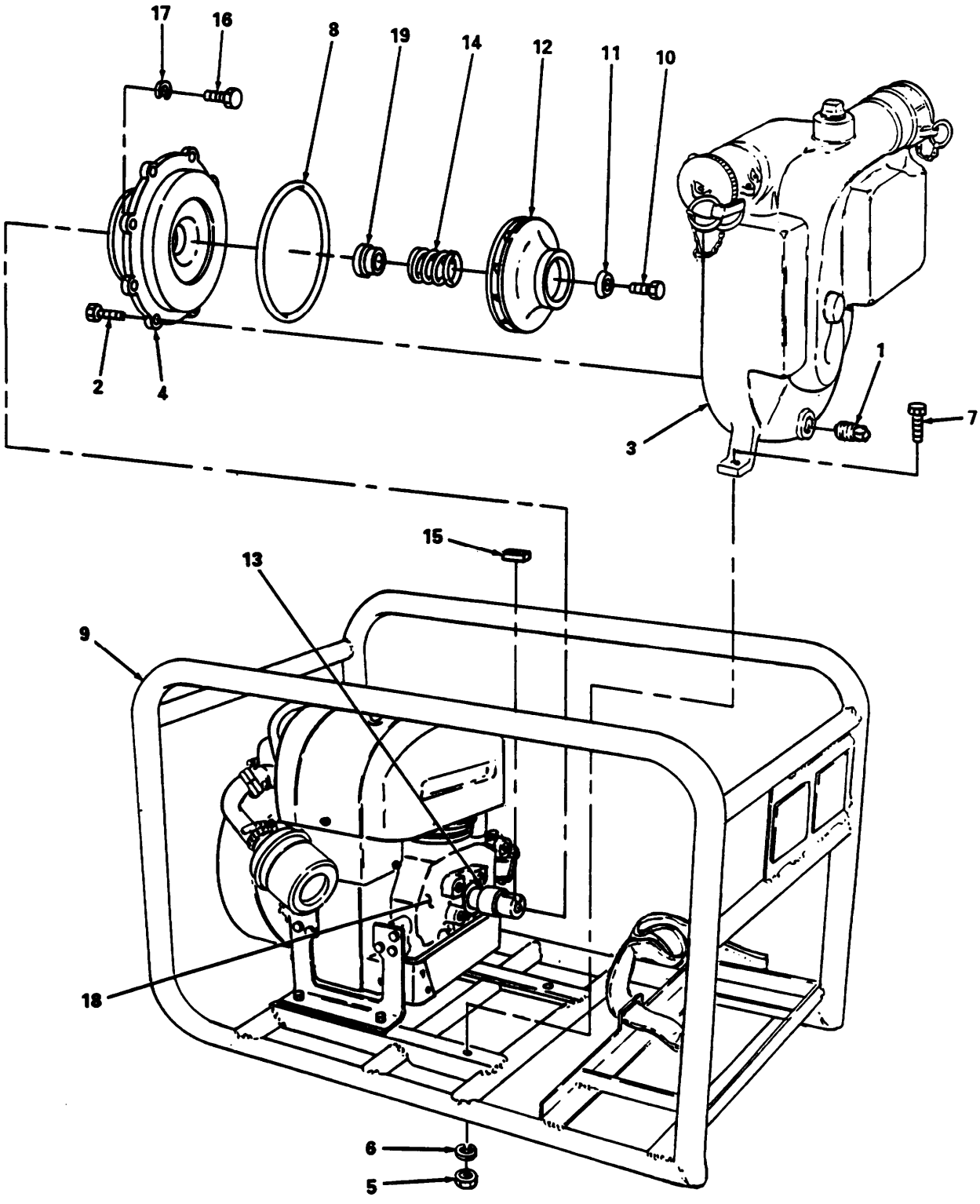


Figure 4-5. Pump Assembly, Install.

4-19. **Engine Assembly.**

This task covers: Replace

INITIAL SETUP

Tools	*Equipment Condition:*
General Mechanic's Tool kit (Appendix B, Section III, Item 1)	Pump assembly removed (Para. 4-18).

Replace. (figure 4-6)

(1) Remove four nuts (1), four washers (2) and four bits (3) securing engine (4) and brackets (5) to frame (6).

(2) Remove engine (4) and brackets (5) from frame (6).

(3) Remove two brackets (5) from engine (4) by removing twelve bolts (7) and twelve lockwashers (8).

(4) Position two brackets on replacement engine and secure with twelve bolts (7) and twelve lockwashers (8).

(5) Position replacement engine on frame (6) and secure brackets with four bolts (3), four washers (2) and four nuts (1).

FOLLOW ON MAINTENANCE
Install pump assembly (para. 4-18)

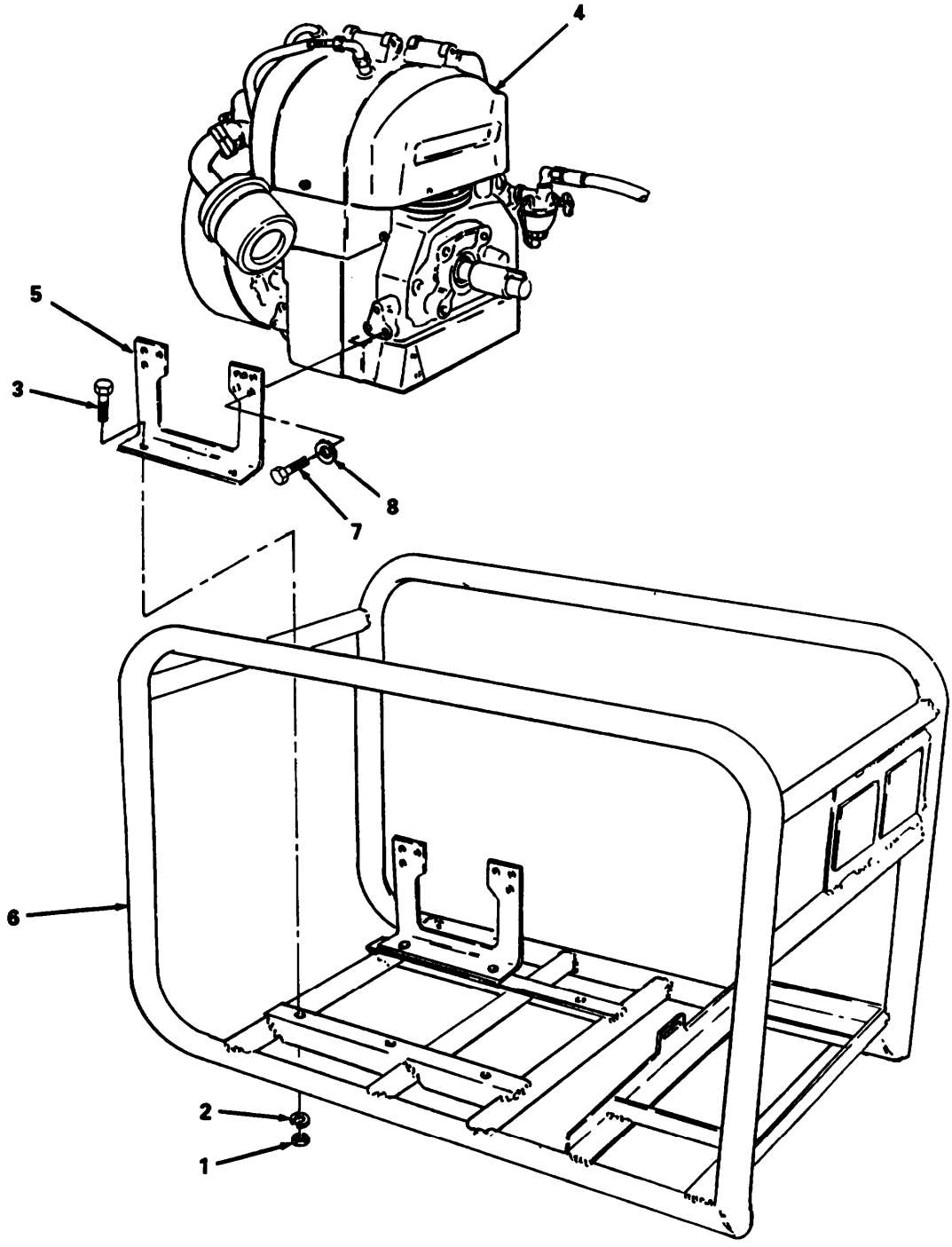


Figure 4-6. Engine Assembly, Removal and Installation.

4-20. **Spark Arrestor.**

This task covers: Replace

INITIAL SETUP

Tools:

General Mechanic's Tool Kit (Appendix B, Section Ill, Item 1)

Replace. (figure 4-7)

(1) Loosen clamp (1) and remove spark arrestor (2) and clamp (1).

(2) Install clamp (1) and spark arrestor (2) and secure with clam (1).

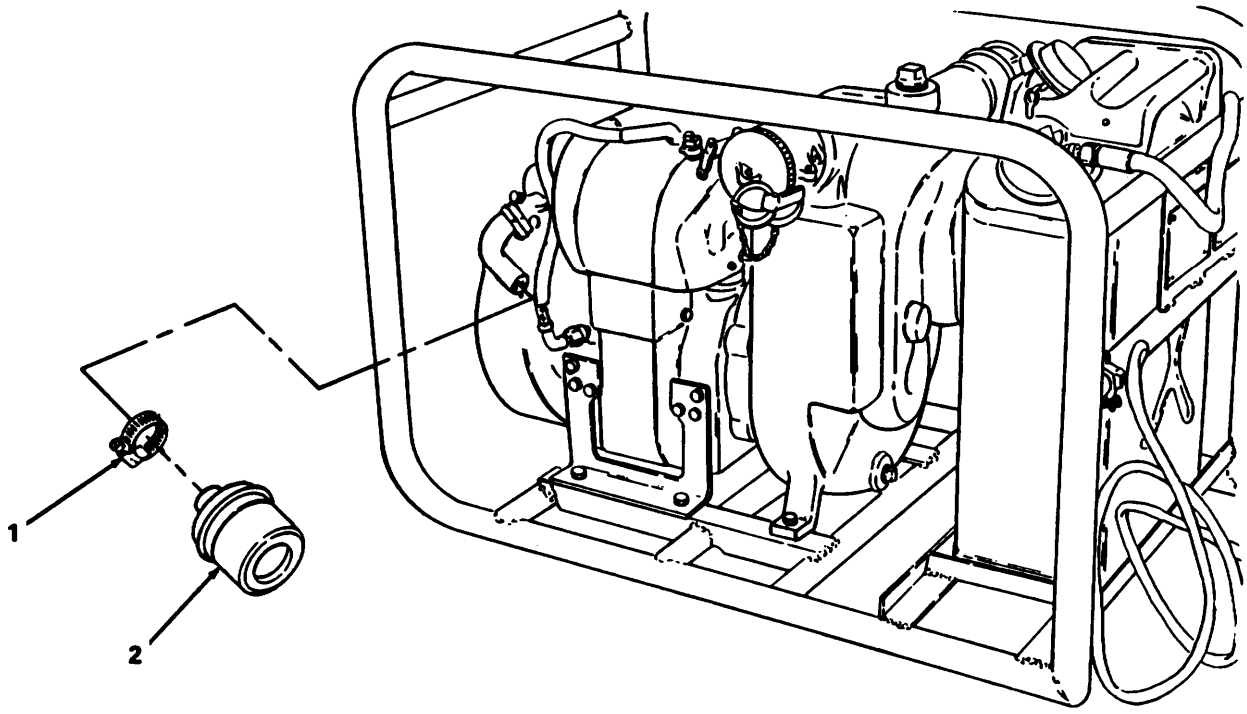


Figure 4-7. Spark Arrestor, Replace.

4-21. Frame.

This task covers: Replace

INITIAL SETUP

Tools:	*Equipment Condition:*
General Mechanic's Tool Kit (Appendix B, Section Ill, Item 1)	Engine removed (para. 4-19).

