TM 9-2330-326-14&P

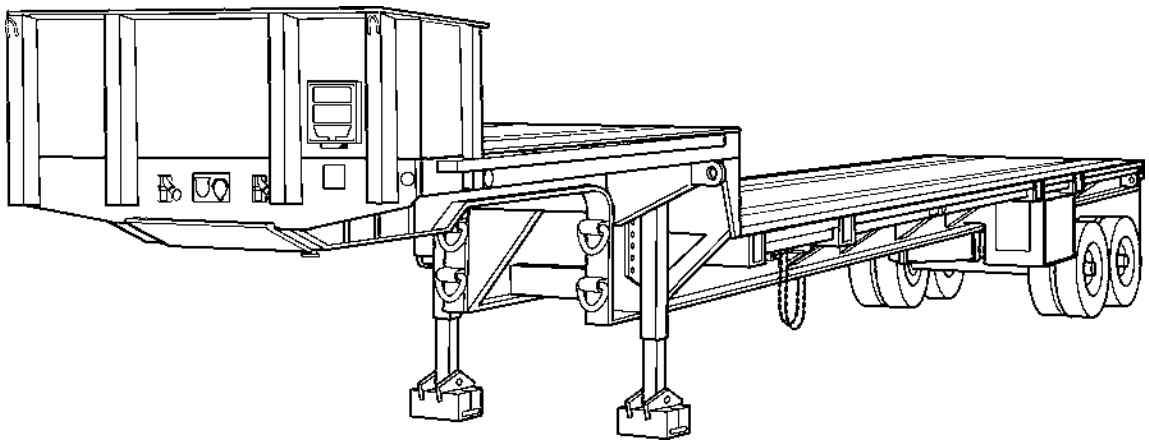
TECHNICAL MANUAL

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

FOR

SEMITRAILER, TACTICAL, DROP DECK BREAKBULK/CONTAINER TRANSPORTER, 22-1/2 TON, M871A3

NSN 2330-01-458-6865



This manual supersedes TM 9-2330-326-14&P, dated 20 May 2003, and all changes.

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HEADQUARTERS, DEPARTMENT OF THE ARMY

FEBRUARY 2006

ACKNOWLEDGEMENT FOR USE OF COMMERCIAL MANUALS IN THE M871A3 COTS TM MANUAL

FONTAINE TRAILER MILITARY PRODUCTS
P. O. BOX 719
100 FONTAINE ROAD
PRINCETON, KENTUCKY 42445
TOLL FREE: 1-877-462-3866
(270) 365-1177
FAX: (270) 365-1171
www.fontainetrailer.net

HOLLAND HITCH CO.
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HOLLAND, MI 49423
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3656 PARAGON DR.
COLUMBUS, OH 43278

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Email POC: stillinghast@weldoninc.com


WARNING

The M871A3 Semitrailer has not been tested to transport wheeled or tracked vehicle or vehicles. Use of this Semitrailer to haul a vehicle or vehicles may result in injury or death to personnel if procedures outlined in page 1-10, paragraph 1-12 are not followed.


WARNING

The M871A3 Semitrailer should always have the wheels chocked, with or without a load, during coupling or uncoupling to prime mover and when parked. Failure to chock the wheels may result in injury or death to personnel.

WARNING

A 20-ft. (6.1 m) ISO container loaded against the drop deck panel will overload the fifth wheel rating of the M1088 by 4,500 lbs (2041 kg). The ISO should be loaded to the rear of the M871A3 to prevent stability/loading problems with the M1088. Failure to heed this warning may result in injury or death to operating personnel.

WARNING

The spare tire and wheel weigh 179 lbs. (81.2 kg). This 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. Failure to do so could result in injury.

WARNING

Ensure the landing leg scissors assemblies retaining (locking) pins do not present a contact hazard to personnel. The pins can extend outward and cause injury.

WARNING

The M915 Series and M1088, for example, are capable of less than a 90-degree turning radius. At this angle there will be interference between the tractor and the semitrailer. Reference the tractor's Operator's Manual to find out if the tractor being used is capable of this interference. Failure to do so could result in injury.

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.

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.

WARNING

Wear protective goggles if you are under semitrailer and need to operate drain valves. Avoid the air stream. Failure to do so could result in personal injury.

WARNING

The triennial (3 years) 36,000 miles check/service is based on normal operation. Conditions identified such as hot brake drums, leakage/seepage of spindle/hub grease, brake lock-up, wheel end noise/damage, and impact damage will require inspection and repair be performed when the incident occurs, not at service interval. May cause injury to personnel or damage to the equipment/

A hot brake can cause serious burns. Exercise caution before attempting to touch brake drum after use. Radiated heat will be felt before brake drum is touched. May cause injury to personnel or damage to the equipment/

WARNING

Air brake chambers (all) must be caged before working on the brake system to prevent serious injury to personnel and damage to equipment. Wheels must be chocked.

No disassembly of air brake chamber is authorized. Before any work is performed on the spring brake system, chock the wheel front and rear to prevent semitrailer movement. When inspecting or caging air brake chambers, do not position yourself in front of, or in line with, the chamber. Serious injury or death may occur if this warning is not followed.

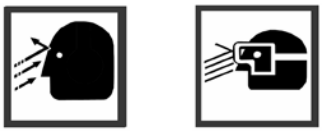
Discarded air brake chambers must be safely and properly disposed of. They should be disarmed prior to disposal to prevent present and future injury. (See Appendix H-20.)

WARNING

Do not allow brake lining to wear to the point that the rivets touch the drum. May cause brake failure, injury to personnel and damage to the equipment.

