

# TM 9-2330-272-14

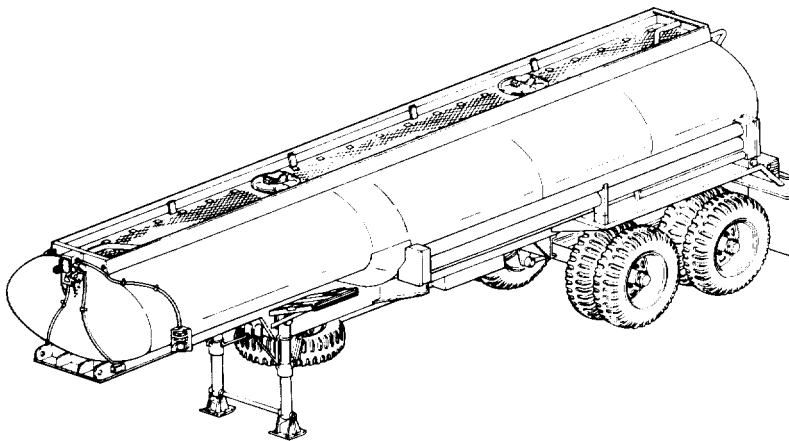
## TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT,  
AND GENERAL SUPPORT MAINTENANCE MANUAL

FOR

SEMITRAILER, TANK: FUEL, 5000 GALLON, 4-WHEEL  
M131A4 (NSN 2330-00-994-9459)  
M131A5 (NSN 2330-00-226-6079)

SEMITRAILER, TANK: FUEL SERVICING,  
5000 GALLON, 4-WHEEL  
M131A4C (NSN 2330-00-994-9458)  
M131A5C (NSN 2330-00-226-6080)



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This manual and TM 9-2330-272-24 supersede TM 9-2330-272-14&P dated 21 July 1983, and all changes.

Approved for public release; distribution is unlimited

HEADQUARTERS, DEPARTMENT OF THE ARMY JUNE 1992



**FOR FIRST AID INFORMATION REFER TO FM 21-11.**

**WARNING**

**STATIC ELECTRICITY AND FUEL ARE A DEADLY COMBINATION!**

- The M131 Series 5000 Gallon Fuel Tank Semitrailers carry flammable fuel. Loaded or empty, operation and maintenance of the semitrailers can be dangerous. When loading and unloading fuel, static electricity is formed. When performing maintenance, wrenches slipping on a fastener and striking another metal object can create a spark; if a spark comes in contact with fuel or fuel vapors, a fire and explosion will result.
- Personnel must read and follow all WARNINGS listed on these pages before operating or maintaining the M131 Series 5000 Gallon Fuel Tank Semitrailers. These pages contain a summary of all the WARNINGS found in the manual.
- Read Chapter 1, Section III, General Safety Regulations and paragraph 2-17, General Fuel Handling Requirements.

**THE BEST DEFENSE AGAINST SERIOUS INJURY OR DEATH IS KNOWLEDGE**

**WARNING**

**ACCESS TO TANK**

Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.

**WARNING**

**BRAKES**

- Cautiously feel each wheel hub and brakedrum. Wheel hub or brakedrum may be hot. Failure to follow this warning may result in burns.
- Wear safety goggles and face shield when performing leakage tests on valves. Failure to follow this warning may result in serious eye injury due to high pressure air.
- Ensure that airlines do not rub against each other or any other surface when installed. Relocate or provide support, as required. If air lines rub, a leak may develop resulting in brake lockup and serious injury or death to personnel.

**WARNING**

**COMPRESSED AIR**

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

**WARNING**

**COUPLING AND UNCOUPLING**

All personnel must stand clear of semitrailer and towing vehicle during coupling and uncoupling operations. Failure to follow this warning may result in serious injury or death to personnel.

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**WARNING**

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**DRY CLEANING SOLVENT**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

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**WARNING**

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**ELECTRICAL SYSTEM**

When troubleshooting an electrical malfunction or performing electrical maintenance, always disconnect intervehicular electrical cable from semitrailer, Failure to follow this warning may create a spark and explosion, resulting in injury or death to personnel.

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**WARNING**

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**ENGINE WILL NOT START**

DO NOT slave start auxiliary engine. Slave starting may cause battery to spark and cause an explosion. Failure to follow this warning may result in injury or death to personnel.

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**WARNING**

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**FUEL HANDLING AND PURGING**

- Follow all fuel handling and purging procedures precisely to prevent serious injury or death to personnel.
- Operator must be alert at all times for leaking or malfunctioning equipment. IMMEDIATELY stop all fuel handling operations at the first sign of leaks or malfunctions. Corrective action must be performed by qualified personnel before resuming any operations.
- DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.
- DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.25 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.
- Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.
- DO NOT mix incompatible fuels in tank. Dangerous fumes and explosion may result, Know what fuel was previously carried so that preventive measures may be taken to ensure that harmful or explosive fumes are not released. Failure to follow this warning may result in serious injury or death to personnel.
- DO NOT perform fuel handling or purging operations in an electrical storm or if a storm is threatening. Keep open flames or other sources of ignition, such as welding and cutting torches and ordinary electrical equipment, away from area where fuel handling or purging operation is In progress. Sufficient fire extinguishers MUST be present and manned. Failure to follow this warning will result in serious injury or death to personnel.

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**WARNING**

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**FUEL HANDLING AND PURGING (Con't)**

- Should an emergency arise requiring entry into a tank which is not vapor-free, or which has an oxygen content less than 19.5%, personnel entering tank must have an attached lifeline and wear protective respiratory equipment in the form of self-contained breathing apparatus or a full facepiece mask with a pressure supply of breathable air. Another person, also provided with respiratory equipment, **MUST** be stationed at manhole opening and remain there with full ability to watch personnel inside tank and summon assistance if a rescue operation is needed. Personnel **MUST NOT** enter a tank which is in the explosive range.
- If after purging procedures semitrailer is left overnight, retest with combustible gas indicator set to ensure a **SAFE** reading. Tanks may recharge themselves with seepage of undetected pockets of vapors. Failure to follow this warning may result in serious injury or death to personnel.
- Personnel engaged in fuel handling or purging operations must not wear wool, nylon, silk, rayon, or other clothing that generates static electricity. Wear clean cotton clothing with no metal zippers. Remove all contents from pockets. Wear rubber boots and gloves to keep fuel off skin, Use cotton cloths for cleaning purposes. Before climbing onto semitrailer, grasp static ground wire to discharge all static from body.

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**WARNING**

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**GROUNDING**

- Connect bonding and grounding connections before beginning any fuel handling operation, or before performing any Organizational, Direct Support, or General Support Maintenance. Maintain bonding and grounding connections until after all fuel handling or maintenance is completed. Connections must be made to clean, unpainted surfaces. An unbonded and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.
- Walk grounding cable back to reel when stowing grounding cable. **DO NOT** let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.

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**WARNING**

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**MAINTENANCE INSIDE TANK**

- When working inside tank, always provide adequate forced air ventilation at the manhole opening with air directed into compartment where work is being performed. Forced air ventilation allows for removal of any explosive quantities and contaminants resulting from the type of work being done and serves to prevent oxygen deficiency. Failure to follow this warning may result in death to personnel.
- **NEVER** work alone inside a tank; a second person must be stationed at the manhole opening. The person inside the tank must have a safety line and harness on in case of emergency for rescue operations. If a rescue operation is required, summon assistance **IMMEDIATELY**. **DO NOT** attempt a rescue until assistance has arrived.
- **DO NOT** perform any welding procedure unless tank is purged. Failure to follow this procedure will result in serious injury or death to personnel.

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**WARNING**

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**NBC HAZARD**

If NBC exposure is suspected, all engine air cleaner air filter media should be handled by personnel wearing protective equipment. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.

**WARNING**

**STORAGE BATTERIES**

- Battery acid (electrolyte) is extremely dangerous. Always wear goggles and rubber gloves when performing battery checks or inspections. Serious injury to personnel will result if battery acid contacts skin or eyes.
- DO NOT perform battery system checks or inspections while smoking or near fire, flames, or sparks. Batteries may explode, causing serious injury or death to personnel.
- Remove all jewelry such as dog tags, rings, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery terminal, a direct short will result, causing serious injury or death to personnel.

TECHNICAL MANUAL  
TM 9-2330-272-14

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington D. C., 30 June 1992

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FOR

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**SEMITRAILER, TANK: FUEL SERVICING,**

**5000 GALLON, 4-WHEEL**

**M131A4C (NSN 2330-00-994-9458)**

**M131A5C (NSN 2330-00-226-6080)**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (*Recommended Changes to Publications and Blank Forms*), or DA Form 2028-2, located in the back of this manual, direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

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\*This manual and TM 9-2330-272-24P supersede TM 9-2330-272-14&P dated 21 July 1983, and all changes.

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# CHAPTER 1 INTRODUCTION

## Section I. GENERAL INFORMATION

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**1-1. SCOPE.**

a. This manual describes the operation and Organizational, Direct Support, and General Support Maintenance for:

- Semitrailer, Tank: Fuel, 4-Wheel, 5000 Gallon, M131A4.
- Semitrailer, Tank: Fuel Servicing, 4-Wheel, 5000 Gallon, M131A4C.
- Semitrailer, Tank: Fuel, 4-Wheel, 5000 Gallon, M131A5.
- Semitrailer, Tank: Fuel Servicing, 4-Wheel, 5000 Gallon, M131A5C.

b. Throughout the manual the terms “curbside” and “roadside” are used to describe views of the semitrailers. As viewed from the rear, curbside is right side and roadside is left side.

c. Similar models of semitrailers were produced by different manufacturers. As a result, minor differences in design among these semitrailers exist. These differences will be identified by serial number.

**1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS.**

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

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

For destruction of Army materiel to prevent enemy use, refer to TM 750-244-6.

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

For information on preparing the semitrailers for storage or shipment, refer to Chapter 4, Section XVII.

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

If your semitrailer 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. Put it on an SF Form 368 (*Product Quality Deficiency Report*). Mail it to us at: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MP, Warren, MI 48397-5000. We will send you a reply.

## Section II. EQUIPMENT DESCRIPTION AND DATA

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### 1-6. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

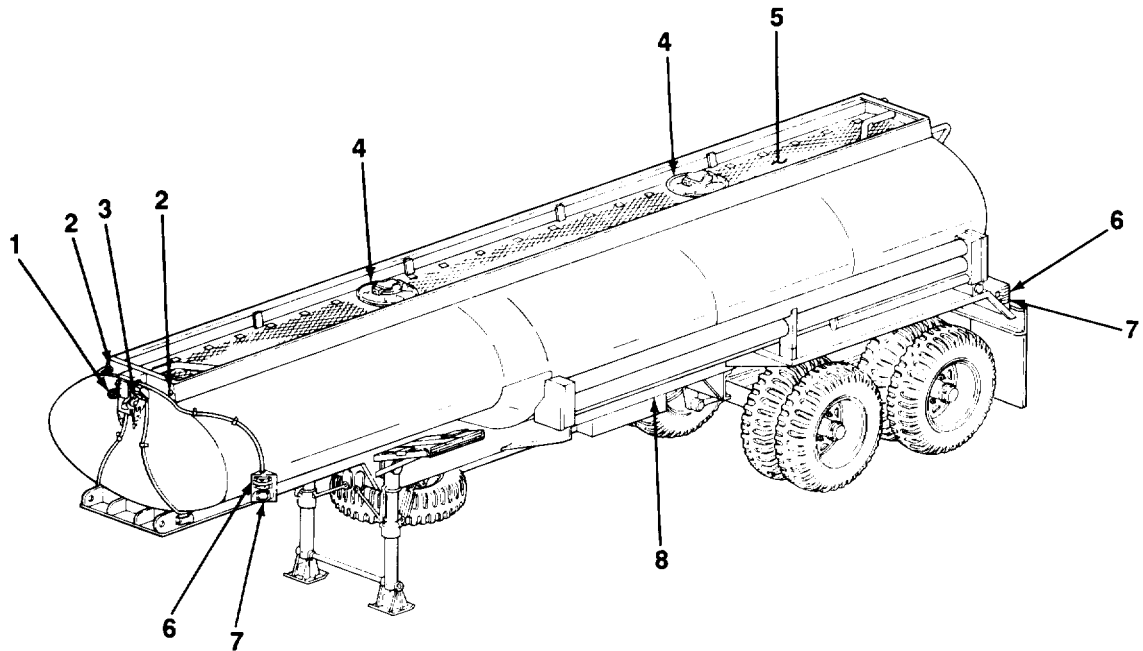
a. The M131 Series Fuel Tank Semitrailers are designed to be towed by the M52A2, M818, M931, or M932 5-Ton, 6 x 6 Tractor.

b. The semitrailers are equipped with:

- (1) A 24-volt electrical system capable of operating under standard and blackout modes.
- (2) Early model lighting system consisting of two service taillights, blackout taillight assemblies, and clearance marker lights.
- (3) Late model lighting system consisting of two composite taillights and clearance maker lights.
- (4) Air-over-hydraulic brake system which receives air pressure from the towing vehicle.
- (5) Spare wheel and tire carrier which uses a cable lift to raise and lower spare wheel and tire.
- (6) A two-speed retractable handcrank-type adjustable landing gear. The landing gear supports the semitrailer when not coupled to towing vehicle and is used to raise and lower chassis when preparing to couple and uncouple semitrailer and towing vehicle.
- (7) A two-or four-compartment stainless steel tank with a total capacity of 5000 gl (18,925 l). Each compartment is equipped with an emergency relief valve and a removable manhole cover and fill cover.
- (8) Air-cooled auxiliary engine and fuel dispensing pump unit used to load and unload fuel into individual compartments.
- (9) A slip resistant catwalk which provides access to the manholes. Two drain plugs are provided at front of catwalk for draining water or spilled fuel from the top of the tank.
- (10) Portable and fixed fire extinguisher systems.
- (11) Dual wheel tandem axle with leaf spring and torque rod suspension to absorb road shock.
- (12) Chock blocks to prevent accidental movement of semitrailer when parked.

c. The M131A4C and M131A5C are equipped with a filter-separator which removes any solid contaminants and water from the fuel.

1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

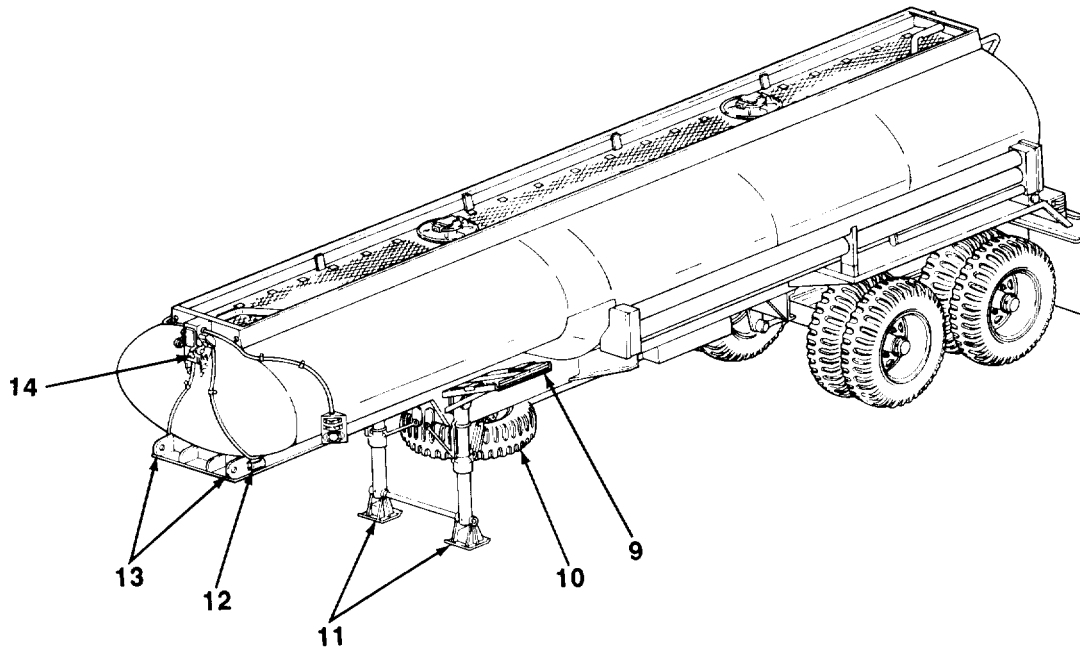


M131A4 AND M131A5 ROADSIDE

Key	Component	Description
1	Service Air Coupling	Connects towing vehicle service air supply to semitrailer.
2	Drain Plug	When removed, allows water or spilled fuel to drain from top of semitrailer. Plugs must be installed at all times, except when washing semitrailer.
3	Emergency Air Coupling	Connects towing vehicle emergency air supply to semitrailer.
4	Manhole Cover	Allows access to inside of tank. M131A4 is equipped with four. M131A5 is equipped with two.
5	Catwalk	Nonskid surface on top of semitrailer.
6	Lights	Contain service, blackout, stoplight, and clearance marker lights on early models and composite light and clearance marker lights on late models.
7	Reflector	Marks outline of semitrailer.
8	Stowage Tube Assembly	Provides stowage for transfer hoses, ground rod, and petroleum gage stick.

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1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Con't).

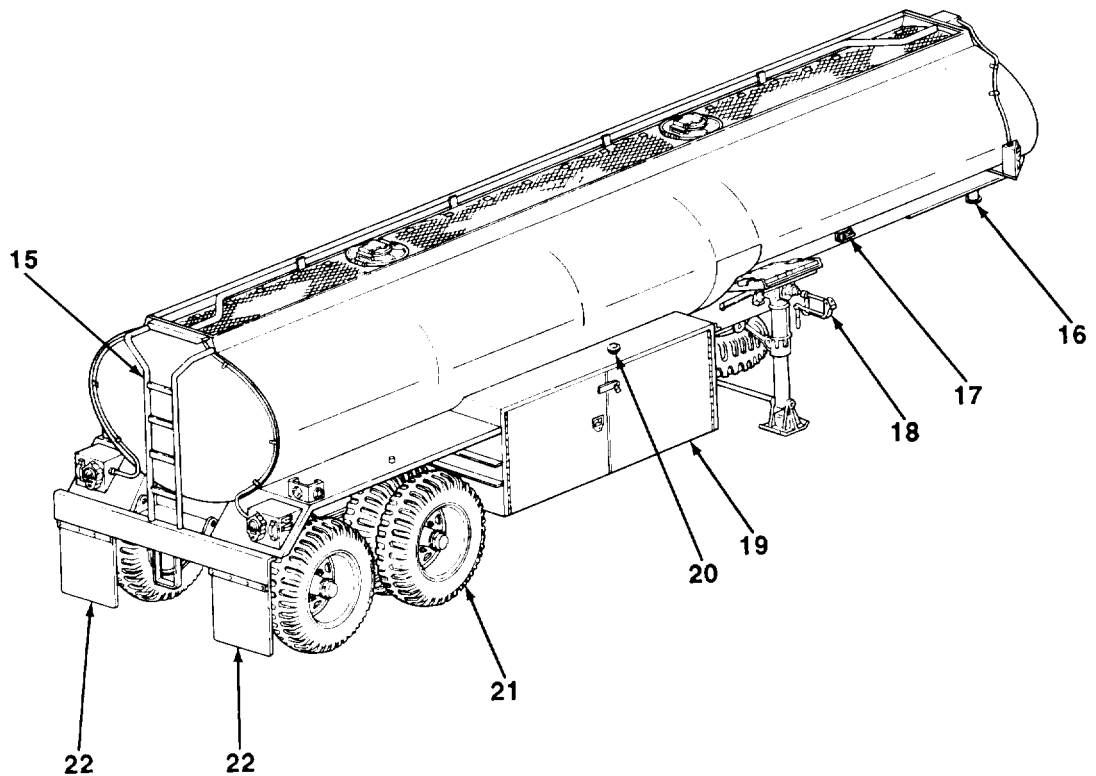


M131A4 AND M131A5 ROADSIDE

Key	Component	Description
9	Ground Board	Placed under landing gear shoes in sandy and muddy terrain.
10	Spare Wheel and Tire	Stowed in spare wheel and tire carrier.
11	Landing Gear	Supports semitrailer when uncoupled from towing vehicle.
12	Emergency Relief Valve Shutoff	Closes emergency relief valves.
13	Lift Points	Allow for lifting of empty semitrailer,
14	Intervehicular Cable Receptacle	Connects towing vehicle electrical system to semitrailer.

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1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Con't).

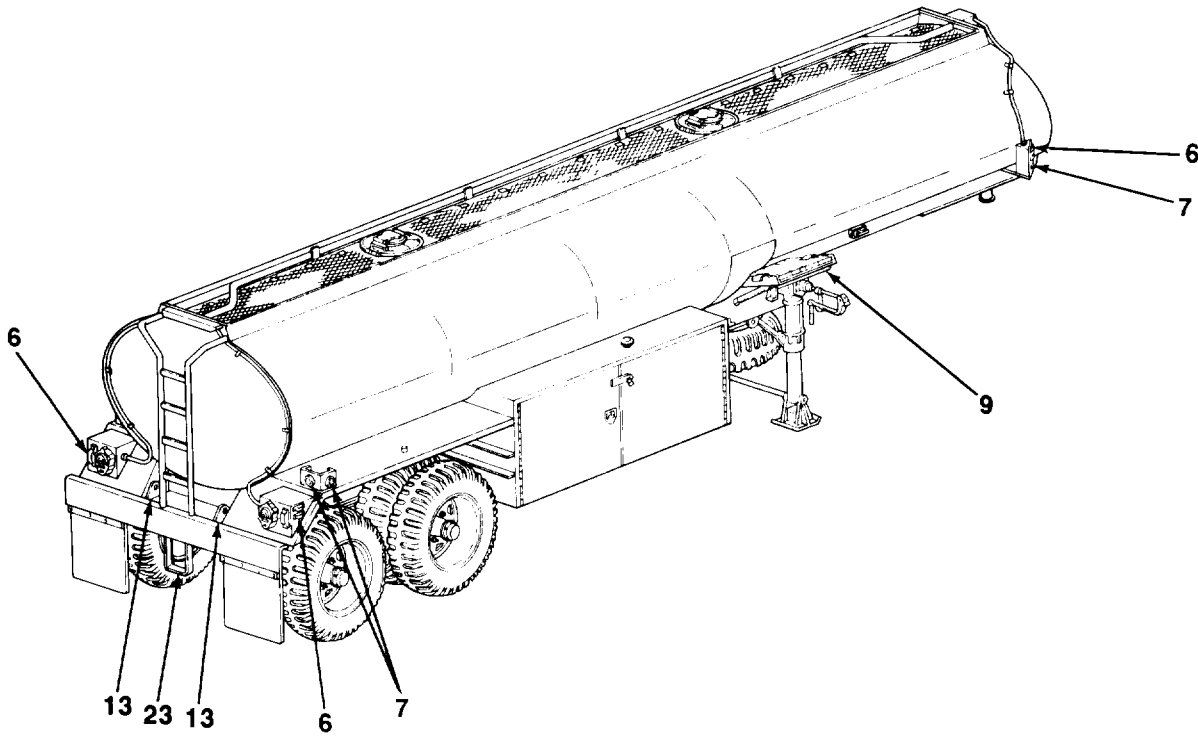


M131A4 AND M131A5 CURBSIDE

Key	Component	Description
15	Ladder	Provides access to top of semitrailer and a means to drain top of semitrailer in event of fuel spillage.
16	Kingpin	Couples semitrailer to towing vehicle fifth wheel plate.
17	Remote Control Handle	Activates fixed fire extinguisher system when pulled.
18	Handcrank	Operates two-speed retractable landing gear legs. Engage high speed by pushing in on handcrank. Engage low speed by pulling out on handcrank.
19	Curbside Cabinet	Houses air-cooled auxiliary engine and fuel dispensing pump unit, fuel manifold, flow control valves, and static reel.
20	Fuel Tank Cap	Provides access to fill auxiliary engine fuel tank.
21	Dual Wheels	Two wheels at the end of each axle to support semitrailer load.
22	Splashguards	Protect vehicles traveling behind from thrown dirt or stones.

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1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Con't).



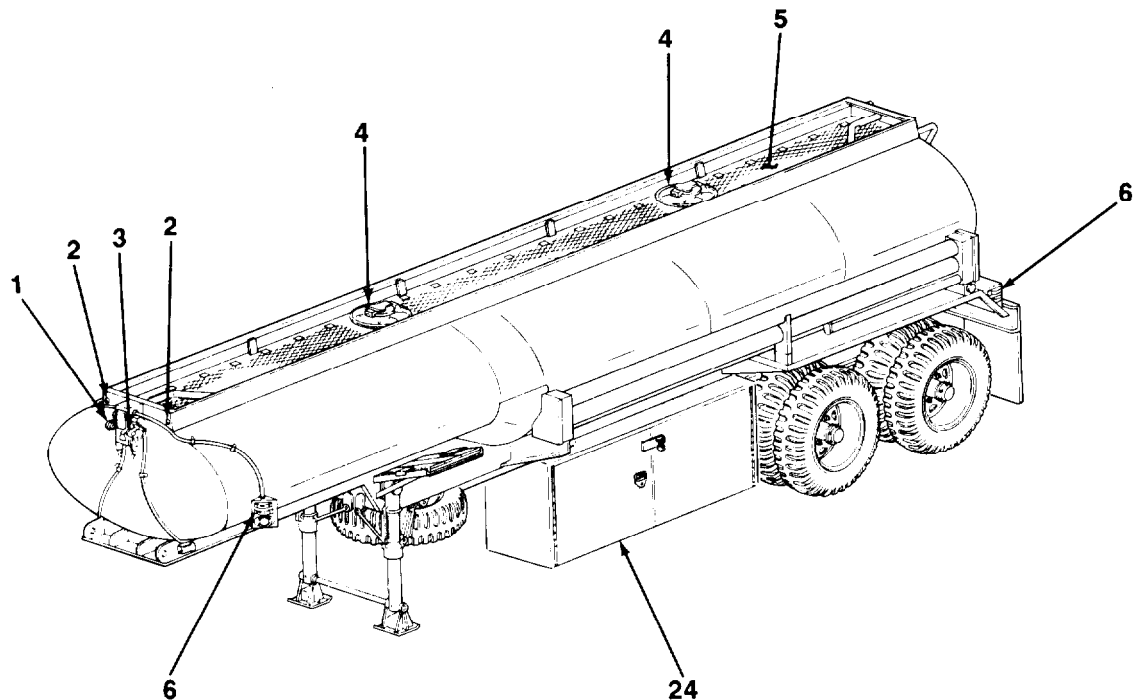
M131A4 AND M131A5 CURBSIDE

Key	Component	Description
23	Step	Provides access to ladder.
6	Lights	Contain service, blackout, stoplight, and clearance marker lights on early models and composite light and clearance marker lights on late models.
7	Reflector	Marks outline of semitrailer.
9	Ground Board	Placed under landing gear shoes in sandy and muddy terrain.
13	Lift Points	Allow for lifting of empty semitrailer.

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1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Con't).

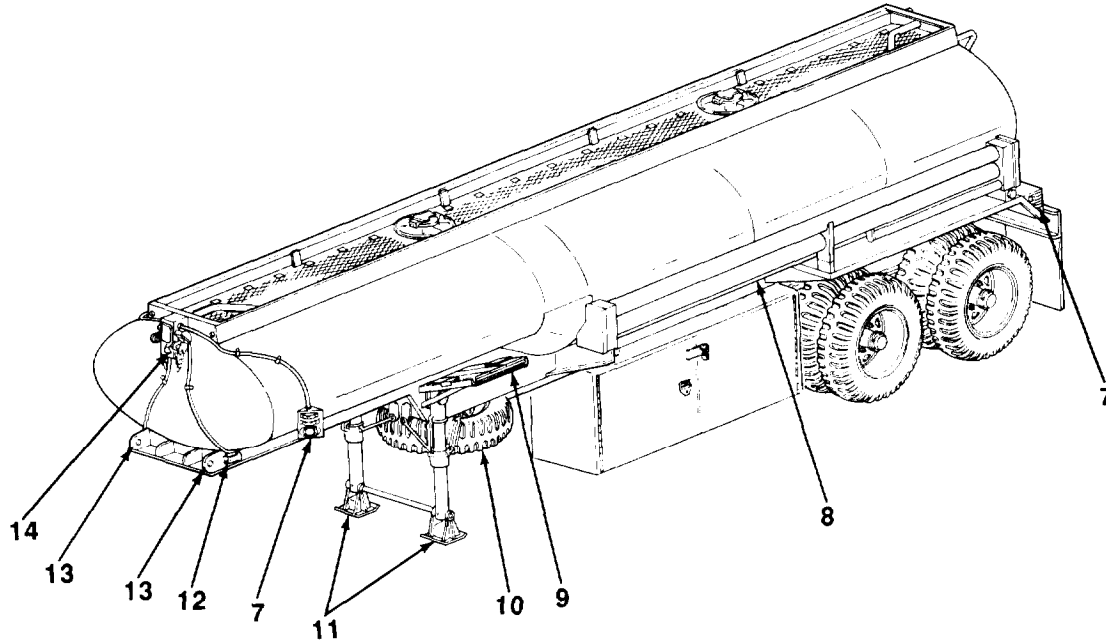


M131A4C AND M131A5C ROADSIDE

Key	Component	Description
24	Roadside Cabinet	Houses volumetric meter, two dispensing assemblies, filter-separator pressure gages, engine controls, fixed fire extinguisher system portable fire extinguishers, and fuel-handling controls.
1	Service Air Coupling	Connects towing vehicle service air supply to semitrailer.
2	Drain Plug	When removed, allows water or spilled fuel to drain from top to o semitrailer. Plugs must be installed at all times, except when washing semitrailer.
3	Emergency Air Coupling	Connects towing vehicle emergency air supply to semitrailer.
4	Manhole Cover	Allows access to inside of tank. M131A4C is equipped with four, M131A5C is equipped with two.
5	Catwalk	Nonskid surface on top of semitrailer.
6	Lights	Contain service, blackout, stoplight, and clearance marker lights on early models and composite light and clearance marker lights on late models.

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1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Con't).

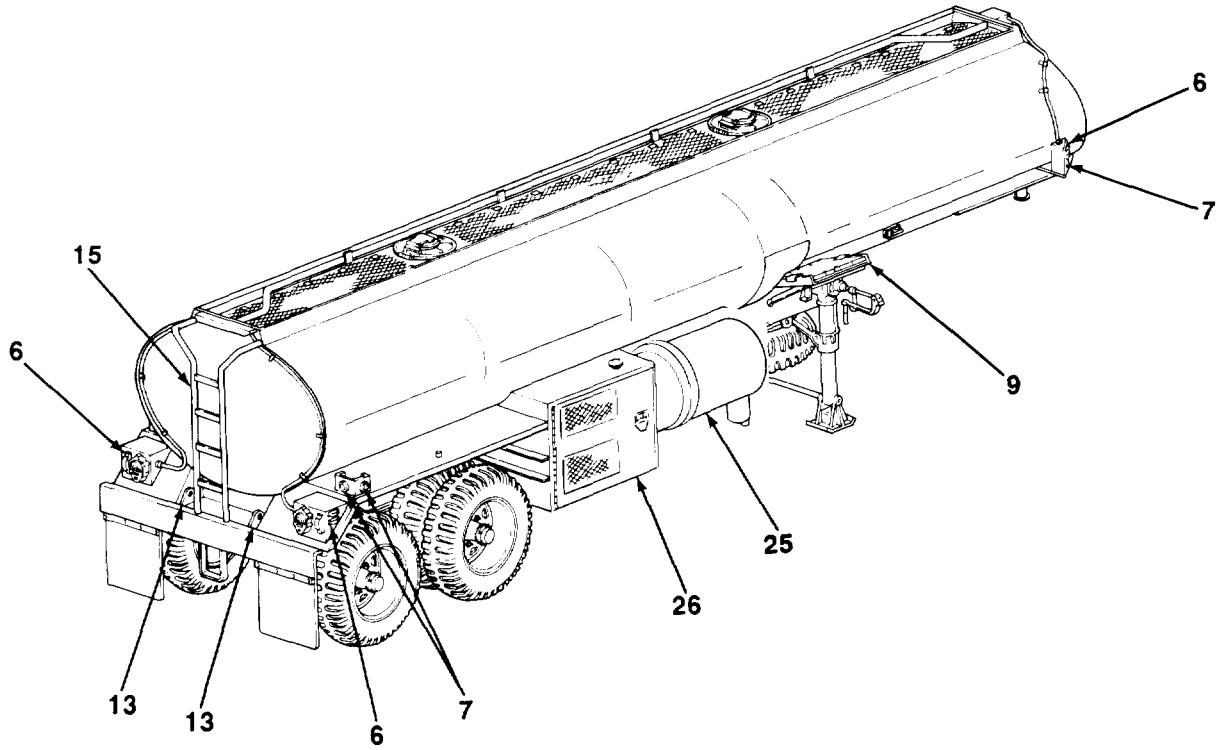


**M131A4C AND M131A5C ROADSIDE**

Key	Component	Description
7	Reflector	Marks outline of semitrailer.
8	Stowage Tube Assembly	Provides stowage for transfer hoses, ground rod, and petroleum gage stick.
9	Ground Board	Placed under landing gear shoes in sandy and muddy terrain.
10	Spare Wheel and Tire	Stowed in spare wheel and tire carrier.
11	Landing Gear	Supports semitrailer when uncoupled from towing vehicle.
12	Emergency Relief Valve Shutoff	Closes emergency relief valves.
13	Lift Points	Allow for lifting of empty semitrailer.
14	Intervehicular Cable Receptacle	Connects towing vehicle electrical system to semitrailer,

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1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Con't).

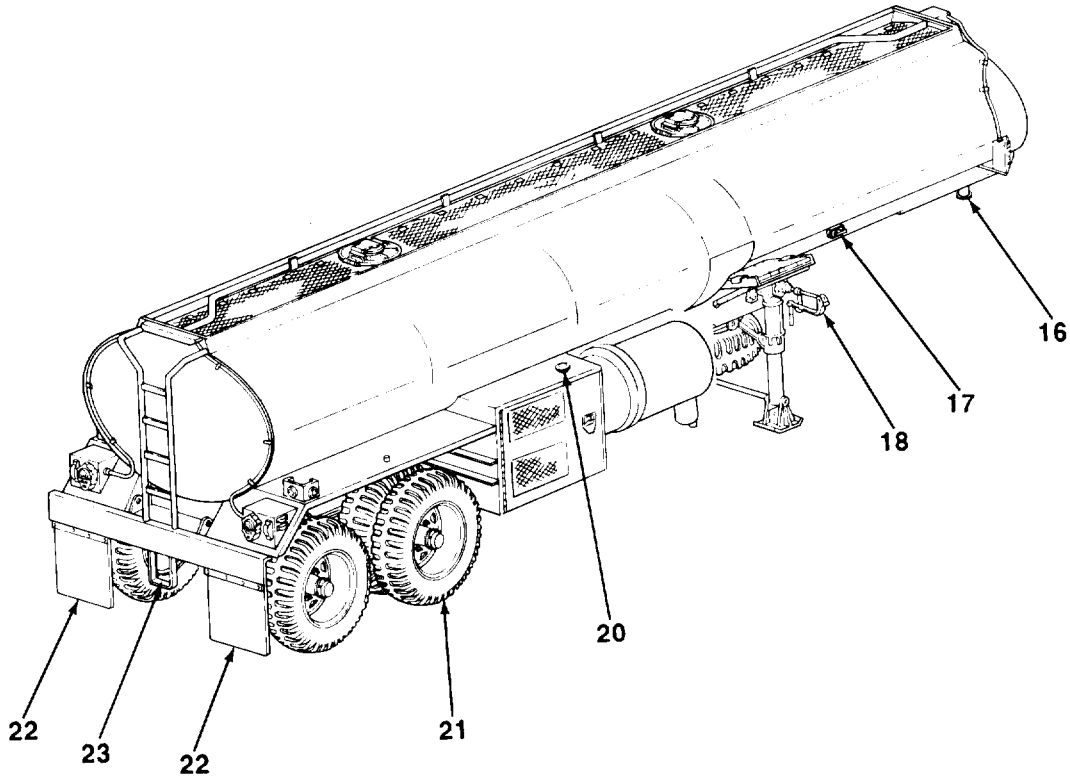


M131A4C AND M131A5C CURBSIDE

Key	Component	Description
25	Filter-separator	Removes solid contaminants and water from fuel.
26	Curbside Cabinet	Houses battery and air-cooled auxiliary engine and fuel dispensing pump unit.
6	Lights	Contain service, blackout, stoplight, and clearance marker lights or early models and composite light and clearance marker lights on late models.
7	Reflector	Marks outline of semitrailer.
9	Ground Board	Placed under landing gear shoes in sandy and muddy terrain.
13	Lift Points	Allow for lifting of empty semitrailer.
15	Ladder	Provides access to top of semitrailer and a means to drain top of semitrailer in event of fuel spillage.

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1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Con't).



M131A4C AND M131A5C CURBSIDE

Key	Component	Description
16	Kingpin	Couples semitrailer to towing vehicle fifth wheel plate.
17	Remote Control Handle	Activates fixed fire extinguisher system when pulled.
18	Handcrank	Operates two-speed retractable landing gear legs. Engage high speed by pushing in on handcrank. Engage low speed by pulling out on handcrank.
20	Fuel Tank Cap	Provides access to fill auxiliary engine fuel tank.
21	Dual Wheels	Two wheels at the end of each axle to support semitrailer load.
22	Splashguards	Protect vehicles traveling behind from thrown dirt or stones.
23	Step	Provides access to ladder.

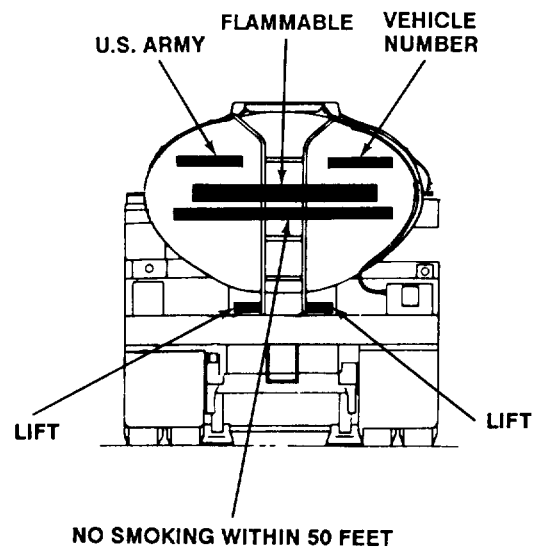
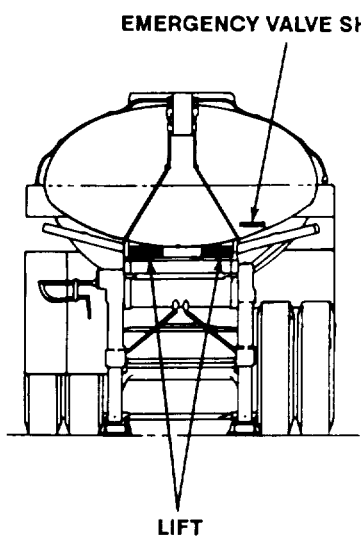
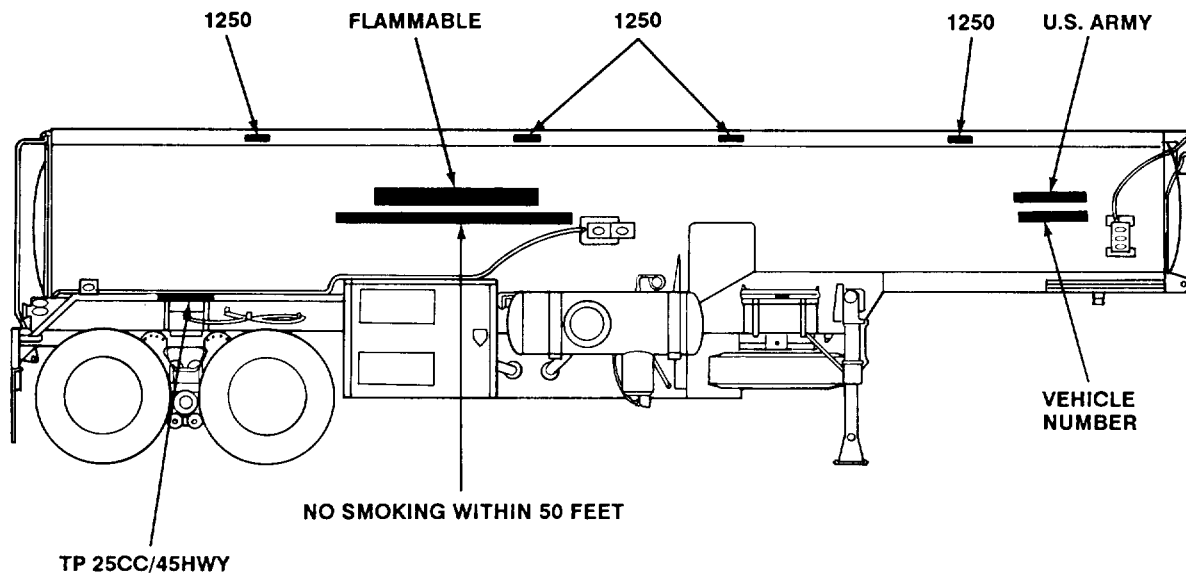
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1-8. LOCATION AND CONTENTS OF STENCIL MARKINGS.

a. M131A4 and M131A4C.

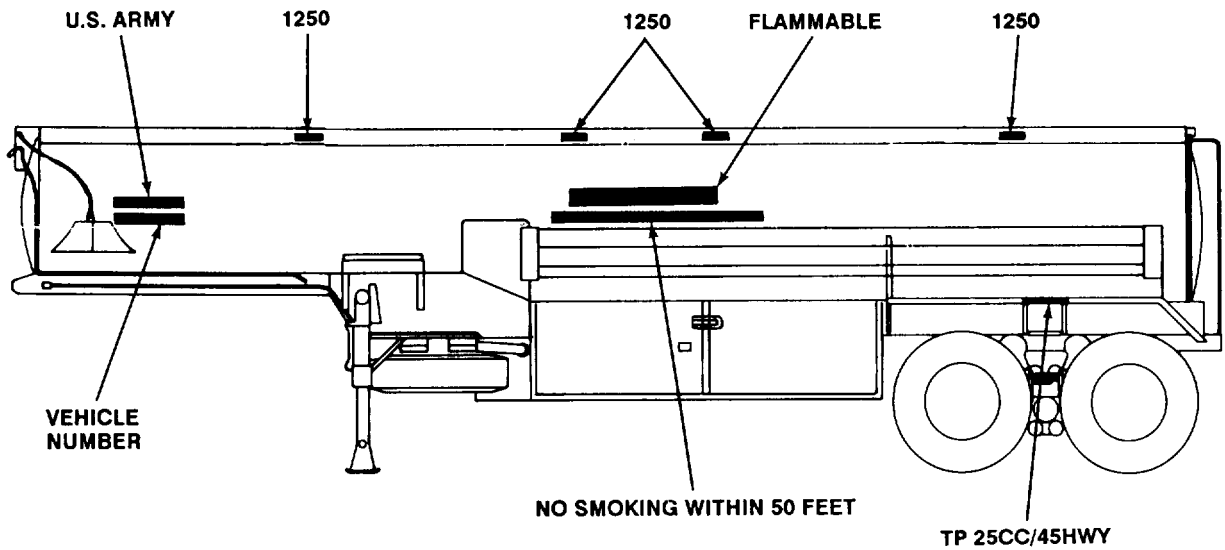
NOTE

Stencil markings on M131A4 and MI 31A4C are the same. M131A4C is illustrated,



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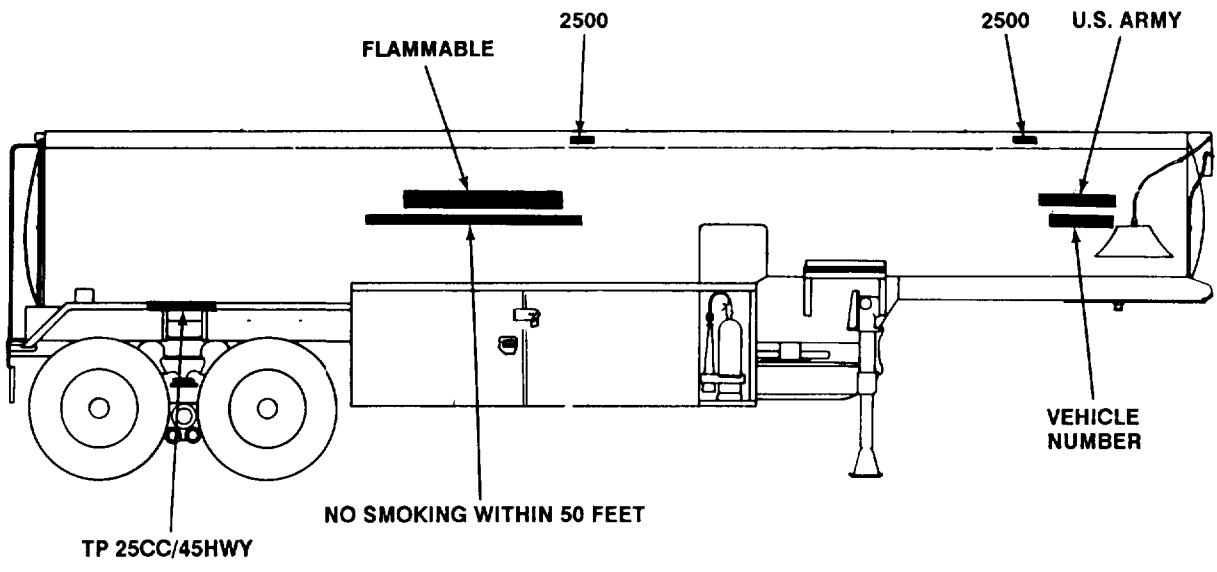
1-8. LOCATION AND CONTENTS OF STENCIL MARKINGS (Con't).



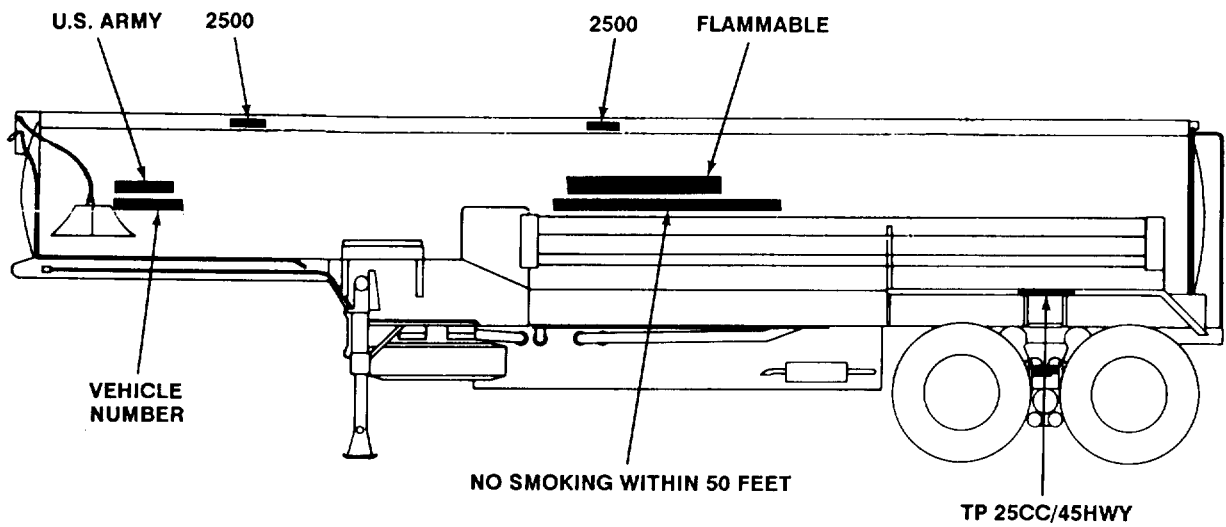
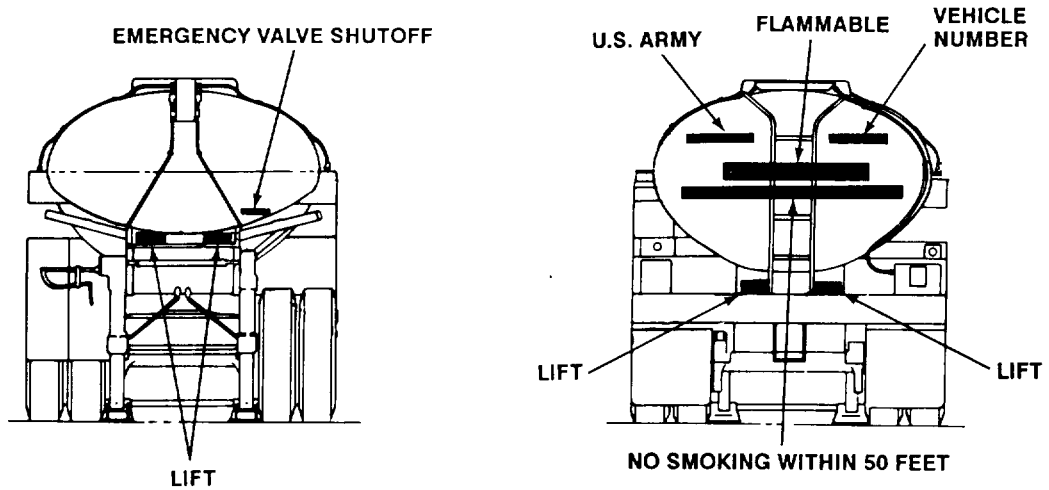
b. M131A5 and M131A5C.

NOTE

Stencil markings on M131A5 and M131A5C are the same. M131A5 is illustrated.



1-8. LOCATION AND CONTENTS OF STENCIL MARKINGS (Con't).



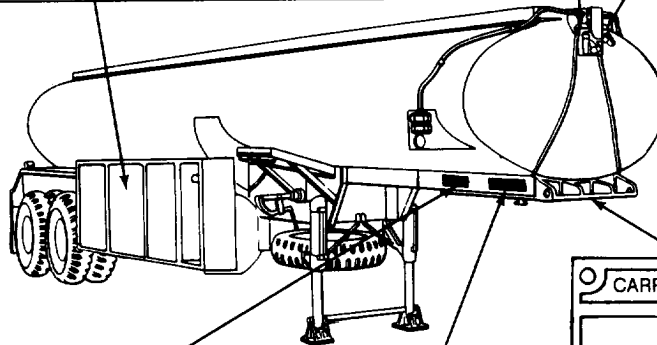
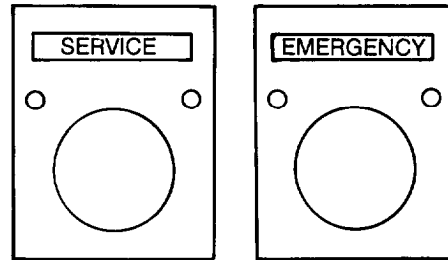
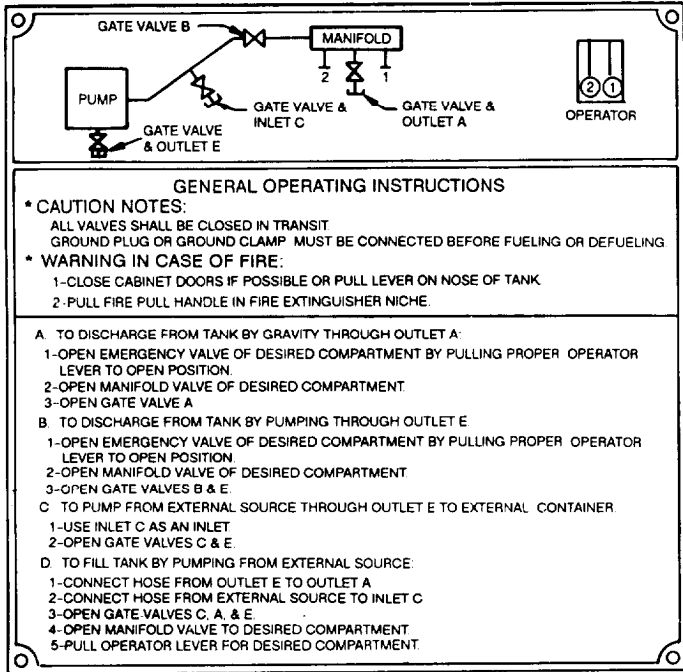
TA702629

1-9. LOCATION AND CONTENTS OF DATA PLATES.

The following illustrations show the location and contents of all semitrailer data plates.

a. M131A4.

(LOCATED ON INSIDE OF CABINET DOOR)



RESPONSIBLE AGENCY	PROCUREMENT	MAINTENANCE
CHASSIS BODY MTD. EQPT.		
U.S. MILITARY PROPERTY		

CARRIERS SERIAL NO.
DATE OF MANUFACTURE
NOMINAL CAP. U.S. GAL.
ICC MC 303 HTS CRES

SEMITRAILER TANK, FUEL 5000 GAL. 4 WHEEL, M131A4		WEIGHT AND DIMENSION DATA																	
FEDERAL STOCK NO.																			
MANUFACTURED BY USA		<table border="1"> <tr> <th>WEIGHT</th> <th>EMPTY</th> <th>CROSSCOUNTRY</th> <th>HIGHWAY</th> </tr> <tr> <td>PAYLOAD</td> <td>10085</td> <td>23405</td> <td>30285</td> </tr> <tr> <td>ON WHEELS</td> <td>3670</td> <td>13625</td> <td>18930</td> </tr> <tr> <td>TOTAL</td> <td>13735</td> <td>37230</td> <td>49215</td> </tr> </table>		WEIGHT	EMPTY	CROSSCOUNTRY	HIGHWAY	PAYLOAD	10085	23405	30285	ON WHEELS	3670	13625	18930	TOTAL	13735	37230	49215
WEIGHT	EMPTY	CROSSCOUNTRY	HIGHWAY																
PAYLOAD	10085	23405	30285																
ON WHEELS	3670	13625	18930																
TOTAL	13735	37230	49215																
ARMY SERIAL NO. _____		SHIPPING CUBAGE - 2275 CU FT																	
MFG SERIAL NO. _____																			
CONTRACT NO. _____																			
PUBLICATIONS																			
TECHNICAL MANUAL AND PART LIST																			
DELIVERY DATE _____		INSPECTED _____																	

TA702630



1-9. LOCATION AND CONTENTS OF DATA PLATES (Con't).

b. M131A4C.

(LOCATED ON INSIDE OF CABINET DOOR)

**FUELING INSTRUCTIONS**

**CAUTION:**

1. ALL VALVES MUST BE CLOSED IN TRANSIT AND SELECTOR VALVE SET AT ZERO
2. GROUND PLUG OR GROUND CLAMP MUST BE CONNECTED BEFORE FUELING OR DEFUELING
3. DO NOT OPEN DUMP VALVE ON FILTER-SEPARATOR SUMP WHEN FUELING AIRCRAFT

**WARNING IN CASE OF FIRE:**

1. CLOSE CABINET DOORS IF POSSIBLE OR PULL EMERGENCY PULL LEVER ON NOSE OF TANK
2. PULL FIRE HANDLE AT FRONT OF CABINET

**FOR HIGH VOLUME DELIVERY, 225 GPM:**

1. OPEN VALVES (B AND D)
2. PULL VALVE (H) CONTROL HANDLE OUT
3. OPEN MANIFOLD VALVES (1 AND 2)
4. PULL OPERATOR HANDLES (1 AND 2)
5. CONTROL FLOW BY MANIPULATING TRIGGER OF FUEL NOZZLE (K)

**FOR LOW VOLUME DELIVERY, 0 TO 55 GPM:**

1. SAME STEPS AS USED FOR HIGH VOLUME DELIVERY EXCEPT VALVE (H) TO BE CLOSED AND VALVE (F) TO BE CONTROLLED BY SETTING SELECTOR VALVE ON INSTRUMENT PANEL TO DESIRED RATE
2. CONTROL FLOW BY MANIPULATING TRIGGER OF NOZZLE (K)

**TO DEFUEL:**

1. OPEN VALVES (E AND G)
2. PUSH VALVE (H) CONTROL HANDLE IN
3. OPEN MANIFOLD VALVES (1 AND 2)
4. PULL OPERATOR HANDLES (1 AND 2)
5. ATTACH LONG ADAPTER TO FUELING NOZZLE (K)
6. PLACE NOZZLE IN TANK TO BE EVIATED AND OPERATE TRIGGER

**GENERAL OPERATING INSTRUCTIONS**

**A. TO DISCHARGE FROM TANK BY GRAVITY THROUGH OUTLET A:**

1. OPEN EMERGENCY VALVE OF DESIRED COMPARTMENT BY PULLING PROPER OPERATOR LEVER TO OPEN POSITION
2. OPEN MANIFOLD VALVE OF DESIRED COMPARTMENT
3. OPEN GATE VALVE A

**B. TO DISCHARGE FROM TANK BY PUMPING THROUGH OUTLET E:**

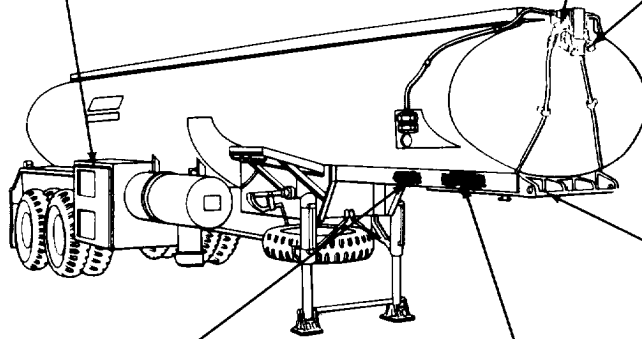
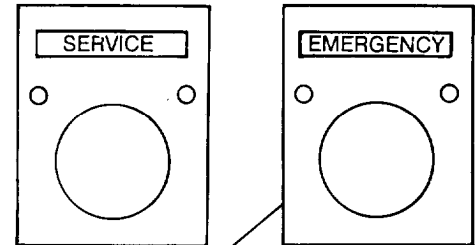
1. OPEN EMERGENCY VALVE OF DESIRED COMPARTMENT BY PULLING PROPER OPERATOR LEVER TO OPEN POSITION
2. OPEN MANIFOLD VALVE OF DESIRED COMPARTMENT
3. OPEN GATE VALVES B & E

**C. TO PUMP FROM EXTERNAL SOURCE THROUGH OUTLET E TO EXTERNAL CONTAINER:**

1. USE VALVE C AS AN INLET
2. OPEN GATE VALVES C & E

**D. TO FILL TANK BY PUMPING FROM EXTERNAL SOURCE:**

1. CONNECT HOSE FROM EXTERNAL SOURCE TO INLET C
2. OPEN GATE VALVE C
3. OPEN MANIFOLD VALVE TO DESIRED COMPARTMENT
4. PULL OPERATOR LEVER FOR DESIRED COMPARTMENT



**CARRIERS SERIAL NO.**

**DATE OF MANUFACTURE**

**NOMINAL CAP U.S. GAL.**

**ICC MC 303 HTS CRES**

RESPONSIBLE AGENCY	PROCUREMENT	MAINTENANCE
CHASSIS BODY MTD. EQPT.		
U.S. MILITARY PROPERTY		

**SEMITRAILER TANK, FUEL 5000 GAL, 4 WHEEL, M131A4C**

FEDERAL STOCK NO. \_\_\_\_\_

MANUFACTURED BY \_\_\_\_\_ USA

ARMY SERIAL NO. \_\_\_\_\_

MFG SERIAL NO. \_\_\_\_\_

CONTRACT NO. \_\_\_\_\_

PUBLICATIONS

TECHNICAL MANUAL AND PART LIST

DELIVERY DATE \_\_\_\_\_ INSPECTED \_\_\_\_\_

**WEIGHT AND DIMENSION DATA**

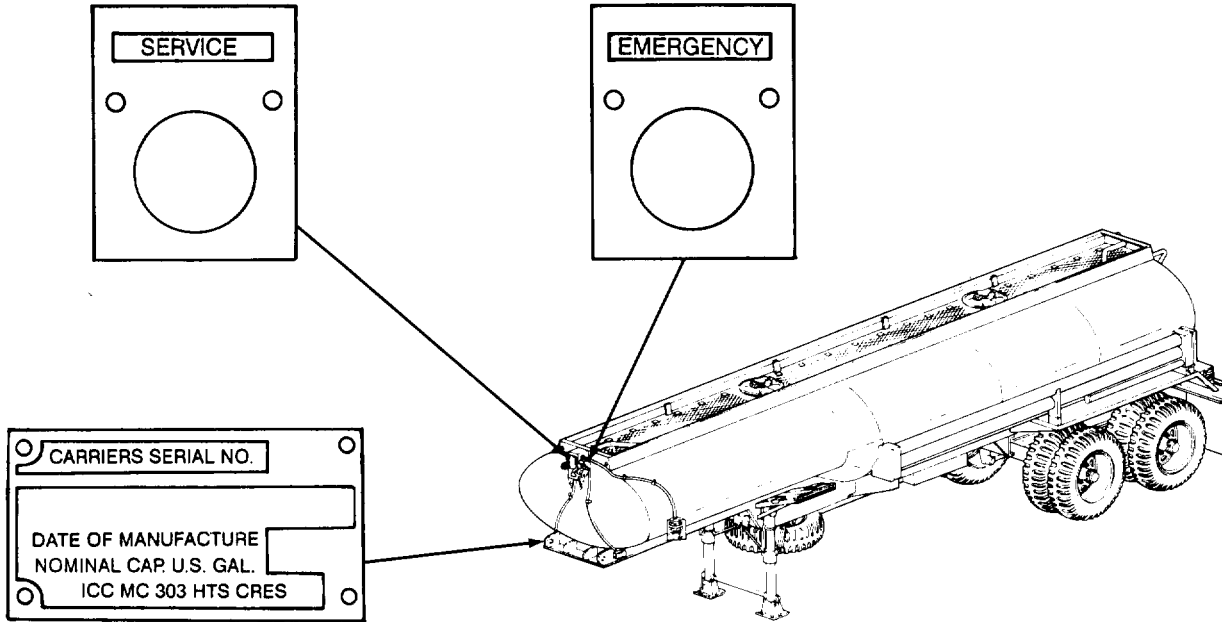
WEIGHT	EMPTY	CROSSCOUNTRY	HIGHWAY
PAYLOAD		23285	36250
ON WHEELS	10085	23405	36285
ON KINGPIN	3670	13625	18930
TOTAL	13736	37230	46215

SHIPPING CUBAGE - 2275 CU FT

TA702631

1-9. LOCATION AND CONTENTS OF DATA PLATES (Con't).

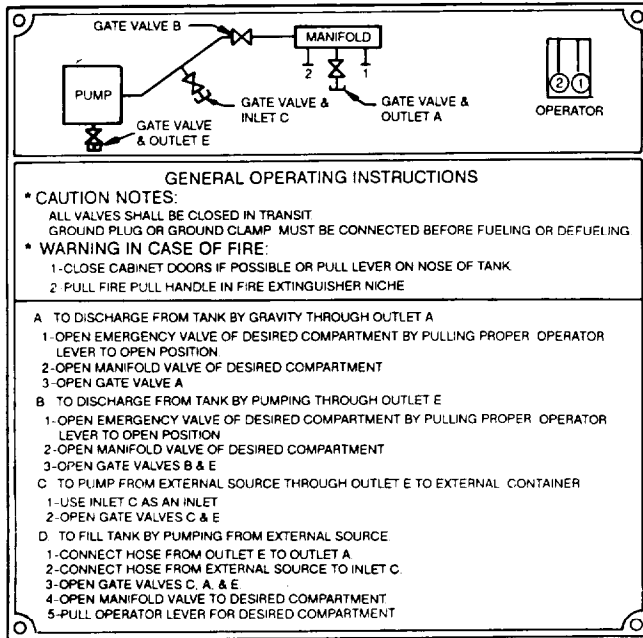
c. M131A5 Roadside.



1-9. LOCATION AND CONTENTS OF DATA PLATES (Con't).

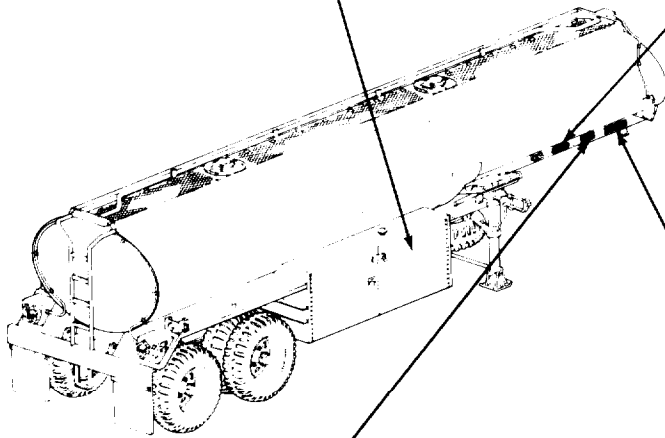
d. M131A5 Curbside.

(LOCATED ON INSIDE OF CABINET DOOR)



**FIRE EXTINGUISHING SYSTEM  
RESET AFTER USE**

1. UNSCREW CONTROL HEAD AT CYLINDER AND REMOVE CYLINDER.
2. RECHARGE WITH 10 LBS. OF CARBON DIOXIDE. FOR INTERCHANGING CYLINDERS 7714476 AND 6183325, USE ELBOWS AND/OR CONNECTORS PROVIDED AS O.V.M. AND STOWED IN THE VEHICULAR TOOL BAG.
3. RESET REMOTE CONTROL HANDLE.
4. RESET CONTROL HEAD BY INSERTING A PIN IN SHAFT AND TURNING COUNTERCLOCKWISE UNTIL CLUTCH PIN AND ARROW ARE LINED UP.
5. RE-INSTALL CYLINDER IN TANK. CLAMP IN PLACE AND CONNECT DISCHARGE TUBING.
6. ASSEMBLE CONTROL HEAD TO RECHARGED CYLINDER.

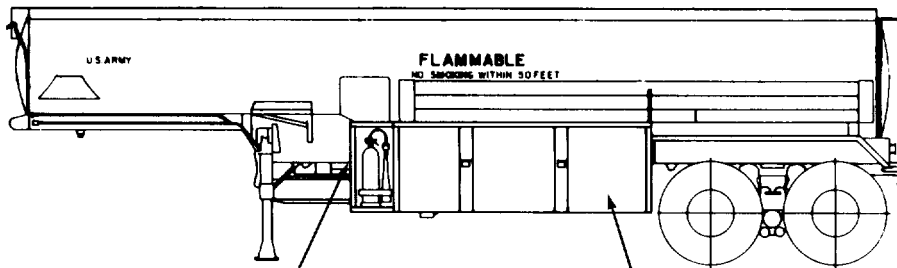


RESPONSIBLE AGENCY	PROCUREMENT	MAINTENANCE
CHASSIS BODY MTD. EQPT.		
U.S. MILITARY PROPERTY		

SEMITRAILER TANK FUEL 5000 GAL. 4 WHEEL M131A5C FEDERAL STOCK NO.		WEIGHT AND DIMENSION DATA																					
MANUFACTURED BY ARMY SERIAL NO. <input type="text"/> MFG SERIAL NO. <input type="text"/> CONTRACT NO. <input type="text"/>																							
PUBLICATIONS TECHNICAL MANUAL AND PART LIST		<table border="1"> <thead> <tr> <th>WEIGHT</th> <th>EMPTY</th> <th>CROSSCOUNTRY</th> <th>HIGHWAY</th> </tr> </thead> <tbody> <tr> <td>PAYLOAD:</td> <td></td> <td>23265</td> <td>35250</td> </tr> <tr> <td>ON WHEELS</td> <td>10085</td> <td>23405</td> <td>30285</td> </tr> <tr> <td>ON KINGPIN</td> <td>3670</td> <td>13525</td> <td>18630</td> </tr> <tr> <td>TOTAL</td> <td>13755</td> <td>37230</td> <td>49215</td> </tr> </tbody> </table>		WEIGHT	EMPTY	CROSSCOUNTRY	HIGHWAY	PAYLOAD:		23265	35250	ON WHEELS	10085	23405	30285	ON KINGPIN	3670	13525	18630	TOTAL	13755	37230	49215
WEIGHT	EMPTY	CROSSCOUNTRY	HIGHWAY																				
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DELIVERY DATE <input type="text"/> INSPECTED <input type="text"/>		SHIPPING CUBAGE - 2275 CU FT																					

1-9. LOCATION AND CONTENTS OF DATA PLATES (Con't).

e. M131A5C Roadside.



**FIRE EXTINGUISHING SYSTEM  
RESET AFTER USE**

1. UNSCREW CONTROL HEAD AT CYLINDER AND REMOVE CYLINDER.
2. RECHARGE WITH 10 LBS. OF CARBON DIOXIDE. FOR INTERCHANGING CYLINDERS 7714476 AND 6183325, USE ELBOWS AND/OR CONNECTORS PROVIDED AS O.V.M. AND STOWED IN THE VEHICULAR TOOL BAG.
3. RESET REMOTE CONTROL HANDLE.
4. RESET CONTROL HEAD BY INSERTING A PIN IN SHAFT AND TURNING COUNTERCLOCKWISE UNTIL CLUTCH PIN AND ARROW ARE LINED UP.
5. RE-INSTALL CYLINDER IN TANK, CLAMP IN PLACE AND CONNECT DISCHARGE TUBING.
6. ASSEMBLE CONTROL HEAD TO RECHARGED CYLINDER.

**FUELING INSTRUCTIONS**

**CAUTION:**

- 1 ALL VALVES MUST BE CLOSED IN TRANSIT AND SELECTOR VALVE SET AT ZERO
- 2 GROUND PLUG OR GROUND CLAMP MUST BE CONNECTED BEFORE FUELING OR DEFUELING
- 3 DO NOT OPEN DUMP VALVE ON FILTER-SEPARATOR SUMP WHEN FUELING AIRCRAFT

**WARNING IN CASE OF FIRE:**

- 1 CLOSE CABINET DOORS IF POSSIBLE OR PULL EMERGENCY PULL LEVER ON NOSE OF TANK
- 2 PULL FIRE HANDLE AT FRONT OF CABINET

**FOR HIGH VOLUME DELIVERY, 225 GPM:**

- 1 OPEN VALVES (B AND L)
- 2 PULL VALVE (H) CONTROL HANDLE OUT
- 3 OPEN ALL MANIFOLD VALVE HANDLES
- 4 PULL ALL OPERATOR HANDLES
- 5 CONTROL FLOW BY MANIPULATING TRIGGER OF FUELING NOZZLE (J)

**FOR LOW VOLUME DELIVERY, 0 TO 55 GPM:**

- 1 SAME STEPS AS USED FOR HIGH VOLUME DELIVERY EXCEPT VALVE (L) TO BE CLOSED AND VALVE (F) TO BE CONTROLLED BY SETTING SELECTOR VALVE ON INSTRUMENT PANEL TO DESIRED RATE
- 2 CONTROL FLOW BY MANIPULATING TRIGGER OF NOZZLE (K)

**TO DEFUEL:**

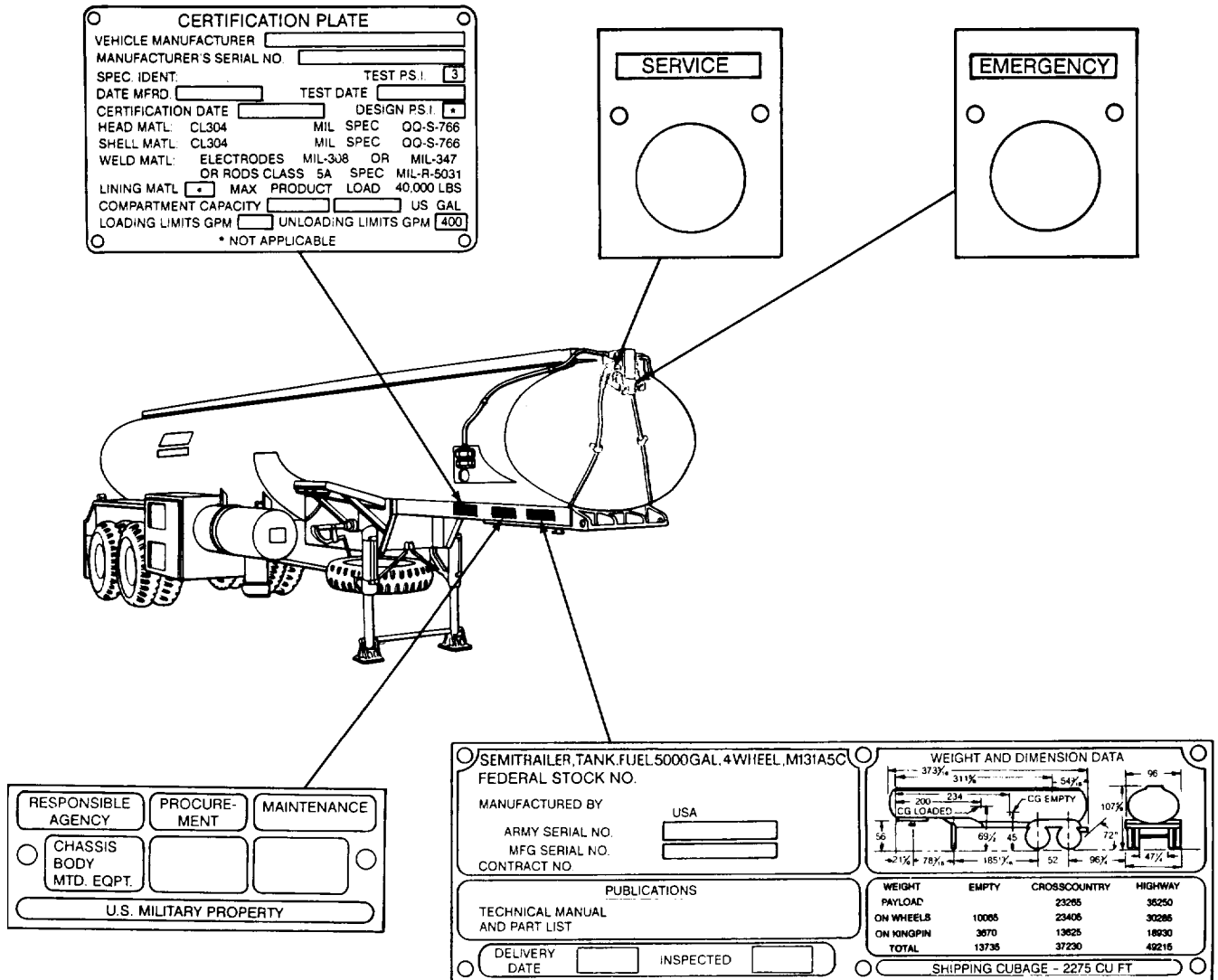
- 1 OPEN VALVES (L AND D)
- 2 PUSH VALVE (H) CONTROL HANDLE IN
- 3 OPEN MANIFOLD VALVES (1 AND 2)
- 4 PULL OPERATOR HANDLES (1 AND 2)
- 5 ATTACH LONG ADAPTER TO FUELING NOZZLE (J)
- 6 PLACE NOZZLE IN TANK TO BE EMPTIED AND OPERATE TRIGGER

(LOCATED ON INSIDE OF CABINET DOOR)

TA702634

1-9. LOCATION AND CONTENTS OF DATA PLATES (Con't).

f. M131A5C Curbside.



TA702635

**1-10. DIFFERENCES BETWEEN MODELS.**

a. The M131A4 and M131A4C semitrailers have four fuel tank compartments with a capacity of 1250 gl (4731 l) each. The M131A5 and M131A5C semitrailers have two fuel tank compartments with a capacity of 2500 gl (9463 l) each.

b. The M131A4 and M131A5 semitrailers are used for fuel transport or fuel transfer only. The M131A4C and M131A5C semitrailers may be used for fuel transport, fuel transfer, or fuel servicing of containers, ground vehicles, or aircraft with over-the-wing fueling facilities with a maximum fuel acceptance rate of 225 gpm (852 lpm).

c. The M131A4 and M131A5 semitrailers consist of an integral fuel tank with one curbside cabinet housing an air-cooled auxiliary engine and fuel dispensing pump unit, fuel manifold, flow control valves, and static reel. The M131A4C and M131A5C semitrailers consist of an integral fuel tank with one curbside cabinet housing an air-cooled auxiliary engine and fuel dispensing pump unit and one roadside cabinet housing a fuel manifold, flow control valves, volumetric meter, static reel, hose reels, and nozzles.

d. Early model lighting system consists of two service taillights, blackout taillight assemblies, and clearance marker lights. Late model electrical system consists of two composite taillights and clearance marker lights.

e. Similar models of semitrailers were produced by different manufacturers. As a result, minor differences in design among these semitrailers exist. The serial numbers and contract numbers listed below should be indicated in any reports, inquiries, or recommendations.

Model No.	Serial No.	Manufacturer	Contract No. 20-113-AMC
M131A4	1-115	City Tank Corp.	DA-11-022-AMC-1894 (T)
M131A4C	1-113	The Heil Co.	DA-11-022-AMC-2012 (T)
M131A4C	114-340	Butler Mfg. Co.	DA-11-022-AMC-1864 (T)
M131A4C	341-396	The Heil Co.	DA-11-022-AMC-2012 (T)
M131A4C	397-497	Butler Mfg. Co.	DA-11-022-AMC-1864 (T)
M131A4C	498-607	The Heil Co.	DA-11-022-AMC-2264 (T)
M131A5	1-840	The Heil Co.	DA-11-022-AMC-5431 (T)
M131A5	841-1640	The Heil Co.	DA-11-022-AMC-10112 (T)
M131A5	1641-2635	Fruehauf Trailer Co.	DA-11-022-AMC-10420 (T)
M131A5	2636-2644	The Heil Co.	DA-11-022-AMC-10112 (T)
M131A5C	1-428	Fruehauf Trailer Co.	DA-11-022-AMC-11226 (T)

f. Differences among M131A4C models are as follows:

(1) **Instrument Panel.** M131A4C semitrailers with serial numbers 1-340 are equipped with the instrument panel in the curbside cabinet. M131A4C semitrailers with serial numbers 341 and above are equipped with the instrument panel near the equipment cabinet on the roadside of the semitrailer.

(2) **Filter-separator,** M131A4C semitrailers with serial numbers 1-113 are equipped with a filter-separator designed by Warner Lewis. M131A4C semitrailers with serial numbers 114 and above are equipped with a filter-separator designed by Bowser, Inc.

1-11. EQUIPMENT DATA.

<u>All Models</u>	
<b>Dimensions (Overall):</b>	
Length .....	373 5/8in. (949.0 cm)
Width .....	96 3/4 in. (245.7 cm)
Height (Empty) .....	107 5/8in. (273.4 cm)
<b>Track:</b>	
Dual Wheel Centers .....	72 in. (182.9 cm)
Towing Facility .....	Kingpin
<b>Kingpin Location:</b>	
Vehicle Nose to Kingpin Center .....	21 5/8 in. (54.9 cm)
Kingpin Center to Landing Gear Center .....	78 3/16in. (198.6 cm)
Angle of Departure (Loaded) .....	700
<b>Fuel Tank Capacity:</b>	
Cross-country .....	3300 gl (12,491l)
Highway .....	5000 gl (18,925l)
<b>Springs:</b>	
Type .....	Semielliptic
Quantity .....	2
Normal Load .....	14,000 lb (6356 kg)
Number of Leaves (Each) .....	12
<b>Axle:</b>	
Diameter (Nominal) .....	5 1/2in. (14.0 cm)
Capacity .....	18,000 lb (8172 kg)
<b>Brakes:</b>	
Type .....	Self-centering
Actuation .....	Air-over-hydraulic
Operating Pressure .....	69-90 psi (476-621 kPa)
<b>Wheels:</b>	
Quantity .....	9
Type .....	Dual, Military Disk
Rim Size .....	20 x 7.5
Number of Stud Holes .....	10
Stud Circle Diameter .....	11 1/4 in. (28.6 cm)
<b>Tires:</b>	
Quantity .....	9
Type .....	NDCC Military
Size .....	11.00 x 20 12 Ply
Tire Inflation:	
Highway .....	60 psi (414 kPa)
Cross-country and Sand .....	45 psi (310 kPa)
<b>Landing Gear:</b>	
Type .....	Two-speed With Shoes
Operation .....	Handcrank

1-11. EQUIPMENT DATA (Con't).

<b>Spare Wheel and Tire Carrier:</b>	
Type .....	Cable Lift
Operation .....	Wheel Nut Wrench
<b>Fuel Transfer Hose:</b>	
Quantity .....	3
Nominal Size .....	3 in. (7.6 cm)
Length .....	15 ft (4.6 m)
<b>Transfer Hose Stowage:</b>	
Type .....	Horizontal Tube
Number of Tubes .....	3
Tube Length .....	16 ft (4.9 m)
<b>Fuel Dispensing Pump:</b>	
Type .....	Centrifugal
Power Source .....	Auxiliary Engine
Delivery Rate (Maximum) .....	225 gpm (852 lpm)
<b>Auxiliary Engine:</b>	
Model .....	2A042-2
(Refer to TM 5-2805-258-14 for tabulated engine data.)	
<b>Electrical System:</b>	
Lamps .....	24 v
Clearance Marker Lights .....	3 cp
Taillights (Blackout) .....	3 cp
Taillights (Service) .....	3 cp
Stoplights (Service) .....	32 cp
<b>Portable Fire Extinguishers:</b>	
Type .....	CO <sub>2</sub>
Quantity/Size .....	2 @ 2½ lb (1.1 kg)
Quantity/Size .....	1 @ 15 lb (6.8 kg)
<b>Fixed Fire Extinguishers:</b>	
Type .....	CO <sub>2</sub>
Size .....	10 lb (4,5 kg)
<b><u>M131A4</u></b>	
<b>Weight:</b>	
Empty .....	12,900 lb (5857 kg)
Cross-country .....	36,165 lb (16,419 kg)
Highway, .....	48,150 lb (21,860 kg)
<b>Center of Gravity (Forward of Suspension Center):</b>	
Empty .....	127 5/8 in. (324.2 cm)
Loaded .....	96 1/8 in. (244.2 cm)



1-11. EQUIPMENT DATA (Con't).

<b>Fuel Tank Data:</b>	
Quantity of Compartments .....	4
Compartment Capacity:	
Cross-country .....	825 gl (3123 l)
Highway .....	1250 gl (4731 l)
<b>Manholes and Fill Covers:</b>	
Quantity .....	4
Manhole Cover Size (Nominal) .....	16 in. (40.6 cm)
Fill Cover Size (Nominal) .....	10 in. (25.4 cm)
<b><u>M131A4C</u></b>	
<b>Weight:</b>	
Empty .....	13,850 lb (6288 kg)
Cross-country .....	36,950 lb (16,775 kg)
Highway .....	49,100 lb (22,291 kg)
<b>Center of Gravity (Forward of Suspension Center):</b>	
Empty .....	111 5/8 in. (283.5 cm)
Loaded .....	77 5/8 in. (197.1 cm)
<b>Fuel Tank Data:</b>	
Quantity of Compartments .....	4
Compartment Capacity:	
Cross-country .....	825 gl (3123 l)
Highway .....	1250 gl (4731 l)
<b>Manholes and Fill Covers:</b>	
Number .....	4
Manhole Cover Size (Nominal) .....	16 in. (40.6 cm)
Fill Cover Size (Nominal) .....	10 in. (25.4 cm)
<b>Fuel Dispensing Hoses:</b>	
Length .....	50 ft (15.3 m)
Quantity/Size .....	1 @ 1½ in. (3.8 cm)
Quantity/Size .....	1 @ 2½ in. (6.4 cm)
<b>Fuel Dispensing Nozzles:</b>	
Type .....	Trigger Control
Quantity .....	1
Nominal Size .....	1½ in. (3.8 cm)
Capacity .....	0-55 gpm (0-208 lpm)
Quantity .....	1
Nominal Size .....	2½ in. (6.4 cm)
Capacity .....	0-255 gpm (0-965 lpm)
<b>Volumetric Meter:</b>	
Flow Rate .....	300 gpm (1136 lpm)
Material .....	Aluminum

1-11. EQUIPMENT DATA (Con't).

<b>Filter-separator:</b>	
Weight (Dry) .....	226 lb (103 kg)
Operating Pressure .....	75 psi (517 kPa)
Capacity .....	300 gpm (1136 lpm)
<b><u>M131A5</u></b>	
<b>Weight:</b>	
Empty .....	12,900 lb (5857 kg)
Cross-country .....	36,165 lb (16,419 kg)
Highway .....	48,150 lb (21,860 kg)
<b>Center of Gravity (Forward of Suspension Center):</b>	
Empty .....	127 5/8 in. (324.2 cm)
Loaded .....	96 1/8 in. (244.2 cm)
<b>Fuel Tank Data:</b>	
Quantity of Compartments .....	2
Compartment Capacity:	
Cross-country .....	1650 gl (62451)
Highway .....	2500 gl (94631)
<b>Manholes and Fill Covers:</b>	
Quantity .....	2
Manhole Cover Size (Nominal) .....	20 in. (50.8 cm)
Fill Cover Size (Nominal) .....	10 in. (25.4 cm)
<b><u>M131A5C</u></b>	
<b>Weight:</b>	
Empty .....	13,850 lb (6288 kg)
Cross-country .....	36,950 lb (16,775 kg)
Highway .....	49,100 lb (22,291 kg)
<b>Center of Gravity (Forward of Suspension Center):</b>	
Empty .....	111 5/8 in. (283.5 cm)
Loaded .....	77 5/8 in. (197.1 cm)
<b>Fuel Tank Data:</b>	
Quantity of Compartments .....	2
Compartment Capacity:	
Cross-country .....	1650 gl (62451)
Highway .....	2500 gl (94631)
<b>Manholes and Fill Covers:</b>	
Quantity .....	2
Manhole Cover Size (Nominal) .....	20 in. (50.8 cm)
Fill Cover Size (Nominal) .....	10 in. (25.4 cm)

1-11. EQUIPMENT DATA (Con't).

<b>Fuel Dispensing Hoses:</b>	
Length .....	50 ft (15.3 m)
Quantity/Size .....	1 @ 1½ in. (3.8 cm)
Quantity/Size .....	1 @ 2½ in. (6.4 cm)
<b>Fuel Dispensing Nozzles:</b>	
Type .....	Trigger Control
Quantity .....	1
Nominal Size .....	1½ in. (3.8 cm)
Capacity .....	0-55 gpm (0-208 lpm)
Quantity .....	1
Nominal Size .....	2½ in. (6.4 cm)
Capacity .....	0-225 gpm (0-965 lpm)
<b>Volumetric Meter:</b>	
Flow Rate .....	300 gpm (1136 lpm)
Material .....	Aluminum
<b>Filter-separator:</b>	
Weight (Dry) .....	226 lb (103 kg)
Operating Pressure .....	75 psi (517 kPa)
Capacity .....	300 gpm (1136 lpm)

## Section III. GENERAL SAFETY REGULATIONS

Paragraph Title	Page Number
Safety Regulations .....	1-26
Scope .....	1-26

### 1-12. SCOPE.

a. Operation and maintenance of any fuel hauling semitrailer can be hazardous due to the flammable and explosive nature of the load.

b. This section contains a summary of safety regulations which **MUST** be strictly followed when operating or maintaining the MI 31 Series Fuel Tank Semitrailers. Personnel who fail to follow these regulations endanger the mission, equipment, and lives of themselves and other personnel.

c. Read and become familiar with all **WARNINGS** in the Warning Summary at the front of this manual.

d. Throughout this manual, **WARNINGS** are placed as they pertain to specific operational or maintenance procedures. Read these warnings and follow them exactly.

### 1-13. SAFETY REGULATIONS.

a. Refer to FM 10-20, FM 10-68, FM 10-69, and FM 10-71 to become familiar with safe fuel handling procedures.

b. Personnel engaged in the operation and maintenance of the semitrailer must not wear clothing that generates static electricity. **DO NOT** wear wool, nylon, silk, rayon, or other similar materials. Remove all contents from pockets. Wear rubber boots and gloves during fuel loading and unloading.

c. Before loading or unloading fuel, purging tank, or performing any Organizational, Direct Support, or General Support Maintenance on semitrailer, connect all bonding and grounding connections. Refer to paragraph 2-13 for information on proper bonding and grounding procedures.

d. Never climb on semitrailer without first touching static ground wire to discharge static electricity from your body.

e. Under normal circumstances, perform all maintenance on semitrailer outdoors, away from buildings, and with tank empty. The semitrailer tank should be checked to ensure that it is free of vapors that could ignite during maintenance activities.

f. If circumstances require that maintenance be performed inside a building, semitrailer tank must be thoroughly drained and purged, and exterior of semitrailer steam cleaned. Explosimeter test, after purging, must read in the **SAFE** zone (para 4-64). Even if semitrailer has tested **SAFE** with combustible gas indicator set, it **MUST** be retested prior to starting work each day and at regular intervals throughout the day. This test can be accomplished by authorized Organizational or Direct Support Maintenance personnel with an MOS of 77F or equivalent (FM 10-20).

g. To reduce the risk of fire and explosion, **DO NOT** perform the following operations on semitrailer unless tank is drained, purged, and exterior of semitrailer steam cleaned:

(1) Replace any component that comes in contact with fuel or vapors (manhole, emergency relief valve, sump drain, filter-separator, valves, and piping).

(2) Troubleshoot electrical system with any test device other than the ohms scale of a multimeter.

(3) Weld or solder.

**1-13. SAFETY REGULATIONS (Con't).**

(4) Cut with acetylene torch or chisel and hammer.

(5) Drill (except aluminum).

h. Follow these rules if working inside a purged tank:

(1) Always provide adequate forced air ventilation with air directed inside to compartment where work is being performed.

(2) NEVER work alone inside a tank; a second person must be stationed at the manhole opening. The person inside the tank must have a safety line and harness.

(3) If the person inside the tank encounters any difficulties, the person stationed at the manhole opening must summon assistance IMMEDIATELY DO NOT attempt a rescue until assistance has arrived.



## CHAPTER 2 OPERATING INSTRUCTIONS

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

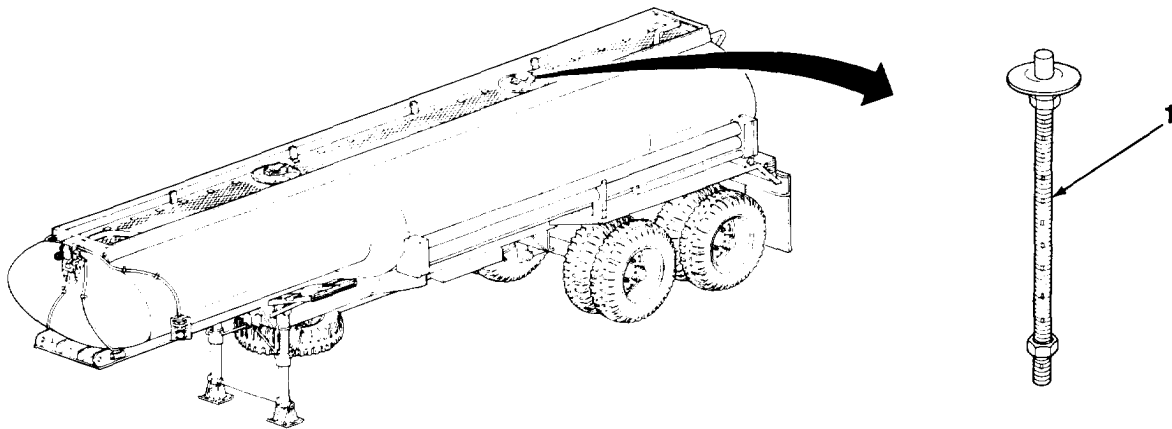
Paragraph Title	Page Number
Controls and Indicators .....	2-1
General .....	2-1

**2-1. GENERAL.**

This section shows the location and function of all semitrailer controls and indicators. review this section thoroughly before operating the semitrailer.

**2-2. CONTROLS AND INDICATORS.**

a. Top.



Key	Control or Indicator	Function
1	Fuel Level Gage	Allows operator to gage amount of fuel in tank when loading. Located inside manhole opening.

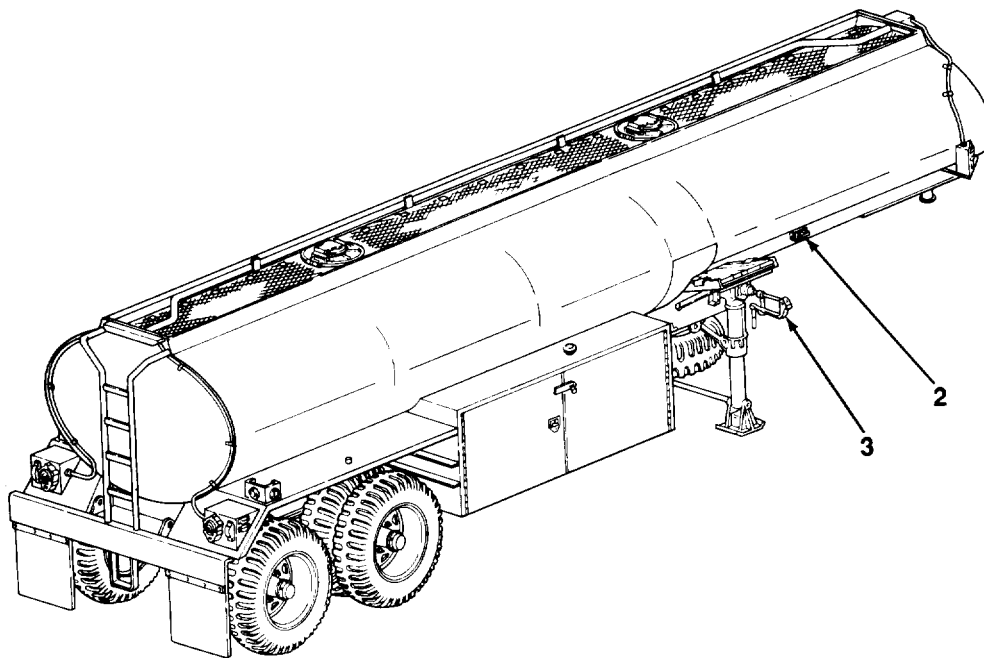
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2-2. CONTROLS AND INDICATORS (Con't).

b. Curbside.

NOTE

Curbside controls and indicators are located in the same place on all models. M131A5 is illustrated.



Key	Control or Indicator	Function
2	Remote Control Handle	Activates fixed fire extinguisher system when pulled. On M131A4C and M131A5C, located on roadside.
3	Handcrank	Operates retractable landing gear legs.

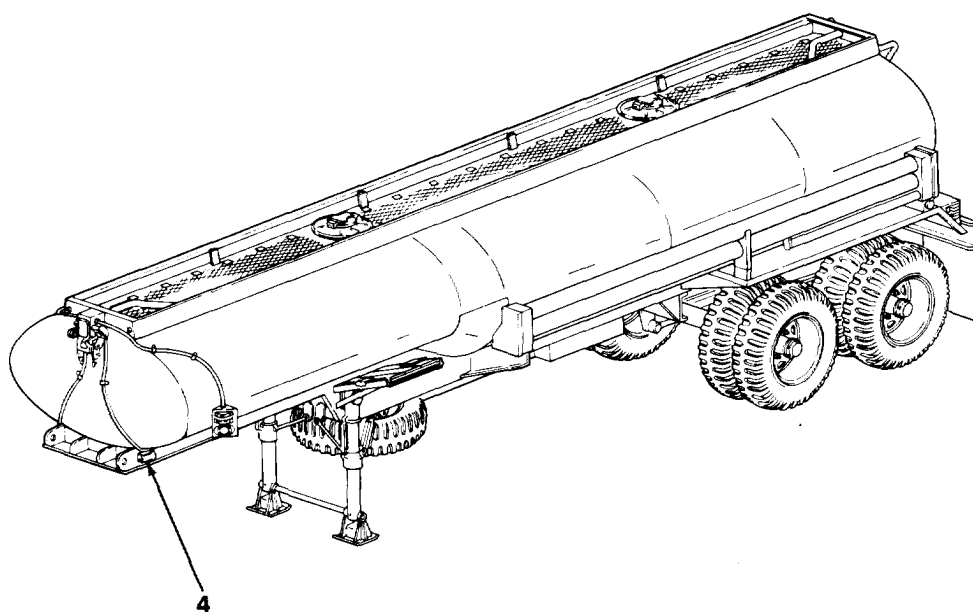


2-2. CONTROLS AND INDICATORS (Con't).

c. Roadside.

NOTE

Roadside controls and indicators are located in the same place on all models. M131A5 is illustrated.



Key	Control or Indicator	Function
4	Emergency Relief Valve Shutoff	Closes emergency relief valves when pulled.

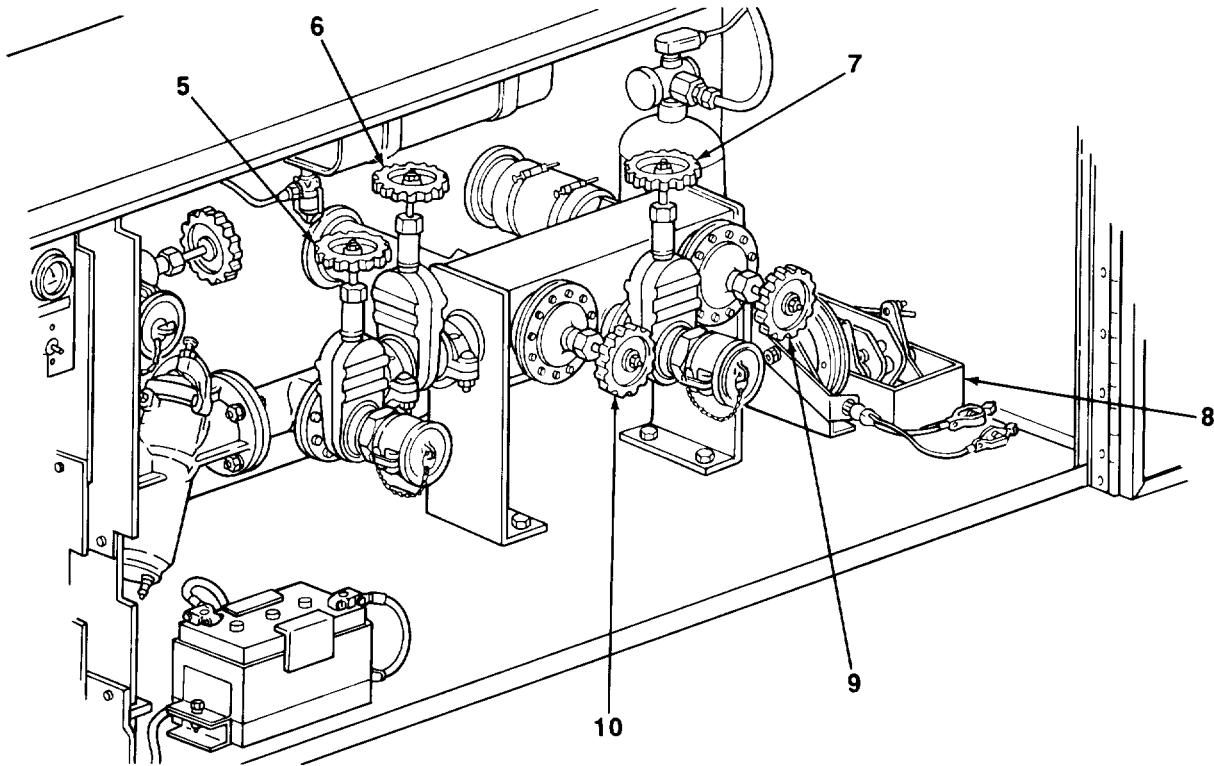
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2-2. CONTROLS AND INDICATORS (Con't).

d. Curbside Cabinet, Front Compartment (M131A4 and M131A5).

NOTE

M131A5 is illustrated.

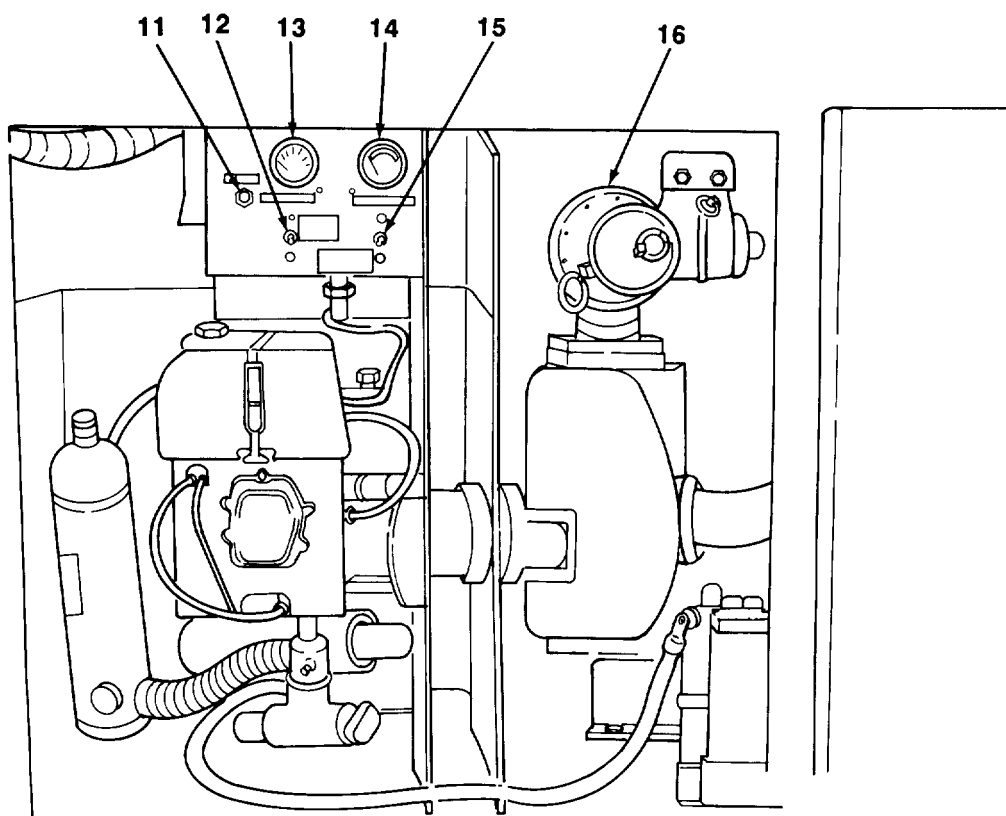


Key	Control or Indicator	Function
5	Pump Intake Valve	Controls fuel flow to pump when bottom loading semitrailer using pumping system.
6	Pump Cutoff Valve	Controls fuel flow from manifold to pump during fuel servicing operations.
7	Gravity Discharge Valve	Controls gravity flow of fuel from manifold.
8	Operating Control Levers	Pull outward to open emergency relief valves. Push in to close emergency relief valves. There are four levers on M131A4 and two levers on M131A5.
9	Front Compartment Manifold Valve	Controls fuel flow between front compartment and manifold. There are two additional manifold valves on M131A4.
10	Rear Compartment Manifold Valve	Controls fuel flow between rear compartment and manifold. There are two additional manifold valves on M131A4.

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## 2-2. CONTROLS AND INDICATORS (Con't).

## e. Curbside Cabinet, Rear Compartment (M131A4 and M131A5).

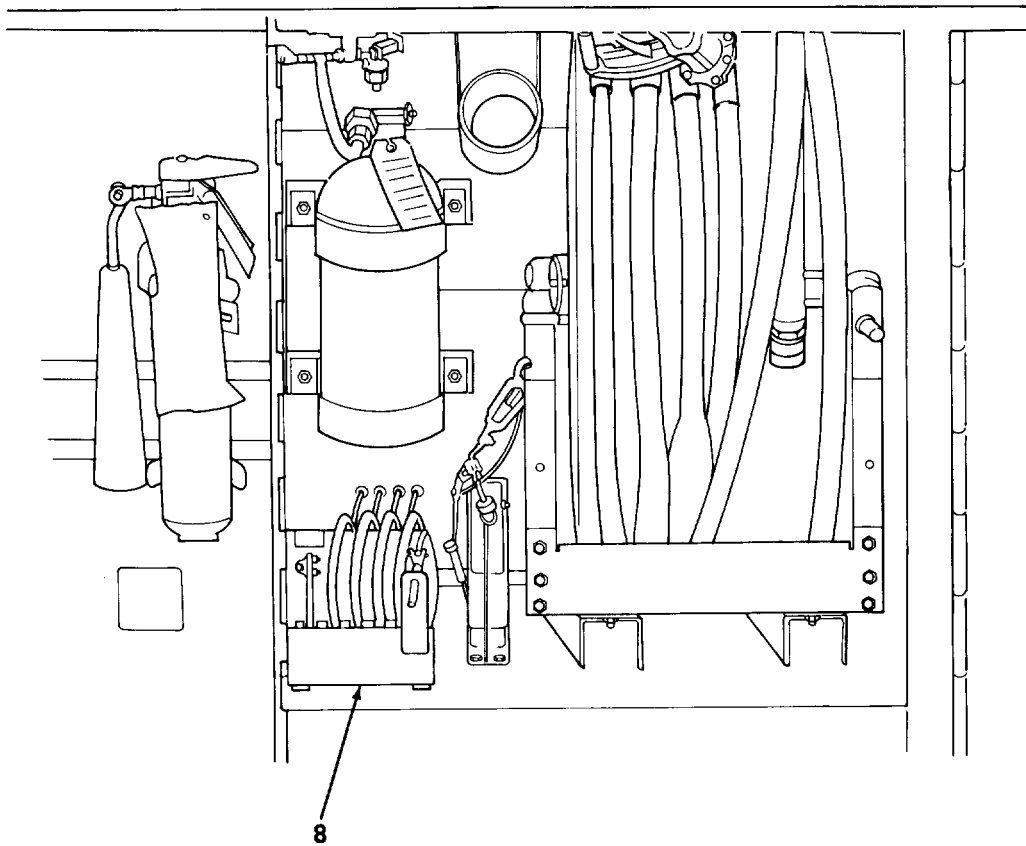


Key	Control or Indicator	Function
11	Starter Switch	Engages starter motor to turn and start engine.
12	Ignition Switch	In ON position, energizes ignition system. In OFF position, stops engine.
13	Oil Pressure Gage	Indicates pressure in engine lubrication system.
14	System Voltage Gage	Indicates battery operating voltage.
15	Panel Power Switch	In ON position, provides power for instrument panel.
16	Pump Discharge Valve	Controls fuel delivery from pump through pump discharge valve outlet.

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2-2. CONTROLS AND INDICATORS (Con't).

f. Roadside Cabinet, Front Compartment (M131A4C).

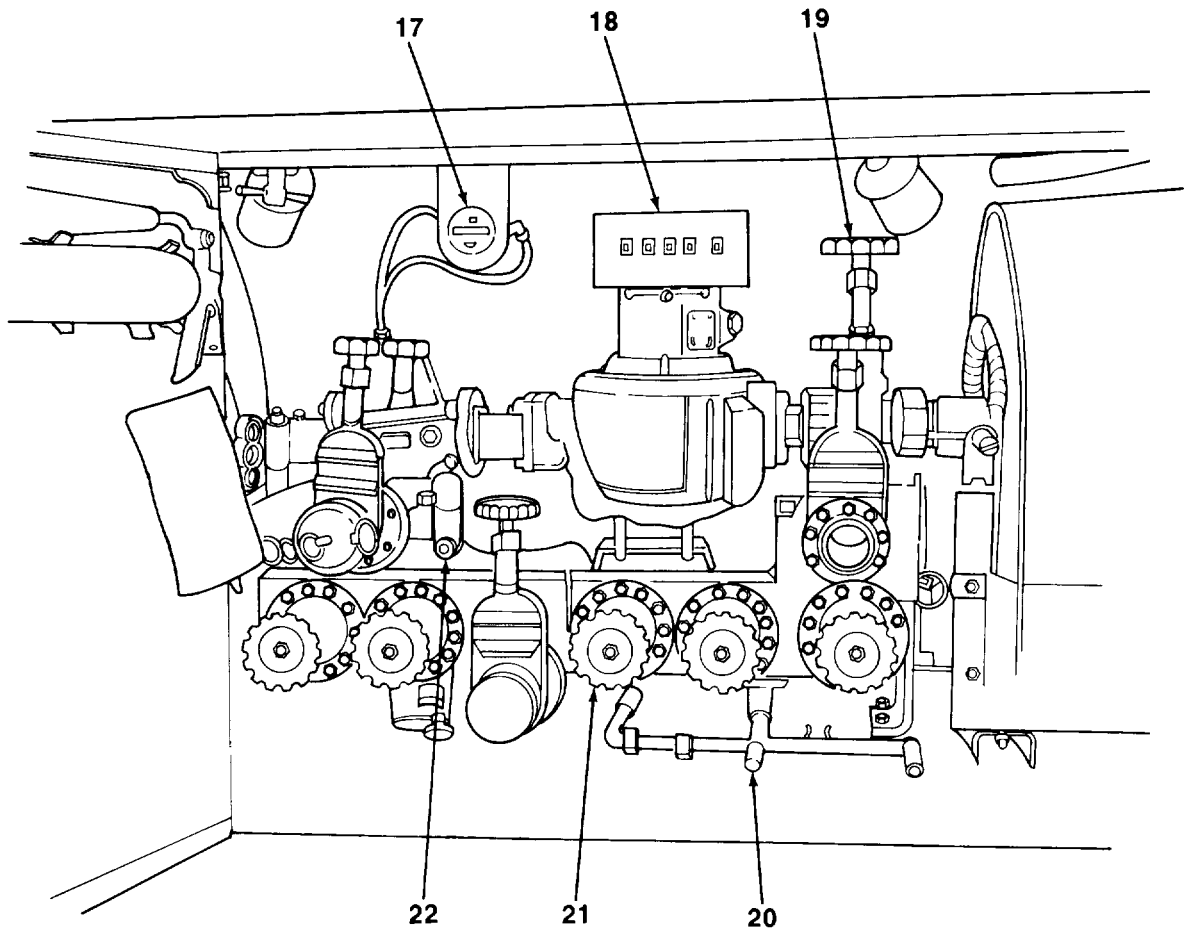


Key	Control or Indicator	Function
8	Operating Control Levers	Pull outward to open emergency relief valves. Push in to close emergency relief valves.

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2-2. CONTROLS AND INDICATORS (Con't).

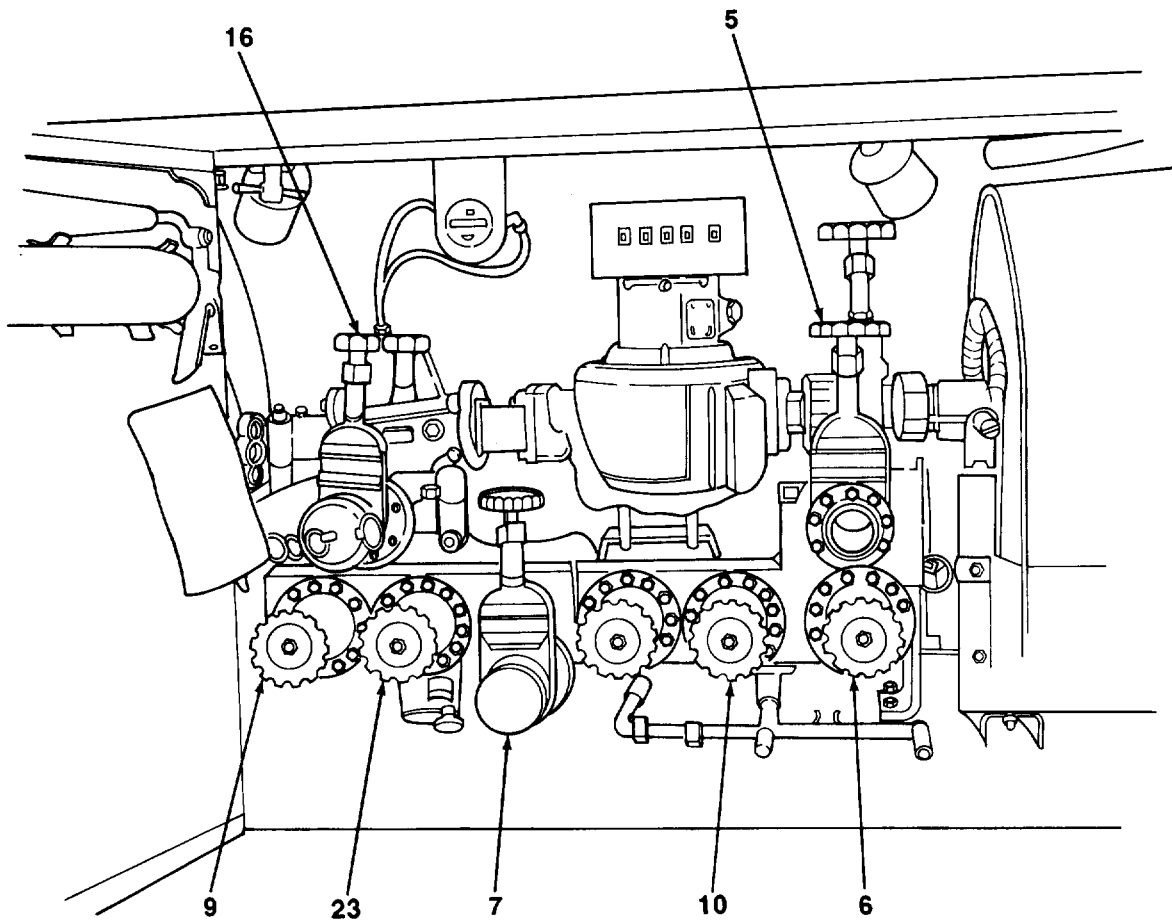
g. Roadside Cabinet, Rear Compartment (M131A4C).



Key	Control or Indicator	Function
17	Rate-of-flow Selector Valve Dial	Used to select specific fuel flow rate through 0-55 gpm (0-208 lpm) fuel dispensing system.
18	Volumetric Meter	Records amount of fuel being loaded or unloaded from semitrailer compartments.
19	225 gpm (852 lpm) Cutoff Valve	Controls fuel flow between meter and 225 gpm (852 lpm) fuel dispensing system.
20	Handcrank	Operates rewind mechanism on hose reels.
21	Rear-middle Compartment Manifold Valve	Controls fuel flow between rear-middle compartment and manifold.
22	Three-way Flow Valve Lever	Directs fuel flow to individual compartments.

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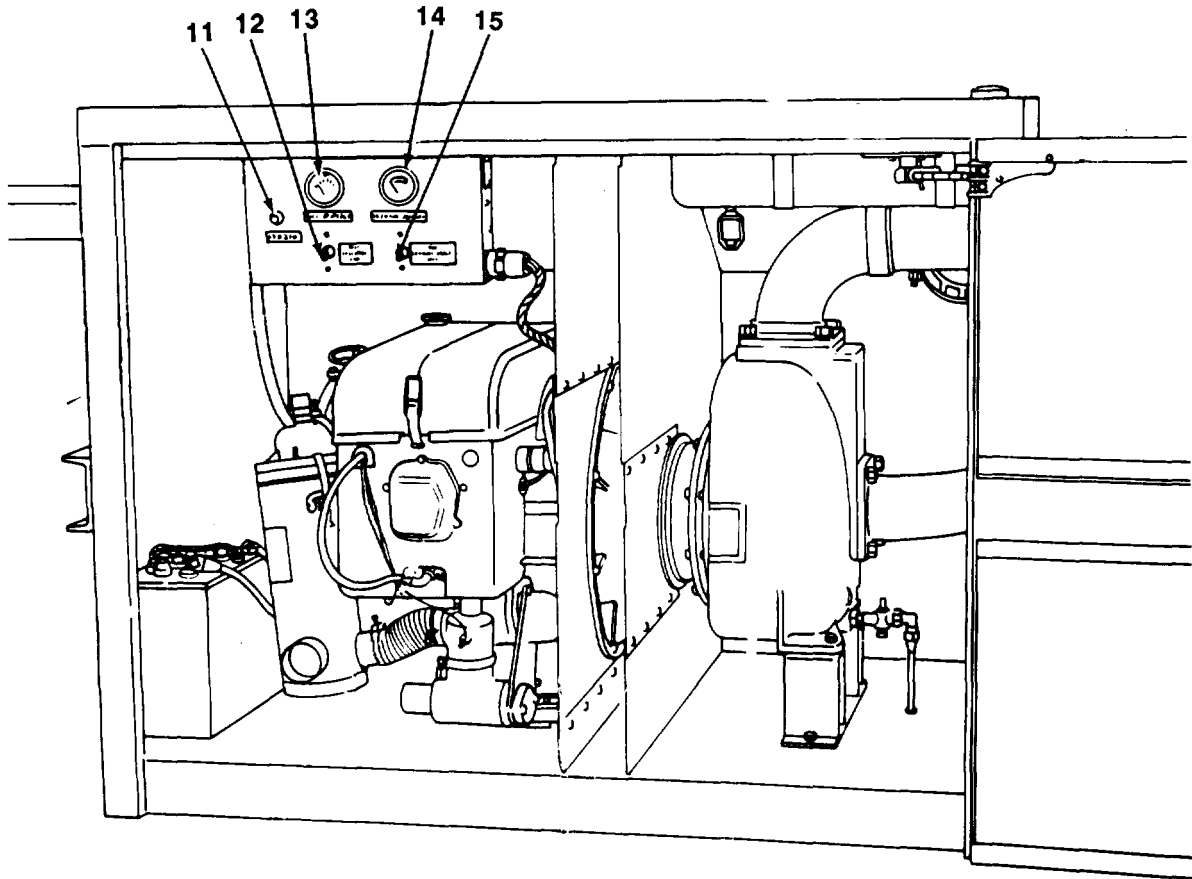
2-2. CONTROLS AND INDICATORS (Con't)



Key	Control or Indicator	Function
23	Front-middle Compartment Manifold Valve	Controls fuel flow between front-middle compartment and manifold.
5	Pump Intake Valve	Controls fuel flow to pump when bottom loading semitrailer using pumping system.
6	Pump Cutoff Valve	Controls fuel flow from manifold to pump during fuel servicing operations.
7	Gravity Discharge Valve	Controls gravity flow of fuel from manifold.
9	Front Compartment Manifold Valve	Controls fuel flow between front compartment and manifold.
10	Rear Compartment Manifold Valve	Controls fuel flow between rear compartment and manifold.
16	Pump Discharge Valve	Controls fuel delivery from pump through pump discharge valve outlet.

2-2. CONTROLS AND INDICATORS (Con't).

h. Curbside Cabinet (M131A4C, Serial Numbers 1-340).

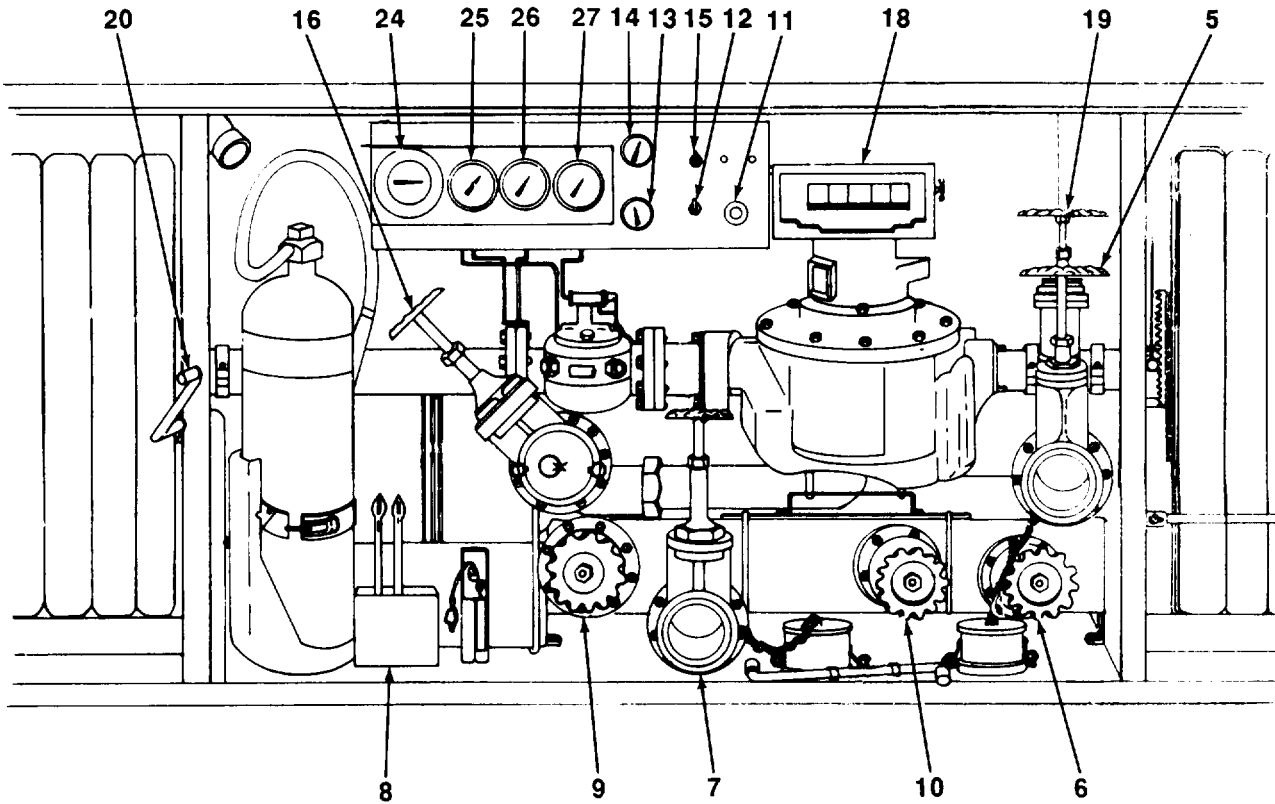


Key	Control or Indicator	Function
11	Starter Switch	Engages starter motor to turn and start engine.
12	Ignition Switch	In ON position, energizes ignition system. In OFF position, stops engine.
13	Oil Pressure Gage	Indicates pressure in engine lubrication system.
14	System Voltage Gage	Indicates battery operating voltage.
15	Panel Power Switch	In ON position, provides power for instrument panel.

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2-2. CONTROLS AND INDICATORS (Con't).

i. Front Roadside Cabinet (M131A5C).



Key	Control or Indicator	Function
24	0-55 gpm (0-208 lpm) Controller	Controls flow rate in 0-55 gpm (0-208 lpm) fuel dispensing system.
25	Filter Outlet Pressure Gage	Indicates filter outlet pressure in filter-separator; used to determine condition of filter elements.
26	First Stage Outlet Pressure Gage	Indicates outlet pressure for first stage elements in filter-separator; used to determine condition of filter elements.
27	Filter Inlet Pressure Gage	Indicates filter inlet pressure in filter-separator; used to determine condition of filter elements.
5	Pump Intake Valve	Controls fuel flow to pump when bottom loading semitrailer with pumping system.
6	Pump Cutoff Valve	Controls fuel flow from manifold to pump during fuel servicing operations.
7	Gravity Discharge Valve	Controls gravity flow of fuel from manifold.

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## 2-2. CONTROLS AND INDICATORS (Con't).

Key	Control or Indicator	Function
8	Operating Control Levers	Pull outward to open emergency relief valves. Push in to close emergency relief valves.
9	Front Compartment Manifold Valve	Controls fuel flow between front compartment and manifold.
10	Rear Compartment Manifold Valve	Controls fuel flow between rear compartment and manifold.
11	Starter Switch	Engages starter motor to turn and start engine.
12	Ignition Switch	In ON position, energizes ignition system. In OFF position, stops engine.
13	Oil Pressure Gage	Indicates pressure in engine lubrication system.
14	System Voltage Gage	Indicates battery operating voltage.
15	Panel Power Switch	In ON position, provides power for instrument panel.
16	Pump Discharge Valve	Controls fuel delivery from pump through pump discharge valve outlet.
18	Volumetric Meter	Records amount of fuel being loaded or unloaded from semitrailer compartments.
19	225 gpm (852 lpm) Cutoff Valve	Controls fuel flow between meter and 225 gpm (852 lpm) fuel dispensing system.
20	Handcrank	Operates rewind mechanism on hose reels.

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

Paragraph Title	Page Number
General . . . . .	2-12
General PMCS Procedures . . . . .	2-12
Leakage Definitions . . . . .	2-13
Operator/Crew Preventive Maintenance Checks and Services (PMCS), Table 2-1 . . . . .	2-14
Reporting Repairs . . . . .	2-12
Service intervals . . . . .	2-12
Specific PMCS Procedures . . . . .	2-13

### 2-3. GENERAL.

a. To ensure that the M131 Series Fuel Tank Semitrailers are ready for operation at all times, they must be inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure, or injury to personnel. This section contains systematic instructions on inspections, adjustments, and corrections to be performed by the operator/crew.

b. While performing PMCS, read and follow all safety instructions found in the Warning Summary at the front of this manual. Keep in mind all WARNINGS and CAUTIONS.

### 2-4. SERVICE INTERVALS.

Perform PMCS, found in Table 2-1, at the following intervals:

- (1) Perform *Before* (B) PMCS just before operating the semitrailer.
- (2) Perform *During* (D) PMCS while operating the semitrailer.
- (3) Perform *After* (A) PMCS right after operating the semitrailer.
- (4) Perform *Weekly* (W) PMCS once each week.

### 2-5. REPORTING REPAIRS.

All defects which the operator cannot fix must be reported on a DA Form 2404, *Equipment Inspection and Maintenance Worksheet*, immediately after completing PMCS. If a serious problem is found, IMMEDIATELY report it to your supervisor.

### 2-6. GENERAL PMCS PROCEDURES.

#### WARNING

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

a. Keep equipment clean. Dirt, oil, and debris may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent (Item 16, Appendix E) on all metal surfaces. Use dishwashing compound (Item 7, Appendix E) and water on rubber, plastic, and painted surfaces.

**2-6. GENERAL PMCS PROCEDURES (Con't).**

b. While performing specific PMCS procedures, inspect the following components:

(1) Bolts, Nuts, and Screws, Ensure that they are not loose, missing, bent, or broken, Report loose or missing bolts, nuts, and screws to Organizational Maintenance.

(2) Welds. Inspect for gaps where parts are welded together Check for loose or chipped paint, rust, and cracks. Report bad welds to Organizational Maintenance.

(3) Electric Conduit, Wires, and Connectors. Inspect for cracked or broken conduit insulation, bare wires, and loose or broken connectors. Report loose connections and faulty wiring to Organizational Maintenance.

(4) Hoses, Lines, and Fittings. Inspect for wear, damage, and leaks. Ensure that clamps and fittings are tight. Report any damage, leaks, or loose fittings and clamps to Organizational Maintenance.

c. Check that components are adequately lubricated in accordance with Chapter 3, Section I.

