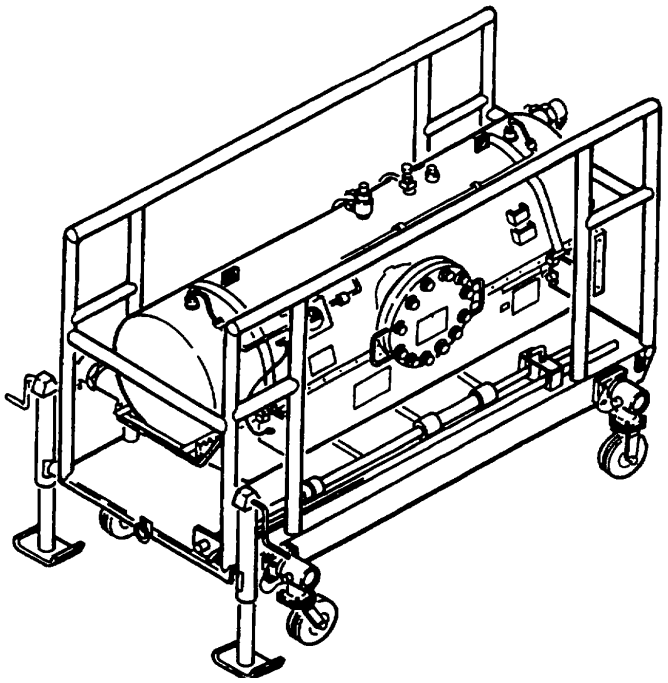
OPERATOR'S, UNIT, AND DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST



200 GPM FUEL FILTER-' SEPARATOR, ARCTIC SERVICE MODEL 13228E1770 NSN: 4330-01-262-9496

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HEADQUARTERS, DEPARTMENT OF THE ARMY
31 MARCH 1996

WARNINGS

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

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

A static discharge could ignite the fuel or cause an explosion of the fuel vapor. Do not operate the filter-separator until it is grounded.

Do not use near open flame or excessive heat. Death or personnel injury could occur due to exploding or burning fuel.

Do not allow smoking within 100 feet of fuel filling area Death or personnel injury could occur due to exploding or burning fuel.

Do not touch cold metal parts with bare hands when operating under arctic conditions. Frostbite can cause permanent injury.

Do not allow fuel to come in contact with eyes or skin. Wear protective goggles. Fuels are toxic and can cause illness or death. If fuel contacts skin or eyes, flush and get medical attention immediately.

Do not spill fuel on clothing. Static electricity can ignite fuel and cause personnel injury or death. Remove clothing and wash affected area thoroughly and get medical attention immediately.

Do not breathe fuel vapors. Fuel vapors are toxic and can cause serious illness or death. If dizziness occurs, leave area and get fresh air.

Do not allow smoking within 100 feet of the dispensing area. Post NO SMOKING signs around the area. Avoid getting fuel on the body or clothing. If clothing becomes saturated with fuel, remove the clothing immediately and wash body with hot soapy water and soak clothing in soapy water. Avoid spillage of fuel. If spillage of fuel occurs, cover the area with dry soil to reduce the rate of vaporization. Be certain a suitable fire extinguisher is charged and readily available in case of fire.

Lifting or moving heavy equipment incorrectly can cause serious injury. Do not try to lift or move more than 50 pounds by yourself. Get an assistant. Bend legs while lifting. Do not support weight with your back.

Do not apply excessive pressure with fingers when cleaning or applying sealant onto threads. Sharp threaded edges could cause injury.

DO NOT breathe dry cleaning solvent vapors for long periods of time or allow solvent to come into contact with skin for an extended time. DO NOT use solvent near open flames or excessive heat.

Flowing fuel can generate static charges within the filter-separator. Do not operate the unit until properly grounded. A static discharge could ignite the fuel or cause an explosion of fuel vapor.

When defrost shroud is used for heating, the shroud and drain valve may be very hot. Exercise caution to prevent burns.

FIRST AID instructions are given in FM 21-11. First Aid For Soldiers.

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TECHNICAL MANUAL
NO TM 10-4330-236-13&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 31 March 1996

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

200 GPM FUEL FILTER-SEPARATOR ARCTIC SERVICE MODEL 13228E1770 (NSN: 4330-01-262-9496)

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 these procedures, please let us know. Mail your letter or 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, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. You may also submit your recommended changes by E-mail directly to <mpmt%avma28.army.mil@st-louis-emh7.army.mil>. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

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HOW TO USE THIS MANUAL

Be sure to read all Warnings before using your equipment.

This manual contains instructions for operation and maintenance of the 200 GPM Filter-Separator

MANUAL OVERVIEW

a. Index Tabs.

Notice the front cover index of this manual. It lists the most important areas of the manual and guides you to those sections. Follow the black mark on the cover index edge through the pages to the edge mark on the section you want. The subjects on the front cover index are also highlighted in the table of contents by boxes. A detailed alphabetical index is located at the back of this manual.

b. Contents.

The following gives you a summary of each chapter and appendix. Before beginning a maintenance task, you must familiarize yourself with the entire procedure.

- Chapter 1 - Introduces you to the equipment and gives you information such as weight, dimensions, abbreviations used and information on how the unit works.

- Chapter 2 - Provides information necessary to identify and use the equipment. Operating instructions in this chapter tell you how to use the equipment in both usual and unusual weather conditions. In addition, preventive maintenance instructions provide information needed to inspect and service the 200 GPM Filter-Separator.

- Chapter 3 - Provides operator troubleshooting procedures for identifying equipment malfunctions and maintenance procedures for performing operator maintenance tasks.

- Chapter 4 - Provides unit maintenance personnel with troubleshooting procedures for identifying equipment malfunctions and maintenance procedures for repairing defective equipment.

- Chapter 5 - Provides direct support maintenance personnel with maintenance instructions for performing repairs on equipment as authorized by the maintenance allocation chart.

- Appendix A - Provides a list of frequently used forms and publications referenced or used in this manual.

- Appendix B - The Maintenance Allocation Chart identifies repairable components and the maintenance level authorized to perform the repairs.

- Appendix C - Lists the Repair Parts and Special Tools information for the 200 GPM Filter Separator.

- Appendix D - List and illustrates components that are not mounted on the equipment, but are required to make the unit functional.

HOW TO USE THIS MANUAL
continued

- Appendix E - Lists and illustrates additional equipment authorized for your unit for use with the 200 GPM Filter-Separator.

- Appendix F - Provides you with information about expendable supplies such as sealants, lubricants, chemicals etc. that are used when operating or maintaining the equipment

- Appendix G - Provides a list of items and instructions on how to mane certain tools and devices required to perform some of the maintenance tasks contained in this manual,

- Appendix H - Provides information concerning torque values and sequences required during maintenance of the equipment

- Glossary - Lists terms and abbreviations used in this manual and their definitions.

- Index - Lists subject matter contained in manual in alphabetical order.

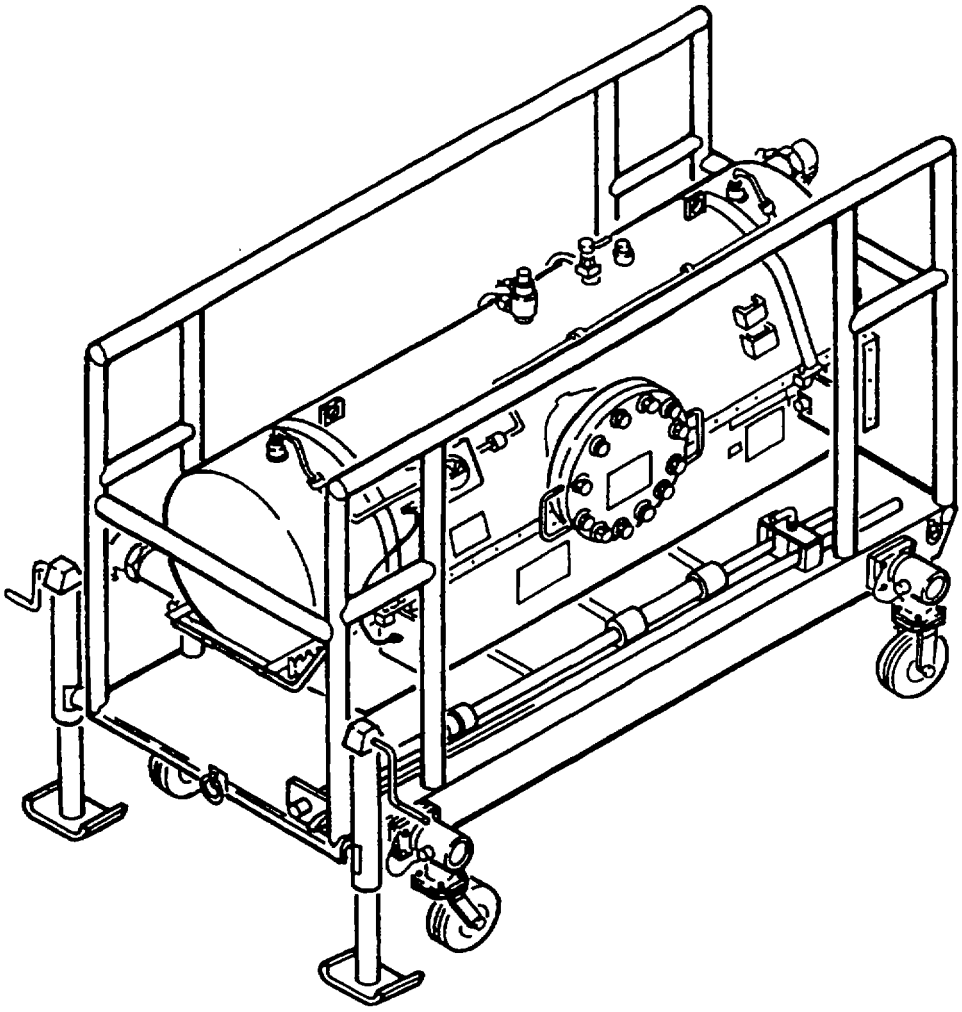

Figure 1-1. 200 GPM Filter-Separator

CHAPTER 1

INTRODUCTION

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Section I. GENERAL INFORMATION

1-1. SCOPE.

This manual contains operating instructions. and Unit, and Direct Support troubleshooting and maintenance procedures. These instructions are required to operate, maintain and repair the 200 GPM Filter-Separator. The purpose of the 200 GPM Filter-Separator is to remove solid contaminants and undissolved water from petroleum fuels. The unit is used as a component of fuel systems designed to operate in environments including low arctic temperatures.

1-2. MAINTENANCE FORMS AND PROCEDURES.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, The Army Maintenance Management System (TAMMS) (Maintenance Management UPDAE).

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

a. General. This equipment may be destroyed by mechanical methods or by using the fuel which the filter-separator contains to set it on fire.

NOTE
Fuel can be used to destroy other pieces of equipment in the same area.

b. Mechanical Demolition. Use an ax, pick, mattock. sledge, or any other heavy implement to smash the quick-disconnect couplings, valves, gage and frame.

c. Demolition by Fire. Use some of the fuel contained in the filter-separator to saturate the equipment and ignite.

d. Additional Information. For additional information on procedure for destruction of materiel, refer to TM 750-244-3.

1-4. CORROSION PREVENTION AND CONTROL (CPC).

a. Corrosion Prevention and Control of Army Materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

b. While corrosion is typically associated with rusting of metals. it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling or breaking of the materials may be a corrosion problem.

c. If a corrosion problem is identified it can be reported using Standard Form 368, Product Quality Deficiency Report. Using key words such as "rust", "deterioration", or "cracking" will insure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA Pam 738-750.

1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

If your 200 GPM filter-separator needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Aviation and Troop Command, ATIN: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. We will send you a reply.

1-6. NOMENCLATURE CROSS REFERENCE LIST.

Common Name	Official Nomenclature
200 GPM Filter-Separator	Filter-Separator. Liquid Fuel: Frame, Mounted, 200 GPM Capacity, Arctic Service
O-Ring	Preformed Packing

1-7. SAFETY, CARE, AND HANDLING.

Observe all WARNINGS, CAUTIONS, AND NOTES in this manual. This equipment can be dangerous or may be damaged if these instructions are not followed.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES.

a. **Characteristics**.

(1) Easily transportable.

(a) Wheels provided for transport over hard smooth surfaces.

(b) Can be towed as a sled when wheels stowed.

(2) Frame protects filter-separator from mechanical damage.

b. **Capabilities and Features**.

(1) Differential pressure gage provides easy monitoring of filter condition.

(2) Pressure relief valve provides automatic protection against over-pressure damage.

(3) Defrost shroud provided for heating water sump and water drain valve to prevent freezing.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

For items 1 through 11 refer to figure 1-2.

1. FRAME.. Supports and protects the components of the 200 GPM filter-separator.
2. TIEDOWN STRAPS. Two tiedown straps secures the tank to the frame.
3. TANK. Contains the fuel being processed by the filter-separator.
4. PRESSURE RELIEF VALVE. Protects the filter-separator from damage due to excessive internal pressure. Pressure relief valve is preset at 150 psi and sealed by the manufacturer.
5. AIR VENT VALVE.. Provides a means for purging air from tank when filling and operating the filter-separator.
6. FUEL INLET. Connection for unfiltered fuel from fuel system pump assembly.
7. CROWBAR Stowed on frame skid. Used to aid in breaking loose from ice and snow when moving fuel system assemblies.
8. WHEEL ASSMEBLY RIGID MOUNT. Non-swiveling wheels for transport on hard surfaces shroud to the frame.
10. DEFROST SHROUD. Contains hot exhaust gas to prevent freezing of water in filter-separator.
11. FUEL FILTER ACCESS PORT. Provides access to internal filters for servicing and maintenance.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - continued

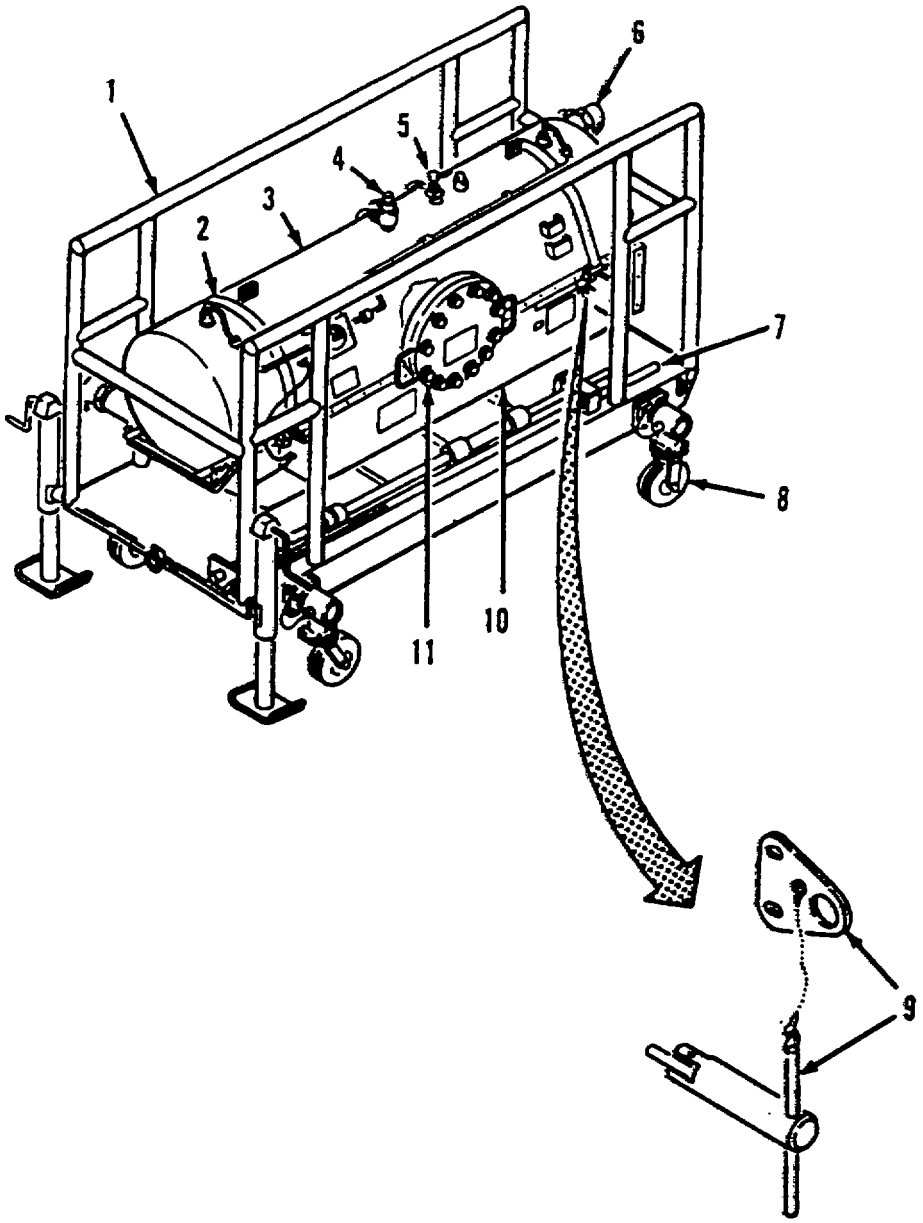

Figure 1-2. 200 GPM Filter-Separator Major Components, Items 1 - 11.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - continued.

For items 12 through 26 refer to figure 1-3.

12. DP (DIFFERENTIAL PRESSURE) GAGE Enables monitoring condition of filter elements during operation of filter-separator.

13. JUMPER CABLE. Provides electrical bonding between the tank and frame.

14. WHEEL ASSEMBLY. CASTER MOUNT. Swivel type wheels for transport on hard surfaces.

15. GROUND CABLE Stowed on frame. Provides a means for connecting the filter-separator to the ground rod.

16. GROUND ROD. Stowed on frame skid. Used to ground filter-separator during operation.

17. TOW RINGS. Used for tandem towing of filter-separator.

18. DEFROST DOOR. Manual heat adjustment for defrost shroud.

19. FUEL OUTFIT. Connection for coupling filtered fuel discharge to fuel system.

20. ADAPTER ASSEMBLY. Stowed on the frame. This adapter is connected at the filter-separator outlet coupling. The adapter contains a sampling probe which extends into the fuel flow. A Water Detector Kit may be connected to the probe for fuel sampling.

21. WATER DRAIN PORT. Exit for tank water drain.

22. WATER DRAIN VALVE. Manual valve for draining water from water sump.

23. WATER SUMP. Collects water separated from fuel.

24. SCREW JACK. Used to raise filter-separator for changing wheels assemblies for either transporting or in the up position. Also, used to level the filter-separator.

25. TANK DRAIN PLUGS. Provide means for complete drainage of tank.

26. HOT EXHAUST GAS INLET. Connection for hot exhaust gas from system pump assembly.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - continued.

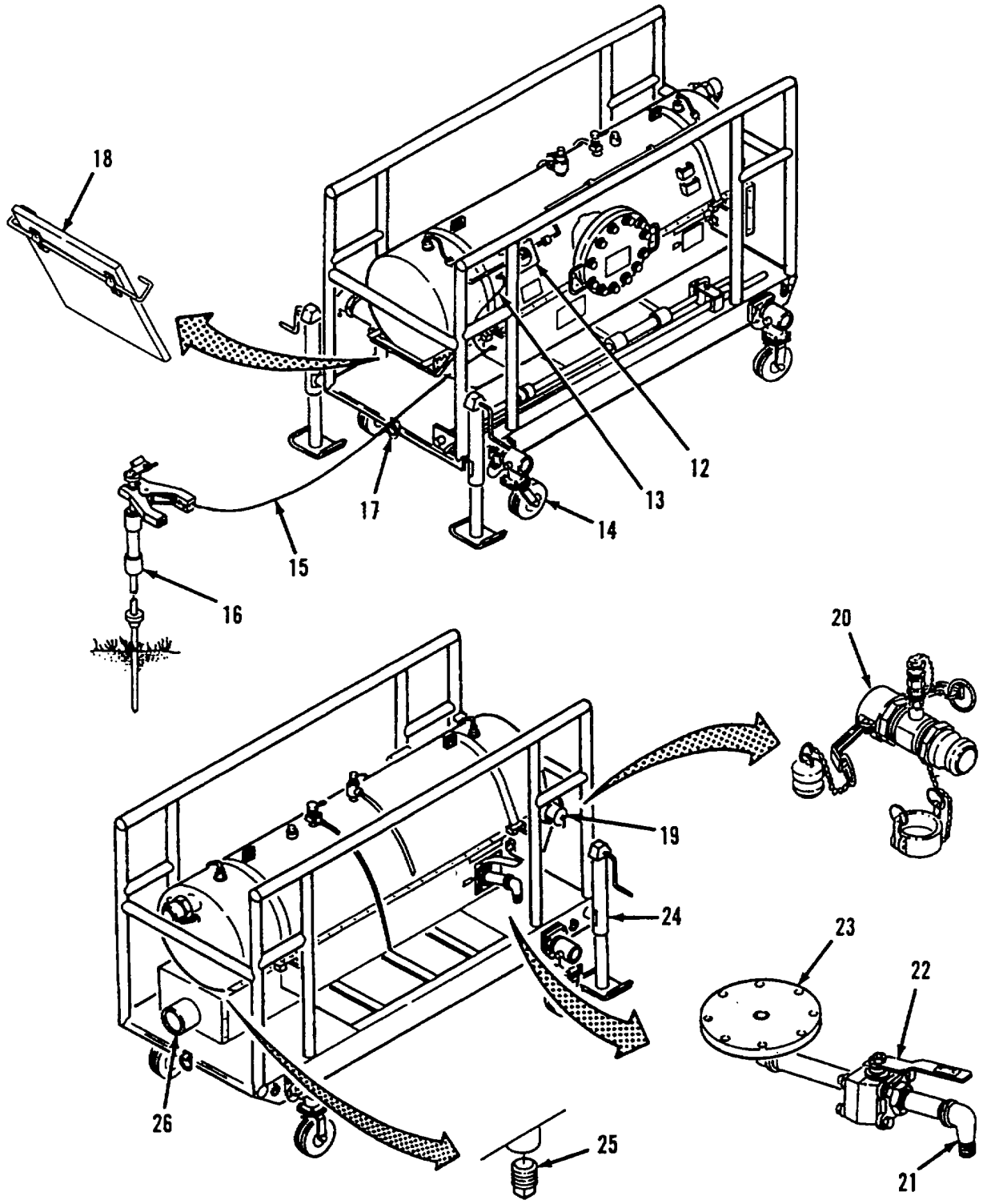

Figure 1-3. 200 GPM Filter-Separator Major Components, Items 12 - 26.

1-10. EQUIPMENT DATA.

a. Weight and Dimensions.

Weight, Empty	475 pounds
Length	40.34 inches
Width	77.38 inches
Height, wheels down	54.37 inches
Height, wheels retracted	44.12 inches

b. Performance

Operating Temperature Range	-60 °F to +95°F
Rated Flow	200 gpm
Maximum Flow	300 gpm
Operating Pressure	50 psig
Maximum Pressure	150 psig
Effluent Fuel Water Content	Less than 5 ppm by volume.
Effluent Fuel Solids Content	Less than 1 milligram per liter.

c. Storage Temperature Range -65 °F to +145°F

Section III. PRINCIPLES OF OPERATION.

1-11. SYSTEM TECHNICAL PRINCIPLES OF OPERATION.

a. General. The flow of fuel through the filter-separator is shown in figure 1-4. Unfiltered fuel is pressurized by the fuel system pump assembly. The system pump discharge is connected to the filter-separator fuel inlet.

b. Air Purging. An air vent valve on top of the tank provides means for releasing trapped air from the tank during filling and operation of the filter-separator.

c. Over-pressure Protection. The filter-separator is protected from high pressure damage by a pressure relief valve on the top of the tank. This valve opens if tank pressure reaches 150 psig, letting the tank pressure down. The valve closes automatically after the internal pressure is let down to a safe value.

d. First Stage Filter. The filter-separator first stage filter consists of 15 replaceable cylindrical elements. Each element has a flow capability of 20 gpm. These elements used in parallel provide a conservatively rated flow of 200 gpm for the filter separator. Unfiltered fuel flows from the tank inlet, through perforated tubes mounted on an internal wall of the tank, to the inside of the filter elements. The filter elements block solid contaminants, but pass clean fuel out from their external surface. The second function of the filter elements is to coalesce undissolved water droplets in the fuel. These droplets are gathered together by the filter element until larger drops are formed. Then the water drops, being heavier than the fuel, fall towards the bottom of the tank. Water collects at the bottom of the tank and is drained from the water sump manually.

1-11. SYSTEM TECHNICAL PRINCIPLES OF OPERATION.

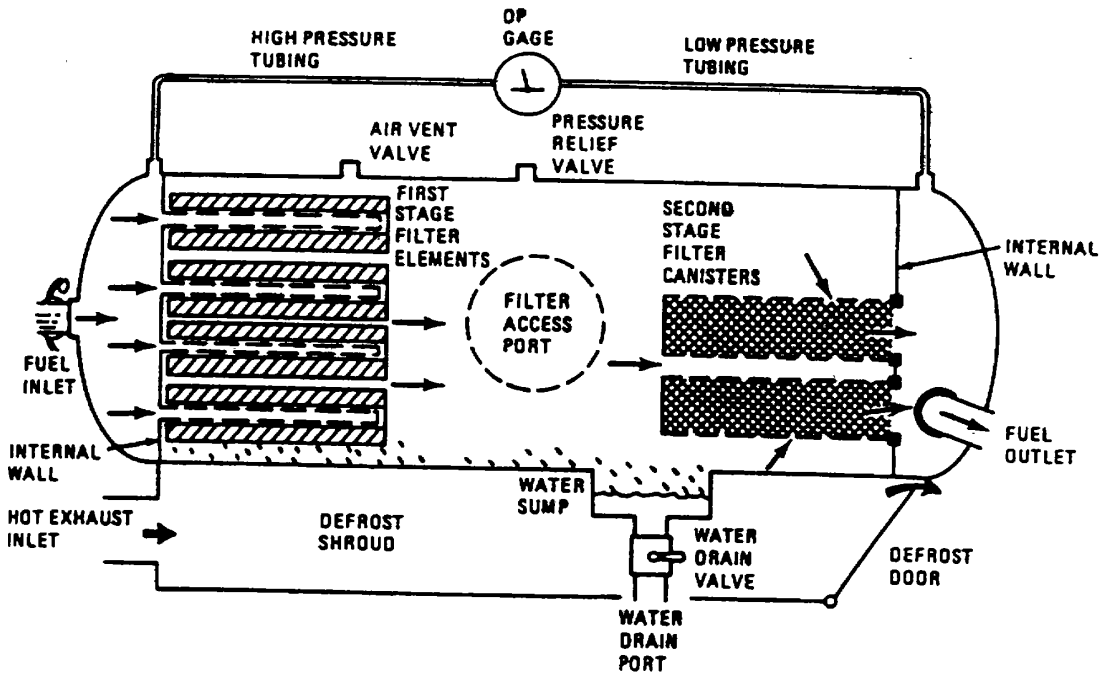

Figure 1-4. 2000 GPM Filter-Separator Principles of Operation

e. Second Stage Filter. The second stage filter function is to further block the flow of water in the outlet fuel stream. Five permanent separator filter elements in parallel form this stage. These cylindrical filter elements are made of a fine screen material coated with TFE, a plastic that repels water. Fuel flows from the outside of the elements through their screen wall, to the inside. From there, fuel flows to the filter-separator outlet. Water blocked by the elements falls to the tank bottom and collects in the water sump.

1-11. SYSTEM TECHNICAL PRINCIPLES OF OPERATION - continued.

f. Filter Access. A filter access port with a removable cover is provided on the side of the tank When the tank is emptied. this port is used to service the internal filter elements.

g. Water Removal. The water sump at the bottom of the tank collects the water separated from the fuel stream. Piping connects the sump to a drain port for water removal. The drain piping contains a manually operated valve to open and shut off the water drain.

h. Freeze Protection The bottom of the filter-separator tank, water sump, and water drain piping are covered by a defrost (heating) shroud. The defrost shroud directs hot exhaust gas from the system pump assembly around the parts of the filter-separator which can contain water. Heating is needed whenever the filter-separator is operated at temperatures below the freezing point of water (32°F). A manually adjustable door is located on the end of the shroud. This door provides adjustable flow of hot exhaust gas through the shroud.

i. DP (Differential Pressure) Monitoring. When the filter-separator is in operation, a drop in pressure occurs from the inlet side to the outlet side of the tank. This is due mainly to the flow resistance of the filter stages. As solids are collected by the filter elements, the drop in pressure increases. Eventually, when the pressure drop reaches a certain value, the filter elements need to be replaced. Tubing outside the tank connects the high pressure (inlet) side and the low pressure (outlet) side of the tank to a DP gage mounted on the tank wall. The gage shows the tank pressure difference directly on a color-zoned dial for monitoring filter element condition. The dial green zone, 0-20 psid (pound-force per square inch difference). is the normal operating range. The 20-35 psid range is colored yellow to warn of the approaching end of serviceable filter life. The first stage filter elements should be changed when DP indication reaches this zone. If the gage needle reaches the red zone, 35-50 psid, the elements could be damaged by continuing operation.

j. The water detector kit adapter assembly is used to obtain a sample of flowing fuel that is tested for water content to determine the effectiveness of the filter-separator. The adapter assembly is installed in the fuel supply line onto the fuel outlet coupling of the filter-separator. A sample is obtained by attaching the water adapter assembly detector kit to the adapter's coupling sample.

CHAPTER 2

OPERATING INSTRUCTIONS

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

2-1. OPERATOR'S CONTROLS AND INDICATORS.

This section provides the operator with information needed to locate, identify, and use the controls and indicators of the 200 GPM Filter-Separator.

1. AIR VENT VALVE (1). Manually operate valve to purge air from tank while filter-separator is being filled. Also use to purge air periodically during operation.

2. DP GAGE (2). Indicates the pressure difference across filters during operation. Colored zones are marked on dial face to simplify monitoring. Operation should be conducted with gage needle in the green zone, 0-20 psid. As solids collect in the filter elements, the reading gradually increases into the yellow zone, 20-35 psid. When the gage reading reaches this zone, the filter elements should be serviced.

CAUTION

Never fully close defrost door during system operation. This would apply excessive back pressure to the pump

3. DEFROST DOOR (3). Manual adjustment for regulating heating of defrost shroud. Applied heat is greatest when door is fully open.
4. ADAPTER ASSEMBLY (4). This adapter is connected at the filter-separator outlet coupling. The adapter contains a sampling probe which extends into the fuel flow. A Water Detector Kit may be connected to the probe for fuel sampling.

2-1. OPERATOR'S CONTROLS AND INDICATORS continued.

5. WATER DRAIN VALVE (5). Manually operated ball valve to drain separated water from tank water sump.

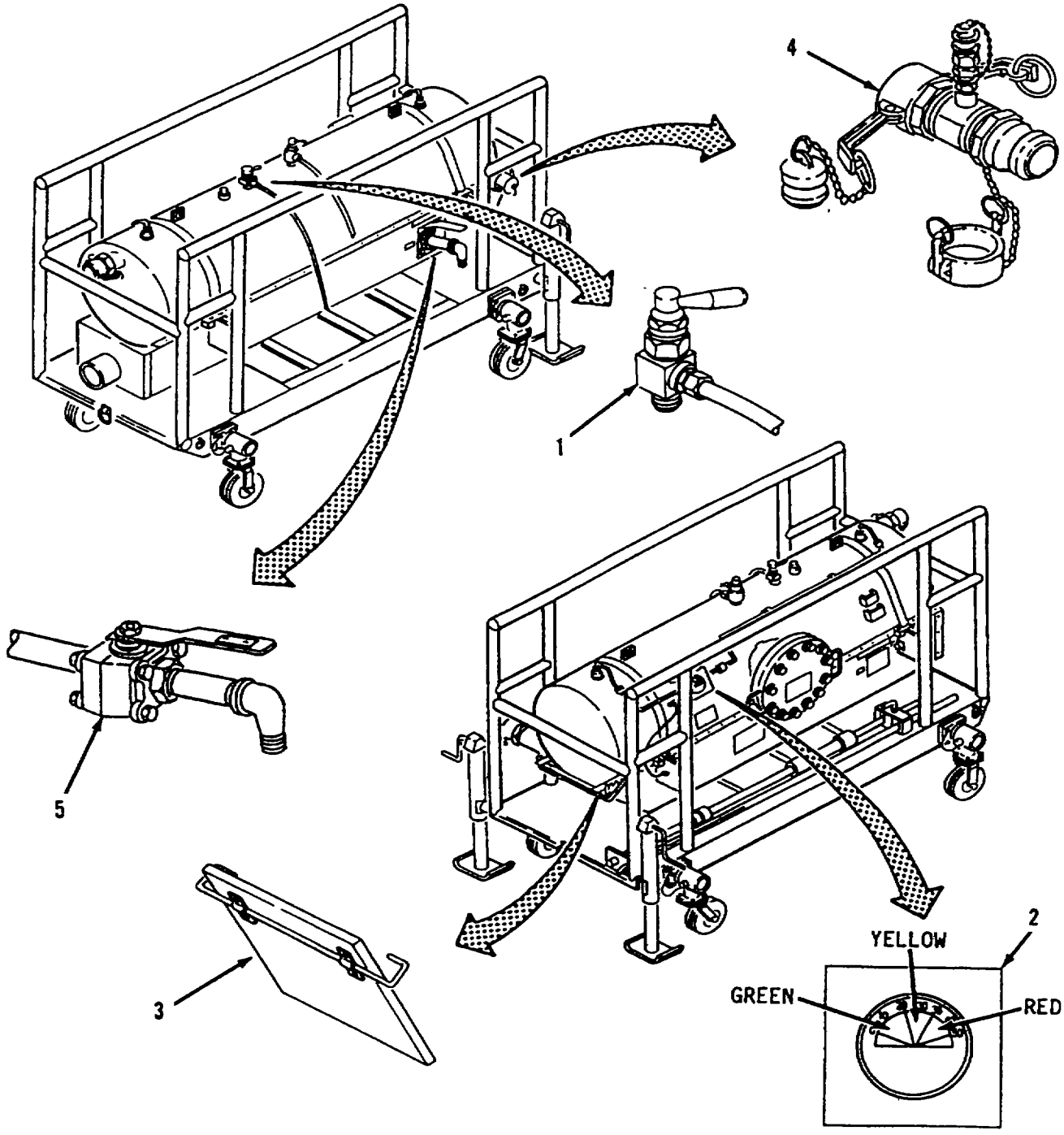

Figure 2-1. Operating Controls and Indicators

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-2. GENERAL

Preventive Maintenance Checks and Services (PMCS) means systematic caring, inspecting and servicing of equipment to keep it in good condition and to prevent breakdowns. As the operator of the 200 GPM filter-separator, your mission is to:

a. Be sure to perform your PMCS each time you operate the 200 GPM filter-separator. Always do your PMCS in the same order so it gets to be a habit. Once you've had some practice, you'll quickly spot anything wrong.
b. Do your BEFORE (B) PMCS just before your operate the equipment. Pay attention to WARNINGs, CAUTIONs and NOTEs.
c. Do your DURING (D) PMCS while you operate the equipment. During operation means to monitor the equipment and its related components while it is actually being operated. Pay attention to WARNINGs, CAUTIONs and NOTEs.
d. Do your AFTER (A) PMCS right after operation. Pay attention to WARNINGs, CAUTIONs and NOTEs.
e. Use DA Form 2404 (Equipment Inspection and Maintenance Work sheet) to record any faults that you discover before, during, or after operation, unless you can fix them. You DO NOT need to record faults that you fix.
f. prepared to assist unit maintenance when required.

2-3. EXPLANATION OF TABLE ENTRIES.

a. Your Preventive Maintenance Checks and Services, Table 2-1, lists inspections and care required to keep your equipment in good operating condition. It is set up so you can make BEFORE (B) OPERATION checks as you walk around the equipment.

b. The "INTERVAL" column of Table 2-1 tells you when to do a certain check or service.

c. The "LOCATION, ITEM TO CHECK/SERVICE" column of Table 2-1 tells you the name of the item to be checked or serviced and where the item is located.

2-3. EXPLANATION OF TABLE ENTRIES - continued.

d. The "PROCEDURE" column of Table 2-1 tells you how to do required checks and services. Carefully follow these instructions. If you don't have tools, notify your supervisor.

e. The "NOT FULLY MISSION CAPABLE IF:" column in Table 2-1 tells you what faults will keep your equipment from being capable of performing its primary mission. If you make check and service procedures that shows faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining or reporting equipment failure.

f. If the equipment does not perform as required, refer to Chapter 3, Section II, Troubleshooting.

g. If anything looks wrong and you can't fix it, write it on your DA Form 2404. IMMEDIAELY, report it to your supervisor.

h. The following are checks that are common to the entire fuel system:

(1) Keep the equipment clean. Remove dirt, sand and debris from equipment to prevent excessive wear and contamination of the fuel system. Use soap and water to remove dirt

(2) Screws and nuts. Check them for obvious looseness. If you find a screw or nut loose, report it to your supervisor.

(3) Couplings. Look for wear, damage and leaks. Make sure couplings are tight. Wet spots show leaks, but a stain around a fitting or connector can also mean a leak. If a leak cones from a loose fitting or coupling, have unit maintenance tighten it. If something is broken or worn out, report it to your supervisor.

i. When you check for operating condition, look at the component to see if it's serviceable.

2-4. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Refer To Table 2-1).

Table 2-1. Operator Preventive Maintenance Checks and Services for 200 GPM Filter Separator.

NOTE
If the equipment must be kept in continuous operation, do only the procedures that can be done without disturbing operation. Make complete checks and services when the equipment is shut down.

Item No	Interval	Location Item To Be Check/Service	Procedures	Not Fully Capable Mission If:
			WARNING Failure to properly ground the filter-separator prior to operation could allow a static discharge (spark) which could ignite fuel or cause an explosion of fuel vapor.	
1	Before	Fuel Inlet Coupling	a. Inspect coupling for cracks or breaks. b. Inspect for missing or damaged arms, plug, chain or gasket.	Cracked or broken coupling. Gasket missing or damaged.
2	Before	Jack Screws	Inspect for loose, damage, or missing jack screw.	
3	Before	Rigid wheel	a. Inspect for bent mounting parts, assembly binding bearings. b. Inspect tire for inflation or damage.	
4	Before	Crowbar	Inspect for damaged or missing crowbar.	
5	Before	Access Cover	Inspect for loose, damaged, or missing hardware.	Hardware loose, damaged. or missing.
6	Before	Pressure Tubing	Inspect for loose or damaged tubing	Tubing loose or damaged.
7	Before	DP Gage	a. Inspect for needle indication at 0-5. b. Inspect for broken lens.	Gage reading not between 0-5. Lens broken.
8	Before	Jumper Cable	Inspect for loose, damaged, or missing jumper cable.	Jumper cable loose, damaged, or missing.

2-4. Operator Preventive Maintenance Checks and Services-continued

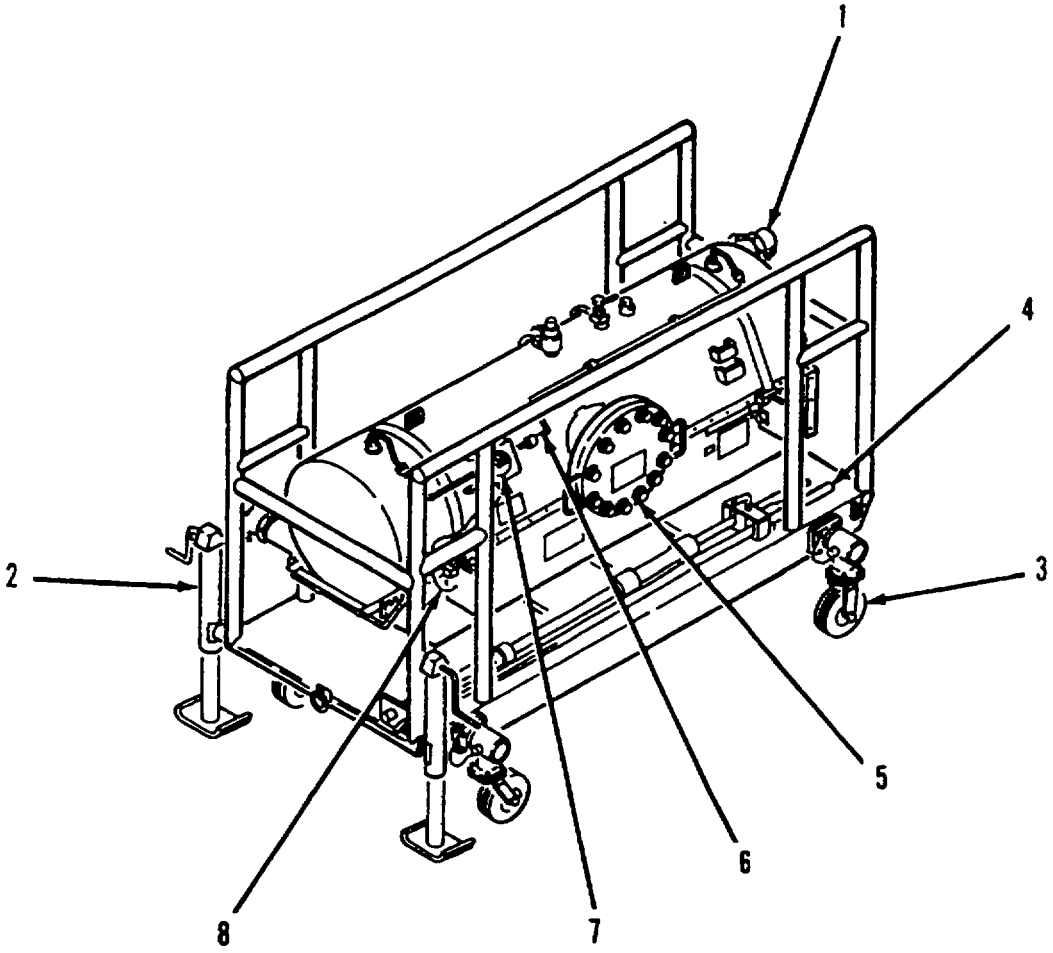

Figure 2-2. Before Operation PMCS Items 1 thru 8.

2-4. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for 200 GPM Filter-Separator.

Item No	Interval	Location: Item to Check/Service	Procedures	Not Fully Mission Capable If:
9	Before	Ground Cable	Inspect ground cable for damage, loose, or missing hardware.	Cable not secure. Hardware is loose, damaged, or missing.
10	Before	Ground Rod	Inspect for loose, damaged or missing ground rod.	Ground rod loose, damaged or missing.
11	Before	Swivel Caster Wheel Assembly	a. Inspect for bent mounting parts, binding bearings or swivel. b. Inspect tire for inflation or damage.	
12	Before	Defrost Door	Inspect for damaged or missing door.	
13	Before	Adapter Assembly, Water Detection	a. Inspect for loose, damaged, or missing sampling probe. b. Inspect coupling for cracks or damage. c. Inspect for missing or damaged gasket	Sample probe loose. damaged, or missing. Coupling cracked or damaged. Gasket missing or damaged.
14	Before	Fuel Outlet Coupling	a. Inspect coupling for cracks or breaks. b. Inspect for missing or damaged cap, chain or gasket.	Coupling cracked or broken. Gasket damaged or missing.
15	Before	Water Drain Piping	a. Inspect for loose or damaged fittings. b. Inspect for loose, damaged, or missing hose	Fittings loose or damaged.
16	Before	Water Drain Valve	a. Inspect for loose or missing handle. Rotate handle, should turn 90° freely. b. Inspect valve body for cracks.	Handle does not rotate freely. Hardware missing. Valve sticks. Body cracked.

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

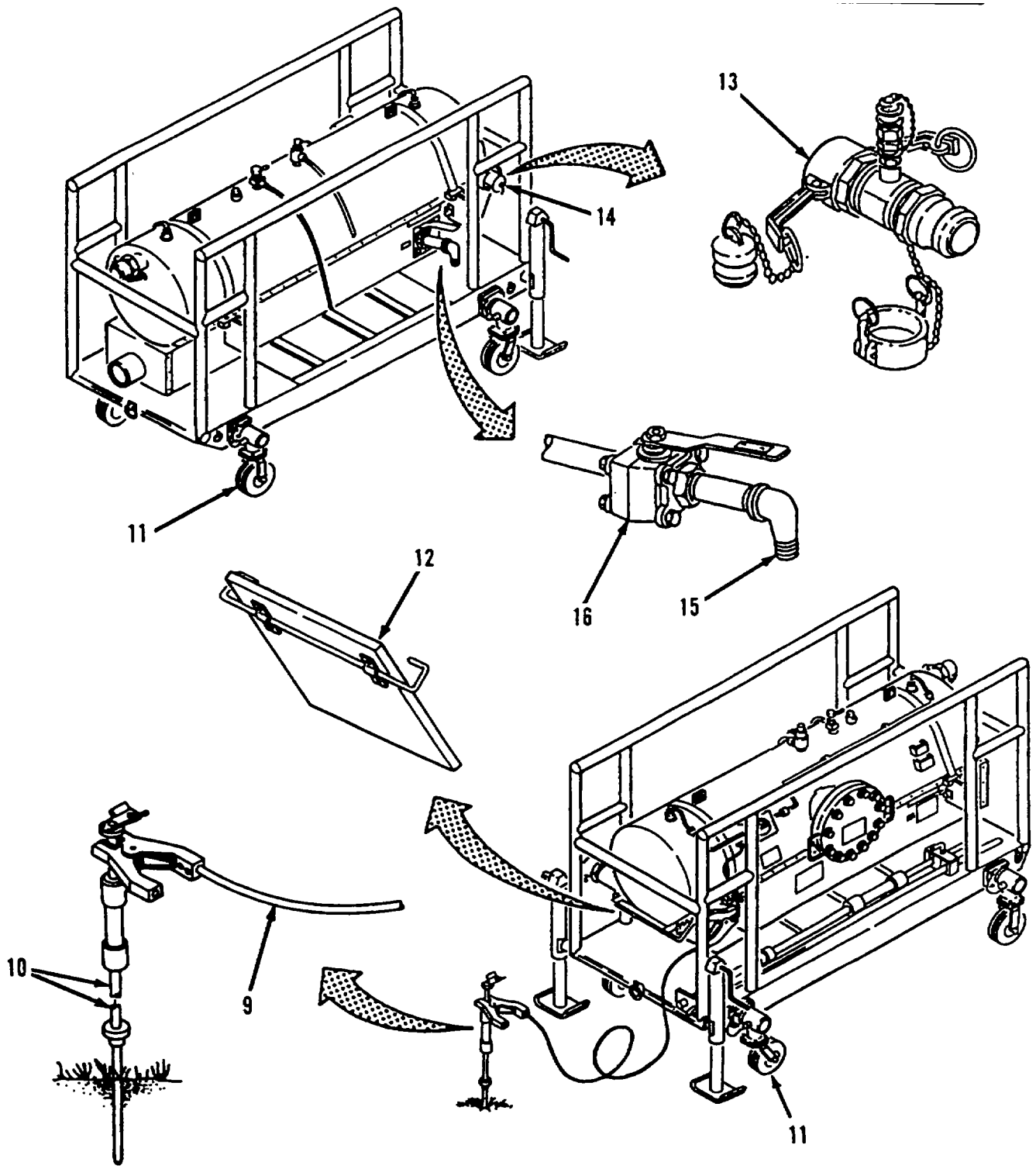

Figure 2-3. Before Operation PMCS Items 9 thru 16.

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for 200 GPM Filter-Separator.

Item No	Interval	Location Item to Check/Service	Procedures	Not Fully Mission Capable If:
17	Before	Sump Cover	Inspect for loose, damaged, or missing hardware.	Hardware loose, damaged, or missing.
18	Before	Defrost Shroud Assembly	Inspect for loose, damaged or missing hardware.	
19	Before	Latch Plates and Latch Pins	a. Inspect for bent pin, missing or damaged pin key, chain or key rings. b. Inspect plate for bends, missing, or damaged mounting hardware.	
20	Before	Tank	a. Inspect for damage, loose or missing hardware. b. Inspect tank for cracks or broken welds.	Hardware damaged, loose, or missing. Tank cracked.
21	Before	Tiedown Straps	Inspect for loose, damaged or missing hardware.	Straps loose or damaged. Hardware loose, damaged, or missing.
22	Before	Air Vent Valve and Tubing	a. Inspect for cracked body. b. Inspect for broken or missing handle. c. Inspect for loose, damaged. or missing tubing.	Valve body cracked Handle broken or missing.
23	Before	Pressure Relief Valve and Tubing	a. Inspect for cracked body. b. Inspect for broken or missing seal. c. Inspect for loose, damaged, or missing tubing.	Valve body cracked Seal broken. Tubing damaged or missing.

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued

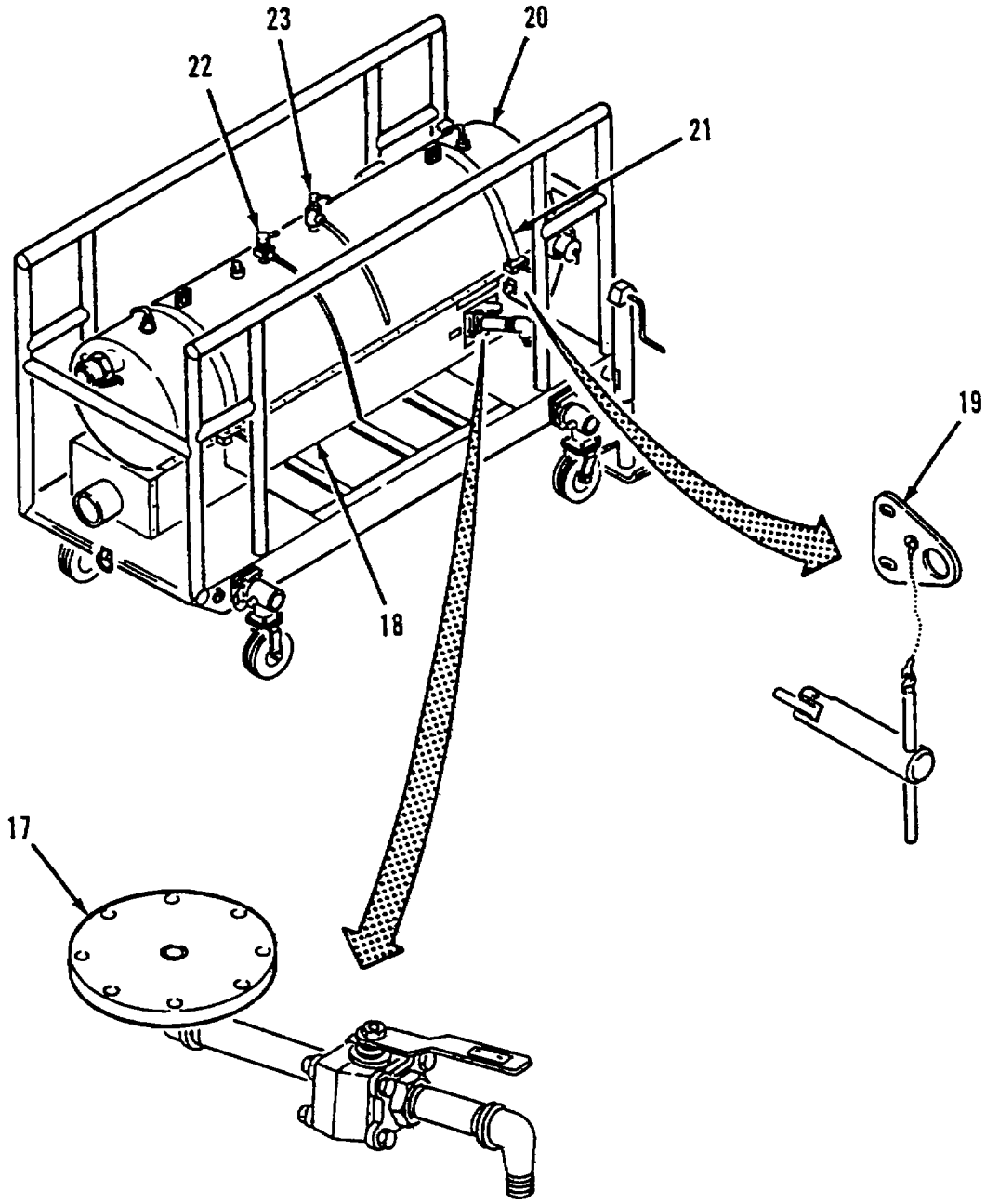

Figure 2-4. Before Operation PMCS Items 17 thru 23.

