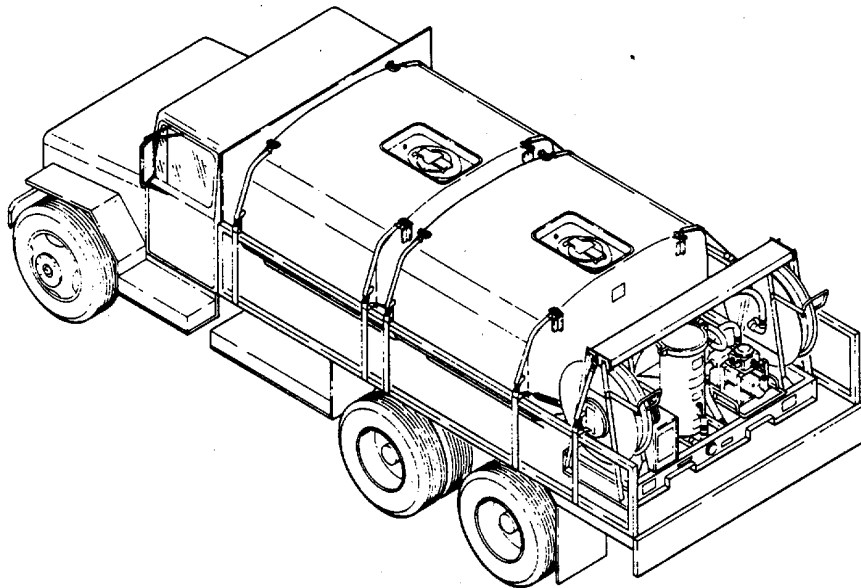


TECHNICAL MANUAL

OPERATOR'S, UNIT, AND
DIRECT SUPPORT MAINTENANCE MANUAL
AND REPAIR PARTS AND SPECIAL TOOLS LIST

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



TANK AND PUMP UNIT,
LIQUID DISPENSING;
FOR TRUCK MOUNTING
MIL DESIGN TANK AND PUMP UNIT

ELECTRIC MOTOR DRIVEN
MODEL (97403) 13226E2150
NSN 4930-01-274-0212

OPERATING
INSTRUCTIONS
PAGE 2-1 -

OPERATOR PREVENTIVE
MAINTENANCE CHECKS
AND SERVICES
PAGE 2-5

OPERATOR MAINTENANCE
INSTRUCTIONS
PAGE 3-1

UNIT MAINTENANCE
INSTRUCTIONS
PAGE 4-1

UNIT TROUBLESHOOTING
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PAGE 5-1

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PAGE 5-1

ALPHABETICAL INDEX
PAGE INDEX-1

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HEADQUARTERS, DEPARTMENT OF THE ARMY
30 AUGUST 1991

CHANGE

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 February 1994

NO. 3

Operator's, Unit, and Direct Support
Maintenance Manual and
Repair Parts and Special Tools List

TANK AND PUMP UNIT, LIQUID DISPENSING,
FOR TRUCK MOUNTING
MIL DESIGN TANK AND PUMP UNIT
ELECTRIC MOTOR DRIVEN
MODEL (97403) 13226E2150
NSN 4930-1-2700021

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NO. 2

OPERATOR'S, UNIT, AND DIRECT SUPPORT
MAINTENANCE MANUAL AND
REPAIR PARTS AND SPECIAL TOOLS LIST

TANK AND PUMP UNIT, LIQUID DISPENSING,
FOR TRUCK MOUNTING
MIL DESIGN TANK AND PUMP UNIT
ELECTRIC MOTOR DRIVEN
MODEL (97403) 13226E2150
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NO. 1

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OPERATOR'S, UNIT, AND DIRECT SUPPORT
MAINTENANCE MANUAL AND
REPAIR PARTS AND SPECIAL TOOLS LIST

TANK AND PUMP UNIT, LIQUID DISPENSING,
FOR TRUCK MOUNTING
MIL DESIGN TANK AND PUMP UNIT
ELECTRIC MOTOR DRIVEN
MODEL (97403) 13226E2150
NSN 4930-01-274-0021

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F-1 through F-7/(F-8 blank)

Insert pages

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F-1 through F-76

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WARNINGS

Give particular attention to specific WARNINGS and CAUTIONS throughout this manual. DEATH or serious injury may result if personnel fail to observe safety precautions.

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

Do not smoke or use open flame within 50 feet (15.34 meters) of tank and pump unit.

Make sure fire extinguishers and fire fighting equipment are available in the immediate area. Be extremely careful when using fire extinguisher in an enclosed area. Provide adequate ventilation.

Do not drain fuel from the unit on the ground. Drain fuel into a container that can be closed, otherwise a fire hazard or environmental contamination could result.

Use protective equipment to prevent skin and eye contact with fuel.

Use rubber fuel resistant gloves when replacing filter elements due to toxic effects of some fuel additives.

Dispose of filter elements in accordance with local policy.

A static discharge could ignite the fuel or cause an explosion of the fuel vapor. Do not operate the tank and pump unit until it has been connected to suitable ground.

To prevent serious injury or death to personnel or, equipment damage, use a lifting device with a lifting capacity of at least three tons to handle tanks or pump unit. Do not allow units to swing back and forth while hanging in the air.

For artificial respiration, refer to FM 21-11.

DEATH or SERIOUS INJURY may result if personnel fail to follow Safety Precautions for welding. Prior to welding, read welding instructions contained in Chapter 5, on repair of the Tank Assembly.

Applying heat or flame to a fuel tank containing residue may result in a violent explosion, causing injury or death to personnel. If conditions require fuel tank repairs by welding or other methods involving heat or flame, be sure that all fumes are purged from the tank or fill tank with water before commencing the repair. If possible, tank should be filled with water prior to welding after being thoroughly purged of fumes.

Personnel engaged in purging operations will not wear static electricity generating clothing. No metal buttons or fittings will be worn. All contents will be removed from pockets.

The tank being purged must have a static ground during all operations. Precautions should be taken with all tools and metal objects around the tank to ensure no spark will be made. Conduct a combustible vapor test reading after purging the tank using an acceptable explosive meter.

WARNINGS

Only personnel thoroughly instructed in the proper handling and reading of the combustion vapor tester will conduct vapor tests. Conduct a combustible vapor test reading immediately after purging. Under no circumstances will repair of the tank begin until declared safe by safety personnel. Discontinue all operations if an electrical storm is threatening or in progress. Eliminate conditions that could cause explosions.

Skin may stick to metal in cold conditions. Do not touch metal parts with bare skin during cold weather.

Low voltage can cause Severe Shock or Death. Disconnect power cable from vehicle NATO slave receptacle before replacing or repairing motor or electrical components. When connecting power cable be sure Remote ON-OFF switch is in "OFF" position.

Serious burns and electrical shock can result from contact with exposed electrical wires or connectors. Turn off all power switches before making electrical connections or disconnections.

CAUTION

Place switch in "OFF" position before connecting "Remote ON-OFF" switch cable.

b

OPERATOR'S, UNIT, AND
 DIRECT SUPPORT MAINTENANCE MANUAL
 AND REPAIR PARTS AND SPECIAL TOOLS LIST

**TANK AND PUMP UNIT,
 LIQUID DISPENSING;
 FOR TRUCK MOUNTING
 MIL DESIGN TANK AND PUMP UNIT
 ELECTRIC MOTOR DRIVEN
 MODEL (97403) 13226E2150
 NSN 4930-01-274-0021**

Current as of 14 August 1991.

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the 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 direct to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MMTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-t798. A reply will be furnished directly to you.

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HOW TO USE THIS MANUAL

Spend a few minutes looking through this manual. It has a new look that is very different from the manuals you've been using. You'll find the new look is a lot easier to use, and you can find what you're looking for a lot faster.

Each chapter begins with an index that lists each paragraph or section in the chapter. Each section in the maintenance chapter also has an index that lists the procedures in the section and gives page numbers. Or you can look for the information you want in the alphabetical subject index at the back of this manual.

We got rid of as many words as we could and put in lots of illustrations to show just about everything you'll be doing to maintain your equipment.

The text is keyed to the illustration with callous numbers (sometimes words). The callous numbers are in parentheses in the text.

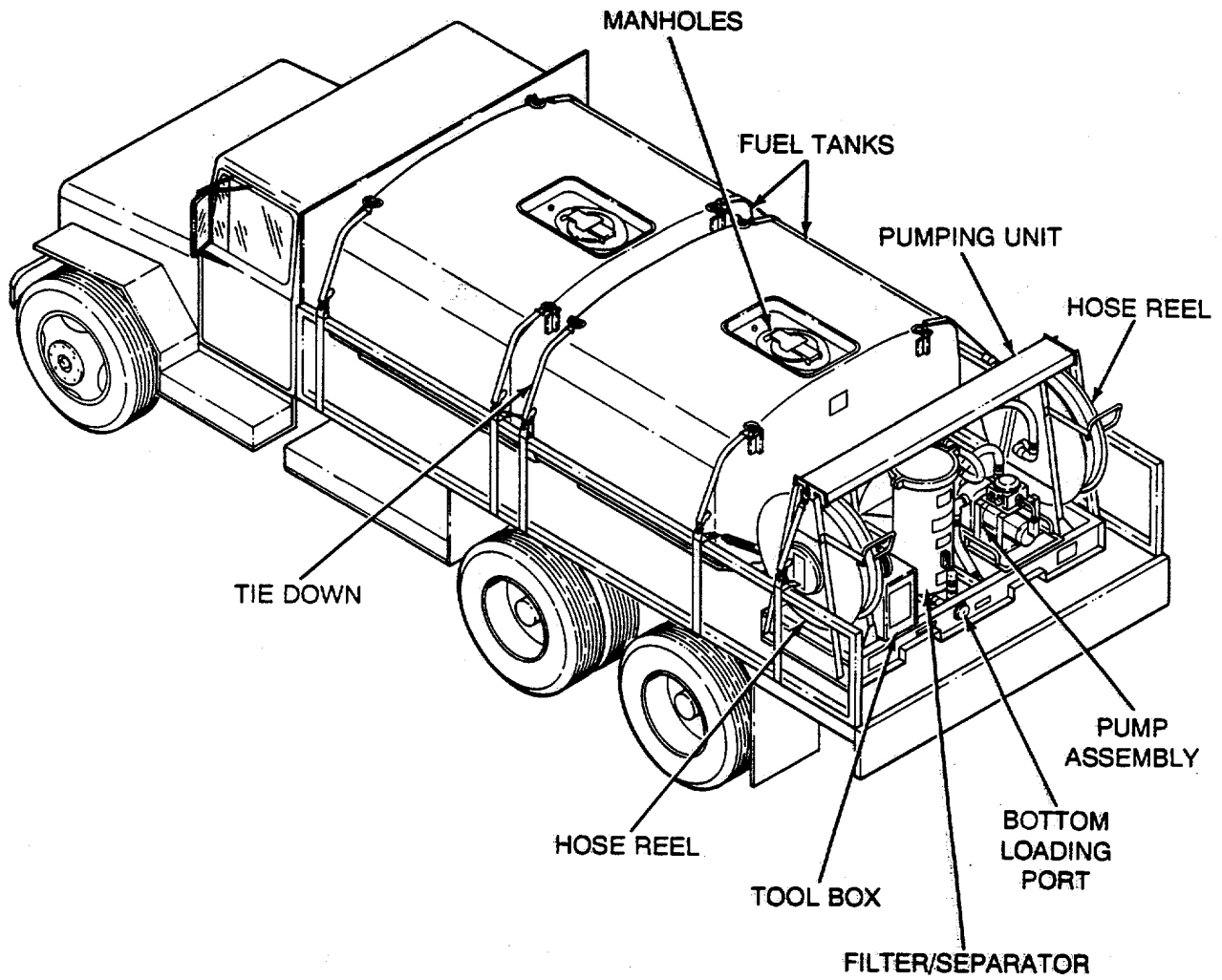
So, HOW DO YOU USE THIS MANUAL?

Like This:

1. Suppose the electric motor won't operate and you want to troubleshoot the unit.
2. Look at the cover and you'll see index boxes near the right-hand edge with subject titles in them. You'll find "UNIT TROUBLESHOOTING 4-9". You can skip over to page 4-9.

OR

3. Bend the pages a bit and look at the edges. You'll see black bars on some of the pages that are lined up with the index boxes on the cover.
4. If you put your thumbnail on the black bar that is lined up with the box on the cover for UNIT TROUBLESHOOTING and open the manual, you'll be on page 4-9.
5. On page 4-9, you'll find Section IV, TROUBLESHOOTING.
6. Turn to page 4-10 and find the symptom "ELECTRIC MOTOR WON'T OPERATE".
7. As you do the tests and corrective actions in the order listed, you will get to replace power cable. Refer to paragraph 4-15.
8. Turn to paragraph 4-15 and look at the procedure. The "INITIAL SETUP" section tells you what tools, materials, and parts are needed to do this task. It also tells you anything you must do before starting this task and it gives general warnings about hazards that can exist while you do this task.
9. The procedure itself has a picture to show you where to look and what to look at, plus the steps you will do to perform the task.
10. Notice the numbered arrows. These are the callous numbers. As you read each step, we tell you where to look by including the callous number (in parentheses) after the name of each thing we call out.
11. Do the procedure, then check to see if you have corrected the fault symptom.



CHAPTER 1
INTRODUCTION

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SECTION I. GENERAL INFORMATION

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1-1. Scope.

a. Type of Manual This manual provides Operator's, Unit, Direct Support Maintenance Manual, and Repair Parts and Special Tools List for the Tank and Pump Unit, Liquid Dispensing: for Truck Mounting, MIL Design Tank and Pump Unit, Electric Motor Driven Model 13226E2150.

b. Purpose of Equipment The purpose of the tank and pump unit is to provide mobile refueling unit for dispensing fuel to military vehicles.

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

1-3. Hand Receipt (-HR) Manual. This manual has a companion document with a TM number followed by -HR (which stands for Hand Receipt) The TM10-g3-236---HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (i.e. COEI, BIL, and ML) you must account for As an aid to property accountability, additional -HR manuals may be requisitioned from the following source in accordance with procedures in AR25-30.

1-4. Reporting Equipment Improvement Recommendations (EIR). If your tank and pump unit 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, Quality Deficiency Report Mail it to us at Commander, US Army Troop Support Command, ATTIC AMSTR-MOF, 4300 Goodfellow Blvd., St. Louis, Missouri 63120-1798. We will send you a reply.

1-5. Destruction of Army Material to Prevent Enemy Use. Demolition of material to prevent enemy use will be in accordance with the requirements of TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

1-6. Preparation for Storage or Shipment. Refer to Chapter 4, Section VI to place equipment into storage and for procedures to place equipment into administrative storage.

1-7. Warranty Information. The Tank and Pump Unit is not covered by warranty.

SECTION II. EQUIPMENT DESCRIPTION AND DATA

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1-8. Equipment Characteristics, Capabilities and Features.

a. Characteristics. The tank and pump unit consists of one electric motor driven 50 gpm (189 liters per minute) pumping assembly, two 500-gallon (1892.5 liter) tanks and related items. It is designed for use with M-34, M-3S, M-36, M-41, M-54, M-55, M-135, M-211, M-923, M-924, M-925 and M-926 vehicles.

b. Capabilities and Features.

- (1) Self priming pump.
- (2) All weather operational.
- (3) Used to convert cargo truck to bulk fuel carrier/dispenser.
- (4) Automatic fuel shutoff during bottom loading refilling.

1-9. Location and Description of Major Components. The following paragraphs contain a functional description of the major components of the tank and pump unit. The location and appearance of the major components are illustrated. The numbers following the nomenclature of the major component correspond to the index numbers in the illustration.

a. **A-FRAME (1).** Provides a housing and supports for the assembled components of the pumping unit. The base of the frame is designed to facilitate loading, transporting, and unloading the pumping unit with a forklift.

b. **INTERVEHICLE POWER CABLE (2).** Provides electrical connection between the NATO slave receptacle on the vehicle and the electric motor for driving the pump.

c. **VEHICLE NATO SLAVE RECEPTACLE (3).** This receptacle is mounted on the back of the truck cab. It provides a means for connecting the truck electrical system to the pumping unit.

d. **NATO ADAPTER (4).** Used to make a compatible connection between the intervehicle power cable and the vehicle NATO slave receptacle.

e. **HOSE REEL (5).** There are two hose reels on the pumping unit. The hose reels are used to retain the hoses in a stowed position, when the pumping unit is not in operation.

f. DISPENSING NOZZLE (6). There are two dispensing nozzles Fuel can be dispensed from either, or both nozzles, as desired.

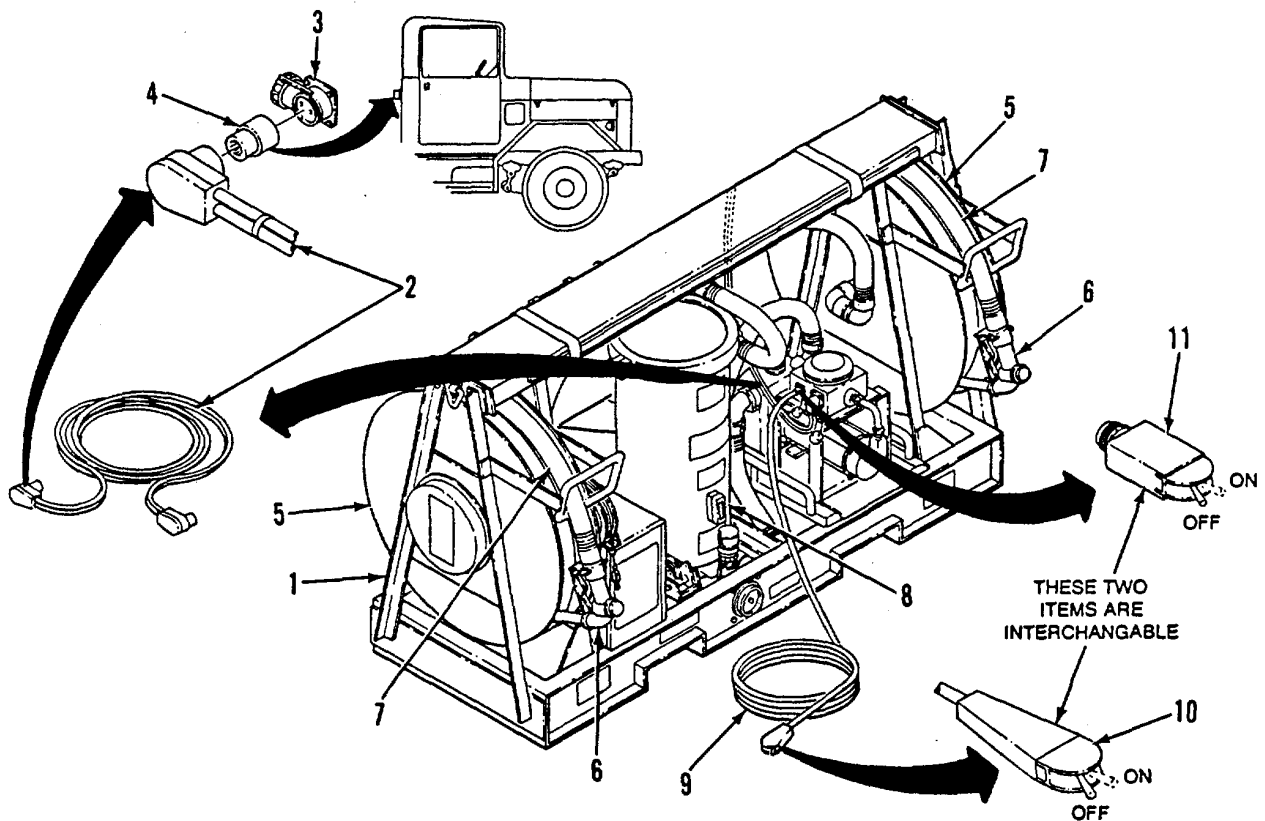
g. HOSE REEL HOSES (7). There are two hoses. Each hose supplies fuel from the hose reel to the dispensing nozzle.

h. FILTER/SEPARATOR (8). The filter/separator removes contaminants from the fuel as the fuel flows from the pump to the dispensing nozzles. Any solid impurities and water in the fuel being pumped is trapped in the filter elements. The elements hold the solid particles and the water collects and settles to the bottom where it can be removed periodically through the draincock. The main components are as follows:

- (1) Four Cannisters
- (2) Four Filter Elements
- (3) One Differential Pressure Gauge
- (4) One Water Level Sight Gauge
- (5) One Draincock

i. ON-OFF CABLE ASSEMBLY (9). When connected to the junction box, controls operation of the electric motor which drives the pump. (May be exchanged for Item (i1).) When the control cable is connected to the junction box, moving the ON-OFF switch (10) to the ON position starts the electric motor and pump assembly. Moving the switch to the OFF position stops the electric motor.

j. TOGGLE SWITCH ASSEMBLY (11). Auxiliary control switch mounts directly to junction box. Operates the same as ON-OFF SWITCH (10). (May be used instead of Item (9).)



l. TANK CONTROL LEVERS (12). Each lever manually operates the bottom loading valve of one tank. Pull levers up to open bottom loading valves, push levers down to close bottom loading valves.

m. QUICK DRY DISCONNECT ADAPTER (13). Provides an alternative attachment point for fuel hoses when bottom loading coupling cannot be used.

n. BOTTOM LOADING PORT (14). Provides a connection point for fueling hoses to allow tanks to be filled through button loading valves.

o. ELECTRIC MOTOR (16). Drives the pump.

p. PUMP (17). Pumps fuel when the electric motor is operated. The pump is a self-priming pump, and driven directly from the electric motor armature shaft. The pump/motor assembly is mounted in the sub-frame (15).

q. JUNCTION BOX (18). Provides a protective enclosure for electrical connections between the receptacle J1, the electric motor and receptacle J2.

r. J1 RECEPTACLE (19). Electrical receptacle for connecting the ON-OFF cable assembly or toggle switch assembly.

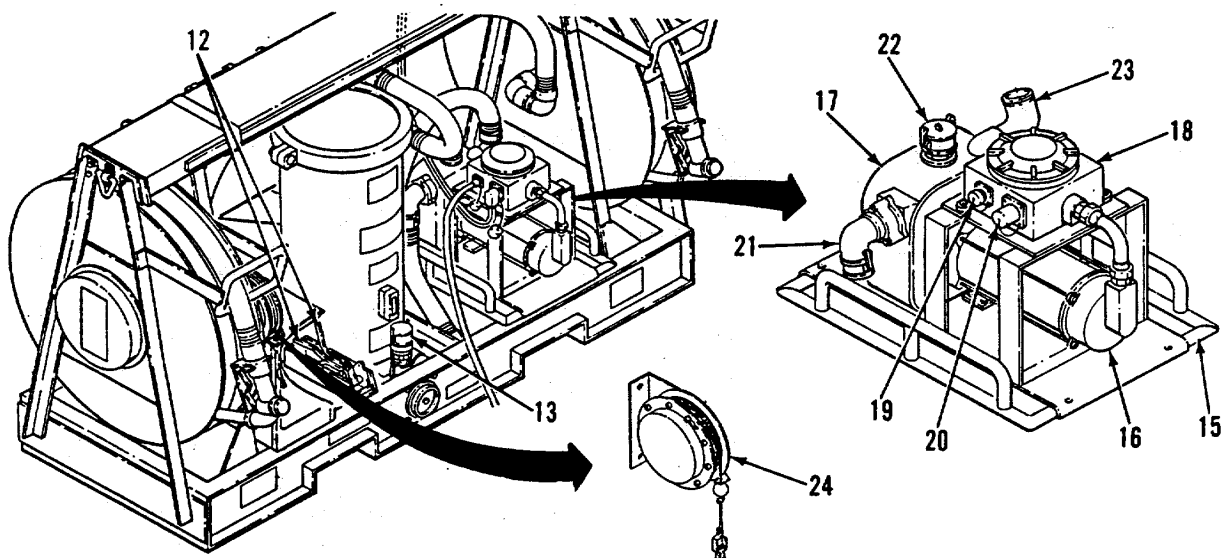
s. J2 RECEPTACLE (20). Electrical receptacle for connecting the intervehicle power cable.

t. INLET ELBOW (21). Elbow with quick-disconnect fitting for connecting the hose from the bottom loading manifold to the inlet side of the pump.

u. PRIMING PORT (22). Provides a means for priming the pump, if for some reason the self-priming pump fails to prime itself.

v. OUTLET ELBOW (23). Elbow is designed to accept a quick-disconnect fitting on the hose from the outlet side of the pump.

w. STATIC DISCHARGE REEL (24). The static ground cable on the static discharge reel is used to ground the pumping unit when the system is in operation. The reel is spring loaded and will rewind the cable automatically.

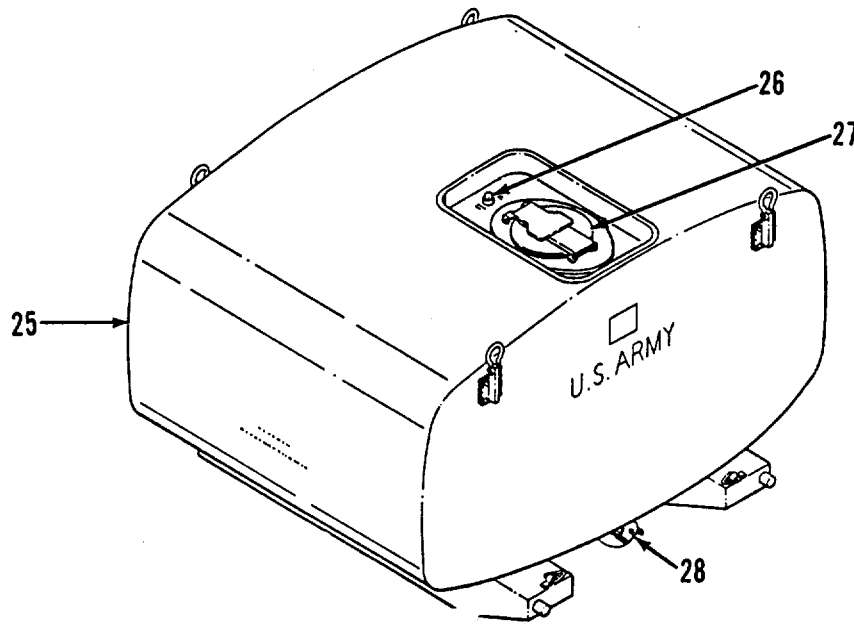


x. FUEL TANK (25). There are two 500 gallon fuel tanks. The tanks are mounted on skids to facilitate loading and unloading from the transport vehicle.

y. ACCESS PORT (26). The plug can be removed from the access port to dipstick the fuel tank. The access port can also be used to pump fuel from the fuel tank with a hand pump.

z. MANHOLE (27). The manhole is equipped with a fill cover that can be opened if the fuel tank is to be filled through the manhole. The entire manhole can be removed for access to the interior of the tank.

aa. BOTTOM LOADING VALVE (28). Each fuel tank is equipped with a bottom loading valve. As the tanks are being filled through the bottom loading port, the valves will open automatically when fuel pressure is applied. Each valve will be closed automatically by the jet level sensor when the tank is full.



1 -10. Equipment Data.

a. Pumping Assembly.

Model/PN	13226E2148
Length	72 in. (182.88 cm)
Width	27 in. (67.88 cm)
Height	44 in. (111.76 cm)
Weight	870 lbs. (395 kg)
Rating	50 gpm (189 liters per minute)

b. Tanks.

Model/PN	13226E2146
Capacity	500 gal. (1892.5 liters)
Length	56 in. (142.24 cm)
Width	72 in. (182.88 cm)
Height	39 in. (99.06 cm)
Weight	500 lbs. (227 kg) (empty)

c. Electric Motor

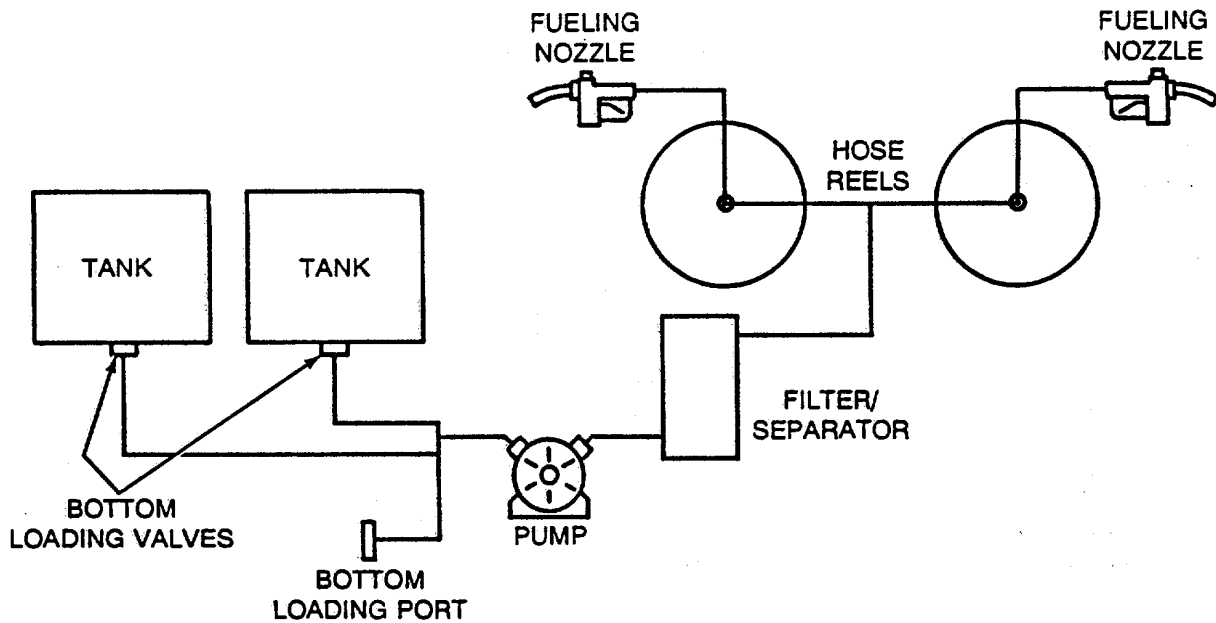
Model/PN	13217E7131 to
Length	16.58 in. (42.11 cm)
Width	5.59 in. (14.46 cm)
Height	6.34 in. (16.10 cm)
Weight	86.5 lb. (39.32 kg)
Input	24 Vdc
Rated current (at 1.5 hp load)	55A
Rated Speed (with motor at 35°C)	3600 rpm
Operating speed	3100 rpm

1-11. Safety, Care and Handling. Observe all WARNINGS, CAUTIONS and NOTES in this manual. This equipment can be extremely dangerous if these instructions are not followed.

SECTION III. TECHNICAL PRINCIPLES OF OPERATION

1-12 Principles of Operation. Once the bottom loading valves are opened, the pump draws fuel from the tanks and sends it to the filter/separator. The filter separator removes contaminants and water then fuel flows to hose reels and fueling nozzles to be dispensed into vehicles needing refueling.

Auxiliary fuel supply hose is connected to the bottom loading port to refuel tanks. A jet level sensor in the top of each tank senses when tanks are full and automatically shuts bottom loading valve to stop fuel flow into tank.



CHAPTER 2
OPERATING INSTRUCTIONS

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OVERVIEW

This chapter covers operator controls and indicators, operator PMCS, and the operation of the filter/separator under usual and unusual conditions.

SECTION I. OPERATOR'S CONTROLS AND INDICATORS

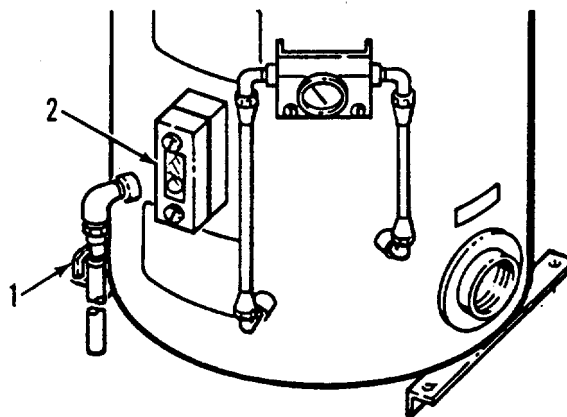
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2-1. General. The tank and pump unit is equipped with controls to start and stop the flow of fuel as well as indicators to show the condition of the filter/separator elements.

2-2. Operator's Controls and Indicators. The controls and indicators for operation of the tank and pump unit are illustrated and described in Table 2-1.

Table 2-1. Controls and Indicators

KEY	CONTROL OR INDICATOR	FUNCTION
1	Draincock	Drains water from the filter/separator.
2	Sight Gauge	Indicates water level inside the filter/separator.



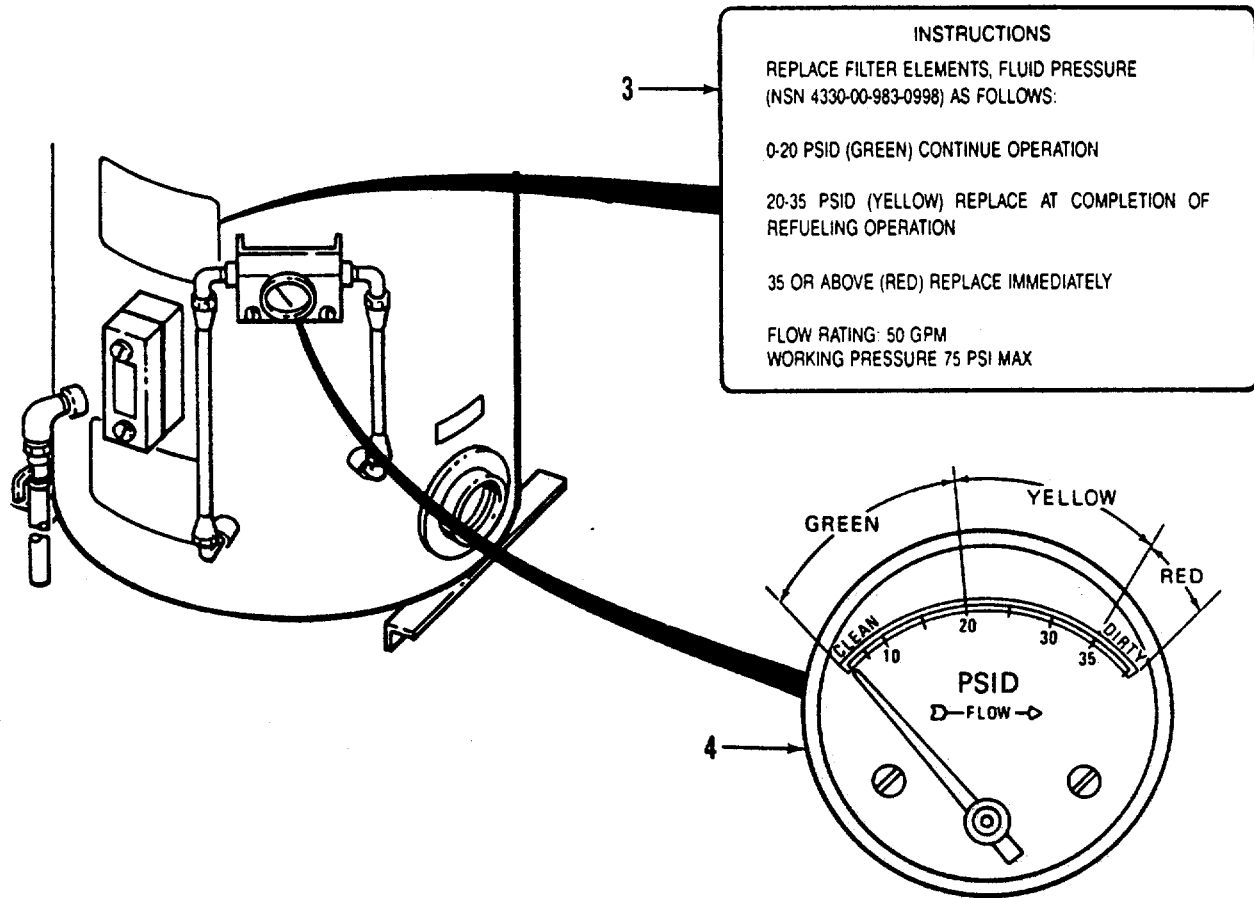


Table 2-1. Controls and Indicators - CONT

KEY	CONTROL OR INDICATOR	FUNCTION
3	Instruction Plate	Provides information for replacement of the filter elements in the filter/separator
4.	Differential Pressure Switch Gage	Indicates the difference in pressure between the inlet and outlet of the filter/separator in PSID (Pounds per Square Inch Differential). The PSID indicating arc on the gage is colored to coincide with the information on the instruction plate

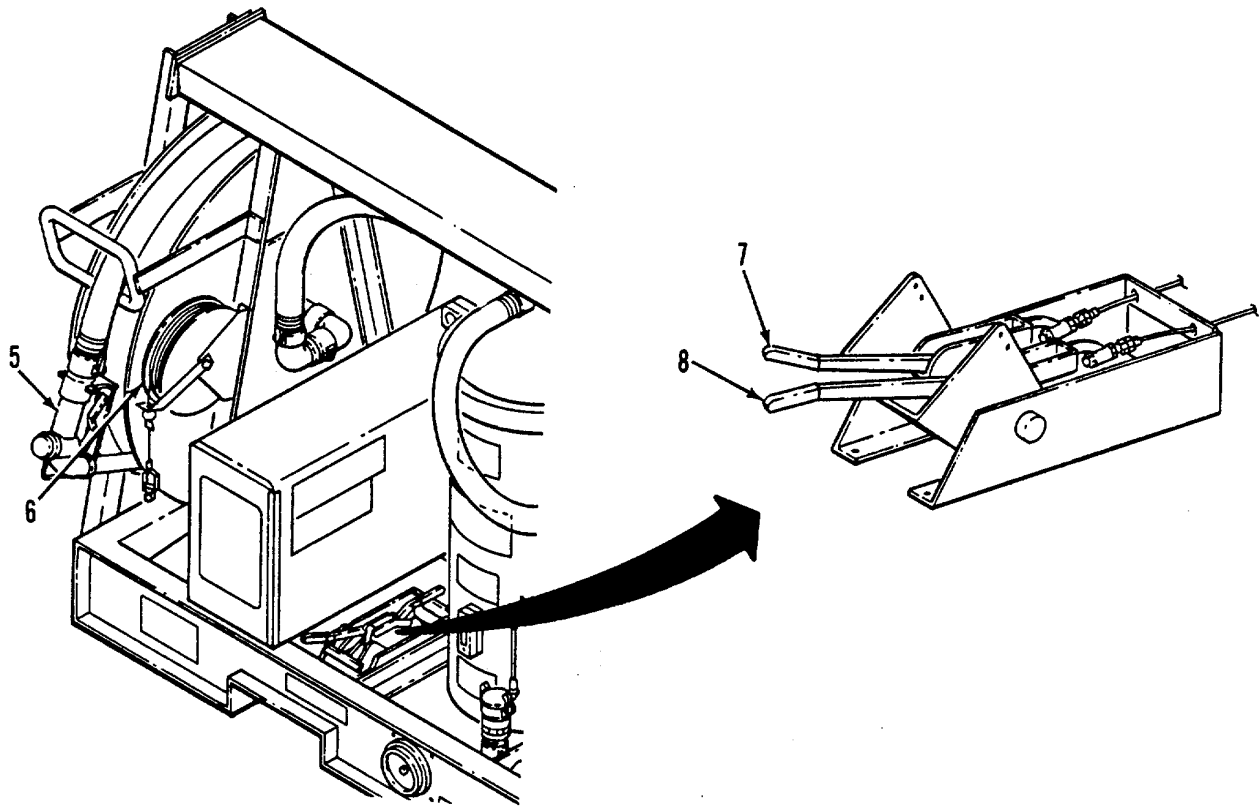


Table 2-1. Controls and Indicators - CONT

KEY	CONTROL OR INDICATOR	FUNCTION
5	Dispensing Nozzle	There are two dispensing nozzles. Each nozzle has a ground cable. The cable is attached to a clamp and a plug to ensure that the nozzle can be grounded to the equipment being fueled.
6	Static Discharge Reel	The ground cable on the reel has an alligator clamp for grounding the pumping unit during fueling operations. The reel is spring loaded to rewind the cable onto the reel
7	Rear Tank Valve Control Lever	Pushing the lever to the OFF position closes the valve in the bottom of the rear fuel tank. Pulling the lever to the ON position opens the valve. Lever is shown in the ON position
8	Front Tank Valve Control Lever	Pulling the lever to the ON position opens the valve in the bottom of the fuel tank. Pushing the lever to the OFF position closes the valve. This lever controls the valve in the (front) TANK. The lever is shown in the ON position.

Table 2-1. Controls and Indicators - CONT

KEY	CONTROL OR INDICATOR	FUNCTION
9	Adapter for Water Detector Kit Sample	The adapter is furnished as a means of obtaining a sample of fuel to be tested. The adapter can be coupled to the filter/separator outlet elbow without any additional fittings.
10	Probe for Water Detector Kit Sample	The probe is used to extract samples of fuel for testing. The probe is installed on the adapter (Key 9). When the adapter is coupled to the filter/separator outlet, a fuel sample may be obtained
11	Pressure Vent Valve	Manually operated pressure vent valve is used to release pressure within fueling system

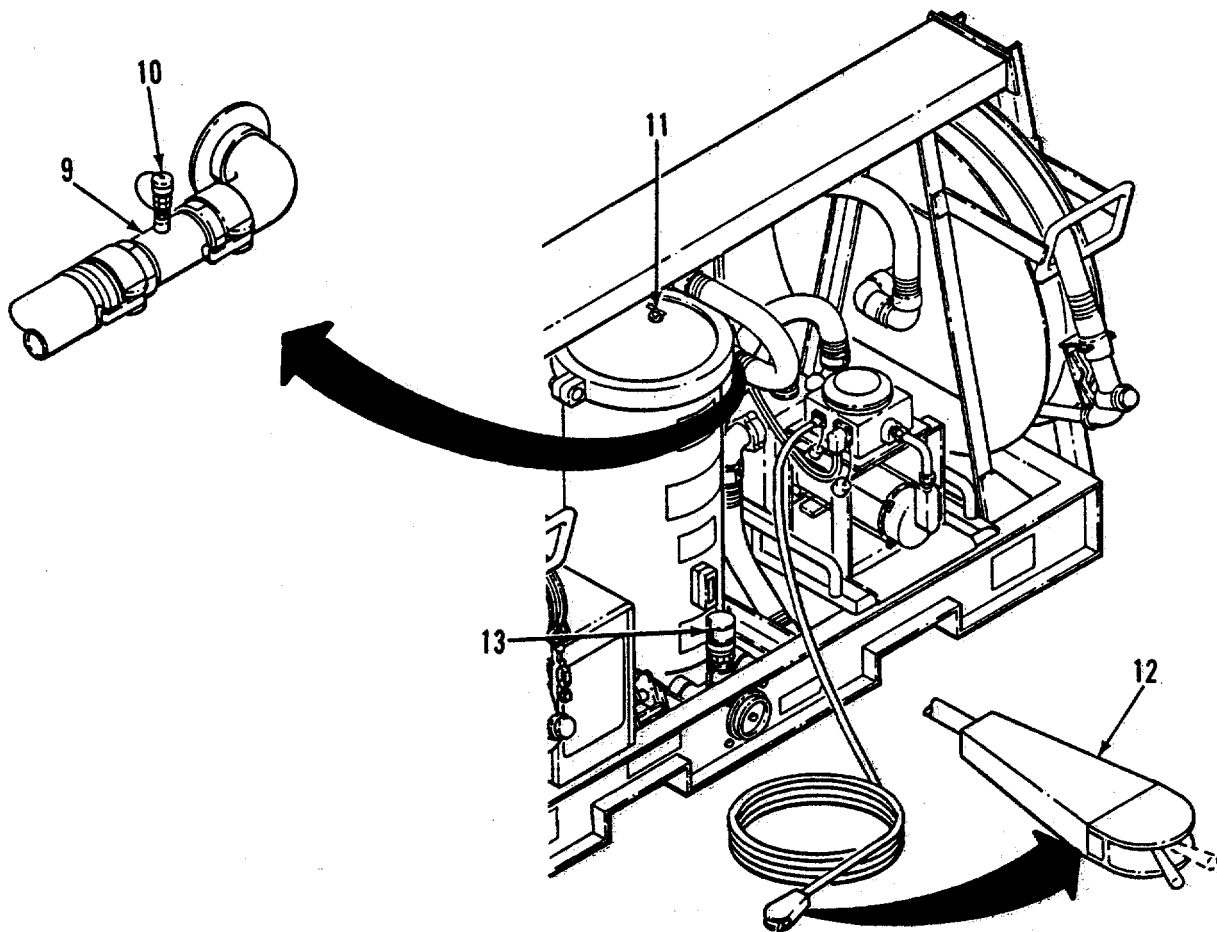
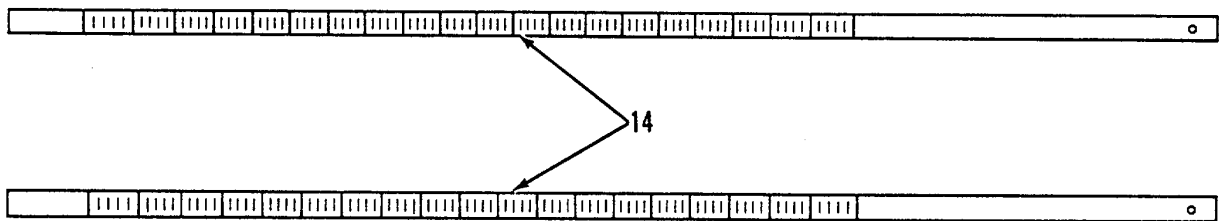


Table 2-1. Controls and Indicators - CONT

KEY	CONTROL OR INDICATOR	FUNCTION
12a	Pump Motor ON-OFF Switch/Cable Assembly	The switch is located at the end of the operator control cable. The ON position applies power to the electric motor to operate the pump. The OFF position stops the motor.
12b	Auxiliary Pump Motor ON-OFF Switch	This switch operates the same as Item 12, however, this switch attaches directly to the electrical junction box.
13	Suction Loading Coupling	This coupling is installed for bottom loading of the fuel tanks from a non-pressurized fuel source. The pump assembly on board the truck is used to fill the fuel tanks.
14	Dipstick	The dipstick is graduated in US GALLONS on one side, and LITERS on the other. It is used to measure the quantity of fuel in the tanks through DIPSTICK/HAND PUMP access pump.



SECTION II. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph		Page
2-3	General	2-5
2-4	Purpose of PMCS Table	2-6
2-5	Explanation of Columns	2-6
2-6	Equipment is Not Ready If Column	2-6
2-7	Reporting Deficiencies	2-6
2-8	Special Instructions	2-6

2-3. General. Operator PMCS are performed to ensure that the tank and pump unit is ready for operation at all times. Perform the checks and services at the specified intervals.

- a. Before you operate, perform your 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 Unit Maintenance.

2-4. 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 H is assigned. Make a habit of doing the checks in the same order each time and anything wrong will be seen quickly. See paragraphs 2-5 and 2-6 for an explanation of the columns in table 2-1.

2-5. 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 services 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 · when each check is to be done.
- c. Item to be Inspected/Procedures. This column identifies the general area or specific part where the check or service is to be done, and explains how to do them.
- d. Equipment is Not Ready/Available If. See paragraph 2-6.

2-6. Equipment is Not Ready/Available If. This column lists conditions that make the equipment unavailable for use because it is unable to perform its mission, or because 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 combat mission. Refer to DA Pam 738-750.

2-7. Reporting Deficiencies. If 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.

2-8. Special Instructions. Preventive maintenance is not limited to performing the checks and services listed in the PMCS table.

WARNING

Drycleaning solvent PD-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 100 -138°F (38 - 60°C).

- 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 boltheads. 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 clamps and frostings are tight. Wet spots and stains around a fitting or connector can mean a leak. If a leak comes from a loose 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 them. 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 III	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 III leaks should be reported to your supervisor or unit maintenance.

a. Painting. Touch-up filter/separator as needed. Refer to TM 43-0139 for specific painting procedures.

NOTE

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

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

Table 2-2. Operator Preventive Maintenance Checks and Services

OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICE								
B - Before		D - During		A - After		M - Monthly		
ITEM NO	INTERVAL					ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUST AS NECESSARY	EQUIPMNET IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
1	●	●	●			Hoses and Fittings	<p style="text-align: center;"><u>WARNING</u></p> <p>A spring loaded mechanism can cause injury if released in an uncontrolled manner. The rewind spring is under high tension when the dispensing hose is extended. This may cause reel to rapidly rotate in reverse.</p> <p>Visually inspect hoses for damage, cracking, and signs of leakage. Inspect fittings and couplings for secure connections, damage, and signs of leakage. Extend fueling hoses fully for inspection. Notify next higher level of maintenance for repairs or replacement of defective parts.</p>	Evidence of fuel leakage.
2	●	●	●			Hose Reels Spring and Ratchet Wheels	<p style="text-align: center;"><u>WARNING</u></p> <p>A spring loaded mechanism can cause injury if released in an uncontrolled manner. The rewind spring is under high tension when the dispensing hose is extended. This may cause reel to rapidly rotate in reverse.</p> <p>Visual and operational inspection. Check operation of hose dispensing reels. dispensing Extend hoses and inspect as per Item 1. Check that ratchet wheel will hold reel leaking. from rotating. Notify next higher level of maintenance if hose reels need repair.</p>	Either hose is
3	●	●	●			Nozzle	<p>Checks nozzles for proper operation and leakage. Check screen for foreign matter. Notify next higher level of maintenance H nozzle needs repair.</p>	Both nozzles inoperative or either nozzle is leaking

OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before

D - During

A - After

W - Weekly

M - Monthly

ITEM NO	INTERVAL					ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUST AS NECESSARY	EQUIPMNET IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
4	*	*	*			Static Discharge Reel	<p>WARNING</p> <p>A spring loaded mechanism can cause injury if released in an uncontrolled manner. The rewind spring is under high tension when the ground cable is extended. This may cause reel to rapidly rotate in reverse.</p> <p>Check for broken clamp, cable or cable coating. Refer to next higher level of maintenance for repairs.</p>	Broken cable, coating or clamp that would not allow a proper ground.
5	*	*	*			Filter/Separator Water Detector Kit	Refer to TM5-4330-232-12&P for procedures to inspect filter/separator.	
6	*	*	*			EMD Pump	Check pump and components for proper operation, damage or leakage. Notify next higher level of maintenance for repair.	Evidence of fuel leakage.
7	*	*				Junction Box	<p>WARNING</p> <p>Low voltage can cause Severe Shock or Death. Disconnect power cable from vehicle NATO slave receptacle before replacing or repairing electrical components.</p> <p>Check for damaged cables, loose connections, switch, or connectors. Check junction box for defective cover seal. Tighten connections if required.</p> <p>Notify next higher level of maintenance for repair.</p>	Damaged connectors, switch cables (that could cause sparks), or cover seal.

OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before

D - During

A - After

W - Weekly

M - Monthly

ITEM NO	INTERVAL					ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUST AS NECESSARY	EQUIPMNET IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
8	*	*	*			Electric Motor	Inspect for loose or missing mounting bolts. Check for proper operation. Notify next higher level of maintenance if motor is inoperable. Tighten mounting bolts.	Electric motor is inoperable.
9	*		*			Power Cable and Plug	Check for loose or damaged cable or connectors. Notify next higher level of maintenance for replacement of defective parts.	Cable damaged sufficiently to cause sparks.
10	*		*			Valve Operating Assembly	Check for proper operation. Check that the cables are securely connected. Notify next higher level of maintenance if repairs are needed.	Cables have loosened.
11	*	*	*			Adapter Half	Inspect for secure connections, damage, and signs of leakage. Notify next higher level of maintenance for replacement defective parts.	Evidence of fuel leakage of exists.
12	*	*	*			Bottom Loading Manifold	Inspect for missing components, secure damage and signs of leakage. Notify next higher level of maintenance for replacement of defective parts.	Evidence of fuel leakage exists.
13	*	*	*			Frame and Storage Box	Inspect frame for cracks, loose and missing hardware or components. Notify next higher level of maintenance for repairs or replacement of missing parts.	Hardware or components necessary for operations are missing.
14	*	*	*			Tie Down Assembly	Inspect tie down assemblies for looseness, cracked welds and thread damage. Tighten loose turnbuckles. Notify next higher level of maintenance for repair or replacement of defective parts.	Two or more tank tie-down assemblies, or one pump unit tie-down assembly is missing.
15	*	*	*			Hose, Tank to Manifold	Visually inspect hose for damage, cracking and signs of leakage. Inspect couplings for secure connections, damage and signs of leakage. Refer to next higher level of maintenance for replacement of defective hose.	Evidence of fluid leakage exists.

OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before

D - During

A - After

W - Weekly

M - Monthly

ITEM NO	INTERVAL					ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUST AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
16	*	*	*			Tank Assembly	Visual inspection to check for damage or signs of leakage. Check for proper operation of bottom loading valve. Refer to higher level of maintenance for repair or replacement of defective parts.	Evidence of leakage or bottom loading valve will not open.
17	*	*				Manhole	Check for damage and proper location of manhole cover gasket, and secure manhole latches. Check the location of vent valve under handle, close to hinge. Refer to next higher level of maintenance for repairs.	Evidence of fuel leakage exists.
18	*	*	*			Coupling Half	Check for signs of leakage around the valve handle shah. Check coupling gasket for cracks. Inspect coupling for secure connection. Test coupling half by observing the internal valve mechanism as the handle is moved to ensure handle operates valve. Refer to next higher level of maintenance for repairs or replacement if necessary.	Evidence of leakage.
19	*	*				Grounding Rod	Check for missing or damaged ground rod.	Ground rod missing.

Section III OPERATION UNDER USUAL CONDITIONS

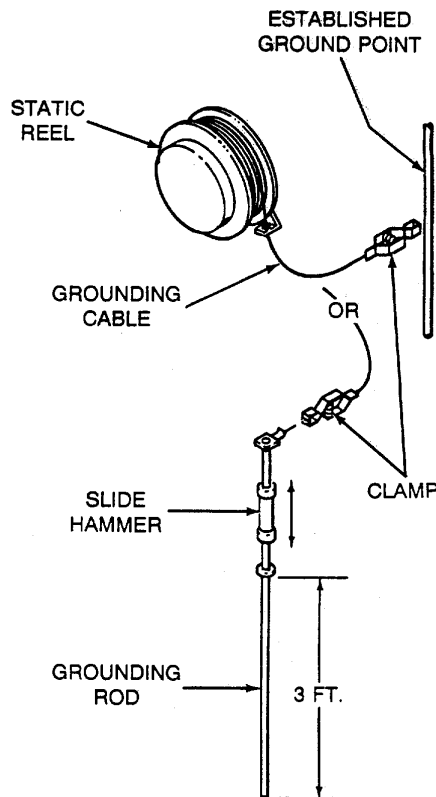
Paragraph		Page
2-3	Grounding Procedures	2-12
2-4	Operating Procedures	2-13
2-5	Preparation for Movement	2-20
2-6	Operating Instructions on Decals and Instruction Plates	2-21

2-3. Grounding Procedures.

WARNING

Failure to properly ground unit prior to operation could allow a static discharge (spark) which could ignite fuel or cause an explosion of fuel vapor.

- a. Unwind the grounding cable and clamp from the static reel.
- b. Attach clamp to established ground. If established ground is not available, remove grounding rod from pump unit frame.
- c. Use slide hammer to drive grounding rod 3 feet into ground then attach clamp to grounding rod.
- d. Once fueling operations are completed, disconnect clamp from grounding rod and guide cable back on reel.
- e. Use slide hammer to withdraw grounding rod from ground then place it in storage position on A-Frame and secure with attaching straps.



2-4. Operating Procedures.

a. Filling Tanks Through Bottom Loading Port.

- (1) Refer to paragraph 2-3 and perform grounding procedures.

WARNING

Fire hazard exists when handling fuel. Do not smoke or use open flame within 50 feet (15.34 meters) of tank and pump unit.

- (2) Open manhole latch and fill cap on both tanks.

CAUTION

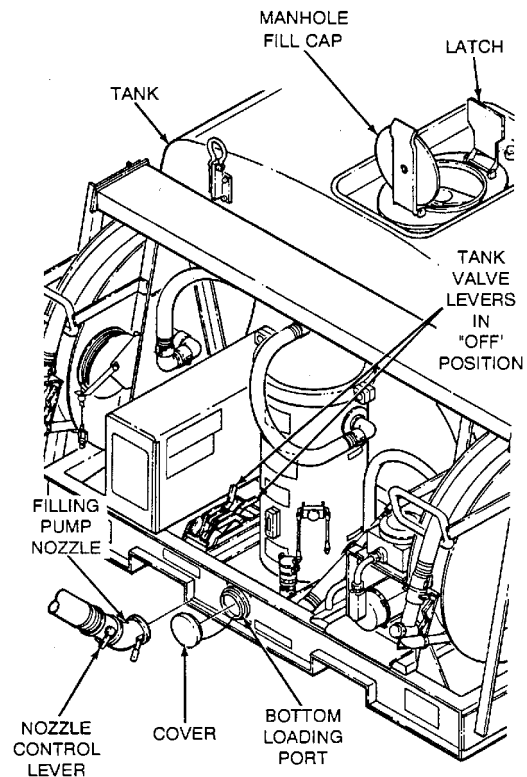
Tank valve levers must be in off position for bottom loading. If not in "OFF" position shut off system will not function.

- (3) Position both tank valve levers in "OFF" (tank valves closed) position.

WARNING

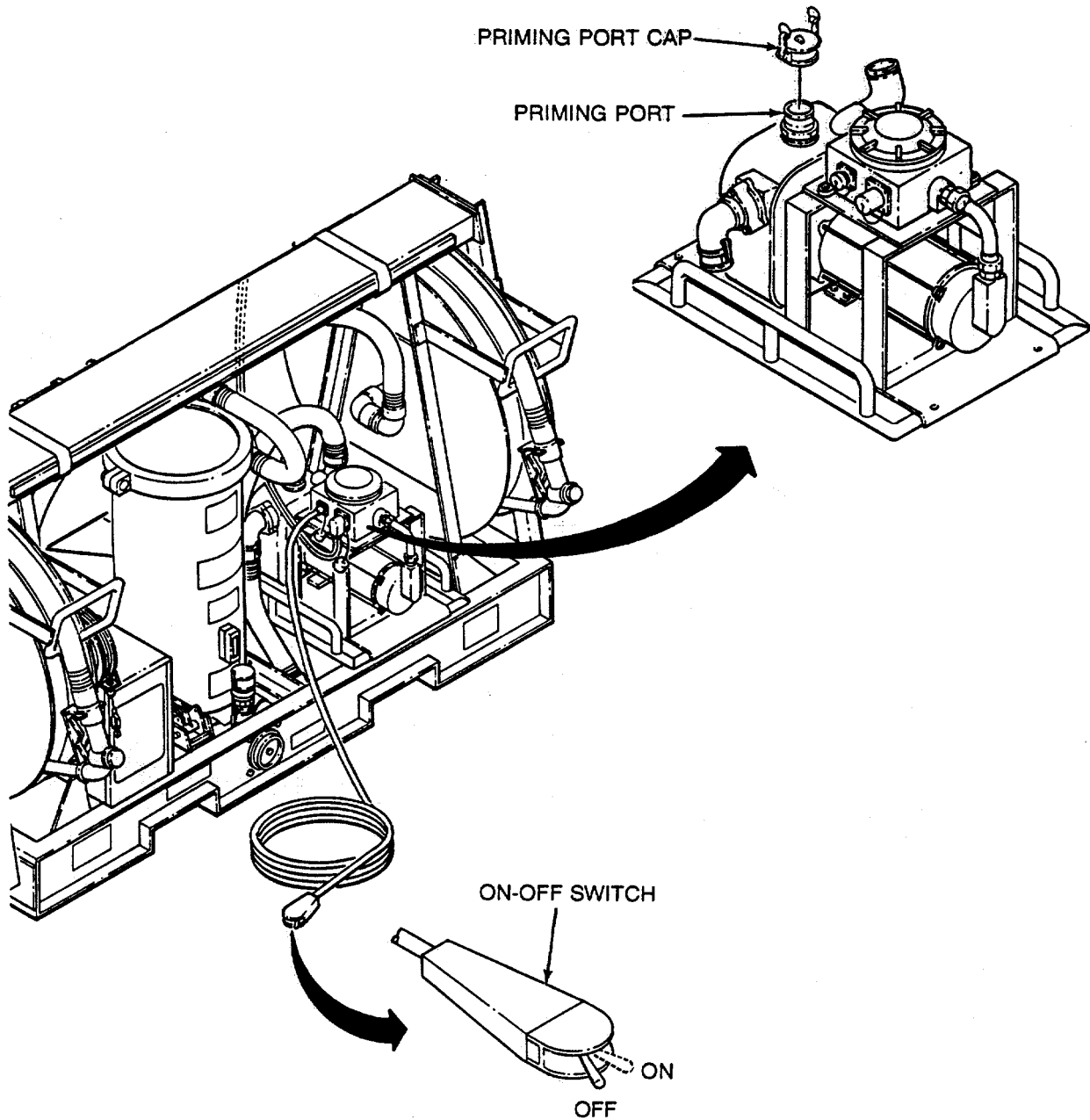
Manhole fill cap must be open during bottom loading operation. Failure to open manhole will cause a pressure build-up within tanks that could cause tanks to rupture or explode.

- (4) Remove the cover from the bottom loading port and attach filling pump nozzle to bottom loading port.
- (5) Operate filling pump nozzle to load fuel. Refer to manual covering nozzle being used.
- (6) When filling operation is completed, disconnect nozzle and install cover on bottom loading port.
- (7) Close and latch both manhole fill caps.
- (8) Disconnect and stow grounding equipment as explained in paragraph 2-3.



b. Manually Priming Pump.

- (1) Place ON-OFF switch to OFF.
- (2) Remove pump priming port cap.
- (3) Pour approximately five gallons of fuel into priming port.
- (4) Install pump priming port cap.



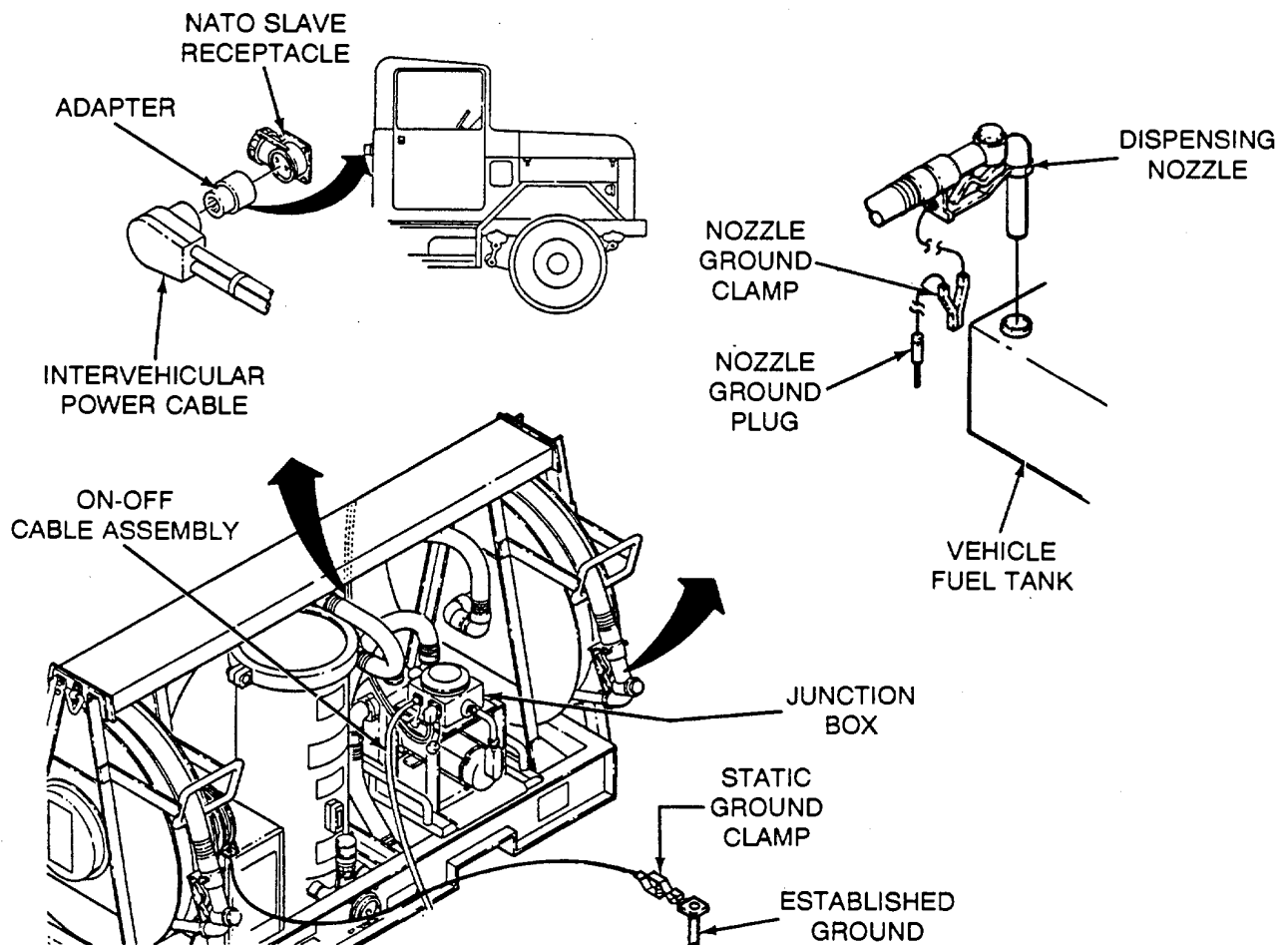
c. Dispensing Fuel.

- (1) Park transport vehicle adjacent to equipment to be fueled.
- (2) Refer to paragraph 2-3 and perform grounding and safety procedures.
- (3) Connect ON-OFF switch/cable assembly to junction box.