**2-7. SPECIFIC PMCS PROCEDURES.**

a. Operator/Crew PMCS are provided in Table 2-1. Always perform PMCS in the order listed. Once it becomes a habit, anything that is not right can be spotted in a minute.

b. Before performing PMCS read all the checks required for the applicable interval and prepare all the tools needed. Have several clean rags (Item 14, Appendix E) handy Perform ALL inspections at the applicable interval.

c. If anything wrong is discovered through PMCS, perform the appropriate troubleshooting task in Chapter 3, Section II. If any component or system is not serviceable, or if a given service does not correct the problem, notify your supervisor.

d. The columns in Table 2-1 are defined as follows:

(1) Item No. Provides a logical sequence for PMCS to be performed and is used as a source of item number for the "TM ITEM NO" column when recording PMCS results on DA Form 2404.

(2) Interval. Specifies the interval at which PMCS is to be performed.

(3) Item To Be Inspected. Lists the system and common name of items that are to be inspected. Included in this column are specific servicing, inspection, replacement, or adjustment procedures to be followed.

**NOTE**

**The terms "ready/available" and "mission-capable" refer to the same status: Equipment is on hand and is able to perform its combat mission (AR 700-138).**

(4) Equipment Is Not Ready/Available If. Explains when and why the semitrailer cannot be used.

**2-8. LEAKAGE DEFINITIONS.**

a. It is important to know how fluid leakage affects the status of the semitrailer. Following are types/classes of leakage an operator must know to determine whether the semitrailer is mission-capable. Learn these leakage definitions. When in doubt, notify your supervisor.

**Leakage Definitions for Operator/Crew PMCS**

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

2-8. LEAKAGE DEFINITIONS (Con't)

**CAUTION**

When operating with Class I or II leaks, continue to check fluid levels in addition to that required in PMCS. Parts without fluid will stop working or may be damaged.

b. Equipment operation is allowed with minor (Class I or II) leakage. Fluid levels in an item/system affected with such leakage must be checked more frequently than required in PMCS. When in doubt, notify your supervisor.

c. Report Class III leaks IMMEDIATELY to your supervisor.

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

B-BEFORE		D-DURING		A-AFTER		W-WEEKLY	
ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED.	EQUIPMENT IS NOT READY/AVAILABLE IF:	
	B	D	A	W			
					<b>NOTE</b>  Perform Weekly (W) as well as Before (B) PMCS: if:  a. You are the assigned operator but have not operated semitrailer since last weekly.  b. You are operating semitrailer for the first time.		
1	•				<b>EXTERIOR OF VEHICLE</b> Check for evidence of fuel leakage on or under semitrailer.	Any fuel leakage is evident.	
2	•				<b>TOWING CONNECTIONS</b> a. Inspect kingpin and upper fifth wheel plate for damage or loose mounting bolts.  b. Visually inspect for obvious cracked or broken welds along upper fifth wheel plate.  c. Connect towing vehicle air lines to air couplings on semitrailer (para 2-10). With towing vehicle engine running, check air lines and air couplings for air leaks. Ensure that air reservoir is drained and draincock is closed.  d. Inspect intervehicular cable receptacle on semitrailer for damage or corrosion. Connect towing vehicle intervehicular cable to receptacle on semitrailer (para 2-10). Check all lights for damage. Check that all lights are operating. If not operating, check tightness of connection at receptacle. If tight, have Organizational Maintenance test and repair lights. Check intervehicular cable for damage.	Kingpin and upper fifth wheel plate are damaged, or mounting bolts are loose.  Any welds are cracked or broken.  Air leaks are evident.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (Con't).

B-BEFORE		D-DURING		A-AFTER		W-WEEKLY	
ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED.	EQUIPMENT IS NOT READY/AVAILABLE IF:	
	B	D	A	W			
3		•			<b>LANDING GEAR</b> a. Inspect for loose shoes, bent or damaged landing gear legs, and loose or missing mounting bolts. b. After coupling towing vehicle to semitrailer, engage landing gear handcrank and raise and lower landing gear legs (para 2-10).	Landing gear legs cannot be raised or lowered.	
		•					
4		•			<b>TANK</b> Inspect tank shell for dents and leaks.	Any fuel leakage is evident.	
5		•			<b>TIRES AND WHEELS</b> a. Inspect tires for unusual wear or damage. b. Check for proper air pressure: Highway. . . . . 60 psi (414 kPa) Cross-country and Sand . . 45 psi (310 kPa) c. Inspect wheels for cracks or other damage. Check to ensure that no wheel nuts are missing or loose.	Tires have damage which could result in tire failure.	
		•					
6		•			<b>STOWAGE TUBE ASSEMBLY</b> a. Inspect stowage tube assembly for damage and security of mounting. Ensure that stowage tube assembly doors are present and secured. b. Ensure that transfer hoses, portable ground rod, and petroleum gage stick are stowed inside stowage tube assembly.	Wheel is damaged or wheel nuts are missing.  Ground rod is missing.	
		•					
7			•		<b>FILTER-SEPARATOR (M131A4C AND M131A5C)</b> a. Open draincock on bottom of filter-separator sump and allow all water to drain. When fuel appears, close draincock. b. Check automatic water drain valve on bottom of filter-separator for fuel seepage. No other liquid except water should be detected at valve. c. Check pressure differential (para 2-16). If there is no pressure or if pressure differential between filter inlet and filter outlet is greater than 20 psi (138 kPa) for M131A5C, or 15 psi (103 kPa) for M131A4C, filter elements and no-go fuses require replacement. Notify Organizational Maintenance.	Fuel is seeping from automatic water drain valve.	
			•				
				•			

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (Con't).

B-BEFORE		D-DURING		A-AFTER		W-WEEKLY				
ITEM NO.	INTERVAL				ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED, OR ADJUSTED AS NEEDED.	EQUIPMENT IS NOT READY/AVAILABLE IF:				
	B	D	A	W						
8	•	•	•	•	<p><b>BRAKE SYSTEM</b></p> <p>a. With towing vehicle coupled to semitrailer, apply semitrailer brakes and inspect all air lines and fittings for leaks.</p> <p>b. Apply semitrailer brakes and observe operation.</p> <p>c. Inspect hydraulic hose and master cylinder for leaks.</p> <p style="text-align: center;"><b>WARNING</b></p> <p><b>Cautiously feel each wheel hub and brakedrum. Wheel hubs or brakedrums may be hot. Failure to follow this warning may result in burns.</b></p> <p>d. Cautiously feel each wheel hub and brakedrum. Check for a wheel hub or brakedrum that is hotter than the others. Overheating could indicate improperly adjusted or defective wheel bearings, or a locked-up brake. IMMEDIATELY report any abnormal conditions to Organizational Maintenance.</p> <p>e. Drain water from air reservoir by opening air reservoir draincock. Close air reservoir draincock.</p>	<p>Air leaks are evident.</p> <p>Brakes do not stop semitrailer or semitrailer pulls to one side.</p> <p>Any leakage is evident.</p> <p>Wheel hub or brakedrum is excessively hot.</p>				
					9	•	•	•	<p><b>REAR AXLES</b></p> <p>During movement of semitrailer, be aware of wander or side pull. Listen for excessive noise. These are indications of improper axle alignment.</p>	<p>Semitrailer wanders, has side pull, or axles have excessive noise.</p>
					10	•	•	•	<p><b>PIPING SYSTEM</b></p> <p>Inspect all lubes for dents and cracks.</p>	<p>Tubes are damaged to an extent that fuel flow will be restricted. Tubes are cracked allowing fuel leakage.</p>
					11	•	•	•	<p><b>MANHOLE COVER</b></p> <p>Check for damaged cover, seal, or loose mounting ring. Ensure that fill cover is securely latched.</p>	<p>Manhole cover or seal are damaged or missing.</p>
					12	•	•	•	<p><b>CATWALK DRAINS</b></p> <p>Inspect for clogged drains at ladder. Remove foreign matter.</p>	







**Section III. OPERATION UNDER USUAL CONDITIONS**

Paragraph Title	Page Number
Bonding and Grounding Procedures . . . . .	2-22
Bottom Loading (Preferred Method) . . . . .	2-30
Coupling Semitrailer to Towing Vehicle . . . . .	2-19
Filter-separator Pressure Check (M131A4C and M131A5C). . . . .	2-27
Fuel Servicing (M131A4C and M131A5C). . . . .	2-62
Fuel Transfer. . . . .	2-57
General . . . . .	2-19
General Fuel Handling Requirements. . . . .	2-28
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Operating Fire Extinguisher Equipment. . . . .	2-81
Operating Manhole Fill Cover . . . . .	2-25
Pressure Discharge of Fuel. . . . .	2-52
Refuel on the Move (ROM) Assembly and Operating Procedures (M131A5C). . . . .	2-78
Top Loading (Alternate Method). . . . .	2-36
Towing Instructions . . . . .	2-21
Uncoupling Semitrailer from Towing Vehicle . . . . .	2-21

**2-9. GENERAL.**

a. This section contains instructions for safely operating the semitrailers under usual conditions. Unusual operating conditions are defined and described in Section IV of this chapter.

b. Review all towing vehicle operating instructions to prepare for coupling and uncoupling operations.

**2-10. COUPLING SEMITRAILER TO TOWING VEHICLE.**

**WARNING**

**All personnel must stand clear of semitrailer and towing vehicle during coupling operation. Failure to follow this warning may result in serious injury or death to personnel.**

a. Ensure that chock blocks are in place.

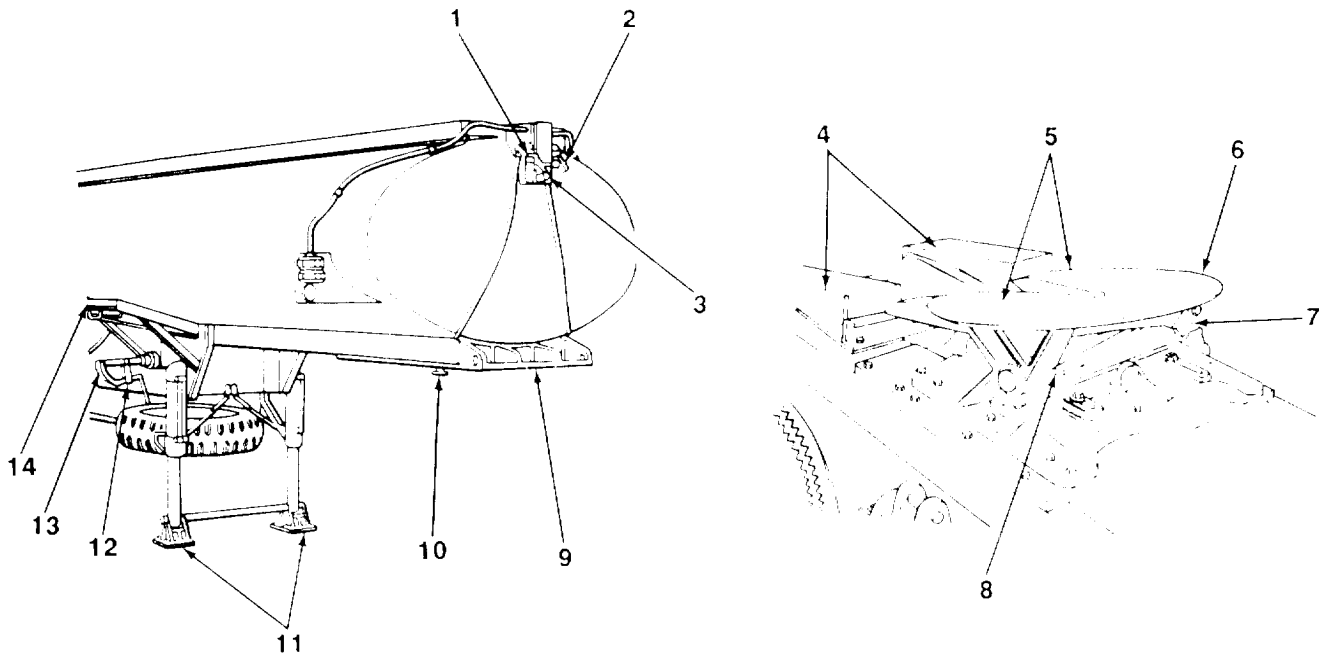
2-10. COUPLING SEMITRAILER TO TOWING VEHICLE (Con't).

**CAUTION**

**Use a ground guide during backing operations. Damage to equipment may result if caution is not followed.**

b. Aline towing vehicle with semitrailer and slowly back towing vehicle. Stop towing vehicle before its fifth wheel plate (6) contacts upper fifth wheel plate (9) of semitrailer.

c. Remove dummy couplings from service air coupling (1) and emergency air coupling (2) at front of semitrailer. Connect towing vehicle service air hose to semitrailer service air coupling. Connect towing vehicle emergency air hose to semitrailer emergency air coupling.



d. Open air shutoff valves on towing vehicle and apply semitrailer brakes.

e. Check that kingpin (10) is centered between approach ramps (4). Adjust kingpin height by raising or lowering landing gear legs (11):

(1) Release handcrank (13) from stowage clip (12).

(2) Rotate handcrank (13) clockwise to raise landing gear legs (11) or counterclockwise to lower landing gear legs.

(3) Stow handcrank (13) in stowage clip (12).

f. After kingpin (10) height is properly adjusted, slowly back towing vehicle until coupler jaws (5) engage kingpin. Inch forward to ensure that coupling is locked. If coupling is not locked, rock back and forth until kingpin locks.

g. Connect towing vehicle intervehicular cable to semitrailer receptacle (3).

h. Ensure that fifth wheel locking plunger lever (8) and safety latch (7) are in locked position.

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**2-10. COUPLING SEMITRAILER TO TOWING VEHICLE (Con't).**

- i. Fully retract landing gear legs (11).
- j. If used, stow ground boards (14) in stowage brackets.
- k. Remove chock blocks and stow in stowage brackets.

**2-11. TOWING INSTRUCTIONS.**a. Driving.

(1) When driving towing vehicle and semitrailer, overall length of unit must be kept in mind when passing other vehicles and when turning.

(2) Turning and backing operations will be affected because towing vehicle and semitrailer are a hinged unit.

(3) The semitrailer load will affect stopping and overall maneuverability. A partial load should be distributed equally between compartments. This can be accomplished by closing all outlet valves and opening all emergency relief valves and manifold valves. Allow several minutes for fuel level to stabilize. Close all emergency relief valves and manifold valves.

(4) Always tow semitrailer at safe speeds and note any driving irregularities.

b. Turning.

(1) When turning corners, allow for semitrailer wheels to turn inside the turning radius of towing vehicle.

(2) To make a right turn at an intersection, drive towing vehicle halfway into intersection, then cut sharply to right. This will allow for shorter turning radius of semitrailer.

c. Stopping.

(1) For safe stopping apply brakes gradually and smoothly.

(2) During normal operation, apply towing vehicle and semitrailer brakes simultaneously. On steep grades and slippery surfaces, apply semitrailer brakes before towing vehicle brakes. This will help prevent semitrailer from jackknifing or swinging out of line of travel.

d. Parking.

When towing vehicle and semitrailer combination is to be parked, set brakes on both vehicles. Place chock blocks in front of or behind wheels, as required.

e. Backing.

(1) Use a ground guide to ensure safe backing operation.

(2) Adjust all towing vehicle rearview mirrors before backing.

(3) If semitrailer is to be backed to right, turn towing vehicle steering wheel to left (counterclockwise). If semitrailer is to be backed to left turn towing vehicle steering wheel to right (clockwise).

(4) When semitrailer has turned and backing in a straight line is required, turn towing vehicle wheels in direction semitrailer is moving. This will slowly bring towing vehicle and semitrailer into a straight line.

**2-12. UNCOUPLING SEMITRAILER FROM TOWING VEHICLE.****WARNING**

**All personnel must stand clear of semitrailer and towing vehicles during uncoupling operation. Failure to follow this warning may result in serious injury or death to personnel.**

- a. Remove chock blocks from stowage brackets and chock wheels.

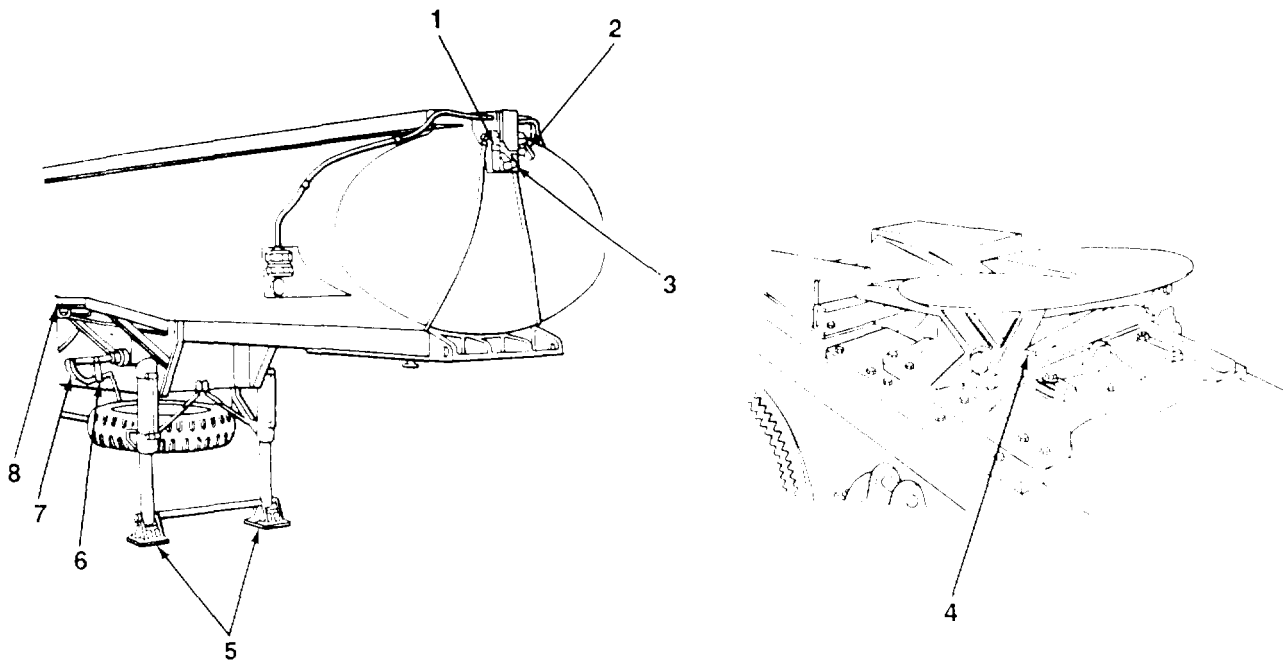
## 2-12. UNCOUPLING SEMITRAILER FROM TOWING VEHICLE (Con't).

b. If in a muddy, sandy, or snow-covered area, remove ground boards (8) from stowage brackets and place on ground directly under shoes of landing gear legs (5).

c. Release handcrank (7) from stowage clip (6). Rotate handcrank counterclockwise to lower landing gear legs (5) until shoes rest solidly on ground or ground boards (8). Return handcrank to stowage clip.

d. Disconnect towing vehicle intervehicular cable from semitrailer receptacle (3).

e. Close air shutoff valves on towing vehicle. Disconnect towing vehicle service and emergency air hoses from semitrailer service air coupling (1) and emergency air coupling (2). Install dummy couplings in service and emergency air couplings.



f. Push fifth wheel locking plunger lever (4) forward, then slowly drive towing vehicle a safe distance away from semitrailer.

### NOTE

**Perform step g only if water or fuel accumulation is present on catwalk.**

g. Release handcrank (7) from stowage clip (6). Rotate handcrank clockwise to raise landing gear legs (5) until front of semitrailer is higher than rear of semitrailer. Allow water accumulation to drain.

## 2-13. BONDING AND GROUNDING PROCEDURES.

### a. General Information.

(1) Static electricity is created whenever fuel is handled. Static electricity can also be created when maintenance is performed on semitrailer. You cannot prevent static electricity.

(2) Static electricity becomes a danger when it builds into a charge that may form a spark. You can prevent sparks by following proper bonding and grounding procedures.

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**2-13. BONDING AND GROUNDING PROCEDURES (Con't).**

(3) Bonding is an electrical connection between metallic units, for instance the semitrailer and a fuel terminal facility Bonding equalizes any static potential that might exist between units.

(4) Grounding is an electrical connection between one or both of the bonded units and ground. Grounding effectively discharges into the earth any static potential that might exist or that might be generated.

(5) If two or more units are bonded and one is grounded, the whole system is effectively grounded.

b. General Bonding and Grounding.

**WARNING**

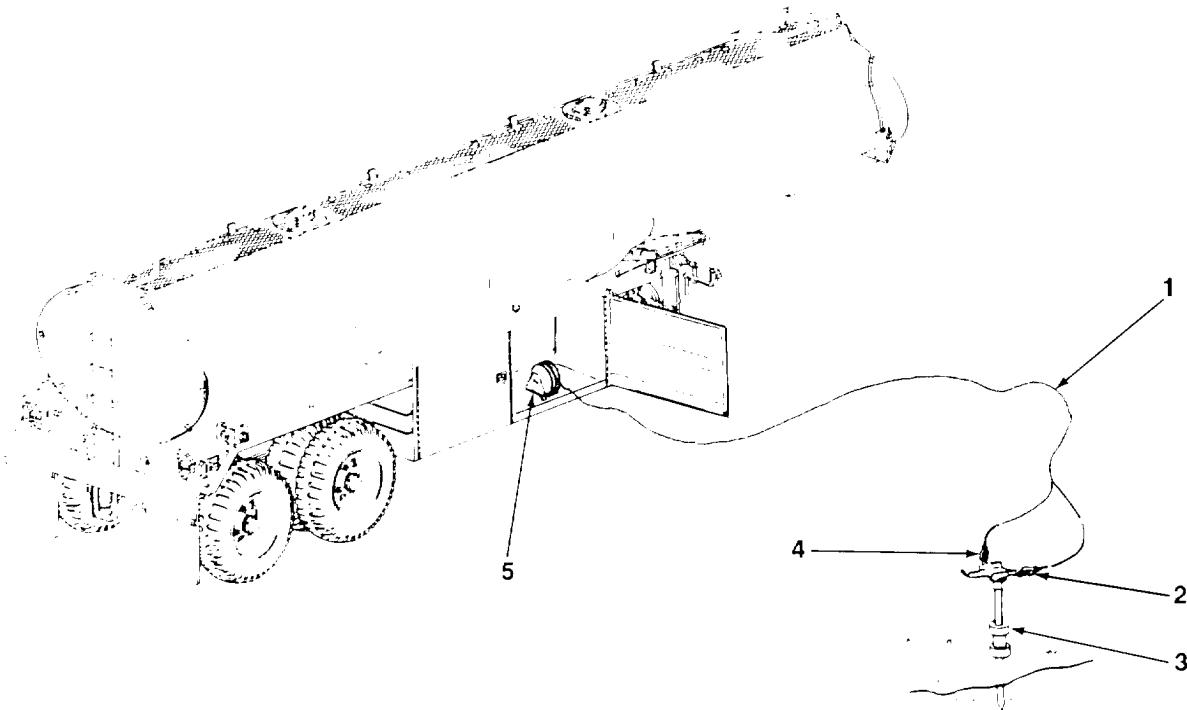
**Connect bonding and grounding connections before beginning any fuel handling operation or performing any maintenance on semitrailer. Maintain bonding and grounding connections until after all fuel handling or maintenance is completed. Connections must be made to clean, unpainted surfaces. An unbonded and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

**NOTE**

**Illustration shows typical grounding procedure.**

(1) Open cabinet and unwind grounding cable (1) from static reel (5). Firmly attach two clips (2 and 4) to ground point at fuel terminal facility.

(2) If fuel terminal facility does not have a ground point, remove ground rod (3) from roadside stowage tube assembly and drive well into ground (FM 10-68).



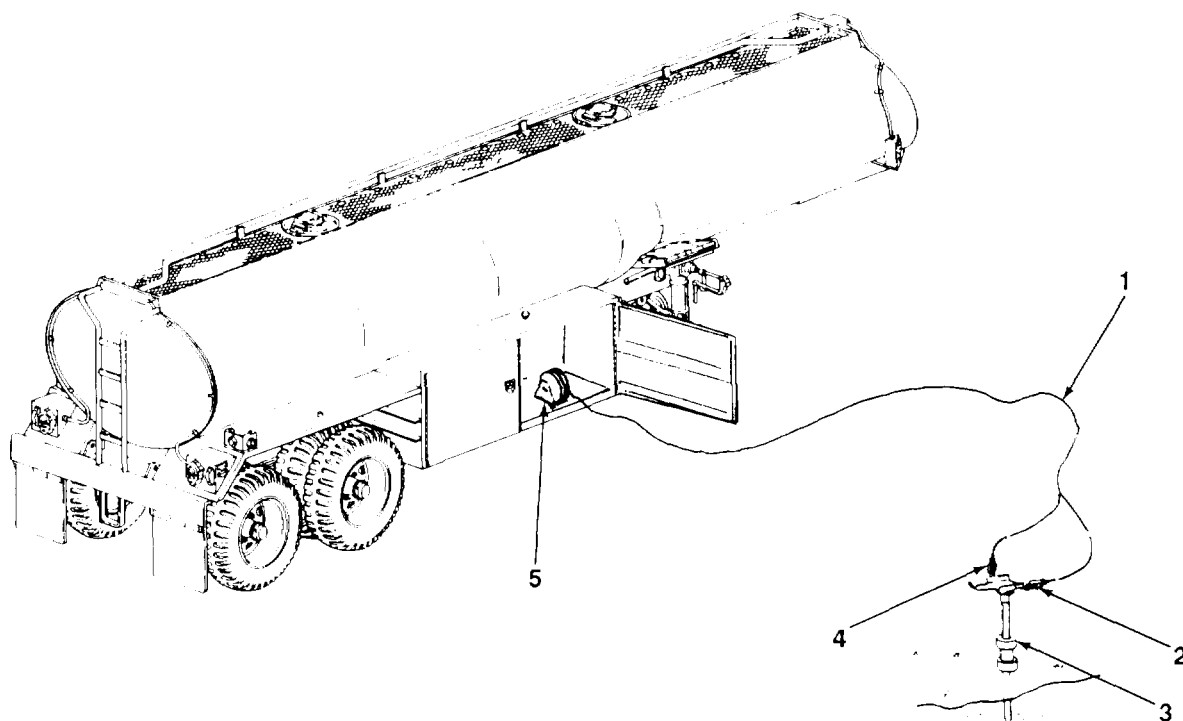
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## 2-13. BONDING AND GROUNDING PROCEDURES (Con't)

### WARNING

**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

(3) Maintain bonding and grounding connection until after all fuel handling or maintenance is completed, then disconnect connection. Stow grounding cable (1) and ground rod (3).



### c. Bonding and Grounding Procedures for Fuel Servicing Operations.

### WARNING

**Connect bonding and grounding connections before beginning any fuel servicing operation. Maintain bonding and grounding connections until after all fuel servicing is completed. Connections must be made to clean, unpainted surfaces. An unbonded and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

(1) Open cabinet and unwind grounding cable (1) from static reel (5).

(2) If fueling a ground vehicle, attach clip (2) to vehicle being serviced. Attach clip (4) to ground rod.

(3) If fueling an aircraft at a hardstand installation, attach clip (2) to aircraft being serviced and clip (4) to ground lug. Connect nozzle ground wire to aircraft before opening aircraft fuel tank filler.

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**2-13. BONDING AND GROUNDING PROCEDURES (Con't).****WARNING**

**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cables until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

(4) Maintain bonding and grounding connection until after all fuel servicing is completed, then disconnect connection. Stow grounding cable (1) on static reel (5) inside cabinet.

**2-14. OPERATING MANHOLE FILL COVER.****WARNING**

- **Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**
- **Stand clear of fill cover when opening manhole. Pressure buildup inside tank may cause fill cover to fly open. Failure to follow this warning may result in serious injury or death to personnel.**
- **Use caution when opening manhole primary latch. If there is pressure buildup inside tank, it must first be relieved, then manhole primary latch slowly opened. Failure to follow this warning may result in serious injury or death to personnel.**

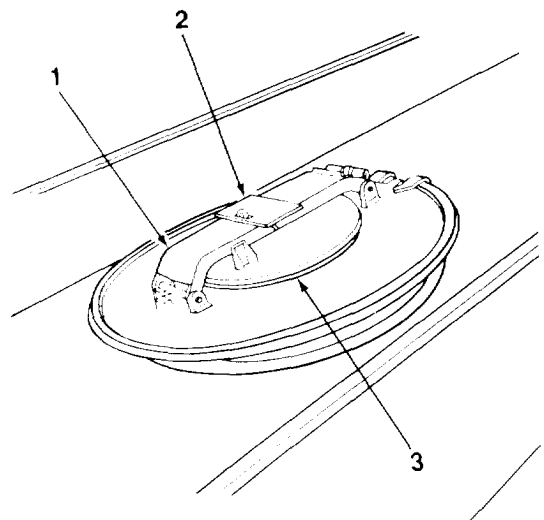
a. Remove padlock

b. Lift primary latch (2) slowly. Pull back on primary latch to release secondary latch on strongback (1). Lift up on strongback and open fill cover (3).

**NOTE**

**Ensure that secondary latch on strongback is engaged in primary latch.**

c. Close fill cover (3). Firmly press down to engage secondary latch on strongback (1) in tongue of primary latch (2). Listen for a snapping sound. Close primary latch.



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## 2-15. OPERATING AUXILIARY ENGINE.

### a. Starting.

#### **NOTE**

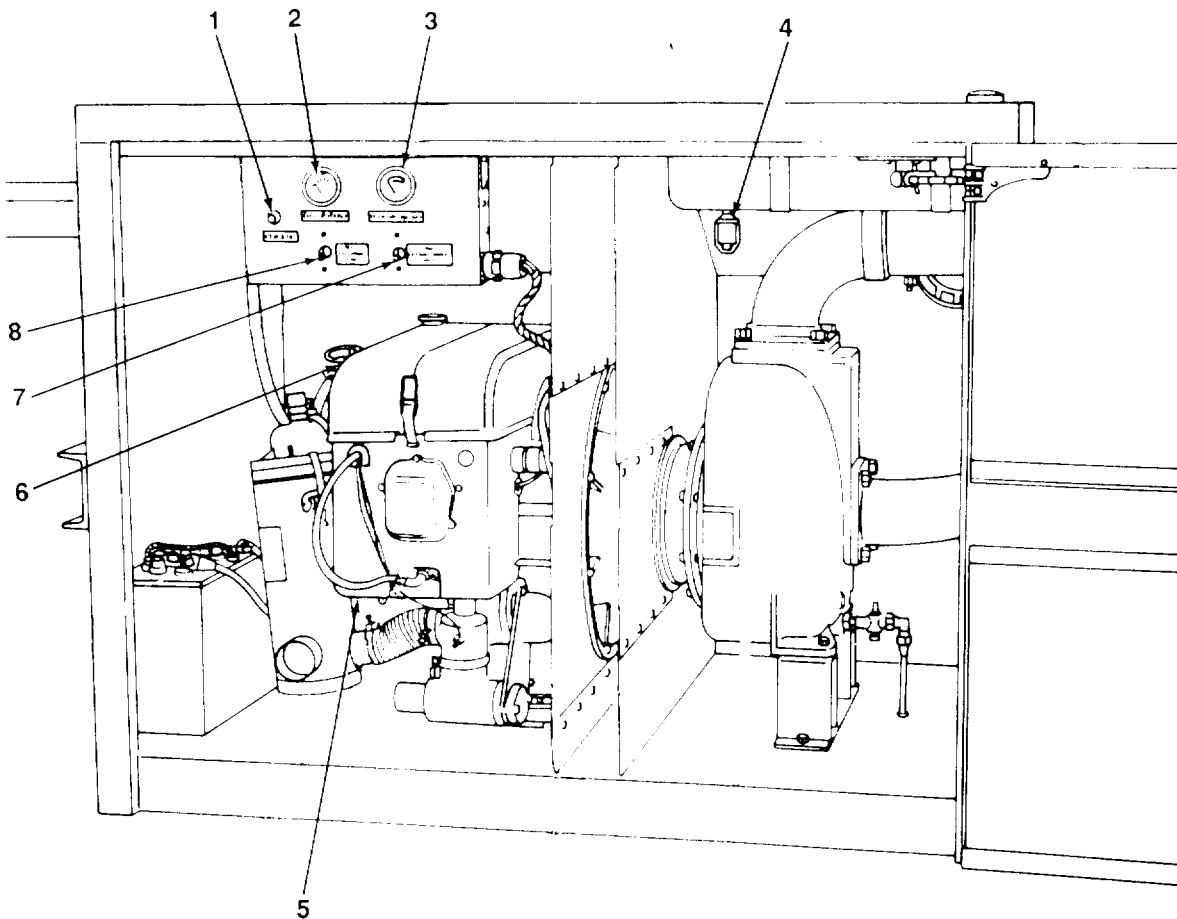
Auxiliary engine operation is the same for all models; location may vary. M131A5 is illustrated. Refer to paragraphs 1-7 and 2-2 for location of engine controls on other models.

- (1) Ensure that fuel shutoff cock on sediment strainer (4) is open.
- (2) Pull out on choke control (6).
- (3) Set panel power switch (7) and ignition switch (8) to ON position.

#### **WARNING**

**DO NOT slave start auxiliary engine. Slave starting may cause battery to spark and cause explosion. Failure to follow this warning may result in injury to personnel.**

- (4) Press starter button (1). If engine (5) does not start within five seconds, release button and wait a few seconds before pressing again. If engine does not start after four or five attempts, perform troubleshooting (Chapter 3, Section II).



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**2-15. OPERATING AUXILIARY ENGINE (Con't).**

- (5) After engine (5) is started, allow a brief period for engine temperature to stabilize.
- (6) Push in on choke control (6).

b. Operating.

- (1) Check that engine oil pressure gage (2) stabilizes and system voltage gage (3) is in the green zone.
- (2) Check alinement of engine and pump and inspect for fuel leakage and loose connections. Notify Organizational Maintenance of any leaks or loose connections.
- (3) To prevent overheating, keep cabinet doors open while engine (5) is running.

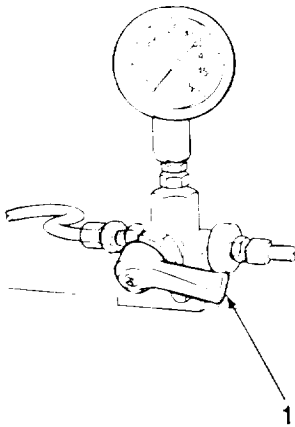
c. Stopping.

Set ignition switch (8) and panel power switch (7) to OFF position.

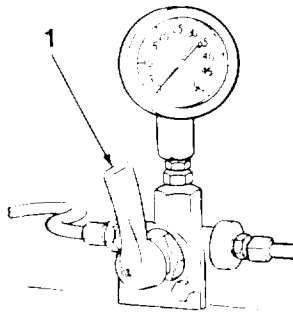
**2-16. FILTER-SEPARATOR PRESSURE CHECK (M131A4C AND M131A5C).**

a. M131A4C.

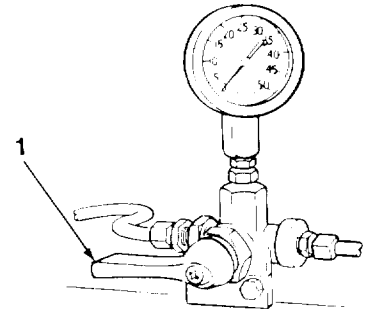
- (1) Start auxiliary engine (para 2-15).
- (2) Turn selector valve handle (1) on top of filter-separator case clockwise to inlet pressure position. Record reading in daily log.
- (3) Turn selector valve handle (1) counterclockwise to midsection pressure position. Record reading in daily log.



**INLET  
PRESSURE**



**MIDSECTION  
PRESSURE**



**CLOSED  
PRESSURE**

- (4) Turn selector valve handle (1) clockwise to closed position.
- (5) Record difference in inlet pressure and midsection pressure.

(6) If there is no pressure, or if pressure differential is greater than 15 psi (103 kPa), notify Organizational Maintenance to replace filter elements and go-no-go fuses.

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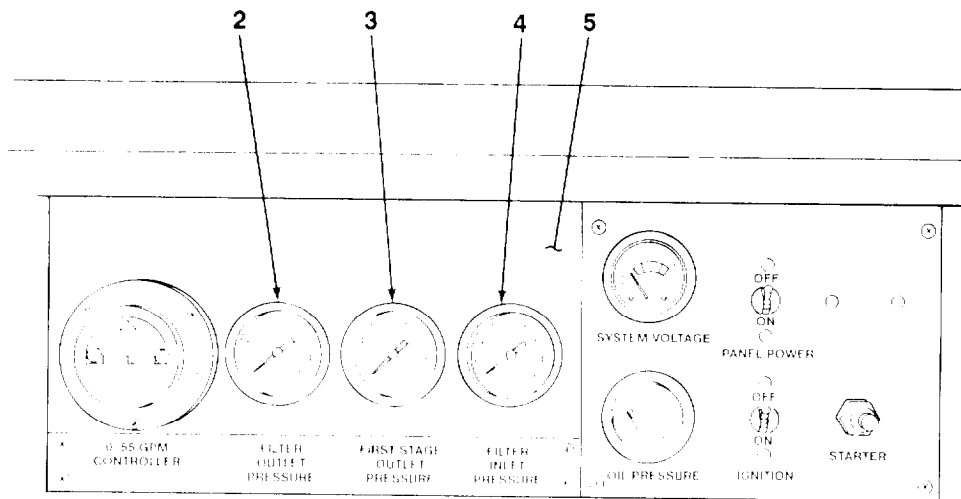
**2-16. FILTER-SEPARATOR PRESSURE CHECK (M131A4C AND M131A5C) (Con't).**

b. M131A5C.

(1) Start auxiliary engine (para 2-15).

(2) Record pressure readings from filter outlet pressure gage (2), first stage outlet pressure gage (3), and filter inlet pressure gage (4) on instrument panel (5).

(3) If pressure differential between filter inlet pressure gage (4) and filter outlet pressure gage (2) is greater than 20 psi (138 kPa), notify Organizational Maintenance to change both filter elements and go-no-go fuses.



(4) If pressure differential between filter inlet pressure gage (4) and first stage outlet pressure gage (3) is greater than 15 psi (103 kPa), notify Organizational Maintenance to replace filter elements only.

(5) If pressure differential between first stage outlet pressure gage (3) and filter outlet pressure gage (2) is greater than 15 psi (103 kPa), notify Organizational Maintenance to replace go-no-go fuses only.

**2-17. GENERAL FUEL HANDLING REQUIREMENTS.**

**WARNING**

- Follow all fuel handling procedures precisely to prevent serious injury or death to personnel.
- DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting serious injury or death to personnel.

a. Refer to FM 10-20, FM 10-68, FM 10-69, and FM 10-71 to become familiar with safe fuel handling procedures.

**2-17. GENERAL FUEL HANDLING REQUIREMENTS (Con't).****WARNING**

**DO NOT mix incompatible fuels in tank. Dangerous fumes and explosion may result. Know what fuel was previously carried so that preventive measures may be taken to ensure that harmful or explosive fumes are not released. Failure to follow this warning may result in serious injury or death to personnel.**

**CAUTION**

**Do not transport two or more types of fuel simultaneously. Improper vehicle servicing may result.**

- b. If fuel to be loaded is not the same fuel as previously carried refer to FM 10-71.
- c. When loading semitrailer from a fuel source below the level of the semitrailer, unprimed suction lift capacity of the pumping system is approximately 19 ft (5.8 m). A suction lift of 30 ft (9.2 m) may be developed with priming, but a two minute wait is required to eliminate all air from pumping system before fuel can flow freely. Generally, pumping from a fuel source more than 19 ft (5.8 m) below semitrailer is not recommended.
- d. Personnel engaged in fuel handling must wear wool, nylon, silk, rayon, or other clothing that generates static electricity. Wear clean cotton clothing with no metal zippers. Remove all contents from pockets. Wear rubber boots and gloves to keep fuel off skin. Use cotton cloths for cleaning purposes. Before climbing onto semitrailer, grasp static ground wire to discharge all static from body.
- e. Keep towing vehicle and semitrailer coupled during fuel handling operations to ensure that vehicles can be moved quickly in an emergency.
- f. Ensure that cabinet doors remain open during all fuel handling operations.

**WARNING**

**Operator must be alert at all times for leaking or malfunctioning equipment. Immediately stop all fuel handling operations the first sign of leaks or malfunctions. Corrective action must be performed by qualified personnel before resuming any operations.**

- g. IMMEDIATELY stop all fuel handling operations at the first sign of leaks or malfunctions.
- h. **IN CASE OF AN EMERGENCY**, to stop fuel flow close emergency relief valves by:
  - (1) pushing emergency relief valve operating control levers in cabinet,
  - (2) pulling emergency relief valve shutoff at front roadside of tank,
  - (3) closing door or cabinet which contains operating control levers.
- i. When loading fuel, bottom load whenever possible. Top load only when bottom loading is not possible. Top loading causes more static electricity and vapors than bottom loading and the chance of a fire is greater.
- j. IMMEDIATELY wipe up fuel spills with rags (Item 14, Appendix E) and dispose of in closed metal containers.
- k. IMMEDIATELY wash with soap and water if you get fuel on your skin.
- l. To remove fuel-soaked clothes follow these steps:
  - (1) Wet your clothes with water.

## 2-17. GENERAL FUEL HANDLING REQUIREMENTS (Con't)

(2) If water is not available, temporarily ground yourself by holding a piece of grounded equipment with your hands.

(3) Remove your hands from grounded equipment and take off your clothes. This grounding action removes danger of a static spark igniting your clothes

m. Man all discharge nozzles and loading arms to avoid fuel spillage. DO NOT exceed loading/unloading rates (para 1-11).

n. Three 15 ft (4.6 m) long transfer hoses stowed in roadside stowage tube assembly may be used as required when added hose length is needed during fuel loading or unloading.

o. If fire extinguishers are discharged for any reason, have qualified personnel recharge them before next mission.

## 2-18. BOTTOM LOADING (PREFERRED METHOD).

### **WARNING**

**DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.**

### **NOTE**

**Refer to appropriate flow diagram at the end of paragraph for assistance.**

a. Shut off towing vehicle engine and set brakes. Refer to towing vehicle technical manual.

b. Remove fire extinguishers from mounting brackets and take to point of operation.

### **WARNING**

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbended and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

c. Connect bonding and grounding connections (para 2-13).

d. Ensure that all manually operated valves (2, 3, 4, 5, 6, 15, and 24) are closed. On M131A4C and M131A5C, ensure that 3-way flow valve (25) is set in position 1 with operating lever pushed inward as far as possible.

e. On M131A4C and M131A5C equipped with a read-out flow selector dial, set selector knob to zero. Close flow selector valve (0-55 gpm) (18).

### **WARNING**

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

f. Have assistant open manhole fill cover of compartment (1, 9, 10, or 12) to be loaded (para 2-14).

g. Remove caps from gravity discharge valve (3) outlet and pump discharge valve (6) outlet. Connect transfer hose (7) from gravity discharge valve outlet to pump discharge valve outlet.

**2-18. BOTTOM LOADING (PREFERRED METHOD) (Con't).**

h. Remove cap from pump intake valve (5) outlet. Connect transfer hose (7) from pump intake valve outlet to fuel source.

i. Open emergency relief valve of compartment (1, 9, 10, or 12) to be loaded by pulling operating control lever outward.

j. Open manifold (2) valve of compartment (1, 9, 10, or 12) to be loaded.

k. Open gravity discharge valve (3), pump intake valve (5), and pump discharge valve (6).

---

**WARNING**

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- **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
- **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**

l. Start auxiliary engine (para 2-15). Fuel will begin to flow. Have assistant watch marker on fuel level gage inside manhole opening to determine fuel level in tank. DO NOT overfill.

m. When operation is complete, shut off auxiliary engine (para 2-15). Close pump discharge valve (6), pump intake valve (5), gravity discharge valve (3), and manifold (2) valve. Close emergency relief valve by pushing in on operating control lever.

n. Close and latch manhole fill cover (para 2-14).

o. Drain and remove transfer hose (7) from gravity discharge valve (3) outlet and pump discharge valve (6) outlet. Install caps on outlets.

p. Drain and remove transfer hose (7) from pump intake valve (5) outlet and fuel source. Install cap on outlet.

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**WARNING**

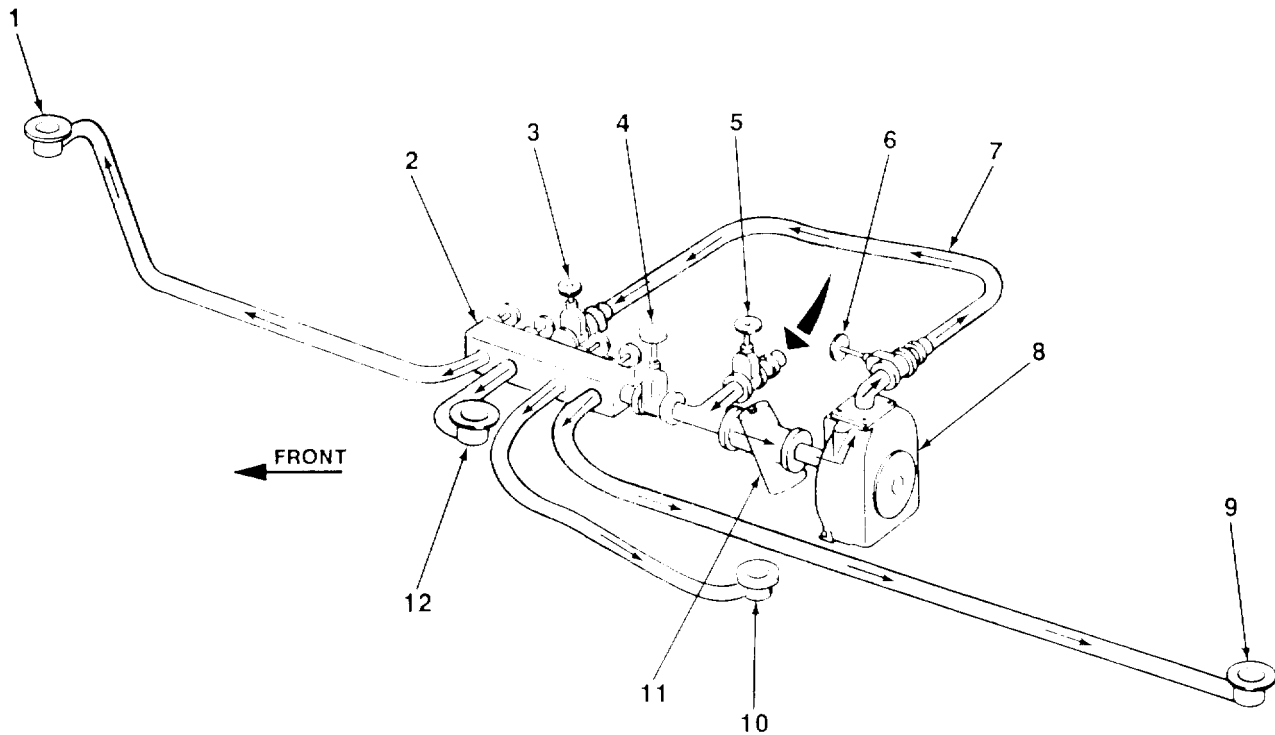
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**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

q. Disconnect bonding and grounding connections (para 2-13).

r. Stow fire extinguishers.

2-18. BOTTOM LOADING (PREFERRED METHOD) (Con't).



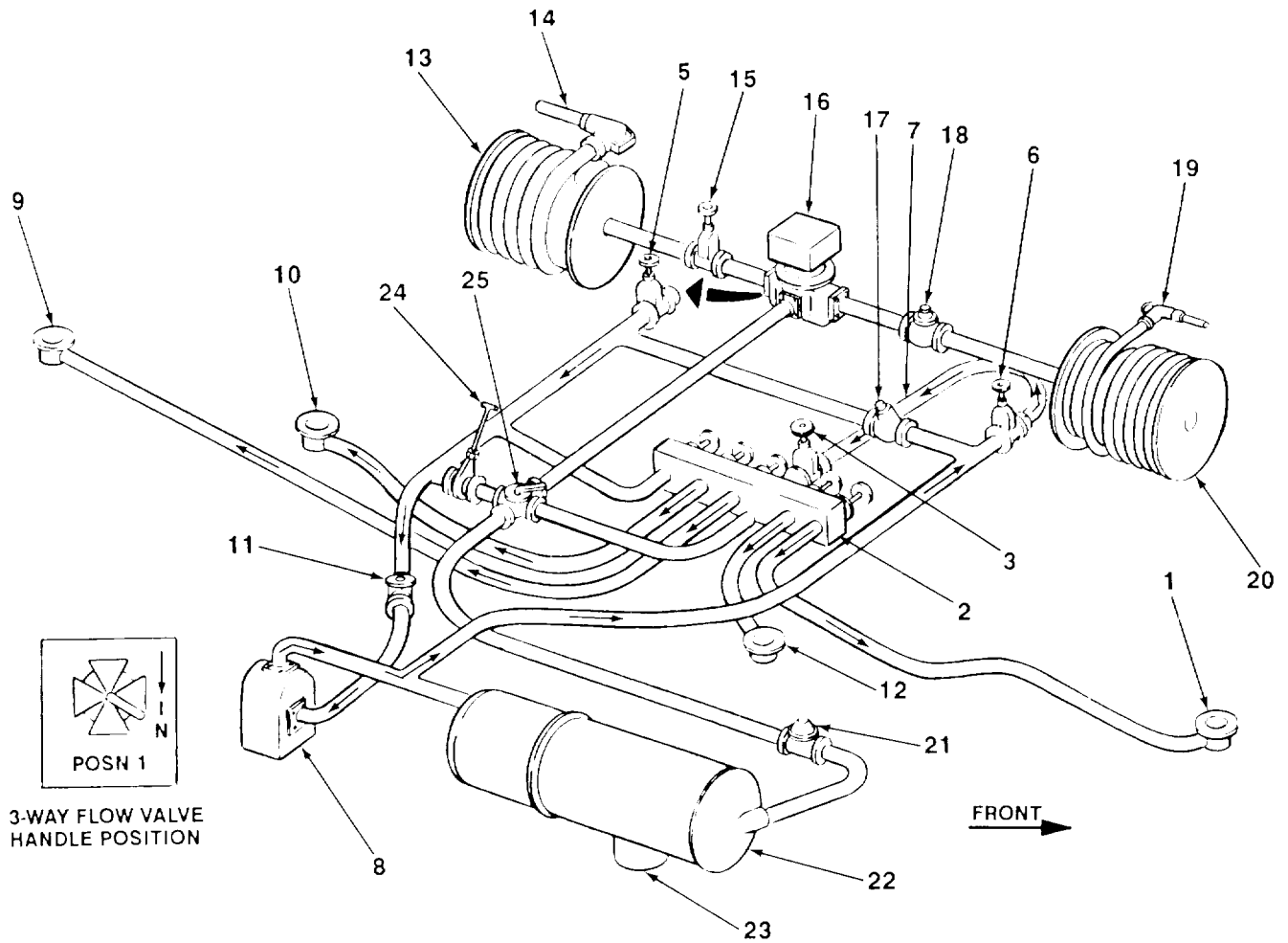
BOTTOM LOADING (M131A4)

**NOTE**

All fuel valves are in closed position unless otherwise indicated.

- |   |                         |
|---|-------------------------|
| 1. Compartment 1                          | 7. 3 Inch Transfer Hose |
| 2. Manifold and Manifold Valves(s) (Open) | 8. Pump                 |
| 3. Gravity Discharge Valve (Open)         | 9. Compartment 4        |
| 4. Pump Cutoff Valve                      | 10. Compartment 3       |
| 5. Pump Intake Valve (Open)               | 11. Sediment Strainer   |
| 6. Pump Discharge Valve (Open)            | 12. Compartment 2       |

2-18. BOTTOM LOADING (PREFERRED METHOD) (Con't).



**BOTTOM LOADING (M131A4C)**

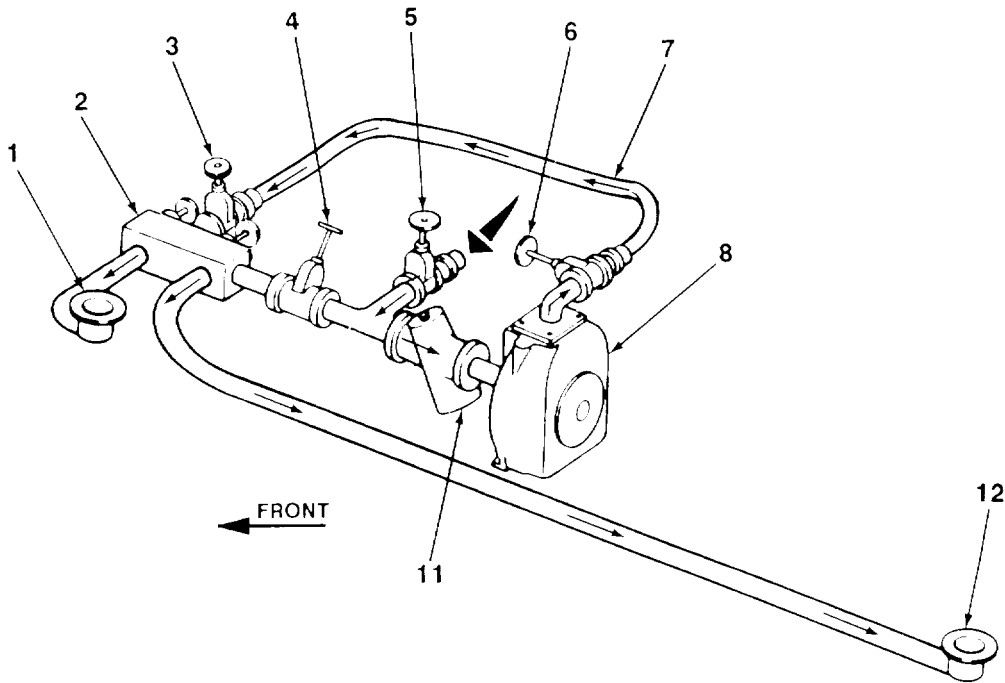
**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves(s) (Open)</li> <li>3. Gravity Discharge Valve (Open)</li> <li>4. Pump Cutoff Valve</li> <li>5. Pump Intake Valve (Open)</li> <li>6. Pump Discharge Valve (Open)</li> <li>7. 3 Inch Transfer Hose</li> <li>8. Pump</li> <li>9. Compartment 4</li> <li>10. Compartment 3</li> <li>11. Sediment Strainer</li> <li>12. Compartment 2</li> <li>13. 2½ Inch Hose Reel</li> </ul> | <ul style="list-style-type: none"> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. Defuel Cutoff Valve</li> <li>25. 3-way Flow Valve (Position 1)</li> </ul> |
|---|--|

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2-18. BOTTOM LOADING (PREFERRED METHOD) (Con't)



**BOTTOM LOADING (M131A5)**

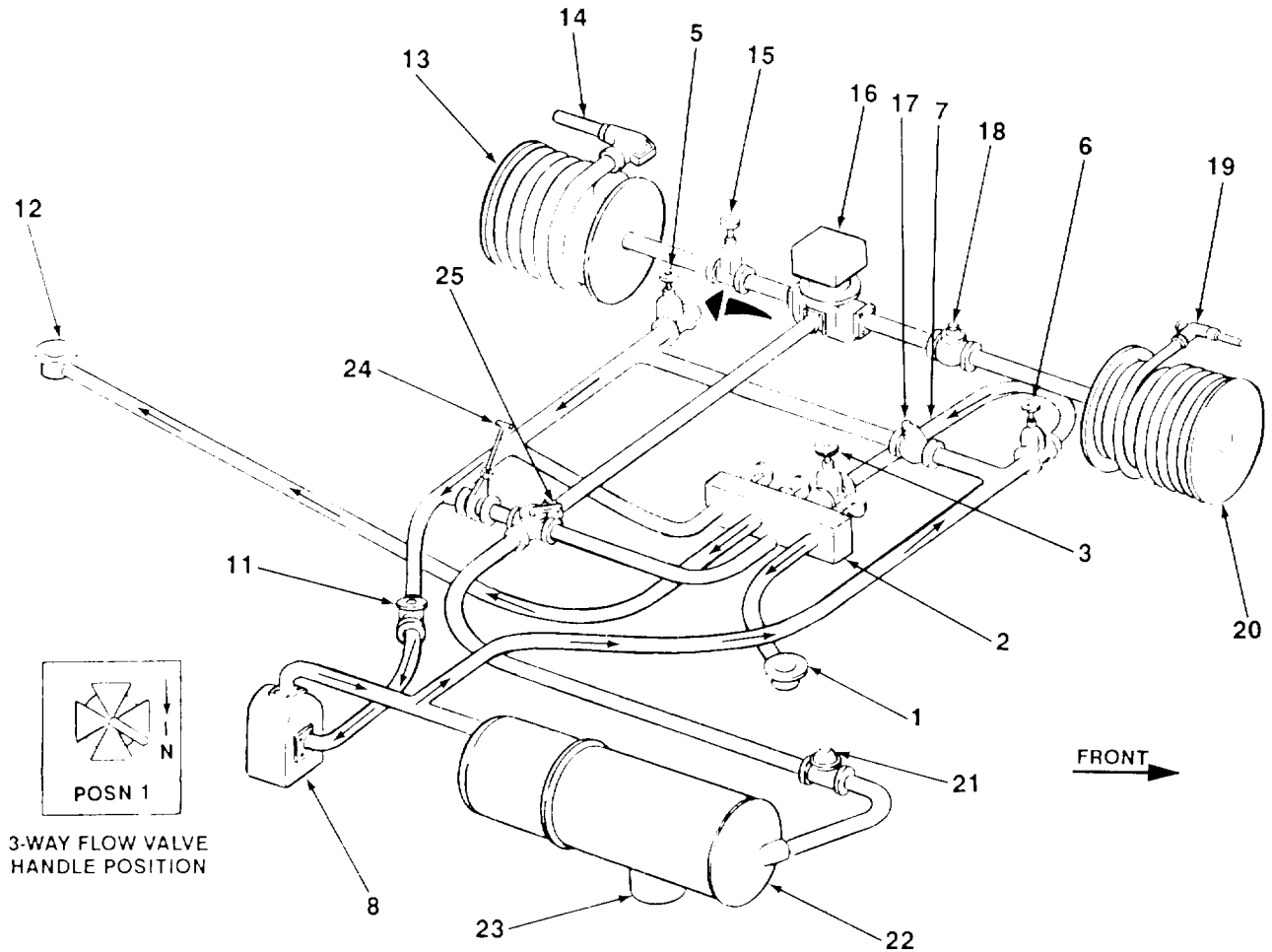
**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

- |   |                                |
|---|--------------------------------|
| 1. Compartment 1                          | 6. Pump Discharge Valve (Open) |
| 2. Manifold and Mainfold Valves(s) (Open) | 7. 3 Inch Transfer Hose        |
| 3. Gravity Discharge Valve (Open)         | 8. Pump                        |
| 4. Pump Cutoff Valve                      | 11. Sediment Strainer          |
| 5. Pump Intake Valve (Open)               | 12. Compartment 2              |



2-18. BOTTOM LOADING (PREFERRED METHOD) (Con't).



BOTTOM LOADING (M131A5C)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves(s) Open</li> <li>3. Gravity Discharge Valve (Open)</li> <li>4. Pump Cutoff Valve</li> <li>5. Pump Intake Valve (Open)</li> <li>6. Pump Discharge Valve (Open)</li> <li>7. 3 Inch Transfer Hose</li> <li>8. Pump</li> <li>11. Sediment Strainer</li> <li>12. Compartment 2</li> <li>13. 2½ Inch Hose Reel</li> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> </ul> | <ul style="list-style-type: none"> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. Defuel Cutoff Valve</li> <li>25. 3-way Flow Valve (Position 1)</li> </ul> |
|--|--|

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## 2-19. TOP LOADING (ALTERNATE METHOD).

### a. Top Loading Using Outside Pump.

#### WARNING

**DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.**

#### NOTE

• **Product is not filtered or metered when using this loading method.**

• **Refer to appropriate flow diagram at end of subparagraph a for assistance.**

(1) Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual.

(2) Remove fire extinguishers from mounting brackets and take to point of operation.

#### WARNING

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbanded and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

(3) Connect bonding and grounding connections (para 2-13)

(4) Ensure that all manually operated valves (2, 3, 4, 5, 6, 12, and 15) are closed. On M131A4C and M131A5C, ensure that 3-way flow valve (24) is set in position 1 with operating lever pushed inward as far as possible.

(5) On M131A4C and M131A5C equipped with a read-out flow selector dial, set selector knob to zero. Close flow selector valve (0-55 gpm) (18).

#### WARNING

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

(6) Have assistant open manhole fill cover of compartment (1, 8, 9, or 11) to be loaded (para 2-14).

#### NOTE

**To reduce vapors and static electricity, transfer hose should be placed as close to bottom of tank as possible.**

(7) Lower transfer hose through fill cover opening and place as close to bottom of tank as possible.

#### WARNING

• **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**

• **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**

(8) Start outside pump and load fuel. While loading, have assistant watch fuel level gage inside manhole opening to determine fuel level in tank. DO NOT overfill.

**2-19. TOP LOADING (ALTERNATE METHOD) (Con't).**

(9) When operation is complete, stop outside pump and drain and remove transfer hose from fill cover opening.

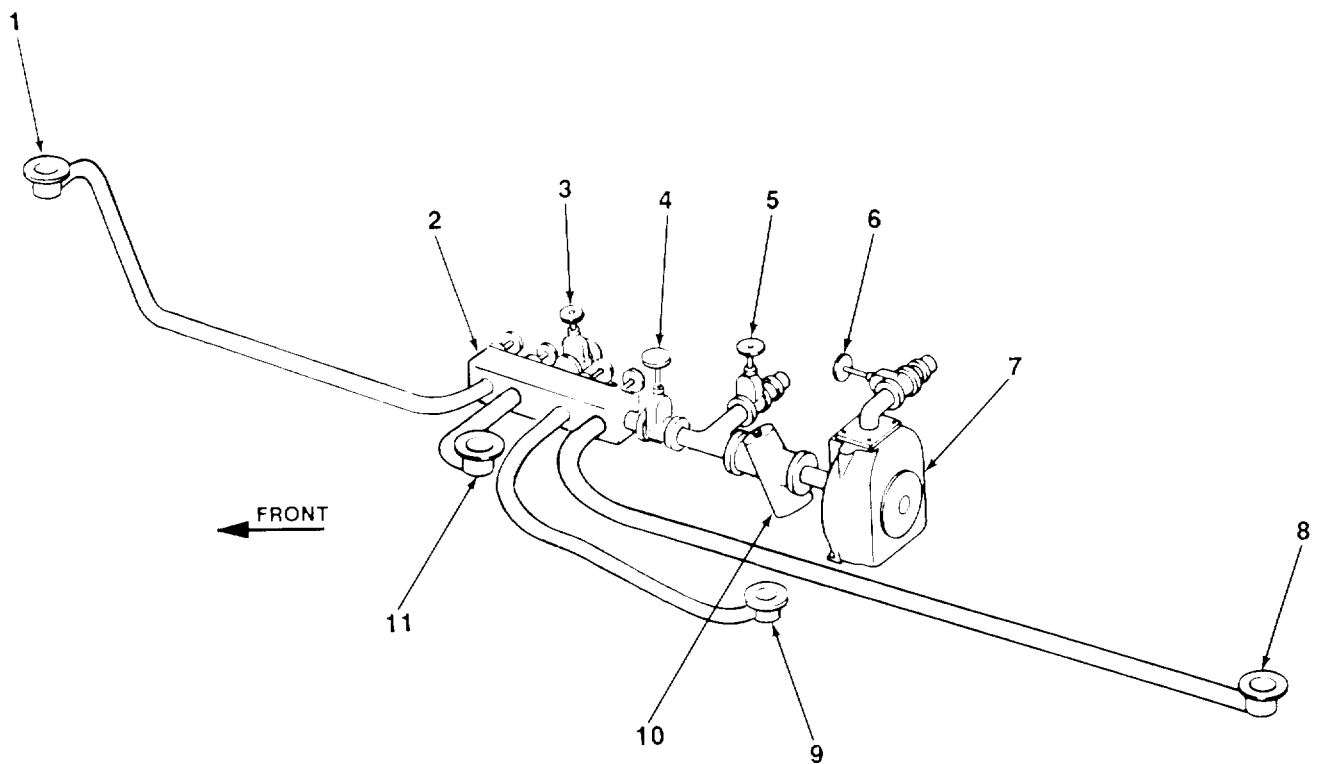
(10) Close and latch manhole fill cover (para 2-14).

**WARNING**

**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

(11) Disconnect bonding and grounding connections (para 2-13).

(12) Stow fire extinguishers.



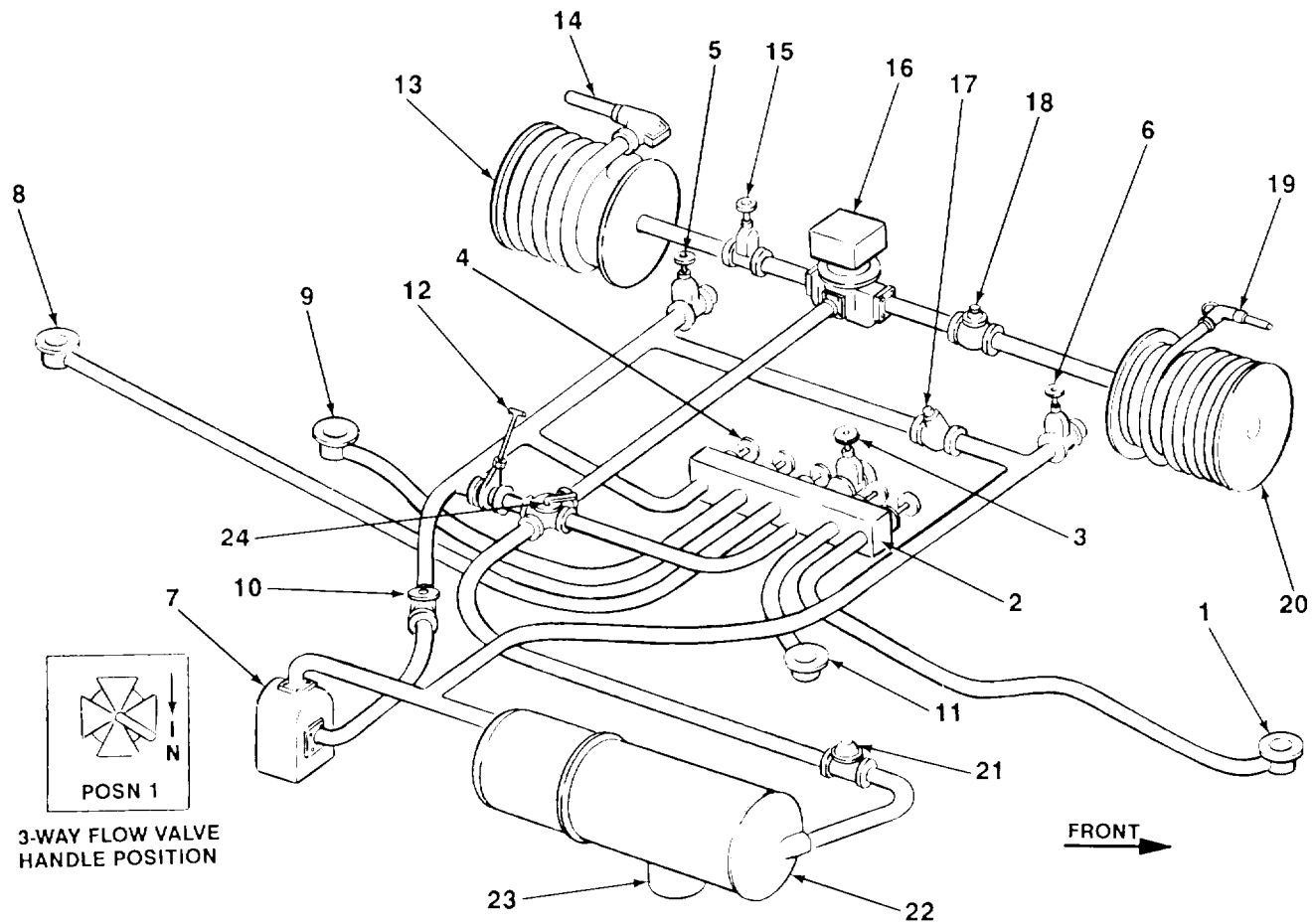
**TOP LOADING USING OUTSIDE PUMP (M131A4)**

**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

- |                                 |                       |
|---------------------------------|-----------------------|
| 1. Compartment 1                | 7. Pump               |
| 2. Manifold and Manifold Valves | 8. Compartment 4      |
| 3. Gravity Discharge Valve      | 9. Compartment 3      |
| 4. Pump Cutoff Valve            | 10. Sediment Strainer |
| 5. Pump Intake Valve            | 11. Compartment 2     |
| 6. Pump Discharge Valve         |                       |

2-19. TOP LOADING (ALTERNATE METHOD) (Con't).



TOP LOADING USING OUTSIDE PUMP (M131A4C)

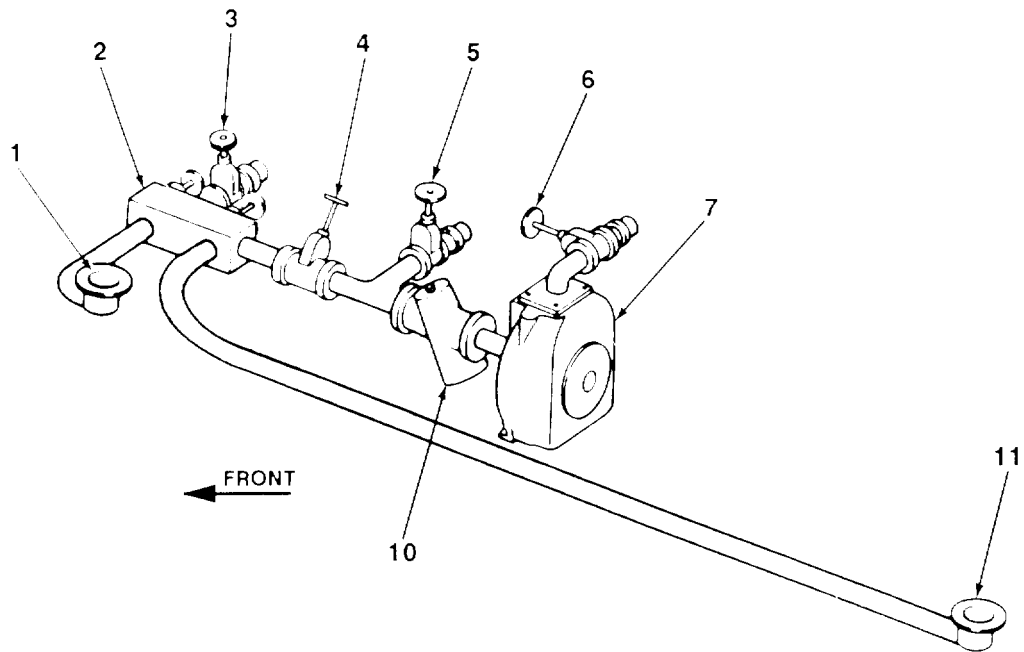
NOTE

All fuel valves are in closed position unless otherwise indicated

- |                                 |  |
|---------------------------------|--|
| 1. Compartment 1                | 13. 2 1/2 Inch Hose Reel                       |
| 2. Manifold and Manifold Valves | 14. 2 1/2 Inch Nozzle (225 gpm Delivery Rate)  |
| 3. Gravity Discharge Valve      | 15. 225 gpm Cutoff Valve                       |
| 4. Pump Cutoff Valve            | 16. Meter                                      |
| 5. Pump Intake Valve            | 17. Adjustable Bypass Valve                    |
| 6. Pump Discharge Valve         | 18. Flow Selector Valve (0-55 gpm)             |
| 7. Pump                         | 19. 1 1/2 Inch Nozzle (0-55 gpm Delivery Rate) |
| 8. Compartment 4                | 20. 1 1/2 Inch Hose Reel                       |
| 9. Compartment 3                | 21. 225 gpm Flow Valve                         |
| 10. Sediment Strainer           | 22. Filter-separator                           |
| 11. Compartment 2               | 23. Sump                                       |
| 12. Defuel Cutoff Valve         | 24. 3-way Flow Valve (Position 1)              |

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2-19. TOP LOADING (ALTERNATE METHOD) (Con't).



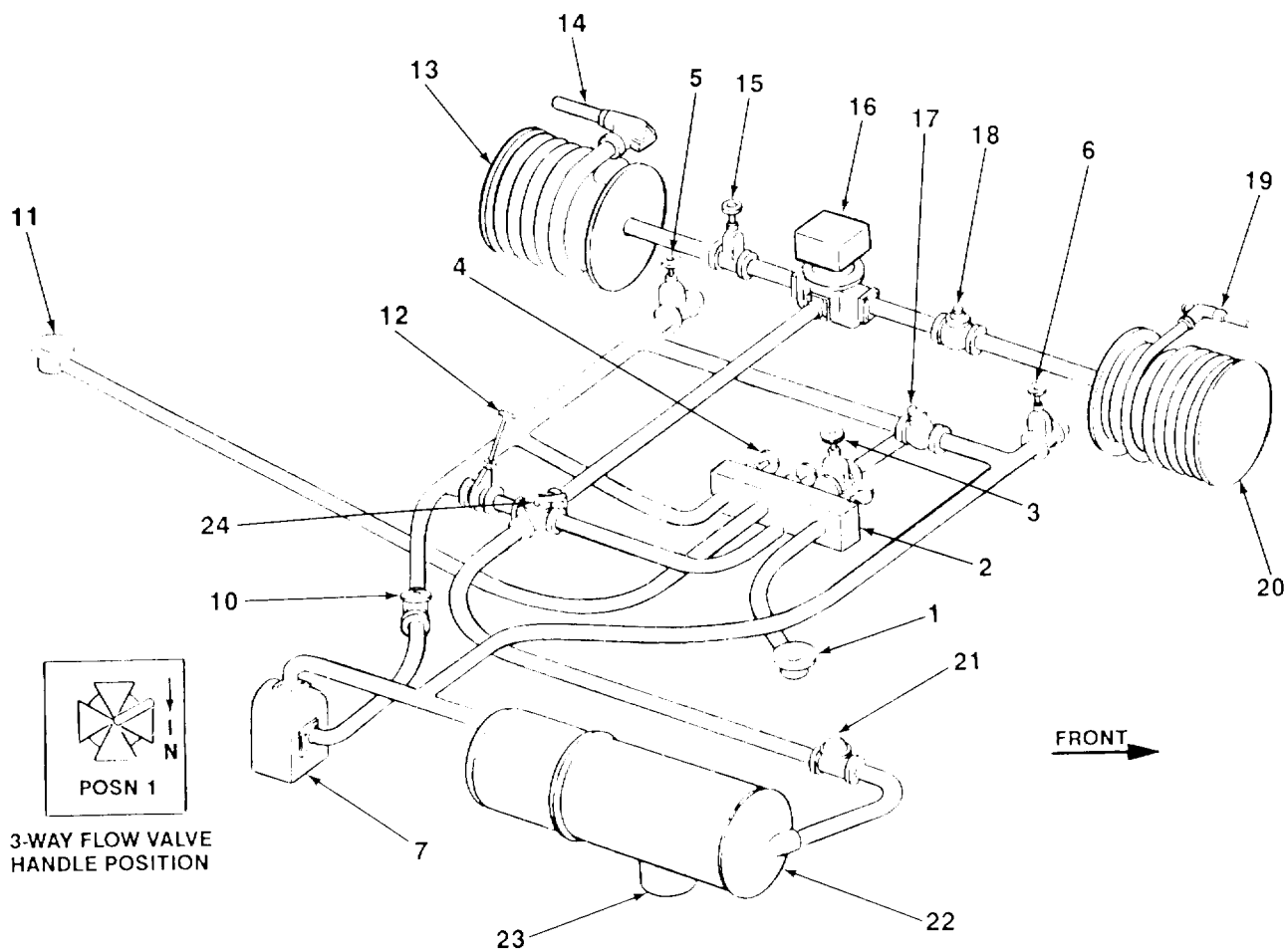
TOP LOADING USING OUTSIDE PUMP (M131A5)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |                                 |                         |
|---------------------------------|-------------------------|
| 1. Compartment 1                | 6. Pump Discharge Valve |
| 2. Manifold and Manifold Valves | 7. Pump                 |
| 3. Gravity Discharge Valve      | 10. Sediment Strainer   |
| 4. Pump Cutoff Valve            | 11. Compartment 2       |
| 5. Pump Intake Valve            |                         |

2-19. TOP LOADING (ALTERNATE METHOD) (Con't).



TOP LOADING USING OUTSIDE PUMP (M131A5C)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves</li> <li>3. Gravity Discharge Valve</li> <li>4. Pump Cutoff Valve</li> <li>5. Pump Intake Valve</li> <li>6. Pump Discharge Valve</li> <li>7. Pump</li> <li>10. Sediment Strainer</li> <li>11. Compartment 2</li> <li>12. Defuel Cutoff Valve</li> <li>13. 2½ Inch Hose Reel</li> </ul> | <ul style="list-style-type: none"> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. 3-way Flow Valve (Position 1)</li> </ul> |
|---|---|

**2-19. TOP LOADING (ALTERNATE METHOD) (Con't).****b Top Loading Using Vehicle Pump.****WARNING**

**DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.**

**NOTE**

- **Product is not filtered or metered when using this loading method.**
- **Refer to appropriate flow diagram at end of subparagraph b for assistance.**

- (1) Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual
- (2) Remove fire extinguishers from mounting brackets and take to point of operation.

**WARNING**

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbended and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

- (3) Connect bonding and grounding connections (para 2-13).
- (4) Ensure that all manually operated valves (2, 3, 4, 5, 6, 12, and 15) are closed, On M131A4C and M131A5C, ensure that 3-way flow valve (24) is set in position 1 with operating lever pushed inward as far as possible.
- (5) On M131A4C and M131A5C equipped with read-out flow selector dial, set selector knob to zero. Close flow selector valve (0-55 gpm) (18).
- (6) Remove cap from pump intake valve (5) outlet and connect transfer hose from outlet to supply source.

**WARNING**

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

- (7) Have assistant open manhole fill cover of compartment (1, 8, 9, or 11) to be loaded (para 2-14).

**NOTE**

**To reduce vapors and static electricity, transfer hose should be placed as close to bottom of tank as possible.**

- (8) Remove cap from pump discharge valve (6) outlet and connect transfer hose to outlet. Lower other end of transfer hose through fill cover opening. Place transfer hose as close to bottom of tank as possible.

- (9) Start auxiliary engine (para 2-15).

**2-19. TOP LOADING (ALTERNATE METHOD) (Con't).**

**WARNING**

- **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
- **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**

(10) Open pump intake valve (5) and pump discharge valve (6). Fuel will begin to flow. Watch fuel level gage inside manhole opening to determine fuel level in tank. DO NOT overfill.

(11) When operation is complete, stop auxiliary engine (para 2-15).

(12) Drain and remove transfer hose from pump discharge valve (6) outlet and fill cover opening. Drain and remove transfer hose from pump intake valve (5) outlet and fuel source.

(13) Close and latch manhole fill cover (para 2-14).

**WARNING**

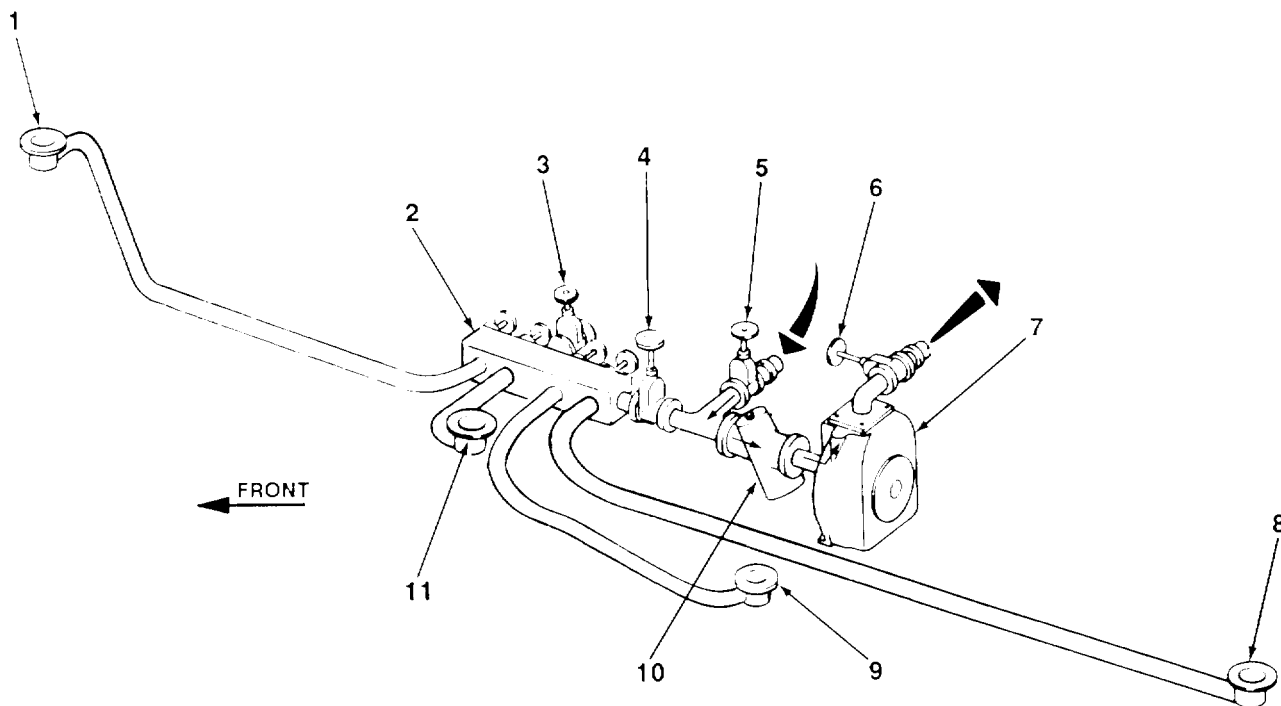
**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

(14) Disconnect bonding and grounding connections (para 2-13).

(15) Stow fire extinguishers.



2-19. TOP LOADING (ALTERNATE METHOD) (Con't).



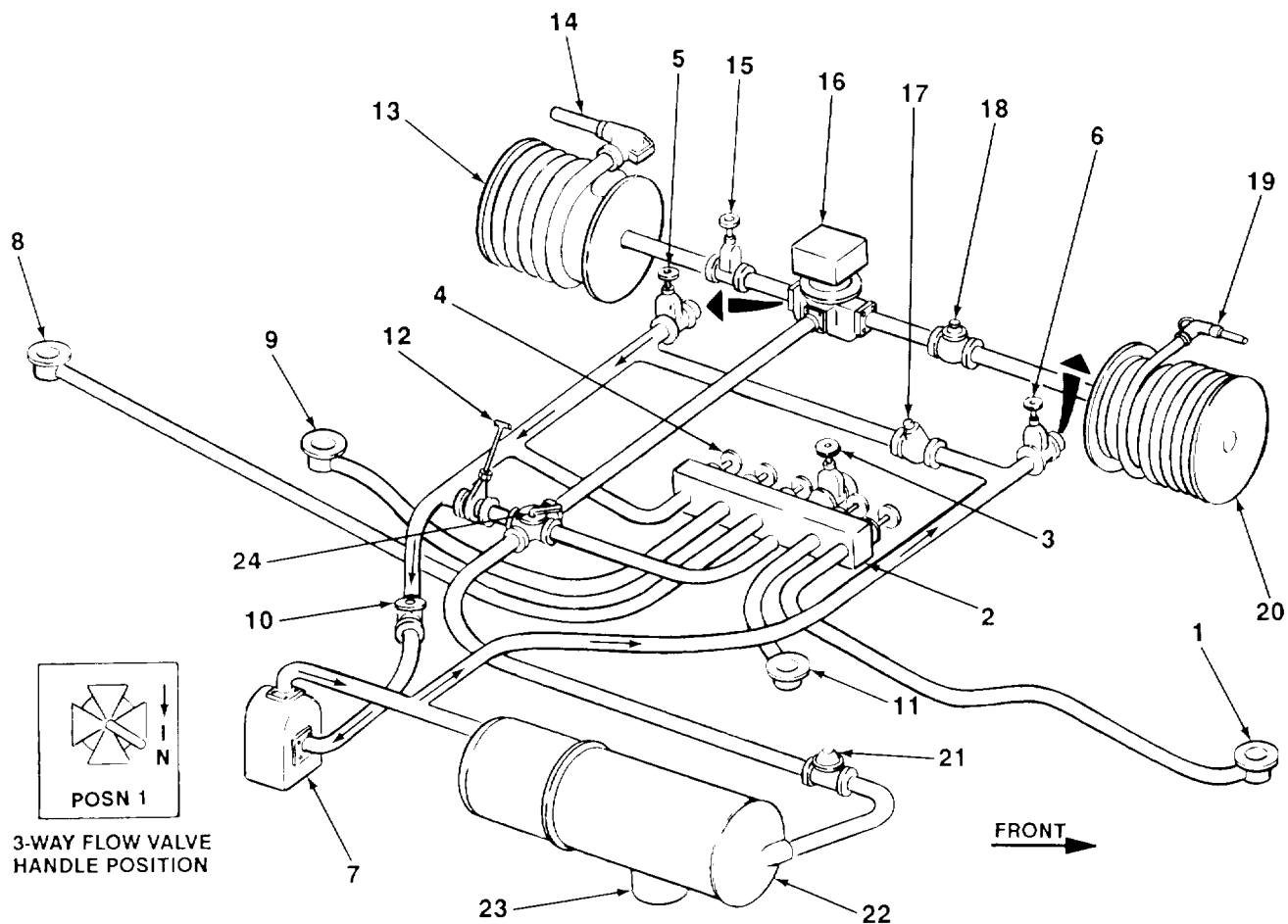
TOP LOADING USING VEHICLE PUMP (M131A4)

NOTE

All fuel valves are in closed position unless otherwise indicated

- |                                 |                       |
|---------------------------------|-----------------------|
| 1. Compartment 1                | 7. Pump               |
| 2. Manifold and Manifold Valves | 8. Compartment 4      |
| 3. Gravity Discharge Valve      | 9. Compartment 3      |
| 4. Pump Cutoff Valve            | 10. Sediment Strainer |
| 5. Pump Intake Valve (Open)     | 11. Compartment 2     |
| 6. Pump Discharge Valve (Open)  |                       |

2-19. TOP LOADING (ALTERNATE METHOD) (Con't).



TOP LOADING USING VEHICLE PUMP (M131A4C)

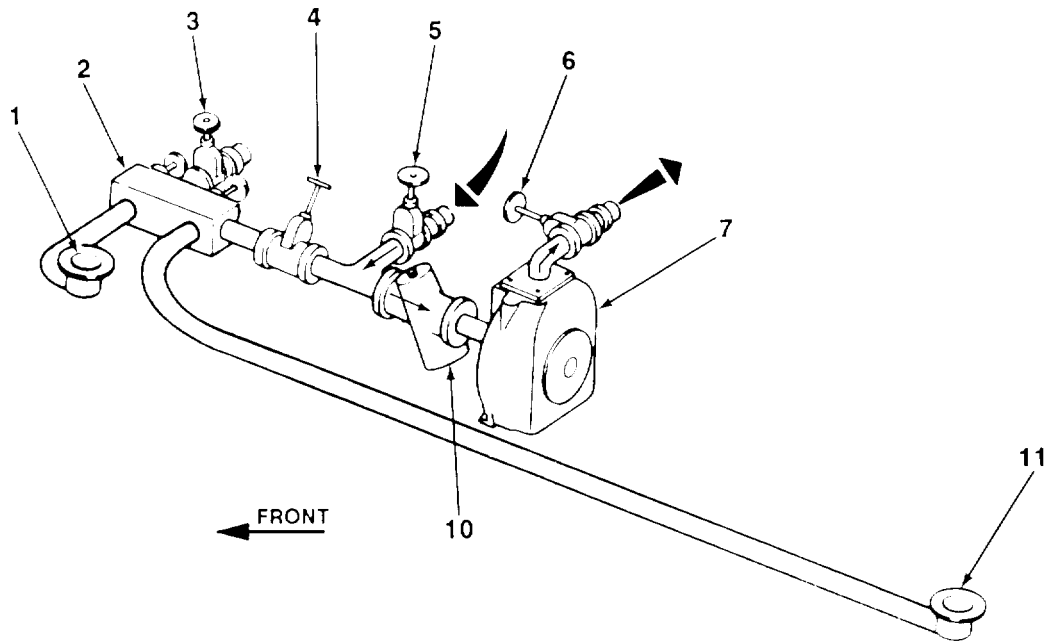
NOTE

All fuel valves are in closed position unless otherwise indicated.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves</li> <li>3. Gravity Discharge Valve</li> <li>4. Pump Cutoff Valve</li> <li>5. Pump Intake Valve (Open)</li> <li>6. Pump Discharge Valve (Open)</li> <li>7. Pump</li> <li>8. Compartment 4</li> <li>9. Compartment 3</li> <li>10. Sediment Strainer</li> <li>11. Compartment 2</li> <li>12. Defuel Cutoff Valve</li> </ul> | <ul style="list-style-type: none"> <li>13. 2½ Inch Hose Reel</li> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. 3-way Flow Valve (Position 1)</li> </ul> |
|--|--|

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2-19. TOP LOADING (ALTERNATE METHOD) (Con't).



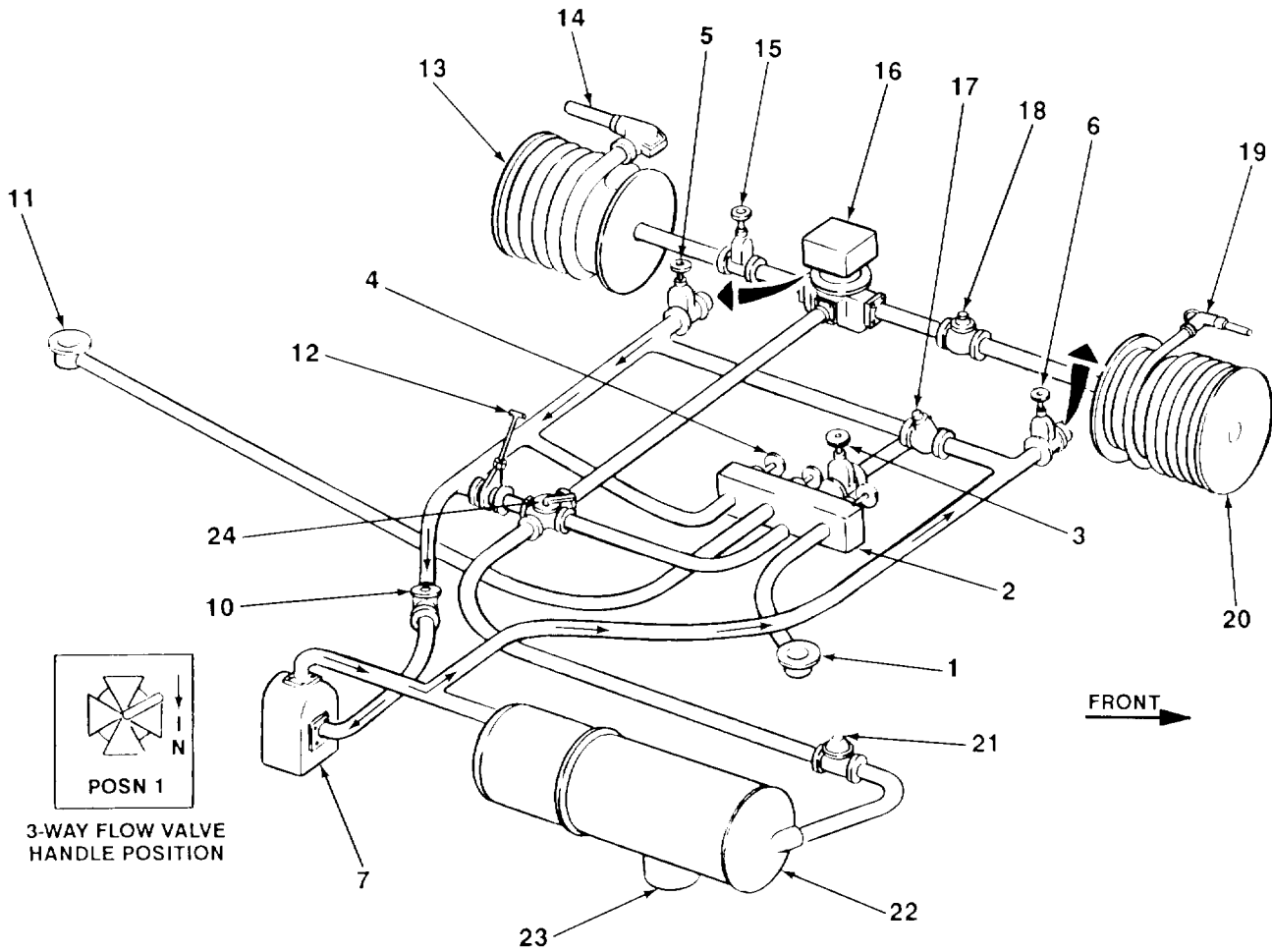
TOP LOADING USING VEHICLE PUMP (M131A5)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |                                 |                                |
|---------------------------------|--------------------------------|
| 1. Compartment 1                | 6. Pump Discharge Valve (Open) |
| 2. Manifold and Manifold Valves | 7. Pump                        |
| 3. Gravity Discharge Valve      | 10. Sediment Strainer          |
| 4. Pump Cutoff Valve            | 11. Compartment 2              |
| 5. Pump Intake Valve (Open)     |                                |

2-19. TOP LOADING (ALTERNATE METHOD) (Con't).



TOP LOADING USING VEHICLE PUMP (M131A5C)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves</li> <li>3. Gravity Discharge Valve</li> <li>4. Pump Cutoff Valve</li> <li>5. Pump Intake Valve (Open)</li> <li>6. Pump Discharge Valve (Open)</li> <li>7. Pump</li> <li>10. Sediment Strainer</li> <li>11. Compartment 2</li> <li>12. Defuel Cutoff Valve</li> <li>13. 2½ Inch Hose Reel</li> </ul> | <ul style="list-style-type: none"> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. 3-way Flow Valve (Position 1)</li> </ul> |
|---|---|

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**2-20. GRAVITY DISCHARGE OF FUEL,****WARNING**

**DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.**

**NOTE**

- **Product is not metered or filtered when using this unloading method.**
  - **Refer to appropriate flow diagram at end of paragraph for assistance.**
- a. Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual.
  - b. Remove fire extinguishers from mounting brackets and take to point of operation.

**WARNING**

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbounded and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

- c. Connect bonding and grounding connections (para 2-13).
- d. Ensure that all manually operated valves (2, 3, 4, 5, 6, 12, and 15) are closed. M131A5C, ensure that 3-way flow valve (24) is set in position 1 with operating lever pushed inward as far as possible.
- e. On M131A4C and M131A5C equipped with read-out flow selector dial, set selector knob to zero. Close flow selector valve (0-55 gpm) (18),

**WARNING**

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

- g. Remove cap from gravity discharge valve (3) outlet and connect transfer hose from outlet to fuel receptacle.
- h. Open emergency relief valve of compartment (1, 8, 9, or 11) to be emptied by pulling operating control lever outward.
- i. Open manifold (2) valve of compartment (1, 8, 9, or 11) to be emptied.

**WARNING**

- **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
  - **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**
- j. Open gravity discharge valve (3). Fuel will begin to flow.

**2-20. GRAVITY DISCHARGE OF FUEL (Con't).**

k. When operation is complete, close gravity discharge valve (3) and manifold (2) valve. Close emergency relief valve by pushing in on operating control lever,

l. Close and latch manhole fill cover (para 2-14).

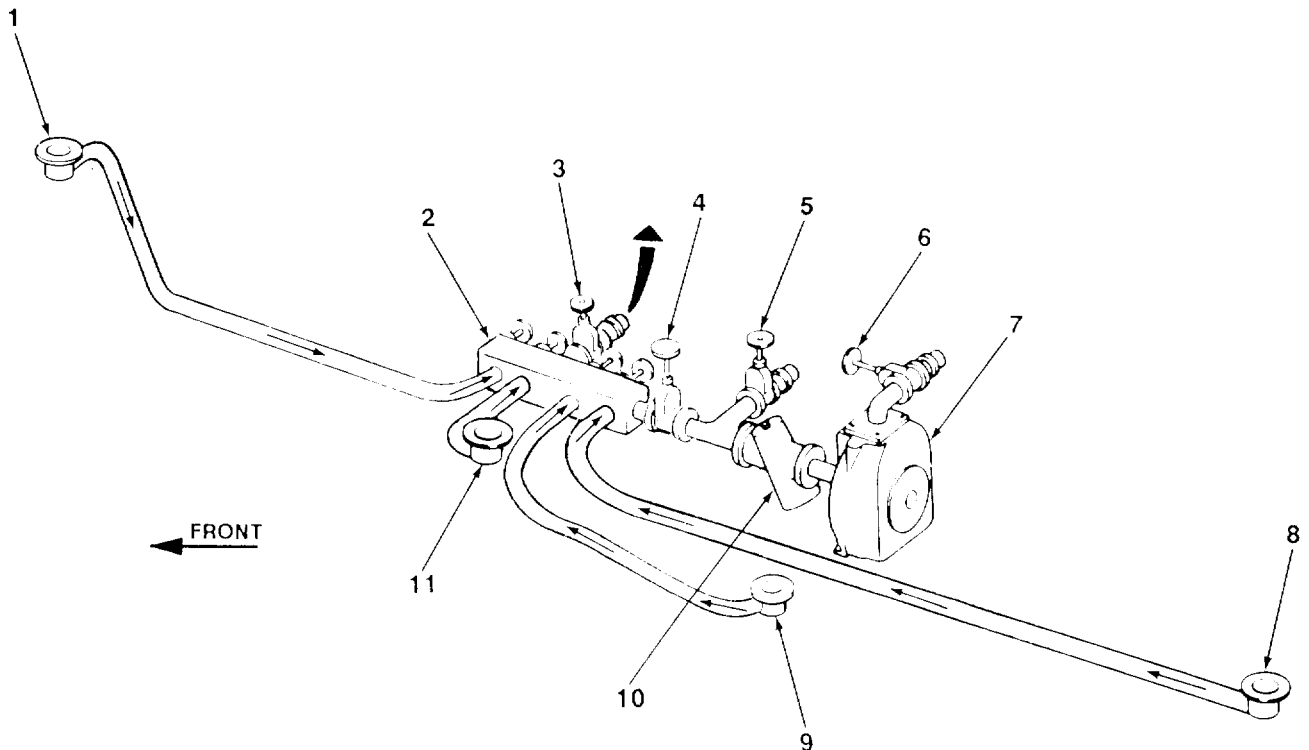
m. Drain and remove transfer hose from fuel receptacle and gravity discharge valve (3) outlet. Install cap on outlet.

**WARNING**

**Walk grounding cable back to reel when stowing ground cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

n. Disconnect bonding and grounding connections (para 2-13).

o. Stow fire extinguishers



**GRAVITY DISCHARGE OF FUEL (M131A4)**

**NOTE**

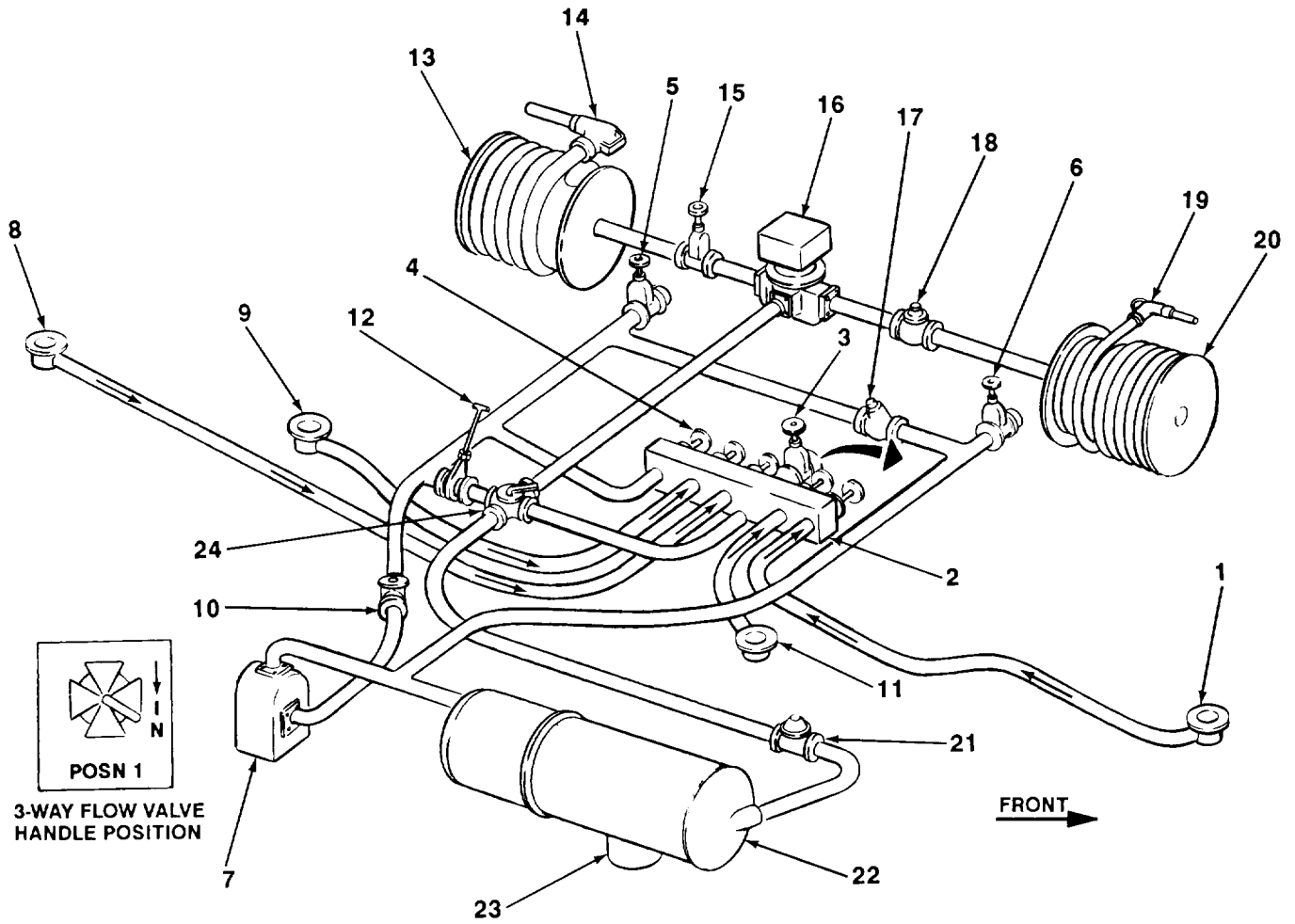
**All fuel valves are in closed position unless otherwise indicated.**

- 1. Compartment 1
- 2. Manifold and Manifold Valves(s) (Open)
- 3. Gravity Discharge Valve (Open)
- 4. Pump Cutoff Valve
- 5. Pump Intake Valve
- 6. Pump Discharge Valve

- 7. Pump
- 8. Compartment 4
- 9. Compartment 3
- 10. Sediment Strainer
- 11. Compartment 2

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2-20. GRAVITY DISCHARGE OF FUEL (Con't).



GRAVITY DISCHARGE OF FUEL (M131A4C)

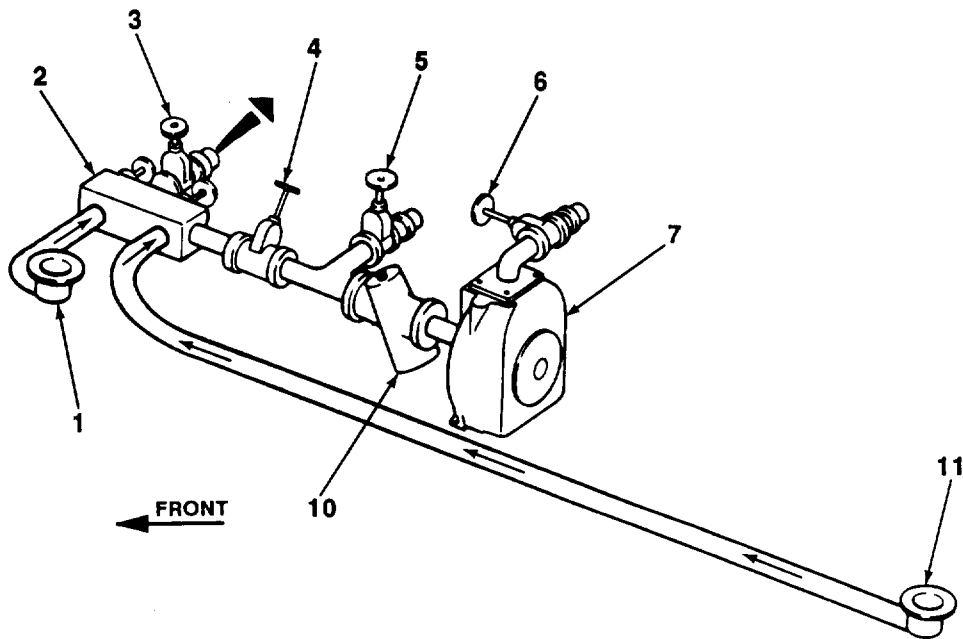
NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves(s) (Open)</li> <li>3. Gravity Discharge Valve (Open)</li> <li>4. Pump Cutoff Valve</li> <li>5. Pump Intake Valve</li> <li>6. Pump Discharge Valve</li> <li>7. Pump</li> <li>8. Compartment 4</li> <li>9. Compartment 3</li> <li>10. Sediment Strainer</li> <li>11. Compartment 2</li> <li>12. Defuel Cutoff Valve</li> </ul> | <ul style="list-style-type: none"> <li>13. 2½ Inch Hose Reel</li> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. 3-way Flow Valve (Position 1)</li> </ul> |
|---|--|

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2-20. GRAVITY DISCHARGE OF FUEL (Con't).



GRAVITY DISCHARGE OF FUEL (M131A5)

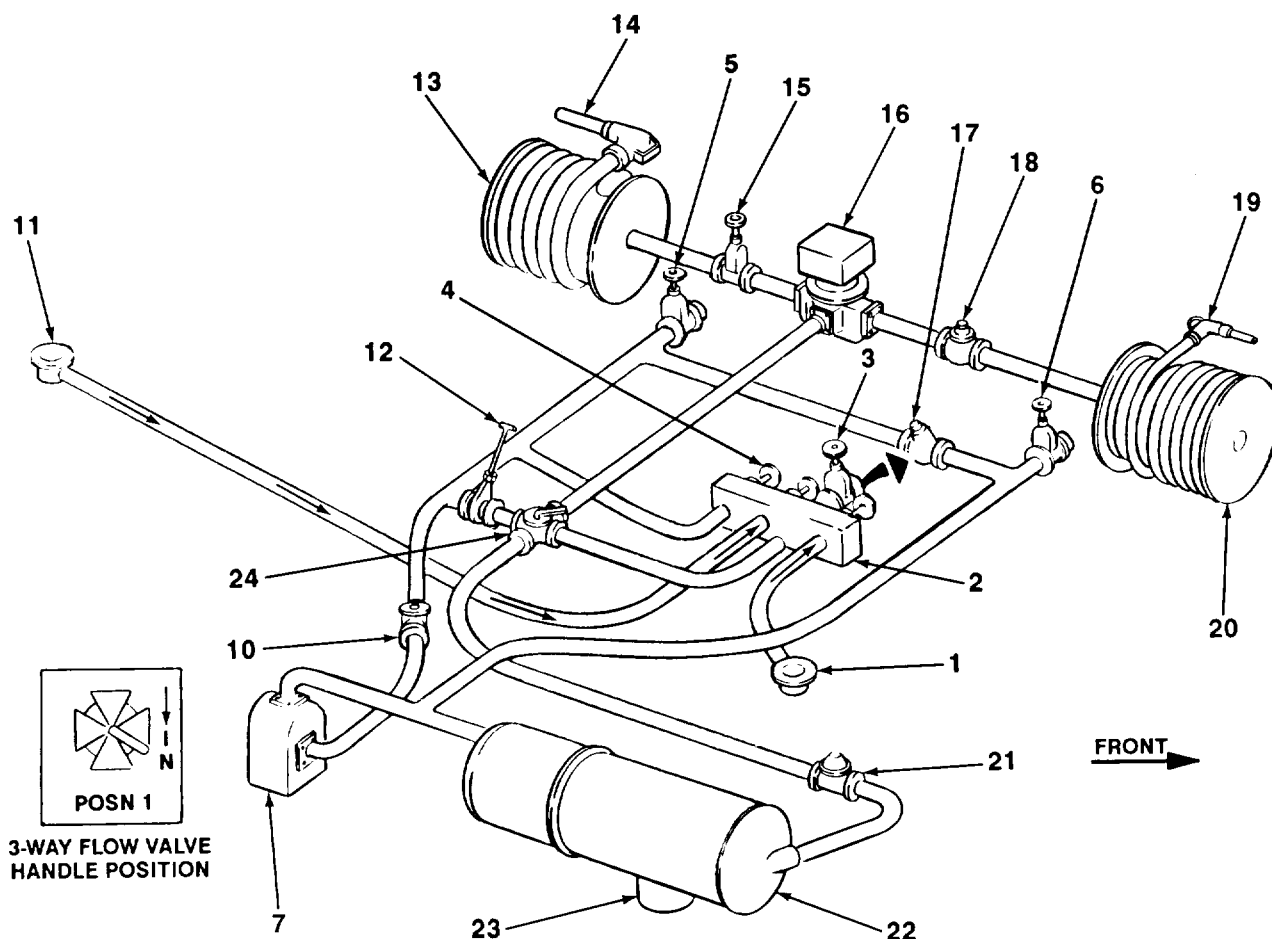
NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |                         |
|---|-------------------------|
| 1. Compartment 1                          | 6. Pump Discharge Valve |
| 2. Manifold and Manifold Valves(s) (Open) | 7. Pump                 |
| 3. Gravity Discharge Valve (Open)         | 10. Sediment Strainer   |
| 4. Pump Cutoff Valve                      | 11. Compartment 2       |
| 5. Pump Intake Valve                      |                         |



2-20. GRAVITY DISCHARGE OF FUEL (Con't).



GRAVITY DISCHARGE OF FUEL (M1 31A5C)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves(s) (Open)</li> <li>3. Gravity Discharge Valve (Open)</li> <li>4. Pump Cutoff Valve</li> <li>5. Pump Intake Valve</li> <li>6. Pump Discharge Valve</li> <li>7. Pump</li> <li>10. Sediment Strainer</li> <li>11. Compartment 2</li> <li>12. Defuel Cutoff Valve</li> <li>13. 2½ Inch Hose Reel</li> </ul> | <ul style="list-style-type: none"> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. 3-way Flow Valve (Position 1)</li> </ul> |
|--|---|

## 2-21. PRESSURE DISCHARGE OF FUEL.

### **WARNING**

**DO NOT** smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.

### **NOTE**

- **Product is not metered or filtered when using this unloading method.**
  - **Refer to appropriate flow diagram at end of paragraph for assistance.**
- a. Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual.
  - b. Remove fire extinguishers from mounting brackets and take to point of operation.

### **WARNING**

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbended and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

- c. Connect bonding and grounding connections (para 2-13).
- d. Ensure that all manually operated valves (2, 3, 4, 5, 6, 12, and 15) are closed. On M131A4C and M131A5C, ensure that 3-way flow valve (24) is set in position 1 with operating lever pushed inward as far as possible.
- e. On M131A4C and M131A5C equipped with a read-out flow selector dial, set selector knob to zero. Close flow selector valve (0-55 gpm) (18).

### **WARNING**

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

- f. Have assistant open manhole fill cover of compartment (1, 8, 9, or 11) to be emptied (para 2-14).
- g. Remove cap from pump discharge valve (6) outlet and connect transfer hose from outlet to fuel receptacle.
- h. Open emergency relief valve of compartment (1, 8, 9, or 11) to be emptied by pulling operating control lever outward.
- i. Open manifold (2) valve of compartment (1, 8, 9, or 11) to be emptied.
- j. Open pump cutoff valve (4) and pump discharge valve (6).

### **WARNING**

- **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
  - **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or Intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**
- k. Start auxiliary engine (para 2-15). Fuel will begin to flow.

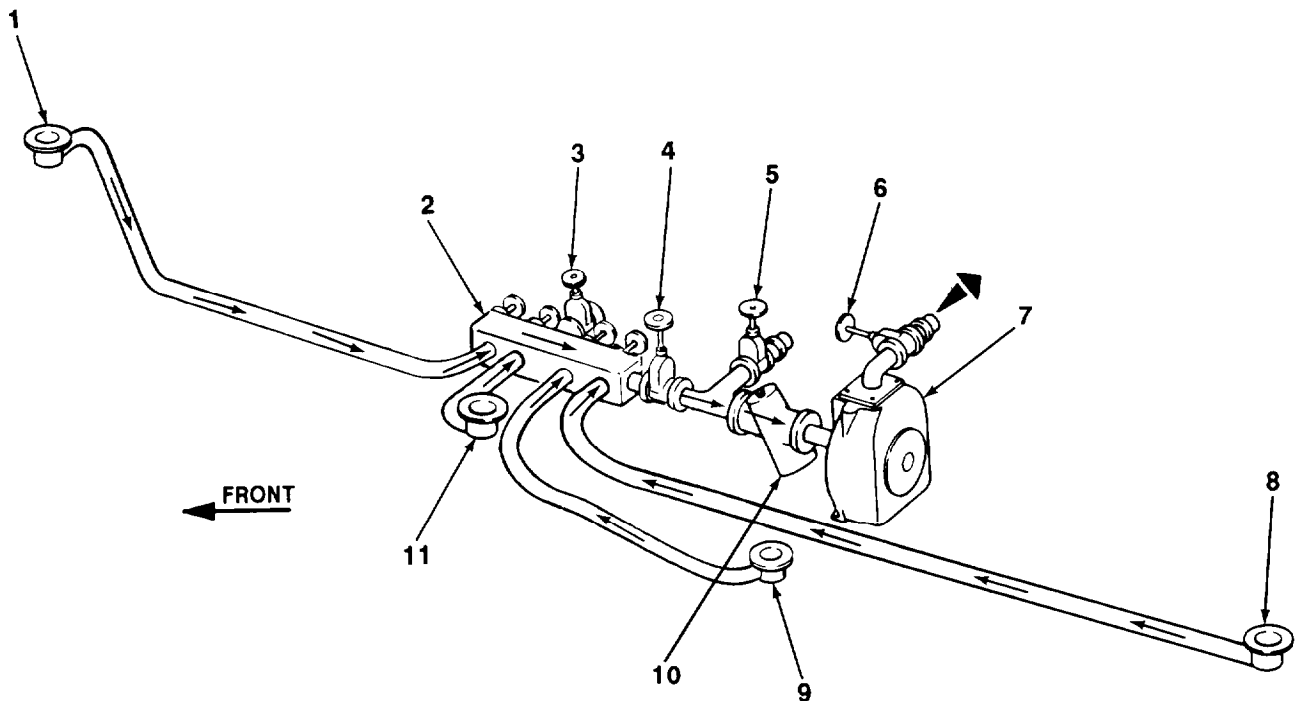
**2-21. PRESSURE DISCHARGE OF FUEL (Con't).**

- l. When operation is complete, shut off auxiliary engine (para 2-15). Close pump cutoff valve (4), pump discharge valve (6), and manifold (2) valve. Close emergency relief valve by pushing in on operating control lever.
- m. Close and latch manhole fill cover (para 2-14).
- n. Drain and remove transfer hose from pump discharge valve (6) outlet and fuel receptacle. Install cap on outlet.

**WARNING**

**Walk grounding cable back to reel when stowing ground cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

- o. Disconnect bonding and grounding connections (para 2-13).
- p. Stow fire extinguishers.



**PRESSURE DISCHARGE OF FUEL (M131A4)**

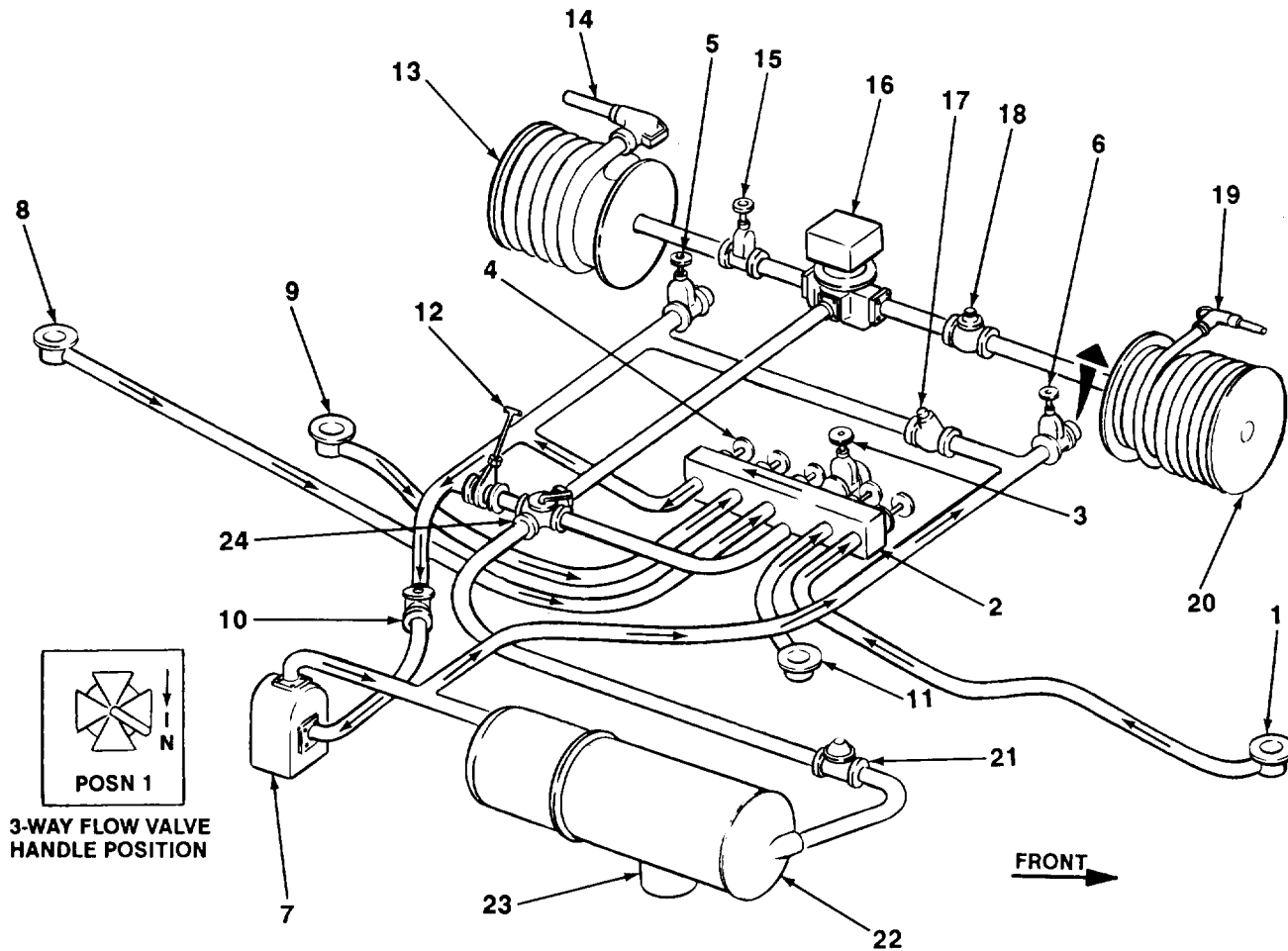
**NOTE**

**All fuel valves are in closed position unless otherwise Indicated.**

- |   |                       |
|---|-----------------------|
| 1. Compartment 1                          | 7. Pump               |
| 2. Manifold and Manifold Valves(s) (Open) | 8. Compartment 4      |
| 3. Gravity Discharge Valve                | 9. Compartment 3      |
| 4. Pump Cutoff Valve (Open)               | 10. Sediment Strainer |
| 5. Pump Intake Valve                      | 11. Compartment 2     |
| 6. Pump Discharge Valve (Open)            |                       |

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2-21. PRESSURE DISCHARGE OF FUEL (Con't).



PRESSURE DISCHARGE OF FUEL (M131A4C)

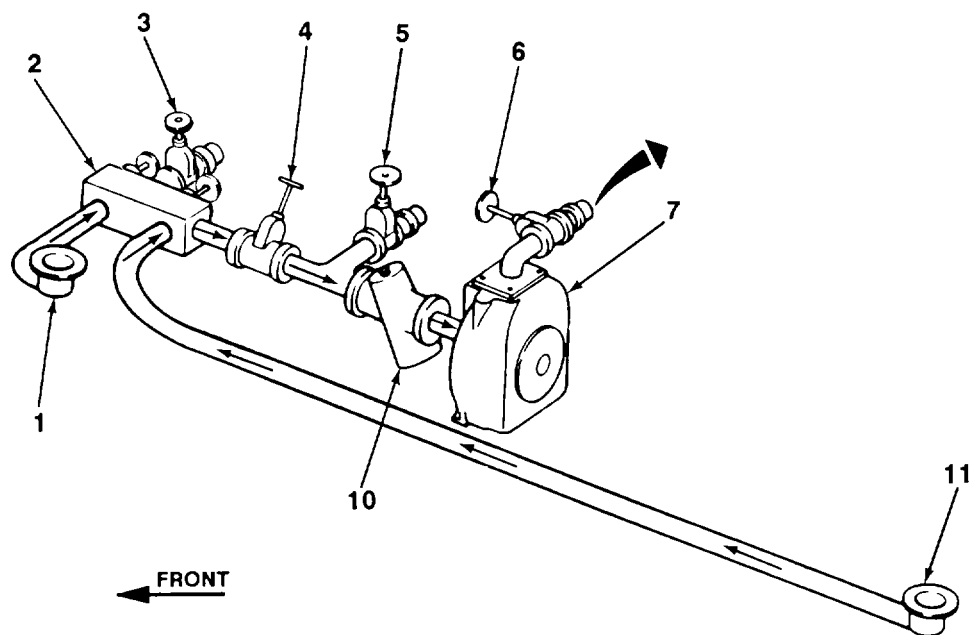
NOTE

All fuel valves are in closed position unless otherwise indicated.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves(s) (Open)</li> <li>3. Gravity Discharge Valve</li> <li>4. Pump Cutoff Valve (Open)</li> <li>5. Pump Intake Valve</li> <li>6. Pump Discharge Valve (Open)</li> <li>7. Pump</li> <li>8. Compartment 4</li> <li>9. Compartment 3</li> <li>10. Sediment Strainer</li> <li>11. Compartment 2</li> <li>12. Defuel Cutoff Valve</li> </ul> | <ul style="list-style-type: none"> <li>13. 2½ Inch Hose Reel</li> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. 3-way Flow Valve (Position 1)</li> </ul> |
|--|--|

TA702671

2-21. PRESSURE DISCHARGE OF FUEL (Con't).



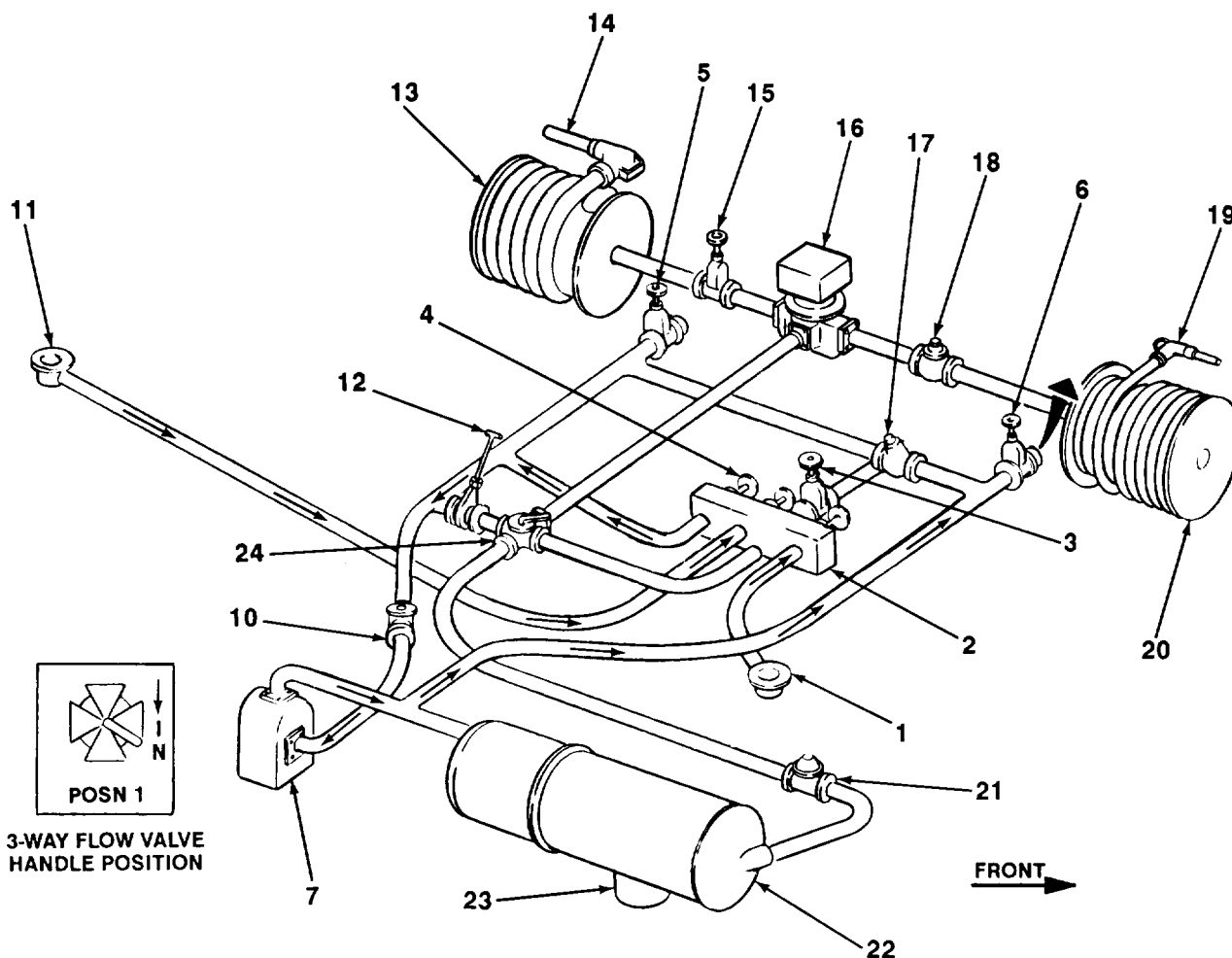
PRESSURE DISCHARGE OF FUEL (M131A5)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |                                |
|---|--------------------------------|
| 1. Compartment 1                          | 6. Pump Discharge Valve (Open) |
| 2. Manifold and Manifold Valves(s) (Open) | 7. Pump                        |
| 3. Gravity Discharge Valve                | 10. Sediment Strainer          |
| 4. Pump Cutoff Valve (Open)               | 11. Compartment 2              |
| 5. Pump Intake Valve                      |                                |

2-21. PRESSURE DISCHARGE OF FUEL (Con't).