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for 200 GPM Filter-Separator.

Item No	Interval	Location: Item To Be Check/Service	Procedures	Not Fully Capable Mission If:
24	During	Fuel Inlet Coupling	Inspect for leaks.	Inlet coupling leaks.
25	During	Access Cover	Inspect access cover for leaks.	Access cover leaks.
26	During	Pressure Tubing	Inspect tubing for leaks.	Pressure tubing leaks.
27	During	DP Gage	Inspect DP gage for leaks.	DP gage leaks.
28	During	Grounding Cable	Inspect for loose connections.	Cable connections loose.
29	During	Adapter Assembly, Water Detection	Inspect for leaks.	Adapter assembly leaks.
30	During	Fuel Outlet Coupling	Inspect for leaks.	Outlet coupling leaks.
31	During	Water drain Valve and Piping	Inspect for leaks.	Leak found
32	During	Sump Cover	Inspect sump cover for leaks.	Sump cover leaks.
33	During	Tank	Inspect tank for leaks.	Tank leaks.
34	During	Air Vent Valve	Inspect air vent valve for leaks.	Air vent valve leaks.
35	During	Pressure Relief Valve	Inspect pressure relief valve for leaks.	Pressure relief valve leaks.

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

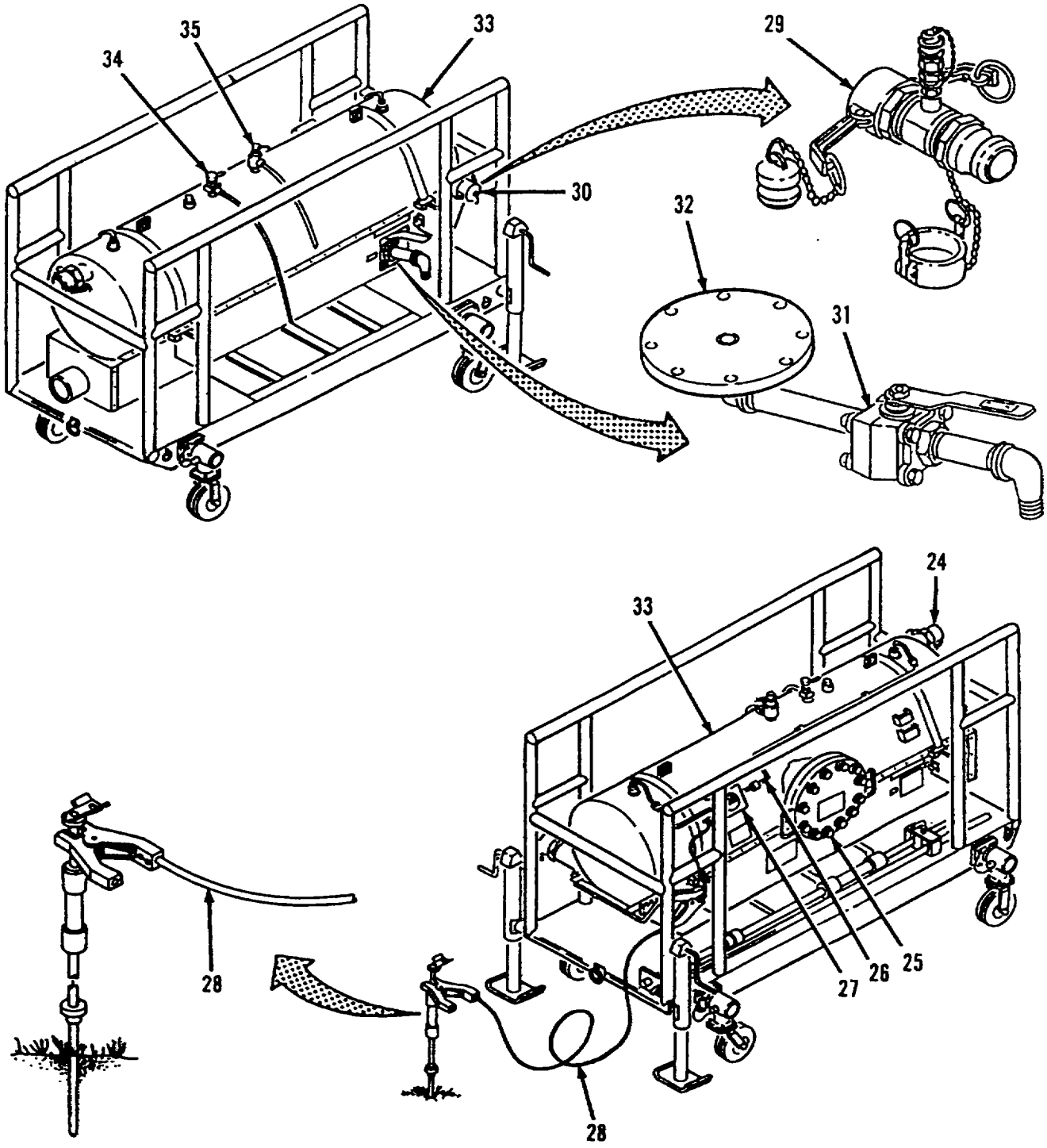

Figure 2-5. During Operation PMCS Items 24 thru 35.

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for 200 GPM Filter-Separator.

Item No	Interval	Location Item to Check/Service	Procedures	Not Fully Mission Capable If:
36	After	Fuel Inlet Coupling	a. Inspect coupling for cracks or breaks.	Outlet coupling cracked or broken.
			b. Inspect coupling for missing or damaged plug, chain, or gasket.	Gasket damaged or missing.
37	After	Jack Screws	Inspect for loose, damaged or missing jack screws.	
38	After	Rigid Wheel Assembly	a. Inspect for bent mounting parts, binding bearings.	
			b. Inspect tire for inflation or damage.	
39	After	Crowbar	Inspect for missing or unserviceable crowbar.	
40	After	Access Cover	Inspect for loose, missing or damaged hardware.	Hardware loose, missing, or damaged.
41	After	Pressure Tubing	Inspect for loose or damaged tubing.	Tubing loose or damaged.
42	After	DP Gage	a. Inspect for zero needle indication at 0-5.	Gage indication not between 0-5.
43	After	Jumper Cable	Inspect for loose, damaged, or missing jumper cable.	Jumper cable loose. damaged, or missing.
44	After	Ground Cable	Inspect ground cable for damage, loose, or missing hardware.	Hardware loose, damaged, or missing.
45	After	Ground Rod	Inspect ground rod for damage.	Ground rod damaged.
46	After	Swivel Caster Wheel Assembly	a. Inspect for bent mounting parts, binding bearings, or swivel. b. Inspect tire for inflation or damage.	
47	After	Defrost Door	Inspect for damaged or missing door.	

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

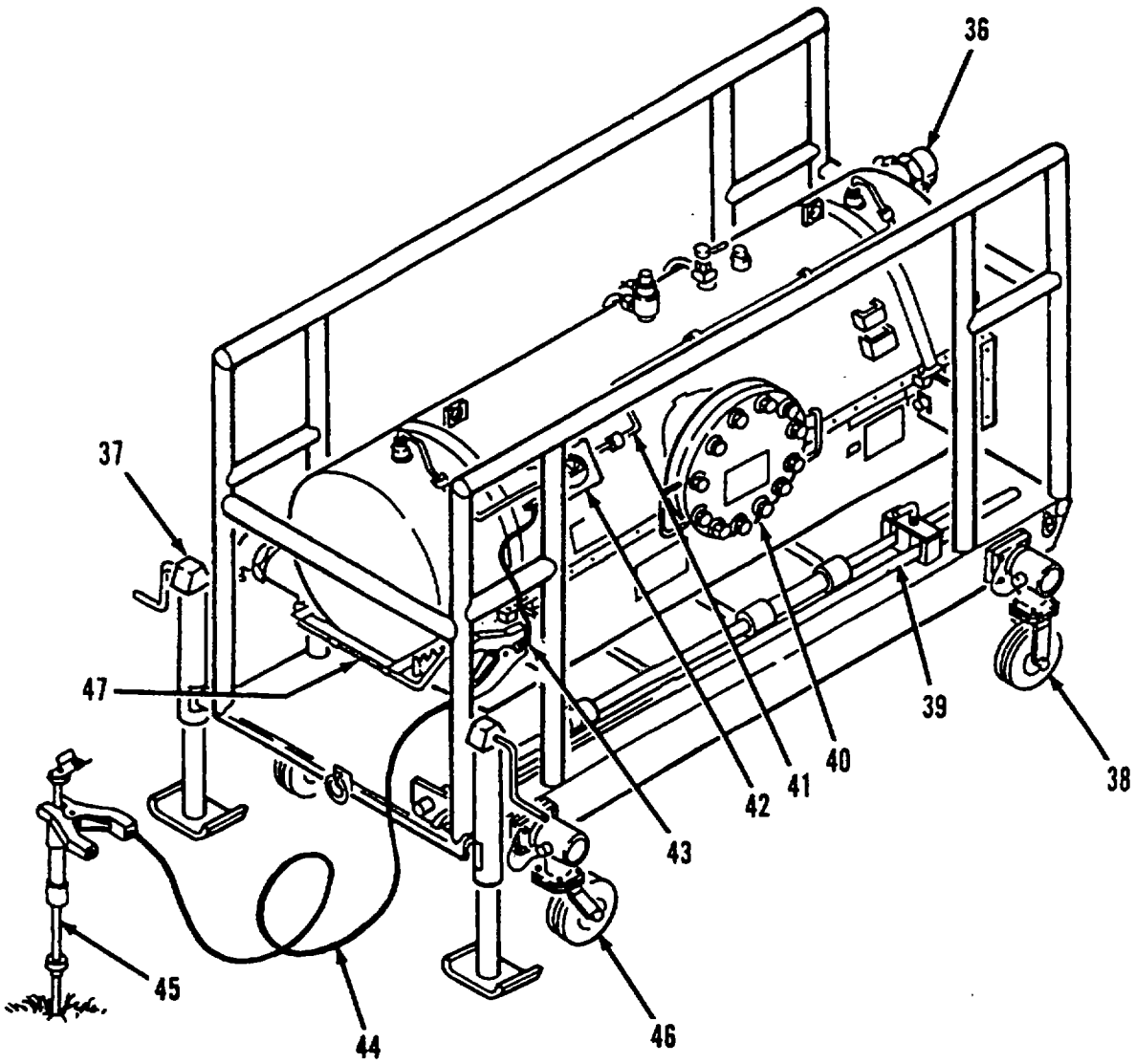

Figure 2-6. After Operation PMCS Items 36 thru 47.

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for 200 GPM Filter-Separator.

Item No	Interval	Location Item to Check/Service	Procedures	Not Fully Mission Capable If:
48	After	Adapter Assembly, Water Detection	a. Inspect for loose, damaged, or missing sampling probe.	Sample probe loose, damaged, or missing.
			b. Inspect coupling for cracks or damage.	Coupling cracked or damaged.
			c. Inspect for missing or damaged gasket	Gasket missing or damaged.
49	After	Fuel Outlet Coupling	a. Inspect coupling for cracks or breaks.	Coupling cracked or broken.
			b. Inspect for missing or damaged cap, chain or gasket.	Gasket damaged or missing.
50	After	Water Drain Piping	a. Inspect for loose or damaged fittings.	Fittings loose or damaged.
			b. Inspect for loose, damaged, or missing hose.	
51	After	Water Drain Valve	a. Inspect for loose or missing handle. Rotate handle, should turn 900 freely.	Handle does not rotate freely. Hardware missing. Valve sticks.
			b. Inspect valve body for cracks.	Body cracked
52	After	Sump Cover	Inspect for loose, damaged, or missing hardware.	Hardware loose, damaged, or missing.
53	After Assembly	Defrost Shroud hardware.	Inspect for loose, damaged or missing	
54	After	Latch Plates and Latch Pins	a. Inspect for bent pin. missing or damaged pin key, chain or key rings.	
			b. Inspect plate for bends. missing. or damaged mounting hardware.	

24. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

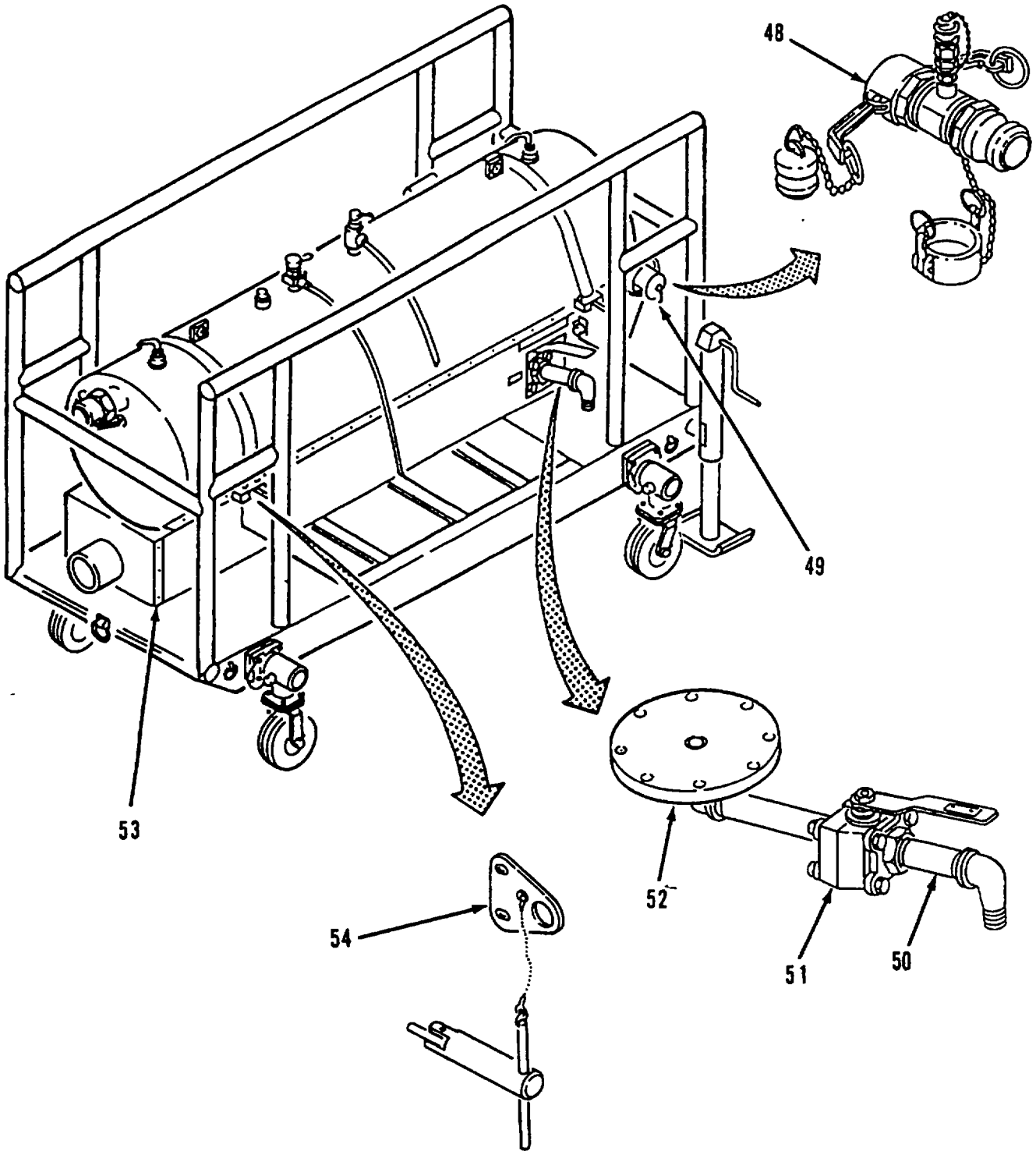

Figure 2-7. After Operation PMCS Items 48 thru 54.

2-4. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

Table 2-1. Operator Preventive Maintenance Checks and Services for 200 GPM Filter-Separator.

Item No	Interval	Location Item to Check/Service	Procedures	Not Fully Mission Capable If:
55	After	Air Vent Valve and Tubing	a. Inspect for cracked body. b. Inspect for broken or missing handle. c. Inspect for loose, damaged, or missing tubing.	Valve body cracked Handle broken or missing.
56	After	Pressure Relief Valve and Tubing	a. Inspect for cracked body. b. Inspect for broken or missing seal. c. Inspect for loose. damaged, or missing tubing.	Valve body cracked Seal broken. Tubing damaged or missing.
57	After	Tank	a. Inspect for damage, loose or missing hardware. b. Inspect tank for cracks or broken welds.	Hardware damaged, loose, or missing. Tank cracked.
58	After	Frame	Inspect frame for cracks or broken welds.	Frame cracked or welds broken.

2-4.OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - continued.

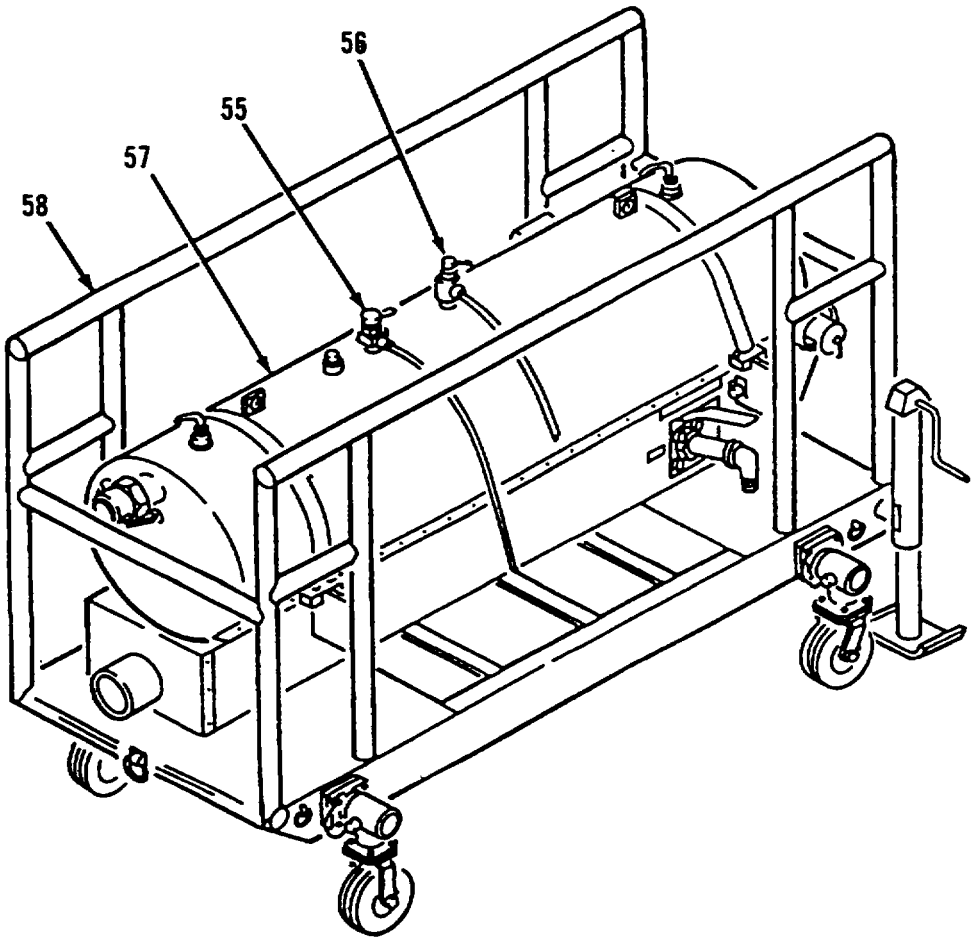

Figure 2-8. After Operation PMCS Items 55 thru 58.

Section IIL OPERATION UNDER USUAL CONDITIONS

2-5. ASSEMBLY AND PREPARATION FOR USE.

a. Site Selection. The following factors must be considered when selecting a location for operating the 200 GPM filter-separator.

(1) The area should be level, smooth, and free of rocks and debris.

(2) Distances to/from other units of the fuel system, i.e., fuel pump assembly and fuel dispensing equipment, and lengths of interconnecting hoses must be considered.

(3) Position the 200 GPM filter-separator so the fuel inlet and outlet face the appropriate direction to other units.

WARNINGS

When raising the filter-separator turn the jack screw crank handles evenly or the filter-separator could tip over and cause injury or equipment damage.

Do not touch could metal with bare hands when operating under arctic conditions. Frostbite can cause permanent injury.

b. Unpacking. Consists of removing accessory components from under tank assembly on filter-separator and checking component for any damage incurred during shipment. If damaged, report the damage to unit maintenance.

c. Retracting Wheels. After transporting the filter-separator on its wheels, the wheels must be placed in the store position before operation. Perform the following procedures: (Refer to figure 2-9).

NOTE

Two individuals are required to raise the filter-separator.

(1) Install the two screw jacks (1) on the frame (2) next to the swivel wheels (3).and align holes. Secure screw jacks (1) by inserting pins (4) in aligned holes. Chock the rigid wheels(5) at the other end to prevent rolling of the filter-separator.

(2) Turn the screw jack crank handles (6) to raise swivel wheels (2) off the ground.

(3) Remove the locking pins (7) and rotate the swivel wheels (2) to the upwards position.

(4) Align holes and install locking pins (7) to secure the swivel wheels(3) in position.

(5) Turn the screw jack crank handles (6) until frame (2) is securely on the ground. Pull out pins (4) and remove screw jacks (1). Store screw jacks (1) on frame under tank.

(6) Repeat steps 1 through 5 for the two rigid wheels(4) at the other end of the frame. Then remove and stow the screw jacks (1).

2--5. ASSEMBLY AND PREPARATION FOR USE - continued.

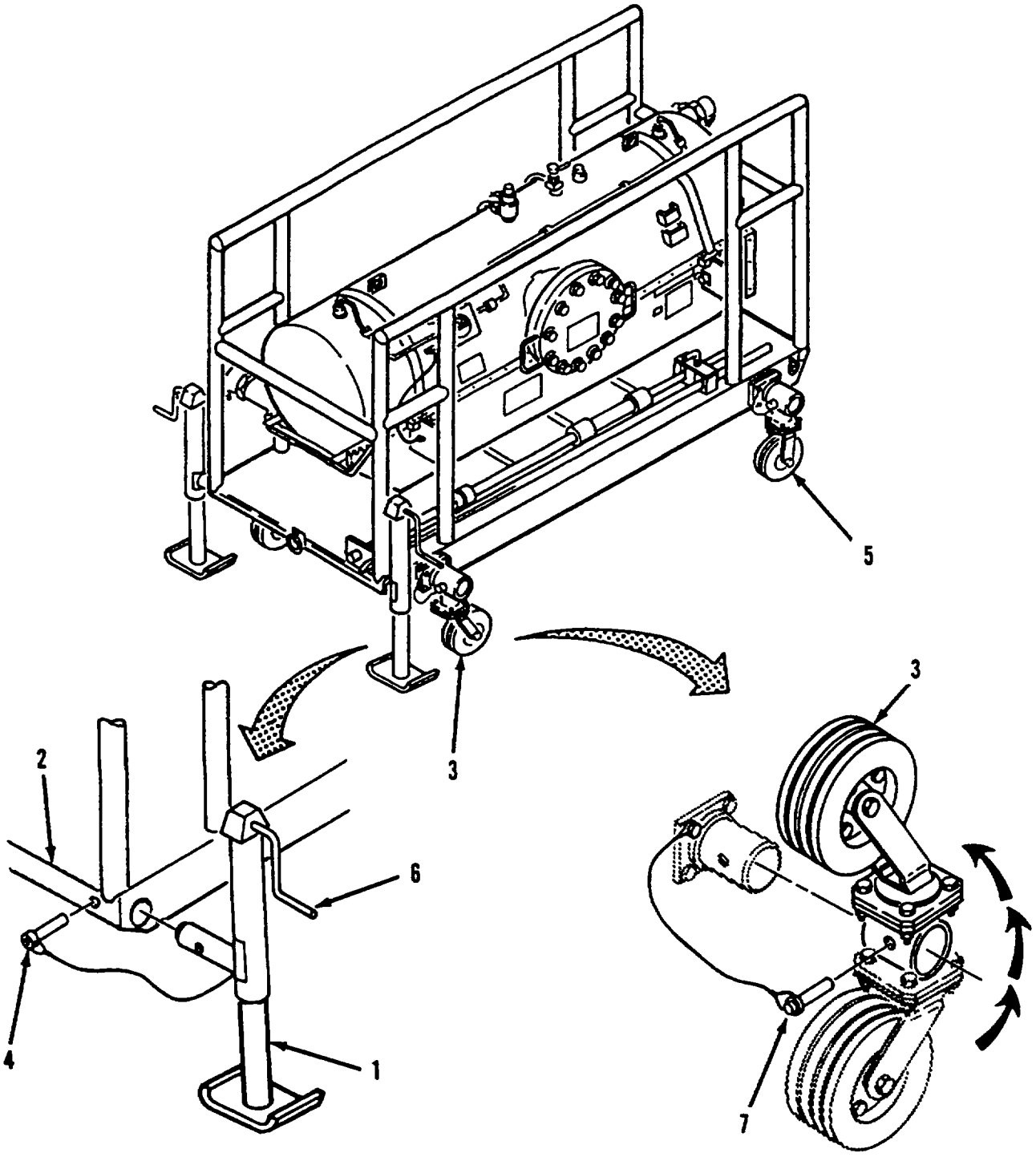

Figure 2-9. Retracting Wheels.

2-5. ASSEMBLY AND PREPARATION FOR USE - continued.

WARNINGS

- **Do not operate the unit until it has been properly grounded. Flowing fuel can generate static charges within the filter-separator. A static discharge could ignite the fuel or cause an explosion of fuel vapor.**

- **Do not touch could metal with bare hands when operating under arctic conditions. Frostbite can cause permanent injury.**

d. Grounding Installation (Refer to Figure 2-10).

Before the 200 GPM filter-separator can be placed in operation, it must be properly grounded. A ground rod with a build in slide hammer and grounding cable are stowed on the frame skid for grounding the filter-separator. A ground stud, located below the tiedown straps on the frame, is provided for connecting the grounding cable. Observe the following procedure when grounding the unit:

WARNINGS

- **Exercise care to prevent injury when driving the ground rod into the ground. Wear gloves. Do not hold ground rod above the stop collar.**

- **Do not operate the unit until it has been properly grounded. Flowing fuel can generate static charges within the filter-separator. A static discharge could ignite the fuel or cause an explosion of fuel vapor.**

(1) Loosen the threaded bar (1) and remove ground rod (2) from frame skid (3).

(2) Drive ground rod (2) into the ground three feet by sliding the hammer (4) up and down on rod.

NOTES

- **In the event ground cannot be sufficiently penetrated, bury the ground rod in a horizontal trench not less than four feet and at least eight inches beneath the surface.**

- **If driving becomes too difficult, try soaking the earth with water. Continue alternately soaking, then driving the rod.**

(3) Attach connectors (5) of ground cable (6) tightly to the ground rod (2) and grounding stud (7).

2-5. ASSEMBLY AND PREPARATION FOR USE continued.

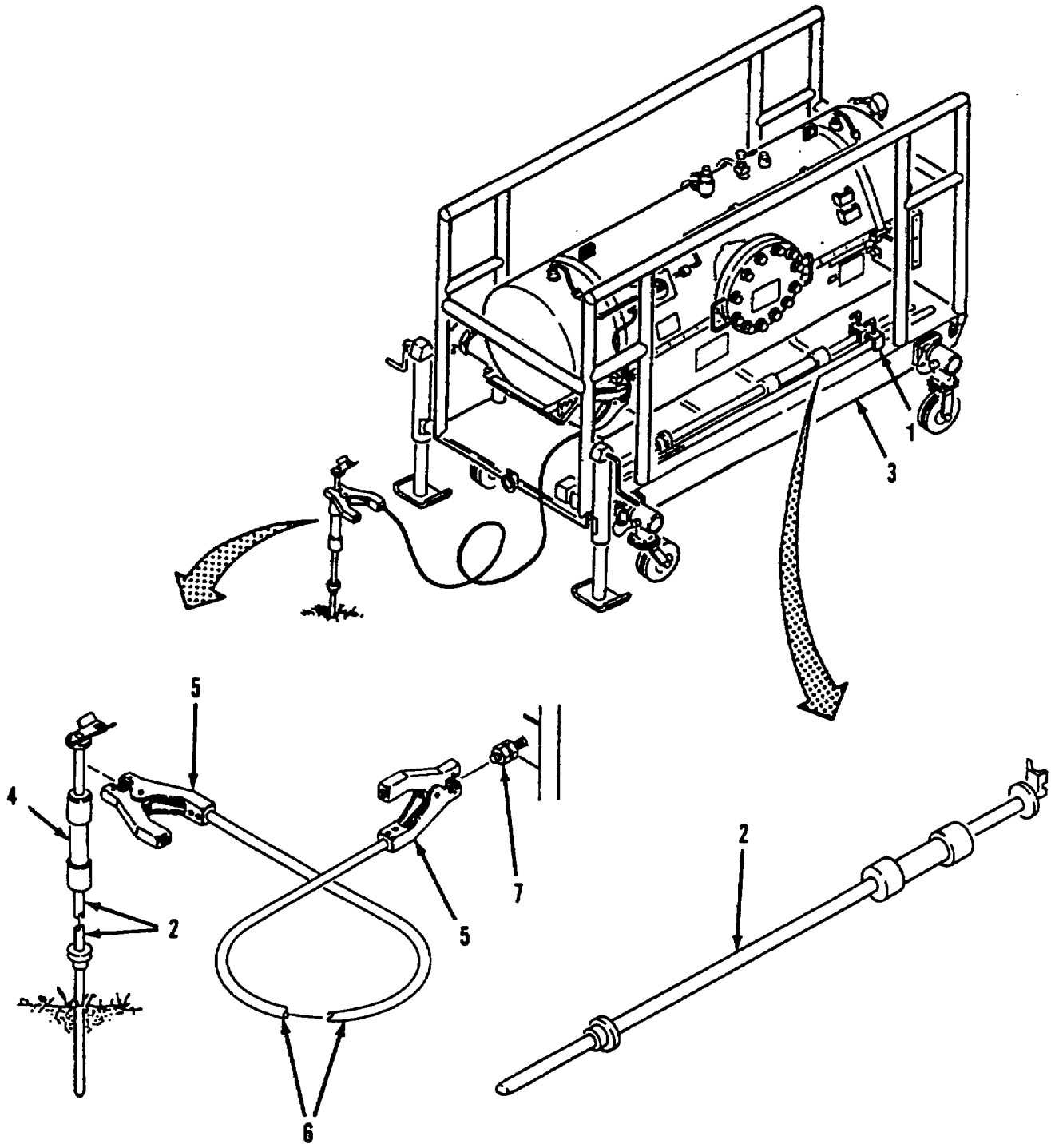

Figure 2-10. Grounding Installation.

2-5. ASSEMBLY AND PREPARATION FOR USE - continued.'

WARNINGS

- **Fuel is flammable and toxic. Avoid breathing of fuel vapors. Keep open flame and sparks away from pump assemblies, fuel hoses and spilled fuel on the ground.**

- **To prevent injury to personnel and damage to the equipment, use care when connecting; coupling to avoid getting debris on coupling mating surfaces. To prevent leaks and secure tight connections, make sure gaskets are installed in all female quick disconnect couplings.**

- **To prevent injury to personnel and equipment, do not apply excessive pressure or force on the locking arms when securing dust caps or dust plugs. Excessive pressure could break the locking arms and cause leaks due to poor connections.**

NOTE

Make certain that the quick disconnect cams on female coupling halves are pulled all the way so that male coupling halves can be securely seated. Check to see that gaskets are installed in each female coupling half.

e. Adapter Assembly. Water Detection. Installation (Refer to Figure 2-11)

(1) Pull locking arms (1) up and out from dust cap (2) and remove dust cap (2) from filter-separator outlet coupling (3).

(2) Pull locking arms (4) up and out from coupling (5) and remove dust plug (6) from adapter assembly (7).

(3) Make sure that the bevel (8) on the sampling probe(9) is pointed in the direction of female coupling (5).

(4) Attach adapter assembly (7) onto outlet coupling (3). Push locking arms (4) back against coupling (5) to secure adapter assembly (7) to filter-separator outlet coupling (3).

(5) Install dust plug (6) into dust cap (2) and push locking arms (1) back against dust cap (2) to secure dust plug (6).

2-5. ASSEMBLY AND PREPARATION FOR USE - continued.

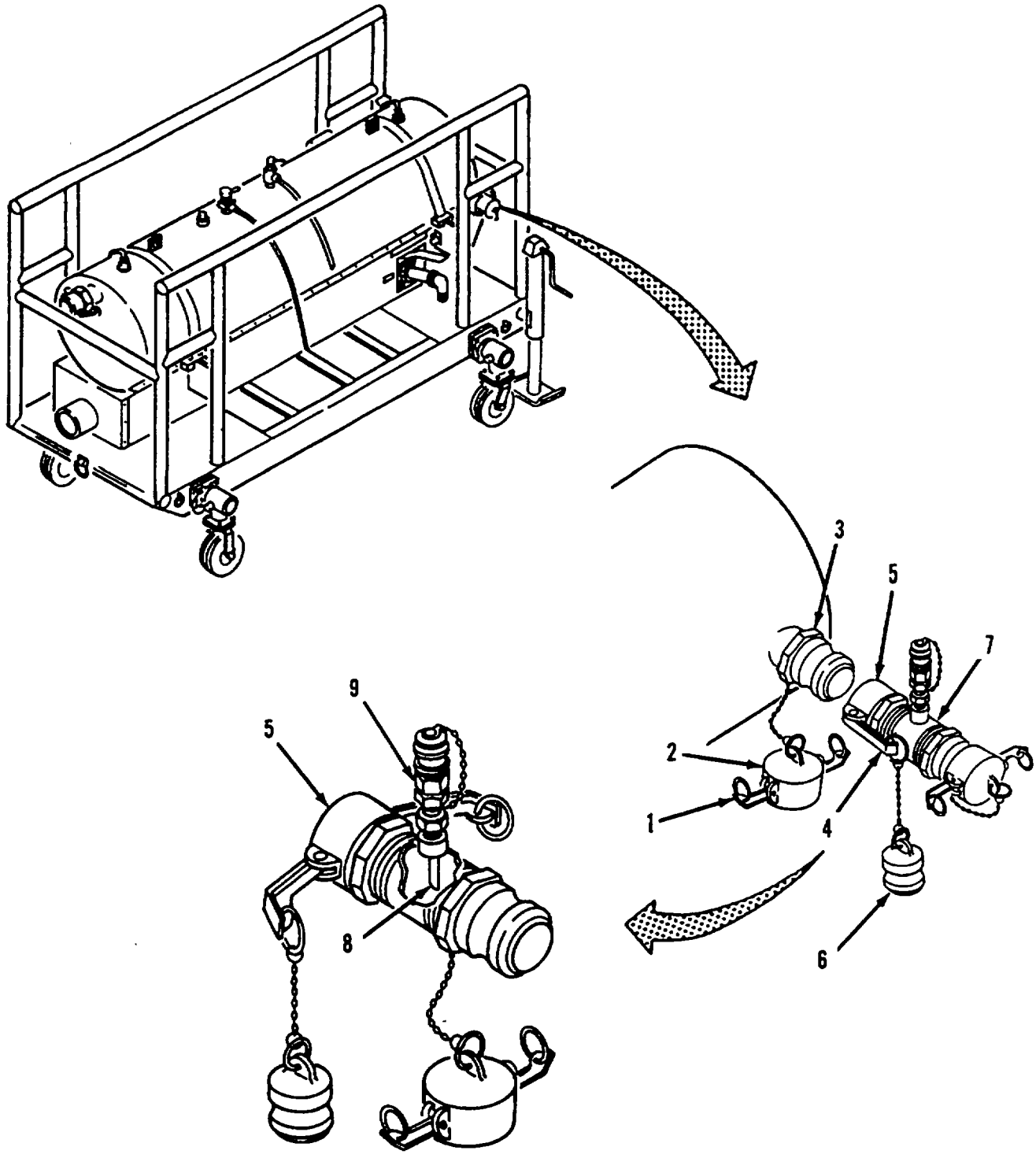

Figure 2-11. Adapter Assembly, Water Detection, Installation.

2--5. ASSEMBLY AND PREPARATION FOR USE - continued.

f. Fuel Connections (Refer to Figure 2-12).

WARNINGS

- **Fuel is flammable and toxic. Avoid breathing of fuel vapors. Keep open flame and sparks away from pump assemblies, fuel hoses and spilled fuel on the ground.**

- **To prevent injury to personnel and damage to the equipment, use care when connecting coupling to avoid getting debris on coupling mating surfaces. To prevent leaks and secure tight connections, make sure gaskets are installed in all female quick disconnect couplings.**

- **To prevent injury to personnel and equipment, do not apply excessive pressure or force on the locking arms when securing dust caps or dust plugs. Excessive pressure could break the locking arms and cause leaks due to poor connections.**

NOTES

- **This procedure reflects typical inlet and outlet fuel connections for the filter-separator. The operating requirements for the system may require different installation of components on the inlet and outlet couplings.**

- **Make certain that the quick disconnect cams on female coupling halves are pulled all the way so that male coupling halves can be securely seated. Check to see that gaskets are installed in each female coupling half.**

(1) Pull locking arms (1) up and out from inlet coupling (2) and remove dust plug (3).

(2) Pull locking arms (4) up and out from hose coupling (5) on inlet hose assembly (6) and remove dust cap (7).

(3) Attach inlet hose assembly (6) on inlet coupling (2) and push locking arms (1) back against inlet coupling (2) to secure inlet hose assembly onto inlet coupling

(4) Install dust plug (3) into dust cap (7) and push locking arms (4) back against dust cap (7) to secure dust plug in dust cap.

(5) Pull locking arms (8) up and out from dust cap (9) and remove dust cap (9) from coupling (10) on adapter assembly (11).

(6) Pull locking arms (12) up and out from hose coupling (13) on discharge hose assembly (14) and remove dust plug (15).

(7) Attach discharge hose assembly (14) to coupling (10) on adapter assembly (11) and push locking arms (8) back against hose coupling (12) to secure discharge hose assembly on adapter assembly.

2--5. ASSEMBLY AND PREPARATION FOR USE - continued.

(8) Install dust plug (15) into dust cap (9) and push locking arms (8) back against dust cap (9) to secure dust plug in dust can.

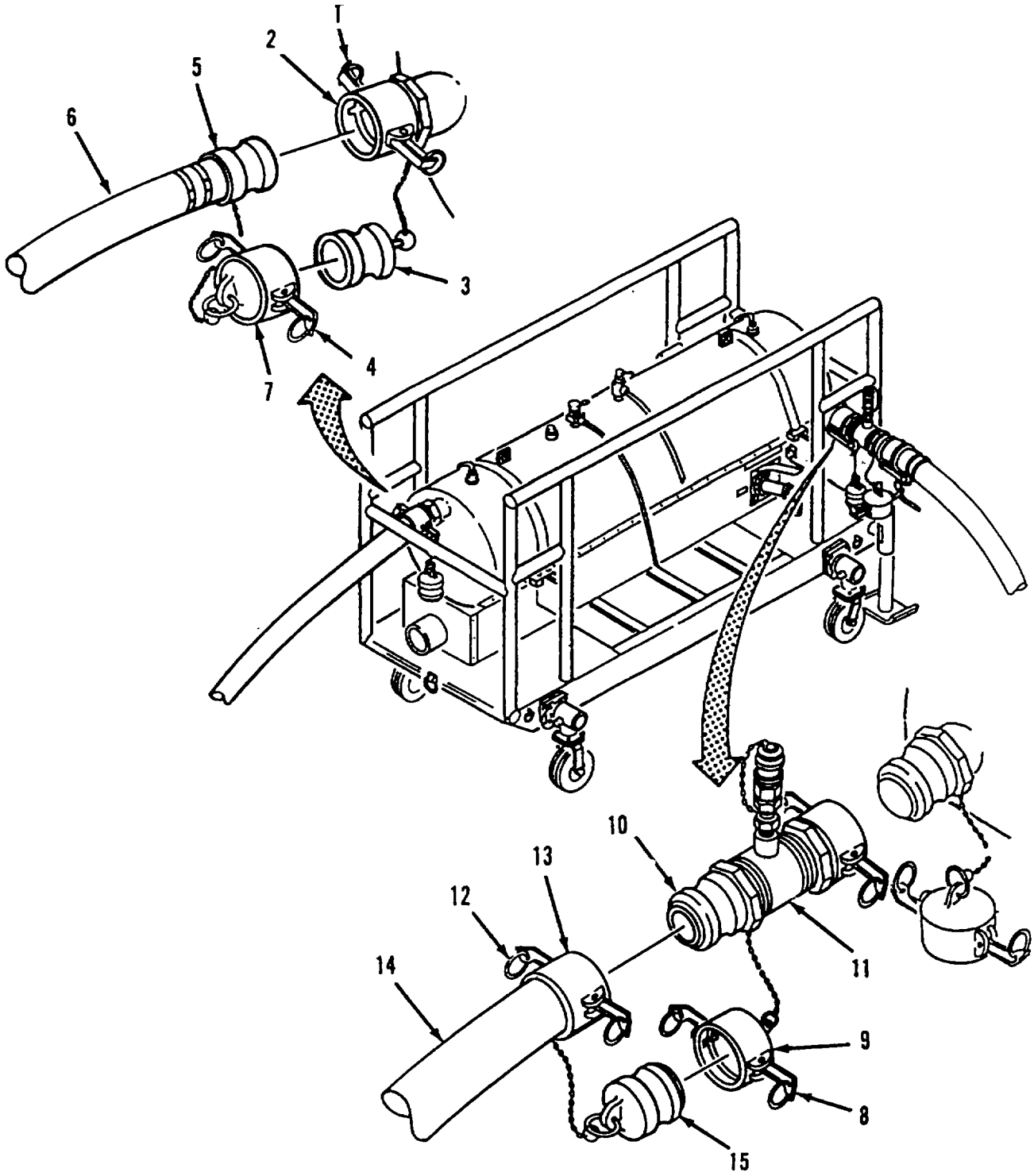

Figure 2-12. Fuel Connections.

2-5. ASSEMBLY AND PREPARATION FOR USE - continued.

g. Air Duct Connection (Refer to Figure 2-13).

WARNINGS

Do not touch cold metal parts with bare hands when operating under arctic conditions. Frostbite can cause permanent injury.

Do not restrict airflow. Be careful to avoid sharp bends which will restrict airflow and cause injury or equipment damage.

NOTE

Attach air duct only if defrost shroud is used for heating to prevent freezing of water in the sump. drain valve, and piping.

(1) Slide clamp (1) over air duct (2) from the system pump assembly and attach duct (2) to the defrost shroud hot exhaust inlet (3). Refer to system technical manual.

(2) Tighten clamp (1) to secure air duct (2) to the hot exhaust inlet (3).

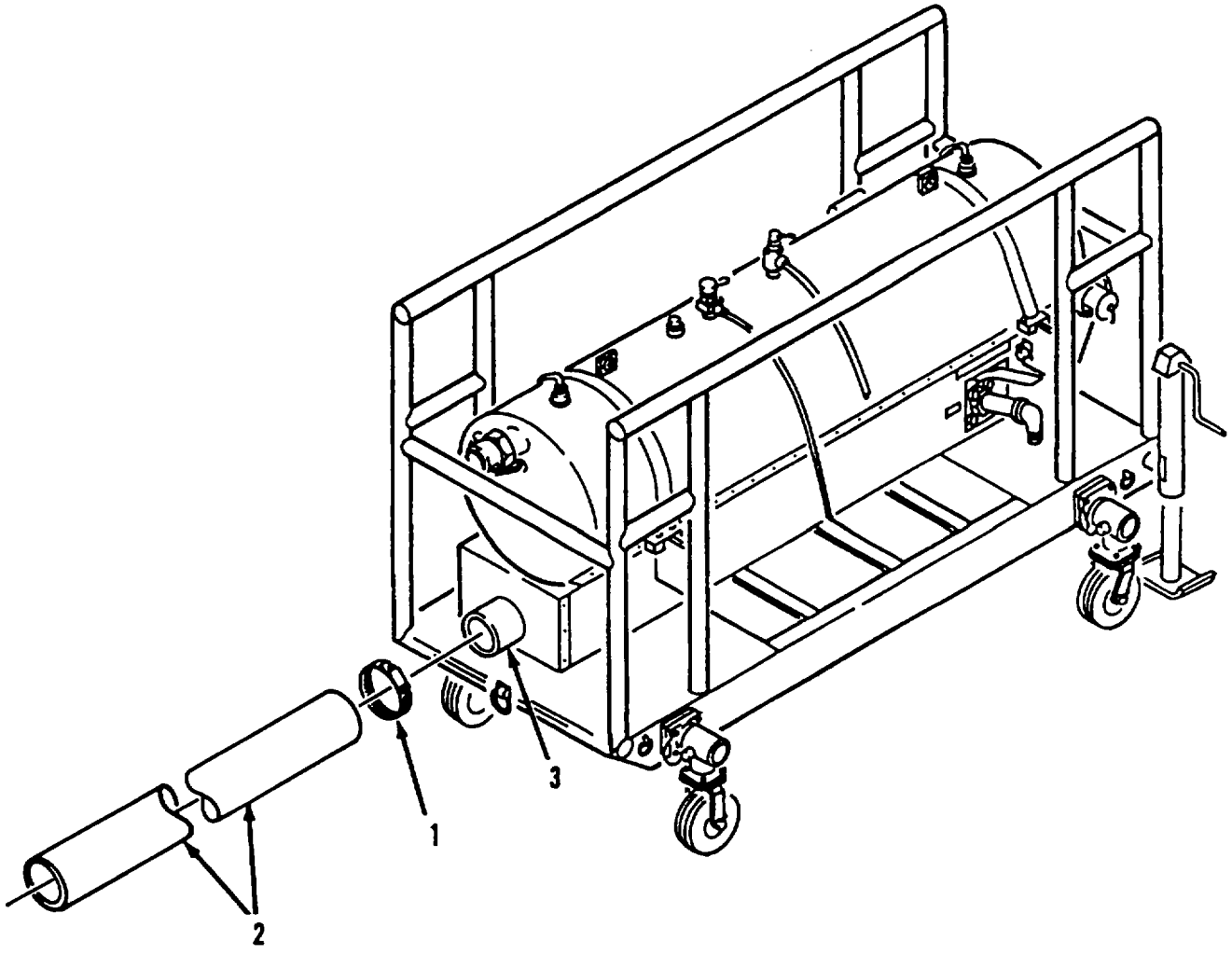

Figure 2-13. Air Duct Connection.

2-5. ASSEMBLY AND PREPARATION FOR USE - continued.

WARNING

Do not touch cold metal parts with bare hands when operating under arctic conditions. Frostbite can cause permanent injury.

h. Tank Filling Procedure (Refer to Figure 2-14).

(1) Set the 200 GPM filter-separator controls as follows:

(a) Air Vent valve (1) - CLOSED.

(b) Water Drain valve (2) - CLOSED.

(c) Defrost door (3) - second notch of adjustment range.

(2) Open an upstream blocking valve slightly to fill the filter-separator slowly with as little pressure as possible. Refer to system technical manual.

(3) Start the system pump assembly. Refer to pump assembly technical manual.

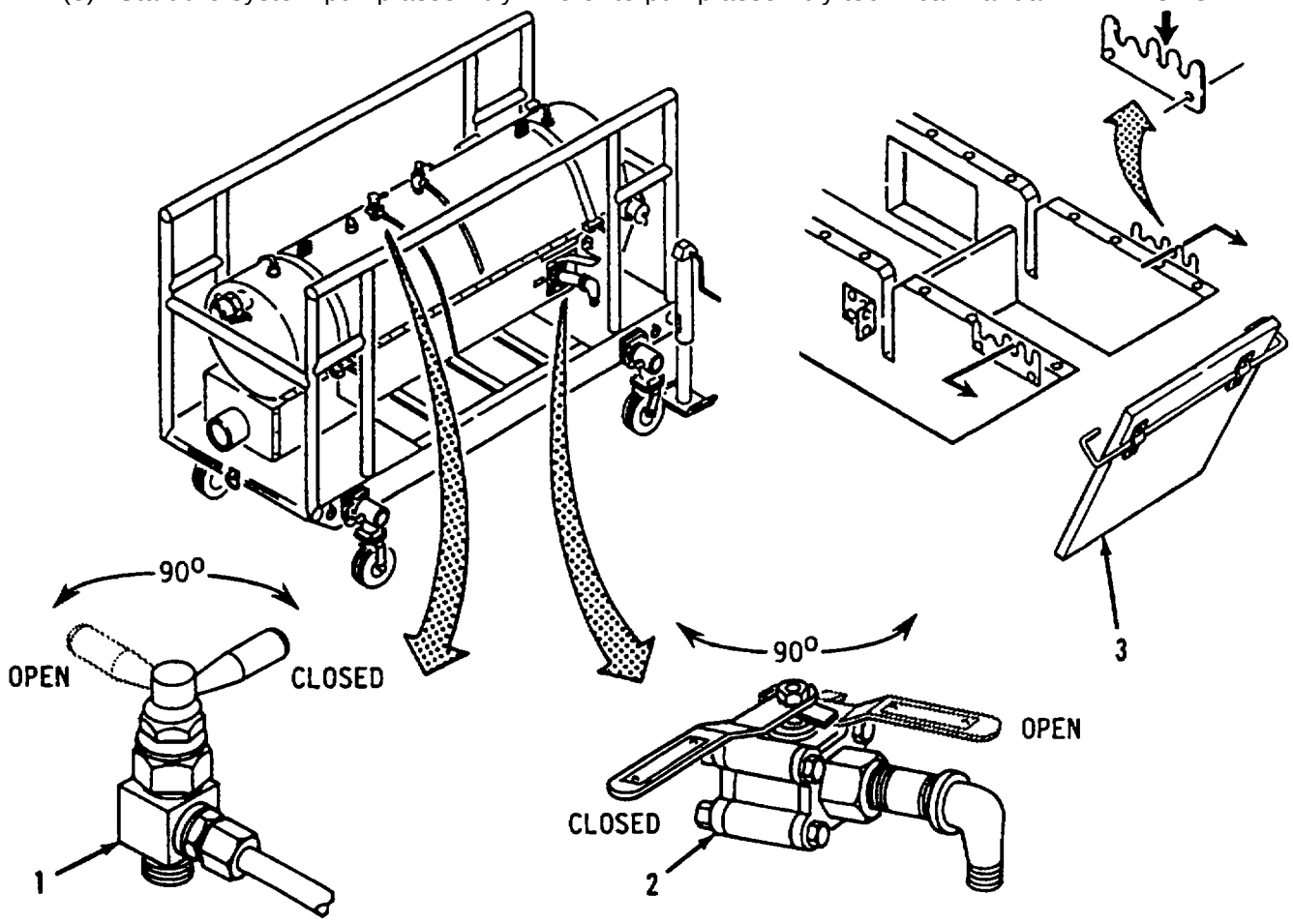

Figure 2-14. Tank Filling Procedures- Setting Controls

2-5. ASSEMBLY AND PREPARATION FOR USE - continued.

h. Tank Filling Procedure continued.