WARNING

Low voltage can cause severe shock or death.

- (4) Connect intervehicular power cable and adapter, if required, to junction box receptacle and vehicle NATO slave receptacle.
- (5) Grasp either dispensing nozzle and unwind enough hose for nozzle to reach fuel tank to be serviced.
- (6) Connect nozzle ground clamp or nozzle ground plug to equipment being serviced, whichever is compatible.

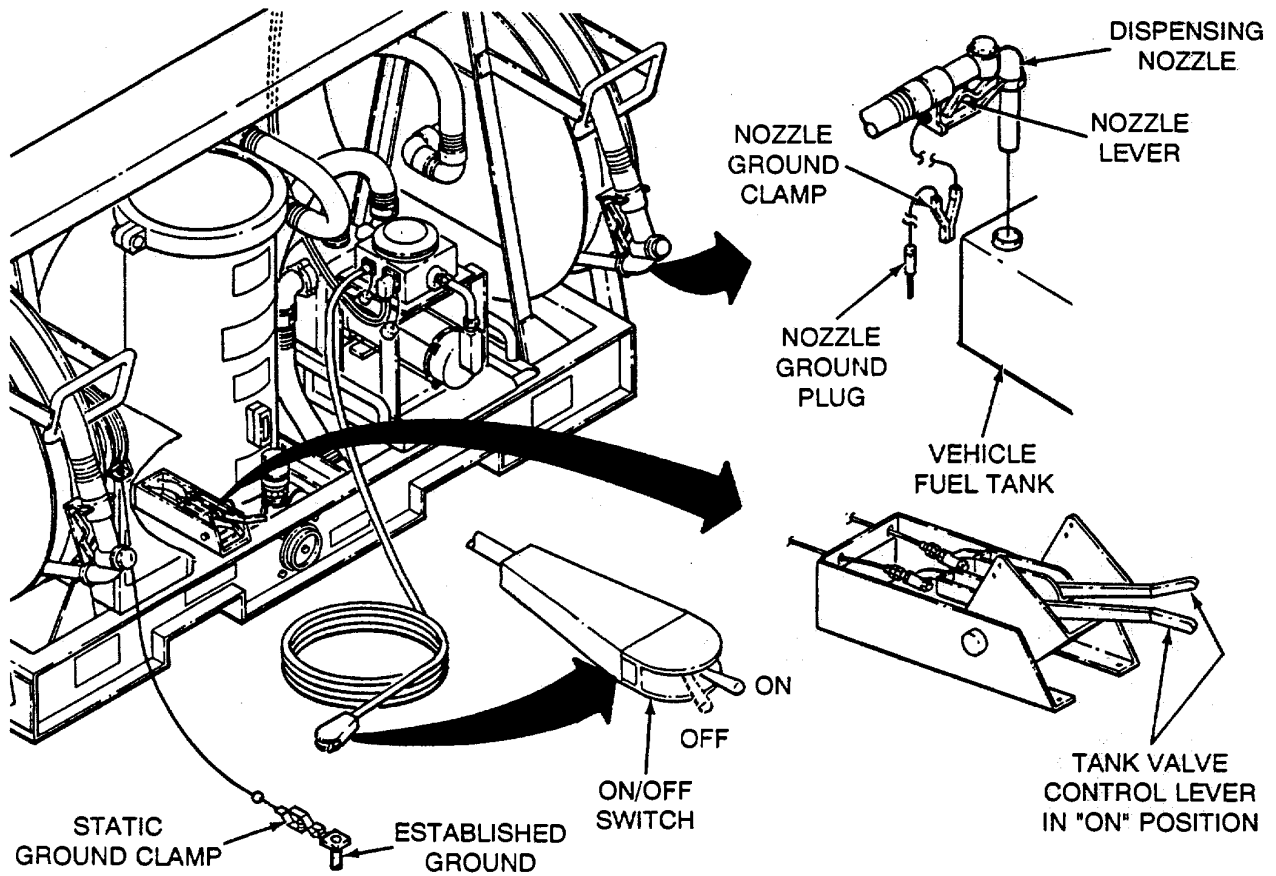


- (7) Pull either or both tank valve control levers to the "ON" position.

WARNING

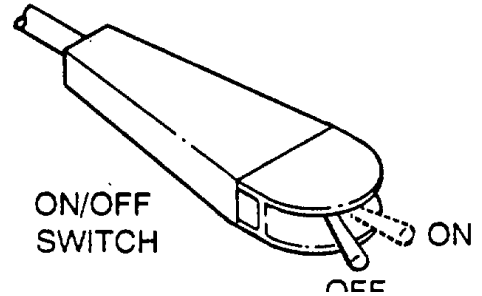
An overheated pump creates a potential fire hazard and will cause pump damage. Do not allow pump to run longer than one minute with nozzles closed. Do not run pump with tank valves closed.

- (8) Insert dispensing nozzle into tank being fueled and squeeze the nozzle lever.
- (9) Move ON-OFF-Switch to "ON" position.
- (10) When tank is full, release nozzle lever.
- (11) Move ON-OFF switch to OFF position and store cable on truck.
- (12) Remove dispensing nozzle from tank, disconnect nozzle ground clamp or plug and rewind hose onto hose reel.
- (13) Dipole tank valve control levers to "OFF" position.
- (14) Lead safety equipment and disconnect static ground as per paragraph 2-3.



c. Obtaining a Fuel Sample.

- (1) With ON/OFF switch set to the "OFF" position, disconnect outlet hose from the filter/separator outlet.
- (2) Attach sample probe adapter to filter/separator outlet then connect outlet hose to sample probe adapter.



NOTE

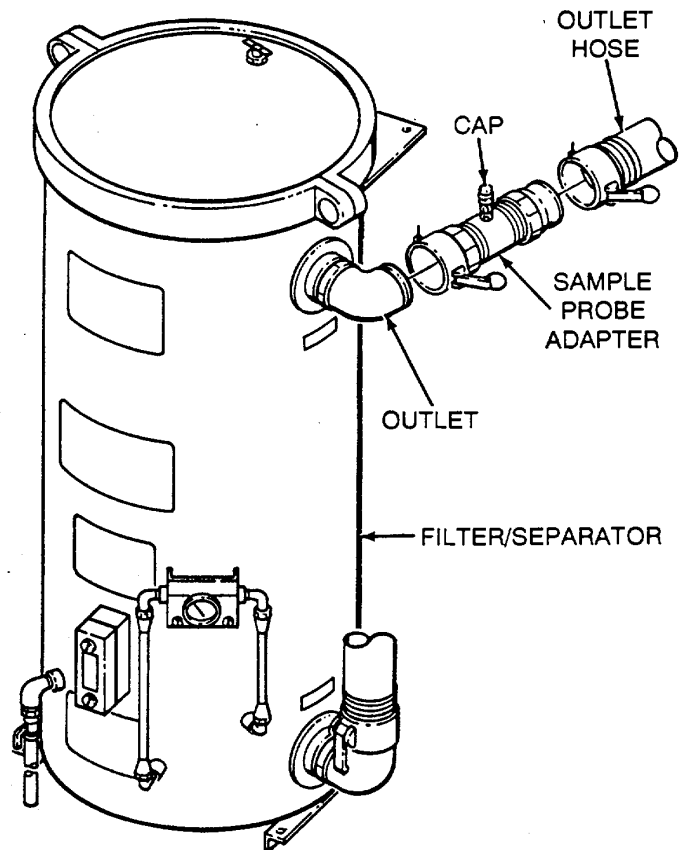
The fuel sample must be obtained while the unit is operating to receive the most accurate representation of the fuel being pumped.

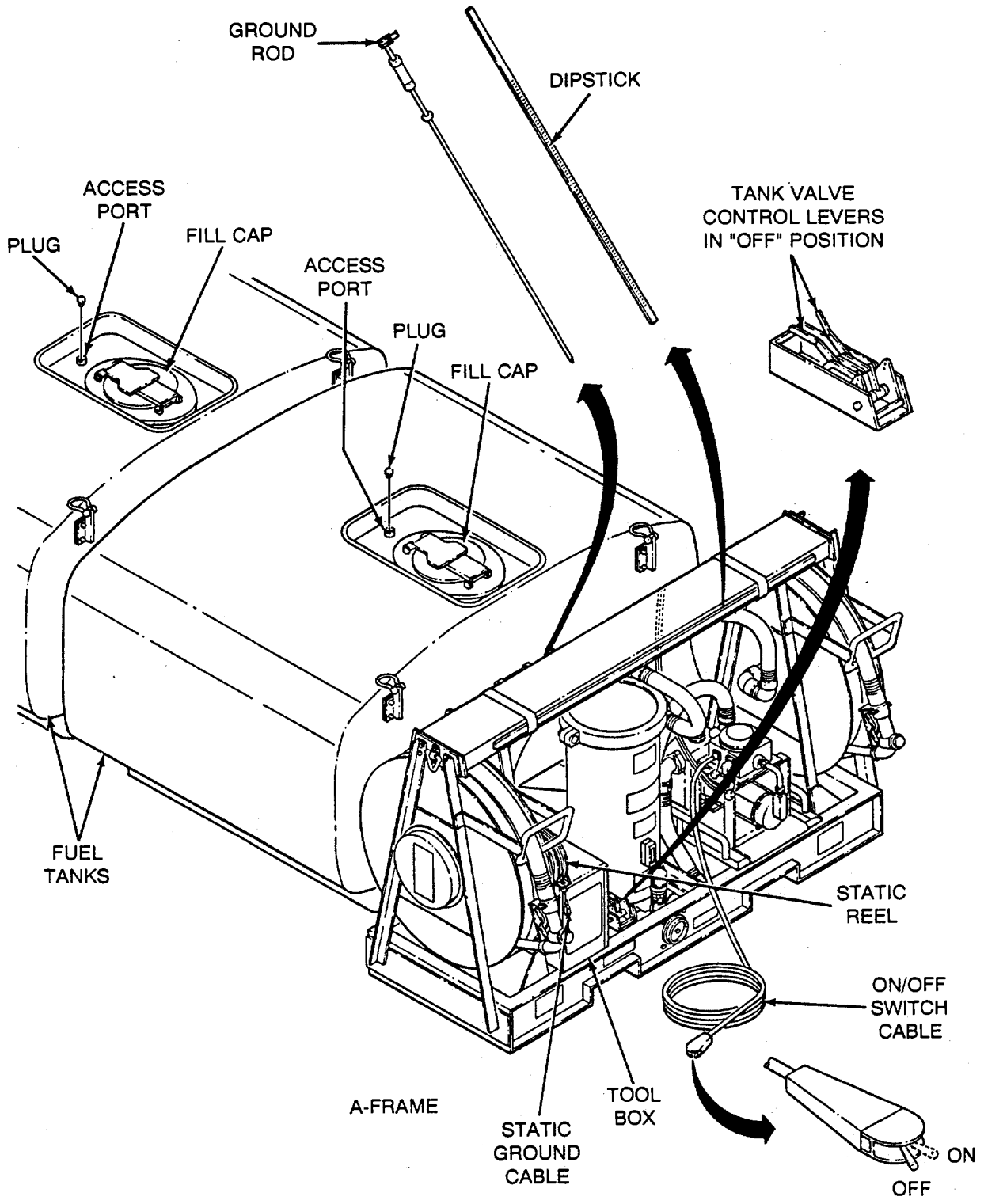
- (3) Refer to paragraph 2-4b. and perform necessary procedures to dispense fuel. While fuel is being dispensed, remove cap from probe and extract fuel sample.
- (4) Install cap on probe.
- (5) Move ON/OFF switch to OFF position.
- (6) Squeeze dispensing nozzle lever to release any built-up fuel pressure.

WARNING

Fuel spills create a potential fire hazard. When disconnecting outlet hose, some fuel within outlet hose and sample probe adapter will be released. Use drip pan to catch fuel.

- (7) Provide a suitable container to catch drainings then, disconnect outlet hose to outlet.
- (8) Remove sample probe adapter from filter/separator outlet, then connect outlet hose to outlet.





d. Shutdown.

- (1) Check to see both fuel dispensing hoses are fully wound onto hose reels.
- (2) Check that static ground cable is fully wound onto static reel.
- (3) Check that both fill caps on manholes are closed securely.
- (4) Remove dipstick from A-Frame.
- (5) Remove plug from each tank's access port and use dipstick to measure quantity of fuel remaining in each fuel tank.

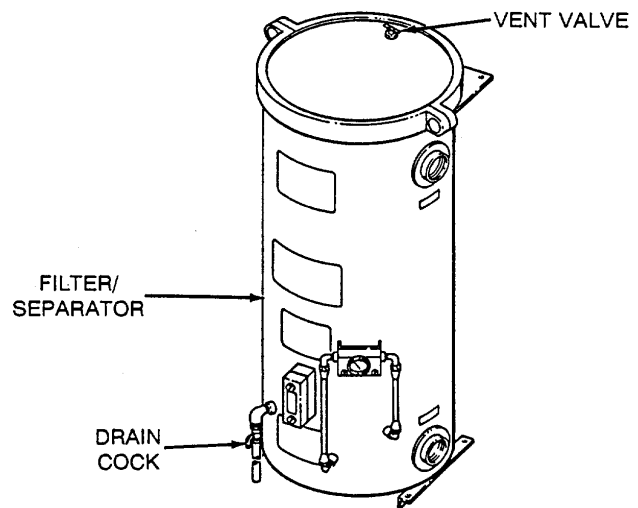
NOTE

If there is insufficient fuel in the fuel tanks for continued operation, or the unit is to be idle for an extended period of time, fill the fuel tanks to prevent condensation from forming and contaminating fuel.

- (6) Install the plugs in the access ports and return the dipstick to its stowed position on the A-Frame.
- (7) Make certain ON/OFF switch cable is in "OFF". position, coiled and secured to unit or stowed in tool box
- (8) Move both tank valve control levers to "OFF" position.
- (9) Make certain ground rod is secured in its stowed position on A-Frame.
- (10) Open draincock on filter/separator to release water from filter/separator. Once water has drained, close draincock.

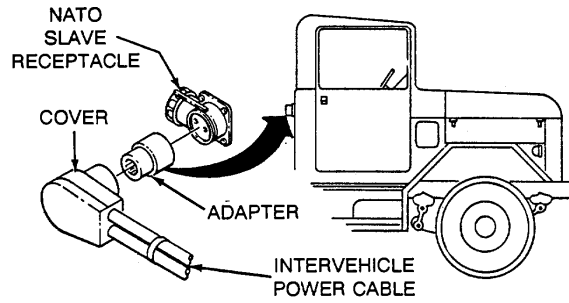
NOTE

It may be necessary to open vent valve to drain water completely.



2-5. Preparation for Movement.

- a. Refer to paragraph 2-4d and perform shutdown procedures.
- b. Disconnect intervehicular power cable and adapter from NATO slave receptacle and coil the cable inside the truck bed.



CAUTION

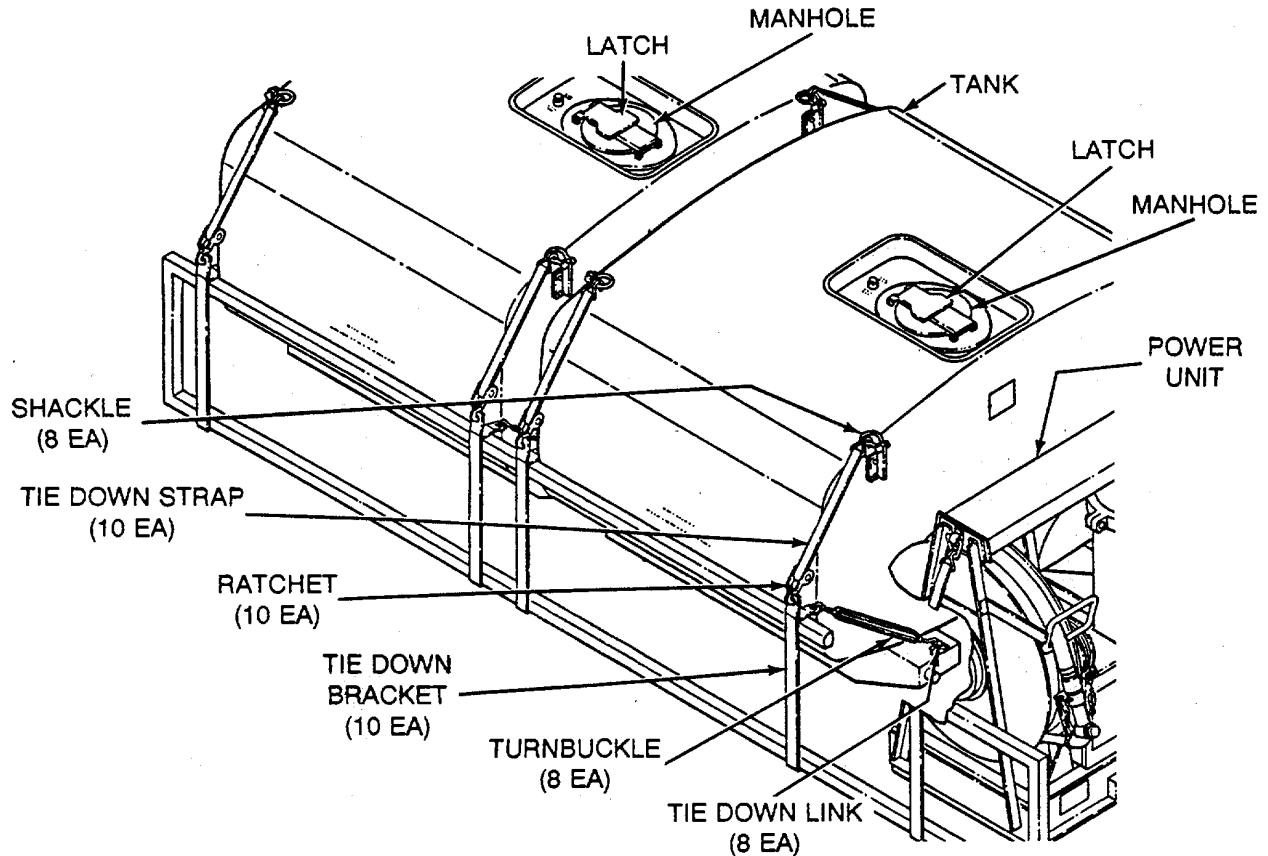
Tighten turnbuckles HAND tight only.

- c. Check that all ten tie down straps are securely attached to tie down brackets and shackles and that all eight turnbuckles are tight.

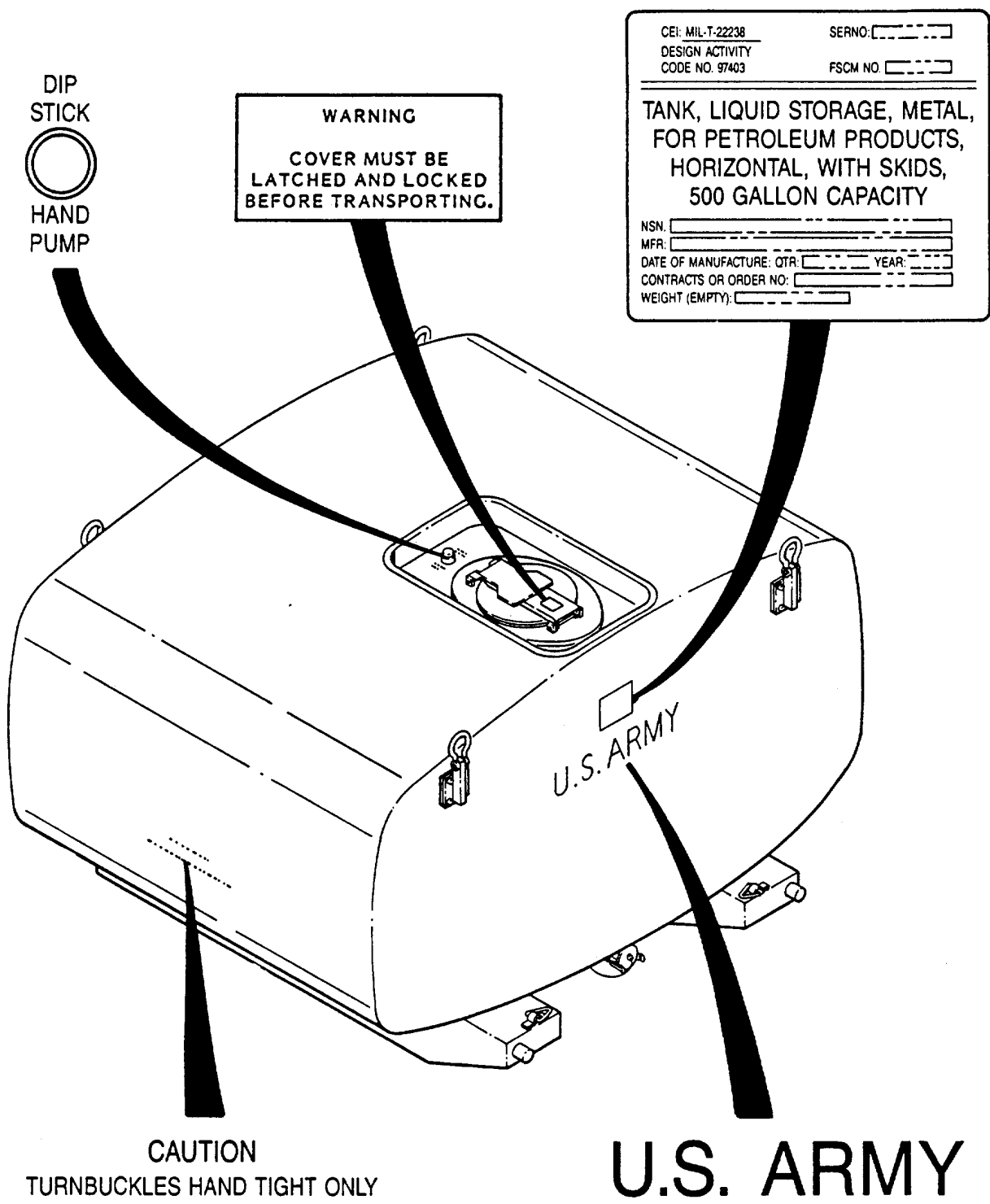
WARNING

To prevent possible fuel spillage and potential fire hazard, manhole must be closed and locked before transporting.

- d. Make certain manholes are closed, latched and locked.
- e. Vehicle is ready for movement.

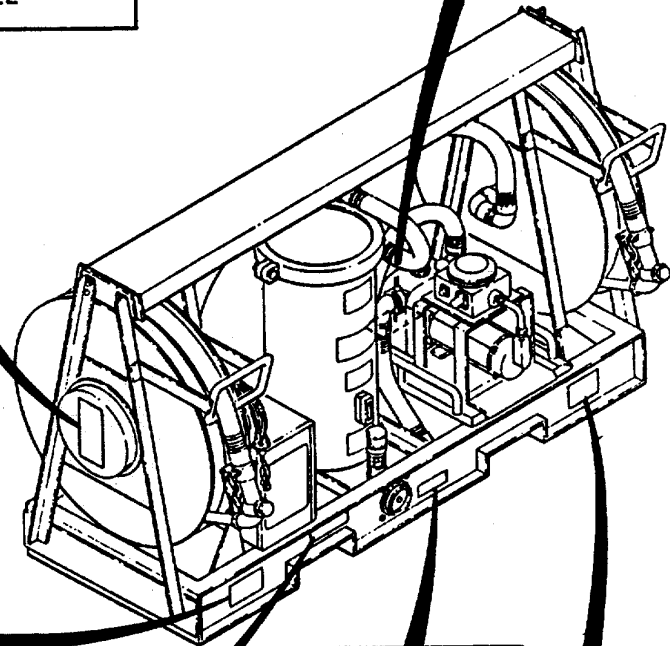


2-6. Operating Instructions on Decals and Instruction Plates. The location of warning, caution, instruction, and identification plates, decals, and stencils are shown in the following illustrations. Illustrations of the plates, decals,



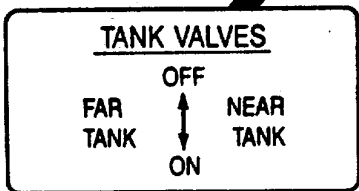
CAUTION - DO NOT REMOVE SPRING CASE COVER EXCEPT WITH EXTREME CARE AND THEN ONLY BY AUTHORIZED MAINTENANCE DEPOT PERSONNEL

CEI: MIL-T-40136	SERNO: _____
DESIGN ACTIVITY	MANUFACTURER
FSCM - 97403	FSCM - _____
PUMP ASSEMBLY, EMD LIQUID DISPENSING 50 GPM AT 60 FT HD	
NSN: _____	DWG _____
MFG IDENTIFICATION	
DATE OF MANUFACTURE: OTR: _____	YEAR: _____
CONTRACT OR ORDER NO.: _____	
WEIGHT: _____	U.S.



CEI: MIL-T-40136	SERNO: _____
DESIGN ACTIVITY	MANUFACTURER
CODE NO - 97403	CODE NO. - _____
TANK AND PUMP UNIT, LIQUID DISPENSING, FOR TRUCK MOUNTING	
NSN: _____	
PUMP UNIT	
NSN: _____	CEI: MIL-T-40136
TANK, 500 GALLON	
NSN: _____	CEI: MIL-T-22238
MFG IDENTIFICATION:	
DATE OF MANUFACTURE: OTR: _____	YEAR: _____
CONTRACT OR ORDER NO.: _____	
U.S.	

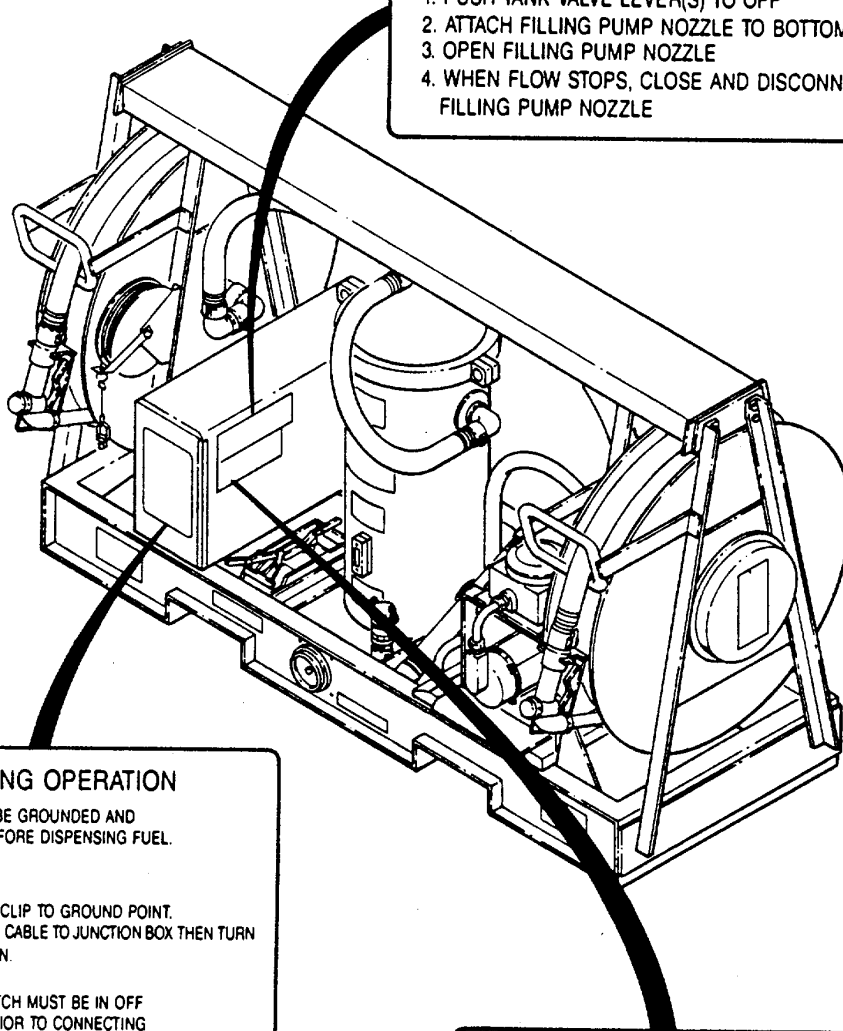
BOTTOM LOADING PORT



CEI: MIL-T-40136	SERNO: _____
DESIGN ACTIVITY	MANUFACTURER
CODE NO - 97403	CODE NO. - _____
PUMP UNIT, LIQUID DISPENSING FOR TRUCK MOUNTING	
NSN: _____	
MFG IDENTIFICATION	
DATE OF MANUFACTURE OTR: _____	YEAR: _____
CONTRACT OR ORDER NO.: _____	
WEIGHT: _____	U.S.

BOTTOM LOADING OPERATING INSTRUCTIONS

1. PUSH TANK VALVE LEVER(S) TO OFF
2. ATTACH FILLING PUMP NOZZLE TO BOTTOM LOADING PORT
3. OPEN FILLING PUMP NOZZLE
4. WHEN FLOW STOPS, CLOSE AND DISCONNECT FILLING PUMP NOZZLE



DISPENSING OPERATION

WARNING: UNIT MUST BE GROUNDED AND BONDED BEFORE DISPENSING FUEL.

PRE-DISPENSING:

1. ATTACH GROUND CABLE CLIP TO GROUND POINT.
2. CONNECT ON-OFF SWITCH CABLE TO JUNCTION BOX THEN TURN SWITCH TO OFF POSITION.

WARNING: ON-OFF SWITCH MUST BE IN OFF POSITION PRIOR TO CONNECTING INTERVEHICLE POWER CABLE.

3. CONNECT INTERVEHICLE POWER CABLE TO JUNCTION BOX AND VEHICLE POWER SOURCE.

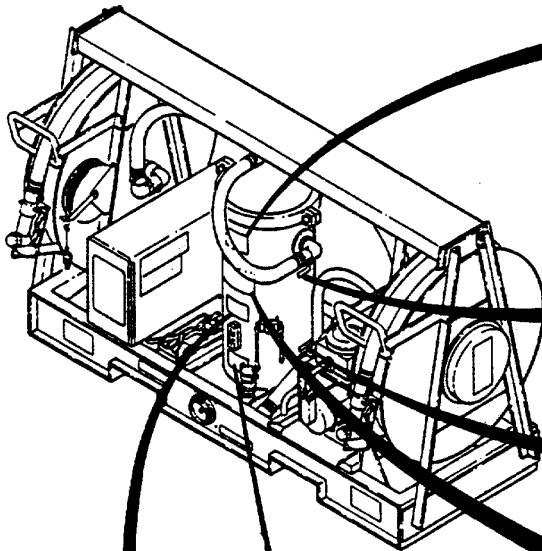
DISPENSING:

1. PULL TANK VALVE LEVERS TO ON POSITION.
2. TURN SWITCH TO ON POSITION.
3. UNREEL HOSE(S) TO DESIRED LENGTH.
4. ATTACH NOZZLE BONDING CABLE CLIP TO UNIT TO BE FUELED, AND DISPENSE FUEL.
5. TURN SWITCH TO OFF POSITION WHEN THROUGH FUELING.
6. DETACH NOZZLE BONDING CABLE AND RE-REEL HOSE(S).

CAUTION

TANK VALVE LEVERS MUST
BE IN OFF POSITION
FOR BOTTOM LOADING

SPECIFICATION NO.: MIL-F-52667
DESIGN ACTIVITY CODE NO.: 97403
MFR: _____ SER NO. _____
FILTER / SEPARATOR, LIQUID FUEL, 50 GPM CAPACITY
ELEMENT QUANTITY: 4
WORKING PRESSURE MAX: 75 PSI
WEIGHT: _____ NSN: _____
MODEL NO.: _____
CONTRACT NO.: _____
DATE OF MANUFACTURE: QTR: _____ YEAR: _____



OUTLET

INLET

**WARNING
MAX WORKING
PRESSURE 75 PSI**

**DRAIN WATER
DAILY OR
WHEN FLOAT
REACHES MARK**

INSTRUCTIONS
REPLACE FILTER ELEMENTS. FLUID PRESSURE (NSN 4330-00-983-0998) AS FOLLOWS:

0-20 PSID (GREEN) CONTINUE OPERATION

20-35 PSID (YELLOW) REPLACE AT COMPLETION OF REFUELING OPERATION

35 OR ABOVE (RED) REPLACE IMMEDIATELY

FLOW RATING 50 GPM
WORKING PRESSURE 75 PSI MAX

SECTION IV. OPERATION UNDER UNUSUAL CONDITIONS

Paragraph		Page
2-7	Operation in Extreme Cold.....	2-25
2-8	Operation in Extreme Heat	2-25
2-9	Operation in Dusty or Sandy Areas	2-25
2-10	Operation in Rainy or Humid Conditions	2-25
2-11	Operation in Salt Water Areas	2-26
2-12	Operation at High Altitudes	2-26
2-13	Emergency Operation	2-26

2-7. Operation In Extreme Cold. The procedures for operating the tank and pump unit are the same as under usual conditions except for the following special precautions.

- a. Check sight glass and drain water more frequently than usual and at each shut down to avoid freezing.
- b. Provide shelter to prevent snow or ice from entering unit when opened for servicing.
- c. If possible provide a heated shelter.
- d. Check differential pressure gage regularly to be sure that pressure limits are not being exceeded.

2-8. Operation In Extreme Heat. The procedures for operating the tank and pump unit are the same as under usual conditions except for the following special precautions.

- a. Erect a screen or shelter to provide shade.
- b. Check differential pressure gage regularly to be sure that the pressure limits are not being exceeded.
- c. Vent filter/separator when not in operation, and collect the discharge of the liquid.

2-9. Operation In Dusty or Sandy Areas. The procedures operating the tank and pump unit are the same as under usual conditions except for the following special precautions:

- a. Under dusty or sandy conditions, filter elements must be replaced more frequently.
- b. Select a work site protected by natural barriers or erect screens of dustproof material.
- c. Keep the unit free of dust and dirt, especially when the unit is open for servicing or repair.
- d. Check the differential pressure gage regularly to make sure that pressure limits are not being exceeded.
- e. Ensure inlet plug and outlet cap are installed when hoses are removed.

2-10. Operation in Rainy or Humid Conditions. The procedures for operating the tank and pump unit are the same as under usual conditions except for the following special precautions.

- a. Water must be drained through the water drain valve more often than under normal conditions.
- b. Erect a shelter to prevent the entrance of rain into the interior of the unit when it is opened for servicing.
- c. Check differential pressure gage regularly to be sure that pressure limits are not exceeded.

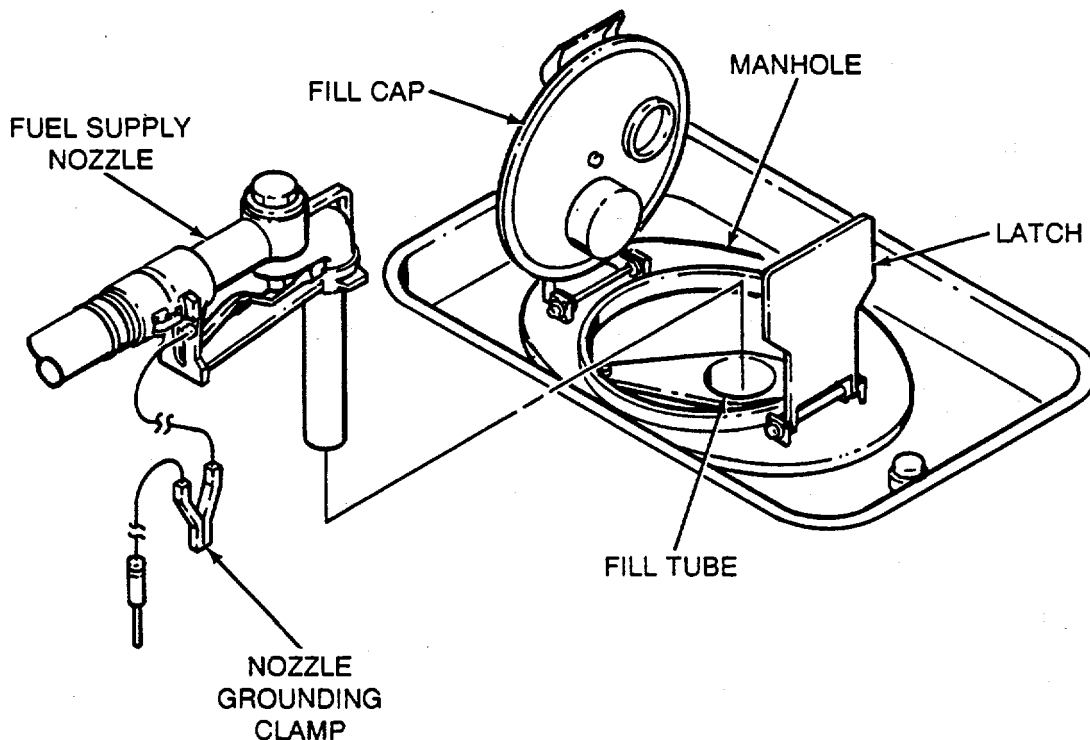
2-11. Operation in Salt Water Areas. The procedures for starting and stopping the tank and pump unit are the same as under usual conditions except for the following special precautions.

- a. Water must be drained through the water drain valve more often than under normal conditions.
- b. Wipe down the tank and pump unit with a lightly oiled rag to prevent corrosion.

2-12. Operation at High Altitudes. The procedures for starting and stopping the tank and pump unit are the same as under usual conditions.

2-13. Emergency Procedures. In a situation where clean filtered fuel is needed but the correct hose coupling to connect to bottom loading port is not available, it will be necessary to fill tanks through the manholes. Perform the following procedures to refuel tanks through manhole fill openings.

- a. Refer to paragraph 2-3 and perform grounding procedures.
- b. Attach nozzle grounding clamp to fuel tank being serviced.
- c. Open latch and fill cap.
- d. Insert fuel supply nozzle into fill tube of tank and fill tank.
- e. When tank is full, withdraw fuel nozzle, close fill cap and latch then disconnect nozzle grounding clamp.
- f. Repeat steps b, c, d and e for remaining tank.
- g. Once both tanks are full, disconnect static ground cable and rewind the cable onto static reel.
- h. If ground rod was used, return it to its stowed position on A-Frame.



**CHAPTER 3
OPERATOR'S MAINTENANCE INSTRUCTIONS**

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Section I.	LUBRICATION INSTRUCTIONS.....	3-1
Section II.	TROUBLESHOOTING	3-1
Section III.	OPERATOR MAINTENANCE PROCEDURES.....	3-3

SECTION I. LUBRICATION INSTRUCTIONS

3-1. Lubrication. There are no lubrication requirements for the tank and pump unit.

SECTION II. TROUBLESHOOTING

3-2. Introduction.

- a. Table 3-1 lists the common malfunctions which you may find during the operation or maintenance of the tank and pump unit or its components. You should perform the tests/inspections and corrective actions in the order listed.
- b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 3-1. Troubleshooting

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1 PUMP FAILS TO DISPENSE FUEL.

Step 1. Check fuel level in the fuel tanks.

Fill tanks, if empty.

Step 2. Check position of tank valve control levers.

Pull levers to the ON position.

Step 3. Check differential pressure gauge on filter separator to determine if filters are clogged.

Notify Unit Maintenance to replace filter elements.

Step 4. Check nozzle screen for foreign material.

Clean as necessary.

Table 3-1. Troubleshooting-CONT

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

2 PUMP LOSES PRIME.

Step 1. Check for kinked hoses.

Straighten hoses.

Step 2. Check for faulty tank valve operating linkage.

Notify Unit Maintenance for repair of valve operator linkage.

3 PUMP OPERATES, BUT DOES NOT PRIME.

Step 1. Check for kinked hoses.

Straighten hoses.

Step 2. Check for faulty tank valve operating linkage;

Notify Unit Maintenance for repair of valve operator linkage.

Step 3. Prime the pump manually (paragraph 2-4).

4 ELECTRIC MOTOR WILL NOT OPERATE.

Step 1. Check to see if intervehicular power cable is properly connected.

Ensure cable is properly connected.

Step 2. Check to see if control cable is properly connected.

Ensure cable is properly connected or connect auxiliary ON-OFF switch.

Step 3. Check truck power supply for proper charging rate.

a. If not, notify Unit Maintenance.

b. If charging rate is sufficient, notify Unit Maintenance to inspect electric motor.

5 UNABLE TO BOTTOM LOAD EITHER TANK

Step 1. Check for inadequate supply pressure.

Notify officer in charge.

Step 2. Bottom loading port obstructed.

Disconnect nozzle and check port for foreign material.

Table 3-1. Troubleshooting - CONT

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

Step 1. If problem still exists:

Refer to Unit Maintenance.

6 FUEL FLOW WILL NOT STOP WHEN TANK IS FULL

Step 1. Check for valve operator lever in ON position.

Move lever to CLOSE position.

Step 2. If malfunction still exists:

Shut off flow, then refer to Unit Maintenance.

SECTION III. MAINTENANCE PROCEDURES

3-3 GENERAL. Operator maintenance on tank and pump unit consists of only those tasks and procedures stated in the Operator Preventive Maintenance Checks and Services (PMCS) Chart. Refer to the Operator's PMCS Chart and perform all tasks outlined at the intervals stated in the chart.

3-3/(3-4blank)

CHAPTER 4

UNIT MAINTENANCE INSTRUCTIONS

	Page
Section I. Repair Parts, Special Tools, TMDE and Support Equipment	4-1
Section II. Service Upon Receipt	4-1
Section III. Preventive Maintenance Checks and Services (PMCS)	4-7
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Section VI. Preparation for Shipment or Storage	4-67

SECTION I. REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

4-1. GENERAL.

a. No special tools are required for maintenance of the equipment. Test, Measurement and diagnostic equipment (TMDE) and support equipment include standard test equipment found in any unit maintenance shop.

b. Repair parts are listed and illustrated in the Repair Parts and Special Tools List (RPSTL), Appendix F, covering unit and direct support maintenance for this equipment.

SECTION II. SERVICE UPON RECEIPT

Paragraph		Page
4-2	Inspection	4-1
4-3	Installation	4-1
4-4	Preparation for Movement	4-6

4-2. INSPECTION.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF 364, Report of Discrepancies.

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.

4-3. INSTALLATION.

a. Equipment Required.

WARNING

Serious injury can occur when lifting. When an item cannot be lined with ease, use two or more people or a lifting device to prevent injury.

(1) Each fuel tank is equipped with four lifting shackles. Hoisting equipment, with a sling attachment, will be required to load the tanks onto the truck using the lifting shackles.

NOTE

The tanks must be oriented with the bottom loading valve toward the rear of the truck bed.

(2) If the tanks are on a loading dock that is approximately the same height as the truck on which the tanks are to be loaded, the tanks can be skidded onto the truck bed. The tiedown links, on the ends of the tank skids, can be used to assist in skidding the tanks onto the truck bed.

CAUTION

Do not attempt to skid the pumping unit onto the truck. If the A-frame tips over, it could damage components mounted on the A-Frame.

(3) The A-Frame is designed to be handled with a forklift. Use a forklift or other suitable device and lift the pumping unit onto the truck bed.

b. Installation Instructions.**CAUTION**

Load tanks on truck before filling. Extreme caution should be taken in filling tanks to avoid exceeding cross-country payload limits of transporting vehicle.

(1) Position a tank assembly (1) on the truck bed near cab, with the dowels (2) toward the rear of the truck.

NOTE

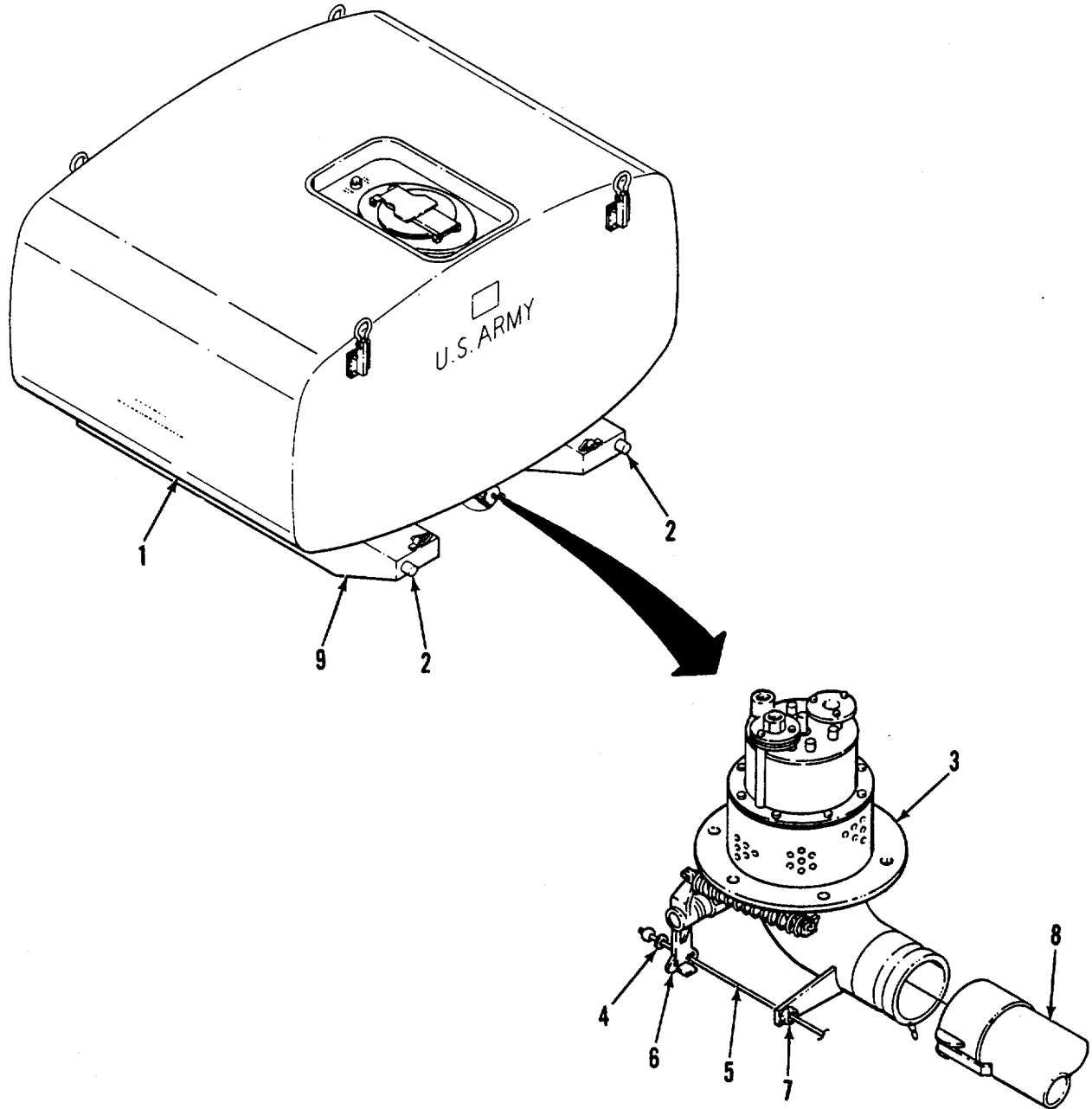
Bottom load valve must face rear.

(2) Install washer (4) on longer tank valve control cable (5) next to end ball then insert cable (5) through one of holes in bottom loading valve lever (6) and through bushing (7). Apply grease to bushing.

(3) Connect the longer tank-to-pump unit hose (8) to the bottom loading valve (3).

(4) Position the other tank assembly (1) on the truck bed. Make sure the dowel holes in the skids (9) mesh with the dowels (2) on previously installed tank assembly.

(5) Using the shorter bottom loading valve control cable (5), connect as in step 2 above for the rear tank bottom loading valve.



(6) Connect the shorter tank-to-pump unit hose (8) to the bottom loading valve (3).

(7) Position the pumping unit on the truck with nozzles toward rear of truck. Slowly push the pumping unit into position, making sure the dowels on the rear tank skids enter the dowel holes in the A-Frame. Insert the hoses and bottom loading valve cables through the holes in the A-Frame base.

NOTE

Four tiedown assemblies are used on each tank and two tiedown assemblies are used on the pumping assembly. Turnbuckles are not used on the pumping assembly.

NOTE

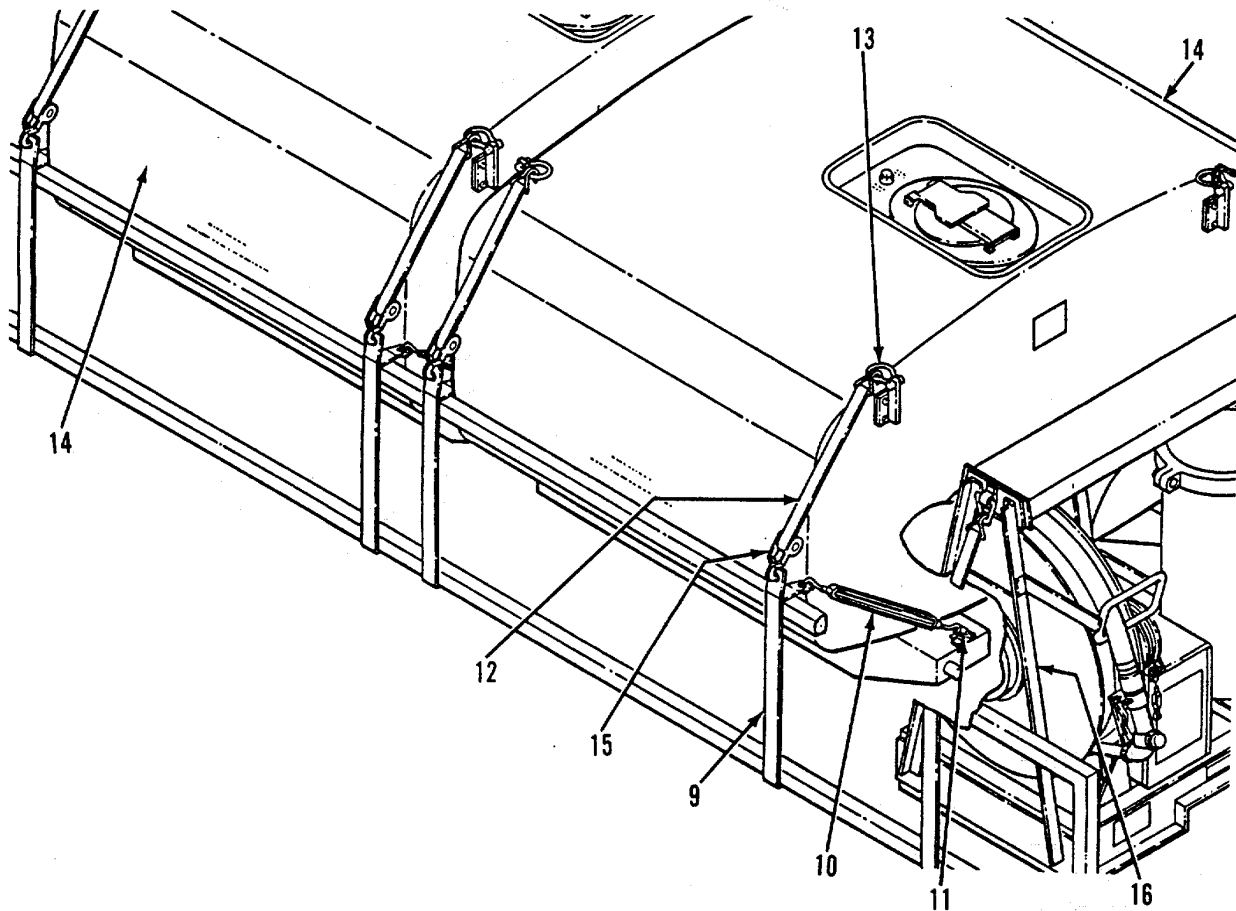
The turnbuckles must be only hand tight. Periodically check tiedown assemblies for tightness. Straps have a tendency to loosen when becoming damp or wet.

(8) Position the tie-down bracket (9) on the truck bed, and connect the turnbuckle (10) between the tie-down bracket (9) and the tie-down link (11) on the tank skid. Tighten the turnbuckles (10) hand tight.

(9) Connect the hook of the tie-down strap (12) to the shackle (13) on the fuel tank (14).

(10) To unlock or release ratchet (15) of tiedown strap assembly (12), press release in ratchet handle. Hold release, pull handle down until side cams engage, and push static ratchet locks up from ratchet dogs. This allows center ratchet spool to rotate in either direction.

(11) Connect the ratchet to the tie-down bracket (9). Operate the ratchet handle until the tie-down strap (12) is tight. Push the ratchet handle to the lock position.



(12) Repeat above steps for each of the other tie downs on tanks.

(13) Use tiedown strap assembly (12) to attach a tiedown bracket (9) between each side of truck and tiedown link at top of pumping assembly A-Frame (16).

NOTE

When connecting the tank valve cables to the tank valve control levers, make sure the front tank valve control cable is connected to the control lever on the left.

(14) Remove the nut (17) from the cable adjusting bolt (18) on the front tank valve control lever (19)

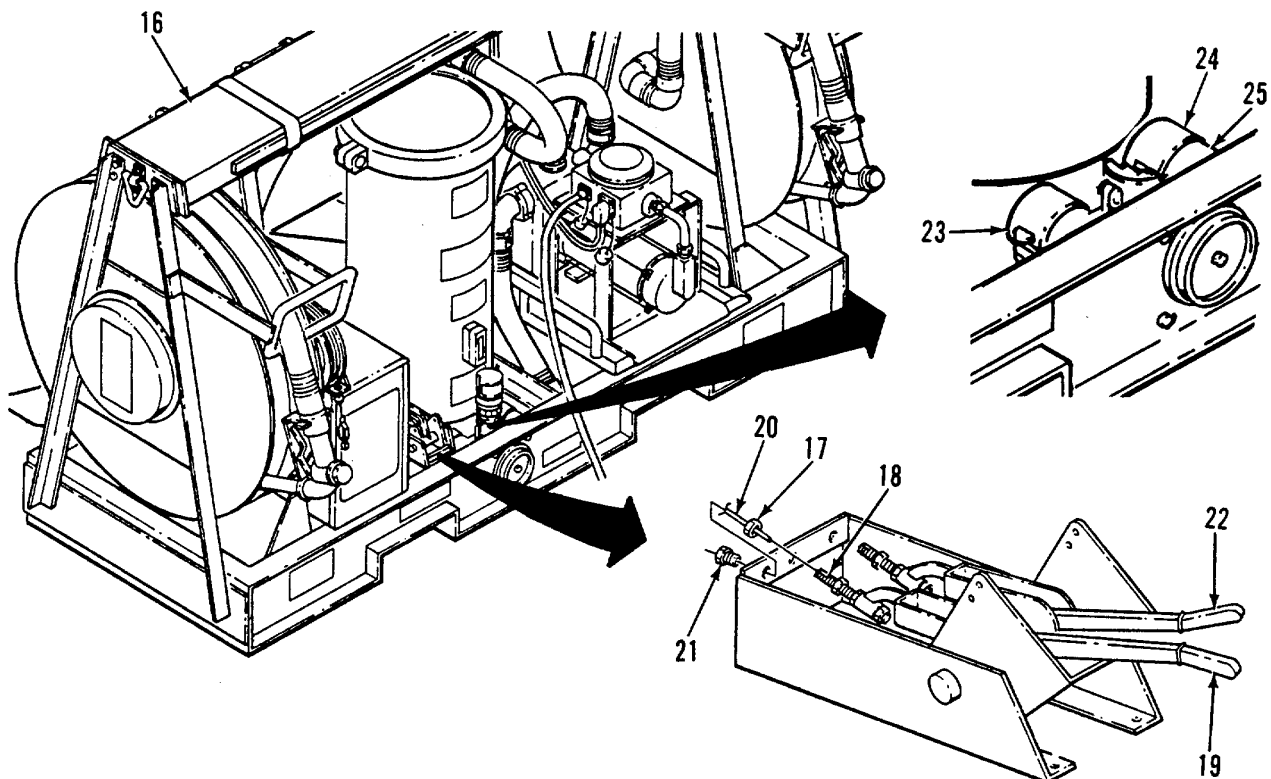
(15) Maneuver the cables (20) through the hole in the A-Frame (16) then through the bushings (21).

(16) Push the valve control lever (19) forward to the OFF (tank valve closed) position.

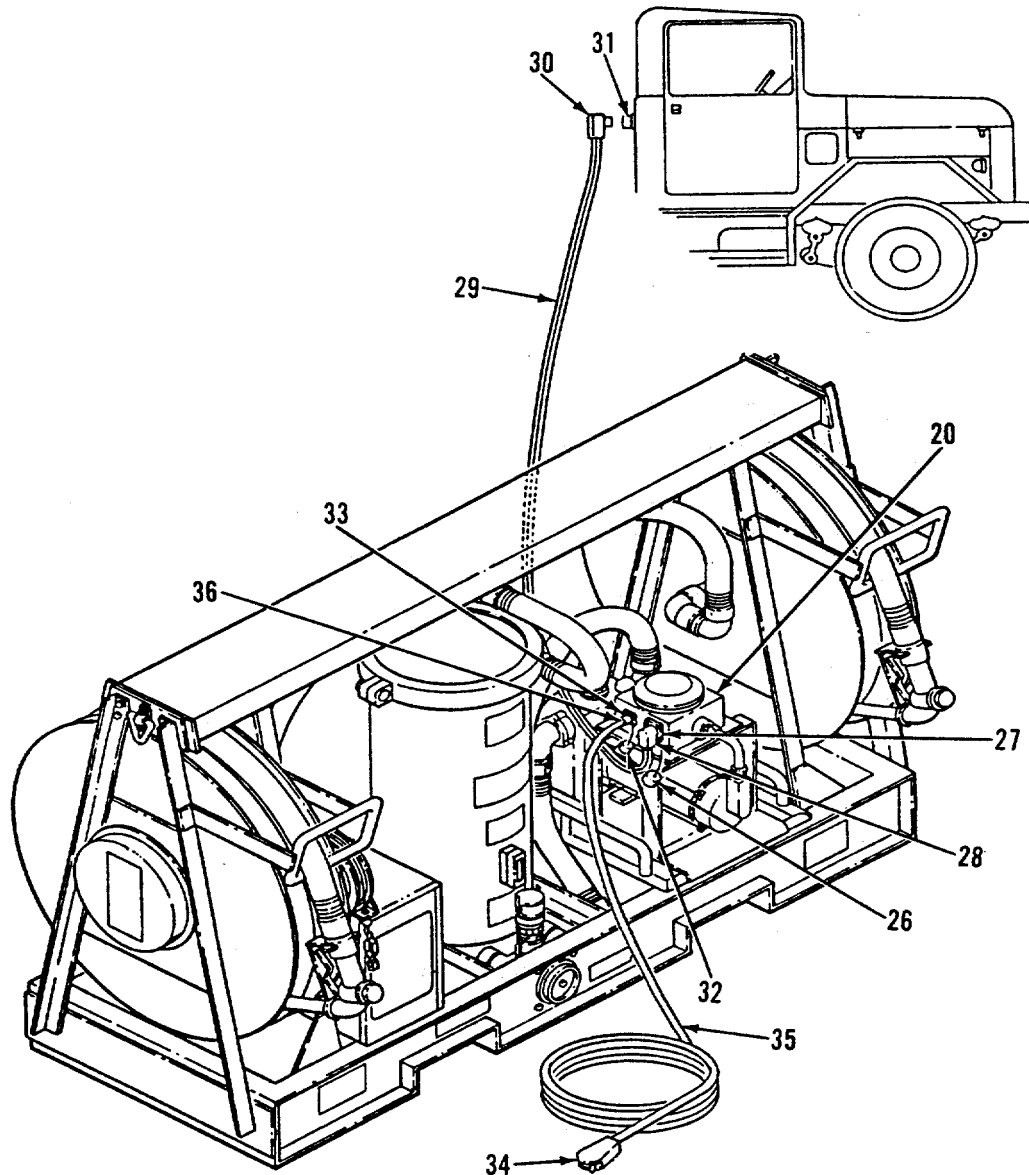
(17) Slide the nut (17) over the tank valve cable (20). Pull the cable (20) taut, and position the cable (20) in the groove in the cable adjusting bolt (18). Hold the cable (20) in position, and screw the nut (17) onto the cable adjusting bolt (18), tightly enough to ensure that the cable (20) does not slip.

(18) Connect the tank valve control cable from the rear tank valve to the rear tank valve control lever (22) by repeating steps 14 thru 17.

(19) Connect the hose from the forward tank valve to the forward tank connection (23) on the bottom loading manifold (25), then connect the hose from the rear tank valve to the rear tank connection (24) on the bottom loading manifold (25).



(20) Remove the dust cap (26) from receptacle J2 (27) on the junction box (37). Connect plug (28) on the intervehicle power cable (29) to receptacle J2 (27). Connect the plug (30) on the other end of cable (29) to receptacle (31) on rear of truck cab.



(21) Remove dust cap (32) from receptacle J1 (33). Make sure that ON-OFF switch (34) is set to OFF, then connect plug (36) at other end of cable (35) to receptacle J1 (33)

4-4. PREPARATION FOR MOVEMENT.

a. Short Distance Movement. The tank and pump unit is truck mounted and does not require dismantling for short distance movement. Move the tank and pump unit to the new worksite with the vehicle.

b. Long Distance Movement. Provide suitable blocking and tiedowns to prevent the unit from shifting during transport.

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

4-5. INTRODUCTION. To ensure the tank and pump unit is ready for operation at all times, it must be inspected systematically so that defects may be discovered, and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services are listed in Table 4-1. Defects discovered during operation of the system shall be noted for future correction to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation, which would damage the equipment if operation were continued. If the equipment fails to operate, troubleshoot with the proper equipment. Report any deficiencies using the proper forms (See DA Pam 738-750).

- a. Item Number. The number appearing in this column indicates the chronological order of the checks and services. The numbers in the item number column shall be used as a source for numbers to be entered in the TM Number Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of - PMCS.
- b. Item To Be Inspected. This column contains an entry, which identifies the item to be inspected.
- c. Procedures. This column contains a brief description of the checks to be performed.

Table 4-1. Unit Preventive Maintenance Checks and Services Monthly Schedule

Item No.	Item To Be Inspected	Procedures
1	Hoses and Fittings	<p style="text-align: center;">WARNING</p> <p>A spring loaded mechanism can cause injury if released in an uncontrolled manner. The rewind spring is under high tension when the dispensing hose is extended. This may cause reel to rapidly rotate in reverse.</p> <p>Visually inspect hoses for damage, cracking, and signs of leakage. Inspect fittings and couplings for secure connections, damage, and signs of leakage. Extending fueling hoses for inspection. Replace defective parts (para. 4-8).</p>

Item No.	Item To Be Inspected	Procedures
2	Hose Reels, Spring and Ratchet Wheels	<p style="text-align: center;">WARNING</p> <p>A spring loaded mechanism can cause injury if a released in an uncontrolled manner. The rewind spring is under high tension when the dispensing hose is extended. This may cause reel to rapidly rotate in reverse.</p> <p>Visual and operational inspection. Check operation of dispensing hose reels. Extend hoses and inspect as per item 1. Check that ratchet wheel will hold reel from rotating. Notify next higher level of maintenance if hose reels need repair.</p>
3	Nozzle	<p>Check nozzles for proper operation and leakage. Check screen for foreign matter. Repair or replace defective nozzles (para. 4-10).</p>
4	Static Discharge Reel	<p style="text-align: center;">WARNING</p> <p>A spring loaded mechanism can cause injury if released in an uncontrolled manner. The rewind spring is under high tension when the cable is extended. Always take care when working with the mechanism.</p> <p>Check for broken clamp, cable or cable coating. Replace defective reel (para. 4-9).</p>
5	Filter/Separator and Water Detector Kit	<p>Refer to TM 10-4330-232-12&P for procedures.</p>
6	EMD Pump	<p>Check pump and components for proper operation, damage or leakage. Refer to Table 4-2 to troubleshoot.</p>
7	Junction Box	<p style="text-align: center;">WARNING</p> <p>Low voltage can cause severe shock, burns or death. Disconnect power cable from NATO slave receptacle before replacing or repairing electrical components.</p> <p>Check for damaged cables, loose connections, switch or connectors. Check for damaged receptacles, housing, or cover gasket. Inspect relay switch and connections inside the junction box for loose connections and corrosion. Clean corroded connections, replace defective parts and tighten loose connections. Refer to para. 4-12 for maintenance.</p>

Item No.	Item To Be Inspected	Procedures
8	Electric Motor	Inspect for loose or missing mounting bolts. Check for proper operation. Tighten loose hardware. Notify next higher level if motor is inoperable.
9	Intervehicle Power Cable and Plug	Check for loose or damaged cable or connectors. Test for continuity (para. 4-15).
10	Valve Operating Assembly	Check for proper operation. Check that cables are securely connected. Tighten loose cables (para. 4-17).
11	Adapter Half, Quick Disconnect	Inspect for secure connections, damage and signs of leakage. Disconnect Refer to para. 4-18 for maintenance.
12	Bottom Loading Manifold	Inspect for secure connections, damage and signs of leakage. Refer to para. 4-19 for repair.
13	Frame and Storage Box	Inspect frame for cracks, loose and missing hardware or components. Tighten loose hardware. Notify next higher level for repairs.
14	Tie Down Assembly	Inspect tie down assemblies for looseness, cracked welds and thread damage. Check for frayed, missing, or loose straps and turnbuckles. Replace defective assemblies (para. 4-21). Tighten loose turnbuckles hand tight.
15	Tank Assemblies	Inspect for damage or signs of leakage. Inspect for damaged or missing shackles and tie down links. Inspect skids for damage. Inspect the bottom loading valve for leaks. If the tank is damaged or leaking, replace the tank (para. 4-23). Refer to next level for repair to tank or bottom loading valve.
16	Manhole	<p style="text-align: center;"><u>CAUTION</u></p> <p>When pumping operation is in progress blockage of the vent valve can cause the tanks to rupture or collapse. In freezing weather, especially during freezing precipitation, ensure the vent valve in the manhole is protected by being located under the Fill Plug Hinge.</p> <p>Check the manhole gasket for damage, and replace if necessary. Ensure that the manhole mounting hardware is tight. Check to see that the manhole cover hinge and cam close tightly.</p>
17	Coupling Half	Check for signs of leakage around the valve handle shaft. Check coupling gasket for cracks. Inspect coupling for secure connection. Test coupling half by observing the internal valve mechanism as the handle is moved to ensure handle operates valve. Refer to para. 4-26 for maintenance procedure.

