

TM 5-2330-325-14&P

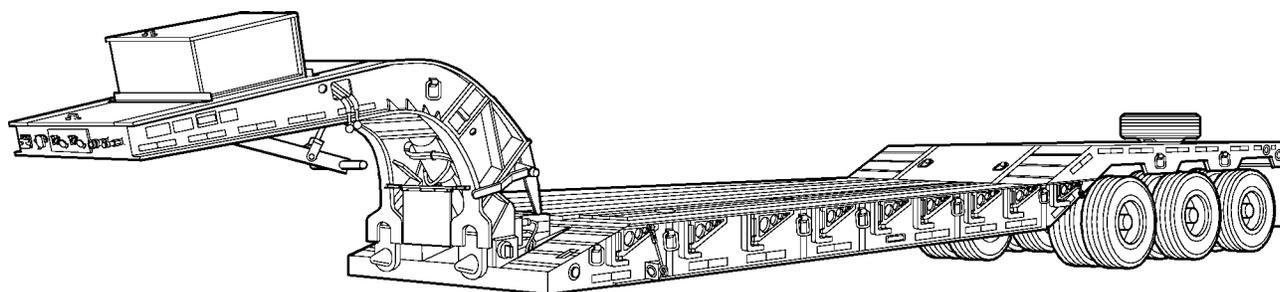
OPERATOR'S, UNIT, AND DIRECT SUPPORT MAINTENANCE MANUAL

WITH

REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)

FOR

TRAILER, MEDIUM HEAVY EQUIPMENT TRANSPORTER (MHET),
40 TON, M870A3
(NSN 2330-01-458-2061)



Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY
JUNE 2004

FOR INFORMATION ON FIRST AID, REFER TO FM 21-11.**WARNING****COMPRESSED AIR**

- Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.
- Air under 100 psi (690 kPa) is used in the operation of the air brake system. Serious injury or death can result if precautions are not taken.

WARNING**WORK SAFETY**

- Hearing protection is required for personnel when performing any function on the M870A3 when Prime Mover is in use. Failure to do so could result in injury to personnel.
- The M870A3 Semitrailer should always have the wheels chocked, with or without a load, during coupling or uncoupling to prime mover and when parked. Failure to not chock the wheels may result in injury or death to personnel.
- Before putting hand to hub, hold hand close to hub to check for excessive heat radiation. Hub may be hot. This will prevent skin burns caused by hot metal.
- If installing a new brake air chamber, make sure it is caged prior to installation. Failure to do so could result in serious injury to personnel or damage to equipment.
- To avoid injury to personnel or damage to equipment, make sure brakes are caged prior to performing maintenance on slack adjuster.
- Always use jack stands, dunnage, or other field expedient means to support the trailer when removing a tire and wheel assembly. Serious injury can result if the jack fails and the trailer is not supported.
- Improper cleaning methods and use of unauthorized cleaning liquids or solvents can injure personnel and damage equipment. To prevent this, refer to TM 9-247 for further instructions.
- Unless otherwise specified, perform all lubrication and preventive maintenance checks with trailer on level ground, uncoupled, and brakes set. Failure to follow this warning may result in injury or death to personnel.
- Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.
- Due to the dimensions and center of gravity of some loads, proper procedures must be followed when loading and unloading equipment to prevent damage to equipment and injury to personnel.
- During slack adjuster maintenance (para. 4-49e), ensure brake drum moves freely after completing step 4 (backing off adjusting screw [4] 3/4 turn). Brake drum should move freely. Failure to do so could result in damage to equipment and serious injury to personnel.

WARNING

ELECTRICAL SYSTEM

- When troubleshooting an electrical malfunction or performing electrical maintenance, **ALWAYS** disconnect inter-vehicular electrical cable from towing vehicle. Failure to do so may result in injury or death due to electric shock.
- Remove all power to trailer prior to making any repairs on the electrical system. Failure to do so may result in serious injury or death.
- Although battery ground cable must be connected in order to test electrical circuit voltage, disconnect battery ground cable from prime mover before performing resistance tests or replacing parts. This will prevent shock to personnel, and damage to parts and equipment.
- **DO NOT** touch heat shrinkable tubing for at least 30 seconds after heating. Heat shrinkable tubing is hot and will burn you.

WARNING

COUPLING/UNCOUPLING

- All persons not involved in coupling/uncoupling operation must stand clear of prime mover and trailer to prevent serious injury.
- Never stand between the prime mover and trailer when the prime mover is being backed up to the trailer. Serious injury or death may result.
- Do not climb on trailer to operate the Hydraulic System Control Levers. Failure to do so could result in injury to personnel. Use of step stool may be required.
- Trailer and prime mover may roll when brake is released. To prevent injury to personnel or damage to equipment, the driver must remain in the cab of the prime mover.
- Always ensure that the trailer is coupled to the prime mover and all parking brakes are set. Failure to do so may result in serious injury or death.
- If welding trailer, it must be uncoupled from prime mover. Failure to follow this warning may damage electronic components.

WARNING

LOADING/UNLOADING OPERATION

- All persons not involved in the loading or unloading operation must stand clear of prime mover and trailer to prevent serious injury.
- Due to the dimensions and center of gravity of some loads, proper procedures must be followed when loading and unloading equipment to prevent damage to equipment and injury to personnel.
- Visibility from the prime mover is significantly reduced when backing, whether the trailer is loaded or not. Proper procedures must be followed and extreme caution used when backing to prevent damage to equipment and injury to personnel.
- Outriggers are only designed to stabilize payload. Payload must be fully supported by trailer load bed. Supporting a payload on the outriggers may result in equipment failure and injury to personnel.
- Improper load placement can have a detrimental effect on braking, evasive maneuvers, and handling characteristics of a tractor trailer vehicle combination.

- Use extremely low speed when loading and unloading vehicles, especially tracked vehicles. Higher speeds will exaggerate motions and create hazardous conditions, which could result in personnel injury or damage to equipment.
- Chemical Agent Resistant Coating (CARC) paint debris may be considered environmentally hazardous during removal. Consult local procedures prior to removal of CARC paint to ensure compliance with local laws.

WARNING

LOADING/UNLOADING OPERATION HEAVY COMPONENTS

- Use extreme caution when handling heavy parts. Lifting device is required when parts weigh 50 lb (23 kg) for a single person lift, over 100 lb (45 kg) for a two person lift, and over 150 lb (68 kg) for a three or more person lift. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause death or injury to personnel or damage to equipment.

WARNING

TRAILER OPERATION

- Caging the brakes releases the brakes and prevents operation of the trailer braking system. When the brakes have been caged, the trailer should only be moved under emergency circumstances and then only with extreme caution and at very low speeds.
- The spring inside the brake chamber is under very high pressure. Do not loosen or remove any nuts or bolts from the brake chamber except the caging bolt and its associated hardware. Failure to follow this warning may result in serious injury.
- The brake chamber contains a spring under high pressure. To prevent personnel injury or death, never work directly behind the brake chamber. If caging bolt will not engage properly, the spring may be broken, do not continue caging procedures.
- Air under 80-82 psi (552-565.4 kPa) is used in the operation of the air brake system. Serious injury or death can result if precautions are not taken to maintain adequate air pressure.

WARNING

Basic Issue Items (BII) Box

- The BII Box Lid is secured by two pneumatic openers. Caution should be used when opening the BII Box. Failure to do so could result in injury to personnel.
- The BII Box removal and replacement of BII requires two personnel. Failure to do so could result in injury to personnel.

WARNING

Spare Tire Assembly

- If spare tire davit is inoperable, the spare tire and wheel requires two people to remove the spare tire from the carrier or install it on the carrier. Slide the spare tire from the carrier or on to the carrier - refrain from lifting the spare tire into position. Use an alternate source if available, i.e., wrecker, crane. Failure to do so could result in injury to personnel.

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WARNING

HAZARDOUS WASTE DISPOSAL

- **When servicing this vehicle, performing maintenance, or disposing of materials such as lubricants or CARC paint, consult your Unit/Local Hazardous Waste Disposal Center or safety officer for local regulatory guidance. If further information is needed, please contact the Army Environmental Hotline at 1-800-872-3845.**

**TECHNICAL MANUAL
TM 5-2330-325-14&P**

**HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 30 June 2004**

**OPERATOR'S, UNIT, AND DIRECT SUPPORT MAINTENANCE MANUAL
WITH
REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)
FOR
TRAILER, MEDIUM HEAVY EQUIPMENT TRANSPORTER (MHET), 40 TON,
M870A3
(NSN 2330-01-458-2061)**

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028-2 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <http://aeprs.ria.army.mil>. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the ADPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax, or email your letter, DA Form 2028, or DA Form 2028-2 direct to: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. The email address is amsta-ac-nml@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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HOW TO USE THIS MANUAL

This manual is designed to help you operate and maintain the M870A3 Trailer, Medium Heavy Equipment Transporter (MHET), 40 Ton.

FEATURES OF THIS MANUAL:

- A table of contents is provided at the beginning of this manual. An index of all paragraphs contained within a section is found at the beginning of each section.
- WARNINGS, CAUTIONS, NOTES, subject headings, and other important information are highlighted in **BOLD** print as visual aid.

WARNING

A WARNING indicates a hazard which can result in death or serious injury.

CAUTION

A CAUTION is a reminder of safety practices or directs attention to usage practices that may result in damage to equipment.

NOTE

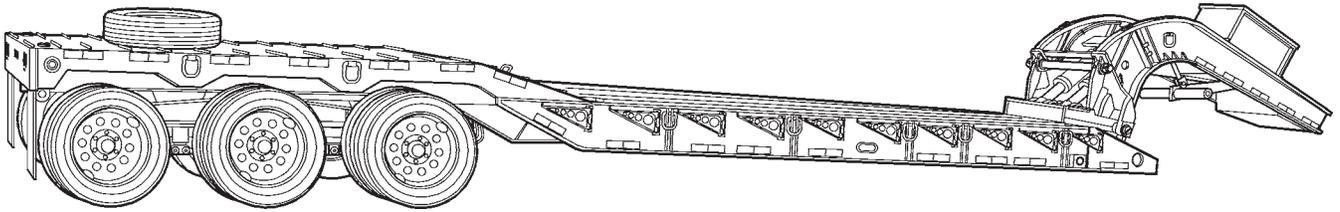
A NOTE is a statement containing information that will make the procedure easier to perform.

- Statements and words of particular importance are printed in CAPITAL LETTERS to create emphasis.
- Instructions are located with illustrations that show the specific task on which the operator or mechanic is working.
- Dashed leader lines used in illustrations indicate that called out items are not visible (i.e., they are located within the structure). Dashed leader lines in the Lubrication Chart indicate that lubrication is required on BOTH sides of the equipment.
- Technical instructions include metric units in addition to standard units. A metric conversion chart is provided on the inside back cover.
- An alphabetical index is provided at the end of the manual to assist in locating information not readily found in the Table of Contents.

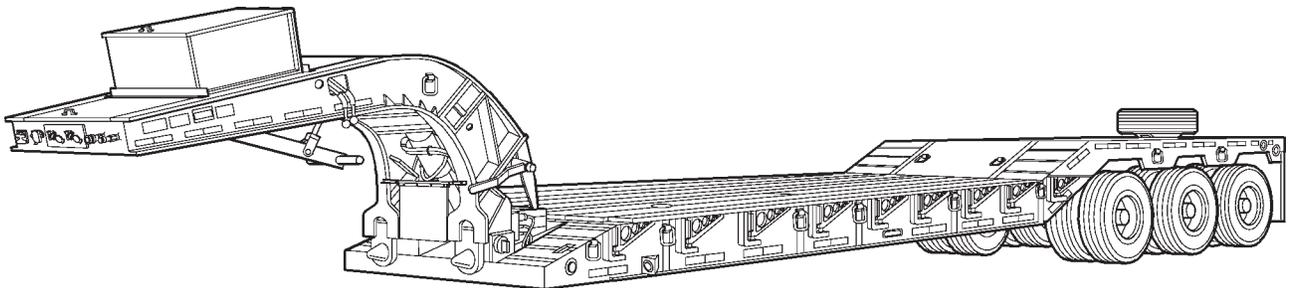
FOLLOW THESE GUIDELINES WHEN YOU USE THIS MANUAL:

- Read through this manual and become familiar with its contents before attempting to operate or maintain the trailer.
- A warning summary is provided at the beginning of this manual and should be read before attempting to operate or maintain the trailer.
- Within a chapter or section, headings are used to help group the material to assist in quickly finding tasks. Read all preliminary information found at the beginning of each task. After completing a task, ALWAYS perform the follow-on maintenance at the end of the task.

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M870A3 (RIGHT VIEW)



M870A3 (LEFT VIEW)

CHAPTER 1 INTRODUCTION

Section I. GENERAL INFORMATION

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1-2.	Maintenance Forms, Records, and Reports	1-1
1-3.	Destruction of Army Materiel to Prevent Enemy Use	1-1
1-4.	Preparation for Storage or Shipment	1-1
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1-1. SCOPE.

- a. **Type of Manual.** Operator's, Unit, Direct Support, and General Support Maintenance Manual with Repair Parts and Special Tools Lists.
- b. **Equipment Name and Model Number.** M870A3 Trailer, Medium Heavy Equipment Transporter (MHET), 40-Ton.
- c. **Purpose of Equipment.** This trailer is intended for use in transporting engineer equipment, tracked vehicles, wheeled vehicles on highways, unimproved roads (graded gravel), and cross country.

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

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, (*Functional User's Manual for the Army Maintenance Management System*) as contained in the Maintenance Management Update.

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

Refer to TM 750-244-3 for procedures for destruction of Army materiel to prevent enemy use.

1-4. PREPARATION FOR STORAGE OR SHIPMENT.

Refer to Chapter 4, Section XII, for instructions for preparing the trailer for storage or shipment.

1-5. OFFICIAL NOMENCLATURE, NAMES, DESIGNATIONS, AND ABBREVIATIONS.

NOTE

Refer to MIL-STD-12D for standard abbreviations.

Official Name	Common Name or Abbreviation
Army Master Data File	AMDF
Basic Issue Item	BII
Center Line	CL
Center of Gravity	CG
Commercial and Government Entity Code	CAGEC
Components of End Item	COEI
Corrosion Prevention and Control	CPC
Equipment Improvement Recommendations	EIR
Gross Vehicle Weight	GVW
Intervehicular Electrical Cable (IVEC)	IVEC
Maintenance Allocation Chart	MAC
Medium Heavy Equipment Transporter	MHET
Modified Table of Organization and Equipment	MTOE
National Item Identification Number (last 9 digits of NSN)	NIIN
National Stock Number	NSN
Preventive Maintenance Checks and Services	PMCS
Quality Deficiency Report	QDR
Repair Parts and Special Tools List	RPSTL
Tables of Organization and Equipment	TOE
Unit of Issue	U/I

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

If your trailer needs improvement, let us know. Send us an SF Form 368 (*Product Quality Deficiency Report*). 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. Mail it to us at: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. We'll send you a reply.

1-7. WARRANTY INFORMATION.

The M870A3 has a one year limited warranty from Kalyn Siebert. The warranty begins the date of delivery to the United States Government. Kalyn Siebert parts are identified under Commercial and Government Entity Code (CAGEC) 63576, located in the Repair Parts and Special Tools List (RPSTL). Contact Kalyn Siebert at 1505 West Main Street, P.O. Box 1078 Gatesville, Texas U.S.A. 76528. 1-800-525-9689, Ph: 254-865-7235 Fax: 254-865-7234 or www.kalynlx.com

1-8. SAFETY, CARE, AND HANDLING.

- a. **First Aid.** For first aid information, refer to FM 21-11, *First Aid for Soldiers*.
- b. **Personnel Safety Precautions.**
 - (1) Read and become familiar with all WARNINGS in the warning summary at the front of this manual.
 - (2) Pay attention to WARNING decals on the trailer. These provide safety instructions and

identify specific hazards which, if not followed, may result in serious injury or death to personnel.

- (3) Throughout this manual, WARNINGS and CAUTIONS are given immediately preceding the procedural steps to which they apply. Read these WARNINGS and CAUTIONS and follow them exactly.
- (4) When performing maintenance, protect yourself against injury. Wear protective gear such as safety goggles or lenses, safety shoes, rubber apron, gloves, etc.
- (5) Notify others in the area if you are handling flammable materials. Know the location of fire extinguishers and emergency procedures in case of accident or fire.
- (6) Before performing maintenance, ensure that trailer is secured against movement.
- (7) When lifting heavy parts, have someone help you. Ensure that lifting or jacking equipment is working properly, is of sufficient capacity for the assigned task, and is secure against slipping.

1-9. CORROSION PREVENTION AND CONTROL (CPC).

- a. CPC of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements made to prevent the problem in future items.
- b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.
- c. If a corrosion problem is identified, it can be reported using SF 368 (*Product Quality Deficiency Report*). 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.

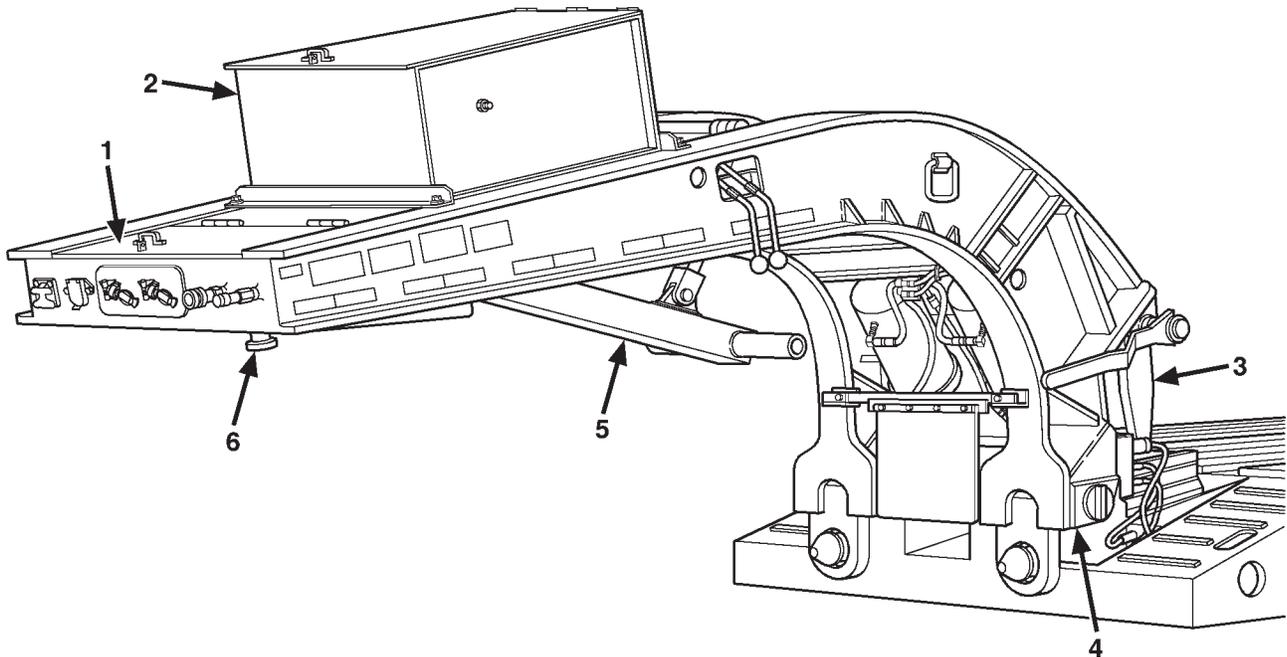
Section II. EQUIPMENT DESCRIPTION AND DATA

Paragraph Number	Paragraph Title	Page Number
1-10.	Equipment Characteristics, Capabilities, and Features	1-4
1-11.	Location and Description of Major Components	1-5
1-12.	Location and Contents of Plates, Decals, and Stencils	1-7
1-13.	Equipment Data	1-8

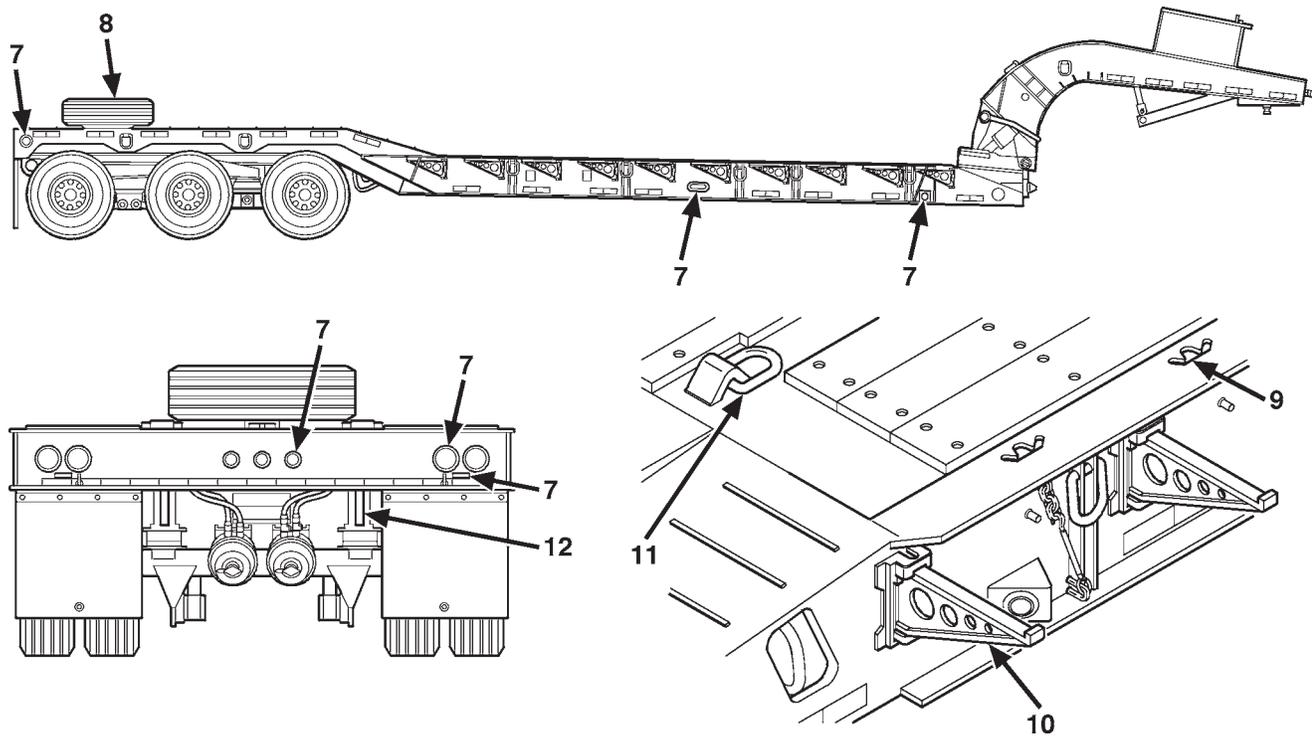
1-10. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

- a. This trailer is designed to transport engineer equipment, tracked vehicles, wheeled vehicles, containerized cargo on highways, unimproved roads (graded level), and cross-country.
- b. The prime mover for the trailer is the M916A1/M916A2/M916A3 truck tractors, as these prime movers are equipped with Air Brake System.

1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

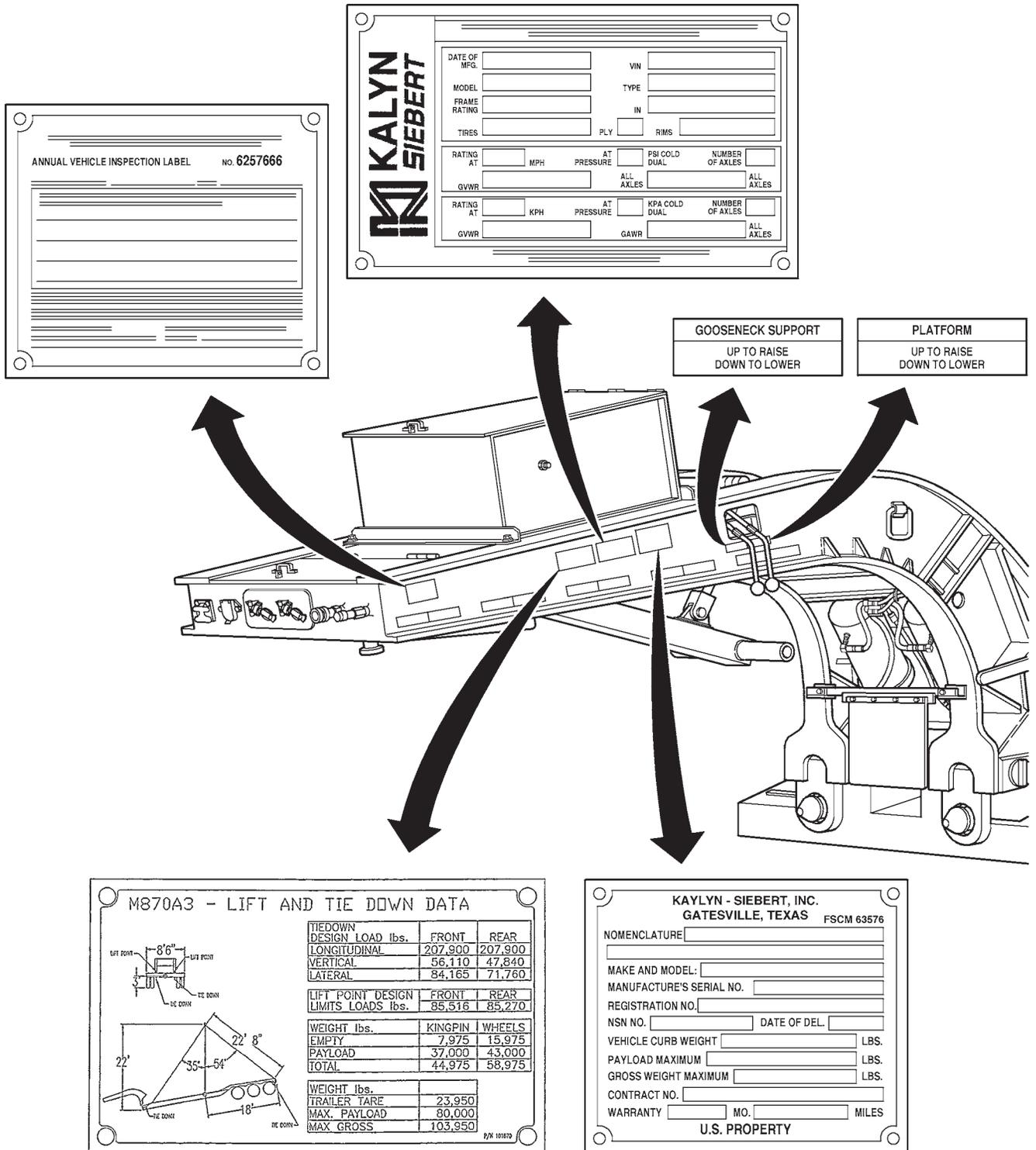


KEY	COMPONENT	DESCRIPTION
1	Kingpin Box	Houses both the towing kingpin and the second kingpin. The base of the box serves as the kingpin plate.
2	Tool Box	Houses equipment such as; cargo, tie down chains, load binders, wheel jack, etc.
3	Shim Assembly	Provides a shimming action between the gooseneck and the trailer to allow for raising of the trailer bed.
4	Neck Base Assembly	Connects the gooseneck to the trailer via lifting pins and lugs and is locked in position by a slide bar rod.
5	Tilt Arm	Acts as a stabilizing force between the gooseneck and the tractor platform.
6	Kingpin	A removable kingpin is inserted from the top side of the trailer's gooseneck and extends below the gooseneck to attach to the prime mover's fifth wheel plate for towing. Two kingpins are provided for use with different prime movers.

1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Continued).

KEY	COMPONENT	DESCRIPTION
7	Lights	Amber clearance lights are located on each front corner of the trailer side and on each side at the mid-point of the trailer. Three red running lights are also located at the rear center of the trailer. Four combination stop, turn, and tail lights are located at the rear of the trailer. Two blackout lights are also located at each corner of the trailer rear. An amber ABS light is located on the right rear corner the trailer.
8	Spare Tire Assembly	Secured to rear raised portion of trailer deck.
9	Cutouts for chains	Fourteen cutouts are provided on the frame rails of the trailer. Seven are located on each side of the loadbed. The chained slots should be used with outrigger loads so that tiedowns do not cross the boards and prevent secure tiedown of the payload. Chain slots may also be used for loads not requiring outriggers.
10	Folding Outriggers	Twenty (ten on each side) permanent outriggers swing out from the side of the trailer.
11	D-Rings	D-rings are provided on the trailer for use in the tiedown of payloads. D-rings are located on each side of the loadbed; on each side of the upper gooseneck deck; on the upper surface of the gooseneck, and on the bed of the trailer.
12	Lifting Shackles	Two are located on the underside of the rear trailer deck.

1-12. LOCATION AND CONTENTS OF PLATES, DECALS, AND STENCILS.



1-13. EQUIPMENT DATA.

TRAILER DIMENSIONS:

Overall Dimensions

Length	45 ft 5.3 in. (1,385.1 cm)
Width	8 ft 6 in. (259.2 cm)
Height	
Overall	105 in. (266.7 cm)
Kingpin to Front.....	16 in. (40.6 cm)
Kingpin to Center Axle.....	455 in. (11.5 meters)
Ground Clearance	
Frame Rail	1 ft 10 in. (55.9 cm)
Axle	1 ft 2-3/4 in. (37.5 cm)
Fording Depth	20 in. (50.8 cm)

VEHICLE WEIGHTS:

GCVW	131,800 lb (59,837 kg)
Highway or Improved Roads	80,000 lb (36,320 kg)
Cross Country	80,000 lb (36,320 kg)
Weight on Kingpin (empty).....	7575 lb (3,617 kg)
Weight on Wheels (empty).....	15,975 lb (7,246 kg)
Empty Net Weight	23,950 lb (10,863 kg)

DECK DIMENSIONS:

Length	33 ft 4.75 in. (1,017.9 cm)
Width (without outriggers)	8 ft 6 in. (259.2 cm)
Width (with outriggers)	10 ft 6 in. (320.2 cm)
Height (no load)	35.8 in. (90.9 cm)

WEIGHT DISTRIBUTION:

Rear Wheels (Empty)	15,975 lb (6,949 kg)
Kingpin (Empty)	7,975 lb (3,556 kg)

AXLES:

Type	Non-driving tubular
Quantity	3
Manufacturer	Spicer
Weight	25,000 lb (11,340 kg)

WHEEL BEARINGS:

Type	Tapered roller
Manufacturer (cone)	SKF
Manufacturer (cup)	Timken

WHEELS:

Type	Hub Pilot
Manufacturer	CentruMount
Rim size	22.5 in. x 9 in. (57.2 cm x 22.9 cm)
Rim type	Tubeless

1-13. EQUIPMENT DATA (Continued).

TIRES

Quantity 13
 Ply 16
 Type Commercial tubeless radial
 Size 275/70 R22.5
 Design On road/Off road tread

TIRE AIR PRESSURE

Highway 115 psi (792.93 kP)
 Unimproved Roads 115 psi (792.93 kP)
 Sand, Mud or Snow 70 psi (482.6 kP)

AIR BRAKE SYSTEM

Type S-cam, two-shoe, expanding, self-centering
 Actuation Air
 Brake Chambers, Spring 6
 ABS Sensors 4

ELECTRICAL SYSTEM

Voltage - Military 24 volt DC
 Voltage - Commercial 12 volt DC
 Power Source Towing Vehicle

SUSPENSION

Type Walking Beam
 Manufacturer Chalmers

SPEED

Highway and Primary Paved Roads
 40-ton (36.3 metric ton) load 55 mph (88.5 km/h)
 Secondary/Gravel Roads
 40-ton (36.3 metric ton) load 30 mph (48.3 km/h)

HYDRAULICS

Gooseneck Lift Cylinder (1) 3 in. bore x 10 in. stroke
 Deck Lift Cylinder (2) 9 in. bore x 10 in. stroke
 Control Valve Prince 2 spool with heavy springs
 Relief Valve Prince Adjustable
 Hydraulic Oil OE/HDO-10

Section III. PRINCIPLES OF OPERATION

Paragraph Number	Paragraph Title	Page Number
1-14.	Gooseneck	1-10
1-15.	Suspension	1-10

1-14. GOOSENECK.

- a. **Removable kingpin.** Two provided, primary is 3.5 in. (8.89 cm), alternate is 2 in. (5.08 cm), for fifth wheel plate and kingpin coupling.
- b. **Gooseneck**
 - (1) Hydraulic detachable for vehicle or equipment loading.
 - (2) Spare tire mounting location on the rear deck of the trailer.
 - (3) Intergrated tool box at front of gooseneck for storage of the tiedown chains, binders, jack, etc.

1-15. SUSPENSION.

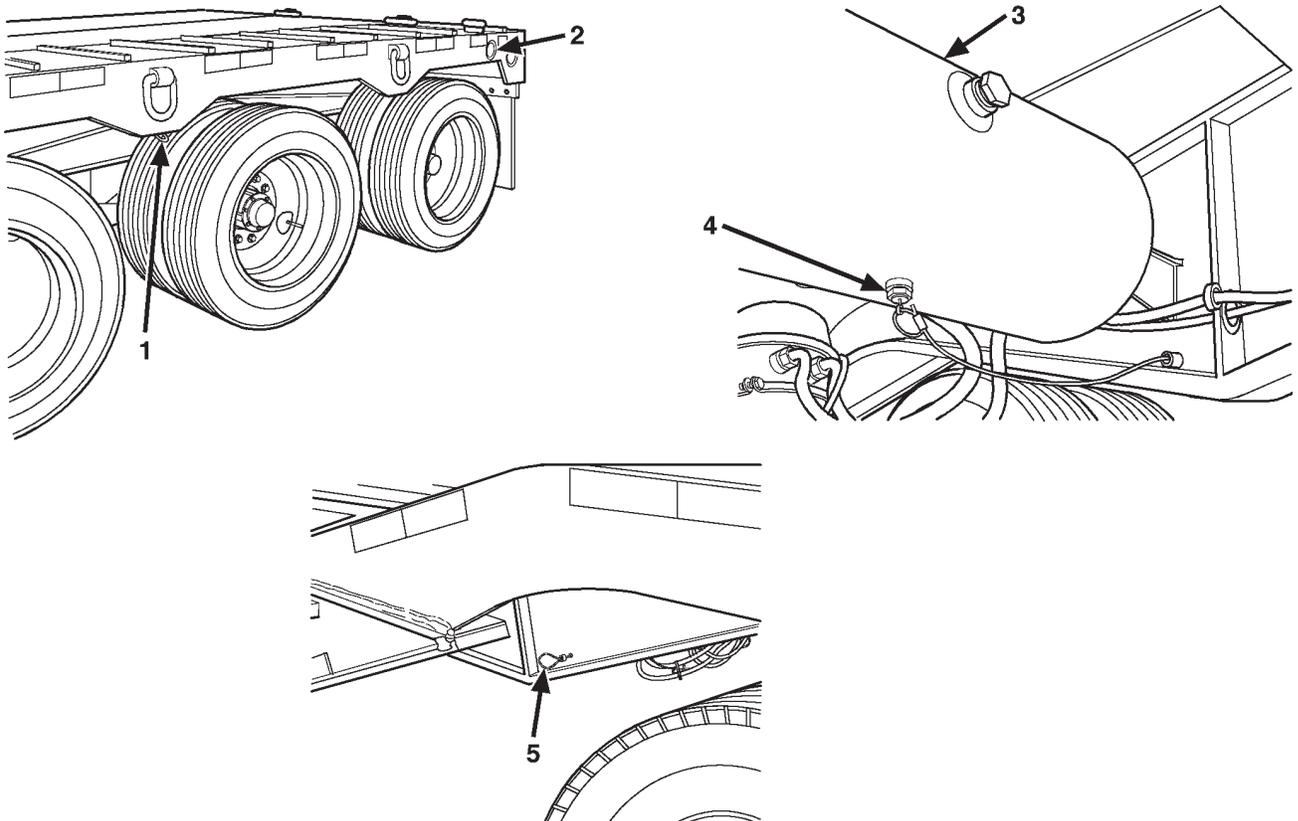
- a. Three rear axles on walking beam suspension support highway and improved roads payload of 80,000 lb (36,320 kg) at 55 mph (88.5 km/h), and unimproved road (graded gravel) payload of 80,000 lb (36,320 kg) at 30 mph (48.3 km/h).
- b. Prime mover supplies brake air pressure for control of brakes, hydraulic power for operation of gooseneck and electric power for trailer lighting.
- c. Hubodometer located on left front wheel records trailer mileage.

CHAPTER 2 OPERATING INSTRUCTIONS

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

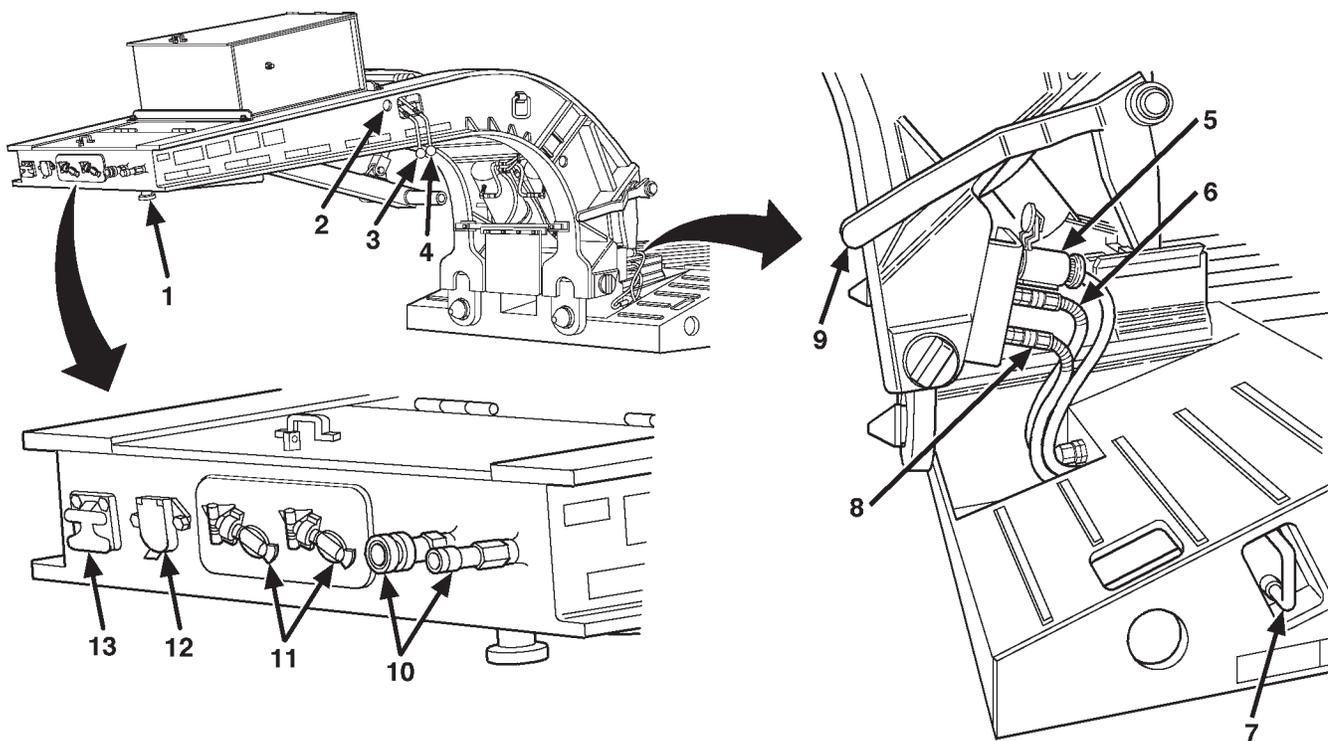
Paragraph Number	Paragraph Title	Page Number
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2-2.	Gooseneck Components, Controls and Indicators	2-2
2-3.	Tiedown and Accessory Items	2-3

2-1. AIR BRAKE CONTROLS AND INDICATORS.



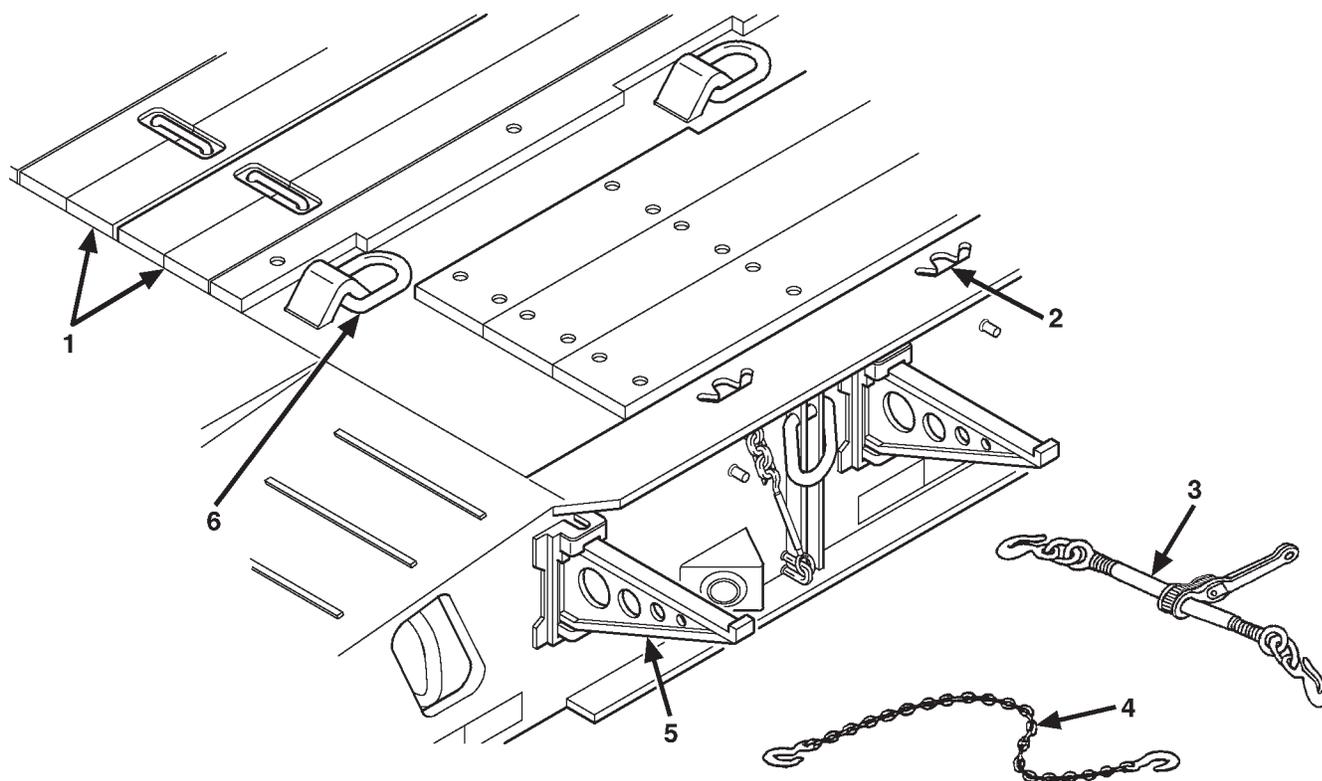
KEY	CONTROL OR INDICATOR	FUNCTION
1 & 5	Air Tank Dump Valve Release Cable	Provides remote point for air to be drained from reservoirs.
2	ABS Indicator Light	Provides indication that antilock braking system is active.
3	Air Tank Reservoirs (2)	Stores trailer air supply.
4	Air Tank Drain Valve	Releases air pressure from reservoir.

2-2. GOOSENECK COMPONENTS, CONTROLS AND INDICATORS.



KEY	CONTROL OR INDICATOR	FUNCTION
1	Kingpin (removable)	Secures trailer to fifth wheel of prime mover. Kingpin is removable and two kingpins are provided.
2	Hydraulic Pressure Gauge	Measures pressure in gooseneck hydraulic system.
3	Lift Arm Control Lever	Actuates lift arm hydraulic cylinders.
4	Tilt Control Valve Lever	Actuates tilt arm hydraulic cylinders.
5	Trailer Electrical Connector	Connection joint for trailer 12/24-volt power source.
6	Trailer Air Line Connector	Gooseneck to trailer emergency air line for braking system.
7	Neck Base Slide Bar Rod Lock	Locks gooseneck to trailer mount.
8	Trailer Air Line Connector	Gooseneck to trailer service line connection for braking system.
9	Shim Lever	Positions shims between neckbase and gooseneck to support trailer in raised position.
10	Hydraulic connector	Connection joint for gooseneck power source.
11	Gladhands (Blue-service, Red-Emergency)	Connect to the prime mover to supply air for the trailer brakes.
12	Gooseneck Electrical Connector	Connection joint for the 12-volt power source.
13	Gooseneck Electrical Connector	Connection joint for the 24-volt power source.

2-3. TIEDOWN AND ACCESSORY ITEMS.



KEY	CONTROL OR INDICATOR	FUNCTION
1	Outrigger Boards (4 center boards)	Positioned on outriggers to support oversized payloads.
2	Chain Slots (14)	Ends of chains are inserted to secure chains for tiedown purposes.
3	Load Binder	Tighten chains used to secure loads to trailer.
4	Chain Assemblies	Used to secure loads to trailer.
5	Outriggers (fold out)	Support outrigger boards.
6	D-Rings	Provide tiedown points for chains to secure loads.

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

Paragraph Number	Paragraph Title	Page Number
2-4.	General	2-4
2-5.	Explanation of Table Entries	2-4
2-6.	General PMCS Procedures	2-5
Table 2-1.	Operator Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET)	2-7

2-4. GENERAL.

To ensure that the trailer is ready for operation at all times, it must be inspected on a regular basis so that defects may be found and corrected before they result in serious damage, equipment failure, or injury to personnel. Table 2-1 contains systematic instructions on inspections, adjustments, and corrections to be performed by the operator/crew to keep your equipment in good operating condition and ready for its primary mission.

2-5. EXPLANATION OF TABLE ENTRIES.

- a. **“Item No.” Column.** Numbers in this column are for reference. When completing DA Form 2404 (*Equipment Inspection and Maintenance Worksheet*) or DA Form 5988E, include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must perform checks and services for the interval listed.
- b. **“Interval” Column.** This column tells you when you must perform the procedure in the procedure column.
 - (1) *Before* procedures must be done before you operate the trailer.
 - (2) *During* procedures must be done while you are operating the trailer.
 - (3) *After* procedures must be done immediately after you have operated the trailer.
 - (4) *Weekly* procedures must be done once each week.
 - (5) *Monthly* procedures must be done once each month.
- c. **“Location, Item to Check/Service” Column.** This column provides the location and item to be checked or serviced.

NOTE

The WARNINGS and CAUTIONS appearing in your PMCS table should always be observed. WARNINGS and CAUTIONS appear before applicable procedures. You must observe these WARNINGS to prevent serious injury to yourself and others, and CAUTIONS to prevent your equipment from being damaged.

- d. **“Procedure” Column.** This column gives the procedure you must perform to check or service the item listed in the Item to Check/Service column to know if the equipment is ready or available for its intended mission or for operation. You must perform the procedure at the time stated in the interval column.

2-5. EXPLANATION OF TABLE ENTRIES (Continued).

- e. **“Not Fully Mission Capable if”:** **Column.** Information in this column tells you what faults will keep your equipment from being capable of performing its primary mission. If you make check and service procedures that show faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

2-6. GENERAL PMCS PROCEDURES.

- a. Always perform PMCS in the same order so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry. If the trailer does not perform as required, refer to the appropriate troubleshooting procedure in Chapter 3, Section II.
- b. If anything looks wrong and you can't fix it, write it on your DA Form 2404 or DA Form 5988E. If you find something seriously wrong, IMMEDIATELY report it to your supervisor.
- c. Before performing preventive maintenance, read all the checks required for the applicable interval and prepare all the tools you need to make all the checks. You'll always need a rag (item 15, Appendix F) or two.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (1) **Keep It Clean.** Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use cleaning compound (item 19, Appendix F) on all metal surfaces. Use detergent (item 8, Appendix F) and water when you clean rubber or plastic.
- (2) **Deterioration, Rust, and Corrosion.**
- (a) Be alert for deterioration of plastic and rubber materials. Report it to your supervisor.
- (b) Check metal parts of vehicle for rust and corrosion. If any bare metal or corrosion exists, clean and apply a light coat of oil (item 13, Appendix F). Report it to your supervisor.
- (3) **Bolts, Nuts, and Screws.** Check bolts, nuts, and screws for obvious looseness, missing, bent, or broken condition. You can't try them all with a tool, of course, but look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, report it to your supervisor.
- (4) **Welds.** Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.
- (5) **Electrical Wires and Connectors.** Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and ensure that the wires are in good condition.

2-6. GENERAL PMCS PROCEDURES (Continued).

- (6) **Hoses.** Look for wear, damage, and signs of leaks. Ensure 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, tighten. If something is broken or worn out, report it to your supervisor.
- (7) **Fluid Leakage.** It is necessary for you to know how fluid leakage affects the status of your trailer. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them, and remember - when in doubt, notify your supervisor.

Leakage Definitions of PMCS

Class I	Leakage indicated by wetness or discoloration, but not great enough to form drops.
Class II	Leakage great enough to form drops, but not enough to cause drops to drip from the item being checked/inspected.
Class III	Leakage great enough to form drops that fall from the item being checked/inspected.

NOTE

Operation is allowable with Class I and Class II leakage. WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR. When operating with Class I or Class II leaks, check fluid levels more frequently. Class III leaks must be reported immediately to your supervisor. Failure to do this will result in damage to vehicle and/or components.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET)

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item To Check/Service		
			<p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Review all WARNINGS, CAUTIONS, and NOTES before performing PMCS and operating the trailer. • Perform all PMCS checks if: <ul style="list-style-type: none"> a. You are the assigned operator but have not operated the trailer since the last inspection. b. You are operating the trailer for the first time. 	
1	Before	CHASSIS	Visually inspect chassis for damaged or missing components.	Excessive wear, cracks, or damage.
2	Before	SUSPENSION	Inspect suspension and related hardware for serviceability	Any component or hardware that is broken, worn or missing
3	Before	GOOSENECK	Inspect gooseneck for cracks, damage, or excessive wear. Inspect hydraulic components for leakage.	Excessive wear, cracks, or damage. Any class III leaks are evident.
4	Before	KINGPIN	Visually inspect kingpins for cracks, damage, or excessive wear.	Excessive wear, cracks, or damage.
5	Before		Inspect for chips, nicks, gouges, and wear.	Nick or chip deeper than 1/8 in. (0.32 cm) is found anywhere on wear surface, or wear exceeds 1/16 in. (0.16 cm) over 25% of wear surface.
6	Before		Inspect kingpin plate for cracks and dents.	Kingpin plate is cracked or dented.
7	Before	GLADHANDS	Inspect gladhands and rubber grommets for serviceability	Any gladhand or rubber grommet is missing or unserviceable.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET) Continued.

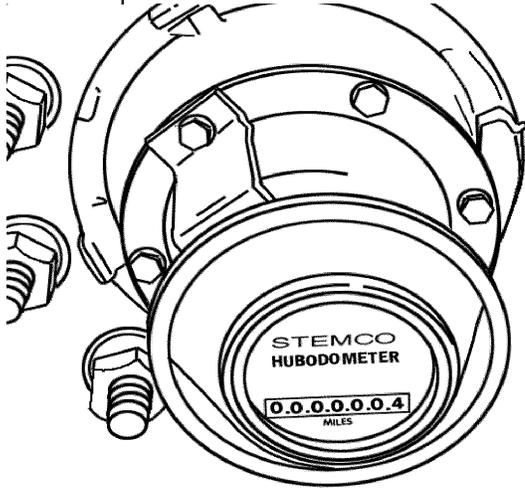
Item No.	Interval	Location		Procedure	Not Fully Mission Capable If:
		Item To Check/Service			
8	Before	TIRES		Check tire pressure when tires are cool.	Any tire is flat, missing or unserviceable.
9	Before			Check tires for gouges, cracks, tread separation, and foreign objects lodged in tread or tire.	
10	Before	WHEELS		Check wheels for damage.	Any wheel is damaged or unserviceable.
11	Before			Check lug nuts for tightness and ensure all lugs are installed.	
12	Before	HUBODOMETER		Inspect hubodometer for damage.	Any lug nuts are missing.
					
13	Before	TOOL BOX		Check tool box cover for proper operation and serviceability.	

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET) Continued.

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item To Check/Service		
14	Before	DECK PLANKING	Inspect planking (1) for damaged or broken boards.	Outrigger load prohibited if any outriggers or boards are unserviceable.
15	Before		Check for missing or damaged bolts and fastening hardware(2).	
16	Before	OUTRIGGERS	Check for proper operation of folding outriggers (5).	
17	Before	TIEDOWN POINTS	Check D-rings (3), and chain slots (4) for serviceability.	
18	Before		Check chains (6), loadbinders (7), and other tiedowns for serviceability and proper quantity.	

The diagram illustrates the trailer's deck and outrigger assembly. Callout 1 points to the deck planking. Callout 2 points to bolts on the deck. Callout 3 points to D-rings used for tie-downs. Callout 4 points to chain slots. Callout 5 points to the folding outriggers. Callout 6 points to a chain. Callout 7 points to a load binder.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET) Continued.

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item To Check/Service		
19	Before	BRAKES	<p>NOTE Any drop in air pressure will indicate an air leak.</p> <p>Check for leaks in airbrakes system by shutting off truck tractor engine when air pressure is at the maximum. Observe air pressure gauge for one minute.</p> <p>NOTE</p> <ul style="list-style-type: none"> • If ABS indicator lamp stays on during mission, continue on with mission until system can be properly diagnosed by Unit Maintenance. Braking capacity will not be impaired. The only effect will be no modulation at wheel or wheels that have a fault. • Trailer is not NMC if during mission ABS is inoperable and there is no time to diagnose problem(s) • During blackout mode conditions, tape over ABS indicator lamp. Do not remove or otherwise disable light. 	Any leaks are evident
20	Before	ABS Indicator Lamp	Check that ABS indicator lamp does not stay on.	ABS indicator lamp does not come on or ABS indicator lamp remains on w/Blink codes. para. 5-51A.
21	Before	LIGHTS	Check all trailer lights including brake and tail lights (2), blackout lights (3), running lights (4), and clearance lights (1) for proper operation and cleanliness.	Any damaged components or parts.
22	Before	AIR SYSTEM	Check for leaks at gooseneck gladhand connections.	Any leaks are evident.
23	Before		Check for leaks in air reservoir tanks.	Any leaks are evident.
24	Before		Momentarily check air tank dump valve release cable.	Inoperative or leaking dump valve.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET) Continued.

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item To Check/Service		
25	Before	HYDRAULICS	Wipe connectors clean, connect hydraulic lines from gooseneck to prime mover (refer to para. 2-15), and check for leaks.	Any class III leaks are evident.
26	Before		Check gooseneck operation (refer to para. 2-15).	Gooseneck does not operate correctly IAW para. 2-15.
1	During	HYDRAULICS AIR SYSTEM	Wipe connectors clean, connect hydraulic lines from gooseneck to prime mover (refer to para. 2-15), and check for leaks.	Any class III leaks are evident.
2	During		Check gooseneck operation (refer to para. 2-15).	Gooseneck does not operate correctly IAW para. 2-15.
3	During		Check for leaks at gooseneck gladhand connections.	Any leaks are evident.
4	During		Check for leaks in air reservoir tanks.	Any leaks are evident.
5	During		Momentarily, check air tank dump valve release cable.	Inoperative or leaking dump valve.

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Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET) Continued.

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item To Check/Service		
6	During	BRAKES	Have an assistant actuate the service brakes. Listen for air leaks at the gladhands and air reservoirs.	Trailer brakes fail to hold or air leaks are found.
7	During		Actuate trailer brakes and check that brakes at all six wheel positions lock.	Trailer brakes inoperative.
1	After	TIRES	Check tire pressure when tires are cool.	Any tire is flat, missing, or unserviceable.
2	After	WHEELS	Check wheels for damage.	A wheel is damaged or unserviceable.
3	After		Check for debris or foreign objects lodged between wheels.	
4	After		Check lug nuts for tightness and ensure all lug nuts are installed.	A lug nut missing.
5	After	HUBODOMETER	Inspect hubodometer for damage.	
6	After		Note mileage before operation and check periodically for proper operation.	

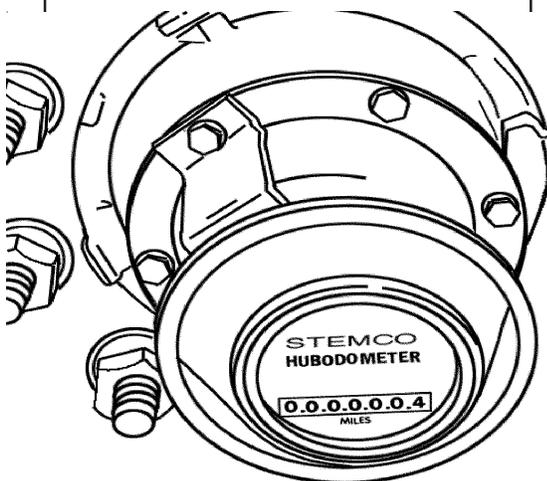


Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET) Continued.

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item To Check/Service		
7	After	HUBS	<div style="border: 1px solid black; padding: 2px; text-align: center; margin-bottom: 10px;">WARNING</div> <p>Before putting hand to hub, hold hand close to hub to check for excessive heat radiation. Hub may be hot. This will prevent skin burns caused by hot metal.</p> <p>Check hubs for discoloration or blistered paint that may indicate excessive heat condition.</p>	Excessive heat, indicating worn wheel bearing.
8	After	AIR SYSTEM	<p>Momentarily open air dump valve to vent accumulated moisture.</p> <p style="text-align: center;">NOTE</p> <p>If trailer will not be used for 72 hours or more, completely drain air tanks.</p>	
1	Weekly	GOOSENECK	Inspect grease points for damage to fittings and sufficient grease.	
2	Weekly	KINGPIN	Apply grease to kingpin.	

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Section III. OPERATION UNDER USUAL CONDITIONS

Paragraph Number	Paragraph Title	Page Number
2-7.	Scope	2-15
2-8.	Types of Loads	2-15
2-9.	Load Distribution	2-17
2-10.	Calculating Center of Gravity	2-17
2-11.	Payload Configurations	2-19
2-12.	Loading or Unloading Equipment and Cargo	2-23
2-13.	Tiedown Procedures	2-26
2-14.	Transporting Loads	2-27
2-15.	Coupling Gooseneck to Prime Mover and Raising Trailer	2-29
2-16.	Disconnecting Gooseneck from Trailer for Loading or Unloading	2-34
2-17.	Connecting Gooseneck to Trailer	2-37
2-18.	Uncoupling Gooseneck from Prime Mover	2-40
2-19.	Caging the Brakes	2-42

2-7. SCOPE.

- a. This section provides instructions on operating the M870A3 Trailer (MHET) under usual conditions.
- b. Refer to Section IV of this chapter for operating instructions under unusual conditions.
- c. Before, during, and after operation, perform applicable Operator PMCS (Chapter 2, Section II).

2-8. TYPES OF LOADS.

CAUTION

Improper load placement can have a detrimental effect on braking, evasive maneuvers, and handling characteristics of a tractor trailer vehicular combination.

- a. **Concentrated Loads.** A load that is localized over a short distance is a concentrated load. Trailer frame members are subject to damage or yielding when subjected to concentrated loads beyond their capacity. Generally, avoid knife-edged interfaces between the load and the trailer. Load spreading devices such as timbers or steel beams are recommended when this type of interface exists.
- b. **Distributed Loads.** A load that bears continuously along its length of engagement with the trailer is a distributed load.
- c. **Self-Supporting Loads.** A load that has its own rigid base is considered to be a self-supported load. It may also be referred to as a "rigid load" or "rigid base load."
- d. **Compound Loads.** A load that is a combination of two or more types of loads on one trailer is considered to be compound load.

2-8. TYPES OF LOADS (Continued).

- e. **Eccentric Loads.** A load that has its center of gravity positioned off to one side is an eccentric load. The degree of offset is a critical factor to the stability of the trailer. Problems encountered may vary from leaning of the trailer, to severe leaning, instability, and/or damage or yielding of the trailer frame.
- f. **High Center of Gravity Loads.** A load with a high center of gravity poses additional stability concerns. Reduce speed with this type of load.
- g. **Outrigger Loads.** Outriggers provide additional stability to wide-based loads. However, due to the spacing of the outriggers, no concentrated loads are permitted on them. Some of the load, by design, must bear on the trailer bed itself and only part of the load on the outriggers.
- h. **Divisible Loads.** A load which has components that can be physically separated (such as two pieces of equipment or vehicles) is considered a divisible load.

2-9. LOAD DISTRIBUTION.

- a. **General.** Load distribution is an important factor in the safe use of a trailer. It is more critical as the maximum load of the trailer is approached. However, even a load that is significantly less than the overall limit of the trailer can cause an overload situation if not distributed properly.

NOTE

Position vehicles or equipment as far forward on the load deck as possible.

- b. **Vehicles and Equipment.** The center of gravity (CG) of the vehicles or equipment being loaded should be positioned as close as possible to the CG of the trailer for the best weight distribution. The load deck should be considered to be the bed space between the base of the gooseneck and the forward axle.
- c. **Capabilities.** The following information is provided for the purpose of calculating weight distribution and to ensure that the trailer and prime mover are not overloaded.
- (1) The M870A3 trailer is rated to carry 80,000 lb (40 ton, 36,320 kg). The rear axle group is capable of supporting a maximum weight of 103,320 lb (52 ton, 46,907.3 kg) total (trailer weight and payload).
 - (2) The M916 prime mover is capable of supporting a maximum weight of 40,000 lb (20 ton, 18,160 kg) total at the kingpin.

2-10. CALCULATING CENTER OF GRAVITY.

- a. Generally, military vehicles and equipment have data plates that provide embarkation or loading information including the location of the center of gravity. When the center of gravity of the payload is known, the portion of the load that is bearing on the kingpin and the portion that is bearing on the axles can be determined.
- b. To determine if the trailer and prime mover combination is within its load bearing capability, this data should be compared to the trailer and prime mover limitations listed in the appropriate manuals and found on the embarkation/load data plates.

2-10. CALCULATING CENTER OF GRAVITY (Continued).

- c. Use the data and formulas provided below to determine if the trailer is loaded properly and within its limits. Known information for the trailer is provided. Information for the payload will need to be calculated through measurements and from data contained on the payload, vehicle, or equipment.

CG = Center of Gravity

M870A3 Data

CL = Center Line

WB = 448.06 in. (37 ft 4 1/16 in.)

EFW = Trailer Empty Weight at Front

EFW = 7,840 lb (3,556.2 kg)

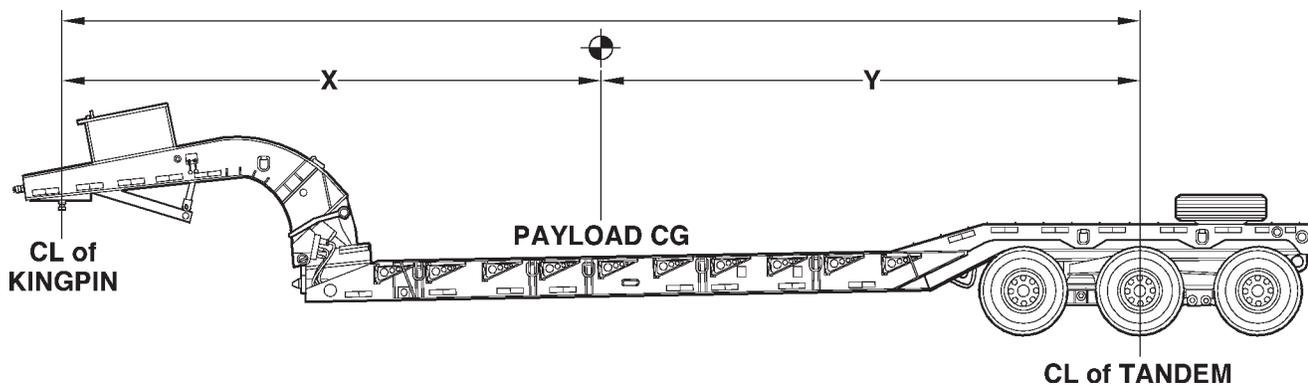
EWR = Trailer Empty Weight at Rear

EWR = 15,320 lb (6,940.0 kg)

WB = Wheelbase

$$\frac{(X) \times \text{Payload Weight} + \text{EWR}}{\text{WB}} = \text{Axle Load}$$

$$\frac{(Y) \times \text{Payload Weight} + \text{EFW}}{\text{WB}} = \text{Kingpin Load}$$



Calculating Trailer Center of Gravity with Payload

2-11. PAYLOAD CONFIGURATIONS.

a. Permit Requirements.

- (1) Although operation aboard Federal Installations may not require permits, operations on public roads will require permits for loads that exceed the legal highway limits. Each state highway authority sets its own oversize/overweight limits. In general, operations without permits are allowed for vehicles that do not exceed 80,000 lb (36,320 kg) Gross Vehicle Weight (GVW). Any load that exceeds 80,000 lb (36,320 kg) GVW will require a permit. Loads are evaluated on the basis of the Federal Bridge Formula which provides acceptable limits for weights on axles and groups of axles. The Bridge Formula allows maximum axle weights of 20,000 lb (9,080 kg) for a single axle, 34,000 lb (15,436 kg) for a tandem axle, and 42,000 lb (19,068 kg) for a tri-axle. Some states may allow a tri-axle load of 60,000 lb (27,240 kg) on the M870A3 with the proper permit. Divisible loads are restricted to 80,000 lb (36,320 kg) GVW and are rarely permitted above that limit.
- (2) Before operating on public roads, check applicable state laws with regard to payload, bridge requirements, and oversized loads, if applicable. Ensure that proper permits have been received prior to conducting operation on public roads.

2-11. PAYLOAD CONFIGURATIONS (Continued).

- (3) Table 2-2 provides information on common equipment and vehicle payloads that will be transported on this trailer. This information is provided as a guide and should be used to determine whether or not a permit is required for use on public roads. Payload configurations not covered in this table may require a permit. Check local regulations for permit requirements.

Table 2-2. Common Equipment and Vehicle Payload Information

PAYLOAD	PAYLOAD WEIGHT	GROSS VEHICLE WEIGHT (GVW)		BRIDGE FORMULA	REQUIRES STATE PERMIT
		w/M916	w/M920		
4000 Forklift	11,808 lb (5,360 kg)	91,128 lb (41,350.1 kg)	110,128 lb (49,967.1 kg)	OK	NO
EBFL Forklift	22,870 lb (10,383 kg)	102,190 lb (46,372.3 kg)	121,190 lb (54,489.3 kg)	OK	YES
1150E Dozer w/ Blade	25,100 lb (11,395.4 kg)	104,420 lb (47,384.7 kg)	123,420 lb (56,001.7 kg)	OK	YES
LRT 7.5 Crane	26,000 lb (11,804 kg)	105,320 lb (47,793.3 kg)	124,320 lb (56,410.3 kg)	OK	YES
1155 Front End Loader	27,750 lb (2,598.5 kg)	107,070 lb (48,587.8 kg)	126,070 lb (57,204.8 kg)	OK	YES
TRAM Forklift/Front and Loader	36,686 lb (16,655.4 kg)	116,006 lb (42,644.7 kg)	135,006 lb (61,261.7 kg)	OK	YES
D7G Dozer	50,000 lb (22,700 kg)	129,320 lb (58,689.3 kg)	148,320 lb (67,306.3 kg)	NO ⁽¹⁾	YES
M9 ACE Armored Combat Earthmover	54,000 lb (24,516 kg)	133,320 lb (60,505.3 kg)	152,320 lb (69,122.3 kg)	NO ⁽¹⁾	YES
621B Scraper	65,000 lb (29,510 kg)	144,320 lb (65,499.3 kg)	163,320 lb (74,116.3 kg)	NO ⁽¹⁾	YES

Notes: (1) Exceeds Bridge Formula tri-axle weight limit 42,000 lb (19,068 kg). D7G tri-axle weight is 47,554 lb (21,589.5 kg). M9 ACE tri-axle weight is 51,706 lb (23,474.5 kg).

2-11. PAYLOAD CONFIGURATIONS (Continued).

- (4) Table 2-3 provides information concerning some combinations of equipment. The table indicates if the criteria for a divisible load 80,000 lb (36,320 kg) max GVW has been met. A 'NO' in this column indicates that the combination exceeds the divisible load criteria and may not be permitted under state and Federal guidelines. All combinations except the D7G/1150E combination are within the capability of the trailer, however, and may be able to be transported in countries with less stringent weight requirements. The D7G/1150E combination cannot be transported on this trailer.
- (5) Check height of payload/trailer combination. Payloads exceeding 13 ft. 6 in. (4.12 m) may require permits and special routing.

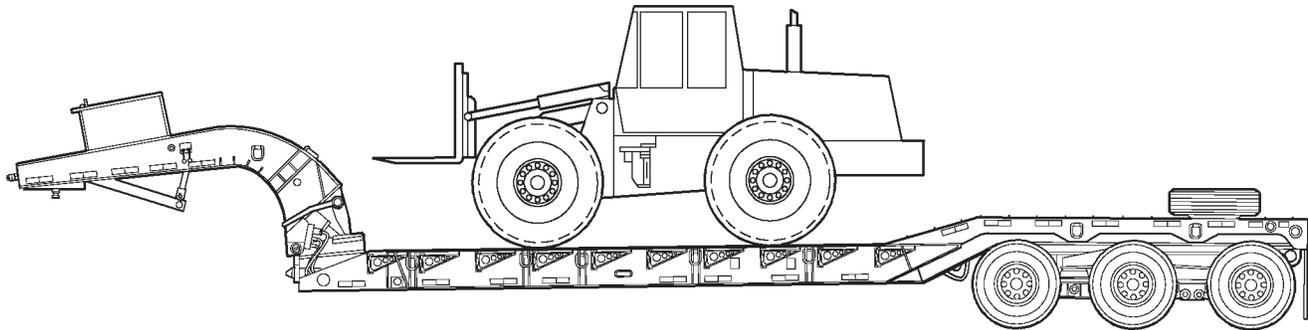
Table 2-3. Common Equipment Combination Payload Information

PAYLOAD COMBINATION	TOLERANCE		GROSS VEHICLE WEIGHT (GVW)	DIVISIBLE LOAD CRITERIA MET
	AXLE	KINGPIN		
EBFL/4000	OK	OK	94,166 lb (42,751.4 kg)	NO
1150E/4000	OK	OK	96,396 lb (43,763.8 kg)	NO
1155/4000	OK	OK	99,046 lb (44,966.9 kg)	NO
TRAM/4000	OK	OK	107,982 lb (49,023.8 kg)	NO
1155/1150E	OK	OK	112,850 lb (51,233.9 kg)	NO
D7G/1150E	NO ⁽¹⁾	OK	135,100 lb (61,335.4 kg)	NO
Notes: (1) Exceeds trailer axle tolerance by 17,000 lb (7,718 kg).				

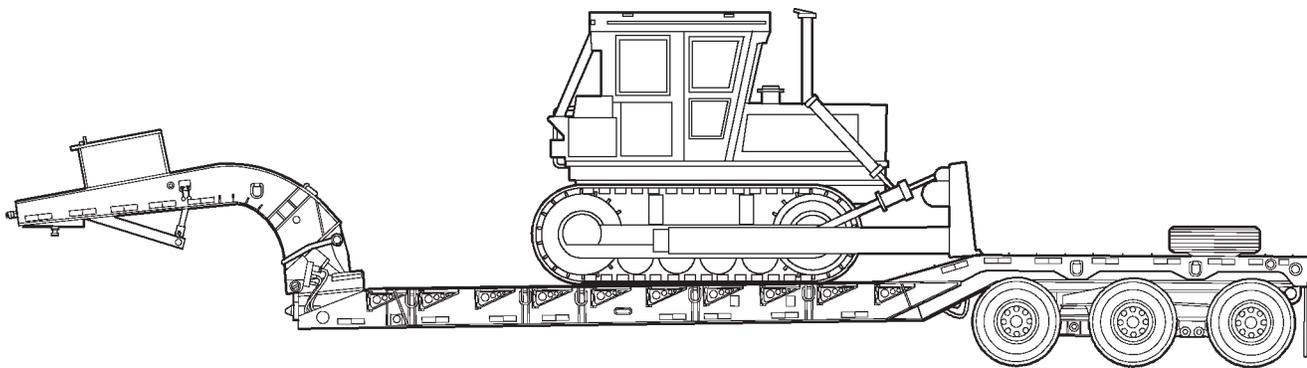
c. Configuration Examples.

- (1) The payload configuration for the trailer is determined by the operational requirements and the loading information provided in the previous section.
- (2) Some examples of typical payload configurations are shown.

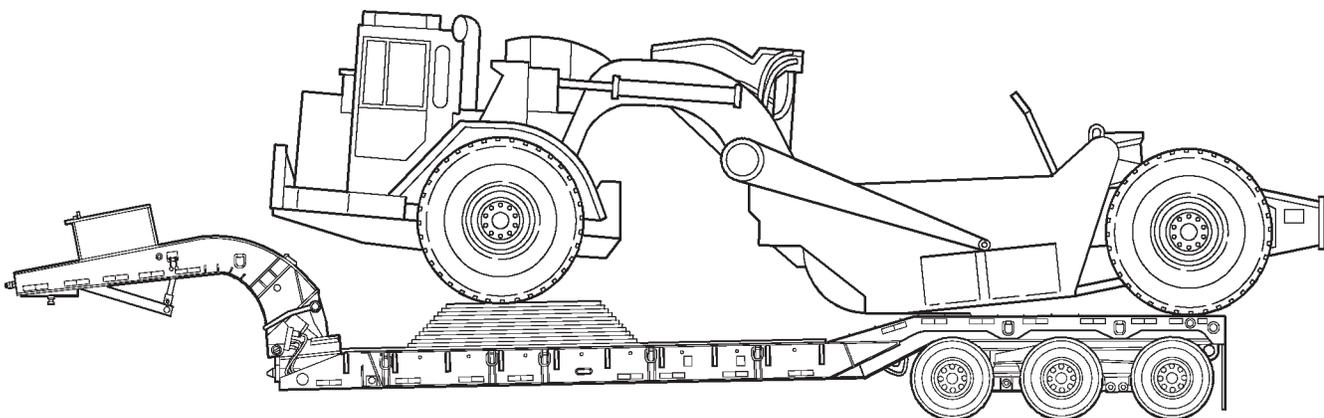
2-11. PAYLOAD CONFIGURATIONS (Continued).



Typical Payload Configurations - TRAM



Typical Payload Configurations - D7G



Typical Payload Configurations - 621C

2-12. LOADING OR UNLOADING EQUIPMENT AND CARGO.

a. Loading Procedures.**WARNING**

All persons not involved in the loading or unloading operation must stand clear of trailer to prevent serious injury.

- (1) If outriggers will be required to stabilize the payload, see paragraphs 2-8/g and 2-12/b for outrigger usage.
- (2) If load will require usage of the rear deck, remove the spare tire stowed on rear deck and place the spare tire where it will not interfere with loading.
- (3) Align equipment to be loaded with the trailer so that the equipment can be driven straight onto the trailer. This is particularly important if the equipment being loaded is a tracked vehicle or a vehicle with a wide track width. Turning vehicles while on the trailer can present hazardous conditions and/or damage the trailer.

NOTE

If equipment is not aligned properly during loading, stop the loading procedure, back the equipment off the trailer, align it properly and begin loading procedure again.

- (4) Prepare and secure equipment in accordance with procedures in paragraph 2-13.
- (5) Replace spare tire on the rear deck mounting location if access is available, otherwise secure tire in an alternate position on the trailer as available.

b. Outrigger Usage.**WARNING**

Outriggers are designed to stabilize the payload. Payload must be fully supported by the trailer load bed. Supporting a payload on the outriggers may result in equipment failure and injury to personnel.

CAUTION

When loading equipment, ensure that the forward edge of the trailer is on level ground that allows full ground contact. Failure to have full ground contact across the front edge of the trailer will cause damage to the trailer.

NOTE

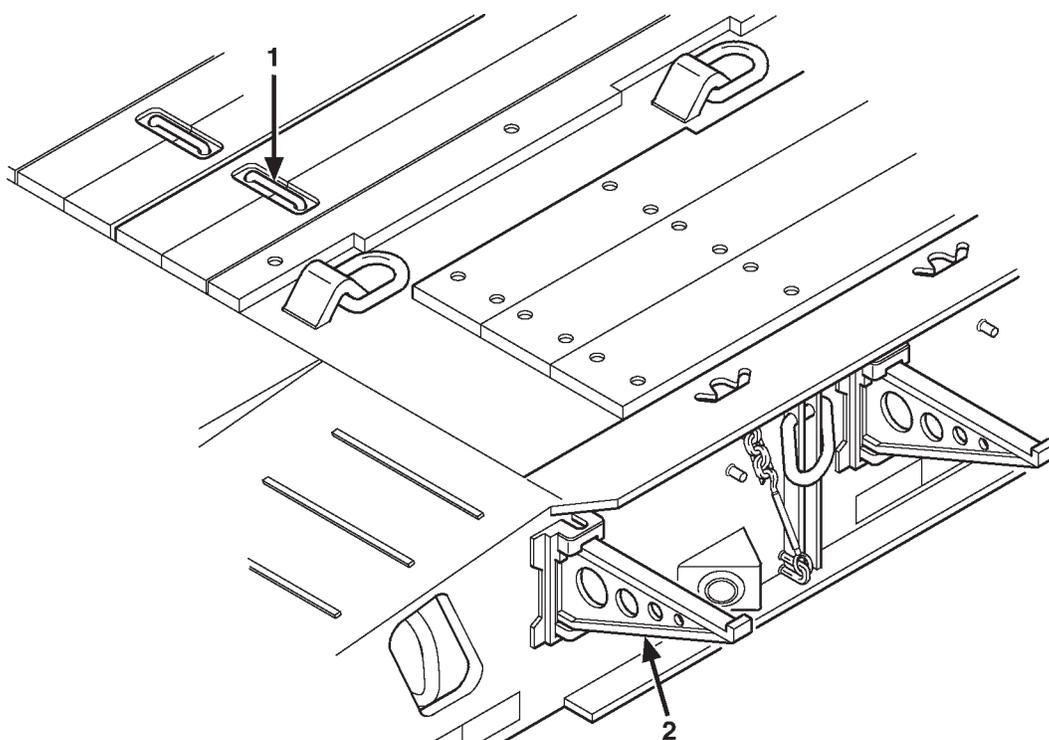
In placement of outriggers and deck boards requires two personnel.

2-12. LOADING OR UNLOADING EQUIPMENT AND CARGO (Continued).

NOTE

If the cargo or equipment to be loaded exceeds 96 in. (243.8 cm) in width at the contact points with the trailer, the outriggers should be used to increase stability. Outriggers should also be used for wheeled vehicles that are near 96 in. (243.8 cm) in width (ex. TRAM), or are difficult to maneuver (ex. grader) to provide additional stability and safety during loading.

- (1) If outriggers are used to stabilize the loaded equipment, ensure that the main weight of the equipment is being borne by the load bed of the trailer. The outriggers are not designed to bear the weight of the payload but are designed to provide stability to oversized equipment (especially vehicles with tires). If the outriggers are bearing the weight of the payload, the equipment is too wide to be transported on this trailer.
- (2) Foldout outriggers (2) by lifting up slightly and rotating the outriggers 90° from the trailer.



- (3) Pull up on the center board handles (1) and remove the two sets of boards from center of trailer and place a set of boards on the outriggers on each side of the trailer. Ensure that the joining brackets on the boards are on the bottom when the boards are placed on the outriggers.
- (4) Secure boards in position by attaching turnbuckle chains to loops on underside of boards and tightening turnbuckle.

2-12. LOADING OR UNLOADING EQUIPMENT AND CARGO (Continued).

c. Unloading Procedure.**WARNING**

All persons not involved in loading or unloading operation must stand clear of trailer to prevent serious injury.

CAUTION

When unloading equipment, ensure that the edge of the trailer is on even, level ground that allows full ground contact along the edge of the trailer. Failure to have full ground contact across the front edge of the trailer will cause damage to the trailer.

- (1) Unload equipment by driving equipment straight off the trailer.
- (2) Replace spare tire at the spare tire mounting location on the raised portion of the trailer bed if it was not previously secured.
- (3) If outriggers (2) were used to stabilize load, remove boards from outriggers and replace on trailer deck surface. Push board handles (1) into handle recesses on boards and fold outriggers against trailer.

2-13. TIEDOWN PROCEDURES.

NOTE

Rear loading of the trailer is possible if a loading dock or berm is available to use as a ramp to gain access to the trailer rear.

a. Preparing Equipment for Loading.

- (1) Be sure that all shackles are on the equipment. Do not use bumpers, axles, towing pintles, or towing hooks as points of attachment for chains.
- (2) Protect windshields of payload equipment.
- (3) Reduce payload equipment to lowest height configuration consistent with the operational requirements.
- (4) Secure any materials or equipment loaded in the beds of payload equipment.
- (5) When loaded, shut down payload equipment, turn off all switches, close doors and hatches, and swing in mirrors.

b. Securing Equipment.

- (1) Use wood dunnage on gooseneck when a portion of the payload contacts the gooseneck.
- (2) Select a tiedown point on the trailer that allows the chain to be at a 45° angle fore and aft and provides sufficient room for positioning a loadbinder.
- (3) Tighten chains using the loadbinders.
- (4) Secure excess chain to the tension-bearing part of the chain.
- (5) Set brakes and put transmissions in neutral on payload equipment.
- (6) Make sure rotating parts are properly secured.
- (7) Make sure all BII items are properly stowed on the trailer.
- (8) Check all tiedowns at halts and any time you suspect a problem.

2-14. TRANSPORTING LOADS.

WARNING

- **Hearing protection is required for personnel when performing any function on the M870A3 when the prime mover is in use. Failure to do so could result in injury to personnel.**
 - **The M870A3 Semitrailer should always have the wheels chocked, with or without a load, during coupling or uncoupling to prime mover and when parked. Failure to not chock the wheels may result in injury or death to personnel.**
- a. General**
- (1) The M870A3 MHET, with its prime mover, will have different operational characteristics based on gross weight, differences between loaded and unloaded weight and suspension characteristics. Safe operating limits are affected by the interaction of the vehicle characteristics, load, road surface, weather, driver skill, and vehicle speed.
 - (2) Before operating the trailer, ensure that all the operating procedures contained in this manual are fully understood.
- b. Pre-Trip Inspection.** Certain items should be inspected prior to each trip. Appropriate procedures for services and PMCS (Chapter 2, Section II) will be completed prior to operating the MHET.
- c. Permits.** See paragraph 2-11a to determine if a permit is required prior to operation.
- d. Driving.**
- (1) **General.** When driving the prime mover and trailer, the overall length must be kept in mind, both when passing other vehicles and when turning. Because the unit pivots at the fifth wheel, backing is also affected.
 - (2) **Road Surfaces.** Uneven terrain, steep grades, crowned roads, and unimproved road surfaces can introduce forces that will make handling difficult. Even a vehicle that is properly maintained and loaded can be hazardous when excessive speed and certain road conditions are combined.
 - (3) **Grades.** Operations on grades requires caution. Use the same gear in descending a long grade as when ascending. Gear selection should be made before descending a grade to minimize the chance of a missed shift. Avoid excessive use of brakes on long down grades in order to maintain air pressure and prevent overheating of the brakes.
 - (4) **Side Slopes.** This trailer is not designed to be operated on excessive (15%) side slopes. The trailer can be safely operated, with or without payloads, on side slopes commonly encountered on highways or unimproved roads.
 - (5) **Turning.** When turning corners, allow extra room. The trailer wheels will follow a track that is inside the radius of the prime mover wheels. For right turns, drive about halfway into the intersection and then cut sharply to the right. The forces affecting the stability of a tractor trailer combination are increased during turning. The smaller the radius, the greater the force trying to pull the vehicle over. Therefore, the tighter the curve, the slower the speed must be in order to avoid a rollover.

2-14. TRANSPORTING LOADS (Continued).

- e. **Stopping.** In normal operation, when the driver applies the brakes, the prime mover and the trailer brakes are applied at the same time. Brake pressure should be applied gradually and smoothly. The trailer brakes may be applied separately by using the trailer hand brake control lever in the prime mover. Extreme caution should be exercised when using only the trailer brakes. Some benefit may be gained on slippery surfaces by slowly applying the trailer brakes before the prime mover brakes, reducing the possibility of jackknifing the trailer. However, it is very dangerous to use only the trailer brakes on long downgrade. Doing so will cause the trailer brakes to heat up and fade. The prime mover brakes alone will not be able to stop the combined vehicle load. Selecting a lower gear before beginning a long downgrade is the safest, most effective way to maintain control of the vehicle combination.
- f. **Parking.** When the prime mover and the trailer are to be parked and left unattended, set the parking brake on the prime mover and the trailer.

WARNING

Visibility from the prime mover is significantly reduced when backing, whether the trailer is loaded or not. Proper procedures must be followed and extreme caution used when backing to prevent damage to equipment and injury to personnel.

- g. **Backing.** When backing, use the assistant driver as a ground guide. Adjust rear view mirrors before backing. Use slow speed and extreme caution when backing this combination.
- h. **Antilock Braking System (ABS).** The ABS is an electronic system that monitors and controls wheel speed during braking and wheel lock situations. The system improves vehicle stability and control by reducing wheel lock during braking. The ABS includes an electronic control unit (ECU) that is combined with a dual modulator valve assembly. Four wheel speed sensors provide input to the ECU. When the ECU detects a wheel lockup during a hard braking situation, the ECU activates the appropriate modulator valve to control air pressure to the braking system. The ECU is to be replaced and is not serviced.

In the event of a malfunction in the ABS, the ABS in the affected wheel is disabled and that wheel still has normal brakes. The other wheels keep the ABS function.

An ABS indicator lamp located on the left rear corner of the trailer, lets the driver know through a series of blink codes the status of the system on initial startup. A warning label is affixed to the trailer near the ABS indicator lamp to identify the meaning of the blink codes.

2-15. COUPLING GOOSENECK TO PRIME MOVER AND RAISING TRAILER.

CAUTION

To prevent damage to the trailer and the prime mover, do not connect the hydraulic lines to a prime mover that does not use the approved military lubricants.

Coupling operations will be conducted with the gooseneck attached to the trailer.

WARNING

- Hearing protection is required for personnel when performing any function on the M870A3 when the prime mover is in use. Failure to do so could result in injury to personnel.
- The M870A3 Semitrailer should always have the wheels chocked, with or without a load, during coupling or uncoupling to prime mover and when parked. Failure to not chock the wheels may result in injury or death to personnel.
- Never stand between the prime mover and trailer when the prime mover is being backed up to the trailer. Serious injury or death may result.
- All persons not involved in coupling/uncoupling operation must stand clear of prime mover and trailer to prevent serious injury.