(4) Purge air from the tank while filling as follows: (Refer to figure 2-15).

(a) Slowly open the air vent valve (1) approximately halfway by turning the valve handle (2) 450 towards the OPEN position.

WARNING

Do not allow fuel to come in contact with eyes or skin. Wear protective goggles. Fuels are toxic and can cause illness or death. If fuel contacts skin or eyes, flush and get medical attention immediately.

(b) Have an empty container ready to catch any fuel expelled from the vent tube assembly (3). Stand by as the tank fills with fuel.

(c) Turn handle (2) on the air vent valve (1) to the CLOSE position when fuel comes out of the vent tube assembly (3).

NOTE

For disposal of contaminated fuel, refer to FM 10-20.

(d) Fully open any valve down-stream from the filter-separator.

(e) Fully open the system upstream valve operated in step (2).

(f) Inspect all connections and piping for leaks.

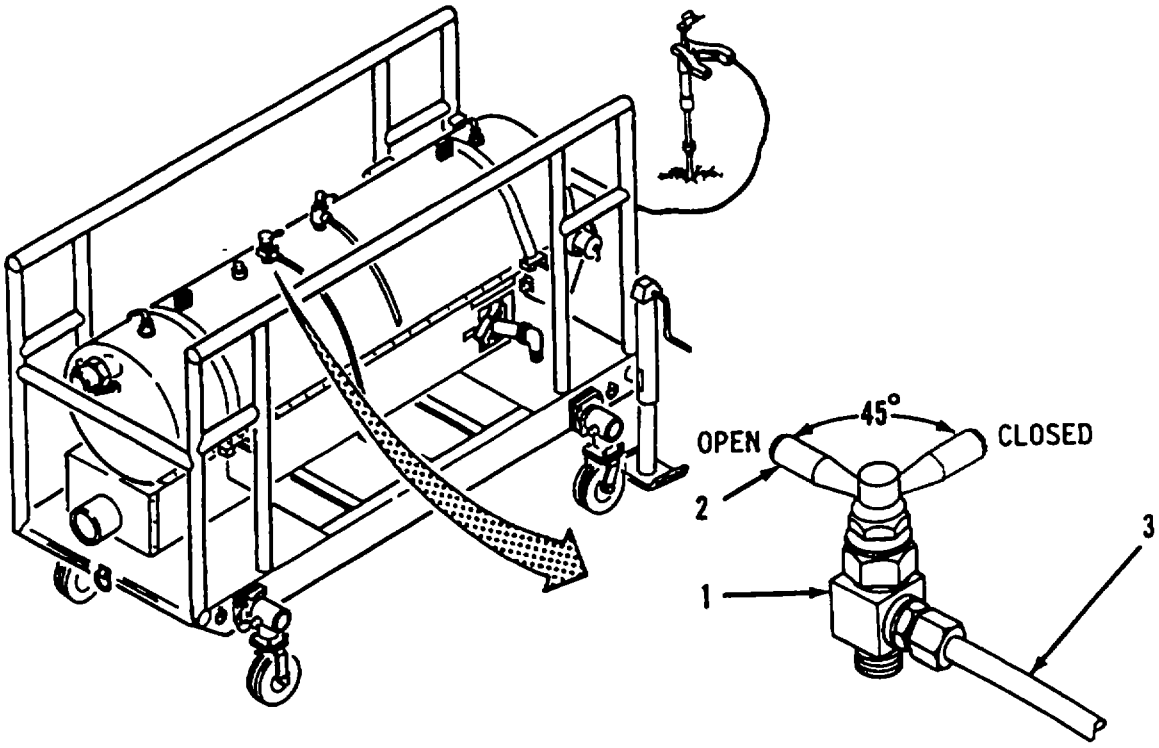

Figure 2-15. Tank Filling Procedures - Purge Air.

2-6. OPERATING PROCEDURES.

a. General. The fuel system is designed so that fuel is circulating through the filter-separator whenever the system fuel pump is running. Recycling of fuel enhances the removal of entrained solids and dissolved water.

During operation, periodic checks must be made of the differential pressure (DP) across the filters Water must be drained from the tank sump before and after each operations.. Also, the air vent valve must be operated periodically to purge the tank of any air. The required frequency of these operating procedures will be based on experience gained in operating the system. Factors affecting this frequency will be:

(1) Amounts of water and solids present in the fuel supply.

(a) An increase in the water removed from fuel can be expected during humid or rainy weather conditions.

(b) An increase in the amount of solids removed, indicated by an accelerated differential pressure indication on the DP gage, can be expected when operating in dusty or sandy environment.

(2) Quantity of fuel being dispensed from the system.

(3) Duration of fuel system operation.

b. Draining Water From Sump (Refer to Figure 2-16).

WARNINGS

When the defrost shroud is used for heating, the shroud and water drain valve may be very hot Exercise caution to avoid burns.

Do not allow fuel to came in contact with eyes or skin. Wear protective goggles. Fuels are toxic and can cause illness or death. If fuel contacts skin or eyes, flush and get medical attention immediately.

(1) Drain water from sump (1) by turning handle (2) on the drain valve (3) slowly to the OPEN position. Hold an empty container under the drain pipe (4) to catch the expelled contaminated fuel.

NOTE

For disposal of contaminated fuel, refer to FM 10-20.

(2) Allow the water to drain until fuel starts to flow from the drain pipe (4), then turn the handle (2) to the CLOSED position.

2-6. OPERATING PROCEDURES - continued.

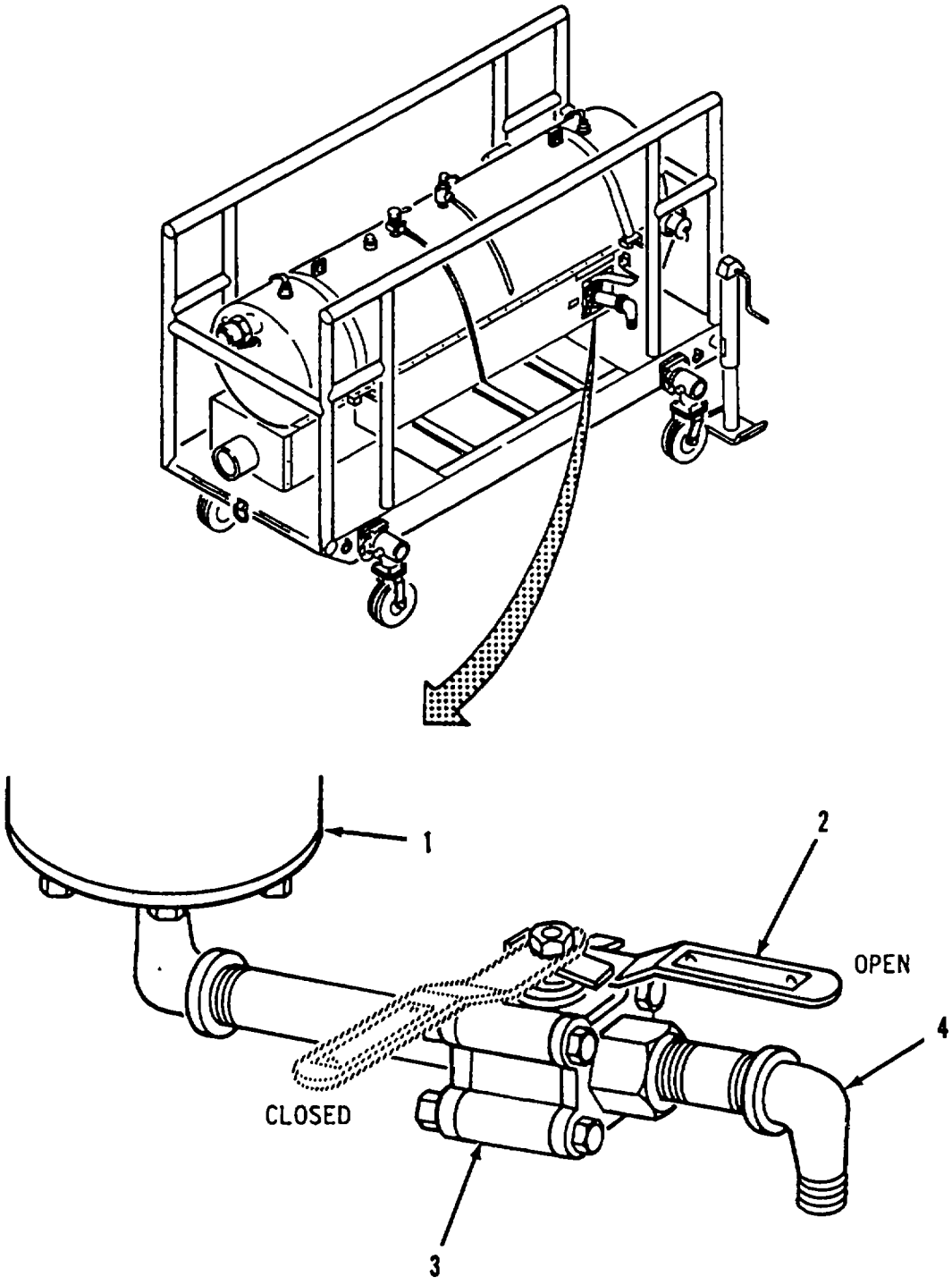

Figure 2-16. Draining Water From Sump.

2-6. OPERATING PROCEDURES - continued.

c. Monitoring Differential Pressure (DP)(Refer to Figure 2-17). The DP gage (1) indicates the differential pressure between the inlet and out pressures to determine filter element condition Differential pressure is checked by observing the needle indication on the DP gage (1). When the reading reaches the yellow zone, the filter elements of the first stage filter should be replaced immediately after operation. If reading in the RED PORTION, STOP IMMEDIATELY AND NOTIFY UNIT MAINENANCE

NOTE

During operation at subfreezing temperatures, below 32°F, filter elements can accumulate ice crystals, causing an increase in the DP gage reading. Allow the fuel system to operate, circulating fuel for a period of time while observing the DP gage. If the gage indication remains in the yellow zone, filter plugging is by solid contaminants. Notify unit maintenance that replacement of the elements is required.

d. Air Purging (Refer to Figure 2-17). Purging air from the filter-separator tank is necessary when filling tank, refer to para 2-5.

(1) Place an empty container under the air vent tube assembly (2).

(2) Slowly open the air vent valve (3) and allow air to escape from the vent tube assembly (2)

(3) Close the air vent valve (3) when fuels flows out of the vent tube assembly (2).

NOTE

For disposal of contaminated fuel, refer to FM 10-20.

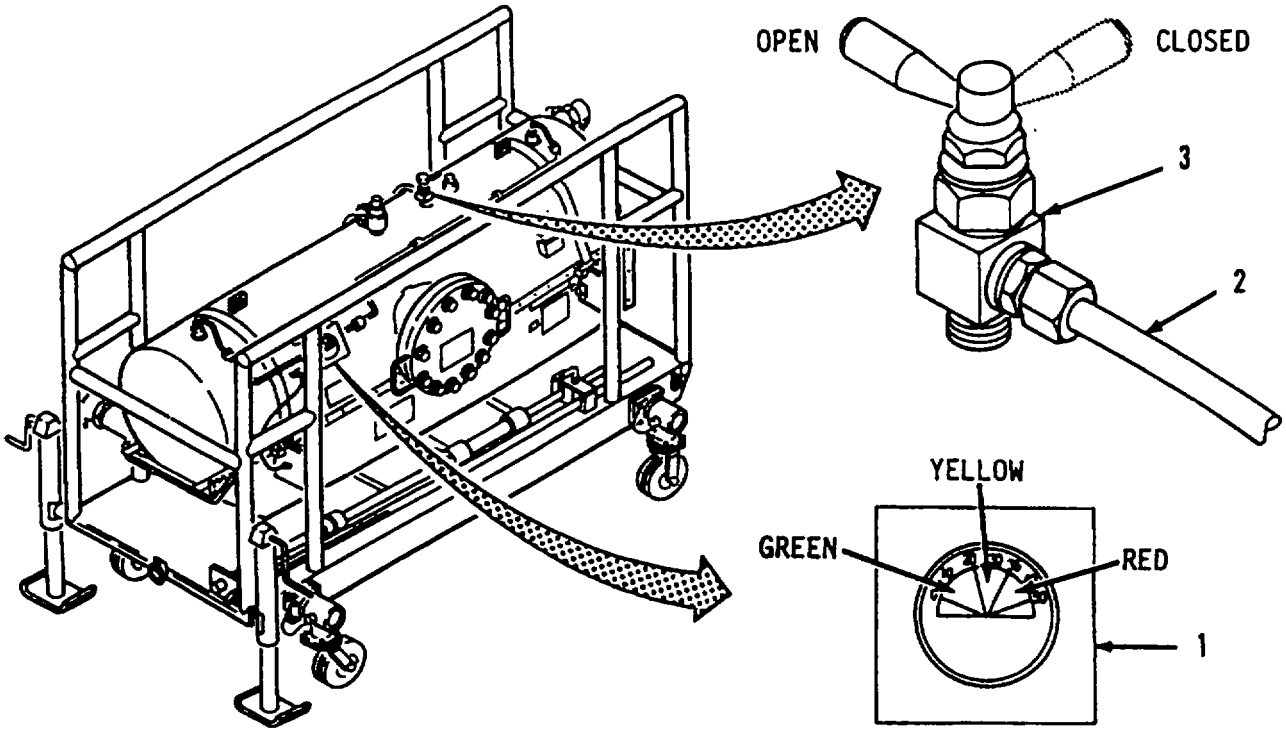

Figure 2-17. Air Purging.

2-6. OPERATING PROCEDURES - continued.

e. Fuel Sampling (Refer to figure 2-18)

(1) It is mandatory that the performance of filter-separator on all aircraft refueling equipment be checked every 30 days through the submission of samples taken from the effluent stream of the filter-separator.

WARNING

Do not allow fuel to come in contact with eyes or skin. Wear protective goggles. Fuels are toxic and can cause illness or death. If fuel contacts skin or eyes, flush and get medical attention immediately.

(2) The adapter assembly (1) attached to the filter-separator's outlet coupling (2) contains a sampling probe (3), which extends into the fuel flow. A Detector Kit, NSN 6640-00-244-9478, can be attached to the sampling probe (3) to obtain fuel samples.

NOTE

For disposal of contaminated fuel, refer to FM 10-20.

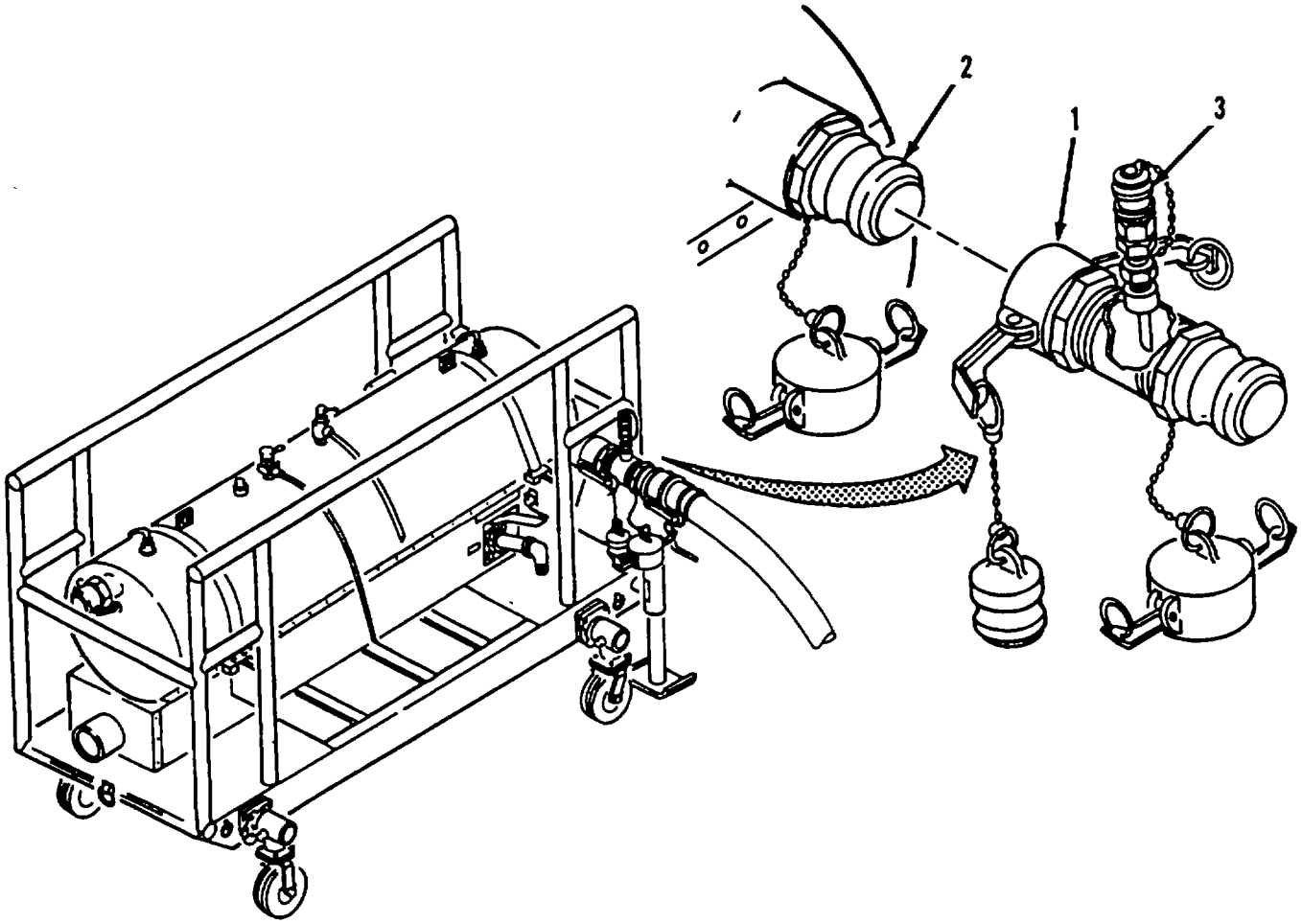

Figure 2-18. Fuel Sampling.

2-6. OPERATING PROCEDURES - continued.

f. Heat Adjusting (Refer to Figure 2-19). When the defrost shroud (1) is used to prevent water freezing in the filter-separator sump, heating from the system pump is adjusted by positioning the defrost door (2) on the shroud.

WARNING

To avoid bums, wear hand protection when adjusting defrost door. The door and shroud may be very hot.

(1) The adjustment bracket (3) on shroud (1) provides four positions for adjusting the defrost door (2).

CAUTION

Never fully close the defrost door during system operation This would apply excessive back pressure to the pump assembly exhaust, which could result in engine damage.

(2) Adjust heat by moving the bar (4) attached to the defrost door (2) to the selected notch. The first notch (fully open) position on the adjustment bracket (3) provides the least heat and the fourth notch (fully closed) position provides the most beat.

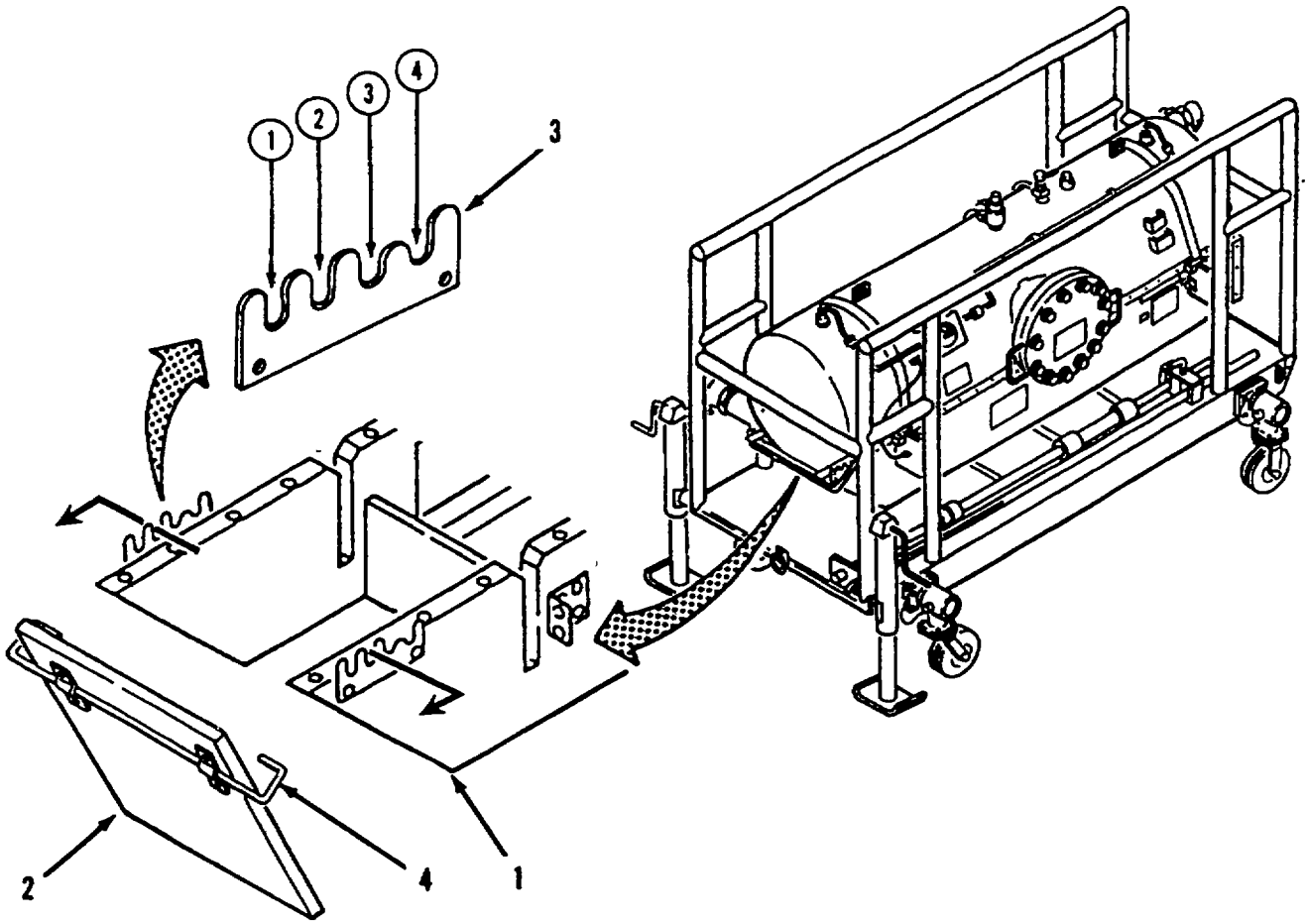

Figure 2-19. Heat Adjusting.

2-6. OPERATING PROCEDURES - continued.

g. Shut Down

(1) Provide an adequate container and open the manual drain valve to drain any accumulated water. Refer to the draining water from pump procedures in para 2-6.

(2) Stop the system pump. Refer to pump technical manual.

(3) Close the up-stream and down-stream valves to isolate the filter-separator from the system.

(4) Open air vent valve. If,shutdown is temporary, leave open until system is restarted. Refer to the air purging procedures in para 2-6.

2-7. LOCATION OF DATA AND IDENTIFICATION PLATES,

Location of identification plates, instruction plates, and markings for the 200 GPM filter-separator are shown in figure 2-20.

2-7. LOCATION OF DATA AND IDENTIFICATION PLATES - continued

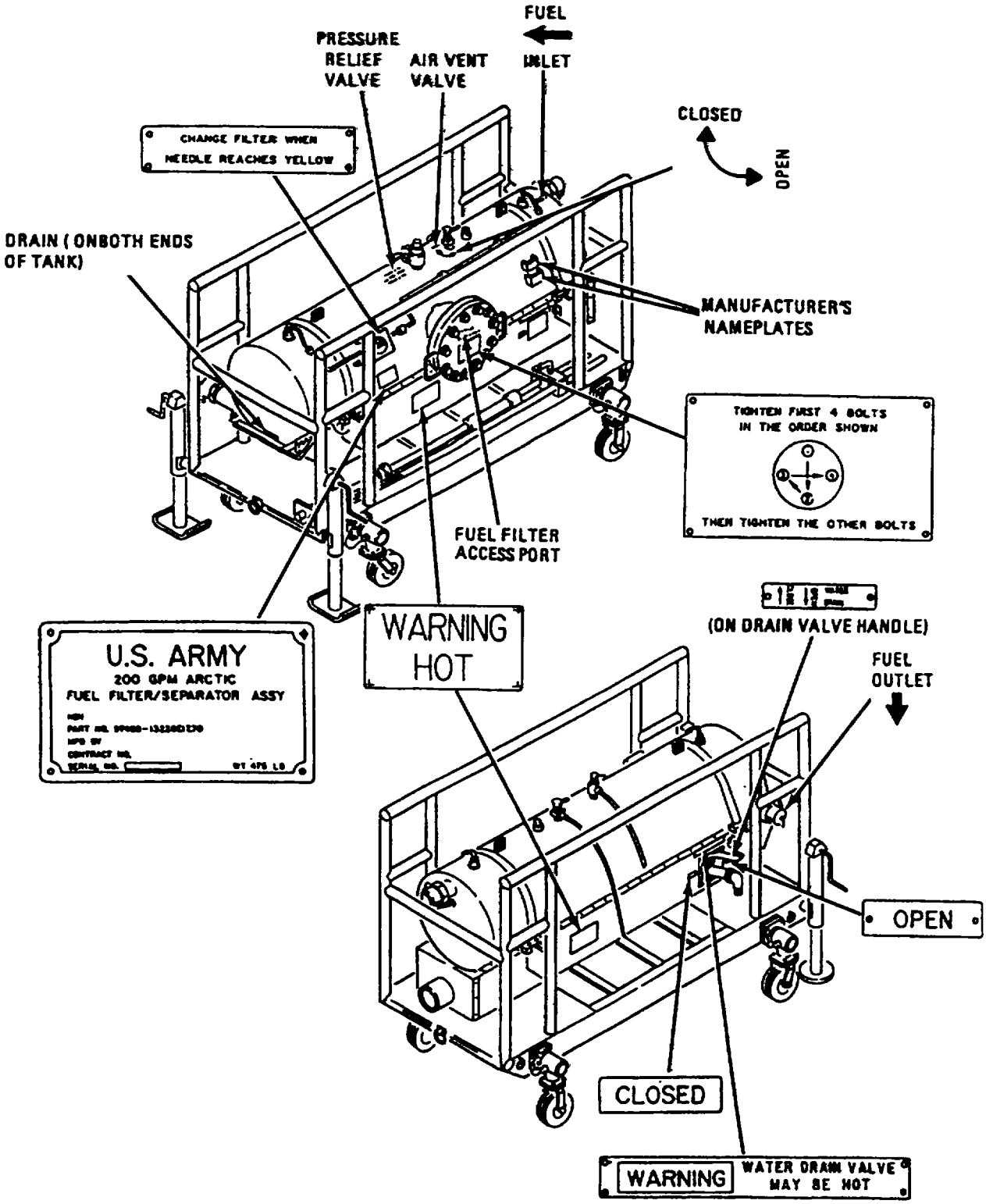

Figure 2-20. Location of Data and Identification Plates.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

12-8. UNUSUAL ENVIRONMENTAL/WEATHER CONDITIONS.

a. Operating in Arctic Cold Conditions

WARNINGS

· Do not touch metal parts with bare hands when operating under arctic cold conditions. Frostbite can cause permanent injury.

Always wear arctic mittens when handling equipment.

To avoid burns, wear hand protection when adjusting defrost door. The door and shroud may be very hot.

CAUTION

Be careful when handling fuel system hoses, tanks and drums to avoid cracking them.

(1) Provide heating to prevent the water within the filter-separator from freezing up. This can be done using the system pump assembly to provide hot exhaust gas to the defrost shroud. If this heat source is not available, provide a heated shelter for the filter-separator.

(2) Remove snow, sleet. or ice from couplings before making or breaking connections.

(3) Operate the 200 GPM filter-separator. Refer to paragraph 2-6.

(4) Water must be drained after each operation in subfreezing conditions. All water must be drained before shutting down the unit. Refer to para 2-6.

b. Operating in Extreme Heat

(1) Remove the heating duct from the system pump assembly or other heating provisions.

(2) Provide shade from direct sun exposure if possible, using a tent or tarpaulin. Do not block air circulation.

(3) Operate the 200 GPM filter-separator. Refer to para 2-6.

c. Operating Under Dusty or Sandy Conditions

(1) Filter elements must be changed more often in dusty or sandy environments. Select a position protected by natural barriers or erect screens of dust proof material.

(2) Keep the unit free of dust and dirt, especially when the filter access port is opened for servicing.

2-8. UNUSUAL ENVIRONMENTAL/WEATHER CONDITIONS - continued.

c. Operating Under Dusty or Sandy Conditions - continued

(3) Check the DP gage indication often to be sure that operation is not in the yellow zone

(4) Operate the 200 GPM filter-separator. Refer to para 2-6.

(5) Precaution must be taken to prevent foreign matter from entering the let or outlet couplings and valves. Remove dust plugs and caps only when ready to make connections. Replace dust plugs and caps as soon as connections are broken.

d. Operating Under Rainy or Humid Conditions

(1) Rainy or extremely humid conditions may cause unusually large amounts of water to be entrained in the fuel. Water must be drained after each operation.

(2) Before the fuel filter access port is opened for servicing. erect a shelter to prevent rain from entering tank.

(3) Operate the 200 GPM filter-separator. Refer to para 2-6.

2-9. EMERGENCY PROCEDURES.

CAUTION

Do not operate the 200 GPM filter-separator when the DP gage indication is past the center of red zone. The filter elements could be ruptured and fuel contaminated.

Under emergency conditions. the 200 GPM filter-separator can be operated with the DP gage reading in the red zone. The DP gage must be continuously monitored under this emergency condition and operation immediately discontinued when the center of the red zone is reached. Drain water from the sump frequently under this condition.

2-10. PREPARATION FOR MOVEMENT.

Prepare the 200 GPM filter-separator for movement as follows:

WARNINGS

· Fuels are toxic and flammable. Avoid breathing of fuel vapors. Keep open flame and sparks away from filter-separator. fuel hose, and spilled fuel.

Do not touch metal parts with bare hands when operating under arctic cold conditions. frostbite can cause permanent injury.

Always wear arctic mittens when handling equipment.

a. Shut down system pump assembly. Refer to system pump technical manual.

2-10. PREPARATION FOR MOVEMENT - continued

b. Isolate filter-separator by closing up-stream and down-stream valves. Refer to system operating manual.

For steps c through k refer to figure 2-21.

c. Place container under air vent tube assembly (1) and open air vent valve (2) to purge air. Refer to para 2-6.

NOTE
For disposal of contaminated fuel, refer to FM 10-20.

d. Place container under drain elbow (3) and turn drain valve handle (4) open to drain water from the sump. Refer to para 2-6.

NOTE
For disposal of contaminated fuel, refer to FM 10-20.

e. Pull locking arms (5) up and out from discharge hose coupling (6) and disconnect discharge hose assembly (7) from adapter coupling (8).

f. Install dust plug (9) in discharge hose coupling (6) and push back against locking arms (5) to secure dust plug in hose coupling.

g. Pull locking arms (10) up and out from adapter coupling (11) and disconnect adapter assembly (12) from filter-separator outlet coupling (13).

h. Install dust plug (14) in adapter coupling (11) and push back against locking arms (10) to secure dust plug i 1 adapter coupling.

i. Install dust cap (15) on adapter coupling (8) and push back against locking arms (I 6) to secure dust plug cap adapter coupling.

j. Install dust cap (17) on filter-separator outlet coupling (13) and push locking arms (18) back against dust cap (17) to secure dust cap on outlet coupling.

WARNING
To avoid burns, wear hand protection when adjusting defrost door. The door and shroud may be very hot.

k. Place the defrost door (19) in the fourth notch (fully closed) of the adjustment plate (20).

2-10. PREPARATION FOR MOVEMENT - continued

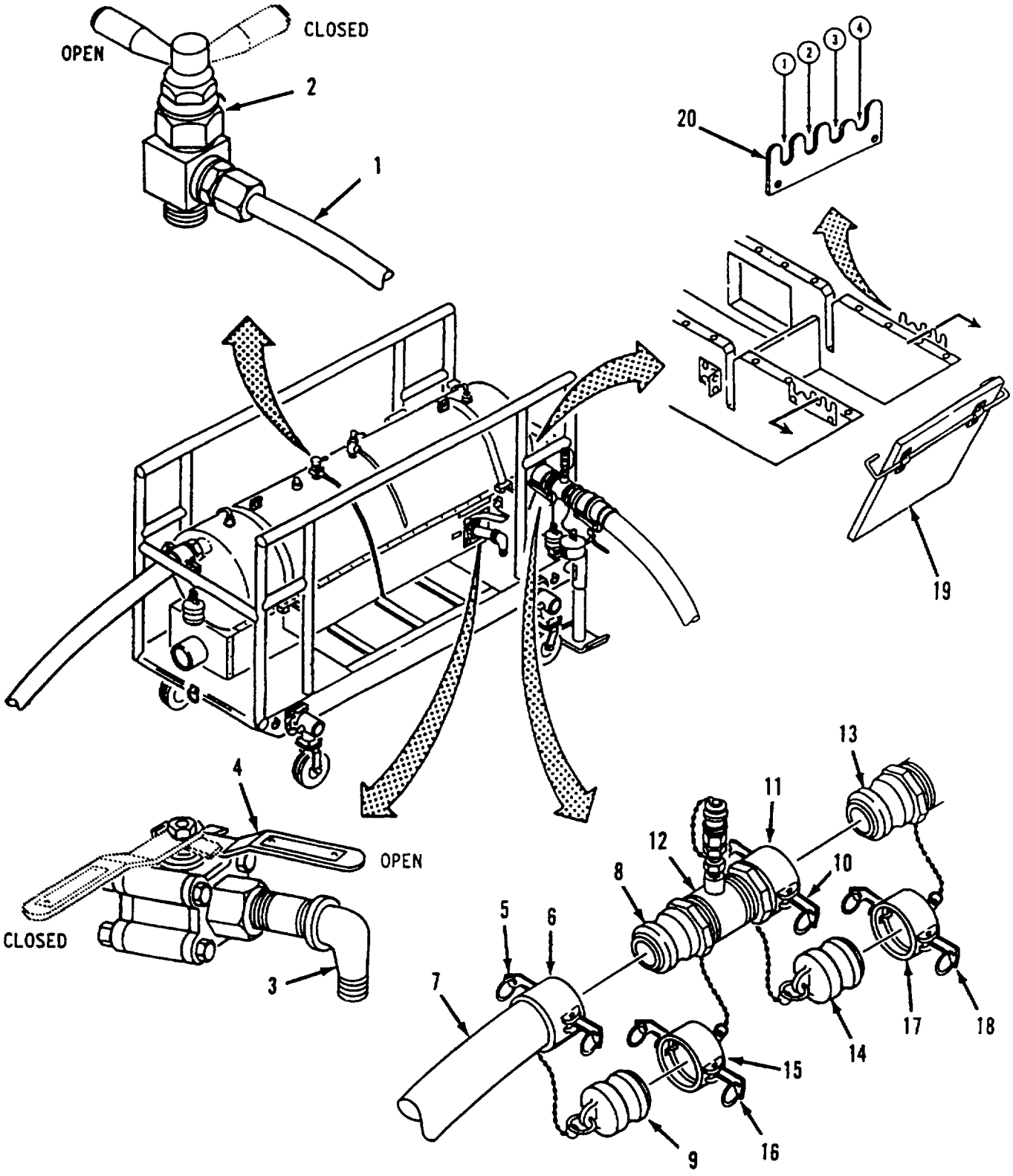

Figure 2-21. Preparation for Movement - Steps a through k.

2-10. PREPARATION FOR MOVEMENT - continued

For steps l through r refer to figure 2-22.

WARNINGS

- **Fuels are toxic and flammable. Avoid breathing of fuel vapors. Keep open flame and sparks away from filter-separator, fuel hose, and spilled fuel.**
- **Do not touch metal parts with bare hands when operating under arctic cold conditions. Frostbite can cause permanent injury.**
- **Always wear arctic mittens when handling equipment. Refer to system pump technical manual.**
- **Exercise care to prevent injury when removing the ground rod. Wear gloves. Do not hold grounding rod above collar.**

CAUTION

To avoid burns, wear hand protection when removing air duct. The air duct and shroud may be very hot.

l. Pull locking arms (1) up and out from filter-separator inlet coupling (2) and disconnect inlet hose assembly (3) from inlet coupling.

m. Install dust plug (4) in inlet coupling (2) and push back against locking arms (1) to secure dust plug in inlet coupling.

n. Install dust cap (5) on inlet hose coupling (6) and push back against locking arms (7) to secure dust cap on inlet hose coupling.

o. Loosen clamp (8) and disconnect system air duct (9) from the hot exhaust inlet (10).

p. Disconnect connectors (11) on ground cable (12) from grounding stud (13) and grounding rod (14). Stow grounding cable (12) under tank on filter-separator.

q. Remove ground rod (14) from ground by sliding hammer (15) up and down on rod.

r. Stow ground rod (14) in bracket (16 and 17).

s. Place hold-down plate (18) on top of bracket (17) and secure in place by tightening the threaded bar (19).

2-10. PREPARATION FOR MOVEMENT - continued

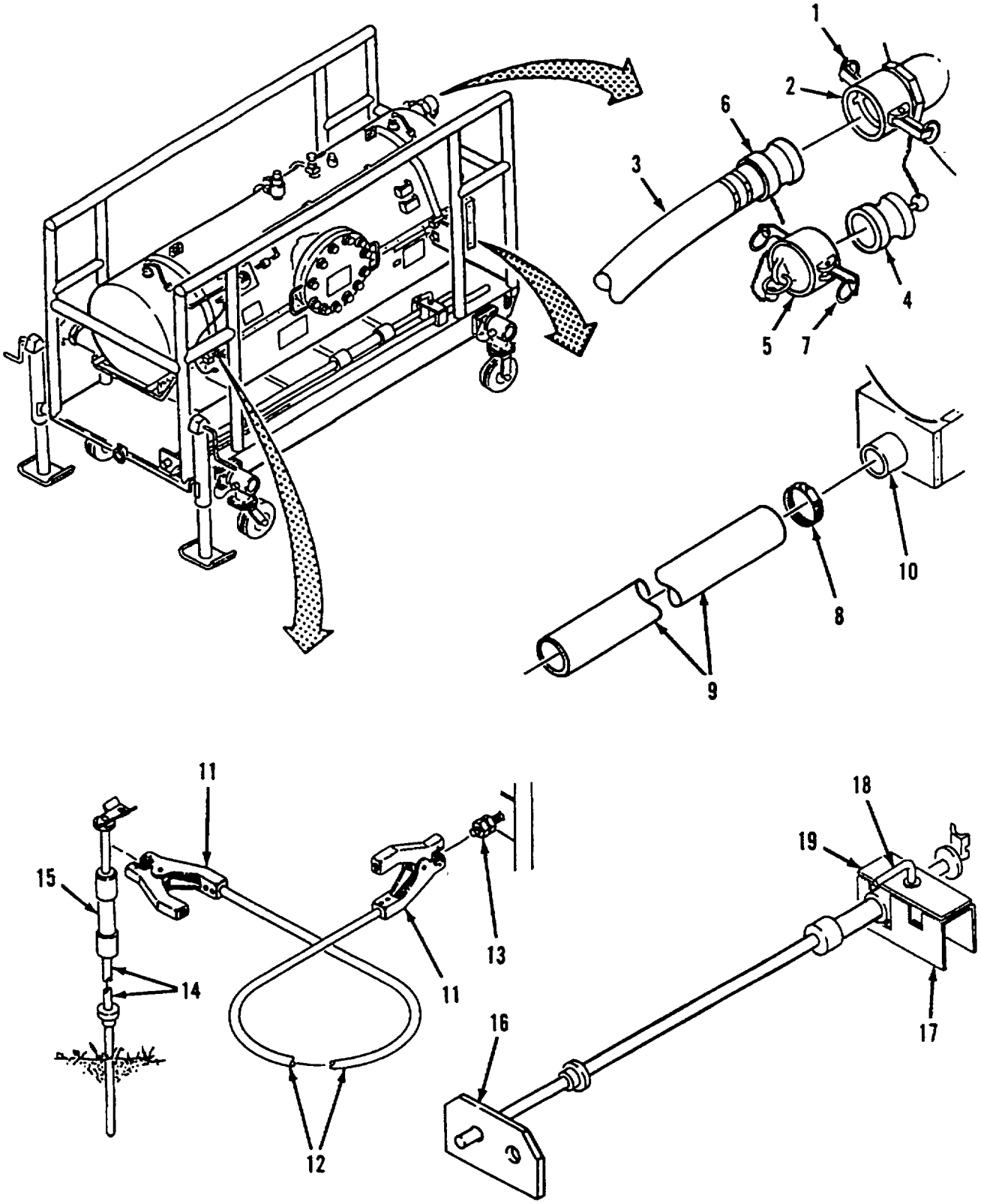

Figure 2-22. Preparation for Movement - Steps l through r.

2-10. PREPARATION FOR MOVEMENT - continued

WARNINGS

- **When raising the filter-separator turn the jack screw crank handles evenly or the filter-separator could tip over and cause injury or equipment damage.**
- **Do not touch could metal with bare hands when operating under arctic conditions. Frostbite can cause permanent injury.**

For step s refer to figure 2-23.

s. If the filter-separator is to be towed, rotate wheel assemblies (1 and 2) to the down position as follows: (1) Install the two screw jacks (3) on the frame (4) next to the swivel wheels (1). Align holes (5 and 6) and install pin (7) to secure screw jacks. Chock the rigid wheels (2) at the other end to prevent the filter-separator from rolling.

NOTE
Two individuals are required to raise the filter-separator.

(2) Turn screw jack crank handles (8) to raise swivel wheel assemblies (1) off the ground.

(3) Remove the locking pins (9) and rotate swivel wheel assemblies (1) to the down position.

(4) Align holes (10 and 11) and install locking pins (9) to lock the swivel wheels assemblies (1) in the down position.

(5) Turn the screw jack crank handle (8) until the tires (12) on swivel wheel assemblies (1) are on the ground.

(6) Pull out locking pins (4) and remove jack screws (3).

(7) Repeat steps 1 through 6 for rotating the rigid wheel assembles (2).

(8) Stow screw jacks (3) under tank on filter-separator.

2-10. PREPARATION FOR MOVEMENT - continued

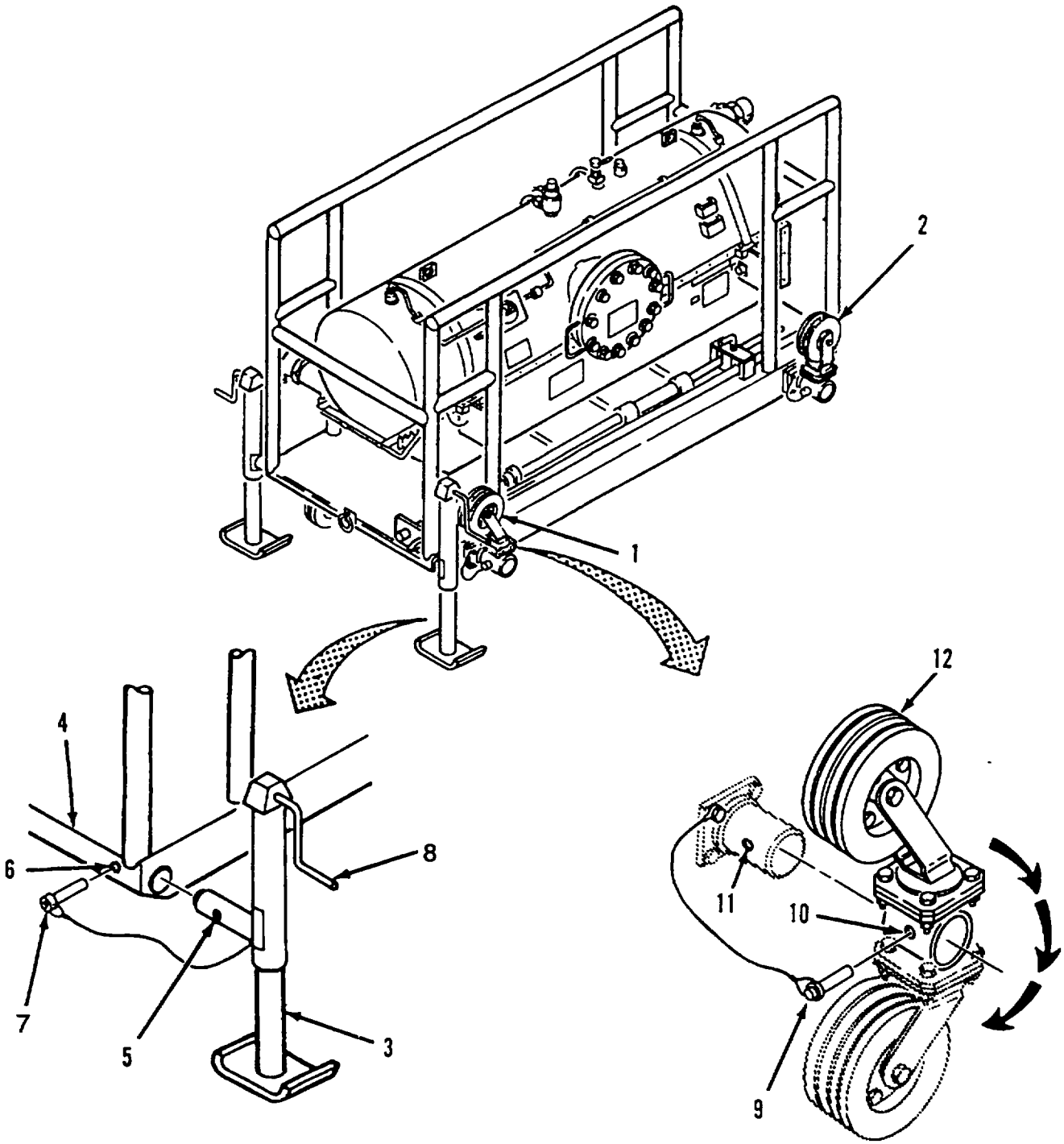

Figure 2-23. Preparation for Movement - Rotating Wheels.

2-11. NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION PROCEDURES.

NOTE
Detailed decontamination procedures can be found in FM3-3. FM3-4, and FM3-5.

a. Genera. The following emergency procedures can be followed until field NBC decontamination facilities are available. Assigned operators will assist the supporting NBC unit.

b. Emergency Procedure. If NBC attack is known or suspected, mask at once and perform the following: (1) Do not connect or disconnect the 200 GPM filter-separator from the fuel system.

(2) Have fuel tested for contamination before resuming operation.

CHAPTER 3

OPERATOR MAINTENANCE INSTRUCTIONS

Paragraph		Page
Section I.	Lubrication Instructions	3-1
Section II.	Operator Troubleshooting	3-1
3-1.	Introduction	3-1
3-2.	Malfunction Index	3-1
3-3.	Troubleshooting	3-2
Section III.	Maintenance Procedures	3-7

Section I. LUBRICATION INSTRUCTIONS

No lubrication is required by the operator for the 200 GPM filter-separator,

Section II. OPERATOR TROUBLESHOOTING

3-1. INTRODUCTION.

a. The troubleshooting table lists the common malfunctions you may encounter during operation of the 200 GPM filter-separator. You should perform the tests, inspections, and corrective actions in the order listed.

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

3-2. MALFUNCTION INDEX.

Malfunction Index	Page
1. Ice crystals in filter	3-2
2. Drain valve handle. does not rotate	3-3
3. Pressure Relief Valve Opens	3-4.
4. Excessive undissolved water in filter-separator effluent fuel samples	3-5
5. Excessive solids in filter-separator effluent fuel samples	3-6

3-3. TROUBLESHOOTING.

Refer to troubleshooting table 3-1.

NOTE

Be sure to read all warnings in the front of this manual before performing the troubleshooting procedures.

Table 3-1. Operator Troubleshooting for 200 GPM Filter-Separator.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. Ice crystals in filter.

High DP gage (1) reading, if high (in the yellow zone on gage dial)

Step 1. Allow fuel to circulate while monitoring DP gage (1) reading.

Step 2. If DP reading does not go down to green. notify unit maintenance.

Step 3. Check position of defrost door (2). Adjust door for more heat. Refer to para 2-6.

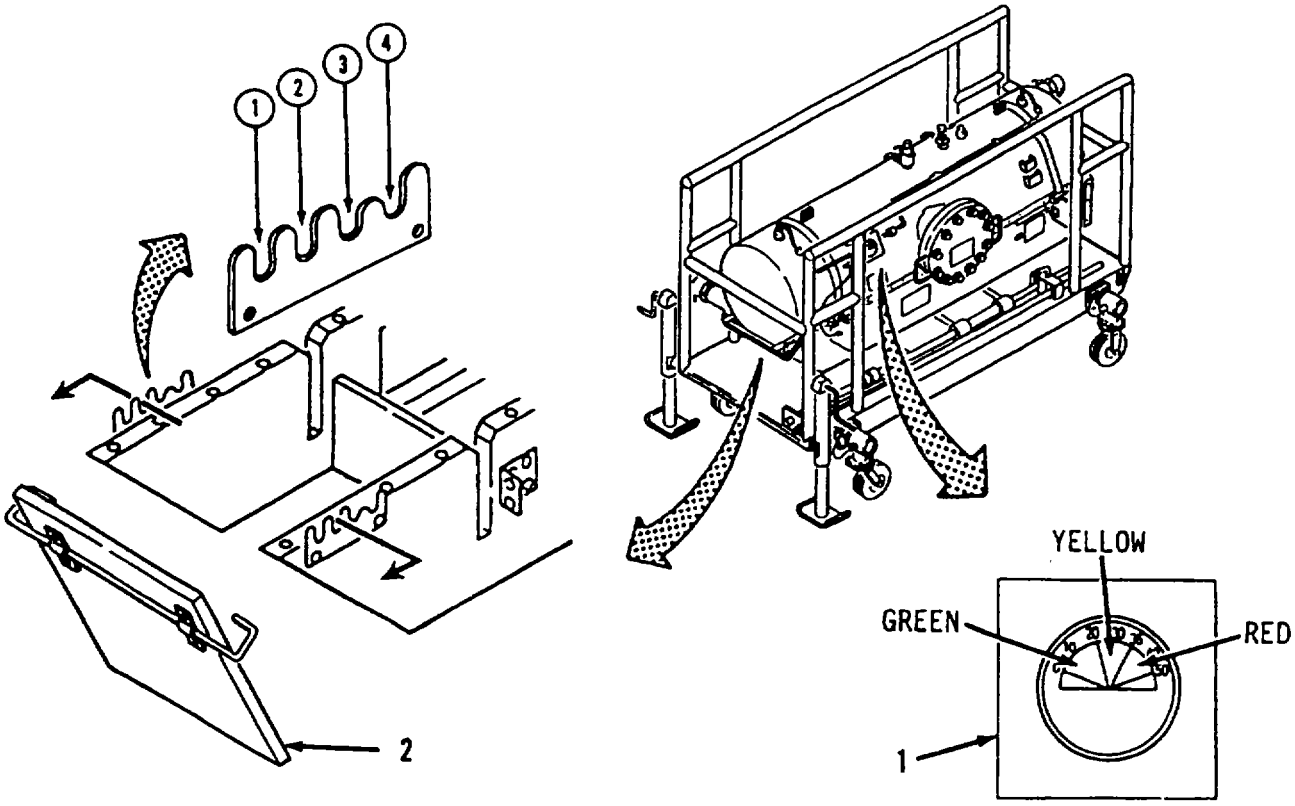

Figure 3-1. Malfunction 1 Ice Crystals 3-2

3-3. TROUBLESHOOTING - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Refer to figure 3-2.

