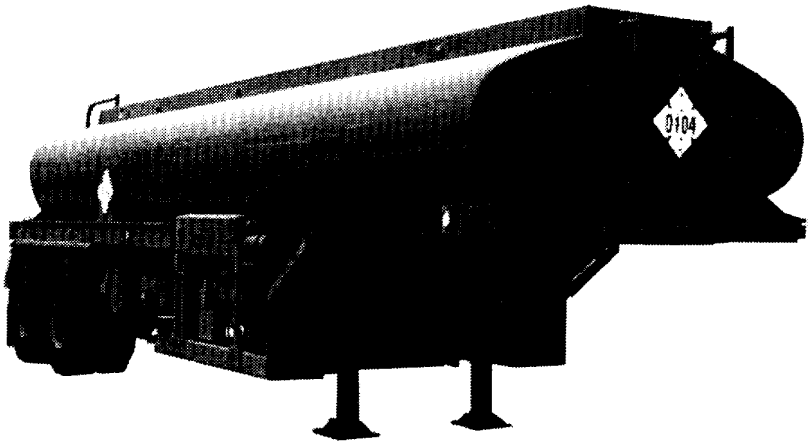
TECHNICAL MANUAL

OPERATOR'S MANUAL FOR SEMITRAILER, TANK, 5000-GALLON, FUEL DISPENSING, AUTOMOTIVE M969A2 (NSN 2330-01-377-9337)



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HEADQUARTERS, DEPARTMENT OF THE ARMY
June 1996

WARNING

GROUNDING SEMITRAILER

- Be sure that grounding connections are made properly and firmly before any fueling operations begin. This will ensure that grounding connections will not release, thus eliminating the possibility of sparks caused by static electricity which will ignite the fuel. This applies to top loading and bottom loading at a fixed loading facility loading is the preferred method when facilities are available. Failure to follow this warning may cause a spark to ignite, resulting in serious injury or death to personnel.

- The grounding cable must be connected before any servicing operations. The first clip should be attached to the ground rod. The second clip should be attached to the aircraft grounding fitting, If one is provided, or to a convenient unpainted metal point on the aircraft. Grounding should not be made to a propeller, radio antenna, or highly stressed components of the landing gear where scratches could cause metal failure. Always disconnect the grounding clips in reverse order: first the aircraft, then the ground rod. The grounding cables shall be disconnected only after fuel-servicing operations have been completed and all dispensing nozzles and hoses have been disconnected or removed from the filler opening and stowed on the refueling vehicle. Grounding cables attached to dispensing nozzles may be disconnected only after nozzles have been disconnected or removed from filler openings of the aircraft being serviced. Failure to follow this warning may cause a spark to ignite, resulting in serious injury or death to personnel.

WARNING

BONDING AND GROUNDING AIRCRAFT OR VEHICLE TO SEMITRAILER

- Bond the fuel nozzle to the aircraft or vehicle before opening the filler cap. Connect closed-circuit nozzles securely before beginning fuel flow. Electrical hazards may be introduced in several ways, such as:

  - Electrostatic sparks.

  - Operation of aircraft engines, auxiliary power units, and heaters.

  - Operation of automotive equipment, other than that performing the fuel-servicing functions, within 50 feet (15.25 m) of the aircraft or vehicle during fuel-servicing operations.

  - Arcing of electrical circuits.

  - Open flames.

  - Energy from energized equipment.

  - Lightning.

WARNING

BONDING AND GROUNDING AIRCRAFT OR VEHICLE TO SEMITRAILER (continued)

- Due to the dangers of static electricity, grounding the semitrailer to the aircraft or vehicle while refueling is mandatory, regardless of the amount of fuel to be dispensed. Failure to follow this warning may cause spark to ignite, resulting in serious injury or death to personnel.

- Before performing maintenance on the semitrailer, the semitrailer must be grounded to an approved (earth) ground and it must be safe to proceed. Failure to follow this warning may cause a spark to ignite, resulting in serious injury or death to personnel.

WARNING

FUEL HANDLING

- To avoid serious Injury or death to personnel, DO NOT fill tanker while pump engine is running, while smoking, or when near open flame. Never overfill the tanker or spill fuel. If fuel Is spilled, clean it up immediately.

- Post signs that read " NO SMOKING WITHIN 50 FEET" when performing any fueling operation. Failure to follow this warning can cause fuel to ignite, resulting in serious injury or death to personnel.

- Do not smoke while performing any fueling operation, or when located within 50 feet (15.25 m) of fueling and fuel storage areas.

- Do not let fuel or oil drain on hot engine. Fuel or oil can catch fire and cause injury or death to personnel.

- Keep fuel away from open flames and keep fire extinguisher within easy reach when working with fuel. Fuel is very flammable and can explode easily, resulting in serious injury or death to personnel.

- Spilled fuel is slippery and can cause you to slip and fall. To avoid injury, wipe up spilled fuel Immediately with rags.

- Follow all fuel-handling procedures precisely, to prevent injury or death to personnel.

- All fueling/defueling operations must be performed outside. Failure to follow this warning may cause spark to ignite fuel vapors, resulting in serious injury or death to personnel.

WARNING

FUEL HANDLING (continued)

- Before and after all fuel-servicing operations, all valves must be in the closed position. Failure to follow this warning could cause excessive spillage or fire, resulting in serious injury or death to personnel.

- DO NOT permit automotive equipment, other than that performing the fuel-servicing functions, to be within 50 feet (15.25 m) of the aircraft or vehicle during fuel-servicing operations.

- When the semitrailer is emptied of fuel, a mixture of vapor and air remains that may be, and often is, within the flammable range. Refilling the semitrailer with a different type of fuel other than it originally contained can cause a potential explosive atmosphere within the semitrailer. Know what fuel was previously carried so that preventive measures may be taken to ensure that injurious or explosive fumes are not released. Failure to follow this warning may result in serious injury or death to personnel.

- DO NOT attempt aircraft fueling operations if combustion heaters (e.g., wing and tail surface heaters or integral cabin heaters) are being operated on the aircraft. Failure to follow this warning may cause a fire or explosion, resulting in serious injury or death to personnel.

- When filling tank by means of bottom loading, or self-loading, a test of the precheck system is mandatory. If this system is not functioning, stop all operations.

- the problem and have it corrected by a qualified technician. Failure of automatic shutoff to function may cause uncontrolled fuel spillage, fire, and/or explosion, resulting in serious injury or death to personnel.

- When top loading through fill cover, there is no automatic shutdown. Man the loading hose to avoid fuel spillage. Use the capacity indicator gage and dipstick gage to determine amount of fuel loaded. Failure to follow this warning may cause uncontrolled fuel spillage, fire, and/or explosion, resulting in serious injury or death to personnel.

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

- In an emergency, pull emergency valve A control handle to CLOSED or pull emergency valve A shutoff valve on opposite side (curb side) of semitrailer. Failure to do so may result in injury to personnel.

WARNING

FUEL HANDLING (continued)

- The operator must be alert for leaking or malfunctioning equipment. Stop all servicing operations immediately at the first sign of leaks or malfunctions. Corrective action must be performed by qualified technicians before resuming any operations. Failure to follow this warning may cause fire or explosion, resulting in serious injury or death to personnel.

- Parking areas for fuel-servicing vehicles should be arranged to:

  - Facilitate the dispersal of vehicles in event of an emergency.
  - Provide a distance of at least 25 feet (7.63 m) of clear space between vehicles for accessibility for fire control purposes.
  - Prevent fuel from any vehicle from draining into an adjacent building.
  - Provide a distance of at least 50 feet (15.25 m) from any structure that houses the public and may have windows or doors in exposed walls.

- All vapor-freeing work by any method should be carried on outdoors, remote from vehicles and other known sources of ignition, and the tank unit must be stationed where flammable vapors will not blow or drift indoors. Failure to follow this warning may result In serious injury or death to personnel.

- DO NOT allow fuel-dispensing nozzle spray to contact skin. Diesel fuel under pressure can penetrate flesh and cause serious injury and infection.

- The following must be observed if the semitrailer is to be moved to the inside of a building: .

  - The tank must be completely drained and purged.
  - The interior of the tank must be checked with explosive meter prior to moving into the building.
  - The combustible gas indicator set must be used to check the tank prior to starting work each day, and random checks must be performed during the day.
  - No open flames, welding, or use of heat-producing devices is permitted near the tank during maintenance unless the tank tests safe with the combustible gas indicator set.
  - No smoking is allowed within 50 feet (15.25 m) of semitrailer at any time.

- DO NOT climb Into interior of the tank until it has been completely drained and purged and a combustible gas indicator set check indicates that it is safe. Adequate forced-air ventilation or a self-contained breathing apparatus must be used. Any person entering the tank must have an attached lifeline. An observer must be stationed at the manhole opening so that assistance may be summoned in the event of an emergency. Failure to follow this warning may result in serious injury or death to personnel.

WARNING

GENERAL OPERATION

DO NOT let go of static reel cable when rewinding until ball stop Is firmly touching the reel. Failure to follow this warning may cause Injury to personnel.

WARNING

The semitrailer must not be operated if fuel leaks from semitrailer tank or engine. Report any fuel leaks to your supervisor or Unit maintenance. Failure to do so may result In a fire hazard, which can cause severe Injury or death to personnel.

WARNING

Ladder has narrow treads. To prevent Injury, use care when climbing.

WARNING

Spare tire and ladder are heavy. Make sure cable Is not frayed or damaged. Do not raise spare tire and ladder past the vertical position or they will slam Into carrier assembly. Failure to follow this warning may result in severe injury to personnel or damage to equipment.

WARNING

The following should be done when servicing a semitrailer when connected to the prime mover, regardless of the nature of the repair:

- The prime mover's engine should be shut down.
- The prime mover's parking brakes should be applied.
- The prime mover's Ignition key should be removed and be In the hands of the operating technician or be locked in an area away from the vehicle.

WARNING

Handle charged fire extinguisher cylinders with care. To prevent serious injury to personnel, DO NOT jar or expose to temperature above 140OF (600C).

WARNING

Voltage of 115-220 volts can cause personal Injury or death. Take extreme care when working with this much voltage.

WARNING

GENERAL OPERATION (continued)

Manhole fill cover does not lock open. Injury may occur if manhole fill cover accidentally closes on personnel.

WARNING

DO NOT crawl underneath, on top, or near the tires of the semitrailer unless the brakes are positively locked and all other personnel are aware of your presence.

WARNING

Operators must wear ear protection while on engine side of semitrailer when engine is running. Failure to follow this warning may result in injury to personnel.

WARNING

HOSE REEL

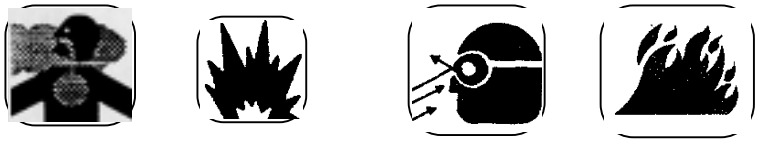
When the hose has been pulled from the hose reel, the hose reel is under spring tension. To avoid movement of the hose reel by accidental activation of the hose reel rewind switch, tighten the hose reel lock. Failure to follow this warning may result in personal injury.

WARNING

Use extreme caution when operating electric rewind on the hose reels. NEVER use the electric rewind on both hose reels at the same time. Electric rewind should be halted, then resumed carefully as the fuel-dispensing nozzle approaches the vehicle. As the hose becomes fully wound on the hose reel, the nozzle may slam against the vehicle with force sufficient to cause injury to personnel and/or damage to equipment. Extreme care Is to be used, ensuring that the hose is rewound slowly. Caution should be used at the hose reels to prevent accidental tripping of the rewind switches. If these are accidentally depressed by hand or by falling objects, serious injury to personnel and/or damage to equipment may occur.

WARNING

SOLVENT P-D-680 HAZARDS



- Drycleaning solvent (P-D-680) Is TOXIC and flammable. Wear protective goggles and gloves; use only In a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent. Failure to follow this warning may result in Injury or death to personnel.

SOLVENT P-D-680 HAZARDS (continued)

- If personnel become dizzy while using drycleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush them with water and get immediate medical attention.

- When P-D-680 drycleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.

WARNING

BATTERY HAZARDS

- Lead-acid batteries can explode. Do not smoke, have open flames, or make sparks around a battery, especially if the caps are off. If a battery is gassing, it can explode and cause injury to personnel.

- Ventilate when charging or using battery in an enclosed space.

- Wear safety goggles and acid-proof gloves when battery cover must be removed or when adding electrolyte.

- Avoid contact between battery electrolyte and skin, eyes, or clothing. If electrolyte spills, take immediate action to stop burning effects:

  - External. Immediately flush with cold running water to remove all acid.
  - Eyes. Flush with cold water for at least 15 minutes. Seek immediate medical attention.
  - Internal. Drink large amounts of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Seek immediate medical attention.
  - Clothing or Vehicle. Wash at once with cold water. Neutralize with baking soda or household ammonia solution.

- Wear safety glasses or goggles when checking batteries. Always check electrolyte level with engine stopped. Do not smoke or use exposed flame when checking battery; explosive gases are present and severe injury to personnel can result.

- Remove or disconnect batteries prior to performing maintenance in immediate battery area or working on electrical system. Such disconnections prevent electrical shock to personnel or equipment.

BATTERY HAZARDS (continued)

- Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing maintenance on batteries. Injury will result if acid contacts skin or eyes. Wear rubber apron to prevent damage to clothing.

- Remove all jewelry, such as rings, identification tags, bracelets, and so on. If jewelry contacts battery terminal, a direct short may result in instant heating of tools, damage to equipment, and injury or death to personnel.

WARNING

NUCLEAR, BIOLOGICAL, OR CHEMICAL (NBC) EXPOSURE AND VEHICLE AIR FILTER HAZARDS

- NBC-contaminated air filters must be handled and disposed of only by authorized and trained personnel. The unit commander or senior officer in charge of maintenance personnel must ensure that prescribed protective clothing (FM 3-4) is used and that prescribed safety measures and decontamination procedures (FM 3-5) are followed. The local unit SOP is responsible for final disposal of contaminated air filters. Failure to comply with this warning may cause severe injury to personnel.

- The NBC protection filters use a type of carbon that contains Chromium VI. This is a known carcinogen if inhaled or swallowed. Damaged or unusable filters are classified as hazardous waste.

  - Do not throw away damaged or unusable filters as trash.
  - Turn in damaged or unusable filters to your Hazardous Waste Management Office or Defense Reutilization and Marketing Office.

- Filters are completely safe to handle and use if they are not damaged in such a way that carbon leaks from them. If carbon does leak use protection, such as a dust respirator to cover nose and mouth, and put carbon in a container, such as a self-sealing plastic bag; turn in to Hazardous Waste Management Office or Defense Reutilization and Marketing Office.

- Disposal of hazardous waste is restricted by law. Violation is subject to criminal penalties.

- Hearing protection is required within 50 feet of tanker during operation of the engine. Failure to follow this warning may result in injury to personnel.

- Sudden changes in temperature may cause M969A2 semitrailers to develop leaks at the fittings and connectors. Use caution and pay special attention to these areas.

- something is broken or worn out, notify Unit maintenance. Corrective action must be performed before resuming any operations. Failure to follow this warning may result in injury to personnel.

HEADQUARTERS
TECHNICAL MANUAL DEPARTMENT OF THE ARMY
NO. 9-2330-398-10 Washington, D.C., 15 June 1996

TECHNICAL MANUAL
OPERATOR'S MANUAL
FOR
SEMITRAILER, TANK, 5000-GALLON, FUEL DISPENSING, AUTOMOTIVE M969A2 (NSN 2330-01-377-9337)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

You may also provide DA Form 2028-2 information to TACOM via datafax or e-mail:

- TACOM's fax number is DSN 786-6323 or (810) 574-6323.
- TACOM's e-mail address is tacom-tech-pubs-cc.army.mil.

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TABLE OF CONTENTS

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HOW TO USE THIS MANUAL

SCOPE.

This technical manual provides you with the information you will need to operate and maintain the M969A2 Automotive Fuel Dispensing 5000-Gallon Tank Semitrailer.

The information contained in this manual is presented in three chapters and five appendixes. Each chapter is divided into sections covering operating procedures and/or other information for specific systems or components. When a reference is made to a table, figure, paragraph, or appendix, refer to that portion of the manual.

You must read and understand this manual BEFORE operating any of the semitrailers.

Throughout this manual you will frequently see the phrase "notify Unit maintenance." When instructed to notify Unit maintenance, do exactly that; Unit maintenance personnel have the tools and training to efficiently and correctly perform the next level of maintenance.

Note that the titles of publications and forms referenced anywhere in this manual are listed in Appendix A. Also, acronyms and abbreviations used in the manual are listed and spelled out on page 1-3.

INDEXING.

Four indexing procedures are used to help you locate information quickly:

- Cover Index. Lists chapters and other important parts of the manual, with corresponding page numbers. Each chapter/part listed is boxed in, with a black outer edge that is in line with the first page of that chapter/ part.
- Table of contents. The table of contents starts on page i, following the summary of warnings.
- Section Indexes. Each section in a chapter starts with a numerical listing of all paragraphs in that section.
- Index. The alphabetically arranged subject index starts on page Index-1.

WARNINGS, CAUTIONS, AND NOTES.

Throughout this manual you will see WARNING, CAUTION, and NOTE headings. There are good reasons for every one of these notices.

WARNING

A warning is used to alert the user to hazardous operating and maintenance procedures, practices, or conditions that could result in injury or death. Warnings must be strictly observed.

CAUTION

A caution is used to alert the user to hazardous operating and maintenance procedures, practices, or conditions that could result in damage to, or destruction of, equipment or mission effectiveness. Cautions must be strictly observed.

WARNINGS, CAUTIONS, AND NOTES (continued).

NOTE

A note highlights an essential operating or maintenance procedure, condition, or statement.

Warnings and cautions appear immediately preceding the step to which they pertain. It is important to read and thoroughly understand the warnings and/or cautions before beginning maintenance.

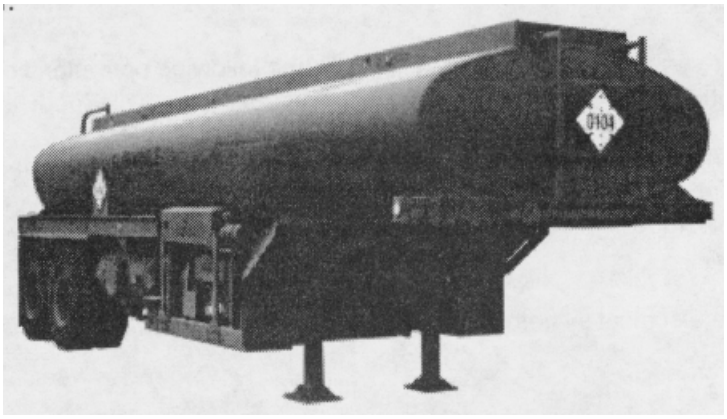
Notes may precede or follow the steps to which they pertain, depending on what makes the most sense.

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE.

This manual contains operation and maintenance instructions for the M969A2 Automotive Fuel Dispensing 5000- Gallon Tank Semitrailer.



Throughout the manual, the terms "right side" or "curb side' and "left side" or "road side" are used to describe views of the semitrailer as viewed from the rear.

The operation and maintenance of any fuel-hauling semitrailer can be hazardous due to the flammable and explosive nature of the load.

Read and become familiar with all WARNINGs in the warning summary at the front of this manual. Throughout this manual, WARNINGs are placed as they pertain to specific operational or maintenance procedures. Read these warnings and follow them exactly.

The following is a summary of safety regulations that MUST be strictly observed when operating or maintaining the M969A2 semitrailers. Personnel who fail to follow these regulations endanger the mission, equipment, and their lives and the lives of bystanders.

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 nylon, silk, rayon, or other similar materials. Remove all contents from pockets. Wear rubber boots and gloves during fuel loading and unloading.

1-1. SCOPE (continued).

c. Before loading or unloading fuel or purging tank on semitrailer, connect all bonding and grounding connections (para 2-16b).

d. Never climb on the semitrailer without first touching a grounding stud to discharge static electricity from your body.

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

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

g. Hearing protection is required for personnel within 50 feet (15.25 m) of the semitrailer when the pump engine is running.

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

- Replace any component that communicated with the inside of the tank and therefore came in contact with fuel or vapors; these components include the manhole, the jet level sensor and tubing, the emergency valve, vapor collection system components, vent caps, the sump drain, and the piping assembly.
- Troubleshoot the electrical system with any test device other than the ohms scale of a multimeter.
- Weld or solder.
- Cut with acetylene torch or chisel and hammer.
- Drill (except aluminum).

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

- Always provide adequate forced air ventilation with air directed inside to the compartment where work is being performed.
- NEVER work alone inside a tank; a second person must be stationed at the manhole opening. A third person must be close by to provide aid and/or assistance in case of an emergency. The person inside the tank must have on a safety line and harness for rescue operations in case of emergency.
- If the person inside the tank encounters any difficulties, the person stationed at the manhole must summon assistance IMMEDIATELY. DO NOT attempt a rescue until assistance has arrived.

1-2. MAINTENANCE FORMS AND PROCEDURES.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA Pam 738-750 or AR 700-138.

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

Refer to TM 750-244-6 for procedures on the destruction of military vehicles to prevent enemy use.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S).

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 or performance. Put it on an SF Form 368 (Product Quality Deficiency Report). Mail it to the address specified in DA Pam 738-750.

1-5. CORROSION PREVENTION AND CONTROL (CPC).

Corrosion prevention and control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with the semitrailers be reported so that the problems can be corrected and improvements can be made in order to prevent the problems in future semitrailers.

While corrosion is typically associated with the rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem. If a corrosion problem is identified (refer to TB 43-0213), it can be reported using an SF Form 368. The use of key words, such as "corrosion, " "rust, " "deterioration, " or "cracking, " will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA Pam 738-750 for corrective maintenance. If the problem persists. notify Unit maintenance.

1-6. LIST OF ABBREVIATIONS AND ACRONYMS.

A .....annually
AAL.....Additional Authorization List
Bll.....Basic Issue Items
CAGEC.....Commercial and Government Entity Code
CARC .....chemical agent resistant coating
Class.....classification
COEI.....Components of End Item
cp.....candle power
DA.....Department of the Army
DOD.....Department of Defense
E .....empty
EIR.....equipment improvement recommendation
GAA.....grease, automotive and artillery
H.....hour
IAW.....in accordance with
JTA .....Joint Table of Allowances

1-6. LIST OF ABBREVIATIONS AND ACRONYMS (continued).

L.....liter- low
LED.....light-emitting diode
M.....monthly
MOS .....military occupational specialty
MTOE .....Modification Table of Organization and Equipment
NBC.....nuclear, biological, and chemical
NSN.....national stock number
OC .....on condition
p.....page
para .....paragraph
PMCS .....preventive maintenance checks and services
Qty. Recm.....quantity recommended
Qty. Rqr .....quantity required
S .....semiannually
S/N.....serial number
TAMMS.....The Army Maintenance Management System
TDA .....Table of Distribution and Allowances
TOE .....Table of Organization and Equipment
U/M .....unit of measure
V dc .....volts, direct current
W/ .....with
W/O .....without

1-7. WARRANTY DATA.

There is no warranty on the M969A2 semitrailer.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

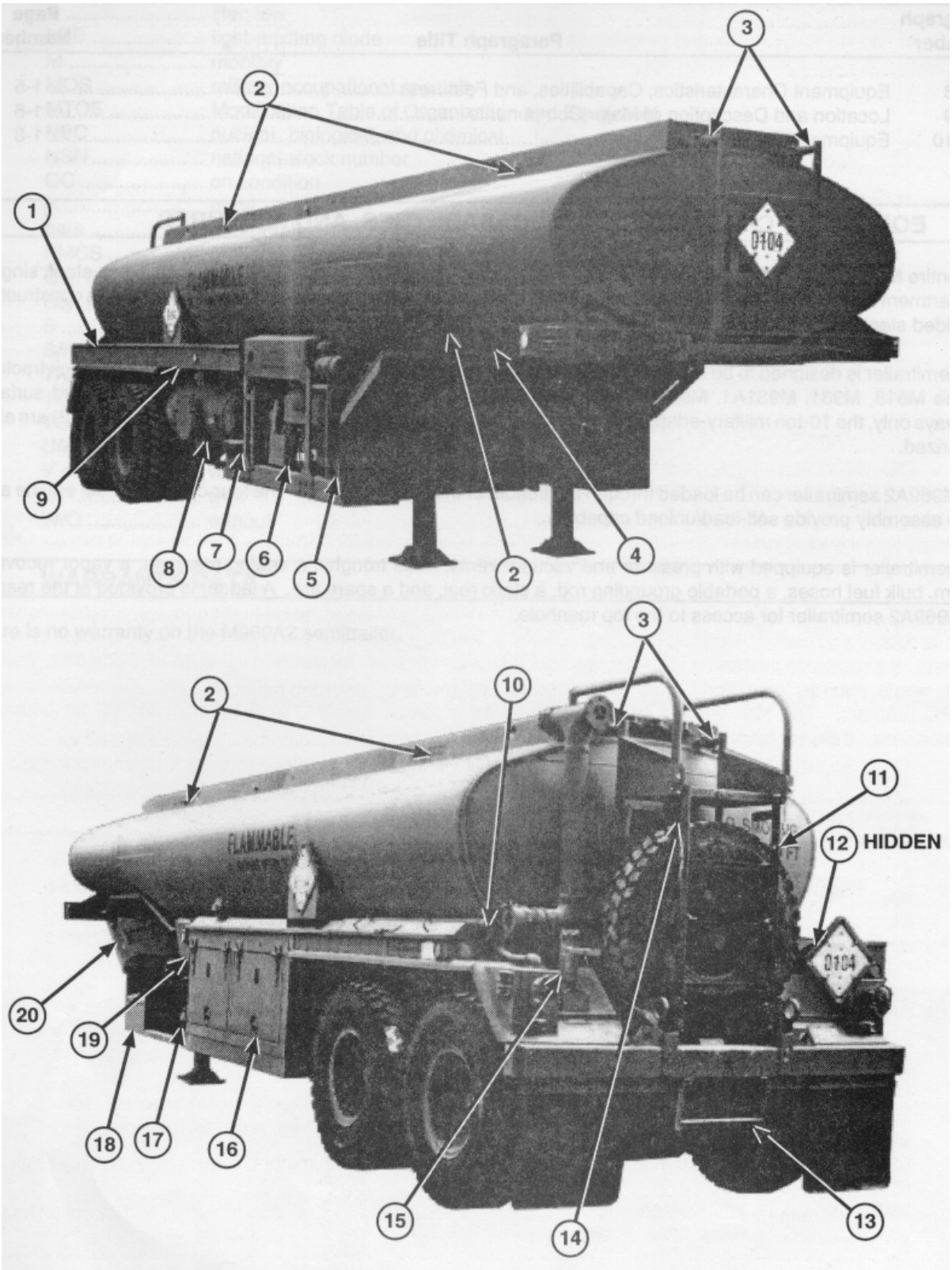
The entire M969A2 semitrailer is constructed of welded stainless steel. Semitrailers have a stainless steel. single-compartment tank of 5000-gallon capacity, plus 3 percent capacity for product expansion. The chassis is constructed of welded steel and is equipped with full floating tandem axles and manually operated landing gear.

The semitrailer is designed to be towed by a truck tractor equipped with a fifth wheel. Authorized 5-ton truck tractors are the M818. M931, M931A1, M931A2, M932, M932A1, M932A2, and M1088. When driving on hard surface highways only, the 10-ton military -adapted commercial 6 x 4 truck tractors (the M915, M915A1, and M915A2) are also authorized.

The M969A2 semitrailer can be loaded through the bottom or the top fill opening. The four-cylinder diesel engine and pump assembly provide self-load/unload capability.

The semitrailer is equipped with pressure and vacuum vents, hose troughs, a sealed manhole, a vapor recovery system, bulk fuel hoses, a portable grounding rod, a static reel, and a spare tire. A ladder is provided at the rear of the M969A2 semitrailer for access to the top manhole.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.



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

KEY	COMPONENT	DESCRIPTION
1	Hose Trough Covers	Protect hoses when stored in hose troughs.
2	Grounding Studs	Allow semitrailer to be grounded, discharging static electricity (four on top, one on each side).
3	Drain Pipes	Allow water to drain from top of semitrailer.
4	Emergency Valve Shut-Off Control	Manually stops fuel flow in an emergency.
5	Engine Fuel Tank	Stores fuel for pump engine.
6	Pump and Engine Compartment	Houses pump and engine.
7	Batteries	Provide electricity for starting pump engine.
8	Filter/Separator	Separates water from fuel and filters fuel.
9	Hose Troughs	Store hoses (one trough on left side, one on right side).
10	Portable Grounding Rod	Allows semitrailer to be grounded, discharging static electricity.
11	Ladder	Allows access to top manhole.
12	Portable M13 Decontaminating Apparatus	Used to spray decontaminating agent DS-2 on surfaces of semitrailer and equipment to reduce the level of toxic chemical agents.
13	Step	Allows access to ladder.
14	Spare Tire Carrier and Winch	Allow easy deployment and recovery of spare tire.
15	Fire Extinguishers	Provide portable fire extinguishing capabilities at point of operation.
16	Hose Reel Cabinets	House hose reels and hoses.
17	Piping Assembly	Dispenses fuel.
18	Tool Box	Stores tools.
19	Engine Control Panel	Houses controls, meters, and gages for pump engine.
20	Landing Leg Ground Boards	Positioned under landing leg shoe when semitrailer is uncoupled in mud, sand, or snow.

1-10. EQUIPMENT DATA.

Bridge Classification:
Empty weight with prime mover ..... Class. 14
Empty weight without prime mover ..... Class. 6
Cross-country loaded with prime mover ..... Class. 25
Cross-country loaded without prime mover ..... Class. 18
Highway loaded with prime mover ..... Class. 30
Highway loaded without prime mover ..... Class. 22

Fuel-Dispensing Hose (Automotive, Overwing):
Length ..... 50 ft (15.25 m)
Quantity 2
Nominal size ..... 1.25 in. (3.18 cm)

Meter:
Quantity 2
Type ..... full metering
Maximum capacity ..... 100 gpm

Angle of departure ..... 60°

Capacities of Tank (Vehicle Capacity):
Hard surface road and cross-country ..... 5000 gal. (18, 925 L)
200/o maximum side slope without leakage ..... 5000 gal. (18, 925 L)
10% maximum longitudinal slope without leakage ..... 5000 gal. (18, 925 L)

Center of Gravity:
Empty (vertical) ..... 54 in. (137.16 cm)
Empty (horizontal from kingpin) ..... 198 in. (502.92 cm)
Loaded (vertical) ..... 66.5 in. (168.91 cm)
Loaded (horizontal from kingpin) ..... 170 in. (431.80 cm)

Dimensions Overall:
Height ..... 104.5 in. (265.43 cm)
Length ..... 366 in. (929.64 cm)
Width ..... 96 in. (243.84 cm)
To outside of tires ..... 97.75 in. (248.28 cm)

Weights:
Empty ..... 16, 350 lb (7422.9 kg)
Tongue weight ..... 6800 lb (3087.2 kg)
Rear axle ..... 9650 lb (4381.1 kg)
Loaded ..... 50, 010 lb (22704.5 kg)

Kingpin Location:
From nose of vehicle ..... 28 in. (71.12 cm)
To landing gear ..... 80 in. (203 2 cm)

1-10. EQUIPMENT DATA (continued).

Portable Fire Extinguishers:
Type ..... Purple-K, dry chemical
Size ..... 10 lb (4.5 kg)
Number per vehicle 2

Tires
Quantity (including spare) 9
Type ..... radial
Size ..... 11.00 x R20 Numeric
Tube equipped ..... yes
Tire pressure, cross-country and sand ..... 45 psi (310.3 kPa)
Tire pressure, hard surface roads ..... 65 psi (448.2 kPa)

Towing Facility ..... kingpin

Prime Mover:
5-ton ..... M818, M931, M931A1, M931A2, M932, M932A1, M932A2, and M1088
10-ton (hard surface highway only) ..... M915 and M91SA1

Track:
Center to center of dual wheels ..... 72 in. (182.88 cm)

Transfer Hose:
Type ..... flexible
Storage ..... trough

Axles and Suspension:
Axle model number A21T-7CT7R-DW10A
Capacity ..... 25, 000 lb (11, 350 kg)
Suspension model number 10476-01
Type ..... tandem overslung axle

Springs:
Type ..... semielliptic multileaf
Shaft ..... semielliptic

Brakes:
Quantity ..... 4 sets
Type ..... fail-safe
Actuation ..... full air S-type cam
Operating pressure ..... 75-95 psi (517-655 kPa)

Drain Valve:
Working pressure ..... 120 psi (827.4 kPa)

Electrical System-Engine-
Type ..... 12 V dc
Alternator (Model A001-2300JB) ..... 65 amps, belt drive
Batteries ..... 2, 12 V dc each, connected in parallel

Electrical System-Vehicle.
Voltage ..... 24 V dc

1-10. EQUIPMENT DATA.

Lamps:
Clearance lights ..... 3 cp
Taillights (service) ..... 3 cp
Taillights (blackout) ..... 3 cp
Stoplights (service) ..... 32 cp

Engine:
Type ..... 4-cylinder, 4-cycle, diesel, air-cooled (Onan)
Model DJC-4494W
Horsepower 27.5
Bore ..... 3.25 in. (8.25 cm)
Stroke ..... 3.625 in. (9.21 cm)

Oil Capacity Crankcase:
Without oil filter change ..... 6 qt (5.6 L)
With oil filter change ..... 6-1/2 qt (6.149 L)
Displacement ..... 120 cu in (774 cu cm)
Injection (firing) sequence 1-2-4-3

Throttle Control:
Length ..... 100 in. (645 cu cm)
Model ..... flexible
Type ..... push-pull with locking handle

Engine Air Cleaner:
Capacity (Air-flow) ..... 1 15 cf m @ 12 in. H20

Filter/Separator:
Construction ..... aluminum
Rating ..... 300 gpm @ 150 psi (1034.25 kPa)
Differential pressure gage psi indicator ..... 0-25 psid (0-172.38 kPa)

Bulk Fuel Servicing Hose (Two with Male and Female Connectors, One with Female Connector, Both Ends):
Length ..... 14 ft (4.27 m)
Quantity 3
Nominal size ..... 4 in. (10.1 cm)

Hose Reels:
Type ..... electric, full control and manual crank

Landing Gear:
Type ..... vertical support with footpads
Operation ..... hand crank, two-speeds

Pump (4-Inch Model):
Type ..... low pressure, centrifugal
Drive ..... flexible coupling to engine

Emergency Valve Control:
Type ..... full release
Control ..... flexible cable

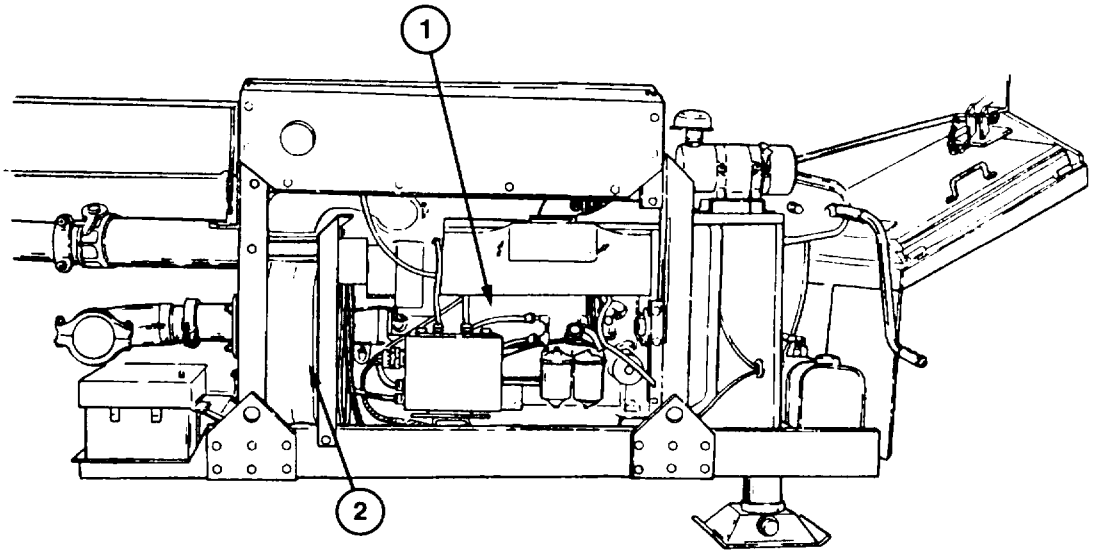
Section III. PRINCIPLES OF OPERATION

1-11. GENERAL.

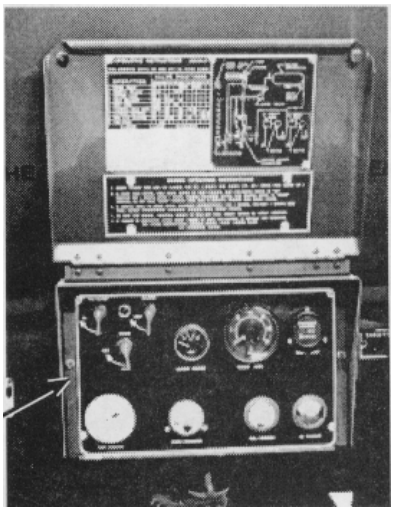
The purpose of the M969A2 5000-gallon tank semitrailer is to provide the means for automotive refueling or bulk fuel hauling and delivery. The M969A2 semitrailer can be loaded through the top or bottom fill opening.

1-12. PRINCIPLES OF OPERATION.

PUMP AND ENGINE ASSEMBLY



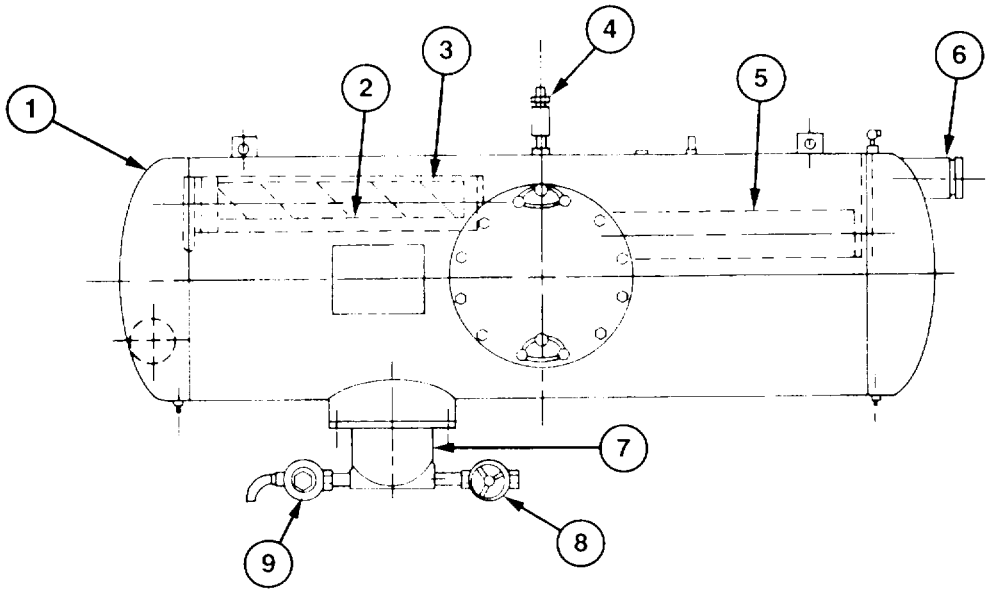
ENGINE. Provides power through flexible coupling to the centrifugal pump (2). The diesel engine (1) is a 4-cylinder, 4-cycle, valve-in-head, air-cooled engine with a maximum rating of 27.5 horsepower, located on the curb side of the semitrailer. The engine (1) is operated and monitored by the control panel (3) located on the road side of the semitrailer.



PUMP. The M969A2 semitrailer is equipped with a 4-inch, self-priming, low-head, low-pressure centrifugal pump (2). The centrifugal pump (2) provides a flow rate for metered fuel (gasoline or diesel) delivery of up to 60 gpm through one or both fuel-dispensing nozzles.

1-12. PRINCIPLES OF OPERATION (continued).

FILTER/SEPARATOR ASSEMBLY



FILTER/SEPARATOR. Provides filtering capabilities to remove contamination and condensation in fuel. The filter/ separator consists of an aluminum tank (1) containing 15 filter elements (5) and five second-stage water stripper elements(3). Fuel under pressure from the pump enters the filter tank inlet (6) and flows through the 15 filter elements (5), where solid particles are removed. The fuel then flows through the five second-stage water stripper elements (3), which further filter out smaller solid particles and coalesce water particles to be collected in the filter sump (7).

Coalescenceisaprocessbywhichmanysmalldropletsoffreewaterinthefuelarecollectedtoformlargerwaterdrops.

These large water drops are then released into the filter sump (7).

AUTOMATIC WATER DRAIN VALVE. Allows water collected in the filter sump (7) to be automatically ejected. The filter sump (7) has a ball float that will float only in water and not in any type of fuel. As water accumulates in the filter sump (7) a float rises. When the float reaches a certain level, a valve will open in the automatic drain valve (9), allowing pump pressure to be applied to a diaphragm valve, opening the automatic drain valve (9). Water is then ejected out of the filter sump (7) through the automatic drain valve (9) While water is being ejected, fuel flow is continued.