PRESSURE DISCHARGE OF FUEL (M131A5C)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves(s) (Open)</li> <li>3. Gravity Discharge Valve</li> <li>4. Pump Cutoff Valve (Open)</li> <li>5. Pump Intake Valve</li> <li>6. Pump Discharge Valve (Open)</li> <li>7. Pump</li> <li>10. Sediment Strainer</li> <li>11. Compartment 2</li> <li>12. Defuel Cutoff Valve</li> <li>13. 2½ Inch Hose Reel</li> </ul> | <ul style="list-style-type: none"> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. 3-way Flow Valve (Position 1)</li> </ul> |
|---|---|

TA702673

## 2-22. FUEL TRANSFER.

**WARNING**

**DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.**

**NOTE**

- **Fuel transfer is using semitrailer's pump to transfer fuel from one outside source to another outside source.**
  - **Refer to appropriate flow diagram at end of paragraph for assistance.**
- a. Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual.
  - b. Remove fire extinguishers from mounting brackets and take to point of operation.

**WARNING**

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbended and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

- c.. Connect bonding and grounding connections (para 2-13).
- d. Ensure that all manually operated valves (2, 3, 4, 5, 6, 12, and 15) are closed. On M131A4C and M1 31A5C, ensure that 3-way flow valve (24) is set in position 1 with operating lever pushed inward as far as possible.
- e. On M131A4C and M1 31A5C equipped with a read-out flow selector dial, set selector knob to zero. Close flow selector valve (0-55 gpm) (18).
- f. Remove cap from pump intake valve (5) outlet and connect transfer hose from outlet to fuel source.
- g. Remove cap from pump discharge valve (6) outlet and connect transfer hose from outlet to fuel receptacle.
- h. Start auxiliary engine (para 2-15).

**WARNING**

- **DO NOT breathe fuel fumes they are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
  - **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**
- i. Open pump intake valve (5) and pump discharge valve (6). Fuel will begin to flow.
  - j. When operation is complete, shut off auxiliary engine (para 2-15). Close pump discharge valve (6) and pump intake valve (5).
  - k. Drain and remove transfer hose from pump discharge valve (6) outlet and fuel receptacle. Install capon outlet.

**2-22. FUEL TRANSFER (Con't).**

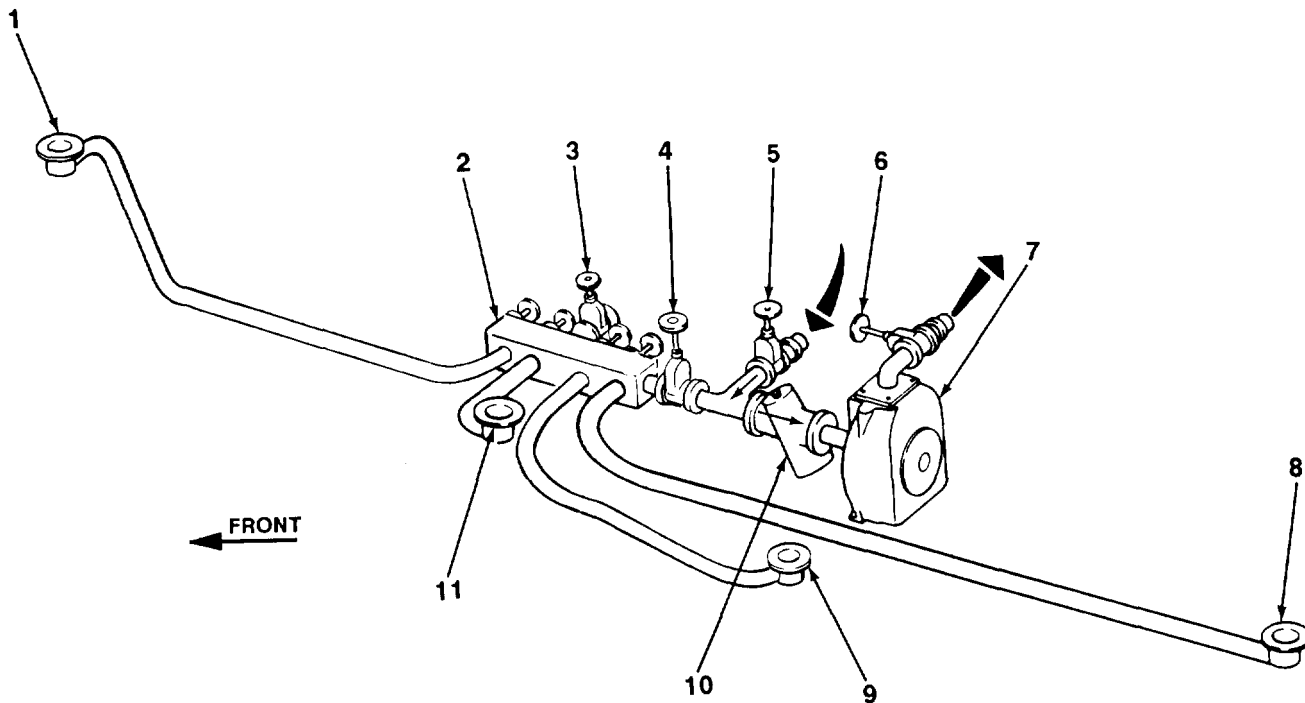
l. Drain and remove transfer hose from pump intake valve (5) outlet and fuel source. Install cap on outlet.

**WARNING**

**Walk grounding cable back to reel when stowing ground cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

m. Disconnect bonding and grounding connections (para 2-13).

n. Stow fire extinguishers.



**FUEL TRANSFER (M131A4)**

**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

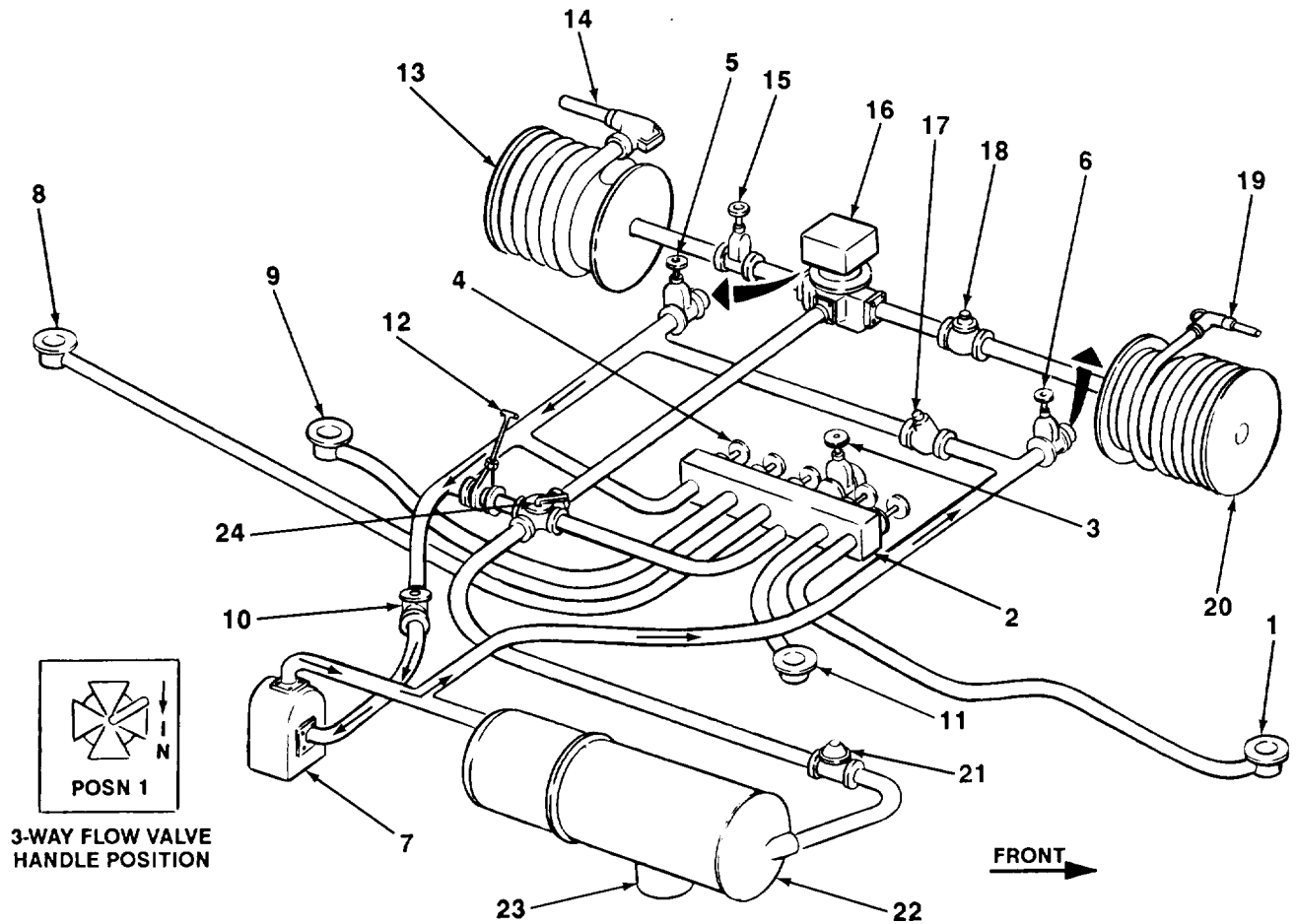
- 1. Compartment 1
- 2. Manifold and Manifold Valves
- 3. Gravity Discharge Valve
- 4. Pump Cutoff Valve
- 5. Pump Intake Valve (Open)
- 6. Pump Discharge Valve (Open)

- 7. Pump
- 8. Compartment 4
- 9. Compartment 3
- 10. Sediment Strainer
- 11. Compartment 2

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2-22, FUEL TRANSFER (Con't).



FUEL TRANSFER (M131A4C)

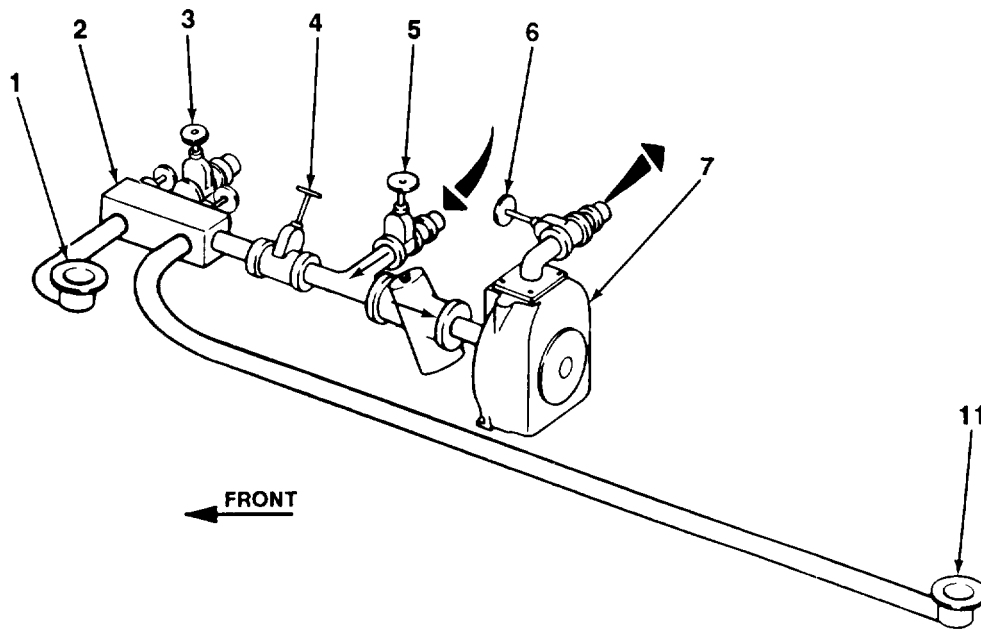
NOTE

All fuel valves are in closed position unless otherwise indicated.

- 1. Compartment 1
- 2. Manifold and Manifold Valves
- 3. Gravity Discharge Valve
- 4. Pump Cutoff Valve
- 5. Pump Intake Valve (Open)
- 6. Pump Discharge Valve (Open)
- 7. Pump
- 8. Compartment 4
- 9. Compartment 3
- 10. Sediment Strainer
- 11. Compartment 2
- 12. Defuel Cutoff Valve

- 13. 2½ Inch Hose Reel
- 14. 2½ Inch Nozzle (225 gpm Delivery Rate)
- 15. 225 gpm Cutoff Valve
- 16. Meter
- 17. Adjustable Bypass Valve
- 18. Flow Selector Valve (0-55 gpm)
- 19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)
- 20. 1½ Inch Hose Reel
- 21. 225 gpm Flow Valve
- 22. Filter-separator
- 23. Sump
- 24. 3-way Flow Valve (Position 1)

2-22. FUEL TRANSFER (Con't).



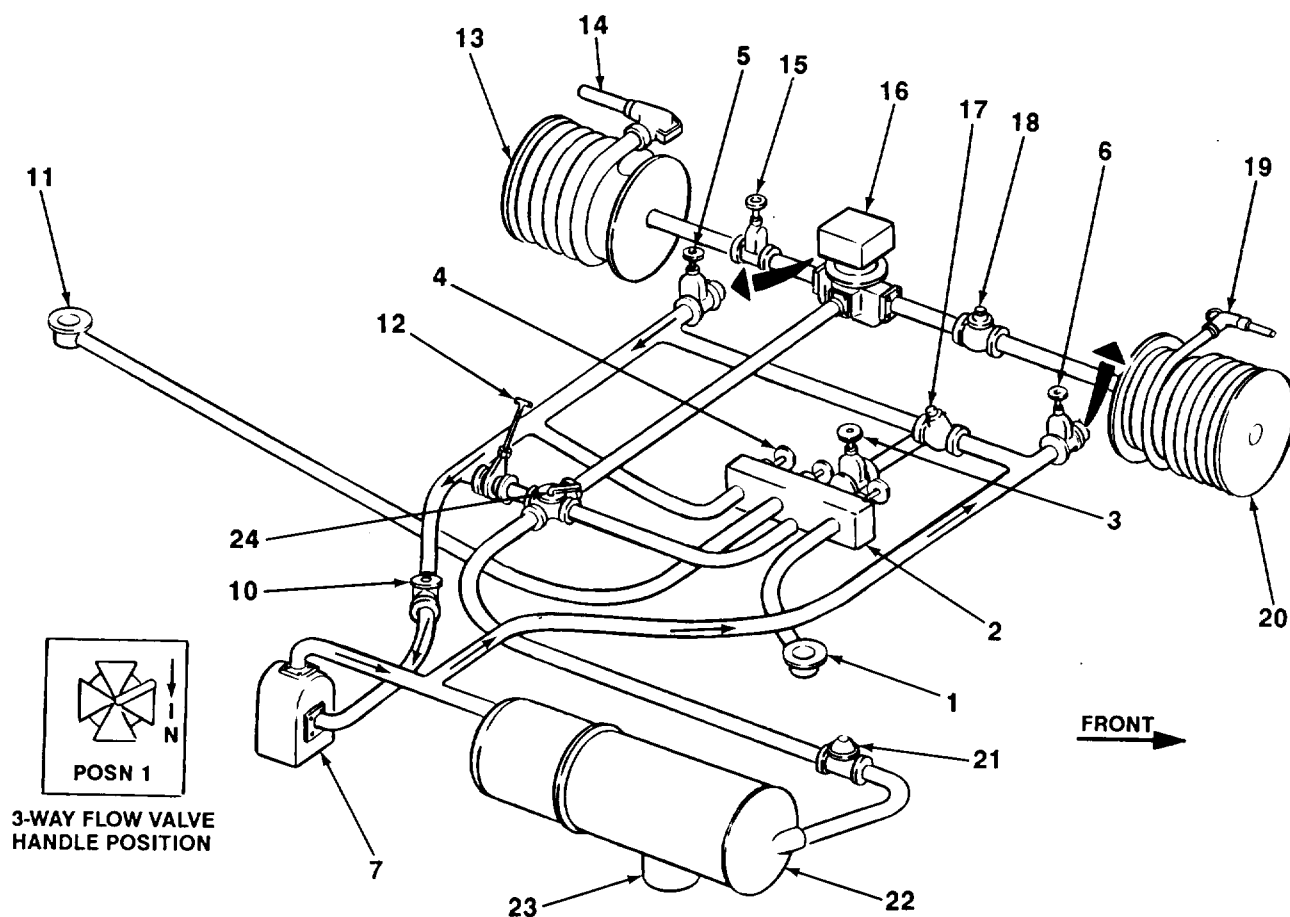
FUEL TRANSFER (M131A5)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |                                 |                                |
|---------------------------------|--------------------------------|
| 1. Compartment 1                | 6. Pump Discharge Valve (Open) |
| 2. Manifold and Manifold Valves | 7. Pump                        |
| 3. Gravity Discharge Valve      | 10. Sediment Strainer          |
| 4. Pump Cutoff Valve            | 11. Compartment 2              |
| 5. Pump Intake Valve (Open)     |                                |

2-22. FUEL TRANSFER (Con't).



FUEL TRANSFER (M131A5C)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Compartment 1</li> <li>2. Manifold and Manifold Valves</li> <li>3. Gravity Discharge Valve</li> <li>4. Pump Cutoff Valve</li> <li>5. Pump Intake Valve (Open)</li> <li>6. Pump Discharge Valve (Open)</li> <li>7. Pump</li> <li>10. Sediment Strainer</li> <li>11. Compartment 2</li> <li>12. Defuel Cutoff Valve</li> <li>13. 2½ Inch Hose Reel</li> </ul> | <ul style="list-style-type: none"> <li>14. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>15. 225 gpm Cutoff Valve</li> <li>16. Meter</li> <li>17. Adjustable Bypass Valve</li> <li>18. Flow Selector Valve (0-55 gpm)</li> <li>19. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>20. 1½ Inch Hose Reel</li> <li>21. 225 gpm Flow Valve</li> <li>22. Filter-separator</li> <li>23. Sump</li> <li>24. 3-way Flow Valve (Position 1)</li> </ul> |
|---|---|

TA702677

## 2-23. FUEL SERVICING (M131A4C AND M131A5C).

### a. General.

(1) The 0-55 gpm (0-208 lpm) fuel delivery system is used for servicing containers, ground vehicles, or aircraft whose fuel acceptance rate is less than 225 gpm (852 lpm).

(2) The 225 gpm (852 lpm) fuel delivery system is used for servicing containers, ground vehicles, or aircraft whose fuel acceptance rate is at least 225 gpm (852 lpm).

(3) Fuel delivery through either 0-55 gpm (0-208 lpm) or 225 gpm (852 lpm) fuel delivery system is accomplished by triggering delivery hose nozzle.

### b. Gravity Discharge Through 225 gpm (852 lpm) System.

#### WARNING

**DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.**

#### CAUTION

**Do not use gravity discharge when fueling aircraft, vehicles, generators, and other equipment. Fuel must be filtered when servicing this equipment. Failure to follow this caution may result in damage to equipment.**

#### NOTE

- **Product is metered but not filtered when using this fuel servicing method.**
- **Refer to appropriate flow diagram at end of subparagraph b for assistance.**

- (1) Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual
- (2) Remove fire extinguishers from mounting brackets and take to point of operation.

#### WARNING

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbonded and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

- (3) Connect bonding and grounding connections (para 2-13).
- (4) Ensure that all manually operated valves (3, 4, 8, 11, 12, 23, and 24) are closed. Ensure that 3-way flow valve (20) is set in position 1 with operating lever pushed inward as far as possible.
- (5) Ensure that counter of meter (5) is set on zero.
- (6) If equipped with a read-out flow selector dial, set selector knob to zero. Close flow selector valve (0-55 gpm) (7).

#### WARNING

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

- (7) Have assistant open manhole fill cover of compartment (13, 14, 21, or 22) to be emptied (para 2-14).

**2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).**

(8) Open emergency relief valve of compartment (13, 14, 21, or 22) to be emptied by pulling outward on operating control lever.

(9) Open manifold (12) valve of compartment (13, 14, 21, or 22) to be emptied.

(10) Open pump cutoff valve (24), defuel cutoff valve (23), and 225 gpm (852 lpm) cutoff valve (4).

(11) Loosen hose reel brake, unwind hose from 21/2 in. (6.4 cm) hose reel (1), and take to point of operation. Place nozzle (2) in receiving container.

---

**WARNING**

---

- **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
- **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer simple first aid must be present.**

(12) Start fuel flow by squeezing trigger on nozzle (2).

(13) When operation is complete, close 225 gpm (852 lpm) cutoff valve (4), defuel cutoff valve (23), pump cutoff valve (24), and manifold (12) valve. Close emergency relief valve by pushing in on operating control lever.

(14) Close and latch manhole fill cover (para 2-14).

(15) Wind hose on hose reel (1). Lock hose reel.

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**WARNING**

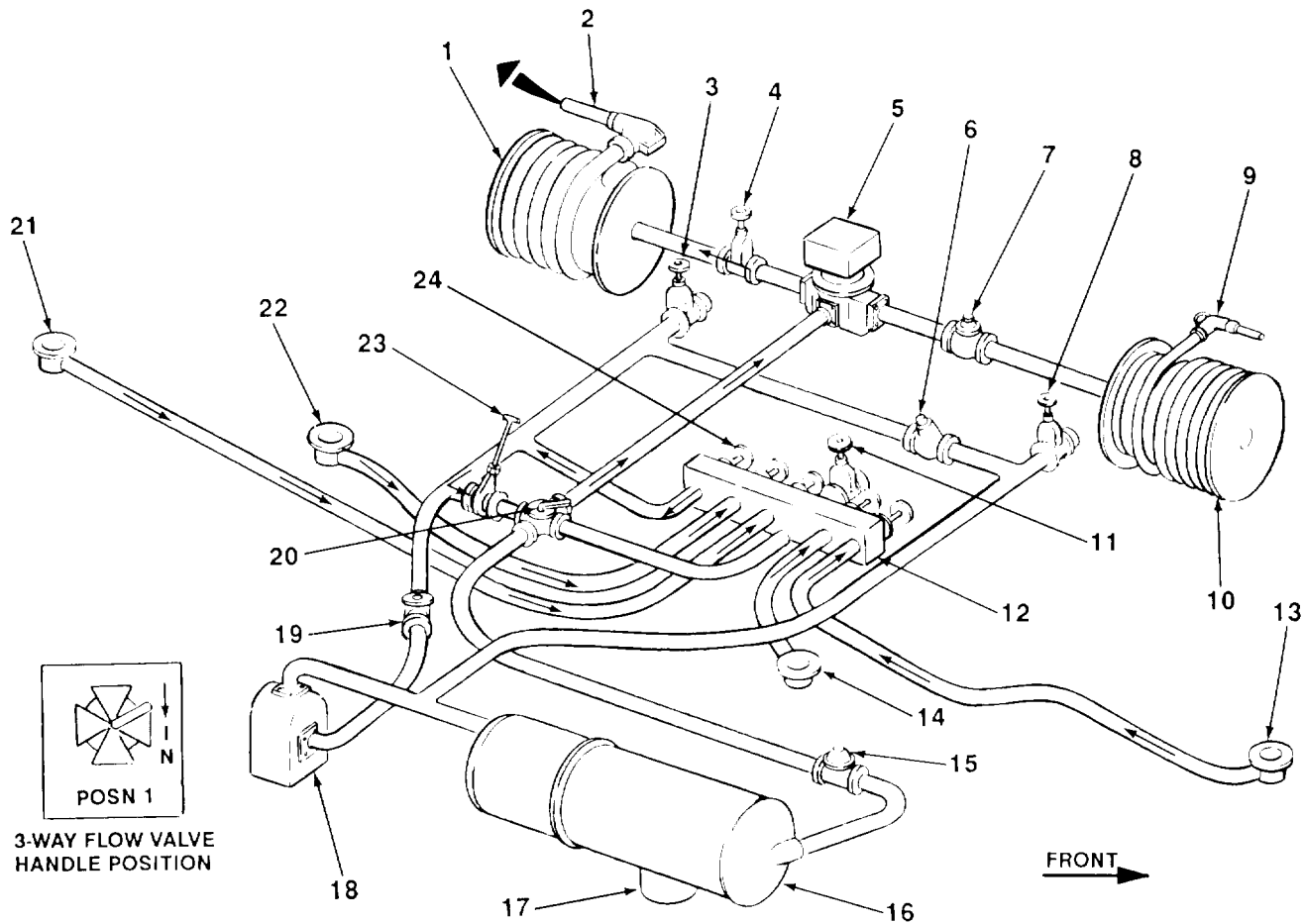
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**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

(16) Disconnect bonding and grounding connections (para 2-13).

(17) Stow fire extinguishers.

2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).



**GRAVITY DISCHARGE, 225 gpm (852 lpm) SYSTEM (M131A4C)**

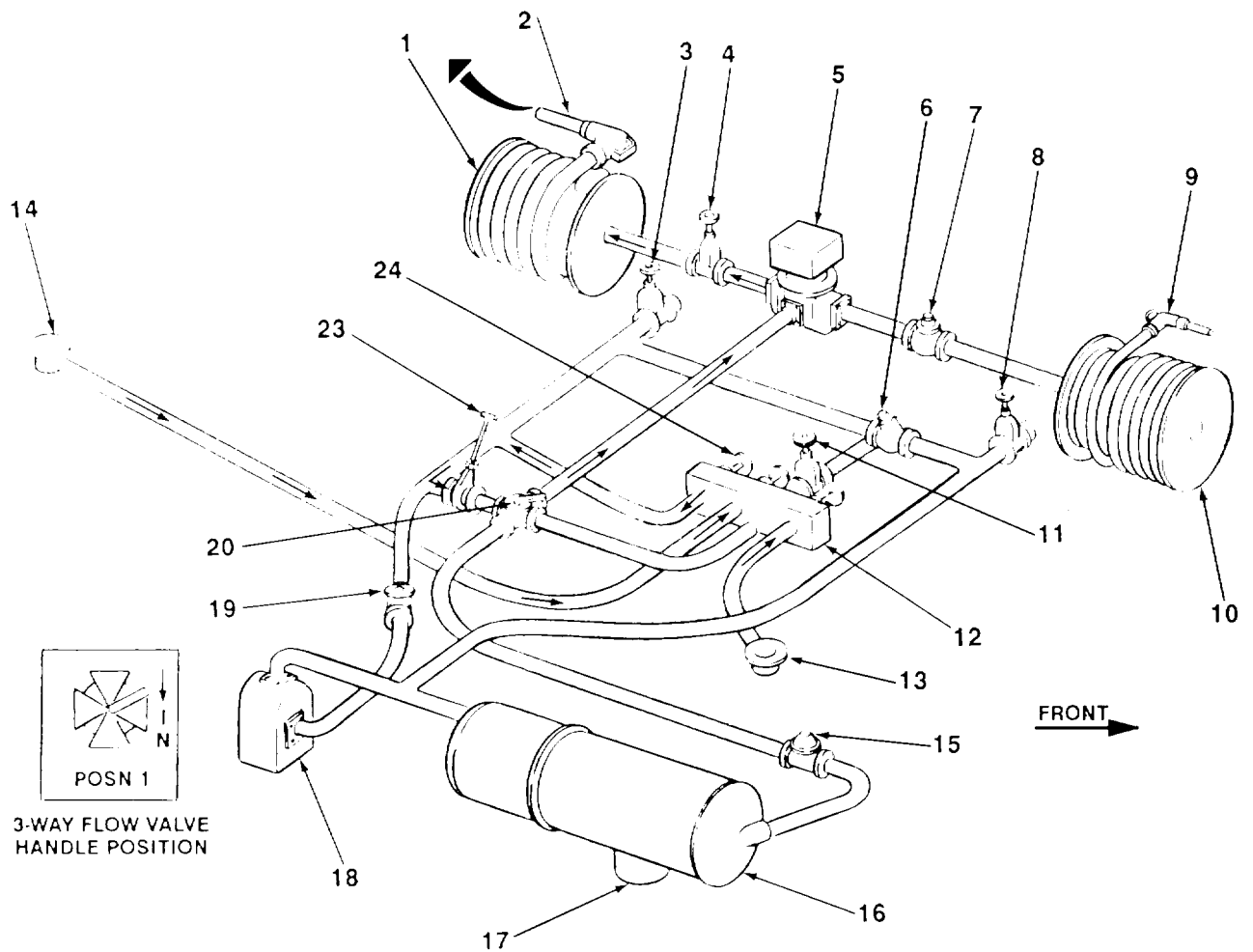
**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1. 2½ Inch Hose Reel</li> <li>2. 2½ Inch Nozzle (225 gpm Delivery Rate)</li> <li>3. Pump Intake Valve</li> <li>4. 225 gpm Cutoff Valve (Open)</li> <li>5. Meter</li> <li>6. Adjustable Bypass Valve</li> <li>7. Flow Selector Valve (0-55 gpm)</li> <li>8. Pump Discharge Valve</li> <li>9. 1½ Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>10. 1½ Inch Hose Reel</li> <li>11. Gravity Discharge Valve</li> <li>12. Manifold and Manifold Valves(s) (Open)</li> </ul> | <ul style="list-style-type: none"> <li>13. Compartment 1</li> <li>14. Compartment 2</li> <li>15. 225 gpm Flow Valve</li> <li>16. Filter-separator</li> <li>17. Sump</li> <li>18. Pump</li> <li>19. Sediment Strainer</li> <li>20. 3-way Flow Valve (Position 1)</li> <li>21. Compartment 4</li> <li>22. Compartment 3</li> <li>23. Defuel Cutoff Valve (Open)</li> <li>24. Pump Cutoff Valve (Open)</li> </ul> |
|---|--|

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2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).



GRAVITY DISCHARGE, 225 gpm (852 lpm) SYSTEM (M131A5C)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |   |
|---|---|
| 1. 2 1/2 Inch Hose Reel                       | 12. Manifold and Manifold Valve(s) (Open) |
| 2. 2 1/2 Inch Nozzle (225 gpm Delivery Rate)  | 13. Compartment 1                         |
| 3. Pump Intake Valve                          | 14. Compartment 2                         |
| 4. 225 gpm Cutoff Valve (Open)                | 15. 225 gpm Flow Valve                    |
| 5. Meter                                      | 16. Filter-separator                      |
| 6. Adjustable Bypass Valve                    | 17. Sump                                  |
| 7. Flow Selector Valve (0-55 gpm)             | 18. Pump                                  |
| 8. Pump Discharge Valve                       | 19. Sediment Strainer                     |
| 9. 1 1/2 Inch Nozzle (0-55 gpm Delivery Rate) | 20. 3-way Flow Valve (Position 1)         |
| 10. 1 1/2 Inch Hose Reel                      | 23. Defuel Cutoff Valve (Open)            |
| 11. Gravity Discharge Valve                   | 24. Pump Cutoff Valve (Open)              |

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**2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).**

c. Pressure Discharge Through 225 gpm (852 lpm) System.

**WARNING**

- **DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.**
- **To prevent fuel overflowing, compartment 2 on M131 A4C and compartment 1 on M131A5C must be emptied first. Failure to follow this warning may result in serious injury to personnel and damage to equipment.**

**NOTE**

- **Product is metered and filtered when using this fuel servicing method.**
- **Refer to appropriate flow diagram at end of subparagraph c for assistance.**

- (1) Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual.
- (2) Remove fire extinguishers from mounting brackets and take to point of operation.

**WARNING**

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbended and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

- (3) Connect bonding and grounding connections (para 2-13).
- (4) Ensure that all manually operated valves (3, 4, 8, 11, 12, 23, and 24) are closed. Ensure that 3-way flow valve (20) is set in position 1 with operating lever pushed inward as far as possible.
- (5) Ensure that counter of meter (5) is set on zero.
- (6) If equipped with read-out flow selector dial, set selector knob at zero. Close flow selector valve (0-55 gpm) (7).

**WARNING**

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

- (7) Have assistant open manhole fill cover of compartment (13, 14, 21, or 22) to be emptied (para 2-14).
- (8) Open emergency relief valve of compartment (13, 14, 21, or 22) to be emptied by pulling outward on operating control lever.
- (9) Open manifold (12) valve of compartment (13, 14, 21, or 22) to be emptied.
- (10) Set 3-way flow valve (20) in position 2 with operating lever pulled outward as far as possible.
- (11) Open pump cutoff valve (24) and 225 gpm (852 lpm) cutoff valve (4).



**2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).**

(12) Start auxiliary engine (para 2-15).

(13) Loosen hose reel brake, unwind hose from 2 1/2 in. (6.4 cm) hose reel (1), and take to point of operation. Place nozzle (2) in receiving container.

---

**WARNING**

---

- **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
- **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**

(14) Start fuel flow by squeezing trigger on nozzle (2).

(15) When operation is complete, shut off auxiliary engine (para 2-15). Close 225 gpm (852 lpm) cutoff valve (4), pump cutoff valve (24), and manifold (12) valve. Close emergency relief valve by pushing in on operating control lever.

(16) Set 3-way flow valve (20) in position 1 with operating lever pushed inward as far as possible.

(17) Close and latch manhole fill cover (para 2-14).

(18) Wind hose on hose reel (1). Lock hose reel.

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**WARNING**

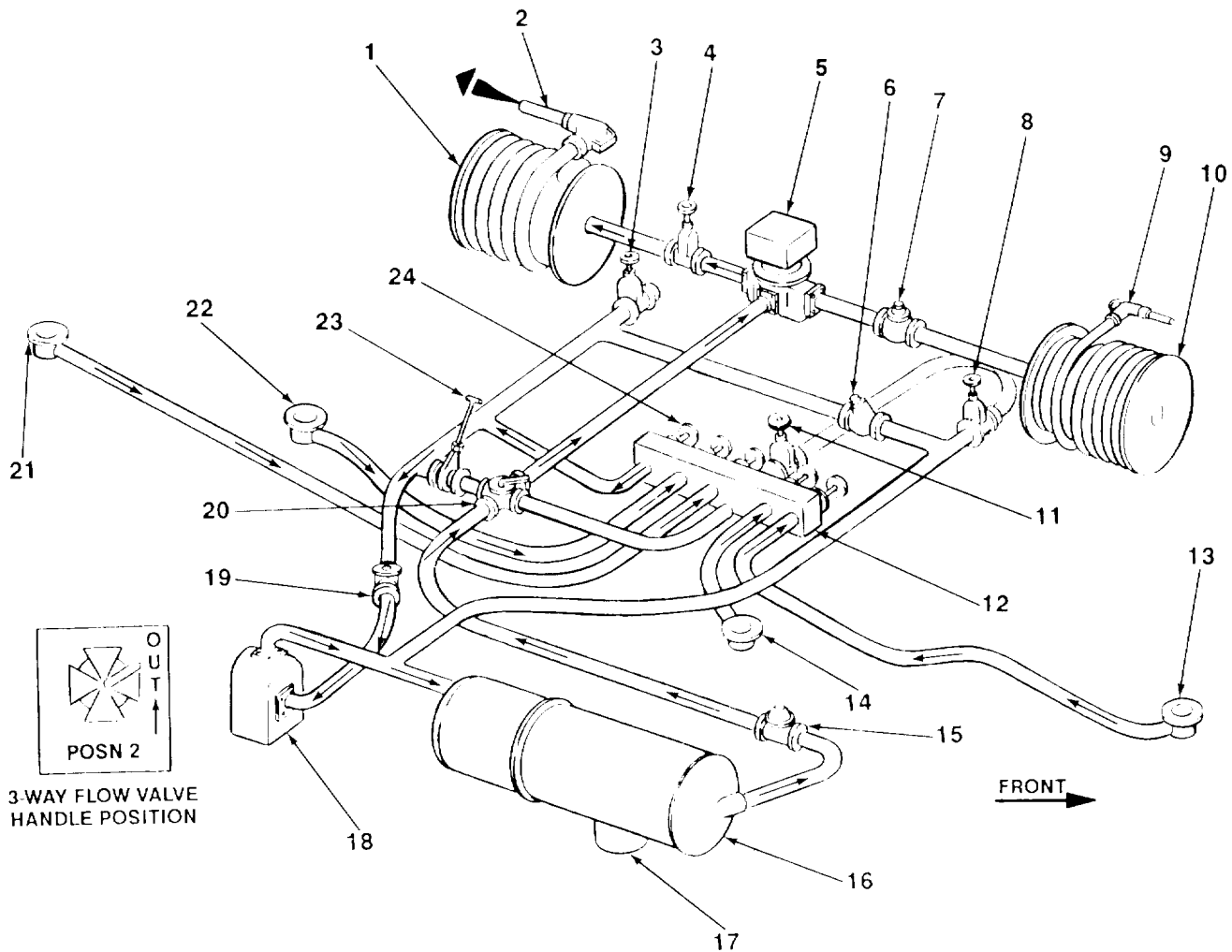
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**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

(19) Disconnect bonding and grounding connections (para 2-13).

(20) Stow fire extinguishers.

2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).



**PRESSURE DISCHARGE, 225 gpm (852 lpm) SYSTEM (M131A4C)**

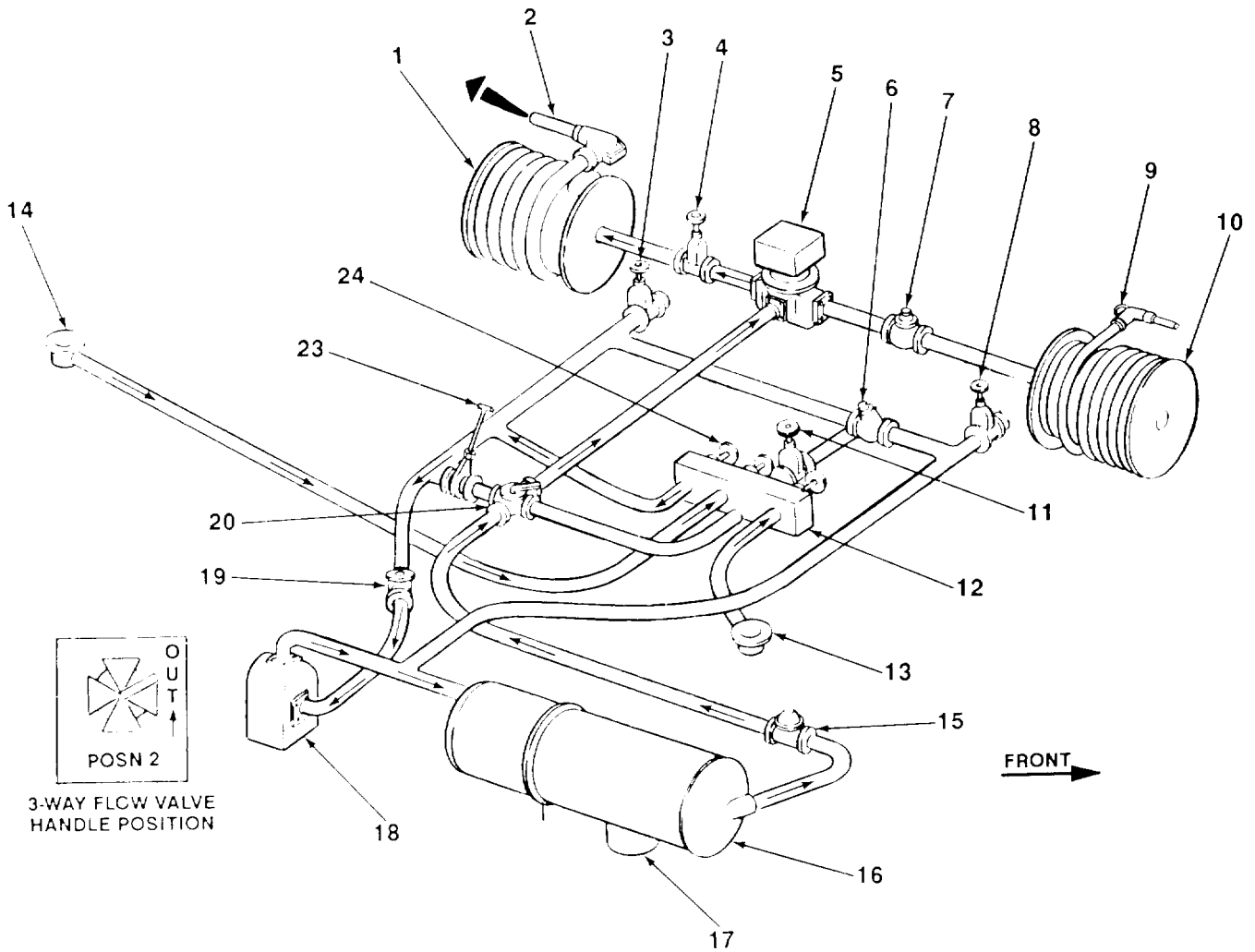
**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. 2 1/2 Inch Hose Reel</li> <li>2. 2 1/2 Inch Nozzle (225 gpm Delivery Rate)</li> <li>3. Pump Intake Valve</li> <li>4. 225 gpm Cutoff Valve (Open)</li> <li>5. Meter</li> <li>6. Adjustable Bypass Valve</li> <li>7. Flow Selector Valve (0-55 gpm)</li> <li>8. Pump Discharge Valve</li> <li>9. 1 1/2 Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>10. 1 1/2 Inch Hose Reel</li> <li>11. Gravity Discharge Valve</li> <li>12. Manifold and Manifold Valves(s) (Open)</li> </ul> | <ul style="list-style-type: none"> <li>13. Compartment 1</li> <li>14. Compartment 2</li> <li>15. 225 gpm Flow Valve</li> <li>16. Filter-separator</li> <li>17. Sump</li> <li>18. Pump</li> <li>19. Sediment Strainer</li> <li>20. 3-way Flow Valve (Position 2)</li> <li>21. Compartment 4</li> <li>22. Compartment 3</li> <li>23. Defuel Cutoff Valve</li> <li>24. Pump Cutoff Valve (Open)</li> </ul> |
|---|---|

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2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).



**PRESSURE DISCHARGE, 225 gpm (852 lpm) SYSTEM (M131A5C)**

**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. 2 1/2 Inch Hose Reel</li> <li>2. 2 1/2 Inch Nozzle (225 gpm Delivery Rate)</li> <li>3. Pump Intake Valve</li> <li>4. 225 gpm Cutoff Valve (Open)</li> <li>5. Meter</li> <li>6. Adjustable Bypass Valve</li> <li>7. Flow Selector Valve (0-55 gpm)</li> <li>8. Pump Discharge Valve</li> <li>9. 1 1/2 Inch Nozzle (0-55 gpm Delivery rate)</li> <li>10. 1 1/2 Inch Hose Reel</li> <li>11. Gravity Discharge Valve</li> </ul> | <ul style="list-style-type: none"> <li>12. Manifold and Manifold Valves(s) (Open)</li> <li>13. Compartment 1</li> <li>14. Compartment 2</li> <li>15. 225 gpm Flow Valve</li> <li>16. Filter-separator</li> <li>17. Sump</li> <li>18. Pump</li> <li>19. Sediment Strainer</li> <li>20. 3-way Flow Valve (Position 2)</li> <li>23. Defuel Cutoff Valve</li> <li>24. Pump Cutoff Valve (Open)</li> </ul> |
|---|---|

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**2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).**

- d. Pressure Discharge Through 0-55 gpm (0-208 lpm) System.

**WARNING**

- **DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a fire and explosion, resulting in serious injury or death to personnel.**
- **To prevent fuel overflowing, compartment 2 on M131A4C and compartment 1 on M131A5C must be emptied first. Failure to follow this warning may result in serious injury to personnel and damage to equipment.**

**NOTE**

- **Product is metered and filtered when using this fuel servicing method.**
- **Refer 10 appropriate flow diagram at end of subparagraph d for assistance.**

- (1) Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual.
- (2) Remove fire extinguishers from mounting brackets and take to point of operation.

**WARNING**

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbonded and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

- (3) Connect bonding and grounding connections (para 2-13).
- (4) Ensure that all manually operated valves (3, 4, 8, 11, 12, 23, and 24) are closed. Ensure that 3-way flow valve (20) is in position 1 with operating lever pushed inward as far as possible.
- (5) Ensure that counter of metal (5) is set on zero.
- (6) If equipped with read-out flow selector dial, set selector knob to zero. Close flow selector valve (0-55 gpm) (7).

**WARNING**

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

- (7) Have assistant open manhole fill cover of compartment (13, 14, 21, or 22) to be emptied (para 2-14).
- (8) Open emergency relief valve of compartment (13, 14, 21, or 22) to be emptied by pulling outward on operating control lever.
- (9) Open manifold (12) valve of compartment (13, 14, 21, or 22) to be emptied.
- (10) Set 3-way flow valve (20) in position 2 with operating lever pulled outward as far as possible.
- (11) Open pump cutoff valve (24).

**2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).**

(12) Open flow selector valve (7), If equipped with read-out flow selector dial, set selector knob to desired delivery rate of 0-55 gpm (0 208 lpm).

(13) Start auxiliary engine (para 2-15).

(14) Loosen hose reel brake, unwind hose from 1 1/2 in. (3.8 cm) hose reel (10), and take to point of operation. Place nozzle (9) in receiving container.

---

**WARNING**

---

- **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
- **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**

(15) Start fuel flow by squeezing trigger on nozzle (9).

(16) When operation is complete, shut off auxiliary engine (para 2-15). Close pump cutoff valve (24) and manifold (12) valve. Close emergency relief valve by pushing in on operating control lever.

(17) Set 3-way flow valve (20) in position 1 with operating lever pushed inward as far as possible.

(18) Close and latch manhole fill cover (para 2-14).

(19) Close flow selector valve (0-55 gpm) (7). If equipped with read-out flow selector dial, set selector knob to zero.

(20) Wind hose on hose reel (10). Lock hose reel.

---

**WARNING**

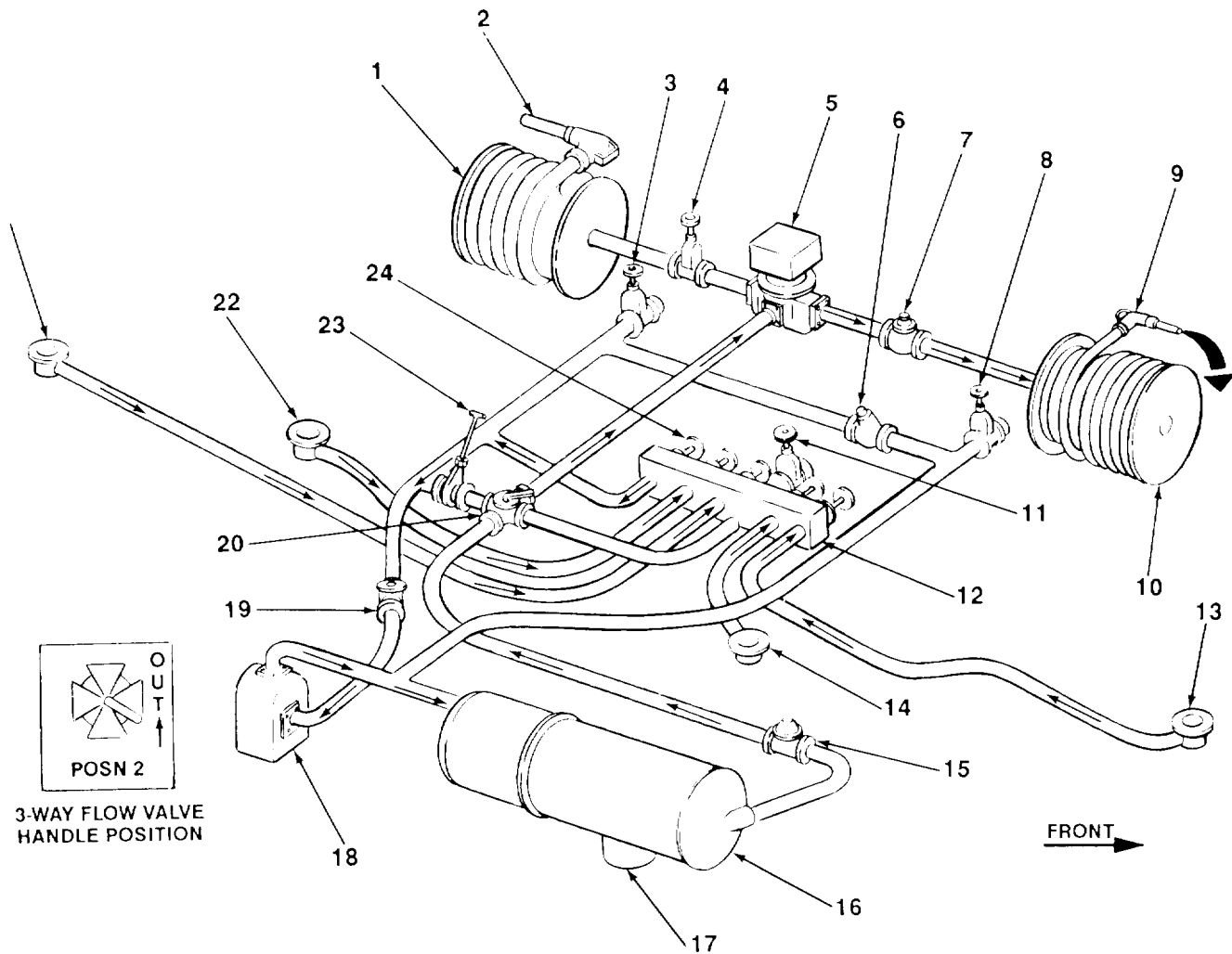
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**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

(21) Disconnect bonding and grounding connections (para 2-13).

(22) Slow fire extinguishers.

2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).



**PRESSURE DISCHARGE, 0-55 gpm (0-208 lpm) SYSTEM (M131A4C)**

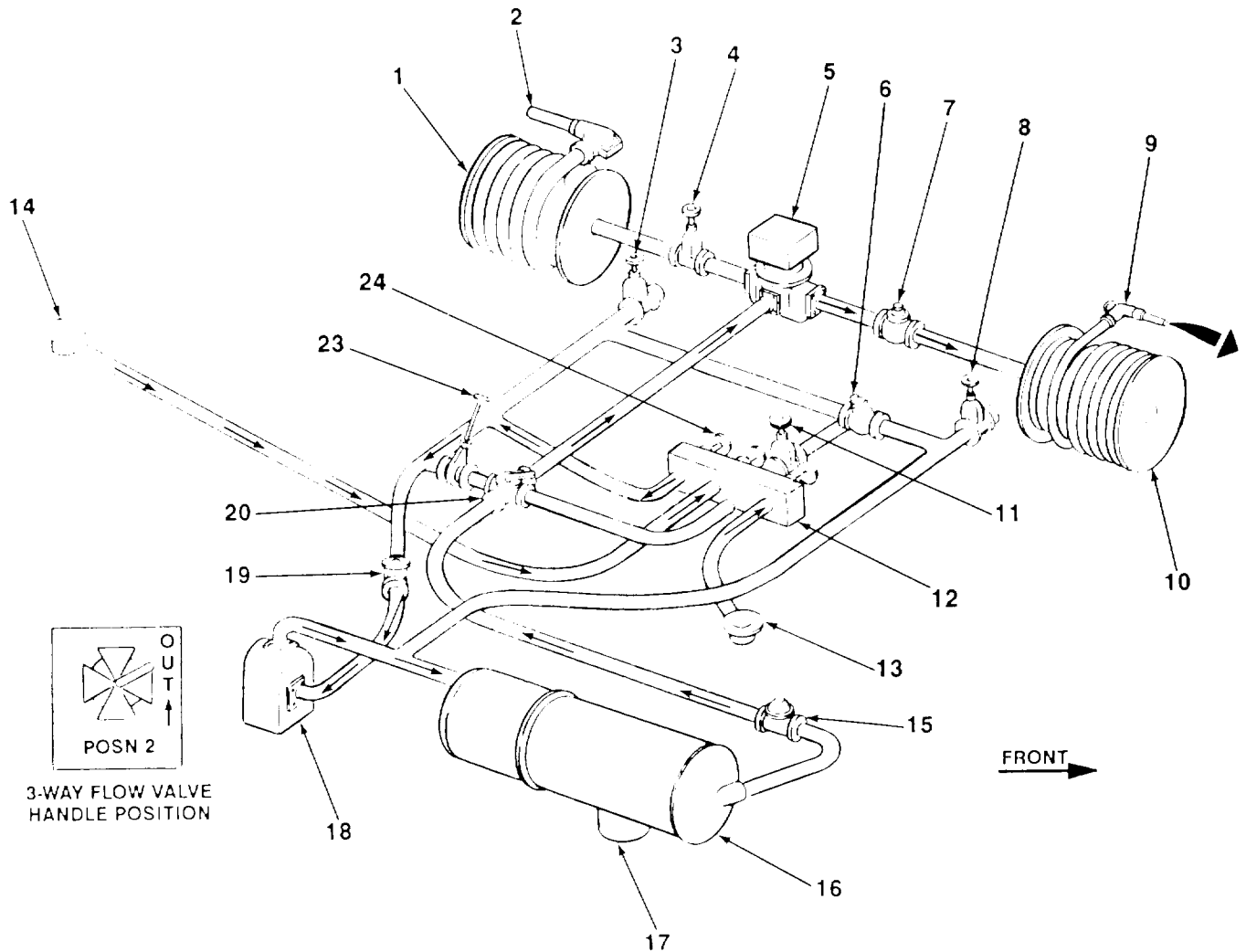
**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. 2 1/2 Inch Hose Reel</li> <li>2. 2 1/2 Inch Nozzle (225 gpm Delivery Rate)</li> <li>3. Pump Intake Valve</li> <li>4. 225 gpm Cutoff Valve</li> <li>5. Meter</li> <li>6. Adjustable Bypass Valve</li> <li>7. Flow Selector Valve (0-55 gpm) (Open)</li> <li>8. Pump Discharge Valve</li> <li>9. 1 1/2 Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>10. 1 1/2 Inch Hose Reel</li> <li>11. Gravity Discharge Valve</li> <li>12. Manifold and Manifold Valves(s) (Open)</li> </ul> | <ul style="list-style-type: none"> <li>13. Compartment 1</li> <li>14. Compartment 2</li> <li>15. 225 gpm Flow Valve</li> <li>16. Filter-separator</li> <li>17. Sump</li> <li>18. Pump</li> <li>19. Sediment Strainer</li> <li>20. 3-way Flow Valve (Position 2)</li> <li>21. Compartment 4</li> <li>22. Compartment 3</li> <li>23. Defuel Cutoff Valve</li> <li>24. Pump Cutoff Valve (Open)</li> </ul> |
|---|---|

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2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).



**PRESSURE DISCHARGE, 0-55 gpm (0-208 lpm) SYSTEM (M131A5C)**

**NOTE**

**All fuel valves are in closed position unless otherwise indicated.**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1 2 1/2 Inch Hose Reel</li> <li>2 2 1/2 Inch Nozzle (225 gpm Delivery Rate)</li> <li>3 Pump Intake Valve</li> <li>4 225 gpm Cutoff Valve</li> <li>5 Meter</li> <li>6 Adjustable Bypass Valve</li> <li>7 Flow Selector Valve (0-55 gpm) (Open)</li> <li>8 Pump Discharge Valve</li> <li>9 1 1/2 Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>10 1 1/2 Inch Hose Reel</li> <li>11 Gravity Discharge Valve</li> </ul> | <ul style="list-style-type: none"> <li>12. Manifold and Manifold Valves(s) (Open)</li> <li>13. Compartment 1</li> <li>14. Compartment 2</li> <li>15. 225 gpm Flow Valve</li> <li>16. Filter-separator</li> <li>17. Sump</li> <li>18. Pump</li> <li>19. Sediment Strainer</li> <li>20. 3-way Flow Valve (Position 2)</li> <li>23. Defuel Cutoff Valve</li> <li>24. Pump Cutoff Valve (Open)</li> </ul> |
|--|---|

## 2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).

- e. Defueling Through 225 gpm (852 lpm) System.

### **WARNING**

**DO NOT smoke while loading or unloading fuel, when handling fuel containers, or when located within 50 ft (15.3 m) of fueling or fuel storage areas. Failure to follow this warning may cause a spark and explosion, resulting in serious injury or death to personnel.**

### **NOTE**

- **Product is metered and filtered when using this fuel servicing method.**
- **For accountability in defueling operations, always load fuel into an empty compartment or one that has been accurately gaged. Refer to FM 10-69 for gaging procedures.**
- **Refer to the appropriate flow diagram at end of subparagraph e for assistance.**

- (1) Shut down towing vehicle engine and set brakes. Refer to towing vehicle technical manual.
- (2) Remove fire extinguishers from mounting brackets and take to point of operation.

### **WARNING**

**Connect bonding and grounding connections before beginning any fuel handling operation. Maintain bonding and grounding connections until after all fuel handling is completed. Connections must be made to clean, unpainted surfaces. An unbended and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.**

- (3) Connect bonding and grounding connections (para 2-13).
- (4) Ensure that all manually operated valves (3, 4, 8, 11, 12, 23, and 24) are closed. Ensure that 3-way flow valve (20) is in position 1 with operating lever pushed inward as far as possible.
- (5) If equipped with read-out flow selector dial, set selector knob to zero, Close flow selector valve (0-55 gpm) (7).

### **WARNING**

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

- (6) Have assistant open manhole fill cover of compartment (13, 14, 21, or 22) to be filled (para 2-14).
- (7) Open emergency relief valve of compartment (13, 14, 21, or 22) to be filled by pulling outward on operating control lever.
- (8) Open manifold (12) valve of compartment (13, 14, 21, or 22) to be filled.
- (9) Remove short spout from nozzle (2) and install auxiliary long spout on nozzle.
- (10) Start auxiliary engine (para 2-15).
- (11) Open defuel cutoff valve (23) and 225 gpm (852 lpm) cutoff valve (4).



**2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).**

(12) Loosen hose reel brake, unwind hose from 2 1/2 in. (6.4 cm) hose reel (1), and take nozzle (2) to point of defueling.

---

**WARNING**

---

- **DO NOT breathe fuel fumes. They are toxic and can cause serious medical problems. Failure to follow this warning may result in serious injury or death to personnel.**
- **Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.**

(13) Insert spout in container to be emptied. Start fuel flow by squeezing trigger on nozzle (2).

(14) When operation is complete, shut off auxiliary engine (para 2-15). Close 225 gpm (852 lpm) cutoff valve (4), defuel cutoff valve (23), and manifold (12) valve. Close emergency relief valve by pushing in on operating control lever.

(15) Close and latch manhole fill cover (para 2-14).

(16) Remove auxiliary long spout from nozzle (2) and install short spout. Stow auxiliary long spout.

(17) Wind hose on hose reel (1). Lock hose reel.

---

**WARNING**

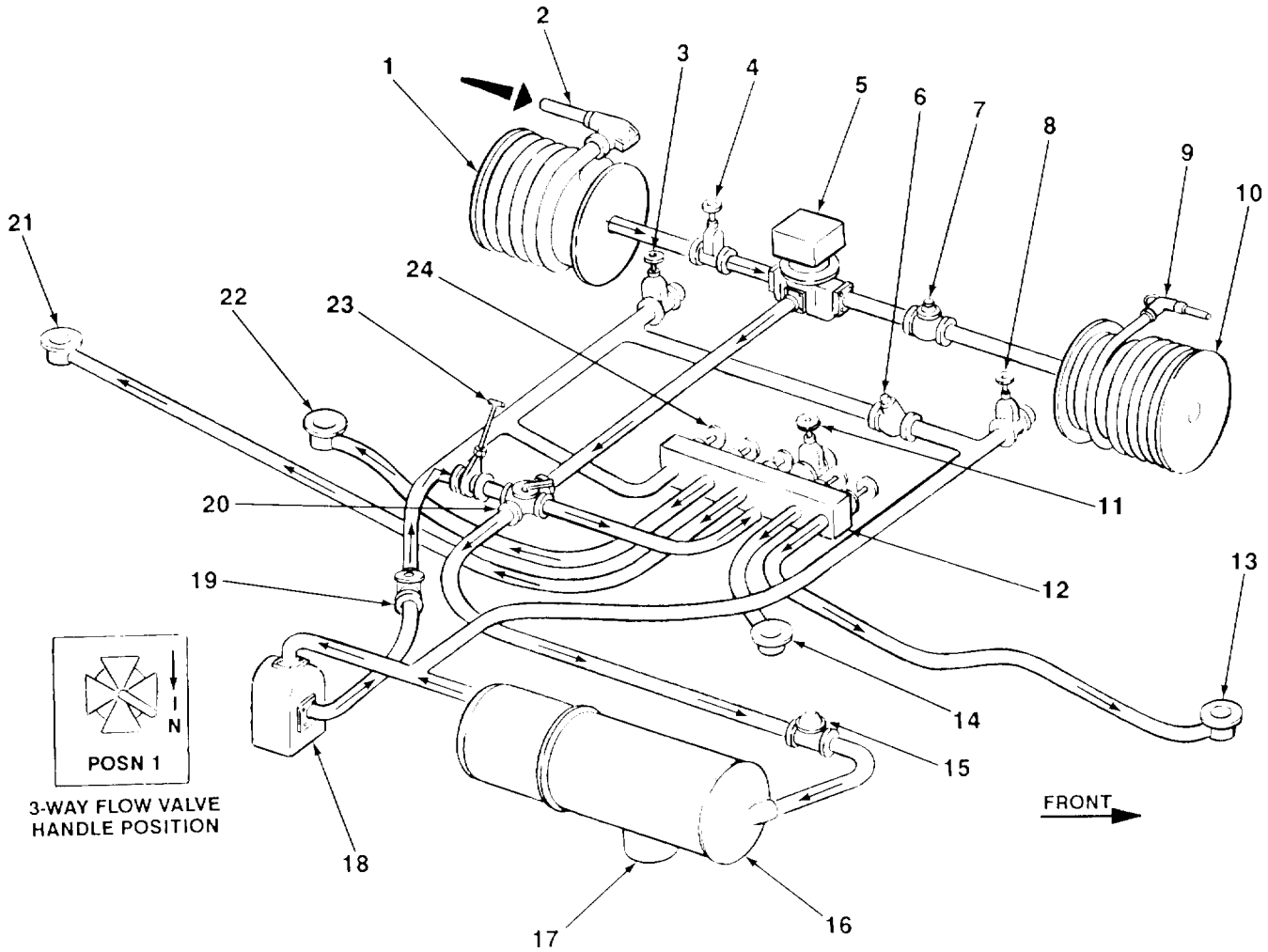
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**Walk grounding cable back to reel when stowing grounding cable. DO NOT let go of grounding cable until fully wound onto reel. Failure to follow this warning may result in serious injury to personnel.**

(18) Disconnect bonding and grounding connect (para 2-13).

(19) Stow fire extinguishers.

2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).



DEFUELING, 225 gpm (952 lpm) SYSTEM (M131A4C)

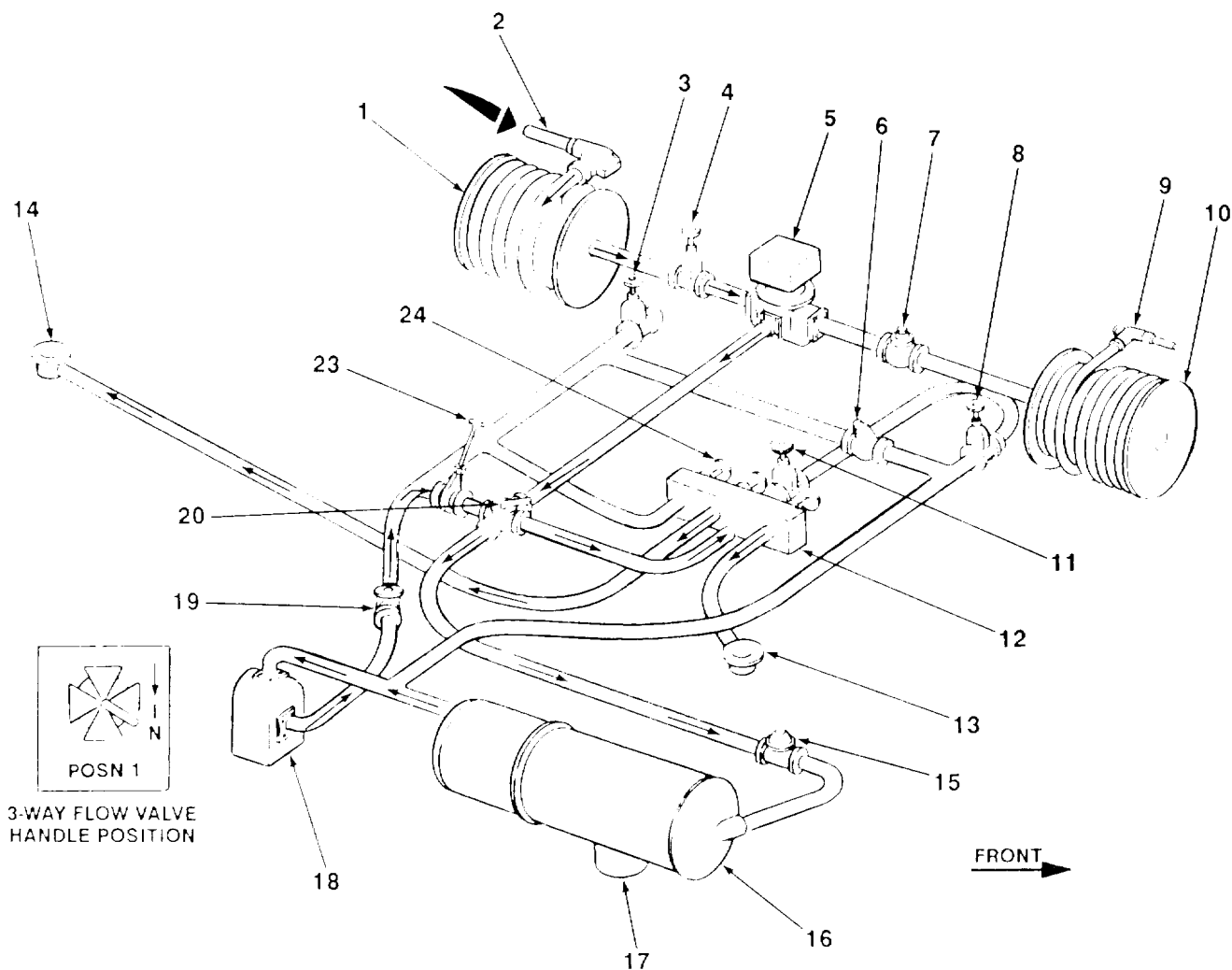
NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. 2 1/2 Inch Hose Reel</li> <li>2. 2 1/2 Inch Nozzle (225 gpm Delivery Rate)</li> <li>3. Pump Intake Valve</li> <li>4. 225 gpm Cutoff Valve (Open)</li> <li>5. Meter</li> <li>6. Adjustable Bypass Valve</li> <li>7. Flow Selector Valve (0-55 gpm)</li> <li>8. Pump Discharge Valve</li> <li>9. 1 1/2 Inch Nozzle (0-55 gpm Delivery Rate)</li> <li>10. 1 1/2 Inch Hose Reel</li> <li>11. Gravity Discharge Valve</li> <li>12. Manifold and Manifold Valves</li> </ul> | <ul style="list-style-type: none"> <li>13. Compartment 1</li> <li>14. Compartment 2</li> <li>15. 225 gpm Flow Valve</li> <li>16. Filter-separator</li> <li>17. Sump</li> <li>18. Pump</li> <li>19. Sediment Strainer</li> <li>20. 3-way Flow Valve (Position 1)</li> <li>21. Compartment 4</li> <li>22. Compartment 3</li> <li>23. Defuel Cutoff Valve (Open)</li> <li>24. Pump Cutoff Valve</li> </ul> |
|---|---|

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2-23. FUEL SERVICING (M131A4C AND M131A5C) (Con't).



DEFUELING, 225 gpm (852 lpm) SYSTEM (M131A5C)

NOTE

All fuel valves are in closed position unless otherwise indicated.

- |   |                                  |
|---|----------------------------------|
| 1 2½ Inch Hose Reel                       | 12 Manifold and Manifold Valves  |
| 2 2½ Inch Nozzle (225 gpm Delivery Rate)  | 13 Compartment 1                 |
| 3 Pump Intake Valve                       | 14 Compartment 2                 |
| 4 225 gpm Cutoff Valve (Open)             | 15 225 gpm Flow Valve            |
| 5 Meter                                   | 16 Filter-separator              |
| 6 Adjustable Bypass Valve                 | 17 Sump                          |
| 7 Flow Selector Valve (0-55 gpm)          | 18 Pump                          |
| 8 Pump Discharge Valve                    | 19 Sediment Strainer             |
| 9 1½ Inch Nozzle (0-55 gpm Delivery Rate) | 20 3-way Flow Valve (Position 1) |
| 10 1½ Inch Hose Reel                      | 23 Defuel Cutoff Valve (Open)    |
| 11 Gravity Discharge Valve                | 24 Pump Cutoff Valve             |

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## 2-24. REFUEL ON THE MOVE (ROM) ASSEMBLY AND OPERATING PROCEDURES (M131A5C).

### **WARNING**

**Fuel handlers must wear appropriate safety equipment and follow all safety precautions to avoid serious injury or death to personnel.**

### **NOTE**

**Components of the Refuel on the Move (ROM) Assembly Kit are listed in Appendix D.**

#### **a. Assembly of ROM Components.**

(1) Select refuel site and park M131A5C semitrailer at right side of road or route.

(2) Open ROM container. Unpack instruction sheet and inventory sheet from container. Take inventory of ROM components.

### **NOTE**

**Remove plugs and dust caps as required from ROM components as they are assembled.**

(3) Extend 2 1/2 in. hose from hose reel to desired length. Remove nozzle assembly P/N 10959970 from hose end. Assemble bushing P/N MS14315-31X to hose end, Assemble coupling P/N MS70097-3 to bushing and to tee assembly P/N 5-14-676C.

(4) Assemble reducers P/N MS49000-1 and MS49000-9 to tee assembly P/N 5-14-676C per instruction sheet. Assemble one valve assembly P/N 13222E9888 to each reducer.

(5) Assemble 3 in. hose assembly P/N 543-419-3-50 to each valve assembly P/N 13222E9888. Assemble 3 in. x3 in. x 1 1/2 in. tee assembly P/N 13222E9884 to each hose assembly.

(6) Assemble 3 in. hose assembly P/N 543-419-3-50 to each 3 in. x3 in. x 1 1/2 in. tee assembly P/N 13222E9884.

(7) Continue to assemble valve assemblies, 3 in. hose assemblies, and 3 in. x3 in. x 1 1/2 in. tee assemblies per instruction sheet.

(8) Assemble eight 1 1/2 in. hose assemblies P/N M370B05B2C3000 to 3 in. x3 in. x 1 1/2 in. tee assemblies P/N 13222E9884 per instruction sheet.

(9) Assemble eight couplings P/N MS27026-9 to nozzle assemblies P/N 10896274 or 12275441-2. Assemble each nozzle assembly to each 1 1/2 in. hose assembly P/N M370B05B2C3000.

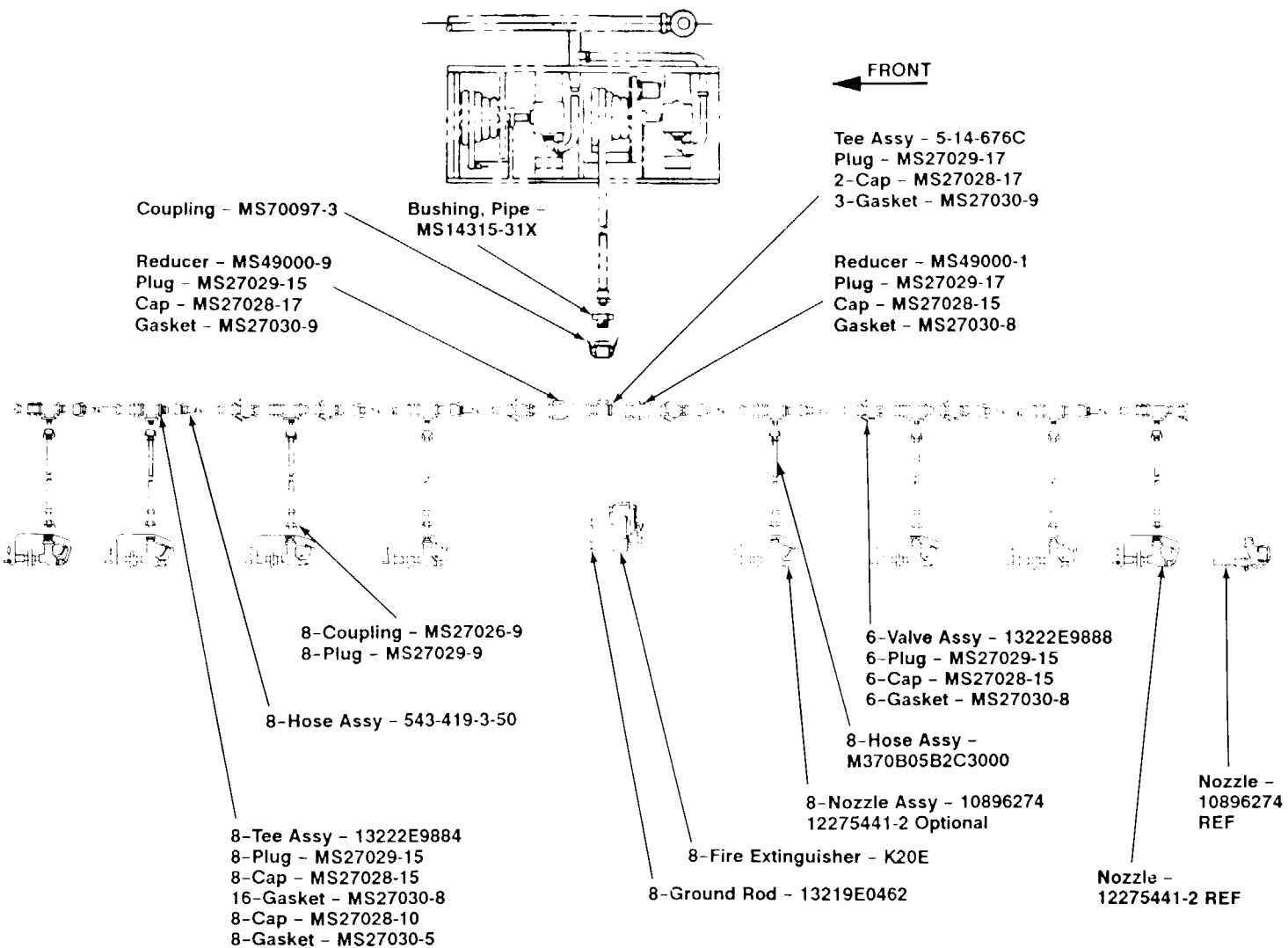
### **NOTE**

**Operator may locally assemble ground wire assembly using 25 ft (7.6 m) of no. 14 gage wire and alligator clamps, one at each end.**

(10) Remove ground rods P/N 13219E0462 from ROM container. Drive well into ground (FM 10-68). Place nozzle assembly P/N 10896274 or 12275441-2 on ground rod handle. Connect alligator clamp of one end of ground wire assembly to ground rod.

(11) Remove fire extinguishers P/N K20E from ROM container and place by each nozzle assembly P/N 10896274 or 12275441-2 at fueling point.

(12) Stow unused ROM components in ROM container.



REFUEL ON THE MOVE (ROM) INSTALLATION (M131A5C)

## 2-24. REFUEL ON THE MOVE (ROM) ASSEMBLY AND OPERATING PROCEDURES (M131A5C) (Con't).

### b. Operating Procedures (Pressure Discharge Through 225 gpm [852 lpm] System).

(1) With ROM components assembled, fuel may be discharged through all eight fueling points. Prepare to discharge fuel by following instructions in paragraph 2-23c, *Pressure Discharge Through 225 gpm (852 lpm) System*, and the appropriate flow diagram for the M131A5C.

(2) Use alligator clamp at other end of each ground wire ASSEMBLY to ground vehicle or receptacle that is to be refueled. Ensure that semitrailer is properly bonded and grounded (para 2-13).

(3) Start and stop fuel flow into vehicle or receptacle by squeezing trigger on nozzle assembly. Check ROM assembly for signs of leaks. Correct all leaks as required.

(4) When operation is complete, follow instructions in paragraph 2-23c to shut down.

### c. Operating Procedures (Defueling Through 225 gpm [852 lpm] System).

#### NOTE

**For accountability in defueling operations, always load fuel into an empty compartment or one that has been accurately gaged. Refer to FM 10-69 for gaging procedures.**

(1) With ROM components assembled, fuel may be loaded into semitrailer from all eight fueling points. Prepare to defuel by following the instructions in paragraph 2-23e, *Defueling Through 225 gpm (852 lpm) System*, and the appropriate flow diagram for the M131A5C.

(2) Use alligator clamp at other end of each ground wire assembly to ground vehicle or receptacle from which fuel is to be pumped. Ensure that semitrailer is properly bonded and grounded (para 2-13).

(3) Start and stop fuel flow into semitrailer by squeezing trigger on nozzle assembly. Check ROM assembly for signs of leaks. Correct all leaks as required.

(4) When defueling is complete, follow instructions in paragraph 2-23e to shut down.

### d. Disassembly of ROM Components.

(1) Disassemble coupling P/N MS70097-3 from tee assembly P/N 5-14-676C.

(2) Remove coupling P/N MS70097-3 and bushing P/N MS14315-31X from hose reel's 2 1/2 in. hose and replace with standard nozzle assembly P/N 10959970.

(3) Wind 2 1/2 in. hose on hose reel. Lock hose reel.

#### NOTE

**Install plugs and dust caps as required to ROM components as they are disassembled.**

(4) Disassemble ROM components and evacuate fuel from one leg of ROM assembly. Roll up 3 in. hose assemblies P/N 543-419-3-50 and elevate to remove fuel.

(5) Repeat step (4) for second leg of ROM assembly.

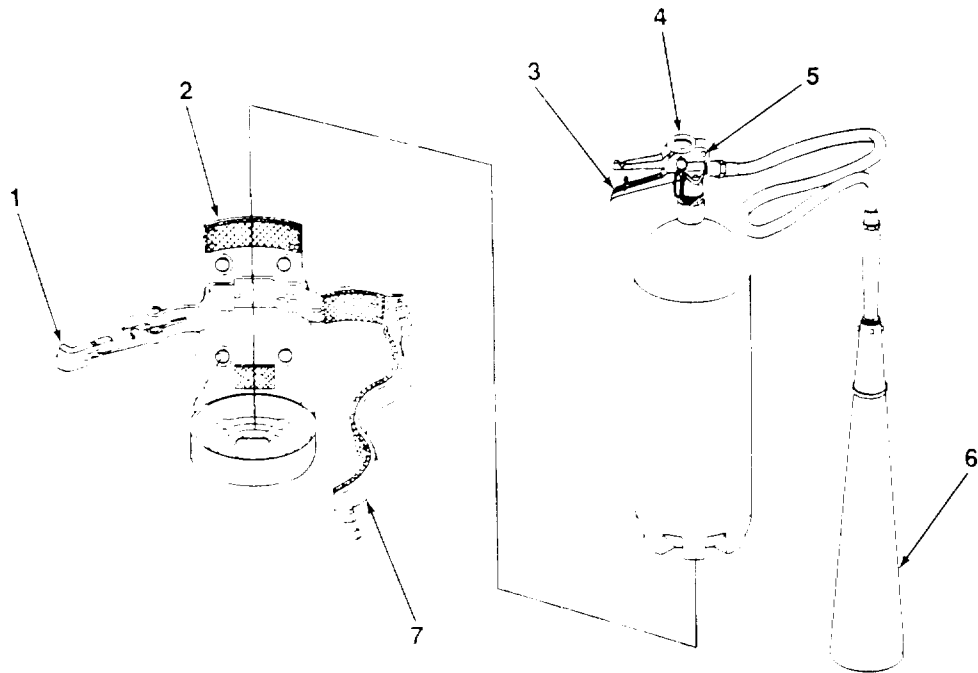
(6) Remove ground rods P/N 13219E0462, ground wire assemblies and fire extinguishers P/N K20E from fueling points.

(7) Stow ROM components in ROM container in accordance with stowage diagram on container.

(8) After ROM operation is completed, ensure that auxiliary engine idle speed is adjusted to 1000-1200 rpm.

**2-25. OPERATING FIRE EXTINGUISHER EQUIPMENT.****a. Operating Portable Fire Extinguisher.**

- (1) Pull front latch (1) and release front clamp (7) on mounting bracket (2).
- (2) Remove fire extinguisher (4) from mounting bracket (2).
- (3) Break wire and pull out pin (5).
- (4) Pull horn (6) up to level position.
- (5) Take fire extinguisher (4) as close as possible to fire and point horn (6) directly at base of flames.
- (6) Press down and hold trigger (3) to release fire extinguisher (4) contents.
- (7) Tag fire extinguisher (4) with word EMPTY.



2-25. OPERATING FIRE EXTINGUISHER EQUIPMENT (Con't).

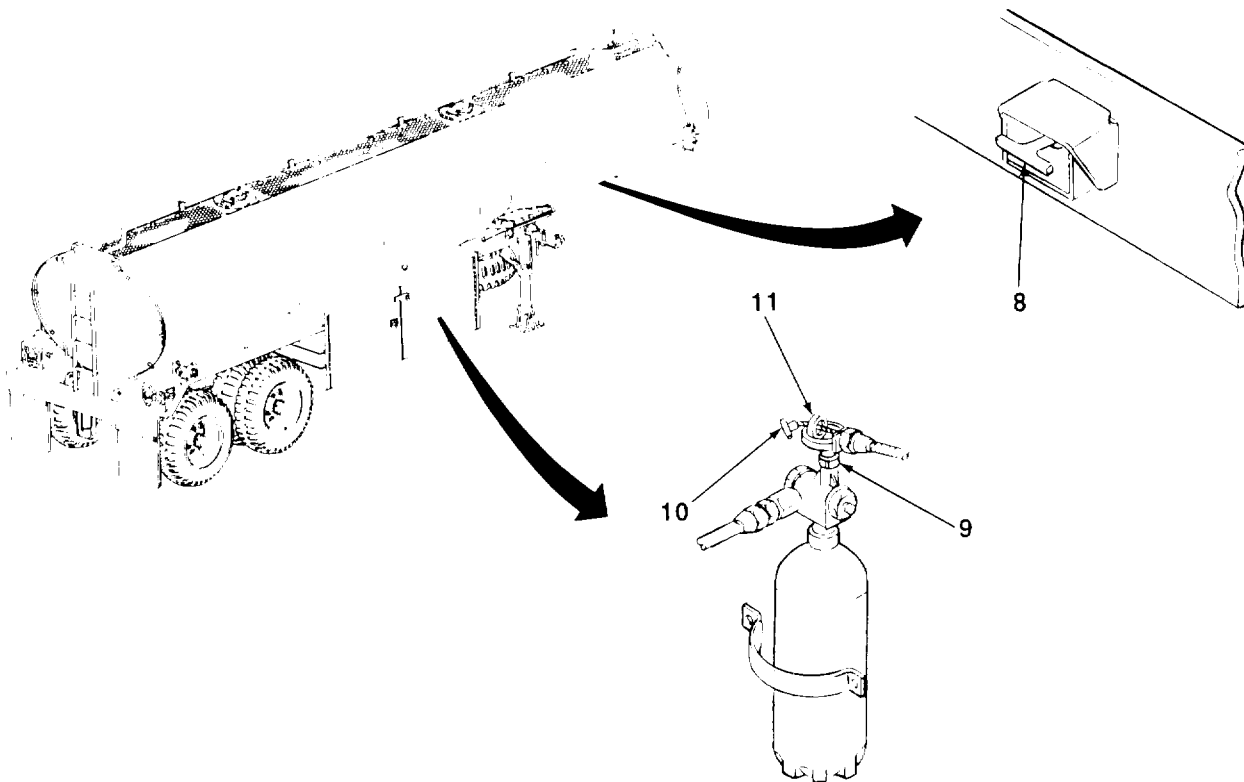
b. Operating Fixed Fire Extinguisher System.

NOTE

- Fixed fire extinguisher operation is the same for all models except location of remote control handle may vary. M131A5 is illustrated. Refer to paragraph 2-2 for remote control handle location on other models.
- Refer to TM 5-315 for complete instructions on operating fixed fire extinguisher system.

(1) Pull locking pin (11) out of control head (9) and move control lever (10) 90° upward.

(2) If locking pin (11) is not accessible, pull remote control handle (8).



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**Section IV. OPERATION UNDER UNUSUAL CONDITIONS**

Paragraph Title	Page Number
Fording .....	2-84
General .....	2-83
Operation in Areas of High Humidity Heavy Rain, or Saltwater .....	2-83
Operation in Extreme Cold or Snow .....	2-83
Operation in Extreme Heat. ....	2-83
Operation in Sandy or Dusty Areas .....	2-83

**2-26. GENERAL.**

a. This section contains instructions for safely operating the semitrailers under unusual conditions. In addition to normal preventive maintenance service, special care must be taken to keep the semitrailers operational in extreme temperatures and humidity.

b. Refer to FM 21-305 and FM 55-30 for information on special driving instructions under unusual conditions.

c. Refer to FM 9-207 for information on operation in cold weather.

d. Refer to 90-3 for information on operation in extreme heat, dusty, or sandy conditions.

**2-27. OPERATION IN EXTREME COLD OR SNOW.**

a. Care must be taken when handling cables. Extreme cold weather can cause insulation material on electrical wire to crack, causing short circuits. Construction material may become hard, brittle, and easily damaged or broken.

b. When parking for any period of time, park in a sheltered area out of the wind and clean off any buildup of snow or ice. Place a footing of planks or brush under tires and landing legs to prevent them from freezing to the ground. Ensure that the tires are properly inflated (para 1-11). Underinflated tires will freeze, resulting in flat spots.

c. Use care when placing semitrailer in motion after a shutdown. Ticked lubricants may cause failure of components. Free frozen brakeshoes, or tires frozen to ground with care.

**2-28. OPERATION IN EXTREME HEAT.**

a. Refer to Chapter 3, Section I for proper lubrication during extreme heat conditions.

b. Do not park the semitrailer in sunlight for long periods of time. Heat and sunlight shorten tire life.

c. Shelter cover the semitrailer with canvas, if available.

**2-29. OPERATION IN SANDY OR DUSTY AREAS.**

a. Clean, inspect, and lubricate the semitrailer more often in sandy or dusty areas (Chapter 3, Section I).

b. Reduce tire pressure to 45 psi (310 kPa) for operation in sand and cross-country terrain. Tire pressure must be returned to 60 psi (414 kPa) when operation resumes on hard-surface roads, if tactical situation permits.

**2-30. OPERATION IN AREAS OF HIGH HUMIDITY, HEAVY RAIN, OR SALTWATER.**

a. Semitrailers, inactive for long periods of time in hot and humid weather, are subject to rapid rusting and accumulation of fungus. Frequently inspect, clean, and lubricate to prevent deterioration of painted surfaces (Chapter 3, Section I).

**2-30. OPERATION IN AREAS OF HIGH HUMIDITY, HEAVY RAIN, OR SALTWATER (Con't).**

b. When uncoupling semitrailer in muddy areas, use ground boards placed under landing legs to prevent legs from sinking.

c. Keep moisture from entering auxiliary engine fuel supply. Have Organizational Maintenance clean auxiliary engine fuel sediment strainer before each operation to remove accumulated moisture.

d. Dampness increases chances of corrosion. Inspect all surfaces and electrical connections for signs of corrosion. Remove any signs of corrosion.

e. Clean, inspect, and lubricate the semitrailer more often in saltwater and muddy areas (Chapter 3, Section I).

**2-31. FORDING.**

a. Refer to towing vehicle operating instructions for information on fording. Towing vehicle instructions are also applicable to the semitrailer.

b. Have Organizational Maintenance clean and pack wheel bearings after each submersion (Chapter 3, Section I).

**CHAPTER 3  
OPERATOR MAINTENANCE**

**Section I. LUBRICATION INSTRUCTIONS**

Paragraph Title	Page Number
General . . . . .	3-1
Lubrication Chart . . . . .	3-2
Specific Lubrication Instructions . . . . .	3-1

**3-1. GENERAL.**

**NOTE**

**These instructions are MANDATORY.**

- a. The semitrailers must receive lubrication at recommended intervals in order to be mission-ready at all times.
- b. The Lubrication Chart shows lubrication points, names items to be lubricated, the required lubricant, and recommended interval for lubrication. Any special lubricating instructions required for specific components are contained in the NOTES section of the chart.
- c. The KEY list lubricants to be used in all temperature ranges and shows the intervals.
- d. Recommended intervals are based on normal conditions of operation, temperature, and humidity. When operating under extreme conditions, lubricants should always be changed more frequently. When in doubt, notify your supervisor.

**3-2. SPECIFIC LUBRICATION INSTRUCTIONS.**

- a. Keep all lubricants in a closed container and store in a clean, dry place away from extreme heat. Keep container covers clean and do not allow dust, dirt, or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.
- b. Maintain a record of lubrication performed and report any problems noted during lubrication. Refer to DA Pam 738-750 for maintenance forms and procedures to record and report any findings.
- c. Keep all external parts of equipment not requiring lubrication free of lubricants. After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.
- d. Refer to FM 9-207 for lubrication instructions in cold weather.
- e. After operation in muddy, sandy, or dusty conditions, clean and inspect all points of lubrication for fouled lubricants. Change lubricants as required.

LUBRICATION CHART

**SEMITRAILER, TANK: FUEL, 5000 GALLON, 4-WHEEL**

**M131A4 (NSN 2330-00-994-9459)**

**M131A5 (NSN 2330-00-226-6079)**

**SEMITRAILER, TANK: FUEL SERVICING,**

**5000 GALLON, 4-WHEEL**

**M131A4C (NSN 2330-00-994-9458)**

**M131A5C (NSN 2330-00-226-6080)**

Intervals (on-condition or hard time) and related man-hour times are based on normal operation. The man-hour time specified is the time you need to do all services prescribed for a particular interval. Decrease the intervals if your lubricants are contaminated, or if you are operating equipment under adverse conditions, including longer-than-usual operating hours. The intervals may be extended during periods of low activity. If extended, adequate preservation precautions must be taken.

Dotted leader lines indicate lubrication is required on both sides of the equipment.

**WARNING**

**Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated**

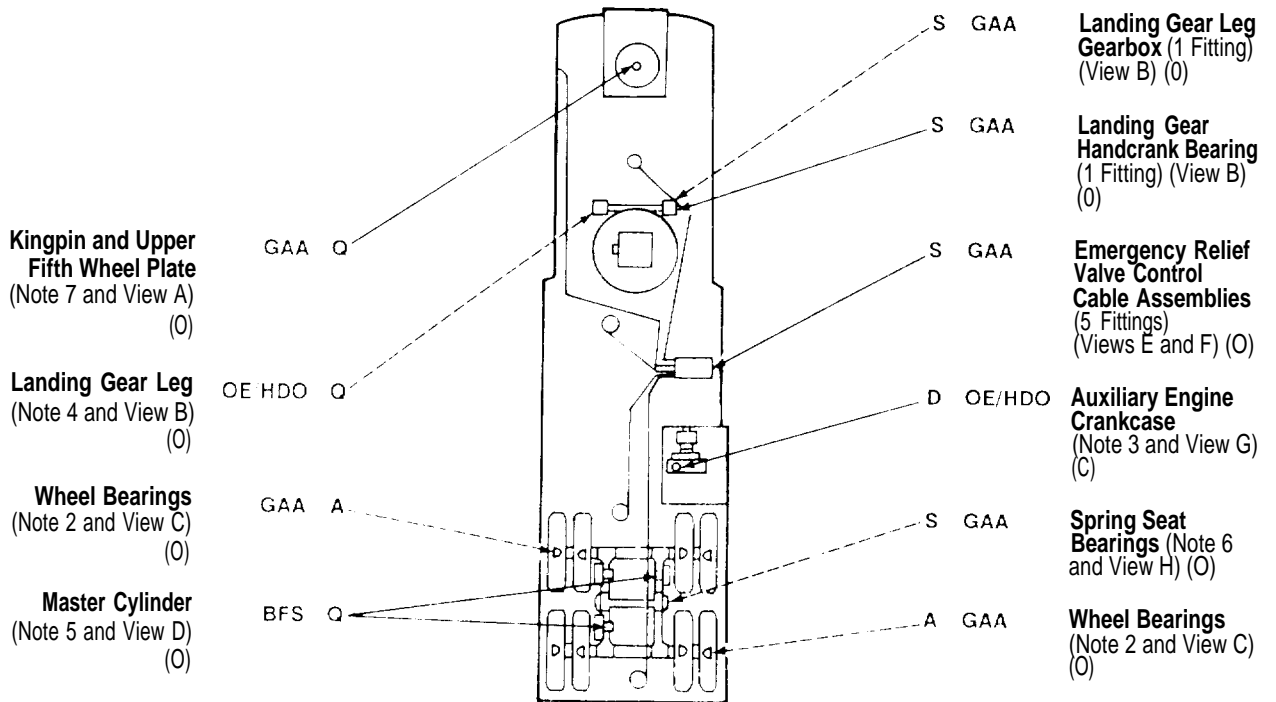
**area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F - 138°F (38°C - 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.**

Clean all fittings and area around lubrication points with dry cleaning solvent (Item 16, Appendix E) or equivalent before lubricating equipment. After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.

The lowest level of maintenance authorized to lubricate a point is indicated in parentheses by use of the following: (C) Operator/Crew; or (O) Organizational Maintenance.

LUBRICANT • INTERVAL

INTERVAL • LUBRICANT



M131A4

TOTAL MAN-HOURS\*

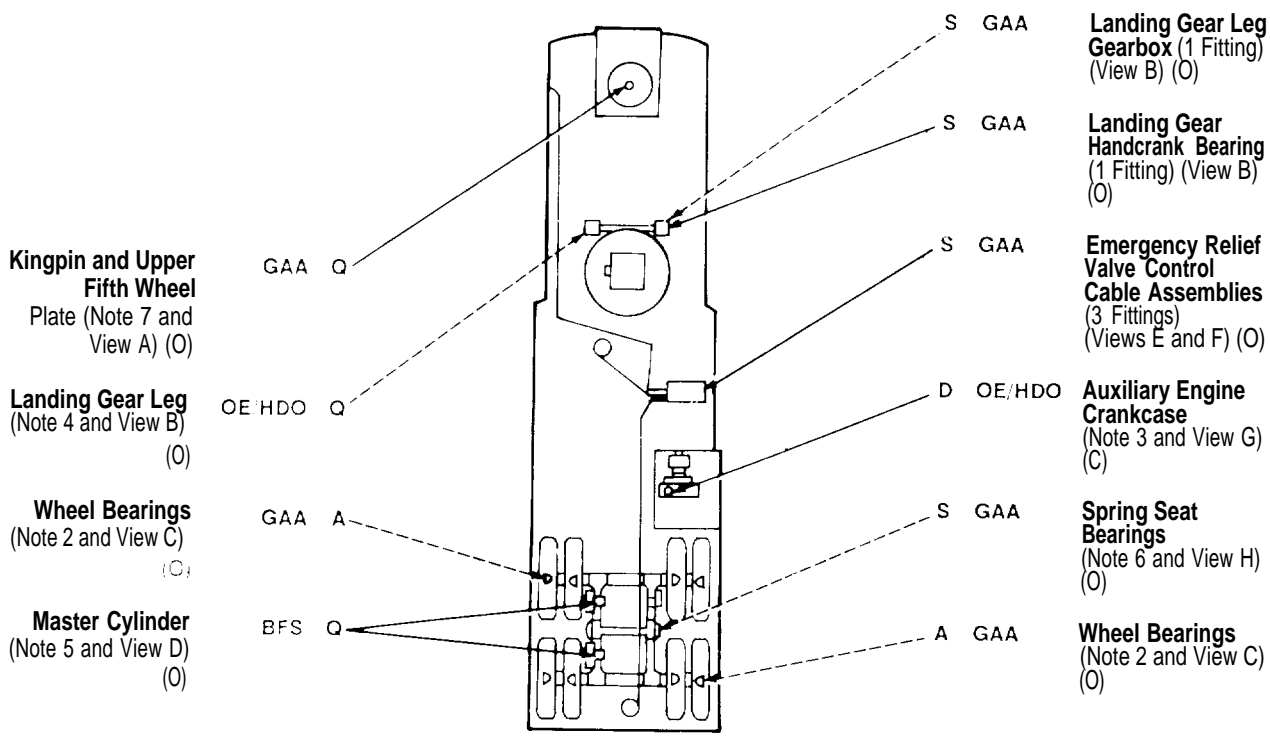
INTERVAL	MAN-HOUR
D	0.1
Q	0.2
S	0.5
A	1.5

\* The man-hour time specified is the time you need to do all services prescribed for a particular interval.

LUBRICANT • INTERVAL		INTERVAL • LUBRICANT
<p><b>Kingpin and Upper Fifth Wheel Plate</b> (Note 7 and View A) (O)</p> <p><b>Landing Gear Leg</b> (Note 4 and View B) (O)</p> <p><b>Emergency Relief Valve Control Cable Assemblies</b> (5 Fittings) (Views E and F) (O)</p> <p><b>1½ Inch Hose Reel Side Bearing</b> (View I) (O)</p> <p><b>2½ Inch Hose Reel Side Bearing</b> (View J) (O)</p> <p><b>Wheel Bearings</b> (Note 2 and View C) (O)</p> <p><b>Master Cylinder</b> (Note 5 and View D) (O)</p>		<p><b>Landing Gear Leg Gearbox (1 Fitting)</b> (View B) (O)</p> <p><b>Landing Gear Handcrank Bearing (1 Fitting)</b> (View B) (O)</p> <p><b>Auxiliary Engine Crankcase</b> (Note 3 and View G) (C)</p> <p><b>Spring Seat Bearings</b> (Note 6 and View H) (O)</p> <p><b>Wheel Bearings</b> (Note 2 and View C) (O)</p>
<b>M131A4C</b>		
<b>TOTAL MAN-HOURS*</b>		
INTERVAL		MAN-HOUR
D		01
Q		0.2
S		0.5
A		1.5
<p>* The man-hour time specified is the time you need to do all services prescribed for a particular interval.</p>		
TA702690		

LUBRICANT • INTERVAL

INTERVAL • LUBRICANT



M131A5

TOTAL MAN-HOURS\*

INTERVAL	MAN-HOUR
D	0.1
Q	0.2
S	0.5
A	1.5

\* The man-hour time specified is the time you need to do all services prescribed for a particular interval.

LUBRICANT • INTERVAL

INTERVAL • LUBRICANT

**Kingpin and Upper Fifth Wheel Plate**  
(Note 7 and View A)  
(0)

**Landing Gear Leg**  
(Note 4 and View B)  
(0)

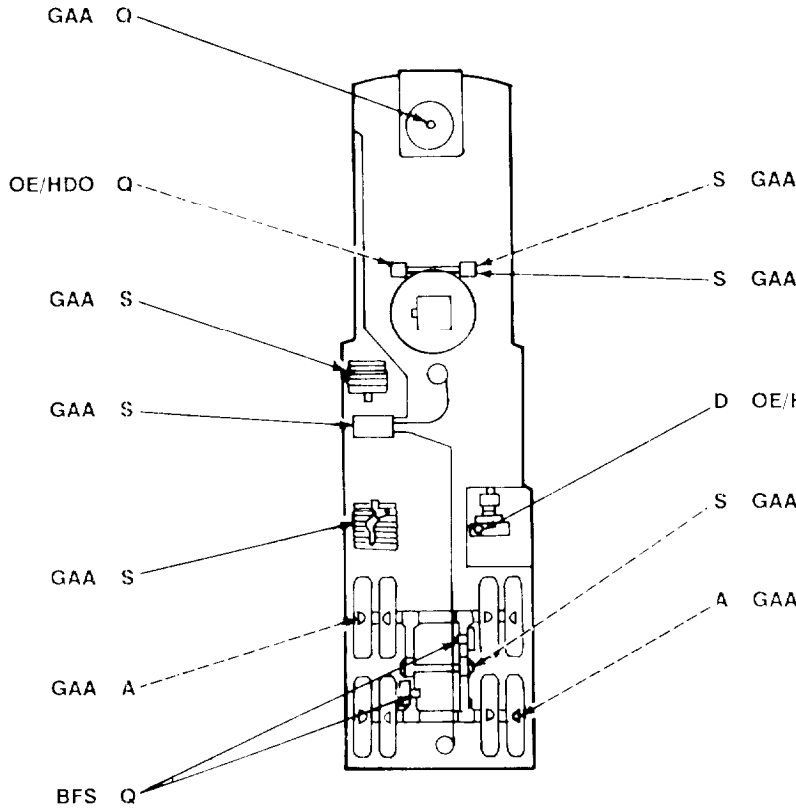
**1 1/2 Inch Hose Reel Side Bearing**  
(View 1) (0)

**Emergency Relief Valve Control Cable Assemblies**  
(3 Fittings)  
(View S E and F) (0)

**2 1/2 Inch Hose Reel Side Bearing**  
(View J) (0)

**Wheel Bearings**  
(Note 2 and View C)  
(0)

**Master Cylinder**  
(Note 5 and View D)  
(0)



**Landing Gear Leg Gearbox** (1 Fitting)  
(View B) (0)

**Landing Gear Handcrank Bearing**  
(1 Fitting) (View B)  
(0)

**Auxiliary Engine Crankcase** (Note 3 and View G) (0)

**Spring Seat Bearings** (Note 6 and View H) (0)

**Wheel Bearings**  
(Note 2 and View C)  
(0)

**M131A5C**

**TOTAL MAN-HOURS\***

INTERVAL	MAN-HOUR
D	0.1
Q	0.2
S	0.5
A	1.5

\* The man-hour time specified is the time you need to do all services prescribed for a particular interval.

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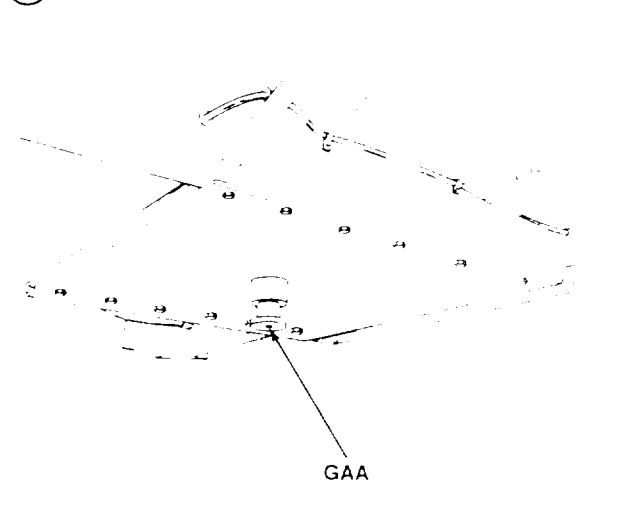


- KEY -

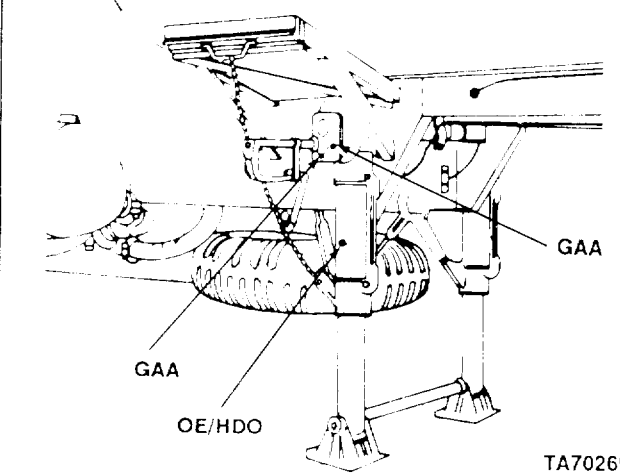
LUBRICANTS	EXPECTED TEMPERATURES			INTERVALS
	ABOVE + 32° F (ABOVE 0°C)	+40°F to -10°F (+ 4°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
OE/HDO (MIL-L-2104) Lubricating Oil, Internal Combustion Engine, Tactical Service	OE/HDO-30	OE/HDO-10	---	D - Daily Q - Quarterly
OEA (MIL-L-46167) Lubricating Oil Internal Combustion Engine Arctic	---	---	OEA	S - Semiannually A - Annual
BFS (MIL-B-46176) Brake Fluid, Silicone, Automotive	All Temperatures			
GAA (MIL-G-10924) Grease, Automotive and Artillery				

FOR ARCTIC OPERATION. REFER TO FM 9-207

(A) KINGPIN AND UPPER FIFTH WHEEL PLATE

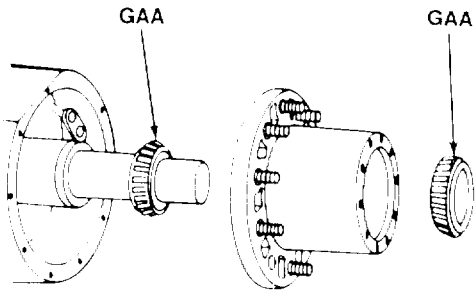


(B) LANDING GEAR LEG, GEARBOX, AND HANDCRANK BEARING

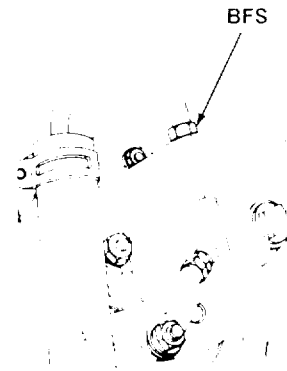


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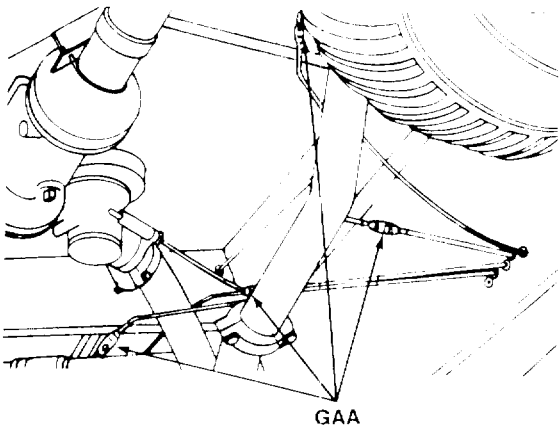
**(C) WHEEL BEARINGS**



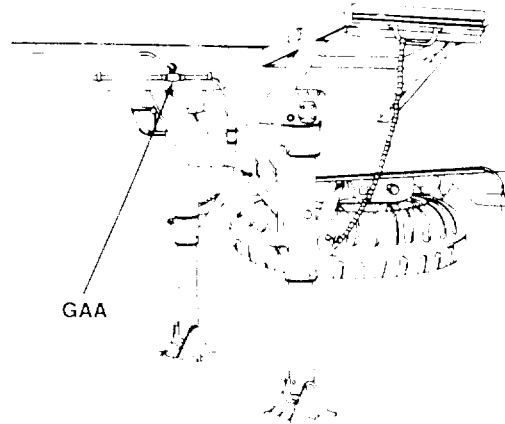
**(D) MASTER CYLINDER**



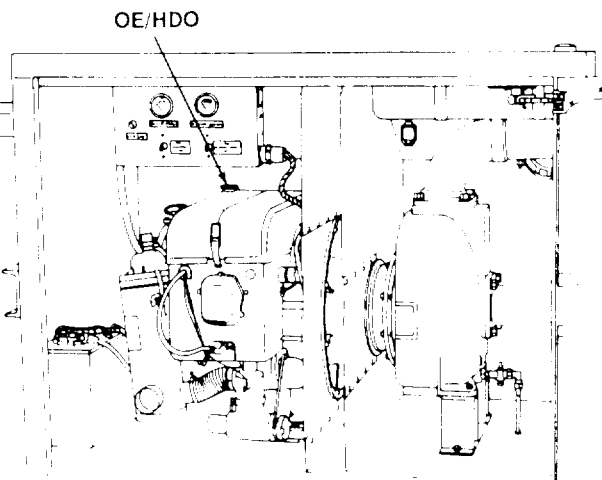
**(E) EMERGENCY RELIEF VALVE CONTROL CABLE ASSEMBLIES**



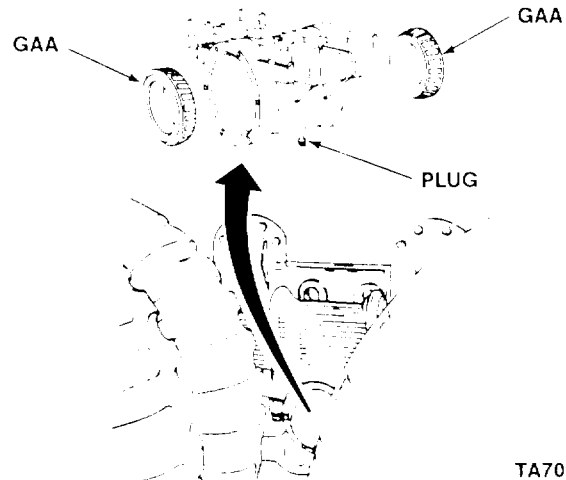
**(F) EMERGENCY RELIEF VALVE CONTROL CABLE ASSEMBLY**



**(G) AUXILIARY ENGINE CRANKCASE**

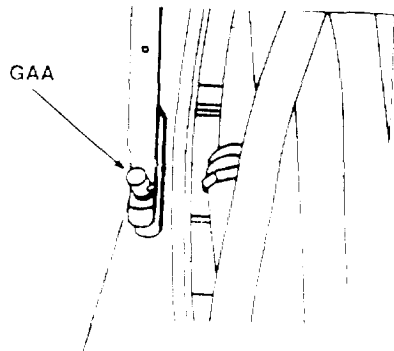


**(H) SPRING SEAT BEARINGS**

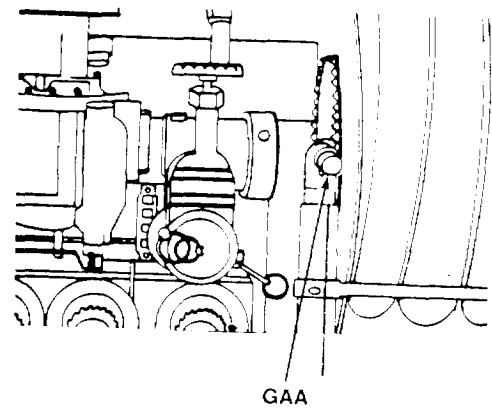


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I 1 1/2 INCH HOSE REEL SIDE BEARING



J 2 1/2 INCH HOSE REEL SIDE BEARING

**NOTES:**

**1. OIL CAN POINTS.** Monthly, lubricate stowage tube assembly and cabinet door hinges, manhole and fill cover latches and hinges, fire extinguisher latches and hinges, landing gear shoes, handcrank assemblies and spare wheel and tire carrier gear-shaft with OE/HDO.

**2. WHEEL BEARINGS.** Annually or every 12,000 miles, remove, clean, and pack with GAA.

**3. AUXILIARY ENGINE CRANKCASE.** Daily, check fluid level. Add OE/HDO as required. Semiannually, drain crankcase and refill (TM 5-2805-258-14).

**4. LANDING GEAR LEG.** Quarterly, extend leg fully, remove screw from oil hole and add OE/HDO. Semiannually, disassemble leg, clean reservoir, assemble leg, and refill reservoir.

**5. MASTER CYLINDER.** Quarterly, check fluid level. Add BFS to within 1/2 in. (13 mm) from top.

**6. SPRING SEAT BEARINGS.** Semiannually, remove plug and insert fitting to lubricate. Install plug.

**7. KINGPIN AND UPPER FIFTH WHEEL PLATE.** Quarterly, apply GAA to kingpin and upper fifth wheel plate. If semitrailer is in continuous use, lubricate weekly.

TA702695

## Section II. OPERATOR/CREW TROUBLESHOOTING PROCEDURES

Paragraph Title	Page Number
Explanation of Columns . . . . .	3-10
General . . . . .	3-10
Operator/Crew Troubleshooting, Table 3-1 . . . . .	3-12
Troubleshooting Symptom Index . . . . .	3-11

### 3-3. GENERAL.

a. This section provides information for identifying and correcting malfunctions which may develop while operating your semitrailer.

b. The Troubleshooting Symptom Index in paragraph 3-5 lists common malfunctions which may occur and refers you to the proper page in Table 3-1 for a troubleshooting procedure.

c. If you are unsure of the location of an item mentioned in troubleshooting, refer to paragraph 1-7 or to the maintenance task where the item is replaced.

d. Before performing troubleshooting, read and follow all safety instructions found in the Warning Summary at the front of this manual.

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

f. When troubleshooting a malfunction:

(1) Locate the symptom or symptoms in paragraph 3-5 that best describe the malfunction.

(2) Turn to the page in Table 3-1 where the troubleshooting procedures for the malfunction in question are described. Headings at top of each page show how each troubleshooting procedure is organized: MALFUNCTION, TEST OR INSPECTION (in step number order), and CORRECTIVE ACTION.

(3) Perform each step in the order listed until the malfunction is corrected. DO NOT perform any maintenance task unless the troubleshooting procedure tells you to do so.

### 3-4. EXPLANATION OF COLUMNS.

The columns in Table 3-1 are defined as follows:

(1) MALFUNCTION. A visual or operational indication that something is wrong with the semitrailer.

(2) TEST OR INSPECTION. A procedure to isolate the problem in a component or system.

(3) CORRECTIVE ACTION. A procedure to correct the problem.

### 3-5. TROUBLESHOOTING SYMPTOM INDEX.

	Troubleshooting Procedure Page
<b>AUXILIARY ENGINE</b>	
Hard to Start .....	3-14
Low:	
Oil Pressure Indicated on Gage [Minimum 20 psi (138 kPa)] .....	3-15
Power .....	3-15
Turns Over But Fails to Start .....	3-15
Turns Over Slowly .....	3-14
Will Not Start .....	3-15
<b>BRAKES</b>	
Grab .....	3-12
None .....	3-13
Slow:	
Application .....	3-13
Release .....	3-13
Weak .....	3-13
Will Not Release .....	3-13
<b>ELECTRICAL SYSTEM</b>	
Lamps Fail to Light:	
All .....	3-12
One or More (But Not All) .....	3-12
<b>FUEL FLOW CONTROL VALVES</b>	
Difficult to Operate .....	3-15
<b>FUELING OPERATIONS</b>	
Fuel Does Not Flow During Any:	
Filtered Fueling Operation (M131A4C and M131A5C) .....	3-16
Nonfiltered Fueling Operation .....	3-16
<b>LANDING GEAR</b>	
Difficult to:	
Lower .....	3-14
Raise .....	3-14
<b>SUSPENSION SYSTEM</b>	
Semitrailer Sags to One Side .....	3-14

3-5. TROUBLESHOOTING SYMPTOM INDEX (Con't).

	Troubleshooting Procedure Page
<b>TIRES</b>	
Abnormal Wear . . . . .	3-13
Air Leakage . . . . .	3-14
W h e e l s :	
Noisy . . . . .	3-14
Wobbly . . . . .	3-14

Table 3-1. Operator/Crew Troubleshooting.

---

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

---

*ELECTRICAL SYSTEM*

**1. ALL LAMPS FAIL TO LIGHT.**

- Step 1. Check that towing vehicle lights are turned on.  
 Turn on towing vehicle lights. Refer to towing vehicle technical manual.
- Step 2. Check intervehicular cable for proper connection.  
 Connect intervehicular cable (para 2-10).
- Step 3. Check intervehicular cable and semitrailer receptacle for dirty or corroded terminals.  
 Clean terminals as required.
- Step 4. Check towing vehicle circuit breaker.  
 Refer to towing vehicle technical manual.

**2. ONE OR MORE LAMPS (BUT NOT ALL) FAIL TO LIGHT.**

- Step 1. Check intervehicular cable for proper connection.  
 Connect intervehicular cable (para 2-10).
- Step 2. Check intervehicular cable and semitrailer receptacle for dirty or corroded terminals.  
 Clean terminals as required.

---

*BRAKES*

**3. BRAKES GRAB.**

- Check for moisture in air reservoir.  
 Open air reservoir draincock and allow all moisture to drain.

**Table 3-1. Operator/Crew Troubleshooting (Con't).**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>4. BRAKES WILL NOT RELEASE.</b>	Step 1. Check that towing vehicle brake is not applied.	Release towing vehicle brake. Refer to towing vehicle technical manual.
	Step 2. Check for closed air shutoff valves on towing vehicle.	Open air shutoff valves. Refer to towing vehicle technical manual.
	Step 3. Check air couplings for proper connections.	Connect air couplings (para 2-10).
	Step 4. Check that air reservoir draincock is closed.	Close air reservoir draincock.
<b>5. NO BRAKES OR WEAK BRAKES.</b>	Step 1. Check for closed air valves on towing vehicle.	Open air shutoff valves. Refer to towing vehicle technical manual.
	Step 2. Check air couplings for proper connections.	Connect air shutoff couplings (para 2-10).
	Step 3. Check that air reservoir draincock is closed.	Close air reservoir draincock.
	Step 4. Check for brake fluid leaks.	If brake fluid is leaking, notify Organizational Maintenance.
	Step 5. Check towing vehicle for proper air pressure. Refer to towing vehicle technical manual.	If air pressure is low, build to normal pressure.
<b>6. SLOW APPLICATION OR SLOW RELEASE OF BRAKES.</b>		Check towing vehicle for proper air pressure. Refer to towing vehicle technical manual. If air pressure is low, build to normal pressure.

---

*TIRES*

**7. ABNORMAL TIRE WEAR.**

- Step 1. Check tires for proper inflation.  
Inflate tires to proper pressure (para 1-11).
- Step 2. Check for loose wheel nuts.  
Tighten wheels nuts. Notify Organizational Maintenance to apply proper torque.

Table 3-1. Operator/Crew Troubleshooting (Con't).

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

**8. AIR LEAKAGE FROM TIRES.**

- Step 1. Check valve core for looseness or damage.  
Tighten loose valve core. If valve core is damaged, notify Organization Maintenance.
- Step 2. Check tires for cracks, gouges, or other damage.  
If tires are damaged, notify Organizational Maintenance.

**9. NOISY OR WOBBLY WHEELS.**

- Check for loose wheel nuts.  
Tighten wheel nuts. Notify Organizational Maintenance to apply proper torque.

---

*LANDING GEAR*

**10. LANDING GEAR DIFFICULT TO RAISE OR LOWER.**

- Step 1. Check landing gear leg for adequate lubrication.  
If landing gear leg requires lubrication, notify Organizational Maintenance.
- Step 2. Check for misaligned or broken handcrank.  
If handcrank is misaligned or broken, notify Organizational Maintenance.
- Step 3. Check for misaligned, bent, or damaged landing gear legs.  
If landing gear legs are misaligned, bent, or damaged, notify Organizational Maintenance.

---

*SUSPENSION SYSTEM*

**11. SEMITRAILER SAGS TO ONE SIDE.**

- Check tires for proper inflation.  
Inflate tires to proper pressure (para 1-11)

---

*AUXILIARY ENGINE*

**WARNING**

**Do not slave start auxiliary engine. Slave starting may cause battery to spark and cause an explosion. Failure to follow this warning may result in injury or death to personnel.**

**12. ENGINE HARD TO START OR TURNS OVER SLOWLY.**

- Step 1. Check for damaged battery.  
If battery is damaged, notify Organizational Maintenance.



Table 3-1. Operator/Crew Troubleshooting (Con't).

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

Step 2. Check for fuel line leaks.

If connections are loose or lines are damaged, notify Organizational Maintenance.

### 13. ENGINE TURNS OVER BUT FAILS TO START.

Step 1. Check level of fuel in fuel tank.

Add fuel.

Step 2. Check for closed fuel shutoff cock on sediment strainer.

Open fuel shutoff cock (para 2-15).

### 14. ENGINE WILL NOT START.

Step 1. Check level of fuel In fuel tank.

Add fuel.

Step 2. Check for closed fuel shutoff cock on sediment strainer.

Open fuel shutoff cock (para 2-15).

Step 3. Check for loose battery cable connections.

If battery cables are loose, notify Organizational Maintenance.

Step 4. Check for damaged battery.

If battery is damaged, notify Organizational Maintenance

### 15. LOW OIL PRESSURE INDICATED ON GAGE [MINIMUM 20 PSI (138 kPa)].

Check oil level in crankcase.

Add oil as required (Chapter 3, Section I).

### 16. LOW ENGINE POWER.

Step 1. Check air cleaner dirt indicator for showing of red band.

If red band is showing, notify Organizational Maintenance.

Step 2. Check for fuel line leaks.

If connections are loose or lines are damaged notify Organizational Maintenance.

---

### FUEL FLOW CONTROL VALVES

### 17. FUEL FLOW CONTROL VALVES DIFFICULT TO OPERATE.

Check valve for binding.

If valve is binding, notify Organizational Maintenance.

Table 3-1. Operator/Crew Troubleshooting (Con't).

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

*FUELING OPERATIONS*

**18. FUEL DOES NOT FLOW DURING ANY FILTERED FUELING OPERATION (M131A4C AND M131A5C).**

- Step 1. Check that emergency relief valve is open.  
 Open emergency relief valve by pulling emergency relief valve operating control lever. If operating control lever does not function, notify Organizational Maintenance.
- Step 2. Check that proper valves are open.  
 Refer to flow diagrams pertaining to fueling operation being performed (para 2-23).
- Step 3. Manually drain filter-separator sump.
- Step 4. Perform filter-separator pressure check (para 2-16).  
 If there is no pressure, or if pressure differential between filter inlet and filter outlet is greater than 20 psi (138 kPa) on M131A5C, or 15 psi (103 kPa) on M131A4C, filter elements and go-no-go fuses require replacement, Notify Organizational Maintenance.
- Step 5. Check for inoperative fuel nozzle assembly.  
 If fuel nozzle assembly is inoperative, notify Organizational Maintenance.

**19. FUEL DOES NOT FLOW DURING ANY NONFILTERED FUELING OPERATION.**

- Step 1. Check that emergency relief valve is open.  
 Open emergency relief valve by pulling emergency relief valve operating control lever. If operating control lever does not function, notify Organizational Maintenance.
- Step 2. Check that proper valves are open and hose connections are correct.  
 Refer to flow diagrams pertaining to fueling operation being performed (para 2-18, 2-19, 2-20, 2-21, or 2-22).

**CHAPTER 4  
ORGANIZATIONAL MAINTENANCE**

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

Paragraph Title	Page Number
Common Tools and Equipment . . . . .	4-1
Repair Parts . . . . .	4-1
Special Tools, Test, Measurement, and Diagnostic Equipment (TMDE); and Support Equipment . . . . .	4-1

**4-1. COMMON TOOLS AND EQUIPMENT.**

Refer to the *Modified Table of Organization and Equipment (MTOE)* for authorized common tools and equipment applicable to your unit.

**4-2. SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE);  
AND SUPPORT EQUIPMENT.**

For authorization of special tools; test, measurement, and diagnostic equipment (TMDE); and support equipment required to maintain the M131 Series Fuel Tank Semitrailers, refer to Appendix B, Maintenance Allocation Chart.

**4-3. REPAIR PARTS.**

Repair parts are listed and illustrated in TM 9-2330-272-24P.

## Section II. SERVICE UPON RECEIPT

Paragraph Title	Page Number
General . . . . .	4-2
Inspection Instructions . . . . .	4-2
Servicing Instructions. . . . .	4-2

**4-4. GENERAL.**

When anew, used, or reconditioned semitrailer is first received, determine whether it has been properly prepared for service and is in condition to perform its mission. Follow the inspection instructions in paragraph 4-5 and servicing instructions in paragraph 4-6.

**4-5. INSPECTION INSTRUCTIONS.**

- a. Refer to DD Form 1397 for procedures on unpacking the semitrailer.
- b. Remove all straps, plywood, tape, seals, and wrappings.

**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F - 138°F (38°C - 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

- c. Remove rust preventive compound from coated exterior parts of the semitrailer using dry cleaning solvent (Item 16, Appendix E) and rags (Item 14, Appendix E).
- d. Inspect the semitrailer for damage incurred during shipment. Check also to see if the equipment has been modified.
- e. Check the equipment against the packing list to ensure that the shipment is complete. Report any discrepancies in accordance with instructions in DA Pam 738-750.

**4-6. SERVICING INSTRUCTIONS.**

- a. Perform all operator/crew and organizational PMCS. Schedule the next PMCS on DD Form 314.
- b. Lubricate all lubrication points as described in Chapter 3, Section I, regardless of interval.
- c. Report any problems on DA Form 2404.
- d. Perform a break-in road test of 25 mi (40 km) at a maximum speed of 50 mi/h (80 km/h).

## Section III. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph Title	Page Number
General . . . . .	4-3
General PMCS Procedures . . . . .	4-3
Organizational Preventive Maintenance Checks and services (PMCS), Table 4-1 . . . .	4-4
Reporting Repairs . . . . .	4-3
Service Intervals . . . . .	4-3
Specific PMCS Procedures . . . . .	4-4

### 4-7. GENERAL.

To ensure that the M131 Series Fuel Tank Semitrailers are ready for operation at all times, they must be inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure, or injury to personnel. This section contains systematic instructions on Inspections, adjustments, and corrections to be performed by Organizational Maintenance.

### 4-8. SERVICE INTERVALS.

Perform PMCS, found in Table 4-1, at the following intervals:

- (1) Perform Semiannual (S) PMCS once every six months.
- (2) Perform Annual (A) PMCS once each year.
- (3) Perform Biennial (B) PMCS once every two years.

### 4-9. REPORTING REPAIRS.

Report all defects and corrective actions on DA Form 2404. If a serious problem is found, report it to your supervisor immediately.

### 4-10. GENERAL PMCS PROCEDURES.

#### WARNING

**Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F - 138°F (38°C - 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.**

a. Keep equipment clean. Dirt, oil, and debris may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent (Item 16, Appendix E) on all metal surfaces. Use dishwashing compound (Item 7, Appendix E) and water on rubber, plastic, and painted surfaces.

b. While performing PMCS, inspect the following components:

- (1) **Bolts, Nuts, and Screws.** Ensure that they are not loose, missing, bent, or broken. Tighten any that are loose.
- (2) **Welds.** Inspect for gaps where parts are welded together. Report bad welds to your supervisor.
- (3) **Electric Wires or Connectors.** Inspect for cracked or broken insulation, bare wires, and loose or broken connectors. Make repairs or replace as required.