Replace. (figure 4-8).

(1) Remove strap (1) from frame (2).

(2) Loosen screw (3) and remove pounding cable (4).

(3) Loosen two *screws* (5) and remove clamp (6) form frame (2).

(4) Install clamp (6) on frame (2) and tighten two screws (5).

(5) Install grounding cable (4) and tighten screw (3).

(6) Install strap (1) on frame (2).

FOLLOW ON MAINTENANCE:
Install Engine (Para 4-19)

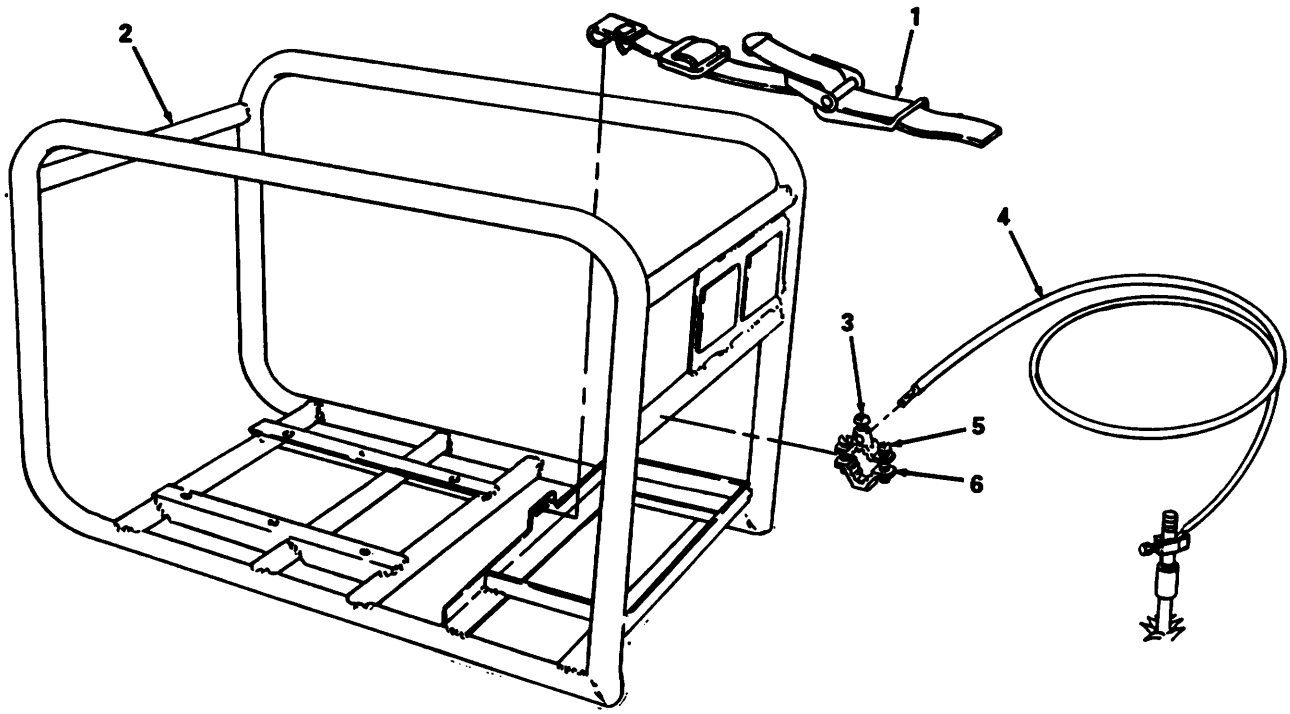


Figure 4-8. Frame, Replace.

4-22. **Grounding Assembly.**

This task covers: Replace

INITIAL SETUP

Tools:

General Mechanic's Tool Kit (Appendix B, Section Ill, Item 1)

Replace. (figure 4-9).

(1) Loosen screw (1) and remove grounding cable (2) from clamp (3).

(2) Loosen screw (4) and remove grounding cable (2) and clamp (5).

(3) Install new 6 AWG grounding cable (2) and clamp (5) and tighten screw (4).

(4) Install grounding cable (2) and tighten screw (1).

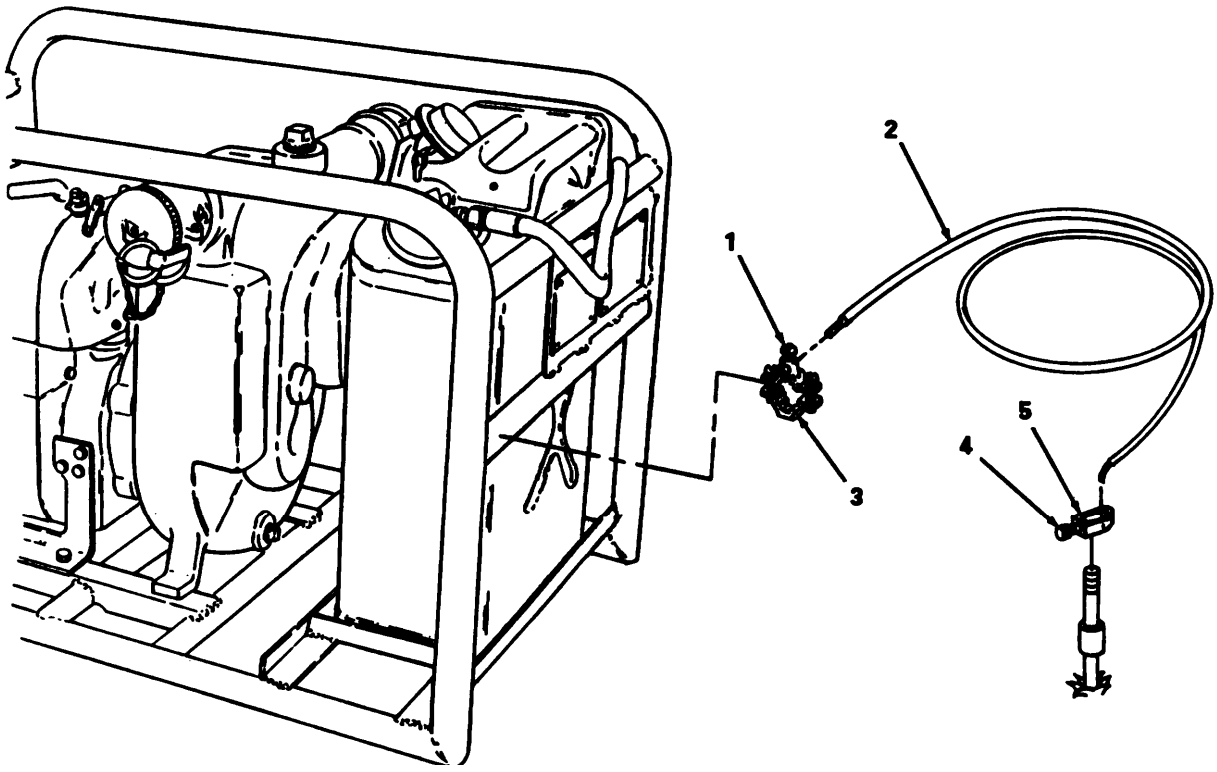


Figure 4-9. Grounding Assembly, Replace.

Section VI. PREPARATION FOR SHIPMENT OR STORAGE

4-23. General. This section contains procedures to place the pump assembly into storage or to prepare it for shipment.

4-24. Administrative Storage.

a. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authority. During the storage period appropriate maintenance records will be kept.

b. Before placing equipment in administrative storage, current maintenance services and Equipment Serviceable Criteria (ESC) evaluations should be completed, shortcomings and deficiencies should be corrected, and all Modification Work Orders (MWO'S) should be applied.

c. Storage site selection. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans, conex containers and other containers maybe used.

4-25. Preparation for Storage or Shipment. Proceed as follows:

a. Perform operator Before and After and Unit PMCS.

b. Remove fuel from the fuel tank and fuel line.

c. Drain the pump (para. 4-18).

d. Drain engine fuel system (refer to TM 9-2805-257-14).

e. Drain engine oil (refer to TM 9-2805-257-14).

f. Secure starter rope to engine.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE

Page

OVERVIEW

This chapter contains information for maintenance of the pump assembly by direct support maintenance personnel.

Section I. REPAIR PARTS, SPECIAL TOOLS, TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

Paragraph Page

5-1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicabe to your unit.

5-2. Special Tools, TMDE,and Support Equipment. No special tools,TMDEorsuppoftequipment are required by direct support maintenance for maintaining the components of the pump assembly, with the exception of the gasoline engine. For a listing of the special tools, TMDE and support equipment authorized for use on the gasoline engine, refer to the Repair Parts and Special Tools List, TM 9-2805-257-24P, and the Maintenance Allocation Chart (MAC) for the engine, Appendix B, TM 9-2805-257-14.

5-3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List (RPSTL) for the centrifugal pump assembly, Appendix G of this manual. For the gasoline engine refer to TM 9-2805-257-24P

Section II. DIRECT SUPPORT MAINTENANCE PROCEDURES

Paragraph Page

5-4. General. This section contains direct support maintenance procedures as authorized by the MAC, Appendix B of this manual. For troubleshooting information, useful in locating and correcting unsatisfactory operation of the pump assembly, refer to paragraphs 3-4 and 4-12. Additional troubleshooting information and repair procedures for the gasoline engine can be found in TM 9-2805-257-14.

5-5. Pump Assembly.

This task covers:
a. Disassembly
b. Cleaning
c. Inspection
d. Repair
e. Reassembly

INITIAL SETUP

Tools:

General Mechanics Tool Kit (Appendix B, Section Ill, Item 1)
3 Fingered Bearing Puller (Appendix B, Section Ill, item 2)

Equipment Condition:

Pump removed from frame (para. 4-18).

Matetial Pads:

Rags, Wiping (Item 3, *Appendix* E)
solvent, Dry Cleaning (Item 5, *Appendix* E)

a. *Disassembly* (Figure 5-1)

NOTE

Pump components have been partially disassembled in the removal operation. Refer to figure 5-1 to complete the disassembly of the pump.

(1) Remove dust cap (1), gasket (2) and coupling (3).

(2) Remove dust cap (4), gasket (5) and coupling (6).

(3) Remove priming plug (7), inserts (8) and drain plug (9) from the pump housing (10).

(4) Remove diffuser gasket (11), dowel pin (12), setscrew (13) and separate the wear ring (14) from the diffuser (15).

(5) Disassemble the impeller by removing three setscrews (16) and separate wear ring (17) from the impeller (18).

(6) Remove the pump shaft (19) from the engine shaft (20) with a three-fingered bearing puller. Retain shaft key (21).