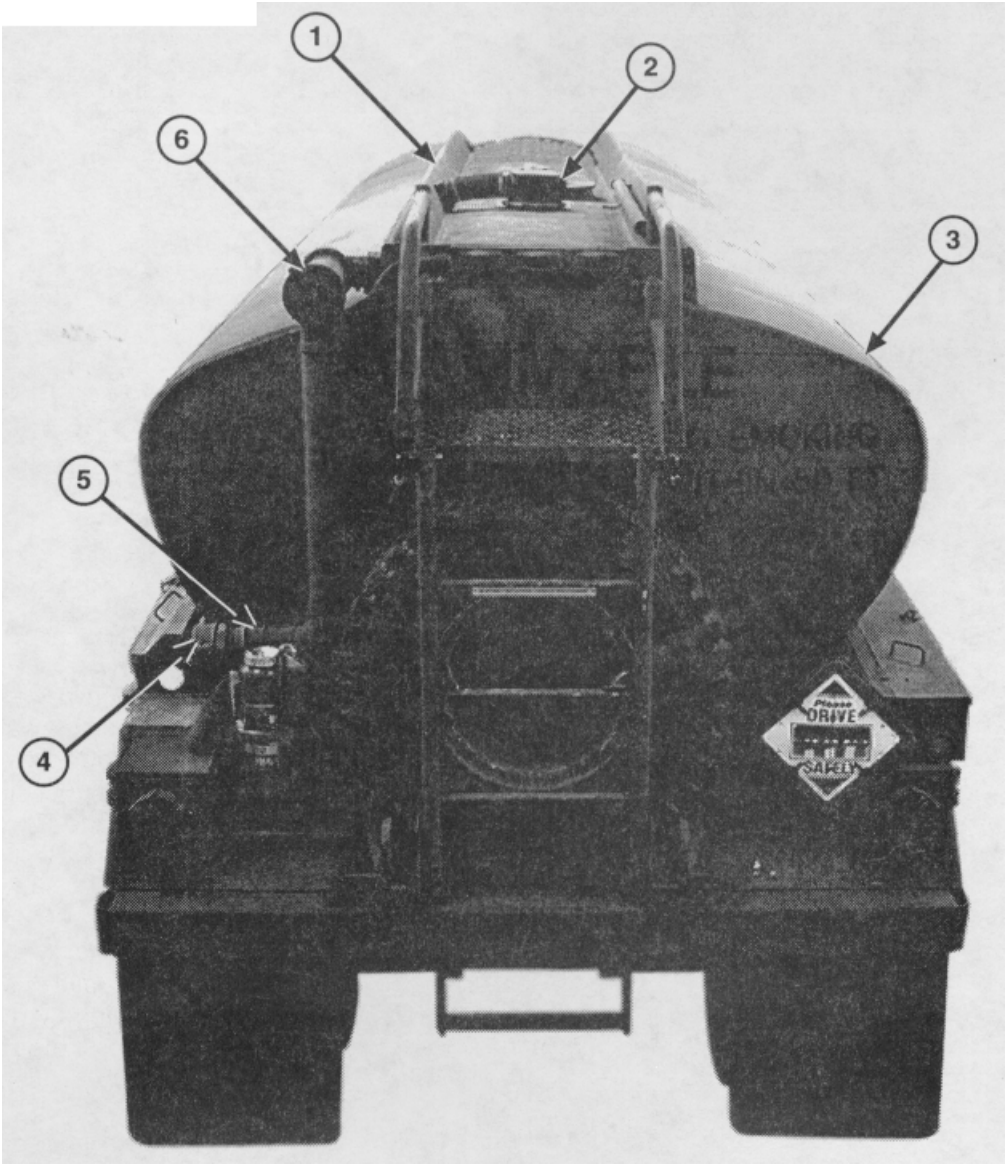
MANUAL DRAIN VALVE. Used primarily during cold weather operations. Water accumulated in the filter sump may freeze. It is important that the manual drain valve (8) on the filter sump be opened after each operation to drain the water accumulation into suitable container Be sure to close the manual drain valve after draining.

GO-NO-GOFUSES. Each of the five second-stage water stripper elements (3) is equipped with three Go-No-Go fuses (2). These fuses are fuel contaminant monitoring devices located "downstream" of the second stage. The fuses restrict the fuel flow when small amounts of water and solid contaminants are present in the fuel stream.

PRESSURE RELIEF VALVE. Automatically opens to relieve internal pressure of filter/separator when pressure exceeds 150 psi (984.2 kPa). Pressure relief valve (4) vents to the atmosphere.

1-12. PRINCIPLES OF OPERATION (continued).

VAPOR RECOVERY SYSTEM



VAPOR RECOVERY SYSTEM. The vapor recovery system allows a fuel depot to collect or recover the vapors and gases that are present during loading operations, and the semitrailer to collector recover the vapors and gases present during unloading operations. This system consists of a sealed vapor-tight line (5) from the vapor recovery hood (2) on the emergency valve vent (6) (directly behind the manhole cover) to the rear of the tank (3). The rollover rail (1) on the roadside of the semitrailer is used as part of the line (5). The adapter (4) on the end of the line (5) is compatible with the 4-inch vapor recovery quick-disconnect connections at a majority of the fuel depots.

CHAPTER 2
OPERATING INSTRUCTIONS

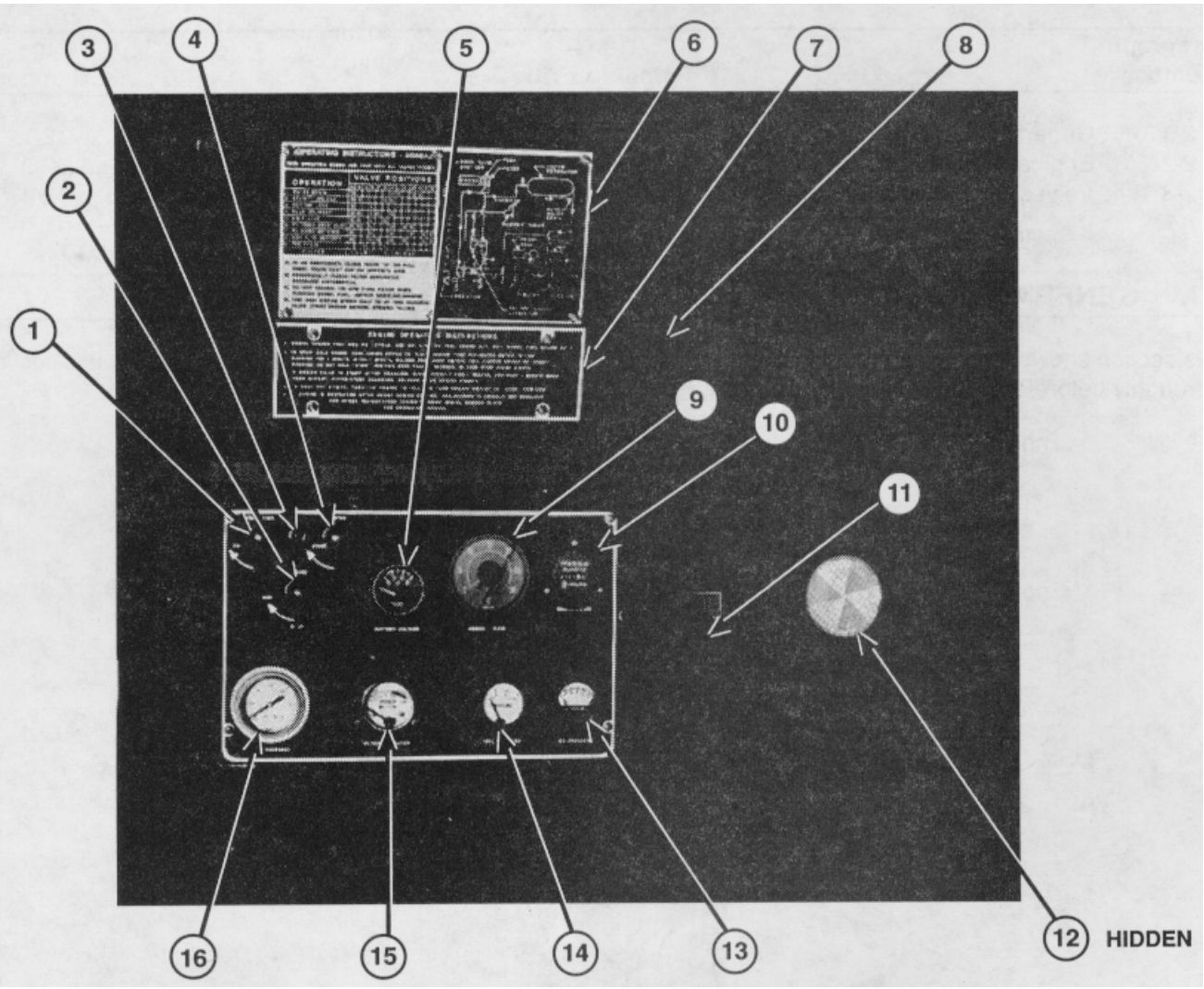
Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. GENERAL.

This section shows the location and function of all M969A2 semitrailer controls and indicators. Review this section thoroughly before operating the semitrailer.

2-2. ENGINE CONTROL PANEL.

The engine control panel is located on the road side of the semitrailer, above the piping assembly. Control functions and gage readings are explained in the table that follows the illustration.



KEY	COMPONENT	DESCRIPTION
1	Preheater Switch	Connects battery voltage to glow plugs in engine intake manifold to preheat the engine. (Engine switch. item 2, must he in RUN position.)
2	Engine Switch	In RUN position, energizes engine electrical system and fuel pumps to permit engine operation. STOP position cuts off fuel supply and stops the engine.
3	Indicator Light	This should turn on when preheater switch, item 1, is turned to ON position. If light does not come on, it indicates there is no current flow to the manifold heaters and glow plugs

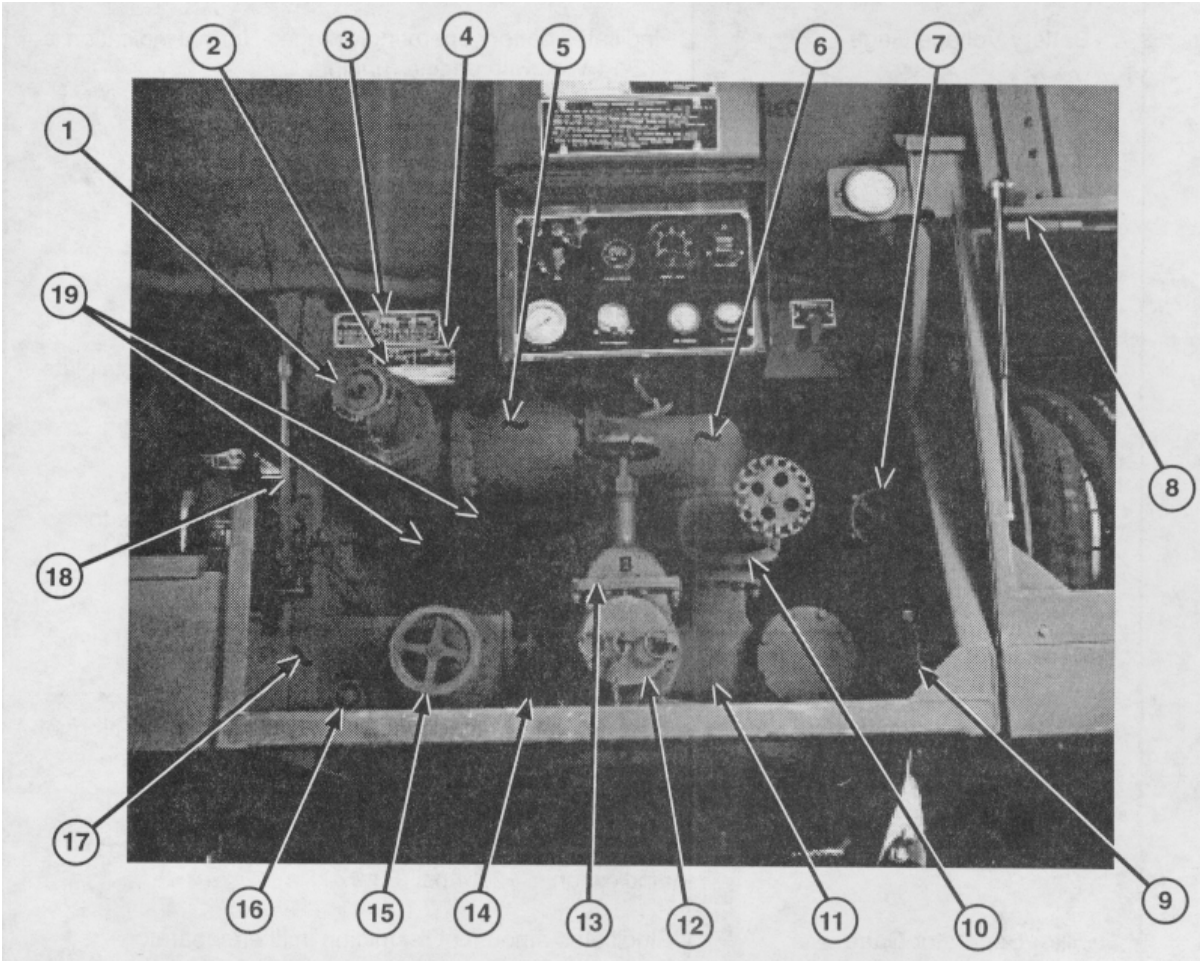
2-2. ENGINE CONTROL PANEL (continued).

KEY	COMPONENT	DESCRIPTION
4	Starter Switch	Engages starter motor to turn and start the engine. (Engine switch, item 2, must be in RUN position.)
5	Battery Voltage Gage	Indicates battery operating voltage. Normal indication is 12-14 V dc with engine running.
6	Engine Operating	Contains engine operating instructions. Instruction Plate
7	Valves Operating	Contains valve operating instructions. Instruction Plate
8	Control Panel Cover	Protects control panel when not in use.
9	Engine RPM (Tachometer)	Indicates engine rpm. Used with flow rate/rpm data plate or Table 2-3 (p. 2-52) to select desired flow rate.
10	Engine Hours Meter	Indicates engine running time.
11	Engine Throttle	Controls and sets engine speed. Pull out handle to selected setting, then rotate it clockwise to lock it in position.
12	Control Panel Light and Switch	Activated to illuminate control panel. Activate light switch at bottom of light.
13	Oil Pressure Gage	Indicates pressure in engine lubrication system. Normal indication is 30-40 psi (207-276 kPa) when engine is warm and running.
14	Fuel Pressure Gage	Indicates pressure in fuel injection system. Normal indication is 12-14 psi (83-97 kPa).
15	Filter/Separator Gage	Indicates amount of restriction in filter/separator. **NOTE** **Pressure will vary. Engine speed, type of operation, and nozzles used have a direct effect on pump pressure.**
16	Pump Pressure Gage	Indicates pressure in pump discharge line. Normal operating pressure is 30 psi (207 kPa) for the four-inch low-head pump.

2-3. VALVES, PIPING, AND DISPENSING COMPONENTS.

The operator/crew should become thoroughly familiar with the location of valves, piping, and dispensing components, and with the piping schematic mounted on the storage box cover before beginning any fuel-servicing or fuel-dispensing operation.

Piping Control Assembly. This assembly contains a four-inch pilot-operated control valve, plus the components listed in the table that follows.



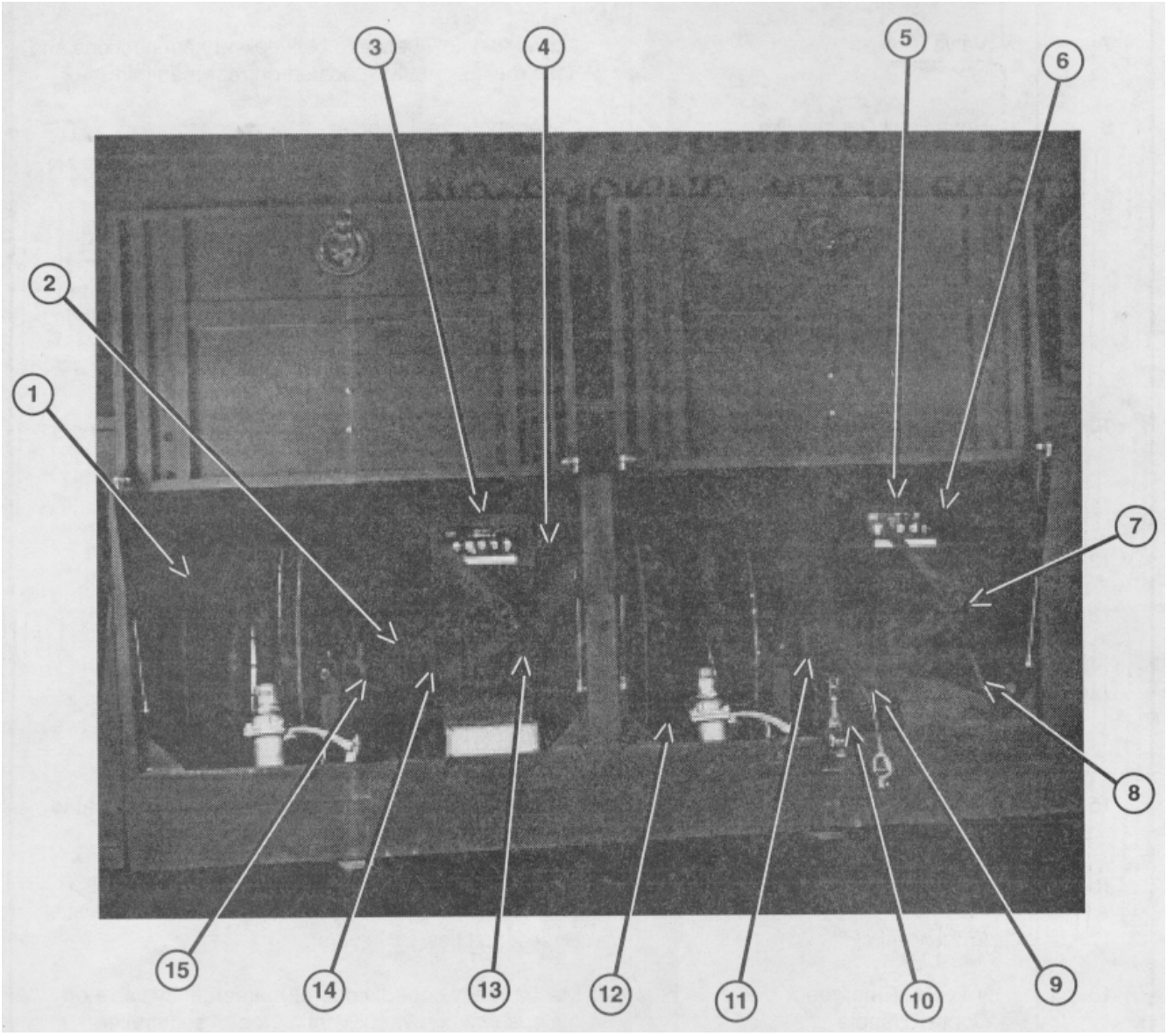
KEY	COMPONENT	DESCRIPTION
1	Bottom Loading Adapter (D-1)	Allows tanker to be closed-circuit loaded from the bottom
2	Valve E	Located next to precheck valve (D). Provides load/ unload selection.
3	Fuel-Dispensing Instruction Plate	Provides engine rpm and pump gpm requirements during fuel-dispensing operations
4	Valve D, Precheck	Provides a way to check shut-off float for proper functioning.

2-3. VALVES, PIPING, AND DISPENSING COMPONENTS (continued).

KEY	COMPONENT	DESCRIPTION
5	Check Valve	Eliminates backflow of fuel during bottom loading.
6	Top Manifold	Directs fuel to various valves.
7	Valve K	Allows fuel flow between bulk delivery connections and hose reel assembly. Located on rear manifold.
8	Hose Reel Cabinet Door	Covers hose reel cabinet. Assembly
9	Static Reel	The static ground cable is pulled from static reel and attached to unit being serviced or to a ground plug, stud, or clamp. The static reel has an automatic locking device that engages when cable is extended to desired length and releases when cable is pulled out again. The reel is spring loaded to rewind automatically.
10	Valve F	Opens pump outlet line to permit bulk fuel delivery (nonfiltered).
11	Rear Manifold	Directs fuel to various valves.
12	Outlet B	Main outlet for bulk fuel delivery.
13	Valve B	Controls the opening for bulk delivery connections. Fastened to the rear manifold.
14	Valve G	Permits gravity unloading and self-loading. Valve is open when handle is parallel to pipe. Located between front and rear manifolds.
15	Valve H	Permits fuel flow through manifold to pump. Located in front manifold.
16	Valve J	Allows water to drain from front manifold.
17	Front Manifold	Directs fuel flow to valve(s).
18	Valve A, Emergency Valve Control Handle	Mechanically controls operator emergency valve on outlet sump and vapor vent on top of semitrailer.
19	Top Manifold Drain Cocks (Two)	Permit water to drain from top manifold.

2-3. VALVES, PIPING, AND DISPENSING COMPONENTS (continued).

Hose Reel Cabinet

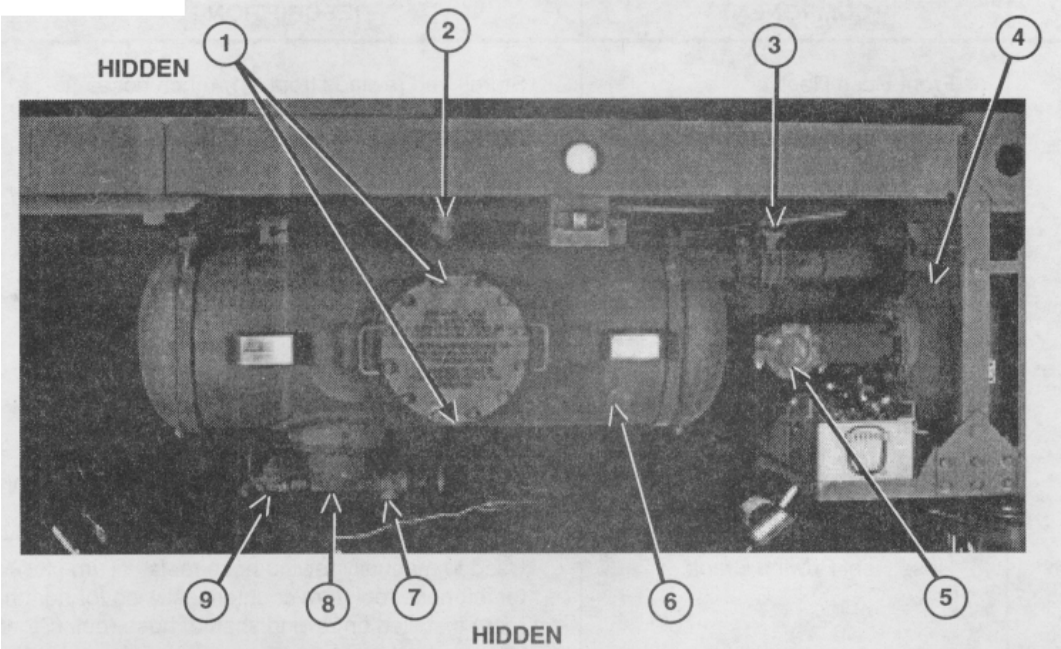


2-3. VALVES, PIPING, AND DISPENSING COMPONENTS (continued).

KEY	COMPONENT	DESCRIPTION
1	Front Hose Reel	Stores and rewinds front 1 1/4-inch hose.
2	Meter Outlet Nipple	Connects meter to hose reel.
3	Front Meter	Records amount of fuel being dispensed through front hose.
4	Meter Reset Knob	Pushed in and turned clockwise to reset meter.
5	Rear Meter	Records amount of fuel being dispensed through rear hose.
6	Meter Reset Knob	Pushed in and turned clockwise to reset meter.
7	Valve R	Permits fuel flow through the rear hose reel. (Valve is open when handle is parallel to pipe).
8	Hose Reel Rewind Crank	Used to manually rewind hose reels. (Turn clockwise for left hose reel; turn counterclockwise for right hose reel.) Installed on rewind shaft of hose reel. (Stored in hose reel cabinet.)
9	Hose Reel Rewind Button	Used to electrically rewind hose reels. (Use while engine is running to avoid discharging battery.)
10	Static Reel	The static ground cable is pulled from static reel and attached to unit being serviced and to a ground plug, stud, or clamp. The static reel has an automatic device that engages when cable is extended to desired length and releases when cable is pulled out again. The static reel is spring loaded to rewind automatically.
11	Hose Reel Lock	Locks hose reel in position.
12	Rear Hose Reel	Stores and rewinds rear 1 1/4-inch hose.
13	Valve P	Permits fuel flow through front hose reel. (Valve is open when handle is parallel to pipe.)
14	Hose Reel Rewind Button	Used to electrically rewind hose reels. (Use while engine is running to avoid discharging battery.)
15	Hose Reel Lock	Turn hand wheel on hose reel clockwise to lock hose reel in position. Turn hand wheel counterclockwise to release hose reel lock.

2-3. VALVES, PIPING, AND DISPENSING COMPONENTS (continued).

Filter/Separator



KEY	COMPONENT	DESCRIPTION
1	Antipilferage	Gives operator a quick method of checking for filter/ separator tampering
2	Relief Valve	Gives pressure/vacuum relief during loading or unloading.
3	Valve M	Controls fuel flow from pump outlet to inlet of filter/ separator Valve is open when handle is parallel to pipe
4	Pump	With engine running, provides fuel flow and pressure to system
5	Pump Inlet Screen	Catches large particles. preventing damage to pump assembly
6	Filter/Separator	Filters p[articulates and separates water from fuel when fuel flows through system.
7	Valve N	Allows manual draining of sump on filter/separator.
8	Float Assembly	Allows automatic discharge of excess water.
9	Automatic Drain Valve	Automatically drains water from filter sump when water accumulates to a certain level.

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

2-4. GENERAL.

a. To ensure that the M969A2 semitrailers are ready for operation at all times, they must be inspected one 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.

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.

2-5. SERVICE INTERVALS.

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

- Perform Before PMCS just before operating the M969A2 semitrailer.
- Perform During PMCS while operating the M969A2 semitrailer.
- Perform After PMCS right after operating the M969A2 semitrailer.
- Perform Weekly PMCS once each week.
- Perform Monthly PMCS once each month.

2-6. REPORTING REPAIRS.

All defects that 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 on Unit maintenance.

2-7. GENERAL PMCS PROCEDURES.

WARNING

- **Drycleaning 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.**

- **When drycleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.**

a. Keep Equipment Clean. Dirt, oil. and debris may cover up a serious problem. Clean as you work and as needed Use drycleaning solvent (Item 3. Appendix D) on all metal surfaces. Use solution of soap (Item 12, Appendix D) and water on rubber, plastic. and painted surfaces.

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

Bolts, Nuts, and Screws. Make sure they are not loose, missing, bent, or broken. If possible, tighten loose bolts, nuts, and screws with tools from Bll (Section III, Appendix B). Report missing bolts, nuts, and screws to Unit maintenance.

Welds. Inspect for gaps where parts are welded together Check for loose or chipped paint. rust, and cracks. Report bad welds to Unit maintenance.

Electric Conduit, Wires, or Connectors. Inspect for cracked or broken conduit insulation, bare wires, and loose or broken connectors. Report any damage. leaks, or loose fittings to Unit maintenance.

Hose and Fluid Lines. Inspect for wear. damage, and leaks. Make sure that clamps and fittings are tight. Wet spots indicate leaks, of course, but a stain around a fitting or connector can also mean a leak If a leak comes from a loose fitting or connector, notify Unit maintenance. If something is broken, damaged, or worn out, report it to Unit maintenance.

c. Check to see that components are adequately lubricated in accordance with Appendix E.

d. Check to see that basic issue items (Bll) are on the semitrailer and in good working condition Bll consists of the items in Appendix B, Section III The semitrailer is considered not fully mission capable if any of these items are missing.

2-8. SPECIFIC PMCS PROCEDURES.

a. Operator/crew PMCS us provided in Table 2-1 Always perform PMCS procedures in the order listed Once they become routine, spotting problems will become much easier.

b. Before performing PMCS, read all the checks required for the applicable interval and prepare all tools needed for the task. Have several clean rags (Item 15, Appendix D) ready for use. Perform ALL inspections at the applicable intervals. Necessary tools are in Bll (Appendix B Section III).

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

2-8. SPECIFIC PMCS PROCEDURES (continued).

d. Table 2-1, your PMCS table. Lists the inspections and care of your equipment required to keep it good operating condition. Explanations of the column headings are as follows

Item No. The item number column is to be used for reference When completing DA Form 2404, include the item number for the check/service indicating a fault Item numbers also appear in the order that you must do checks and services for the intervals listed.

Interval. This column tells you when to do a certain check or service.

Item To Check/Service. This column names the location and the item to be checked or serviced.

Procedure. This column tells you how to do the required checks and services and which crew member(s) is responsible for each check or service. Carefully follow these instructions. If you do not have the tools, or if the procedure tells you to, have Unit maintenance do the work.

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

2-9. LEAKAGE DEFINITIONS.

a. It is important to know how fluid leakage affects the status of the semitrailer. The 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

Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

Class II Leakage 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.

WARNING

The semitrailer must not be operated if there are any fuel leaks from semitrailer tank or from engine. Report any fuel leaks to your supervisor or Unit maintenance. Failure to do so will result in a fire hazard, which can cause severe injury or death to personnel.

CAUTION

When operating engine with Class I or 11 oil 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 11) 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 oil leaks IMMEDIATELY to your supervisor or Unit maintenance.

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

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
			NOTE Perform Weekly as well as Before PMCS if: a. You are the assigned operator but have not operated the semitrailer since the last weekly PMCS. b. You are operating the semitrailer for the first time.	
1	Before	Exterior of Semitrailer	a. Walk around semitrailer. Check for evidence of product leakage on or under semitrailer. b. Check each fire extinguisher. Make sure red button is down. Check security of mounting bracket or security pin. c. Check for operation of hazardous materials placards.	a. Any product leakage is evident. b. Fire extinguisher is missing. Red button is up. Security pin is missing (if so equipped). c. Any placard is missing or inoperative.

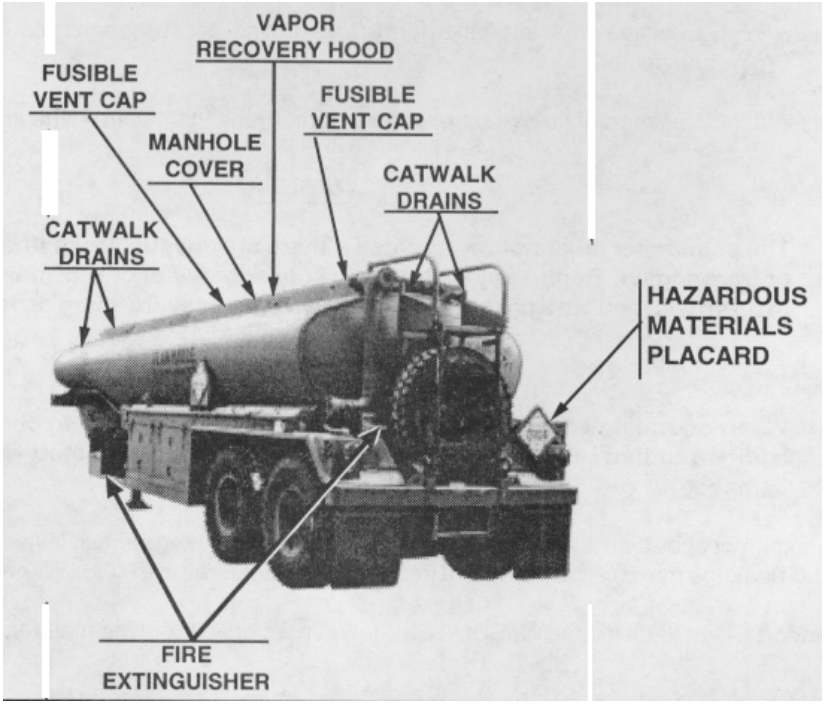


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

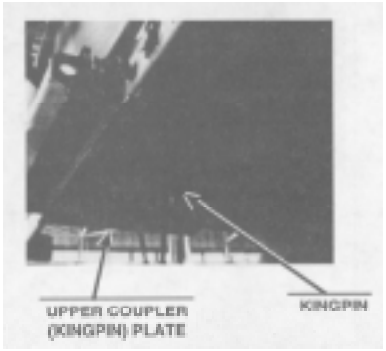
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
2	Before	Tank	a. Inspect tank shell for dents, leaks, and broken welds. b. Check for leaks around fusible vent caps. Tighten caps if loose. c. Check for leaks around manhole cover. If leaks are evident, check for damaged cover gasket or loose mounting ring. Also check to see that cover can be opened, closed. and securely latched. d. Inspect front and rear catwalk drains for clogs or restrictions. Remove any debris or foreign matter. e. Inspect vapor recovery hood for any loose, damaged, or missing hardware. f. Check tank for rust at intersections where brackets are welded to tank. Check condition of paint. If any damage is found, notify your supervisor.	a. Tank shell has fuel leaks. b. Any fuel leaks are present. c. Manhole cover gasket is damaged, manhole cover cannot be securely closed, or any fuel leaks are present.
3	Before	Kingpin or Upper Coupler (Kingpin) Plate	a. Inspect kingpin or upper coupler (kingpin) plate for damage or loose mounting bolts. or mounting bolts are loose. b. Visually inspect for obvious cracked or broken welds around kingpin.  	a. Kingpin or upper coupler (kingpin) plate is damaged

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

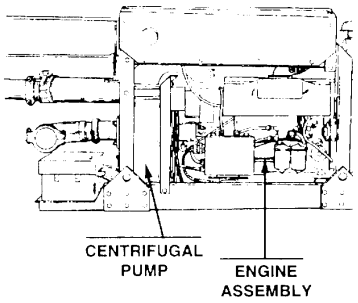
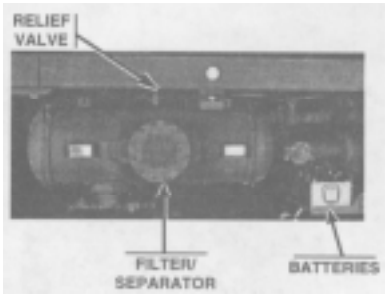
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
4	Before	Engine Assembly	Perform before-operation checks listed in paragraph 2-17a, engine operating instructions. 	Engine does not operate and is required for mission.
5	Before	Centrifugal Pump	Inspect pump for signs of leaks	Any fuel leaks are present.
6	Before	Batteries	Check batteries for secure mounting.	Battery is required for mission but is damaged
7	Before	Filter/ Separator	Check relief valve for debris at top of filter/ separator Remove debris 	

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

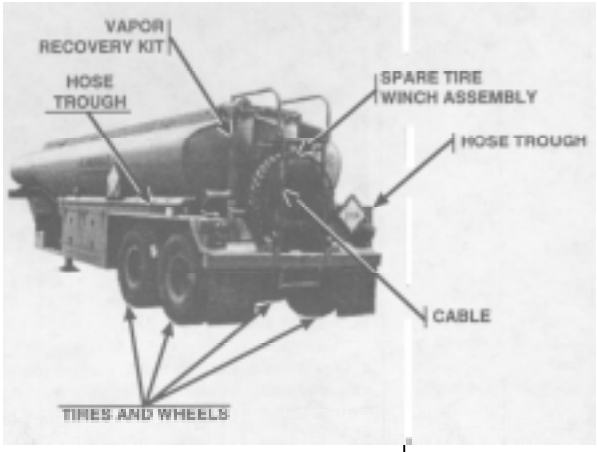
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
8	Before	Hose Troughs	Visually inspect hose trough lock bars for obvious damaged or missing parts. Check all mounting hardware for loose or missing components. Check drain holes for clogs or debris. Remove debris.	
				
9	Before	Vapor Recovery Kit	Check discharge outlet for debris or any other foreign matter. Check all mounting hardware for loose or missing components.	Vapor recovery kit is required for mission, but is damaged.
10	Before	Tires and Wheels	Inspect tires and wheels for unusual wear or damage.	Tires or wheels have damage that could result in tire failure.
11	Before	Spare Tire Winch	a. Visually inspect spare tire winch assembly for loose, damaged, or missing components. Assembly	
			b. Visually inspect for frayed or worn cable.	b. Cable is frayed or worn.

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

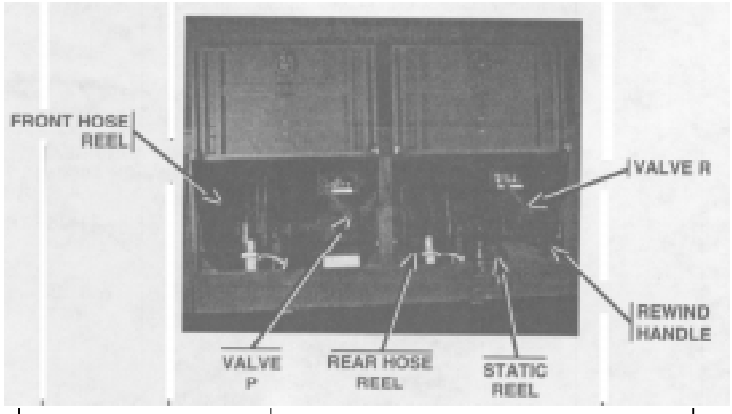
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
12	Before	Hose Reels	Check operation of rewind handle for front and rear hose reels	Either front or rear hose reel is inoperable.
				
13	Before	Grounding Devices	a. Check static reel operation. Inspect for missing grounding clips and loose or missing mounting hardware.	a. Static reel is missing from vehicle or is damaged.
			b. Check portable grounding rod to ensure that it is not damaged or missing.	b. Portable grounding rod is missing from vehicle or is damaged.
14	During	Piping System	a. Check all valves and couplings for leaks.	a. Any fuel leaks are present.
			b. Check valves P and R for proper operation.	b. Valve is hard to open or close.
15	During	Towing Connec-tions	a. Connect air lines of prime mover to couplings on semitrailer. With prime mover engine running. check air lines and couplings for air leaks.	a. Air leaks are present.
			b. Connect electrical line of prime mover to receptacle on semitrailer. Check all lights for damage. Check to see that all lights are operating, and check tightness of connection at receptacle. If tight, and lights still do not operate, notify Unit maintenance. Check electrical line for damage.	b. Turn signal and stop lights are not operating. Prime mover intervehicular cable is damaged (cuts, cracks, broken wires, etc.)

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

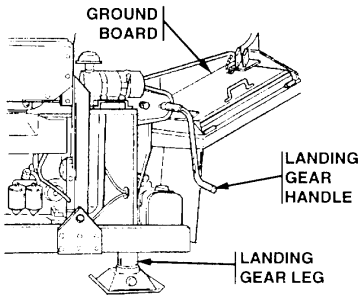
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
16	During	Brake System	a. With prime mover coupled to semitrailer, apply prime mover brakes and inspect semi-trailer service and emergency air brake couplings and all air lines and fittings for leaks. If leaks are found, notify Unit maintenance. 	a. Any leaks are present.
			b. Apply semitrailer brakes and observe operation.	b. Brakes do not stop semitrailer, or semitrailer pulls to one side.
17	During	Landing Gear	a. With prime mover coupled to semitrailer, engage landing gear handle and raise and lower landing gear legs.	a. Landing gear legs cannot be raised or lowered.
			b. Inspect landing leg ground boards for serviceability. 	b. Wood is required for mission but is dry-rotted

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

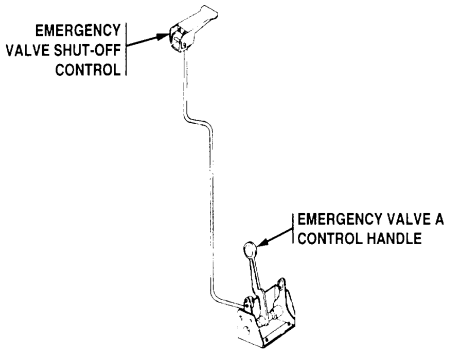
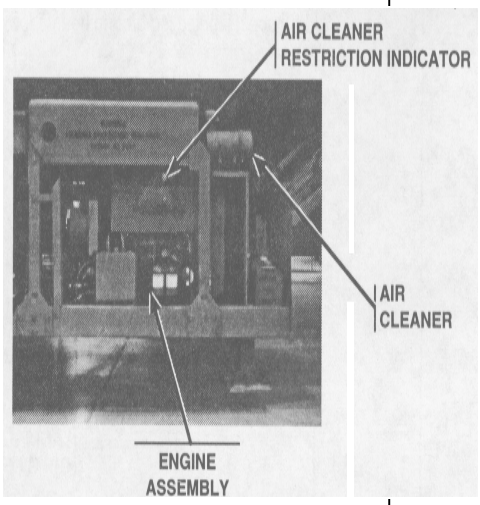
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
18	During	Emergency Valve	Make sure all valves are closed. Move emergency valve A control handle to OPEN position. On front curb side of the semitrailer, pull emergency valve shut-off control. Make sure emergency valve A control handle has moved to CLOSED position.	Emergency valve A does not move to the CLOSED position.
				
19	During	Engine Assembly	a. Check air cleaner restriction indicator for red area. If red area is visible, remove and clean engine air cleaner filter element (para 3-9). Notify Unit maintenance to replace air cleaner filter element after six cleanings or annually.	a. Restriction indicator has red area visible.
			b. Check engine assembly for fuel and oil leaks.	b. Any fuel leaks or Class III oil leaks are present.
				

