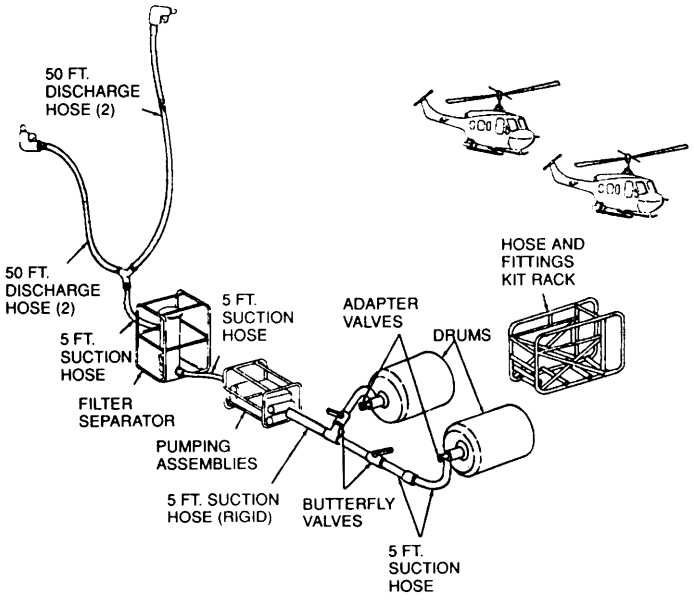
TECHNICAL MANUAL

OPERATOR'S AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)



FORWARD AREA REFUELING EQUIPMENT NSN: 4930–01–301–8201

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

*This manual supersedes TM 5-4930-238-12&P, dated 16 January 1990

HEADQUARTERS, DEPARTMENT OF THE ARMY

30 JUNE 1993

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 14 March 1994

Operator's and Unit, Maintenance Manual
(Including Repair Parts and Special Tools List)

FORWARD AREA REFUELING EQUIPMENT NSN: 4930-01-301-8201

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

TM 10-4930-238-12&P, 30 June 1993, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

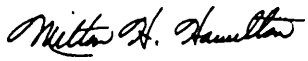
Remove pages	Insert pages
2-11 through 2-14	2-11 through 2-14
- - - -	2-14.1 and 2-14.2
2-15 and 2-16	2-15/(2-16 blank)
F-11 and F-12	F-11 and F-12

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:



MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
06433

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25-E, block no. 6058, requirements for TM 10-4930-238-12&P.

Personal injury may result if the engine is not turned off during service or maintenance.

Do not fill fuel tank while engine is running or hot.

Do not smoke or use an open flame in the vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

Weight of the box cover is approximately 90 lb (40.82 kgs). Four persons are required to lift cover from skid when uncrating.

Steel banding, cut under tension, can snap free and cause injury. Leather gloves and face shield are required. Failure to observe this warning can cause personnel injury.

Cleaning solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged breathing of fumes. Keep solvent away from flames. Do not use in excessive amounts. Avoid skin contact.

Hearing protection must be worn within 18 feet (5.495 m) of the pump assembly.

TECHNICAL MANUAL
TM 10-4930-238-12&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D. C., 30 June 1993

TECHNICAL MANUAL

OPERATOR'S AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FORWARD AREA REFUELING EQUIPMENT

Current as of 1 June 1992

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form *2028-2* located in the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATT AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-01798. A reply will be furnished directly to you.

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TABLE OF CONTENTS

*This manual supersedes TM 5-4930-238-12&P, dated 16 January 1990.

TABLE OF CONTENTS – Continued

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS – Continued

LIST OF TABLES

HOW TO USE THIS MANUAL

a. General. This manual contains operation instructions and maintenance procedures for the Forward Area Refueling Equipment. At the beginning of each chapter, you will find an index of the topics covered in the chapter.

Chapter 3	Operator Maintenance
Chapter 4	Unit Maintenance

In using these procedures, you must familiarize yourself with an entire maintenance procedure before beginning a specific maintenance task.

Read all Warnings before you begin operating your equipment. Read each procedure completely before beginning a task. In locating specific items in this manual, following sections are included in this manual. References in the manual are to pages, paragraphs and appendixes or other publications.

b. Front Cover Index – Tabbed index of major functions and appendixes are keyed to tabbed pages in the manual. These major items are also enclosed in boxed areas in the Table of Contents.

c. Table of Contents – List of chapters, sections and appendixes.

d. Alphabetical Index – Extensive index for each subject, located at the end of this manual.

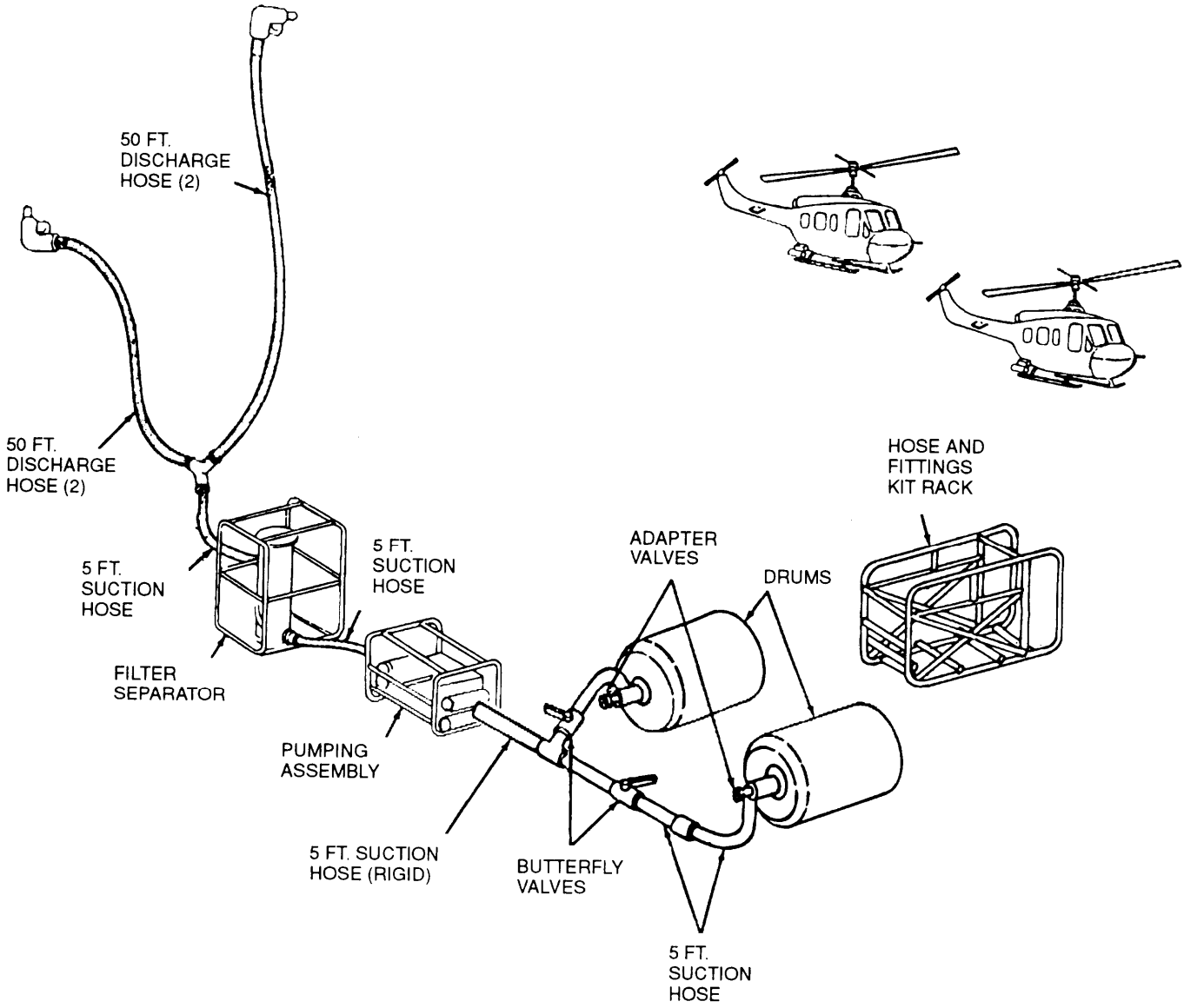


Figure 1–1. Typical Layout of FARE.

Chapter 1

INTRODUCTION

Section 1. GENERAL INFORMATION

1-1. SCOPE.

a. Type of Manual. Operator and Unit Maintenance Manual, Including Repair Parts and Special Tools List.

b. Model Number and Equipment Name. Forward Area Refueling Equipment, LaBarge Model Number LPI-F0500. Refer to Figure 1–1.

c. Purpose of Equipment. Designed for refueling of helicopters in forward combat areas.

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.

1–3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

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

1-4. PREPARATION FOR STORAGE OR SHIPMENT.

For other storage requirements or for shipment instructions, refer to Chapter 4, Section VI Administrative storage requirements will be in accordance with the following:

1-4. PREPARATION FOR STORAGE OR SHIPMENT- Continued.

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 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.

1-5. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC).

Quality Assurance/Quality Control procedures will be those enforced by the local commander.

1-6. NOMENCLATURE CROSS REFERENCE LIST.

Common Name	Official Nomenclature
Forward Area Refueling Equipment or FARE	Forward Area Refueling Equipment

1-7. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

If the Forward Area Refueling Equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, U. S. Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798.

1-8. LIST OF ABBREVIATIONS.

cm . . . . . centimeter
FSN . . . . . Federal Stock Number
GPM . . . . . Gallons Per Minute
IN . . . . . inch(es)
Lb . . . . . pound(s)
m . . . . . millimeter
MAX . . . . . maximum
NSN . . . . . National Stock Number
PSI . . . . . Pounds Square Inch
WT . . . . . Weight

Section II. EQUIPMENT DESCRIPTION AND DATA

1-9. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. Characteristics.

(1) Lightweight.

(2) Used to refuel helicopters in forward combat areas.

(3) Primarily, the equipment is used to transfer fuel from 500 gallon (1892.5 liters) collapsible drums to helicopters in forward combat areas.

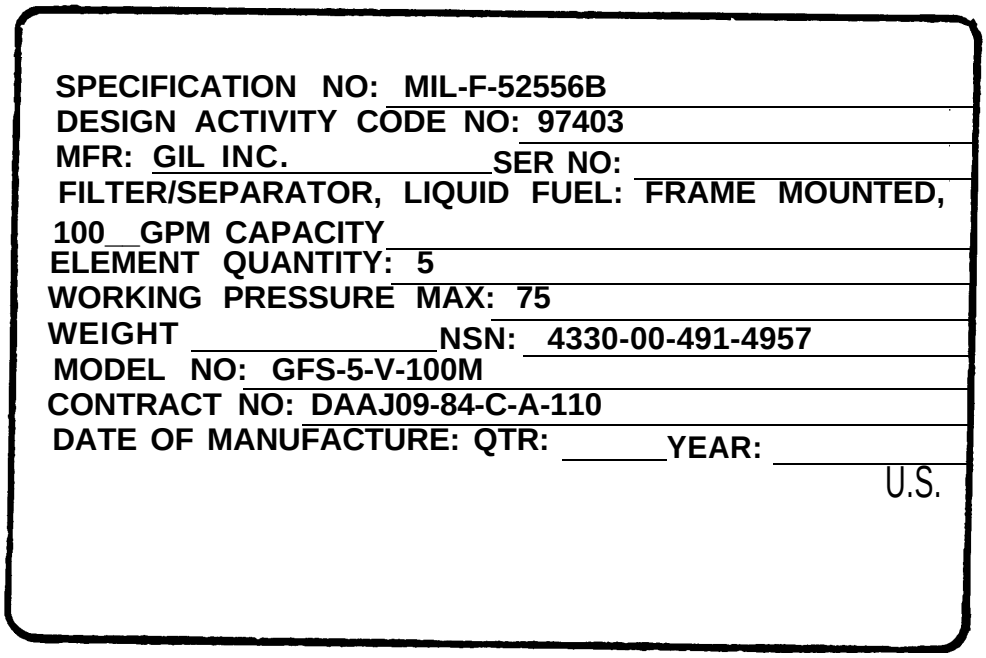
b. Capabilities and Features.

(1) Used to refuel fixed wing aircraft and ground vehicles in a secondary function.

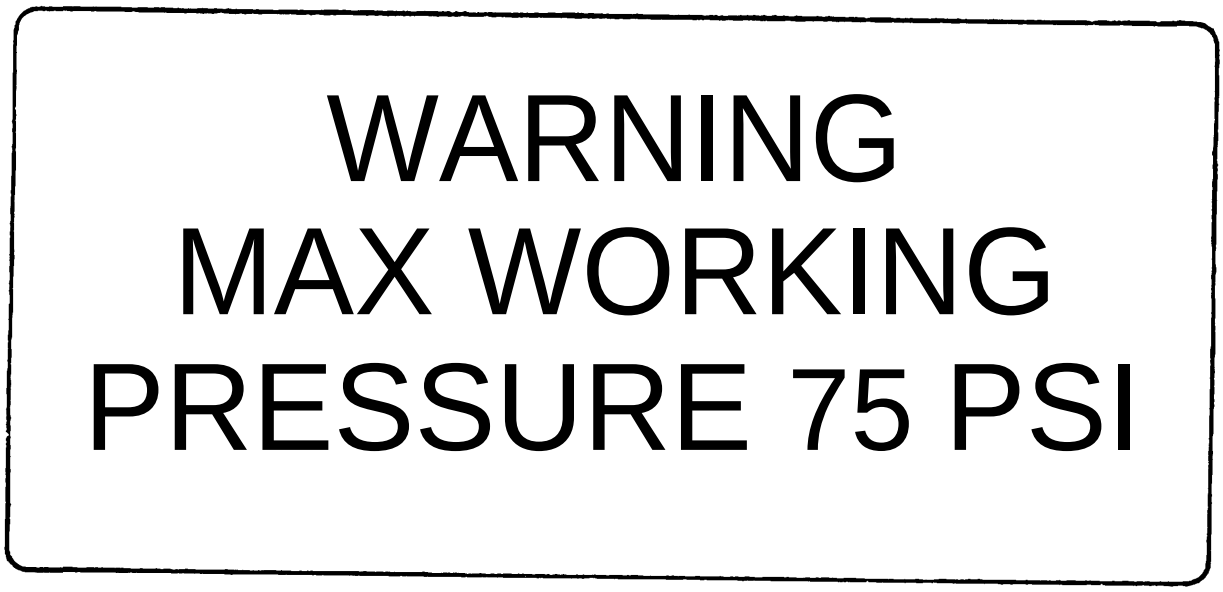
(2) Two types of fuel nozzles are available, that will permit refueling of service aircraft or surface vehicles having either a gravity feed or closed circuit fuel system capability.

(3) A 4“ x 2“ (10.16 x 5.08 cm) adapter extends the equipment pumping capability to dispense fuel from a 10,000 gallon (37,850 liters) tank.

(4) Labels, Decals, Information, and Identification Plates. The Forward Area Refueling Equipment utilizes many labels, decals, information and identification plates which are located on different components. Refer to Figure 1–2 for location and identification of the various labels, decals, information and identification plates.



Filter/ Separator Identification Plate, Located on Sight Gauge Side



Filter/Separator Warning Decal, Located on Filter Inlet Side.

Figure 1–2. Labels, Decals, Information and Identification Plates (Sheet 1 of 3).

INSTRUCTIONS

REPLACE FILTER ELEMENTS, FLUID PRESSURE (NSN 4330-983-0998) 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: 100 GPM
WORKING PRESSURE: 75 PSI MAX

Filter/Separator Instruction Plate, Located on Filter Inlet Side

DRAIN WATER
DAILY OR
WHEN FLOAT
REACHES MARK

OUTLET

Filter/Separator Instruction Decals, Located on Sight Gauge Side

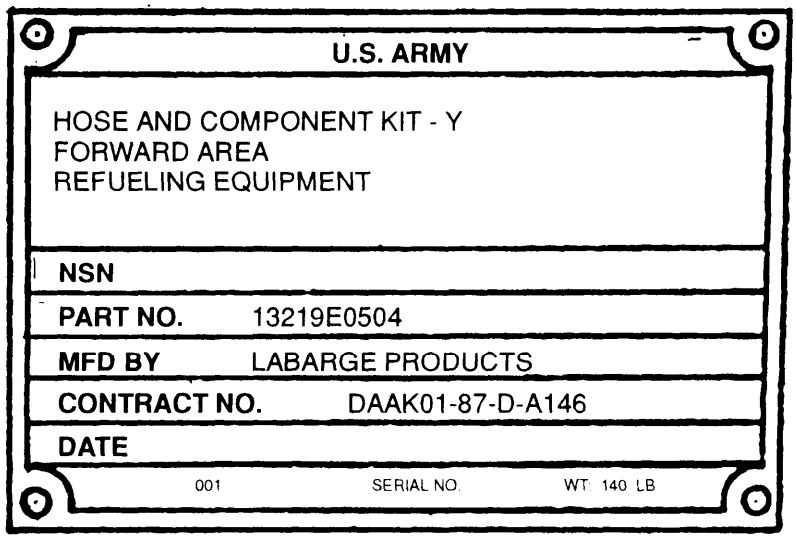
U.S. ARMY

SUCTION HOSE KIT –
FORWARD AREA REFUELING EQUIPMENT

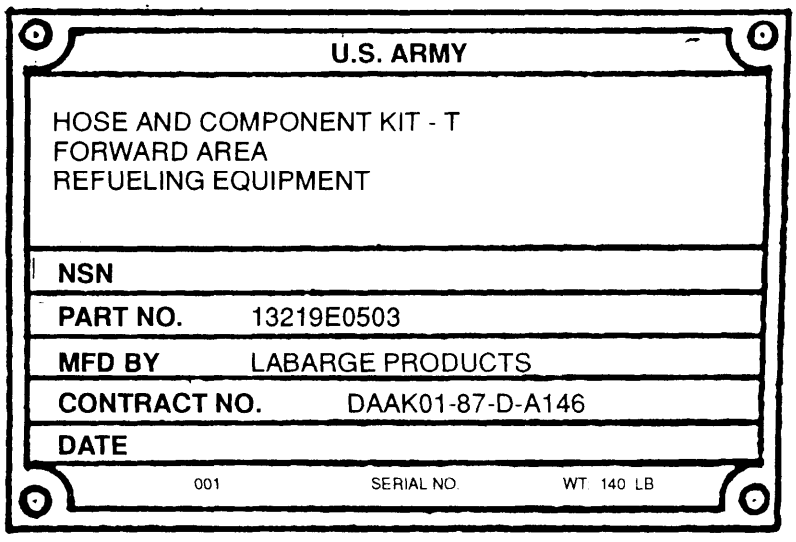
NSN 4930-00-513-9906
PART NO. 13219E0501
MFD BY LABARGE PRODUCTS
CONTRACT NO. DAAK01-87-D-A146
DATE
SERIAL NO. WT: 134 LB

Suction Hose Kit, Identification Plate, Located on Canvas Container

Figure 1-2. Labels, Decals, Information and Identification Plates (Sheet 2 of 3).



Discharge Hose and Component Kit-Y Identification Place, Located on Kit Frame



Discharge Hose and Component Kit-T Identification Place, Located on Kit Frame

Figure 1–2. Labels, Decals, Information and Identification Plates (Sheet 3 of 3).

1–10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

a. Filter Separator. (Refer to Figure 1-3)

(1) The filter separator assembly consists of vessel capable of filtering fuel through five replaceable elements at a rate of 100 (378.5 liters) gpm.

(2) Refer to TM 5-4330-217-12 for maintenance of the filter separator.

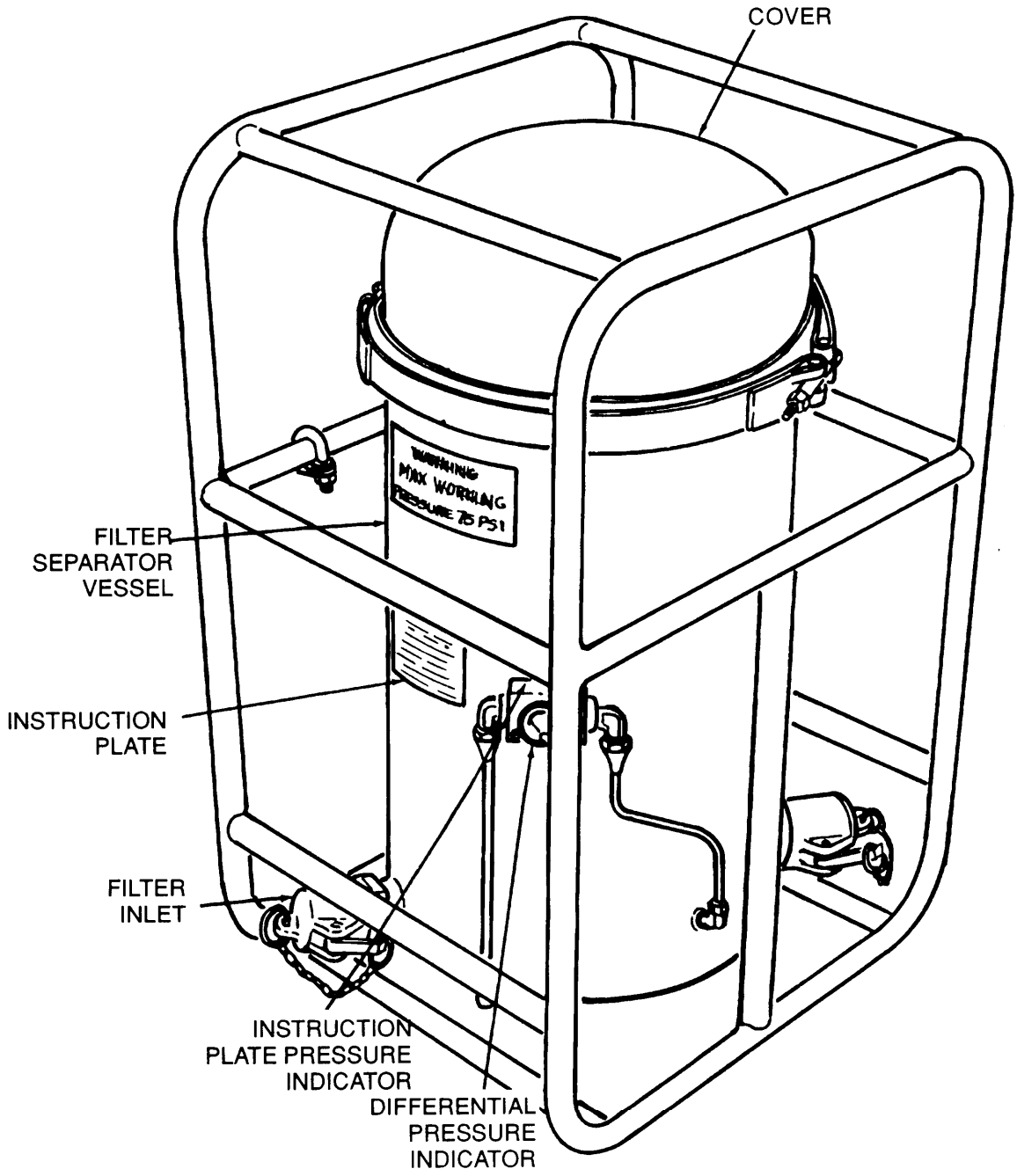


Figure 1-3. Filter Separator (Sheet 1 of 2).

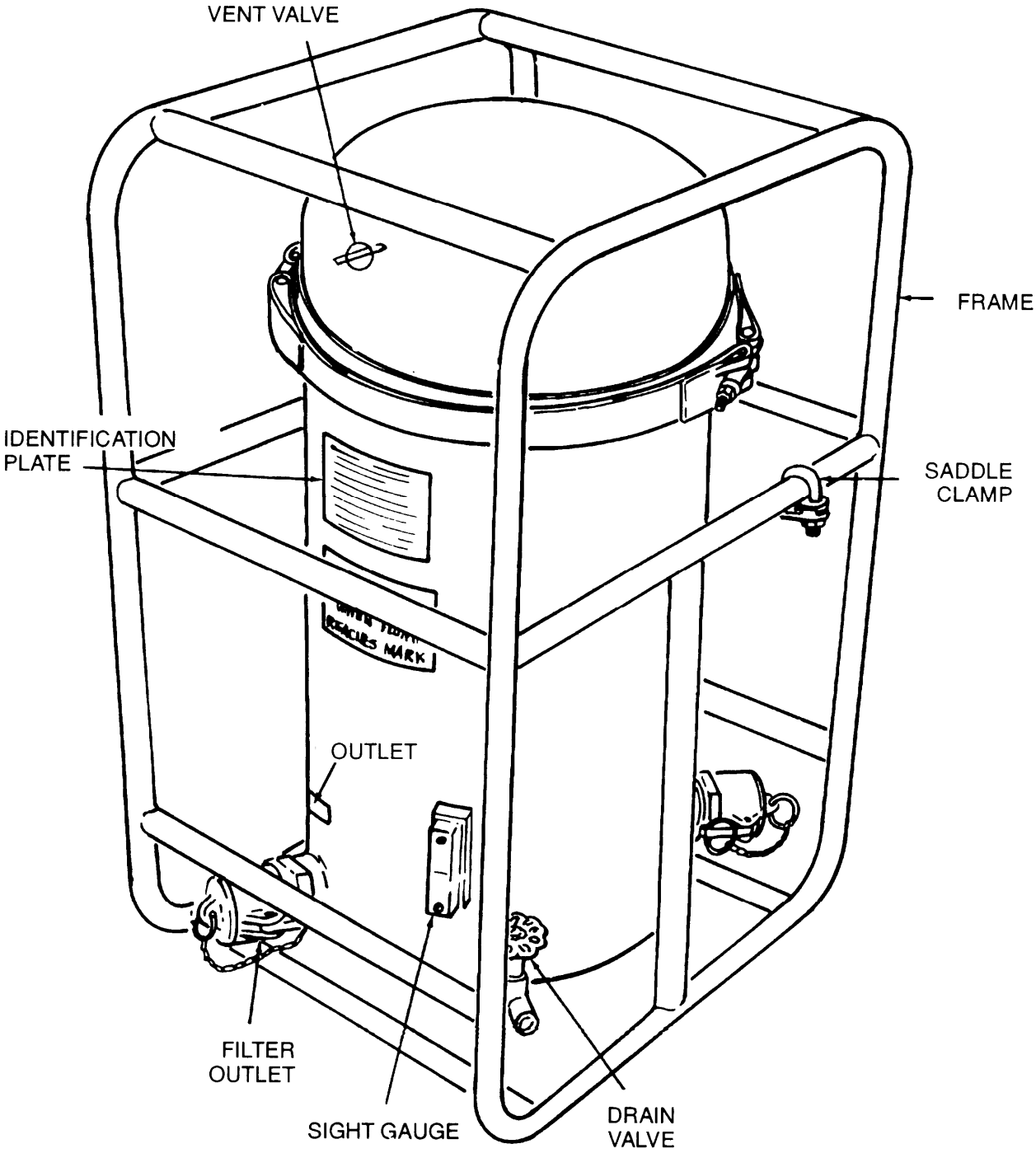


Figure 1-3. Filter Separator (Sheet 2 of 2).

b. Pumping Assembly. (Refer to Figure 1–4)

(1) The pumping assembly consists of a diesel engine and pump, and is capable of pumping fuel at 100 (378.5 liters) gpm.

(2) Refer to TM 5-4320-313-14 for maintenance of the pumping assembly.

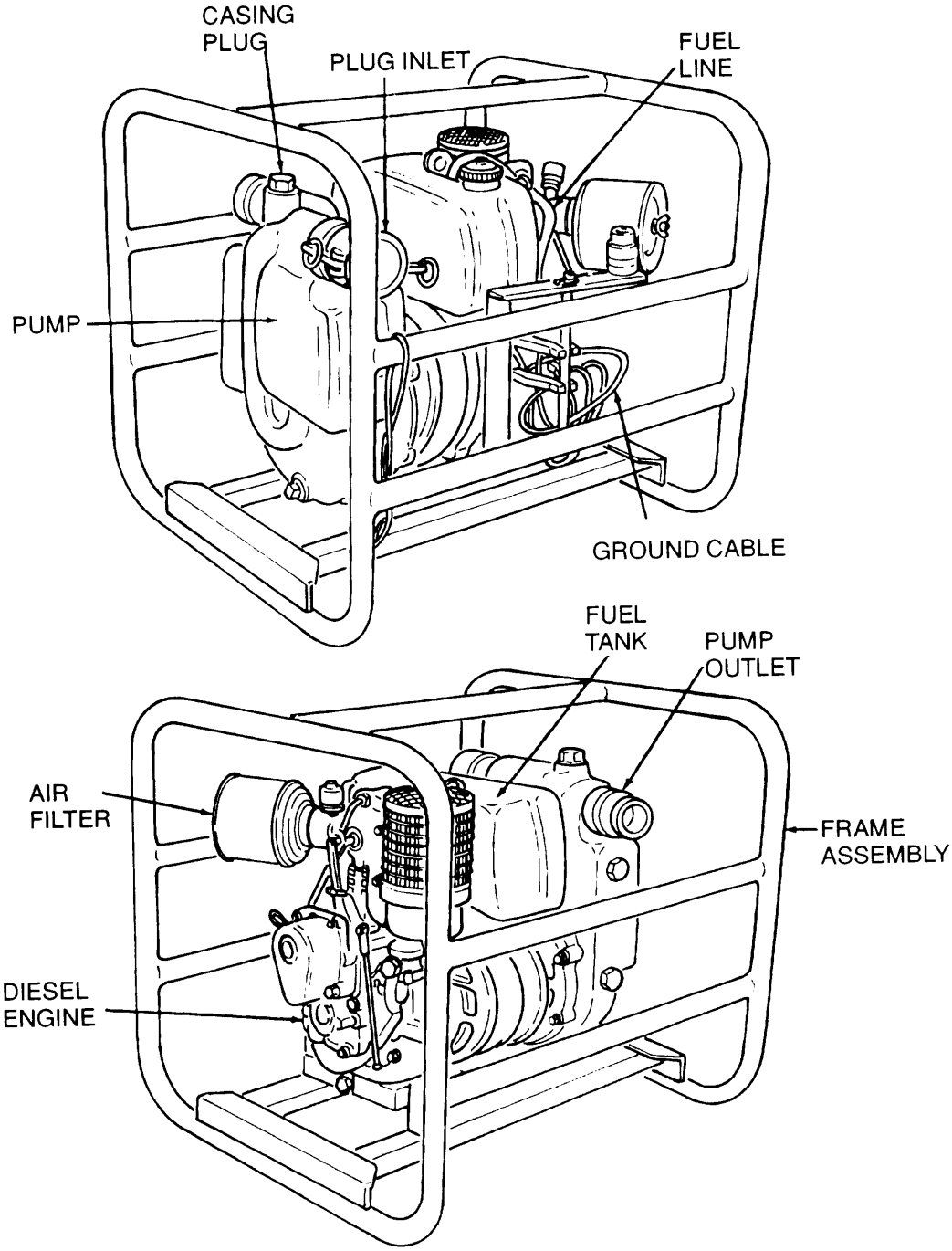


Figure 1-4. Pumping Assembly.

1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS – Continued.

c. Suction Hose Kit. Refer to Figure 1–5 The suction hose kit consists of six suction hoses, two ground rods, and canvas container.