CAUTION

To prevent damage to the equipment, coupling should be done by two people, the first person in the prime mover cab and the second acting as a ground guide.

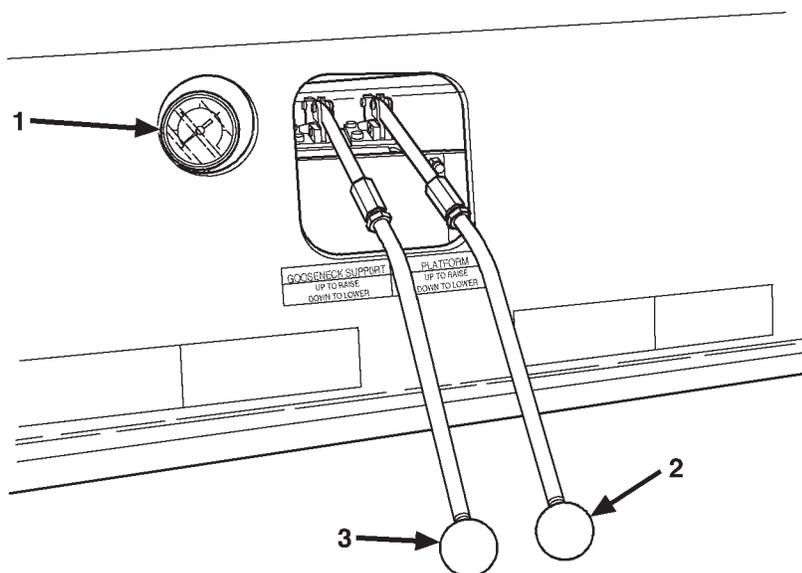
- (1) Line up prime mover with trailer and note whether the height of the gooseneck kingpin is sufficient to couple with the prime mover bed plate.

2-15. COUPLING GOOSENECK TO PRIME MOVER AND RAISING TRAILER (Continued).**NOTE**

- A reading of 2500 psi is only on gauge (1) when hydraulic controls are in use. Readings will drop to 500 psi when levers are disengaged.
- The psi will vary due to load. Hydraulic pressures will vary from 300 to 2500 psi under normal operation, and will reach a maximum of 2500 to 2800 psi under full load.

NOTE

If the gooseneck height is too low, connect the hydraulic lines from the prime mover to the gooseneck (Ref. pg. 2-32, Steps 7 & 8), pressurize the system to a minimum of 2500 psi (17237.5 kPa) on the gauge (1), and raise the gooseneck by holding the platform lever (2) down as required until the kingpin and the bedplate are approximately parallel. (Be sure the gooseneck shim is positioned so as not to obstruct movement of the gooseneck base assembly. Ref. pg. 2-32, Item 10.) If the gooseneck kingpin is too high, lower the gooseneck by moving the platform lever (2) to the up position until the gooseneck drops to the desired height. Hydraulic pressure is not required to lower the gooseneck since the weight of the gooseneck will allow it to drop under these conditions.



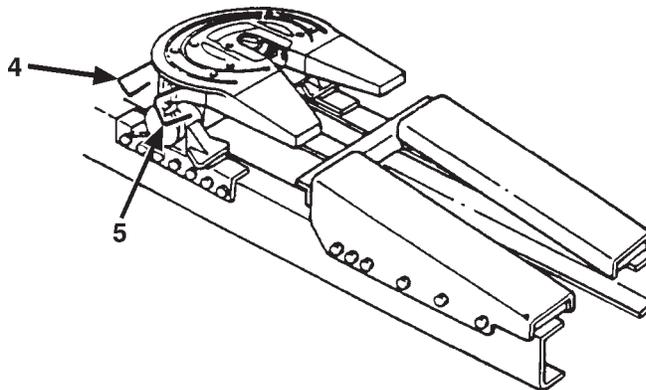
- (2) Check that the gooseneck tilt arm is fully raised to clear the prime mover bedplate and position it as required with the gooseneck support lever (3). Ref. pg. 2-32, Item 10.

2-15. COUPLING GOOSENECK TO PRIME MOVER AND RAISING TRAILER (Continued).

CAUTION

On prime movers equipped with a fifth wheel lockout device, ensure that the lockout is disengaged before traveling off-road to prevent damage to equipment.

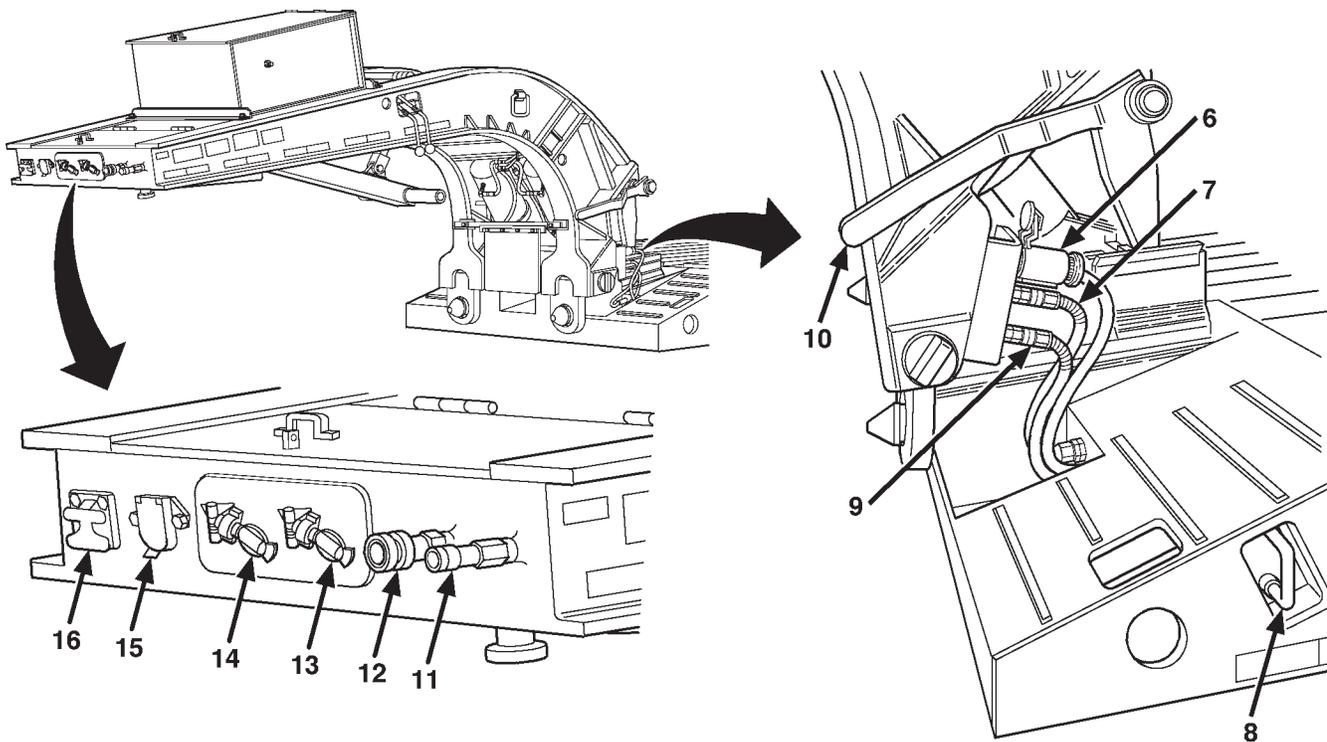
- (3) Unlock the fifth wheel by pulling the secondary lock handle (5) out and lifting up on the handle until it locks in place. Then pull the primary lock handle (4) out and lift up until it locks in place.



- (4) Slowly back the prime mover under the trailer, allowing the trailer to slide up the approach ramps to the fifth wheel plate until the kingpin engages and locks in place. With the supply (red/emergency) line disconnected from the trailer, the trailer brakes will be locked.

2-15. COUPLING GOOSENECK TO PRIME MOVER AND RAISING TRAILER (Continued).

- (5) Connect the 12-volt (15) and 24-volt (16) electrical cables from the prime mover to the gooseneck electrical connectors. Also check to be sure the 12/24-volt electrical cable (6) is connected between the trailer and the gooseneck.



- (6) Connect the blue service and red emergency air lines from the prime mover to the respective gooseneck blue (14) and red (13) gladhands. Also check to be sure the air lines (7 and 9) are connected between the trailer and the gooseneck.

NOTE

Rotate female hydraulic connector 90° after connecting to gooseneck to avoid possible damage during transport.

- (7) Remove hydraulic return line connector dust cover and wipe connector clean. Connect the hydraulic return line from the prime mover to the gooseneck hydraulic return connector (12).
- (8) Remove hydraulic inlet line connector dust cover and wipe connector clean. Connect the hydraulic inlet line from the prime mover to the gooseneck hydraulic inlet connector (11).

NOTE

Be sure that the level for hydraulic fluid in reservoir of the prime mover is above the minimum level to avoid getting air in the hydraulic lines.

2-15. COUPLING GOOSENECK TO PRIME MOVER AND RAISING TRAILER (Continued).

- (9) Check to be sure that the neck base slide bar road lock (8) is in the locked position with the rod end dropped into the rod hole.
- (10) Allow air reservoirs to fill and charge the trailer air supply.

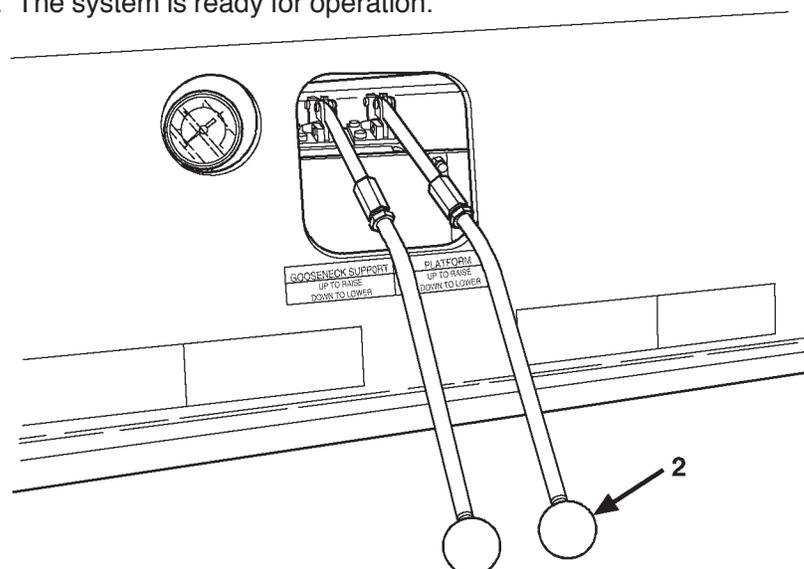
NOTE

The trailer is equipped with a ECU/modulator valve that provides air to the reservoirs first. The spring brakes will remain set until the air pressure reaches 80 - 82 psi (551.6 kPa to 565.4 kPa), then the modulator portion of the ECU/modulator valve allows air to begin flowing to release the spring brakes and operate the service brakes.

- (11) Check prime mover braking system for proper pedal pressure and application and release of brakes.

WARNING

- Do not climb on trailer to operate the Hydraulic System Control Levers. Failure to do so could result in injury to personnel. Use of step stool may be required.
 - Trailer and prime mover may roll when the brakes are released. To prevent injury to personnel or damage to equipment, the driver must remain in the cab of the prime mover.
- (12) Turn on the prime mover lights and check to make sure that all trailer clearance lights, running lights and tail, turn signal, ABS and brake lights operate.
 - (13) With the hydraulic system pressurized, move the platform lever (2) to the up position to raise the trailer bed to a position slightly above the desired height. Position the shims (10, See pg. 2-32) in the appropriate slot to maintain the trailer height and lower the trailer bed slightly to lock the shims in position.
 - (14) Move prime mover and trailer forward slowly and apply brakes to assure proper braking action. The system is ready for operation.



2-16. DISCONNECTING GOOSENECK FROM TRAILER FOR LOADING OR UNLOADING.

Disconnecting the gooseneck from the trailer for loading or unloading shall be conducted with the gooseneck coupled to the prime mover and the trailer raised.

WARNING

All persons not involved in the disconnecting operation must stand clear of prime mover and trailer to prevent serious injury.

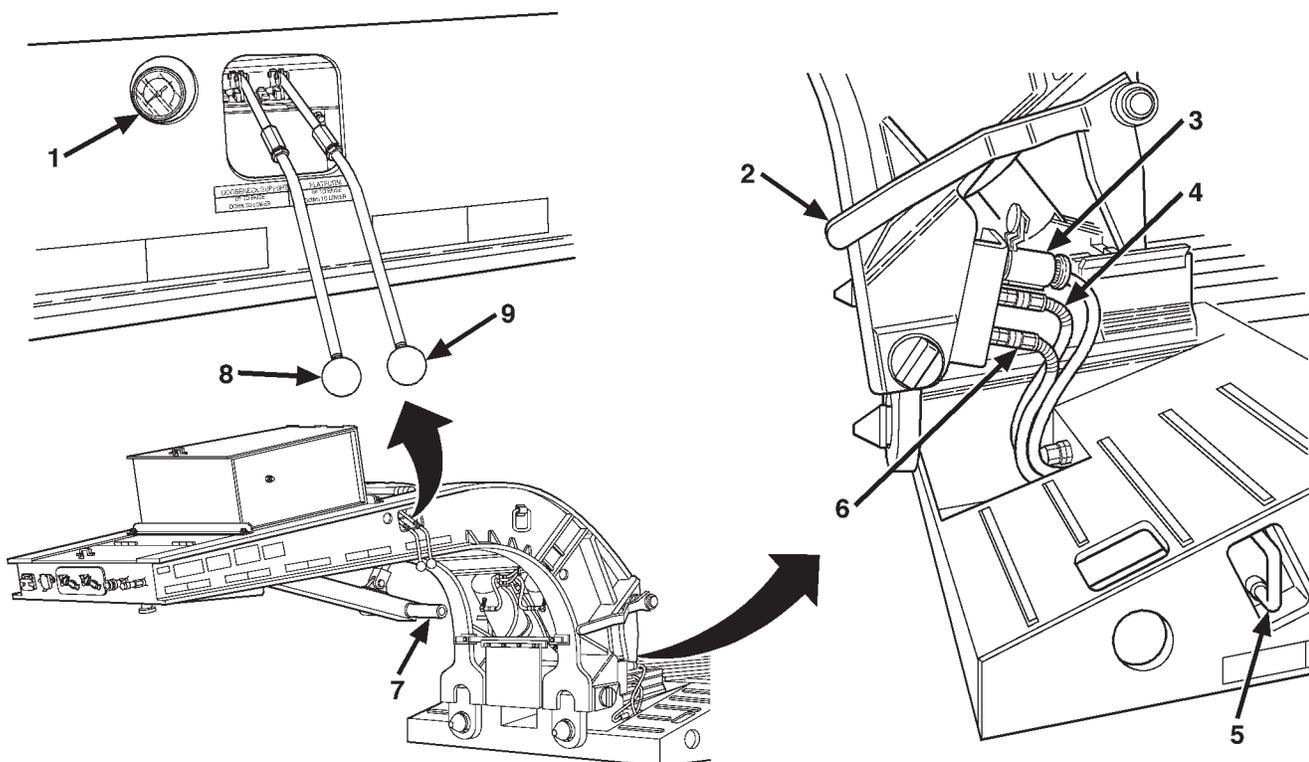
CAUTION

To prevent damage to the equipment, the procedure to disconnect the gooseneck should be performed by a driver working in cooperation with a ground observer.

NOTE

- A reading of 2500 psi is only on gauge (1) when hydraulic controls are in use. Readings will drop to 500 psi when levers are disengaged.
- The psi will vary due to load. Hydraulic pressures will vary from 300 to 2500 psi under normal operation, and will reach a maximum of 2500 to 2800 psi under full load.

- (1) Start up the hydraulic system on the prime mover and observe the appropriate psi on the hydraulic gauge (1).



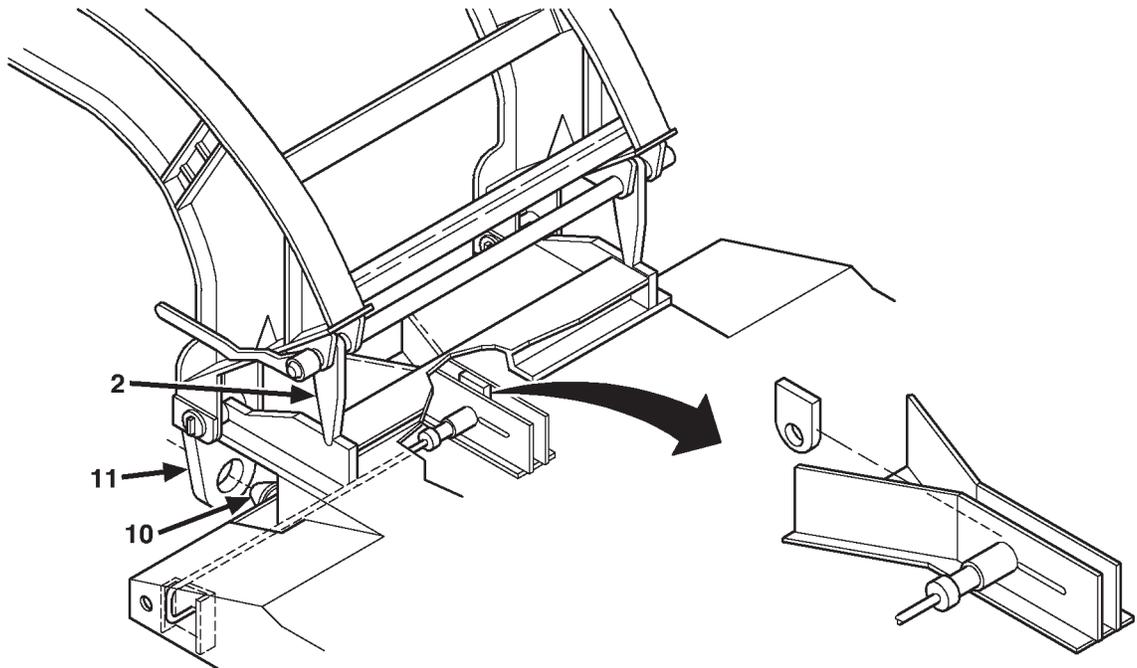
2-16. DISCONNECTING GOOSENECK FROM TRAILER FOR LOADING OR UNLOADING (Continued).

- (2) Raise the trailer using the platform lever (9) until the shim lever (2) is free to rotate the shims clear of the detents.
- (3) Disconnect the 12/24-volt cable (3) connecting the gooseneck to the trailer, as well as the two air lines (4 and 6) connecting the gooseneck to the trailer.

NOTE

Disconnecting the air lines will set the brakes on the trailer.

- (4) Holding the shim lever (2) in the raised position, lower the trailer by holding the platform lever (9) in the down position until the front of the trailer evenly rests on the ground or wooden blocks.
- (5) Slightly lower the gooseneck an additional amount to release the pressure on the lifting pins (10) located on the front of the trailer. The lifting pins (10) should be centered in the holes of the gooseneck lifting lugs (11).



- (6) Pull the neck base slide bar handle (5), (See pg. 2-34) fully out until the end clears the bar recess hole and rotate the bar handle counterclockwise to lock in released position.

NOTE

It may be necessary to back bump the gooseneck slightly to release the neck base slide bar.

- (7) Lower the gooseneck tilt support arm (7) by pulling down on the gooseneck support lever (8) until the arm contacts the prime mover rear bumper or approach ramps of the prime mover bedplate.

2-16. DISCONNECTING GOOSENECK FROM TRAILER FOR LOADING OR UNLOADING (Continued).

NOTE

The tilt support arm is used only when the gooseneck is disconnected from the trailer to provide support and stability for the gooseneck while it is attached to the prime mover.

- (8) Slowly pull the prime mover forward until the gooseneck base clears the trailer and park the prime mover and gooseneck in a location clear of the trailer to permit loading or unloading of the trailer.

WARNING

The driver of the prime mover should exercise extreme caution when moving the prime mover with the gooseneck attached. The observer/ground guide should direct the driver under these circumstances. Failure to follow this warning may result in serious injury or death.

2-17. CONNECTING GOOSENECK TO TRAILER.

Connecting the gooseneck to the trailer shall be conducted with the gooseneck coupled to the prime mover IAW para. 2-15 and the trailer lowered to ground level or resting evenly on wood blocks.

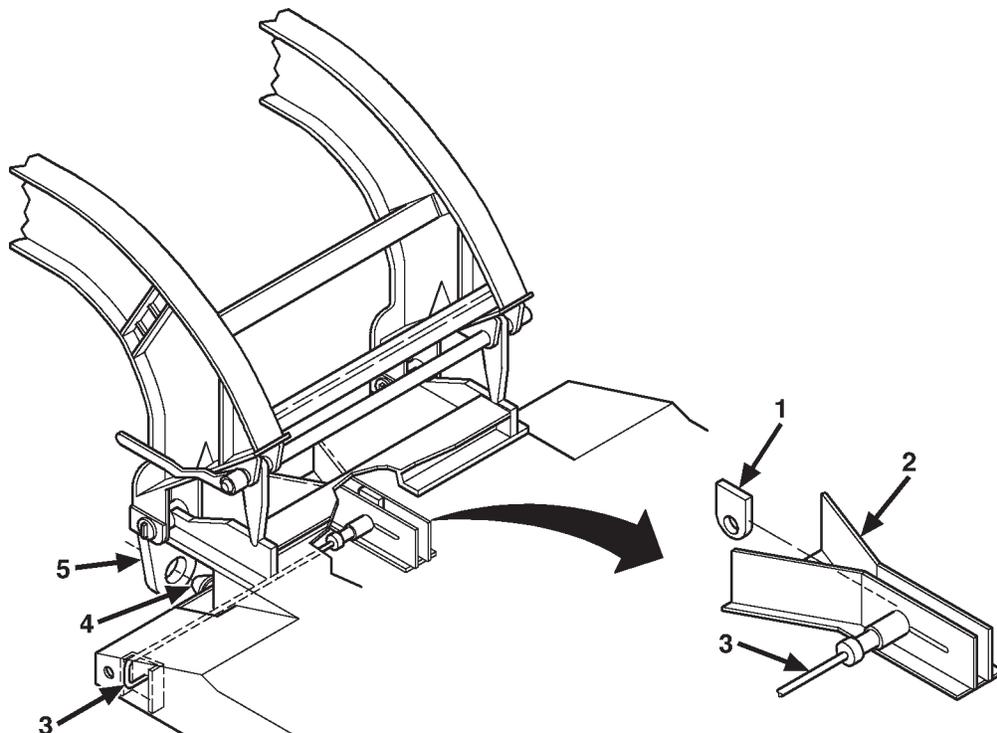
WARNING

All persons not involved in the connecting operation must stand clear of prime mover and trailer to prevent serious injury. Never stand between the gooseneck and the trailer when the prime mover is being backed up to the trailer. Serious injury or death may result.

CAUTION

To prevent damage to the equipment, the procedure to connect the gooseneck should be performed by a driver working in cooperation with a ground observer.

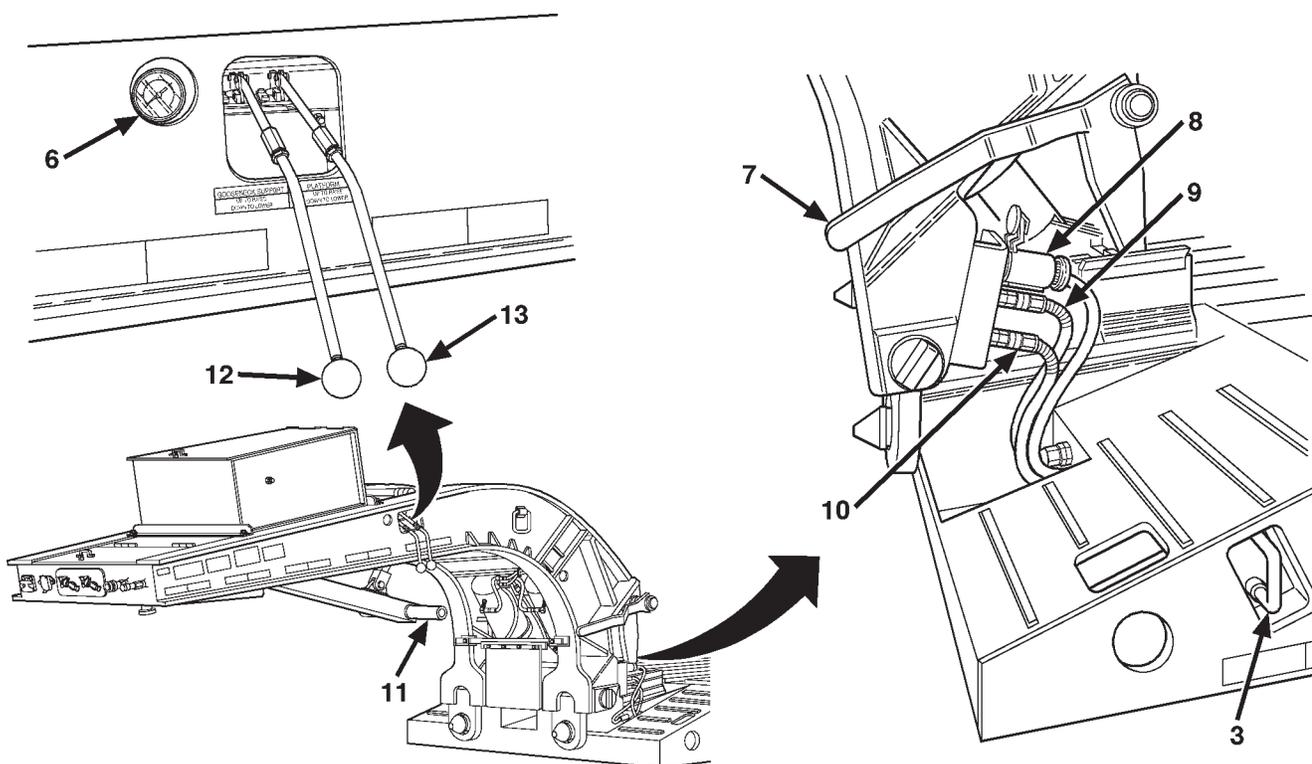
- (1) Line up the prime mover with the trailer and note whether the holes in the lifting lugs (5) on the bottom of the gooseneck base align and are centered with the lifting pins (4) on the front of the trailer. The center lug (1) on the bottom of the gooseneck base should also be aligned with the receiver "V" slot (2) of the trailer deck.
- (2) Unlatch the gooseneck base travel lock by pulling the gooseneck base slide bar handle (3) fully out until the end clears the bar recess hole and rotate the bar handle counterclockwise to lock in the released positioned.
- (3) Slowly backup the trailer until the gooseneck lifting lugs (5) contact the front of the trailer. Rotate the slide bar handle (3) so that the travel lock latches. **THE TRAVEL LOCK MUST BE FULLY ENGAGED.**



2-17. CONNECTING GOOSENECK TO TRAILER (Continued).**NOTE**

It may be necessary to raise or lower the gooseneck tilt support arm (11) with the gooseneck support lever (12) to assist in aligning the gooseneck base to the trailer deck. It may also be necessary to back bump the gooseneck slightly to engage the neck base slide bar (3). The bar is fully engaged when the end of the bar resides in the bar recess hole.

- (4) Connect the air lines (9 and 10) between the trailer and the gooseneck.

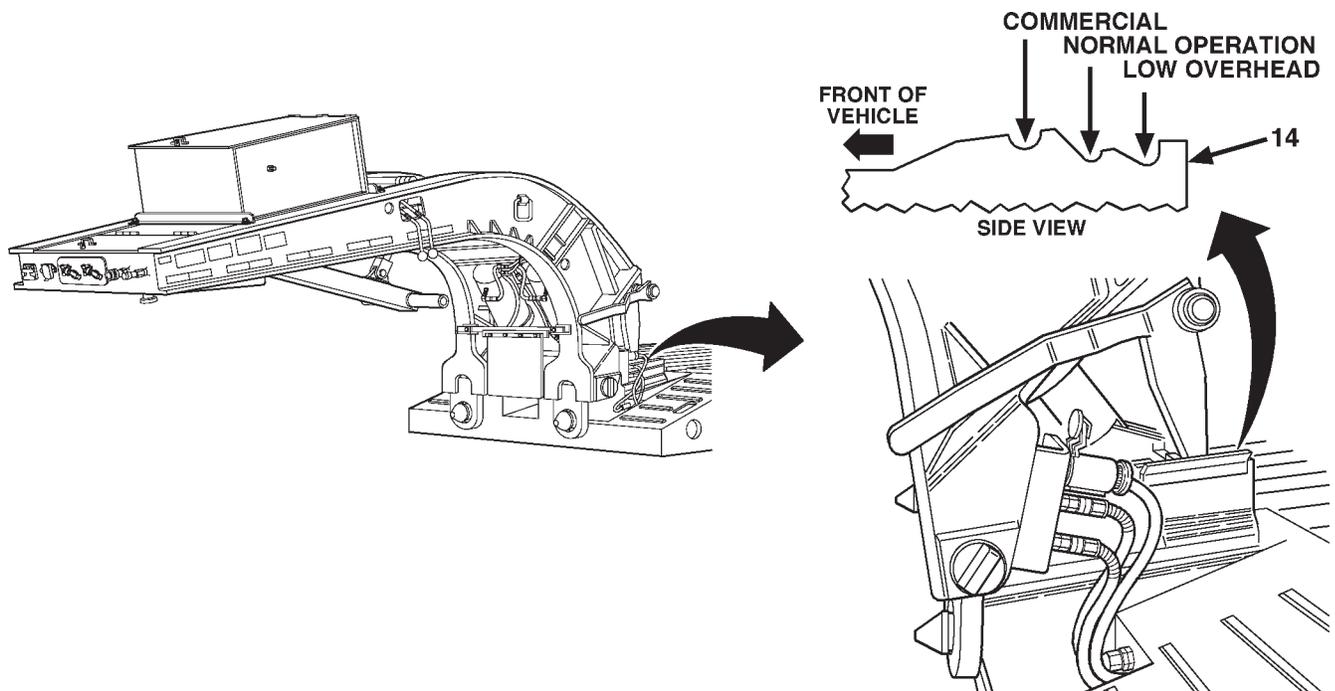


2-17. CONNECTING GOOSENECK TO TRAILER (Continued).

- (5) Connect the 12/24 volt electrical cable (8) between the trailer and the gooseneck.
- (6) With the hydraulic system pressurized to the appropriate psi on the gauge (6), move the platform lever (13) to the up position to raise the trailer bed to a position slightly above the desired height. Using the shim lever (7), position the shims in the appropriate notch of the baseplate (14) to maintain the trailer height and lower the trailer bed slightly to lock the shims in place.

NOTE

- A reading of 2500 psi is only on gauge (6) when hydraulic controls are in use. Readings will drop to 500 psi when levers are disengaged.
- The psi will vary due to load. Hydraulic pressures will vary from 300 to 2500 psi under normal operation, and will reach a maximum of 2500 to 2800 psi under full load.



- (7) Using the gooseneck support lever (12), raise the tilt arm (11).
- (8) Move prime mover and trailer forward slowly and apply brakes to check for proper braking action. The system is ready for operation.

2-18. UNCOUPLING GOOSENECK FROM PRIME MOVER.

Uncoupling the gooseneck from the prime mover shall be conducted with the trailer lowered to the ground or evenly resting on wooden blocks.

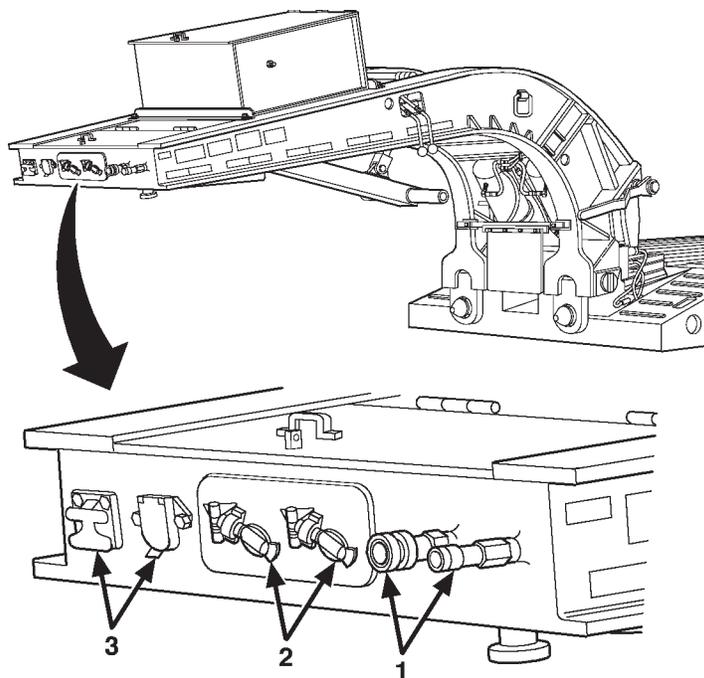
WARNING

All persons not involved in uncoupling operation must stand clear of prime mover and trailer to prevent serious injury.

CAUTION

To prevent damage to the equipment the uncoupling procedure should be done by two people. One person should be in the prime mover cab and the second acting as a ground guide/observer.

- (1) Disconnect the 12 - volt and 24 - volt electrical cables from the prime mover to the gooseneck electrical connectors (3) at the front of the gooseneck.



- (2) Disconnect the service (blue) and emergency (red) air lines from the prime mover to the gooseneck gladhands (2).

2-18. UNCOUPLING GOOSENECK FROM PRIME MOVER (Continued).

- (3) Release the downward pressure of the gooseneck kingpin on the prime mover fifth wheel bedplate by lowering the gooseneck a slight amount beyond the resting point where the trailer contacts the ground or wooden blocks.
- (4) Disengage the Power Take Off (PTO) on the prime mover to relieve the hydraulic pressure.

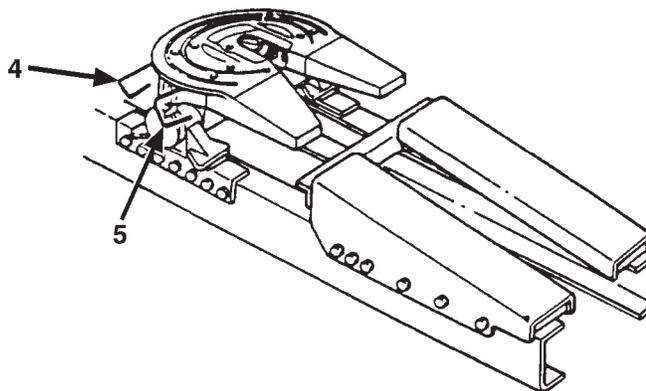
WARNING

The hydraulic system is under extreme pressure. Serious injury or death may occur if the PTO is left engaged during disconnecting of the hydraulic inlet and outlet lines.

- (5) Disconnect the hydraulic inlet and outlet lines from the prime mover to the gooseneck hydraulic connectors (1), wipe the connectors clean, install the dust covers and store the lines in the gooseneck forward storage box.
- (6) Unlock the fifth wheel by pulling the secondary lock handle (5) out and lifting up on the handle until it locks in place. Then pull the primary lock handle (4) out and lift up until it also locks in place.

WARNING

Extreme caution should be taken when releasing the fifth wheel lock handles that the observer stands clear of the prime mover rear wheels before driver moves the vehicle. Serious injury or death may occur if the observer is caught between the prime movers rear wheels.



- (7) Slowly drive the prime mover forward from under the gooseneck kingpin while observing that the kingpin clears the fifth wheel and the rear bumper of the prime mover.

NOTE

If the kingpin does not clear the rear bumper of the prime mover, it may momentarily be lifted out of the gooseneck kingpin recess to complete the uncoupling procedure.

2-19. CAGING THE BRAKES.

WARNING

- **Caging the brakes releases the brakes and prevents operation of the trailer braking system. When the brakes have been caged, the trailer should only be moved under emergency circumstances and then only with extreme caution and at very low speeds.**
- **The spring inside the brake chamber is under very high pressure. Do not loosen or remove any nuts or bolts from the brake chamber except the caging bolt and its associated hardware. Failure to follow this warning may result in serious injury.**

NOTE

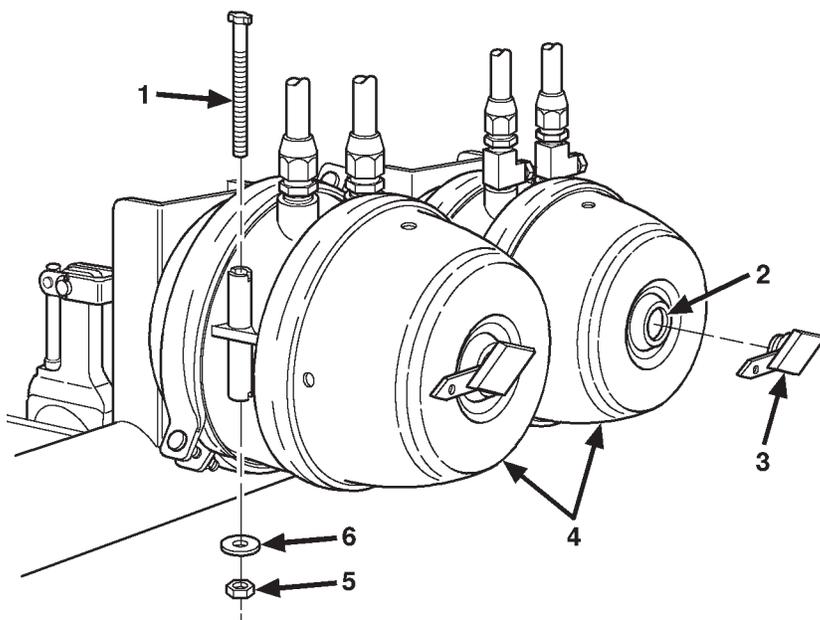
This procedure is used to manually release the brakes in the event that the air supply to the trailer has been lost or interrupted. This procedure should be performed only under extreme circumstances when the vehicle must be moved.

- (1) Place blocks under trailer wheels to prevent trailer from rolling during procedure.
- (2) Remove the dust cover (3) from the caging bolt keyhole (2) in the center of the spring brake chamber (4).

CAUTION

If the inside of the spring brake chamber is clogged with mud, sand, or dirt, do not proceed with the caging procedure unless the chamber can be cleared. Notify Unit Maintenance if chamber cannot be cleared.

- (3) Visually inspect the inside of the spring brake chamber (4) for mud, sand, or dirt.
- (4) Remove nut (5) and washer (6) from the side of the spring brake chamber (4) and remove caging bolt (1).

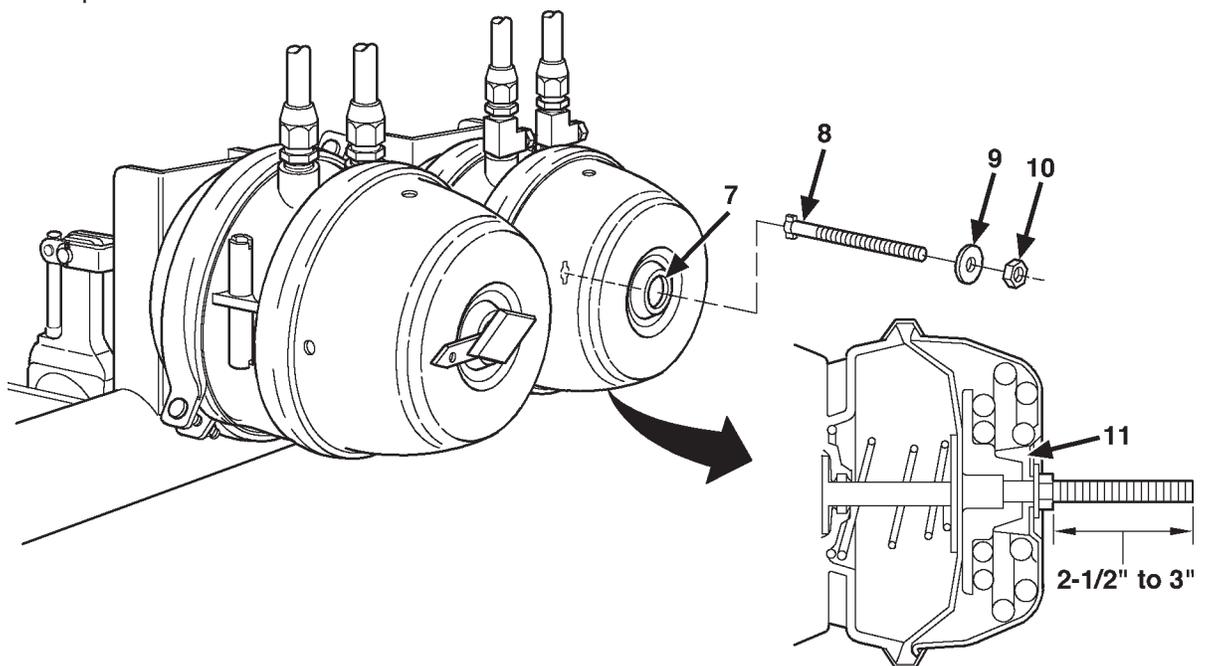


2-19. CAGING THE BRAKES (Continued).

WARNING

The brake chamber contains a spring under high pressure. To prevent personnel injury or death, never work directly behind the brake chamber. If caging bolt will not engage properly, the spring may be broken - do not continue caging procedures.

- (5) Insert the T-end (8) of the caging bolt into the keyhole (7) in the brake chamber. The T-end should be inserted into key-way of the metal diaphragm (11) inside the brake chamber. Turn the caging bolt one quarter turn clockwise until the caging bolt contacts stop inside diaphragm.
- (6) Pull on the caging bolt to seat it properly. The caging bolt is properly positioned when it cannot be removed by pulling straight out.
- (7) Place washer (9) and nut (10) onto threaded end of caging bolt (8).
- (8) To cage the main spring, tighten the nut (10) on the caging bolt (8). Visually check to ensure that the service push rod is retracting into the spring brake chamber. This procedure will compress the brake spring inside the brake chamber and release the brake at the wheel position.



- (9) Do not over-torque the caging bolt assembly [35 ft-lb (47.46 N•m) maximum].
- (10) When the spring is fully compressed and the brakes are released, the threaded portion of the caging bolt should extend 2.5 in. (6.35 cm) to 3 in. (7.62cm) beyond the nut.
- (11) Brakes should remain caged until proper maintenance personnel can inspect the brake system.
- (12) Repeat procedures as necessary for remaining wheel positions.

NOTE

To uncage the brakes release nut (10) on caging bolt (8), return caging bolt (8), washer (9) and nut (10) to original location on side of brake spring chamber (4) and close dust cover (3).

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

Paragraph Number	Paragraph Title	Page Number
2-20.	General	2-44
2-21.	Operation in Extreme Cold	2-44
2-22.	Operation in Extreme Heat and High Humidity	2-45
2-23.	Operation in Sandy or Dusty Areas	2-45
2-24.	Operation in Mud and Snow	2-45
2-25.	Operation in Saltwater Areas	2-46
2-26.	Operation in Rocky Terrain	2-46

2-20. GENERAL.

- a. This section contains special instructions for operating and servicing the trailer under unusual conditions.
- b. In addition to performing all the usual PMCS procedures, 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.
- c. When failure of material results from extreme conditions, report the condition on SF Form 368.

2-21. OPERATION IN EXTREME COLD.

- a. **Operation**
 - 1. Insulation may crack and cause electrical short circuits.
 - 2. Tires may freeze to the ground or have a flat spot if underinflated.
 - 3. Brakeshoes may freeze to brakedrums and may need to be preheated to prevent damage to mating surfaces.
 - 4. Refer to FM 9-207 and FM 21-305 for special instruction on driving hazards in extreme cold.
 - 5. Refer to Appendix I for proper lubrication during extreme cold weather conditions.
- b. **At-Halt Parking**
 - 1. When parking short term, park in a sheltered area out of the wind.
 - 2. When parking long term, prepare a footing of planks or brush if high, dry ground is not available.
 - 3. Remove all buildup of ice and snow as soon as possible after shutdown.
 - 4. Cover and shield the trailer with canvas covers if available. Keep ends of covers off the ground to keep them from freezing to the ground.

2-22. OPERATION IN EXTREME HEAT AND HIGH HUMIDITY.

- a. Refer to Appendix I for proper lubrication during extreme heat conditions. Adequate lubrication is essential. Extreme heat will cause oil films to evaporate, resulting in inadequate lubrication.
- b. Keep tires protected from direct sunlight to prevent increases in air pressure and deterioration of rubber.
- c. Cover inactive trailer with tarpaulins, if they are available and if there is no other available shelter. For several hours each week, shake out and air canvas covers or other items subject to deterioration from mildew or attacks by insects or vermin.
- d. If inactive for long periods in hot, humid weather, trailers are subject to rapid rusting and accumulation of fungi growth. Frequently inspect, clean, and lubricate to prevent excessive deterioration.

2-23. OPERATION IN SANDY OR DUSTY AREAS.

CAUTION

Do not tow, pull, or push trailer by the rear bumper. This may cause damage to the equipment.

- a. Inspect, clean, and lubricate trailer frequently when operating in dusty or sandy areas. Refer to Appendix I for proper lubrication instructions.
- b. Reduce tire pressure to 70 psi (482.6 kPa) for operation in beach or desert sand.
- c. Be sure to return tire pressure to normal 115 psi (792.93 kPa) for the M870A3 after operation in sand.
- d. Make sure no dust or sand enters exposed mechanisms or lubrication fittings during inspections and repair operations. Cover exposed parts with tarpaulins or other suitable cover during disassembly and assembly.

2-24. OPERATION IN MUD AND SNOW.

CAUTION

Do not tow, pull, or push trailer by the rear bumper. This may cause damage to the equipment.

NOTE

Refer to FM 21-305 for special instructions for operation in snow.

- a. Frequently clean, inspect, and lubricate trailer. Refer to Appendix I for proper lubrication instructions.
- b. Reduce tire pressure to 70 psi (482.6 kPa) while operating in soft mud, if practical.
- c. If one or more wheels sink into mud, you may need to jack up mired wheel and put planking or matting under it.

2-24. OPERATION IN MUD AND SNOW (Continued).

- d. After each operation remove ice, snow, and mud from underneath trailer and from hoses, lines, tubes, and electrical connections.
- e. Return tire pressure to normal 115 psi (792.93 kPa) for the M870A3 after operation in mud.

2-25. OPERATION IN SALTWATER AREAS.

- a. Wash salt deposits from all equipment with fresh water.
- b. Moist and salty areas can destroy the rust-preventative qualities of oils and greases. When equipment is active, exposed surfaces should be cleaned and lubricated daily.
- c. When equipment is inactive, unpainted parts should be coated with lubricating oil as specified in the lubrication chart key (refer to Appendix I). All covers and caps should be in place.

2-26. OPERATION ON ROCKY TERRAIN.

- a. Tires must be fully inflated 115 psi (792.93 kPa) when moving on rough or rocky terrain. Underinflated tires will cause internal ruptures of tires and damage to tubes.
- b. Before driving over stumps or rocks, make sure the trailer can clear them. Such objects can damage components on the underside of the trailer. Beware of low hanging limbs that can damage cargo.
- c. Be sure you have a serviceable spare tire and rim assembly because there is a greater than usual chance of tire puncture.

CHAPTER 3 OPERATOR MAINTENANCE

Section I. LUBRICATION INSTRUCTIONS

- a. Lubrication instructions are in Appendix I of this manual.
- b. All lubrication instructions are mandatory.

Section II. OPERATOR TROUBLESHOOTING PROCEDURES

Paragraph Number	Paragraph Title	Page Number
3-1.	General	3-2
3-2.	Explanation of Columns	3-2
3-3.	Operator Troubleshooting Symptom Index	3-3
Table 3-1.	Operator Troubleshooting	3-4

3-1. GENERAL.

- a. This section provides information for identifying and correcting malfunctions that you may find while operating the MHET.
- b. The Troubleshooting Symptom Index (paragraph 3-3) lists common malfunctions which may occur and refers you to the proper page in Table 3-1 for a troubleshooting procedure.
- c. If you are unaware of the location of an item mentioned in troubleshooting, refer to paragraphs 1-11, 2-1, or 2-2.
- d. Before performing troubleshooting, read and follow all safety instructions found in the warning summary at the front of this manual.
- e. This section cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed, or is not corrected by the listed corrective actions, notify your supervisor.
- f. When troubleshooting a malfunction:
 - (1) Locate the symptom or symptoms in paragraph 3-3 that best describes the malfunction. If the appropriate symptom is not listed, notify your supervisor.
 - (2) Turn to the page in Table 3-1 where the troubleshooting procedures for the malfunction in question are described. Headings at the top of each page show how each troubleshooting procedure is organized: **Malfunction**, **Test or Inspection** (in step number order), and **Corrective Action**.
 - (3) Perform each step in the order listed until the malfunction is corrected and the item being inspected is operational. DO NOT perform any maintenance task unless the troubleshooting procedure tells you to do so.

3-2. EXPLANATION OF COLUMNS.

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

- (1) **MALFUNCTION.** A visual or operational indication that something is wrong with the equipment.
- (2) **TEST OR INSPECTION.** A procedure to isolate the problem in a system or component.
- (3) **CORRECTIVE ACTION.** A procedure to correct the problem.

3-3. OPERATOR TROUBLESHOOTING SYMPTOM INDEX.

**Troubleshooting
Procedure
Page****OPERATOR TROUBLESHOOTING SYMPTOM INDEX****ELECTRICAL SYSTEM**

All Lights Inoperable	3-4
One or More Lights Inoperable	3-4

BRAKES

Brakes Will Not Release	3-4
Brakes Grab	3-5
Brakes Fail to Engage	3-5

HYDRAULIC SYSTEM

Gooseneck Will Not Raise or Lower	3-6
---	-----

TIRES

Excessively Worn, Scuffed or Cupped Tires	3-6
---	-----

Table 3-1. Operator Troubleshooting**MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION***ELECTRICAL SYSTEM***1. ALL LIGHTS INOPERABLE.**

Step 1. Check lights on prime mover, including turn signals and stop lights.
Notify Unit Maintenance if prime mover lights are inoperable.

Step 2. Check electrical connection at cable receptacle.
Reconnect cable if not properly connected.

Step 3. Check connectors for dirty, corroded, or damaged pins.
Clean in accordance with procedures in paragraph 3-5.
Notify Unit Maintenance if pins are damaged.

2. ONE OR MORE LIGHTS INOPERABLE.

Step 1. Check for burned out or defective bulbs/lights.
Notify Unit Maintenance for replacement.

Step 2. Check for broken lead wires or loose connections
Notify Unit Maintenance for repair.

Step 3. Check for dirty or corroded connectors at back of light.
Clean in accordance with procedures in paragraph 3-5.
Notify Unit Maintenance if cleaning does not correct malfunction.

*BRAKES***1. BRAKES WILL NOT RELEASE.**

Step 1. Check prime mover air supply to ensure air is flowing.
Release prime mover parking brake to start air flow to trailer.

Step 2. Check pressure in prime mover air supply.
If air pressure is low, build up to required level.

Step 3. Check air line connection at the gladhands.
Clean in accordance with procedures in paragraph 3-6.
Notify Unit Maintenance if packing is leaking.

Step 4. Check for dirty or leaking gladhand connections.
If gladhand is dirty, clean gladhand.
If gladhand is leaking, notify unit maintenance.
If gladhand is clean and not leaking, proceed to step 5.

Table 3-1. Operator Troubleshooting (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 5.	<p>Check for open dump valve on air tank reservoir.</p> <p>If dump valve is open, release any binding of cable and see if valve snaps shut.</p> <p>If dump valve does not snap shut, notify Unit Maintenance.</p> <p>Inspect for damage in accordance with paragraph 3-7.</p>
	Step 6.	<p>Inspect air line connections for leaks.</p> <p>Notify Unit Maintenance if leaks are found.</p>
2.	BRAKES GRAB.	
	Step 1.	<p>Check for moisture in air reservoirs by releasing air from dump valve.</p> <p>If moisture is present, allow reservoir to drain.</p> <p>Notify Unit Maintenance if no moisture is present.</p>
3.	BRAKES FAIL TO ENGAGE.	
	Step 1.	<p>Check control (blue/service) air line connection at gladhand.</p> <p>If line is not properly connected, remove and reconnect.</p> <p>If no air is flowing from prime mover, notify Unit Maintenance and use another prime mover.</p>
	Step 2.	<p>Check for dirty or damaged packing in the gladhand.</p> <p>Clean in accordance with procedures in paragraph 3-6.</p> <p>Notify Unit Maintenance if packing is leaking.</p>
	Step 3.	<p>Inspect control (blue/service) air line for damage.</p> <p>Notify Unit Maintenance if damage is found.</p>
	Step 4.	<p>Check brake system hardware for damaged or missing components.</p> <p>Notify Unit Maintenance for further inspections and/or repairs.</p>
	Step 5.	<p>Check for low air pressure.</p> <p>If pressure is low, build up pressure.</p> <p>If pressure remains low, notify Unit Maintenance.</p>

Table 3-1. Operator Troubleshooting (Continued)

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION***HYDRAULIC SYSTEM***WARNING**

- Do not work under gooseneck without lock pins securely in place. Serious injury or death may result.
- Always ensure that the trailer is coupled to the prime mover and all parking brakes are set prior to attempting to free lock pins that will not retract. Failure to do so may result in serious injury or death.

NOTE

- A reading of 2500 psi is only on gauge (1) when hydraulic controls are in use. Readings will drop to 500 psi when levers are disengaged.
- The psi will vary due to load. Hydraulic pressures will vary from 300 to 2500 psi under normal operation, and will reach a maximum of 2500 to 2800 psi under full load.

1. GOOSENECK TILT OR LIFT CYLINDERS WILL NOT EXTEND/RETRACT

- Step 1. Ensure that prime mover hydraulic fluid is at appropriate level (Ref. as required: M916A1, M916A2 - TM 9 -2320-363, M916A3 - TM 9-2320-302.
- Step 2. Ensure that Power Take Off (PTO) is engaged.
- Step 3. Check hydraulic gauge for sufficient pressure.
(Pressure will vary from 300 - 2500 psi for normal operation and from 2500 - 2800 psi under a full load)
Notify Unit Maintenance if pressure reads below 300 psi.
- Step 4. Check tilt and lift cylinder rams for evidence of wall pitting, scoring, or hydraulic oil seal leakage.
Notify Unit Maintenance if severe wall pitting or oil leakage is evident.

Table 3-1. Operator Troubleshooting (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<i>TIRES</i>		
1.	EXCESSIVELY WORN, SCUFFED OR CUPPED TIRES.	
	Step 1.	Check tire pressure. Inflate or deflate tires as required for proper pressure.
	Step 2.	Check for loose, cracked, or broken wheels. If wheels are loose, tighten and torque lug nuts in accordance with paragraph 3-8. Notify Unit Maintenance if wheel is cracked or broken.
	Step 3.	Check suspension system for damaged, loose, or missing hardware. Notify Unit Maintenance for repair.
	Step 4.	Check axle for misalignment. Axles should track behind each other and the prime mover when moving. If trailer "crabs", or does not track straight, axles may be misaligned. Notify Unit Maintenance if axles appear to be misaligned.

Section III. OPERATOR MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
3-4.	General	3-8
3-5.	Electrical Connectors	3-8
3-6.	Gladhands	3-9
3-7.	Air Reservoir Service Check	3-10
3-8.	Tire Assembly Replacement	3-11
3-9.	Spare Tire Assembly	3-14
3-10.	Kingpin Replacement	3-15
3-11.	Cleaning	3-16

3-4. GENERAL.

Paragraphs 3-5 through 3-11 are the only maintenance procedures performed by the operator. Required lubrication is specified in Chapter 3, Section I.

3-5. ELECTRICAL CONNECTORS.

a. Cleaning.

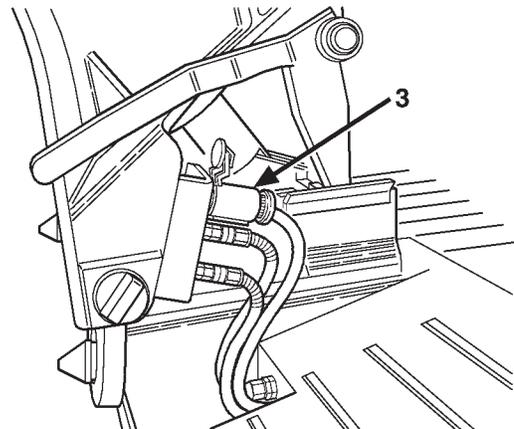
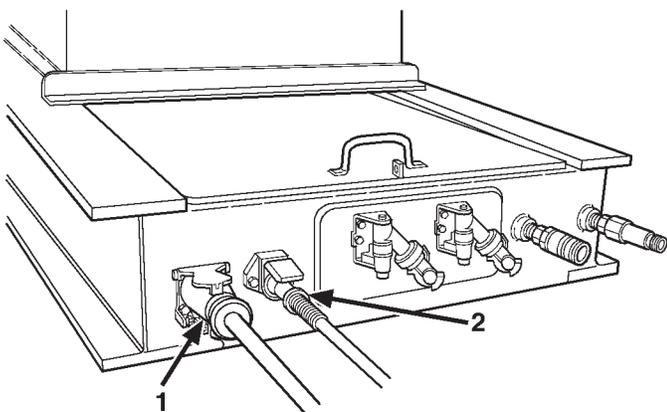
WARNING

Remove all power to trailer prior to making any repairs on the electrical system. Failure to do so may result in serious injury or death.

- (1) Disconnect inter-vehicular electrical cables (1) and (2) from prime mover to trailer and from trailer to gooseneck (3).
- (2) Use a rag (item 15, Appendix F) to remove any build up of grease or dirt from exterior of connector and receptacle. Allow to dry.
- (3) Using a brush (item 3, Appendix F) and detergent (item 8, Appendix F), clean metal surfaces. Allow to dry.

b. Inspection.

- (1) Inspect connector and pins for damage.
- (2) Notify Unit Maintenance if any damage is found.



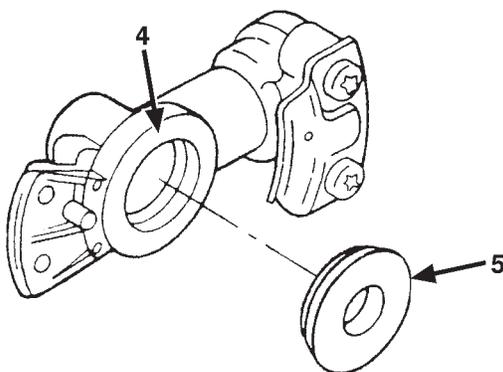
3-6. GLADHANDS.

a. Cleaning.

- (1) Use a rag (item 15, Appendix F) to remove any buildup of grease and dirt from gladhands.
- (2) Use a rag (item 15, Appendix F), detergent (item 8, Appendix F), and water to thoroughly clean gladhand connecting surfaces (4), to include rubber grommet (5).
- (3) Allow parts to dry thoroughly.

b. Inspection.

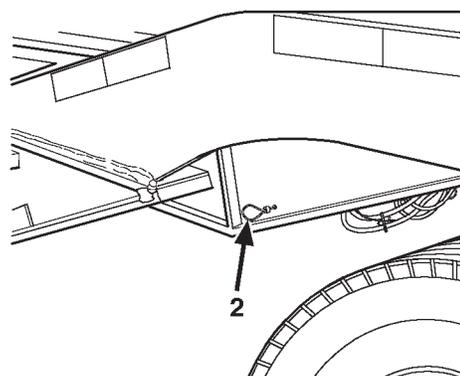
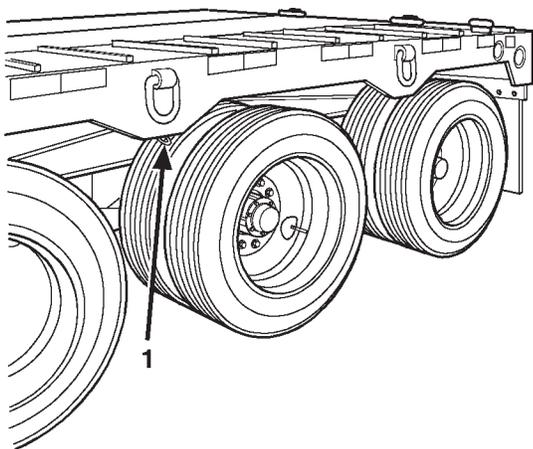
- (1) Inspect gladhands for damage.
 - (a) Check rubber grommet and screen for damage.
 - (b) Use a soapy water solution (detergent, item 8, Appendix F and water) to check for air leaks.
- (2) Notify Unit Maintenance if damage is found.



3-7. AIR RESERVOIR SERVICE CHECK.

a. Servicing.

- (1) Turn off air supply to trailer.
- (2) Unhook gladhands.
- (3) Pull on front and rear air reservoir dump valve release cables (1) and (2) to allow air reservoir to drain fully, then release dump valve cables.
- (4) Connect gladhands.
- (5) Turn on air supply to trailer at prime mover.
- (6) Check for air leaks. Listen for hissing sounds and feel for air escaping. A soapy water solution (detergent, item 8, Appendix F and water) will aid in detecting air leaks. Notify Unit Maintenance if leaks are detected.



3-8. TIRE ASSEMBLY REPLACEMENT.

WARNING

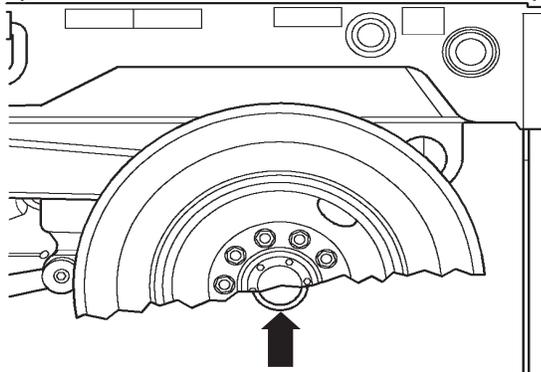
If spare tire davit is inoperable, the spare tire and wheel requires two people to remove the spare from the carrier or install it on the carrier. Slide the spare from the carrier or on to the carrier - refrain from lifting the spare into position. Use an alternate source if available, i.e., wrecker, crane. Failure to do so could result in injury to personnel.

NOTE

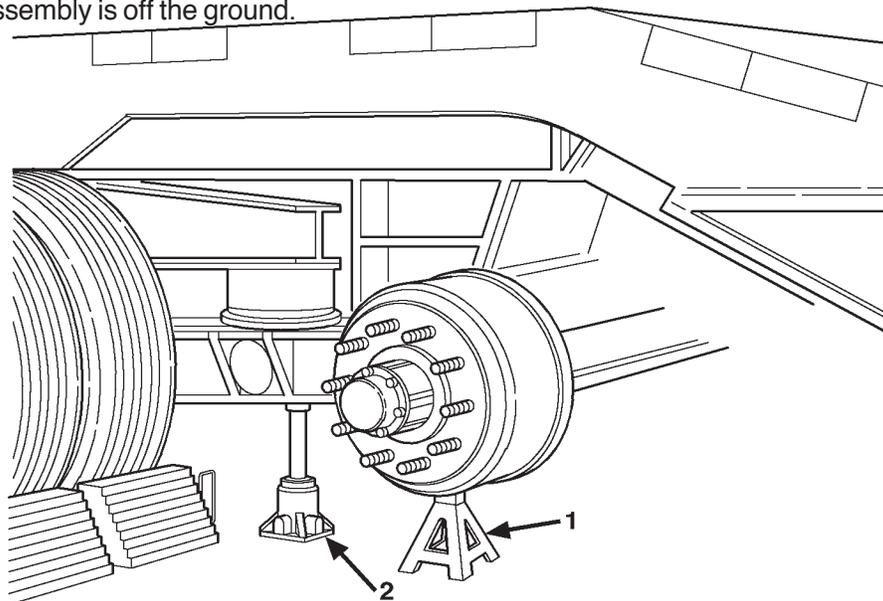
A 2-1/4 in. x 7-1/2 in. x 2 ft block of wood is provided in the tool box to be used under the bottle jack in loose soil conditions.

a. Removal.

- (1) For the rear axle mounted tires, chock opposite tire and place the hydraulic jack appropriately raised under axle between the torque rod bracket and the inner wheel. Jack up the axle until the tire assembly is off the ground.



- (2) For mid and front axle tires, chock opposite tire and place the jack (2) under the tandem beam at the point closest to the tire assembly that is to be removed. Jack up the tandem beam until the tire assembly is off the ground.



WARNING

Always use jack stands to support the trailer when removing a tire and wheel assembly. Serious injury can result if the jack fails and the axle is not supported.

- (3) Place jack stand (1) under the axle from which the tire assembly is being removed and lower the axle to rest on the jack stand. Leave the jack in position as a secondary support.

3-8. TIRE ASSEMBLY REPLACEMENT (Continued).

- (4) Using handle and wrench, remove ten lug nuts (3).
- (5) With the aid of an assistant, remove the outer tire assembly (4).

NOTE

If removing only the outer tire assembly, do not perform Step (6).

- (6) With the aid of an assistant, remove the inner tire assembly.
- (7) Remove valve stem extension.

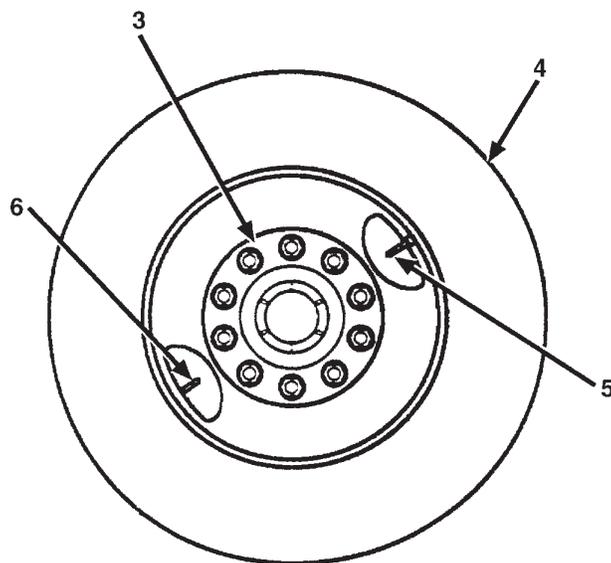
CAUTION

If the valve stem extension is not removed prior to mounting the spare tire to the storage area, it will break off the entire valve due to its extended length.

b. Installation.**NOTE**

If only the outer tire assembly is being installed, go to Step (3).

- (1) Install valve stem extension.
- (2) With the aid of an assistant, install inner tire assembly.
- (3) With the aid of an assistant, install outer tire assembly (4). Be sure that the valve stem (5), is opposite (180°) from the inner valve stem (6).



Tire Assembly Installed Correctly

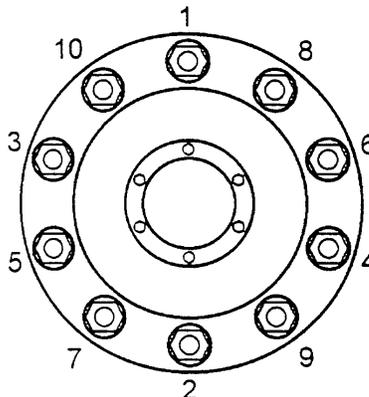
- (4) Using handle and wrench, install 10 lug nuts and tighten.

NOTE

It is recommended that a torque wrench be used. If a torque wrench is not available, tighten the lug nuts with a wrench handle, pushing down with full body weight. Check for proper torque at earliest availability.

3-8. TIRE ASSEMBLY REPLACEMENT (Continued).

- (5) As soon as possible, have Unit Maintenance torque lug nuts to 450-500 ft-lb (610.2 N•m to 678 N•m) in accordance with lug nut tightening sequence illustrated below.
- (6) Using gage and hose assembly, check tire assembly for proper air pressure. Adjust air pressure as required. Trailer air supply may be used by attaching air hose to connector located next to air reservoir dump valve.



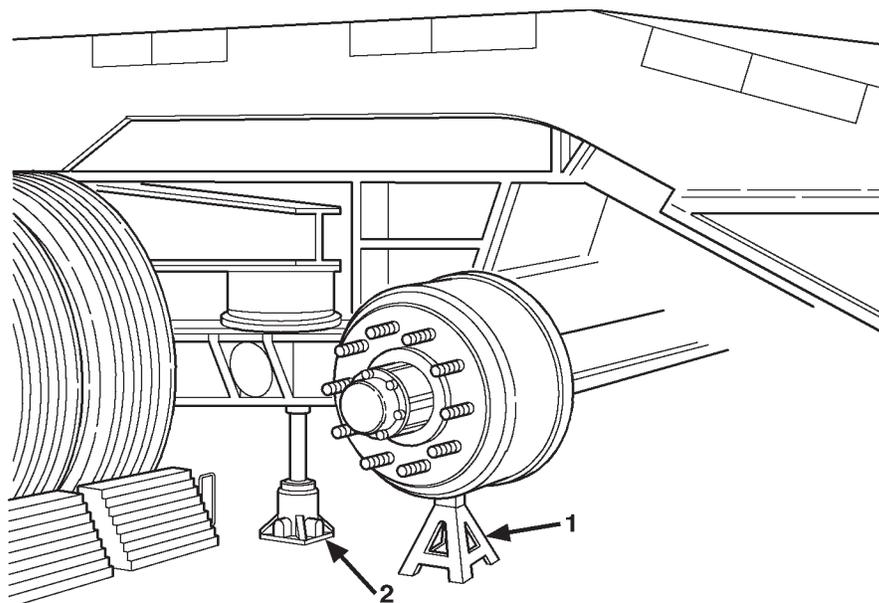
Tightening Sequence for Lug Nuts

- (7) Check alignment of tire assembly. Place a block of wood or other object on the ground at the side of the tire and rotate the wheel. If the distance between the block of wood and the tire varies by more than 1/8 in. (.32 cm), the tire assembly is not properly mounted. To correct, loosen the nut on the side with the greatest deviation and tighten the nuts on the opposite side. Recheck the torque and the alignment.

NOTE

Lug nuts should be rechecked for proper tightness after the first 50 miles (80.5 Km) to 100 miles (160.9 Km) of operation after wheel reinstallation.

- (8) Remove jack stands (1), lower axle, and remove hydraulic jack (2).



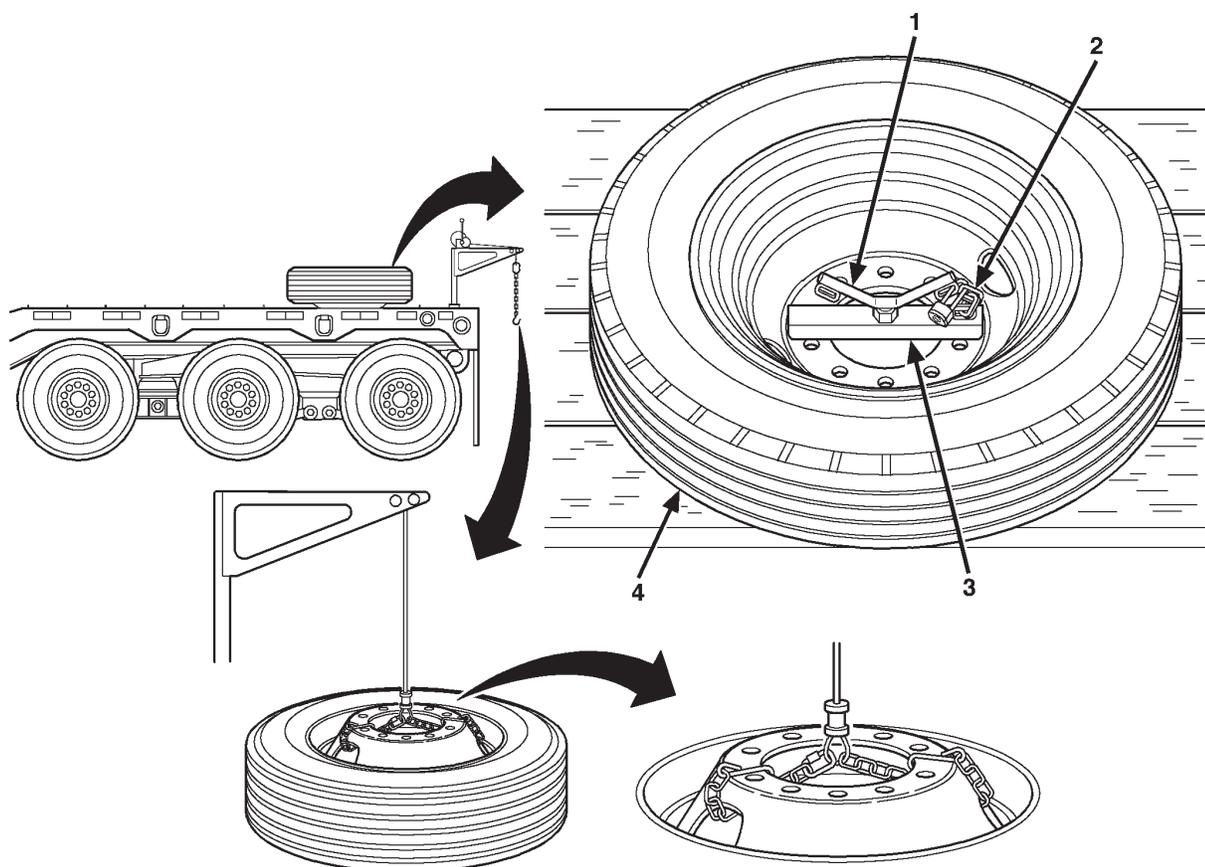
3-9. SPARE TIRE ASSEMBLY.

a. Removal.

NOTE

One carrier location is provided for securing the spare tire assembly on the trailer. The spare tire is located on the raised loadbed at rear of trailer.

- (1) Install spare tire crane to rear of trailer.
- (2) Remove the security chain (2) from the spare tire retaining bolt (1).
- (3) Remove retaining bolt (1) and retainer bar (3) from the trailer deck.
- (4) Connect spare tire to spare tire crane assembly by feeding chain through wheel openings and secure chain.
- (5) With the aid of an assistant, raise spare tire (4) from the trailer and lower to ground.



b. Installation.

- (1) Connect spare tire to spare tire crane assembly by feeding chain through openings in wheel and secure chain. Raise tire to deck of trailer, lower in position and remove chain.

NOTE

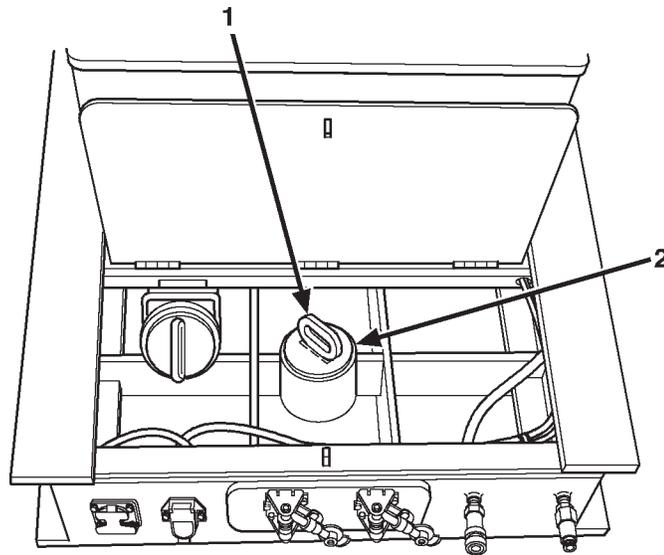
If chain assembly is not routed correctly, tire will not clear rear of trailer.

- (2) Center spare tire (4) over the threaded hole on the raised loadbed at the rear of the trailer.
- (3) Secure the tire to the trailer deck with the retainer bar (3) and retaining bolt (1).
- (4) Attach the security chain (2) to the retaining bolt (1) and secure.

3-10. KINGPIN REPLACEMENT.

a. Removal.

Remove kingpin (1) from gooseneck recess (2), by lifting straight up from recess.

**b. Installation.**

Install kingpin (1) to gooseneck (2), by lowering straight down into kingpin recess.

3-11. CLEANING.

Cleaning.

- (1) Use a high pressure stream of water to clean the exterior.
- (2) Use a stiff broom or brush (item 3, Appendix F) and detergent (item 8, Appendix F) to remove remaining dirt from exterior.
- (3) Use a stiff broom or brush (item 3, Appendix F) and detergent (item 8, Appendix F) to remove remaining dirt from underside of trailer.

CHAPTER 4 UNIT MAINTENANCE

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

Paragraph Number	Paragraph Title	Page Number
4-1.	Common Tools and Equipment	4-1
4-2.	Special Tools, TMDE, and Support Equipment	4-1
4-3.	Repair Parts	4-1

4-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to Appendix B, *Maintenance Allocation Chart*, and to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

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

Special tools are listed and illustrated in the *Repair Parts and Special Tools List (RPSTL)*, Appendix C. TMDE and support equipment are listed in the *Maintenance Allocation Chart (MAC)*, Appendix B.

4-3. REPAIR PARTS.

Repair parts are listed and illustrated in Appendix C of this manual.

Section II. SERVICE UPON RECEIPT

Paragraph Number	Paragraph Title	Page Number
4-4.	General	4-2
4-5.	Inspection Instructions	4-2
4-6.	Servicing Instructions	4-2

4-4. GENERAL.

When a new, used, or reconditioned M870A3 Trailer (MHET) is first received, determine whether it has been properly prepared for service and is in condition to perform its mission. Follow the inspection instructions in paragraph 4-5 and servicing instructions in paragraph 4-6.

4-5. INSPECTION INSTRUCTIONS.

- a. Read and follow all instructions on DD Form 1397.
- b. Remove all straps, plywood, tape, seals, wrapping, or any other shipping material.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- c. If any exterior parts are coated with rust preventive compound, remove with cleaning compound (item 19, Appendix F) and rags (item 15, Appendix F).
- d. Inspect the equipment for any damage incurred during shipment. Also check to see if the equipment has been modified.
- e. Check the equipment against the packing slip to ensure that the shipment is complete. Report any discrepancies.

4-6. SERVICING INSTRUCTIONS.

- a. Perform all Unit Maintenance PMCS. Schedule the next PMCS on DD Form 314.
- b. Perform all lubrication, regardless of interval, as described in Lubrication Instructions, Appendix I.
- c. Report any problems.

Section III. GENERAL MAINTENANCE INSTRUCTIONS

Paragraph Number	Paragraph Title	Page Number
4-7.	General	4-3
4-8.	Work Safety	4-4
4-9.	Cleaning Instructions	4-4
4-10.	Preservation of Parts	4-5
4-11.	Painting	4-5
4-12.	Inspection Instructions	4-6
4-13.	Disassembly and Assembly Instructions	4-6
4-14.	Lubrication Instructions	4-6
4-15.	Application of Adhesives	4-7
4-16.	Standard Tool Requirements	4-7
4-17.	Tagging Wires and Hoses	4-8
4-18.	Soldering	4-8
4-19.	Heat Shrinkable Tubing	4-8
4-20.	Electrical Ground Points	4-9
4-21.	Lines and Ports	4-10
4-22.	Anti-seize Tape	4-10
4-23.	Tubes and Compression Fittings	4-11
4-24.	Fluid Disposal	4-12
4-25.	Service Replacement Parts and Kits	4-12
4-26.	Welding	4-12
4-27.	Electrical Repair	4-12

4-7. GENERAL.

- a. These general maintenance instructions contain general shop practices and specific methods you must be familiar with to properly maintain the equipment. You should read and understand these practices and methods before performing any maintenance procedures.
- b. Before beginning a task, find out how much repair, modification, or replacement is needed to fix the equipment. Sometimes the reason for equipment failure can be seen right away and complete tear down is not necessary. Disassemble equipment only as far as necessary to repair or replace damaged parts.
- c. In some cases, a part may be damaged during removal. If the part appears to be good, and other parts behind it are not defective, leave it in place and continue with the procedure. Here are a few simple rules:
 - (1) Do not remove dowel pins or studs unless loose, bent, broken, or otherwise damaged.
 - (2) Do not remove bearings or bushings unless damaged. If you need to remove them to access parts behind, carefully pull out bearings and bushings.
 - (3) Replace all gaskets, lockwashers, self-locking nuts, seals, cotter pins, and preformed packings.

4-7. GENERAL (Continued).

- d. The following “Initial Setup” information applies to all maintenance procedures:
 - (1) Resources are not listed unless they apply to the procedure.
 - (2) “Personnel Required” is listed only if more than one mechanic is required to complete the procedure.
- e. All tags and forms attached to the equipment must be checked to learn the reason for removal of equipment from service. Modification Work Orders (MWOs) and Technical Bulletins (TBs) must also be checked for equipment changes and updates.

4-8. WORK SAFETY.

- a. Before beginning a procedure, think about the safety risks and hazards to yourself and to others. Wear protective gear such as safety goggles or lenses, safety shoes, rubber apron, or gloves.
- b. Before beginning a procedure, ensure that the following conditions have been observed, unless otherwise specified:
 - (1) Trailer, if coupled, should be parked on level ground with prime mover parking brake set.
 - (2) Engine must be off if prime mover is coupled to trailer, unless otherwise indicated.
 - (3) Components must be at operating temperature to be tested.
- c. Immediately clean up spilled fluids to avoid slipping.
- d. When lifting heavy parts, have someone help you. Ensure that lifting equipment or jack is working properly, that it meets weight requirement of part being lifted, and that it is securely fastened to part.
- e. Always use power tools carefully.

4-9. CLEANING INSTRUCTIONS.

WARNING

Improper cleaning methods and use of unauthorized cleaning liquids or solvents can injure personnel and damage equipment. To prevent this, refer to TM 9-247 for further instructions.

- a. **General.** Cleaning instructions will be the same for the majority of parts and components which make up the equipment. The following applies to all cleaning operations:
 - (1) Clean all parts before inspection, after repair, and before assembly.
 - (2) Keep hands free of grease which can collect dust, dirt and grit.
 - (3) After cleaning, all parts should be covered or wrapped to protect them from dust and dirt. Parts that are subject to rust should be lightly oiled after cleaning (paragraph 4-10).

4-9. CLEANING INSTRUCTIONS (Continued).

b. Castings, Forgings, and Machined Metal Parts.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (1) Clean inner and outer surfaces with cleaning compound (item 19, Appendix F) and dry with clean rags (item 15, Appendix F).
- (2) Remove grease and accumulated deposits with a scrub brush (item 3, Appendix F).

WARNING

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

- (3) Clear all threaded holes with compressed air to remove dirt and cleaning fluids.

CAUTION

DO NOT wash electrical cable, and flexible hoses with dry cleaning solvent or mineral spirits. Serious damage or destruction of material will result.

- c. **Electrical Cables, and Flexible Hoses.** Wash electrical cables, and flexible hoses with a solution of detergent (item 8, Appendix F) and water, and wipe dry with a clean rag (item 15, Appendix F).
- d. **General Cleaning Covered by Other Manuals.** Refer to TM 9-247, *Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materials Including Chemicals.*

4-10. PRESERVATION OF PARTS.

Unpainted metal parts that will not be installed immediately after cleaning should be covered with a thin coat of lubricating oil (item 13, Appendix F).

4-11. PAINTING.

On painted areas where paint has been removed, paint in accordance with procedures outlined in TM 43-0139 and TB 43-209.

4-12. INSPECTION INSTRUCTIONS.

NOTE

All damaged areas should be marked for repair or replacement.

- a. All components and parts must be carefully checked to determine if they are serviceable for use, can be repaired, or must be scrapped.
- b. Inspect drilled and tapped (threaded) holes for the following:
 - (1) Wear, distortion, cracks, and any other damage in or around holes.
 - (2) Threaded areas for wear distortion (stretching) and evidence of cross-threading.
- c. Inspect metal lines, flexible lines or hoses, and metal fittings and connectors for the following:
 - (1) Metal lines for sharp kinks, cracks, bad bends, and dents.
 - (2) Flexible lines or hoses for fraying, evidence of leakage, and loose metal fittings or connectors.
 - (3) Metal fittings and connectors for thread damage and worn or rounded hex heads.
- d. Inspect castings forging, and machined metal parts for the following:
 - (1) Machined surfaces for nicks, burrs, scoring, grooves, raised metal wear, and other damage.
 - (2) Inner and outer surfaces for breaks and cracks.
- e. Inspect bearings in accordance with TM 9-214.

4-13. DISASSEMBLY AND ASSEMBLY INSTRUCTIONS.

Follow these general practices when performing disassembly and assembly procedures:

- (1) Keep major components together whenever possible and practical.
- (2) Tag hoses, electrical wires, cables, and harnesses to identify them and aid during installation.
- (3) Keep related parts together for identification purposes.
- (4) Temporarily install attaching hardware such as screws, bolts, washers, and nuts to prevent loss.
- (5) Only disassemble to the point of the problem.
- (6) Ensure that parts are clean and lubricated before assembly.

4-14. LUBRICATION INSTRUCTIONS.

Refer to Appendix I for detailed illustrated instructions on proper lubrication. The following are some general practices to used:

- (1) Always use the correct lubricant.
- (2) Keep lubricants clean.
- (3) Clean all fittings prior to lubrication.
- (4) Lubricate clean, disassembled, and new parts to prevent rust (paragraph 4-10).

4-15. APPLICATION OF ADHESIVES.

- a. **General.** Adhesives are recommended in some tasks to ensure and strengthen seals. The following information describes their correct use and application.
- b. **Silicone Sealant.** Silicone sealant (item 16, Appendix F) is used to seal parts against moisture. Use the following instructions when applying:
- (1) Anytime a seal is broken, the part must be thoroughly cleaned to remove any remaining sealing compound and dirt.
 - (2) Thoroughly clean surface before applying sealant.
 - (3) When applying sealant, ensure that the area is completely covered. Press sealant into and around parts as necessary.
 - (4) Silicone sealant will set in 15-30 minutes depending on temperature and humidity.
- c. **Loctite Adhesive.** Loctite adhesive (item 1, Appendix F) provides a seal against leakage and a resistance to loosening when used in the assembly of threaded, slip-fitted, or press-fitted parts. Always use grade of Loctite adhesive specified and never use when other retaining means are provided, such as lockwires, lockwashers, lockplates, and fasteners. DO NOT use Loctite adhesive on brass fittings, plugs, or items that need frequent servicing, or when operating temperature exceeds 300°F (149°C). Apply Loctite adhesive as follows:
- (1) Before application, clean threads to remove oil, grease, and metal chips.
 - (2) Apply Loctite adhesive to second and third threads. DO NOT apply to first thread to ensure system cleanliness.
 - (3) Loctite adhesive will dry in 6-24 hours at room temperature.
 - (4) Adjustments for elbows, gages, and valves can be made up to 24 hours after application without affecting the seal.

4-16. STANDARD TOOL REQUIREMENTS.