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

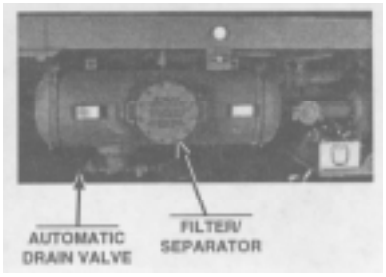
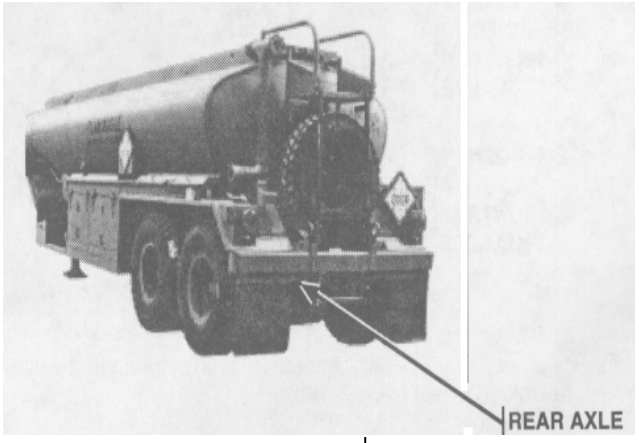
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
20	During	Filter/ Separator	Place suitable container under automatic drain valve. Check automatic drain valve on bottom of filter/separator for fuel seepage. No other liquid except water should be detected at the automatic drain valve. 	Any fuel leaks are present.
21	During	Rear Axles	During movement of semitrailer, be aware of wander or side pull. Listen for excessive noise. These are indications of improper rear axle alignment. 	Semitrailer wanders, has side pull, or rear axles make excessive noise.

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

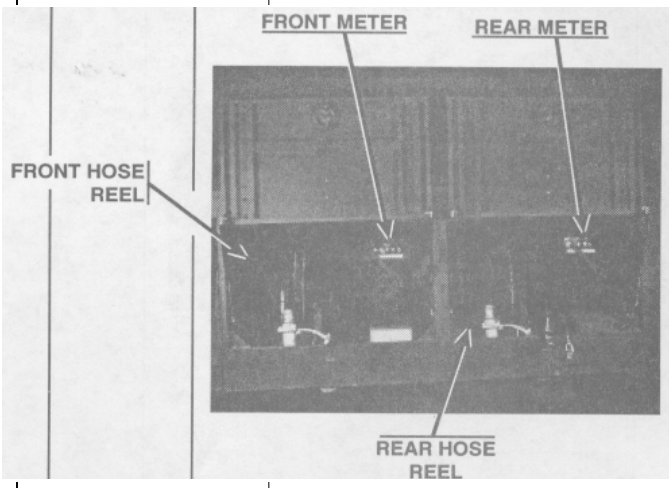
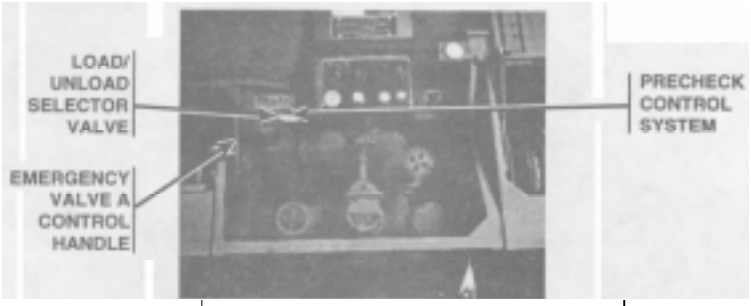
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
22	During	Hoses and Hose Reels	a. When unwinding hoses, observe for binding in front Or rear hose reel b. Inspect hoses for cuts and cracks	a. Hose reel binds or will not unwind hose. b. Either hose has cuts or cracks that allow leakage.
				
23	During	Meters	Check front and rear meters for registration of fuel being dispense,	
24	During	Precheck Control System	Check operation of shut-off float (para 2-18a)	Precheck control system does not operate. Emergency valve A control handle does not move freely from closed to open position.
				
25	During	Load/ Unload Selector Valve	Check operation of selector control valve (para 2-18b).	Load/unload selector valve does not operate. Emergency valve A control handle does not move freely from closed to open position.

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

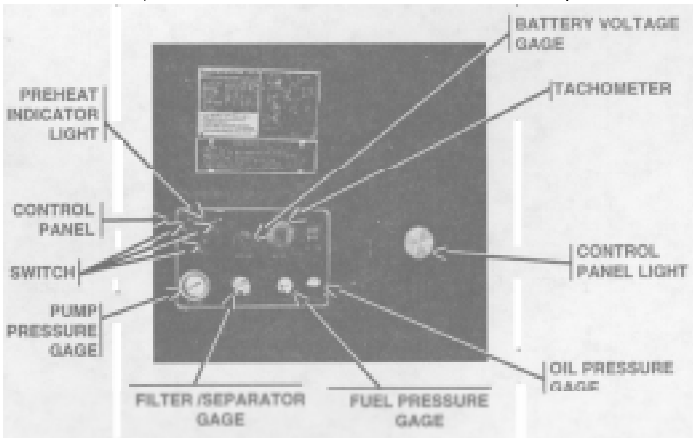
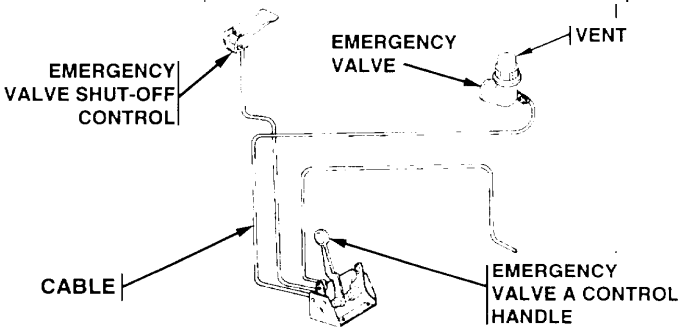
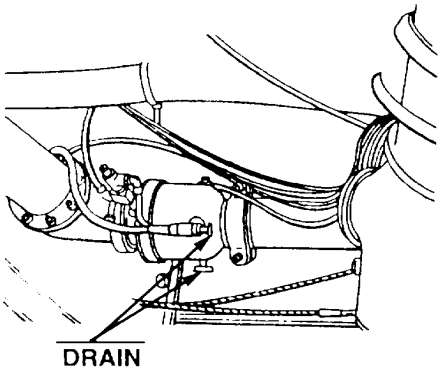
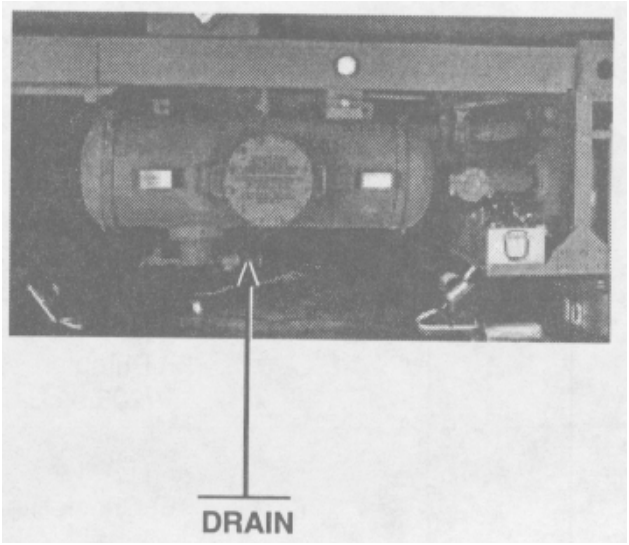
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
26	During	Control Panel	a. Check switches for proper operation	a. Switch does not work
			b. Check to see that preheat indicator light is lit when engine is preheating.	b. Preheat indicator light is not lit.
				
			c. Check gages for proper operation as follows:	
			(1) Check tachometer operation.	c(1). Tachometer is inoperative or operates erratically.
			(2) Battery voltage gage should read 12-14 V do with engine running	
			(3) Oil pressure gage should read 30-40 psi (206.9-275 8 kPa) with engine warm and running.	c(3). Oil pressure gage is inoperative or operates erratically
			(4) Fuel pressure gage should read 12-14 psi (82.7-96.5 kPa).	
			(5) Pump pressure gage should read 30 psi (206 9 kPa) for four-inch low-head pump.	c(5). Pump pressure gage is not functioning properly during pumping operations.
			(6) Check filter/separator gage	c(6). Filter/separator gage indicates 20 psi (137.9 kPa) or higher.
			d. Check control panel light for proper operation	

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

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
27	During	Emergency Valve and Vent	Make sure all valves are closed. Operate emergency valve A control handle, and make sure cable is actuating emergency valve shut-off control and opens vent on top of semitrailer.	Emergency valve A control handle will not actuate emergency valve shut-off control, or vent fails to open.
28	After	Piping System	a. Inspect all pipes for dents and cracks. b. Drain water from piping system drains.	a. Pipes are damaged to the extent that fuel flow will be restricted Pipes are cracked, allowing fuel leakage







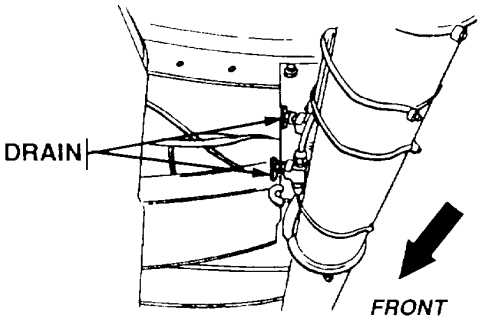
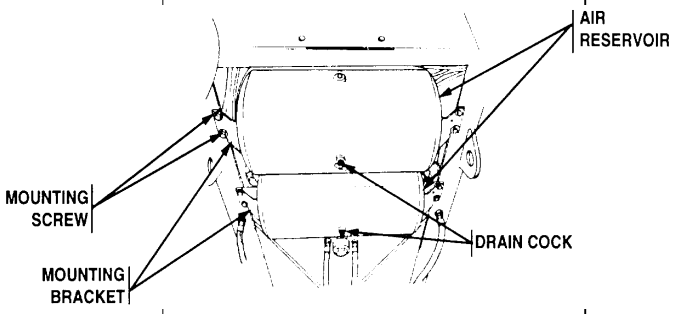


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
29	After	Brake System	a. Drain water from both air reservoirs by opening air reservoir drain cocks. b. Check mounting screws and mounting brackets for loose, missing, or damaged hardware.	b. Notify Unit maintenance if hardware is loose, missing, or damaged.
30	After	Engine Assembly	a. Inspect for debris in grille of air cooling intake area. b. Inspect alternator belt for tightness and cracks. c. Inspect hoses and connections for tightness and leaks. d. Inspect electrical harnesses for tightness and cracks e. Check engine oil level. Add oil if needed. For oil specifications, refer to page E-8. f. Check fuel tank for fuel. Add if needed; 1/4 of a tank is required.	



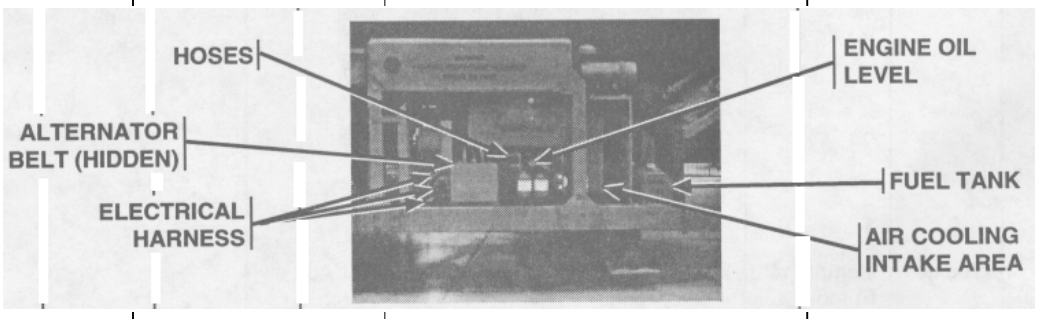


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

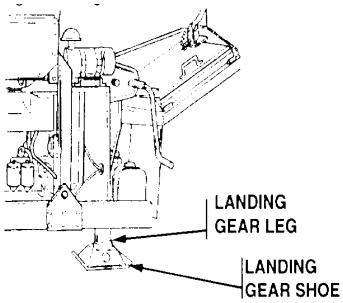
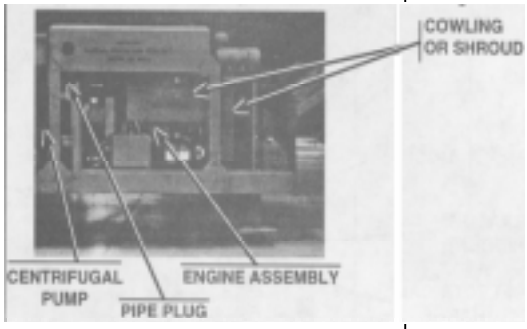
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
31	After	Hose Troughs	Inspect troughs for debris Remove any debris found and check to see that water drain holes are open 	
32	Weekly	Landing Gear	Inspect for loose landing gear shoes, bent or damaged landing gear legs, and loose or missing mounting bolts. 	Mounting bolts are loose or missing.
33	Weekly	Engine Assembly	Visually inspect engine assembly for loose, damaged, or missing cowlings or shrouds. 	Any cowling or shroud is missing.
34	Weekly	Centrifugal Pump	Remove pipe plug and check oil level. Add oil if below bottom of pipe plug hole For oil specifications, refer to page E-8.	

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

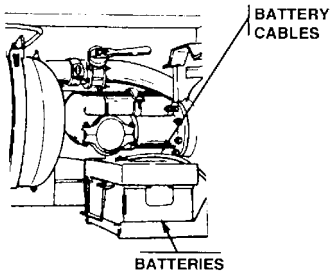
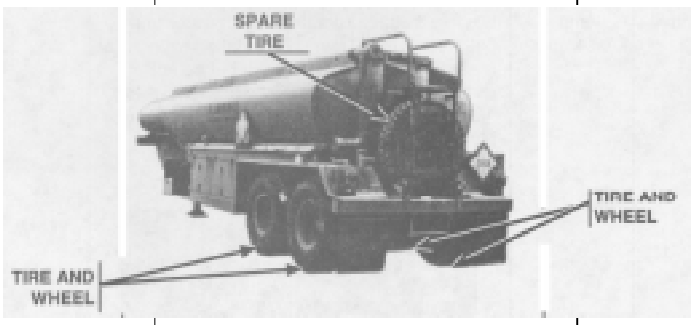
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
35	Weekly	Batteries	a. Remove battery cover. Visually inspect batteries for damage. b. Check electrolyte level in each cell.  	a. Any battery is damaged. b. If electrolyte level is low, notify Unit maintenance.
36	Weekly	Battery Cables and Terminals	Check for corrosion at terminals. Check cable tightness on terminals. Check for cable damage.	If terminals are loose or damaged, notify Unit maintenance.
37	Weekly	Tires and Wheels	Check for proper air pressure: Radial hard road surface - 65 psi (448.2 kPa). Cross country - 45 psi (310.8 kPa).  	
38	Monthly	Tires and Wheels	a. Inspect wheels for cracks or other damage. Check tightness of wheel nuts. b. Inspect spare tire for secure mounting. c. Inspect wheel assemblies.	a. Wheel is damaged or three or more wheel nuts are missing.

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

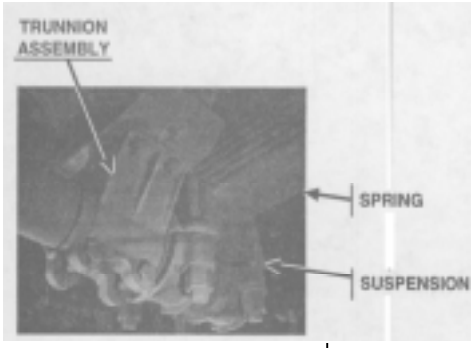
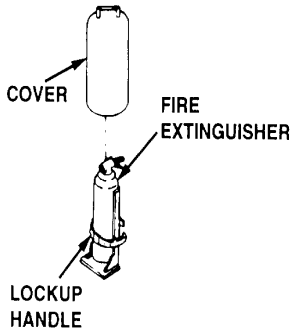
ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
39	Monthly	Suspension	a. Visually inspect Trunnion assembly for obvious damage. b. Inspect springs for broken leaves. c. Visually inspect suspension for loose, missing. or damaged hardware. 	c. Suspension hardware is loose, missing, or damaged.
40	Monthly	Engine Assembly	Using a suitable container, drain water from both fuel filters. Using combination wrench set (Item 24, Appendix B), loosen but do not remove drain plugs at bottom of filters. Allow fuel to drain until clear of water Tighten drain plugs. 	

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

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION[CAPABLE IF:
41	Monthly	Fuel-Dispensing Nozzles	Clean nozzle screens (para 3-11).	
42	Monthly	Fire Extinguishers	**WARNING** **Handle charged fire extinguisher cylinders with care. DO NOT jar or expose to temperature above 140OF (60-C).**	
			a. Remove cover from each fire extinguisher. Check to see that lockup handle moves freely and is not damaged.	a. Lockup handle is missing, damaged, or inoperative.
			b. Check to see that plastic indicator on top of fire extinguisher is intact.	b. Plastic indicator is missing, damaged, or inoperative.
			NOTE **Some f ire extinguishers have a safety wire lead or plastic seal attached to pull pin.**	
			c. Check to see that safety wire lead or plastic seal is not broken or missing.	c. Safety wire lead or plastic seal is missing, damaged, or inoperative.
			d. Check to see that tube is not kinked and nozzle is free of obstructions.	d. Tube or nozzle is missing, damaged, or inoperative.
				

Section III. OPERATION UNDER USUAL CONDITIONS

2-10. GENERAL.

WARNING

If used incorrectly, this equipment can cause severe injury or death. Those who use and maintain the equipment should be trained in its proper use, should be warned of its dangers, and should read this entire manual before attempting to set up, operate, adjust, or service the equipment.

This section provides operator/crew instructions for the operations and proper use of the M969A2 semitrailers under usual conditions.

2-11. INITIAL ADJUSTMENTS, CHECKS,AND SELF-TEST.

WARNING

Equipment, safety devices, and working areas must be inspected frequently to ensure personal and operational safety and to correct potential or actual hazards.

a. The sernitrailer must not be operated if any of the following conditions exist.

(1) Fuel leaks

(2) Damage to wiring or electrical conduits, causing inoperative lights

(3) Damage to prime mover or semitrailer

(4) Inoperative primary or parking brake systems.

2-11. INITIAL ADJUSTMENTS, CHECKS AND SELF-TEST (continued).

NOTE

Pressure, vacuum, and fusible vents are installed to meet code requirements and to protect the semitrailer from damage. A plugged or inoperative vent can cause extensive shell damage if design pressure o0 vacuum is exceeded. The fusible vents are designed to operate at high temperatures if these vents are coated with paint, dirt, or other foreign material, the temperature when relief vent opens may be greatly increased.

(5) Plugged, inoperative, or removed vents

b. The before-operation services specified in Title 2-1, Operator/Crew Preventive Maintenance Checks and Services, must be performed before using the semitrailer

c. You must follow approved practices and precautions. A detailed study of Section IV, Operation Under Unusual Conditions, is essential for use of the M96C3A2 semitrailer under unusual conditions.

2-12. COUPLING SEMITRAILER TO PRIME MOVER.

WARNING

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

CAUTION

Do not ram prime mover into semitrailer upper coupling (kingpin) plate. Failure to follow this caution may damage equipment.

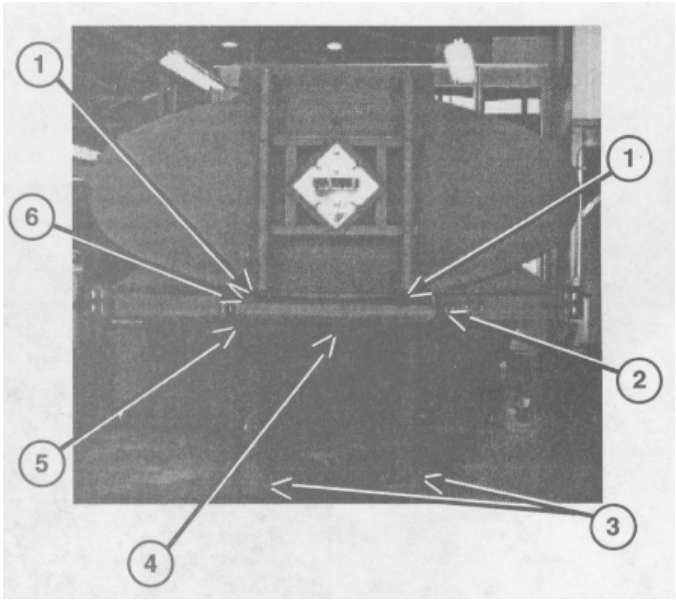
1. With the aid of an assistant, hack prime mover slowly to front of semitrailer. Maneuver prime mover so kingpin (4) on semitrailer is in line with fifth wheel jaws on prime mover

2. Stop prime mover before upper coupler (kingpin) plate (5) of semitrailer starts to ride con fifth wheel of prime mover.

3. Make sure kingpin (4) and fifth wheel are properly aligned. Landing gear legs (3) may need to be raised or lowered to align the level of upper coupler (kingpin) plate (5) and fifth wheel.

4. Back prime mover under upper coupler (kingpin) plate (5) until kingpin (4) and fifth wheel hook automatically. Make sure kingpin (4) and fifth wheel are engaged and locked Engage prime mover parking brake.

5. Remove dummy couplings (1) from semitrailer service air coupling (6) and semitrailer emergency air coupling (2). Connect prime mover air line marked SERVICE to service air coupling (6), and connect air line marked EMERGENCY to emergency air coupling (2)



2-12. COUPLING SEMITRAILER TO PRIME MOVER (continued).

CAUTION

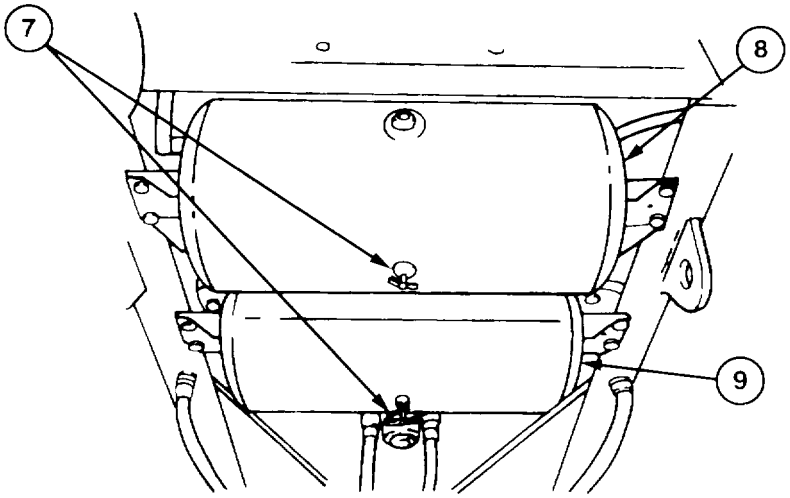
Proper operation of semitrailer primary brake system is essential for safe operation of vehicle. Functional system check is necessary before putting trailer into service. Semitrailer parking brakes are provided to maintain braking and holding requirements whether semitrailer is fully loaded or empty. The system will automatically apply parking brakes when air pressure in primary reservoir falls below specified pressure. Proper operation of this system must be maintained.

6. Close drain valves (7) on front and rear reservoir tanks (8 and 9).

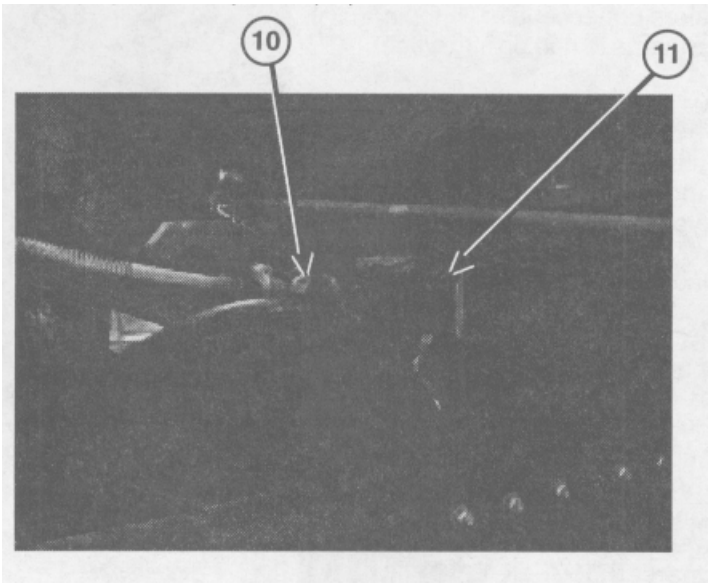
NOTE

Some prime movers are not equipped with shut-off valves.

7. Open shut-off valves on air lines of prime mover



8. Plug intervehicular cable (10) into receptacle (11) on semitrailer.



2-12. COUPLING SEMITRAILER TO PRIME MOVER (continued).

9. With the aid of an assistant, operate lights from prime mover to make sure all semitrailer lights are working properly.

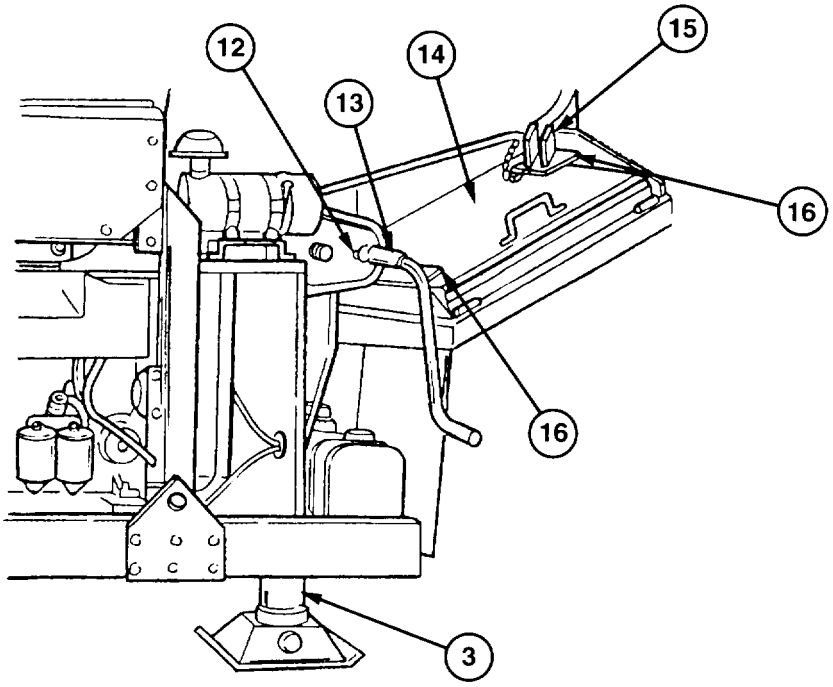
10. Release landing gear operating crank (13) from clip (15), and engage crank (13) on shaft (12).

NOTE

- **When there is no load, pull out on crankshaft to engage high-speed gears for fast raising or lowering of landing gear legs.**
- **When greater power is needed, push in on operating shaft to engage low-speed gears to lower or raise landing gear legs.**
- **Rotate crank clockwise to raise landing gear legs. Rotate crank counterclockwise to lower landing gear legs.**

11. Rotate crank (13) and raise landing gear legs (3).

12. Replace crank (13) in clip (15).



13. If ground boards (14) were used, stow them in brackets (16) at each side of semitrailer.

2-13. SPARE TIRE DISMOUNTING AND MOUNTING.

a. DISMOUNTING

1 Remove two nuts (6) and reinforcement channel (7) from studs and spare tire (5).

2 Remove curb-side then road-side quick-release pins (1) from ladder (4) and carrier assembly (3).

WARNING

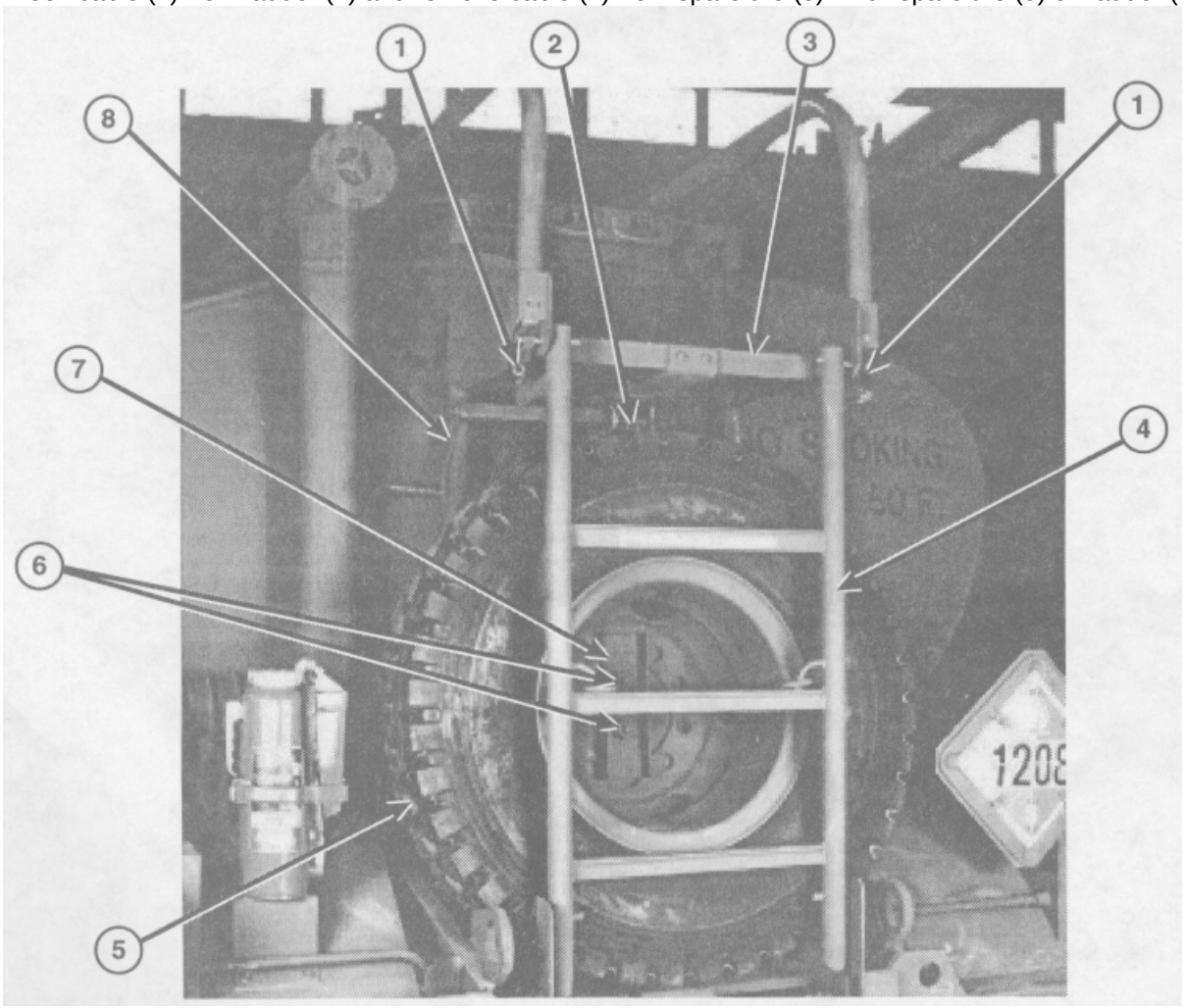
Spare tire and ladder are heavy. Make sure cable is not frayed or damaged. Do not raise spare tire and ladder past the vertical position or they will slam into carrier assembly. Failure to heed this warning may result in severe injury to personnel or damage to the equipment.

3 Rotate winch handle (8) until cable (2) is tight, then rotate winch handle (8) 1-1/2 turns in opposite direction.

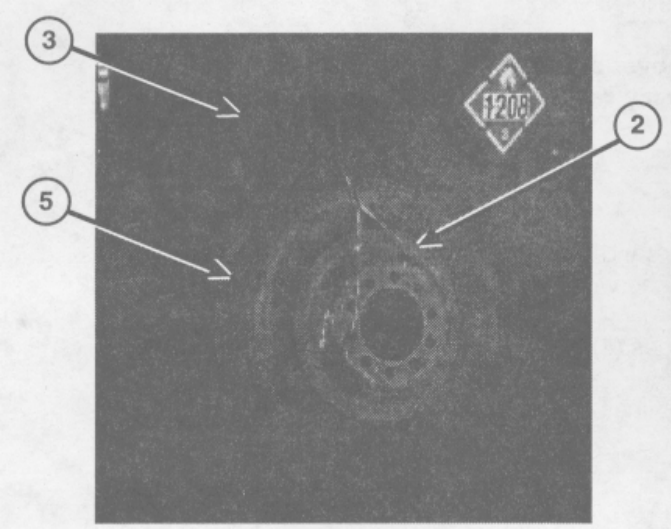
4. Push spare tire (5) and ladder (4) away from carrier assembly (3) until supported by cable (2).

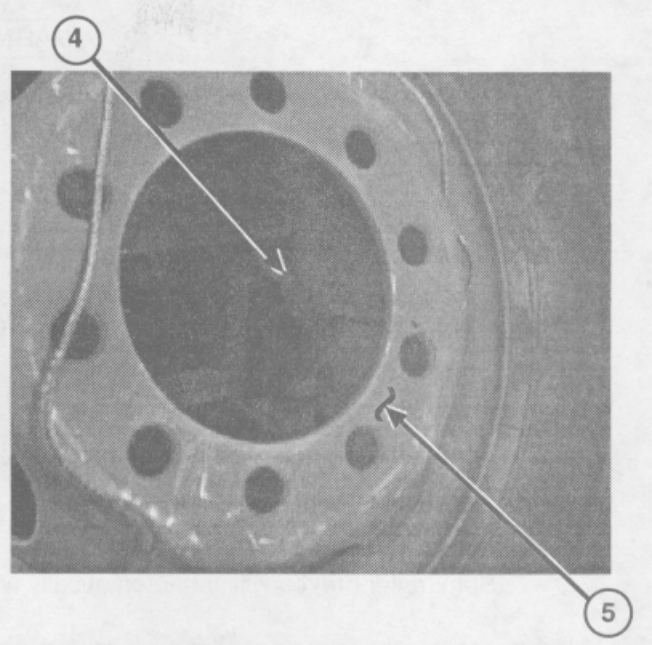
5 Rotate winch handle (8) until spare tire (5) and ladder (4) are fully lowered to the ground and cable (2) is slack.

6. Unhook cable (2) from ladder (4) and remove cable (2) from spare tire (5). Roll spare tire (5) off ladder (4).



2-13. SPARE TIRE DISMOUNTING AND MOUNTING (continued).





b. MOUNTING

1 Roll spare tire (5) onto ladder (4). Route cable (2) through ventilation holes in spare tire (5) and hook to ladder (4).

WARNING

Spare tire and ladder are heavy. Make sure cable is not frayed or damaged. Do not raise spare tire and ladder past the vertical position or they will slam into carrier assembly. Failure to heed this warning may result in severe injury to personnel or damage to the equipment.

2. Rotate winch handle (8) until spare tire (5) and ladder (4) are nearly vertical, with weight still supported by cable (2).

3. Carefully push spare tire (5) and ladder (4) in until resting against carrier assembly (3).

4. Install road-side then curb-side quick-release pins (1) in ladder (4) and carrier assembly (3).

5. Secure spare tire (5) to carrier assembly (3) with two nuts (6) and reinforcement channel (7)

6. Rotate winch handle (8) until cable (2) is tight and winch handle (8) is pointing down

2-14. UNCOUPLING SEMITRAILER FROM PRIME MOVER.

WARNING

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

NOTE

If the semitrailer is to be uncoupled in mud, sand, or snow, or if the prime mover is an M931 Al or M932A1, begin at step

1. Otherwise, go to step 2.

1. Center ground boards (1) beneath landing gear shoes (4).

2. Close shut-off valves on service and emergency air lines at rear of prime mover.

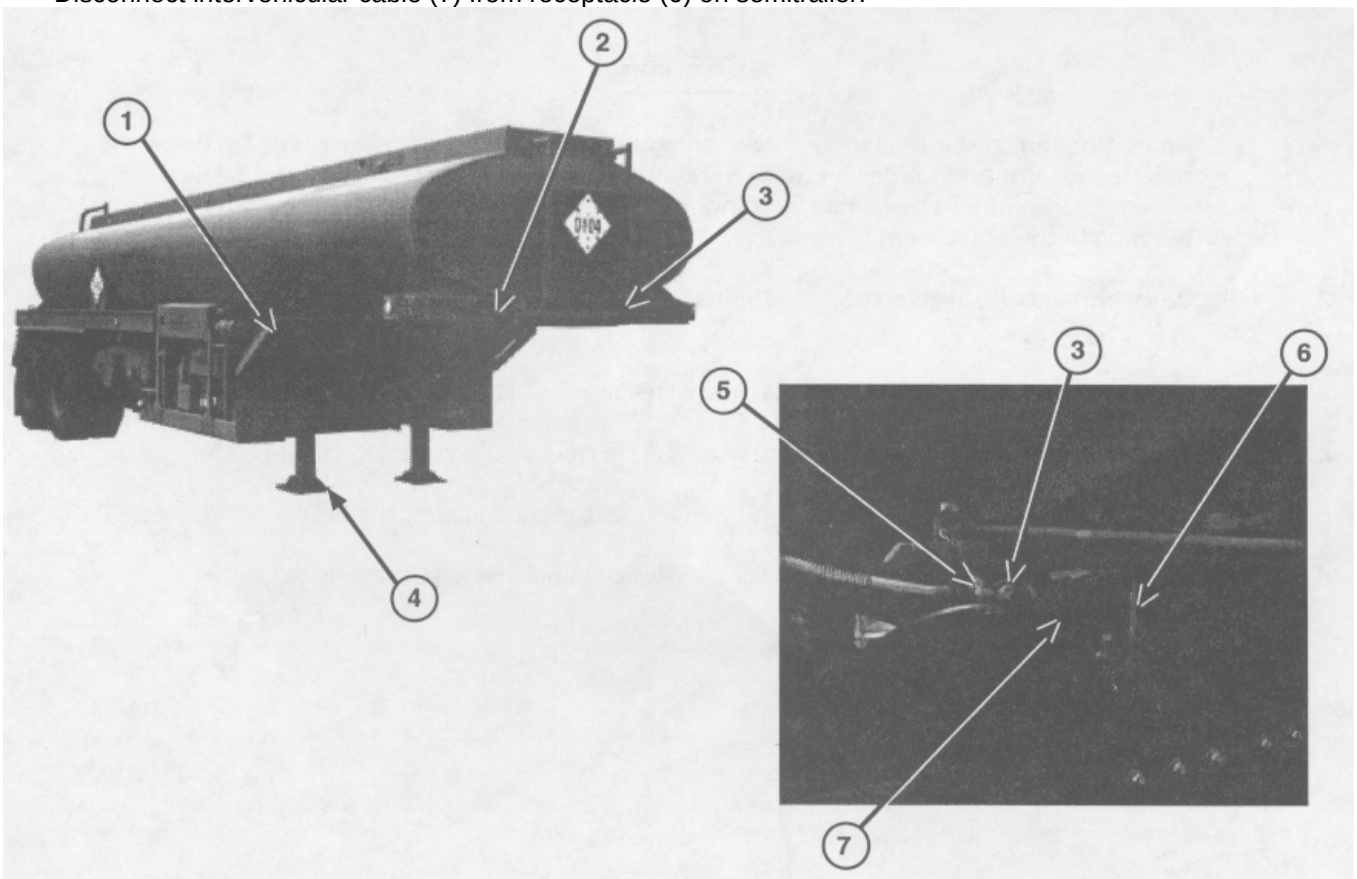
NOTE

Semitrailer brakes will set automatically when service airbrake hose is uncoupled.

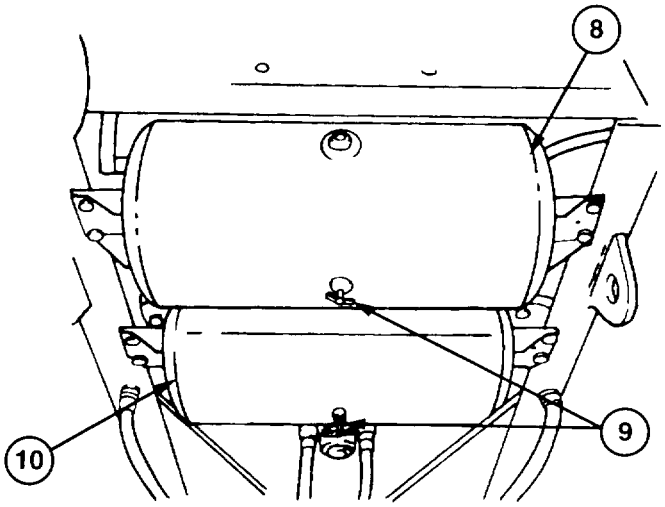
3. Disconnect emergency and service air lines from emergency and service air couplings (2 and 3) on semitrailer.

4. Install dummy couplings (5) in semitrailer emergency and service air couplings (2 and 3).

5. Disconnect intervehicular cable (7) from receptacle (6) on semitrailer.



2-14. UNCOUPLING SEMITRAILER FROM PRIME MOVER (continued).