**4-10. GENERAL PMCS PROCEDURES (Con't).**

(4) Hoses, Lines, and Fittings. Inspect for wear, damage, and leaks. Ensure that clamps and fittings are tight. If a leak originates from a loose fitting or connector, tighten it. If a component is broken or worn, correct problem if authorized by the Maintenance Allocation Chart (MAC) (Appendix B). If not authorized, report if to your supervisor.

**4-11. SPECIFIC PMCS PROCEDURES.**

a. Organizational PMCS are provided in Table 4-1. Always perform PMCS in the order listed. Once it becomes a habit, anything that is not right can be spotted in a minute. If anything wrong is discovered through PMCS, perform the appropriate troubleshooting task in Section IV of this chapter. If any component or system is not serviceable, or if given service does not correct problem, notify your supervisor.

b. Before performing preventive maintenance, read all the checks required for the applicable interval and prepare tools needed to make all checks. Have several clean rags (Item 14, Appendix E) handy. Perform ALL inspections at the applicable interval.

c. The columns in Table 4-1 are defined as follows:

(1) **Item No.** Provides a logical sequence for PMCS to be performed and is used as a source of item numbers for the "TM ITEM NO" column on DA Form 2404 in recording PMCS results.

(2) **Interval.** Specifies interval at which PMCS is to be performed.

(3) **Item To Be Inspected.** Lists the system and common name of items that are to be inspected.

(4) **Procedures.** Tells you how to do the required check or service.

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

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES
	S	A	B		
1				TANK	<p style="text-align: center;"><b>NOTE</b></p> <p><b>Perform operator/crew PMCS prior to or In conjunction with organizational PMCS if:</b></p> <p><b>a. There is a delay between daily operation of semitrailer and organizational PMCS.</b></p> <p><b>b. Regular operator is not assisting/participating.</b></p> <p>Check tank for rust at intersections where components are welded to tank. Check condition of paint. Notify Direct Support Maintenance of any damage found.</p>

Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS) (Con't).

S-SEMIANNUAL				A-ANNUAL		B-BIENNIAL				
ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES					
	S	A	B							
2	•	Ž		UPPER FIFTH WHEEL PLATE AND CATWALK DRAIN PLUGS	a. Clean out front and rear corners of upper fifth wheel plate. Remove grease and dirt to allow water to drain from upper fifth wheel plate. b. Inspect front of semitrailer and catwalk drain plugs. Drain plugs should be installed at all times (except when washing semitrailer) to prevent water from draining into upper fifth wheel plate area.					
3	•			ELECTRICAL SYSTEM	Check chassis electrical tubing connections and retaining clips for security and condition.					
4	•	•	•	SUSPENSION	a. Tighten cross tube screws as required. b. Check spring leaves, clips, and spring U-bolts for looseness or damage. c. Check torque rods for looseness or damage.					
5	•			KINGPIN AND UPPER FIFTH WHEEL PLATE	<p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;"><b>Kingpin groove original dimension is 2.0 in. (5.1 cm).</b></p> Inspect condition of kingpin. Kingpin and upper fifth wheel plate should be replaced when any of the following conditions exist:  (1) Wear of $\frac{1}{16}$ in. (1.6 mm) over $\frac{1}{4}$ of the circumference of the kingpin. This would be a condition of uneven wear on one or more sides of the kingpin wear surface.					

Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS) (Con't).

S-SEMIANNUAL

A-ANNUAL

B-BIENNIAL

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES
	S	A	B		
5				KINGPIN AND UPPER FIFTH WHEEL PLATE (Con't)	<p>(2) Even wear over the kingpin surface causing the diameter to be reduced by <math>\frac{1}{16}</math> in. (1.6 mm).</p> <div style="text-align: center;"> </div>
6		•		WHEELS AND HUBS	<p>(3) A crack of any size is noted anywhere on the kingpin or associated welds.</p> <p>(4) A nick, chip, or gouge deeper than <math>\frac{1}{8}</math> in. (3.2 mm) is noted anywhere on the kingpin wear surface.</p> <p>Remove, disassemble, clean, and inspect hub and brakedrum (para 4-44). Clean, inspect, and pack wheel bearings.</p>
7	•	•		BRAKES	<p>a. Remove hub and brakedrum (para 4-44). Check brakedrum for evidence of overheating. Check brakeshoe lining thickness. Brakeshoe linings should have a minimum thickness of <math>\frac{1}{8}</math> in. (0.79 mm) above rivet heads (para 4-30).</p> <p>b. Check air couplings for damage. Tighten if loose. Check air coupling preformed packing for damage. Replace if damaged (para 4-36).</p>
8	•			BATTERIES AND CABLES	<p>Check electrolyte level in each cell. If low, add distilled water. Check electrolyte specific gravity. Check for corrosion (TM 9-6140-200-14).</p>

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Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS) (Con't).

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES
	S	A	B		
9				FILTER-SEPARATOR (M131A4C AND M131A5C)	Change filter elements and go-no-go fuses. Record date on filter-separator housing (para 4-86, 4-87, or 4-88).
10			•	PIPING	Service sediment strainer (para 4-93).
11				FIRE EXTINGUISHERS	<p style="text-align: center;"><u>WARNING</u></p> <p><b>Handle charged fire extinguisher cylinders with care. DO NOT jar or expose to temperature above 140°F (60°C).</b></p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>Refer to TB 5-4200-200-10 for guidance on fire extinguisher servicing.</b></p> <p>a. Remove fire extinguisher from mounting bracket and weigh. Fill out maintenance request (DA Form 2407) or exchange request (DA Form 2402) for cylinders requiring recharging.</p> <p>b. Check mounting bracket for secure attachment to semitrailer. Check that lockup handle moves freely and is not damaged.</p> <p>c. If equipped, check that plastic indicator on top of fire extinguisher is intact.</p> <p style="text-align: center;"><b>NOTE</b></p> <p><b>Some fire extinguishers have a safety wire-lead or plastic seal attached to pull pin.</b></p> <p>d. Check that safety wire-lead or plastic seal is not broken or missing.</p> <p>e. Check that tube is not kinked and nozzle is free of obstructions.</p> <p>f. Check that the fire extinguisher tag is securely attached. Check for date of last inspection/recharge.</p>

Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS) (Con't).

S-SEMIANNUAL			A-ANNUAL	B-BIENNIAL	
ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES
	S	A	B		
11	•			<b>FIRE EXTINGUISHERS (Con't)</b>	<p>g. Install fire extinguisher on mounting bracket. Ensure that lockup handle holds fire extinguisher securely to mounting bracket.</p> <p>h. Check that fixed fire extinguisher remote control cable is attached to remote control handle and fixed fire extinguisher is not damaged.</p>

## Section IV. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES

Paragraph Title	Page Number
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General . . . . .	4-9
Organizational Troubleshooting, Table 4-2 . . . . .	4-11
Troubleshooting Symptom Index . . . . .	4-10

### 4-12. GENERAL.

a. This section provides information for identifying and correcting malfunctions which may develop when operating or maintaining the semitrailers.

b. The Troubleshooting Symptom Index in paragraph 4-14 lists common malfunctions which may occur and refers you to the proper page in Table 4-2 for a troubleshooting procedure.

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

d. When troubleshooting a malfunction:

(1) Question the operator to obtain any information that might help determine the cause of the problem. Before continuing, ensure that all applicable operator/crew troubleshooting was performed.

(2) Locate the symptom(s) in paragraph 4-14 that best describes the malfunction. If the appropriate symptom is not listed, notify your supervisor.

(3) Turn to the page in Table 4-2 where the troubleshooting procedures for the malfunction in question are described. Headings at the top of each page show how each troubleshooting procedure is organized: MALFUNCTION, TEST OR INSPECTION (in step number order), and CORRECTIVE ACTION.

(4) Perform each step in the order listed until the malfunction is corrected. DO NOT perform any maintenance task unless the troubleshooting procedure tells you to do so.

### 4-13. EXPLANATION OF COLUMNS.

The columns in Table 4-2 are defined as follows:

- (1) **MALFUNCTION.** A visual or operational indication that something is wrong with the trailer.
- (2) **TEST OR INSPECTION.** A procedure to isolate the problem in a component or system.
- (3) **CORRECTIVE ACTION.** A procedure to correct the problem.

4-14. TROUBLESHOOTING SYMPTOM INDEX.

	Troubleshooting Procedure Page
<b>AUXILIARY ENGINE</b>	
Does Not Shut Off When Ignition Switch is Turned to Off . . . . .	4-17
Hard to Start . . . . .	4-17
Turns Over But Fails to Start . . . . .	4-17
Turns Over Slowly . . . . .	4-17
Will Not Start . . . . .	4-16
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Drag (One or More Brakedrums Running Hot) . . . . .	4-14
Grab . . . . .	4-14
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Will Not Release . . . . .	4-12
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Lamps Fail to Light:	
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Lights:	
Dim . . . . .	4-12
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<b>PIPING CONTROL COMPONENTS</b>	
Emergency Relief Valve:	
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4-14. TROUBLESHOOTING SYMPTOM INDEX (Con't).

	Troubleshooting Procedure Page
<b>SUSPENSION SYSTEM</b>	
Leans to One Side . . . . .	4-15
Pulls to One Side . . . . .	4-16
<b>TIRES</b>	
Abnormal Wear . . . . .	4-15
Wheels:	
Noisy . . . . .	4-15
Wobbly . . . . .	4-15

Table 4-2. Organizational Troubleshooting.

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**MALFUNCTION**

TEST OR INSPECTION	CORRECTIVE ACTION
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*ELECTRICAL SYSTEM*

**WARNING**

**When troubleshooting an electrical malfunction, ALWAYS disconnect intervehicular electrical cable from semitrailer. Failure to follow this warning may create a spark and explosion, resulting in injury or death to personnel.**

**NOTE**

**Refer to paragraph 4-29 to determine routing of electrical wires and location of electrical components.**

**1. ALL LAMPS FAIL TO LIGHT.**

Step 1. Troubleshoot towing vehicle electrical system.

Refer to towing vehicle technical manual.

Step 2. Inspect connectors and intervehicular cable receptacle for damage and corrosion.

Repair connectors or receptacle (para 4-27 or 4-29).

Step 3. Perform continuity checks of wires.

Repair or replace wiring (para 4-26 or 4-27).

**2. ONE OR MORE LAMPS (BUT NOT ALL) FAIL TO LIGHT.**

Step 1. Check affected lamps.

Replace lamps (para 4-21, 4-22, 4-23, or 4-24).

Table 4-2. Organizational Troubleshooting (Con't).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. Check for dirty or corroded lamp sockets.	Clean lamp sockets and contacts.
	Step 3. Check affected light assembly.	Replace light assembly (para 4-21, 4-22, 4-23, or 4-24).
<b>3. DIM OR FLICKERING LIGHTS.</b>		
	step 1. Check for dirty, loose, or corroded terminals	Clean and tighten terminals.
	Step 2. Check for poor or loose ground connections.	Clean and tighten ground lead terminals.
	Step 3. Check affected lamps.	Replace lamps (para 4-21, 4-22, 4-23, or 4-24).
	Step 4. Check for dirty or corroded lamp sockets.	Clean lamp sockets and contacts.
	Step 5. Check affected light assembly.	Replace light assembly (para 4-21, 4-22, 4-23, or 4-24).
<b>4. DIRECTIONAL SIGNALS INOPERATIVE.</b>		
	Step 1. Check for dirty or corroded lamp sockets.	Clean lamp sockets and contacts.
	Step 2. Check affected light assembly.	Replace light assembly (para 4-21, 4-22, 4-23, or 4-24).
	Step 3. Check for defective flasher switch in towing vehicle.	Refer to towing vehicle technical manual.

---

*BRAKES*

**5. BRAKES WILL NOT RELEASE.**

- Step 1. Check for leakage in air lines.  
Replace air line (para 4-39).

Table 4-2. Organizational Troubleshooting (Con't).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2.	Check relay valve for leaks and proper operation (para 4-40 and 4-41). Replace relay valve (para 4-41).
	Step 3.	Check service brake adjustment. Adjust service brakes (para 4-31).
	Step 4.	Check for weak or broken brakeshoe return spring. Replace return spring (para 4-30).
<b>6. NO BRAKES OR WEAK BRAKES.</b>		
	Step 1.	Perform air leakage test (para 4-40). Tighten loose fittings or replace air lines (para 4-39).
	Step 2.	Check fluid level in master cylinder. Fill master cylinder to within $\frac{1}{2}$ in. (13 mm) from top (Chapter 3, Section I).
	Step 3.	Check for leaking or damaged master cylinder. Replace master cylinder (para 4-32).
	Step 4.	Check for air in hydraulic brake system. Bleed brakes (para 4-35).
	Step 5.	Check service brake adjustment. Adjust service brakes (para 4-31).
	Step 6.	Check for grease on brakeshoe linings. Replace brakeshoes (para 4-30). Replace oil seal if necessary (para 4-44).
	Step 7.	Check for worn brakeshoe linings. Replace brakeshoes (para 4-30).
	Step 8.	Check for leaking or damaged wheel cylinder. Replace wheel cylinder (para 4-33).
<b>7. SLOW APPLICATION OR SLOW RELEASE OF BRAKES.</b>		
	Step 1.	Perform air leakage test. Check for leakage in service air line (para 4-40). Tighten loose fittings or replace air line (para 4-39).
	Step 2.	Check fluid level in master cylinder. Fill master cylinder to within $\frac{1}{2}$ in. (13 mm) from top (Chapter 3, Section I).

Table 4-2. Organizational Troubleshooting (Con't).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 3. Check for leaking or damaged master cylinder.	Replace master cylinder (para 4-32).
	Step 4. Check for air in hydraulic brake system.	Bleed brakes (para 4-35).
	Step 5. Check for leaking or damaged wheel cylinder.	Replace wheel cylinder (para 4-33).
	Step 6. Check for weak or broken brakeshoe return spring.	Replace return spring (para 4-30).

**8 . BRAKES GRAB.**

- Step 1. Check service brake adjustment.  
Adjust service brakes (para 4-31).
- Step 2. Check for loose or worn wheel bearings.  
Adjust or replace wheel bearings (para 4-44).
- Step 3. Check for loose or worn brakeshoe linings.  
Replace brakeshoes (para 4-30).
- Step 4. Check for cracked, scored, or deformed brakedrum.  
Replace brakedrum (para 4-44).

**9 . BRAKES DRAG (ONE OR MORE BRAKEDRUMS RUNNING HOT).**

- Step 1. Check service brake adjustment.  
Adjust service brakes (para 4-31).
- Step 2. Check for weak or broken brakeshoe return spring.  
Replace return spring (para 4-30).
- Step 3. Check for out-of-round brakedrum.  
Replace brakedrum (para 4-44).

**10. UNEVEN BRAKING.**

- Step 1. Check service brake adjustment.  
Adjust service brakes (para 4-31).



Table 4-2. Organizational Troubleshooting (Con't).

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

- Step 2. Check for grease on brakeshoe linings.  
Replace brakeshoes (para 4-30). Replace oil seal if necessary (para 4-44).
- Step 3. Check for leaking or damaged wheel cylinder.  
Replace wheel cylinder (para 4-33).

**11. NOISY BRAKES.**

- Step 1. Check for loose brakeshoe rivets or lining.  
Replace brakeshoes (para 4-30).
- Step 2. Check for dirt, rust, and metal particles in brakedrum.  
Clean brakedrum and brake components (para 4-44).
- Step 3. Check for scored or deformed brakedrum.  
Replace brakedrum (para 4-44).

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*TIRES*

**12. ABNORMAL TIRE WEAR.**

- Step 1. Check for loose wheel bearings.  
Adjust wheel bearings (para 4-44).
- Step 2. Check for deformed brakedrum.  
Replace brakedrum (para 4-44).

**13. NOISY OR WOBBLY WHEELS.**

- Step 1. Check service brake adjustment.  
Adjust service brakes (para 4-31).
- Step 2. Check for loose or worn wheel bearings.  
Adjust or replace wheel bearings (para 4-44).

---

*SUSPENSION SYSTEM*

**14. SEMITRAILER LEANS TO ONE SIDE.**

- Check for broken spring leaves, center bolts, or clips.  
Replace springs (para 4-52).

Table 4-2. Organizational Troubleshooting (Con't).

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

**15. SEMITRAILER PULLS TO ONE SIDE.**

- |         |   |
|---------|---|
| Step 1. | Check service brake adjustment.<br>Adjust service brakes (para 4-31). |
| Step 2. | Check wheel bearing adjustment.<br>Adjust wheel bearings (para 4-44). |
| Step 3. | Check for loose suspension springs.<br>Tighten U-bolts (para 4-52).   |

*LANDING GEAR***16. DIFFICULT OPERATION.**

- |   |
|---|
| Check for bent operating shaft.<br>Replace operating shaft (para 4-50). |
|---|

*AUXILIARY ENGINE***WARNING**

Do not slave start auxiliary engine, Slave starting may cause battery to spark and cause an explosion. Failure to follow this warning may result in injury or death to personnel.

**17. ENGINE WILL NOT START.**

- |         |  |
|---------|--|
| Step 1. | Check for defective panel power switch.<br>Replace panel power switch (para 4-80).                   |
| Step 2. | Check for defective ignition switch.<br>Replace ignition switch (para 4-80).                         |
| Step 3. | Check for defective starter switch.<br>Replace starter switch (para 4-80).                           |
| Step 4. | Check for defective panel power circuit breaker.<br>Replace panel power circuit breaker (para 4-81). |

Table 4-2. Organizational Troubleshooting (Con't).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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**18. ENGINE HARD TO START OR TURNS OVER SLOWLY.**

- Step 1. Check for discharged battery.  
Replace battery (para 4-25).
- Step 2. Check for defective or loose battery cables.  
Replace or tighten battery cables (para 4-25).

**19. ENGINE TURNS OVER BUT FAILS TO START.**

- Step 1. Check if ignition switch is grounding magneto.  
Replace ignition switch (para 4-80).
- Step 2. Check for grounded magneto lead.  
Replace lead (para 4-80).

**20. ENGINE DOES NOT SHUT OFF WHEN IGNITION SWITCH IS TURNED TO OFF.**

- Step 1. Check for poor ground lead connection between magneto and ignition switch.  
Replace ignition switch (para 4-80).
- Step 2. Check for defective ignition switch  
Replace ignition switch (para 4-80).

*FUEL DISPENSING PUMP***21. PUMP FAILS TO DELIVER FUEL.**

- Step 1. Check if pump has either lost prime or has not been primed.  
Prime pump (para 4-92).
- Step 2. Check for evidence of leaking gaskets.  
Replace gaskets (para 4-90).
- Step 3. Check for free rotation of pump shaft  
Replace pump (para 4-90).

*PIPING CONTROL COMPONENTS***22. EMERGENCY RELIEF VALVE WILL NOT OPEN OR CLOSE OR LEAKS OCCUR.**

- Step 1. Check for adequate lubrication of control cable assemblies.  
Lubricate control cable assemblies (Chapter 3, Section I).

**Table 4-2. Organizational Troubleshooting (Con't).**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
	Step 2.	Check for loose cable in adjusting bolt at operator control. Tighten nuts at adjusting bolt (para 4-96).
	Step 3.	Check for loose conduit to frame adapter nut. Tighten nut.
	Step 4.	Check for looseness of U-bolt nuts at emergency relief valve end of cable. Tighten U-bolt nuts.
	Step 5.	Check for loose nuts on emergency relief valve mounting flange. Tighten nuts.
	Step 6.	Check for leaking emergency relief valve. Replace emergency relief valve (para 4-95).
<b>23. EMERGENCY RELIEF VALVE OPERATOR CONTROL OPERATES IMPROPERLY.</b>		
	Step 1.	Check for adequate lubrication of control cable assemblies. Lubricate control cable assemblies (Chapter 3, Section I).
	Step 2.	Check for looseness of cable at emergency relief valve lever or control box handle. Tighten nuts at each end of cable as required.
	Step 3.	Check adjustment on trip lever and front emergency relief valve shutoff. Perform adjustment of emergency relief valve operator control (para 4-96).
	Step 4.	Check for broken wire rope in tubing. Replace control cable assembly (para 4-97).
<b>24. GATE VALVES OPERATE IMPROPERLY.</b>		
		Check for leaks around handwheel stem. Open valve one full turn. Tighten stuffing box nut. Close valve.
<b>25. MANIFOLD OPERATES IMPROPERLY.</b>		
	Step 1.	Check for leaks at rear of manifold. Tighten coupler nuts.
	Step 2.	Check for leaks around handwheel stems. Open valves one full turn. Tighten stuffing box nuts. Close valves.

Table 4-2. Organizational Troubleshooting (Con't).

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

Step 3. Check for leaks at manifold valve.

Replace or repair manifold valve (para 4-98 or 4-99).

**26. MANHOLE COVERS AND FILLER CAPS OPERATE IMPROPERLY.**

Check for loose manhole cover.

Tighten ring or clamp screw and nut. Replace vent valve (para 4-62 or 4-63).

**Section V. GENERAL MAINTENANCE INSTRUCTIONS**

Paragraph Title	Page Number
Cleaning Instructions . . . . .	4-21
General . . . . .	4-20
Inspection Instructions . . . . .	4-22
Repair Instructions . . . . .	4-22
Tagging Wires and Hoses . . . . .	4-22
Work Safety . . . . .	4-20

**4-15. GENERAL.**

a. Maintenance of any fuel hauling semitrailer can be hazardous due to the flammable and explosive nature of the load, Refer to Chapter 1, Section III for general safety regulation that pertain to maintenance.

b. These general maintenance instructions contain general shop practices and specific methods you must be familiar with to property maintain your semitrailer. You should read and understand these practices and methods before performing any Organizational Maintenance tasks.

c. Before beginning a task, find out how much repair, modification, or replacement is needed to fix the equipment. Sometimes the reason for equipment failure can be seen right away, and complete tear down is not necessary. Disassemble equipment only as far as necessary to repair or replace damaged or broken parts.

d. The following "Initial Setup" information applies to all procedures:

(1) Resources are not listed unless they apply to the procedure.

(2) "Personnel Required" is listed only if more than one technician is required to complete the task. If "Personnel Required" is not listed, one technician can complete the task.

e. All tags and forms attached to equipment must be checked to learn the reason for equipment's removal from service. Modification Work Orders (MWO) and Technical Bulletins (TB) must also rechecked for equipment changes and updates.

f. In some cases, a part may be damaged by removal. If the part appears to be good, and other parts behind it are not defective, leave it on and continue with the procedure. Here are a few simple rules:

(1) Do not remove dowel pins or studs unless loose, bent, broken, or otherwise damaged.

(2) Do not remove bearings or bushings unless damaged. If you need to remove them to access parts behind, pull bearings and bushings out carefully.

(3) Replace all gaskets, seals, lockwashers, locknuts, cotter pins, and preformed packings.

s

a. Observe all WARNINGS and CAUTIONS.

b. Always use power tools carefully.

c. Protect yourself against injury, Wear protective gear such as safety goggles or lenses, safety shoes, rubber apron, or gloves.

d. When lifting heavy parts, have someone help you. Ensure that lifting/jacking equipment is working properly, is suitable for the assigned task, and is secure against slipping.

#### 4-17. CLEANING INSTRUCTIONS.

##### **WARNING**

**Improper cleaning methods and use of unauthorized cleaning liquids or solvents can injure personnel and damage equipment. To prevent this, refer to TM 9-247 for further instructions.**

a. General. Cleaning instructions will be the same for a majority of parts and components which make up the semitrailer. The following should apply to all cleaning operations:

(1) Clean all parts before inspection, after repair, and before assembly.

(2) Keep hands free of grease which can collect dust, dirt, and grit.

(3) After cleaning, all parts should be covered or wrapped to protect them from dust and dirt. Parts that are subject to rust should be lightly oiled.

##### b. Steam Cleaning.

(1) Before steam cleaning exterior of semitrailer, protect all electrical equipment which could be damaged by steam or moisture.

(2) Place disassembled parts in a suitable container to steam clean. Parts that are subject to rust should be dried and lightly oiled after cleaning.

##### c. Castings, Forgings, and Machined Metal Parts.

##### **WARNING**

**Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.**

(1) Clean inner and outer surfaces with dry cleaning solvent (Item 16, Appendix E).

(2) Remove grease and accumulated deposits with a wire brush (Item 4, Appendix E).

##### **WARNING**

**Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.**

(3) Clear all threaded holes with compressed air to remove dirt and cleaning fluids.

##### **CAUTION**

**Do not wash oil seals, electrical cables, and flexible hoses with dry cleaning solvent or mineral spirits. Serious damage or destruction of material would result.**

d. Oil Seals, Electrical Cables, and Flexible Hose. Wash electrical cables and flexible hose with a solution of dishwashing compound (Item 7, Appendix E) and water and wipe dry.

e. Bearings. Clean bearings in accordance with TM 9-214.

#### 4-18. INSPECTION INSTRUCTIONS.

##### NOTE

**All damaged areas should be marked for repair or replacement.**

- a. All components and parts must be carefully checked to determine if they are serviceable for use, can be repaired, or must be scrapped.
- b. Inspect drilled and tapped (threaded) holes for the following:
  - (1) Wear, distortion, cracks, and any other damage in or around holes.
  - (2) Threaded areas for wear distortion (stretching), and evidence of cross-threading.
- c. Inspect metal lines, flexible lines (hoses), and metal fittings for the following:
  - (1) Metal lines for sharp kinks, cracks, bad bends, and dents.
  - (2) Flexible lines for fraying, evidence of leakage, and loose metal fittings or connectors.
  - (3) Metal fittings and connectors for thread damage and worn or rounded hex heads.
- d. Inspect castings, forgings, and machined metal parts for the following:
  - (1) Machined surfaces for nicks, burrs, raised metal, wear, and other damage.
  - (2) Inner and outer surfaces for breaks and cracks.
- e. Inspect air lines, fittings, and connectors for leaks by coating them with a solution of dishwashing compound (Item 7, Appendix E) and water (para 4-40), No leakage is permissible.
- f. Inspect bearings in accordance with TM 9-214.

#### 4-19. REPAIR INSTRUCTIONS.

- a. Repair casting, forgings, and machined metal parts using the following instructions:
  - (1) Repair minor cracked casting or forgings in accordance with TM 9-237.
  - (2) Repair minor damage to machined surfaces with a fine mill file or an abrasive cloth (Item 5, Appendix E) dipped in dry cleaning solvent (Item 16, Appendix E).
  - (3) Replace any deeply nicked machined surface that could affect the assembly operation.
  - (4) Repair minor damage to threaded capscrew holes with thread tap of same size to prevent cutting oversize.
- b. After repair, clean all parts thoroughly to prevent dirt, metal chips, or other foreign material from entering any working parts.

#### 4-20. TAGGING WIRES AND HOSES.

- a. As soon as first wire or hose is disconnected, write number "1" on two tags. Secure one tag to wire or hose and other tag to terminal, nipple, or fitting. After disconnecting second wire or hose, write number "2" on two tags. Secure one tag to wire or hose, and second tag to terminal, nipple, or fitting. Do the same for all hoses and fittings.
- b. Note which numbers you used, in pencil, on art In manual. This will help you accurately retag, if tags are removed to perform cleaning and maintenance work.
- c. Remove all tags when finished.



**Section VI. ELECTRICAL SYSTEM MAINTENANCE**

Paragraph Title	Page Number
Blackout Stoplight Maintenance (Early Model) . . . . .	4-28
Clearance Marker Light Maintenance . . . . .	4-23
Composite Stoplight-taillight Maintenance (Late Model) . . . . .	4-30
Electrical Tube and Wiring Replacement . . . . .	4-36
Intervehicular Cable Receptacle Maintenance . . . . .	4-42
Stoplight-taillight Maintenance (Early Model) . . . . .	4-26
Storage Battery and Battery Cables Maintenance . . . . .	4-32
Wiring Diagrams . . . . .	4-44
Wiring Repair . . . . .	4-38

**4-21. CLEARANCE MARKER LIGHT MAINTENANCE.**

*This Task Covers:*

- |            |                 |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

*Initial Setup:*

**Equipment Conditions:**

- Intervehicular cable disconnected from semitrailer (para 2-12).-

**Tools/TestEquipment:**

- General mechanic's tool kit

---

**4-21. CLEARANCE MARKER LIGHT MAINTENANCE (Con't).**

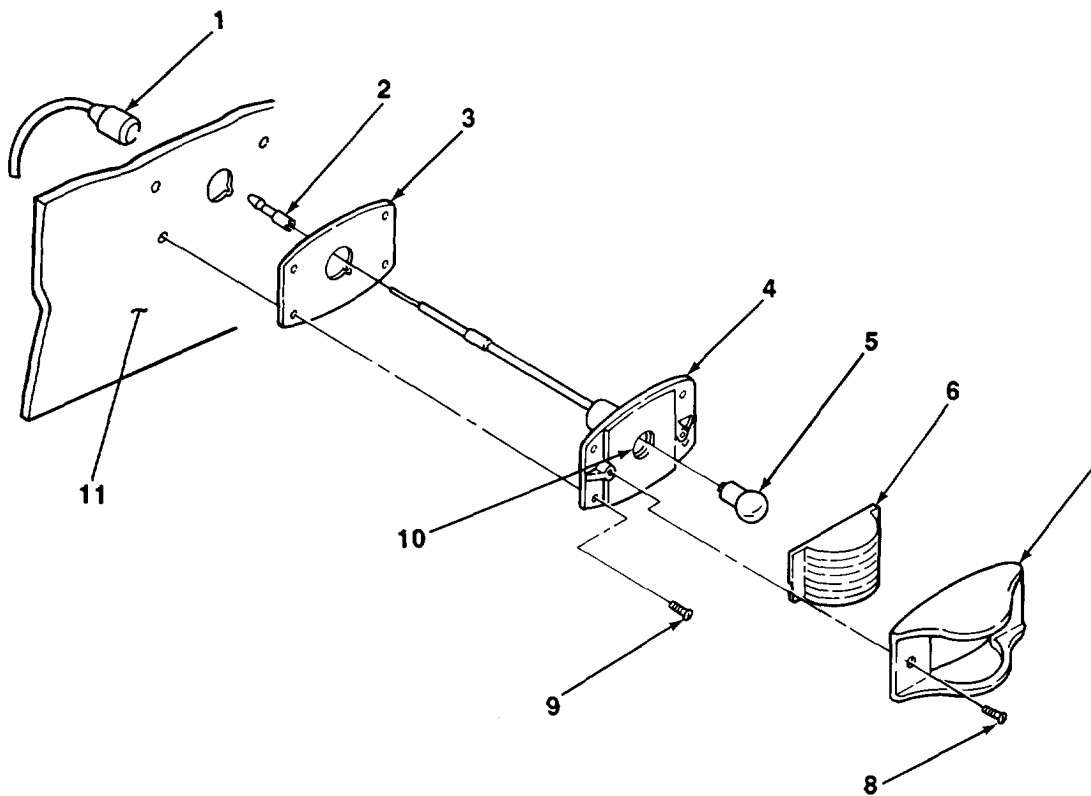
---

**a. REMOVAL**

**NOTE**

**If removing lamp only, perform steps 1 and 2.**

1. Remove two screws (8) and door (7) from base (4). Remove lens (6) from door.
2. Remove lamp (5) from socket (10) by pushing lamp in and turning counterclockwise.
3. Remove four screws (9) and pull base (4) out of frame (11).
4. Disconnect plug connectors (1 and 2).
5. Remove base (4) and pad (3) from frame (11).



**b. INSTALLATION**

**NOTE**

**if installing lamp only, perform steps 3 and 4.**

1. Position pad (3) on base (4) and connect plug connectors (1 and 2).
2. Install pad (3) and base (4) on frame (11) with four screws (9).

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---

**4-21. CLEARANCE MARKER LIGHT MAINTENANCE (Con't).**

---

3. Install lamp (5) in socket (10) by pushing lamp in and turning clockwise.
4. Position lens (6) in door (7) and install door on base (4) with two screws (8).

**FOLLOW-ON TASKS:**

- Connect intervehicular cable to semitrailer (para 2-10).
- Check operation of light.

---

**4-22. STOPLIGHT-TAILLIGHT MAINTENANCE (EARLY MODEL).**

---

*This Task Covers:*

- |                     |                 |
|---------------------|-----------------|
| a. Lamp Replacement | c. Installation |
| b. Removal          |                 |
- 

*Initial Setup:*

**Equipment Conditions:**

- Intervehicular cable disconnected from semitrailer (para 2-12).

**Materials/Parts:**

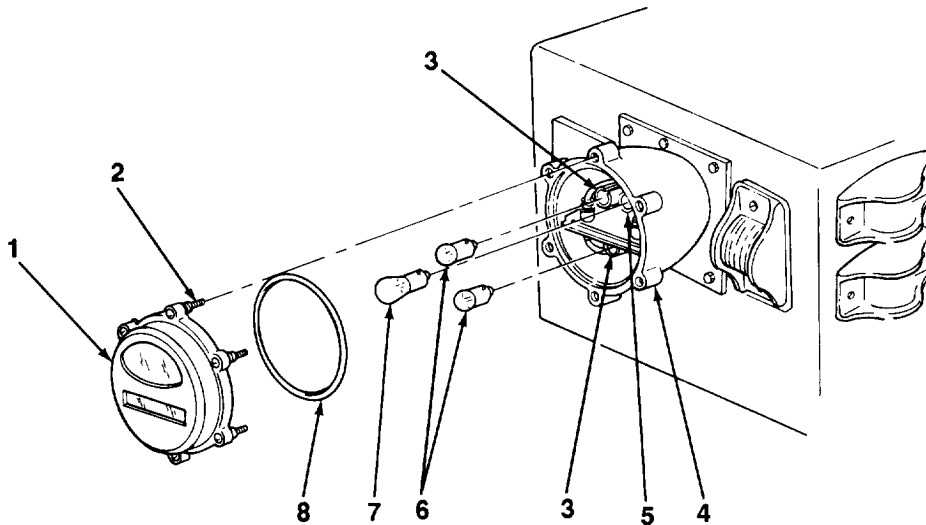
- Marker tags (Item 17, Appendix E)
- Ten lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**a. LAMP REPLACEMENT**

1. Loosen six screws (2) and remove door (1) from body (4).
2. Inspect preformed packing (8) for damage. If damaged, remove and discard.
3. Remove two lamps (6) and lamp (7) from sockets (3) and socket (5) by pushing lamps in and turning counterclockwise.



4. install two lamps (6) and lamp (7) in sockets (3) and socket (5) by pushing lamps in and turning clockwise.
5. If removed, install new preformed packing (8) in door (1).
6. Install door (1) to body (4) and tighten six screws (2).

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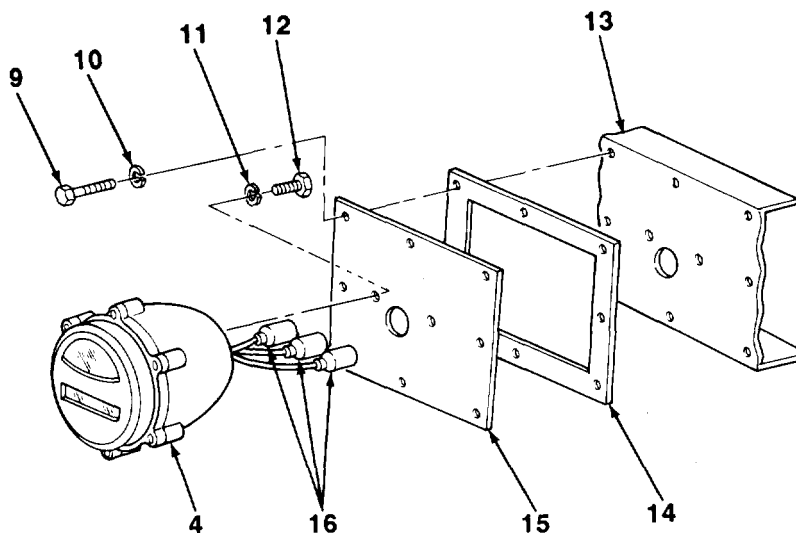
---

**4-22. STOPLIGHT-TAILLIGHT MAINTENANCE (EARLY MODEL) (Con't).**


---

**b. REMOVAL**

1. Remove eight screws (9), lockwashers (10), plate (15), and gasket (14) from frame (13). Discard lockwashers.
2. Tag wires for installation if identification bands are missing or not legible (para 4-20).
3. Disconnect three plug connectors (16) from wiring harness plug connectors.
4. Remove two bolts (12), lockwashers (11), and body (4) from plate (15). Discard lockwashers.

**c. INSTALLATION**

1. Install body (4) on plate (15) with two new lockwashers (11) and bolts (12).
2. Connect three plug connectors (16) to wiring harness plug connectors.
3. Install gasket (14) and plate (15) on frame (13) with eight new lockwashers (10) and screws (9).

**FOLLOW-ON TASKS:**

- Connect intervehicular cable to semitrailer (para 2-10).
- Check operation of light.

---

#### 4-23. BLACKOUT STOPLIGHT MAINTENANCE (EARLY MODEL).

---

*This Task Covers:*

- a. Lamp Replacement
  - b. Removal
  - c. Installation
- 

*Initial Setup:*

**Equipment Condtions:**

- Intervehicular cable disconnected from semitrailer (para 2-12).

**Materials/Parts:**

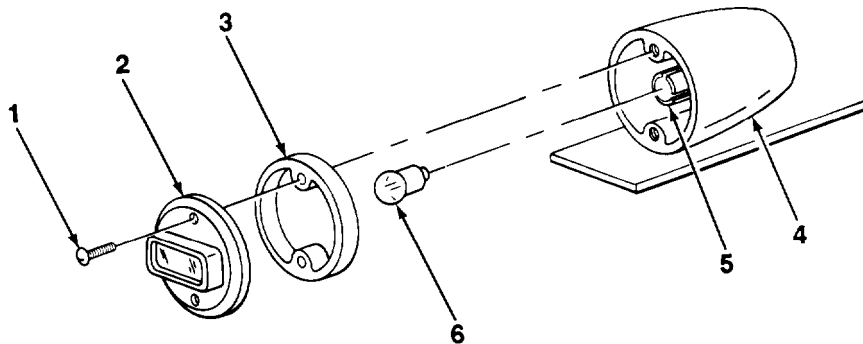
- \*Five lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

#### **a . LAMP REPLACEMENT**

1. Remove two screws (1) and door (2) from housing (4).
2. Inspect gasket (3) for damage. If damaged, remove and discard.
3. Remove lamp (6) from socket (5) by pushing lamp in and turning counterclockwise.
4. Install lamp (6) in socket (5) by pushing lamp in and turning clockwise.
5. If removed, install new gasket (3) in door (2).
6. Install door (2) on housing (4) with two screws (1).



#### **b . REMOVAL**

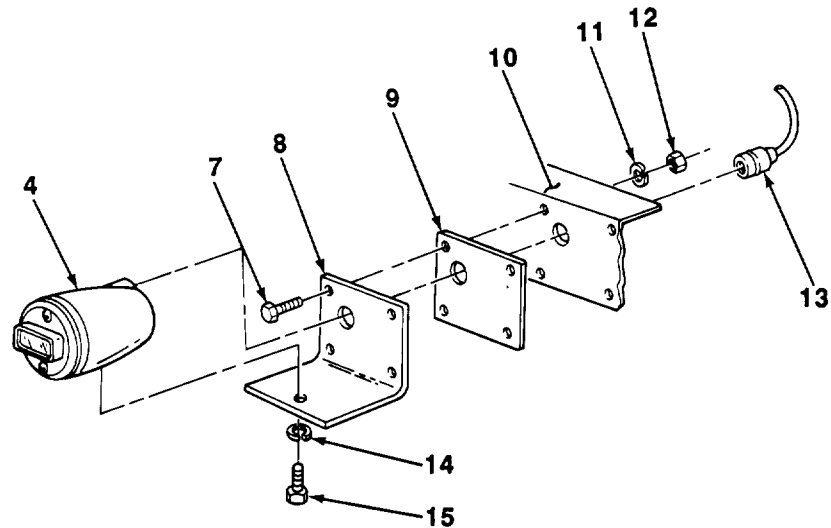
1. Remove four nuts (12), lockwashers (11), screws (7), bracket (8), and gasket (9) from frame (10), Discard lockwashers.
2. Disconnect plug connector (13) from housing (4).
3. Remove bolt (15), lockwasher (14), and housing (4) from bracket (8). Discard lockwasher.

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**4-23. BLACKOUT STOPLIGHT MAINTENANCE (EARLY MODEL) (Con't).**


---




---

**c. INSTALLATION**


---

1. Install housing (4) on bracket (8) with new lockwasher (14) and bolt (15).
2. Connect plug connector (13) to housing (4).
3. Install gasket (9) and bracket (8) on frame (10) with four screws (7), new lockwashers (11), and nuts (12).

**FOLLOW-ON TASKS:**

- Connect intervehicular cable to semitrailer (para 2-10).
- Check operation of light.

---

## 4-24. COMPOSITE STOPLIGHT-TAILLIGHT MAINTENANCE (LATE MODEL).

---

*This Task Covers:*

- |                     |                 |
|---------------------|-----------------|
| a. Lamp Replacement | c. Installation |
| b. Removal          |                 |
- 

*Initial Setup:*

### Equipment Conditions:

- Intervehicular cable disconnected from semitrailer (para 2-12).

### Materials/Parts:

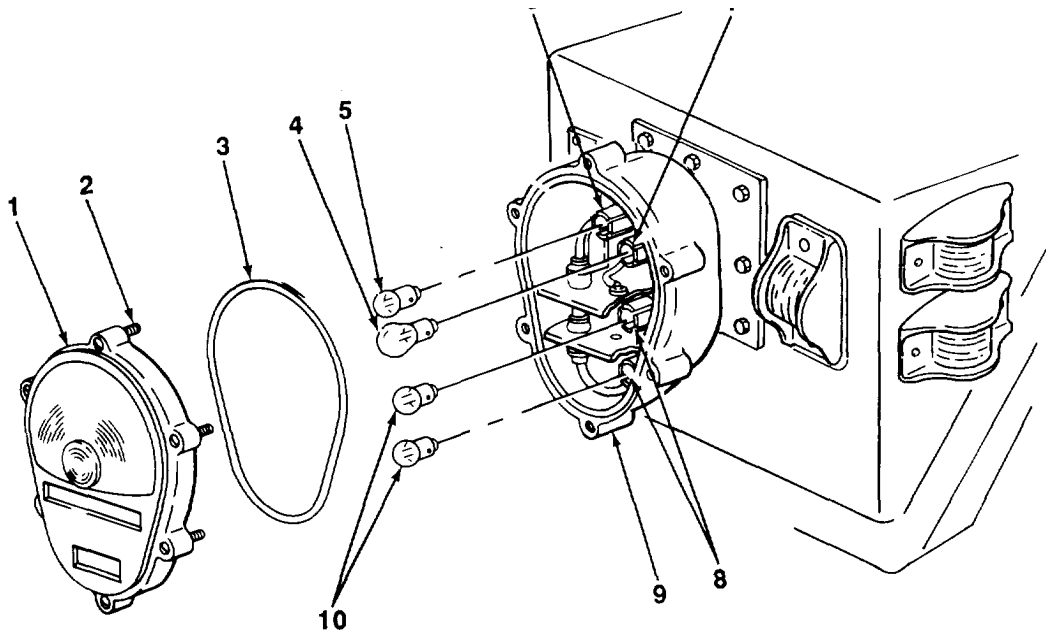
- Marker tags (Item 17, Appendix E)
- Two lockwashers

### Tools/Test Equipment

- General mechanic's tool kit
- 

#### a. LAMP REPLACEMENT

1. Loosen six screws (2) and remove lens (1) from body (9).
2. Inspect preformed packing (3) for damage. If damaged, remove and discard.
3. Remove four lamps (4, 5, and 10) from sockets (6, 7, and 8) by pushing lamps in and turning counterclockwise.
4. Install four lamps (4, 5, and 10) in sockets (6, 7, and 8) by pushing lamps in and turning clockwise.
5. If removed, install new preformed packing (3) in lens (1).
6. Install lens (1) on body (9) and tighten six screws (2).





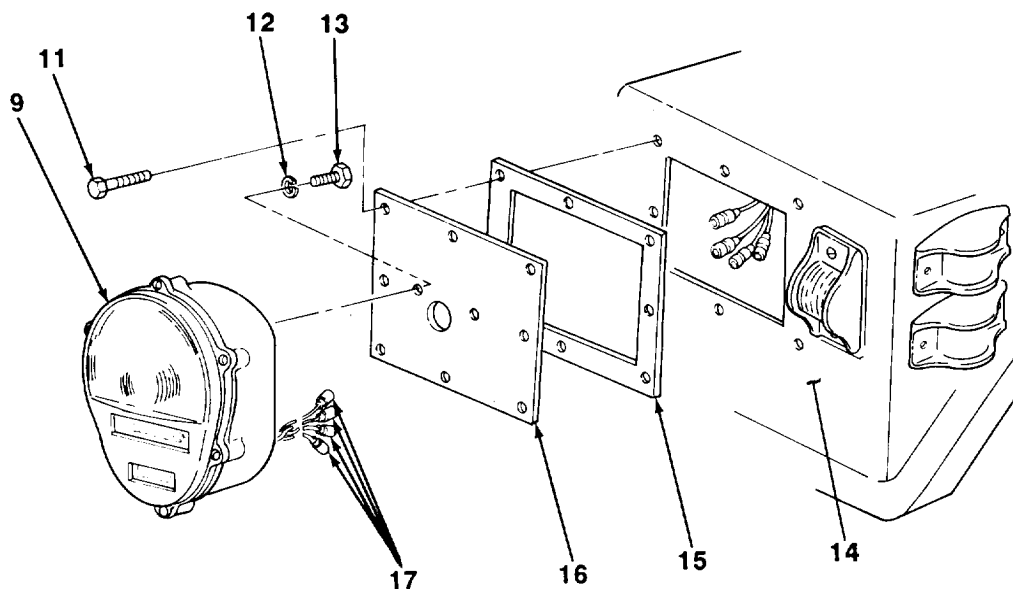
---

**4-24. COMPOSITE STOPLIGHT-TAILLIGHT MAINTENANCE (LATE MODEL) (Con't).**


---

**b. REMOVAL**

1. Remove seven screws (11), plate (16), and gasket (15) from body (14).
2. Tag wires for installation if identification bands are missing or not legible (para 4-20).
3. Disconnect four plug connectors (17) from wiring harness plug connectors.
4. Remove two screws (13), lockwashers (12), and body (9) from plate (16). Discard lockwashers.


**c. INSTALLATION**

1. Install body (9) on plate (16) with two new lockwashers (12) and screws (13).
2. Connect four plug connectors (17) to wiring harness plug connectors.
3. Install gasket (15) and plate (16) on body (14) with seven screws (11).

**FOLLOW-ON TASKS:**

- Connect intervehicular cable to semitrailer (para 2-10).
- Check operation of light.

---

## 4-25. STORAGE BATTERY AND BATTERY CABLES MAINTENANCE.

---

*This Task Covers:*

- |            |                 |
|------------|-----------------|
| a. Removal | c. Installation |
| b. Service |                 |
- 

*Initial Setup:*

**Equipment Conditions:**

- Intervehicular cable disconnected from semitrailer (para 2-12).

**Materials/Parts:**

- Four lockwashers

**Tool/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**References:**

- TM 9-6140-200-14
- 

**WARNING**

- **Battery acid (electrolyte) is extremely dangerous. Always wear goggles and rubber gloves when performing battery checks or inspections. Serious injury to personnel will result if battery acid contacts skin or eyes.**
- **DO NOT perform battery system checks or inspections while smoking or near fire, flames, or sparks. Batteries may explode, causing serious injury or death to personnel.**
- **Remove all jewelry such as dog tags, rings, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery terminal, a direct short will result, causing serious injury or death to personnel.**

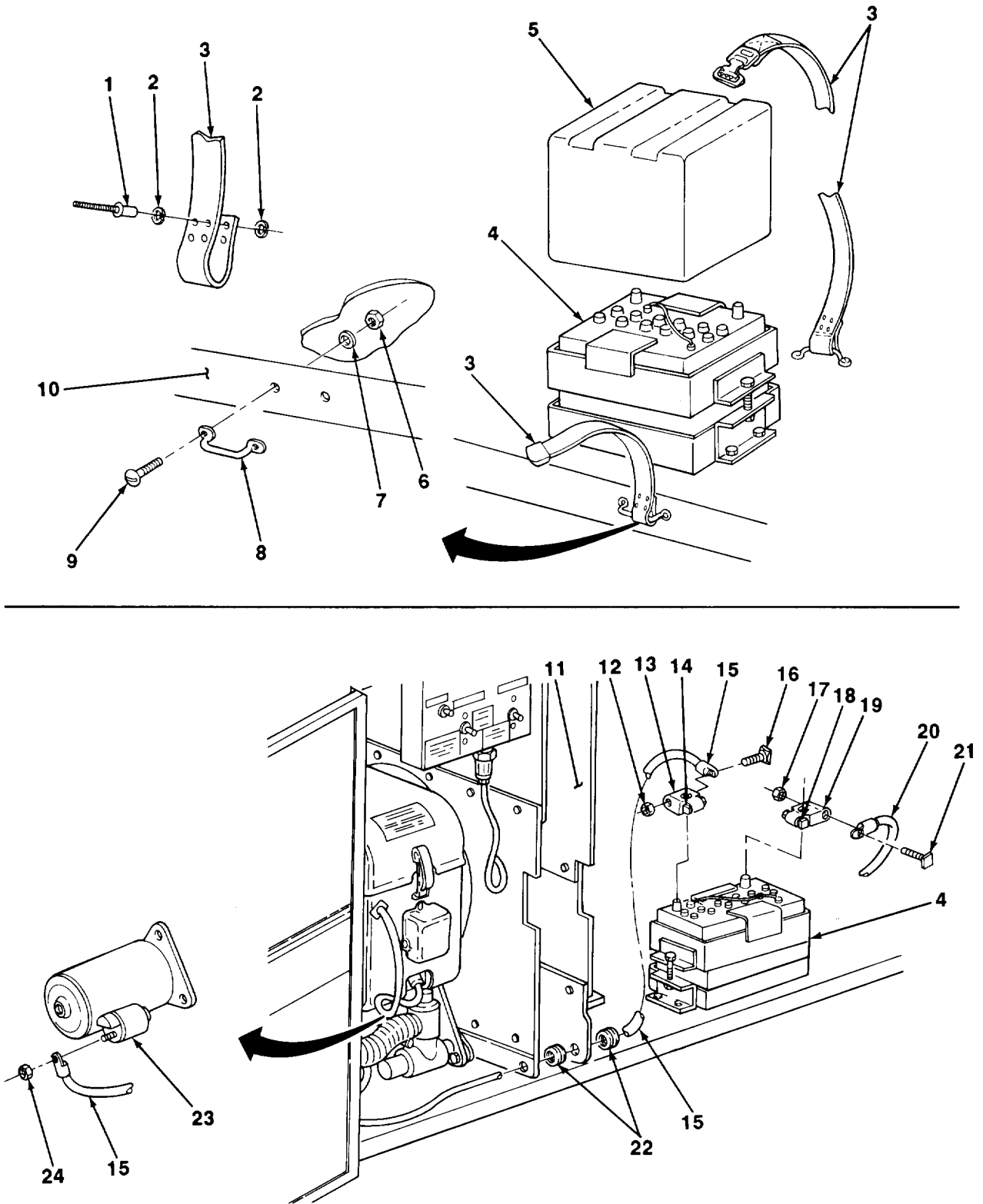
**a. REMOVAL**

**NOTE**

**Steps 1 through 3 apply only to M131A5.**

1. Unfasten two straps (3) and remove battery cover (5) from battery (4).
2. If strap (3) or loop (8) is damaged, remove two locknuts (6), washers (7), screws (9), loop, and strap from cabinet (10). Discard locknuts.
3. If damaged, remove two washers (2) and rivet (1) from strap (3). Discard rivet.
4. Loosen nut (18) and remove negative battery terminal (19) from battery (4).
5. Loosen nut (14) and remove positive battery terminal (13) from battery (4).
6. Remove nut (12), screw (16), and positive battery terminal (13) from positive cable (15).
7. Remove nut (17), screw (21), and negative battery terminal (19) from negative cable (20).
8. Remove nut (24) and positive cable (15) from starter solenoid (23). Remove cable and two grommets (22) from firewall (11).

4-25. STORAGE BATTERY AND BATTERY CABLES MAINTENANCE (Con't).



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**4-25. STORAGE BATTERY AND BATTERY CABLES MAINTENANCE (Con't).**

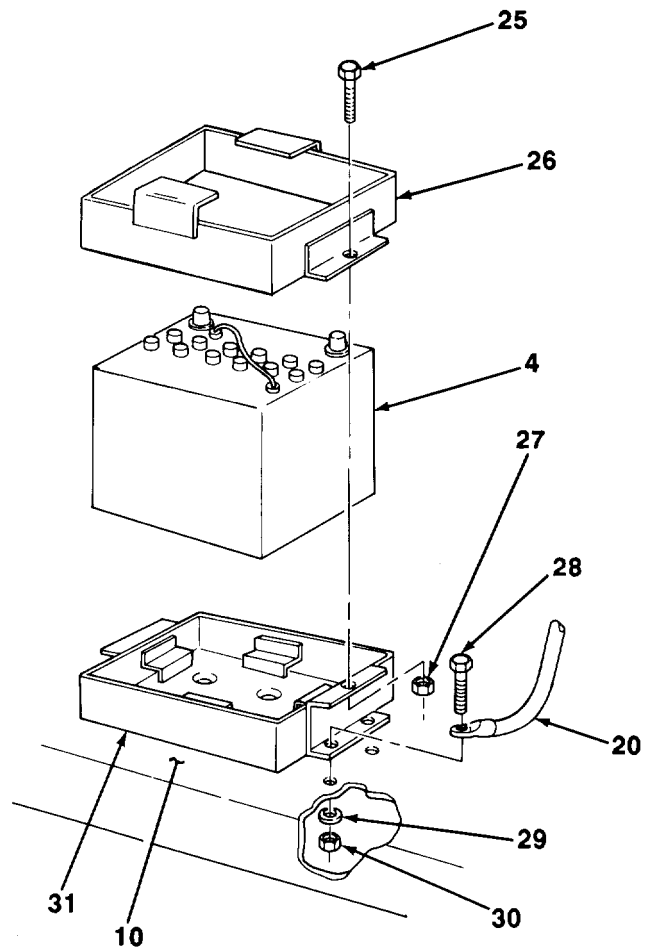
9. Remove two nuts (27), screws (25), frame (26), and battery (4) from rack (31).
10. Remove four nuts (30), lockwashers (29), screws (28), negative cable (20), and rack (31) from cabinet (10). Discard lockwashers.

**b. SERVICE**

Refer to TM 9-6140-200-14 for instructions on servicing battery.

**c. INSTALLATION**

1. Install rack (31) and negative cable (20) on cabinet (10) with four screws (28), new lockwashers (29), and nuts (30).
2. Position battery (4) in rack (31) and install frame (26) on rack with two screws (25) and nuts (27).
3. Install positive cable (15) on starter solenoid (23) with nut (24).
4. Install two grommets (22) in firewall (11). Thread positive cable (15) through firewall.
5. Install negative battery terminal (19) on negative cable (20) with screw (21) and nut (17).
6. Install positive battery terminal (13) on positive cable (15) with screw (16) and nut (12).
7. Position positive battery terminal (13) on positive post of battery (4) and tighten nut (14).
8. Position negative battery terminal (19) on negative post of battery (4) and tighten nut (18).

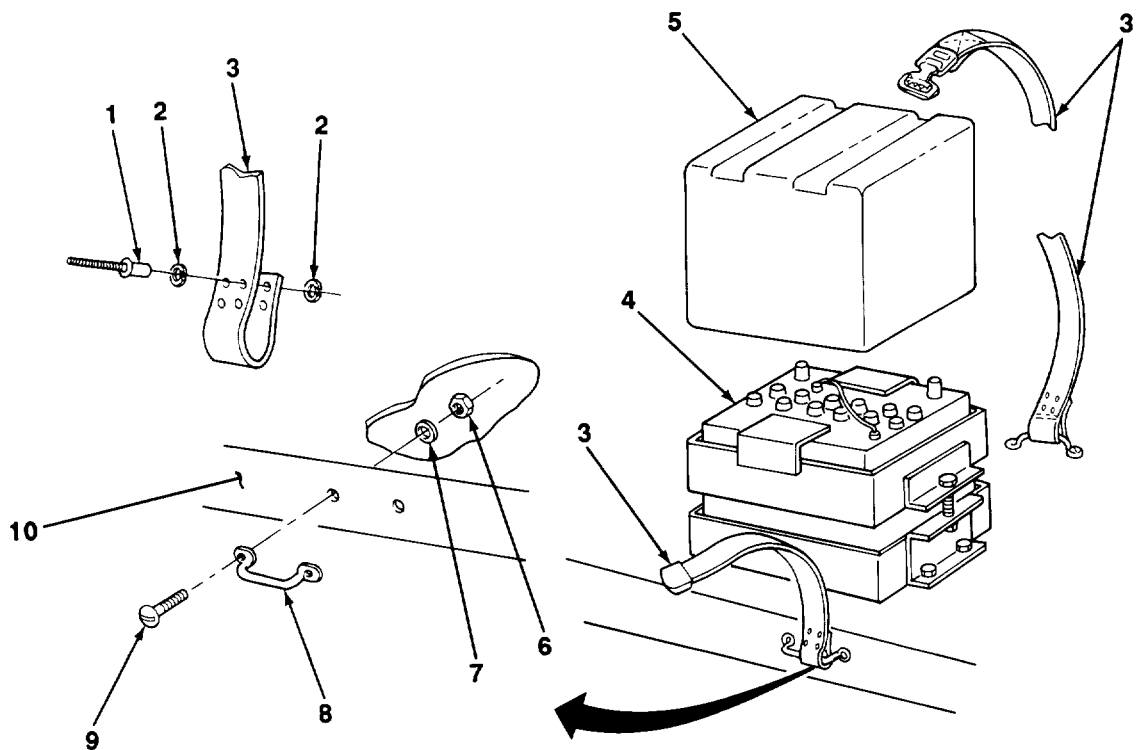
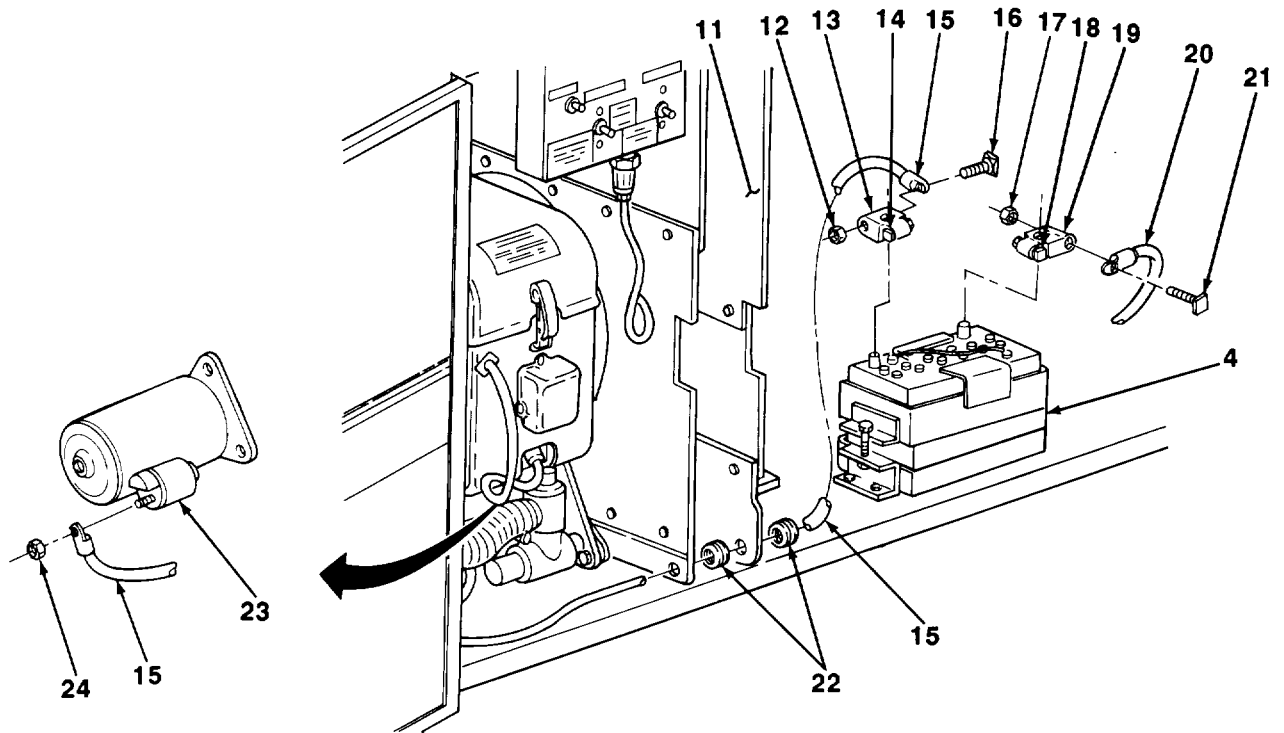


**NOTE**

**Steps 9 through 11 apply only to M131A5.**

9. if removed, install strap (3) to loop (8) with new rivet (1) and two washers (2).
10. if removed, install loop (8) and strap (3) on cabinet (10) with two screws (9), washers (7), and new locknuts (6).
11. Position battery cover (5) on battery (4) and fasten two straps (3).

4-25. STORAGE BATTERY AND BATTERY CABLES MAINTENANCE (Con't).



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---

## 4-26. ELECTRICAL TUBE AND WIRING REPLACEMENT.

---

This Task Covers: Replacement

---

*Initial Setup:*

**Equipment Conditions:**

- Intervehicular cable disconnected from semitrailer (para 2-12).

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

### REPLACEMENT

#### NOTE

**Electrical tube and wire replacement is the same for all tubes and wires except quantity of clips may vary.**

1. Remove nosebox cover (para 4-28).
2. Disconnect plug connectors from lights (para 4-21,4-22,4-23, or 4-24).
3. Disconnect wiring harness at opposite end of harness.
4. Remove plug connectors from both ends of wiring harness (para 4-27).

#### CAUTION

**Use caution when removing electrical tubing at straps. Straps should be lifted gently and only enough to release electrical tubing. Improper handling of straps will cause them to break.**

5. Gently lift straps (4) and release electrical tube (3). If two or more consecutive straps are missing or damaged, notify Direct Support Maintenance.
6. Remove two jamnuts (1) from connectors (2).
7. Remove electrical tube (3) and two connectors (2) from semitrailer.
8. Lay electrical tube (3) on work surface.
9. Connect old wiring harness and new wiring harness together by twisting old wires to new wires.
10. Pull old wiring harness out and new wiring harness into electrical tube until new wiring harness is in place.
11. Transfer identification bands from old wires to new wires (para 4-27).
12. Disconnect and discard old wiring harness from new wiring harness.
13. Position two connectors (2) and electrical tube (3) on semitrailer.
14. Install two jamnuts (1) on connectors (2).

#### WARNING

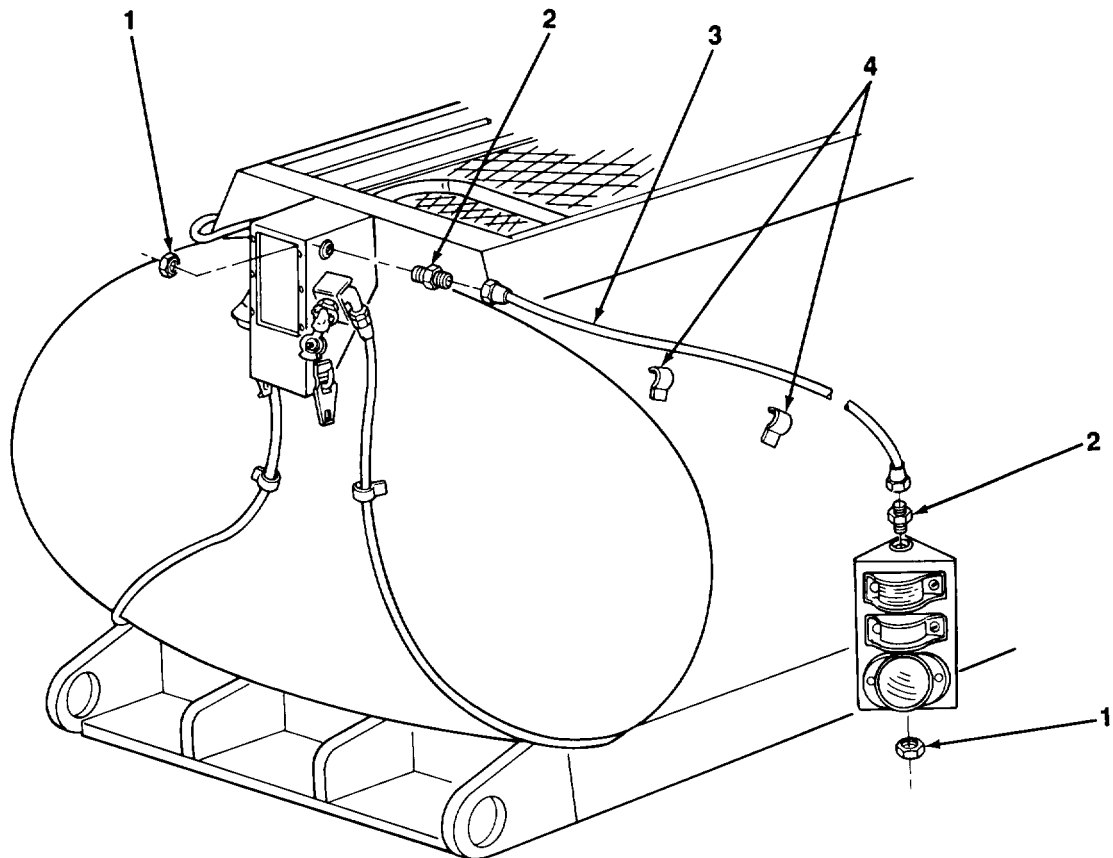
**Use caution when installing electrical tubing at straps. When securing electrical tubing under straps, a soft-faced hammer should be used to tap straps back into place. improper handling of straps will cause them to break.**

15. Install electrical tube (3) in straps (4). Gently bend straps over electrical tube.

---

**4-26. ELECTRICAL TUBE AND WIRING REPLACEMENT (Con't).**


---



16. Install plug connectors on each end of wiring harness (para 4-27).
17. Connect plug connectors to lights (para 4-21, 4-22, 4-23, or 4-24), and to wiring harness at opposite end.

**FOLLOW-ON TASKS:**

- Connect intervehicular cable to semitrailer (para 2-10).
- Check operation of lights.

---

## 4-27. WIRING REPAIR.

---

*This Task Covers:*

- |                                    |                            |
|------------------------------------|----------------------------|
| a. Identification Band Replacement | d. Female Connector Repair |
| b. Terminal Replacement            | e. Plug Assembly Repair    |
| c. Male Connector Repair           | f. Receptacle Repair       |
- 

*Initial Setup:*

### Equipment Conditions:

- InterVehicular cable disconnected from semitrailer (para 2-12).

### Tools/Test Equipment:

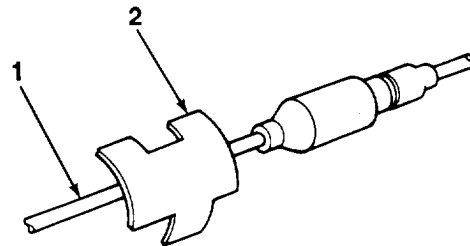
- General mechanic's tool kit
- Common no. 1 shop set

### Materials/Parts:

- Solder (item 15, Appendix E)
  - Contacts (as required)
  - identification bands (as required)
  - Terminal assemblies (as required)
  - Terminals (as required)
- 

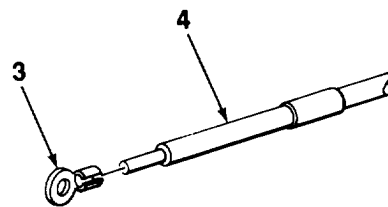
### **a. IDENTIFICATION BAND REPLACEMENT**

1. Remove identification band (2) from wire lead (1) and discard.
2. Mark new identification band (2) with proper identification number.
3. Position new identification band (2) on wire lead (1) and bend tabs over wire lead.



### **b. TERMINAL REPLACEMENT**

1. Cut terminal (3) off wire lead (4) and discard.
2. Strip insulation off wire lead (4) equal to depth of new terminal (3).
3. Position new terminal (3) on wire lead (4). Crimp terminal.



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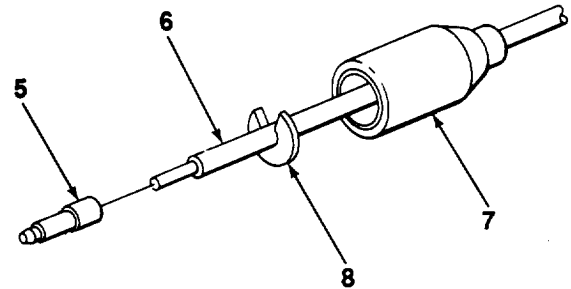
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**4-27. WIRING REPAIR (Con't).**


---

**c. MALE CONNECTOR REPAIR**

1. Slide shell (7) back and remove washer (8) from wire lead (6). Cut contact (5) from wire lead and discard. Remove shell.
2. Strip insulation off wire lead (6) equal to depth of new contact (5).
3. Slide shell (7) on wire lead (6).
4. Position new contact (5) on wire lead (6) and crimp.
5. Position washer (8) on wire lead (6). Slide shell (7) over washer and contact (5).

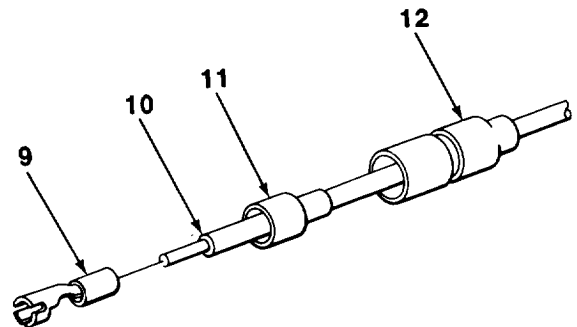



---

**d. FEMALE CONNECTOR REPAIR**


---

1. Slide connector (12) and insulator (11) back and cut terminal assembly (9) from wire lead (10). Discard terminal assembly.
2. Remove insulator (11) and connector (12) from wire lead (10).
3. Strip insulation off wire lead (10) equal to depth of new terminal assembly (9).
4. Slide connector (12) and insulator (11) on wire lead (10).
5. Position new terminal assembly (9) on wire lead (10) and crimp.
6. Slide insulator (11) and connector (12) over terminal assembly (9).



---

4-27. WIRING REPAIR (Con't).

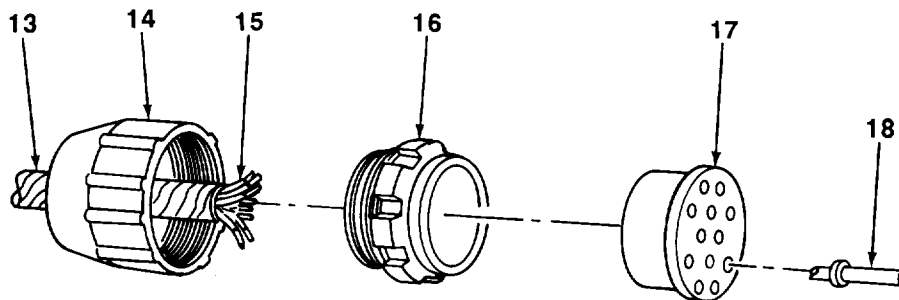
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**e. PLUG ASSEMBLY REPAIR**

**NOTE**

**Male and female inserts are replaced the same way. This procedure covers male insert replacement.**

1. Remove coupling nut (16) from grommet retaining nut (14).
2. Remove grommet (17) from coupling nut (16). Cut insert (18) from wire (15). Discard insert.
3. Remove grommet (17), coupling nut (16), and grommet retaining nut (14) from cable (13).
4. Strip insulation off wire (15) equal to depth of new insert (18).



5. Thread cable (13) through grommet retaining nut (14), coupling nut (16), and grommet (17).
6. Position new insert (18) on wire (15) and solder.
7. Press grommet (17) into coupling nut (16) until seated.
8. Install coupling nut (16) on grommet retaining nut (14).

**f. RECEPTACLE REPAIR**

**NOTE**

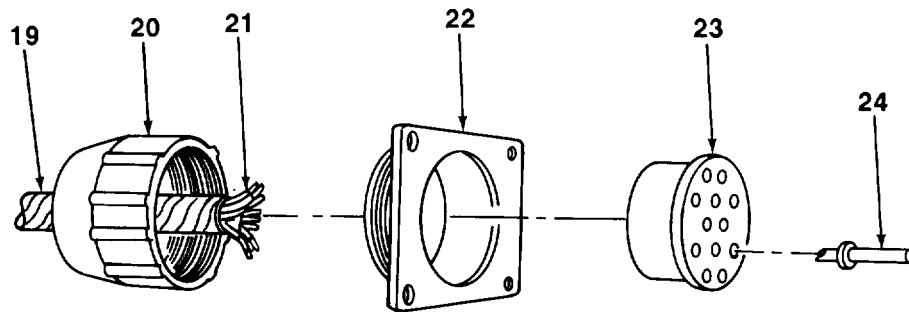
**Male and female inserts are replaced the same way. This procedure covers male insert replacement.**

1. Remove receptacle (22) from grommet retaining nut (20).
2. Remove grommet (23) from receptacle (22). Cut insert (24) from wire (21). Discard insert.
3. Remove grommet (23), receptacle (22), and grommet retaining nut (20) from cable (19).

---

**4-27. WIRING REPAIR (Con't).**

---



4. Strip insulation off wire (21) equal to depth of new insert (24).
5. Thread cable (19) through grommet retaining nut (20), receptacle (22), and grommet (23).
6. Position new insert (24) on wire (21) and solder.
7. Press grommet (23) into receptacle (22) until seated.
8. Install receptacle (22) on grommet retaining nut (20).

**FOLLOW-ON TASKS:**

- Connect intervehicular cable to semitrailer (para 2-10).
- Check operation of lights.

---

## 4-28. INTERVEHICULAR CABLE RECEPTACLE MAINTENANCE.

---

*This Task Covers:*

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

*Initial Setup:*

**Equipment Conditions:**

- Intervehicular cable disconnected from semitrailer (para 2-12).

**Materials/Parts:**

- Marker tags (item 17, Appendix E)
- One gasket
- Four locknuts

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

### **a. REMOVAL**

1. Remove six screws (1) and nosebox cover (2) from nosebox (3).
2. Tag wires for installation if identification bands are missing or not legible (para 4-20).
3. Disconnect seven plug connectors (7).
4. Remove two locknuts (5), ground leads (6), and screws (10) from receptacle (9). Discard locknuts.
5. Remove two locknuts (4), screws (11), receptacle (9), and gasket (8) from nosebox (3). Discard locknuts and gasket.

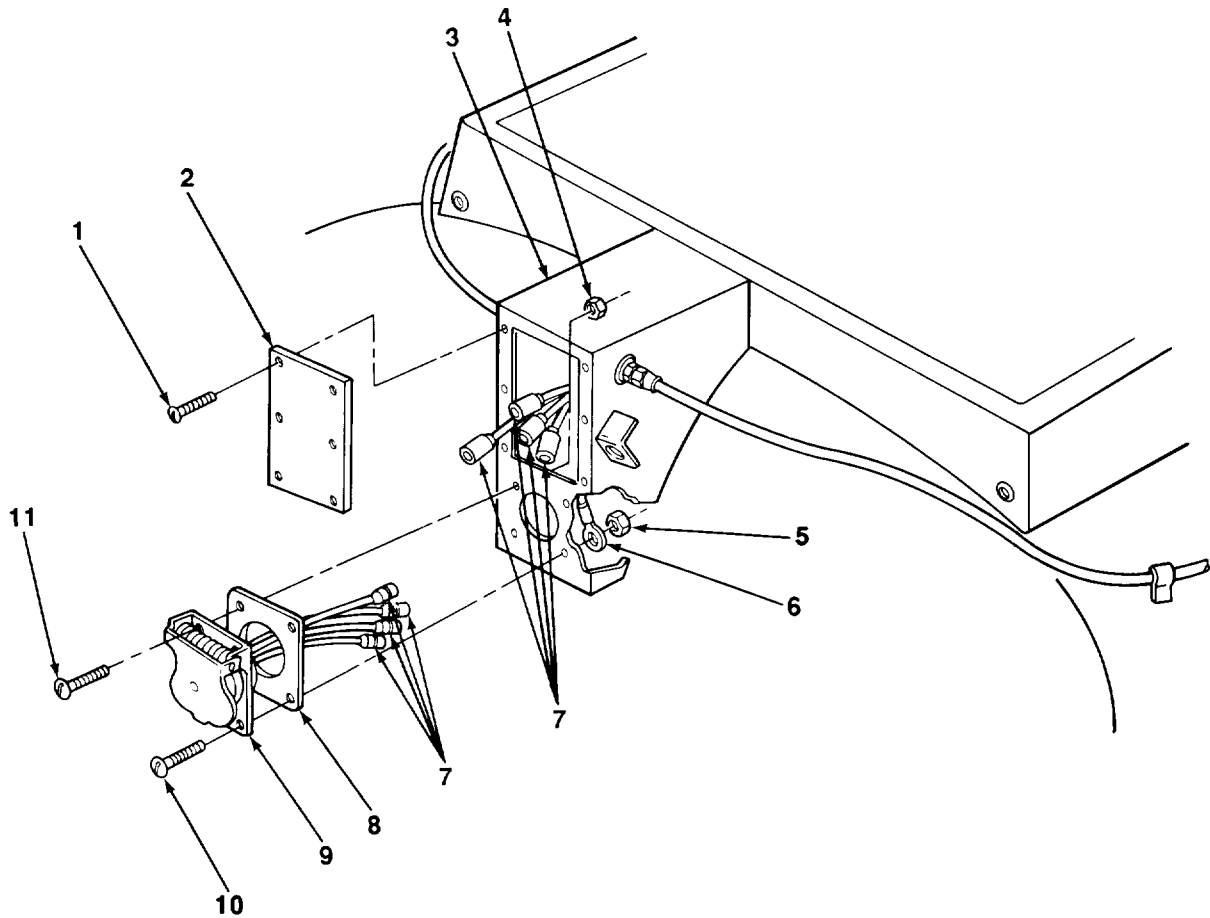
### **b. REPAIR**

For repair of receptacle refer to paragraph 4-27.

### **c. INSTALLATION**

1. Install new gasket (8) and receptacle (9) on nosebox (3) with two screws (11) and new locknuts (4).
2. Install two screws (10), ground leads (6), and new locknuts (5) on receptacle (9).
3. Connect seven plug connectors (7).
4. Install nosebox cover (2) on nosebox (3) with six screws (1).

4-28. INTERVEHICULAR CABLE RECEPTACLE MAINTENANCE (Con't).



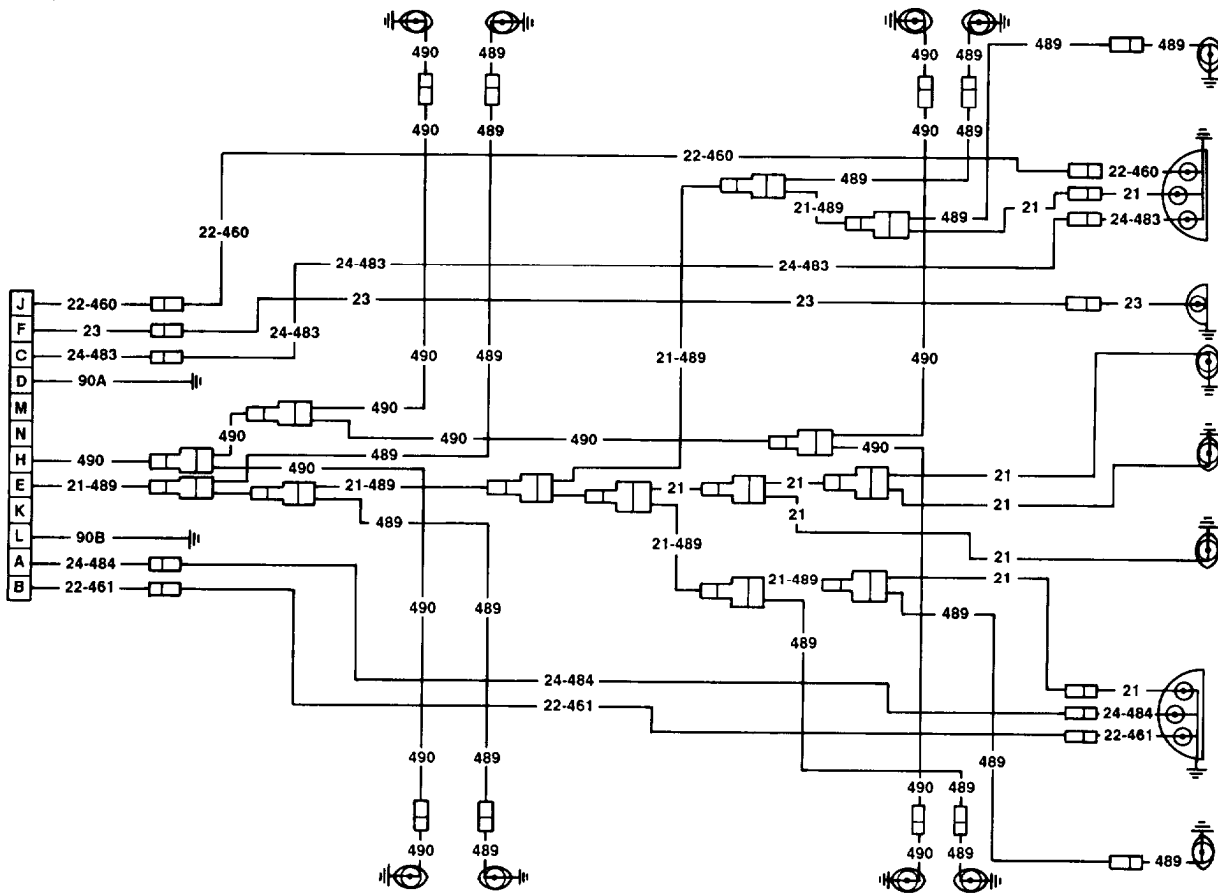
**FOLLOW-ON TASKS:**

- Connect intervehicular cable to semitrailer (para 2-10).
- Check operation of lights.

4-29. WIRING DIAGRAMS.

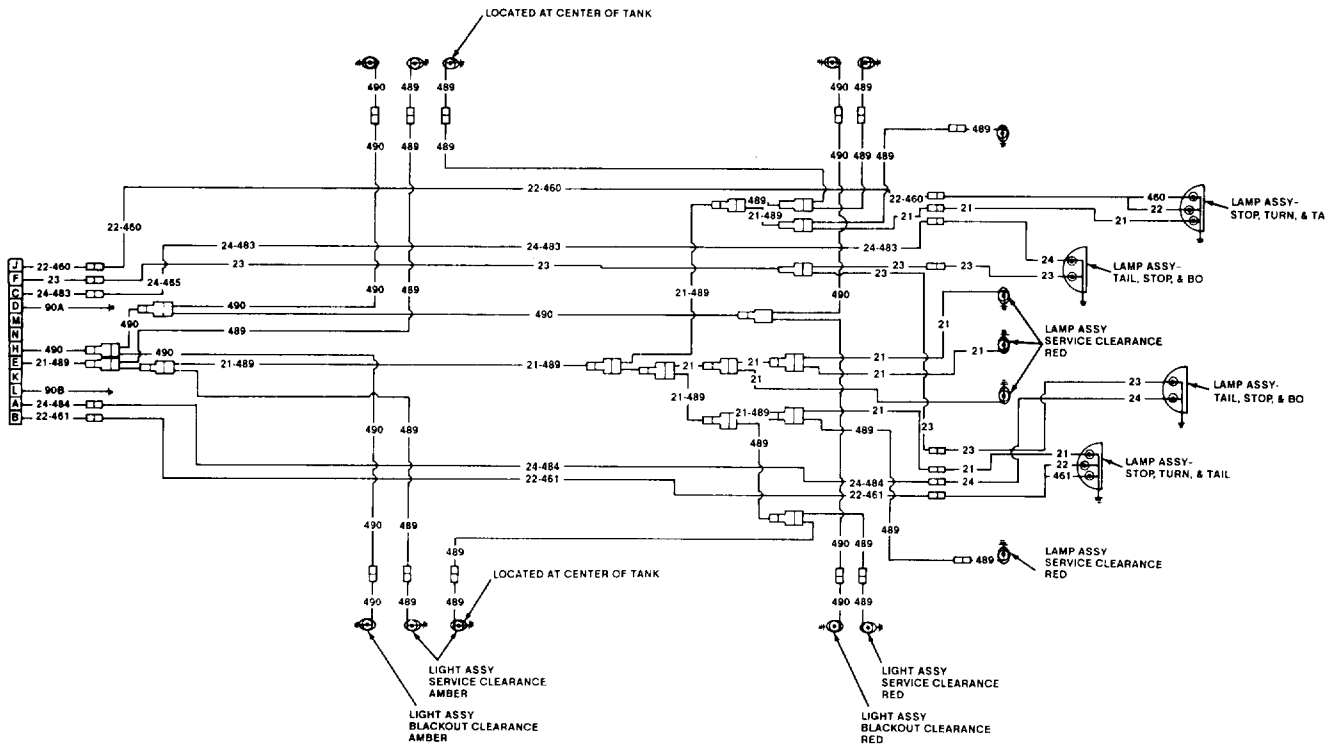
NOTE

This paragraph contains the semitrailer wiring diagrams. Refer to these diagrams when performing electrical troubleshooting and when performing electrical repair and maintenance.

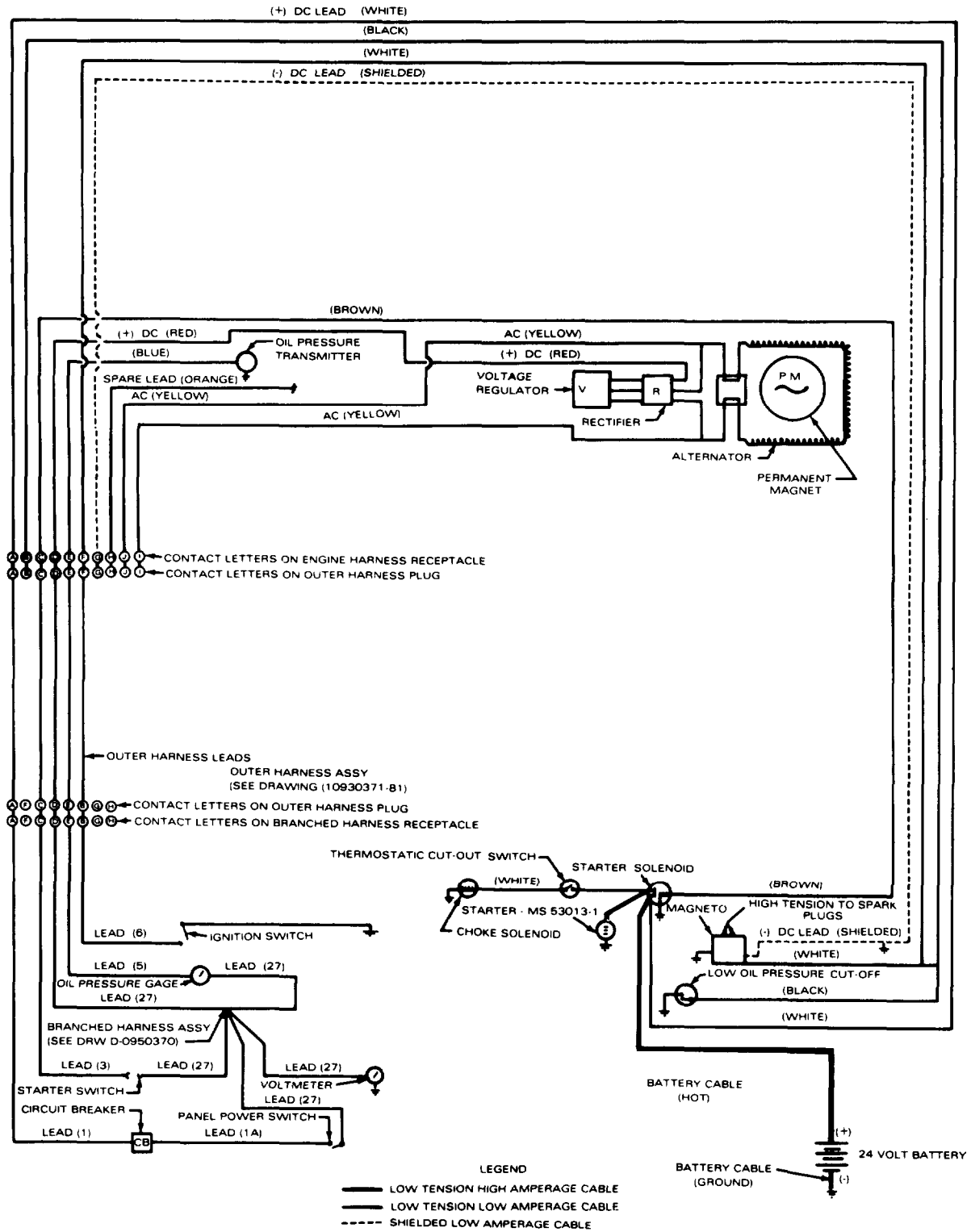


M131A4 AND M131A4C

4-29. WIRING DIAGRAMS (Con't).



4-29. WIRING DIAGRAMS (Con't).



AUXILIARY ENGINE AND CONTROL CIRCUIT

TA702715



**Section VII. BRAKE SYSTEM MAINTENANCE**

Paragraph Title	Page Number
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**4-30. SERVICE BRAKE MAINTENANCE.**

*This Task Covers:*

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>a. Disassembly</li> <li>b. Cleaning and Inspection</li> </ul> | <ul style="list-style-type: none"> <li>c. Assembly</li> </ul> |
|--|---|

*Initial Setup:*

**Equipment Conditions:**

- Hub and brakedrum removed (para 4-44).
- Hydraulic line disconnected from backing plate, If removing backing plate (para 4-34).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set
- Brakeshoeretum spring remover

**Materials/Parts:**

- Dry cleaning solvent (item 16, Appendix E)
- One brakeshoe parts kit
- Two lockwashers
- Four cotter pins
- Ten locknuts

4-30. SERVICE BRAKE MAINTENANCE (Con't).

a. DISASSEMBLY

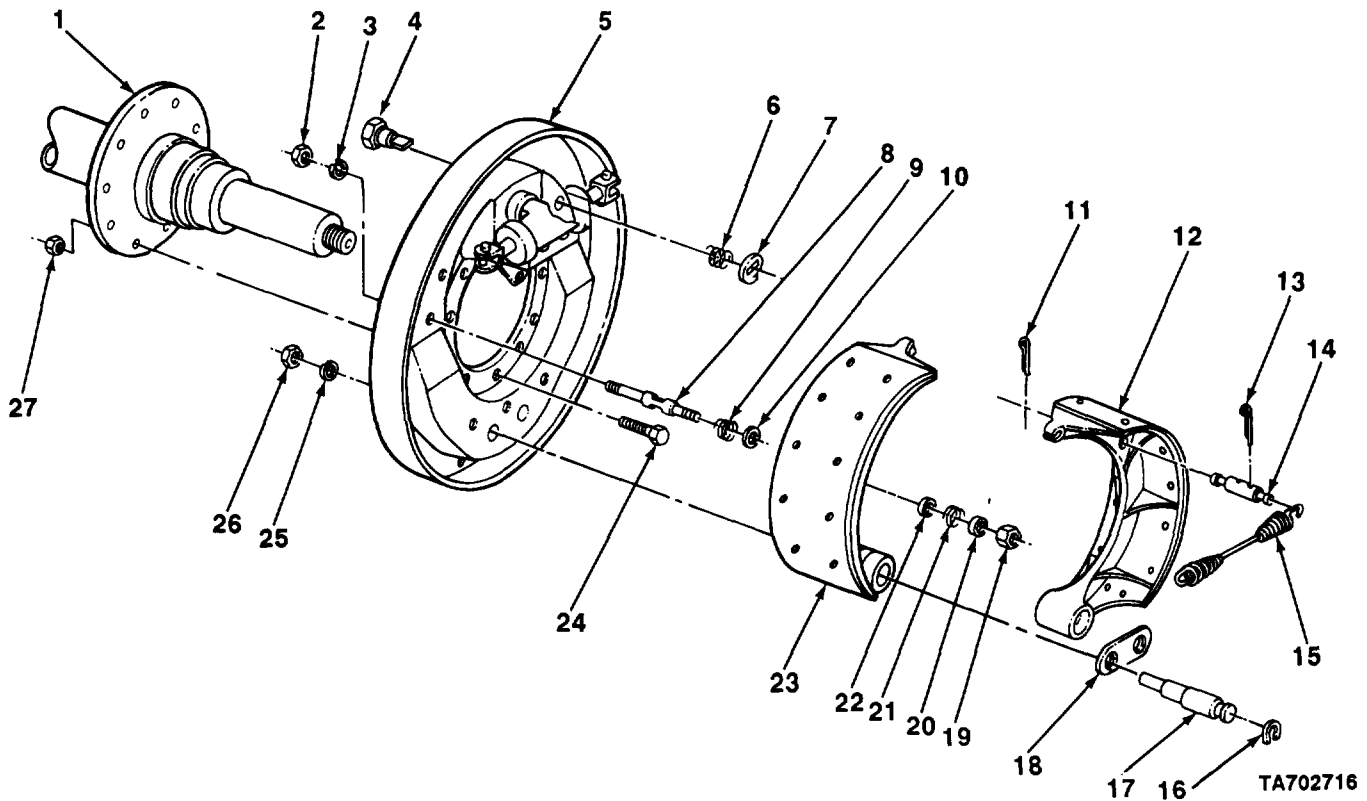
**WARNING**

DO NOT handle brakeshoes, brakedrums, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if you touch it or breathe it. Wear an approved filter mask and gloves. Never use compressed air or a dry brush to clean brake components. Dust may be removed using an Industrial-type vacuum cleaner. Clean dust or mud away from brake components with water and a wet, soft brush or cloth. Failure to follow this warning may result in serious illness or death to personnel.

**NOTE**

If removing brakeshoes only, perform steps 1 through 5.

1. Remove return spring (15) from brakeshoes (12 and 23).
2. Remove two cotter pins (13) from shoulder pins (14). Discard cotter pins.
3. Remove and discard two locknuts (19), washers (20), springs (21), and washers (22) from brakeshoes (12 and 23) and guide pins (8).
4. Remove two slotted washers (16) and link (18) from brakeshoes (12 and 23) and shoulder pins (17).



#### 4-30. SERVICE BRAKE MAINTENANCE (Con't).

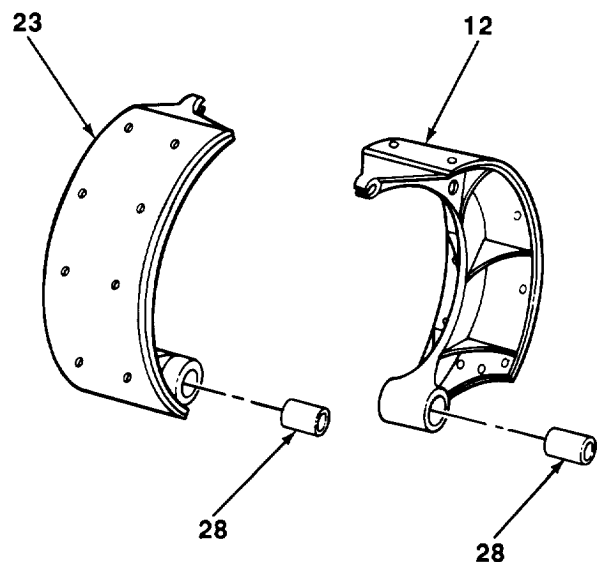
5. Remove brakeshoes (12 and 23) from backing plate (5).
6. Remove and discard two washers (10) and springs (9) from guide pins (8).
7. Remove and discard two nuts (2), lockwashers (3), and guide pins (8) from backing plate (5).
8. Remove two nuts (26), lockwashers (25), and shoulder pins (17) from backing plate (5). Discard lockwashers.
9. Remove two cotter pins (11) and shoulder pins (14) from adjusting cams (7). Remove two adjusting cams, springs (6), and shoulder pins (4) from backing plate (5). Discard cotter pins.
10. Remove ten locknuts (27), screws (24), and backing plate (5) from axle (1). Discard locknuts.

#### b. CLEANING AND INSPECTION

##### WARNING

- **DO NOT** handle brakeshoes, brakedrums, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if you touch it or breathe it. Wear an approved filter mask and gloves. Never use compressed air or a dry brush to clean brake components. Dust may be removed using an Industrial-type vacuum cleaner. Clean dust or mud away from brake components with water and a wet, soft brush or cloth. Failure to follow this warning may result in serious illness or death to personnel.
- Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and **DO NOT** breathe vapors. **DO NOT** use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean all parts with dry cleaning solvent. Dry thoroughly.
2. Inspect all parts for damage. Replace any damaged parts.
3. Inspect brakeshoe surfaces for cracks, distortion, and excessive wear. Brakeshoe linings should have a minimum thickness of 1/32 in. (0.79 mm) above rivet heads. Replace brakeshoes if brake-shoe lining thickness is less than 1/32 in. (0.79 mm) above rivet heads.
4. Measure inside diameter of two bushings (28) in brakeshoes (12 and 23). Remove bushing and discard if inside diameter exceeds 1 13/32 in. (3.6 cm).



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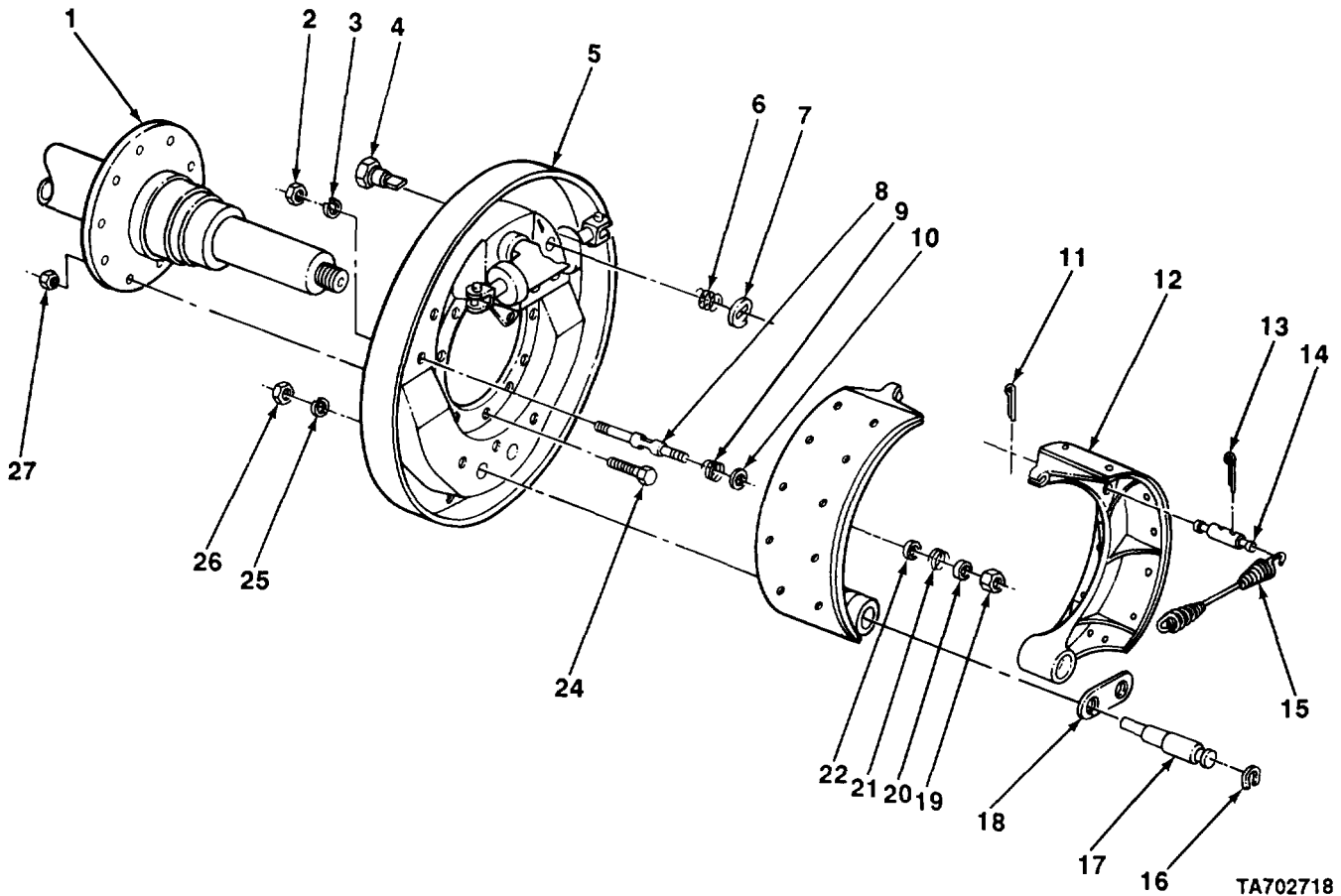
4-30. SERVICE BRAKE MAINTENANCE (Con't).

**c. ASSEMBLY**

**NOTE**

- If Installing brakeshoes only, perform steps 6 through 10.
- If backing plate is being replaced, a new dust cover must be installed.

1. Position backing plate (5) on axle (1) and Install ten screws (24) and new locknuts (27).
2. Install two shoulder pins (4), springs (6), and adjusting cams (7) on backing plate (5). Install two shoulder pins (14) on adjusting cams with two new cotter pins (11).
3. Install two shoulder pins (17) on backing plate (5) with two new lockwashers (25) and nuts (26).
4. Install two new guide pins (8) on backing plate (5) with two new lockwashers (3) and new nuts (2).
5. Install two new springs (9) and new washers (10) on guide pins (8).
6. Install brakeshoes (12 and 23) on backing plate (5).
7. Install link (18) and two slotted washers (16) on shoulder pins (17).



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**4-30. SERVICE BRAKE MAINTENANCE (Con't).**

---

8. Install two new washers (22), new springs (21), new washers (20), and new locknuts (19) on guide pins (8).
9. Install two new cotter pins (13) on shoulder pins (14),
10. Install return spring (15) on brakeshoes (12 and 23).

**FOLLOW-ON TASKS:**

- If disconnected, connect hydraulic line to backing plate (para 4-34).
- Install hub and brakedrum (para 4-44).
- Adjust service brakes (para 4-31).
- Bleed brakes (para 4-35).

---

## 4-31. SERVICE BRAKE ADJUSTMENT.

---

*This Task Covers:*

- a. Major Adjustment b. Minor Adjustment
- 

*Initial Setup:*

**Equipment Conditions:**

- Wheels removed (para 4-43).
- Air reservoir drained.

**Materials/Parts:**

- One lockwasher (major adjustment)

**Tools/Test Equipment:**

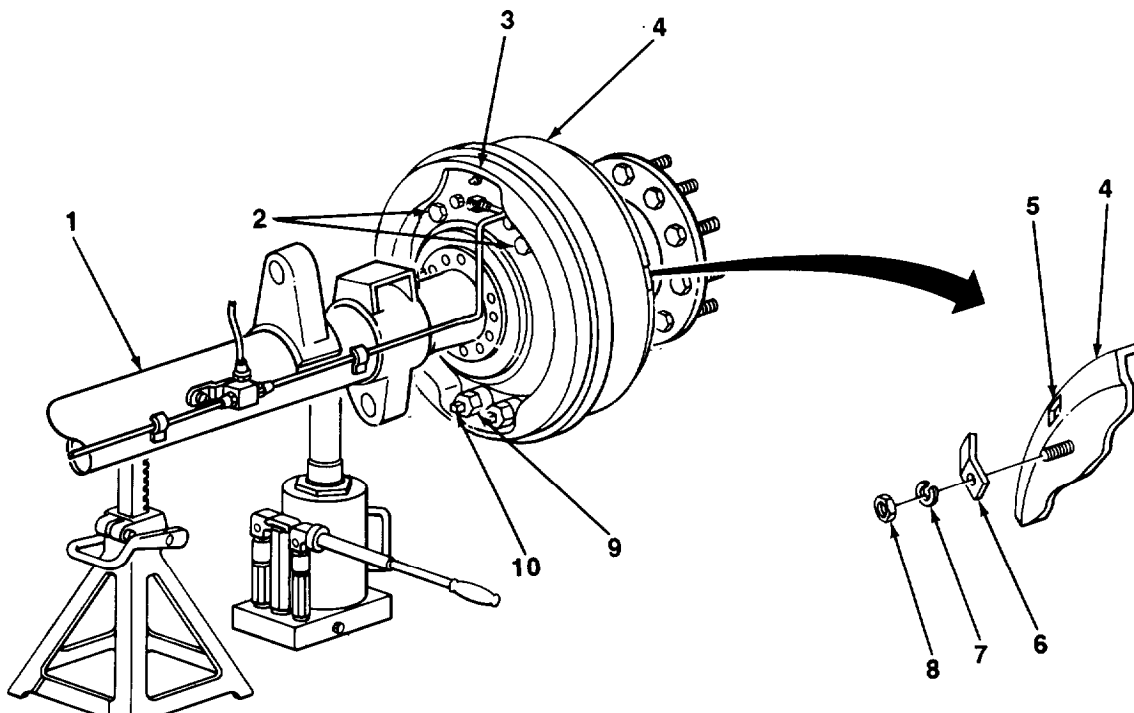
- General mechanic's tool kit
  - Common no. 1 shop set
- 

**a. MAJOR ADJUSTMENT**

**NOTE**

**Perform this adjustment at each wheel when new brakeshoes are installed.**

1. Raise axle (1) enough to allow wheel to turn freely, Support axle with jackstand.
2. Remove nut (8), lockwasher (7), and cover (6) from brakedrum (4). Discard lockwasher.
3. Rotate brakedrum (4) until inspection hole (5) is 1 ½ in. (3.8 cm) from anchor pin (10) and adjacent to rear brakeshoe.



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**4-31. SERVICE BRAKE ADJUSTMENT (Con't).**

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4. Loosen nut (9) on anchor pin (10).
5. Insert a 0.010 in. (0.25 mm) feeler gage in inspection hole (5) between brakeshoe lining and brakedrum (4).
6. Adjust brakeshoe by turning anchor pin (10) on backing plate (3) until a slight drag is felt with feeler gage. Remove feeler gage.
7. Rotate brakedrum (4) until inspection hole (5) is 1 ½ in. (3.8 cm) from adjusting stud (2) and adjacent to rear brakeshoe.
8. Insert a 0.020 in. (0.51 mm) feeler gage in inspection hole (5) between brakeshoe lining and brakedrum (4).
9. Adjust brakeshoe by turning adjusting stud (2) on backing plate (3) until a slight drag is felt with feeler gage. Remove feeler gage.
10. Tighten nut (9) on anchor pin (10).
11. Repeat steps 3 through 10 for front brakeshoe.
12. Install cover (6), new lockwasher (7), and nut (8) over inspection hole (5) on brakedrum (4).
13. Remove jackstand and lower axle (1).

---

**b. MINOR ADJUSTMENT**

---

**NOTE**

**Perform this adjustment at each wheel to compensate for normal brakeshoe lining wear.**

1. Raise axle (1) enough to allow wheel to turn freely. Support axle with jackstand.
2. Adjust brakeshoes by turning two adjusting studs (2) on backing plate (3) until a slight drag is felt when wheel is spun.
3. Back off adjustment until wheel turns freely.
4. Remove jackstand and lower axle (1).

**FOLLOW-ON TASKS:**

- Install wheels (para 4-43).

## 4-32. MASTER CYLINDER REPLACEMENT

*This Task Covers:*

- a. Removal b. Installation

*Initial Setup:*

### Equipment Conditions:

- Wheels chocked.
- Air reservoir drained.
- Airbrake chamber removed, if replacing bracket (para 4-38).

### Materials/Parts:

- Rags (Item 14, Appendix E)
- Two gaskets
- Three lockwashers

### Tools/Test Equipment:

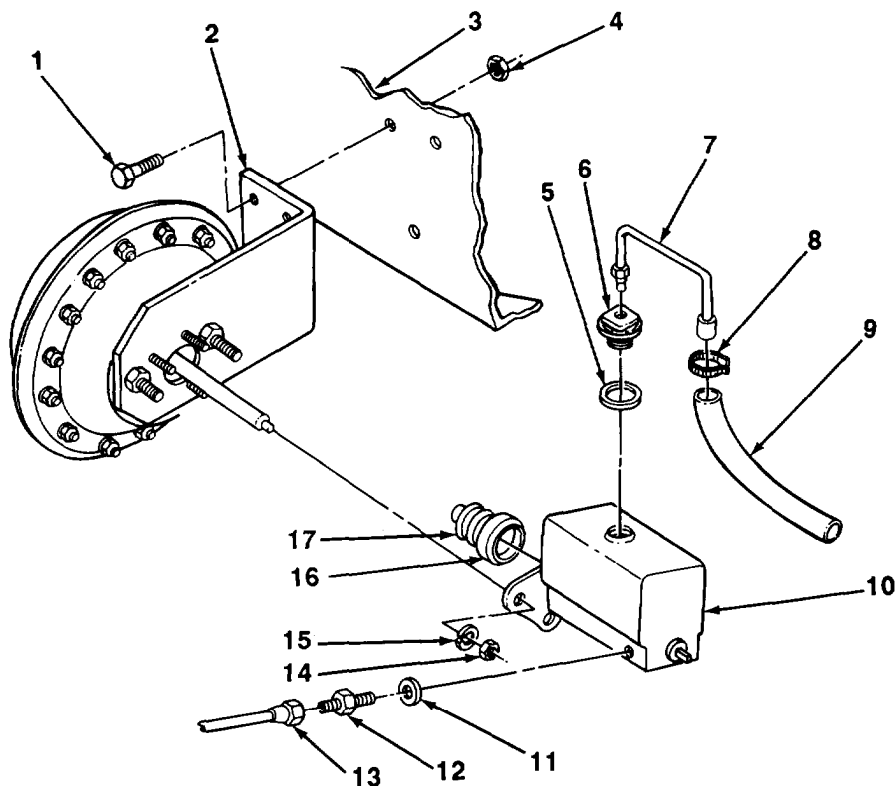
- General mechanic's tool kit
- Common no. 1 shop set

### a. REMOVAL

#### NOTE

A drain pan should be used to catch any draining brake fluid. Ensure that all spills are cleaned up.

1. Remove hose assembly (13), straight adapter (12), and gasket (11) from master cylinder (10). Discard gasket.
2. Remove three nuts (14), lockwashers (15), and master cylinder (10) from bracket (2). Discard lockwashers.



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**4-32. MASTER CYLINDER REPLACEMENT (Con't).**

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3. Remove retaining strap (16) and bellows (17) from master cylinder (10).
4. Loosen clamp (8) and remove hose (9) from vent tube (7).
5. Remove vent tube (7), filler cap (6), and gasket (5) from master cylinder (10). Discard gasket.
6. If bracket (2) is damaged, remove three locknuts (4), screws (1), and bracket from crossmember (3). Discard locknuts.

**b. INSTALLATION**

1. If removed, install bracket (2) on crossmember (3) with three screws (1) and new locknuts (4).
2. Install new gasket (5), filler cap (6), and vent tube (7) on master cylinder (10).

**NOTE**

**For information of manufacturing hose refer to Appendix F.**

3. Install hose (9) on vent tube (7) and tighten clamp (8).
4. Install bellows (17) and retaining strap (16) on master cylinder (10).
5. Position master cylinder (10) on bracket (2) and install three new lockwashers (15) and nuts (14).
6. Install new gasket (11), straight adapter (12), and hose assembly (13) on master cylinder (10).

**FOLLOW-ON TASKS:**

- Install airbrake chamber, if removed (para 4-38).
- Bleed brakes (para 4-35).

**4-33. WHEEL CYLINDER REPLACEMENT.**

*This Task Covers:*

- |            |                 |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

*Initial Setup:*

**Equipment Conditions:**

- Brakeshoes removed (para 4-30).

**Materials/Parts:**

- Rags (Item 14, Appendix E)
- Two lockwashers

**Tools/Test Equipment:**

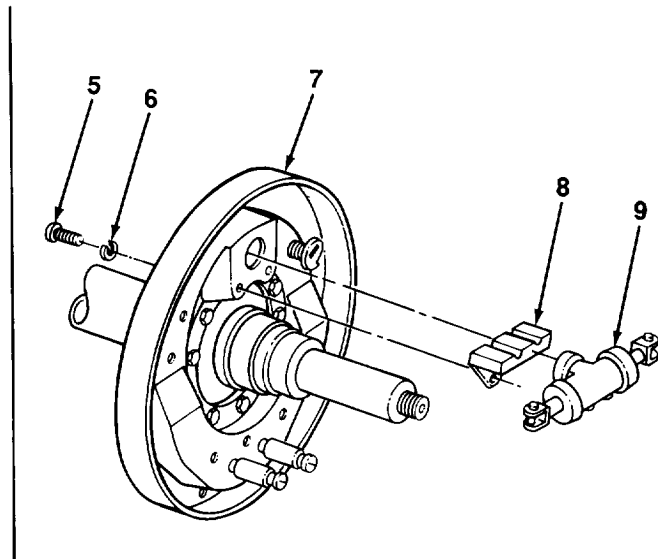
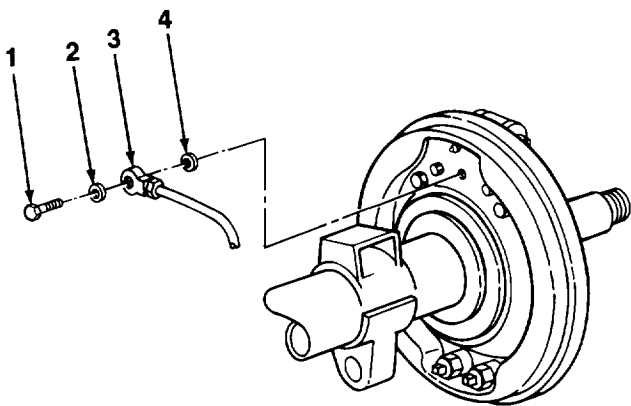
- General mechanic's tool kit
- Common no. 1 shop set

**a. REMOVAL**

**NOTE**

**A drain pan should be used to catch any draining brake fluid. Ensure that all spills are cleaned up.**

1. Remove fluid passage bolt (1s), flatwasher (2), and flatwasher (4) from connector (3) and wheel cylinder (9).
2. Remove two screws (5), lockwashers (6), wheel cylinder (9), and shield (8) from backing plate (7). Discard lockwashers.



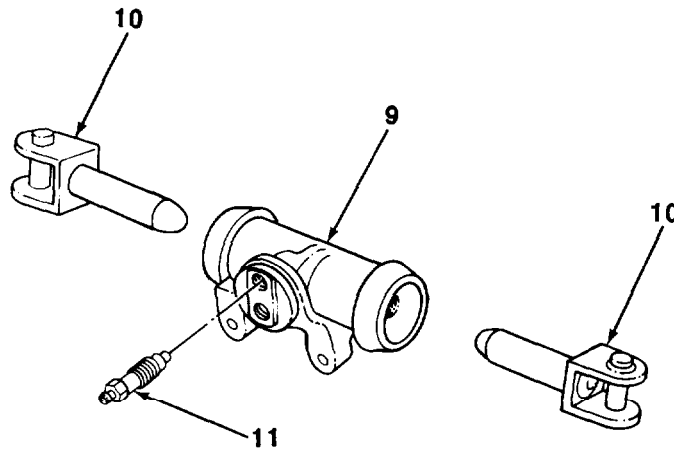
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**4-33. WHEEL CYLINDER REPLACEMENT (Con't).**

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3. Remove two links (10) from wheel cylinder (9).
4. Remove bleeder valve (11) from wheel cylinder (9).

**b. INSTALLATION**

1. Install bleeder valve (11) in wheel cylinder (9).
2. Install two links (10) on wheel cylinder (9).
3. Position shield (8) and wheel cylinder (9) on backing plate (7) and install two new lockwashers (6) and screws (5).
4. Install flatwasher (4), flatwasher (2), and fluid passage bolt (1) on connector (3) and wheel cylinder (9).

**FOLLOW-ON TASKS:**

- Install brakeshoes (para 4-30).
- Bleed brakes (para 4-35).



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**4-34. HYDRAULIC LINES, HOSES, AND FITTINGS REPLACEMENT (Con't).**

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**b. LINES AND AXLE MULTIPLE CONNECTOR REPLACEMENT**

---

**NOTE**

- A drain pan should be used to catch any draining brake fluid. Ensure that oil spills are cleaned up.

- This procedure covers right and left lines.

1. Disconnect two tube assemblies (4) from connectors (3) and multiple connector (9).
2. Remove two locknuts (5), clamps (6), and tube assemblies (4) from axle (10). Discard locknuts.
3. If connected, disconnect hose assembly (2) from multiple connector (9).
4. Remove locknut (8) and multiple connector (9) from axle (10). Discard locknut.
5. Install multiple connector (9) on axle (10) with new locknut (8). Connect hose assembly (2) to multiple connector.
6. Install two tube assemblies (4) on multiple connector (9).
7. Install two clamps (6) on tube assemblies (4) and axle (10) with two new locknuts (5).
8. Connect two tube assemblies (4) to connectors (3).

**FOLLOW-ON TASKS:**

- Bleed brakes (para 4-35).



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**4-35. BLEEDING HYDRAULIC BRAKE SYSTEM (Con't).**

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**b . PRESSURE BLEEDING****NOTE**

- Perform this task at each wheel cylinder.
  - Ensure that fluid level in master cylinder is within  $\frac{1}{2}$  in. (13 mm) from top.
  - A drain pan should be used to catch any draining brake fluid. Ensure that all spills are cleaned up.
1. Connect pressure bleeder to master cylinder. Pressure bleeder should contain 10-20 psi (69-138 kPa).
  2. Bleed hydraulic brake system by performing MANUAL BLEEDING except manual operation of brake pedal and replenishing of brake fluid are not required.

**FOLLOW-ON TASKS:**

- Uncouple semitrailer from towing vehicle (manual bleeding) (para 2-12).

---

## 4-36. AIR COUPLING REPLACEMENT.

---

*This Task Covers:*

- a. Removal b. Installation
- 

*Initial Setup:*

**Equipment Conditions:**

- Semitrailer uncoupled from towing vehicle (para 2-12).

**Materials/Parts:**

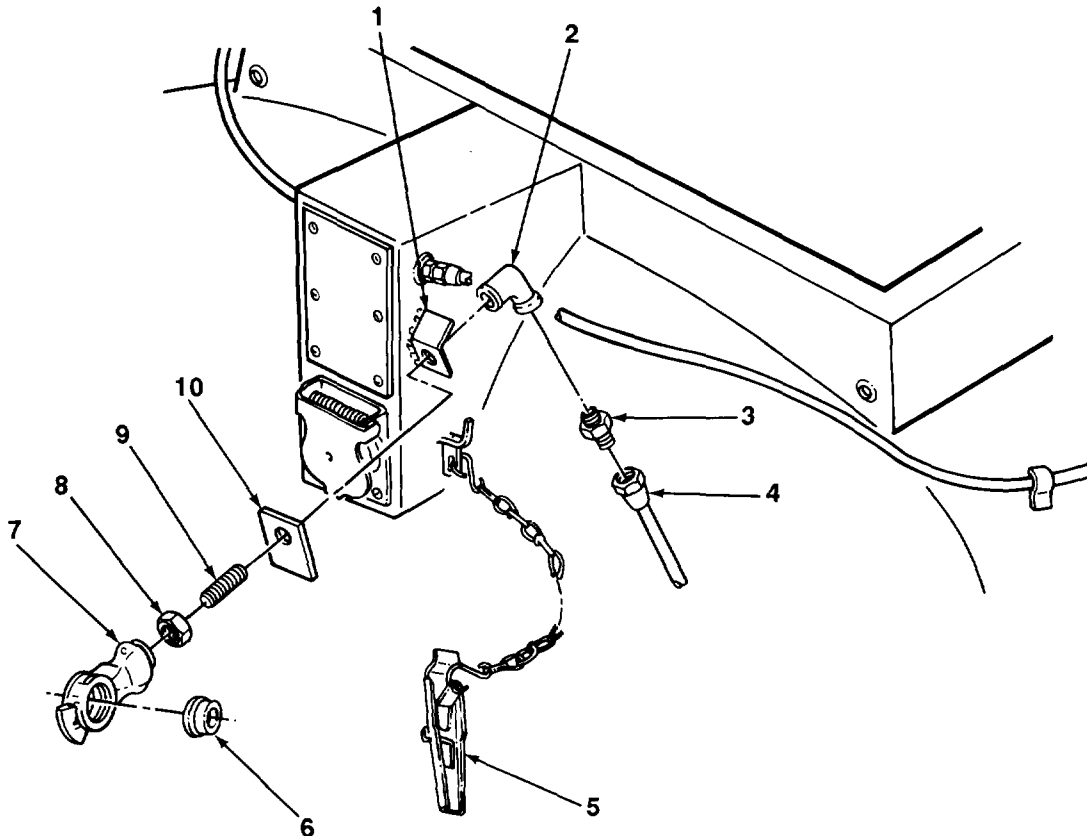
- Antiseizing tape (Item 18, Appendix E)

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

### a. REMOVAL

1. Remove dummy coupling (5) from air coupling (7).
2. If damaged, remove preformed packing (6) from air coupling (7) and discard.
3. Back off nut (8). Remove air coupling (7), nut, and plate (10) from nipple (9).



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**4-36. AIR COUPLING REPLACEMENT (Con't).**

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4. If damaged, remove nipple (9) from bracket (1) and elbow (2).
5. If damaged, remove elbow (2) and straight adapter (3) from air tube (4).

**b. INSTALLATION**

1. If removed, apply antiseizing tape to straight adapter (3) and install straight adapter and elbow (2) on air tube (4).
2. If removed, apply antiseizing tape to nipple (9) and install through bracket (1) on elbow (2).
3. Install plate (10) nut (8), and air coupling (7) on nipple (9). Tighten nut against air coupling.
4. If removed, install new preformed packing (6) in air coupling (7).
5. Install dummy coupling (5) on air coupling (7).

**FOLLOW-ON TASKS:**

- Couple semitrailer to towing vehicle (para 2-10).
- Perform air leakage test (para 4-40).

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## 4-37. AIR FILTER REPLACEMENT.

---

*This Task Covers:*

a. Air Filter Removal

b. Air Tube Installation

---

*Initial Setup:*

**Equipment Conditions:**

- Wheels chocked.

**Materials/Parts:**

- Antiseizing tape (Item 18, Appendix E)

**Tools/Test Equipment:**

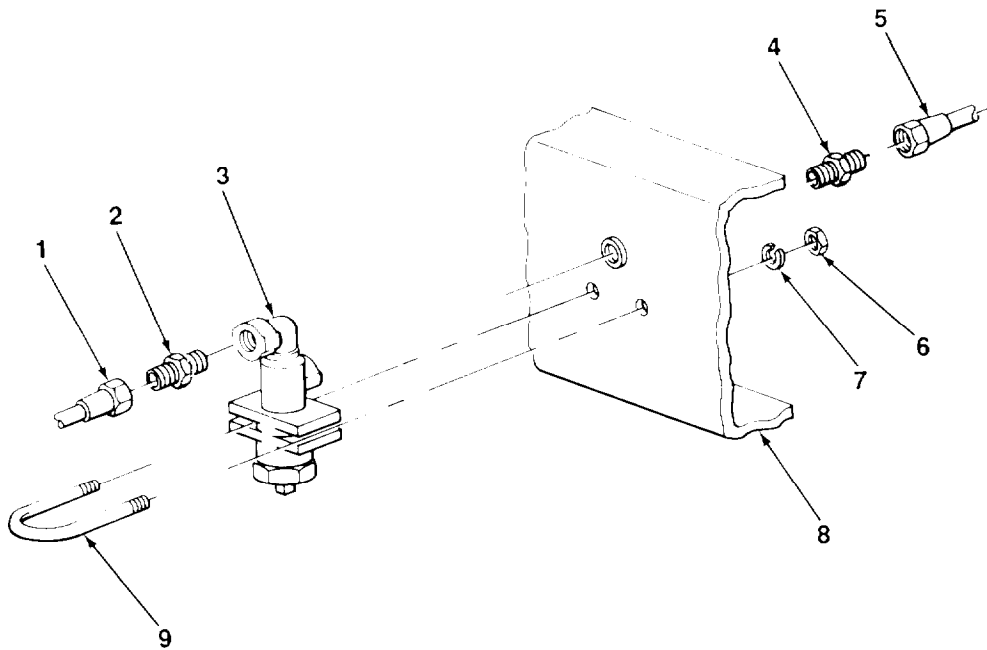
- General mechanic's tool kit
  - Common no. 1 shop set
- 

**NOTE**

**Air filters are no longer required and are replaced by an air tube.**

**a. AIR FILTER REMOVAL**

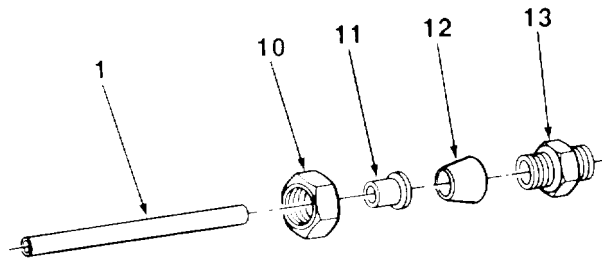
1. Disconnect air tube (1) from straight adapter (2) at air filter (3).
2. Disconnect air tube (5) from straight adapter (4) at crossmember (8).
3. Remove straight adapter (4) from air filter (3) and crossmember (8). Discard straight adapter.
4. Remove two nuts (6), lockwashers (7), U-bolt (9), and air filter (3) from crossmember (8). Discard lockwashers.
5. Remove straight adapter (2) from air filter (3). Discard straight adapter.