SECTION IV. TROUBLESHOOTING

4-6. GENERAL

a. Table 4-2 lists the common malfunctions which you may find during the operation or maintenance of the tank and pump unit. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 4-2. Unit Maintenance Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

1 FUEL WILL NOT BEGIN TO FLOW

Fusible link of valve operator control cable apart or control cable pulled loose.

Reconnect control cable to valve operator mechanism. (Para. 4-17)

2 FUEL FLOW SLOWS OR STOPS DURING OPERATION

Step 1. Inspect for defective nozzle.

Repair defective nozzle. (Para. 4-10) imp

Step 2. Check for clogged filter elements.

Replace filter elements. (Refer to TM 10-4330-232-12&P,

3 ELECTRIC MOTOR WILL NOT OPERATE

Step 1. Check vehicle power supply.

Check that vehicle charging system is operating properly. (Refer to manual for vehicle.)

Step 2. Check power and control cables. "

Check continuity of intervehicle and OFF-ON switch control cables. Replace defective cables. (Para. 4-15, 4-16)

Step 3. Check electric motor.

Notify next higher level of maintenance.

4 PUMP WILL NOT OPERATE AT RATED CAPACITY

Step 1. Check differential pressure gauge on filter/separator to determine if filter elements are clogged or dirty.

Replace clogged or dirty filter elements. (Refer to TM 10-4330-232-12&P)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

4 PUMP WILL NOT OPERATE AT RATED CAPACITY - CONT

Step 2. Check for kinked or damaged hoses.

Replace kinked or damaged hoses. (Para. 4-8)

Step 3. Check for defective nozzle assembly.

Repair defective nozzle. (Para. 4-10)

Step 4. Check that bottom loading valves are opening properly, when valve control levers are pulled to the ON position.

Adjust bottom loading valve control linkage. (Refer to Para. 4-3.)

Step 5. Check for leaks in suction hoses, and for leaking gaskets.

Replace defective hose or gasket. (Para. 4-22)

5 FUEL FLOW WILL NOT STOP WHEN TANK IS FULL

Bottom loading valve malfunction.

Drain tank and refer to next level of maintenance.

6 TANK WILL NOT BOTTOM LOAD

Step 1. Inspect jet level sensor to see if fuel is present in drain tube. If fuel is present:

Refer to next level of maintenance.

Step 2. Inspect jet level sensor to see if fuel is present in drain tube. If fuel is not present:

a. Repair or replace jet level sensor (Para. 4-25).

b. Remove and check manifold to tank hose (Para. 4-22).

SECTION V. UNIT MAINTENANCE INSTRUCTIONS

Paragraph		Page
4-7	Pump Unit Replacement.....	4:12
4-8	Hose Replacement	4:14
4-9	Static Discharge Reel Maintenance.....	4:18
4-10	Dispensing Nozzle Maintenance	4:19
4-11	Filter Separator Maintenance	4:23
4-12	Junction Box Maintenance.....	4:25
4-13	Pump and Electric Motor Maintenance.....	4:32
4-14	Centrifugal Pump Maintenance	4:34
4-15	Intervehicle Power Cable	4:35
4-16	ON-OFF Cable Assembly	4:36
4-17	Valve Operating Lever Assembly Maintenance.....	4:38
4-18	Adapter Half Maintenance	4:42
4-19	Bottom Loading Manifold Maintenance.....	4:45
4-20	Storage Box Maintenance	4:48
4-21	Tie Down Assembly Maintenance.....	4:49
4-22	Tank Hose Maintenance.....	4:50
4-23	Tank Maintenance	4:54
4-24	Manhold Maintenance.....	4:55
4-25	Jet Level Sensor Maintenance.....	4:61
4-26	Coupling Half Maintenance.....	4:63

4-7. PUMP UNIT REPLACEMENT.

This task consists of: a. Removal b. Installation

INITIAL SETUP

Tools Required

General Mechanics Tool Kit (Appendix B, Section III, Item 3)

Materials/Parts Required

None

Equipment Condition

Shut Down

General Safety Instructions

WARNING

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

WARNING

Do not smoke or use open flame within 50 feet (15.34 meters) of the Tank and Pump Unit.

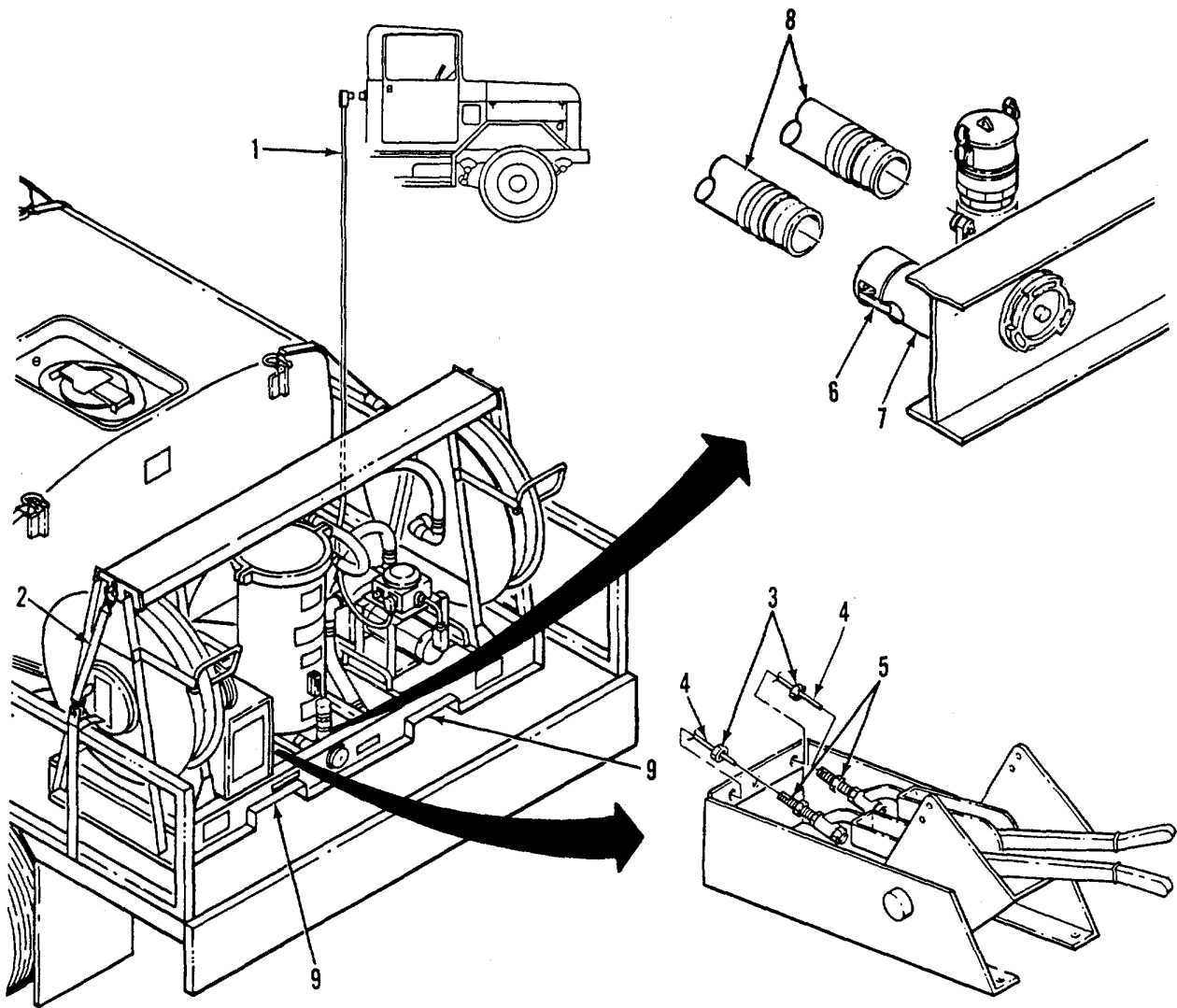
REMOVAL

- a. Park on hard level surface.
- b. Disconnect intervehicular power cable (1).

- c. Release pump unit tiedowns (2).
- d. Loosen nuts (3) and disconnect cables (4) from adjusting bolts (5).
- e. Pull out on cam lock levers (6) on manifold (7) to release tank hoses (8).
- f. Insert fork lift forks into slots (9) in A-Frame base.
- g. Lift pump unit and back away from truck.

INSTALLATION

- a. Use fork lift to place pump unit on truck.
- b. Refer to paragraph 4-3 to complete installation.



4-8. HOSE REPLACEMENT

This task consists of: a. Removal b. Installation

INITIAL SETUP

Tools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)

Materials/Parts Required

Lockwire (Appendix F)

Suitable Container

Drip Pan

Equipment Condition

Shut Down

Personnel Required

Two (2)

General Safety Instructions

WARNING

Do not smoke within 50 feet (15.34 meters) of Tank and Pump Unit. Spring loaded mechanisms can cause injury. Fuel spills create a potential fire hazard.

WARNING

Do not smoke or use open flame within 50 feet (15.34 meters) of tank and pump unit.

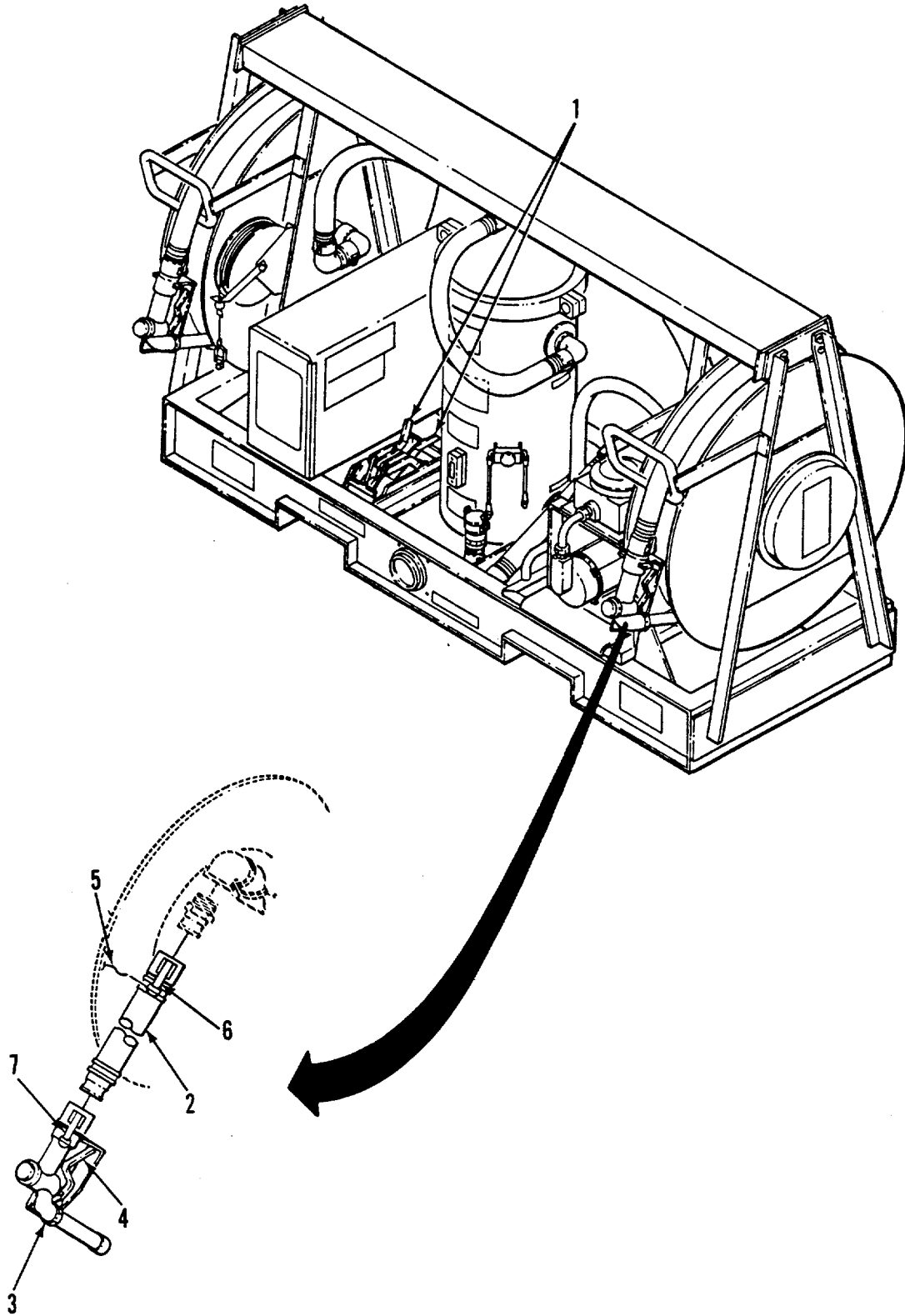
REMOVAL

- a. Perform safety procedures.
- b. Move tank levers (1) to OFF.
- c. Position a suitable container downhill of pump unit.

WARNING

A spring loaded mechanism can cause injury if released in an uncontrolled manner. The rewind spring is under high tension when the dispensing hose is extended. This may cause reel to rapidly rotate in reverse.

- d. Unwind reel hose (2) full length and place nozzle (3) over container. Operate lever (4) and drain fuel from reel hose. Repeat procedure for other reel hose.
- e. To remove reel hose (2), remove lockwire (5) and pull out on cam lock arms (6). Pull out on cam lock arms (7) to separate the hose (2) from nozzle (3).



f. Provide a suitable container beneath the filter/separator drain hose (8), open drain valve (9) and drain fuel from filter/separator (10) and hoses (11, 12,13 and 14).

WARNING

Fuel spills create a potential fire hazard. Use a drip pan beneath hoses when disconnecting.

g. To remove any of hoses (11, 12 or 13), pull out on cam lock arms (15) and disconnect hose.

h. To remove hoses (14 and 16), pull out on cam lock arms (17) to disconnect hoses at filter/separator and manifold, then refer to paragraph 4-13 and remove the EMD Pump Assembly (18).

i. Pull out on cam lock arms (19) and disconnect hoses (14 and 16).

j. Remove any of the gaskets (20) that require replacement.

INSTALLATION

a. Make sure each female coupling has a good gasket (20) installed.

b. Connect hoses (14 and 16) to EMD Pump Assembly (18) and close cam lock arms (19). Refer to paragraph 4-13 and install pump assembly.

c. Connect hoses (14 and 16} at filter/separator and manifold and close cam lock arms (17).

d. Install hoses (11, 12 and 13) and close cam lock arms (15).

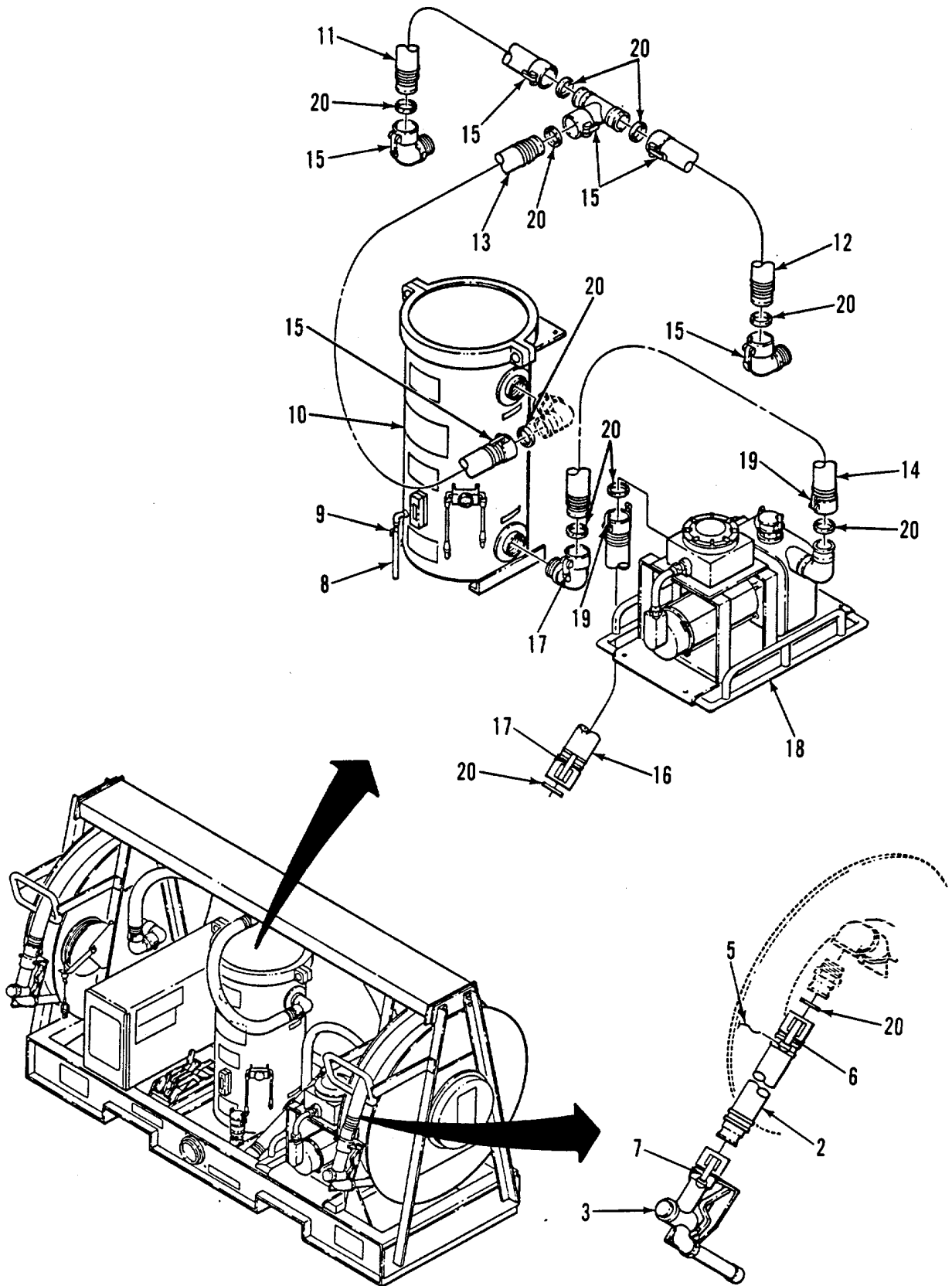
WARNING

A spring loaded mechanism can cause injury if released in an uncontrolled manner. The rewind spring is under high tension when the dispensing hose is extended. This may cause reel to rapidly rotate in reverse.

e. Connect reel hoses (2) and close cam lock arms (6). Install lockwire (5) and wind hose onto reel.

f. Connect nozzle (3) to hose (2) and close cam lock arms (7).

g. Make sure that drain valve (9) is closed.



4-9. STATIC DISCHARGE REEL MAINTENANCE

This task consists of: a. Removal b. Installation

INITIAL SETUP**Tools Required**

General Mechanic Tool Kit (Appendix 8, Section III, Item 3)
Torque wrench (Appendix B, Section III, Item 2)

Materials/Parts Required

Lockwasher (2) (Appendix F)

General Safety instructions**WARNING**

Spring loaded mechanisms can cause injury.

REMOVAL**WARNING**

A spring loaded mechanism can cause injury if released in an uncontrolled manner. The rewind spring is under high tension when the dispensing hose is extended. This may cause reel to rapidly rotate in reverse.

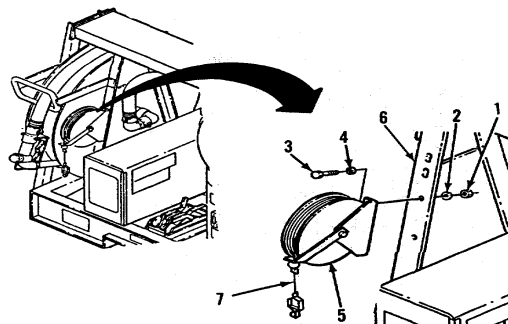
NOTE

Discard mandatory replacement parts.

- a. Remove nuts (1), lockwashers (2), screws (3) and flat washers (4).
- b. Remove static discharge reel assembly (5) from frame (6).

INSTALLATION

- a. Position static reel assembly (5) on frame (6) and aline mounting holes.
- b. Install screws (3), flat washers (4), lockwashers (2) and nuts (1). Torque to 50 - 55 ft.-lbs. (67.8 - 74.6 Nm).
- c. Pull cable (7) all the way out and check to see that it rewinds fully. onto static discharge reel (5).



4-10. DISPENSING NOZLE MAINTENANCE

This task consists of:

- | | | |
|-------------|-----------------|-----------|
| a. Removal | b. Disassembly | c. Repair |
| d. Assembly | e. Installation | |

INITIAL SETUP

Tools Required

- General Mechanic Tool Kit (Appendix B, Section III, Item 3)
- Pipe Wrench (Appendix B, Section III, Item 2)

Materials/Parts Required

- Drycleaning Solvent (Appendix E, Section II, Item 1)
- Silicone Compound (Appendix E, Section II, Item 5)
- Sealing Compound (Appendix E, Section II, Item 6)
- Rags, Wiping (Appendix E, Section II, Item 13)
- Suitable Container
- O-Ring Packing (1) (Appendix F)
- Gasket (1) (Appendix F)

Equipment Condition

- Pumping Unit Shutdown

General Safety Instructions

WARNING

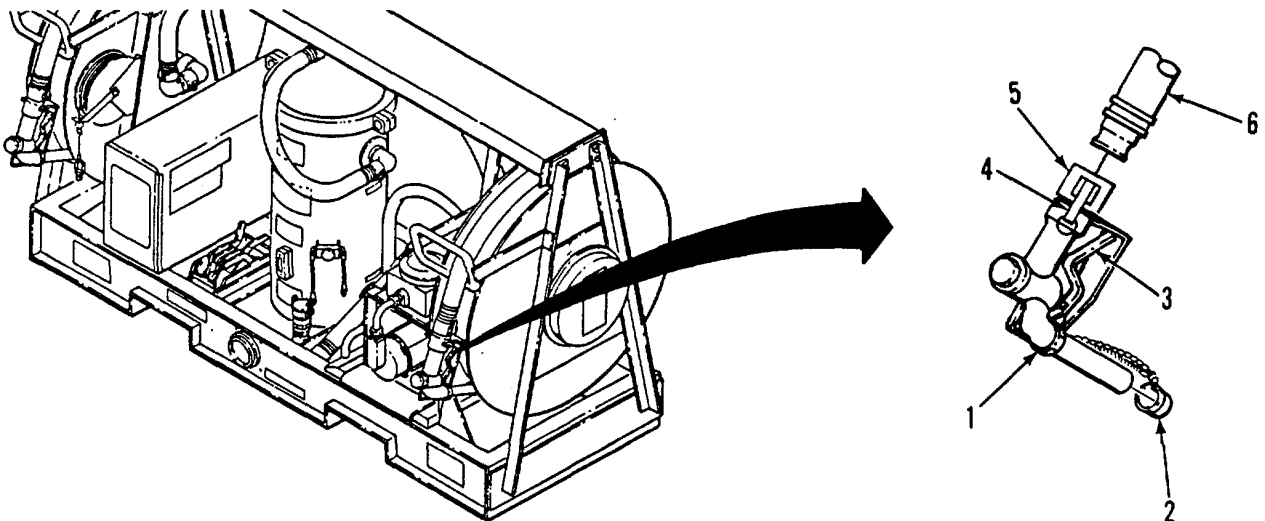
Drycleaning solvent is potentially dangerous to personnel and property.

Using compressed air can be dangerous.

Silicone compound is toxic to skin, eyes and respiratory tract.

REMOVAL

- a. Position a suitable container beneath nozzle (1), remove cap (2) and operate nozzle lever (3) to drain any fuel from nozzle.
- b. Pull out on cam lock arms (4) of coupling half (5) and disconnect nozzle (1) from reel hose (6).



DISASSEMBLY

- a. Unscrew spout (1) and remove O-ring packing (2), gasket (3) and strainer element (4) from body (5).

NOTE

Further disassembly should only be performed to the extent required for parts replacement.

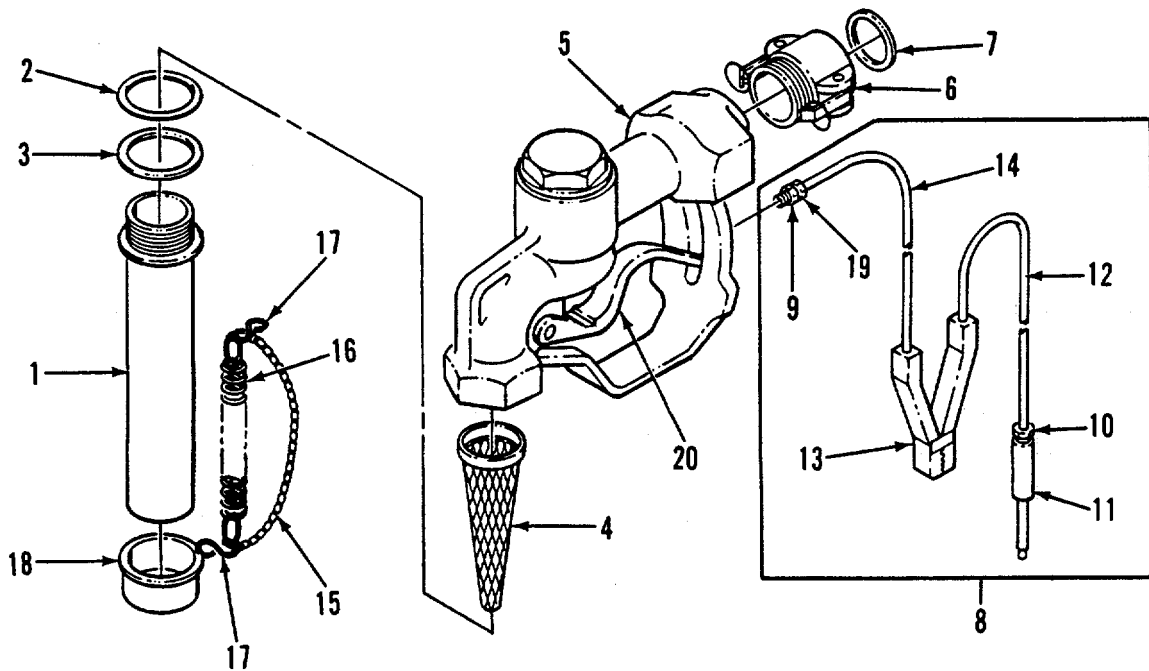
- b. Unscrew and remove coupling half (6). If gasket (7) is damaged, remove gasket from coupling half.
- c. Unscrew contact (9) from body (5) and remove static discharger (8). Hold nut (10) and unscrew plug (11) from nut. Pull nut (10) from cable (12) only if it requires replacement.
- d. To remove chain (15) and/or spring (16), spread open e-hooks (17) and disconnect chain (15) and spring (16)
- e. Spread open the other end of e-hooks (17) to remove them from the body (5) and cap (18).

REPAIR

WARNING

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

- a. Clean all metal parts with drycleaning solvent and dry thoroughly.



- b. Inspect nozzle body (5) and spout (1) for damage. Check free operation of lever (20).
- c. Inspect coupling half (6) for any damage. Check the gasket (7) and replace if damaged.
- d. Check grounding wires (12 and 14) for breaks, fraying and broken or missing covering. Make sure clip (13) jaws close firmly and inspect plug (11) and nut (10) for any damage. If clip (13) or wire (12) are defective, replace complete static discharger (8).

NOTE

Do not shorten grounding wire to less than 18 inches between contact and clip.

e. If grounding wire (14) is broken or frayed at the contact (9) it may be repaired. Hold nut (19) and unscrew contact (9). Pull nut from wire (14) and cut off the frayed portion of the wire. Trim plastic cover from the end of wire and slide nut (19) over the end of wire (14), allowing approximately 1/4 inch of wire to extend through nut. Use a punch, or similar tool, to spread the end of wire (14) slightly, then screw contact (9) onto nut (19).

- f. If nut (10) was removed, use the same procedure as above to install it on wire (12).

WARNING

Compressed air used for cleaning can create airborne particles that may enter the eyes. Pressure will not exceed 30 psig. Eye protection required.

- g. Use low pressure compressed air to dry strainer element (4) and remove any trapped particles. Replace the strainer element if there is damage to the screen.
- h. Replace any other parts that are damaged. Use a new O-ring packing (2) and gasket (3) at assembly.

ASSEMBLY

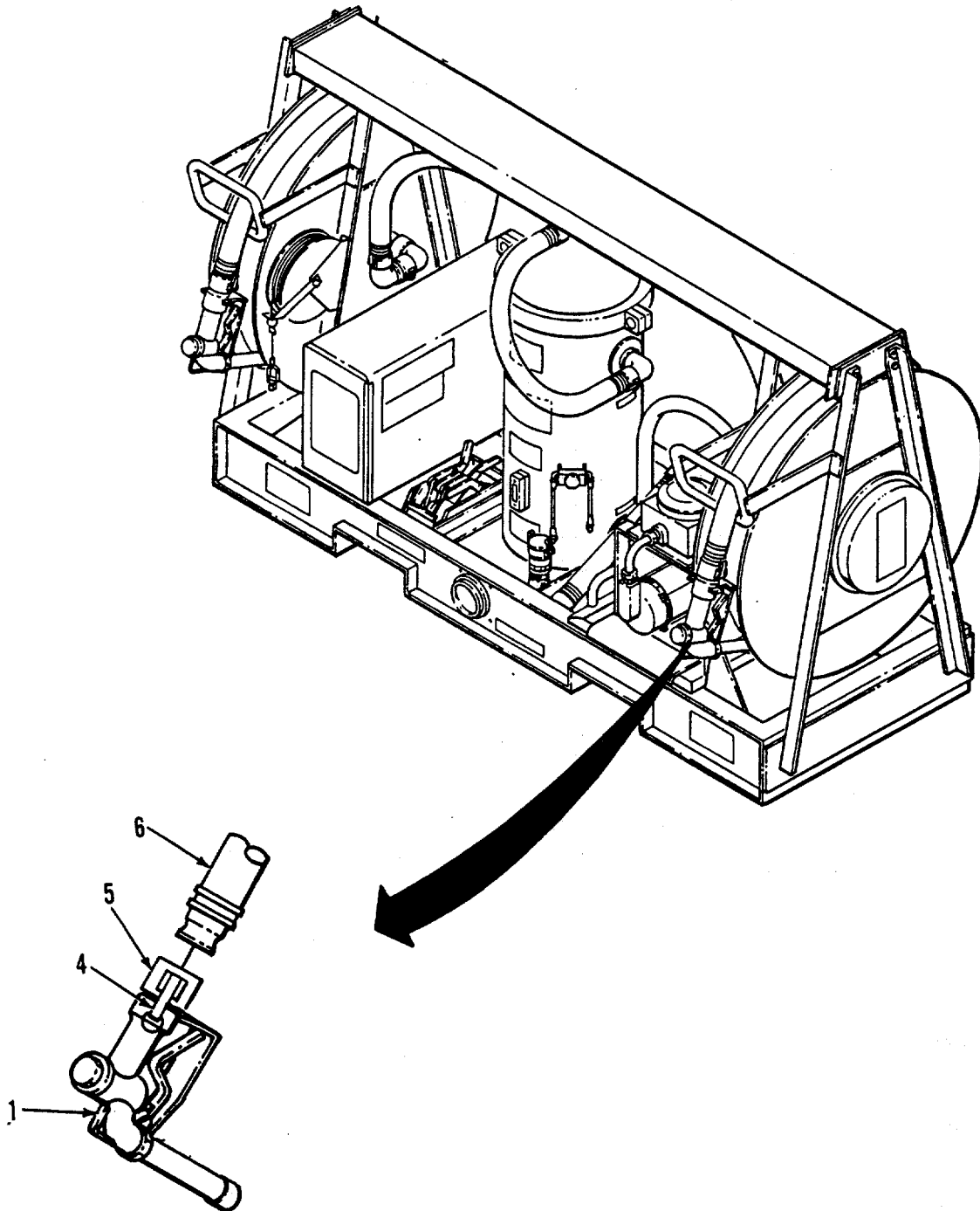
WARNING

Silicone compound, MIL-S-8660, is toxic to skin, eyes and respiratory tract. Skin and eye protection required. Avoid repeated or prolonged contact. Good general ventilation is normally adequate.

- a. Apply silicone compound to O-ring packing (2) and install it on strainer element (4).
- b. Install strainer element (4) and gasket (3) on spout (1) and screw spout into nozzle body (5), hand tight.
- c. Screw plug (11) onto nut (10) and install the static discharger (8) by screwing contact (9) into nozzle body (5)
- d. Connect chain (15) and spring (16) to e-hooks (17) and squeeze the e-hook closed. Connect the s-hooks to the body (5) and cap (18) and squeeze closed. Install the cap (18) on spout (1).
- e. Apply sealing compound to threads of coupling half (6) and screw coupling half into body (5). Install gasket (7).

INSTALLATION

- a. Install nozzle (1) on reel hose (6).
- b. Close cam lock arms (4) on coupling half (5).



4-11. FILTER/SEPARATOR MAINTENANCE

This task consists of:

- a. Removal
- b. Installation

INITIAL SETUP

Tools Required

- General Mechanic Tool Kit (Appendix B, Section III, Item 3)
- Torque Wrench (Appendix B, Section III, Item 2)

Materials/Parts Required

- Lockwasher (a) (Appendix F)

Equipment Condition

- Pumping Unit Shutdown
- Hoses Removed from Filter/Separator (Paragraph 4-8)

Personnel Required

- Two (2)

General Safety Instructions

WARNING

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

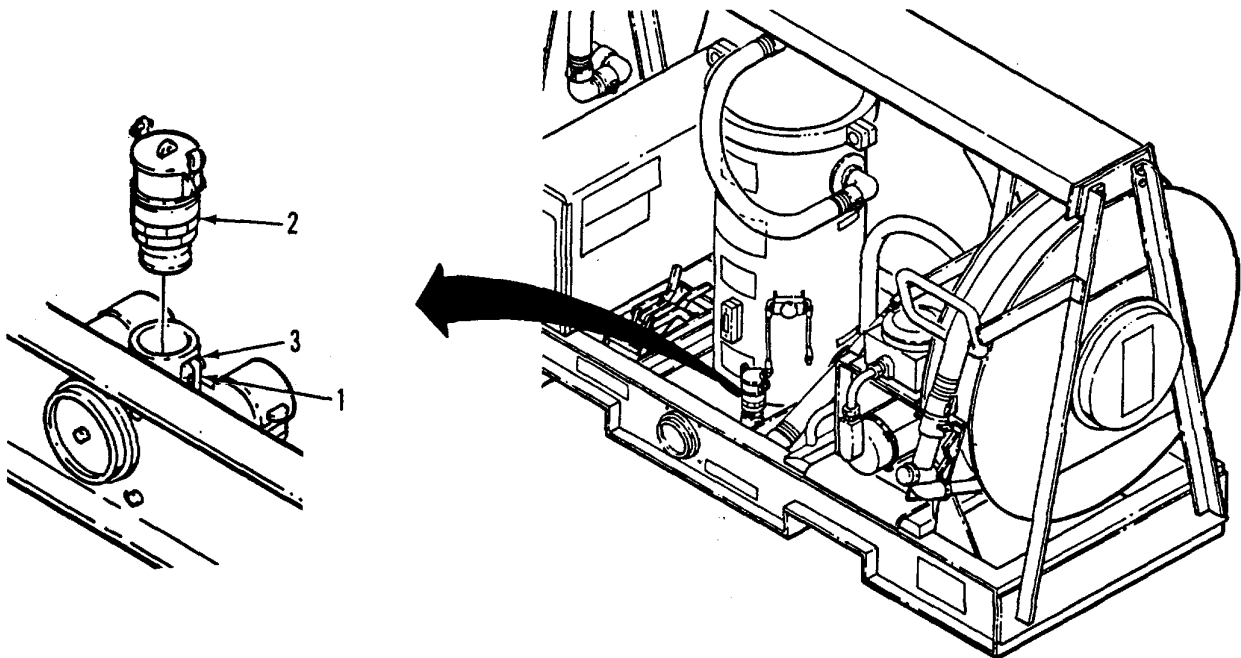
Lifting heavy equipment can cause injury.

REMOVAL

NOTE

Discard all mandatory replacement parts.

- a. Pull out on cam lock arms (1) and remove adapter had (2) from manifold (3).



- b. Remove six nuts (4), lockwashers (5), screws (6) and flat washers (7).

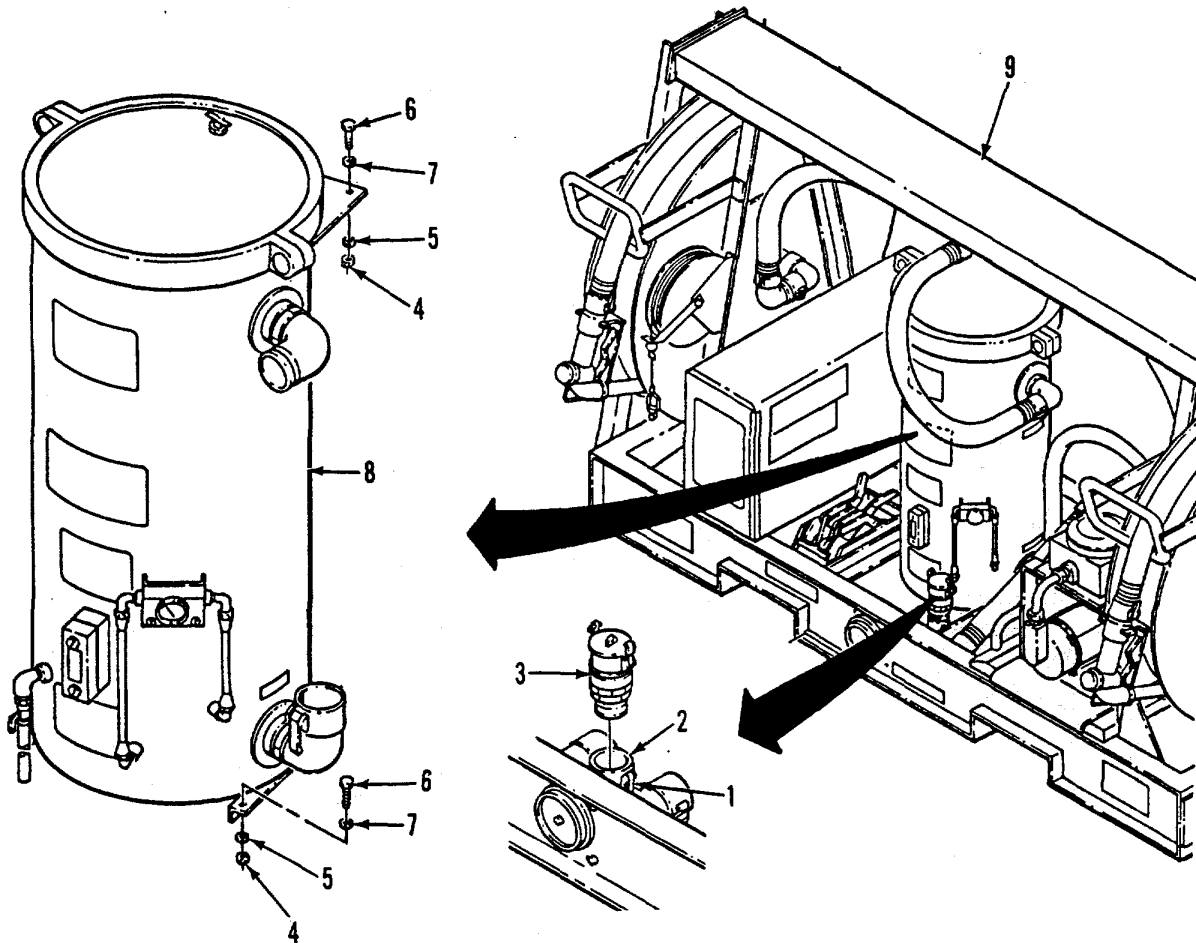
WARNING

Lifting heavy equipment can cause injury. When an item cannot be lifted with ease, use two or more people to prevent injury.

- c. Remove the filter/separator (8) from the A-Frame (9).
- d. Refer to TM 10-433-232-12&P for repair of the filter/separator.

INSTALLATION

- a. Position filter/separator (8) on A-frame (9) and aline mounting holes.
- b. Install flat washers (7), screws (6), lockwashers (5) and nuts (4). Torque to 50-55 ft.-lbs. (67-74.6 Nm).
- c. Refer to paragraph 4-8 and install hoses to filter/separator.
- d. install adapter half (2) in manifold (3) and close cam lock arms (1).



4-12. JUNCTION BOX MAINTENANCE

This task consists of:

- | | | |
|-----------------|-----------|------------|
| a. Test | b. Repair | c. Removal |
| d. Installation | | |

INITIAL SETUP

Tools Required

- General Mechanic Tool Kit (Appendix B, Section III, Item 3)
- Multimeter (Appendix B, Section III, item 11)
- Soldering Iron (Appendix B, Section III, Item 12)

Materials/Parts Required

- Silicone Compound (Appendix E, Section II, Item 5)
- Solder (Appendix E, Section II, Item 3)
- Heat Shrink Insulation (Appendix E, Section II, Item 10)
- O-Ring Packing (1) (Appendix F)
- Lockwashers (Appendix F)

Equipment Condition

- Pumping Unit Shutdown

General Safety Instructions

WARNING

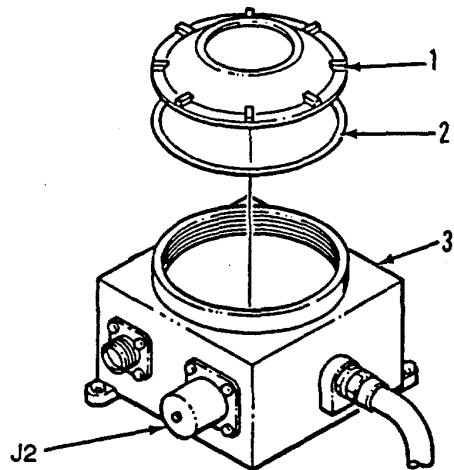
Low Voltage can cause injury or death.

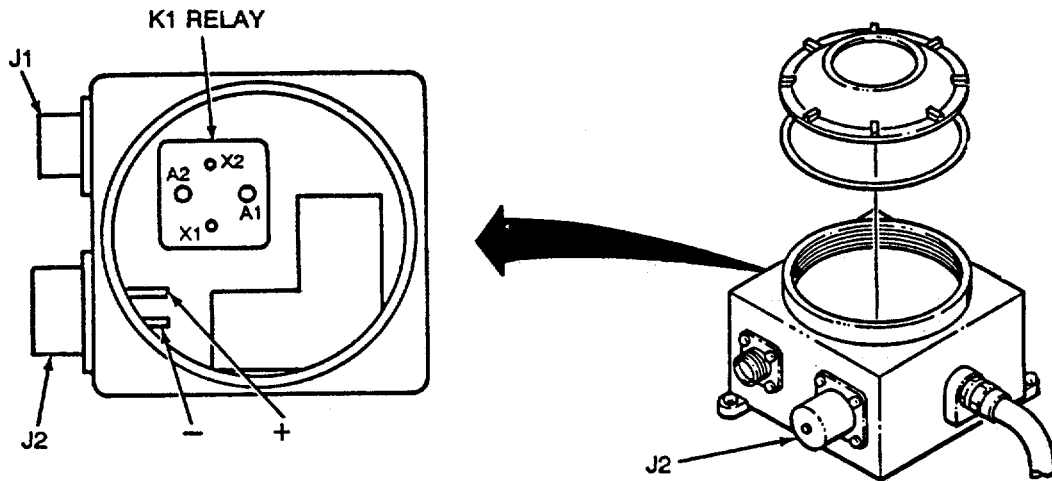
Silicone Compound is toxic to skin, eyes and respiratory tract.

Avoid fumes Generated by soldering.

TEST

- a. K1 Relay Test Procedure.
 - (1) Place ON-OFF switch in OFF position.
 - (2) Disconnect power cable from J2.
 - (3) Unscrew and remove cover (1) with O-ring packing (2) from junction box (3).





NOTE

Failure of motor thermostatic switch can prevent relay operation.

(4) The "X" circuit of the relay is grounded through the thermostatic switch in the motor. To check continuity, put probe on "X2" terminal of relay, and the other probe on negative (-) of the J2 connector.

CAUTION

The following tests require the power cable be connected as in normal pumping procedure. Exercise care in use of multimeter test probes.

- (5) Connect power cable to J2 and to vehicle NATO slave connector.
- (6) Hold negative (-) probe of multimeter on inner threaded portion of junction box for ground.
- (7) Touching positive (+) probe of multimeter to "A1" terminal of relay should give 24 ± 2 volt reading.
- (8) All other terminals should have zero readings.
- (9) Place ON-OFF switch in ON position.
- (10) Ground negative (-) probe of multimeter as above.
- (11) Touching positive (+) probe of multimeter to "X1" terminal of relay should give 24 ± 2 volt reading.
- (12) Touching positive (+) probe of multimeter to "A1" terminal of relay should give 24 ± 2 volt reading.
- (13) Touching positive (+) probe of multimeter to "A2" terminal should give 24 ± 2 volt reading.
- (14) Switch ON-OFF switch to the OFF position.

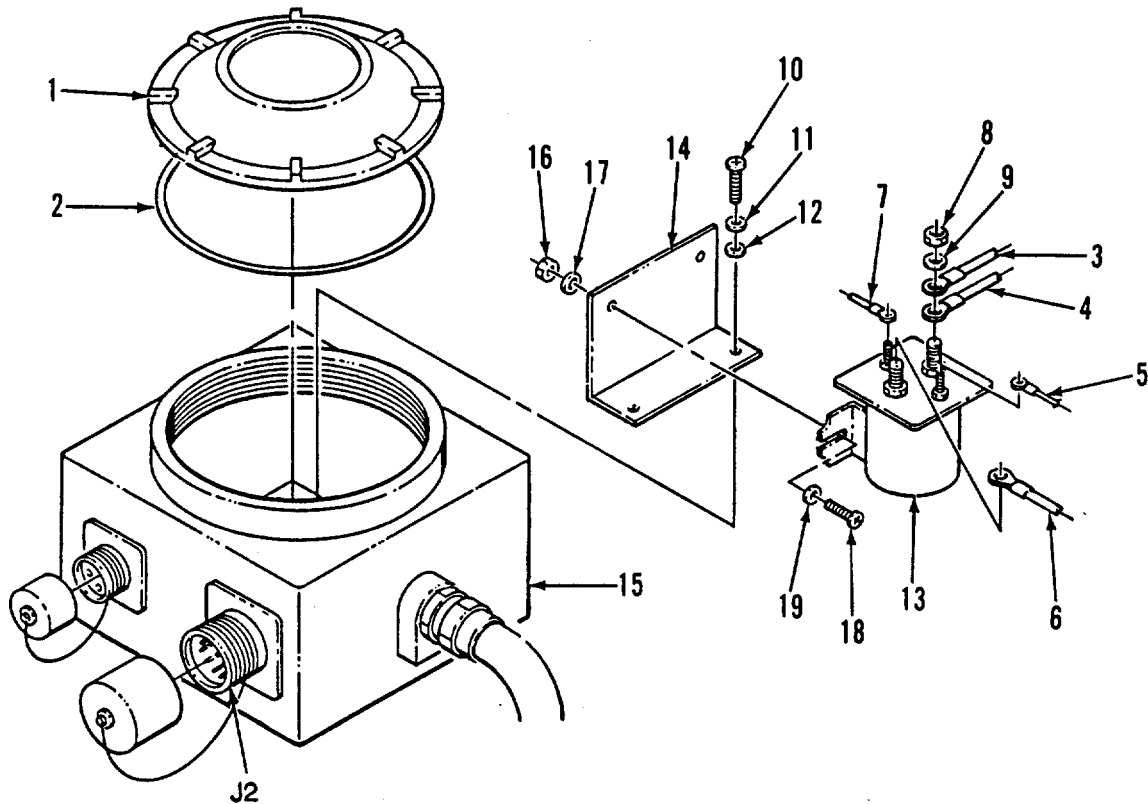
REPAIR

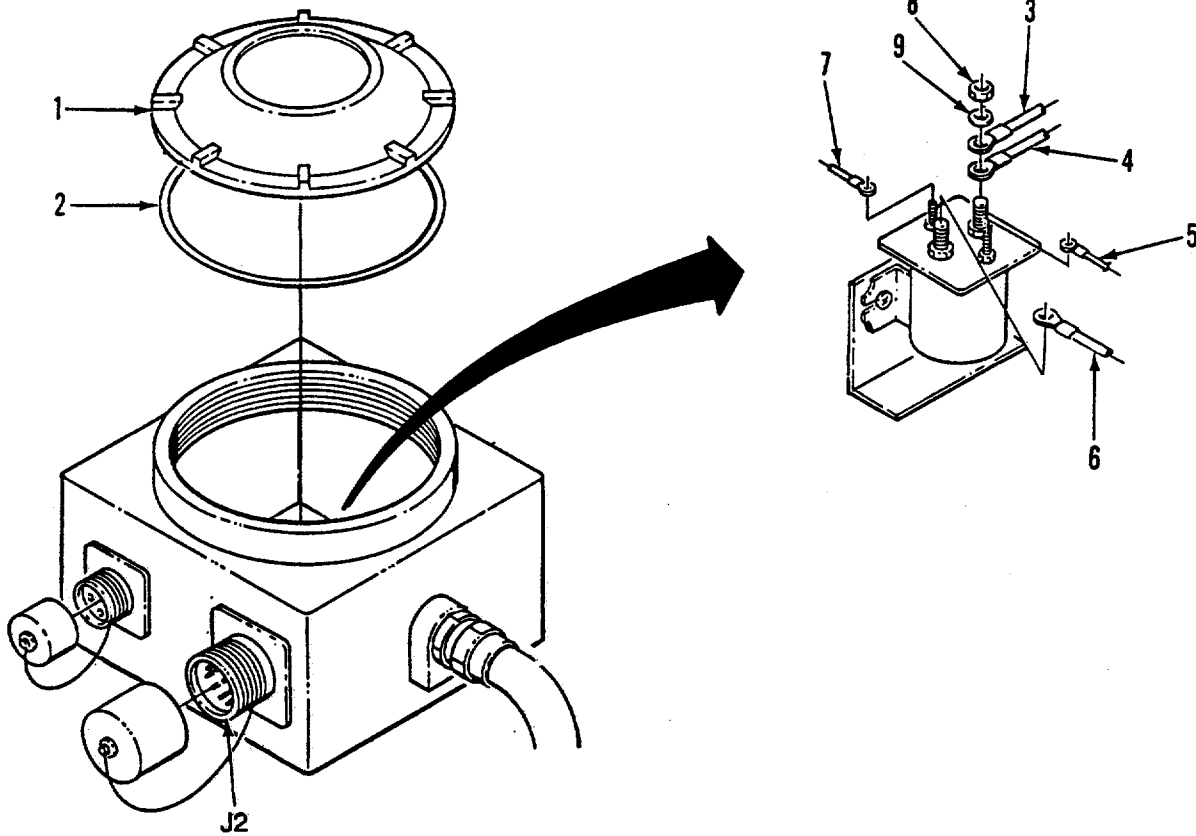
NOTE

Discard all mandatory replacement parts.

a. Replacement of K1 Relay.

- (1) Disconnect power cable from receptacle J2 and remove cover (1) and O-ring packing (2).
- (2) Tag each of the leads (3-7) connected to the relay (13), then remove nuts (8), lockwashers (9) and disconnect leads.
- (3) Remove screws (10), lockwashers (11) and flat washers (12).
- (4) Remove K1 relay (13) with bracket (14) from the junction box (15).
- (5) Remove nuts (16), star washers (17), screws (18) and flat washers (19) to separate the relay (13) from bracket (14).
- (6) Mount new relay (13) to bracket (14) with screws (18), flat washers (19), star washers (17) and nuts (16).
- (7) Install the relay and bracket in the junction box (15) and aline the mounting holes.
- (8) Install flat washers (12), lockwashers (11) and screws (10).





CAUTION

Do not over-tighten nuts. Equipment damage can result from over tightening.

- (9) Connect leads (3-7) and install lockwashers (9) and nuts (8).

WARNING

Silicone compound, MIL-S-8660, is toxic to skin, eyes and respiratory tract. Skin and eye protection required. Good general ventilation is normally adequate.

- (10) Apply silicone compound to O-ring packing (2) and install on cover (1). Install cover (1) and connect power cable at receptacle J2.

b. Removal of RF1 Filter.

- (1) Remove K1 relay (paragraph a. above).
- (2) Tag and disconnect the three leads (1) by removing nuts (2) and star washers (3).
- (3) Remove two screws (4), lockwashers (5) and flat washers (6).

(4) Move the RF1 filter (7) toward the center of opening in junction box (8), then remove screws (9) and cover (10).

(5) Make sure the leads from motor are marked as in wiring diagram, then remove nuts (11), star washers (12) and six motor leads (13). Remove the RF1 filter (7).

c. Testing RF1 Filter. Test the RF1 filter for continuity across terminals 4-1; 5-2; and 6-3. If there is not continuity at all three points, the RF1 filter is defective.

d. Installation of the RF1 Filter.

(1) Remove screws (9) and cover (10), and position RF1 filter (7) in the junction box (8).

CAUTION

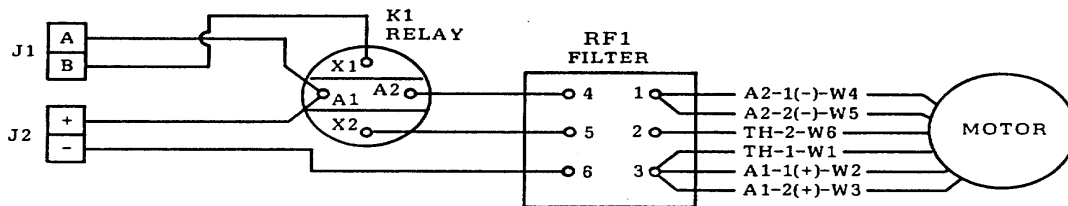
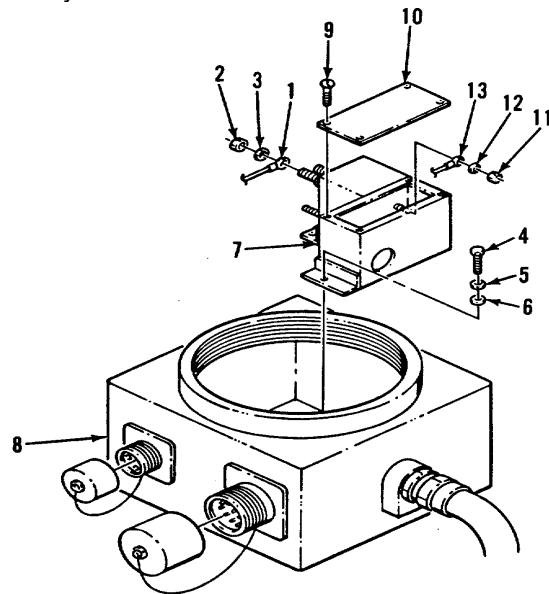
Do not over-tighten nuts. Equipment damage can result from over-tightening.

(2) Put the six motor leads (13) through the hole in back of RF1 filter and connect to terminals with star washers (12) and nuts (11). (Refer to wiring diagram for connections.)

(3) Install cover (10) and screws (9), then move RF1 filter (7) into position with mounting holes aligned. Install flat washer (6), lockwashers (5) and screws (4).

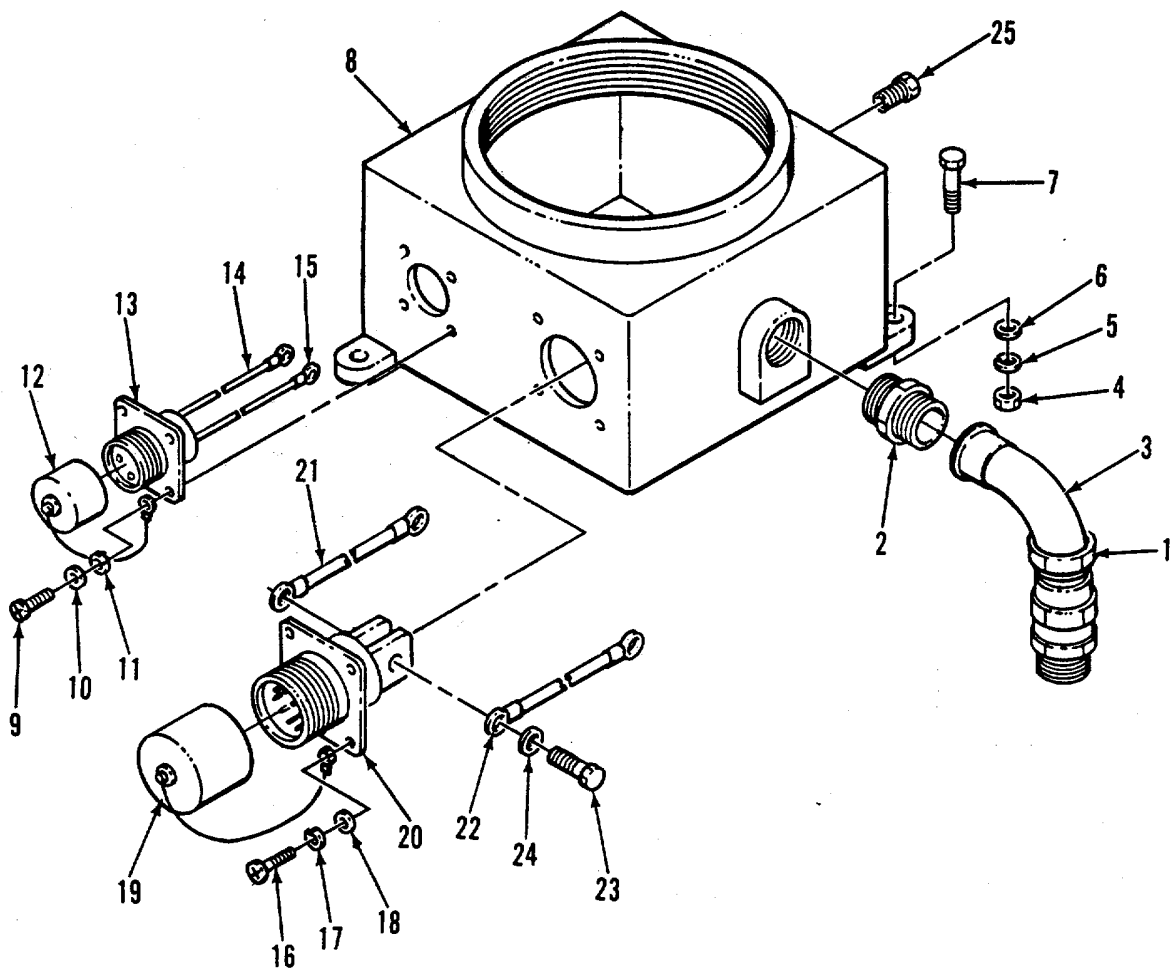
(4) Connect three leads (1) with star washers (3) and nuts (2).

(5) Refer to paragraph a. above and install K1 relay.



REMOVAL OF JUNCTION BOX

- a. Disconnect power cable and ON-OFF cable from junction box receptacles.
- b. Refer to procedures above to remove the K1 relay and RF1 filter.
- c. Unscrew coupling nut (1) from coupling (2) to release elbow (3).
- d. Remove nuts (4), lockwashers (5), flat washers (6) and screws (7).
- e. Lift junction box (8) from bracket carefully while withdrawing the motor leads.
- f. Remove screws (9), lockwashers (10), flat washers (11), dust cap (12) and receptacle J1 (13) with leads (14 and 15).
- g. Remove screws (16), lockwashers (17), flat washers (18), dust cap (19) and receptacle J2 (20) with leads (21 and 22).
- h. Remove screws (23), washers (24) and leads (21 and 22).
- i. Remove coupling (2) and vent plugs (25) from junction box (8).



INSTALLATION

- a. Install using new parts as required.
- b. Install leads (21, 22), washers (24) and screws (23) on receptacle (20).
- c. Insert leads (21, 22) through mounting hole and install receptacle (20), dust cap (19), flat washers (18), lockwashers (17) and screws (16). Attach dust cap using screw (16) at lower right of receptacle.

WARNING

Avoiding breathing fumes generated by soldering. Eye protection is required. Good general ventilation is normally adequate. Ensure good ventilation.

- d. Install heat shrink insulation on wire, then solder leads (14 and 15) to terminals of receptacle (13). Move heat shrink into position and apply heat. Install receptacle (13), dust cap (12), flat washers (11), lockwashers (10) and screws (9). Use screw (9) at lower right of receptacle to attach dust cap (12).
- e. Install vent plugs (25) and coupling (2). Place the junction box (8) on the bracket and insert the motor leads through the coupling (2). Screw the coupling nut (1) onto coupling (2).
- f. Install screws (7), flat washers (6), lockwashers (5) and nuts (4).
- g. Refer to procedures above and install the K1 relay and RF1 filter.
- h. Connect power cable and ON-OFF cable to junction box receptacles.

4-13. ELECTRIC MOTOR DRIVEN (EMD) PUMP ASSEMBLY MAINTENANCE

This task consists of:

- a. Removal
- b. Installation

INITIAL SETUP

Tools Required

- General Mechanic Tool Kit (Appendix B, Section III, Item 3)
- Torque Wrench (Appendix B, Section III, Item 2)

Materials/Parts Required

- Lockwashers (4) (Appendix F)

Equipment Condition

- Pumping Unit Shutdown
- Power Cable Disconnected
- Hoses Removed (Paragraph 4-8)

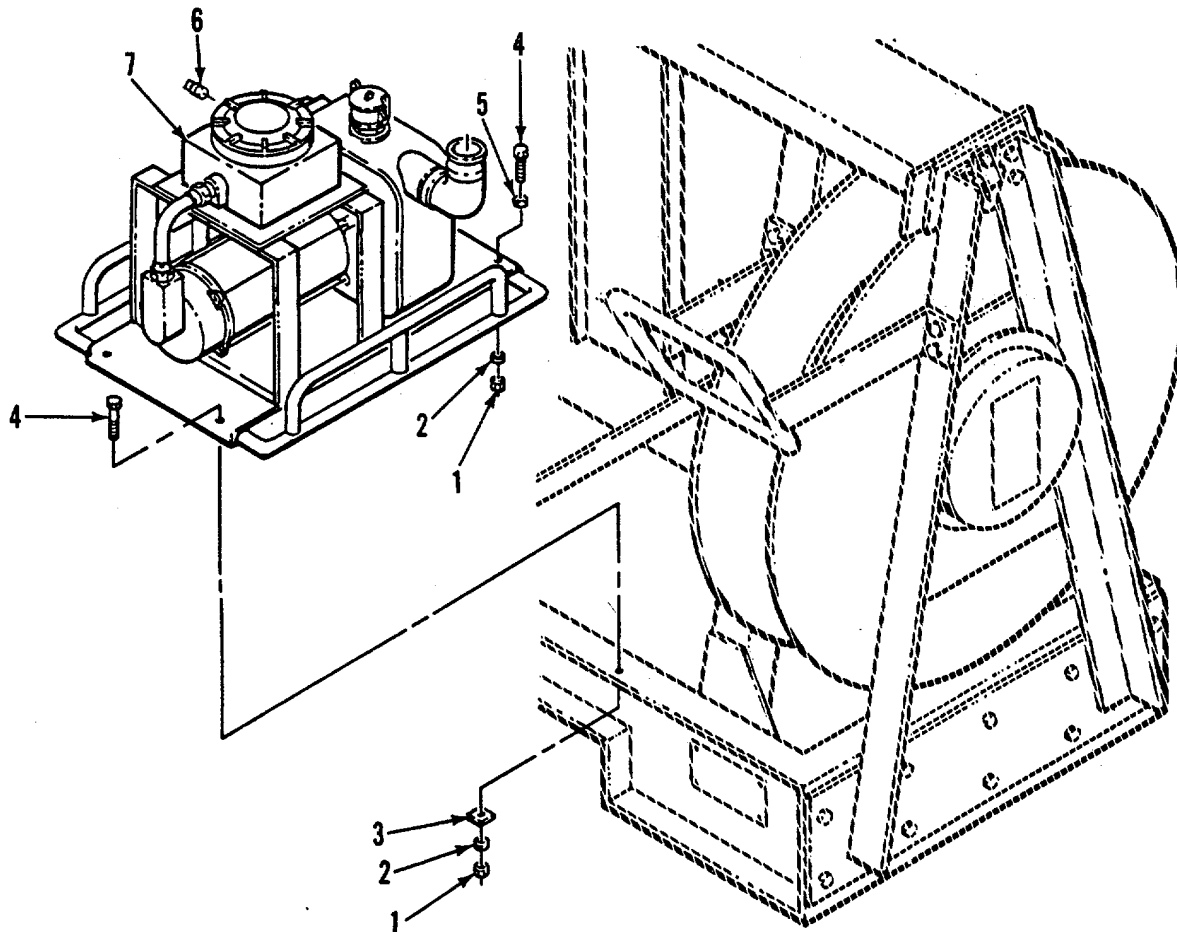
Personnel Required

- Two (2)

General Safety Instructions

WARNING

Lifting heavy equipment can cause injury.



REMOVAL**NOTE**

Discard all mandatory replacement parts.

- a. Remove nuts (1), lockwashers (2), bevel washers (3), flat washers (5) and screws (4).
- b. Drain fuel from pump by removing plug (6). Install plug.

WARNING

When an item cannot be lifted with ease, use two or more people to prevent injury.