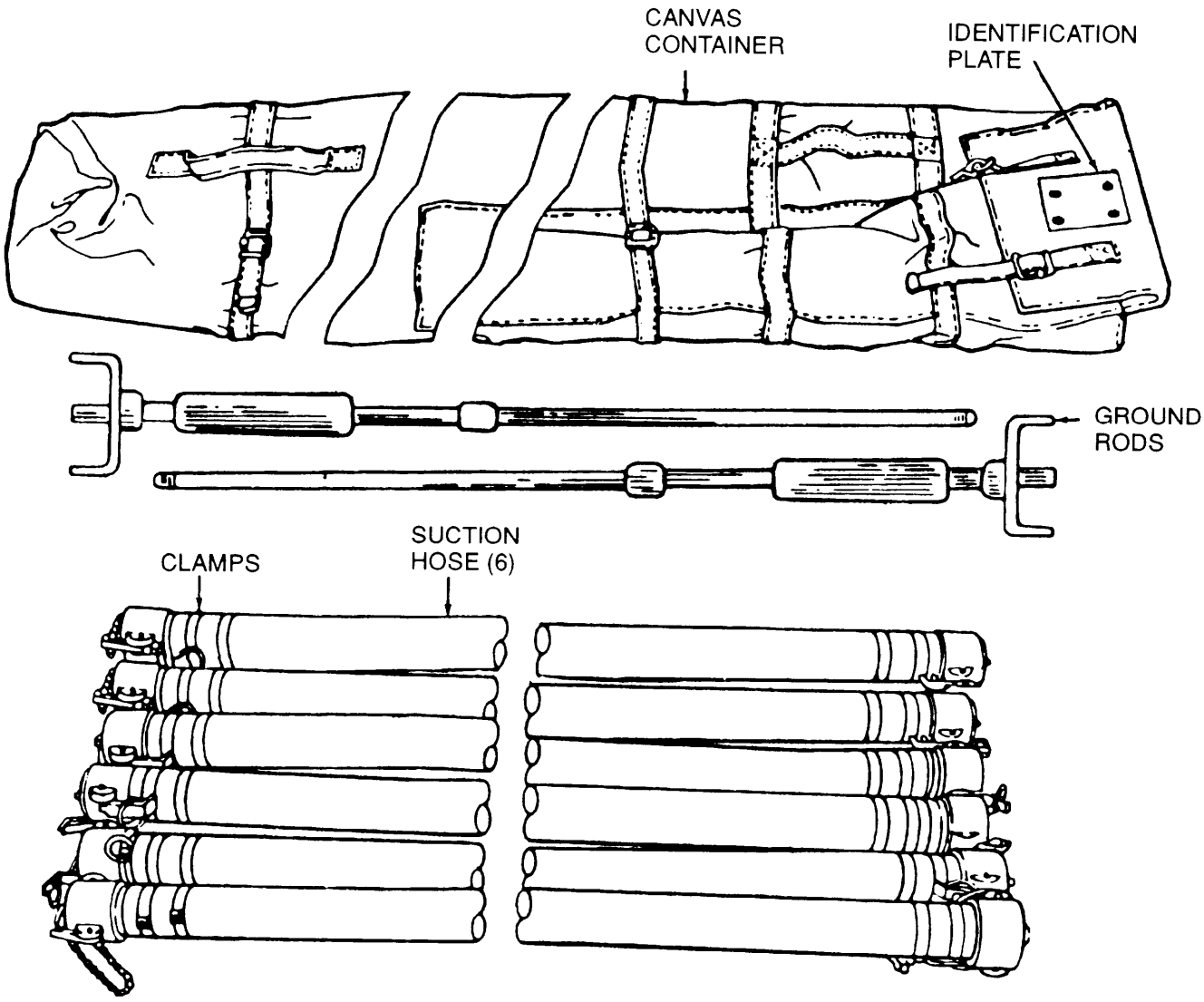


Figure 1–5. Suction Hose Kit.

d. Hose and Component Kit-T Discharge. (Refer to Figure 1–6.) Hose and component kit-T is used during single point refueling operation. Located in the container is one each butterfly valve, one each tee assembly, one each valve elbow coupler, one each adapter, male by male, 2 in. by 2 in., one each nozzle adapter, one each nozzle assembly, and one each adapter assembly, 3 in. female by 2 in. male.

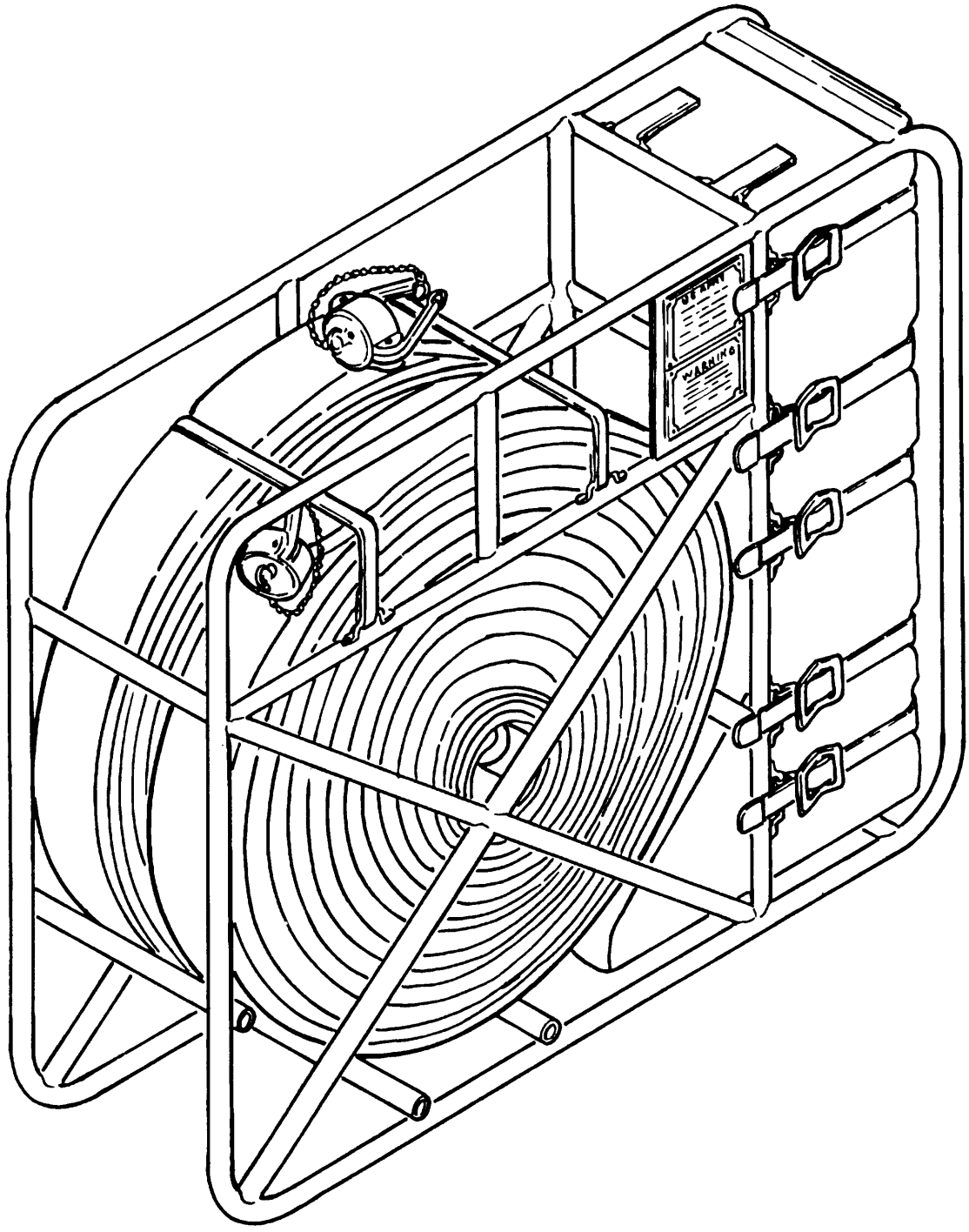


Figure 1-6. Hose and Component Kit-T.

1–10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS – Continued.

e. Hose and Component Kit-Y Discharge. Refer to Figure 1–7. Hose and component kit-Y, discharge is used during two point refueling operation. Located in the container is one each adapter assembly, 4 in. female by 2 in. male, one each butterfly valve, one each Y-fitting assembly, one each valve elbow coupler, one each adapter, male by male, 2 in. by 2 in., one each adapter nozzle, one each nozzle assembly, and one each adapter/water detection kit.

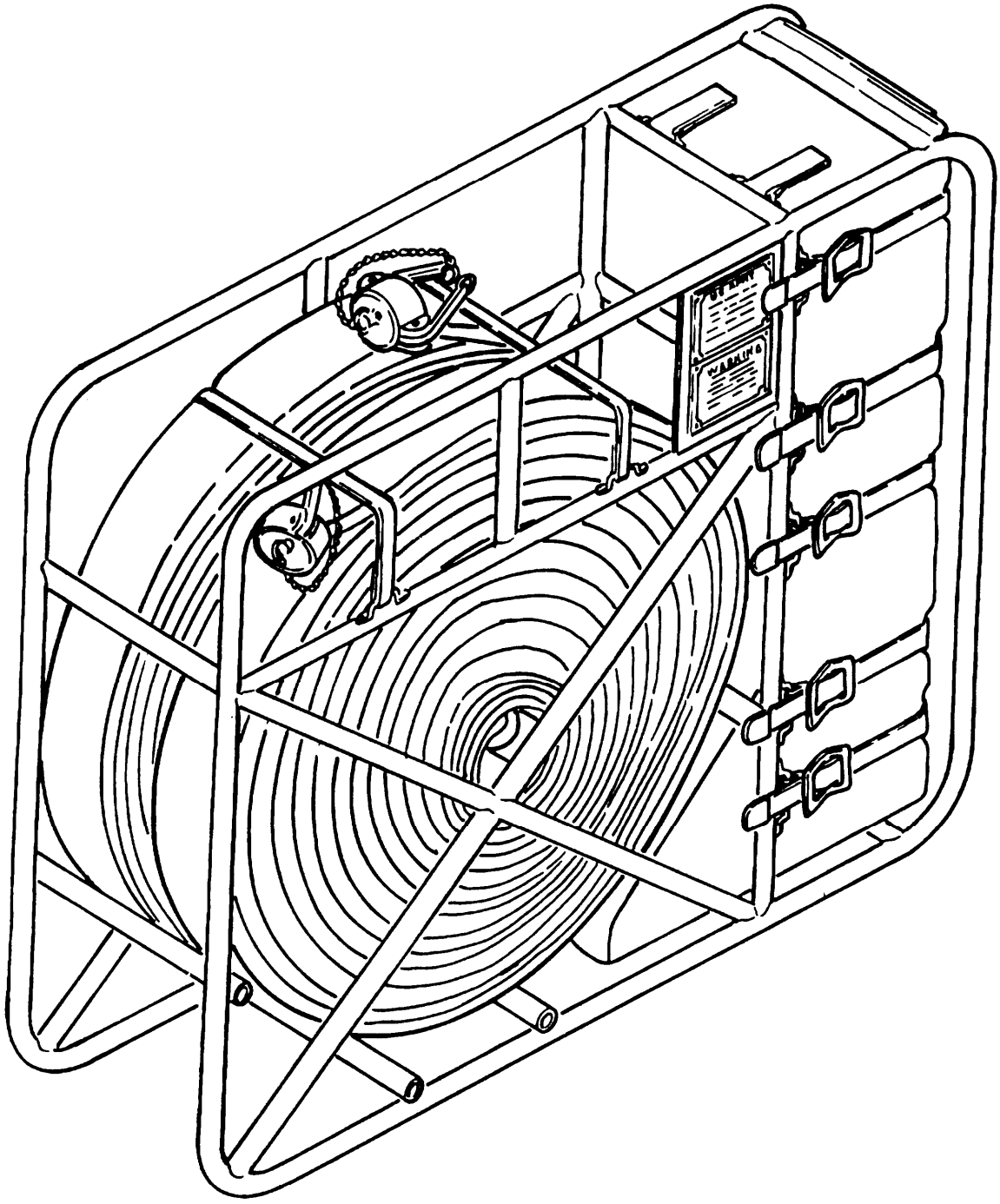


Figure 1–7. Hose and Component Kit-Y, Discharge.

1–11. EQUIPMENT DATA.

FORWARD AREA REFUELING EQUIPMENT

Manufacturer's Model Number	LPI-F0500
Weight	1,200 lbs (544.80 kg)
Height	3 Ft (.915 m)
Length	8 Ft (2.44 m)
Width	4 Ft (1.22 m)

NOTE

Dimensions and weight listed above are for a crated Forward Area Refueling Equipment.

Section III. TECHNICAL PRINCIPLES OF OPERATION

1–12. GENERAL.

This section provides the theory of operation and functional desctription of components comprising the Forward Area Refueling Equipment. The controls and instruments used, are for the most part, located on the individual assemblies.

1-13. ELBOW COUPLER VALVE. (Refer to Figure 1-8.)

The elbow coupler valve is a manual control which is used to start and stop flow of fuel. Turn the handwheel to the left (counterclockwise) to start flow and to the right (clockwise) to stop flow.

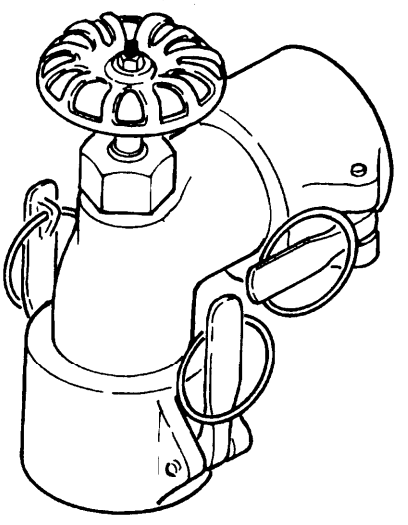


Figure 1–8. Elbow Coupler Valve.

1–14. BUTTERFLY VALVE. (Refer to Figure 1–9.)

The butterfly valve is a manually controlled valve and is used to control fuel flow on the suction hose.

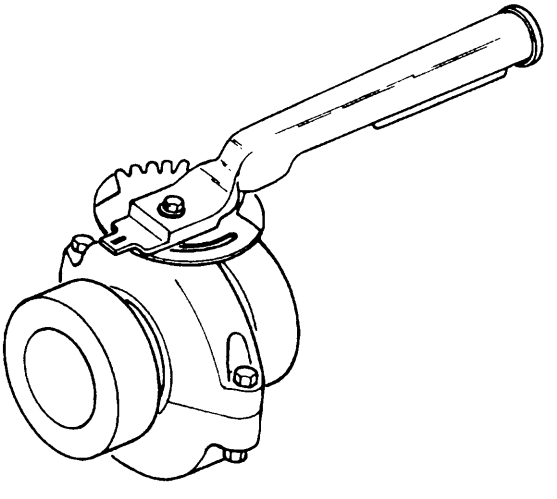


Figure 1–9. Butterfly Valve.

1–15. CLOSED CIRCUIT REFUELING NOZZLE. (Refer to Figure 1-10.)

Used in refueling of aircraft equipped with a closed circuit fuel system.

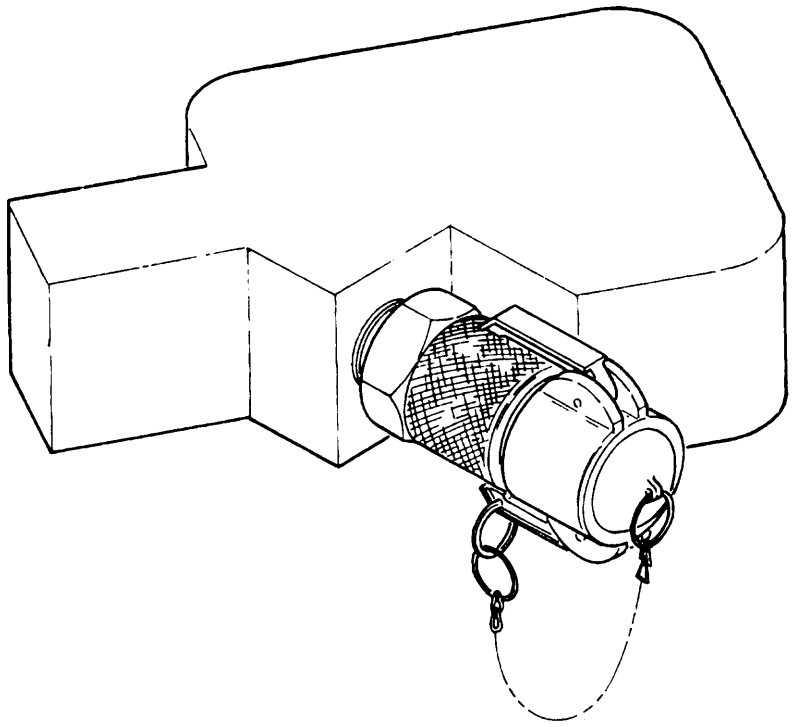


Figure 1–10. Closed Circuit Refueling Nozzle.

1–16. GRAVITY FILL ADAPTER. (Refer to Figure 1–11.)

Used in refueling aircraft or surface vehicles equipped with a gravity feed fuel system.

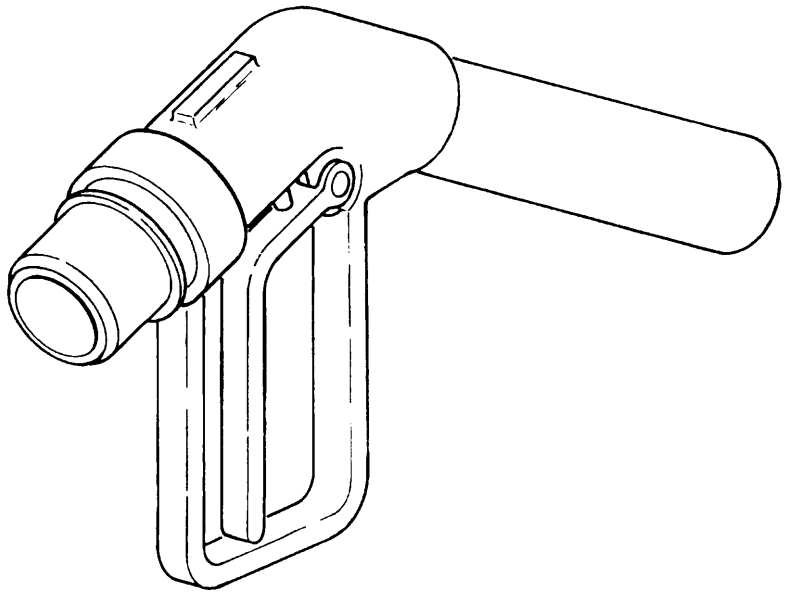


Figure 1–11. Gravity Fill Adapter.

1–17. FILTER SEPARATOR ASSEMBLY. (Refer to Figure 1–12.)

Used to filter fuel through five filter elements at a rate of 100 (378.5 liters) gpm.

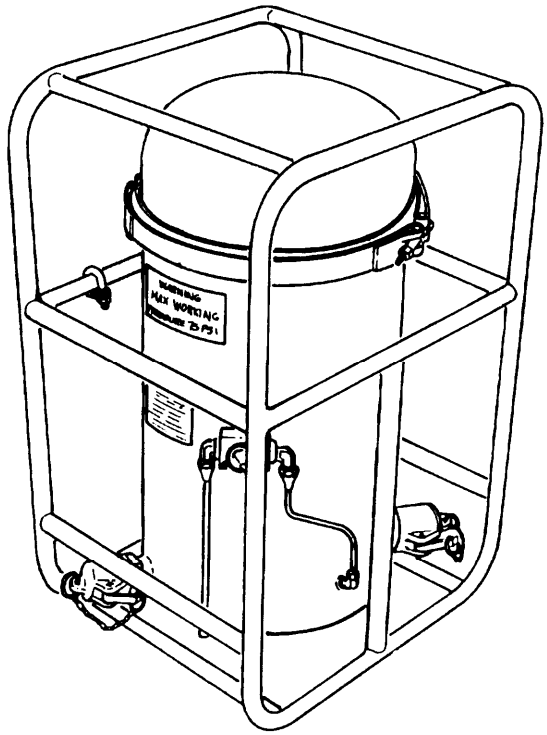


Figure 1–12. Filter Separator Assembly.

1–18. WYE FITTING. (Refer to Figure 1–13.)

Wye fitting is used when refueling two aircrafts at one time.

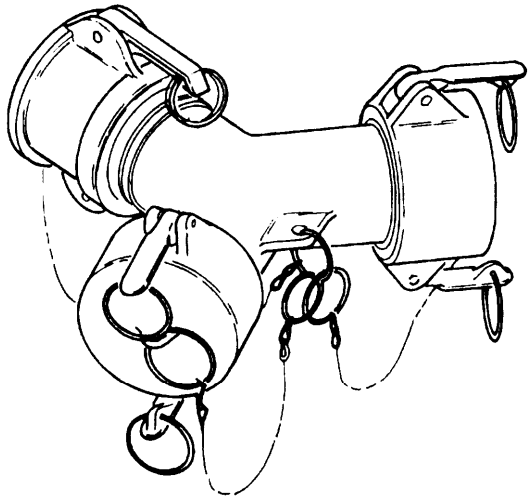


Figure 1–13. Wye Fitting.

1–19. DISCHARGE HOSE ASSEMBLIES. (Refer to Figure 1-14.)

Discharge hose assemblies are used to dispense fuel. There are two hose assemblies per unit and are stored on a frame assembly.

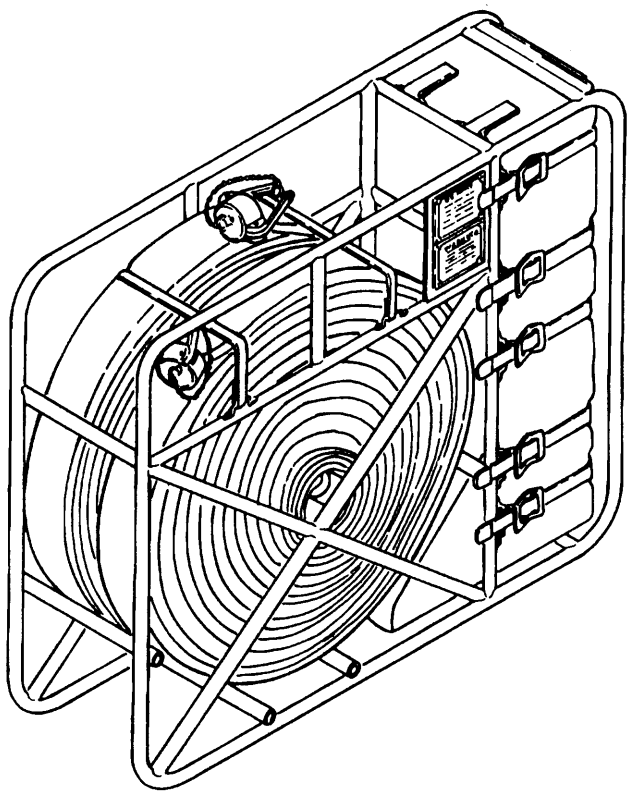


Figure 1–14. Discharge Hose Assemblies.

1–20. SUCTION HOSE ASSEMBLIES. (Refer to Figure 1-15.)

Suction hoses are used between fuel drum tee fittings and pumping assembly, filter separator assembly and wye fitting. There are six hose assemblies per unit and they are stored in a canvas container.

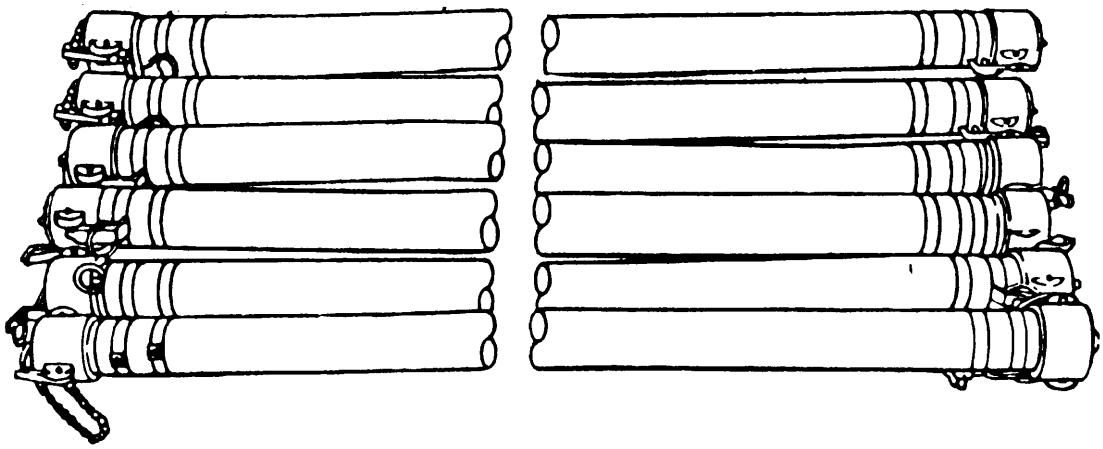


Figure 1–15. Suction Hose Assemblies.

1–21. COLLAPSIBLE DRUM. (Refer to Figure 1-16.)

Used as a source of fuel supply Collapsible drums are issued separately.

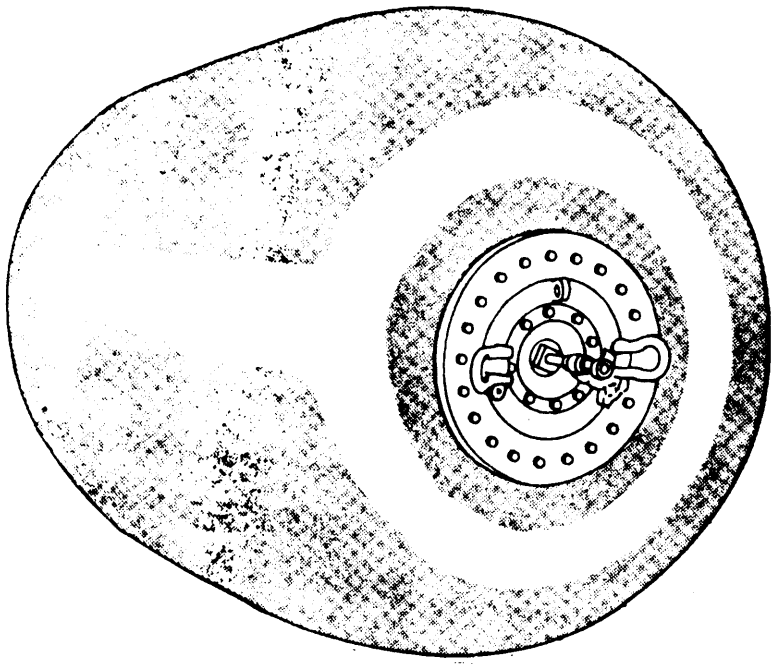


Figure 1–16. Collapsible Drum.

1–22. WATER DETECTOR KIT ADAPTER. (Refer to Figure 1–17.)

Used to attach fuel contamination test kit at the filter-separator outlet.

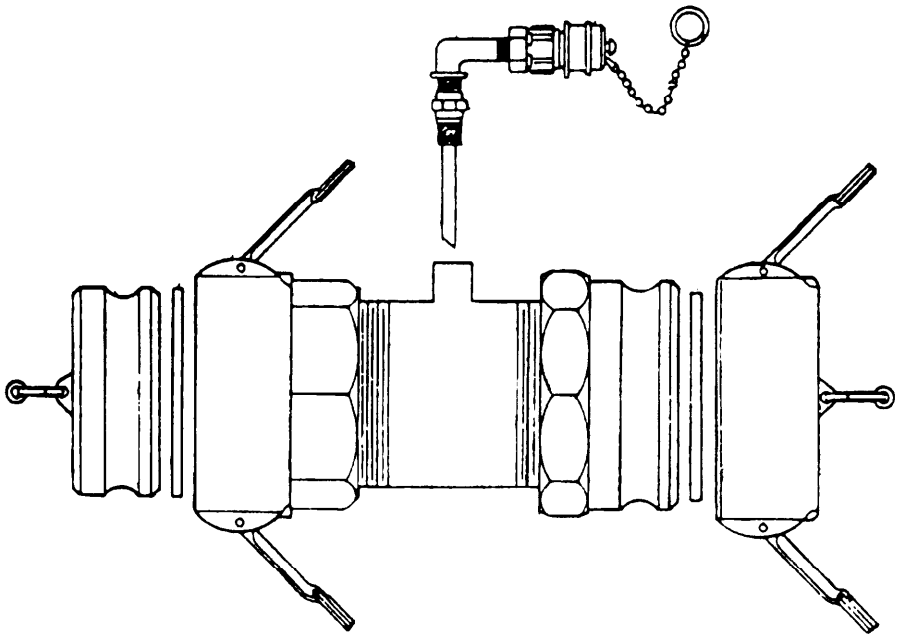


Figure 1–17. Water Detector Kit Adapter.

1-23. GROUND ROD. (Refer to Figure 1-18.)

Provides a ground for the pumping assembly, filter separator, and helicopter/vehicle.

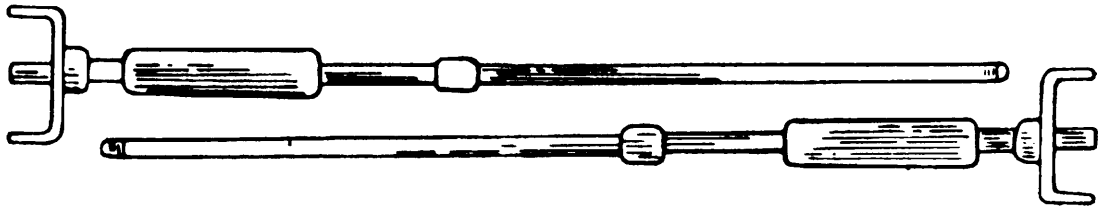


Figure 1–18. Ground Rod.

1-24. PUMPING ASSEMBLY. (Refer to Figure 1–19.)

Used to pump fuel from storage containers, with a capacity of 100 gal (378.5 liters) gpm.

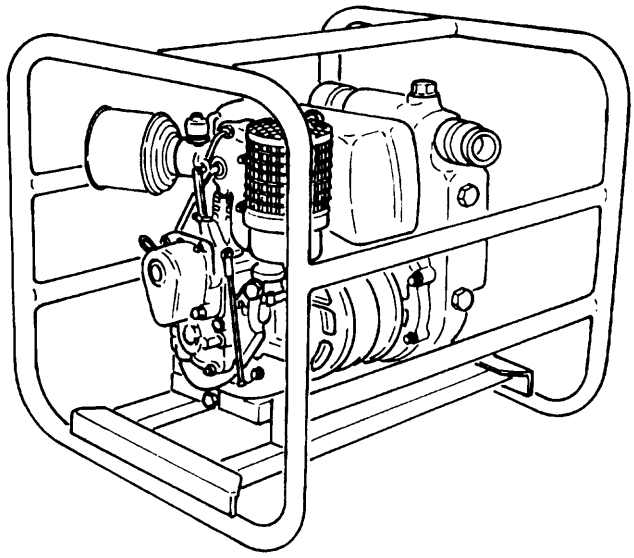


Figure 1–19. Pumping Assembly.

1-25. TEE ASSEMBLY. (Refer to Figure 1-20.)

Used during two-point refueling operation.

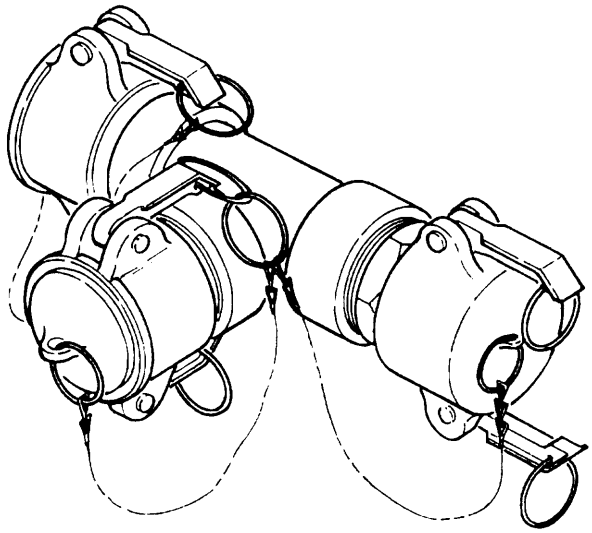


Figure 1 –20. Tee Assembly.

1-26. ADAPTER ASSEMBLY, 3 IN. FEMALE BY 2 IN. MALE. (Refer to Figure 1-21.)

Used when you are pumping fuel from an auxiliary fuel source.

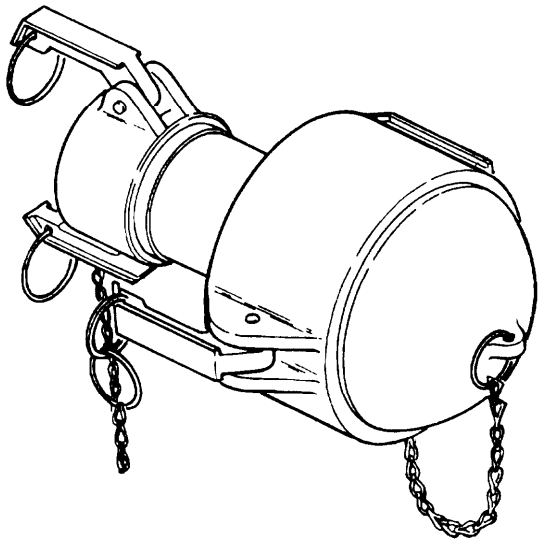


Figure 1–21. Adapter Assembly.