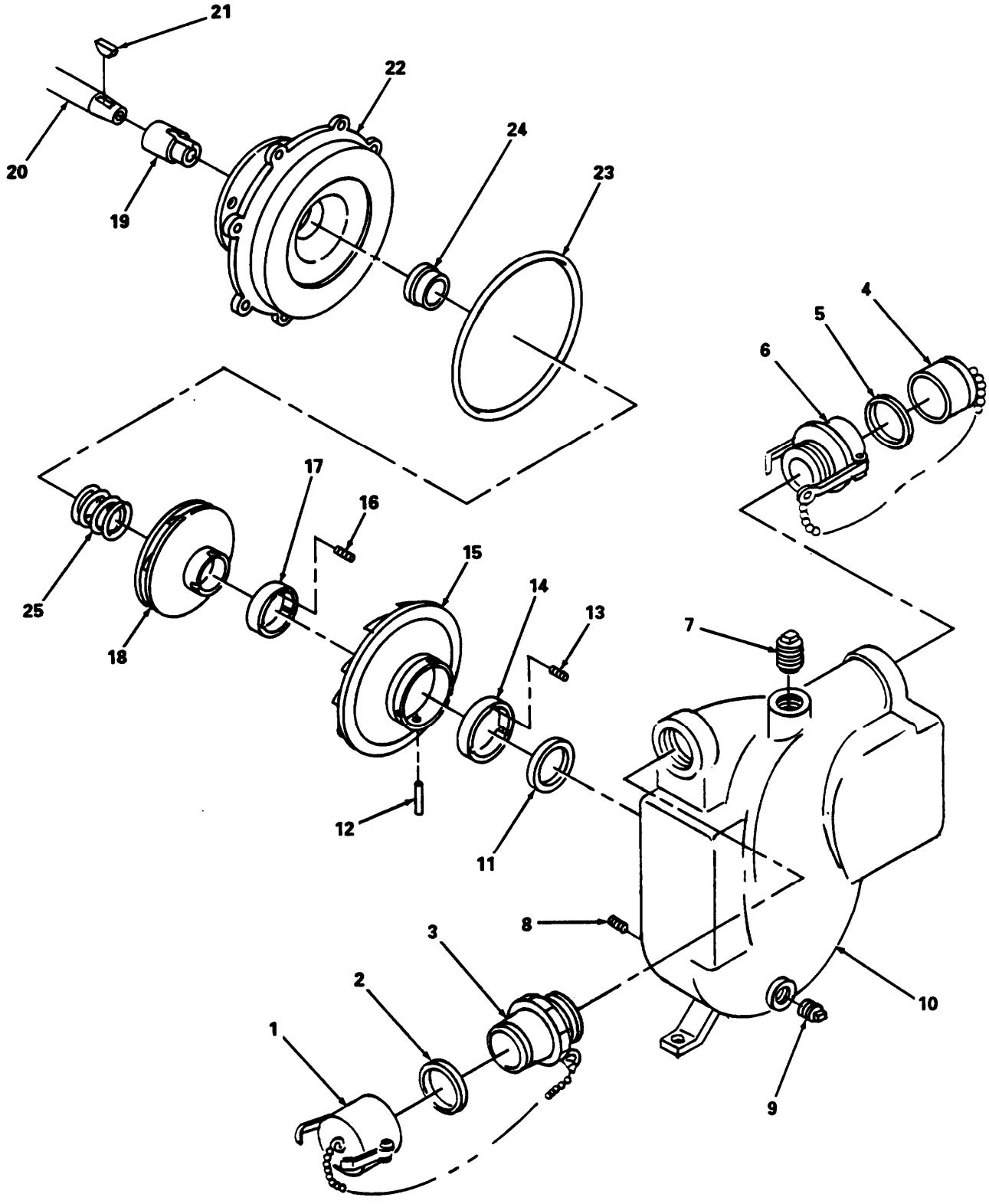


Figure 5-1. Pump Assembly, Disassembly.

5-5. Pump Assembly (cont).

b. Cleaning.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 10OF - 138°F (38°C - 50°C).

(1) Clean all disassembled parts with cleaning solvent (Fed Spec P-D-680) and dry thoroughly with a soft wiping rag.

(2) Use probe to remove any obstructions in vane of the impeller (18).

c. Inspection alll parts including impeller housing (22), O-ring (23), mechanical seal (24), and spring (25) for cracks, breaks or any other damage.

d. Repair by replacement from stock of any defective parts.

e. Assembly (figure 5-2)

(1) Position key (21) in slot of engine shaft (20).

(2) Install pump shaft (19) on the engine shaft (20).

(3) Assemble wear ring (17) on the impeller (18) and secure with three setscrews (16).

(4) Press wear ring (14) on diffuser (15) and secure with setscrew (13). Install dowel pin (12).

(5) Place sealer gasket (11) on diffuser (15) and insert the assembly into the pump housing (10). Make sure the dowel pin (12) mates with the slot in the pump housing (10).

(6) Insert gaskets (2 and 5) in couplings (3 and 6) and install the couplings on the housing.

(7) Install primer plug (7), drain plug (9) and inserts (8).

FOLLOWING ON MAINTENANCE
Install pump (para. 4-18).

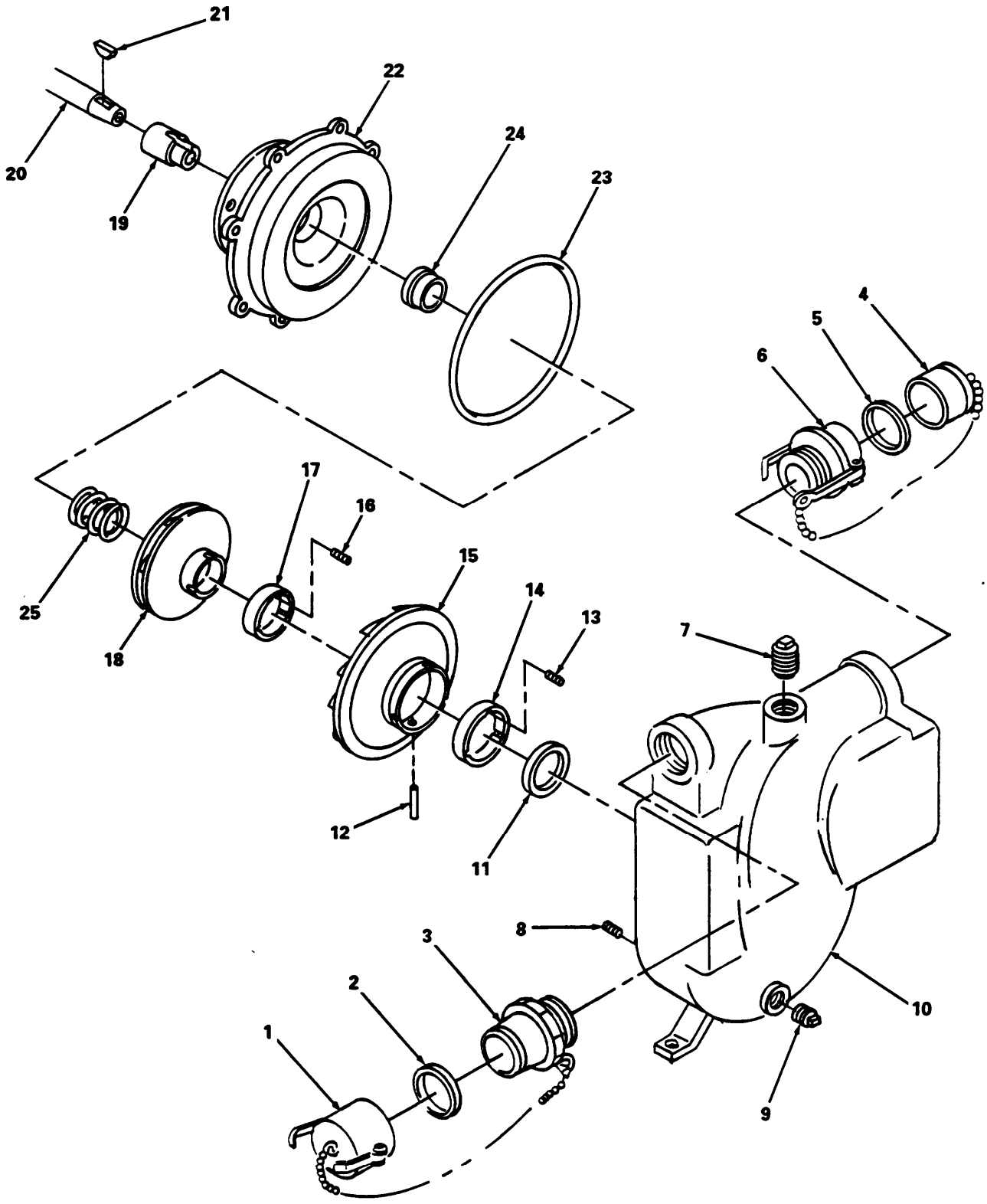


Figure 5-2. Pump Assembly, Assembly.

5-6. Frame.

This task covers: a. Disassembly b. Repair c. Assembly

INITIAL SETUP

Tools:

Riveter, Hand, Blind (Appendix B, Section Ill, Item 3)
Tool Kit Comnon No. 1 (Appendix B, Section III, Item 2)

Equipment Condition:

Engine assembly removed (para. 4-19).

Material/Parts:

Rivets (Item x)

a. Disassembly. (figure 5-3)

(1) Drill out eight rivets (1) and remove identification plate (2) and warning plate (3).

(2) Remove ground cable clamp (4) by loosening two screws (5) and separating ciamp (4) from frame (6).

b. Repair.

(1) Straighten any misalignment or bends in the frame (6).

(2) If structural frame members or welded joints are cracked or broken, refer to higher level of maintenance.

c. Assembly.

(1) Install identification plate (2) and warning plate (3) with eight rivets (1).

(2) Install ground cable clamp (4) by slipping loosened clamp halves (4) over frame (6), aligning clamp and tightening two screws (5).

FOLLOW ON MAINTENANCE
Install engine assemby (para. 4-19).

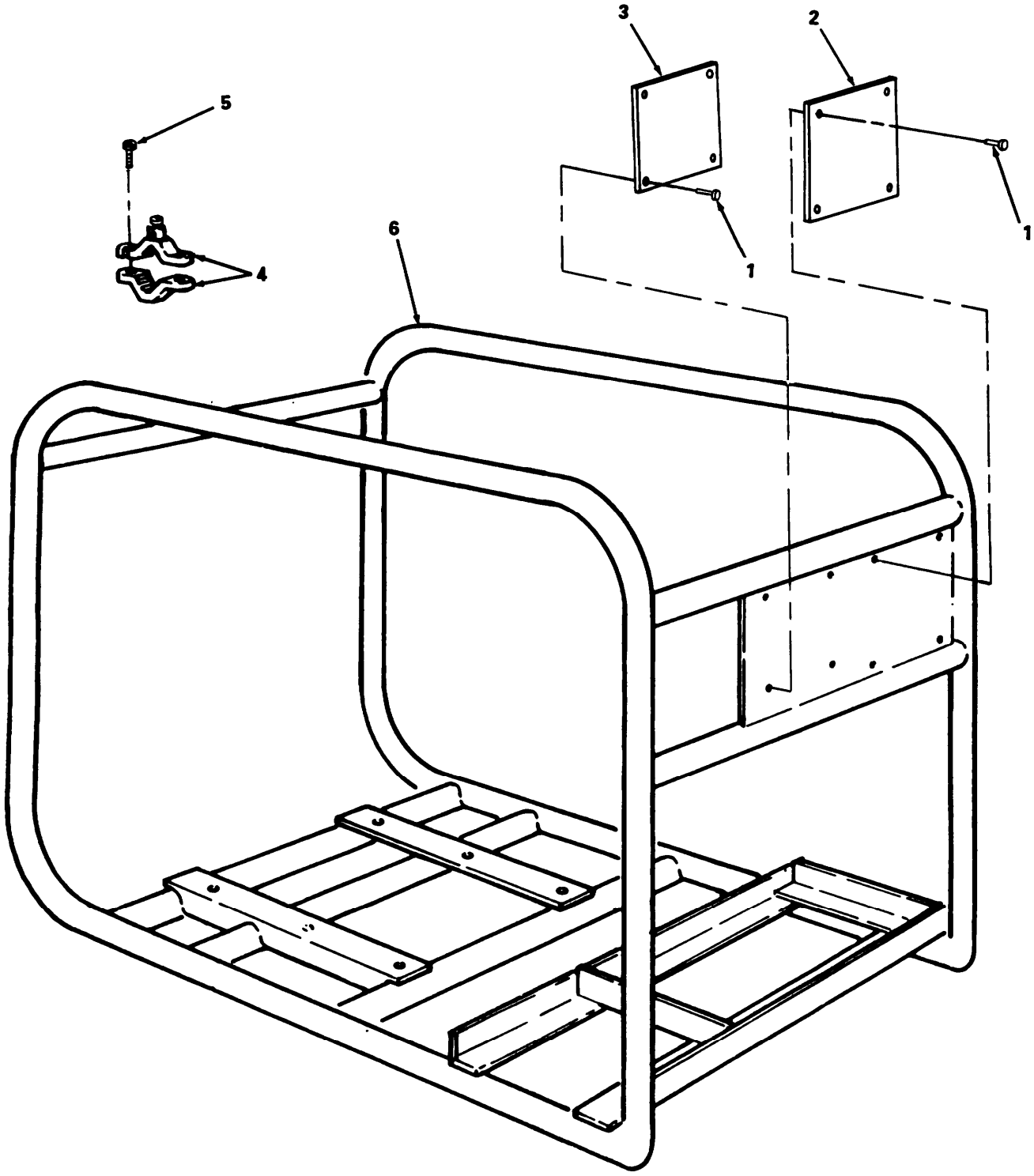


Figure 5-3. Frame, Disassembly Repair, and Assembly.