- c. Remove the EMD pump assembly (7) from the pump unit A-Frame.

INSTALLATION

- a. Set the EMD pump assembly (7) on pump unit A-Frame.
- b. Install screws (4), flat washers (5), bevel washers (3), lockwashers (2) and nuts (1). Torque to 50-55 ft.-lbs. (67.8 -74.6 Nm).
- c. Refer to paragraph 4-8 to install hoses.
- d. Connect power cable and ON-OFF cable to junction box.
- e. Operate pump to check for proper operation.

4-14. CENTRIFUGAL PUMP MAINTENANCE

This task consists of:

- a. Repair
-

INITIAL SETUP

Tools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)

Materials/Parts Required

Check Valve Assembly (Appendix F)

Equipment Condition

Pump Unit Shutdown

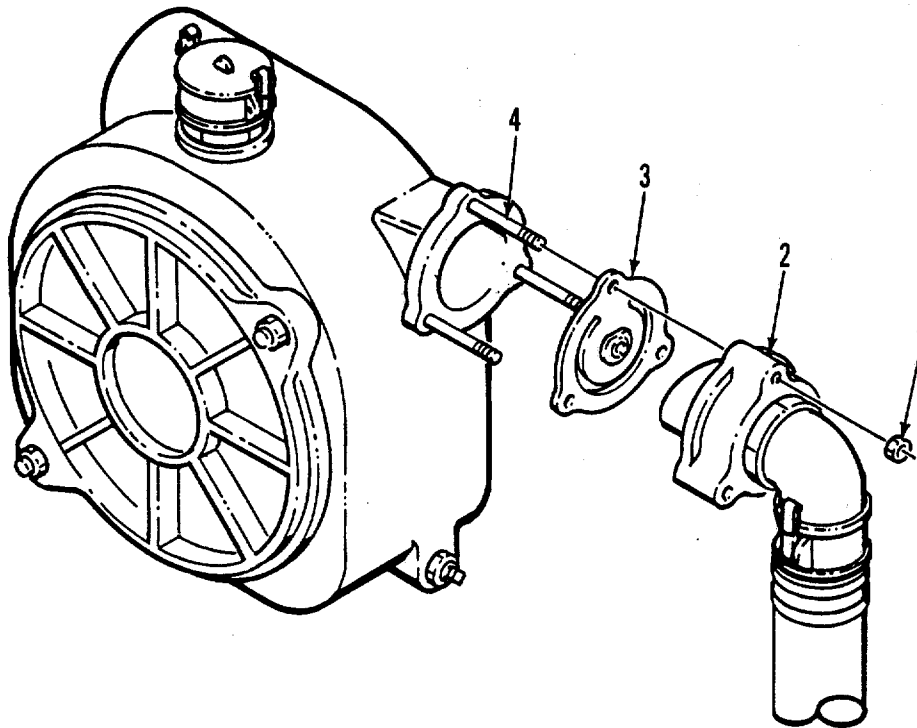
General Safety Instructions

WARNING

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

REPAIR

- a. Remove nuts (1) and disconnect flange (2) with elbow and hose attached.
- b. Remove the check valve assembly (3) from the studs (4). Discard check valve assembly.
- c. Place new check valve assembly (3) on studs (4).
- d. Position flange (2) on studs (4) and install nuts (1)



4-15. INTERVEHICLE POWER CABLE

This task consists of:

- a. Removal
- b. Test
- c. Installation

INITIAL SETUP

Tools Required

Multimeter (Appendix B, Section III, Item 11)

Materials/Parts Required

None

Equipment Condition

Pumping Unit Shutdown

General Safety Instructions

WARNING

Low voltage can cause injury or death.

REMOVAL

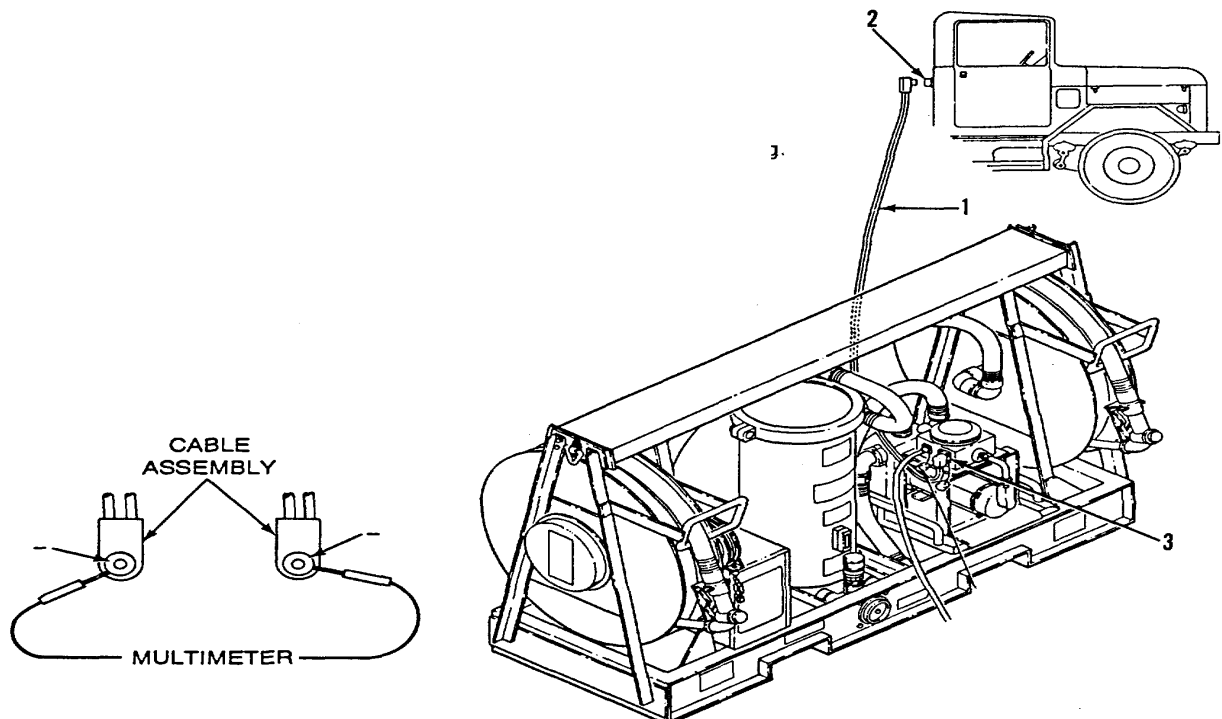
Disconnect power cable (1) from vehicle NATO slave receptacle (2) and junction box receptacle (3).

TESTING

Use multimeter to check both negative and positive sides of the cable connectors. There should be a zero to 5 ohms resistance reading. If greater than 5 ohms, replace cable.

INSTALLATION

Connect power cable to junction box receptacle (3) and Vehicle NATO slave receptacle (2).



4-16. ON-OFF CABLE ASSEMBLY

This task consists of:

- | | | |
|------------|-------------|-----------------|
| a. Removal | b. Test | c. Disassembly |
| d. Repair | e. Assembly | f. Installation |
-

INITIAL SETUPTools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)
Soldering Gun (Appendix B, Section III, Item 12)

Materials/Parts Required

Solder (Appendix E, Section II, Item 3)

Equipment Condition

Pumping Unit Shutdown

General Safety Instructions**WARNING**

Avoid breathing fumes generated by soldering.

REMOVAL

Disconnect cable (1) from junction box (2).

TEST

Test for continuity with switch in ON position. If reading is more than 5 Ohms, replace the cable or defective connector.

DISASSEMBLY

- a. Loosen screws (3) and unscrew body (4) from alinement barrel (7).
- b. Slide body (4), metal collar (5) and plastic collar (6) back on cable.
- c. Pull off alinement barrel (7) and rubber isolator (8).
- d. Tag and unsolder leads (9) from pins (10).

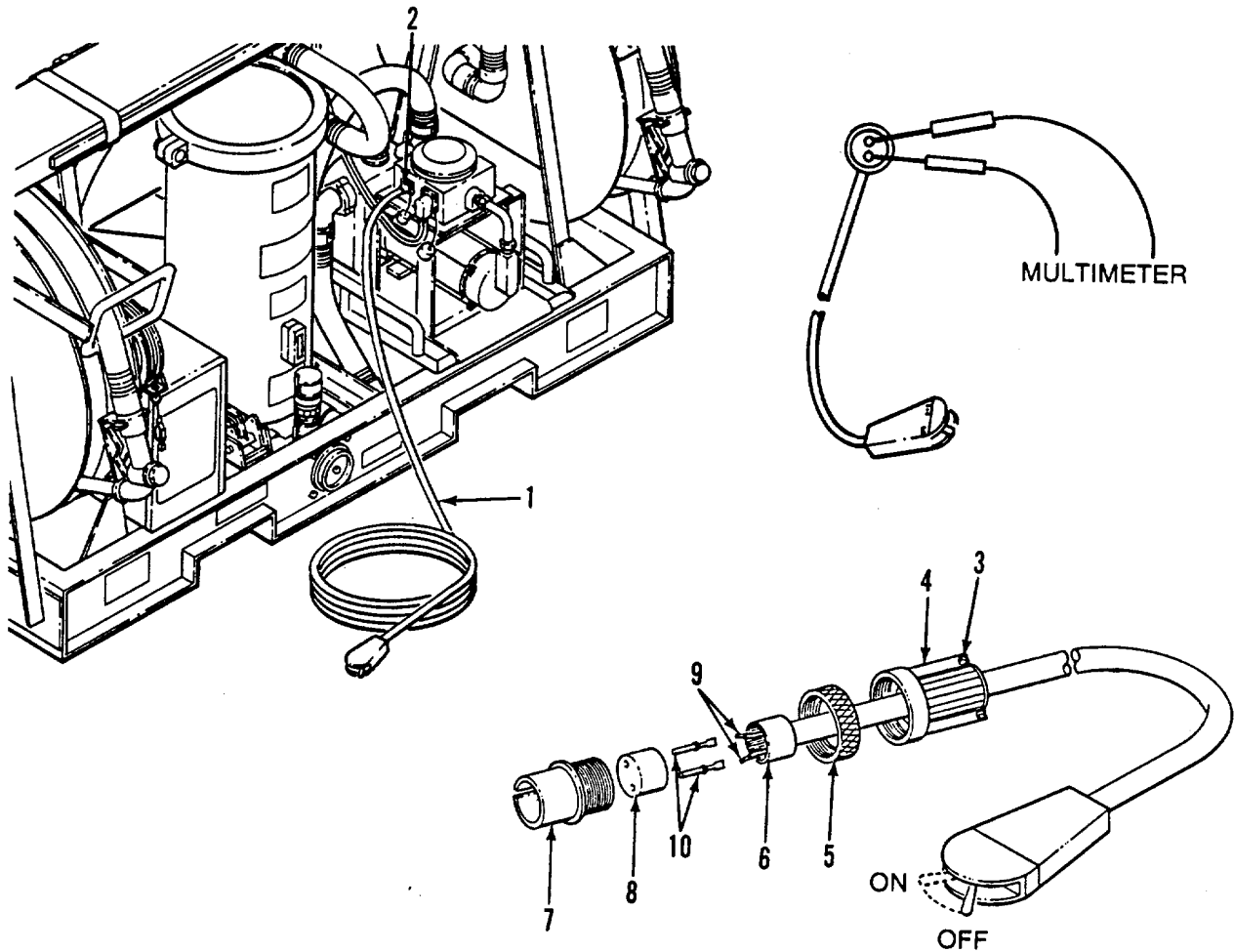
REPAIR

a. Inspect the cable for breaks or cuts. If the cable is damaged near the connector, cut the cable above the damage and trim back the outer insulation approximately 1/2 inch. Trim insulation on each lead to expose approximately 1/4 inch of wire.

- b. Inspect the connector components (3-8) for damage. Replace connector if damaged.

ASSEMBLY

- a. Slide body (4), metal collar (5) and plastic collar (6) onto cable, if removed.



WARNING

Avoid breathing fumes generated by soldering. Eye protection is required. Good general ventilation is normally adequate.

- b. Solder pins (10) to leads (9).
- c. Push pins (10) completely through rubber isolator (8).
- d. Install plastic collar (6) over rubber isolator (8).
- e. Push pins (10) into alignment barrel (7) as far as possible by hand, then pull pins through with needle nose pliers until pins seat within barrel.
- f. Slide plastic collar (6) fully into alignment barrel (7).
- g. Position metal collar (5) onto alignment barrel (7) and screw body (4) on alignment barrel.
- h. Tighten screws (3).

4-17. VALVE OPERATING LEVER ASSEMBLY

This task consists of:

- | | | |
|-------------|-----------------|-----------|
| a. Removal | b. Disassembly | c. Repair |
| d. Assembly | e. Installation | |

INITIAL SETUP

Tools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)

Materials/Parts Required

- Grease "Appendix E, Section II, Item 8)
- Dry Cleaning Solvent (Appendix E, Section II, Item 1)
- Rags, Wiping (Appendix E, Section II, Item 13)
- Lockwashers (4) (Appendix F)
- Spring Pin (1) (Appendix F)

Equipment Condition

Pumping Unit Shutdown

General Safety Instructions

WARNING

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

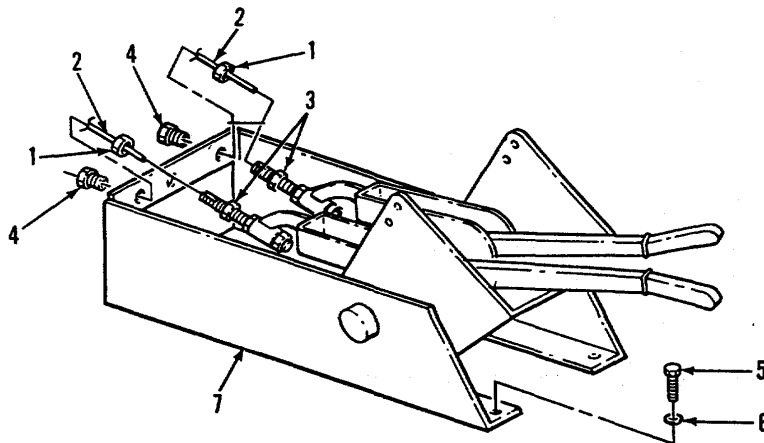
Dry cleaning solvent is potentially dangerous to personnel and property.

NOTE

Discard all mandatory replacement parts.

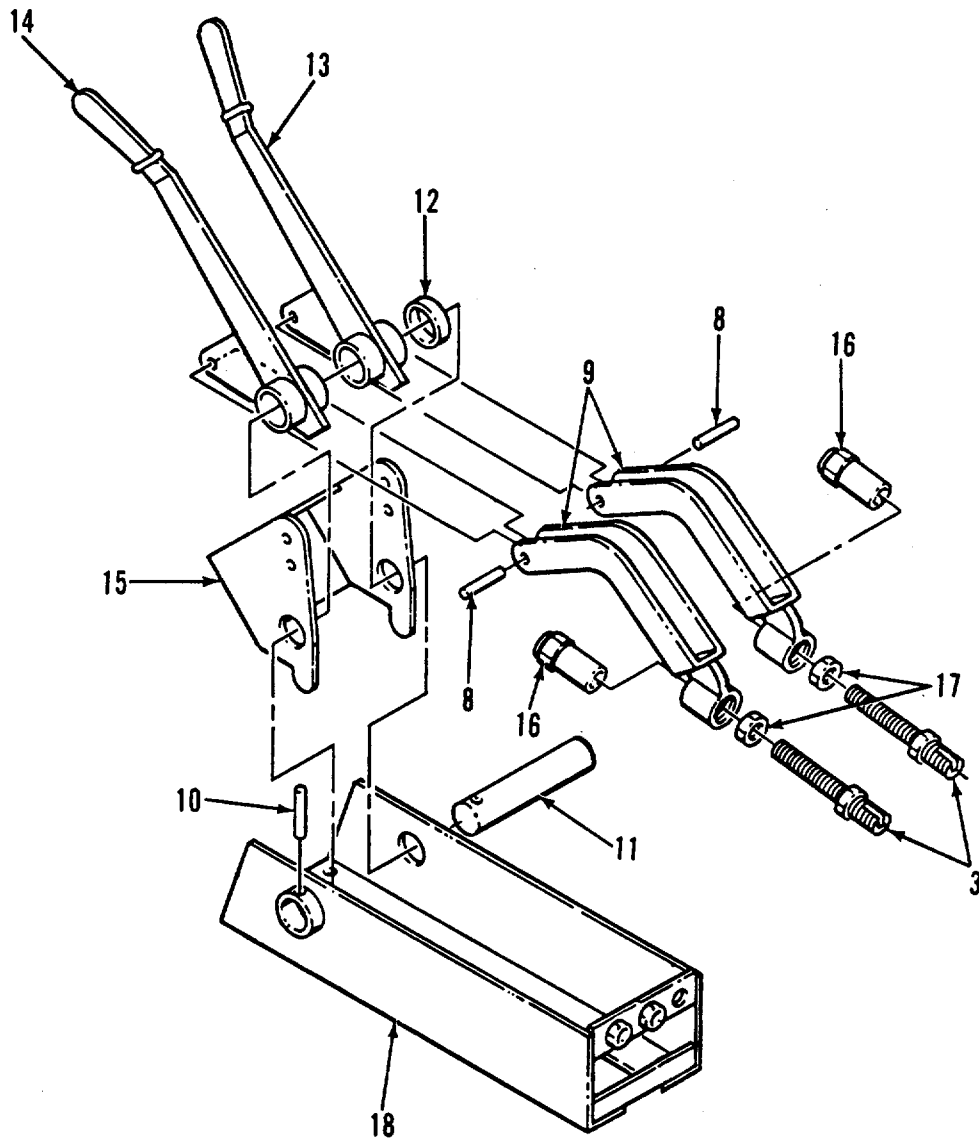
REMOVAL

- a. Loosen nuts (1) to disconnect cables (2) from the adjusting bolts (3).
- b. Remove the nuts (1) and withdraw cables (2) through bushings (4).
- c. Remove screws (5) and lockwashers (6) to remove lever assembly (7) from pumping unit.



DISASSEMBLY

- a. Remove spring pin (10) and shaft (11).
- b. Remove roll pins (8) and yokes (9).
- c. Remove spacer (12), control levers (13 and 14) and trip lever (15) from container (18).
- d. Remove fuse nuts (16), adjusting bolts (3) and nuts (17) from yokes (9).

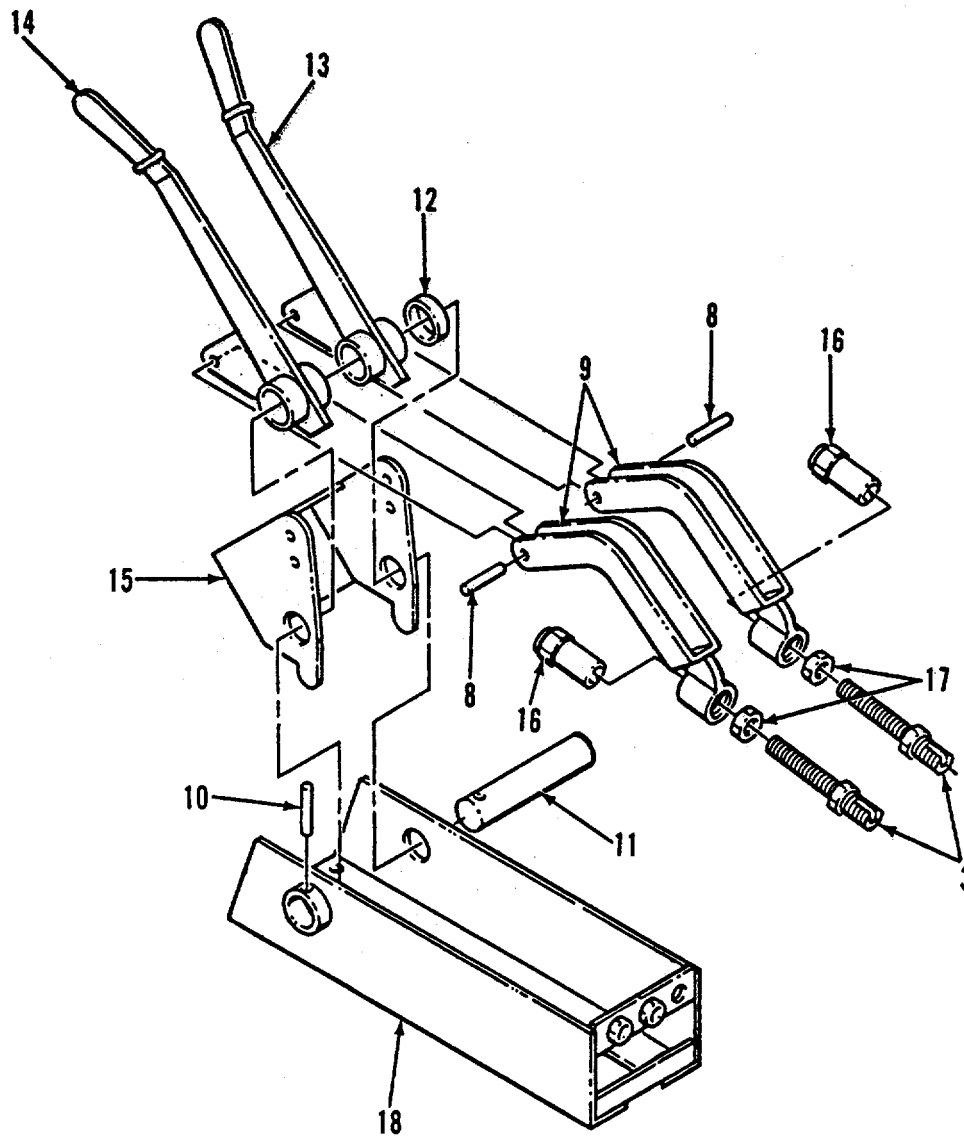


REPAIR

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 100 degrees F-138 degrees F (38 degrees C-59 degrees C).

- a. Clean all parts with dry cleaning solvent and dry thoroughly.
- b. Inspect all parts for wear and damage. Check levers and yokes for cracks or breaks.
- c. Replace all worn or damaged parts.

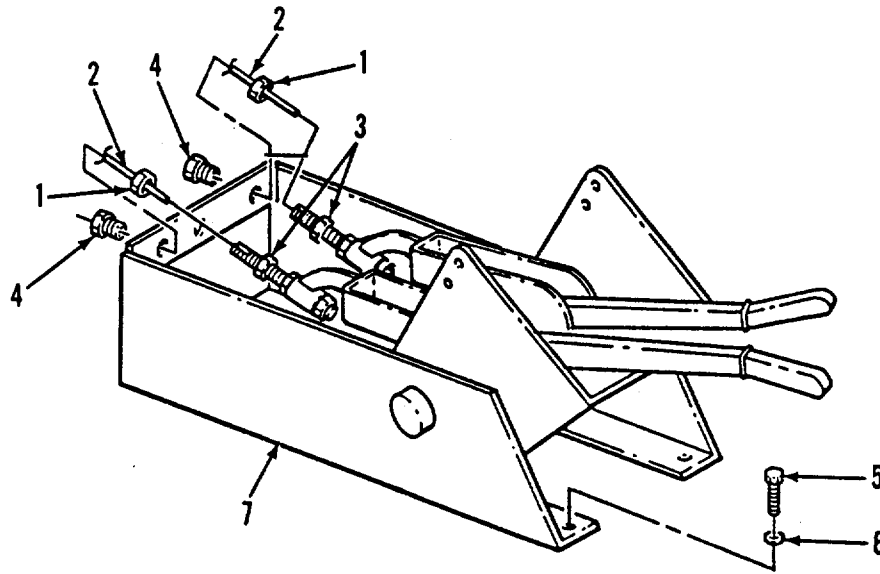


ASSEMBLY

- a. Thread nuts (17) on adjusting bolts (3). Install fuse nuts (16) and adjusting bolts (3) in yokes (9). Attach yokes to control levers (14 and 13) with roll pins (8).
- b. Install trip lever (15) in container (18) and insert shaft (11). Install spacer (12) and control levers (13 and 14) as shaft (11) is pushed into place. Make sure hole in shaft is alined with hole in container boss.
- c. Install spring pin (10).

INSTALLATION

- a. Position lever assembly (7) on A-Frame, aline holes and install screws (5) and lockwashers (6).
- b. Move levers (13 and 14) forward to OFF position.
- c. Insert cable (2) from front tank valve through bushing (4) on left side and install nut (1) on cable. Pull cable taut and install in groove of adjusting bolt (3). Screw nut (1) onto adjusting bolt (3) tight enough that cable (2) does not slip.
- d. Insert cable (2) from rear tank valve through right side bushing (4) and connect as above.



4-18. ADAPTER HALF MAINTENANCE

This task consists of: a. Removal b. Disassembly c. Repair
 d. Assembly. e. Installation

INITIAL SETUPTools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)
 Spanner Wrench (Appendix B, Section III, Item 8)
 Vise (Appendix B, Section III, Item 2)

Materials/Parts Required

Drycleaning Solvent (Appendix E, Section II, Item 1)
 Sealing Compound (Appendix E, Section II, Item 6)
 Tape, Anti-seize (Appendix E, Section II, Item 4)
 Rags, Wiping (Appendix E, Section II, Item 13)
 Seal (1) (Appendix F)

Equipment Condition

Pumping Unit Shutdown
 Fuel Evacuated from Lines and Manifold

General Safety Instructions**WARNING**

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

Dry cleaning solvent is potentially dangerous to personnel and property.

REMOVAL

- a. Pull out on cam lock handles (1) on bottom loading manifold coupling half (2).
- b. Remove the adapter half (3) from the manifold coupling half (2).

DISASSEMBLY**NOTE**

Discard all mandatory replacement parts.

- a. Pull out on cam lock handles (4) of dust cap (5) and remove dust cap with gasket (6).
- b. Unscrew and remove coupling half (7).
- c. Remove pipe end (8), seal (9) and spring (10) from adapter end (11).
- d. Remove the disc assembly (12).
- e. Unscrew stem (13) and remove spacer (14), washer (15) and disc (16) from holder (17).

REPAIR

- a. Cleaning and Inspection.

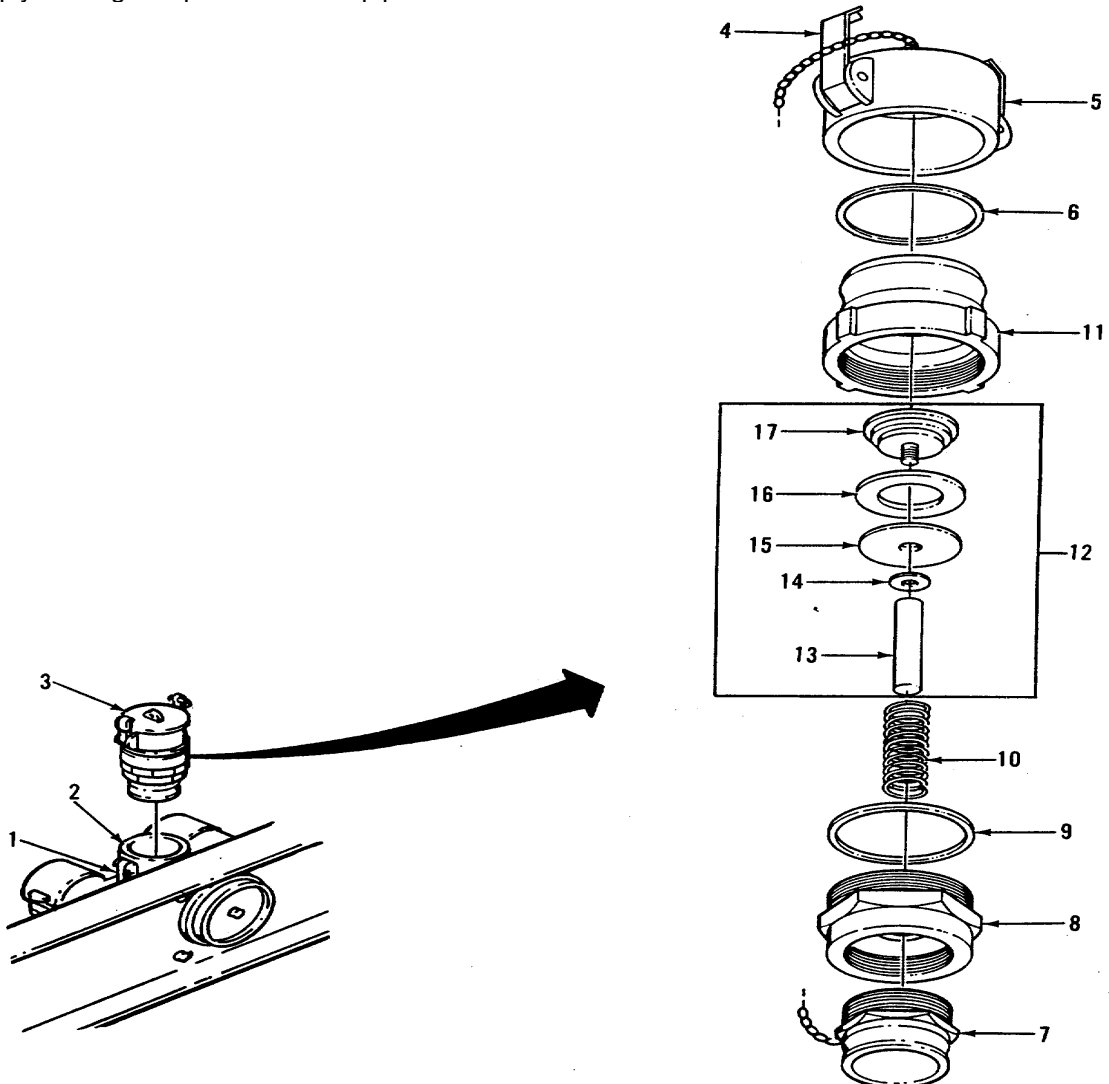
WARNING

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 100 degrees F-138 degrees F (38 degrees C-59 degrees C).

- (1) Clean all metal parts with dry cleaning solvent and dry thoroughly.
- (2) Inspect all parts for wear or damage. If stem (13), washer (15), or holder (17) are damaged, replace complete disc assembly (12).
- (3) Inspect gasket (6) in dust cap (5). If it is damaged or broken, replace gasket.
- (4) Check resilience of spring (10).
- (5) Replace all worn or damaged parts. Use a new seal (9) at assembly.

ASSEMBLY

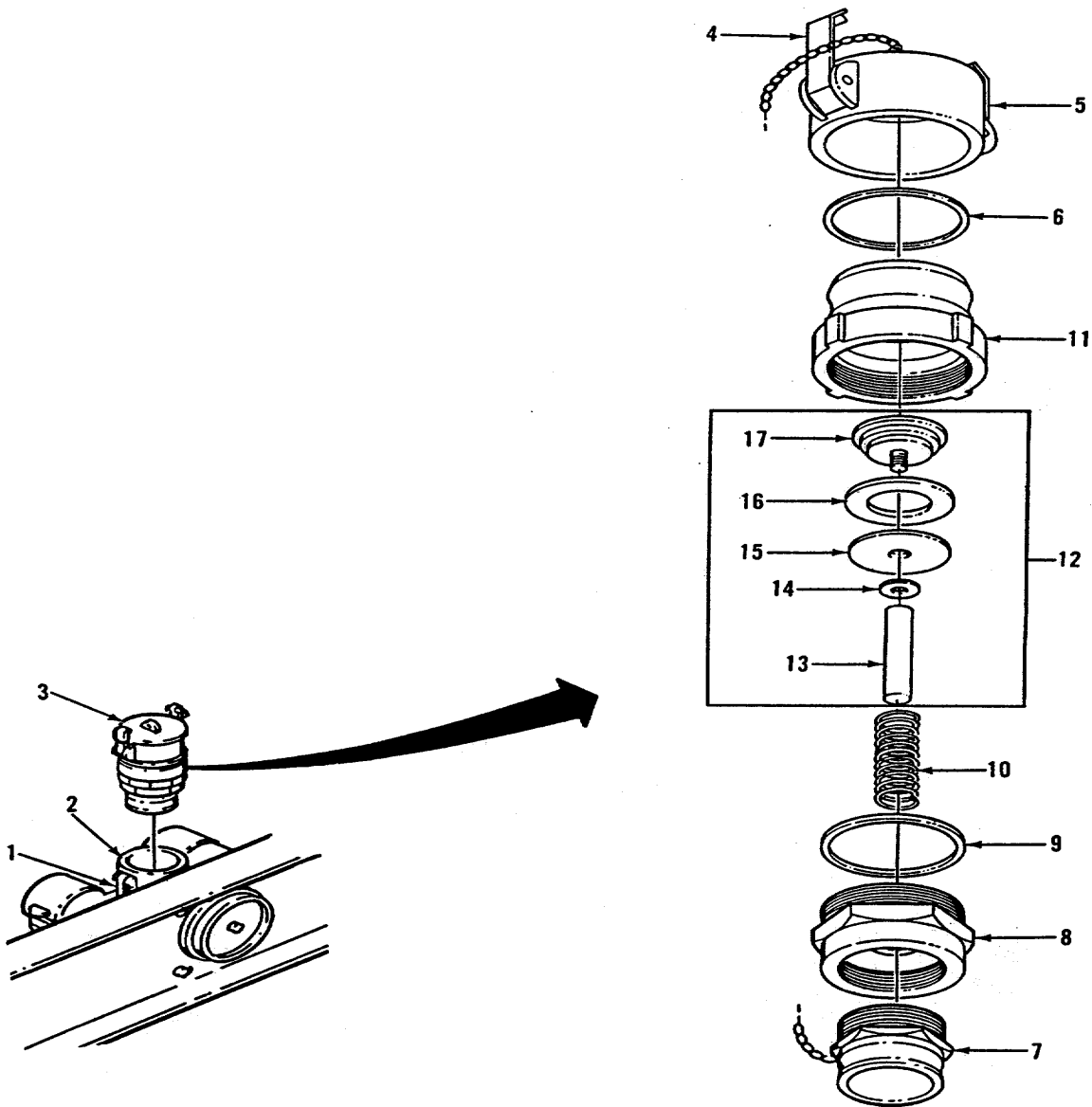
- a. Apply sealing compound to male pipe threads.



- b. Assemble disc (16), washer (15) and spacer (12) to holder (17). Install stem (13).
- c. Place disc assembly (12) in adapter end (11) and install spring (10) over stem (13).
- d. Install seal (9) and pipe end (8).
- e. Thread coupling half (7) into pipe end (8) and install dust cap (5), with gasket (6) on adapter end (11). Close cam lock handles (4) on dust cap.

INSTALLATION

- a. Install assembled adapter half (3) in manifold coupling half (2).
- b. Close cam lock handles (1) on coupling half (2).
- c. Refer to paragraph 2-4 to return equipment to operational status.



4-19. BOTTOM LOADING MANIFOLD MAINTENANCE

This task consists of: a. Removal b. Disassembly c. Repair
 d. Assembly e. Installation

INITIAL SETUPTools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)

Helicoil I and Removal Tool (Appendix B, Section III, Item 2)

Materials/Parts Required

Drycleaning Solvent (Appendix E, Section II, Item 1)

Rags, Wiping (Appendix E, Section II, Item 13)

Lockwashers (4) (Appendix F)

Equipment Condition

Pumping Unit Shutdown

Fuel Evacuated from Manifold

EMD Pump Assembly Removed (paragraph 4-13)

Valve Control Cables Disconnected (paragraph 4-17)

Personnel Required

Three (3)

General Safety Instructions

WARNING

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

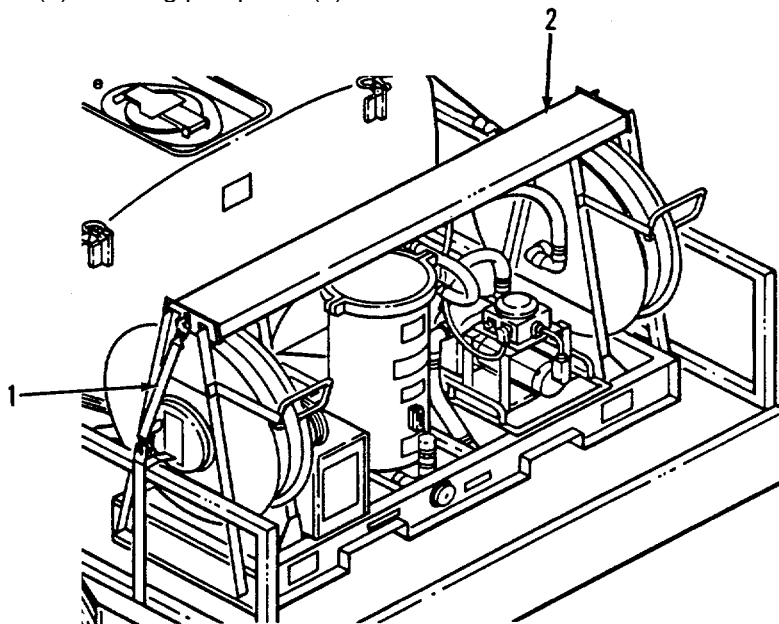
Dry cleaning solvent is potentially dangerous to personnel and property.

Lifting heavy equipment can cause injury.

REMOVAL**NOTE**

Discard all mandatory replacement parts.

- a. Loosen tie downs (1) securing pump unit (2).



- b. Pull out on cam lock handles (3) on manifold (6).

WARNING

When an item cannot be lifted with ease, use two or more people to prevent injury.

- c. Move pump unit (2) back away from tank to disconnect hoses (4 and 5).
- d. Remove nuts (7), lockwashers (8), screws (9) and flat washers (10).

DISASSEMBLY

- a. Pull out on cam lock handles (11) and remove adapter half (12).
- b. Remove screws (13), service adapter (14) and O-ring packing (15).
- c. Remove cap (16) and lanyard (17).

REPAIR

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 100 degrees F-138 degrees F (38 degrees C-69 degrees C).

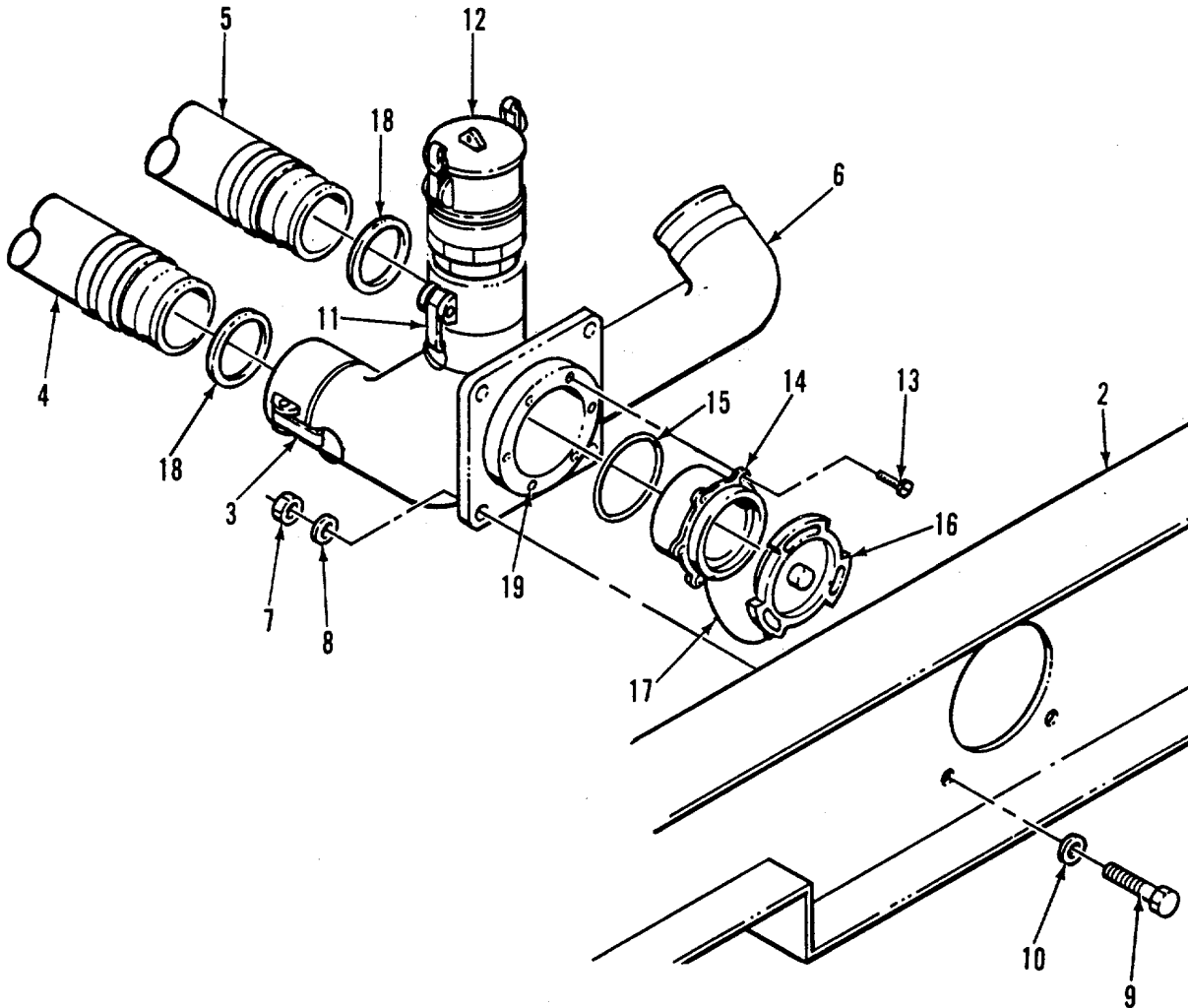
- a. Clean manifold and service adapter with dry cleaning solvent and dry thoroughly.
- b. Examine manifold for cracks or other damage. Check gaskets (18) in coupling halves for damage. Replace as required.
- c. Inspect thread inserts (19). If they are damaged, extract them and install new inserts.
- d. Inspect service adapter for damage. Inspect fit of cap and check O-ring for damage. Replace as required.

ASSEMBLY

- a. Install O-ring packing (15) on service adapter (14) and assemble to manifold (6). Install screws (13). Attach lanyard (17) with screw at lower left position.
- b. Install cap (16) and lanyard (17) on service adapter (14).

INSTALLATION

- a. Position manifold (6) within pump unit (2) frame and install flat washers (10), screws (9), lockwashers (8) and nuts (7). Torque to 60-56 ft. lbs. (67.8-74.6 Nm).
- b. Make sure gaskets (18) are in place. Guide tank hoses (4 and 6) into place as pump unit (2) is pushed forward into position. Close cam lock handles (3).



- c. Install adapter half (12) in manifold (6) and close cam lock handles (11).
- d. Refer to paragraph 4-17 and install valve control cables.
- e. Refer to paragraph 4-13 and install EMD pump assembly.
- f. Refer to paragraph 4-3 and install tie downs to pump unit.

4-20. STORAGE BOX MAINTENANCE

This task consists of: a. Inspection b. Repair

INITIAL SETUP

Tools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)

Materials/Parts Required

Dry Cleaning Solvent (Appendix E, Section II, Item 1)

Adhesive (Appendix E, Section II, Item 9)

Rags, Wiping (Appendix E, Section II, Item 13)

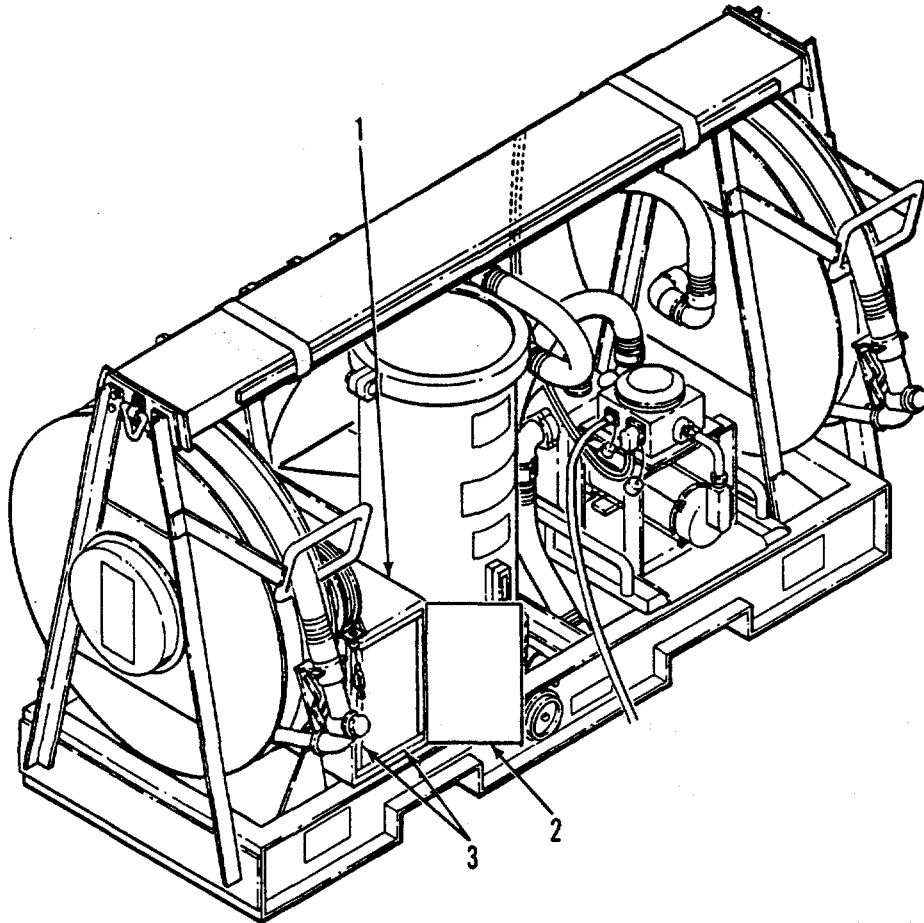
Gasket Material (Appendix F)

INSPECTION

- a. Inspect the exterior of storage box (1) for dents or scratches.
- b. Open storage box door (2) and check for torn or missing gaskets (3).

REPAIR

- a. Knock out any minor dents.
- b. Cut gaskets (3) from bulk gasket material. Clean surface of box with dry cleaning solvent. Apply adhesive to rubber gasket and attach to box.

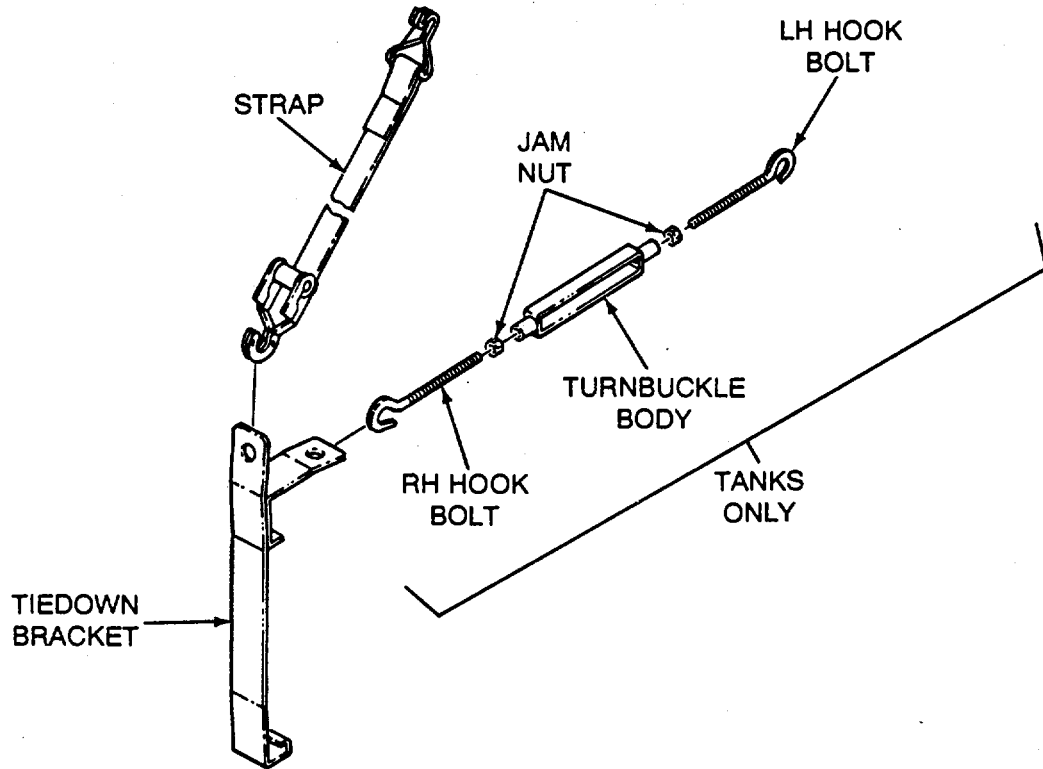


4-21. TIE DOWN ASSEMBLY

This task consists of: a. Repair

REPAIR

This task authorizes repair by replacement of parts found worn or damaged.



4-22. TANK HOSE MAINTENANCE

This task consists of: a. Removal b. Installation

INITIAL SETUPTools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)
 Suitable Lifting Device

Materials/Parts Required

Drip Pans
 Rags, Wiping (Appendix E, Section II, Item 13)
 Hose, Tank to Pump (Appendix F)

Equipment Condition

Fuel Evacuated from Lines and Manifold
 Rear Tank Empty
 Valve Control Cables Disconnected (paragraph 4-17)

Personnel Required

Two (2)

General Safety instructions**WARNING**

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

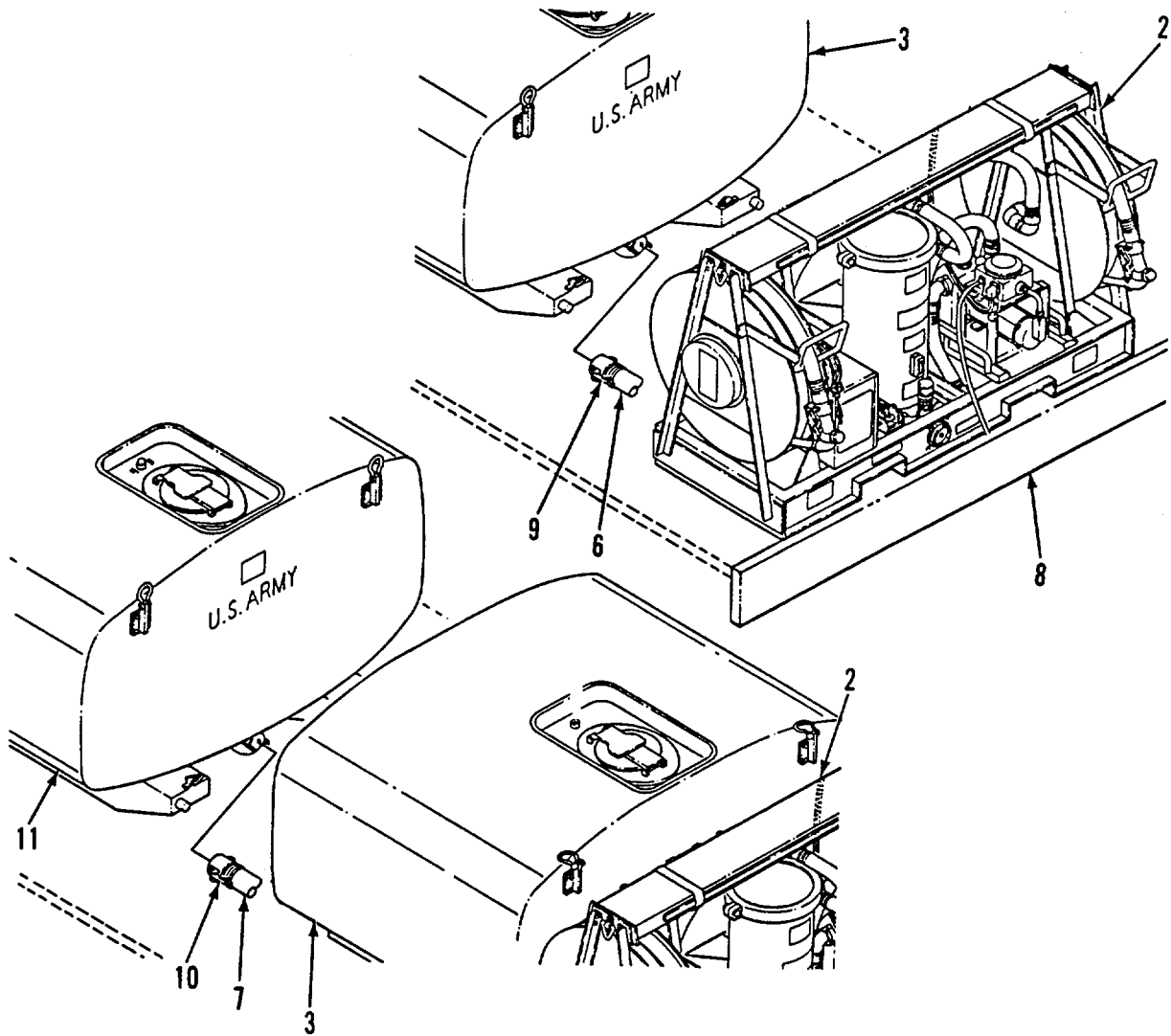
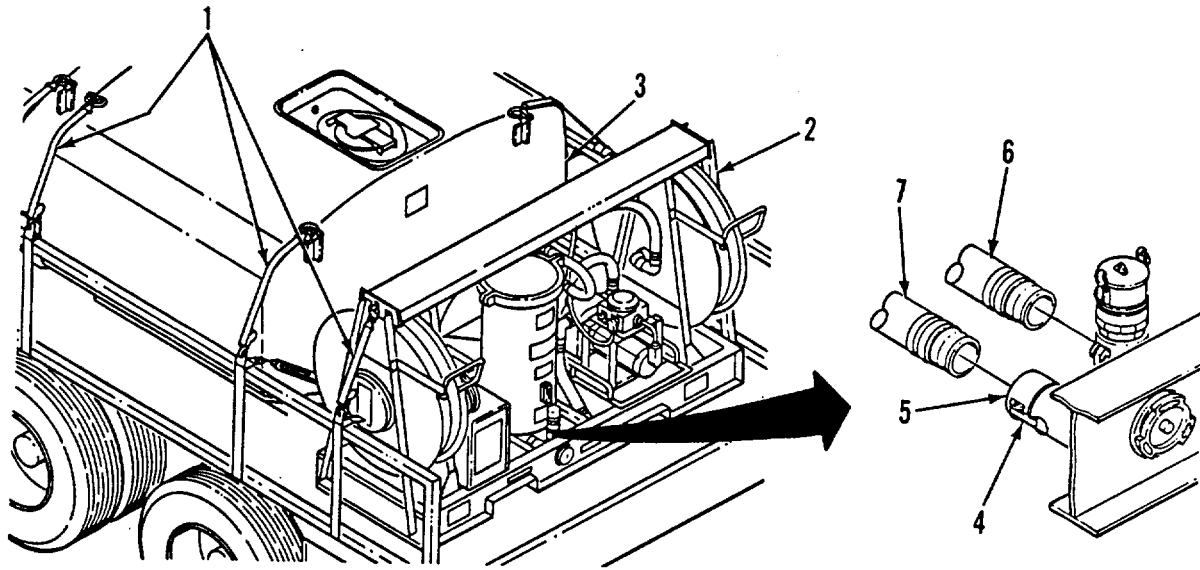
Do not drain fuel from the unit on the ground.

Use protective equipment to prevent skin and eye contact with fuel.

Use a lifting device with a lifting capacity of at least three tons to handle tanks or pump unit.

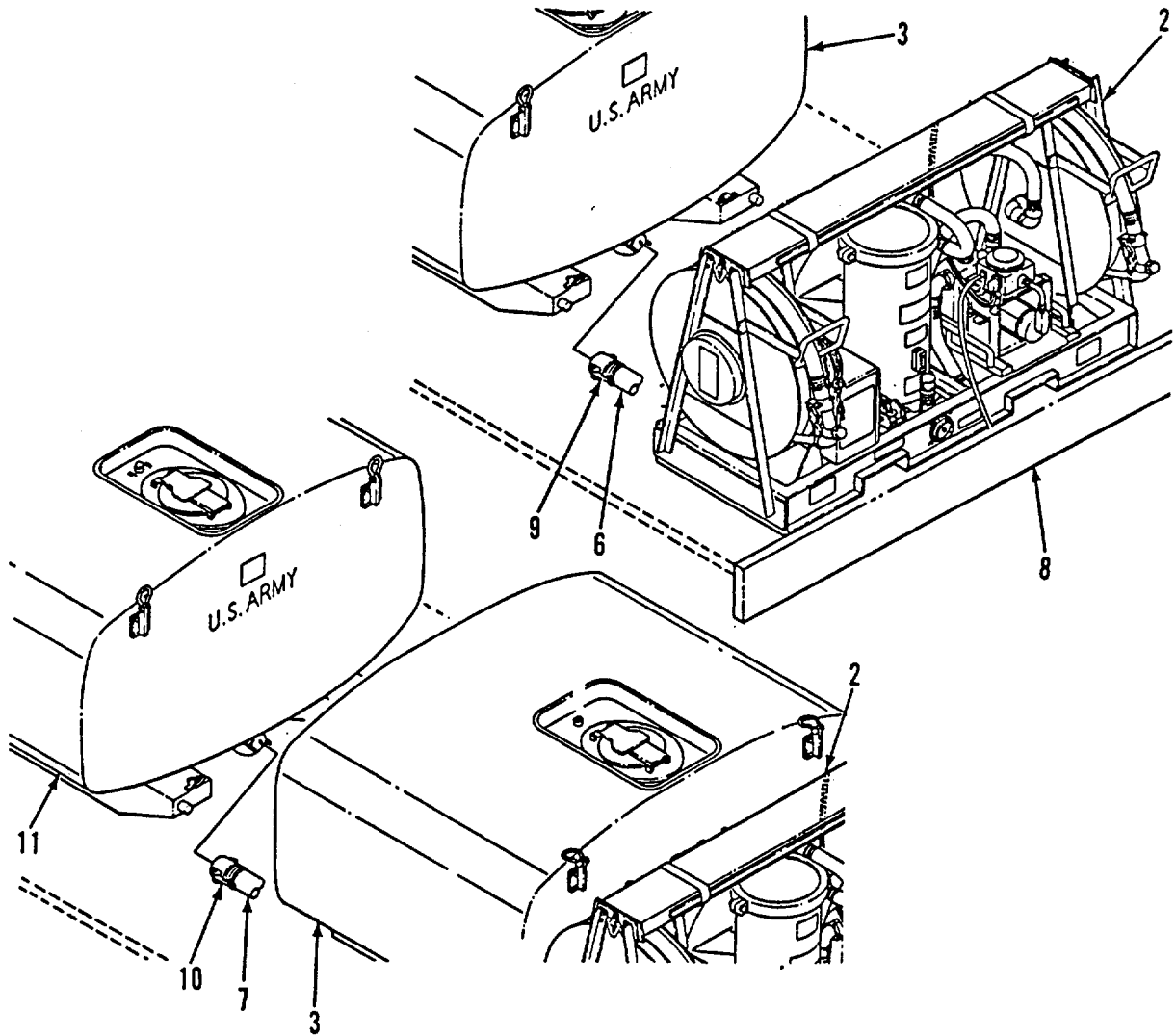
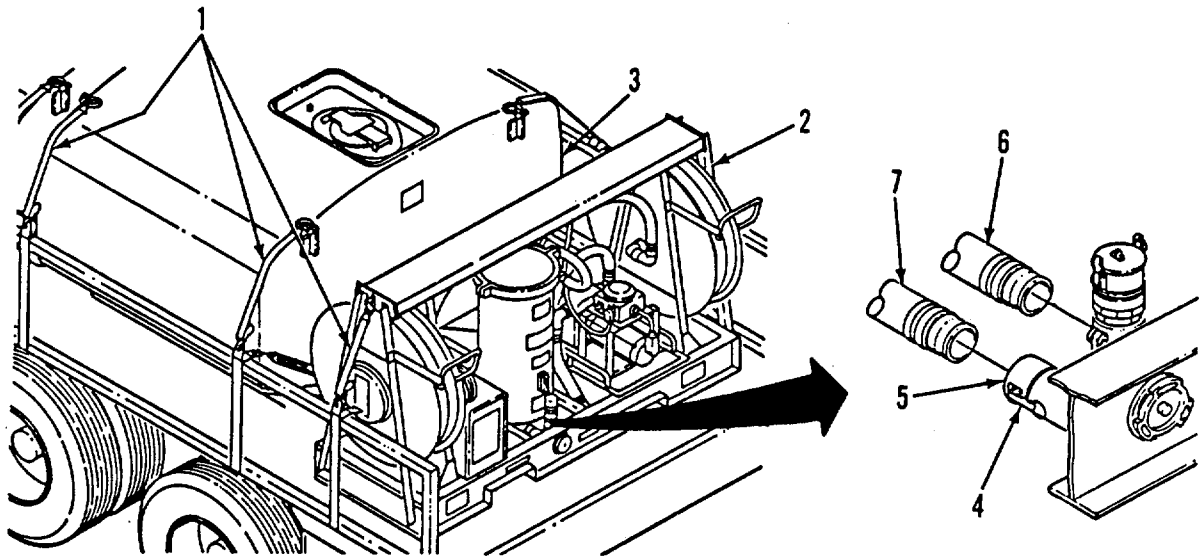
REMOVAL

- a. Remove tie down straps (1) from both ends of pump unit (2) and rear tank (3).
- b. Pull out on cam lock handles (4) on manifold couplings (5) and disconnect tank to manifold hoses (6 and 7)
- c. Move pump unit (2) back to tailgate (8).
- d. Pull out on cam lock handles (9) and remove rear hose (6).
- e. Slide the rear tank (3) back to pump unit (2).
- f. Pull out on cam lock handles (10) and remove front hose (7) from front tank (11).
9. Pull hose (7) out through pump unit (2) frame.



INSTALLATION

- a. Push front tank hose (7) through pump unit (2) frame and past rear tank (3).
- b. Connect hose (7) to front tank (11) and close cam lock handles (10).
- c. Slide rear tank (3) forward to front tank (11).
- d. Push rear tank hose (6) through pump unit (2) frame.
- e. Connect hose (6) to rear tank (3) and close cam lock handles (9).
- f. Guide tank hoses (6 and 7) into couplings (5) as pump unit (2) is pushed forward into position. Close cam lock handles (4).
9. Refer to paragraph 4-3 and install tie downs to rear tank and pump unit.
- h. Refer to paragraph 4-17 and connect valve control cables.



4-23. TANK MAINTENANCE

This task consists of: a. Removal b. Installation

INITIAL SETUPTools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)
Suitable Lifting Device

Materials/Parts Required

Replacement Tank(s) (Appendix F)

Equipment Condition

Fuel Tanks Emptied (paragraph 2-4)
Hoses Removed (paragraph 4-22)
Pump Unit Removed (paragraph 4-7)

Personnel Required

Two (2)

General Safety Instructions**WARNING**

Use a lifting device with a lifting capacity of at least three tons to handle tanks or pump unit.

REMOVAL**WARNING**

To prevent serious injury or death to personnel, or damage to equipment, use a lifting device with a lifting capacity of at least three tons to handle tanks or pump unit. Do not allow units to swing back and forth while handling in the air

a. Attach a suitable lifting device to the four lifting/tie down shackles (1) on the rear tank (2) and lift the tank from truck bed.

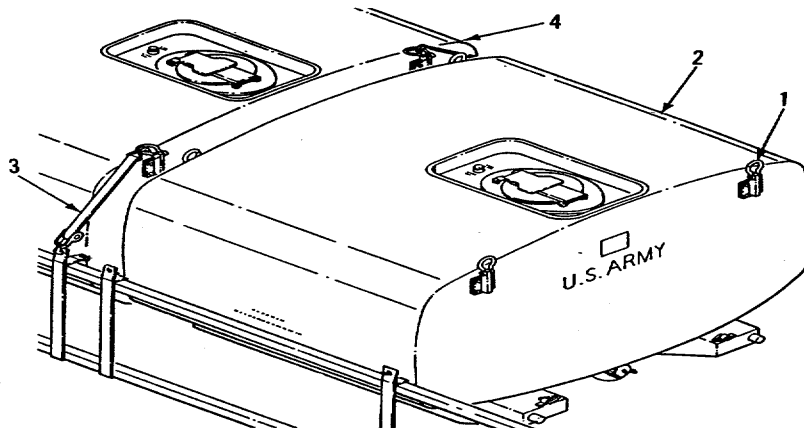
NOTE

If only the rear tank is being replaced, perform installation at this point. If front tank is being replaced, go to step b.

b. Remove the four tie downs (3) for the front tank (4), attach lifting device as above and lift front tank from truck bed.

INSTALLATION

Refer to paragraph 4-3 to install tanks and return the tank and pump unit to operational status.



4-24. MANHOLE MAINTENANCE

This task consists of: a. Removal b. Disassembly c. Repair
 d. Assembly e. Installation

INITIAL SETUP

Tools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)
 Spanner Wrench (Appendix B, Section III, Item 8)

Materials/Parts Required

Dry Cleaning Solvent (Appendix E, Section II, Item 1)
 Silicone Compound (Appendix E, Section II, Item 5)
 Rags, Wiping (Appendix E, Section II, Item 13)
 Gasket (4) (Appendix F)
 Washer Nuts (4) (Appendix F)
 Locknuts (4) (Appendix F)
 Cotter Pins (6) (Appendix F)

Equipment Condition

Pumping Unit Shutdown
 Tank 1/2 Full or Less

General Safety Instructions

WARNING

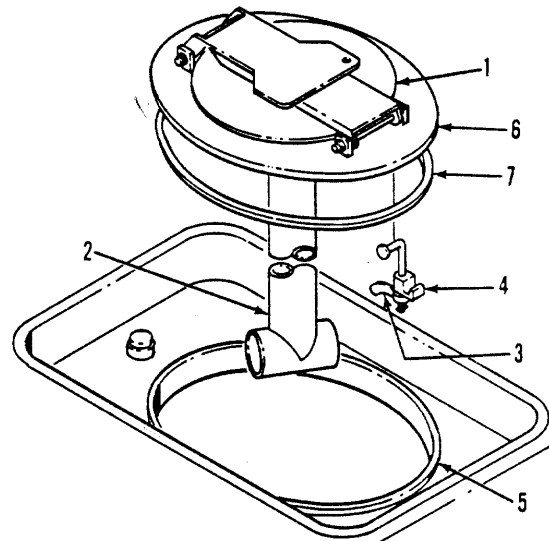
Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

Silicone Compound is toxic to skin, eyes and respiratory tract.