1–27. ADAPTER ASSEMBLY, 4 IN. FEMALE BY 2 IN. MALE. (Refer to Figure 1–22.)

Used when you are pumping fuel from an auxiliary fuel source.

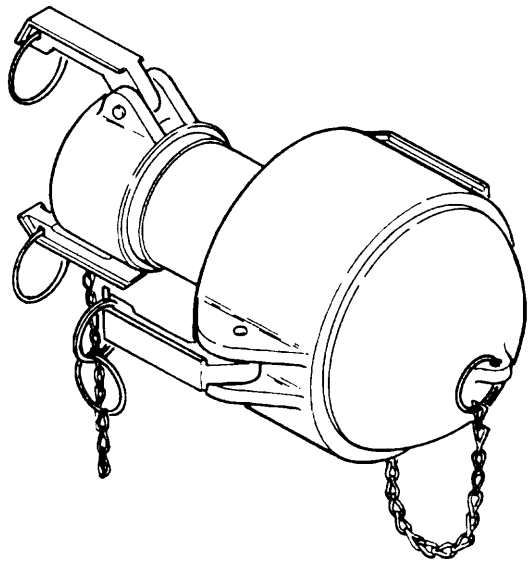


Figure 1–22. Adapter Assembly.

Chapter 2

OPERATING INSTRUCTIONS

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

2–1. INTRODUCTION.

This section describes the controls and indicators you, as the operator, will be using most often. Most of the controls and instruments used are located on individual assemblies that make up the Forward Area Refueling Equipment. Table 2–1 will give you a brief description of each control or instrument.

2–2. ELBOW COUPLER VALVE AND BUTTERFLY VALVE ASSEMBLY.

(Refer to Figure 2-1 and Table 2-1.)

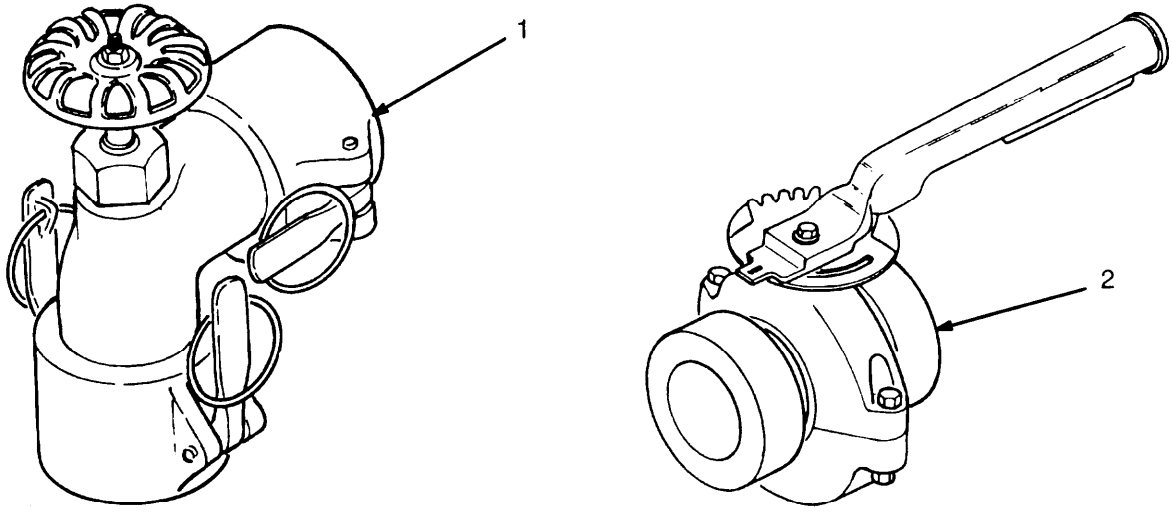


Figure 2–1. Operator's Valve Controls.

Table 2–1. Operator's Valve Controls and Indicators

KEY	CONTROL OR INDICATOR	FUNCTION
1	ELBOW COUPLER VALVE	Used to start and stop flow of fuel. Turn handwheel to the left (counterclockwise) to start fuel flow and to the right (clockwise) to stop fuel flow,
2	BUTTERFLY VALVE ASSEMBLY	Used to control fuel flow in the suction hose. Turn handle to the left (counterclockwise) to start fuel flow and slowly move handle to the left (counterclockwise), until the desired fuel flow is obtained. Turn handle to the right (clockwise) to stop fuel flow.

2–3. PUMPING ASSEMBLY CONTROLS AND INDICATORS. (Refer to Figure 2-2 and Table 2-2.)

WARNING

Personal injury may result if the engine is not turned off during service or maintenance.

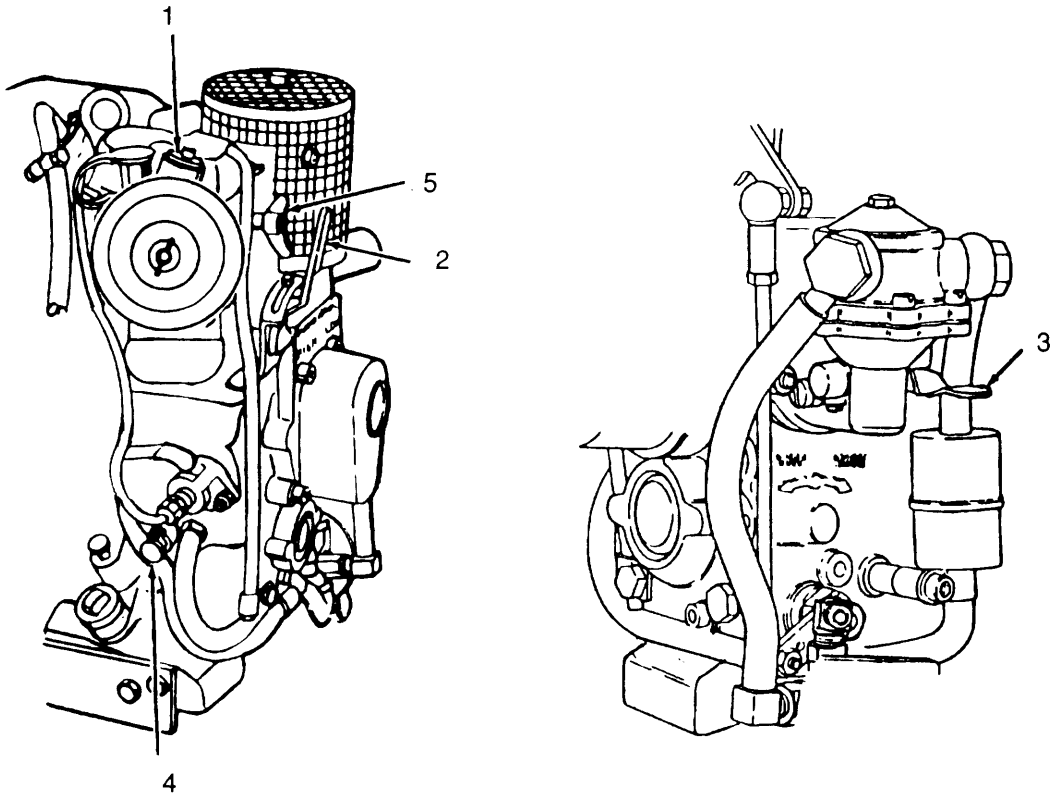


Figure 2–2. Operator's Engine Controls.

Table 2-2. Operator's Engine Controls and Indicators

KEY	CONTROL OR INDICATOR	FUNCTION
1	AIR FILTER INDICATOR	Indicates a dirty air filter element. A red band appears in window, which indicates element needs replacing. Air filter indicator must be reset after servicing the air filter.
2	THROTTLE CONTROL HAND LEVER	Controls engine speed. With the hand lever in START position, the engine is at highest operating speed. By moving the lever between START and STOP, the desired engine speed can be obtained.
3	FUEL PRIMER LEVER	Mechanically connected to fuel lift pump. Used to prime engine by forcing fuel from tank into fuel system.
4	EXTRA FUEL BUTTON	Provides more fuel to engine during starting. Pulling button out allows more fuel to engine. Button returns to normal position when engine reaches operating speed.
5	DECOMPRESSION LEVER	Controls engine compression. Lever is placed in decompression position during engine starting and returns to compression when engine reaches operating speed.

2–4. FILTER SEPARATOR CONTROLS AND INDICATORS.
(Refer to Figure 2-3 and Table 2-3.)

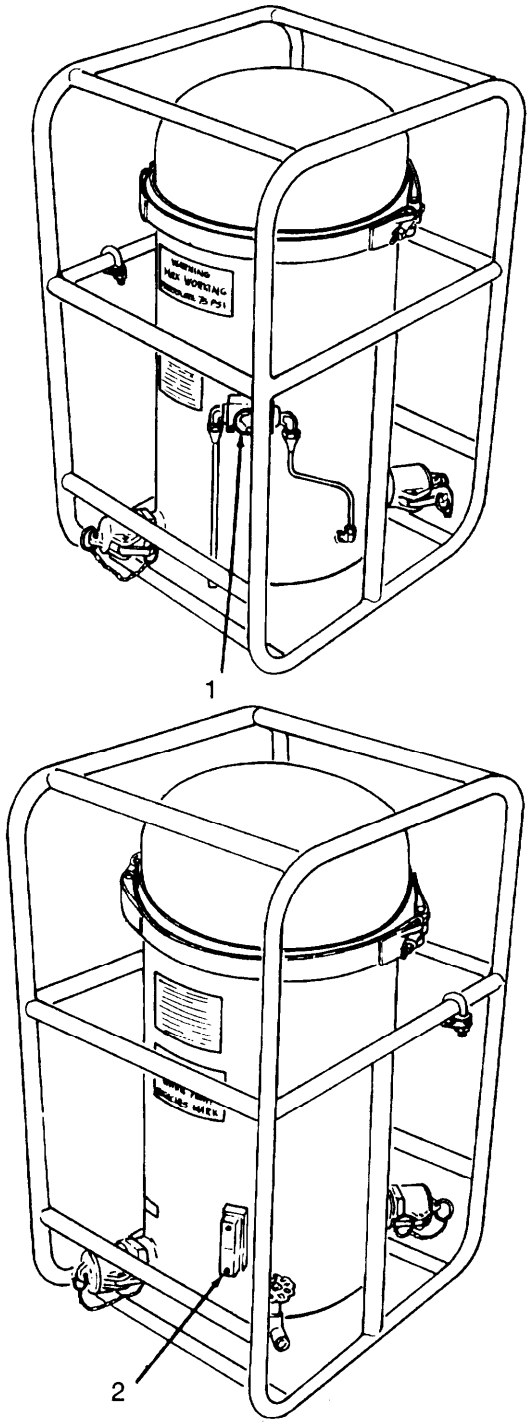


Figure 2-3. Filter Separator Controls and Indicators.

Table 2-3. Operator's Filter Separator Controls and Indicators

KEY	CONTROL OR INDICATOR	FUNCTION
1	DIFFERENTIAL PRESSURE INDICATOR	Indicates differential pressure when filter separator is on full operating pressure.
2	SIGHT GAGE	Indicates amount of water in filter separator. Drain water daily or when ball reaches the mark on body of sight gage.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2–5. INTRODUCTION.

a. General.

(1) Before You Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your Before PMCS.

(2) While You Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your During PMCS.

(3) After You Operate. Be sure to perform your After PMCS.

(4) If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA PAM 738-750.

b. PMCS Procedures.

(1) Purpose of PMCS. Your Preventive Maintenance Checks and Services list the inspections and care of your equipment required to keep it in good operating condition.

(2) Item Number Column. Checks and services are numbered in chronological order of intervals. This column is used as a source of item numbers for the "Item Number'' column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

2–5. INTRODUCTION - Continued.

b. PMCS Procedures - Continued.

(3) Interval Column. The interval columns tell you when to do a certain check or service: before, during, or after operation.

(4) Item to Be Inspected Column. This column lists the common name of the item to be inspected such as “Air Filters”.

(5) Procedures Column. This column tells you how to do the required checks and services. Carefully follow these instructions.

(6) Not Fully Mission Capable If. This column tells you when and why your equipment cannot be used.

NOTE

The terms “Ready/Available” and “Mission Capable” refer to the same status: equipment is on hand and is able to perform its combat missions. (See DA PAM 738-750).

(7) Increased Inspections. Perform weekly as well as Before Operations PMCS if:

(1) You are the assigned operator and have not operated the item since the last weekly.

(2) You are operating the item for the first time.

(8) Categories of leakage are classified as follows:

(1) Class I: See page of fluid (as indicated by wetness or discoloration) not great enough to form drops.

(2) Class II: Leakage of fluid great enough to form drops but not great enough to cause drops to drip from the item being checked/inspected.

(3) 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 course, you must consider the fluid capacity in the item being checked/inspected. When in doubt, notify your supervisor.
- When operating with Class I or Class II leaks, continue to check fluid levels as required in your PMCS.

CAUTION

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

2-6. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

NOTE

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

Table 2-4. Operator's Preventive Maintenance Checks and Services

ITEM NO.	INTERVAL	ITEM TO CHECK/ PROCEDURE	NOT FULLY MISSION CAPABLE IF:
1	Before	Inspect discharge and suction hose assemblies for leaks, separation of material, cuts, missing dust covers, damaged camlocks and loose or missing hose clamps.	Class III leaks, damaged hose.
2	Before	Inspect frame assembly for broken welds, bent frame. Inspect canvas storage bag for tears or broken straps.	
3	Before	Inspect closed circuit refueling nozzle for leaks.	Class III leaks.
4	Before	a. Inspect pumping assembly for signs of oil or fuel leaks. Notify unit maintenance. b. Inspect pumping assembly for loose, damaged or missing hardware and parts. Notify unit maintenance. **WARNING** Do not fill fuel tank while engine is running or hot.	Class III leaks.
5	Before	Check fuel tank for leaks. Notify unit maintenance.	Class Ill leaks.
6	Before	Inspect filter separator for leaks and broken pressure indicator and water in sight glass. Notify unit maintenance.	Class Ill leaks.
7	Before	Inspect butterfly valve assembly for leaks and missing dust cover. Notify unit maintenance.	Class Ill leaks.
8	Before	Inspect tee assembly for leaks, missing dust covers and damaged camlocks. Notify unit maintenance.	Class Ill leaks.

Table 2-4. Operator's Preventive Maintenance Checks and Services - Continued

ITEM NO.	INTERVAL	ITEM TO CHECK/ PROCEDURE	NOT FULLY MISSION CAPABLE IF:
9	Before	Inspect adapter assembly for leaks, missing dust cap and damaged camlocks. Notify unit maintenance.	Class III leaks.
10	Before	Inspect wye fitting assembly for leaks, missing dust caps and camlocks. Notify unit maintenance.	Class III leaks.
11	During	Inspect discharge and suction hose assemblies for leaks, separation of material, cuts, missing dust covers, damaged camlocks and loose or missing hose clamps.	Class III leaks, damaged hose.
12	During	Inspect closed circuit refueling nozzle for leaks.	Class III leaks.
13	During	Inspect pumping assembly for signs of oil or fuel leaks. Notify unit maintenance.  **WARNING** Do not fill fuel tank while engine is running or hot .	Class Ill leaks.
14	During	Check fuel tank for leaks. Notify unit maintenance.	Class Ill leaks.
15	During	Inspect filter separator for leaks and broken pressure indicator and water in sight glass. Notify unit maintenance.	Class Ill leaks.
16	During	Inspect butterfly valve assembly for leaks and missing dust cover. Notify unit maintenance.	Class Ill leaks.
17	During	Inspect tee assembly for leaks, missing dust covers and damaged camlocks. Notify unit maintenance.	Class III leaks.
18	During	Inspect elbow coupler valve for leaks. Notify unit maintenance.	Class III leaks.
19	During	Inspect adapter assembly for leaks, missing dust cap and damaged camlocks. Notify unit maintenance.	Class III leaks.
20	During	Inspect wye fitting assembly for leaks, missing dust caps and damaged camlocks. Notify unit maintenance.	Class Ill leaks.

Table 2-4. Operator's Preventive Maintenance Checks and Services - Continued

ITEM NO.	INTERVAL	ITEM TO CHECK/ PROCEDURE	NOT FULLY MISSION CAPABLE IF:
21	After	Inspect discharge and suction hose assemblies for leaks, separation of material, cuts, missing dust covers, damaged camlocks and loose or missing hose clamps.	Class III leaks, damaged hose.
22	After	Inspect frame assembly for broken welds, bent frame. Inspect canvas storage bag for tears or broken straps.	
23	After	Inspect closed circuit refueling nozzle for leaks.	Class Ill leaks.
24	After	Inspect pumping assembly for signs of oil or fuel leaks. Notify unit maintenance. **WARNING** Do not fill fuel tank while engine is running or hot.	Class Ill leaks.
25	After	Check fuel tank for leaks. Notify unit maintenance.	Class Ill leaks.
26	After	Inspect filter separator for leaks and broken pressure indicator and water in sight glass. Notify unit maintenance.	Class Ill leaks.
27	After	Inspect butterfly valve assembly for leaks and missing dust cover. Notify unit maintenance.	Class Ill leaks.
28	After	Inspect tee assembly for leaks, missing dust covers and damaged camlocks. Notify unit maintenance.	Class Ill leaks.

Section III. OPERATION UNDER USUAL CONDITIONS

2–7. ASSEMBLY AND PREPARATION FOR USE. (Refer to figures 2-4 and 2-5.)

WARNING

Three persons are required in lifting hose and component kits, which weighs 145 lbs (64.83 kgs). Three-persons are required in lifting filter separator, which, weighs 125 lbs (56.25 kgs). Four persons are required in lifting pump assembly which weighs 196 lbs (88.98 kgs). Failure to comply with this warning could result in injury to personnel.

a. Siting.

(1) Select a site that will provide a relatively level terrain.

(2) Clear away brush, leaves and dry grass from the area where the pump assembly will be operated.

b. Installation for Two-Point Refueling Operation. (Refer to Figure 2-4.)

NOTE

Prior to starting installation procedures, remove suction hose assemblies and ground rods from canvas container. Remove discharge hose and fittings from frame and canvas container.

(1) Position pumping assembly (6) in its desired location.

NOTE

Remove dust plugs and dust caps before installing individual components.

(2) Position filter separator (7) in its desired location.

NOTE

Secure individual components with their camlock levers.

(3) Connect elbow coupler valve (1) to drum assemblies.

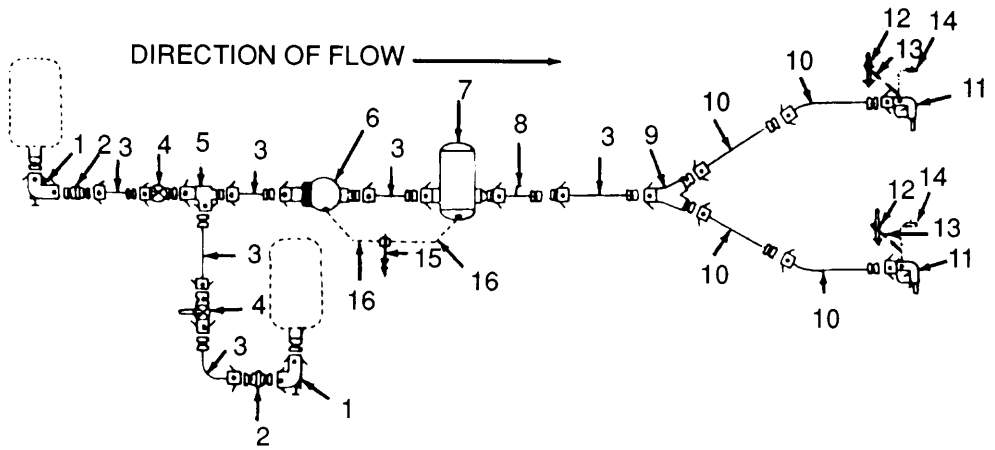


Figure 2-4. FARE Schematic for Two-Point Refueling Operation.

2-7. ASSEMBLY AND PREPARATION FOR USE - Continued.

b. Installation for Two-Point Refueling Operation - Continued.

(4) Connect adapter (2), male by male, 2 in. by 2 in., to elbow coupler valves.

(5) Connect suction hose (3) to adapter (2).

(6) Connect butterfly valves (4) to suction hose (3).

(7) Connect tee fittings (5) to butterfly valve (4).

(8) Connect suction hose (3) to tee fitting (5) and pumping assembly (6) inlet connection.

(9) Connect suction hose (3) to pumping assembly (6) discharge connection and filter separator (7) inlet connection.

(10) Connect adapter water detector (8) to filter separator (7) outlet connection.

(11) Connect suction hose (3) to adapter water detector (8) and wye fitting (9).

(12) Connect two discharge hose assemblies (10) to wye fitting (9). Connect the other two discharge hose assemblies (10). Connect closed circuit nozzles (11) to discharge hose assemblies (10).

c. Grounding Procedures (Refer to Figure 2-4)

NOTE

Grounding of equipment is a means to provide a conductive path into the ground so a static charge isn't trapped on the surface of the equipment where it could discharge as a spark.

Extreme care must be taken to prevent injury to fingers or hands when driving the ground rods. Do not place hands between the ram and drive collar. Cloves should be worn. Be sure all connections are tight so as to avoid a possible spark between the units and ground rod.

(1) Drive Grounding Rod (12) into ground to the required depth. (see Table 2-1, Required depths for grounding rods.) Grounding Rod (12) can be used as a nozzle hanger and/or a grounding rod.

DEATH or serious injury may result if proper grounding procedures are not followed prior to operating the equipment.

(2) Remove Pumping Assembly (6) and Filter Separator (7) Grounding Rod (15) from Filter Separator— Frame. Drive Grounding Rod (15) into ground to the required depth. (See Table 2-1, Required Depths For Grounding Rod.) Connect grounding cables (16) from Pumping Assembly (6) and Filter Separator (7) to grounding Rod (15). The Refueler and System are now grounded and the fueling process may begin.

2-7. ASSEMBLY AND PREPARATION FOR USE - Continued.

c. Grounding Procedures - Continued.

Table 2-1. Required depths for ground rods

Type of soil	Depth of ground rod
Coarse ground, cohesionless sands and gravels	6 feet
Inorganic clay, claying gravels, gravel-sand clay, claying sands, sandy clay, gravelly day, and silty day	4 feet
Silty gravel, gravel-sand-silt, silty sand, sand, silt, peat, muck, and swamp soil	3 feet

(3) Methods of Grounding. There is no quick or easy way to test the adequacy of a ground. The testing procedures (See FM 10-68 Appendix E) are complex and the equipment is bulky and expensive. For these reasons, several levels or methods of grounding and bonding are required to meet the various operational needs of the Army. The three methods/levels are listed in order of preference.

(a) Method 1: equipment is grounded to a rod or rods that have measured resistance to ground equal to or less than 10,000 ohms. Ground the refueling system to this tested ground rod. In addition, the nozzle is bonded to the vehicle/aircraft. (See paragraph 2.8(b) Bonding) Use of this method is required unless conditions, as described below, prevent its use. Method I is the only standard of grounding acceptable, without authorization, at any fixed airfield or refueling point. It is the safest method.

(b) Method 2: In some instances, equipment is not available to test resistance to ground. Method 2 uses an untested ground - a grounding system based on the knowledge that damp earth will accept and drain off an electrical charge. Utilize method 2 when the location, tactical situation, or type of operation makes it impossible to test ground rods. Ground equipment to a rod or rods driven a specific depth into the ground depending on the type of soil (see Table 2-1) at the site. The depth to which the rods must be driven is determined by the normal depth of permanent ground moisture in the various types of soils. The commander of the operating '[nit must authorize the use of method 2. This method is less desirable. Employ method 2 when impossible to use method 1.

Death or serious injury may occur if proper bonding procedures are not followed. (See paragraph 2.8(b) Bonding) While using method 3, an object with a different electrical potential (any object that not part of the bonded system) should not come into contact with the bonded equipment when a flammable vapor-air mixture maybe present.

(c) Method 3: When the climate, terrain, or tactical condition makes it impossible to secure a satisfactory ground rod, requirements to ground the fuel dispenser (system or refueler) may be waived. However the requirement to bond the fuel dispenser to the aircraft/vehicle may not be waived under any circumstances Method 3 relies on bonding alone. (See paragraph 2-8(b) Bonding) Bonding is made between the aircraft/vehicle and the refueling system or refueler along with the nozzle and the aircraft/vehicle. A contact between an unbended object and the system could produce a spark that could set off an explosion or fire. Method 3 procedures are authorized by the commander of the unit one organizational level above the operating unit. This is the least desirable method since it involves bonding only!

2-7. ASSEMBLY AND PREPARATION FOR USE - Continued.

d. Installation for Filling a 500 Gallon Drum (1892.5 Liters). (Refer to Figure 2-5)

(1) Position pumping assembly (3) in its desired location.

(2) Position filter separator (5) in its desired location.

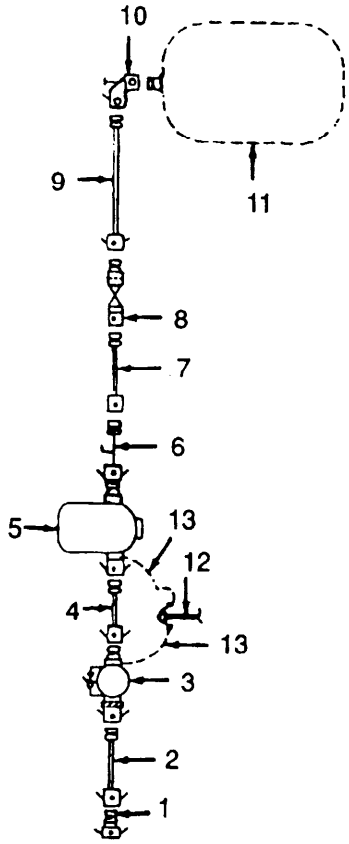


Figure 2-5. Piping Diagram for Filling Operation.

NOTE

Remove dust plugs and dust caps before installing individual components.

(3) Connect adapter (1) to fuel source.

NOTE

Secure individual components with their camlock levers.

(4) Connect suction hose assembly (2) to adapter and pumping assembly (3) inlet connection.

(5) Connect suction hose assembly (4) to pumping assembly (3) discharge connector and filter separator (5) inlet connector.

(6) Connect adapter water detector (6) to filter separator(S) outlet connection. Connect suction hose assembly (7) to adapter water detector (7) and pressure control valve (8).

NOTE

Refer to TM 10-8110-201-14&P for maintenance of the fuel drum and pressure control valve.

2-7. ASSEMBLY AND PREPARATION FOR USE - Continued.

d. Installation of Filling a 500 Gallon Drum - Continued.

(7) Connect discharge hose assembly (9) to pressure control valve (8) and elbow coupler valve (10).

(8) Connect elbow coupler valve (10) to drum (11).

WARNING

• Extreme care must be taken to prevent injury to fingers or hands when driving the ground rods Do not place hands between the ram and drive collar. Gloves should be worn.

• Be sure all connections are tight so as to avoid a possible spark between the units and ground rod. Failure to do so could result in damage to equipment or injury to personnel.

(9) Remove the ground rod (12) from the filter separator frame, assemble, and place it between the pump assembly and filter separator and drive it into the ground at least 3 ft (.91 5 m). Connect ground cables (13) from pump engine assembly and filter separator to ground rod.

2-8. OPERATING PROCEDURES. (Refer to Figures 2-6, 2-7, and 2-8)

a. Preparation for Starting.

(1) Perform all before operation PMCS contained in Table 2-1. Report any problems to unit maintenance.

(2) Refer to Figure 2-6. Remove pipe plugs (1) from priming port (2).

(3) Pour fuel in volute (2) until volute (3) is full.

CAUTION

If volute does not fill with liquid, check suction hose assembly and suction hose assembly connection at pump assembly intake connections for leaks. Rotation of pumping assembly impeller without fuel involute can damage or reduce service life of pump assembly.

(4) Install pipe plug (1) and tighten.

2-8. OPERATING PROCEDURES - Continued.

a. Preparation for Starting - Continued

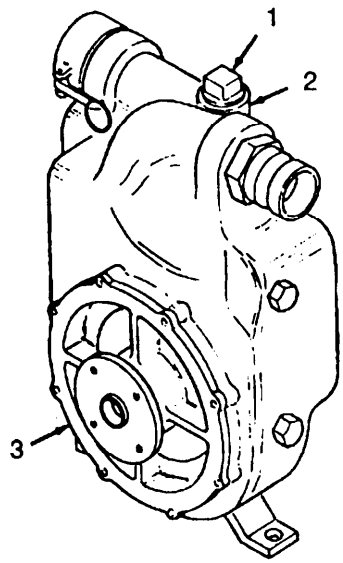


Figure 2-6. Priming Pump.

(5) Move throttle lever (1), Figure 2-7, to START position.

NOTE

Refer to TM 5-4330-217-12 prior to starting the system and open vent valve on filter/separator. Operate engine at idle speed and fill vessel slowly until air is expelled and fuel flows from vent valve. Close vent valve. If red is indicated on the differential pressure gate, shutdown the equipment and replace elements.

(6) Pull out extra fuel device button (2) until fully extended.

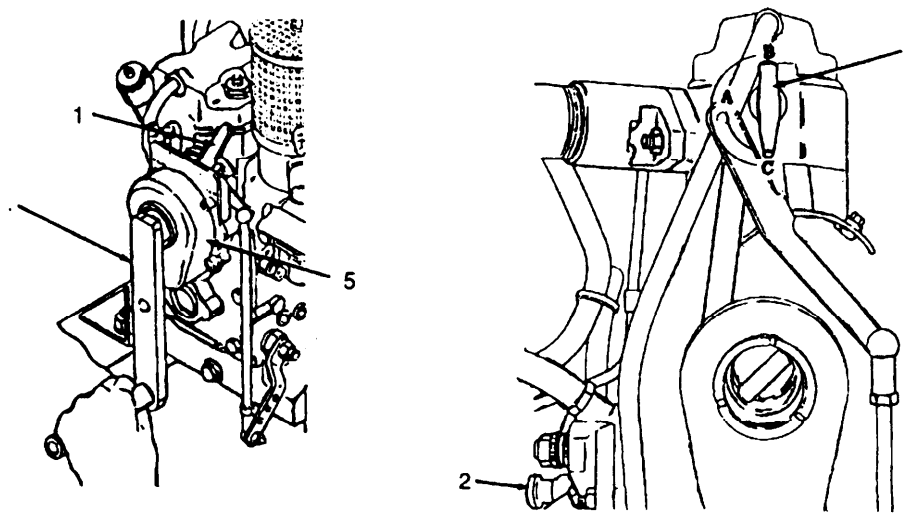


Figure 2-7. Engine Controls.

2-8. Preparation for Starting - Continued.

a. Preparation for Starting - Continued.

(7) Turn decompression lever (3) clockwise to 12 o'clock position (position B).

(8) Engage crank handle (4) in gear housing (5).

(9) With both hands, turn crank handle (4) clockwise with increasing speed.

(10) When decompression lever (3) reaches C position, the highest possible speed must be obtained. Engine will start and go to maximum operating speed. Extra fuel device button (2) will return to normal position by itself.

(11) Adjust throttle control hand lever (1) to desired speed.

CAUTION

If engine does not start on initial attempt, allow engine rotation to stop completely before engaging crank handle.

b. Bonding and Grounding Procedures

WARNING

DEATH or serious injury may result if proper bonding and grounding procedures are not followed prior to operating the equipment.

NOTE

Bonding is the process that equalizes the charge on two unlike objects such as an aircraft and a refueling nozzle. It is done in order to prevent arcing, in the presence of flammable vapors, as the two objects are joined.

(1) Extend the grounding cable (1) from the nozzle so it can be inserted into the vehicle/aircraft receptacle (if present). Otherwise attach the grounding clip to a bare metal surface of the receiving vehicle/aircraft. Bond before the dust cap or gas tank cap is removed to prevent a spark occurring when fuel vapor is present. For the same reason, do not disconnect the bond until refueling is complete and the gas tank cap and nozzle dust cap are replaced.

c. Stopping

Immediate shutdown of the engine without a 5-minute idle time may cause damage to the engine. Do so only when made necessary by emergency conditions.