- a. The following are general practices regarding the use of tools:
- (1) Always use the proper tool kit and tools for the procedure being performed.
 - (2) Ensure that tools are clean and lubricated to reduce wear and to prevent rust.
 - (3) Keep track of tools. Do not be careless with them.
 - (4) Return tools to toolbox when finished with repair or maintenance.
 - (5) Return toolboxes and tools to tool storage when not in use.
 - (6) Inventory tools before and after each use.
- b. Some maintenance tasks may require special or fabricated tools. The “Initial Setup” of the procedure will specify any special or fabricated tools needed to perform that procedure. Use these special tools only for the maintenance procedures for which they are designed or called out. If you are unfamiliar with a required tool, see your supervisor.

4-17. TAGGING WIRES AND HOSES.

- a. Use marker tags (item 20, Appendix F) to identify all electrical wires, lines, and any other parts which may be hard to identify or replace later. Fasten tags to parts during removal by wrapping wire fasteners around or through parts and twisting ends together. Position tags to be out of the way during cleaning, inspection, and repair. Mark tags with a pencil, pen, or marker.
- b. Whenever possible, identify electrical wires with the number of the terminal or wire to which it connects. If no markings can be found, tag both wires or wire and terminal, and use the same identifying mark for both. If you cannot tag a wire because it must fit through a small hole or you cannot reach it, write down the description of the wire and the point to which it connects or draw a simple diagram on paper. Be sure to write down enough information so you will be able to properly connect the wires during assembly. If you need to identify a loose wire, look for identifying numbers near the end of the wire, stamped on a permanent metal tag. Compare this number to wire number on the appropriate electrical schematic.
- c. Identify lines when you are taking off more than one line at the same time. Mark tags with points to which lines and hoses must be connected. If it is not obvious which end of a line goes where, tag each end of the line.
- d. Identify and tag other parts as required by name and installed location.

4-18. SOLDERING.

CAUTION

Use low wattage soldering gun when soldering electrical wires, connectors, terminal lugs, and receptacles. High wattage soldering guns may damage parts by overheating.

- a. Solder connection must be bright and clean before soldering. Remove dirt and grease with a wire brush (item 4, Appendix F) or a pocket knife. Solder used must be of lead alloy (item 18, Appendix F) with soldering flux (item 9, Appendix F). All wires, parts, and soldering gun must be tinned for good connection and maximum transfer of heat.
- b. To prevent overheating damage to electrical parts when soldering and unsoldering connections, hold bare wire, lead, or terminal lug close to soldering point with long roundnose pliers. Pliers act as heat sink and absorb excess heat.

4-19. HEAT SHRINKABLE TUBING.

Use the heat shrinkable tubing (item 25, Appendix F) to insulate soldered and crimped electrical connections as follows:

- (1) Cut desired length of new heat shrinkable tubing twice the length of the connection to be covered.
- (2) Slide the heat shrinkable tubing onto the wire and out of the way before making electrical connection.
- (3) After making electrical connection, slide heat shrinkable tubing into place over electrical connection.

4-19. HEAT SHRINKABLE TUBING (Continued).

WARNING

DO NOT touch heat shrinkable tubing for at least 30 seconds after heating. Heat shrinkable tubing is hot and will burn you.

- (4) Hold hot air blow gun 4-5 in. (10.2-12.7 cm) away from heat shrinkable tubing and apply heat for approximately 30 seconds. Stop applying heat as soon as heat shrinkable tubing forms to the shape of the electrical connection.

4-20. ELECTRICAL GROUND POINTS.

Many electrical problems are the result of poor ground connection. You can ensure that ground connections are good by performing the following steps:

WARNING

Although battery ground cable must be connected in order to test electrical circuit voltage, disconnect battery ground cable from prime mover before performing resistance tests or replacing parts. This will prevent shock to personnel, and damage to parts and equipment.

- (1) Remove hardware connecting ground cable terminal lug to ground point.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (2) Clean mounting hardware, ground cable terminal lugs, and ground point with cleaning compound (item 19, Appendix F) and scrub brush (item 3, Appendix F).
- (3) Remove any rust with wire brush (item 4, Appendix F).
- (4) Look for cracks, loose terminal lugs, and stripped threads. Replace any defective parts.
- (5) Install hardware connecting ground cable terminal lug to ground point. Ensure that all hardware is tight.

4-21. LINES AND PORTS.

WARNING

- **High pressure hydraulics [oil under 2450 psi (16,893 kPa)] used to operate this equipment can pierce body tissue and cause severe injury to personnel. Never disconnect any hydraulic line or fitting without first dropping pressure to zero.**
- **Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure oil.**

To keep dirt from contaminating fluid systems when removing and installing lines, perform the following steps:

- (1) Clean fittings and surrounding area before disconnecting lines.
- (2) Cover, cap, plug, or tape lines and ports after disconnecting lines. Use cap and plug set on air lines. When these are not available, use hand-carved wooden plugs, clean rags (item 15, Appendix F), duct tape (item 22, Appendix F), or other similar materials to prevent dirt from entering system.
- (3) Ensure that new and used parts are clean before installing.
- (4) Wait to remove covers, caps, plugs, or tape from lines and ports until just before installing lines.

4-22. ANTI-SEIZE TAPE.

CAUTION

Apply anti-seize tape only to pipe threads of male fittings of air system or damage to air valves may result.

When connecting air lines and fittings without compression sleeves or packings, anti-seize tape (item 21, Appendix F) may be used to keep connections from leaking. Use as follows:

- (1) Ensure that threads are clean and dry.
- (2) Start anti-seize tape one or two threads from small or leading edge of fitting, joining tape together with an overlap of about 1/8 in. (3.18 mm) for fittings with fine threads. For fittings with coarse threads, tape should be wrapped around threads two or three times.
- (3) Tightly wrap anti-seize tape in same direction as you would tighten a nut. Tape must be pressed into threads without cutting or ripping.

CAUTION

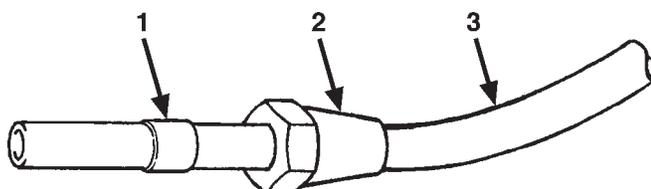
DO NOT exceed specified torque or use power tools to tighten fittings taped with anti-seize tape. Over tightening could damage fitting threads and cause connection to leak.

- (4) Using hand tools, tighten fittings to specified torque.

4-23. TUBES AND COMPRESSION FITTINGS.

- a. **Standard Compression Fittings:** Tubes with inverted nuts and compression fittings are designed for one time assembly. Once assembled, they must be replaced as a unit if any parts are found defective. Used parts may not seal properly when used with new ones. Used tube assemblies in good condition can be reinstalled to their original location without leaking. Assemble new tubes, compression sleeves, and inverted nuts as follows:

- (1) Slide inverted nut (2) onto end of tube (3).
- (2) Slide compression sleeve (1) onto end of tube (3).
- (3) Repeat previous two steps for other end of tube as required.



- (4) Insert end of tube as far as it will go into compression fitting to which tube is being installed.
 - (5) Twist inverted nut (2) into compression fitting and tighten inverted nut against compression sleeve (1) with open-end wrench. Compression sleeve will clamp down around tube and conform to internal surface of compression fitting and inverted nut.
 - (6) Repeat previous two steps for other end of tube as required.
- b. **Prestomatic Push-In Fittings:** Microlok fittings are used for some of the connections at the spring brake control valve. A push-on collet collar grips or releases the tubing as required to provide a quick disconnect/connect feature of the air line tubing to the fitting, without the use of tools. To separate tubing from fitting depress the fitting collar until it bottoms against the fitting and withdraw the tubing. To assemble tubing onto fitting, insert the tubing into the fitting until it bottoms. (Pushing on tubing twice to verify that tubing is inserted past collet and O-Ring) pull fitting collar out to lock tubing and pull on tubing to verify it is locked in place. Tubing cut for insertion into the fitting must be squarely out. The maximum allowable angle is 15°. Use of a tube cutting tool is recommended.

4-24. FLUID DISPOSAL.

WARNING

When servicing this vehicle, performing maintenance, or disposing of materials such as engine coolant, transmission fluid, lubricants, battery acids or batteries and CARC paint, consult your Unit/Local Hazardous Waste Disposal Center or safety office for local regulatory guidance. If further information is needed, please contact the Army Environmental Hotline at 1-800-872-3845.

4-25. SERVICE REPLACEMENT PARTS AND KITS.

Many service replacement parts are available in standard sizes as well as various undersized and/or oversized sizes. Service kits for reconditioning certain parts and service sets, which include all parts necessary to complete a procedure, are also available.

4-26. WELDING.

CAUTION

If welding trailer, it must be uncoupled from prime mover. Failure to follow this warning may damage electronic components.

Refer to TM 9-237, *Operator's Manual for Welding Theory and Application*, for instructions on welding components.

4-27. ELECTRICAL REPAIR.

- a. **General.** Specific electrical system maintenance tasks are covered in Chapter 4, Section VI of this manual.

Section IV. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph Number	Paragraph Title	Page Number
4-28.	General	4-13
4-29.	Explanation of Table Entries	4-13
4-30.	General Lubrication Procedures	4-14
4-31.	General PMCS Procedures	4-15
4-32.	PMCS Initial Setup	4-16
4-33.	Lubrication Data	4-17
Table 4-1.	Lubrication Data	4-17
4-34.	Mandatory Replacement Parts	4-18
Table 4-2.	Unit Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET)	4-19

4-28. GENERAL.

To ensure that the trailer is ready for operation at all times, it must be lubricated and inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure, or injury to personnel. Table 4-1 lists the types, amounts, and temperature ranges of the lubricants required for specified intervals. Table 4-2 contains systematic instructions on lubrications, inspections, adjustments, and corrections to be performed by Unit Maintenance to keep your equipment in good operating condition and ready for its primary mission.

4-29. EXPLANATION OF TABLE 4-2 ENTRIES.

- a. **“Item No.” Column.** Numbers in this column are for reference. When completing DA Form 2404 (*Equipment Inspection and Maintenance Worksheet*), include the item number for the check/service indicating a fault. Item numbers also appear in the order you must perform checks and services for the interval listed.
- b. **“Interval” Column.** This column tells you when you must perform the procedure in the procedure column.
 - (1) *Semiannual* procedures must be done once every six months.
 - (2) *Annual* procedures must be done once each year.
- c. **“Location - Item to Check/Service” Column.** This column identifies the location and the item to be checked or serviced.

4-29. EXPLANATION OF TABLE 4-2 ENTRIES (Continued).

NOTE

The **WARNINGS** and **CAUTIONS** appearing in your PMCS table should always be observed. **WARNINGS** and **CAUTIONS** appear before applicable procedures. These **WARNINGS** and **CAUTIONS** must be observed to prevent serious injury to yourself and others or to prevent your equipment from being damaged.

- d. **“Procedure” Column.** This column gives the procedure you must perform to check or service the item listed in the Item to Check/Service column to know if the equipment is ready or available for its intended mission or for operation. You must perform the procedure at the time stated in the interval column.
- e. **“Not Fully Mission Capable if:” Column.** Information in this column tells you what fault will keep your equipment from being capable of performing its primary mission. If you make check and service procedures that show faults listed in this column, the equipment is not mission-capable. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

4-30. GENERAL LUBRICATION PROCEDURES.

NOTE

Refer to Appendix I, *Lubrication Instructions*, for Lubrication Chart, key, localized views, and procedural notes.

- a. 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.
- b. Keep all lubricants in a closed container and store in a clean, dry place away from extreme heat or cold. 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.
- c. Maintain a good record of all lubrication performed and report any problems noted during lubrication. Refer to DA Pam 738-750 for maintenance forms and procedures to record and report any findings.
- d. Keep all external parts of equipment not requiring lubrication free of lubricants. Before lubrication, wipe lubrication fittings with a clean rag (item 15, Appendix F). After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.
- e. Refer to FM 9-207 for lubrication instructions in cold weather.
- f. Refer to AR 70-12 for use of standardized lubricants.

4-31. GENERAL PMCS PROCEDURES.

- a. Always perform PMCS in the same order so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry. If any deficiency is discovered, perform the appropriate troubleshooting task in Section V of this chapter. If any component or system is not serviceable, or if the given service does not correct the deficiency, notify your supervisor.
- b. Before performing preventive maintenance, read all the checks required for the applicable interval and prepare all tools needed to make all checks. Have several clean rags (item 15, Appendix F) handy. Perform ALL inspections at the applicable interval.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (1) **Keep It Clean.** Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use cleaning compound (item 19, Appendix F) on all metal surfaces. Use dishwashing compound (item 5, Appendix F) and water when you clean rubber, plastic, and painted surfaces.
- (2) **Deterioration, Rust, and Corrosion.**
 - (a) Be alert for deterioration of plastic and rubber materials. Report it to your supervisor.
 - (b) Check metal parts for rust and corrosion. If any bare metal or corrosion exists, clean and apply a light coat of lubricating oil (item 13, Appendix F). Report it to your supervisor.
- (3) **Bolts, Nuts, and Screws.** Check bolts, nuts, and screws for obvious looseness, missing, bent, or broken condition. You can't try them all with a tool, but look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it.
- (4) **Welds.** Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.
- (5) **Electric Wires and Connectors.** Look for cracked or broken insulation, break wires, and loose or broken connectors. Tighten loose connectors and ensure that the wires are in good condition.
- (6) **Fluid Leakage.** It is necessary for you to know how fluid leakage affects the status of your trailer. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them, and remember-when in doubt, notify your supervisor.

4-31. GENERAL PMCS PROCEDURES (Continued).

NOTE**Leakage Definitions for Unit PMCS**

Class I	Leakage indicated by wetness or discoloration, but not great enough to form drops.
Class II	Leakage great enough to form drops, but not enough to cause drops to drip from the item being checked/inspected.
Class III being	Leakage great enough to form drops that fall from the item checked/inspected.

CAUTION

Operation is allowable with Class I and Class II leakage. **WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR.** When operating with Class I or Class II leaks, check components more frequently. Class III leaks must be reported immediately to your supervisor. Failure to do this will result in damage to vehicle and/or components.

4-32. PMCS INITIAL SETUP.

a. General.

- (1) This paragraph lists tools, materials, and personnel required for PMCS and lubrication.
- (2) Mandatory replacement parts for PMCS and lubrication are listed in paragraph 4-34.

b. Tools.

- (1) Drain pan.
- (2) General mechanic's tool kit (item 5, Appendix B, Section III).

c. Materials.

- (1) Corrosion preventive (item 7, Appendix F).
- (2) Dishwashing compound (item 5, Appendix F).
- (3) Detergent (item 8, Appendix F).
- (4) Lubricating oil, OEA (item 12, Appendix F).
- (5) Lubricating oil, OE/HDO 10 (item 13, Appendix F).
- (6) Lubricating oil, OE/HDO 30 (item 14, Appendix F).
- (7) Rags (item 15, Appendix F).
- (8) Dry cleaning solvent (item 19, Appendix F).

d. Personnel.

- (1) Driver/Operator.
- (2) Unit Maintenance Mechanic.

4-33. LUBRICATION DATA.

Table 4-1. Lubrication Data.

ANNUAL LUBRICANTS		
Lubricant/Component	Refill Capacity	Expected Temperatures*
OE/HDO (MIL-PRF-2104G) Oil, Lubricating, ICE, Tactical	As Required	OE/HDO-10: +6°F to +122°F (-14°C to +50°C) -4°F to +50°F (-20°C to +10°C)
WD-40 Corrosion Preventive		ALL TEMPERATURES
*For arctic operation, refer to FM 9-207.		

4-34. MANDATORY REPLACEMENT PARTS.

No mandatory replacement parts are required while performing unit Preventive Maintenance Checks and Services (PMCS).

Table 4-2. Unit Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET)

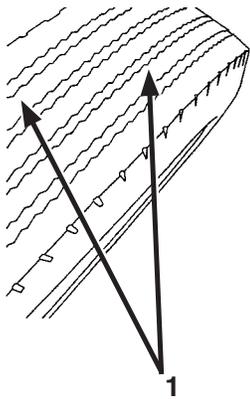
Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item To Check/Service		
1	semi-annual	Tires	<div style="border: 1px solid black; padding: 5px; text-align: center; width: fit-content; margin: 0 auto;">WARNING</div> <p>Unless otherwise specified, perform all lubrication and preventive maintenance checks with trailer on level ground, uncoupled, and brakes set. Failure to follow this warning may result in injury or death to personnel.</p> <p style="text-align: center;">NOTE</p> <p>Perform all Operator PMCS, (Chapter 2, Section II) as appropriate, while performing Item No. 2 checks. Drive at least 5 mi (8 Km) to give enough time to detect malfunctions.</p>	Tread depth is less than 1/16 in. (0.16 cm).
	semi-annual	Tires	Measure tread depth (1). Measurements should be taken at random locations on the tire.	
	semi-annual	Check wheel nuts for tightness	Rotate and match tires semiannually in accordance with TM 9-2610-200-24.	
			Torque nuts to 450-500 ft-lb (610.2-678.0 N•m).	
				

Table 4-2. Unit Preventive Maintenance Checks and Services (PMCS) for M870A3 Trailer (MHET)

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item To Check/ Service		
2	semi-annual	Brake air system	Check all air hoses for leaks, kinks, bends, cracks and missing mounting clamps.	
3	semi-annual	Brakes	Check for proper operation. Check for proper adjustment.	Failure to operate properly or out of adjustment.
4	annual	Brake linings	Check brake Linings for sufficient material.	Excessive wear.
	annual	Brake linings	Check brake linings for damage.	Excessive damage.
5	semi-annual	Brake drums	Visually inspect brake drums for cracks, scoring, gouging, or abnormal wear.	Excessive wear, cracks, or damage.
	annual	Brake drums	Measure brake drums to check for excessive wear.	
6	annual	Wheel bearing and seals	Remove wheel bearings and visually inspect for wear or damage.	Excessive wear or damage.
	annual	Wheel bearing and seals	Visually inspect bearing seat for wear or damage.	Excessive wear or damage.

Section V. UNIT TROUBLESHOOTING PROCEDURES

Paragraph Number	Paragraph Title	Page Number
4-35.	General	4-21
4-36.	Explanation of Columns	4-21
4-37.	Troubleshooting Symptom Index	4-22
Table 4-3.	Unit Troubleshooting	4-23

4-35. GENERAL.

- a. This section provides information for identifying and correcting malfunctions that you may find while operating and maintaining the trailer.
- b. The Troubleshooting Symptom Index (paragraph 4-37) lists common malfunctions which may occur and refers you to the proper page in Table 4-3 for a troubleshooting procedure.
- c. If you are unaware of the location of an item mentioned in troubleshooting, refer to paragraphs 1-11 or 2-1 through 2-3.
- d. Before performing troubleshooting, read and follow all safety instructions found in the warning summary at the front of this manual.
- e. This section cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by the listed corrective actions, notify your supervisor.
- f. When troubleshooting a malfunction:
 - (1) Locate the symptom or symptoms in paragraph 4-37 that best describes the malfunction. If the appropriate symptom is not listed, notify your supervisor.
 - (2) Turn to the page in Table 4-3 where the troubleshooting procedures for the malfunction in question are described. Headings at the top of each page show how each troubleshooting procedure is organized: Malfunction, Test or Inspection (in step number order), and Corrective Action.
 - (3) Perform each step in the order listed until the malfunction is corrected and the item being inspected is operational. DO NOT perform any maintenance task unless the troubleshooting procedure tells you to do so.

4-36. EXPLANATION OF COLUMNS.

The columns in Table 4-3 are defined as follows:

- (1) **MALFUNCTION**. A visual or operational indication that something is wrong with the equipment.
- (2) **TEST OR INSPECTION**. A procedure to isolate the problem in a system or component.
- (3) **CORRECTIVE ACTION**. A procedure to correct the problem.

4-37. TROUBLESHOOTING SYMPTOM INDEX.

**Troubleshooting Procedure
Page**

UNIT TROUBLESHOOTING SYMPTOM INDEX**KINGPIN**

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Table 4-3. Unit Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<i>KINGPIN</i>		
1. KINGPIN FAILS TO LOCK IN FIFTH WHEEL.	Step 1. Check kingpin for damage.	Replace kingpin in accordance with paragraph 3-10.
	Step 2. Check area where kingpin is seated in gooseneck for damage.	Repairs to gooseneck are structural in nature. Decision to repair must be made at next higher maintenance level or above.
<i>LOADBED</i>		
1. BOARDS LOOSE.	Step 1. Check for missing hardware.	Replace hardware in accordance with paragraph 4-70.
	Step 2. Check for warped or damaged boards.	Replace in accordance with paragraph 4-70.

Table 4-3. Unit Troubleshooting (Continued)

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION***WHEEL ASSEMBLY***1. HUB GENERATES EXCESSIVE HEAT.**

- Step 1. Inspect hub for damage.
Replace damaged hub in accordance with paragraph 4-61.
- Step 2. Inspect hub for improper binding or excessive end play.
Adjust hub and bearings in accordance with paragraph 4-61.

WARNING

Before putting hand to hub, hold hand close to hub to check for excessive heat radiation. Hub may be hot. This will prevent skin burns caused by hot metal.

- Step 3. Inspect bearings for wear or damage.
Replace damaged or worn components in accordance with paragraph 4-61.

Table 4-3. Unit Troubleshooting (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<i>SUSPENSION</i>		
1. TRAILER DOES NOT TRACK STRAIGHT BEHIND PRIME MOVER.		
Step 1.	Inspect suspension components for damage.	Notify Direct Support Maintenance.
Step 2.	Inspect axle for proper alignment.	Notify Direct Support Maintenance.
<i>BRAKES</i>		
1. BRAKES WILL NOT RELEASE		
Step 1.	Check for restrictions in air lines and hoses.	If air lines or hoses are restricted, replace in accordance with paragraph 4-58. If air lines and hoses are not restricted, proceed to step 2.
Step 2.	Check to see if shutoff valves in towing vehicle are open.	If valves are closed, open shutoff valves. If valves are open, proceed to step 3.
Step 3.	Check to see if either dump valve is open.	If a dump valve is open, close dump valve. If both dump valves are closed, proceed to step 4.
Step 4.	Check for intervehicular air hoses for proper connection and damaged or missing preformed packing.	If hoses are improperly connected, connect them properly. If preformed packing is missing or damaged, replace packing. If hoses are properly connected and preformed packing is good, proceed to step 5.
Step 5.	Check ECU valve and brake chamber.	Apply towing vehicle brakes and release. ECU valve should vent brake chamber air through exhaust port when brakes are released. If air is not vented from brake chamber, replace ECU valve in accordance with paragraph 4-52. If ECU valve is not defective but brake chamber is defective, replace brake chamber in accordance with paragraph 4-53. If ECU valve and brake chamber are not defective, proceed to step 6.
Step 6.	Check for weak or broken brake shoe return spring.	If return spring is defective, replace spring in accordance with paragraph 4-47. If return spring is not defective, proceed to step 7.
Step 7.	Check for out-of-adjustment brakes.	Adjust brakes in accordance with paragraph 4-48.

Table 4-3. Unit Troubleshooting (Continued)**MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION***BRAKES (Continued)***2. BRAKES GRAB OR BIND.**

Step 1. Inspect brake shoes for damage or excessive wear.
Replace brake shoes in accordance with paragraph 4-47.

Step 2. Inspect air brake chambers.
Replace air brake chambers in accordance with paragraph 4-53.

3. BRAKES MAKE EXCESSIVE SQUEALING OR GRINDING NOISE WHEN APPLIED.

Step 1. Inspect brake drum for wear or damage.
Notify Direct Support Maintenance.

Step 2. Inspect brake shoes for excessive wear.
Replace brake shoes in accordance with paragraph 4-47.

4. BRAKES FAIL TO ENGAGE.

Step 1. Check Control (blue/service) Air Line connection at gladhand.
If no air is flowing from prime mover, problem is with prime mover.

Step 2. Inspect Control Air Line for damage.
Repair or replace air lines or fittings in accordance with paragraph 4-58.

Step 3. Inspect spring brake control valve for proper function.
Replace valve in accordance with para 4-51.

Step 4. Check for proper function of brakes.
Adjust brakes in accordance with paragraph 4-48.

Step 5. Check brake system hardware for damaged or missing components.
Replace brake system components as necessary.

5. SLOW BRAKE APPLICATION OR SLOW RELEASE.

Step 1. Check for restrictions in air lines and hoses.
If air lines or hoses are restricted.
Replace in accordance with paragraph 4-58.
If air lines and hoses are not restricted, proceed to step 2.

Step 2. Check ECU valve operation.
If ECU valve is defective IAW para. 4-51A,
Replace ECU valve in accordance with paragraph 4-52.
If ECU valve is not defective, proceed to step 3.

Table 4-3. Unit Troubleshooting (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<i>BRAKES (Continued)</i>		
Step 3.	Check for weak or broken brake shoe return spring.	If return spring is defective, replace in accordance with paragraph 4-47. If return spring is not defective, proceed to step 4.
Step 4.	Check for defective air brake chamber.	If air brake chamber is defective, replace air brake chamber in accordance with paragraph 4-53. If air brake chamber is not defective, proceed to step 5.
Step 5.	Check for low pressure.	Perform leakage test. Repair or replace leaking air lines, hoses or connections in accordance with paragraph 4-58.
6.	BRAKE DRUM RUNNING HOT.	
Step 1.	Check brake adjustment.	If brakes are out-of-adjustment, adjust brakes in accordance with paragraph 4-48. If brake adjustment is correct, proceed to step 2.
Step 2.	Check for weak or broken brake shoe return spring.	If return spring is weak or broken, replace return spring in accordance with paragraph 4-47. If return spring is not defective, proceed to step 3.
Step 3.	Check for out-of-round brake.	Notify Direct Support Maintenance.
7.	UNEVEN BRAKING.	
Step 1.	Check brake adjustment.	If brakes are out-of-adjustment, adjust brakes in accordance paragraph 4-48. If brake adjustment is correct, proceed to step 2.
Step 2.	Check for grease on brake lining.	If grease is present, replace grease seal and brake lining in accordance with 4-47.

Table 4-3. Unit Troubleshooting (Continued)

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION***AIR SYSTEM***1. AIR RESERVOIRS FAIL TO FILL WITH AIR.**

- Step 1. Inspect reservoir and drain valve.
If open, close drain valve.
If damaged, repair in accordance with paragraph 4-57.
- Step 2. Inspect parking brake on prime mover.
If engaged, release parking brake.
- Step 3. Inspect gladhands for damage or incorrect coupling.
Disconnect, inspect, and reconnect gladhands.
If damaged, repair in accordance with paragraph 4-50.
- Step 4. Inspect air lines and connections for leaks. Feel for escaping air and/or use soapy water solution to detect leaks.
Tighten connections.
Repair air lines or connections in accordance with paragraphs 4-58 and 4-59.
- Step 5. Inspect air reservoirs for damage or leaks.
Tighten connections.
Repair or replace reservoirs in accordance with paragraph 4-54 or 4-55.

*ELECTRICAL SYSTEM***WARNING**

When troubleshooting an electrical malfunction or performing electrical maintenance, ALWAYS disconnect intervehicular electrical cable from towing vehicle. Failure to do so may result in injury or death due to electrical shock.

1. ALL LIGHTS ARE INOPERABLE.

- Step 1. Check trailer and gooseneck electrical connectors for dirty, corroded, or damaged pins.
Clean connection(s) in accordance with paragraph 3-5.
If damaged, repair in accordance with paragraph 4-44.
- Step 2. Check prime mover electrical connection at cable receptacle.
Reconnect cable if not properly connected.
If prime mover has no power, consult appropriate TM for troubleshooting.

Table 4-3. Unit Troubleshooting (Continued)

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

*ELECTRICAL SYSTEM (Continued)***WARNING**

When troubleshooting an electrical malfunction or performing electrical maintenance, **ALWAYS** disconnect intervehicular electrical cable from towing vehicle. Failure to do so may result in injury or death due to electrical shock.

2. ONE OR MORE LIGHTS INOPERABLE.

- Step 1. Check for burned out or defective LEDs /lights.
Replace light in accordance with paragraph 4-41, 4-42, or 4-43.
- Step 2. Check receptacle for proper voltage at receptacle.
If voltage is low, clean receptacle and wires in accordance with paragraph 3-5.
- Step 3. If there is no power at receptacle, unplug wires at receptacle and check for proper voltage in accordance with paragraphs 4-44 and 4-45.
If proper voltage exists, replace receptacle in accordance with paragraph 4-39 or 4-40.
- Step 4. If there is no power at wires, test voltage at next check point (see schematic, paragraph 4-45).
- Step 5. If proper voltage exists, check for breaks or damage to wires between test points.
Repair or replace wiring in accordance with paragraph 4-44.
- Step 6. If there is no power at check point, continue to next check point. Continue testing until reaching 24-volt receptacle.
Repair or replace wires as required in accordance with paragraph 4-44.

*HYDRAULIC SYSTEM***NOTE**

- **A reading of 2500 PSI is only on gauge (1) when hydraulic controls are in use. Readings will drop to 500 PSI when levers are disengaged.**
- **The PSI will vary due to load. Hydraulic pressures will vary from 300 to 2500 PSI under normal operation, and will reach a maximum of 2500 to 2800 PSI under full load.**

1. GOOSENECK LIFT CYLINDER IS INOPERABLE.

- Step 1. Check for leaks.
Notify direct support maintenance for cylinder replacement.

Table 4-3. Unit Troubleshooting (Continued)

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

HYDRAULIC SYSTEM (Continued)

- | | | |
|---------|--|--|
| Step 2. | Check hydraulic pressure setting.
If hydraulic pressure is low, set hydraulic pressure in accordance with paragraph 4-67. | |
| Step 3. | Check throttle valve for obstruction.
If throttle valve is clogged, clean throttle valve in accordance with para. 4-65. | |
| Step 4 | Check cylinder for internal leaks.
Fully retract cylinder rod. Disconnect and cap hydraulic hose connected opposite of the rod end cylinder port. | |

WARNING

Do not exceed 3000 psi. Serious injury or death may occur if pressure exceeds 3000 psi.

Apply pressure to the rod end port and inspect for leakage out of the open port. (Small drips more than 10 seconds apart are acceptable). If more significant leakage is present, notify direct support maintenance for cylinder replacement.

2. PLATFORM LIFT CYLINDERS ARE INOPERABLE

- | | | |
|---------|---|--|
| Step 1. | Check for leaks.
Notify direct support maintenance for cylinder replacement. | |
| Step 2. | Check hydraulic pressure setting. | |

NOTE

- **A reading of 2500 psi is only on gauge (1) when hydraulic controls are in use. Readings will drop to 500 psi when levers are disengaged.**
- **The psi will vary due to load. Hydraulic pressures will vary from 300 to 2500 psi under normal operation, and will reach a maximum of 2500 to 2800 psi under full load.**

If hydraulic pressure is low, set hydraulic pressure in accordance with paragraph 4-67.

Table 4-3. Unit Troubleshooting (Continued)

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION***HYDRAULIC SYSTEM (Continued)*

- Step 3. Check hydraulic pressure relief valve pressure setting by disconnecting gooseneck from prime mover (Ref. paragraph 2-18), lowering platform to the ground and keeping lever engaged until the cylinder dead ends. Check psi.

NOTE

- **A reading of 2500 psi is only on gauge (1) when hydraulic controls are in use. Readings will drop to 500 psi when levers are disengaged.**
- **The psi will vary due to load. Hydraulic pressures will vary from 300 to 2500 psi under normal operation, and will reach a maximum of 2500 to 2800 psi under full load.**

If PSI reads more or less than 300 to 500 psi, reset hydraulic pressure (Ref. paragraph 4-67).

- Step 4. Check throttle valve for obstruction

If throttle is clogged, clean throttle valve in accordance with paragraph 4-65.

- Step 5. Check cylinder for internal leaks.

Fully retract cylinder rod, disconnect and cap hydraulic hose connected opposite of the rod end cylinder port. Apply pressure to rod end port and inspect for leakage out of the open port. (Small drips more than 10 seconds apart are acceptable).

WARNING

Do not exceed 3000 psi. Serious injury or death may occur if pressure exceeds 3000 psi.

If more significant leakage is present, notify direct support maintenance for cylinder replacement.

TM 5-2330-325-14&P

SECTION VI. ELECTRICAL SYSTEM MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
4-38.	General	4-33
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4-41.	Tail Light Replacement.....	4-40
4-42.	Clearance and Running Light Replacement (Typical)	4-42
4-43.	Blackout Lights Replacement.....	4-44
4-44.	Wiring Harness Replacement and Repair	4-46
4-45.	Wiring Diagram	4-47

4-38. GENERAL.

WARNING

Remove all power to trailer prior to making any repairs on the electrical system. Failure to do so may result in serious injury or death.

- a. The M870A3 trailer is equipped with two intervehicular cable receptacles, located on the front of the trailer.
- b. The 12-pin, 24-volt receptacle is located to the right of the 7-pin, 12-volt receptacle.
- c. The M870A3 trailer is equipped with four tail lights, two on each side. The outer set of tail lights includes both turn signals and running lights. The inner set of tail lights includes brake lights and running lights. The M870A3 trailer is also equipped with two rear blackout lights, one on each side. Each blackout light includes running lights, brake lights, and turn signals (both left and right). Amber clearance lights are located on each front corner of the trailer side and on each side at the midpoint of the trailer. Red clearance lights are located on each side at the rear of the trailer, and three red running lights are also located at the center of the rear of the trailer. An amber ABS light is located on the right rear corner of the trailer.
- d. Refer to wiring diagram (para. 4-45) for locating any untagged, disconnected wires.

4-39. FRONT AND REAR 24-VOLT RECEPTACLE REPLACEMENT.

This task covers:

- a. Removal b. Installation
-

Initial Setup:

Equipment Conditions:

- Trailer, parked and lowered to ground, brakes engaged, and wheels chocked.
- Gooseneck Gravel Guard removed.

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033
 - Shop equipment, common set No. 1, NSN 4910-00-754-0654
-

Materials/Parts:

- Nut, self-locking (4)

General Safety Instructions:

- Remove all power to trailer prior to making any repairs on the electrical system.
-

a. Removal.

- (1) Lower trailer to ground and raise the platform lever (1) to allow the gooseneck to drop to its lowest position.

WARNING

- **Remove all power to trailer prior to making any repairs on the electrical system. Failure to do so may result in serious injury or death.**
- **Secure kingpin stowage box lid prior to removing 24-volt receptacle. Failure to do so may result in serious injury.**

NOTE

- **For front 24-volt receptacle follow Steps 1 thru 3.**
- **For rear 24-volt receptacle follow Steps 4 thru 8.**

- (2) Remove nut (18) and clamp (19).
- (3) Remove keeper pin (20) and unplug receptacle harness (16).
- (4) Remove four bolts (13), self-locking nuts (17), washers (14) and receptacle (15) from frame (9). Discard self-locking nuts.

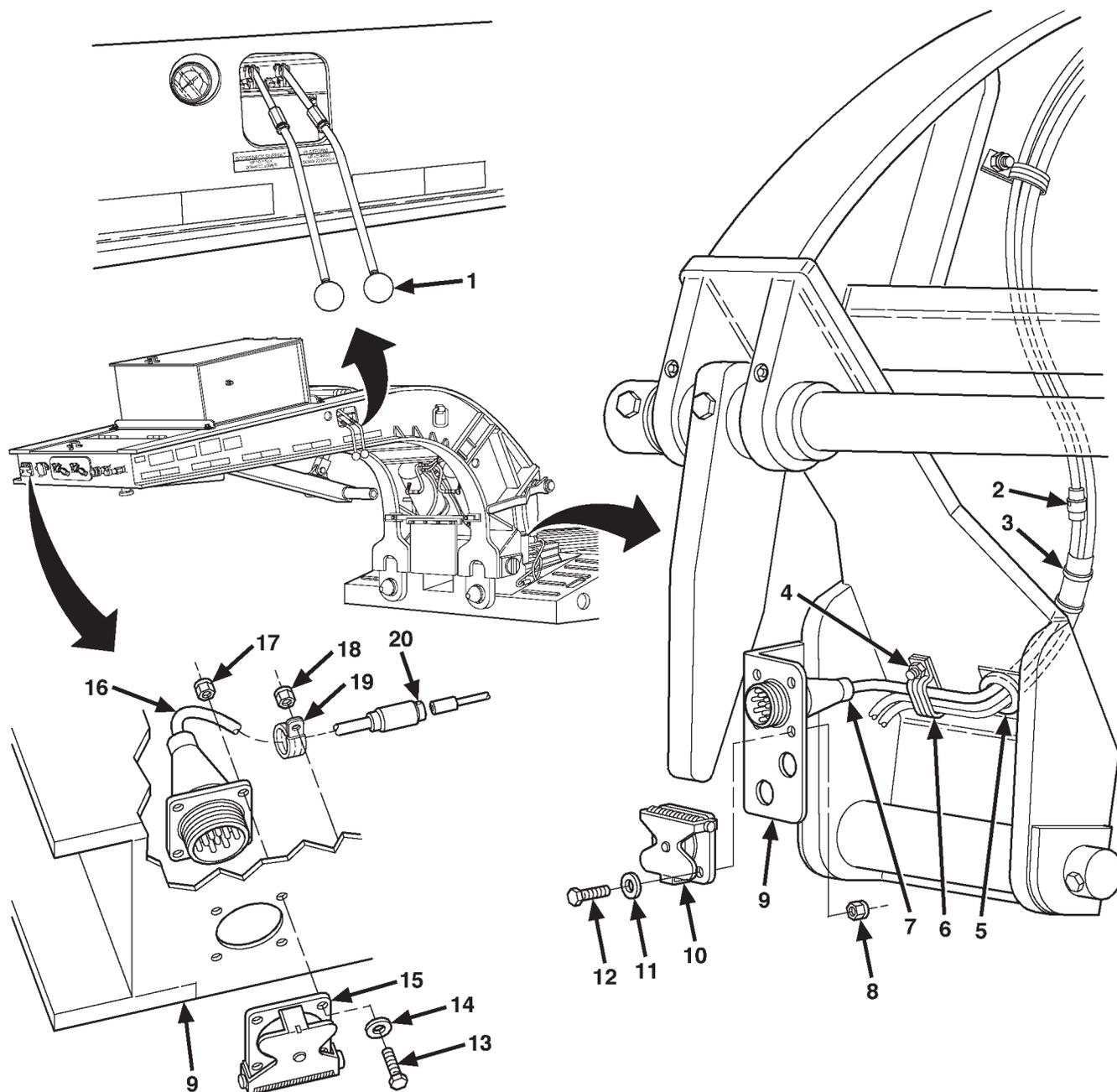
WARNING

Failure to lower trailer to ground and allowing the gooseneck to fully lower may result in serious injury or death to personnel.

- (5) Remove two nuts (4), two clamps (6) and four zip-ties (3) from securing harness.
- (6) Remove four bolts (12), self-locking nuts (8), flat washers (11), and separate receptacle (10) from frame (9). Discard self-locking nuts.

4-39. FRONT AND REAR 24-VOLT RECEPTACLE REPLACEMENT (Continued).

- (7) Remove keeper pin (2), unplug harness (7) and remove from gooseneck.
- (8) Remove grommet (5) from gooseneck.



4-39. FRONT AND REAR 24-VOLT RECEPTACLE REPLACEMENT (Continued).

b. Installation.**NOTE**

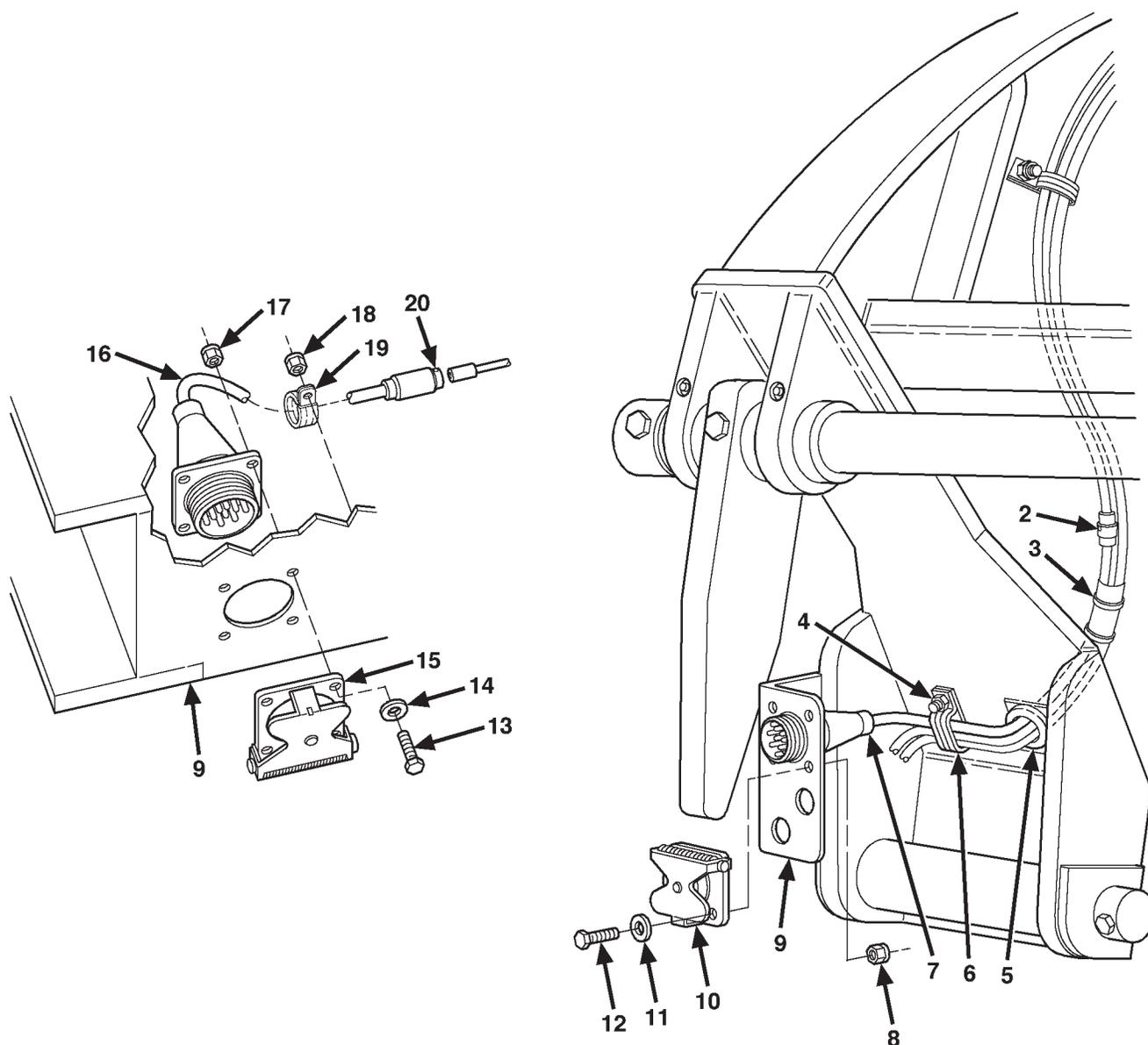
- **For front 24-volt receptacle follow Steps 1 thru 4.**
- **For rear 24-volt receptacle follow Steps 5 thru 8.**

- (1) Position receptacle harness (16) onto gooseneck frame (4).
- (2) Plug receptacle harness (16) into main wiring harness and install keeper pin (20).
- (3) Install clamp (19) and nut (18).
- (4) Position receptacle cover (15) onto gooseneck frame (9) and secure with four screws (13), washers (14) and new self-locking nuts (17).
- (5) Install receptacle harness (7) to gooseneck frame (9) and feed through grommet (5). Install grommet (5).
- (6) Connect receptacle harness to main harness and install keeper pin (2).

NOTE

Be sure receptacle is installed with the keyway in the down position.

- (7) Install receptacle cover (10) to gooseneck frame (9). Install four bolts (12), washers (11) and new self-locking nuts (8).
- (8) Install two clamps (6), two nuts (4) and four zip-ties (3).

4-39. FRONT AND REAR 24-VOLT RECEPTACLE REPLACEMENT (Continued).**FOLLOW-ON TASKS:**

Check for proper operation of lights.

4-40. 12-VOLT RECEPTACLE REPLACEMENT.

This task covers:

- a. Removal b. Installation
-

Initial Setup:

Equipment Conditions:

- Trailer, parked on level ground, brakes engaged and wheels chocked

Materials/Parts:

- Marker tags (item 20, Appendix F)
- Nut, self-locking (2)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033

General Safety Instructions:

- Remove all power to trailer prior to making any repairs on electrical system.
-

a. Removal.

WARNING

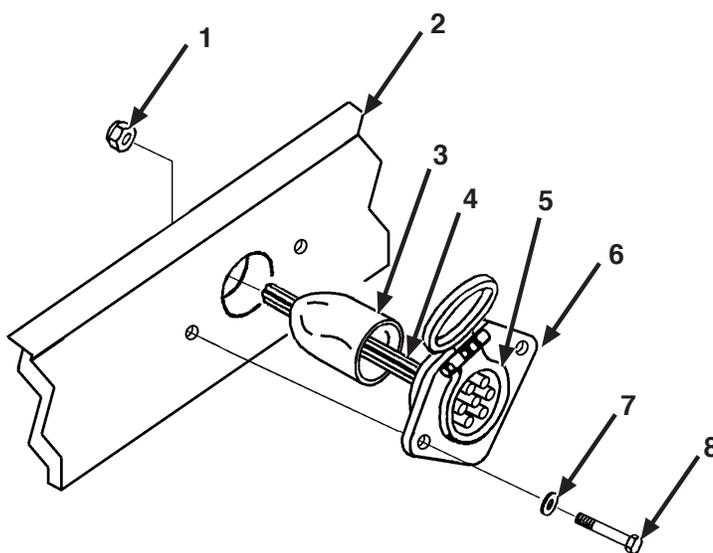
Remove all power to trailer prior to making any repairs on the electrical system. Failure to do so may result in serious injury or death.

- (1) Slide boot (3) off of connector (5) at rear of receptacle (6).
- (2) Remove self locking nuts (1) from rear of receptacle (6).
- (3) Turn connector (5) clockwise and remove from receptacle (6).
- (4) Tag and disconnect wires (4) from connector (5).
- (5) Remove two screws (8), washers (7), and receptacle (6) from gooseneck (2). Discard self-locking nuts.

4-40. 12-VOLT RECEPTACLE REPLACEMENT (Continued).

b. Installation.

- (1) Position receptacle (6) on gooseneck (2) and secure with two screws (8), washers (7), and new self-locking nuts (1).
- (2) Connect wires (4) to connector (5) per wire tags.
- (3) Insert connector (5) in receptacle (6) and turn counter clockwise to set.
- (4) Slide boot (3) over connector (5).

**FOLLOW-ON TASKS:**

Check electrical system for proper operation.

4-41. TAIL LIGHT REPLACEMENT (Continued).

d. Installation.

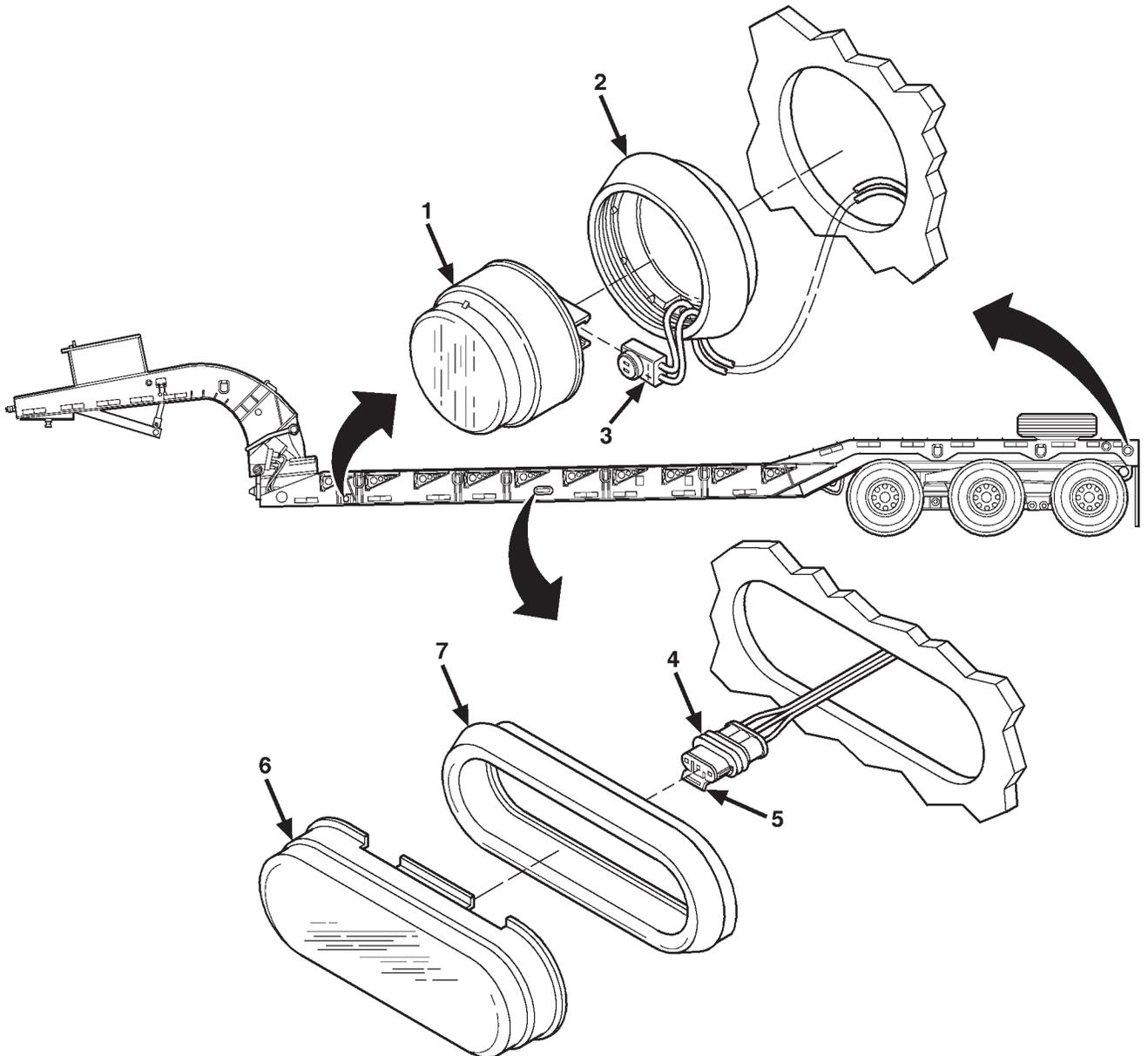
- (1) Position rubber grommet (2) in tail light mounting opening and rotate grommet so that word "TOP" is uppermost.
- (2) Connect electrical connector (3) to rear of tail light lens (1) and secure with locking tab (4).
- (3) Align tail light so that electrical connector is at bottom and push lens into grommet until it seats in place.

NOTE

Lens should be evenly aligned with grommet before pushing. Liquid soap may be used to lubricate the grommet.

FOLLOW-ON TASKS:

Check electrical system for proper operation.

4-42. CLEARANCE AND RUNNING LIGHTS REPLACEMENT (TYPICAL) (Continued).**FOLLOW-ON TASKS:**

Check electrical system for proper operation.

4-43. BLACKOUT LIGHT REPLACEMENT.

This task covers:

- a. Removal b. Installation
-

Initial Setup:

Equipment Conditions:

- Tail light removed (para. 4-41).

Materials/Parts:

- Lockwasher (2)

Tools/Test Equipment

- Tool kit, mechanics general, NSN 5180-00-177-7033

General Safety Instructions:

- Remove all power to trailer prior to making any repairs on electrical system.
-

a. **Removal.**

WARNING

Remove all power to trailer prior to making any repairs on the electrical system. Failure to do so may result in serious injury or death.

NOTE

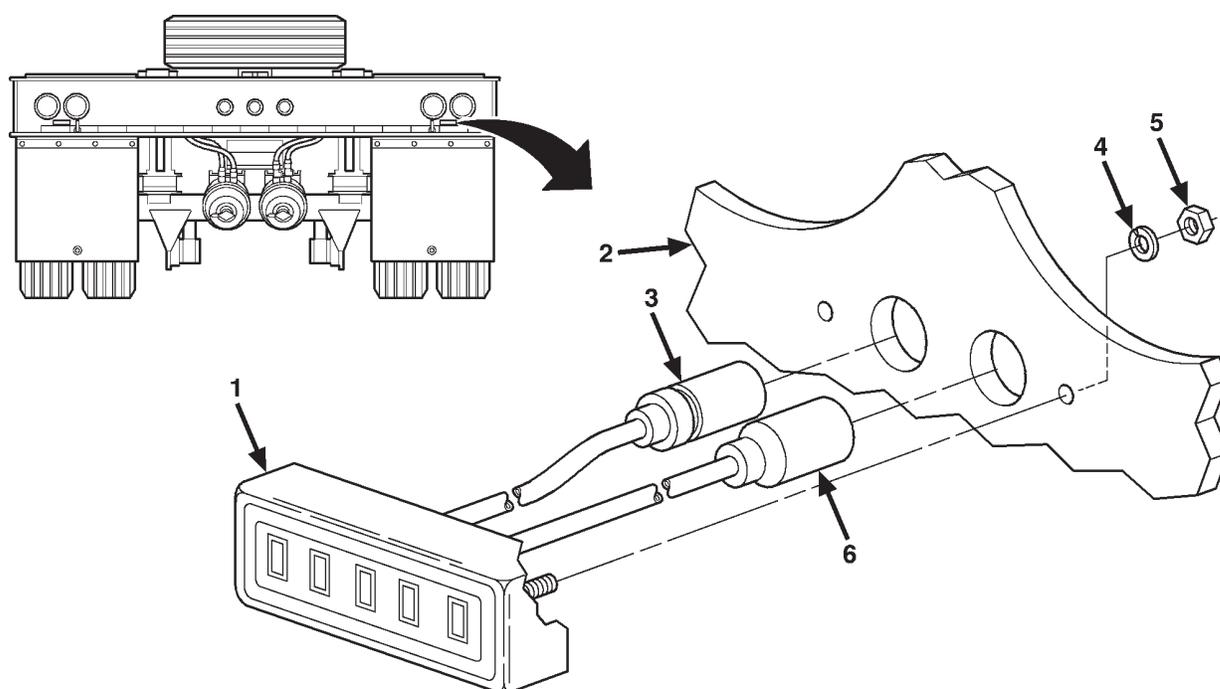
Removal of blackout lights requires initial removal of outer tail lights to gain access to the blackout light mounting nuts and electrical harness clips.

- (1) Remove two 11/32 in. nuts (5) and lockwashers (4) that hold blackout light (1) to trailer frame (2). Discard nuts and lockwashers.
- (2) Partially pull blackout light (1) away from trailer frame (2).
- (3) Disconnect connectors (3 and 6) from main wiring harness.
- (4) Complete removal of blackout light from trailer.

4-43. BLACKOUT LIGHT REPLACEMENT (Continued).

b. Installation.

- (1) Thread blackout light wires through trailer mounting holes and trailer electrical harness clip and connect blackout light and harness connectors (3 and 6).
- (2) Secure harness clip in position.
- (3) Position blackout lights (1) on trailer frame (2) and secure with two new nuts (5) and lockwashers (4).

**FOLLOW-ON TASKS:**

- Install tail light assemblies (Ref. para. 4-41).
- Check electrical system for proper operation.

4-44. WIRING HARNESSES REPLACEMENT AND REPAIR.

This task covers:

Repair/Replacement

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Tools/Test Equipment

- Tool kit, mechanics general, NSN 5180-00-177-7033
- Shop equipment, common set No. 1, NSN 4910-00-754-0654

Materials/Parts:

- Tie, plastic (item 24, Appendix F)

General Safety Instructions:

- Remove all power to trailer prior to making any repairs on the electrical system.
-

WARNING

Remove all power to trailer prior to making any repairs on the electrical system. Failure to do so may result in serious injury or death.

NOTE

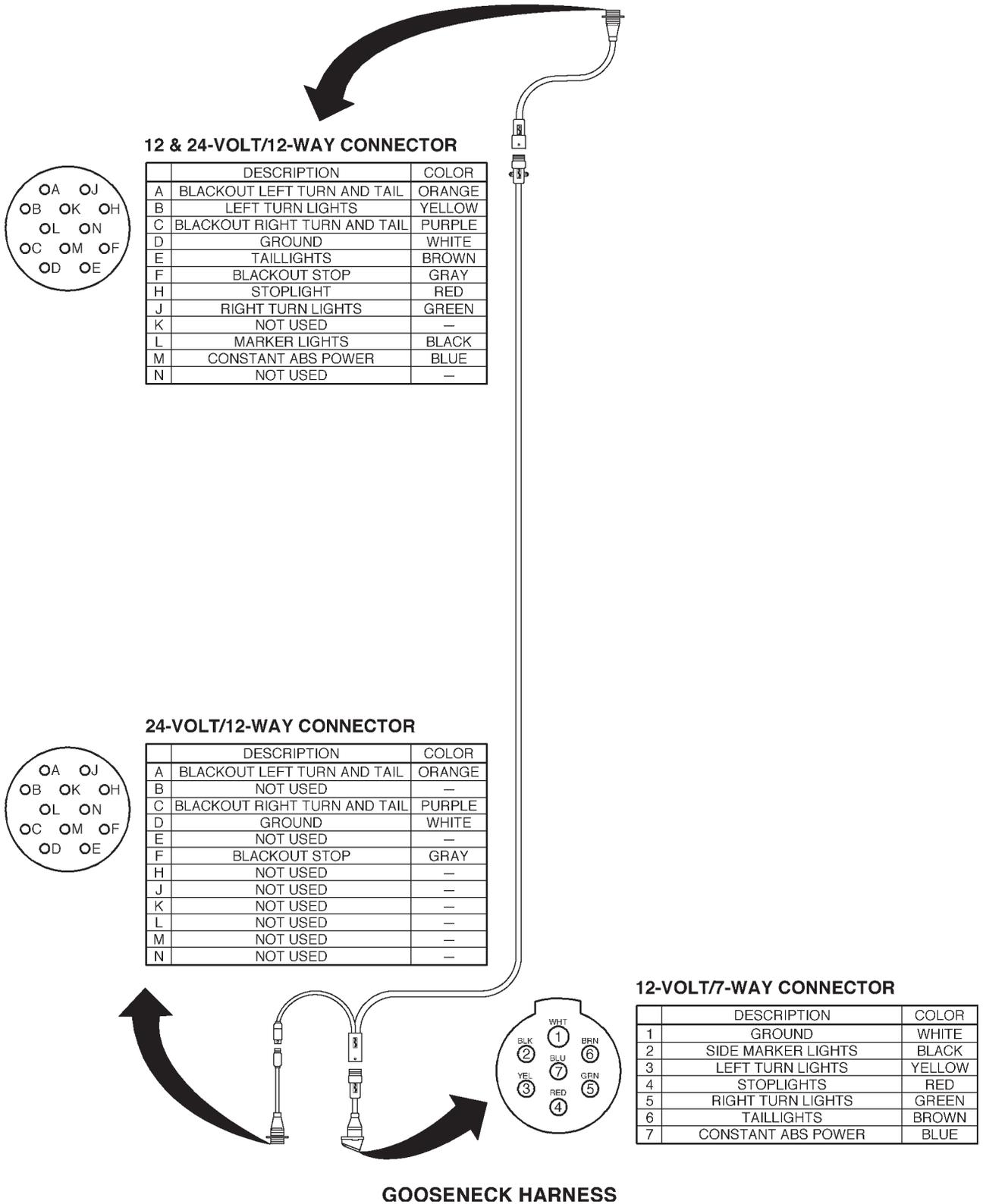
- **Wiring harnesses can be replaced or repaired depending on the type of damage. Broken wires can be spliced and sealed with heat shrink tubing or electrical tape.**
- **See paragraphs 4-17 (tagging wires and hoses), 4-18 (soldering), 4-19 (heat shrink tubing), and 4-20 (electrical ground points) for general wiring harness maintenance instructions.**

Replacement/Repair. Wiring harnesses are not ordinarily removed except if they are badly damaged and must be replaced. Wiring harness connections must be tightly attached and connected. See wiring diagram (para. 4-45) for additional information.

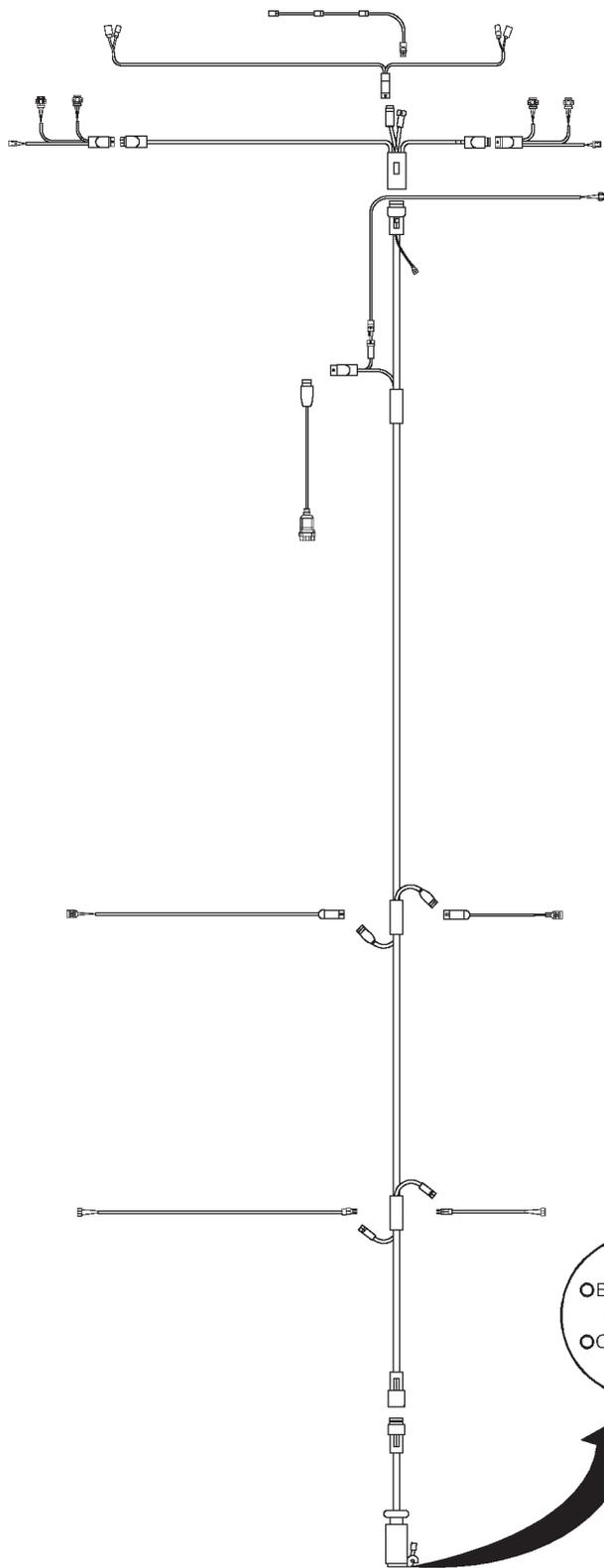
FOLLOW-ON TASKS:

Check electrical system for proper operation.

4-45. WIRING DIAGRAM.



4-45. WIRING DIAGRAM (Continued).



12 & 24-VOLT/12-WAY CONNECTOR

	DESCRIPTION	COLOR	VOLTAGE
A	BLACKOUT LEFT TURN AND TAIL	ORANGE	24V
B	LEFT TURN LIGHTS	YELLOW	12V
C	BLACKOUT RIGHT TURN AND TAIL	PURPLE	24V
D	GROUND	WHITE	—
E	TAILLIGHTS	BROWN	12V
F	BLACKOUT STOP	GRAY	24V
H	STOPLIGHT	RED	12V
J	RIGHT TURN LIGHTS	GREEN	12V
K	NOT USED	—	—
L	MARKER LIGHTS	BLACK	12V
M	CONSTANT ABS POWER	BLUE	12V
N	NOT USED	—	—

TRAILER HARNESS

Section VII. BRAKE SYSTEM MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
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4-51.	Spring Brake Control Valve Replacement	4-60
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4-57.	Dump Valve Replacement.....	4-77
4-58.	Air Brake Hose Replacement and Repair	4-79
4-59.	Air Brake System Diagram	4-80

4-46. GENERAL.

WARNING

Air under 100 psi (690 kPa) is used in the operation of the air brake system. Serious injury or death can result if precautions are not taken to maintain adequate air pressure.

- a. The following paragraphs cover procedures for testing, removal, and installation of brake shoe assembly, brake air chamber assembly, relay valve, ration relay valve, air reservoir and air lines. These paragraphs also cover cleaning, inspection and repair of air lines.
- b. The service brakes are straight air type with automatic break-away protection. When the Semitrailer brake system is properly connected to the service brake system of the towing vehicle, the towing vehicle brake pedal operates the brakes on both vehicles.

4-47. BRAKESHOE REPLACEMENT.

This task covers:

- a. Removal b. Inspection c. Installation

Initial Setup:

Equipment Conditions:

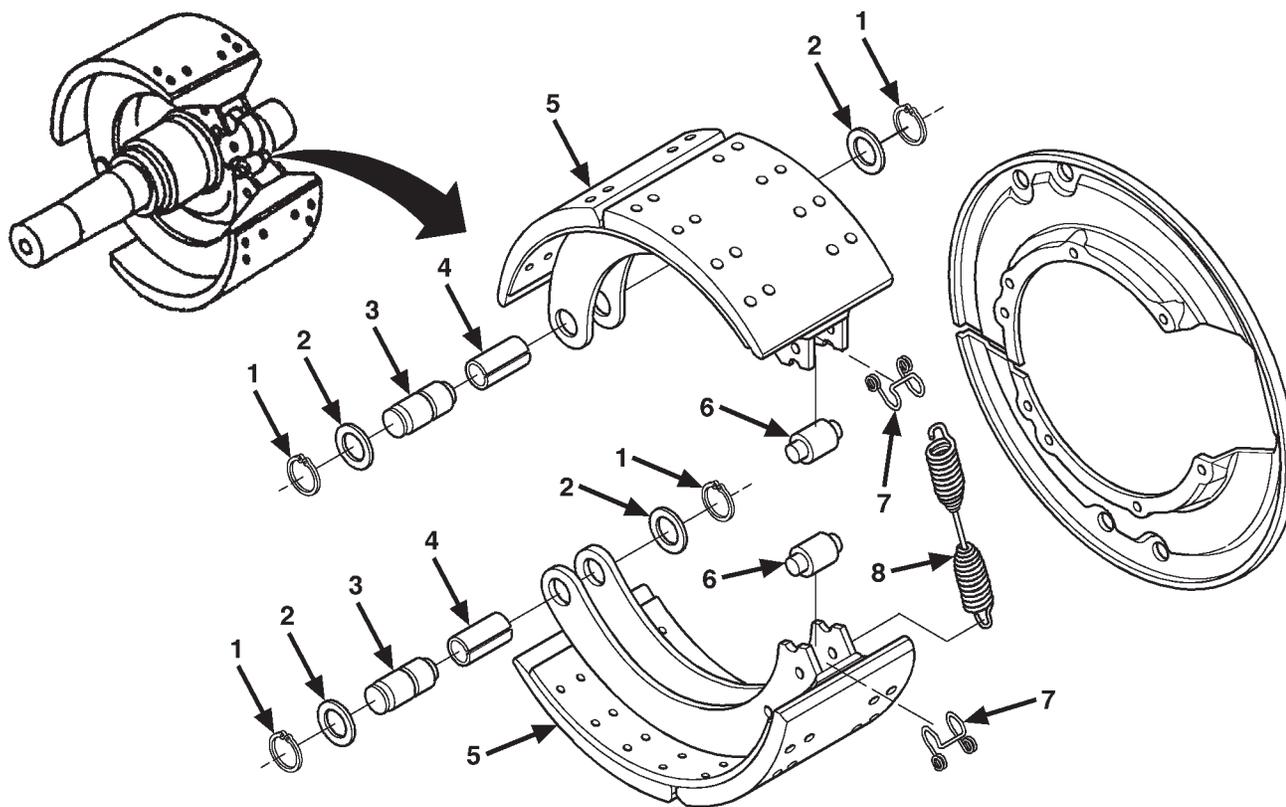
- Tire assemblies removed (para. 3-8)
- Hub and drum assembly removed (para. 4-61)

Tools/Test Equipment:

- Tool kit, mechanics general,
NSN 5180-00-177-7033

a. Removal.

- (1) Remove full circle retainer rings (1) and flat washers (2) and withdraw both grooved pins (3) and bushing (4).
- (2) Remove two sleeved bushing retainer clips (7).
- (3) Swing back brake shoes (5) and remove shoes with return spring (8).
- (4) Remove both sleeved bushings (6).



4-47 BRAKESHOE REPLACEMENT (Continued).

b. Inspection.

- (1) Inspect springs for rust, obvious defects and excessive wear. Replace defective spring.
- (2) Inspect brake shoe lining for wear. If braking surface is within 3/16 in. (.48 cm) of rivet heads or grease is present, replace brake shoes.

c. Installation.

- (1) Assemble return spring (8), retainer clips (7), and sleeve bushings (6) to brake shoes (5).
- (2) Position brake shoes (5) on axle spider and complete connection of return spring (8) to both shoes (5).
- (3) Spread each shoe (5) apart and insert bushings (4), grooved pins (3), flat washers (2), and retaining rings (1).

FOLLOW-ON TASKS:

- Install hub and drum assembly (para. 4-61).
- Install tire assemblies (para. 3-8).
- Adjust slack adjuster (para. 4-48).

4-48. SLACK ADJUSTER REPLACEMENT.

This task covers:

- | | | | |
|---------------|-------------|---------------|-----------------|
| a. Removal | b. Cleaning | c. Inspection | d. Installation |
| e. Adjustment | | | |
-

Initial Setup:

Equipment Conditions:

- Brakes caged (para. 2-15).

Materials/Parts:

- Clevis pin kit
- Cleaning compound (item 19, Appendix F)
- Brush (item 3, Appendix F)
- Locktite (item 1, Appendix F)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033
- Clevis installation gage (Appendix G)

General Safety Instructions:

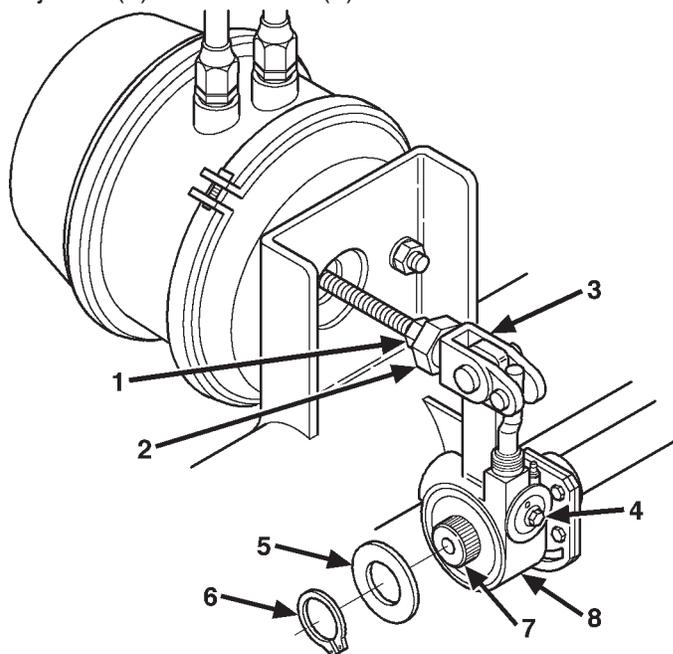
- Make sure brakes are caged prior to performing maintenance on slack adjusters.
-

WARNING

To avoid injury to personnel or damage to equipment, make sure brakes are caged prior to performing maintenance on slack adjusters.

a. Removal.

- (1) Using snap ring pliers, remove snap ring (6) and flat washer (5) from camshaft (7).
- (2) Turn adjusting screw (4) counterclockwise to release tension on slack adjuster (8).
- (3) Back off 1-1/4 in. slack adjuster nut (2) until it separates from slack adjuster clevis (3).
- (4) Loosen 15/16 in. locknut (1).
- (5) Slide slack adjuster (8) off camshaft (7).



4-48. SLACK ADJUSTER REPLACEMENT (Continued).

b. Cleaning.

- (1) Remove surface dirt with water and brush.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

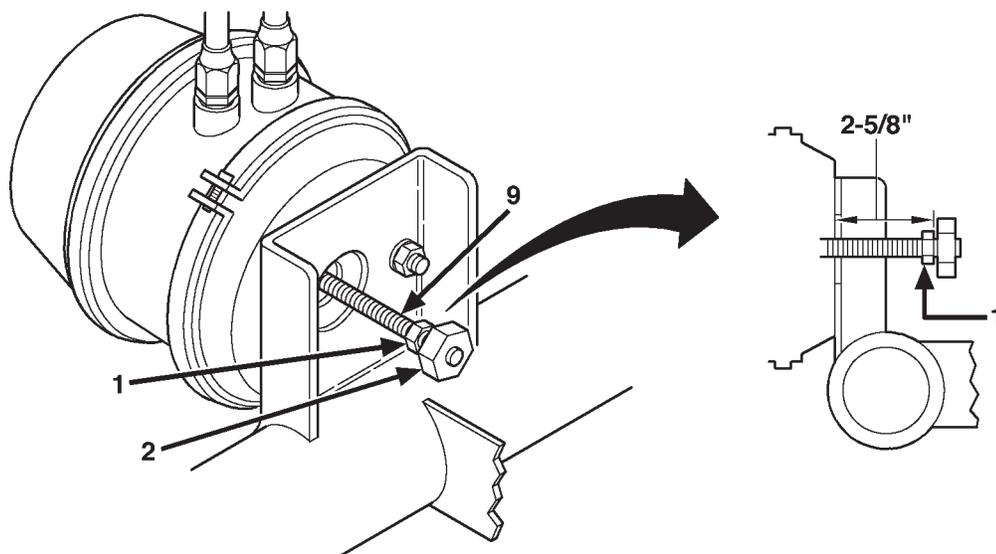
- (2) Remove grease and oil with cleaning compound. Dry thoroughly.
- (3) Lubricate in accordance with Appendix I, Lubrication Instructions.

c. Inspection.

- (1) Inspect for damage and condition of splines. Replace defective or missing parts.
- (2) Inspect for rust or corrosion.

d. Installation.

- (1) Set 15/16 in. jamnut (1) 2-5/8 in. (13.34 cm) from air chamber.



- (2) Slide 1-1/4 in. slack adjuster nut (2) onto air chamber shaft until it makes contact jamnut (1).
- (3) Install slack adjuster (8) onto camshaft (7).
- (4) Install flat washer (5) and snap ring (6).

NOTE

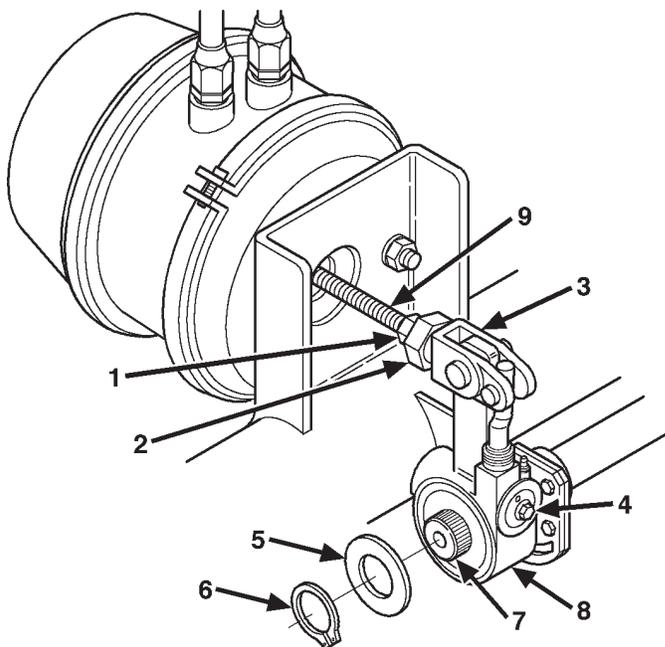
Turn adjusting screw (4) clockwise to align clevis (3) and air chamber shaft (9).

4-48. SLACK ADJUSTER REPLACEMENT (Continued).

- (5) Using adjusting screw (4), align clevis and air chamber shaft.
- (6) Turn 1-1/4 in. slack adjuster nut (2) counterclockwise to thread onto clevis until handtight.
- (7) Apply locktite to threads and tighten jamnut (1).

NOTE

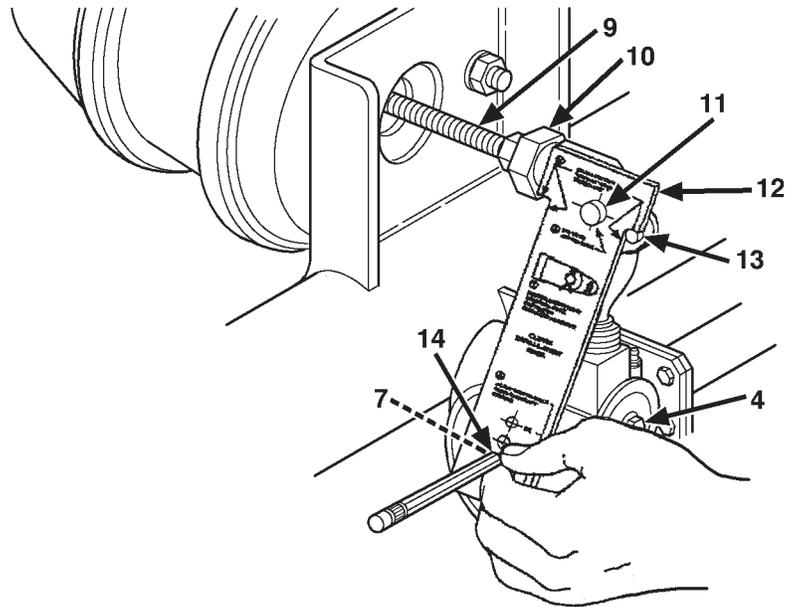
Cotter pin securing slack adjuster to clevis should be installed facing wheel.

**e. Adjustment.****NOTE**

Slack adjusters are self-adjusting. Use this procedure when installing new slack adjusters or when slack adjusters have been disconnected.

- (1) Place clevis installation gage (12) (Ref. Appendix G) so it fits over the body of the larger clevis pin (11).
- (2) If slack adjuster is properly adjusted, a pencil can be placed into the center of the camshaft (7) and the 6.0 in. slack hole (14) of the gage (12). The notch in gage and the smaller of the clevis pins (13) should also be aligned.
- (3) Adjust the 3/4 in. adjuster nut (10) in or out on the air chamber shaft (9) until the centers of the 6.0 in. slack hole (14) and the camshaft (7) are aligned.

4-48. SLACK ADJUSTER REPLACEMENT (Continued).



- (4) Lubricate in accordance with Appendix I, Lubrication Instructions.
- (5) Turn adjusting screw (4) clockwise until brake drum does not move. Back off adjusting screw (4) 3/4 of a turn. Brake drum should move freely.

WARNING

Ensure brake drum moves freely after completing step 5 (backing off adjusting screw [4] 3/4 of a turn). Brake drum should move freely. Failure to do so could result in damage to equipment and serious injury to personnel.

FOLLOW-ON TASKS:

Uncage brakes (para. 2-19).

4-49. BRAKE CAMSHAFT REPLACEMENT.

This task covers:

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

Initial Setup:

Equipment Conditions:

- Brake shoe assembly removed (para. 4-47)
- Slack adjuster assembly removed (para. 4-48)

Materials/Parts:

- Seal (2)
- Cleaning compound (item 19, Appendix F)
- Brush (item 3, Appendix F)
- Gasket

Tools/Test Equipment:

- Tool kit, mechanics general,
NSN 5180-00-177-7033
- Shop equipment, common No. 1,
NSN 4910-00-754-0654

General Safety Instructions:

- Dry cleaning solvent is toxic and flammable.
 - Avoid prolonged breathing of vapors, avoid skin contact and keep away from open flame.
-

a. Removal.

CAUTION

Make sure not to damage machined surface of camshaft when removing retaining ring. Equipment failure could result.

- (1) Expand retaining ring (6) and remove from camshaft (10).
- (2) Remove flat washer (7) from camshaft (10).
- (3) Expand retaining ring (5) and remove camshaft (10), flat washer (2), spider seal (3) and flat washer (4) from axle spider (1) and cam bracket kit (9). Discard seal.
- (4) Remove four screws (8) from cam bracket kit (9) and remove kit from bracket.

b. Cleaning.

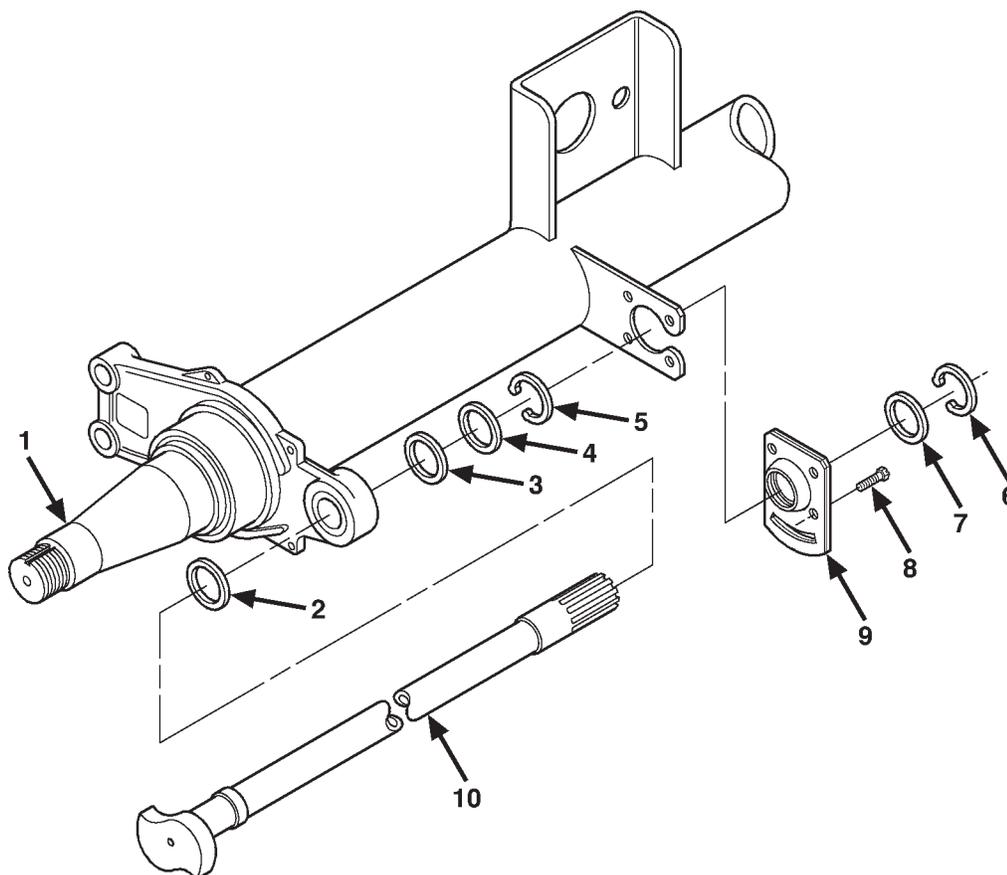
- (1) Remove dirt and mud with water and brush.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (2) Remove grease and oil with cleaning compound and a rag. Dry thoroughly.
- (3) Lubricate in accordance with Appendix I, Lubrication Instructions.

4-49. BRAKE CAMSHAFT REPLACEMENT (Continued).

**c. Inspection.**

- (1) Inspect for damage and condition of splines. Replace defective parts.
- (2) Inspect for rust or corrosion.

d. Installation.

- (1) Position cam bracket kit (9) onto spider bracket and secure with four screws (8).
- (2) Align new seals (3), flat washers (2 and 4), and expanded retaining ring (5), and install camshaft (10) in axle spider (1) and cam bracket kit (9).
- (3) Install flat washer (7) on camshaft (10).
- (4) Expand retaining ring (6) and install on camshaft (10).

FOLLOW-ON TASKS:

- Install slack adjuster (para. 4-48).
- Adjust slack adjuster (para. 4-48).
- Install brake shoe assembly (para. 4-47).

4-50. GLADHAND REPLACEMENT.

This task covers:

- | | | |
|------------------------------|-----------------|-------------------------------|
| a. Removal | b. Cleaning | c. Inspection and Replacement |
| d. Packing Ring Installation | e. Installation | |
-

Initial Setup:

Equipment Conditions:

- Parked on level ground and brakes engaged.

Materials/Parts:

- Packing ring
- Cleaning compound (item 19, Appendix F)
- Rags (item 15, Appendix F)
- Brush (item 3, Appendix F)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033

General Safety Instructions:

- Dry cleaning solvent is toxic and flammable.
 - Avoid prolonged breathing of vapors, avoid skin contact and keep away from open flame.
-

a. Removal.

- (1) Disconnect air line coupling from rear of gladhand coupling.
- (2) Open kingpin stowage box lid and secure in open position

WARNING

Secure kingpin stowage box lid prior to removing gladhands. Failure to do so may result in serious injury

- (3) Remove three bolts (1), washers (2), and nuts (3) from gladhand (4) and gooseneck.
- (4) Remove gladhand (4) from gooseneck.

b. Cleaning.

- (1) Clean mud and dirt from all exposed surfaces with water and a brush.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (2) Remove grease with cleaning compound and a clean rag.

4-50. GLADHAND REPLACEMENT (Continued).

c. Inspection and Replacement.