Dry cleaning solvent is potentially dangerous to personnel and property.

REMOVAL

- a. Open the manhole cover (1) and note the offset position of the fill tube (2).
- b. Unscrew the wing nuts (3) far enough for the hook clamps (4) to clear the manhole ring (5) welded to the tank.
- c. Rotate the hook clamps (4) to position the hooks toward the center of the manhole.
- d. Remove the manhole (6), with the fill tube (2) attached, from the fuel tank.
- e. Remove the gasket (7) from the groove in the manhole (6). Discard gasket.



DISASSEMBLY**WARNING**

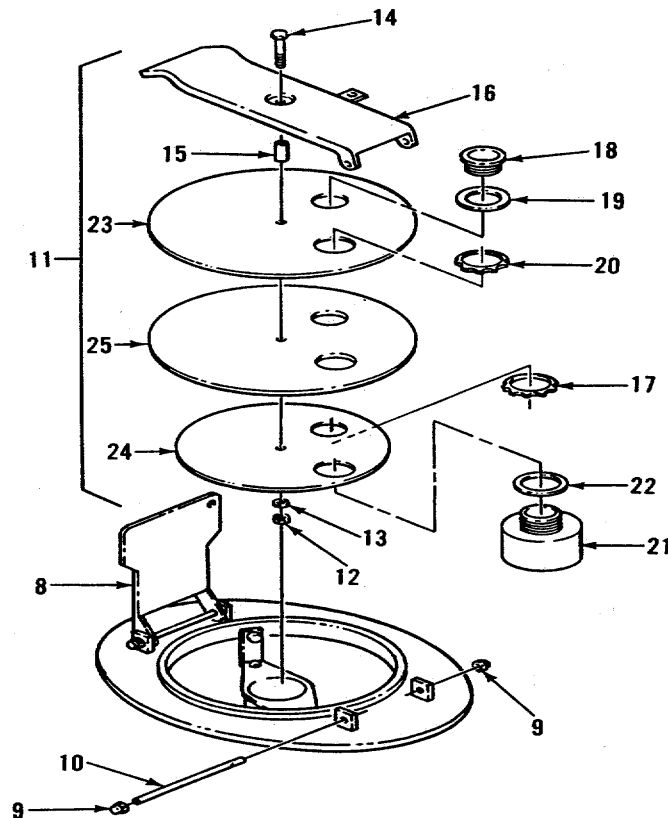
Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100 degrees F-138 degrees F (38 degrees C-59 degrees C).

NOTE

Discard all mandatory replacement parts.

a. Fill cover.

- (1) Thoroughly clean the exterior of the manhole assembly with dry cleaning solvent.
- (2) Open cam (8).
- (3) Remove washer nuts (9), hinge pin (10) and fill cover assembly (11).
- (4) Remove nut (12), washer (13), capscrew (14), spacer (15) and hinge (16).
- (5) Remove nut (17), fuse plug (18) and gasket (19).
- (6) Remove nut (20), vent (21) and gasket (22).
- (7) Separate plug (23) from gasket retainer (24) and remove gasket (25).



b. Cover and Fill Tube.

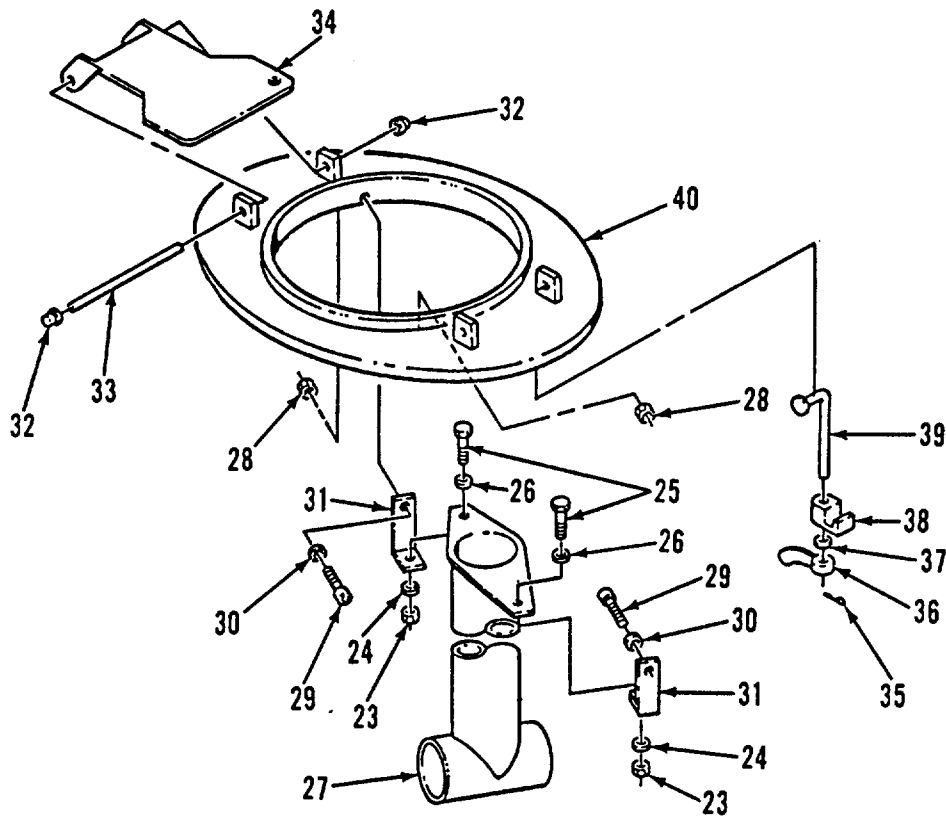
- (1) Remove locknuts (23), flat washers (24), capscrews (25), flat washers (26) and fill tube (27).
- (2) Remove locknuts (28), capscrews (29), flat washers (30) and brackets (31).
- (3) Remove washer nuts (32), hinge pin (33) and cam (34).
- (4) Remove cotter pins (35), wing nuts (36), lockwashers (37), hook clamps (38) and en bolts (39) from cover (40).

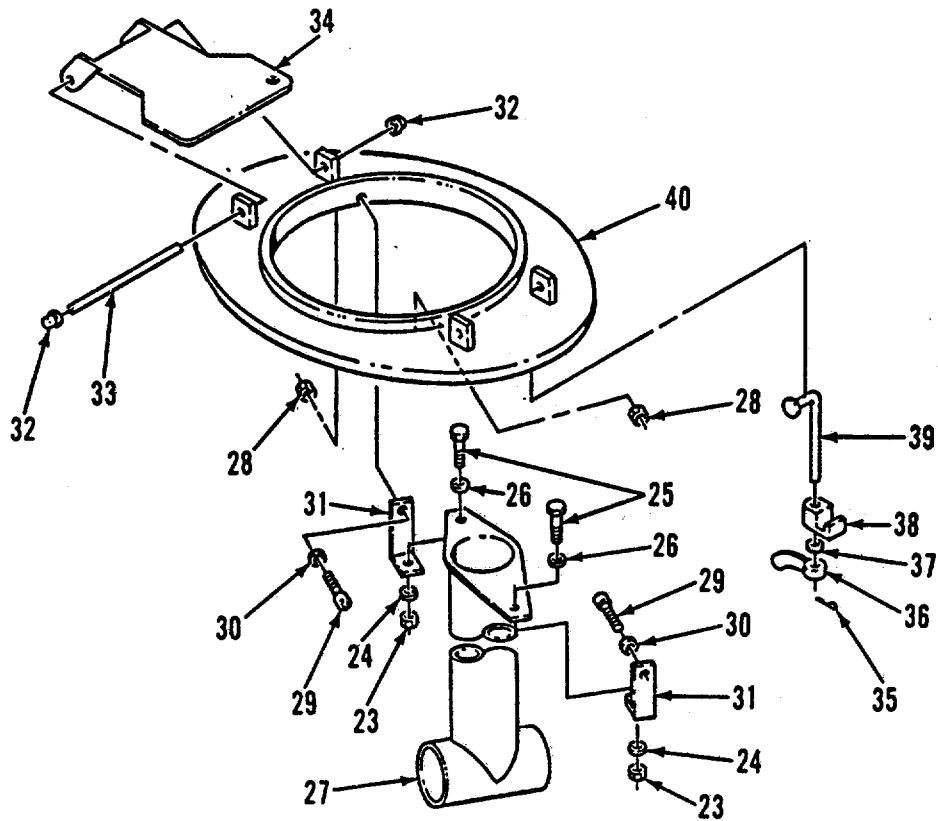
REPAIR

WARNING

Dry cleaning solvent, P-D-80, 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 100 degrees F-138 degrees F (38 degrees C-59 degrees C).

- a. Clean all metal parts with dry cleaning solvent and dry thoroughly.
- b. Inspect parts for damage and replace parts as required.





ASSEMBLY

a. Cover and Fill Tube.

- (1) Position brackets (31) on the cover (40), and install flat washers (30), capscrews (29) and locknuts (28).
- (2) Position cam (34) on the cover (40), and install hinge pin (33) and washer nuts (32).
- (3) Install ell bolts (39), hook clamps (38), lockwashers (37), wing nuts (36) and cotter pins (35).

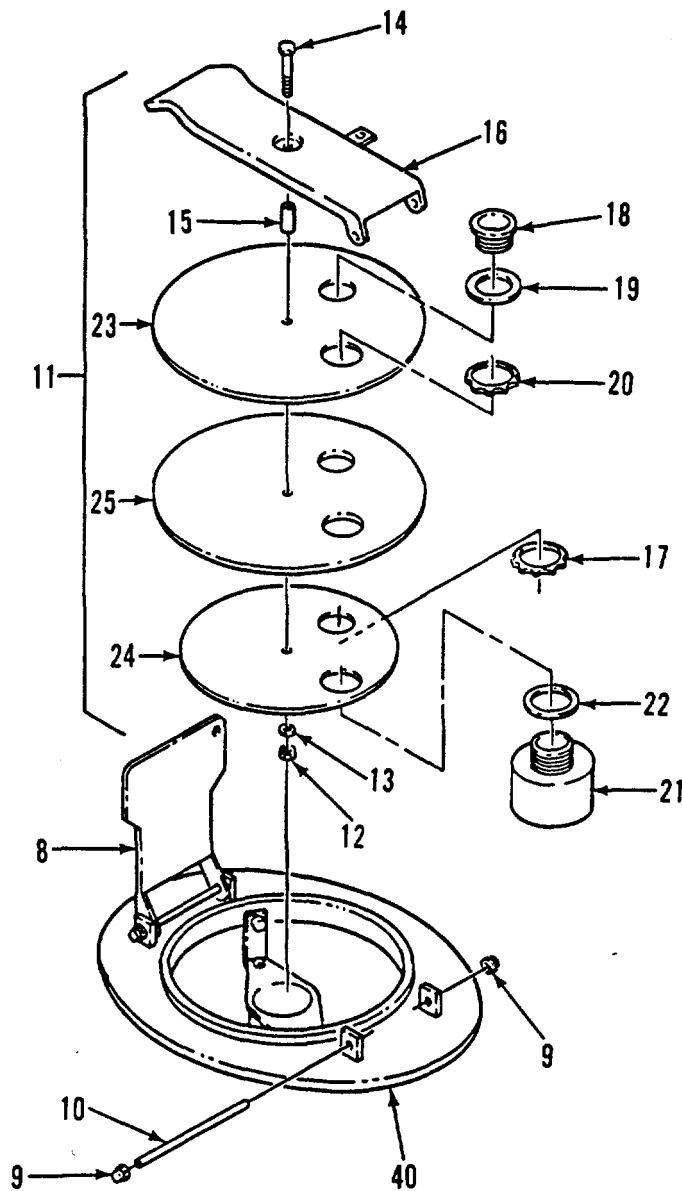
NOTE

Make certain the fill tube is in same position as noted at removal.

- (4) Position the fill tube (27) on brackets (31), and install flat washers (26), capscrews (25), flat washers (24) and nuts (23).

b. Fill Cover.

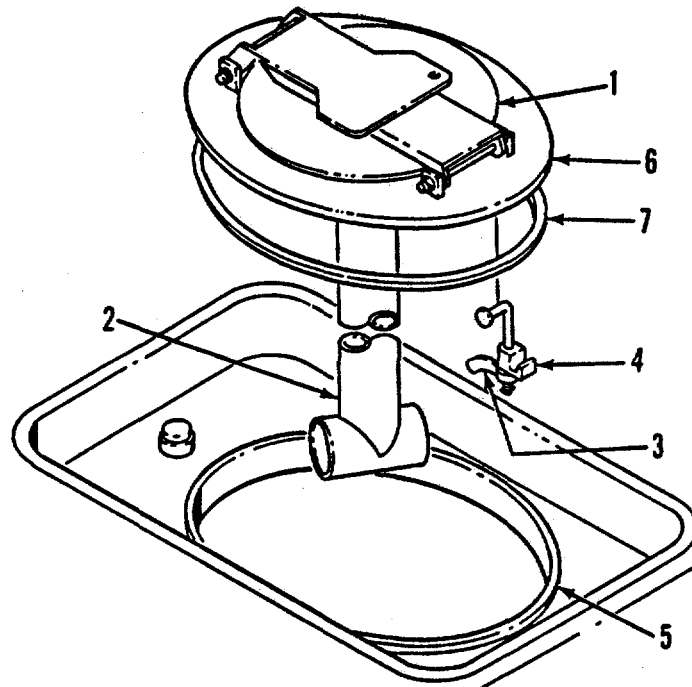
- (1) Position gasket (25) between plug (23) and gasket retainer (24), and install gasket (22), vent (21) and nut (20).
- (2) Install gasket (19), fuse plug (18) and nut (27).
- (3) Position hinge (16) and spacer (15) on plug (23) and install capscrew (14), washer (13) and nut (12).
- (4) Position fill cover assembly (11) on the cover (40) and install hinge pin (10) and washer nuts (9)



INSTALLATION**WARNING**

Silicone compound, MIL-S-8660, is toxic to skin, eyes and respiratory tract. Skin and eye protection required. Good general ventilation is normally adequate.

- a. Apply silicone compound to gasket (7) and install in groove in manhole (6).
- b. Place manhole (6) and fill tube (2) in position on the manhole ring (5).
- c. Rotate the hook clamps (4) so that the grooves in the hook clamps will straddle the manhole ring (5) welded to the tank.
- d. Tighten the wing nuts (3).
- e. Close and latch the manhole cover (1).



4-25. JET LEVEL SENSOR MAINTENANCE.

This task covers: a. Removal b. Repair c. Installation

INITIAL SETUP:

Tools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)

Materials/Parts Required

- Dry Cleaning Solvent (Appendix E, Section II, Item 1)
- Sealing Compound (Appendix E, Section II, Item 6)
- Rags, Wiping (Appendix E, Section II, Item 13)
- Lockwashers (b) (Appendix F)

Equipment Condition

- Pumping Unit Shutdown
- Tank 1/2 Full or Less

General Safety Instructions

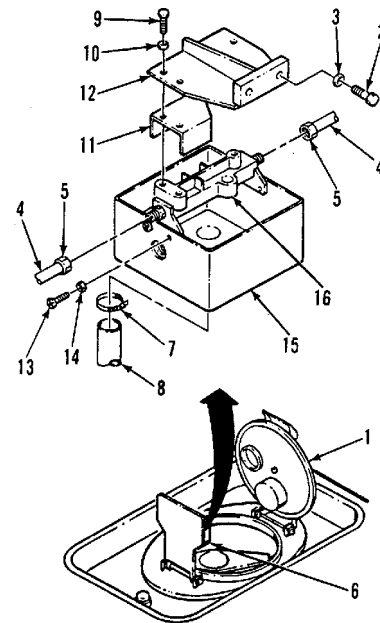
WARNING

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

Dry cleaning solvent is potentially dangerous to personnel and property.

REMOVAL

- a. Open manhole (1), remove capscrews (2) and lockwashers (3).
- b. Maneuver sensor (6) out for access, then disconnect sensor tubes (4). Note which tube is inlet and outlet. Clean tube and apply tape to prevent tube nuts (5) from falling back down tubes (4). Do not allow tubes (4) to fall into tank.
- c. Remove jet level sensor (6) from tank.
- d. Loosen hose clamp (7) and disconnect hose (8).
- e. Remove capscrews (9), lockwashers (10) and remove the jet level sensor (6) with deflector shield (11) from bracket (12).
- f. Remove screws (13) and flat washers (14) to release tray (15) from sensor (16).



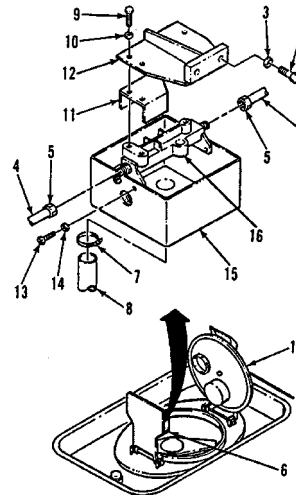
REPAIR**WARNING**

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 100 degrees F-138 degrees F (38 degrees C-59 degrees C).

- a. Clean all metal parts with dry cleaning solvent and dry thorough 9.
- b. Inspect parts for damage and replace parts as required.
- c. Inspect fuel passage for obstructions.

INSTALLATION

- a. Install tray (15) on sensor (16) and install flat washers (14) and screws (13).
- b. Assemble deflector shield (11) to sensor (16) and position on bracket (12) with mounting holes alined.
- c. Install lockwashers (10) and capscrews (9)
- d. Connect hose (8) with clamp (7).
- e. While holding jet level sensor (6) in manhole (1), note the tube (4) marked inlet! then attach inlet tube to jet level sensor inlet. Attach remaining tube (4).
- f. Position jet level sensor (6) within tank and secure with capscrews (2) and lockwashers (3).
- g. Close and latch manhole (1).



4-26. COUPLING HALF MAINTENANCE.

This task covers: **a. Removal** **b. Repair** **c. Assembly**

INITIAL SETUP:Tools Required

General Mechanic Tool Kit (Appendix B, Section III, Item 3)

Materials/Parts Required

Dry Cleaning Solvent (Appendix E, Section II, Item 1)

Silicone Compound (Appendix E, Section II, Item 5)

Rags, Wiping (Appendix E, Section II, Item 13)

O-Ring Packing (4) (Appendix F)

Gasket (1) (Appendix F)

Cotter Pin (3) (Appendix F)

General Safety Instructions**WARNING**

Parts under spring tension can cause serious injury.

Dry cleaning solvent is potentially dangerous to personnel and property.

Silicone compound is toxic to skin, eyes and respiratory tract.

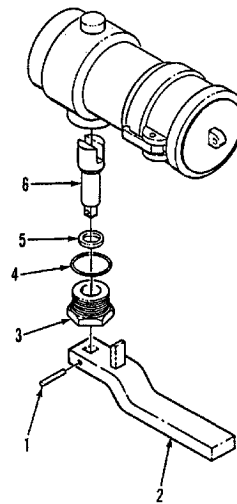
NOTE

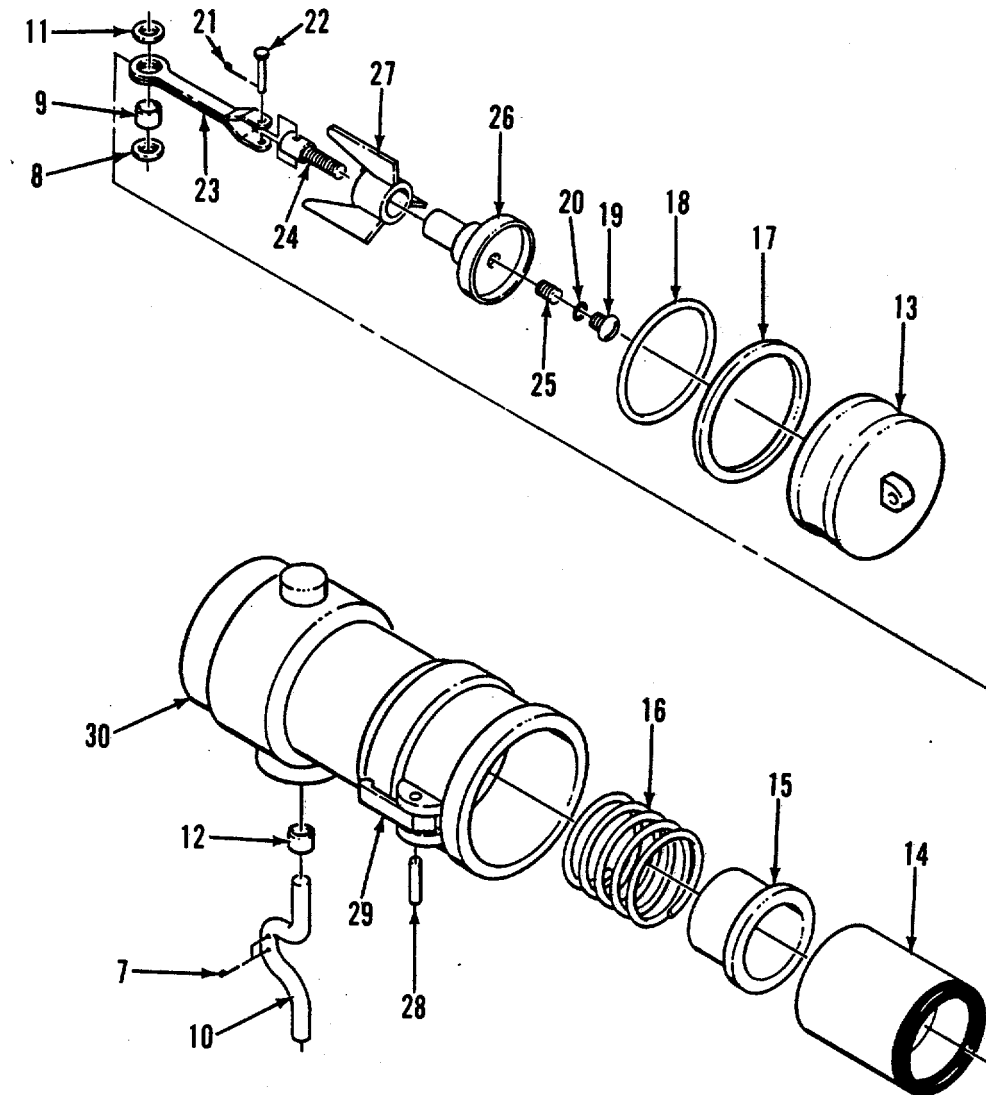
The coupling is stored in storage box.

DISASSEMBLY

a. Remove drive pin (1) and lever (2).

b. Remove stuffing box (3), packing (4), packing (5) and stem (6).





- c. Remove cotter pins (7), nylon washer (8), nylon bushing (9) and camshaft (10).
- d. Remove flat washer (11) and bushing (12).

WARNING

Parts under spring tension can cause serious injury. Take extreme care when releasing parts under spring tension.

- e. Position the coupling with dustplug (13) downward. Apply pressure to hold dust plug against work surface, then open cam lock handles (29) to remove dust plug (13).
- f. Remove cylinder (14), guide (15) and spring (16).
- g. Remove gasket (17) and gasket (18).
- h. Remove screw (19) and O-ring packing (20).

- i. Remove cotter pin (21), clevis pin (22) and link (23).
- j. Remove yoke (24), setscrew (25) and poppet (26) from the guide (27).
- k. Using drift on solid end of pin (28), remove pin and cam lock handles (29) from body (30).

REPAIR

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 100 degrees F-138 degrees F (38 degrees C-59 degrees C).

- a. Clean all metal surfaces with dry cleaning solvent and dry thoroughly.
- b. Inspect all parts for damage or wear, and replace parts as required. Discard all mandatory replacement parts.

ASSEMBLY

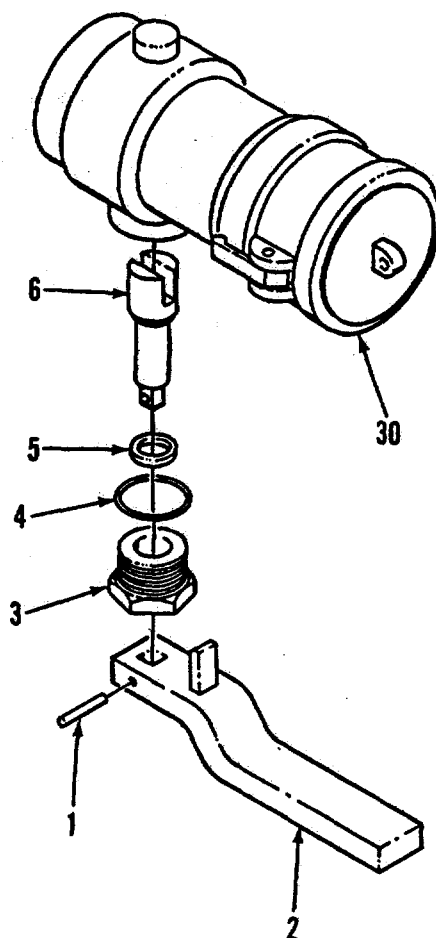
WARNING

Silicone compound, MIL-S-8660, is toxic to skin, eyes and respiratory tract. Skin and eye protection required. Good general ventilation is normally adequate.

NOTE

Apply silicone compound to packings prior to installation.

- a. Position gasket (17) in body (30).
- b. Position cam lock handles (29) on body (30) and install pins (28). Use drift on open end of pins (28).
- c. Position yoke (24) in link (23) and install clevis pin (22) and cotter pin (21).
- d. Position poppet (26) in guide (27) and install setscrew (25). Install poppet and guide (26 and 27) on the yoke (24). Tighten setscrew (25).
- e. Install packing (20) and screw (19).
- f. Position assembled items in cylinder (14) and install spring (16), guide (15) and cylinder (14) in body (30). Install dust cap (13) to hold items in place.
- g. Install bushing (12) and flat washer (11).
- b. Install camshaft (10) through link (23), then install nylon bushing (9), nylon washer (8) and cotter pins (7).
- i. Turn the camshaft (7) so that its curve is toward open end of body (30).



- j. Install stem (6). Place packings (4 and 5) on stuffing box (3) and install stuffing box on stem. Tighten stuffing box.
- k. Position handle end of lever (2) toward dust plug end of body (30) and install lever on stem (6).
- l. Install drive pin (1).

Section VI. PREPARATION FOR SHIPMENT OR STORAGE

Paragraph		Page
4-27	Short Term Storage	4-67
4-28	Intermediate Storage	4-67
4-29	Administrative Storage of Equipment	4-67
4-30	Preparation for Shipment	4-67

4-27. SHORT TERM STORAGE

- a. Drain fuel from tanks, lines and manifold.
- b. Store loose components and cables in storage box.
- c. Secure grounding rod and dipstick with straps provided.

4-28. INTERMEDIATE TERM STORAGE . Refer to the following documents for information relative to storing the tank and pump unit.

- a. TM 38-230-1 Preservation and Packing of Military Equipment.
- b. AR-750-1 Army Materiel Maintenance Policy and Retail Maintenance Operations.

4-29. 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 preventive maintenance checks and services (PMCS) 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 may be used.

4-30. PREPARATION FOR SHIPMENT . Refer to TM 38-230-1 Preservation and Packing of Military Equipment.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Page

Section I. Repair Parts, Special Tools, TMDE, and Support Equipment 5-1
 Section II. Troubleshooting 5-1
 Section III Maintenance Procedures 5-3

SECTION I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

5-1 GENERAL.

- a. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.
- b. Test, Maintenance, and Diagnostic Equipment(TMDE) and support equipment include electrical test equipment, standard pressure and vacuum gages, vacuum pumps, and charging manifolds found as standard equipment in any direct support maintenance shop.
- c. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, (RPSTL), AppendixF.covering unit and direct support maintenance for this equipment.

SECTION II. TROUBLESHOOTING

5-2. GENERAL.

- a. Table 5-1 lists the common malfunctions which you may find during the operation or maintenance of the tank and pump unit. You should perform the tests/inspections and corrective actions in the order listed.
- b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 5-1. Direct Support Maintenance Troubleshooting

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

WARNING

Disconnect intervehicle power cable from vehicle before maintaining or replacing electrical components.

Table 5-1. Direct Support Maintenance Troubleshooting-CONT

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

1 ELECTRIC MOTOR WILL NOT RUN

Step 1. Check for foreign material in volute housing that would prevent the impeller from turning. (Para. 5-4)

Remove foreign material.

Step 2. Check electric motor for proper operation.

Replace motor. (Para. 5-4)

2 PUMP IS NOISY

Step 1. Check for foreign material in volute housing. (Para. 5-4)

Remove foreign material.

Step 2. Check for loose impeller.

Tighten impeller or replace defective parts. (Para. 5-4)

3 PUMP LEAKS

Step 1. Inspect for defective gaskets, O-rings and seals or mounting screw compression inserts.

Replace defective parts. (Para. 5-4)

4 TANKS WILL NOT BOTTOM LOAD

Bottom loading valve malfunction.

Remove and repair bottom loading valve (Para. 5-8)

5 FUEL FLOW WILL NOT STOP WHEN TANK IS FULL

Bottom loading valve malfunction.

Remove and repair bottom loading valve. (Para. 5-8)

SECTION III. MAINTENANCE PROCEDURES

Paragraph		Page
5-3	Hose Reel Maintenance	5-3
5-4	Centrifugal Pump and Electric Motor Maintenance	5-7
5-5	Frame and Bracket Maintenance	5-11
5-6	Frame Maintenance	5-13
5-7	Tank Maintenance	5-16
5-8	Bosom Load Valve Maintenance.....	5-19

5-3. HOSE REEL MAINTENANCE.

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

INITIAL SETUP:

Tools Required

- General Mechanic Tool Kit (Appendix B, Section III, Item 4)
- Torque Wrench (Appendix B, Section III, Item 7)

Materials/Parts Required

- Dry Cleaning Solvent (Appendix E, Section II, Item 1)
- Rags, Wiping (Appendix E, Section II, Item 13)
- Lockwashers

Equipment Condition

- Pumping Unit Removed (paragraph 4-7)
- Reel Supply Hose and Dispensing Hose Removed (paragraph 4-8)

Personnel Required

- Two (2)

General Safety Instructions

WARNING

A spring loaded mechanism can cause injury.

Dry cleaning solvent is potentially dangerous to personnel and property.

The two hose reels have recoil tension springs to wind the 40-foot discharge hoses on the reels.

NOTE

Maintenance procedures are identical for both hose reels.

REMOVAL

WARNING

A spring loaded mechanism can cause injury if released in an uncontrolled manner. Always take care while working with a spring loaded mechanism.

NOTE

Discard all mandatory replacement parts.

- a. Release spring tension on reel by carefully releasing locking pawl, then turning reel backwards nine turns to a neutral position.
- b. Remove swivel and coupling (1).

WARNING

A spring loaded mechanism can cause injury if released in an uncontrolled manner. Be sure spring recoil tension has been released before removing reel.

- c. Remove nuts (2), lockwashers (3), capscrews (4) and flat washers (5) to remove spring casing (6).
- d. Remove nuts (7), lockwashers (8), capscrews (9), flat washers (10) and hose guide (11).
- e. Remove nuts (12), lockwashers (13), capscrews (14) and fiat washers (15).
- f. Remove strap (16) and link (17).
- g. Remove nuts (18), lockwashers (19), capscrews (20) and flat washers (21).
- h. Remove outer A-Frame (22).
- i. Remove reel (23) from inner A-frame (24).
- j. Remove ball bearing (25) from reel (23).

NOTE

If ball bearing will not pull off shaft easily, remove rough edges with crocus cloth to allow bearing removal.

REPAIR

- a. Cleaning and Inspection.

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 100 degrees F-138 degrees F (38 degrees C-59 degrees C).

- (1) Clean all metal parts with dry cleaning solvent and dry thoroughly.
- (2) Inspect spring housing (6) for broken welds, dents, distortion and other damage.
- (3) Inspect the reel for leakage, distortion, dents and other damage
- (4) Inspect ratchet (27) and pawl (31) for wear. Check pawl spring (28) tension.
- (5) Inspect free roll of bearing (25).

b. Disassembly. Perform steps as necessary to replace worn or damaged parts.

(1) Remove four screws (26) and ratchet (27) from reel (23). Mark outside of ratchet.

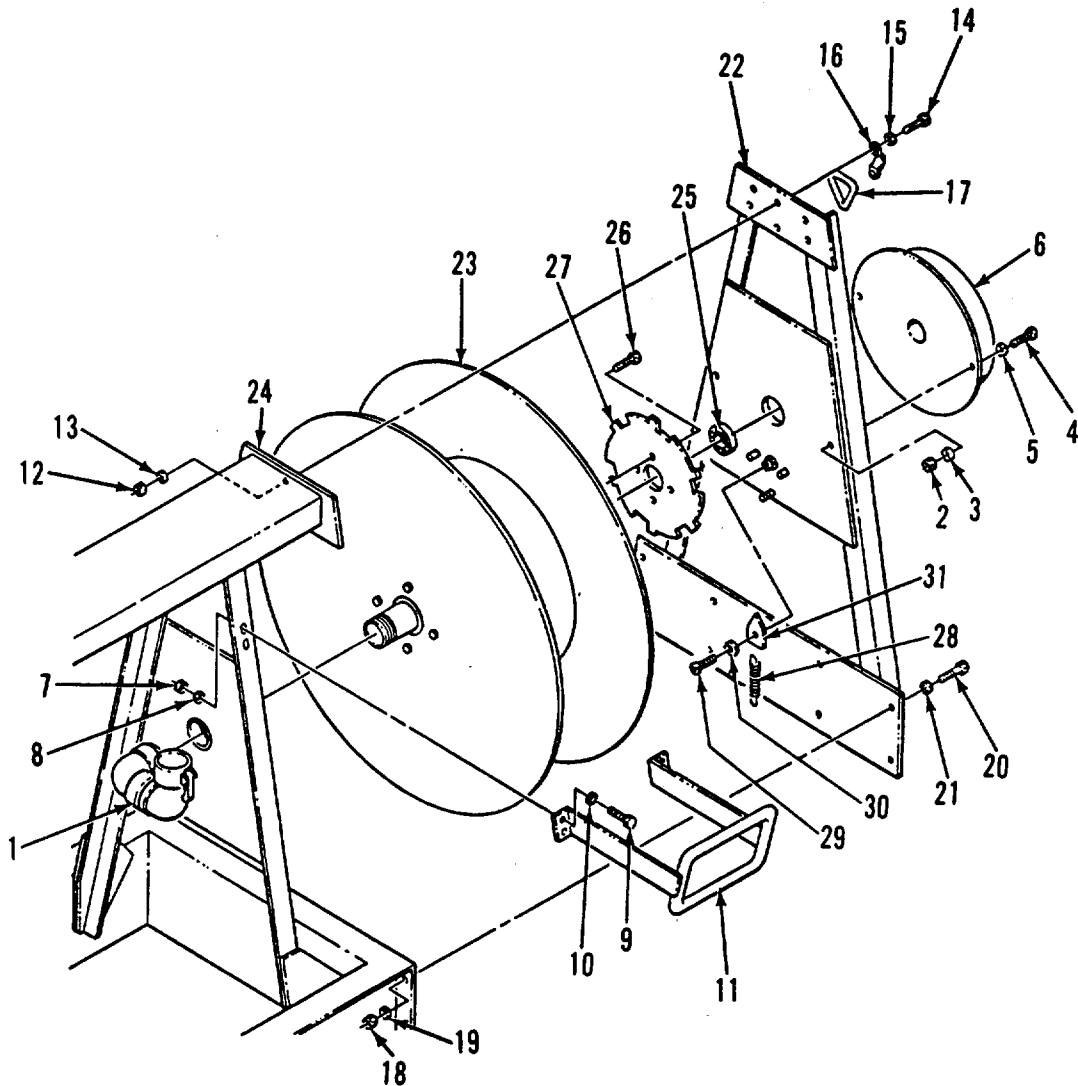
(2) Unhook pawl spring (28) and remove screw (29), pawl cap (30) and pawl (31) from outer A-Frame (22).

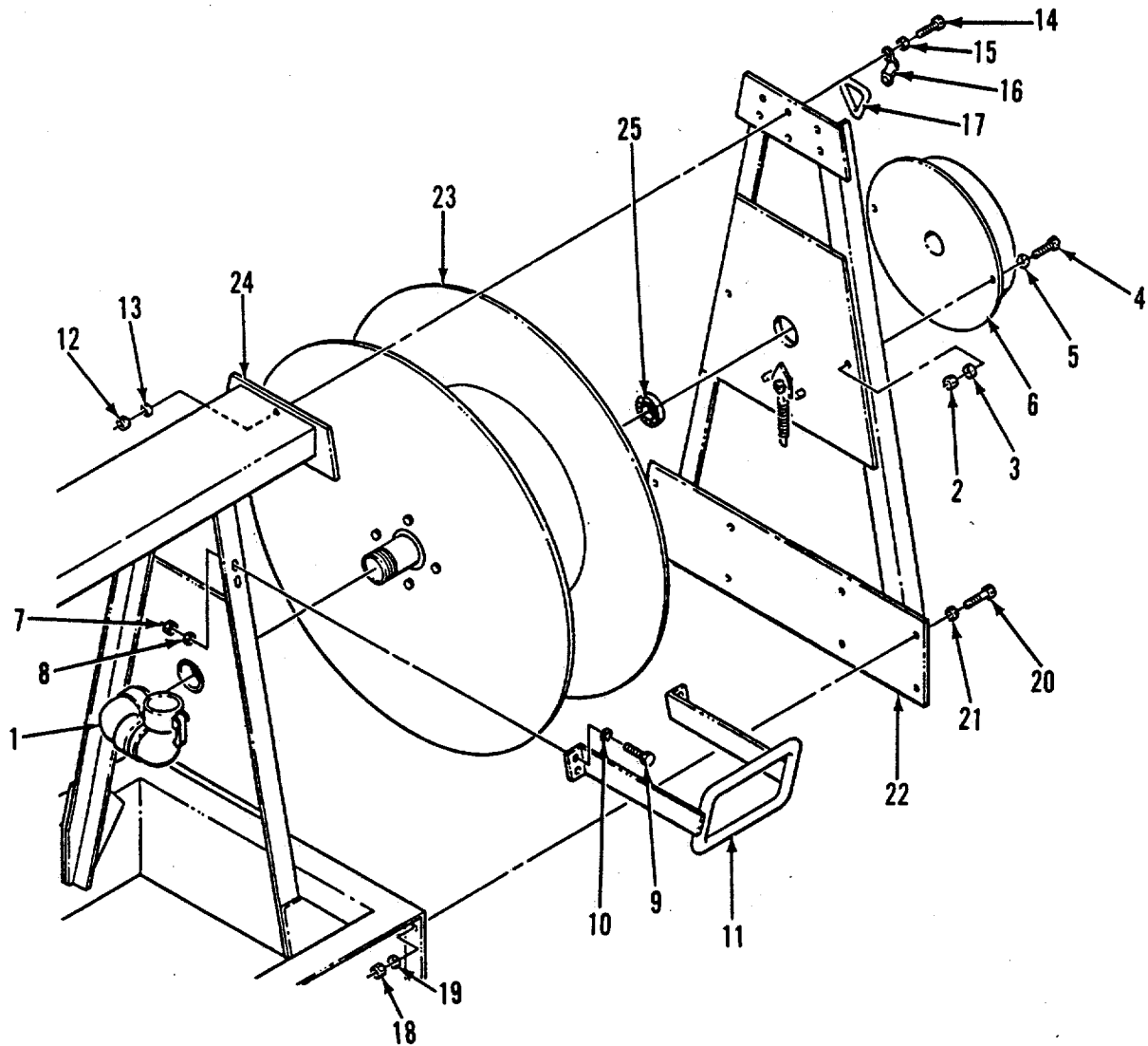
c. Assembly.

(1) Install screw (29), pawl cap (30) and pawl (31) on outer A-Frame (22). Attach pawl spring (28).

(2) Position ratchet (27) on reel (23) and install screws (26).

(3) Install bearing (25) onto reel (23).





INSTALLATION

- a. Assemble reel (23) to inner A-Frame (24).
- b. Lubricate reel hub bearing (25) surface.
- c. Assemble outer A-Frame (22) to hose reel (23) and inner A-Frame (24), and install flat washers (5, 21), capscrews (14, 20), link (17), strap (16), lockwashers (13, 19) and nuts (12, 18). Torque to 50-55 ft. lbs. (67.8-74.6 Nm).
- d. Position spring casing (6) on reel shaft and align mounting holes.
- e. Install capscrews (4), flat washers (5), lockwashers (3) and nuts (2). Torque to 20-23 ftlbs. (27.1-31.2 Nm).
- f. Position the hose guide (11) on A-Frame (24 and 22) and install capscrews (9), flat washers (10), lockwashers (8) and nuts (7). Torque to 50-55 ft. lbs. (67.8-74.6 Nm).
- g. Turn reel forward nine turns to load spring tension.
- h. Refer to paragraph 4-8 and install reel supply hose and dispensing hose.

5-4. ELECTRIC MOTOR DRIVEN (EMD) PUMP ASSEMBLY MAINTENANCE

This task covers: **a. Removal** **b. Repair** **c. Assembly**

INITIAL SETUP:**Tools Required**

General Mechanic Tool Kit (Appendix B, Section III, Item 4)

Materials/Parts Required

Cleaning Solvent (Appendix E, Section II, Item 1)
 Silicone Compound (Appendix E, Section II, Item 5)
 Rags, Wiping (Appendix E, Section III, Item 13)
 O-Ring Packing (2) (Appendix F)
 Self-Sealing Screws (4)
 Seal Assembly (Appendix F)
 Lockwashers (4) (Appendix F)
 Suitable Container (Appendix F)

Equipment Condition

EMD Pump Assembly Removed (Paragraph 4-13)
 Junction Box Removed (Paragraph 4-12)
 Flange and Check Valve removed (Paragraph 4-14)

General Safety Instructions**WARNING**

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

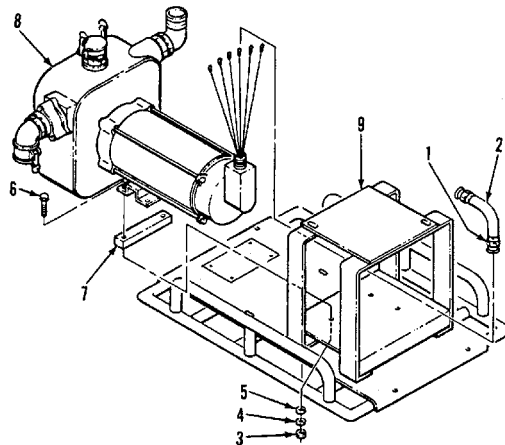
Dry cleaning solvent is potentially dangerous to personnel and property.

Silicone compound is toxic to skin, eyes and respiratory tract.

REMOVAL**NOTE**

Discard all mandatory replacement parts.

- a. Unscrew coupling nut (1) and remove elbow (2).
- b. Remove nuts (3), lockwashers (4), flat washers (5), screws (6), spacers (7) and pump/motor (8) from frame and bracket (9).



DISASSEMBLY

- a. Remove nuts (10), flat washers (11), volute(12) and O-ring packings (13 and 14).
- b. Remove plug (15) from rear of motor (29) and insert flat blade screwdriver to hold motor from turning.
- c. Remove capscrew (16) and washer (17), then withdraw impeller (18) with parts (19 through 24) attached.
- d. Clamp the shaft adapter (24) in a soft jawed vise and unscrew impeller (18). Remove impeller (18), spring seat (19), spring (20) and shims (21 and 22). Pull seal (23) from shaft adapter (24).

NOTE

The spring seat and spring are part of the seal assembly.

- e. Remove screws (25) and wear plate (26).
- f. Remove self-sealing screws (27) and separate pump housing (28) from electric motor (29).
- g. Remove key (30).

REPAIR

- a. Cleaning and Inspection

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 100 degrees F-138 degrees F (38 degrees C-59 degrees C).

- (1) Clean metal parts with dry cleaning solvent and dry thoroughly.
- (2) Inspect volute (12), impeller (18) and wear plate (26) for dents, cracks or worn surfaces.
- (3) Inspect housing (28) for dents, cracks or other damage.
- (4) Inspect studs (31 and 32), inserts (33), plug (34) and bushing (35) for thread damage.

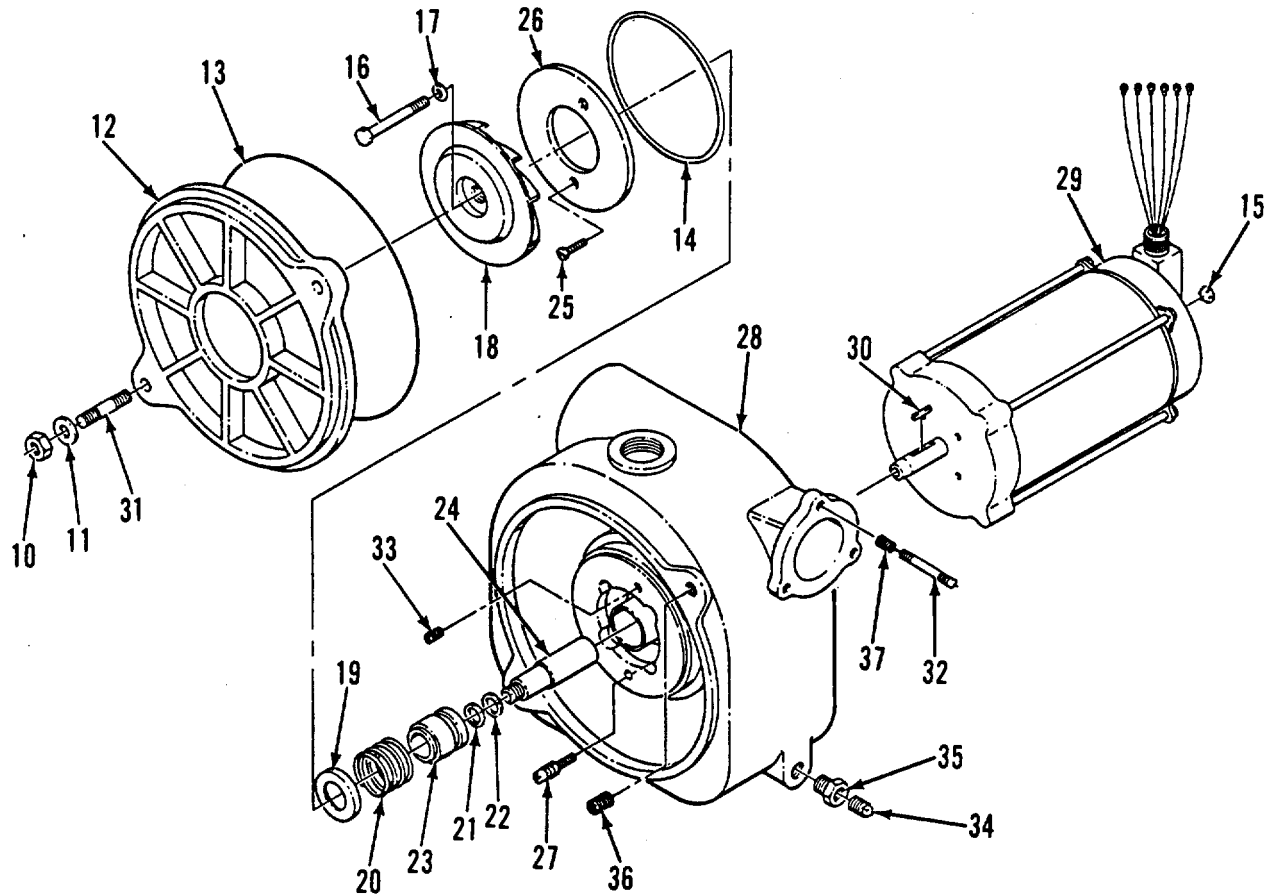
- b. Repair.

(1) If any of the studs (31, 32) are replaced, the associated inserts (36, 37) shall be extracted and new inserts installed.

- (2) Replace any worn or damaged parts.

ASSEMBLY

- a. Install key (30) in motor (29) shaft.
- b. Assemble pump housing (28) to motor (29) and install sealing screws (27).
- c. Install seal (23) on shaft adapter (24) then install adapter on motor shaft.



d. Install wear plate (26) and screws (25).

e. Install shims (21, 22), spring (20), spring seat (19), impeller (18), capscrew (16) and washer (17). Insert flat blade screwdriver through hole in rear of motor (29) to prevent shaft from turning and tighten capscrew (16).

f. Using a feeler gage, check the clearance between the impeller(18) and wear plate (26) at a location where the impeller is closest to the wear plate. This distance shall be .010-.015 inch (.254-.381 mm). Add or remove shims (21, 22) as required to attain this clearance.

WARNING

Silicone compound, MIL-S-8660, is toxic to skin, eyes and respiratory tract. Skin and eye protection required. Good general ventilation is normally adequate.

g. Apply silicone compound to O-ring packings (13, 14) and their contacting surfaces.

h. Install O-ring packing (14) in housing and O-ring packing (13) on volute (12).

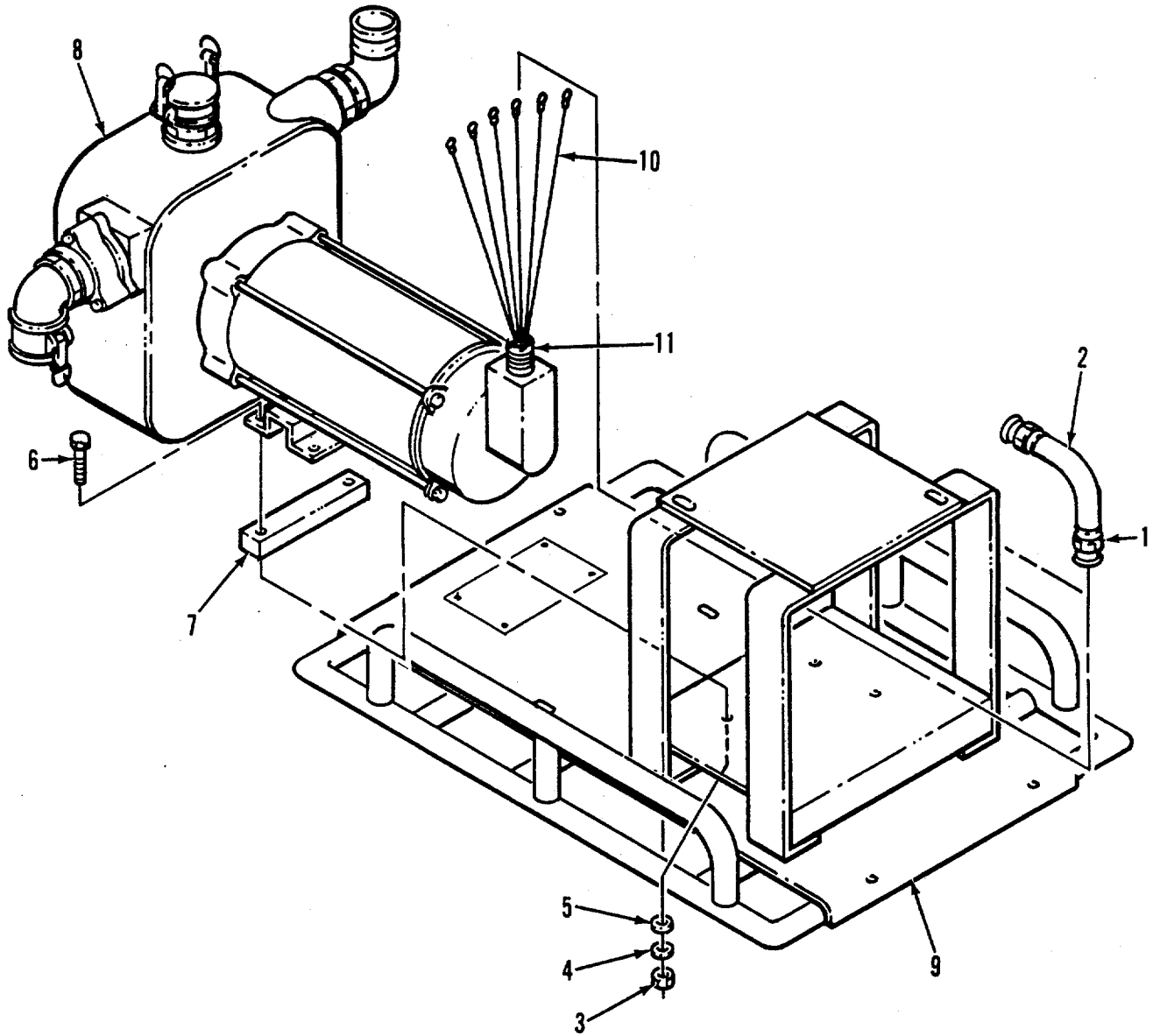
i. Install volute (12), washers (11) and nuts (10).

j. If removed, apply sealing compound to threads and install bushing (35) and plug (34).

k. Refer to paragraph 4-14 and install flange and check valve.

INSTALLATION

- a. Place pump/motor (8) on bracket and frame (9) and install spacers (7).
- b. Install screws (6), flat washers (5), lockwashers (4) and nuts (3).
- c. Insert motor leads (10) through elbow (2) then place elbow on coupling (11) and tighten coupling nut (1).
- d. Refer to paragraph 4-12 and install the junction box.
- e. Refer to paragraph 4-13 and install the EMD pump assembly.



5-5. FRAME AND BRACKET MAINTENANCE

This task covers:

- | | |
|----------------|---------------|
| a. Disassembly | b. Inspection |
| c. Repair | e. Assembly |
-

INITIAL SETUP:

Tools Required

- General Mechanic Tool Kit (Appendix B, Section Iii, Item 4)
- Shop Equipment, Welding (Appendix B, section Iii, Item 6)

Materials/Parts Required

- Lockwashers (4) (Appendix F)

Equipment Condition

- EMD Pump Assembly Removed (Paragraph 4-13)
- Junction Box Removed (Paragraph 4-12)
- Pump/Motor Removed (Paragraph 5-4)

General Safety Instructions

WARNING

Welding operations produce heat, highly toxic fumes, injurious radiation, metal slag and airborne particles. Protective equipment required.

DISASSEMBLY

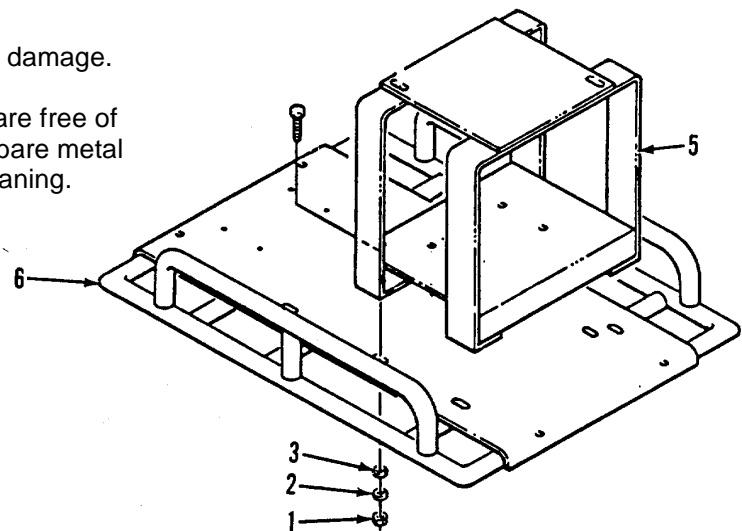
NOTE

Discard mandatory replacement parts.

- a. Remove nuts (1), lockwashers (2), flat washers (3) and screws (4).
- b. Separate brackets (5) from frame (6)

INSPECTION

- a. Inspect for cracks, dents, corrosion or other damage.
- b. Make certain the frame (6) and bracket (5) are free of dirt, grease, oil, grease or other foreign matter and bare metal is exposed for welding. Refer to TM 43-0139 for cleaning.

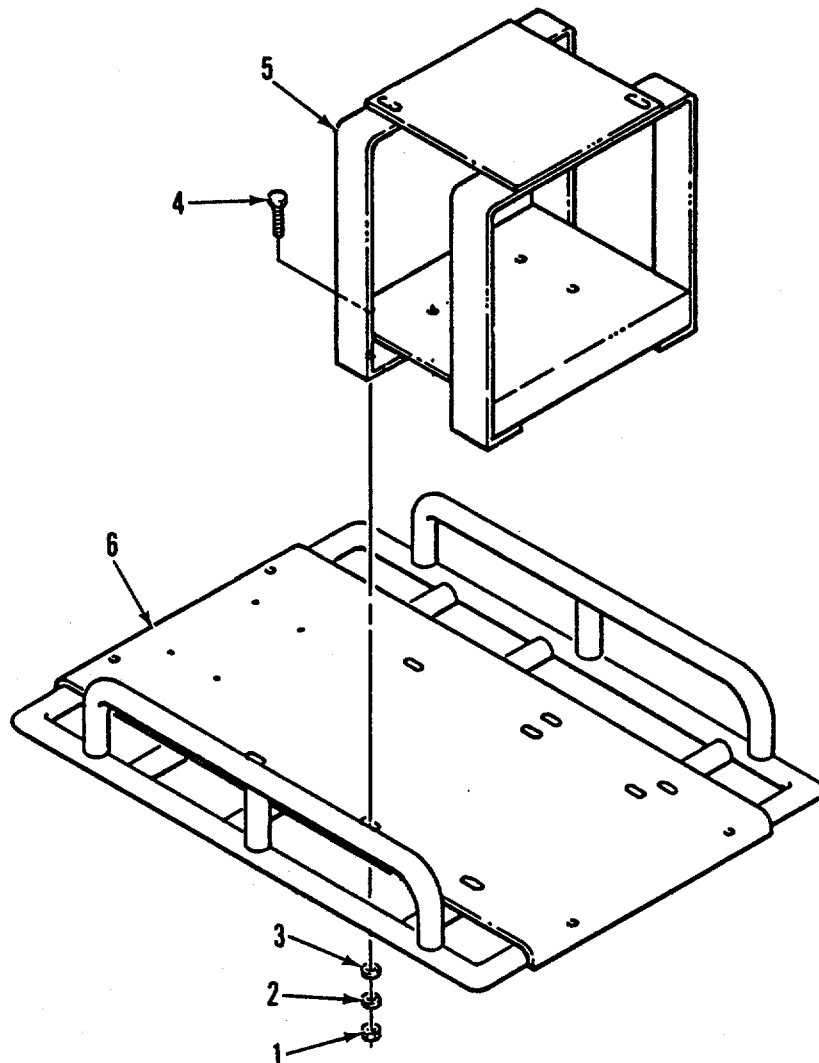


REPAIR

- a. Repair cracks or breaks by welding. Refer to TM 9-237. Material is 6061 aluminum.
- b. Treat and paint surface in accordance with TM 43-0139

ASSEMBLY

- a. Position bracket (5) on frame (6).
- b. Install screws (4), flat washers (3), lockwashers (2) and nuts (1).
- c. Refer to paragraph 5-4 and install pump/motor.
- d. Refer to paragraph 4-12 and install junction box.
- e. Refer to paragraph 4-13 and install EMD pump assembly.



5-6. FRAME MAINTENANCE

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

INITIAL SETUP:

Tools Required

- General Mechanic Tool Kit (Appendix B, Section Iii, Item 4)
- Shop Set, Welding (Appendix B, Section Iii, Item 6)

Materials/Parts Required

- Dry Cleaning Solvent (Appendix Ej Section ii. Item 1)
- Rags, Wiping (Appendix E, Section II, Item 13)
- Lockwashers (7) (Appendix F)

Equipment Condition

- Pumping Unit Removed (Paragraph 4-7)
- Hoses Removed (Paragraph 4-8)
- Static Reel Removed (Paragraph 4-9)
- Filter-Separator Removed (Paragraph 4-11)
- EMD Pump Assembly Removed (Paragraph 4-13)
- Valve Operating Lever Assembly Removed (Paragraph 4-17)
- Bottom Loading Manifold Removed (Paragraph 4-19)
- Hose Reels Removed (Paragraph 5-3)

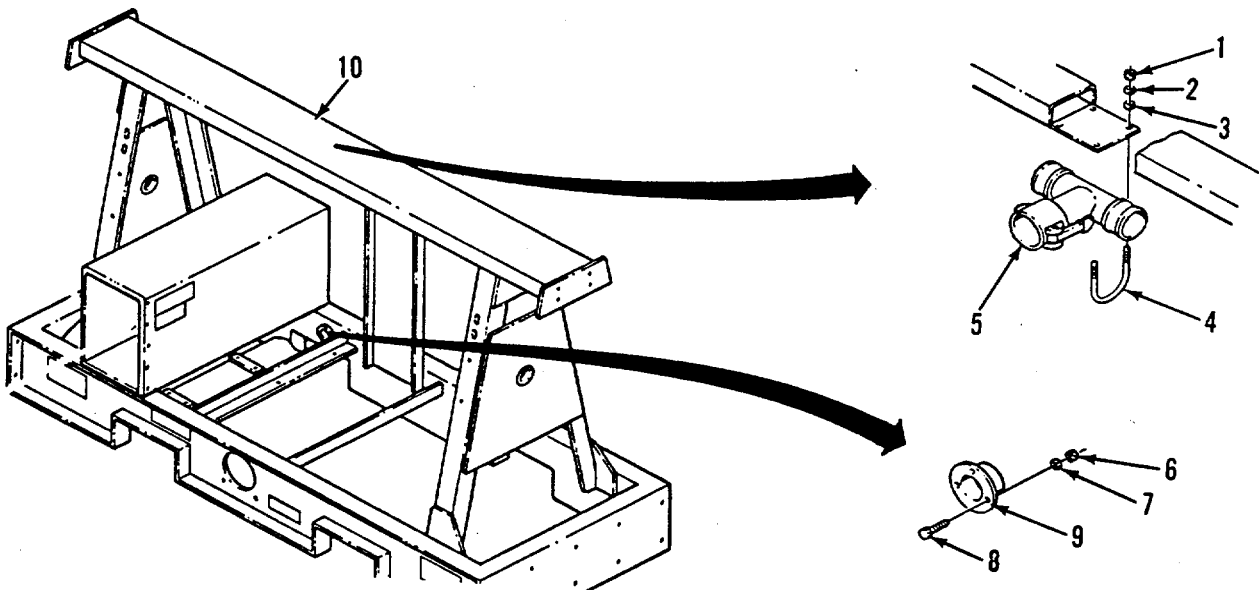
General Safety Instructions

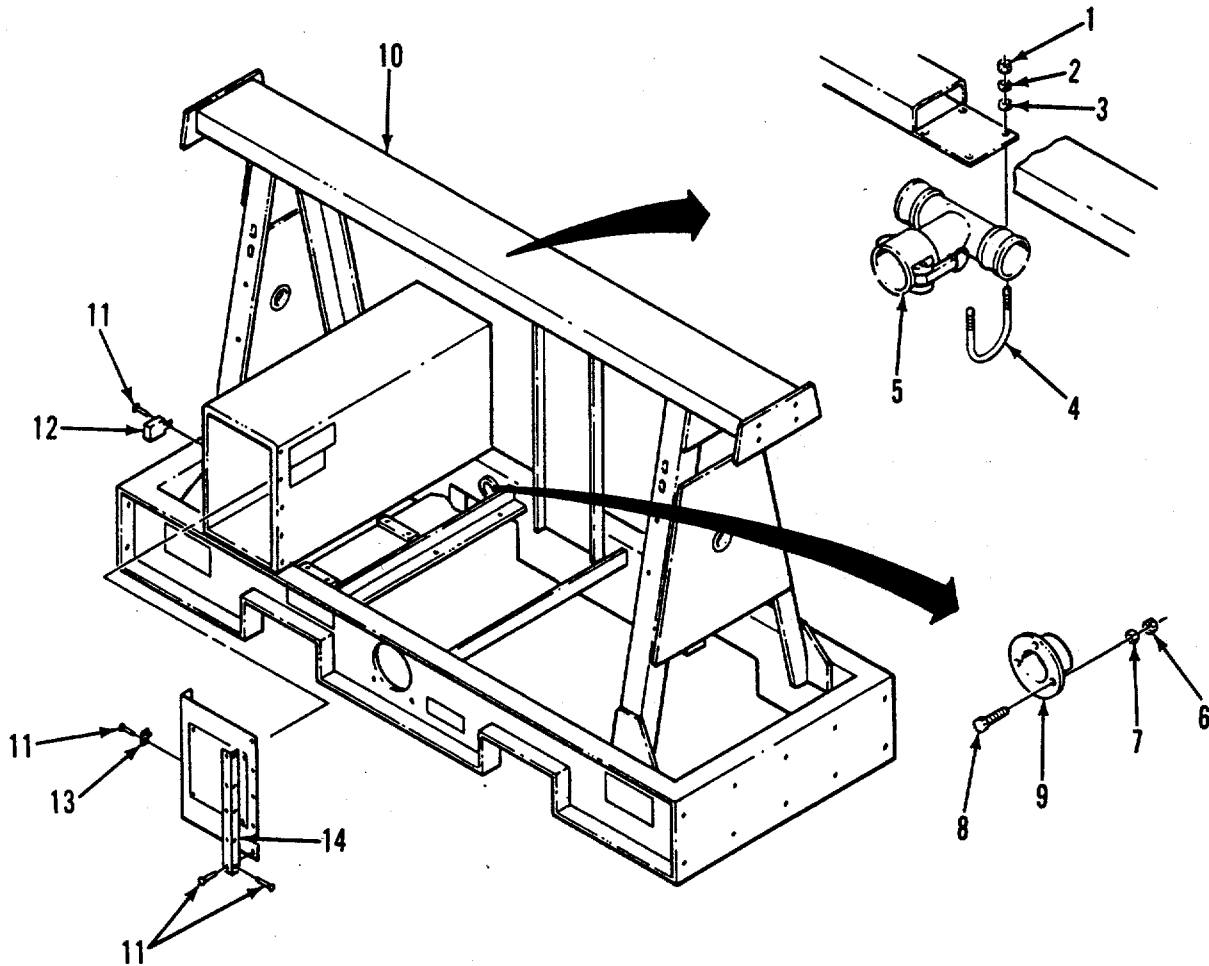
WARNING

Dry cleaning solvent is potentially dangerous to personnel and property.