2. Drain valve handle does not rotate.

Attempt to drain water from sump at elbow (1) by opening drain valve (2). If no flow results:

Step 1. Check position of defrost door (3). Adjust door to increase heating of sump and water drain. Refer to paragraph 2-6.

Step 2. Attempt to turn drain valve handle (4) to the OPEN position.

Step 3. If handle (4) does not rotate, notify unit maintenance.

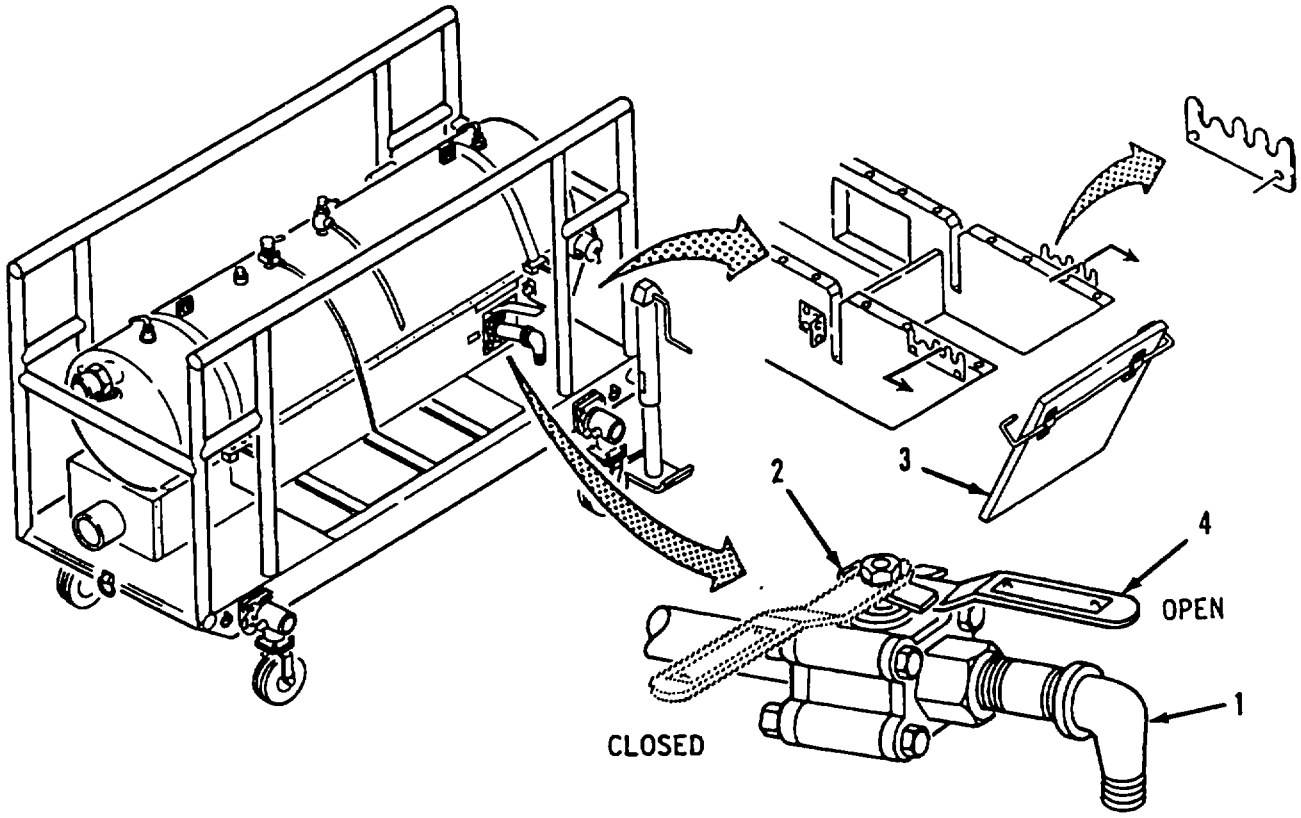

Figure 3-2. Malfunction 2 Drain Valve Handle

3-3. TROUBLESHOOTING - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Refer to figure 3-3.

3. Pressure relief valve (1) opens.

Check see if relief valve been adjusted.

Step 1. If seal (2) has been tampered with or broken, shutdown system pump and notify unit maintenance.

Check fuel discharge pressure at system pump.

Step 1. If pressure is over 150 psig, lower system pump discharge pressure to 150 psig.

Step 2. If pressure is less than 150 psig., shutdown system pump and notify unit maintenance.

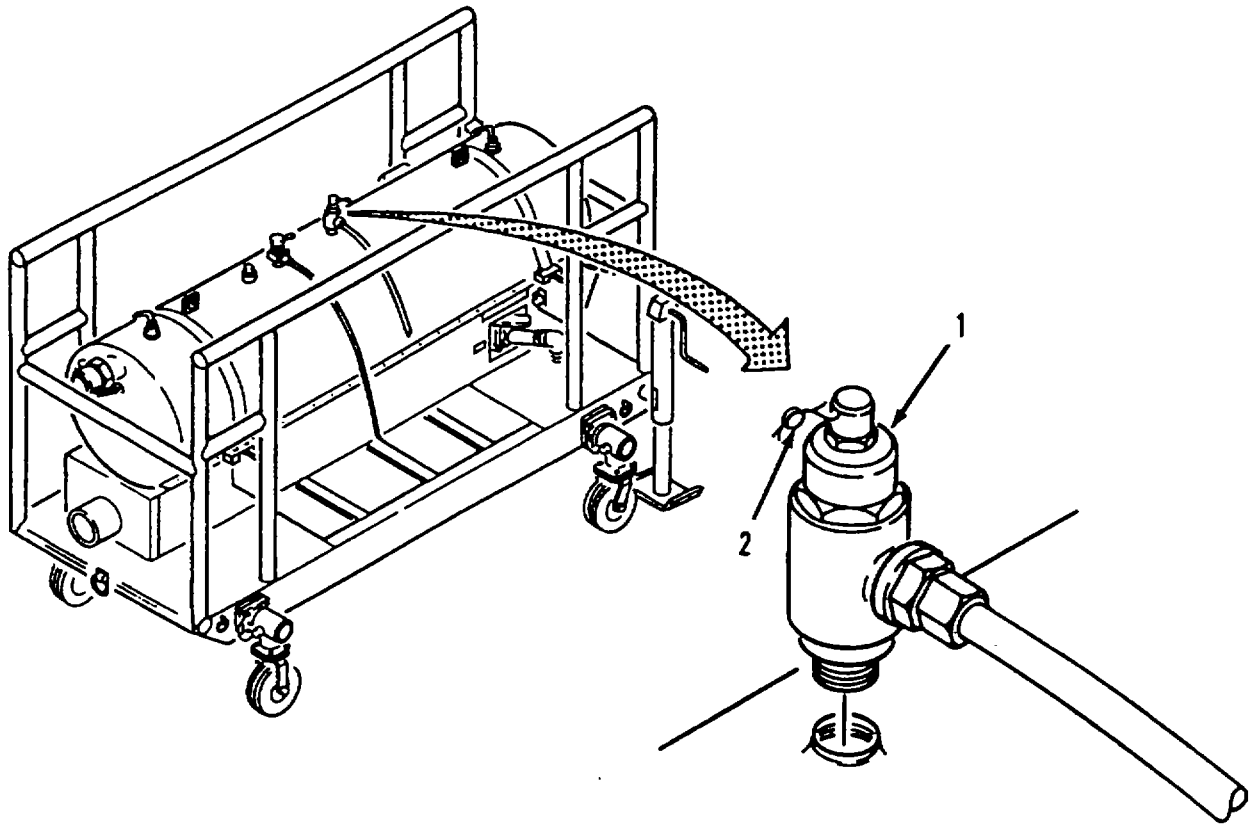

Figure 3-3. Malfunction3 Pressure Relief Valve.

3-3. TROUBLESHOOTING - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Refer to figure 3-4.

4. Excessive undissolved water in filter-separator effluent fuel samples.

Step 1. Drain water from sump (1) more frequently by turning drain valve handle (2) on drain valve (3) to the open position. Refer to para 2-6.

Step 2. If water in effluent samples still high, close up-stream and down-stream valves to isolate filter-separator from system and notify unit maintenance.

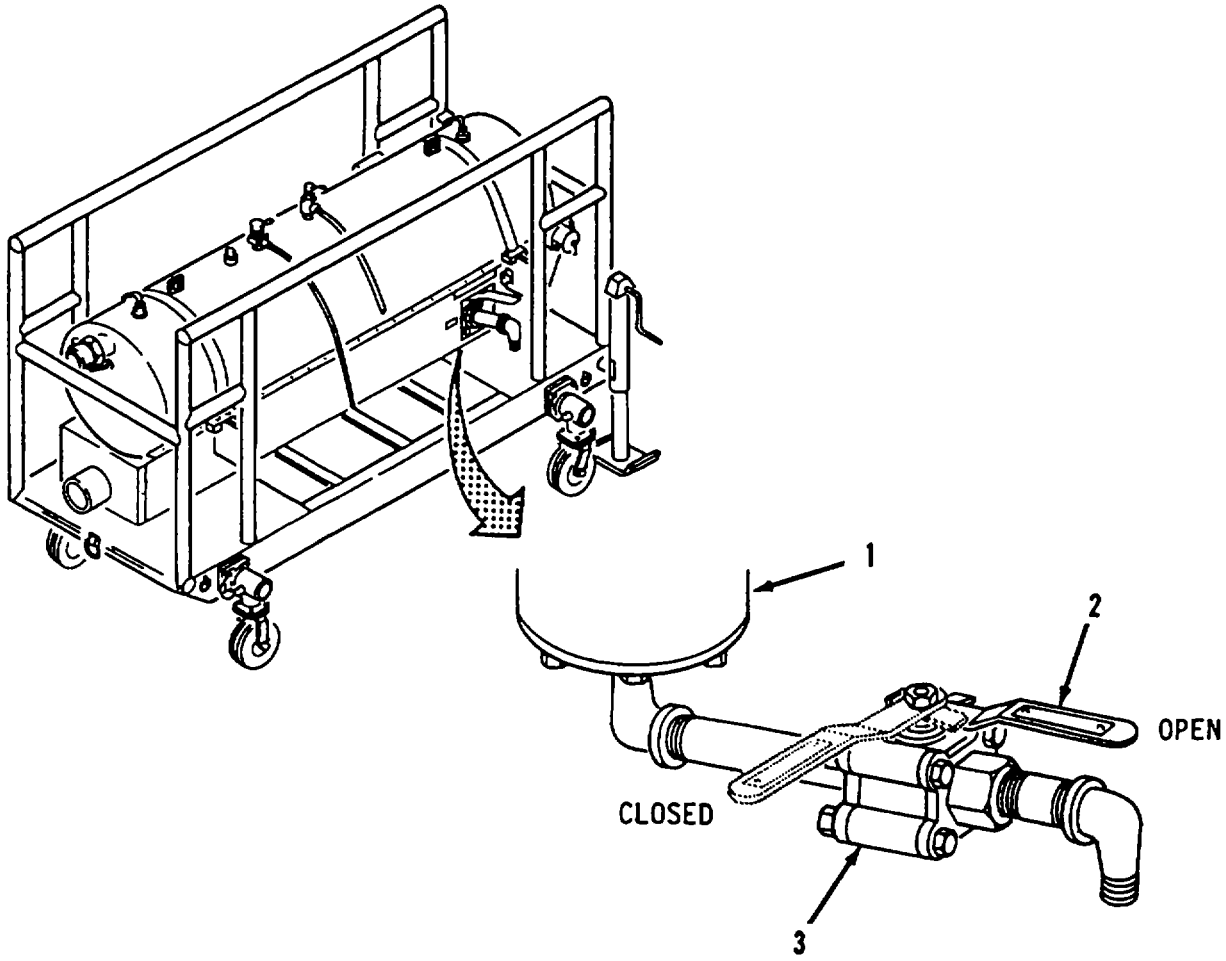

Figure 3-4. Malfunction 4 Undissolved Water.

3-3. TROUBLESHOOTING - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Refer to figure 3-5.

5. Excessive solids in filter-separator effluent fuel samples.

Check DP gage (1) reading, if high (in the yellow zone on gage indication):

Step 1. If water in effluent samples still high, complete operation and notify unit maintenance.

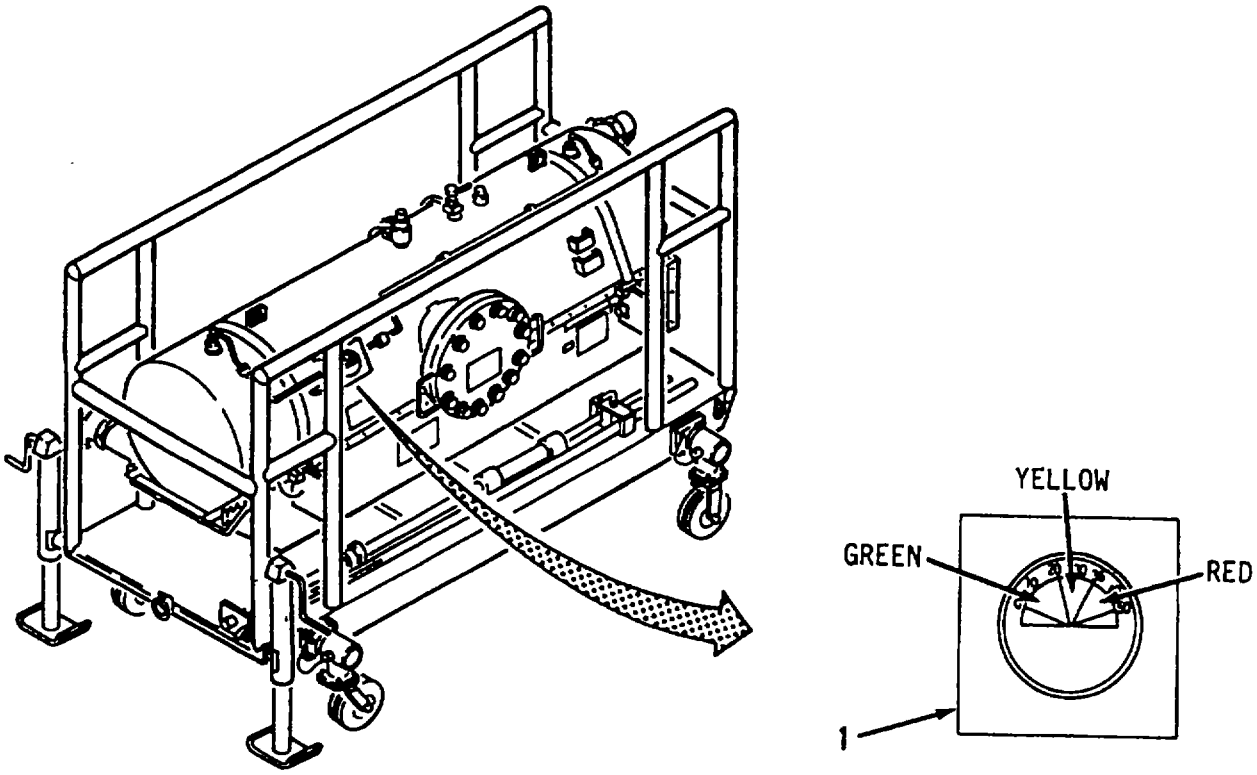

Figure 3-5. Malfunction 5 - Excessive Solids

Section III. OPERATOR MAINTENANCE PROCEDURES

Operator maintenance on the 200 GPM filter-separator consists of only tasks and procedures stated in the operator Preventive Maintenance Checks and Services (PMCS) chart Refer to the operator's PMCS chart and perform all tasks outlined at the intervals specified.

CHAPTER 4

UNIT MAINTENANCE INSTRUCTIONS

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Section I. REPAIR PARTS AND SPECIAL TOOLS LIST

4-1. COMMON TOOLS AND EQUIPMENT.

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

4-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

Refer to the Maintenance Allocation Chart contained in Appendix B for maintenance tasks authorized at Unit level and for the TMDE and support equipment required to perform these tasks.

4-3. REPAIR PARTS.

Repair parts are listed and illustrated in Appendix C, Unit and Direct Support Maintenance Repair Parts and Special Tools List.

Section II. . SERVICE UPON RECEIPT OF MATERIAL

4-4. SITING.

a. Transport. The filter-separator is designed and shipped in packing crates. Transport these only on equipment compatible with the filter-separator.

b. Site Selection. When selecting a site installation for the filter-separator , consider the overall operating area. Site should be leveled and large enough to contain the filter-separator and associated hoses.

4-5. SHELTER REQUIREMENTS.

When not in use, the filter-separator does not require special siting or shelter. However, if shelter is available, storing the filter-separator under cover will minimize the need for maintenance.

4-6. CHECKING UNPACKED EQUIPMENT.

a. General. The filter-separator accessory components are packed and shipped in a packing crate. Accessory components are stored on the filter-separator under the tank Retain the pacing crate for reuse unless otherwise directed.

4-6. CHECKING UNPACKED EQUIPMENT - continued.

b. Unpacking Filter-Separator.Refer to figure 4-1.

WARNINGS

- Lifting or moving heavy equipment incorrectly can cause serious injury. Do not try to lift or move more than 50 pounds by yourself. Always use assistants during lifting operations. Bend legs while lifting. Do not support heavy weight with your back.
- Steel banding. cut under tension, can snap free and cause injury. Be careful when uncrating the equipment to prevent injury or damage to equipment. Leather gloves and face shield are required.
- The top cover is heavy and difficult to handle. Two personnel are required to lift top cover from packing crate.
- Do not use excessive pressure when applying sealant onto threads. Sharp thread edges can cause injury.
- To prevent injury to personnel and damage to equipment, hoist or crane or similar type lifting equipment must be used to lift tank from the packing crate.

(1) Remove top cover (1) by cutting reinforcement bands (2) and unscrewing bolts (3) from packing crate (4).

(2) Attach the lifting device to the two tabs (5) and lift the filter-separator (6) from the packing crate (4)

c. Checking and Processing Unpacked Equipment.

(1) Inspect filter-separator stencils, markings, identification and informational plates. All items should be clear and readable.

(2) Remove all tape, paper wrapping, plastic sheeting, and packing materials from the components.

(3) Inspect components for any damage incurred during shipment. If the equipment has been damaged, report the damage on SF 364, Report of Discrepancy.

(4) Check 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 or DA Pam 738-751.

(5) Check to see if the filter-separator and components has been modified.

4--6. CHECKING UNPACKED EQUIPMENT - continued. I

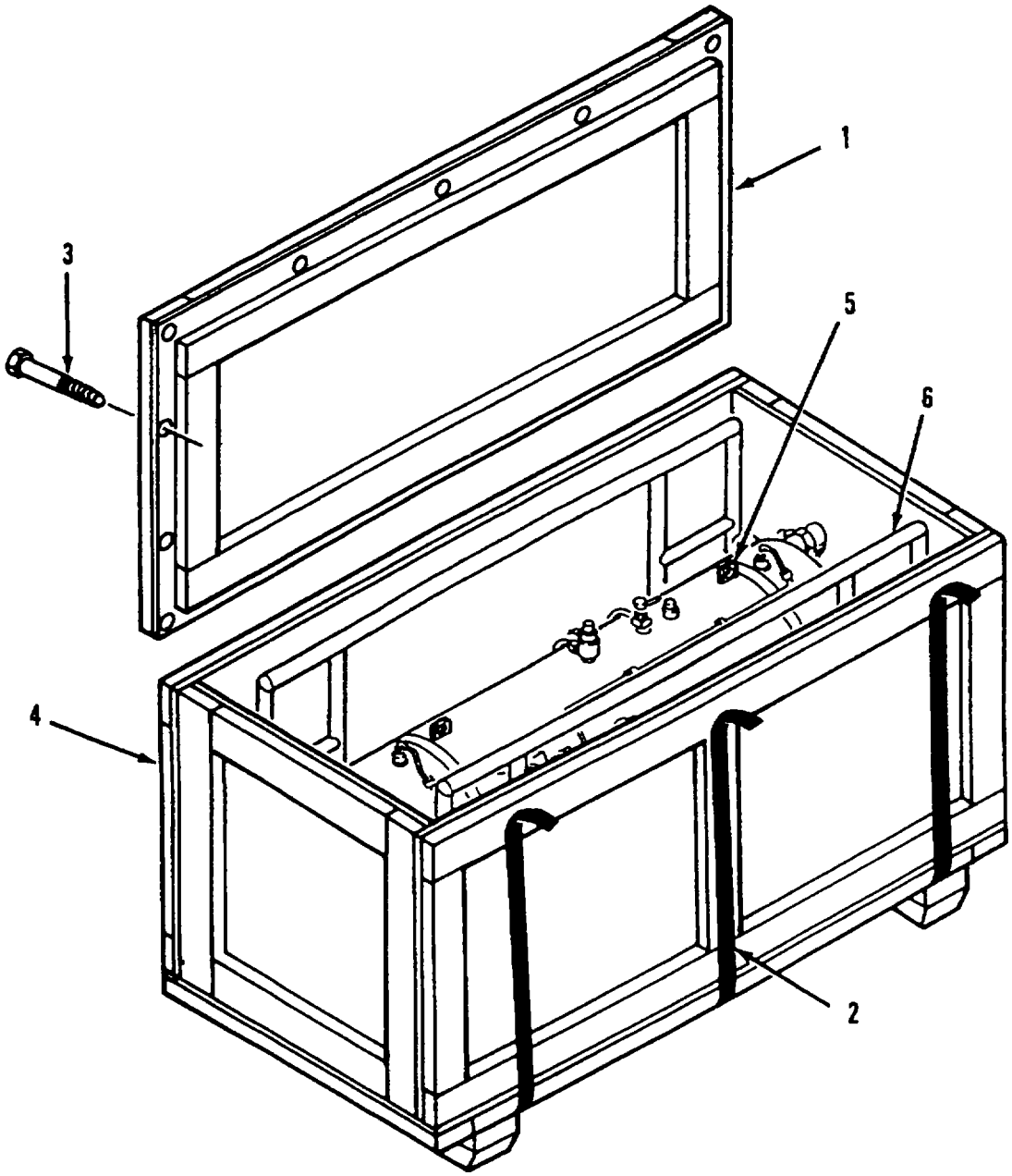


Figure 4-1. Unpacking Filter-Separator.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-7. GENERAL

To ensure the 200 GPM filter-separator is ready at all times, it must be inspected systematically so defects are corrected before serious damage or equipment failure occurs. The necessary Preventive Maintenance Checks and Services (PMCS) to be performed are listed in Table 4-1. Defects discovered during operation of the unit should be corrected as soon as possible. All deficiencies and corrective actions will be recorded on DA Form 2404 (Equipment Inspection and Maintenance Work sheet). Items to be inspected are shown in figure 4-2.

Table 4-1. Unit Preventive Maintenance Checks and Services for 200 GPM Filter-Separator.

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable If
1	Monthly	Rigid Wheel Assembly	a. Inspect for bent mounting and damaged tire. If tire low. inflate to 60 psi. b. Lubricate rigid wheel assemblies with GAA, per MIL-- 10924.	Bent mounting, tire damaged.
2	Monthly	Swivel Wheel Assembly	a. Inspect for bent mounting, stuck swivel, and damaged tire. If tire low, inflate to 60 psig. b. Lubricate wheel assembly with GAA, per MIL-G-10924.	Bent mounting, swivel stuck, or tire damaged.
3	Bi-monthly	Filter Elements	Replace first stage and second stage filter elements.	Service overdue.

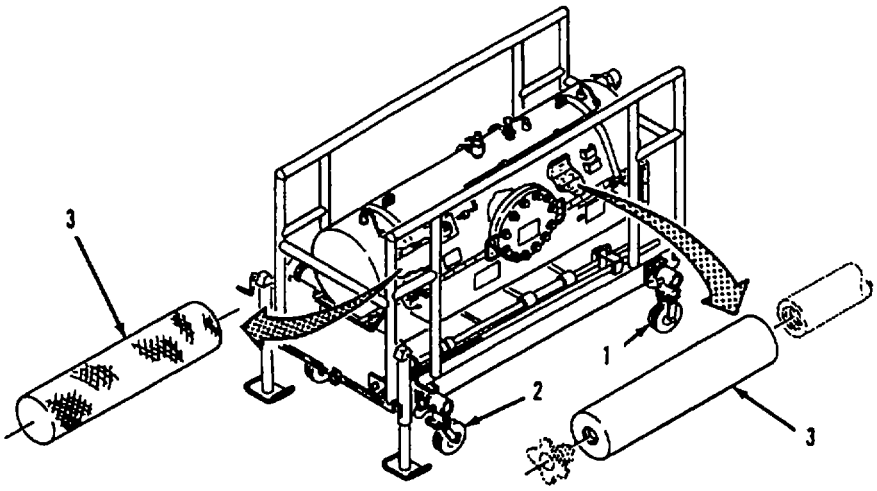


Figure 4-2. Unit PMCS Items.

Section IV. UNIT TROUBLESHOOTING PROCEDURES

4-8. INTRODUCTION.

a. this section contains troubleshooting information for locating and correcting most of the operation troubles which may develop in the 200 GPM filter-separator. Each malfunction is followed by a test or inspection which will help you to determine corrective actions to take.

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

c. Table 4-2 lists common malfunctions which you may find during the operation or maintenance of the filter-separator and its components. You should perform the tests inspections and corrective actions in the order listed.

4-9. TROUBLESHOOTING. I

There are not unit troubleshooting procedures.

Section V. UNIT MAINTENANCE PROCEDURES

4-10. GENERAL.

This section contains instructions for performing Unit level maintenance on the 200 GPM filter-separator.

4-11. PERSONNEL SAFETY.

To ensure safety of personnel, proper care should be used when handling assemblies and parts. Many assemblies are heavy. The assistance of another person, lifting device, or other support equipment may be required to move or position heavy items.

Personnel must remove all items of jewelry (rings, bracelets, watches, necklaces, etc.) and loose clothing before working on the equipment. Jewelry and loose clothing can get caught in equipment and result in damage to equipment or injury to personnel.

When performing maintenance on the 200 GPM filter-separator, keep in mind that the purpose of the equipment is to filter liquid fuel. Cleaning fluids, lubricants, preservatives, paint or other chemicals must not be allowed to contaminate the fuel.

Operate the equipment after performing maintenance to ensure repairs have been performed correctly and equipment can be returned to service.

4-12. PROPER EQUIPMENT.

Obtain proper equipment before beginning maintenance. This includes hand tools and/or special tools, receptacles for storing small parts, and expendable materials required by the maintenance task.

4-13. DEFROST DOOR AND SHROUD REPAIR.

This task consists of: a. Removal b. Repair c. Installation

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B.Section III, Item 1)

Equipment Conditions
Air duct disconnected from defrost shroud. Refer to para 2-6.

General Safety Instructions

WARNINGS
- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.
- Lifting or moving heavy equipment incorrectly can cause serious injury.

Refer to Figure 4-3.

WARNING

Lifting or moving heavy equipment incorrectly can cause serious injury. Do not try to left or move more than 50 pounds by yourself. Get an assistant. Bend your legs while lifting. Do not support weight with your back.

CAUTION

To avoid burns, wear hand protection when removing defrost door and shroud. The defrost door and shroud may he very hot.

a. **Removal.**

(1) Remove defrost door (1) from adjustment brackets (2) on shroud assembly (3).

(2) Remove nut (4), flat washer (5), and handle (6) from drain valve (7).

(2) Support shroud assembly (3) and pull out four latch pins (8).

NOTE

Two individuals are required to remove the shroud from the filter-separator.

(3) Remove defrost shroud (3).

b. **Repair.** Replace defective components. Refer to paragraph 4-27 for replacement of identification and instructional plates.

c. **Installation.**

(1) Position shroud assembly (3) and secure with four latch pins (8).

(2) Install handle (6) on drain valve (7) and secure with flat washer (5) and nut (4).

(3) Install defrost door (1) in adjustment bracket (2) on shroud assembly (3).

4-13.DEFROST DOOR AND SHROUD REPAIR - continued.

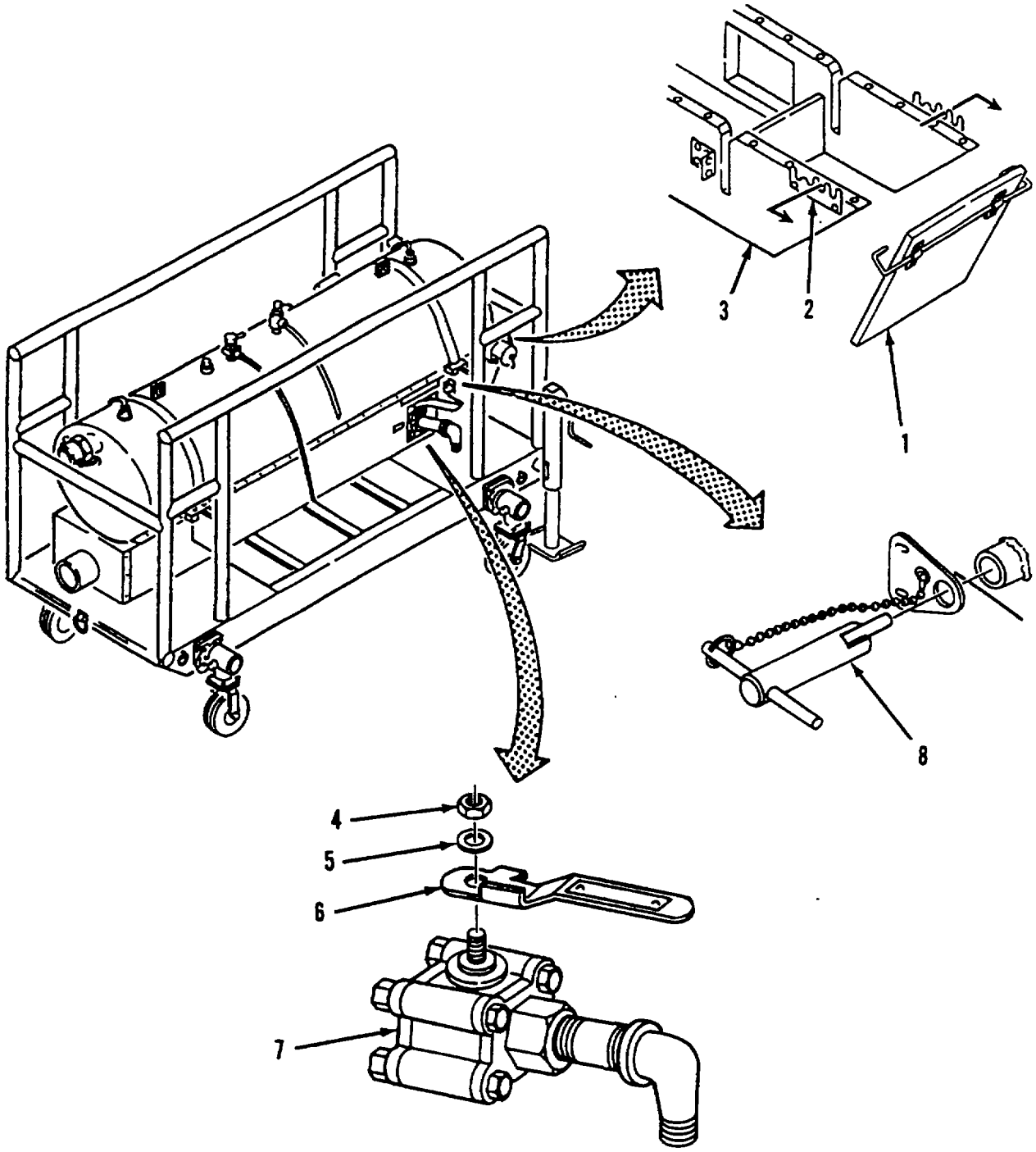


Figure 4-3. Defrost Door and Shroud Repair.

4-14. LATCH PIN, LATCH PLATE AND JUMPER CABLE REPLACEMENT.

This task consists of: a Removal b. Installation

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section III Item 1)

Materials/Parts
Lock washers (Appendix C, Section I)

Equipment Conditions
Filter-separator removed from system. Refer to para 2-6.
Air vent valve open. Refer to para 2-6.

Equipment Conditions - continued
Air duct disconnected from defrost shroud. Refer to para 2-6.
Defrost door and shroud removed. Refer to para 4-13.

General Safety Instructions

WARNINGS
- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.

a. **Latch Pin and Latch Plate** Refer to figure 4-4.

NOTE
Latch pins and latch plates are located in four places on the 200 gpm filter-separator. This procedure is typical for all latch plates.

(1) Removal. Remove four nuts (1), two lock washers (2), two screws (3), two flat washers (4), and latch plate (5) from shroud bracket (6) on shroud assembly (7).

(2) Installation Install plate (5), two screws (3), two flat washers(4), two lock washers (2), and two nuts (1) onto shroud bracket (6).

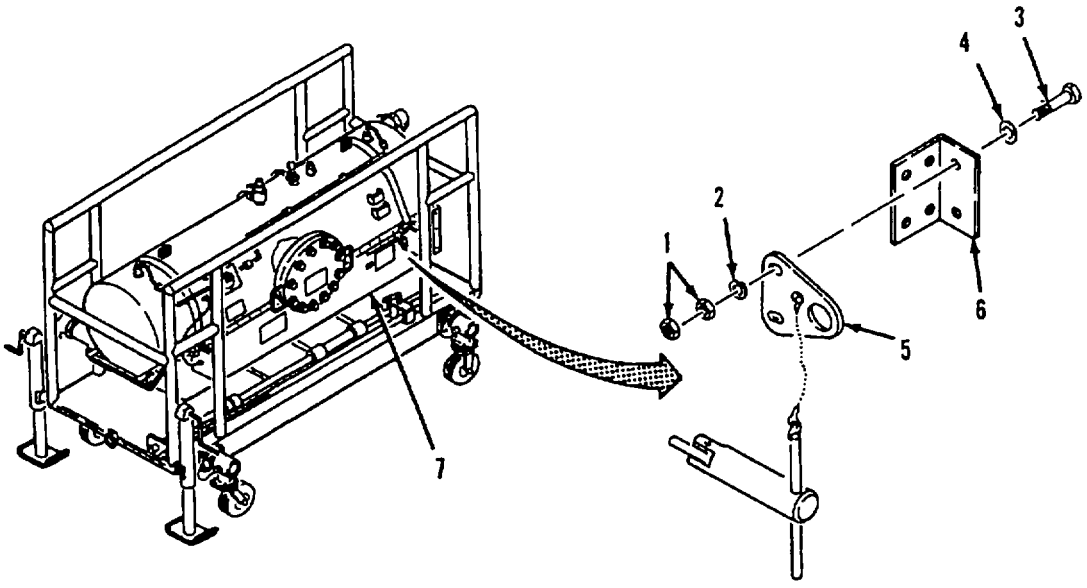


Figure 4-4. Latch Pin and Latch Plate Replacement.

4-14. LATCH PIN, LATCH PLATE AND JUMPER CABLE REPLACEMENT - continued.

b. **Jumper Cable** Refer to figure 4-5.

NOTE

The purpose of the jumper cable is to provide an electrical ground (bonding) connection between the tank and frame on the filter-separator.

(1) Removal.

(a) Remove two nuts (1) and one spring lock washer (2), two star lock washers (3) securing jumper cable (4) to stud (5) on frame (6).

(b) Remove two nuts (7) and one spring lock washer (8), two star lock washers (9), one bolt (10), and star washer (11) securing jumper cable (4) to gage bracket (12).

(2) Installation

WARNING

Improper grounding (bonding) connections between tank and frame can generate a static discharge (spark). Make sure jumper cable connection provides a metal-to-metal contact between tank and frame. A static discharge could ignite fuel or cause an explosion of the fuel vapor and cause personnel injury or death.

(a) Attach jumper cable assembly (4) to stud (5) on frame (6) with two star lock washers (3),one spring lock washers (2), and two nuts (1).

(b) Attach other end of jumper cable assembly (4) to DP gage bracket (12) with screw (10), star lock washer (11), two star lock washers (9), spring lock washer (8) and two nuts (7).

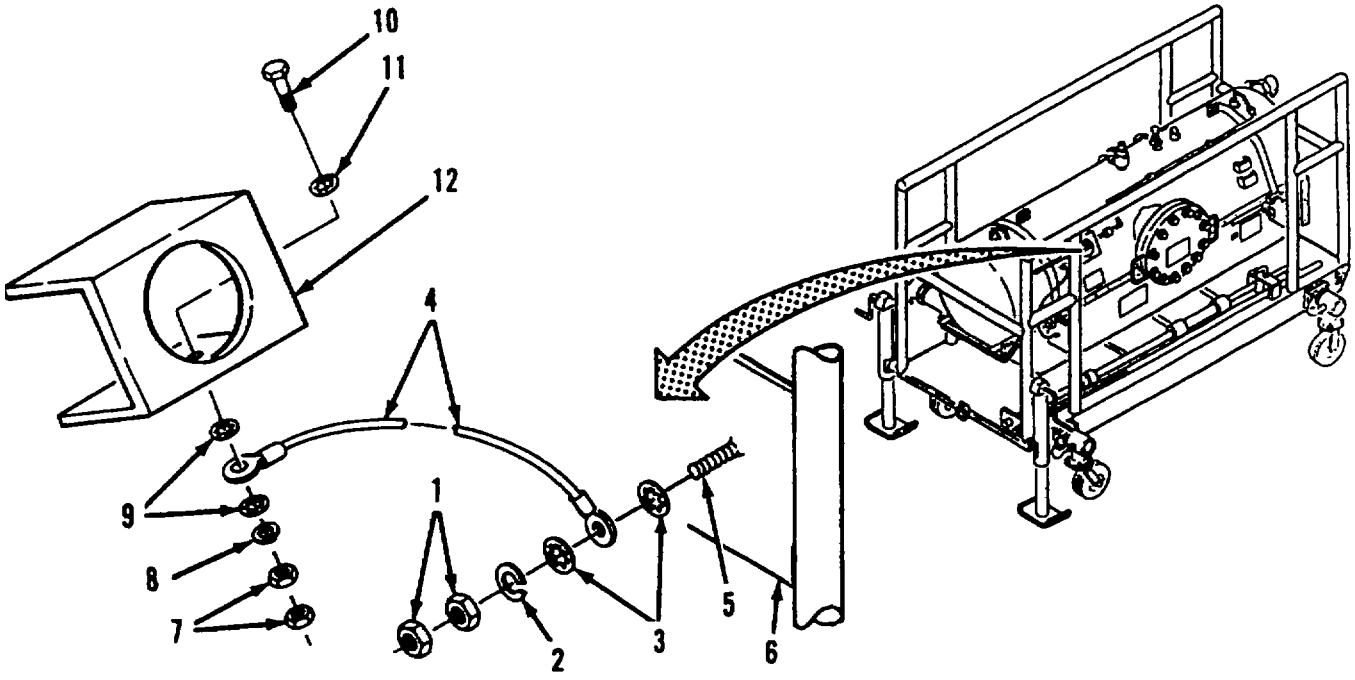


Figure 4-5. Jumper Cable Replacement

14-15. AIR VENT VALVE AND DRAIN TUBE ASSEMBLY REPLACEMENT.

This task consists of: a. Removal b. Installation

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section III, Item 1)

Materials/Parts
Thread Sealant (Appendix F, Section II, Item 2)

Equipment Conditions
Filter-separator removed from system. Refer to para 2-6.
Air vent valve open. Refer to para 2-6.

General Safety Instructions

WARNINGS
- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.
- Sealant is toxic to skin, eyes, and respiratory tract.

Refer to figure 4-6.

a. **Removal.**

(1) Remove vent tube assembly (1) from air vent valve (2) by unscrewing adapter nut (3) while holding adapter (4) with wrench to keep it from turning.

(2) Remove adapter (4) from air vent valve (2).

(3) Remove air vent valve (2) from tank (5).

b. **Installation.**

WARNING
Do not apply excessive pressure with fingers when cleaning or applying sealant onto threads. Sharp threaded edges could cause injury.

(1) Apply thread sealant to inlet pipe threads of air vent valve (2) and install into tank (5).

NOTE
In sure outlet port of air vent valve points towards rear of filter-separator.

(2) Apply thread sealant to threads on adapter (4) and install adapter (4) in outlet port of air vent valve (2).

(3) Position sleeve on vent tube assembly (1) against adapter (4) and secure with nut (3).

4--15. AIR VENT VALVE AND DRAIN TUBE ASSEMBLY REPLACEMENT - continued.

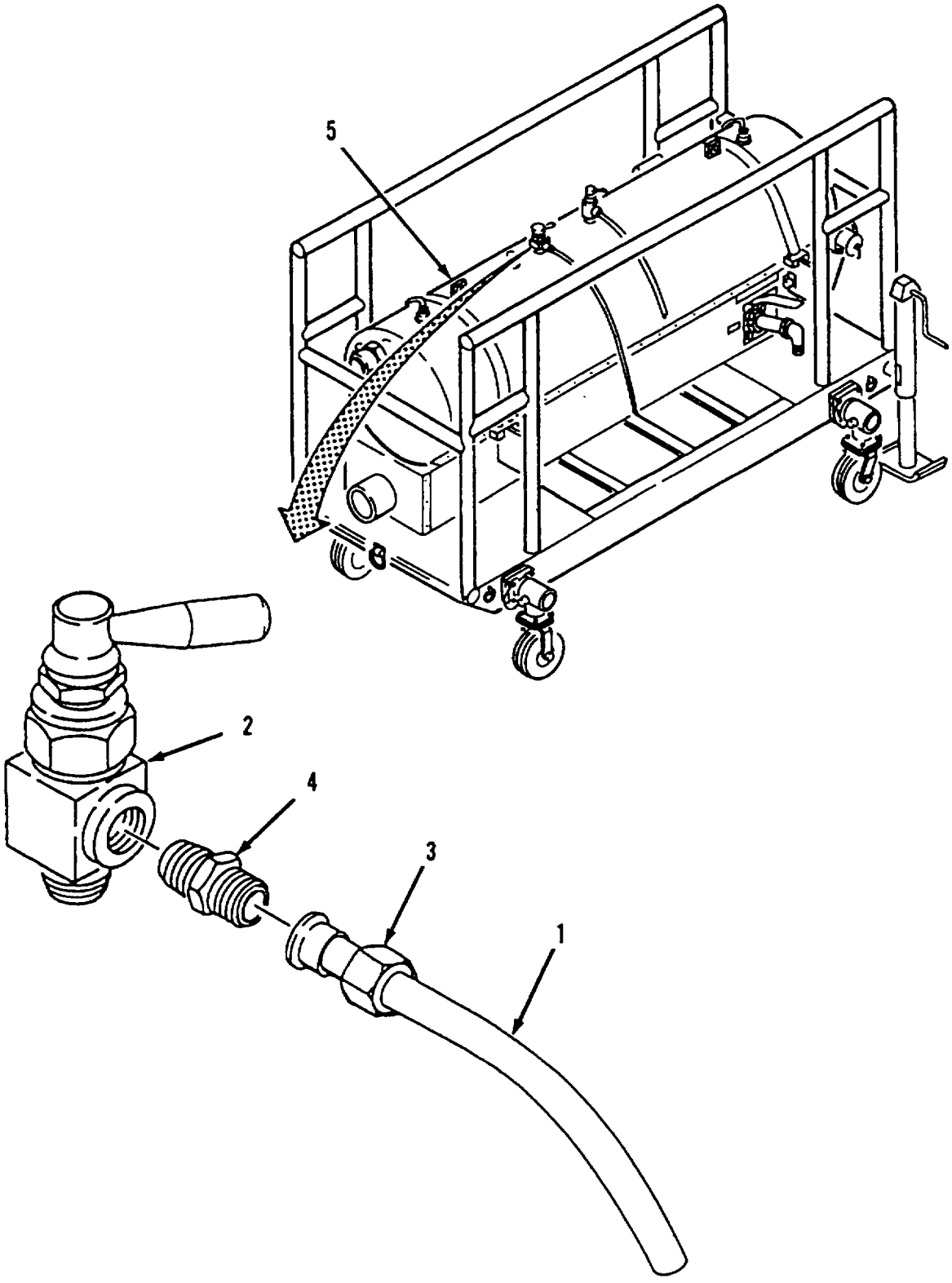


Figure 4-6. Air Vent and Drain Tube Assembly Replacement.

4-16.WATER DRAIN VALVE AND PIPING REPLACEMENT

This task consists of: a. Removal b. Installation

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section III Item 1)
Pipe wrenches (2)(Appendix B, Section III, Item 2).

Personnel Required
Two

Materials/Parts
Thread Sealant (Appendix F, Section II, Item 2)

Equipment Conditions
Filter-separator removed from system, tank drained and water drain valve open. Refer to para 2- 6.
Air duct disconnected from defrost shroud inlet. Refer to para 2-6.
Defrost door removed from shroud. Refer to para 4-13.

General Safety Instructions

WARNINGS
- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.
- Sealant istoxic to skin, eyes, and respiratory tract.

Refer to figure 4-7.

a. **Removal.**

(1) Hold pipe nipple (1) in place with a pipe wrench and remove elbow (2).

(2) Remove pipe nipple (1) from drain valve (3).

(3) Remove drain valve (3) from pipe nipple (4).

(4) Remove pipe nipple (4) from elbow (5).

(3) Remove elbow (5) from sump cover (6).

e. **Installation.**

WARNING

Do not apply excessive pressure with fingers when cleaning or applying sealant onto threads. Sharp threaded edges could cause injury.

(1) Coat threads of elbow (5) with sealant and install into sump cover (6).

NOTE

Make sure arrow marked on drain valve body points away from tank sump.

(2) Coat threads of pipe nipple (4) and install into elbow (5).

(3) Install drain valve (3) on pipe nipple (4).

14-16. WATER DRAIN VALVE AND PIPING REPLACEMENT - continued.

(4) Coat threads of pipe nipple (1) with thread sealant and install into valve (3

(5) Install elbow (2) on pipe nipple (1) with elbow pointing down.

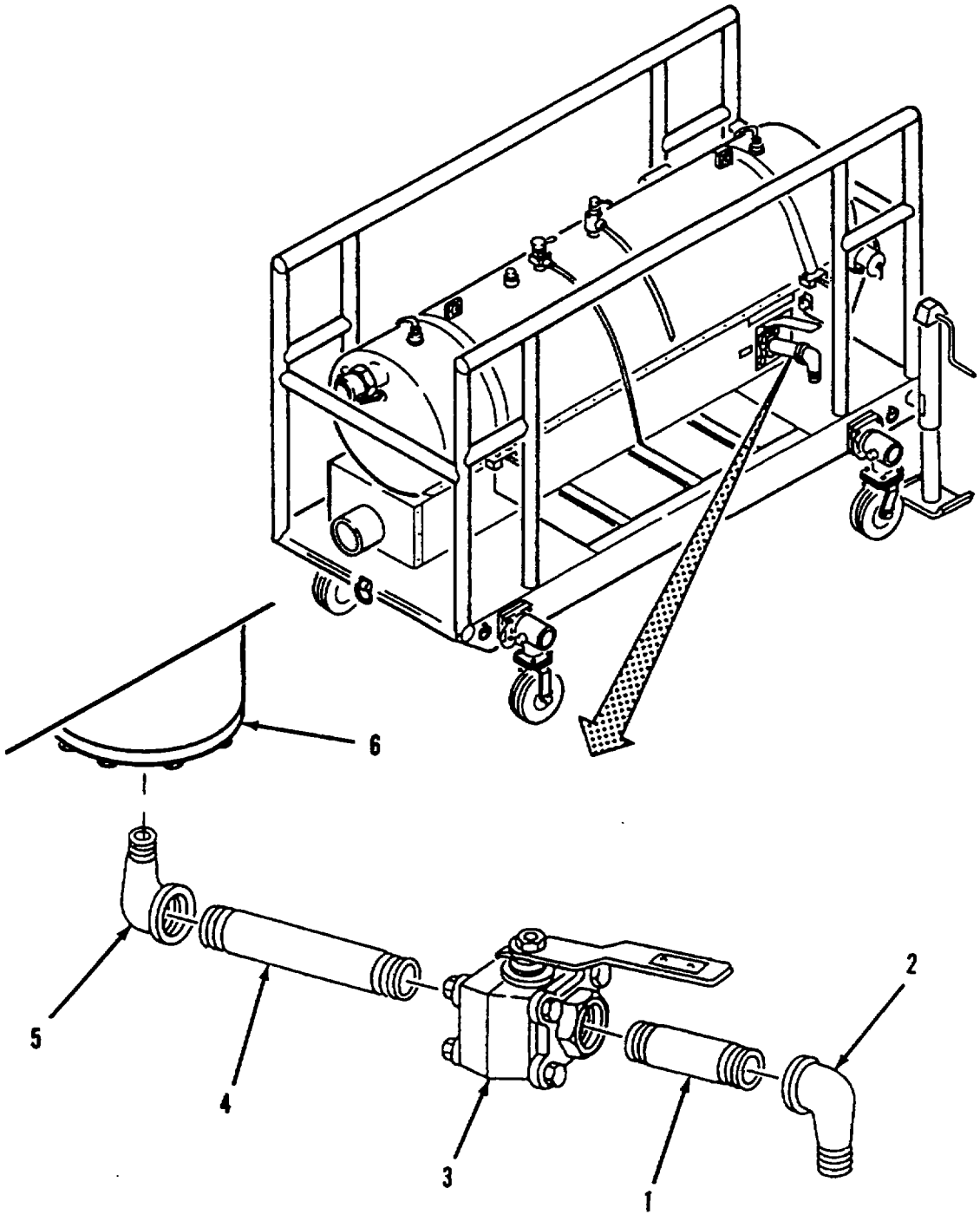


Figure 4-7. Water Drain Valve and Piping Replacement

14-17. TIEDOWN STRAP REPLACEMENT.

This task covers: a. Removal b. Installation

INITIAL SETUP

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

Materials/Parts
Lock washers (Appendix C, Section II)

Equipment Conditions
Filter-separator removed from system, tank drained and water drain valve open. Refer to para 2- 6.
Air Vent valve open. Refer to para 2-6.

General Safety Instructions

WARNINGS
- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.
Tiedown straps could spring out and cause injury.

Refer to figure 4-8.

WARNING
Tiedown straps are under tension which creates a potential hazard and could cause injury. Stay clear when removing because tiedown straps could spring out and hit someone.

NOTES
- **Following procedure is typical for tiedown straps on the filter-separator.**
- **Removal of tiedown straps may require use of a pry bar.**

a. **Removal.**

(1) Remove nuts (1), lock washers (2), and flat washers (3) from u-bolts (4) on tiedown straps (5).

(2) Remove tiedown strap (5) from brackets (6) on frame.

b. **Installation.**

(1) Position tiedown strap (5) around tank and install u-bolts (4) into brackets (6).

(2) Install flat washers (3). lock washers (2) and nuts (1) on u-bolts (6) and tighten to secure tiedown straps(5).

4-17.TIEDOWN STRAP REPLACEMENT - continued.