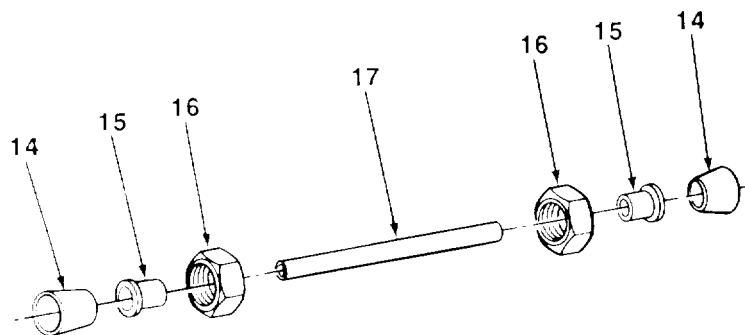
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**4-37. AIR FILTER REPLACEMENT (Con't).****b. AIR TUBE INSTALLATION**

1. Cut 12 in. (30.5 cm) and connector from end of air tube (1).
2. Cut connector front air tube (5) as close to connector as possible.
3. Install nut (10), insert (11) and sleeve (12) on air tube (1). Sleeve and nut should be 1/4 in. (6.4 mm) from end of air tube.
4. Apply antiseizing tape to straight adapter (13) and install on nut (10).



5. Repeat steps 3 and 4 for air tube (5).
6. Cut required length of new air tube (17).
7. Install two nuts (16), inserts (15), and sleeves (14) on air tube (17). Slide nuts over sleeves.

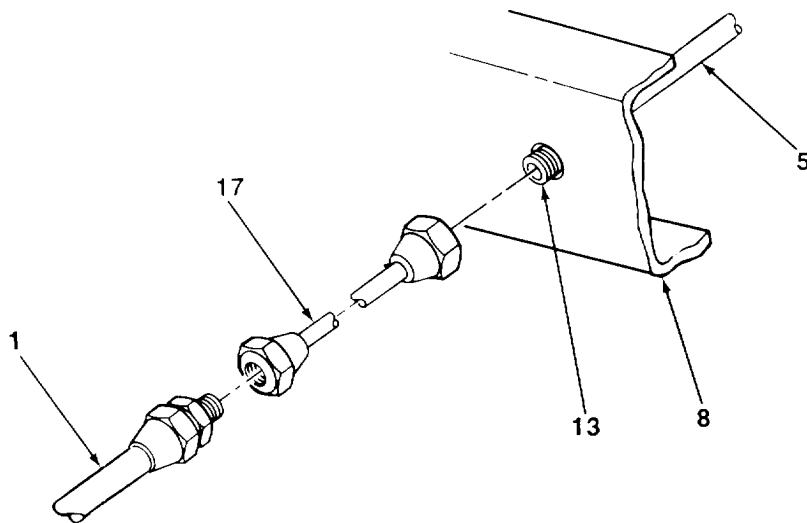


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**4-37. AIR FILTER REPLACEMENT (Con't).**

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8. Push straight adapter (13) on air tube (5) through hole in crossmember (8).
9. Install air tube (17) on two air tubes (1 and 5).



**FOLLOW-ON TASKS:**

- Perform air leakage test (para 4-40).

**4-38. AIRBRAKE CHAMBER REPLACEMENT.**

*This Task Covers:*

## a. Removal

## b. Installation

*Initial Setup:*

**Equipment Conditions:**

- Wheels chocked.
- Air reservoir drained.

**Materials/Parts:**

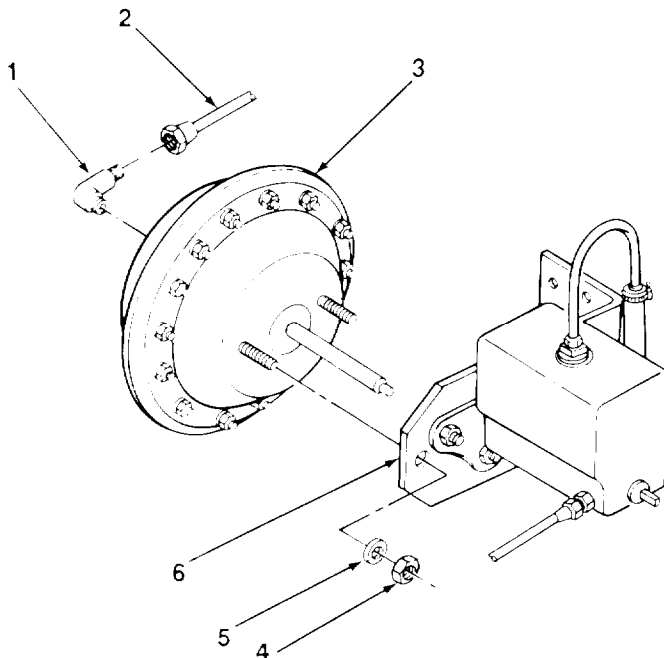
- Antizeizing tape (Item 18, Appendix E)
- Two lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no 1 shop set

**a. REMOVAL**

1. Disconnect air tube (2) from elbow (1) on airbrake chamber (3). Remove elbow.
2. Remove two nuts (4), lockwashers (5), and airbrake chamber (3) from braket (6). Discard lockwashers.

**b. INSTALLATION**

1. Install airbrake chamber (3) on braket (6) with two new lockwashers (5) and nuts (4).
2. Apply antiseizing tape to elbow (1) and install elbow on airbrake chamber (3). Connect air tube (2) to elbow.

**FOLLOW-ON TASKS:**

- Perform air leakage test (para 4-40).

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## 4-39. AIR LINES AND FITTINGS REPLACEMENT.

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*This Task Covers:*

- |   |  |
|---|--|
| a. Air Coupling-to-Air Filter Air Tube Replacement              | d. Rear Airbrake Chamber-to-Relay Valve Air Tube Replacement |
| b. Air Filter-to-Relay Valve Air Tube Replacement               |  |
| c. Forward Airbrake Chamber-to-Relay Valve Air Tube Replacement |  |
- 

*Initial Setup*

**Equipment Conditions:**

- Wheels chocked.
- Air reservoir drained.

**Materials/Parts:**

- Antiseizing tape (Item 18, Appendix E)

**Tools/Test Equipment:**

- General mechanic's tool kit
  - Common no. 1 shop set
- 

---

### a. AIR COUPLING-TO-AIR FILTER AIR TUBE REPLACEMENT

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1. Remove air tube (3) and straight adapter (2) from air coupling (1).

**NOTE**

**Air filters are no longer required and may have been replaced by an air tube.**

2. Remove air tube (3) and straight adapter (4) from air filter (5) or air tube (6).

**CAUTION**

- Use caution when removing air tube at clips. Clips should be lifted gently and only enough to release air tube. Improper handling of clips will cause them to break.
- If two or more consecutive clips are missing or damaged, air tube will not be adequately supported. Damage to air tube may result.

3. Gently lift clips (9) and release air tube (3). If two or more consecutive clips are missing or damaged, notify Direct Support Maintenance.

**NOTE**

**Air tube may have to be cut to be removed.**

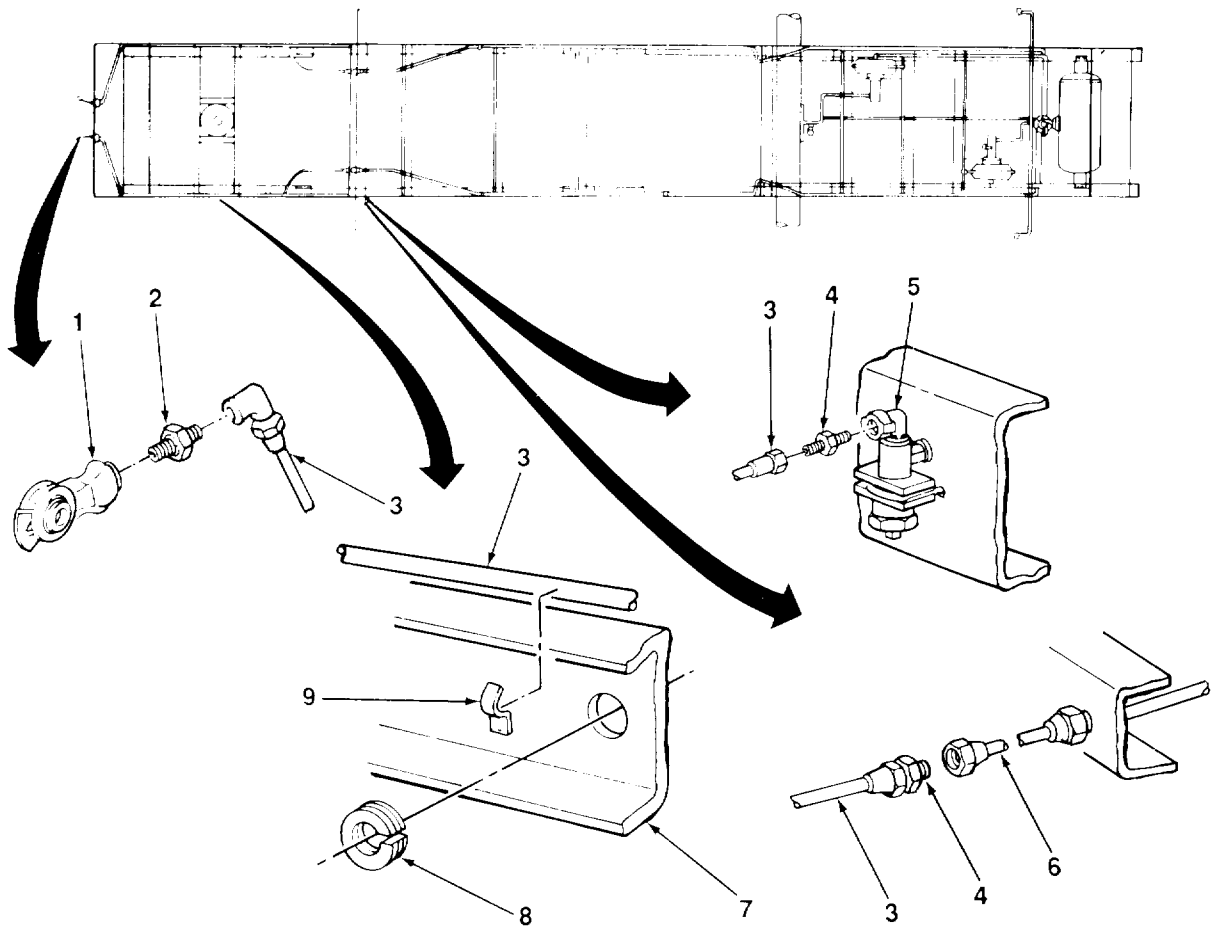
4. Remove air tube (3) from grommet (8) and frame (7). If damaged, remove grommet from frame and discard.

**NOTE**

**For information on manufacturing air tube refer to Appendix F.**

5. If removed, install new grommet (8) in frame (7). Position air tube (3) through grommet and frame.
6. Apply antiseizing tape to straight adapter (4) and install straight adapter and air tube (3) on air filter (5) or air tube (6).

4-39. AIR LINES AND FITTINGS REPLACEMENT (Con't).



7. Apply antiseizing tape to straight adapter (2) and install straight adapter and air tube (3) on air coupling (1).

**CAUTION**

- Use caution when installing air tube at clips. When securing air tube under clips, a soft-faced hammer should be used to tap clips back into place. Improper handling of clips will cause them to break.
- If two or more consecutive clips are missing or damaged, air tube will not be adequately supported. Damage to air tube may result.

8. Install air tube (3) in clips. (9) Gently bend clips over air tube. Notify Direct Support Maintenance if two or more consecutive clips become damaged at installation.

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4-39. AIR LINES AND FITTINGS REPLACEMENT (Con't).

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**b. AIR FILTER-TO-RELAY VALVE AIR TUBE REPLACEMENT**

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**NOTE**

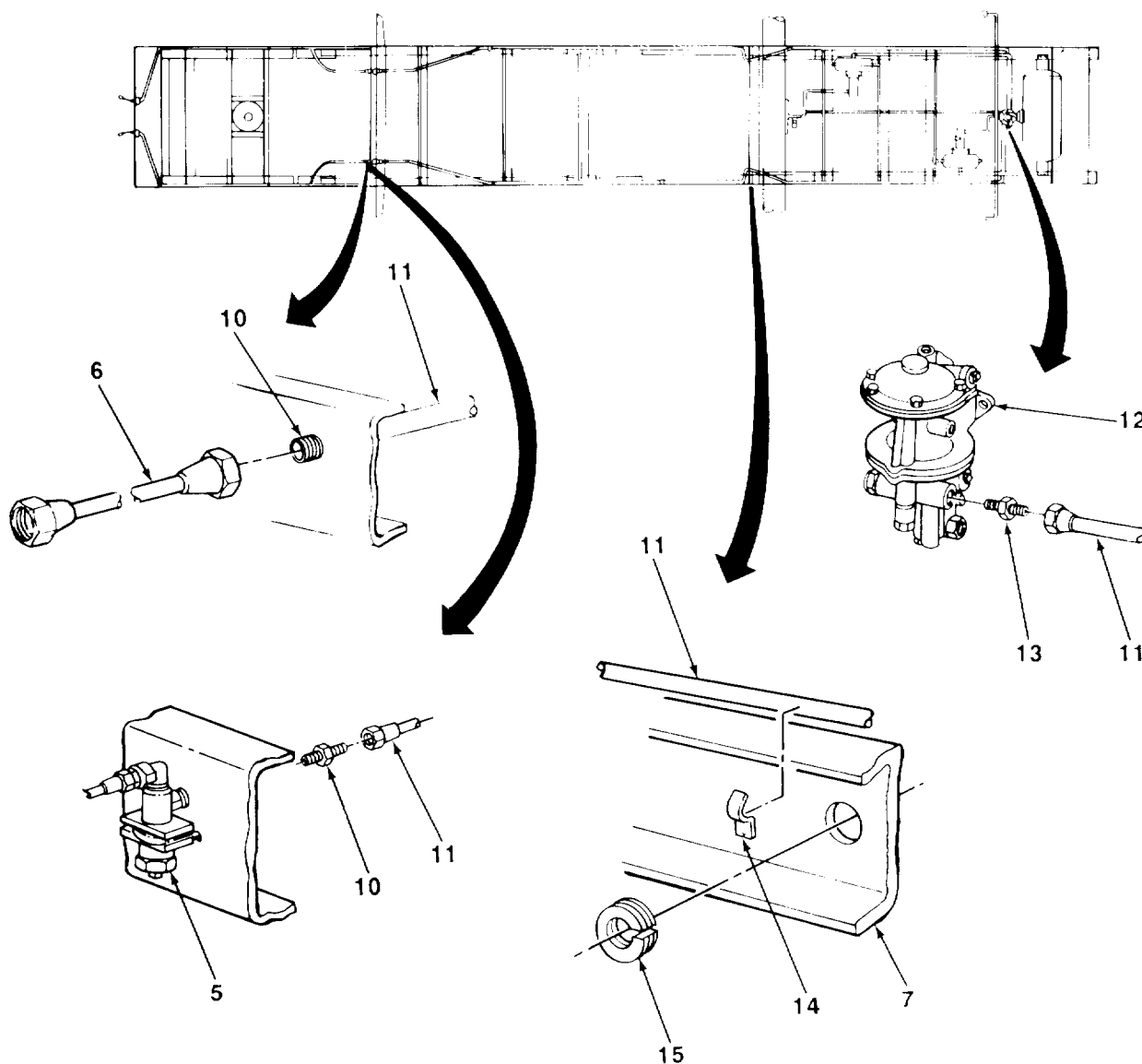
Air filters are no longer required and may have been replaced by an air tube.

1. Remove air tube (11) and straight adapter (10) from air filter (5) or air tube (6).

**NOTE**

On curbside, air tube connects to an elbow at relay valve.

2. Remove air tube (11) and straight adapter (13) from relay valve (12).



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**4-39. AIR LINES AND FITTINGS REPLACEMENT (Con't).**

---

**CAUTION**

- **Use caution when removing air tube at clips. Clips should be lifted gently and only enough to release air tube. Improper handling of clips will cause them to break.**
  - **If two or more consecutive clips are missing or damaged, air tube will not be adequately supported. Damage to air tube may result.**
3. Gently lift clips (14) and release air tube (11). If two or more consecutive clips are missing or damaged, notify Direct Support Maintenance.

**NOTE**

**Air tube may have to be cut to remove.**

4. Remove air tube (11) from four grommets (15) and frame (7). If damaged, remove grommets from frame and discard,

**NOTE**

**For Information on manufacturing air tube refer to Appendix F.**

5. If removed, install four new grommets (15) in frame (7). Position air tube (11) through grommets and frame.
6. Apply antiseizing tape to straight adapter (13) and install straight adapter and air tube (11) on relay valve (12).
7. Apply antiseizing tape to straight adapter (10) and install straight adapter and air tube (11) on air filter (5) or air tube (6).

**CAUTION**

- **Use caution when installing air tube at clips. When securing air tube under clips, a soft-faced hammer should be used to tap clips back into place. Improper handling of clips will cause them to break.**
  - **If two or more consecutive clips are missing or damaged, air tube will not be adequately supported. Damage to air tube may result.**
8. Install air tube (11) in clips (14). Gently bend clips over air tube. Notify Direct Support Maintenance if two or more consecutive clips are damaged at installation.

#### 4-39. AIR LINES AND FITTINGS REPLACEMENT (Con't).

##### c. FORWARD AIRBRAKE CHAMBER-TO-RELAY VALVE AIR TUBE REPLACEMENT

###### NOTE

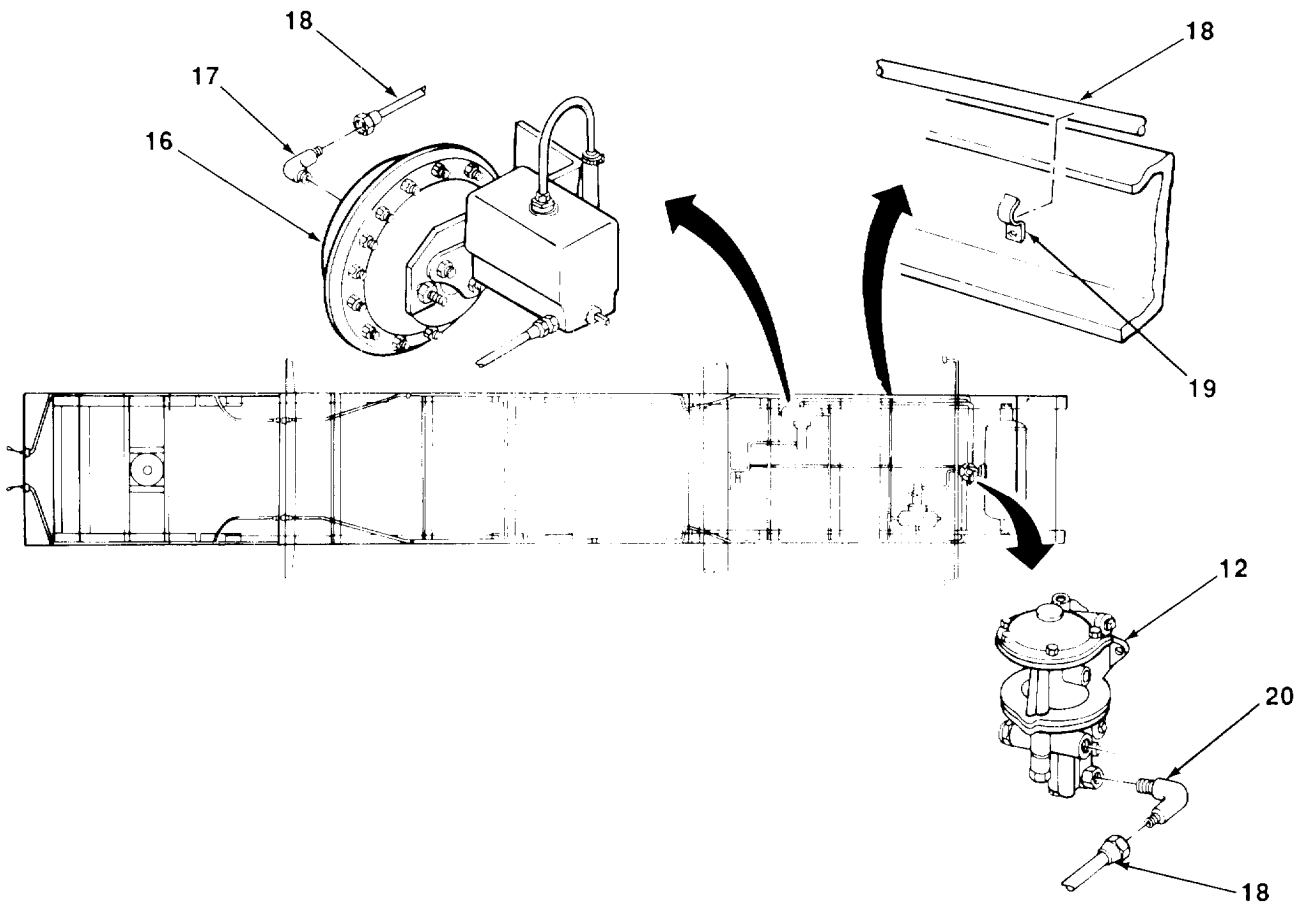
M131A5 forward airbrake chamber is located on opposite side of semitrailer as airbrake chamber illustrated in this task.

1. Remove air tube (18) and elbow (17) from forward airbrake chamber (16).
2. Remove air tube (18) anti elbow (20) from relay valve (12).

###### CAUTION

- Use caution when removing air tube at clips. Clips should be lifted gently and only enough to release air tube. Improper handling of clips will cause them to break.
- If two or more consecutive clips are missing or damaged, air tube will not be adequately supported. Damage to air tube may result.

3. Gently lift clips (19) and release air tube (18). If two or more consecutive clips are missing or damaged, notify Direct Support Maintenance.



TA702732

#### 4-39. AIR LINES AND FITTINGS REPLACEMENT (Con't).

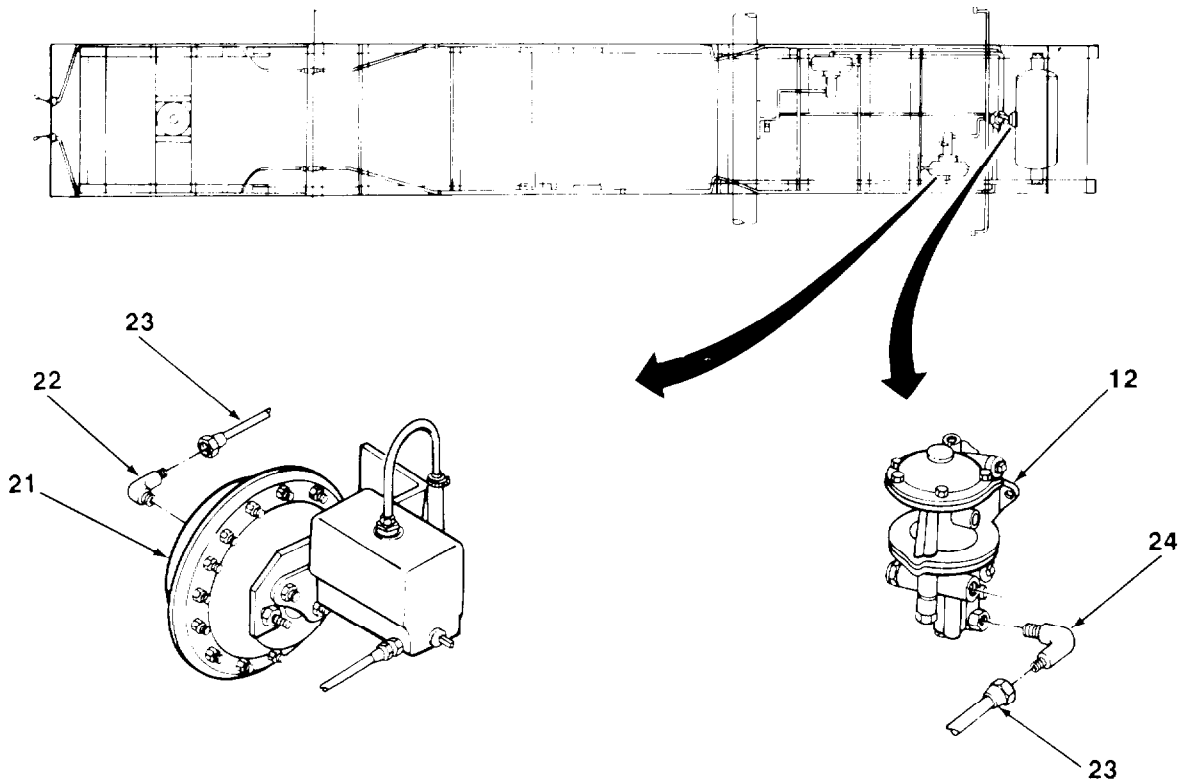
##### NOTE

For information on manufacturing air tube refer to Appendix F.

4. Apply antiseizing tape to elbow (20) and install elbow and air tube (18) on relay valve (12).
5. Apply antiseizing tape to elbow (17) and install elbow and air tube (18) on forward airbrake chamber (16).
  - Use caution when installing air tube at clips. When securing air tube under clips, a soft-faced hammer should be used to tap clips back into place. Improper handling of clips will cause them to break.
  - If two or more consecutive clips are missing or damaged, air tube will not be adequately supported. Damage to air tube may result.
6. Install air tube (18) in clips (19). Gently bend clips over air tube. Notify Direct Support Maintenance if two or more consecutive clips are damaged at installation.

#### d. REAR AIRBRAKE CHAMBER-TO-RELAY VALVE AIR TUBE REPLACEMENT

1. Remove air tube (23) and elbow (22) from rear airbrake chamber (21).
2. Remove air tube (23) and elbow (24) from relay valve (12).



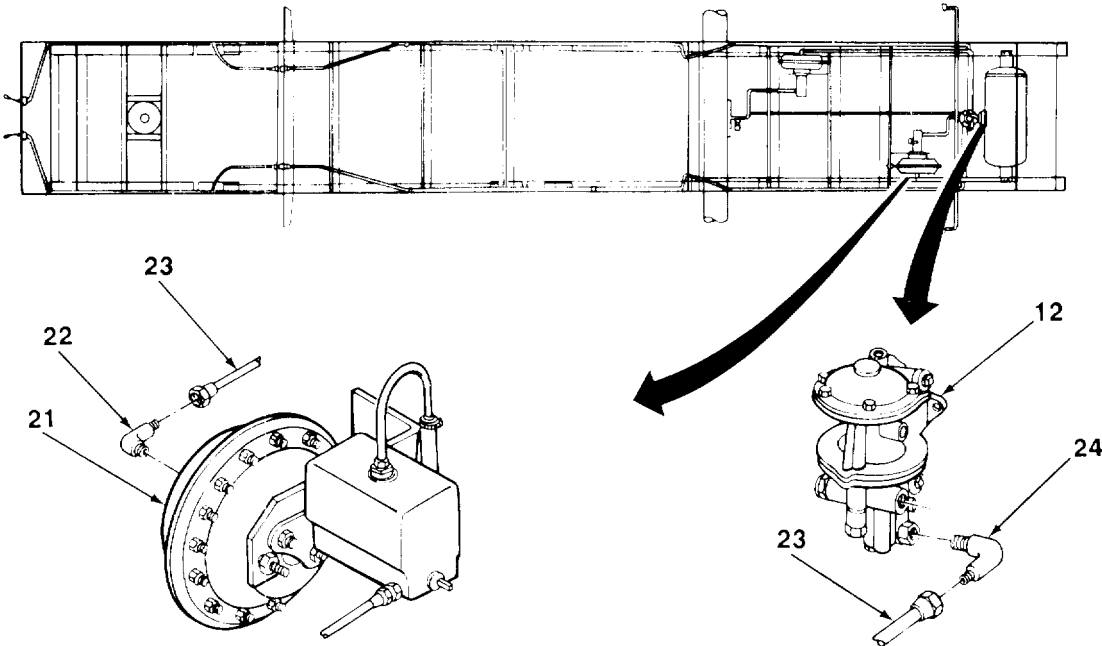
TA702733

**4-39. AIR LINES AND FITTINGS REPLACEMENT (Con't).**

**NOTE**

**For information on manufacturing air tube refer to Appendix F.**

3. Apply antiseizing tape to elbow (24) and install elbow and air tube (23) on relay valve (12).
4. Apply antiseizing tape to elbow (22) and install elbow and air tube (23) on rear airbrake chamber (21).



**FOLLOW-ON TASKS:**

- Perform air leakage test (para 4-40).

**4-40. AIR LEAKAGE TEST.**

*This Task Covers* Test

*Initial Setup*

**Equipment Conditions:**

- Wheels chocked
- Semitrailer coupled to towing vehicle with air system pressurized (para 2-10).

**Tools/Test Equipment:**

- General mechanic's tool kit

**Materials/Parts:**

- Dishwashing compound (Item 7, Appendix E)

**Personnel Required:** Two

**T E S T**

- 1 Coat air couplings air lines, and fittings with soap and water solution.
- 2 Have assistant apply and release brakes. Inspect for air bubbles. No leakage is permissible.
- 3 Tighten any leaking components or replace defective components as required.
- 4 Coat relay valve exhaust check valve with soap and water solution. Inspect for leakage. Replace relay valve if bubble larger than 1 in. (2.5 cm) is present in three seconds.
- 5 Release brakes and place relay valve in emergency position by disconnecting either towing vehicle air line from semitrailer air coupling. Coat relay valve exhaust port with soap and water solution. Inspect for leakage. Replace relay valve if bubble larger than 1 in. (2.5 cm) is present in three seconds.
- 6 Coat air reservoir and draincock with soap and water solution. Inspect for leakage. No leakage is permissible. Replace air reservoir or draincock if leakage is present (para 4-42).

---

## 4-41. RELAY VALVE MAINTENANCE.

---

*This Task Covers:*

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

*Initial Setup:*

**Equipment Conditions:**

- Wheels chocked.
- Semitrailer coupled to towing vehicle (operating test (para 2-10).

**Materials/Parts:**

- Marker tags (Item 17, Appendix E)
- Antiseizing tape (Item 18, Appendix E)

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

### **a. OPERATING TEST**

---

1. Apply brakes. Check that semitrailer brakes apply properly.
2. Release brakes and check that air pressure is released through exhaust check valve on relay valve (3).
3. Charge semitrailer brake system and close emergency shutoff valve on towing vehicle.
4. Disconnect emergency air coupling and check that semitrailer brakes apply.
5. Connect emergency air coupling and open emergency shutoff valve on towing vehicle. Check that brakes release.

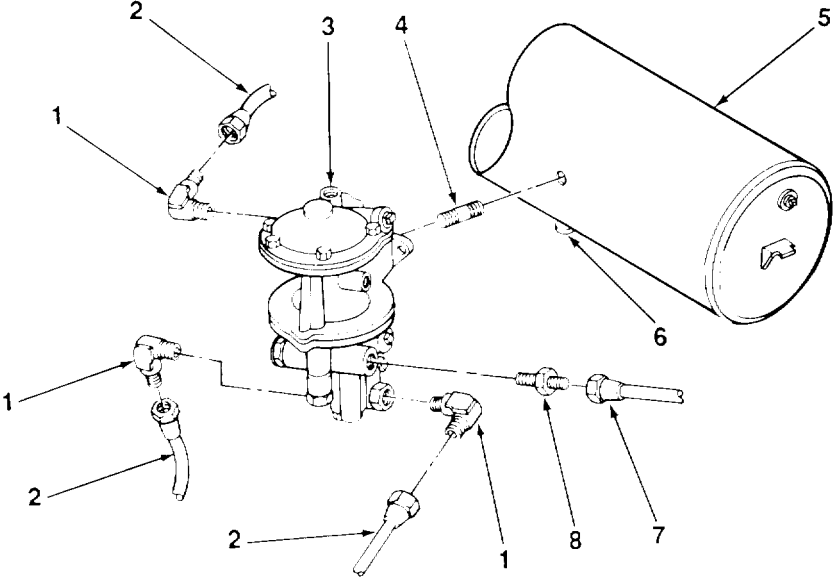
### **b. REMOVAL**

1. Open draincock (6) on air reservoir (5) and allow all air pressure to release. Close draincock.
2. Tag three air tubes (2). Remove three air tubes and elbows (1) from relay valve (3).
3. Tag air tube (7). Remove air tube and straight adapter (8) from relay valve (3).
4. Remove relay valve (3) from nipple (4) on air reservoir (5).

### **c. INSTALLATION**

1. Apply antiseizing tape to threads of nipple (4) on air reservoir (5). Turn relay valve (3) clockwise to install on nipple.
2. Apply antiseizing tape to threads of straight adapter (8). Install straight adapter and air tube (7) on relay valve (3).
3. Apply antiseizing tape to threads of three elbows (1). Install elbows and air tubes (2) on relay valve (3).

4-41. RELAY VALVE MAINTENANCE (Con't).



FOLLOW-ON TASKS:

- Perform air leakage test (para 4-40).

## 4-42. AIR RESERVOIR REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

Initial Setup.

### Equipment Conditions:

- Relay valve removed (para 4-41).

### Materials/Parts:

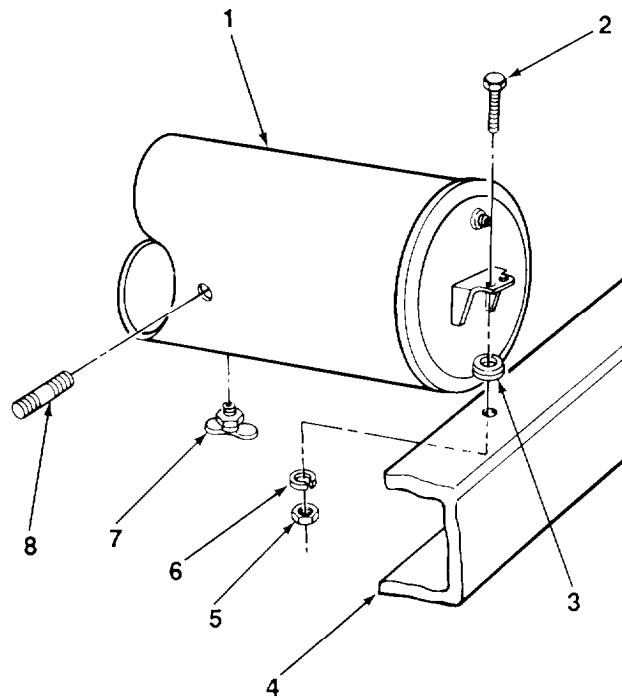
- Antiseizing tape (Item 18, Appendix E)
- Four locknuts

### Tools/Test Equipment:

- General mechanic's tool kit

### a. REMOVAL

1. Remove four locknuts (5), washers (6), grommets (3), screws (2), and air reservoir (1) from crossmembers (4). Discard locknuts.
2. Remove nipple (8) and draincock (7) from air reservoir (1).



### b. INSTALLATION

1. Apply antiseizing tape to draincock (7) and nipple (8) and install on air reservoir (1).
2. Install air reservoir (1) on crossmembers (4) with four screws (2), grommets (3), washers (6), and new locknuts (5).

### FOLLOW-ON TASKS:

- Install relay valve (para 4-41).

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## Section VIII. WHEELS, HUBS, AND BRAKEDRUMS MAINTENANCE

Paragraph Title	Page Number
Hub, Wheel Bearing, and Brakedrum Maintenance . . . . .	4-83
Wheel and Tire Maintenance. . . . .	4-79

### 4-43. WHEEL AND TIRE MAINTENANCE.

*This Task Covers'*

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>a. Removal</li> <li>b. Repair</li> </ul> | <ul style="list-style-type: none"> <li>c. Installation</li> </ul> |
|---|---|

*Initial Setup:*

**Equipment Conditions:**

- Wheels checked.

**Personnel Required:** Two

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**References:**

- TM 9-2610-200-14

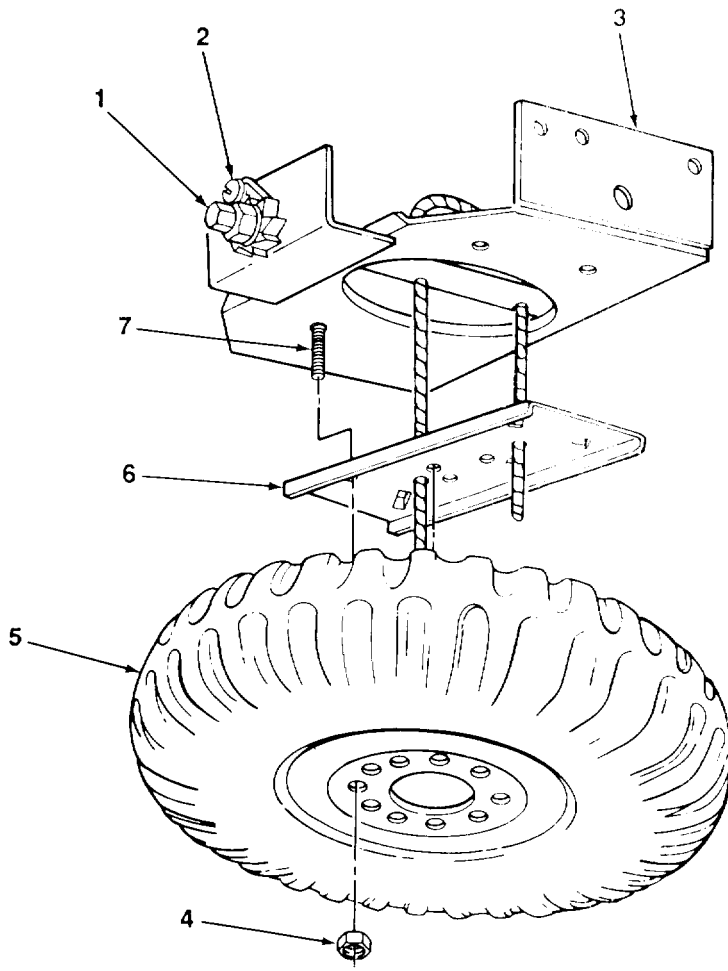
4-43. WHEEL AND TIRE MAINTENANCE (Con't).

a. REMOVAL

NOTE

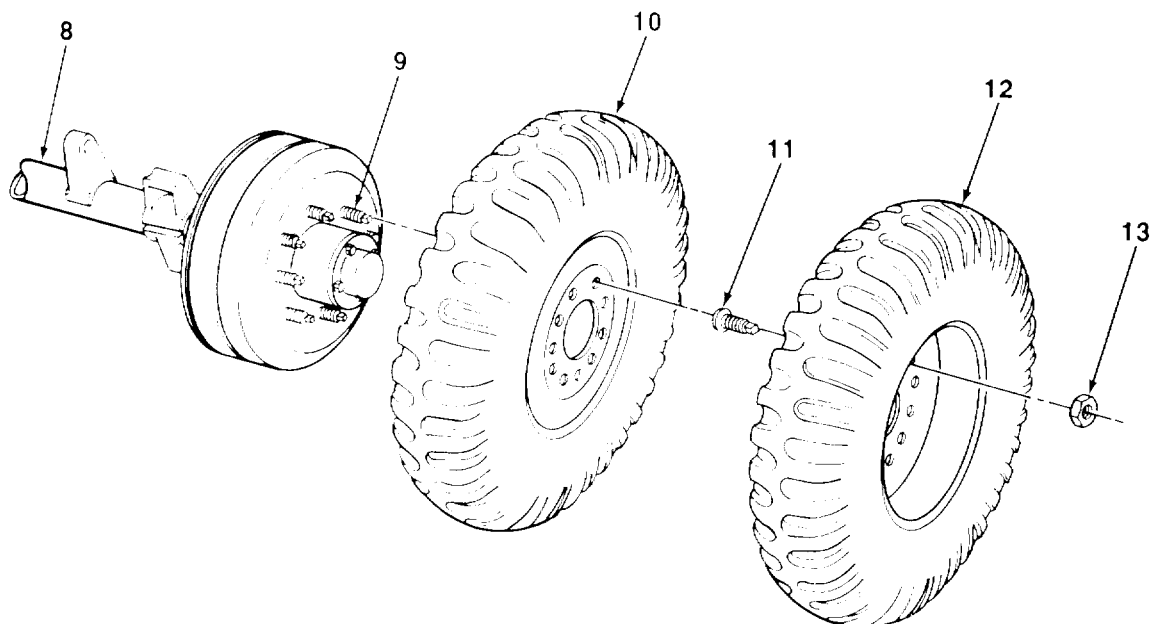
If removing spare wheel and tire from spare wheel and tire carrier, perform steps 1 through 3.

1. Remove four nuts (4) from bolts (7) on spare wheel and tire carrier (3).
2. Using lug wrench from towing vehicle, rotate gearshaft (1) enough to release pawl (2) and slowly lower spare wheel and tire (5) to ground.
3. Remove retaining plate (6) from spare wheel and tire (5).
4. Loosen, but do not remove ten wheel nuts (13) and capnut (11) from outer wheel (12).
5. Position floor jack under axle (8) gearwheels (10 and 12) to be removed, and raise semitrailer until wheels are off ground.



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## 4-43. WHEEL AND TIRE MAINTENANCE (Cont't)



6. Remove ten wheel nuts (13) and outer wheel (12) front capnuts (11).
7. Remove ten capnuts (11) and inner wheel (10) from wheel studs (9).

## b. REPAIR

Refer to TM 9-2610-200-14 for instructions on dismounting and mounting tire and tube, and for repairing tube.

## c. INSTALLATION

**CAUTION**

**Do not mix cross-country tires with highway tires on an axle.**

1. Position inner wheel (10) on wheel studs (9) with convex side facing out. Install ten capnuts (11) fingertight in sequence shown.

**NOTE**

**Ensure that valve stem for outer wheel is approximately 180° away from valve stem of inner wheel.**

2. Position outer wheel (12) on capnuts (11) with convex side facing in. Install ten wheel nuts (13) fingertight in sequence shown.
3. Lower floor jack until wheels (10 and 12) are on ground. Remove floor jack.
4. Torque ten capnuts (11) and wheel nuts (13) to 450 - 470 lb.-ft (610 - 637 N•m) in sequence shown.

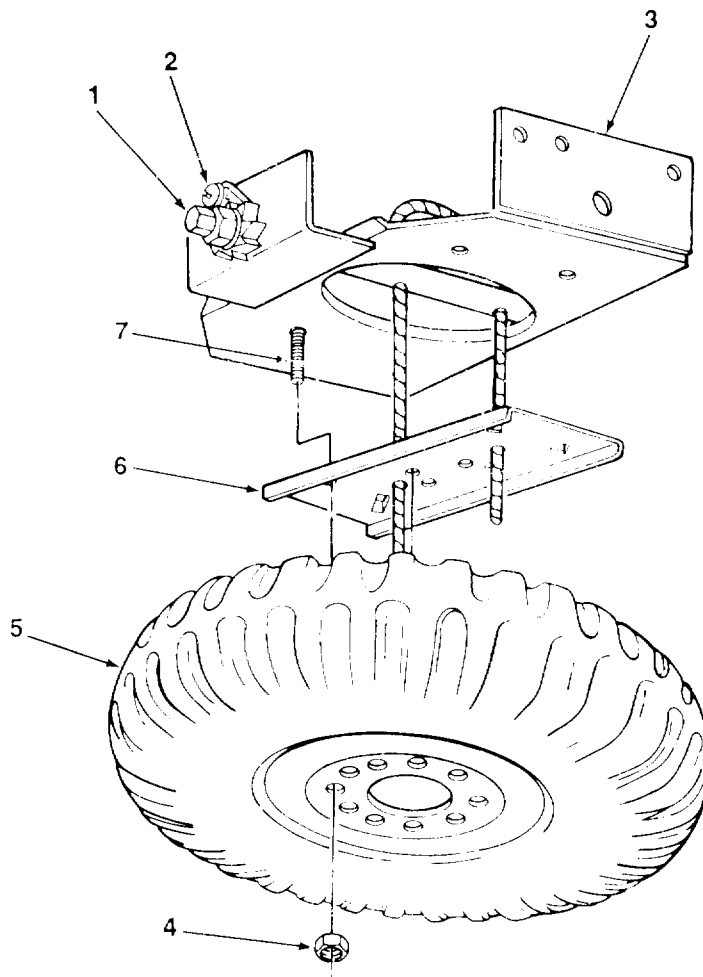
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4-43. WHEEL AND TIRE MAINTENANCE (Con't).

NOTE

If installing spare wheel and tire onto spare wheel and tire carrier perform steps 5 through 7.

5. Position retaining plate (6) in spare wheel and tire (5).
6. Using lug wrench from towing vehicle, rotate gearshaft (1) clockwise to raise spare wheel and tire (5) into position on spare wheel and tire carrier (3). Engage pawl (2) to lock gearshaft.
7. Install four nuts (4) on bolts (7).



**4-44. HUB, WHEEL BEARING, AND BRAKEDRUM MAINTENANCE.***This Task Covers:*

- |                            |                             |
|----------------------------|-----------------------------|
| a. Removal                 | d. Assembly                 |
| b. Disassembly             | e. Installation             |
| c. Cleaning and Inspection | f. Wheel Bearing Adjustment |

*Initial Setup***Equipment Conditions:**

- Wheels removed (para 4-43).
- Air reservoir drained.

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set
- Wrench socket, wheel bearing adjusting
- Seal inserter

**Materials/Parts:**

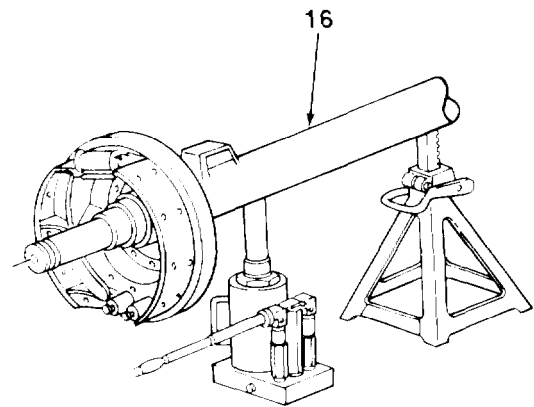
- Abrasive cloth (Item 5, Appendix E)
- Grease (Item 10, Appendix E)
- Dry cleaning solvent (Item 16, Appendix E)
- One gasket
- One oil seal
- Six lockwashers

**References:**

- TM 9-214

**a. REMOVAL**

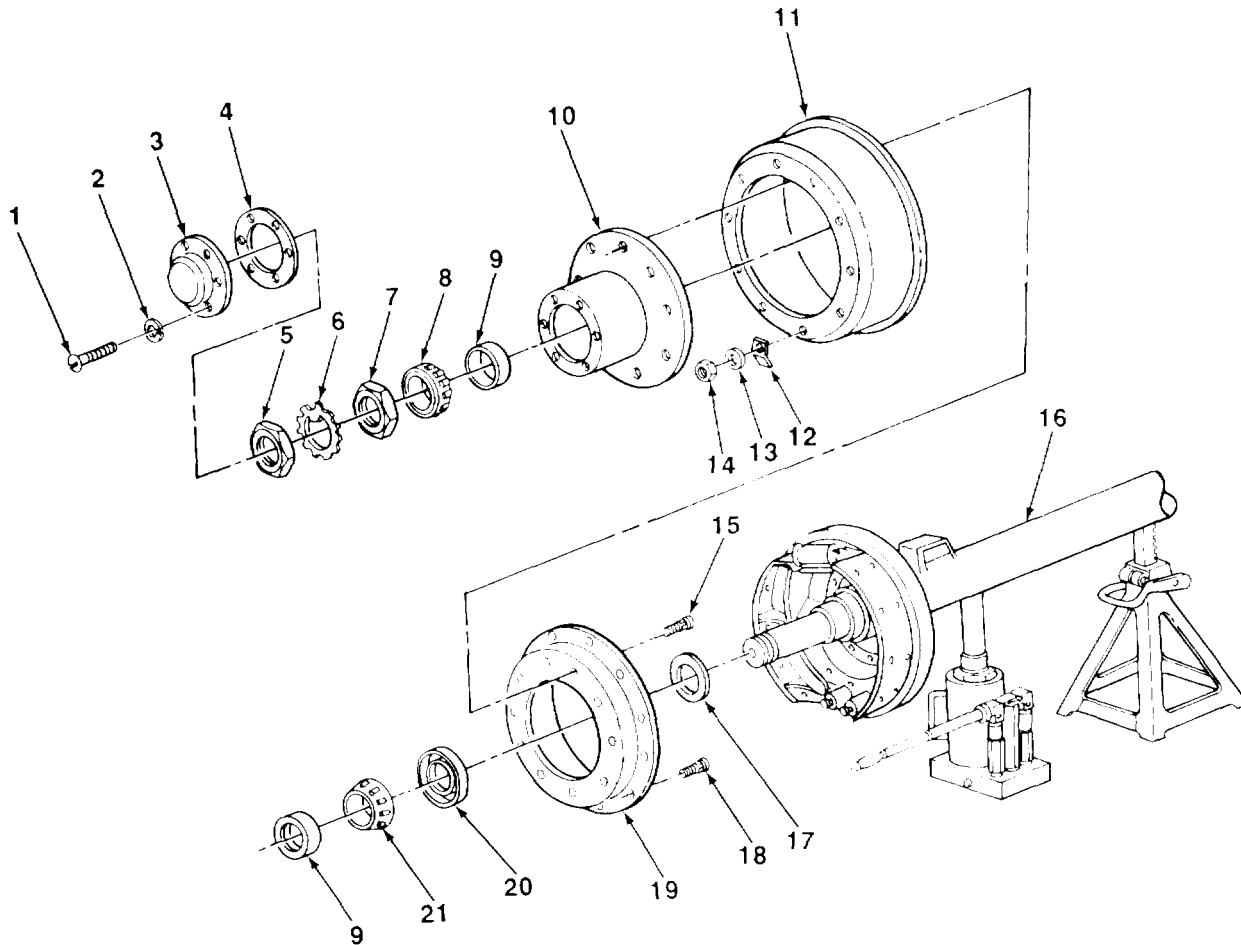
1. Position jackstand under axle (16) and remove floor jack.



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**4-44. HUB, WHEEL BEARING, AND BRAKEDRUM MAINTENANCE (Con't).**

2. Remove six bolts (1), lockwashers (2), access cover (3), and gasket (4) from hub (10). Discard lockwashers and gasket.
3. Unbend tabs of keywasher (6). Remove outer nut (5), keywasher, and inner adjusting nut (7) from hub (10) and axle (16).



4. Pull hub (10) out slightly on axle (16) to loosen outer wheel bearing cone (8) Remove outer wheel bearing cone from hub and axle.

**WARNING**

**DO NOT** handle brakeshoes, brakedrums, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if you touch it or breathe it. Wear an approved filter mask and gloves. Never use compressed air or a dry brush to clean brake components. Dust may be removed using an industrial-type vacuum cleaner. Clean dust or mud away from brake components with water and a wet, soft brush or cloth. Failure to follow this warning may result in serious illness or death to personnel.

5. Remove hub (10) and brakedrum (11) from axle (16).

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#### 4-44. HUB, WHEEL BEARING, AND BRAKEDRUM MAINTENANCE (Con't).

---

6. Remove inner wheel bearing cone (21), oil seal (20), and wiper ring (17) from hub (10) or axle (16). Discard oil seal.

#### **b. DISASSEMBLY**

#### **WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and **DO NOT** breathe vapors. **DO NOT** use near open flame or excessive heat. The solvent's flash point is 100°F - 138°F (38°C -59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

#### **NOTE**

**Perform steps 1 and 2 only if adapter or brakedrum is damaged.**

1. Remove ten studs (15) and remove adapter (19) and brakedrum (11) from hub (10).
2. Remove ten nuts (14), lockwashers (13), cover (12), bolts (1 8), and adapter (19) from brakedrum (11). Discard lockwashers.

#### **c. CLEANING AND INSPECTION**

#### **WARNING**

- **DO NOT** handle brakeshoes, brake drums, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if you touch it or breathe it. Wear an approved filter mask and gloves. Never use compressed air or a dry brush to clean brake components. Dust may be removed using an industrial-type vacuum cleaner. Clean dust or mud away from brake components with water and a wet, soft brush or cloth. Failure to follow this warning may result in serious illness or death to personnel.
- Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and **DO NOT** breathe vapors. **DO NOT** use near open flame or excessive heat. The solvent's flash point is 100°F - 138°F (38°C - 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean all removed components, axle spindle shoulder, and hub with dry cleaning solvent. Remove any burrs with abrasive cloth and wipe clean.

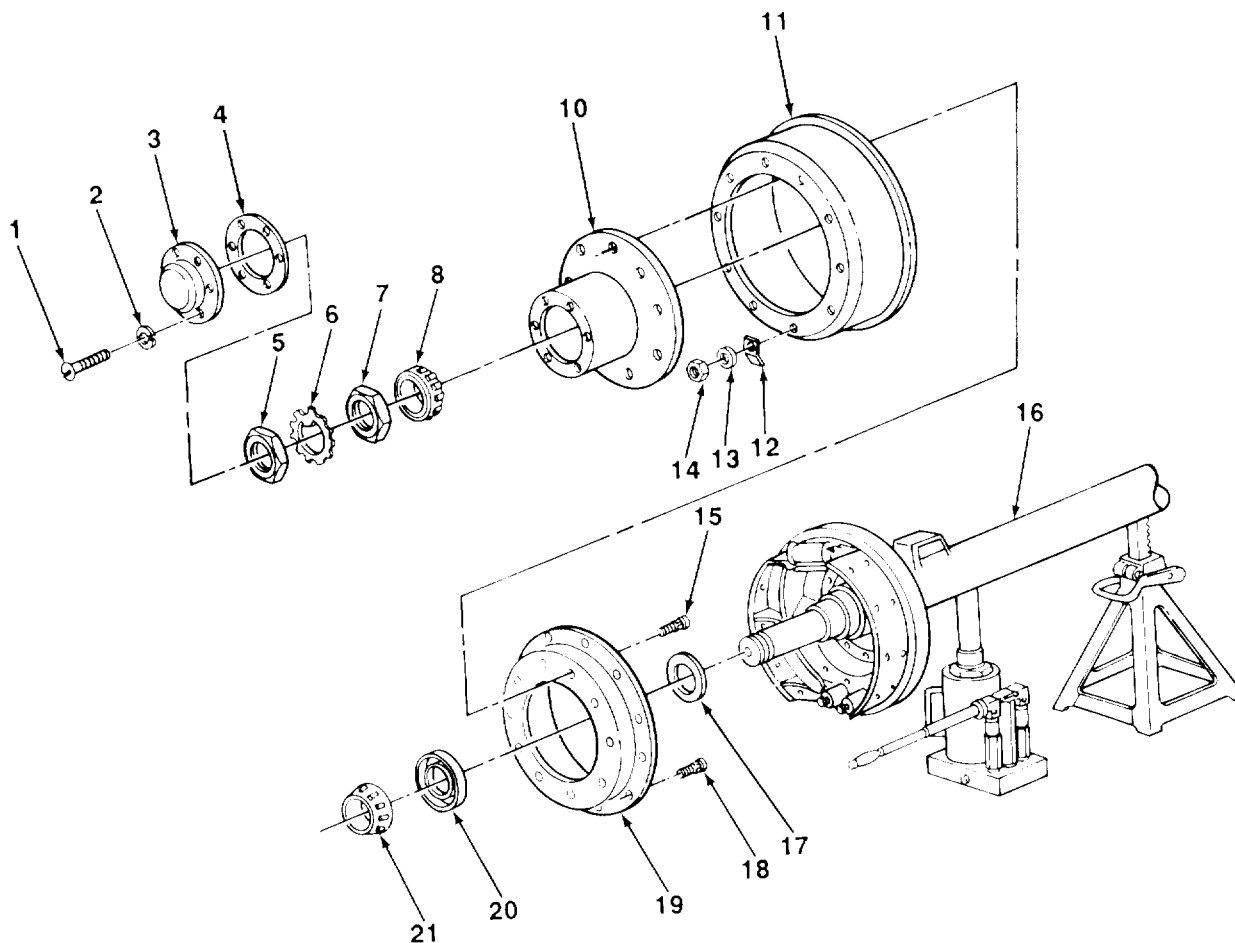
#### **NOTE**

**If outer and inner wheel bearing cones need replacing, bearing cups must also be replaced.**

2. Clean and inspect outer and inner wheel bearing cones in accordance with TM 9-214. Discard if damaged.
3. If damaged, or if replacing outer and inner wheel bearing cones, remove two bearing cups (9) from hub (10). Press in new bearing cups and fully seat inside hub.

**4-44. HUB, WHEEL BEARING, AND BRAKEDRUM MAINTENANCE (Con't).**

4. Inspect brakedrum for cracks, scoring, pitting, or grooves. Check edge of brakedrum for cracks or broken areas. Replace brakedrum if damaged.
5. Inspect all remaining components for damage. Replace if damaged.



**d. ASSEMBLY**

1. If removed, install adapter (19) and cover (12) on brakedrum (11) with ten bolts (18), new lockwashers (13), and nuts (14).

**CAUTION**

**Hub with left-hand thread studs must be installed on roadside and hubs with right-hand thread studs must be installed on curbside. Failure to follow this caution may result in damage to equipment.**

2. If removed, install adapter (19) and brakedrum (11) on hub (10) with ten studs (15).

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**4-44. HUB, WHEEL BEARING, AND BRAKEDRUN'I MAINTENANCE (Con't).**

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**e. INSTALLATION****NOTE**

**Instructions for packing outer and inner wheel bearing cones are found in TM 9-214.**

1. Pack inner wheel bearing cone (21) with grease. Install inner wheel bearing cone, new oil seal (20), and wiper ring (17) on hub (10).
2. Install hub (10) and brakedrum (11) on axle (16).
3. Pack outer wheel bearing cone (8) with grease. Install outer wheel bearing cone and inner adjusting nut (7) on hub (10) and axle (16).

**f. WHEEL BEARING ADJUSTMENT**

1. Tighten inner adjusting nut (7) while turning hub (10) and brakedrum (1) until drag is felt.
2. Rotate hub (10) and brakedrum (11) one full turn. Loosen inner adjusting nut (7) while rocking hub and brakedrum back and forth until looseness is felt.
3. Tighten inner adjusting nut (7) slowly while rocking hub (10) and brakedrum (11) until looseness is no longer felt.
4. Install keywasher (6) and outer nut (5) on axle (16). Bend tabs of keywasher over outer nut.
5. Install new gasket (4) and access cover (3) on hub (10) with six new lockwashers (2) and bolts (1).

**FOLLOW-ON TASKS:**

- Adjust service brakes (para 4-31).
- Install wheels (para 4-43).

## Section IX. FRAME AND TOWING ATTACHMENTS MAINTENANCE

Paragraph Title	Page Number
Catwalk Grating Replacement . . . . .	4-89
Gearbox Replacement . . . . .	4-102
Ladder Replacement (M131A5C). . . . .	4-90
Landing Gear Leg Replacement . . . . .	4-97
Spare Wheel and Tire Carrier Maintenance . . . . .	4-92
Step Replacement. . . . .	4-91
Upper Fifth Wheel Plate Replacement (Late Model) . . . . .	4-96

### 4-45. CATWALK GRATING REPLACEMENT.

This Task Covers: Replacement

*Initial Setup:*

**Tools/Test Equipment:**

- General mechanic’s tool kit
- Common no. 1 shop set

### REPLACEMENT

#### WARNING

**Use extreme caution when working or walking on top of semitrailer. Catwalk can become slippery due to moisture or fuel spillage. Failure to follow this warning may result in serious injury to personnel.**

#### CAUTION

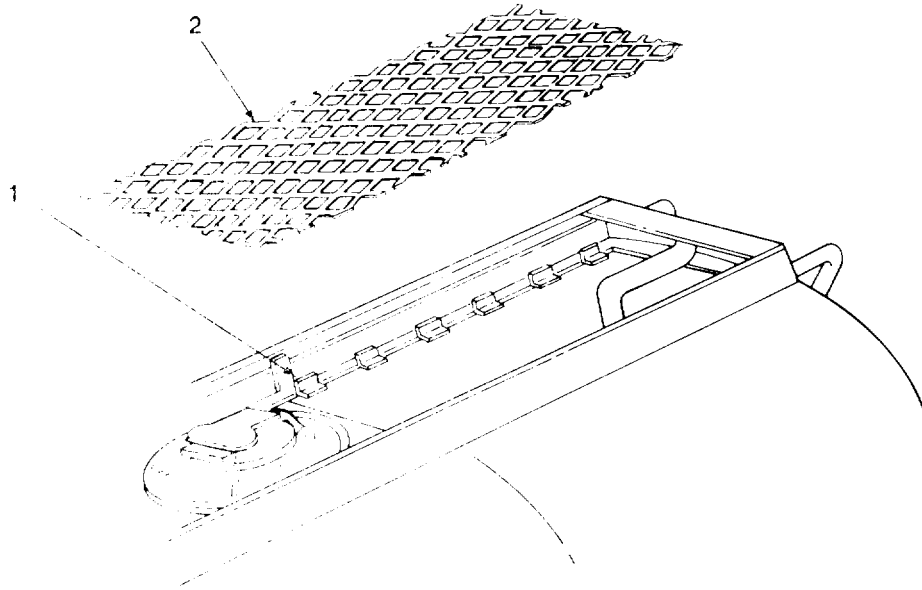
**Use caution when removing or installing catwalk grating at clips. Clips should be lifted gently and only enough to release grating. When securing grating under clips, a soft-faced hammer should be used to tap clips back into place. Improper handling of clip will cause thereto break.**

#### NOTE

**All catwalk grating is replaced the same way except quantity of clips may vary. This procedure covers M131A5 rear catwalk grating.**

1. Gently lift 12 clips (1) and release catwalk grating (2). If two or more consecutive clips are missing or damaged, notify Direct Support Maintenance.
2. Remove catwalk grating (2) from semitrailer.

4-45. CATWALK GRATING REPLACEMENT (Con't).



**NOTE**

**For information on manufacturing catwalk grating refer to Appendix F.**

3. Position catwalk grating (2) on semitrailer.
4. Install catwalk grating (2) in 12 clips (1). Gently bend clips over grating.

---

## 4-46. LADDER REPLACEMENT (M131A5C).

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*This Task Covers:* Replacement

---

*Initial Setup:*

**Materials/Parts:**

- Two gaskets
- Four locknuts
- Six lockwashers

**Tools/Test Equipment:**

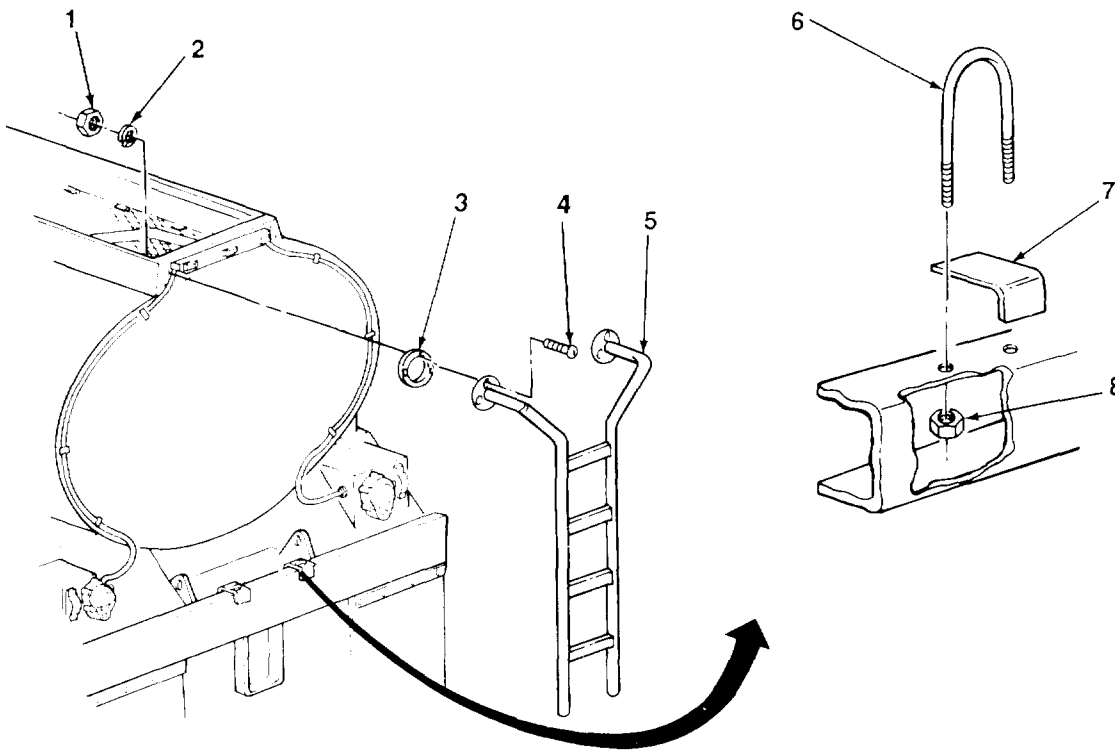
- General mechanic's tool kit

**Personnel Required:** Two

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### REPLACEMENT

1. Remove four locknuts (8) and two U-bolts (6) from two brackets (7). Discard locknuts.
2. Remove six nuts (1), lockwashers (2), and screws (4) from ladder (5) and semitrailer. Discard lockwashers.
3. Remove ladder (5) and two gaskets (3) from semitrailer. Discard gaskets.
4. Position two new gaskets (3) and ladder (5) on semitrailer and install six screws (4), new lockwashers (2), and nuts (1).
5. Secure ladder (5) on two brackets (7) with two U-bolts (6) and four new locknuts (8).



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**4-47. STEP REPLACEMENT.**

---

*This Task Covers:* Replacement

---

*Initial Setup:*

**Materials/Parts:**

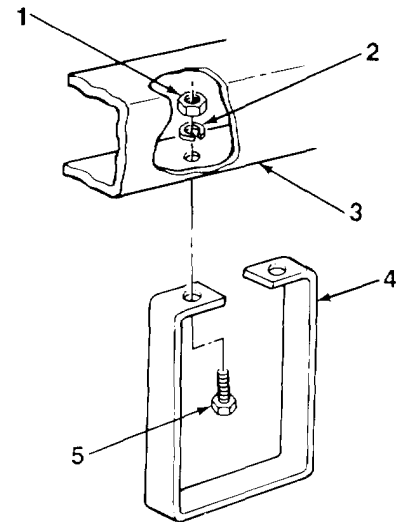
- Two lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**REPLACEMENT**

1. Remove two nuts (1), lockwashers (2), screws (5), and step (4) from bumper (3). Discard lockwashers.
2. Install step (4) on bumper (3) with two screws (5), new lockwashers (2), and nuts (1).



TA702745

**4-48. SPARE WHEEL AND TIRE CARRIER MAINTENANCE.**

*This Task Covers.*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | d. Assembly     |
| b. Disassembly             | e. Installation |
| c. Cleaning and Inspection |                 |

*Initial Setup:*

**Equipment Conditions:**

- Spare wheel and tire removed (para 4-43).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

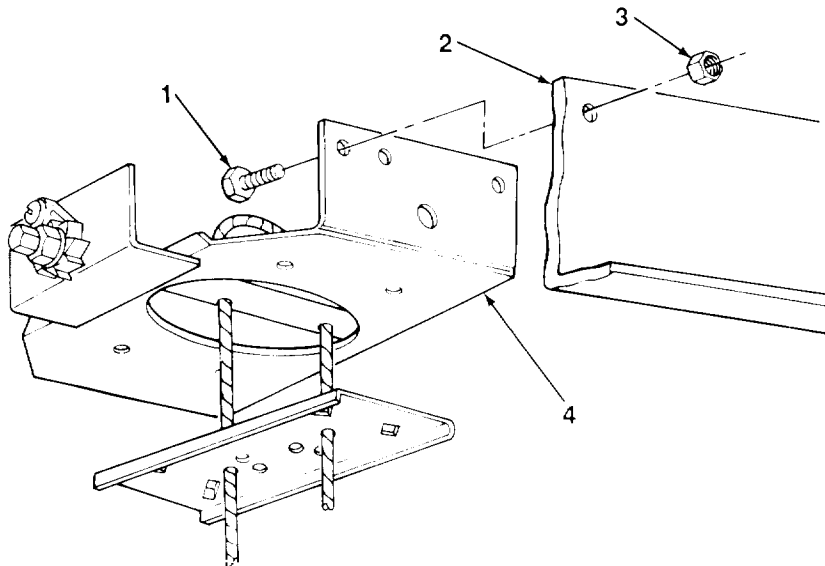
**Materials/Parts:**

- Dry cleaning solvent (Item 16, Appendix E)
- One cotter pin
- Four locknuts
- Four lockwashers

**Personnel Required: Two**

**a. REMOVAL**

Remove four locknuts (3), screws (1), and spare wheel and tire carrier (4) from frame (2). Discard locknuts.



**b. DISASSEMBLY**

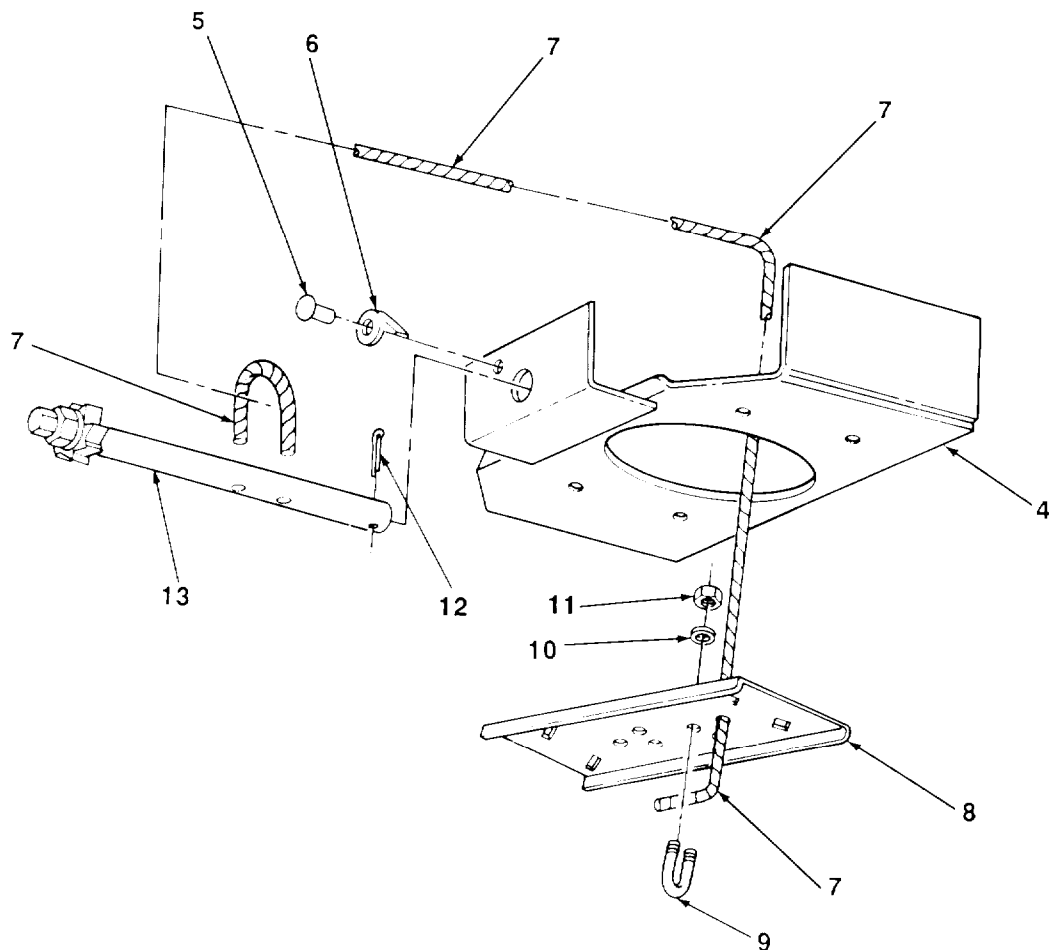
1. Remove four nuts (11), lockwashers (10), two U-bolts (9), and wire rope (7) from retainer plate (8). Discard lockwashers.

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**4-48. SPARE WHEEL AND TIRE CARRIER MAINTENANCE (Con't).**


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2. Remove wire rope (7) from gearshaft (13).
3. Remove cotter pin (12) from gearshaft (13) and remove gearshaft from spare wheel and tire carrier (4). Discard cotter pin.
4. If damaged, remove rivet (5) and pawl (6) from spare wheel and tire carrier (4). Discard rivet.

---

**c. CLEANING AND INSPECTION**


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**WARNING**


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Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and **DO NOT** breathe vapors. **DO NOT** use near open flame or excessive heat. The solvent's flash point is 100 °F-138 °F (38 °C -59 °C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean all parts with dry cleaning solvent. Allow to dry.

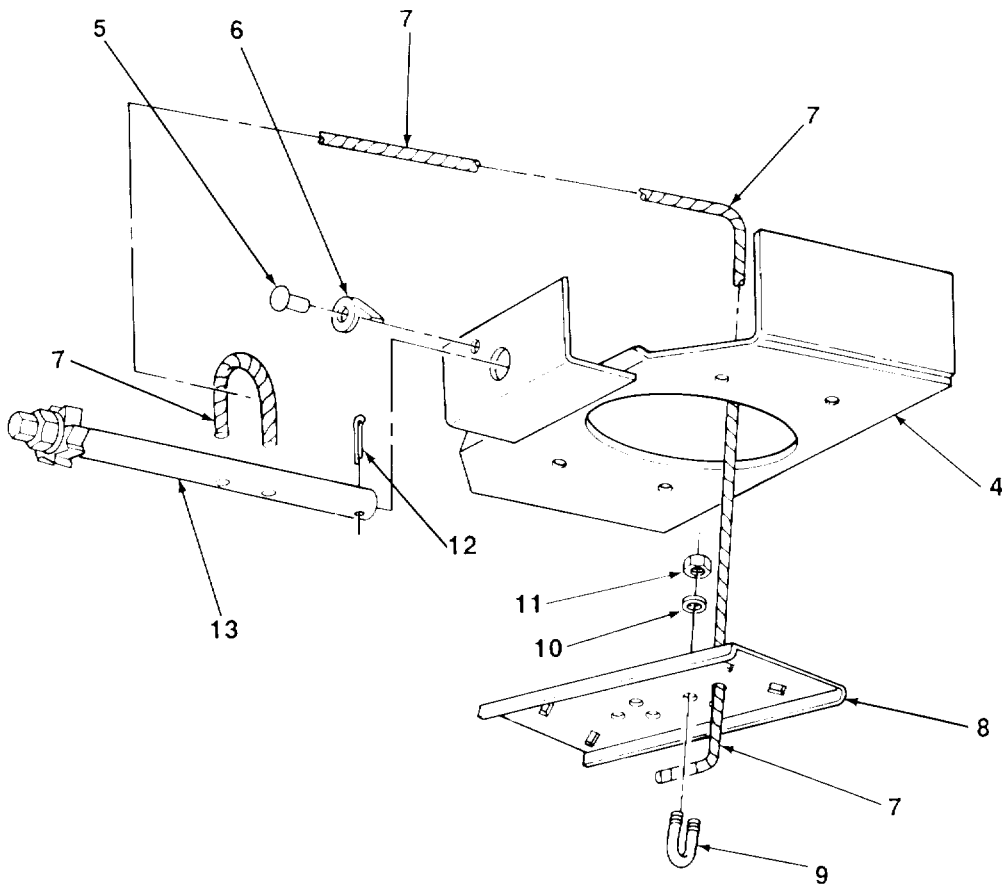
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**4-48. SPARE WHEEL AND TIRE CARRIER MAINTENANCE (Con't).**

2. Inspect spare wheel and tire carrier for cracks, twists, and broken welds. Replace spare wheel and tire carrier if cracked or twisted. Notify Direct Support Maintenance of broken welds.
3. Inspect gearshaft for wear or bent shaft. Replace gearshaft if worn or bent.
4. Inspect retainer plate for damage. Replace if damaged.
5. Inspect wire rope for fraying or excessive wear. Replace wire rope if frayed or excessively worn.

**d. ASSEMBLY**

1. If removed, install pawl (6) on spare wheel and tire carrier (4) with new rivet (5).
2. Install gearshaft (13) on spare wheel and tire carrier (4) with new cotter pin (12).



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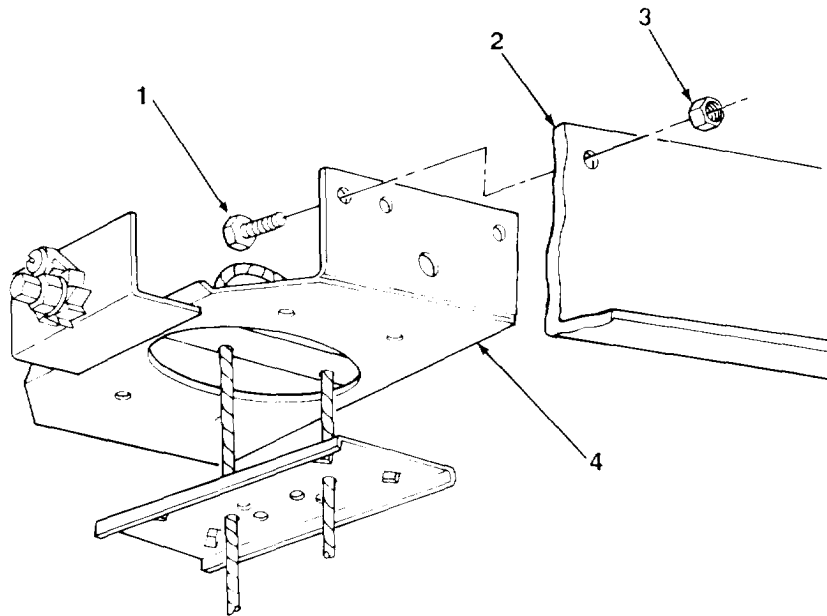
**4-48. SPARE WHEEL AND TIRE CARRIER MAINTENANCE (Con't).**

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3. Thread wire rope (7) through holes in gearshaft (13) until both ends are equal in length.
4. Thread wire rope (7) through holes in retainer plate (8) and overlap ends in a loose, single knot. Secure wire rope to retainer plate with two U-bolts (9), four new lockwashers (10), and nuts (11).

**e. INSTALLATION**

Install spare wheel and tire carrier (4) on frame (2) with four screws (1) and new locknuts (3).

**FOLLOW-ON TASKS:**

- Lubricate spare wheel and tire carrier (Chapter 3, Section I).
- Install spare wheel and tire (para 4-43).

---

#### 4-49. UPPER FIFTH WHEEL PLATE REPLACEMENT (LATE MODEL).

---

*This Task Covers:*

a. Removal

b. Installation

---

*Initial Setup:*

**Materials/Parts:**

- Twelve locknuts

**Tools/Test Equipment:**

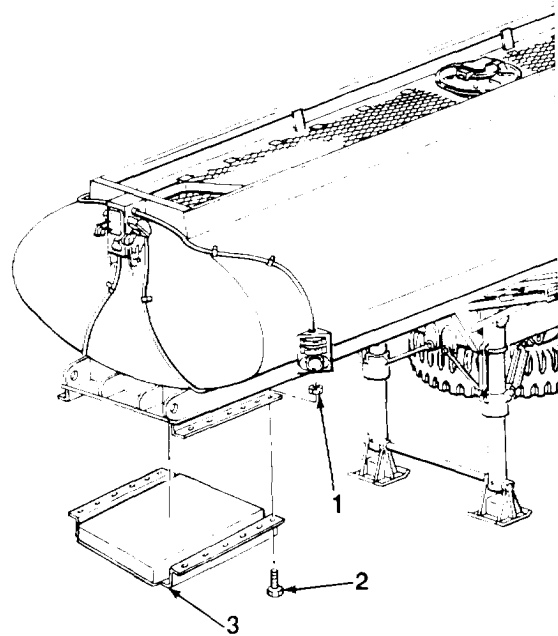
- General mechanic's tool kit
- Common no. 1 shop set

**Personnel Required:** Three

---

**a. REMOVAL**

1. Provide a balanced support for upper fifth wheel plate (3).
2. Remove 12 locknuts (1) and screws (2). Discard locknuts.
3. Remove upper fifth wheel plate (3) from under semitrailer.



**b. INSTALLATION**

1. Place upper fifth wheel plate (3) on a balanced support.
2. Lift upper fifth wheel plate (3) into position under semitrailer and loosely install 12 screws (2) and new locknuts (1).
3. Ensure that upper fifth wheel plate (3) is flush against semitrailer. Tighten 12 locknuts (1).

**FOLLOW-ON TASKS:**

- Lubricate upper fifth wheel plate (Chapter 3, Section 1).

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**4-50. LANDING GEAR LEG REPLACEMENT.**


---

*This Task Covers:*

a. Removal

b. Installation

---

*Initial Setup:*

**Equipment Conditions:**

- Wheels chocked.

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

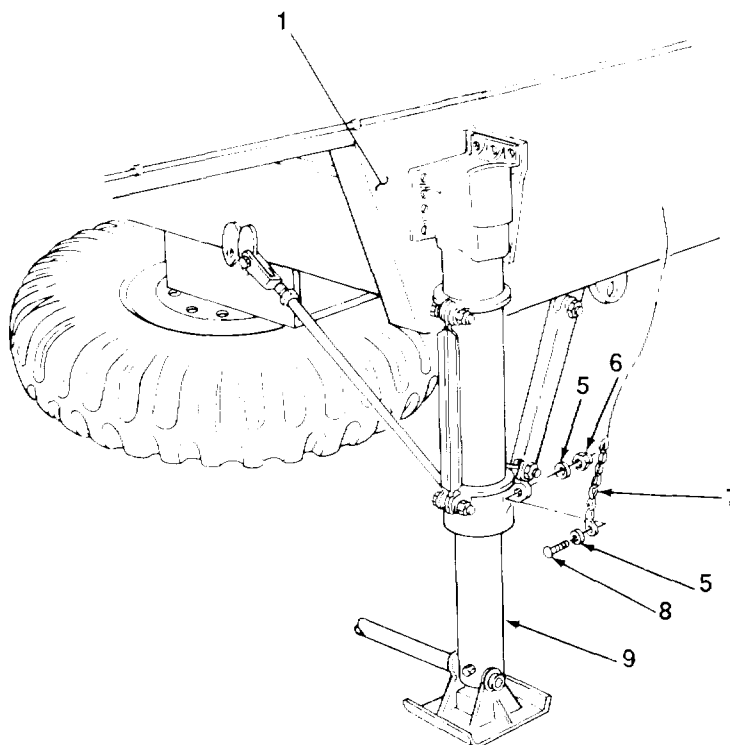
- Three locknuts
- Eleven lockwashers

**Personnel Required:** Two

---

**a. REMOVAL**

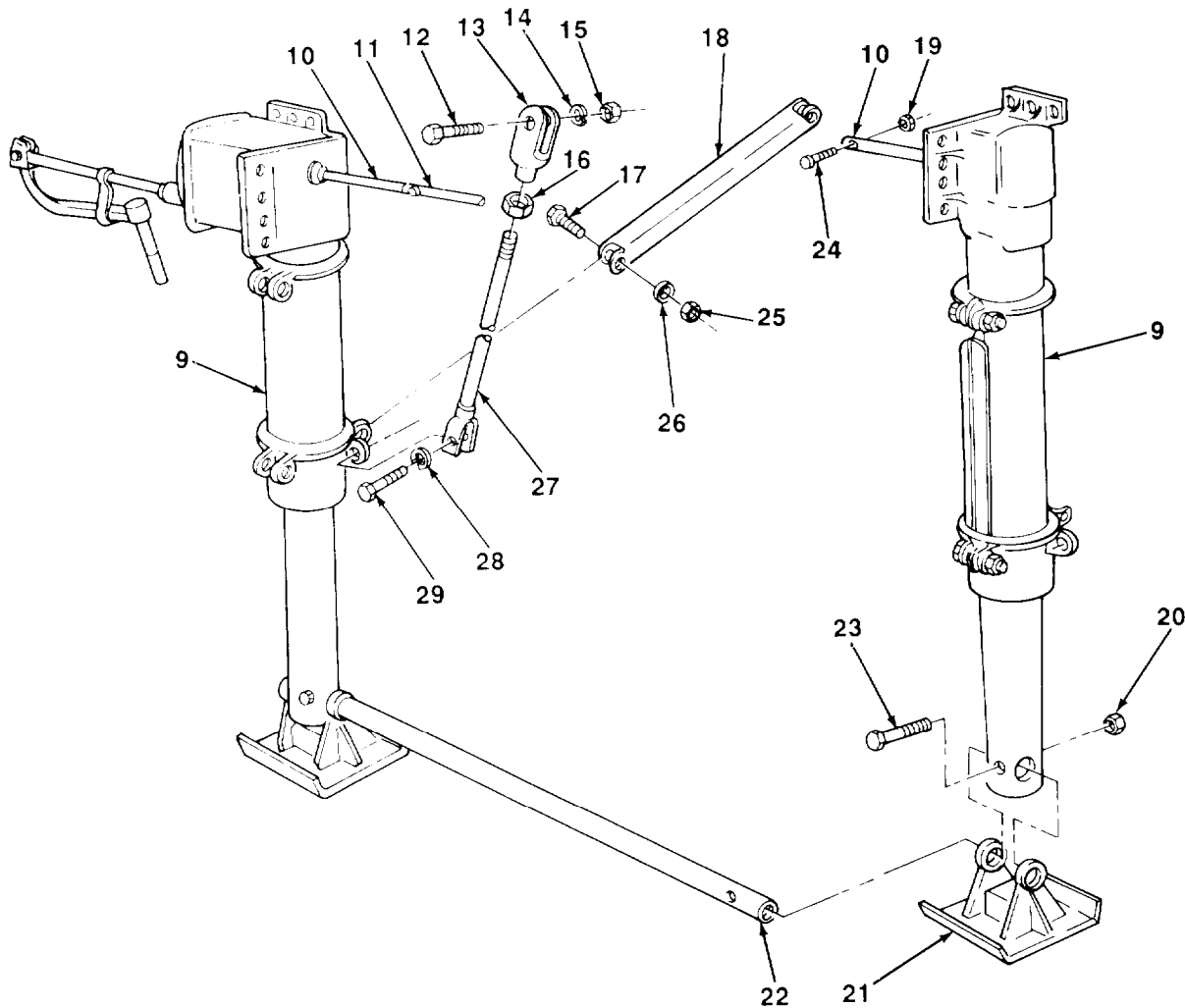
1. Position suitable support under front corners of frame (1).
2. Raise landing gear legs (9) enough to relieve load from landing gear.
3. Remove nut (6), two washers (5), screw (8), and ground board chain (7) from landing gear leg (9).



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**4-50. LANDING GEAR LEG REPLACEMENT (Con't).**

4. Remove two locknuts (19), and screws (24) from shaft (11) and gearbox output shafts (10). Discard locknuts.
5. Remove nut (15), lockwasher (14), and screw (12) from rod (27) and crossmember. Discard lockwasher.
6. Remove screw (29), lockwasher (28), and rod (27) from landing gear leg (9). Discard lockwasher.



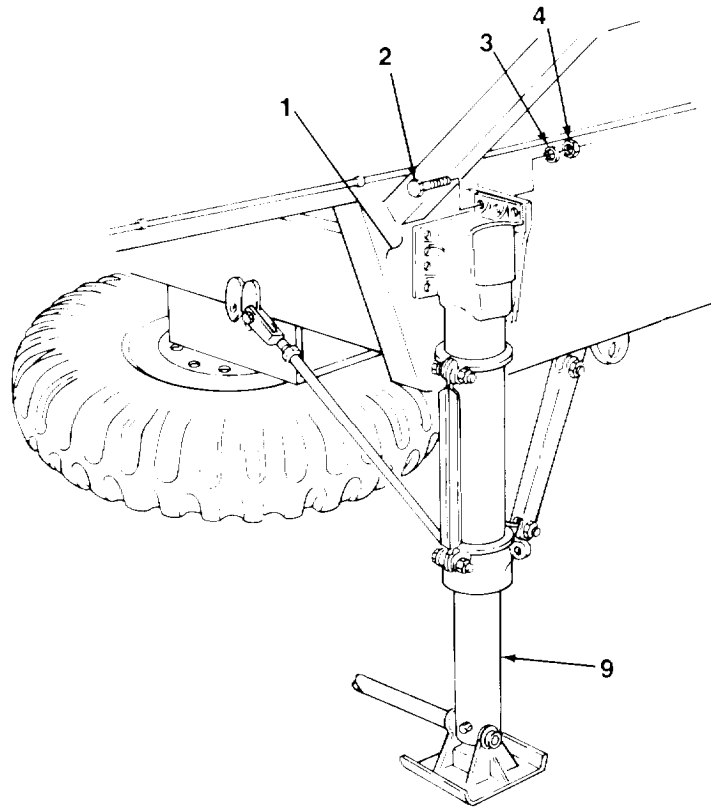
7. If damaged, remove clevis (13) and nut (16) from rod (27).
8. Remove two nuts (25), lockwashers (26), screws (17), and brace (18) from landing gear leg (9) and frame (1). Discard lockwashers.
9. Remove locknut (20), screw (23), and tube (22) from landing gear leg (9) and shoe (21). Discard locknut.
10. Remove seven nuts (4), lockwashers (3), and screws (2) from landing gear leg (9) and frame (1). Pull outward and remove landing gear leg from frame. Remove shaft (11) from gearbox output shaft (10) on other landing gear leg. Discard lockwashers.

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**4-50. LANDING GEAR LEG REPLACEMENT (Con't).**


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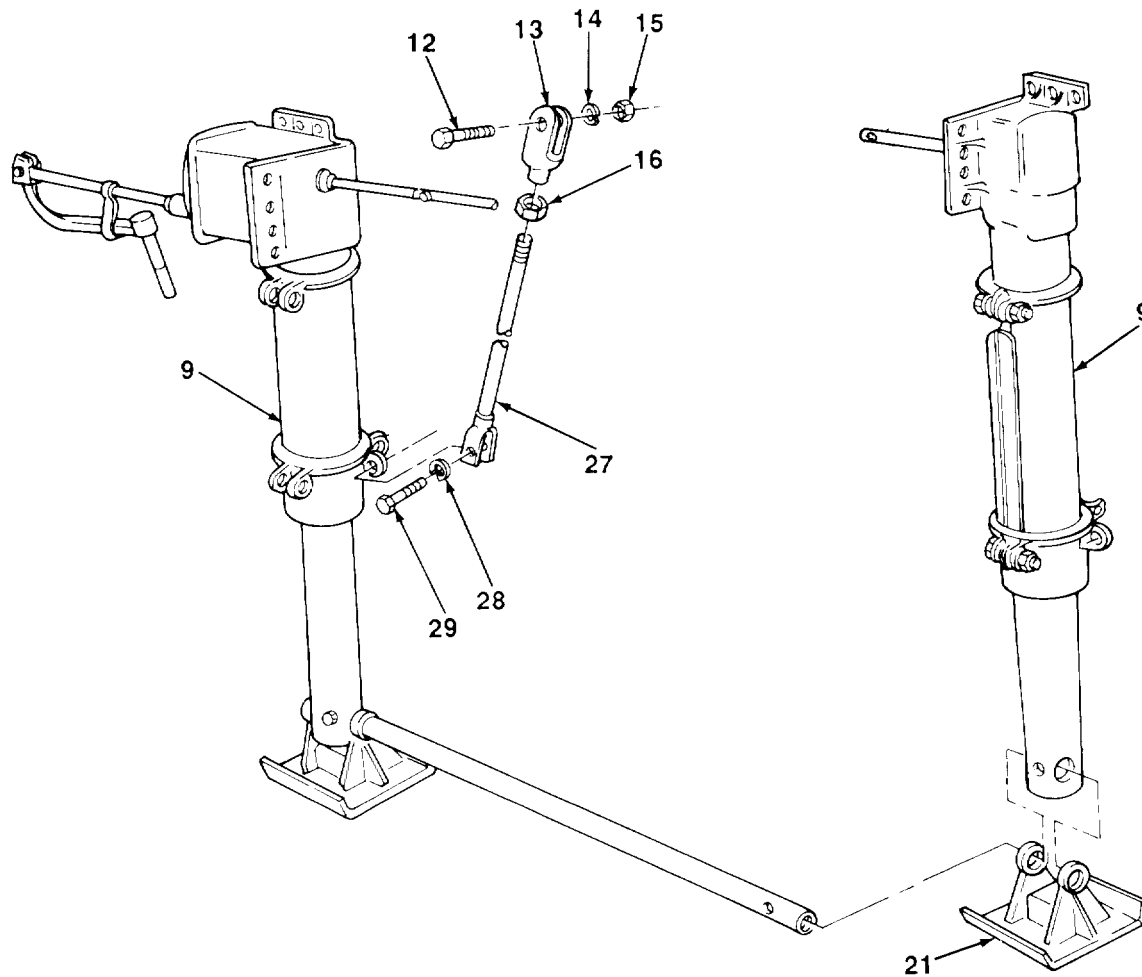

**b. INSTALLATION**

1. Install shaft (11) on gearbox output shaft (10) of other landing gear leg with screw (24) and new locknut (19).
2. Position landing gear leg (9) on frame (1) with gearbox output shaft (10) installed into shaft (11).
3. Position shoe (21) on landing gear leg (9). Install landing gear leg on tube (22) with screw (23) and new locknut (20).
4. Manually turn gearbox output shaft (10) until landing gear leg (9) is same height as other landing gear leg.
5. Install landing gear leg (9) on frame (1) with seven screws (2), new lockwashers (3), and nuts (4). Do not fully tighten nuts.
6. Install screw (24) and new locknut (19) into shaft (11) and gearbox output shaft (10).
7. Install brace (18) on frame (1) and landing gear leg (9) with two screws (17), new lockwashers (26), and nuts (25).

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**4-50. LANDING GEAR LEG REPLACEMENT (Con't).**

8. If removed, install nut (16) and clevis (13) on rod (27).
9. Install rod (27) on landing gear leg (9) with new lockwasher (28) and screw (29).
10. Install rod (27) on crossmember with screw (12), new lockwasher (14), and nut (15).



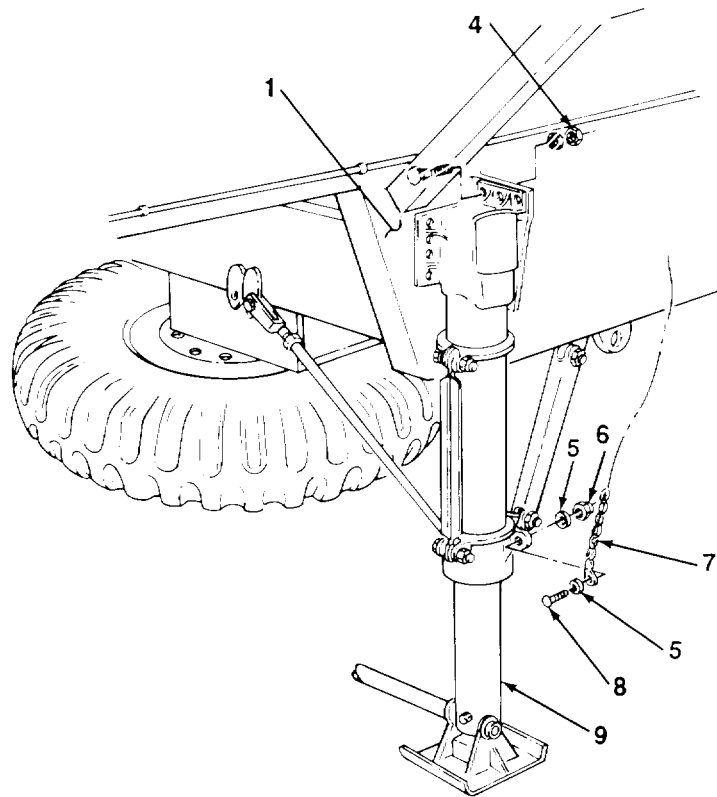
11. Install ground board. chain (7) on landing gear leg (9) with screw (8), two washers (5), and nut (6).
12. Torque nuts (4) to 60-70 lb.-ft. (81 -95 N•m).
13. Lower landing gear legs (9) until shoes (21) contact ground.
14. Remove support from under front corners of frame (1).

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**4-50. LANDING GEAR LEG REPLACEMENT (Con't).**

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**FOLLOW-ON TASKS:**

- Lubricate landing gear leg (Chapter 3, Section I).

**4-51. GEARBOX REPLACEMENT.**

*This Task Covers:*

a. Replacement (Curbside)

b. Replacement (Roadside)

*Initial Setup:*

**Equipment Conditions:**

- Landing gear leg removed (para 4-50).

**Materials/Parts:**

- Two locknuts

**Tools/Test Equipment:**

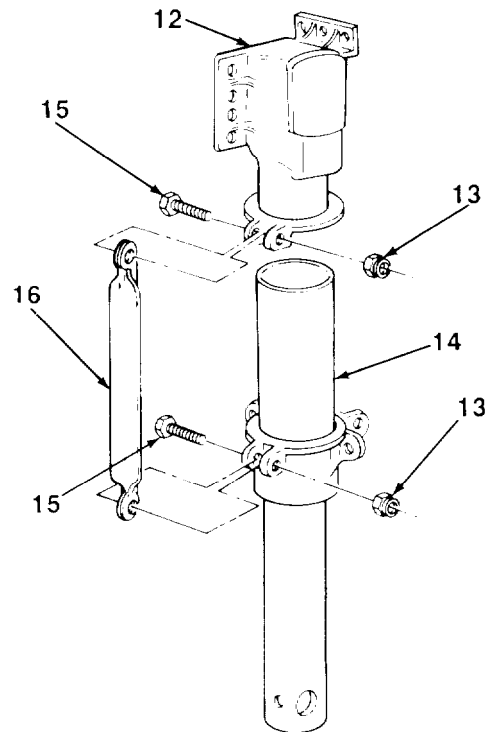
- General mechanic's tool kit

**a. REPLACEMENT (CURBSIDE)**

1. Remove nut (5), two washers (2), bolt (1), handcrank (3), and handcrank rest (4) from gearbox output shaft (6).
2. Remove two locknuts (8), screws (10), angle bracket (11), and gearbox (7) from landing gear leg (9). Discard locknuts.
3. Position gearbox (7) on landing gear leg (9) and install angle bracket (11) with two screws (10) and new locknuts (8).
4. Position handcrank rest (4) on gearbox output shaft (6) and install handcrank (3) with bolt (1), two washers (2), and nut (5).

**b. REPLACEMENT (ROADSIDE)**

1. Remove two locknuts (13), screws (15), angle bracket (16), and gearbox (12) from landing gear leg (14). Discard locknuts.
2. Position gearbox (12) on landing gear leg (14) and install angle bracket (16) with two screws (15) and new locknuts (13).



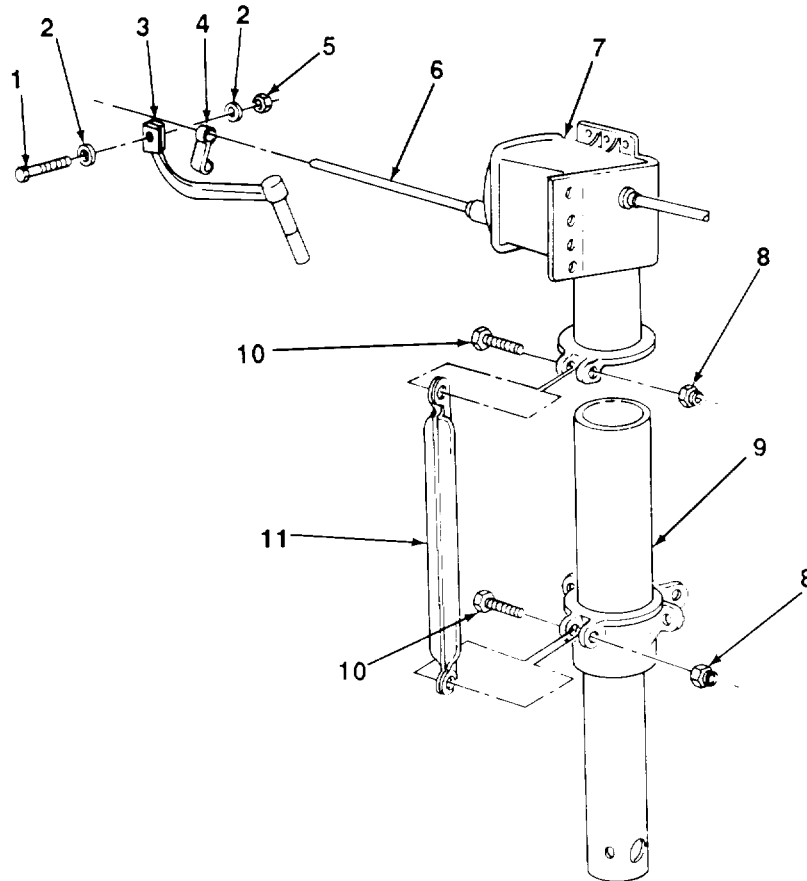
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**4-51. GEARBOX REPLACEMENT (Con't).**

---

**FOLLOW-ON TASKS:**

- Lubricate gearbox (Chapter 3, Section I).
- Install landing gear leg (para 4-50).

Section X. SPRINGS MAINTENANCE

Paragraph Title	Page Number
Spring Replacement . . . . .	4-104
Spring Seat Replacement . . . . .	4-107
Torque Rod Replacement. . . . .	4-110

**4-52. SPRING REPLACEMENT.**

*This Task Covers:*

- a. Removal
- b. Installation

*Initial Setup:*

**Equipment Conditions:**

- Hydraulic lines removed from rear axle (para 4-34).

**Materials/Parts:**

- Six lockwashers

**Tools/Test Equipment:**

- Common no. 2 shop set

**Personnel Required: Two**

**a. REMOVAL**

1. Position semitrailer on hard level surface with front resting on landing gear.
2. Ensure that air reservoir is drained.
3. Raise forward-rear and rear axles on side where spring is to be removed. Jacks should be repositioned as close as possible to lower torque rod brackets on axles.
4. Position floor jack under torque rod bracket on cross tube. Raise cross tube until weight of semitrailer is off spring to be removed. Place supports under rear corners of semitrailer frame.
5. Remove wheels from both axles (para 4-43).
6. Remove four nuts (7), lockwashers (6), and two U-bolts (1) from spring (10) and spring seat (5). Remove spring seat saddle (11) from spring. Discard lockwashers.

**WARNING**

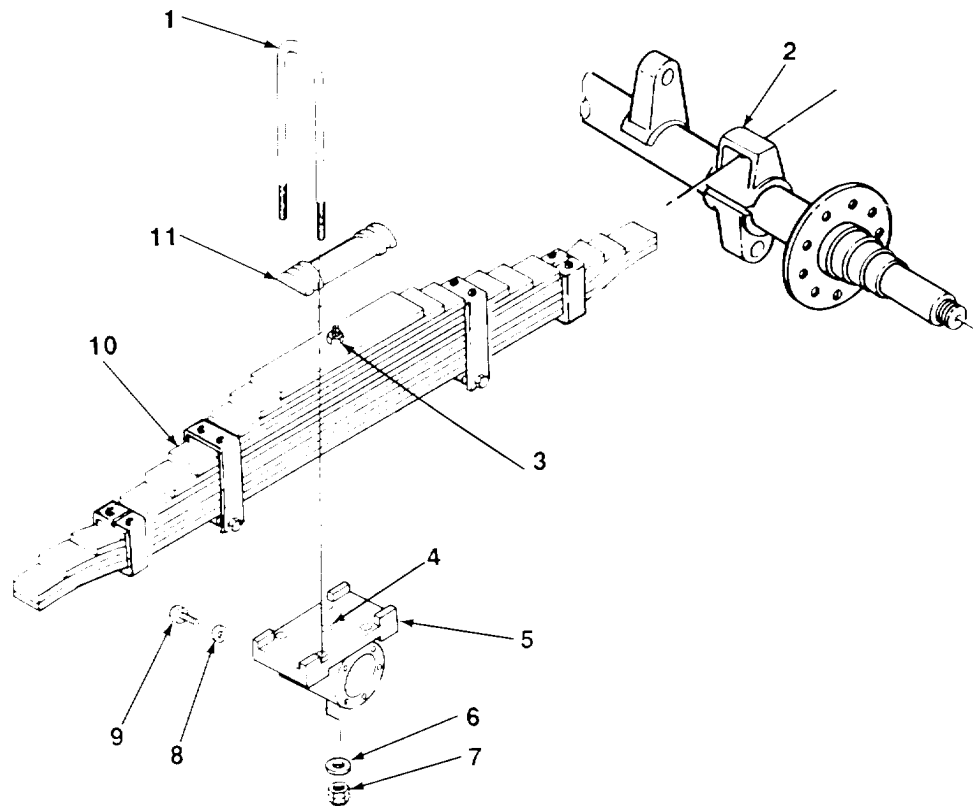
**If spring is seized in spring seat, raise rear axle to lift spring. Be careful not to lift semitrailer off supports under frame.**

7. Remove two screws (9) and lockwashers (8) from spring seat (5) and lift spring (10) from seat. Discard lockwashers.
8. Disconnect upper torque rod from bracket on rear axle (para 4-54).

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**4-52. SPRING REPLACEMENT (Con't).**


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9. Move rear axle rearward until end of spring (10) clears guide bracket (2).
10. Use a suitable lifting device to lift spring (10) from guide bracket (2) on forward-rear axle.

**b. INSTALLATION**

1. Lubricate spring bearing plate. Insert end of spring (10), larger leaf down, into guide bracket (2) on forward-rear axle.
2. Position spring (10) on spring seat (5) so center bolt of spring is over recess (4) in spring seat. Seat spring firmly.
3. Position spring seat saddle (11) on spring (10). Ensure that nut (3) on center bolt fits into recess on spring saddle.
4. Install two U-bolts (1) on spring (10) and spring seat (5) with four new lockwashers (6) and nuts (7). Torque nuts to 200-320 lb.-ft. (271-434 N•m).
5. Install two new lockwashers (8) and screws (9) on spring seat (5). Torque screws to 650-750 lb.-ft. (881-1017 N•m).
6. Move rear axle forward and install spring (10) in guide bracket (2) on forward-rear axle. Release jacks after spring clears guide bracket.

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**4-52. SPRING REPLACEMENT (Con't).**

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7. Connect upper torque rod to bracket on rear axle (para 4-54).
8. Install wheels (para 4-43).
9. Remove all supports.

**FOLLOW-ON TASKS:**

- Install hydraulic lines on rear axle (para 4-34).

---

#### 4-53. SPRING SEAT REPLACEMENT.

---

*This Task Covers.*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | c. Installation |
| b. Cleaning and Inspection |                 |
- 

*Initial Setup:*

**Equipment Conditions:**

- Spring removed (para 4-52).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no 2 shop set

**Materials/Parts:**

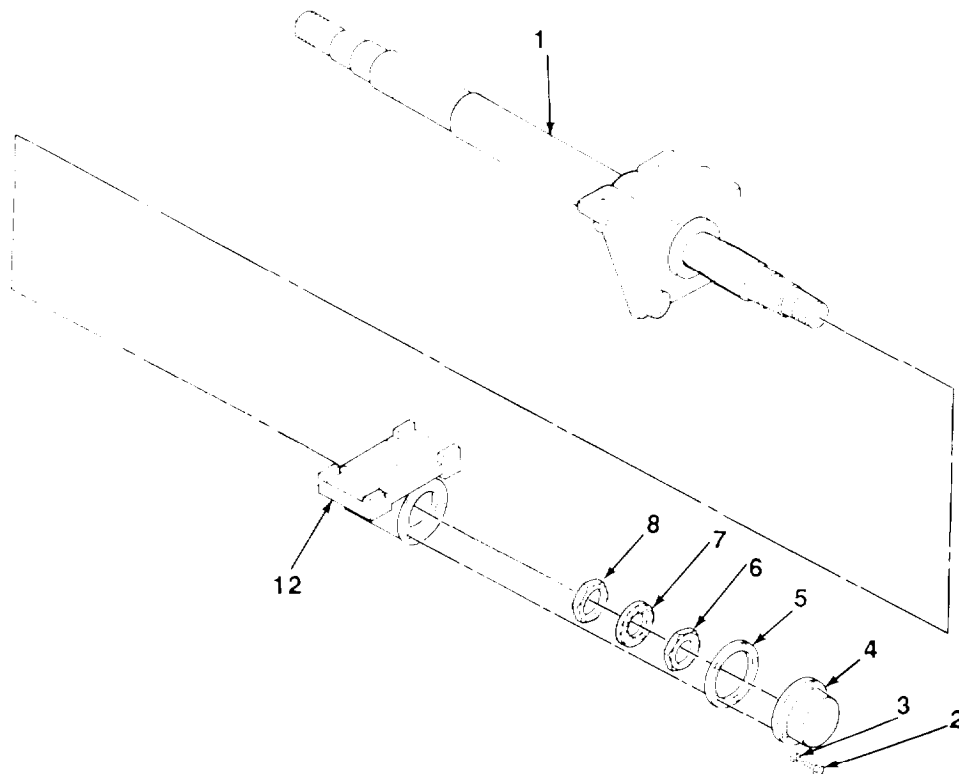
- Grease (Item 10, Appendix E)
- Dry cleaning solvent (Item 16, Appendix E)
- One gasket
- One seal
- Six lockwashers

**References:**

- TM 9-214
- 

**a. REMOVAL**

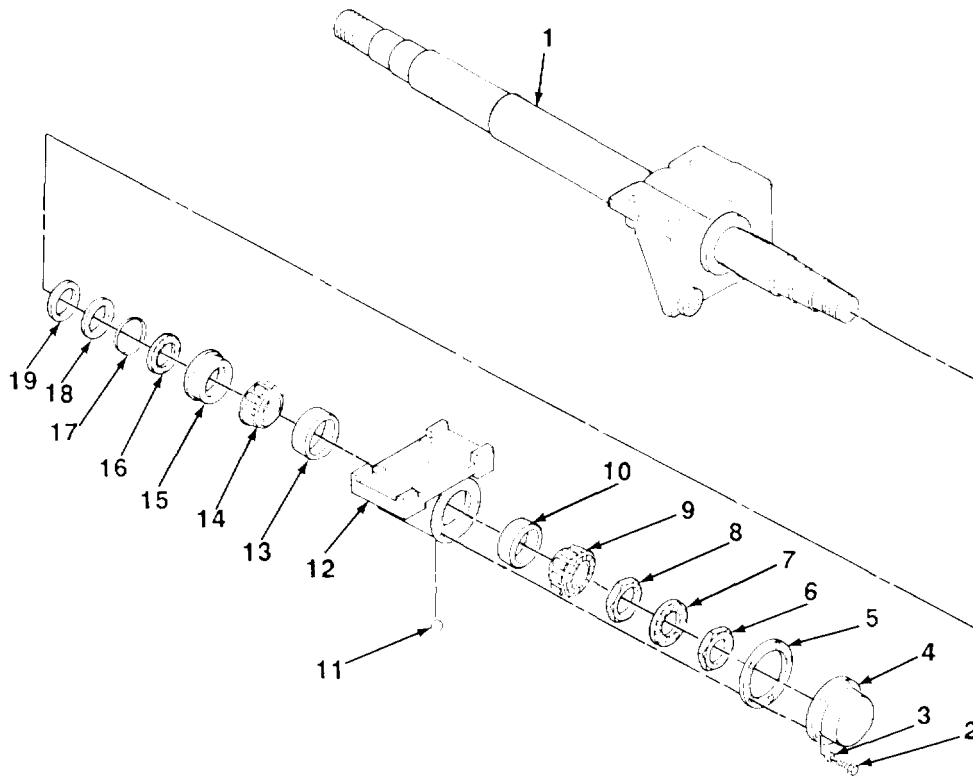
1. Remove six screws (2), lockwashers (3), access cover (4), and gasket (5) from spring seat (12). Discard lockwashers and gasket.
2. Remove nut (6), keywasher (7), and inner adjusting nut (8) from spring seat (12) and cross tube (1).



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**4-53. SPRING SEAT REPLACEMENT (Con't).**

3. Tap spring seat (12) with a soft hammer to loosen outer bearing cone (9). Remove outer bearing cone from spring seat and cross tube (1).
4. Remove spring seat (12) from cross tube (1). Seal (15) will remain in spring seat.
5. Remove seal (15), inner bearing cone (14), and pipe plug (11) from spring seat (12). Discard seal.



**b. CLEANING AND INSPECTION**

**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean spring seat and cross tube with dry cleaning solvent and inspect for cracks or other damage. Replace spring seat if damaged. Notify Direct Support Maintenance if cross tube is damaged.

**NOTE**

**If outer and inner bearing cones need replacing, bearing cups must also be replaced.**

2. Clean and inspect outer and inner bearing cones in accordance with TM 9-214. Discard if damaged.

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**4-53. SPRING SEAT REPLACEMENT (Con't).**

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3. Inspect packing retainer (16), felt (17), wiper ring (18), and washer (19) for damage. Remove from cross tube and discard if damaged.
4. If damaged or if outer and inner bearing cones are being replaced, remove two bearing cups (10 and 13) from spring seat. Discard bearing cups.

**c. INSTALLATION**

1. If removed, install two new bearing cups (10 and 13) in spring seat (12).
2. If removed, install new washer (19), new wiper ring (18), new felt (17), and new packing retainer (16) on cross tube (1).

**NOTE**

**Instructions for packing outer and inner bearing cones are found in TM 9-214.**

3. Pack inner bearing cone (14) with grease. Install inner bearing cone in spring seat (12).
4. Install pipe plug (11) in spring seat (12). Install spring seat on cross tube (1). Install new seal (15) in spring seat.
5. Pack outer bearing cone (9) with grease. Install outer bearing cone and inner adjusting nut (8) on spring seat (12) and cross tube (1). Torque nut to approximately 25 lb. -ft. (34 N•m) to ensure that bearings seat properly. Back off nut until spring seat can be rotated by hand but without noticeable lateral movement.
6. Install keywasher (7) on cross tube (1) so that pin in inner adjusting nut (8) engages hole in keywasher.
7. Install nut (6) on cross tube (1). Check bearing adjustment again.
8. Install new gasket (5) and access cover (4) on spring seat (12) with six new lockwashers (3) and screws (2).

**FOLLOW-ON TASKS:**

- Install spring (para 4-52).

**4-54. TORQUE ROD REPLACEMENT.**

*This Task Covers:*

- a. Removal
- b. Cleaning and Inspection
- c. Installation

*Initial Setup:*

**Equipment Conditions:**

- Spring removed (upper torque rod replacement only) (para 4-52).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

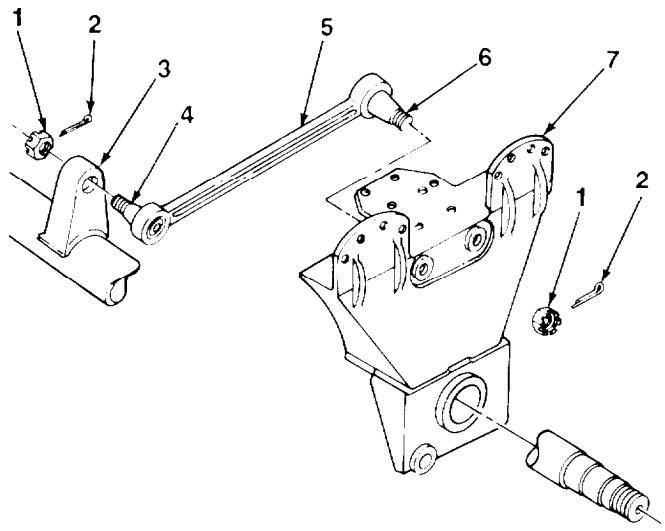
- Scrub brush (Item 3, Appendix E)
- Dry cleaning solvent (Item 16, Appendix E)
- Two cotter pins

**NOTE**

- Upper and lower torque rods are replaced the same way. Upper torque rod is illustrated.
- Ball assemblies are mounted in rubber and can be moved out of normal alignment for removal.

**a. REMOVAL**

1. Remove two cotter pins (2) and slotted nuts (1) from torque rod (5). Discard cotter pins.
2. Tap threaded end of ball assembly (4) with a soft hammer to loosen torque rod (5) from axle bracket (3).
3. Remove torque rod (5) from mounting bracket (7).



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**4-54. TORQUE ROD REPLACEMENT (Con't).**

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**b. CLEANING AND INSPECTION**

1. Clean rubber parts with water and a scrub brush.

---

**WARNING**

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Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

2. Clean all other parts with dry cleaning solvent. Allow to dry.
3. Inspect rubber on two ball assemblies (4 and 6) for loss of elasticity, breaks in material, and secure mounting in torque rod. Notify Direct Support Maintenance if damaged or loose.

**c. INSTALLATION**

1. Position torque rod (5) in mounting bracket (7).
2. Position torque rod (5) in axle bracket (3) and install two slotted nuts (1) and new cotter pins (2).

**FOLLOW-ON TASKS:**

- Install spring (upper torque rod replacement only) (para 4-52).

Section XI. BODY MAINTENANCE

Paragraph Title	Page Number
Cabinet Door Latches and Hinges Replacement . . . . .	4-122
Chock Block Chain Hook Replacement . . . . .	4-114
Cleaning Tank Interior . . . . .	4-138
Drain Plug and Chain Assembly Replacement . . . . .	4-113
Fuel Level Gage Adjustment.. . . . .	4-140
Hose Reel Replacement (M131A4C and M131A5C) . . . . .	4-115
Manhole Cover Maintenance (M131A4 and M131A4C) . . . . .	4-125
Manhole Cover Maintenance (M131A5 and M131A5C) . . . . .	4-128
Purging Tank . . . . .	4-130
Splashguard Replacement . . . . .	4-112
Static Reel Replacement . . . . .	4-116
Stowage Tube Assembly Replacement . . . . .	4-118

**4-55. SPLASHGUARD REPLACEMENT.**

*This Task Covers:* Replacement

*Initial Setup:*

**Materials/Parts:**

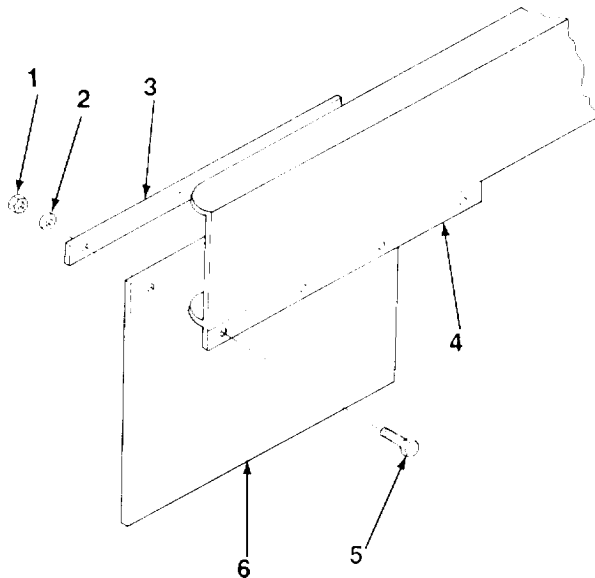
- Four lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit

**REPLACEMENT**

1. Remove four nuts (1), lockwashers (2), screws (5), bracket (3), and splashguard (6) from frame (4). Discard lockwashers.
2. Install splashguard (6) and bracket (3) on frame (4) with four screws (5), new lockwashers (2), and nuts (1).



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**4-56. DRAIN PLUG AND CHAIN ASSEMBLY REPLACEMENT.**

---

*This Task Covers:* Replacement

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*Initial Setup:*

**Materials/Parts:**

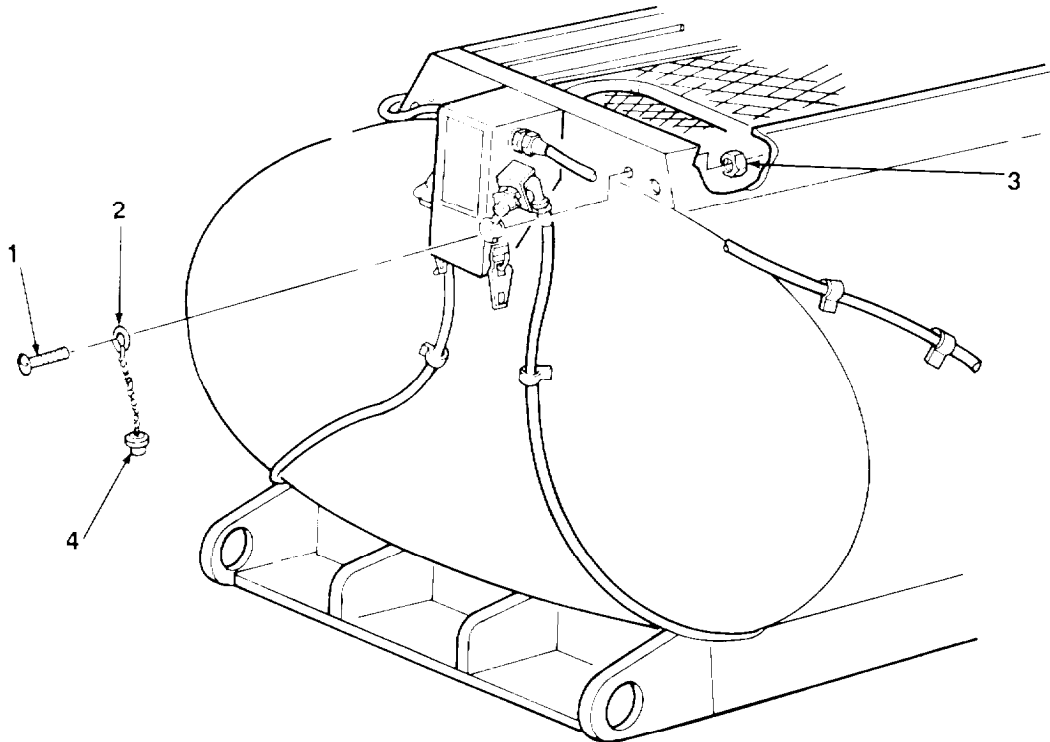
- One locknut

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**REPLACEMENT**

1. Remove locknut (3) and screw (1) from chain assembly (2). Remove drain plug (4) from semitrailer. Remove drain plug and chain assembly. Discard locknut.
2. Install drain plug (4) on semitrailer. Install chain assembly (2) on semitrailer with screw (1) and new locknut (3).



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#### 4-57. CHOCK BLOCK CHAIN HOOK REPLACEMENT.

---

*This Task Covers:* Replacement

---

*Initial Setup:*

**Materials/Parts:**

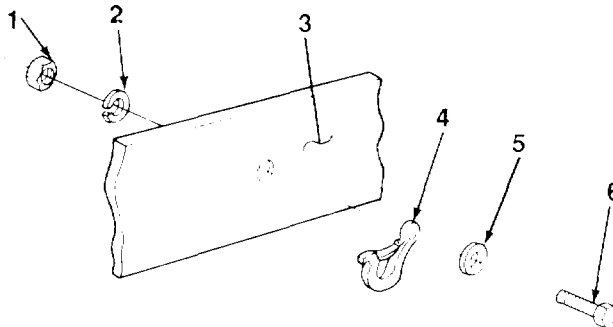
- One lockwasher

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**REPLACEMENT**

1. Remove nut (1), lockwasher (2), screw (6), washer (5), and chock block chain hook (4) from frame (3). Discard lockwasher.
2. Install chock block chain hook (4) on frame (3) with washer (5), screw (6), new lockwasher (2), and nut (1).



**4-58. HOSE REEL REPLACEMENT (M131A4C AND M131A5C).**

*This Task Covers:* Replacement

*Initial Setup:*

**Equipment Conditions:**

- Hose removed (para 4 68).

**Tools/Test Equipment:**

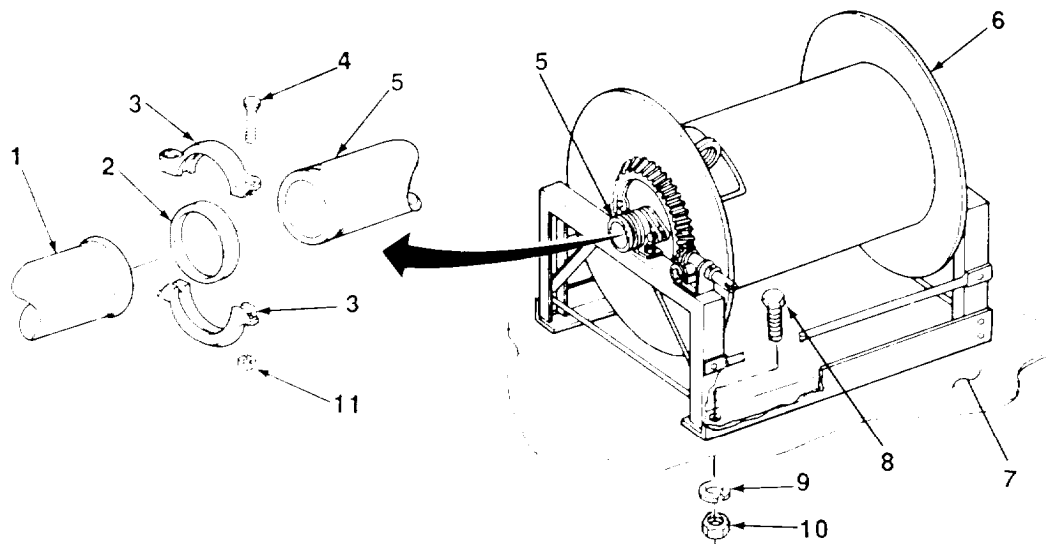
- General mechanic's tool kit

**Materials/Parts:**

- Four lockwashers

**Personnel Required:** Two**REPLACEMENT**

1. Remove two nuts (11), screws (4), and coupler (3) from tube (1) and packing joint (5).
2. Remove gasket (2) from packing joint (5) and tube (1).
3. Remove four nuts (10), lockwashers (9), screws (8), and hose reel (6) from cabinet (7). Discard lockwashers.
4. Install hose reel (6) in cabinet (7) with four screws (8), new lockwashers (9), and nuts (10).
5. Slide gasket (2) over packing joint (5) and tube (1) No portion of gasket should extend into groove on tube.

**CAUTION**

**Uneven tightening of nuts may cause gasket to pinch.**

6. Install coupler over gasket (2) with two screws (4) and nuts (11). Tighten nuts evenly until coupler halves are firmly together metal to metal.

**FOLLOW-ON TASKS:**

- Install hose (para 4-68).