DISASSEMBLY

- a. Remove nuts (1), lockwashers (2), flat washers (3), u-bolts (4) and tee (5).
- b. Remove nuts (6), lockwashers (7), screws (8) and cable guide (9) from center frame (10).





REPAIR

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 100 degrees F - 138 degrees F (38 degrees C - 59 degrees C).

- a. Clean all metal surfaces with dry cleaning solvent to remove dirt, oil and grease.
- b. Examine welds for cracks, breaks or other damage.
- c. Repair any cracked or broken welds by welding. Refer to TM 9-237. Material is 6061 aluminum.
- d. Inspect latch, strike and hinge on storage box for damage.

- e. Replace rivets (11), latch (12), strike (13) or hinge (14) as necessary.
- f. Treat and paint metal surfaces as required. Refer to TM 43-0139.
- g. Replace any damaged or illegible instruction plates.

ASSEMBLY

- a. Position cable guide (9) in frame (10) and install screws (8), lockwashers (7) and nuts (6).
- b. Position tee (5) and attach with u-bolts (4), flat washers (3), lockwashers (2) and nuts (1).
- c. Refer to paragraph 5-3 and install hose reels.
- d. Refer to paragraph 4-19 and install bottom loading manifold.
- e. Refer to paragraph 4-17 and install valve lever assembly.
- f. Refer to paragraph 4-13 and install EMD pump assembly.
- g. Refer to paragraph 4-11 and install filter-separator.
- h. Refer to paragraph 4-9 and install static reel
- i. Refer to paragraph 4-8 and install hoses.
- l. Refer to paragraph 4-7 and install pumping unit.

5-7. TANK MAINTENANCE

This task covers: a. Repair

INITIAL SETUP:**Tools Required**

General Mechanic Tool KH (Appendix B, Section III, Item 4)
Shop Set, Welding (Appendix B, Section III, Item 6)
Compressed Air Supply and air hose to reach depth of tank.
Tester, Combustion Vapor (Appendix B, Section III, Item 5)

Materials/Parts Required

Dry Cleaning Solvent (Appendix E, Section II, Item 1)
Detergent, General Purpose (Appendix E, Section II, Item 2)
Trisodium-Phosphate (TSP)
Adequate water supply with large diameter hose.
Rags, Wiping (Appendix E, Section II, Item 13)

Equipment Condition

Tank Removed (Paragraph 4-23)
Manhole Removed (Paragraph 4-24)

Personnel Required

Two (2)

General Safety Instructions**WARNING**

Do not smoke within 50 feet (15.34 meters) of the Tank and Pump Unit.

Trisodium-Phosphate is toxic to eyes, skin and respiratory tract.

Dry cleaning solvent is potentially dangerous to personnel and property.

Tanks used to store flammable liquids must be purged before welding.

Compressed air can create airborne particles that may enter the eye.

REPAIR**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 100 degrees F -138 degrees F (38 degrees C - 59 degrees C).

Trisodium-Phosphate is toxic to eyes, skin and respiratory tract. Skin and eye protection required. Use only in a well ventilated area.

Applying heat or flame to a fuel tank containing residue may result in a violent explosion, causing injury or death to personnel. Tanks used to store flammable liquids must be purged in accordance with the safety precautions set forth in this paragraph before welding.

a. Cleaning Exterior. Wash all exterior surfaces with a solution of trisodium-phosphate and water; rinse thoroughly and dry. Parts removed during disassembly may be cleaned by immersing in or wiping with dry cleaning solvent.

b. Safety Precautions.

(1) The tank being purged must have a static ground during all operations. Caution should be taken with all tools and metal objects around the tank to ensure no spark will be made.

(2) Conduct a combustible vapor test reading prior to purging the tank, using a combustion vapor tester.

(3) Only personnel thoroughly instructed in the proper handling and reading of the combustion vapor tester will conduct vapor tests.

(4) Conduct a combustible vapor test reading immediately after purging. Under no circumstances will repair of the tank begin until declared safe by safety personnel.

(5) Discontinue all operations if an electrical storm is threatening or in progress.

(6) Eliminate conditions that could cause explosions.

c. Safety precautions for personnel.

(1) Personnel engaged in purging operations will not wear wool, nylon, silk, rayon or other similar static electricity generating clothing.

(2) Clean cotton clothing with no metal buttons or fittings will be worn. All contents will be removed from pockets.

(3) Rubber boots will be worn.

(4) Cotton rags will be used for cleaning. Material that may generate static electricity will not be used

d. Purging procedures.

(1) Completely drain all liquid from the tank to be purged. Be sure the drained liquid is removed from the area where work will be performed. Remove all flammable liquid from the floor and liquid-soaked waste from the area.

(2) Remove all accessory items that might entrap liquid and close or seal all drains.

(3) Fill the tank and overflow with cold water for five minutes. Drain the tank completely.

(4) Conduct a combustible vapor test reading to determine if the tank is safe to repair. If combustible vapor test reading indicates tank is not safe, repeat purging procedure until safety personnel determine tank is safe to repair.

e. Inspection of the Tank Assembly.

(1) Check the tank for the condition of the paint.

(2) Check the tank for dents that require repairs. Check dents on welds for breaks in the weld seam Check for any damage or wear that has caused a rupture or leak.

(3) Check the interior of the tank for general cleanliness and the presence of contaminants.

WARNING

When using compressed air, wear safety goggles or glasses and ensure air blast is not directed at another person. Do not direct compressed air against the skin.

(4) When testing tank, completely dry and clean the interior and exterior of the tank of all foreign matter. When the tank is completely dry and clean, close all openings such as valves and fill cap, plug and fill cap vent, and subject the tank to a constant internal air pressure of 3 to 5 pounds per square inch gage (PSIG). Apply liquid detergent conforming to P-D-223 over the entire exterior surface of the tank at a pressure of not less than 70 PSIG (hand sprayer). Applying the liquid detergent by brush or other means is not acceptable. Observe the exterior of the tank. Leaks as evidenced by fizzing or bubbling of the liquid detergent, surface rupture, deformation, or broken hardware shall constitute failure.

f. Repair of the Tank Assembly.

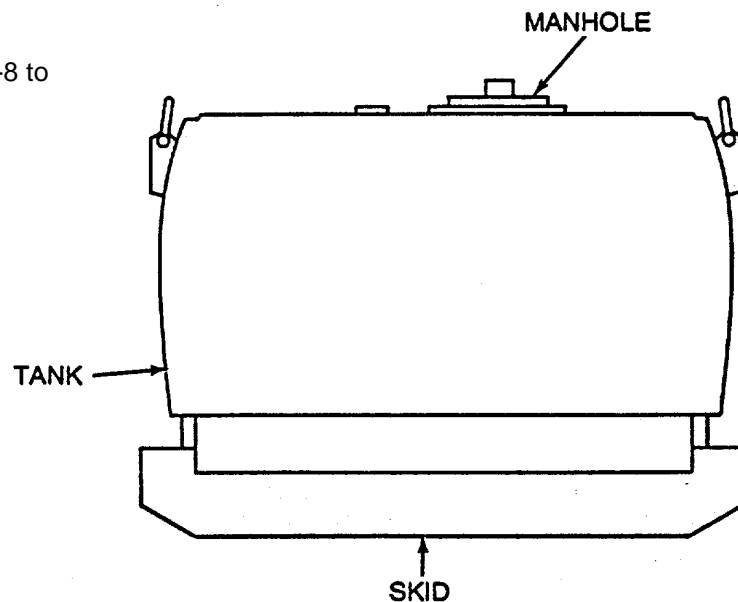
WARNING

Applying heat or flame to a fuel tank containing residue may result in a violent explosion, causing injury or death to personnel. If conditions require fuel tank repairs by welding or other methods involving heat or flame, take care to assure that all fumes are purged from the tank or fill tank with water before commencing the repair. If possible, tank should be filled with water prior to welding after being thoroughly purged of fumes.

(1) Repair all dents, cracks, breaks, and holes in the tank. Weld ruptured weld seams and other damage. Replace badly damaged parts. Refer to TM 9-237.

(2) if welding repairs are required near the bottom loading valve, refer to Paragraph 5-8 to remove the bottom loading valve.

(3) Treat and paint the exterior of the tank in accordance with TM 43-0139.



5-8. BOTTOM LOAD VALVE MAINTENANCE

This task covers:

- | | | |
|--------------------|------------------------|------------------|
| a. Removal | b. Disassembly | c. Repair |
| d. Assembly | e. Installation | |
-

INITIAL SETUP:
Tools Required

- General Mechanic Tool Kit (Appendix B, Section Iii, Item 4)
- Torque Wrench (Appendix B, Section Iii, Item 7)
- Soft-Jaw Vise

Materials/Parts Required

- Dry Cleaning Solvent (Appendix E, Section II, Item 1)
- Silicone Compound (Appendix E, Section II, Item 5)
- Sealing Compound (Appendix E, Section II, Item 6)
- Grease (Appendix E, Section II, Item 8)
- Pilot Valve (1) (Appendix F)
- Gasket (2) (Appendix F)
- Retaining Ring (3) (Appendix F)
- Seal (2) (Appendix F)
- Garter Spring (1) (Appendix F)
- Seal and Retainer (1) (Appendix F)
- O-Ring Packing (1) (Appendix F)
- Cotter pin (1) (Appendix F)
- Hair Pin (1) (Appendix F)
- Lockwasher (8) (Appendix F)

Equipment Condition

- Tank Removed (Paragraph 4-23)
- Tank Drained and Purged (Paragraph 5-7)

General Safety Instructions
WARNING

Parts under spring tension can cause serious injury.

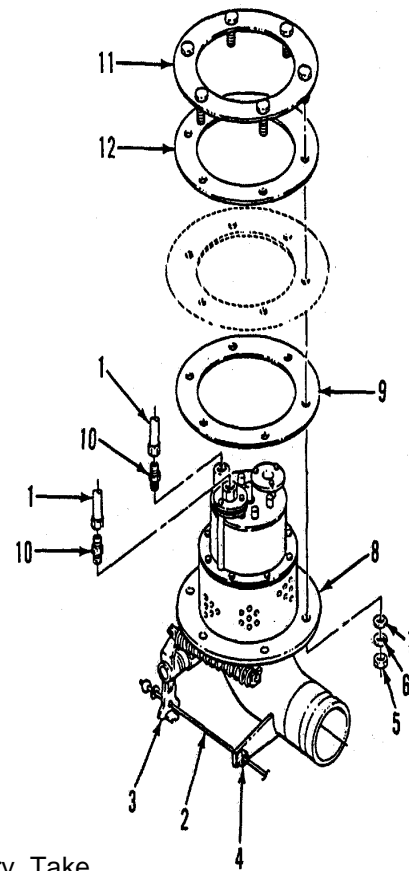
Dry cleaning solvent is potentially dangerous to personnel and property.

NOTE

Discard all mandatory replacement parts.

REMOVAL

- a. Disconnect tubes (1) at jet level sensor.
- b. Withdraw cable (2) from lever (3) and bushing (4).
- c. Remove nuts (5), lockwashers (6), flat washers (7), bottom loading valve (8) and gasket (9).
- d. Disconnect tubes (1) and remove connectors (10).
- e. Reach through mounting hole and lift retainer (11) up and away from gasket (12). Remove gasket through hole.



DISASSEMBLY

- a. Remove screws (13), plug (14) from SECONDARY port and pilot assembly (15) from PRIMARY port.

WARNING

Parts under spring tension can cause serious injury. Take extreme care when releasing parts under spring tension.

- b. Remove screws (16) and lift off cap (17).
- c. Remove garter spring (18), seal (19) and spring (20).
- d. Remove retaining ring (21) and seal assembly (22) from cap (17).
- e. Remove screen (23), spring (24), pin (25) and lever (26).
- f. Unscrew gland (27) and remove gland and shaft (28).
- g. Remove O-ring packing (29) and seal/retainer assembly (30) from gland (27).
- h. Pins (31) may remain in shaft (28) unless they must be replaced due to damage.
- i. Remove shaft (32) from valve body (33) with parts attached to shaft.
- j. Remove hair pin (34), pin (35) and cam (36).
- k. Depress shaft (32) into piston (44) then remove cotter pin (37), washer (38), limitpin (39), links (40), spring (41) and orifice (42).

i. Remove retaining ring (43) to separate piston (44) from shaft (32) and remove retaining ring (45).

m. Remove tubes (46 and 47) and plug (48).

n. Do not remove bushing (49) or pin (50) unless they need replacement.

REPAIR

a. Cleaning and Inspection

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 100 degrees F - 138 degrees F (38 degrees C - 59 degrees C).

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

(2) Inspect all parts carefully for damage or wear.

(3) Check resilience of springs (20 and 41).

(4) Replace parts as required. Install new pilot valve (15), garter spring (18), seals (19) and 23), O-ring packing (29), seal assembly (30), retaining rings (22, 43 and 45), hair pin (34) and cotter pin (37) at assembly.

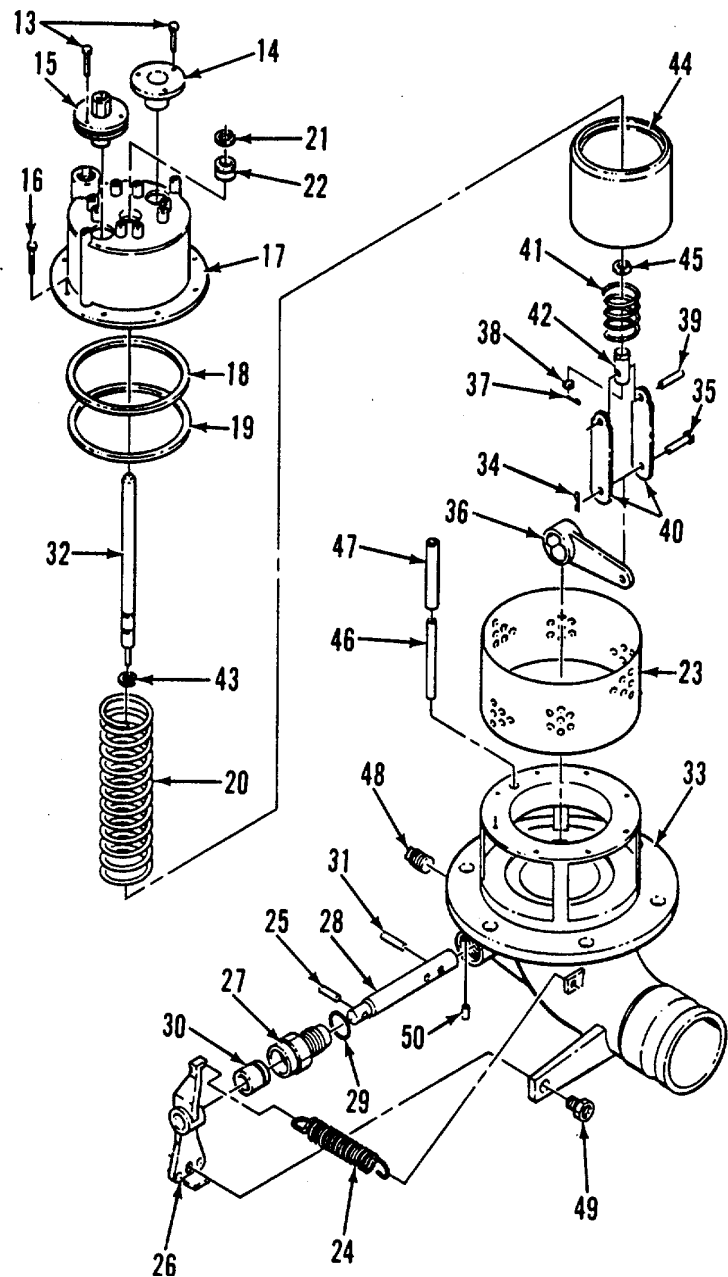
ASSEMBLY

a. Assemble links (40) to cam (36) and install pin (35) and hair pin (34).

b. Position orifice (42) at opposite end of links (28) and install limit pin (39).

c. Install retaining ring (45) on shaft (32).

d. Position spring (41) over orifice (42), then insert end of shaft (32) into orifice and install washer (38) and cotter pin (37).



e. Insert shaft (32) through piston (44) and install retaining ring (43).

f. Lower assembled parts into valve body (33) making sure that cam (36) goes to the rear of body.

g. Insert shaft (28) with pins (31) through opening in body and into the cam (36).

WARNING

Silicone compound, MIL-S-8660, is toxic to skin, eyes and respiratory tract. Good general ventilation is normally adequate.

h. Apply silicone compound to O-ring packing (29) and install O-ring on gland (27).

i. Install gland (27) over shaft (28) and screw gland into body (33).

j. Install seal/retainer assembly (30) in gland and install lever (26) and pin (25).

k. Install spring (24) between lever (26) and body (33), then operate lever by hand to make sure that spring (26) pulls piston (44) firmly into place.

l. Install tubes (46 and 47) and screen (23).

m. Install seal (22) and retaining ring (21) in cap (17).

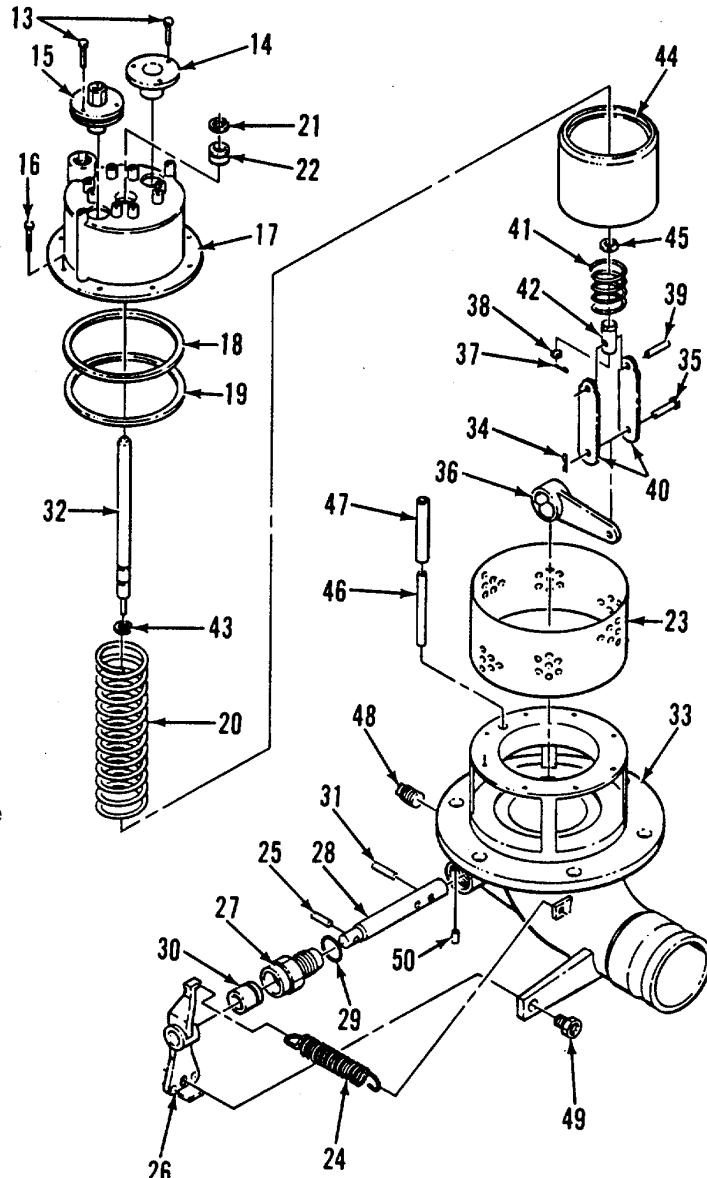
WARNING

Parts under spring tension can cause serious injury. Take extreme care when releasing parts under spring tension.

n. Place spring (20) over shaft (32) and install seal (19), garter spring (18), cap (17) and screws (16).

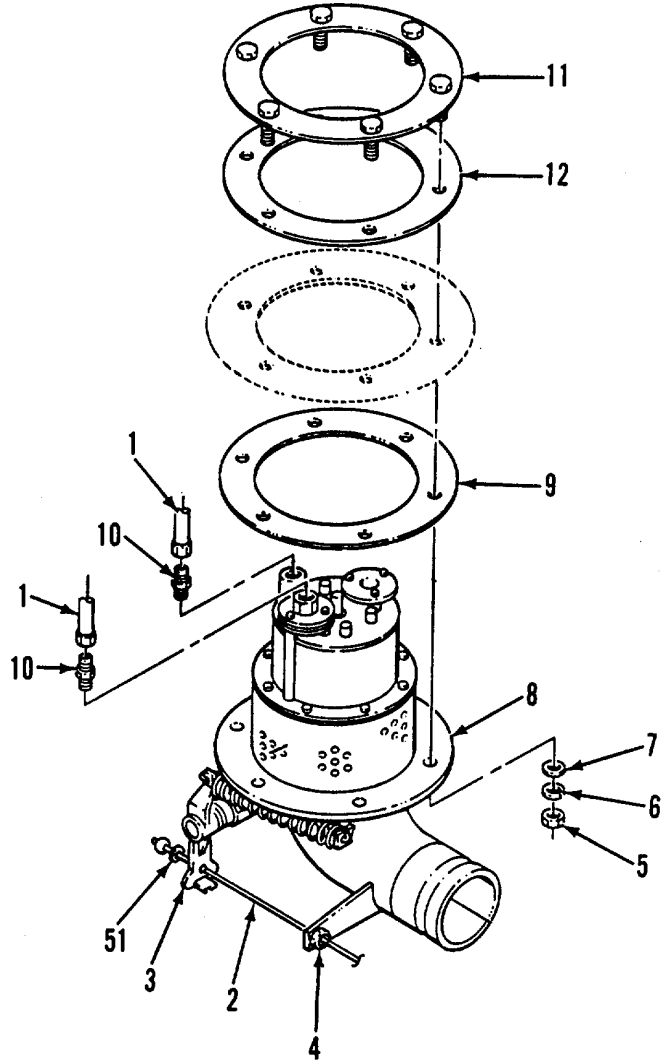
o. Position pilot assembly (15) on PRIMARY port and plug (14) on SECONDARY port of cap (17) and install screws (13).

p. Apply sealing compound to threads of plug (48) and install plug in valve body (33).



INSTALLATION

- a. Insert gasket (12) through hole in tank and position in place with holes aligned.
- b. Working through mounting hole, install retainer (11).
- c. Install connectors (10) and gasket (9) on bottom loading valve (8).
- d. Lower tubes (1) through manhole to extend far enough through mounting hole for connection to valve (8).
- e. Install the valve (8) in tank and fasten with flat washers (7), lockwashers (6) and nuts (5). Torque to 50 - 55 ft.lbs. (67.8 74.6 Nm).
- f. Make certain tubes (1) are clear of obstructions prior to connection.
- g. Connect tubes (1) at jet level sensor.
- h. Check that washer (51) is on cable (2) and insert cable through lever (3) and bushing (4). Apply grease to bushing.
- i. Refer to paragraph 4-23 to install tank and return the tank and pump unit to operational status.



APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals, and miscellaneous publications referenced in this manual.

A-2. FORMS

Recommended Changes to Publications and Blank Forms.....	DA Form 2028
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Quality Deficiency Report	SF 368

A-3. FIRST AID

First Aid for Soldiers	FM 21-11
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A-4. PAINTING

Treatment and Painting of Material	MIL-STD-704R
Painting Instructions for Army Material	TM 43-0139

A-5. MAINTENANCE

Elimination of Combustibles in Fuel Tanks	TB ORD 1 047
The Army Maintenance Management System (TAMMS)	DA PAM 738-750
Welding Theory and Application	TM 9-237
Operator's and Unit Maintenance Manual (Including RPSTL) for Filter Separator, Liquid Fuel, 50 GPM	TM 10-4330-232-12&P

A-6. SHIPMENT AND STORAGE

Administrative Storage of Equipment	TM 740-91-1
Preservation, Packaging, and Packing of Military Supplies and Equipment	TM 38-230-1
Army Material Maintenance Policy and Retail Maintenance Operations.....	AR 750-1

A-7. DEMOLITION

Procedures for Destruction of Equipment to Prevent Enemy Use	TM 750-244-3
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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 categories.
- b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.
- c. Section III lists the special tools and test equipment 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.
- b. **Test.** To verify serviceability by measuring the mechanical 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., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.
- d. **Adjust.** To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.
- e. **Align.** To adjust specified 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 equipment 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 install the same item when required to perform service or other maintenance functions. Install is the act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
- h. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the ad position code of the SMR code.

B-2. MAINTENANCE FUNCTIONS - Continued

i. Repair. The application of maintenance services¹ or other maintenance actions² to 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) necessary to restore an item to a completely serviceable/operational condition as prescribed 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 condition.

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

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

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

b. Column 2, Component/Assembly. Column 2 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 Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting 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 categories are as follows:¹

- C Operator or crew.
- O Organizational 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 tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetical order, which shall be keyed to the remarks contained in Section IV.

¹Services - inspect, test, service, adjust, align, calibrate, or replace.

²Actions - welding, grinding, riveting, straightening, facing, remachining, or resurfacing.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

- 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 REFERENCE CODES, SECTION IV

- a. Column 1, Reference Code. The code recorded in column 6, Section II.
- b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

SECTION II MAINTENANCE ALLOCATION CHART (CONTINUED)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			C	O	F	H	D		
01	Pump Unit, Liq Dspnsg	Remove		0.5					
		Install		0.5					
	Hose, Separator to Reel	Inspect	0.2						
		Replace		0.5				3	
	Hose, Manifold to Pump	Inspect	0.2						
		Replace		0.2				3	
	Hose, Pump to Separator	Inspect	0.2						
		Replace		0.2				3	
	Hose, Reel	Inspect	0.2						
		Replace		0.2				3	
0101	Reel, Static Discharge	Inspect	0.2						
0102	Nozzle Assembly, Fuel Dispensing	Replace		0.5					3
		Inspect	0.2						
0103	Reel Assembly, Fuel Dispensing	Repair		2.0					3
		Inspect	1.5					2, 3	A, G
	Spring	Replace			2.6				1, 4
		Repair			2.0				1, 4
	Wheel Ratchet	Inspect			0.3				
		Replace			1.5				1, 4
0104	Filter Separator Refer to TM 5-4330-232-12&P	Inspect			0.4				
		Replace			2.0				1, 4
0105	Pump Assy EMD								
	Junction Box Assembly	Inspect	0.1						
		Test		0.5					
	Relay, K1	Replace		1.0					2, 3
		Repair		1.0					2, 3
	RF Filter, F1	Test		1.0					2, 3
		Replace		1.0					2, 3
	Pump	Inspect	0.5						
		Replace			0.5				1, 4
		Repair			0.2	3.0			1, 3, 4

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAIN FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP	(6) REMARKS
			C	O	F	H	D		
	Electric Motor	Inspect Replace	0.5		0.5			1,4	
	Intervehicle Power Cable and Plug Assy	Inspect Test Replace	0.1	0.5				2	H, I, L
	On-Off Switch Cable Assembly	Insect Test Replace Repair	0.1	0.5				2 2, 3	H, I, L
	Frame and Bracket	Inspect Repair			0.5		1.0		E
0106	Valve Operator Lever Assy	Inspect Replace Repair	0.1	1.5				3 3	
0107	Adapter, Half, Quick Disconnect	Inspect Replace Repair	0.2	0.5				2 3	A, G
0108	Manifold Bottom Loading	Inspect Replace Repair	0.2	1.0				3	A
0109	A Frame Assy	Inspect Replace Repair	0.5	2.0	4.0			1, 4 1, 4	G, E
	Storage Box	Inspect Repair	0.2	0.5	0.5				E, G
02	Tie Down Assembly	Inspect Repair	0.2	0.5				3	
03	Hoses, Tank to Manifold	Inspect Replace	0.2	0.5				3	
04	Tank Group								
0401	Tank Assembly	Inspect Replace	0.2 1.0					3	
	Tank	Inspect Replace Repair	0.2	1.0		4.0		3 1, 4, 5	E
	Manhole	Inspect Replace Repair	0.2	0.5				3 3	G
0402	Sensor, Jet Fuel Level	Inspect Replace Repair		0.2 0.3 1.0				3 3 3	A, G

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAIN. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP.	(6) REMARKS
			C	O	F	H	D		
0403	Valve, Bottom Loading	Inspect	0.2						
		Replace		0.2	2.0			3	
		Repair			1.0			4	G
		Test			0.5				
05	Coupling Half	Inspect	0.2						
		Service	0.2						
		Test	0.5						k
		Replace		0.5				3	
		Repair		1.0				3	A, C, G

**SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
MAINTENANCE ALLOCATION CHART**

(1) Tool/ Test Eqpt Ref Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic Less Power (19204)	4910-00-754-0705	SC 4910-95CL-A 31
2	O	Shop Equipment, Automotive Maintenance, and Repair: Organizational Maintenance, Common No. 1 Less Power	4910-00-754-0654	SC 4910-95CL-A 74
3	O	Tool Kit, General Mechanics, Automotive	5180-00-177-7033	SC 5180-90-CL-N26
4	F	Tool Kit, Master Mechanics	5180-00-699-5273	SC 5180-90-CL-N05
5	F	Tester, Combustion Vapor	6665-00-664-4650	
6	F	Shop Equipment, Welding: Field Maintenance:	4940-00-357-7268	SC 4940-95-CL-B19-HR
7	O	Wrench, Torque: Deflecting-Frame End DR Style Mech. ½" Male Sq. Drive	5120-00-247-2536	SC 4910-95CL-A74
8	O	Wrench, Spanner: Adj Hook Type, Fixed Pivot Point, ¾ inch and 2" max circ.	5120-00-288-6468	SC 4910-95CL-A74
10	O	Wrench, Pipe: Adj Jaw Style, 1-½ inch to 2-½ inch	5120-00-277-1462	SC 4910-95CL-A74
11	O	Multimeter, Digital AN/PSM-45, 3-½ inch	6625-01-139-2512	SC4910-95CL-A74
12	O	Solder Gun: AC 60Hz, SGL-PH, Loop Tip, Removable Pistol Grip	3439-00-542-0396	SC 4910-9SCL-A74
13	O	PAN, Drain; 4 Gal Cap, W/Push-Pull HDL and Lifting Handles	4910-00-754-9592	SC 4910-95CL-A74

**Section IV. REMARKS FOR
MAINTENANCE ALLOCATION CHART**

Reference code	REMARKS
<p align="center"> A B C E F G H I J K L </p>	<p> Replace Gaskets Replace Defective Hose Assembly Replace Seal Assembly Weld Insulation Breakdown Continuity Test Repair by Replacing Defective Components Test for Opens, Grounds, and Shorts Continuity Test Repair by Replacing Defective Wire Operational Test Test for Known Voltage </p>

APPENDIX C**COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS****SECTION I. INTRODUCTION****B-1. SCOPE**

This appendix lists components of end item and basic issue items for the Tank and Pump Unit to help you inventory items required for safe and efficient operation.

B-2. GENERAL

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

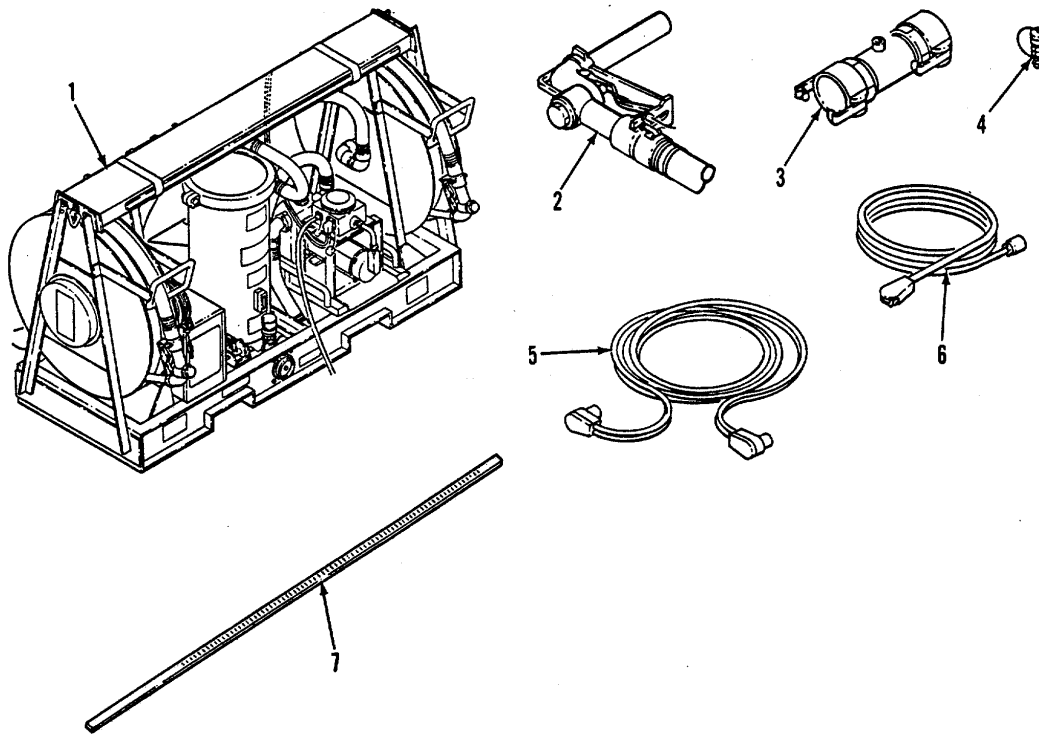
a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property 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 Tank and Pump Unit in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the Tank and Pump Unit during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS

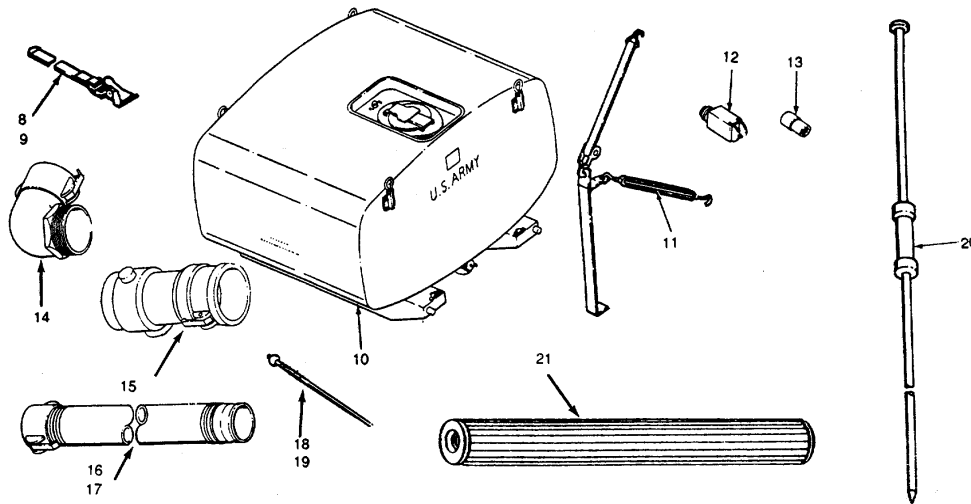
The following provides an explanation of columns found in the tabular listings:

- a. Column (1)-Illustration Number (Illus. 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 FSCM (in parentheses) followed by the part number.
- d. Column (4)-Unit of Measure (U/M). Indicates the measure used in performing the actual operation all 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.

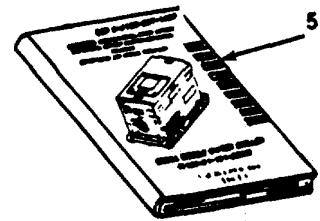
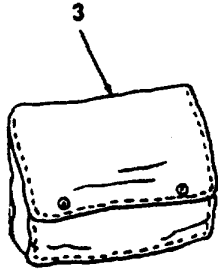
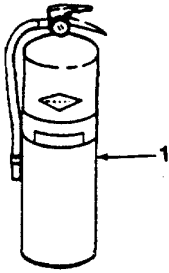


SECTION II. COMPONENTS OF END ITEM

(1) Illus/ Item No	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code	(5) Qty rqr
1	4320-01-333-9190	Pumping Unit (97403) 13226E2148	Ea	1
2	4930-00-902-4642	Nozzle Assembly (81349) MIL-N-52110	Ea	2
3	4930-01-159-4437	Adapter Assembly (97403) 13220E9406-3	Ea	1
4	4930-01-169-5287	Probe Assembly, Water Detector (97403) 13220E9914-3	Ea	1
5	6150-01-022-6004	Cable Assembly, Power (19207) 11682336-1	Ea	1
6	6150-01-191-9732	Cable Assy, ON-OFF (97403) 13217E2964	Ea	1
7		Gauge Stick. Petroleum 1 3228E2591	Ea	1



(1) Illus. Item No.	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code	(5) Qty rqr
8	5340-01-162-4325	Strap Assembly (97403) 13220E5288-2	Ea	2
9	5340-01-165-3721	Strap Assembly (97403) 13220E5288-4	Ea	1
10	4930-01-256-0650	Tank Assembly, Liquid Storage (97403) 13226E2146	Ea	2
11	3990-01-015-8457	Tie-Down Assembly, Cargo Truck (97403) 13217E7150	Ea	10
12		Switch Assembly, Toggle (97403) 13222E9859	Ea	1
13	5935-00-322-8959	Adapter, Connector (19206) 1167750	Ea	1
14		Coupling Halt (97403) D13226E217713	Ea	1
15	4730-01-150-3108	Coupling Half (97403) D13217E7129	Ea	1
16		Hose and Hose Assembly (81349) Mil-H-370 M370-B06B2A890	Ea	1
17		Hose and Hose Assembly (81349) Mil-H-370 M370-B06B2A260	Ea	1
18		Cable Ball End (97403) C 13217E7175-1	Ea	1
19		Cable Ball End (97403)C13217E7175-2	Ea	1
20	5975-01-050-5707	Ground Rod (97403) (13219E0462	Ea	1
21	(81349) MIL-F-52308	Filter Elements	Ea	4



SECTION III. BASIC ISSUE ITEMS

(1) Illus. Item No.	(2) National Stock Number	(3) DESCRIPTION FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
1	4210-00-775-0127	Fire Extinguisher Type 2, Class 2, w/Bracket		Ea	1
2		DELETED			
3	2540 00 67-2459	Bag Pamphlet (561 61)1 0510977		Ea	1
4		DELETED			
5		TM 10-4930-236-13&P		Ea	1
6		DELETED			

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

SECTION I. INTRODUCTION

C-1. SCOPE

This appendix lists additional items you are authorized for the support of the Tank and Pump Unit.

C-2. GENERAL

This list identifies items that do not have to accompany the Tank and Pump Unit and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION FSCM & PART NUMBER USABLE ON CODE	(3) U/M	(4) QTY AUTH
3990-01-169-5286	Tie Down Assembly Vehicle (Hinge Side used with 5 ton dropside vehicle)	EA	10

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 operate and maintain the Tank and Pump Unit. 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), or CTA 8-100, Army Medical Department Expendable/Durable 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.

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

O-Unit Maintenance

F-Direct 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 Federal Supply Code for Manufacturer (FSCM) 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. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	O	6950-00-281-1985	Dry Cleaning Solvent	GAL
2	O	7930-00-526-2919	Detergent General Purpose Liquid s gal Pail	GAL
3	O	3439-00-555-4629	Solder, Tin Alloy (81349) QQ-S-571 SN 60 WRAP 2 0.0321	LB
4	O	8030-00-889-3535	Tape Anti-Seize 11-½ x 260" (18876) 11072502	RL
5	O	6850-00-880-7616	Silicone Compound (81349) -MIL-S-8660	EA
6	O	8030-00-543-4384	Sealing Compound (81349) MIL-S-791-6	LB
7	F	8040-00-851-0211	Adhesive Sealant Silicone RTV-Type I (81349) MIL-A-46106	EA
8	O AR	9150-00-530-6814	Grease, Wire Rope and Exposed Gear (81349) MIL-G-18458	AR
9	O	8040-00-262-9011	Adhesive, Rubber Base, General Purpose (81348) MMM-A-1617, Type III	EA
10	O		Insulation Sleeving, Electrical, Heat Shrink (81349) MIL-T-23053fi	EA
11	O	5340-01-004-5180	Padlock, Key Operated (96906) MS35647-5	EA
12	F		Varnish (81349) MIL-V-173	EA
13	O	7920-00-205-1711	Rags	BE

UNIT AND DIRECT SUPPORT

MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

SECTION I. INTRODUCTION

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 and direct support maintenance of the Tank and Pump Unit. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

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 II. Repair parts for repairable special tools are also listed in this section. Items listed are shown on the associated illustration(s)/figure(s).

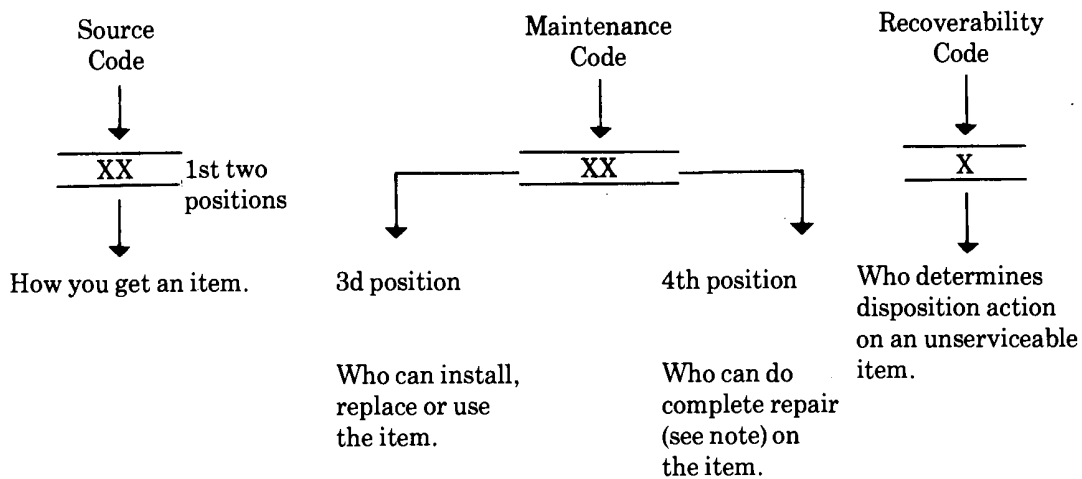
b. Section III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

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.

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-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:



*Complete Repair: Maintenance capacity, capability, and authority to perform all 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 to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations 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 indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.

MO--(Made at org.
AVUM Level
MF--(Made at DS/
AVUM Level
MH--(Made at GS
Level)
ML--Made at Spe-
cialized Repair
Activity (SRA))
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 part number in the DESCRIPTION and USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.

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 indicated 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 items are assembled at a higher level, order the item from the higher level of maintenance.

AO--(Assembled by
org/AVUM Level)
AF--(Assembled by
DS/AVIM Level)
AH--(Assembled by
GS Category)
AL--(Assembled by
SRA)
AD--(Assembled by
Depot)

XA-Do not requisition "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 Reciprocating Compressor 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, may be 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 750-1.

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

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

- | Code | Application/Explanation |
|------|---|
| C- | Crew or operator maintenance done within organizational or aviation unit maintenance. |
| O- | Organizational 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 capability to do complete repair (i.e., perform all authorized repair functions.) NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes. This position will contain one of the following maintenance codes.

- | Code | Application/Explanation |
|------|---|
| O- | Organizational or aviation unit is the lowest level that can do complete repair of the item. |
| F- | Direct support or aviation intermediate is the lowest level 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 is the lowest level that can do complete repair of the item. |
| D- | Depot is the lowest level that can do complete repair of the item. |
| Z- | Nonreparable. No repair is authorized. |
| B- | No repair is authorized. (No parts or special tools are authorized for the maintenance of a Coded item). However, the item may be 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 gem at the level of maintenance shown in ad position of SMR Code.

O-Reparable item. When not economically reparable, condemn and dispose of the item at organizational 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, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. CAGEC (Column (3)). The Commercial and Government Entity Code (CAGEC) is a 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 to 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 an 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) (Column (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, 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) Spare/repair parts that make up an assembled item are listed immediately following the assembled 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 paragraph 5, Special Information).

(8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipment's 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 both Section II and Section III.

(10) The indenture, shown as dots appearing before the repair part, indicates that the item is a repair part of the next higher assembly.

f. **QTY (Column (6)).** The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and may vary from application to application.

4. EXPLANATION OF COLUMNS (SECTION IV).

a. NATIONAL STOCK NUMBER (NSN) INDEX.

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

NSN

5305-01-574-1467

NIIN

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 III.

(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 NUMBER 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 0 through 9 and each following letter or digit in like order).

(1) **CAGEC column.** The Commercial and Government 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 j. (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/located in Sections II and III.

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

c. FIGURE AND ITEM NUMBER INDEX.

(1) **FIG. column.** This column lists the number of the figure where the item is identified/located in Section II and III.

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

(3) **STOCK NUMBER column.** This column lists the NSN for the item.

(4) **CAGEC column.** The Commercial and Government Entity Code (CAGEC) is a Digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(5) **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.

5. SPECIAL INFORMATION.

a. **USABLE ON CODE.** The usable on code appears in the lower corner of the Description column heading. Usable on codes are shown as "UOC:" in the Description Column Justified left) on the last line applicable item description/nomenclature. Uncoded items are applicable to all models.

b. **ASSOCIATED PUBLICATIONS. NOT APPLICABLE.**

6. HOW TO LOCATE REPAIR PARTS.

a. **When 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 item on the figure and note the item number.

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

(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 c-a.(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see paragraph c-.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 are looking for, then locate the item number in the repair parts list for the figure.

7. ABBREVIATIONS. Abbreviations used in this manual are listed in MIL-STD-12.

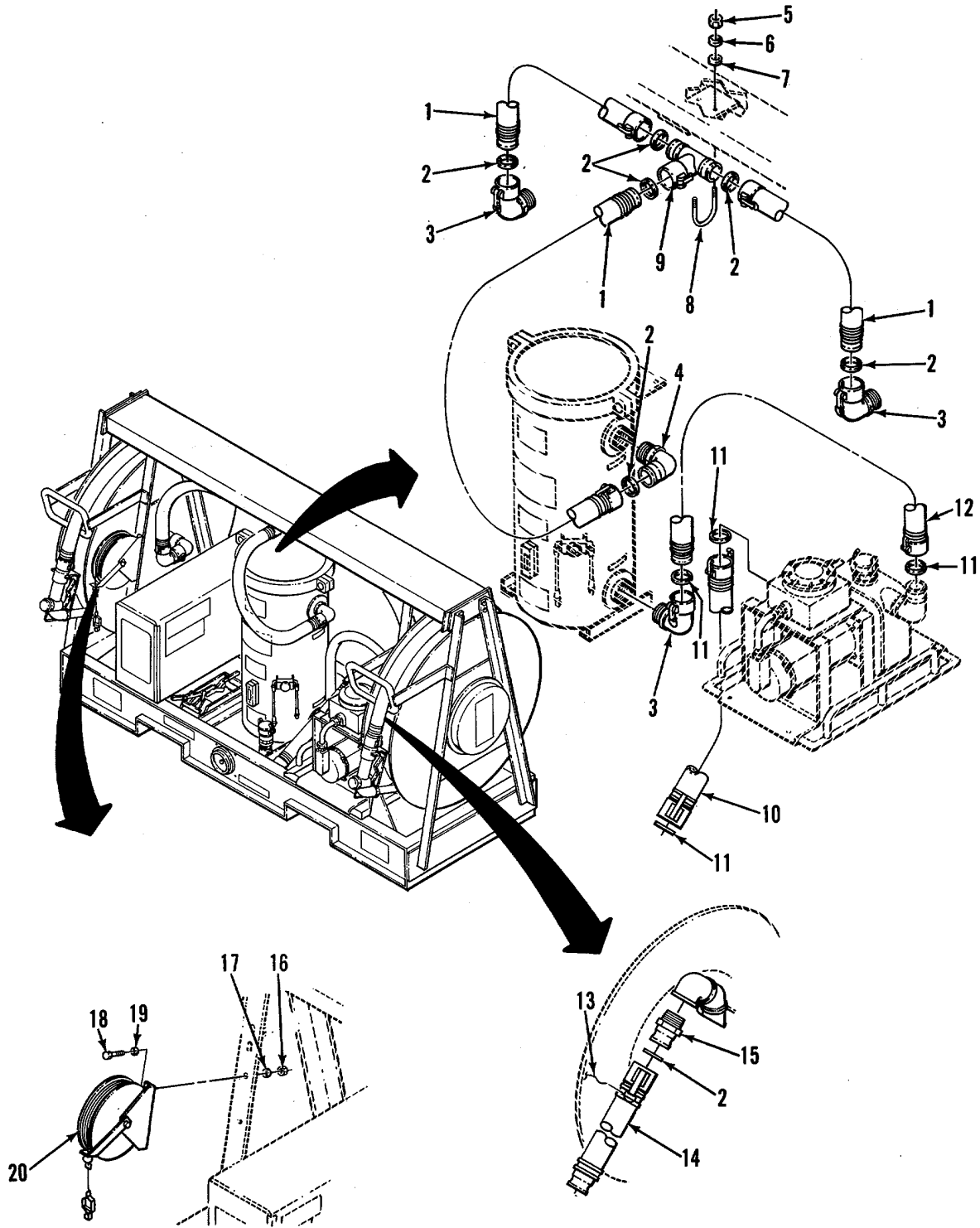


Figure 1. Hoses and Static Reel

Change 1 F-8

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 01 PUMP UNIT, LIQUID					
FIG. F-1. HOSES AND STATIC REEL					
	PFOFF	97403	13226E2148	PUMP UNIT, LIQUID DI.....	1
1	PAOZZ	81349	M370-A05B2A290	.HOSE ASSY TEE TO FILTER/REEL.....	3
2	PAOZO	96906	MS27030-5	.GASKET.....	7
3	PBOZZ	97403	13217E7125	.COUPLING HALF, QUICK.....	3
4	PBOZZ	97403	13217E6306	.COUPLING HALF, QUICK.....	1
5	PAOZZ	96906	MS51967-9	.NUT, PLAIN, HEXAGON.....	4
6	PAOZZ	96906	MS35338-46	.WASHER, LOCK.....	4
7	PAOZO	96906	Ms27183-i4	.WASHER, FLAT.....	4
8	PAOZA	97403	13217E7123	.BOLT, U.....	2
9	XBOZZ	97403	13217E7122	.COUPLING HALF.....	1
10	PAOZZ	81349	M370-B06B2A104	.HOSE ASSEMBLY, NONME MANIFOLD TO PUMP.....	1
11	PAOZO	96906	MS27030-6	.GASKET.....	4
12	PAOZZ	81349	M370-A05B2A385	.HOSE ASSY PUMP TO FILTER-SEPARATOR.....	1
13	MOOZZ	19099	MS20995F32-10	.WIRE, SAFETY MAKE FROM P/N..... MS20995F32, 10 IN. REQ.....	1
14	PAOZZ	81349	M370-A05B2A4800	.HOSE ASSEMBLY, NONME.....	2
15	PAOZZ	96906	MS27022-9	.COUPLING HALF, QUICK.....	2
16	PAOZZ	96906	MS51967-15	.NUT, PLAIN, HEXAGON.....	2
17	PAOZO	96906	MS35333-44	.WASHER, LOCK.....	2
18	PAOZZ	96906	MS90728-117	.SCREW, CAP, HEXAGON H.....	2
19	PAOZO	96906	MS27183-18	.WASHER, FLAT.....	2
20	PAOZZ	97403	13220E7596	.REEL, STATIC DISCH.....	1

END OF FIGURE

Change 1 F-9

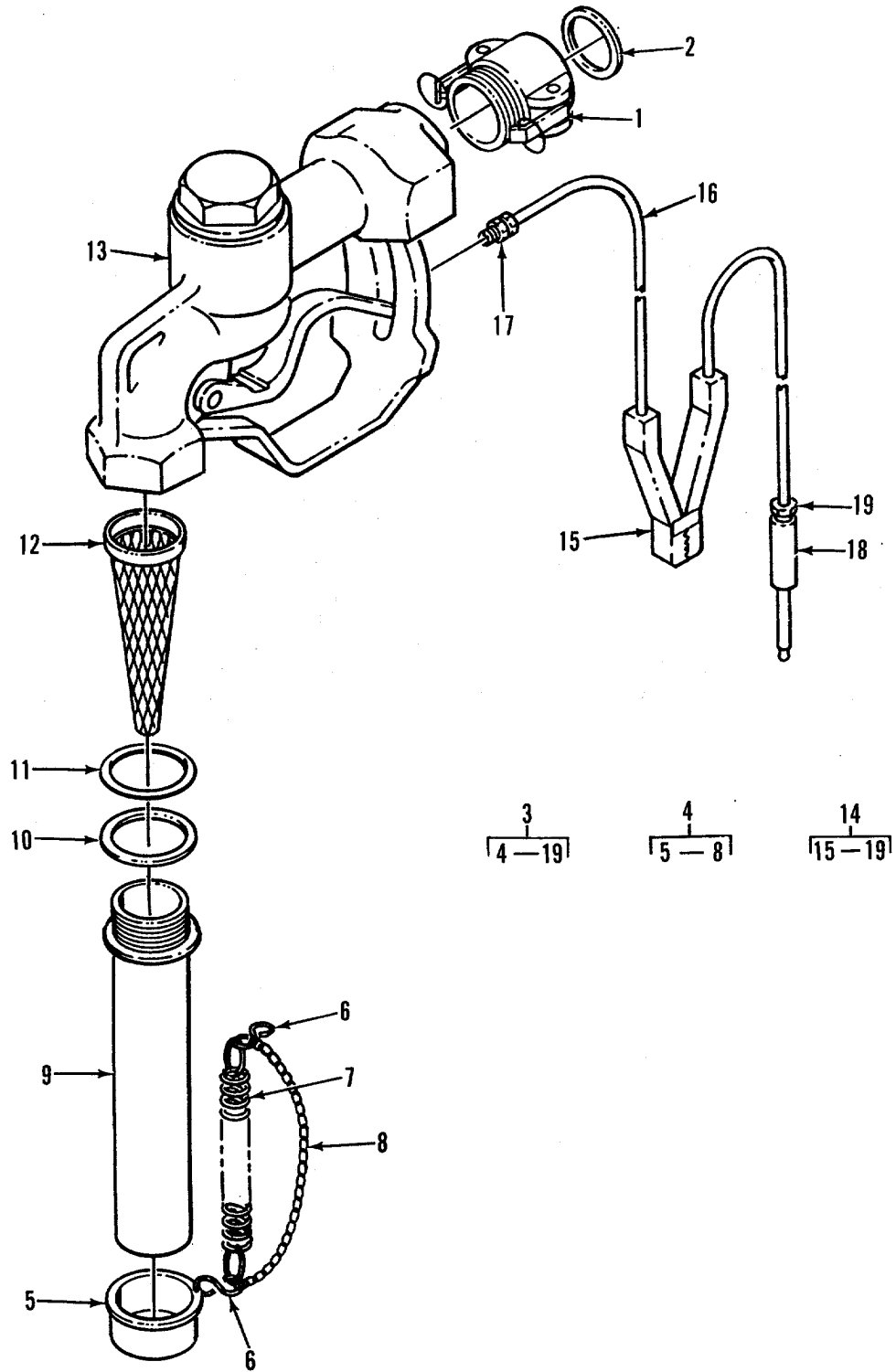


Figure 2. Fuel Dispensing Nozzle Assembly

Change 1 F-10

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 01 PUMP UNIT, LIQUID DISPENSING	
				FIG. F-2. FUEL DISPENSING NOZZLE ASSEMBLY	
1	PAOZZ	96906	MS27026-9	..COUPLING HALF, QUICK.....	2
2	PAOZO	96906	MS27030-5	..GASKET.....	2
3	PAOOF	81718	190G(B104)	..NOZZLE ASSY, FUEL.....	2
4	PBOZZ	81718	296CA15/8	..CAP ASSEMBLY, DUST.....	1
5	XAOZZ	81718	H-3804-AG	...CAP.....	1
6	XAOZZ	81718	H-3673M	...HOOK, CHAIN, S.....	2
7	XAOZZ	81718	H-9209-M	...SPRING, COMPRESSION	1
8	XAOZZ	81718	H-9597-RB	...CHAIN, NOZZLE	1
9	XBOZZ	81718	C-32631½	..SPOUT ASSY.....	1
10	PAOZZ	81718	H-7766-M	...GASKET.....	1
11	PBOZZ	81718	H7670M	..PACKING, PREFORMED.....	1
12	XBOZZ	81718	153	..ELEMENT, STRAINER.....	1
13	XAOZZ	31718	D1554-AG	..BODY, NOZZLE	1
14	PBOZZ	81718	616W	..DISCHARGER, ELECTROS.....	1
15	XAOZZ	81718	H5482M	...CLIP, ELECTRICAL.....	1
16	XAOZZ	81718	45132RS	...WIRE.....	1
17	XAOZZ	96906	MS25384-3	...CONTACT, ELECTRICAL.....	1
18	XAOZZ	96906	MS3493-1	...PLUG, TIP	1
19	XAOZZ	96906	MS3493-2	...NUT, COMPRESSION.....	1

END OF FIGURE

Change 1 F-11

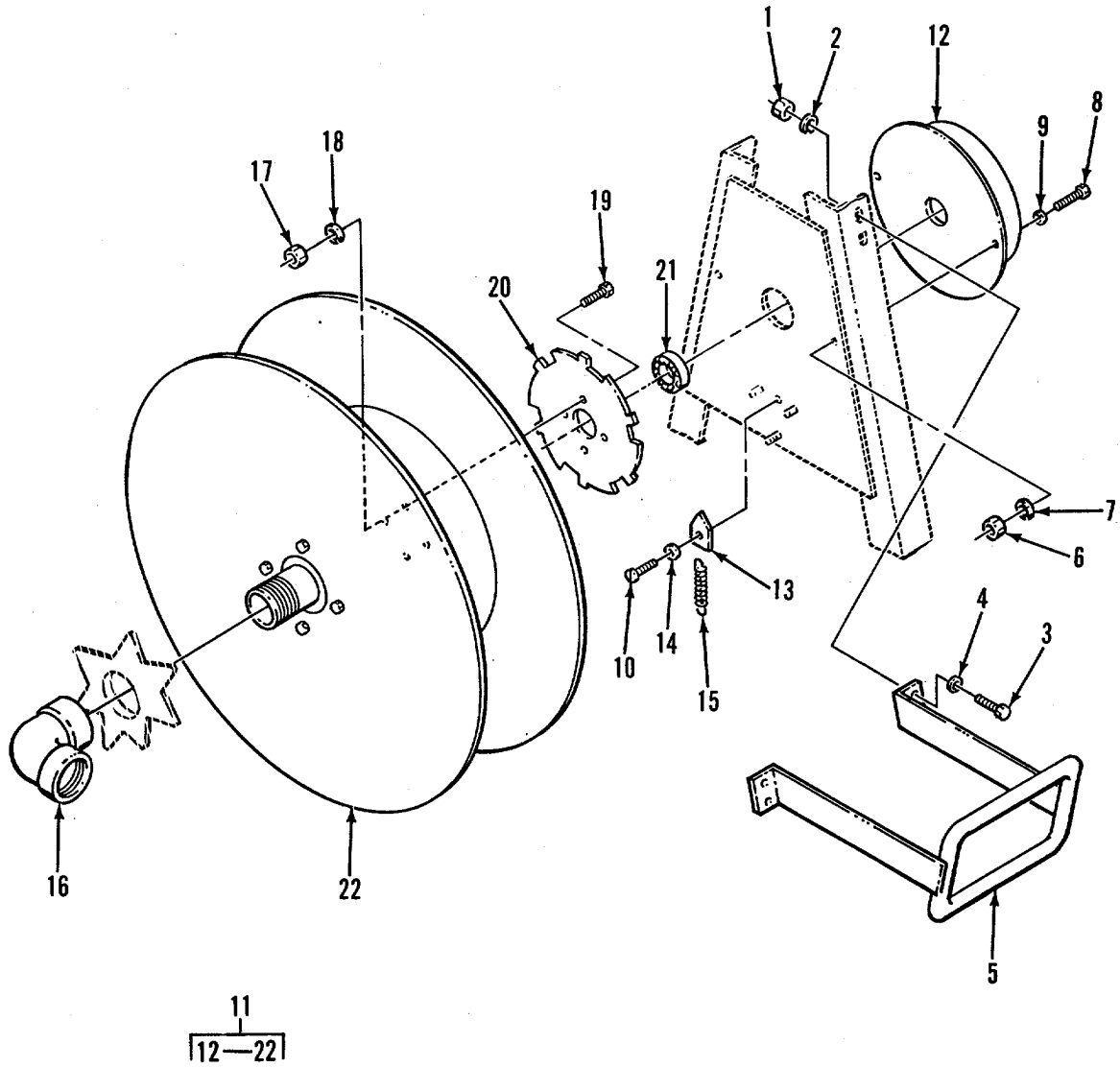


Figure 3. Reel Assembly, Fuel Dispensing, RH and LH

Change 1 F-12

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 01 PUMP UNIT, LIQUID DISPENSIN'G FIG. F-3. REEL ASSEMBLY, FUEL DIS PENSING, RH AND LH	
1	PAOZZ	96906	MS51967-15	.NUT, PLAIN, HEXAGON	8
2	PAOZZ	96906	MS35338-48	.WASHER, LOCK	8
3	PAOZO	96906	MS90728-114	.SCREW, CAP, HEXAGON H.....	8
4	PAOZO	96906	MS27183-18	.WASHER, FLAT	8
5	XBOZZ	97403	13228E2590	.GUIDE, HOSE	2
6	PAFZZ	96906	MS51967-9	.NUT, PLAIN, HEXAGON	4
7	PAFZZ	96906	MS35338-46	.WASHER, LOCK	4
8	PAFZZ	96906	MS90725-64	.SCREW, CAP, HEXAGON H.....	4
9	PAFZO	96906	MS27183-14	.WASHER, FLAT	4
10	PBFZZ	96906	MS21093-457	.SCREW, SELF-LOCKING	2
11	PBFFF	38205	363001	.REEL ASSY, HOSE, RH.....	1
11	PBFFF	38205	363002	.REEL ASSY, HOSE, LH	1
12	PBFZZ	38205	323091R	..SPR POCKET ASSY RIGHT HAND ASSY	1
12	PBFZZ	38205	323091L	..SPR POCKET ASSY LEFT HAND ASSY	1
13	PBFZZ	38205	320263	..PAWL ASSY.....	1
14	XAFZZ	82366	47727	..CAP, PAWL.....	1
15	XAFZZ	38205	316002	..SPRING, PAWL.....	1
16	PBFZZ	81718	3630	..PIPE FITTING, SWIVEL	1
17	PAFZZ	96906	MS51967-5	..NUT, PLAIN, HEXAGON	4
18	PAFZO	96906	MS35338-45	..WASHER, LOCK.....	4
19	PAFZZ	96906	MS16997-81	..SCREW, CAP, SOCKET HE.....	4
20	XBFZZ	38205	326875	..WHEEL, RATCHET	1
21	PBFZZ	82366	310025	..BEARING, BALL.....	1
22	XAFZZ	19099	JFB14RH	..REEL, HOSE, RH RIGHT HAND ASSY	1
22	XAFZZ	19099	JFB14LH	..REEL, HOSE, LH LEFT HAND ASSY.....	1

END OF FIGURE

Change 1 F-13

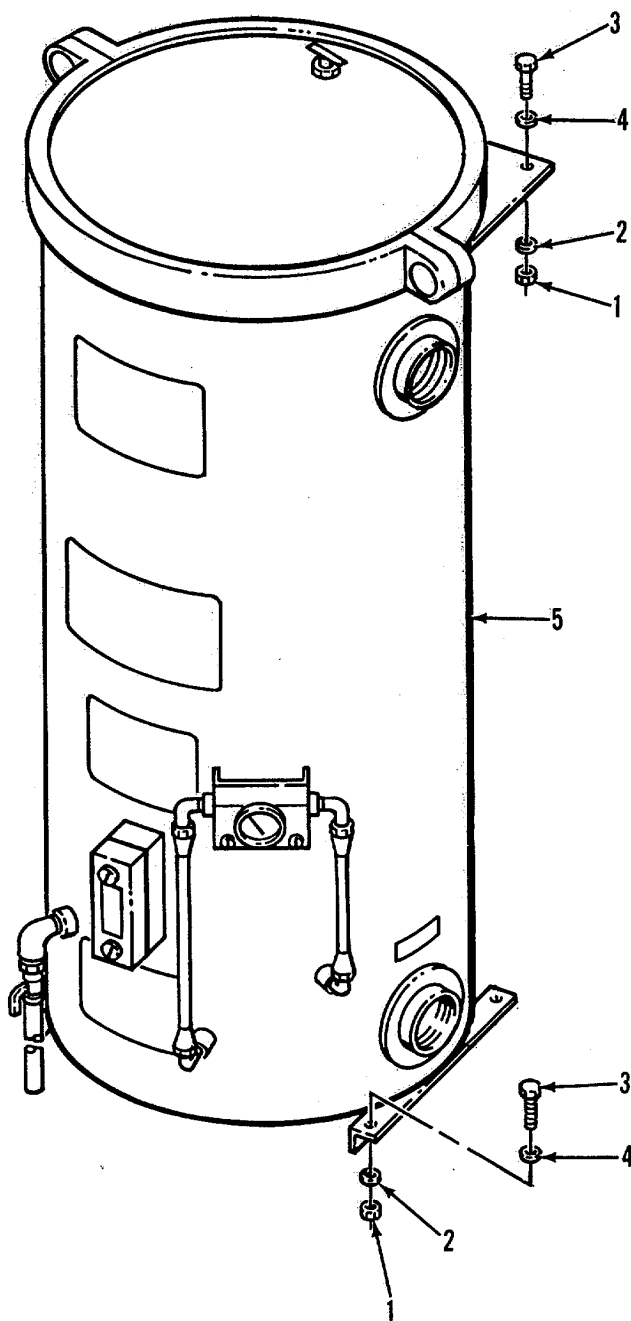


Figure 4. Filter Separator

Change 1 F-14

SECTION II

TM 10-4930-236-13&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
-------------------	--------------------	--------------	-----------------------	--	------------