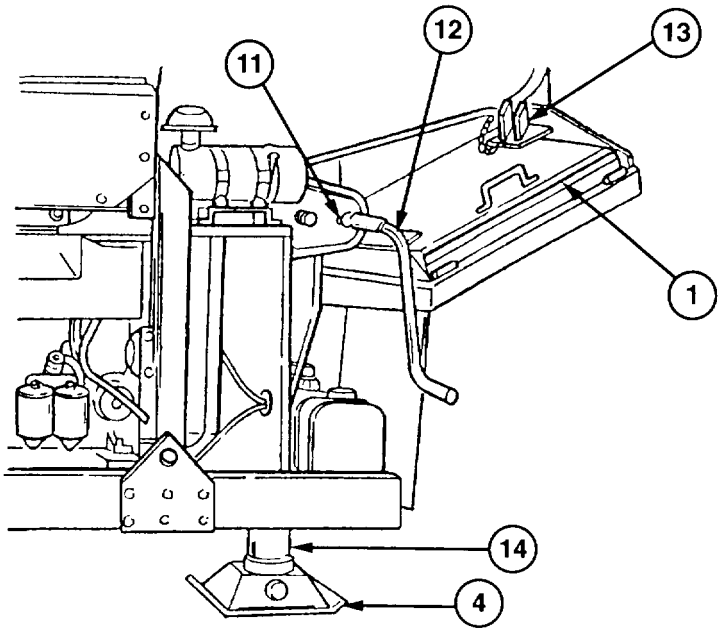


6. Open drain valves (9) on front and rear reservoirs (8 and 10).

7. Release landing gear operating crank (12) from clip (13), and engage crank (12) on shaft (11).

8. Rotate crank (12) counterclockwise to lower landing gear (14) until shoes (4) are firmly on the ground or ground boards (1).

9. Replace crank (12) in clip (13) and secure.



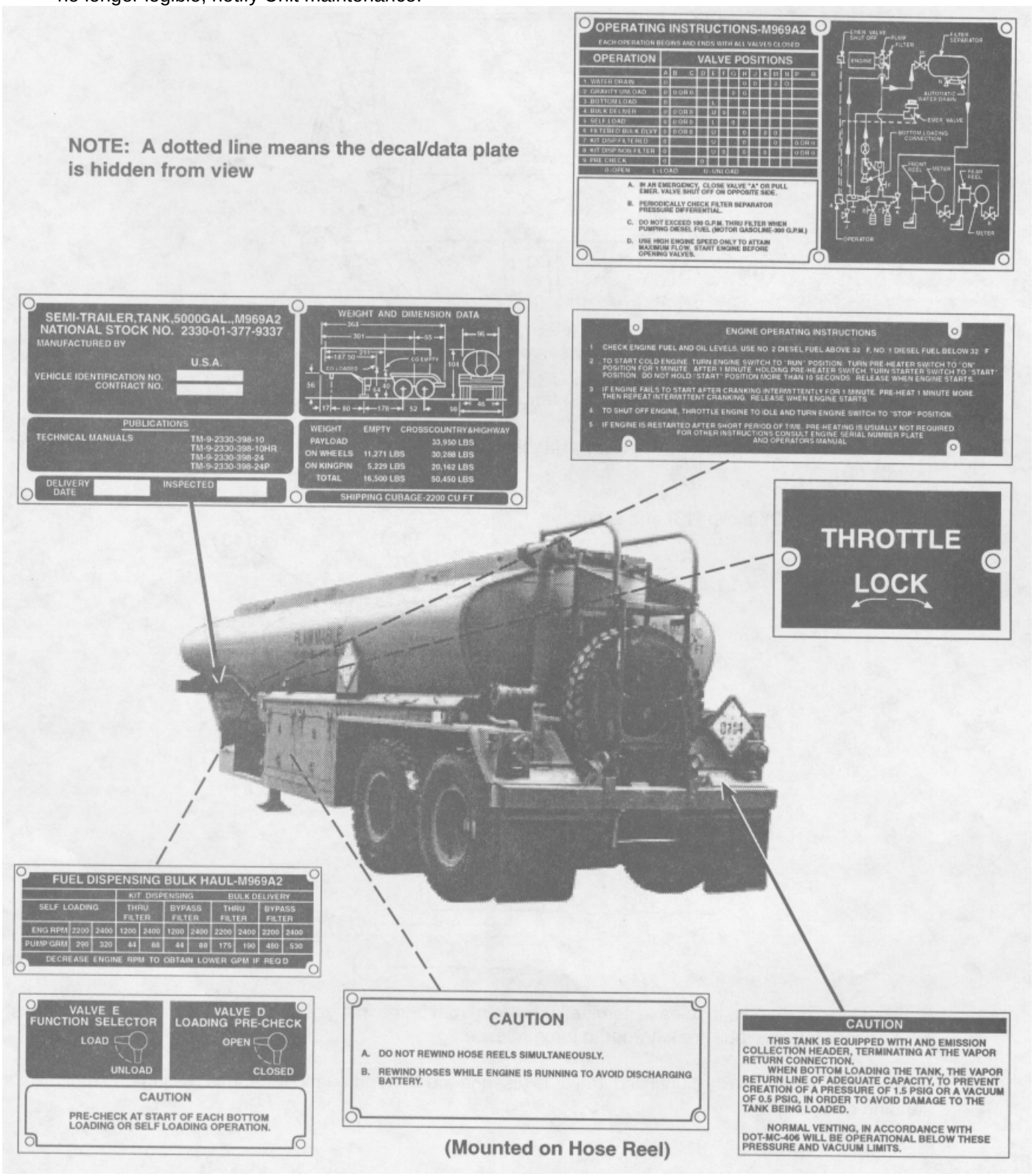
10. Pull out lockjaw handle to release semitrailer kingpin from prime mover's fifth wheel hook. If hook is binding and will not release, pull hook harder to force release.

11. Drive prime mover forward until semitrailer is disengaged from prime mover and is resting on semitrailer's landing gear (14).

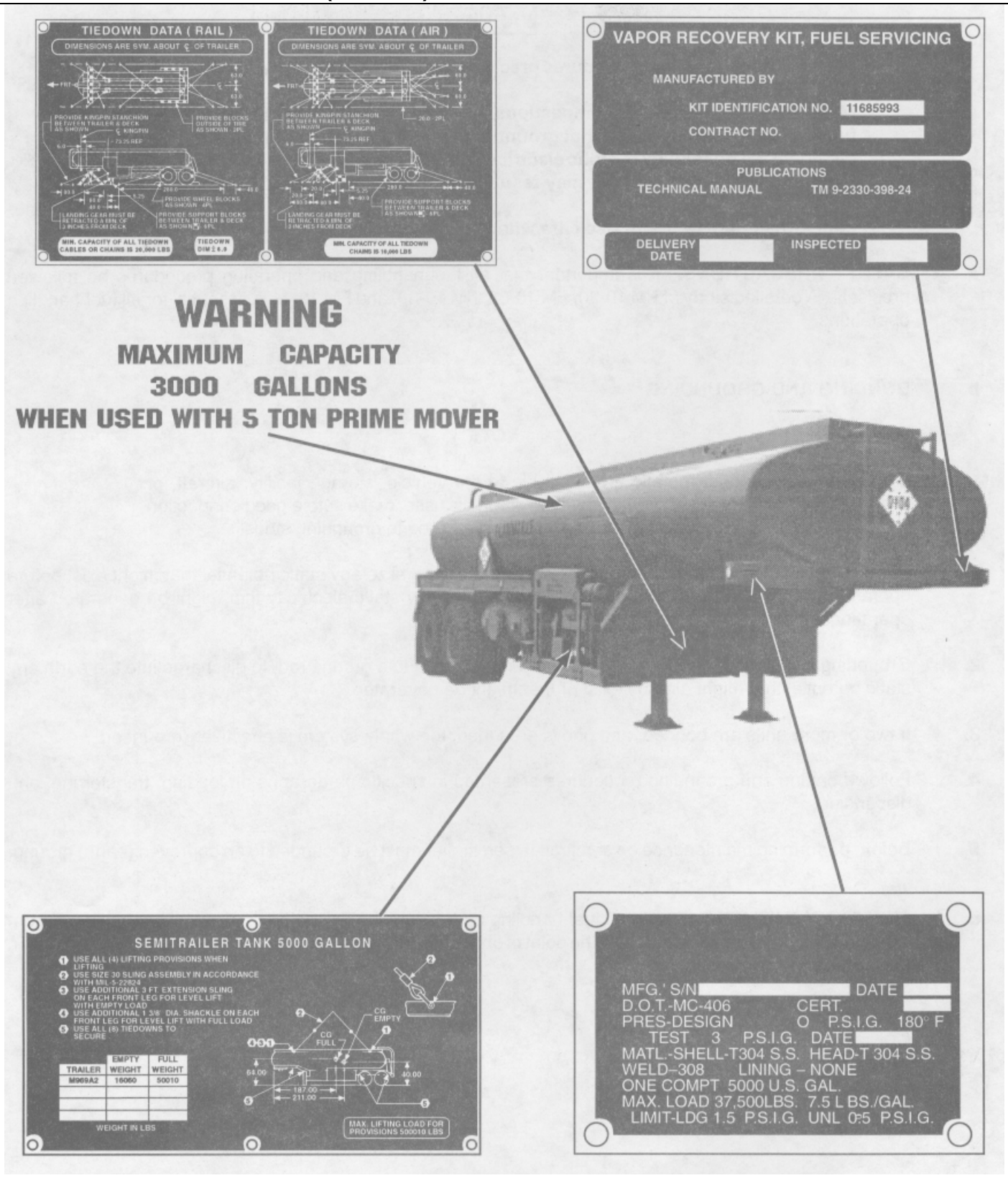
2-15. DECALS AND DATA PLATES.

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

b Maintain all decals and data plates so that all information remains legible. If any decals or data plate is missing or no longer legible, notify Unit maintenance.



2-15. DECALS AND DATA PLATES (continued).



2-16. GENERAL FUEL-HANDLING INSTRUCTIONS.

WARNING

- **Follow all fuel-handling procedures precisely, to prevent injury or death to personnel.**
- **Make sure that grounding connections are made properly and firmly before any fueling operations begin so that grounding connections will not release. This will eliminate the possibility of static electricity creating sparks which will ignite the fuel. Failure to follow this warning may result in serious injury or death to personnel.**
- **Ladder has narrow tread. Use care when climbing.**

a. SAFETY PRECAUTIONS. It is important that all fuel-handling and operating procedures be followed precisely. A detailed study of FM 10-20, FM 10-68, FM 10-69, and FM 10-71 is essential for all fuel-handling operations.

b. BONDING AND GROUNDING

NOTE

Always connect a static ground cable to the vehicle, storage facility, aircraft, or equipment being serviced. If portable ground is used, make sure a good connection is made. Make sure grounding cables are secured to grounding studs.

1. Bonding is electrically connecting units or containers to equalize any static potential that might exist before operations begin and to provide a continuous path for any static electricity that might be generated after operations begin.

2. Grounding is electrically connecting single or bonded units to a ground rod to discharge into the earth any static potential that might already exist or that might be generated.

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

4. Follow bonding and grounding procedures presented in specific paragraphs on loading, transferring, and dispensing.

5. Before performing maintenance on semitrailer, semitrailer must be grounded to an approved (earth) ground.

c. FIRE EXTINGUISHERS. During all fuel-handling operations, the fire extinguishers must be removed from their stowage brackets and brought to the point of operation. Replace fire extinguishers and their covers when fuel servicing is completed.

2-16. GENERAL FUEL-HANDLING INSTRUCTIONS (continued).

WARNING

The operator must be alert for leaking and malfunctioning equipment. Stop all servicing operations immediately at the first sign of leaks or malfunctions. Corrective action must be performed by qualified technicians before resuming any operations. Failure to observe these precautions may result in injury to personnel.

d. **SPILLS AND LEAKS**. All spills must be cleaned up immediately. Suitable containers must be placed under hose connections to collect leakage or spills.

e. **VAPOR RECOVERY.** Refer to paragraph 1-11 for information on the vapor recovery system.

f. **BULK FUEL SERVICING HOSES.** Whenever bulk fuel hose is required, remove the necessary lengths from hose troughs and couple together as required.

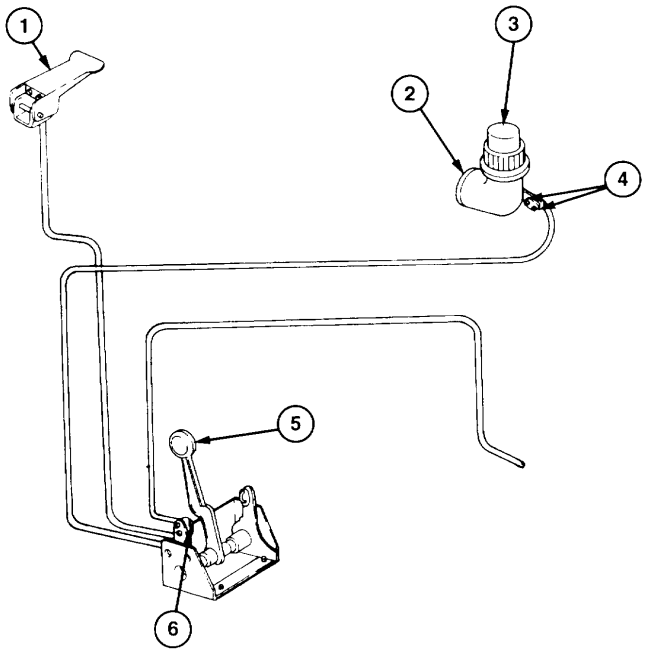
g. **FUEL-DISPENSING NOZZLES.** Make sure hoses are installed with correct fuel dispensing nozzles for the operation intended. Refer to paragraph 3-11 to install fuel-dispensing nozzles.

h. **EMERGENCY VALVE OPERATION.** The emergency valve (2) controls the tank outlet. The emergency valve (2) and its vapor vent (3) are mechanically operated by the emergency valve A control handle (5) in the piping control assembly. Engaging the emergency valve A control handle (5) opens the emergency valve (2) to permit fuel flow to/from tank sump. At the same time, vapor vent (3) at top of tank opens to relieve pressure/ vacuum during loading or unloading.

1. Emergency valve (2) must be open for all loading/unloading operations except top loading.

2. In an emergency, close emergency valve (2) by disengaging emergency valve A control handle (5) (road side of semitrailer), or by pulling emergency valve shut-off (1) (curb side).

3. In the event of fire or explosion, either the fusible nut (6) on emergency valve A control handle (5) or the fuse plates (4) at emergency valve (2) will melt, releasing emergency valve (2) and automatically stopping fuel flow.



2-17. ENGINE OPERATING INSTRUCTIONS.

WARNING

Before and after fuel-servicing operations, all valves are to be in the closed position. Failure to follow this warning could result in excessive spillage and create a fire hazard.

CAUTION

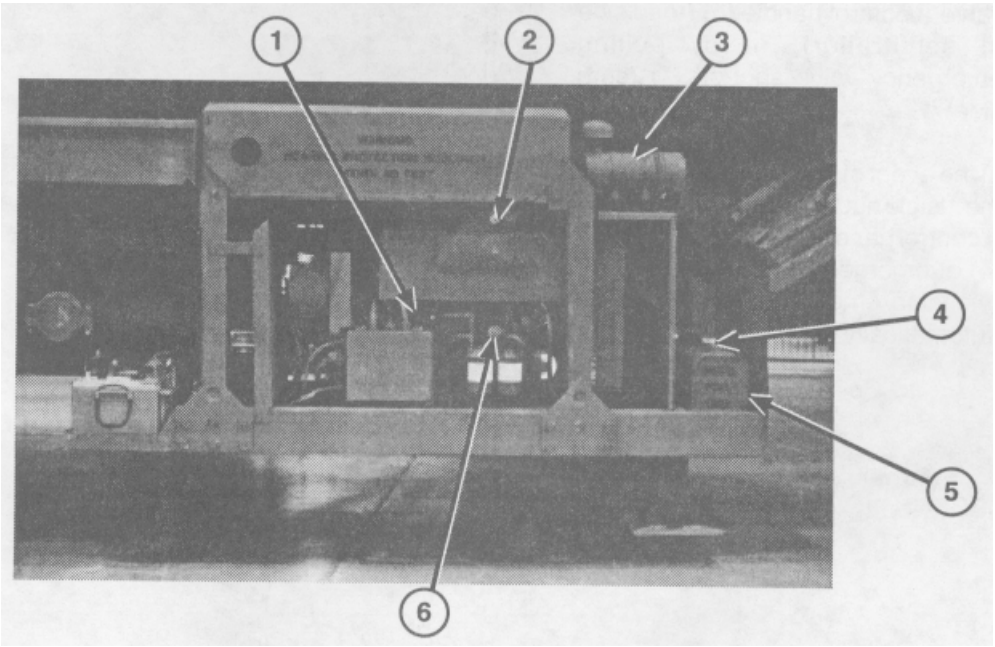
- Prior to starting engine, make sure all manually operated valves are closed. This is a must before starting or ending any fuel-servicing operation.
- To prevent collapse of tank when filling or emptying tank, make sure that the top vent is working properly.
- Open only those valves required to perform a specific operation. All other valves must remain closed. Close all valves again after completing the operation.

a. BEFORE OPERATION

NOTE

Before starting engine, the checks and services listed in steps 1 through 3 should be performed.

1 Before starting engine (1), remove fuel tank cap (4) and check fuel level in fuel tank (5). Fill with winter-grade diesel fuel oil (Item 6, Appendix D) or Arctic diesel fuel oil (Item 4. Appendix D) for operation below 32"F (0 C). Use regular-grade diesel fuel oil (Item 5, Appendix D) for operation above 32 F (0 C). Tank capacity is approximately four gallons (15.1 L).



2-17. ENGINE OPERATING INSTRUCTIONS (continued).

2. Pull oil dipstick (6) and check oil level. If dipstick (6) reads L (low), add one quart to bring oil to F (full) mark. If below L mark, add one quart at a time until dipstick (6) reads F. For oil specifications, refer to page E-8.

3. Check air cleaner restriction indicator window (2). A red band indicates that engine air cleaner (3) is dirty. Clean or replace air cleaner filter element (para 3-9).

b. STARTING ENGINE

WARNING

- **Carbon monoxide can be deadly. DO NOT operate engine in an enclosed area unless it is adequately ventilated.**
- **Hearing protection is required within 50 feet of tanker during operation of engine. Failure to follow this warning may result in injury to personnel.**

NOTE

This procedure is for starting a cold engine in temperatures above 55°F (13°C).

1. Set engine switch (11) on control panel (8) to RUN.

NOTE

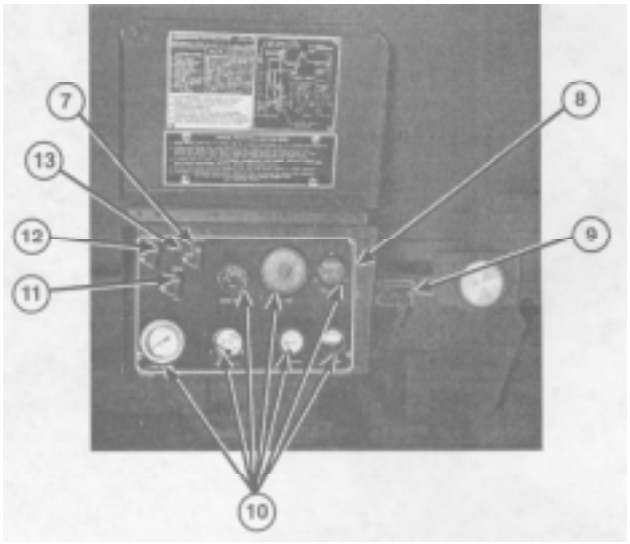
When engine is warm or is being restarted after short periods of time, preheating is usually not necessary. In temperature below 30°F (-1°C), a longer preheating period is needed (subpara f).

2. Set preheater switch (12) to ON for about one minute. Make sure indicator light (13) is illuminated.

3. After one minute, turn starter switch (7) to START.

4. After engine (1) starts, release starter switch (7) and preheater switch (12).

5. Check gages (10) on control panel (8) for correct indications (Table 2-1). Stop engine (1) if a system malfunction is indicated.



c. STOPPING ENGINE

1. To allow for gradual cooling of engine, run engine at fast idle (1200 rpm) for about five minutes before stopping.

2. Release throttle (9) to allow engine (1) to return to low idle.

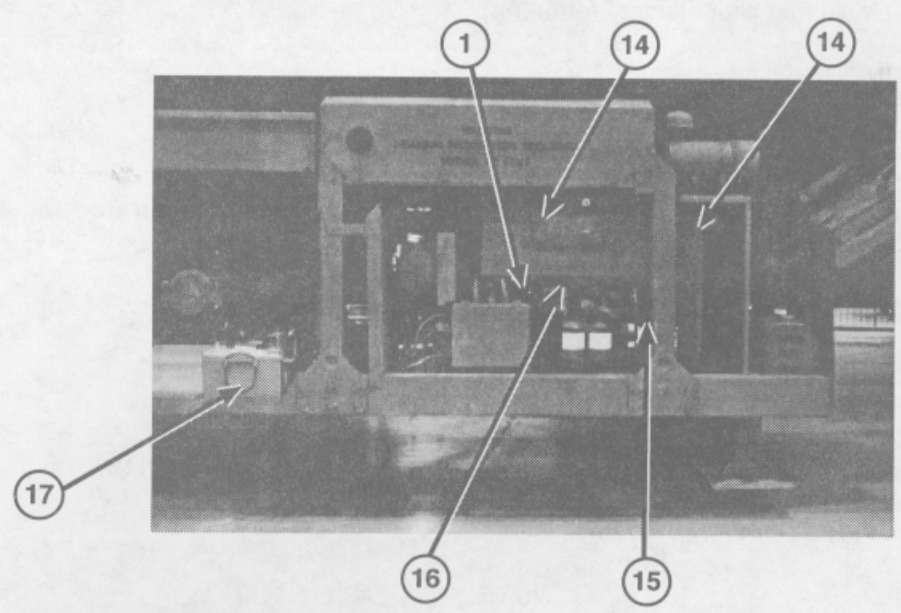
3. Set engine switch (7) to STOP.

2-17. ENGINE OPERATING INSTRUCTIONS (continued).

d. ENGINE OPERATION (High Temperature)

1. Make sure nothing obstructs air flow to and from engine oil cooler (15) and cylinder cooling fins (16).

2. Make sure all shrouds (14) are properly installed and in good condition.



e. ENGINE OPERATION (Low Temperature)

1. Make sure engine (1) has the proper oil and fuel for existing temperatures. For fuel specifications, refer to paragraph 2-17a. For oil specifications, refer to page E-8.

2. Keep batteries (17) fully charged.

NOTE

Entire cold weather starting procedure may not be required. The colder the temperature, the more preheating and cranking will be required.

f. COLD WEATHER STARTING

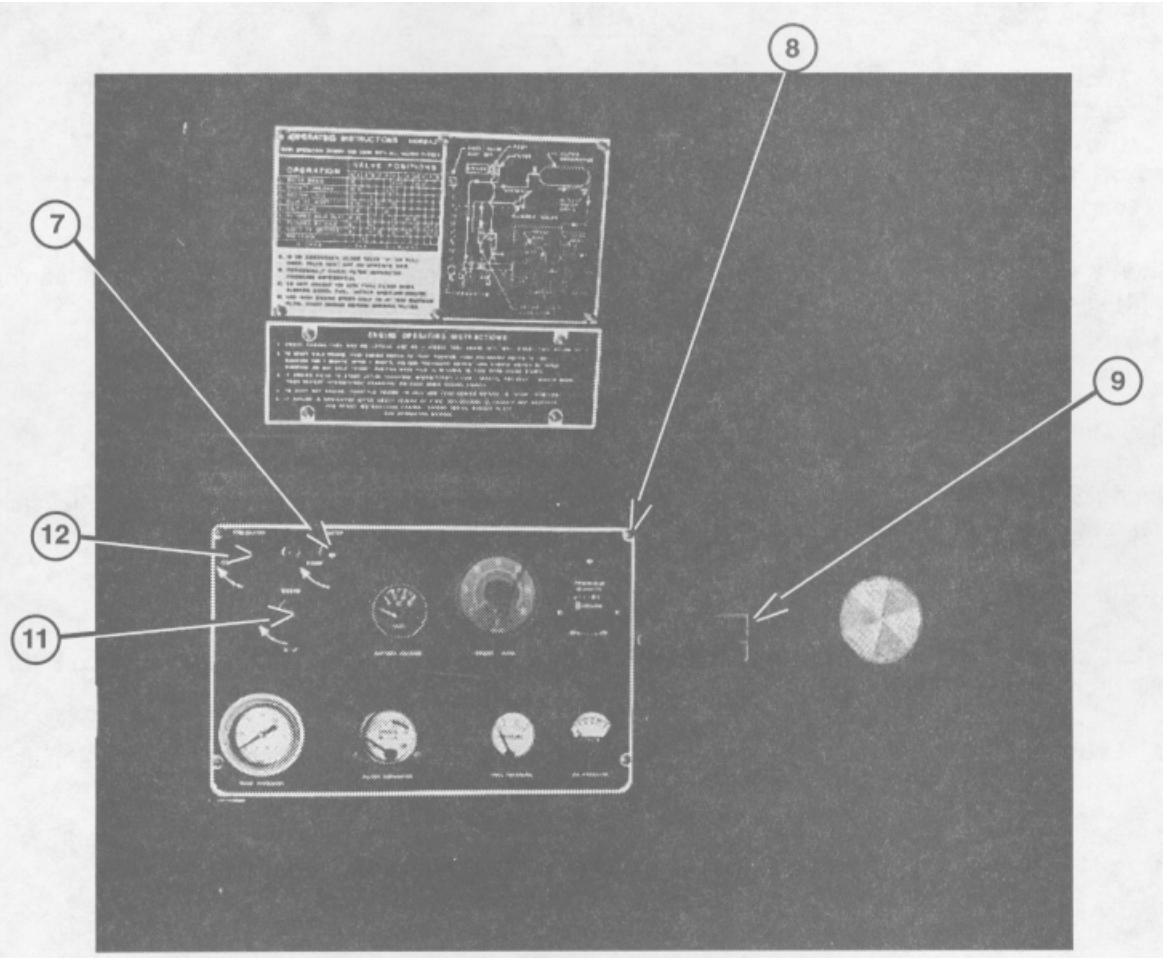
NOTE

When temperatures are below 30°F (-1°C), use this procedure to start engine.

1. Pull out throttle (9) about halfway.

2. Set preheater switch (12) to ON.

2-17. ENGINE OPERATING INSTRUCTIONS (continued).



3. After two minutes, set engine switch (11) on control panel (8) to RUN. Wait 15 seconds, then turn starter switch (7) to START and crank for 15 seconds. Release starter switch (7).

NOTE

DO NOT disengage starter switch at first firing of engine. Continue with switch engaged for a limited time (30 seconds maximum) to help engine run and gain speed.

4. Wait one minute and turn starter switch (7) to START. Crank for one minute, or until running, then release starter switch (7). Leave preheater switch (12) in ON position for about five minutes after engine starts.

5. If engine still has not started, turn starter switch (7) to START and crank for one minute. Engine should be firing. Release starter switch (7) when engine speed is increasing.

6. Release preheater switch (12).

2-18. FUELING/DEFUELING PRECHECK AND OPERATIONS SUMMARY.

a. LOADING PRECHECK

WARNING

When filling tank by means of bottom loading or self-loading, a test of the precheck system is mandatory. If this system is not functioning, stop all operations. Determine the problem and have it corrected by a qualified technician. Failure of automatic shut- off to function may result in uncontrolled fuel spillage and danger of fire and explosion.

1. Shortly after fuel flow has begun, open precheck valve D (4) to precheck automatic shut-off. Opening valve D (4) sends fuel to float valve (2) inside tank to simulate full-tank condition.

2. If shut-off float is functional, flow should stop after about 20-25 seconds.

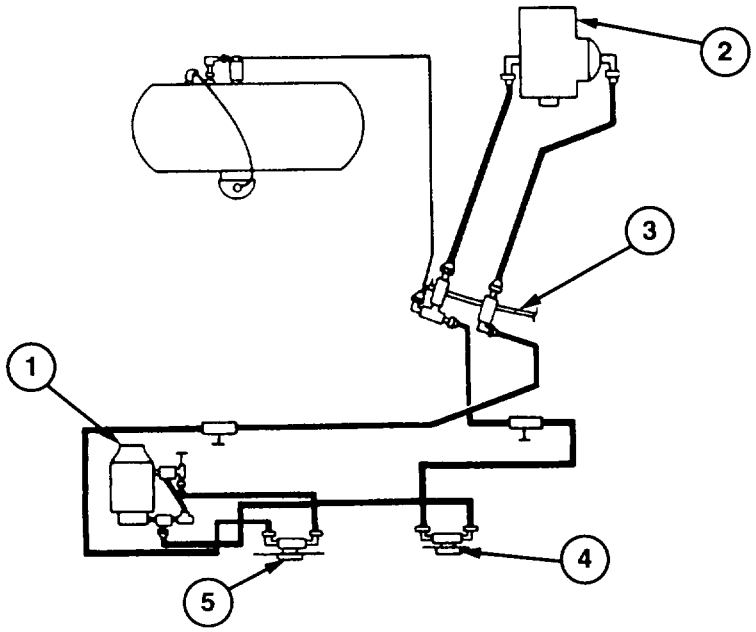
3. Close valve D (4). Flow will resume in about 20 seconds.

4. During normal loading through bottom of tank (3), shut-off system will stop incoming flow automatically when fuel reaches the level of the float valve (2).

b. LOAD/UNLOAD SELECTOR

Before opening any valves for a fuel-servicing operation, make sure unload/load selector valve E (5) handle is in proper position for fuel-servicing operation.

(a) Load Position. When selector valve E (5) is in load position, it directs pilot pressure to the 4-inch (10.16- cm)



2-18. FUELING/DEFUELING PRECHECK AND OPERATIONS SUMMARY (continued).

(b) Unload Position. When selector valve E (5) is in unload position, it shuts off pilot pressure to the 4-inch (10.16 cm) control valve (1). With pilot pressure shut off, the 4-inch (10.16 cm) control valve (1) closes, eliminating flow through control valve (1) during bulk delivery and fuel-servicing operation.

C. FUELING/DEFUELING OPERATIONS.

WARNING

All fueling/defueling operations must be performed outside.

NOTE

Refer to Table 2-2, Fueling/Defueling Operations Summary, for a list of paragraphs pertaining to the semi-trailer.

Table 2-2. Fueling/Defueling Operations Summary

The following operations can be performed with the M969A2 semi-trailer:

BULK HAUL AND FUEL SERVICING NOT INVOLVING USE OF ENGINE AND PUMP
Top Loading ..... Para 2-19a
Bottom Loading (Nonfiltered) ..... Para 2-19b
Gravity Unload ..... Para 2-19c

NONFILTERED FUEL SERVICING INVOLVING USE OF ENGINE AND PUMP
Self-load ..... Para 2-20a
Bulk Delivery ..... Para 2-20b
Nonfiltered Dispensing ..... Para 2-20c

FILTERED FUEL-SERVICING OPERATIONS
Filtered Bulk Delivery ..... Para 2-21a
Filtered Fuel Dispensing ..... Para 2-21b

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 injurious or explosive fumes are not released. Failure to follow this warning may result in injury or death to personnel.

Changing Fuels. If fuel to be loaded is not the same fuel as previously carried, refer to FM 10-71 for information on purging requirements.

2-19. BASIC BULK HAUL AND FUEL-SERVICING OPERATIONS NOT INVOLVING USE OF ENGINE AND PUMP.

a. TOP LOADING

WARNING

- **When top loading through fill cover, there is no automatic shutdown. Man the loading hose to avoid fuel spillage. Use capacity indicator gage and dipstick gage to determine amount of fuel loaded. Failure to follow this warning may result in uncontrolled fuel spillage and a fire or explosion hazard.**
- **Ladder has narrow steps. Use care when climbing.**

1. Review general fuel-handling instructions (para 2-16).

NOTE

Operation begins and ends with all valves closed.

2. Make sure all valves are closed.

NOTE

When loading with a rack or stand, perform step 3. When loading with a hose, perform step 4.

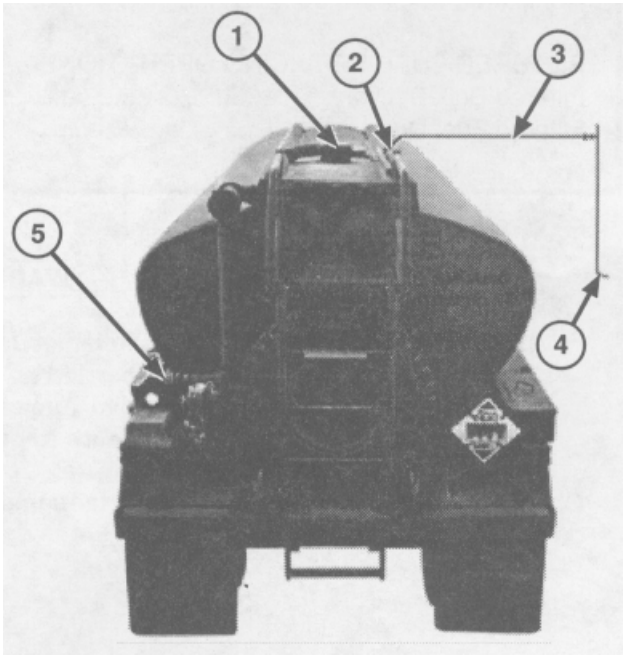
3. Connect bonding and grounding cable (3) of loading rack or stand to one of six grounding studs (2) before opening manhole fill cover (1).

4. Before opening fill cover (1), connect vehicle bonding and grounding cable (3) to one of four grounding studs (2) on top of tank and to some part of permanent piping of storage facility (4).

NOTE

The loading hose supplied by the storage facility may have a metal fitting on the free end, and the hose may not be bonded internally. Such a fitting is insulated and could become charged.

5. Install vapor recovery hose (5).



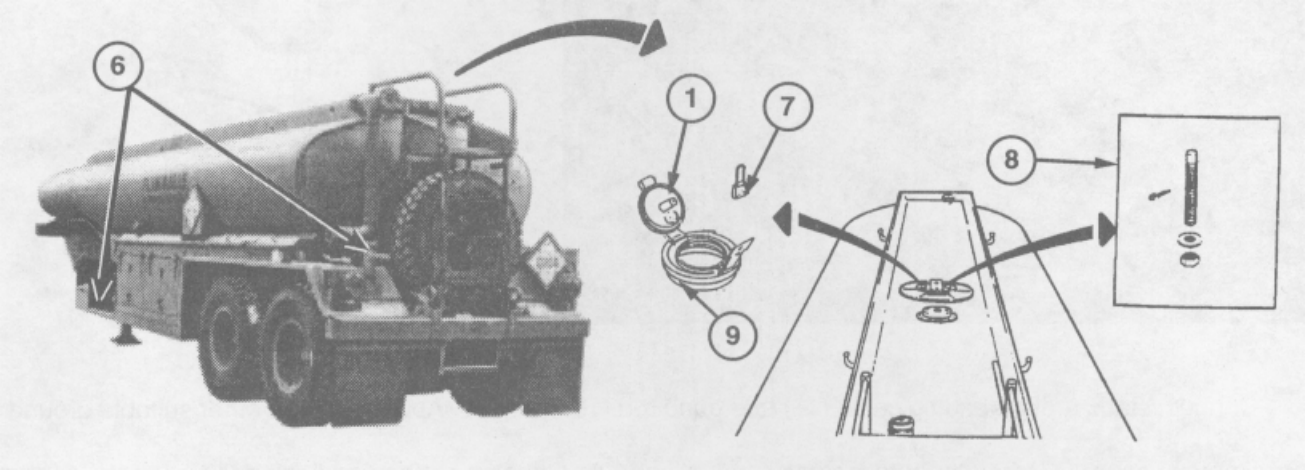
2-19. BASIC BULK HAUL AND FUEL-SERVICING OPERATIONS NOT INVOLVING USE OF ENGINE AND PUMP (continued).

6. Remove fire extinguishers (6) and bring them to the point of operation.

WARNING

Manhole fill cover does not lock open. Injury may occur if manhole fill cover accidentally closes on personnel.

7. Remove padlock (7). Slowly open fill cover (1) in manhole cover (9) and insert hose far enough to keep end of hose in contact with bottom of tank.



NOTE

Capacity indicator gage is located inside tank near fill cover.

8. Slowly begin flow, and fill tank no further than to bottom of capacity indicator gage (8).

9. Remove vapor recovery hose (5). Close and secure fill cover (1) with padlock (7).

10. Drain accumulated water (para 2-19d).

11. Remove bonding and grounding cable (3) from storage facility (4) and grounding studs (2) on semi-trailer. Store and cover fire extinguishers (6).

b. BOTTOM LOADING (NONFILTERED)

1. Review general fuel-handling instructions (para 2-16).

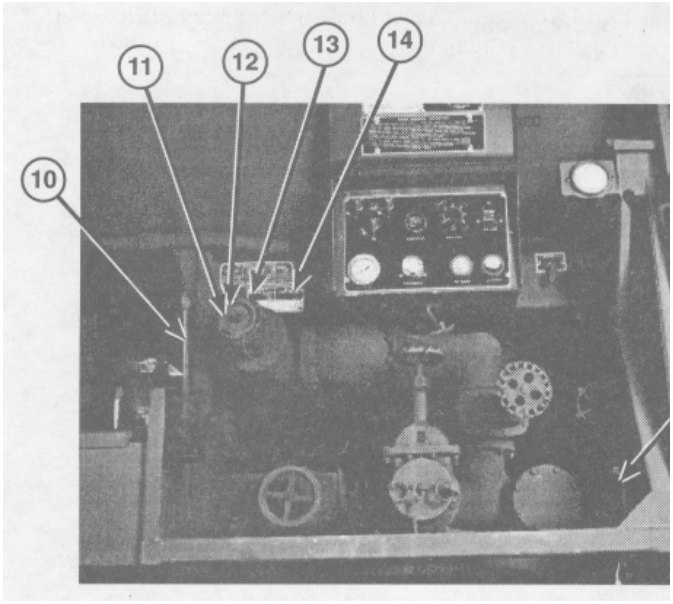
NOTE

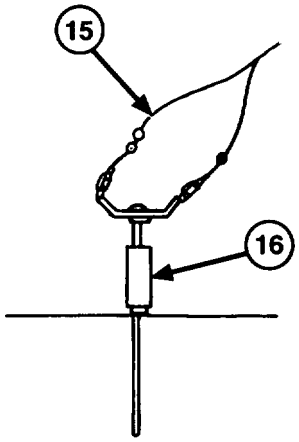
Operation begins and ends with all valves closed.

2. Make sure all valves are closed.

3. Remove fire extinguishers (6) and bring them to the point of operation.

2-19. BASIC BULK HAUL AND FUEL-SERVICING OPERATIONS NOT INVOLVING USE OF ENGINE AND PUMP (continued).





4. Connect static reel grounding cable (15) to ground rod (16) (Item 20, Appendix B) or other suitable ground.

5. Remove cover (11) from bottom loading connection (12). Connect bottom loading hose to bottom loading connection (12).

6. Set function selector valve E (13) to LOAD position.

7. Pull emergency valve A control handle (10) to OPEN position.

8. Begin fuel flow.

WARNING

When filling tank by means of bottom loading, a test of precheck system is mandatory. If this system is not functioning, stop all operations and notify your supervisor. Failure of automatic shut-off to function may result in uncontrolled fuel spillage and danger of fire and explosion.

9. After flow has begun, set precheck valve D (14) to OPEN position to precheck automatic shut-off (para 2-18a). If shut-off float is functional, flow should stop after about 20-25 seconds.

10. Set precheck valve D (14) to CLOSED position. Flow will resume in about 20 seconds.

NOTE

If fuel flow into semi-trailer stops because of a shut-off float malfunction, a defective 4-inch control valve, or the presence of leaks, or if any other unusual conditions are observed, stop fuel supply at loading facility and notify your supervisor.

2-19. BASIC BULK HAUL AND FUEL-SERVICING OPERATIONS NOT INVOLVING USE OF ENGINE AND PUMP (continued).

11. When tank is full, fuel flow should stop automatically. Close all valves. Disconnect hose from bottom loading connection (12) and install cover (11). Drain hose into suitable container.

12. Drain accumulated water (para 2-19d).

WARNING

DO NOT let go of static reel grounding cable when rewinding until ball stop is firmly touching reel. Failure to follow this warning may cause injury to personnel.

13. Disconnect static reel grounding cable (15) from ground rod (16) (Item 20, Appendix B) or suitable ground.

14. Store and cover fire extinguishers (6).

C. GRAVITY UNLOAD

1. Review general fuel-handling instructions (para 2-16).

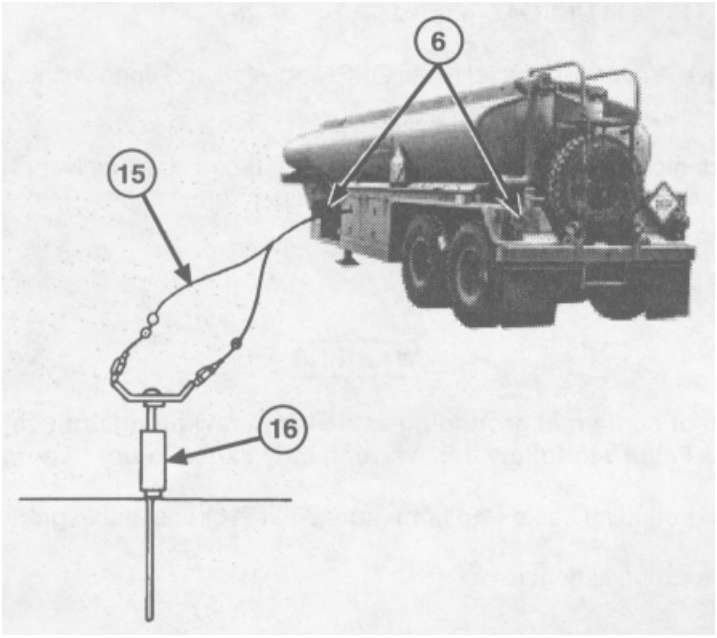
NOTE

Operation begins and ends with all valves closed.