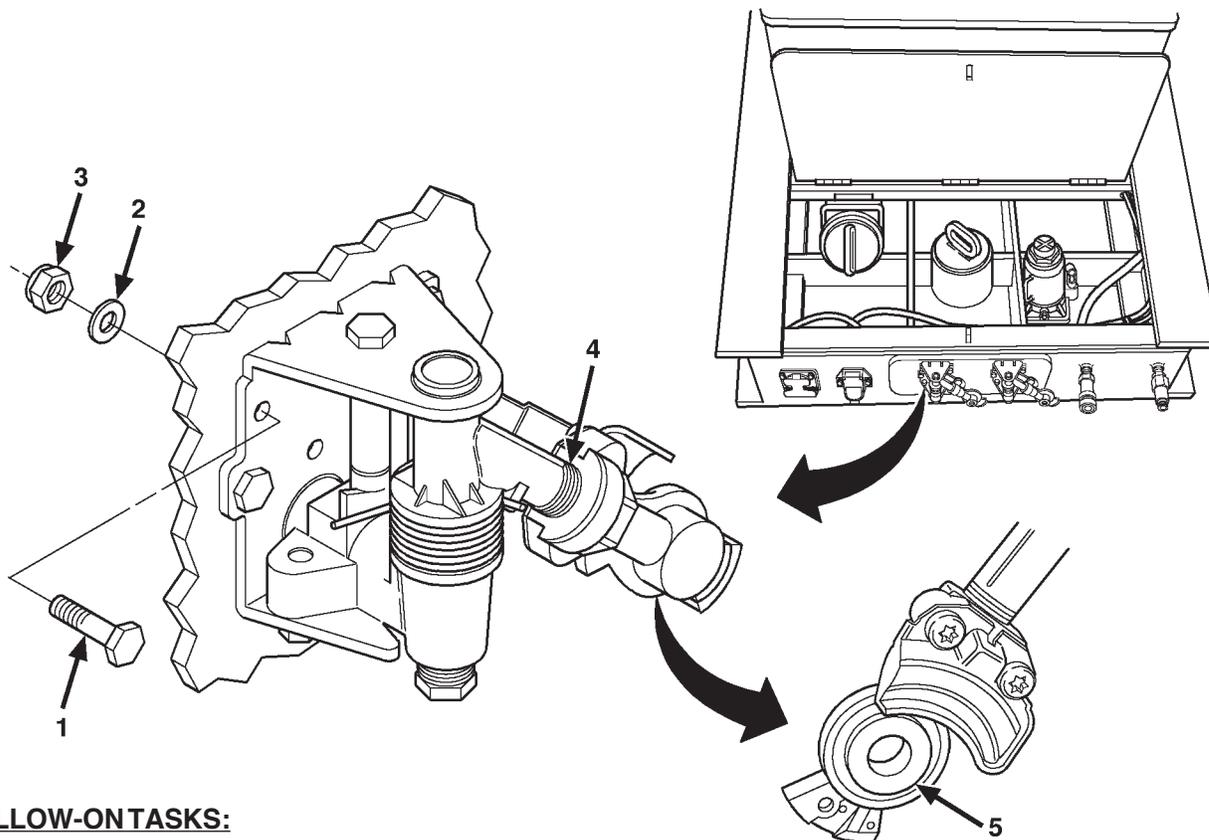
- (1) Inspect gladhand body for damaged threads, cracks, dents, holes and warps.
- (2) Replace defective gladhand.
- (3) Pry out packing ring (5) and check for wear and deterioration.

d. Packing Ring Installation.

- (1) Clean packing ring groove in gladhand.
- (2) Partially collapse ring with fingers and insert one side of ring flange into groove.
- (3) Push ring into place. Face of ring must lie flat with no twist or bulge.

e. Installation.

- (1) Position gladhand (4) on gooseneck and secure with three bolts (1), washer (2), and nuts (3).
- (2) Apply anti-seize tape to threads of gladhand (4) and air line coupling and connect air line to gladhand.



FOLLOW-ON TASKS:

None.

4-51. SPRING BRAKE CONTROL VALVE REPLACEMENT.

This task covers:

- a. Removal b. Installation c. Operating Test d. Leakage Test
-

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033

Materials/Parts:

- Marker tag (item 20, Appendix F)
 - Tape, anti-seizing (item 22, Appendix F)
 - Detergent (item 8, Appendix F)
-

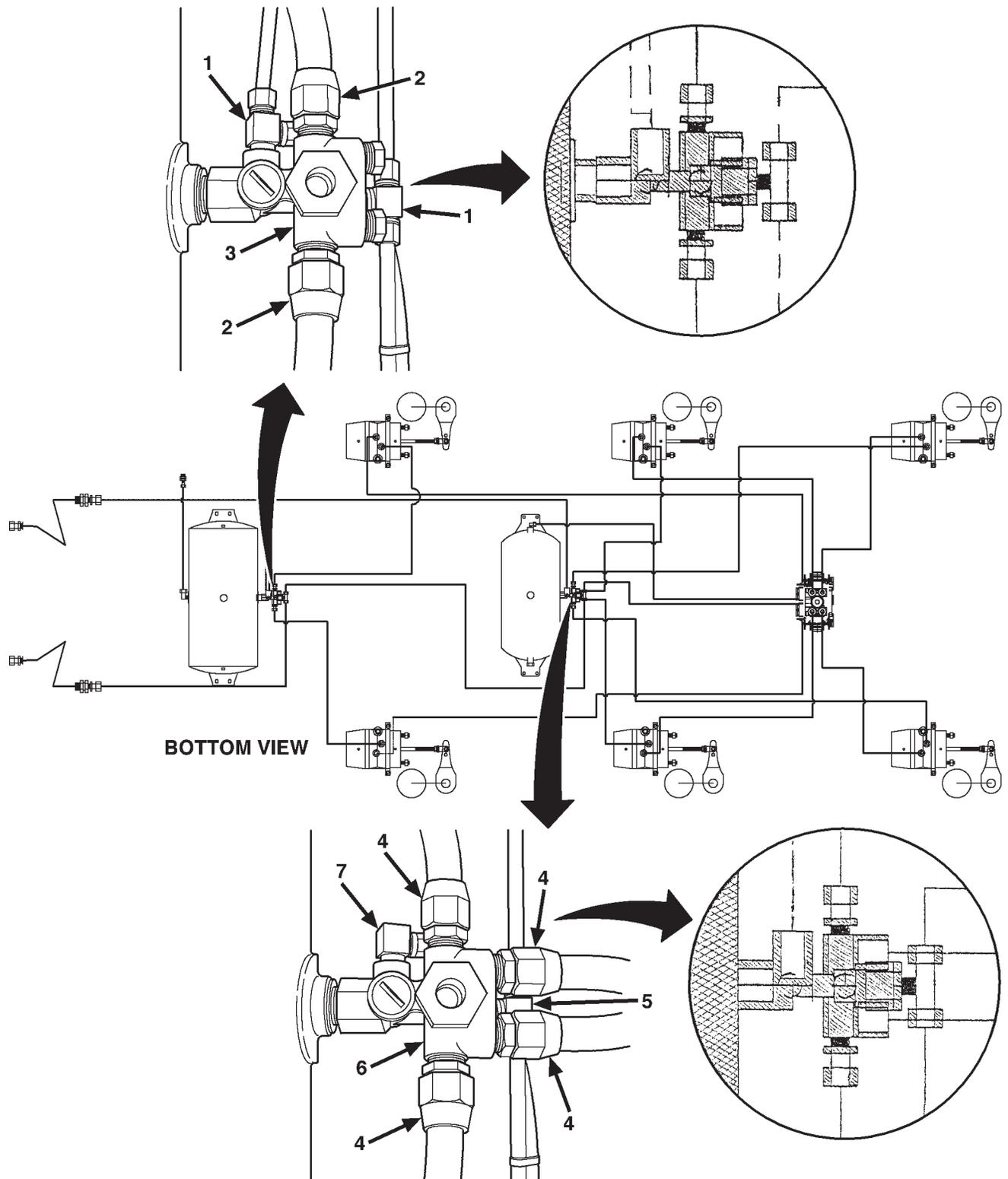
a. Removal.

- (1) For front spring brake control valve (3), tag and disconnect six air lines from two tees (1) and two fittings (2).
- (2) For mid spring brake control valve (6), tag and disconnect seven air lines from one tee (5), four fittings (4) and one elbow (7).
- (3) Remove spring brake control valve (3 or 6) from air reservoir.
- (4) Remove tees (1 or 5), fittings (2 or 4) and elbow (7) from spring brake control valve (3 or 6).
- (5) Install plugs or tape closed all line openings to prevent dirt contamination of system.

b. Installation.

- (1) Remove plugs or tape from air line openings.
- (2) Apply anti-seize tape to threads of fittings (2 or 4), tees (1 or 5) and elbow (7) and install onto spring brake control valve (3 or 6).
- (3) Apply anti-seize tape to threads of spring brake control valve (3 or 6) and install onto air reservoir.

4-51. SPRING BRAKE CONTROL VALVE REPLACEMENT (Continued).



4-51. SPRING BRAKE CONTROL VALVE REPLACEMENT (Continued).

c. Operating Test.

- (1) With gladhands connected to towing vehicle, apply brakes. Check to see that brakes of all semitrailer wheels apply properly.
- (2) Release brakes. Check to see that each brake releases properly.
- (3) With brake system fully pressurized, close shutoff cock on emergency hose in towing vehicle. Disconnect gladhands tagged EMERGENCY to towing vehicle. Make sure semitrailer brakes apply automatically.
- (4) Connect gladhands tagged EMERGENCY to towing vehicle. Open shutoff valve cock in towing vehicle. Check to see that brakes release automatically.

d. Leakage Test.

- (1) With air system connected, apply a solution of detergent and water to flanges holding diaphragm in spring brake chamber, and to gladhands tagged SERVICE. No leakage is permitted. Tighten nuts on flanges and coupling on gladhands as required.
- (2) With brake system fully pressureized, close shutoff cock on emergency line in towing vehicle. Disconnect gladhands tagged EMERGENCY from towing vehicle. Make sure semitrailer brakes apply automatically. Coat spring brake control valve exhaust port with a solution of detergent and water.
- (3) Leakage must not exceed a one-inch (2.5 cm) bubble in three seconds. If excess leakage is found, replace spring brake control valve.

FOLLOW-ONTASKS:

None.

4-51A. ELECTRONIC CONTROL UNIT (ECU) OPERATING TEST.

This task covers:

- a. Operating Test
-

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Tools/Test Equipment:

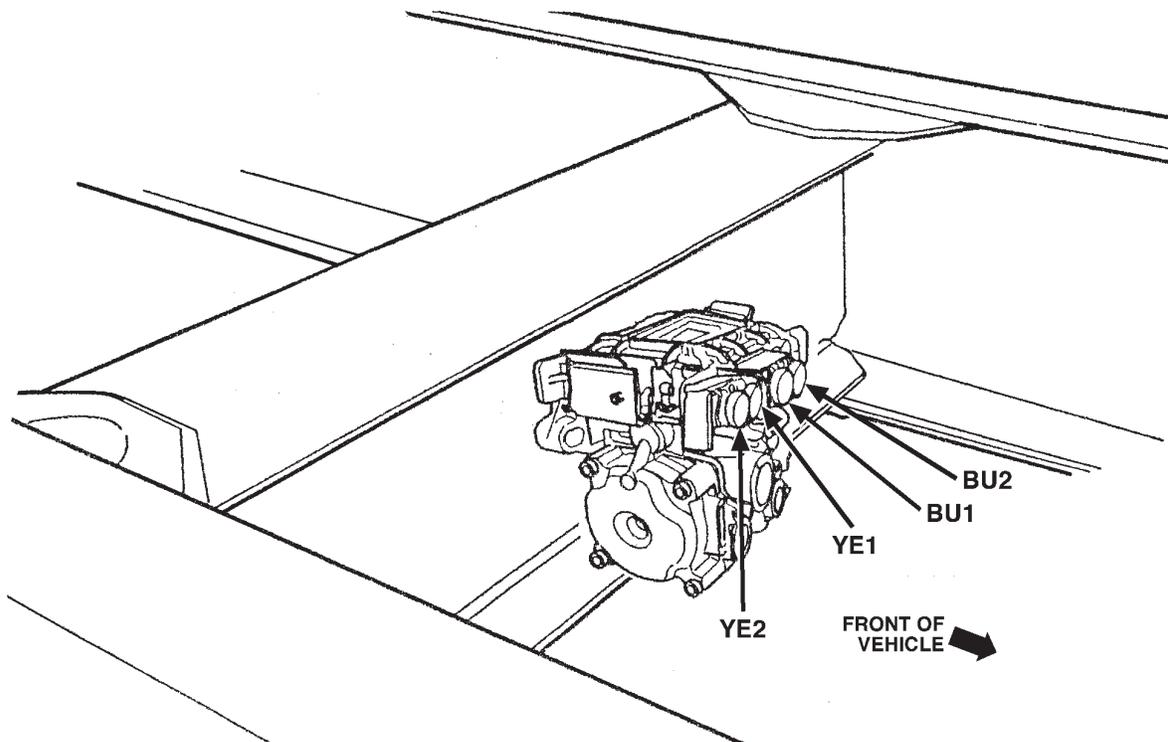
- Tool kit, mechanics general
NSN 5180-00-177-7033
-

a. Operating Test.

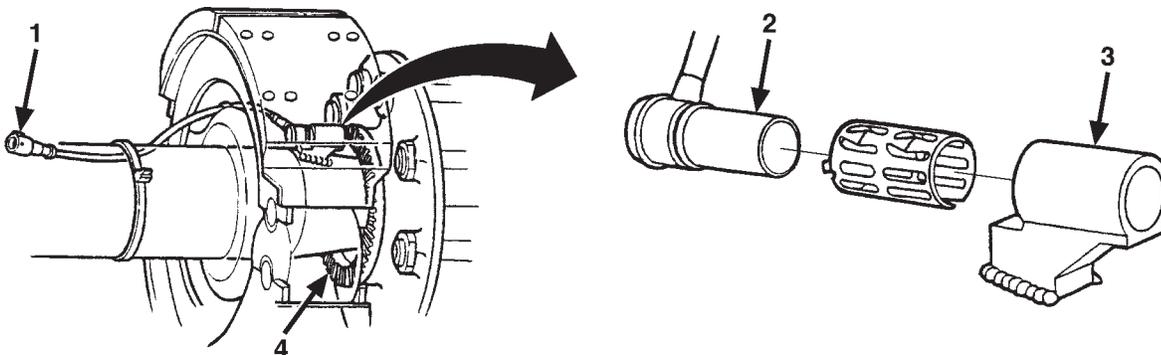
- (1) Apply 12 volt DC power to the ABS.
- (2) The ECU/dual modulator valve assembly should click four times.
- (3) If the ABS indicator lamp comes on for three seconds and then goes out, this indicates a proper installation. The Operating Test is complete.
- (4) If the ABS indicator lamp comes on and stays on, check the sensor installation by removing power from the ABS and raising the sensed wheels so they may be rotated.
- (5) Apply emergency air to fill the air tanks and release the spring brakes so that the wheels may be rotated.
- (6) Repeat Steps (1) and (2).
- (7) Rotate each sensed wheel, one at a time and at a rate of 1/2 revolution per second. This rate equals a wheel speed of approximately 4 mph (7 kph). If the ABS indicator lamp goes out and stays out, a proper installation is indicated and the Operating Test is complete.
- (8) If the ABS lamp does not go out, there is a sensor gap problem or hardware fault. Adjust the sensor gap and, if necessary, perform a fault code check (Ref. Step 11).

4-51A. ELECTRONIC CONTROL UNIT (ECU) OPERATING TEST (Continued).

- (9) Test sensors at each wheel location by disconnecting power to the ECU assembly. Disconnect the sensor electrical connector (1) from the ECU assembly. Connect the leads of a volt/ohm meter to the two wire component terminals inside the disconnected connector (1). When checking the resistance, the meter must read 900 to 2000 ohms. Check and replace the sensor (2) and cables as required.
- (10) To perform a sensor gap adjustment push the sensor (2) into its holder (3) until it contacts the tooth wheel (4). There must be no gap between the sensor and the tooth wheel. The AC voltage should measure 0.2 volt AC when the wheel is rotated at a rate of 1/2 revolution per second. Make the necessary repairs and repeat Steps (1) through (7).
- (11) To perform the fault code check, apply constant power to the ECU/dual modulator valve assembly for more than one, but less than five seconds. Remove power and then reapply power. The ABS indicator lamp should repeat the appropriate blink code (Ref. Table 4-4. Fault Blink Code Chart) three times. Find the problem on the chart, repair as required and repeat Steps (1) through (7).



ECU/DUAL MODULATOR VALVE MOUNTED WITH
SENSORS FACING FRONT OF TRAILER
(TYPICAL VIEW)



4-51A. ELECTRONIC CONTROL UNIT (ECU) OPERATING TEST (Continued).**Table 4-4. Fault Blink Code Chart**

Blink Code	Problem Area	Action
3	Sensor BU1	<ul style="list-style-type: none"> • Determine sensor location. • Check sensor installation. • Conduct sensor test. • Replace sensor (Ref. para. 4-52A). • Check sensor extension installation.
4	Sensor YE1	<ul style="list-style-type: none"> • Determine sensor location. • Check sensor installation. • Conduct sensor test. • Replace sensor (Ref. para. 4-52A). • Check sensor extension installation.
5	Sensor BU2	<ul style="list-style-type: none"> • Determine sensor location. • Check sensor installation. • Conduct sensor test. • Replace sensor (Ref. para. 4-52A). • Check sensor extension installation.
6	Sensor YE2	<ul style="list-style-type: none"> • Determine sensor location. • Check sensor installation. • Conduct sensor test. • Replace sensor (Ref. para. 4-52A). • Check sensor extension installation.
7	External ABS modulator valve	<ul style="list-style-type: none"> • Verify proper electrical installation. • Check power supply. • Replace ECU (Ref. para. 4-52).
9	Internal modulator failure, inlet valve #2	<ul style="list-style-type: none"> • Verify proper installation. • If code continues, replace ECU (Ref. para. 4-52).
10	Internal modulator failure, inlet valve #1	<ul style="list-style-type: none"> • Verify proper installation. • If code continues, replace ECU (Ref. para. 4-52).
11	Internal modulator failure, outlet valve	<ul style="list-style-type: none"> • Verify proper installation. • If code continues, replace ECU (Ref. para. 4-52).
14	Power Supply	<ul style="list-style-type: none"> • Verify proper electrical installation. • Check power supply. • Check for voltage readings of 11 - 16 volts • Replace ECU (Ref. para. 4-52).
15	ECU Failure	<ul style="list-style-type: none"> • Verify proper installation. • If code continues, replace ECU (Ref. para. 4-52).
16	SAE J1708 Failure	<ul style="list-style-type: none"> • Internal failure. • Replace ECU (Ref. para. 4-52).
17	SAE J2497 Failure	<ul style="list-style-type: none"> • Internal failure. • Replace ECU (Re. para. 4-52).
18	Generic I/O Failure	<ul style="list-style-type: none"> • Verify proper electrical installation. • Check power supply. • Check for voltage readings of 11 - 16 volts. • Replace ECU (Ref. para. 4-52)

FOLLOW-ONTASKS:

None.

4-52. ELECTRONIC CONTROL UNIT (ECU) REPLACEMENT.

This task covers:

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

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Materials/Parts:

- Tape, anti-seizing (item 22, Appendix F)
- Marker tag (item 20, Appendix F)
- Detergent (item 8, Appendix F)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033
-

a. Removal.

WARNING

- **Release all pressure from the air system before you disconnect any components. Pressurized air can cause serious personal injury.**
- **Remove all power to trailer prior to making any repairs to the Electronic Control Unit (ECU). Failure to do so may result in serious injury or death.**

- (1) Release all air pressure from the air lines.
- (2) Identify and label all electrical cables and air lines connected to ECU.
- (3) Disconnect the air lines from the ECU and seal opening to lines with tape. Also seal ECU air ports with tape or protective caps if available.
- (4) Disconnect electrical cables from the ECU sensor ports and seal ports with tape or protective caps if available
- (5) Loosen and remove two mounting bolts and lock nuts securing ECU to bracket and remove ECU.

b. Installation.

NOTE

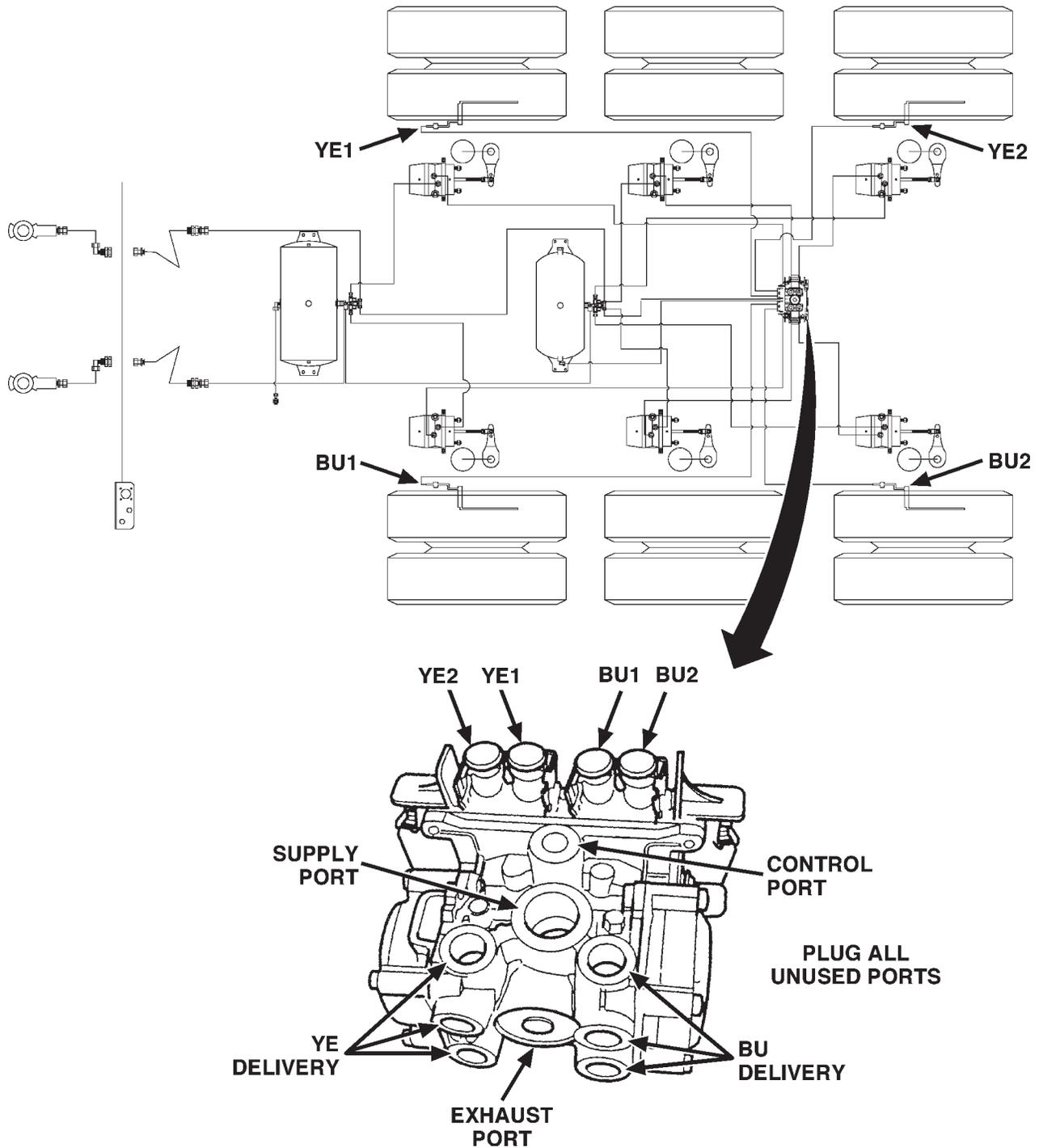
The ECU/dual modulator valve is supplied with black protective caps on each sensor port. When a sensor cable is not plugged into a sensor port, the black cap must remain on the connector port to protect it from dirt and contamination.

- (1) Mount the ECU to the trailer bracket and orient the ECU so that the exhaust port faces down. Secure using two 3/8 in. grade 8 bolts and new locknuts and torque the nuts to 18 lbs-ft (24 N•m). Plug all unused ports.
- (2) Clean threads to air lines and apply anti-seize tape to threads.
- (3) Connect air lines to ECU following label markers applied during removal.
- (4) Connect electrical sensor cables to ECU following label markers applied during removal (Ref. electrical diagram).

4-52. ELECTRONIC CONTROL UNIT (ECU) REPLACEMENT (Continued).

NOTE

When securing sensor cables to ECU, the sensor retainer clip must be pushed down to secure connection. Retainer clips must fit in groove of sensor connectors to ensure proper connection.

**FOLLOW-ON TASKS:**

None.

4-52A. ABS WHEEL SENSOR.

This task covers:

- a. Removal b. Installation c. Sensor Output Voltage Test
-

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged. and wheels chocked.
- Slack adjusters backed off.
- Tire and wheel removed (para. 3-8).
- Drum removed (para. 4-61)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180 00-177-7033
-

WARNING

The ABS is an electrical system. When working on the ABS the same precautions must be taken as with any electrical system to avoid serious personal injury. The danger of electrical shock or sparks exists which could ignite flammable substances. Always disconnect the power to the system before any repairs are made.

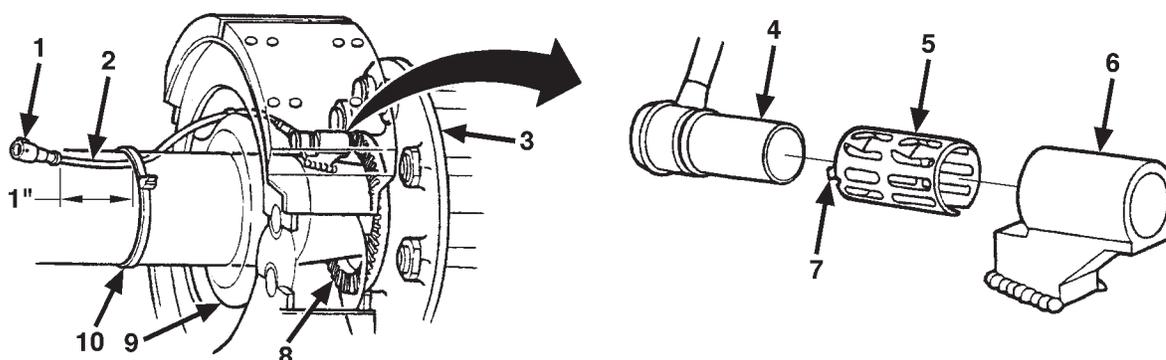
CAUTION

When welding on an ABS equipped vehicle or trailer, disconnect the power connector from the ECU. Also disconnect the power from the ECU/Valve Assembly before removing any components. Failure to do so can cause faults to be recorded and stored in the ECU memory.

a. Removal.

- (1) Grasp the sensor (4) (not the cable [2]), and using a twisting motion, pull the sensor out of the mounting block sensor holder (6).
- (2) Remove the spring clip (5) from the sensor holder (6).
- (3) Remove any fasteners (10) holding the sensor cable to other components.
- (4) Disconnect the sensor cable (1) from the extension cable.

4-52A. ABS WHEEL SENSOR (Continued).

**b. Installation.**

- (1) Apply a mineral oil-based grease (ref. item 10, Appendix F) that contains molydisulfide to the sensor spring clip and to the body of the sensor. The grease must be anti-corrosive and contain adhesive properties that will continuously endure temperatures from -40° to 302° F. (-40° to 150° C).
- (2) Push the spring clip (5) into the sensor holder (6) from the inboard side until the spring clip tabs (7) are against the sensor holder (6).
- (3) Push the sensor (4) into the spring clip (5) as far as possible.
- (3) Route the sensor cable (2) toward the brake chamber, over the brake spider (9), and behind the axle. Use a zip ties (10) to secure the cable to the axle between the brake spider and the suspension brackets. Locate the zip ties one inch from the molded sensor plug (1). Continue to route the sensor cable behind the spring seats.
- (4) Install the wheel hub (3) carefully, so that the tooth wheel (8) pushes against the sensor as you adjust the wheel bearings. After installation there should be no gap between the sensor (4) and the tooth wheel (8). During normal operation a gap of 0.040 in. is allowable.

c. Sensor Output Voltage Test.

- (1) Use a volt/ohm meter to check the AC output voltage of the sensors while rotating the wheel at approximately one-half revolution per second. Minimum output must be greater than 0.2 volts AC. If minimum output is less than 0.2 volts AC, push the sensor (4) toward the tooth wheel (8). Recheck the sensor output.

FOLLOW-ONTASKS:

None.

4-53. AIR BRAKE CHAMBER REPLACEMENT.

This task covers:

- | | | |
|-----------------|-----------------|-------------|
| a. Leakage test | b. Removal | c. Cleaning |
| d. Inspection | e. Installation | |
-

Initial Setup:

Equipment Conditions:

- Brakes caged (para. 2-19)

Materials/Parts:

- Cleaning compound (item 19, Appendix F)
- Anti-seize tape (item 21 Appendix F)
- Detergent (item 8, Appendix F)
- Brush (item 3, Appendix F)
- Rags (item 15, Appendix F)
- Marker tags (item 20, Appendix F)
- Lock washer (2)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033

General Safety Instructions:

- Dry cleaning solvent is toxic and flammable.
 - Avoid prolonged breathing of vapors, void skin contact, and keep away from open flame.
-

a. Leakage Test.

- (1) Coat air chamber flange with soap and water solution to all air fittings and inspect for leaks.
- (2) If any leakages are detected, tighten securing hardware sufficiently to stop leaks. No leakage is allowable.
- (3) Check non-pressure side of air chamber for leaks by applying soap and water solution to holes in chamber body. If leakage exists, replace air chamber.

b. Removal.

- (1) Open dump valve on all air reservoirs and allow air pressure to bleed off.
- (2) Loosen locknut (6).
- (3) Back off slack adjuster nut (5) until it separates from slack adjuster clevis (4).
- (4) Turn adjusting screw counterclockwise to release tension on slack adjuster.
- (5) Tag and disconnect two air lines (1) from air chamber (7).
- (6) Remove two nuts (3) and lock washers (2) and air chamber (7) from axle. Discard lock washers.

c. Cleaning

- (1) Clean mud and dirt from exposed surfaces with water and a stiff brush.

4-53. AIR BRAKE CHAMBER REPLACEMENT(Continued).

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (2) Remove grease and oil with cleaning compound using a soft cloth. Dry thoroughly.

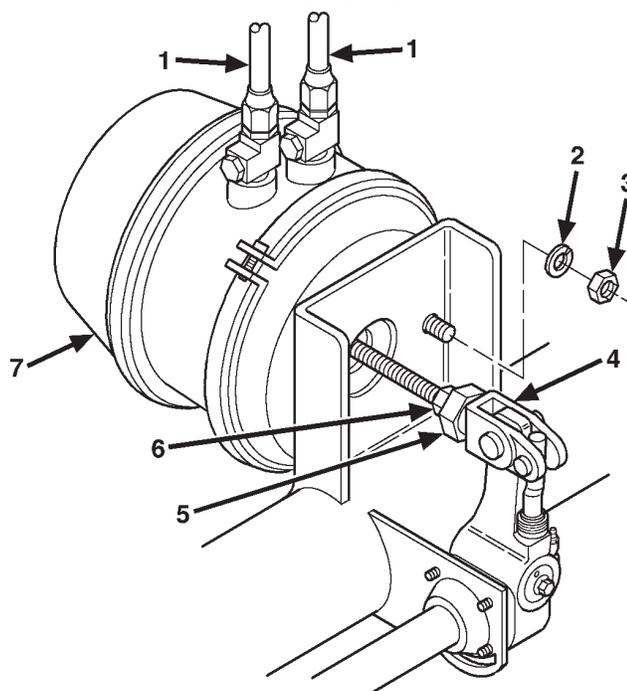
d. Inspection.

- (1) Inspect for loose, missing or damaged parts.
- (2) Inspect air chamber for cracks, dents, holes and warps.
- (3) Inspect for rust or corrosion.

e. Installation.

WARNING

If installing a new brake air chamber, make sure it is caged prior to installation. Failure to do so could result in serious injury to personnel or damage to equipment.



- (1) Position air chamber (7) onto axle and secure with two nuts (3) and new lock washers (2).
- (2) Apply anti-seize tape to two air lines (1) and connect air lines.
- (3) Close all drain valves and pressurize air brake system.
- (4) Check for leaks.

FOLLOW-ON TASKS:

- Adjust slack adjuster (para. 4-48).
- Uncage brakes (para. 2-19).

4-54. FRONT RESERVOIR MAINTENANCE.

This task covers:

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

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground and brakes engaged.
- Spring brake control valve removed (para. 4-51).

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033

Materials/Parts:

- Cleaning compound (item 19, Appendix F)
 - Tape, anti-seizing (item 21, Appendix F)
 - Rag (item 15, Appendix F)
 - Brush (item 3, Appendix F)
 - Marker tag (item 20, Appendix F)
 - Nut, self-locking (4)
 - Gasket (2)
-

a. Removal.

- (1) Tag and disconnect air hose (4) from elbow (3).
- (2) Remove elbow (3), from air reservoir (2).
- (3) Seal reservoir outlet (9) to spring brake control valve with tape.
- (4) Remove four bolts (1), eight washers (6), four self-locking nuts (5), and two gaskets (7) from air reservoir (2) and trailer frame (8) and lower and remove reservoir. Discard self-locking nuts and gaskets.

b. Cleaning.

CAUTION

To prevent contamination of air system components, take care to keep water from entering reservoir.

- (1) Clean mud and dirt from exposed surfaces with water and brush.

WARNING

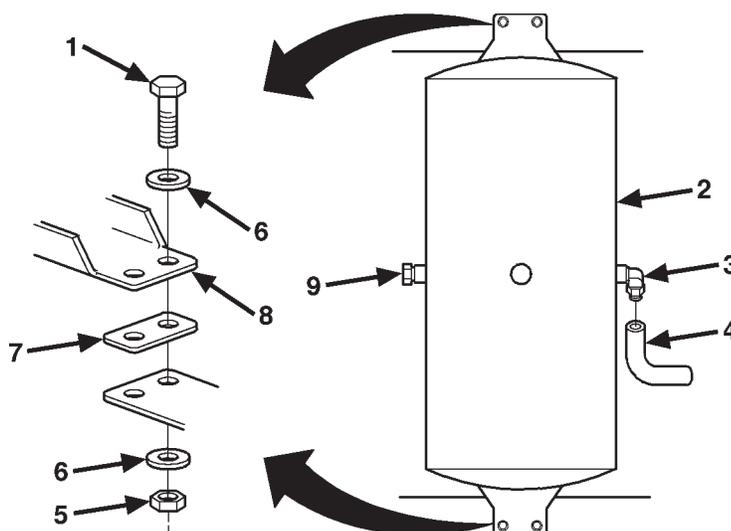
Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (2) Remove grease and oil with cleaning compound and a clean soft rag.

c. Inspection.

- (1) Inspect for loose, missing or damaged parts.
- (2) Inspect air reservoir for cracks, dents, holes and bulges.
- (3) Inspect mounting brackets for cracks, warps and broken welds.
- (4) Inspect for rust or corrosion.
- (5) Replace defective parts.

4-54. FRONT RESERVOIR MAINTENANCE (Continued).

**d. Installation.**

- (1) Install air reservoir (2) and two new gaskets (7) to trailer frame (8) using four bolts (1), eight washers (6), and four new self-locking nuts (5).
- (2) Apply anti-seize tape to threads of elbow (3) and install elbow to air reservoir (2).
- (3) Connect air hose (4) and elbow (3).
- (4) Remove sealing tape from outlet coupling (9) to spring brake control valve and apply anti-seize tape to threads of valve outlet coupling.

FOLLOW -ON TASKS:

None.

4-55. REAR RESERVOIR MAINTENANCE.

This task covers:

- | | | |
|-----------------|-------------------------|---------------------------|
| a. Removal | b. Cleaning | c. Inspection |
| d. Installation | e. Drain valve cleaning | f. Drain valve inspection |

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged. and wheels chocked.
- Spring brake control valve removed (para. 4-51).

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033

Materials/Parts:

- Cleaning compound (item 3, Appendix F)
- Gasket (2)
- Tape, anti-seizing (item 21, Appendix F)
- Rag (item 15, Appendix F)
- Brush (item 3, Appendix F)
- Marker tag (item 20, Appendix F)
- Nut, self-locking (4)

a. Removal.

- (1) Tag and disconnect air hose (10) from elbow (9), and seal air hose with tape.
- (2) Remove elbow (9) from air reservoir (2).
- (3) Seal reservoir outlet (3) to spring brake control valve with tape.
- (4) Remove four bolts (1), eight washers (6), four self-locking nuts (5), and two gaskets (7) from air reservoir (2) and trailer frame (8) and lower and remove air reservoir. Discard self-locking nuts and gaskets.

b. Cleaning.

CAUTION

To prevent contamination of air system components, take care to keep water from entering reservoirs.

- (1) Clean mud and dirt from exposed surfaces with water and brush.

WARNING

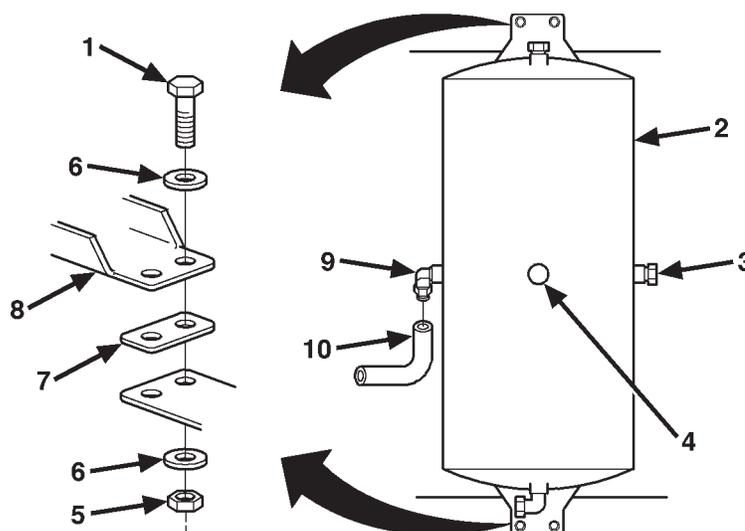
Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (2) Remove grease and oil with cleaning compound and a clean soft rag.

c. Inspection.

- (1) Inspect for loose, missing or damaged parts.
- (2) Inspect air reservoir for cracks, dents, holes and bulges.

4-55. REAR RESERVOIR MAINTENANCE (Continued).



- (3) Inspect mounting brackets for cracks, warps and broken welds.
- (4) Inspect for rust or corrosion.
- (5) Replace defective parts.

d. Installation.

- (1) Install air reservoir (2) and two new gaskets (7) to trailer frame (8) using four bolts (1), eight washers (6) and four new self-locking nuts (5).
- (2) Apply anti-seize tape to threads of elbow (9), and install elbow to air reservoir (2).
- (3) Connect air hose (10) to elbow (9).
- (4) Remove sealing tape from outlet coupling (3) to spring brake control valve, apply anti-seize tape to threads of valve and connect to coupling.
- (5) Hold valve in position and tighten coupling (3).

e. Drain Valve Cleaning.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

Remove grease and oil with cleaning compound and a clean soft rag.

f. Drain Valve Inspection.

- (1) Inspect drain valve (4) for damage or excessive wear.
- (2) Replace defective Drain Valve.

FOLLOW-ON TASKS:

- Perform air reservoir serviceability test (para. 4-56).

TM 5-2330-325-14&P

4-56. AIR RESERVOIR SERVICEABILITY TEST.

This task covers:

- a. Serviceability Test

Initial Setup:

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033

Materials/Parts:

- Detergent (item 8, Appendix F)
-

a. Serviceability Test.

- (1) With air brake system connected to towing vehicle, coat connections with a solution of detergent and water. No leakage is permissible.
- (2) Tighten any leaking connections.
- (3) Inspect air reservoir for damage or corrosion. Replace air reservoir if it leaks or if there is any damage or corrosion that could weaken the air reservoir.

FOLLOW-ON TASKS:

None.

4-57. DUMP VALVE REPLACEMENT.

This task covers:

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

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Tools/Test Equipment:

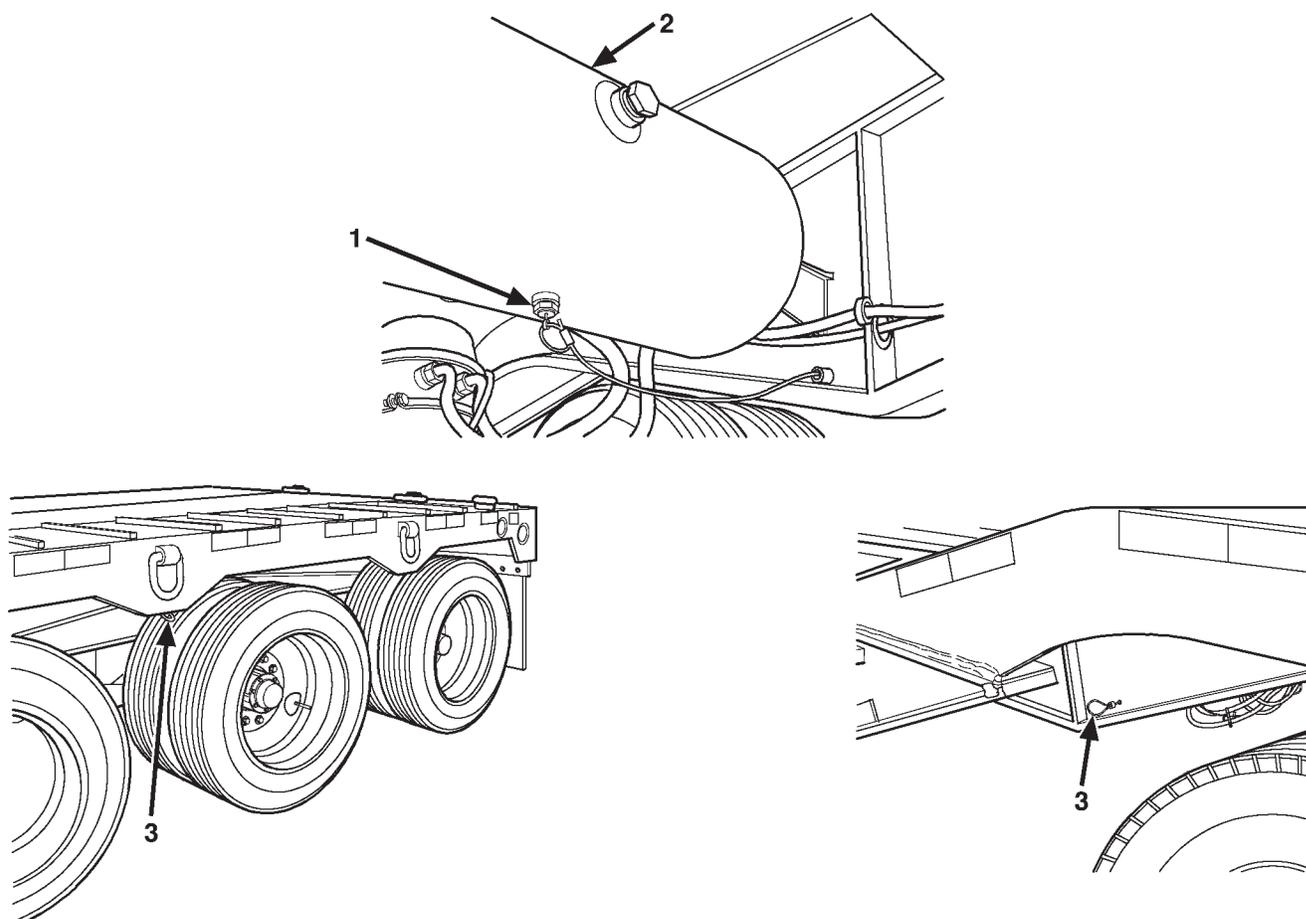
- Tool kit, mechanics general, NSN5180-00-177-7033

Materials/Parts:

- Cleaning compound (item 19, Appendix F)
- Tape, anti-seizing (item 21, Appendix F)
- Rag (item 15, Appendix F)
- Brush (item 3, Appendix F)
- Marker tag (item 20, Appendix F)

a. Removal.

- (1) Disconnect release cable (3) from dump valve (1).
- (2) Remove dump valve (1) from front or rear air reservoir (2).



4-57. DUMP VALVE REPLACEMENT (Continued).

b. Cleaning.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

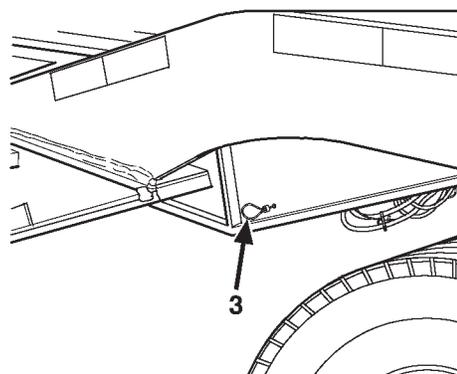
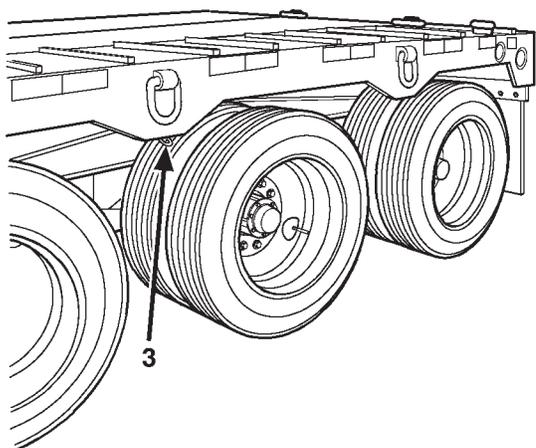
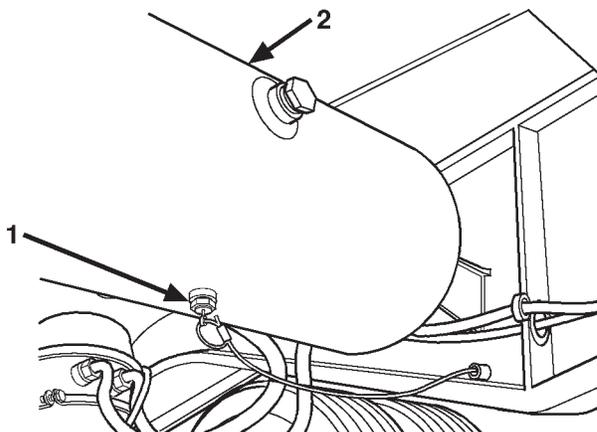
- (1) Remove grease and oil with cleaning compound and a clean soft rag.

c. Valve Inspection.

- (1) Inspect for damage or excessive wear.
- (2) Replace defective drain valve.

d. Installation.

- (1) Apply anti-seize tape to threads of dump valve (1) and install valve onto air reservoir (2)
- (2) Connect dump valve release cable (3) to dump valve (1).

**FOLLOW-ON TASKS:**

None.

4-58. AIR BRAKE HOSE REPLACEMENT AND REPAIR.

This task covers:

- a. Replacement/Repair
-

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033

Materials/Parts:

- Tape, anti-seizing (item 21, Appendix F)
 - Tie, plastic (item 24, Appendix F)
-

NOTE

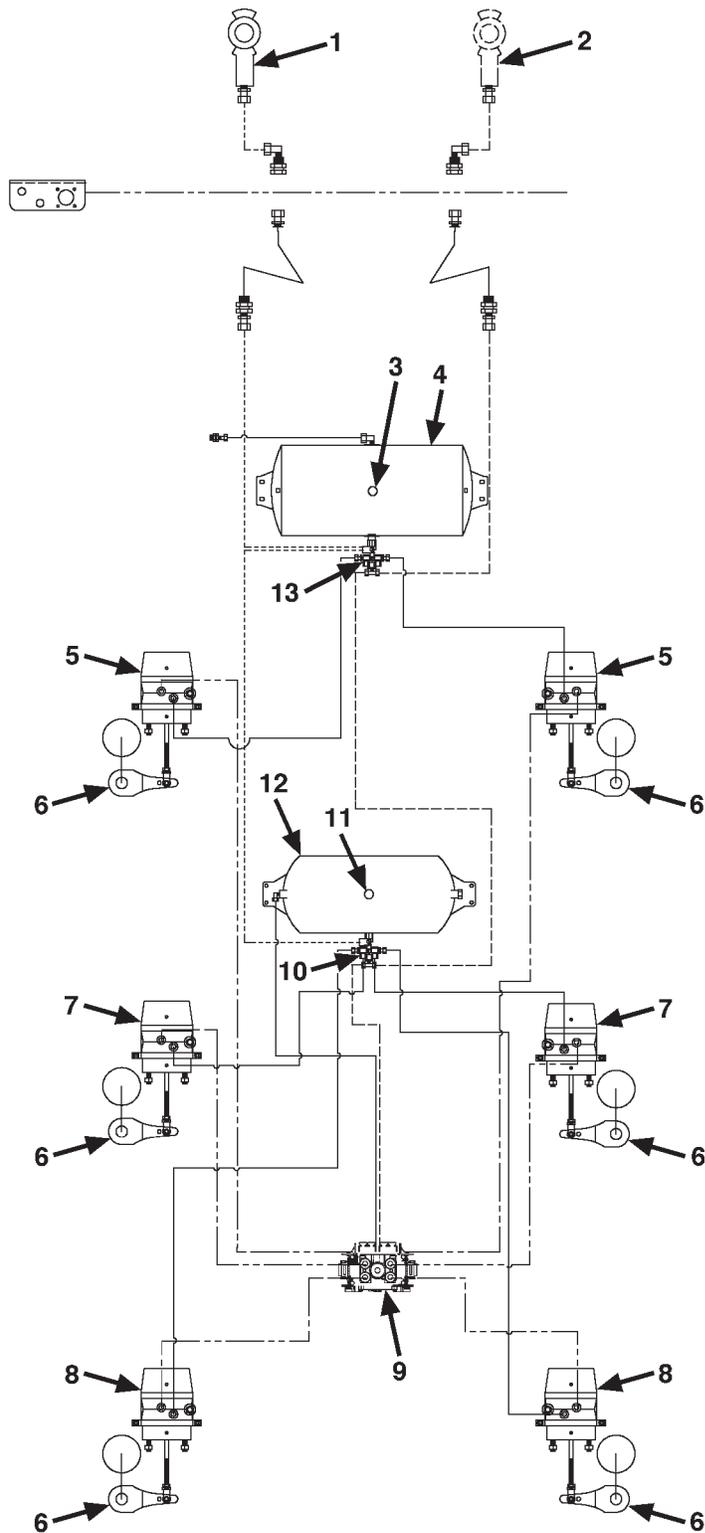
- **Air hoses can be replaced or repaired, depending on the length of the damaged section. If damaged air hose is short, replace it. If damaged air hose is long, repair it. Ensure air pressure has been relieved from air system prior to removing, replacing or repairing airlines.**
 - **See paragraphs 4-21 (Lines and Ports), 4-22 (Anti-seize Tape), and 4-23 (Tubes and Compression Fittings) for general air brake hose maintenance instructions.**
- a. **Replacement/Repair.** Air hoses are not ordinarily removed except if they need to be replaced. Badly damaged air hoses must be replaced. Air hoses must be tightly attached and connected. See air brake system schematic (para. 4-59) diagram for additional information.

FOLLOW-ON TASKS:

Check air brake system for leaks (para. 4-56).

4-59. AIR BRAKE SYSTEM DIAGRAM

SUPPLY -----
 CONTROL -----
 EMER. -----
 SERVICE -----



KEY COMPONENT

- | | |
|----|-----------------------------------|
| 1 | Coupling—Gladhand, Emergency |
| 2 | Coupling—Gladhand, Control |
| 3 | Drain Valve—Front Reservoir |
| 4 | Air Reservoir—Front |
| 5 | Air Brake Chambers, Front Axle |
| 6 | Slack Adjusters |
| 7 | Air Brake Chambers, Mid Axle |
| 8 | Air Brake Chambers, Rear Axle |
| 9 | Electronic Control Unit (ECU) |
| 10 | Spring Brake Control Valve, Rear |
| 11 | Drain Valve—Rear Reservoir |
| 12 | Air Reservoir—Rear |
| 13 | Spring Brake Control Valve, Front |

AIR BRAKE SYSTEM DIAGRAM

Section VIII. WHEELS, HUBS, AND BRAKEDRUM REPLACEMENT

Paragraph Number	Paragraph Title	Page Number
4-60.	General	4-82
4-61.	Hub and Brakedrum Replacement	4-82

4-60. GENERAL.

This section provides information for performing Unit level wheel, hub, and brakedrum repairs on the M870A3 semitrailers.

4-61. HUB AND BRAKEDRUM REPLACEMENT.

This task covers:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Removal c. Installation and Adjustment | <ul style="list-style-type: none"> b. Cleaning and Inspection |
|--|--|

Initial Setup:

Equipment Conditions:

- Wheel removed (para. 3-8).
- Brake caged (para. 2-14).

Materials/Parts:

- Lockwasher (6)
- Gasket
- Gravel guard
- Cleaning compound (item 19, Appendix F)
- Grease (item 10, Appendix F)
- Brush (item 3, Appendix F)

Tools/Test Equipment:

- Tool kit, mechanics general,
NSN 5180-00-177-7033
- Shop equipment, common No 1,
NSN 4910-00-754-0654

a. Removal.

NOTE

Steps (1) and (2) apply to right forward hub and drum only. Perform step (2) if hubodometer or bracket is damaged and must be replaced.

- (1) For right front hub and drum only - from wheel hub (7) remove two bolts (19), lockwashers (20) and bracket (17) with hubodometer (18). Discard lock washers.
- (2) Remove nut (22) and lockwasher (21) and separate hubodometer (18) from bracket (17).
- (3) Remove bolts (19), lock washers (20) from hub (7) and remove hub cap (15), and cap gasket (14) from hub (7). Discard lockwashers and gasket.

4-61. HUB AND BRAKEDRUM REPLACEMENT (Continued).

- (4) Back off brake drum (16) from hub (7).
- (5) Bend tabs on tabbed washer (2) and remove 3- 1/2 in. (8.26 cm) outer bearing nut (1), tabbed washer (2), keyed washer (3) and 3- 7/8 in. (9.84 cm) inner nut (4).

CAUTION

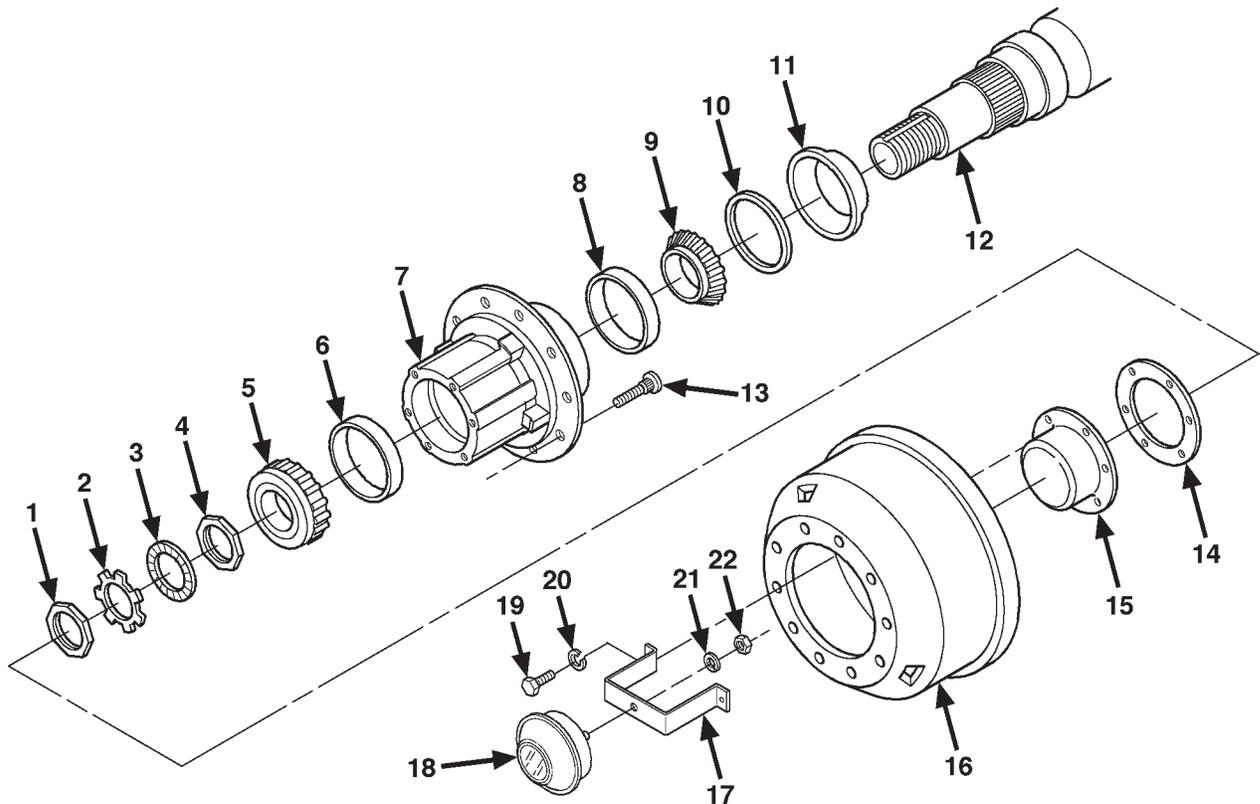
DO NOT remove studs (13) from hub unless stud(s) are damaged.

- (6) Remove outer bearing set (5 & 6).

NOTE

Perform steps 7 and 8 if hub (7), inner bearing set (8 & 9) and/or seal (10) are damaged and are to be replaced.

- (7) Remove hub (7) and studs (13).
- (8) Remove grease seal (10) and inner bearing set (8 & 9).
- (9) Remove gravel guard (11). Discard gravel guard.



4-61. HUB AND BRAKEDRUM REPLACEMENT (Continued).

b. Cleaning and Inspection.

- (1) Remove surface dirt with water and brush.

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

- (2) Remove grease and oil with cleaning compound. Dry thoroughly.
- (3) Inspect for damage, rust, or corrosion.
- (4) Inspect brake drum for out-of-roundness and scoring.
- (5) Inspect bearings (refer to TM 9-214).
- (6) Inspect cones for cracks, wear or other damage. Replace defective parts.
- (7) Make sure contact material on grease seals are intact and pliable.

c. Installation and Adjustment of Wheel Bearings.**NOTE**

Perform steps 1 and 2 if inner bearing set (8 & 9) and seal (10) were removed.

- (1) Pack inner bearing (9) with grease. Insert bearing (9) into hub (7) with large outside diameter of bearing toward grease seal.
- (2) Install new grease seal (10) in hub (7), with lip of seal next to bearing.
- (3) Install new gravel guard (11).

CAUTION

To avoid damage to grease seal, use caution when sliding hub (7) onto axle spindle (12).

- (4) Slide hub (7) with studs (13) onto axle spindle (12).
- (5) Pack outer bearing (5) with grease. Insert into hub (7) with large diameter of bearing facing out.
- (6) Install inner nut (4), using 3-7/8 in. (9.84 cm) wheel bearing locknut wrench.
- (7) While rotating hub slowly, tighten inner nut (4), using 3-7/8 in. (9.84 cm) wheel bearing locknut wrench, to a torque of 150 ft-lb (203.4 N•m). Back off inner nut (4) one turn. Re-torque inner nut to 50 ft-lb (67.8 N•m).
- (8) Check adjustment by trying to rock hub on spindle. If bearings are properly adjusted, lateral movement of brake drum will not be visible and brake drum will move freely. If movement is excessive, repeat step 7.

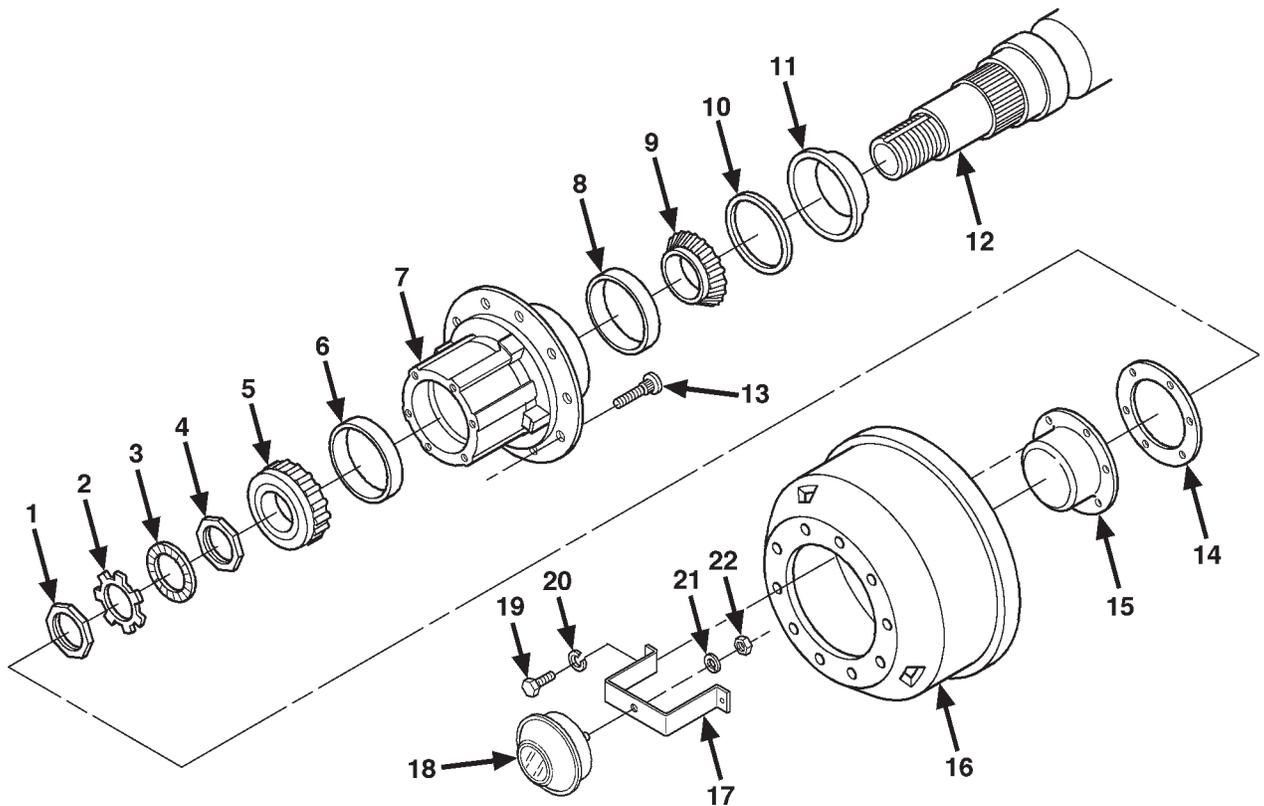
4-61. HUB AND BRAKEDRUM REPLACEMENT (Continued).

- (9) Install keyed washer (3). If necessary, back off inner nut (4) so that alignment pin on inner nut mates into closest hole in keyed washer (3).
- (10) Install tabbed washer (2).
- (11) Install outer bearing nut (1), using 3-1/4 in. (8.26 cm) wheel bearing locknut wrench. Turn nut (1) tightly against keyed washer (3). Torque outer bearing nut (1) to 150 ft-lb (203.4 N •m).

NOTE

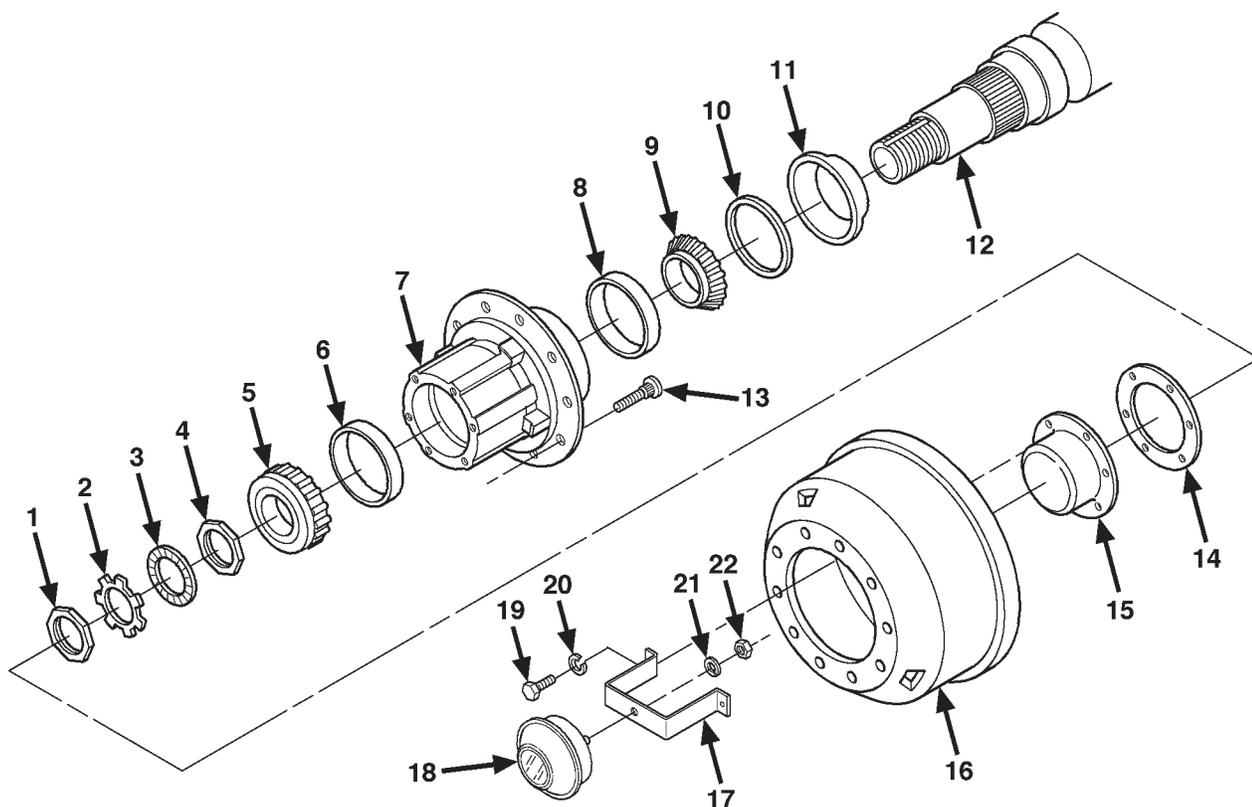
A minimum of two tabs must be bent down on tabbed washer (2).

- (12) Bend tabs on tabbed washer (2) against outer bearing nut (1).



4-61. HUB AND BRAKEDRUM REPLACEMENT (Continued).

- (13) Align brake drum holes with hub studs (13) and slide drum (16) onto hub (7).
- (14) Install new cap gasket (14).
- (15) Position hub cap (15) and secure with six bolts (19) and new lockwashers (20).
- (16) For right front hub and drum only, if hubodometer (18) was removed, install hubodometer onto bracket (17) and secure with nut (22) and two new lock washers (21).
- (17) Position hub cap (15) and bracket (17) with hubometer (18) and secure with six bolts (19) and new lock washers (20).

**FOLLOW-ON TASKS:**

- Install tire assembly (para. 3-8).
- Uncage brakes (para. 2-15).

Section IX. GOOSENECK HYDRAULIC SYSTEM MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
4-62.	General	4-88
4-63.	Hydraulic Line Replacement	4-88
4-64.	Hydraulic Pressure Relief Valve Replacement	4-90
4-65.	Hydraulic Throttle Valve Replacement.....	4-92
4-66	Hydraulic Directional Control Valve and Pressure Gauge Replacement	4-94
4-67.	Setting Hydraulic Pressure	4-96

4-62. GENERAL.

This section provides information for performing Unit level hydraulic maintenance repairs on the M870A3 semitrailers.

4-63. HYDRAULIC LINE REPLACEMENT.

This task covers:

- a. Replacement

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground and brakes engaged.

Materials/Parts:

- Tape, anti-seizing (item 21, Appendix F)
- Tie, plastic (item 24, Appendix F)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN5180-00-177-7033

WARNING

- **Gooseneck must be securely supported during this procedure and resting on a firm foundation. Severe injury or death to personnel may occur if gooseneck is unstable or tips.**
- **High pressure hydraulics [oil under 2450 psi (16,893 kPa)] used to operate this equipment can pierce body tissue and cause severe injury to personnel. Never disconnect any hydraulic line or fitting without first dropping pressure to zero.**
- **Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure oil.**

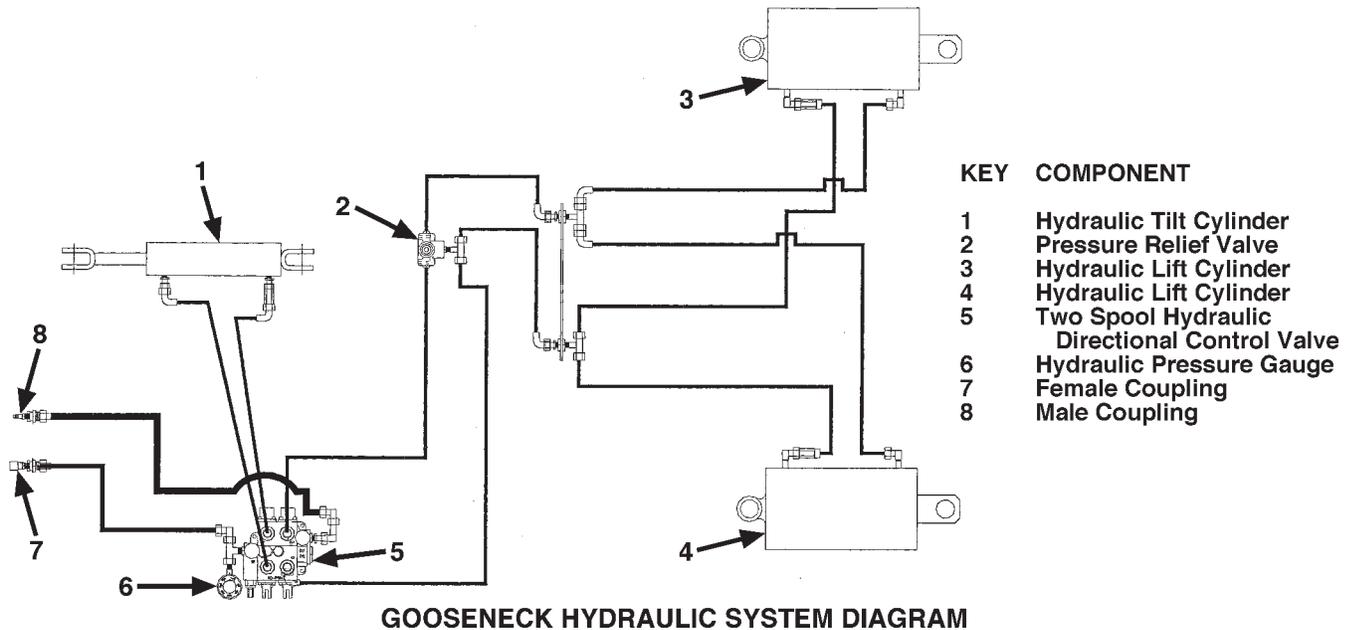
4-63. HYDRAULIC LINE REPLACEMENT (Continued).

NOTE

- Hydraulic lines can be replaced or repaired, depending on the length of the damaged section. If damaged line is short, replace it. If damaged hydraulic line is long, repair it.
- See paragraphs 4-21 (Lines and Ports) and 4-22 (Anti-seize Tape) for general gooseneck hydraulic line maintenance instructions.

a. Replacement.

Hydraulic lines and fittings are not ordinarily removed unless they need to be replaced. Badly damaged lines and fittings must be replaced. Hydraulic lines must be tightly connected. See gooseneck hydraulic diagram for additional information.



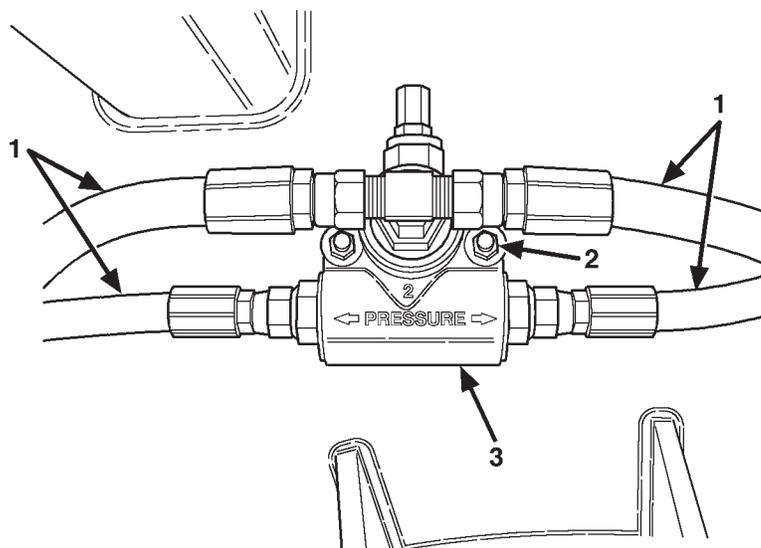
FOLLOW-ONTASKS:

None.

4-64. HYDRAULIC PRESSURE RELIEF VALVE REPLACEMENT (Continued)

b. Installation.

- (1) Install pressure relief valve (3) onto gooseneck relief valve mounting studs and secure in position with two locknuts (2). Torque locknuts to 9 ft-lb (12.20 N•m).
- (2) Remove tape and/or caps from four relief valve hydraulic lines (1) and relief valve ports and apply anti-seizing tape to threads of hydraulic lines. Reconnect and tighten lines to appropriate ports as directed by tags previously attached during removal procedure.
- (3) Pressurize system and check for leaks.

**FOLLOW-ON TASKS:**

None.

4-65. HYDRAULIC THROTTLE VALVE REPLACEMENT

This task covers:

- a. Removal b. Clean c. Installation
-

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.
- Gooseneck Gravel Guard removed.

Materials/Parts:

- Marker tag (item 20, Appendix F)
- Tape, anti-seizing (item 21, Appendix F)
- WD-40 (item 7, Appendix F)
- O-ring (PN 568906)

Tools/Test Equipment

- Tool set, general mechanics, NSN 5180-00-177-7033

General Safety Instructions:

- Gooseneck must be securely supported during procedure or attached to trailer.
-

WARNING

- **Gooseneck must be securely supported during this procedure and resting on a firm foundation. Severe injury or death to personnel may occur if gooseneck is unstable or tips.**
- **High pressure hydraulics [oil under 2450 psi (16,893 kPa)] used to operate this equipment can pierce body tissue and cause severe injury to personnel. Never disconnect any hydraulic line or fitting without first dropping pressure to zero.**
- **Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure oil.**

a. Removal.

- (1) Release all pressure from hydraulic lines.
- (2) Disconnect hydraulic line (2) from hydraulic throttle valve (1).
- (3) Disconnect throttle valve (1) and from hydraulic lift cylinder fitting (4) and remove O-ring (3). Discard O-ring.

CAUTION

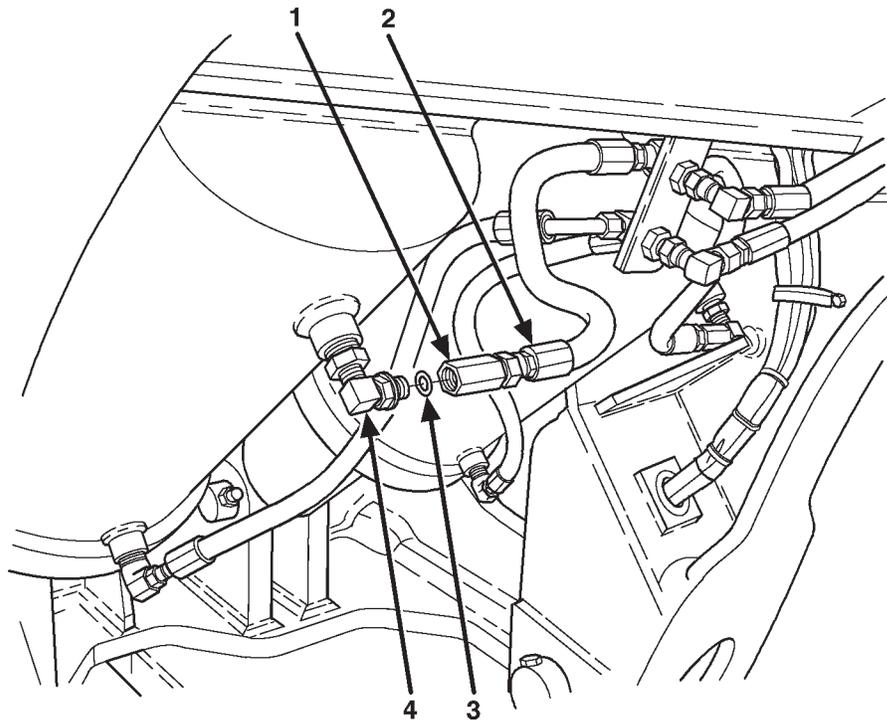
Failure to cap or plug all open fitting and hose ends to prevent contamination of hydraulic system may result in damage to equipment.

- (4) Cap or plug open lift cylinder fitting (4) and open hydraulic line end (2).

4-65. HYDRAULIC THROTTLE VALVE REPLACEMENT (Continued).

b. Clean.

- (1) Clean throttle valve using WD-40 (item 7, Appendix F) and blow out using compressed air.

**c. Installation.**

- (1) Remove tape or caps from lift cylinder fitting (4) and hydraulic line disconnected end (2) and apply anti-seizing tape to threads of hydraulic line and lift cylinder fitting.
- (2) Install new O-ring (3) onto hydraulic lift cylinder fitting (4).
- (3) Reconnect throttle valve (1) to lift cylinder fitting (4) and hydraulic line (2) and tighten as appropriate.
- (4) Pressurize system and check for leaks.

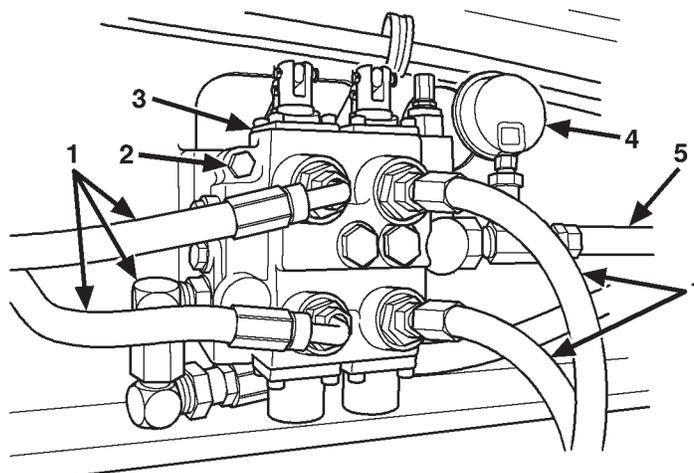
FOLLOW-ONTASKS:

None.

4-66. HYDRAULIC DIRECTIONAL CONTROL VALVE AND PRESSURE GAUGE REPLACEMENT (Continued).

b. Installation.

- (1) Remove tape or cap from directional control valve pressure gauge port, apply anti-seizing tape to threads of pressure gauge (4), thread gauge onto directional control valve (3), and orient gauge to vertical position.
- (2) Install hydraulic directional control valve (3) onto inside wall of gooseneck and secure in position with three mounting bolts (2), washers and nuts. Torque bolts to 35 ft-lb(47.46 N•m).
- (3) Remove tape and/or cap from pressure gauge hydraulic line (5), apply anti-seizing tape to threads of hydraulic line, and connect and tighten pressure gauge hydraulic line (5) to pressure gauge (4).
- (4) Remove tape and/or caps from five hydraulic lines (1) to be connected to inlet and outlet ports of control valve (3) and apply anti-seizing tape to threads of lines. Reconnect and tighten lines to appropriate ports as directed by tags previously attached during removal procedure.
- (5) Pressurize system and check for leaks.

**FOLLOW-ONTASKS:**

None.

4-67. SETTING HYDRAULIC PRESSURE.

This task covers:

- a. Adjustment
-

Initial Setup:

Equipment Conditions:

- Trailer parked, lowered to level ground, brakes engaged and wheels chocked.

Tools/Test Equipment

- Tool set, general mechanics, NSN 5180-00-177-7033
-

NOTE

- **A reading of 2500 psi is only on gauge when hydraulic controls are in use. Readings will go down to 500 psi when levers are disengaged.**
- **The psi will vary due to load. Hydraulic pressures will vary from 300 to 2500 psi under normal operation and will reach a maximum of 2500 to 2800 psi under full load.**

a. Adjustment.

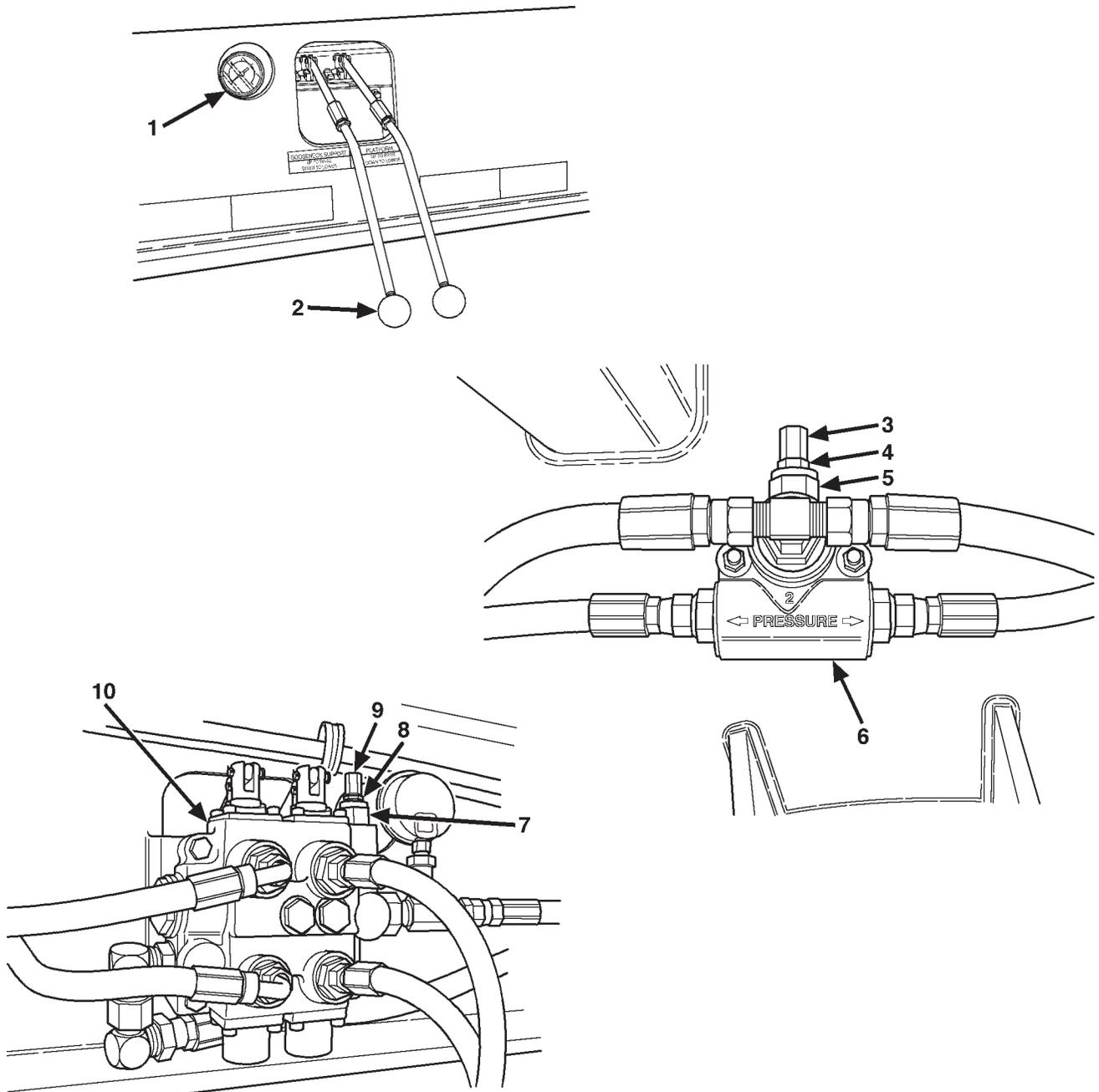
- (1) Raise the gooseneck tilt support lever (2) until the support arm is fully raised.
- (2) While continuing to hold the support lever (2) raised, check the psi reading on the pressure gauge (1). The psi reading should be 2500 to 2800 psi. If the psi reading is higher than 2800 psi, or lower than 2500 psi, adjust the pressure by adjusting the pressure relief valve (6).
- (3) Remove the small barrel nut (4) on the pressure relief valve (6) and loosen the larger retaining nut (5) using a 1 1/16 in. deep-well socket.
- (4) Rotate clockwise the six-sided allen stud (3) located inside the barrel nut (4) on the pressure relief valve (6) to raise the pressure setting, or counter-clockwise to lower the pressure setting.
- (5) Install the barrel nut (4) to lock the allen stud (3) in position and retighten the retaining nut (5).
- (6) Repeat steps (1) and (2). If the pressure reading is still not correct, verify the pressure on the prime mover supply system and continue to Step (7).
- (7) Remove the small barrel nut (8) on the directional control valve (10) and loosen the larger retaining nut (7) using a 1 1/16 in. deep-well socket.

WARNING

Do not exceed 3000 psi. Serious injury or death may occur if pressure exceeds 3000 psi.

4-67. SETTING HYDRAULIC PRESSURE (Continued).

- (8) Rotate the six-sided allen stud (9) clockwise to raise the pressure setting on the directional control valve (10). Set the pressure as high as possible but do not exceed 3000 psi. The pressure gauge (1) on the directional control valve can now be used to verify the pressure setting of the prime mover supply system.



FOLLOW-ON TASKS:

None.

Section X. BODY MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
4-68.	General	4-98
4-69.	Mud Flap Replacement	4-98
4-70.	Floor Board Replacement	4-100
4-71.	Tool Box Replacement	4-102

4-68. GENERAL.

This section provides information for performing Unit level body repairs on the M870A3 semitrailers.

4-69. MUD FLAP REPLACEMENT.