CHAPTER 6

GENERAL SUPPORT MAINTENANCE

OVERVIEW

This chapter contains information for maintenance of thepumpassembly by general support maintenance personnel. The only repair authorized by the Maintenance allocation Chart (MAC), appendix B is welding of the frame.

Section I. REPAIR PARTS, SPECIAL TOOLS, TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

6-1. **Common Tools and Test Equipment.** For authorized common tools and test equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

6-2. **Special Tools, TMDE, and Support Equipment.** No special tools, TMDE or support equipment are required by general support maintenance for maintaining the components of the pump assembly, with the exception of the gasoline engine. For a listing of the special tools, TMDE and support equipment authorized for use on the gasoline engine, refer to the Repair Parts and Special Tools List, TM 9-2805-257-24P, and the Maintenance Allocation Chart (MAC) for the engine, Appendix B, TM 9-2805-257-14.

6-3. **Repair Parts.** Repair parts for the gasoline engine are listed and illustrated in the Repair Parts and Special Tools List (RPSTL) TM 9-2805-257-24P

Section Il. GENERAL SUPPORT MAINTENANCE PROCEDURES

6-4. Frame Assembly.

This task covers: Repair

INITIAL SETUP

Tools:	*Equipment Condition:*
Toll Kit Common No. 1 (Appendix B, Section III, Item 2)	Engine assembly removed (para. 4-19).

The only repair authorized at the general support level is welding of a broken or cracked frame structural member or welded joint.

NOTE

Welding repairs shall be performed in accordance with TM 9-237, Operations Manual for Welding, Theory and Application

FOLLOW ON MAINTENANCE
Install engine assembly (para. 4-19).

APPENDIX A

REFERENCES

A-1. **Scope.** This appendix lists all forms, technical manuals and miscellaneous publications referenced, or to be used with, this manual.

A-2. **Publication Indexes.** The following publication indexes should be consulted frequently for the latest changes or revisions of references given in this appendix and for new publications relating to the material covered in this manual:

Consolidated Index of Army Publications and Blank Forms . . . . . DA PAM 25-30

The Army Maintenance Management System (TAMMS) . . . . . DA PAM 738-750

A-3. Technical Manuals.

Operations Manual for Welding, Theory and Application . . . . . TM 9-237

Painting instructions for Field Use . . . . TM 43-0139

Operator, Unit, Direct Support, and General Support Maintenance
Manual, Engine, Gasoline, 3 HP, Military Standard Models . . . . . TM 9-2805-257-14

Repair Parts and Special Tools List, Engine, Gasoline, 3 HP,
Military Standard Models TM9-2805-257-24P

Procedures for Destruction of Equipment to Prevent Enemy Use . . . . . TM 750-244-3

A-4. Field Manuals.

First Aid for Soldiers . . . . . .FM 21-11

A-5. Army Regulations.

Dictionary of United States Army Terms. . . . . AR 310-25

Authorized Abbreviations and Brevity Codes . . . . . AR 310-50

Packaging of Material . . . . . AR 700-15

Army Material Maintenance Concepts and Policies . . . . . .AR 750-1

A-6. Forms.

Recommended Changes to Publications and Blank Forms . . . . . DA Form 2028

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1 General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the Performance of maintenance functions on the pump assembly. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels.

c. Section Ill lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. **Maintenance Functions.** Maintenance functions will be limited to and defined as follows:

a. Inspect To determine the serviceability of an item by comparing its physical, mechanical, and or electrical characteristics with established standards through examination (e.g. by sight, sound, or feel).

b. Test. To verify serviceability By by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., clean (includes decontamination, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, compressed air, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specific variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons 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.

g. Remove/Install. to remove and instqall the sme item when required to perform service or other maintenance functions. Install my be the act of emplacing, seating or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unservicable Item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3d position code of the SMR oode.

i. Repair. The application of maintenance service including fault location/troubleshooting, removal/ installation, and disassernbly assembly procedures, and maintenanace actions to identify trouble and restore serviceability to an Item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end Item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new oondition.

k. Rebuild. Consists of those servces/actions necessary for the restoration of unserviceable equipment to like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation include the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. Explanation of Columns in the MAC, Section II.

a. Column 1. Group Number. Column group code numbers the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group shall be, "00".

b. Column 2. Component/Assembly. contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3. Maintenance/Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2).

d. Column 4. Maintenance Level. Column 4 specifies, by the listing to work time fire in the appropriate subcolumn(s), the level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform the function listed in indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown, for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module and item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/ assembly time), Troubleshooting/fault location time, and quality assurance /quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels areas follows:

C - Operator or crew
O - Unit Maintenance
F - Direct Support Maintenance
H - General Support Maintenance
D - Depot Maintenance

e. Column 5. Tools and Equipment. Column 5 specifies by code, those common tools sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. *Column 5. Remarks.* This column shall, when applicable oontain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. Explanation of Columns in Tool and Test Equipment Requirements, Section Ill.

a. *Column 1. reference Code.* The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. *Column 2. Maintenance Category.* The lowest category of maintenance authorized to use the tool or test equipment.

c. *Column 3. Nomenclature.* Name or identification of the tool or test equipment.

d. *Column 4. National Stock Number.* The National stock number of the tool or test equipment.

e. *Column 5. Tool Number.* The manufacturer's part number.

B-5. Explanation of Columns in Remarks, in Section IV.

a. *Column 1. References.* The code recorded in column 6, Section Il.

b. *Column 2. Remarks* This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section Il.

Section II. MANTENANCE ALLOCATION CHART FOR 100 GPM CENTRIFUGAL PUMP ASSEMBLY

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS	REMARKS
00	Centrifugal Pump Assembly								
01	Fuel System								
0101	Fuel Lines	Inspect	0.2						
		Replace		0.5				1	
0102	Fuel Tank	Inspect	0.1						
		Replace		0.2				1	
0103	Fuel Tank Adapter	Inspect	0.1						
		Replace		0.2				1	
02	Pump Assembly	Inspect	0.1						
		Repair			1.3			2	
		Replace	0.2	1.3				1	
0201	Shaft, Impeller, Seals, Bearings	Inspect			0.3				
		Repair			0.3			2	
		Replace			1.0			2	
03	Engine Assembly	Inspect	0.3						A
		Replace		2.5					
0301	Spark Arrestor	Inspect	0.1						
		Replace		0.5				1	
04	Frame	Inspect	0.1						
		Repair			1.0	1.0		2, 3	
		Replace		1.0				1	
0401	Grounding Assy	Inspect	0.2						
		Replace		0.2				1	

Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS FOR 100 GPM CENTRIFUGAL PUMP ASSEMBLY.

Tool or test equipment ref code (1)	Maintenance category (2)	Nomenclature (3)	National/NATO stock number (4)	PN Tool number (5)
1	O	General Mechanic's Tool Kit	5180-00-177-7033	SC 5180-90-CL-N26
2	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance Common No. 1, Less Power	4910-00-754-0654	SC 4190-95-CL-A74
3	F	Riveter, Blind, Hand	5120-00-017-2849	

Section IV. REMARKS

Reference code	Remarks
A	Refer to TM 9-2805-257-14 for all maintenance requirements.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

C-1. **Scope.** This appendix lists components of end item and basic issue items for the Centrifugal Pump Assembly to help you inventory items required for safe and efficient operation.

C-2. **General.** The Components of End Item and Basic Issue Items Lists are divided into the following sections.

a. *Section II. Component of End Item.* This listing is for informational purposes only, and is not authority to requisition replacements. The items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between properly accounts. Illustrations are furnished to assist you in identifying the items.

b. *Section III. Basic Issue Items* These are the minimum essential items required to place the pump assembly in operating, to operate it and to perform emergency repairs. Although shipped separately packed, they must accompany the pump assembly during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement Bll based on Table of Organization and Equipment (TOE)/Modified Table of Organization and Equipment (MTOE) authorization of the end item.

C-3. **Explanation of Columns.**

The following provides an explanation of columns found in the tabular listings:

a. *Column (1), Illustration Number (llIUS Number)* This column indicates the number of the illustration in which the item is shown.

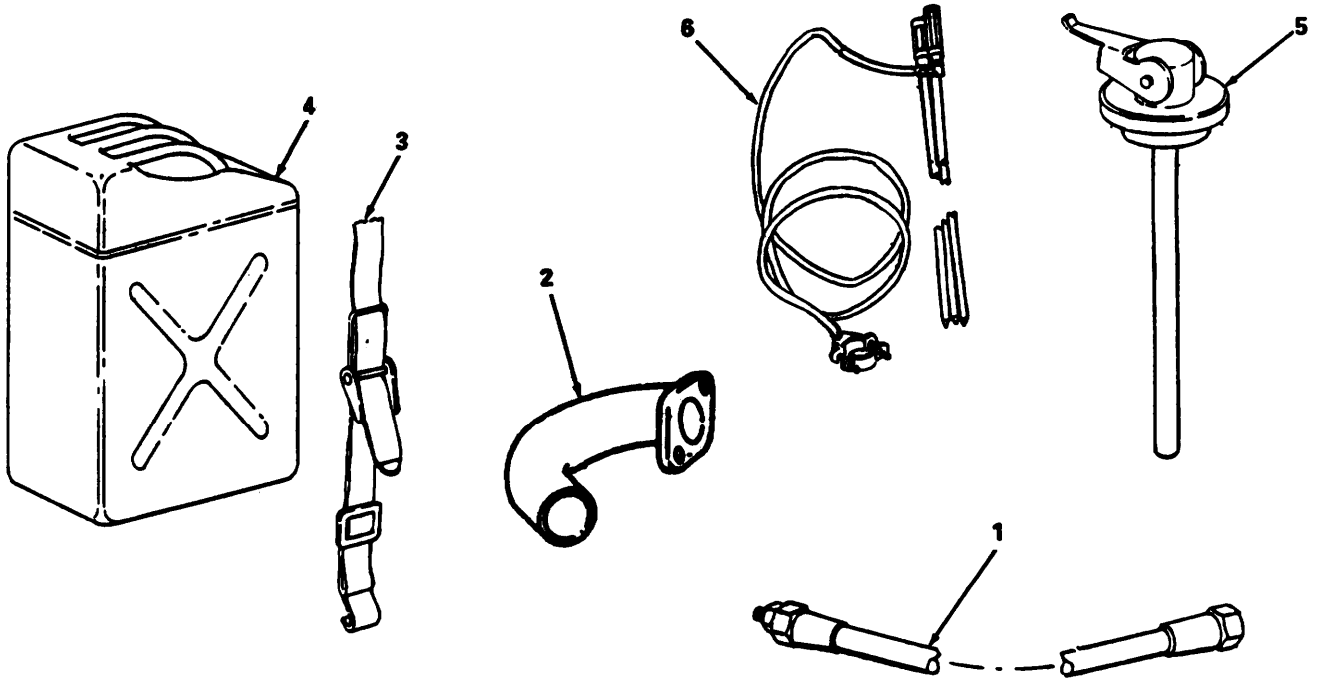
b. *Column (2) National Stock Number.* Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

c. *Column (3), Description.* Indicates the Federal item name, and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGEC (in parentheses) followed by the part number.

d. *Column (4). Unit of Measure (U/M).* Indicates the measure used in performing the actual operational maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr).

e. *Column (5). Quantity Required (QTY RQR).* Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENT OF END ITEMS



(1) Illus Number	(2) National Stock Number	(3) Description CAGEC and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
1	4720-00-298-8927	Hose Assembly, Fuel Line (96906) MS 28741-5-0360		Ea	1
2	4730-00-231-5634	Elbow (96906) MS20822-5B		Ea	1
3	5340-00-914-7308	Strap, Assembly, Fuel Can (97403) 13212E3613		Ea	1
4	7240-00-222-3088	Can, Gasoline (81349) MIL-C-1283		Ea	1
5	2910-00-066-1235	Adapter Assembly, Fuel Drum (97403) 13211E7541		Ea	1
6	6150-00-483-3918	Ground Cable Assembly (97403) 13219E3930		Ea	1

SECTION III. BASIC ISSUE ITEMS

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QTY RQR
		TM 10-4320-256-14&P OPERATOR, UNIT DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL		1	

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. **Scope.** This appendix lists additional items you are authorized for the support of the pump assembly.