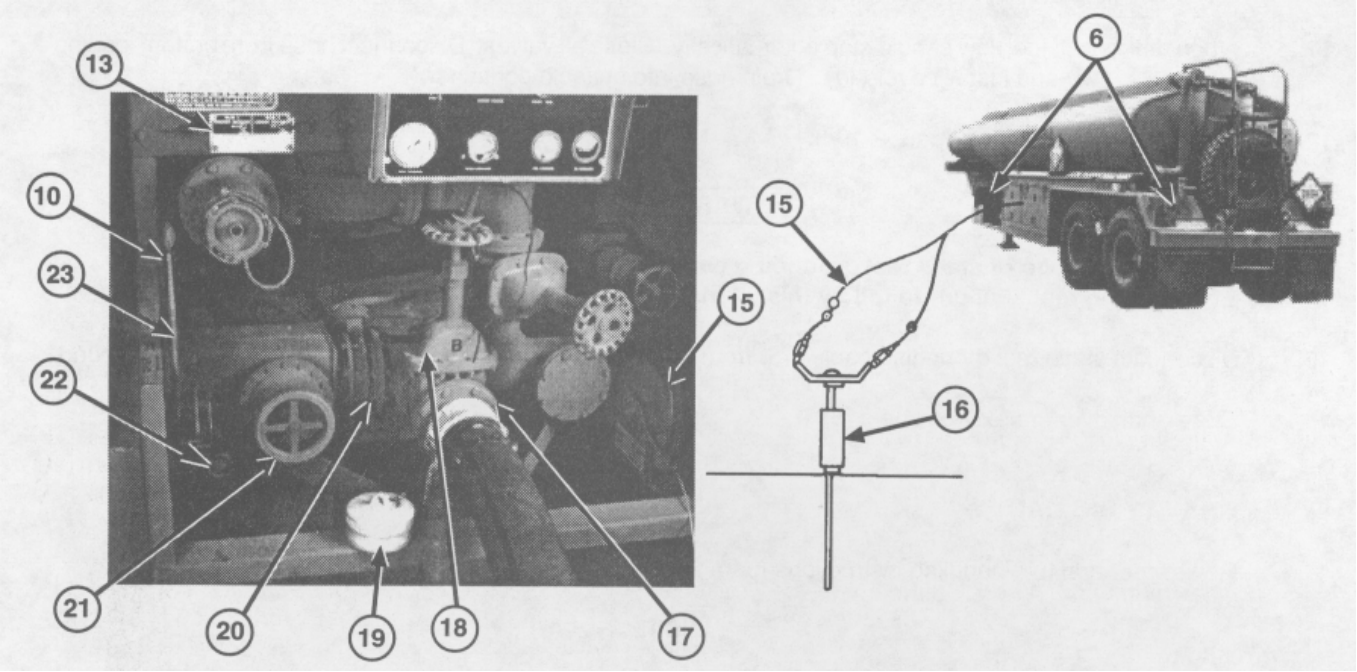
2. Make sure all valves are closed.

3. Connect static reel grounding cable (15) to ground rod (16) (Item 20, Appendix B) or suitable ground.

4. Disconnect spring pins and turn hose trough bars out of the way to remove 4-inch (10.16-cm) bulk delivery hose(s) from trough.



2-19. BASIC BULK HAUL AND FUEL-SERVICING OPERATIONS NOT INVOLVING USE OF ENGINE AND PUMP (continued).



5. Remove dust cover (19) from outlet B (17). Connect 4-inch (10.16-cm) bulk delivery hose to outlet B (17) and storage facility.

6. Remove fire extinguishers (6) and bring to point of operation.

7. Make sure valve E (13) is in UNLOAD position.

8. Pull emergency valve A control handle (10) to OPEN position and open valves B, G, and H (18, 20, and 21) to begin flow.

9. At end of operation, close all valves. Drain 4-inch (10.16-cm) bulk delivery hose into suitable container. Disconnect hose and put it in hose trough. Secure hose trough latches. Install dust cover (19) on outlet B (17).

10. Drain accumulated water (para 2-19d).

WARNING

DO NOT let go of static reel grounding cable when rewinding until ball stop is firmly touching reel. Failure to follow this warning may cause injury to personnel.

11. Remove static reel grounding cable (15) from ground rod (16) or suitable ground.

12. Store and cover fire extinguishers (6).

2-19. BASIC BULK HAUL AND FUEL-SERVICING OPERATIONS NOT INVOLVING USE OF ENGINE AND PUMP (continued).

d. WATER DRAIN

NOTE

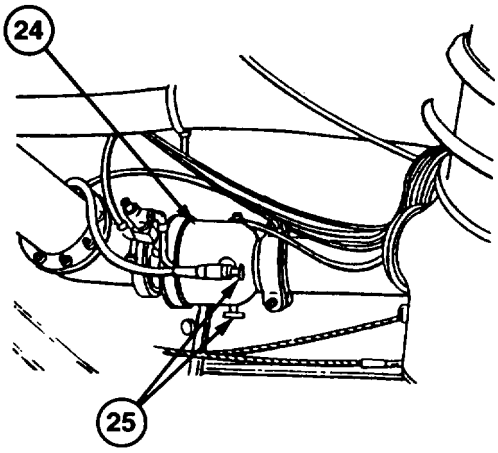
- **Accumulated water should be drained from the system after each period of operation**.
- **Operation begins and ends with all valves closed**.

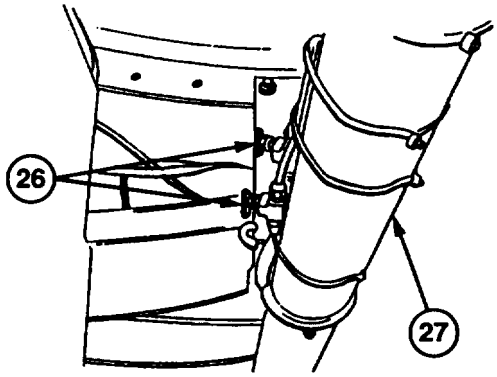
1. Make sure all valves are closed.

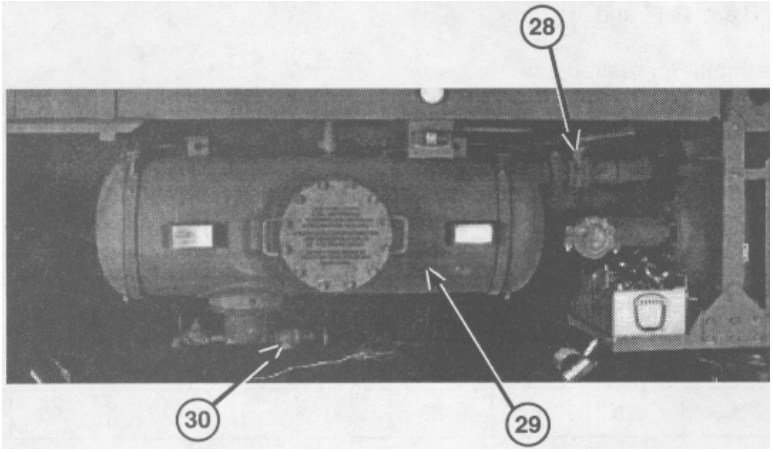
2. Place suitable container under manifold (23) in piping control cabinet. Pull emergency valve A control handle (10) to OPEN position. Slowly open valves H and J (21 and 22). Allow to drain until pure fuel begins to flow. Close valves H and J (21 and 22), and set emergency valve A control handle (10) to CLOSED position.

3. Place suitable container under drain valves (25 and 26). Open drain valves (25 and 26). Drain valves (25) are located behind piping control assembly near 4-inch (10.16-cm) flow control valve (24). Drain valves (26) are located beneath the tank, fastened to emergency valve discharge tube (27). Allow to drain until fuel begins to flow. Close drain valves.

4. Place suitable container under valve N (30) on bottom of filter/separator (29). Open valve M (28), then slowly open valve N (30). Allow to drain until fuel flow begins. Close valves N and M (30 and 28).







2-20. NONFILTERED FUEL SERVICING INVOLVING USE OF ENGINE AND PUMP.

a. SELF-LOAD

NOTE

- **Use this procedure when it is necessary to use onboard engine and pump to load fuel from storage facility to semi-trailer.**
- **Operation begins and ends with all valves closed.**

1. Review general fuel-handling instructions (para 2-16).
2. Make sure all valves are closed.
3. Connect static reel grounding cable (4) to storage facility. Remove fire extinguishers and bring to point of operation.
4. Start engine (para 2-17b). When engine is warm, adjust to idle speed (1000-1200 rpm).
5. Disconnect spring pins and turn hose trough bars out of the way to remove 4-inch (10.16-cm) bulk fuel hose from hose trough.
6. Remove dust cover (5) from outlet B (6) and connect bulk fuel hose to outlet B (6) and storage facility.
7. Put valve E (2) in LOAD position.
8. Pull emergency valve A control handle (1) to OPEN position.
9. Open valves B and G (7 and 8).
10. Adjust engine throttle for desired flow rate (refer to Table 2-3).

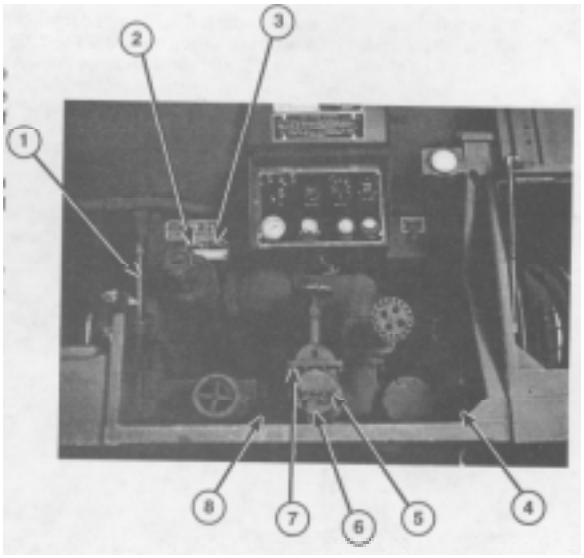


Table 2-3. Fuel-Dispensing Flow Rates in Gallons per Minute (GPM)

	SELF-LOAD		DISPENSING				BULK DELIVERY			
			FILTERED		NONFILTERED		FILTERED		NONFILTERED	
ENGINE RPM	2200	2400	1200	2400	2200	2400	2200	2400		
PUMP GPM	290	320	44	88	44	88	175	190	480	530

2-20. NONFILTERED FUEL SERVICING INVOLVING USE OF ENGINE AND PUMP (continued).

WARNING

When filling tank by means of bottom loading, a test of the precheck system is mandatory. If this system is not functioning, stop all operations. Notify Unit maintenance. Failure of automatic shut-off to function may result in uncontrolled fuel spillage and danger of fire and explosion.

11. Shortly after flow has started, open valve D (3) to precheck automatic shut-off. If shut-off float is functional, flow should stop after about 20-25 seconds (para 2-18a).

12. Close valve D (3). Flow will resume in about 20 seconds.

WARNING

In an emergency, pull emergency valve A control handle to CLOSED or pull emergency valve A shut-off valve on opposite side (curb side) of semi-trailer. Failure to do so may result in injury to personnel.

13. When tank is full, flow should stop automatically.

14. At end of operation, idle down engine. Close all valves. Drain 4-inch (10.16 cm) bulk delivery hose into suitable container. Disconnect hose and place in hose trough. Secure hose trough latches. Install dust cover (5) on outlet B (6).

15. Stop engine (para 2-17c).

16. Drain accumulated water (para 2-19d).

WARNING

DO NOT let go of static reel grounding cable when rewinding until ball stop is firmly touching reel. Failure to follow this warning may cause injury to personnel.

17. Remove static reel grounding cable (4) from storage facility.

18. Store and cover fire extinguishers.

b. BULK DELIVERY

NOTE

- **Use this procedure to pump fuel from semi-trailer to storage facility.**
- **Operation begins and ends with all valves closed.**

1. Review general fuel-handling instructions (para 2-16).

2. Make sure all valves are closed.

3. Connect static reel grounding cable (4) to storage facility. Remove fire extinguishers and bring them to the point of operation.

4. Start engine (para 2-17b). When engine is warm, adjust engine speed to 1000-1200 rpm.

5. Disconnect spring pins and turn hose trough bars out of the way to remove 4-inch (10.16-cm) bulk fuel hose from trough.

2-20. NONFILTERED FUEL SERVICING INVOLVING USE OF ENGINE AND PUMP (continued).

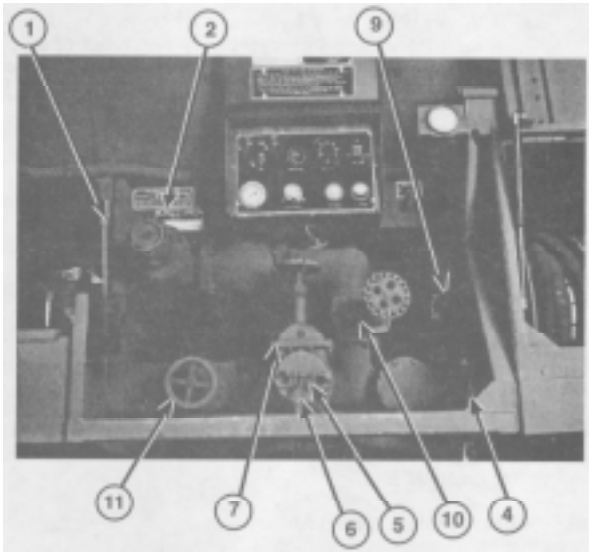
6. Remove dust cover (5) from outlet B (6) and connect 4-inch (10.16-cm) bulk fuel hose to outlet B (6) and storage facility.

7. Put valve E (2) in UNLOAD position.

8. Pull emergency valve A control handle (1) to OPEN position, and open valves B, F, and H (7, 10, and 11).

9. Adjust engine speed for desired flow rate (refer to Table 2-3).

10. Idle down engine at end of operation. Close all valves, and disconnect 4-inch (10.16-cm) bulk fuel hose. Drain hose into suitable container, and install dust cover (5) on outlet B (6).



11. Put bulk fuel hoses in hose trough and secure latches.
12. Stop engine (para 2-17c).

13. Drain accumulated water (para 2-19d).

14. Remove static reel grounding cable (4) from storage facility.

15. Store and cover fire extinguishers.

C. NONFILTERED DISPENSING

NOTE

Use this procedure for fuel that does not require filtering and is routed directly from pump to hose reels, bypassing filter/separator.

1. Review general fuel-handling instructions (para 2-16).

NOTE

Operation begins and ends with all valves closed.

2. Make sure all valves are closed.

NOTE

If two semi-trailers are being serviced, make sure they are both grounded to each other using separate static reel grounding cables.

3. Unreel static reel grounding cable (4), and connect it to a suitable ground.

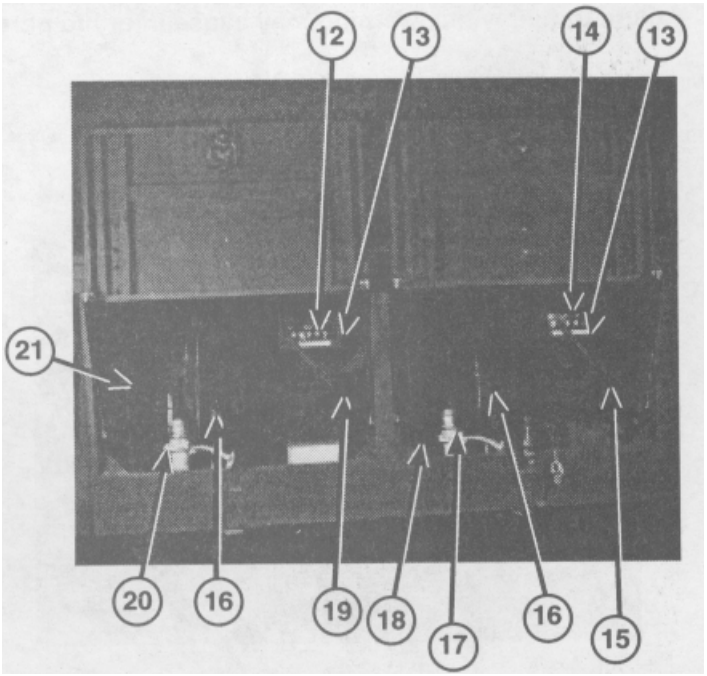
2-20. NONFILTERED FUEL SERVICING INVOLVING USE OF ENGINE AND PUMP (continued).

4. Remove fire extinguishers and bring them to the point of operation.

5. Start engine (para 2-17b). When engine is warm, adjust engine speed to 1000-1200 rpm.

6. Put valve E (2) in UNLOAD position.

7. Pull emergency valve A control handle (1) to OPEN position, and open valves F, H, and K (10, 11, and 9).



8. Reset meter (12 or 14) to zero by pushing reset knob (13) and turning clockwise.

NOTE

Valves P and R may be opened at the same time if two vehicles are being serviced. Make sure both vehicles are grounded to each other and to earth ground.

9. Open valve P (19) if front hose (21) reel is being used, or open valve R (15) if rear hose (18) reel is being used.

10. Adjust engine throttle for desired flow rate (refer to Table 2-3).

11. Release lock (16) on hose (18 or 21) reel and unwind hose.

12. Insert fuel-dispensing nozzle (17 or 20) into vehicle fuel tank/container. Squeeze fuel-dispensing nozzle (17 or 20) trigger to start flow.

13. At end of operation, release trigger of fuel-dispensing nozzle (17 or 20) and remove nozzle from vehicle fuel tank/container.

14. Adjust engine speed to 1000-1200 rpm.

15. Rewind hose (18 or 21) and tighten lock(s) (16) on hose (18 or 21) reel.

2-20. NONFILTERED FUEL SERVICING INVOLVING USE OF ENGINE AND PUMP (continued).

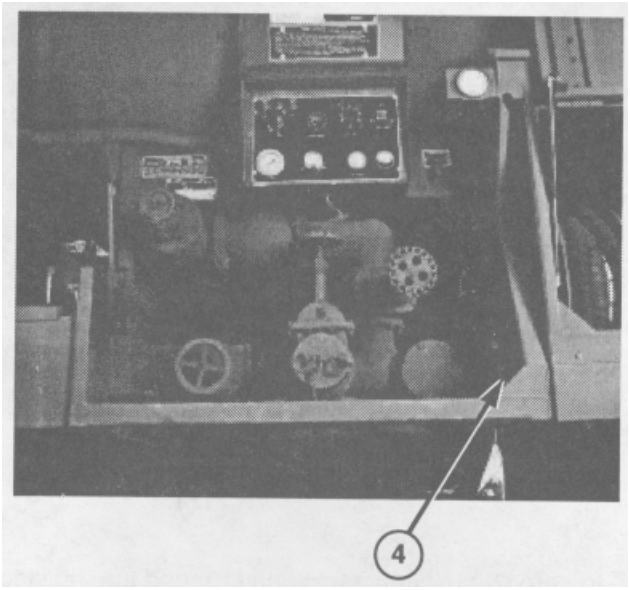
16. Close all valves.

17. Stop engine (para 2-17c).

WARNING

DO NOT let go of static reel grounding cable when rewinding until ball stop is firmly touching reel. Failure to follow this warning may cause injury to personnel.

18. Disconnect and rewind static reel grounding cable (4).



19. Store and cover fire extinguishers.

2-21. FILTERED FUEL SERVICING OPERATIONS.

a. FILTERED BULK DELIVERY

NOTE

Use this procedure when filtered fuel is required in storage facility. Fuel is pumped from semi-trailer tank through filter/separator to storage facility.

1. Review general fuel-handling instructions (para 2-16).

NOTE

Operation begins and ends with all valves closed.

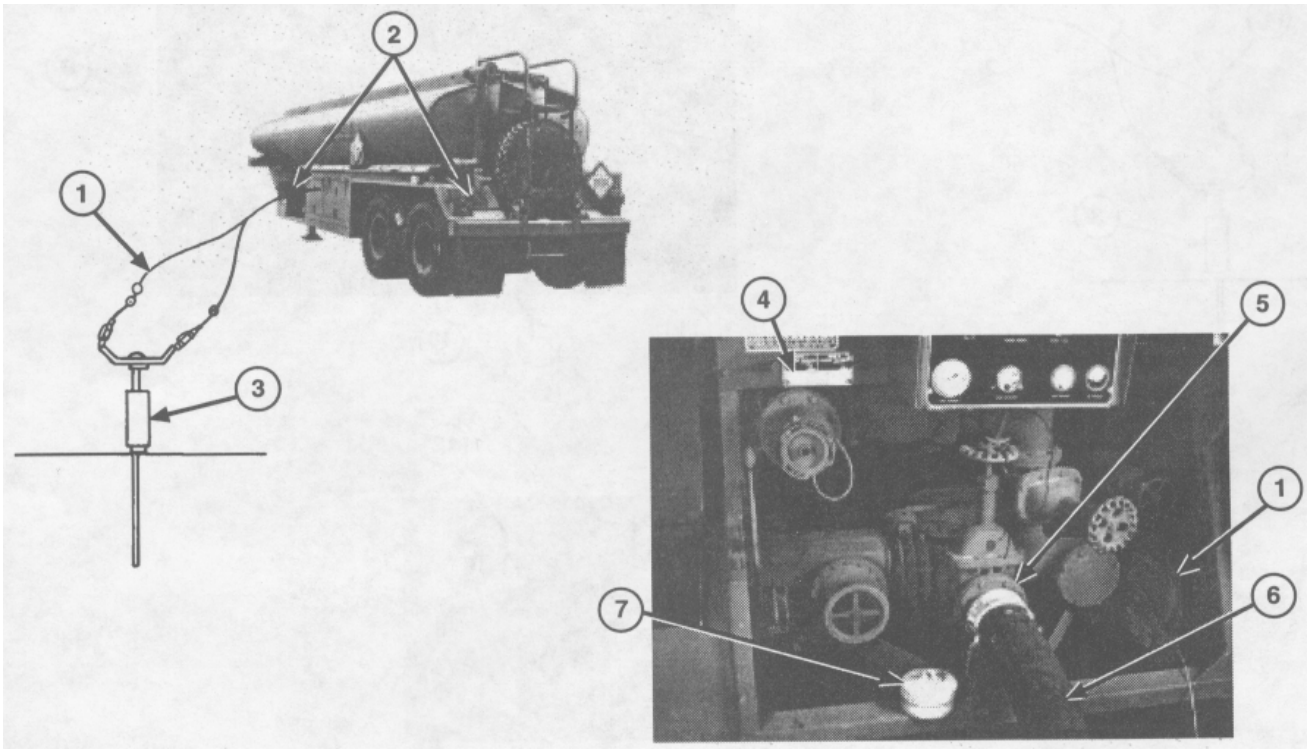
2. Make sure all valves are closed.

3. Connect static reel grounding cable (1) to ground rod (3). Remove 4-inch (10.1 6-cm) bulk delivery hose (6) from hose trough and connect it to receiving facility. Remove dust cover (7) from outlet B (5) and connect bulk delivery hose (6) to outlet B (5).

4. Remove fire extinguishers (2) and bring them to point of operation.

5. Start engine (para 2-17b) and, when warm, adjust engine speed to 1000-1200 rpm.

6. Set valve E (4) to UNLOAD position.



2-21. FILTERED FUEL SERVICING OPERATIONS (continued).

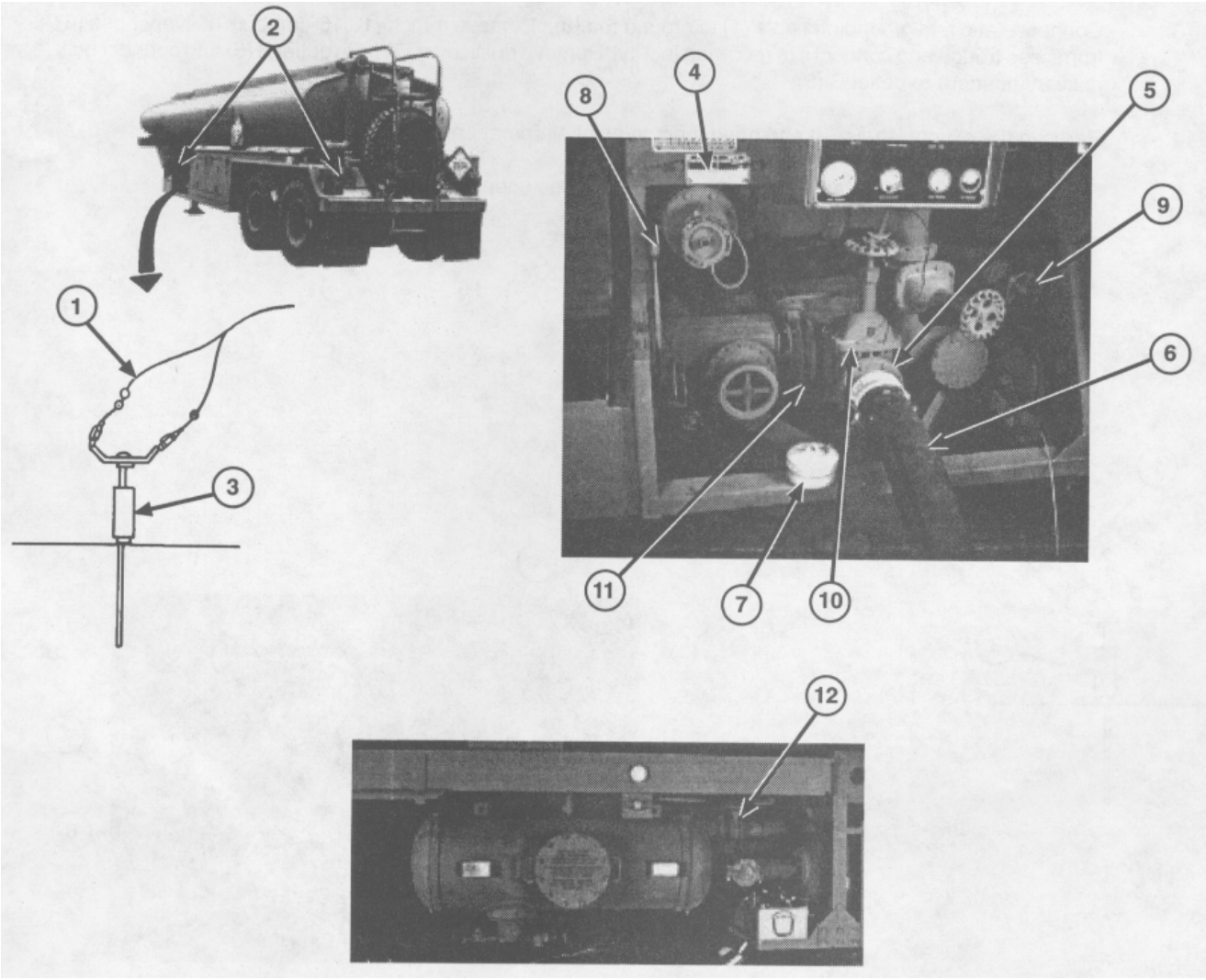
7. Pull emergency valve A control handle (8) to OPEN position, and open valves B, H, M, and K (10, 11, 12, and 9).

8. Adjust engine throttle for desired flow rate (refer to Table 2-3).

9. At end of operation, adjust engine speed to 1000-1200 rpm.

10. Close all valves. Drain bulk delivery hose (6) into suitable container.

11. Remove bulk delivery hose (6) from outlet B (5) and receiving facility and store in hose troughs. Secure hose trough latches. Install dust cover (7) on outlet B (5).



2-21. FILTERED FUEL SERVICING OPERATIONS (continued).

12. Shut off engine (para 2-17c).

WARNING

DO NOT let go of static reel grounding cable when rewinding until ball stop is firmly touching reel. Failure to follow this warning may cause injury to personnel.

13. Remove static reel grounding cable (1) from ground rod (3) or suitable ground.

14. Cover and store fire extinguishers (2).

b. FILTERED FUEL DISPENSING

NOTE

Use this procedure to dispense metered fuel from semi-trailer tank to vehicle. Fuel is pumped through filter/separator, meter, and hose reel to vehicle.

1. Review general fuel-handling instructions (para 2-16).

NOTE

Operation begins and ends with all valves closed.

2. Make sure all valves are closed.

3. Connect static reel grounding wire (16) to vehicle.

4. Remove fire extinguishers (2) and bring them to point of operation.

5. Start engine (para 2-17b) and, when warm, adjust engine speed to 1000-1200 rpm.

6. Set valve E (4) to UNLOAD position.

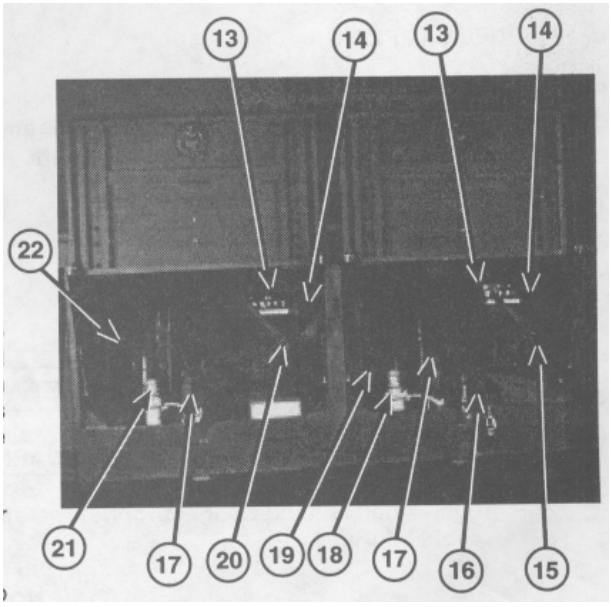
7. Pull emergency valve A control handle (8) to OPEN position and open valves H and M (11 and 12) and either P (20) or R (15), depending on which hose reel is to be used. If both hose reels are to be used, open both valve P (20) and valve R (1 5).

8. Reset meter(s) (13) to zero by pushing in meter reset knob(s) (14) and turning clockwise.

9. Adjust engine throttle for desired flow rate (refer to Table 2-3).

10. Release hose reel lock (17) on hose reel (19 or 22) to be used. Unwind hose (19 or 22).

11. Insert nozzle (18 or 21) into vehicle being serviced, and squeeze nozzle trigger to start flow.



2-21. FILTERED FUEL SERVICING OPERATIONS (continued).

12. Release nozzle trigger at end of operation and remove nozzle (18 or 21) from vehicle.

13. Adjust engine speed to 1000-1200 rpm.

14. Rewind hose reel (19 or 22). Do not rewind both hose reels at the same time. Tighten hose reel lock (17). Drain hose into suitable container.

15. Close all valves.

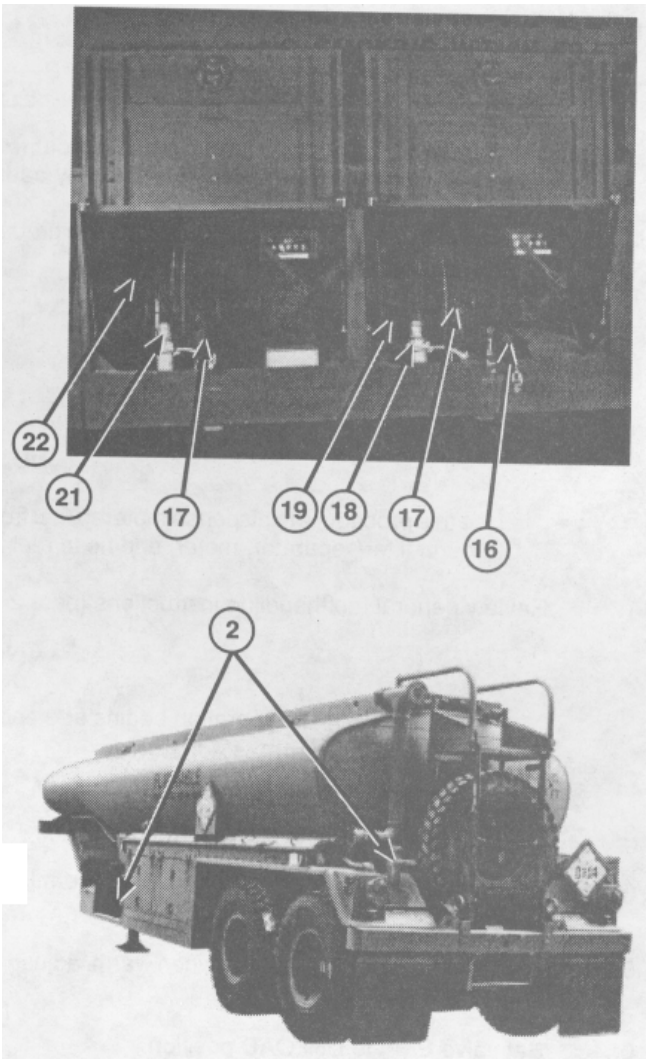
16. Shut off engine (para 2-17c).

WARNING

DO NOT let go of static reel grounding cable when rewinding until ball stop is firmly touching reel. Failure to follow this warning may cause injury to personnel.

17. Disconnect static reel grounding wire (16) from vehicle. Rewind static reel grounding wire (16).

18. Cover and store fire extinguishers (2). Close hose reel cabinet doors.



C. FUEL SAMPLING

Fuel sampling is done during filtered fuel dispensing operation. Fuel is removed through an Aqua-Glo probe and adapter installed on outlet nipple of one or both meters.

NOTE

Additional information on fuel sampling may be obtained from FM 10-68.

2-22. REFUEL ON THE MOVE (ROM) ASSEMBLY AND OPERATING PROCEDURES.

WARNING

Fuel handlers must wear appropriate safety equipment during fueling operations, to avoid injury.

NOTE

Components of the Refuel on the Move (ROM) Assembly (NSN 4730-01-295-1842) are listed in Appendix C.

The M969A2 semi-trailers have ROM capabilities. Refer to FM 10-71 for instructions on installing, operating, and disassembling the ROM kit.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-23. GENERAL.

a. This section contains instructions for safely operating the M969A2 semi-trailers under unusual conditions. In addition to normal preventive maintenance service, special care must be taken to keep the M969A2 semi-trailers operational in extreme temperatures and humidity.

b. For information on driver selection, training, and supervision, refer to FM 55-30.

c. For information on special driving instructions for operating wheeled vehicles under unusual conditions, refer to FM 21-305.

2-24. OPERATION IN EXTREME COLD.

WARNING

Sudden changes in temperature may cause M969A2 semi-trailers to develop leaks at the fittings and connectors. Use caution and pay special attention to these areas. If something is broken or worn out, report it to Unit maintenance. Corrective action must be performed before resuming any operations. Failure to follow this warning may result in injury to personnel.

a. Special care must be taken when operating M969A2 semi-trailers in extreme cold weather. Refer to FM 9-207 for information on operation in cold weather.

b. In addition to performing all normal PMCS, special care must be taken in regard to cleaning and lubrication when extremes in temperature, humidity, and terrain conditions are present or anticipated. Proper cleaning, lubrication, storage, and handling ensures proper operation and function and also guards against excessive wear. Refer to Appendix E for proper lubrication during extreme cold weather.

c. Generally, extreme cold causes lubricants to thicken or freeze and various semi-trailer construction materials to become hard and brittle, and easily damaged or broken. The operator must be alert to effects of extreme cold on semi-trailers.

d. 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 broken or damaged.

2-24. OPERATION IN EXTREME COLD (continued).

e. When parking for any period of time in temperatures below 0F (-180C), park in a sheltered area out of the wind and clean off any buildup of ice or snow. Place a footing of planks or brush under tires to prevent them from freezing to the ground. Make sure tires are properly inflated (para 1-10). Under-inflated tires will freeze, resulting in flat spots.

f. Use caution when placing semi-trailer in motion after a shutdown. Thickened lubricants may cause component failure. Free frozen brakeshoes, or tires frozen to ground, with care.

2-25. OPERATION IN EXTREME HEAT.

a. Refer to Appendix E for proper lubrication during high heat conditions.

b. Do not park semi-trailer in sunlight for long periods of time. Heat and sunlight shorten tire life.

CAUTION

DO NOT use gasoline or drycleaning solvent to remove oil or grease spots from tarpaulin. Use only water and a scrubbing brush. Failure to follow this caution will damage the tarpaulin.

c. Cover inactive semi-trailers with tarpaulins if no other shelter is available. Tarpaulins are subject to deterioration from mildew and attacks by insects or animals. Shake out and air tarpaulins weekly for several hours. Clean mildewed tarpaulins with a dry scrubbing brush. DO NOT clean with water until mildew is removed. If mildew is found, examine tarpaulin to determine if it is rotted or weakened. Replace tarpaulin if damaged. If tarpaulin is not damaged, treat as outlined in FM 10-16.

d. Semi-trailers inactive for long periods in hot, humid weather are subject to rusting and the accumulation of fungi growth. Frequently inspect, clean, and lubricate to prevent deterioration.

2-26. OPERATION IN HIGH HUMIDITY AND SALTWATER AREAS.

a. Dampness increases chances of corrosion. Inspect all surfaces and electrical connections for signs of corrosion. Remove all signs of corrosion. Apply silicone compound (Item 2, Appendix D) to all electrical connections.

b. Protect semi-trailer from direct rainfall whenever possible.

c. Keep moisture from entering the fuel supply. Drain the filter separator sump (para 3-10) before each operation, to remove accumulated moisture.

d. Clean, inspect, and lubricate the semi-trailer frequently when operating in saltwater areas (refer to Appendix E).

2-27. OPERATION IN MUD AND SNOW.

a. Immediately after operation in mud or snow, thoroughly clean, inspect, and lubricate if tactical situation permits (refer to Appendix E).

b. Refer to FM 21-305 for special instructions on driving hazards in snow.

c. After each operation, remove ice and snow from underneath semi-trailer and from hoses, lines, tubes, and electrical connections.

2-28. OPERATION IN DUSTY OR SANDY AREAS.

a. Clean, inspect, and lubricate semi-trailer frequently when operating in dusty or sandy areas (refer to Appendix E).

b. Maintain proper tire pressure:

1. Reduce tire pressure to 32 psi (221 kPa) for operation in soft sand.

2. Reduce tire pressure to 45 psi (310.3 kPa) for operation on cross-country terrain. Tire pressure must be returned to 65 psi (448.2 kPa) when operation resumes on hard-surface roads if tactical situation permits.

c. When uncoupling semi-trailer in sandy areas, use ground boards to prevent landing gear from sinking.

2-29. FORDING.

a. The M969A2 semi-trailer is designed for fording hard bottom water crossings deep enough to submerge the running gear.

b. Refer to the towing vehicle operating instructions for information on fording. Towing vehicle instructions are also applicable to the semi-trailer.

c. Before entering water, spray engine assembly electrical connections with silicone compound (Item 2, Appendix D). Notify Unit maintenance to pack wheel bearings after each submersion (refer to Appendix E).

d. Reduce tire pressure to aid in amphibious landings.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1. LUBRICATION INSTRUCTIONS.

Lubrication instructions are in Appendix E of this manual. All lubrication instructions are mandatory.

Section II. OPERATOR/CREW TROUBLESHOOTING PROCEDURES

3-2. GENERAL.

a. This section provides information for identifying and correcting malfunctions that may develop while operating your semi-trailer.

b. The Quick Guide to Troubleshooting (para 3-3) lists common symptoms you may find during operation or maintenance of your semi-trailer or its components, and refers you to the Troubleshooting Chart (para 3-4) for the appropriate troubleshooting procedures. You should perform the tests/inspections and corrective actions in the order listed.

c. If you are unsure of the location of an item mentioned in troubleshooting, refer to paragraph 1-9 or to the maintenance task where the item is serviced.

d. Before performing troubleshooting, read and follow all safety instructions found in the warning summary at the beginning 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 corrective actions listed, notify your supervisor or Unit maintenance.

f. When troubleshooting a malfunction:

- Locate the symptom(s) in the Quick Guide to Troubleshooting (para 3-3) that best describes the symptom(s).
- Turn to the page in the Troubleshooting Chart (para 3-4) where the troubleshooting procedures for the symptom(s) in question are described.
- 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.

3-3. QUICK GUIDE TO TROUBLESHOOTING.

ITEM	SYMPTOM	PARAGRAPH
ENGINE	ENGINE WILL NOT TURN OVER.	para 3-4a(1)
	ENGINE IS HARD TO START OR TURNS OVER SLOWLY.	para 3-4a(2)
	ENGINE TURNS OVER BUT FAILS TO START.	para 3-4a(3)
	ENGINE MISFIRES AT HEAVY LOAD OR ENGINE POWER IS LOW.	para 3-4a(4)
	LOW OIL PRESSURE IS INDICATED ON GAGE (minimum 20 psi [138 kPa]).	para 3-4a(5)
ELECTRICAL SYSTEM	LIGHTS ON TRAILER WILL NOT OPERATE.	para 3-4b(1)
	ONE OR MORE LIGHTS (BUT NOT ALL) WILL NOT OPERATE, OR LIGHTS ARE DIM OR FLICKERING.	para 3-4b(2)
	CONTROL PANEL SECURE LIGHTING DOES NOT OPERATE.	para 3-4b(3)
BRAKE SYSTEM	BRAKES WILL NOT RELEASE.	para 3-4c(1)
	NO BRAKES OR BRAKES ARE WEAK.	para 3-4c(2)
	BRAKE APPLICATION OR RELEASE IS SLOW.	para 3-4c(3)
	BRAKES GRAB.	para 3-4c(4)
FUELING OPERATIONS	FUEL DOES NOT FLOW DURING ANY NONFILTERED FUELING OPERATION.	para 3-4d(1)
	FUEL DOES NOT FLOW DURING ANY FILTERED FUELING OPERATION.	para 3-4d(2)
	FUEL DOES NOT FLOW DURING ANY OVERWING FUELING OPERATION.	para 3-4d(3)
TIRES	TIRES ARE EXCESSIVELY WORN, SCUFFED, OR CUPPED.	para 3-4e(1)
LANDING GEAR	CRANK IS DIFFICULT TO OPERATE.	para 3-4f(1)

3-4. TROUBLESHOOTING CHART.

a. ENGINE

(1) ENGINE WILL NOT TURN OVER.