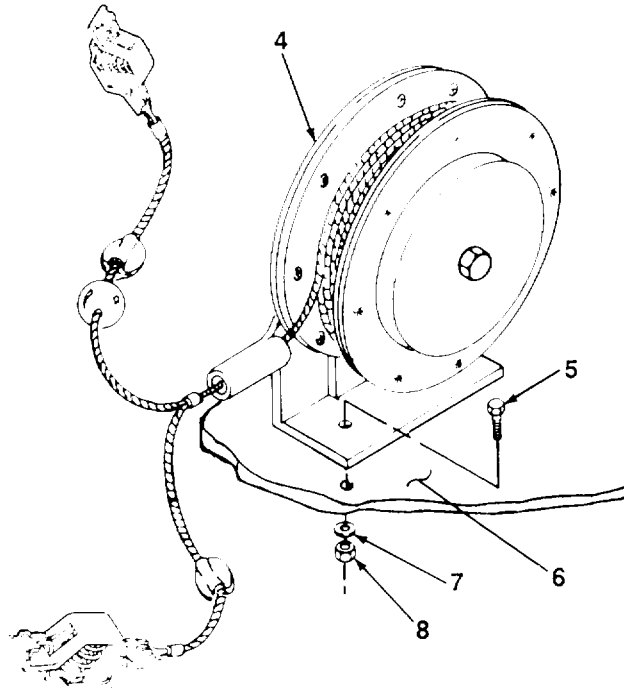
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4-59. STATIC REEL REPLACEMENT (Con't).

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## 4-60. STOWAGE TUBE ASSEMBLY REPLACEMENT.

---

*This Task Covers.*

- a. Removal b. Installation
- 

*Initial Setup.*

### Equipment Conditions:

- Stowage tubes empty.

### Tools/Test Equipment:

- General mechanic's tool kit

### Materials/Parts:

- Adhesive (Item 1, Appendix E)
- Two grommet strips
- Six lockwashers (M131A4 and M131A4C)
- Thirteen lockwashers (M131A5 and M131A5C)

**Personnel Required:** Two

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### a. REMOVAL

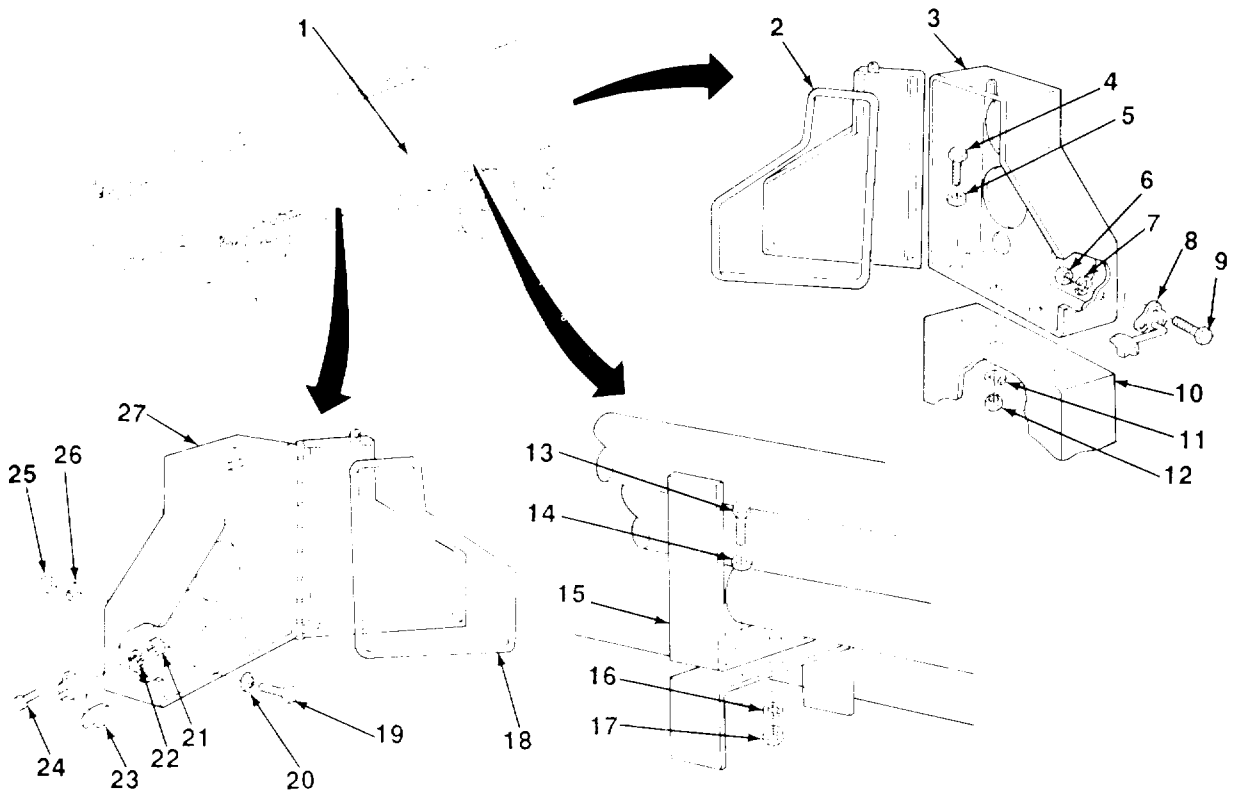
#### NOTE

- If removing stowage tube assembly on M131A5 or M131A5C, perform steps 1 through 5.
- Stowage tube assembly on M131A4 and M131A4C is welded to semitrailer. Maintenance for M131A4 and M131A4C stowage tube assembly is limited to replacement of grommet strips and fasteners on end assemblies. Perform only steps 6 through 9 for these models.

1. Remove padlocks from front and rear stowage tube end assemblies (27 and 3) and open doors.
2. Remove three nuts (12), lockwashers (11), screws (4), and washers (5) from rear stowage tube end assembly (3) and support (10). Discard lockwashers.
3. Remove two nuts (17), lockwashers (16), screws (13), and washers (14) from bracket (15). Discard lockwashers.
4. Remove two nuts (25), lockwashers (26), screws (19), and washers (20) from front stowage tube end assembly (27). Discard lockwashers.
5. Remove stowage tube assembly (1) from semitrailer.
6. Remove grommet strip (2) from rear stowage tube end assembly (3). Discard grommet strip.
7. Remove three nuts (6), lockwashers (7), screws (9), and fastener (8) from rear stowage tube end assembly (3). Discard lockwashers.
8. Remove grommet strip (18) from front stowage tube end assembly (27). Discard grommet strip.
9. Remove three nuts (21), lockwashers (22), screws (24), and fastener (23) from front stowage tube end assembly (27). Discard lockwashers.



4-60. STOWAGE TUBE ASSEMBLY REPLACEMENT (Con't).



b. INSTALLATION

NOTE

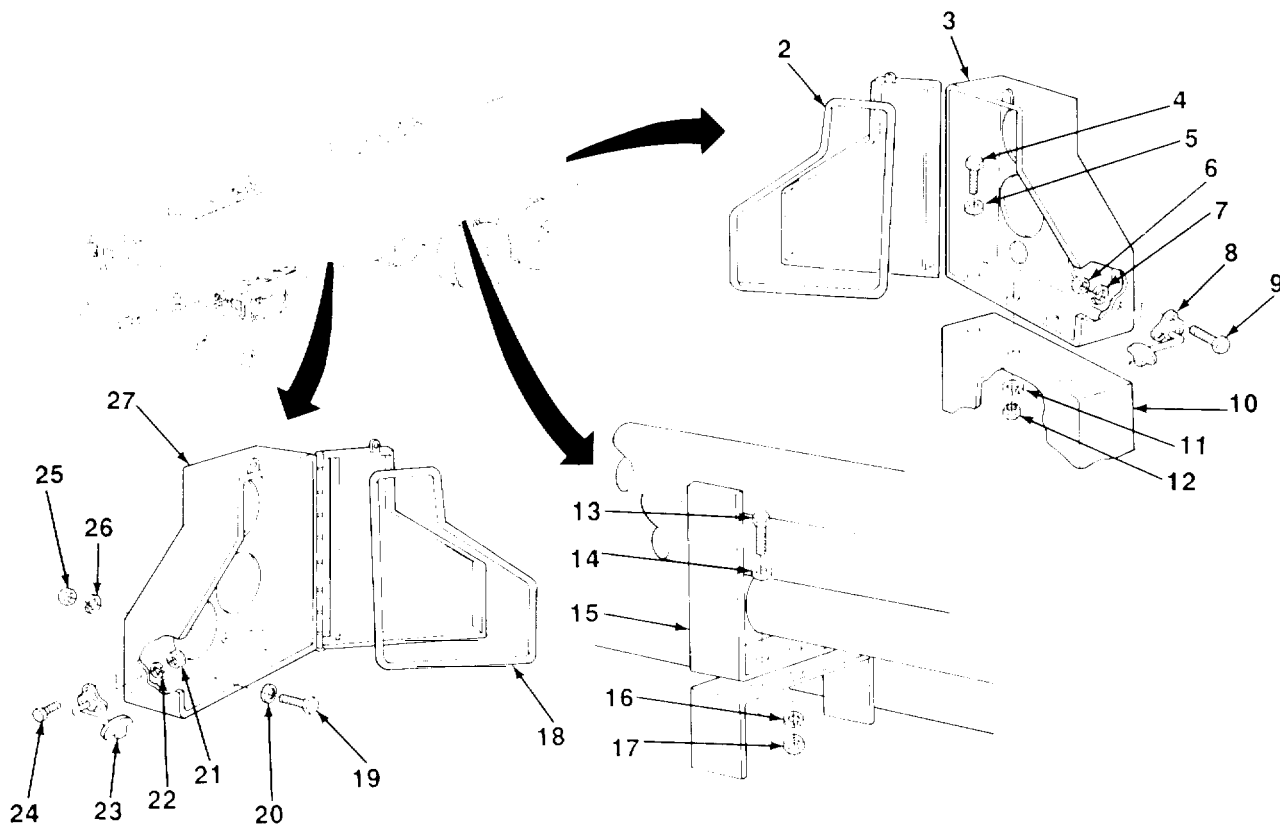
- If installing stowage tube assembly on M131A5 or M131A5C, perform steps 1 through 4 and 9.
- Stowage tube assembly on M131A4 and M131A4C is welded to semitrailer. Maintenance for M131A4 and M131A4C stowage tube assembly is limited to replacement of grommet strips and fasteners on end assemblies. Perform only steps 5 through 9 for these models.

1. Position stowage tube assembly (1) on semitrailer.

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**4-60. STOWAGE TUBE ASSEMBLY REPLACEMENT (Con't).**

2. Install two screws (19), washers (20), new lockwashers (26), and nuts (25) on front stowage tube end assembly (27).
3. Install two screws (13), washers (14), new lockwashers (16), and nuts (17) on bracket (15).
4. Install three screws (4), washers (5), new lockwashers (11), and nuts (12) on rear stowage tube end assembly (3) and support (10).
5. Install fastener (23) on front stowage tube end assembly (27) with three screws (24), new lockwashers (22), and nuts (21).
6. Apply adhesive to grommet strip (18) and install on front stowage tube end assembly (27).



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**4-60. STOWAGE TUBE ASSEMBLY REPLACEMENT (Con't).**

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7. Install fastener (8) on rear stowage tube end assembly (3) with three screws (9), new lockwashers (7), and nuts (6).
8. Apply adhesive to grommet strip (2) and install on rear stowage tube end assembly (3).
9. Close front and rear stowage tube end assemblies (27 and 3) and install padlocks.

---

## 4-61. CABINET DOOR LATCHES AND HINGES REPLACEMENT.

---

*This Task Covers:*

a. Removal

b. Installation

---

*Initial Setup:*

**Materials/Parts:**

- One seal
- Three cotter pins (M131A4 and M131A4C)
- Four rivets
- Five lockwashers (M131A4 and M131A4C)

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**a. REMOVAL**

**NOTE**

Perform steps 1 through 7 on M131A4 and M131A4C only.

1. Remove cotter pin (9), pin (8), and rod (14) from hinge (11). Discard cotter pin.
2. Remove three nuts (5), lockwashers (6), screws (10), and hinge (1 1) from cabinet door (7). Discard lockwashers.
3. Remove rod (14) from fitting (22).
4. Remove adjusting link (12) and nut (13) from rod (14).
5. Remove cotter pin (4), nut (3), and fitting (22) from mounting plate (24) and bracket (25) Discard cotter pin.
6. Remove cotter pin (21), spring (19), and bearing (20) from fitting (22). Discard cotter pin.
7. Remove two nuts (2), lockwashers (1), screws (23), and mounting plate (24) from bracket (25). Discard lockwashers.
8. Remove four rivets (17) and latch assembly (18) from two brackets (16) and cabinet door (7). Discard rivets.
9. Remove seal (15) from cabinet door (7), Discard seal.

---

**b. INSTALLATION**

---

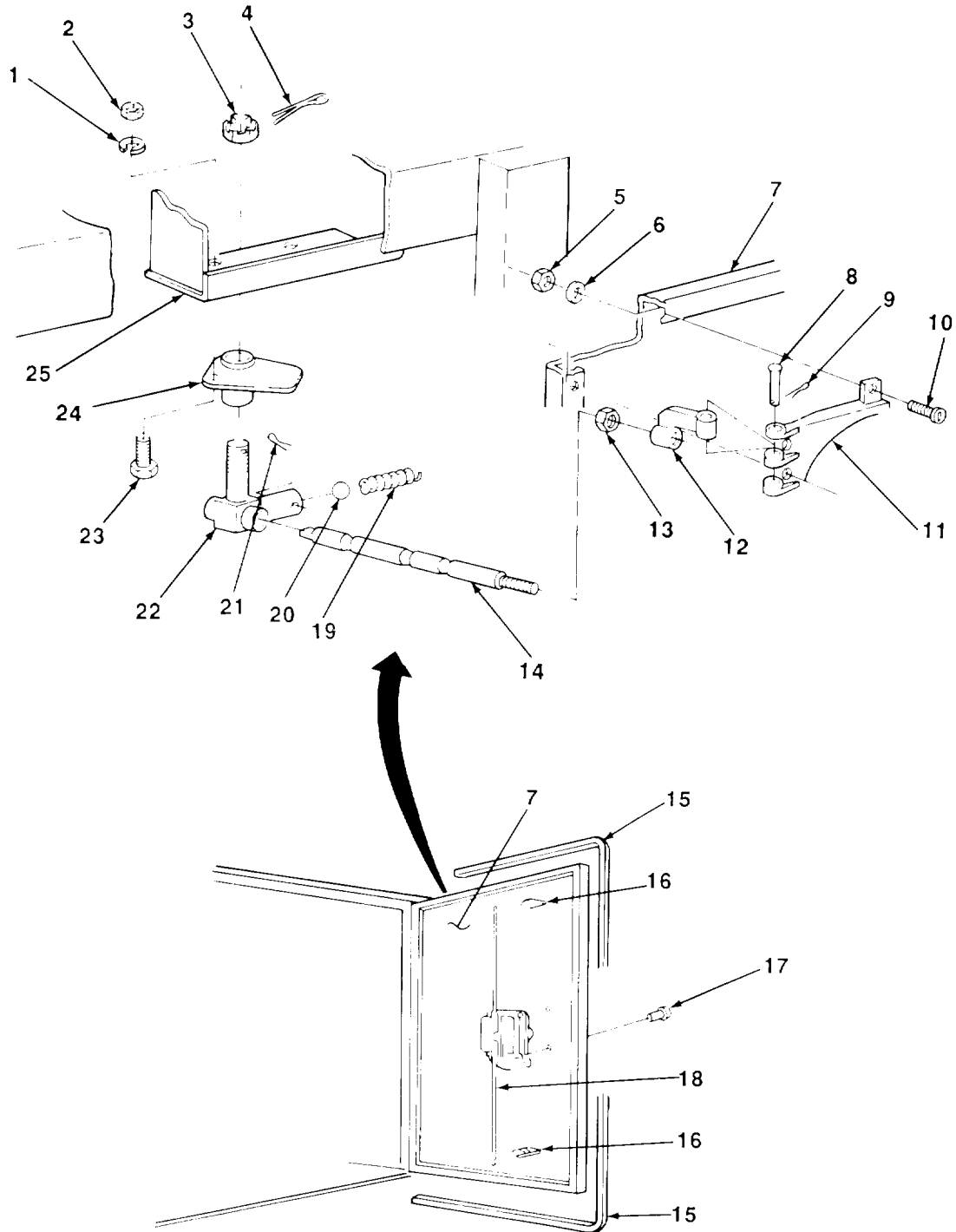
1. Install new seal (15) in cabinet door (7).
2. Position latch assembly (18) in two brackets (16) on cabinet door (7) and install four new rivets (17).

**NOTE**

Perform steps 3 through 10 for M131A4 and M131A4C only.

3. Install mounting plate (24) on bracket (25) with two screws (23), new lockwashers (1), and nuts (2)
4. Install bearing (20) and spring (19) in fitting (22) with new cotter pin (21).
5. Install fitting (22) on mounting plate (24) and bracket (25) with nut (3) and new cotter pin (4).

4-61. CABINET DOOR LATCHES AND HINGES REPLACEMENT (Con't).



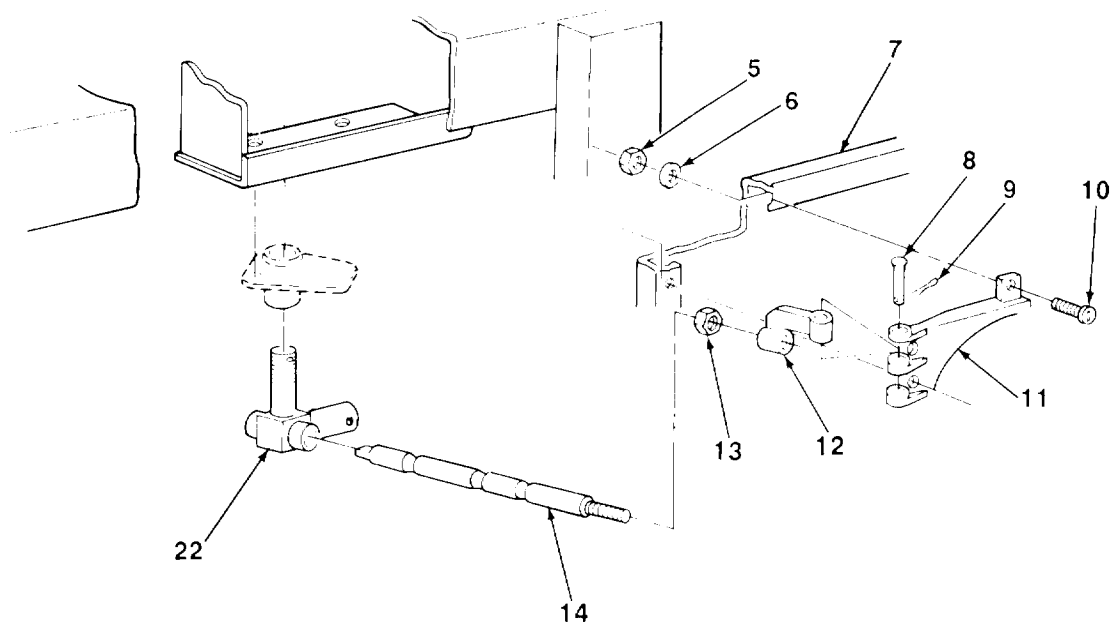
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**4-61. CABINET DOOR LATCHES AND HINGES REPLACEMENT (Con't).**

---

6. Install nut (13) and adjusting link (12) on rod (14).
7. Position rod (14) in fitting (22).
8. Install hinge (11) on cabinet door (7) with three screws (10), new lockwashers (6), and nuts (5).
9. Position rod (14) in hinge (11) and install pin (8) with new cotter pin (9).
10. Adjust rod (14) as necessary to permit cabinet door (7) to close by loosening or tightening nut (13).



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**4-62. MANHOLE COVER MAINTENANCE (M131A4 AND M131A4C).**

---

*This Task Covers:*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | d. Assembly     |
| b. Disassembly             | e. Installation |
| c. Cleaning and Inspection |                 |
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Materials/Parts:**

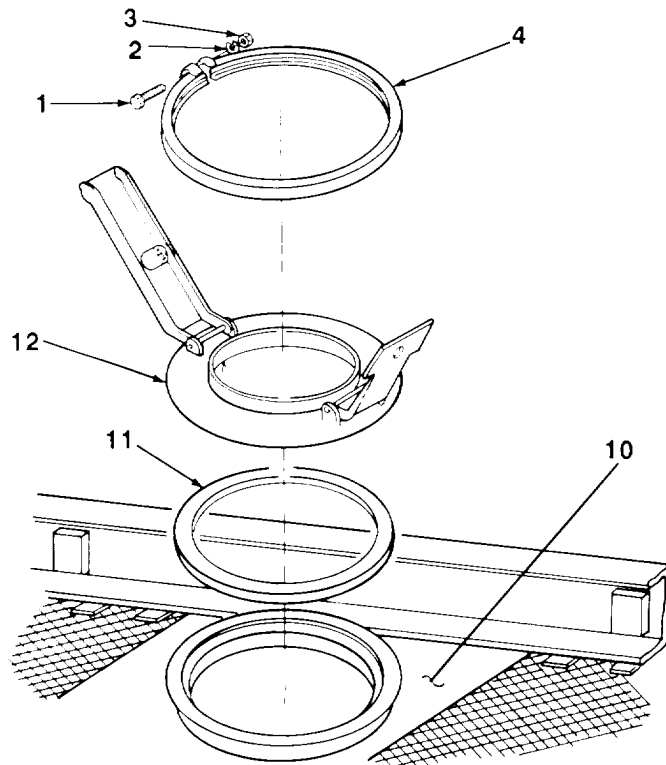
- Dry cleaning solvent (Item 16, Appendix E)
- Two gaskets

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**a. REMOVAL**

1. Remove nut (3), washer (2), bolt (1), and ring (4) from manhole cover (12).
2. Remove manhole cover (12) and gasket (11) from semitrailer (10). Discard gasket.

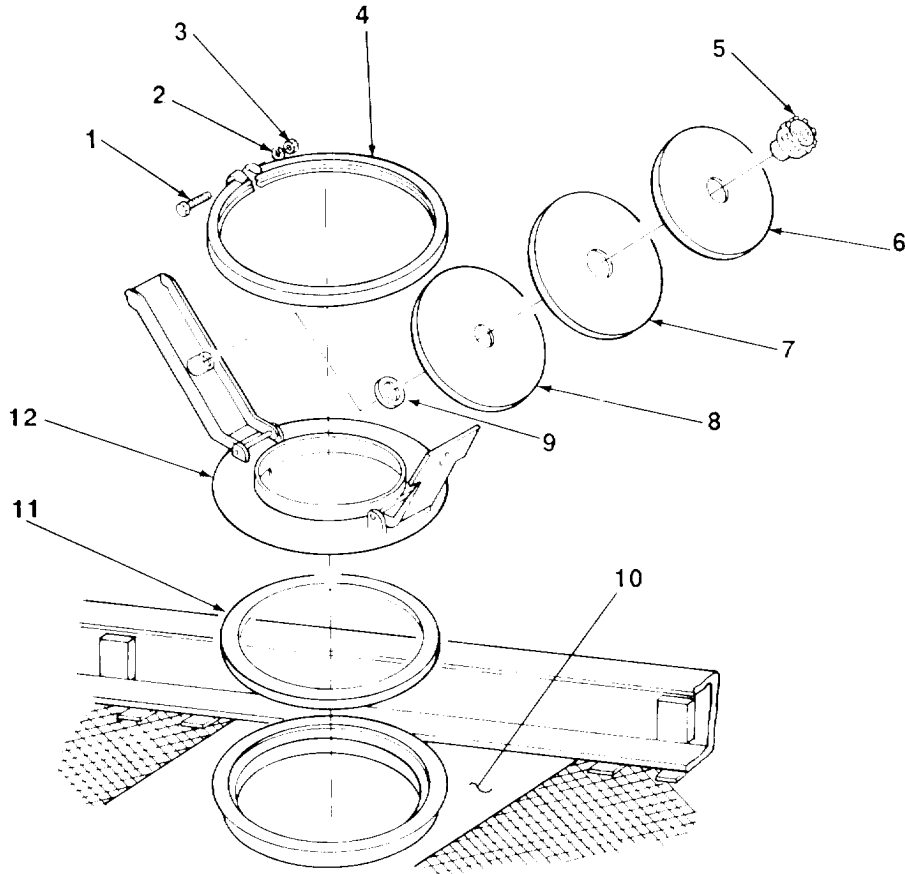


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4-62. MANHOLE COVER MAINTENANCE (M131A4 AND M131A4C) (Con't).

**b. DISASSEMBLY**

Remove vent valve (5), retainer (6), gasket (7), fill cover (8), and washer (9) from manhole cover (12). Discard gasket.



**c. CLEANING AND INSPECTION**

**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean parts with dry cleaning solvent. Allow to dry.
2. Inspect all parts for corrosion and damage, Replace any corroded or damaged parts.

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**4-62. MANHOLE COVER MAINTENANCE (M131A4 AND M131A4C) (Con't).**

---

3. Shake vent valve and listen for rattling sound. If rattling does not occur, vent valve is clogged with debris and must be replaced.
4. Apply gentle pressure through threaded end of vent valve on valve disc. Disc should be free to move approximately  $\frac{1}{4}$ in. (6.35 mm). If disc movement is not smooth, vent valve is nonfunctional and must be replaced.

---

**d. ASSEMBLY**

---

Install washer (9), fill cover (8), new gasket (7), and retainer (6) on manhole cover (12) with vent valve (5).

---

**e. INSTALLATION**

---

1. Position new gasket (11) and manhole cover (12) on semitrailer (10).
2. Install ring (4) on manhole cover (12) with bolt (1), washer (2), and nut (3)

---

#### 4-63. MANHOLE COVER MAINTENANCE (M131A5 AND M131A5C).

---

*This Task Covers:*

- |                |                            |
|----------------|----------------------------|
| a. Adjustment  | d. Cleaning and Inspection |
| b. Removal     | e. Assembly                |
| c. Disassembly | f. Installation            |
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit

**Materials/Parts:**

- Dry cleaning solvent (Item 16, Appendix E)
  - One locknut
  - Two gaskets
- 

**a. ADJUSTMENT**

1. Open fill cover (8) (para 2-14).
2. Loosen locknut (6) and close fill cover (8).
3. Loosen or tighten adjusting screw (15) until primary latch (10) just clears secondary latch on strongback (14).
4. Open fill cover (8) and tighten locknut (6).  
Close fill cover (8) and check clearance of primary latch (10) and strongback (14).

**b. REMOVAL**

1. Remove nut (3), washer (2), screw (1), and clamp ring (4) from manhole cover (13).
2. Remove manhole cover (13) and gasket (11) from semitrailer (12). Discard gasket.

**c. DISASSEMBLY**

1. Remove locknut (6), adjusting screw (15), fill cover (8), and spring (5) from manhole cover (13). Discard locknut.
2. Remove vent (9) and gasket (7) from fill cover (8). Discard gasket.

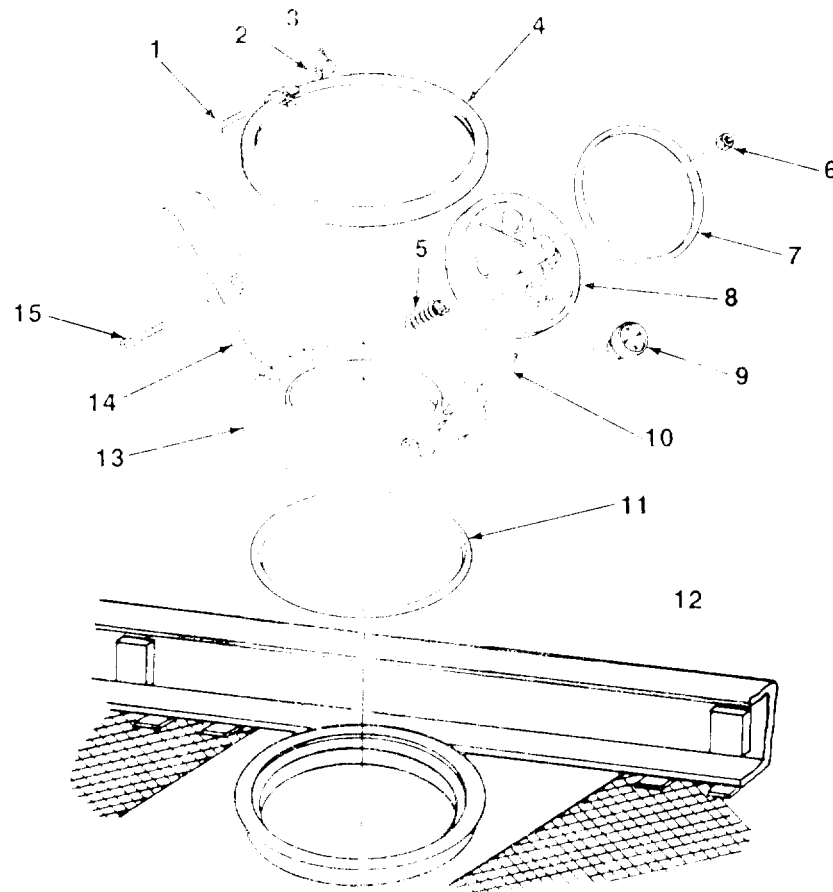
**d. CLEANING AND INSPECTION**

**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean parts with dry cleaning solvent. Allow to dry.
2. Inspect all parts for corrosion and damage. Replace any corroded or damaged parts.

## 4-63. MANHOLE COVER MAINTENANCE (M131A5 AND M131A5C) (Con't)



3. Shake vent and listen for rattling sound. If rattling does not occur, vent is clogged with debris and must be replaced.
4. Apply gentle pressure through threaded end of vent on valve disc. Disc should be free to move approximately  $\frac{1}{4}$  in. (6.35mm). If disc movement is not smooth, vent is nonfunctional and must be replaced.

e. ASSEMBLY
-------------

1. Install new gasket (7) and vent (9) on fill cover (8).
2. Install spring (5) and fill cover (8) on manhole cover (13) with adjusting screw (15) and new locknut (6).
3. Perform adjustment (subpara a).

f. INSTALLATION
-----------------

1. Position new gasket (11) and manhole cover (13) on semitrailer (12).
2. Install clamp ring (4) on manhole cover (13) with screw (1), washer (2), and nut (3).

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#### 4-64. PURGING TANK.

---

*This Task Covers:*

- |                        |                        |
|------------------------|------------------------|
| a. General Information | d. Steam Clean Purging |
| b. Draining Tank       | e. Forced Air Purging  |
| c. Chemical Purging    |                        |
- 

*Initial Setup:*

**Materials/Parts:**

- Rags (Item 14, Appendix E)

**Personnel Required:** Three

**Tools/Test Equipment:**

- Common no. 2 shop set
- Combustible gas indicator set
- Steam cleaner

**References:**

- FM 10-20
  - FM 10-71
  - TB 43-0212
- 

**a. GENERAL INFORMATION**

1. Removal of combustible vapors and liquids requires a coordinated effort of properly skilled safety and maintenance personnel. This maintenance procedure is to be performed by authorized Organizational or Direct Support Maintenance personnel with an MOS of 77F or equivalent.
2. A thorough reading of FM 10-20, FM 10-71, and TB 43-0212 is essential for understanding proper draining and purging methods.
3. There are several methods available to eliminate combustibles from fuel tankers. The primary method is by use of a purging chemical. Using a chemical to purge saves time, labor, and material compared to other methods. It greatly reduces the possibility of a combustible vapor buildup after the purging procedure has been completed and after the vapor test readings show a safe level.
4. Alternate methods include steam and forced air.
5. The methods described here will be chemical, steam, and forced air.
6. If the semitrailer is being shipped after draining and purging, refer to Chapter 4, Section XVII for supplemental instructions.

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#### 4-64. PURGING TANK (Con't).

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##### b. DRAINING TANK

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#### WARNING

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- Do NOT perform draining operations in an electrical storm or if a storm is threatening. Keep open flames or other sources of ignition, such as welding and cutting torches and ordinary electrical equipment, away from area where draining operation is in progress. Sufficient fire extinguishers MUST represent and manned. Failure to follow this warning will result in serious injury or death to personnel.
  - Connect bonding and grounding connection before beginning draining operations. Maintain bonding and grounding connection until after all draining is completed. Connections must be made to clean, unpainted surfaces. An unbended and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.
  - Personnel engaged in draining operations must not wear wool, nylon, silk, rayon, or other clothing that generates static electricity. Wear clean cotton clothing with no metal zippers, Remove all contents from pockets. Wear rubber boots and gloves to keep fuel off skin. Use cotton cloths for cleaning purposes. Before climbing onto semitrailer, grasp static ground wire to discharge all static from body.
  - Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.
1. Park semitrailer 100 ft (30.5 m) from any building, source of ignition, or sewer system Close all windows and doors of nearby buildings to prevent flow of vapors into areas where flame and other sources of ignition may exist.
  2. Uncouple smetrailer form towing vehicle (para 2-12)
  3. Connect bonding and grounding connections (para 2-13).
  4. Place sufficient fire extinguishers 50 ft (15.25m) upwind and attend with qualified personnel.
  5. Place drain pans under all drain points. Ground drain pans to tank and to tank's common ground. Grounding conections shall be made to clean, unpainted surfaces.

---

#### CAUTION

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**Meters should be air dried thoroughly to eliminate rusting of internal moving park.**

6. Completely drain tank interior, all piping, and pump. On M131A4C and M131A5C, completely drain meter and filter-separator. Remove all accessory items, such as gages and floats, which might entrap fuel. Drain the equipment that has been removed. Wiupe dry all connections.
7. Wipe dry all spilled fuel. Wash, dry, and store any cloths or mops used, or dispose of them in accordance with local policy.

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4-64. PURGING TANK (Con't).

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c. CHEMICAL PURGING

WARNING

- Do NOT perform purging operations In an electrical storm or if a storm is threatening. Keep open flames or other sources of ignition, such as welding and cutting torches and ordinary electrical equipment, away from area where purging operation is in progress. Sufficient fire extinguishers must be present and manned. Failure to follow this warning will result in serious Injury or death to personnel.
  - Connect bonding and grounding connections before beginning purging operations. Maintain bonding and grounding connections until after all purging is completed. Connections must be made to clean, unpainted surfaces. An unbanded and ungrounded or Improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious Injury or death to personnel.
  - personnel engaged in purging operations must not wear wool, nylon, silk, rayon, or other clothing that generates static electricity. Wear clean cotton clothing with no metal zippers. Remove all contents from pockets. Wear rubber boots and gloves to keep fuel off skin. Use cotton cloths for cleaning purposes. Before climbing onto semitrailer, grasp static ground wire to discharge all static from body.
  - Give IMMEDIATE medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.
  - Should an emergency arise requiring entry into a tank which is not vapor-free, or which has an oxygen content less than 19.5%, personnel entering must have an attached lifeline and wear protective respiratory equipment in the form of self-contained breathing apparatus or a full facepiece mask with a pressure supply of breathable air. Another person, also provided with respiratory equipment, MUST be stationed at manhole opening and remain there with full ability to watch personnel inside tank and summon assistance in the event a rescue operation is needed. Personnel MUST NOT enter a tank which is in the explosive range.
  - If semitrailer is left overnight after purging procedure, retest with combustible gas indicator set to ensure a SAFE reading. Tanks may recharge themselves with seepage of undetected pockets of vapors. Failure to follow this warning may result in serious injury or death to personnel.
1. After draining tank, close or seal all valves and drain points.
  2. Fill tank with cold water and allow to overflow for five minutes or until all traces of flammable material are removed. Fill rear compartment first and continue to fill each compartment, filling front compartment last. Reverse procedure when draining tank. Drain tank completely.
  3. Close or seal all valves and drain points.

---

**4-64. PURGING TANK (Con't).**

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**CAUTION**

**Insufficient amount of chemical will result in an incomplete purging. Once purging has begun, do not stop until process is complete.**

**NOTE**

**For detailed information concerning purging chemical, refer to TB 43-0212.**

4. Add 40 fl oz (1183 ml) of chloro-carbon base purging chemical to tank for each 100 gl (379 l) capacity. A 5000 gl (18,925 l) tank will take approximately 17 gl (64 l) of purging chemical.
5. Fill tank to top with water. Do not overflow.
6. Insert air hoses through manhole openings and agitate solution with 3-5 psi (21-34 kPa) of air for 40 minutes. Frequently move air hoses around in tank, covering as much area as possible, especially near the bottom and around baffles. Remove air hoses and drain solution from tank at all valves and drain points.
7. Fill tank with cold water and allow to overflow for five minutes or until water is clear. Drain tank completely at all valves and drain points.
8. Measure explosive vapor level to determine if tank is safe to repair, clean, paint, store, change material, or ship. Take readings in several areas of tank. Readings should be 20% lower explosive level (LEL) or less. If any reading indicates tank is not safe, repeat step 7 until a safe reading is obtained.
9. After tank has been freed of combustible vapors, it is ready to clean, repair, paint, store, change materiel, or ship.

#### 4-64. PURGING TANK (Con't).

##### d. STEAM CLEAN PURGING

#### WARNING

- **DO NOT** perform purging operations in an electrical storm or if a storm is threatening. Keep open flames or other sources of ignition, such as welding and cutting torches and ordinary electrical equipment, away from area where purging operation is in progress. Sufficient fire extinguishers must be present and manned. Failure to follow this warning will result in serious injury or death to personnel.
- Connect bonding and grounding connections before beginning purging operations. Maintain bonding and grounding connection until after all purging is completed. Connections must be made to clean, unpainted surfaces. An unbanded and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.
- Personnel engaged in purging operations must not wear wool, nylon, silk, rayon, or other clothing that generates static electricity. Wear clean cotton clothing with no metal zippers. Remove all contents from pockets. Wear rubber boots and gloves to keep fuel off skin. Use cotton cloths for cleaning purposes. Before climbing onto semitrailer, grasp static ground wire to discharge all static from body.
- Give **IMMEDIATE** medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.
- Should an emergency arise requiring entry into a tank which is not vapor-free, or which has an oxygen content less than 19.5%, personnel entering must have an attached lifeline and wear protective respiratory equipment in the form of self-contained breathing apparatus or a full facepiece mask with a pressure supply of breathable air. Another person, also provided with respiratory equipment, **MUST** be stationed at manhole opening and remain there with full ability to watch personnel inside tank and summon assistance in the event a rescue operation is needed. Personnel **MUST NOT** enter a tank which is in the explosive range.
- If semitrailer is left overnight after purging procedure, retest with combustible gas indicator set to ensure a **SAFE** reading. Tanks may recharge themselves with seepage of undetected pockets of vapors. Failure to follow this warning may result in serious injury or death to personnel.

#### NOTE

This method is an alternate to chemical method. It is effective for the removal of high viscosity petroleum products. Low pressure steam is injected into tank for a period of time to bring the temperature of tank to 76°C (170°F).

1. Ground semitrailer to steam cleaner. Ensure that semitrailer bonding and grounding connections are made (para 2-13).
2. After draining tank, ensure that all valves and drain points remain open.
3. Introduce steam through manhole openings in sufficient volume to raise temperature of tank to 76°C (170°F). Close manhole fill covers as far as steam lines will permit.



---

**4-64. PURGING TANK (Con't).**

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**CAUTION**

**Ensure that steam does not come in contact with electrical wiring and other components. The heat of steam can damage painted surface of tank, valve seats, gaskets, and diaphragms.**

4. Steam tank for a minimum of three hours. Turn steam source off.

**CAUTION**

**After purging by steam method, leave tank valves and drain points open during cool-down to prevent vacuum collapse of tank.**

5. Leave all valves and drain points open until tank is fully cooled, at least one hour.
6. Measure explosive vapor level, Take readings in several areas of tank. Readings should be 20% lower explosive level (LEL) or less. If LEL is greater than 20%, repeat steam cleaning for one hour. Continue steaming until 20% LEL or less is obtained.
7. After tank has been freed of combustible vapors, it is ready to clean, repair, paint, store, change material, or ship.

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#### 4-64. PURGING TANK (Con't).

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##### e. FORCED AIR PURGING

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#### WARNING

- **DO NOT** perform purging operations in an electrical storm or if a storm is threatening. Keep open flames or other sources of ignition, such as welding and cutting torches and ordinary electrical equipment, away from area where purging operation is in progress. Sufficient fire extinguishers must be present and manned. Failure to follow this warning will result in serious injury or death to personnel.
- Connect bonding and grounding connection before beginning purging operations. Maintain bonding and grounding connection until after all purging is completed. Connections must be made to clean, unpainted surfaces. An unbended and ungrounded or improperly bonded and grounded semitrailer could produce a spark. The resulting explosion will cause serious injury or death to personnel.
- Personnel engaged in purging operations must not wear wool, nylon, silk, rayon, or other clothing that generates static electricity. Wear clean cotton clothing with no metal zippers. Remove all contents from pockets. Wear rubber boots and gloves to keep fuel off skin. Use cotton cloths for cleaning purposes. Before climbing onto semitrailer, grasp static ground wire to discharge all static from body.
- Give **IMMEDIATE** medical attention to personnel exposed to hydrocarbon or toxic vapors. Signs of distress are weakness, nausea, coughing or intoxication, nosebleed or cramps, or other unusual symptoms. Qualified personnel able to administer artificial respiration and simple first aid must be present.
- Should an emergency arise requiring entry into a tank which is not vapor-free, or which has an oxygen content less than 19.5%, personnel entering must have an attached lifeline and wear protective respiratory equipment in the form of self-contained breathing apparatus or a full facepiece mask with a pressure supply of breathable air. Another person, also provided with respiratory equipment, **MUST** be stationed at manhole opening and remain there with full ability to watch personnel inside tank and summon assistance in the event a rescue operation is needed. Personnel **MUST NOT** enter a tank which is in the explosive range.
- If semitrailer is left overnight after purging procedure, retest with combustible gas indicator set to ensure a **SAFE** reading. Tanks may recharge themselves with seepage of undetected pockets of vapors. Failure to follow this warning may result in serious injury or death to personnel.

#### NOTE

- Blower/air supply to be used with this procedure shall be an explosion-proof blower conforming to MIL-B-7619A or MIL-H-27507C. If these blowers are not available, 10 Cal safety personnel may authorize the use of another type blower.
  - The following steps describe use of a blower with one output duct to force air purge one tank compartment. Repeat steps as required to ensure that all tank compartments are purged.
1. After draining tank, leave all valves and drain points open to facilitate maximum air circulation. Leave grounded drain pan in place to catch fuel during purging operation.
  2. Place blower/air supply 50 ft (15.25 m) upwind of semitrailer. Ground blower to static ground and connect duct to outlet side of blower.

---

**4-64. PURGING TANK (Con't).**

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3. Start blower BEFORE inserting duct into manhole opening. This will prevent fuel vapors from entering duct and going into blower.
4. Ground duct to semitrailer.
5. Install duct inside manhole opening Secure with tape or tie to semitrailer.
6. Purge tank for two hours. During purging operation, observe that air is being expelled at all valves and drain points. Trapped fuel may prevent air from being circulated through all valves and drains. In the event air is not coming out of a valve or drain, temporarily close all other valves and drains and observe if trapped fuel is expelled. Reopen valves and drains.
7. Remove duct from manhole opening.
8. Shut off air supply. Wait ten minutes.
9. Measure explosive vapor level of tank. Take readings in several areas of tank. Readings should be 20% lower explosive level (LEL) or less. If any reading is above 20% LEL, resume purging operation following instructions above.
10. Purge for one hour AFTER a safe reading is obtained.
11. Remove duct from manhole opening BEFORE shutting off blower.
12. Close all valves and drains. Leave manhole fill covers open. Tank is now ready to clean, repair, paint, store, change material, or ship.

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## 4-65. CLEANING TANK INTERIOR.

---

*This Task Covers:*

- a. Inspection b. Cleaning
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).
- Manhole cover removed (para 4-62 or 4-63).

**Materials/Parts:**

- Scrub brush (Item 3, Appendix E)
- Dishwashing compound (Item 7, Appendix E)
- Rags (Item 14, Appendix E)

**Tools/Test Equipment:**

- Combustible gas indicator set
- Fresh air respirator
- Rubber boots
- Rubber gloves
- Safety rope

**Personnel Required:** Two

---

### a. INSPECTION

WARNING

- **Explosive vapor level check must be made before entering tank. All personnel required to be inside of tank must be equipped with fresh air respirators, safety rope, rubber boots, and rubber gloves.**
  - **NEVER work alone inside tank. A safety rope must be secured around chest and under arms of person entering tank. Opposite end of safety rope must be held by person stationed at manhole opening. This will allow for quick removal of person from tank in the event of accident or personal injury.**
1. Enter tank. An explosion-proof light, flashlight, or electric lantern with lens approved for use in hazardous areas must be used for inspection.
  2. inspect for sediment, solid deposits, or foreign matter of any kind. Inspect for corrosion and signs of bad welds. Report bad welds to Direct Support Maintenance.

### b. CLEANING

CAUTION

- Metal tools, steel wool, steel brushes, or any abrasive cleaning powders must not be used to clean tank interiors. Their use would destroy the thin oxidation film.**
1. Use a lint-free rag to wipe off any sediment or foreign matter of any kind that may adhere to inside of tank. A bristle brush can be used to remove solid deposits. Mild dishwashing compound may be used for removal of heavy residue.

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**4-65. CLEANING TANK INTERIOR (Con't).**

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**WARNING**

**Compressed air used for drying purposes should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.**

2. Rinse entire interior with warm water. Rinse off all soap with warm water. Dry interior thoroughly. Compressed air or centrifugal blowers may be used to speed up drying.

**FOLLOW-ON TASKS:**

- Install manhole cover (para 4-62 or 4-63).

---

**4-66. FUEL LEVEL GAGE ADJUSTMENT.**

---

*This Task Covers:* Adjustment

---

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Materials/Parts:**

- One cotter pin

**Tools/Test Equipment:**

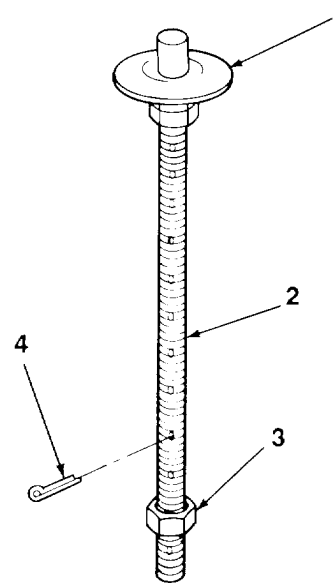
- General mechanic's tool kit
- 

**NOTE**

**A fuel level gage is welded to the manhole collar in each tank compartment. Unless severely bent or broken off, only adjustment may be required.**

**ADJUSTMENT**

1. Unstow petroleum gage stick from stowage tube assembly.
2. Open fill cover of affected tank compartment (para 2-14).
3. Set petroleum gage stick upright on bottom of tank.
4. Check fuel level gage (2). If indicator disk (1) is adjusted correctly, locknut (3) will be even with full mark on petroleum gage stick.
5. If indicator disk (1) is not properly positioned, go to step 6.
6. Remove cotter pin (4). Discard cotter pin.
7. Loosen locknut (3) and adjust locknut position until even with full mark on petroleum gage stick.
8. Tighten locknut (3).
9. Install new cotter pin (4) in nearest hole beneath locknut (3).
10. Remove petroleum gage stick from tank. Close fill cover (para 2-14).
11. Stow petroleum gage stick in stowage tube assembly.



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**Section XII. BODY AND CHASSIS ACCESSORY ITEMS MAINTENANCE**

Paragraph Title	Page Number
Data Plate Replacement .....	4-145
Hose Replacement (M131A4C and M131A5C) .....	4-144
Nozzle Assembly Maintenance (M131A4C and M131A5C) .....	4-141
Reflector Replacement .....	4-146

**4-67. NOZZLE ASSEMBLY MAINTENANCE (M131A4C AND M131A5C).**

*This Task Covers:*

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>a. Removal</li> <li>b. Disassembly</li> <li>c. Cleaning and Inspection</li> </ul> | <ul style="list-style-type: none"> <li>d. Assembly</li> <li>e. Installation</li> </ul> |
|--|--|

*Initial Setup:*

**Materials/Parts:**

- Rags (Item 14, Appendix E)
- Dry cleaning solvent (Item 16, Appendix E)
- One gasket

**Tools/Test Equipment:**

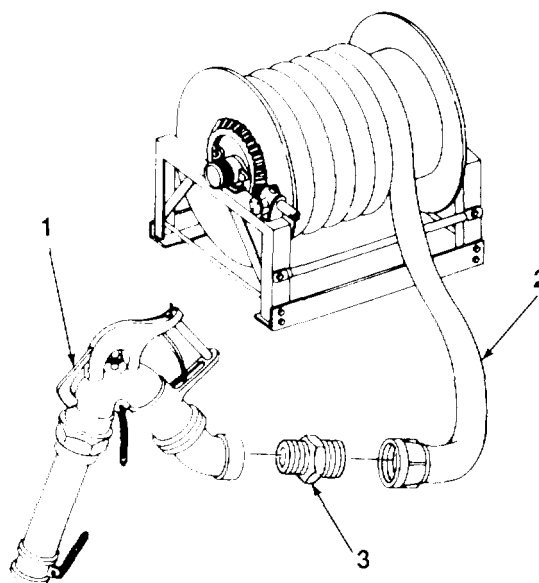
- General mechanic's tool kit
- Common no. 1 shop set

**NOTE**

- **Nozzles on 1½ in. (3.8 cm) and 2½ in. (6.4 cm) hoses are replaced the same way. 2½ in. (6.4 cm) hose is illustrated.**
- **A drain pan should be used to catch any draining fuel. Ensure that all spills are cleaned up.**

**a. REMOVAL**

Remove nozzle assembly (1) and adapter (3) from hose (2).



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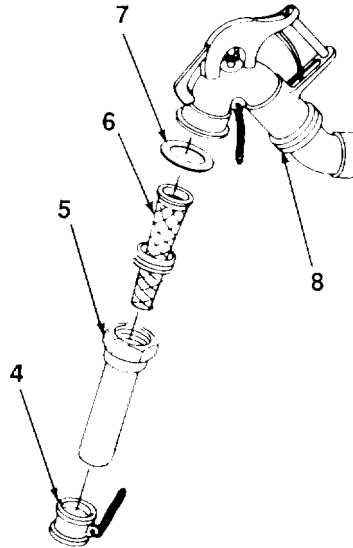
---

**4-67. NOZZLE ASSEMBLY MAINTENANCE (M131A4C AND M131A5C) (Con't).**

---

**b. DISASSEMBLY**

Remove cap (4), adapter (5), strainer (6), and gasket (7) from nozzle (8). Discard gasket.



**c. CLEANING AND INSPECTION**

**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean all parts with dry cleaning solvent. Dry thoroughly.
2. Inspect all parts for damage. Replace damaged parts.

**d. ASSEMBLY**

Install new gasket (7), strainer (6), adapter (5), and cap (4) on nozzle (8).



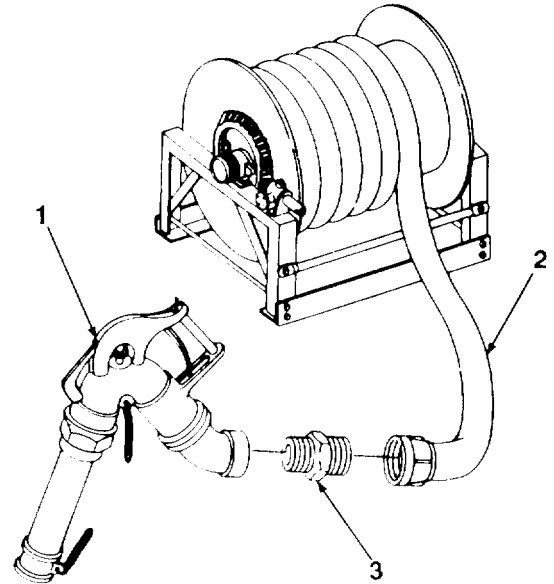
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**4-67. NOZZLE ASSEMBLY MAINTENANCE (M131A4C AND M131A5C) (Con't).**

---

**e. INSTALLATION**

Install adapter (3) and nozzle assembly (1) on hose (2).



---

## 4-68. HOSE REPLACEMENT (M131A4C AND M131A5C).

---

*This Task Covers:*

a. Removal

b. Installation

---

*Initial Setup:*

### Equipment Conditions:

- Nozzle assembly removed (para 4-67).

### Tools/Test Equipment:

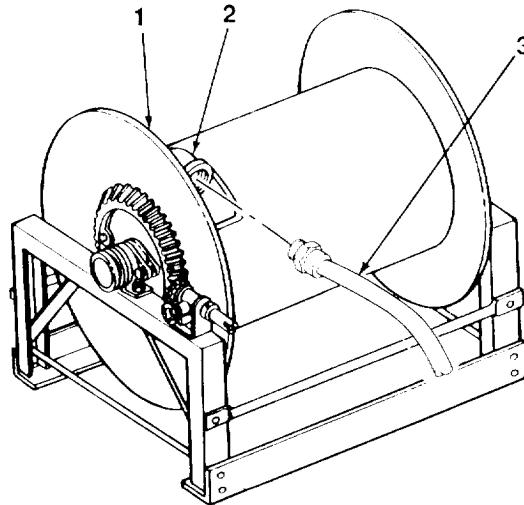
- General mechanic's tool kit
  - Common no. 1 shop set
- 

## a. REMOVAL

### NOTE

**1½ in. (3.8 cm) and 2½ in. (6.4 cm) hoses are replaced the same way. 2½ in. (6.4 cm) hose is illustrated.**

1. Unwind hose (3) from hose reel (1).
2. Remove hose (3) from elbow (2).



## b. INSTALLATION

1. Install hose (3) on elbow (2)
2. Wind hose (3) on hose reel (1).

### FOLLOW-ON TASKS:

- Install nozzle assembly (para 4-67).

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**4-69. DATA PLATE REPLACEMENT.**

*This Task Covers:*

a. Replacement (Instruction Data Plates)

b. Replacement (All Except Instruction Data Plates)

*Initial Setup:*

**Materials/Parts:**

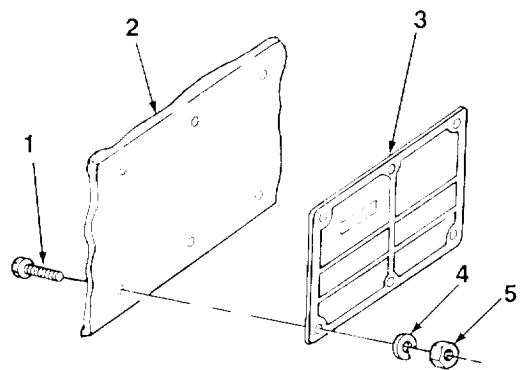
- Four lockwashers (instruction data plates only)

**Tools/Test Equipment:**

- General mechanic's tool kit

**a. REPLACEMENT (INSTRUCTION DATA PLATES)**

1. Remove four nuts (5), lockwashers (4), screws (1), and data plate (3) from cabinet door (2). Discard lockwashers.
2. Install data plate (3) on cabinet door (2) with four screws (1), new lockwashers (4), and nuts (5)

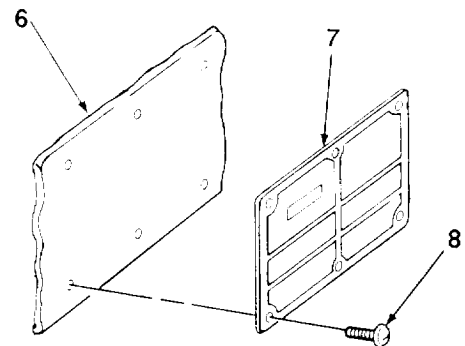


**b. REPLACEMENT (ALL EXCEPT INSTRUCTION DATA PLATES)**

**NOTE**

**All data plates are replaced the same way; quantity of screws may vary.**

1. Remove six screws (8) and data plate (7) from frame (6).
2. Install data plate (7) on frame (6) with six screws (8).



---

## 4-70. REFLECTOR REPLACEMENT.

---

*This Task Covers:* Replacement

---

*Initial Setup:*

**Materials/Parts:**

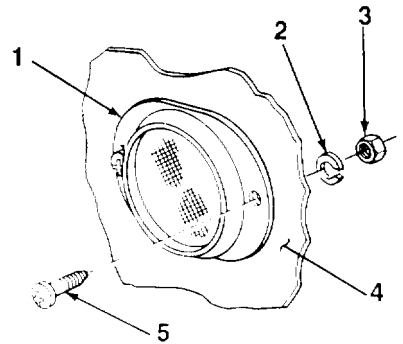
- Two lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

### REPLACEMENT

1. Remove two nuts (3), lockwashers (2), screws (5), and reflector (1) from frame (4). Discard lockwashers.
2. Install reflector (1) on frame (4) with two screws (5), new lockwashers (2), and nuts (3).



**Section XIII. AUXILIARY ENGINE MAINTENANCE**

Paragraph Title	Page Number
Auxiliary Engine Oil Drain Replacement . . . . .	4-151
Auxiliary Engine Instrument Panel Harness Assembly and Circuit Breaker Replacement . . . . .	4-172
Auxiliary Engine Instrument Panel Switches and Gages Replacement . . . . .	4-168
Auxiliary Engine Replacement . . . . .	4-147
Auxiliary Engine Sediment Strainer Maintenance . . . . .	4-160
Draining Auxiliary Engine Fuel Tank . . . . .	4-152
Firewall Panel Replacement . . . . .	4-174
Fuel Lines and Fittings Replacement (All Except M131A5C) . . . . .	4-155
Fuel Lines and Fittings Replacement (M131A5C) . . . . .	4-158
Fuel Tank Replacement . . . . .	4-154
Muffler and Exhaust Pipe Replacement (All Except M131A5C) . . . . .	4-163
Muffler and Exhaust Pipe Replacement (M131A5C) . . . . .	4-166

**4-71. AUXILIARY ENGINE REPLACEMENT.**

*This Task Covers:*

- |            |                 |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

*Initial Setup:*

**Equipment Conditions:**

- Fuel line disconnected from fuel filter (para 4-75 or 4-76) .
- Fuel dispensing pump removed (para 4-90).
- Exhaust pipe removed (para 4-78 or 4-79).
- Instrument panel removed (para 4-81).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

- Five Five lockwashers

**Personnel Required:** Two

**References:**

- TM 5-2805-258-14

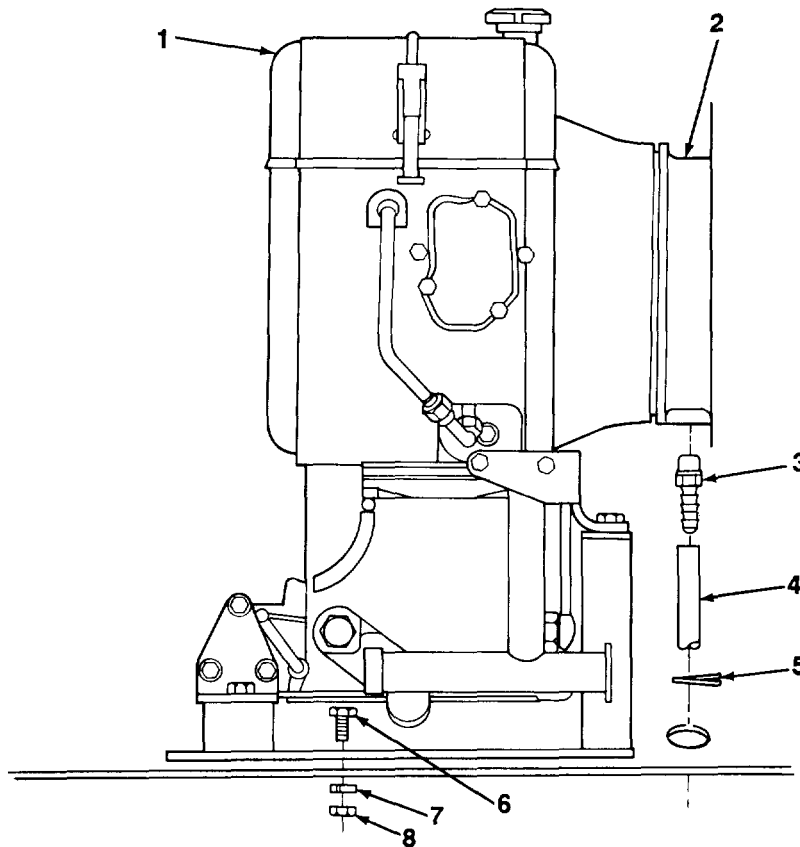
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**4-71. AUXILIARY ENGINE REPLACEMENT (Con't).**

---

**a. REMOVAL**

1. Squeeze clamp (5) and slide down hose (4).
2. Remove hose (4) and straight adapter (3) from flange (2).
3. Remove two nuts (8), lockwashers (7), screws (6), and auxiliary engine (1) from cabinet. Discard lockwashers.



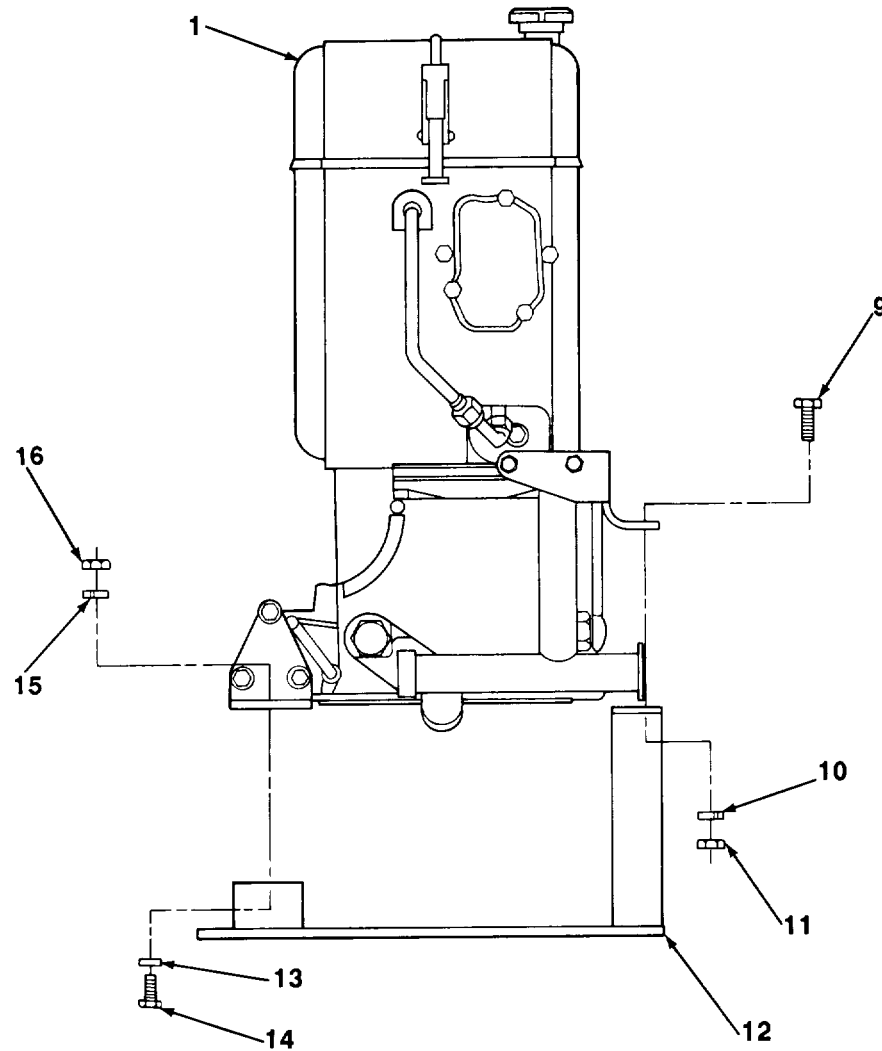
4. Drain auxiliary engine oil (TM 5-2805-258-14).
5. Remove auxiliary engine oil drain (para 4-72).
6. Remove two nuts (16), lockwashers (15), screws (14), and washers (13) from auxiliary engine (1) and engine mount (12). Discard lockwashers.
7. Remove nut (11), lockwasher (10), screw (9), and auxiliary engine (1) from engine mount (12). Discard lockwasher.

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**4-71. AUXILIARY ENGINE REPLACEMENT (Con't).**


---

**b. INSTALLATION**

1. Position auxiliary engine (1) on engine mount (12) and install screw (9), new lockwasher (10), and nut (11).
2. Install two washers (13), screws (14), new lockwashers (15), and nuts (16) on auxiliary engine (1) and engine mount (12).
3. Install auxiliary engine oil drain (para 4-72).

---

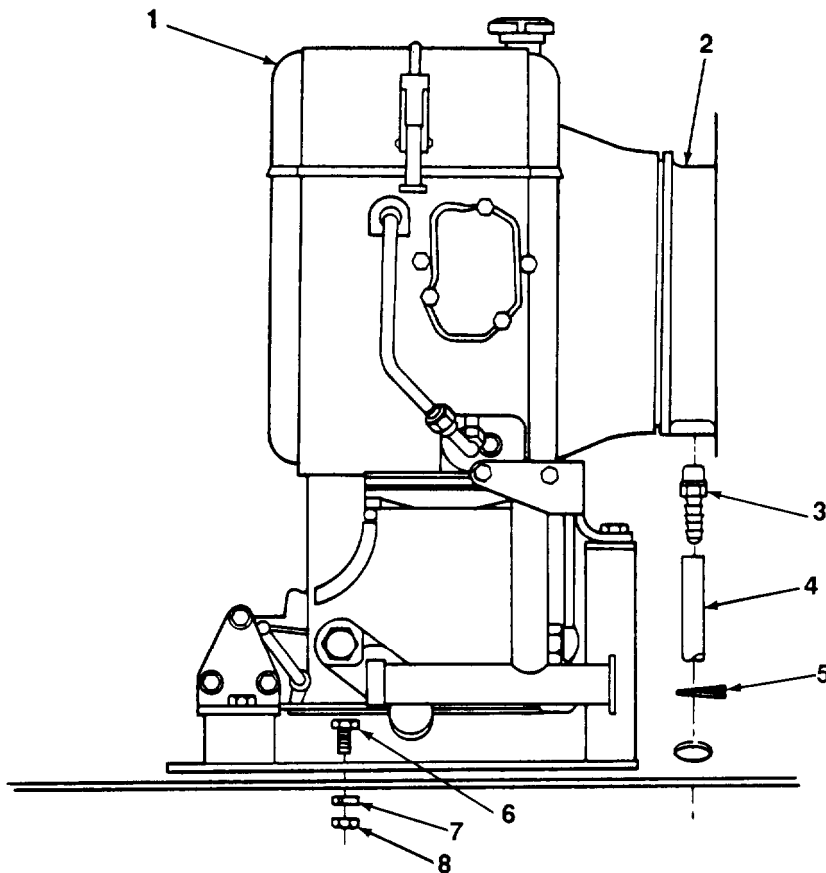
**4-71. AUXILIARY ENGINE REPLACEMENT (Con't).**

---

**CAUTION**

**Position auxiliary engine oil drain through cabinet floor when positioning auxiliary engine in cabinet. Failure to follow this caution will result in damage to auxiliary engine oil drain.**

4. Install auxiliary engine (1) in cabinet with two screws (6), new lockwashers (7), and nuts (8).
5. Install straight adapter (3) on flange (2).
6. Position hose (4) on straight adapter (3) and install clamp (5).



**FOLLOW-ON TASKS:**

- Install instrument panel (para 4-81).
- Install exhaust pipe (para 4-78 or 4-79).
- Install fuel dispensing pump (para 4-90).
- Connect fuel line to fuel filter (para 4-75 or 4-76).
- Fill auxiliary engine crankcase with oil (Chapter 3, Section 1).

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**4-72. AUXILIARY ENGINE OIL DRAIN REPLACEMENT.**

*This Task Covers:*

a. Removal

b. Installation

*Initial Setup:*

**Equipment Conditions:**

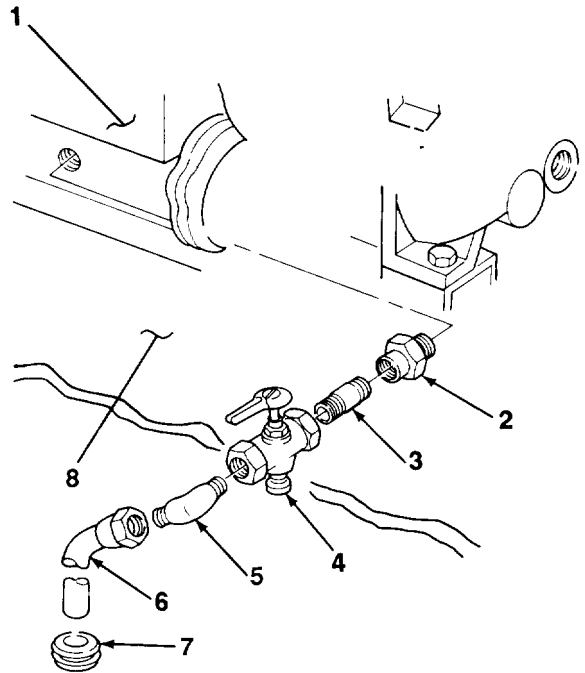
- Auxiliary engine removed (para 4-71).

**Tools/Test Equipment:**

- General mechanic's tool kit

**a. REMOVAL**

1. Remove tube (6) and elbow (5) from shutoff cock (4).
2. Remove shutoff cock (4), nipple (3), and straight adapter (2) from auxiliary engine (1).
3. if damaged, remove grommet (7) from cabinet floor (8). Discard grommet.



**b. INSTALLATION**

1. If removed, install new grommet (7) in cabinet floor (8).
2. Install straight adapter (2), nipple (3), and shutoff cock (4) on auxiliary engine (1).
3. Install elbow (5) and tube (6) on shutoff cock (4).

**FOLLOW-ON TASKS:**

- Install auxiliary engine (para 4-71).

**4-73. DRAINING AUXILIARY ENGINE FUEL TANK.**

*This Task Covers:*

- |                                  |                       |
|----------------------------------|-----------------------|
| a. Draining (All Except M131A5C) | b. Draining (M131A5C) |
|----------------------------------|-----------------------|

*Initial Setup:*

**Materials/Parts:**

- Rags (Item 14, Appendix E)
- One gasket (all except M131A5C)

**Tools/Test Equipment:**

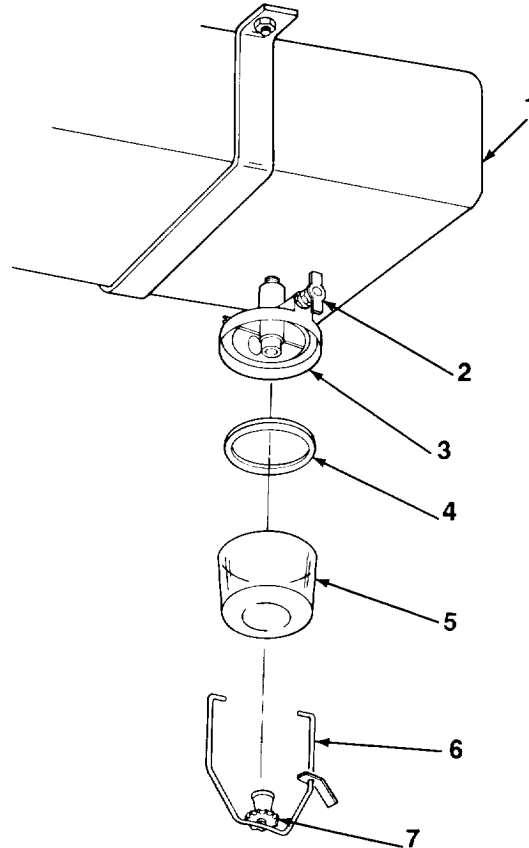
- General mechanic's tool kit
- Common no. 1 shop set

**NOTE**

A drain pan should be used to catch any draining fuel. Ensure that all spills are cleaned up.

**a. DRAINING (ALL EXCEPT M131A5C)**

1. Close auxiliary engine sediment strainer shutoff cock (2).
2. Loosen thumbscrew (7) and remove bowl (5), gasket (4), and bail (6) from strainer head (3). Discard gasket.
3. Open auxiliary engine sediment strainer shutoff cock (2) and allow all fuel to drain from fuel tank (1).
4. When fuel tank (1) is completely drained, close auxiliary engine sediment strainer shutoff cock (2).
5. Position bail (6), new gasket (4), and bowl (5) on strainer head (3) and tighten thumbscrew (7).
6. Open auxiliary engine sediment strainer shutoff cock (2).



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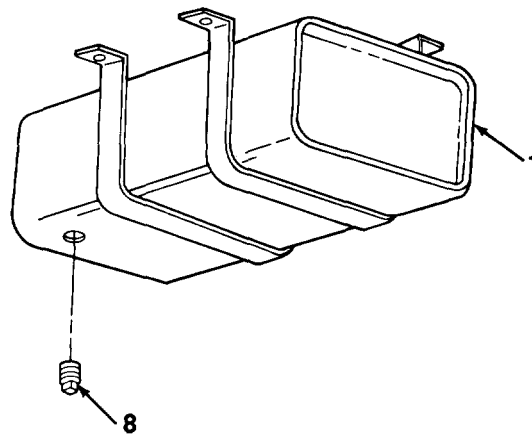
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**4-73. DRAINING AUXILIARY ENGINE FUEL TANK (Con't).**

---

**b. DRAINING (M131A5C)**

1. Remove drain plug (8) from fuel tank (1). Allow all fuel to drain.
2. When fuel tank (1) is completely drained, install drain plug (8).



**4-74. FUEL TANK REPLACEMENT.**

*This Task Covers: Replacement*

*Initial Setup:*

**Equipment Conditions:**

- Fuel tank drained (para 4-73).
- Auxiliary engine sediment strainer removed (para 4-77).

**Materials/Parts:**

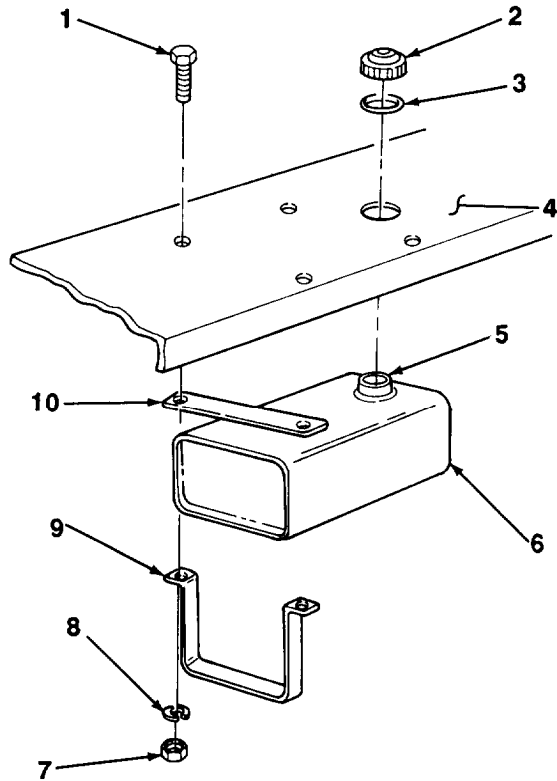
- Four lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit

**REPLACEMENT**

1. Remove cap (2) from fill tube (5). inspect gasket (3). If damaged, remove gasket from cap and discard.
2. Remove four nuts (7), lockwashers (8), screws (1), two brackets (9), fuel tank (6), and two gaskets (10) from cabinet (4). Discard lockwashers. Inspect gaskets and discard if damaged.
3. Position two gaskets (10) and fuel tank (6) on cabinet (4) and install two brackets (9) with four screws (1), new lockwashers (8), and nuts (7).
4. if removed, install new gasket (3) inside cap (2). Install cap on fill tube (5).



**FOLLOW-ON TASKS:**

- Install auxiliary engine sediment strainer (para 4-77).
- Fill fuel tank.

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---

## 4-75. FUEL LINES AND FITTINGS REPLACEMENT (ALL EXCEPT M131A5C).

---

*This Task Covers:*

- |            |                 |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|
- 

*Initial Setup:*

### Equipment Conditions:

- Auxiliary engine sediment strainer shutoff cock closed (para 4-73).

### Tools/Test Equipment:

- General mechanic's tool kit
- Common no. 1 shop set

### Materials/Parts:

- Rags (Item 14, Appendix E)
- One lockwasher (M131A4C)
- Two lockwashers (M131A4)

### References:

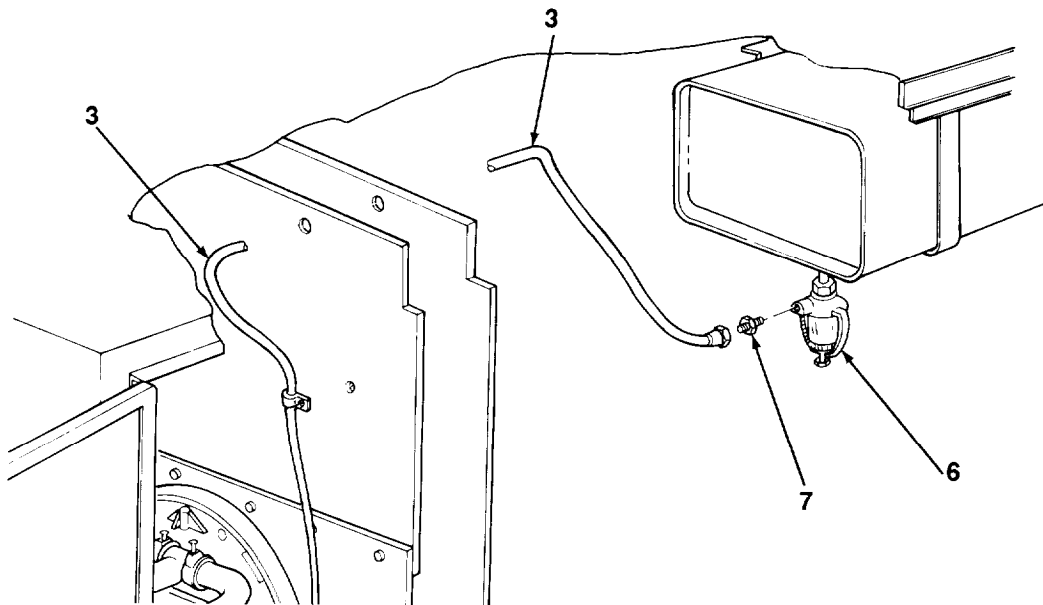
- TM 5-2805-258-14
- 

### **a. REMOVAL**

#### NOTE

**A suitable container should be used to catch any draining fuel. Ensure that all spills are cleaned up.**

1. Disconnect fuel line (3) from adapter (7). Remove adapter from auxiliary engine sediment strainer (6).
2. Remove auxiliary engine access cover (TM 5-2805-258-14).



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**4-75. FUEL LINES AND FITTINGS REPLACEMENT (ALL EXCEPT M131A5C) (Con't).**

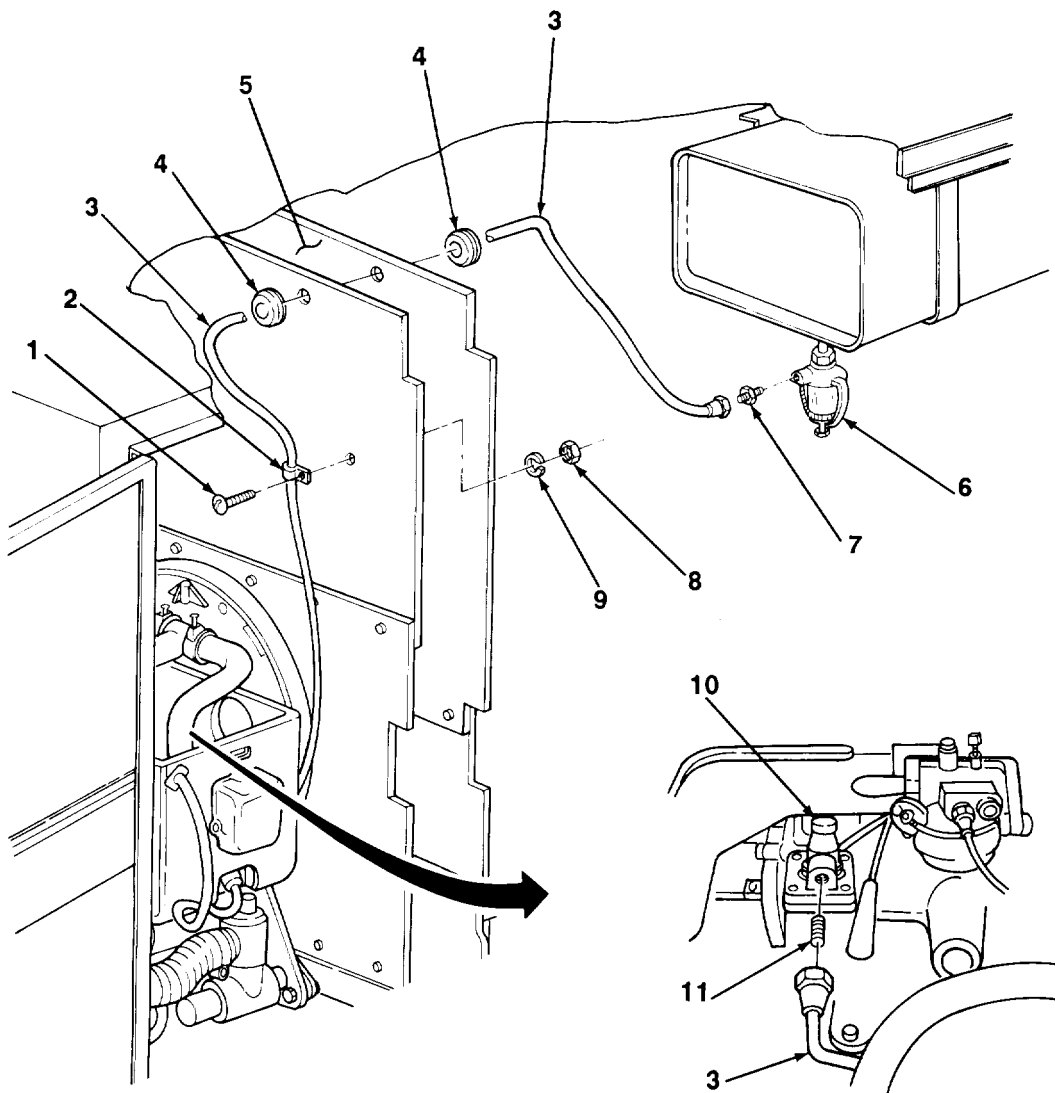
---

3. Disconnect fuel line (3) from adapter (11). Remove adapter from fuel filter (10).

**NOTE**

**Step 4 applies only to M131A4 and M131A4C. M131A4 has two straps and M131A4C has one strap.**

4. Remove nut (8), lockwasher (9), screw (1), and strap (2) from firewall (5). Discard lockwasher.



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---

**4-75. FUEL LINES AND FITTINGS REPLACEMENT (ALL EXCEPT M131A5C) (Con't).**

---

**CAUTION**

**Use extreme caution when removing fuel line from firewall. Failure to follow this caution may result in fuel line crimping.**

5. Remove fuel line (3) from firewall (5).
6. If damaged, remove two grommets (4) from firewall (5). Discard grommets.

**b. INSTALLATION**

1. If removed, install two new grommets (4) in firewall (5).

**CAUTION**

**Use extreme caution when installing fuel line in firewall. Failure to follow this caution may result in fuel line crimping.**

2. Position fuel line (3) through firewall (5).

**NOTE**

Step 3 applies only to M131A4 and M131A4C. M131A4 has two straps and M131A4C has one strap.

3. Secure fuel line (3) to firewall (5) with strap (2), screw (1), new lockwasher (9), and nut (8).
4. Install adapter (11) on fuel filter (10). Connect fuel line (3) to adapter.
5. Install auxiliary engine access cover (TM 5-2805-258-14).
6. Install adapter (7) on auxiliary engine sediment strainer (6). Connect fuel line (3) to adapter.

**FOLLOW-ON TASKS:**

- Open auxiliary engine sediment strainer shutoff cock (para 4-73).

---

## 4-76. FUEL LINES AND FITTINGS REPLACEMENT (M131A5C).

---

*This Task Covers:*

- a. Removal b. Installation
- 

*Initial Setup:*

**Equipment Conditions:**

- Auxiliary engine sediment strainer shutoff cock closed (para 4-73).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

- Rags (Item 14, Appendix E)

**References:**

- TM 5-2805-258-14
- 

**a. REMOVAL**

**NOTE**

A suitable container should be used to catch any draining fuel. Ensure that all spills are cleaned up.

1. Disconnect fuel line (2) from adapter (6). Remove adapter from auxiliary engine sediment strainer (5).
2. Remove auxiliary engine access cover (TM 5-2805-258-1 4).
3. Disconnect fuel line (7) from adapter (9). Remove adapter from fuel filter (8).
4. Remove fuel lines (2 and 7) from nipple (1).
5. Remove fuel line (2) from firewall (4).
6. If damaged, remove two grommets (3) from firewall (4). Discard grommets.

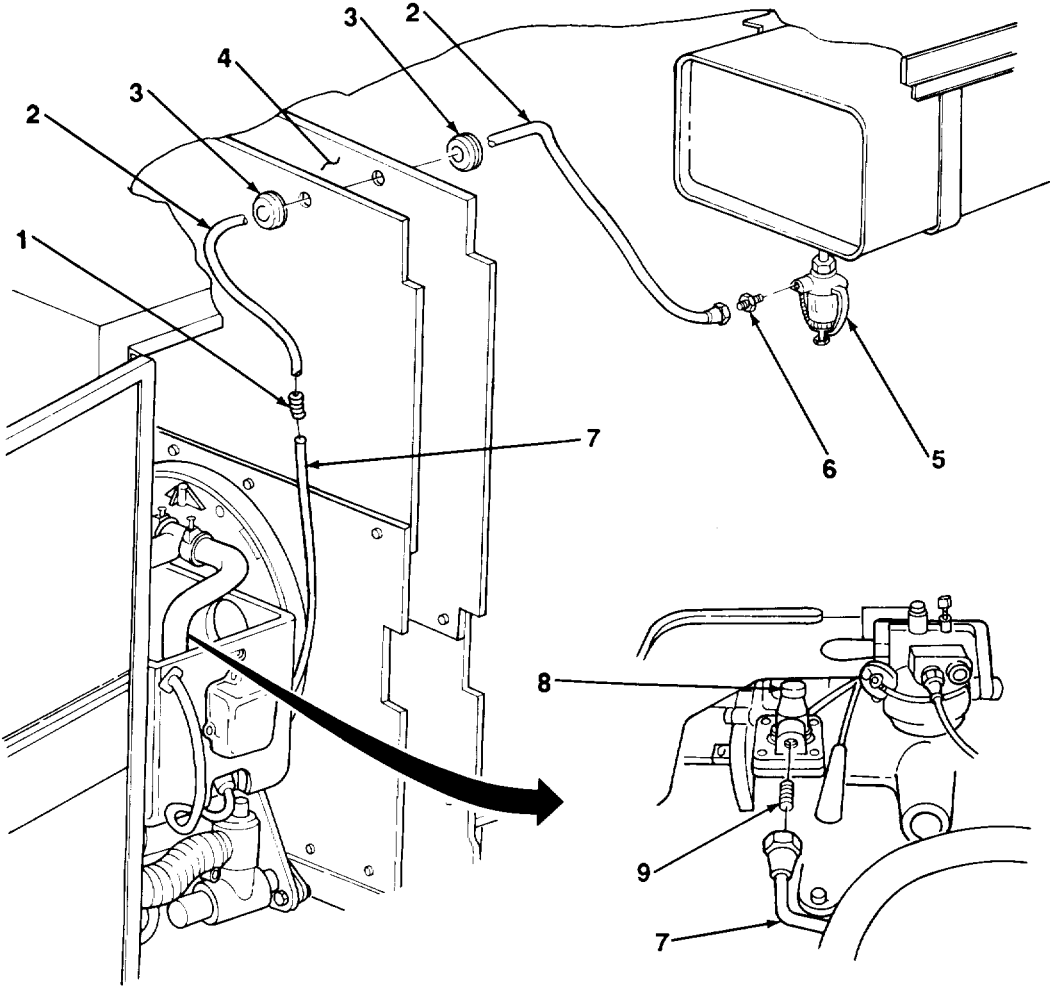
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**b. INSTALLATION**

1. If removed, install two new grommets (3) in firewall (4).
2. Position fuel line (2) through firewall (4).
3. Install fuel lines (2 and 7) on nipple (1).
4. Install adapter (9) on fuel filter (8). Connect fuel line (7) to adapter.
5. Install auxiliary engine access cover (TM 5-2805-258-14).
6. Install adapter (5) on auxiliary engine sediment strainer (5). Connect fuel line (2) to adapter.



4-76. FUEL LINES AND FITTINGS REPLACEMENT (M131A5C) (Con't).



**FOLLOW-ON TASKS:**

- Open auxiliary engine sediment strainer shutoff cock (para 4-73).

---

## 4-77. AUXILIARY ENGINE SEDIMENT STRAINER MAINTENANCE.

---

*This Task Covers:*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | d. Assembly     |
| b. Disassembly             | e. Installation |
| c. Cleaning and Inspection |                 |
- 

*Initial Setup:*

**Equipment Conditions:**

- Fuel tank drained (para 4-73).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

- Rags (Item 14, Appendix E)
  - Dry cleaning solvent (Item 16, Appendix E)
  - One gasket
- 

**NOTE**

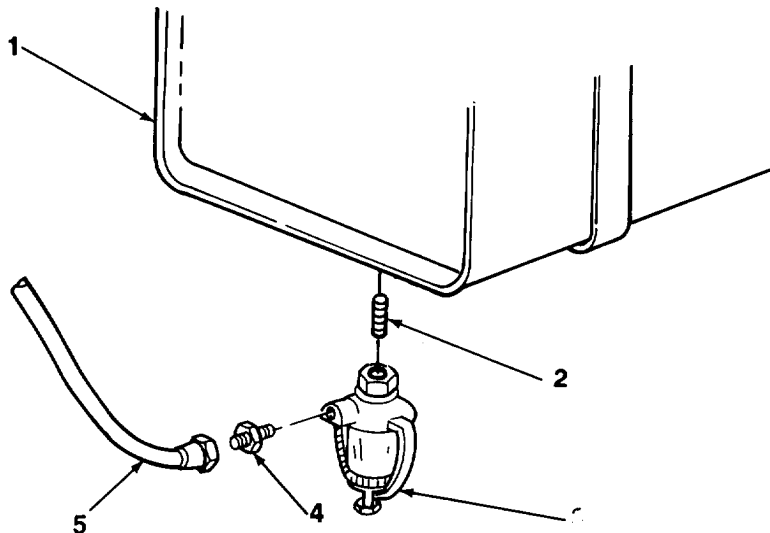
- If servicing strainer element only, perform subparagraphs b through d.
- A drain pan should be used to catch any draining fuel. Ensure that all spills are cleaned up.

---

**a. REMOVAL**

---

1. Disconnect fuel line (5) from straight adapter (4). Remove straight adapter from sediment strainer (3).
2. Remove sediment strainer (3) and nipple (2) from fuel tank (1).



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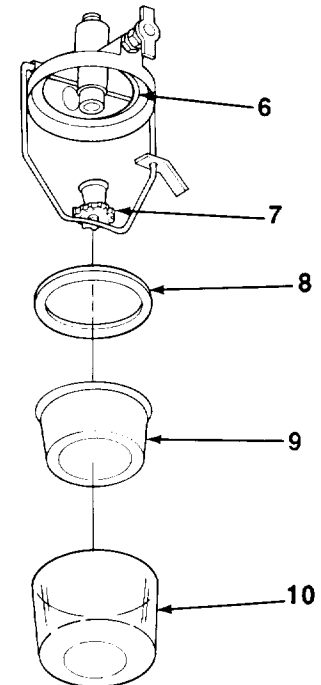
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**4-77. AUXILIARY ENGINE SEDIMENT STRAINER MAINTENANCE (Con't).**


---

**b. DISASSEMBLY**

1. Loosen thumbscrew (7) and remove bowl (10) and gasket (8) from strainer head (6). Discard gasket.
2. Remove strainer element (9) from bowl (10).




---

**c. CLEANING AND INSPECTION**


---



---

**WARNING**


---

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean strainer head, strainer element, and bowl with dry cleaning solvent. Dry thoroughly.
2. Inspect strainer head and bowl for cracks, breaks, and other damage. Replace bowl if cracked, bent, or otherwise damaged. If strainer head is damaged, replace entire sediment strainer.
3. Inspect strainer element for corrosion and deterioration. Replace strainer element if corroded or deteriorated.

---

**d. ASSEMBLY**


---

1. Position strainer element (9) in bowl (10)

---

**NOTE**


---

Tighten thumbscrew only enough to prevent fuel leakage.

2. Position new gasket (8) and bowl (10) in strainer head (6) and tighten thumbscrew (7).

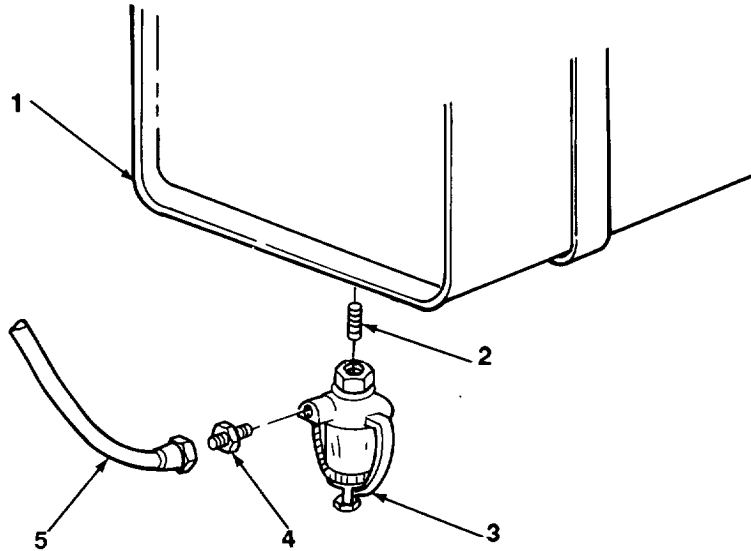
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**4-77. AUXILIARY ENGINE SEDIMENT STRAINER MAINTENANCE (Con't).**

---

**e. INSTALLATION**

1. Install nipple (2) and sediment strainer (3) on fuel tank (1).
2. Install straight adapter (4) on sediment strainer (3). Connect fuel line (5) to straight adapter.



**FOLLOW-ON TASKS:**

- Fill fuel tank.

---

**4-78. MUFFLER AND EXHAUST PIPE REPLACEMENT (ALL EXCEPT M131A5C).**

---

*This Task Covers:*

a. Removal

b. Installation

---

*Initial Setup:*

**Materials/Parts:**

- Adhesive (Item 1, Appendix E)
- One gasket
- One seal
- Four lockwashers

**Tools/Test Equipment:**

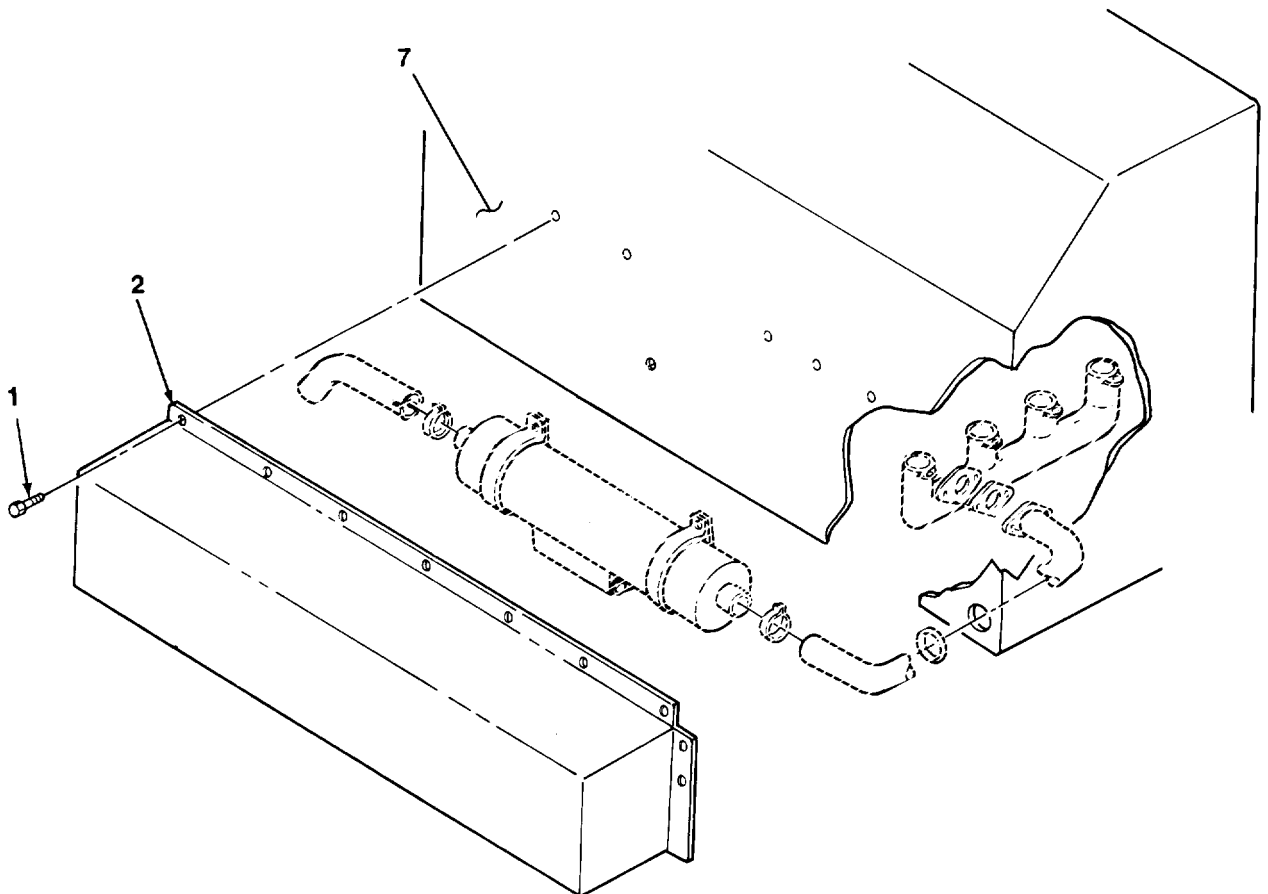
- General mechanic's tool kit
- 

**WARNING**

Before attempting to replace any part of exhaust system, allow exhaust system to cool.  
Failure to follow this warning may result in serious burns.

**a. REMOVAL**

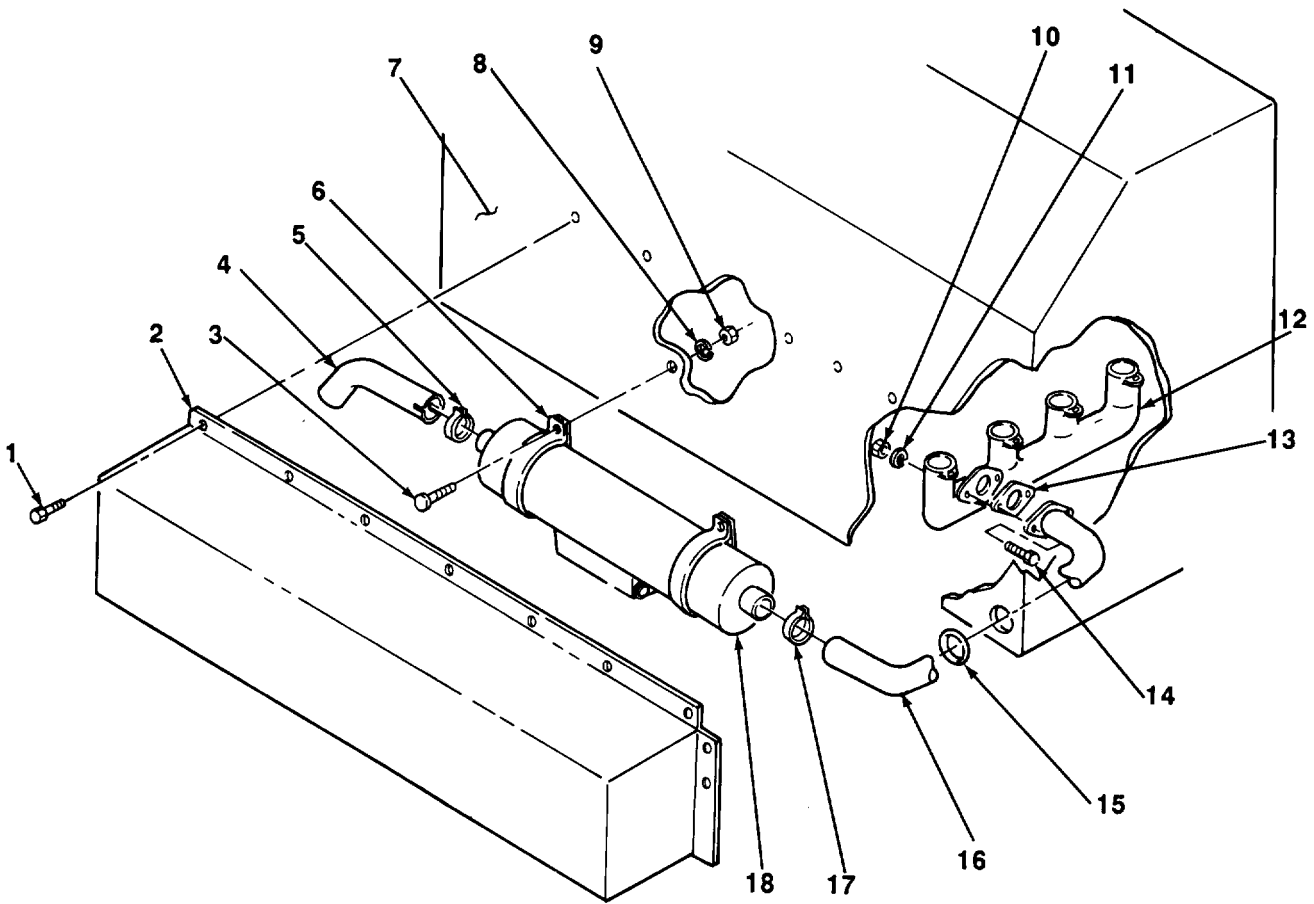
1. Remove 12 screws (1) and guard (2) from cabinet (7).



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## 4-78. MUFFLER AND EXHAUST PIPE REPLACEMENT (ALL EXCEPT M131A5C) (Con't).

2. Loosen clamp (5) and remove tailpipe (4) from muffler (18).
3. Loosen clamp (17) and disconnect exhaust pipe (16) from muffler (18).
4. Remove two nuts (9), lockwashers (8), screws (3), brackets (6), and muffler (18) from cabinet (7). Discard lockwashers.
5. Remove two nuts (10), lockwashers (11), screws (14), gasket (13), and exhaust pipe (16) from auxiliary engine exhaust manifold (12). Discard lockwashers and gasket.
6. Remove exhaust pipe (16) and seal (15) from cabinet (7). Discard seal.



### **b. INSTALLATION**

1. Apply adhesive to seal (15) and install on cabinet (7).
2. Position exhaust pipe (16) through cabinet (7). Install new gasket (13) and exhaust pipe on auxiliary engine exhaust manifold (12) with two screws (14), new lockwashers (11), and nuts (10).

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**4-78. MUFFLER AND EXHAUST PIPE REPLACEMENT (ALL EXCEPT M131A5C) (Con't).**

---

3. Position two brackets (6) on muffler (18) and install on cabinet (7) with two screws (3), new lockwashers (8), and nuts (9).
4. Position exhaust pipe (16) muffler (18) and tighten clamp (17).
5. Position tailpipe (4) on muffler (18) and tighten clamp (5).
6. Install guard (2) on cabinet (7) with 12 screws (1).

---

## 4-79. MUFFLER AND EXHAUST PIPE REPLACEMENT (M131A5C).

---

*This Task Covers:*

- a. Removal b. Installation
- 

*Initial Setup:*

**Materials/Parts:**

- One gasket
- Twelve lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**WARNING**

**Before attempting to replace any part of exhaust system, allow exhaust system to cool.  
Failure to follow this warning may result in serious burns.**

**a. REMOVAL**

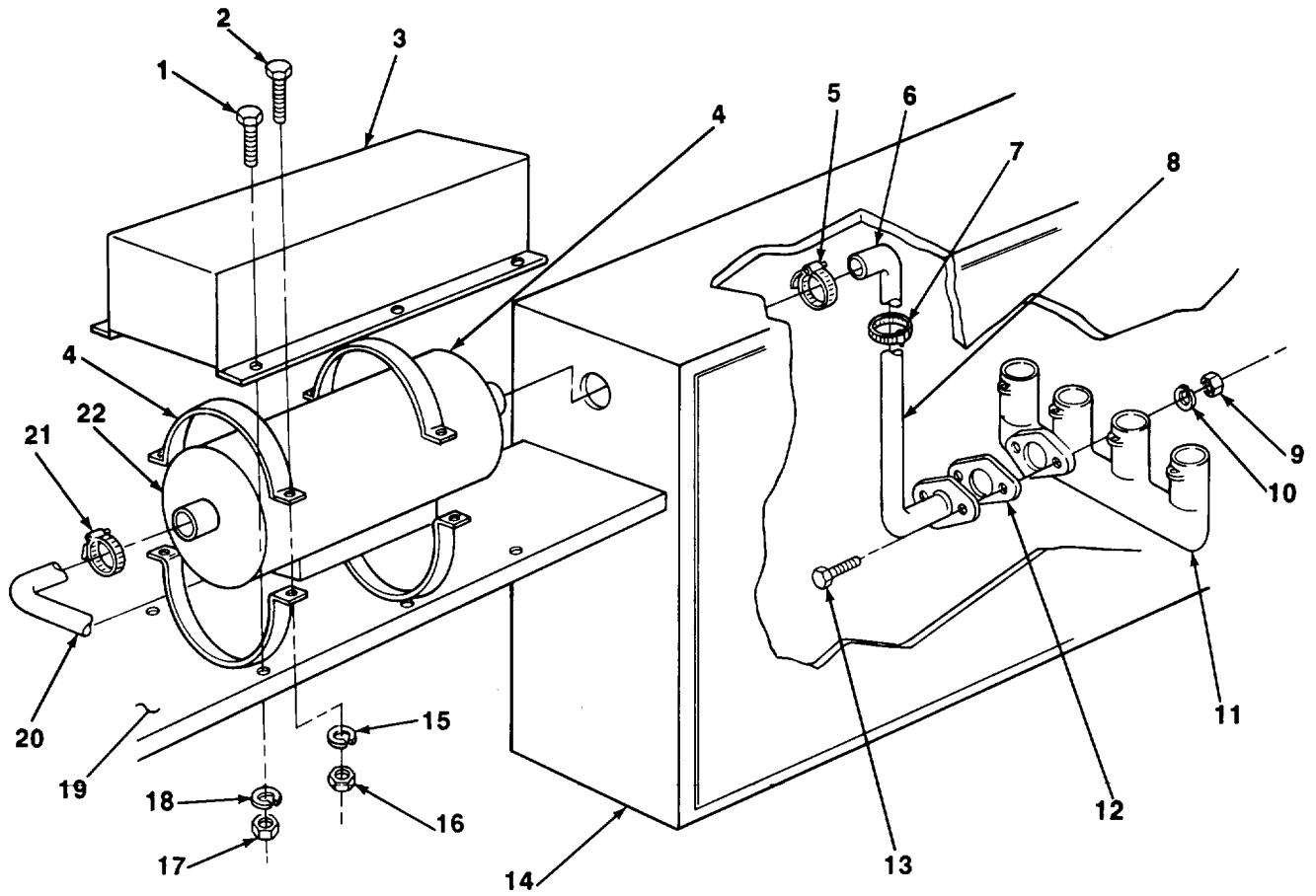
1. Remove six nuts (17), lockwashers (18), screws (1), and guard (3) from fender (19). Discard lockwashers.
2. Loosen clamp (21) and remove tailpipe (20) from muffler (22).
3. Loosen clamp (5) and disconnect exhaust pipe (6) from muffler (22).
4. Remove four nuts (16), lockwashers (15), screws (2), two brackets (4), and muffler (22) from fender (19). Discard lockwashers.
5. Loosen clamp (7) and remove exhaust pipe (6) from tubing (8).
6. Remove exhaust pipe (6) from cabinet (14).
7. Remove two nuts (9), lockwashers (10), screws (13), gasket (12), and tubing (8) from auxiliary engine exhaust manifold (11). Discard gasket and lockwashers.

**b. INSTALLATION**

1. Install new gasket (12) and tubing (8) on auxiliary engine exhaust manifold (11) with two screws (13), new lockwashers (10), and nuts (9).
2. Position exhaust pipe (6) through cabinet (14) and install on tubing (8). Tighten clamp (7).
3. Position muffler (22) and two brackets (4) on fender (19) and install four screws (2), new lockwashers (15), and nuts (16).
4. Position exhaust pipe (6) on muffler (22) and tighten clamp (5).
5. Install tailpipe (20) on muffler (22) and tighten clamp (21).
6. Install guard (3) on fender (19) with six screws (1), new lockwashers (18), and nuts (17).



4-79. MUFFLER AND EXHAUST PIPE REPLACEMENT (M131A5C) (Con't).



TA702797

## 4-80. AUXILIARY ENGINE INSTRUMENT PANEL SWITCHES AND GAGES REPLACEMENT.

*This Task Covers:*

- |  |  |
|--|--|
| a. Panel Power and Ignition Switches Replacement     | d. Filter-separator Pressure Gages Replacement (M131A5C) |
| b. Starter Switch Replacement                        |  |
| c. Oil Pressure and System Voltage Gages Replacement |  |

*Initial Setup:*

**Equipment Conditions:**

- Battery cables disconnected (para 4-25).

**Materials/Parts:**

- Marker tags (Item 17, Appendix E)

**Tools/Test Equipment:**

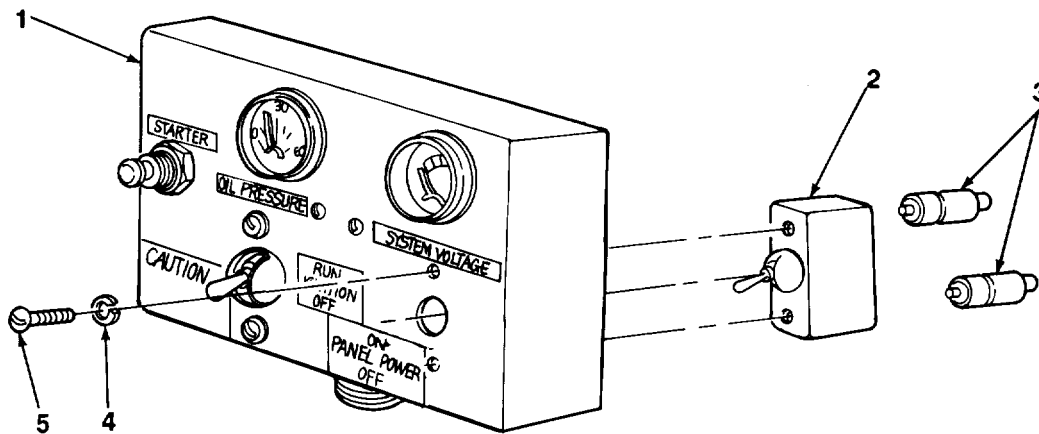
- General mechanic's tool kit

### a. PANEL POWER AND IGNITION SWITCHES REPLACEMENT

**NOTE**

Panel power switch and ignition switch are replaced the same way on all models. This task covers M131A5 panel power switch.

1. Tag wires for installation if identification bands are missing or not legible (para 4-20).
2. Disconnect two plug connectors (3) from switch (2).
3. Remove two screws (5), washers (4), and switch (2) from instrument panel (1).
4. Install switch (2) on instrument panel (1) with two washers (4) and screws (5).
5. Connect two plug connectors (3) to switch (2).



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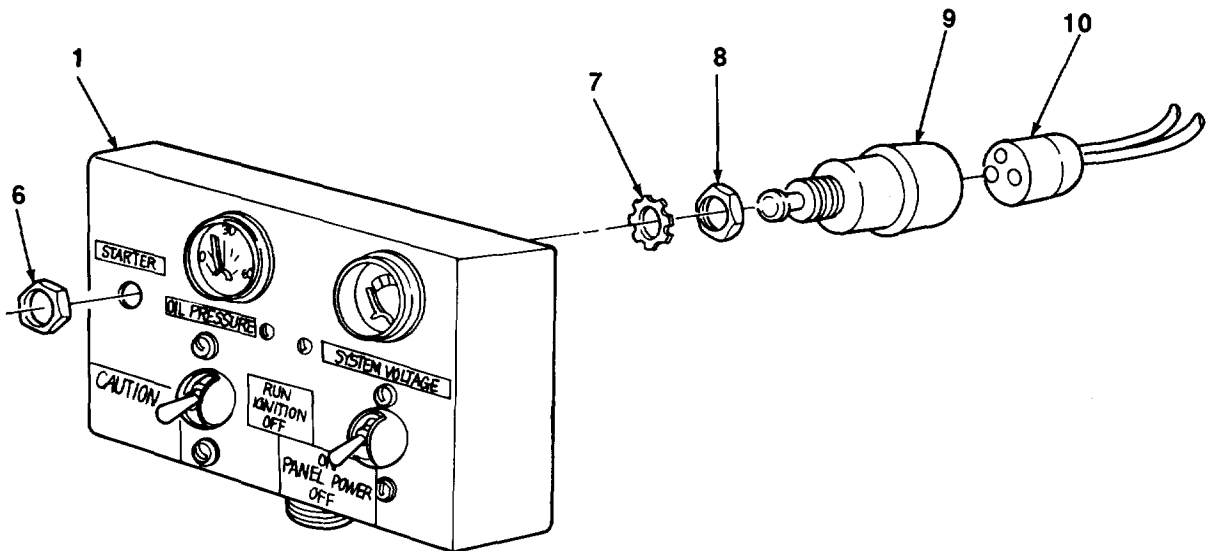
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## 4-80. AUXILIARY ENGINE INSTRUMENT PANEL SWITCHES AND GAGES REPLACEMENT (Con't).

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### b. STARTER SWITCH REPLACEMENT

1. Disconnect plug connector (10) from switch (9).
2. Remove nut (6) and switch (9) from instrument panel (1).
3. Remove starwasher (7) and nut (8) from switch (9).
4. Install nut (8) and starwasher (7) on switch (9).
5. Install switch (9) on instrument panel (1) with nut (6).
6. Connect plug connector (10) to switch (9).



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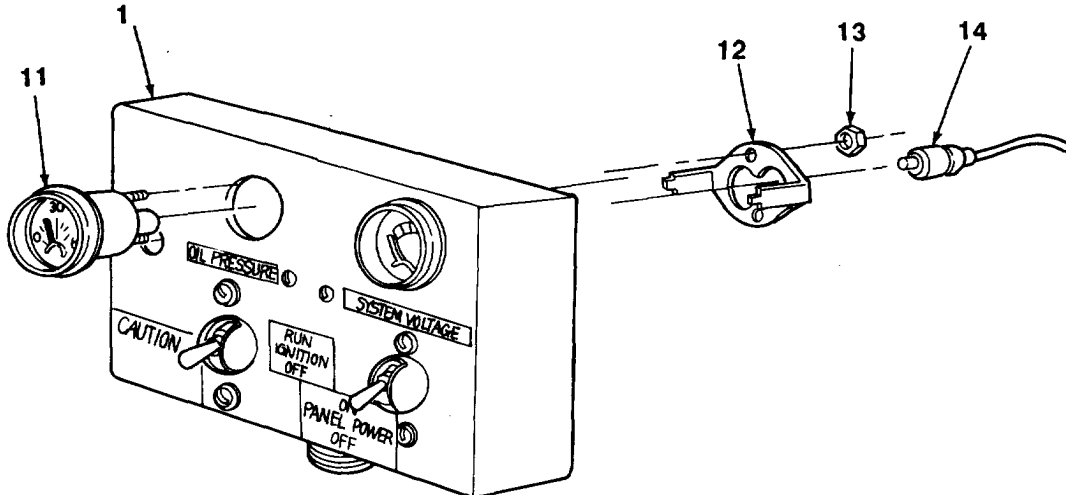
## 4-80. AUXILIARY ENGINE INSTRUMENT PANEL SWITCHES AND GAGES REPLACEMENT (Con't).

### c. OIL PRESSURE AND SYSTEM VOLTAGE GAGES REPLACEMENT

#### NOTE

Oil pressure gage and system voltage gage are replaced the same way on all models. This task covers M131A5 oil pressure gage.

1. Tag wires for installation if identification bands are missing or not legible (para 4-20).
2. Disconnect two plug connectors (14) from gage (11).
3. Remove two nuts (13), bracket (12), and gage (11) from instrument panel (1).
4. Position gage (11) in instrument panel (1) and Install bracket (12) with two nuts (13).
5. Connect two plug connectors (14) to gage (11).



### d. FILTER-SEPARATOR PRESSURE GAGES REPLACEMENT (M131A5C)

#### NOTE

Filter-separator pressure gages are replaced the same way. This task covers filter outlet pressure gage.

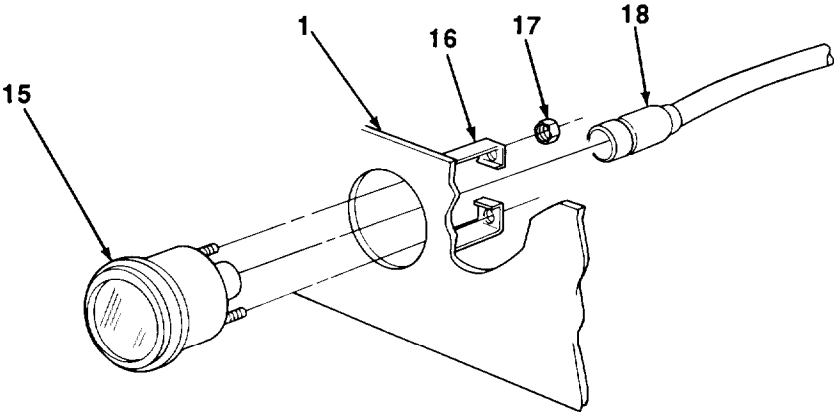
1. Disconnect plug connector (18) from gage (15).
2. Remove two nuts (17), brackets (16), and gage (15) from instrument panel (1).
3. Position gage (15) in instrument panel (1) and install two brackets (16) and nuts (17).
4. Connect plug connector (18) to gage (15).

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**4-80. AUXILIARY ENGINE INSTRUMENT PANEL SWITCHES AND GAGES REPLACEMENT (Con't).**

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**FOLLOW-ON TASKS:**

- Connect battery cables (para 4-25).

## 4-81. AUXILIARY ENGINE INSTRUMENT PANEL HARNESS ASSEMBLY AND CIRCUIT BREAKER REPLACEMENT.

*This Task Covers:*

- a. Removal b. Installation

*Initial Setup:*

**Equipment Conditions:**

- Battery cables disconnected (para 4-25).

**Materials/Parts:**

- Marker tags (Item 17, Appendix E)
- Four lockwashers

**Tools/Test Equipment:**

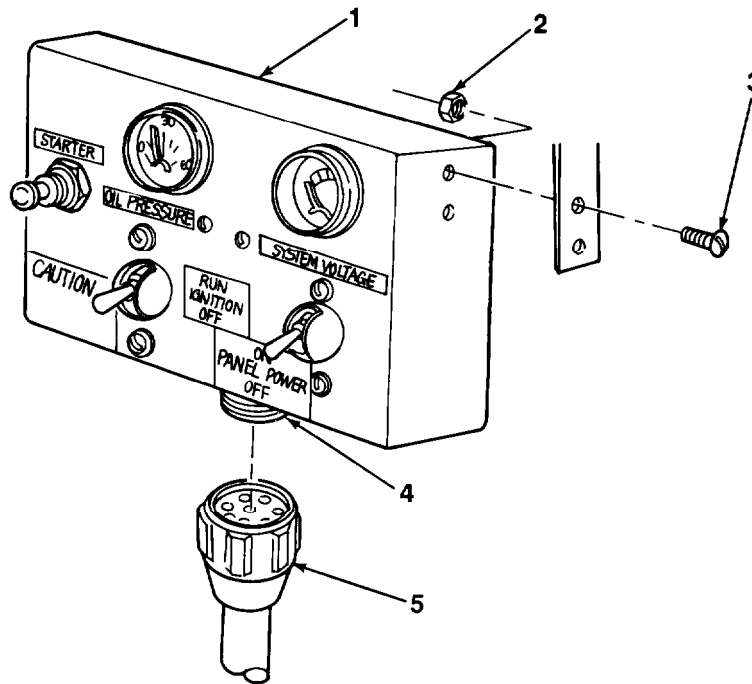
- General mechanic's tool kit

**a. REMOVAL**

**NOTE**

Auxiliary engine instrument panel harness and circuit breaker are replaced the same way on all models except quantity of plug connectors may vary. M131A5 is illustrated.

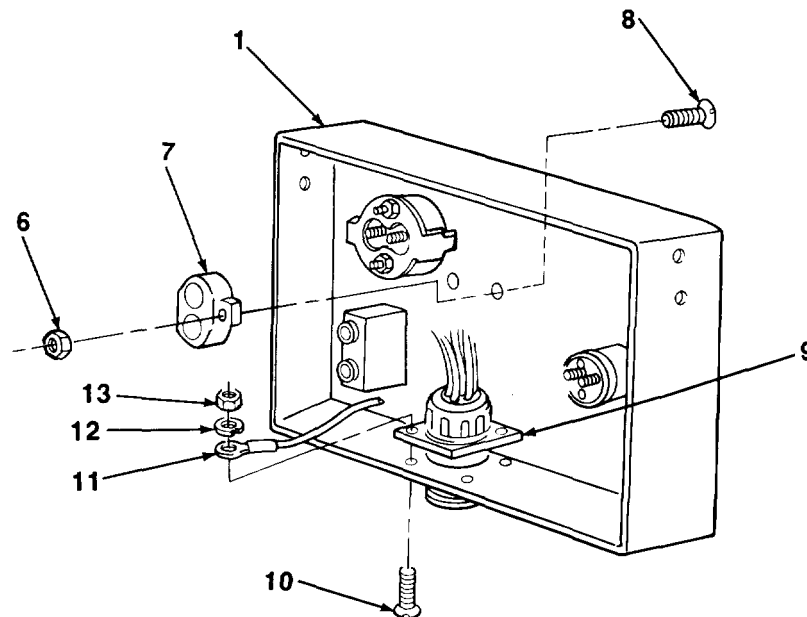
1. Disconnect cable (5) from receptacle (4).
2. Remove four nuts (2), screws (3), and instrument panel (1) from cabinet.
3. Tag wires for installation if identification bands are missing or not legible (para 4-20).



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#### 4-81. AUXILIARY ENGINE INSTRUMENT PANEL HARNESS ASSEMBLY AND CIRCUIT BREAKER REPLACEMENT (Con't).

4. Disconnect plug connectors from switches, gages, and circuit breaker (7) (para 4-80).
5. Remove four nuts (13), lockwashers (12), screws (10), ground lead (11), and harness assembly (9) from instrument panel (1). Discard lockwashers.
6. Remove two nuts (6), screws (8), and circuit breaker (7) from instrument panel (1).



#### **b. INSTALLATION**

1. Install circuit breaker (7) on instrument panel (1) with two screws (8) and nuts (6).
2. Install harness assembly (9) and ground lead (11) on instrument panel (1) with four screws (10), new lockwashers (12), and nuts (13).
3. Connect plug connectors to switches, gages, and circuit breaker (7) (para 4-80).
4. Install instrument panel (1) in cabinet with four screws (3) and nuts (2).
5. Connect cable (5) to receptacle (4).

#### **FOLLOW-ON TASKS:**

- Connect battery cables (para 4-25).

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## 4-82. FIREWALL PANEL REPLACEMENT.

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*This Task Covers:* Replacement

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*Initial Setup:*

**Materials/Parts:**

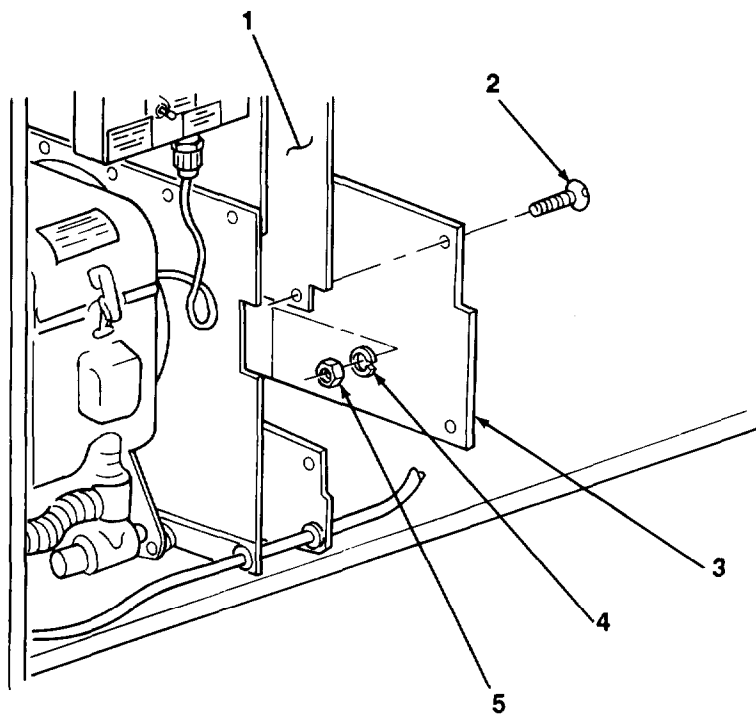
- Eight lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**REPLACEMENT**

1. Remove eight nuts (5), lockwashers (4), screws (2), and firewall panel (3) from firewall (1). Discard lockwashers.
2. Install firewall panel (3) on firewall (1) with eight screws (2), new lockwashers (4), and nuts (5).



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## Section XIV. FILTER-SEPARATOR MAINTENANCE

Paragraph Title	Page Number
Filter-separator Replacement (M131A4C and M131A5C Early Model) . . . . .	4-176
Filter-separator Replacement (M131A5C Late Model) . . . . .	4-178
Filter-separator Servicing (M131A4C) . . . . .	4-179
Filter-separator Servicing (M131A5C Early Model), . . . . .	4-182
Filter-separator Servicing (M131A5C Late Model) . . . . .	4-185
Float Assembly Replacement . . . . .	4-188
Pressure Gage Replacement (M131A4C) . . . . .	4-175

### 4-83. PRESSURE GAGE REPLACEMENT (M131A4C).

*This Task Covers:* Replacement

*Initial Setup:*

**Materials/Parts:**

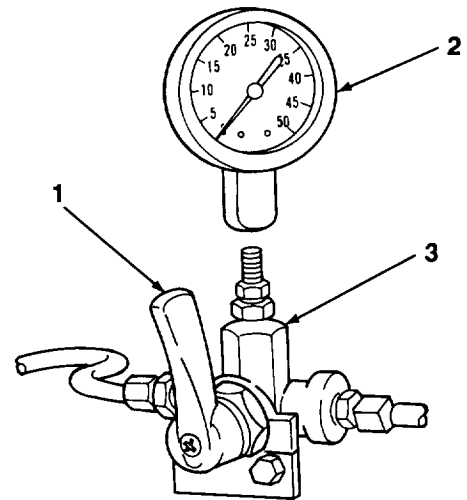
- Antiseizing tape (item 18, Appendix E)

**Tools/Test Equipment:**

- General mechanic's tool kit

**REPLACEMENT**

1. Ensure that handle (1) is in closed position.
2. Remove pressure gage (2) from elbow (3) by turning pressure gage counterclockwise.
3. Apply antiseizing tape to threads of elbow (3). Install pressure gage (2) on elbow by turning pressure gage clockwise.