D-2. **General.** This list identifies items that do not have to accompany the pump assembly and that do not have to be turned in with it.

D-3. **Explanation of Listing.** National stock number, descriptions and quantities are provided to help you identify and request the addition items you require to support this equipment.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description, CAGEC and Part Number	(3) u/M	(4) Qty Auth
6150-01-197-6335	Cable, Grounding, (58541) 13220E1 127	Ea	1
5975-00-924-9927	Stud, Driving, (73616) GRB58	Ea	1
5975-00-794-2523	Rod, Ground, w/Coupling, (7361 6) GRB58 Knurled	Ea	1
5120-01-013-1676	Hammer, Slide, (97403) 13226E7741	Ea	1
5120-00-895-9569	Wrench, Box, Open End 1/2 in.	Ea	1
5120-00-449-8083	Wrench, Adjustable	Ea	1
4210-00-889-2221	Extinguisher, Fire, Dry Chemical	Ea	1

APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope. This appendix lists expendable supplies and materials you will need to maintain the pump assembly. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. Explanation Of Columns.

a. *Column (1) - Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use dry cleaning solvent, item 5, appendix E)".

b. *Column (2) - Level.* This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. *Column (3) - National Stock Number.* This is the National stock number assigned to the item; use it to request or requisition the item.

d. *Column (4) - Description.* Indicates the Federal item name, and, if required, a description to identify the item. The last line for each item indicates the Contractor and Government Entity Code (CAGEC) in parentheses followed by the part number.

e. *Column (5) - Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN., PR). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPANDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C		OIL, ENGINE, OEA/APH-PD-1	QT
2	C		OIL, ENGINE, OEA/APG-PD-1	QT
3	C	7920-00-205-1711	RAG, WIPING, 50/B (58536) A-A-531	EA
4	C	5320-00-242-1581	RIVET, ALUMINUM, 1/8 IN. DIA X .250 IN. LG	BOX
5	C	6850-00-274-5421	SOLVENT, DRYCLEANING, PD-680. MS20470A4-4	5 GAL

APPENDIX F

TORQUE LIMITS

F-1. General. Table F-1 provides torque limits to be observed when installing attaching hardware.

Table F-1. Torque Limits.

Attaching Parts	Limit
Impeller to shaft	80 inch-pounds
Intermediate backhead to casing	50 inch-pounds

APPENDIX G
REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

G-1. SCOPE.

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of unit, direct support, and general support maintenance of the centrifugal pump assembly. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

G-2. GENERAL.

In addition to this section, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. *Section II. Repair Parts List*. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair parts kits are listed separately in their own functional group within Section Il. Repair parts for repairable special tools are also listed in this section. Items listed are shown on the associated illustration(s)/figure(s).

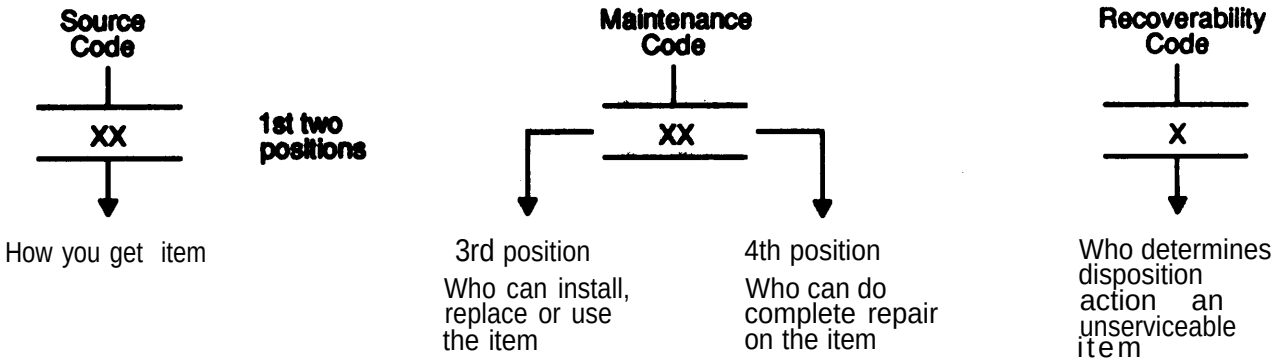
b. *Section III. Special Tools Lists.* A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

c. *Section IV. Cross-references Indexes.* A list, in National Item Identification Number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross referenced to each illustration figure and item number appearance. The figure and item number index lists figure and item number in alphanumeric sequence and cross references NSN, CAGEC and part number.

G-3. Explanation of Columns (Sections II and III).

a. Item No. (Column (1)). Indicates the number used to identify items called out in the illustration.

b. SMR Code (column (2)). The source, Maintenance, and Recoverability (SMR) code is a 5-positbn code containing supply/requistitioning information, maintenance category authorization criteria, and disposition instructions, as shown in the following breakout:



***** Complete Repair: Maintenance capacity, capability, and authority to perform all the corrective maintenance tasks of the “Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) *Source code.* The source code tells you how get an item needed for maintenance, repair, or overhaul of an end item/equipment. Expaniations of source codes follows:

Code	Explanation
PA PB PC** PD PE PF PG	Stocked items; use the applicable NSN/ to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3rd position of the SMR code. ** NOTE: Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category in the 3d position of the SMR code. The complete kit must be requisitioned and applied.

Code	Explanation
MO - (Made at unit/ AVUM Level) MF - (Made at DS/ AVUM Level) MH - (Made at GS Level) ML- (Made at Specialized Repair Activity MD - (Made at Depot)	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the pad number in the DESCRIPTION and USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in the RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, the source code indicates it is made at a higher level, order the item from the higher level of maintenance.

Code	Explanation
AO - (Assembly by unit/AVUM Level) AF - (Assembled by DS/AVIM Level) AH - (Assembled by GS Category) AL- (Assembled by SRA) AD - (Assembled by Depot)	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indited by the source code. If the 3rd position code of the SMR code authorizes you to replace the item, but the source code indicates the item assembled at a higher level, order the item from the higher level of maintenance.

Code	Explanation
XA	Do not requisition an "XA" - coded item. Order its next higher assembly. (Also refer to the NOTE below.)
XB	If an "XB" item is not available from salvage, order it using the CAGEC and part number given.
XC	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD	Item is not stocked. Order an "XD"- coded item through normal supply channels using the CAGEC and part number given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, maybe used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 700-72.

(2) *Maintenance code.* Maintenance codes tell you the level(s) of maintenance USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(a) The maintenace code in the third position it tells you the lowest maintenance level authorized to remove, replace and use an item. The maintenance entered in the third position will indicate authoization to one of the following levels of maintenanace.

Code	Application/Explanation
C	Crew or operator maintenance done within unit or aviation unit maintenance.
O	Unit or aviation unit category can remove, replace, and use the item.
F	Direct support or aviation intermediate level can remove, replace, and use the item.
H	General support level can remove, replace, and use the item.
L	Specialized repair activity can remove, replace, and use the item.
D	Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capabiiity to do complete repair (i.e., perform all authorized function) (NOTE: Some limited repair maybe done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR code.) This position will contain one of the following maintenance codes.

Code	Application/Explanation
O	Unit or aviation unit is the lowest level that can do oomlete repair of the item.
F	Direct support or aviation intermediate is the lowest levei that can do complete repair of the item.
H	General support is the lowest level that can do complete repair of the item.
L	Specialized repair activity (designate the specialized repair activity) is the lowest level that can do oomplete repair of the item.
D	Depot is the lowest level that can do complete repair of the item.
Z	Nonrepairable. No repair is authorized.
B	No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded Item.) However, the item maybe reconditioned by adjusting, lubricating, etc., at the user level.

(3) *Recoverability code.* Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Recoverability codes	Application/Explanation
Z	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3rd position of SMR Code.
O	Reparable item. When uneconomically reparable, condemn and dispose of the item at unit or aviation unit level.
F	Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or aviation intermediate level.
H	Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level.
D	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material). Refer to appropriate manuals/directives for specific instructions.

c. CAGEC (COLUMN(3)). The Contractor and Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

d. Part number (Column) (4). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use a NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. Description and Usable on Code (UOC) (Colunm (5)). This column includes the following information:

(1) The Federal item name and, when required, a minimum description to identify the item.

(2) The physical security classification of the item is indicated by the parenthetical entry. (Insert applicable physical security classification abbrivation, e.g., Phy Sec C1 (C) - Confidential, Phy Sec C1 (S) - Secret, Phy Sec C1 (T)- Top Secret).

(3) Items that are included in kits and sets are listed below the name of the kit or set.

(4) Spares that makeup an assembled are listed immediately following the assembed item line entry.

(5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC).

(7) The usable on code, when applicable (see paraghraph 5, Special Information).

(8) In the Special Tools List section, the basis of issue (BOl) appears as the last line(s) in the entry for each tool, special TMDE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased Proportionately.

(9) The statement "End of Figure" appears just below the last item description in Column 5 for a given figure in Section Il.

f. The Qty (quantity per figure column) indicates the quantity of the item used in the breakout shown on this illustration figure, which is prepared for a functional group, subfunctional group or an assembly. A "V" appearing in the column in lieu of a quantity indicates that the quantity is variable and may vary from application to application.

G-4. Explanation of Columns (Sect. IV).

a. National Stock Number Index.

(1) STOCK NUMBER column (5). This column lists the NSN by National item identification number (NlIN) sequence. The NIIN consists of the last nine digits of the NSN (i.e.

NSN
5305-01-084-1487).
NlIN

When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

(2) *FIG. column.* This column lists the number of the figure where the item is identified/located. The figures are in numerical order in Section II and Section Ill.

(3) *ITEM column.* The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

b. *Part numbers Index.* Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers O through 9 and each following letter or digit in like order.

(1) *CAGEC columm. The* Contractor and Goverment Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(2) *PART NUMBER column.* Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

(3) *STOCK NUMBER column.* This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and CAGEC columns to the left.

(4) *FIG.* column. This column lists the number of the figure where the item is identified/bcated in Section II and Ill.

(5) *ITEM column.* The item number is that number assigned to the item as it appears in the figure referenced in the adjacent frigure number column.

G-5. **Special information.** (Not applicable.)

G-6. **How to Locate Repair Parts.**

a. *National Stock Number or Part Number is Not Known.*

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) *Second.* Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) *Third.* Identify the items on the figure and note the item number.

(4) *Fourth.* Refer to the Repair Parts List for the figure to find the part number.

(5) *Fifth.* Refer to the Part Number Index to find the NSN, if assigned.

b. *When National Stock Number or Part Number is Known.*

(1) *First.* Using the Index of National Stock Numbers and Part Numbers, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see G-4a.(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see G-4.b). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) *Second.* After finding the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

G-7. Abbrevations.