A. 1. Set engine switch on engine control panel to RUN.

2. Check for discharged or defective battery.

3. Set engine switch to STOP.

Does battery voltage indicator read 12-14 V dc?

no

yes

Notify Unit maintenance that additional troubleshooting is required.

B. 1. Remove battery cover Para 3-6

2. Check for loose or corroded battery cable connections Para 3-6

3. Clean connections (

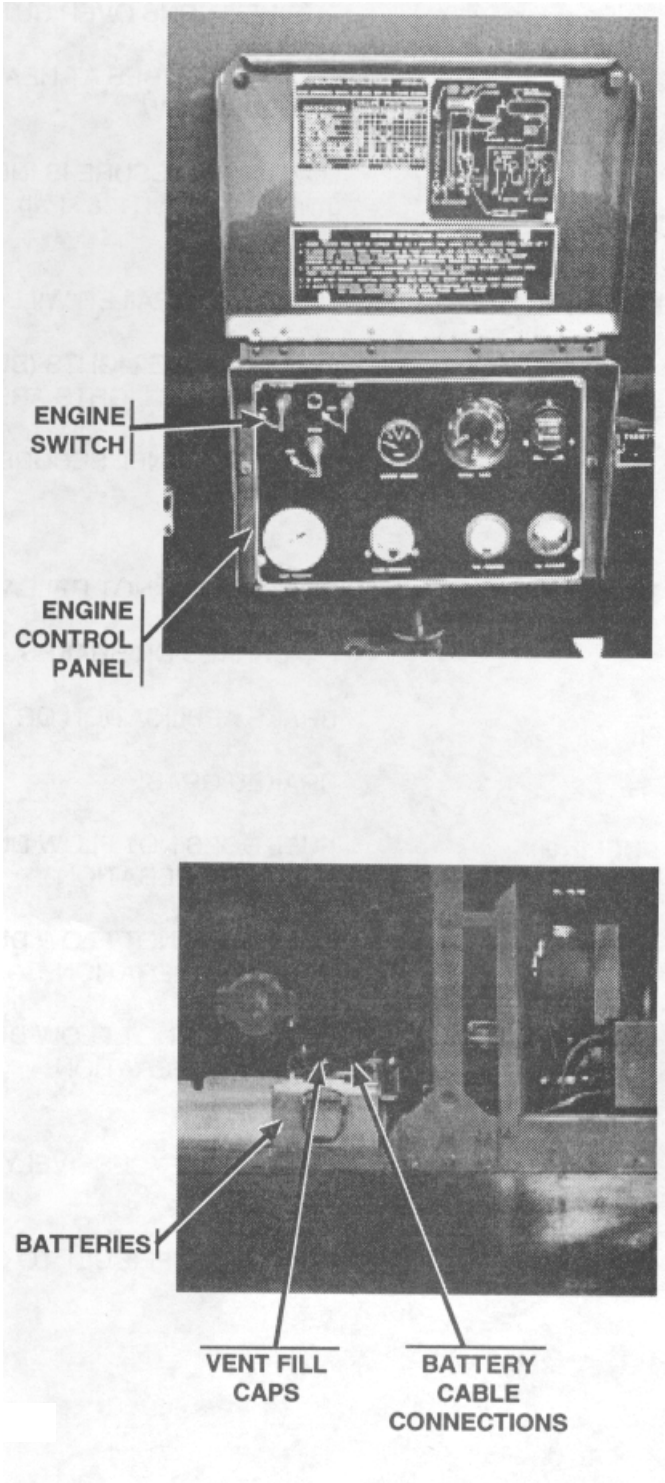
4. Remove vent fill caps and check for loss of electrolyte (Para 3-6) If low, notify Unit maintenance.

WARNING

Do not attempt to jump-start engine. Jump-starting may result in damage to batteries or serious fire hazard. Failure to heed this warning may result in severe injury or death to personnel.

5. Notify Unit maintenance if battery is discharged.

END OF TASK



3-4. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued)

(2) ENGINE IS HARD TO START OR TURNS OVER SLOWLY.

A. 1. Set engine switch on engine control panel to RUN.

2. Check for discharged or defective battery.

3. Set engine switch to STOP.

Does battery voltage indicator read 12-14 V dc?

no

B. 1. Remove battery cover (para 3-6)..

2. Check for loose or corroded battery cable connections

3. Clean connections (para 3-6.

4. Remove vent fill caps and check for loss of electrolyte (para 3-6. If low, notify Unit maintenance.

WARNING

Do not attempt to jump-start engine. Jump-starting may result in damage to batteries or serious fire hazard. Failure to heed this warning may result in severe injury or death to personnel.

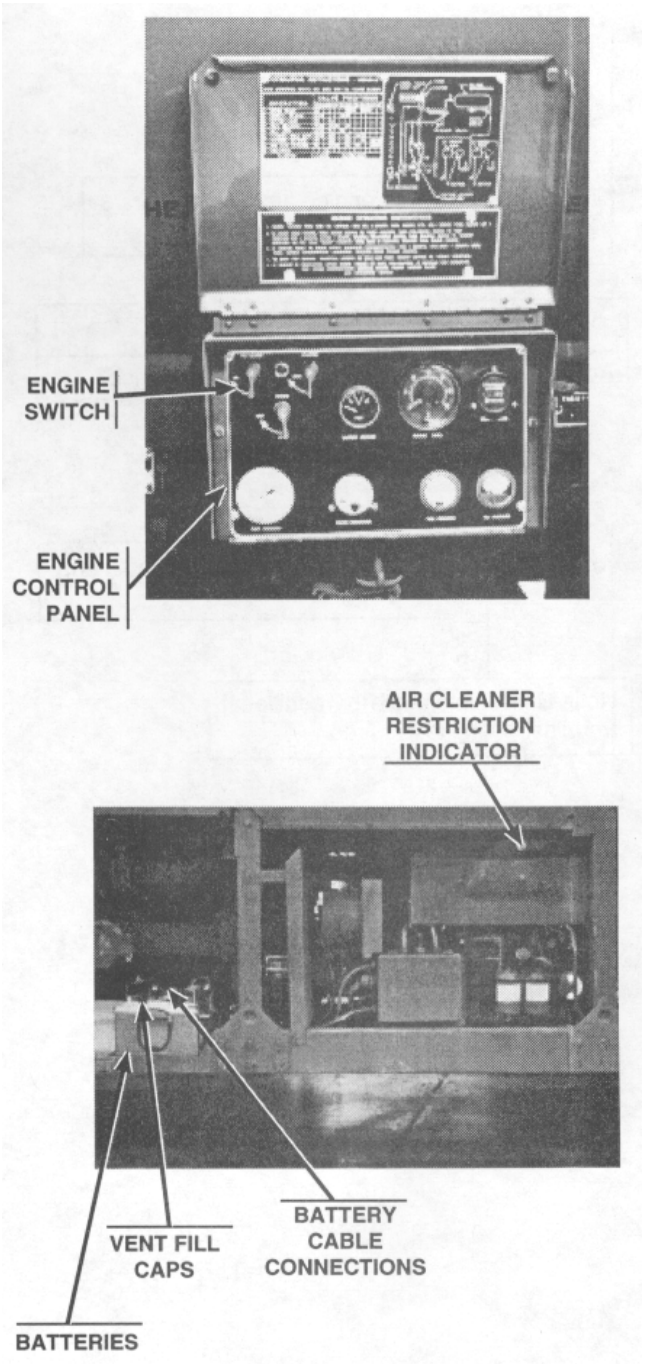
5. Notify Unit maintenance if battery is discharged or engine does not operate.

yes

C. Check air cleaner restriction indicator for red band.

Is red band showing?

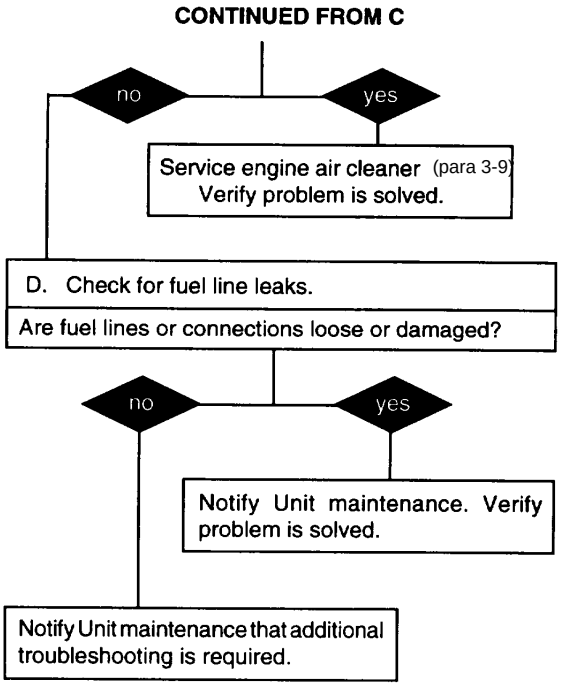
continued on next page



3-4. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued)

(2) ENGINE IS HARD TO START OR TURNS OVER SLOWLY (CONTINUED).



END OF TASK

3-4. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued)

(3) ENGINE TURNS OVER BUT FAILS TO START.

A. 1. Remove fuel cap from engine fuel tank.

2. Check fuel level in engine fuel tank.

Is fuel level low?

no / yes

Add fuel as required. Verify problem is solved.

B. **NOTE**

Engine switch energizes and de-energizes fuel stop solenoid, causing solenoid piston to move up and down.

1. Check position of fuel stop solenoid piston.
2. Set engine switch to RUN.
3. Check position of fuel stop solenoid piston.
4. Set engine switch to STOP.

Does fuel stop solenoid piston move up and down?

no / yes

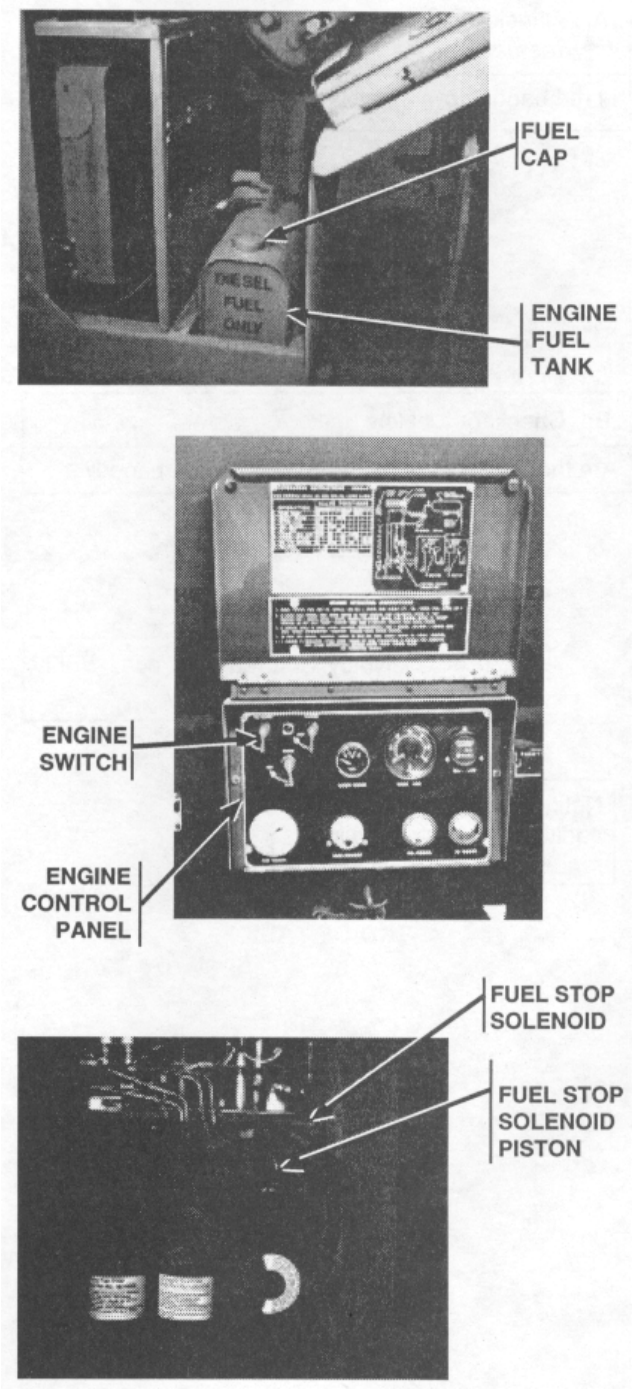
NOTE

If engine is overheated, high-temperature switch contacts open and de-energize fuel stop solenoid, stopping the engine.

Cool engine for 3 to 5 minutes before attempting to start engine again. Verify problem is solved.

Notify Unit maintenance that additional troubleshooting is required.

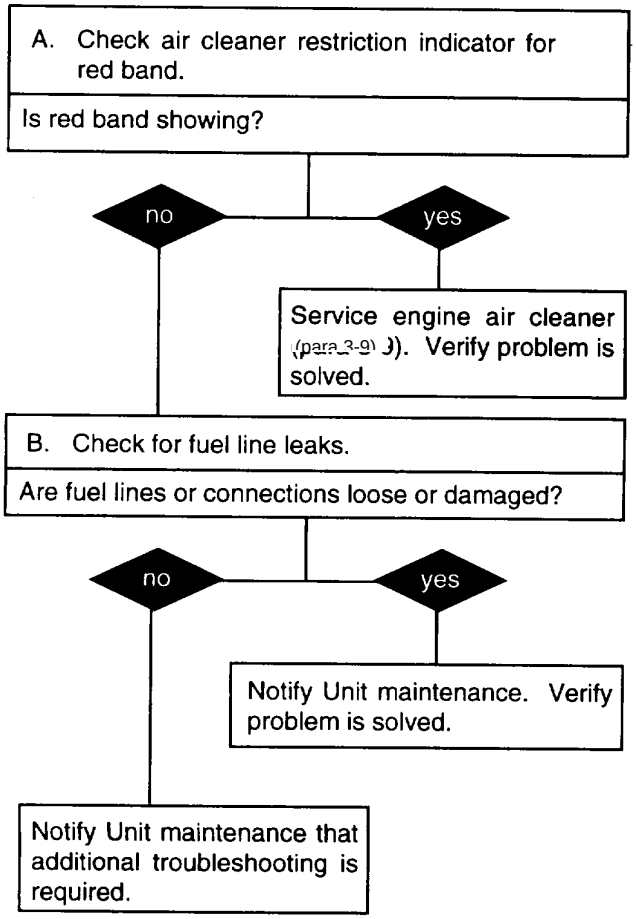
END OF TASK

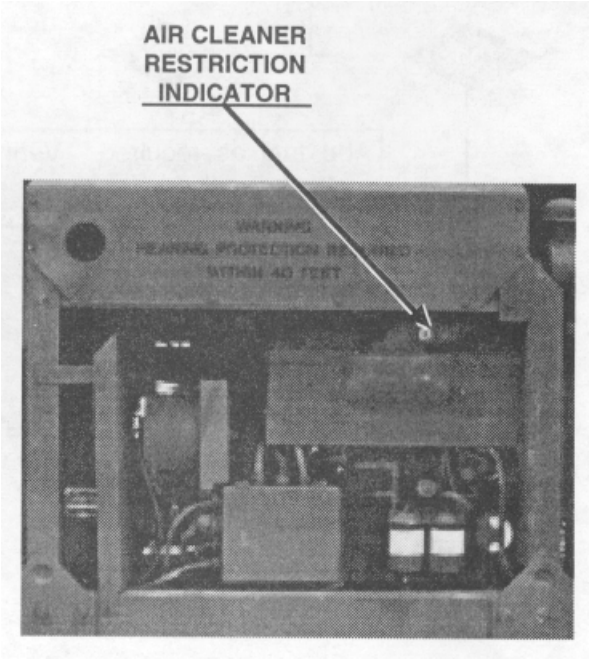


3-4. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued)

(4) ENGINE MISFIRES AT HEAVY LOAD OR ENGINE POWER IS LOW.





END OF TASK

3-4. TROUBLESHOOTING CHART (continued).

a. ENGINE (continued)

(5) LOW OIL PRESSURE IS INDICATED ON GAGE (minimum 20 psi [138 kPa]).

NOTE

Engine must be off before checking oil.

A. Remove engine oil dipstick and check oil level.

Is engine oil level low?

no

yes

Add oil as necessary. For oil specifications, refer to page E-8. Verify problem is solved.

B. Check oil pressure gage on engine control panel for damage.

Is oil pressure gage damaged?

no

yes

Notify Unit maintenance. Verify problem is solved.

C. 1. Start engine (para 2-17b).

2. Monitor oil pressure gage.

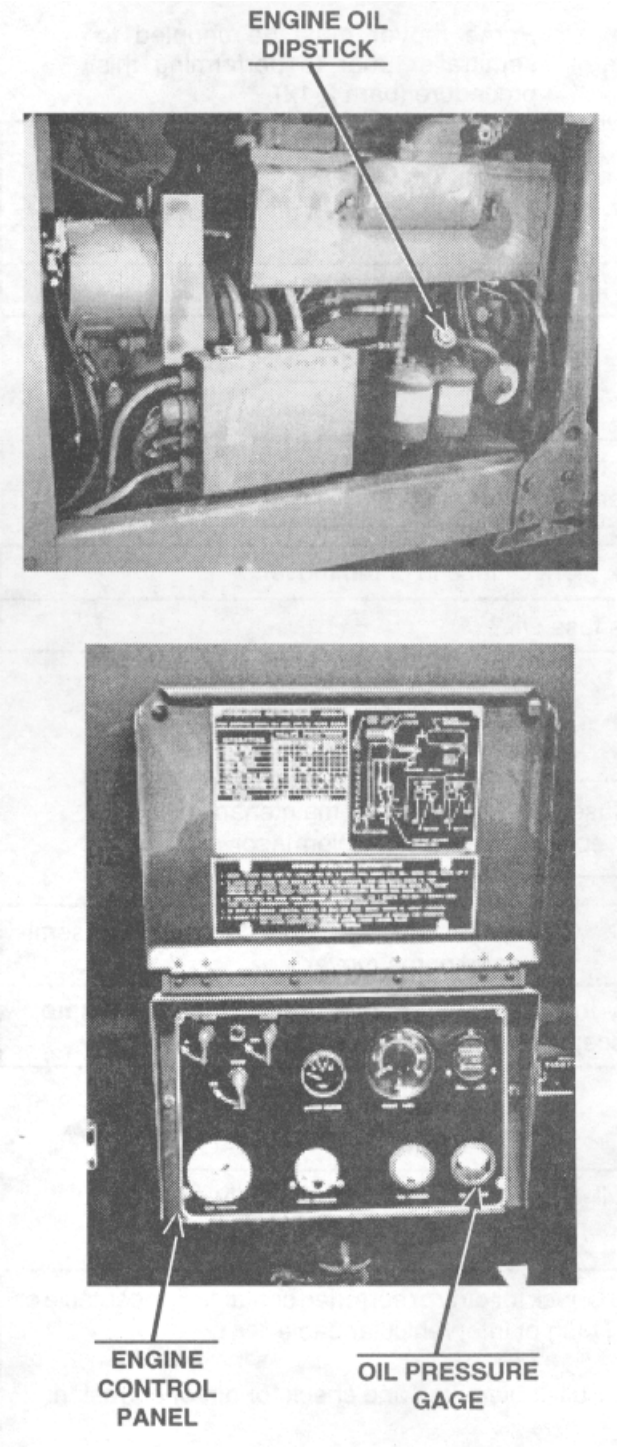
Is low oil pressure continuing?

no

yes

Notify Unit maintenance that additional troubleshooting is required.

Continue to monitor and notify Unit maintenance if low oil pressure returns.



END OF TASK

3-4. TROUBLESHOOTING CHART (continued).

b. ELECTRICAL SYSTEM **(1) LIGHTS ON TRAILER WILL NOT OPERATE.**

NOTE

Prime mover must be coupled to semitrailer prior to performing this procedure (para 2-12).

A. 1. Set parking brakes of prime mover.

2. Check light switch in prime mover for proper setting.

Is light switch in correct position?

no → Set light switch to correct position. Verify problem is solved.

yes →

B. Check fuse in prime mover.

Is fuse OK?

no → If fuse is blown, notify Unit maintenance to replace fuse. Verify problem is solved.

yes →

C. Check intervehicular cable connection of semitrailer and prime mover.

Is intervehicular cable properly plugged into receptacle of semitrailer and prime mover?

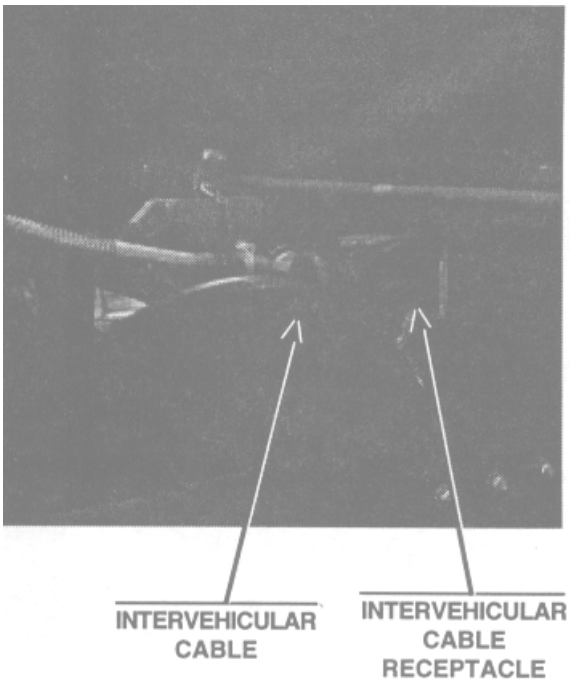
no → Pull cable out and reinsert tightly in receptacle. Verify problem is solved.

yes →

1. Check for dirty or corroded contacts in receptacle or on plug of intervehicular cable.

2. Pull cable plugs and check for dirt or corrosion.

3. Clean plugs and receptacle. Verify problem is solved.



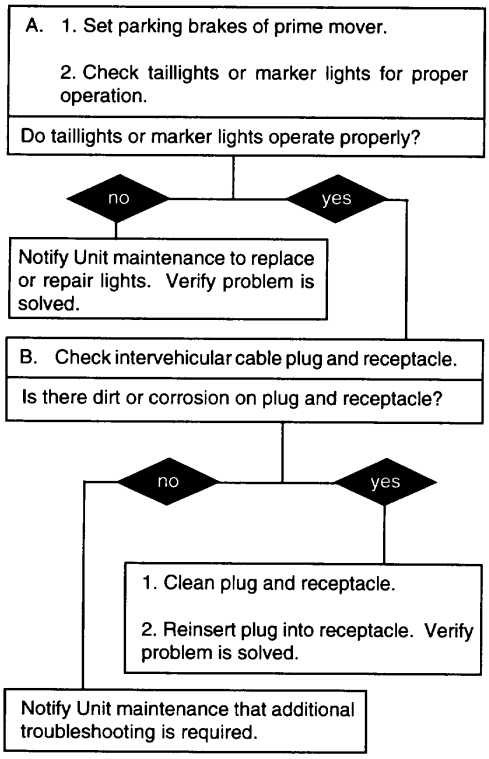
END OF TASK

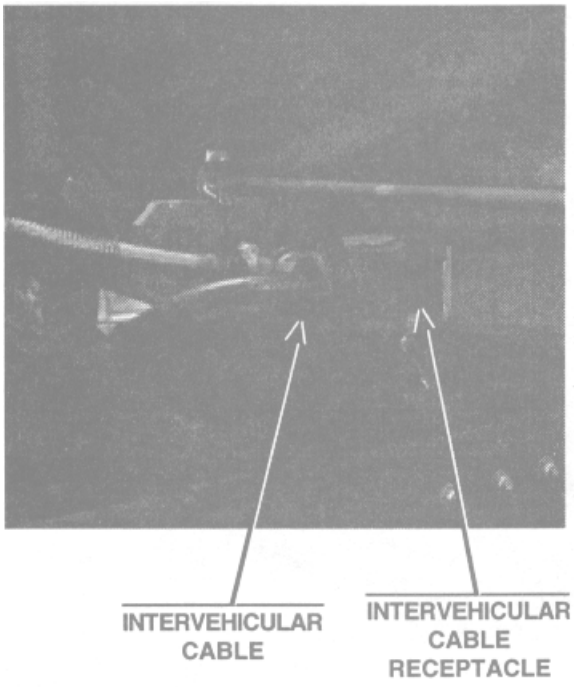
3-4. TROUBLESHOOTING CHART (continued).

b. ELECTRICAL SYSTEM (continued) **(2) ONE OR MORE LIGHTS (BUT NOT ALL) WILL NOT OPERATE, OR LIGHTS ARE DIM OR FLICKERING.**

NOTE

Prime mover must be coupled to semitrailer prior to performing this procedure (para 2-12).





END OF TASK

3-4. TROUBLESHOOTING CHART (continued).

b. ELECTRICAL SYSTEM (continued)	**(3) CONTROL PANEL SECURE LIGHTING DOES NOT OPERATE.**

Notify Unit maintenance.

3-4. TROUBLESHOOTING CHART (continued).

c. BRAKE SYSTEM — (1) BRAKES WILL NOT RELEASE.

NOTE
Prime mover must be coupled to semitrailer prior to performing this procedure (para 2-12).

A. 1. Set parking brakes of prime mover.

2. Apply service brake.

3. Check emergency supply brake valve on prime mover.

Is emergency supply brake valve applied?

no — yes

Move emergency supply brake valve to released position. Verify problem is solved.

NOTE

Some prime movers may not be equipped with shut-off valves.

B. Check shut-off valves on prime mover.

Are shut-off valves closed?

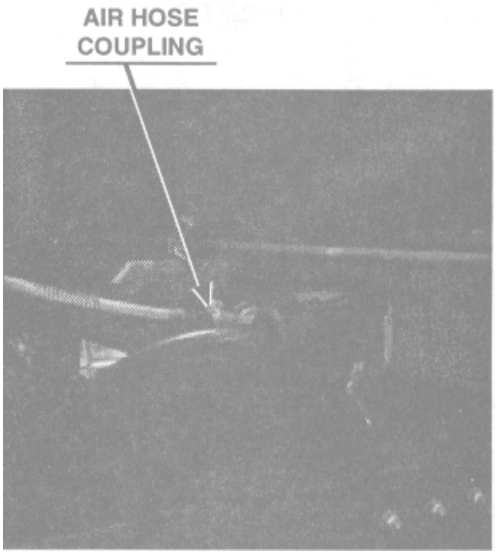
no — yes

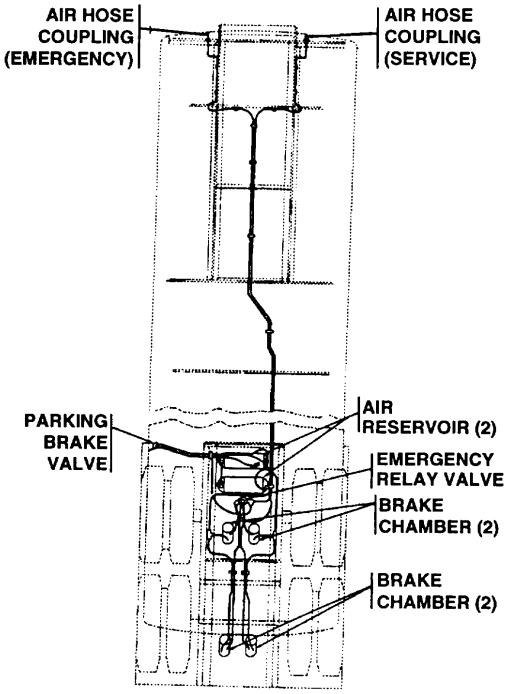
Open shut-off valves. Verify problem is solved.

C. Check components of airbrake system for damage or leaks.

Are any components of airbrake system leaking or damaged?

continued on next page



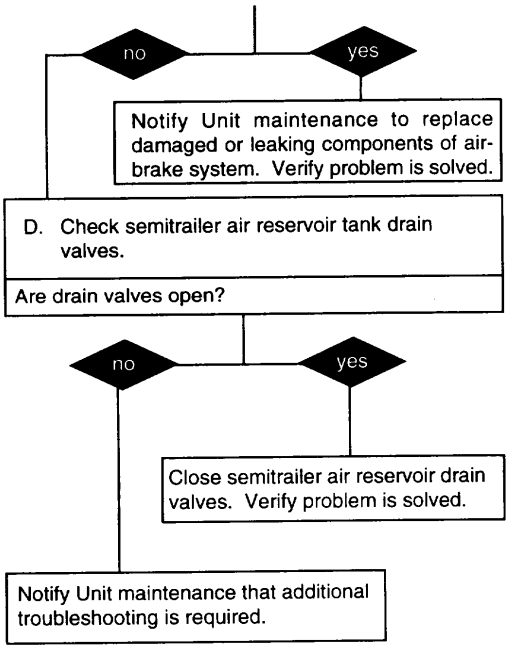


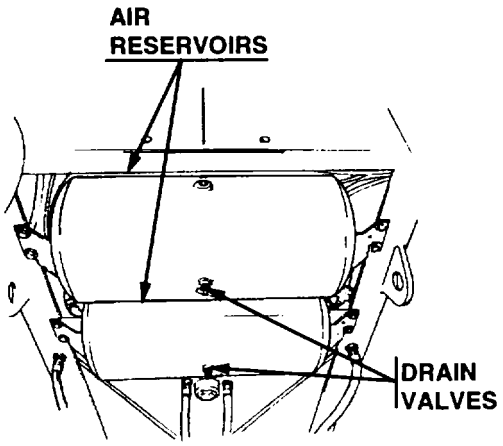
COMPONENTS OF AIRBRAKE SYSTEM

3-4. TROUBLESHOOTING CHART (continued).

c. BRAKE SYSTEM (continued) **(1) BRAKES WILL NOT RELEASE (continued).**

CONTINUED FROM C





END OF TASK

3-4. TROUBLESHOOTING CHART (continued).

c. BRAKE SYSTEM (continued) **(2) NO BRAKES OR BRAKES ARE WEAK.**

NOTE

- **Prime mover must be coupled to semitrailer prior to performing this procedure (para 2-12).**
- **Some prime movers are not equipped with shut-off valves.**

A. 1. Set parking brakes of prime mover.

2. Apply service brake.

3. Check position of shut-off valves on prime mover.

Are shut-off valves open?

no → Open shut-off valves. Verify problem is solved.

yes →

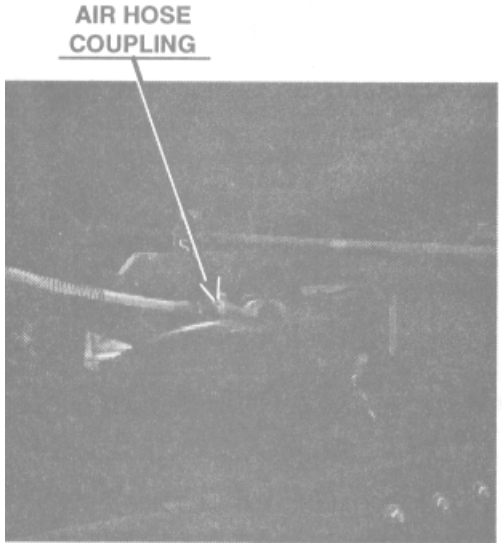
B. Check components of airbrake system for leaks or damage.

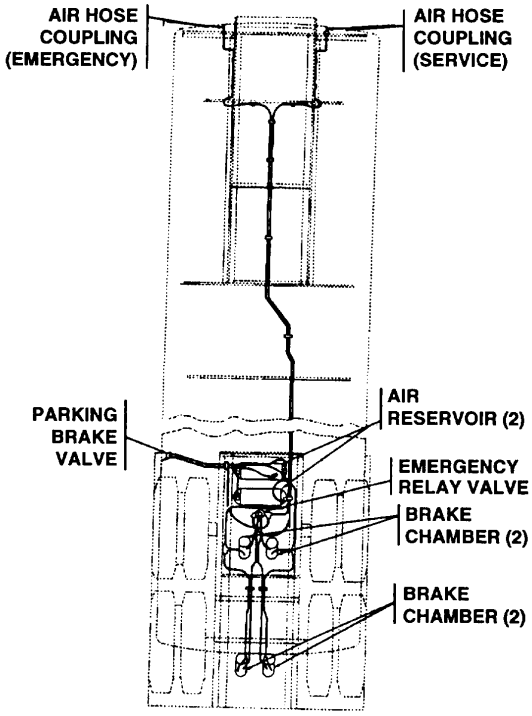
Are any components of airbrake system leaking or damaged?

no → Notify Unit maintenance that additional troubleshooting is required.

yes → Notify Unit maintenance to replace or repair damaged components of airbrake system. Verify problem is solved.

END OF TASK





COMPONENTS OF AIRBRAKE SYSTEM

3-4. TROUBLESHOOTING CHART (continued).

c. BRAKE SYSTEM (continued) **(3) BRAKE APPLICATION OR RELEASE IS SLOW.**

NOTE
Prime mover must be coupled to semitrailer prior to performing this procedure (para 2-12).

A. 1. Set parking brakes of prime mover.

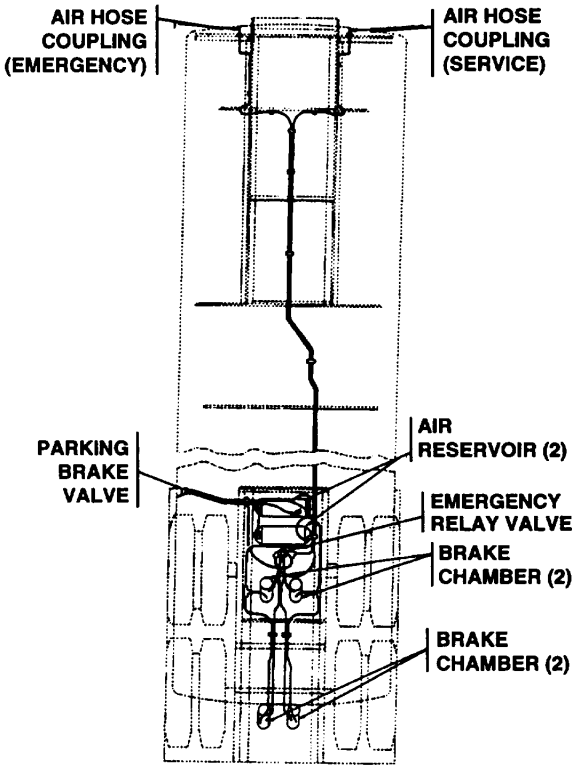
2. Check to see if any components of airbrake system are leaking or damged.

Are any components of airbrake system leaking or damaged?

no → Notify Unit maintenance that additional troubleshooting is required.

yes → Notify Unit maintenance to replace or repair damaged components of air-brake system. Verify problem is solved.

END OF TASK



COMPONENTS OF AIRBRAKE SYSTEM

3-4. TROUBLESHOOTING CHART (continued).

c. BRAKE SYSTEM (continued) **(4) BRAKES GRAB.**

NOTE

Prime mover must be coupled to semitrailer prior to performing this procedure (para 2-12).

A. 1. Set parking brakes of prime mover.

2. Check semitrailer air reservoirs for moisture (para 3-7).

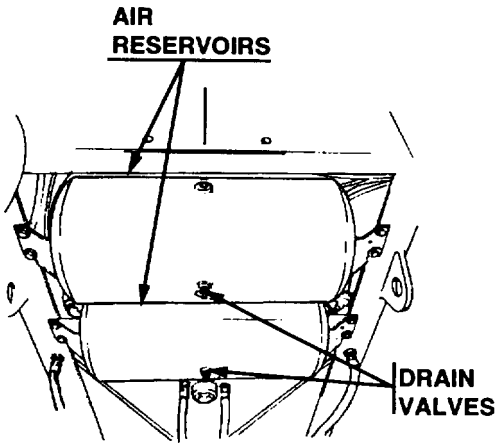
Is moisture present in semitrailer air reservoirs?

no

Notify Unit maintenance that additional troubleshooting is required.

yes

Open drain valves to drain moisture from semitrailer air reservoirs (para 3-7). Verify problem is solved.



END OF TASK

3-4. TROUBLESHOOTING CHART (continued).

d. FUELING OPERATIONS

(1) FUEL DOES NOT FLOW DURING ANY NONFILTERED FUELING OPERATION.

A. 1. Check to see if emergency valve A control handle is in open position.

Is emergency valve A control handle in open position?

no → Open emergency valve by operating emergency valve A control handle. If control does not operate, notify Unit maintenance.

yes →

B. Check fueling operation and make sure the proper valves are open (para 2-16.)

Are the proper valves open during fueling operation?

no → Open valves as required in fueling operation (para 2-16). Verify problem is solved.

yes →

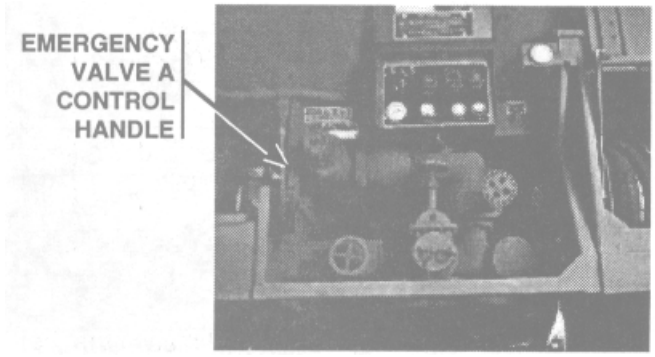
C. Check for dirt or debris in nozzle screen of fuel-dispensing nozzle (para 3-11).

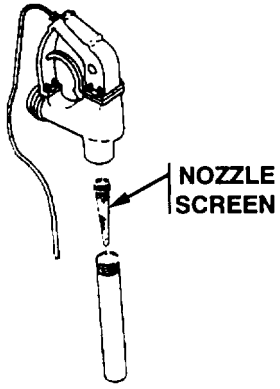
Is nozzle screen clogged with dirt or debris?

no → Notify Unit maintenance that additional troubleshooting is required.

yes → Clean or replace nozzle screen (para 3-11). Verify problem is solved.

END OF TASK





FUEL-DISPENSING NOZZLE

3-4. TROUBLESHOOTING CHART (continued).

d. FUELING OPERATIONS (continued)

(2) FUEL DOES NOT FLOW DURING ANY FILTERED FUELING OPERATION.

A. Check to see if emergency valve A control handle is in open position.

Is emergency valve A control handle in open position?

no

Open emergency valve by operating emergency valve A control handle. If control does not operate, notify Unit maintenance.

yes

B. 1. Start engine (para 2-17b).

2. Check fueling operation and make sure the proper valves are open (para 2-16).

Are the proper valves open during fueling operation?

no

Open valves as required in fueling operation (para 2-16). Verify problem is solved.

yes

C. Open valve N and check for water in filter/ separator.

Is water present?

no

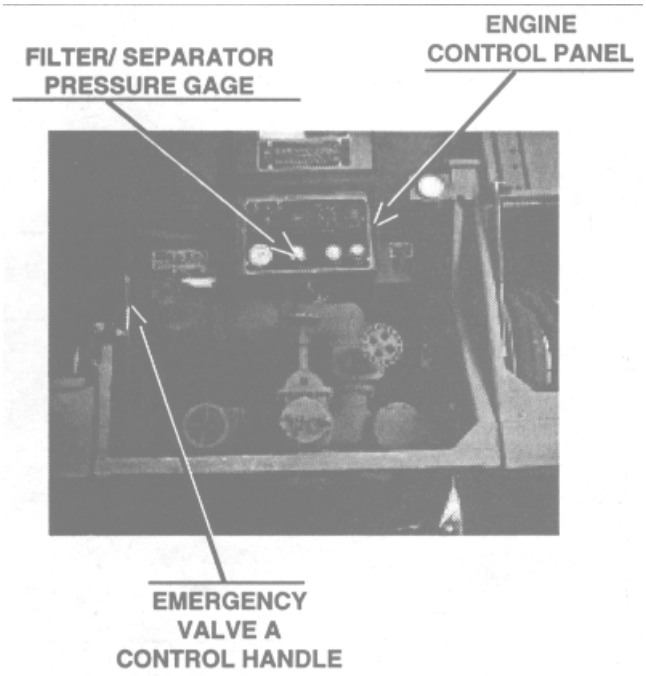
Drain filter/separato (para 2-19d). Verify problem is solved.