This task covers:

- | | |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Materials/Parts:

- Nut, self-locking (4)

Tools/Test Equipment

- Tool kit, mechanics general,
NSN 5180-00-177-7033

General Safety Instructions:

- None

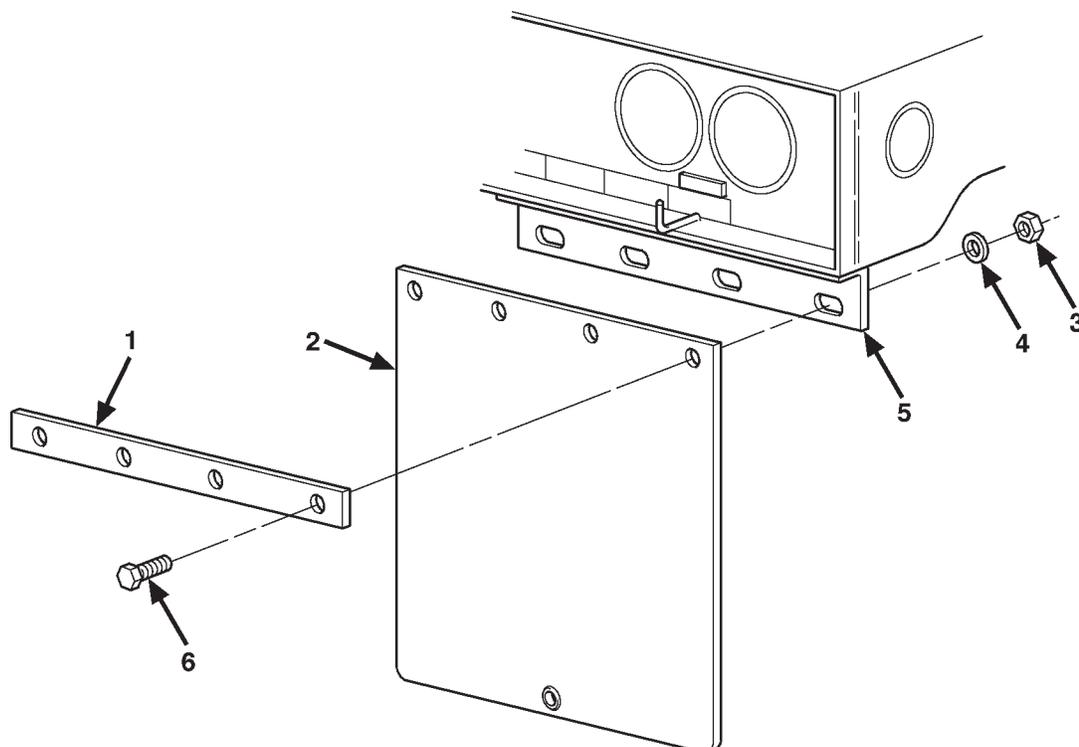
a. Removal.

- (1) Remove four self-locking nuts (3) from screws (6), behind bracket (1). Discard self-locking nuts.
- (2) Remove bracket (1).
- (3) Remove mudflap (2), four washers (4) and screws (6) from trailer frame (5).

b. Installation.

- (1) Position mud flap (2) on trailer frame (5).
- (2) Insert four screws (6) with four washers (4) through bracket (1), mud flap (2) and trailer frame (5).
- (3) Secure with four new self-locking nuts (3).

4-69. MUD FLAP REPLACEMENT (Continued).



FOLLOW-ON TASKS:

None.

4-70. FLOOR BOARD REPLACEMENT (Continued).

NOTE

The trailer decking material is Apitong. It is a very dense wood and is difficult to cut or drill. Special tools may be required if cutting or drilling of replacement Apitong boards is required.

- (2) Using an electric drill and bit, drill holes in board (3).
- (3) Using hammer, drive screw (2) in board (3) as far as possible. Repeat for remaining holes.
- (4) Install clip (5) and nut (4) on screw (2). Tighten until head of screw (2) is fully seated. Repeat for rest of clips, screws, and nuts.

FOLLOW-ONTASKS:

None.

4-71. TOOL BOX REPLACEMENT.

This task covers:

- a. Removal b. Disassemble c. Assemble d. Installation
-

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged, and wheels chocked.

Materials/Parts:

- Pin hinges (3)

Tools/Test Equipment

- Tool kit, mechanics general, NSN 5180-00-177-7033
- Shop equipment, common No.1, NSN 4910-00-754-0654

General Safety Instructions:

- Carc paint debris may be hazardous during removal.
 - Use extreme care with cutting, grinding, and/or welding on metal surfaces.
 - Trailer must be uncoupled from prime mover before welding.
-

WARNING

Chemical Agent Resistant Coating (CARC) paint debris may be considered environmentally hazardous during removal. Consult local procedures prior to removal of CARC paint to ensure compliance with local laws.

WARNING

- **The BII Box Lid is secured by two pneumatic openers. Caution should be used when opening the BII Box. Failure to do so could result in injury to personnel.**
- **The BII Box removal and replacement of BII Box requires two personnel. Failure to do so could result in injury to personnel.**

a. Removal.

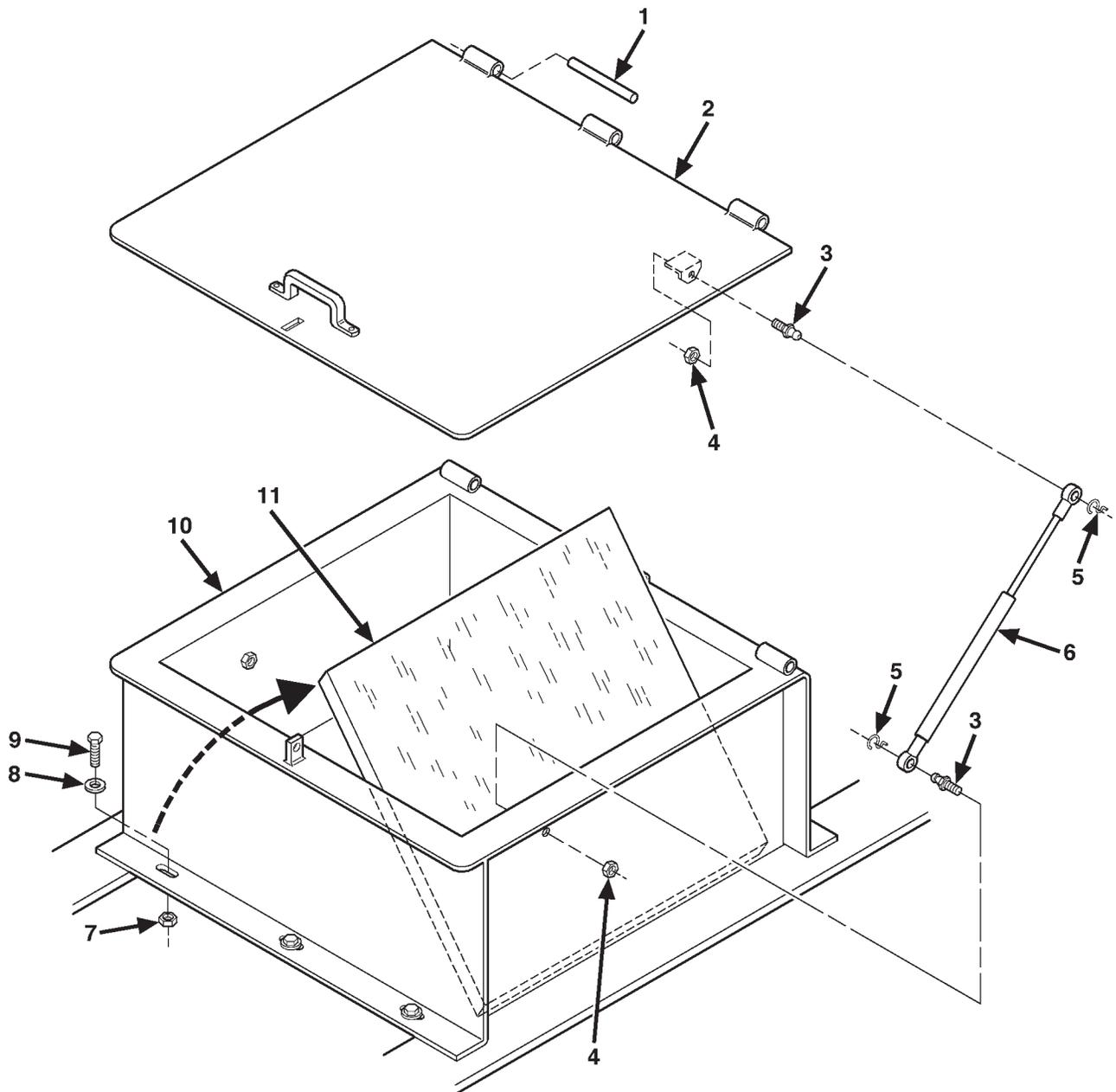
CAUTION

Extreme caution must be exercised when cutting, grinding, and/or welding on metal surfaces. Excessive heat from these processes may cause damage to and reduction of strength in areas that are worked on. These procedures should only be performed by or under supervision of trained personnel.

- (1) In accordance with local procedures for CARC paint, remove paint from area to be repaired.
- (2) Remove safety clips (5) and pull to disconnect pneumatic cylinders (6) from ball studs (3) and remove pneumatic cylinders. Remove nuts (4) and ball studs (3).
- (3) Using a cutting torch, release welds between hinges and tool box cover (2) and remove cover.
- (4) Using hammer and punch, drive pins (1) out of hinges. Discard hinge pins.
- (5) Remove six lock nuts (7), six flat washers (8), six bolts (9), and lift off tool box (10) from gooseneck. Discard lock nuts.

4-71. TOOL BOX REPLACEMENT (Continued).**b. Disassemble.**

- (1) Fully open and secure tool box lid (2), disconnect lower end of pneumatic cylinders (6) and tilt wooden tool box floor board (11) up on one side to clear pneumatic cylinder ball studs (3). Lift out floor.



4-71. TOOL BOX REPLACEMENT (Continued).

c. Assemble.

- 1) Tilt and lower tool box floor (11) into tool box to clear gas cylinder ball studs (3) and drop floor (11) in place. Reconnect gas cylinders (6).

d. Installation.

- (1) Install tool box (10) onto gooseneck and secure with six bolts (9), six flat washers (8) and six new lock nuts (7).
- (2) Install new hinge pins (1) on portion of hinge attached to tool box (10)
- (3) Install tool box cover portion of hinges onto hinge pins (1) and locate tool box cover (2) to the closed position.
- (4) Align tool box cover (2) and clamp hinges in position.

CAUTION

When welding, trailer must be uncoupled from prime mover. Failure to follow this warning may damage electronic components.

NOTE

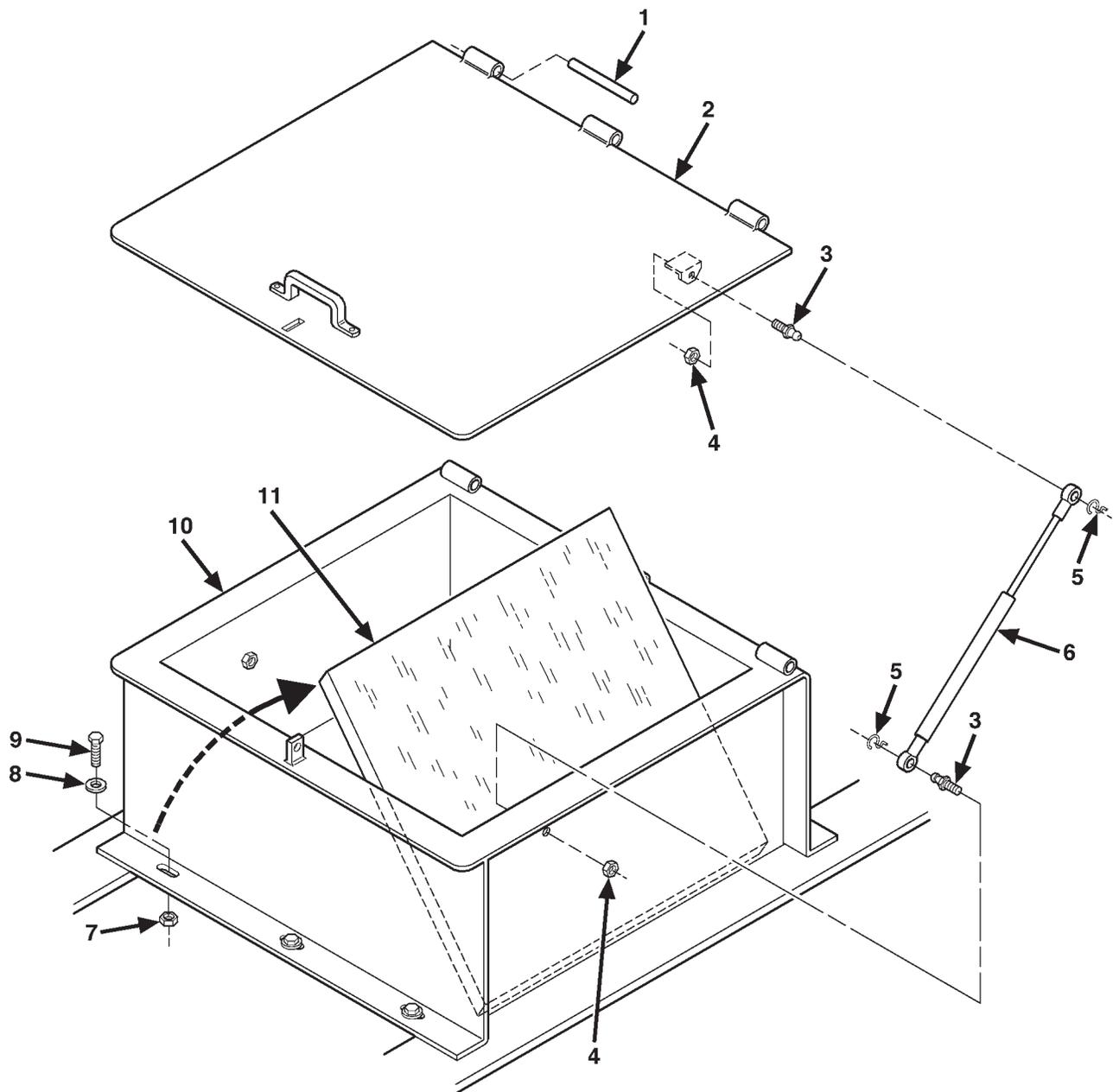
Refer to TM 9-237 for instructions on welding components.

- (5) Weld tool box cover portion of hinges to tool box cover (2).

NOTE

Check alignment of cover (2) to tool box (10) before completing welding procedure.

- (6) Install ball studs (3) and secure with nuts (4).
- (7) Install gas cylinders (6) onto ball studs (3) by pushing ends of cylinders over ball studs. Install safety clips (5).

4-71. TOOL BOX REPLACEMENT (Continued).**FOLLOW-ON TASKS:**

None.

Section XI. ACCESSORY ITEMS MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
4-72.	General	4-106
4-73.	Data Plates Replacement	4-106

4-72. GENERAL.

This section provides information for performing Unit level repair for accessory items on the M870A3 semitrailers.

4-73. DATA PLATES REPLACEMENT (TYPICAL).

This task covers:

- | | |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Materials/Parts:

- Rivets (10)

Tools/Test Equipment

- Tool kit, mechanics general, NSN 5180-00-177-7033
- Shop equipment, common No.1, NSN 4910-00-754-0654

General Safety Instructions:

- None

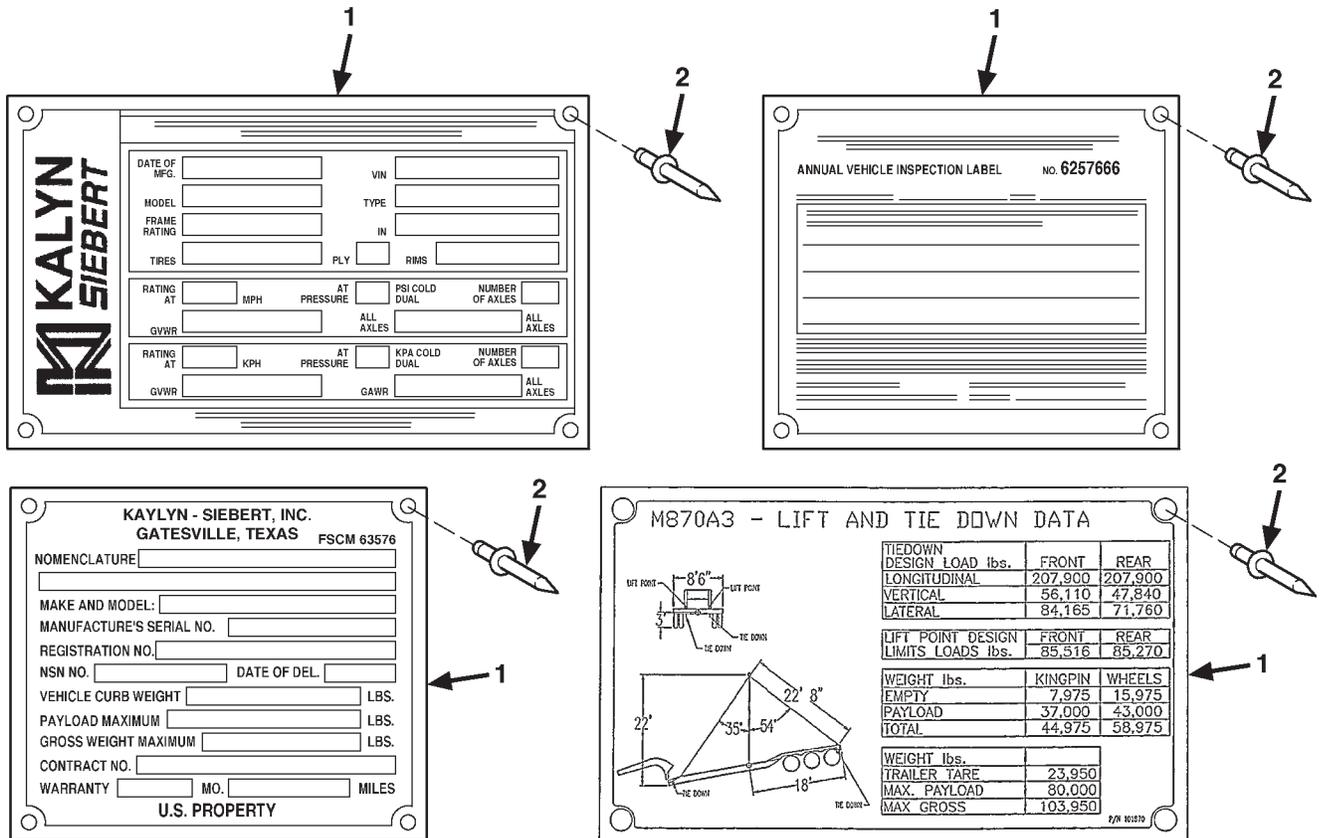
a. Removal.

- (1) Drill out rivets (2) from data plate (1). Discard rivets.
- (2) Remove data plate (1).

4-73. DATA PLATES REPLACEMENT (TYPICAL) (Continued).

b. Installation.

- (1) Place data plate (1) in position.
- (2) Install data plate (1) with new rivets (2).



FOLLOW-ON TASKS:

None.

Section XII. PREPARATION FOR STORAGE OR SHIPMENT

Paragraph Number	Paragraph Title	Page Number
4-74.	General	4-108
4-75.	Definition of Administrative Storage	4-108
4-76.	Preparation of Equipment for Administrative Storage	4-108
4-77.	Care of Equipment in Administrative Storage	4-110
4-78.	Procedures for Common Components and Miscellaneous Items	4-111
4-79.	Removal of Equipment from Administrative Storage	4-111
4-80.	Preparation of Equipment for Shipment	4-111

4-74. GENERAL.

- a. This chapter contains requirements and procedures for administrative storage of equipment that is issued to and in use by Army activities worldwide.
- b. The requirements specified herein are necessary to maintain equipment in administrative storage in such a way as to achieve the maximum readiness condition.
- c. Equipment that is placed in administrative storage should be capable of being readied to perform its mission within one 24-hour period, or as otherwise may be prescribed by the approving authority. Before equipment is placed in administrative storage, a current Preventive Maintenance Checks and Services (PMCS) should be completed and deficiencies corrected.
- d. Report equipment in administrative storage as prescribed for all reportable equipment.
- e. Perform inspections, maintenance services, and lubrication as specified herein.
- f. Records and reports to be maintained for equipment in administrative storage are those prescribed by DA Pam 738-750 for equipment in use.
- g. A 10% variance is acceptable on time used to determine the required maintenance actions.
- h. Accomplishment of applicable PMCS, as mentioned throughout this chapter, will be on a semiannual basis.

4-75. DEFINITION OF ADMINISTRATIVE STORAGE.

The placement of equipment in administrative storage can be for short periods of time when a shortage of maintenance effort exists. Items should be ready for use within the time factors as determined by the directing authority. During the storage period, appropriate maintenance records will be kept.

4-76. PREPARATION OF EQUIPMENT FOR ADMINISTRATIVE STORAGE.

- a. **Storage Site.**
 - (1) Select the best available site for administrative storage. Separate store equipment from equipment in use. Conspicuously mark the area "Administrative Storage".
 - (2) Covered space is preferred.
 - (3) Open sites should be improved hardstand, if available. Unimproved sites should be firm, well-drained, and free of excessive vegetation.

4-76. PREPARATION OF EQUIPMENT FOR ADMINISTRATIVE STORAGE (Continued).

b. Storage Plan.

- (1) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions.
- (2) Take into consideration environmental conditions, such as extreme heat or cold; high humidity; blowing sand, dust, or loose debris; soft ground; mud; heavy snows; or any combination thereof, and take adequate precautions.
- (3) Establish a fire plan and provide for adequate fire fighting equipment and personnel.

c. Maintenance Services and Inspections.

- (1) **Maintenance Services.** Prior to storage, perform the next scheduled PMCS.
- (2) **Inspection.** Inspect and approve the equipment prior to storage. Do not place nonmission-capable equipment in storage.

d. Correction of Shortcomings and Deficiencies. Correct all shortcomings and deficiencies prior to storage, or obtain a deferment from the approving authority.**e. Lubrication. Lubricate equipment in accordance with Appendix I.****f. General Cleaning, Painting, and Preservation.**

CAUTION

DO NOT direct water under pressure against unsealed electrical systems of any exterior opening. Failure to follow this caution may result in damage to equipment.

- (1) **Cleaning.** Clean the equipment of dirt, grease, and other contaminants, but do not use vapor degreasing.
- (2) **Painting.** Remove rust and damaged paint by scraping, wire brushing, sanding, or buffing. Sand to a smooth finish and spot paint as necessary (TB 43-0209).
- (3) **Preservation.** After cleaning and drying, immediately coat unpainted metal surfaces with oil or grease, as appropriate.

NOTE

- **Place a piece of barrier material (item 2, Appendix F) between desiccant bags and metal surfaces.**
 - **Air circulation under draped covers reduces deterioration from moisture or heat.**
- (4) **Weatherproofing.** Sunlight, heat, moisture (humidity), and dirt tend to accelerate deterioration. Install all covers authorized for the equipment. Close and secure all openings except those required for venting and draining. Seal openings to prevent the entry of rain, snow, or dust. Insert desiccant when complete seal is required. Place equipment, and provide blocking or framing, to allow for ventilation and water drainage. Support cover away from item surfaces which may rust, rot, or mildew.

4-77. CARE OF EQUIPMENT IN ADMINISTRATIVE STORAGE.

- a. **Maintenance Services.** After equipment has been placed in administrative storage, inspect, service, and exercise as specified herein.
- b. **Inspection.** Inspection will usually be visual and must consist of at least a walk around examination of all equipment to detect any deficiencies. **Inspect equipment in open storage weekly and equipment in covered storage monthly.** Inspect all equipment immediately after any severe storm or environmental change. The following are examples of things to look for during a visual inspection:
- (1) Low or flat tires.
 - (2) Oil leaks.
 - (3) Condition of preservatives, seals, and wraps.
 - (4) Corrosion or other deterioration.
 - (5) Missing or damaged parts.
 - (6) Water in compartments.
 - (7) Any other readily recognizable shortcomings or deficiencies.
- c. **Repair During Administrative Storage.** Keep equipment in an optimum state of readiness. Accomplish the required services and repairs as quickly as possible. Whenever possible, perform all maintenance on-site.
- d. **Exercising.** Exercise equipment in accordance with Table 4-5, *Exercise Schedule*, and the following instructions.
- (1) **Vehicle Major Exercise.** Depreserve equipment by removing only that material restricting exercise. Close all drains, remove blocks, and perform all BEFORE operational checks. Make several right and left 90° turns. Make several hard braking stops without skidding. While exercising, and when it is safe and convenient, operate all other functional components and perform all DURING and AFTER operational checks.
 - (2) **Scheduled Services.** Scheduled services will include inspection per subparagraph b and will be conducted in accordance with Chapter 4, Section IV, Unit Preventive Maintenance Checks and Services (PMCS). Lubricate in accordance with instructions in Appendix I.
 - (3) **Corrective Action.** Immediately take action to correct shortcomings and deficiencies noted. Record inspection and exercise results on DA Form 2404 or DA Form 5988E. Record and report all maintenance actions on DA Form 2407. After exercising, restore the preservation to the original condition. Replenish lubricants used during exercising and note the amount on DA Form 2408.

Table 4-5. Exercise Schedule

Weeks	2	4	6	8	10	12	14	16	18	20	22	24
Scheduled Services												X
Major Services												X

- e. **Rotation.** Rotate items in accordance with any rotational plan that will keep the equipment in an operational condition and reduce the maintenance effort.

4-78. PROCEDURES FOR COMMON COMPONENTS AND MISCELLANEOUS ITEMS.

- a. **Tires.** Visually inspect tires during each walk around inspection. This inspection includes checking tires with a tire gage. Inflate, repair, or replace as necessary those found to be low, damaged, or excessively worn. Mark inflated and repaired tires with a crayon for checking at the next inspection.
- b. **Seals.** Seals may develop leaks during storage or shortly thereafter. If leaking persists, refer to the applicable maintenance section in this manual for corrective maintenance procedures.

4-79. REMOVAL OF EQUIPMENT FROM ADMINISTRATIVE STORAGE.

- a. **Activation.** Restore the equipment to normal operating condition in accordance with the instructions contained in Chapter 4, Section II.
- b. **Servicing.** Resume the maintenance service schedule in effect at the commencement of storage or service the equipment before the scheduled dates in order to produce a staggered maintenance workload.

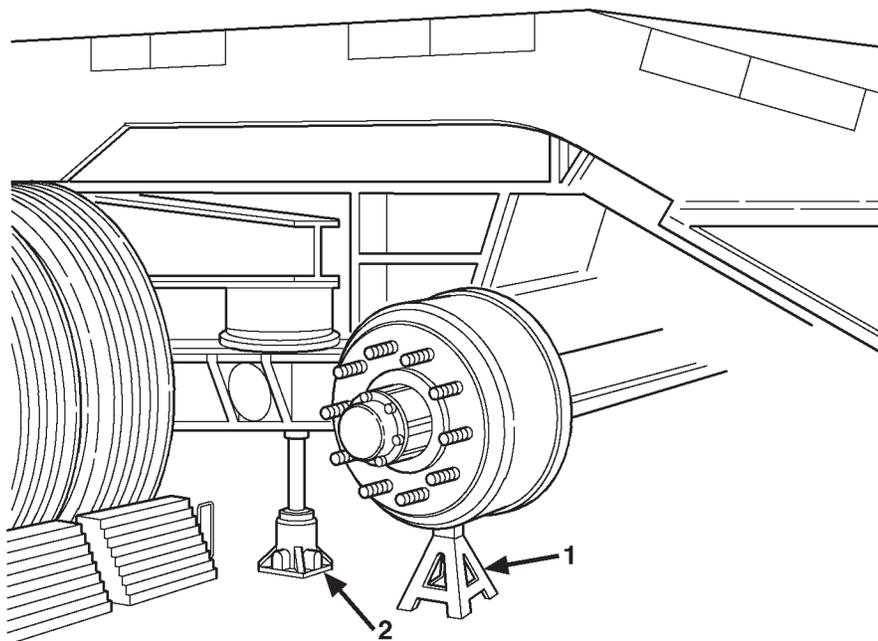
4-80. PREPARATION OF EQUIPMENT FOR SHIPMENT.

- a. Refer to FM 55-21, TM 55-601, and TM 743-200-1 for additional instructions on processing, storage, and shipment of materiel.
- b. Vehicles that have been removed from storage for shipment do not have to be reprocessed if they will reach their destination within the administrative storage period. Reprocess only if inspection reveals any corrosion or if anticipated in-transit weather conditions make it necessary.
- c. When a vehicle is received and has already been processed for domestic shipment, as indicated on DD Form 1397, it does not have to be reprocessed for storage unless corrosion and deterioration are found during the inspection upon receipt. List on SF Form 364 all discrepancies found because of poor preservation, packaging, packing, marking, handling, loading, storage, or excessive preservation. Repairs that cannot be handled by the receiving unit must have tags attached listing needed repairs. A report of these conditions will be submitted by the unit commander for action by an ordnance maintenance unit.

TM 5-2330-325-14&P

5-2. FRONT AND MIDDLE AXLE REPLACEMENT (Continued).

- (1) Using a hydraulic bottle jack (2), raise by approximately three in. (7.62 cm) the end of the tandem beam supporting the axle to be removed.



- (2) Place a jack stand (1) under the tandem beam and lower the beam to rest on the jack stand. Repeat Step (1) for the tandem beam on the opposite side, but leave the jack in position as a secondary support.

WARNING

Always use jack stands to support the trailer when removing a tire and wheel assembly. Serious injury can result if the jack fails and the axle is not supported.

- (3) Using a handle and wrench, remove ten lug nuts securing each wheel and remove the inner and outer wheels on both sides of the axle to be removed.
- (4) Position a dolly jack under balance point of front axle and raise dolly until dolly comes in contact with axle.

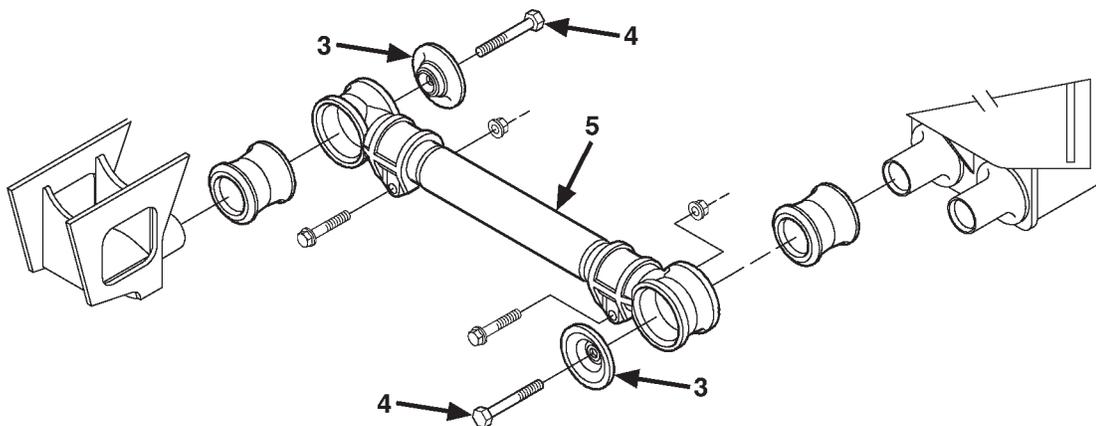
5-2. FRONT AND MIDDLE AXLE REPLACEMENT (Continued).

- (5) Remove 5/8 in. bolts (4) and self locking nuts securing both ends of the four upper and lower torque rods securing the axle. Discard bolts and nuts.

NOTE

For torque rods attached to the axle tower, pry off the metal plug caps from the towers to gain access to the torque rod self locking bushing nuts.

- (6) Remove spigot caps (3) and torque rods (5).



TORQUE ROD INSTALLATION (TYPICAL VIEW)

NOTE

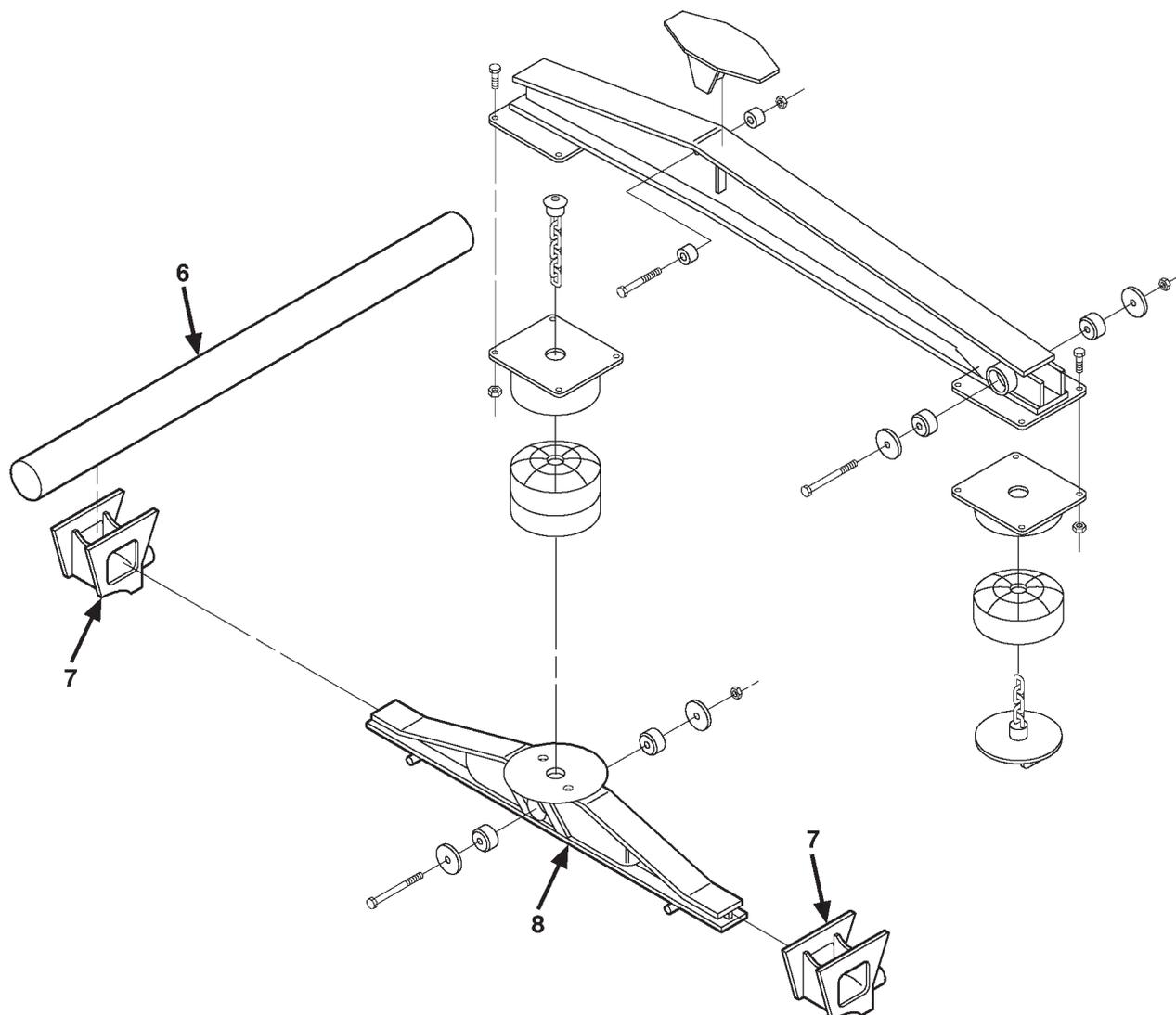
It is suggested to mark one end of the torque rod tube relative to installation location and orientation prior to removal of the torque rods to avoid possible reversing of torque rod during reinstallation.

5-2. FRONT AND MIDDLE AXLE REPLACEMENT (Continued).

- (7) Using the dolly jack, withdraw torque rod saddle axle brackets (7) and axle (6) from the tandem beam (8) and lower the axle while an assistant balances the axle.
- (8) Pull axle out from under the trailer and place on dunnage.

b. Installation.

- (1) Place axle (6) on dolly jack and position onto tandem beam (8).
- (2) Connect torque rods (5) to spigots on torque rod saddle axle brackets (7) and trailer suspension towers and hanger frames.
- (3) Secure torque rods in position with spigot caps (3) and new 5/8 in. NC bolts (4) and locking nuts.

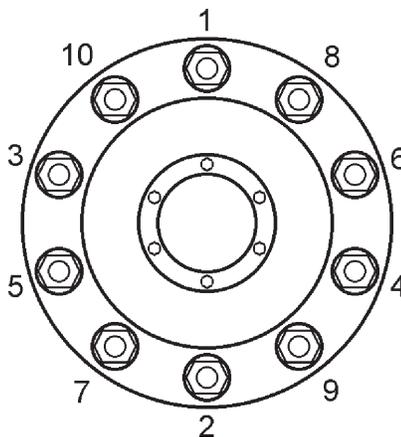


5-2. FRONT AND MIDDLE AXLE REPLACEMENT (Continued).

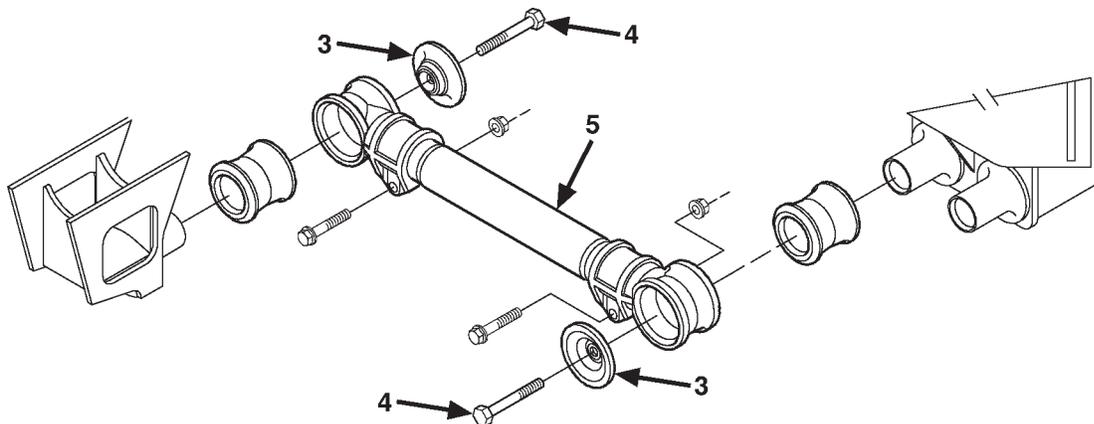
WARNING

Use only new Chalmers approved 5/8 in. NC bolts and nuts for the torque rod to joint fasteners. Do not re-use or use other fasteners. To do so may lead to fastener failure and consequent loss of vehicle control resulting serious injury or death.

- (4) If previously removed, replace the tower metal plug caps.
- (5) With aid of an assistant, install tire and wheel assemblies and torque lug nuts to 450 to 500 ft-lb (610.2 to 678 N•m) in accordance with lug nut tightening sequence. Be sure that the valve stem is opposite (180°) from the inner valve stem.



- (6) Check alignment of tire assembly by placing a block of wood or other object on the ground at the side of the tire and rotate the wheel. If the distance between the block of wood and the tire varies by more than 1/8 in. (.32cm), the tire assembly is not properly mounted. To correct loosen the nut on the side with the greatest deviation and tighten the nuts on the opposite side. Recheck the torque and the alignment.



TORQUE ROD INSTALLATION (TYPICAL VIEW)

5-2. FRONT AND MIDDLE AXLE REPLACEMENT (Continued).

NOTE

Lug nuts should be rechecked for proper tightness after the first 50 miles (80.5 Km) to 100 miles (160.9 Km) of operation after wheel reinstallation.

- (7) Remove hydraulic jack and jack stands from tandem beams.

FOLLOW-ON TASKS:

- Install left and right brake camshafts (para. 4-49).
- Install left and right air brake chambers (para. 4-53).
- Install left and right slack adjuster assemblies (para. 4-48).
- Install left and right brake shoe shoe assemblies (para. 4-47).
- Align axle(s) as required (para. 5-5).
- Install ABS sensor (para. 4-52A).

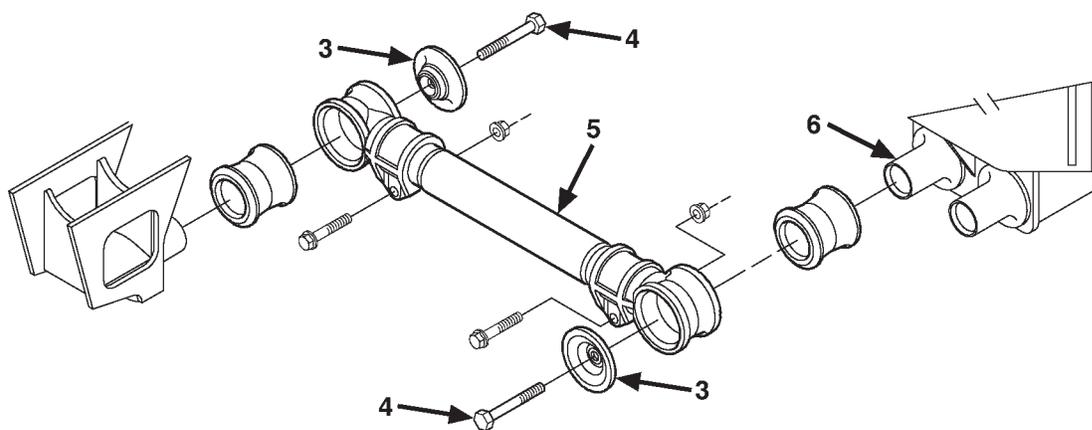
5-3. REAR AXLE REPLACEMENT (Continued).

- (2) Repeat Step (1) for the opposite equalizing beam but leave the jack in position as a secondary support.

WARNING

Always use jack stands to support the trailer when removing a tire and wheel assembly. Serious injury can result if the jack fails and the axle is not supported.

- (3) Using a handle and wrench, remove 10 lug nuts securing each wheel and remove the inner and outer wheels on both sides of the rear axle.
- (4) Position a dolly jack under balance point of front axle and raise dolly until dolly comes in contact with axle.
- (5) Remove 5/8 in. bolts (4) and self-locking nuts securing both ends of the four upper and lower torque rods securing the axle. Discard bolts and nuts.



TORQUE ROD INSTALLATION (TYPICAL VIEW)

NOTE

For torque rods attached to the axle tower, pry off the metal plug caps from the towers to gain access to the torque rod self locking bushing nuts.

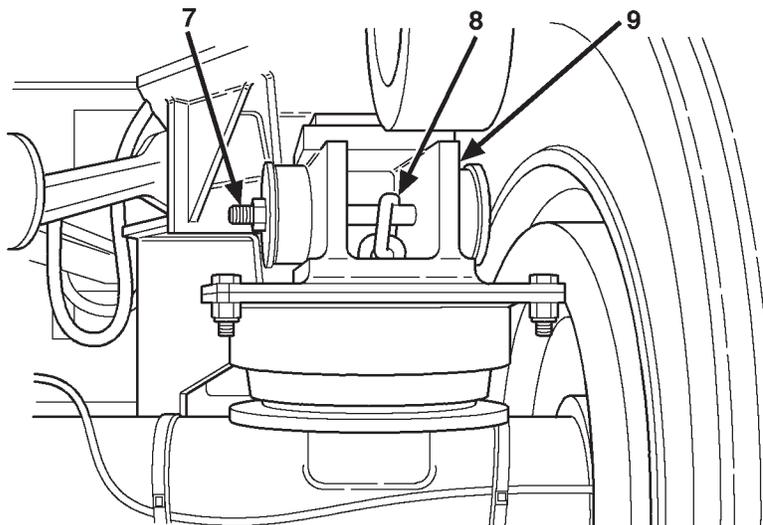
- (6) Remove spigot caps (3) and torque rods (5).

5-3. REAR AXLE REPLACEMENT (Continued).

NOTE

It is suggested to mark one end of the torque rod tube relative to installation location and orientation prior to removal of the torque rods to avoid possible reversing of torque rod during reinstallation.

- (7) Remove the 5/8 in. NC bolt (7) and lock nut securing the rebound chain (8) to the right and left equalizing beams (9). Discard locknut.
- (8) Using the dolly jack, lower the axle while an assistant balances the axle and pull the axle out from under the trailer and place it on dunnage.

**b. Installation.**

- (1) Place axle on dolly jack and position under trailer aligned with rear rubber springs.
- (2) Raise axle and connect rebound chains (8) to equalizing beams (9) with new 5/8 in. NC bolt (7) and locking nuts and torque nuts to 175 ft-lb (237 N•m).

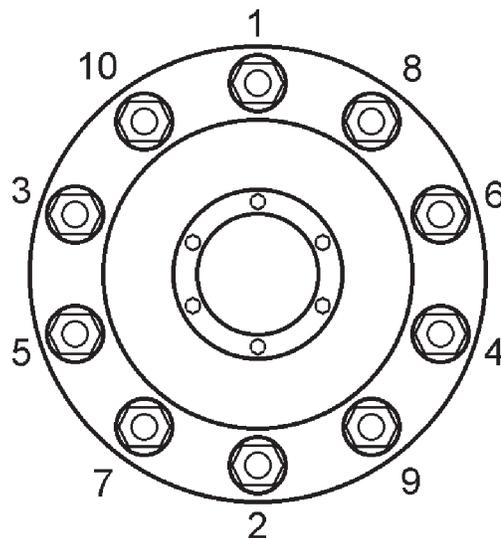
WARNING

Use only new Chalmers approved 5/8 in. NC bolts and nuts for the torque rod to joint fasteners. Do not re-use or use other fasteners. To do so may lead to fastener failure and consequent loss of vehicle control.

- (3) Connect torque rods (5) to spigots (6) on torque rod axle brackets, trailer suspension towers and hanger frames.
- (4) Secure torque rods in position with spigot caps (3) and new 5/8 in. NC bolts (4) and locking nuts.

5-3. REAR AXLE REPLACEMENT (Continued).

- (5) If previously removed, replace the tower metal plug caps.
- (6) With aid of an assistant, install tire and wheel assemblies and torque lug nuts to 450 to 500 ft-lb (610.2 to 678 N•m) in accordance with lug nut tightening sequence. Be sure that the valve stem is opposite (180°) from the inner valve stem.



5-3. REAR AXLE REPLACEMENT (Continued).

- (7) Check alignment of tire assembly by placing a block of wood or other object on the ground at the side of the tire and rotate the wheel. If the distance between the block of wood and the tire varies by more than 1/8 in. (.32cm), the tire assembly is not properly mounted. To correct loosen the nut on the side with the greatest deviation and tighten the nuts on the opposite side. Recheck the torque and the alignment.

NOTE

Lug nuts should be rechecked for proper tightness after the first 50 miles (80.5 Km) to 100 miles (160.9 Km) of operation after wheel reinstallation.

- (8) Lower trailer and remove hydraulic jack and jack stands from equalizing beams.

FOLLOW-ON TASKS:

- Install left and right brake camshafts (para. 4-49).
- Install left and right air brake chambers (para. 4-53).
- Install left and right slack adjuster assemblies (para. 4-48).
- Install left and right brake shoe shoe assemblies (para. 4-47).
- Align axle(s) as required (para. 5-5).
- Install ABS sensor (para. 4-52A).

5-4. TORQUE ROD BUSHING REPLACEMENT.

This task covers:

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

Initial Setup:

Equipment Conditions:

- Power wash or brush torque rod(s) ends.
- Brakes caged (para. 2-19).

Personnel Required: 1

Materials/Parts:

- 5/8 NC bolt and self locking 5/8 NC, GRC nuts (8)

Tools/Test Equipment:

- Tool kit, mechanics general NSN 5180-00-177-7033
- Shop equipment, common No. 1, NSN 4910-00-754-0654

General Safety Instructions:

- Front tires chocked and brakes released or caged.
 - Semitrailer must be supported using jack stands at front and rear to prevent shifting. All weight must be taken off the suspension components.
-

a. Removal.

CAUTION

Replacement of torque rod bushings may be accomplished without the use of a press or special tools. Hand check torque rods for free play at the ends to determine the need for replacement. Do not use a pry bar or lever to check for free play. To do so may lead to premature bushing failure.

CAUTION

Work on only one torque rod at a time in order to avoid possible altering of axle alignment. In addition, by completely removing and refitting only one torque rod at a time, the chance of torque rod mix-up (which could lead to re-alignment of the suspension or loss of axle planing angle and consequent axle damage) will be eliminated. If necessary prior to removal, mark one end of torque rod relative to installation location and orientation to avoid possible reversing torque rod during reinstallation.

- (1) Cage brakes of axle(s) involved in removal procedure.
- (2) Remove 5/8 in. bolt (4), self locking nut and spigot cap (3) and discard bolt and nut.

5-4. TORQUE ROD BUSHING REPLACEMENT (Continued).

NOTE

For torque rods attached to the axle towers, pry off the metal plug caps from the towers to gain access to the torque rod self locking bushing nuts.

- (3) Remove torque rod (5) from the spigot (6) by prying at each end of rod until it separates from spigot.
- (4) Support torque rod end with the bushing end facing up. Remove bushing (1) by inserting the blade tip of a large screwdriver between the bushing and the eye (2) of the torque rod and prying the bushing out. Discard the bushing.

b. Cleaning.

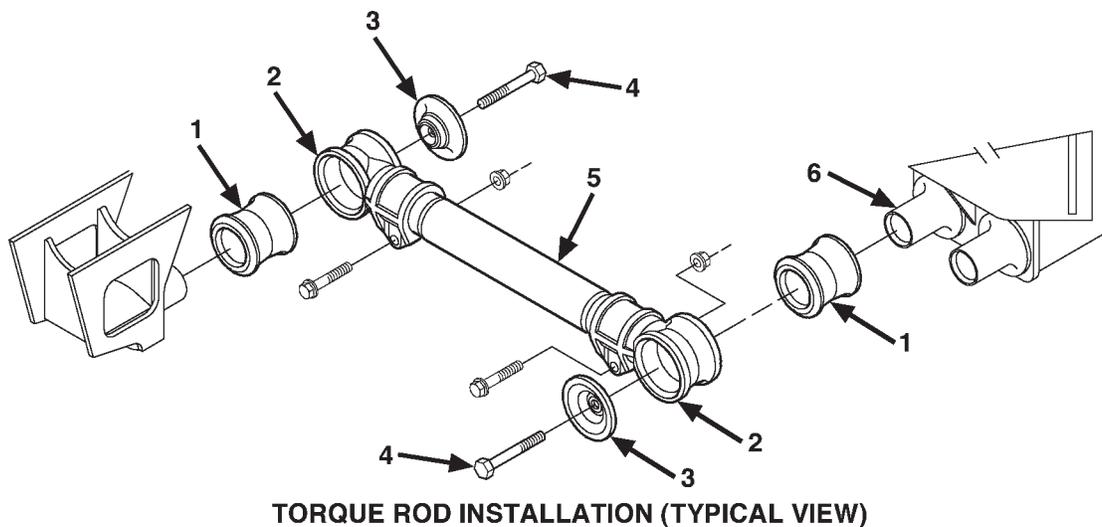
Using a wire brush and/or scraper, clean all rust, scale and rubber accumulations from torque rod eyes and spigot caps (3) and spigots (6).

NOTE

Particular attention should be paid to cleaning the inside taper of the spigot.

c. Inspection.

Inspect the torque rod eyes (2), spigots (6) and spigot caps (3) for visual cracks and wear.



5-4. TORQUE ROD BUSHING REPLACEMENT (Continued).

NOTE

If torque rod eyes or spigot caps show visual cracks, they must be discarded and replaced. If the spigots show visual cracks, contact the supplier (Chalmers Suspensions International, Inc.) for guidelines.

Oversize replacement bushings are available. Refer to Table 5-1 for wear limits on spigots.

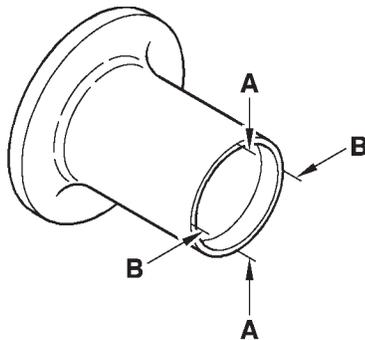
Table 5-1. Spigot Wear Limits

Part No.	Spigot	Std. Bushing Wear Limit	Wear Limit for Oversize Bushing
800021	Spigot #2	2.530" 800010 Min. Bushing	2.530" Max. 800009* Bushings 2.500" Min.

* Service Bushing

NOTE

The standard bushing should be used until the spigot diameter is below 2.530 in. (64.262 mm). To determine wear, take two measurements 90 degrees apart (i.e. "A-A" and "B-B") as shown in the illustration, or measure over visible wear area. The smaller of the two dimensions is to be taken as the wear limit (ref. Table 5-1 for values). If spigot is below the minimum dimension shown in Table 5-1, contact Chalmers Suspensions International, Inc. for guidelines.



NUMBER 2 JOINT ASSEMBLY

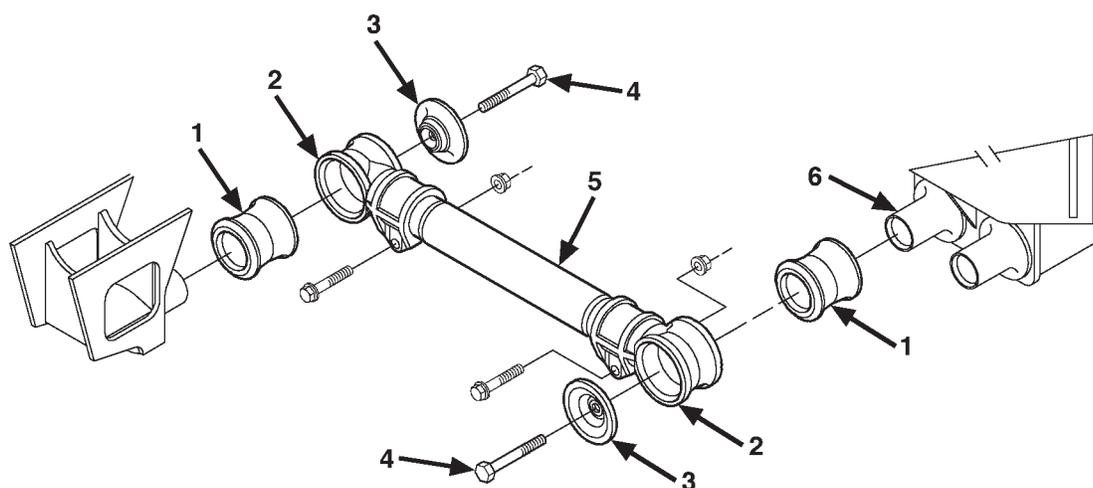
5-4. TORQUE ROD BUSHING REPLACEMENT (Continued).

d. Installation

- (1) Lubricate the inside diameter of the torque rod eye (2) and the outside diameter of the replacement rubber bushing (1) with a quality rubber lubricant such as Rimslip or equivalent.

CAUTION

Never use any mineral based oils, greases, jellies or solvent soaps as a lubricant. To do so will lead to the premature failure of the bushing.



TORQUE ROD INSTALLATION (TYPICAL VIEW)

- (2) Support the end of the torque rod (5) with the torque rod eye (2) facing up and evenly place the rubber bushing (1) onto the torque rod eye so that the outside tapered end of the bushing just enters the eye. With a heavy, soft faced mallet, sharply strike the bushing to drive it down into the torque rod eye. The bushing should be evenly positioned front and back within the torque rod eye.
- (3) Repeat the above procedure for the second bushing.
- (4) Lubricate the spigot ends and the inside diameter of the bushing and install the torque rod as originally installed onto the spigots (6).
- (5) Secure the torque rod in position with spigot caps (3) and new 5/8 in. NC bolt (4) and locking nut. Torque nuts to 135 ft-lb (183 N•m).
- (6) If previously removed, replace the tower metal plug caps (not shown).

5-4. TORQUE ROD BUSHING REPLACEMENT (Continued).

WARNING

Use only new Chalmers approved 5/8 in. NC bolts and nuts for the torque rod to joint fasteners. Do not re-use or use other fasteners. To do so may lead to fastener failure and consequent loss of vehicle control.

- (7) Repeat procedure for opposite torque rod.
- (8) Uncage brakes as required.

FOLLOW-ONTASKS:

None.

5-5. AXLE ALIGNMENT.

This task covers:

- a. Checking axle alignment b. Aligning the axle
-

Initial Setup:

Equipment Conditions:

- Brakes caged (para. 2-19).
- Wheels removed.
- Suspension must be free and loose and no binding exists. All weight must be taken off the suspension components.

Personnel Required: 2**Tools/Test Equipment:**

- Tool kit, mechanics general
NSN 5180-00-177-7033
 - Shop equipment, common No. 1,
NSN 4910-00-754-0654
 - Spindle extensions
 - Tram gauge
-

- a. **Checking Axle Alignment.**

NOTE

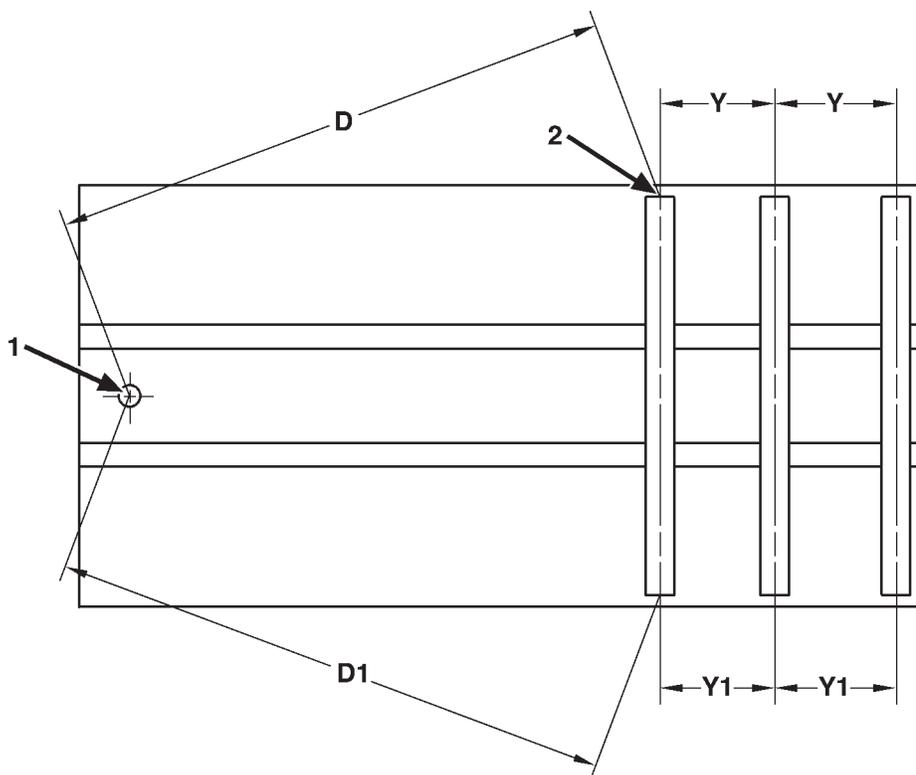
For proper tracking and reduced tire wear, the axles must be properly aligned in relation to the kingpin. Prior to alignment, make certain the suspension is free and loose and the axles have not been placed in a binding condition due to sharp turns or unusual maneuvers. Axles can be relaxed (neutralized) by simply moving the trailer back and forth in a straight line or raising the axle(s) off the ground to allow them to straighten out. Alignment can be accomplished with an optical device designed for this purpose, or it can be accomplished manually by use of a tram gauge or steel tape measure.

5-5. AXLE ALIGNMENT (Continued).

- (1) Measure distance "D" (see illustration) from the kingpin centerpoint (1) to the centerline of the axle spindle (2).

NOTE

It is recommended that spindle extensions be used to facilitate measurement procedures.



- (2) Measure distance "D1" (see illustration) from the kingpin centerpoint (1) to the centerline of the axle spindle (2) for the opposite side of the axle.
- (3) Compare the dimensions taken in Steps (1) and (2). If the dimensions "D" and "D1" are equal, the axle is aligned. If the dimensions are not equal, the axle must be aligned. Subtract the difference between dimension "D" and "D1" and divide the difference in half. This is the amount change required to bring the axle into square with the kingpin.

5-5. AXLE ALIGNMENT (Continued).

b. Aligning the Axles.**NOTE**

On the M870A3 trailer 1100 Series Tri-axle suspension system only one of the lower torque rods for each axle is adjustable for axle alignment procedures. The other three torque rods for each axle are fixed. Only one at a time of the adjustable torque rods should be adjusted.

- (1) Starting with the front axle, loosen the torque rod eye pinch bolts on both ends of the adjustable torque rod.

NOTE

If the pinch bolt fasteners are badly corroded or damaged, remove and discard the bolts and replace with new bolts.

- (2) Attach a pipe wrench to the torque rod tube and rotate the tube to either lengthen or shorten the torque rod as required until dimensions "D" and "D1" are both the same within a tolerance of 1/6 in. (4.233 mm).

NOTE

If difficulty is encountered rotating the torque rod tube, the threaded ends may have become corroded. Apply a quality penetrating oil to the threads. If difficulty is still encountered, wedges may be driven between the eye lugs to release the clamping effect. A chain type wrench is suggested when rotating the torque rod.

- (3) Visually check the rubber bushings to be sure that they are not distorted and are evenly distributed around the torque rod eye. If distortion is seen, neutralize (relax) the bushing as previously described and recheck the dimension.
- (4) Tighten and torque the eye pinch bolts. If the bolts were discarded, replace with new fasteners. Torque 1/2 in. NC bolts to 65 ft-lb (88.2 N•m) and 5/8 in. NC bolts to 135 ft-lb (183 N•m).

5-5. AXLE ALIGNMENT (Continued).

WARNING

Failure to torque fasteners to the specified torque may lead to fastener failure and consequent loss of vehicle control.

- (5) Repeat Steps (1) through (4) to align the next rearward axle. Follow the same procedure of loosening the torque rod pinch bolts, rotating the tube until dimensions "Y" and "Y1" between the axle just aligned and the next rearward axle are equal, and then tightening the clamp bolts to the proper torque.
- (6) After alignment has been accomplished on all axles, all torque clamp bolts should be rechecked to make sure they are at the proper torque.

FOLLOW-ON TASKS:

None

Section II. BRAKE MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
5-6.	General	5-21
5-7.	Brake Drum Repair	5-21

5-6. GENERAL.

This section provides information for performing Direct Support level axle repairs on the M870A3 semitrailers.

5-7. BRAKE DRUM REPAIR.

This task covers:

- | | |
|------------|---------------------|
| a. Removal | b. Repair Standards |
|------------|---------------------|
-

Initial Setup:

Equipment Conditions:

- Brake drum removed (para 4-61).
- Brake lathe

Tools/Test Equipment:

- Shop equipment, common No. 1
NSN 4910-00-754-0654
-

a. Removal.

- (1) If inspection shows brake drum to be out-of-round or excessively scored, rebore, removing as little metal as necessary to true friction surface.
- (2) After boring, check that brake drum meets the requirements of repair standards.
- (3) If refinishing requires the removal of more than 1/16 in. (0.16 cm) of material 1/8 in. (0.32 cm) in diameter, replace brake drum.
- (4) The repair and rebuild standards included herein give the minimum, maximum, and key clearance of new or rebuilt parts. They also give wear limits which indicate that the point to which a part or parts may be worn before replacement, in order to give maximum service with minimum replacement.

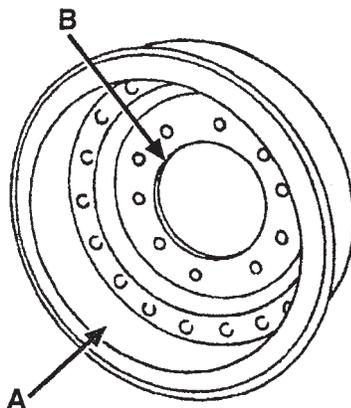
5-7. BRAKE DRUM REPAIR (Continued).

b. Repair Standards.**Table 5-2. Brake Drum Wear Tolerances**

Item and Point of Measurement	Illustration letter ref.	Size and Fit of New Parts		Wear Limits
		Minimum	Maximum	
Inside Diameter	A	16.495 in. (41.9 cm)	16.505 in. (41.92 cm)	16.625 in. (42.23 cm)
Concentricity of inside diameter with outside diameter	B	Total Reading	Indicator 0.004	*

(* Indicates that part should be replaced when worn beyond the limits given in "size and fit of new parts" column.)

Normally, all parts which have not been worn beyond the dimensions shown under "Wear Limits" in the above table, or damaged by corrosion, will be approved for service. Points of measurement of repair standards are shown in the illustration.

**FOLLOW-ON TASKS:**

Install brake drum (para 4-61).

Section III. WHEEL AND TIRE MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
5-8.	General	5-23
5-9.	Wheel and Tire Repair	5-23

5-8. GENERAL.

This section provides information for performing Direct Support level wheel and tire repairs on the M870A3 semitrailers.

5-9. WHEEL AND TIRE REPAIR.

For wheel and tire repairs, refer to TM 9-2610-200-14.

Section IV. GOOSENECK HYDRAULIC SYSTEM MAINTENANCE

Paragraph Number	Paragraph Title	Page Number
5-10.	General	5-24
5-11.	Tilt Cylinder Replacement	5-24
5-12.	Lift Cylinder Replacement	5-26
5-13.	Gooseneck Hydraulic Line Repair	5-30

5-10. GENERAL.

This section provides information for performing Direct Support level hydraulic system repairs on the M870A3 semitrailers.

5-11. TILT CYLINDER REPLACEMENT.

This task covers:

- a. Removal b. Installation

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Materials/Parts:

- Cotter-pins (2)
- Tape, anti-seizing (item 21, Appendix F)
- Marker tag (item 20, Appendix F)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033
- Shop equipment common No. 1 4910-00-754-0654

General Safety Instructions:

- Gooseneck must be securely supported during procedure or attached to trailer.

a. Removal.

WARNING

- Gooseneck must be securely supported during procedure or attached to trailer. Severe injury or death to personnel may occur if gooseneck is unstable or tips.
- High pressure hydraulics used to operate this equipment can pierce body tissue and cause severe injury to personnel. Never disconnect any hydraulic line or fitting without first dropping pressure to zero.
- Wear safety goggles when performing any hydraulic maintenance procedures or test. Failure to do so may result in serious eye injury due to high pressure oil.

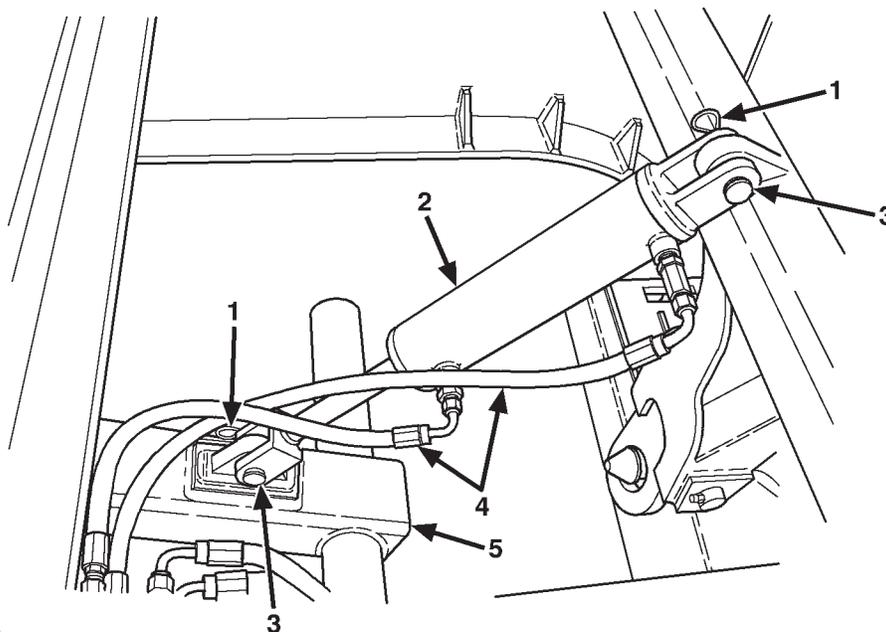
5-11. TILT CYLINDER REPLACEMENT (Continued).

- (1) Release all pressure from hydraulic lines by disconnecting gooseneck hydraulics from power source.
- (2) Tag and disconnect two hydraulic lines (4) from tilt cylinder (2) and cap or seal lines.

CAUTION

Cap or plug all ports and hose ends to prevent contamination of hydraulic oil. Failure to do so may result in damage to equipment.

- (3) Support gooseneck tilt arm (5).
- (4) Remove upper and lower cotter pins (1) from tilt arm and withdraw cylinder attaching pins (3).
- (5) Remove tilt cylinder (2)



b. Installation.

- (1) Install tilt cylinder (2) between gooseneck frame and tilt arm (5) and secure upper and lower ends with cylinder attaching pins (3).
- (2) Lock cylinder attaching pins (3) in place by inserting cotter pins (1) and bend pins to secure.
- (3) Remove caps or sealing tape from ends of hydraulic lines and apply anti-seize tape to threads of inlet and outlet ports of tilt cylinder (2).
- (4) Connect hydraulic lines (4) to tilt cylinder (2) and apply hydraulic pressure to test operation and check for leaks.
- (5) Extend and retract tilt cylinder (2) ten times to remove air from system.

FOLLOW-ONTASKS:

None.

5-12. LIFT CYLINDER REPLACEMENT.

This task covers:

- a. Removal b. Installation
-

Initial Setup:

Equipment Conditions:

- Gooseneck detached from trailer resting on firm pad.

Materials/Parts:

- Marker tag (item 20, Appendix F)
- Tape, anti-seizing (item 21, Appendix F)
- Oil Lubricating: Internal Combustion (item 13, Appendix F)

Tools/Test Equipment

- Tool set, general mechanics, NSN 5180-00-177-7033
- Chain hoist
- Support Equipment common No.1 4910-00-754-0654

General Safety Instructions:

- Gooseneck must be securely supported in a manner that will prevent it from extending prior to working on gooseneck lock pin hydraulic cylinder or lock pins.
-

WARNING

- **Gooseneck must be securely supported during this procedure and resting on a firm foundation. Severe injury or death to personnel may occur if gooseneck is unstable or tips.**
- **High pressure hydraulics used to operate this equipment can pierce body tissue and cause severe injury to personnel. Never disconnect any hydraulic line or fitting without first dropping pressure to zero.**
- **Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure oil.**

a. Removal.

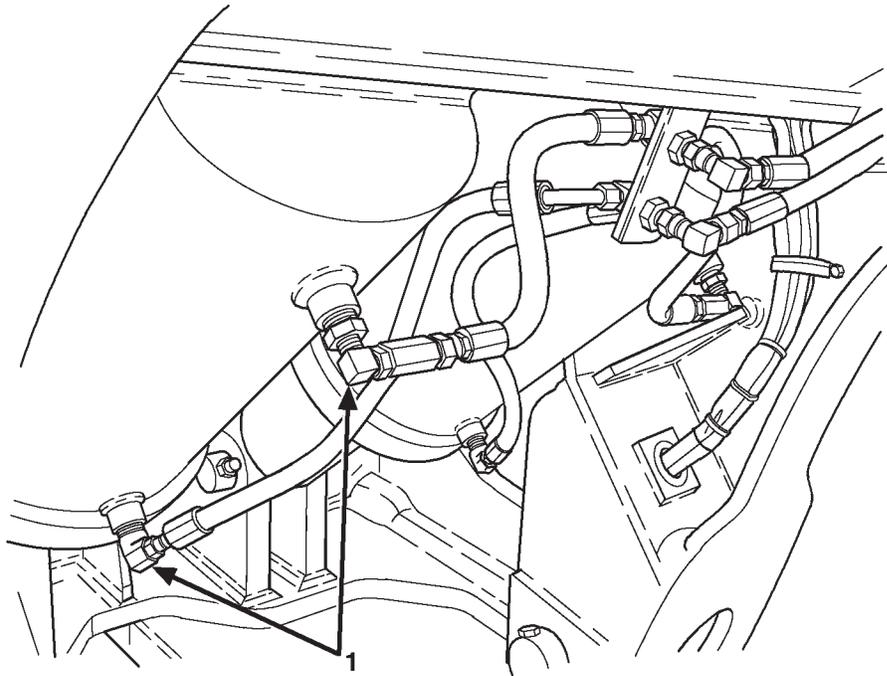
- (1) Rigidly support front of gooseneck so that there is ample work clearance under the gooseneck. Gooseneck base should be permitted to drop until the gooseneck lifting lugs and center lug of the gooseneck are firmly on the ground to allow the maximum extension of the lift cylinders.

NOTE

Remove lower hydraulic line first in order to drain hydraulic fluid from system. Do not attempt to reuse hydraulic fluid, but discard as described in front matter portion of this manual under hazardous waste disposal warning.

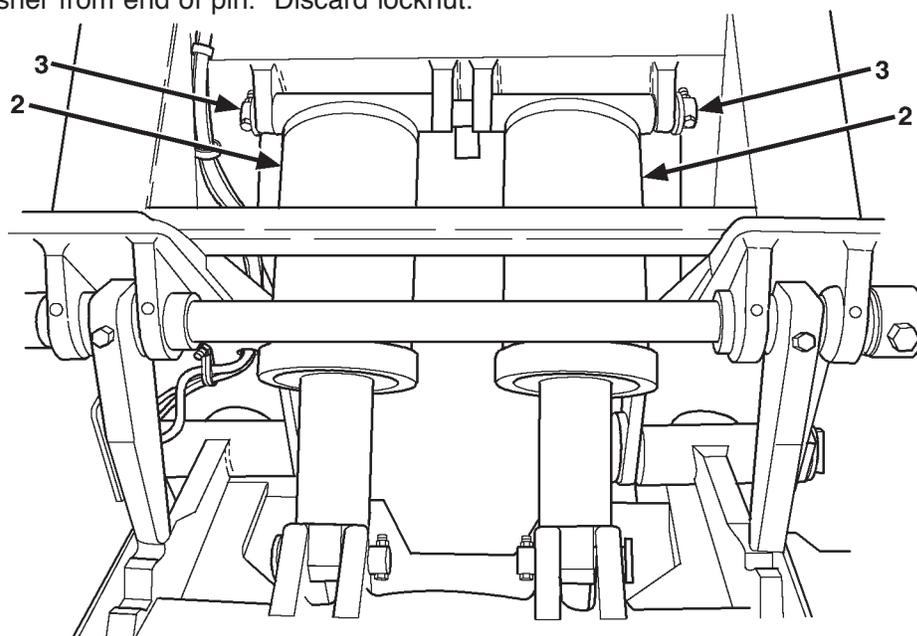
- (2) Disconnect and appropriately tag lower and upper hydraulic lines (1) from lift cylinder inlet and outlet ports and cap or tape closed openings in ports and lines.

5-12. LIFT CYLINDER REPLACEMENT (Continued).

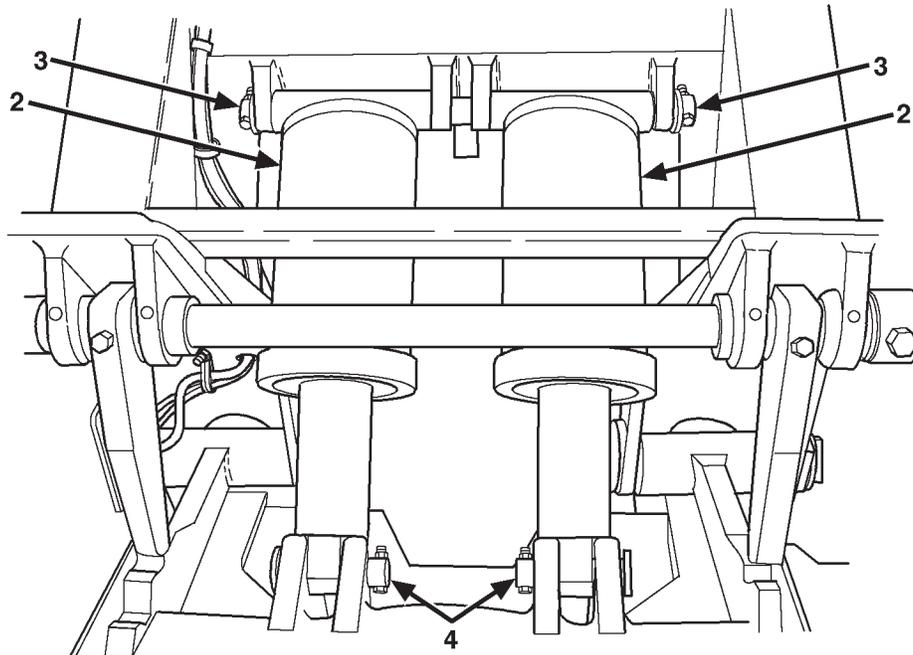
**CAUTION**

Cap or plug all ports and hose ends to prevent contamination of hydraulic oil. Failure to do so may result in damage to equipment.

- (3) Using an overhead hoist, secure a chain around the upper portion of the lift cylinder (2) and draw up on the hoist to remove slack.
- (4) Remove bolt and locknut securing outer end of upper lift cylinder pin (3) and remove washer from end of pin. Discard locknut.



5-12. LIFT CYLINDER REPLACEMENT (Continued).



- (5) Drive upper lift cylinder pin (3) out from hangers through access hole in gooseneck wall to free upper portion of lift cylinder.

NOTE

As cylinder pin is driven out, maintain sufficient tension on chain hoist supporting upper portion of lift cylinder so that cylinder does not suddenly shift as pin is removed.

- (6) Using heavy rope, secure around piston of lift cylinder to restrain movement of lower portion of cylinder when lower pin is removed.

CAUTION

Do not use a chain to restrain movement of piston as a chain may score or damage piston surface.

- (7) Remove bolt and nut securing lower lift cylinder pin (4), drive out pin and raise hoist to remove lift cylinder.

5-12. LIFT CYLINDER REPLACEMENT (Continued).

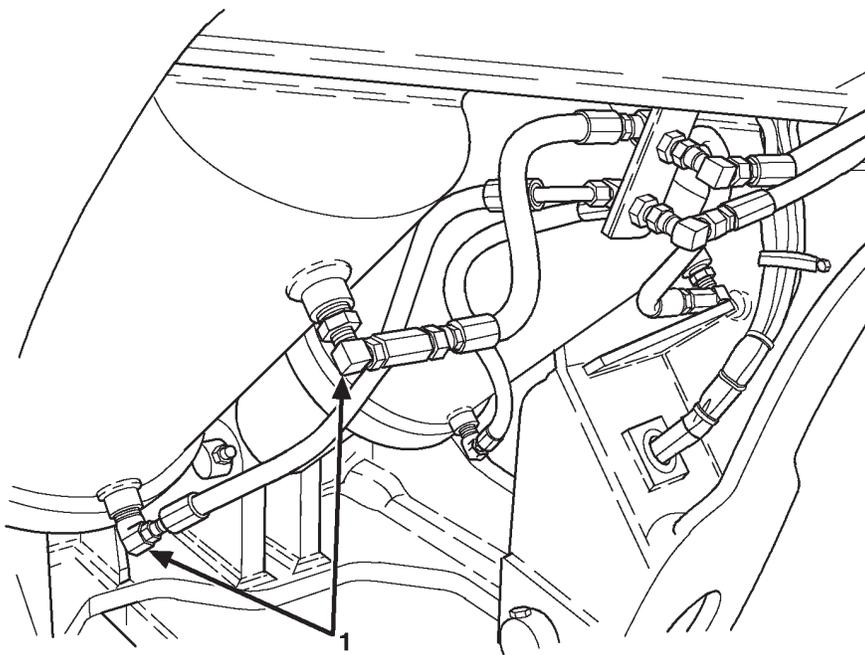
b. Installation.

- (1) Using a chain hoist securing the upper portion of the lift cylinder and a second heavy rope around the lift cylinder piston, position lift cylinder (2) onto gooseneck so that end of piston is located between lugs of base plate and secure with pin (4), washer, bolt and new locknut.

CAUTION

Do not use a chain to control movement of piston as a chain may score or damage piston surface.

- (2) Work the upper portion of the lift cylinder into position so that the upper lift cylinder pin can be driven through the lift cylinder hangers and lugs. Secure pin with bolt, washer and new locknut.
- (3) Remove chain hoist and rope from lift cylinder.
- (4) Remove caps or tape from ends of hydraulic line and lift cylinder ports and reconnect hydraulic lines (1).
- (5) Apply hydraulic pressure to the system and check for leaks.
- (6) Extend and retract lift cylinder (2) ten times to remove any air from hydraulic system.



FOLLOW-ON TASKS:

- Replenish hydraulic fluid and check system for leaks.
- Check hydraulic system for proper operation.

5-13. GOOSENECK HYDRAULIC LINE REPAIR.

This task covers:

a. Repair

Initial Setup:

Equipment Conditions:

- Trailer parked on level ground, brakes engaged and wheels chocked.

Materials/Parts:

- Tape, anti-seizing (item 21, Appendix F)
- Tie, plastic (item 24, Appendix F)

Tools/Test Equipment:

- Tool kit, mechanics general, NSN 5180-00-177-7033
-

WARNING

- **Gooseneck must be securely supported during this procedure and resting on a firm foundation. Severe injury or death to personnel may occur if gooseneck is unstable or tips.**
- **High pressure hydraulics [oil under 2450 psi (16,893 kPa)] used to operate this equipment can pierce body tissue and cause severe injury to personnel. Never disconnect any hydraulic line or fitting without first dropping pressure to zero.**
- **Wear safety goggles when performing leakage tests on valves. Failure to do so may result in serious eye injury due to high pressure oil.**

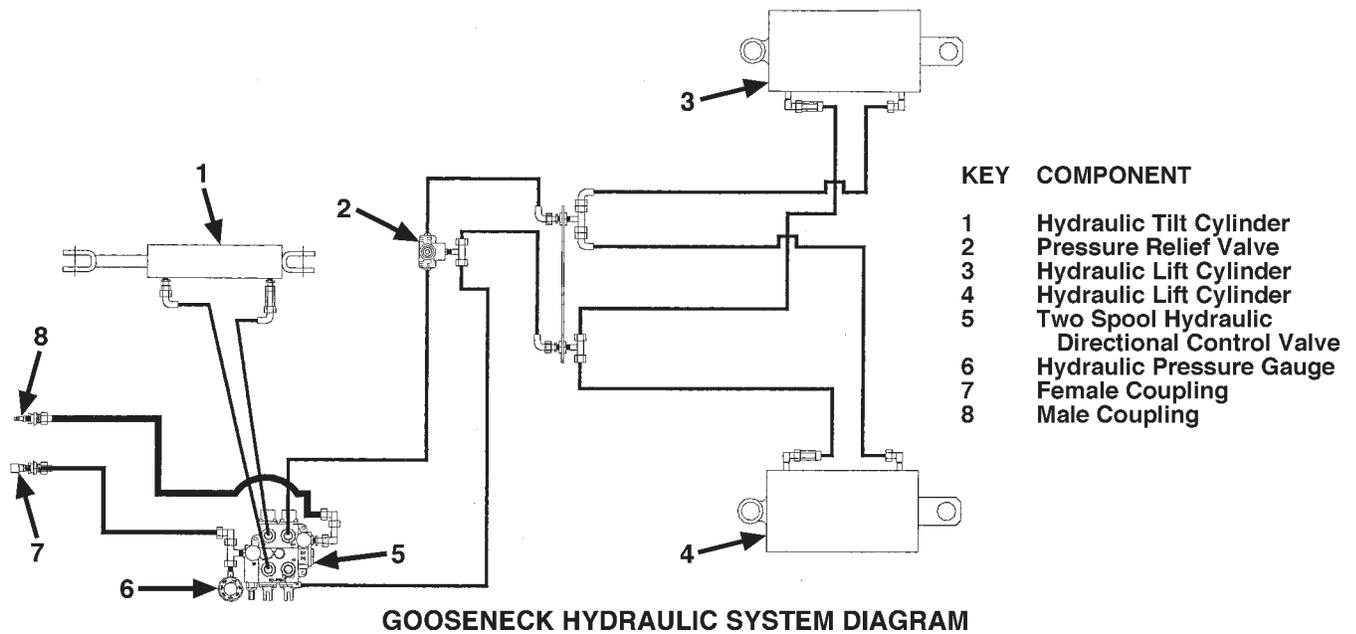
NOTE

- **Hydraulic lines can be replaced or repaired, depending on the length of the damaged section. If damaged line is short, replace it. If damaged line is long, repair it.**
- **Reference paragraphs 4-21 (Lines and Ports) and 4-22 (Anti-seize Tape) for general gooseneck hydraulic line maintenance instructions.**

a. Repair.

Hydraulic lines and fittings are not ordinarily removed unless they need to be replaced. Badly damaged hydraulic lines or fittings must be replaced. Hydraulic lines and fittings must be tightly attached and connected. See gooseneck hydraulic diagram for additional information.

5-13. GOOSENECK HYDRAULIC LINE REPAIR (Continued).

**FOLLOW-ON TASKS:**

None

TM 5-2330-325-14&P

APPENDIX A REFERENCES

A-1. SCOPE.

This appendix lists all forms, field manuals, technical manuals, and other publications referenced in this manual, and that apply to the operation and maintenance of the M870A3 Trailer (MHET).

A-2. PUBLICATION INDEX.

DA Pam 25-30, *Consolidated Index of Army Publications and Blank Forms*, should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

A-3. FORMS.

Refer to DA Pam 738-750, *Functional Users Manual for the Army Maintenance Management System (TAMMS)*, for instructions on the use of maintenance forms.

Equipment Control Record	DA Form 2408-9
Equipment Inspection and Maintenance Worksheet	DA Form 2404 or DA Form 5988E
Equipment Log Assembly (Records)	DA Form 2408
Maintenance Request	DA Form 2407
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
Product Quality Deficiency Report	SF Form 368
Recommended Changes to Equipment Technical Publications	DA Form 2028-2
Recommended Changes to Publications and Blank	DA Form 2028
Report of Discrepancy (ROD)	SF Form 364

A-4. FIELD MANUALS.

Basic Cold Weather Manual	FM 31-70
Chemical and Biological Contamination Avoidance	FM 3-3
Field Behavior of NBC Agents (Including Smoke and Incendiaries)	FM 3-6
First Aid for Soldiers	FM 21-11
Manual for Wheeled Vehicle Driver	FM 21-305
NBC Decontamination	FM 3-5
NBC Protection	FM 3-4
Northern Operations	FM 31-71
Operation and Maintenance of Ordnance Materiel in Cold Weather 0°F to 65°F (-17.8°C- 54°C)	FM 9-207
Operational Terms and Symbols	FM 101-5-1
Railway Operating and Safety Rules	FM 55-21
Visual Signals	FM 21-60

A-5. TECHNICAL BULLETINS.

Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment, and Materiel Handling Equipment	TB 43-0209
Corrosion Prevention and Control, Including Rustproofing Procedures for Tactical Vehicles and Trailers	TB 43-0213
Equipment Improvement Report and Maintenance Digest (U.S. Series Army Tank-Automotive Command) Tank-Automotive Equipment	TB 43-0001-39-Series
Warranty Technical Bulletin, M870A3	TB 5-2330-325-14
Tactical Wheeled Vehicles: Repair of Frames	TB 9-2300-247-40

A-6. TECHNICAL MANUALS.

.....	TM 43-209
Inspection, Care, and Maintenance of Antifriction Bearings	TM 9-214
Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materials Including Chemicals	TM 9-247
Operator, Unit, Direct Support Maintenance Manual for Care, Maintenance, Repair, and Inspection of Pneumatic Tires and Inner Tubes	TM 9-2610-200-14
Operator's Manual for Welding Theory and Application	TM 9-237
Organizational, Unit, Direct Support and General Support Care, Maintenance, and Repair of Pneumatic Tires and Inner Tubes	TM 9-2610-200-24
Painting Instructions for Army Materiel	TM 43-0139
Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Command)	TM 750-244-3
Railcar Loading Procedures	TM 55-601
Storage and Materials Handling	TM 743-200-1
M916A1, M916A2 TM	TM 9-2320-363
M916A3 TM	TM 9-2320-302

A-7. OTHER PUBLICATIONS.