Abbreviations	Explanation
EA	Each
FT	Foot/Feet
IN.	Inch/inches
LG	Long
MTG	Mounting
NF	National Fine (Thread)

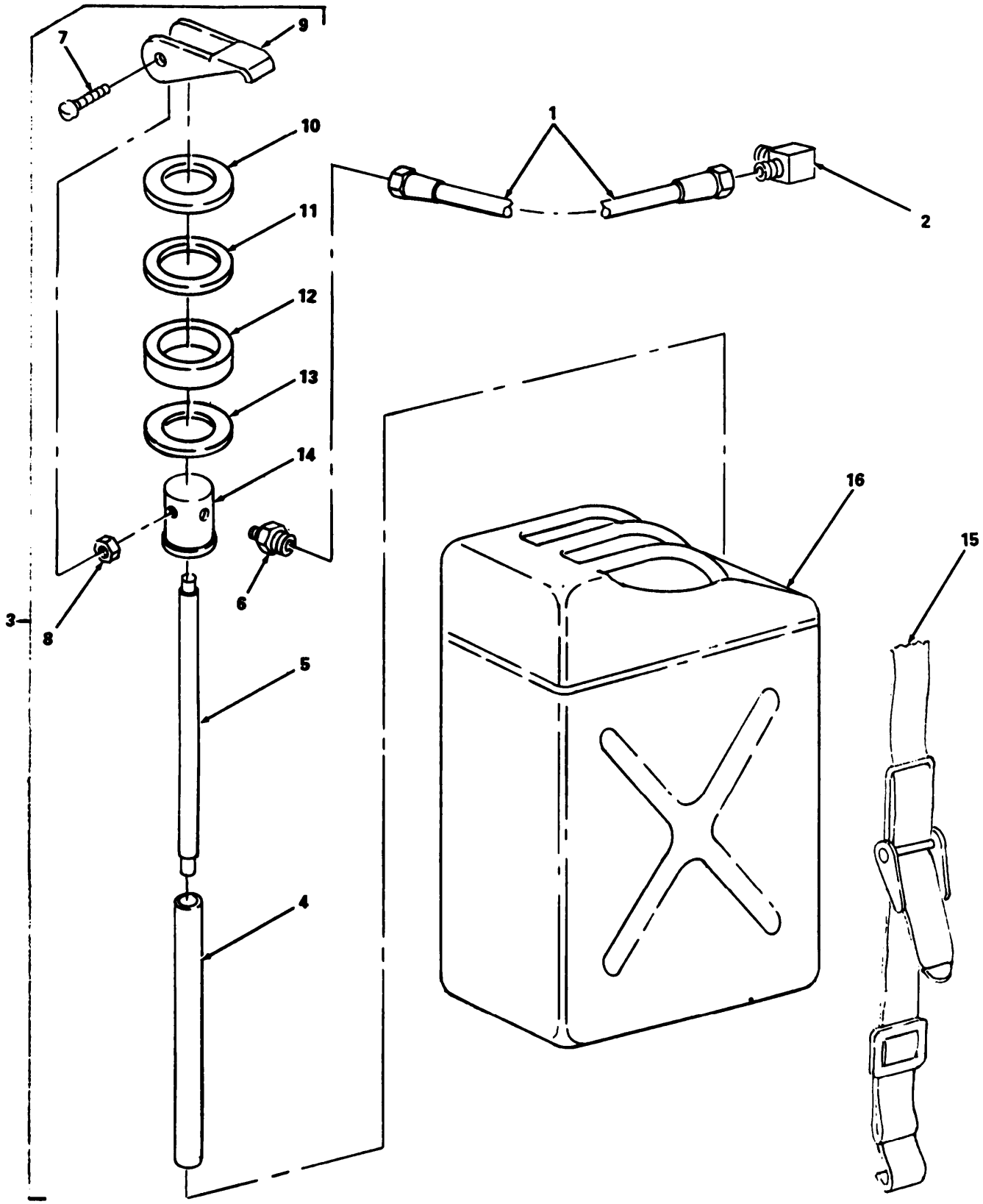


Figure G-1. Fuel System.

(1) ITEM NO	(2) SMR CODE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
			GROUP 01 FUEL SYSTEM	
			FIG. G-1 FUEL SYSTEM	
1	PAOZZ	96906 MS28741-5-0360	HOSE ASSEMBLY FUEL TANK TO ENGINE ON HEAD	1
2	PAOZZ	96906 MS20822-5B	ELBOW, PIPE TO TUBE FUEL LINE TO ENGINE, QUICK DISCONNECT	1
3	PAOOZ	97403 13211E7541	ADAPTER, CONTAINER FUEL DRUM	1
4	PAOZZ	97403 13211E7542	PIPE, METALLIC FUEL CAN	1
5	PBOZZ	97403 13211E7543	PIPE, METALLIC	1
6	PAOZZ	88044 AN816-5-4	ADAPTER, STRAIGHT, PI TO TUBE	1
7	XBOZZ	97403 13211E7545	SCREW, SHOULDER	2
8	PAOZZ	96906 MS35335-60	WASHER,LOCK CLAMP	2
9	PAOZZ	97403 13200E6363	CLAMP,STRAINER RUBBER, SYNTHETIC	1
10	PAOZZ	97403 13200E6361	WASHER,FLAT CLAMP	1
11	PAOZZ	97403 13211E7547	WASHER, FLAT	1
12	XBOZZ	13211 13211E7546	GASKET	1
13	PAOZZ	97403 13211E7544	WASHER, RECESSED CLAMP	1
14	XDOZZ	97403 13211E7548	HEAD, SPRAYER INSECT	1
15	PAOZZ	97403 13212E3613	STRAP, WEBBING TIE DOWN, FUEL CAN	1
16	PAOZZ	97403 13219E2670	CAN,GASLINE,MILITA FIVE GALLON	1
			END OF FIGURE	

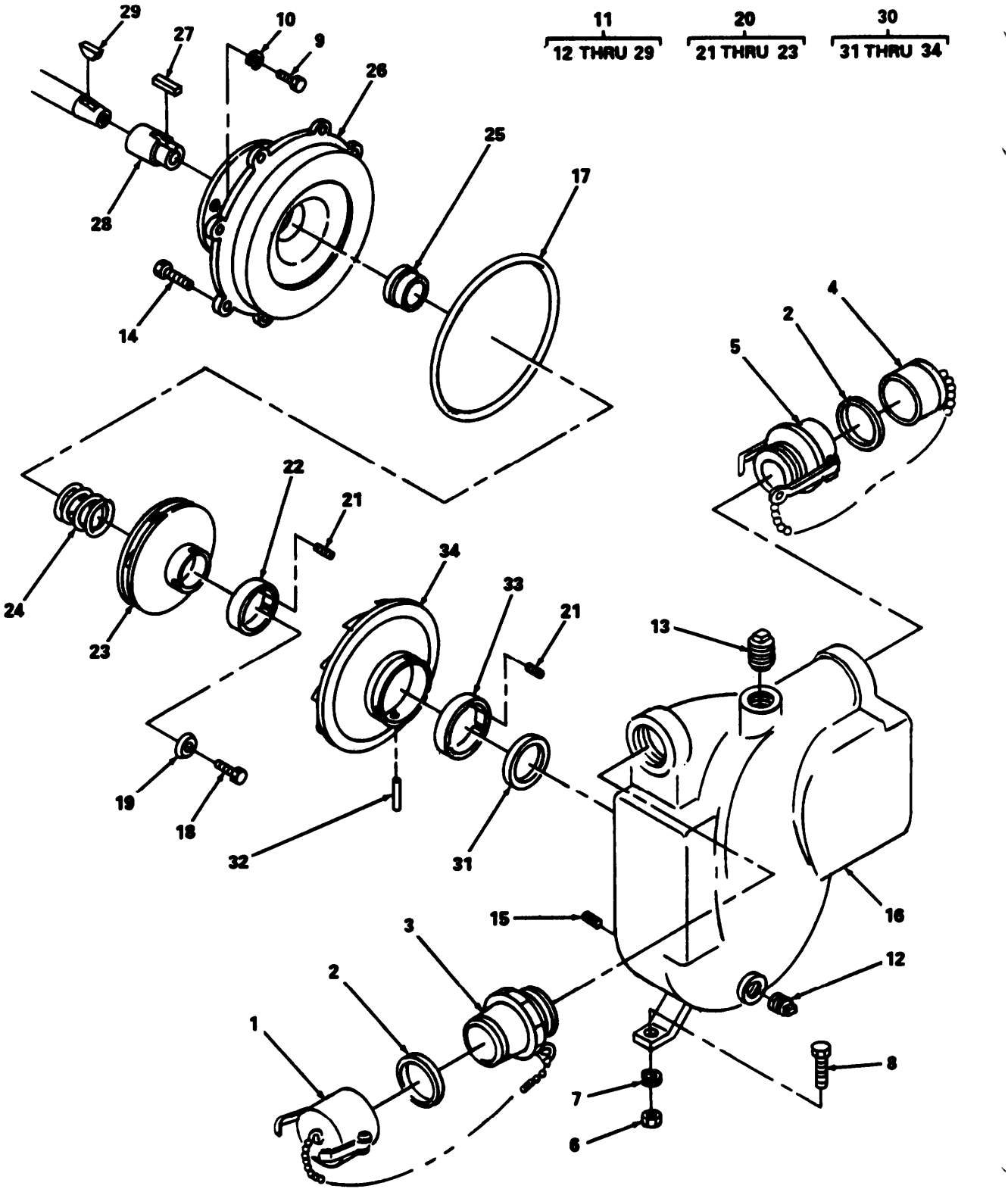


Figure G-2. Pump Assembly

(1) ITEM NO	(2) SMR CODE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
			GROUP 02 PUMP ASSEMBLY	
			FIG. G-2 PUMP ASSEMBLY	
1	PAOZZ	96906 MS27028-11	CAP,PROTECTIVE,DUST CAM-LOCKING	1
2	PAOZZ	96906 MS27030-6	WASHER,FLAT QUICK DISCONNECT, CAM-LOCKING	2
3	PAOZZ	96906 MS27022-11	COUPLING HALF,QUICK CAM-LOCKING ON HEAD	1
4	PAOZZ	96906 MS27029-11	COUPLING HALF, QUICK CAM-LOCKING	1
5	PAOZZ	96906 MS27026-11	COUPLING HALF, QUICK	1
6	PAOZZ	96906 MS51967-8	NUT, PLAIN, HEXAGON HOUSING MOUNTING	2
7	PAOZZ	96906 MS35338-46	WASHER, LOCK	2
8	XDOOZ	96906 MS90725-64	SCREW, CAP, HEXAGON HEAD HOUSING MOUNTING ON HEAD	2
9	PAOZZ	96906 MS90726-33	BOLT, MACHINE INTERMEDIATE TO ENGINE, PIPE TO TUBE	4
10	XDOZZ	96906 MS35338-45	WASHER, LOCK INTERMEDIATE MOUNTING ON HEAD	4
11	XAOZO	97403 13219E3949	PUMP, CENTRIFUGAL 100 GPM	1
12	PAOZZ	96906 MS20913-4	PLUG, PIPE PUMP DRAIN	1
13	PAOZZ	96906 MS20913-8	PLUG, PIPE	2
14	XDOZZ	96906 MS90726-59	SCREW, CAP, HEXAGON HEAD, INTERMEDIATE TO CASTING ON HEAD	8
15	PAOZZ	96906 MS124698	INSERT, SCREW THREAD COIL HOUSING PUMP	8
16	PAOZZ	97403 13219E3948	HOUSING, MECHANICAL	1
17	PAOZZ	96936 MS29513-270	PACKING, PREFORMED HYDROCARBON FUEL RESISTANCE	1
18	PAOZZ	96906 MS90726-34	BOLT, MACHINE IMPELLER MOUNTING ON HEAD	1
19	PAOZZ	97403 13219E3937	WASHER, IMPELLER	1
20	PAOZZ	97403 13219E3941	IMPELLER ASSEMBLY, P	1
21	PBOZZ	96906 MS51021-32	SETSCREW WEAR RING MOUNTING	4
22	PAOZZ	97403 13219E3939	RING, WEARING IMPELLER	1
23	PAOZZ	97403 13219E3940	IMPELLER, PUMP, CENTER	1
24	PAOZZ	97403 13219E3938	SHIM	1
25	PAOOZ	97403 13219E3942	SEAL, SHAFT	1
26	XAOZZ	97403 13219E3944	BACKHEAD INTERMEDIATE	1
27	XBOZZ	96906 MS20066-141	KEY, MACHINE IMPELLER MOUNTING ON HEAD	1
28	PAOZZ	97403 13219E3943	SHAFT, SHOULDERED	1
29	PAOZZ	96906 MS35756-34	KEY, WOODRUFF ENGINE SHAFT MOUNTING ON HEAD	1
30	PAOZZ	97403 13219E3947	DIFFUSER ASSY	1
31	PAOZZ	81349 MILS22473	SEALING, LOCKING AND RETAINING (QUANTITY AS REQUIRED	V
32	PAOZZ	96906 MS9389-55	PIN, STRAIGHT HEADLESS DIFFUSER MOUNTING	1
33	PBOZZ	97403 13219E3945	RING, WEARING	1
34	XAOZZ	97403 13219E3946	DIFFUSER	1
			END OF FIGURE	