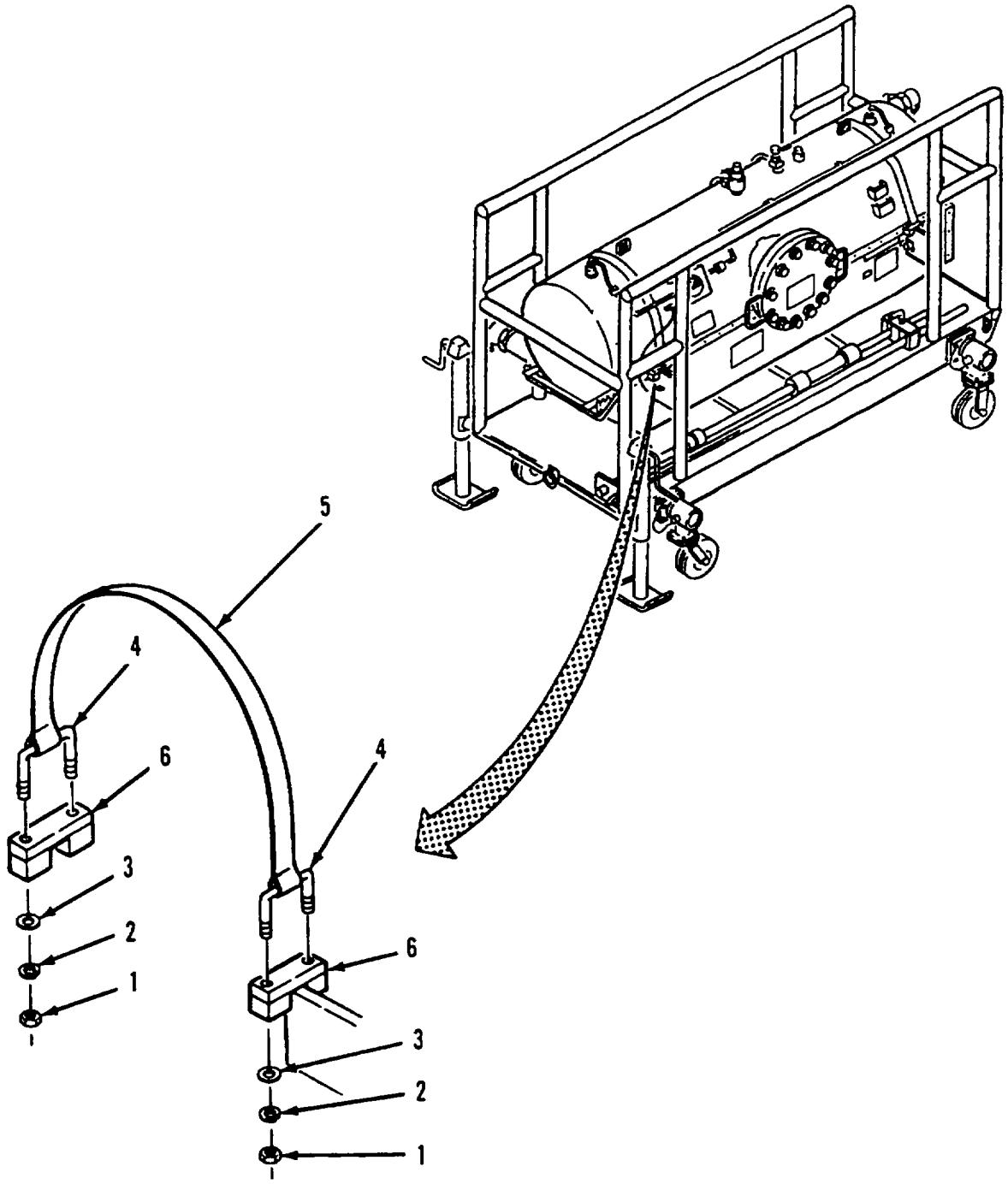


Figure 4-8. Tiedown Strap Replacement.

4-18. TANK ASSEMBLY MAINTENANCE.

This tank assembly consists of the components listed below. Refer to the following paragraphs for applicable maintenance procedures.

Procedures	Page
Identification and Instruction Plates Replacement	4-41
Tank Filter-Separator Maintenance	4-17

4-19.TANK FILTER-SEPARATOR MAINTENANCE.

This tank filter-separator consists of the components listed below. Refer to the following paragraphs for applicable maintenance procedures.

Procedures	Page
Dust Plug, Dust Cap and tank Couplings Repair	4-17
Pressure Relief Valve and Tubing Replacement	4-21
Pressure Tubing Replacement	4-23
DP Gage Replacement	4-25
Access Cover and Gasket Replacement	4-27
Spider Plate and Filter Elements Replacement	4-29
Water Sump Cover and Gasket Replacement	4-33
Tank Replacement	4-35

4-20.DUST PLUG, DUST CAP AND TANK COUPLINGS REPAIR.

This task covers: a Removal b. Cleaning c. Inspection d. Repair e. Installation

INITIAL SET-UP

Tools

General Mechanics Tool Kit (Appendix B. Section III, Item 1)
Pipe wrench, Adjustable (Appendix B, Section III, Item 2)

Materials/Parts

Coupling Gaskets (2) (Appendix C, Section II)
Dry Cleaning Solvent (Appendix F, Section II, Item 1)
Wiping Rags (Appendix F, Section II, Item 3)
Thread Sealant (Appendix F. Section II, Item 2)

Equipment Conditions

Filter-separator remove from system, tank drained and water drain valve open. Refer to para 2-6.
Air vent valve open. Refer to para 2-6.
Water detection adapter assembly removed. Refer to para 2-6.

General Safety Instructions

WARNINGS

- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.
- Sealant is toxic to skin, eyes, and respiratory tract.
- Dry cleaning solvent is potentially dangerous to personnel and property.

4-20.DUST PLUG, DUST CAP AND TANK COUPLINGS REPAIR.- continued.

Refer to figure 4-9.

a. **Removal.**

(1) Remove split rings (1 and 2) and chain (3) from dust plug (4) and tab (5) on tank (6).

(2) Pull locking arms (7) up and out on inlet coupling (8) and remove dust plug (4) from inlet coupling.

(3) Remove gasket (9) from inlet coupling (8). Discard gasket

(4) Remove inletcoupling (8) from tank (6).

(5) Remove split rings (10 and 11) from chain (12), dust cap (13) and tab (14) on tank (6).

(6) Pull locking arms (15) on dust cap (13) and remove dust cap from outlet coupling (16).

(7) Remove gasket (17) from dust cap (13). Discard gasket.

(8) Remove outlet coupling (16) from tank (6).

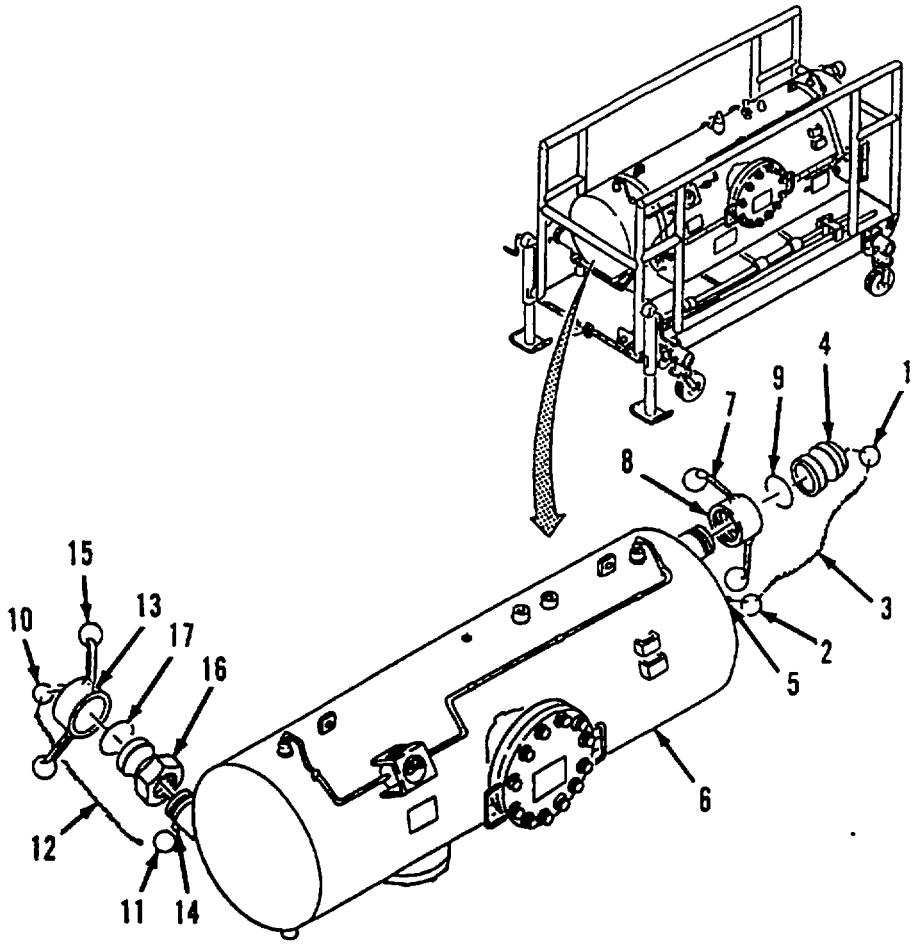


Figure 4-9. Dust Plug, Dust Cap and Tank Couplings Removal.

4-20.DUST PLUG, DUST CAP AND TANK COUPLINGS REPAIR.- continued.

b. **Cleaning.**

WARNING

Dry cleaning solvent, A-A-711 Type I used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or nonporous gloves when handling solvents or material, wet with dry cleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Do not work with solvent in a closed room. Be sure there is good ventilation or the solvent vapors will build up in the air and become a poisonous mixture which can cause physical injury or even death.

Clean all components removed with dry cleaning solvent and dry with a clean wiping rag.

For steps c through e refer to figure 4-10.

c. **Inspection**

(1) Inspect dust plug (4) for damaged mating surface.

(2) Inspect inlet coupling (8) for damaged mating surface, stripped threads, cracks and broken or damaged locking arms (7).

(3) Inspect dust cap (13) for damaged mating surface.

(4) Inspect outlet coupling (16) for damaged mating surface, stripped threads, cracks and broken or damaged locking arms (15).

d. **Repair.**

(1) Replaced damaged components. Refer to Appendix G. Figure G-2, for fabrication of sash chains.

(2) Replace all gaskets.

e. **Installation.**

WARNING

Do not apply excessive pressure with fingers when cleaning or applying sealant onto threads. Sharp threaded edges could cause injury.

(1) Apply sealant on outlet pipe threads on outlet coupling (16) and install on tank (6).

(2) Install new gasket (17) in dust cap (13).

(3) Install dust cap (13) on outlet coupling (16) and push against locking arms (15) to lock dust cap in place.

(3) Attach split rings (10 and 1) to chain (12), dust cap (13) and tab (14).

(4) Apply sealant on inlet pipe threads and install inlet coupling (8) on tank (6).

4-20.DUST PLUG, DUST CAP AND TANK COUPLINGS REPAIR.- continued.

(5) Install new gasket (9) into inlet coupling (8).

(6) Insert dust plug (4) into inlet coupling (8) and push against locking arms (7) to lock dust plug in place.

(7) Attach split rings (1 and 2) to dust plug (4) and tab (5).

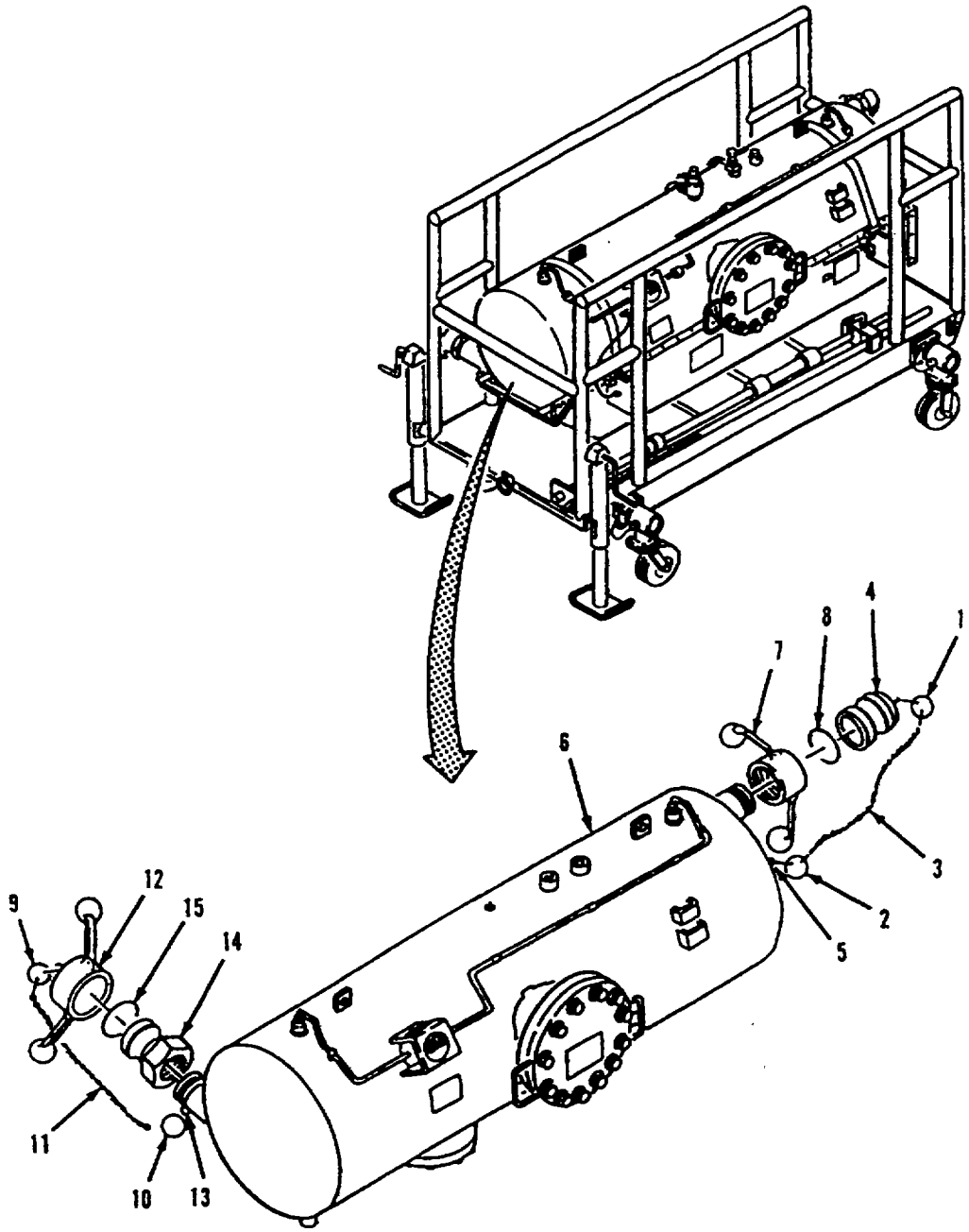


Figure 4-10. Dust Plug, Dust Cap and Tank Couplings Installation.

4-21.PRESSURE RELIEF VALVE AND TUBING REPLACEMENT.

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools
General Mechanics Tool Kit (Appendix B, Section III. Item 1)

Materials/Parts
Thread Sealant (Appendix F. Section II, Item 2)

Equipment Conditions
Filter-separator remove from system, tank drained and waterdrain valve open. Refer to para 2-6.
Air vent valve open. Refer to para 2-6.

Equipment Conditions - continued
Defrost door and shroud removed. Refer to para 4-13.

General Safety Instructions

WARNINGS
- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.
- Sealant is toxic to skin, eyes, and respiratory tract.

Refer to figure 4-11.

WARNING

Fuel is toxic to skin, eyes and respiratory tract Wear skin and eye protection when handling components. Provide adequate ventilation.

NOTE

Pressure relief valve is preset at 150 psig and sealed by the manufacturer. If seal is broken notify unit maintenance.

a. **Removal.**

(1) Remove tube assembly (1) from pressure relief valve (2) by unscrewing nut (3) while holding adapter (4) with wrench to keep it from turning.

(2) Remove adapter (4) from pressure relief valve (2).

(3) Unscrew pressure relief valve (2) from outlet port (5) on tank.

b. **Installation.**

WARNING

Do not apply excessive pressure with fingers when cleaning or applying sealant onto threads. Sharp threaded edges could cause injury.

(1) Apply sealant to pipe threads on pressure relief valve (2) and install pressure relief valve in outlet port (5) on tank.

(3) Apply sealant to threads on adapter (4) and install in pressure relief valve (2) outlet port.

(4) Position sleeve on tube assembly (1) against adapter (4) and tighten nut(3) to secure tube assembly on adapter.

4-21. PRESSURE RELIEF VALVE AND TUBING REPLACEMENT - continued.

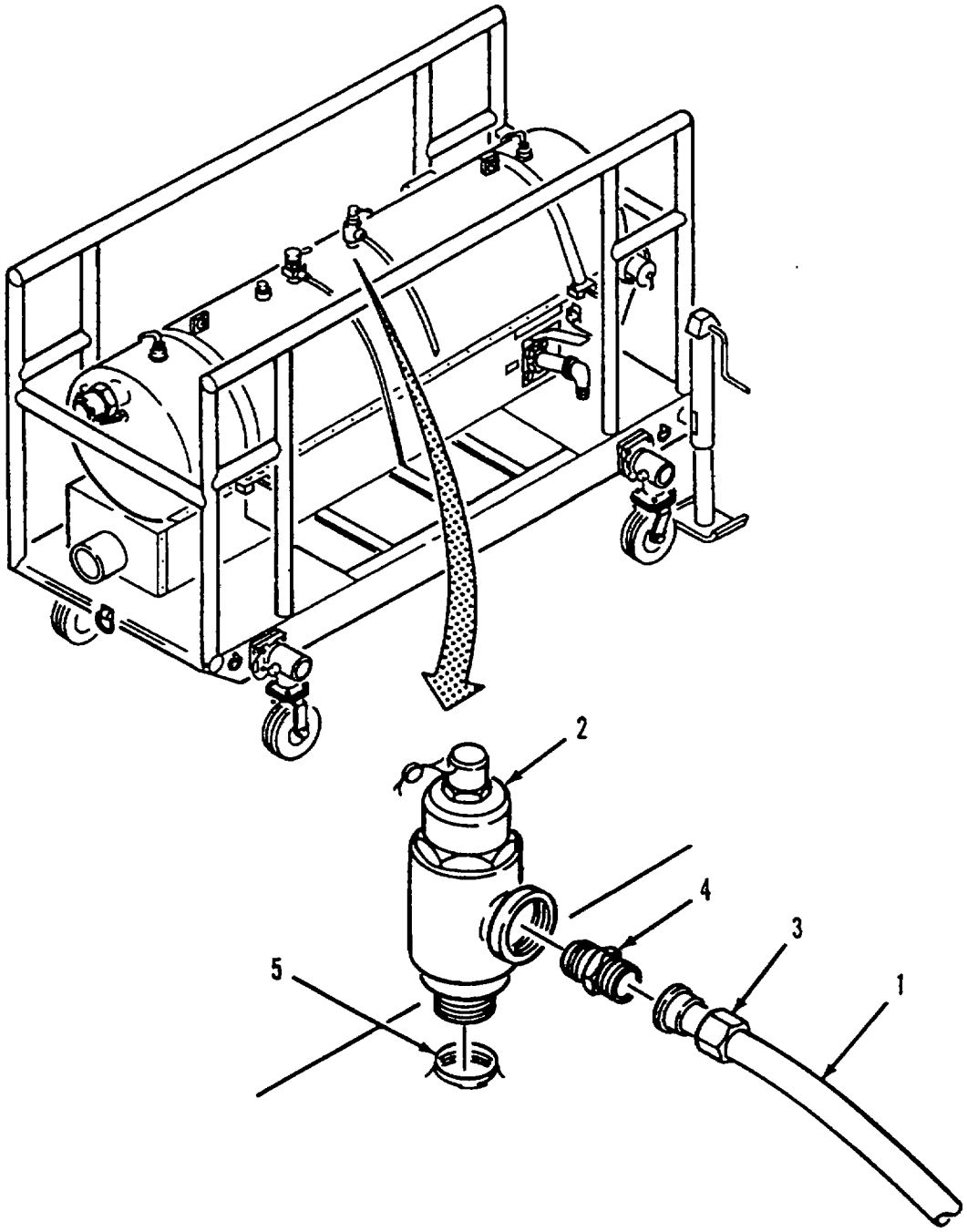


Figure 4-11. Pressure Relief Valve and Tubing Replacement.

14-22. PRESSURE TUBEREPLACEMENT.

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools
General Mechanics Tool Kit (Appendix B. Section III, Item 1)

Materials/Parts
Thread Sealant (Appendix F, Section II, Item 2)
lock washers (Appendix C)

Equipment Conditions
Filter-separator removed from system and air vent valve open. Refer to para 2-6.

General Safety Instructions

WARNINGS
- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.
- Sealant is toxic to skin, eyes, and respiratory tract.

Refer to figure 4-12.

WARNINGS

- **Fuel is toxic to skin eyes and respiratory tract. Wear skin and eye protection when handling components. Provide adequate ventilation.**
- **Avoid spillage of fuel. Drain fuel in an adequate container, otherwise a fire hazard or environmental contamination could result.**
- **Do not apply excessive pressure with fingers when cleaning or applying sealant onto threads. Sharp threaded edges could cause injury.**

a. **Removal.**

(1) Remove four nuts(1).four lock washers (2). eight flat washers (3). four screws (4), and four clamps (5) from the long tube (6).

(2) Remove long tube (6) by unscrewing two nuts (7) while holding adapters (8) with wrench to keep adapters from turning.

(3) Remove one nut (9), one lock washer (10), two flat washers (11) one screw (12) and one clamp (13) from the short tube (14).

(4) Remove short tube (14) by unscrewing two nuts (15) while holding adapters (16) with wrench to keep adapters from turning.

(5) Remove adapters (8 and 16) from DP gage (17) and tank ports (18).

b. **Installation**

(1) Apply sealant to threads on adapters (8 and 16) and install in DP gage (17) and outlet ports (18).

(2) Insert short tube (14) ends in adapters (16) at DP gage (17) and tank ports (18) then secure with nuts (15).

4-22.PRESSURE TUBE REPLACEMENT - continued.

(3) Place clamp (13) over short tube (14) and secure with one screw (12). two flat washers (11). one lock washer (10) and one nut (9).

(4) Insert long tube (6) ends in adapters (8) at DP gage (17) and tank ports (18) then secure with nuts (7).

(5) Place clamp (5) over long tube (6) and secure with four screws (4), four lock washers (3), eight flat washers (3) and four nuts (1).

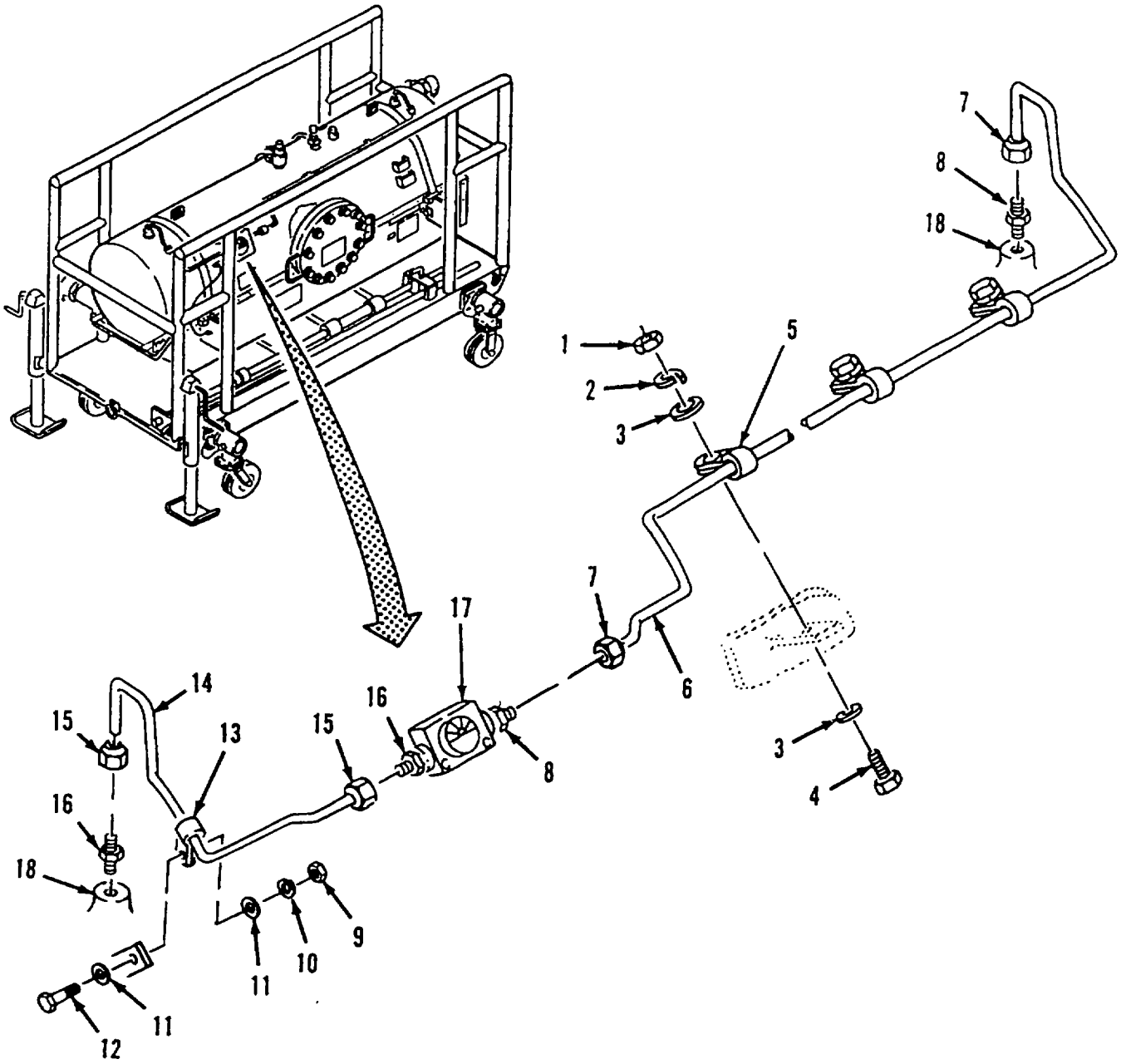


Figure 4-12. Pressure Tube Replacement.

4-23. DP GAGE REPLACEMENT

This task consists of:
a. Removal **b. Installation**

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section II, Item 1)

Materials/Parts
Thread Sealant (Appendix F. Section I. Item 1)
lock washers (Appendix C)

Equipment Conditions
Filter-separator removed from system, tank drained and air vent valve open. Refer to para 2-6.

General Safety Instructions

WARNINGS
Do not smoke within 100 feet of filter-separator.
Fuel is toxic to skin, eyes, and respiratory tract.
Sealant is toxic to skin, eyes, and respiratory tract.

Refer to figure 4-13.

WARNINGS

Fuel is toxic to skin, eyes and respiratory tract. Wear skin and eye protection when handling components. Provide adequate ventilation.

Do not apply excessive pressure with fingers when cleaning or applying sealant onto threads. Sharp threaded edges could cause injury.

a. .Removal

(1) Unscrew nuts (1) from adapters (2) while holding adapters with wrench to keep them from turning and disconnect short tube (3) and long tube (4).

(2) Remove two nuts (5), two lock washers (6), four flat washers (7) and two screws (8) then remove DP gage (9) from bracket (10).

b. Installation

(1) Apply sealant to threads on adapters (2) and install adapters in DP gage (9)

(2) Position DP gage (9) in bracket (10) and secure with two screws (8). four flatwashers (7), two lock washers (6), and two nuts (5).

(4) Insert short tube (3) and long tube (4) in adapters (2) and tighten nuts (1)

4-23. DP GAGE REPLACEMENT- continued.

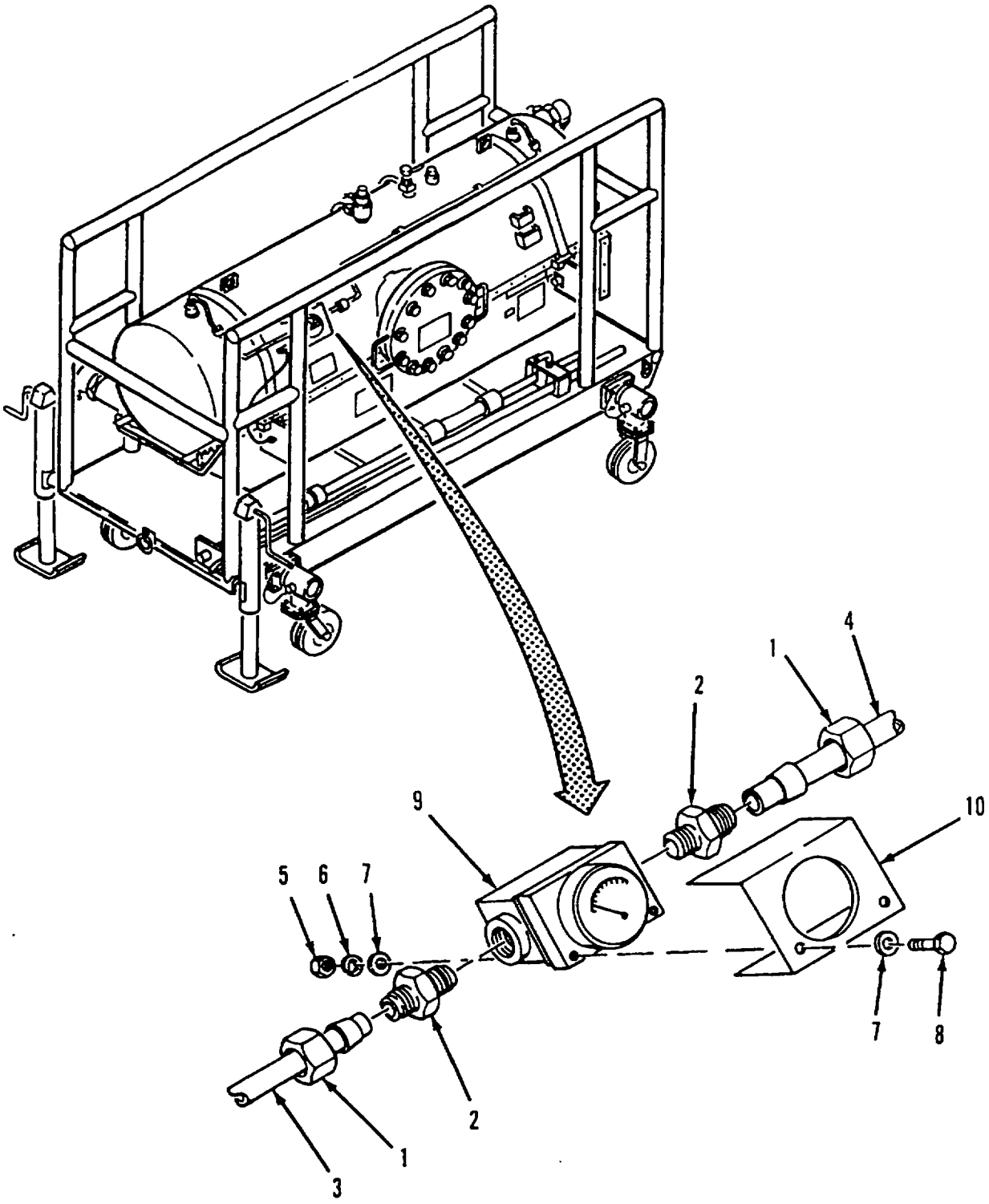


Figure 4-13. DP Gage Replacement

4-24. ACCESS COVER AND GASKET REPLACEMENT

This task consists of:
a. Removal **b. Installation**

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section III, Item 1)

Materials/Parts
Flange Gasket (Appendix C)
lock washer (Appendix C)

Equipment Conditions
Filter-separator removed from system, tank empty and water drain valve open. Refer to para 2-6.
Air vent valve open. Refer to para 2-6.

General Safety Instructions

WARNINGS
Do not smoke within 100 feet of filter-separator.
Fuel is toxic to skin. eyes, and respiratory tract.

Refer to figure 4-14.

WARNINGS

Fuel is toxic to skin, eyes and respiratory tract Wear skin and eye protection when handling components.

Avoid spillage of fuel. Drain fuel in an adequate container, otherwise a fire hazard or environmental contamination could result.

Install the top two bolts to avoid injury. These bolts will support access cover until all other hardware is installed.

Only loosen the top two bolts to avoid injury. These bolts will support access cover until all other hardware is removed.

a. Removal

(1) Remove twelve nuts (1), twelve lock washers (2),twenty-four flat washers (3) and twelve screws (4).

(2) Remove cover (5) and gasket (6) from tank flange (7). Discard gasket.

b. Installation

(1) Install new gasket (6) and cover (5) on tank flange (7) and secure with twelve screws (4), twenty-four flat washers (3), twelve lock washers (2) and twelve nuts (1).

(2) Tighten screws (4) in sequence as shown.

4-24. ACCESS COVER AND GASKET REPLACEMENT - continued.

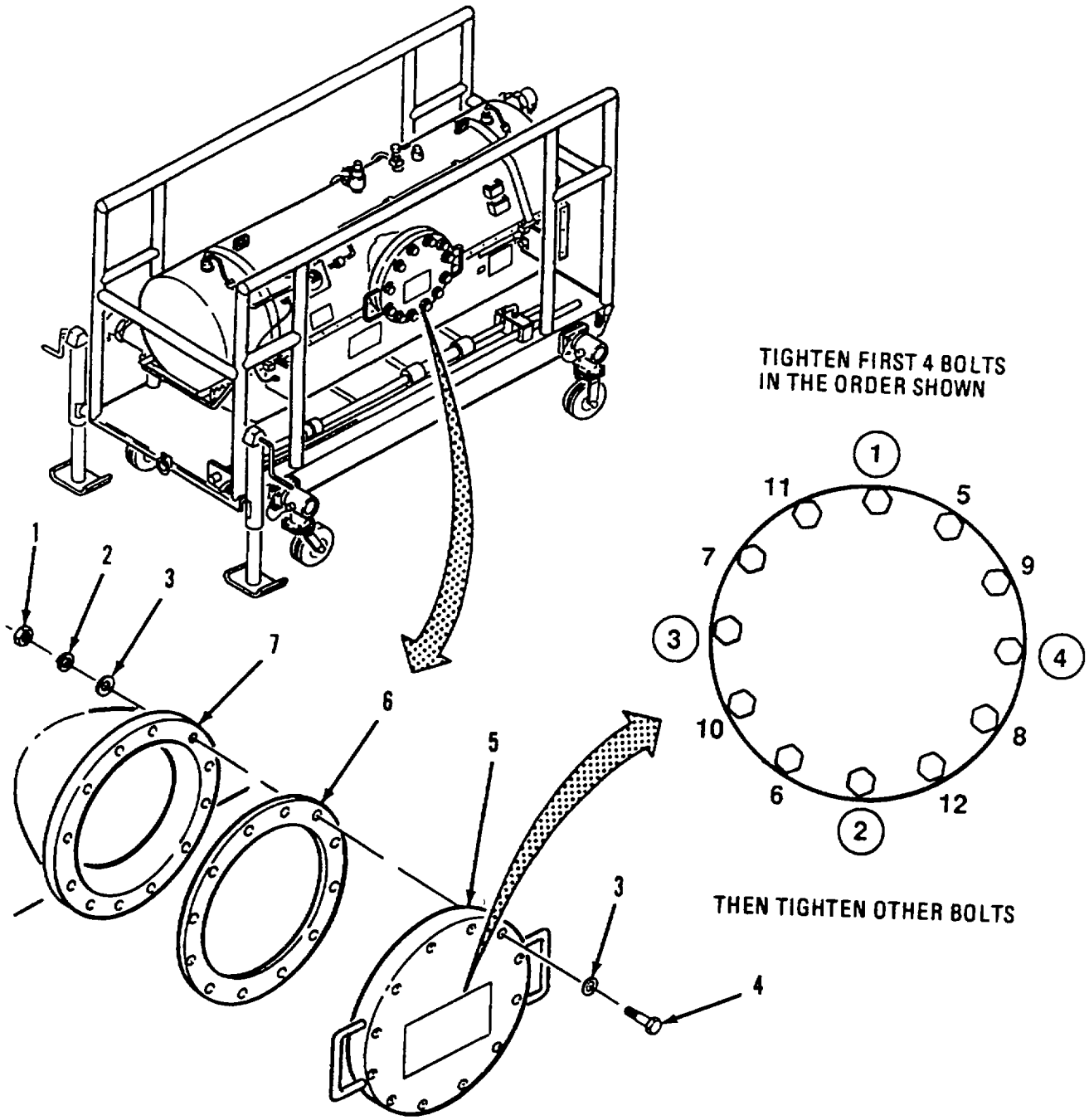


Figure 4-14. Access cover and Gasket Replacement

4-25. SPIDER PLATE AND FILTER ELEMENTS REPLACEMENT.

This task consists of:
a. Removal b. Cleaning c. Inspection d. Installation

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B. Section III, Item 1)
Material/Part
Wiping Rags (Appendix F, Item 3)
Filter Element, First Stage (Appendix C)
Filter Element, Fluid (Appendix C)
lock washer (Appendix C)

Equipment Conditions
Filter-separator removed from system, tank drained and water drain valve open. Refer to para 6.
Air vent valve open. refer to para 2-6.

General Safety Instructions

WARNINGS
· Do not smoke within 100 feet of filter-separator.
Fuel is toxic to skin, eyes, and respiratory tract

Refer to figure 4-15.

WARNINGS

Only loosen the top two bolts to avoid injury. These bolts will support access cover until all other hardware is removed.

Fuel is toxic to skin, eyes and respiratory tract. Wear skin and eye protection when handling components.

a. Removal

(1) Remove twelve nuts (1), twelve lock washers (2), twenty-four flat washers (3), and twelve screws (4) holding access cover (5) to tank flange (6).

(2) Remove cover (5) and gasket (7). Discard gasket.

(3) Remove seven nuts (8), lock washers (9) and flat washers (10) holding spider plate (11).

(4) Remove nuts (12), flat washers (13) and spider plate (11).

(5) Remove screw (14). flat washer (15), and guide rod (16).

NOTE
Start with the lower element nearest the filter access port.

(6) Remove wire support (17) from under element (18).

(7) Pull element (18) until it drops down and remove element (18) and gasket (19). Discard element.

(8) Repeat preceding steps (4 and 5) to remove remaining four elements (18) and gaskets (19).

4-25. SPIDER PLATE AND FILTER ELEMENTS REPLACEMENT- continued.

(9) If necessary remove rod stay (20).

(10) Remove fifteen element retaining plugs (21) and slide filter elements (22) off guide pipes(23). Discard filter elements.

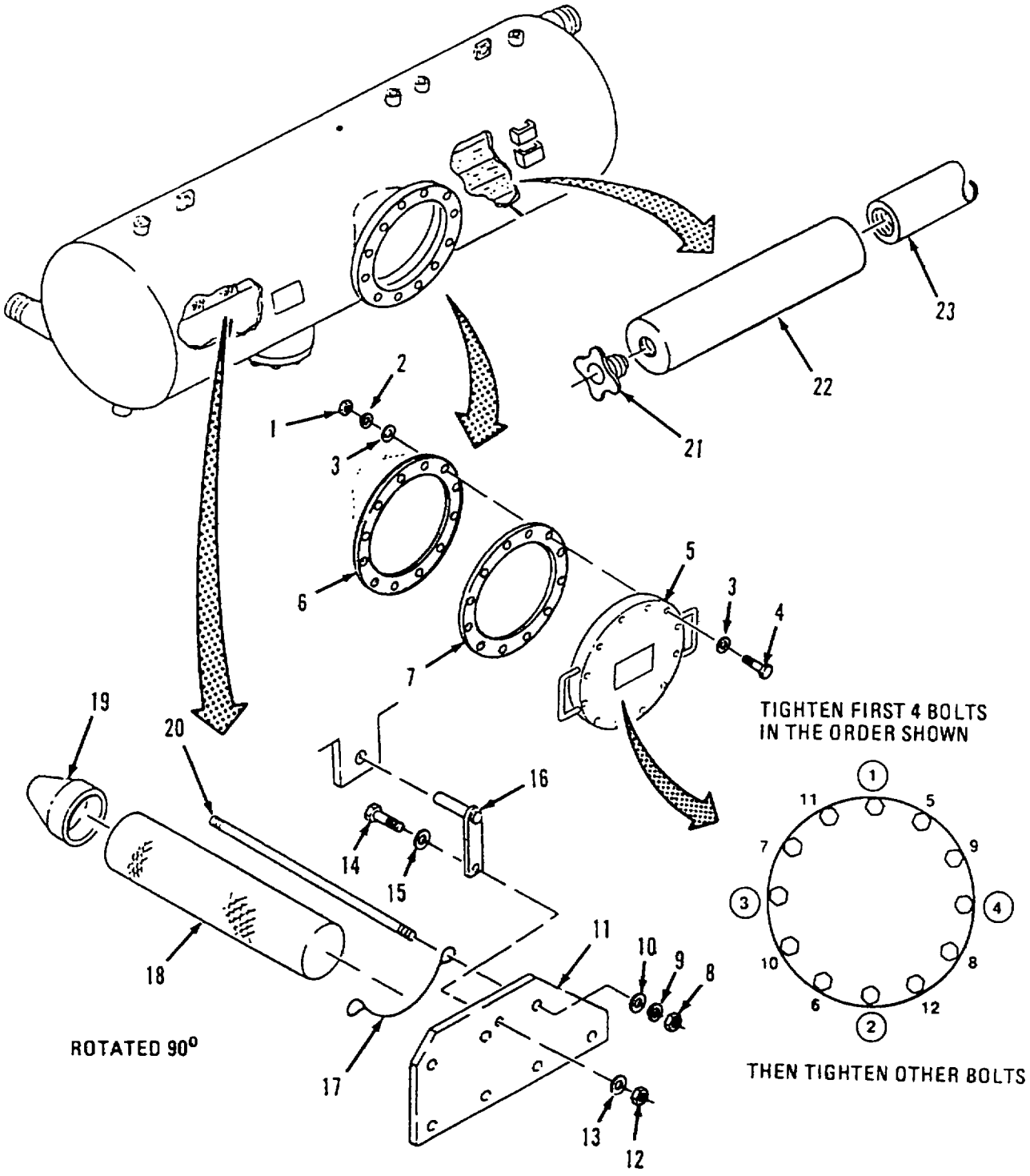


Figure 4-15. Spider Plate and Filter Elements Removal

4-25. SPIDER PLATE AND FILTER ELEMENTS REPLACEMENT - continued.

WARNING

Fuel is toxic to skin, eyes and respiratory tract. Wear skin and eye protection when handling components. Provide adequate ventilation.

b. Cleaning. Clean all parts and interior of tank with clean wiping cloth.

c. Inspection. Inspect all hardware, fasteners and gaskets for damage. Replace defective parts.

CAUTIONS

Oils from the skin can penetrate the surface of the element and cause them to be ineffective. When installing element, do not touch the element surface.

Do not allow any metal object to come in contact with Teflon on element.

d. Installation. Refer to figure4-16.

(1) Install 15 new filter elements (22) onto guide pipes (23),starting with the farthest element from the access port.

(2) Secure filter elements (22) on guide pipes (23) with retaining plugs (21). Hand tighten plugs, being careful not to over tighten.

(3) Install gasket (19) onto element (18).

(4) Slant end of element with gasket (19) down and insert though access port.

(5) Turn element (18) slightly to the right and lift into position on upper wall hole farthest from the access port.

(6) Slide element (18) to the right until it fits into the outlet hole in the tank.

(7) Hold up end of element (18) and install wire support (17) on rod stays (20).

(8) Install next element (18) on top row and install other end of wire support (17).

(9) Install remaining three elements(18),with gasket end (19) in lower row of holes, starting farthest from access port Install remaining wire spacers (17).

(10) Insert guide rod (16) in hole on tab hole inside of tank.

(11) Install screw (14), flat washer (15),in guide rod (16) and insert guide rod into tab hole inside of tank.

(12) Install spider plate (11) on rod stays (20) and secure with seven flat washers (10), lock washers (9), and nuts (8).

4-25. SPIDER PLATE AND FILTER ELEMENTS REPLACEMENT - continued.

(13) Secure gasket (7) and access cover (5) to tank flange (6) with twelve nuts (1). twelve lock washers (2) twenty-four flat washers (3), and twelve screws (4), Tighten screws (4) in the sequence shown below.

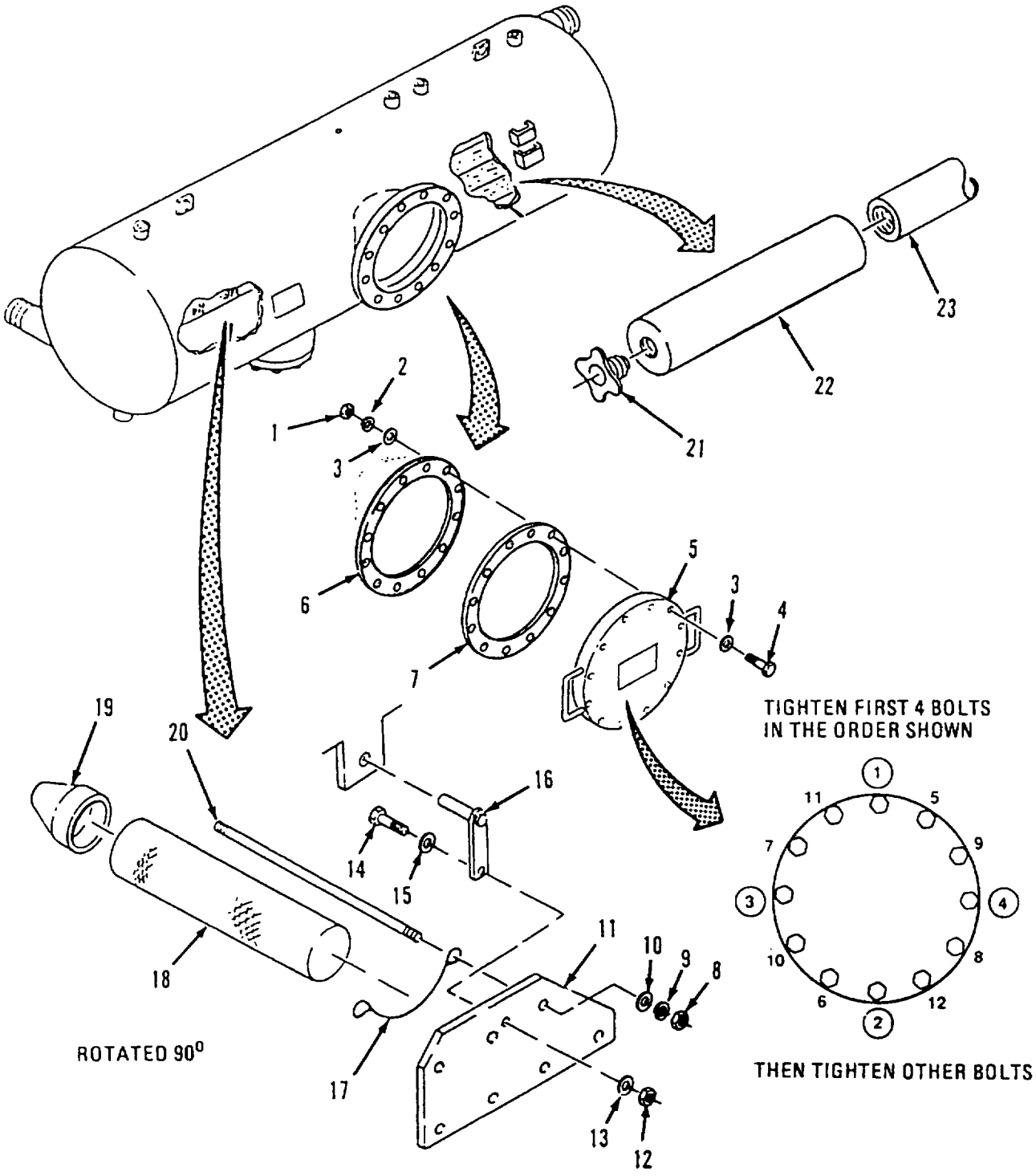


Figure 4-16. Spider Plate and Filter Elements Installation.

4-26. WATER SUMP COVER AND GASKET REPLACEMENT.

This task consists of:
a. Removal **b. Installation**

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section III, Item 1)

Materials/Parts
Flange gasket (Appendix C, Section UI)

Equipment Conditions
Filter-separator removed from system and tank empty. Refer to para 26.
Air vent valve open. Refer to para 26.
Defrost door and shroud removed. Refer to para 4-13.

Equipment Conditions - continued
Water drain valve and piping removed. Refer to para 4-15.

General Safety Instructions

WARNINGS
Do not smoke within 100 feet of filter-separator.
Fuel is toxic to skin, eyes, and respiratory tract

Refer to figure 4-17.

WARNINGS
- **Leave two bolts loosen to avoid injury. These bolts will support the sump cover until all other hardware is removed.**
- **Fuel is toxic to skin, eyes and respiratory tract. Wear skin and eye protection when handling components.**
- **Avoid spillage of fuel. Drain fuel in an adequate container, otherwise a fire hazard or environmental contamination could result.**

a. Removal.

(1) Remove eight screws (1) and flat washers (2) from water sump (3).

(2) Remove cover (4) and gasket (5). Discard gasket.

a. Installation

(1) Position gasket (5) and cover (4) on water sump (3) and secure with eight screws (1) and flat washers (2).

(2) Tighten screws (1) in the sequence as shown.

4-26. WATER SUMP COVER AND GASKET REPLACEMENT - continued.