(1) Slowly move throttle control hand lever toward STOP position to idle speed. Allow engine to idle for 5 minutes to allow engine operating temperature to stabilize.

(2) Drain water from water/separator before venting air from unit. Leave vent valve open during shutdown.

(3) Move throttle control hand lever to extreme right STOP position.

2-9. PREPARATION FOR MOVEMENT.

NOTE

Release camlock levers on individual components during preparation for movement.

2-9. PREPARATION FOR MOVEMENT - Continued

a. Teardown of Two-Point Refueling Operation. (Refer to Figure 2-8).)

(1) Disconnect closed circuit nozzle ground cable (1) from helicopter.

(2) Disconnect ground cable (2) from ground rod. Pull ground rod (3) from the ground and stow in suction hose assembly storage container.

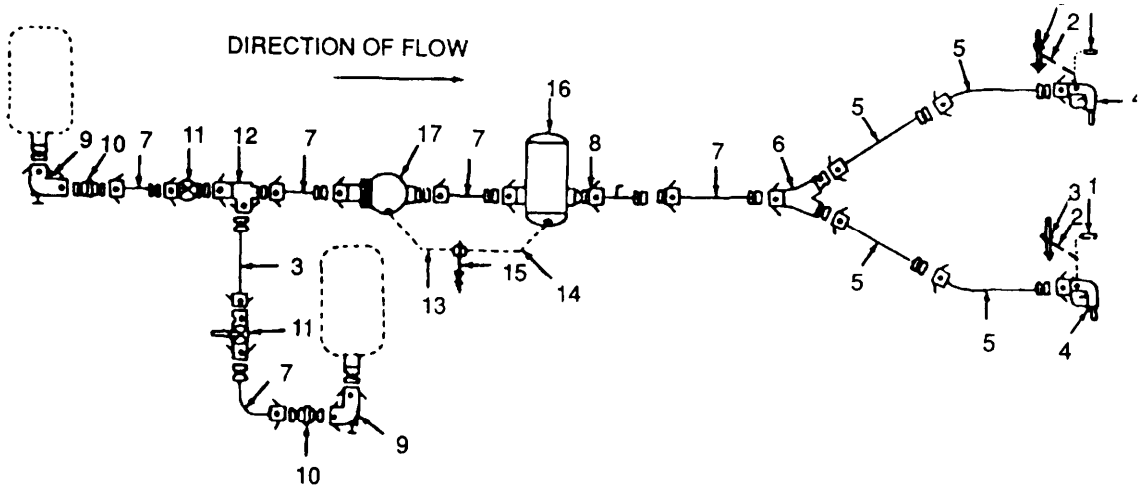


Figure 2-8. FARE Schematic for Two-Point Refueling Operation.

NOTE

Place nozzle end of closed circuit nozzle in a suitable container and drain fuel from system. Remove each hose assembly and individual fittings one at a time. Drain fuel from each hose assembly and fittings into a suitable container, before placing them into their storage containers.

(3) Remove closed circuit nozzles (4), install dust cap and stow in container located on discharge hose assembly frame.

(4) Remove discharge hose assemblies (5). Install dust cap and stow hose assembly on frame.

(5) Remove wye fitting (6), install dust caps and dust plug. Stow wye fitting in container located on discharge hose assembly frame.

(6) Remove suction hose assemblies (7). Install dust caps and stow hose assemblies in the suction hose container.

(7) Remove water detector adapter (8) and stow in container located on “y” discharge hose assembly frame.

(8) Remove elbow coupler valve (9), adapter (10), butterfly valve (11), and tee fitting (12). Install dust caps and plugs. Stow all parts in container located on discharge hose container.

(9) Disconnect ground cables (13 and 14) and stow with the pumping assembly and filter/separator.

2-9. PREPARATION FOR MOVEMENT - Continued.

a. Teardown of Two-Point Refueling Operation - Continued.

(10) Pull ground rod (15) from the ground and stow with the filter/separator.

(11) Drain all fuel from filter/separator(16) and pumping assembly (17).

b. Teardown of Filling Operation. (Refer to Figure 2–9)

NOTE

Release camlock levers on individual components during preparation for movement.

(1) Remove ground cables (13 and 14) and stow on pumping assembly and filter/ separator.

(2) Pull ground rod (12) from the ground and stow on filter separator frame.

(3) Remove discharge hose (9) and elbow coupler valve (10) from drum (11) and drain fuel from hose. Install dust caps and plugs. Stow discharge hose on frame and elbow coupler valve in storage container.

(4) Remove suction hose assemblies (7), (4), and (2) and drain fuel from hose assemblies. Remove pressure control valve (7) and install dust caps. Install dust caps on suction hose assemblies and stow in container.

(5) Remove adapter (1) and install dust caps. Stow adapter in container located on discharge hose frame.

(6) Drain fuel from pump assembly (3) and filter separator (5).

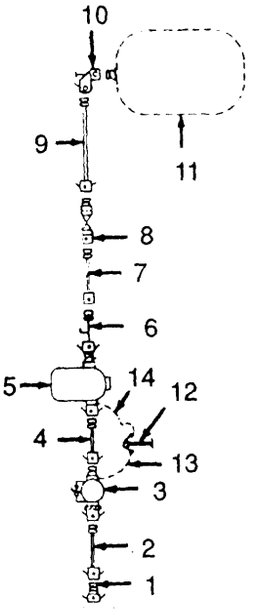


Figure 2–9. Piping Diagram for Filling Operation.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-10. OPERATION IN EXTREME COLD.

The Forward Area Refueling Equipment will operate satisfactorily in extreme cold weather. Use proper precautions when handling fuel. Protect hose connections and nozzles from ice and snow. Inspect sight gage more frequently for moisture. The low temperature operational limit is –25°F (–32°C).

2-11. OPERATION IN EXTREME HEAT.

The Forward Area Refueling Equipment will operate in extreme heat. The high temperature limit is 125°F (52°C).

CAUTION

A hose full of fuel and closed at both ends must not be exposed to the sun for extended periods. Expansion of the fuel will damage the hose. Open vent valve on fuel separator when not in use.

2-12. OPERATION IN DUSTY OR SANDY AREAS.

The Forward Area Refueling Equipment is affected by dusty or sandy conditions. The gravity fill adapter spouts should be cleaned immediately before refueling operations start. Keep all dust caps in place except when in use. Refer to TM 5-4320-313-14 for operation of the pumping assembly.

2–13. OPERATION UNDER RAINY OR HUMID CONDITIONS.

Keep gravity fill adapter capped except when in use. Dry nozzles thoroughly before refueling aircraft.

2–14. OPERATION IN SALT WATER AREAS.

Operation in saltwater areas presents corrosion problems. Keep exposed metal parts clean by washing with fresh water and drying thoroughly.

2–15. OPERATION IN HIGH ALTITUDES.

Pump output may fall off slightly due to lower horsepower output of the engine at high altitudes.

Chapter 3
OPERATOR'S MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1. GENERAL.

The Forward Area Refueling Equipment does not require periodic lubrication. Refer to TM 5-4320-313-14, paragraph 3–1 for pumping assembly lubrication instructions.

Section II. TROUBLESHOOTING PROCEDURES

3-2. TROUBLESHOOTING.

Troubleshooting of the FARE system by the operator is not authorized.

Chapter 4
UNIT MAINTENANCE INSTRUCTIONS

4-1. GENERAL

This chapter covers unit maintenance for components of the Forward Area Refueling Equipment. Refer to TM 5-4930-235-13&P for repair of the closed circuit nozzle. Refer to TM 5-4930-313-14 for repair of the pumping assembly. Refer to TM 5-4330-217-12 for repair of the filter separator assembly. Refer to TM 10-8110-201-14&P for repair of the drum.

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

4-2. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

There are no special tools used with this equipment. TMDE and support equipment are listed in the MAC.

4-4. REPAIR PARTS.

Repair parts are listed and illustrated in the Repair Parts and Special Tools List Appendix F of this manual for this equipment.

Section II. SERVICE UPON RECEIPT

4-5. SERVICE UPON RECEIPT OF MATERIEL.

a. Unpacking Equipment (Refer to Figure 4-1)

NOTE

The wooden shipping box is used when shipped to first destination. Thereafter, use of the wooden box is optional.

- Ž Weight of the box cover is approximately 90 Ibs (40.82 kgs). Four persons are required to lift the cover from skid.
- Ž Steel banding, cut under tension, can snap free and cause injury. Leather gloves and face shield are required. Failure to observe this warning can cause personnel injury.

(1) Cut metal bands (1). Remove nails (2) from bottom of edge of box cover (3). Remove box cover (3).

(2) Cut metal bands (4). Remove thirty-two nuts (5), thirty-two Iockwashers (6), sixteen plates (7) and sixteen U-bolts (8). Remove all components from skid.

(3) Cut metal bands (9). Remove nails from suction hose box cover (10) and remove suction hose assemblies.

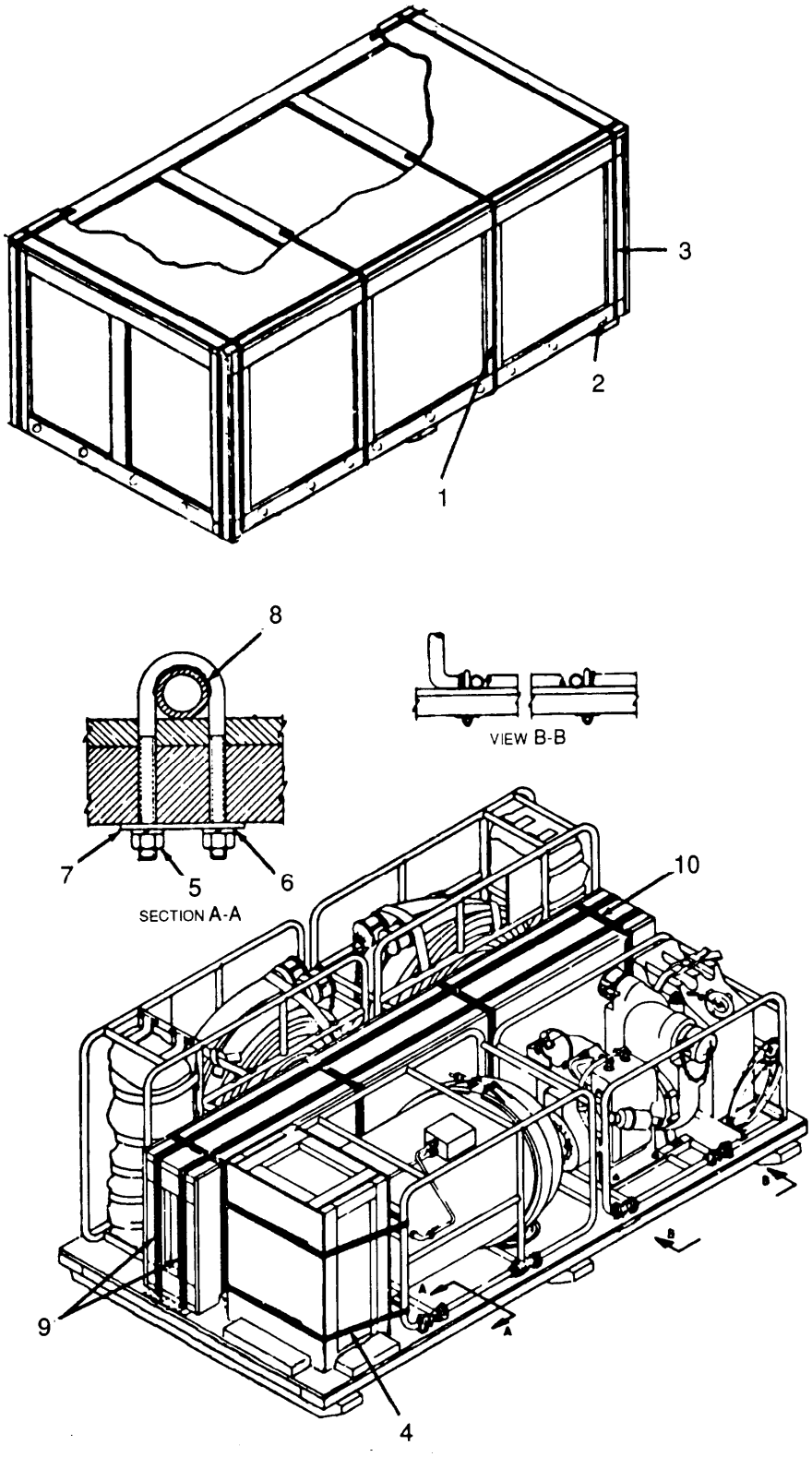


Figure 4-1. Unpacking Instructions.

4-5. SERVICE UPON RECEIPT OF MATERIEL - Continued.

b. Inspection.

(1) Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report.

(2) 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.

(3) Check to see whether the equipment has been modified.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-6. UNIT PMCS. (Refer to Table 4–1).

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

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
1	Monthly	Suction Hose Assemblies	Check continuity of suction hose assemblies, Refer to para. 4-11	Assemblies are interrupted,
2	Monthly	Pump and Engine Assembly	Refer to TM 5-4320-313-14.	Any fault listed in NOT FULLY MISSION CAPABLE IF column of referenced TM.
3	Monthly	Filter/Separator	Refer to TM 5-4330-217-12.	Any fault listed in NOT FULLY MISSION CAPABLE IF column of referenced TM.
4	Monthly	Closed Circuit Nozzle	Refer to TM 5-4930 -235-14&P.	Any fault listed in NOT FULLY MISSION CAPABLE IF column of referenced TM.
5	Monthly	Drum, Collapsible	Refer to TM 10-8110-201-14&P.	Any fault listed in NOT FULLY MISSION CAPABLE IF column of referenced TM.

Section IV. TROUBLESHOOTING

4-7. INTRODUCTORY INFORMATION.

a. The table lists the common malfunctions which you may find during the maintenance of the Forward Area Refueling Equipment 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 the listed corrective actions, notify your supervisor.

4-8. SYMPTOM INDEX.

4-9. TROUBLESHOOTING. (Refer to Table 4–2.)

Table 4-2. Unit Level Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. PUMPING ASSEMBLY WILL NOT PRIME.
Remove plug in volute housing and check for fuel, add fuel.
If volute housing is full of fuel, refer to TM 5-4320-313-14 for repair.
2. ENGINE ASSEMBLY WILL NOT START.
Check fuel tank for fuel.
If fuel tank is empty, add fuel.
If fuel tank is full, refer to TM 5-4320-313-14 for repair.

Table 4–2. Unit Level Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
3. FILTER/ SEPARATOR. Refer to TM 5-4320-4330-217-12.
4. CLOSED CIRCUIT NOZZLE. Refer to TM 5-4930-235-14&P.
5. DRUM, COLLAPSIBLE. Refer to TM 10-8110-201-14&P.

Section V. MAINTENANCE PROCEDURES

Place nozzle end of closed circuit nozzle in a suitable container and drain fuel from system. Drain fuel from each hose assembly and fitting into a suitable container when they are removed. Failure to do so could result in injury to personnel or equipment.

4-10. CONTAINER, SUCTION HOSE.

This task consists of:

a. Removal b. Installation

INITIAL SETUP:

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para 2-8 b.

a. Removal. (Refer to Figure 4-2)

(1) Unbuckle two straps (1) and open flap.

(2) Remove six suction hoses (2) and two ground rods (3).

b. Installation.

(1) Lay container (4) on ground and insert two ground rods (3).

(2) Insert six suction hoses (2) into container (4) and buckle two straps (1).

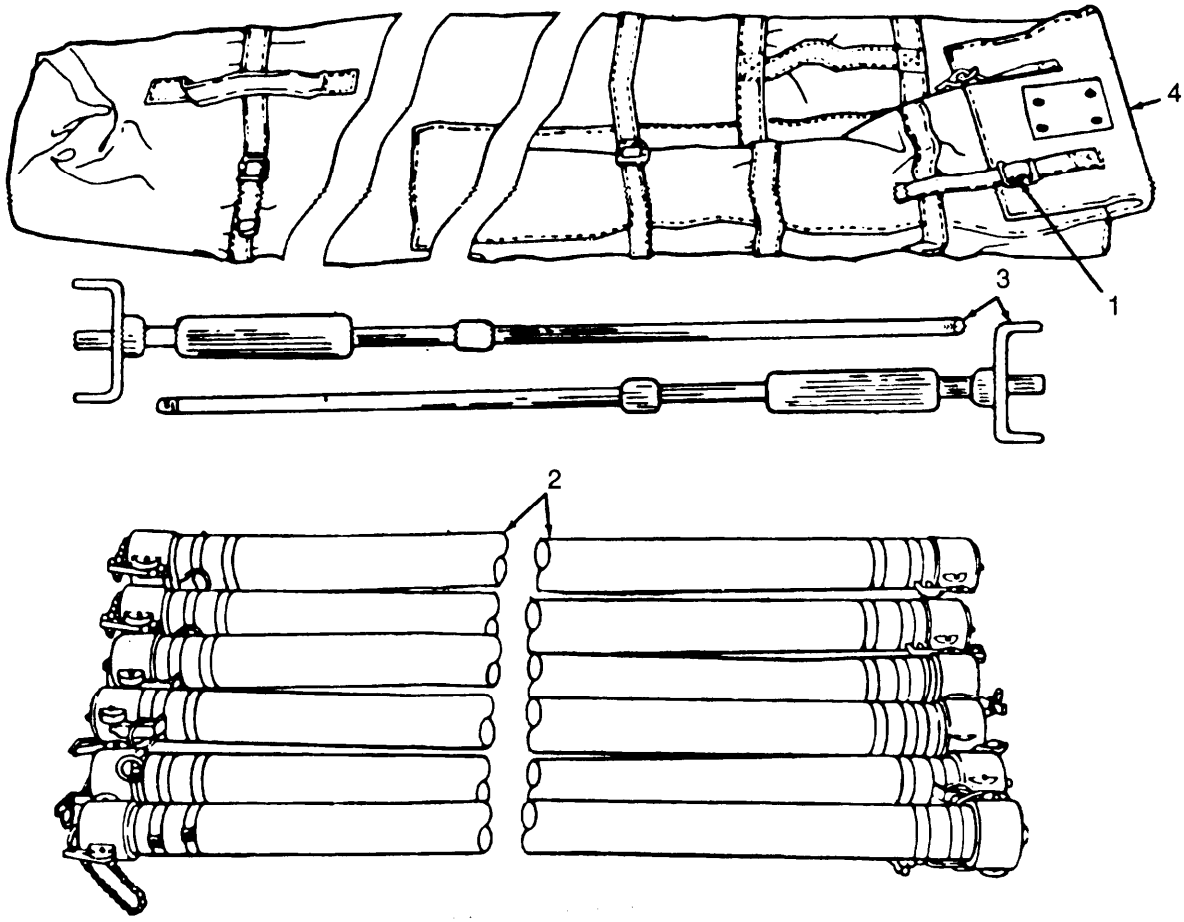


Figure 4–2. Suction Hoses, Ground Rod, and Container, Removal/Installation.

4-11. HOSE ASSEMBLY, SUCTION.

This task consists of:

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

INITIAL SETUP:

Tools Required:

Banding Tool, Appendix B, Item 2
Multimeter, Appendix B, Item 1
Tool Kit, General Mechanic's, Appendix B, Item 3

Materials Required:

Seals, NSN 5340-00-244-7327
Strapping, NSN 5340-00-245-9440

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2–8 b.

General Safety Instruction:

WARNING

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

a. Removal. (Refer to Figure 4-3.)

(1) Pull upon camlock levers (1) on butterfly valve (2).

(2) Remove suction hose (3).

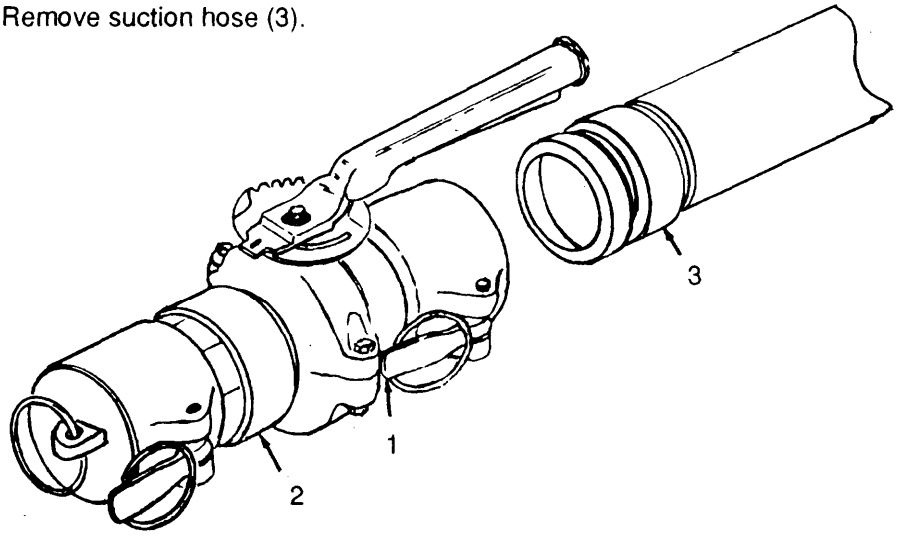


Figure 4-3. Suction Hose, Removal/Installation.

b. Test.

(1) Touch each probe of multimeter to opposite end hose coupling half. Use a multimeter and perform a continuity test on the suction hose to insure the wires in the suction hose are not broken.

(2) The resistance reading should be 5 ohms or less. Repair hose assembly if resistance is greater than 5 ohms.

(3) No hydrostatic testis required on the discharge hose and suction hose. If the local commander requires a hydrostatic test, it is up to him as to how and when it is accomplished.

NOTE

Suction hose assembly should be tested every thirty days or whenever hose has been damaged.

c. Repair. (Refer to Figure 4-4.)

(1) Cut band and remove damaged coupling.

(2) If hose is damaged within 1 foot (30.48 cm) of end of hose, cut strapping and remove coupling.

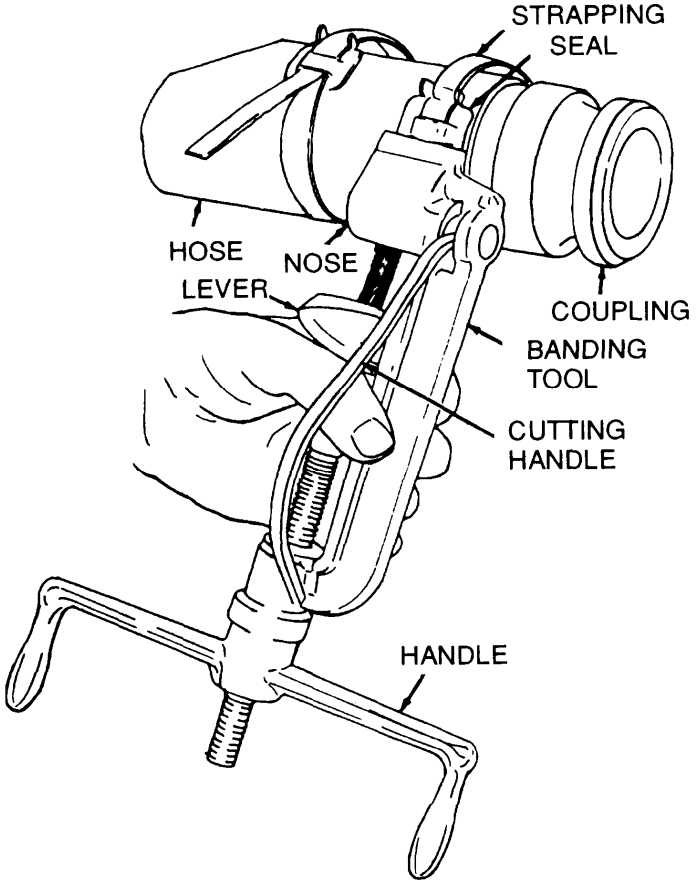


Figure 4-4. Hose Assembly Repair.

4-11. HOSE ASSEMBLY, SUCTION - Continued.

c. Repair - Continued

(3) Cut hose and remove damaged area. Make sure ground wire extends at least 1/4 inch. If not extended at least 1/4 inch, use pliers and pull out on ground wire until 1/4 inch is exposed.

(4) Insert new coupling in hose.

(5) Slide seal on strapping material and bring end of strapping around hose adjacent to barb on coupling shank. Wrap strapping around hose twice and again run end through the seal.

(6) Place strapping in open slot of banding tool nose and slide in.

(7) With thumb on band gripper lever, apply tension by turning handle of tool. After tension is created, it is no longer necessary to hold band gripper lever as it locks itself under tension.

(8) Place finger on strapping material at seal bridge while tensioning with tool handle (turn handle clockwise).

(9) When strapping material stops moving through seal as you turn handle, stop turning. Maximum tension is being exerted by strapping material around hose.

Failure to back off with tension handle throughout entire course of roll may result in breaking of strapping and injury to personnel.

(10) Roll tool over seal, backing off with tension handle throughout entire rolling operation,

(11) Pull cutting handle to cut strapping.

(12) Remove tool, holding stub of strapping down with thumb. Clinch stubby hammering down seal ears.

(13) Refer to para. 4-11 b and perform continuity test.

d. Installation.

(1) Refer to Figure 4-3 and connect suction hose (3) to butterfly valve (2).

(2) Push down on camlock levers (1) and secure suction hose.

4-12. GROUND ROD.

This task consists of:

a. Removal b. Installation

INITIAL SETUP:

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-8 b.

a. Removal. (Refer to Figure 4-5.)

(1) Unbuckle two straps (1) and open flap (2).

(2) Remove two ground rods (3) from container (4).

b. Installation.

(1) Insert two ground rods (3) into container (4).

(2) Close flap (2) and buckle two straps (1).

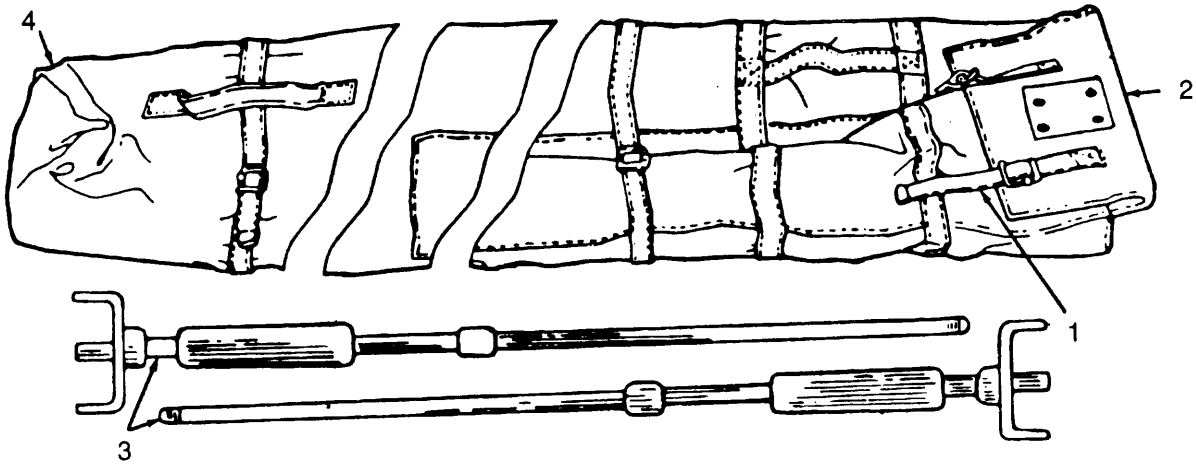


Figure 4-5. Ground Rod, Removal/Installation.

4-13. HOSE ASSEMBLY, DISCHARGE.

This task consists of:

a. Removal b. Repair c. Installation

INITIAL SETUP:

Tools Required:

Banding Tool, Appendix B, Item 2
Tool Kit, General Mechanic's, Appendix B, Item 3

Materials Required:

Seals, NSN 5340-00-244-7327
Strapping, NSN 5340-00-245-9440

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-8 b.

General Safety Instruction:

WARNING

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

a. Removal. Refer to Figure 4-6)

(1) Pull upon camlock levers on discharge hoses (1) and closed circuit nozzles (3).

(2) Remove discharge hoses (1) from wye fitting (2) and closed circuit nozzles (3).

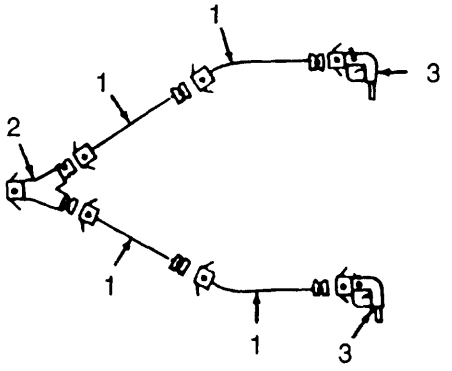


Figure 4-6. Discharge Hoses, Removal/Installation.

b. Repair. (Refer to Figure 4-7.)

(1) Cut strapping and remove damaged coupling.

(2) If hose is damaged within 10 feet (304.8 cm) of end of hose, cut strapping material and remove coupling.

(3) Cut hose and remove damaged area.

(4) Insert new coupling in hose.

(5) Slide seal on strapping material and bring end of strapping around hose adjacent to barb on coupling shank. Wrap strapping around hose twice and again run end through the seal.

(6) Place strapping in open slot of banding tool nose and slide in.

(7) With thumb on band gripper lever, apply tension by turning handle of tool. After tension is created, it is no longer necessary to hold band gripper lever as it locks itself under tension.

(8) Place finger on strapping material at seal bridge while tensioning with tool handle. (Turn handle clockwise).

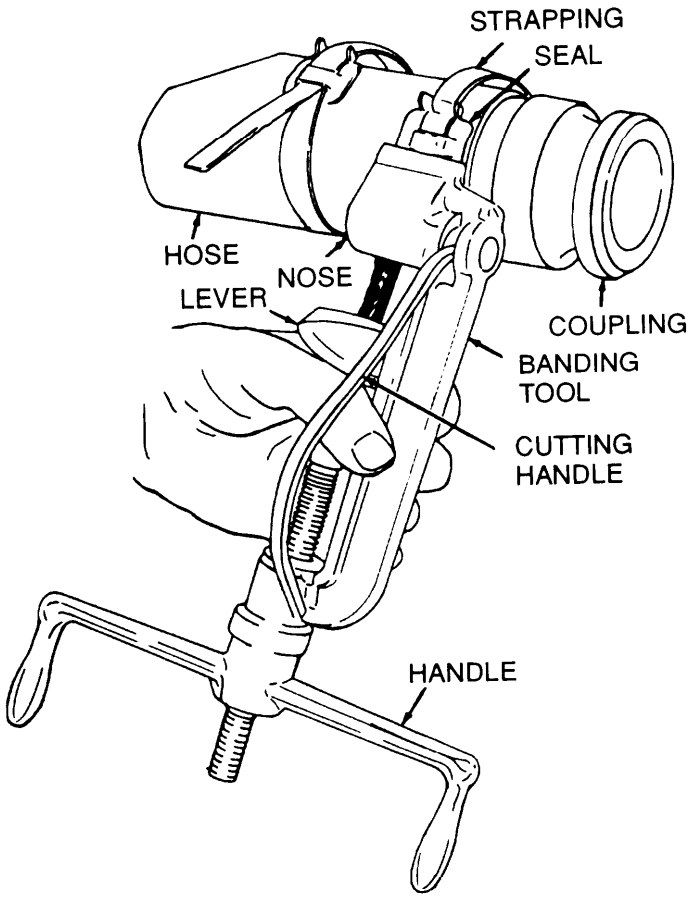


Figure 4-7. Hose Assembly Repair.

4-13. HOSE ASSEMBLY, DISCHARGE - Continued.

b. Repair - Continued.

(9) When strapping material stops moving through seal as you turn handle, stop turning. Maximum tension is being exerted by strapping material around hose.

Failure to back off with tension handle throughout entire course of roll may result in breaking of strapping and injury to personnel.

(10) Roll tool over seal, backing off with tension handle throughout entire rolling operation.

(11) Pull cutting handle to cut strapping.

(12) Remove tool, holding stub of strapping down with thumb. Clinch stubby hammering down seal ears.

c. Installation.