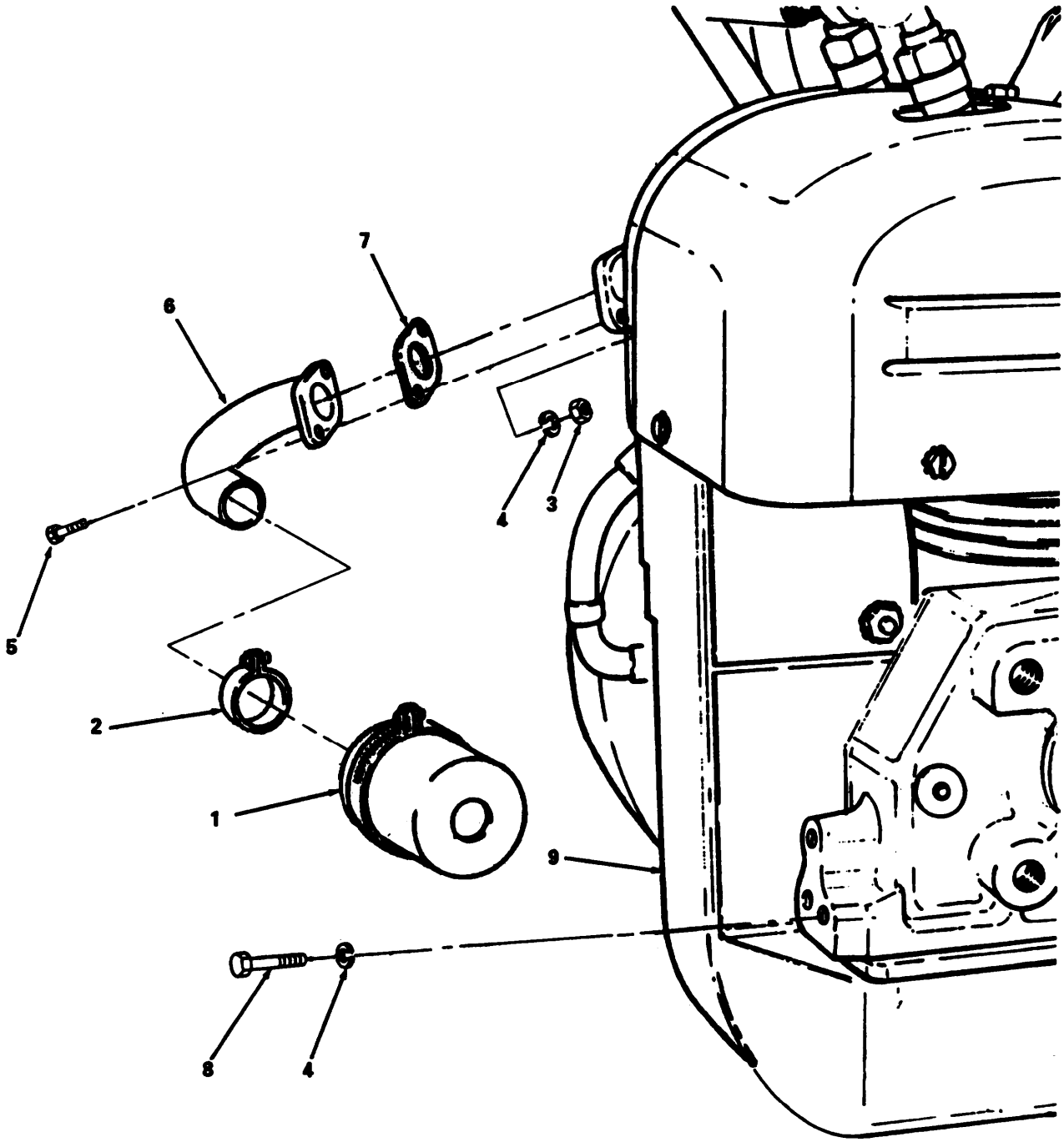


Figure G-3 Engine Assembly

(1) ITEM NO	(2) SMR CODE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
			GROUP 03 ENGINE ASSEMBLY	
			FIG. G-3 ENGINE ASSEMBLY	
1	PAOZZ	97403 13217E9484	ARRESTER, SPARK EXHA	1
2	PAOZZ	96906 MS35842-12	CLAMP,HOSE SPARK ARRESTER EXHAUST	1
3	PAOZZ	96906 MS51967-2	NUT, PLAIN, HEXAGON EXHAUST PIPE MTG ON HEAD	2
4	PAOZZ	96906 MS35338-44	WASHER, LOCK EXHAUST PIPE MTG ON HEAD	14
5	PAOZZ	96906 MS90725-8	SCREW, CAP, HEXAGON HEAD EXHAUST PIPE MOUNTING ON HEAD	2
6	PAOZZ	97403 13219E3933	ELBOW, EXHAUST	1
7	PAOZZ	97403 9786E50-2	GASKET	1
8	PAOZZ	96906 MS90725-5	SCREW, CAP, HEXAGON HEAD, ENGINE TO SUPPORT ON HEAD	12
9	PAFHH	97403 2A016-4	ENGINE, GASOLINE	1
			END OF FIGURE	

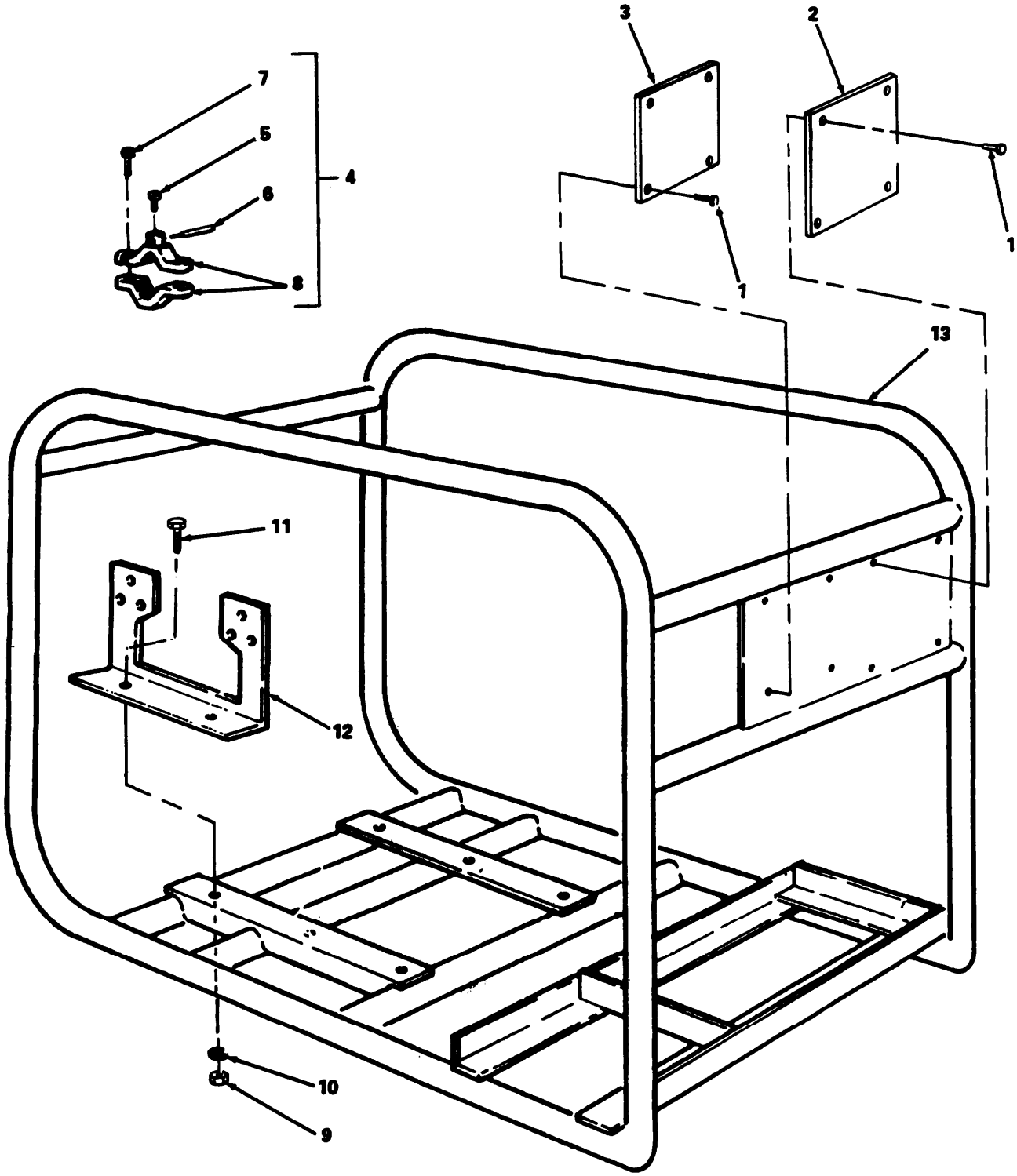


Figure G-4 Figure Assembly

(1) ITEM NO	(2) SMR CODE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
			GROUP 04 FRAME ASSEMBLY	
			FIG. G-4 FRAME ASSEMBLY	
1	PAOZZ	96906 MS20470A6-5	RIVET, SOLID	8
2	XDOZZ	97403 13219E3931	PLATE IDENTIFICATION	1
3	XBOZZ	97403 13219E3926	PLATE, WARNING	1
4	PAOZZ	97403 13219E3930	CABLE ASSEMBLY, POW	1
5	XDOZZ	96906 MS35214-80	SCREW, MACHINE GROUNDING CLAMP ON HEAD	2
6	XDOZZ	81348 FFDSRECJC95TYPEA VACLASS4	WIRE, ELECTRICAL	6
7	PAOZZ	96906 MS35214-75	SCREW, MACHINE GROUNDING CLAMP	4
8	PAOZZ	97403 13219E3929	CLAMP, GROUNDING	2
9	PAOZZ	96906 MS51967-5	NUT, PLAIN, HEAXAGON SUPPORT MOUNTING ON HEAD	4
10	XDOZZ	96906 MS35338-45	WASHER, LOCK INTERMEDIATE MOUNTING	4
11	PAOZZ	96906 MS90725-34	BOLT, MACHINE SUPPORT MOUNTING ON HEAD	4
12	PBOZZ	97403 13219E3936	SUPPORT, ENGINE	1
13	PAOZZ	97403 13219E3932	FRAME, PUMP, ENGINE PUMP AND ENGINE MOUNTING	1
			END OF FIGURE	