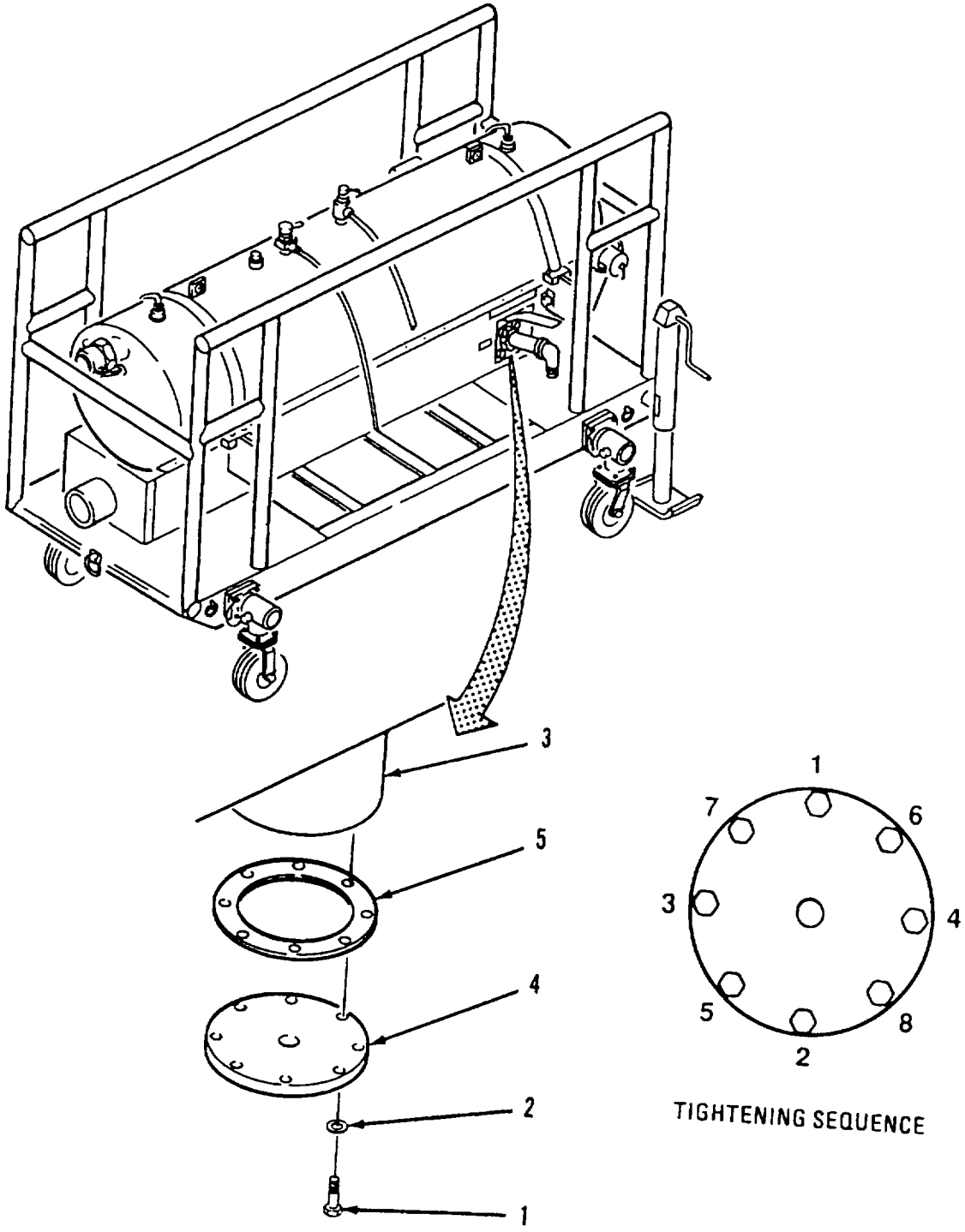


Figure 4-17. Water Sump Cover and Gasket Replacement.

4-27. TANK REPLACEMENT

This task consists of:
a. Removal **b. Installation**

INITIAL SET-UP:

Tools
Tool Kit, General Mechanics (Appendix B, Section III, Item I)
Lifting device.

Personnel Required
Two (2)

Materials/Parts
Rivets (Appendix C, Section II)
Drive screws (Appendix C, Section II)
Filter-separator removed from system, tank empty. Refer to para 2-6.
Water detector assembly removed. Refer to para 2-6.
Defrost door and shroud removed. Refer to para 4-13.
Latch pins, latch plates and jumper cable removed. Refer to para 4-14.
Air vent valve and drain tube assembly removed. Refer to para 4-15.

Equipment Conditions - continued.
Water drain valve and piping removed. Refer to para 4-16.
Tiedown straps removed. Refer to para 4-17.
Dust plug, dust cap, and tank couplings removed. Refer to para 4-20.
Pressure relief valve and tubing removed. Refer to para 4-21.
Pressure tubing removed. Refer to para 4-22.
DP gage removed. Refer to para 4-23.
Access cover and gasket removed. Refer to para 4-24.
Spider plates and filter elements removed. Refer to para 4-25.
Water sump cover and gasket removed. Refer to para 4-26.
Identification plate removed. Refer to para 4-30.
General Safety Instructions

WARNINGS
Do not smoke within 100 feet of filter-separator.
Fuel is toxic to skin, eyes, and respiratory tract.
Lifting or moving heavy equipment can cause injury.

Refer to figure 4-18.

WARNINGS

Lifting or moving heavy equipment incorrectly can cause serious injury. Do not try to lift or move more than 50 pounds by yourself. Get an assistant. Bend legs while lifting. Do not support weight with your back.

Fuel is toxic to skin; eyes and respiratory tract. Wear skin and eye protection when handling components.

Avoid spillage of fuel Drain fuel in an adequate container, otherwise a fire hazard or environmental contamination could result. Dispose of contaminated fuel in accordance with FM 10-20.

a. Removal

(1) Remove drain plugs (1, 2, and 3) from ports (4).

(2) Attach a lifting device to tabs (5) and remove tank (6) from frame (7).

4-27. TANK REPLACEMENT - continued.

b. Installation

(1) Apply sealant to threads on drain plugs (1, 2. and 3) and install in ports (4).

(2) Attach lifting device to tabs (5) and position tank (6) onto frame (7).

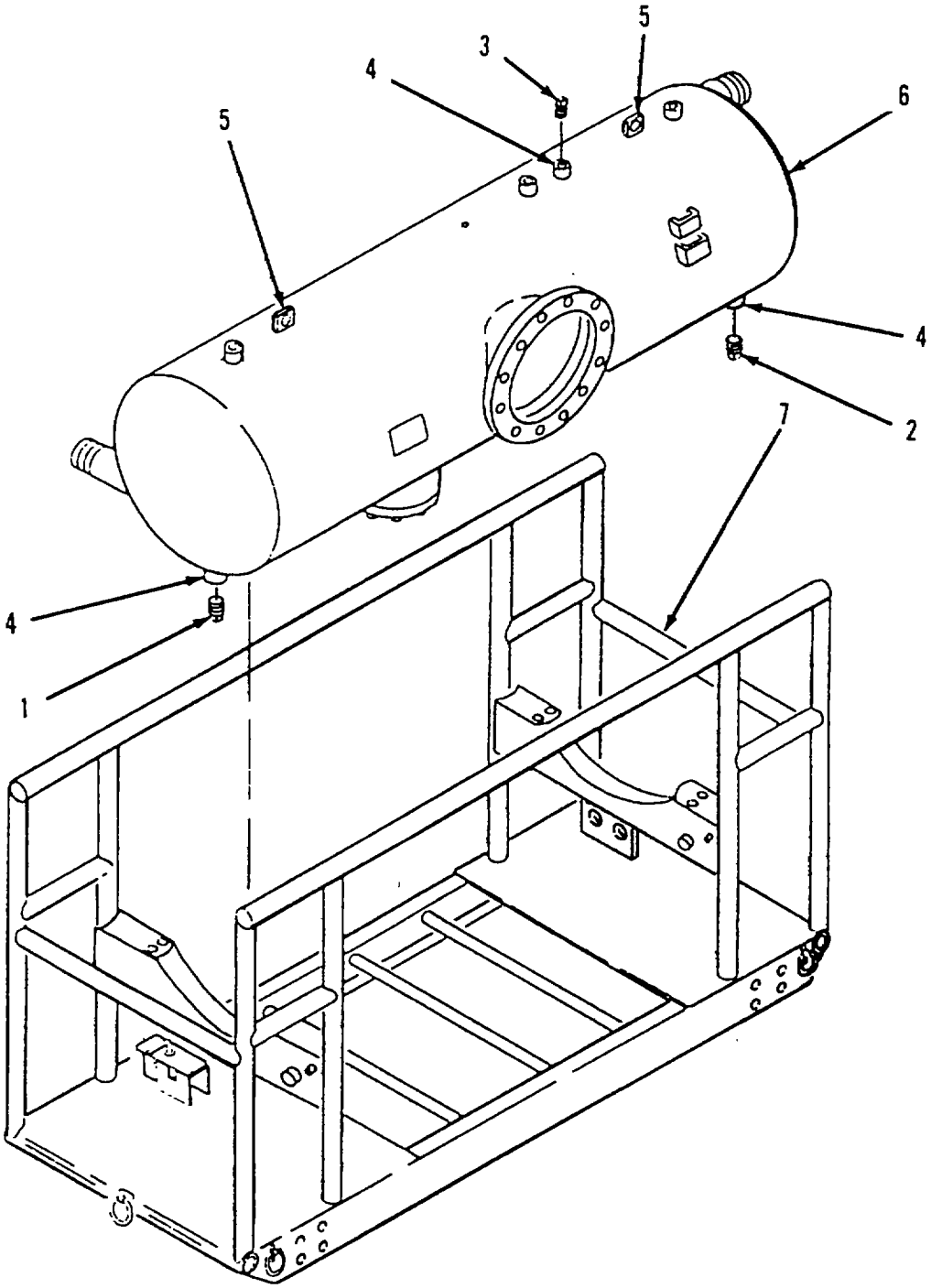


Figure 4-18. Tank Replacement

4-28. WHEEL, DETENT PIN, GEAR MOUNT, AND PIVOT REPLACEMENT

This task consists of:
a. Removal **b. Service** **c. Installation**

INITIAL SET-UP:

Tools:
General Mechanics Tool Kit (Appendix B, Section III, Item 1)
Grease Gun (Appendix B, Section m, Item 2)

Materials/Parts
lock washers (Appendix C)
Wiping Rags (Appendix F, Item 3)

Equipment Conditions
Wheel retracted. Refer to para 2-5.
Jack screw removed. Refer to para 2-5.

General Safety Instructions

WARNINGS
Do not smoke within 100 feet of filter-separator.
Fuel is toxic to skin, eyes, and respiratory tract.

Refer to figure 4-19.

NOTE

The following procedure is typical for the swivel and rigid wheel assemblies.

a. Removal.

(1) Remove wheel assembly (1) by removing four nuts (2), four lock washers (3), four flat washers (4), and four screws (5).

(2) Pull detent pin (6) and slide pivot (7) off running gear mount (8).

(3) Remove detent pin (6) and running gear mount (8) by removing nuts (9), lock washers (10), flat washers (11) and screws (12).

b. Service.

(1) Service wheel assembly (1) with grease GAA. MIL-G- 10924.

NOTE
Each wheel assembly has a grease fitting located on the hub. The caster wheel assembly has an additional grease fitting located on the caster swivel.

(2) Wipe excess grease from fittings and surrounding area with clean wiping rag.

b. Installation

(1) Install detent pin (6) and running gear mount (8) onto frame with screws (12), flat washers (11), lock washers (10) and nuts (9).

(2) Slide pivot (7) on running gear mount (8) and align holes then insert detent pin (6).

(3) Secure wheel assembly (1) on pivot (6) with four screws (5), four flat washers (4), four lock washers (3), and four nuts (2).

4-28. WHEEL, DETENT PIN, GEAR MOUNT, AND PIVOT REPLACEMENT-continued.

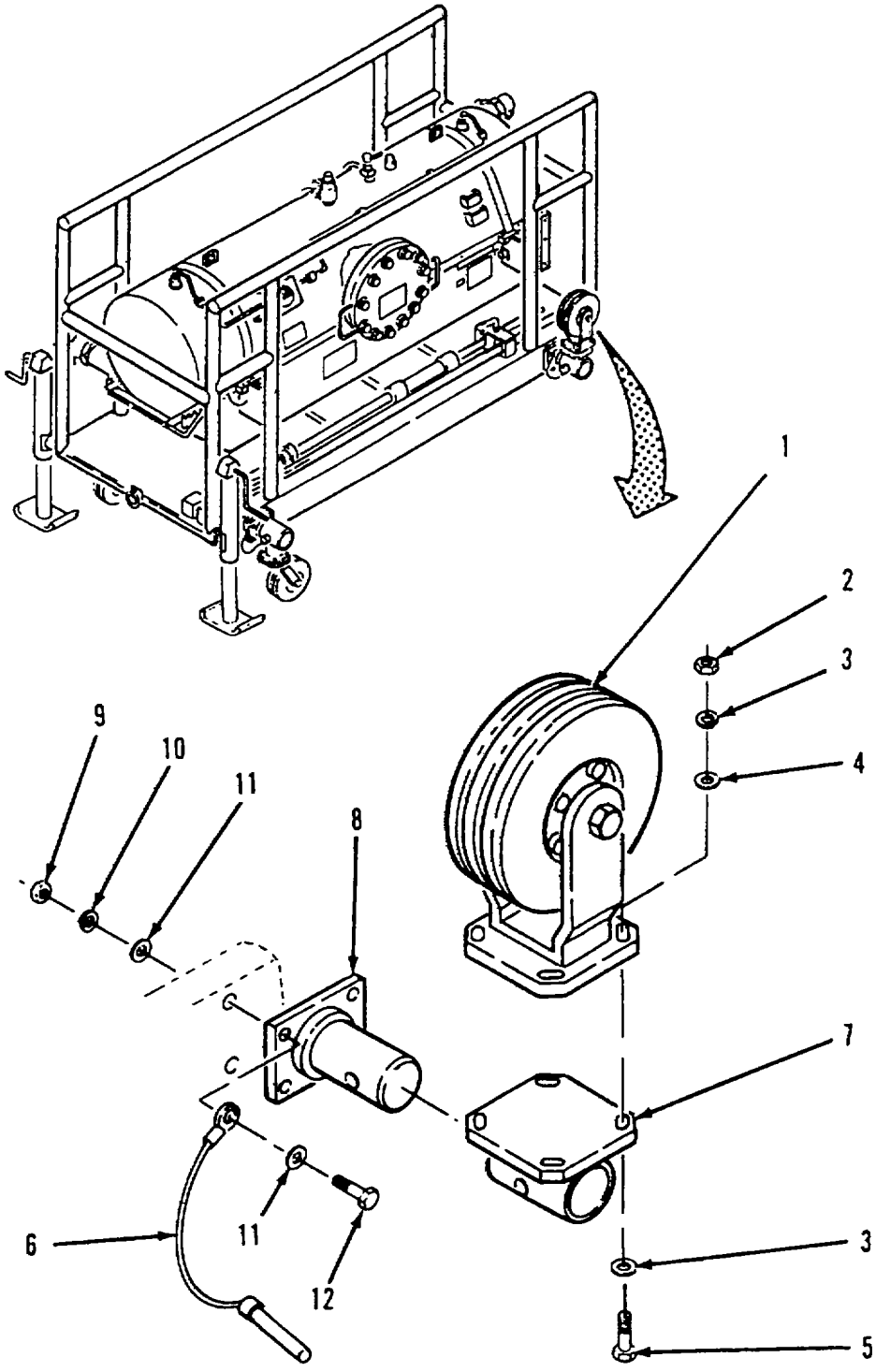


Figure 4-19. Wheel, Detent Pin, Gear Mount, and Pivot Replacement

4-29. FRAME ASSEMBLY REPAIR.

This task consists of:
a. Removal **b. Repair** **c. Installation**

INITIAL SET-UP:

Tools
Shop Equipment. Automotive (Appendix B, Section III, Item 2)

Equipment Conditions
Filter-separator removed from system. Refer to para 2-6.
Air vent valve open. Refer to para 2-5
Crowbar removed. Refer to para 2-5.
Ground rod removed, Refer to para 2-5.
Ground cable removed. Refer to para 2-5.
Jack screw removed. Refer to para 2-5.
Water detection adapter assembly removed. Refer to para 2-5.

Equipment Conditions - continued.
Defrost door and exhaust shroud removed. Refer to para 4-13.
Tank removed. Refer to para 4-27.
Wheel, detent pin, gear mount, and pivot removed. Refer to para 4-28.

General Safety Instructions

WARNINGS
- **Do not smoke within 100 feet of filter-separator.**
- **Fuel is toxic to skin, eyes, and respiratory tract.**
- **Lifting or moving heavy equipment can cause injury.**

Refer to figure 4-20.

WARNINGS

Lifting or moving heavy equipment incorrectly can cause serious injury. Do not try to lift or move more than'50 pounds by yourself. Get an assistant. Bend legs while lifting. Do not support weight with your back.

NOTE

This procedure is typical for the four "D" rings and two tie down rings installed on the frame.

a. Removal.

(1) Unscrew threaded bar (1) and remove hold-down plate (2) from bracket (3) on frame (4)

(2) Unscrew tie down rings (5) from frame (4).

(2) Remove two nuts (6), two flat washers (7),two screws (8) and "D" ring (9) from frame (4).

b. Repair. Repair is limited to replacement of defective components.

c. Installation

(1) Position the holddown plate (2) on bracket (3) and secure plate on bracket with threaded bar (1).

(2) Screw tiedown rings (2) in frame (3).

(2) Position "D" rings (7) on frame (3) and secure with four screws (6), four flat washers (5) and four nut; (4).

4-29. FRAME ASSEMBLY REPAIR - continued.

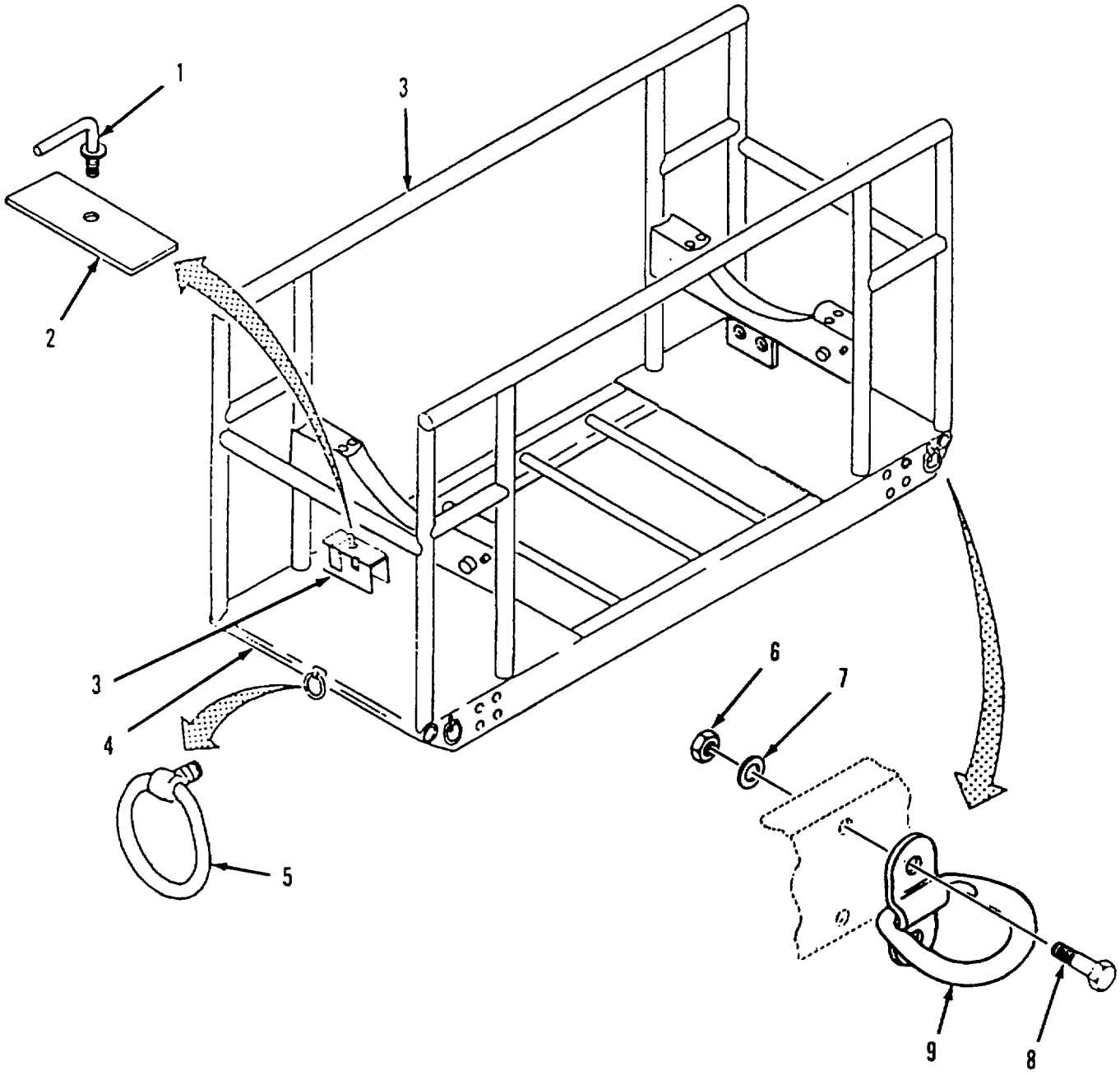


Figure 4-20. Frame Assembly Repair

4-30. IDENTIFICATION AND INSTRUCTION PLATES REPLACEMENT.

This task consists of:
a. Removal **b. Installation**

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section III, Item 1)
Riveter, Blind, Hand(Appendix B. Section II Item 5)
Drill (Appendix B, Section III. Item 2)

Materials/Parts
Drive Screws (Appendix C, Section II)
Rivets (Appendix C, Section I)

Equipment Conditions
Filter-separator removed from system, tank drained. Refer to para 2-6.
Air vent valve open. Refer to para 2-6.

General Safety Instructions

WARNINGS
- **Do not smoke within 100 feet of filter-separator.**
- **Fuel is toxic to skin, eyes, and respiratory tract.**
- **Wear safety goggles or glasses to protect your eyes from airborne objects.**

Refer to figure 4-21.

WARNING

Drilling may cause metal particles to go airborne and cause injury. Wear safety goggles or glasses to protect your eyes.

NOTE

The following procedure is typical for all identification and instruction plates. These plates are mounted in different locations on the filter-separator

a. Removal. Remove identification and instruction plates (1) by drilling out drive screws (2) or rivets (3).

b. Installation Install identification and instruction plates (1) and fasten with drive screws (2) or rivets (3).

4-30. IDENTIFICATION AND INSTRUCTION PLATES REPLACEMENT - continued.

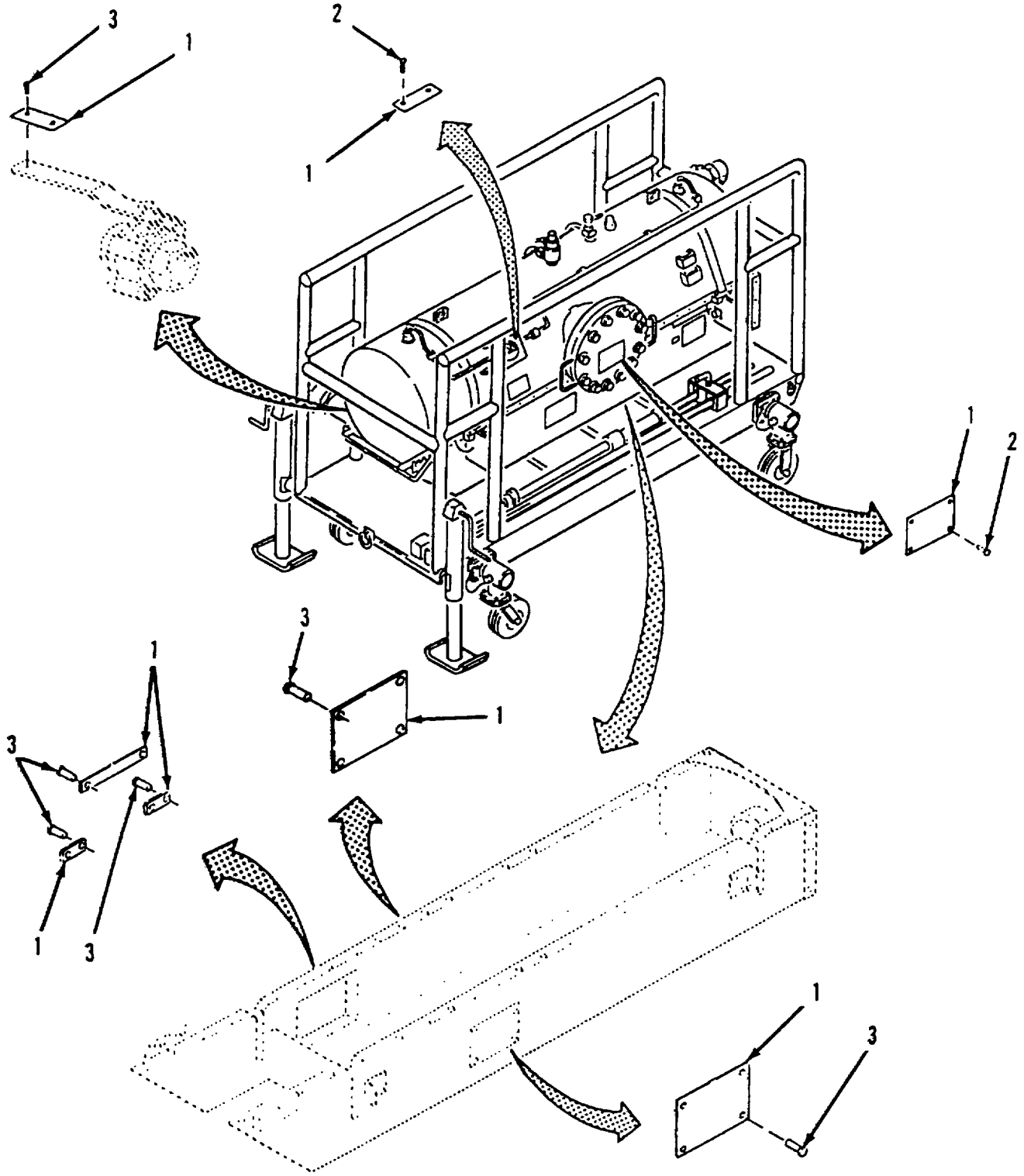


Figure 4-21. Identification and Instruction Plates Replacement

4-31. GROUND CABLE ASSEMBLY REPAIR

This task consists of:
a. Disassembly **b. Repair** **c. Assembly**

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section III, Item 1)

Materials/Parts
Cable (Appendix C, Section II)

Equipment Conditions
Filter-separator removed from system and tank drain. Refer to para 2-6.
Air vent valve open. Refer to para 2-6.
Ground cable removed. Para 2-5.

General Safety Instructions

WARNINGS
Do not smoke within 100 feet of filter-separator.
Fuel is toxic to skin, eyes, and respiratory tract.
Wear safety goggles or glasses to protect your eyes.

Refer to figure 4-22.

a. Disassembly. Remove four alien screws (1) from two clips (2) and pull ends (3) of cable (4) from clips.

b. Repair. Replace defective components. Refer to Appendix G, Figure G- 1 for fabrication of cable.

c. Assembly.

WARNING

Wear safety goggles or glasses to protect your eyes from injury when cutting cable.

(1) Cut six feet of cable (4). Refer to Appendix G, Figure G-1.

(2) Insert ends (3) of cable (4) into clips (2) and install alien screws (1) to secure ends in clips.

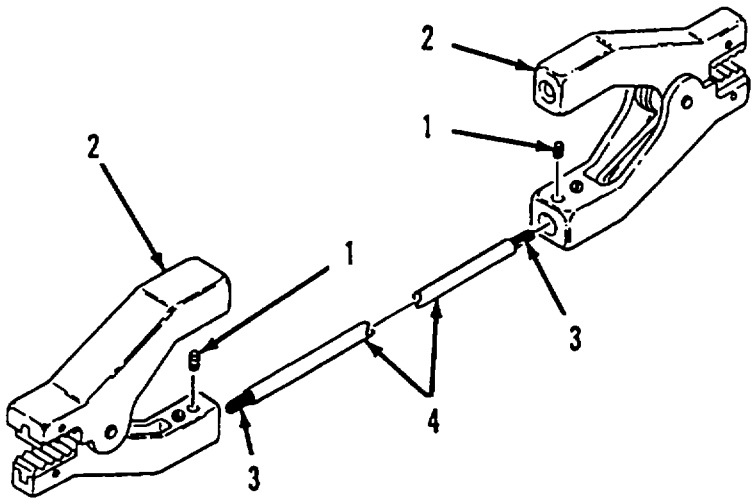


Figure 4-22. Ground Cable Repair.

4-32. WATER DETECTION ADAPTER ASSEMBLY REPAIR.

This task consists of:
a. Disassembly b. Repair c. Assembly

INITIAL SET-UP:

Tools
General Mechanics Tool Kit (Appendix B, Section III, Item 1)

Materials/Parts
Gaskets (Appendix C, Section II)
Sealing Compound Refer to Appendix F, Section II, Item 2.
Chain, sash. Appendix G Table F-2.

Equipment Conditions
Filter-separator removed from system. and tank drained. Refer to para 2-6.
Water detection adapter assembly removed. Refer to para 2-5.

General Safety Instructions

WARNINGS
· Do not smoke within 100 feet of filter-separator.
Fuel is toxic to skin, eyes, and respiratory tract.
Sealant is toxic to skin. eyes, and respiratory tract.

Refer to figure 4-23.

WARNINGS

Do not apply excessive pressure with fingers when cleaning or applying sealant onto threads. Sharp threaded edges could cause injury.

Fuel is toxic to skin, eyes and respiratory tract. Wear skin and eye protection when handling components.

a. Disassembly

(1) Clamp the adapter assembly in a vise and remove sampling probe (1).

(2) Remove three split rings (2) from chains (3), dust cap (4), dust plug (5), and coupling (6).

(3) Pull locking arms (7) on dust cap (4) out and remove dust cap.

(4) Remove gasket (8) from dust cap (4). Discard gasket.

(5) Pull locking arms (9) up and out on coupling (10) and remove dust plug (5).

(6) Remove gasket (11) from coupling (10). Discard gasket

(7) Unscrew couplings (6 and 10) from adapter nipple (12).

b. Repair. Replace defective components.

(1) Replace all defective components. Refer to Appendix G, Figure G-a for fabrication of chain.

(2) Replace gaskets.

4-32. WATER DETECTION ADAPTER ASSEMBLY REPAIR - continued. I

c. Assembly.

(1) Apply sealant on threads and screw couplings (6 and 10) on adapter nipple (12).

(2) Install gasket (11) into coupling (10).

(3) Install dust plug (5) into coupling (10) and push cam handles (9) down to secure dust plug.

(4) Install gasket (8) in dust cap (4).

(5) Install dust cap (4) onto coupling (6) and push cam handles (7) down to secure dust cap.

(6) Attach split rings (2) to chains (3), dust plug (5). dust cap (4) and coupling (6).

(7) Apply sealant to threads on adapter nipple (12) and install probe (1) into the adapter nipple (12). Make sure the bevel (13) on the sampling probe points toward the female coupling (10).

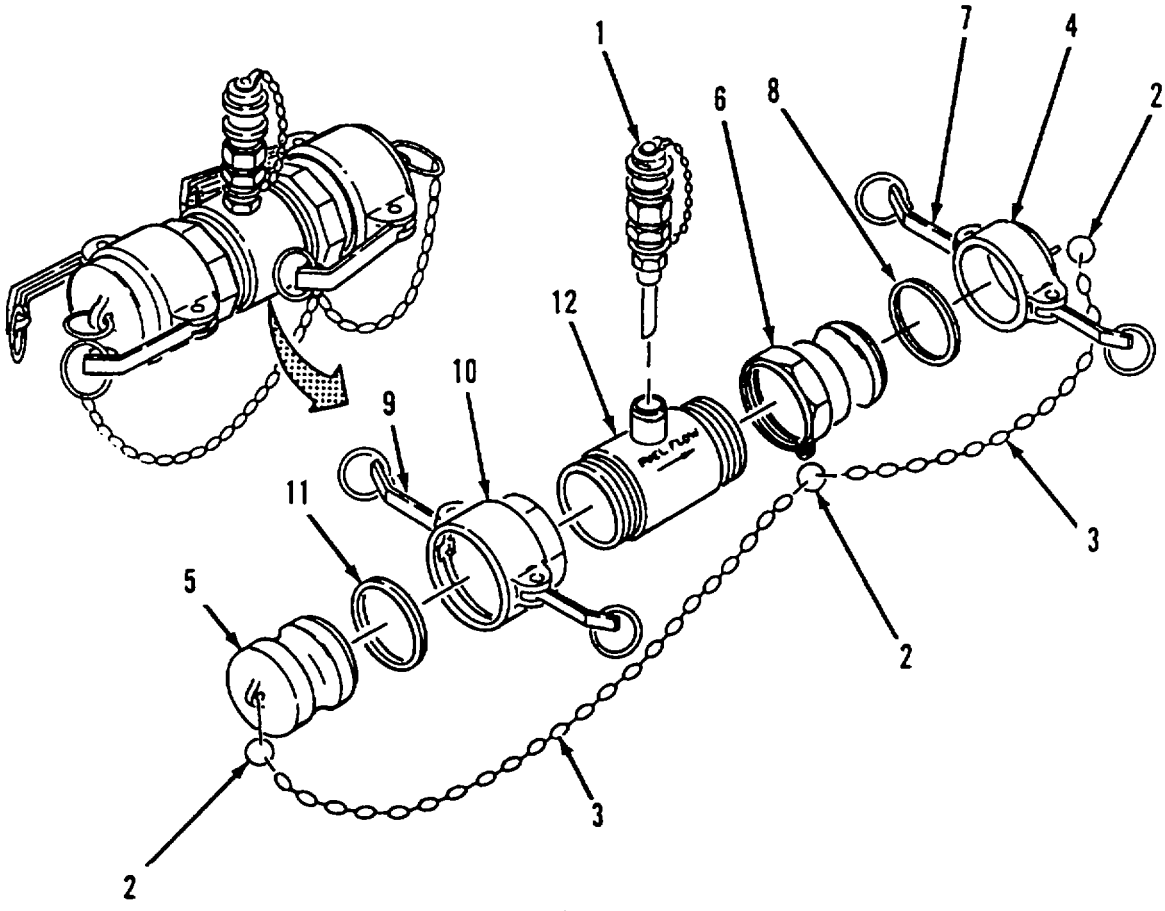


Figure 4-23. Water Detection Adapter Assembly Repair.

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

4-33. SECURITY PROCEDURES.

Refer to AR 190-1 or AR 190-13.

4-34. SHORT TERM STORAGE.

Store the for filter-separator as follow:

a. Isolate the filter-separator from the system by closing upstream and downstream valves.

b. Disconnect water detection adapter assembly.

c. Open the water drain valve and drain the contaminated fuel in a canister.

d. Disconnect inlet and outlet hoses from filter-separator.

e. Disconnect air duct from exhaust shroud.

f. Disconnect ground rod and cable.

4-35. INTERMEDIATE STORAGE.

Refer to the following documents for information relative to storing the filter-separator.

a. TM 38-230-1, Preservation and packing of military equipment.

b. AR -7501. Army Materiel Policy and Retail Maintenance Operations.

c. MIL-F-52429 Packing of fuel separators.

4-36. ADMINISTRATIVE STORAGE.

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

b. Before placing the equipment in administrative storage, current Preventive Maintenance Checks and Services (PMCS) should be completed, shortcomings and deficiencies should be corrected, and all Modification Work Orders (MWO) 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.

CHAPTER 5
DIRECT SUPPORT MAINTENANCE PROCEDURES

Paragraph **Page**

Direct Support Maintenance Procedures 5-1
5-1. Introduction 5-1
5-2. Shroud Assembly Repair 5-1
5-3. Frame Assembly - Repair 5-3

5-1. INTRODUCTION.

This chapter contains instructions for performing Direct Support Maintenance on the 200 GPM filter-separator.

5-2. SHROUD ASSEMBLY REPAIR.

This task covers: Repair

INITIAL SET-UP:

Tools
Shop Equipment, Welding field maintenance, (Appendix B, Section III, Item 6)

Equipment Conditions:
Shroud removed. Refer to para 4-13.
Latch pin and latch plate removed. Refer to para 4-14.
Identification and instructional plates removed. Refer to para 4-30.

References:
TM 9-237

General Safety Instructions

WARNINGS
• Do not smoke within 100 feet of filter-separator.
• Fuel is toxic to skin, eyes, and respiratory tract.

Refer to figure 5-1.

Repair. Straighten and weld shroud assembly (1) as required. Refer to TM 9-237 for welding procedures. If shroud is damaged beyond repair. replace shroud assembly.

5-2. SHROUD ASSEMBLY REPAIR - continued.

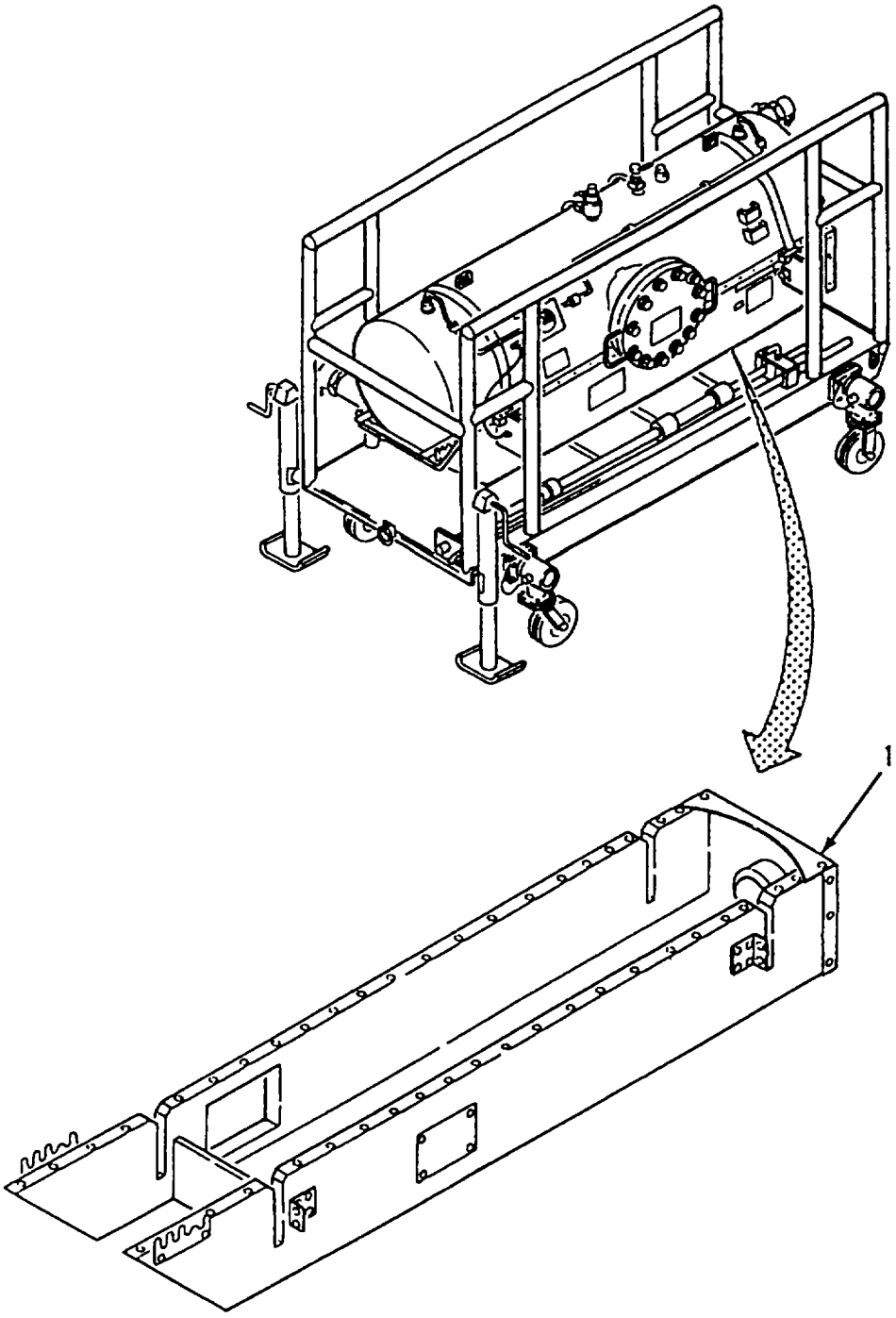


Figure 5-1. Shroud Assembly Repair.

5-2. FRAME ASSEMBLY REPAIR.

This task covers: Repair

INITIAL SET-UP:

Tools

Shop Equipment, Welding field maintenance. (Appendix B, Section III, Item 6)

Equipment Conditions

Defrost door and shroud removed.
4-13.
Latch pin, latch plate and jumper cable removed. Refer to para 4-14.
Air vent and drain tube removed. Refer to para 4-15.
Water drain valve and piping removed. Refer to para 4-16.
Tiedown straps removed. Refer to para 4-17.
Dust plug, dust cap, and tank couplings removed. Refer to para 4-20.
Pressure relief valve and tubing removed. Refer to para 4-21.
Pressure tubing removed. Refer to para 4-22.
DP gage removed. Refer to para 4-23.
Access cover and gasket removed. Refer to para 4-27.

Equipment Conditions - continued

Spider plate and filter elements removed. Refer to para 4-25.
Water sump cover and gasket removed. Refer to para 4-26.
Refer to para Tank removed. Refer to para 4-24.
Wheel, detent pin, gear mount and pivot removed. Refer to para 4-28.
Identification and instruction plates removed. Refer to para 4-30.
Ground cable assembly removed. Refer to para 4-31
Water detection adapter assembly removed. Refer to para 4-32.

General Safety Instructions

WARNINGS

- Do not smoke within 100 feet of filter-separator.
- Fuel is toxic to skin, eyes, and respiratory tract.
- Lifting or moving heavy equipment can cause injury.

Refer to figure 5-2.

WARNING

Lifting or moving heavy equipment incorrectly can cause serious injury. Do not try to lift or move more than 50 pounds by yourself. Get an assistant. Bend legs while lifting. Do not support weight with your back.

Repair.

(1) Check welds for cracks or breaks on frame assembly (1). Welds will be in accordance with TM9-237.

(2) Straighten bends found in frame.

(3) Check painted surfaces for chipped, blistered or missing paint Treat and paint exposed surfaces in accordance with TM 43-0139 and MIL-L-T-704.

5-2. FRAME ASSEMBLY REPAIR - continued.

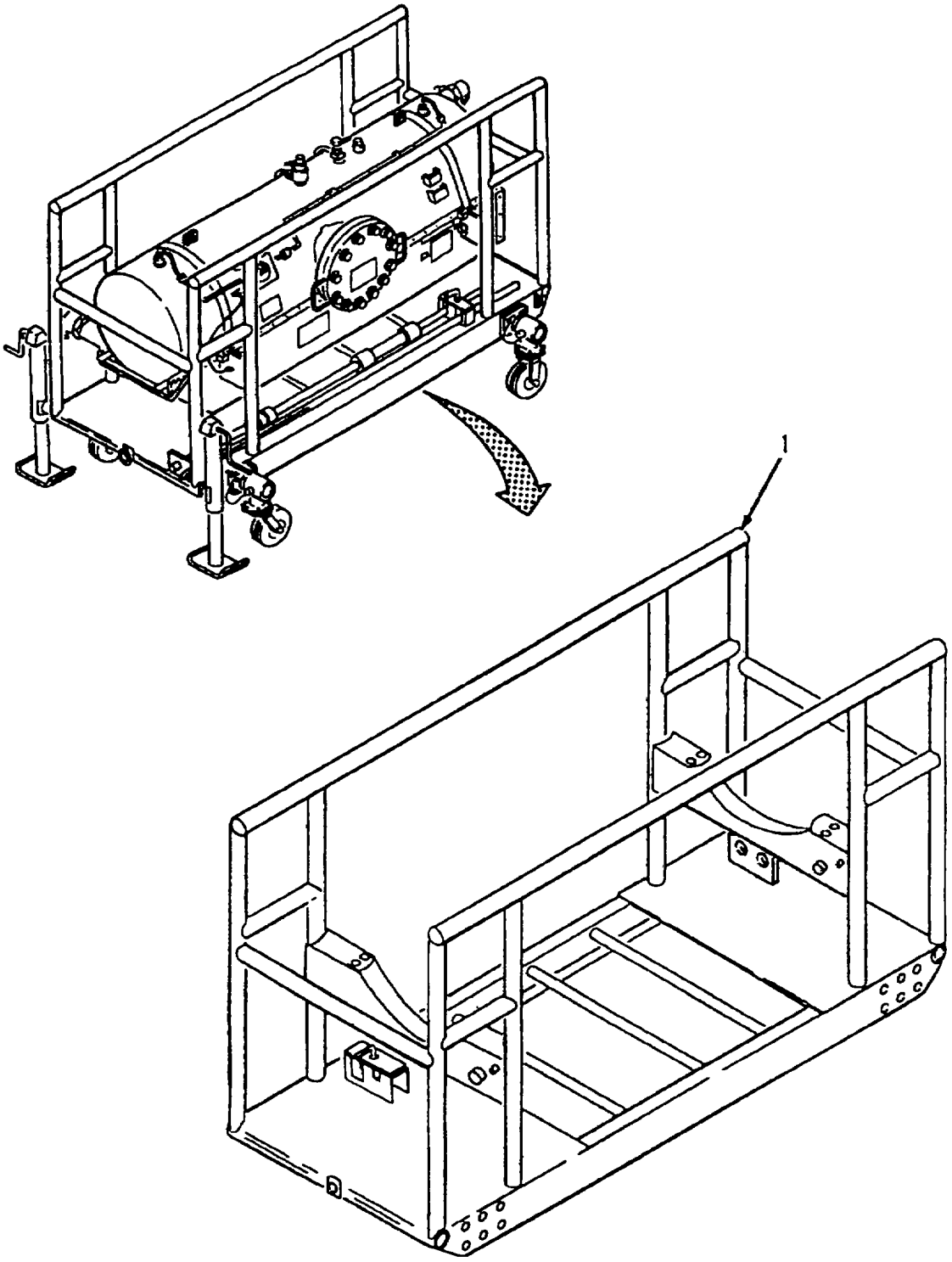


Figure 5-2. Frame Assembly Repair.

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals, and miscellaneous publications referenced in this manual. Also listed are publications that should be consulted for additional information.

A-2. FORMS

Recommended Changes to DA Publications	DA Form 2028-2
Recommended Changes to DA Publications and Blank Forms	DA Form 2028
Equipment Inspection and Maintenance Work Sheet	DA Form 2404
Maintenance Request	DA Form 2407
Product Quality Deficiency Report	STD Form 368

A-3. FIELD MANUALS

NBC Contamination Avoidance	FM 3-3
NBC Protection	FM3-4
NBC Decontamination of Military Petroleum Pipelines, Tanks and Related Equipment	FM 10-20
Aircraft Refueling	FM 10-68
Petroleum Supply Point Equipment and Operations	FM 10-69
First Aid for Soldiers	FM 21-11
Basic Cold Weather Manual	FM 31-70
Northern Operations	FM 31-71

A-4. TECHNICAL MANUALS

Welding	TM 9-237
Preservation and Packing of Military Equipment	TM 38-230-1
Painting Instructions for Field Use	TM 43-0139
Destruction of Army Material to Prevent Enemy Use	TM 750-224-3

A-5. MISCELLANEOUS

The Army Maintenance Management System	DA PAM 738-750
Security Procedures	AR 190-1
Parting of Army Material for Shipment and Storage	AR 746-1
Army Materiel Policy and Retail Maintenance Operations	AR 750- 1

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL.

a. This section provides a general explanation of all maintenance and repair function authorized at various maintenance categories.

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

c. Section m 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 are 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 decontaminate, 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. Align. 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 on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and 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.

B-2. MAINTENANCE FUNCTIONS - continued.

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, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures. and maintenance actions 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.

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

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

B-3. EXPLANATION OF COLUMNS IN THE MAC - SECTION H.

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 are "00".

b. Column 2. Component/Assembly 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).

d. Column 4. Maintenance. Level. Column 4 specifies, by the listing of a work time figure (expressed as man-hours shown as whole hours or decimals) in the appropriate sub-column(s), the level of maintenance authorized to perform the function listed in' Column (3). This figure presents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or the complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation item 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 system designations for the various maintenance levels are shown on the following page.

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

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

f. Column 6, Remarks. This column, when applicable, contains a letter code, in alphabetic order, which is 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 Level. The lowest category of maintenance authorized to use the tool or test equipment

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

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

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

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

a. Column 1, Reference Code. The code recorded in column 6, Section II.

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

Section II. MAINTENANCE ALLOCATION CHART
FOR
200 GPM FILTER SEPARATOR

(1)	(2)	(3)	(4) MAINTENANCE CATEGORY					(5)	(6)
			UNIT		DS	GS	DEPOT	TOOLS AND	
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	EQPT.	REMARKS
00	200 GPM FILTER/ SEPARATOR	INSPECT	0.5						
		SERVICE		0.5					
		REPLACE							
		REPAIR						1,2	A,B,C
01	SHROUD ASSEMBLY	INSPECT	0.5						
		REPLACE		0.5					
		REPAIR		1.0	1.0			1,2,4,5	A,B,C
02	TANK ASSEMBLY	INSPECT	0.5						
		REPLACE		1.0					
		REPAIR		2.0				1,2,4	A
0201	TANK SEPARATOR ASSEMBLY	INSPECT	0.5						
		REPLACE		1.0					
		REPAIR		2.0				1,2	AB
020101	DUST CAP, DUST PLUG AND COUPLINGS	INSPECT	0.2						
		REPLACE		0.5					
		REPAIR		0.5				1,2,3	A
020102	SPIDER PLATE	INSPECT	0.2						
		REPLACE		0.5					
		REPAIR		0.5				1,2	A
03	FRAME ASSEMBLY	INSPECT	0.5						
		REPLACE		1.0					
		REPAIR			2.0			1,2,5	A,C
04	GROUND CABLE ASSEMBLY	INSPECT	0.5						
		REPLACE		0.5					
		REPAIR		1.0				1,2	A
05	WATER DETECTION ADAPTER ASSEMBLY	INSPECT	0.5						
		REPLACE	0.5						
		REPAIR	1.0	1,2	A				

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National Stock Number NSN	(5) Tool Number
1	O	TOOL KIT, GENERAL MECHANICS	5180-00-177-7033	SC5180-90-CL-N26
2	O	SHOP EQUIPMENT AUTOMOTIVE VEHICLE	491000-754-0654	SC-4910-95-CL-A74
3	O	PIPE WRENCH, 1 1/2 TO 2 1/2 INCH, 24 INCH	51200277-1462	SC-4910-95-CL-A31
4	O	RIVETER BLIND, HAND	5120-4017-2849	200 OR EQUIVALENT (CAGE 10054)
5	F	SHOP EQUIPMENT, WELDING FIELD MAINTENANCE	4940-40-357-7268	SC-4910-95-CL-B19-HR

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	REPAIR LIMITED TO REPLACEMENT OF DEFECTIVE COMPONENTS
B	REPAIR LIMITED TO REPLACEMENT OF IDENTIFICATION AND INSTRUCTION PLATES
C	WELD AND STRAIGHTEN AT DIRECT SUPPORT

UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

C-1. SCOPE. This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of unit, direct support and general support maintenance of the Air Conditioner. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

C-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. This 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 functional groups in Section II. Repair parts for repairable special tools are also listed in this section. Items listed are shown in the associated illustration(s)/figure(s).

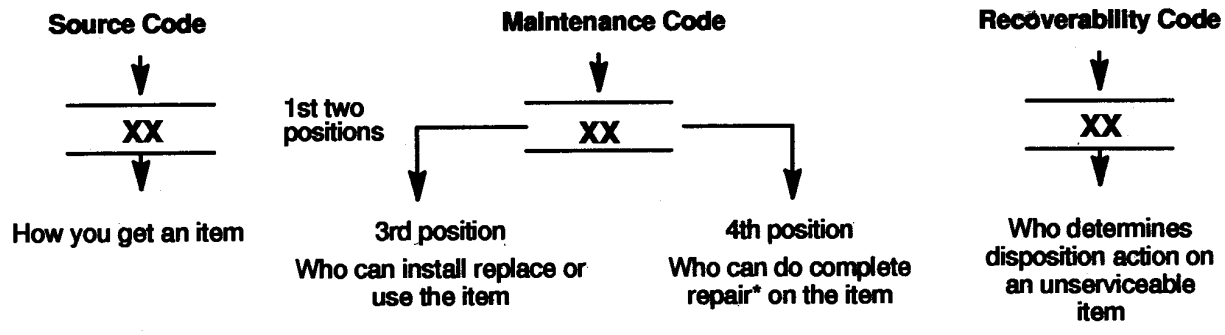
b. Section III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

c. Section IV. Cross-Reference Index. 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 numbers in alphanumeric sequence and cross references NSN, CAGEC and part number.