(1) Refer to Figure 4–6 and connect discharge hoses (1) to wye fitting (2) and closed circuit nozzles (3).

(2) Push down on camlock levers and secure discharge hoses.

4-14. VALVE ASSEMBLY, BUTTERFLY.

This task consists of:

a. Removal b. Cleaning c. Inspection d. Repair
e. Disassembly f. Reassembly g. Installation

INITIAL SETUP:

Tools Required:

Tool Kit, General Mechanic's

Materials Required:

Cleaning Solvent (Item 1, Appendix E)
Cloth (Item 3, Appendix E)
Lockwashers, P/N 20-11-04

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-8 b.

General Safety Instructions:

WARNING

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

a. Removal. (Refer to Figure 4-8.)

(1) Pull up on the camlock lever rings.

(2) Remove butterfly valve assembly (1) from suction hose assembly (2) and tee assembly (3).

(3) Install dust cap and dust plug. Secure dust cap and dust plug with camlock levers.

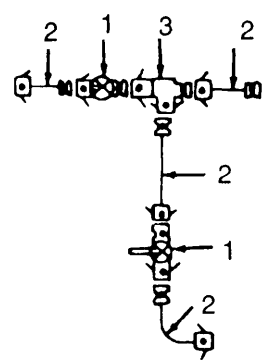


Figure 4–8. Butterfly Valve Assembly, Removal/Installation.

4-14. VALVE ASSEMBLY, BUTTERFLY - Continued.

b. Cleaning.

Cleaning solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged breathing of fumes. Keep solvent away from flames. Do not use in excessive amounts. Avoid skin contact.

(1) Clean butterfly valve with cleaning solvent.

(2) Allow to dry.

c. Inspection.

(1) Inspect butterfly valve for damaged or missing dust cover and dust plug.

(2) Inspect butterfly valve for damaged camlock levers.

(3) Check butterfly valve lever for ease of operation.

(4) Visually inspect seat disc shaft for wear or damage.

d. Repair. Repair is limited to replacing defective parts,

e. Disassembly. (Refer to Figure 4–9.)

(1) Remove screw (1), washer (2), and handle (3).

(2) Remove two nuts (4), two lockwashers (5), two bolts (6), and latch plate (7).

(3) Remove two nuts (8), two lockwashers (9), and two bolts (10).

(4) Remove upper body half (11) and two spacers (12).

(5) Remove lower body half (13), two pipe ends (14), and two bearings (15).

(6) Remove disc shaft (16) and seat (17).

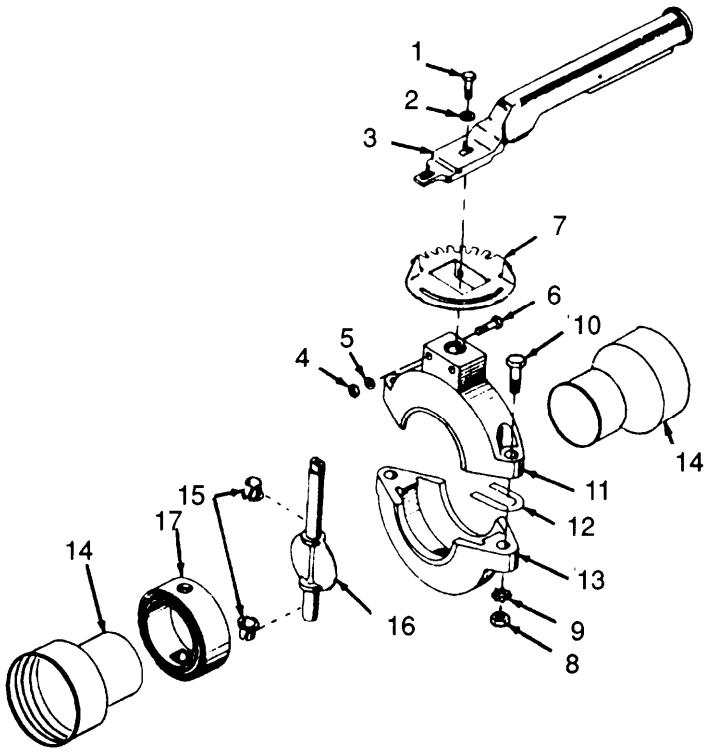


Figure 4-9. Butterfly Valve Assembly, Disassembly/Reassembly.

f. Reassembly.

(1) Refer to Figure 4-9 and install seat (17) on disc shaft (16) and install bearing (15) in lower body.

(2) Install assembled disc shaft (16) and seat (17) in lower body half (13) and install in lower body.

(3) Install other bearing (15) and two pipe ends (14) in upper body half (11) and position upper body half (11) on lower body half (13). Install spacers (12) and secure with two bolts (10), two lock-washers (9), and two nuts (8).

(4) Position latch plate (7) in place and secure with two bolts (6), two Iockwashers (5), and two nuts (4).

(5) Install handle (3) and secure with washer (2) and screw (1).

g. Installation.

(1) Refer to Figure 4-8 and pull upon camlock lever and remove dust cap and dust plug.

(2) Position butterfly valve (1) on tee assembly (3) and secure by pushing down on camlock levers.

(3) Connect suction hose assembly (2) to butterfly valve and secure by pushing down on camlock levers.

4-15. TEE ASSEMBLY.

This task consists of:

a. Removal b. Cleaning c. Inspection d. Repair
e. Disassembly f. Reassembly g. Installation

INITIAL SETUP:

Tools Required:

Tool Kit, General Mechanic's, Appendix B , Item 3

Materials Required:

Cleaning Solvent (Item 1, Appendix E)
Cloth, Lint-Free (Item 3, Appendix E)
Gasket, P/N MS27030-6
Sealing Compound (Item 2, Appendix E)

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-8 b.

General Safety Instructions:

WARNING

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

---

a. Removal. (Refer to Figure 4-10.)

(1) Pull upon camlock levers on two suction hoses (1) and remove suction hoses (1) from tee assembly (2).

(2) Pull upon camlock levers on tee assembly (2) and remove butterfly valve (3).

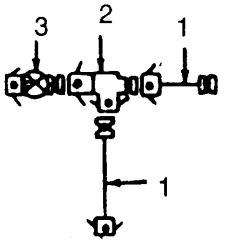


Figure 4-10. Tee Assembly, Removal/Installation.

b. Cleaning.

WARNING

Cleaning solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged breathing of fumes. Keep solvent away from flames. Do not use in excessive amounts. Avoid skin contact.

(1) Clean tee assembly with cleaning solvent.

(2) Allow to dry.

c. Inspection.

(1) Inspect tee assembly for damaged dust plugs or dust cap.

(2) Inspect tee assembly for damaged camlock levers.

d. Repair. Repair is limited to replaang defective parts.

e. Disassembly. (Refer to Figure 4-11.)

(1) Pull upon camlock levers and remove dust cap (1) and gasket (2). Remove coupling half (3). Discard gasket (2).

(2) Pull upon camlock levers and remove two dust plugs (4) and two gaskets (5). Discard gaskets (5).

(3) Remove two coupling halves (6) from tee (7).

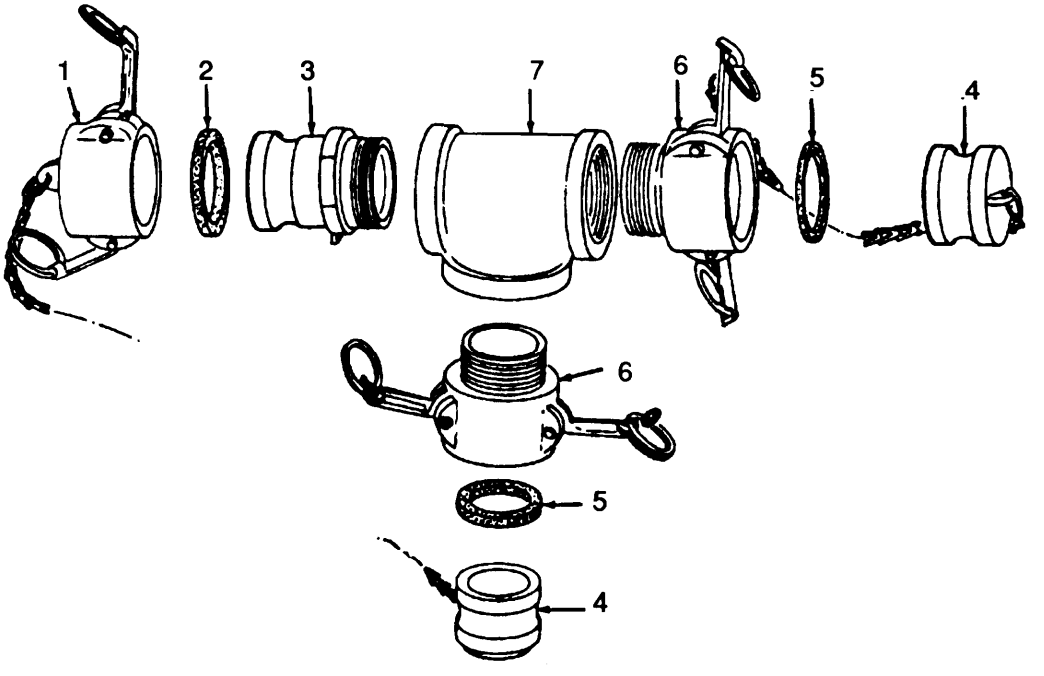


Figure 4-11. Tee Assembly, Disassembly/Reassembly.

4-15. TEE ASSEMBLY - Continued.

f. Reassembly.

(1) Refer to Figure 4-11 and apply sealing compound to threads and install two coupling halves (6) in tee (7).

(2) Install two gaskets (5) and two dust plugs (4). Secure dust plugs with camlock levers.

(3) Apply sealing compound to threads and install coupling half (3), gasket (2), and dust cap (1). Secure dust cap with camlock levers.

g. Installation.

(1) Refer to Figure 4-10 and position tee assembly (2) in place on butterfly valve (3) and secure with camlock levers.

(2) Install two suction hose assemblies (1) and secure with camlock levers.

4-16. VALVE, ELBOW COUPLER.

This task consists of:

a. Removal b. Cleaning c. Inspection d. Repair
e. Disassembly f. Reassembly g. Installation

INITIAL SETUP:

Tools Required:

Tool Kit, General Mechanic's, Appendix B , Item 3

Materials Required:

Cleaning Solvent (Item 1, Appendix E)
Cloth, Lint-Free (Item 3, Appendix E)
Gaskets, P/N 6338M
Packing, P/N H234M

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-8 b.

General Safety Instructions:

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

---

a. Removal. (Refer to Figure 4-12.)

(1) Pull upon camlock levers on valve (1).

(2) Remove valve (1) from fuel drum (2) and adapter (3).

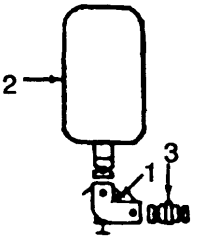


Figure 4-12. Elbow Coupler Valve, Removal/Installation.

b. Cleaning.

Cleaning solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged breathing of fumes. Keep solvent away from flames. Do not use in excessive amounts. Avoid skin contact.

(1) Clean valve with cleaning solvent.

(2) Allow to dry.

c. Inspection.

(1) Inspect valve for damaged or missing camlock levers.

(2) Check valve for ease of operation by turning handwheel.

(3) Check valve for damage or missing parts.

d. Repair. Repair is limited to replacing defective parts.

4-16. VALVE, ELBOW COUPLER - Continued.

e. Disassembly (Refer to Figure 4-13.)

(1) Remove nut (1) and handwheel (2).

(2) Remove nut (3), gland (4), and packing (5) from body (9). Discard packing.

(3) Remove pin (6), stem (7), and two gaskets (8) from body (9). Discard gaskets.

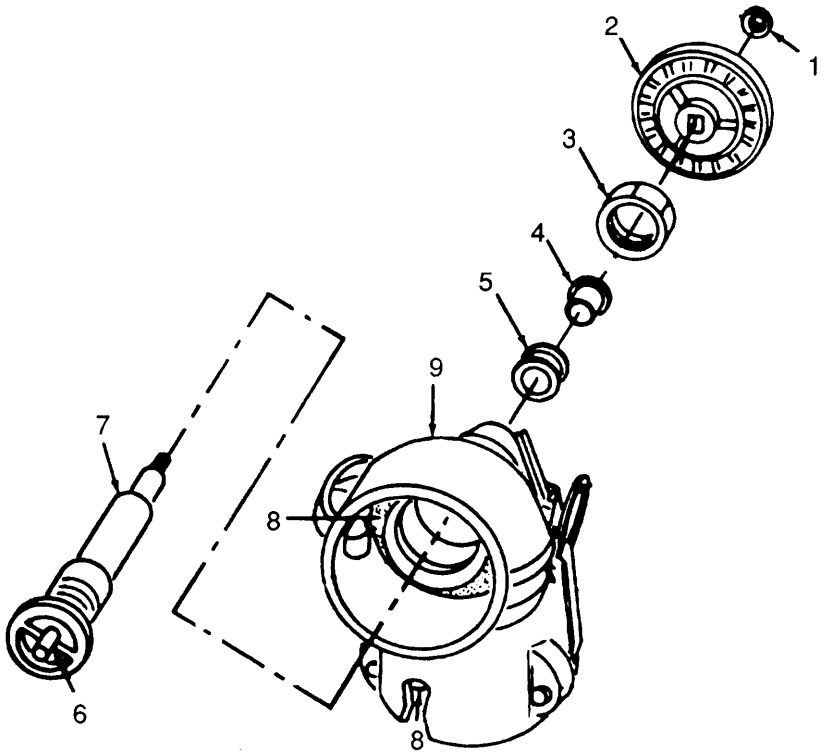


Figure 4–13. Elbow Coupler Valve, Disassembly/Reassembly.

f. Reassemble.

(1) Refer to Figure 4-13 and install two gaskets (8) in body (9).

(2) Install stem (7) and pin (6).

(3) Install packing (5), gland (4), and nut (3).

(4) Install handwheel (2) and secure with nut (1).

g. Installation.

(1) Refer to Figure 4-12 and position valve (1) on fuel drum (2) and adapter (3).

(2) Secure valve (1) to fuel drum (2) and adapter (3) by pushing down on camlock levers.

4-17. ADAPTER ASSEMBLY.

This task consists of:

a. Removal	b. Cleaning	c. Inspection	d. Repair
e. Disassembly	f. Reassembly	g. Installation	

INITIAL SETUP:

Tools Required:

Tool Kit, General Mechanic's, Appendix B , Item 3

Materials Required:

Cleaning Solvent (Item 1, Appendix E)
Cloth, Lint-Free (Item 3, Appendix E)
Gasket, P/N MS27030-6 (2")
Gasket, P/N MS27030-8 (3")
Gasket, P/N MS27030-9 (4")

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-8 b.

General Safety Instructions:

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

a. Removal. (Refer to Figure 4-14.)

(1) Pull upon suction hose (1) camlock levers.

(2) Remove adapter assembly (2) and install dust plug and dust cap.

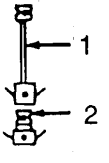


Figure 4-14. Adapter Assembly, Removal/Installation.

4-17. ADAPTER ASSEMBLY-Continued.

b. Cleaning.

WARNING

Cleaning solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged breathing of fumes. Keep solvent away from flames. Do not use in excessive amounts. Avoid skin contact.

(1) Clean adapter assembly with cleaning solvent.

(2) AIIow to dry.

c. Inspect ion.

(1) Inspect adapter assembly for missing dust plug or cap.

(2) Inspect adapter assembly for damaged or missing camlock levers.

d. Repair. Repair is limited to replacing defective parts.

e. Disasse mbly. (Refer to Figure 4-15.)

(1) Disconnect hook (1) and remove dust plug (2) and gasket (3), Discard gasket.

(2) Remove dust cap (4) and gasket (5) from reducer (6). Discard gasket.

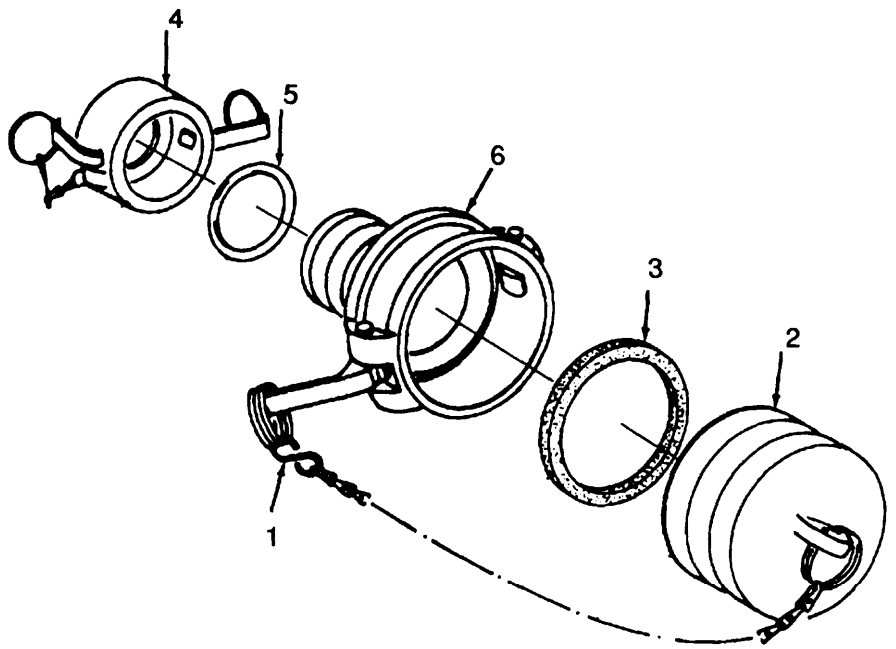


Figure 4-15. Adapter Assembly, Disassembly/Reassembly.

f. Reassembly.

(1) Refer to Figure 4-15 and install new gasket (5) and dust cap (4).

(2) Install new gasket (3) and dust plug (2).

(3) Connect hook (1) to camlock lever.

g. Installation.

(1) Refer to Figure 4-14 and position adapter assembly (2) on fuel source and secure by pushing down on camlock levers.

(2) Install suction hose assembly (1) and secure by pushing down on camlock levers.

4-18. ADAPTER, NOZZLE.

This task consists of:

a. Inspection b. Cleaning c. Removal d. Installation

INITIAL SETUP:

Tools Required:

Tool Kit, General Mechanic's Appendix B, Item 3

Materials Required:

Cleaning Solvent (Item 1, Appendix E)
Cloth, Lint-Free (Item 3, Appendix E)

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-8 b.

General Safety Instructions:

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

---

a. Inspection.

(1) Inspect adapter for leaks.

(2) Inspect adapter for missing or damaged end cover.

4-18. ADAPTER, NOZZLE - Continued.

b. Cleaning.

WARNING

Cleaning solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged breathing of fumes. Keep solvent away from flames. Do not use in excessive amounts. Avoid skin contact.

(1) Clean adapter with cleaning solvent.

(2) Allow to dry.

c. Removal. (Refer to Figure 4-16.)

(1) Slide reducer ring (1) on closed circuit nozzle (2) and remove adapter (3).

d. Installation.

(1) Slide release ring (1) on closed circuit nozzle (2) and install adapter (3) on closed circuit nozzle (2).

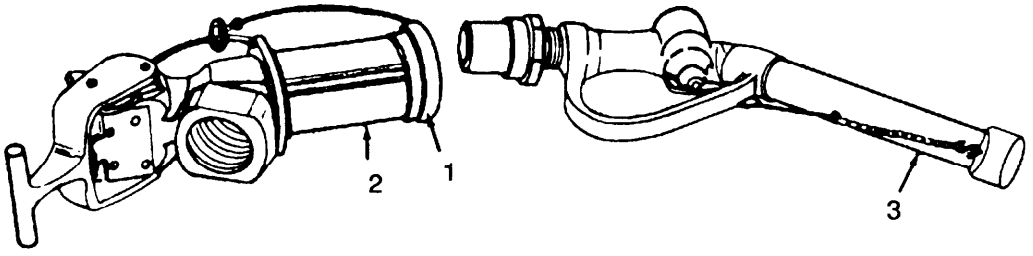


Figure 4-16. Adapter, Nozzle, Replace/Installation.

4-19. FRAME ASSEMBLY.

This task consists of:

a. Removal b. Repair c. Installation

INITIAL SETUP:

Tools Required:

Tool Kit, General Mechanic's, Appendix B , Item 3

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-6 b.

General Safety Instructions:

WARNING

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

a. Removal. (Refer to Figure 4-17.)

(1) Remove discharge hose from frame (1).

(2) Remove contents from container (2).

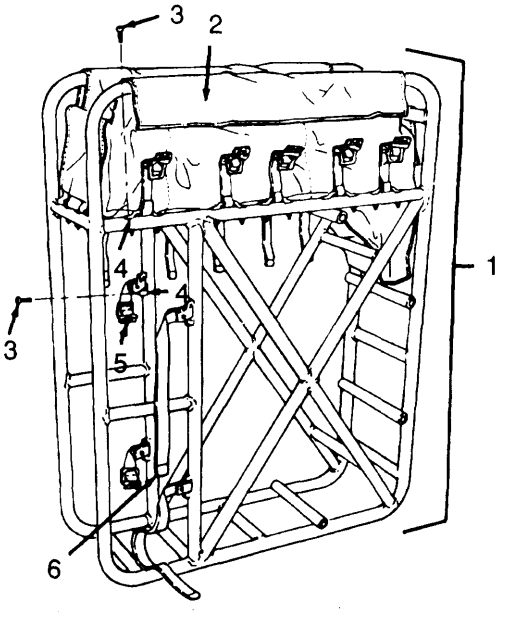


Figure 4-17. Frame Assembly, Removal/Installation.

4-19. FRAME ASSEMBLY - Continued.

b. Repair.

(1) If container (2) is damaged, remove twenty-eight screws (3), fourteen loops (4) and remove container (2). Position new container (2) on frame and secure with fourteen loops (4) and twenty-eight screws (3).

(2) If any straps (5) or (6) are damaged, remove two screws (3), loops (4), and remove damaged straps (5) or (6). Position new strap (5) or (6) on frame and secure with loop (4) and two screws (3).

(3) Repair frame (1) by straightening or painting frame. Refer to TM 43-0139 for painting.

c. Installation.

(1) Refer to Figure 4-17 and install contents in container (2).

(2) Install discharge hose on frame (1).

4-20. WYE FITTING ASSEMBLY.

This task consists of:

a. Removal b. Cleaning c. Inspection d. Repair
e. Disassembly f. Reassembly g. Installation

INITIAL SETUP:

Tools Required:

Tool Kit, General Mechanic's, Appendix B , Item 3

Materials Required:

Cleaning Solvent (Item 1, Appendix E)
Cloth, Lint-Free (Item 3, Appendix E)
Gaskets, P/N MS27030-6

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-8 b.

General Safety Instructions:

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

---

a. Removal. (Refer to Figure 4-18.)

(1) Pull upon camlock levers and remove two discharge hose assemblies (1).

(2) Pull upon camlock levers on wye fitting (2) and remove wye fitting (2) from suction hose assemblies (3).

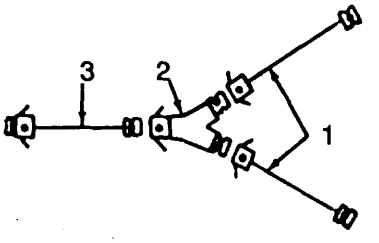


Figure 4-18. Wye Fitting Assembly, Removal/Installation.

b. Cleaning.

WARNING

Cleaning solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged breathing of fumes. Keep solvent away from flames. Do not use in excessive amounts. Avoid skin contact.

(1) Clean wye fitting assembly with cleaning solvent.

(2) Allow to dry.

c. Inspection.

(1) Inspect wye fitting assembly for missing dust caps or dust plug.

(2) Inspect wye fitting assembly for damaged or missing camlock levers.

d. Repair. Repair is limited to replacing defective parts.

4-20. WYE FITTING ASSEMBLY - Continued

e. Disassembly. (Refer to Figure 4-19.)

(1) Disconnect chain (1) and remove two dust caps (2) and two gaskets (3). Discard gasket.

(2) Disconnect chain (4) and remove dust plug (5) and gasket (6) from wye fitting (7)

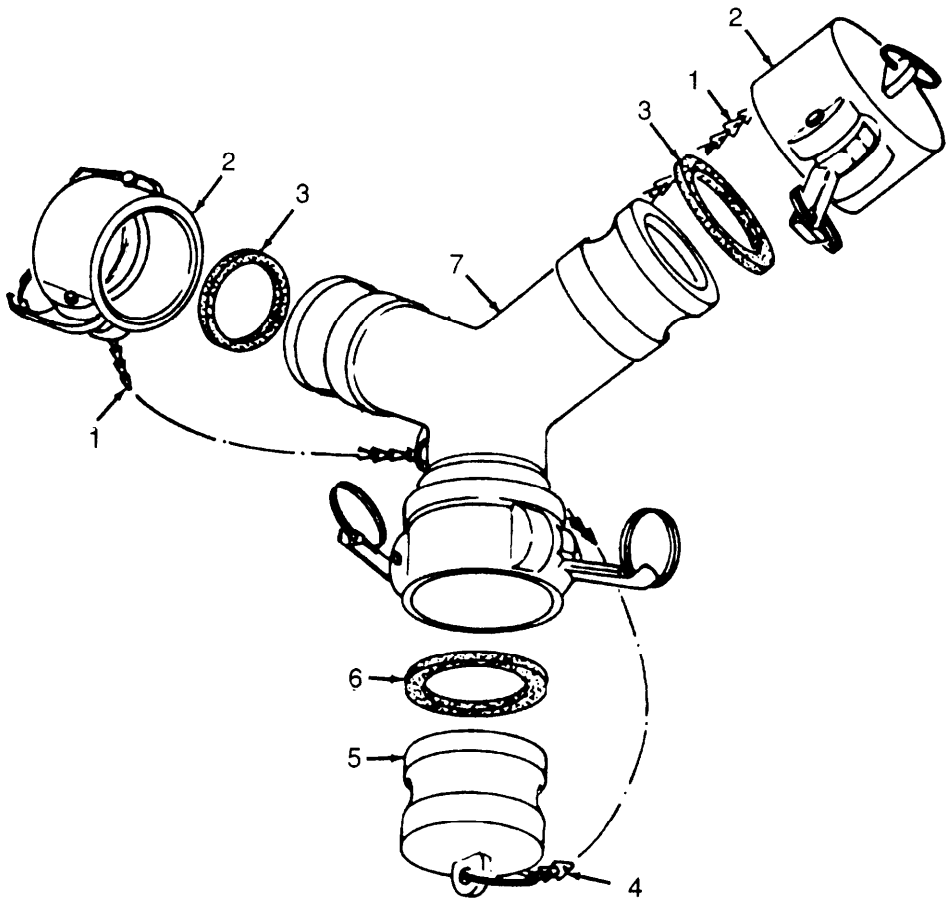


Figure 4-19. Wye Fitting Assembly, Disassembly/Reassembly.

f. Reassembly.

(1) Refer to Figure 4-19 and install new gasket (6) and dust plug (5) on wye fitting (7). Connect chain (4).

(2) Install two new gaskets (3) and two dust caps (2). Connect two chains (1).

g. Installation.

(1) Refer to Figure 4-18 and position wye fitting (2) on suction hose assembly (3) and secure by pushing down on camlock levers.

(2) Install two discharge hose assemblies (1) and secure by pushing down on camlock levers.

4-21. ADAPTER, WATER DETECTOR.

This task consists of:

a. Removal b. Inspection c. Cleaning d. Repair
e. Disassembly f. Reassembly g. Installation

INITIAL SETUP:

Tools Required:

Tool Kit, General Mechanic's, Appendix B , Item 3

Materials Required:

Cleaning Solvent (Item 1, Appendix E)
Cloth, Lint-Free (Item 3, Appendix E)
Gaskets, P/N MS27030-6
Sealing Compound (Item 2, Appendix E)

Equipment Conditions:

Forward Area Refueling Equipment shutdown per para. 2-6 b.

General Safety Instructions:

Do not smoke or use an open flame in vicinity of the Forward Area Refueling Equipment. Failure to comply may result in personnel injury.

a. Removal. (Refer to Figure 4-20.)

(1) Pull upon camlock levers and remove suction hose assembly (1),

(2) Pull upon camlock levers and remove adapter (2) from filter/separator (3).

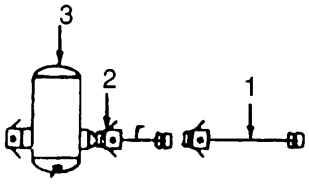


Figure 4-20. Water Detector Adapter, Removal/Installation.

4-21. ADAPTER, WATER DETECTOR - Continued.

b. Inspection.

(1) Inspect adapter for leaks.

(2) Inspect adapter for missing or damaged dust plugs or caps.

(3) Inspect adapter for a damaged probe assembly.

c. Cleaning.

Cleaning solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged breathing of fumes. Keep solvent away from flames. Do not use in excessive amounts. Avoid skin contact.

(1) Clean adapter with cleaning solvent.

(2) Allow to dry.

d. Repair. Repair is limited to replacing defective parts.

e. Disassembly. (Refer to Figure 4-21.)

(1) Pull upon camlock levers (1) and remove dust plug (2) and gasket (3). Discard gasket.

(2) Pull upon camlock levers (4) and remove dust cap (5) and gasket (6). Discard gasket.

(3) Remove probe assembly (7) from nipple (10).

(4) Remove coupling half (8) and coupling half (9) from nipple (10).

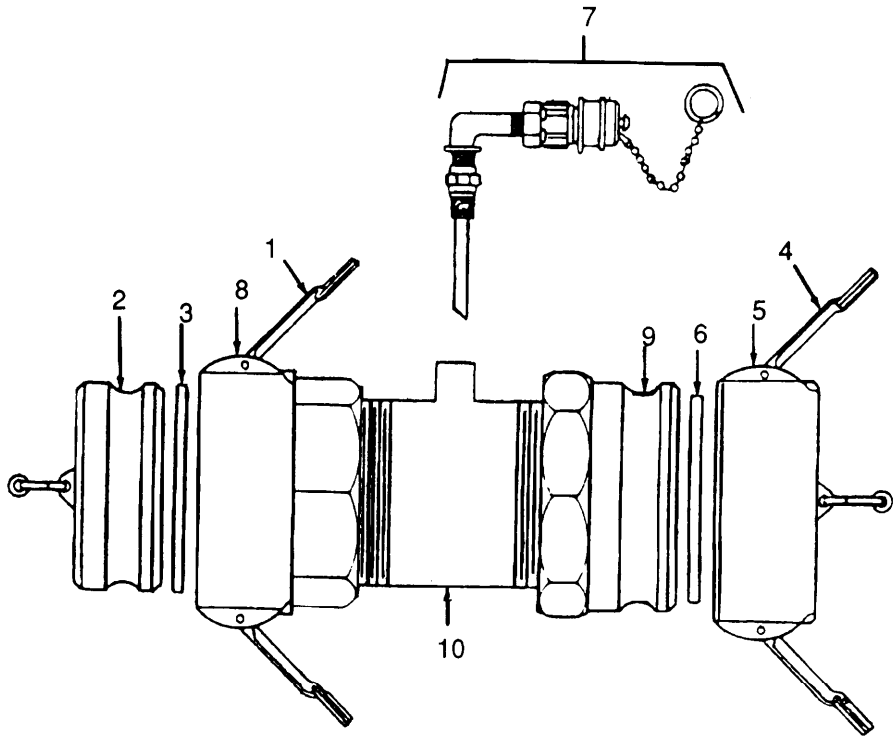


Figure 4–21. Water Detector Adapter, Disassembly/Reassembly.

f. Reassembly.

(1) Refer to Figure 4-21 and apply sealing compound to threads of coupling halves and install coupling half (9) and coupling half (8) on nipple (10).

(2) Apply sealing compound to threads and install probe assembly (7).

(3) Install new gasket (6) and dust cap (5). Secure with camlock levers (4).

(4) Install new gasket (3) and dust plug (2). Secure with camlock levers (1).

g. Installation.

(1) Refer to Figure 4-20 and pull upon camlock levers and remove dust plug and dust cap.

(2) Position adapter (2) on fitter/separator (3) outlet fitting. Secure by pushing down on camlock levers.