(1) ITEM NO	(2) SMR CODE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
			GROUP 05 BULK MATERIALS	
			FIG. BULK	
1 PAOZZ	05972	083-21	SEALING COMPOUND GRADE CV	V
2 MOOOZ	81348	JC95TYPEAVACLASS 4	WIRE, ELECTRICAL MFD FROM CABLE, NSN 6145-00-189-6695	6
			END OF FIGURE	

Section III. SPECIAL TOOLS LIST

(Not Applicable)

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5315-00-043-1787	G-2	29	4320-01-106-5591	G-2	30
5340-00-066-1235	G-1	3	5365-01-127-2264	G-2	24
5305-00-068-0501	G-3	8	4320-01-130-1892	G-2	22
8030-00-081-2331	BULK	1	4320-01-136-4752	G-2	23
4730-00-088-9285	G-2	5	2805-01-169-1100	G-3	9
2990-00-176-9298	G-3	1			
4710-00-185-6948	G-1	5			
4730-00-188-3515	G-2	12			
5310-00-209-1239	G-1	8			
7240-00-222-3088	G-1	16			
5305-00-225-3839	G-3	5			
5306-00-225-8499	G-4	11			
5306-00-225-9088	G-2	9			
5306-00-225-9089	G-2	18			
4730-00-231-5634	G-1	2			
5320-00-242-1581	G-4	1			
4730-00-277-5115	G-1	6			
5305-00-281-3118	G-2	21			
4730-00-287-2182	G-2	13			
5340-00-291-3492	G-2	15			
5310-00-408-2561	G-1	11			
6150-00-483-3918	G-4	4			
4730-00-557-7112	G-3	6			
3040-00-559-1516	G-2	16			
4320-00-559-1517	G-2	20			
4320-00-559-1518	G-2	19			
4320-00-559-1519	G-2	33			
4320-00-559-1520	G-2	28			
2990-00-563-6359	G-4	12			
2990-00-563-6382	G-4	13			
5310-00-566-9502	G-1	13			
5310-00-571-5090	G-1	10			
5310-00-582-5965	G-3	4			
4710-00-597-8731	G-1	4			
5330-00-612-2414	G-2	2			
5310-00-637-9541	G-2	7			
4730-00-649-9100	G-2	1			
5310-00-732-0558	G-2	6			
5310-00-761-6882	G-3	3			
5330-00-797-3506	G-3	7			
5315-00-851-2516	G-2	32			
5310-00-880-7744	G-4	9			
3740-00-902-1481	G-1	9			
4730-00-908-3193	G-3	2			
5340-00-914-7303	G-1	15			
4730-00-915-5127	G-2	4			
4730-00-938-7997	G-2	3			
5305-00-954-9525	G-4	7			
5975-01-016-0880	G-4	8			
5330-01-017-8352	G-2	25			

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
88044	AN816-5-4	4730-00-277-5115	G-1	6
81348	FFDSRECJC95TYPEAVACLASS4		G-4	6
81348	JC95TYPEAVACLASS4		BULK	2
81349	MILS22473		G-2	31
96906	MS124698	5340-00-291-3492	G-2	15
96906	MS20066-141		G-2	27
96906	MS20470A6-5	5320-00-242-1581	G-4	1
96906	MS20822-5B	4730-00-231-5634	G-1	2
96906	MS20913-4	4730-00-188-3515	G-2	12
96906	MS20913-8	4730-00-287-2182	G-2	13
96906	MS27022-11	4730-00-938-7997	G-2	3
96906	MS27026-11	4730-00-088-9285	G-2	5
96906	MS27028-11	4730-00-649-9100	G-2	1
96906	MS27029-11	4730-00-915-5127	G-2	4
96906	MS27030-6	5330-00-612-2414	G-2	2
96906	MS28741-5-0360		G-1	1
96936	MS29513-270		G-2	17
96906	MS35214-75	5305-00-954-9525	G-4	7
96906	MS35214-80		G-4	5
96906	MS35335-60	5310-00-209-1239	G-1	8
96906	MS35338-44	5310-00-582-5965	G-3	4
96906	MS35338-45		G-2	10
			G-4	10
96906	MS35338-46	5310-00-637-9541	G-2	7
96906	MS35756-34	5315-00-043-1787	G-2	29
96906	MS35842-12	4730-00-908-3193	G-3	2
96906	MS51021-32	5305-00-281-3118	G-2	21
96906	MS51967-2	5310-00-761-6882	G-3	3
96906	MS51967-5	5310-00-880-7744	G-4	9
96906	MS51967-8	5310-00-732-0558	G-2	6
96906	MS90725-34	5306-00-225-8499	G-4	11
96906	MS90725-5	5305-00-068-0501	G-3	8
96906	MS90725-64		G-2	8
96906	MS90725-8	5305-00-225-3839	G-3	5
96906	MS90726-33	5306-00-225-9088	G-2	9
96906	MS90726-34	5306-00-225-9089	G-2	18
96906	MS90726-59		G-2	14
96906	MS9389-55	5315-00-851-2516	G-2	32
05972	083-21	8030-00-081-2331	BULK	1
97403	13200E6361	5310-00-571-5090	G-1	10
97403	13200E6363	3740-00-902-1481	G-1	9
97403	13211E7541	5340-00-066-1235	G-1	3
97403	13211E7542	4710-00-597-8731	G-1	4
97403	13211E7543	4710-00-185-6948	G-1	5
97403	13211E7544	5310-00-566-9502	G-1	13
97403	13211E7545		G-1	7
13211	13211E7546		G-1	12
97403	13211E7547	5310-00-408-2561	G-1	11
97403	13211E7548		G-1	14

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
97403	13212E3613	5340-00-914-7303	G-1	15
97403	13217E9484	2990-00-176-9298	G-3	1
97403	13219E2670	7240-00-222-3088	G-1	16
97403	13219E3926		G-4	3
97403	13219E3929	5975-01-016-0880	G-4	8
97403	13219E3930	6150-00-483-3918	G-4	4
97403	13219E3931		G-4	2
97403	13219E3932	2990-00-563-6382	G-4	13
97403	13219E3933	4730-00-557-7112	G-3	6
97403	13219E3936	2990-00-563-6359	G-4	12
97403	13219E3937	4320-00-559-1518	G-2	19
97403	13219E3938	5365-01-127-2264	G-2	24
97403	13219E3939	4320-01-130-1892	G-2	22
97403	13219E3940	4320-01-136-4752	G-2	23
97403	13219E3941	4320-00-559-1517	G-2	20
97403	13219E3942	5330-01-017-8352	G-2	25
97403	13219E3943	4320-00-559-1520	G-2	28
97403	13219E3944		G-2	26
97403	13219E3945	4320-00-559-1519	G-2	33
97403	13219E3946		G-2	34
97403	13219E3947	4320-01-106-5591	G-2	30
97403	13219E3948	3040-00-559-1516	G-2	16
97403	13219E3949		G-2	11
97403	2A016-4	2805-01-169-1100	G-3	9
97403	9786E50-2	5330-00-797-3506	G-3	7

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
BULK	1	8030-00-081-2331	05972	083-21
BULK	2		81348	JC95TYPEAVACLASS 4
G-1	1		96906	MS28741-5-0360
G-1	2	4730-00-231-5634	96906	MS20822-5B
G-1	3	5340-00-066-1235	97403	13211E7541
G-1	4	4710-00-597-8731	97403	13211E7542
G-1	5	4710-00-185-6948	97403	13211E7543
G-1	6	4730-00-277-5115	88044	AN816-5-4
G-1	7		97403	13211E7545
G-1	8	5310-00-209-1239	96906	MS35335-60
G-1	9	3740-00-902-1481	97403	13200E6363
G-1	10	5310-00-571-5090	97403	13200E6361
G-1	11	5310-00-408-2561	97403	13211E7547
G-1	12		13211	13211E7546
G-1	13	5310-00-566-9502	97403	13211E7544
G-1	14		97403	13211E7548
G-1	15	5340-00-914-7303	97403	13212E3613
G-1	16	7240-00-222-3088	97403	13219E2670
G-2	1	4730-00-649-9100	96906	MS27028-11
G-2	2	5330-00-612-2414	96906	MS27030-6
G-2	3	4730-00-938-7997	96906	MS27022-11
G-2	4	4730-00-915-5127	96906	MS27029-11
G-2	5	4730-00-088-9285	96906	MS27026-11
G-2	6	5310-00-732-0558	96906	MS51967-8
G-2	7	5310-00-637-9541	96906	MS35338-46
G-2	8		96906	MS90725-64
G-2	9	5306-00-225-9088	96906	MS90726-33
G-2	10		96906	MS35338-45
G-2	11		97403	13219E3949
G-2	12	4730-00-188-3515	96906	MS20913-4
G-2	13	4730-00-287-2182	96906	MS20913-8
G-2	14		96906	MS90726-59
G-2	15	5340-00-291-3492	96906	MS124698
G-2	16	3040-00-559-1516	97403	13219E3948
G-2	17		96936	MS29513-270
G-2	18	5306-00-225-9089	96906	MS90726-34
G-2	19	4320-00-559-1518	97403	13219E3937
G-2	20	4320-00-559-1517	97403	13219E3941
G-2	21	5305-00-281-3118	96906	MS51021-32
G-2	22	4320-01-130-1892	97403	13219E3939
G-2	23	4320-01-136-4752	97403	13219E3940
G-2	24	5365-01-127-2264	97403	13219E3938
G-2	25	5330-01-017-8352	97403	13219E3942
G-2	26		97403	13219E3944
G-2	27		96906	MS20066-141
G-2	28	4320-00-559-1520	97403	13219E3943
G-2	29	5315-00-043-1787	96906	MS35756-34
G-2	30	4320-01-106-5591	97403	13219E3947
G-2	31		81349	MILS22473
G-2	32	5315-00-851-2516	96906	MS9389-55

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
G-2	33	4320-00-559-1519	97403	13219E3945
G-2	34		97403	13219E3946
G-3	1	2990-00-176-9298	97403	13217E9484
G-3	2	4730-00-908-3193	96906	MS35842-12
G-3	3	5310-00-761-6882	96906	MS51967-2
G-3	4	5310-00-582-5965	96906	MS35338-44
G-3	5	5305-00-225-3839	96906	MS90725-8
G-3	6	4730-00-557-7112	97403	13219E3933
G-3	7	5330-00-797-3506	97403	9786E50-2
G-3	8	5305-00-068-0501	96906	MS90725-5
G-3	9	2805-01-169-1100	97403	2A016-4
G-4	1	5320-00-242-1581	96906	MS20470A6-5
G-4	2		97403	13219E3931
G-4	3		97403	13219E3926
G-4	4	6150-00-483-3918	97403	13219E3930
G-4	5		96906	MS35214-80
G-4	6		81348	FFDSRECJC95TYPEA VACLASS4
G-4	7	5305-00-954-9525	96906	MS35214-75
G-4	8	5975-01-016-0880	97403	13219E3929
G-4	9	5310-00-880-7744	96906	MS51967-5
G-4	10		96906	MS35338-45
G-4	11	5306-00-225-8499	96906	MS90725-34
G-4	12	2990-00-563-6359	97403	13219E3936
G-4	13	2990-00-563-6382	97403	13219E3932

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Chief of Staff

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PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARDWOOD, MO. 63108

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 10-4320-256-14&P	12 JUNE 1991	PUMP ASSEMBLY, FLAMMABLE LIQUID

BE EXACT. PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
6	2-1 a		
81		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 Cylenders. The engine on my set only has 4 Cylenders. Change the manual to show 4 Cylenders.

Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please Correct one or the Other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is Wrong. Please give me a good NSN

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
JOHN DOE, PFC (268) 317-7111

SIGN HERE John Doe
JOHN DOE

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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 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 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 milliliters = .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