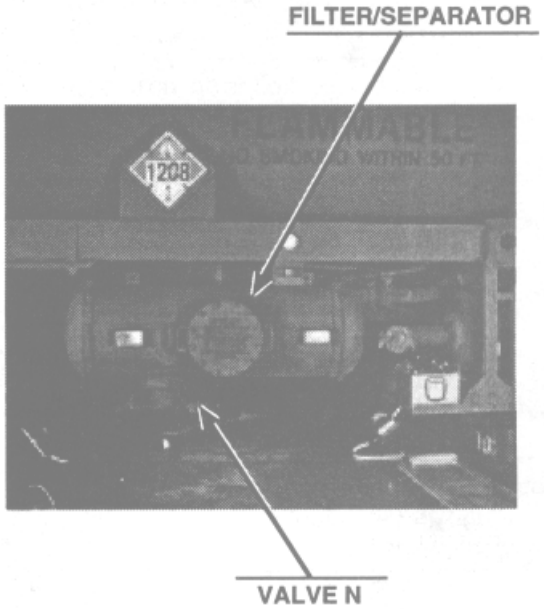
yes

D. Check reading of filter/separator pressure gage on engine control panel.

Is filter/separator pressure reading above 18 psi (172.4 kPa)?

continued on next page





3-4. TROUBLESHOOTING CHART (continued).

d. FUELING OPERATIONS (continued) **(2) FUEL DOES NOT FLOW DURING ANY FILTERED FUELING OPERATION (continued).**

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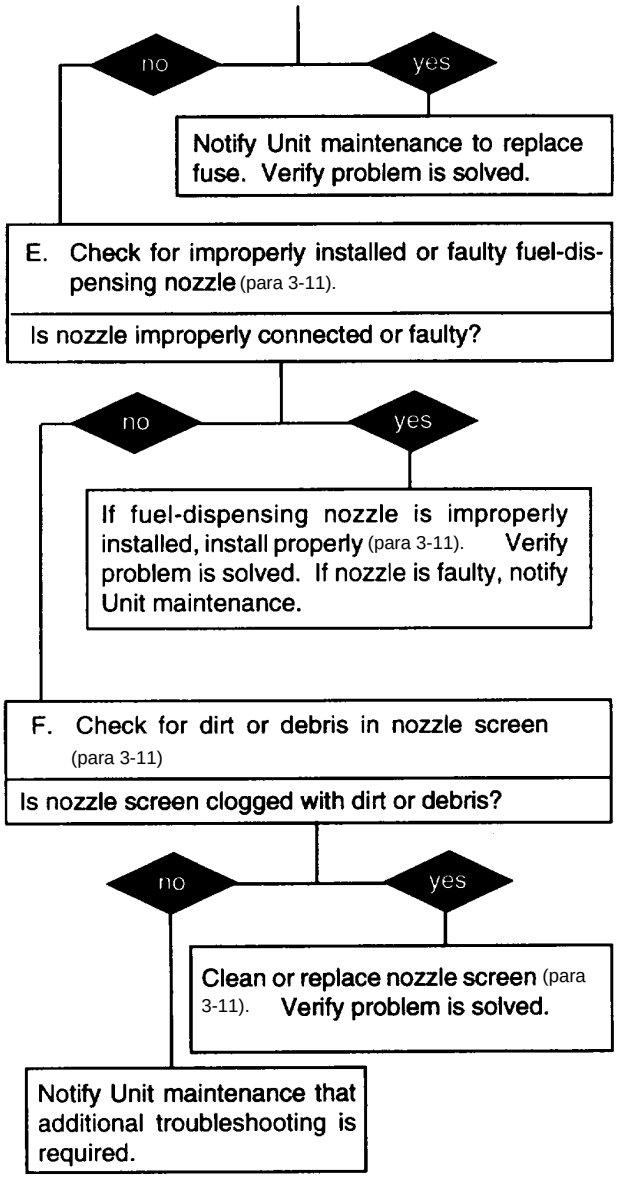
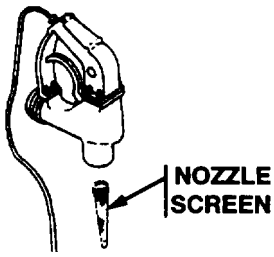


END OF TASK



FUEL-DISPENSING NOZZLE

3-4. TROUBLESHOOTING CHART (continued).

d. FUELING OPERATIONS (continued)

(3) FUEL DOES NOT FLOW DURING ANY OVERWING FUELING OPERATION.

A. Perform steps B through F of FUEL DOES NOT FLOW DURING ANY FILTERED FUELING OPERATION (para 3-4d(2)).

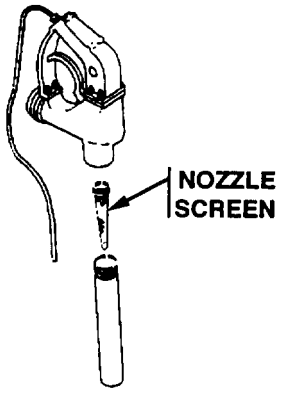
Is nozzle screen clogged with dirt or debris?

no

yes

Clean or replace nozzle screen (para 3-11). Verify problem is solved.

Notify Unit maintenance that additional troubleshooting is required.



FUEL-DISPENSING NOZZLE

END OF TASK

3-4. TROUBLESHOOTING CHART (continued).

e. TIRES

(1) TIRES ARE EXCESSIVELY WORN, SCUFFED, OR CUPPED.

A. Check tire pressure.

Are radial or tires overinflated or underinflated?

no / yes

1. Inflate/deflate tires as follows:
   - 65 psi (448.2 kPa) for hard surface roads.
   - 45 psi (310.3 kPa) for cross-country.
2. Verify problem is solved.

B. Check for loose wheels.

Is any wheel loose?

no / yes

Tighten wheel stud nuts. Verify problem is solved.

C. Check for bent wheel assemblies.

Is any wheel assembly bent?

no / yes

Notify Unit maintenance to replace bent wheel assembly. Verify problem is solved.

Notify Unit maintenance that additional troubleshooting is required.

TIRES AND WHEEL ASSEMBLIES

END OF TASK

3-4. TROUBLESHOOTING CHART (continued).

f. LANDING GEAR **(1) CRANK IS DIFFICULT TO OPERATE.**

NOTE

Prime mover must be coupled to semitrailer prior to performing this procedure (para 2-12).

A. Check to see if lower leg is bent.

Does lower leg appear to be bent?

no — yes

yes: Notify Unit maintenance to replace or repair landing gear lower leg. Verify problem is solved.

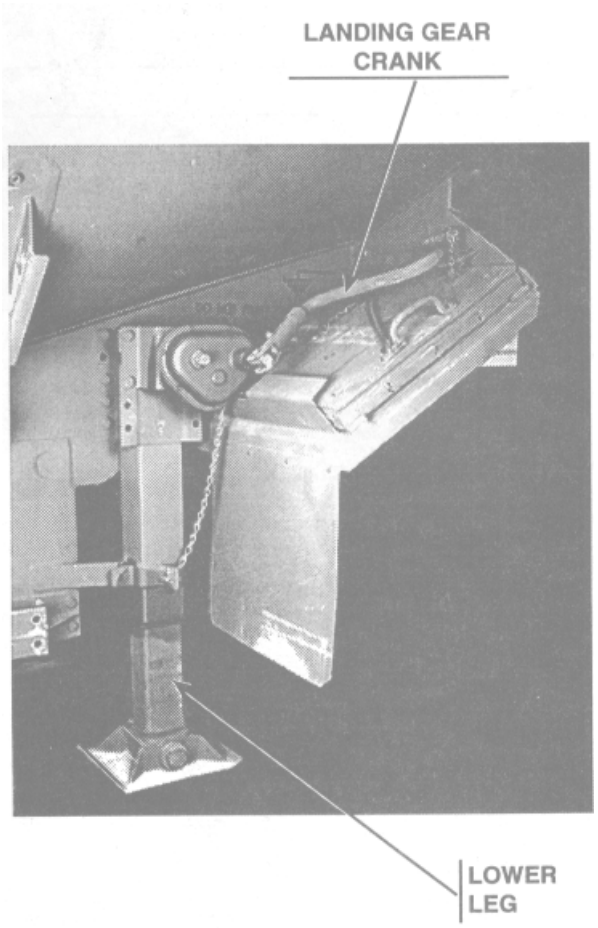
B. Turn landing gear crank and raise lower leg.

Does lower leg return to its fully retracted position?

no — yes

yes: Notify Unit maintenance that additional troubleshooting is required.

no: Notify Unit maintenance to replace or repair landing gear lower leg. Verify problem is solved.



END OF TASK

Section III. MAINTENANCE PROCEDURES

3-5. GENERAL.

This section provides maintenance instructions for those items that are the responsibility of the operator/crew. The maintenance functions are limited to those operations that are authorized by the Maintenance Allocation Chart (MAC), Appendix B of TM 9-2330-398-24.

3-6. BATTERIES, TERMINALS, AND CABLES SERVICE.

This Task covers:

Inspection and Service

Initial Setup:

Materials/Parts:
- Baking soda (Item 1, Appendix D)

Equipment Conditions:
- Semitrailer uncoupled from prime mover (para 2-14).

INSPECTION AND SERVICE

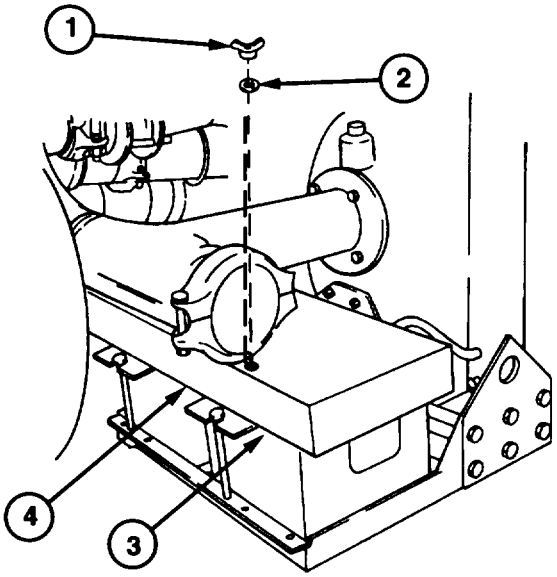
WARNING

Batteries produce explosive gases. Keep sparks, flames, and smoking material away. Ventilate when charging or using in an enclosed space. The batteries contain sulfuric acid that causes severe burns. If acid contacts eyes, skin, or clothing, flush well with water. For contact with eyes, get immediate medical attention. Do not jump-start engine. Batteries must be removed for recharging.

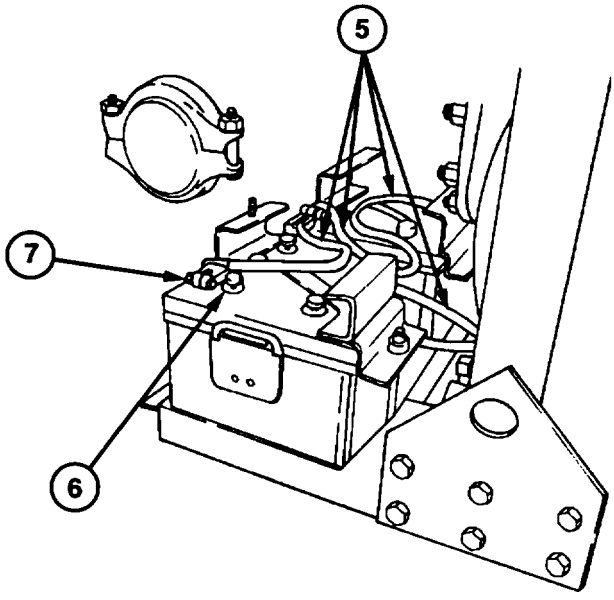
NOTE

Each time before vehicle is put into operation, battery terminals and cables should be inspected for excessive dirt and corrosion, loose connections, and damage. Dirt, combined with electrolyte or moisture on top of battery, can result in a continuous battery discharge.

3-6. BATTERIES, TERMINALS, AND CABLES SERVICE (continued).



a. Remove four wingnuts (1) and washers (2) securing battery cover (3) to battery hold-down bracket (4). Remove battery cover (3) from hold-down bracket (4).
b. Inspect battery area for excessive dirt and corrosion. Clean battery area with mixture of baking soda and water, then flush battery area with clean water.



c. Check four cables (5) for frayed insulation. If insulation is worn or frayed, notify Unit maintenance.
d. Check terminals (7) for looseness. If loose, notify Unit maintenance.
e. Remove 12 vent fill caps (6) and check electrolyte level. Electrolyte level must be just below ring at bottom of each cell opening. If electrolyte level is low, notify Unit maintenance. Install 12 vent fill caps (6).
f. Install battery cover (3) on hold-down bracket (4) with four wingnuts (1) and washers (2).

FOLLOW-ON MAINTENANCE:
• None

3-7. AIR RESERVOIRS MAINTENANCE.

This Task Covers:

Draining Water from Air Reservoir

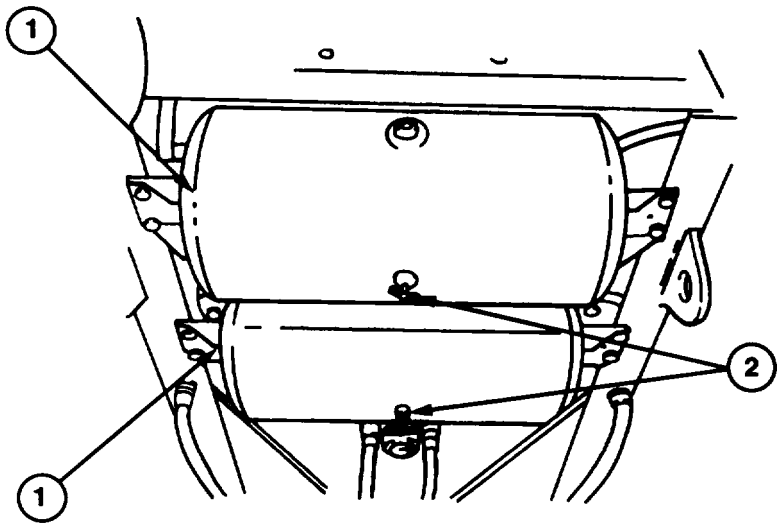
Initial Setup:

Equipment Conditions:
- Semitrailer uncoupled from prime mover (para 2-14).

DRAINING WATER FROM AIR RESERVOIR

NOTE
Perform this procedure daily.

1. Open drain valve (2) on each of two air reservoirs (1) and allow water to flow out.
2. Close drain valve (2) on each of two air reservoirs (1).



FOLLOW-ON MAINTENANCE:
- None

3-8. STORAGE BOX MAINTENANCE.

This Task Covers:

a. Cleaning

b. Inspection

Initial Setup:

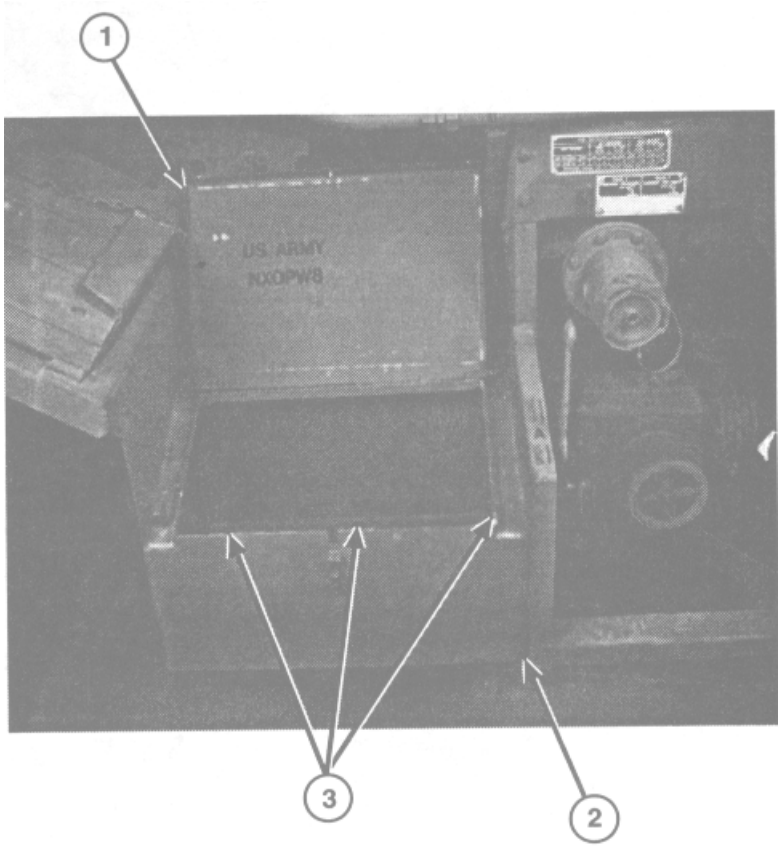
Equipment Conditions:
- Semitrailer uncoupled from prime mover (para 2-14).

a. CLEANING

Periodically clean dirt and debris from storage box (2) and cover (1). Make sure all drain holes (3) are clear of debris or restrictions.

b. INSPECTION

Inspect storage box (2) and cover (1) for damage. Report any damage to Unit maintenance.



FOLLOW-ON MAINTENANCE:
- None

3-9. ENGINE AIR CLEANER SERVICE.

This Task Covers:

a. Removal
b. Cleaning and Inspection
c. Installation

Initial Setup:

Materials/Parts:
• Rag (Item 11, Appendix D)

Equipment Conditions:
• Semitrailer uncoupled from prime mover (para 2-14).

CAUTION
Do not run engine if red band is showing in restriction indicator. Damage to engine could result.

NOTE
Service air cleaner whenever restriction indicator (1) shows a red band.

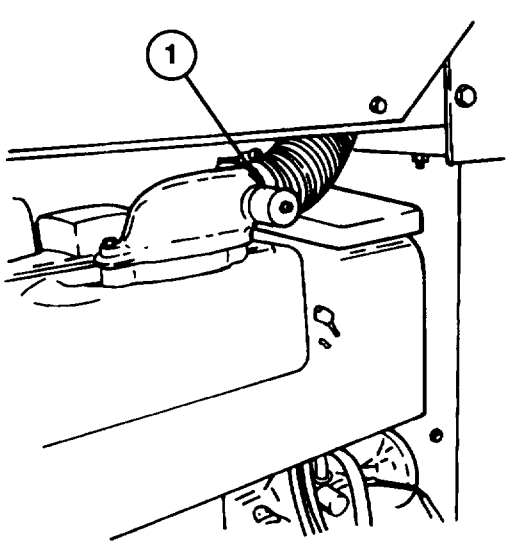
a. REMOVAL

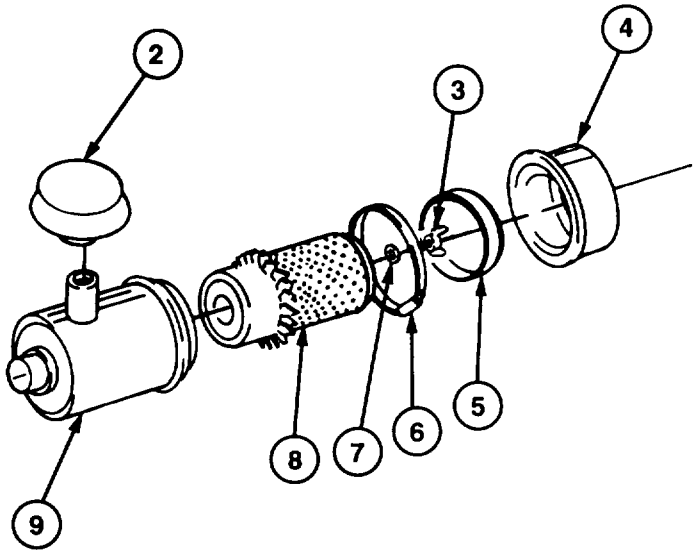
1. To service filter, loosen clamp (6) and remove filter end cap (4) from air cleaner body (9).

CAUTION
Never run engine with filter or dust collector removed. Dam, age to engine could result.

2. Unscrew wingnut (3) and washer (7) and remove filter element (8) from air cleaner body (9).

3. Remove baffle (5) from end cap (4), and remove any accumulated dirt.





3-9. ENGINE AIR CLEANER SERVICE (continued).

4. Remove rain cap (2) from air cleaner body (9).

b. CLEANING AND INSPECTION

1. Clean rain cap with clean rag.

2. Use a clean rag to wipe clean the interior of air cleaner and end cap.

3. Use a clean rag to wipe obstructions and dirt from filter element. After six cleanings or annually, have Unit maintenance obtain a replacement filter element.

c. INSTALLATION

1. Install baffle (5) in end cap (4).

2. Install new or cleaned filter element (8) in air cleaner body (9). Fasten in place with washer (7) and wingnut (3).

3. Install end cap (4) on air cleaner body (9). Make sure portion of end cap marked "TOP" is at top. Secure end cap (4) by tightening clamp (6).

4. Install rain cap (2) on air cleaner body (9).

5. Press button on air restriction indicator (1) to reset red band.

FOLLOW-ON MAINTENANCE:
• None

3-10. FILTER/SEPARATOR SUMP MAINTENANCE.

This Task covers:

Draining Sump

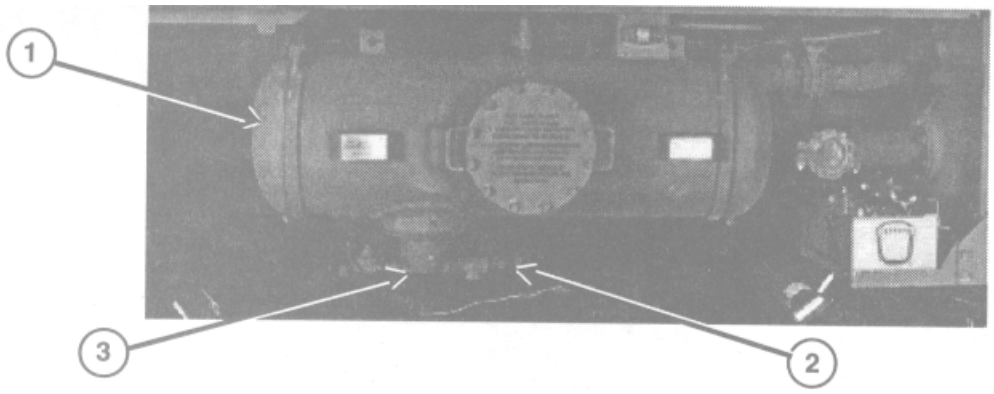
Initial Setup:

Equipment Conditions:
- Semitrailer uncoupled from prime mover (para 2-14).

DRAINING SUMP

NOTE
Place drain pan under sump before, during, and after operation.

Place suitable container under valve N (2) of filter/separator sump (3). Open valve N (2) to drain water from filter/separator (1) after each period of operation (para 2-19d).



FOLLOW-ON MAINTENANCE:
- None

3-11. FUEL-DISPENSING NOZZLE MAINTENANCE.

This Task Covers:

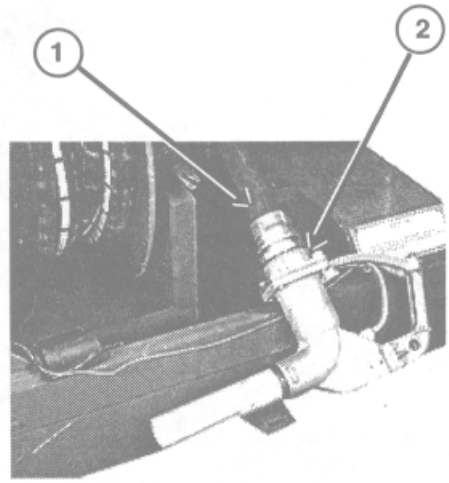
a. Removal
b. Service
c. Installation

Initial Setup:

Materials/Parts:
- Drycleaning solvent (Item 6, Appendix D)
- Rag (Item 15, Appendix D)

Equipment Conditions:
- All fuel-handling valves closed (para 2-16).

a. REMOVAL



1. Unscrew fuel-dispensing nozzle (2) from hose (1).
2. Using suitable container, drain fuel from nozzle (2) and hose (1).

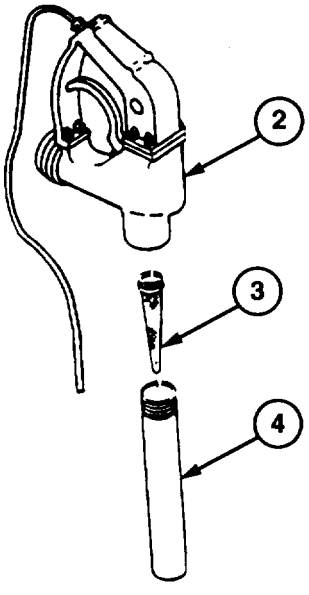
NOTE
Cover end of hose with rag to keep out dirt and debris.

b. SERVICE

NOTE
Screen in fuel-dispensing nozzle must be cleaned periodically and whenever flow through nozzle is restricted.

1. Unscrew spout (4) from nozzle (2).
2. Remove screen (3) from inside of spout (4).

WARNING
Drycleaning 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 flames or excessive heat.



3. Clean screen (3) with drycleaning solvent and rag. Use compressed air to dry screen and remove any excess material.
4. Install screen (3) in spout (4).
5. Install spout (4) on nozzle (2).

c. INSTALLATION

Install nozzle (2) on hose (1).

FOLLOW-ON MAINTENANCE:
- None

APPENDIX A
REFERENCES

A-1. SCOPE.

This appendix lists all forms, manuals, bulletins, and other publications that are referenced in this manual and/or are applicable to material covered in this manual.

A-2. PUBLICATIONS INDEX.

DA Pam 25-30, Consolidated Index of Army Publications and Blank Forms, should be consulted frequently for the latest revisions and for new publications relating to material covered in this manual. Also consult DA Pam 350-9, Index and Description of Army Training Devices.

A-3. FORMS.

For instructions on the use of maintenance forms, refer to DA Pam 738-750, The Army Maintenance Management System (TAMMS).

Recommended Changes to Publications and Blank Forms ..... DA Form 2028
Recommended Changes to Equipment Technical Publications ..... DA Form 2028-2
Organization Control Record for Equipment ..... DA Form 2401
Equipment Inspection and Maintenance Worksheet ..... DA Form 2404
Maintenance Request ..... DA Form 2407
Equipment Log Assembly (Records) ..... DA Form 2408
Preventive Maintenance Schedule and Record ..... DD Form 314
Processing and Deprocessing Record for Shipment,
Storage and Issue of Vehicles and Spare Engines ..... DD Form 1397
Report of Discrepancy (ROD) ..... SF Form 364
Product Quality Deficiency Report ..... SF Form 368

A-4. FIELD MANUALS.

NBC Contamination Avoidance ..... FM 3-3
NBC Protection ..... FM 3-4
NBC Decontamination ..... FM 3-5
Field Behavior of NBC Agents (Including Smoke and Incendiaries) ..... FM 3-6
Route Reconnaissance and Classification ..... FM 5-36
Ammunition Handbook ..... FM 9-13
Operation and Maintenance of Ordnance Materiel in Cold Weather (0 Degrees F to Minus 65 Degrees F) ..... FM 9-207
General Fabric Repair ..... FM 10-16
Organizational Maintenance of Military Petroleum Pipelines, Tanks and Related Equipment ..... FM 10-20
Aircraft Refueling ..... FM 10-68
Petroleum Supply Point Equipment and Operations ..... FM 10-69
Petroleum Tank Vehicle Operations ..... FM 10-71
Camouflage ..... FM 20-3
Vehicle Recovery Operations ..... FM 20-22
First Aid for Soldiers ..... FM 21-11
Manual for the Wheeled Vehicle Driver ..... FM 21-305
Battle Focused Training ..... FM 25-101
Basic Cold Weather Manual ..... FM 31-70
Northern Operations ..... FM 31-71
Railway Operating and Safety Rules ..... FM 55-21
Army Motor Transport Units and Operations ..... FM 55-30
Desert Operations (How to Fight) ..... FM 90-3(HTF)
Mountain Operations ..... FM 90-6
Operational Terms and Symbols ..... FM 101-5-1

A-5. TECHNICAL MANUALS.

Operator and Organizational Maintenance Manual (Including Repair Parts and Special Tools List) for Nozzle Assembly, Closed Circuit Refueling W/Strainer Assembly ..... TM 5-4930-226-12&P
Inspection, Care and Maintenance of Antifriction Bearings ..... TM 9-214
Deepwater Fording of Ordnance Materiel ..... TM 9-238
Materials Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel and Related Materials Including Chemicals ..... TM 9-247
Hand Receipt: Semitrailer, Tank, 5000-Gallon, M969A2 ..... TM 9-2330-398-10-HR
Unit, Direct Support, and General Support Maintenance Manual for Semitrailer, Tank, 5000-Gallon, Fuel Dispensing, Automotive, M969A2 ..... TM 9-2330-398-24
Unit, Direct Support, and General Support Maintenance Repair Parts and Special Tools List for Semitrailer, Tank, 5000-Gallon, M969A2 (NSN 2330-01-155-0048) ..... TM 9-2330-398-24P
Operator's, Unit, Direct Support and General Support Maintenance Manual for Care, Maintenance Repair and Inspection of Pneumatic Tires and Inner Tubes ..... TM 9-2610-200-14
Operator's, Unit, Intermediate Direct Support and Intermediate General Support Maintenance Manual for Lead-Acid Storage Batteries ..... TM 9-6140-200-14
Painting Instructions for Army Materiel ..... TM 43-0139
Railcar Loading Procedures ..... TM 55-601
Storage and Materials Handling ..... TM 743-200-1
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use ..... TM 750-244-6
Direct Support and General Support for Quality Control Inspector's Inspection Criteria ..... TM 750-245-4

A-6. BULLETINS.

Storage Serviceability Standard: Tracked Vehicles, Wheeled Vehicles, and Component Parts ..... SB 740-98-1
Occupational and Environmental Health: Sanitary Control and Surveillance of Field Water Supplies ..... TB MED 577
Description, Use, Bonding Techniques and Properties of Adhesives ..... TB ORD 1032
Hand Portable Fire Extinguishers Approved for Army Users ..... TB 5-4200-200-10
Tactical Wheeled Vehicles: Repair of Frames ..... TB 9-2300-247-40
Equipment Improvement Report and Maintenance Digest (U.S. Army Tank-automotive and Armaments Command) ..... TB 43-0001-39 Series
Maintenance Expenditure Limits for Tactical Wheeled Vehicles. FSC Group 23, FSC Classes 2320 and 2330 ..... TB 43-0002-81
Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment and Materials Handling Equipment ..... TB 43-0209
Purging, Cleaning and Coating Interior Ferrous and Terne Sheet Vehicle Fuel Tanks ..... TB 43-0212
Corrosion Prevention and Control Including Rustproofing Procedures for Tactical Vehicles and Trailers ..... TB 43-0213
Maintenance in the Desert ..... TB 43-0239

A-7. OTHER PUBLICATIONS.

Army Logistics Readiness and Sustainability ..... AR 700-138
Army Medical Department Expendable/Durable Items ..... CTA 8-100
Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items) ..... CTA 50-970

APPENDIX B
COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

B-1. SCOPE.

This appendix lists components of the end item and basic issue items for the M969A2 semitrailer, to help you inventory items required for safe and efficient operation.

B-2. GENERAL.

The components of end item and basic issue items lists are divided into the following sections:

a. Section II. Components of End Item (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 packaged separately 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). This list contains 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. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorizations of the end item.

B-3. EXPLANATION OF COLUMNS IN SECTIONS II AND III.

The following provides an explanation of columns found in the tabular listings in Sections II and III:

a. Column (1), Illus. Number [Illustration Number], gives you the illustration number of the item.

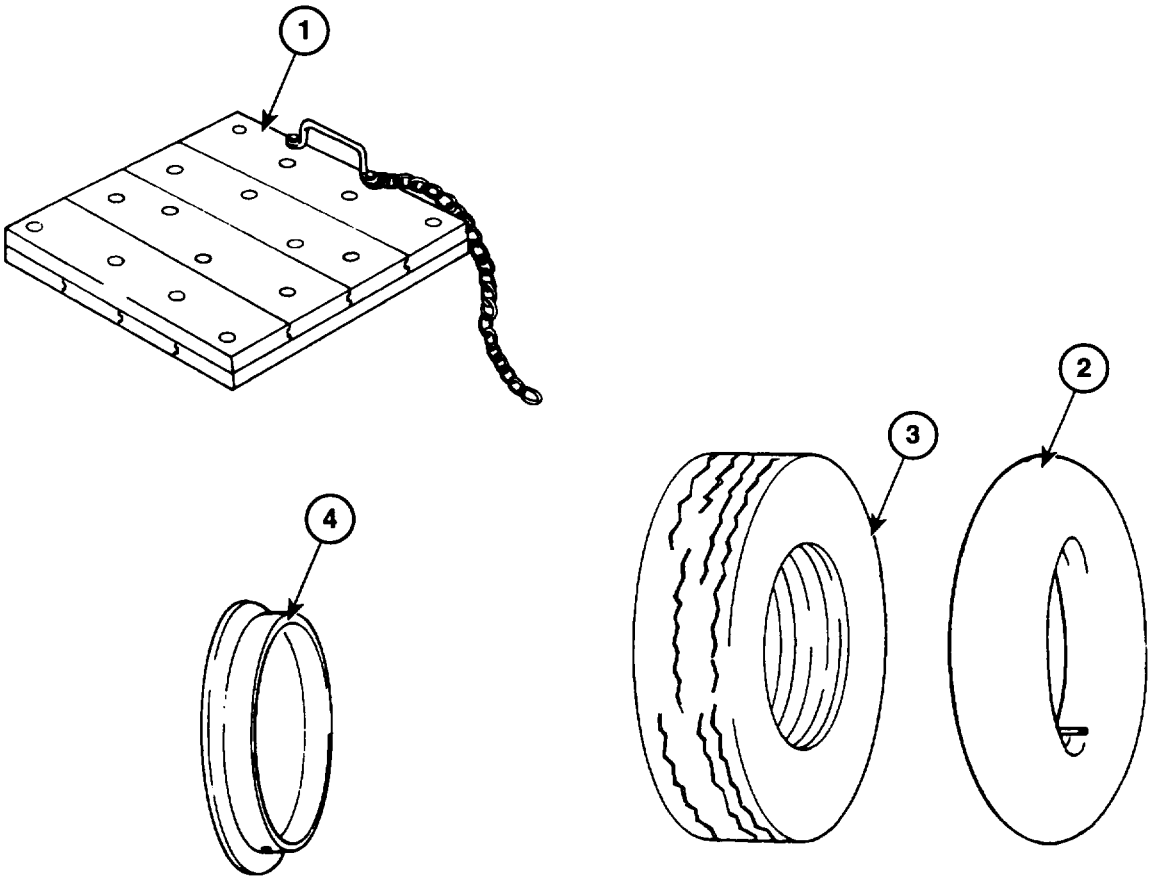
b. Column (2), National Stock Number, identifies the national stock number assigned to the item; this number is used for requisitioning purposes.

c. Column (3), Description, CAGEC and Part Number, identifies the Federal item name (in capital letters) and, if required, gives a brief description to identify and locate the item. The last line below the description is the Commercial and Government Entity Code (CAGEC) (in parentheses), followed by the part number.

d. Column (4), U/M [Unit of Measure], indicates how the item is issued for the national stock number shown in column 2. This measure is expressed by a two-character alphabetical abbreviation: EA for "each."

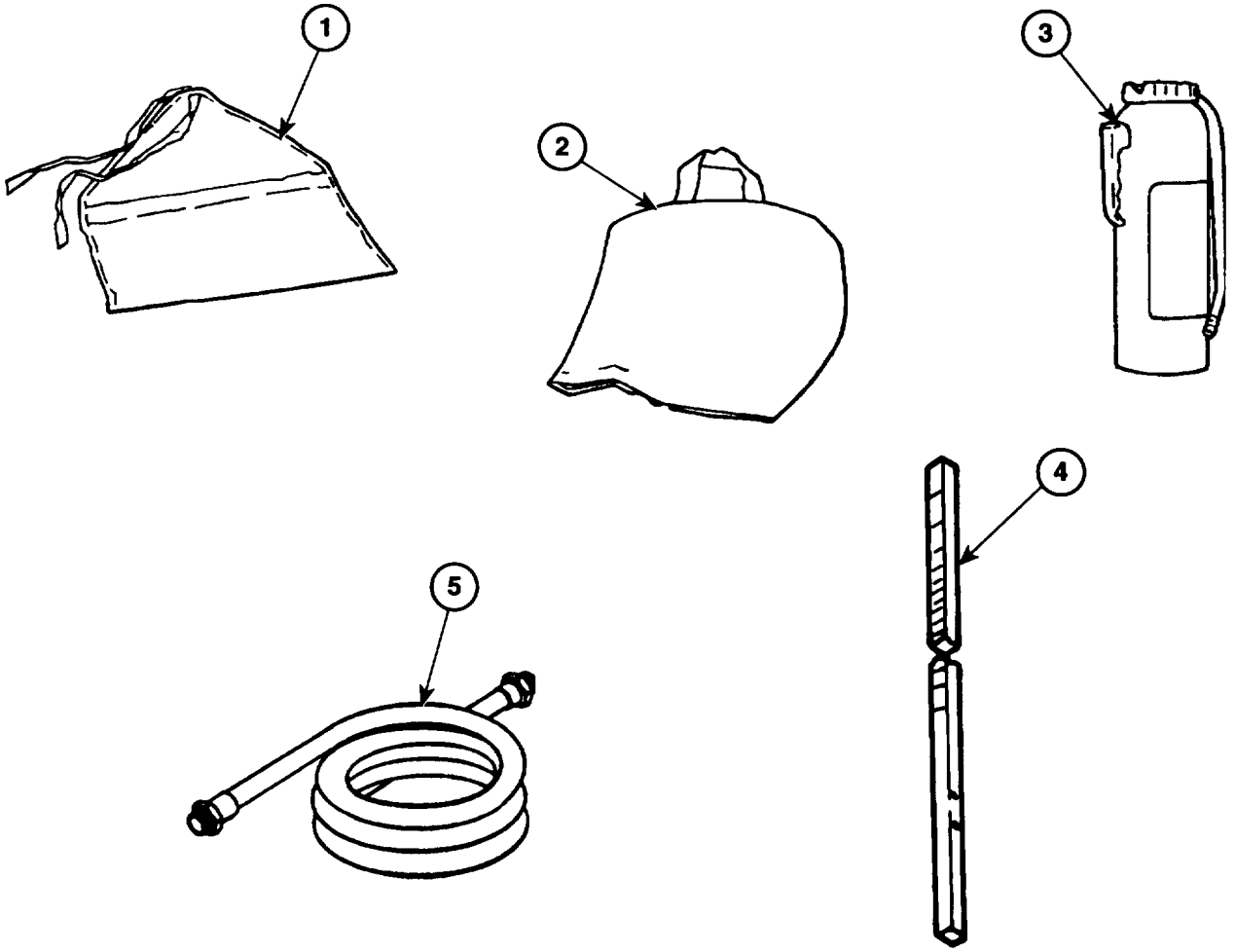
e. Column (5), Qty. Rqr. [Quantity Required], indicates the quantity of the item authorized to be used with or on the equipment.