(3) Install suction hose (1) and secure by pushing down on camlock levers.

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

Place nozzle end of closed circuit nozzle in a suitable container and drain fuel from system. Drain fuel from each hose assembly and fitting into a suitable container when they are removed. Failure to do so could result in injury to personnel or equipment.

4-22. PREPARATION FOR STORAGE OR SHIPMENT.

a. Shut down the pump assembly by slowly moving engine throttle control lever toward stop position to idle speed. Allow engine to idle for five (5) minutes to allow engine operating temperature to stabilize.

b. Move throttle control hand lever to extreme right stop position.

c. Disconnect ground cables and remove nozzles. Remove discharge hose assemblies and drain fuel into a suitable container. Install dust plugs and dust caps. Stow discharge hose assemblies on their frame assembly.

d. Remove discharge hose fittings and drain fuel into a suitable container. Install dust plugs and dust caps. Stow discharge hose fittings in canvas bag located on frame assembly.

e. Remove suction hose assemblies and fittings. Drain fuel into a suitable container. Install dust plugs and dust caps. Stow suction hose assemblies in their canvas container. Stow in suction hose assembly container.

f. Disconnect pumping assembly ground cable.

g. Disconnect filter/separator ground cable. Remove ground rod and stow on filter/separator frame.

h. Remove plug from bottom of pumping assembly volute housing and drain fuel into a suitable container. Install drain plug in bottom of pumping assembly.

i. Open air vent valve and open drain valve on bottom of filter/ separator and drain fuel into a suitable container. Close valves.

Appendix A
REFERENCES

A-1. SCOPE.

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

A-2. FORMS.

Recommended Changes to Publications and Blank Forms . . . . . DA Form 2028
Recommended Changes to DA Publications . . . . DA Form 2028–2
Quality Deficiency Report SF–368
Equipment inspection and Maintenance Worksheet . . . . . DA Form 2404
Packaging Improvement Report. . . . . .. DD Form 6

A-3. TECHNICAL MANUALS.

Destruction of Army Materiel . . . . . TM 750–244-3
Painting instructions for Army Materiel . . . . . TM 43–0139
The Army Maintenance Management System . . . . . DA PAM 738–750
Operator, Unit, Direct Support and General Support Maintenance
Manual for Pump Assembly . . . . . TM 5-4320-313-14
Operator and Organizational Maintenance Manual Including Repair
Parts and Special Tools List for Filter Separator . . . . . TM 5-4330-217-12
Operator and Organizational Maintenance Manual Including Repair
Parts and Special Tools List for Nozzle Assembly, Closed
Circuit . . . . . TM 5–4930–235-13&P
Operator's, Organizational, Direct Support and General Support
Maintenance Manual Including Repair Parts and Special Tools
List for Drums, Fabric Collapsible, Non–Vented; 500–Gallon
Liquid Fuel . . . . . TM 10-8110–201–14&P

Appendix B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. INTRODUCTION.

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

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

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

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

B-2. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

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

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

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

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

e. Aline. To adjust specified variable elements of an item to bring about optimum Performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted to 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.

B-2. MAINTENANCE FUNCTIONS - Continued.

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

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the SMR code.

i. Repair. The application of maintenance services ([1]), including fault location/troubleshooting ([2]), removal/installation, and disassembly/assembly ([3]) procedures, and maintenance actions ([4]) to identify troubles, and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly) end item, or system.

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 maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group numbers shall be "00".

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 a detailed explanation of these functions, see paragraph B-2.)

([1]) Services - Inspect, test, service, adjust, aline, calibrate, and/or replace.

([2]) Fault locate/troubleshoot - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

([3]) Disassemble/Assemble - Encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componency identified as maintenance significant (i. e., assigned an SMR code) for the category of maintenance under consideration.

([4]) Action - Welding, grinding, riveting, straightening, facing, remachining, and/or resurfacing.

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d. Column 4, Maintenace 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 that maintenance function at the indicated category of maintenance. If the number or complexity of task within a 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/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C . . . . . Operator or crew
O . . . . . Unit Maintenance
F. . . . . Direct Support Maintenance
H . . . . . General Support Maintenance
L . . . . . Specified Repair Activity (SRA) ([5])

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.

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.

([5]) This maintenance category is not included in Section II, column (4) of the Maintenance Allocation Chart. To identify functions to this category of maintenance, enter a work time figure in the “H” column of Section II, column (4), and use an associated reference code in the Remarks column (6). Key the code to Section IV, Remarks, and explain the SRA complete repair application there. The explanatory remark(s) shall reference the specific Repair Parts and Special Tools List (RPSTL) TM which contains additional SRA criteria and the additional spare/repair parts.

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

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

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

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

a. Column 1, Reference Code. The code recorded in column (1), Section II.

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

Section II. MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4) MAINTENANCE CATEGORY					(5)	(6)
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT	TOOLS AND	
GROUP NUMBER	COMPONENT ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	EQUIP.	REMARKS
00	Forward Area Refueling Equipment								
01	Suction Hose Kit								
	Container, Suction Hose	Inspect	0.2						
		Replace		0.4					
	Hose Assembly	Inspect	0.3						
		Test		0.8				1	A
		Replace		0.1					
		Repair		0.5				2, 3	
	Ground Rod	Inspect	0.1						
		Replace		0.1					
02	Hose and component Kit-T, Discharge								
	Hose Assembly	Inspect	0.2						
		Replace		0.2					
		Repair		1.7				2, 3	

Section II. MAINTENANCE ALLLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY UNIT C	UNIT O	DIRECT SUPPORT F	GENERAL SUPPORT H	EPOT D	(5) TOOLS AND EQUIP.	(6) REMARKS
	Valve Assembly, Butterfly	Inspect Replace Repair	0.1	0.5 1.3				3	
	Tee Assembly	Inspect Replace Repair	0.1	0.2 0.7				3	
	Valve, Elbow Coupler	Inspect Replace Repair	0.1	0.3 1.1				3	
	Adapter Assembly, 3 in. Female x 2 in. Male	Inspect Replace Repair	0.1	0.2 0.7				3	
	Adapter, Nozzle	Inspect Replace	0.1	0.2				3	
	Frame Assembly	Inspect Replace Repair	0.1	0.4 0.5				3	
03	Hose and Component Kit-Y, Discharge								
	Hose Assembly	Inspect Replace Repair	0.2	0.2 1.7				2,3	
	Adapter Assembly, 4 in. Female x 2 in. Male	Inspect Replace Repair	0.1	0.2 0.7				3	
	Valve Assembly, Butterfly	Inspect Replace Repair	0.1	0.5 1.3				3	
	Wye Fitting Assembly	Inspect Replace Repair	0.1	0.2 0.4				3	

Section II. MAINTENANCE ALLLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANcE FUNCTION	(4) MAINTENANCE CATEGORY UNIT C	UNIT O	DIRECT SUPPORT F	GENERAL SUPPORT H	DEPOT D	(5) TOOLS AND EQUIP,	(6) REMARK
03	Hose and Component Kit-Y, Discharge-Continued								
	Valve, Elbow Coupler	Inspect Replace Repair	0.1	0.3 1.1				3	
	Adapter, Nozzle	Inspect Replace	0.1	1.2				3	
	Adapter, Water Detector Kit	Inspect Replace Repair	0.3	0.8 1.2				3	
	Frame Assembly	Inspect Replace Repair	0.1	0.4 0.5				3	
04	Nozzle, Closed Corcuit, Refueling								Refer to TM5-4930-235-13&P
05	Pump Assembly								Refer to TM5-4320-313-14
06	Filter/Separator								Refer to TM5-4330-217-12
07	Drum, Fabric collapsible								Refer to TM10-8110-201-14&P

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

1 REFERENCE CODE	2 MAINTENANCE CATEGORY	3 NOMENCLATURE	4 NATIONAL STOCK NUMBER (NSN)	5 TOOL NUMBER
1	O	MULTIMETER, AN/PSM	6625-01-139-2515	
2	O	BANDING TOOL	5120-00-278-9925	
3	O	TOOL KIT, GENERAL MECHANICS	5180-00-177-7033	

Section IV. REMARKS

(1) REFERENCE CODE	(2) REMARKS
A	Continuity test.

Appendix C
COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. SCOPE.

This appendix lists Components of End Item and Basic Issue Items for the Forward Area Refueling Equipment to help you inventory items required for safe and efficient operation.

C-2. GENERAL.

The Components of End Item and Basic Issue Items List 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 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 Forward Area Refueling Equipment in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, Bll must be with the equipment during operation and whenever it is transferred between property account. 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.

C-3. EXPLANATION OF COLUMNS.

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

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 and name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE (in parentheses) followed by the part number.

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

C-3. EXPLANATION OF COLUMNS - Continued.

SECTION II. COMPONENTS OF END ITEM

e. Column (5) - Quantity required (Qty rqr). Indicates the quantity of the item authorized to used with/on the equipment.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION USABLE ON CAGE AND PART NUMBER CODE	(4) U/M	(5) QTY RQR
1	4930-00-513-9906	KIT, SUCTION HOSE (97403) 13219E0501	EA	2
2	4930-00-475-3057	KIT, HOSE AND COMPONENTS (T) (97403) 13219E0503	EA	1
3	4930-00-483-3849	KIT, HOSE AND COMPONENTS (Y) (97403) 13219E0504	EA	1
4	4320-00-427-0002	PUMPING ASSY AND COMPONENTS (97403) 13227E9215	EA	1
5	4330-00-491-4957	FILTER, SEPARATOR AND COMPONENTS (97403) 13217E5350	EA	1

SECTION III. BASIC ISSUE ITEMS

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION USABLE ON CAGE AND PART NUMBER CODE	(4) U/M	(5) QTY RQR
		TM 10-4930-238-12&P OPERATOR'S, AND UNIT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST	EA	1
6	5120-00-278-9925	BANDING TOOL	EA	1

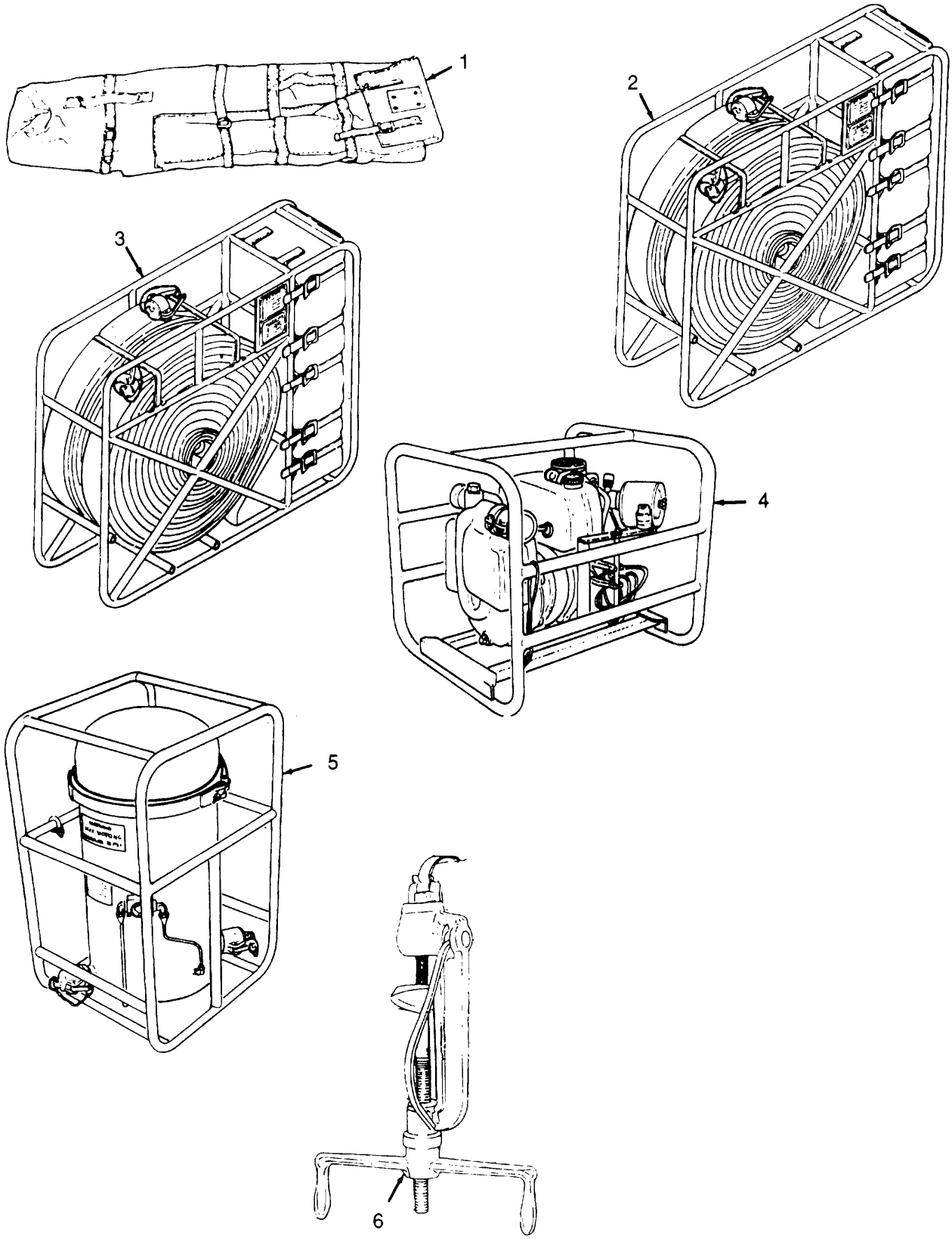


Figure C–1. Components of End Item and Basic Issue Items.

Appendix D
ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. SCOPE.

This appendix lists additional items you are authorized for the support of the Forward Area Refueling Equipment.

D-2. GENERAL.

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

D-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.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER AND CAGE	USABLE ON CODE	(3) U/M	(4) QTY AUTH
6640-00-244-9478	Model GTP 323 Series II (33218) Test Kit, Fuel Contamination		EA	1
5340-00-244-7327	Seals, 3/4" Strapping		EA	100
5340-00-245-9440	Strapping, 3/4"		100 FT ROLL	1
4210-01-089-0875	IRA 4210-031-201b (98725) 1211 20 lb ABC Fire Extinguisher, Halon		EA	3

Appendix E
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. SCOPE.

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the Forward Area Refueling Equipment. 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.

E-2. EXPLANATION OF COLUMNS.

a. Column 1- Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g..''Use sealing compound, Item 6, Appendix E").

b. Column 2 - Category. This column identified the lowest category of maintenance that required the listed item:

C - Operator/Crew
O - Unit
F - Direct Support
H - General Support

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 part number followed by the Commercial and Government Entity (CAGE) code in parenthesis, if applicable.

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 lowest unit of measure differs from the rest of the issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) CATEGORY	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	O	6850-00-664-5685	SOLVENT, CLEANING, AA 711, TYPE I AND TYPE II	GAL
2	O	8030-00-845-3499	SEALING COMPOUND	GAL
3	O	7920-00-205-1711	CLOTH, LINT-FREE	LB

Appendix F

OPERATOR'S AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

Section I. INTRODUCTION

F-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 operator and unit maintenance of Forward Area Refueling Equipment (FARE). It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

F-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 reparable special tools are also listed in this section. Items listed are shown on the associated illustration(s)/figure(s).

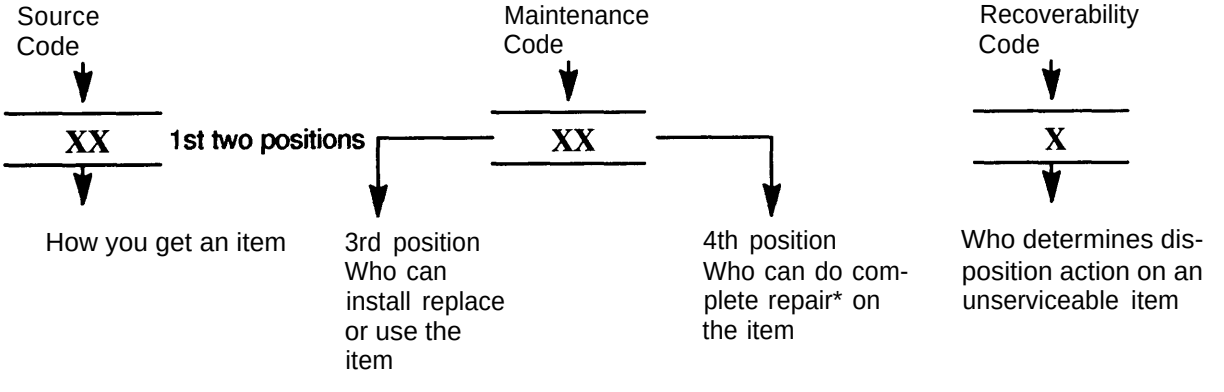
b. SECTION III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

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, CAGE and part number.

F-3. EXPLANATION OF COLUMNS (SECTION II AND SECTION 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:



NOTE

*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 3d 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 3d position of the SMR code. The complete kit must be requisitioned and applied.

Code	Explanation
MO-(Made at org AVUM Level) MF—(Made at DS/ AVUM Level) MH—(Made at Specialized 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 3d 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.

Code	Explanation
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)	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 3d 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.

Code	Explanation
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 CAGE and part number given.	
XC—installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer’s part number.	
XD-item is not stocked. Order an “XD” -coded item through normal supply channels using the CAGE 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—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 “B” 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 item at the level of maintenance shown in 3d position of SMR Code.
O	—Reparable item. When uneconomically 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.

Recoverability Codes — Application/Explanation

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. CAGE (Column (3)). The Commercial and Government Entitiy Code is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

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

NOTE

When you use 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 Cl - Confidential, Phy Sec Cl (S) - Secret, Phy Sec Cl (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 makeup 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 F–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 equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.

(9) The statement “END OF FIGURE” appears just below the last item description in Column (5) for a given figure in both Section II and Section Ill.

(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 quantityofthe item used in the break-out 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.

F-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)

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 Ill and Section Ill.

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

b. PART 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 O through 9 and each following letter or digit in like order).

(1) CAGE 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 (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 Section II and Section 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 Section 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 5-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.

F-5. SPECIAL INFORMATION.

a. USABLE ON CODE. The usable on code appears in the lower left 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. The publications listed below pertains to the Forward Area Refueling Equipment, LaBarge Model Number LPI-FFO500 and its components:

Publication	Short Title
TM 5-4320-313-24	PUMPING ASSEMBLY, FARE SYSTEM
TM 5-4320-313-24P	PUMPING ASSEMBLY, FARE SYSTEM (RPSTL)

F-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 F-4a(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see paragraph F-4b). 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.

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

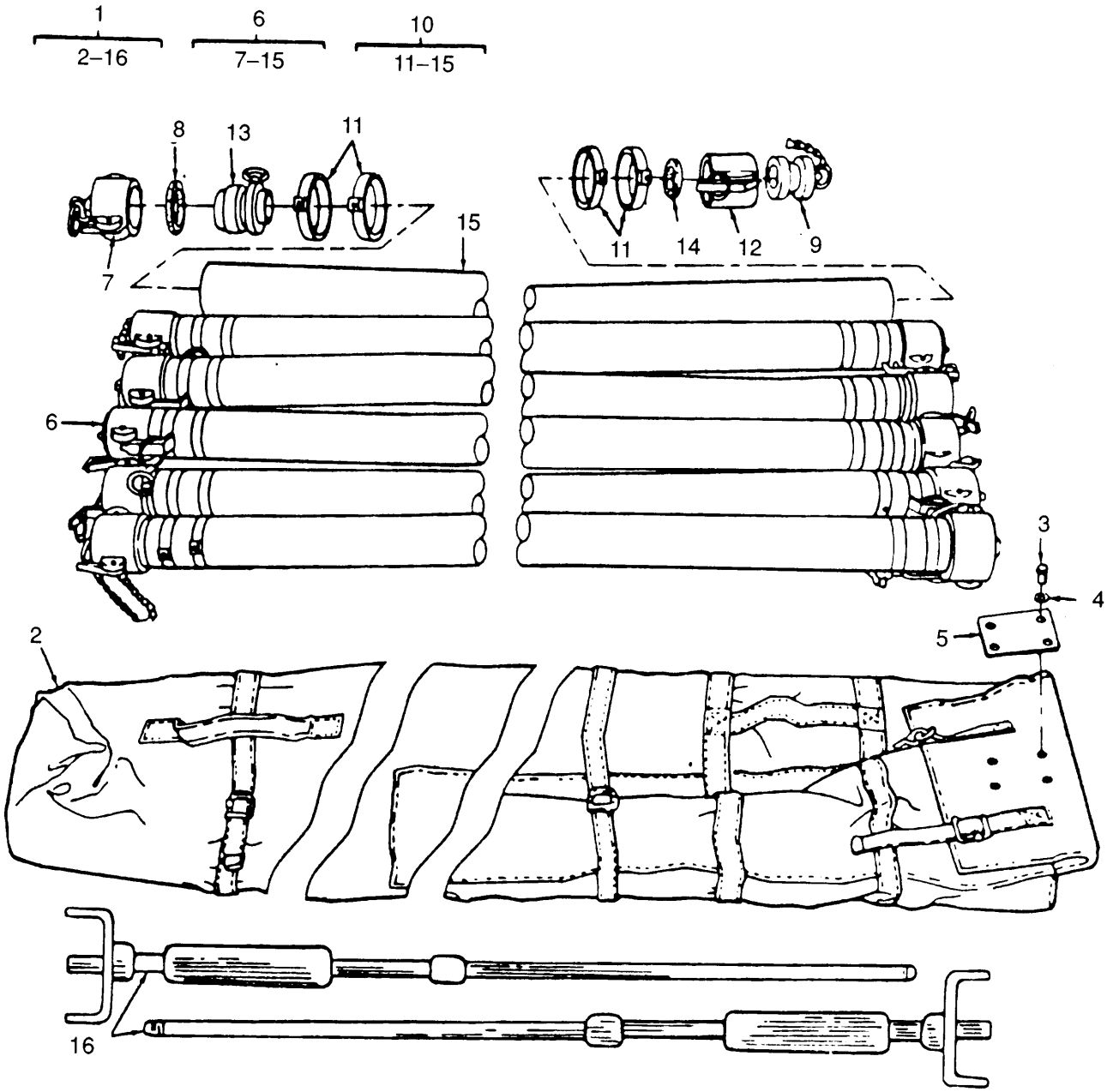


Figure F–1. Suction Hose Kit.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 01 SUCTION HOSE KIT	
				FIG. 1 SUCTION HOSE KIT	
1	PFOOO	97403	13219E0501	SUCTION HOSE KIT	2
2	PCOZZ	97403	13219E0461	.CONTAINER SUCTION H	1
3	PAOZZ	81349	MIL-R-24243/1	.RIVET BLIND	4
4	PAOZZ	96906	MS15795-741	.WASHER, FLAT	4
5	XDOZZ	97403	13219E0496	.PLATE, IDENTIFICATIO	1
6	AOOOO	97403	13219E0464	.HOSE ASSEMBLY, NONME	6
7	PAOZZ	96906	MS27029-11	..PLUG, QUICK DISCONNE	1
8	PCOZZ	96906	MS27030-6	..GASKET	1
9	PAOZZ	96906	MS27028-11	..CAP, QUICK DISCONNEC	1
10	PC000	97403	13217E9444	..HOSE ASSEMBLY, NONME	1
11	XDOZZ	81348	TYPE H WW-C-440	...CLAMP HOSE	4
12	XDOZZ	96906	MS27025-11	...COUPLING HALF, QUICK	1
13	XDOZZ	96906	MS27021-11	...COUPLING HALF, QUICK	1
14	PCOZZ	96906	MS27030-6	...GASKET	1
15	MOOZZ	97403	13217E9444-1	...HOSE RUBBER LIQUID MAKE FROM MIL-H-370, TYPE II, SIZE 6, CUT TO 60 INCHES	1
16	PAOZZ	97403	13219E0462	.ROD, GROUND	2
				END OF FIGURE	

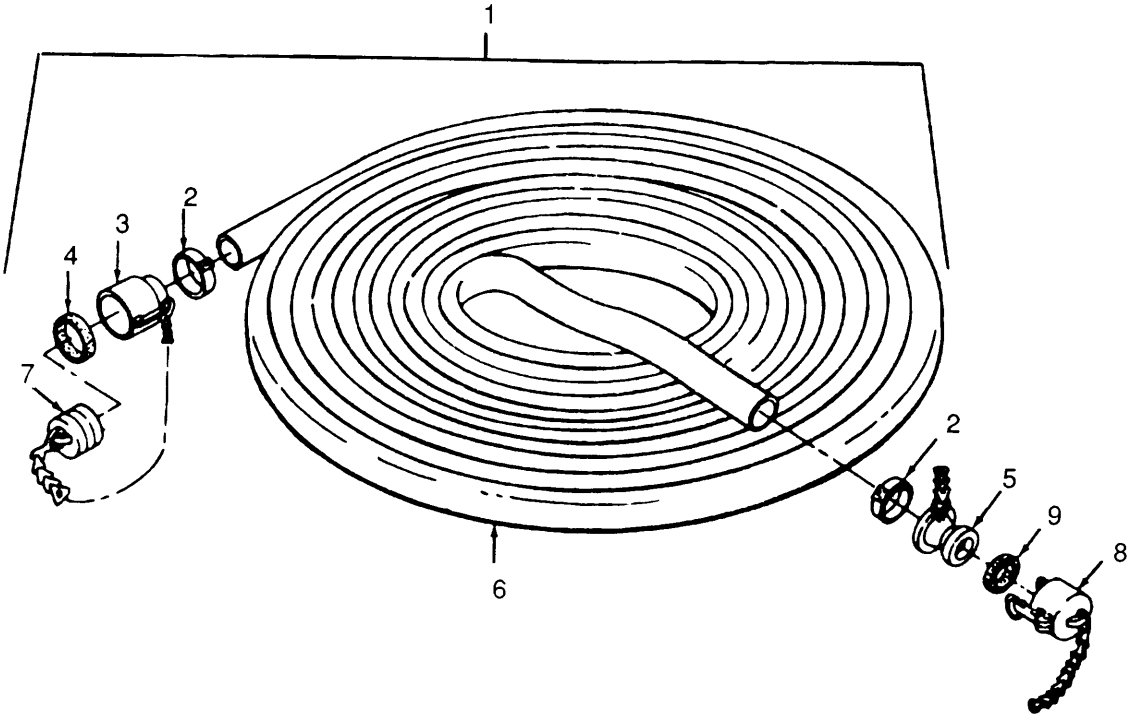


Figure F–2. Hose and Component Kit.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT-T	
				FIG. 2 HOSE AND COMPONENT KIT	
	PFOOO	97403	13219E0503	HOSE AND COMP. T. KIT	1
1	AOOOZ	97403	13219E0465	.HOSE ASSEMBLY, DISCH	2
	PCOOO	97403	13219E0463	..HOSE ASSY DISCHARGE	2
2	XDOZZ	81348	TYPE H WW-C-440	...CLAMP HOSE	4
3	XDOZZ	96906	MS27025-11	...COUPLING HALF, QUICK	2
4	PCOZZ	96906	MS27030-6	...GASKET	1
5	XDOZZ	96906	MS27021-11	...COUPLING HALF, QUICK	2
6	XDOZZ	81349	MIL-H-82127	...HOSE DISCHARGE	50
7	PAOZZ	96906	MS27029-11	..PLUG, QUICK DISCONNE	2
8	PAOZZ	96906	MS27028-11	..CAP, QUICK DISCONNEC	1
9	PCOZZ	96906	MS27030-6	..GASKET	1
				END OF FIGURE	

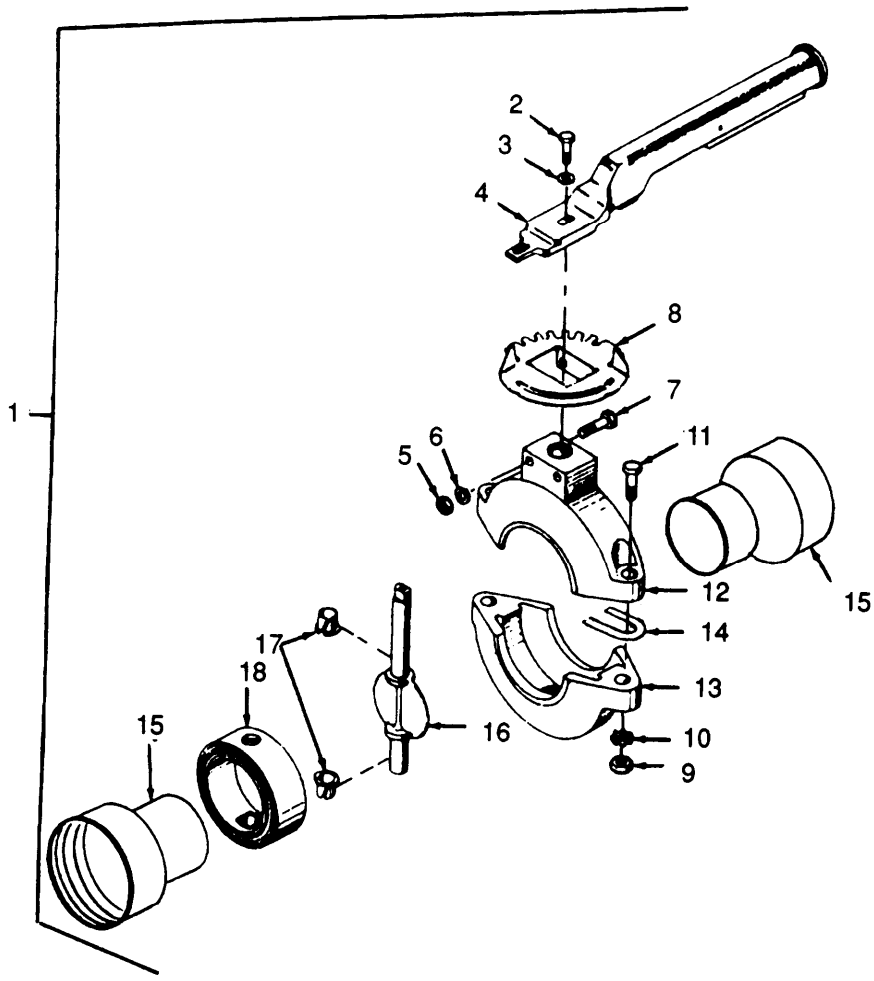


Figure F-3. Butterfly Valve Assembly.