C-3. EXPLANATION OF COLUMNS (SECTIONS II AND III).

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

b. SMR Code (Column (2)). The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:



* Complete Rear: 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 you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow.

XA - Do not requisition an "XA" -coded item. Order its next higher assembly. (Also, refer to the **NOTE** below.)

Code	Explanation
PA PB PC** PD PE PF PG	Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3rd position of the SMR code. **NOTE : Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.
MO (Made at org AVUM level) MF (Made at DS/AVUM level) MH (Made at GS level) ML (Made at 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 the RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.
AO (Assembled by org AVUM Level) AF (Assembled by DS/AVUM 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 3rd position code of the SMR code, authorizes you to replace the item, but the source code indicates the items are assembled at a higher level, order the item from the higher level of maintenance.

Code	Explanation
XA	- - Do not requisition an "XA"-coded item. Order its next higher assembly. (Also, refer to the NOTE below.)
XB	- - If an "XB" item is not available from salvage, order it using the CAGE Code 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 Code 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 tell 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 the following levels of maintenance.

Maintenance Code	Application/Explanation
C	Crew or operator maintenance done within unit/AVUM maintenance.
O	Unit level/AVUM maintenance can remove, replace, and use the item.
F	Direct support/AVIM maintenance can remove, replace, and use the item.
H	General support maintenance can remove, replace, and use the item.
L	Specialized repair activity can remove, replace, and use the item.
D	Depot 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). This position will contain one of the following maintenance codes.

NOTE

Some limited repair may be done on an item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

Maintenance Code	Application/Explanation
O	Unit/AVUM is the lowest level that can do complete repair of the item.
F	Direct support/AVIM 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	Non-reparable. 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	Non-reparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3rd position of SMR Code.
O	Reparable item. When not economically reparable, condemn and dispose of the item at unit or AVUM level.
F	Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or AVIM level.
H	Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level.
D	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. CAGEC (Column (3)). The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency/activity 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 number listed.

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.

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

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

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

C-4. EXPLANATION OF INDEX FORMAT AND COLUMNS (SECTION IV).

a. NATIONAL STOCK NUMBER (NSN) INDEX.

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

NSN
5305-01-574-1467
NIIN

When using this column to locate an item, ignore the first four digits of the NSN. Use the complete NSN (1 3 digits) when requisitioning items by stock number.

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

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

b. PART NUMBER INDEX. Part numbers in this index are listed in ascending alphanumeric sequence (i. e., vertical arrangement of letter and number combinations which place the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9, and each following letter or digit in like order).

(1) CAGEC Column. The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency/activity 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 1II.

(5) 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.

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 Ill.

(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/activity 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.

C-5. SPECIAL INFORMATION.

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

b. FABRICATION INSTRUCTIONS. Bulk materials required to manufacture items are listed in the Bulk Material Functional Group of this RPSTL. Part numbers for bulk materials are also referenced in the description column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in TM 9-4120-404-14.

c. INDEX NUMBERS. Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the National Stock Number/Part Number Index and the bulk material list in Section II.

d. ASSOCIATED PUBLICATIONS. None.

C-6. HOW TO LOCATE REPAIR PARTS.

a. When National Stock Numbers or Part Numbers are NOT Known

(1) First. Using the table of contents, determine the assembly 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 use the Figure and Item Number Index to find the NSN.

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

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

(2) Second. Turn to 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.

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

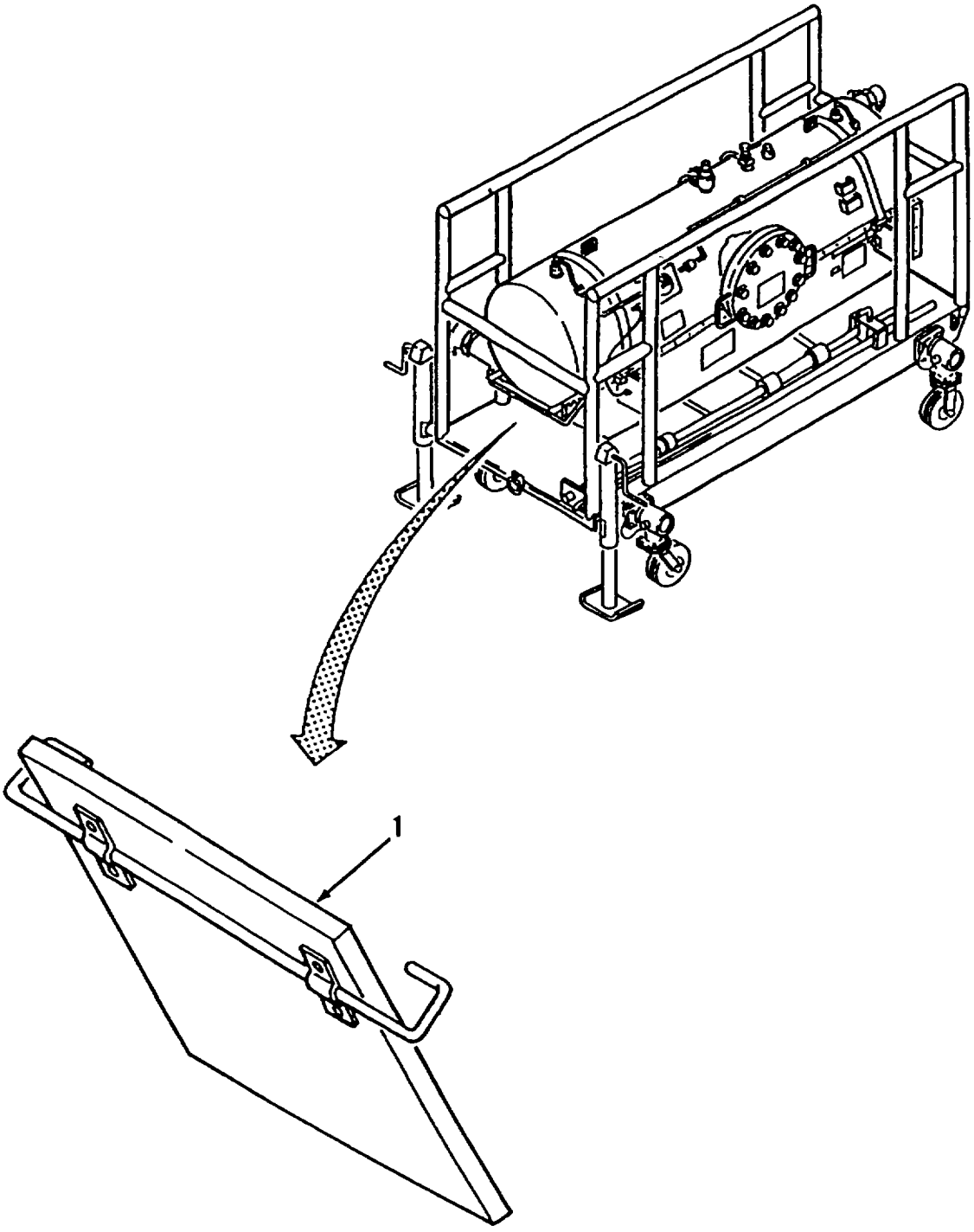


Figure C-1. Door Assembly, Arctic Defrost

(1) ITEM NO	(2) SMR CODE CAGEC	(3) PART NUMBER	(4)	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(°) QTY
				GROUP 01 SHROUD ASSEMBLY	
				FIG. 1 DOOR ASSEMBLY, ARCTIC DEFROST	
1	XBOZZ	97403	13228E1781	DOOR,ASSEMBLY ARTIC.....	1
				END OF FIGURE	

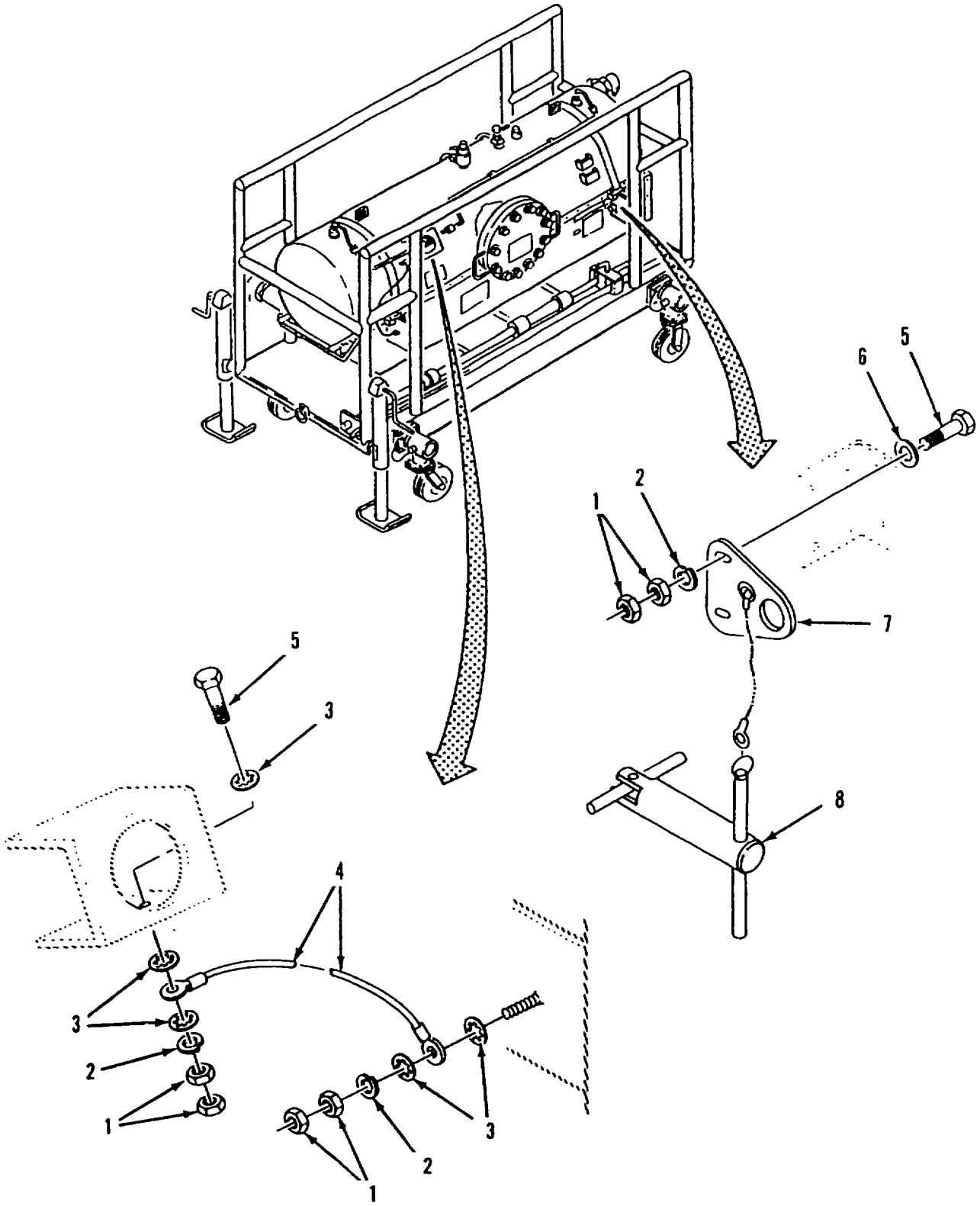


Figure C-2. Jumper Cable and Plate Assemblies

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) PART CAGEC	(4) NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 01 SHROUD ASSEMBLY	
				FIG. 2 JUMPER CABLE AND PLATE ASSEMBLIES	
1	PAOZZ	96906	MS356492254	NUT,PLAIN,HEXAGON	20
2	PAOZZ	96906	MS35338139	WASHER,LOCK	10
3	PAOZZ	96906	MS3533419	WASHER,LOCK	5
4	PAOZZ	81349	M83413/8A16CC	LEAD,ELECTRICAL	1
5	PAOZZ	96906	MS35307306	SCREW,CAP,HEXAGON H	9
6	PAOZZ	96906	MS15795810	WASHER,FLAT	8
7	XBOZZ	97403	13228E1784	PLATE ASSY,LATCH	4
8	PAOZZ	97403	13228E1783	PIN,SHOULDER,HEADED	4
				END OF FIGURE	

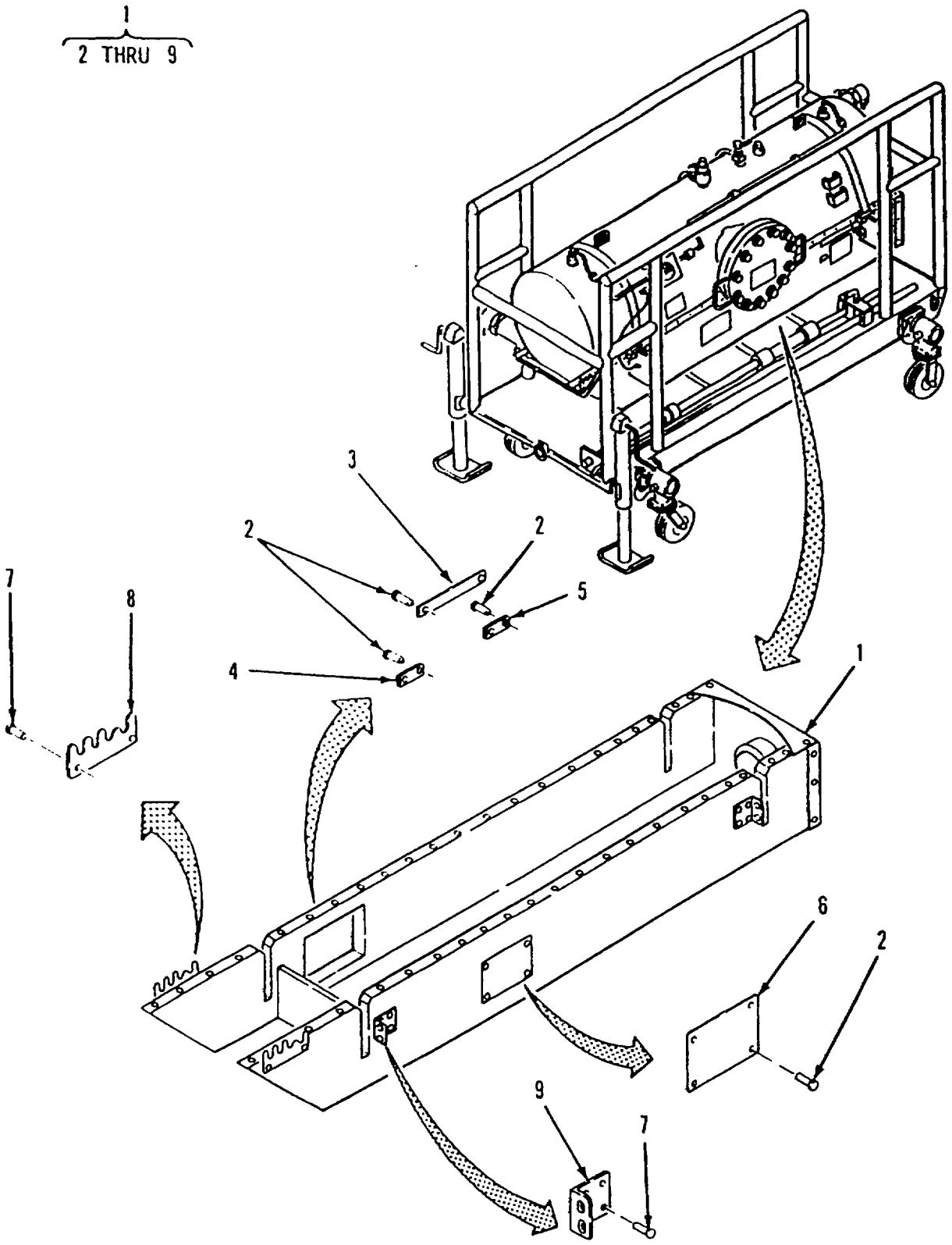


Figure C-3. Shroud Assembly

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) PART CAGEC	(4) NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 01 SHROUD ASSEMBLY	
				FIG. 3 SHROUD ASSEMBLY	
1	XBOFF	97403	13228E1776	SHROUD ASSEMBLY,ARC	1
2	XBOZZ	96906	MS20600BSW2	RIVET,BLIND	19
3	XBOZZ	97403	13228E17771	PLATE,WARNING WARNING WATER DRAIN VALVE MAY BE HOT	1
4	XBOZZ	97403	13228E17742	PLATE,INSTRUCTION CLOSE OPEN WATER DRAIN	1
5	XBOZZ	97403	13228E17741	PLATE,INSTRUCTION CLOSED	1
6	XBOZZ	97403	13228E17772	PLATE,WARNING WARNING HOT	2
7	XBOZZ	96906	MS20600B6W3	RIVET,BLIND	33
8	XBOZZ	97403	13228E17768	PLATE,LATCH	2
9	XBOZZ	97403	13228E177610	BRACKET	4

END OF FIGURE

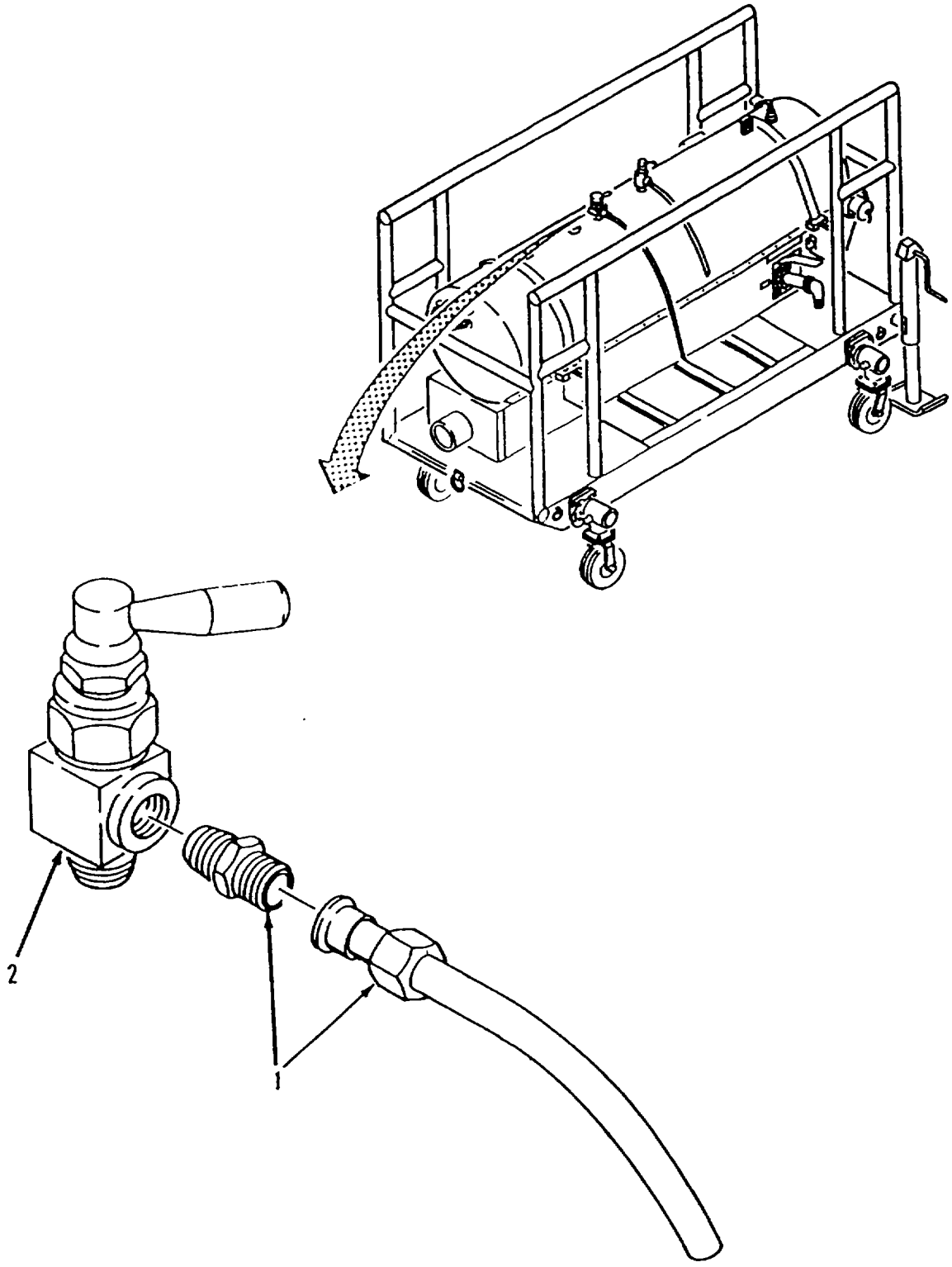


Figure C-4. Drain Tube and Vent Valve

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) PART CAGEC	(4) NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 02 TANK ASSEMBLY	
				FIG. 4 DRAIN TUBE AND VEN[VALVE	
1	XBOZZ	97403	13228E1792	TUBE ASSEMBLY,DRAIN	1
2	XBOZZ	18034	SS-DLM4-F4-A	VALVE,DI APHRAGM	1

END OF FIGURE

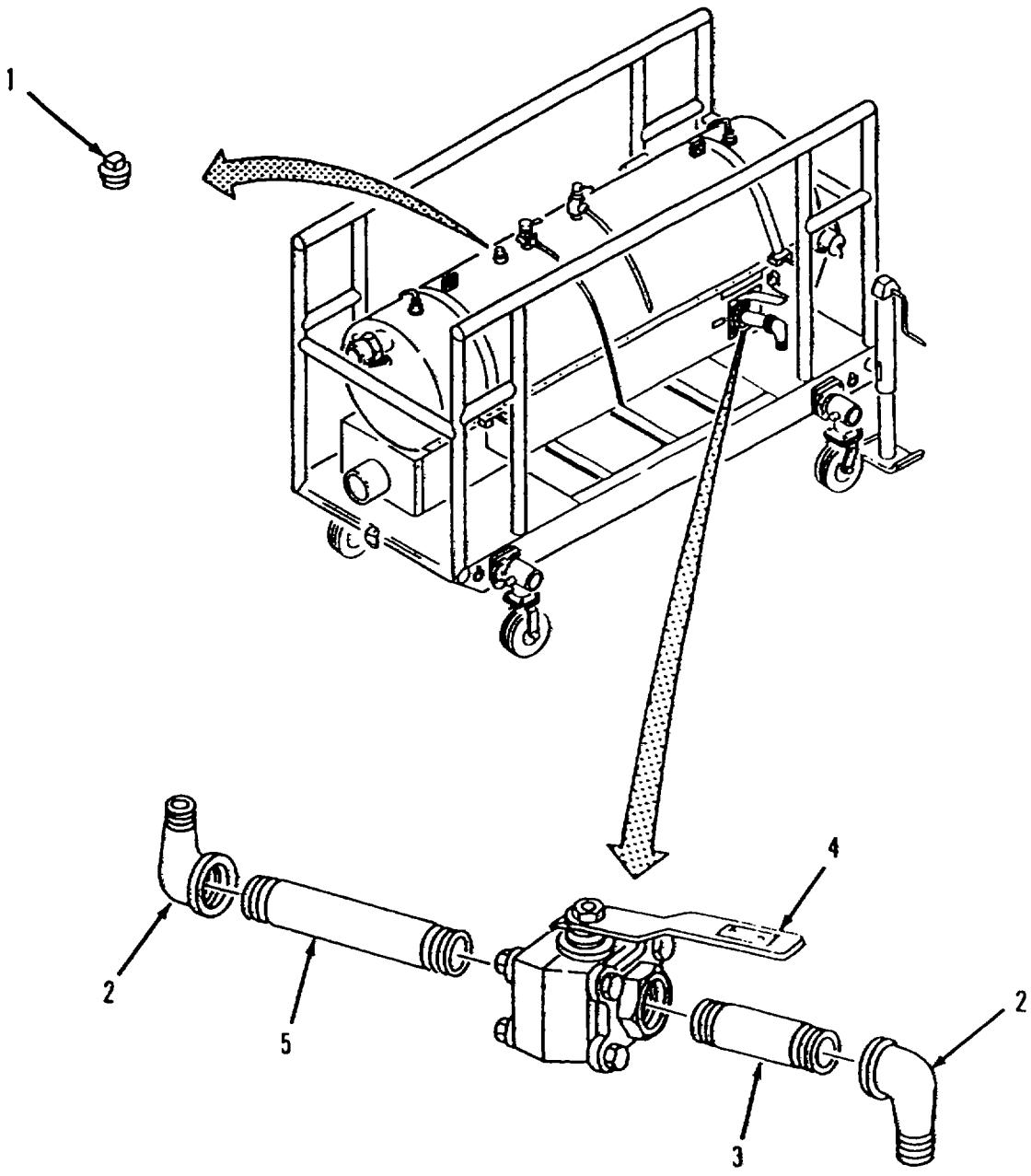


Figure C-5. Drain Valve and Piping

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) PART CAGEC	(4) NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 02 ANK ASSEMBLY	
				FIG. 5. DRAIN VALVE AND PIPING	
1	PAOZZ	96906	MS20913-2K	PLUG, PIPE	1
2	PAOZZ	96906	MS39230-6	ELBOW,PIPE	2
3	PAOZZ	96906	MS51953-126	NIPPLE,PIPE	1
4	PBOZZ	12623	SS65TF16	VALVE,BALL	1
5	PAOZZ	96906	MS51953-130	NIPPLE,PIPE	1
				END OF FIGURE	

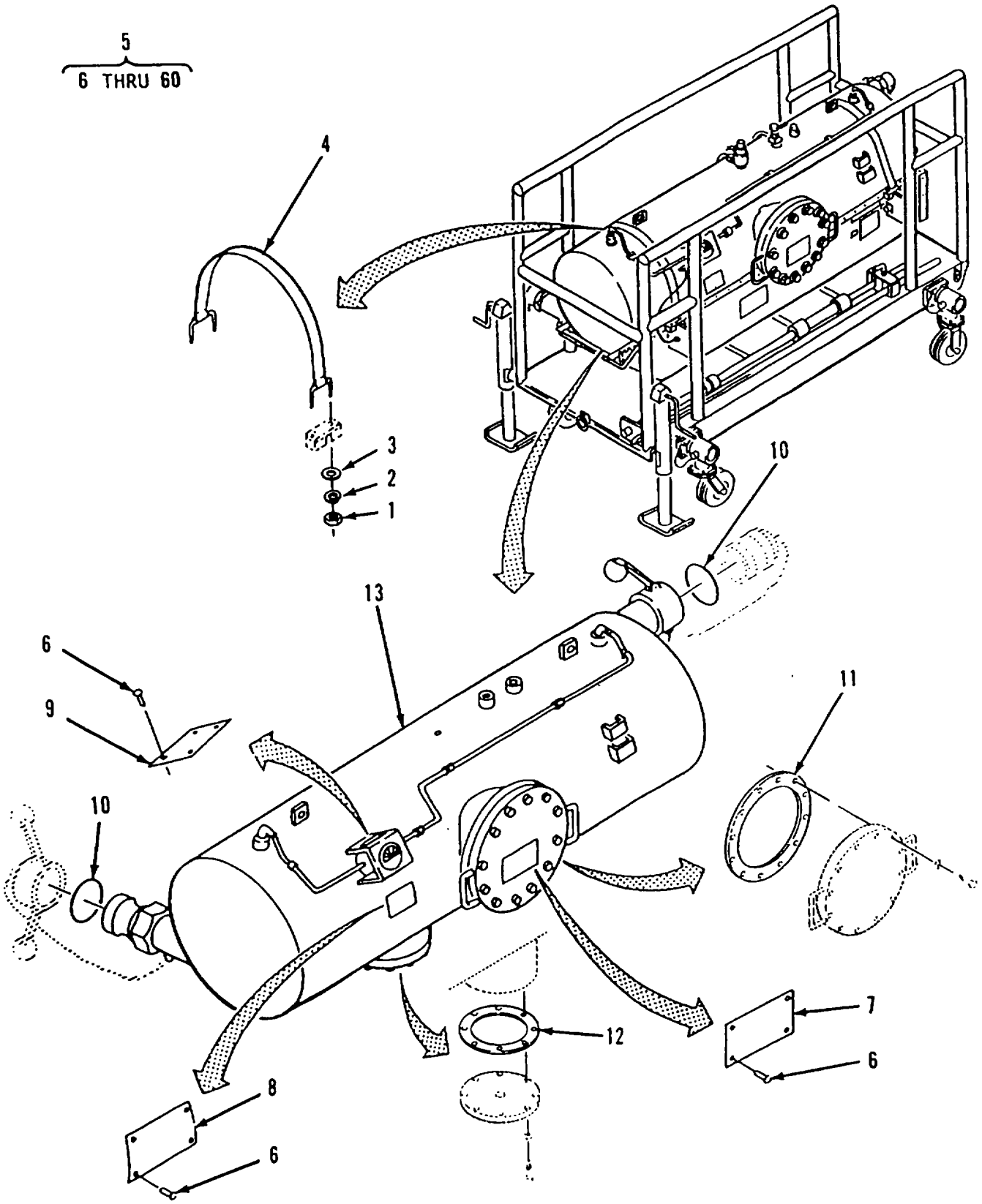


Figure C-6. Tie-Down Strap and Tank (Sheet 1 of 4)

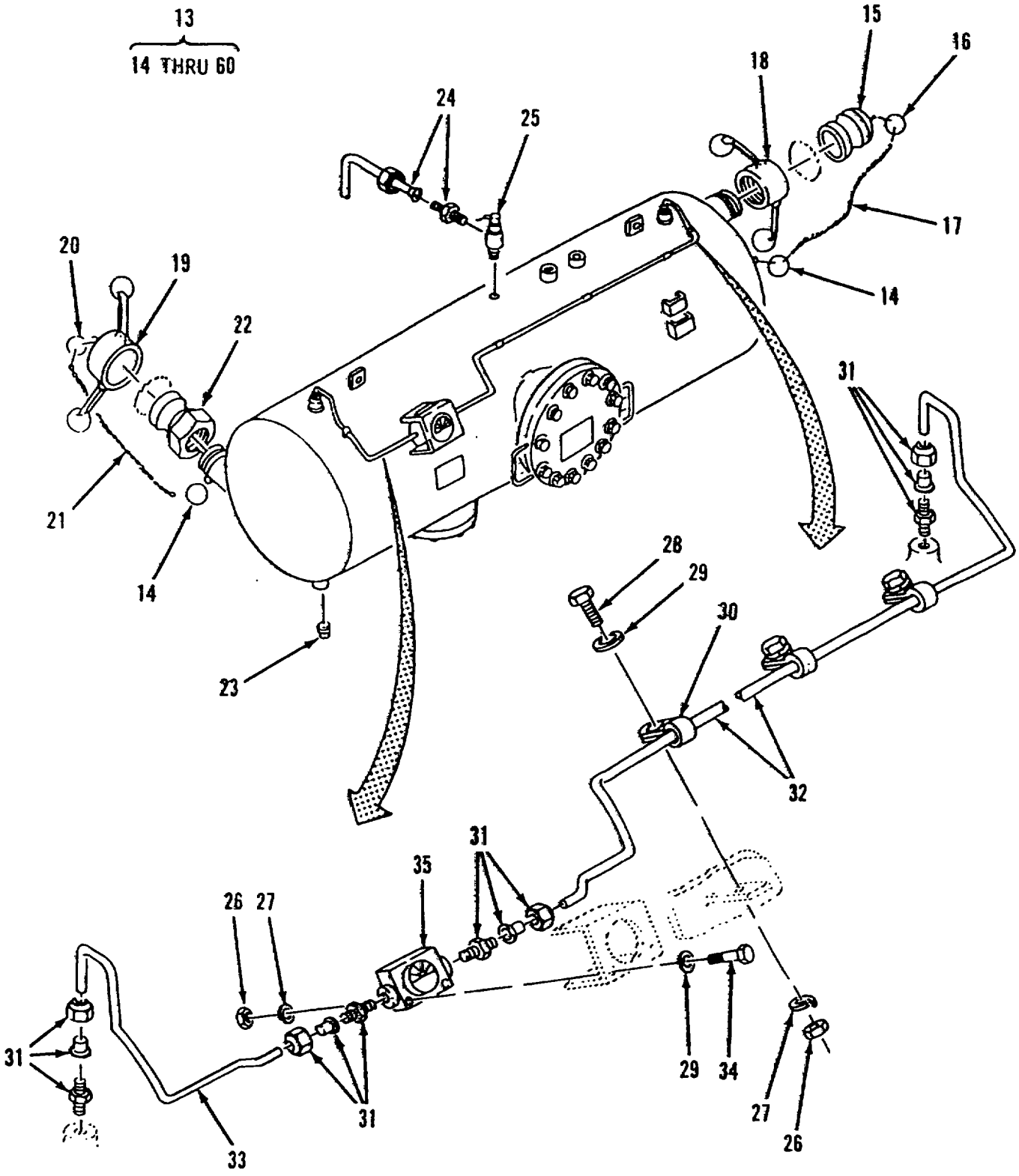


Figure C-6. Tie-Down Strap and Tank (Sheet 2 of 4)

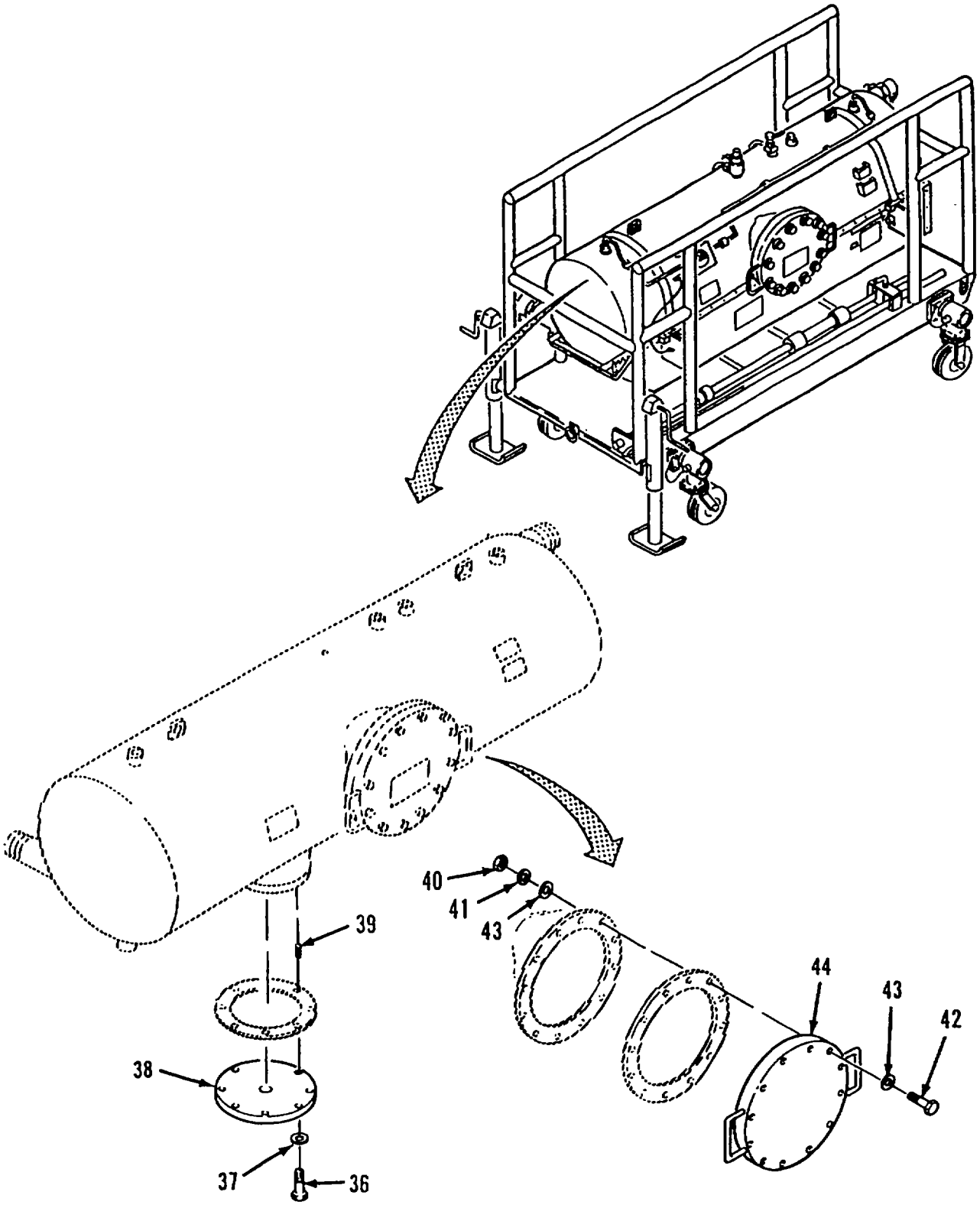


Figure C-6. Tie-Down strap and Tank (Sheet 3 of 4)

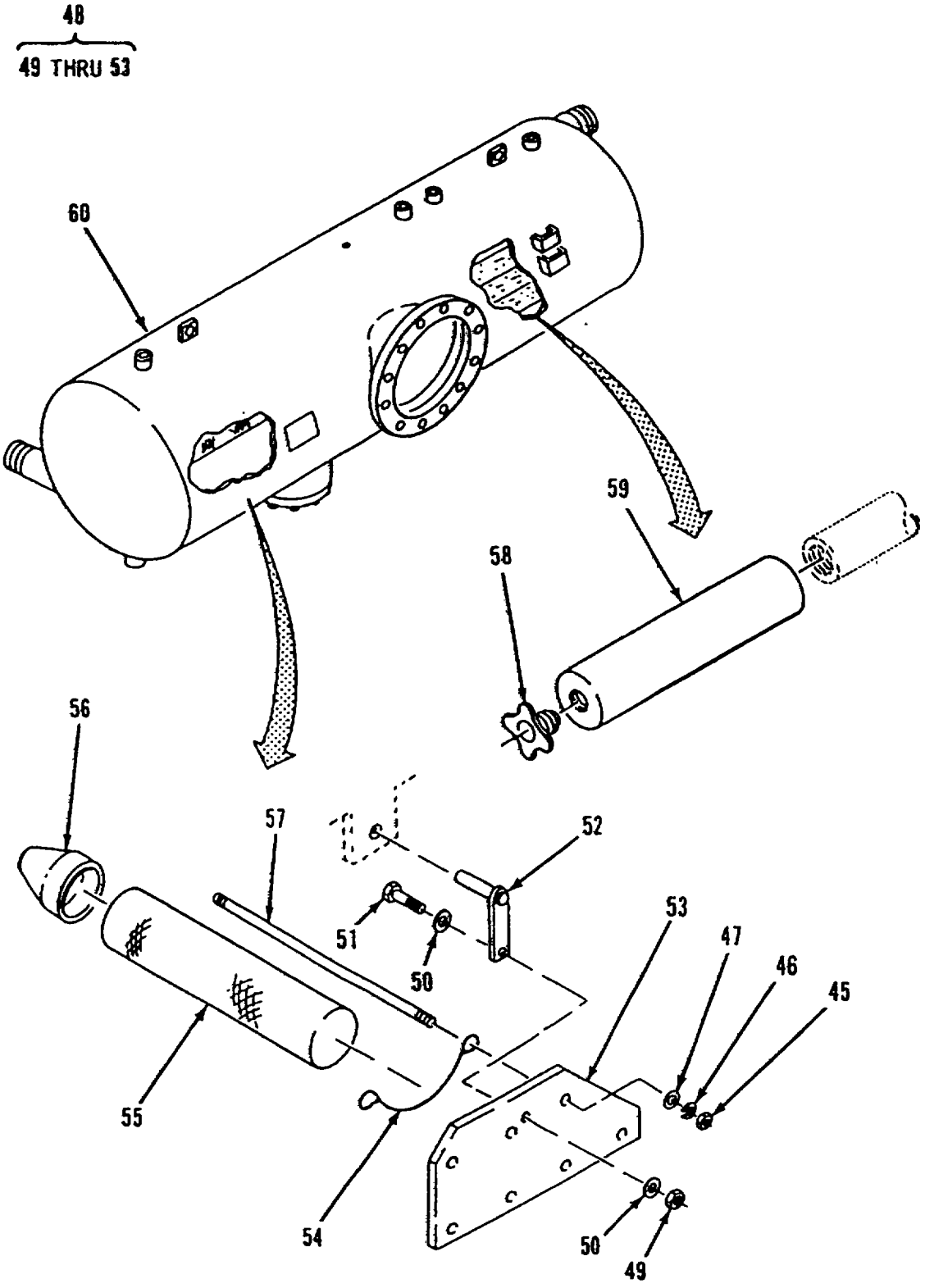


Figure C-6. Tie-Down Strap and Tank (Sheet 4 of 4)

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) PART CAGEC	(4) NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 02 TANK ASSEMBLY	
				FIG. 6 TIEDOWN STRAP AND TANK	
1	PAOZZ	96906	MS519713	NUT,PLAIN,HEXAGON	8
2	PAOZZ	96906	MS5184852	WASHER,LOCK	8
3	PAOZZ	96906	MS15795814	WASHER,FLAT	8
4	PBOZZ	97403	13228E1773	STRAP ASSY,TIEDOWN	2
5	AOOOO	97403	13228E1789	TANK ASSEMBLY	1
6	XBOZZ	96906	MS2131827	.SCREW,DRIVE	12
7	XBOZZ	97403	13228E17792	.PLATE,INSTRUCTION TIGHTEN FIRST FOUR BOLTS IN ORDER SHOWN	1
8	XBOZZ	97403	13228E1771	PLATE,IDENTIFICATION 200 GPM ARCTIC FUEL/SEPARATOR ASSY	1
9	XBOZZ	97403	13228E17791	.PLATE,INSTRUCTION CHANGE FILTER WHEN NEEDLE REACHES YELLOW	1
10	PCOZZ	97403	13228E17688	.GASKET	2
11	PCOZZ	97403	13228E17722	.GASKET	1
12	PCOZZ	97403	13228E17721	.GASKET	1
13	XBOOO	OBUN9	A1137	.TANK,FILTER SEPARAT	1
14	PAOZZ	39428	90177A218	..HOLDER,KEY	2
15	PAOOZ	96906	MS2702915	..PLUG,QUICK DISCONNE 1	1
16	PAOZZ	39428	90177A218	...HOLDER,KEY	1
17	MOOZZ	19099	HES1	...CHAIN,WELDLESS MAKE FROM P/N RRC271TYPE2CLASS3(81348),19 LINKS REQUIRED	1
18	PAOZZ	96906	MS2702415	..COUPLING HALF,QUICK	1
19	PAOOZ	96906	MS2702815	..CAP,QUICK DISCONNEC	1
20	PAOZZ	39428	90177A218	...HOLDER,KEY	1
21	MOOZZ	19099	HES1	...CHAIN,WELDLESS MAKE FROM P/N RRC271TYPE2CLASS3(81348),19 LINKS REQUIRED	1
22	PAOZZ	96906	MS2702015	..COUPLING HALF,QUICK	1
23	XBOZZ	OBUN9	A11374115	..PLUG	2
24	XBOZZ	97403	13230E3122	..TUBE ASSEMBLY	1
25	XBOZZ	OFC60	MODEL 20	..VALVE,PRESS RELIEF	1
26	PAOZZ	OBUN9	A113728	..NUT,PLAIN,HEXAGON	6
27	PAOZZ	OBUN9	A113730	..WASHER,LOCK	6
28	PAOZZ	80204	B1821BH02SCIOON	..SCREW,CAP,HEXAGON H	4
29	PAOZZ	OBUN9	A113729	..WASHER,FLAT	6
30	PAOZZ	45681	CL6	..CLAMP,HOSE	4
31	PBOZZ	54938	44FBZSS	..ADAP'ER,STRAIGHT,PI	4
32	XBOZZ	OBUN9	A113735	..TUBE	1
33	XBOZZ	OBUN9	A113735A	..TUBE	1
34	PAOZZ	80204	B1821BHO25C150N	..SCREW,CAP,HEXAGON H	2
35	PBOZZ	97403	13219E97491	..GAGE,DIFFERENTIAL,D	1
36	PAOZZ	80204	B1821BHO38C150N	..SCREW,CAP,HEXAGON H	8
37	PAOZZ	OBUN9	A113733	..WASHER,FLAT	8
38	XBOZZ	OBUN9	A113731	..COVER,SUMP	1
39	XBOZZ	OBUN9	A113724	..HELICOIL	8
40	PAOZZ	OBUN9	A113717	..NUT,PLAIN,HEXAGON H	12

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) PART CAGEC	(4) NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
41	PAOZZ	OBUN9	A113719	..WASHER,LOCK	12
42	PAOZZ	80204	B1821BH050C350N	..SCREW,CAP,HEXAGON H	12
43	PAOZZ	OBUN9	A113718	..WASHER,FLAT	24
44	XBOZZ	OBUN9	100002S	..COVER	1
45	PBOZZ	OBUN9	A11378	..NUT,PLAIN,HEXAGON	7
46	PBOZZ	OBUN9	A11379	..WASHER,LOCK	7
47	PBOZZ	OBUN9	A113710	..WASHER,FLAT	7
48	XBOGO	OBUN9	300008	..SPIDERPLATE ASSY	1
49	XBOZZ	OBUN9	3000085	...NUT,LOCK	1
50	XBOZZ	OBUN9	3000086	...WASHER,FLAT	2
51	XBOZZ	OBUN9	3000084	..BOLT,MACHINE	]
52	XBOZZ	OBUN9	30000823	...GUIDE ROD AND BAR	1
53	XBOZZ	OBUN9	3000081	...SPIDERPLATE	1
54	PBOZZ	OBUN9	100101	..SUPPORT,WIRE,CANIST	5
55	PAOZZ	87405	640269	..FILTER ELEMENT,F	5
56	XBOZZ	OBUN9	100396	..CAP	5
57	XBOZZ	OBUN9	A11377	..ROD,STAY	7
58	PBOZZ	OBUN9	200020	..PLUG,ELEMENT RETAIN	15
59	PAOZZ	OBUN9	200025	..ELEMENT	15
60	XAOZZ	OBUN9	500005S	..WELDMENT,TANK	1

END OF FIGURE

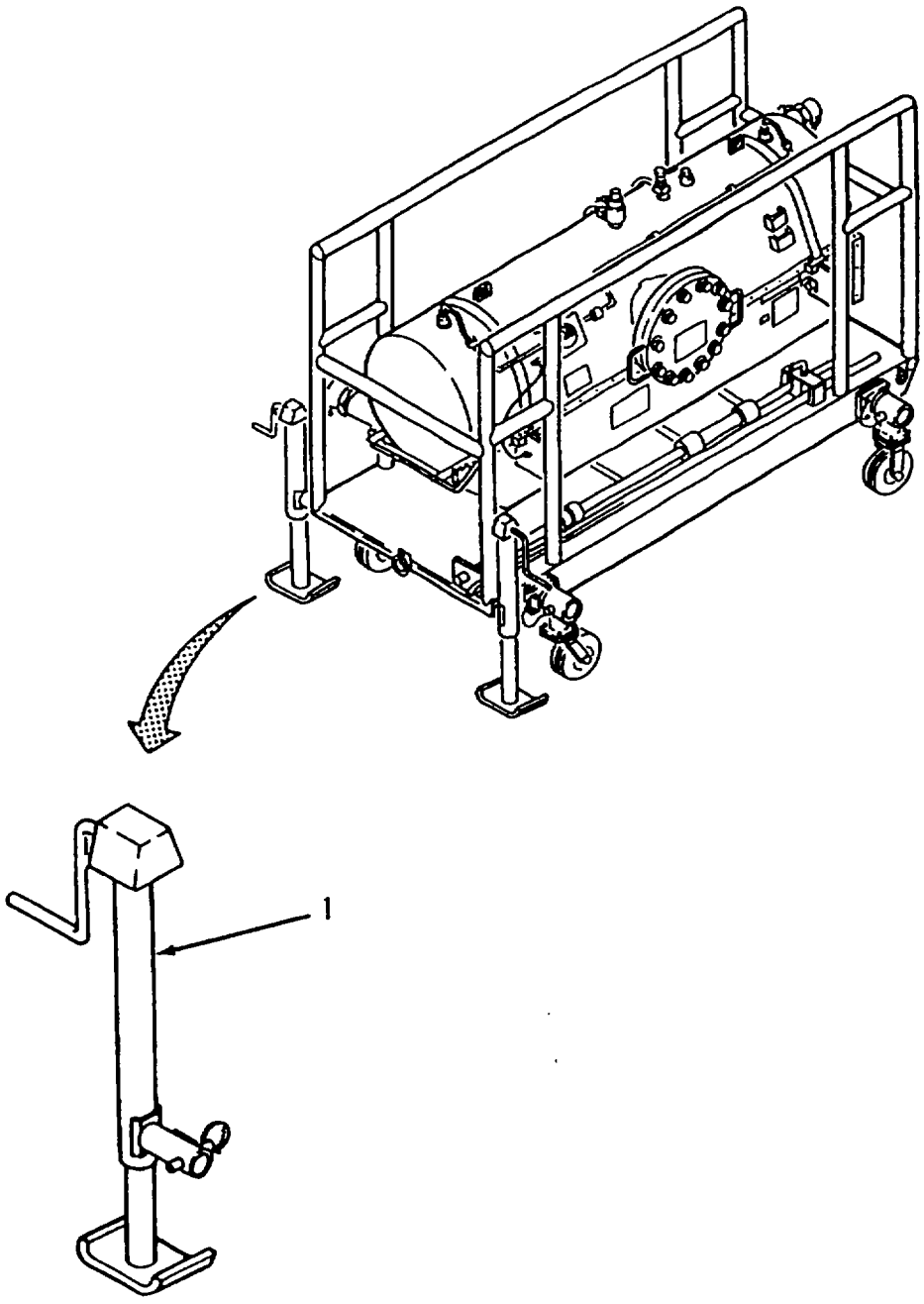


Figure C-7. Screw Jack

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 03 FRAME ASSFMBL.Y	
				FIG. 7 SCREW JACK	
1	XBOZZ	99003	009672	JACK,SCREW.....	2
				END OF FIGURE	