Army Medical Department Expendable/Durable Items	CTA 8-100
Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)	CTA 50-970
Fuels and Lubricants Standardization Policy for Equipment Design, Operation, and Logistic Support	AR 70-12
Functional Users Guide for the Army Maintenance Management System	DA PAM 738-750
Military Standard Abbreviations for Use on Drawings, Specifications Standards, and in Technical Documents	MIL-STD-12D
Prevention of Motor Vehicle Accidents	AR 385-55

APPENDIX B MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. THE ARMY MAINTENANCE SYSTEM MAINTENANCE ALLOCATION CHART (MAC)

- a. This introduction (Section I) provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance system concept.
- b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:
 - Unit - includes two subcolumns, C (Operator/Crew) and O (Unit) Maintenance.
 - Direct Support - includes an F subcolumn.
 - General Support - includes an H subcolumn.
 - Depot - includes a D subcolumn.
- c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.
- d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS.

Maintenance functions are limited to and defined as follows:

- a. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).
- b. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item/end item and comparing those characteristics with prescribed standards.
- c. **Service.** Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.
- d. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specific parameters.
- e. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.
- f. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- g. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing onto position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

B-2. MAINTENANCE FUNCTIONS (Continued).

- h. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the 3rd position code of the SMR code.
- i. **Repair.** The application of maintenance services¹ including fault location/troubleshooting², removal/installation, and disassembly/assembly³ procedures, and maintenance actions⁴ to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.
- j. **Overhaul.** That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in the appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
- k. **Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

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

- a. **Column (1) - Group Number.** Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.
- b. **Column (2) - Component/Assembly.** Column 2 contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.
- c. **Column (3) - Maintenance Function.** Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2).

NOTE

When a complete replace or repair task performed at higher level maintenance includes lower level maintenance tasks (equipment condition/follow-on tasks), the lower level work time figures in the MAC must be added to the higher level work time shown in the MAC to determine the total to accomplish that maintenance function.

-
1. Services - Inspect, test, service, adjust, align, calibrate, and/or replace.
 2. Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).
 3. Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/function group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).
 4. Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

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

- d. **Column (4) - Maintenance Level.** Column 4 specified each level of maintenance authorized to perform each function listed in Column 3, by indicating a work time required (expressed as man-hours in whole hours or decimals) in the appropriate subcolumn. This work-time figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work-time figures are shown for each level. The work-time figure represents the average time required to restore an item (assembly, subassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time designations for the various maintenance levels are as follows:
- C - Operator or Crew Maintenance
 - O - Unit Maintenance
 - F - Direct Support Maintenance
 - L - Specialized Repair Activity (SRA)⁵
 - H - General Support Maintenance
 - D - Depot Maintenance
- e. **Column (5) - Tools and Test Equipment Reference Code.** Column 5 specifies, by code those common tool sets (not individual tools), common TMDE, and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to Tools and Test Equipment in Section III.
- f. **Column (6) - Remarks.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks contained in Section IV.

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

- a. **Column (1) - Tool or Test Equipment Reference Code.** The tool or test equipment reference code correlates with a code used in the MAC, Section II, column (5).
- b. **Column (2) - Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.
- c. **Column (3) - Nomenclature.** Name or identification of the tool or test equipment.
- d. **Column (4) - National Stock Number.** The National Stock Number of the tool or test equipment.
- e. **Column (5) - Tool Number.** The manufacturer's part number, model number, or type number.

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

N/A

5. This maintenance level is not included in Section II, column (4) of the MAC. Functions to this level of maintenance are identified by a work-time figure in the "H" column of Section II, column (4), and an associated reference code is used in the "Remarks" column (6). This code is keyed to Section IV, Remarks, and the SRA complete repair application is explained there.

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Section II. MAINTENANCE ALLOCATION CHART FOR 870A3

(1) Group	(2) Component/	(3) Maintenance	(4) Maintenance Level					(5) Tools and Equipment	(6)
			Unit		DS	GS	Depot		
			C	O	F	H	D		
06	Electrical System								
0608	24 Volt Receptacle	Service Replace		0.2 1.0				5,6 5,6	
	12 Volt Receptacle	Service Replace		0.2 0.5				5	
0609	Stop Taillights	Inspect Replace	0.2					5	
	Light, Marker Clearance	Inspect Replace	0.2					5	
	Blackout Lights	Inspect Replace	0.2					5	
0613	Wiring Harness	Replace Repair		1.0 1.0				5,6 5,6	
11	Axle								
1100	Axle	Replace			6.0			5,6	
12	Brakes								
1202	Service Brakes	Inspect Replace	0.2	1.0 4.0				5 5	
1206	Slack Adjusters	Service Inspect Replace Adjust		0.5 0.2 1.0 1.0				6 5 5,7	
	Brake Camshaft	Service Replace		0.5 1.0				5 5,6	
1208	Gladhands	Service Replace Repair	0.2					5 5	
	Reservoir Drain Valve	Inspect Service Replace	0.2 0.2					5	

Section II. MAINTENANCE ALLOCATION CHART (Continued)

(1) Group	(2) Component/	(3) Maintenance	(4) Maintenance Level					(5) Tools and Equipment	(6)
			Unit		DS	GS	Depot		
			C	O	F	H	D		
13	Air Hoses and Fittings	Inspect	0.2	0.2				5	
		Replace		1.0				5	
	Spring Brake Control Valve	Inspect	0.7						
		Replace		1.0				5	
		Test		0.4					
	Electronic Control Unit	Inspect	1.0						
		Replace		1.0				5	
		Test		0.4					
	Air Brake Chambers	Test		0.2					
		Replace		1.0				5	
Front Air Reservoir	Inspect	0.2							
	Test		0.2				5		
	Replace		1.0				5		
ABS Sensor	Inspect		0.1						
	Test		0.3						
	Replace		0.3						
Rear Air Reservoir	Inspect	0.2							
	Test		0.2				5		
	Replace		1.0				5		
13	Wheels, Hubs, and Drums								
1311	Hub and Drum Assembly	Inspect	0.5	1.0					
		Service		0.2				5,6	
		Replace		2.0				5,6,8	
		Repair			1.0		6,10		
1313	Wheel Assembly	Inspect	0.3						
		Replace		1.0					
		Hubodometer	Inspect	0.1					
		Replace		0.5			5		
1313	Tire	Inspect	0.1	1.0				5	
		Replace	0.5					1,2,3,4	
		Repair		0.5					

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Section II. MAINTENANCE ALLOCATION CHART (Continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks
			Unit		DS	GS	Depot		
			C	O	F	H	D		
15	Frame, Towing Attachments, Drawbar, and Articulation								
1501	Gooseneck Tilt Cylinder	Replace			0.5			5	
	Gooseneck Lift Cylinder	Replace			3.0			5	
	Gooseneck	Replace Repair			3.0 6.0				
	Gooseneck Airlines	Inspect Replace	0.2	3.0				5	
1503	King Pin	Inspect Service Replace	0.2 0.2 0.2						
1504	Spare Tire and Mounting Hardware	Service Replace Repair	0.2 0.2	0.5				5,6	
18	Body, Cab, Hood, and Hull								
1801	Mud Flaps	Replace	0.4					5	
1805	Deck Planking	Inspect Replace	0.2	1.5				5,6	
1808	Tool Box Door	Inspect Replace	0.2	1.0				5,6	
22	Body, Chassis, and Hull Accessories								
2202	Reflectors	Replace	0.2					5	
2210	Data Plates	Replace	0.5					5,6	
2406	Hydraulic Lines and Fittings	Inspect Replace Repair	0.2	1.0	1.0				

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Tool or Test Equipment ReferenceCode	(2) Maintenance Level	(3) Nomenclature	(4) National Stock Number	(5) Tool Number
1	C	Handle, Truck	5120-01-134-9422	(75204) TR5
2	C	Jack, Hydraulic		(00000) 14465-B934
3	C	Wrench, Truck	5120-01-292-9849	(75204) TR9
4	C	Gage and Hose Assembly		
5	O	Tool Kit, General Mechanics	2180-00-177-7033	
6	O	Shop Equipment, Common No. 1	4910-00-754-0654	
7	O	Clevis Installation Gage		
8	F	Overhead Lift		
9	F	Brake Lathe		

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APPENDIX C REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)

SECTION I. INTRODUCTION

C-1. SCOPE

The RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of organizational, direct support and general support maintenance of the M870A3 Trailer (MHET). It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

C-2. GENERAL

In addition to the Introduction work package, this RPSTL is divided into the following work packages.

1. Repair Parts List Work Packages. Work packages containing lists of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. These work packages also include parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with parts in each group listed in ascending figure and item number sequence. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in FIG. BULK at the end of the work packages. Repair parts kits are listed separately in their own functional group and work package. Repair parts for reparable special tools are also listed in a separate work package. Items listed are shown on the associated illustrations.

2. Special Tools List Work Packages. Work packages containing lists of special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC) column). Tools that are components of common tool sets and/or Class VII are not listed.

3. Cross-Reference Indexes Work Packages. There are two cross-reference indexes work packages in this RPSTL; the National Stock Number (NSN) Index work package and the Part Number (P/N) work package. The National Stock Number Index work package refers you to the figure and item number. The Part Number Index work package refers you to the figure and item number.

C-3. EXPLANATION OF COLUMNS IN THE REPAIR PARTS LISTS AND SPECIAL TOOLS LIST WORK PACKAGES.

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

SMR CODE (Column (2)). The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout:

<u>Source Code</u>	<u>Maintenance Code</u>	<u>Recoverability Code</u>
xx	xx	x
1 st two positions: How to get an item.	3 rd position: Who can Install, replace, or use item.	4 th position: Who can complete repair* on the item.
		5 th position: Who determines disposition action on unserviceable items.

*Complete repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

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C-3. EXPLANATION OF COLUMNS IN THE REPAIR PARTS LISTS AND SPECIAL TOOLS LIST WORK PACKAGES (Continued).

Source Code. The source code tells you how you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

<u>Source Code</u>	<u>Application/Explanation</u>
PA PB PC PD PE PF PG	<p>Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the 3rd position of the SMR code.</p> <p style="text-align: center;">NOTE</p> <p>Items coded PC are subject to deterioration.</p>
KD KF KB	<p>Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance level indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.</p>
MO-Made at unit/ AVUM level MF-Made at DS/ AVIM level MH-Made at GS level ML-Made at SRA MD-Made at depot	<p>Items with these codes are not to be requisitioned/requested individually. They must be made from bulk material which is identified by the P/N in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work package of the RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at higher level, order the item from higher level of maintenance.</p>
AO-Assembled by unit/AVUM level AF-Assembled by DS/AVIM level AH-Assembled by GS level AL-Assembled by SRA AD-Assembled by depot	<p>Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned of fabricated and assembled at the level of maintenance indicated by the source code. If the 3rd position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the the higher level of maintenance.</p>
XA	<p>Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to NOTE below.)</p>
XB	<p>If an item is not available from salvage, order it using the CAGEC and P/N.</p>
XC	<p>Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer's P/N.</p>

C-3. EXPLANATION OF COLUMNS IN THE REPAIR PARTS LISTS AND SPECIAL TOOLS LIST WORK PACKAGES (Continued).

XD Item is not stocked. Order an XD-coded item through normal supply channels using the CAGEC and P/N given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes except for those items source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

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

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

Maintenance Code

Application/Explanation

- C - Crew or operator maintenance done within unit/AVUM maintenance.
- O - Unit level/AVUM maintenance can remove, replace, and use the item.
- F - Direct support/AVIM maintenance can remove, replace, and use the item.
- H - General support maintenance can remove, replace, and use the item.
- L - Specialized repair activity can remove, replace, and use the item.
- D - Depot can remove, replace, and use the item.

Fourth Position. The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (perform all authorized repair functions).

NOTE

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

Maintenance Code

Application/Explanation

- O - Unit/AVUM is the lowest level that can do complete repair of the item.
- F - Direct support/AVIM is the lowest level that can do complete repair of the item.
- H - General support is the lowest level that can do complete repair of the item.
- L - Specialized repair activity is the lowest level that can do complete repair of the item.

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C-3. EXPLANATION OF COLUMNS IN THE REPAIR PARTS LISTS AND SPECIAL TOOLS LIST WORK PACKAGES (Continued).

- D - Depot is the lowest level that can do complete repair of the item.
- Z - Nonrepairable. No repair is authorized.
- B - No repair is authorized. No parts or special tools are authorized for maintenance of "B" coded item. However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is shown in the fifth position of the SMR code as follows:

Recoverability Code
Application/Explanation

- Z - Nonrepairable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
- O - Repairable item. When uneconomically repairable, condemn and dispose of the item at the unit level.
- F - Repairable item. When uneconomically repairable, condemn and dispose of the item at the direct support level.
- H - Repairable item. When uneconomically repairable, condemn and dispose of the item at the general support level.
- D - Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot level.
- L - Repairable item. Condemnation and disposal of item are not authorized below Specialized Repair Activity (SRA).
- A - Item requires special handling or condemnation procedures because of specific reasons (such as precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

NSN (Column (3)). The NSN for an item is listed in this column.

CAGEC (Column (4)). The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

PART NUMBER (Column (5)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use an NSN to requisition an item, the item you receive may have a different P/N from the one listed.

C-3. EXPLANATION OF COLUMNS IN THE REPAIR PARTS LISTS AND SPECIAL TOOLS LIST WORK PACKAGES (Continued).

DESCRIPTION AND USEABLE ON CODE (UOC) (Column (6)). This column includes the following information.

1. The federal item name, and when required, a minimum description to identify the item.
2. P/Ns of bulk materials are referenced in this column in the line entry to be manufactured or fabricated.
3. Hardness Critical Item (HCI). A support item that provides the equipment with special protection from electromagnetic pulse (EMP) damage during a nuclear attack.
4. The statement END OF FIGURE appears just below the last item description column (6) for a given figure in both the repair parts list and the special tools list work packages.

QTY (Column (7)). The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and quantity may change from application to application.

C-4. EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS

1. National Stock Number (NSN) Index Work Package.

STOCK NUMBER Column. This column lists the NSN in National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN.

NSN
(e.g., 5385-01-574-1476)
NIIN

When using this column to locate an item, ignore the first four digits of the NSN. However the complete NSN should be used when ordering items by stock number.

FIG. Column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in the repair parts list and special tools list work packages.

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

2. Part Number (P/N) Index Work Package. P/Ns in this index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combinations which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

PART NUMBER Column. Indicates the P/N assigned to the item.

FIG. Column. This column lists the number of the figure where the item is identified/located in the repair parts list and special tools list work packages.

ITEM Column. The item number is the number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

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C-5. SPECIAL INFORMATION

UOC. The UOC appears in the lower left corner of the Description Column heading. Useable on codes are shown as "UOC: " in the Description Column (justified left) on the first line under the applicable item/nomenclature. Uncoded items are applicable to all models. Identification of the UOCs used in the RPSTL are:

<u>Code</u>	<u>Used On</u>
TLC	M870A3

Fabrication Instructions. Bulk materials required to manufacture items are listed in the bulk material functional group of this RPSTL. Part numbers for bulk materials are also referenced in the Description Column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in Appendix (x) of this manual.

Index Numbers. Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the NSN / P/N index work packages and the bulk material list in the repair parts list work package.

C-6. HOW TO LOCATE REPAIR PARTS

1. When NSNs or P/Ns Are Not Known.

First. Using the table of contents, determine the assembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.

Second. Find the figure covering the functional group or the subfunctional group to which the item belongs.

Third. Identify the item on the figure and note the number(s).

Fourth. Look in the repair parts list work packages for the figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

2. When NSN Is Known.

First. If you have the NSN, look in the STOCK NUMBER column NSN index work package. The NSN is arranged in NIIN sequence. Note the figure and item number next to the NSN.

Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

3. When P/N Is Known.

First. If you have the P/N and not the NSN look in the PART NUMBER column of the part number index work package. Identify the figure and item number.

Second. Look up the item on the figure in the applicable repair parts list work package.

C-7. ABBREVIATIONS

No uncommon abbreviations are used in this RPSTL.

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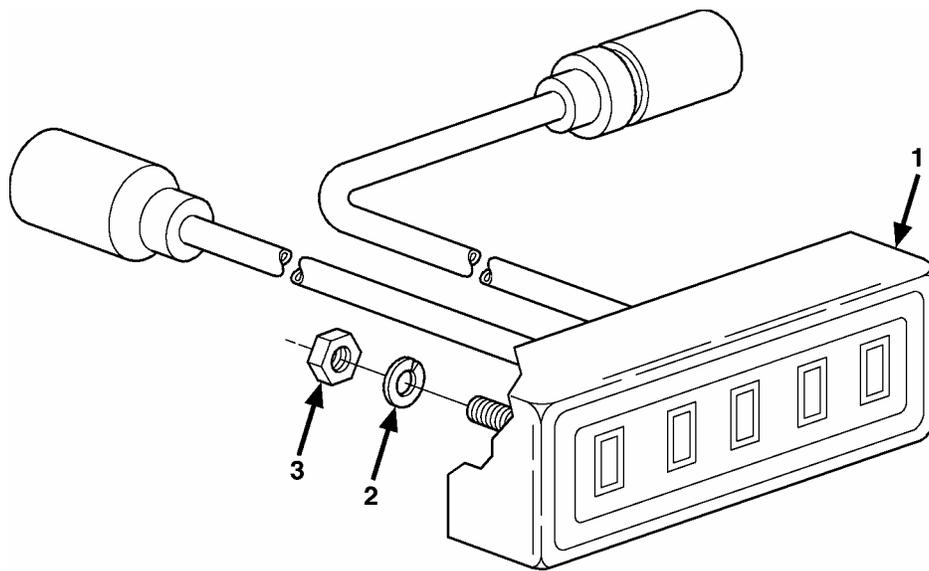


FIGURE 1. BLACKOUT, STOP AND TAIL LIGHT

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(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 06 ELECTRICAL	
					GROUP 0609 LIGHTS	
					FIG. 1 BLACKOUT, STOP AND TAIL LIGHT	
1	PAOZZ	6220-01-343-1327	5A910	12258211-2	LAMP, BLACKOUT 24 VOLT	2
2	PAOZZ	5310-00-045-3299	80205	MS35338-42	WASHER, LOCK #8	4
3	PAOZZ	5310-00-934-9757	96906	MS35649-282	NUT, PLAIN, HEXAGON #8-32	4

END OF FIGURE

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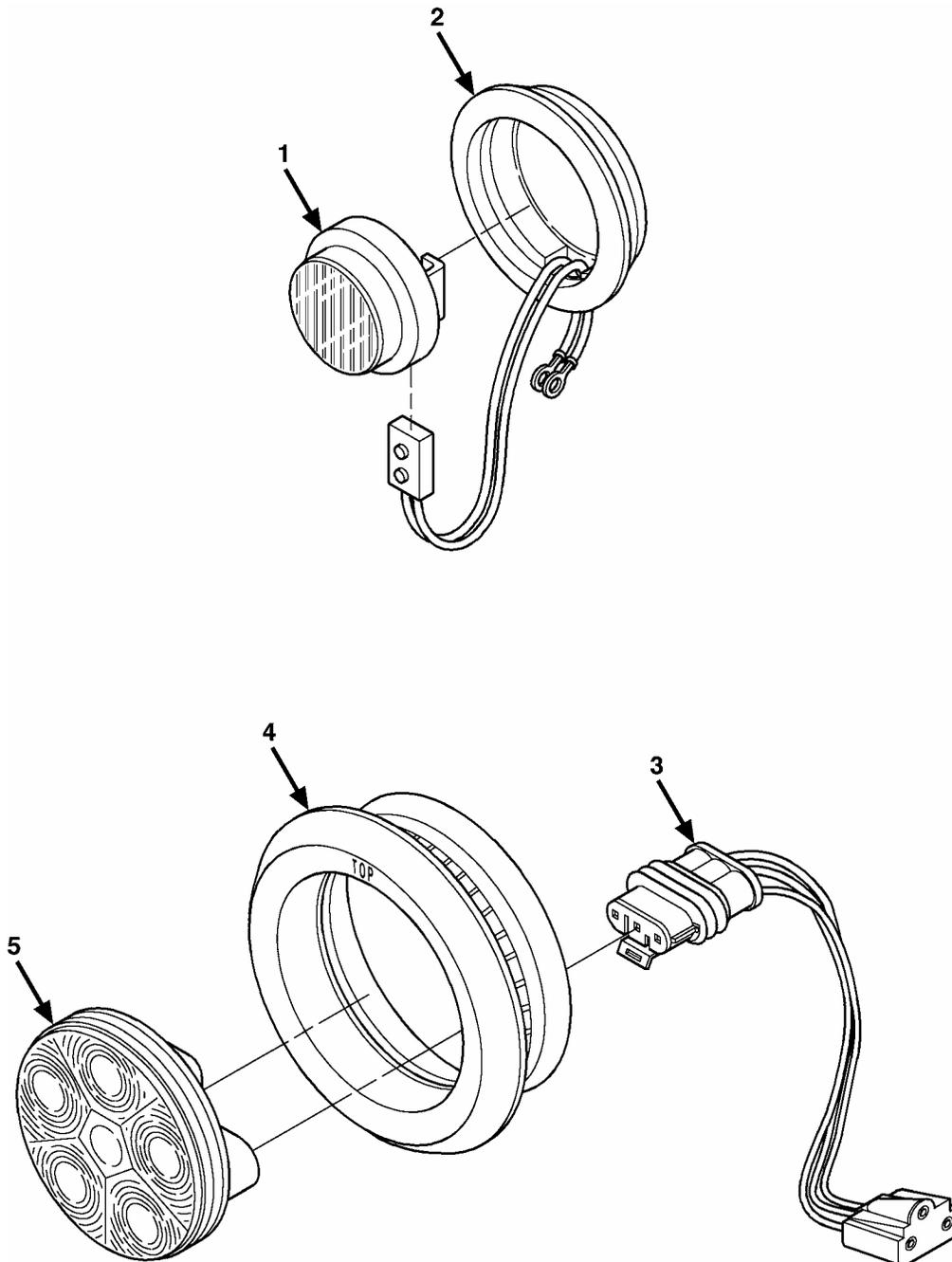


FIGURE 2. TAIL AND RUNNING LIGHTS

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(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 0609 LIGHTS						
FIG. 2 TAIL AND RUNNING LIGHTS						
1	PAOZZ	6240-01-518-6843	13548	10250R	LAMP, RED	5
2	PAOZZ	5325-01-519-2175	13548	10702	GROMMET, NON-METALLIC	5
3	KFOZZ		13548	94706	PLUG, ADAPTER METALLIC PART OF KIT 44030R	4
4	PAOZZ	5325-01-067-5890	13548	40700	GROMMET, NON-METALLIC PART OF KIT 44030R	4
5	KFOZZ		13548	44302R	LAMP, RED, TAIL METALLIC PART OF KIT 44030R	4

END OF FIGURE

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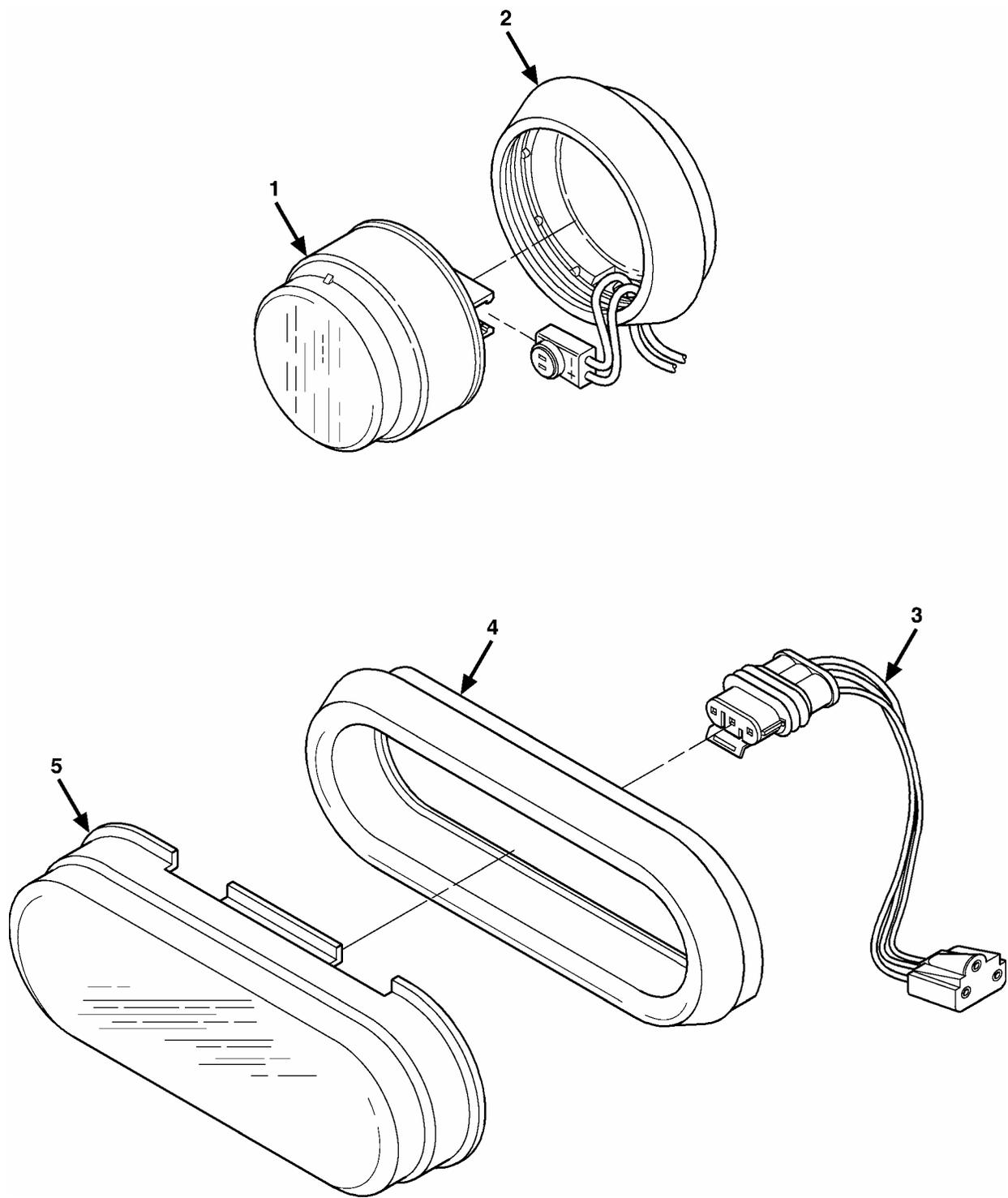


FIGURE 3. MID-SHIP TURN SIGNAL AND CLEARANCE LAMPS

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(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 0609 LIGHTS						
FIG. 3 MID-SHIP TURN SIGNAL AND CLEARANCE LAMPS						
1	PAOZZ	6220-01-519-2252	13548	10275Y	LAMP, CLEARANCE, YELLOW	2
2	PAOZZ		13548	10702	GROMMET, CLOSED BACK	2
3	KFOZZ		13548	94789	PLUG, ADAPTER PART OF KIT 60075Y	2
4	PAOZZ	5325-01-163-6558	13548	60700	GROMMET, NONMETALLIC PART OF KIT 60075Y	2
5	KFOZZ		13548	60275Y	LAMP, MID-SHIP TURN PART OF KIT 60075Y	2

END OF FIGURE

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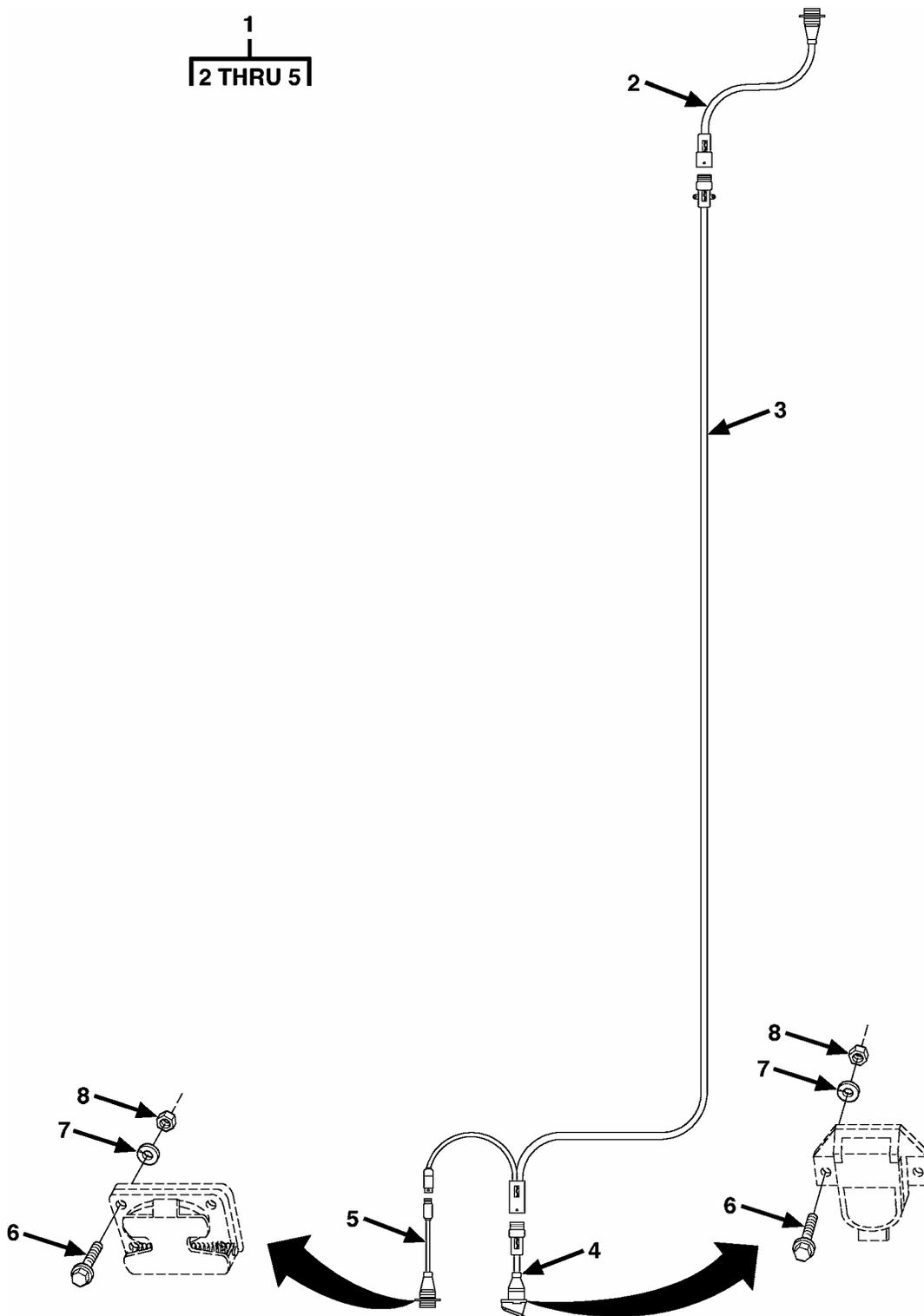


FIGURE 4. GOOSENECK WIRING, 24 AND 12 VOLT RECEPTACLES

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(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0613 HULL OR CHASSIS WIRING HARNESS	
					FIG. 4 GOOSENECK WIRING, 24 AND 12 VOLT RECEPTACLES	
1	PFOZZ	6150-01-519-2182	63576	HKS-KIT-4150	WIRING HARNESS, BRANCHED	1
2	PAOZZ	6150-01-519-2173	63576	HKS-047	WIRING HARNESS, 10-PIN MILITARY	1
3	PAOZZ	6150-01-519-2172	63576	HKS-046	WIRING HARNESS, MAIN GOOSENECK	1
4	PAOZZ	6150-01-519-2170	63576	HKS-001	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL, 12 V RECEPTACLE	1
5	PAOZZ	6150-01-519-2168	63576	HKS-045	WIRING HARNESS, 24 V RECEPTACLE	2
6	PAOZZ	5305-01-425-0119	80204	B1821BH025C100D	SCREW, CAP, HEXAGON HEAD 1/4-20 x 1 ...	6
7	PAOZZ	5310-00-285-8124	43999	2W1-16-20-32	WASHER, FLAT 1/4	6
8	PAOZZ	5310-00-965-1820	81349	M45913/1-4CBB	NUT, SELF-LOCKING, HEXAGON 1/4-20	6

END OF FIGURE

TM 5-2330-325-14&P

1
2 THRU 14

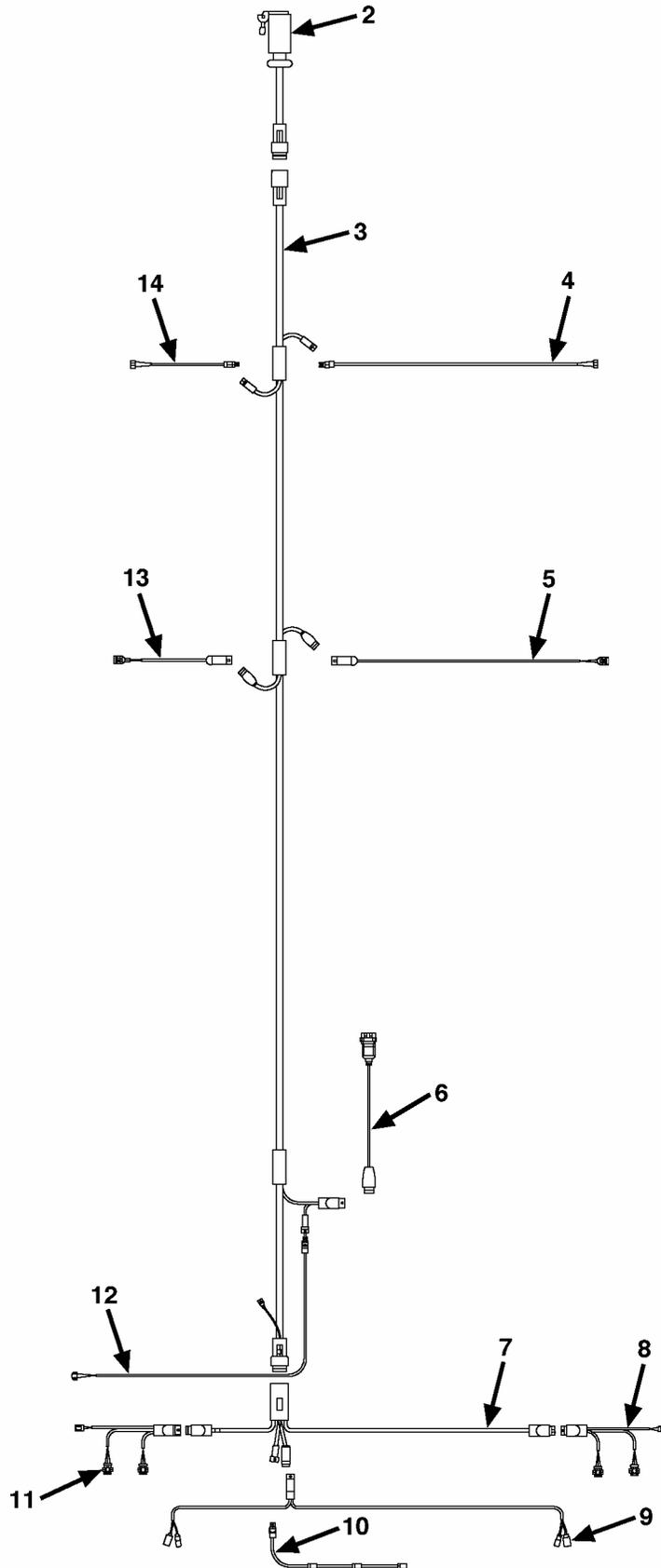


FIGURE 5. LOWBOY BED WIRING

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 0613 HULL AND CHASSIS WIRING HARNESSES						
FIG. 5 LOWBOY BED WIRING						
1	PFOZZ	6150-01-519-7023	63576	HKS-KIT-4100	WIRING HARNESS, BRANCHED	1
2	PAOZZ	6150-01-519-2154	63576	HKS-048	WIRING HARNESS, NOSE END	1
3	PAOZZ	6150-01-519-2147	63576	HKS-017	WIRING HARNESS, BRANCHED, ABS MAIN	1
4	PAOZZ	6150-01-519-2146	63576	HKS-018	WIRING HARNESS, CURBSIDE MARKER	1
5	PAOZZ	6150-01-519-2150	63576	HKS-020	WIRING HARNESS, CURBSIDE MID-TURN	1
6	PAOZZ	6150-01-519-2151	63576	HKS-006	WIRING HARNESS, ECU POWER	1
7	PAOZZ	6150-01-519-2156	63576	HKS-024	WIRING HARNESS, BRANCHED, REAR SILL ...	1
8	PAOZZ	6150-01-519-2157	63576	HKS-026	WIRING HARNESS, BRANCHED, CURBSIDE PIGTAIL	1
9	PAOZZ	6150-01-519-2158	63576	HKS-028	WIRING HARNESS, BRANCHED, BLACK-OUT LIGHTS	1
10	PAOZZ	6150-01-519-2163	63576	HKS-025	WIRING HARNESS, I.D. BAR	1
11	PAOZZ	6150-01-519-2164	63576	HKS-027	WIRING HARNESS, BRANCHED, R/S PIGTAIL .	1
12	PAOZZ	6150-01-519-6507	63576	HKS-075	WIRING HARNESS, ABS WARNING LIGHT	1
13	PAOZZ	6150-01-519-2166	63576	HKS-021	WIRING HARNESS, ROADSIDE MID-TURN	1
14	PAOZZ	6150-01-519-2167	63576	HKS-019	WIRING HARNESS, ROADSIDE MARKER	1

END OF FIGURE

TM 5-2330-325-14&P

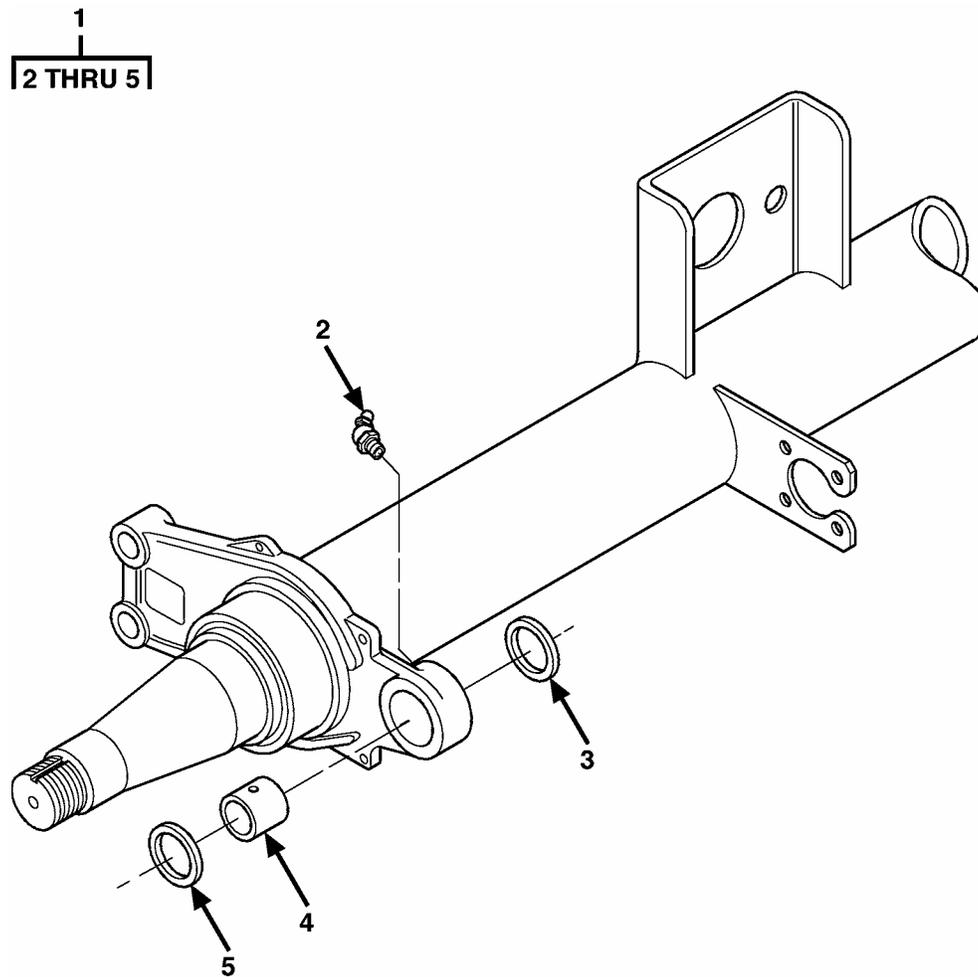


FIGURE 6. AXLE ASSEMBLIES

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 11 REAR AXLE	
					GROUP 1100 REAR AXLE ASSEMBLY	
					FIG. 6 AXLE ASSEMBLIES	
1	PAFFF		62707	D22AX603-2136	AXLE ASSEMBLY, INTERMEDIATE	1
1	PAFFF		62707	D22AX603-2135	AXLE ASSEMBLY, FRONT & REAR W/ABS	2
2	PAFZZ	4730-01-720-0028	96906	MS15003-4	·FITTING, LUBRICATION	1
3	KFFZZ		62707	M16HH103	·SEAL, SPIDER, PART OF KIT M10KY107	1
4	KFFZZ		62707	M16HD106	·BUSHING, SPIDER, PART OF KIT M10KY107 ..	1
5	KFFZZ		62707	EH125011	·WASHER, PART OF KIT M10KY107	1

END OF FIGURE

TM 5-2330-325-14&P

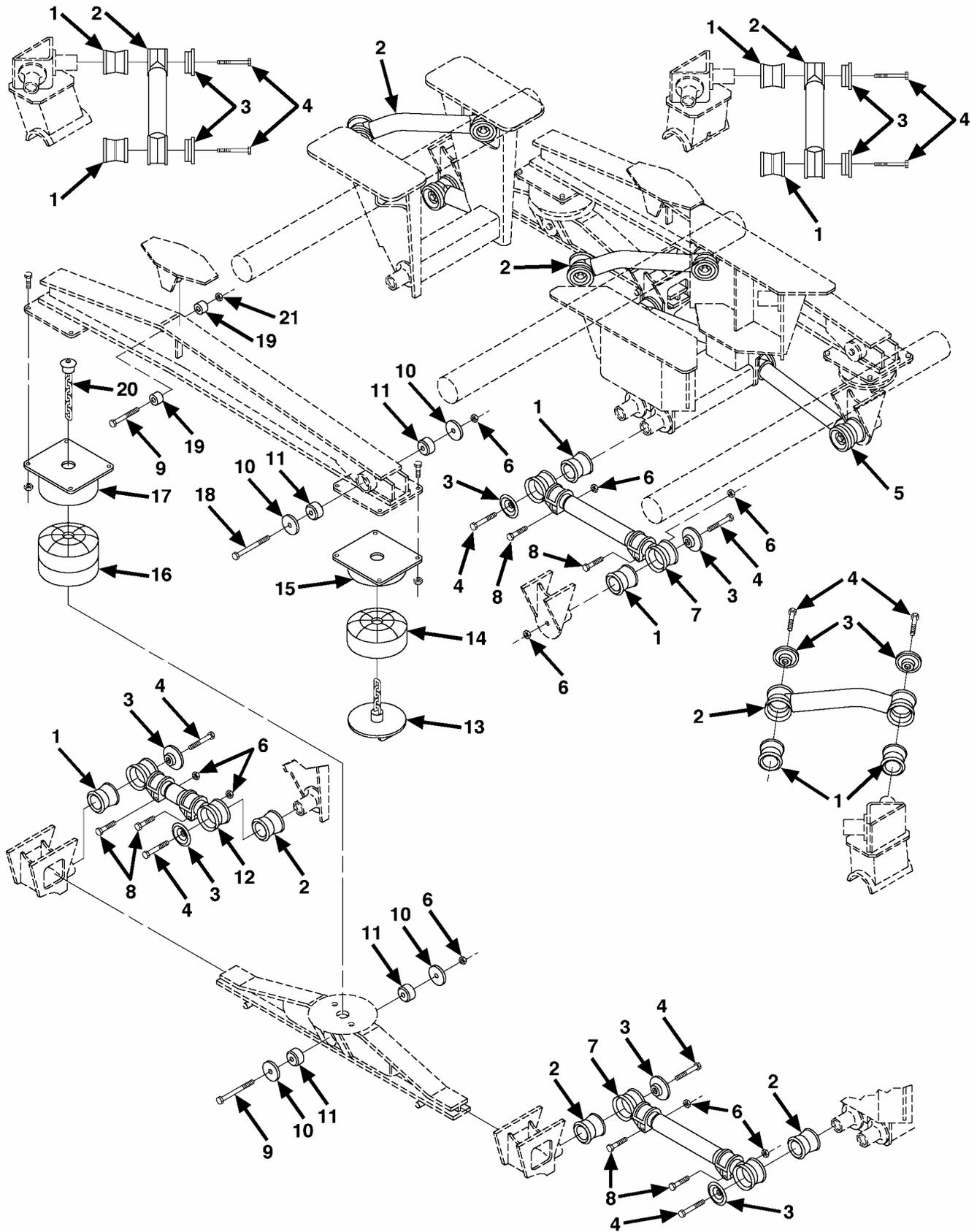


FIGURE 7. AXLE SUSPENSION

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1100 REAR AXLE ASSEMBLY						
FIG. 7 AXLE SUSPENSION						
1	PAFZZ	5365-01-519-2200	3AN25	800010	BUSHING, NON-METALLIC	24
2	PAFZZ	2530-01-519-2137	3AN25	800049	TORQUE ROD, UPPER CURVED	6
3	PAFZZ	5340-01-519-2260	3AN25	800055	CAP, PROTECTIVE, DUST AND MOISTURE SEAL .	24
4	PAFZZ		63576	HDW.382	BOLT, CAP, HEXAGON	24
5	PAFZZ	2530-01-519-2138	3AN25	805223	TORQUE ROD, LOWER FIXED	2
6	PAFZZ		63576	HDW.379	NUT, SELF-LOCKING	34
7	PAFZZ	2530-01-519-2140	3AN25	807223	TORQUE ROD, LOWER ADJUSTABLE	2
8	PAFZZ		63576	HDW.380	BOLT, CAP HEXAGON	4
9	PAFZZ		63576	HDW.342	BOLT, CAP, HEXAGON	4
10	PAFZZ	5310-01-519-2141	3AN25	04P00243	WASHER, FLAT	8
11	PAFZZ	5365-01-519-2203	3AN25	22096	SPACER, SLEEVE	8
12	PAFZZ	2530-01-519-2143	3AN25	807155	TORQUE ROD, LOWER ADJUSTABLE	1
13	PAFZZ	5340-01-519-2264	3AN25	03S00494	PLATE MOUNTING	2
14	PAFZZ	5340-01-519-2263	3AN25	15016	PAD SHOCK MOUNT	2
15	PAFZZ	5340-01-519-2284	3AN25	07S00012	PLATE MOUNTING	2
16	PAFZZ	5340-01-519-2283	3AN25	15002	MOUNT, RESILIENT, GENERAL PURPOSE	2
17	PAFZZ	5340-01-519-2287	3AN25	07S00011	PLATE MOUNTING	2
18	PAFZZ		63576	HDW.055	BOLT, CAP, HEXAGON	4
19	PAFZZ	5365-01-519-2214	3AN25	120161	SPACER SLEEVE	4
20	PAFZZ	4010-01-519-2197	3AN25	04S00080	ANCHOR CHAIN	2
21	PAFZZ		63576	HDW.018	NUT, SELF-LOCKING	4

END OF FIGURE

TM 5-2330-325-14&P

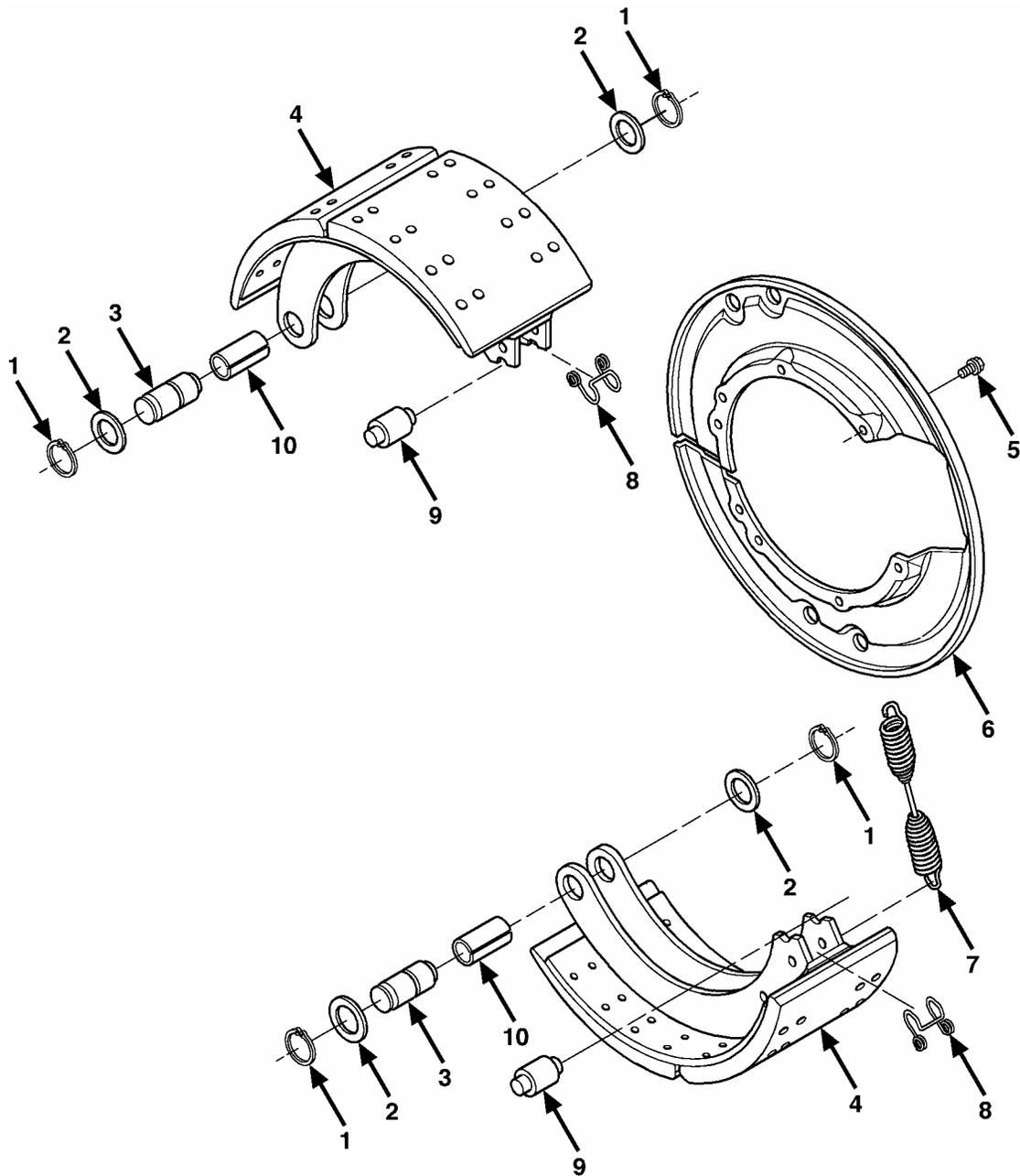


FIGURE 8. BRAKE SHOE AND LINING

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 12 BRAKES						
GROUP 1202 SERVICE BRAKES						
FIG. 8 BRAKE SHOE AND LINING						
1	PAOZZ	5325-01-062-1009	62707	31624	RING, RETAINING PART OF KIT M16WD121-31X	24
2	PAOZZ	5310-01-062-1531	62707	M10HN135	WASHER, FLAT PART OF KIT M16WD121-31X ..	24
3	PAOZZ	5315-01-220-6238	62707	M10HP102	PIN, GROOVED, HEADLESS PART OF KIT M16WD121-31X	12
4	PAOZZ	2530-01-241-3216	62707	M16WN121-31X	BRAKE SHOE ASSEMBLY PART OF KIT M16WD121-31X	12
5	PAOZZ	5305-01-265-6080	62707	M10HM115	SCREW, MACHINE	36
6	PAOZZ	2530-01-217-8156	62707	M16WB100	SHIELD, BRAKE DISK	6
7	PAOZZ	5360-01-241-6961	62707	M16WJ100	SPRING, RETURN PART OF KIT M16WD121-31X	6
8	PAOZZ	5340-01-239-0883	62707	M16WJ102	CLIP, RETAINER PART OF KIT M16WD121-31X	12
9	PAOZZ	5315-01-220-6245	62707	M16WJ104	BUSHING, SLEEVE	12
10	PAOZZ	3120-01-239-0889	62707	M16HD107	BUSHING, PART OF KIT M10KY107	12

END OF FIGURE

TM 5-2330-325-14&P

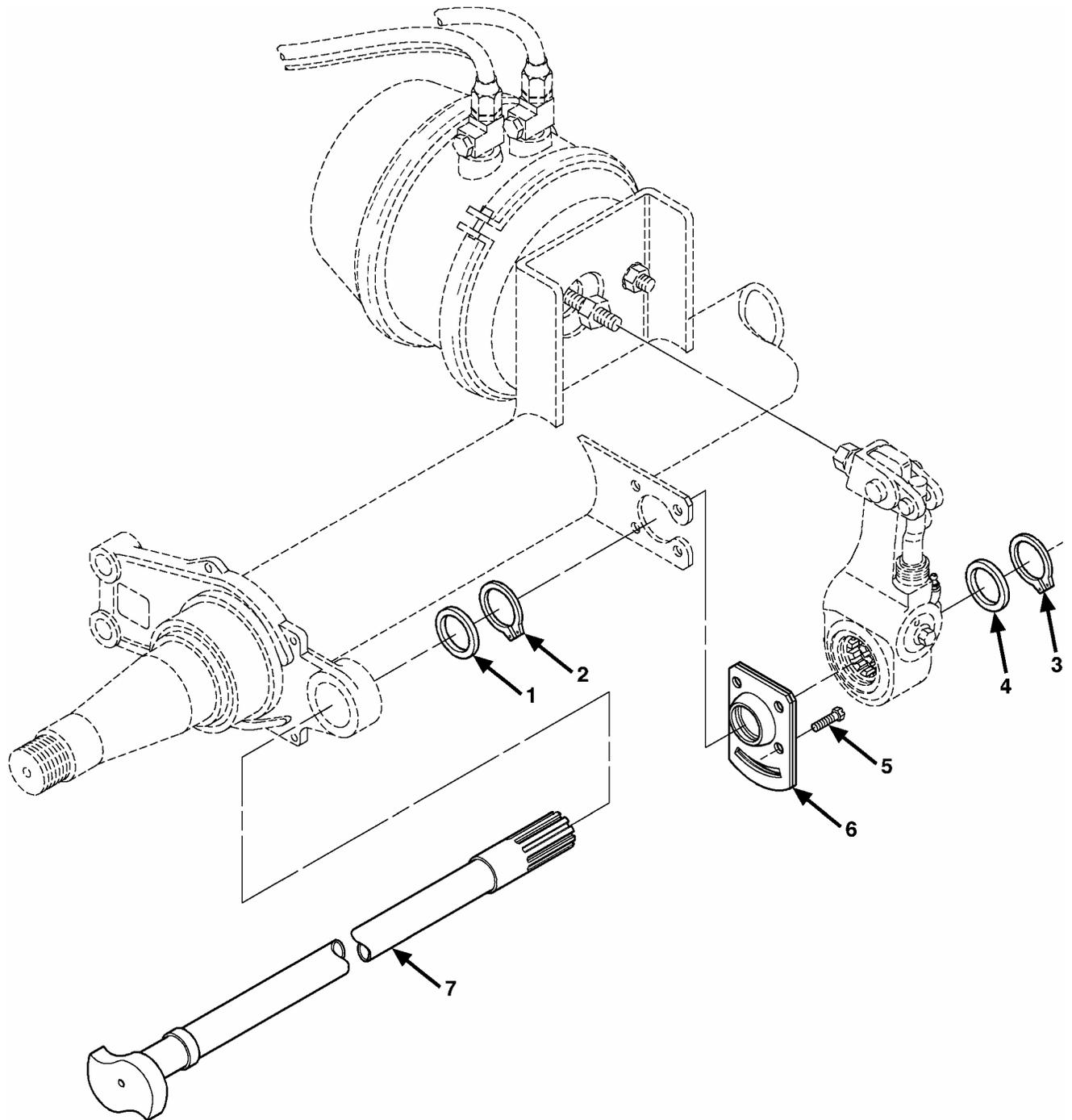


FIGURE 9. BRAKE CAMSHAFTS

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1202 SERVICE BRAKES						
FIG. 9 BRAKE CAMSHAFTS						
1	KFOZZ		62707	M10HS143	WASHER, FLAT PART OF KIT M10KY107	6
2	KFOZZ		62707	SH-162	RING, RETAINING PART OF KIT M10KY107 ..	6
3	KFOZZ		62707	M10HR155	RING, RETAINING PART OF KIT M10KY107 ..	6
4	KFOZZ		62707	M10HS145	WASHER, FLAT PART OF KIT M10KY107	6
5	KFOZZ		62707	M10HM195	SCREW, SELF TAPPING PART OF KIT M10KY107	24
6	KFOZZ		62707	M10WH150-R	CAM BRACKET, RH PART OF KIT M10KY107 ..	3
6	KFOZZ		62707	M10WH150-L	CAM BRACKET, LH PART OF KIT M10KY107 ..	3
7	PAOZZ		62707		CAM, USE ON FRONT AND REAR AXLES, RH ...	3
7	PAOZZ		62707		CAM, USE ON FRONT AND REAR AXLES, LH ...	3
7	PAOZZ		62707		CAM, USE ON INTERMEDIATE AXLE RH	3
7	PAOZZ		62707		CAM, USE ON INTERMEDIATE AXLE LH	3

END OF FIGURE

TM 5-2330-325-14&P

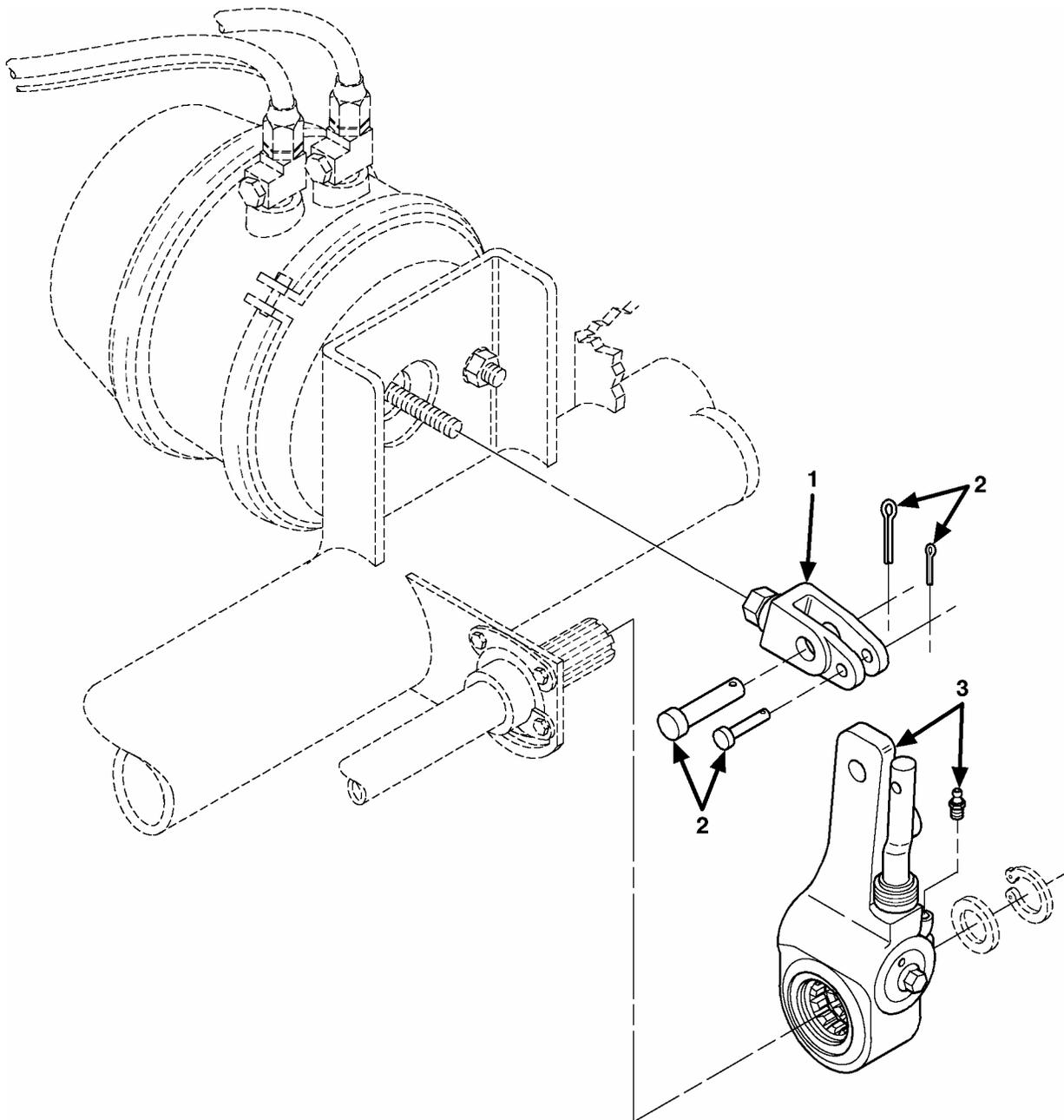


FIGURE 10. SLACK ADJUSTER

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1206 MECHANICAL BRAKES						
FIG. 10 SLACK ADJUSTERS						
1	PAOZZ	5340-01-517-3793	73972	AS3018	CLEVIS, ROD END	1
2	PAOZZ	5340-01-517-3815	73972	AS4004	KIT, CLEVIS PINS	1
3	PAOZZ	2530-01-519-2148	73972	AS1141	SLACK ADJUSTER, AUTOMATIC INCLUDES ITEMS 1 AND 2	6

END OF FIGURE

TM 5-2330-325-14&P

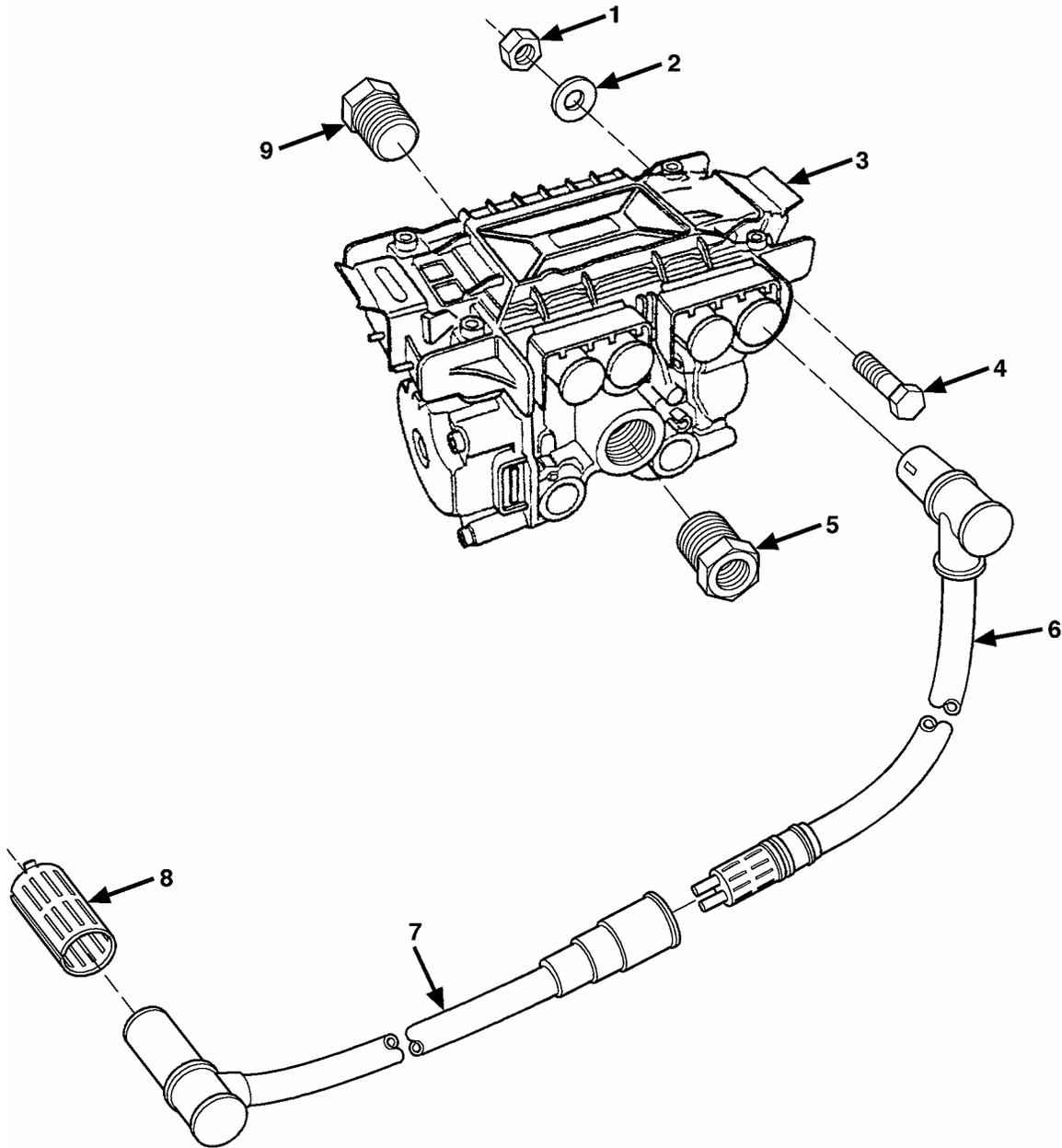


FIGURE 11. ABS BRAKING SYSTEM

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1207 ELECTRICAL BRAKE SYSTEM						
FIG. 11 ABS BRAKING SYSTEM						
1	PAOZZ	5310-00-914-6028	81349	M45913/1-6CS3	NUT, SELF-LOCKING 3/8-16	2
2	PAOZZ	5310-01-312-4960	96906	MS27183-55	WASHER, FLAT 3/8	2
3	PAOZZ	4810-01-499-3407	78500	S4005001030	ECU VALVE ASSY	1
4	PAOZZ		39428	91286A206	BOLT 3/8-16 X 1-3/4	2
5	PAOZZ	4730-00-278-3888	30780	0102-12-8	REDUCER, PIPE	1
6	PAOZZ	2530-01-499-3170	78500	S4497130300	SENSOR, ANTILOCK	4
7	PAOZZ	2530-01-502-0543	78500	S4410328090	SENSOR ASSY	4
8	PAOZZ	5340-01-499-3481	78500	S899-759-815-4	CLIP, SPRING TENSION	4
9	PAOZZ	4730-00-678-4749	79470	C3159X12	PLUG, PIPE	1

END OF FIGURE

TM 5-2330-325-14&P

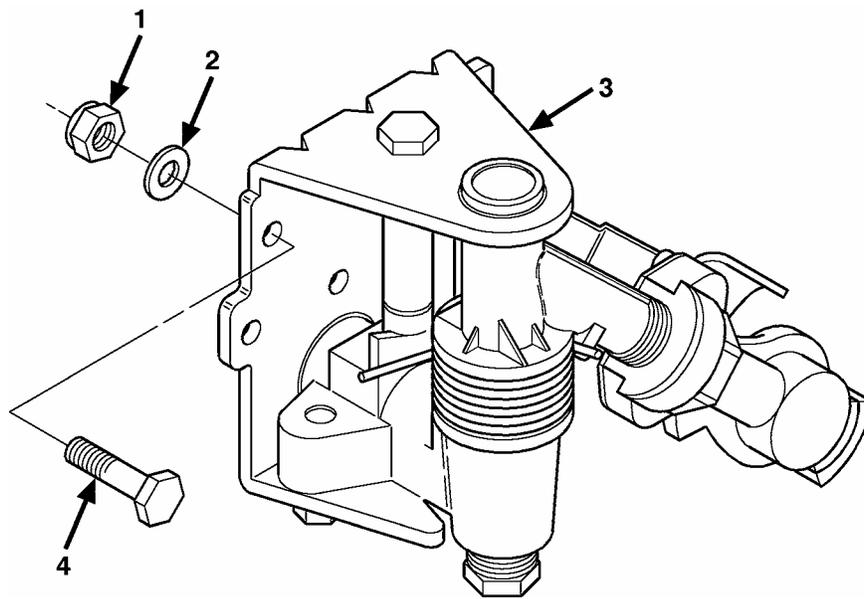


FIGURE 12. GLADHANDS AND MOUNTING HARDWARE

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1208 AIR BRAKE SYSTEM						
FIG. 12 GLADHANDS AND MOUNTING HARDWARE						
1	PAOZZ	5310-00-984-3806	81349	M45913/1-5CG5C	NUT, SELF-LOCKING HEXAGON 5/16-18	6
2	PAOZZ	5310-00-809-3078	96906	MS27183-11	WASHER, FLAT 5/16	6
3	PAOZZ	4730-01-310-4665	0N972	441106	COUPLING HALF, QUICK DISCONNECT, SERVICE	1
3	PAOZZ	4730-01-499-3471	0N972	441105	COUPLING HALF, QUICK DISCONNECT, EMERGENCY	1
4	PAOZZ	5305-01-389-9097	80204	B1821AH031C125N	SCREW, CAP, HEXAGON HEAD 5/16-18 X 1-1/4	6

END OF FIGURE

TM 5-2330-325-14&P

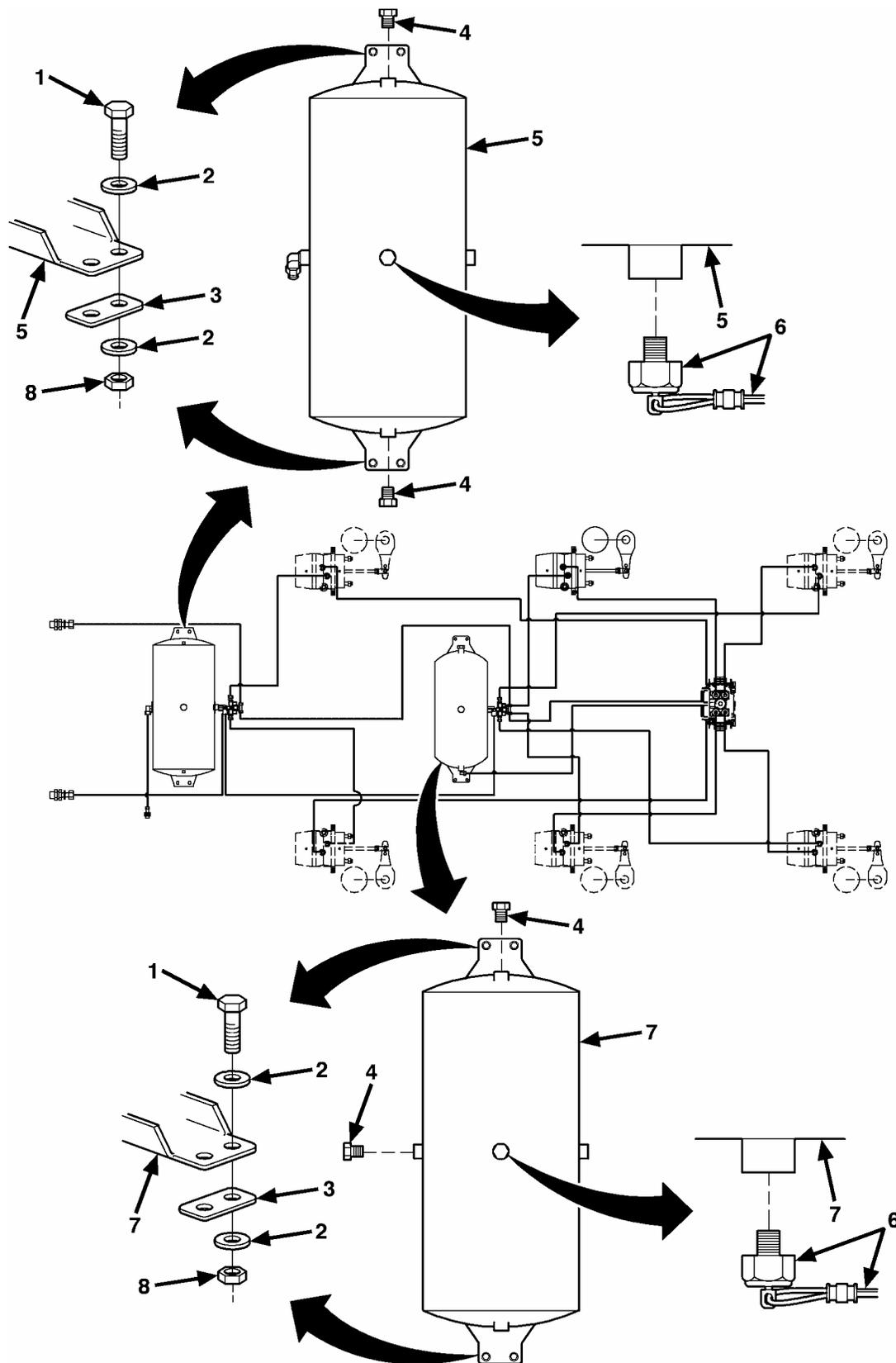


FIGURE 13. PRIMARY AND SECONDARY AIR RESERVOIRS AND REMOTE DUMP VALVE

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1208 AIR BRAKE SYSTEM						
FIG. 13 PRIMARY AND SECONDARY AIR RESERVOIRS AND REMOTE DUMP VALVE						
1	PAOZZ	5305-00-068-0511	80204	B1821BH038C125N	BOLT, MACHINE 3/8-16 X 1-1/4	8
2	PAOZZ	5310-01-312-4960	96906	MS27183-55	WASHER, FLAT 3/8	16
3	PAOZZ	5330-01-519-2670	62173	1078	GASKET, PRESSURE TANK	4
4	PAOZZ	4730-00-014-4027	51900	8W8X543	PLUG, PIPE	4
5	PAOZZ	2530-01-517-3992	62173	HT-1218	AIR TANK	1
6	PAOZZ	2590-01-519-2181	63576	12355	VALVE, POPPET, HULL DRAIN	2
7	PAOZZ	2530-01-517-3716	62173	9531	AIR TANK	1
8	PAOZZ	5310-00-914-6028	81349	M45913/1-6CS3	NUT, SELF-LOCKING 3/8-16	8

END OF FIGURE

TM 5-2330-325-14&P

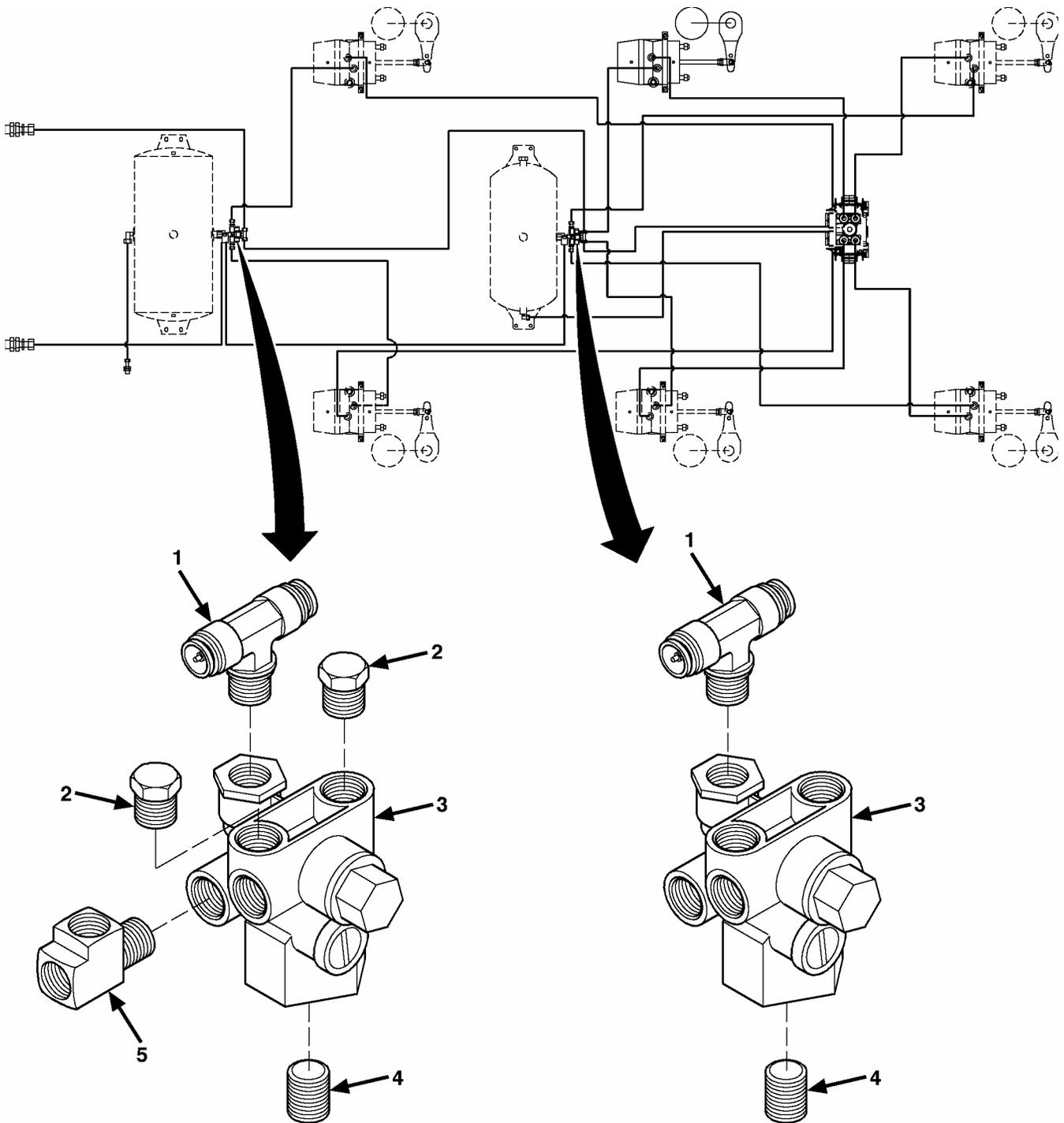


FIGURE 14. SPRING BRAKE CONTROL VALVE

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1208 AIR BRAKE SYSTEM						
FIG. 14 SPRING BRAKE CONTROL VALVE						
1	PAOZZ	4730-01-519-2377	93061	VS172PMTNS-6-6	TEE, PIPE TO TUBE	2
2	PAOZZ	5365-01-318-1888	55242	P3/8GSP	PLUG, MACHINE THREAD	2
3	PAOZZ	4820-01-497-8729	10125	110500	VALVE, CHECK	2
4	PAOZZ	4730-01-519-2178	10125	6002	NIPPLE, 1/2SC80	2
5	PAOZZ		55242	P3/8GST	TEE	1

END OF FIGURE

TM 5-2330-325-14&P

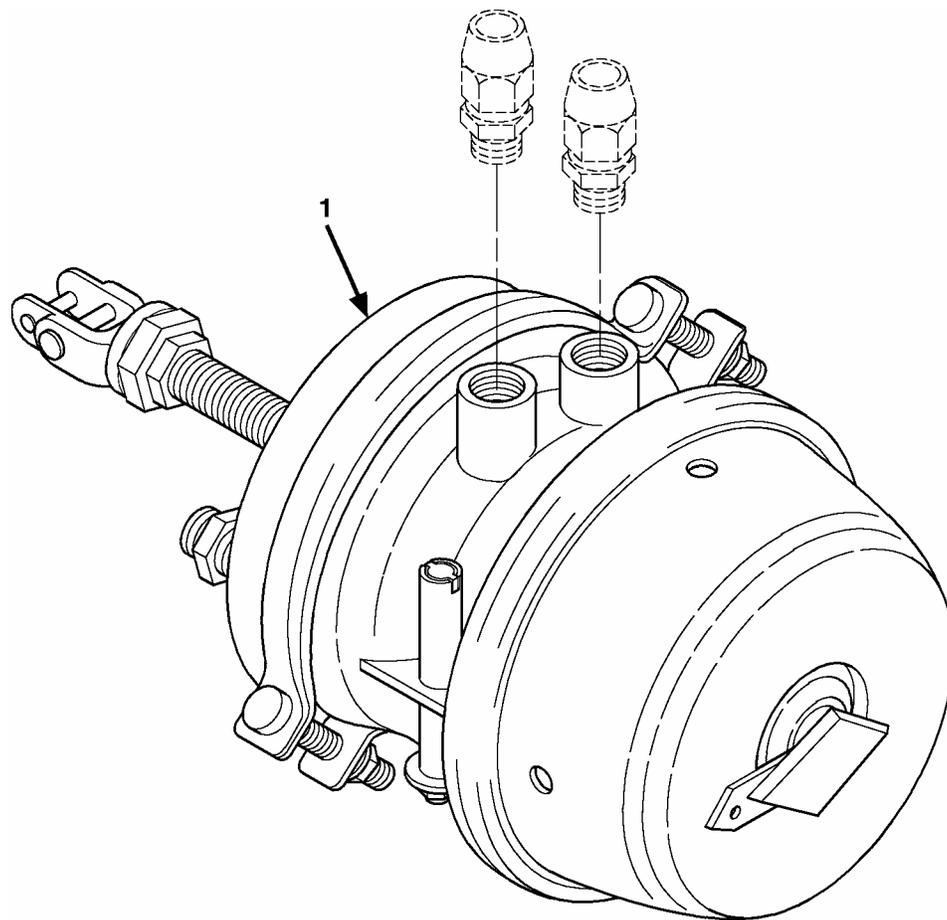


FIGURE 15. SPRING BRAKE CHAMBERS

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 1208 AIR BRAKE SYSTEM	
					FIG. 15 SPRING BRAKE CHAMBERS	
1	PAOZZ	2530-01-519-2152	63576	12591	CHAMBER, AIR BRAKE, FRONT	2
1	PAOZZ	2530-01-368-8282	63576	3130272	CHAMBER, AIR BRAKE, CENTER	2
1	PAOZZ	2530-01-519-2161	63576	12582	CHAMBER, AIR BRAKE, REAR	2
					END OF FIGURE	

TM 5-2330-325-14&P

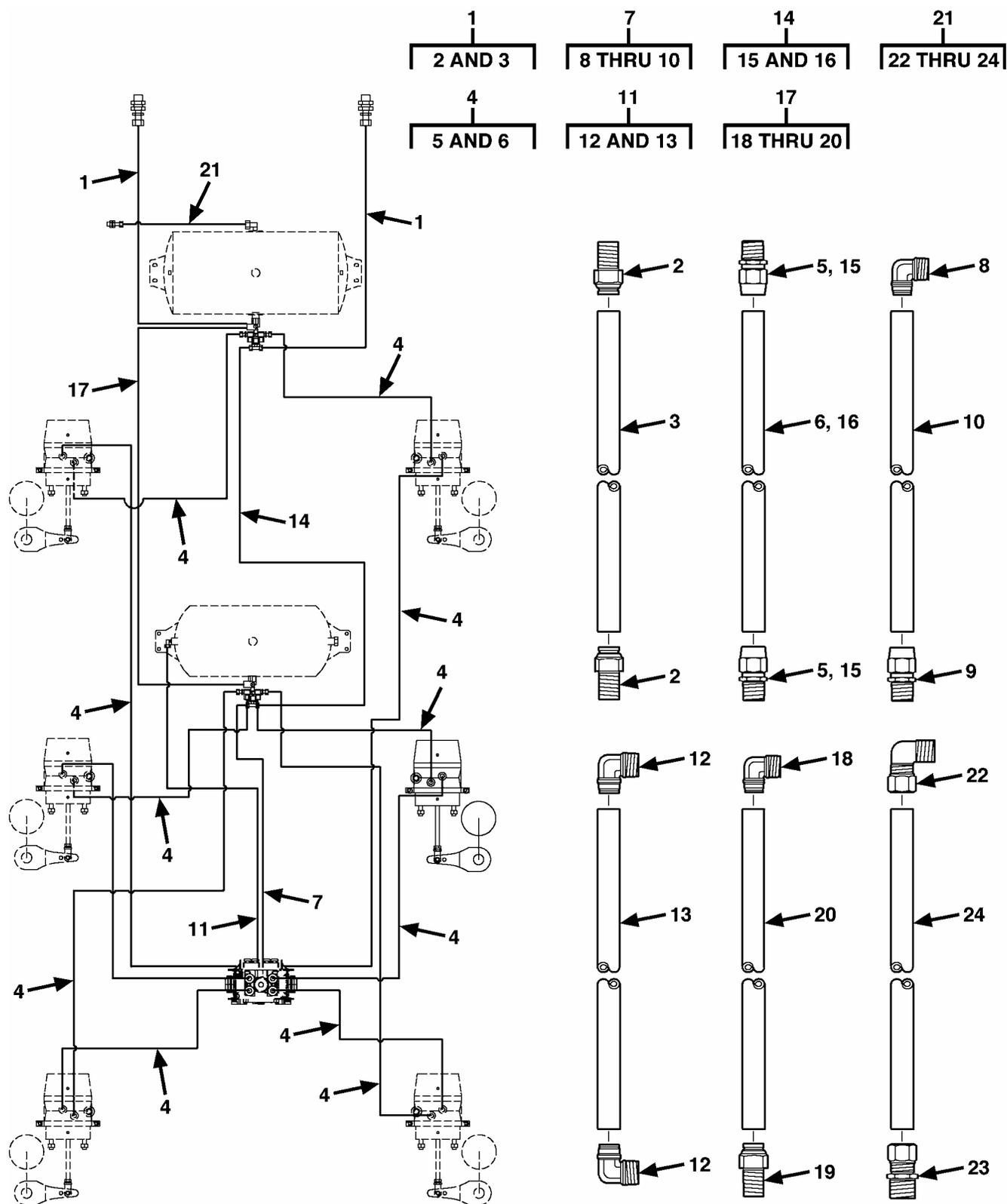


FIGURE 16. AIR BRAKE HOSES AND FITTINGS

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1208 AIR BRAKE SYSTEM						
FIG. 16 AIR BRAKE HOSES AND FITTINGS						
1	A0000		63576	X8291-1	AIR BRAKE HOSE ASSEMBLY.....	2
2	PAOZZ	4730-01-519-2372	93061	VS68PMT-6-6	·COUPLING HALF, QUICK DISCONNECT	2
3	MOOZZ		63576	125608-1	·HOSE, MAKE FROM HOSE, NONMETALLIC, PN 6ABB (81300)	V
4	A0000		63576	X8291-2	AIR BRAKE HOSE ASSEMBLY, SPRING BRAKE CHAMBER	12
5	PAOZZ	4730-01-519-2159	93061	VS68RB-6-6	·ADAPTER, STRAIGHT PIPE TO HOSE	2
6	MOOZZ		63576	125608-2	·HOSE, MAKE FROM HOSE, NONMETALLIC, PN 6ABB (81300)	V
7	A0000		63576	X8291-3	AIR BRAKE HOSE ASSEMBLY.....	1
8	PAOZZ	4730-01-519-2380	93061	VS169PMTNS-6-4	·ELBOW, PIPE TO TUBE	1
9	PAOZZ	4730-01-519-2159	93061	VS68RB-6-6	·ADAPTER, STRAIGHT PIPE TO TUBE	1
10	MOOZZ		63576	8291-3	·HOSE MAKE FROM HOSE, NONMETALLIC, PN 3250-0616 (85757)	V
11	A0000		63576	X8291-4	HOSE ASSEMBLY.....	1
12	PAOZZ	4730-01-519-2390	93061	VS169PMTNS-8-8	·ELBOW, PIPE TO TUBE	2
13	MOOZZ		63576	8291-4	·HOSE MAKE FROM HOSE, NONMETALLIC, PN PFT8B-BLACK-100 (61424)	V
14	A0000		63576	X8291-5	AIR BRAKE HOSE ASSEMBLY.....	1
15	PAOZZ	4730-01-519-2159	93061	VS68RB-6-6	·ADAPTER, STRAIGHT PIPE TO HOSE	2
16	MOOZZ		63576	8291-5	·HOSE MAKE FROM HOSE, NONMETALLIC, PN 3250-0616 (85757)	V
17	A0000		63576	X8291-6	HOSE ASSEMBLY.....	2
18	PAOZZ	4730-01-519-2416	93061	VS169PMTNS-6-6	·ELBOW, PIPE TO HOSE	1
19	PAOZZ		93061	VS68PMT-6-6	·CONNECTOR, MALE	1
20	MOOZZ		63576	8291-6	·HOSE MAKE FROM HOSE, NONMETALLIC, PN PFT6B-RED (61424)	V
21	A0000		63576	X8291-7	HOSE ASSEMBLY.....	1
22	PAOZZ	4730-01-310-4665	93061	VS269NTA-8-8	·ELBOW, MALE	1
23	PAOZZ	4730-00-453-8252	93061	VS68NTA-8-6	·CONNECTOR, MALE	1
24	MOOZZ		63576	8291-7	·HOSE MAKE FROM HOSE, NONMETALLIC, PN PFT8B-BLACK-100 (61424)	V