**GROUP 01 PUMP UNIT, LIQUID DISPENSING
FIG. F-4. FILTER SEPARATOR**

1	PADZZ	96906	MS51967-15	.NUT, PLAIN.HEXAGON	4
2	PAOZZ	96906	MS35338-48	.WASHER, LOCK	4
3	PAOZZ	96906	MS90725-113	.SCREW, CAP, HEXAGON H.....	4
4	PAOZO	96906	MS27183-18	.WASHER, FLAT	4
5	PBOOO	97403	13217E7140	.FILTER-SEPARATOR, LI (REFER TO TM 10-4330-232-12&P FOR PARTS..... BREAKDOWN).....	1

END OF FIGURE

Change 1 F-15

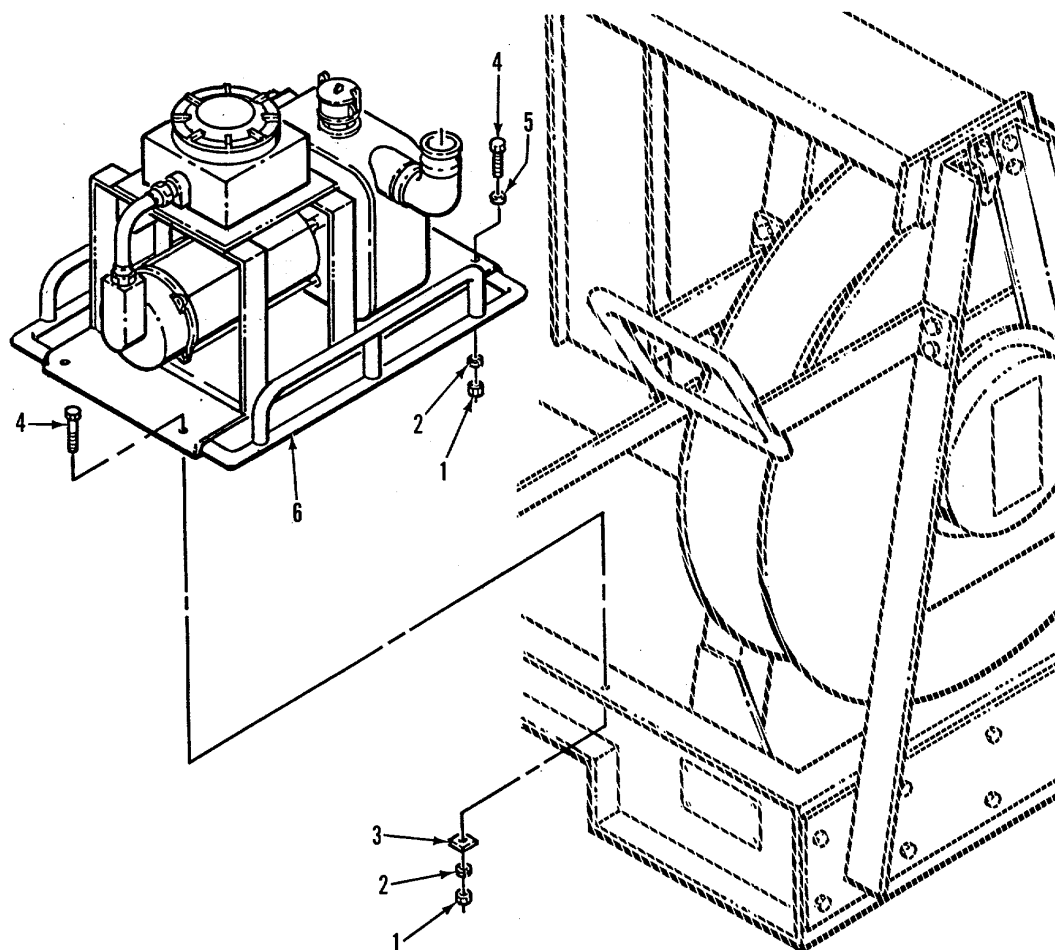


Figure 5. EMD Pump Assembly

Change 1 F-16

SECTION II

TM 10-4930-236-13&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 01 PUMP UNIT, LIQUID DISPENSING	
				FIG. F-5. END PUMP ASSEMBLY	
1	PAOZZ	96906	MS51967-15	.NUT, PLAIN, HEXAGON	4
2	PAOZZ	96906	MS35338-48	.WASHER, LOCK	4
3	PBOZZ	97403	13206E4482-2	.WASHER, BEVEL	2
4	PAOZZ	96906	MS90728-117	.SCREW, CAP, HEXAGON H.....	4
5	PAOZO	96906	MS27183-18	.WASHER, FLAT	2
6	PBOFH	97403	13217E7135	.PUMP UNIT, CENTRIFUG	1

END OF FIGURE

Change 1 F-17/(F-18 blank)

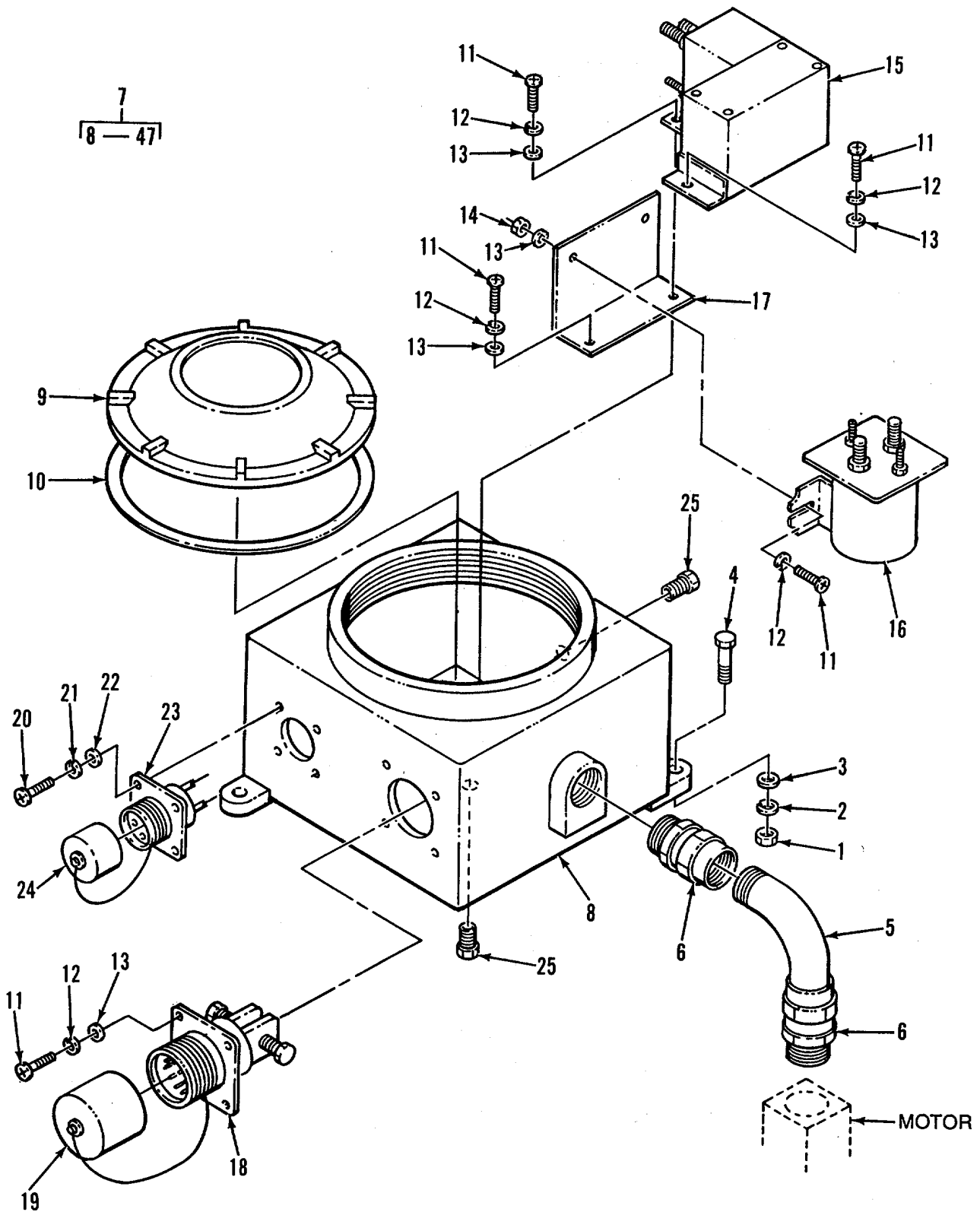


Figure 6. Junction Box Assembly (Sheet 1 of 2)

Change 1 F-19

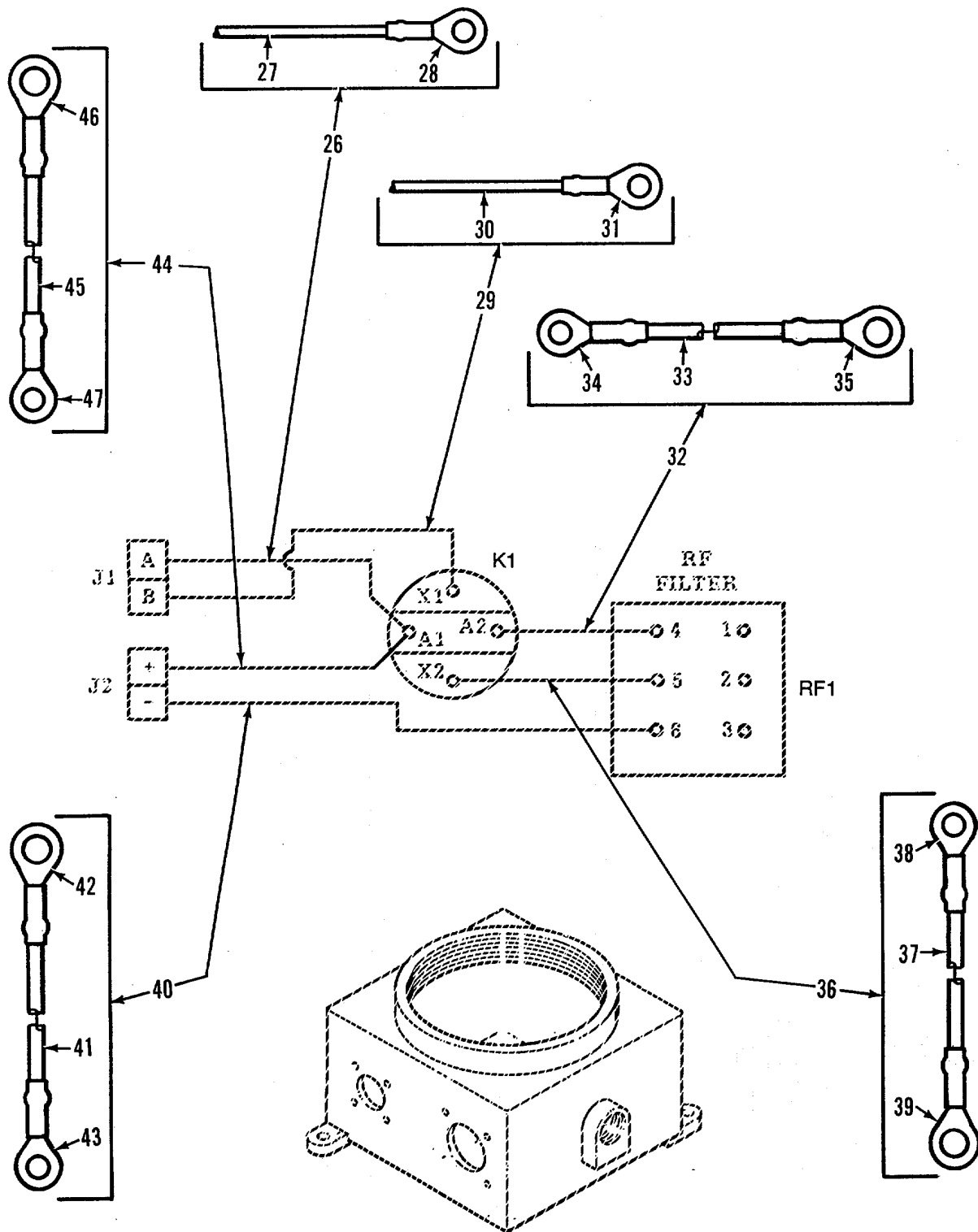


Figure 6. Junction Box Assembly (Sheet 2 of 2)

Change 1 F-20

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 01 PUMP UNIT, LIQUID DISPENSING					
FIG. F-6 JUNCTION BOX ASSEMBLY					
1	PAOZZ	96906	MS51967-8	..NUT,PLAIN,HEX.....	2
2	PAOZZ	96906	MS35338-46	..WASHER,LOCK.....	2
3	PAOZO	96906	MS27183-14	..WASHER,FLAT.....	2
4	PAOZZ	96906	MS90725-65	..SCREW,CAP.....	2
5	XBOZZ	97403	13217E7166	..ELBOW,90 DEG.....	1
6	XBOZZ	15235	UNY105SA	..CPLG,ELEC CONDUIT.....	2
7	XBOOF	97403	13227E6652	..JUNCTION BOX ASSY.....	1
8	XBOOO	97403	13217E7132	..JUNCTION BOX.....	1
9	XBOZZ	15235	GUB0101	...COVER,CONDUIT OUTLE.....	1
10	PAOZZ	15235	GASK925	...PACKING,PREFORMED.....	1
11	PAOZO	96906	MS35207-264	...SCREW,MACHINE.....	9
12	PAOZO	96906	MS35333-39	...WASHER,LOCK.....	9
13	PAOZO	96906	MS27183-42	...WASHER,FLAT.....	9
14	PAOZZ	96906	MS35650-302	...NUT,PLAIN,HEXAGON.....	2
15	PBOZZ	23939	A4497A	...FILTER,RADIO FREQUE.....	1
16	PAOZZ	80089	586 114111	...RELAY 200 AMP, 24 VDC.....	1
17	XBOZZ	97403	13228E4274	...BRACKET,MOUNTING.....	1
18	PBOZZ	96906	MS52131-1	...CONNECTOR,PLUG,ELEC.....	1
INTERVEHICLE POWER CABLE.....					
19	XBOZZ	19207	11675004	...CAP,PROTECTIVE,DUST.....	1
20	PAOZO	96906	MS35206-218	...SCREW,MACHINE.....	4
21	PAOZO	96906	MS35333-36	...WASHER,LOCK.....	4
22	PAOZZ	96906	MS27183-4	...WASHER,FLAT.....	4
23	PBOZZ	96906	MS3452W165-4S	...CONNECTOR,RECEPTACL.....	1
24	XBOZZ	96906	MS25043-16DA	...COVER,ELECTRICAL CO.....	1
25	XBOZZ	81349	M286755B03	...FITTING,DRAIN.....	2
26	AOOZZ	97403	13217E7141-1	...LEAD,ELECTRICAL J1-A TO K1-A1.....	1
27	MOOZZ	97403	13217E7141-1-1	...WIRE,ELECTRICAL..... MAKE FROM BULK	1
WIRE P/N MIL-W-16878/5TYPE EE-16,.....					
6IN RQ.....					
28	PAOZO	96906	MS25036-109	...TERMINAL,LUG.....	1
29	AOOZZ	97403	13217E7141-2	...LEAD,ELECTRICAL J1-B TO K1-X1.....	1
30	MOOZZ	97403	13217E7141-2-1	...WIRE,ELECTRICAL MAKE FROM BULK.....	1
WIRE P/N MIL-W-16878/5TYPE EE-16,					
6IN RQ.....					
31	PAOZZ	96906	MS25036-108	...TERMINAL,LUG.....	1
32	AOOZZ	97403	13217E7141-5	...LEAD,ELECTRICAL K1-A2 TO RF1-4.....	1
33	MOOZZ	97403	13217E7141-5-2	...WIRE,ELECTRICAL MAKE FROM BULK.....	1
WIRE P/N MIL-W-16878/5TYPE EE-8,6IN REQ.....					
34	PAOZZ	96906	MS25036-116	...TERMINAL,LUG.....	1
35	PAOZZ	96906	MS25036-117	...TERMINAL,LUG.....	1
36	AOOZZ	97403	13217E7141-6	...LEAD,ELECTRICAL K1-X2 TO RF1-5.....	1
37	MOOZZ	97403	13217E7141-6-1	...WIRE,ELECTRICAL MAKE FROM BULK.....	1
WIRE P/N..... MIL-W-16878/5TYPE EE-16,					
6IN RQ.....					
38	PAOZZ	96906	MS25036-108	...TERMINAL,LUG.....	1

SECTION II

TM 10-4930-236-13&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
39	PAOZZ	96906	MS25036-115	....TERMINAL,LUG	1
40	AOOZZ	97403	13217E7141-4	...LEAD,ELECTRICAL J2(-) TO RF1-6.....	1
41	MOOZZ	97403	13217E7141-4-2	....WIRE,ELECTRICAL MAKE FROM BULK.....	1
				WIRE P/N MIL-W-16878/5TYPE EE-8,6IN	
				REQ.....	
42	PAOZZ	96906	MS25036-116	....TERMINAL,LUG	1
43	PAOZZ	96906	MS25036-118	....TERMINAL,LUG	1
44	AOOZO	97403	13217E7141-3	...LEAD,ELECTRICAL J2(+) TO K1-A1.....	1
45	MOOZZ	97403	13217E7141-3-2	....WIRE,ELECTRICAL MAKE FROM BULK.....	1
				WIRE P/N MIL-W-16878-5TYPE EE-8,6IN	
				REQ.....	
46	PAOZZ	96906	MS25036-117	....TERMINAL,LUG	1
47	PAOZZ	96906	MS25036-118	....TERMINAL,LUG	1

END OF FIGURE

Change 1 F-22

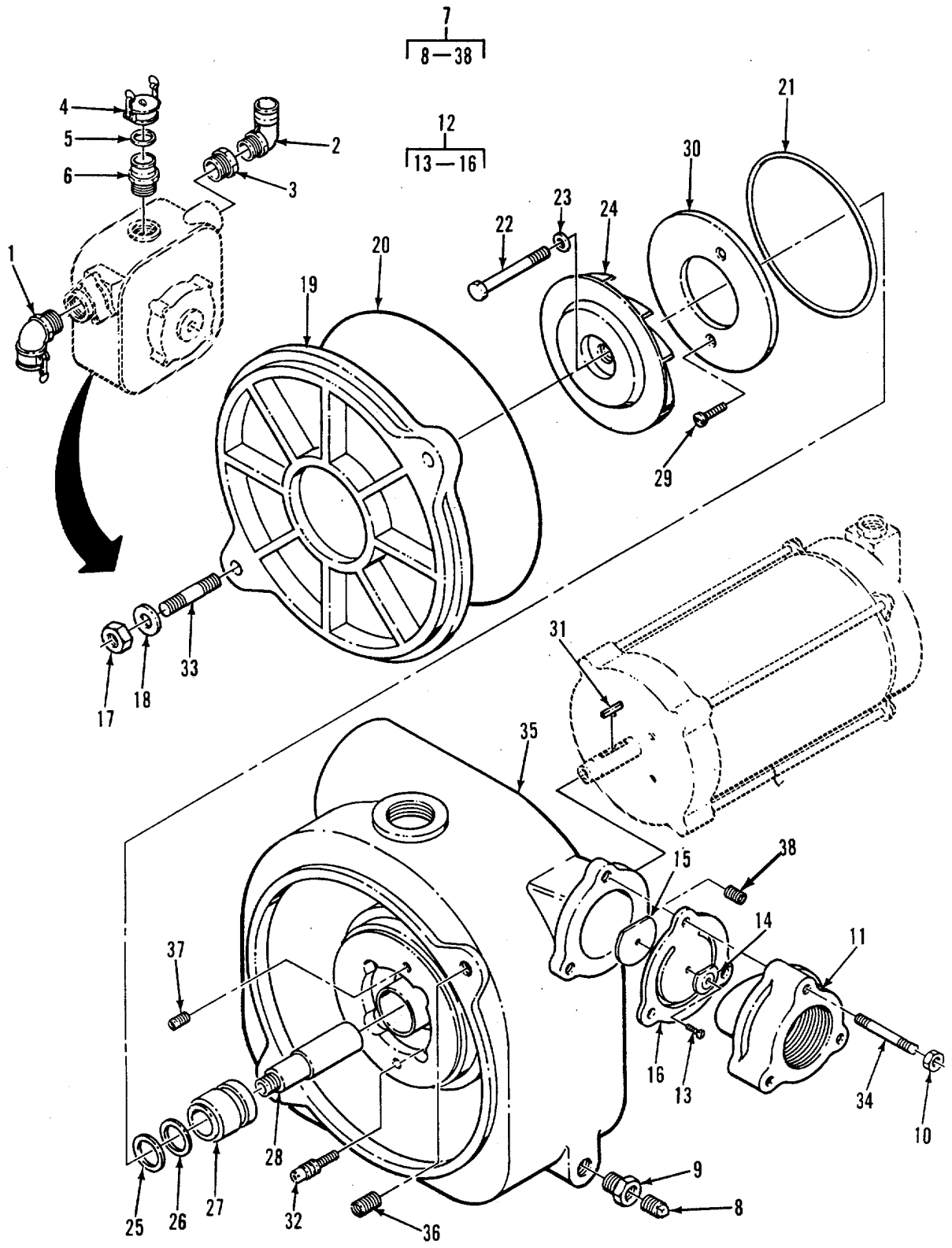


Figure 7. Pump Assembly

Change 1 (F-23 blank)/F-24

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 01 PUMP UNIT, LIQUID DISPENSING					
FIG. F-7 PUMP ASSEMBLY					
1	PAOZZ	97403	13217E7129	..COUPLING HALF,QUICK.....	1
2	PAOZZ	97403	13217E6306	..COUPLING HALF,QUICK.....	1
3	PAOZZ	96906	MS14315-22X	..BUSHING,PIPE.....	1
4	PAOZO	96906	MS27028-11	..CAP,QUICK DISCONNEC.....	1
5	PAOZO	96906	MS27030-6	..GASKET.....	1
6	PAOZZ	96906	MS27022-11	..COUPLING HALF QUICK.....	1
7	PBOFF	97403	13217E7170	..PUMP ASSEMBLY.....	1
8	PAOZZ	96906	MS51884-5C	...PLUG,PIPE.....	1
9	PAOZZ	96906	MS51887-7C	...BUSHING,PIPE.....	1
10	PAOZZ	96906	MS51968	...NUT,PLAIN,HEX.....	3
11	XBOZZ	97403	13200E8814	...FLANGE,PIPE.....	1
12	PBOOO	97403	13200E8810	...DISK,VALVE.....	1
13	PAOZO	96906	MS35214-69	...SCREW,MACHINE.....	1
14	XDOZZ	97403	13200E8812	...WEIGHT,CHECK VALVE.....	1
15	PAOZZ	97403	13200E8811	...WEIGHT,CHECK VALVE.....	1
16	XAOZO	97403	13200E8813	...GASKET.....	1
17	PAFZO	96906	MS51968-14	...NUT,PLAIN,HEXAGON.....	2
18	PAFZO	96906	MS27183-18	...WASHER,FLAT.....	2
19	XBFZZ	97403	13200E8809	...VOLUTE,PUMP.....	1
20	PAFZO	96906	MS29513-273	...PACKING,PREFORMED.....	1
21	PAFZZ	96906	MS29513-253	...PACKING,PREFORMED.....	1
22	PAFZF	96906	MS90726-43	...BOLT,MACHINE.....	1
23	PAFZZ	97403	13200E8802	...RETAINER,PACKING.....	1
24	XBFZZ	97403	13217E7167	...IMPELLER.....	1
25	PBFZO	97403	13200E8807-1	...SHIM.....	1
26	PBFZZ	97403	13200E8807-2	...WASHER,FLAT.....	1
27	PAFZO	67209	21-106-13	...SEAL ASSEMBLY PUMP.....	1
28	XDFZZ	97403	13200E8804	...SHAFT,SHOULDERED.....	1
29	PBFZZ	96906	MS35198-73	...SCREW,MACHINE.....	2
30	XBFZZ	97403	13217E7168	...VEAR,PLATE.....	1
31	PAFZO	96906	MS35756-34	...KEY,WOODRUFF.....	1
32	XDFZZ	82896	SAF-LOK SOCKET	...SCREW,SELF-SEALING.....	4
33	PAOZZ	96906	MS51864-106-20	...STUD,PLAIN.....	2
34	PAOZZ	96906	MS51864-103-18	...STUD.....	3
35	XBFZZ	97403	13200E8803	...HOUSING,LIQUID PUMP.....	1
36	PBFZZ	96906	MS122125	...INSERT,SCREW THR.....	2
37	PBFZZ	96906	MS122121	...INSERT,SCREW THREAD.....	2
38	PBFZZ	96906	MS122122	...INSERT,SCREW THREAD.....	3

END OF FIGURE

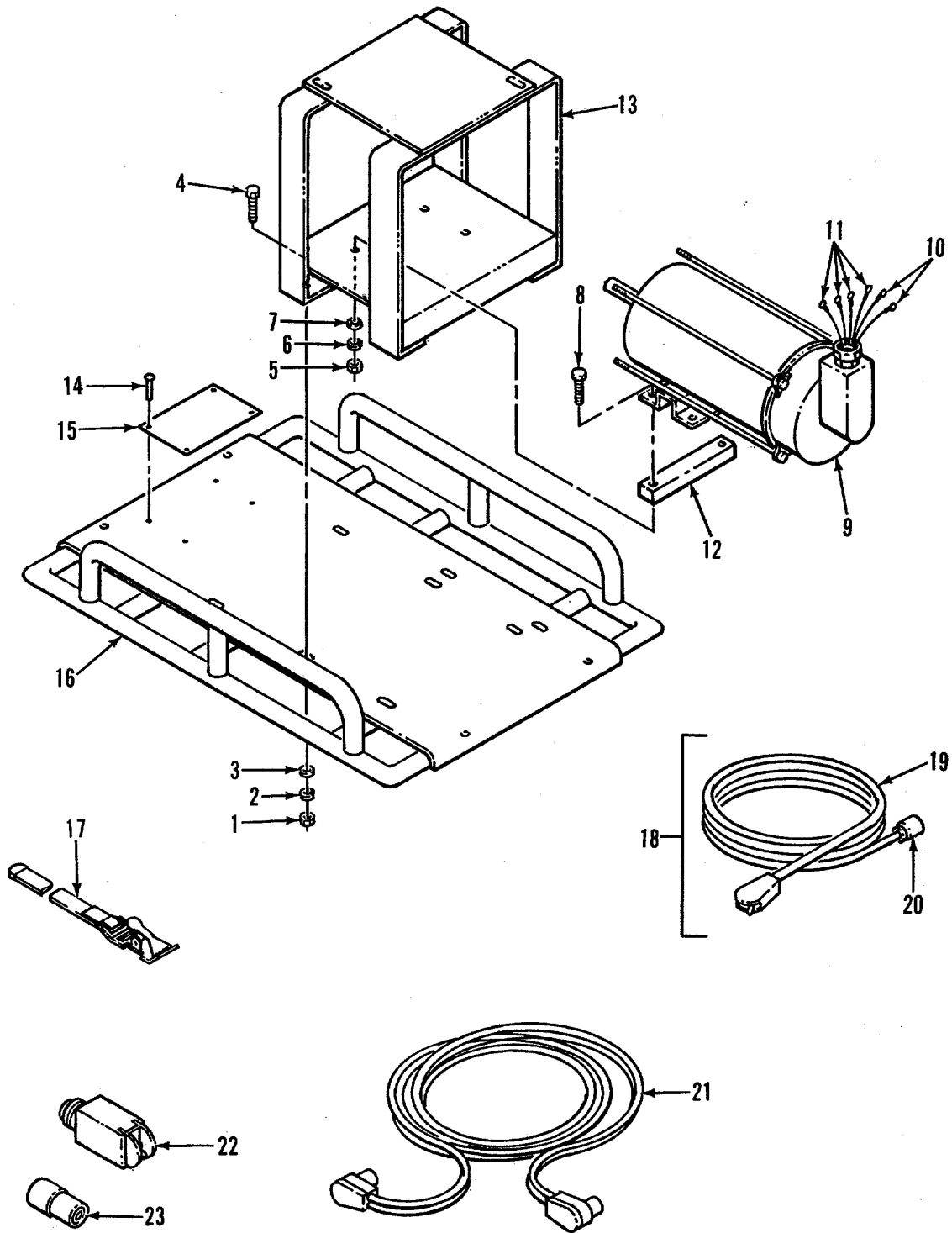


Figure 8. Electric Motor with Frame and Bracket

Change 1 F-26

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 01 PUMP UNIT, LIQUID DISPENSING					
FIG. F-8 ELECTRIC MOTOR WITH FRAME AND BRACKET					
1	PAOZZ	96906	MS51967-8	..NUT,PLAIN,HEX.....	4
2	PAOZZ	96906	MS35338-46	..WASHER,LOCK.....	4
3	PAOZO	96906	MS27183-14	..WASHER,FLAT.....	4
4	PAOZZ	96906	MS90728-61	..SCREW,CAP,HEXAGON H.....	4
5	PAFZZ	96906	MS51967-5	..NUT,PLAIN,HEXAGON.....	4
6	PAFZO	96906	MS35338-45	..WASHER,LOCK.....	4
7	PAOZZ	96906	MS27183-12	..WASHER,FLAT.....	4
8	PAOZZ	96906	MS90725-39	..BOLT,MACHINE.....	4
9	PBFZZ	97403	13217E7131	..MOTOR,DIRECT CURREN.....	1
10	PAOZZ	96906	MS25036-149	..TERMINAL,LUG.....	2
11	PAOZZ	96906	MS25036-157	..TERMINAL,LUG.....	4
12	XBOZZ	97403	13222E9858	..SPACER,MOTOR.....	2
13	XBOZZ	97403	13217E7136	..BRACKET,MOT MOUNT.....	1
14	PAOZH	96906	MS20600AD6W4	..RIVET,BLIND.....	4
15	XBOZZ	97403	13217E7137	..PLATE,IDENT.....	1
16	XBFZZ	97403	13217E7121	..BASE,PUMP ENGINE MO.....	1
17	PAOZZ	97403	13220E5288-4	..STRAP,WEBBING (SECURES CABLE ASSEMBLY SWITCH).....	1
18	PBOFO	97403	13217E2964	..CABLE ASSY SWITCH (JUNCTION BOX ON-OFF SWITCH).....	1
19	XAOZZ	81349	C0-02-MG-F-(2/16)-0335	..CABLE,ELECTRICAL.....	1
20	PBOZA	96906	MS3456W165-4P	...CONNECTOR,PLUG,ELEC.....	1
21	PBOZZ	19207	11682336-1	..CABLE ASSY, POWER (VEHICLE TO JUNCTION BOX).....	1
22	PBOZZ	97403	13222E9859	..SWITCH ASSY,TOGGLE (AUXILIARY ON- OFF).....	1
23	XBOZZ	19207	11677570	..ADAPTER,CONNECTOR (NATO TO PRONG).....	1

END OF FIGURE

Change 1 F-27

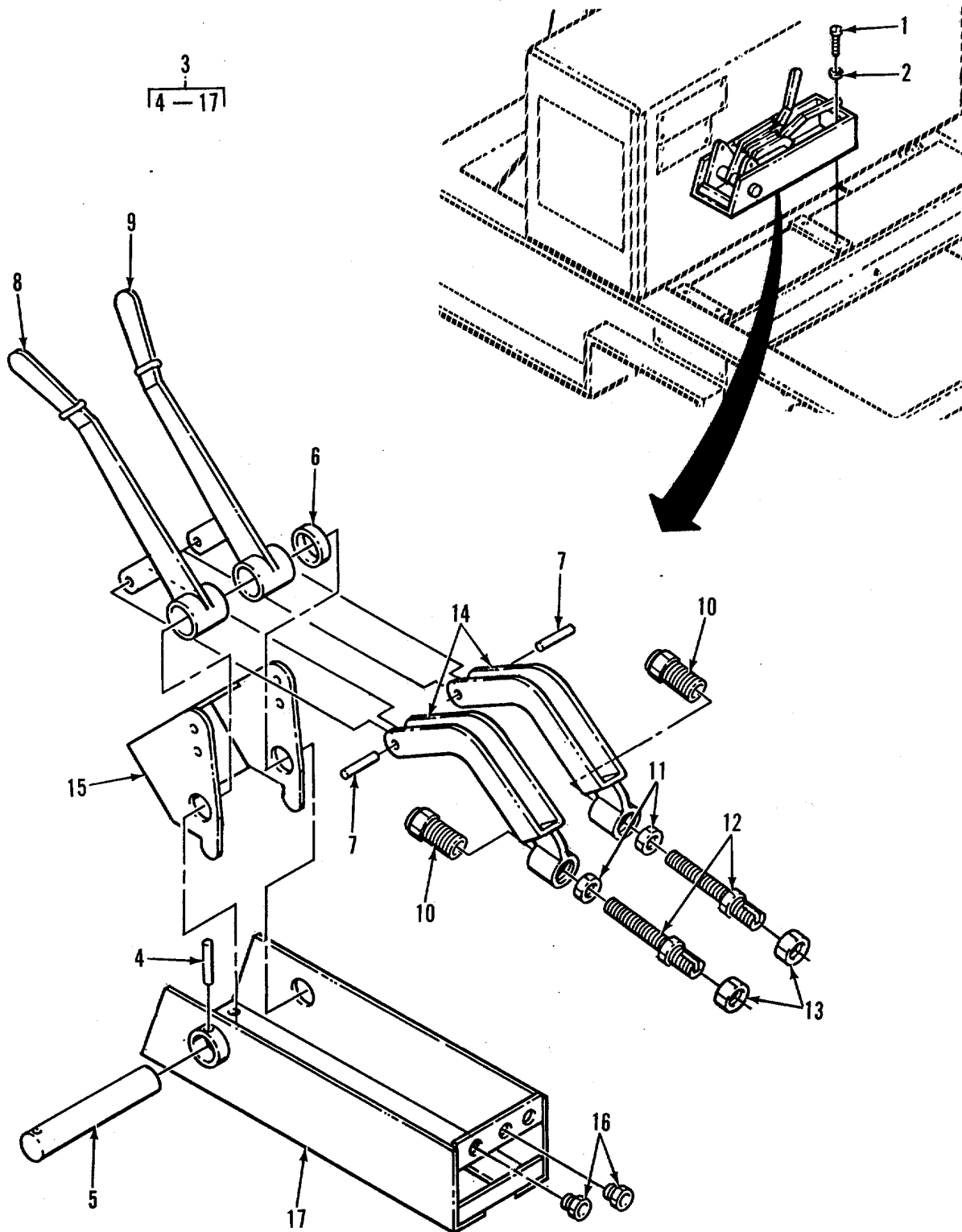


Figure 9. Valve Operating Lever Assembly

Change 1 F-28

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 01 PUMP UNIT, LIQUID DISPENSING	
				FIG. F-9 VALVE OPERATING LEVER ASSEMBLY	
1	PAOZO	96906	MS35206-264	..SCREW,MACHINE	4
2	PAOZZ	96906	MS35338-43	..WASHE2,LOCK.....	4
3	PBOOF	09310	F0157-016	..VALVE OPR,2-LEVER.....	1
4	XBOZZ	09310	407843	..PIN,ROLL	1
5	XBOZZ	09310	444957	..SHAFT.....	1
6	XBOZZ	09310	564020	..SPACE2,SLEEVE.....	1
7	XBOZZ	09310	443802	..PIN ROLL	2
8	XBOZZ	09310	565136	..HANDLE,LEVER,RH.....	1
9	XBOZZ	09310	565135	..HANDLE,LEVER,LH.....	1
10	XBOZZ	09310	444909	..FUSE-NUT	2
11	XBOZZ	09310	443791	..NUT,ADJUSTING,HEX.....	2
12	XBOZZ	09310	443789	..BOLT,CABLE ADJUST.....	2
13	XBOZZ	09310	443790	..NUT,PLAIN,HEX.....	2
14	XBOZZ	09310	442898	..YOKE,HANDLE	2
15	XBOZZ	09310	452691	..LEVER.....	1
16	XBOZZ	09310	443824	..BUSHING	2
17	XBOZZ	09310	444946	..CONTAINER,2 COMPT	1

END OF FIGURE

Change 1 F-29

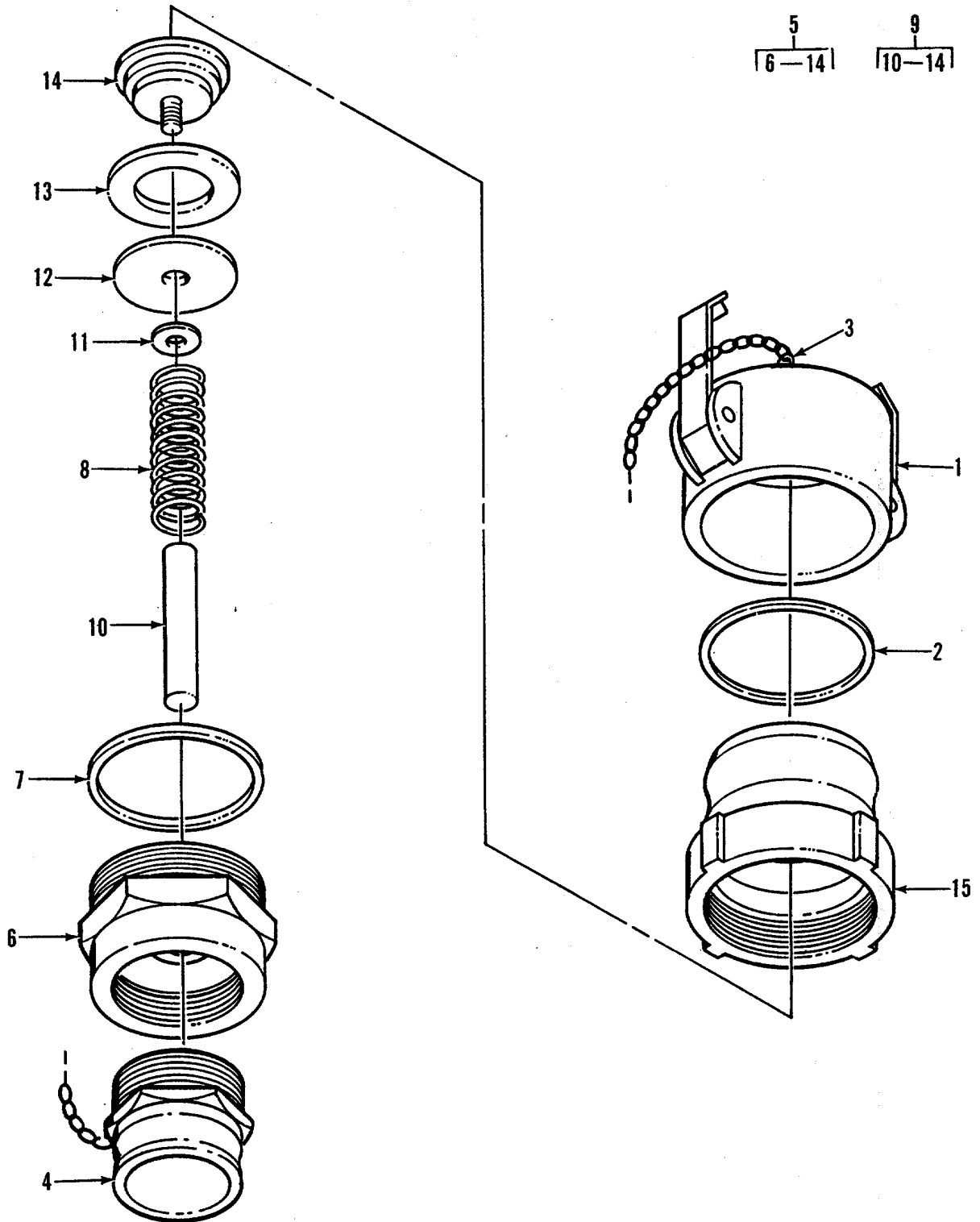


Figure 10. Quick Disconnect Adapter Half

Change 1 F-30

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 01 PUMP UNIT, LIQUID DISPENSING	
				FIG. F-10 QUICK DISCONNECT ADAPTER HALF	
1	PAOZZ	96906	MS27028-13	.CAP,QDISC.....	1
2	PAOZZ	96906	MS27030-7	.GASKET.....	1
3	PAOZZ	96906	MS37006-23	.HOOK,CHAIN,S.....	2
4	PAOZZ	96906	MS27022-11	.COUPLING HALF,QUICK.....	1
5	PAOOO	81718	1661-A-2	.ADAPTER HALF,QDISC.....	1
6	XBOZZ	81718	C-1122-A	..PIPE END.....	1
7	XBOZZ	81718	H-4239-M	..GASKET.....	1
8	XBOZZ	81718	H-4903-M	..SPRING.....	1
9	XBOZZ	81718	H-4907	..DISC ASSY.....	1
10	XBOZZ	81718	H-4233-RE	...STEM.....	1
11	XBOZZ	81718	H-20235-M	...SPACER.....	1
12	XBOZZ	81718	H-5549-M	...WASHER,DISC.....	1
13	XDOZZ	81718	H-4234-M	...DISC.....	1
14	XBOZZ	81718	H-4235-RA	...HOLDER,DISC.....	1
15	XBOZZ	81718	C-1121-A	..ADAPTER END.....	1

END OF FIGURE

Change 1 F-31

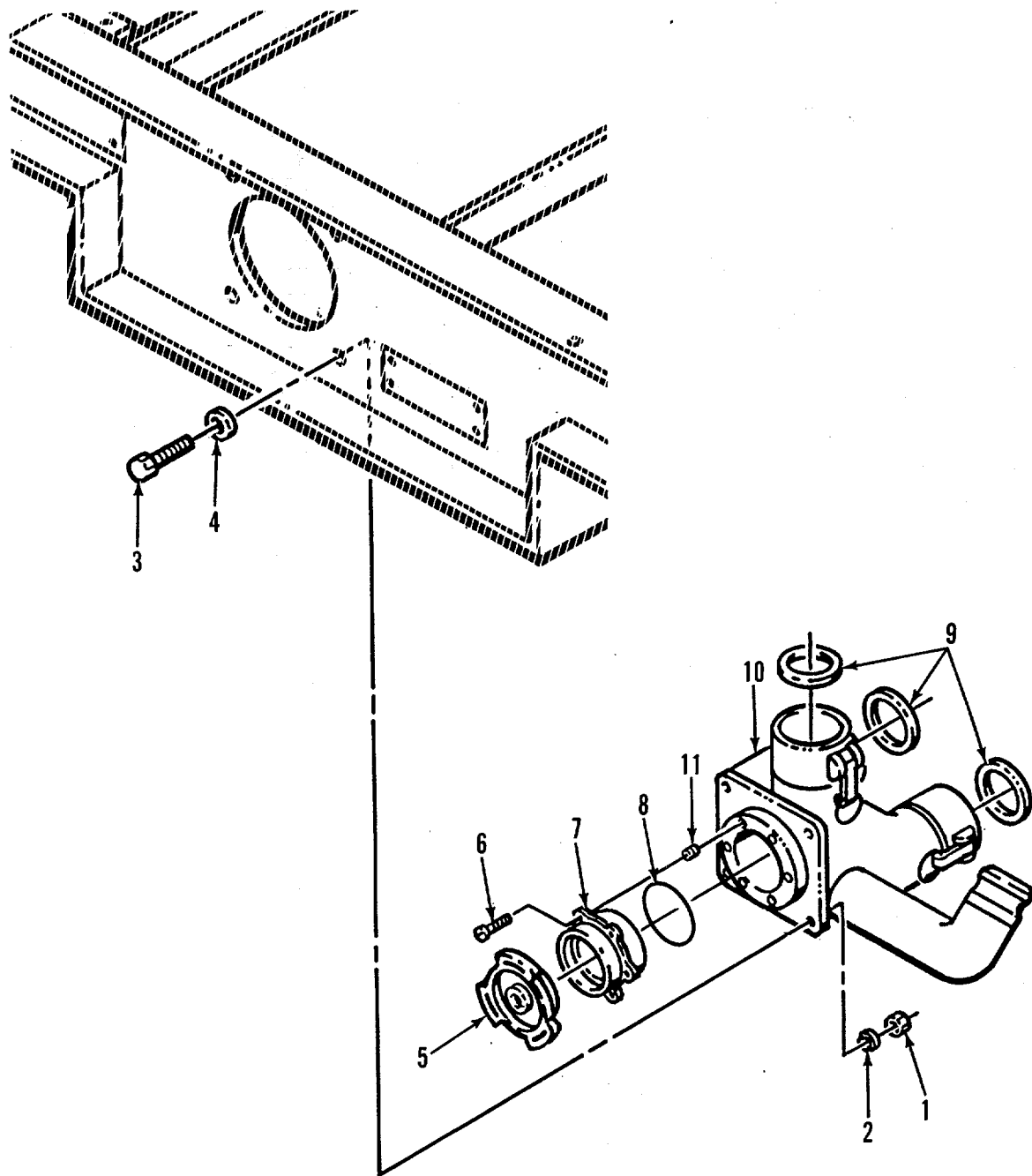


Figure 11. Bottom Loading Manifold

Change 1 F-32

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 01 PUMP UNIT, LIQUID DISPENSING					
FIG. F-11 BOTTOM LOADING MANIFOLD					
1	PAOZZ	96906	MS51967-15	.NUT,PLAIN,HEXAGON	4
2	PAOZZ	96906	MS35338-48	.WASHER,LOCK	4
3	PAOZZ	96906	MS90725-113	.SCREW,CAP,HEXAGON H.....	4
4	PAOZO	96906	MS27183-18	.WASHER,FLAT	4
5	PBOZZ	96906	MS29526-2	.CAP,FILLER OPENING	1
6	PAOZZ	96906	MS24693-S273	.SCREW,MACHINE	6
7	XBOZZ	96906	MS24484-5	.ADAPTER,PRESS FS	1
8	PAOZZ	96906	MS33666-153	.PACKING,PREFORMED	1
9	PAOZO	96906	MS27030-6	.GASKET	3
10	XBOZZ	97403	13225E8408	.MANIFOLD,BOT LOAD	1
11	PBOZZ	96906	MS21209F1-20P	..INSERT,SCREW THREAD.....	6

END OF FIGURE

Change 1 F-33

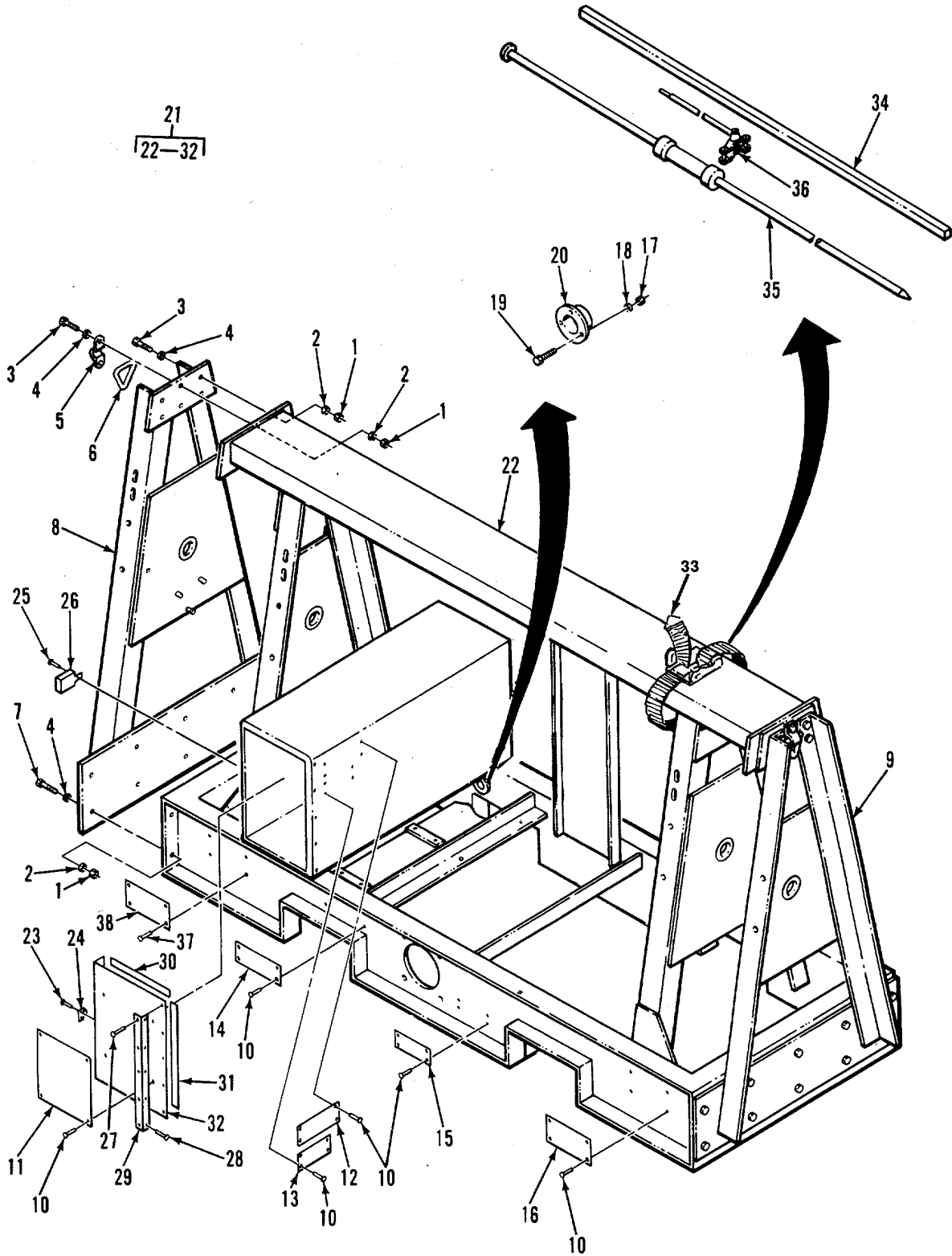


Figure 12. Frame

Change 1 F-34

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 01 PUMP UNIT, LIQUID DISPENSING					
FIG. F-12 FRAME					
1	PAOZZ	96906	M551967-15	.NUT,PLAIN,HEXAGON	32
2	PAOZZ	96906	MS35338-48	.WASHER,LOCK	32
3	PAOZZ	96906	MS90728-117	.SCREW,CAP,HEXAGON H.....	12
4	PAOZO	96906	MS27183-18	.WASHER,FLAT	32
5	PBOZZ	97403	13217E7093	.STQAP,RETAINING	2
6	PBOZZ	97403	13217E7094	.LINK,CHAIN,END	2
7	PAOZZ	96906	MS90728-115	.SCREW,CAP,HEXAGON H.....	20
8	XBFZZ	97403	13228E2588	.A-FRAME,OUTER LEFT	1
9	XBFZZ	97403	13228E2589	.A-FRAME,OUTER RIGHT	1
10	PAOZH	96906	MS20600AD6W4	.RIVET,BLIND.....	24
11	XBOZZ	97403	13228E3185	.PLATE,IN'STR	1
12	XBOZZ	97403	13227E9680	.PLATE,INSTR.....	1
13	XBOZZ	97403	13227E9679	.PLATE,CAUTION	1
14	XBOZZ	97403	13227E9678	.PLATE,INSTR.....	1
15	XBOZZ	97403	13217E7179	.PLATE,INFORMATION	1
16	XBOZZ	97403	13217E7127	.PLATE,IDENT	1
17	PAOZO	96906	M535649-202	.NUT,PLAIN,HEXAGON	3
18	PAOZZ	96906	MS35338-43	.WASHER,LOCK	3
19	PAOZO	96906	M535206-264	.SCREW,MACHINE	3
20	XDOZZ	97403	13217E7149	.GUIDE,CABLE.....	1
21	XBFFF	97403	13226E2151	.FRAME ASSY.....	1
22	XAFZZ	97403	13226E2151-1-39	..FRAME	1
23	PAFZZ	96906	MS10470B4-7	..RIVET,SOLID	2
24	XBFZZ	96906	M518015-3	..STRIKE,CATCH	1
25	PAFZZ	96906	MS20470B4-16	..RIVET,SOLID	2
26	XBFZZ	96906	M518015-2	..LATCH.....	1
27	PAFZZ	96906	MS20470B4-6	..RIVET,SOLID	7
28	PAFZZ	96906	MS20600B4W3	..RIVET,BLIND.....	7
29	XBFZZ	96906	MS35825-10A	..HINGE,BUTT	1
30	MOOZZ	97403	13226E2149-13	..GASKET,RUBBER MAKE FROM P/N MIL- R-6855,CLASS 1,GRADE 40,7-1/2 IN. REQ	2
31	MOOZZ	97403	13226E2149-11	..GASKET,RUBBER MAKE FROM P/N MIL- R-6855,CLASS 1,GRADE 40,12-3/4 IN REQ	2
32	XBFZZ	97403	13226E2149-1	..DOOR,BOX	1
33	PBOZZ	97403	13220E5288-2	.STRAP,WEBBING.....	2
34	PBOZZ	97403	13228E2591	.DIPSTICK	1
35	PBOZZ	97403	13219E0462	.ROD,GROUND	1
36	PBOZO	97403	13219E3930	.CABLE ASSEMBLY,POWE	1
37	PAOZH	96906	MS20600AD6W4	RIVET,BLIND.....	4
38	XBOZZ	97403	13217E7101	PLATE,IDENTIFICATIO	1

END OF FIGURE

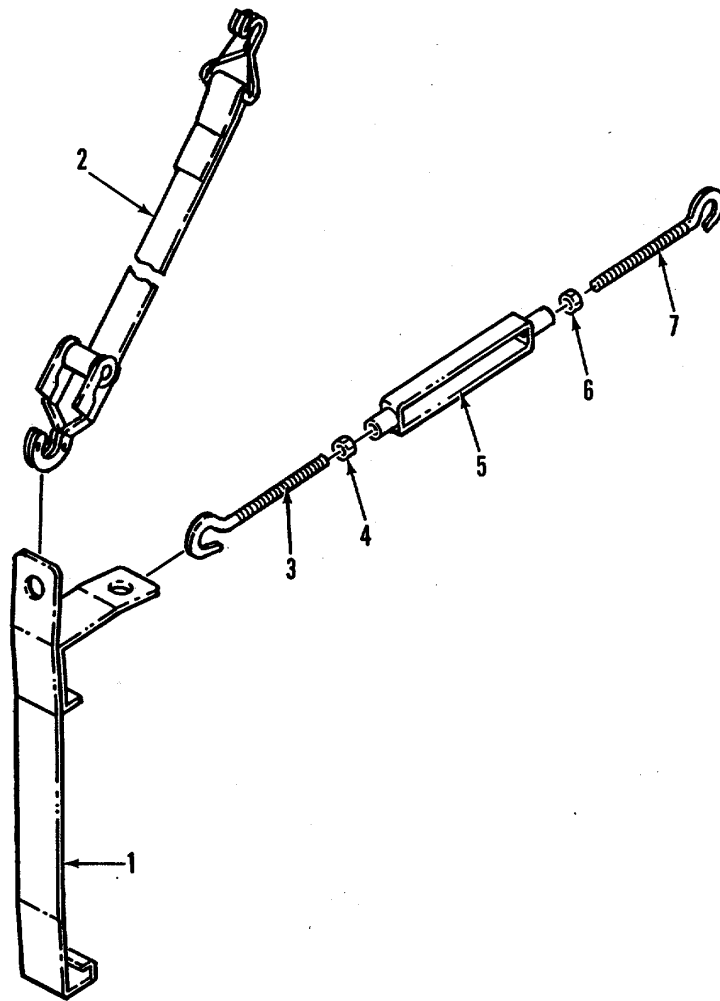


Figure 13. Tie Down Assembly

Change 1 F-36

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 02 TIE DOWN ASSEMBLY	
				FIG. F-13 TIE DOWN ASSEMBLY	
	PAOOZ	97403	13217E7150	TIEDOWN,CARGO,VEHIC	10
1	XBDZZ	97403	13217E7152	.BRACKET,TIE DOWN.....	1
2	PAOZZ	97403	13217E7151	.STRAP,WEBBING.....	1
3	XBOZZ	96906	MS27953-10	.BOLT,HOOK.....	1
4	PAOZZ	96906	MS35691-34	.NUT,PLAIN,HEXAGON	1
5	XBOZZ	96906	MS27954-5	.TURNBUCKLE BODY.....	1
6	XBOZZ	96906	MS27952-7	.NUT,PLAIN,HEXAGON LEFT HAND THREAD.....	1
7	XBOZZ	96906	MS17953-9	.BOLT,HOOK,TRNBKL,LH	1

END OF FIGURE

Change 1 F-37

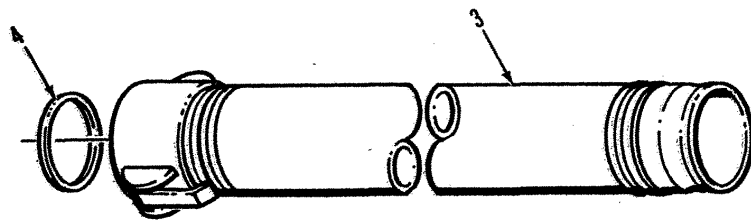
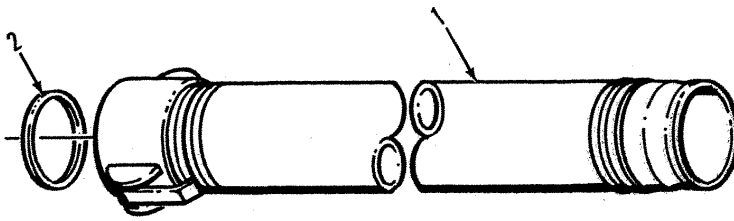


Figure 14. Hoses - Tank to Manifold

Change 1 F-38

SECTION II

TM 10-4930-236-13&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 03	HOSES, TANK TO MANIFOLD
				FIG. F-14	HOSES, TANK TO MANIFOLD
1	PADZZ	81349	M370-B06B2A890	HOSE ASSY FWD TANK TO MANIFOLD	1
2	PAOZO	96906	MS27030-6	.GASKET	1
3	PAOZZ	81349	M370-B06B2A260	HOSE ASSY REAR TANK TO MANIFOLD	1
4	PAOZO	96906	MS27030-6	.GASKET	1

END OF FIGURE

Change 1 F-39

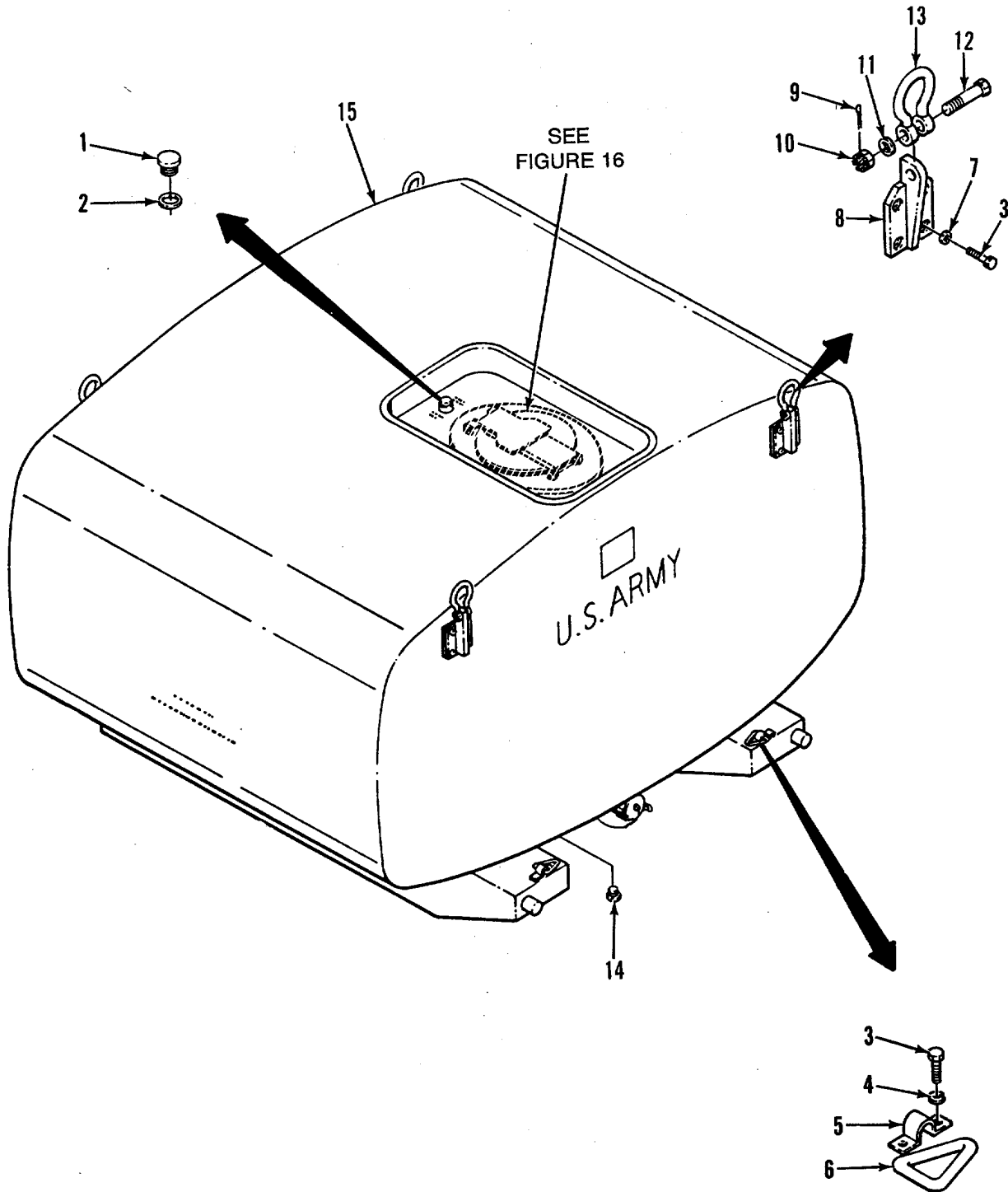


Figure 15. Tank, Liquid Storage

Change 1 F-40

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 04 TANK GROUP	
				FIG. F-15 TANK, LIQUID STORAGE	
	PDOFD	97403	13226E2146	TANK,LIQUID STORAGE METAL,PETRO	2
				PROD,HORIZ	
1	PBOZZ	81348	PPP-P-420	.PLUG.....	1
2	PAOZZ	81349	MIL-G-432	.GASKET	1
3	PAOZZ	96906	MS90728-111	.SCREW,CAP,HEXAGON H.....	24
4	PAOZZ	96906	MS35338-48	.WASHER,LOCK	8
5	XBOZZ	97403	13217E7093	.STRAP,RETAINING	4
6	XBOZZ	97403	13217E7094	.LINK,CHAIN,END	4
7	PAOZO	96906	MS27183-18	.WASHER,FLAT	16
8	XBOZZ	97403	13217E7092	.BRACKET,SHACKLE	4
9	PAOZO	96906	MS24665-357	.PIN,COTTER	4
10	PAOZZ	96906	MS35692-58	.NUT,PLAIN,SLOTTED,H	4
11	PAOZO	96906	MS27183-23	.WASHER,FLAT	4
12	PAOZZ	96906	MS90728-191	.SCREW,CAP,HEXAGON H.....	4
13	XBOZZ	97403	13217E7085	.SHACKLE.....	4
14	XBOZZ	97403	13218E0122-17	.PLUG,PIPE.....	1
15	XAFFH	97403	13226E2147	.TANK,LIQ STORAGE	1