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(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT-T	
				FIG. 3 BUTTERFLY VALVE ASSEMBLY	
	AOOOO	97403	13219E0467	.VALVE ASSY, BUTTERFL	1
1	PAOOZ	97403	13219E0468	..VALVE, BUTTERFLY	1
2	XDOZZ	66208	20-14-04	...BOLT	1
3	XDOZZ	66208	20-15-04	...WASHER FLAT	1
4	XDOZZ	66208	20-07-03	...HANDLE	1
5	XDOZZ	66208	20-13-04	...NUT	2
6	XDOZZ	96906	MS35338-44	...WASHER, LOCK	4
7	XDOZZ	66208	20-12-04	...BOLT	2
8	XDOZZ	66208	20-06-04	...PLATE LATCH	1
9	XDOZZ	66208	20-10-04	...NUT	2
10	XDOZZ	66208	20-11-04	...WASHER LOCK	2
11	XDOZZ	66208	20-09-04	...BOLT	2
12	XDOZZ	66208	20-01-03	...BODY UPPER HALF	1
13	XDOZZ	66208	20-02-03	...BODY LOWER HALF	1
14	XDOZZ	66208	20-16-03	...SPACER	6
15	XDOZZ	66208	20-05-03-SE-FE	...PIPE END	2
16	XDOZZ	66208	20-03-01	...SHAFT AND DISC	1
17	XDOZZ	66208	20-08-02	...BEARING NYLON SPLIT	2
18	XDOZZ	66208	20-04-H	...SEAT BUNA	1
				END OF FIGURE	

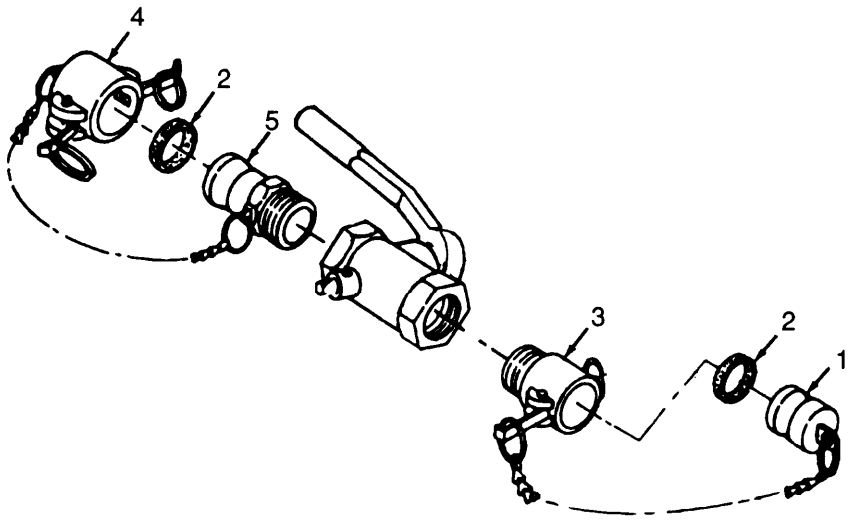

Figure F-4. Kit, Hose and Component.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT-T	
				FIG.4 KIT, HOSE AND COMPONENT	
1	PAOZZ	96906	MS27029-11	..PLUG, QUICK DISCONNE	1
2	PCOZZ	96906	MS27030-6	..GASKET	2
3	PAOZZ	96906	MS27026-11	..COUPLING HALF, QUICK	1
4	PAOZZ	96906	MS27028-11	..CAP, QUICK DISCONNEC	1
5	PAOZZ	96906	MS27022-11	..COUPLING HALF,QUICK	1
				END OF FIGURE	

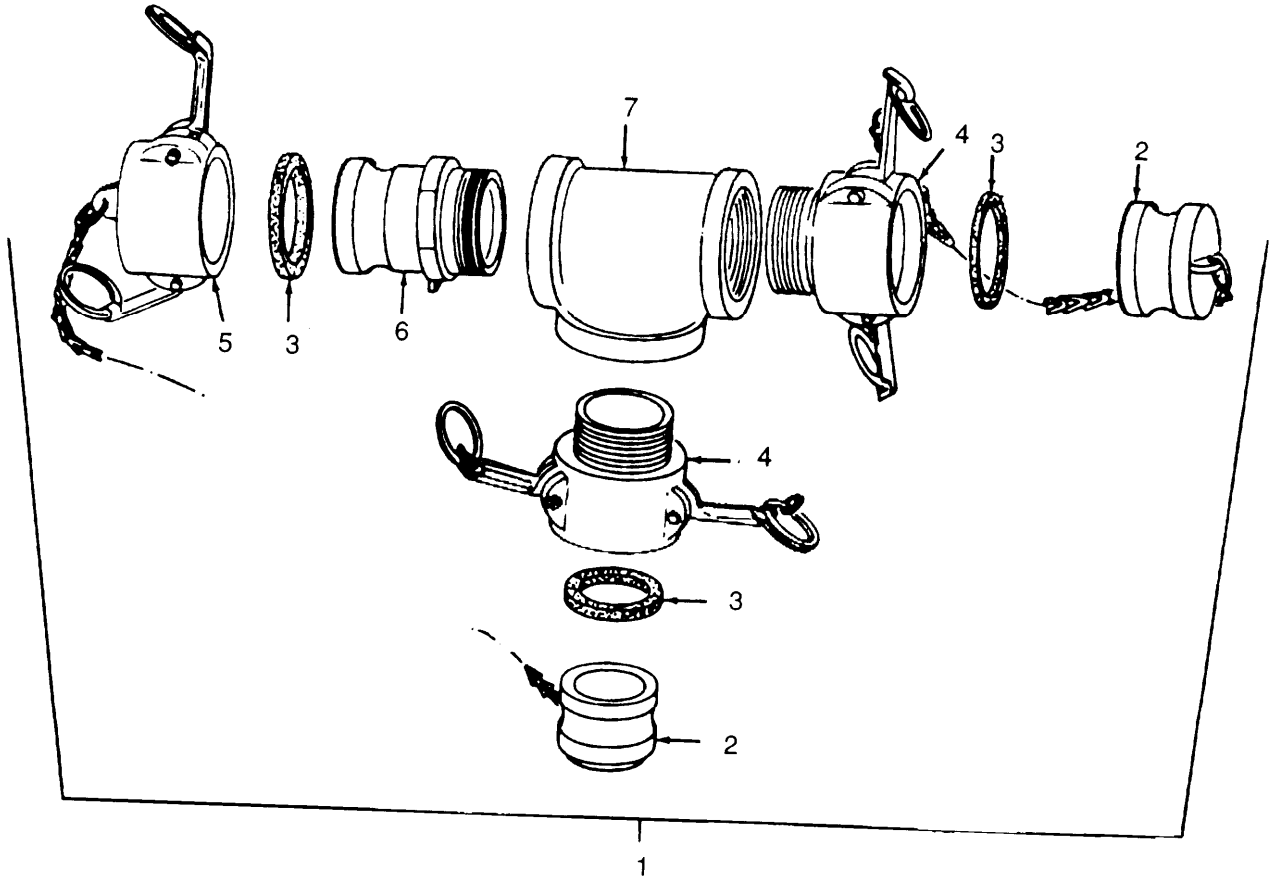

Figure F–5. Tee Assembly.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT	
				FIG. 5 TEE ASSEMBLY	
1	AOOOZ	97403	13219E0476	.WYE, QUICK DISCONNEC	1
2	PAOZZ	96906	MS27029-11	..PLUG, QUICK DISCONNE	2
3	PCOZZ	96906	MS27030-6	..GASKET	3
4	PAOZZ	96906	MS27026-11	..COUPLING HALF, QUICK	2
5	PAOZZ	96906	MS27028-11	..CAP, QUICK DISCONNEC	1
6	PAOZZ	96906	MS27022-11	..COUPLING HALF, QUICK	1
7	PAOZZ	81349	MIL-F-52618	..FITTING TEE	1
				END OF FIGURE	

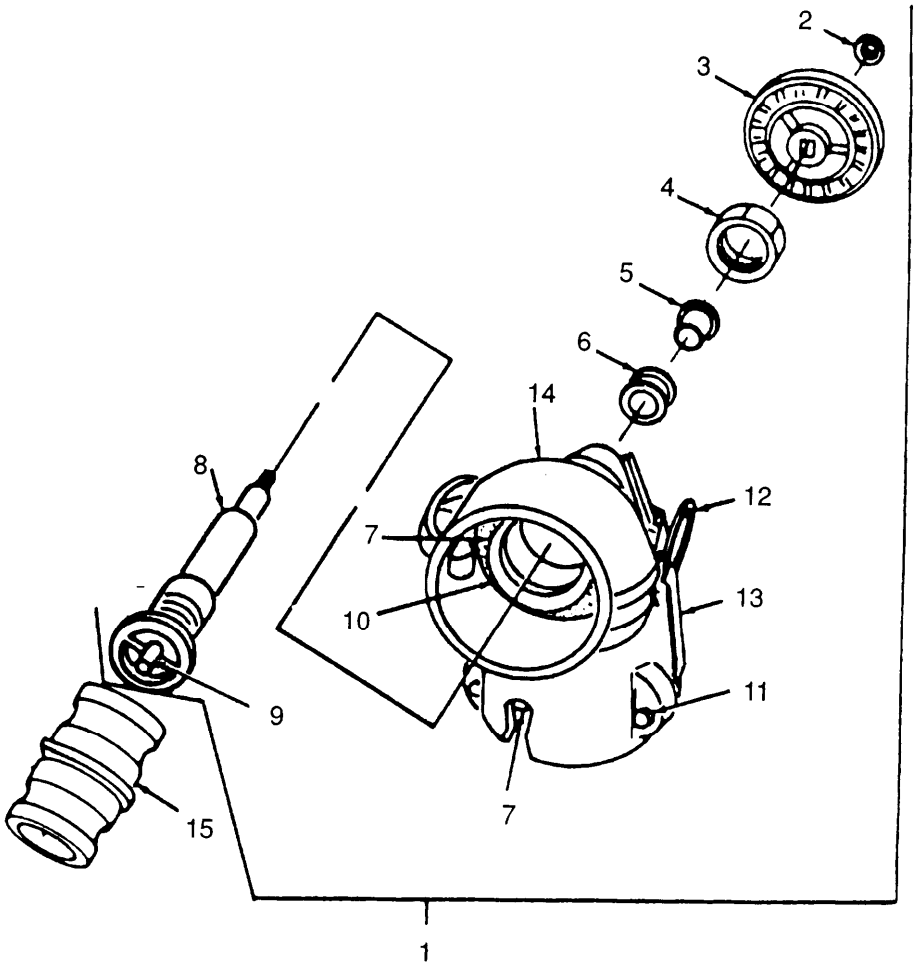

Figure F–6. Valve, Elbow, Coupler.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT-T	
				FIG. 6 VALVE, ELBOW, COUPLER	
1	PAOZZ	97403	13219E0491	.VALVE, ANGLE	1
2	XDOZZ	81718	H500M	..NUT	1
3	XDOZZ	81718	H11AG	..HANDWHEEL	1
4	XDOZZ	81718	H776RB	..NUT PACKING	1
5	XDOZZ	81718	H185RB	..GLAND	1
6	XDOZZ	81718	H234M	..PACKING, PREFORMED	1
7	PCOZZ	96906	MS27030-6	..GASKET	2
8	XDOZZ	81718	H9402	..STEM	1
9	XDOZZ	81718	407RE	..PIN, THRUST	1
10	XDOZZ	81718	H441RB	..RING SEAT	1
11	XDOZZ	81718	H9770RE	..PIN	2
12	XDOZZ	81718	H6451M	..RING, FINGER	2
13	XDOZZ	81718	C3378M	..CAM	2
14	XDOZZ	81718	D263AG	..BODY	1
15	PAOZZ	96906	MS39352-9	.NIPPLE, QUICK-DISCON MALE BY MALE, 2 IN BY 2 IN	1
				END OF FIGURE	

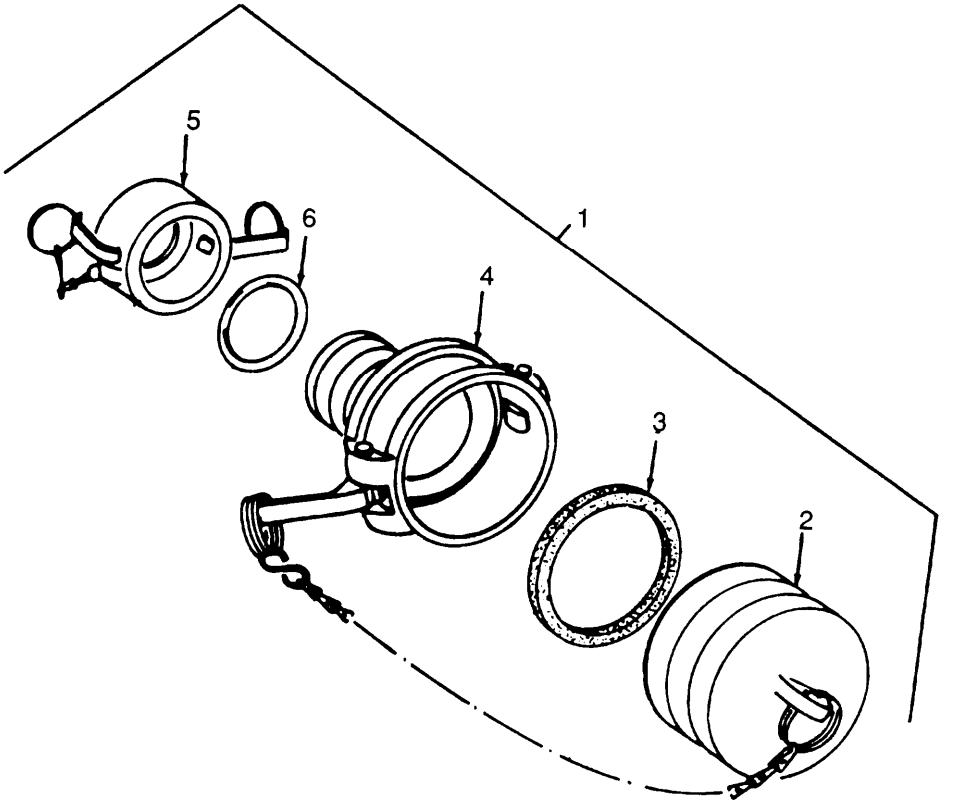

Figure F–7. Adapter Assembly.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT-T	
				FIG. 7 ADAPTER ASSEMBLY	
1	AOOOO	97403	13219E0493	.ADAPTER ASSEMBLY, 3 IN FEMALE BY 2 IN MALE	1
2	PAOZZ	96906	MS27029-15	..PLUG, QUICK DISCONNE	1
3	PCOZZ	96906	MS27030-8	..GASKET	1
4	PAOZZ	96906	MS49000-3	..COUPLING HALF, QUICK FEMALE BY FEMALE 3 IN BY 2 IN	1
5	PAOZZ	96906	MS27028-11	..CAP, QUICK DISCONNEC	1
6	PCOZZ	96906	MS27030-6	..GASKET	1
				END OF FIGURE	

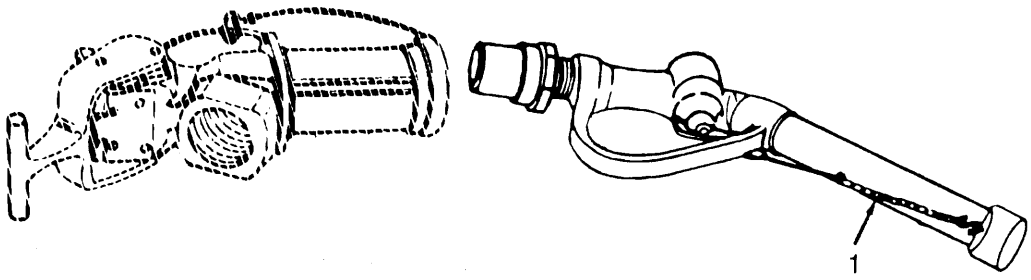

Figure F-8. Nozzle Adapter.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT-T	
				FIG. 8 NOZZLE AND ADAPTER	
1	PAOZZ	97403	13219E0498	.NOZZLE AND ADAPTER	1
				END OF FIGURE	

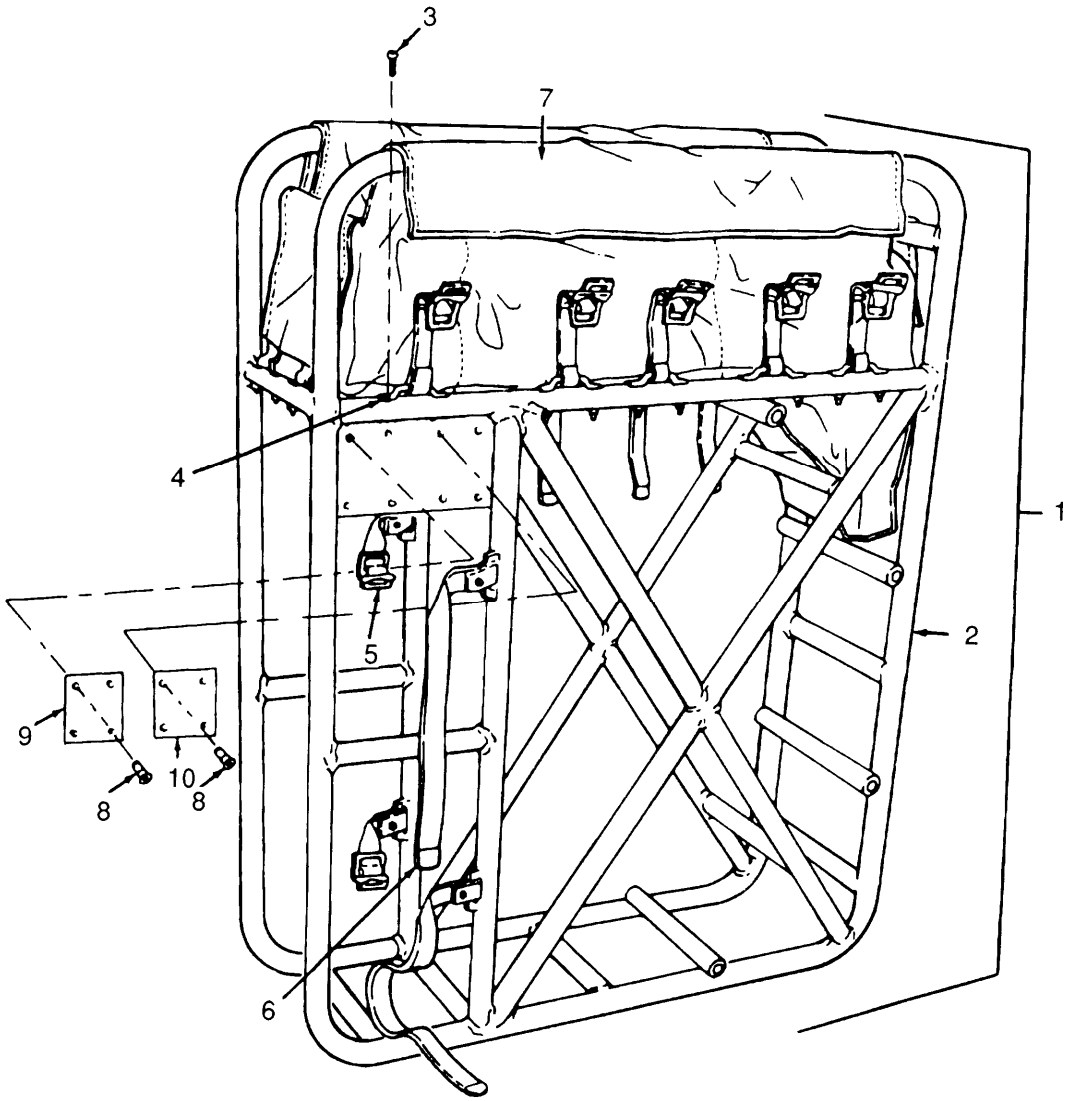

Figure F–9. Frame Assembly, Component Kit.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT-T	
				FIG. 9 FRAME ASSEMBLY, COMPONENT KIT	
1	AOOOO	97403	13219E0470	.FRAME ASSEMBLY	1
2	XBOZZ	97403	13219E0471	..FRAME	1
3	PAOZZ	96906	MS51960-67	..SCREW, MACHINE	40
4	PAOZZ	97403	13219E0469	..LOOP, STRAP FASTENER	20
5	PCOZZ	97403	13219E0472	..STRAP, WEBBING	2
6	PCOZZ	97403	13219E0473	..STRAP, WEBBING	2
7	PCOZZ	97403	13219E0474	..CONTAINER, COMPONENT	1
8	PAOZZ	96906	MS20470A4-4	.RIVET, SOLID	8
9	XBOZZ	97403	13219E0495	.PLATE WARNING	1
10	XBOZZ	97403	13219E0505	.PLATE IDENT	1
				END OF FIGURE	

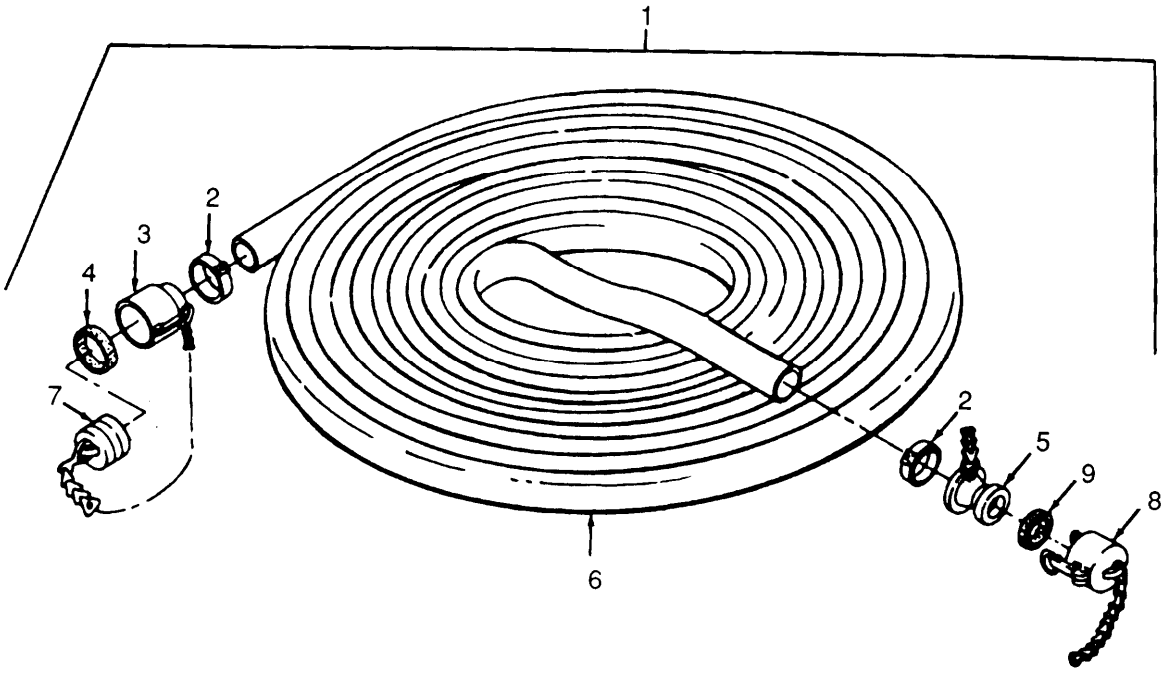

Figure F–10. Kit, Hose and Component.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 03 HOSE AND COMPONENT KIT-Y	
				FIG. 10 KIT HOSE AND COMPONENT	
	PFOOO	97403	13219E0504	HOSE AND COMP. Y. KIT	1
1	AOOOZ	97403	13219E0465	.HOSE ASSEMBLY,DISCH	2
	PAOOO	97403	13219E0463	..HOSE ASSY DISCHARGE	2
2	XDOZZ	81348	TYPE H WW-C-440	...CLAMP HOSE	4
3	XDOZZ	96906	MS27025-11	...COUPLING HALF, QUICK	1
4	PCOZZ	96906	MS27030-6	...GASKET	1
5	XDOZZ	96906	MS27021-11	...COUPLING HALF, QUICK	1
6	PAOZZ	81349	MIL-H-82127	...HOSE DISCHARGE	50
7	PAOZZ	96906	MS27029-11	.PLUG, QUICK DISCONNE	1
8	PAOZZ	96906	MS27028-11	.CAP, QUICK DISCONNEC	1
9	PCOZZ	96906	MS27030-6	.GASKET	1
				END OF FIGURE	

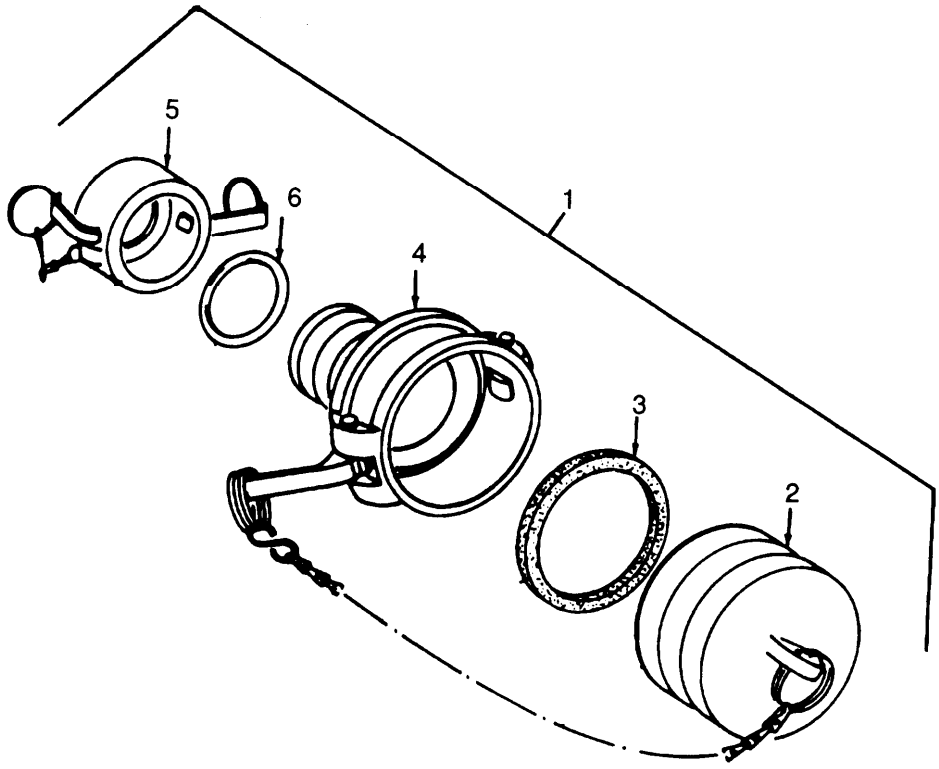

Figure F–11. Adapter Assembly.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 03 HOSE AND COMPONENT KIT-Y	
				FIG. 11 ADAPTER ASSEMBLY	
1	AOOOO	97403	13219E0466	.ADAPTER ASSEMBLY, 4 IN FEMALE BY 2 IN MALE	1
2	PAOZZ	96906	MS27029-17	..PLUG, QUICK DISCONNE	1
3	PCOZZ	96906	MS27030-9	..GASKET	1
4	PAOZZ	96906	MS49000-17	..REDUCER, QUICK DISCO MALE BY FEMALE AND FEMALE BY MALE 4 IN BY 2 IN	1
5	PAOZZ	96906	MS27028-11	..CAP, QUICK DISCONNEC	1
6	PCOZZ	96906	MS27030-6	..GASKET	1
				END OF FIGURE	

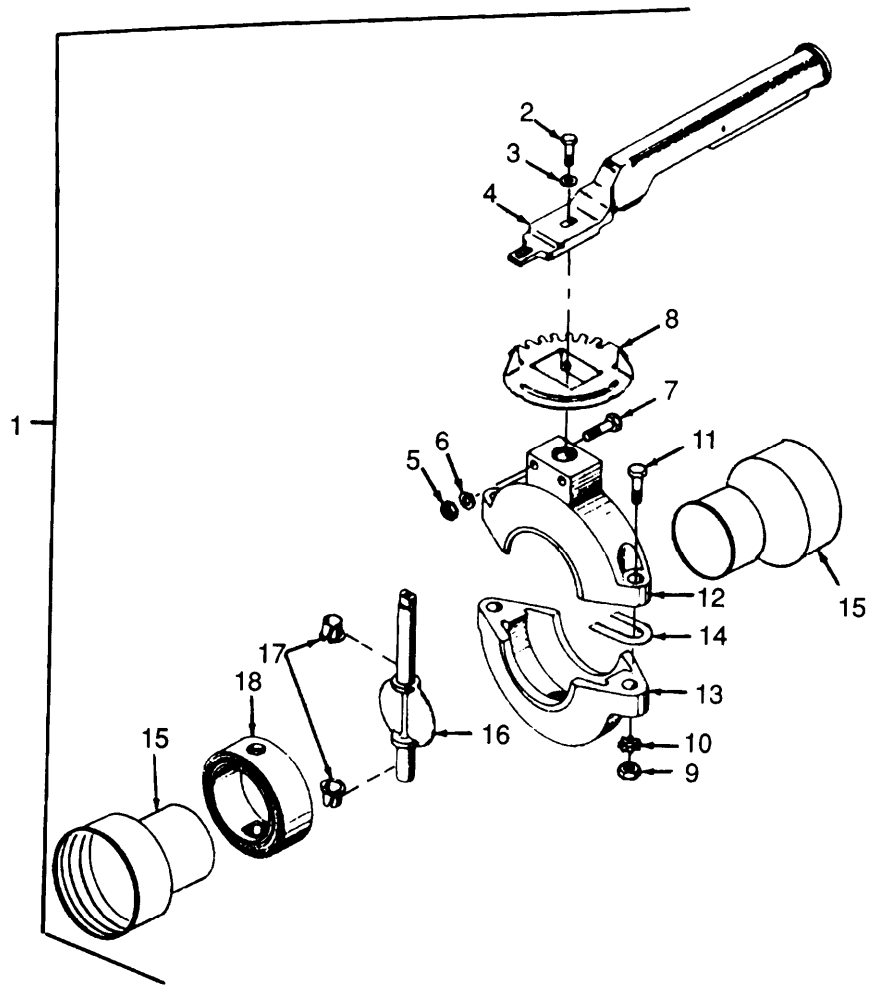

Figure F–12. Butterfly Valve Assembly.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 02 HOSE AND COMPONENT KIT-T	
				FIG. 3 BUTTERFLY VALVE ASSEMBLY	
	AOOOO	97403	13219E0467	.VALVE ASSY, BUTTERFL	1
1	PAOOZ	97403	13219E0468	..VALVE, BUTTERFLY	1
2	XDOZZ	66208	20-14-04	...BOLT	1
3	XDOZZ	66208	20-15-04	...WASHER FLAT	1
4	XDOZZ	66208	20-07-03	...HANDLE	1
5	XDOZZ	66208	20-13-04	...NUT	2
6	XDOZZ	96906	MS35338-44	...WASHER, LOCK	4
7	XDOZZ	66208	20-12-04	...BOLT	2
8	XDOZZ	66208	20-06-04	...PLATE LATCH	1
9	XDOZZ	66208	20-10-04	...NUT	2
10	XDOZZ	66208	20-11-04	...WASHER LOCK	2
11	XDOZZ	66208	20-09-04	...BOLT	2
12	XDOZZ	66208	20-01-03	...BODY UPPER HALF	1
13	XDOZZ	66208	20-02-03	...BODY LOWER HALF	1
14	XDOZZ	66208	20-16-03	...SPACER	6
15	XDOZZ	66208	20-05-03-SE-FE	...PIPE END	2
16	XDOZZ	66208	20-03-01	...SHAFT AND DISC	1
17	XDOZZ	66208	20-08-02	...BEARING NYLON SPLIT	2
18	XDOZZ	66208	20-04-H	...SEAT BUNA	1
				END OF FIGURE	

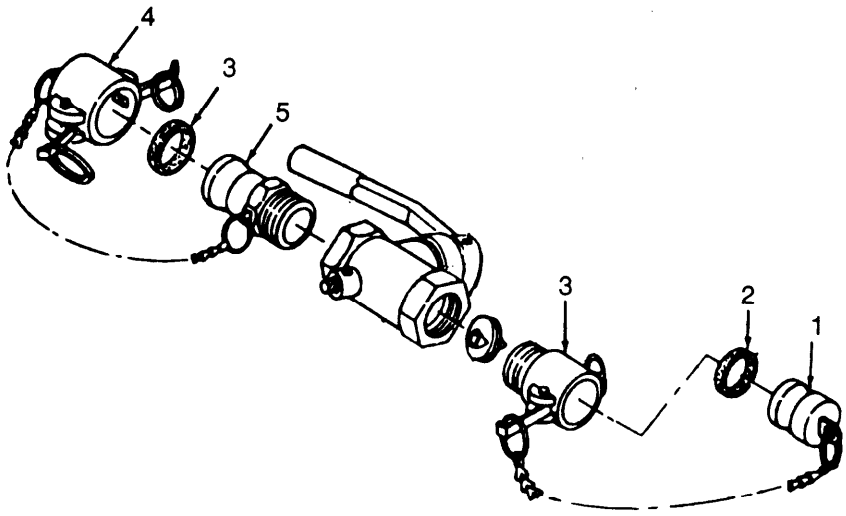

Figure F–13. Kit, Hose and Component.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 03 HOSE AND COMPONENT KIT-Y	
				FIG. 13 KIT, HOSE AND COMPONENT	
1	PAOZZ	96906	MS27029-11	..PLUG, QUICK DISCONNE	1
2	PCOZZ	96906	MS27030-6	..GASKET	2
3	PAOZZ	96906	MS27026-11	..COUPLING HALF, QUICK	1
4	PAOZZ	96906	MS27028-11	..CAP,QUICK DISCONNEC	1
5	PAOZZ	96906	MS27022-11	..COUPLING HALF, QUICK	1
				END OF FIGURE	