END OF FIGURE

TM 5-2330-325-14&P

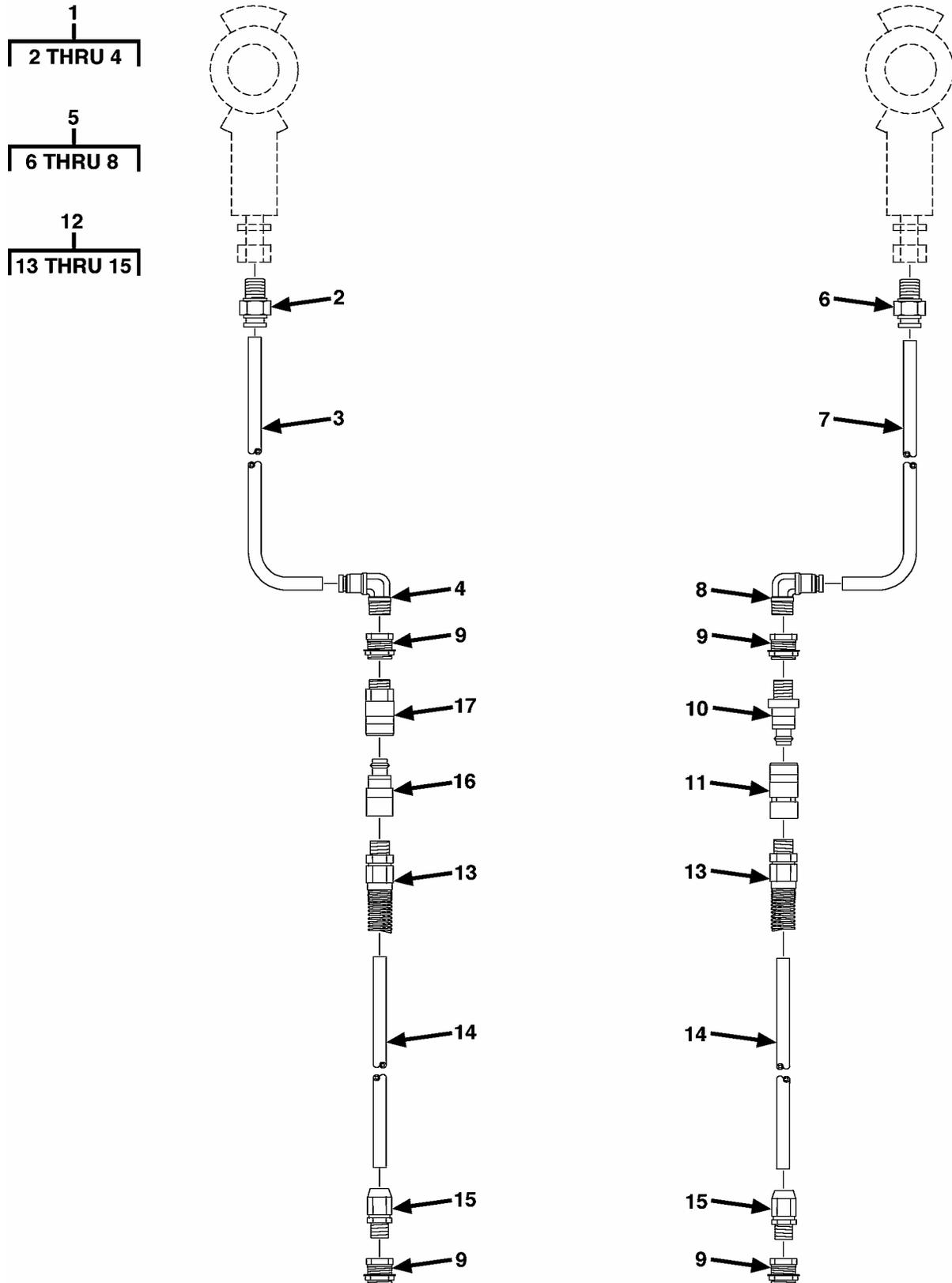


FIGURE 17. GOOSENECK AIR HOSES AND FITTINGS

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1208 AIR BRAKE SYSTEM						
FIG. 17 GOOSENECK AIR HOSES AND FITTINGS						
1	A0000		63576	X8291-15	HOSE ASSEMBLY, AIR BRAKE	1
2	PAOZZ	4730-01-519-2372	93061	VS68PMT-6-6	·COUPLING HALF, QUICK DISCONNECT	2
3	MOOZZ		63576	8291-15	·HOSE, MAKE FROM HOSE, NONMETALLIC, PN PFT6B-RED (61424)	V
4	PAOZZ	4730-01-519-2416	93061	VS169PMTNS-6-6	·ELBOW, PIPE TO HOSE	1
5	A0000		63576	X8291-14	HOSE ASSEMBLY, AIR BRAKE	1
6	PAOZZ	4730-01-519-2372	93061	VS68PMT-6-6	·COUPLING HALF, QUICK DISCONNECT	2
7	MOOZZ		63576	8291-14	·HOSE, MAKE FROM HOSE, NONMETALLIC, PN 3250-0616 (85757)	V
8	PAOZZ	4730-01-519-2416	93061	VS169PMTNS-6-6	·ELBOW, PIPE TO HOSE	1
9	PAOZZ	5340-01-517-3807	F6193	50006	FITTING, BULKHEAD	4
10	PAOZZ	4730-01-276-6942	63576	6534K47	PLUG, QUICK DISCONNECT	1
11	PAOZZ	4730-01-519-2406	63576	6536K29	COUPLER, FEMALE BODY	1
12	A0000		63576	X8291-13	HOSE ASSEMBLY, AIR BRAKE	2
13	PAOZZ		F6193	34003	·FITTING, AIR HOSE W/SPRING	1
14	MOOZZ		63576	125608-13	·HOSE, MAKE FROM HOSE, NONMETALLIC, PN 6ABB (81300)	V
15	PAOZZ	4730-01-519-2159	93061	VS68RB-6-6	·ADAPTER, STRAIGHT PIPE TO HOSE	1
16	PAOZZ	4730-01-519-2414	63576	6534K57	PLUG, QUICK DISCONNECT	1
17	PAOZZ	4730-01-519-2409	63576	6536K19	SOCKET, QUICK DISCONNECT	1

END OF FIGURE

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 13	WHEELS AND TRACKS
					GROUP 1311	WHEEL ASSEMBLY
					FIG. 18	HUB AND DRUM ASSEMBLY
1	PAOZZ	3110-00-293-8998	60038	HM212049	CONE AND ROLLERS, TAPERED ROLLER BEARING	6
2	PAOZZ	3110-00-293-8997	60038	HM212011	CUP, TAPERED ROLLER BEARING	1
3	XDOFF		1S0R6	4809001	HUB AND DRUM ASSEMBLY W/ABS	4
4	PFOZZ	2530-01-506-2721	1S0R6	4819001	·HUB	1
5	PFOZZ	5306-01-508-5764	1S0R6	3018503	·BOLT, WHEEL	10
6	PFOZZ	2530-01-519-2188	1S0R6	2308712	·BRAKE, DRUM	1
7	PAOZZ	3110-00-618-0249	60038	HM218210	CUP, TAPERED ROLLER BEARING	6
8	PAOZZ	3110-00-618-0248	60038	HM218248	CONE AND ROLLERS, TAPERED ROLLER BEARING	6
9	PAOZZ	5330-01-093-1149	26151	320-2110	SEAL, OIL	6
10	PAOZZ	5330-01-255-0201	62707	M10HS101	RETAINER, OIL SEAL	6
11	PAOZZ	5310-01-043-0596	62707	M10HN101	NUT, PLAIN, OCTAGON 2-5/8 - 16	6
12	PAOZZ	5310-00-620-2486	62707	M10HN100	WASHER, KEY 2-5/8	6
13	PAOZZ	5310-01-049-9051	62707	M10HN151	WASHER 2-5/8	6
14	PAOZZ	5310-01-239-0893	62707	M10HN102	NUT, PLAIN, SLOTTED, OCTAGON 2-5/8 - 16	6
15	PAOZZ	5330-01-335-9958	26151	330-3067	GASKET	6
16	PAOZZ		26151	340-5097	CAP, GREASE	6
17	PAOZZ	5310-00-959-4679	96906	MS35340-45	WASHER, LOCK 5/16	36
18	PAOZZ	5306-00-226-4822	80204	B1821BH031C050N	BOLT, MACHINE 5/16-18 X 1/2	36
19	PAOZZ	5310-01-414-7141	09386	3208401	NUT, PLAIN, EXTENDED, WASHER, HEXAGON	60

END OF FIGURE

TM 5-2330-325-14&P

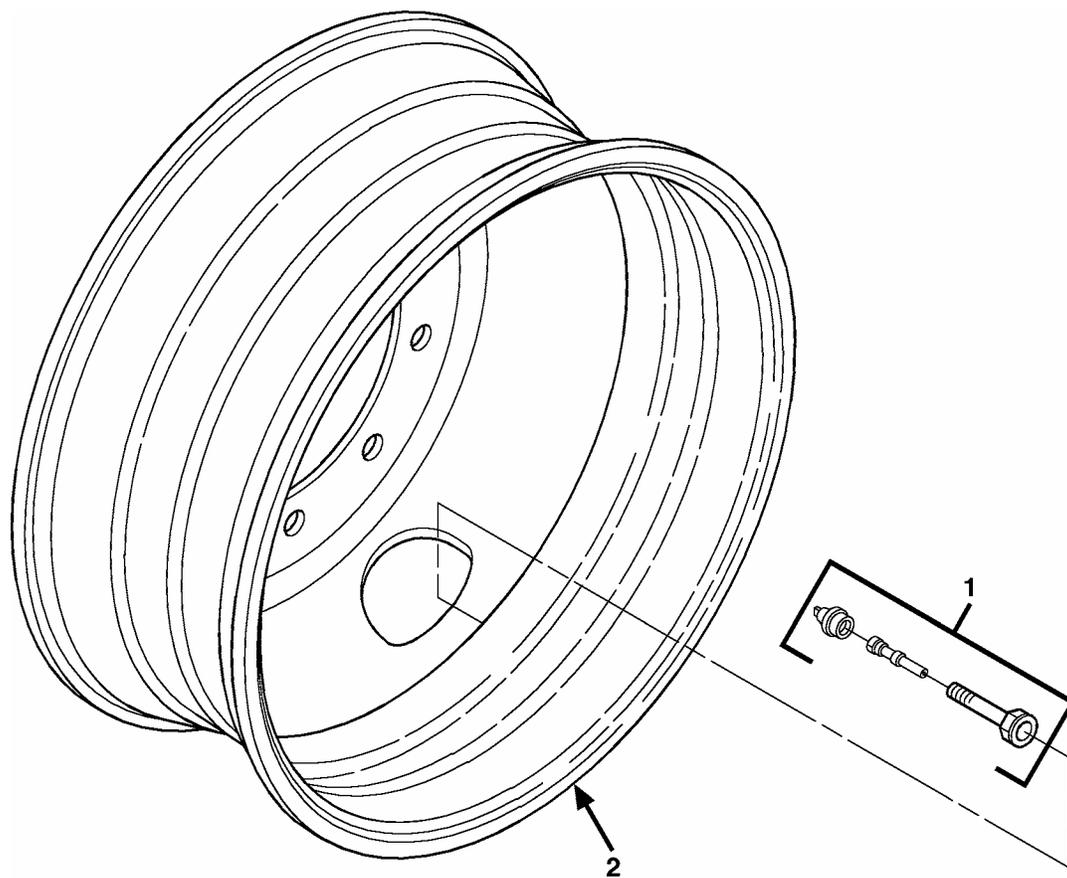


FIGURE 19. WHEEL ASSEMBLY

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 1311 WHEEL ASSEMBLY	
					FIG. 19 WHEEL ASSEMBLY	
1	PAOZZ	2640-00-555-2823	27783	TR572	VALVE, PNEUMATIC TIRE	13
2	PAOZZ	2530-01-441-9700	73195	28408	WHEEL, PNEUMATIC TIRE	13

END OF FIGURE

TM 5-2330-325-14&P

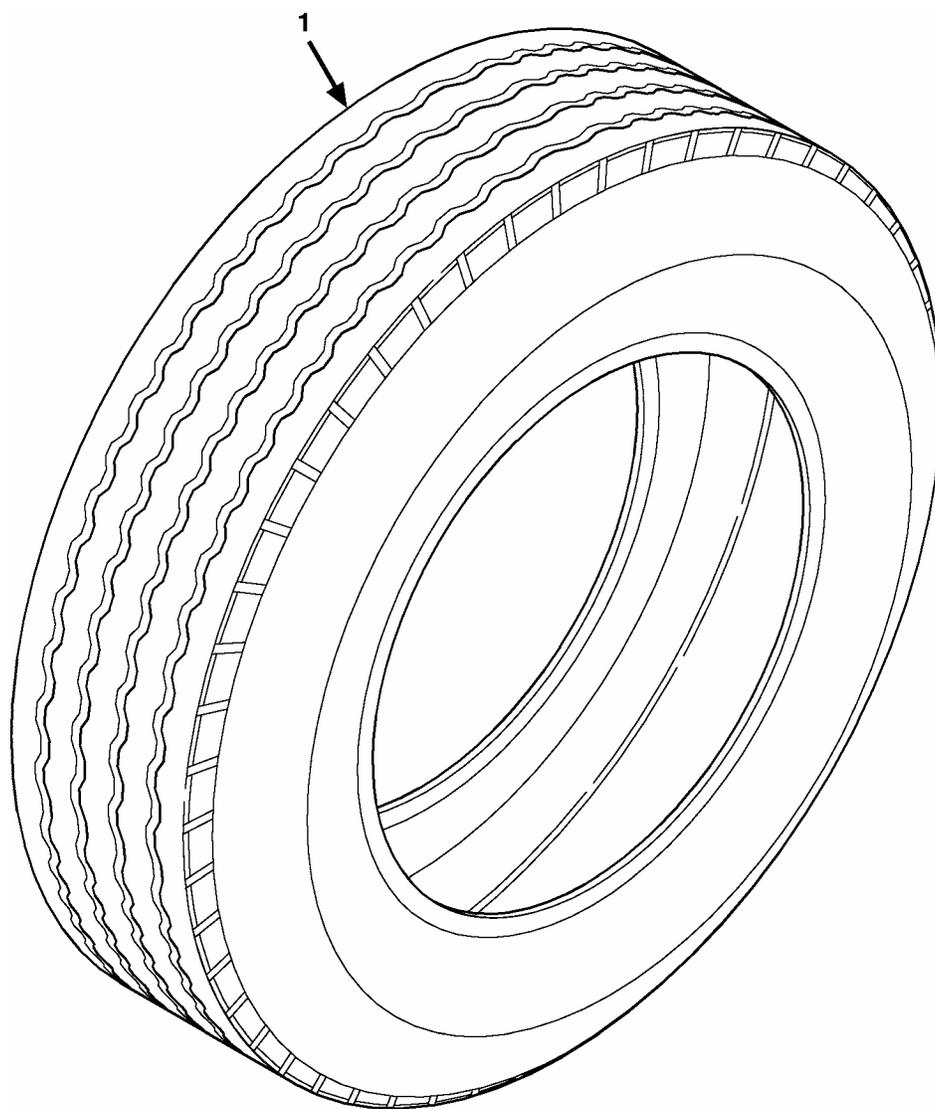


FIGURE 20. TIRES

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 1313 TIRES, TUBES, TIRE CHAINS	
					FIG. 20 TIRE. PNEUMATIC, TUBELESS	
1	PAOFH	2610-01-518-5292	12195	56999	TIRE, PNEUMATIC	13
					END OF FIGURE	

TM 5-2330-325-14&P

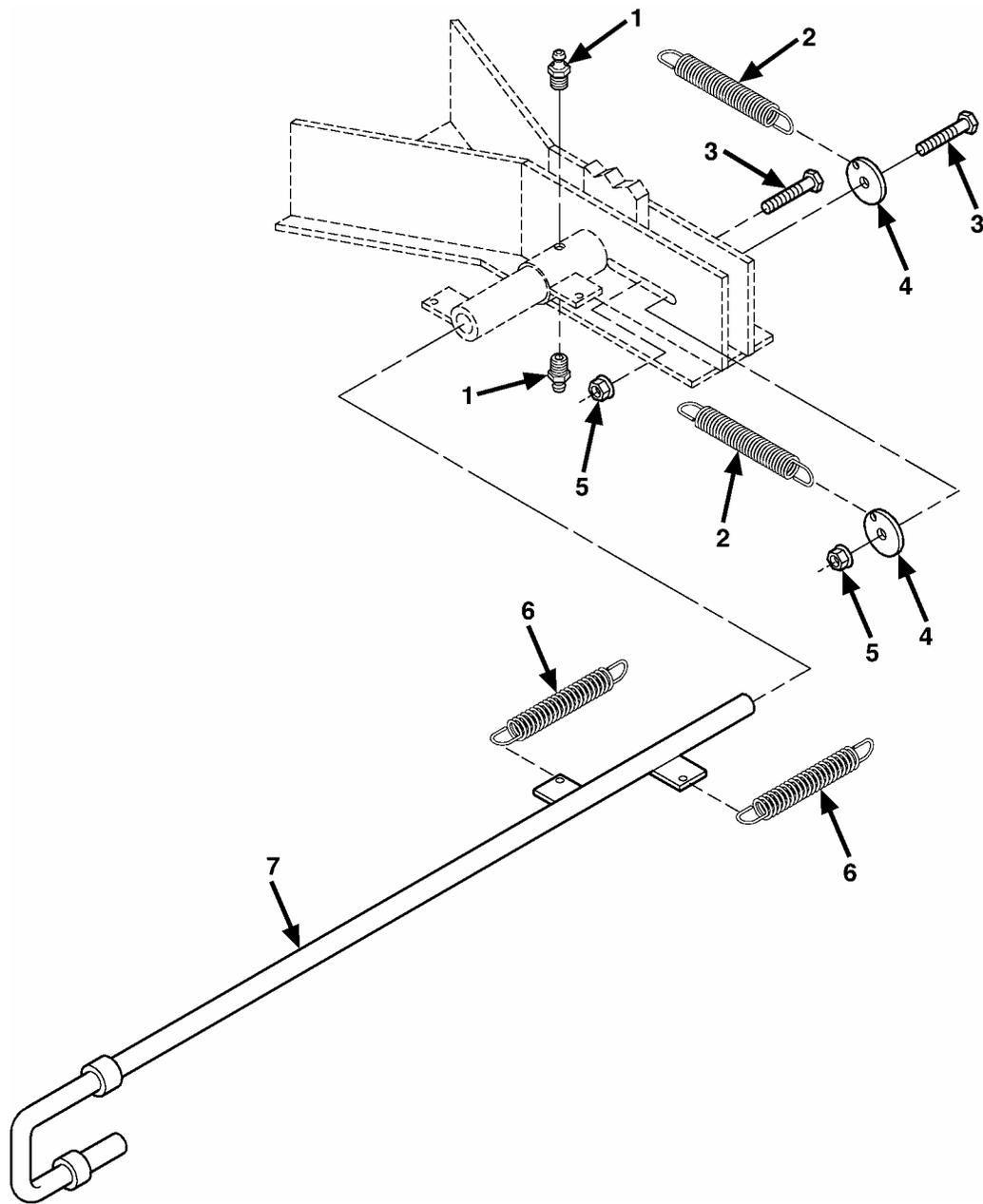


FIGURE 21. GOOSENECK LOCKING ASSEMBLY

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 15 FRAME, TOWING ATTACHMENTS, DRAWBARS AND ARTICULATION SYSTEMS	
					GROUP 1501 FRAME, TOWING ATTACHMENTS AND DRAWBARS	
					FIG. 21 GOOSENECK LOCKING ASSEMBLY	
1	PAOZZ	4730-01-517-3795	63576	AERKS1/8PT	FITTING, GREASE	2
2	PAOZZ	5360-01-519-2542	39428	9654K296	SPRING, EXTENSION	2
3	PAOZZ	5306-01-519-2541	39428	91286A344	BOLT, MACHINE	2
4	PAOZZ	5310-01-519-2543	63576	FENDERWASHER	WASHER, FENDER	2
5	PAOZZ	5310-01-232-9769	39428	94895A823	NUT, SELF-LOCKING 1/2-13	2
6	PAOZZ	5360-01-519-2557	56988	371	SPRING, EXTENSION	2
7	PAOZZ	5340-01-519-2540	63576	F0285	BAR, LATCH	1
					END OF FIGURE	

TM 5-2330-325-14&P

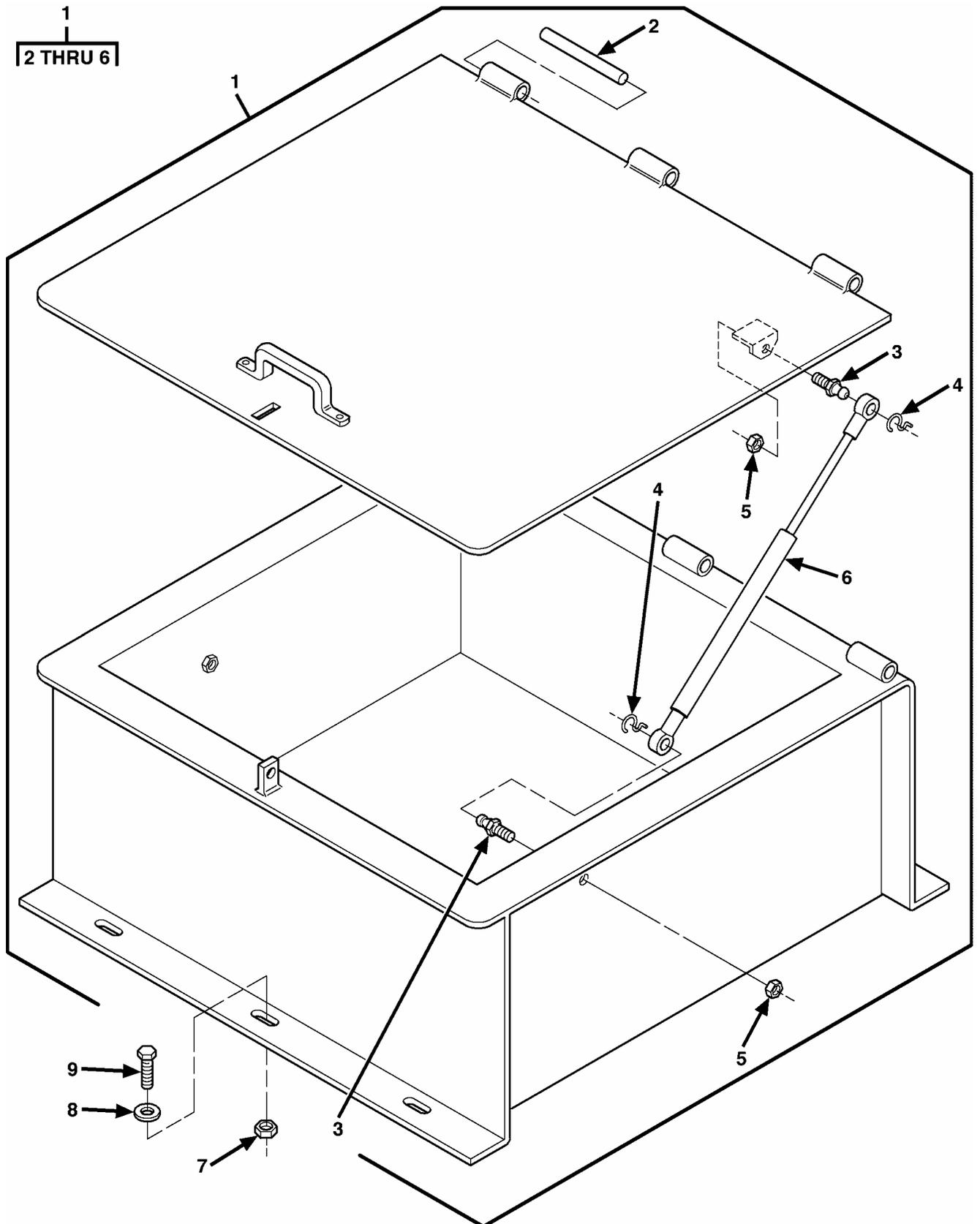


FIGURE 22. TOOLBOX ASSEMBLY

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 1501 FRAME, TOWING ATTACHMENTS, AND DRAWBARS	
					FIG. 22 TOOLBOX ASSEMBLY	
1	PFOOO			63576 101876	TOOLBOX ASSEMBLY	1
2	PFOZZ	5315-01-519-2555	63576	R140-0150SP	·PIN, STRAIGHT, HEADLESS	3
3	PFOZZ	5307-01-519-2689	7B735	16298SP	·STUD, BALL	4
4	PFOZZ	5340-01-519-6522	7B735	GS-10MM-C	·CLIP, SAFETY	4
5	PFOZZ	5310-00-984-3806	81349	M45913/1-5CG5C	·NUT, SELF-LOCKING HEXAGON 5/16-18	4
6	PFOZZ	3040-01-519-2196	7B735	AVMSE1000V	·ACTUATOR, MECHANICAL, NONAIRCRAFT	2
7	PFOZZ		39428	90580A315	NUT, SELF-LOCKING 1/2-13 GR C	6
8	PFOZZ		39428	98025A133	FLATWASHER 1/2 GR 8	6
9	PFOZZ		39428	92620A716	SCREW 1/2-13 X 1-1/2 GR 8	6

END OF FIGURE

TM 5-2330-325-14&P

1
2 THRU 6

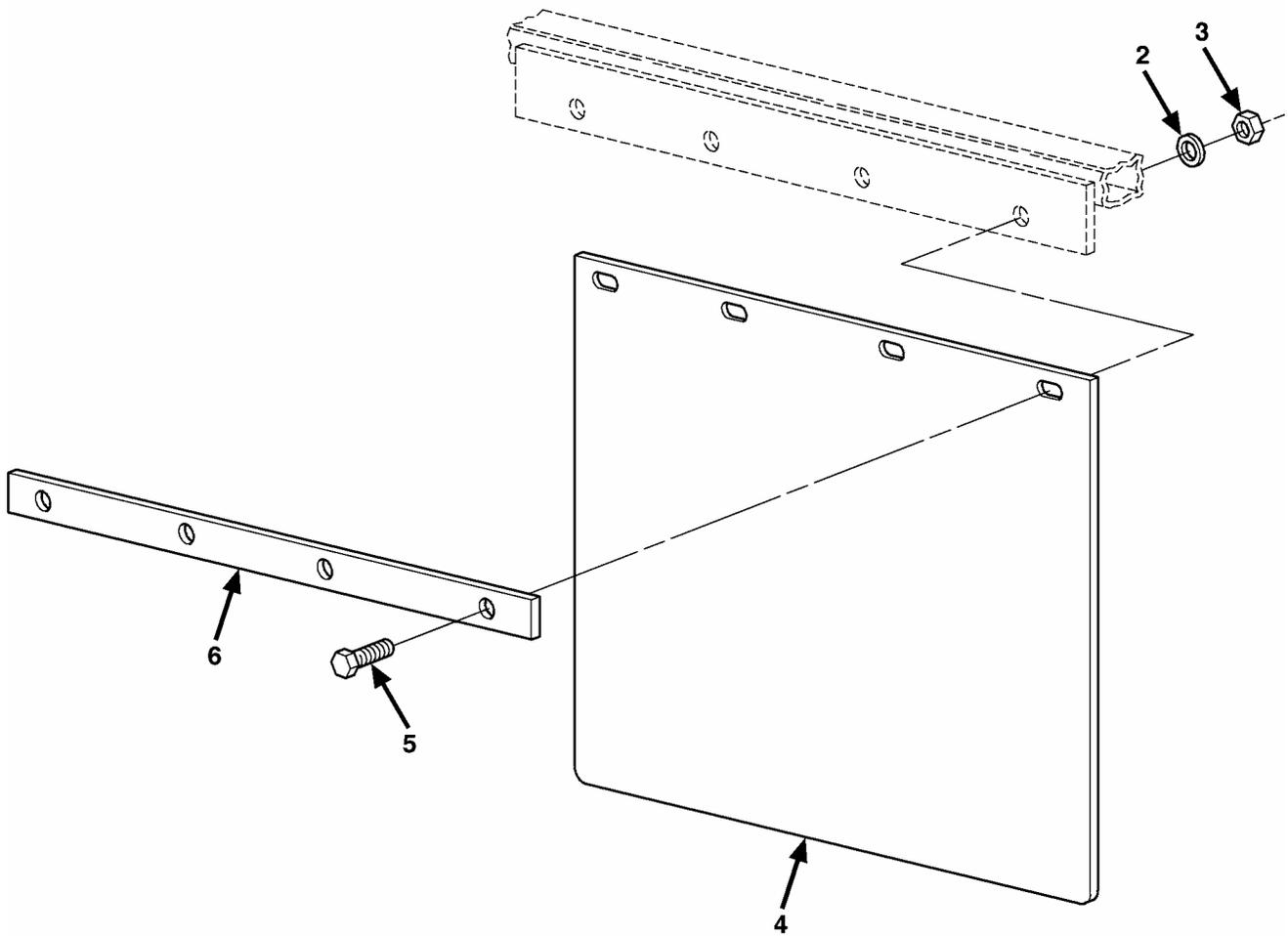


FIGURE 23. GOOSENECK GRAVEL GUARD

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1501 FRAME ASSEMBLY						
FIG. 23 GOOSENECK GRAVEL GUARD						
1	A0000		63576	101888	GRAVEL GUARD ASSEMBLY, GOOSENECK	1
2	PAOZZ	5310-01-358-0596	96906	MS27183-53	·WASHER, FLAT, 5/16, GRADE 5	4
3	PAOZZ	5310-00-984-3806	81349	M45913/1-5CG5C	·NUT, SELF-LOCKING 5/16-18	4
4	PAOZZ	2540-01-519-2193	63576	24X30MFNL	·MUD FLAP 24 X 24	1
5	PAOZZ	5305-01-389-9097	80204	B1821AH031C125N	·SCREW, CAP, HEXAGON HEAD 5/16-18 X 1-1/4	4
6	PAOZZ	5340-01-517-3848	63576	MFW2375	·BRACKET, MUD FLAP BOLTING	1

END OF FIGURE

TM 5-2330-325-14&P

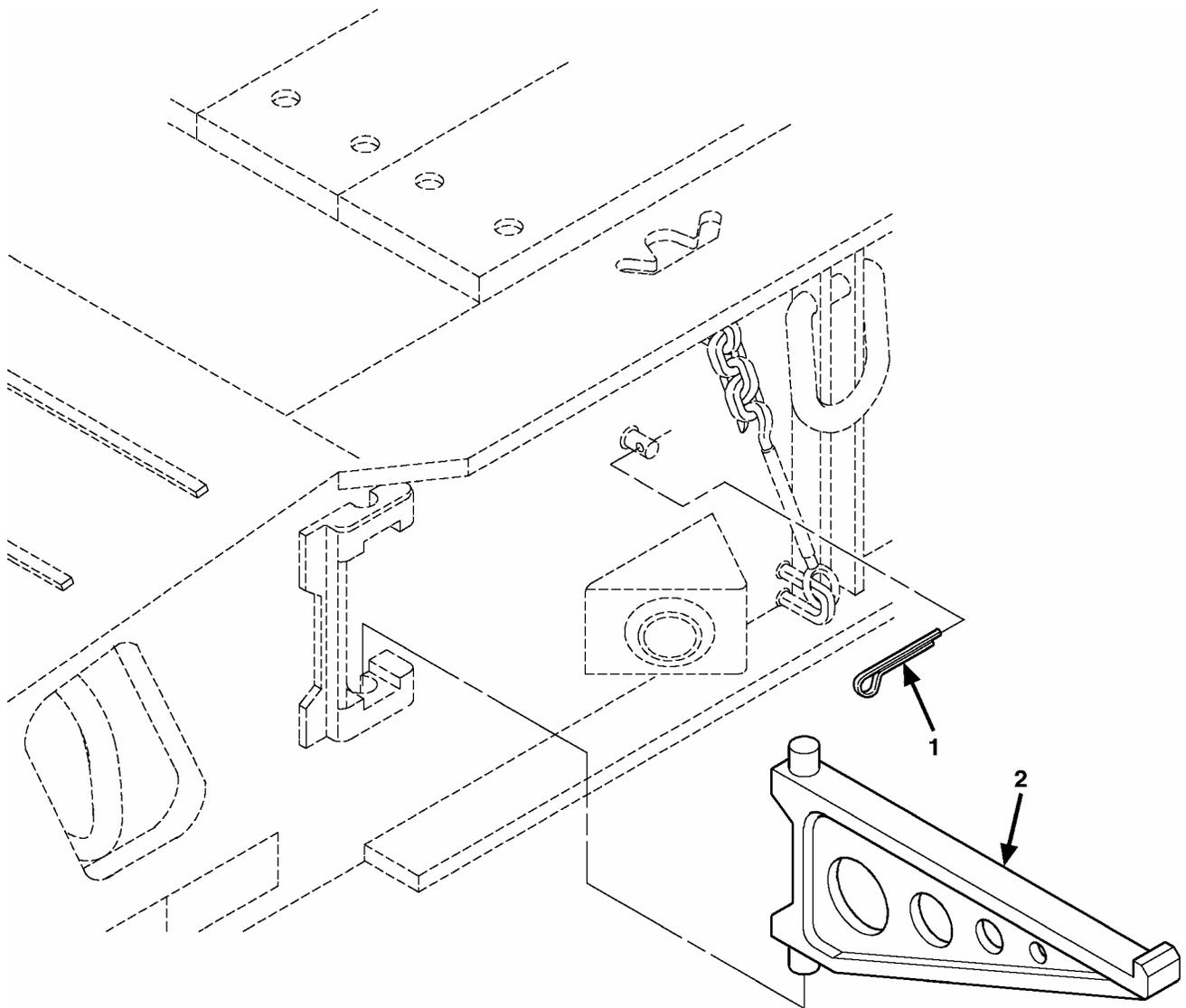


FIGURE 24. OUTRIGGER

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 1501 FRAME ASSEMBLY	
					FIG. 24 OUTRIGGER	
1	PAOZZ	5315-01-476-4740	39428	98335A069	PIN,COTTER	18
2	PAOZZ	2590-01-519-2199	63576	OR2BC	BRACKET, VEHICULAR COMPONENTS	18
					END OF FIGURE	

TM 5-2330-325-14&P

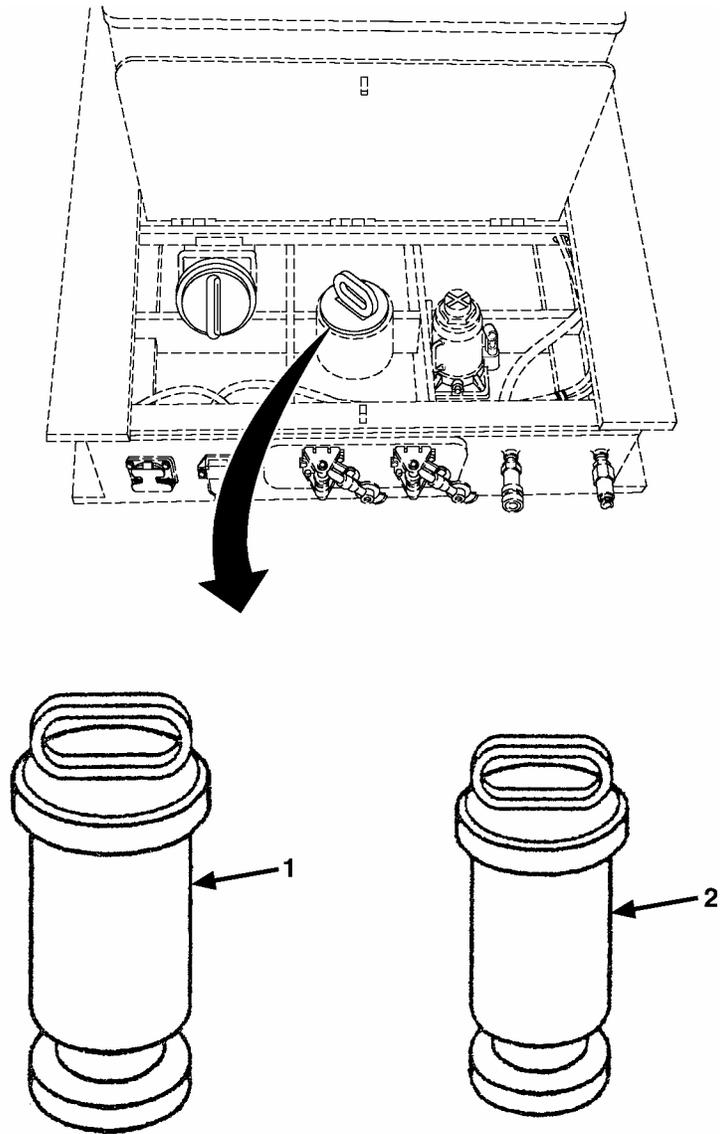


FIGURE 25. KINGPIN

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 1503 PINTLES AND TOWING ATTACHMENTS	
					FIG. 25 KINGPIN	
1	PFOZZ	2510-01-517-3991	63576	F0080	KING PIN FIFTHWHEEL 3 1/2"	1
2	PFOZZ	2510-01-517-3871	63576	F0081	KING PIN FIFTHWHEEL 2"	1
					END OF FIGURE	

TM 5-2330-325-14&P

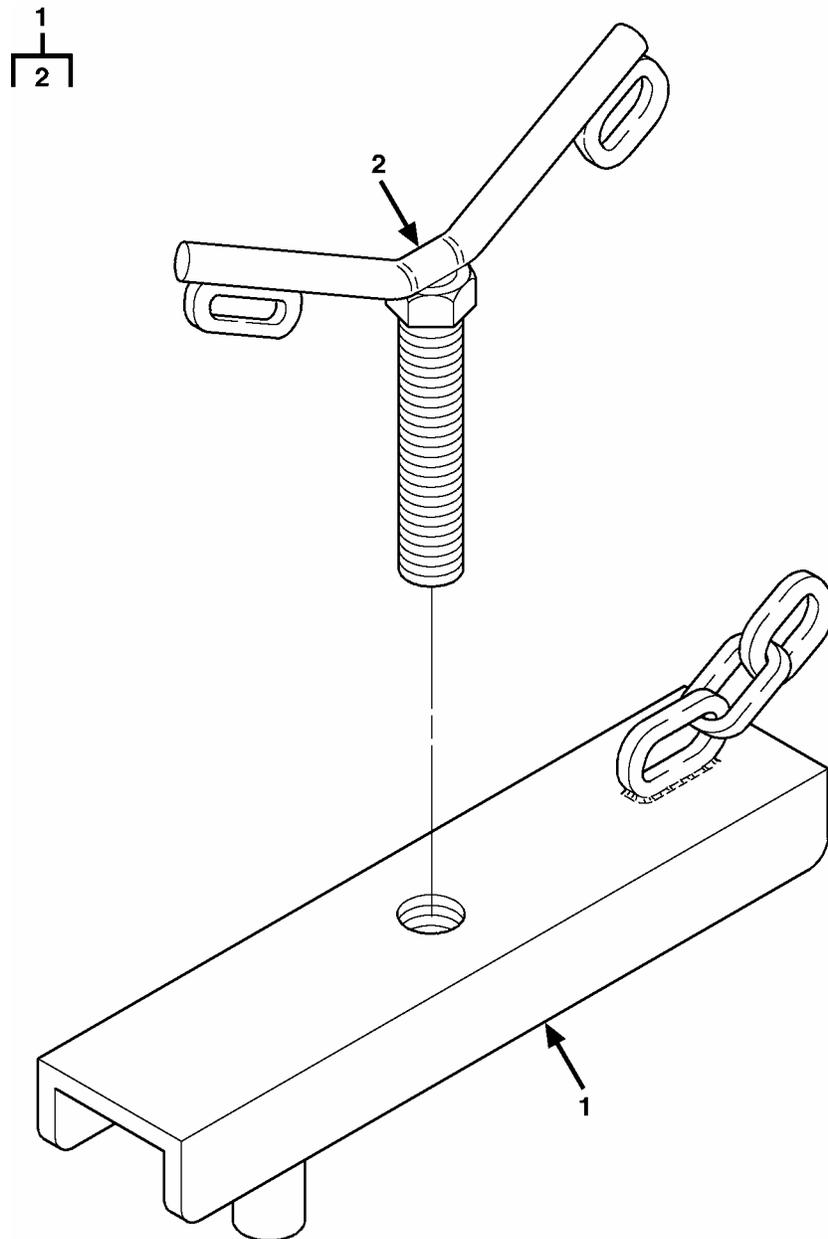


FIGURE 26. SPARE TIRE CARRIER

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 1504 SPARE TIRE CARRIER	
					FIG. 26 SPARE TIRE CARRIER	
1	PFOZZ		63576	160055	TIRE CARRIER	1
2	PFOZZ	5306-01-517-3678	63576	160040-02	XBOLT, SWIVEL HANDLE	1
					END OF FIGURE	

TM 5-2330-325-14&P

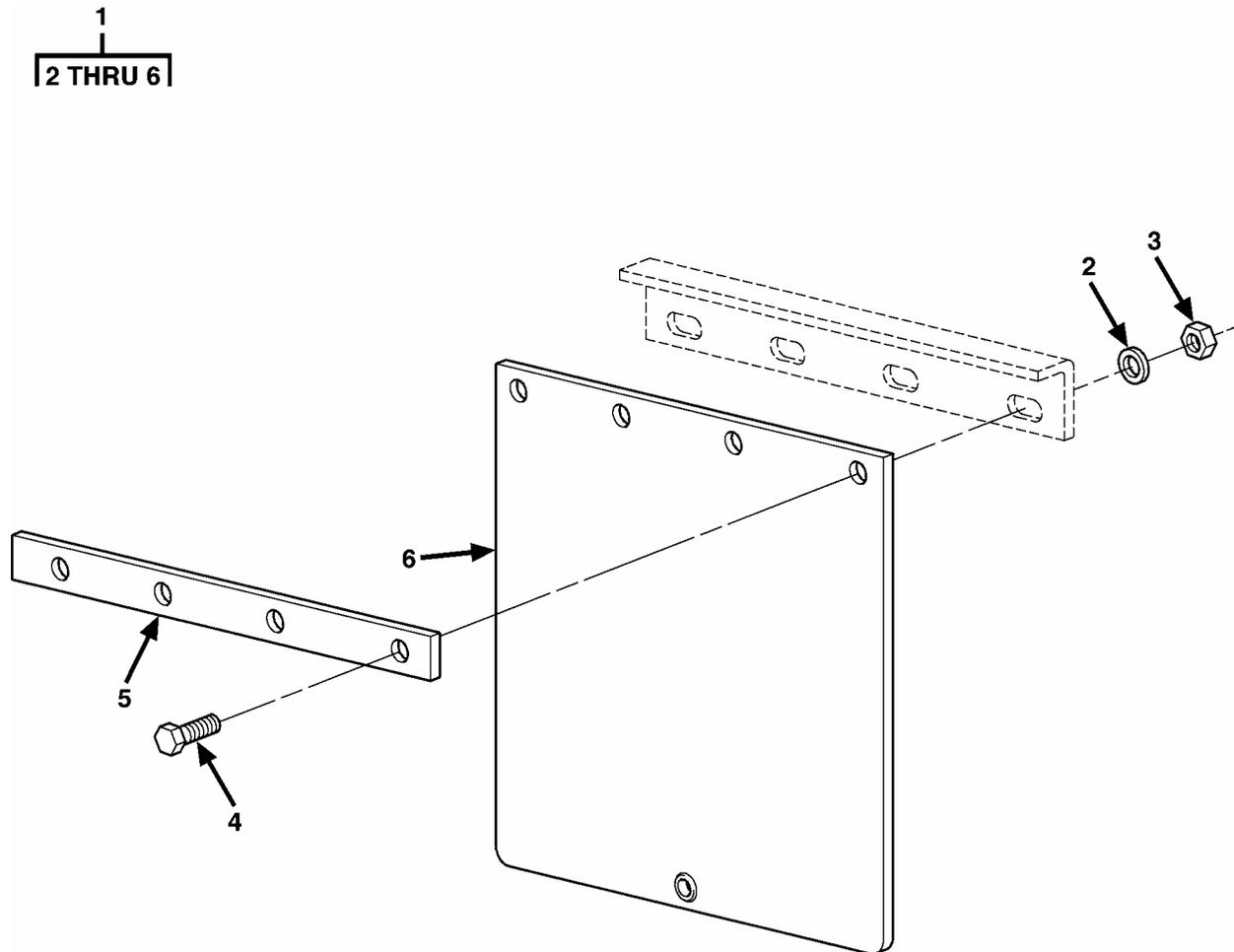


FIGURE 27. MUD FLAPS

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 18 BODY, CAB, HOOD AND HULL	
					GROUP 1801 BODY, CAB, HOOD AND HULL ASSEMBLIES	
					FIG. 27 MUD FLAPS	
1	MOOZZ		63576	101911	MUD FLAP ASSEMBLY	1
2	PFOZZ	5310-01-358-0596	96906	MS27183-53	·WASHER, FLAT 5/16	8
3	PFOZZ	5310-00-984-3806	81349	M45913/1-5CG5C	·NUT, SELF-LOCKING 5/16-18	8
4	PFOZZ	5305-01-389-9097	80204	B1821AH031C125N	·SCREW, CAP 5/16-18 X 1-1/4	8
5	PFOZZ		63576	MFW2375	·BRACKET, MUD FLAP MOUNTING	2
6	PFOZZ	2540-01-519-2239	63576	24X30MFNL	·MUD FLAP	1

END OF FIGURE

TM 5-2330-325-14&P

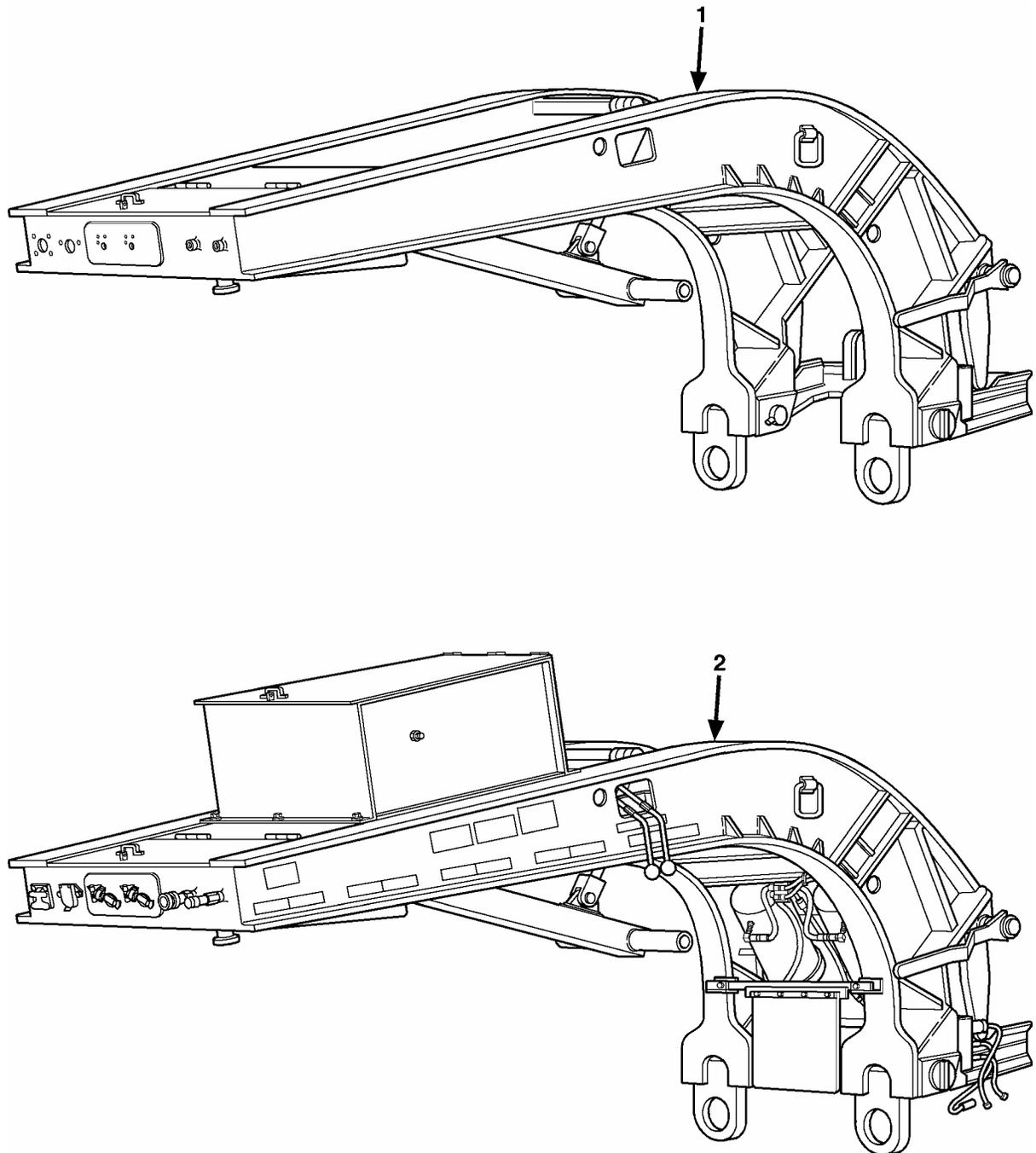


FIGURE 28. GOOSENECK

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 1801 BODY, CAB, HOOD AND HULL ASSEMBLIES	
					FIG. 28 GOOSENECK	
1	XDFZZ		63576	G2870-PART	GOOSENECK FRAME ASSEMBLY.....	1
2	XDFZZ		63576	G2708-ASSY	GOOSENECK ASSEMBLY.....	1

END OF FIGURE

TM 5-2330-325-14&P

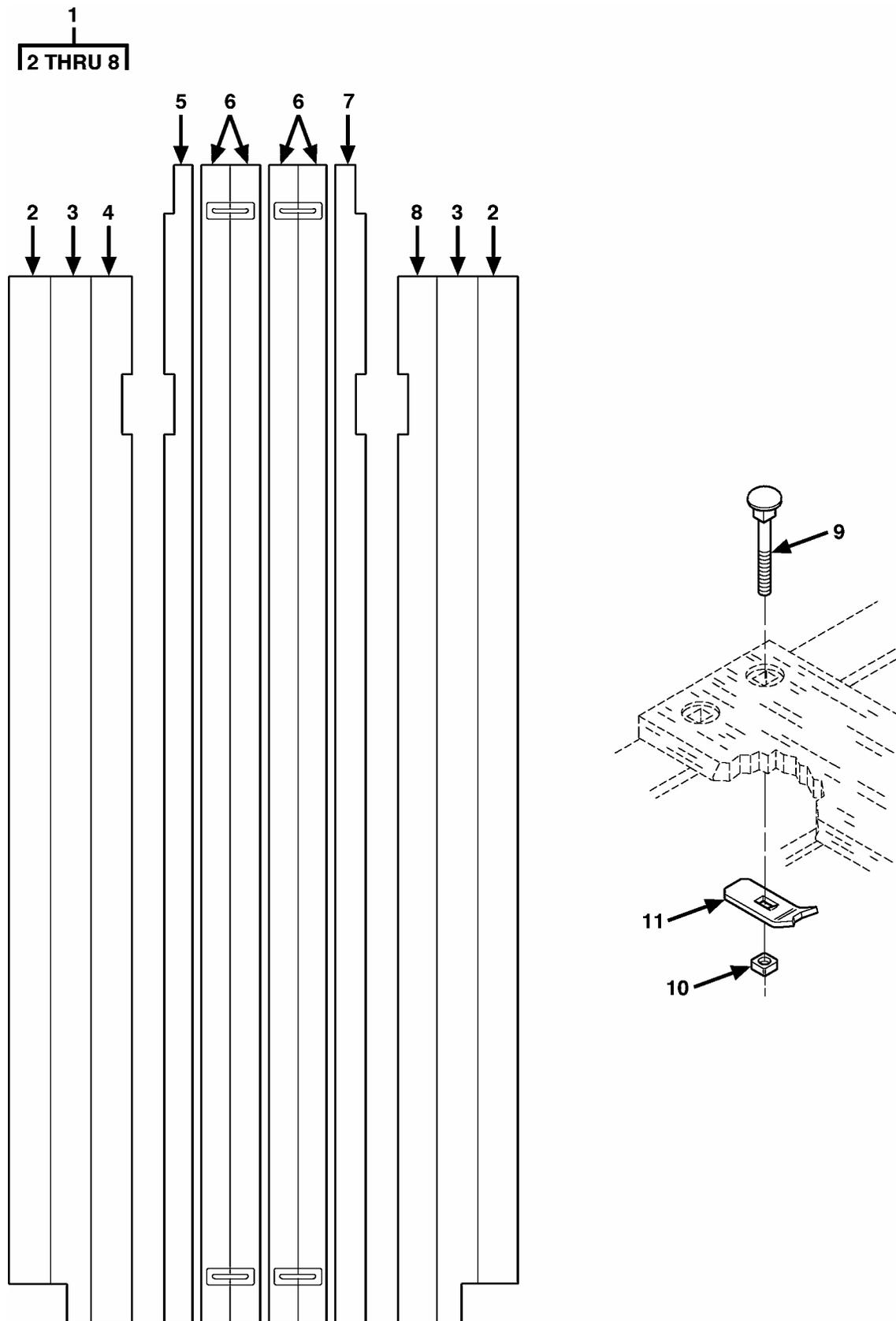


FIGURE 29. FLOOR DECK BOARDS

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 1805 FLOORS, SUBFLOORS AND RELATED PARTS						
FIG. 29 FLOOR DECK BOARDS						
1	PFOOO		63576	101900	FLOOR KIT, HARDWOOD.....	1
2	PFOZZ	2510-01-519-2241	63576	101900-1	·BOARD, DECKING, OUTER DECK 1	2
3	PFOZZ	2510-01-519-2243	63576	101900-2	·BOARD, DECKING, OUTER DECK 2	2
4	PFOZZ	2510-01-519-2244	63576	101900-3	·BOARD, DECKING, OUTER DECK 3	1
5	PFOZZ	2510-01-519-2248	63576	101900-5	·BOARD, DECKING	1
6	PFOZZ	2510-01-519-2247	63576	101900-7	·BOARD ASSEMBLY, INNER, REMOVABLE	4
7	PFOZZ	2510-01-519-2253	63576	101900-6	·BOARD, DECKING	1
8	PFOZZ	2510-01-519-2246	63576	101900-4	·BOARD, DECKING, INNER DECK 4	1
9	PFOZZ		63576	3/8X31/2CBDACROMER	BOLT, CARRIAGE 3/8-18 X 3-1/2	225
10	PFOZZ	5310-01-519-2534	63576	3/8SNUTDACROMER	NUT, SQUARE 3/8-16	225
11	PFOZZ	5340-01-519-2679	63576	FCMAKCOGAL	CLIP, FLOOR RETAINING	225

END OF FIGURE

TM 5-2330-325-14&P

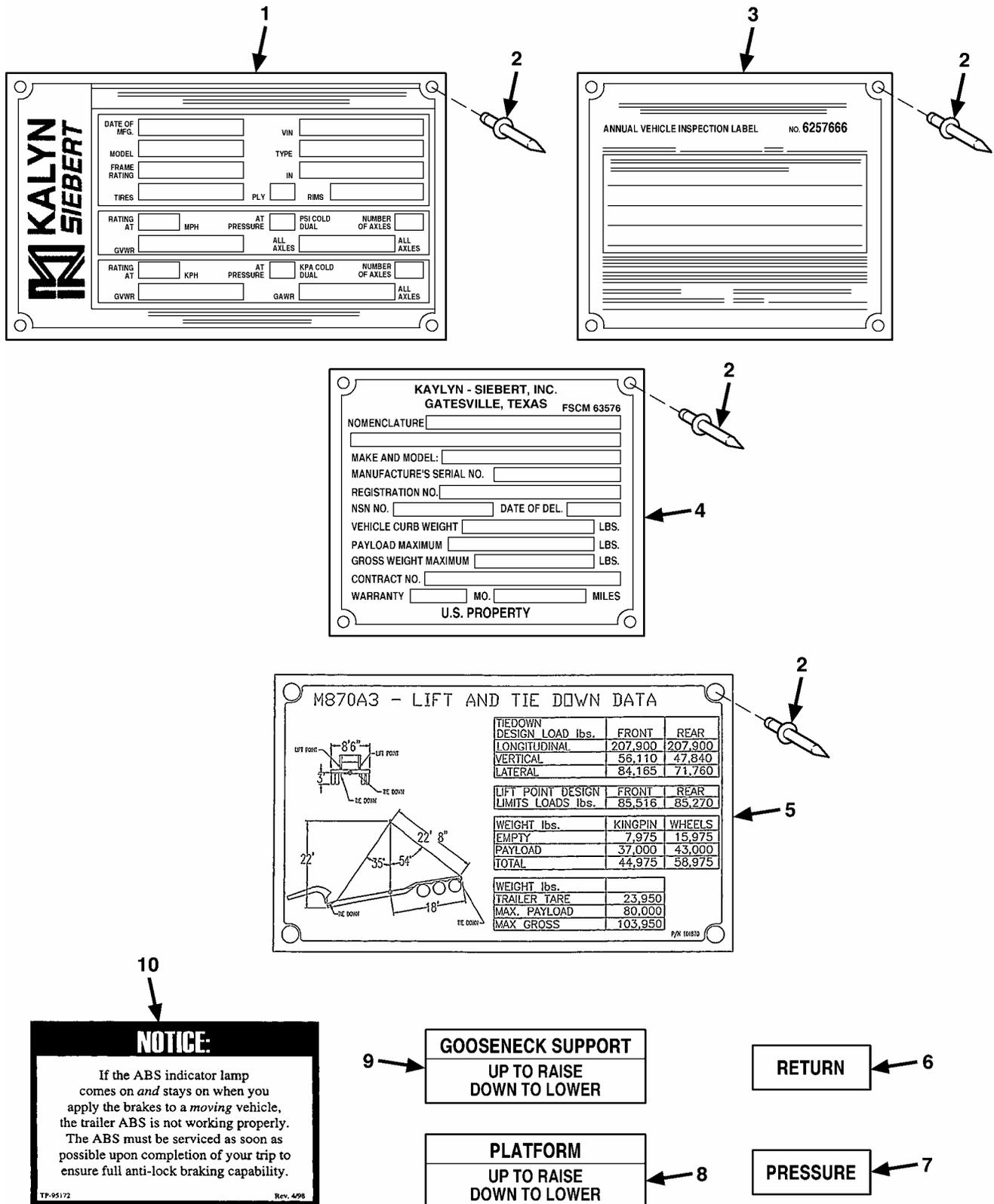


FIGURE 30. DATA PLATES

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 22 BODY, CHASSIS OR HULL, AND ACCESSORY ITEMS	
					GROUP 2210 DATA PLATES AND INSTRUCTION HOLDERS	
					FIG. 30 DATA PLATES	
1	PFOZZ	9905-01-519-2805	63576	GVWRPLATE	PLATE, GVWR	1
2	PFOZZ	5320-01-519-2424	63576	AFA64	RIVET, POP 3/16	12
3	PFOZZ	9905-01-519-2807	63576	49-SN	DECAL, FMVSS	1
4	PFOZZ	9905-01-519-2809	63576	NOMENCLATURE	PLATE, MILITARY REGISTRATION DATA	1
5	PFOZZ	9905-01-519-3017	63576	101870	PLATE, M870A3 TRANSPORTATION DATA	1
6	PFOZZ	9905-01-519-2811	63576	L0085-2	DECAL, HYDRAULIC RETURN LINE	1
7	PFOZZ	9905-01-519-2815	63576	L0085-1	DECAL, HYDRAULIC PRESSURE LINE	1
8	PFOZZ		63576	L0020	DECAL, PLATFORM OPERATION	1
9	PFOZZ	9905-01-519-2813	63576	L0019	DECAL, GOOSENECK SUPPORT	1
10	PFOZZ	7690-01-499-6991	78500	TP-95172	DECAL, WABCO ABS WARNING	1

END OF FIGURE

TM 5-2330-325-14&P

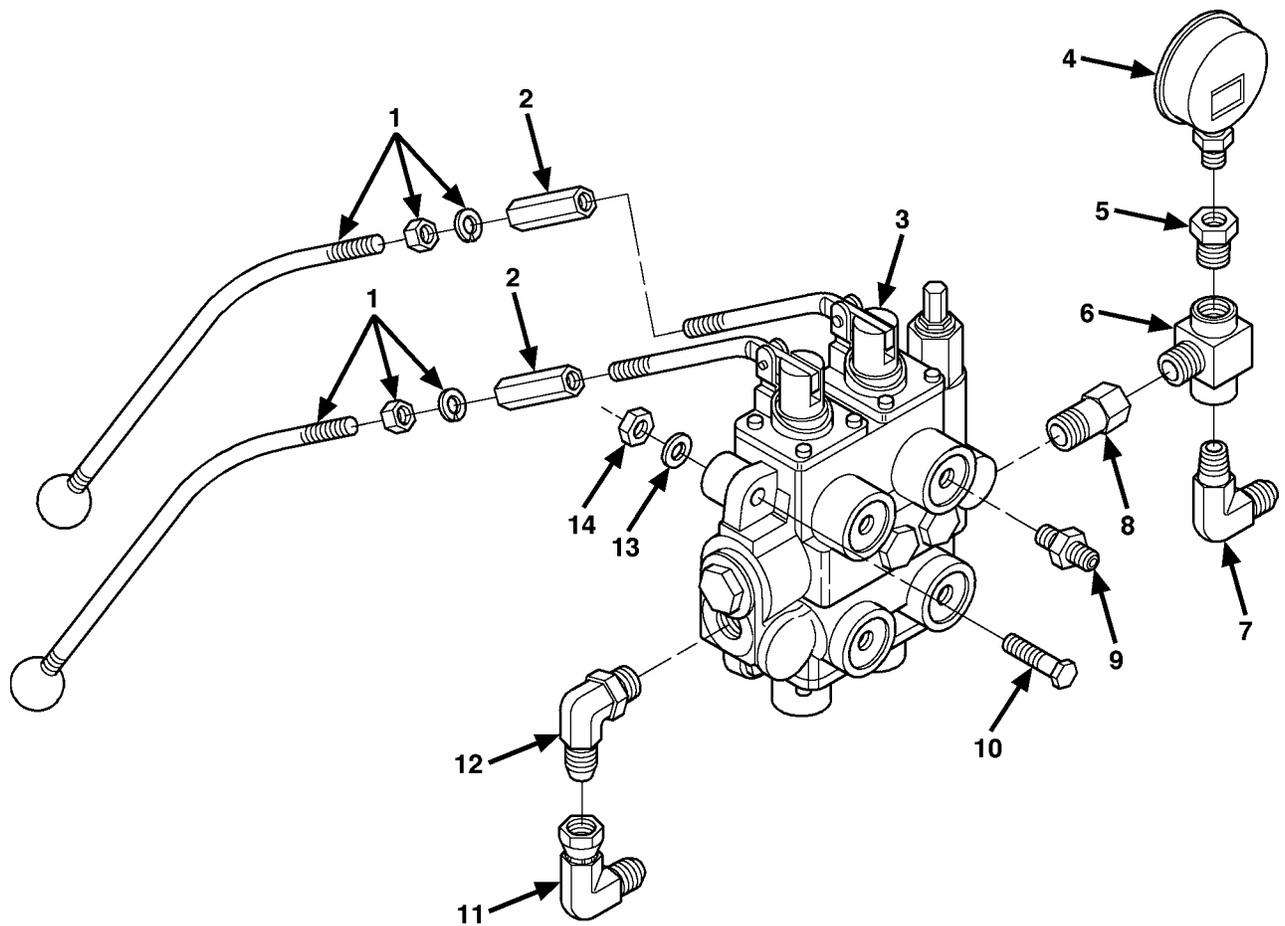


FIGURE 31. HYDRAULIC CONTROL VALVE, PRESSURE GAUGE AND FITTINGS

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 24 HYDRAULIC LIFT COMPONENTS	
					GROUP 2402 MANIFOLD AND/OR CONTROL VALVES	
					FIG. 31 HYDRAULIC CONTROL VALVE, PRESSURE GAUGE AND FITTINGS	
1	PAOZZ	3040-01-519-2221	29260	660150017	HANDLE EXTENSION, BENT	1
2	PAOZZ	5340-01-519-2551	63576	90264A480	NUT, COUPLING 7/16-20	2
3	PAOZZ	4820-01-519-2217	29260	HC-V-BC23	SLIDE, DIRECTIONAL CONTROL LINEAR VALVE	1
4	PAOZZ	6685-01-519-2206	63576	HPGS3	PRESSURE GAUGE, SILICON HYDRAULIC	1
5	PAOZZ		8G781	110A-DB	BUSHING	2
6	PAOZZ	4730-01-519-2289	79470	TF3609X8	TEE, MALE BRANCH	1
7	PAOZZ	4730-01-519-2236	63576	3A1608A08	FITTING, 90 DEGREES	1
8	PAOZZ	4730-01-152-5473	79470	C3269X12X8	ADAPTER, STRAIGHT, PIPE TO BOSS	1
9	PAOZZ		79740	C5315X6X10	FITTING, O-RING	4
10	PAOZZ		39428	91257A634	BOLT 3/8-16 X 2-1/2	3
11	PAOZZ	4730-00-133-3196	79740	C5506X12	ELBOW, TUBE	1
12	PAOZZ	4730-00-946-7823	79740	C5515X12	ELBOW, TUBE TO BOSS	1
13	PAOZZ	5310-01-312-4960	96906	MS27183-55	WASHER, FLAT 3/8	3
14	PAOZZ	5310-00-914-6028	81349	M45913/1-6CS3	NUT, SELF-LOCKING 3/8-16	3

END OF FIGURE

TM 5-2330-325-14&P

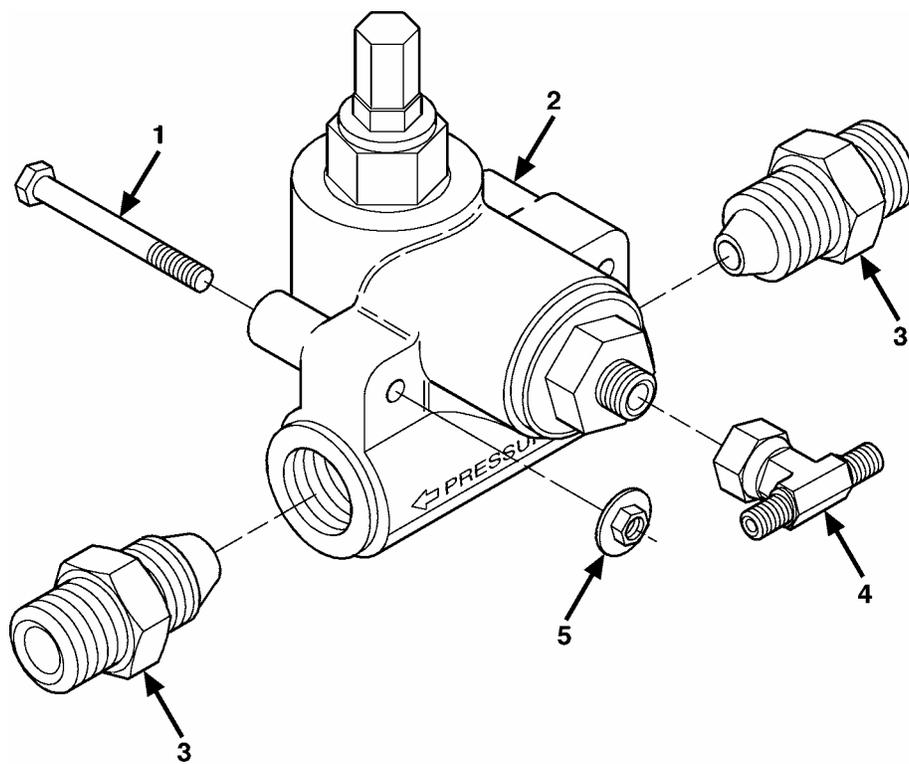


FIGURE 32. HYDRAULIC RELIEF VALVE AND FITTINGS

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 2402 MANIFOLD AND/OR RELIEF VALVES	
					FIG. 32 RELIEF VALVE AND FITTINGS	
1	PAOZZ	5305-01-283-9211	39428	91247A550	BOLT, 1/4-20 X 2 GR 5	2
2	PAOZZ	4820-01-519-7027	12335	RV-3L	VALVE, HYDRAULIC RELIEF	1
3	PAOZZ	4730-01-519-7011	79470	C5315X6X10	FITTING, O-RING	3
4	PAOZZ	4730-01-519-2367	79470	C5707X6	TEE, SWIVEL BRANCH	1
5	PAOZZ	5310-00-965-1820	81349	M45913/1-4CBB	NUT, SELF-LOCKING, NYLON INSERT 1/4-20	2
					END OF FIGURE	

TM 5-2330-325-14&P

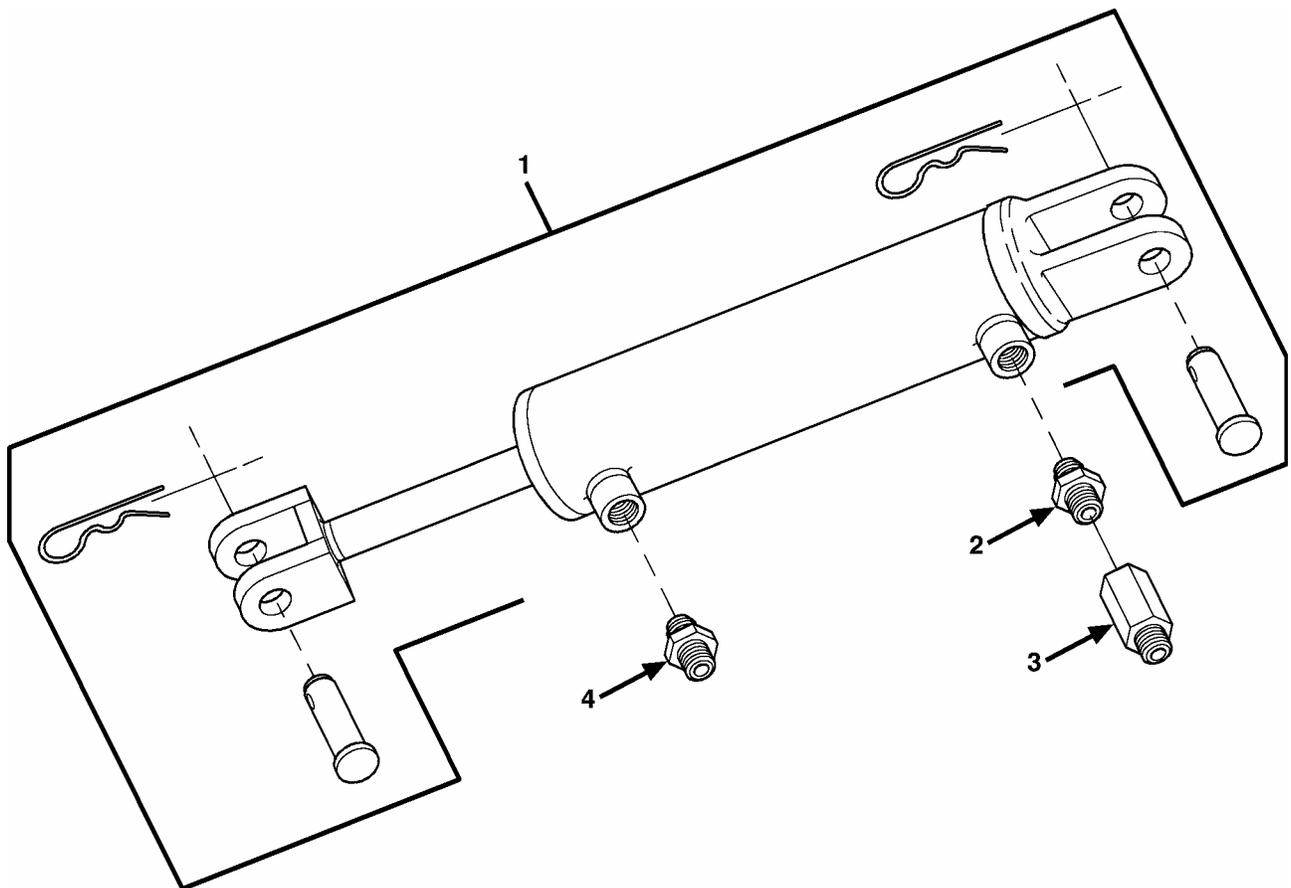


FIGURE 33. HYDRAULIC TILT CYLINDER

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 2404 HYDRAULIC TILT CYLINDERS AND TILT CRANK	
					FIG. 33 HYDRAULIC TILT CYLINDER	
1	PAFZZ	3040-01-519-2208	63576	CYLM3010	CYLINDER, HYDRAULIC.....	1
2	PAFZZ	4730-01-519-2222	63576	C3249X6X8	FITTING, O-RING #6.....	1
3	PAFZZ		63576	10312-606-.062	VALVE, THROTTLE.....	1
4	PAFZZ	4730-01-162-7054	30780	0103-8-6	ADAPTER, STRAIGHT, PIPE TO BOSS.....	1

END OF FIGURE

TM 5-2330-325-14&P

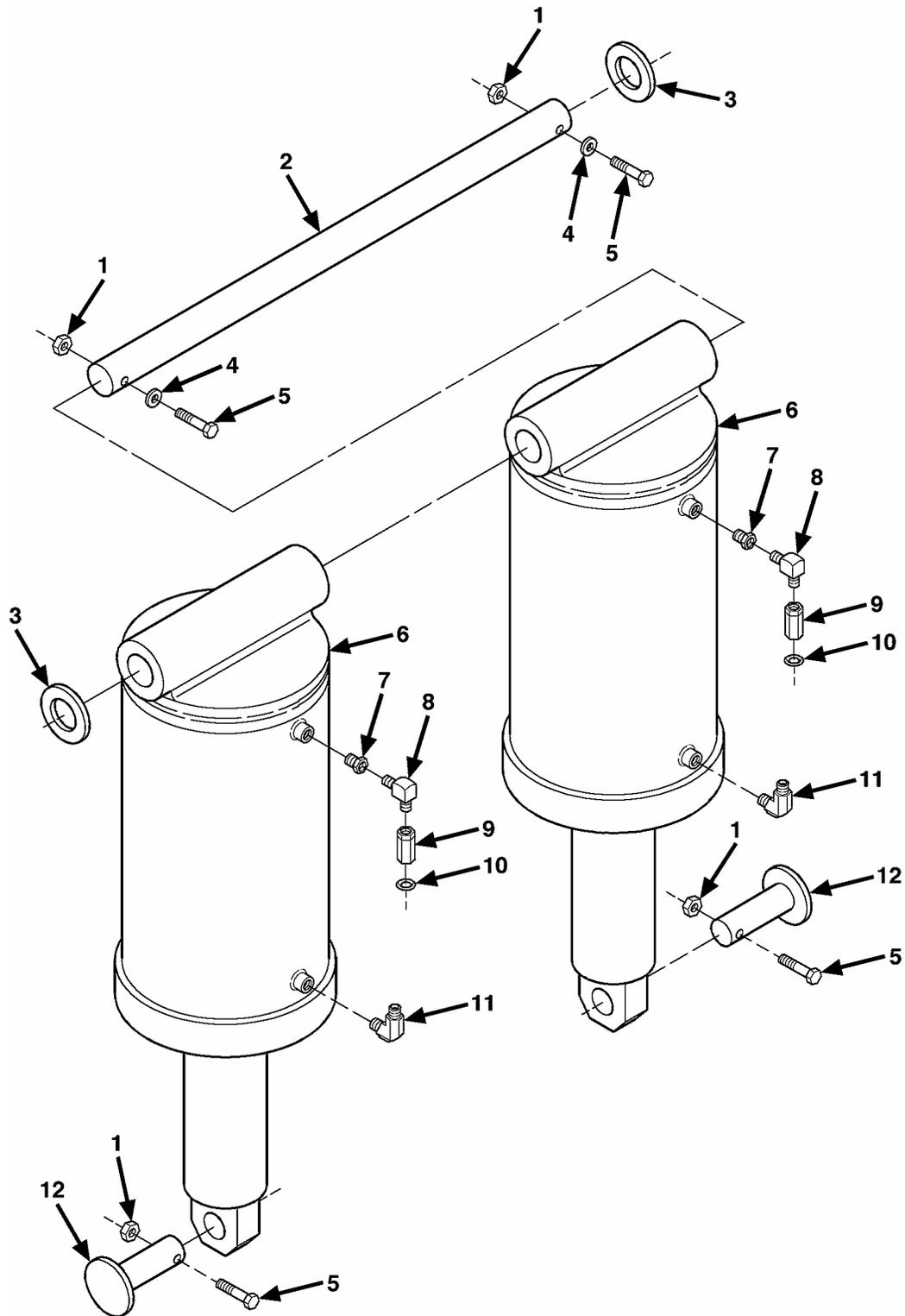


FIGURE 34. HYDRAULIC LIFT CYLINDERS

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 2405 MAST COLUMN						
FIG. 34 HYDRAULIC LIFT CYLINDERS						
1	PAFZZ	5310-01-519-2538	39428	93839A031	NUT, SELF-LOCKING 3/8-16	4
2	PAFZZ	5315-01-519-2548	63576	24140	PIN, CYLINDER RETAINER	1
3	PAFZZ		63576	DOMEX1/4	RETAINER, CYLINDER PIN	2
4	PAFZZ	5310-01-312-4960	96906	MS27183-55	WASHER, FLAT 3/8	2
5	PAFZZ		39428	91257A634	SCREW, CAP, HEXAGON HEAD 3/8-16 X 2-1/2	4
6	PAFZZ	3040-01-519-2211	63576	CYLM9010	CYLINDER, 3000 PSI	2
7	PAFZZ	5365-01-498-7249	3A054	50785K65	BUSHING	2
8	PAFZZ	4730-01-519-2235	63576	6806X6X4	FITTING, O-RING, 90°	2
9	PAFZZ	4820-01-519-7021	63576	10312-606-062	THROTTLE VALVE, LINE	2
10	PAFZZ	5331-01-519-2559	63576	568906	O-RING, #6	2
11	PAFZZ	4730-01-519-7014	C1988	3A16-08A06	ELBOW, MALE J.I.C.	2
12	PAFZZ	5315-01-519-2423	63576	101835-11	PIN, CYLINDER	2

END OF FIGURE

TM 5-2330-325-14&P

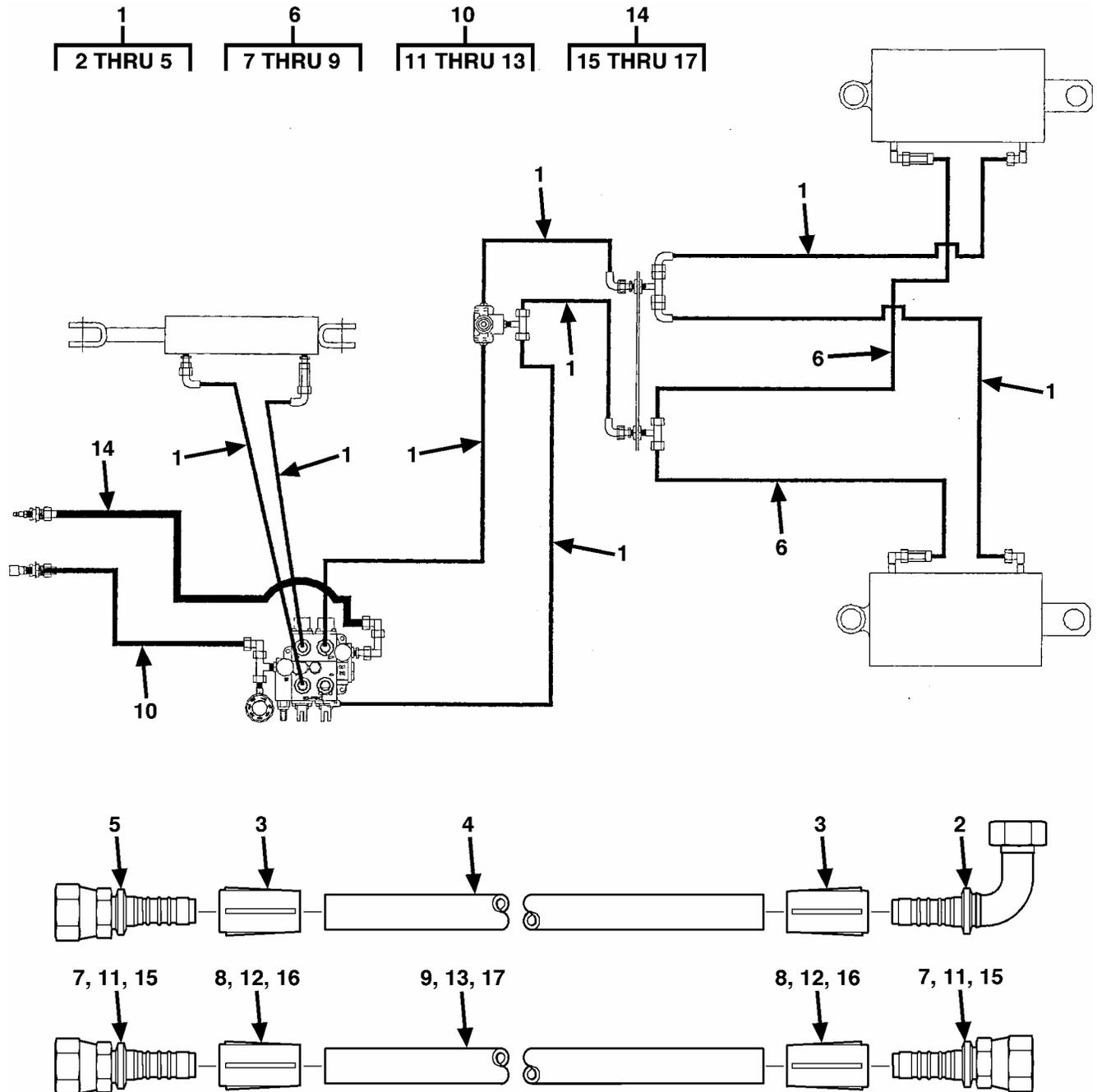


FIGURE 35. HYDRAULIC LINES AND FITTINGS

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 2406 HYDRAULIC LINES AND FITTINGS						
FIG. 35 HYDRAULIC LINES AND FITTINGS						
1	A0000		63576	X8296-1	HOSE ASSEMBLY, HYDRAULIC	8
2	PAOZZ	4720-01-519-6534	63576	6101-0004	·FITTING, FEMALE JIC 90°	1
3	PAOZZ	4720-01-519-6527	63576	6101-0005	·FERRULE, 3/4"	2
4	MOOZZ		63576	8296-1	·HOSE, 3/4" MAKE FROM PN A101-12 (52684)	V
5	PAOZZ	4720-01-519-6533	63576	6102-0001	·FITTING, FEMALE JIC	1
6	A0000	4720-01-519-6530	63576	6101-0002	HOSE ASSEMBLY, HYDRAULIC	2
7	PAOZZ		63576	206-606	·FITTING, FEMALE JIC	2
8	PAOZZ	4720-01-519-6529	63576	6101-0007	·FERRULE, 3/4"	2
9	MOOZZ	4720-01-519-6525	63576	6101-0006	·HOSE, 3/4" MAKE FROM PN A101-12 (52684)	V
10	A0000		63576	X8296-3	HOSE ASSEMBLY, HYDRAULIC	1
11	PAOZZ		63576	208-608	·FITTING, FEMALE JIC	2
12	PAOZZ		63576	508-A500	·FERRULE, 1/2"	2
13	MOOZZ		63576	8296-3	·HOSE, 1/2" MAKE FROM PN A151-08 (52684)	V
14	A0000		63576	X8296-4	HOSE ASSEMBLY, HYDRAULIC	1
15	PAOZZ		63576	212-612	·FITTING, FEMALE JIC	2
16	PAOZZ	4730-01-519-2205	63576	512-A500	·FERRULE, 3/4"	2
17	MOOZZ		63576	8296-4	·HOSE, 1/2" MAKE FROM PN A151-08 (52684)	V