## 4-84. FILTER-SEPARATOR REPLACEMENT (M131A4C AND M131A5C EARLY MODEL).

*This Task Covers:*

- a. Removal b. Installation

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).
- Piping disconnected from filter-separator (para 4-94).

**Materials/Parts:**

- Eight lockwashers

**Personnel Required:** Two

**Tools/Test Equipment:**

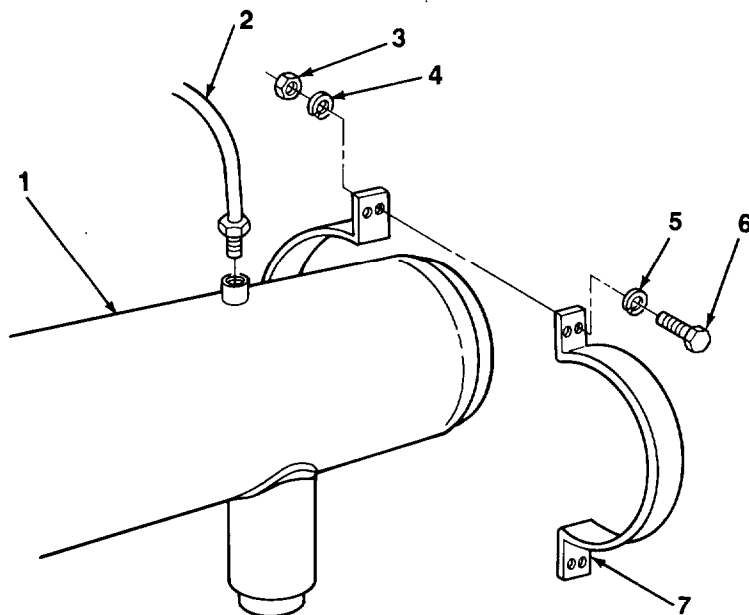
- 1 General mechanic's tool kit
- 1 Common no. 1 shop set

**a. REMOVAL**

**NOTE**

**M131A4C and M131A5C early model filter-separators are removed the same way except M131A4C has one tube and M131A5C has three tubes.**

1. Disconnect three tubes (2) from filter-separator (1).
2. Position suitable lifting device under filter-separator (1).
3. Remove eight nuts (3), lockwashers (4), screws (6), washers (5), two brackets (7), and filter-separator (1) from semitrailer. Discard lockwashers.



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**4-84. FILTER-SEPARATOR REPLACEMENT (M131A4C AND M131A5C EARLY MODEL)  
(Con't).**

---

**b. INSTALLATION****NOTE**

**M131A4C and M131A5C early model filter-separators are installed the same way expect M131A4C has one tube and M131A5C has three tubes.**

1. Position filter-separator (1) on semitrailer and install two brackets (7) with eight washers (5), screws (6), new lockwashers (4), and nuts (3).
2. Connect three tubes (2) to filter-separator (1).

---

## 4-85. FILTER-SEPARATOR REPLACEMENT (M131A5C LATE MODEL).

---

*This Task Covers:*

a. Removal

b. Installation

---

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Materials/Parts:**

- Two gaskets

**Tools/Test Equipment:**

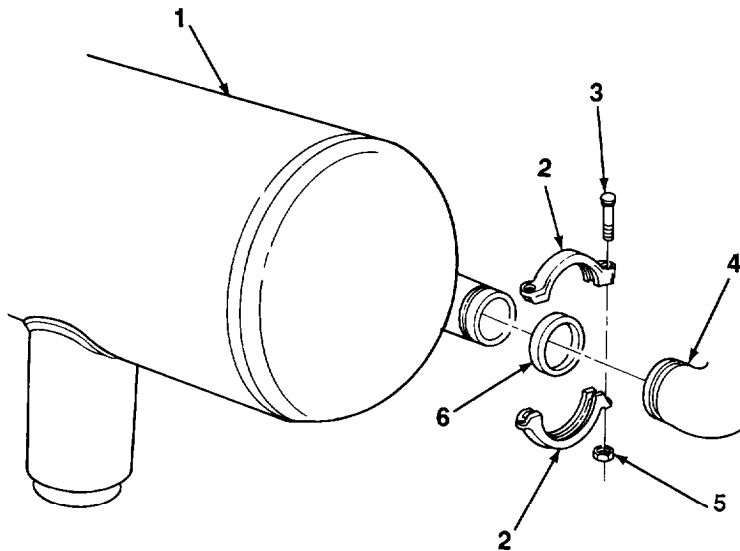
- General mechanic's tool kit
- Common no. 1 shop set

**Personnel Required:** Two

---

### **a. REMOVAL**

1. Position suitable lifting device under filter-separator (1).
2. Remove four nuts (5), screws (3), and two couplers (2) from filter-separator (1) and tubes (4).
3. Remove two gaskets (6) from filter-separator (1). Discard gaskets.
4. Remove filter-separator (1) from semitrailer.



### **b. INSTALLATION**

1. Position filter-separator (1) on semitrailer.
2. Position two new gaskets (6) on tubes (4) and filter-separator (1).
3. Install two couplers (2) on filter-separator (1) and tubes (4) with four screws (3) and nuts (5).

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## 4-86. FILTER-SEPARATOR SERVICING (M131A4C).

*This Task Covers:*

- |                            |                          |
|----------------------------|--------------------------|
| a. Elements Removal        | c. Elements Installation |
| b. Cleaning and Inspection |                          |

### Equipment Conditions:

- Tank drained (para 4-64).

### Tools/Test Equipment:

- General mechanic's tool kit
- Common no. 1 shop set

### Materials/Parts:

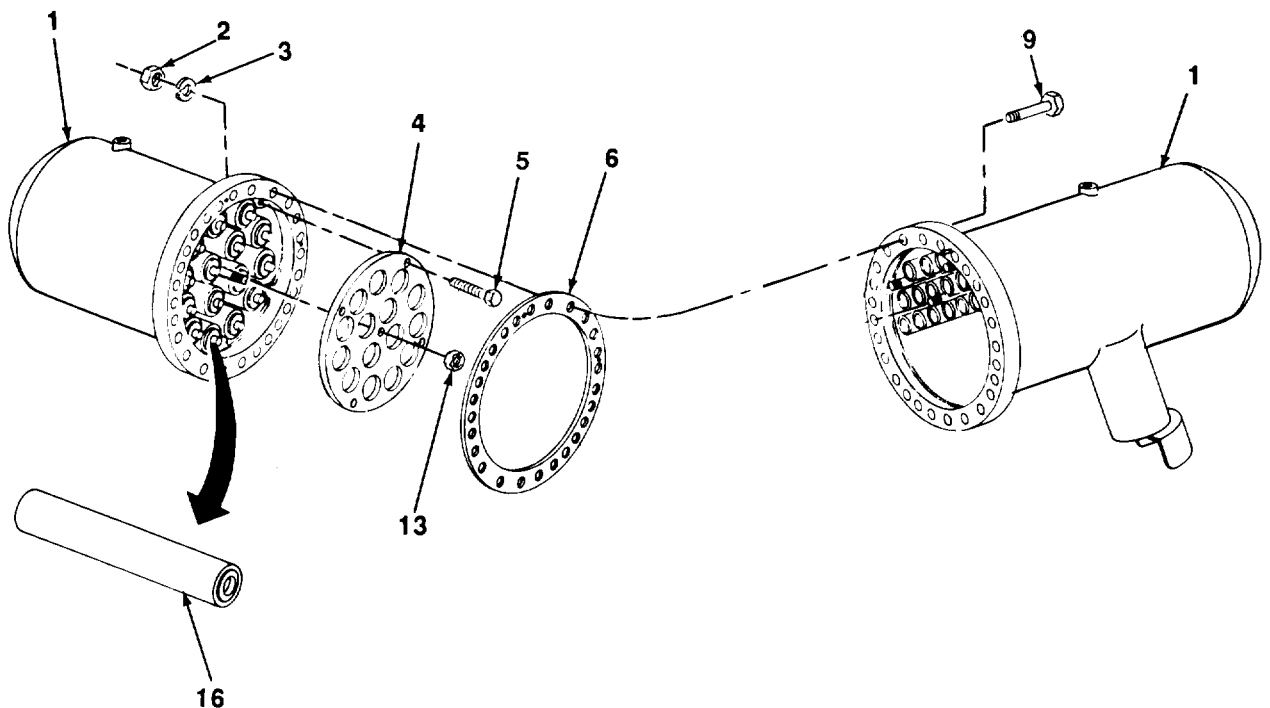
- Rags (Item 14, Appendix E)
- One gasket
- Twenty-six lockwashers
- Twenty-nine preformed packings

### a. ELEMENTS REMOVAL

#### **WARNING**

Read and observe all safety precautions listed in the Warning Summary before servicing filter-separator. Ensure that semitrailer is grounded and it is safe to proceed. Failure to follow this warning may cause a spark to ignite, resulting in serious injury or death to personnel.

1. Remove 26 nuts (2), lockwashers (3), and screws (9) and separate two sections of filter-separator (1). Remove gasket (6). Discard gasket and lockwashers.
2. Remove four bolts (5), nut (13), and retainer plate (4) from first stage elements (16).



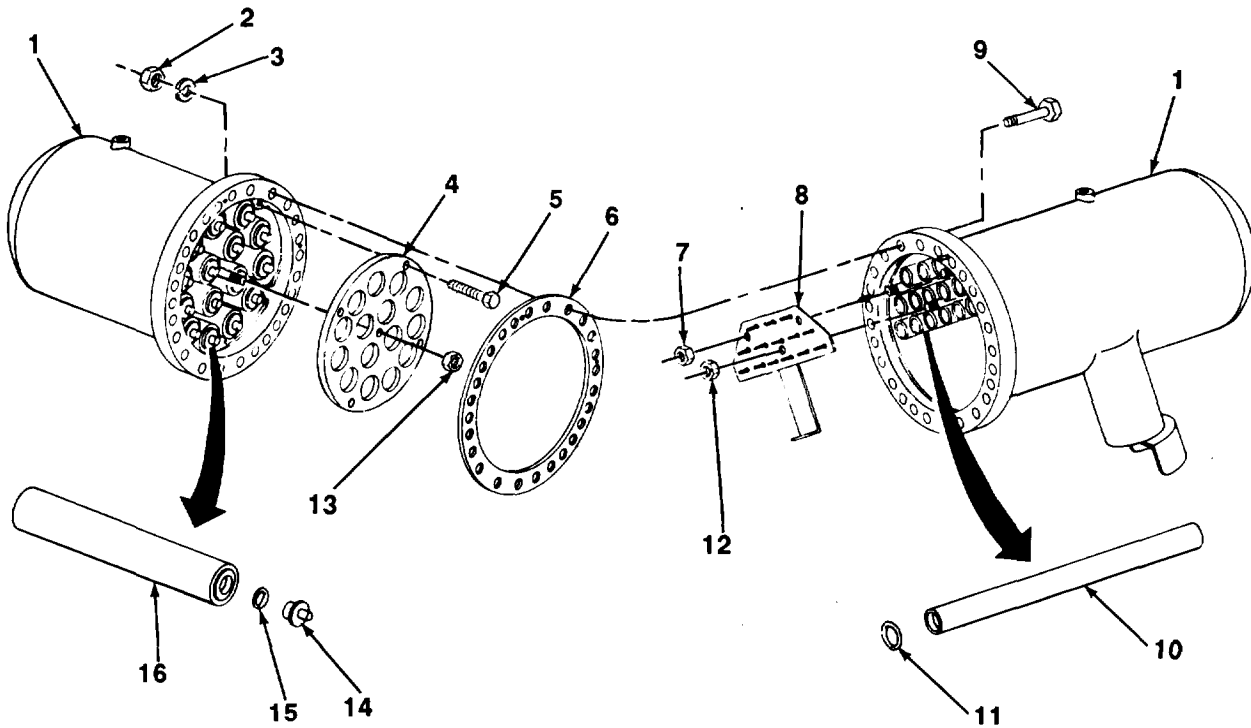
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**4-86. FILTER-SEPARATOR SERVICING (M131A4C) (Con't).**

3. Remove 15 plugs (14), preformed packings (15), and first stage elements (16). Discard preformed packings.
4. Remove two nuts (7), nut (12), and retainer plate (8) from second stage elements (10).
5. Remove 14 second stage elements (10) from filter-separator (1).
6. Remove 14 preformed packings (11) from second stage elements (10). Discard preformed packings.

**b. CLEANING AND INSPECTION**

1. Clean interior of filter-separator with a clean rag and inspect for damage. Replace if damaged.
2. Inspect elements for damage. Replace any damaged elements.



**c. ELEMENTS INSTALLATION**

1. Install 14 new preformed packings (11) on second stage elements (10).
2. Install 14 second stage elements (10) in filter-separator (1).
3. Install retainer plate (8) on second stage elements (10) with nut (12) and two nuts (7).
4. Install 15 new preformed packings (15) and plugs (14) on first stage elements (16).

---

**4-86. FILTER-SEPARATOR SERVICING (M131A4C) (Con't).**

---

5. Install 15 first stage elements (16) in filter-separator (1).
6. Install retainer plate (4) on first stage elements (16) with nut (13) and four bolts (5).
7. Position new gasket (6) on filter-separator (1). Install two sections of filter-separator together with 26 screws (9), new lockwashers (3), and nuts (2).

---

## 4-87. FILTER-SEPARATOR SERVICING (M131A5C EARLY MODEL).

---

*This Task Covers:*

- |                               |                                    |
|-------------------------------|------------------------------------|
| a. Elements and Fuses Removal | c. Elements and Fuses Installation |
| b. Cleaning and Inspection    |                                    |
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank drained (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit
  - Common no. 1 shop set
- 

**Materials/Parts:**

- Rags (Item 14, Appendix E)
- Three gaskets
- Four lockwashers

**a. ELEMENTS REMOVAL**

**WARNING**

**Read and observe all safety precautions listed in the Warning Summary before servicing filter-separator. Ensure that semitrailer is grounded and it is safe to proceed. Failure to follow this warning may cause a spark to ignite, resulting in serious injury or death to personnel.**

1. Remove 12 nuts (16), bolts (19), washers (18), cover (20), and gasket (21) from mounting flange (17). Discard gasket.
2. Remove four wingnuts (7), lockwashers (6), eight washers (5), and retainer plate (8) from filter-separator (1). Discard lockwashers.

**NOTE**

**Always remove lower canister assembly first.**

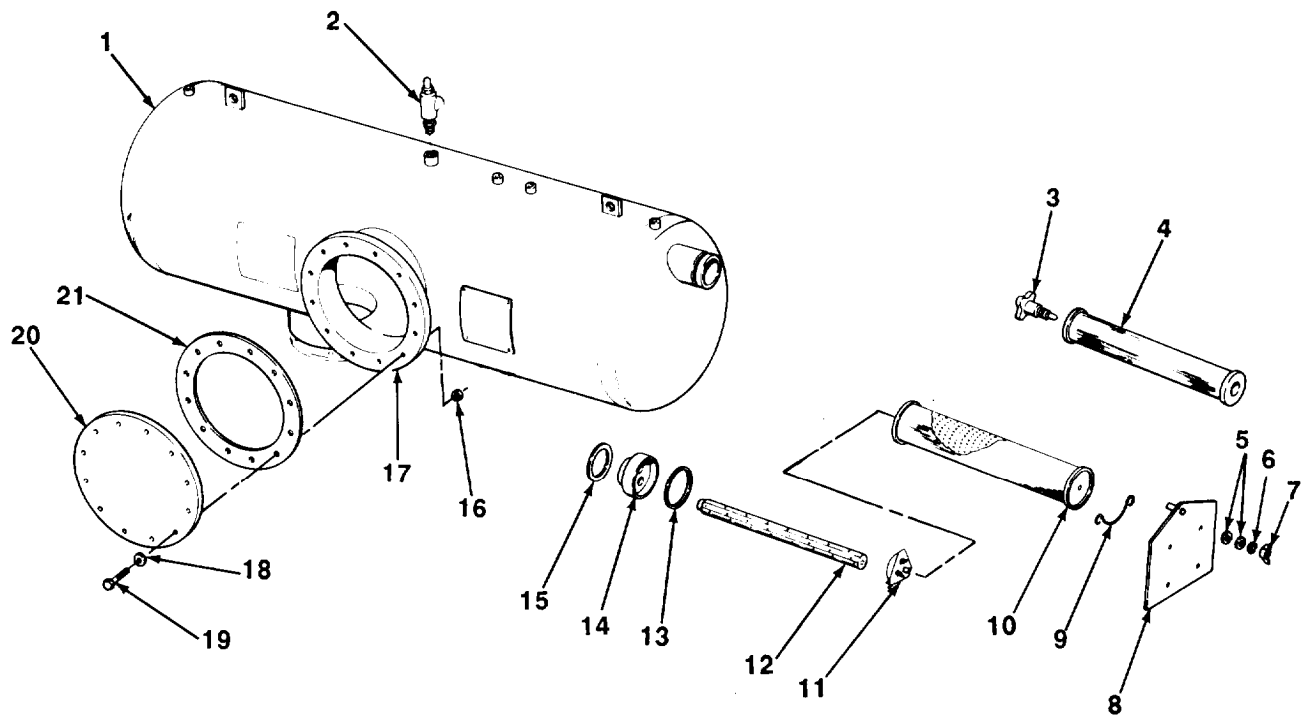
3. Starting with lower canister (10) assembly nearest to service port, remove spacewire (9) and pull canister assembly to the right until it drops down and can be removed through service port.
4. Repeat step 3 for four remaining canister (10) assemblies.
5. Remove adapter (14) and three fuses (12) from each canister (10).
6. Remove two gaskets (13 and 15) from adapter (14). Ensure that all gasket remains are removed from filter-separator (1). Discard gaskets.
7. Remove five fuse clips (11) from canisters (10).
8. Remove 15 retainers (3) from elements (4).
9. Remove 15 elements (4) from guide pipes in filter-separator (1).
10. Remove relief valve (2) from filter-separator (1).



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**4-87. FILTER-SEPARATOR SERVICING (M131A5C EARLY MODEL) (Con't).**


---


**b. CLEANING AND INSPECTION**

1. Clean all parts with a clean rag.
2. Inspect elements and fuses for damage. Replace damaged parts.

**c. ELEMENTS INSTALLATION**

1. Install relief valve (2) on filter-separator (1).
2. Install 15 elements (4) on guide pipes in filter-separator (1) beginning with guide pipes farthest from service port.
3. Install 15 retainers (3) on elements (4) and handtighten only. Do not overlighten.
4. Install new gasket (13) on adapter (14).
5. Install three fuses (12) in adapter (14). Push elements into holes and install fuse clip (11) on fuses. Install new gasket (15) on adapter.
6. Slide canister (10) over fuse (12) assembly and push canister into adapter (14).
7. Repeat steps 4 through 6 to assemble four remaining canister (10) assemblies.
8. Insert canister (10) assembly through service port with adapter (14) end down toward bottom of tank. Turn adapter end left and lift canister assembly into position on upper guide rods farthest from service port. Slide canister assembly to left until it fits into the outlet hole.

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## 4-87. FILTER-SEPARATOR SERVICING (M131A5C EARLY MODEL) (Con't).

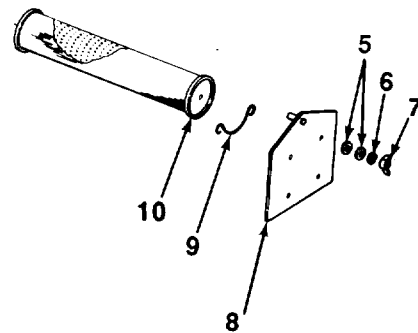
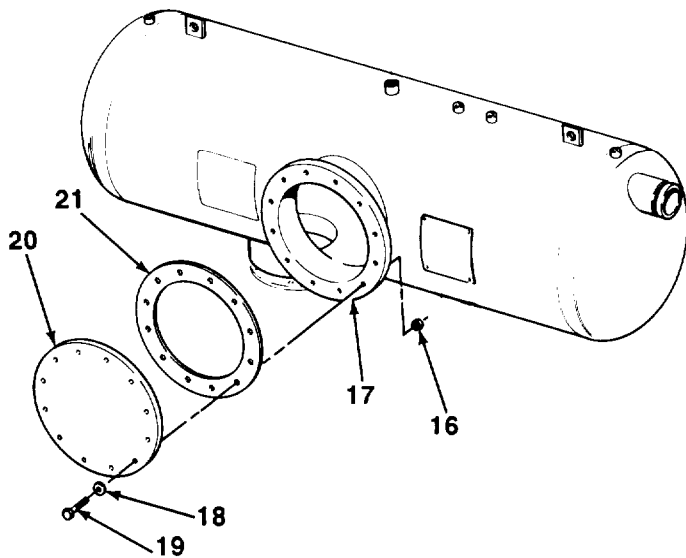
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9. Raise end of canister (10) assembly and install spacewire (9) near end of canister.
10. Install next canister (10) assembly on upper guide rods, followed by lower row starting with the farthest installation away from service port. install remaining spacewires (9).

### NOTE

**Handtighten wingnuts only. Do not use a wrench.**

11. Install retainer plate (8) with eight washers (5), four new lockwashers (6), and wingnuts (7).
12. Install new gasket (21) and cover (20) on mounting flange (17) with 12 bolts (19), washers (18), and nuts (16).



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**4-88. FILTER-SEPARATOR SERVICING (M131A5C LATE MODEL).**

---

*This Task Covers:*

- |                               |                                    |
|-------------------------------|------------------------------------|
| a. Elements and Fuses Removal | c. Elements and Fuses Installation |
| b. Cleaning and Inspection    |                                    |
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank drained (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

- Rags (Item 14, Appendix E)
  - One preformed packing
  - Two gaskets
  - Four lockwashers
- 

**a. ELEMENTS REMOVAL**

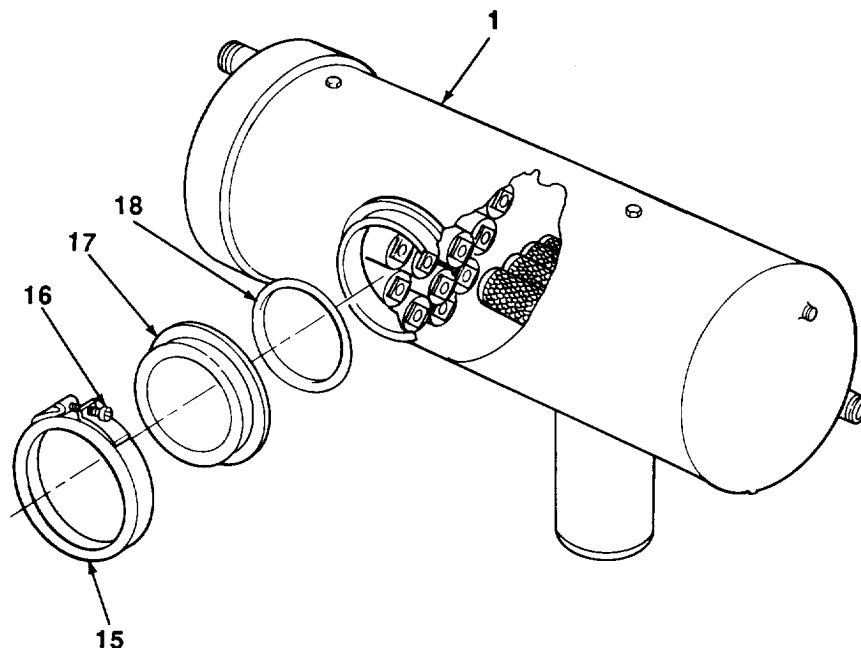
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**WARNING**

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**Read and observe all safety precautions listed in the Warning Summary before servicing filter-separator. Ensure that semitrailer is grounded and it is safe to proceed. Failure to follow this warning may cause a spark to ignite, resulting in serious injury or death to personnel.**

1. Loosen screw (16) and remove clamp (15), cover (17), and preformed packing (18) from filter-separator (1). Discard preformed packing.



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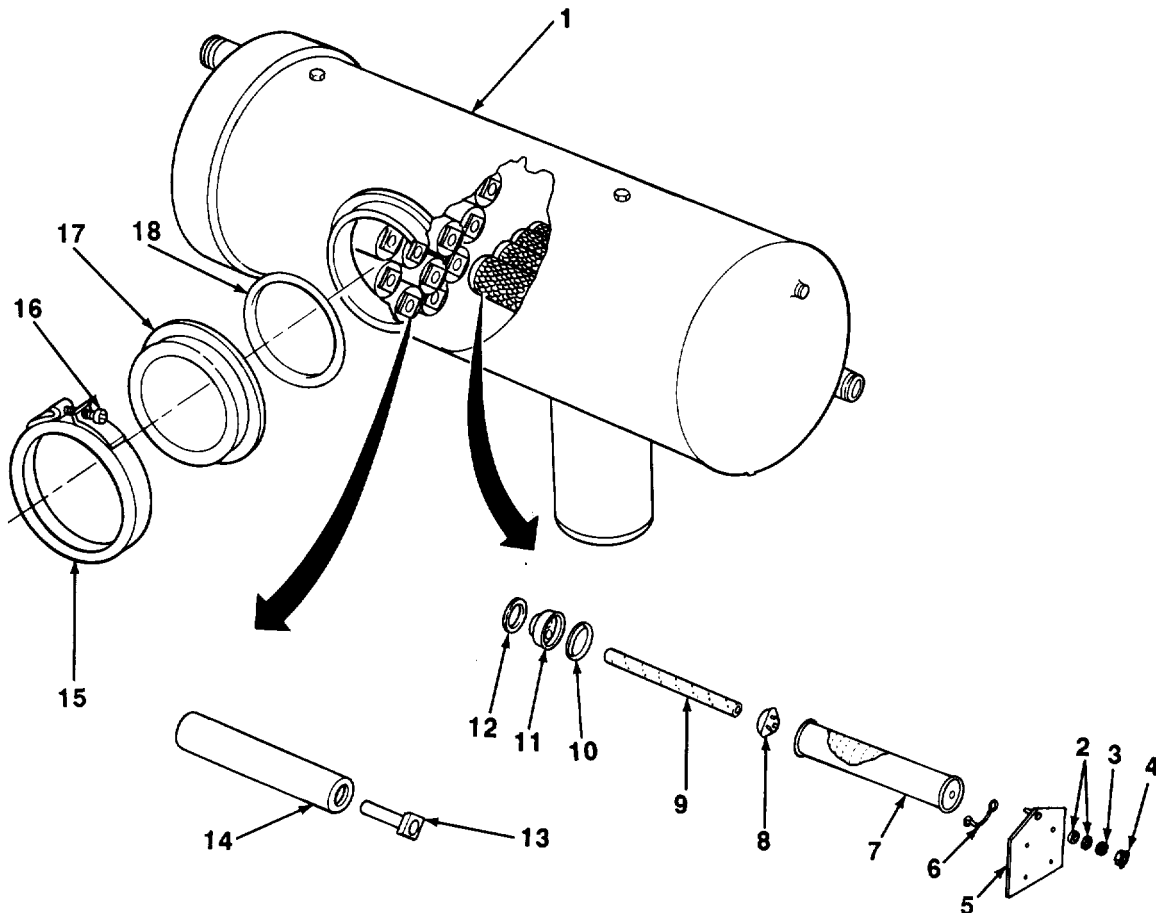
## 4-88. FILTER-SEPARATOR SERVICING (M131A5C LATE MODEL) (Con't).

2. Remove four wingnuts (4), lockwashers (3), eight washers (2), and retainer plate (5) from filter-separator (1). Discard lockwashers.

**NOTE**

**Always remove lower canister assembly first.**

3. Starting with lower canister (7) assembly nearest to service port, remove spacer wire (6) and pull canister assembly to the right until it drops down and can be removed through service port.
4. Repeat step 3 for four remaining canister (7) assemblies.
5. Remove adapter (11) and three fuses (9) from canister (7).
6. Remove two gaskets (12 and 10) from adapter (11). Ensure that all gasket remains are removed from filter-separator (1). Discard gaskets.
7. Remove five fuse clips (8) from canisters (7).



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**4-88. FILTER-SEPARATOR SERVICING (M131A5C LATE MODEL) (Con't).**

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8. Repeat steps 5 through 7 for four remaining canister (7) assemblies.
9. Remove 15 retainers (13) from elements (14).
10. Remove 15 elements (14) from guide pipes in filter-separator (1).

**b. CLEANING AND INSPECTION**

1. Clean all parts with a clean rag.
2. Inspect elements and fuses for damage. Replace damaged parts.

**c. ELEMENTS INSTALLATION**

1. Install 15 elements (14) on guide pipes in filter-separator (1) beginning with guide pipes farthest from service port.
2. Install 15 retainers (13) on elements (14) and handtighten only. Do not overtighten.
3. Install new gasket (10) on adapter (11).
4. Install three fuses (9) in adapter (11). Push elements into holes and install fuse clip (8) on fuses. Install new gasket (12) on adapter.
5. Slide canister (7) over fuse (9) assembly and push canister into adapter (11).
6. Repeat steps 3 through 5 to assemble four remaining canister (7) assemblies.
7. Insert canister (7) assembly through service port with adapter (11) end down toward bottom of tank. Turn adapter end left and lift canister assembly into position on upper guide pipes farthest from service port. Slide canister assembly to left until it fits into the outlet hole.
8. Raise end of canister (7) assembly and install spacer wire (6) near end of canister.
9. Install next canister (7) assembly on upper guide pipes, followed by lower row starting with the farthest installation away from service port. Install remaining spacer wires (6).

**NOTE**

**Handtighten wingnuts. Do not use a wrench.**

10. Install retainer plate (5) with eight washers (2), four new lockwashers (3), and wingnuts (4).
11. Position new preformed packing (18) and cover (17) on filter-separator (1) and install clamp (15). Tighten screw (16).

## 4-89. FLOAT ASSEMBLY REPLACEMENT.

*This Task Covers:*

a. Removal

b. Installation

*Initial Setup:*

### Materials/Parts:

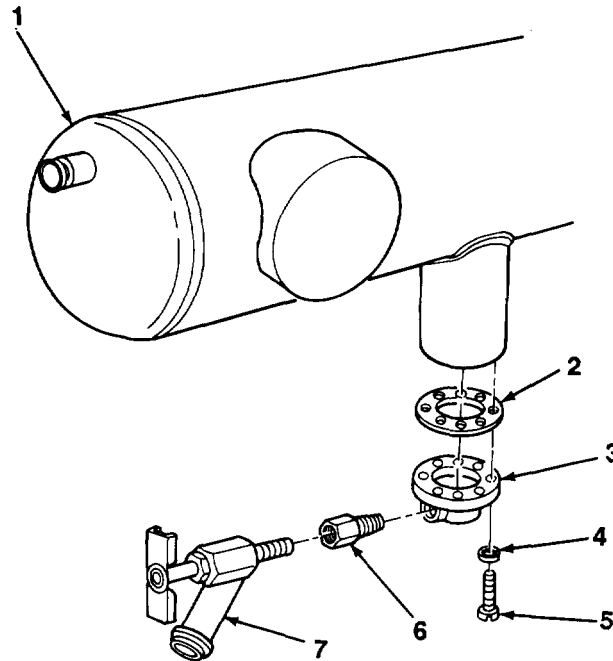
- One gasket
- Eight lockwashers

### Tools/Test Equipment:

- General mechanic's tool kit
- Common no. 1 shop set

### a. REMOVAL

1. Remove eight screws (5), lockwashers (4), float assembly (3), and gasket (2) from filter-separator (1). Discard lockwashers and gasket.
2. Remove draincock (7) and adapter (6) from float assembly (3).



### b. INSTALLATION

1. Install adapter (6) and draincock (7) on float assembly (3).
2. Install new gasket (2) and float assembly (3) on filter-separator (1) with eight new lockwashers (4) and screws (5).

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**Section XV. PUMPS, METERS, VALVES, LINES,  
AND FITTINGS MAINTENANCE**

Paragraph Title	Page Number
Adjustable Bypass Valve Replacement (M131A4C and M131A5C) . . . . .	4-222
Emergency Relief Valve Operator Control Cable Assembly Replacement . . . . .	4-210
Emergency Relief Valve Operator Control Maintenance . . . . .	4-208
Emergency Relief Valve Replacement . . . . .	4-206
Flow Control Valve Replacement . . . . .	4-220
Flow Selector Valve Replacement (M131A4C and M131A5C Early Model) . . . . .	4-221
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**4-90. FUEL DISPENSING PUMP REPLACEMENT.**

*This Task Covers:*

- |            |                 |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

*Initial Setup:*

**Equipment Conditions:**

- Battery removed (para 4-25).
- Tank purged (para 4-64).
- Sediment strainer removed (para 4-93).
- Gravity discharge valve removed (M131A4 and M131A5 only) (para 4-105).
- Firewall panels removed (para 4-82).

**Materials/Parts:**

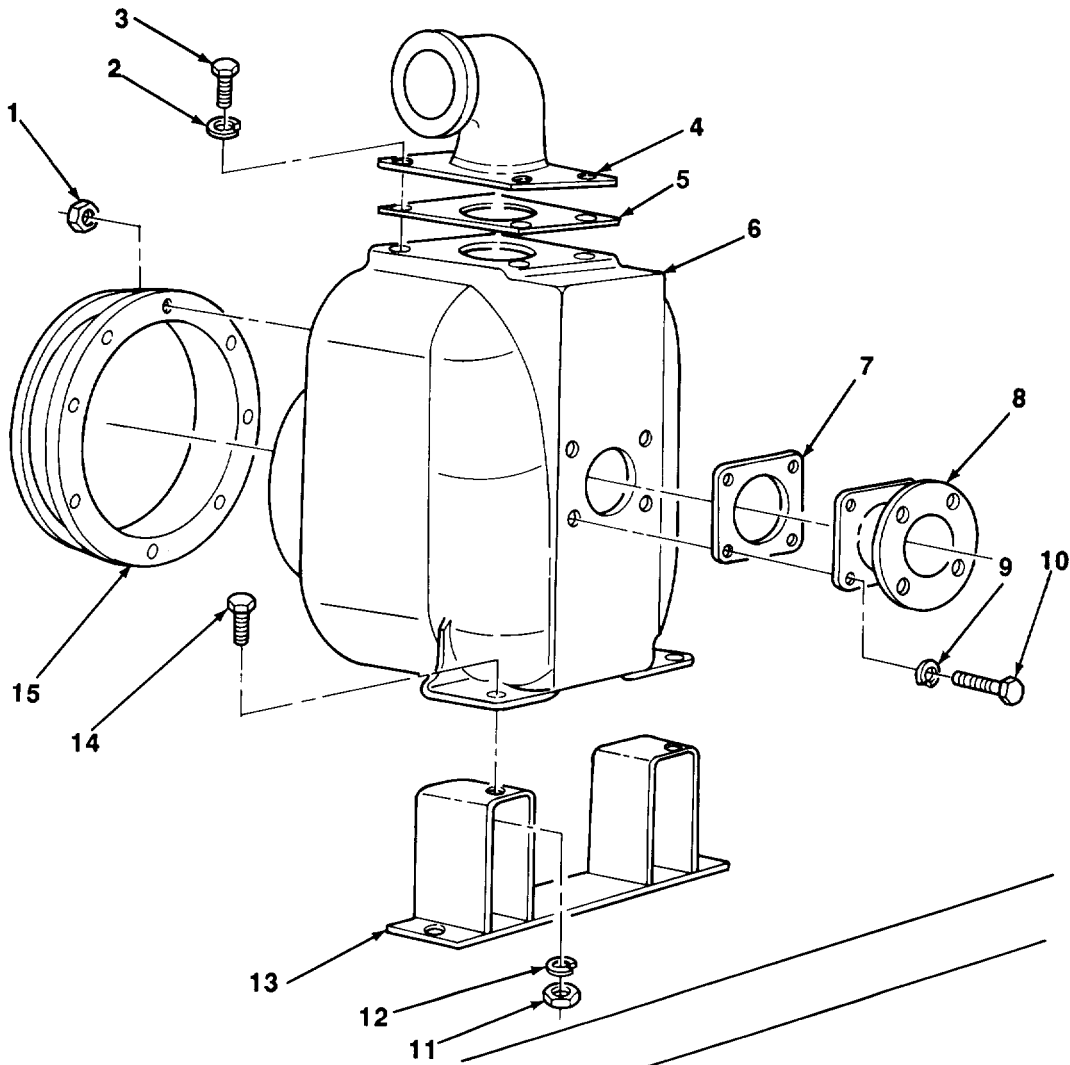
- Two gaskets
- Eight locknuts
- Twelve lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**4-90. FUEL DISPENSING PUMP REPLACEMENT (Con't).**

1. Remove four screws (10), lockwashers (9), tube (8), and gasket (7) from pump (6). Discard lockwashers and gasket.
2. Remove four screws (3), lockwashers (2), elbow (4), and gasket (5) from pump (6). Discard lockwashers and gasket.
3. Remove eight locknuts (1) from pump (6) and coupling flange (15). Discard locknuts.
4. Remove two nuts (11), lockwashers (12), screws (14), and pump (6) from bracket (13). Discard lockwashers.
5. Remove two nuts (18), lockwashers (19), screws (16), and bracket (13) from cabinet floor (17). Discard lockwashers.



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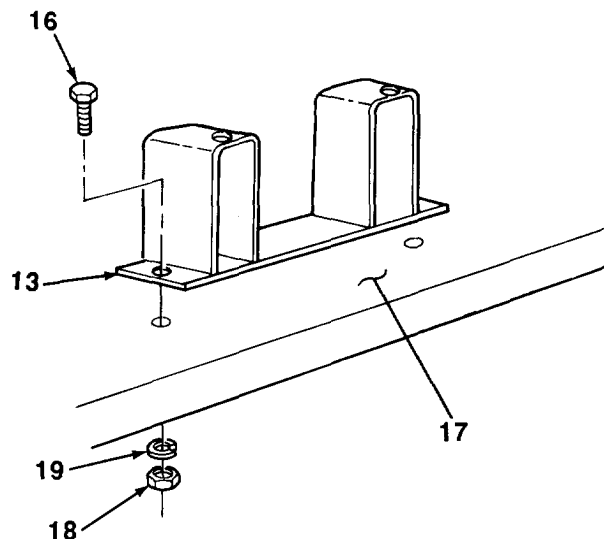
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## 4-90. FUEL DISPENSING PUMP REPLACEMENT (Con't).

---

### b. INSTALLATION

1. Install bracket (13) on cabinet floor (17) with two screws (16), new lockwashers (19), and nuts (18).



2. Install pump (6) on bracket (13) with two screws (14), new lockwashers (12), and nuts (11).
3. Install eight new locknuts (1) on pump (6) and coupling flange (15).
4. Install new gasket (5) and elbow (4) on pump (6) with four new lockwashers (2) and screws (3).
5. Install new gasket (7) and tube (8) on pump (6) with four new lockwashers (9) and screws (10).

### FOLLOW-ON TASKS:

- Install firewall panels (para 4-82).
- Install gravity discharge valve (M131A4 and M131A5 only) (para 4-105).
- Install sediment strainer (para 4-93).
- Install battery (para 4-25).

---

## 4-91. FUEL DISPENSING PUMP OIL DRAIN REPLACEMENT.

---

*This Task Covers:* Replacement

---

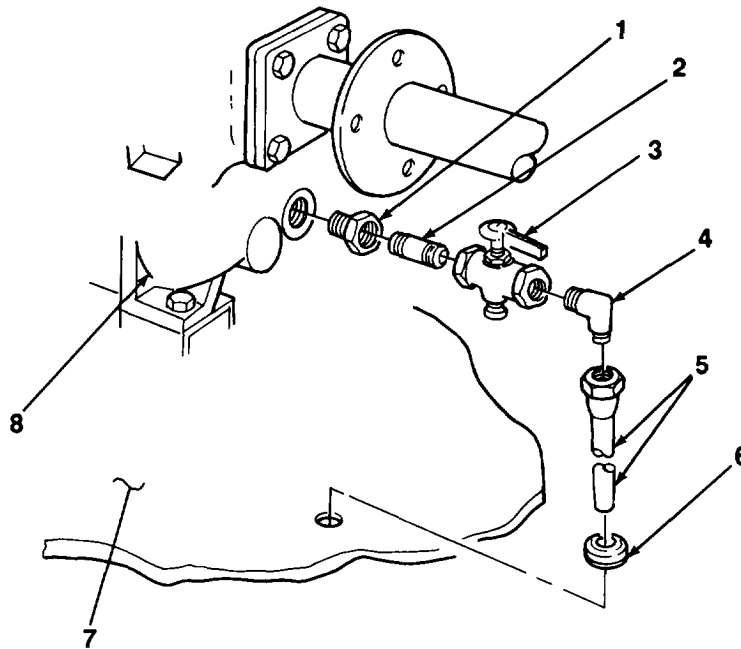
*Initial Setup:*

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

### **REPLACEMENT**

1. Remove hose (5) from elbow (4) and cabinet floor (7).
2. If damaged, remove grommet (6) from cabinet floor (7). Discard grommet.
3. Remove elbow (4), shutoff cock (3), nipple (2), and bushing (1) from pump (8).
4. Install bushing (1), nipple (2), shutoff cock (3), and elbow (4) on pump (8).
5. If removed, install new grommet (6) in cabinet floor (7).
6. Position hose (5) through grommet (6) and cabinet floor (7) and install on elbow (4)



TA702817

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**4-92. PRIMING FUEL DISPENSING PUMP.**

---

*This Task Covers:* Priming

---

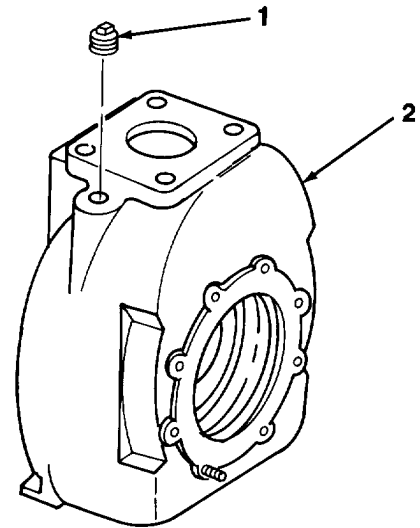
*Initial Setup:*

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**PRIMING**

1. Remove fill plug (1) from pump (2).
2. Fill pump housing to bottom of fill port with type of fuel being transported in semitrailer tank.
3. Install fill plug (1) in pump (2).



TA702818

## 4-93. SEDIMENT STRAINER MAINTENANCE.

*This Task Covers:*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | d. Assembly     |
| b. Disassembly             | e. Installation |
| c. Cleaning and Inspection |                 |

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

- Rags (Item 14, Appendix E)
- Dry cleaning solvent (Item 16, Appendix E)
- Three gaskets
- Eight lockwashers

**NOTE**

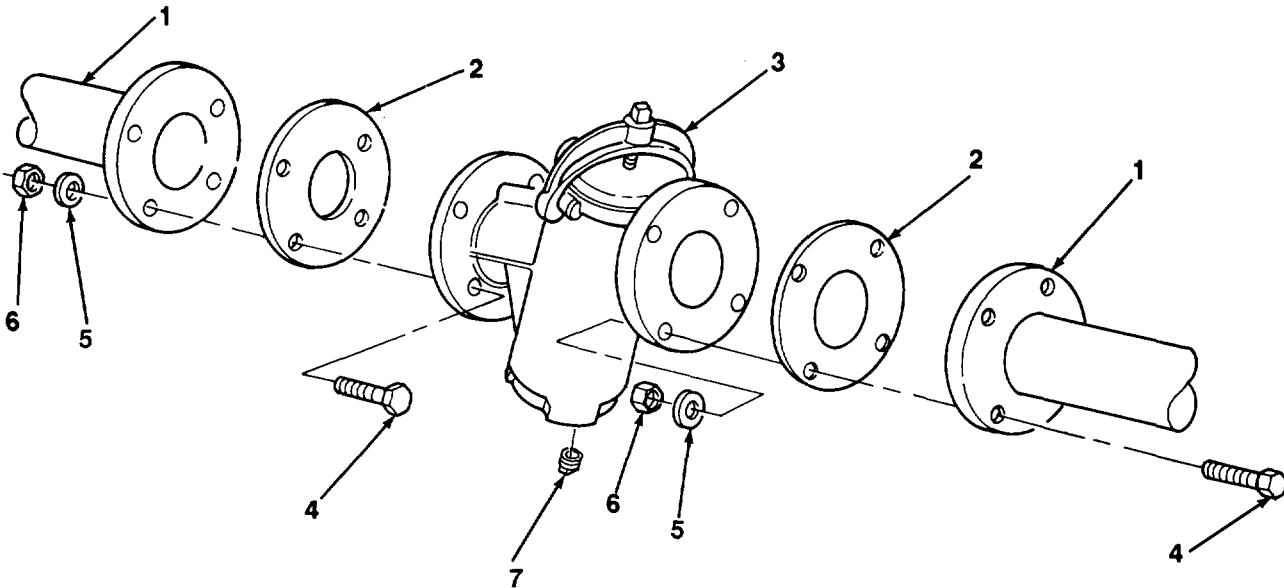
To service sediment strainer, perform subparagraphs b through d. Sediment strainer does not need to be removed to be serviced.

**a. REMOVAL**

**NOTE**

A drain pan should be used to catch any draining fluid. Ensure that oil spills are cleaned up.

1. Remove drain plug (7) and allow any accumulated fuel to drain.
2. Remove eight nuts (6), lockwashers (5), screws (4), sediment strainer (3), and two gaskets (2) from two tubes (1). Discard lockwashers and gaskets.



TA702819

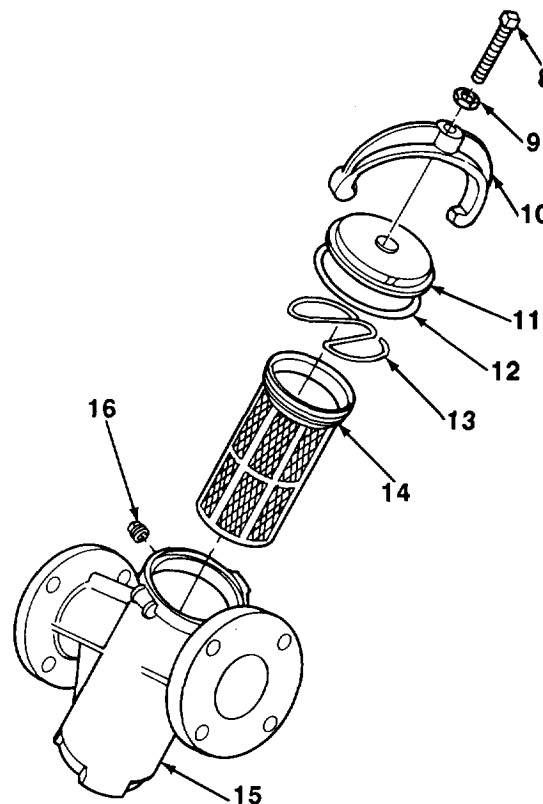
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**4-93. SEDIMENT STRAINER MAINTENANCE (Con't).**

---

**b. DISASSEMBLY**

1. Remove screw (8), nut (9), clamp (10), and cap (11) from strainer body (15). Remove gasket (12) from cap. Discard gasket.
2. Remove retaining ring (13) and filter element (14) from strainer body (15).
3. If damaged, remove drain plug (16) from strainer body (15). Discard drain plug.

**c. CLEANING AND INSPECTION****WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

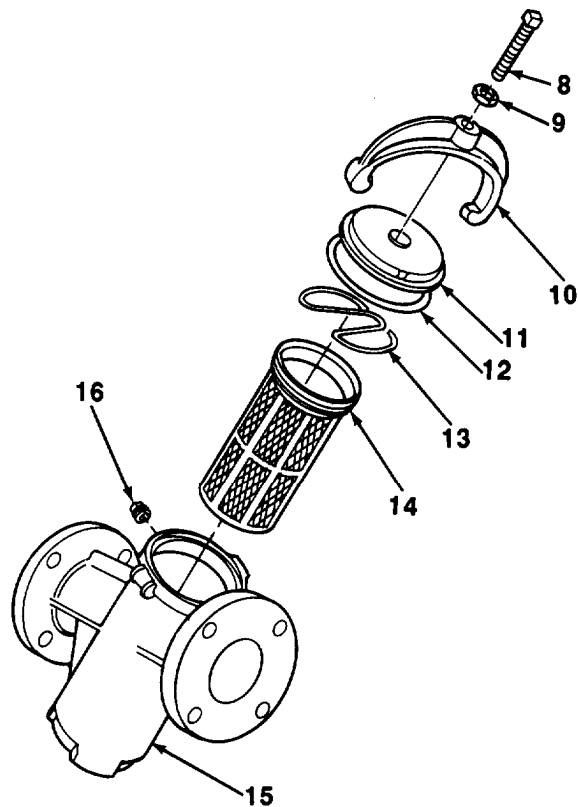
1. Clean all components with dry cleaning solvent and dry thoroughly.
2. Inspect components for damage.
3. Replace any damaged components.

TA702820

## 4-93. SEDIMENT STRAINER MAINTENANCE (Con't).

### d. ASSEMBLY

1. If removed, install new drain plug (16) in strainer body (15).
2. Install filter element (14) in strainer body (15) with retaining ring (13).
3. Install new gasket (12) in cap (11). Install cap, clamp (10), and nut (9) on strainer body (15) with screw (8).



### e. INSTALLATION

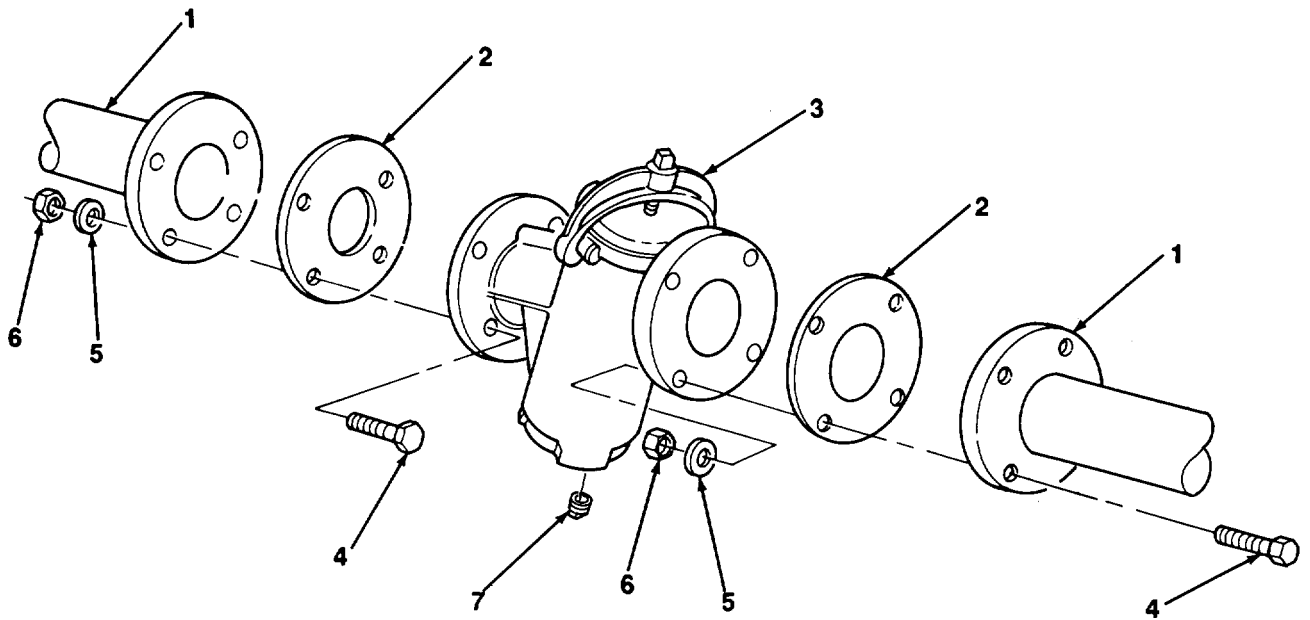
1. Install sediment strainer (3) and two new gaskets (2) on two tubes (1) with eight screws (4), new lockwashers (5), and nuts (6).
2. Install drain plug (7) in sediment strainer (3).

TA702821

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**4-93. SEDIMENT STRAINER MAINTENANCE (Con't).**

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## 4-94. TUBES, COUPLERS, AND HOSE CONNECTIONS REPLACEMENT.

*This Task Covers:*

- |                 |                    |
|-----------------|--------------------|
| a. Removal      | c. Piping Diagrams |
| b. Installation |                    |

*Initial Setup:*

**Materials/Parts:**

- Gaskets (as required)
- LockWashers (as required)

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**a. REMOVAL**

**NOTE**

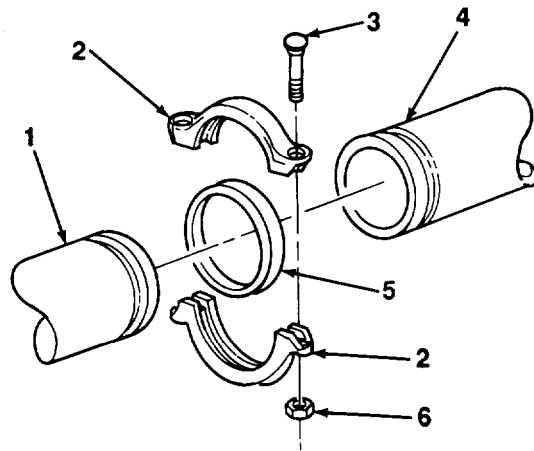
- All tubes are installed between components and supported in a similar manner. End connection points and quantity and location of mounting hardware vary from model to model and depend on location and function of tube.
- Refer to appropriate piping diagram in subparagraph c for the location of specific components as they pertain to each model.

1. Read and observe all safety precautions in the Warning Summary and in Chapter 1, Section III before proceeding.
2. Consider the location of the tube to be removed and drain all affected valves and tubes (para 4-64).
3. Consider the size and weight of the tube to be removed and provide assistance or support as required.

**NOTE**

**Couplers provide most common means of connecting a tube to another tube or to other components, such as a valve or filter-separator.**

4. If present, remove couplers (2):
  - (a) Remove two nuts (6) and screws (3) from coupler (2).
  - (b) Remove coupler (2) from tubes (1 and 4).
  - (c) Slide gasket (5) onto end of one tube (4).
  - (d) When tube (1) is removed, remove gasket (5) from tube (4) and discard.



TA702823



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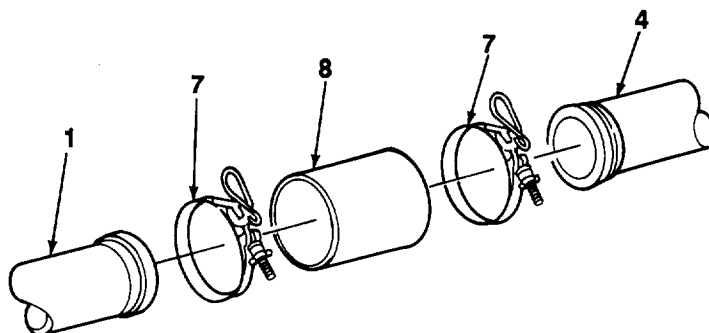
**4-94. TUBES, COUPLERS, AND HOSE CONNECTIONS REPLACEMENT (Con't).**


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**NOTE**

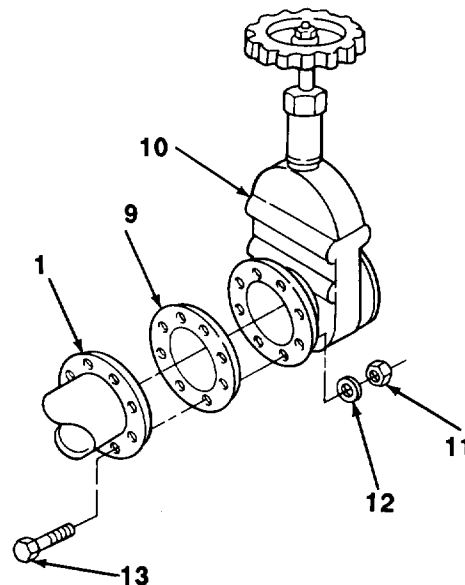
**Hose connections provide a connection between two tubes and are most commonly found connecting longer lengths of tubes.**

5. If present, remove hose connections (8):
  - (a) Loosen two clamps (7) and slide off hose connection (8).
  - (b) Remove hose connection (8) from tubes (1 and 4).

**NOTE**

**Flange connections always connect tubes to gate valves.**

6. If present, remove tubes from gate valves (10):
  - (a) Remove nuts (11), lockwashers (12), and screws (13) from tube (1) and gate valve (10). Discard lockwashers.
  - (b) Remove tube (1) and gasket (9) from gate valve (10). Discard gasket.



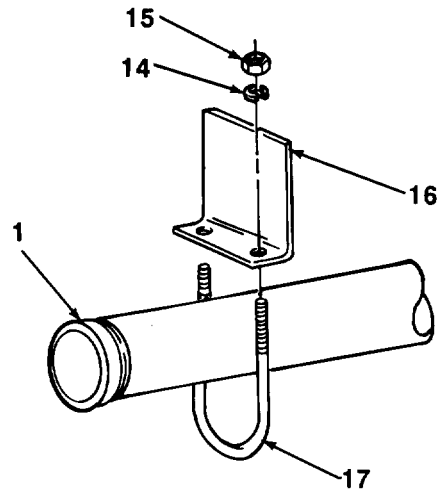
TA702824

**4-94. TUBES, COUPLERS, AND HOSE CONNECTIONS REPLACEMENT (Con't).**

**NOTE**

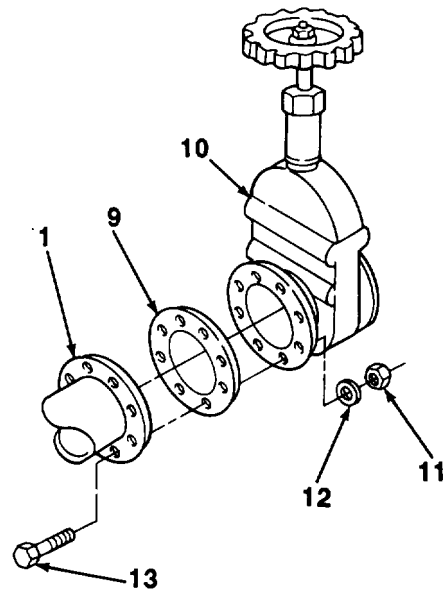
Tubes are typically supported by U-bolts installed at brackets which are welded to frame.

- 7. If present, remove tubes from U-bolt brackets (16):
  - Remove two nuts (15), lockwashers (14), U-bolt (17), and tube (1) from U-bolt bracket (16). Discard lockwashers.



**b. INSTALLATION**

- 1. If removed, install tubes on U-bolt brackets (16):
  - (a) Position tube (1) at U-bolt bracket (16).
  - (b) Install U-bolt (17) on tube (1) and U-bolt bracket (16) with two new lockwashers (14) and nuts (15).
- 2. If removed, install tubes on gate valves (10):
  - (a) Position new gasket (9) and tube (1) on gate valve (10).
  - (b) Install screws (13), new lockwashers (12), and nuts (11) on tube (1) and gate valve (10).



TA702825

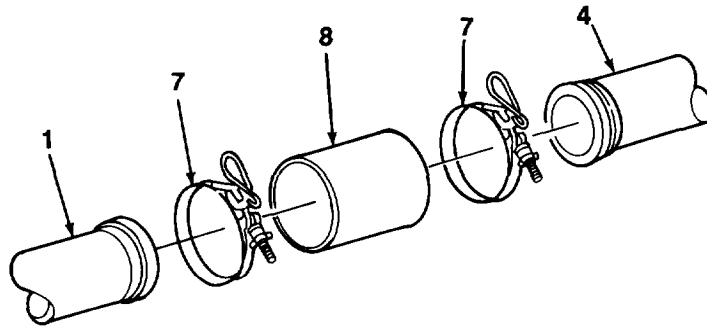
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**4-94. TUBES, COUPLERS, AND HOSE CONNECTIONS REPLACEMENT (Con't).**


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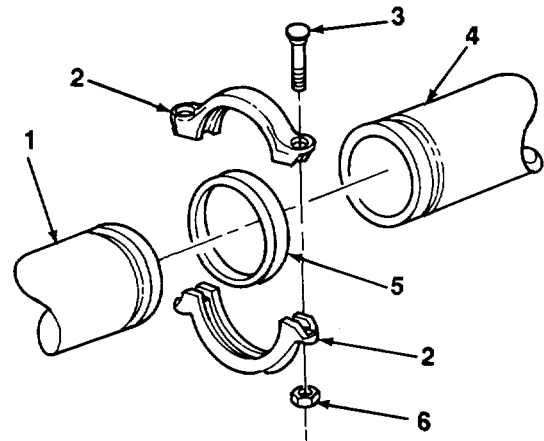
3. If removed, install hose connections (8):

- (a) Slide hose connection (8) onto end of one tube (4).
- (b) Aline and bring two ends of tubes (1 and 4) together. Slide hose connection (8) into position and tighten two clamps (7).



4. If removed, install couplers (2):

- (a) Slide new gasket (5) onto end of one tube (4). Ensure that gasket lip does not overhang tube end.
- (b) Aline and bring two ends of tubes (1 and 4) together and slide gasket (5) into position centered between the grooves on each tube end. No portion of gasket should extend into groove on either tube.
- (c) Assemble coupler (2) halves, ensuring that edges of coupler drop securely into grooves. Squeeze coupler halves tight with hands to further center gasket (5) and seat coupler.



**CAUTION**

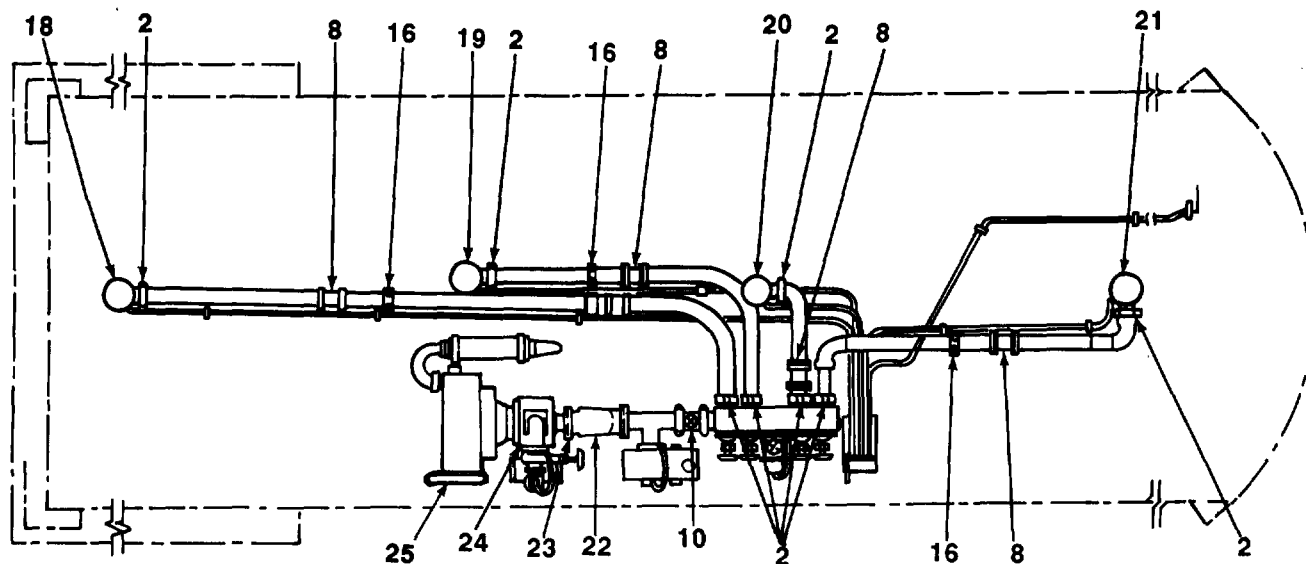
**Uneven tightening of nuts may cause gasket to pinch.**

- (d) Install two screws (3) and nuts (6). Fingertighten nuts evenly until coupler (2) halves are firmly together metal to metal. Do not fully tighten nuts until tubes (1 and 4) are installed at both ends.

TA702826

4-94. TUBES, COUPLERS, AND HOSE CONNECTIONS REPLACEMENT (Con't).

c. PIPING DIAGRAMS



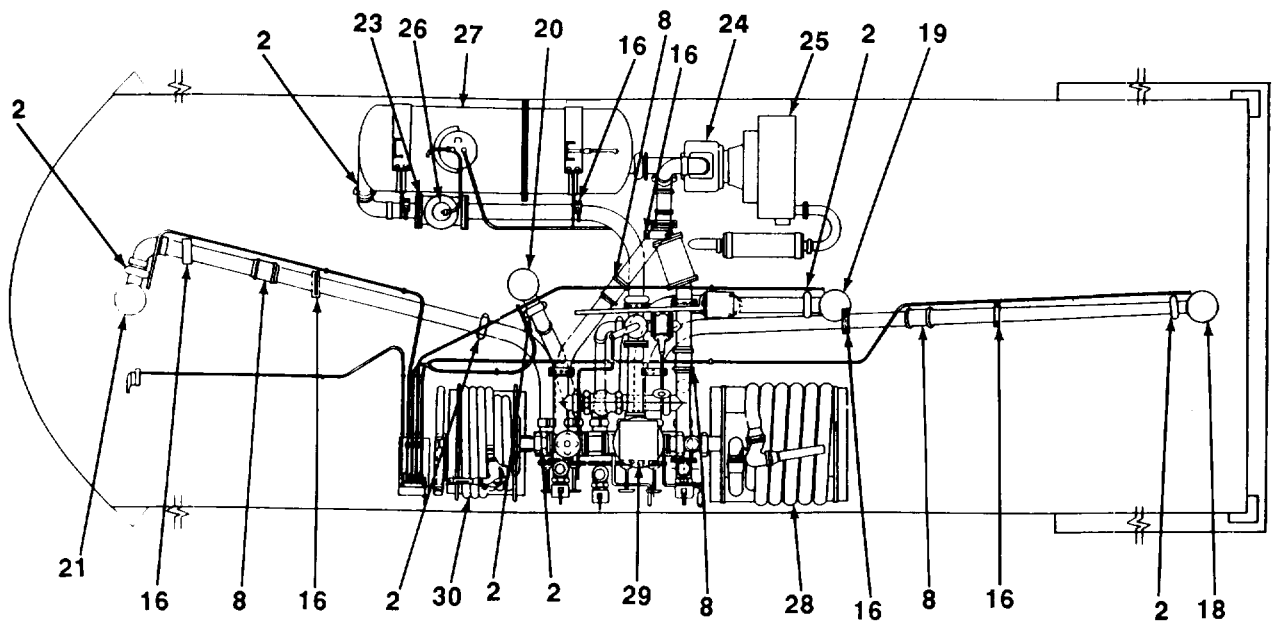
M131A4

- 2. Coupler
- 8. Hose Connection
- 10. Gate Valve
- 16. U-bolt Bracket
- 18. Rear Compartment
- 19. Rear Middle Compartment

- 20. Front Middle Compartment
- 21. Front Compartment
- 22. Sediment Strainer
- 23. Flange Connection
- 24. Pump
- 25. Auxiliary Engine

TA702827

4-94. TUBES, COUPLERS, AND HOSE CONNECTIONS REPLACEMENT (Con't).



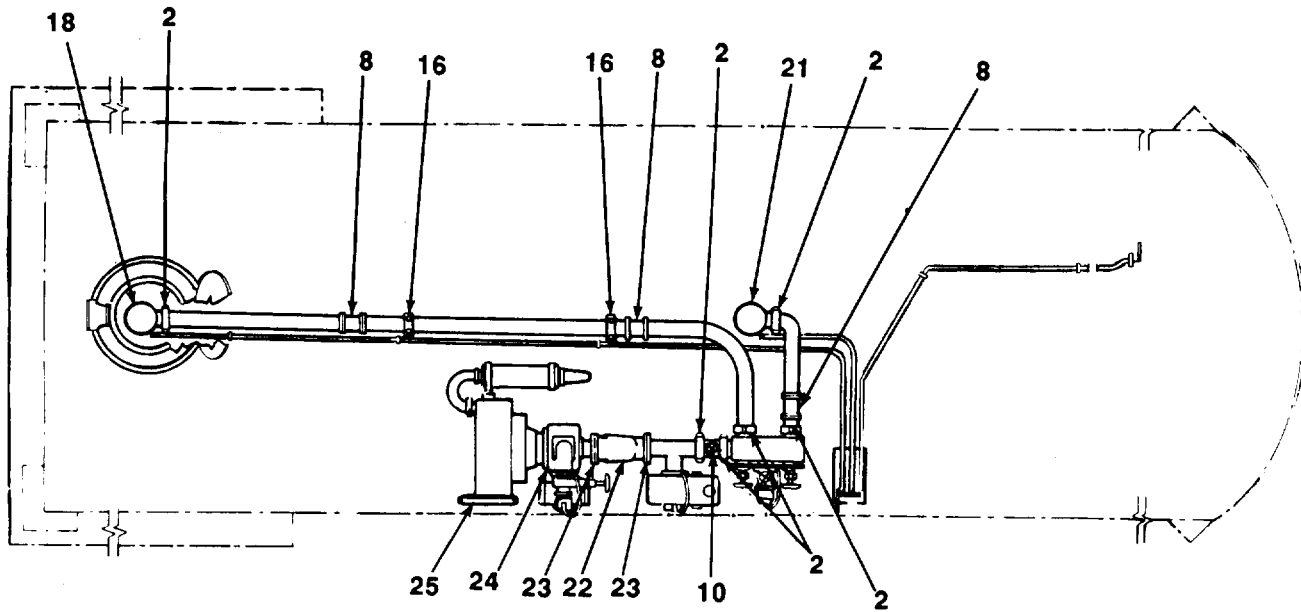
M131A4C

- |                              |                        |
|------------------------------|------------------------|
| 2. Coupler                   | 24. Pump               |
| 8. Hose Connection           | 25. Auxiliary Engine   |
| 16. U-bolt Bracket           | 26. Slug Control Valve |
| 18. Rear Compartment         | 27. Filter-separator   |
| 19. Rear Middle Compartment  | 28. 2½ Inch Hose Reel  |
| 20. Front Middle Compartment | 29. Meter              |
| 21. Front Compartment        | 30. 1½ Inch Hose Reel  |
| 23. Flange Connection        |                        |

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**4-94. TUBES, COUPLERS, AND HOSE CONNECTIONS REPLACEMENT (Con't).**

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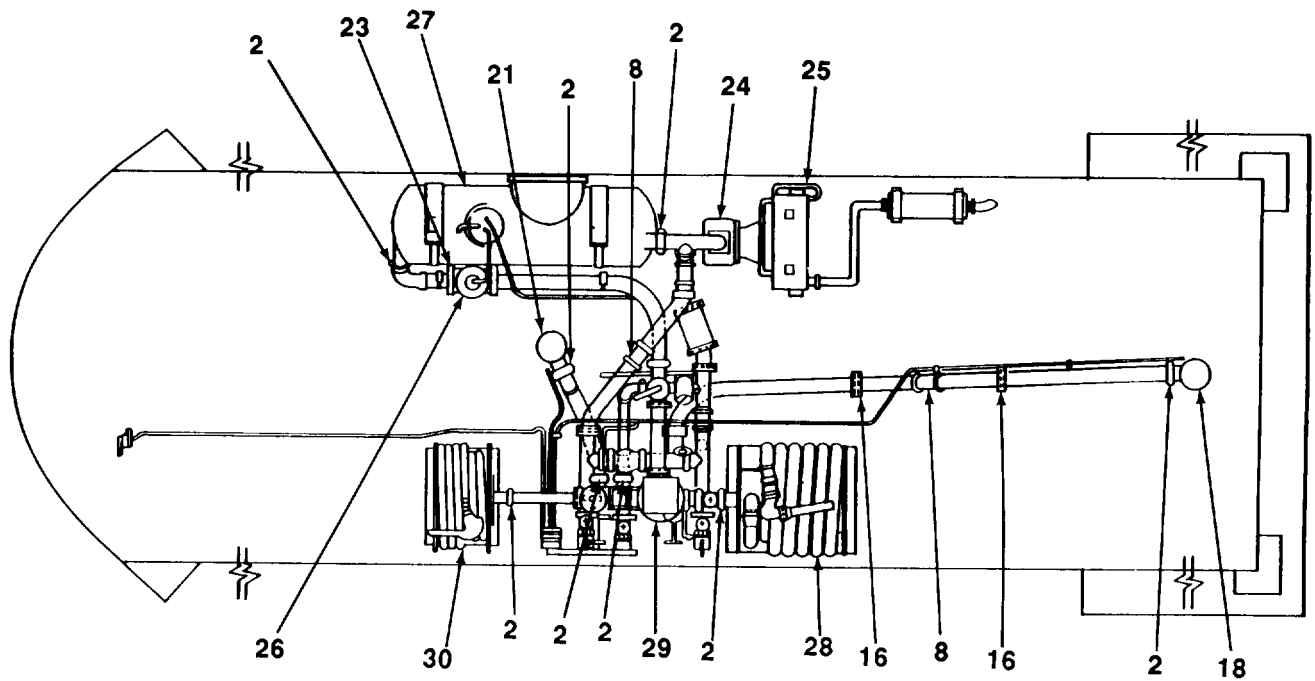
**M131A5**

- 2. Coupler
- 8. Hose Connection
- 10. Gate Valve
- 16. U-bolt Bracket
- 18. Rear Compartment

- 21. Front Compartment
- 22. Sediment Strainer
- 23. Flange Connection
- 24. Pump
- 25. Auxiliary Engine

TA702829

4-94. TUBES, COUPLERS, AND HOSE CONNECTIONS REPLACEMENT (Con't).



M131A5C

- |                       |                        |
|-----------------------|------------------------|
| 2. Coupler            | 25. Auxiliary Engine   |
| 8. Hose Connection    | 26. Slug Control Valve |
| 16. U-bolt Bracket    | 27. Filter-separator   |
| 18. Rear Compartment  | 28. 2½ Inch Hose Reel  |
| 21. Front Compartment | 29. Meter              |
| 23. Flange Connection | 30. 1½ Inch Hose Reel  |
| 24. Pump              |                        |

## 4-95. EMERGENCY RELIEF VALVE REPLACEMENT.

*This Task Covers:* Replacement

*Initial Setup:*

### Equipment Conditions:

- Tank purged (para 4-64).
- Control cable assembly disconnected from emergency relief valve (para 4-97).

### Materials/Parts:

- Rags (Item 14, Appendix E)
- One gasket
- Six lockwashers

### Tools/Test Equipment:

- General mechanic's tool kit
- Common no. 1 shop set

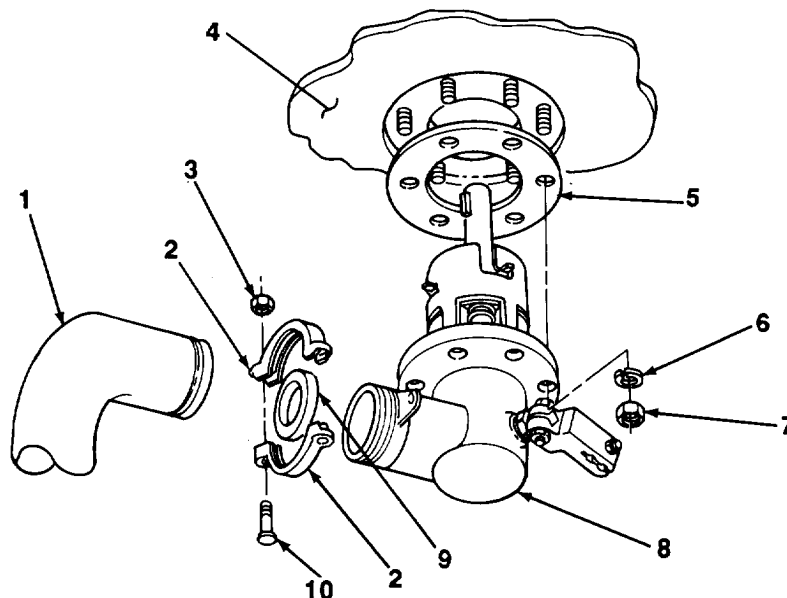
## REPLACEMENT

1. Remove two nuts (3), screws (10), and coupler (2) from emergency relief valve (8) and tube (1).
2. Slide gasket (9) onto tube (1).

### NOTE

**A drain pan should be used to catch any draining fluid. Ensure that all spills are cleaned up.**

3. Remove six nuts (7), lockwashers (6), emergency relief valve (8), and gasket (5) from semitrailer (4). Discard lockwashers and gasket.
4. Remove gasket (9) from tube (1) and discard.



TA702831



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**4-95. EMERGENCY RELIEF VALVE REPLACEMENT (Con't).**

---

5. Slide new gasket (9) onto tube (1). Ensure that gasket lip does not overhang tube end.
6. Install new gasket (5) and emergency relief valve (8) on semitrailer (4) with six new lockwashers (6) and nuts (7).
7. Slide gasket (9) into position centered between grooves on tube (1) and emergency relief valve (8). Install coupler (2) on emergency relief valve and tube with two screws (10) and nuts (3).

**FOLLOW-ON TASKS:**

- Connect control cable assembly to emergency relief valve (para 4-97).

## 4-96. EMERGENCY RELIEF VALVE OPERATOR CONTROL MAINTENANCE.

*This Task Covers:*

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>a. Removal</li> <li>b. Installation</li> </ul> | <ul style="list-style-type: none"> <li>c. Adjustment</li> </ul> |
|---|---|

*Initial Setup:*

**Equipment Conditions:**

- Tank drained (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit

**Materials/Parts:**

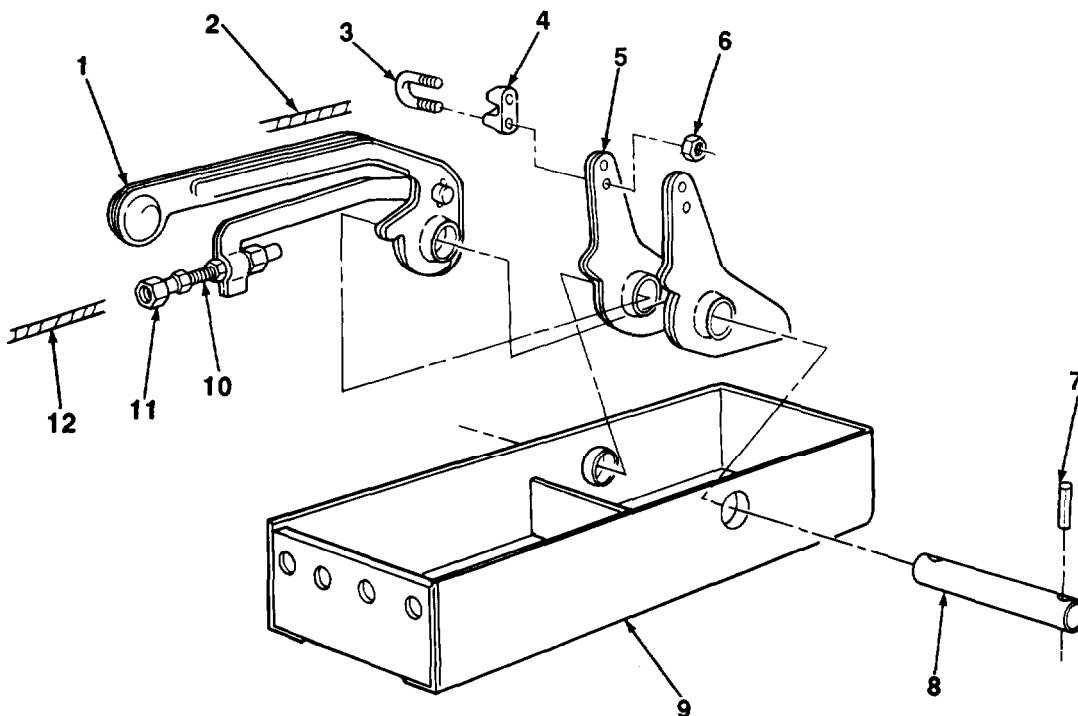
- Two cotter pins (M131A5 and M131A5C)
- Two spring pins
- Four cotter pins (M131A4 and M131A4C)

**a. REMOVAL**

**NOTE**

Emergency relief valve operator control is removed the same way on all models except quantity of control levers vary. M131A5 and M131A5C have two control levers and M131A4 and M131A4C have four control levers. M131A5 is illustrated.

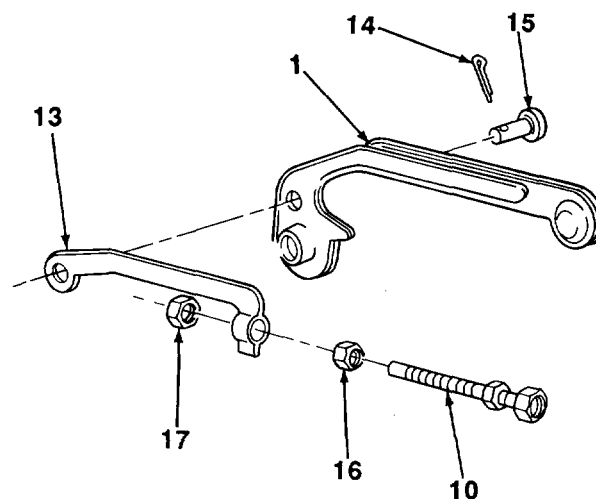
1. Remove two nuts (6), U-bolt (3), wire rope (2), and cable clamp (4) from trip assembly (5).
2. Remove two nuts (11) and two wire ropes (12) from two adjusting bolts (10).
3. Remove two spring pins (7) and shaft (8) from trip assembly (5) and two control levers (1). Discard spring pins.



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#### 4-96. EMERGENCY RELIEF VALVE OPERATOR CONTROL MAINTENANCE (Con't).

4. Remove trip assembly (5) and two control levers (1) from frame (9).
5. Remove two cotter pins (14), pins (15), and links (13) from two control levers (1). Discard cotter pins.
6. Remove two nuts (17) and adjusting bolts (10) from links (13). Remove two nuts (16) from adjusting bolts.



#### **b. INSTALLATION**

1. Install two nuts (16) on adjusting bolts (10). Install adjusting bolts on links (13) with two nuts (17).
2. Position two links (13) on control levers (1) and install two pins (15) with two new cotter pins (14).
3. Position trip assembly (5) and two control levers (1) in frame (9) and install shaft (8) with two new spring pins (7).
4. Position two wire ropes (12) on adjusting bolts (10) and install two nuts (11).
5. Position wire rope (2) and cable clamp (4) on trip assembly (5) and install U-bolt (3) with two nuts (6).

#### **c. ADJUSTMENT**

#### **NOTE**

**Ensure that control levers are pushed in and that emergency relief valves are closed.**

1. Pull emergency relief valve shutoff at front roadside of semitrailer to maintain shutoff in the open position.
2. Loosen two nuts (6) and two nuts (11) and remove all slack in wire ropes (2 and 12). Tighten nuts.
3. Operate control levers (1) and check that emergency relief valves will open and close.
4. Pull control levers (1) to open emergency relief valves.
5. Pull on emergency relief valve shutoff at front roadside of semitrailer and check that emergency relief valves close.
6. Repeat steps 1 through 5 if wire ropes (2 and 12) do not function properly.

TA702833

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## 4-97. EMERGENCY RELIEF VALVE OPERATOR CONTROL CABLE ASSEMBLY REPLACEMENT.

---

*This Task Covers:*

- a. Removal b. Installation
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank drained (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit
  - Common no. 1 shop set
- 

**NOTE**

- Emergency relief valve operator control cable assemblies consist of a one-piece wire rope routed through two lengths of tubing. The tubing lengths are joined in the middle by a connector with a grease fitting. If either wire rope, tubing lengths, or grease fitting are damaged, entire control cable assembly is replaced as a unit.
- Emergency relief valve operator control cable assemblies are replaced in a similar manner for all models. M131A5 and M131A5C have three control cable assemblies. M131A4 and M131A4C have five control cable assemblies. M131A5 is illustrated.

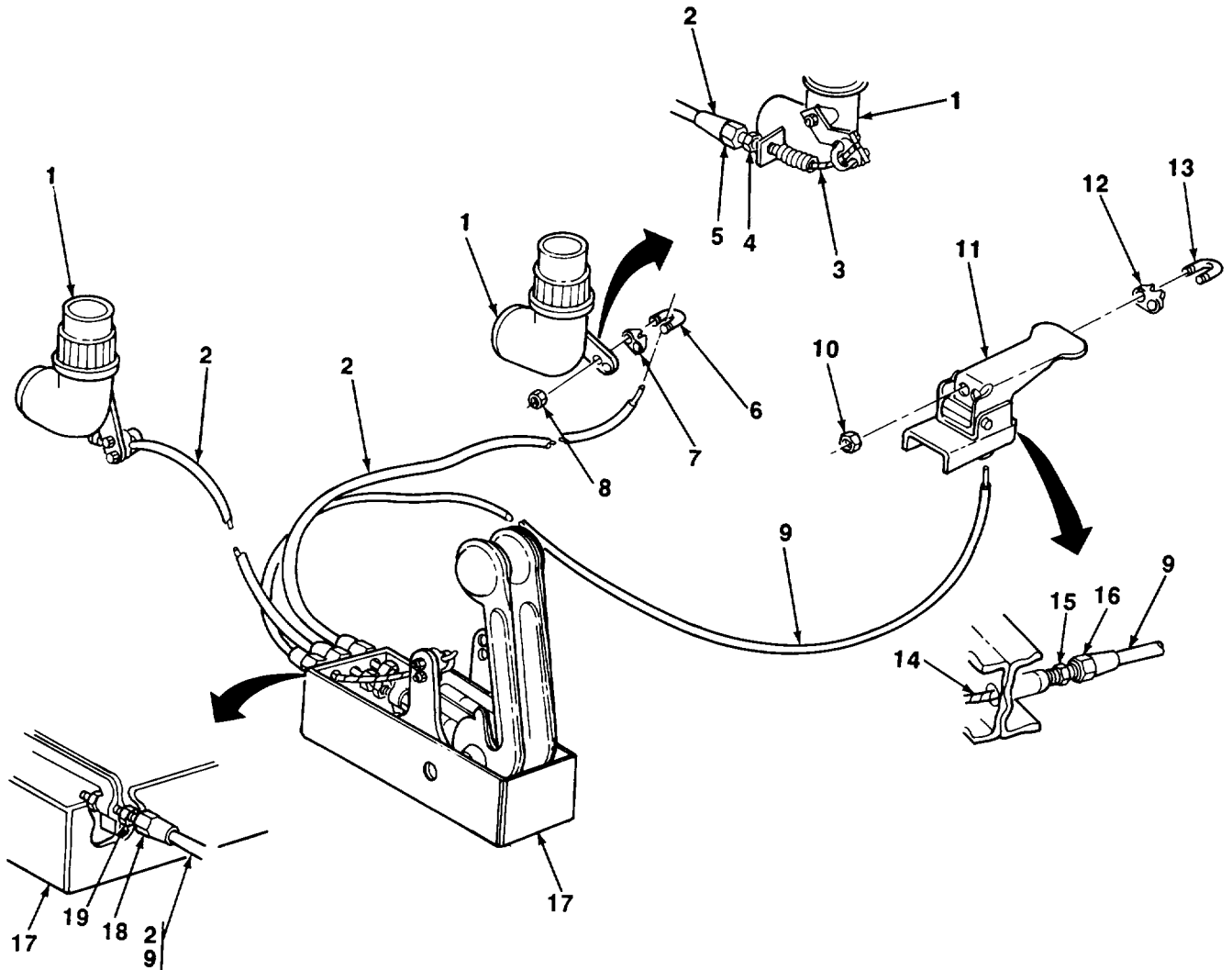
**a. REMOVAL**

**NOTE**

- To remove control cable assembly between emergency relief valve shutoff at front roadside of semitrailer and operator control inside cabinet, perform steps 1 through 4, 9, and 10.
- To remove control cable assembly between operator control inside cabinet and one emergency relief valve, perform steps 5 through 10.

1. Loosen two nuts (10), U-bolt (13), and cable clamp (12) and disconnect wire rope (14) from emergency relief valve shutoff (11).
2. Loosen nut (16) and disconnect tubing (9) from connector (15) at emergency relief valve shutoff (11).
3. Disconnect wire rope (14) from operator control (17) inside cabinet (para 4-96).
4. Loosen nut (18) and disconnect tubing (9) from connector (19) at operator control (17).
5. Loosen two nuts (8), U-bolt (6), and cable clamp (7) and disconnect wire rope (3) from emergency relief valve (1).
6. Loosen nut (5) and disconnect tubing (2) from connector (4) at emergency relief valve (1).
7. Disconnect wire rope (3) from operator control (17) inside cabinet (para 4-96).
8. Loosen nut (18) and disconnect tubing (2) from connector (19) at operator control (17).

**4-97. EMERGENCY RELIEF VALVE OPERATOR CONTROL CABLE ASSEMBLY REPLACEMENT (Con't).**



**CAUTION**

Use caution when removing control cable assembly at straps. Straps should be lifted gently and only enough to release control cable assembly. Improper handling of straps will cause them to break.

9. Gently lift straps and release control cable assembly from frame. If two or more consecutive straps are missing or damaged, notify Direct Support Maintenance.
10. Unbend as required and remove control cable assembly from frame.

TA702834

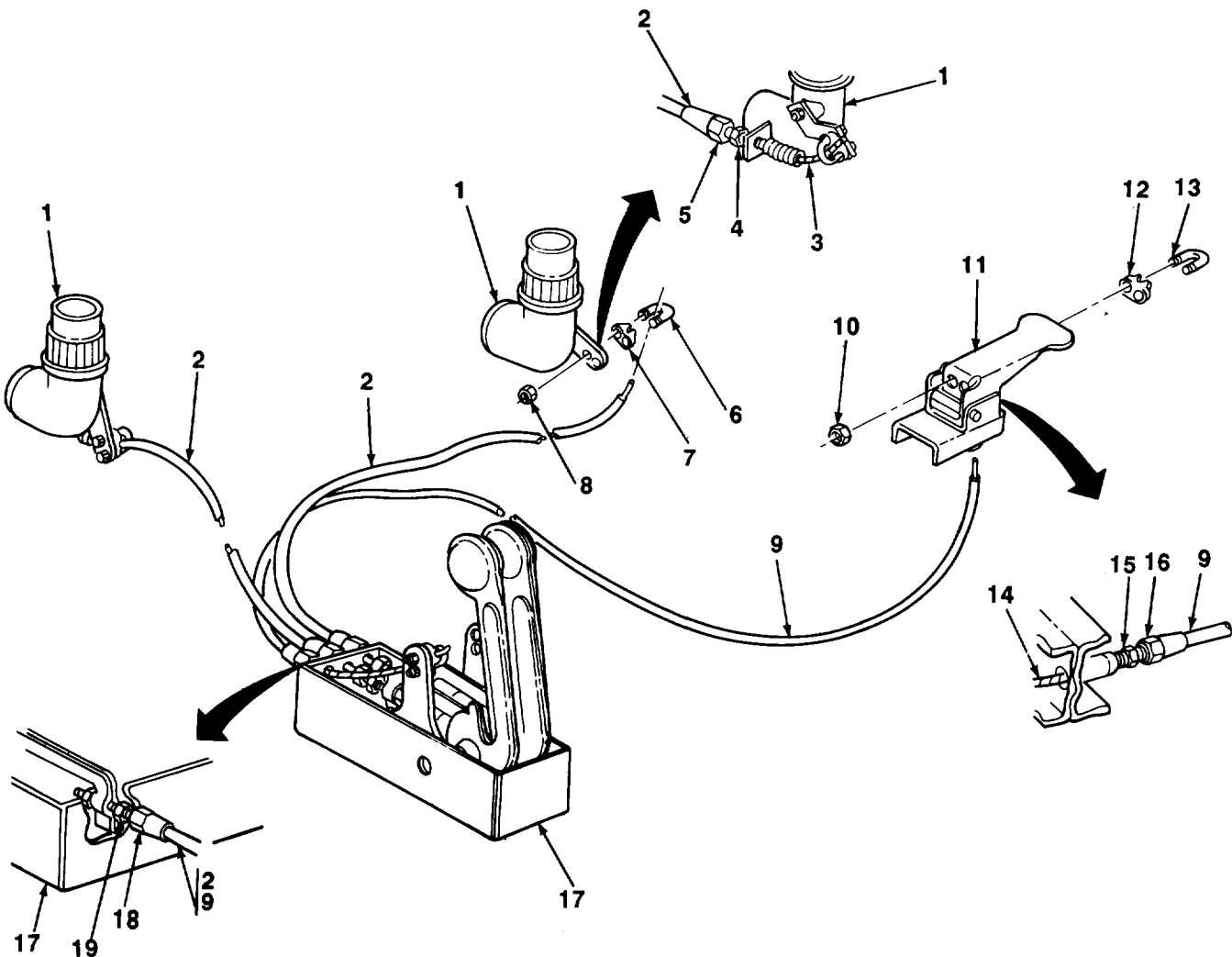
**4-97. EMERGENCY RELIEF VALVE OPERATOR CONTROL CABLE ASSEMBLY REPLACEMENT (Con't).**

**b. INSTALLATION**

**NOTE**

- To install control cable assembly between emergency relief valve shutoff at front roadside of semitrailer and operator control inside cabinet, perform steps 1, 2, and 7 through 10.
- To install control cable assembly between operator control inside cabinet and one emergency relief valve, perform steps 1 through 6.

1. Position control cable assembly between points of installation and bend as required to follow contour of frame.



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**4-97. EMERGENCY RELIEF VALVE OPERATOR CONTROL CABLE ASSEMBLY REPLACEMENT (Con't).**

---

**CAUTION**

Use caution when installing control cable assembly at straps. When securing control cable assembly under straps, a soft-faced hammer should be used to tap straps into place. Improper handling of straps will cause them to break.

2. Gently bend straps over control cable assembly to secure to frame.
3. Connect tubing (2) to connector (19) at operator control (17) inside cabinet and tighten nut (18).
4. Connect wire rope (3) to operator control (17) (para 4-96).
5. Connect tubing (2) to connector (4) at emergency relief valve (1) and tighten nut (5).
6. Connect wire rope (3) to emergency relief valve (1) and tighten cable clamp (7) U-bolt (6), and two nuts (8).
7. Connect tubing (9) to connector (19) at operator control (17) and tighten nut (18).
8. Connect wire rope (14) to operator control (17) (para 4-96).
9. Connect tubing (9) to connector (15) at emergency relief valve shutoff (11) and tighten nut (16).
10. Connect wire rope (14) to emergency relief valve shutoff (11) and tighten cable clamp (12), U-bolt (13), and two nuts (10).

**FOLLOW-ON TASKS:**

- Lubricate emergency relief valve operator control cable assembly (Chapter 3, Section I).
- Check operation of emergency relief valve operator control cable assembly and adjust as required (para 4-96).

---

## 4-98. FUEL MANIFOLD MAINTENANCE.

---

*This Task Covers:*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | d. Assembly     |
| b. Disassembly             | e. Installation |
| c. Cleaning and Inspection |                 |
- 

*Initial Setup:*

### Equipment Conditions:

- Tank purged (para 4-64).
- Gravity discharge valve removed (para 4-105).
- Piping disconnected from manifold (para 4-94).

### Tools/Test Equipment:

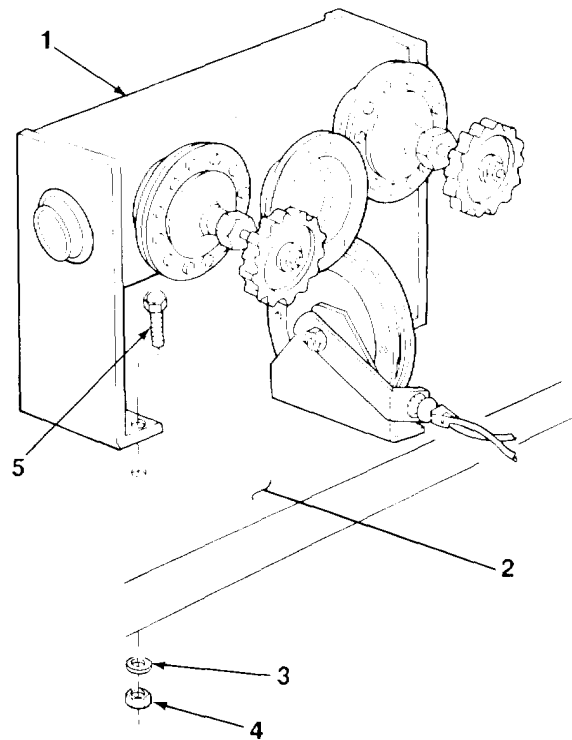
- General mechanic's tool kit

### Materials/Parts:

- Dry cleaning solvent (Item 16, Appendix E)
  - Four lockwashers
  - Gaskets (as required)
  - Locknuts (as required)
- 

### a. REMOVAL

Remove four nuts (4), lockwashers (3), screws (5), and manifold (1) from cabinet floor (2). Discard lockwashers.



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## 4-98. FUEL MANIFOLD MAINTENANCE (Con't).

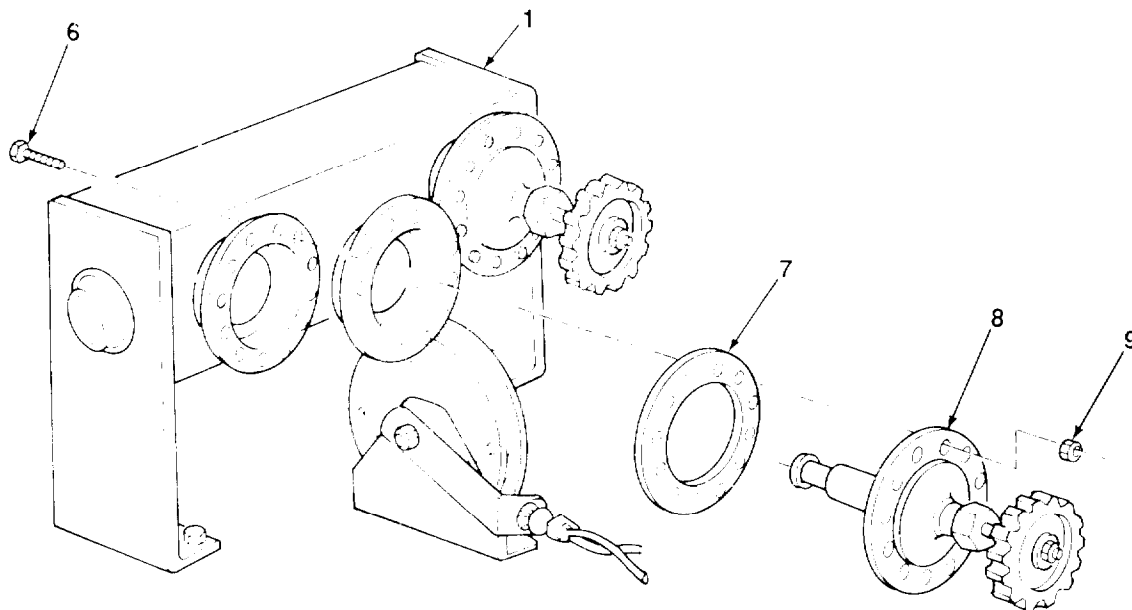
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### b. DISASSEMBLY

#### NOTE

Manifold is disassembled the same way for all models except quantity of manifold valves indifferent. M131A4 has four valves, M131A4C has five valves, M131A5 has two valves, and M131A5C has three valves. M131A5 is illustrated. Perform this subparagraph for each valve.

Remove 12 locknuts (9), screws (6), manifold valve (8), and gasket (7) from manifold (1) Discard locknuts and gasket.




---

### c. CLEANING AND INSPECTION

---

#### WARNING

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean all parts with dry cleaning solvent. Allow to dry.
2. Inspect all parts for damage Replace damaged parts.

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**4-98. FUEL MANIFOLD MAINTENANCE (Con't).**

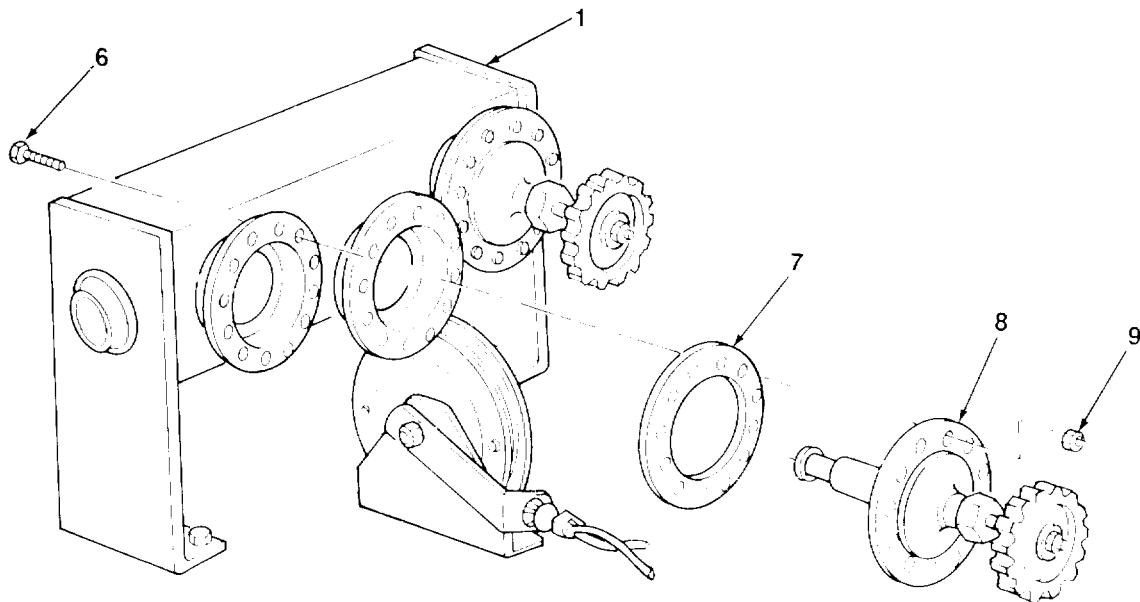
3. Flush manifold with dry cleaning solvent.
4. Inspect manifold for sediment deposits and cracked or worn valve seats. Replace manifold if sediment deposits are present or if valve seats are cracked or worn.

**d. ASSEMBLY**

**NOTE**

Manifold is assembled the same way for all models except quantity of manifold valves is different. M131A4 has four valves, M131A4C has five valves, M131A5 has two valves, and M131A5C has three valves. M131A5 is illustrated. Perform this subparagraph for each valve.

Install new gasket (7) and manifold valve (8) on manifold (1) with 12 screws (6) and new locknuts (9.)



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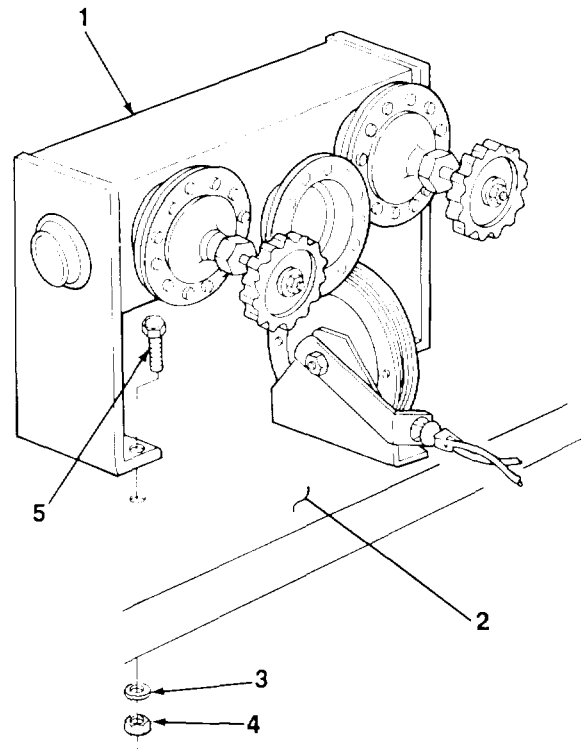
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**4-98. FUEL MANIFOLD MAINTENANCE (Con't).**

---

**e. INSTALLATION**

Install manifold (1) on cabinet floor (2) with four screws (5), new lockwashers (3), and nuts (4).

**FOLLOW-ON TASKS:**

- Connect piping to manifold (para 4-94).
- Install gravity discharge valve (para 4-105).

---

## 4-99. MANIFOLD VALVE REPAIR.

---

*This Task Covers:*

- a. Disassembly
  - b. Cleaning and Inspection
  - c. Assembly
- 

*Initial Setup:*

**Equipment Conditions:**

- Manifold valve removed (para 4-98).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

- Dry cleaning solvent (Hem 16, Appendix E)
  - One preformed packing
  - One valve disk
  - One washer packing
- 

**a. DISASSEMBLY**

1. Remove nut (1) and handwheel (2) from stem (9).
2. Remove nut (3), packing retainer (4), and bonnet (7) from stem (9).
3. Remove preformed packing (5) and washer packing (6) from bonnet (7). Discard performed packing and washer packing.
4. Remove nut (13), retainer (12), and valve disk (11) from stem (9), Discard valve disk.
5. Remove retainer (10) from nut (8) and stem (9).

---

**b. CLEANING AND INSPECTION**

---

**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean parts with dry cleaning solvent. Allow to dry.
2. Inspect parts for damage. Replace any damaged parts.

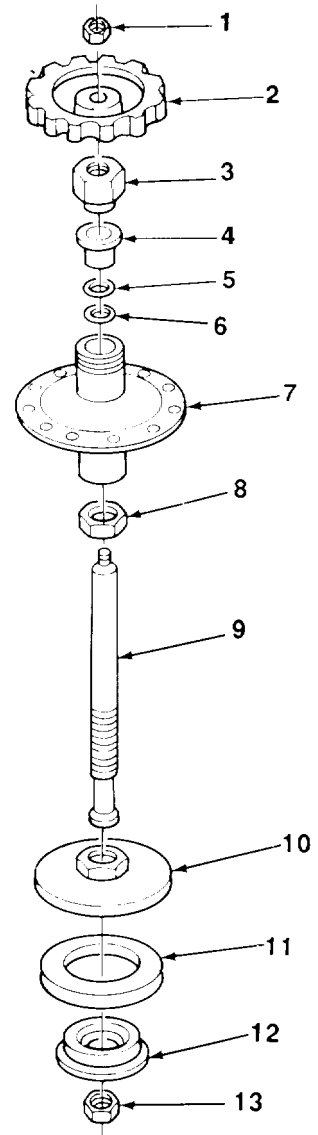
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**4-99. MANIFOLD VALVE REPAIR (Con't).**

---

**c. ASSEMBLY**

1. Install retainer (10) on stem (9) and nut (8).
2. Install new valve disk (11) and retainer (12) on stem (9) with nut (13).
3. Install new washer packing (6) and new preformed packing (5) in bonnet (7).
4. Install bonnet (7) and packing retainer (4) on stem (9) with nut (3).
5. Install handwheel (2) on stem (9) with nut (1).

**FOLLOW-ON TASKS:**

- Install manifold valve (para 4-98)

**4-100. FLOW CONTROL VALVE REPLACEMENT.**

*This Task Covers:* Replacement

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).
- All manual valves closed.

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

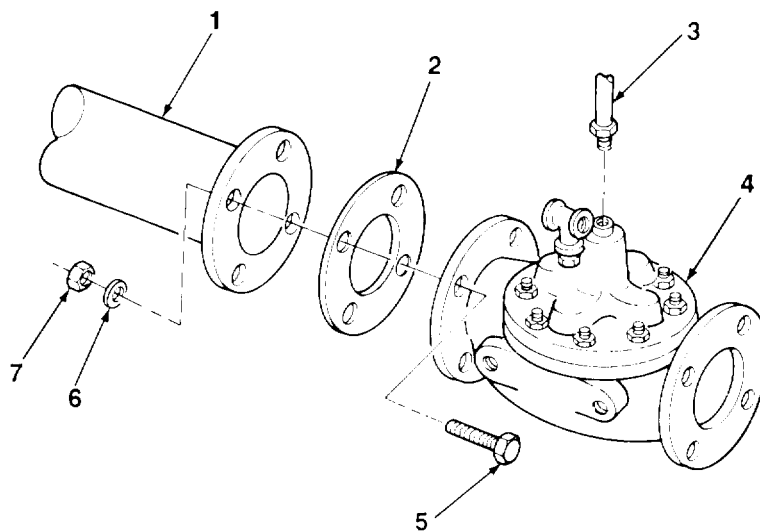
- Rags (Item 14, Appendix E)
- Two gaskets
- Eight lockwashers

**REPLACEMENT**

**NOTE**

**A drain pan should be used to catch any draining fluid. Ensure that all spills are cleaned up.**

1. Disconnect tube (3) from flow control valve (4).
2. Remove eight nuts (7), lockwashers (6), screws (5), two gaskets (2), and flow control valve (4) from two tubes (1). Discard lockwashers and gaskets.
3. Install two new gaskets (2) and flow control valve (4) on two tubes (1) with eight screws (5), new lockwashers (6), and nuts (7).
4. Connect tube (3) to flow control valve (4).



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## 4-101. FLOW SELECTOR VALVE REPLACEMENT (M131A4C AND M131A5C EARLY MODEL).

---

*This Task Covers:* Replacement

---

*Initial Setup:*

### Equipment Conditions:

- Tank purged (para 4-64).

### Tools/Test Equipment:

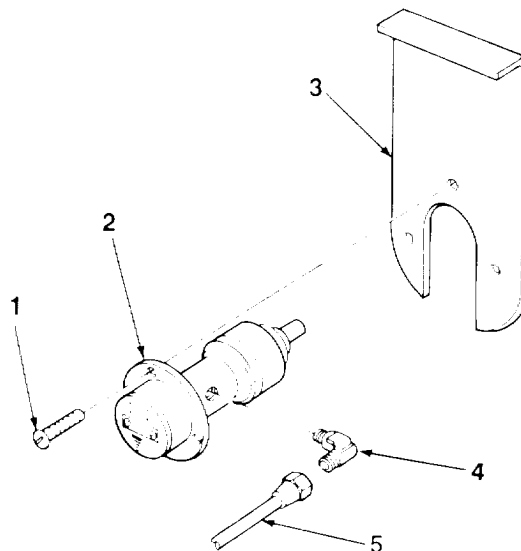
- General mechanic's tool kit
- Common no. 1 shop set

### NOTE

Use this procedure to remove and install flow selector valve to gain access to other components. If flow selector valve is unserviceable, it must be replaced with a late model flow selector valve. Notify Direct Support Maintenance.

### REPLACEMENT

1. Disconnect two tubes (5) from elbows (4) and remove elbows from flow selector valve (2).



### NOTE

Screws are provided with replacement valve.

2. Remove three screws (1) and flow selector valve (2) from bracket (3).
3. Install flow selector valve (2) on bracket (3) with three screws (1).
4. Install two elbows (4) on flow selector valve (2) and connect two tubes (5) to elbows

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## 4-102. ADJUSTABLE BYPASS VALVE REPLACEMENT (M131A4C AND M131A5C).

---

*This Task Covers:*

- a. Removal
  - b. Cleaning and Inspection
  - c. Installation
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

**Materials/Parts:**

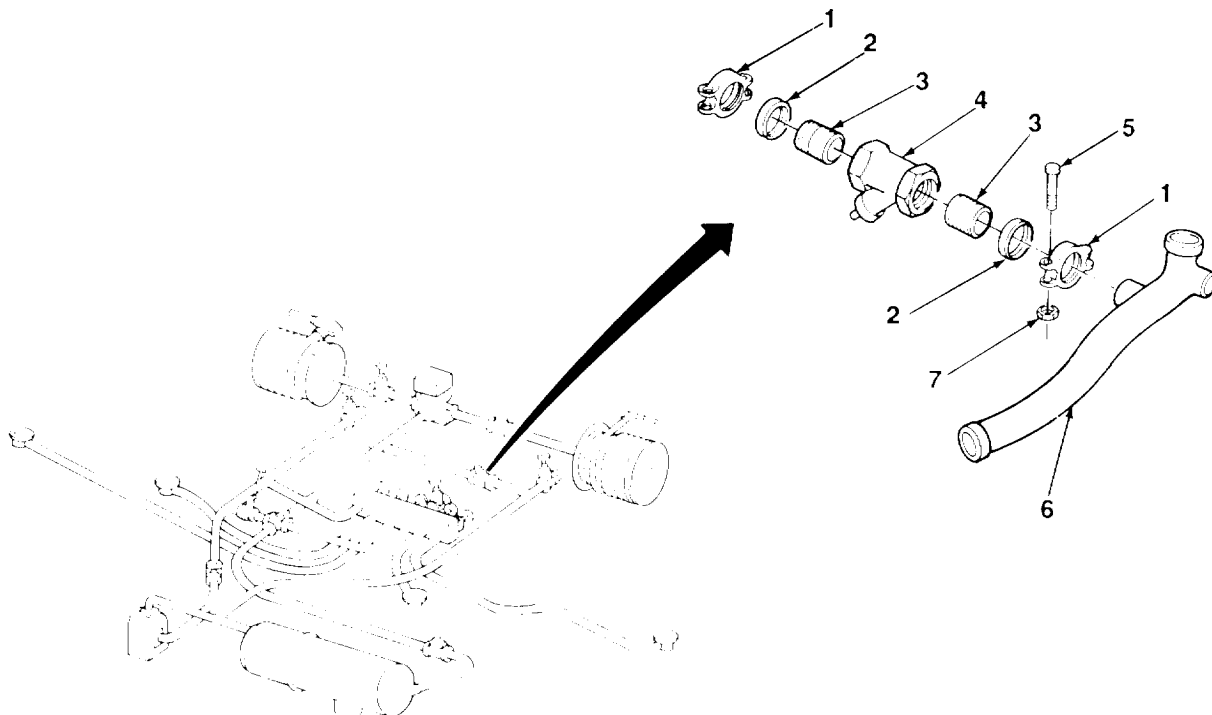
- Dry cleaning solvent (Item 16, Appendix E)
  - Two gaskets
- 

**NOTE**

**Adjustable bypass valve is replaced the same way on M131A4C and M131A5C. M131A4C is illustrated.**

**a. REMOVAL**

1. Remove four nuts (7), screws (5), two couplers (1), gaskets (2), and adjustable bypass valve (4) from tubes (6). Discard gaskets.
2. Remove two nipples (3) from adjustable bypass valve (4).



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**4-102. ADJUSTABLE BYPASS VALVE REPLACEMENT (M131A4C AND M131A5C) (Con't).**

---

---

**b. CLEANING AND INSPECTION**

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---

**WARNING**

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Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean all parts with dry cleaning solvent.
2. inspect parts for damage. Replace damaged parts.

---

**c. INSTALLATION**

---

1. Install two nipples (3) on adjustable bypass valve (4).
2. Install two new gaskets (2) on nipples (3).
3. Position adjustable bypass valve (4) on tubes (6). Slide two gaskets (2) over tubes and install two couplers (1) with four screws (5) and nuts (7').

**4-103. SLUG CONTROL VALVE REPLACEMENT.**

*This Task Covers:* Replacement

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

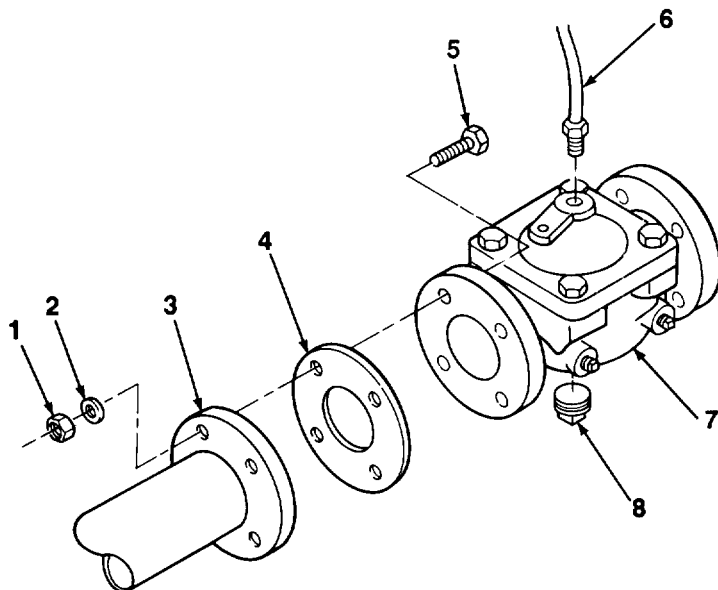
- Rags (Item 14, Appendix E)
- Two gaskets
- Eight lockwashers

**REPLACEMENT**

**NOTE**

**A drain pan should be used to catch any draining fluid. Ensure that all spills are cleaned up.**

1. Remove drain plug (8) and allow slug control valve (7) to drain.
2. Disconnect tube (6) from slug control valve (7).
3. Remove eight nuts (1), lockwashers (2), screws (5), slug control valve (7), and two gaskets (4) from tubes (3). Discard lockwashers and gaskets.
4. Install two new gaskets (4) and slug control valve (7) on tubes (3) with eight screws (5), new lockwashers (2), and nuts (1).
5. Connect tube (6) to slug control valve (7).
6. install drain plug (8) on slug control valve (7).



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**4-104. THREE-WAY CONTROL VALVE REPLACEMENT (M131A4C AND M131A5C).**

---

*This Task Covers:* Replacement

---

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Tools/Test Equipment:**

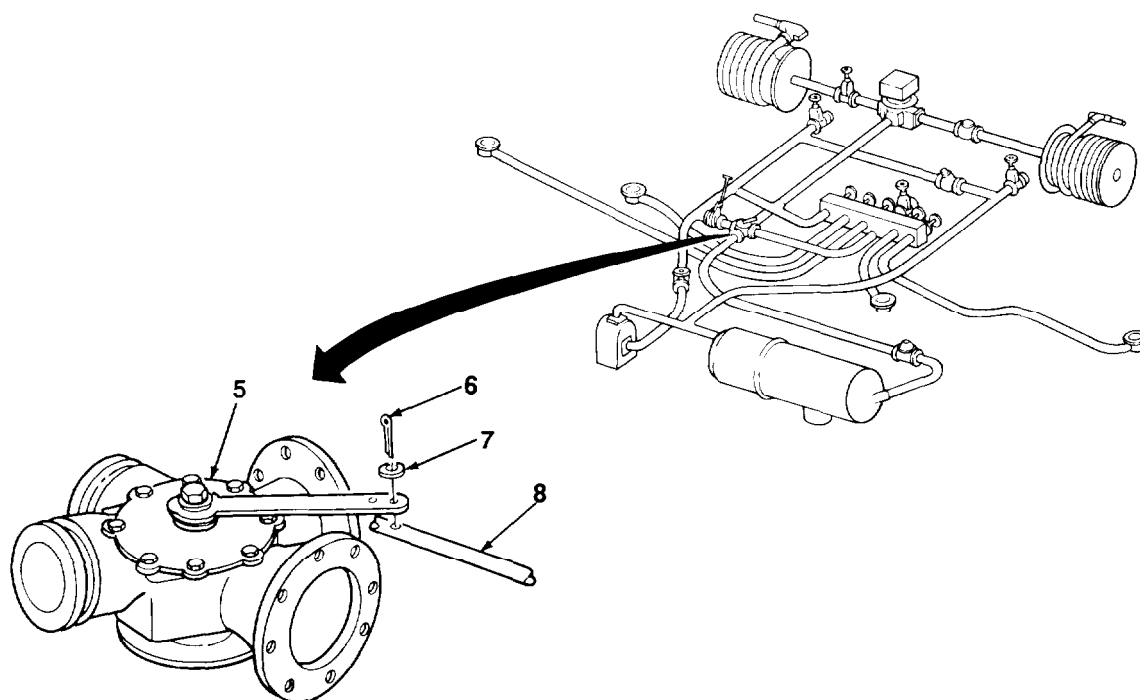
- General mechanic's tool kit
- Common no. 1 shop set

**Materials/Parts:**

- One cotter pin
  - Two gaskets
  - Two seals
  - Sixteen lockwashers
- 

**REPLACEMENT**

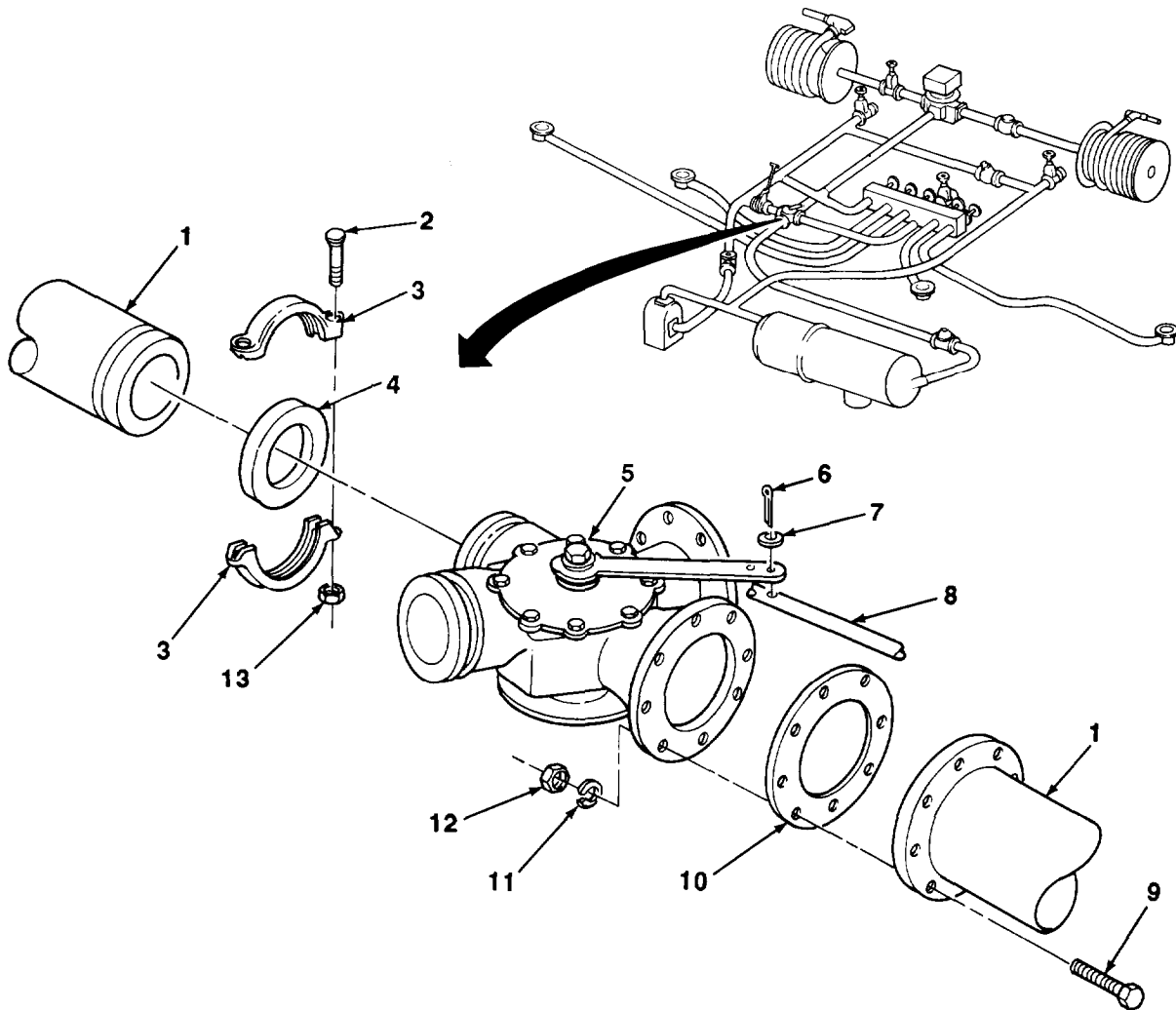
1. Remove cotter pin (6), flatwasher (7), and disconnect rod (8) from three-way control valve (5). Discard cotter pin.



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**4-104. THREE-WAY CONTROL VALVE REPLACEMENT (M131A4C AND M131A5C) (Con't).**

2. Remove sixteen nuts (12), lockwashers (11), and screws (9) from three-way control valve (5) and two tubes(1). Discard lockwashers.
3. Remove four nuts (13), screws (2), and two couplers (3) from three-way control valve (5) and two tubes (1).
4. Remove two seals (4) from three-way control valve (5), and remove three-way control valve and two gaskets (10) from tubes (1). Discard gaskets and seals.
5. Install three-way control valve (5) and two new gaskets (10) on two tubes (1) with sixteen screws (9), new lockwashers (11), and nuts (12).
6. Position two new seals (4) on three-way control valve (5) and install two couplers (3) with four screws (2) and nuts (13).
7. Connect rod (8) to three-way control valve (5) with flatwasher (7) and new cotter pin (6).



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#### 4-105. GATE VALVES REPLACEMENT.