Section II. COMPONENTS OF END ITEM (COEI)

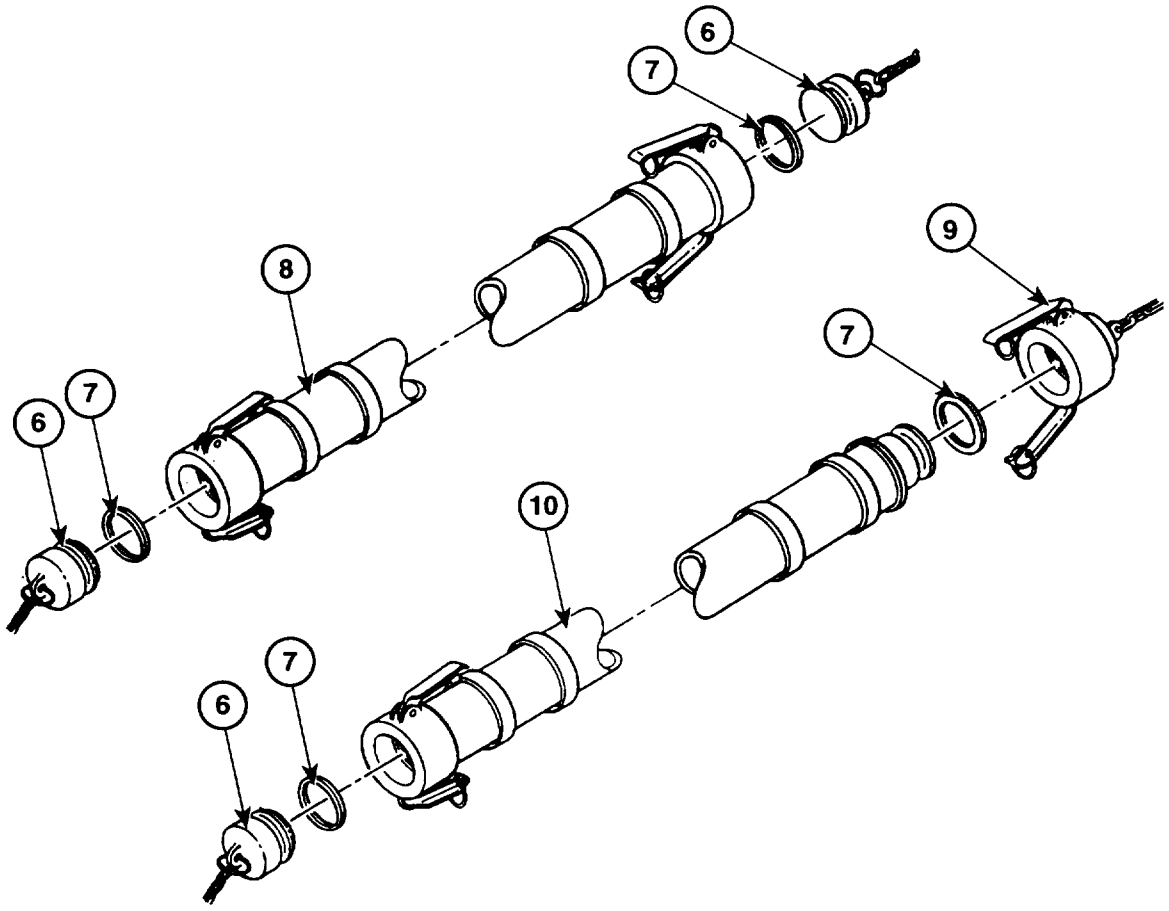


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Reqd
1	2510-00-741-7585	BOARD, GROUND (stowed at landing legs) (19207) 7417585		EA	2
2	2610-00-029-0563	TUBE, INNER, PNEUMATIC (stowed on rear bracket)		EA	1
3	2610-00-373-7294	TIRE, SPARE, RADIAL (stowed on rear bracket)		EA	1
4	2640-00-555-2924	FLAP, INNER TUBE (stowed on rear bracket)		EA	1

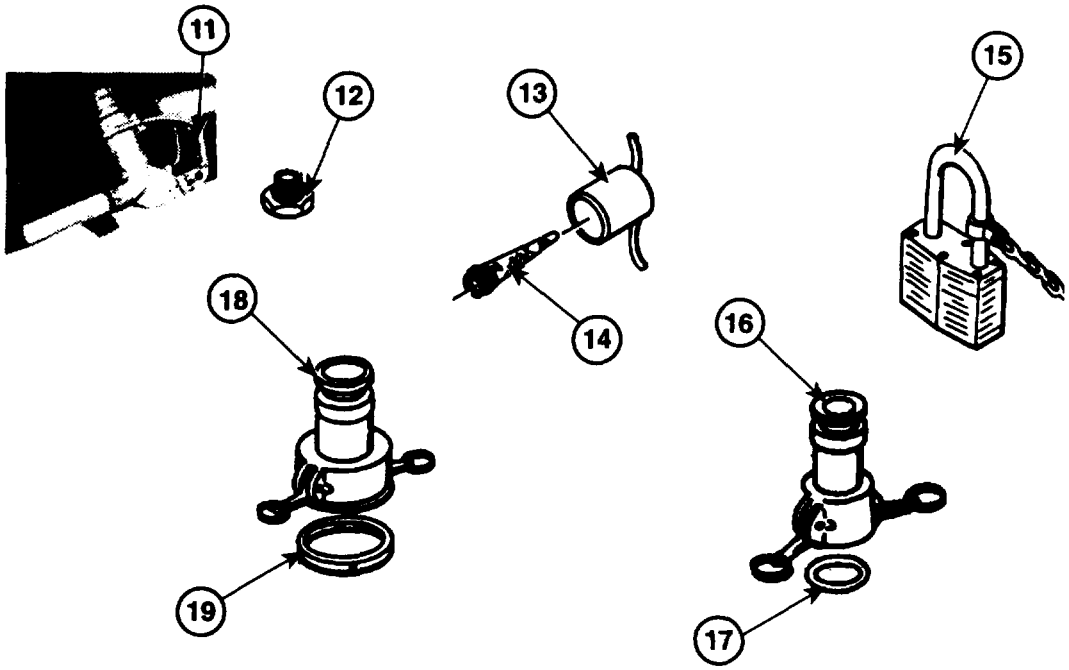
Section III. BASIC ISSUE ITEMS (BII)



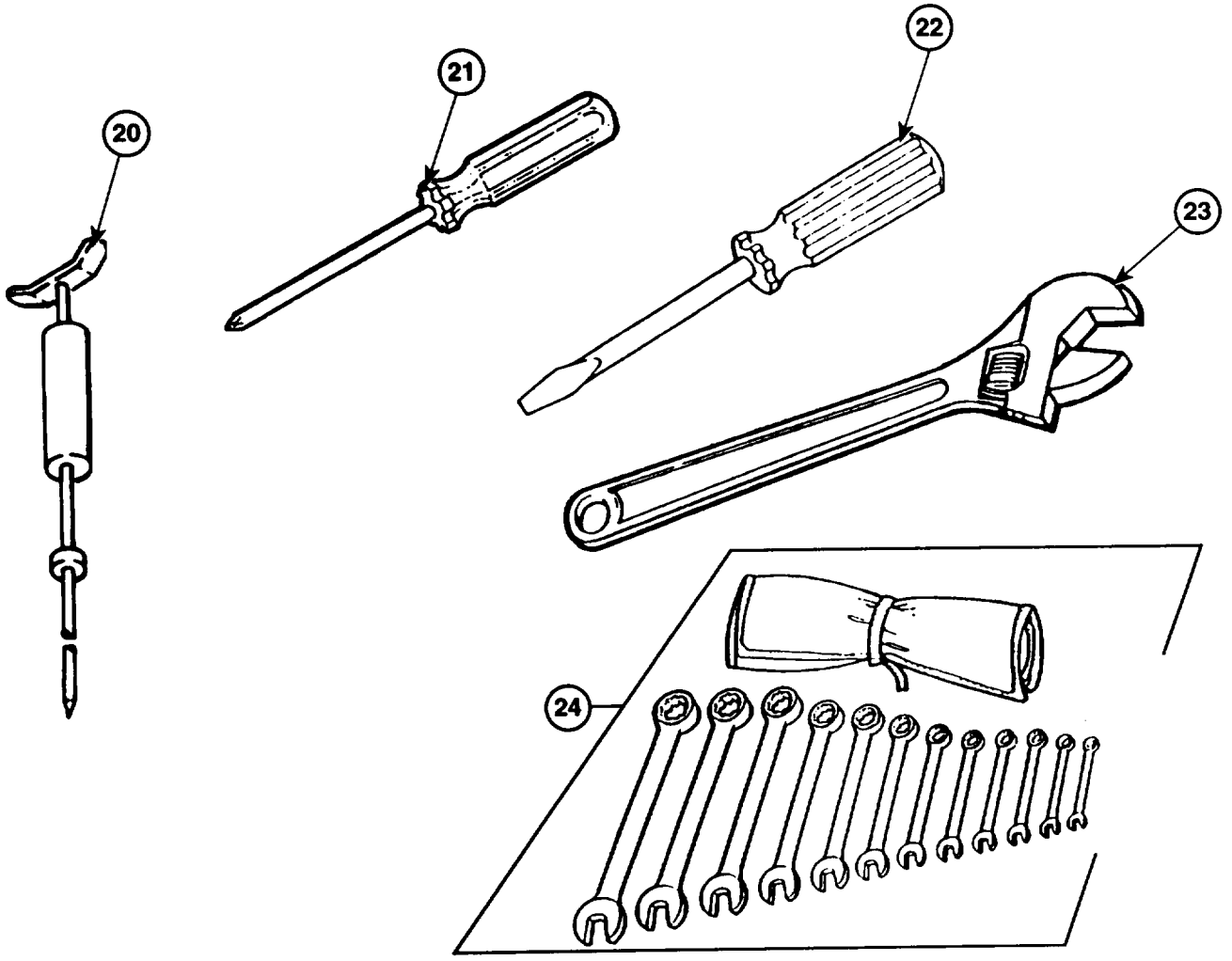
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number Usable On Code	(4) U/M	(5) QTY Reqd
1	5140-00-772-4142	BAG, TOOL (stowed in tool box) (19207) 7724142	EA	2
2	5340-01-290-2727	COVER, ACCESS (on fire extinguishers) (19207) 11668081	EA	2
3	4210-00-808-4544	EXTINGUISHER, FIRE (stowed on rear and side bracket) (3670) IK10E	EA	2
4	5210-01-054-9934	GAGE, STICK (stowed on stowage tube) (19207)11685988	EA	1
5	4720-01-058-6032	HOSE ASSEMBLY, 1-1/4 IN. x 50 FT (19207)11685953	EA	2



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Reqd
6	4730-00-640-6188	PLUG, QUICK-DISCONNECT (96906) MS27029-17		EA	4
7	5330-00-899-4509	GASKET (96906) MS27030-9		EA	6
8	4720-01-096-4390	HOSE, TRANSFER (stowed in hose trough) (19207)11685834		EA	1
9	4730-00-640-6156	CAP, QUICK-DISCONNECT (96906) MS27028-17		EA	2
10	4720-01-087-5876	HOSE, TRANSFER (stowed in hose trough) (19207)11685835		EA	2



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	(4) U/M	(5) QTY Reqd
11	4930-01-377-3136	NOZZLE ASSEMBLY (stowed in tool box) (19207) 12275441-3	EA	2
12	4730-00-2687479	BUSHING, PIPE SHOULDER (stowed in tool box) (96906) MS14315-23	EA	2
13	5340-01-170-4999	DUST CAP (stowed in tool box) (19207) 12275443	EA	2
14	4730-01-170-4973	STRAINER (stowed in tool box) (19207) 12275444	EA	2
15	5340-00-912-4086	PADLOCK SET, W/CLEVIS AND CHAIN, COMPOSED OF 2 PADLOCKS AND 2 KEYS (96906) MS21313-160	EA	1
16	4730-00-951-3293	REDUCER, QUICK-DISCONNECT (stowed in tool box) (96906) MS49000-1	EA	1
17	531000-612-2414	GASKET, REDUCER (stowed in tool box) (96906) MS27030-6	EA	1
18	4730-00-951-3295	REDUCER, QUICK-DISCONNECT (stowed in tool box) (96906) MS49000-5	EA	1
19	5330-00-8994509	GASKET, REDUCER (stowed in tool box) (96906) MS27030-9	EA	1



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Reqd
20	5975-01-050-5707	ROD, GROUND (stowed in stowage tube) (97403) 13219E0462		EA	1
21	5120-00-234-8913	SCREWDRIVER, CROSS TIP (19207) 11655777-12		EA	1
22	5120-00-222-8852	SCREWDRIVER, FLAT TIP (96906) MS15219-1		EA	1
23	5120-00-240-5328	WRENCH, ADJUSTABLE (96906) MS15461-3		EA	1
24	5120-00-148-7917	WRENCH SET, COMBINATION (81348) GGG-W-636		EA	1

APPENDIX C
ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. SCOPE.

a. This appendix lists additional items you are authorized for support of the M969A2 semitrailer.
b. The list in Section II identifies items that do not have to accompany the semitrailer and do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-2. EXPLANATION OF LISTING.

The national stock number, description, Commercial and Government Entity Code (CAGEC) (in parentheses), part number, unit of measure (U/M), and quantity recommended (Qty. Recm.) are provided for each item 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.

Section II. ADDITIONAL AUTHORIZATION LIST (AAL)

(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/M	(5) Qty. Recm.
4930-00-516-0839	ADAPTER ASSEMBLY, GRAVITY FILL (96124) 780000-5	EA	1
2590-00-473-6331	BRACKET, VEHICULAR (19207) 6566675	EA	1
7240-00-377-5269	CAN, GASOLINE (81349) MIL-C-53109	EA	1
4720-01-065-9388	COUPLING, FUEL SAMPLING (19207)11668858	EA	1
4730-01-088-8675	COUPLING HALF, QUICK-DISCONNECT (16069) F4333	EA	1
4930-00-360-0710	COUPLING HALF, QUICK-DISCONNECT, 11/2-IN. FUEL HOSE, 1-IN. MALE - 1-IN. FEMALE (81718) 633B1INAL	EA	1
4930-00-117-4726	NOZZLE ASSEMBLY, CLOSED-CIRCUIT REFUELING, W/STRAINER (79326) CCN101/14	EA	1
4930-01-068-5100	NOZZLE, UNLEADED FUEL (33456) OPW11AP	EA	1
4730-00-889-2382	REDUCER, QUICK-DISCONNECT, 1-IN. MALE - 1 1/2-IN. FEMALE (96906) MS49000-7	EA	1
4730-01-295-1842	REFUEL ON THE MOVE (ROM) ASSEMBLY (19207)12356117 Consisting of:	EA	1
4730-00-936-4584	CAP, 1.50 IN. (3.81 cm) (96906) MS27028-10	EA	8
4730-00-929-0787	CAP, 3.00 IN. (7.62 cm) (96906) MS27028-15	EA	15
4730-00-640-6156	CAP, 4.00 IN. (10.16 cm) (96906) MS27028-117	EA	3
4730-00-203-1010	COUPLING, 1.5 F to 1-1/2 NPT (96906) MS27026-9	EA	8
4210-00-257-5343	FIRE EXTINGUISHER (03670) K20E	EA	8

Section II. ADDITIONAL AUTHORIZATION LIST (AAL) (continued)

(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/M	(5) Qty. Recm.
5330-00-360-0595	GASKET, 1.50 IN. (3.81 cm) (96906) MS27030-5	EA	8
5330-00-088-9166	GASKET, 3.00 IN. (7.62 cm) (96906) MS27030-8	EA	23
5330-00-899-4509	GASKET, 4.00 IN. (10.16 cm) (96906) MS27030-9	EA	4
5975-01-050-5707	GROUND ROD (97403)13219E0462	EA	8
4720-00-555-8325	HOSE ASSEMBLY, 1.50 IN. (3.81 cm) I.D. (81349) M370B05B2C3000	EA	8
4720-00-083-0048	HOSE ASSEMBLY, 3.00 IN. (7.62 cm) I.D. (73842) 543-419-3-50	EA	8
4930-00-471-0288	NOZZLE, FUEL (19207)10896274	EA	8
4730-00-823-5316	PLUG, 1.50 IN. (3.81 cm) (96906) MS27029-9	EA	8
4730-00-929-0790	PLUG, 3.00 IN. (7.62 cm) (96906) MS27029-15	EA	15
4730-00-640-6188	PLUG, 4.00 IN. (10.16 cm) (96906) MS27029-17	EA	2
4730-00-951-3293	REDUCER, 4.0/3.0 F/M 24869) MS49000-1	EA	1
4730-00-951-3296	REDUCER, 4.0/3.0 M/F (96906) MS49000-9	EA	1
4730-01-096-1039	TEE ASSEMBLY, QUICK-DISCONNECT, 3.0 X 1.5 IN. (7.62 x 3.81 cm) (97403) 13222E9884		EA
4730-00-075-2405	TEE ASSEMBLY, QUICK-DISCONNECT, 4.00 IN. (10.16 cm) (97403)5-14-676C	EA	1
4820-01-098-4925	VALVE ASSEMBLY, 3.00 IN. (7.62 cm) (97403)13222E9888	EA	6
4720-01-064-8820	TUBING ASSEMBLY, NONMETALLIC (19207)11668857	EA	1

APPENDIX D
EXPENDABLE AND DURABLE ITEMS LIST

Section I. INTRODUCTION

D-1. SCOPE.

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the M969A2 semitrailer.

This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable items.

D-2. EXPLANATION OF COLUMNS.

There are five columns in Section II, Expendable and Durable Items List:

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., Drycleaning solvent, Item 6, Appendix D).

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

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

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

Column (4) - Description (CAGEC). This column 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 Code (CAGEC) (in parentheses) followed by the part number, if applicable.

Column (5) - U/M [Unit of Measure]. Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation: EA (each), GL (gallon), LB (pound), OZ (ounce), PT (pint), and OT (quart). 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 AND DURABLE ITEMS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION (CAGEC)	(5) U/M
1	C	8950-00-292-9611	BAKING SODA (63298) A-A-20086	Oz
2	C	6850-01-092-3550	COMPOUND: Silicone (75037)1609	EA
3	C		DRYCLEANING SOLVENT: Type II (81348) P-D-680	
		6850-00-110-4498	1 -Pint Can	PT
		6850-00-274-5421	5-Gallon Can	GL
		6850-00-285-8011	55-Gallon Drum	GL
4	C		FUEL OIL, DIESEL: Arctic, DF-A (81348) W-F-800	
		9140-00-286-5282	5-Gallon Can	GL
		8140-00-286-5284	55-Gallon Drum	GL
5	C		FUEL OIL, DIESEL: Regular, DF-2 (81348) W-F-800	
		9140-00-286-5295	5-Gallon Can	GL
		9140-00-286-5296	55-Gallon Drum	GL
6	C		FUEL OIL, DIESEL: Winter, DF-1 (81348) W-F-800	
		9140-00-286-5287	5-Gallon Can	GL
		9140-00-286-5288	55-Gallon Drum	GL
7	C		GREASE: Automotive and Artillery (81349) MIL-G-10924	
		9150-01-197-7688	2 1/4-Ounce Tube	Oz
		9150-01-197-7689	6 1/2-Pound Can	LB
		9150-01-197-7690	1 3/4-Pound Can	LB
		9150-01-197-7692	35-Pound Can	LB
		9150-01-197-7693	14-Ounce Cartridge	Oz
8	C		LUBRICATING OIL: Internal Combustion Engine, Arctic, OEA (81349) 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

Section II. EXPENDABLE AND DURABLE ITEMS LIST (continued)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION (CAGEC)	(5) U/M
9	C		LUBRICATING OIL: OE/HDO 10W	
			(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
10	C		LUBRICATING OIL: OE/HDO 15/40W	
		(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
11	C	7920-00-205-1711	RAG: Wiping, Cotton and Cotton Synthetic	
			(58536) A-A-531	
			50-Pound Bale	LB
12	C	8520-00-228-0598	SOAP: Toilet, Liquid	
			(81348) P-S-624 Type 1	GL

APPENDIX E
LUBRICATION INSTRUCTIONS

E-1. GENERAL.

NOTE

These instructions are MANDATORY.

a. Semitrailers must receive lubrication with approved lubricants at recommended intervals in order to be mission-capable at all times.
b. The KEY (p. E-8) lists lubricants to be used in all temperature ranges and shows the intervals.
c. The lubrication charts (pp. E-3 through E-7) show lubrication points, items to be lubricated, the required lubricants, and recommended intervals for lubrication. Any special lubricating instructions required for specific components are contained in the NOTES section (p. E-8).
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.

E-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 for recording and reporting any findings.

WARNING

Wipe excess lubricant from the area of brakeshoe linings to prevent grease from soaking the linings. If brakeshoe linings become soaked, have Unit maintenance replace them. Failure to follow this warning may cause brakes to malfunction, resulting in serious injury or death to personnel.

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-2. SPECIFIC LUBRICATION INSTRUCTIONS (continued).

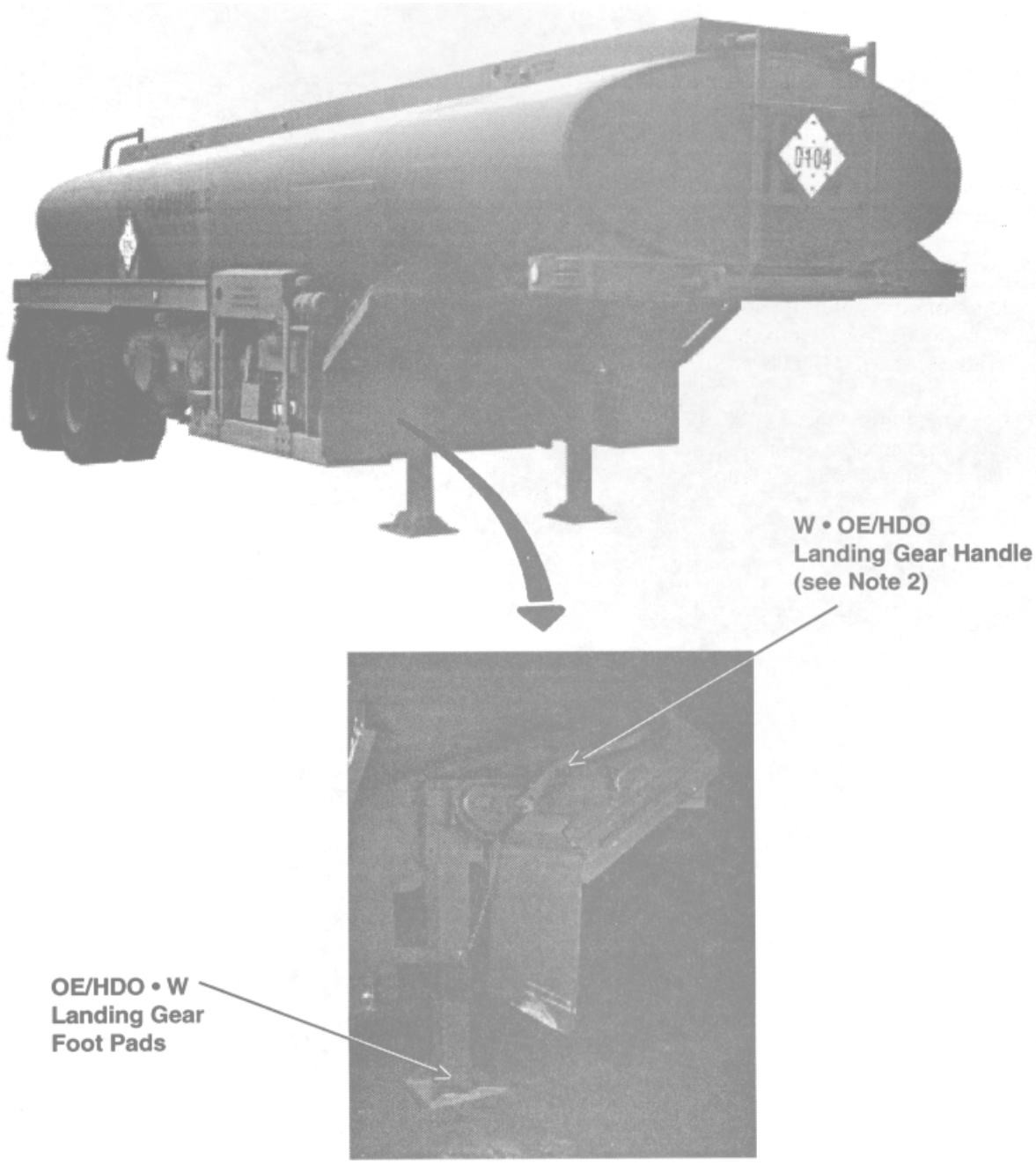
e. After operation in muddy, sandy, or dusty conditions, clean and inspect all points of lubrication for fouled lubricants.

f. Intervals (on-condition or hard time) and the 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.

WARNING

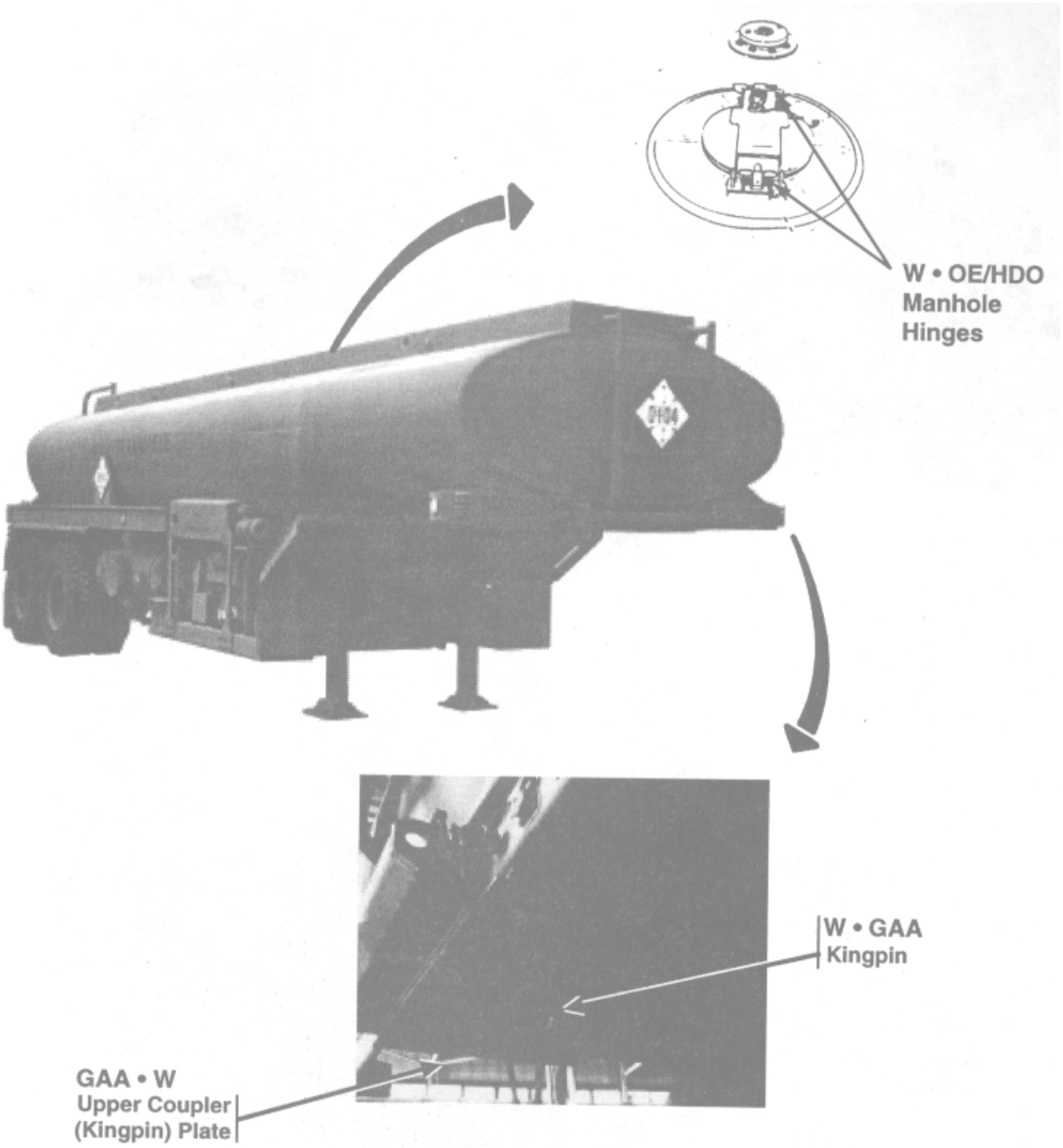
Drycleaning solvent P-D680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flames or excessive heat.

Clean all fittings and areas around lubrication points with drycleaning solvent (Item 3, Appendix D) or the equivalent before lubricating equipment. After lubrication, wipe off excess oil or grease with clean rags (Item 11, Appendix D) to prevent accumulation of foreign matter.



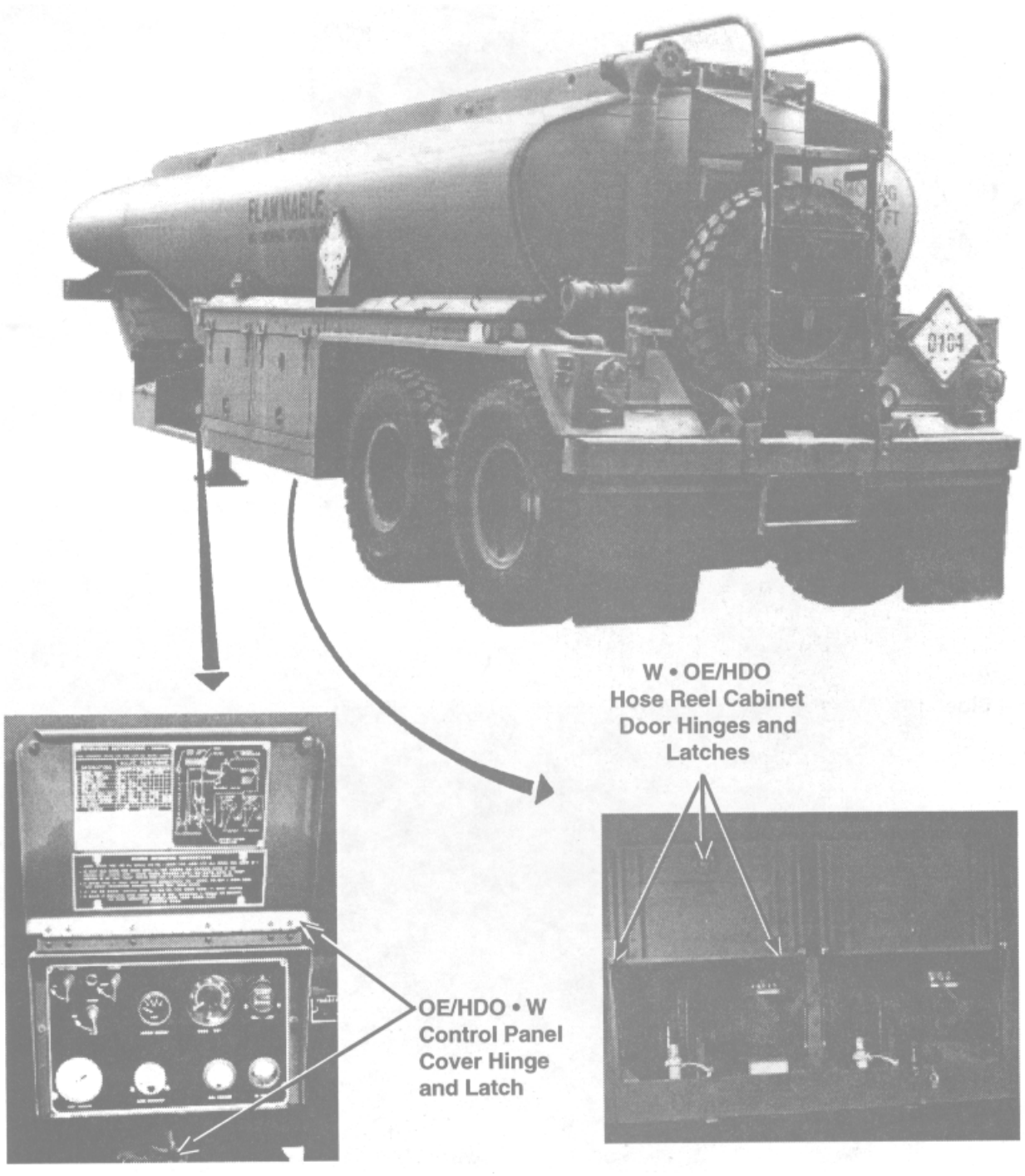
INTERVAL	MAN-HOURS *
W	0.2

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



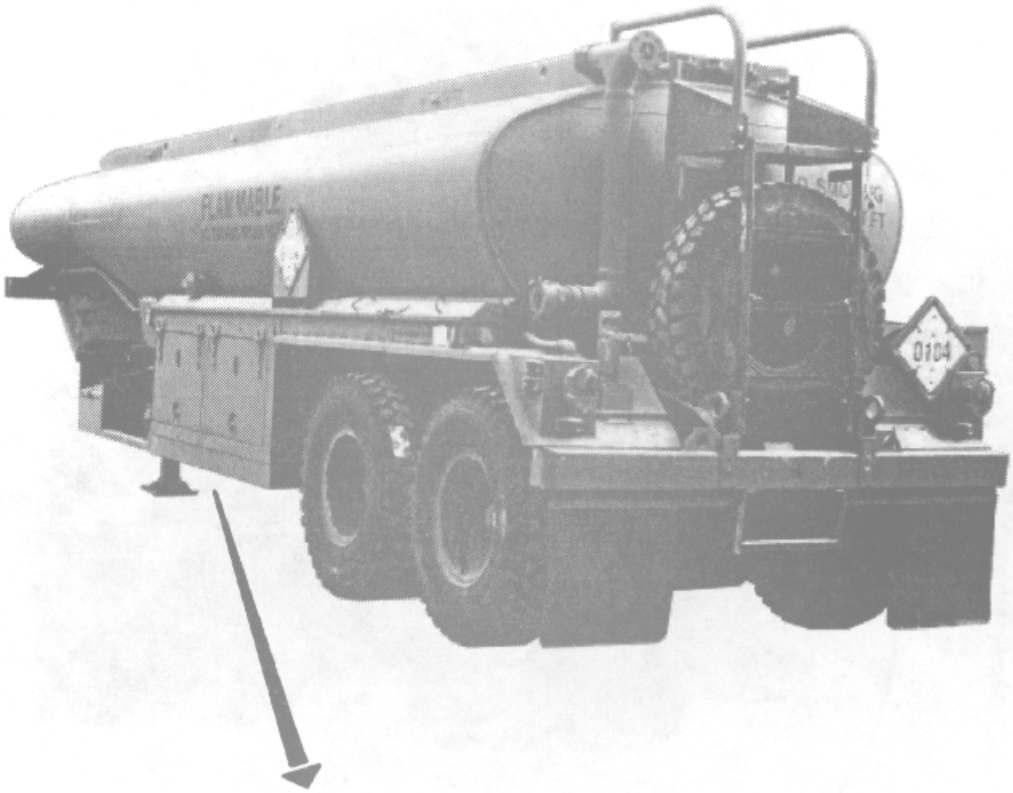
INTERVAL	MAN-HOURS *
W	0.2

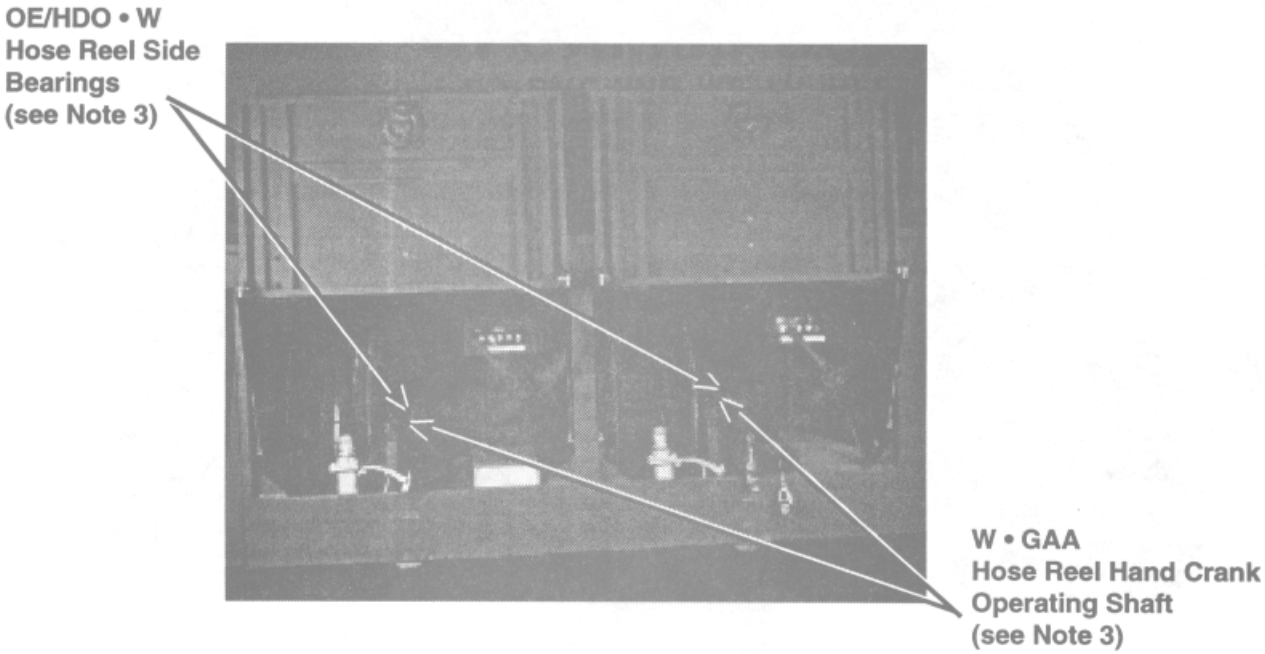
* The man-hour time specified is the time you need to do all the services prescribed for a particular interval.



INTERVAL	MAN-HOURS *
W	0.2

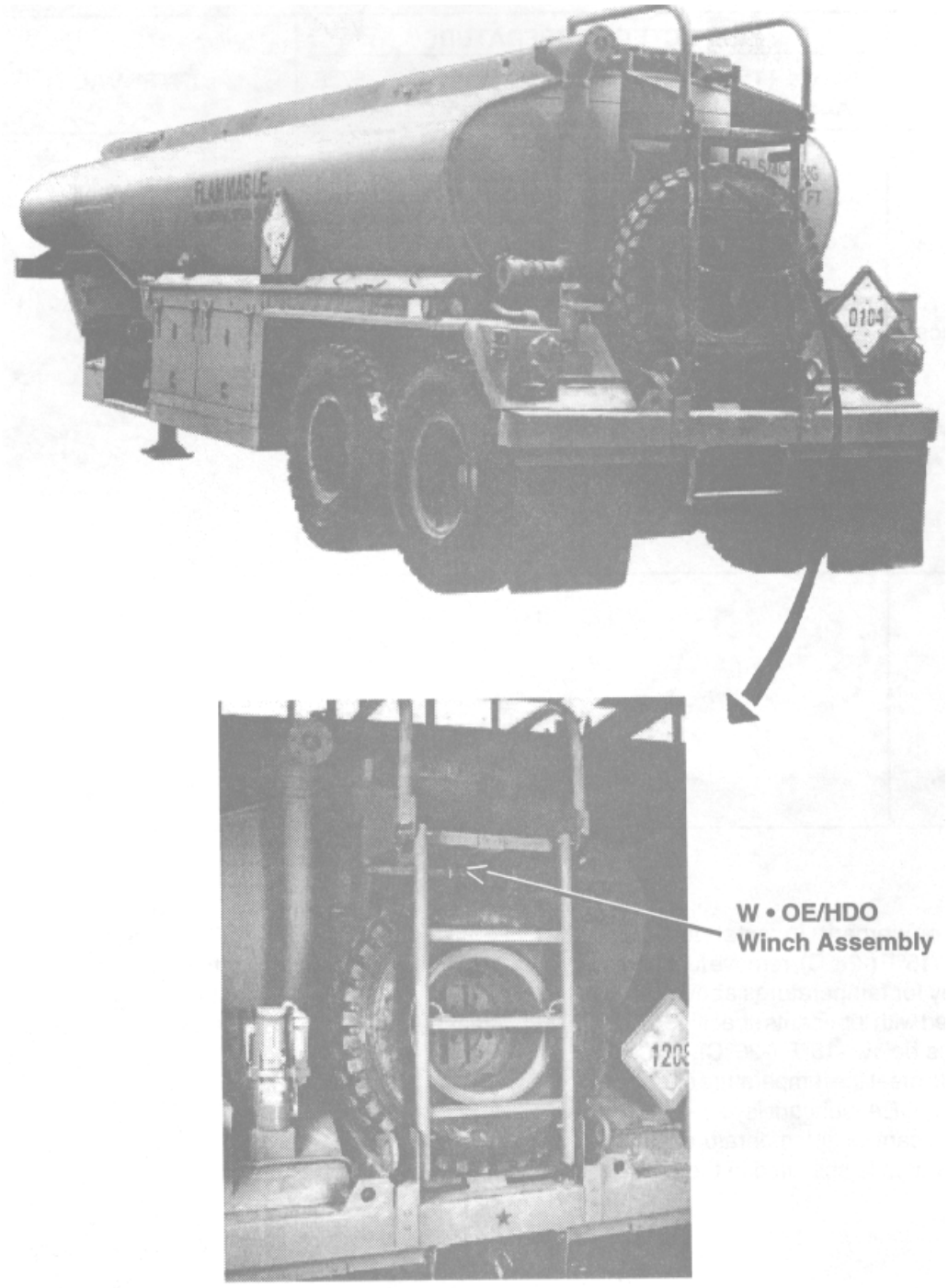
* The man-hour time specified is the time you need to do all the services prescribed for a particular interval.





INTERVAL	MAN-HOURS *
W	0.4

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



INTERVAL	MAN-HOURS *
W	0.4

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

-KEY-

LUBRICANT	EXPECTED TEMPERATURE*			INTERVAL
	Above +15°F (Above -9°C)	**+40'F to -0°F (+4°C to -18°C)**	**+41°F to 67°F (+5°C to -55°C)**	
OEIHDO (MIL-L-2104) Lubricating-Oil, Internal Combustion Engine, Tactical Service **OEA** (MIL-L-46167) Lubricating Oil, Internal Combustion Engine, Arctic	OE/HDO 15W40	OE/HDO 15W40	OEA (see Note 1)	W - Weekly
GAA (MIL-G-10924) Grease, Automotive and Artillery * For Arctic operations, refer to FM 9-207.	All Temperatures			

NOTES:

1. **For operation of equipment in extended cold temperatures below -15°F (-26°C), remove lubricants prescribed in the key for temperatures above -15°F (-26°C). Relubricated with lubricants specified in the key for temperatures below -15°F (-26°C). If OEA lubricant is required to meet the temperature changes prescribed in the key, OEA lubricant is to used in place of OE/HDO lubricant for all temperature ranges where OE/HDO lubricant is specified in the key.**

2. **Landing Gear Handle. After lubricating , operate landing gear up and down to distribute lubricant.**

3. **Grease zerk fittings until grease appears.**

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By Order of the Secretary of the Army:

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02067

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* **U.S. GOVERNMENT PRINTING OFFICE: 1996 746-014/2028**

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

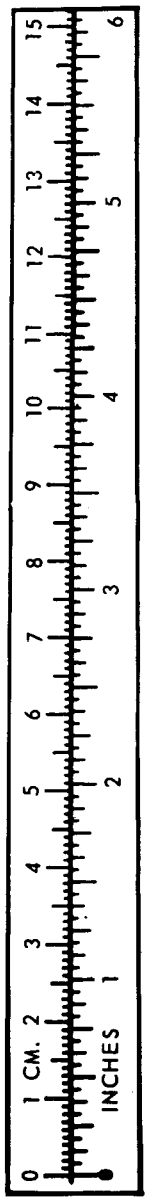
TEMPERATURE

$5/9\,(^{0}F - 32) = {}^{0}C$
212^{0} Fahrenheit is equivalent to 100^{0} Celsius
90^{0} Fahrenheit is equivalent to 32.2^{0} Celsius
32^{0} Fahrenheit is equivalent to 0^{0} Celsius
$9/5\,C^{0} + 32 = F^{0}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
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

TO CHANGE	TO	MULTIPLY BY
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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