END OF FIGURE

TM 5-2330-325-14&P

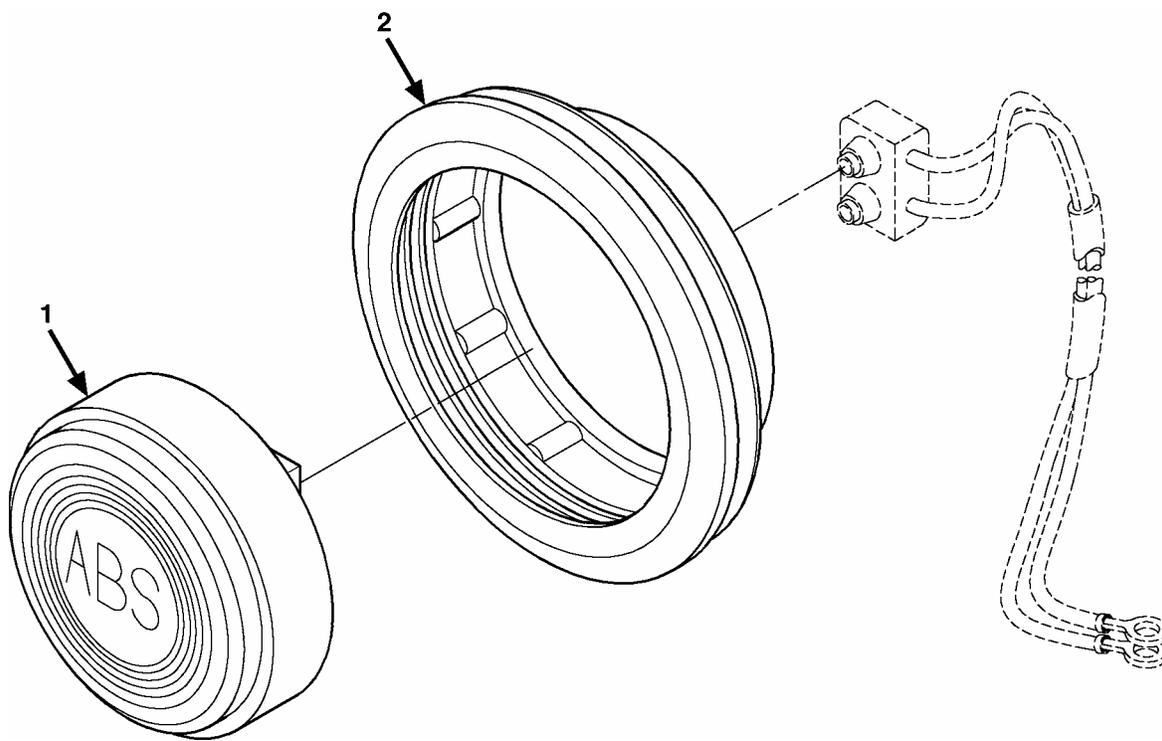


FIGURE 36. ABS WARNING LIGHT

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 42 ELECTRICAL EQUIPMENT (NOT CONTAINED IN OTHER FUNCTIONAL GROUPS)	
					GROUP 4209 SIGNALLING DEVICES	
					FIG. 36 ABS WARNING LIGHT	
1	PFOZZ	6240-01-499-4267	13548	30257Y	LAMP, INCANDESCENT PART OF KIT 30075Y	2
2	PFOZZ	5325-01-067-5438	13548	30700	GROMMET, NONMETALLIC PART OF KIT 30075Y	2
					END OF FIGURE	

TM 5-2330-325-14&P

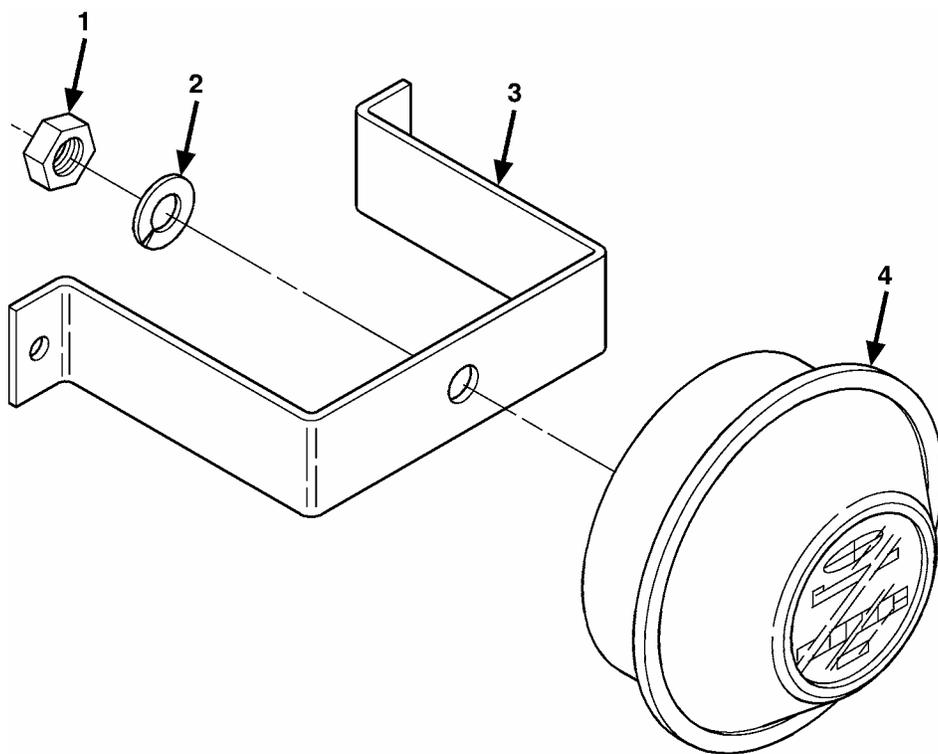


FIGURE 37. HUBODOMETER

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 47 GAGES (NON-ELECTRICAL)	
					GROUP 4701 INSTRUMENTS (SPEED AND DISTANCE)	
					FIG. 37 HUBODOMETER	
1	PAOZZ	5310-00-761-6882	96906	MS51967-2	NUT, PLAIN, HEXAGON 1/4-20	1
2	PAOZZ	5310-00-582-5965	80204	MS35338-44	WASHER, LOCK 1/4	1
3	PAOZZ	2590-01-450-0304	26151	610-0065	BRACKET, VEHICULAR	1
4	PAOZZ	6645-01-519-2220	26151	650-0619	HUBODOMETER	1

END OF FIGURE

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 94 REPAIR KITS	
					GROUP 9401 REPAIR KITS	
					FIG. KITS	
1	PAOZZ	6220-01-511-1629	13548	60075Y	LED GROMMET MOUNTING KIT, YELLOW	V
					.LAMP (1)	
					.GROMMET (1)	
					.ADAPTER PLUG (1)	
2	PAOZZ	6220-01-519-6523	13548	44030R	LED GROMMET MOUNTING KIT, RED	V
					.LAMP (1)	
					.GROMMET (1)	
					.ADAPTER PLUG (1)	
3	PAOZZ		62707	M16WD121-31X	KIT, BRAKE	V
					.BRAKE SHOE (2)	
					.PIN, GROOVED (2)	
					.WASHER, FLAT (4)	
					.RING, RETAINING (4)	
					.CLIP, RETAINER (2)	
					.SPRING, RETURN (1)	
4	PAOZZ		62707	M10KY107	KIT, CAM REBUILD	V
					.BUSHING, ANCHOR PIN (4)	
					.CAM BRACKET, LH (1)	
					.CAM BRACKET, RH (1)	
					.SCREW, SELF TAPPING (8)	
					.RING, SNAP (4)	
					.WASHER (6)	
					.SEAL, SPIDER (4)	
					.BUSHING, SPIDER (2)	
5	PAOZZ	6220-01-519-2186	13548	30075Y	ABS LIGHT GROMMET KIT	V
					.LAMP (1)	
					.GROMMET (1)	
					.PLUG (1)	

END OF FIGURE

TM 5-2330-325-14&P

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 95 GENERAL USE STANDARDIZED PARTS	
					GROUP 9501 HARDWARE SUPPLIES AND BULK MATERIAL, COMMON	
					FIG. BULK	
1	PAOZZ	4720-01-287-9313	61424	PFT-6B-RED	HOSE, NONMETALLIC	V
2	PAOZZ	4720-01-179-2939	85757	3250-0616	HOSE, NONMETALLIC	V
3	PAOZZ	4720-01-003-6706	61424	PFT-8B-BLK-100	HOSE, NONMETALLIC	V
4	PAOZZ	4720-01-519-2261	52684	A151-08	HOSE, NONMETALLIC	V
5	PAOZZ	4720-01-519-2271	52684	A101-12	HOSE, NONMETALLIC	V
6	PAOZZ	4720-01-412-1664	81300	6ABB	HOSE, NONMETALLIC	V

END OF FIGURE

**CROSS REFERENCE INDEXES
NATIONAL STOCK NUMBER INDEX**

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
4730-00-014-4027	13	4	5340-01-239-0883	8	8
5310-00-045-3299	1	2	3120-01-239-0889	8	10
5305-00-068-0511	13	1	5310-01-239-0893	18	14
4730-00-133-3196	31	11	2530-01-241-3216	8	4
5306-00-226-4822	18	18	5330-01-255-0201	18	10
4730-00-278-3888	11	5	5305-01-265-6080	8	5
5310-00-285-8124	4	7	5305-01-283-9211	32	1
3110-00-293-8997	18	2	4720-01-287-9313	BULK	1
3110-00-293-8998	18	1	4730-01-310-4665	16	22
4730-00-453-8252	16	23	5310-01-312-4960	11	2
5310-00-582-5965	37	2		13	2
3110-00-618-0248	18	8		31	13
3110-00-618-0249	18	7		34	4
5310-00-620-2486	18	12	5365-01-318-1888	14	2
4730-00-678-4749	11	9	5330-01-335-9958	18	15
5310-00-761-6882	37	1	6220-01-343-1327	1	1
5310-00-809-3078	12	2	5310-01-358-0596	23	2
5310-00-914-6028	11	1		27	2
	13	8	5305-01-389-9097	12	4
	31	14		23	5
5310-00-934-9757	1	3		27	4
4730-00-946-7823	31	12	4720-01-412-1664	BULK	6
5310-00-959-4679	18	17	5310-01-414-7141	18	19
5310-00-965-1820	4	8	5305-01-425-0119	4	6
	32	5	4730-01-449-8032	12	3
5310-00-984-3806	12	1	2590-01-450-0304	37	3
	22	5	4820-01-497-8729	14	3
	23	3	2530-01-499-3170	11	6
	27	3	4810-01-499-3407	11	3
4720-01-003-6706	BULK	3	5340-01-499-3481	11	8
5310-01-043-0596	18	11	6240-01-499-4267	36	1
5310-01-049-9051	18	13	2530-01-502-0543	11	7
5325-01-062-1009	8	1	2530-01-506-2721	18	4
5310-01-062-1531	8	2	4730-01-720-0028	6	2
5325-01-067-5438	36	2			
5325-01-067-5890	2	4			
5330-01-093-1149	18	9			
4730-01-152-5473	31	8			
4730-01-162-7054	33	4			
5325-01-163-6558	3	4			
4720-01-179-2939	BULK	2			
2530-01-217-8156	8	6			
5315-01-220-6238	8	3			
5315-01-220-6245	8	9			
5310-01-232-9769	21	5			

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**CROSS REFERENCE INDEXES
PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
30780	0102-12-8	4730-00-278-3888	11	5
30780	0103-8-6	4730-01-162-7054	33	4
63576	03S00494		7	13
63576	04P00243		7	10
63576	04S00080		7	20
63576	07S00011		7	17
63576	07S00012		7	15
63576	101835-11		34	12
63576	101870		30	5
63576	101876		22	1
63576	101888		23	1
63576	101900		29	1
63576	101900-1		29	2
63576	101900-2		29	3
63576	101900-3		29	4
63576	101900-4		29	8
63576	101900-5		29	5
63576	101900-6		29	7
63576	101900-7		29	6
63576	101911		27	1
13548	10250R		2	1
13548	10275Y		3	1
63576	10312-606-.062		33	3
			34	9
13548	10702		2	2
			3	2
62173	1078		13	3
10125	110500	4820-01-497-8729	14	3
8G781	110A-DB		31	5
			34	7
63576	120161		7	19
5A910	12258211-2	6220-01-343-1327	1	1
63576	12355		13	6
19207	12377928-2		19	2
63576	125608-1		16	3
63576	125608-13		17	14
63576	125608-2		16	6
63576	12582		15	1
63576	12591		15	1
63576	12592		15	1
63576	15002		7	16
63576	15016		7	14
63576	160040-02		26	2
63576	160055		26	1
7B735	16298SP		22	3
63576	206-606		35	5
			35	7

**CROSS REFERENCE INDEXES
PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
63576	206-M666		35	2
63576	208-608		35	11
63576	212-612		35	15
63576	22096		7	11
1S0R6	2308712		18	6
63576	24140		34	2
63576	24X30MFNL		23	4
			27	6
12195	275/70R22.5 XTY2 LRH 07		20	1
43999	2W1-16-20-32	5310-00-285-8124	4	7
63576	3/8SNUTDACROMER		29	10
63576	3/8X31/2CBDACROMER		29	9
13548	30075Y		KITS	5
1S0R6	3018503		18	5
13548	30257Y	6240-01-499-4267	36	1
13548	30700	5325-01-067-5438	36	2
62707	31624	5325-01-062-1009	8	1
26151	320-2110	5330-01-093-1149	18	9
09386	3208401	5310-01-414-7141	18	19
85757	3250-0616	4720-01-179-2939	BULK	2
26151	330-3067	5330-01-335-9958	18	15
F6193	34003		17	13
26151	340-5097		18	16
56988	371		21	6
C1988	3A16-08A06		34	11
63576	3A1608A08		31	7
13548	40700	5325-01-067-5890	2	4
13548	44030R		KITS	2
0N972	441069	4730-01-449-8032	12	3
0N972	441070		12	3
13548	44302R		2	5
1S0R6	4809001		18	3
1S0R6	4819001	2530-01-506-2721	18	4
63576	49-SN		30	3
F6193	50006		17	9
63576	506-A500		35	3
			35	8
63576	508-A500		35	12
63576	512-A500		35	16
63576	568906		34	10
10125	6002		14	4
13548	60075Y		KITS	1
13548	60275Y		3	5
13548	60700	5325-01-163-6558	3	4
26151	610-0065	2590-01-450-0304	37	3
26151	650-0619		37	4
29260	660150017		31	1

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**CROSS REFERENCE INDEXES
PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
63576	6806X6x4		34	8
81300	6ABB	4720-01-412-1664	BULK	6
63576	800010		7	1
63576	800049		7	2
63576	800055		7	3
63576	805223		7	5
63576	807155		7	12
63576	807223		7	7
63576	8291-3		16	10
63576	8291-4		16	13
63576	8291-5		16	16
63576	8291-6		16	20
63576	8291-7		16	24
63576	8291-14		17	7
63576	8291-15		17	3
63576	8296-1		35	4
			35	9
63576	8296-3		35	13
63576	8296-4		35	17
51900	8W8X543	4730-00-014-4027	13	4
63576	90264A480		31	2
39428	90580A315		22	7
39428	91247A550	5305-01-283-9211	32	1
39428	91257A634		31	10
			34	5
39428	91286A206		11	4
39428	91286A344		21	3
39428	92620A716		22	9
39428	93839A031		34	1
13548	94706		2	3
13548	94789		3	3
39428	94895A823	5310-01-232-9769	21	5
62173	9531		13	7
39428	9654K296		21	2
39428	98025A133		22	8
39428	98335A069		24	1
52684	A101-12		BULK	5
52684	A151-08		BULK	4
63576	AD66A		30	2
63576	AERKS1/8PT		21	1
73972	AS1141		10	3
73972	AS3018		10	1
73972	AS4004		10	2
7B735	AVMSE1000V		22	6
80204	B1821AH031C125N	5305-01-389-9097	12	4
			23	5
			27	4

**CROSS REFERENCE INDEXES
PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
80204	B1821BH025C100D	5305-01-425-0119	4	6
80204	B1821BH031C050N	5306-00-226-4822	18	18
80204	B1821BH038C125N	5305-00-068-0511	13	1
79470	C3159X12	4730-00-678-4749	11	9
63576	C3249X6X8		33	2
79470	C3269X12X8	4730-01-152-5473	31	8
79740	C5315X6X10		31	9
			32	3
79740	C5506X12	4730-00-133-3196	31	11
79740	C5515X12	4730-00-946-7823	31	12
79470	C5707X6		32	4
63576	CYLM3010		33	1
63576	CYLM9010		34	6
62707	D22AX603-2135		6	1
62707	D22AX603-2136		6	1
63576	DOMEX1/4		34	3
62707	EH125011		6	5
62707	EH810292		8	7
63576	F0080		25	1
63576	F0081		25	2
63576	F0285		21	7
63576	FCMAKCOGAL		29	11
63576	FENDERWASHER		21	4
63576	G2708-ASSY		28	2
63576	G2870-PART		28	1
7B735	GS-10MM-C		22	4
63576	GVWRPLATE		30	1
29260	HC-V-BC23		31	3
63576	HDW.018		7	21
63576	HDW.055		7	18
63576	HDW.342		7	9
63576	HDW.379		7	6
63576	HDW.380		7	8
63576	HDW.382		7	4
63576	HKS-001		4	4
63576	HKS-006		5	6
63576	HKS-017		5	3
63576	HKS-018		5	4
63576	HKS-019		5	14
63576	HKS-020		5	5
63576	HKS-021		5	13
63576	HKS-023		5	12
63576	HKS-024		5	7
63576	HKS-025		5	10
63576	HKS-026		5	8
63576	HKS-027		5	11
63576	HKS-028		5	9

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**CROSS REFERENCE INDEXES
PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
63576	HKS-045		4	5
63576	HKS-046		4	3
63576	HKS-047		4	2
63576	HKS-048		5	2
63576	HKS-4100		5	1
63576	HKS-KIT-4150		4	1
60038	HM212011	3110-00-293-8997	18	2
60038	HM212049	3110-00-293-8998	18	1
60038	HM218210	3110-00-618-0249	18	7
60038	HM218248	3110-00-618-0248	18	8
63576	HPGS3		31	4
62173	HT-1218		13	5
63576	L0019		30	9
63576	L0020		30	8
63576	L0085-1		30	7
63576	L0085-2		30	6
62707	M10HM115	5305-01-265-6080	8	5
62707	M10HM195		9	5
62707	M10HN100	5310-00-620-2486	18	12
62707	M10HN101	5310-01-043-0596	18	11
62707	M10HN102	5310-01-239-0893	18	14
62707	M10HN135	5310-01-062-1531	8	2
62707	M10HN151	5310-01-049-9051	18	13
62707	M10HP102	5315-01-220-6238	8	3
62707	M10HR155		9	3
62707	M10HS101	5330-01-255-0201	18	10
62707	M10HS143		9	1
62707	M10HS145		9	4
62707	M10KY107		KITS	4
62707	M10WH150-L		9	6
62707	M10WH150-R		9	6
62707	M16HD106		6	4
62707	M16HD107	3120-01-239-0889	8	10
62707	M16HH103		6	3
62707	M16WB100	2530-01-217-8156	8	6
62707	M16WD121-31X		KITS	3
62707	M16WJ102	5340-01-239-0883	8	8
62707	M16WJ104	5315-01-220-6245	8	9
62707	M16WKL25-191		9	7
62707	M16WKL25-256		9	7
62707	M16WKR25-191		9	7
62707	M16WKR25-256		9	7
62707	M16WN121-31X	2530-01-241-3216	8	4
81349	M45913/1-4CBB	5310-00-965-1820	4	8
			32	5
81349	M45913/1-5CG5C	5310-00-984-3806	12	1
			22	5

**CROSS REFERENCE INDEXES
PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
			23	3
			27	3
81349	M45913/1-6CS3	5310-00-914-6028	11	1
			13	8
			31	14
63576	M7183/8FP		17	11
63576	M7193/8MB		17	17
63576	M7323/8FP		17	16
63576	M7333/8		17	10
63576	MFW2375		23	6
			27	5
96906	MS15003-4	4730-01-720-0028	6	2
96906	MS27183-11	5310-00-809-3078	12	2
96906	MS27183-53	5310-01-358-0596	23	2
			27	2
96906	MS27183-55	5310-01-312-4960	11	2
			13	2
			31	13
			34	4
80205	MS35338-42	5310-00-045-3299	1	2
80204	MS35338-44	5310-00-582-5965	37	2
96906	MS35340-45	5310-00-959-4679	18	17
96906	MS35649-282	5310-00-934-9757	1	3
96906	MS51967-2	5310-00-761-6882	37	1
63576	NOMENCLATURE		30	4
63576	OR2BC		24	2
55242	P3/8GSP	5365-01-318-1888	14	2
55242	P3/8GST		14	5
61424	PFT-6B-RED	4720-01-287-9313	BULK	1
61424	PFT-8B-BLK-100	4720-01-003-6706	BULK	3
63576	R140-0150SP		22	2
12335	RV-3L		32	2
78500	S4005001030	4810-01-499-3407	11	3
78500	S4410328090	2530-01-502-0543	11	7
78500	S4497130300	2530-01-499-3170	11	6
78500	S899-759-815-4	5340-01-499-3481	11	8
62707	SH-162		9	2
79470	TF3609X8		31	6
78500	TP-95172		30	10
27783	TR572		19	1
93061	VS169PMTNS-6-4		16	8
93061	VS169PMTNS-6-6		16	18
			17	4
			17	8
93061	VS169PMTNS-8-8		16	12
93061	VS172PMTNS-6-6		14	1
93061	VS269NTA-8-8	4730-01-310-4665	16	22
93061	VS68NTA-8-6	4730-00-453-8252	16	23

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**CROSS REFERENCE INDEXES
PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
93061	VS68PMT-6-6		16	2
			16	19
			17	2
			17	6
93061	VS68RB-6-6		16	5
			16	9
			16	15
			17	15
63576	X8291-1		16	1
63576	X8291-2		16	4
63576	X8291-3		16	7
63576	X8291-4		16	11
63576	X8291-5		16	14
63576	X8291-6		16	17
63576	X8291-7		16	21
63576	X8291-13		17	12
63576	X8291-14		17	5
63576	X8291-15		17	1
63576	X8296-1		35	1
63576	X8296-2		35	6
63576	X8296-3		35	10
63576	X8296-4		35	14

**CROSS REFERENCE INDEXES
FIGURE AND ITEM INDEX**

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
1	1	6220-01-343-1327	5A910	12258211-2
1	2	5310-00-045-3299	80205	MS35338-42
1	3	5310-00-934-9757	96906	MS35649-282
2	1		13548	10250R
2	2		13548	10702
2	3		13548	94706
2	4	5325-01-067-5890	13548	40700
2	5		13548	44302R
3	1		13548	10275Y
3	2		13548	10702
3	3		13548	94789
3	4	5325-01-163-6558	13548	60700
3	5		13548	60275Y
4	1		63576	HKS-KIT-4150
4	2		63576	HKS-047
4	3		63576	HKS-046
4	4		63576	HKS-001
4	5		63576	HKS-045
4	6	5305-01-425-0119	80204	B1821BH025C100D
4	7	5310-00-285-8124	43999	2W1-16-20-32
4	8	5310-00-965-1820	81349	M45913/1-4CBB
5	1		63576	HKS-4100
5	2		63576	HKS-048
5	3		63576	HKS-017
5	4		63576	HKS-018
5	5		63576	HKS-020
5	6		63576	HKS-006
5	7		63576	HKS-024
5	8		63576	HKS-026
5	9		63576	HKS-028
5	10		63576	HKS-025
5	11		63576	HKS-027
5	12		63576	HKS-023
5	13		63576	HKS-021
5	14		63576	HKS-019
6	1		62707	D22AX603-2136
6	1		62707	D22AX603-2135
6	2	4730-01-720-0028	96906	MS15003-4
6	3		62707	M16HH103
6	4		62707	M16HD106
6	5		62707	EH125011
7	1		63576	800010
7	2		63576	800049
7	3		63576	800055

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**CROSS REFERENCE INDEXES
FIGURE AND ITEM INDEX**

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
7	4		63576	HDW. 382
7	5		63576	805223
7	6		63576	HDW. 379
7	7		63576	807223
7	8		63576	HDW. 380
7	9		63576	HDW. 342
7	10		63576	04P00243
7	11		63576	22096
7	12		63576	807155
7	13		63576	03S00494
7	14		63576	15016
7	15		63576	07S00012
7	16		63576	15002
7	17		63576	07S00011
7	18		63576	HDW. 055
7	19		63576	120161
7	20		63576	04S00080
7	21		63576	HDW. 018
8	1	5325-01-062-1009	62707	31624
8	2	5310-01-062-1531	62707	M10HN135
8	3	5315-01-220-6238	62707	M10HP102
8	4	2530-01-241-3216	62707	M16WN121-31X
8	5	5305-01-265-6080	62707	M10HM115
8	6	2530-01-217-8156	62707	M16WB100
8	7		62707	EH810292
8	8	5340-01-239-0883	62707	M16WJ102
8	9	5315-01-220-6245	62707	M16WJ104
8	10	3120-01-239-0889	62707	M16HD107
9	1		62707	M10HS143
9	2		62707	SH-162
9	3		62707	M10HR155
9	4		62707	M10HS145
9	5		62707	M10HM195
9	6		62707	M10WH150-R
9	6		62707	M10WH150-L
9	7		62707	M16WKR25-256
9	7		62707	M16WKL25-256
9	7		62707	M16WKR25-191
9	7		62707	M16WKL25-191
10	1		73972	AS3018
10	2		73972	AS4004
10	3		73972	AS1141
11	1	5310-00-914-6028	81349	M45913/1-6CS3
11	2	5310-01-312-4960	96906	MS27183-55

**CROSS REFERENCE INDEXES
FIGURE AND ITEM INDEX**

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
11	3	4810-01-499-3407	78500	S4005001030
11	4		39428	91286A206
11	5	4730-00-278-3888	30780	0102-12-8
11	6	2530-01-499-3170	78500	S4497130300
11	7	2530-01-502-0543	78500	S4410328090
11	8	5340-01-499-3481	78500	S899-759-815-4
11	9	4730-00-678-4749	79470	C3159X12
12	1	5310-00-984-3806	81349	M45913/1-5CG5C
12	2	5310-00-809-3078	96906	MS27183-11
12	3		0N972	441070
12	3	4730-01-449-8032	0N972	441069
12	4	5305-01-389-9097	80204	B1821AH031C125N
13	1	5305-00-068-0511	80204	B1821BH038C125N
13	2	5310-01-312-4960	96906	MS27183-55
13	3		62173	1078
13	4	4730-00-014-4027	51900	8W8X543
13	5		62173	HT-1218
13	6		63576	12355
13	7		62173	9531
13	8	5310-00-914-6028	81349	M45913/1-6CS3
14	1		93061	VS172PMTNS-6-6
14	2	5365-01-318-1888	55242	P3/8GSP
14	3	4820-01-497-8729	10125	110500
14	4		10125	6002
14	5		55242	P3/8GST
15	1		63576	12591
15	1		63576	12592
15	1		63576	12582
16	1		63576	X8291-1
16	2		93061	VS68PMT-6-6
16	3		63576	125608-1
16	4		63576	X8291-2
16	5		93061	VS68RB-6-6
16	6		63576	125608-2
16	7		63576	X8291-3
16	8		93061	VS169PMTNS-6-4
16	9		93061	VS68RB-6-6
16	10		63576	8291-3
16	11		63576	X8291-4
16	12		93061	VS169PMTNS-8-8
16	13		63576	8291-4
16	14		63576	X8291-5
16	15		93061	VS68RB-6-6
16	16		63576	8291-5

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**CROSS REFERENCE INDEXES
FIGURE AND ITEM INDEX**

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
16	17		63576	X8291-6
16	18		93061	VS169PMTNS-6-6
16	19		93061	VS68PMT-6-6
16	20		63576	8291-6
16	21		63576	X8291-7
16	22	4730-01-310-4665	93061	VS269NTA-8-8
16	23	4730-00-453-8252	93061	VS68NTA-8-6
16	24		63576	8291-7
17	1		63576	X8291-15
17	2		93061	VS68PMT-6-6
17	3		63576	8291-15
17	4		93061	VS169PMTNS-6-6
17	5		63576	X8291-14
17	6		93061	VS68PMT-6-6
17	7		63576	8291-14
17	8		93061	VS169PMTNS-6-6
17	9		F6193	50006
17	10		63576	M7333/8
17	11		63576	M7183/8FP
17	12		63576	X8291-13
17	13		F6193	34003
17	14		63576	125608-13
17	15		93061	VS68RB-6-6
17	16		63576	M7323/8FP
17	17		63576	M7193/8MB
18	1	3110-00-293-8998	60038	HM212049
18	2	3110-00-293-8997	60038	HM212011
18	3		1S0R6	4809001
18	4	2530-01-506-2721	1S0R6	4819001
18	5		1S0R6	3018503
18	6		1S0R6	2308712
18	7	3110-00-618-0249	60038	HM218210
18	8	3110-00-618-0248	60038	HM218248
18	9	5330-01-093-1149	26151	320-2110
18	10	5330-01-255-0201	62707	M10HS101
18	11	5310-01-043-0596	62707	M10HN101
18	12	5310-00-620-2486	62707	M10HN100
18	13	5310-01-049-9051	62707	M10HN151
18	14	5310-01-239-0893	62707	M10HN102
18	15	5330-01-335-9958	26151	330-3067
18	16		26151	340-5097
18	17	5310-00-959-4679	96906	MS35340-45
18	18	5306-00-226-4822	80204	B1821BH031C050N
18	19	5310-01-414-7141	09386	3208401

**CROSS REFERENCE INDEXES
FIGURE AND ITEM INDEX**

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
19	1		27783	TR572
19	2		19207	12377928-2
20	1		12195	275/70R22.5 XTY2 LRH 07
21	1		63576	AERKS1/8PT
21	2		39428	9654K296
21	3		39428	91286A344
21	4		63576	FENDERWASHER
21	5	5310-01-232-9769	39428	94895A823
21	6		56988	371
21	7		63576	F0285
22	1		63576	101876
22	2		63576	R140-0150SP
22	3		7B735	16298SP
22	4		7B735	GS-10MM-C
22	5	5310-00-984-3806	81349	M45913/1-5CG5C
22	6		7B735	AVMSE1000V
22	7		39428	90580A315
22	8		39428	98025A133
22	9		39428	92620A716
23	1		63576	101888
23	2	5310-01-358-0596	96906	MS27183-53
23	3	5310-00-984-3806	81349	M45913/1-5CG5C
23	4		63576	24X30MFNL
23	5	5305-01-389-9097	80204	B1821AH031C125N
23	6		63576	MFW2375
24	1		39428	98335A069
24	2		63576	OR2BC
25	1		63576	F0080
25	2		63576	F0081
26	1		63576	160055
26	2		63576	160040-02
27	1		63576	101911
27	2	5310-01-358-0596	96906	MS27183-53
27	3	5310-00-984-3806	81349	M45913/1-5CG5C
27	4	5305-01-389-9097	80204	B1821AH031C125N
27	5		63576	MFW2375
27	6		63576	24X30MFNL
28	1		63576	G2870-PART
28	2		63576	G2708-ASSY
29	1		63576	101900
29	2		63576	101900-1
29	3		63576	101900-2
29	4		63576	101900-3
29	5		63576	101900-5

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**CROSS REFERENCE INDEXES
FIGURE AND ITEM INDEX**

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
29	6		63576	101900-7
29	7		63576	101900-6
29	8		63576	101900-4
29	9		63576	3/8X31/2CBDACROMER
29	10		63576	3/8SNUTDACROMER
29	11		63576	FCMAKCOGAL
30	1		63576	GVWRPLATE
30	2		63576	AD66A
30	3		63576	49-SN
30	4		63576	NOMENCLATURE
30	5		63576	101870
30	6		63576	L0085-2
30	7		63576	L0085-1
30	8		63576	L0020
30	9		63576	L0019
30	10		78500	TP-95172
31	1		29260	660150017
31	2		63576	90264A480
31	3		29260	HC-V-BC23
31	4		63576	HPGS3
31	5		8G781	110A-DB
31	6		79470	TF3609X8
31	7		63576	3A1608A08
31	8	4730-01-152-5473	79470	C3269X12X8
31	9		79740	C5315X6X10
31	10		39428	91257A634
31	11	4730-00-133-3196	79740	C5506X12
31	12	4730-00-946-7823	79740	C5515X12
31	13	5310-01-312-4960	96906	MS27183-55
31	14	5310-00-914-6028	81349	M45913/1-6CS3
32	1	5305-01-283-9211	39428	91247A550
32	2		12335	RV-3L
32	3		79470	C5315X6X10
32	4		79470	C5707X6
32	5	5310-00-965-1820	81349	M45913/1-4CBB
33	1		63576	CYLM3010
33	2		63576	C3249X6X8
33	3		63576	10312-606-.062
33	4	4730-01-162-7054	30780	0103-8-6
34	1		39428	93839A031
34	2		63576	24140
34	3		63576	DOMEX1/4
34	4	5310-01-312-4960	96906	MS27183-55
34	5		39428	91257A634

**CROSS REFERENCE INDEXES
FIGURE AND ITEM INDEX**

FIG.	ITEM	STOCK NUMBER	CAGE	PART NUMBER
34	6		63576	CYLM9010
34	7		8G781	110A-DB
34	8		63576	6806X6X4
34	9		63576	10312-606-.062
34	10		63576	568906
34	11		C1988	3A16-08A06
34	12		63576	101835-11
35	1		63576	X8296-1
35	2		63576	206-M666
35	3		63576	506-A500
35	4		63576	8296-1
35	5		63576	206-606
35	6		63576	X8296-2
35	7		63576	206-606
35	8		63576	506-A500
35	9		63576	8296-1
35	10		63576	X8296-3
35	11		63576	208-608
35	12		63576	508-A500
35	13		63576	8296-3
35	14		63576	X8296-4
35	15		63576	212-612
35	16		63576	512-A500
35	17		63576	8296-4
36	1	6240-01-499-4267	13548	30257Y
36	2	5325-01-067-5438	13548	30700
37	1	5310-00-761-6882	96906	MS51967-2
37	2	5310-00-582-5965	80204	MS35338-44
37	3	2590-01-450-0304	26151	610-0065
37	4		26151	650-0619
BULK	1	4720-01-287-9313	61424	PFT-6B-RED
BULK	2	4720-01-179-2939	85757	3250-0616
BULK	3	4720-01-003-6706	61424	PFT-8B-BLK-100
BULK	4		52684	A151-08
BULK	5		52684	A101-12
BULK	6	4720-01-412-1664	81300	6ABB
KITS	1		13548	60075Y
KITS	2		13548	44030R
KITS	3		62707	M16WD121-31X
KITS	4		62707	M10KY107
KITS	5		13548	30075Y

APPENDIX D

BASIC ISSUE ITEMS (BII) LISTS

Section I. INTRODUCTION

D-1. SCOPE.

This appendix lists Basic Issue Items (BII) for the M870A3 Trailer (MHET) to help you inventory items required for safe and efficient operation.

NOTE

There are no Components of End Item (COEI).

D-2. GENERAL.

Section III. Basic Issue Items. These are the minimum essential items required to place the trailer in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the trailer during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of end item.

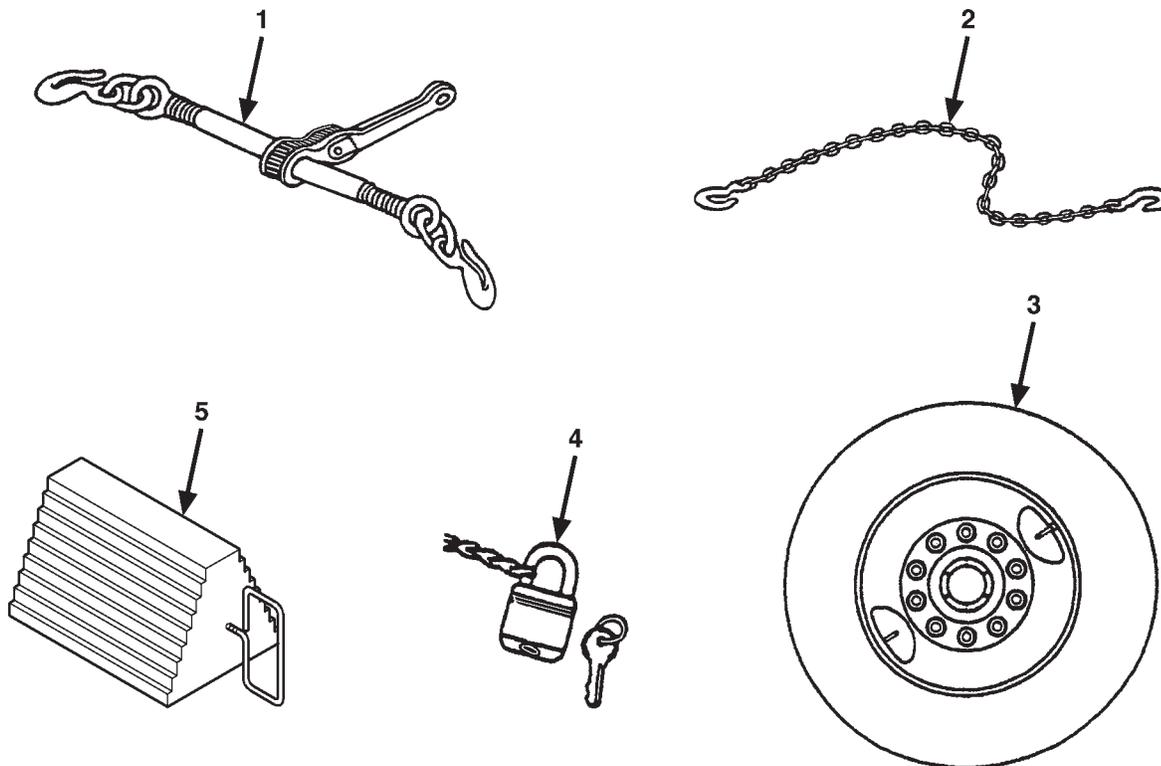
D-3. EXPLANATION OF COLUMNS.

Below is an explanation of columns found in the tabular listings:

- a. **Column (1) - Illustration Number (Illus Number).** This column indicates the number of the illustration that shows the item.
- b. **Column (2) - National Stock Number.** Indicates the National Stock Number (NSN) assigned to the item and will be used for requisitioning purposes.
- c. **Column (3) - Description and Usable on Code.** Not Applicable.
- d. **Column (4) - Unit of Issue (U/I).** Indicates how the item is issued for the National Stock Number shown in Column (2).
- e. **Column (5) - Quantity Required (Qty/Rqd).** Indicates the quantity of the item authorized to be used with the equipment.

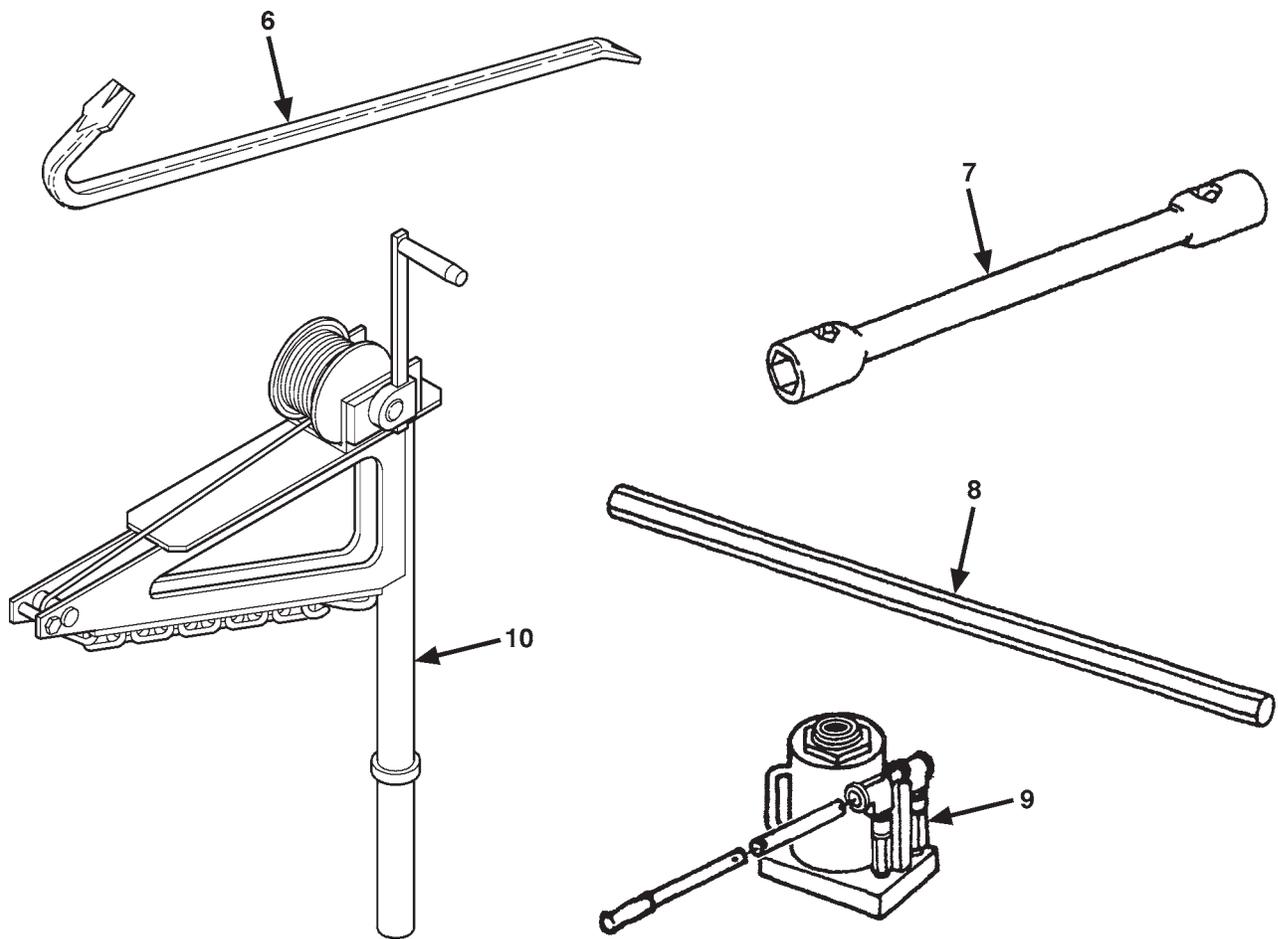
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Section II. BASIC ISSUE ITEMS



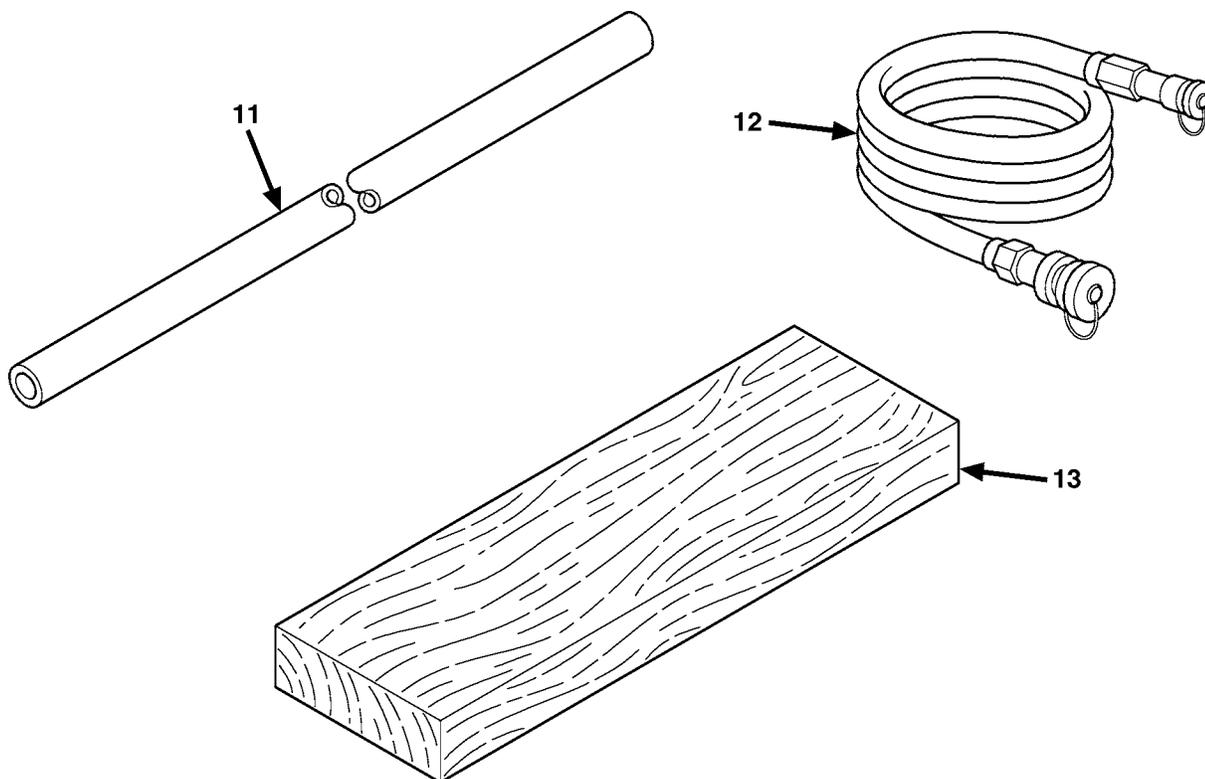
(1) Illus Number	(2) National Stock Number	(3) Description (CAGEC) Part Number	(4) Usable On Code	(5) U/I	(6) Qty Rqd
1	3990-01-213-1746	LOAD BINDER (27404) R-45		EA	8
2		CHAIN ASSEMBLY (39428) 1/2 X 20BC Grade 7		EA	8
3		SPARE TIRE ASSEMBLY		EA	1
4	5340-00-682-1505	PADLOCK SET MS100W		EA	3
5	2540-00-678-3469	CHOCK, WHEEL (98255) SW11979A		EA	2

SECTION III. BASIC ISSUE ITEMS



(1) Illus Number	(2) National Stock Number	(3) Description (CAGEC) Part Number	(4) Usable On Code	(5) U/I	(6) Qty Rqd
6		CROWBAR (39428) 5992A6		EA	1
7	5120-00-293-1289	WRENCH, SOCKET (19207) 41W3838-30		EA	1
8	5120-00-243-2419	HANDLE, TRUCK WRENCH (19204) 41H1541-10		EA	1
9		JACK , BOTTLE 15 Ton TM1500		EA	1
10		CRANE, SPARE TIRE (63576) 160061		EA	1

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(1) Illus Number	(2) National Stock Number	(3) Description (CAGEC) Part Number	(4) Usable On Code	(5) U/I	(6) Qty Rqd
11		CHEATER BAR, Hollow, 1-3/8 in. OD, 4 ft Long (19207)		EA	1
12		HOSE ASSEMBLY, Quick disconnect (19207)		EA	2
13		WOOD BLOCK, 2-3/8 in. X 7-1/2 in. X 24 in. (19207)		EA	1

APPENDIX E ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

E-1. SCOPE.

This appendix lists additional items you are authorized for the support of the M870A3 (MHET) Trailer.

E-2. GENERAL.

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

E-3. EXPLANATION OF COLUMNS.

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in the alphabetical sequence by item name under the type document (i.e. CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you. If item required differs for different models of this equipment, the model is shown under the "usable on" heading in the description column.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description CAGE and Part Number	(3) U/M	(4) Qty. Auth
NA	Hydraulic Interface Kit (19207) Resk 19434	ea	1

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APPENDIX F

EXPENDABLE AND DURABLE ITEMS LIST

Section I. INTRODUCTION

Paragraph Number	Paragraph Title	Page Number
F-1.	Scope	F-1
F-2.	Explanation of Columns	F-1

F-1. SCOPE.

This appendix lists expendable and durable items you will need to operate and maintain the M870A3 Trailer (MHET). 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*.

F-2. EXPLANATION OF COLUMNS.

- a. **Column (1) - Item Number.** This number is assigned to the entry in the listing and is referenced in the "Initial Setup" of maintenance paragraphs or narrative instructions to identify the material needed (e.g., Dry cleaning solvent, item 19, Appendix F).
- b. **Column (2) - Level.** This column identifies the lowest level of maintenance that requires the listed item.
 - C - Operator/Crew
 - O - Unit Maintenance
 - F - Direct Support Maintenance
 - H - General Support Maintenance
- c. **Column (3) - National Stock Number.** This is the National Stock Number assigned to the item. Use it to request or requisition the item.
- d. **Column (4) - Item Name, Description, Commercial and Government Entity Code (CAGEC), Part Number.** 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.
- e. **Column (5) - Unit of Measure (U/M)/Unit of Issue (U/I).** This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue as shown in the Army Master Data File (AMDF), requisition the lowest unit of issue that will satisfy your requirements.

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Section II. EXPENDABLE AND DURABLE ITEMS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, (CAGEC), Part Number	(5) U/M UI
1	O	8040-01-024-6991	ADHESIVE: Locite, Minute Bond 312 (05972) 31231 50 Milliliter Bottle	ml
2	O	8135-00-171-0930	BARRIER MATERIAL: Greaseproof, Waterproofed Flexible (81349) MIL-B-121 100 Yard Roll	yd
3	O	7920-00-061-0038	BRUSH: Scrub (81348) H-B-1490-7-P1	ea
4	O	7920-00-900-3577	BRUSH: Wire (17987) 3577	ea
5	O	7930-00-899-9534	COMPOUND: Dishwashing, Hand (83421) 7930-00-899-9534 5 Gallon Can	gl
6	O	8030-01-054-0740	COMPOUND: Sealing, Pipe (05972) 592-31 50 Cubic Centimeter Tube	cc
7	O	8030-01-418-9006	CORROSION PREVENTIVE (09137) WD-40 Box of 12 Aerosol Cans, 9 Ounces Each	oz
8	O	7930-00-282-9699	DETERGENT: General Purpose, Liquid (83421) 7930-00-282-9699 1 Gallon Can	gl
9	O	3439-00-255-9935	FLUX: Soldering, TY1 Form A (58536) A-A-51145 1 Pound Can Fluid, Hydraulic	lb

Section II. EXPENDABLE AND DURABLE ITEMS LIST (Continued)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, (CAGEC), Part Number	(5) U/M UI
10	C	9150-01-197-7693 9150-01-197-7688 9150-01-197-7690 9150-01-197-7689 9150-01-197-7692 9150-01-197-7691	GREASE: Automotive and Artillery, GAA (81349) MIL-G-10924 14 Ounce Cartridge 2 1/4 Ounce Tube 1 3/4 Pound Can 6 1/2 Pound Can 35 Pound Pail 120 Pound Drum	oz oz lb lb lb lb
11	O	9150-00-076-1574	GREASE: Ball Bearing (73219) 9150-00-076-1574 5 Pound Can	lb
12	C	9150-00-402-4478 9150-00-402-2372 9150-00-491-7197	OIL: Lubricating, Internal Combustion Engine, Arctic, OEA (81349) MIL-L-46167 1 Quart Can 5 Gallon Can 55 Gallon Drum	qt gl gl
13	C	9150-00-183-7807	OIL: Lubricating, Internal Combustion Engine, OE/HDO 10 (81349) MIL-PRF-2104G 1 Gallon Can	gl
14	C	9150-00-186-6681 9150-00-188-9858 9150-00-189-6729	OIL: Lubricating, Internal Combustion Engine, OE/HDO 30 (81349) MIL-L-2104 1 Quart Can 5 Gallon Can 55 Gallon Drum	qt gl gl
15	C	7920-00-205-1711	RAG: Wiping (64067) 7920-00-205-1711 50 Pound Bale	lb

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Section II. EXPENDABLE AND DURABLE ITEMS LIST (Continued)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, (CAGEC), Part Number	(5) U/M UI
16	F	8040-00-833-9563	SEALANT: Adhesive, Silicone Rubber (94833) 52498 5 Ounce Tube	kt
17	O	6850-01-092-3550	Silicone Compound: 13.2 Fluid Ounce Aerosol Can (75037) 1609	ea
18	O		SOLDER: Lead Alloy (81348) QQ-S-571	
		3439-00-247-6921	1 Pound Bar	lb
		3439-00-265-7102	1 Pound Spool/Roll	lb
19	F		SOLVENT-DETERGENT: Cleaning Compound (66724) PF Degreaser	
		7930-01-328-2030	5 Gallon Can	gl
20			TAG: Marker (64067) 9905-00-537-8954	
		9905-00-537-8954	50 Each	ea
21	O		TAPE: Antiseize, 1/2 Inch Width (81755) P5025-2R	
		8030-00-889-3535	260 Inch Roll	in
22	O		TAPE: Duct, 2 Inch Width (39428) 1791K70	
		5640-00-103-2254	60 Yard Roll	yd
23	F		TAPE: Pressure Sensitive Adhesive, Masking, Flat, 1 Inch Width (76892) MANSON1-2-2	
		5970-00-682-8536	60 Yard Roll	yd
24	O		Tie, Wire: Strap, Tiedown, Electrical Components, Black Nylon (06383) PLT3S-C-0	
		5975-01-379-4997	100 Each	hd
25	O		TUBING: Heat Shrinkable (81349) M23053/5-106-0	
		5970-00-815-1295		ft

APPENDIX G

ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I. INTRODUCTION

G-1. SCOPE.

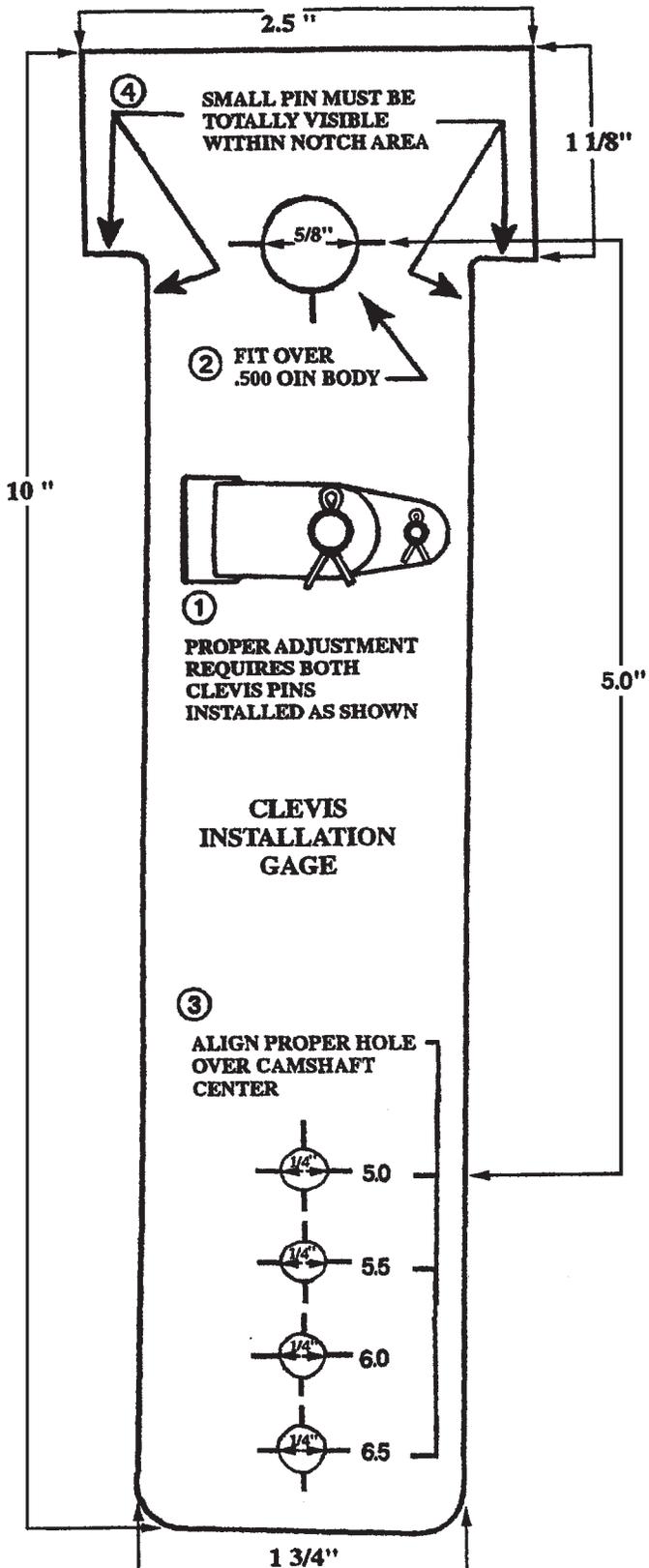
- a. This appendix includes complete instructions for making items authorized to be manufactured or fabricated.
- b. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the paragraph which covers fabrication criteria.
- c. All bulk materials needed for manufacture of an item are listed by Part Number and CAGEC or specification number.
- d. Only items requiring complicated manufacturing instructions are illustrated.

Table G-1. Manufactured Items Part Number Cross-Reference Index.

Part Number	Name	Paragraph
CIG	Clevis Installation Gage	G-2

Section II. MANUFACTURING INSTRUCTIONS

G-2. CLEVIS INSTALLATION GAGE.



1. Fabricate from cardboard, National Stock Number 9310-00-641-4851, part number, 73, (CAGEC 74322).
2. Cut to dimensions shown.

APPENDIX H

TORQUE VALUES FOR THREADED FASTENERS

Paragraph Number	Paragraph Title	Page Number
H-1.	Scope	H-1
H-2.	General	H-1
H-3.	Torque Limits	H-1
H-4.	How to Use Torque Table	H-2
H-5.	Tightening Metal Fasteners.	H-4
H-6.	Fastener Size and Thread Pattern	H-5
H-7.	Fastener Grade	H-6

H-1. SCOPE.

This appendix lists standard torque values, as shown in Table H-1, and provides general information for applying torque. Special torque values and tightening sequences are indicated in the maintenance procedures for applicable components.

H-2. GENERAL.

- a. Always use the torque values listed in Table H-1 when the maintenance procedure does not give a specific torque value.
- b. Unless otherwise indicated, standard torque tolerance shall be $\pm 10\%$.
- c. Torque values listed are based on clean, dry threads. Reduce torque by 10% when engine oil is used as a lubricant. Reduce torque by 20% if new plated capscrews are used.
- d. Capscrews threaded into aluminum may require reductions in torque of 30% or more of Grade 5 capscrew torque. Capscrew threaded into aluminum must also attain two capscrew diameters of thread engagement.

CAUTION

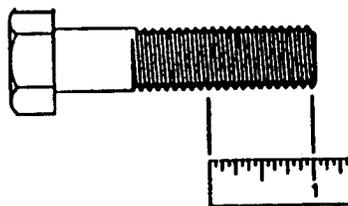
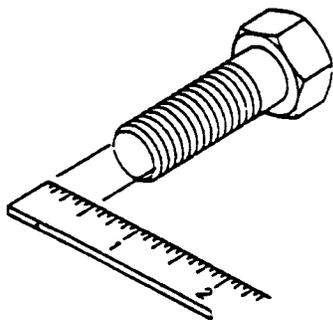
If replacement capscrews are of higher grade than originally supplied, use torque specifications for the original. This will prevent equipment damage due to overtorquing.

H-3. TORQUE LIMITS.

Table H-1 (p. H-3) lists dry torque limits, which are used on screws that do not have lubricants applied to threads. Table H-2 (p. H-4) lists wet torque limits, which are used on screws that have high-pressure lubricants applied to threads.

H-4. HOW TO USE TORQUE TABLE

- a. Measure the diameter of the screw to be installed.
- b. Count the number of threads per inch or use a pitch gage.
- c. Under the heading "SIZE" in Table H-1, look down the left-hand column until the diameter of screw to be installed is found (there will usually be two lines beginning with the same size).
- d. In the second column under "SIZE", find the number of threads per inch that matches the number of threads counted in step 2.



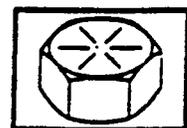
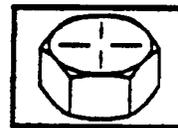
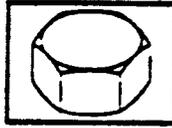
- e. To find the grade of the screw that is to be installed, match the markings on the head to the correct picture of CAPSCREW HEAD MARKINGS on the table. Manufacturer's marks may vary. These are all SAE Grade No. 5 (3 lines).
- f. Look down the column under the picture found in step 5 until the torque limit in foot-pounds for the diameter and threads per inch of the screw being installed is found.

CAPSCREW HEAD MARKINGS

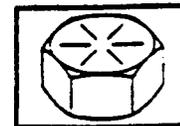
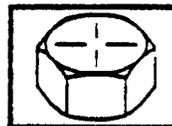
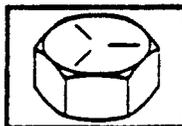
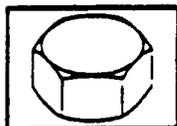


H-4. HOW TO USE TORQUE TABLE (Continued)

Table H-1. Torque Limits for Dry Fasteners

SAE CAPSCREW HEAD
MARKINGS

SIZE			TORQUE							
			SAE GRADE No. 1 or 2		SAE GRADE No. 5		SAE GRADE No. 6 or 7		SAE GRADE No. 8	
DIA. (IN.)	THREADS PER INCH	MM	FOOT- POUNDS	N•m	FOOT- POUNDS	N•m	FOOT- POUNDS	N•m	FOOT- POUNDS	N•m
1/4	20	6.35	5	6.78	8.0	10.85	10	13.56	12	16.27
1/4	28	6.35	6	8.14	10.0	13.56	—	—	14	18.98
5/16	18	7.94	11	14.92	17.0	23.05	19	25.76	24	32.52
5/16	24	7.94	13	17.63	19.0	25.76	—	—	27	36.61
3/8	16	9.53	18	24.41	31.0	42.04	34	46.10	44	59.66
3/8	24	9.53	20	27.12	35.0	47.46	—	—	49	66.44
7/16	14	11.11	28	37.97	49.0	66.44	55	74.58	70	94.92
7/16	20	—	30	40.68	55.0	74.58	—	—	78	105.77
1/2	13	12.70	39	52.88	75.0	101.70	85	115.26	105	142.38
1/2	20	—	41	55.60	85.0	115.26	—	—	120	162.78
9/16	12	14.28	51	69.16	110.0	149.16	120	162.72	155	210.18
9/16	18	—	55	74.58	120.0	162.72	—	—	170	230.52
5/8	11	15.88	63	85.43	150.0	203.40	167	226.45	210	284.76
5/8	18	—	95	128.82	170.0	230.52	—	—	240	325.44
3/4	10	19.05	105	142.38	270.0	356.12	280	379.68	375	506.50
3/4	16	—	115	155.94	295.0	400.02	—	—	420	596.52
7/8	9	22.23	160	216.96	375.0	536.62	440	596.64	605	820.38
7/8	14	—	175	237.30	435.0	599.85	—	—	675	915.30
1	8	25.40	235	318.66	590.0	800.04	660	694.96	910	1233.96
1	14	—	250	338.00	660.0	894.96	—	—	990	1342.44
1 1/8	—	25.58	—	—	800.0	1064.80	—	—	1280	1735.70
					880.0	1193.30	—	—	1444	1952.80
1 1/4	—	31.75	—	—	—	—	—	—	1820	2467.90
									2000	2712.00
1 3/8	—	34.93	—	—	1460.0	1979.80	—	—	2300	3227.30
					1680.0	2278.10	—	—	2720	3688.30
1 1/2	—	38.10	—	—	1940.0	2630.60	—	—	3160	4285.00
					2200.0	2963.20	—	—	3560	4827.40

H-4. HOW TO USE TORQUE TABLE (Continued)**Table H-2. Torque Limits for Wet Fasteners****SAE CAPSCREW HEAD MARKINGS**

SIZE			TORQUE							
			SAE GRADE No. 1 or 2		SAE GRADE No. 5		SAE GRADE No. 6 or 7		SAE GRADE No. 8	
DIA. (IN.)	THREADS PER INCH	MM	FOOT- POUNDS	N•m	FOOT- POUNDS	N•m	FOOT- POUNDS	N•m	FOOT- POUNDS	N•m
1/4	20	6.35	4.9	6.10	7.2	9.76	9.0	12.00	10.8	14.64
1/4	28	6.35	5.4	7.33	9.0	12.20	—	—	12.6	17.08
5/16	18	7.94	9.9	13.34	15.3	22.54	17.1	23.18	21.6	29.27
5/16	24	7.94	11.7	15.87	17.1	23.18	—	—	24.3	32.95
3/8	16	9.53	16.2	21.97	27.9	37.84	30.6	41.49	39.6	53.69
3/8	24	9.53	18.0	24.41	31.5	42.71	—	—	44.1	59.80
7/16	14	11.11	25.2	34.17	44.1	59.80	49.5	67.12	63.0	85.42
7/16	20	—	27.0	36.61	49.5	67.12	—	—	70.2	95.19
1/2	13	12.70	35.1	47.58	67.5	91.53	76.5	103.73	94.5	128.14
1/2	20	—	36.9	50.04	76.5	103.73	—	—	106.0	146.50
9/16	12	14.29	45.9	62.24	99.0	134.24	108.0	146.45	139.5	189.16
9/16	18	—	45.5	67.12	106.0	146.45	—	—	153.0	207.47
5/8	11	15.88	56.7	76.89	135.0	183.06	150.3	203.80	189.0	256.28
5/8	18	—	85.5	115.94	153.0	207.47	—	—	216.0	296.90
3/4	10	19.05	94.5	128.14	243.0	329.51	252.0	341.71	337.5	457.65
3/4	16	—	103.5	140.35	265.5	360.20	—	—	378.0	536.87
7/8	9	22.23	144.0	195.26	355.5	482.06	396.0	536.98	544.5	738.34
7/8	14	—	157.5	213.57	391.5	530.87	—	—	607.5	823.77
1	8	25.40	211.5	286.79	531.0	720.04	594.0	805.46	819.0	1110.56
1	14	—	225.0	305.10	594.0	805.46	—	—	891.0	1208.20
1-1/8	—	25.58	—	—	720.0	976.32	—	—	1152.0	1562.13
					792.0	1073.97			1296.0	1757.52
1-1/4	—	31.75	—	—	—	—	—	—	1638.0	2221.11
									1800.0	2440.80
1-3/8	—	34.93	—	—	1314.0	1781.82	—	—	2142.0	2904.57
					1512.0	2050.29			2448.0	3319.47
1-1/2	—	38.10	—	—	1746.0	2367.54	—	—	2844.0	3856.50
					1980.0	2684.88			3204.0	4344.66

H-5. TIGHTENING METAL FASTENERS

When torquing a fastener, select a torque wrench whose range (Table H-3, p. H-5) fits the required torque value. A torque wrench is most accurate from 25 percent to 75 percent of its stated range. A torque wrench with a stated range of 0 to 100 will be most accurate from 25 to 75 lb-ft. The accuracy of readings will decrease as you approach 0 lb-ft or 100 lb-ft. The ranges in Table H-3 are based on this principle.

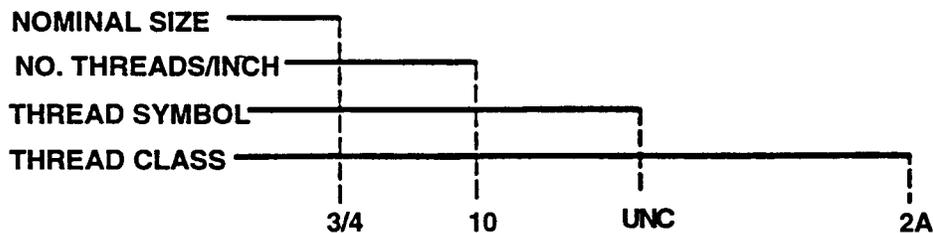
H-5. TIGHTENING METAL FASTENERS (Continued)

STATED RANGE	MOST EFFECTIVE RANGE
0-600 lb-ft (0-813.60 Nm) 0-170 lb-ft (0-230.52 Nm) 15-75 lb-ft (61.02-101.70 Nm)	150-450 lb-ft (203.40-610.20 Nm) 44-131 lb-ft (59.67-177.64 Nm) 30-60 lb-ft (40.68-81.36 Nm)

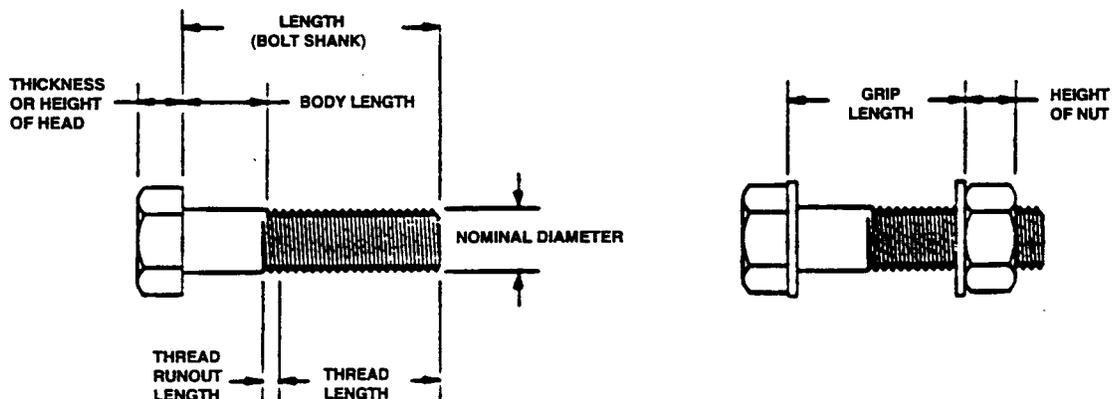
H-6. FASTENER SIZE AND THREAD PATTERN

Threaded fasteners are categorized according to diameter of the fastener shank. Thread styles are divided into broad groups, the two most common being coarse (Unified Coarse-UNC) and fine (Unified Fine-UNF). These groups are defined by the number of threads per inch on the bolt shanks. In addition, threads are categorized by thread class (Table H-4), which is a measure of the degree between threads of bolt or screw (external threads) and threads of the attaching nut or tapped hole (internal threads of the attaching nut or tapped hole) (internal threads). The most common thread class for bolts and screws is Class 2.

EXTERNAL	INTERNAL	INTERNAL
1A	1B	LOOSE FIT
2A	2B	MEDIUM FIT
3A	3B	CLOSE FIT



NOTE: Unless followed with -LH (e.g., 3/4-10 UNC-2A-LH), threads are right-hand.



H-7. FASTENER GRADE.

In addition to being classified by thread type, thread fasteners are also classified by material. The most familiar fastener classification system is the SAE grading system (Table H-5).

Table H-5. SAE Screw and Bolt Markings	
SCREWS	BOLTS
SAE GRADE 2 NO MARKING	SAE GRADE 6 4 RADIAL DASHES 90° APART
SAE GRADE 3 2 RADIAL DASHES 180° APART	SAE GRADE 7 5 RADIAL DASHES 72° APART
SAE GRADE 5 3 RADIAL DASHES 120° APART	SAE GRADE 8 6 RADIAL DASHES 60° APART

Markings on Hex Locknuts

GRADE A - No Marks
GRADE B - 3 Marks
GRADE C - 6 Marks

GRADE A - No Marks
GRADE B - Letter B
GRADE C - Letter C

GRADE A - No Notches
GRADE B - One Notch
GRADE C - Two Notches

APPENDIX I LUBRICATION INSTRUCTIONS

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

I-1. GENERAL.

NOTE

These instructions are mandatory.

- a. The M870A3 trailer (MHET) must receive lubrication with approved lubricants at recommended intervals in order to be mission-ready at all times.
- b. The Lubrication Chart shows lubrication points, items to be lubricated, the required lubricants, and recommended intervals for lubrication. Any special lubrication instructions required for specific components are contained in the NOTES section of the chart.
- c. The KEY provides information needed to select the proper lubricant for various temperature ranges and uses, and identifies the capacities and intervals.
- d. Recommended intervals are based on normal conditions of operation, temperature, and humidity. When operating under extreme conditions, lubricants should always be changed more frequently. When in doubt, notify your supervisor.

I-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 lubrication equipment clean and ready for use.
- b. Maintain a record of lubrication performed and report any problems noted during lubrication. Refer to DA Pam 738-750 for maintenance forms and procedures to record and report any findings.
- c. Keep all external parts of equipment not requiring lubrication free of lubricants. After lubrication, wipe off excess lubricant to prevent accumulation of foreign matter.
- d. Refer to FM 9-207 for lubrication instructions in cold weather.

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**TRAILER, MEDIUM HEAVY EQUIPMENT TRANSPORTER
M870A3
(NSN 2330-01-458-2061)**

The Lubrication Chart is for operator/crew (C) and Unit Maintenance (O). Lubrication intervals (on-condition or hard time) are based on normal operation. Lubricate more during constant use and less during inactive periods. Use correct grade of lubricant for seasonal temperature expected.

For equipment under manufacturer's warranty, hard time oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g., longer than usual operating hours, extended idling periods, extreme dust, etc.)

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

Clean area around lubrication points with dry cleaning solvent (item 19, Appendix F) or equivalent before lubricating equipment. After lubrication, wipe off excess lubricant to prevent accumulation of foreign matter.

Before you start your lubrication service:

ALWAYS

- a. Clean area around lubrication point before lubricating.
- b. Use the Lubrication Chart as your guide.

NEVER

- a. Use wrong type/grade lubricant.
- b. Use too much lubricant

Lubrication Chart Key - M870A3 Trailer

LUBRICANTS	EXPECTED TEMPERATURE *			INTERVALS
	Above +32°F (Above 0°C)	+40°F to -10°F (+4°C to -23°C)	0°F to -65°F (-18°C to -54°C)	
GAA (MIL-G-10924) Grease, Automotive and Artillery	GAA	GAA	GAA	W -- Weekly M -- Monthly A -- Annual
GO/GOS Lubricating Oil, Multi- purpose or subzero	GO	GO	GOS	
PL-M/PL-S Lubricating Oil, Preservative	PL-M	PL-S	PL-S	
OE/HDO Lubricating Oil	OE/HDO 30	OE/HDO 10	OEA/AP6-PD-1	

* For Arctic operations, refer to FM 9-207.

NOTES:

WARNING

Solvents can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If solvent gets on skin or clothing, wash immediately with soap and water.

NOTE

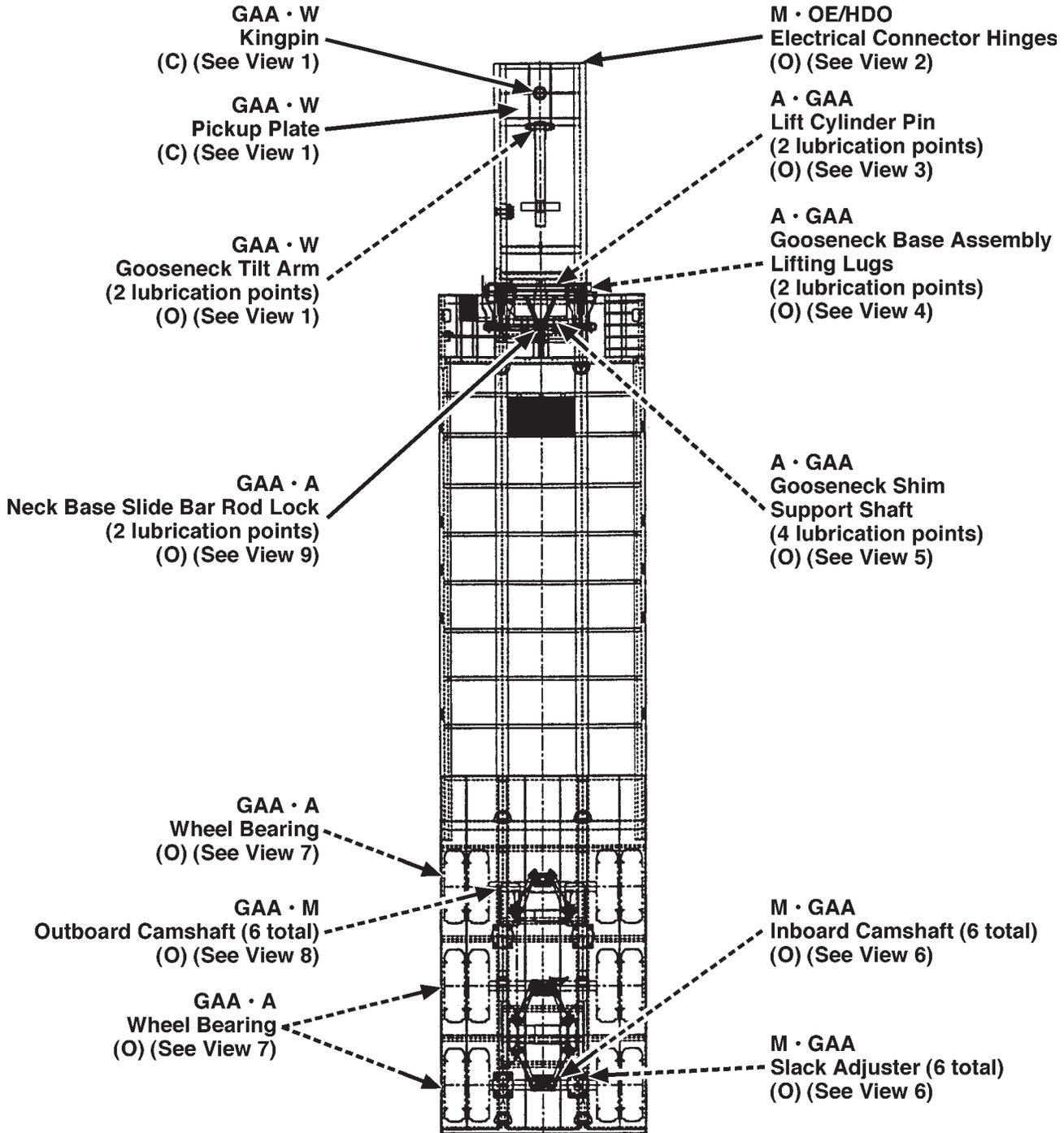
When conducting the first annual inspection, wheel bearings must be thoroughly cleaned prior to packing with GAA approved grease because wheel bearings may have been packed by the manufacturer with other than GAA approved grease. Ref. pg. I-6, View 3.

In sandy areas, halve the lubrication intervals.

LUBRICATION CHART-M870A3 TRAILER (MHET)

LUBRICANT · INTERVAL

INTERVAL · LUBRICANT

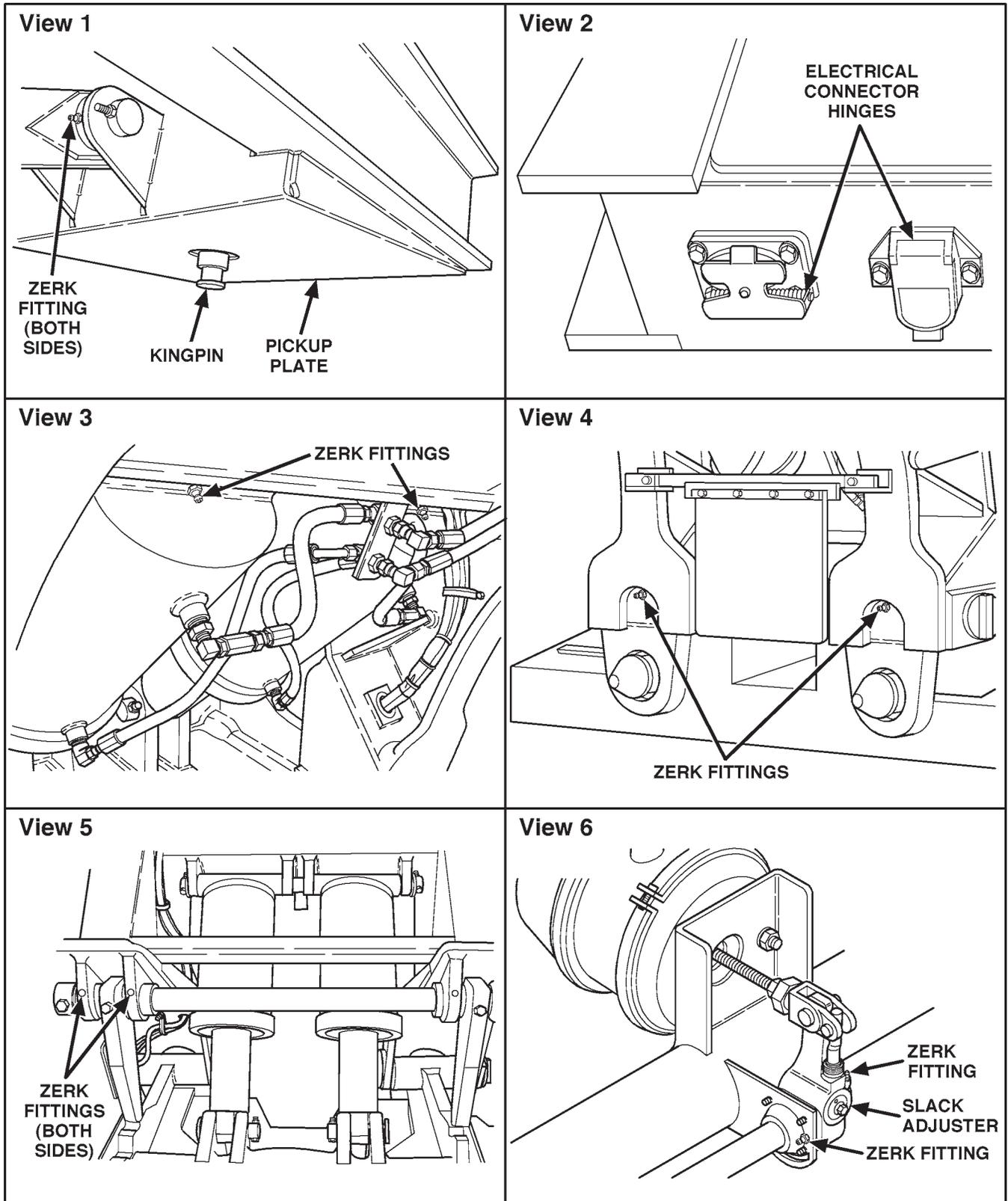


NOTE

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

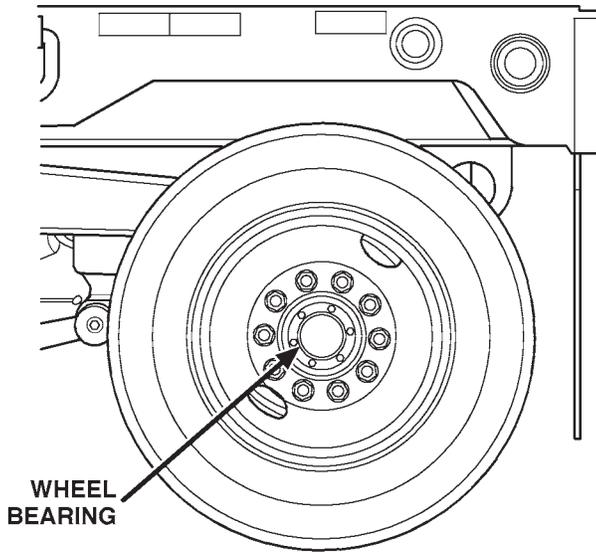
INTERVAL	MAN-HOURS*
W	1.0
M	1.2
A	9.5

* The man-hour time specific is the time you need to do all the services prescribed.

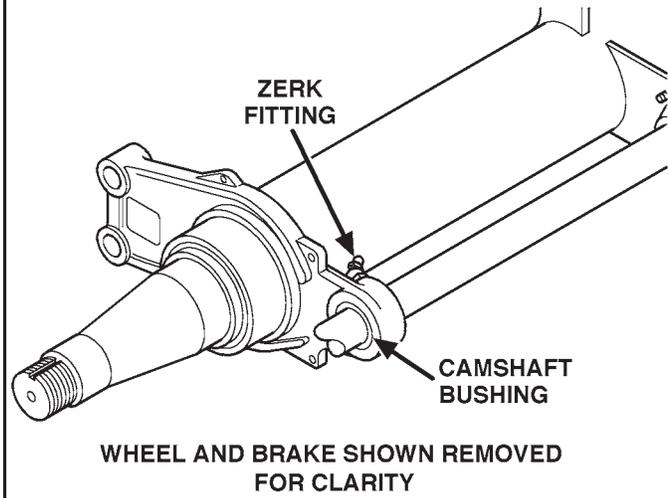


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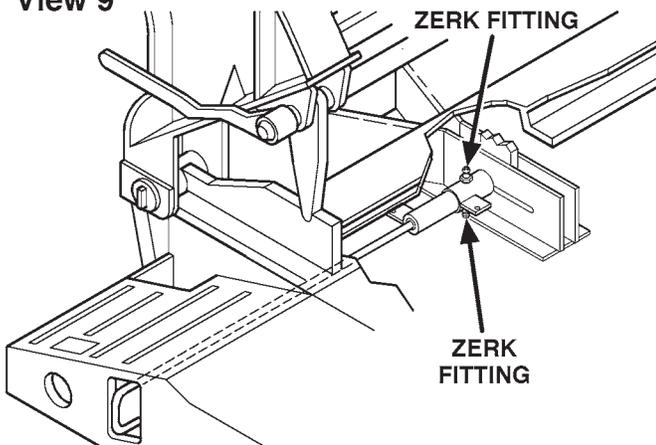
View 7



View 8



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TM 5-2330-325-14&P

By Order of the Secretary of the Army:

Official:



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Secretary of the Army*

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*General, United States Army
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PUBLICATION/FORM NUMBER TM 9-2320-302-20	DATE 28 May 2001	TITLE Unit Maintenance Manual for the M915A3 Tractor Truck
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ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
	0035 00-1	Initial Setup				Item number for Oil, Lubricating is not correct.

SAMPLE

* Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE Johnny Wilson, E-5, MOTOR SGT	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION DSN 867-7967	SIGNATURE
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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (<i>Provide exact wording of recommended changes, if possible.</i>)	
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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

- 1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
- 1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches
- 1 Kilometer = 1,000 Meters = 0.621 Miles

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 = 1,000 Cu Millimeters = 0.06 Cu Inches
- 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

- 1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
- 1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

- Degrees Fahrenheit (F) = $^{\circ}\text{C} \cdot 9 \div 5 + 32$
- Degrees Celsius (C) = $\text{F}^{\circ} - 32 \cdot 5 \div 9$
- 212° Fahrenheit is equivalent to 100° Celsius
- 90° Fahrenheit is equivalent to 32.2° Celsius
- 32° Fahrenheit is equivalent to 0° Celsius

WEIGHTS

- 1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1,000 Grams = 2.2 Lb
- 1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Millimeters	25.4
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	0.4536
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		
Millimeters	Inches	0.03937
Centimeters	Inches	0.3937
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	2.2046
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