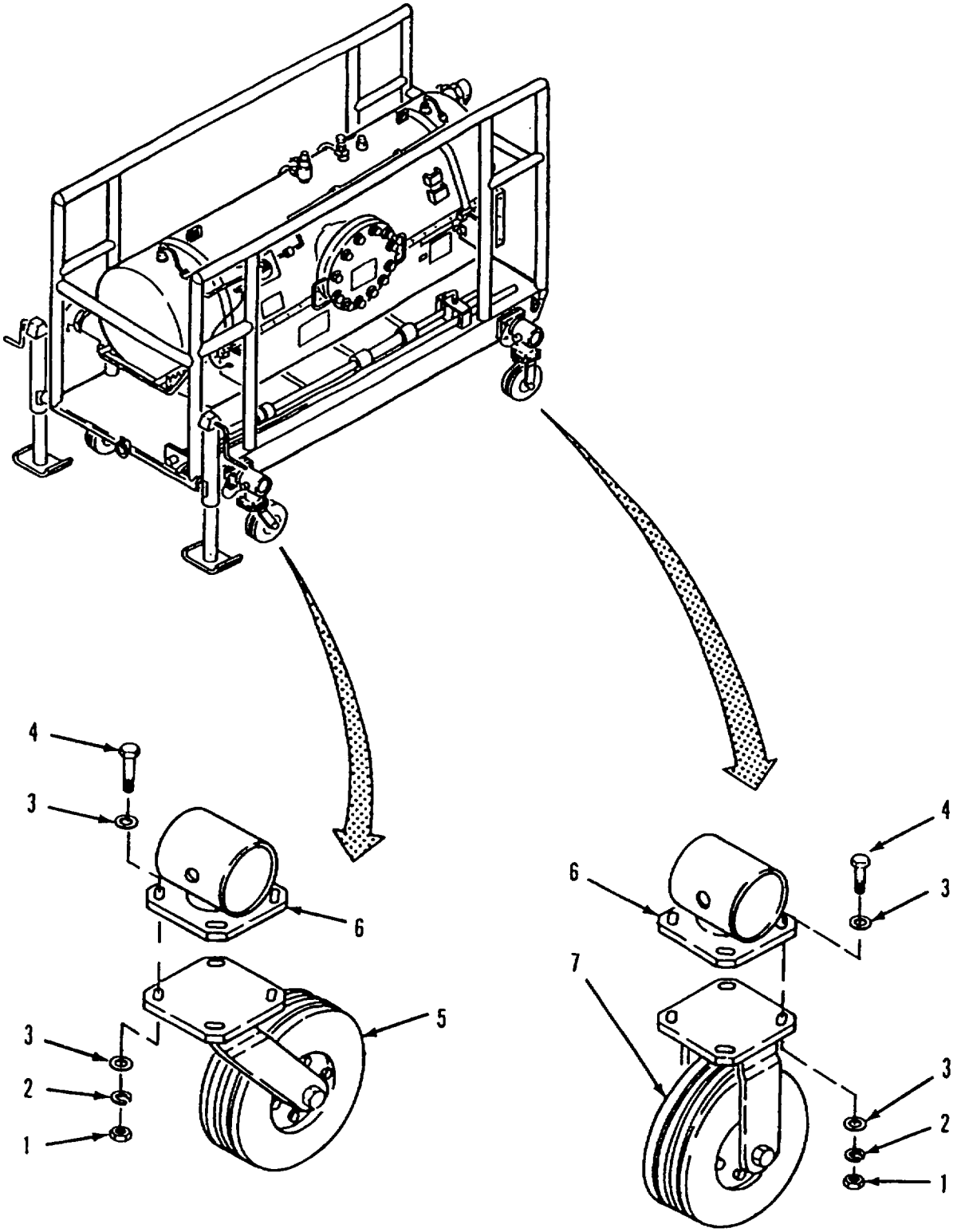


Figure C-8. Pivot and Caster Wheel Assemblies

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 03 FRAME ASSEMBLY	
				FIG. 8 PIVOT AND CASTER WHEEL ASSEMBLIES	
1	PAOZZ	96906	MS51971-3	NUT,PLAIN,HEXAGON	16
2	PAOZZ	96906	MS35338-141	WASHER,LOCK	16
3	PAOZZ	96906	MS15795-814	WASHER,FLAT	32
4	PAOZZ	96906	MS35307-364	SCREW,CAP,HEXAGON H	16
5	XBOZZ	5G955	FN-830-SM	WHEEL ASSY,CASTER	2
6	XBOZZ	97403	13230E2993	PIVOT,RUNNING GEAR	4
7	XBOZZ	5G955	FN-830-RM	WHEEL ASSY,RIGID	2
				END OF FIGURE	

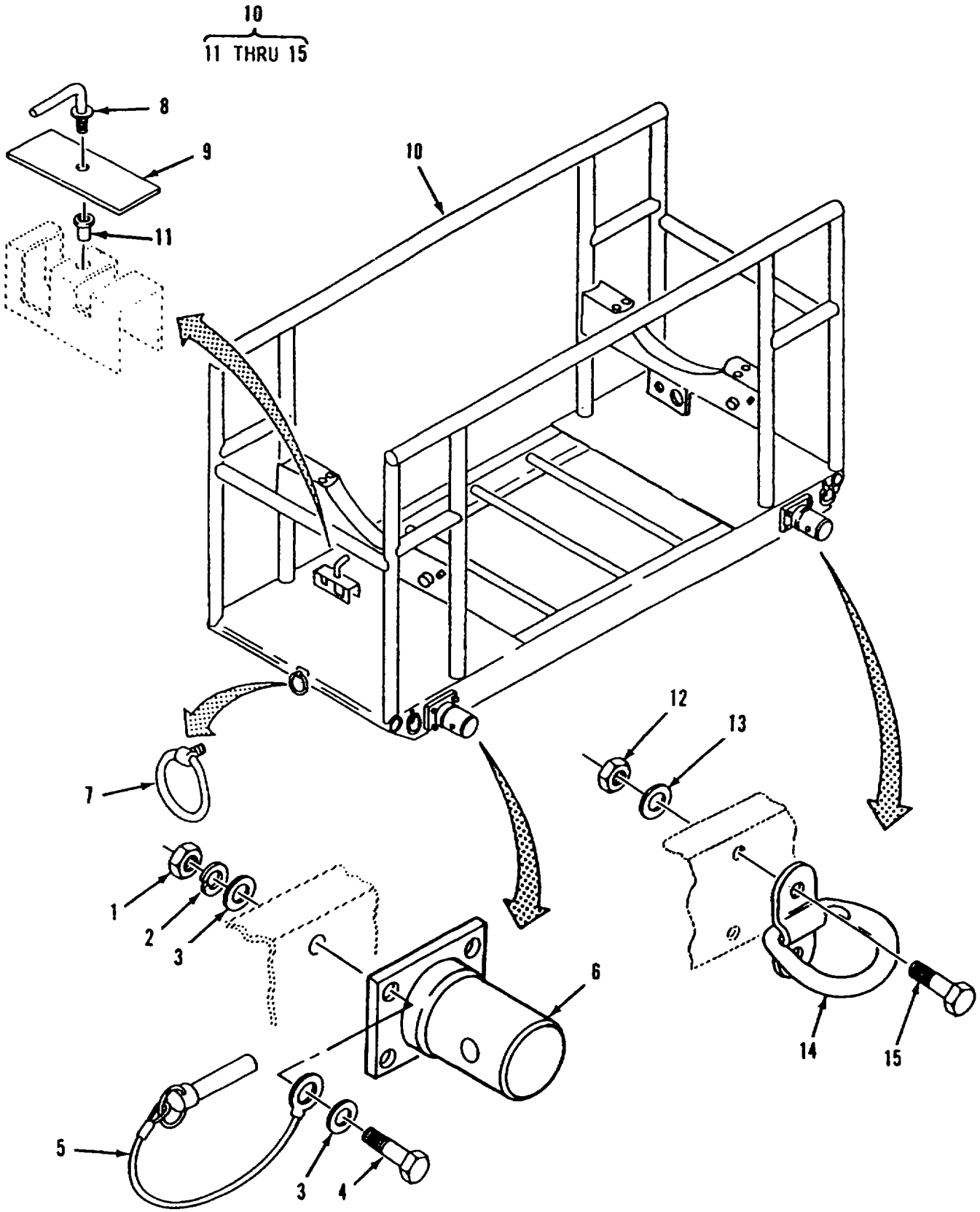


Figure C-9. Detent Pin, Running Gear Mount, and Frame

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 03 FRAME ASSEMBLY	
				FIG. 9 DETENT PIN, RUNNING GEAR MOUNT, AND FRAME	
1	PAOZZ	96906	MS51971-3	NUT,PLAIN,HEXAGON	16
2	PAOZZ	96906	MS35338-141	WASHER,LOCK	16
3	PAOZZ	96906	MS15795-814	WASHER,FLAT	32
4	PAOZZ	96906	MS35307-364	SCREW,CAP,HEXAGON H	16
5	PBOZZ	OCUJ4	DP8-300S-E/L62P-600S-2E	FIBER ROPE ASSY,SIN	4
6	XBOZZ	97403	13230E2990	MOUNT,RUNNING GEAR	4
7	PBOZZ	98313	FDC-1422-1	RING AND STUD ASSEM	2
8	PBOZZ	97403	13230E2985	BAR,THREADED	1
9	XBOZZ	97403	13230E2984	HOLD DOWN	1
10	XBOFF	97403	13230E2970	FRAME,200GPM ARCTIC	1
11	XBOZZ	96906	MS27130-CR56K	.NUT,BLIND RIVET	1
12	XBOZZ	96906	MS51922-2	.NUT,SELF-LOCKING,HE	8
13	XBOZZ	96906	MS15795-810	.WASHER,FLAT	8
14	XBOZZ	98313	FDK-2850	.RING,DEE	4
15	XBOZZ	96906	MS35307-307	.SCREW,CAP,HEXAGON H	8

END OF FIGURE

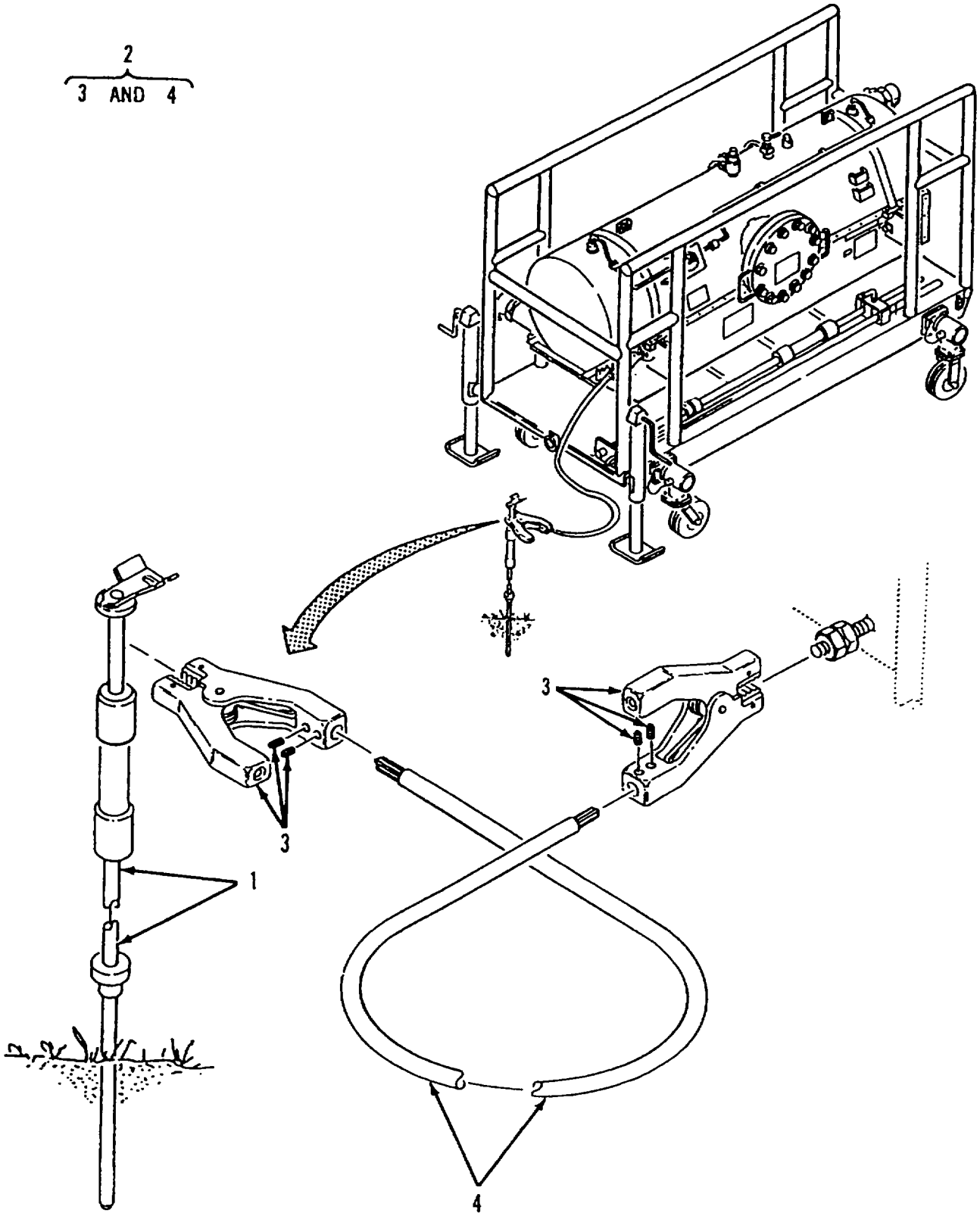


Figure C-10. Ground Rod and Cable

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 04 GROUND CABLE ASSEMBLY	
				FIG. 10 GROUND ROD AND CABLE	
1	PAOZZ	97403	13219E0462	ROD,GROUND.....	1
2	XBOOO	97403	13220E1127-1	CABLE,GROUND.....	1
3	XBOZZ	81349	M83413/7-1	.CLIP,ELECTRICAL WITH ALLEN SCREWS.....	2
4	MOOZZ	19099	13220E1127-2	.WIRE,ELECTRICAL MAKE FROM P/N ..... M5086/1-10-9(81349),73 INCHES REQUIRED	1
				END OF FIGURE	

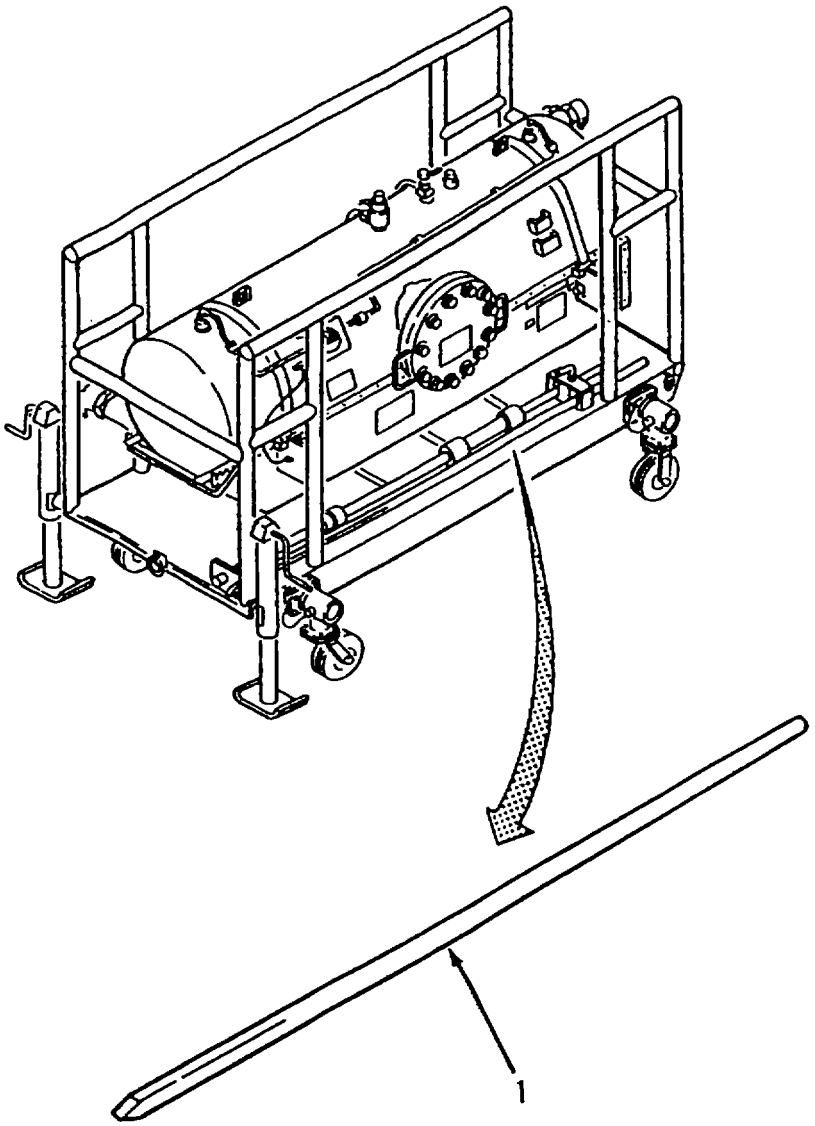


Figure C-ll. Crow Bar

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 04 GROUNG CABLE ASSEMBLY	
				FIG. 11 CROW BAR	
1	XBOZZ	81348	TY-II-CL-1-SIZE-6	CROWBAR,PINCH—POINT	1
				END OF FIGURE	

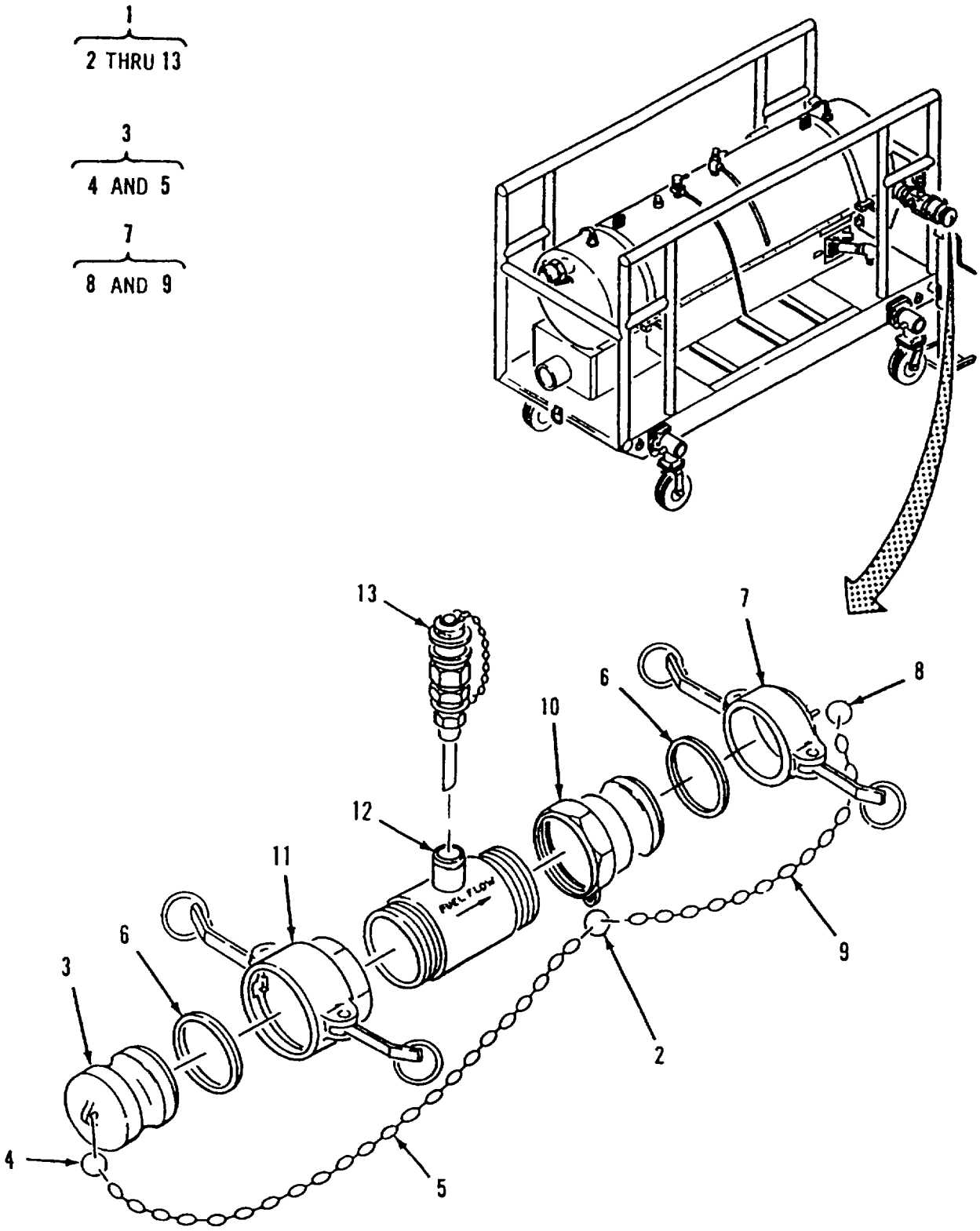


Figure C-12. Adapter Assembly, Water Detection Kit

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 05 WATER DETECTION ADAPTER ASSEMBLY	
				FIG. 12 ADAPTER ASSEMBLY, WATER DETECTION KIT	
1	PBOOO	97403	13228E1817	ADAPTER ASSEMBLY	1
2	PAOZZ	39428	90177A218	.HOLDER,KEY	1
3	PAOOZ	96906	MS27029-15	.PLUG,QUICK DISCONNE	1
4	PAOZZ	39428	90177A218	..HOLDER,KEY	1
5	MOOZZ	19099	HES-1	..CHAIN,WELDLESS MAKE FROM P/N RRC271TYPE2CLASS3(81348),19 LINKS REQUIRED	1
6	PCOZZ	97403	13228E1768-8	.GASKET	2
7	PAOOZ	96906	MS27028-15	.CAP,QUICK DISCONNEC	1
8	PAOZZ	39428	90177A218	..HOLDER,KEY	1
9	MOOZZ	19099	HES-1	..CHAIN,WELDLESS MAKE FROM P/N RRC271TYPE2CLASS3(81348),19 LINKS REQUIRED	1
10	PAOZZ	96906	MS27020-15	.COUPLING HALF,QUICK	1
11	PAOZZ	96906	MS27024-15	.COUPLING HALF,QUICK	1
12	XBOZZ	97403	13228E1818	.ADAPTER,WATER DETEC	1
13	PAOZZ	32218	GTP-3484-2	.PROBE,SAMPLING:ARCT	1

END OF FIGURE

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 06 BULK MATERIAL	
				FIG. BULK	
1	PAOZZ	81348	RRC271TYPE2CLASS 3	CHAIN,WELDLESS.....	9
2	PAOZZ	81349	M5086/1-10-9	WIRE,ELECTRICAL V	
				END OF FIGURE	

CROSS-REFERENCE INDEXES
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM
6145-00-003-9527	BULK	2
5305-00-021-3740	8	4
	9	4
4730-00-034-1397	5	1
5305-00-071-2077	6	42
5305-00-071-2509	6	34
4730-00-079-1364	6	22
	12	10
4730-00-175-9387	6	31
4730-00-196-1524	5	3
4730-00-196-1556	5	5
5305-00-225-3843	6	28
5310-00-250-9477	2	1
4730-00-254-2744	5	2
5310-00-582-5677	2	6
5305-00-702-4523	2	5
5305-00-725-2317	6	36
5310-00-773-7618	6	3
	8	3
	9	3
5310-00-821-6269	2	3
5310-00-913-8881	6	1
	8	1
	9	1
4730-00-929-0787	6	19
	12	7
4730-00-929-0790	6	15
	12	3
5310-00-933-8121	2	2
4730-00-938-7998	6	18
	12	11
5310-00-984-7042	8	2
	9	2
6685-01-015-8645	6	35
5310-01-020-5947	6	2
5975-01-050-5707	10	1
4330-01-062-3836	6	55
6150-01-160-9124	2	4
5340-01-177-8975	6	14
	6	16
	6	20
	12	2
	12	4
	12	8
4820-01-214-2314	5	4
4730-01-392-6557	12	1
5340-01-392-8497	6	4
4330-01-393-5280	6	59
4330-01-393-5834	6	54
4330-01-393-5835	6	58
5306-01-393-6330	9	7
5310-01-394-3518	6	27
5310-01-394-3519	6	41
5310-01-394-3520	6	43
5310-01-394-3521	6	45
5310-01-394-3522	6	46
5310-01-394-3523	6	29
5310-01-394-3524	6	37
5310-01-394-3525	6	40
5310-01-394-3530	6	47
5315-01-395-2788	2	8
5340-01-395-8014	6	30
5310-01-395-8743	6	26
5330-01-398-8738	6	11
5330-01-398-8739	6	10
	12	6
5330-01-398-8741	6	12

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
OBUN9	A1137		6	13
OBUN9	A1137-10	5310-01-394-3530	6	47
OBUN9	A1137-17	5310-01-394-3525	6	40
OBUN9	A1137-18	5310-01-394-3520	6	43
OBUN9	A1137-19	5310-01-394-3519	6	41
OBUN9	A1137-24		6	39
OBUN9	A1137-28	5310-01-395-8743	6	26
OBUN9	A1137-29	5310-01-394-3523	6	29
OBUN9	A1137-30	5310-01-394-3518	6	27
OBUN9	A1137-31		6	38
OBUN9	A1137-33	5310-01-394-3524	6	37
OBUN9	A1137-35		6	32
OBUN9	A1137-35A		6	33
OBUN9	A1137-4115		6	23
OBUN9	A1137-7		6	57
OBUN9	A1137-8	5310-01-394-3521	6	45
OBUN9	A1137-9	5310-01-394-3522	6	46
80204	B1821BH025C100N	5305-00-225-3843	6	28
80204	B1821BHO25C150N	5305-00-071-2509	6	34
80204	B1821BH038C150N	5305-00-725-2317	6	36
80204	B1821BH050C350N	5305-00-071-2077	6	42
45681	CL6	5340-01-395-8014	6	30
OCUJ 4	DP8-300S-E/L62P-600S-2E		9	5
98313	FDC-1422-1	5306-01-393-6330	9	7
98313	FDK-2850		9	14
5G955	FN-830-RM		8	7
5G955	FN-830-SM		8	5
32218	GTP-3484-2		12	13
19099	HES-1		6	17
			6	21
			12	5
			12	9
OFC60	MODEL 20		6	25
96906	MS15795-810	5310-00-582-5677	2	6
			9	13
96906	MS15795-814	5310-00-773-7618	6	3
			8	3
			9	3
96906	MS20600B5W2		3	2
96906	MS20600B6W3		3	7
96906	MS20913-2K	4730-00-034-1397	5	1
96906	MS21318-27		6	6
96906	MS27020-15	4730-00-079-1364	6	22
			12	10
96906	MS27024-15	4730-00-938-7998	6	18
			12	11
96906	MS27028-15	4730-00-929-0787	6	19
			12	7
96906	MS27029-15	4730-00-929-0790	6	15
			12	3

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS27130-CR56K		9	11
96906	MS35307-306	5305-00-702-4523	2	5
96906	MS35307-307		9	15
96906	MS35307-364	5305-00--021-3740	8	4
			9	4
96906	MS35334-19	5310-00-821-6269	2	3
96906	MS35338-139	5310-00-933-8121	2	2
96906	MS35338-141	5310-00-984-7042	8	2
			9	2
96906	MS35649-2254	5310-00-250-9477	2	1
96906	MS39230-6	4730-00-254-2744	5	2
96906	MS51848-52	5310-01-020-5947	6	2
96906	MS51922-2		9	12
96906	MS51953-126	4730-00-196-1524	5	3
96906	MS51953-130	4730-00-196-1556	5	5
96906	MS51971-3	5310-00-913-8881	6	1
			8	1
			9	1
81349	MS5086/1-10-9	6145-00-003-9527	BULK	2
81349	M83413/7-1		10	3
81349	M83413/8-A16CC	6150-01-160-9124	2	4
81348	RRC271TYPE2CLASS 3		BULK	1
18034	SS-DLM4-F4-A		4	2
12623	SS65TF16	4820-01-214-2314	5	4
81348	TY-II-CL-1-SIZE-6		11	1
99003	009672		7	1
OBUN9	100002S		6	44
OBUN9	100101	4330-01-393-5834	6	54
OBUN9	100396		6	56
97403	13219E0462	5975-01-050-5707	10	1
97403	13219E9749-1	6685-01-015-8645	6	35
97403	13220E1127-1		10	2
19099	13220E1127-2		10	4
97403	13228E1768-8	5330-01-398-8739	6	10
			12	6
97403	13228E1771		6	8
97403	13228E1772-1	5330-01-398-8741	6	12
97403	13228E1772-2	5330-01-398-8738	6	11
97403	13228E1773	5340-01-392-8497	6	4
97403	13228E1774-1		3	5
97403	13228E1774-2		3	4
97403	13228E1776		3	1
97403	13228E1776-10		3	9
97403	13228E1776-8		3	8
97403	13228E1777-1		3	3
97403	13228E1777-2		3	6
97403	13228E1779-1		6	9
97403	13228E1779-2		6	7
97403	13228E1781		1	1

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
97403	13228E1783	5315-01-395-2788	2	8
97403	13228E1784		2	7
97403	13228E1789		6	5
97403	13228E1792		4	1
97403	13228E1817	4730-01-392-6557	12	1
97403	13228E1818		12	12
97403	13230E2970		9	10
97403	13230E2984		9	9
97403	13230E2985		9	8
97403	13230E2990		9	6
97403	13230E2993		8	6
97403	13230E3122		6	24
OBUN 9	200020	4330-01-393-5835	6	58
OBUN 9	200025	4330-01-393-5280	6	59
OBUN 9	300008		6	48
OBUN 9	300008-1		6	53
OBUN 9	300008-2-3		6	52
OBUN 9	300008-4		6	51
OBUN 9	300008-5		6	49
OBUN 9	300008-6		6	50
54938	4-4FBZSS	4730-00-175-9387	6	31
OBUN 9	500005S		6	60
87405	640269	4330-01-062-3836	6	55
39428	90177A218	5340-01-177-8975	6	14
			6	16
			6	20
			12	2
			12	4
			12	8

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
BULK	1		81348	RRC271TYPE2CLASS 3
BULK	2	6145-00-003-9527	81349	M5086/1-10-9
1	1		97403	13228E1781
2	1	5310-00-250-9477	96906	MS35649-2254
2	2	5310-00-933-8121	96906	MS35338-139
2	3	5310-00-821-6269	96906	MS35334-19
2	4	6150-01-160-9124	81349	M83413/8-A16CC
2	5	5305-00-702-4523	96906	MS35307-306
2	6	5310-00-582-5677	96906	MS15795-810
2	7		97403	13228E1784
2	8	5315-01-395-2788	97403	13228E1783
3	1		97403	13228E1776
3	2		96906	MS20600B5W2
3	3		97403	13228E1777-1
3	4		97403	13228E1774-2
3	5		97403	13228E1774-1
3	6		97403	13228E1777-2
3	7		96906	MS20600B6W3
3	8		97403	13228E1776-8
3	9		97403	13228E1776-10
4	1		97403	13228E1792
4	2		18034	SS-DLM4-F4-A
5	1	4730-00-034-1397	96906	MS20913-2K
5	2	4730-00-254-2744	96906	MS39230-6
5	3	4730-00-196-1524	96906	MS51953-126
5	4	4820-01-214-2314	12623	SS65TF16
5	5	4730-00-196-1556	96906	MS51953--130
6	1	5310-00-913-8881	96906	MS51971--3
6	2	5310-01-020-5947	96906	MS51848--52
6	3	5310-00-773-7618	96906	MS15795--814
6	4	5340-01-392-8497	97403	13228E1773
6	5		97403	13228E1789
6	6		96906	MS21318-27
6	7		97403	13228E1779-2
6	8		97403	13228E1771
6	9		97403	13228E1779-1
6	10	5330-01-398-8739	97403	13228E1768-8
6	11	5330-01-398-8738	97403	13228E1772-2
6	12	5330-01-398-8741	97403	13228E1772-1
6	13		OBUN9	A1137
6	14	5340-01-177-8975	39428	90177A218
6	15	4730-00-929-0790	96906	MS27029-15
6	16	5340-01-177-8975	39428	90177A218
6	17		19099	HES-1
6	18	4730-00-938-7998	96906	MS27024-15
6	19	4730-00-929-0787	96906	MS27028-15
6	20	5340-01-177-8975	39428	90177A218
6	21		19099	HES-1
6	22	4730-00-079-1364	96906	MS27020-]5
6	23		OBUN9	A1137-4115

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
6	24		97403	13230E3122
6	25		OFC60	MODEL 20
6	26	5310-01-395-8743	OBUN9	A1137-28
6	27	5310-01-394-3518	OBUN9	A1137-30
6	28	5305-00-225-3843	80204	B1821BH025C10ON
6	29	5310-01-394-3523	OBUN9	A1137-29
6	30	5340-01-395-8014	45681	CL6
6	31	4730-00-175-9387	54938	4-4FBZSS
6	32		OBUN9	A1137-35
6	33		OBUN9	A1137-35A
6	34	5305-00-071-2509	80204	B1821BHO25Cl50N
6	35	6685-01-015-8645	97403	13219E9749-1
6	36	5305-00-725-2317	80204	B1821BHO38C150N
6	37	5310-01-394-3524	OBUN9	A1137-33
6	38		OBUN9	A1137-31
6	39		OBUN9	A1137-24
6	40	5310-01-394-3525	OBUN9	A1137-17
6	41	5310-01-394-3519	OBUN9	A1137-19
6	42	5305-00-071-2077	80204	B1821BH050C350N
6	43	5310-01-394-3520	OBUN9	A1137-18
6	44		OBUN9	100002S
6	45	5310-01-394-3521	OBUN9	A1137-8
6	46	5310-01-394-3522	OBUN9	A1137-9
6	47	5310-01-394-3530	OBUN9	A1137-10
6	48		OBUN9	300008
6	49		OBUN9	300008-5
6	50		OBUN9	300008-6
6	51		OBUN9	300008-6
6	52		OBUN9	300008-2-3
6	53		ODUN9	300008-1
6	54	4330-01-393-5834	OBUN9	100101
6	55	4330-01-062-3836	87405	640269
6	56		OBUN9	100396
6	57		OBUN9	A1137-7
6	58	4330-01-393-5835	OBUN9	200020
6	59	4330-01-393-5280	OBUN9	200025
6	60		OBUN9	5000055
7	1		99003	009672
8	1	5310-00-913-8881	96906	MS51971-3
8	2	5310-00-984-7042	96906	MS35338-141
8	3	5310-00-773-7618	96906	MS15795-814
8	4	5305-00-021-3740	96906	MS35307-364
8	5		5G955	FN-830-SM
8	6		97403	13230E2993
8	7		5G955	FN-830-RIM
9	1	5310-00-913-8881	96906	MS51971-3
9	2	5310-00-984-7042	96906	M535338-141
9	3	5310-00-773-7618	96906	MS15795-814
9	4	5305-00-021-3740	96906	MS35307-364
9	5		OCUJ4	DP8-300S-E/L62I1-600S-2E

CROSS-REFERENCE INDEXES

FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
9	6		97403	13230E2990
9	7	5306-01-393-6330	98313	FDC-14I2-1
9	8		97403	13230E2985
9	9		97403	13230E2984
9	10		97403	13230E2970
9	11		96906	MS27130 CR56K
9	12		96906	MS51922-2
9	13		96906	MS15795-010
9	14		98313	FDK-2850
9	15		96906	MS35307-307
10	1	5975-01-050-5707	97403	13219E0462
10	2		97403	13220E1127-1
10	3		81349	M83413/7-1
10	4		19099	13220E1127-2
11	1		81348	TY-II-CL-1 -SIZE-6
12	1	4730-01-392-6557	97403	13228E1817
12	2	5340-01-177-8975	39428	90177A218
12	3	4730-00-929-0790	96906	MS27029--15
12	4	5340-01-177-8975	39428	90177A218
12	5		19099	HES-1
12	6	5330-01-398-8739	97403	13228E1768-8
12	7	4730-00-929-0787	96906	MS27028-15
12	8	5340-01-177-8975	39428	90177A218
12	9		19099	HES-1
12	10	4730-00-079-1364	96906	MS27020-15
12	11	4730-00-938-7998	96906	MS27024-15
12	12		97403	13228E1818
12	13		32218	GTP-3484-2

APPENDIX D

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

D-1. SCOPE.

This appendix lists components of end item and basic issue items for the 200 GPM filter-separator to help you inventory items required for safe and efficient operation.

D-2. GENERAL.

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

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

b. Section I. Basic Issue Items. These are the minimum essential items required to place the 200 GPM filter-separator in operation. Although shipped separately packaged. BII must be with the filter-separator during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MIOE authorization of the end item.

D-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).

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

Section II. COMPONENTS OF END ITEM

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION USABLE CAGEC AND PART NUMBER CODE	(4) U/M	(5) QTY RQD
1		Screw Jack (97403) 13230E2987	EA	2
2		Wheel Assembly, Caster (5G955) FN-830-SM	EA	2
3		Wheel Assembly, Rigid (5G955) FN-830-RM	FA	2
4		Ground Cable Assembly (97403) 13220E1127-1	EA	1
5		Water Detection Adapter Assembly (97403) 13228E1817	EA	1
6	5975-014-050-5707	Ground Rod Assembly (97403) 13219E0462	EA	1
7		Crowbar, Pinch-Point (81348) TY-11-CL-1-SIZE 6	EA	1
8	4330-01-062-3836	Filter, Element (87405) 640269	EA	1
9	4330-00-983-0998	Filter, Element (OBUN9) 200025	EA	15

Section II. COMPONENTS OF END ITEM - continued

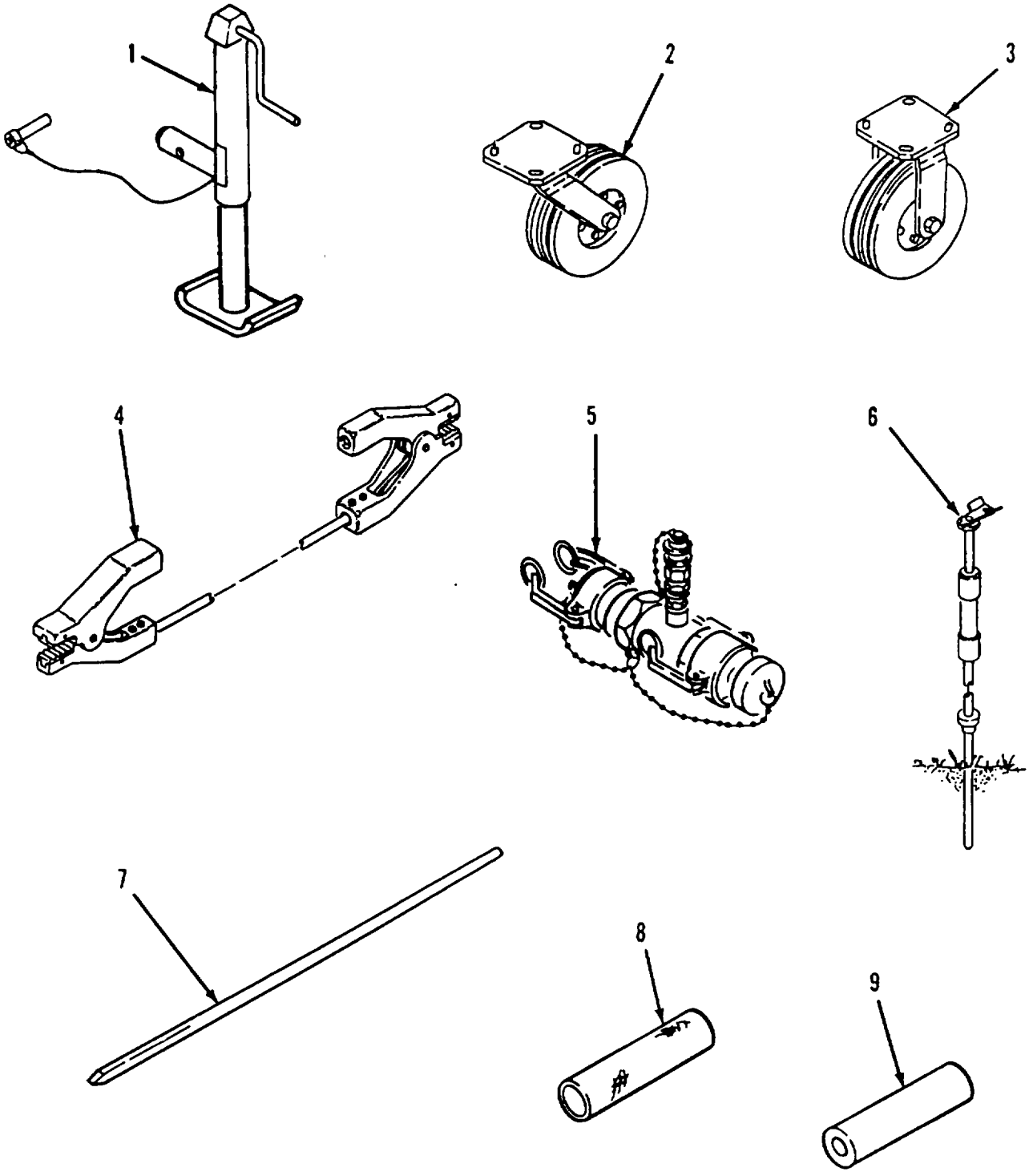


Figure D-1. Components of End Item.

Section III. BASIC ISSUE ITEMS

(1) ILLUS. NUMBER	(2) NAIONAL STOCK NUMBER	(3) DESCRIPTION Usable on CAGE and Part Number Code	(4) U/M	(5) QTY. RQD
1		TECHNICAL MANUAL. OPERATOR'S, UNIT AND DIRECT SUPPORT MAINENANCE INCLUIDING REPAIR PARTS AND SPECIAL TOOLS LIST. TM 10-4330-236-13&P	EA	1

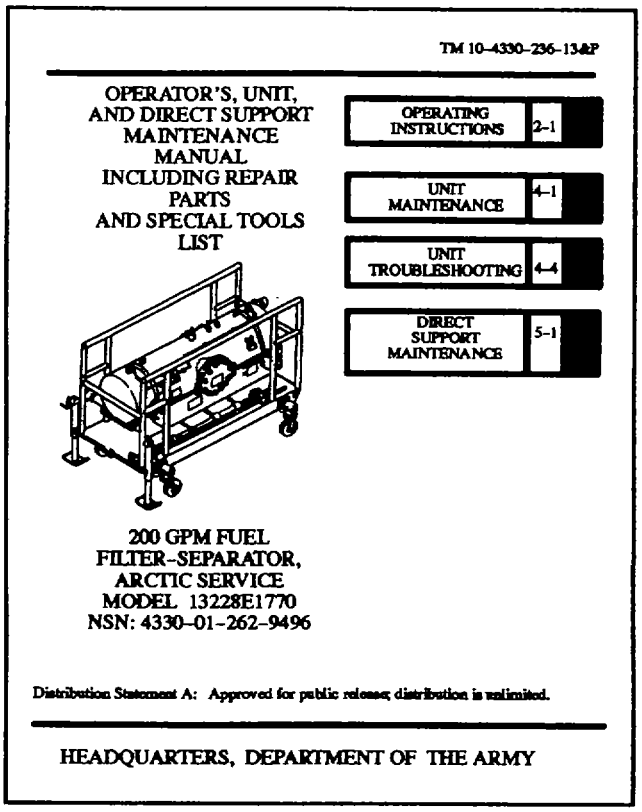


Figure D-2. Basic Issue Items.

APPENDIX E
ADDITIONAL AUTHORIZATION LIST

Section I. Introduction.

E-1. SCOPE.

This appendix lists additional items you are authorized for support of the 200 GPM filter-separator.

E-2. GENERAL.

This list identifies items that do not have to accompany the 200 GPM filter-separator water system and that do not have to be turned in with it. These items are all authorized authorized to you by CTA, MITOE, TDA, or JTA.

E-3. EXPLANATION OF LISTING.

National stock number, descriptions and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name. If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description. If item required differs for different models of this equipment, the model is shown under the "Usable on" heading in the description column.

Section II. Additional Authorization Items List

There are no additional items authorized.

APPENDIX F

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

F-1. SCOPE.

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the 200 GPM filter-separator. This listing is for informational purpose only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

F-2. EXPLANATION OF COLUMNS.

a. Column 1-Item Number. This number is assigned to the entry in the listing and is referenced in maintenance procedures to identify the material.

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

C - Operator/Crew
O - Unit Maintenance
F - Direct Support Maintenance
G - General Support Maintenance

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

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 for Manufacturer in parentheses, 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 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

Item Number	Category	National Stock Number	Description	U/M
1	O	6850-00-281-1985	Dry Cleaning solvent A-A-711, Type I	GL
2	O		Sealant, Thread with Teflon PN 13228E1791	TU
3	O	7920-00-295-1711	Rags, Wiping, DDD-R-30G	LB
4	O	91500-190-0904	Grease, GAA, MIL-G-10924	CN

APPENDIX G
ILLUSTRATED LIST OF MANUFACTURED ITEMS

G-1. INTRODUCTION.

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at organizational maintenance.

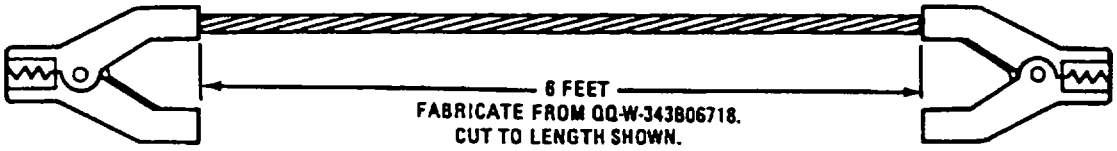
A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria

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

G-2. FABRICATION INSTRUCTIONS.

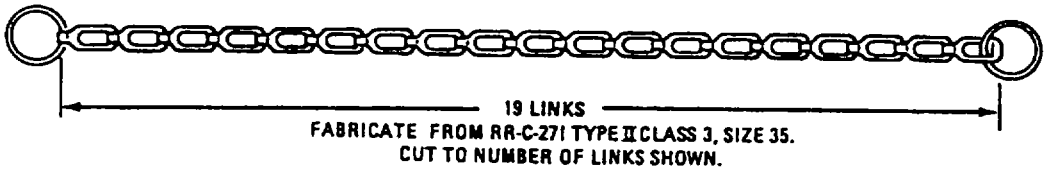
Table G-1. Part Number Index.

Part Number	Description	Figure
M5086/1-10-9	Wire, Electrical	G-1
HES-1	Chain, Sash	G-2



Fabricate from M5086/1-10-9
Cut to length shown

Figure G-1. Ground Cable Fabrication.



Fabricate from RR-C-271 Type II, Class 3, Size 35.
Cut to number of links shown.

Figure G-2. Sash Chain Fabrication.

Table G-2. Bulk Materials List

Part or Specification Number	Technical Characteristics
M5086/1-10-9 MIL-W-5086/1	Wire, electrical, nylon jacket, tin-coated copper conductor, 600 volt, size 10.
RR-C-271, Type II Class 3	Chain, Weldless, Sash-Link size 35.

APPENDIX H
TORQUE LIMITS

TYPE	BODY SIZE OR OUTSIDE DIAMETER OF FASTENER															
	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2	2 3/4	3
SAE 0-1-2	96 (130)	155 (210)	206 (279)	310 (420)	480 (651)	675 (915)	900 (1220)	1100 (1492)	1470 (1993)	1900 (2576)	2360 (3200)	2750 (3729)	3450 (4678)	4400 (5966)	7350 (9967)	9500 (12882)
SAE 3	145 (197)	234 (317)	372 (504)	551 (747)	872 (1182)	1211 (1642)	1624 (2202)	1943 (2635)	2660 (3607)	3463 (4696)	4695 (6366)	5427 (7359)	7226 (9798)	8049 (10914)	13450 (18238)	17548 (23795)
SAE 5	154 (209)	257 (349)	382 (518)	587 (796)	794 (1077	1105 (1498)	1500 (2034)	1775 (2407)	2425 (3288)	3150 (4271)	4200 (5695)	4550 (6170)	6550 (8882)	7175 (9729)	13000 (17628)	16000 (21696)
SAE 6	209 (283)	350 (475)	550 (746)	825 (1119)	1304 (1768)	1815 (2461)	2434 (3301)	2913 (3950)	3985 (5404)	5189 (7036)	6980 (9465)	7491 (10158)	10825 (14679)	14983 (20317)	20151 (27325)	26286 (35644)
SAE 7	215 (292)	360 (488)	570 (773)	840 (1139)	1325 (1797)	1825 (2475)	2500 (3390)	3000 (4068)	4000 (5424)	5300 (7187)	7000 (9492)	7500 (10170)	11000 (14916)	15500 (21018)	21000 (28476)	27000 (36612)
SAE 8	230 (312)	380 (515)	600 (814)	900 (1220)	1430 (1940)	1975 (2678)	2650 (3593)	3200 (4339)	4400 (5966)	5650 (7661)	7600 (10306)	8200 (11119)	12000 (16272)	17000 (23052)	23000 (31188)	29000 (39324)
SOCKET HEAD CAP SCREW	250 (339)	400 (542)	640 (868)	970 (1315)	1520 (2061)	2130 (2888)	2850 (3865)	3450 (4678)	4700 (6373)	6100 (8272)	8200 (11119)	8800 (11933)	13000 (17628)	18000 (24408)	24000 (32544)	31000 (42036)
SOCKET SET SCREW	100 (136)	146 (198)														

TORQUE LIMITS-continued

TYPE	MINIMUM TENSILE STRENGTH	MATERIAL	BODY SIZE OR OUTSIDE DIAMETER OF FASTENER												
			#2	#3	#4	#5	#6	#8	#10	1/4	5/16	3/8	7/16	1/2	9/16
SAE 0-1-2	74,000 PSI	LOW CARBON STEEL								6 (8)	12 (16)	20 (27)	32 (44)	47 (64)	69 (94)
SAE 3	100,000 PSI	MEDIUM CARBON STEEL								9 (12)	17 (23)	30 (41)	47 (64)	69 (94)	103 (140)
SAE 5	120,000 PSI	MEDIUM CARBON HEAT TREAT STEEL								10 (14)	19 (26)	33 (45)	54 (73)	78 (106)	114 (155)
SAE 6	133,000 PSI	MEDIUM CARBON STEEL QUENCHED TEMPERED								12 (16)	24 (33)	43 (58)	69 (94)	106 (144)	150 (203)
SAE 7	133,000 PSI	MEDIUM CARBON ALLOY STEEL								13 (18)	25 (34)	44 (60)	71 (96)	110 (141)	154 (209)
SAE 8	150,000 PSI	MEDIUM CARBON ALLOY STEEL								14 (19)	29 (39)	47 (64)	78 (106)	119 (161)	169 (229)
SOCKET HEAD CAP SCREW	160,000 PSI	HIGH CARBON CASE HARDENED STEEL								16 (22)	33 (45)	54 (73)	84 (114)	125 (170)	180 (244)
SOCKET SET SCREW	212,000 PSI	HIGH CARBON CASE HARDENED STEEL					9 (1.0)	16 (1.8)	30 (3.4)	70 (7.9)	140 (15.8)	18 (2.0)	29 (3.3)	43 (4.9)	63 (7.1)

APPENDIX I

MANDATORY REPLACEMENT PARTS

ITEM NO	NOMENCLATURE	PART NUMBER
1	Washer. Lock	A1137-9
2	Washer. Lock	A1137-18
3	Washer, Lock	A1137-28
4	Chain, Weldless	HES-1
5	Rivet Blind	MS20600B5W2
6	Rivet Blind	MS20600B6W2
7	Screw, Drive	MS21318-27
8	Washer, Lock	MS35334-19
9	Washer, Lock-Spring	MS35338-139
10	Washer, Lock	MS35338-141
11	Nut. Self-Locking	MS51922-2
12	Gasket	13228E1768-8
13	Gasket	13228E1772-1

GLOSSARY

Section I. ABBREVIATIONS

psig	Pound-force Per Square Inch, Gage
PN	Part Number
gpm	Gallons Per Minute
TBD	To Be Determined
psid	Pounds Per Square Inch Differential (Pressure Difference)
DP	Differential Pressure
TFE	Tetraflourethylene (a Teflon plastic)
GAA	Grease, Automotive and Artillery
ppm	Parts Per Million

Section II. DEFINITIONS OF UNUSUAL TERMS

Ambient:	Surrounding on all sides (environmental).
Milligram:	One-thousandth of a gram (454 grams equal one pound)
Coalesce:	To gather together.
Effluent:	Output flow.

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By Order o the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B.HUDSON
Acting Administrative Assistant to the
Secretary of the Army
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23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

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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 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

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

Square Measure

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

Cubic Measure

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

Approximate Conversion Factors

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

Temperature (Exact)

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

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