---

*This Task Covers:*

- a. Discharge and Intake Valves Replacement.                      b. Cutoff Valves Replacement
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Tools/Test Equipment:**

- General mechanic's tool kit

**Materials/Parts:**

- One gasket (discharge and intake valves)
  - Two gaskets (cutoff valve)
  - Eight lockwashers (discharge and intake valves)
- 

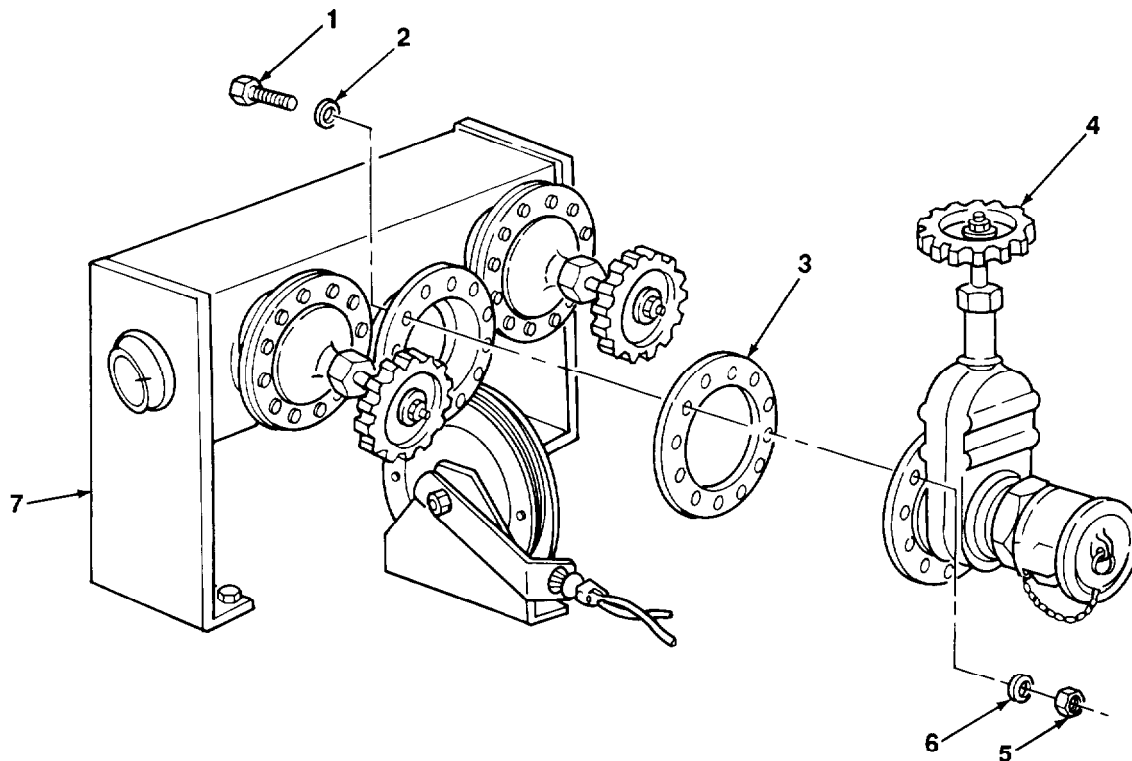
#### a. DISCHARGE AND INTAKE VALVES REPLACEMENT

---

**NOTE**

**Gravity and pump discharge valves and pump Intake valve are replaced the same way. Gravity discharge valve is illustrated.**

1. Remove eight nuts (5), lockwashers (6), screws (1), washers (2), gravity discharge valve (4), and gasket (3) from manifold (7). Discard lockwashers and gasket.
2. Install new gasket (3) and gravity discharge valve (4) on manifold (7) with eight washers (2), screws (1), new lockwashers (6), and nuts (5).



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**4-105. GATE VALVES REPLACEMENT (Con't).**

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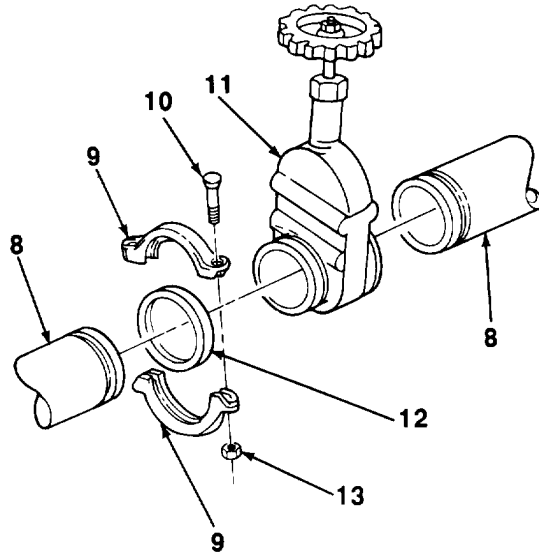
**b. CUTOFF VALVES REPLACEMENT**

---

**NOTE**

**Pump cutoff and 225 gpm (852 lpm) cutoff valves are replaced the same way. Pump cutoff valve is illustrated.**

1. Remove four nuts (13), screws (10), two couplers (9), gaskets (12), and cutoff valve (11) from tubes (8). Discard gaskets.
2. Position two new gaskets (12) on tubes (8) and cutoff valve (11) and install two couplers (9) with four screws (10) and nuts (13).



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**Section XVI. PAINTING AND IDENTIFICATION MARKING**

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**4-106. PAINTING AND IDENTIFICATION MARKING.**

---

- a. **Painting.** Refer to TM 43-0139 for instructions on painting the M131 Series Semitrailers.
- b. **Stencil Markings.**

**NOTE**

**For location and contents of stencil markings refer to paragraph 1-8.**

(1) If stencil markings are not legible, stencil must be repainted. Paint numerals or letters in simple block type, using black paint.

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**WARNING**

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Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

(2) Before applying paint, clean all surfaces to be stenciled with dry cleaning solvent (Item 16, Appendix E). Dry thoroughly.

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**WARNING**

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- Avoid excessive inhalation of vapors when stenciling. All stenciling procedures must be performed in a well-ventilated area. A fire extinguisher must be on hand. Failure to follow this warning may result in injury to personnel.
- Personnel must wear protective face masks if spraying paint. If face masks are not available, paint with brush only. Personnel must stay clear of work area where spray painting is taking place. Failure to follow this warning may result in injury to personnel.

(3) Apply paint to stencil with dabbing motion.

(4) Allow paint to dry for 24 hours.

**Section XVII. PREPARATION FOR STORAGE OR SHIPMENT**

Paragraph Title	Page Number
Care of Equipment in Administrative Storage . . . . .	4-232
Definition of Administrative Storage. . . . .	4-230
Exercise Schedule, Table 4-3 . . . . .	4-232
General . . . . .	4-230
Preparation of Equipment for Administrative Storage . . . . .	4-230
Preparation of Equipment for Shipment . . . . .	4-233
Procedures for Common Components and Miscellaneous items . . . . .	4-232
Removal of Equipment from Administrative Storage . . . . .	4-233

**4-107. GENERAL.**

- a. This section contains requirements and procedures for administrative storage of equipment that is issued to and in use by Army activities worldwide.
- b. The requirements specified herein are necessary to maintain equipment in administrative storage in such away as to achieve the maximum readiness condition.
- c. Equipment that is placed in administrative storage should be capable of being readied to perform its mission within a 24-hour period, or as otherwise may be prescribed by the approving authority. Before equipments placed in administrative storage, a current preventive maintenance checks and services (PMCS) should be completed and deficiencies corrected.
- d. Report equipment in administrative storage as prescribed for all repoflable equipment.
- e. Perform inspections, maintenance services, and lubrication as specified herein.
- f. Records and reports to be maintained for equipment in administrative storage are those prescribed by DA Pam 738-750, for equipment in use.
- g. A 10% variance is acceptable on time, running hours, or mileage used to determine the required maintenance actions.
- h. Accomplishment of applicable PMCS, as mentioned throughout this section, will be on a quarterly basis.

**4-108. DEFINITION OF ADMINISTRATIVE STORAGE.**

The placement of equipment in administrative storage can be for short periods of time when a shortage of maintenance effort exists, Items should be ready for use within the time factors as determined by the directing authority. During the storage period, appropriate maintenance records will be kept.

**4-109. PREPARATION OF EQUIPMENT FOR ADMINISTRATIVE STORAGE.**

a. Storage Site.

- (1) Select the best available site for administrative storage. Separate stored equipment from equipment in use, Conspicuously mark the area "Administrative Storage."
- (2) Covered space is preferred.
- (3) Open sites should be improved hardstand, if available. Unimproved sites should be firm, well-drained, and kept free of excessive vegetation.



**4-109. PREPARATION OF EQUIPMENT FOR ADMINISTRATIVE STORAGE (Con't).****b. Storage Plan.**

(1) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions.

(2) Take Into consideration environmental conditions, such as extreme heat and cold; high humidity; blowing sand, dust, or loose debris; soft ground; mud; heavy snows; or combinations thereof, and take adequate precautions.

(3) Establish a fire plan and provide for adequate firefighting equipment and personnel.

**c. Maintenance Services and Inspection.**

(1) Maintenance Services. Prior to storage, perform the next scheduled organizational PMCS.

(2) Inspection. Inspect and approve the equipment prior to storage. Do not place equipment in storage if in a nonmission-capable condition.

**d. Auxiliary Equipment and Basic Issue Items.**

(1) Process auxiliary and basic issue items simultaneously with the major item to which they are assigned.

(2) If possible, store auxiliary and basic issue items with the major item.

(3) If stored apart from the major item, mark auxiliary and basic issue items with tags indicating the major item, its registration or serial number and location, and store in protective type closures. In addition, place a tag or list indicating the location of the removed items in a conspicuous place on the major item.

**e. Correction of Shortcomings and Deficiencies.** Correct all shortcomings and deficiencies prior to storage, or obtain a deferment from the approving authority.

**f. Lubrication.** Lubricate equipment in accordance with instructions in Chapter 3, Section I.

**g. General Cleaning, Painting, and Preservation.****CAUTION**

**Do not direct water or steam, under pressure, against unsealed electrical systems or any exterior opening. Failure to follow this caution may result in damage to equipment.**

(1) **Cleaning.** Clean the equipment of dirt, grease, and other contaminants, but do not use vapor decreasing.

(2) **Painting.** Remove rust and damaged paint by scraping, wire brushing, sanding, or buffing. Sand to a smooth finish and spot paint as necessary (TB 43-0209).

(3) **Preservation.** After cleaning and drying, immediately coat unpainted metal surfaces with oil or grease, as appropriate (Chapter 3, Section I).

**CAUTION**

**Place a piece of barrier material (Item 2, Appendix E) between desiccant bags and metal surfaces.**

**NOTE**

**Air circulation under draped covers reduces deterioration from moisture or heat.**

(4) **Weatherproofing.** Sunlight, heat, moisture (humidity), and dirt tend to accelerate deterioration. Install all covers (including vehicle protective closures) authorized for the equipment. Close and secure all openings except those required for venting and draining. Seal openings to prevent the entry of rain, snow, or dust. Insert desiccant when complete seal is required. Place equipment and provide blocking or framing to allow for ventilation and water drainage. Support cover away from item surfaces which may rust, rot, or mildew.

**4-110. CARE OF EQUIPMENT IN ADMINISTRATIVE STORAGE.**

a. **Maintenance Services.** After equipment has been placed in administrative storage, inspect, service, and exercise as specified herein.

b. **Inspection.** Inspection will usually be visual and must consist of at least a walkaround examination of all equipment to detect any deficiencies. Inspect equipment in open storage weekly and equipment in covered storage monthly. Inspect all equipment immediately after any severe storm or environmental change. The following are examples of things to look for during a visual inspection:

- (1) Low or flat tires.
- (2) Fuel leaks.
- (3) Condition of preservatives, seals, and wraps.
- (4) Corrosion or other deterioration.
- (5) Missing or damaged parts.
- (6) Water in compartments.
- (7) Any other readily recognizable shortcomings or deficiencies.

c. **Repair During Administrative Storage.** Keep equipment in an optimum state of readiness. Accomplish the required services and repairs as quickly as possible. Whenever possible, perform all maintenance on-site.

d. **Exercising.** Exercise equipment in accordance with Table 4-3, *Exercise Schedule*, and the following instructions.

(1) Vehicle Major Exercise. Depreserve equipment by removing only that material restricting exercise. Close all drains, remove blocks, and perform all before-operation checks. Couple semitrailer to towing vehicle and drive for at least 25 mi (40 km). Make several right and left 90° turns. Make several hard braking stops without skidding. Do the following during exercising when it is convenient and safe: operate all other functional components and perform all during- and after-operation checks.

(2) Scheduled Services. Scheduled services will include inspection per subparagraph b above and will be conducted in accordance with Table 4-3. Lubricate in accordance with instructions in Chapter 3, Section I.

(3) Corrective Action. Immediately take action to correct shortcomings and deficiencies noted. Record inspection and exercise results on DA Form 2404. Record and report all maintenance actions on DA Form 2407. After exercising, restore the preservation to the original condition. Replenish lubricants used during exercising, and note the amount on DA Form 2408.

**Table 4-3. Exercise Schedule.**

Weeks	2	4	6	8	10	12	14	16	18	20	22	24
PMCS						X						X
Scheduled Services		X		X		X		X		X		
Major Exercise												X

e. **Rotation.** Rotate items in accordance with any rotational plan that will keep the equipment in an operational condition and reduce the maintenance effort.

**4-111. PROCEDURES FOR COMMON COMPONENTS AND MISCELLANEOUS ITEMS.**

a. **Tires.** Visually Inspect tires during each walkaround inspection. This Inspection includes checking tires with a tire gage. Inflate, repair, or replace as necessary those found to be low, damaged, or excessively worn. Mark inflated and repaired tires with a crayon for checking at the next inspection.

#### 4-111. PROCEDURES FOR COMMON COMPONENTS AND MISCELLANEOUS ITEMS (Con't).

b. **Air Lines and Air Reservoir.** Drain airlines and air reservoir of condensation and leave draincock open. Attach a caution tag, annotated to provide for closing of draincock when the equipment is exercised. Place tags in a conspicuous location.

c. **Seals.** Seals may develop leaks during storage, or shortly thereafter. If leaking persists, refer to the applicable maintenance section in this manual for corrective maintenance procedures.

#### 4-112. REMOVAL OF EQUIPMENT FROM ADMINISTRATIVE STORAGE.

a. **Activation.** Restore the equipment to normal operating condition in accordance with the instructions contained in Chapter 4.

b. **Servicing.** Resume the maintenance service schedule in effect at the commencement of storage, or service the equipment before the scheduled dates in order to produce a staggered maintenance workload.

#### 4-113. PREPARATION OF EQUIPMENT FOR SHIPMENT.

a. Refer to TM 55-21, TM 55-601, and TM 743-200-1 for additional instructions on processing, storage, and shipment of materiel.

b. Semitrailers that have been removed from storage for shipment do not have to be reprocessed if they will reach their destination within the administrative storage period. Reprocess only if inspection reveals any corrosion or if anticipated in-transit weather conditions make it necessary.

c. When a semitrailer is received and has already been processed for domestic shipment, as indicated on DD Form 1397, the semitrailer does not have to be reprocessed for storage unless corrosion and deterioration are found during the inspection upon receipt. List on SF Form 364 all discrepancies found because of poor preservation, packaging, packing, marking, handling, loading, storage, or excessive preservation. Repairs that cannot be handled by the receiving unit must have tags attached listing needed repairs. A report of these conditions will be submitted by the unit commander for action by an ordnance maintenance unit.



## CHAPTER 5 DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

### Section I. REAR AXLE MAINTENANCE

#### 5-1. REAR AXLE REPLACEMENT

*This Task Covers:* Replacement

*Initial Setup:*

**Equipment Conditions:**

- Hub and brakedrum removed (para 4-44).
- Backing plates removed from axle (para 4-30).
- Hydraulic hose removed (para 4-34).
- Hydraulic line and axle tee removed (para 4-34).
- Torque rod disconnected from axle (para 4-54).

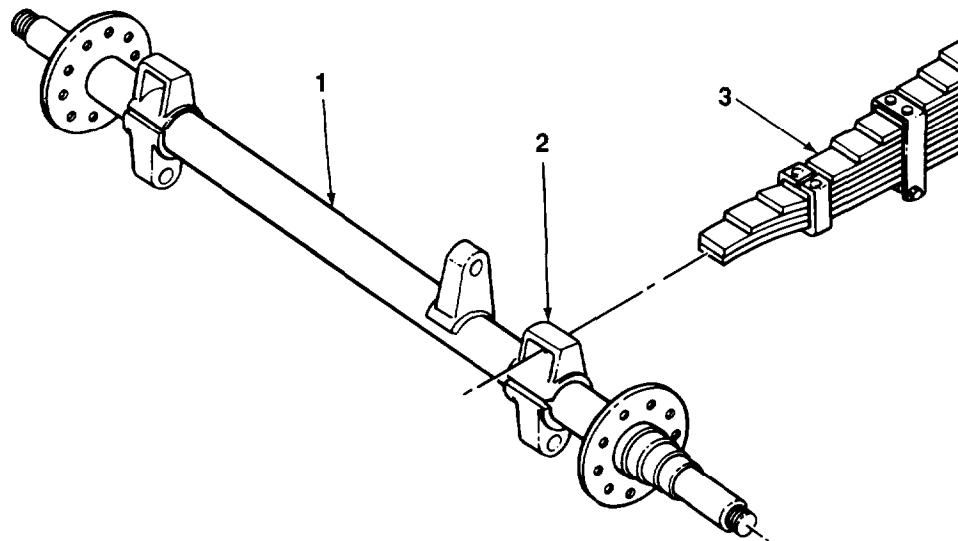
**Tools/Test Equipment:**

- General mechanic's tool kit
- Field automotive shop set

**Personnel Required:** Two

#### REPLACEMENT

1. Position a floor jack under axle (1).
2. Move axle (1) and free springs (3) from spring guide brackets (2). Remove axle from semitrailer.
3. Position axle (1) on semitrailer with springs (3) in spring guide brackets (2).



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**5-1. REAR AXLE REPLACEMENT (Con't).**

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**FOLLOW-ON TASKS:**

- Connect torque rods to axle (para 4-54).
- Install hydraulic line and axle tee (para 4-34).
- Install hydraulic hose (para 4-34).
- Install backing plate (para 4-30).
- Install hub and brakedrum (para 4-44).
- Bleed brakes (para 4-35).

Section II. BRAKE SYSTEM MAINTENANCE

5-2. BRAKESHOE REPAIR.

This Task Covers:

- a. Disassembly
- b. Cleaning and Inspection
- c. Assembly

Initial Setup:

Equipment Conditions:

- 1 Brakeshoes removed (para 4-30).

Tools/Test Equipment:

- 1 Field automotive shop set
- 1 Brake and clutch reliner

Materials/Parts:

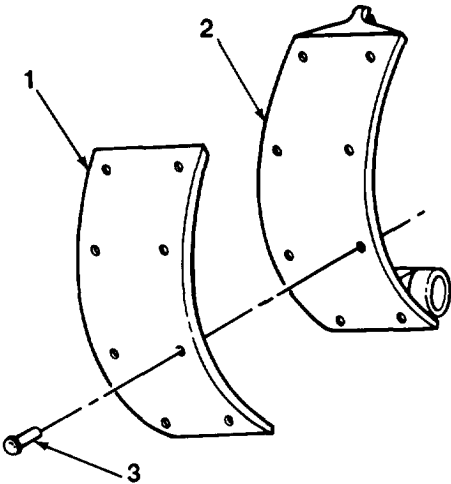
- Wire brush (Item 4, Appendix E)
- Dry cleaning solvent (Item 16, Appendix E)
- Brake lining repair kit

**WARNING**

DO NOT handle brakeshoes, brakedrums, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if you touch it or breathe it. Wear an approved filter mask and gloves. Never use compressed air or a dry brush to clean brake components. Dust may be removed using an industrial-type vacuum cleaner. Clean dust or mud away from brake components with water and a wet, soft brush or cloth. Failure to follow this warning may result in serious illness or death to personnel.

**a. DISASSEMBLY**

Remove 16 rivets (3) and brakeshoe linings (1) from brakeshoes (2). Discard rivets and linings.



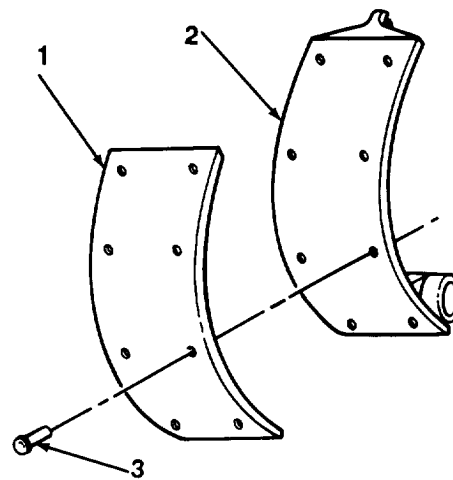
**5-2. BRAKESHOE REPAIR (Con't).**

**b. CLEANING AND INSPECTION**

**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean brakeshoes (2) with dry cleaning solvent and a wire brush. Allow to air dry.
2. Inspect brakeshoes (2) for cracks and breaks. Replace brakeshoes if cracked or broken.



**c. ASSEMBLY**

**WARNING**

**If brakeshoe lining is replaced, replace all brakeshoe linings on that axle. Combination of old brakeshoes with new will cause uneven braking. Accidents causing serious injury or death to personnel or damage to equipment may result.**

Install brakeshoe linings (1) on brakeshoes (2) with 16 new rivets (3).

**FOLLOW-ON TASKS:**

- Install brakeshoes (para 4-30).
- Adjust service brakes (para 4-31).



Section III. BRAKEDRUM AND TIRE MAINTENANCE

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Paragraph Title	Page Number
Brakedrum Repair . . . . .	5-5
Tire Repair . . . . .	5-7

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**5-3. BRAKEDRUM REPAIR.**

---

*This Task Covers:*

- |               |           |
|---------------|-----------|
| a. Inspection | b. Repair |
|---------------|-----------|
- 

*Initial Setup:*

**Equipment Conditions:**

- Hub and brakedrum removed (para 4-44).

**Tools/Test Equipment:**

- Field automotive shop set
- 

**WARNING**

DO NOT handle brakeshoes, brakedrums, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if you touch it or breathe it. Wear an approved filter mask and gloves. Never use compressed air or a dry brush to clean brake components. Dust may be removed using an Industrial-type vacuum cleaner. Clean dust or mud away from brake components with water and a wet, soft brush or cloth. Failure to follow this warning may result in serious illness or death to personnel.

a. INSPECTION

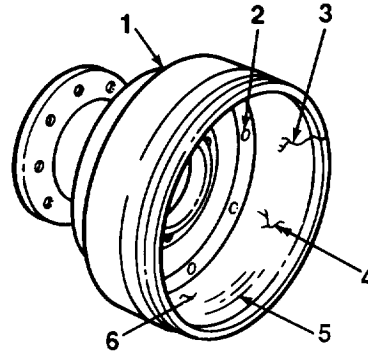
**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean all parts with dry cleaning solvent. Allow to dry.

**5-3. BRAKEDRUM REPAIR (Con't).**

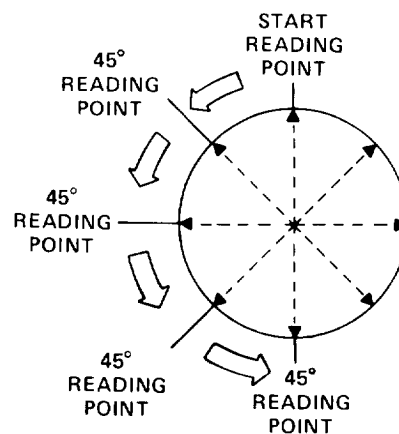
2. Inspect stud holes (2) for cracks (3). Discard brakedrum (1) if cracks are present.



**WARNING**

**DO NOT use brakedrum that exceeds maximum wear specifications. Failure to follow this warning may result in brake failure and serious injury or death.**

3. Measure inside diameter of brakedrum (1). Discard brakedrum if inside diameter exceeds 16.8 in. (42.7 cm).
4. Inspect braking surface (6) for cracks (3), heat checking (4), and scoring (5). Reface braking surface if damaged (subpara b).
5. Inspect braking surface (6) for out-of-round at 45° intervals. Out-of-round should not exceed 0.015 in. (0.38 mm). If runout exceeds 0.015 in. (0.38 mm), reface braking surface (subpara b).



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**5-3. BRAKEDRUM REPAIR (Con't).**

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**b. REPAIR**

1. Reface braking surface (6) with brakedrum lathe, removing a maximum of 0.01 in. (0.25 mm) per cut.

---

**WARNING**

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**DO NOT use brakedrum that exceeds maximum wear specifications. Failure to follow this warning may result in brake failure and serious injury or death.**

2. Discard brakedrum (1) if inside diameter exceeds 16.8 in. (42.7 cm) after repair.

**FOLLOW-ON TASKS:**

- Install hub and brakedrum (para 4-44).

---

**5-4. TIRE REPAIR.**

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Refer to TM 9-2610-200-14 for instructions on tire repair.

## Section IV. FRAME MAINTENANCE

### 5-5. LANDING LEG REPAIR.

*This Task Covers:*

- |                            |             |
|----------------------------|-------------|
| a. Disassembly             | c. Assembly |
| b. Cleaning and Inspection |             |

*Initial Setup:*

**Equipment Conditions:**

- Gearbox removed (para 4-51).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Field automotive shop set

**References:**

- TM 9-214

**Materials/Parts:**

- Grease (Item 10, Appendix E)
- Rags (Item 14, Appendix E)
- Dry cleaning solvent (Item 16, Appendix E)
- One felt strip
- One lockwasher
- One oil seal

**a. DISASSEMBLY**

**NOTE**

**A drain pan should be used to catch draining oil. Ensure that all spills are cleaned up.**

1. Remove screw (9) and lockwasher (8) from upper leg (7). Allow oil to drain. Discard lockwasher.
2. Remove operating screw (18) assembly from lower leg (4).
3. Remove ring (3) and lower leg (4) from upper leg (7). Remove felt strip (2) from ring. Discard felt strip.
4. Remove two dowels (6), stop plate (5), nut sleeve (20), and oil reservoir (1) from lower leg (4).
5. Remove oil seal (19) from operating screw (18). Discard oil seal.
6. Using a file remove metal on operating screw (18) from staking and remove nut (10).
7. Remove bevel gear (11), woodruff key (17), and outer bearing (12) from operating screw (18).
8. Remove retainer (14) and inner bearing (16) from operating screw (18).
9. Remove outer cup (13) and inner cup (15) from retainer (14).

**b. CLEANING AND INSPECTION**

1. Clean interior parts and surfaces with a lint-free cloth.

**WARNING**

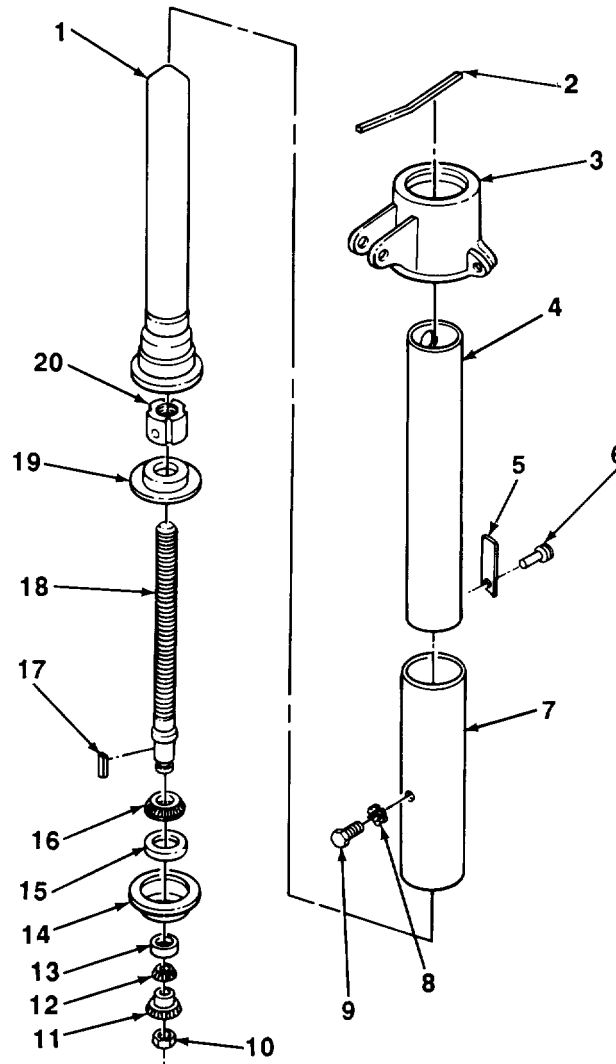
**Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.**

2. Clean exterior surfaces and remove hardened lubricant with dry cleaning solvent.

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 5-5. LANDING LEG REPAIR (Con't).
 

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3. Inspect parts for wear, distortion, and cracks. Replace any worn, distorted, or cracked parts.
4. Inspect operating screw for straightness by rolling on flat surface. Replace if bent.
5. Clean and inspect bearings in accordance with TM 9-214. Discard if damaged.

---

 c. ASSEMBLY
 

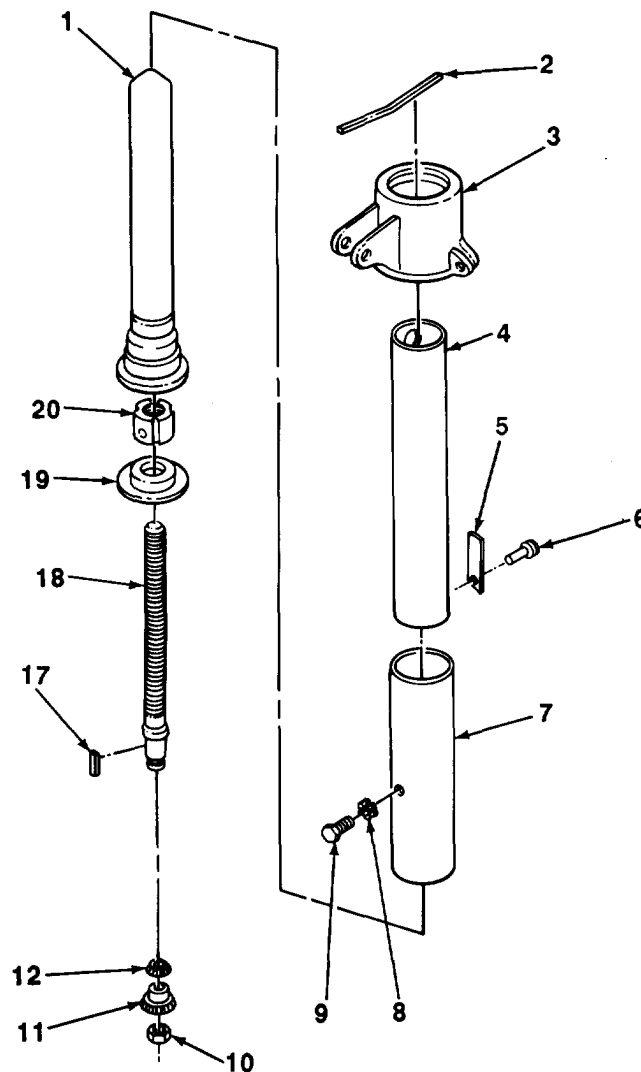
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1. Lubricate inner bearing (16) with grease and install on operating screw (18).
2. Install outer cup (13) and inner cup (15) in retainer (14). Install retainer on operating screw (18).

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5-5. LANDING LEG REPAIR (Con't).

3. Lubricate outer bearing (12) with grease and install on operating screw (18).
4. install woodruff key (17) on operating screw (18).
5. Install bevel gear (11) and nut (10) on operating screw (18). Stake nut by making two punch marks on end of operating screw.
6. Install new oil seal (19) and nut sleeve (20) on operating screw (18). Position nut sleeve approximately 12½ in. (31.7 cm) from bottom of operating screw.



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**5-5. LANDING LEG REPAIR (Con't).**

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**NOTE**

**When positioning oil reservoir, lower leg, and stop plate on operating screw, ensure that holes align with hole in nut sleeve.**

7. Position oil reservoir (1), lower leg (4), and stop plate (5) on operating screw (18) and install two dowels (6).
8. Install new felt strip (2) into ring (3).

**NOTE**

**Use care not to displace felt strip when passing end of lower leg through ring.**

9. Position ring (3) on upper leg (7) and insert lower leg (4) in upper leg.
10. Install operating screw (18) into lower leg (4) and until oil seal (19) is seated.
11. Install new lockwasher (8) and screw (9) into upper leg (7).

**FOLLOW-ON TASKS:**

- Install gearbox (para 4-51).
- Lubricate landing leg (Chapter 3, Section I)

## Section V. SPRINGS MAINTENANCE

Paragraph Title	Page Number
Cross Tube and Mounting Bracket Replacement . . . . .	5-12
Torque Rod Repair . . . . .	5-15

### 5-6. CROSS TUBE AND MOUNTING BRACKET REPLACEMENT.

*This Task Covers:*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | c. Installation |
| b. Cleaning and Inspection |                 |

*Initial Setup:*

**Equipment Conditions:**

- Spring seat removed (para 4-53).
- Torque rods removed (para 4-54).

**Materials/Parts:**

- Ten lockwashers
- Thirty-two locknuts

**Tools/Test Equipment:**

- General mechanic' stool kit
- Field automotive shop set

**Personnel Required:** Two

**a. REMOVAL**

1. Position floor jack under cross tube (1).
2. Remove eight nuts (10), lockwashers (11), screws (3), and cross tube (1) from two mounting brackets (4). Discard lockwashers.
3. Remove cross tube (1) and two brackets (9) from under semitrailer.
4. Remove two nuts (2), screws (13), lockwashers (112), and brackets (9) from cross tube (1). Discard lockwashers.
5. Remove eight locknuts (8), and screws (5) from mounting bracket (4) and frame. Discard locknuts.
6. Remove eight locknuts (6), screws (7), and mounting bracket (4) from frame. Discard locknuts.
7. Repeat steps 5 and 6 for mounting bracket (4) on other side.

**b. CLEANING AND INSPECTION**

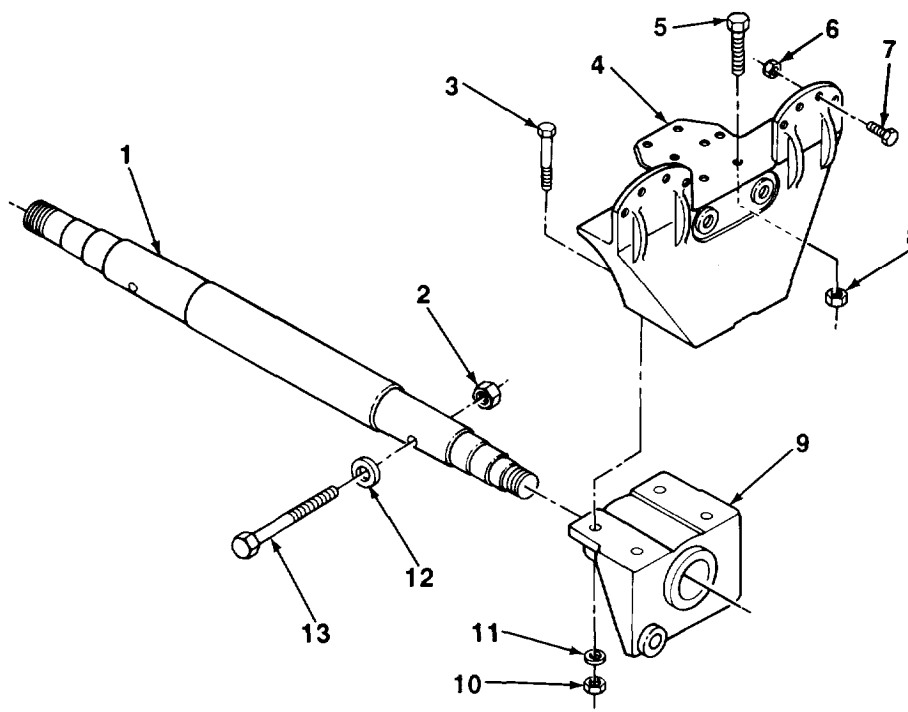
**WARNING**

**Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.**

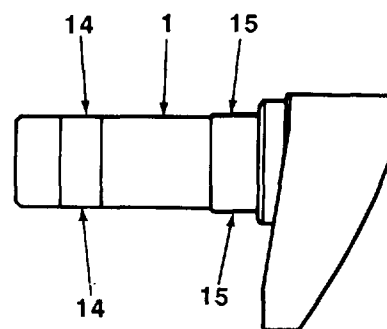
1. Clean all parts with dry cleaning solvent.



**5-6. CROSS TUBE AND MOUNTING BRACKET REPLACEMENT (Con't).**



2. Measure cross tube outer diameter at outer bearing mounting surface (14). Discard cross tube (1) if measurement is less than 3.3 in. (8.4 cm).
3. Measure cross tube outer diameter at inner bearing mounting surface (15). Discard cross tube (1) if measurement is less than 3.5 in. (8.9 cm).



**c. INSTALLATION**

1. Position mounting bracket (4) on frame and install eight screws (7) and new locknuts (6).
2. Install eight screws (5) and new locknuts (8) on mounting bracket (4) and frame.
3. Repeat steps 1 and 2 for mounting bracket (4) on other side.
4. Install two brackets (9) on cross tube (1) with two new lockwashers (12), screws (13), and nuts (2).
5. Install cross tube (1) and two brackets (9) on two mounting brackets (4) with eight screws (3), new lockwashers (11), and nuts (10).

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**5-6. CROSS TUBE AND MOUNTING BRACKET REPLACEMENT (Con't).**

---

**FOLLOW-ON TASKS:**

- Install torque rods (para 4-54).
- Install spring seat (para 4-53).

---

**5-7. TORQUE ROD REPAIR.**

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This Task Covers: Repair

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*Initial Setup:*

**Equipment Conditions:**

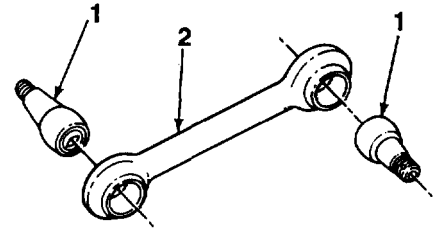
- Torque rod removed (para 4-54).

**Tools/Test Equipment:**

- General mechanic's tool kit
  - Field automotive shop set
- 

**REPAIR**

1. Remove ball assembly (1) from torque rod (2).
2. Install ball assembly (1) in torque rod (2).

**FOLLOW-ON TASKS:**

- Install torque rod (para 4-54).

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Section VI. BODY MAINTENANCE

Paragraph Title	Page Number
Cabinet Door Maintenance .....	5-21
Hose Reel Repair (M131A4C and M131A5C) .....	5-16

**5-8. HOSE REEL REPAIR (M131A4C AND M131A5C).**

*This Task Covers:*

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>a. Disassembly</li> <li>b. Cleaning and Inspection</li> </ul> | <ul style="list-style-type: none"> <li>c. Assembly</li> </ul> |
|--|---|

*Initial Setup:*

**Equipment Conditions:**

- Hose removed (para 4-68).

**Tools/Test Equipment:**

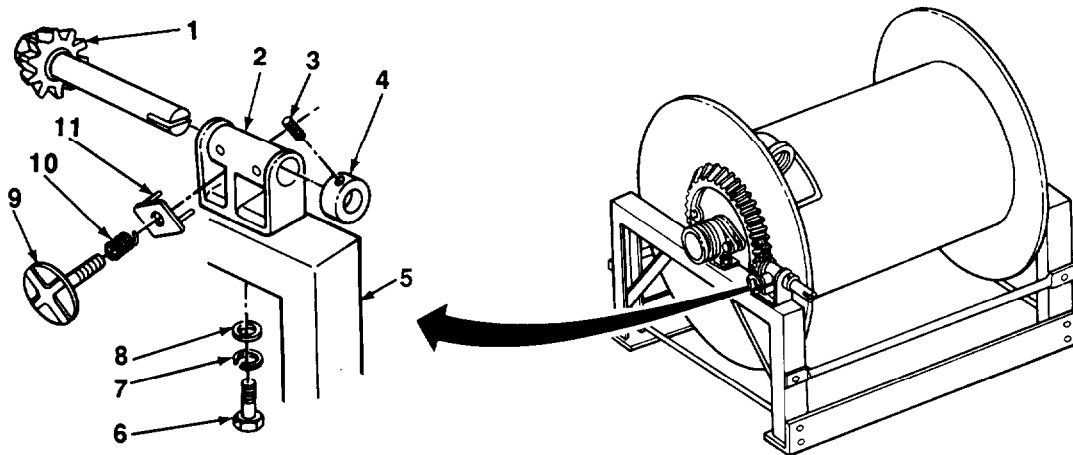
- General mechanic's tool kit
- Field automotive shop set

**Materials/Parts:**

- Dry cleaning solvent (Item 16, Appendix E)
- One gasket
- One packing set
- Ten lockwashers

**a. DISASSEMBLY**

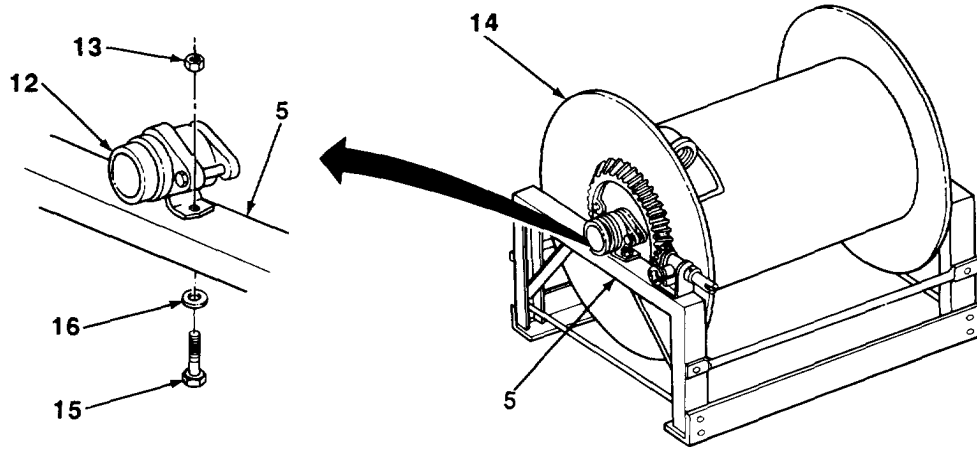
1. Remove locking handle (9), brake spring (10), and brake spacer (11) from pinion bearing (2).
2. Loosen setscrew (3) and remove collar (4) from bevel gearshaft (1).



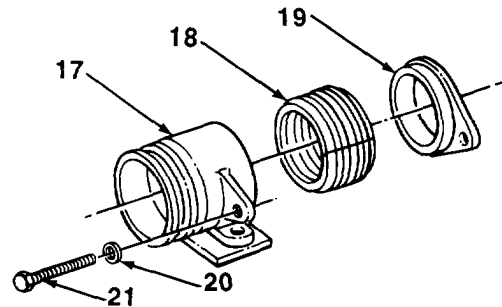
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**5-8. HOSE REEL REPAIR (M131A4C AND M131A5C) (Con't).**

3. Remove bevel gearshaft (1) from pinion bearing (2).
4. Remove two screws (6), lockwashers (7), flatwashers (8) and pinion bearing (2) from frame (5). Discard lockwashers.
5. Remove two screws (15), washers (16), nuts (13), and hub and coupling assembly (12) from frame (5) and hose reel (14).

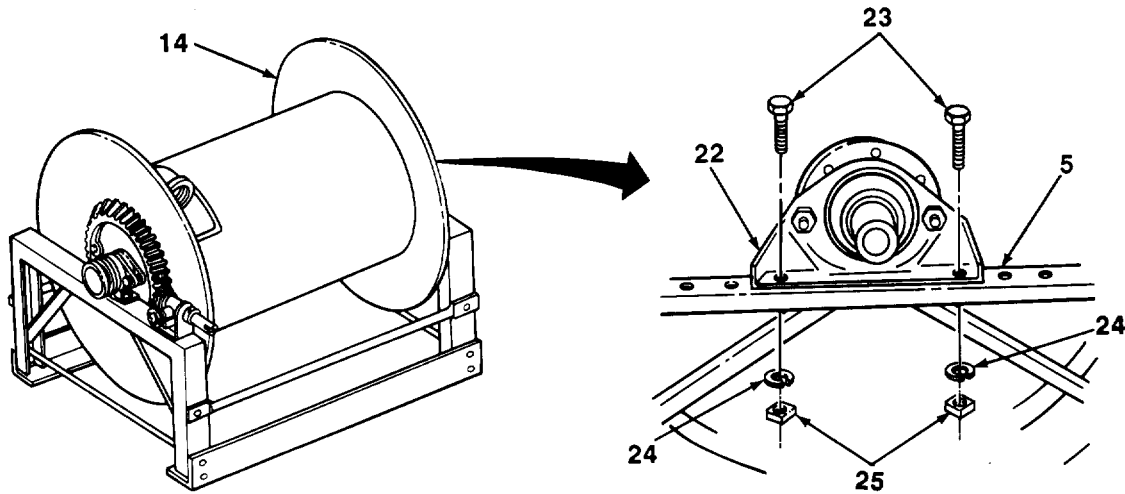


6. Remove two screws (21) and lockwashers (20). Separate hub (17), packing set (18), and coupling (19). Discard lockwashers and packing set.

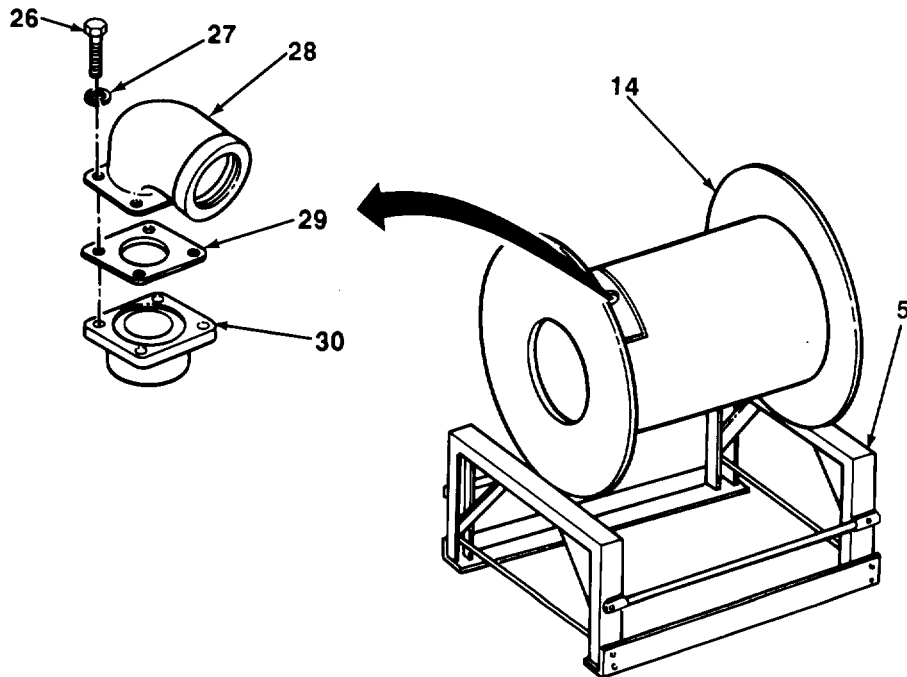


5-8. HOSE REEL REPAIR (M131A4C AND M131A5C) (Con't).

7. Remove two nuts (25), lockwashers (24), screws (23), and bearing (22) from frame (5) and hose reel (14). Discard lockwashers.



8. Remove hose reel (14) from frame (5).
9. Remove four screws (26), lockwashers (27), elbow (28), and gasket (29) from adapter (30). Discard lockwashers and gasket.



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**5-8. HOSE REEL REPAIR (M131A4C AND M131A5C) (Con't).**


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**b. CLEANING AND INSPECTION**


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**WARNING**


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Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and **DO NOT** breathe vapors. **DO NOT** use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

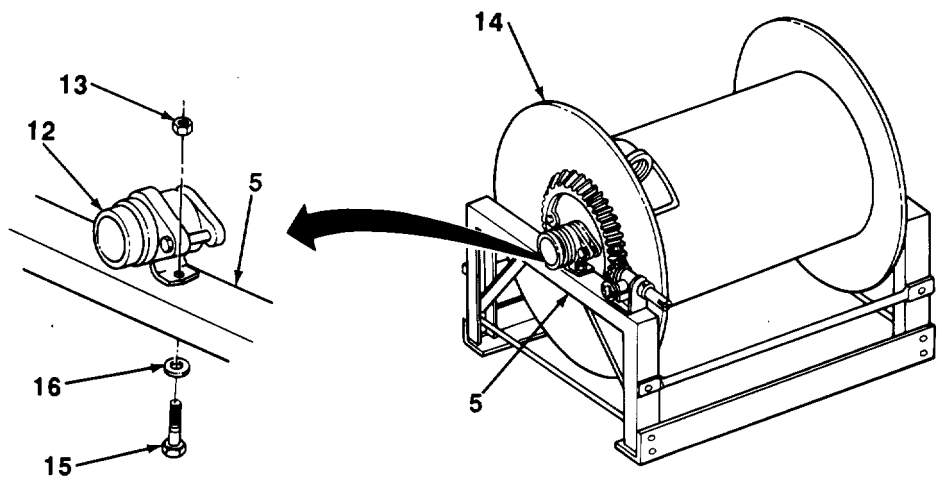
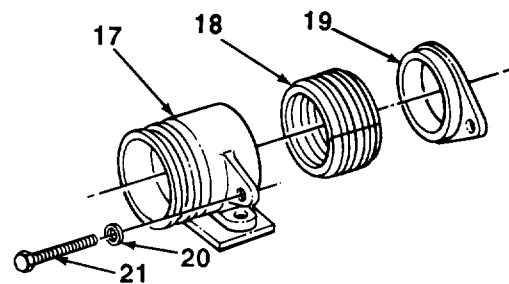
1. Clean all parts with dry cleaning solvent.
2. Inspect all parts for damage. Replace any damaged parts.

---

**c. ASSEMBLY**


---

1. Install new gasket (29) and elbow (28) on adapter (30) with four new lockwashers (27) and screws (26).
2. Position hose reel (14) on frame (5).
3. Position bearing (22) on hose reel (14) and install on frame (5) with two screws (23), new lockwashers (24), and nuts (25).
4. Install new packing set (18) and hub (17) on coupling (19) with two new lockwashers (20) and screws (21).
5. Position hub and coupling assembly (12) on hose reel (14) and install on frame (5) with two washers (16), screws (15), and nuts (13).



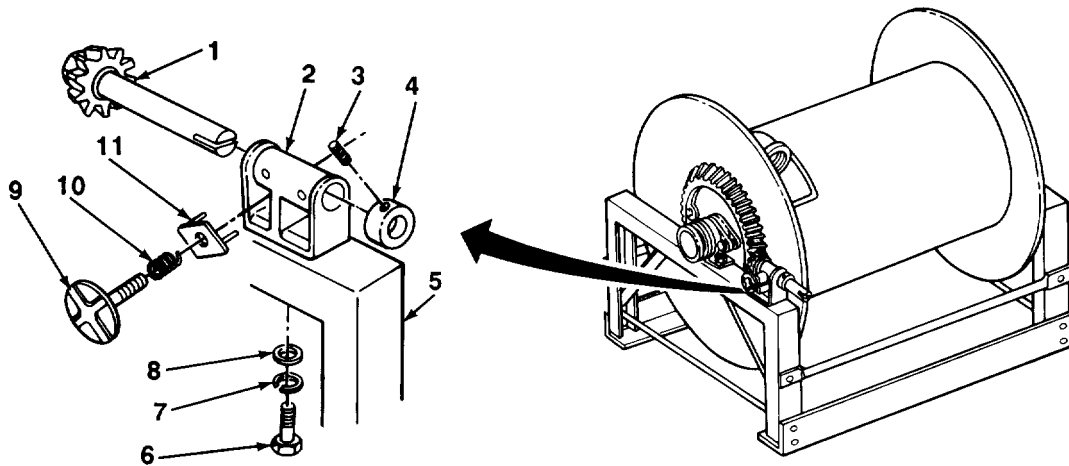
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**5-8. HOSE REEL REPAIR (M131A4C AND M131A5C) (Con't).**

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6. Install pinion bearing (2) on frame (5) with two new lockwashers (7), flatwashers (8), and screws (6).
7. Position bevel gearshaft (1) in pinion bearing (2).
8. Install collar (4) on bevel gearshaft (1). Tighten setscrew (3).
9. Install brake spacer (11), spring (10), and locking handle (9) on pinion bearing (2).



**FOLLOW-ON TASKS:**

- Install hose (para 4-68).
- Lubricate hose reel (Chapter 3, Section I).



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**5-9. CABINET DOOR MAINTENANCE.**

---

*This Task Covers:*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | c. Repair       |
| b. Cleaning and Inspection | d. Installation |
- 

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).
- Cabinet door hinges removed (para 4-61).

**Tools/Test Equipment:**

- General mechanic's tool kit
- Field automotive shop set
- Welder's tool kit

**References:**

- TM 9-237

**Materials/Parts:**

- Dry cleaning solvent (Item 16, Appendix E)
- Ten locknuts

**Personnel Required:** Two

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**NOTE**

Cabinet doors are replaced the same way on all models except quantity of screws and locknuts may vary. M131A5 is illustrated.

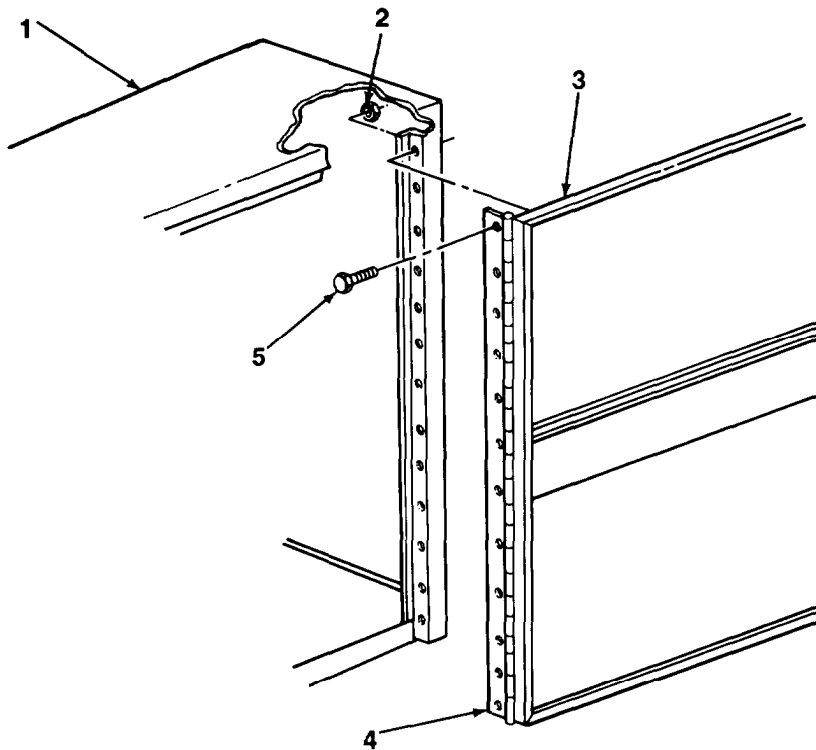
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**5-9. CABINET DOOR MAINTENANCE (Con't).**

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**a. REMOVAL**

1. Grind off tack welds that secure hinge (4) to cabinet (1).
2. Remove ten locknuts (2), screws (5), and cabinet door (3) with hinge (4) from cabinet (1). Discard locknuts.




---

**b. CLEANING AND INSPECTION**

---

**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean all parts with dry cleaning solvent.
2. Inspect cabinet door and hinge for bends and cracks. Straighten bends if possible.

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**5-9. CABINET DOOR MAINTENANCE (Con't).**

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**c. REPAIR**

Repair cracks in cabinet door by welding (TM 9-237).

---

**d. INSTALLATION**

---

1. Install cabinet door (3) with hinge (4) on cabinet (1) with ten screws (5) and new locknuts (2).
2. Tack weld hinge (4) to cabinet (1).

**FOLLOW-ON TASKS:**

- Install cabinet door hinges (para 4-61).

## Section VII. PUMPS, METERS, VALVES, LINES, AND FITTINGS MAINTENANCE

Paragraph Title	Page Number
Flow Selector Valve Maintenance (M131A4C and M131A5C Late Model) .....	5-26
Volumetric Meter Replacement (M131A4C and M131A5C) .....	5-24

### 5-10. VOLUMETRIC METER REPLACEMENT (M131A4C AND M131A5C).

*This Task Covers:* Replacement

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).
- All manually operated valves closed.

**Materials/Parts:**

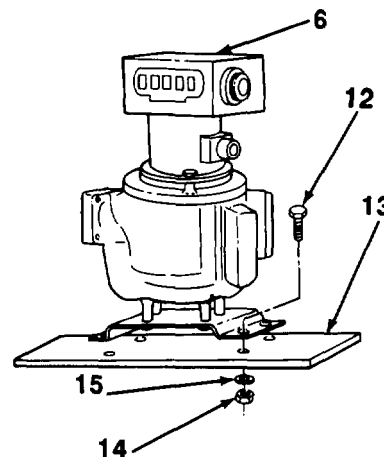
- Three gaskets
- Sixteen lockwashers

**Tools/Test Equipment:**

- General mechanic's tool kit

#### REPLACEMENT

1. Remove 12 nuts (1), lockwashers (2), and screws (5) from volumetric meter (6) and tubes (3). Discard lockwashers.
2. Remove four nuts (8), lockwashers (9), and two U-bolts (11) from volumetric meter (6) and manifold (7). Discard lockwashers.
3. Remove volumetric meter (6), three gaskets (4), and two bars (10) from tubes (3) and manifold (7). Discard gaskets.
4. Remove four nuts (14), washers (15), screws (1 2), and pad (13) from volumetric meter (6).
5. Install volumetric meter (6) on pad (13) with four screws (12), washers (15), and nuts (14).

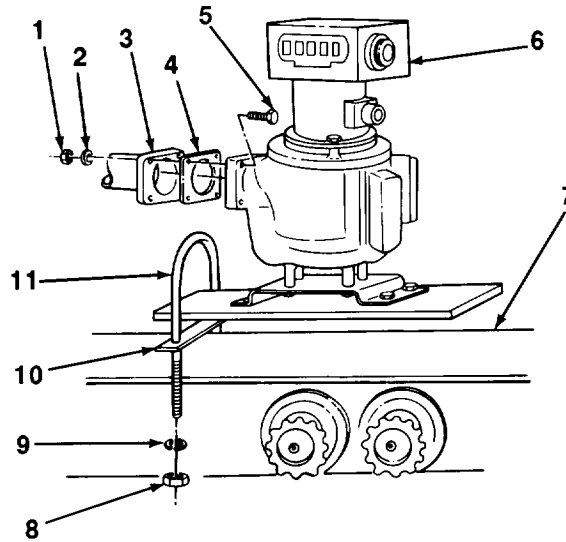


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**5-10. VOLUMETRIC METER REPLACEMENT (M131A4C AND M131A5C) (Con't).**


---



6. Position two bars (10), three new gaskets (4), and volumetric meter (6) on manifold (7) and tubes (3).
7. Install two U-bolts (11), four new lockwashers (9), and nuts (8) on volumetric meter (6) and manifold (7).
8. Install 12 screws (5), new lockwashers (2), and nuts (1) on volumetric meter (6) and tubes (3).

---

## 5-11. FLOW SELECTOR VALVE MAINTENANCE (M131A4C AND M131A5C LATE MODEL).

---

*This Task Covers:*

- |                            |                 |
|----------------------------|-----------------|
| a. Removal                 | d. Assembly     |
| b. Disassembly             | e. Installation |
| c. Cleaning and Inspection |                 |
- 

*Initial Setup:*

**Materials/Parts:**

- Dry cleaning solvent (Item 16, Appendix E)
- One diaphragm
- One gasket

**Tools/Test Equipment:**

- General mechanic's tool kit
- 

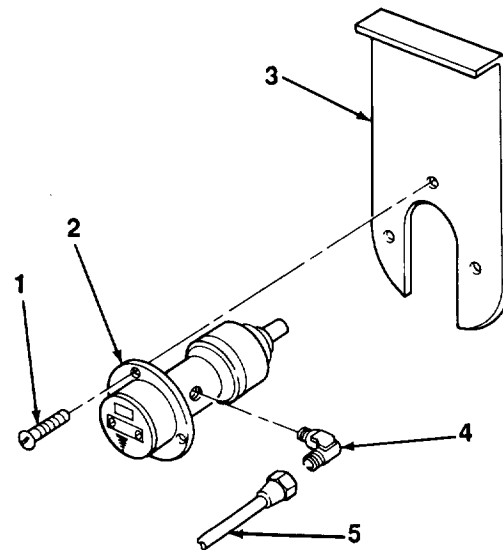
### a. REMOVAL

1. Disconnect two tubes (5) from elbows (4) and remove elbows from valve (2).

**NOTE**

Screws are provided with replacement valve.

2. Remove three screws (1) and valve (2) from bracket (3).



### b. DISASSEMBLY

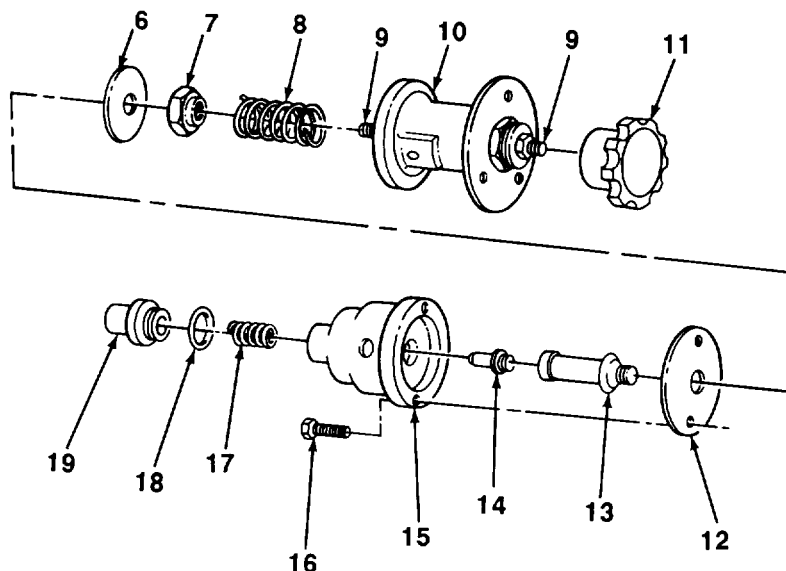
1. Remove adapter (19), gasket (18), and spring (17) from housing (15). Discard gasket.
2. Remove knob (11) from screw (9).
3. Remove two screws (16) from housing (15), Remove housing, diaphragm (12), and washer (6) from valve body (10), Discard diaphragm.
4. Remove disk retainer (14) from spacer (13).
5. Remove spacer (13) from nut (7).
6. Remove nut (7) and spring (8) from screw (9).

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## 5-11. FLOW SELECTOR VALVE MAINTENANCE (M131A4C AND M131A5C LATE MODEL) (Con't).

---




---

### c. CLEANING AND INSPECTION

---



---

#### WARNING

---

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F/138°F (38°C/59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean parts in dry cleaning solvent. Dry thoroughly.
2. Inspect parts for damage. Replace damaged parts.

---

### d. ASSEMBLY

---

1. Install spring (8) and nut (7) on screw (9).
2. Install spacer (13) on nut (7).
3. Install disk retainer (14) in spacer (13).
4. Install washer (6), new diaphragm (12), and housing (15) on valve body (10) with two screws (16).
5. Install knob (11) on screw (9).
6. Install spring (17), new gasket (18), and adapter (19) on housing (15).

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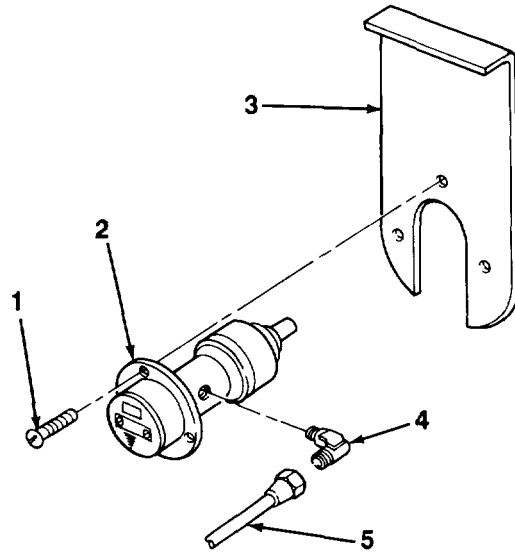
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**5-11. FLOW SELECTOR VALVE MAINTENANCE (M131A4C AND M131A5C LATE MODEL)  
(Con't).**

---

**e. INSTALLATION**

1. Install valve (2) on bracket (3) with three screws (1).
2. Install two elbows (4) on valve (2) and connect two tubes (5) to elbows.





**Section VIII. FIRE EXTINGUISHER SYSTEM MAINTENANCE**

**5-12. FIXED FIRE EXTINGUISHER MAINTENANCE.**

*This Task Covers:*

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>a. Control Valve and Pull Box Removal</li> <li>b. Cylinder Removal</li> <li>c. Lines and Fittings Removal</li> <li>d. Nozzles Removal</li> <li>e. Cleaning and Inspection</li> </ul> | <ul style="list-style-type: none"> <li>f. Nozzles Installation</li> <li>g. Lines and Fittings Installation</li> <li>h. Cylinder Installation</li> <li>i. Control Valve and Pull Box Installation</li> </ul> |
|---|---|

*Initial Setup:*

**Equipment Conditions:**

- Tank purged (para 4-64).

**Tools/Test Equipment**

- General mechanic's tool kit

**Materials/Parts:**

- Dry cleaning solvent (Item 16, Appendix E)
- Antiseizing tape (Item 18, Appendix E)
- Eight lockwashers

---

**5-12. FIXED FIRE EXTINGUISHER MAINTENANCE (Con't).**

---

**a. CONTROL VALVE AND PULL BOX REMOVAL**

1. Disconnect control valve (4) from cylinder (7).
2. Remove tube (6) and pull cable (5) from control valve (4).
3. Remove pull handle (23) and pull cable (5) from tube (6).
4. Remove tube (6), straight adapter (29), nut (28), and washer (27) from pull box (25).

**NOTE**

**M131A5 is not equipped with cover.**

5. Remove retaining pin (24), pull box (25), and cover (26) from frame.

---

**b. CYLINDER REMOVAL**

1. Remove discharge line (1) from cylinder adapter (2).
2. Remove two nuts (10), lockwashers (9), mounting bracket (8), and cylinder (7) from cabinet. Discard lockwashers.

---

**c. LINES AND FITTINGS REMOVAL**

1. Remove three discharge lines (1, 19, and 20) from two tees (21). Remove tees from two nozzles (22).

**NOTE**

**Step 2 applies to M131A4C and M131A5C only.**

2. Remove two discharge lines (17 and 19) from straight adapter (18).
3. Remove discharge line (17), straight adapter (16), and elbow (15) from nozzle (14).

---

**d. NOZZLES REMOVAL**

Remove six screws (11), lockwashers (1 2), two nozzles (22), and nozzle (14) from three brackets (13). Discard lockwashers.

---

**e. CLEANING AND INSPECTION**

---

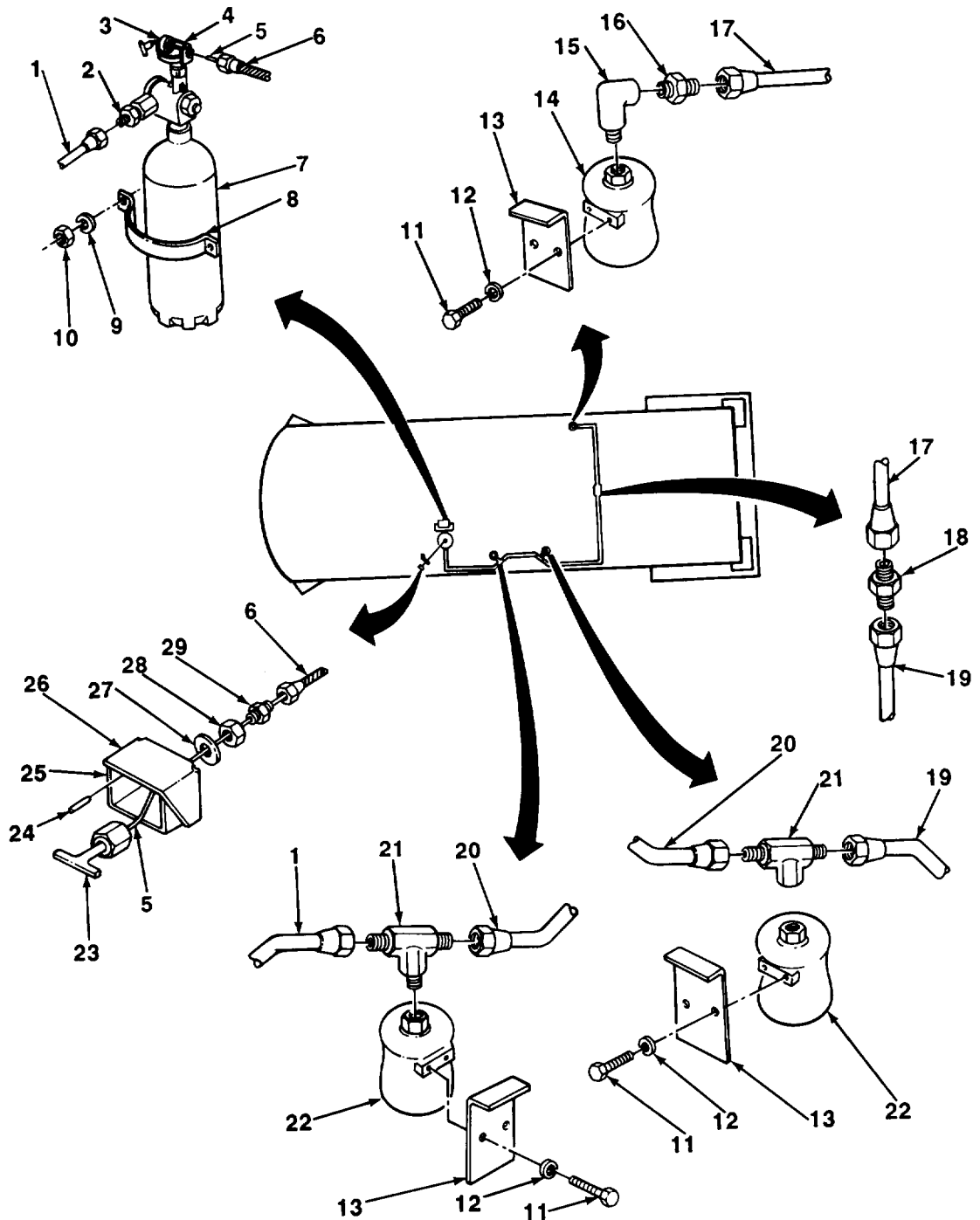
**WARNING**

---

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F-138°F (38°C-59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. Clean parts with dry cleaning solvent.

5-12. FIXED FIRE EXTINGUISHER MAINTENANCE (Con't).



---

## 5-12. FIXED FIRE EXTINGUISHER MAINTENANCE (Con't).

---

### **WARNING**

**Compressed air used for drying purposes should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury.**

2. Flush lines, fittings, and nozzles with dry cleaning solvent. Dry with compressed air.
3. Inspect parts for cracks and bends. Test cable for freedom of movement in tube.
4. Inspect control valve to ensure that arrow on self-resetting shaft is pointing upward and that pullout pin (3) is in place,
5. Check for damage and corrosion. Replace damaged or corroded parts.
6. Inspect weight of cylinder. Recharge or replace cylinder as necessary.

---

### **f. NOZZLES INSTALLATION**

Install two nozzles (22) and nozzle (14) on three brackets (13) with six new lockwashers (12) and screws (11).

---

### **g. LINES AND FITTINGS INSTALLATION**

1. Apply antiseizing tape to threads of elbow (15) and straight adapter (16). Install elbow, straight adapter, and discharge line (17) on nozzle (14).

#### **NOTE**

**Step 2 applies to M131A4C and M131A5C only.**

2. Apply antiseizing tape to threads of straight adapter (18) and install two discharge lines (17 and 19) on straight adapter.
3. Apply anti seizing tape to threads of two tees (21) and install on two nozzles (22). Install three discharge lines (1, 19, and 20) on tees.

---

### **h. CYLINDER INSTALLATION**

1. Position cylinder (7) in cabinet and install mounting bracket (8) with two new lockwasher (9) and nuts (10).
2. Apply antiseizing tape to adapter (2) and Install discharge line (1) on adapter.

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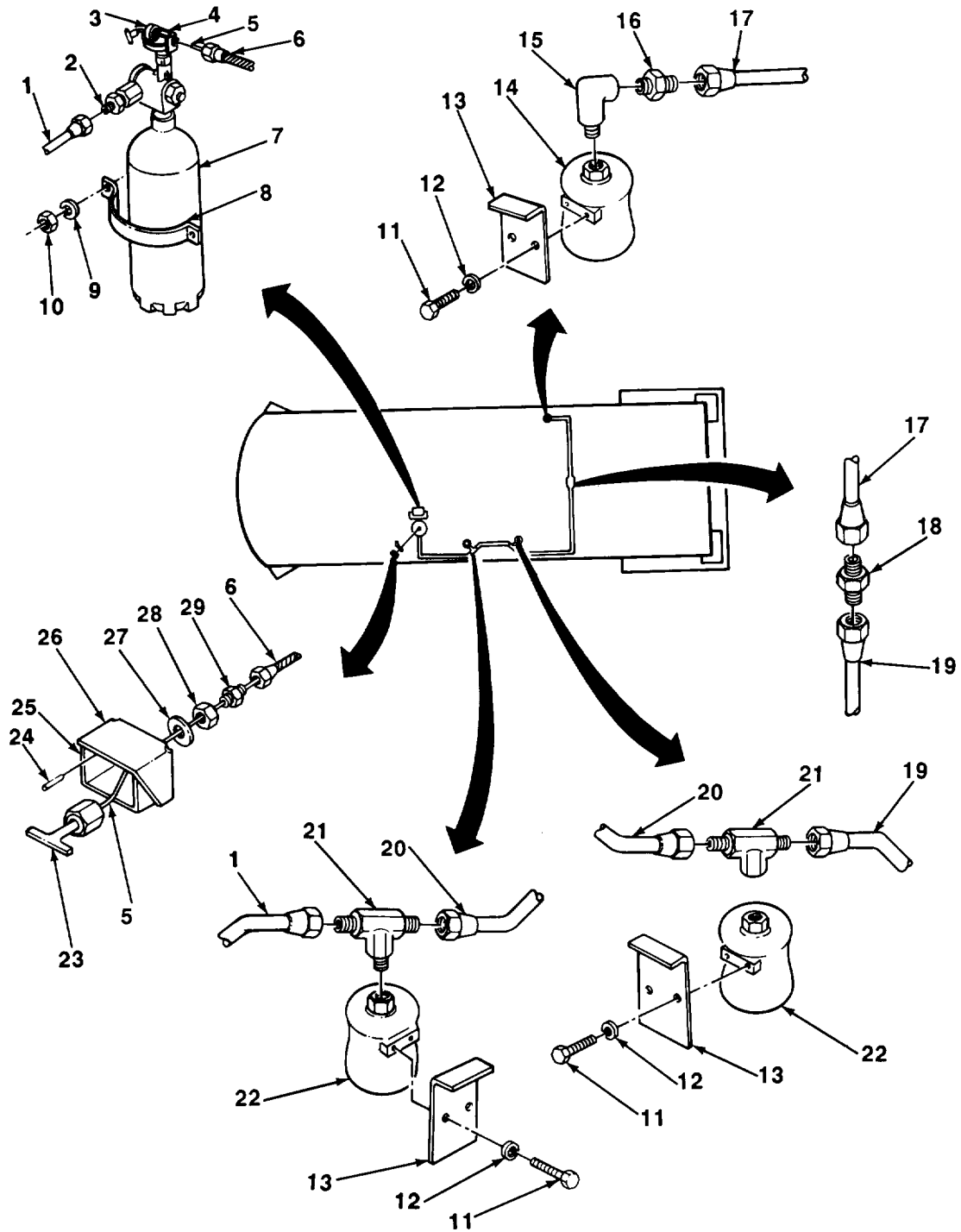
### **i. CONTROL VALVE AND PULL BOX INSTALLATION**

#### **NOTE**

**M131A5 is not equipped with cover.**

1. Install pull box (25) and cover (26) on frame with retaining pin (24).
2. Apply antiseizing tape to straight adapter (29) and install washer (27), nut (28), straight adapter, and tube (6) on pull box (25).
3. Thread pull cable (5) through tube (6) and install pull handle (23) in pull box (25).
4. Install pull cable (5) and tube (6) on control valve (4).
5. Install control valve (4) on cylinder (7).

5-12. FIXED FIRE EXTINGUISHER MAINTENANCE (Con't).



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**APPENDIX A  
REFERENCES**

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**A-1. SCOPE.**

This appendix lists all forms, field manuals, technical manuals, and other publications referenced in this manual and which apply to the operation, Organizational, Direct Support, and General Support Maintenance of the M131 Series Fuel Tank Semitrailers.

**A-2. PUBLICATION INDEX.**

DA Pam 25-30, *Consolidated Index of Army Publication and Blank Forms*, should be consulted frequently for latest changes or revisions and for new publications relating to materiel covered in this technical manual.

**A-3. FORMS.**

Refer to DA Pam 738-750, *The Army Maintenance Management System (TAMMS)*, for instructions on the use of maintenance forms.

Equipment Inspection and Maintenance Worksheet	DA Form 2404
Equipment Log Assembly (Records)	DA Form 2408
Exchange Tag	DA Form 2402
Maintenance Request Form	DA Form 2407
Organizational Control Record for Equipment	DA Form 2401
Preventive Maintenance Schedule and Record	DD Form 314
Processing and Reprocessing Record for Shipment, Storage and Issue of Vehicles and Spare Engines	DD Form 1397
Product Quality Deficiency Report	SF Form 368
Recommended Changes to Equipment Technical Publications	DA Form 2028-2
Recommended Changes to Publications and Blank Forms	DA Form 2028
Report of Discrepancy (ROD)	SF Form 364

**A-4. FIELD MANUALS.**

Aircraft Refueling	FM 10-68
Army Motor Transport Units and Operations	FM 55-30
Desert Operations	FM 90-3
Field Hygiene and Sanitation	FM 21-10
First Aid for Soldiers	FM 21-11
Manual for the Wheeled Vehicle Driver	FM 21-305
NBC Contamination Avoidance	FM3-3
NBC Decontamination	FM 3-5
NBC Protection	FM 3-4
Operation and Maintenance of Ordnance Materiel in Cold Weather (0°F to - 65°F)	FM 9-207
Organizational Maintenance of Military Petroleum Pipelines, Tanks, and Related Equipment	FM 10-20
Petroleum Supply Point Equipment and Operations	FM 10-69
Petroleum Tank Vehicle Operations	FM 10-71

**A-5. TECHNICAL BULLETINS.**

Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment, and Materiels Handling Equipment	TB 43-0209
Elimination of Combustibles from Interiors of Metal or Plastic Gasoline and Diesel Fuel Tanks	TB 750-1047

**A-5. TECHNICAL BULLETINS (Con't).**

Equipment Improvement Report and Maintenance Digest  
(U.S. Army Tank-Automotive Command) Tank-Automotive Equipment . . . . . TB 43-0001-39 Series  
Hand Portable Fire Extinguishers Approved for Army Users . . . . . TB 5-4200-200-10  
Purging, Cleaning and Coating Interior Ferrous and Terne Sheet Vehicle Fuel Tanks . . . . . TB 43-0212

**A-6. TECHNICAL MANUALS.**

Firefighting and Rescue Procedures in Theaters of Operations . . . . . TM 5-315  
Inspection, Care, and Maintenance of Antifriction Bearings . . . . . TM 9-214  
Materials Used For Cleaning, Preserving, Abrading, and Cementing  
Ordnance Materiel and Related Items Including Chemicals . . . . . TM 9-247  
Operator, Organizational, Direct Support, and General Support Maintenance  
Manual: Engine, Gasoline, 10 HP . . . . . TM 5-2805-258-14  
Operator's Manual for Welding Theory and Application . . . . . TM 9-237  
Operator's, Organizational, Direct Support, and General Support  
Maintenance Repair Parts and Special Tools List for . . . . . TM 9-2330-272-24P  
Operator's, Organizational, and Direct Support Maintenance Manual  
including Repair Parts and Special Tools List for Converter  
Assembly, Vapor Recovery . . . . . TM 9-2590-506-13&P  
Operator's, Unit, Direct Support, and General Support Maintenance  
Manual for Care, Maintenance, Repair and inspection of Pneumatic  
Tires and Inner Tubes . . . . . TM9-2610-200-14  
Operator's, Unit, Intermediate Direct Support, and Intermediate General  
Support Maintenance Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14  
Organizational, Intermediate (Field) (Direct Support and General Support)  
and Depot Maintenance Repairs Parts and Special Tools List for Engine,  
Gasoline, 10 HP . . . . . TM 5-2805-258-24p  
Painting instructions for Army Material . . . . . TM 43-0139  
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use . . . . . TM 750-244-6  
Railcar Loading Procedures . . . . . TM 55-601  
Railway Operating and Safety Rules. . . . . TM 55-21  
Storage and Materials Handling . . . . . TM 743-200-1  
Unit, Direct Support, and General Support Maintenance Repair Parts  
and Special Tools Lists for Semitrailer, Tank: Fuel, 5000 Gallon,  
4-Wheel, M131A4, M131A5, M131A4C, and M131A5C . . . . . TM 9-2330-272-24P

**A-7. OTHER PUBLICATIONS.**

Army Logistics Readiness and Sustainability . . . . . AR 700-138  
Army Medical Department Expendable/Durable Items.. . . . CTA 8-100  
Blower, Exhaust, Electric Motor Driven, Explosion Proof, Type MA-1 . . . . . MIL-B-7619A  
Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items) . . . . . CTA 50-970  
Heater, Duct Type, Portable, Trailer Mounted, HDU-13/M . . . . . MIL-H-27507C



## APPENDIX B MAINTENANCE ALLOCATION CHART

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### Section I. INTRODUCTION

#### B-1. GENERAL.

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

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

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

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

#### B-2. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

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

b. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristic 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. **Anne.** To adjust specified variable elements of an item to bring about optimum or desired performance.

f. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic 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.

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 third position 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.

**B-2. MAINTENANCE FUNCTIONS (Con't).**

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 accordance with original manufacturing standards. Rebuild is the highest degree of materiel 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 II.**

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

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

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

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

- C . . . . . *Unit (Operator or Crew)*
- O . . . . . *Unit (Organizational) Maintenance*
- F . . . . . *Direct Support Maintenance*
- H . . . . . *General Support Maintenance*
- D . . . . . *Depot Maintenance*

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

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

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

a. **Column 1, Tool or Test Equipment 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 level of maintenance authorized to use the tool or test equipment.

**B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III (Con't).**

- c. Column 3, Nomenclature. Name or identification of the tool or test equipment.
- d. Column 4, National/NATO Stock Number. The National or NATO 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**

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools and Equipment	(6) Remarks	
			Unit		DS	GS			Depot
			C	O	F	H			D
<b>06</b>	<b>ELECTRICAL SYSTEM</b>								
0609	Lights								
	Lamps, Incandescent	Replace		0.1				1	
	Light Assemblies	Replace		0.2				1	
		Repair		0.5				1	
0612	Battery, Storage								
		Service		0.5				2	
		Replace		0.3				1	
0613	Hull or Chassis Wiring Harness								
	Harness, Electrical, Chassis	Replace		2.5				1,2	
		Repair		0.5				1,2	
	Receptacle, Intervehicular Cable	Replace		0.5				1	
		Repair		1.0				1,2	
<b>11</b>	<b>REAR AXLE</b>								
1100	Rear Axle Assembly	Replace			8.0			1,5	
<b>12</b>	<b>BRAKES</b>								
1202	Service Brakes								
	Brakeshoe Assembly	Adjust		0.2				1,2	
		Replace		4.0				1,2,6	
		Repair			6.0			5	

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1204	<i>Hydraulic Brake System</i>								
	Cylinder, Master	Service		0.2				1	
		Replace		1.0				1,2	
	Cylinder, Wheel	Replace		1.0				1,2	
	Lines, Fittings, and Hoses, Hydraulic	Replace		1.0				1,2	
1208	<i>Airbrake System</i>								
	Coupling, Air	Replace		1.0				1	
	Lines and Fittings, Air	Replace		1.0				1,2	
	Chamber, Airbrake	Replace		1.0				1,2	
	Valve, Relay	Replace		2.0				1	
	Reservoir, Air	Service	0.2						
		Replace		2.0				1	
<b>13</b>	<b>WHEELS AND TRACKS</b>								
1311	<i>Wheel Assembly</i>								
	Bearing, Hub	Replace		2.0				1,2,8	
		Adjust		0.5				1,2,8	
	Brakedrum	Replace		3.0				1,2,8	
		Repair				4.0		5	
	Hub, Wheel	Replace		3.0				1,2,8	
		Repair		1.5				1,2,8	
	Seal, Oil, and Wiper	Replace		2.0				1,2,7,8	
	Stud, Wheel	Replace		3.5				1,2,8	
1313	<i>Tires, Tubes, Tire Chains</i>								
	Tires	Replace		1.0				1,2	
		Repair				1.5			
	Tubes	Replace		1.0				1,2	
		Repair		1.5					

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
<b>15</b>	<b>FRAME, TOWING ATTACHMENTS, DRAWBARS, AND ARTICULATION SYSTEMS</b>								
1501	<i>Frame Assembly</i>								
	Ladder	Replace		0.5				1	
	Step	Replace		0.2				1	
	Catwalk Grating	Replace		0.1					
1504	<i>Spare Wheel Carrier and Tire Lock</i>								
	Carrier, Spare Wheel	Replace		0.5				1,2	
		Repair		1.0				1,2	
1507	<i>Landing Gear, Leveling Jacks</i>								
	Gear, Landing	Replace		2.0				1,2	
		Repair			6.0			1,5	
<b>16</b>	<b>SPRINGS AND SHOCK ABSORBERS</b>								
1601	<i>Springs</i>								
	Seat, Spring	Replace		8.0				1,3	
	Bracket, Mounting	Replace		2.0				1,3	
		Replace			4.0			1,5	
1605	<i>Torque, Radius, and Stabilizer Rods</i>								
	Rod Assembly, Torque	Replace		3.5				1,2	
		Repair			4.0			1,5	
<b>18</b>	<b>BODY, CAB, HOOD, AND HULL</b>								
1801	<i>Body, Cab, Hood, and Hull Assemblies</i>								
	Guard, Splash	Replace		0.5				1	
1804	<i>Drain Valves, Drain Plugs, Etc.</i>								
	Plug, Drain	Replace		0.5				1	

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1808	<i>Stowage Racks, Boxes, Straps, Carrying Cases, Cable Reels, Hose Reels, Etc.</i>								
	Reel Assembly, Hose (M131A4C and M131A5C)	Replace Repair		1.5		2.0			1 1,5
	Stowage Tubes (M131A4C and M131A5C)	Replace		1.0					1
	Reel, Static (M131A4C and M131A5C)	Replace		0.5					1
	Doors	Replace Repair				0.6 2.0			1,4,5 1,4,5
	Latch and Hinges, Door	Replace		0.5					1
	1811	<i>Tank Bodies</i>							
Cover, Manhole		Replace Repair		0.5 0.5					1 1
Indicator, Level, Load		Adjust		1.0					1
Fuel Tank		Service (Purge)		2.0					3,9
22	<b>BODY, CHASSIS, AND HULL ACCESSORY ITEMS</b>								
2202	<i>Accessory Items</i>								
	Reflectors	Replace		0.2					1
	Hose Assembly, Fuel	Replace		1.0					1,2
	Nozzle Assembly (M131A4C and M131A5C)	Replace Repair		0.5 1.0					1,2 1,2
2210	<i>Data Plates and Instruction Holders</i>								
	Plates, Data	Replace		0.1					1

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
<b>29</b>	<b>AUXILIARY GENERATOR AND ENGINE AND CONTROLS</b>								
2910	<i>Engine Assembly</i>	Service Replace		0.5 2.5				1,2	
2916	<i>Engine Lubrication System</i>								
	Lines and Fittings, Oil Drain	Replace		1.0				1	
2935	<i>Engine Fuel Tank</i>								
	Fuel Tank	Replace		0.5				1,2	
2937	<i>Engine Fuel Filter</i>								
	Filter, Fluid and Strainer Element	Service Replace		0.5 1.0				1,2	
2938	<i>Engine Priming System, Lines and Pumps</i>								
	Lines, Fuel	Replace		1.0				1,2	
2941	<i>Engine Muffler, Exhaust and Tail Pipes</i>								
	Muffler, Exhaust	Replace		0.5				1	
	Pipe, Tail	Replace		0.3				1	
2967	<i>Instrument Panel</i>								
	Switches and Gages	Replace		1.0				1	
<b>56</b>	<b>FILTERS, SEPARATORS, AND PURIFIERS</b>								
5600	<i>Fuel, Water, Air, Filter/ Separation or Purifier Assembly</i>								
	Filter-separator Assembly (M131A4C and M131A5C)	Service Replace		0.5 4.0				1,2 1,2	
	Element, Filter (M131A4C and M131A5C)	Replace		1.5				1,2	

Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
5600	<i>Fuel, Water Air, Filter/ Separation or Purifier Assembly (Con't)</i>								
	Gage, Pressure (M131A4C)	Replace		0.2				1	
	Drain (M131A4C and M131A5C)	Replace		1.0				1,2	
	Valve, 3-Way (M131A4C and M131A5C)	Replace		1.0				1,2	
5601	<i>Automatic Discharge and Relief Valve</i>								
	Float Assembly (M131A4C and M131A5C)	Replace		2.0				1,2	
<b>72</b>	<b>DISPENSING AND SERVICING EQUIPMENT COMPONENTS</b>								
7202	<i>Pumps and Meters</i>								
	Pump, Centrifugal	Replace		2.0				1,2	
	Meter, Volumetric	Replace			1.0			1	
7203	<i>Valves, Fittings, Lines</i>								
	Strainer, Sediment Assembly	Service Replace		0.5 1.0				1,2 1,2	
	Lines and Fittings	Replace		1.0				1	
	Manifold, Fuel	Replace Repair		0.5 1.0				1 1	
	Valve Assembly, Slug	Replace		1.0				1,2	
	Valves, Relief, Emergency Manifold and Bypass	Replace		0.5				1,2	
	Valve, Gate	Replace		1.0				1	
	Valve Assembly, Flow Control (M131A4C and M131A5C)	Replace		1.0				1,2	
	Valve Assembly, Rate-of-Flow (Early Model)	Replace		1.0				1	A



Section II. MAINTENANCE ALLOCATION CHART (Con't)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
7203	<i>Valves, Fittings, Lines (Con't)</i>								
	Valve Assembly, Rate-of-Flow (Late Model)	Replace			1.0			1	
		Repair			1.0			1,5	
	Control, Emergency Relief Valve	Adjust		0.5				1	
		Replace		1.0				1	
<b>76</b>	<b>FIRE FIGHTING EQUIPMENT COMPONENTS</b>								
7639	<i>Fixed Fire Fighting Equipment</i>								
	Fire Extinguisher	Replace			0.3			1	
	Lines and Fittings	Replace			1.5			1	
	Nozzles	Replace			0.4			1	

**Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS**

(1) Tool or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	O	Tool Kit, General Mechanic's, Automotive	5180-00-177-7033	
2	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1, Less Power	4910-00-754-0654	
3	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 2, Less Power	4910-00-754-0650	
4	F	Tool Kit, Welder's	5180-00-754-0661	
5	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance	4910-00-754-0705	
6	O	Remover and Replacer: Brakeshoe Return Spring	5120-00-795-0060	
7	O	Inserter, Seal	5120-00-795-0136	
8	O	Wrench, Socket: Wheel Bearing Adjusting Nut	5120-00-378-3139	
9	O	Combustible Gas Indicator Set	6665-00-292-9945 6665-00-664-4650	

**Section IV. REMARKS**

(1) Reference Code	(2) Remarks
A	If unserviceable, early model rate-of-flow valve assembly must be replaced with late model rate-of-flow valve assembly. Notify Direct Support Maintenance.

**APPENDIX C**  
**COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS**

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**Section I. INTRODUCTION**

**C-1. SCOPE.**

This appendix lists Components of End Item and Basic Issue Items for the M131 Series Fuel Tank Semitrailers to help you inventory items required for safe and efficient operation.

**C-2. GENERAL.**

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

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

b. **Section III. Basic Issue Items (BII).** These are the minimum essential items required to place the semitrailer in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the semitrailer 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 upon TOE/MTOE authorizations of the end item.

**C-3. EXPLANATION OF COLUMNS.**

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

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

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

c. **Column (3) - Description.** Indicates the Federal Item Name and, if required, a description to identify and locate the item. The last line for each item indicates the Commercial and Government Entity (CAGE) Code in parentheses, followed by the part number. If item needed differs for different models of this equipment, the model is shown under the "Usable On Code" heading in this column.

Code	Used On
026	M131A4
025	M131A4C
049	M131A5
047	M131A5C

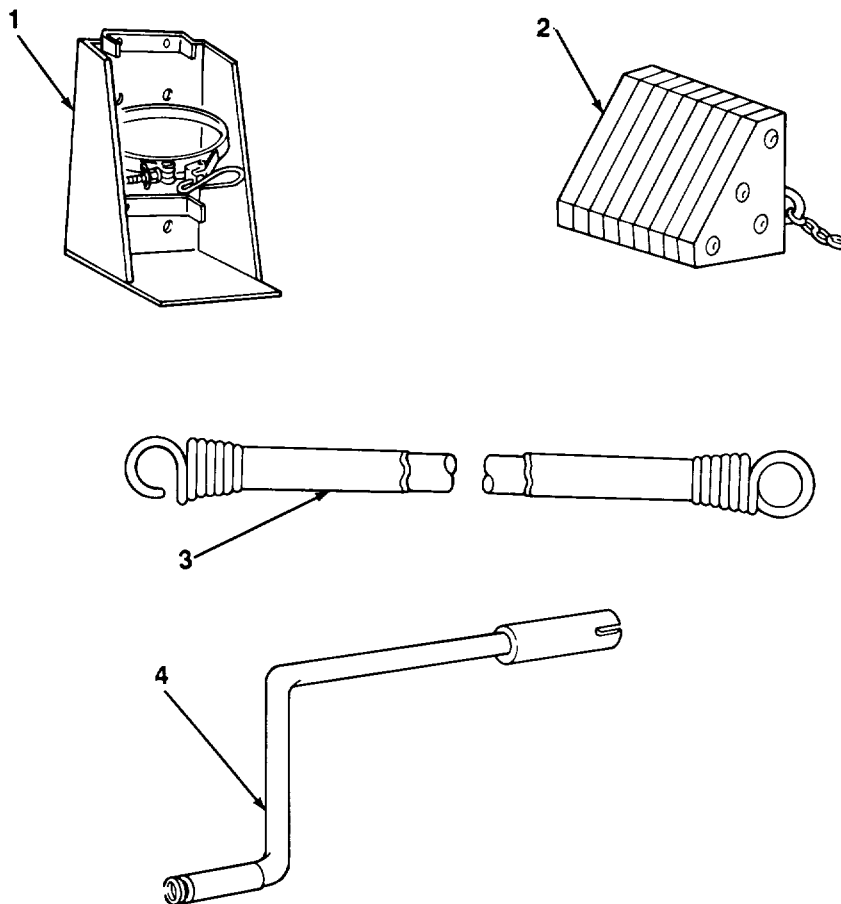
d. **Column (4) - Unit of Measure (U/M).** Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr).

e. **Column (5) - Quantity Required (Qty Req'd).** Indicates the quantity of the item authorized to be used with/on the equipment.

**Section II. COMPONENTS OF END ITEM**

The semitrailers currently do not have any Components of End Item assigned.

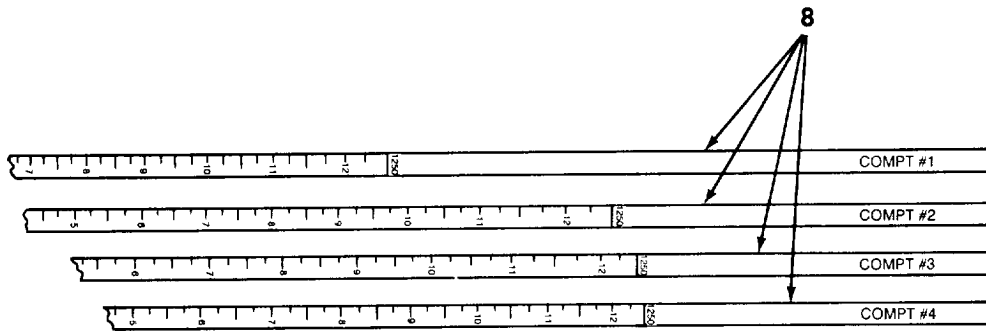
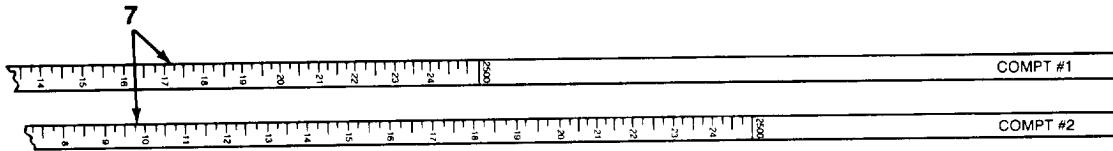
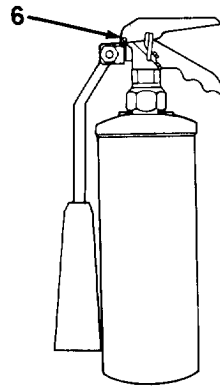
Section III. BASIC ISSUE ITEMS



(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable on Code	(4) U/M	(5) Qty Req'd
1	4210-00-595-4085	Bracket: Fire Extinguisher (19207) 7357907		ea	2
2	2540-00-678-3469	Chock: Wheel-track (19207) 7979235		ea	2
3	4020-00-933-3597	Cord Assembly: Elastic (19207) 11611900	047	ea	2
4	5340-00-903-1114	Crank: Hand (19207) 10936998	025,047	ea	1

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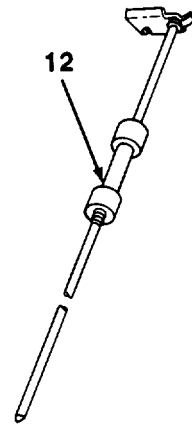
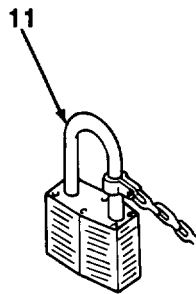
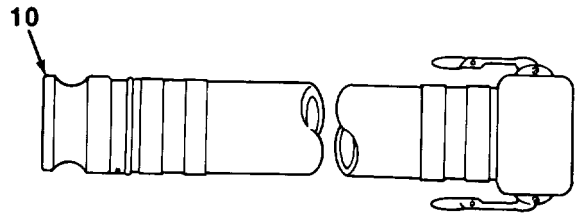
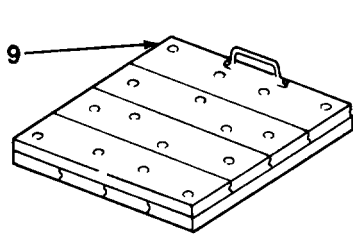
Section III. BASIC ISSUE ITEMS (Con't)



(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable on Code	(4) U/M	(5) Qty Req'd
5	4210-00-202-7858	Extinguisher, Fire: Carbon Dioxide (81348) OE910		ea	1
6	4210-00-555-8837	Extinguisher, Fire: Vaporizing Liquid, Dry Chemical (19207) 10916537		ea	2
7	5210-00-178-1411	Gage Stick: Petroleum (19207) 10959923	047,049	ea	1
8	5210-00-678-5363	Gage Stick: Petroleum (19207) 8360470	025,026	ea	1

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Section III. BASIC ISSUE ITEMS (Con't)



(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	Usable on Code	(4) U/M	(5) Qty Req'd
9	2510-00-741-7585	Ground Board: Jack (19207) 7417585		ea	2
10	4720-00-937-8157	Hose Assembly: Nonmetallic (19207) 11611898		ea	3
11	5340-00-912-4088	Padlock Set: (96906) MS21313-162	047,049	ea	1
11	5340-00-912-4089	Padlock Set: (96906) MS21313-163	025,026	ea	1
12	5975-01-050-5707	Rod: Ground (97403) 13219EO462		ea	1

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**APPENDIX D  
ADDITIONAL AUTHORIZATION LIST**

**Section I. INTRODUCTION**

**D-1. SCOPE.**

This appendix lists additional items you are authorized for the support of the M 131 Series Fuel Tank Semitrailers.

**D-2. GENERAL.**

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

**D-3. EXPLANATION OF LISTINGS.**

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

b. If item required differs for different models of this equipment, the model is shown under the "Usable On Code" heading in the description column. These codes are identified as:

Code	<u>Used On</u>
026	M131A4
025	M131A4C
049	M131A5
047	M131A5C

**Section II. ADDITIONAL AUTHORIZATION LIST**

(1) National Stock Number	(2) Description CAGE and Part Number	Usable On Code	(3) U/M	(4) Qty Auth
2590-01-090-7659	Converter Assembly (19207) 11669562		ea	1
4730-01-295-1842	Refuel on the Move (ROM) Assembly (19207) 12356117	047	ea	1
4730-00-152-9915	Bushing, Pipe (96906) MS14315-31X	047	ea	1
4730-00-936-4584	Cap, Quick Disconnect, 1.50 (96906) MS27028-10	047	ea	8
4730-00-929-0787	Cap, Quick Disconnect, 3.00 (96906) MS27028-15	047	ea	15
4730-00-640-6156	Cap, Quick Disconnect, 4.00 (96906) MS27028-17	047	ea	3
4730-00-109-2513	Coupling Half, Quick Disconnect (96906) MS70097-3	047	ea	1

## Section II. ADDITIONAL AUTHORIZATION LIST (Con't)

(1) National Stock Number	(2) Description CAGE and Part Number	Usable On Code	(3) U/M	(4) Qty Auth
4730-00-203-1010	Coupling Half, Quick Disconnect, 1.5 F to 1½ NPT (96906) MS27026-9	047	ea	8
4210-00-257-5343	Extinguisher, Fire, Dry Chemical (03670) K20E	047	ea	8
5330-00-360-0595	Gasket, 1.50 (96906) MS27030-5	047	ea	8
5330-00-088-9166	Gasket, 3.00 (96906) MS27030-8	047	ea	23
5330-00-899-4509	Gasket, 4.0 (96906) MS27030-9	047	ea	4
4720-00-555-8325	Hose Assembly, 1.50 I.D. (81349) M370B05B2C3000	047	ea	8
4720-00-083-0048	Hose Assembly, 3.00 I.D. (73842) 543-419-3-50	047	ea	8
4930-00-471-0288	Nozzle, Fuel Servicing (19207) 10896274	047	ea	8
4930-01-022-7901	Nozzle, Fuel Servicing (1 9207) 12275441-2	047	ea	8
4730-00-823-5316	Plug, Quick Disconnect, 1.50 (96906) MS27029-9	047	ea	8
4730-00-929-0790	Plug, Quick Disconnect, 3.00 (96906) MS27029-15	047	ea	15
4730-00-640-6188	Plug, Quick Disconnect, 4.00 (96906) MS27029-17	047	ea	2
4730-00-951-3293	Reducer, Quick Disconnect, 4.0/3.0 F/M (24869) MS49000-1	047	ea	1
4730-00-951-3296	Reducer, Quick Disconnect, 4.0/3,0 M/F (96906) MS49000-9	047	ea	1
5975-01-050-5707	Rod, Ground (97403) 13219E0462	047	ea	8
4730-01-096-1039	Tee Assembly, Quick Disconnect, 3.0 x 1.5 (97403) 13222E9884	047	ea	8
4730-00-075-2405	Tee Assembly, Quick Disconnect, 4.0 (97403) 5-14-676C	047	ea	1
4820-01-098-4925	Valve Assembly, Ball, 3.00 (97403) 13222E9888	047	ea	6

**APPENDIX E**  
**EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST**

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**Section I. INTRODUCTION**

**E-1. SCOPE.**

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the M131 Series Fuel Tank Semitrailers. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, *Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)*, or CTA 8-100, *Army Medical Department Expendable/Durable Items*.

**E-2. EXPLANATION OF COLUMNS.**

**a. Column (1) – Item Number.** This number is assigned to the entry in the listing and is referenced in the “Initial Setup” of maintenance paragraphs or narrative instructions to identify the material needed (e.g., Dry cleaning solvent, Item 16, Appendix E).

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

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

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

**d. Column (4) - Description.** Indicates the Federal Item Name and, if required, a description to identify the item. The last line for each item indicates the Commercial and Government Entity (CAGE) Code in parentheses followed by the part number, 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 unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description (CAGE) Part Number	(5) U/M
1	O	8040-00-664-4318	Adhesive: General Purpose, Type II (81348) MMM-A-1617  1 Pint Can	pt
2	O	8135-00-171-0930	Barrier Material: Greaseproof, Waterproofed, Flexible (81349) MIL-B-121  100 Yard Roll	yd
3	O	7920-00-061-0038	Brush: Scrub (81348) H-B-1490	ea
4	O	7920-00-900-3577	Brush: Wire (17987) 15SS	ea
5	O	5350-00-221-0872	Cloth: Abrasive, Crocus (81348) P-C-458  50 Sheets	sh
6	O	6030-00-935-7158	Compound: Corrosion Preventive (81349) MIL-C-83933  1 Gallon Can	gl
7	C	7930-00-899-9534	Compound: Dishwashing, Hand (81348) P-D410  5 Gallon Can	gl
8	O	9150-01-102-9455 9150-01-123-3152 9150-01-072-8379	Fluid: Brake Silicone, Automotive, All Weather, Operational and Preservative (81349) MIL-B-46176  1 Gallon Can Plastic 5 Gallon Can 55 Gallon Drum	gl gl gl

**Section II. EXPENDABLE/DURABLE SUPPLIES AND  
MATERIALS LIST (Con't)**

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description (CAGE) Part Number	(5) U/M
9	C		Gasoline: Automotive (81349) MILG3056	
		9130-00-160-1818	1 Gallon Can	gl
		9130-00-160-1817	5 Gallon Can	gl
		9130-00-221-0680	55 Gallon Drum	gl
10	O		Grease: Automotive and Artillery (81349) MIL-G-10924	
		9150-00-935-1017	14 Ounce Cartridge	oz
		9150-00-190-0804	1.75 Pound Can	lb
		9150-00-190-0805	6.50 Pound Can	lb
11	C		Oil: Lubricating, Internal Combustion Engine, Arctic, OEA (18349) MIL-L-46167	
		9150-00-402-4478	1 Quart Can	qt
		9150-00-402-2372	5 Gallon Can	gl
		9150-00-491-7197	55 Gallon Drum	gl
12	C		Oil: Lubricating, internal Combustion Engine, Tactical Service, OE/HDO 10 (81349) MIL-L-2104	
		9150-00-189-6727	1 Quart Can	qt
		9150-00-186-6668	5 Gallon Can	gl
		9150-00-191-2772	55 Gallon Drum	gl
13	C		Oil: Lubricating, Internal Combustion Engine, Tactical Service, OE/HDO 30 (81349) MIL-L-2104	
		9150-00-186-6681	1 Quart Can	qt
		9150-00-188-9858	5 Gallon Can	gl
		9150-00-189-6729	55 Gallon Drum	gl
14	C		Rag: Wiping, Cotton and Cotton-synthetic, White (58536) A-A-531	
		7920-00-205-1711	50 Pound Bale	lb

**Section II. EXPENDABLE/DURABLE SUPPLIES AND  
MATERIALS LIST (Con't)**

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description (CAGE) Part Number	(5) U/M
15	O	3439-00-247-6921	Solder: Lead Alloy (81348) QQ-S-571  1 Pound Bar	lb
16	C	6850-00-664-5685 6850-00-281-1985 6850-00-28\$8011	Solvent: Dry Cleaning (81349) P-D-680 Type II  1 Quart Can 1 Gallon Can 55 Gallon Drum	qt gl gl
17	O	9905-00-537-8954	Tag: Marker (81349) MIL-T-12755  50 Each	ea
18	O	8030-00-067-7366  8030-00-889-3535	Tape: Antiseizing  ¼ Inch Width, (71643) Temprth  54 Feet Long  ½ Inch Width, (81349) MIL-T27730  260 Inch Roll	ft  in

**APPENDIX F**  
**ILLUSTRATED LIST OF MANUFACTURED ITEMS**

---

**Section I. INTRODUCTION**

**F-1. SCOPE.**

a. This appendix includes complete instructions for making items authorized to be manufactured or fabricated.

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

c. All bulk materials needed for manufacture of an item are listed by National Stock Number (NSN), part number, or specification number in the manufacturing instructions. All dimensions where provided are in standard units.

**Table F-1. Manufactured Items Part Number Cross-reference Index.**

<b>Part Number</b>	<b>Figure Title</b>	<b>Figure Number</b>
ASTM B280-80-1	Metal Tube	F-5
ASTM B280-80-2	Metal Tube	F-5
ASTM B280-80-3	Metal Tube	F-5
ASTM B280-80-4	Metal Tube	F-5
ASTM B280-80-5	Metal Tube	F-5
BB3338-1	Nonmetallic Hose	F-13
BB3338-2	Nonmetallic Hose	F-13
MS521301A20412-1	Nonmetallic Hose	F-4
305087-0116-1	Metallic Tube	F-9
305087-0116-19	Metallic Tube	F-9
7002538-1	Metallic Tube	F-11
7002538-4	Metallic Tube	F-11
7704051-1	Copper Tube	F-10
7704051-2	Copper Tube	F-10
8360226-1	Nonmetallic Hose	F-14
8360226-2	Nonmetallic Hose	F-14
8360440-15	Electrical Tubing	F-1
8360440-54	Electrical Tubing	F-1
8360440-86	Electrical Tubing	F-1
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10936934-1	Nonmetallic Hose	F-12
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10959868-10	Electrical Tubing	F-2
10959868-120	Electrical Tubing	F-2
1597491-1	Rubber Seal	F-7



**Section II. MANUFACTURING INSTRUCTIONS**

1. Make from NSN 5975-01-249-6803, part number 8360440 stock.
2. Cut to proper length.

Part Number	Length
6360440-15	15 ft
8360440-54	54 in.
6360440-86	86 in.

3. Apply paint that conforms to MIL-C-53039 or MIL-C-46168.

**Figure F-1. Electrical Tubing.**

1. Make from part number 10959868 stock.
2. Cut to proper length.

Part Number	Length
10959868-10	10 in.
10959868-120	120 in.

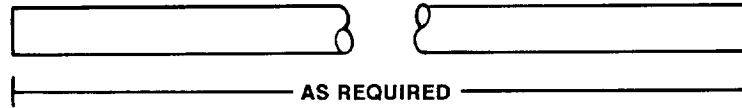
3. Apply paint that conforms to MIL-C-53039 or MIL-C-46168.

**Figure F-2. Electrical Tubing.**

1. Make from NSN 4710-00-277-3529, part number 8689210 stock.
2. Cut to 58 in. to make part number 8689210-58.
3. Apply paint that conforms to MIL-C-53039 or MIL-C-46168.

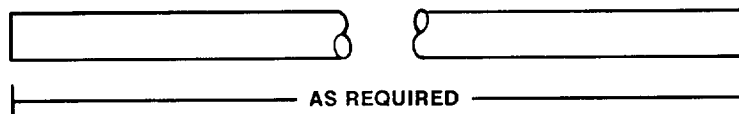
**Figure F-3. Electrical Tubing.**

**Section II. MANUFACTURING INSTRUCTIONS (Con't)**



1. Make from NSN 4720-00-809-2750, part number MS521301A20412 stock.
2. Cut ends of nonmetallic hose square using old nonmetallic hose as a guide for correct length.
3. Apply part number MS521301A20412-1.

**Figure F-4. Nonmetallic Hose.**



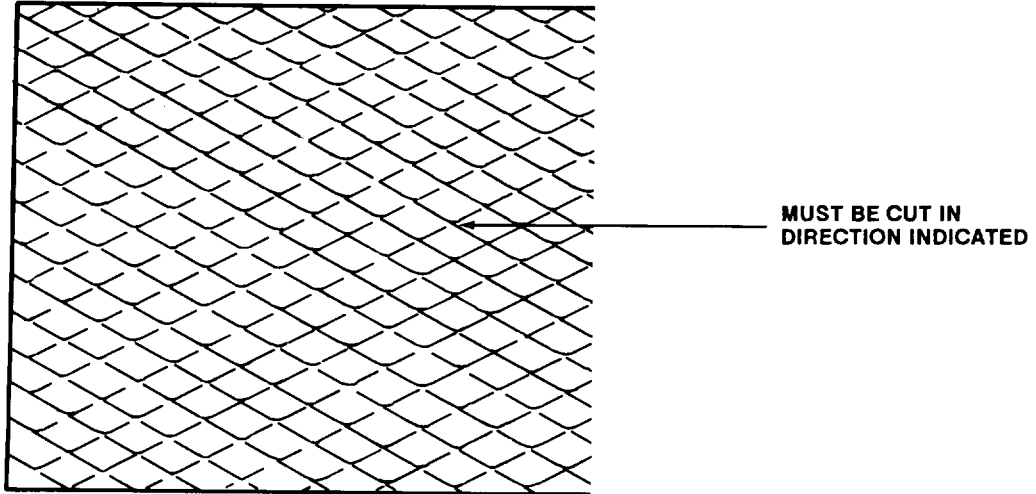
1. Make from NSN 4710-00-277-5527, part number ASTM B280-80 stock.
2. Cut to proper length.

Part Number	Length
ASTM B280-80-1	175 in.
ASTM B280-80-2	300 in.
ASTM B280-80-3	80 in.
ASTM B280-80-4	28 in.
ASTM B280-80-5	As Required

3. Remove burrs from inside of metal tube.

**Figure F-5. Metal Tube.**

**Section II. MANUFACTURING INSTRUCTIONS (Con't)**

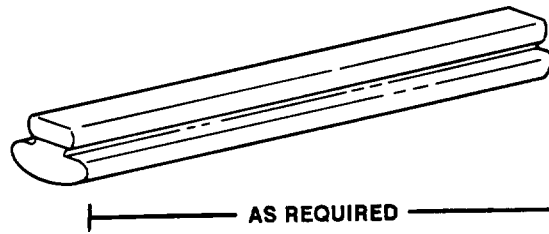


1. Make from part number 10959856 stock.
2. Cut to proper length and width.

<b>Part Number</b>	<b>Length</b>	<b>Width</b>
10959856-1	57½ in.	24 in.
10959856-2	86 in.	24 in.
10959856-3	16¼ in.	24 in.
10959856-4	64 in.	24 in.
10959856-5	48¾ in.	24 in.
10959856-8	120 in.	24 in.
10959856-10	101 in.	24 in.
10959856-11	79 in.	24 in.

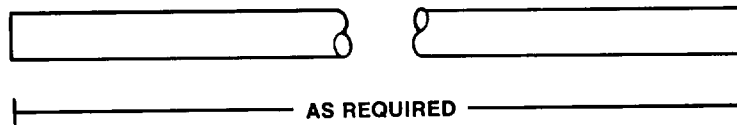
**Figure F-6. Catwalk Grating.**

Section II. MANUFACTURING INSTRUCTIONS (Con't)



1. Make from NSN 9390-00-930-5302, part number 11597491 stock.
2. Cut ends of rubber seal square using old rubber seal as a guide for correct length.
3. Apply part number 11597491-1.

Figure F-7. Rubber Seal.

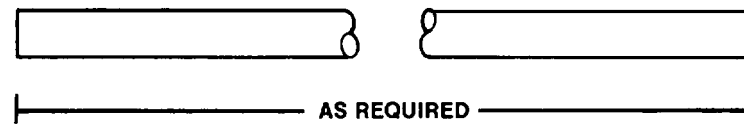


1. Make from NSN 4710-00-277-5525, part number 8689206 stock.
2. Cut ends of metallic tube square to proper length.

Part Number	Length
8689206-52	52 in.
8689206-71	71 in.

3. Remove burrs from inside of metallic tube.

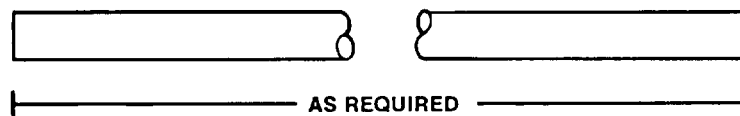
Figure F-8. Metallic Tube.

**Section II. MANUFACTURING INSTRUCTIONS (Con't)**

1. Make from part number 305087-0116 stock.
2. Cut ends of metallic tube square using old metallic tube as a guide for correct length.
3. Apply part number 305087-0116-1 or 305087-0116-19 as required.

**Figure F-9. Metallic Tube.**

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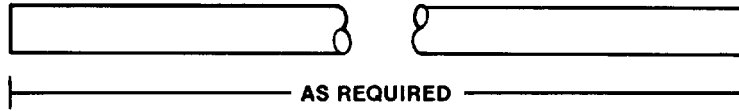


1. Make from NSN 4710-00-277-5525, part number 7704051 stock.
2. Cut ends of copper tube square using old copper tube as a guide for correct length.
3. Apply part number 7704051-1 or 7704051-2 as required.

**Figure F-10. Copper Tube.**

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Section II. MANUFACTURING INSTRUCTIONS (Con't)



1. Make from NSN 4710-01-152-2550, part number 7002538 stock.
2. Cut ends of metallic tube square using old metallic tube as a guide for correct length.
3. Apply part number 7002538-1 or 7002538-4 as required.

Figure F-11. Metallic Tube.

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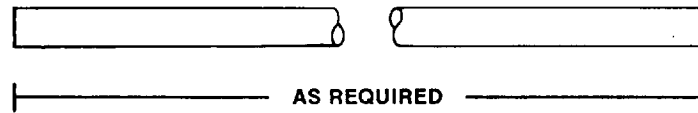
1. Make from NSN 4720-00-796-4705, part number 10936934 stock.
2. Cut ends of nonmetallic hose square using old nonmetallic hose as a guide for correct length.
3. Apply part number 10936934-1, 10936934-2, 10936934-3, or 10936934-4 as required.

Figure F-12. Nonmetallic Hose.

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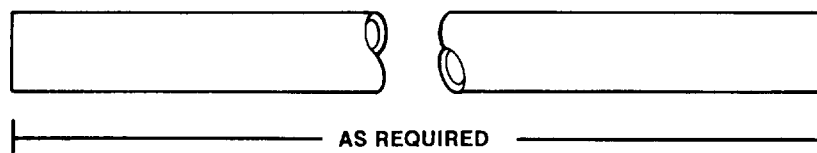
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**Section II. MANUFACTURING INSTRUCTIONS (Con't)**



1. Make from NSN 4710-00-277-5525, part number BB3338 stock.
2. Cut ends of nonmetallic hose square using old nonmetallic hose as a guide for correct length.
3. Apply part number BB3338-1 or BB3338-2 as required.

**Figure F-13. Nonmetallic Hose.**



1. Make from NSN 4710-00-289-0640, part number 8360226 stock.
2. Cut ends of nonmetallic hose square using old nonmetallic hose as a guide for correct length.
3. Apply part number 8360226-1 or 8360226-2 as required.

**Figure F-14. Nonmetallic Hose.**

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## APPENDIX G TORQUE LIMITS

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### G-1. SCOPE.

This appendix lists standard torque values, as shown in Table G-1, and provides general information for applying torque. Special torque values and tightening sequences are indicated in the maintenance procedures for applicable components.

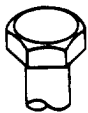



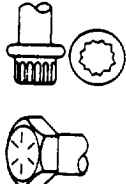
### G-2. GENERAL.

- a. Always use the torque values listed in Table G-1 when the maintenance procedure does not give a specific torque value.
- b. Unless otherwise specified, standard torque tolerance shall be  $\pm 10\%$ .
- c. Torque values are based on clean, dry threads. Reduce torque by 10% when engine oil is used as a lubricant. Reduce torque by 20% if new plated capscrews are used.
- d. Capscrews threaded into aluminum may require reductions in torque of 30% or more of Grade 5 capscrew torque. Capscrew threaded into aluminum must also attain two capscrew diameters of thread engagement.

**CAUTION**

If replacement capscrews are of a higher grade than originally supplied, use torque specifications for the original. This will prevent equipment damage due to overtightening.

Table G-1. Torque Limits.

Current Usage	Much Used	Much Used	Used at Times	Used at Times
Quality of Material	Indeterminate	Minimum Commercial	Medium Commercial	Best Commercial
<b>SAE Grade Number</b>  <b>Capscrew Head Markings</b>  <b>Manufacturer's marks may vary</b>  <b>These are all SAE Grade 5 (3 line)</b>	1 or 2    	5  	6 or 7  	8  
Capscrew Body Size Inches - Thread	Torque lb.-ft. (N•m)	Torque lb.-ft. (N•m)	Torque lb.-ft. (N•m)	Torque lb.-ft. (N•m)
$\frac{1}{4}$ 20 28	5 (7) 6 (8)	8 (11) 10 (14)	10 (14)	12 (16) 14 (19)
$\frac{5}{16}$ 18 24	11 (15) 13 (18)	17 (23) 19 (26)	19 (26)	24 (33) 27 (37)
$\frac{3}{8}$ 16 24	18 (24) 20 (27)	31 (42) 35 (47)	34 (46)	44 (60) 49 (66)
$\frac{7}{16}$ 14 20	28 (38) 30 (41)	49 (66) 55 (75)	55 (75)	70 (95) 78 (106)
$\frac{1}{2}$ 13 20	39 (53) 41 (56)	75 (102) 85 (115)	85 (115)	105 (142) 120 (163)
$\frac{9}{16}$ 12 18	51 (69) 55 (75)	110 (149) 120 (163)	120 (163)	155 (210) 170 (231)
$\frac{5}{8}$ 11 18	83 (113) 95 (129)	150 (203) 170 (231)	167 (226)	210 (285) 240 (325)
$\frac{3}{4}$ 10 16	105 (142) 115 (156)	270 (366) 295 (400)	280 (380)	375 (509) 420 (570)
$\frac{7}{8}$ 9 14	160 (217) 175 (237)	395 (536) 435 (590)	440 (597)	605 (820) 675 (915)
1 8 14	235 (319) 250 (339)	590 (800) 660 (895)	660 (895)	910 (1234) 990 (1342)

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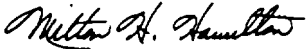
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## THE METRIC SYSTEM AND EQUIVALENTS

### LINEAR MEASURE

1 Centimeter=10 Millimeters=0.01 Meters=0.3937 Inches  
 1 Meter=100 Centimeters=1000 Millimeters=39.37 Inches  
 1 Kilometer=1000 Meters=0.621 Miles

### WEIGHTS

1 Gram=0.001 Kilograms=1000 Milligrams=0.035 Ounces  
 1 Kilogram=1000 Grams=2.2 Lb  
 1 Metric Ton=1000 Kilograms=1 Megagram=1.1 Short Tons

### LIQUID MEASURE

1 Milliliter=0.001 Liters=0.0338 Fluid Ounces  
 1 Liter=1000 Milliliters=33.82 Fluid Ounces

### SQUARE MEASURE

1 Sq Centimeter=100 Sq Millimeters=0.155 Sq Inches  
 1 Sq Meter=10,000 Sq Centimeters=10.76 Sq Feet  
 1 Sq Kilometer=1,000,000 Sq Meters=0.386 Sq Miles

### CUBIC MEASURE

1 Cu Centimeter=1000 Cu Millimeters=0.06 Cu Inches  
 1 Cu Meter=1,000,000 Cu Centimeters=35.31 Cu Feet

### TEMPERATURE

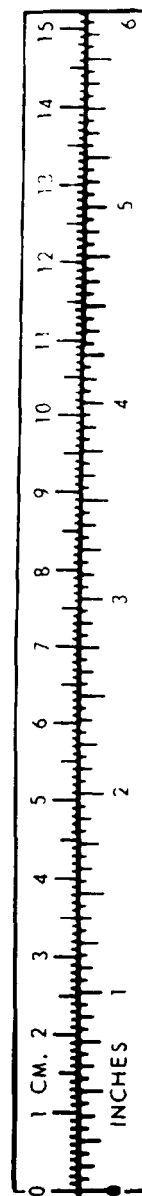
$5/9 (°F - 32) = °C$   
 212° Fahrenheit is equivalent to 100° Celsius  
 90° Fahrenheit is equivalent to 32.2° Celsius  
 32° Fahrenheit is equivalent to 0° Celsius  
 $9/5 C + 32 = F°$

### APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches . . . . .	Centimeters . . . . .	2.540
Feet . . . . .	Meters . . . . .	0.305
Yards . . . . .	Meters . . . . .	0.914
Miles . . . . .	Kilometers . . . . .	1.609
Square Inches . . . . .	Square Centimeters . . . . .	6.451
Square Feet . . . . .	Square Meters . . . . .	0.093
Square Yards . . . . .	Square Meters . . . . .	0.836
Square Miles . . . . .	Square Kilometers . . . . .	2.590
Acres . . . . .	Square Hectometers . . . . .	0.405
Cubic Feet . . . . .	Cubic Meters . . . . .	0.028
Cubic Yards . . . . .	Cubic Meters . . . . .	0.765
Fluid Ounces . . . . .	Milliliters . . . . .	29.573
Pints . . . . .	Liters . . . . .	0.473
Quarts . . . . .	Liters . . . . .	0.946
Gallons . . . . .	Liters . . . . .	3.785
Ounces . . . . .	Grams . . . . .	28.349
Pounds . . . . .	Kilograms . . . . .	0.454
Short Tons . . . . .	Metric Tons . . . . .	0.907
Pound-Feet . . . . .	Newton-Meters . . . . .	1.356
Pounds per Square Inch . . . . .	Kilopascals . . . . .	6.895
Miles per Gallon . . . . .	Kilometers per Liter . . . . .	0.425
Miles per Hour . . . . .	Kilometers per Hour . . . . .	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters . . . . .	Inches . . . . .	0.394
Meters . . . . .	Feet . . . . .	3.280
Meters . . . . .	Yards . . . . .	1.094
Kilometers . . . . .	Miles . . . . .	0.621
Square Centimeters . . . . .	Square Inches . . . . .	0.155
Square Meters . . . . .	Square Feet . . . . .	10.764
Square Meters . . . . .	Square Yards . . . . .	1.196
Square Kilometers . . . . .	Square Miles . . . . .	0.386
Square Hectometers . . . . .	Acres . . . . .	2.471
Cubic Meters . . . . .	Cubic Feet . . . . .	35.315
Cubic Meters . . . . .	Cubic Yards . . . . .	1.308
Milliliters . . . . .	Fluid Ounces . . . . .	0.034
Liters . . . . .	Pints . . . . .	2.113
Liters . . . . .	Quarts . . . . .	1.057
Liters . . . . .	Gallons . . . . .	0.264
Grams . . . . .	Ounces . . . . .	0.035
Kilograms . . . . .	Pounds . . . . .	2.205
Metric Tons . . . . .	Short Tons . . . . .	1.102
Newton-Meters . . . . .	Pound-Feet . . . . .	0.738
Kilopascals . . . . .	Pounds per Square Inch . . . . .	0.145
Kilometers per Liter . . . . .	Miles per Gallon . . . . .	2.354
Kilometers per Hour . . . . .	Miles per Hour . . . . .	0.621



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