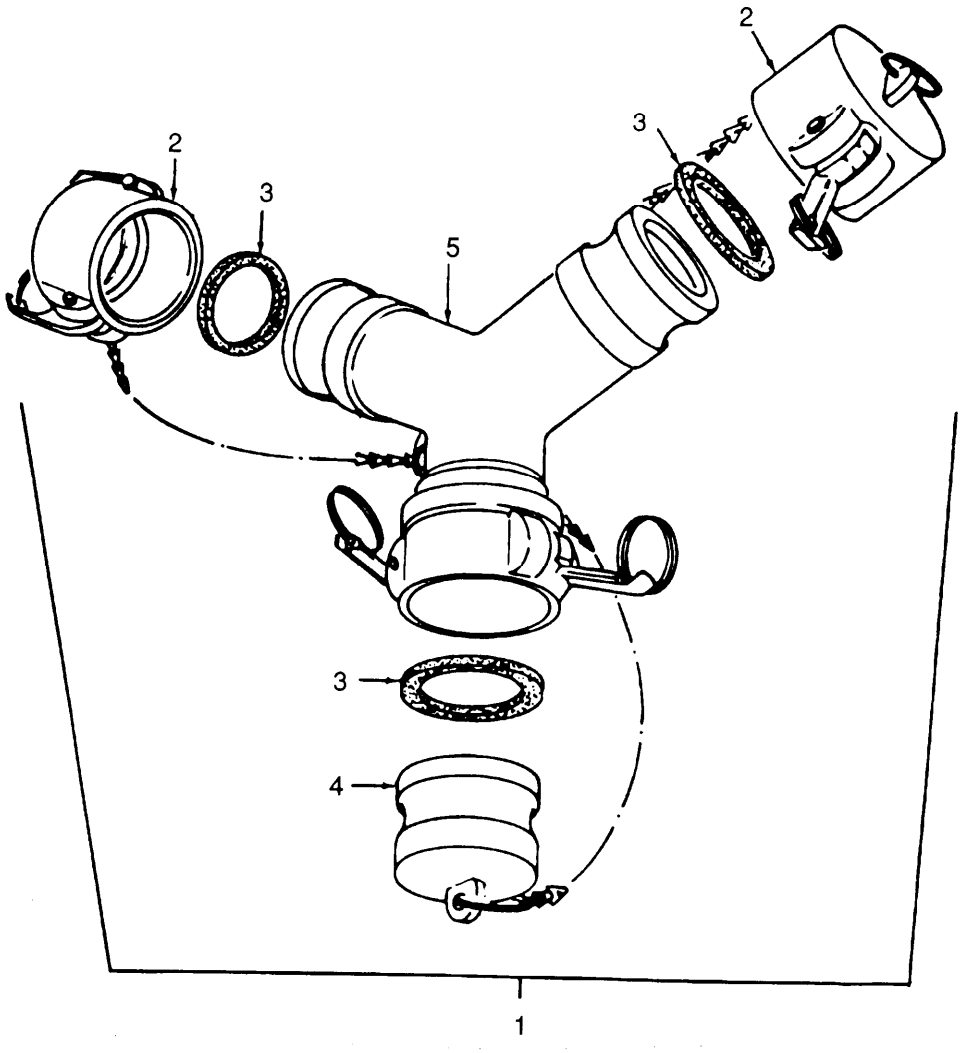

Figure F–14. Wye Fitting Assembly.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 03 HOSE AND COMPONENT KIT-Y	
				FIG. 14 WYE FITTING ASSEMBLY	
1	AOOOZ	97403	13219E0475	.WYE FITTING ASSEMBL	1
2	PAOZZ	96906	MS27028-11	..CAP, QUICK DISCONNEC	2
3	PCOZZ	96906	MS27030-6	..GASKET	3
4	PAOZZ	96906	MS27029-11	..PLUG, QUICK DISCONNE	1
5	PAOZZ	97403	13219E0477	..WYE, QUICK DISCONNEC	1
				END OF FIGURE	

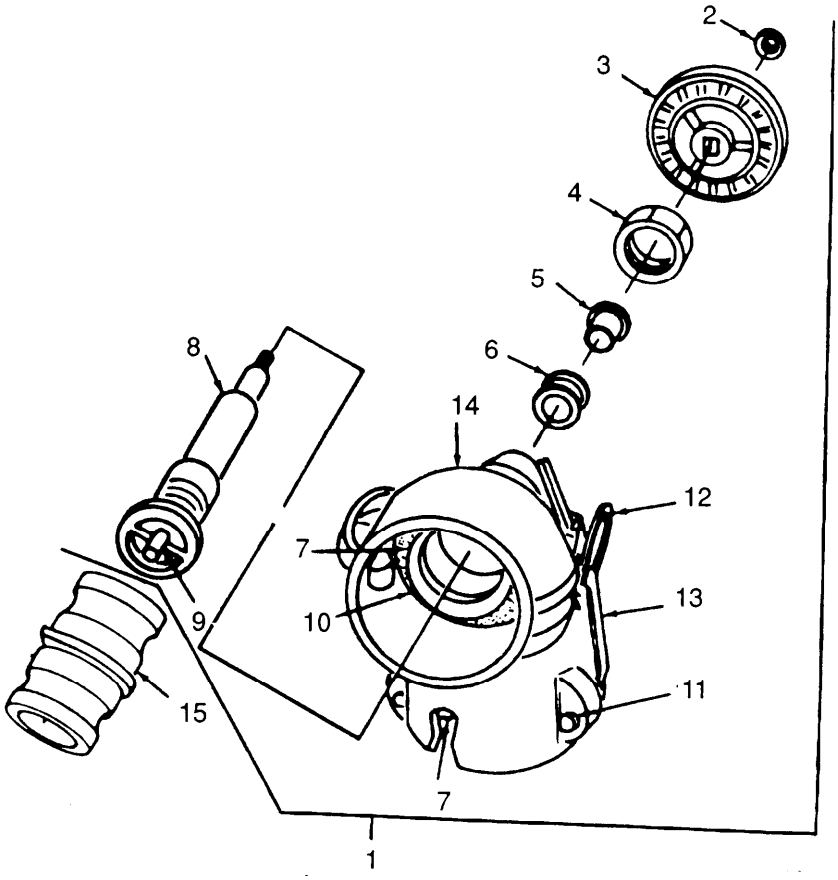

Figure F–15. Valve, Elbow, Coupler.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 03 HOSE AND COMPONENT KIT-Y	
				FIG. 15 VALVE, ELBOW, COUPLER	
1	PAOZZ	97403	13219E0491	.VALVE, ANGLE	1
2	XDOZZ	81718	H500M	..NUT	1
3	XDOZZ	81718	H11AG	..HANDWHEEL	1
4	XDOZZ	81718	H776RB	..NUT PACKING	1
5	XDOZZ	81718	H185RB	..GLAND	1
6	XDOZZ	81718	H234M	..PACKING, PREFORMED	1
7	PCOZZ	96906	MS27030-6	..GASKET	2
8	XDOZZ	81718	H9402	..STEM	1
9	XDOZZ	81718	407RE	..PIN, THRUST	1
10	XDOZZ	81718	H4418	..RING SEAT	1
11	XDOZZ	81718	H9770RE	..PIN	2
12	XDOZZ	81718	H6451M	..RING, FINGER	2
13	XDOZZ	81718	C3378M	..CAM	2
14	XDOZZ	81718	D263AG	..BODY	1
15	PAOZZ	96906	MS39352-9	.NIPPLE,QUICK-DISCON MALE BY MALE, 2 IN BY 2 IN	1
				END OF FIGURE	

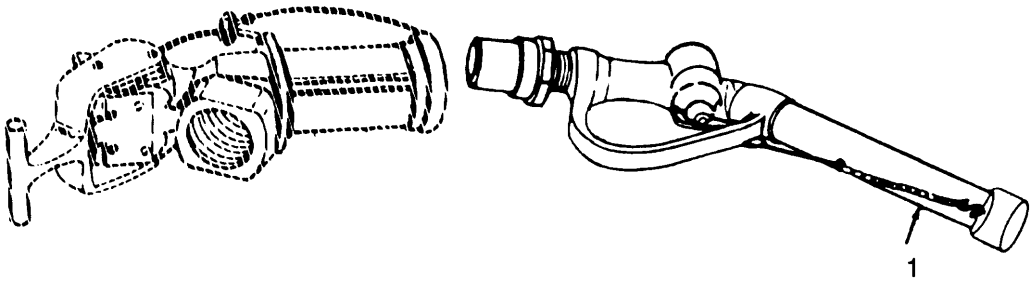

Figure F–16. Nozzle Adapter.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 03 HOSE AND COMPONENT KIT-Y	
				FIG. 16 NOZZLE ADAPTER	
1	PAOZZ	97403	13219E0498	.NOZZLE AND ADAPTER	1
				END OF FIGURE	

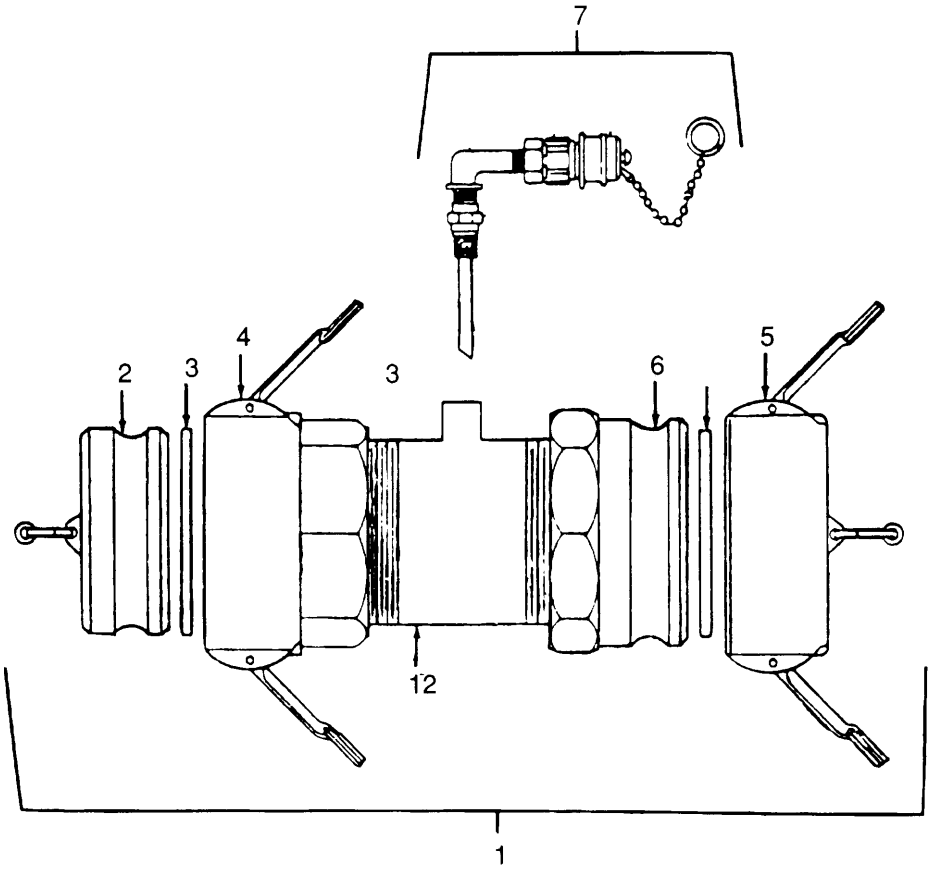

Figure F–17. Adapter, Water Detector Kit.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 03 HOSE AND COMPONENT KIT-Y	
				FIG. 17 ADAPTER, WATER DETECTOR KIT	
1	AOOOZ	97403	13220E9406-1	.ADAPTER ASSEMBLY, WA	1
2	PAOZZ	96906	MS27029-11	..PLUG, QUICK DISCONNE	1
3	PCOZZ	96906	MS27030-6	..GASKET	2
4	PAOZZ	96906	MS27024-11	..COUPLING HALF, QUICK	1
5	PAOZZ	96906	MS27028-11	..CAP, QUICK DISCONNEC	1
6	PAOZZ	96906	MS27020-11	..COUPLING HALF, QUICK	1
7	PAOZZ	32218	13220E9914-1	..PROBE ASSEMBLY, WATE	1
				END OF FIGURE	

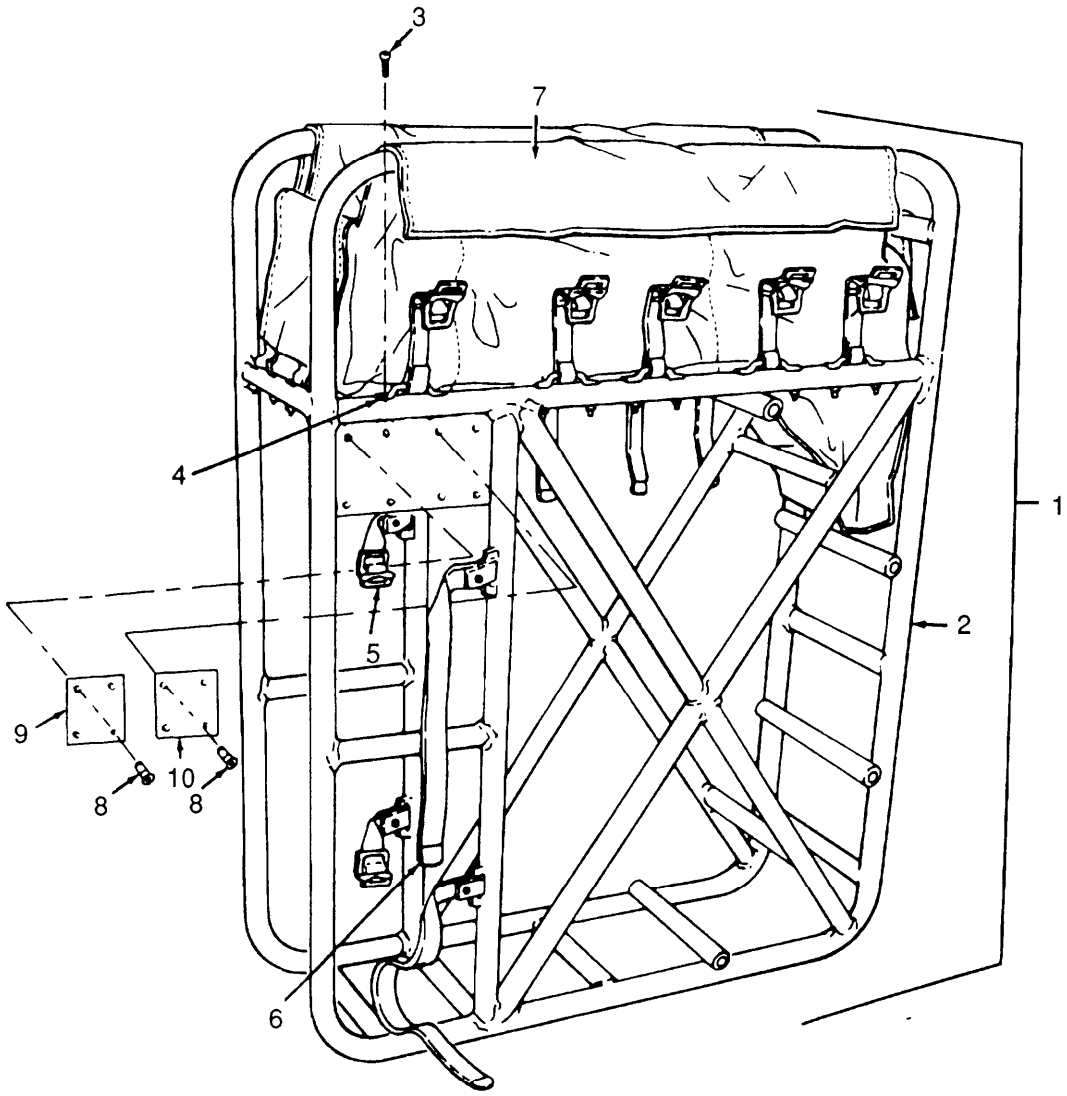

Figure F–18. Frame Assembly, Component Kit.

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 03 HOSE AND COMPONENT KIT-Y	
				FIG. 18 FRAME ASSEMBLY, COMPONENT KIT	
1	AOOOO	97403	13219E0470	.FRAME ASSEMBLY	1
2	XBOZZ	97403	13219E0471	..FRAME	1
3	PAOZZ	96906	MS51960-67	..SCREW, MACHINE	40
4	PAOZZ	97403	13219E0469	..LOOP, STRAP FASTENER	20
5	PCOZZ	97403	13219E0472	..STRAP, WEBBING	2
6	PCOZZ	97403	13219E0473	..STRAP, WEBBING	2
7	PCOZZ	97403	13219E0474	..CONTAINER, COMPONENT	1
8	PAOZZ	96906	MS20470A4-4	.RIVET, SOLID	8
9	XBOZZ	97403	13219E0495	.PLATE WARNING	1
10	XBOZZ	97403	13219E0506	.PLATE IDENT	1
				END OF FIGURE	

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				GROUP 04 BULK MATERIALS LIST	
				FIG. BULK	
1	PBOZZ	81349 TYPE II	MIL-H-370	HOSE, RUBBER	V

SECTION III. SPECIAL TOOLS LIST

(Not Applicable)

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5305-00-071-1324	9	3	4730-00-915-5127	10	7
	18	3		13	1
4730-00-079-1362	17	6		14	4
5330-00-088-9166	7	3		17	2
4730-00-088-9285	4	3	4730-00-929-0790	7	2
	5	4	4730-00-938-7997	4	5
	13	3		5	6
4720-00-253-5535	10	6		13	5
5310-00-257-6228	1	4	4730-00-951-3294	7	4
4930-00-475-3057	2		5340-01-003-7714	9	5
4930-00-483-3849	10			18	5
4930-00-503-0380	9	7	5340-01-003-7715	9	6
	18	7		18	6
4820-00-507-0114	3	1	5340-01-003-7718	9	4
	12	1		18	4
4930-00-513-9906	1	1	4730-01-009-1735	6	15
4930-00-516-0839	8	1		15	15
	16	1	4930-01-017-3638	17	7
5320-00-584-9078	9	8	5975-01-050-5707	1	16
	18	8	4730-01-064-0560	11	4
5330-00-612-2414	1	8	4730-01-068-5070	14	5
	1	18	4930-01-069-9054	1	2
	2	4	4720-01-134-7315	1	10
	2	9	4820-01-167-6550	6	1
	4	2		15	1
	5	3			
	7	6			
	10	4			
	10	9			
	11	6			
	13	2			
	14	3			
	17	3			
4730-00-640-6188	11	2			
4730-00-649-9100	1	9			
	2	8			
	4	4			
	5	5			
	7	5			
	10	8			
	11	5			
	13	4			
	14	2			
	17	5			
4730-00-649-9103	17	4			
5330-00-899-4509	11	3			
4730-00-915-5127	1	7			
	2	7			
	4	1			
	5	2			

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGE	PART NUMBER	STOCK NUMBER	FIG.	ITEM
81718	C3378M		6	13
			15	13
81718	D263AG		6	14
			15	14
81718	H11AG		6	3
			15	3
81718	H185RB		6	5
			15	5
81718	H234M		6	6
			15	6
81718	H441RB		6	10
81718	H4418		15	10
81718	H500M		6	2
			15	2
81718	H6451M		6	12
			15	12
81718	H776RB		6	4
			15	4
81718	H9402		6	8
			15	8
81718	H9770RE		6	11
			15	11
81349	MIL-F-52618		5	7
81348	MIL-H-370 TYPE II		BULK	1
81349	MIL-H-82127		2	6
		4720-00-253-5535	10	6
81349	MIL-R-24243/1		1	3
96906	MS15795-741	5310-00-257-6228	1	4
96906	MS20470A4-4	5320-00-584-9078	9	8
			18	8
96906	MS27020-11	4730-00-079-1362	17	6
96906	MS27021-11		1	13
			2	5
			10	5
96906	MS27022-11	4730-00-938-7997	4	5
			5	6
			13	5
96906	MS27024-11	4730-00-649-9103	17	4
96906	MS27025-11		1	12
			2	3
			10	3
96906	MS27026-11	4730-00-088-9285	4	3
			5	4
			13	3
96906	MS27028-11	4730-00-649-9100	1	9
			2	8
			4	4
			5	5
			7	5
			10	8
			11	5

SECTION IV

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGE	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS27028-11	4730-00-649-9100	13	4
			14	2
			17	5
96906	MS27029-11	4730-00-915-5127	1	7
			2	7
			4	1
			5	2
			10	7
			13	1
			14	4
			17	2
96906	MS27029-15	4730-00-929-0790	7	2
96906	MS27029-17	4730-00-640-6188	11	2
96906	MS27030-6	5330-00-612-2414	1	8
			1	14
			2	4
			2	9
			4	2
			5	3
			6	7
			7	6
			10	4
			10	9
			11	6
			13	2
			14	3
			15	7
			17	3
96906	MS27030-8	5330-00-088-9166	7	3
96906	MS27030-9	5330-00-899-4509	11	3
96906	MS35338-44		3	6
			12	6
96906	MS39352-9	4730-01-009-1735	6	15
			15	15
96906	MS49000-17	4730-01-064-0560	11	4
96906	MS49000-3	4730-00-951-3294	7	4
96906	MS51960-67	5305-00-071-1324	9	3
			18	3
81348	TYPE H WW-C-440		1	11
			2	2
			10	2
97403	13217E9444	4720-01-134-7315	1	10
97403	13217E94444-1		1	15
97403	13219E0461	4930-01-069-9054	1	2
97403	13219E0462	5975-01-050-5707	1	16
97403	13219E0463		2	
			10	
97403	13219E0464		1	6
97403	13219E0465		2	1
			10	1
97403	13219E0466		11	1
97403	13219E0467		3	

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGE	PART NUMBER	STOCK NUMBER	FIG.	ITEM
97403	13219E0467		12	
97403	13219E0468	4820-00-507-0114	3	1
			12	1
97403	13219E0469	5340-01-003-7718	9	4
			18	4
97403	13219E0470		9	1
			18	1
97403	13219E0471		9	2
			18	2
97403	13219E0472	5340-01-003-7714	9	5
			18	5
97403	13219E0473	5340-01-003-7715	9	6
			18	6
97403	13219E0474	4930-00-503-0380	9	7
			18	7
97403	13219E0475		14	1
97403	13219E0476		5	1
97403	13219E0477	4730-01-068-5070	14	5
97403	13219E0491	4820-01-167-6550	6	1
			15	1
97403	13219E0493		7	1
97403	13219E0495		9	9
			18	9
97403	13219E0496		1	5
97403	13219E0498	4930-00-516-0839	8	1
			16	1
97403	13219E0501	4930-00-513-9906	1	1
97403	13219E0503	4930-00-475-3057	2	
97403	13219E0504	4930-00-483-3849	10	
97403	13219E0505		9	10
97403	13219E0506		18	10
97403	13220E9406-1		17	1
32218	13220E9914-1	4930-01-017-3638	17	7
66208	20-01-03		3	12
			12	12
66208	20-02-03		3	13
			12	13
66208	20-03-01		3	16
			12	16
66208	20-04-H		3	18
			12	18
66208	20-05-03-SE-FE		3	15
			12	15
66208	20-06-04		3	8
			12	8
66208	20-07-03		3	4
			12	4
66208	20-08-02		3	17
			12	17
66208	20-09-04		3	11
			12	11

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGE	PART NUMBER	STOCK NUMBER	FIG.	ITEM
66208	20-10-04		3	9
			12	9
66208	20-11-04		3	10
			12	10
66208	20-12-04		3	7
			12	7
66208	20-13-04		3	5
			12	5
66208	20-14-04		3	2
			12	2
66208	20-15-04		3	3
			12	3
66208	20-16-03		3	14
			12	14
81718	407RE		6	9
			15	9

SECTION IV

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
1	1	4930-00-513-9906	97403	13219E0501
1	2	4930-01-069-9054	97403	13219E0461
1	3		81349	MIL-R-24243/1
1	4	5310-00-257-6228	96906	MS15795-741
1	5		97403	13219E0496
1	6		97403	13219E0464
1	7	4730-00-915-5127	96906	MS27029-11
1	8	5330-00-612-2414	96906	MS27030-6
1	9	4730-00-649-9100	96906	MS27028-11
1	10	4720-01-134-7315	97403	13217E9444
1	11		81348	TYPE H WW-C-440
1	12		96906	MS27025-11
1	13		96906	MS27021-11
1	14	5330-00-612-2414	96906	MS27030-6
1	15		97403	13217E9444-1
1	16	5975-01-050-5707	97403	13219E0462
2			97403	13219E0463
2		4930-00-475-3057	97403	13219E0503
2	1		97403	13219E0465
2	2		81348	TYPE H WW-C-440
2	3		96906	MS27025-11
2	4	5330-00-612-2414	96906	MS27030-6
2	5		96906	MS27021-11
2	6		81349	MIL-H-82127
2	7	4730-00-915-5127	96906	MS27029-11
2	8	4730-00-649-9100	96906	MS27028-11
2	9	5330-00-612-2414	96906	MS27030-6
3			97403	13219E0467
3	1	4820-00-507-0114	97403	13219E0468
3	2		66208	20-14-04
3	3		66208	20-15-04
3	4		66208	20-07-03
3	5		66208	20-13-04
3	6		96906	MS35338-44
3	7		66208	20-12-04
3	8		66208	20-06-04
3	9		66208	20-10-04
3	10		66208	20-11-04
3	11		66208	20-09-04
3	12		66208	20-01-03
3	13		66208	20-02-03
3	14		66208	20-16-03
3	15		66208	20-05-03-SE-FE
3	16		66208	20-03-01
3	17		66208	20-08-02
3	18		66208	20-04-H
4	1	4730-00-915-5127	96906	MS27029-11
4	2	5330-00-612-2414	96906	MS27030-6
4	3	4730-00-088-9285	96906	MS27026-11
4	4	4730-00-649-9100	96906	MS27028-11
4	5	4730-00-938-7997	96906	MS27022-11

SECTION IV
CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
5	1		97403	13219E0476
5	2	4730-00-915-5127	96906	MS27029-11
5	3	5330-00-612-2414	96906	MS27030-6
5	4	4730-00-088-9285	96906	MS27026-11
5	5	4730-00-649-9100	96906	MS27028-11
5	6	4730-00-938-7997	96906	MS27022-11
5	7		81349	MIL-F-52618
6	1	4820-01-167-6550	97403	13219E0491
6	2		81718	H500M
6	3		81718	H11AG
6	4		81718	H776RB
6	5		81718	H185RB
6	6		81718	H234M
6	7		96906	MS27030-6
6	8		81718	H9402
6	9		81718	407RE
6	10		81718	H441RB
6	11		81718	H9770RE
6	12		81718	H6451M
6	13		81718	C3378M
6	14		81718	D263AG
6	15	4730-01-009-1735	96906	MS39352-9
7	1		97403	13219E0493
7	2	4730-00-929-0790	96906	MS27029-15
7	3	5330-00-088-9166	96906	MS27030-8
7	4	4730-00-951-3294	96906	MS49000-3
7	5	4730-00-649-9100	96906	MS27028-11
7	6	5330-00-612-2414	96906	MS27030-6
8	1	4930-00-516-0839	97403	13219E0498
9	1		97403	1219E0470
9	2		97403	13219E0471
9	3	5305-00-071-1324	96906	MS51960-67
9	4	5340-01-003-7718	97403	13219E0469
9	5	5340-01-003-7714	97403	13219E0472
9	6	5340-01-003-7715	97403	13219E0473
9	7	4930-00-503-0380	97403	13219E0474
9	8	5320-00-584-9078	96906	MS20470A4-4
9	9		97403	13219E0495
9	10		97403	13219E0505
10			97403	13219E0463
10		4930-00-483-3849	97403	13219E0504
10	1		97403	13219E0465
10	2		81348	TYPE H WW-C-440
10	3		96906	MS27025-11
10	4	5330-00-612-2414	96906	MS27030-6
10	5		96906	MS27021-11
10	6	4720-00-253-5535	81349	MIL-H-82127
10	7	4730-00-915-5127	96906	MS27029-11
10	8	4730-00-649-9100	96906	MS27028-11
10	9	5330-00-612-2414	96906	MS27030-6
11	1		97403	13219E0466
11	2	4730-00-640-6188	96906	MS27029-17

SECTION IV

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
11	3	5330-00-899-4509	96906	MS27030-9
11	4	4730-01-064-0560	96906	MS49000-17
11	5	4730-00-649-9100	96906	MS27028-11
11	6	5330-00-612-2414	96906	MS27030-6
12			97403	13219E0467
12	1	4820-00-507-0114	97403	13219E0468
12	2		66208	20-14-04
12	3		66208	20-15-04
12	4		66208	20-07-03
12	5		66208	20-13-04
12	6		96906	MS35338-44
12	7		66208	20-12-04
12	8		66208	20-06-04
12	9		66208	20-10-04
12	10		66208	20-11-04
12	11		66208	20-09-04
12	12		66208	20-01-03
12	13		66208	20-02-03
12	14		66208	20-16-03
12	15		66208	20-05-03-SE-FE
12	16		66208	20-03-01
12	17		66208	20-08-02
12	18		66208	20-04-H
13	1	4730-00-915-5127	96906	MS27029-11
13	2	5330-00-612-2414	96906	MS27030-6
13	3	4730-00-088-9285	96906	MS27026-11
13	4	4730-00-649-9100	96906	MS27028-11
13	5	4730-00-938-7997	96906	MS27022-11
14	1		97403	13219E0475
14	2	4730-00-649-9100	96906	MS27028-11
14	3	5330-00-612-2414	96906	MS27030-6
14	4	4730-00-915-5127	96906	MS27029-11
14	5	4730-01-068-5070	97403	13219E0477
15	1	4820-01-167-6550	97403	13219E0491
15	2		81718	H500M
15	3		81718	H11AG
15	4		81718	H776RB
15	5		81718	H185RB
15	6		81718	H234M
15	7		96906	MS27030-6
15	8		81718	H9402
15	9		81718	407RE
15	10		81718	H4418
15	11		81718	H9770RE
15	12		81718	H6451M
15	13		81718	C3378M
15	14		81718	D263AG
15	15	4730-01-009-1735	96906	MS39352-9
16	1	4930-00-516-0839	97403	13219E0498
17	1		97403	13220E9406-1
17	2	4730-00-915-5127	96906	MS27029-11

SECTION IV

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
17	3	5330-00-612-2414	96906	MS27030-6
17	4	4730-00-649-9103	96906	MS27024-11
17	5	4730-00-649-9100	96906	MS27028-11
17	6	4730-00-079-1362	96906	MS27020-11
17	7	4930-01-017-3638	32218	13220E9914-1
18	1		97403	13219E0470
18	2		97403	13219E0471
18	3	5305-00-071-1324	96906	MS51960-67
18	4	5340-01-003-7718	97403	13219E0469
18	5	5340-01-003-7714	97403	13219E0472
18	6	5340-01-003-7715	97403	13219E0473
18	7	4930-00-503-0380	97403	13219E0474
18	8	5320-00-584-9078	96906	MS20470A4-4
18	9		97403	13219E0495
18	10		97403	13219E0506
BULK	1		81349	MIL-H-370 TYPE II

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- Q -

- R –

— S -

ALPHABETICAL INDEX - Continued.

Page

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- U -

- V -

ALPHABETICAL INDEX - Continued.

Page

- W -

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary *of the* Army

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SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
CDR, 1st Br, 65th ADA
ATTN: SP4 J. Brown
Key West, FL 33040

DATE SENT
10 Jun 79

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1430-550-34-1	7 Sep 72 .	Unit of Radar Set AN/MPQ-50 Tested at the HFC

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
9-19		9-5	
21-2	step 1C	21-2	

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

"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.

Reads: Multimeter B indicates 600 K ohms to 9000 K ohms.

Change to read: Multimeter B indicates 600 K ohms minimum.

Reason: Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER
SP4 J.T. Brown, Jr.

SIGN HERE
SP4 James Brown, Jr.

DA FORM 2 JUL 79 2028-2

REPLACES DA FORM 2028-2, 1 APR 78 WHICH WILL BE USED UNTIL EXHAUSTED
AMSAV-M Overprint 3, 1 Mar 91

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REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

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TM 10-4930-238-12&P	30 June 1993	FORWARD AREA REFUELING EQUIPMENT

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

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

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The Metric System and Equivalents

Linear Measure

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

Weights

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

Liquid Measure

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

Square Measure

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

Cubic Measure

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

Approximate Conversion Factors

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

Temperature (Exact)

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