END OF FIGURE

Change 1 F-41

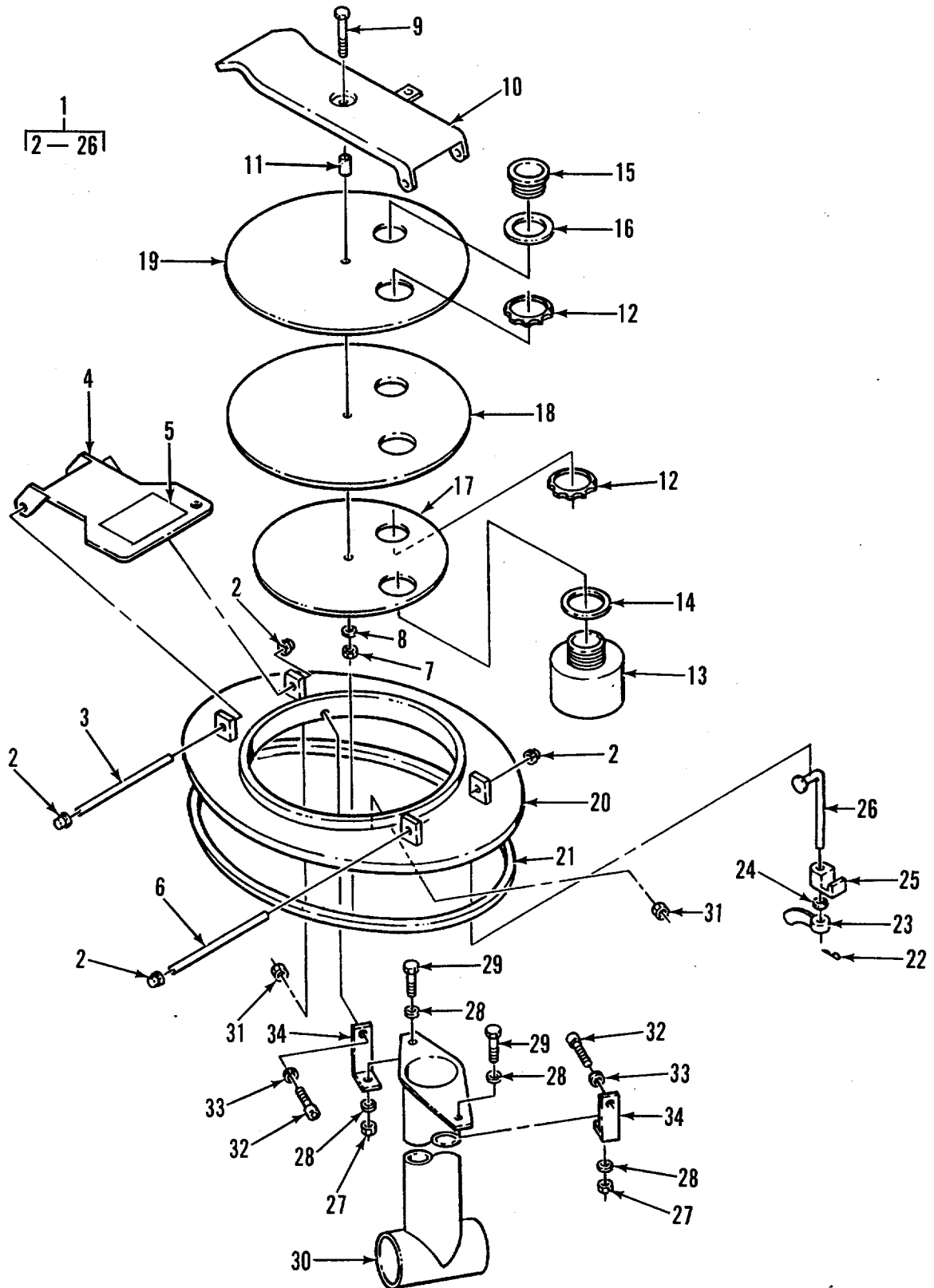


Figure 16. Manhole Cover

Change 1 F-42

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 04 TANK GROUP					
FIG. F-16 MANHOLE COVER					
1	PBOOO	12718	887-L-542	..MANHOLE, OVAL LOW PROFILE	1
2	PAOZZ	12718	1820-001	...NUT, PLAIN, EXTENDED	4
3	XBOZZ	12718	887-802	PIN, HINGE	1
4	XBOZZ	12718	2097-401	...CAM, LOCKING	1
5	XDOZZ	12718	887-302	...DECAL, WARNING	1
6	XBOZZ	12718	887-801	...PIN, HOLLOW	1
7	XBOZZ	12718	1607-180	...NUT, RETAINER	1
8	XBOZZ	12718	2097-700	...WASHER, RETAINER	1
9	XBOZZ	12718	2097-916	...BOLT, RETAINER	1
10	XBOZZ	12718	2097-301	...HINGE	1
11	XBOZZ	12718	2097-500	...SPACER	1
12	XBOZZ	12718	2097-910	...NUT	2
13	XBOZZ	12718	937	...CAP, VENT, FUEL	1
14	XDOZZ	12718	21-100	...GASKET	1
15	XBOZZ	12718	887-353	...PLUG, FUSE	1
16	XDOZZ	12718	887-213	...GASKET	1
17	XDOZZ	12718	2097-250	...GASKET	1
18	PBOZZ	12718	2097-251	...GASKET	1
19	XBOZZ	12718	2097-249	...PLUG	1
20	XAOZZ	12718	887-303	...COVER, OVAL	1
21	PBOZZ	12718	887-122	...GASKET	1
22	XBOZZ	12718	887-129	...PIN, COTTER	6
23	XBOZZ	12718	887-128	...NUT, WING	6
24	XBOZZ	12718	887-130	...WASHER, LOCK	6
25	XBOZZ	12718	887-125	...CLAMP, HOOK	6
26	XBOZZ	12718	887-301	...BOLT, ELL	6
27	PAOZZ	96906	MS51922-18	..NUT, SELF-LOCKING, HE	2
28	PAOZO	96906	MS15795-813	..WASHER, FLAT	4
29	PAOZO	96906	MS35307-364	..SCREW, CAP, HEXAGON H	2
30	XBOZZ	97403	13228E3248-2	..TUBE, RECIRC FILL	1
31	PAOZZ	96906	MS51922-14	..NUT, SELF-LOCKING, HE	2
32	PAOZZ	96906	MS16996-32	..SCREW, CAP	2
33	PAOZZ	96906	MS15795-811	..WASHER, FLAT	2
34	XBOZZ	97403	13228E3249	..BRACKET	2

END OF FIGURE

Change 1 F-43/(F-44 blank)

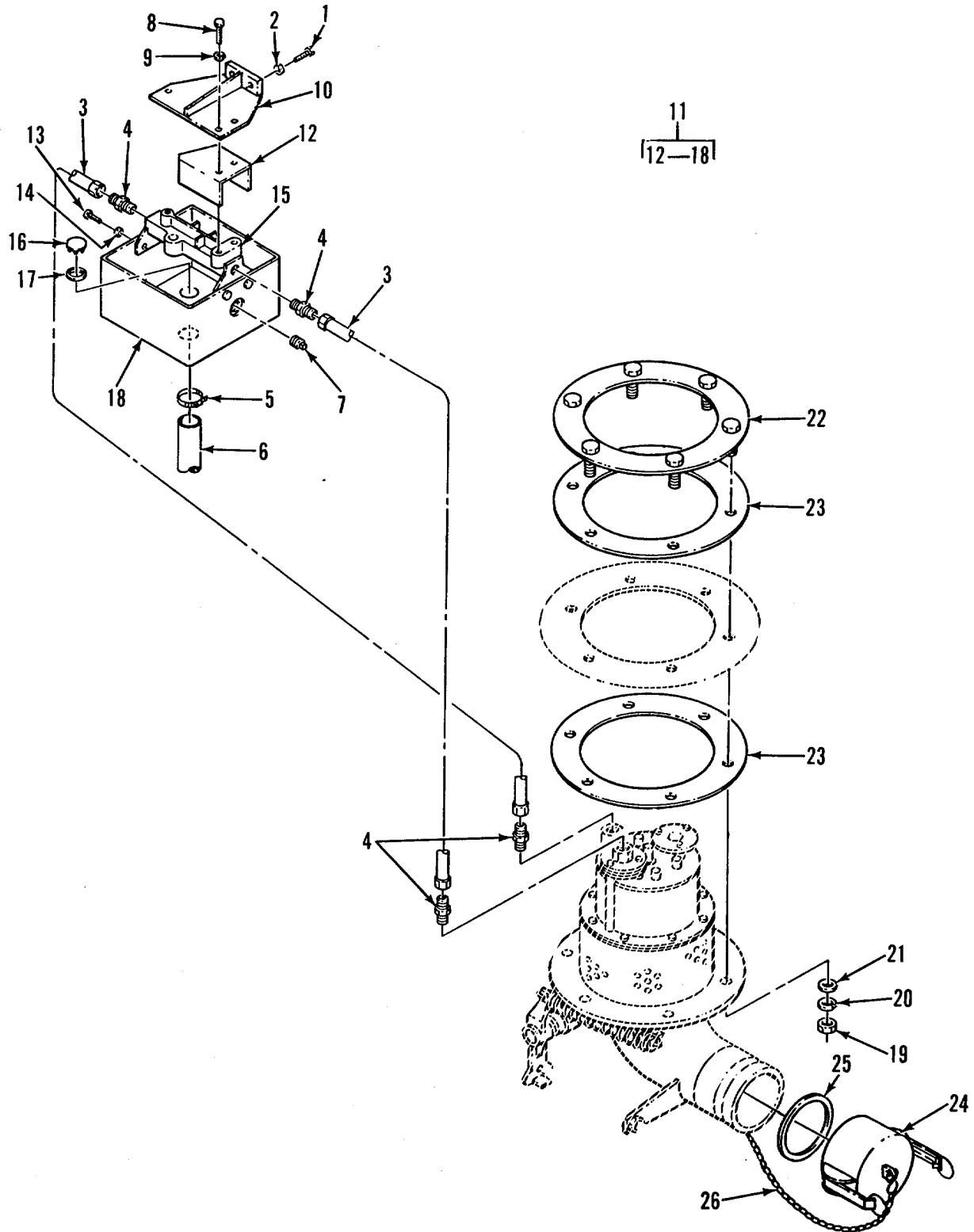


Figure 17. Jet Level Sensor and Bottom Load Valve (Sheet 1 of 2)

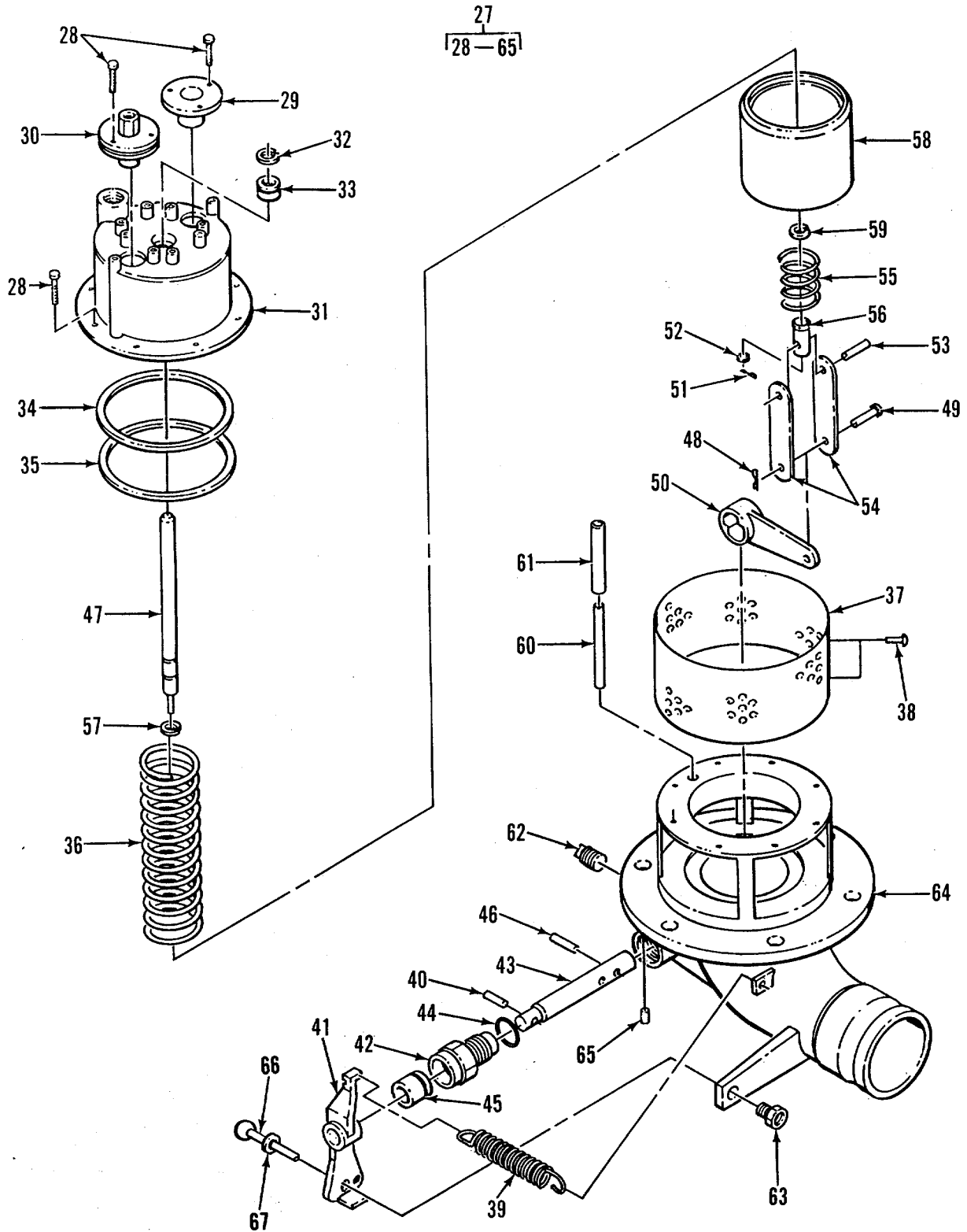


Figure 17. Bottom Load Valve (Sheet 2 of 2)

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 04 TANK GROUP	
				FIG. F-17 JET LEVEL SENSOR AND BOTTOM LOAD VALVE	
1	PAOZO	96906	MS90725-6	.SCREW,CAP,HEXAGON H.....	2
2	PAOZZ	96906	MS35338-44	.WASHER,LOCK.....	2
3	XDOZZ	97403	13217E7155-14	.TUBE,NONMETALLIC.....	2
4	PAOZZ	97403	13217E7178-5	.CONN,MALE,AIR BRAKE.....	4
5	PAOZO	96906	MS35842-12	.CLAMP,HOSE.....	1
6	XDOZZ	97403	13228E3354-33	.TUBING,FLEXIBLE.....	1
7	XDOZZ	81349	WW-P-471	.PLUG,PIPE.....	1
8	PAOZO	96906	MS90725-31	.BOLT,MACHINE.....	3
9	PAOZO	96906	MS35338-45	.WASHER,LOCK.....	3
10	XBOZZ	97403	13217E7156	.BRACKET.....	1
11	PBOFF	64548	F613D	.SENSOR,JET LEVEL.....	1
12	XBOZZ	64548	2715444-61	.SHIELD.....	1
13	PAOZZ	96906	MS51958-61	.SCREW,MACHINE.....	4
14	XBOZZ	88044	AN960C10	.WASHER,FLAT.....	4
15	XBOZZ	64548	F613	.JET SENSOR.....	1
16	XBOZZ	64548	SS48172	.PLUG,BUTTON.....	1
17	PAOZF	96906	MS29513-112	.PACKING,PREFORMED.....	1
18	XBOZZ	64548	2672336	.CAN,COLLECTOR.....	1
19	PAOZZ	96906	MS51967-14	.NUT,PLAIN,HEX.....	6
20	PAOZZ	96906	MS35338-48	.WASHER,LOCK.....	6
21	PAOZO	96906	MS27183-18	.WASHER,FLAT.....	6
22	XBOZZ	97403	13217E7082	.RETAINER,PACKING.....	1
23	PAOZZ	97403	13217E7084	.GASKET.....	2
24	PAOZO	96906	MS27028-11	.CAP,QUICK DISCONN.....	1
25	PAOZO	96906	MS27030-6	.GASKET.....	1
26	PBOZZ	96906	MS87006-3	.HOOK,CHAIN,S.....	1
27	PBFFF	64548	F668	.VALVE ASSY,BOT LOAD.....	1
28	XBFZZ	64548	270656000832075	.SCREW.....	14
29	XBFZZ	64548	2773247-101	.PLUG.....	1
30	PBFZZ	64548	2775237-101	.PILOT ASSY.....	1
31	XBFZZ	64548	2775029-101	.CAP.....	1
32	XBFZZ	64548	5008-81	.RING,RETAINING.....	1
33	PBFZZ	64548	2775040-101	.SEAL.....	1
34	PBFZZ	64548	2775041-101	.SPRING,GARTER.....	1
35	PBFZZ	64548	2775039-102	.SEAL.....	1
36	XBFZZ	64548	2775035-101	.SPRING.....	1
37	XBFZZ	64548	2775153-101	.SCREEN.....	1
38	PAFZZ	96906	MS20470A4-4	.RIVET,SOLID.....	2
39	XBFZZ	64548	2775163-101	.SPRING.....	1
40	PAFZZ	96906	MS16562-252	.PIN,SPRING.....	1
41	XBFZZ	64548	2775038-101	.LEVER.....	1
42	XBFZZ	64548	2775042-101	.GLAND.....	2
43	XBFZZ	64548	2775154-101	.SHAFT.....	1
44	PBFZZ	64548	2661058BD121	.PACKING,PREFORMED.....	1
45	PBFZZ	64548	2775054-101	.SEAL ASSY.....	1
46	PAFZZ	96906	MS171651	.PIN,SPRING.....	2
47	XBFZZ	64548	2793080-101	.SHAFT.....	1

SECTION II

TM 10-4930-236-13&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
48	XBFZZ	39428	98335A034	..PIN,HAIR	1
49	XBFZZ	39428	98306A159	..PIN,STRAIGHT,THREAD	1
50	XBFZZ	64548	2775036-101	..CAM	1
51	PAFZZ	96906	MS24665-82	..PIN,COTTER	1
52	XBFZZ	64548	2793089-101	..WASHER,RETAINER	1
53	XBFZZ	64548	2793081-101	..PIN,LIMIT	1
54	XBFZZ	64548	2775034-101	..LINK	2
55	XBFZZ	64548	2793093-101	..SPRING	1
56	XBFZZ	64548	2793082-101	..ORIFICE	1
57	PAFZZ	96906	MS16624-4050	..RING,RETAINING	1
58	PBFZZ	64548	2775031-101	..PISTON	1
59	XDFZZ	80756	RSN-50	..RING,RETAINING	1
60	XDFZZ	64548	2775053-101	..TUBE	1
61	XBFZZ	64548	2775052-101	..TUBE	1
62	XBFZZ	64548	2706138-101	..PLUG.....	1
63	XBFZZ	64548	2721205-1	..BUSHING,MACHINE	1
64	XAFZZ	64548	2803025-101	..BODY,VALVE	1
65	PAFZZ	96906	MS171648	..PIN,SPRING	1
66	PBOZZ	97403	13217E7175-2	CABLE,BALL END FRONT TANK	1
66	PBOZZ	97403	13217E7175-1	CABLE,BALL END REAR TANK.....	1
67	PAOZO	96906	MS15795-809	WASHER,FLAT	2

END OF FIGURE

Change 1 F-48

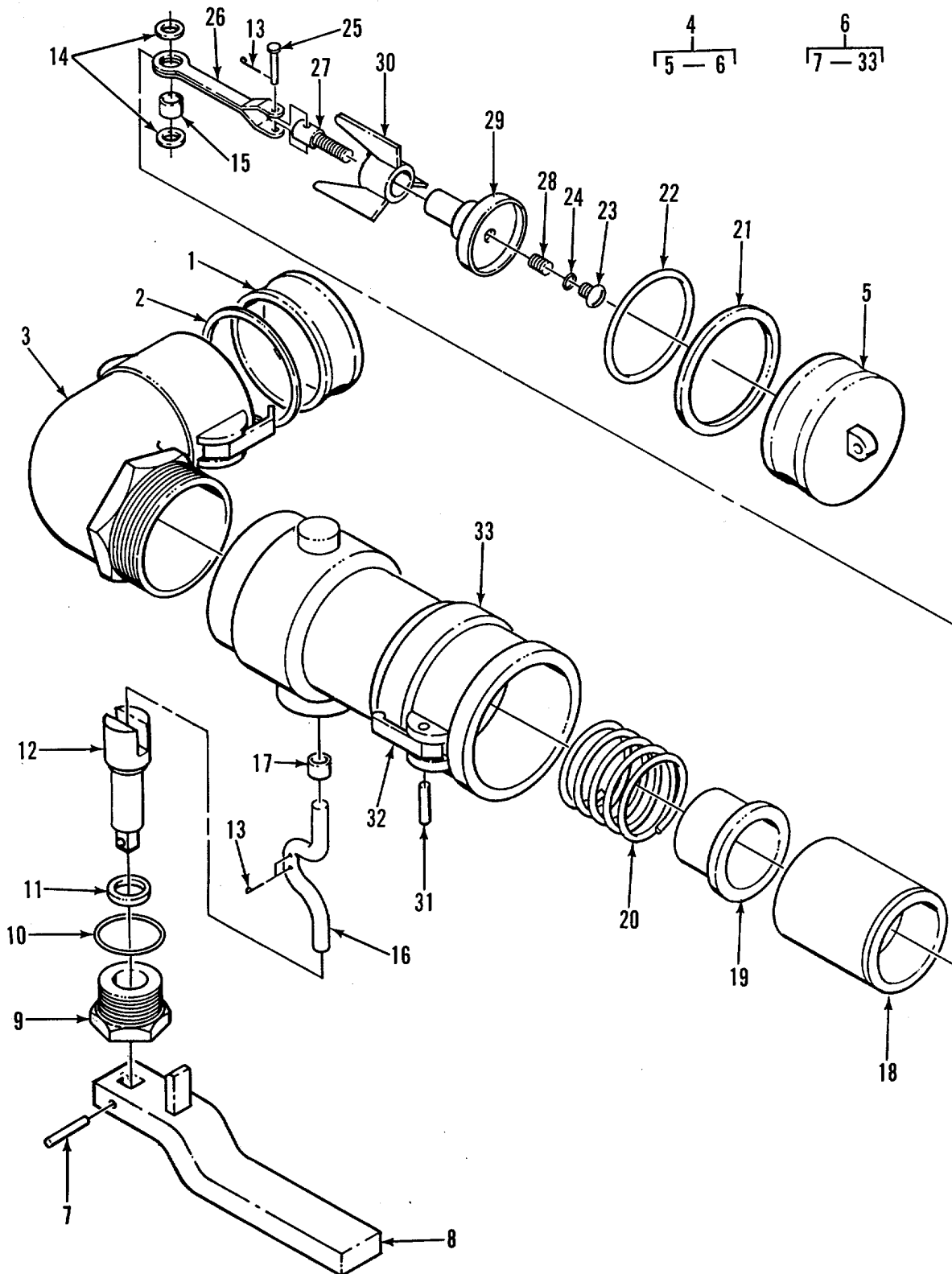


Figure 18. Quick Disconnect Coupling Half

Change 1 (F-49 blank)/F-50

SECTION II

TM 10-4930-236-13&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 05 COUPLING HALF					
FIG. F-18 QUICK DISCONNECT COUPLING HALF					
1	PBOZZ	96906	MS27029-13	PLUG,DUST.....	1
2	PAOZO	96906	MS27030-6	GASKET	6
3	XBOZZ	97403	13217E7129	COUPLING HALF,QUICK	1
4	PBOOF	97403	13226E2177	CPLG HALF,QDISC DRY	1
5	PBOZZ	96906	MS27029-13	..PLUG,DUST.....	1
6	XAOOF	81718	1711-D-2	..CPLG HALF,QDISC DRY	1
7	XBOZZ	81718	H-20342-M	..PIN,GROOVE	1
8	XBOZZ	81718	C-10111-DI	..LEVER	1
9	XBOZZ	81718	H-7724-M	..BOX,STUFFING	1
10	PBOZZ	81718	H-7725-M	..PACKING,PREFORMED	1
11	PBOZZ	81718	H-6281-M	..PACKING,PREFORMED	1
12	XBOZZ	81718	C-10112-RE	..STEM	1
13	XDOZZ	81718	H-4981-M	..PIN,COTTER	3
14	XDOZZ	81718	H-4626-M	..WASHER,FLAT	2
15	XDOZZ	81718	H-4273-H	..BEARING	1
16	XBOZZ	81718	H-9778-RE	..SHAFT,CAM	1
17	XDOZZ	81718	H-4278-M	..BUSHING	1
18	XBOZZ	81718	H-4615	..CYLINDER ASSY	1
19	XBOZZ	81718	H-4275-M	..GUIDE	1
20	XBOZZ	81718	H-4274-M	..SPRING	1
21	PAOZO	96906	MS27030-6	..GASKET	1
22	PBOZZ	81718	H-6223-M	..PACKING,PREFORMED	1
23	XBOZZ	81718	H-4468-M	..SCREW	1
24	PBOZZ	81718	H-2149-M	..PACKING,PREFORMED	1
25	XBOZZ	81718	H-20032-RE	..RIVET	1
26	XBOZZ	81718	H-4255-M	..LINK SUBASSY	1
27	XBOZZ	81718	H-4257-RE	..YOKE	1
28	XBOZZ	81718	H-4310-M	..SETSCREW	1
29	XBOZZ	81718	H-4471-RA	..POPPET	1
30	X30ZZ	81718	H-4470-M	..GUIDE,POPPET	1
31	XBOZZ	81718	H-9770-RE	..PIN	2
32	XBOZZ	81718	C-33-78-M	..CAM	2
33	XAOZZ	81718	D-506-A	..BODY	1

END OF FIGURE

Change 1 F-51/(F-52 blank)

SECTION II

TM 10-4930-236-13&P

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 06 BULK MATERIAL					
FIG. BULK					
1	PAOZZ	81349	MIL-W-16878-5TYP E EE-8	WIRE,ELECTRICAL.....	V
2	PAOZZ	81349	MIL-W-16878-5TYP E EE-16	WIRE,ELECTRICAL.....	V
3	PAOZZ	81349	MIL-R-6855,CLASS 1,GRADE40	SYNTHETIC RUBBER	V
4	PAOZZ	96906	MS20995F32	WIRE,NONELECTICAL	V

END OF FIGURE

Change 1 F-53/(F-54 blank)

SECTION III. SPECIAL TOOLS LIST

(Not Applicable)

Change 1 F-55/(F-56 blank)

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-014-5850	6	13	5310-00-407-9566	3	18
5305-00-021-3740	16	29		8	6
5315-00-043-1787	7	31		17	9
5310-00-045-3296	9	2	5340-00-476-9245	13	2
	12	18	6150-00-483-3918	12	36
5305-00-052-5925	7	29	5305-00-543-2419	8	4
5305-00-059-3657	17	13	5310-00-550-5054	17	67
5305-00-068-0502	17	1	5330-00-551-3963	7	21
5305-00-071-2067	15	3	5940-00-557-1629	8	30
5305-00-071-2070	3	3	5940-00-557-4345	6	43
5305-00-071-2071	12	7		6	47
5305-00-071-2073	1	18	5310-00-576-5752	6	12
	5	4	5320-00-582-3276	8	14
	12	3		12	10
5330-00-075-3268	10	2		12	37
5310-00-080-6004	1	7	5320-00-582-3521	12	28
	3	9	5310-00-582-5965	17	2
	6	3	5320-00-584-9078	17	38
	8	3	5315-00-597-3693	17	65
5310-00-081-4219	8	7	5330-00-612-2414	1	11
5940-00-114-1305	6	34		7	5
	6	42		11	9
5940-00-114-1306	6	35		14	2
	6	46		14	4
5320-00-118-1995	12	27		17	25
4930-00-119-0452	2	4		18	2
5320-00-119-6826	12	25		18	21
5940-00-143-4777	8	11	5305-00-637-1119	7	13
5940-00-143-4780	6	31	4730-00-649-9100	7	4
	6	38		17	24
5940-00-143-5284	6	39	9505-00-684-4841	BULK	4
5310-00-171-2435	15	10	5365-00-712-5972	7	25
4730-00-187-4202	7	8	5330-00-712-7730	7	23
5310-00-193-7577	6	21	5310-00-712-7731	7	26
5310-00-194-1483	1	17	4730-00-721-9639	1	4
4730-00-203-1010	2	1		7	2
5306-00-225-8496	17	8	5310-00-732-0560	7	17
5306-00-225-8503	8	8	5330-00-733-2208	17	17
5306-00-225-9098	7	22	4730-00-735-4388	1	3
5330-00-263-8015	7	20	5310-00-761-0654	1	5
4730-00-268-7479	7	3		3	6
4030-00-270-5436	17	26	5310-00-761-3706	1	16
5940-00-283-5281	6	28		3	1
5340-00-290-4504	7	36		4	1
5340-00-290-4521	7	38		5	1
5315-00-298-1481	15	9		11	1
5330-00-298-7165	15	2		12	1
4730-00-360-0589	1	15	4320-00-790-6357	7	27
5330-00-360-0595	1	2	5310-00-802-4701	16	28
	2	2	5365-00-804-7645	17	57

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5306-00-806-8512	1	8	4730-01-150-3108	7	1
5310-00-809-5998	1	19	5310-01-150-5922	5	3
	3	4	5340-01-162-4325	12	33
	4	4	5340-01-165-3721	8	17
	5	5	6150-01-191-9732	8	18
	7	18	5330-01-200-2704	16	18
	11	4	5330-01-200-2705	16	21
	12	4	5935-01-225-1987	6	23
	15	7	5935-01-241-9740	8	20
	17	21	5430-01-256-0650	15	
5310-00-809-8533	15	11	4320-01-283-4525	7	7
5315-00-823-8742	17	40	5915-01-290-1912	6	15
5310-00-880-7744	3	17	5305-01-325-8387	3	8
	8	5	5305-01-325-8388	4	3
5310-00-891-1734	13	4		11	3
5920-00-897-4857	2	14	4320-01-333-9190	1	
4730-00-908-3193	17	5	5310-01-334-7388	16	2
5310-00-914-6028	16	27			
5310-00-927-3877	16	31			
4320-00-930-8726	7	15			
5310-00-934-9751	6	14			
5310-00-934-9758	12	17			
4730-00-938-7997	7	6			
	10	4			
5305-00-947-4354	15	12			
5310-00-950-1310	6	22			
5305-00-957-7086	11	6			
5305-00-983-6622	3	19			
5305-00-983-6730	6	20			
5305-00-984-6211	9	1			
	12	19			
5305-00-989-7435	6	11			
4820-00-991-6517	7	12			
4330-01-012-3313	4	5			
4010-01-013-5131	12	6			
5307-01-013-7888	7	34			
5330-01-015-4753	17	23			
3990-01-015-8457	13				
5340-01-015-8667	12	5			
5307-01-016-4423	7	33			
5330-01-019-8913	6	10			
6150-01-022-6004	8	21			
4720-01-028-1816	1	14			
5340-01-030-6854	7	37			
4320-01-047-1927	5	6			
5975-01-050-5707	12	35			
4720-01-071-2871	1	10			
4730-01-100-0109	7	9			
5330-01-103-0958	2	11			
6105-01-139-3183	8	9			

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
88044	AN960C10		17	14
23939	A4497A	5915-01-290-1912	6	15
81718	C-10111-DI		18	8
81718	C-10112-RE		18	12
81718	C-1121-A		10	15
81718	C-1122-A		10	6
81718	C-326311-2		2	9
81718	C-3378-M		18	32
81349	C0-02-MG-F-(2-16)-0335		8	19
81718	D-506-A		18	33
81718	D1554-AG		2	13
09310	F0157-016		9	3
64548	F613		17	15
64548	F613D		17	11
64548	F668		17	27
15235	GASK925	5330-01-019-8913	6	10
15235	GUB0101		6	9
81718	H-20032-RE		18	25
81718	H-20235-M		10	11
81718	H-20342-M		18	7
81718	H-2149-M		18	24
81718	H-3673M		2	6
81718	H-3804-AG		2	5
81718	H-4233-RE		10	10
81718	H-4234-M		10	13
81718	H-4235-RA		10	14
81718	H-4239-M		10	7
81718	H-4255-M		18	26
81718	H-4257-RE		18	27
81718	H-4273-H		18	15
81718	H-4274-M		18	20
81718	H-4275-M		18	19
81718	H-4278-M		18	17
81718	H-4310-M		18	28
81718	H-4468-M		18	23
81718	H-4470-M		18	30
81718	H-4471-RA		18	29
81718	H-4615		18	18
81718	H-4626-M		18	14
81718	H-4903-M		10	8
81718	H-4907		10	9
81718	H-4981-M		18	13
81718	H-5549-M		10	12
81718	H-6223-M		18	22
81718	H-6281-M		18	11
81718	H-7724-M		18	9
81718	H-7725-M		18	10
81718	H-7766-M		2	10
81718	H-9209-M		2	7
81718	H-9597-RB		2	8

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
81718	H-9770-RE		18	31
81718	H-9778-RE		18	16
81718	H5482M		2	15
81718	H7670M	5330-01-103-0958	2	11
19099	JFB14LH		3	22
19099	JFB14RH		3	22
81349	MIL-G-432	5330-00-298-7165	15	2
81349	MIL-R-6855,CLASS 1,GRADE40		BULK	3
81349	MIL-W-16878-5TYP E EE-16		BULK	2
81349	MIL-W-16878-5TYP E EE-8		BULK	1
96906	MS10470B4-7		12	23
96906	MS122121	5340-01-030-6854	7	37
96906	MS122122	5340-00-290-4521	7	38
96906	MS122125	5340-00-290-4504	7	36
96906	MS14315-22X	4730-00-268-7479	7	3
96906	MS15795-809	5310-00-550-5054	17	67
96906	MS15795-811		16	33
96906	MS15795-813	5310-00-802-4701	16	28
96906	MS16562-252	5315-00-823-8742	17	40
96906	MS16624-4050	5365-00-804-7645	17	57
96906	MS16996-32		16	32
96906	MS16997-81	5305-00-983-6622	3	19
96906	MS171648	5315-00-597-3693	17	65
96906	MS171651		17	46
96906	MS17953-9		13	7
96906	MS18015-2		12	26
96906	MS18015-3		12	24
96906	MS20470A4-4	5320-00-584-9078	17	38
96906	MS20470B4-16	5320-00-119-6826	12	25
96906	MS20470B4-6	5320-00-118-1995	2	27
96906	MS20600AD6W4	5320-00-582-3276	8	14
			12	10
			12	37
96906	MS20600B4W3	5320-00-582-3521	12	28
96906	MS20995F32	9505-00-684-4841	BULK	4
19099	MS20995F32-10		1	13
96906	MS21093-457		3	10
96906	MS21209F1-20P		11	11
96906	MS24484-5		11	7
96906	MS24665-357	5315-00-298-1481	15	9
96906	MS24665-82		17	51
96906	MS24693-5273	5305-00-957-7086	11	6
96906	MS25036-108	5940-00-143-4780	6	31
			6	38
96906	MS25036-109	5940-00-283-5281	6	28
96906	MS25036-115	5940-00-143-5284	6	39
96906	M525036-116	5940-00-114-1305	6	34
			6	42

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
96906	MS25036-117	5940-00-114-1306	6	35
			6	46
96906	MS25036-118	5940-00-557-4345	6	43
			6	47
96906	MS25036-149	5940-00-557-1629	8	10
96906	MS25036-157	5940-00-143-4777	8	11
96906	MS25043-16DA		6	24
96906	MS25384-3		2	17
96906	MS27022-11	4730-00-938-7997	7	6
			10	4
96906	MS27022-9	4730-00-360-0589	1	15
96906	MS27026-9	4730-00-203-1010	2	1
96906	MS27028-11	4730-00-649-9100	7	4
			17	24
96906	MS27028-13		10	1
96906	MS27029-13		18	1
			18	5
96906	MS27030-5	5330-00-360-0595	1	2
			2	2
96906	MS27030-6	5330-00-612-2414	1	11
			7	5
			11	9
			14	2
			14	4
			17	25
			18	2
			18	21
96906	MS27030-7	5330-00-075-3268	10	2
96906	MS27183-12	5310-00-081-4219	8	7
96906	MS27183-14	5310-00-030-6004	1	7
			3	9
			6	3
			8	3
96906	MS27183-18	5310-00-809-5998	1	19
			3	4
			4	4
			5	5
			7	18
			11	4
			12	4
			15	7
			17	21
96906	MS27183-23	5310-00-809-8533	15	11
96906	MS27183-4	5310-00-950-1310	6	22
96906	MS27183-42	5310-00-014-5850	6	13
96906	MS27952-7		13	6
96906	MS27953-10		13	3
96906	MS27954-5		13	5
96906	MS29513-112	5330-00-733-2208	17	17
96906	MS29513-253	5330-00-551-3963	7	21
96906	MS29513-273	5330-00-263-8015	7	20

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
96906	MS29526-2		11	5
96906	MS33666-153		11	8
96906	MS3452',416S-4S	5935-01-225-1987	6	23
96906	MS34561!16S-4P	5935-01-241-9740	8	20
96906	MS3493-1		2	18
96906	MS3493-2		2	19
96906	MS35198-73	5305-00-052-5925	7	29
96906	MS35206-218	5305-00-983-6730	6	20
96906	MS35206-264	5305-00-984-6211	9	1
			12	19
96906	MS35207-264	5305-00-989-7435	6	11
96506	MS35214-69	5305-00-637-1119	7	13
96906	M535307-364	5305-00-021-3740	16	29
96906	MS35333-36	5310-00-193-7577	6	21
96906	MS35333-39	5310-00-576-5752	6	12
96906	MS35333-44	5310-00-194-1483	1	17
96906	MS35338-43	5310-00-045-3296	9	2
			12	18
96906	MS35338-44	5310-00-582-5965	17	2
96906	MS35338-45	5310-00-407-9566	3	18
			8	6
			17	9
96906	MS35338-46		1	6
			3	7
			6	2
			8	2
96906	MS35338-48		3	2
			4	2
			5	2
			11	2
			12	2
			15	4
			17	20
96906	MS35649-202	5310-00-934-9758	12	17
96906	MS35650-302	5310-00-934-9751	6	14
96906	MS35691-34	5310-00-891-1734	13	4
96906	MS35692-58	5310-00-171-2435	15	10
96906	MS35756-34	5315-00-043-1787	7	31
96906	MS35825-10A		12	29
96906	MS35842-12	4730-00-908-3193	17	5
96906	MS37006-23		10	3
96906	MS51864-103-18	5307-01-013-7888	7	34
96906	MS51864-106-20	5307-01-016-4423	7	33
96906	MS51884-5C	4730-00-187-4202	7	8
96906	MS51887-7C	4730-01-100-0109	7	9
96906	M551922-14	5310-00-927-3877	16	31
96906	MS51922-18	5310-00-914-6028	16	27
96906	MS51958-61	5305-00-059-3657	17	13
96906	MS51967-14		17	19
96906	MS51967-15	5310-00-761-3706	1	1

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
96906	MS51967-15	5310-00-761-3706	4	1
			5	1
			11	1
			12	1
96906	MS51967-5	5310-00-880-7744	3	17
			8	5
96906	MS51967-8		6	1
			8	1
96906	MS51967-9	5310-00-761-0654	1	5
			3	6
96906	MS51968		7	10
96906	MS51968-14	5310-00-732-0560	7	17
96906	MS52131-1		6	18
96906	MS87006-3	4030-00-270-5436	17	26
96906	MS90725-113	5305-01-325-8388	4	3
			11	3
96906	MS90725-31	5306-00-225-8496	17	8
96906	MS90725-39	5306-00-225-8503	8	8
96906	MS90725-6	5305-00-068-0502	17	1
96906	MS90725-64	5305-01-325-8387	3	8
96906	MS90725-65		6	4
96906	MS90726-43	5306-00-225-9098	7	22
96906	MS90728-111	5305-00-071-2067	15	3
96906	MS90728-114	5305-00-071-2070	3	3
96906	MS90728-115	5305-00-071-2071	12	7
96906	MS90728-117	5305-00-071-2073	1	18
			5	4
			12	3
96906	MS90728-191	5305-00-947-4354	15	12
96906	MS90728-61	5305-00-543-2419	8	4
81349	M286755B03		6	25
81349	M370-A05B2A290		1	1
81349	M370-A05B2A385		1	12
81349	M370-A05B2A4800	4720-01-028-1816	1	14
81349	M370-B06B2A104	4720-01-071-2871	1	10
81349	M370-B06B2A260		14	3
81349	M370-B06B2A890		14	1
81348	PPP-P-420		15	1
80756	RSN-50		17	59
82896	SAF-LOK SOCKET		7	32
64548	SS48172		17	16
15235	UNY105SA		6	6
81349	WW-P-471		17	7
19207	11675004		6	19
19207	11677570		8	23
19207	11682336-1	6150-01-022-6004	8	21
97403	13200E8802	5330-00-712-7730	7	23
97403	13200E8803		7	35
97403	13200E8804		7	28
97403	13200E8807-1	5365-00-712-5972	7	25
97403	13200E8807-2	5310-00-712-7731	7	26

CROSS-REFERENCE INDEXES

CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
97403	13200E8809		7	19
97403	13200E8810	4820-00-991-6517	7	12
97403	13200E8811	4320-00-930-8726	7	15
97403	13200E8812		7	14
97403	13200E8813		7	16
97403	13200E8814		7	11
97403	13206E4482-2	5310-01-150-5922	5	3
97403	13217E2964	6150-01-191-9732	8	18
97403	13217E6306	4730-00-721-9639	1	4
			7	2
97403	13217E7082		17	22
97403	13217E7084	5330-01-015-4753	17	23
97403	13217E7085		15	13
97403	13217E7092		15	8
97403	13217E7093	5340-01-015-8667	12	5
			15	5
97403	13217E7094	4010-01-013-5131	12	6
			15	6
97403	13217E7101		12	38
97403	13217E7121		8	16
97403	13217E7122		1	9
97403	13217E7123	5306-00-806-8512	1	8
97403	13217E7125	4730-00-735-4388	1	3
97403	13217E7127		12	16
97403	13217E7129	4730-01-150-3108	7	1
			18	3
97403	13217E7131	6105-01-139-3183	8	9
97403	13217E7132		6	8
97403	13217E7135	4320-01-047-1927	5	6
97403	13217E7136		8	13
97403	13217E7137		8	15
97403	13217E7140	4330-01-012-3313	4	5
97403	13217E7141-1		6	26
97403	13217E7141-1-1		6	27
97403	13217E7141-2		6	29
97403	13217E7141-2-1		6	30
97403	13217E7141-3		6	44
97403	13217E7141-3-2		6	45
97403	13217E7141-4		6	40
97403	13217E7141-4-2		6	41
97403	13217E7141-5		6	32
97403	13217E7141-5-2		6	33
97403	13217E7141-6		6	36
97403	13217E7141-6-1		6	37
97403	13217E7149		12	20
97403	13217E7150	3990-01-015-8457	13	
97403	13217E7151	5340-00-476-9245	13	2
97403	13217E7152		13	1
97403	13217E7155-14		17	3.
97403	13217E7156		17	10
97403	13217E7166		6	5

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
97403	13217E7167		7	24
97403	13217E7168		7	30
97403	13217E7170	4320-01-283-4525	7	7
97403	13217E7175-1		17	66
97403	13217E7175-2		17	66
97403	13217E7178-5		17	4
97403	13217E7179		12	15
97403	13218E0122-17		15	14
97403	13219E0462	5975-01-050-5707	12	35
97403	13219E3930	6150-00-483-3918	12	36
97403	13220E5288-2	5340-01-162-4325	12	33
97403	13220E5288-4	5340-01-165-3721	8	17
97403	13220E7596		1	20
97403	13222E9858		8	12
97403	13222E9859		8	22
97403	13225E8408		11	10
97403	13226E2146	5430-01-256-0650	15	
97403	13226E2147		15	15
97403	13226E2148	4320-01-333-9190	1	
97403	13226E2149-1		12	32
97403	13226E2149-11		12	31
97403	13226E2149-13		12	30
97403	13226E2151		12	21
97403	13226E2151-1-39		12	22
97403	13226E2177		18	4
97403	13227E6652		6	7
97403	13227E9678		12	14
97403	13227E9679		12	13
97403	13227E9680		12	12
97403	13228E2588		12	8
97403	13228E2589		12	9
97403	13228E2590		3	5
97403	13228E2591		12	34
97403	13228E3185		12	11
97403	13228E3248-2		16	30
97403	13228E3249		16	34
97403	13228E3354-33		17	6
97403	13228E4274		6	17
81718	153		2	12
12718	1607-180		16	7
81718	1661-A-2		10	5
81718	1711-D-2		18	6
12718	1820-001	5310-01-334-7388	16	2
81718	190G(B104)		2	3
12718	2097-249		16	19
12718	2097-250		16	17
12718	2097-251	5330-01-200-2704	16	18
12718	2097-301		16	10
12718	2097-401		16	4
12718	2097-500		16	11
12718	2097-700		16	8

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
12718	2097-910	.	16	12
12718	2097-916		16	9
12718	21-100		16	14
67209	21-106-13	4320-00-790-6357	7	27
64548	2661058BD121		17	44
64548	2672336		17	18
64548	2706138-101		17	62
64548	270656000832075		17	28
64548	2715444-61		17	12
64548	2721205-1		17	63
64548	2773247-101		17	29
64548	2775029-101		17	31
64548	2775031-101		17	58
64548	2775034-101		17	54
64548	2775035-101		17	36
64548	2775036-101		17	50
64548	2775038-101		17	41
64548	2775039-102		17	35
64548	2775040-101		17	33
64548	2775041-101		17	34
64548	2775042-101		17	42
64548	2775052-101		17	65
64548	2775053-101		17	60
64548	2775054-181		17	45
64548	2775153-101		17	37
64548	2775154-101		17	43
64548	2775163-101		17	39
64548	2775237-101		17	30
64548	2793080-101		17	47
64548	2793081-101		17	53
64548	2793082-101		17	56
64548	2793085-101		17	52
64548	2793093-101		17	55
64548	2803025-101		17	64
81718	296CA1 5-8	4930-00-119-0452	2	4
82366	310025		3	21
38205	316002		3	15
38205	320263		3	13
38205	323091L		3	12
38205	323091R		3	12
38205	326875		3	20
81718	3630		3	16
38205	363001		3	11
38205	363002		3	11
09310	407843		9	4
09310	442898		9	14
09310	443789		9	12
09310	443790		9	13
09310	443791		9	11
09310	443802		9	7
09310	443824		9	16

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CAGEC	PART NUMBER	PART NUMBER INDEX STOCK NUMBER	FIG.	ITEM
09310	444909		9	10
09310	444946		9	17
09310	444957		9	5
81718	45132RS		2	16
09310	452691		9	15
82366	47727		3	14
64548	5008-81		17	32
09310	564020		9	6
09310	565135		9	9
09310	565136		9	8
80089	586 114111		6	16
81718	616W	5920-00-897-4857	2	14
12718	887-L-542		16	1
12718	887-122	5330-01-200-2705	16	21
12718	887-125		16	25
12718	887-128		16	23
12718	887-129		16	22
12718	887-130		16	24
12718	887-213		16	16
12718	887-301		16	26
12718	887-302		16	5
12718	887-303		16	20
12718	887-353		16	15
12718	887-801		16	6
12718	887-802		16	3
12718	937		16	13
39428	98306A159		17	49
39428	98335A034		17	48

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
BULK	1		81349	MIL-W-16878-5TYP E EE-8
BULK	2		81349	MIL-W-16878-5TYP E EE-16
BULK	3		81349	MIL-R-6B55,CLASS 1, GRADE40
BULK	4	9505-00-684-4841	96906	MS20995F32
1		4320-01-333-9190	97403	13226E2148
1	1	-	81349	M370-A05B2A290
1	2	5330-00-360-0595	96906	MS27030-5
1	3	4730-00-735-4388	97403	13217E7125
1	4	4730-00-721-9639	97403	13217E6306
1	5	5310-00-761-0654	96906	MS51967-9
1	6		96906	MS35338-46
1	7	5310-00-080-6004	96906	MS27183-14
1	8	5306-00-806-8512	97403	13217E7123
1	9		97403	13217E7122
1	10	4720-01-071-2871	81349	M370-B06B2A104
1	11	5330-00-612-2414	96906	MS27030-6
1	12		81349	M370-A05B2A385
1	13		19099	MS20995F32-10
1	14	4720-01-028-1816	81349	M370-A05B2A4800
1	15	4730-00-360-0589	96906	MS27022-9
1	16	5310-00-761-3706	96906	MS51967-15j
1	17	5310-00-194-1483	96906	MS35333-44
1	18	5305-00-071-2073	96906	MS90728-117
1	19	5310-00-809-5998	96906	MS27183-18
1	20		97403	13220E7596
2	1	4730-00-203-1010	96906	MS27026-9
2	2	5330-00-360-0595	96906	MS27030-5
2	3		81718	190G(B104)
2	4	4930-00-119-0452	81718	296CA1 5/8
2	5		81718	H-3804-AG
2	6		81718	H-3673M
2	7		81718	H-9209-M
2	8		81718	H-9597-RB
2	9		81718	C-326311/2
2	10		81718	H-7766-M
2	11	5330-01-103-0958	81718	H7670M
2	12		81718	153
2	13		81718	D1554-AG
2	14	5920-00-897-4857	81718	616N
2	15		81718	H5482M
2	16		81718	45132RS
2	17		96906	MS25384-3
2	18		96906	MS3493-1
2	19		96906	MS3493-2
3	1	5310-00-761-3706	96906	MS51967-15
3	2		96906	MS35338-48'
3	3	5305-00-071-2070	96906	MS90728-114
3	4	5310-00-809-5998	96906	MS27183-18

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
3	5		97403	13228E2590
3	6	5310-00-761-0654	96906	MS51967-9
3	7		96906	MS35338-46
3	8	5305-01-325-8387	96906	MS90725-64
3	9	5310-00-080-6004	96906	MS27183-14
3	10		96906	MS21093-457
3	11		38205	363001
3	11		38205	363002
3	12		38205	323091L
3	12		38205	323091R
3	13		38205	320263
3	14		82366	47727
3	15		38205	316002
3	16		81718	3630
3	17	5310-00-880-7744	96906	MS51967-5
3	18	5310-00-407-9566	96906	MS35338-45
3	19	5305-00-983-6622	96906	MS16997-81
3	20		38205	326875
3	21		82366	310025
3	22		19099	JFB14LH
3	22		19099	JFB14RH
4	1	5310-00-761-3706	96906	MS51967-15
4	2		96906	MS35338-48
4	3	5305-01-325-8388	96906	MS90725-113
4	4	5310-00-809-5998	96906	MS27183-18
4	5	4330-01-012-3313	97403	13217E7140
5	1	5310-00-761-3706	96906	MS51967-15
5	2		96906	MS35338-48
5	3	5310-01-150-5922	97403	13206E4482-2
5	4	5305-00-071-2073	96906	MS50728-117
5	5	5310-00-809-5998	96906	MS27183-18
5	6	4320-01-047-1927	97403	13217E7135
6	1		96906	MS51967-8
6	2		96906	MS35338-46
6	3	5310-00-080-6004	96906	MS27183-14
6	4		96906	MS90725-65
6	5		97403	13217E7166
6	6		15235	UNY1055A
6	7		97403	13227E6652
6	8		97403	13217E7132
6	9		15235	GUB0101
6	10	5330-01-019-8913	15235	GASK925
6	11	5305-00-989-7435	96906	MS35207-264
6	12	5310-00-576-5752	96906	MS35333-39
6	13	5310-00-014-5850	96906	MS27183-42
6	14	5310-00-934-9751	96906	MS35650-302
6	15	5915-01-290-1912	23939	A4497A
6	16		80089	586 114111
6	17		97403	13228E4274
6	18		96906	MS52131-1
6	19		19207	11675004

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
6	20	5305-00-983-6730	96906	MS35206-218
6	21	5310-00-193-7577	96906	MS35333-36
6	22	5310-00-950-1310	96906	MS27183-4
6	23	5935-01-225-1987	96906	MS3452W16S-45
6	24		96906	:MS25043-16DA
6	25		81349	M286755B03
6	26		97403	13217E7141-1
6	27		97403	13217E7141-1-1
6	28	5940-00-283-5281	96906	MS25036-109
6	29		97403	13217E7141-2
6	30		97403	13217E7141-2-1
6	31	5940-00-143-4780	96906	MS25036-108
6	32		97403	13217E7141-5
6	33		97403	13217E7141-5-2
6	34	5940-00-114-1305	96906	MS25036-116
6	35	5940-00-114-1306	96906	MS25036-117
6	36		97403	13217E714i-6
6	37		97403	13217E7141-6-1
6	38	5940-00-143-4780	96906	MS25036-108
6	39	5940-00-143-5284	96906	MS25036-115
6	40		97403	13217E7141-4
6	41		97403	13217E7141-4-2
6	42	5940-00-114-1305	96906	MS25036-116
6	43	5940-00-557-4345	96906	MS25036-118i
6	44		97403	13217E7141-3
6	45		97403	13217E7141-3-2
6	46	5940-00-114-1306	96906	MS25036-117
6	47	5940-00-557-4345	96906	MS25036-118
7	1	4730-01-150-3108	97403	13217E7129
7	2	4730-00-721-9639	97403	13217E6306
7	3	4730-00-268-7479	96906	MS14315-22X
7	4	4730-00-649-9100	96906	MS27028-11
7	5	5330-00-612-2414	96906	MS27030-6
7	6	4730-00-938-7997	96906	MS27022-11
7	7	4320-01-283-4525	97403	13217E7170
7	8	4730-00-187-4202	96906	MS51884-5C
7	9	4730-01-100-0109	96906	MS51887-7C
7	10		96906	MS51968
7	11		97403	13200E8814
7	12	4820-00-991-6517	97403	13200E8810
7	13	5305-00-637-1119	96906	MS35214-69
7	14		97403	13200E8812
7	15	4320-00-930-8726	97403	13200E8811
7	16		97403	13200E8813
7	17	5310-00-732-0560	96906	MS51968-14
7	18	5310-00-809-5998	96906	MS27183-18
7	19		97403	13200E8809
7	20	5330-00-263-8015	96906	MS29513-273
7	21	5330-00-551-3963	96906	MS29513-253
7	22	5306-00-225-9098	96906	MS90726-43
7	23	5330-00-712-7730	97403	13200E8802

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
7	24		97403	13217E7167
7	25	5365-00-712-5972	97403	13200E8807-1
7	26	5310-00-712-7731	97403	13200E8807-2
7	27	4320-00-790-6357	67209	21-106-13
7	28		97403	13200E8804
7	29	5305-00-052-5925	96906	MS35198-73
7	30		97403	13217E7168
7	31	5315-00-043-1787	96906	MS35756-34
7	32		82896	SAF-LOK SOCKET
7	33	5307-01-016-4423	96906	MS51864-106-20
7	34	5307-01-013-7888	96906	MS51864-103-18
7	35		97403	13200E8803
7	36	5340-00-290-4504	96906	MS122125
7	37	5340-01-030-6854	96906	MS122121
7	38	5340-00-290-4521	96906	MS122122
8	1		96906	MS51967-8
8	2		96906	MS35338-46
8	3	5310-00-080-6004	96906	MS27183-14
8	4	5305-00-543-2419	96906	M590728-61
8	5	5310-00-880-7744	96906	MS51967-5
8	6	5310-00-407-9566	96906	MS35338-45
8	7	5310-00-081-4219	96906	MS27183-12
8	8	5306-00-225-8503	96906	MS90725-39
8	9	6105-01-139-3183	97403	13217E7131
8	10	5940-00-557-1629	96906	MS25036-149
8	11	5940-00-143-4777	96906	MS25036-157
8	12		97403	13222E9858
8	13		97403	13217E7136
8	14	5320-00-582-3276	96906	MS20600hDGW4
8	15		97403	13217E7137
8	16		97403	13217E7121
8	17	5340-01-165-3721	97403	13220E5288-4
8	18	6150-01-191-9732	97403	13217E2964
8	19		81349	C0-02-MG-F-(2/16))-0335
8	20	5935-01-241-9740	96906	MS3456W165-4P
8	21	6150-01-022-6004	19207	11682336-1
8	22		97403	13222E9859
8	23		19207	11677570
9	1	5305-00-984-6211	96906	MS35206-264
9	2	5310-00-045-3296	96906	MS35338-43
9	3		09310	F0157-016
9	4		09310	407843
9	5		09310	444957
9	6		09310	564020
9	7		09310	443802
9	8		09310	565136
9	9		09310	565135
9	10		09310	444909
9	11		09310	443791
9	12	.	09310	443789

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9	14		09310	442898
9	15		D9310	452691
9	16		09310	443824
9	17		09310	444946
10	1		96906	MS27028-13
10	2	5330-00-075-3268	96906	MS27030-7
10	3		96906	MS37006-23
10	4	4730-00-938-7997	96906	MS27022-11
10	5		81718	1661-A-2
10	6		81718	C-1122-A
10	7		81718	H-4239-M
10	8		81718	H-4903-M
10	9		81718	H-4907
10	10		81718	H-4233-RE
10	11		81718	H-20235-M
10	12		81718	H-5549-M
10	13		81718	H-42 34-M
10	14		81718	H-4235-RA
10	15		81718	C-1121-A
11	1	5310-00-761-3706	96906	MS51967-15
11	2		96906	MS35338-48
11	3	5305-01-325-8388	96906	MS90725-113
11	4	5310-00-809-5998	96906	MS27183-18V
11	5		96906	MS29526-2
11	6	5305-00-957-7086	96906	MS24693-5273
11	7		96906	MS24484-5
11	8		96906	MS33666-153
11	9	5330-00-612-2414	96906	MS27030-6
11	10		97403	13225E8408
11	11		96906	MS21209F1-20P
12	1	5310-00-761-3706	96906	MS51967-15
12	2		96906	MS35338-48
12	3	5305-00-071-2073	96906	MS90728-117
12	4	5310-00-809-5998	96906	MS27153-18
12	5	5340-01-015-8667	97403	13217E7093
12	6	4010-01-013-5131	97403	13217E7094
12	7	5305-00-071-2071	96906	MS90728-115
12	8		97403	13228E2588
12	9		97403	13228E2589
12	10	5320-00-582-3276	96906	MS20600AD6W4
12	11		97403	13228E3185
12	12		97403	13227E9680
12	13		97403	13227E9679
12	14		97403	13227E9678
12	15		97403	13217E7179
12	16		97403	13217E7127
12	17	5310-00-934-9758	96906	MS35649-202
12	18	5310-00-045-3296	96906	MS35338-43
12	19	5305-00-984-6211	96906	MS35206-264
12	20		97403	13217E7149

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
12	21		97403	13226E2151
12	22		97403	13226E2151-1-39
12	23		96906	MS10470B4-7
12	24		96906	MS18015-3
12	25	5320-00-119-6826	96906	MS20470B4-16
12	26		96906	MS18015-2
12	27	5320-00-118-1995	96906	MS20470B4-6
12	28	5320-00-582-3521	96906	MS2060OB4W3
12	29		96906	MS35825-10A
12	30		97403	13226E2149-13
12	31		97403	13226E2149-11
12	32		97403	13226E2149-1
12	33	5340-01-162-4325	97403	13220E5288-2
12	34		97403	13228E2591
12	35	5975-01-050-5707	97403	13219E0462
12	36	6150-00-483-3918	97403	13219E3930
12	37	5320-00-582-3276	96906	MS20600AD6W4
12	38		97403	13217E7101
13		3990-01-015-8457	97403	13217E7150
13	1		97403	13217E7152
13	2	5340-00-476-9245	97403	13217E7151
13	3		96906	MS27953-10
13	4	5310-00-891-1734	96906	MS35691-34
13	5		96906	MS27954-5
13	6		96906	MS27952-7
13	7		96906	MS17953-9
14	1		81349	M370-B06B2A890
14	2	5330-00-612-2414	96906	MS27030-6
14	3		81349	M370-B06B2A260
14	4	5330-00-612-2414	96906	MS27030-6
15		5430-01-256-0650	97403	13226E2146
15	1		81348	PPP-P-420
15	2	5330-00-298-7165	81349	MIL-G-432
15	3	5305-00-071-2067	96906	MS90728-111
15	4		96906	MS35338-48
15	5		97403	13217E7093
15	6		97403	13217E7094
15	7	5310-00-809-5998	96906	MS27183-18
15	8		97403	13217E7092
15	9	5315-00-298-1481	96906	MS24665-357
15	10	5310-00-171-2435	96906	MS35692-58
15	11	5310-00-809-8533	96906	MS27183-23
15	12	5305-00-947-4354	96906	MS90728-191
15	13		97403	13217E7085
15	14		97403	13218E0122-17
15	15		97403	13226E2147
16	1		12718	887-L-542
16	2	5310-01-334-7388	12718	1820-001
16	3		12718	887-802
16	4		12718	2097-401
-16	5		12718	887-302

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
16	6		12718	887-801
16	7		12718	1607-180
16	8		12718	2097-700'
16	9		12718	2097-916
16	10		12718	2097-301
16	11		12718	2097-500
16	12		12718	2097-910
16	13		12718	937
16	14		12718	21-100
16	15		12718	887-353
16	16		12718	887-213
16	17		12718	2097-250
16	18	5330-01-200-2704	12718	2097-251
16	19		12718	2097-249
16	20		12718	887-303
16	21	5330-01-200-2705	12718	887-122
16	22		12718	887-129
16	23		12718	887-128
16	24		12718	887-130
16	25		12718	887-125
16	26		12718	887-301
16	27	5310-00-914-6028	96906	MS51922-18
16	28	5310-00-802-4701	96906	MS15795-813
16	29	5305-00-021-3740	96906	MS35307-364
16	30		97403	13228E3248-2
16	31	5310-00-927-3877	96906	MS51922-14
16	32		96906	MS16996-32
16	33		96906	MS15795-811
16	34		97403	13228E3249
17	1	5305-00-068-0502	96906	MS90725-6
17	2	5310-00-582-5965	96906	MS35338-44
17	3		97403	13217E7155-14
17	4		97403	13217E7178-5
17	5	4730-00-908-3193	96906	MS35842-12
17	6		97403	13228E3354-33
17	7		81349	WW-P-471
17	8	5306-00-225-8496	96906	MS90725-31
17	9	5310-00-407-9566	96906	MS35338-45
17	10		97403	13217E7156
17	11		64548	F613D
17	12		64548	2715444-61
17	13	5305-00-059-3657	96906	MS51958-61
17	14		88044	AN960C10
17	15		64548	F613
17	16		64548	5548172
17	17	5330-00-733-2208	96906	MS29513-112
17	18		64548	2672336
17	19		96906	MS51967-14
17	20		96906	MS35338-48
17	21	5310-00-809-5998	96906	MS27183-18
17	22		97403	13217E7082

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
17	23	5330-01-015-4753	97403	13217E7084
17	24	4730-00-649-9100	96906	MS27028-11
17	25	5330-00-612-2414	96906	MS27030-6
17	26	4030-00-270-5436	96906	MS87006-3
17	27		64548	F668
17	28		64548	270656000832075
17	29		64548	2773247-101
17	30		64548	2775237-101
17	31		64548	2775029-101
17	32		64548	5008-81
17	33		64548	2775040-101
17	34		64548	2775041-101
17	35		64548	2775039-102
17	36		64548	2775035-101
17	37		64548	2775153-101
17	38	5320-00-584-9078	96906	MS20470A4-4
17	39		64548	2775163-101
17	40	5315-00-823-8742	96906	MS16562-252
17	41		64548	2775038-101
17	42		64548	2775042-101
17	43		64548	2775154-101
17	44		64548	2661058BD121
17	45		64548	2775054-101
17	46		96906	MS171651
17	47		64548	2793080-101
17	48		39428	98335A034
17	49		39428	98306A159
17	50		64548	2775036-101
17	51		96906	MS24665-82
17	52		64548	2793089-101
17	53		64548	2793081-101
17	54		64548	2775034-101
17	55		64548	2793093-101
17	56		64548	2793082-101
17	57	5365-00-804-7645	96906	MS16624-4050
17	58		64548	2775031-101
17	59		80756	RSN-50
17	60		64548	2775053-101
17	61		64548	2775052-101
17	62		64548	2706138-101
17	63		64548	2721205-1
17	64		64548	2803025-101
17	65	5315-00-597-3693	96906	MS171648
17	66		97403	13217E7175-1
17	66		97403	13217E7175-
17	67	5310-00-550-5054	96906	MS15795-809
18	1		96906	MS27029-13
18	2	5330-00-612-2414	96906	MS27030-6
18	3		97403	13217E7129
18	4		97403	13226E2177
18	5		96906	MS27029-13

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18	6		81718	1711-D-2
18	7		81718	H-20342-M
18	8		81718	C-10111-DI
18	9		81718	H-7724-M
18	10		81718	H-7725-M
18	11		8171B	H-6281-M
18	12		81718	C-10112-RE
18-	13		81718	H-4981-M
18	14		81718	H-4626-M
18	15		81718	H-4273-H
18	16		81718	H-9778-RE
18	17		81718	H-4278-M
18	18		81718	H-4615
18	19		81718	H-4275-M
18	20		81718	H-4274-M
18	21	5330-00-612-2414	96906	MS27030-6
18	22		81718	H-6223-M
18	23		81718	H-4468-M
18	24		81718	H-2149-M
18	25		81718	H-20032-RE
18	26		81718	H-4255-M
18	27		81718	H-4257-RE
18	28		81718	H-4310-M
18	29		81718	H-4471-RA
18	30		81718	H-4470-M
18	31		81718	H-9770-RE
18	32		81718	C-337B-M
18	33		81718	D-506-A

Change 1 F-76

APPENDIX G

ILLUSTRATED LIST OF MANUFACTURED ITEMS

G-1 INTRODUCTION

a. This appendix includes complete instructions for making item authorized to be manufactured or fabricated at unit maintenance.

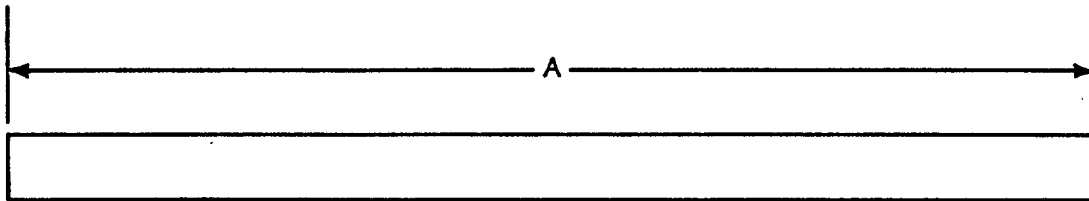
b. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

c. All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

G-2 PART NUMBER INDEX

The following part numbers are illustrated in this appendix.

PART NO.	FIGURE NO.
13226E2149-11	G-1
13226E2149-13	G-1



PART NO.	DIMENSION 'A'
13226E2149-11	12.75
13226E2149-13	7.5

NOTES:

1. FABRICATE FROM SYNTHETIC RUBBER, PART NO. MIL-R-6855, CLASS 1, GRADE 40.
2. DIMENSIONS ARE IN INCHES.

J

Figure G-1. Rubber Gasket

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By Order of the Secretary of the Army:

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The Adjutant General

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TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 **2028-2**

PREVIOUS EDITIONS ARE OBSOLETE.

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

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 decigrams = .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
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