WARNING

Do not use air pressure or a steel bristle brush to clean cones and rollers. Use kerosene or diesel fuel to clean bearings. Do not use gasoline. Do not rotate bearings using compressed air, as this will damage the polished surfaces. Bearing failure can cause injury.



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.

WARNING

Disconnect all electrical power before performing any maintenance on the electrical system. Failure to do so could result in injury to personnel.

WARNING

Jack must be positioned directly under axle to prevent slippage. Direct all personnel to stay clear of vehicle when vehicle is supported in the air. Failure to do so could result in serious injury and damage to equipment.

To prevent shifting of trailer, floor jack should be used only on a hard, level surface. Use ground boards (Paragraph 6-24), if necessary.

WARNING

Axles and trunnion are heavy and require two or more persons to lift.

WARNING

Do not use teflon grease or molly-disulfide or white grease lubricant for lubricating slack adjusters. These lubricants will affect the Automatic Slack Adjuster (ASA) causing premature clutch failure, resulting in injury to personnel and damage to equipment.

WARNING

Service Air uses a blue seal, Emergency Air uses a red seal. Do not cross Service/Emergency air lines at glad-hands. Make sure they are hooked up correctly to meet brake air pressure requirements.

WARNING

For fifth wheel heights of 62 inches, as on the M1088, it is recommended that the ground boards are placed under the extended, and locked, scissors landing leg feet on the M871A3. Attempting to couple the tractor with the semitrailer below the fifth wheel height may damage the equipment. Ground boards should be used both on soft and hard surfaces to preclude personnel injury and equipment damage.

WARNING

Clean and check service brakes and all brake components for wear and damage. Replace worn or damaged parts. At Triennial Service replace all springs, pins, rollers, clips and bushings on each axle end. May cause injury to personnel and damage to the equipment.

12V/24V COVERTER:

CAUTION

To preclude damage to the semitrailer's converter box and electrical system either the 12 volt (7 pin) OR the 24 volt (12 pin) cable must be plugged into a converter box, only one or the other, *NOT* both. The converter box allows either 12 volts OR 24 volts to be utilized from the tractor, *not* both at the same time.

ASBESTOS FIBER EXPOSURE

WARNING

The following procedures for servicing brakes are recommended to reduce exposure to ASBESTOS FIBER dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

HAZARD SUMMARY

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20, or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

RECOMMENDED WORK PRACTICES

Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

DANGER: ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

Respiratory Protection. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.

Procedures for Servicing Brakes. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.

As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.

If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.

Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.

NEVER use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. NEVER use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.

Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. NEVER use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the filter with care.

Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink, or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.

Waste Disposal. Dispose of discarded linings, used rags, cloths, and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state, and local regulations on waste disposal.

REGULATORY GUIDANCE

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

NON-ASBESTOS FIBER EXPOSURE

WARNING

The following procedures for servicing brakes are recommended to reduce exposure to NON-ASBESTOS dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

HAZARD SUMMARY

Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers, and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some medical experts believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers, and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

RECOMMENDED WORK PRACTICES

Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.

Respiratory Protection. OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m³ as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease from inhaling non-asbestos dust.

Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. Even when exposures are expected to be within maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.

Procedures for Servicing Brakes. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.

As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.

If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.

Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.

NEVER use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. NEVER use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.

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TM 9-2330-326-14&P

LIST OF EFFECTIVE PAGES

NOTE: This manual supersedes TM 9-2330-326-14&P dated 20 MAY 03 (Original)

Date of issue for the Revision is: 24 February 2006

This revision implements Army Maintenance Transformation and changes the Maintenance Allocation Chart (MAC) to support Field and Sustainment Maintenance.

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 34 AND TOTAL NUMBER OF PAGES IS 540 (46 Blank), CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Title……..	0
Acknowledgements (Inside Front Cover), a to j.....	0
i to viii ……..	0
1-1 to 1-10 (10 pgs)……..	0
2-1 to 2-12/2-14 Blank) (14 pgs)….....	0
3-1 to 3-12 (12 pgs).....	0
4-1 to 4-13/4-14(Blank) (14 pgs).....	0
5-1 to 5-2 (2 pgs).....	0
6-1 to 6-96 (96 pgs)……..	0
7-1 to 7-21/7-22 Blank (22 pgs).....	0
A-1 to A-3/4 (Blank) (4 pgs).....	0
B-1 to B-17/B-18 Blank (18 pgs).....	0
C-1 to C-10 (10 pgs).....	0
D-1 to D-3/D-4 Blank (4 pgs).....	0
E-1 to E-4 (4 pgs).....	0
F-1 to F-8 (8 pgs).....	0
G-1 to G-12 Blank (12 pgs).....	0
H-1 to H-177/H-178 Blank (178 pgs)……..	0
I-1 to I-94 (94 pgs).....	0
I-95 to I-98 (Vender List) (4 pgs).....	0

*Zero in this column indicates an original page.

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TECHNICAL MANUAL

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

FOR

SEMITRAILER, TACTICAL,
DROP DECK BREAKBULK/CONTAINER
TRANSPORTER, 22-1/2 TON, M871A3

NSN 2330-01-458-6865

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. 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 (Recommended Changes to Publications and Blank Forms), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.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 AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or E-mail your letter, DA Form 2028 direct to: AMSTA-LC-CI/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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HEADQUARTERS, DEPARTMENT OF THE ARMY

24 February 2006

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Chapter 6 Unit Maintenance (Cont.)

Chapter 7 Direct Support and General Support Maintenance

Appendix H Supplemental Information (Cont.) **Page**

HOW TO USE THIS MANUAL

SCOPE

This manual provides you with the information you will need to operate and maintain the M871A3 Semitrailer.

MANUAL CONTENT

Front Matter

There are general warnings that start on the first right-hand page immediately after the cover that should be read before performing any maintenance on the Semitrailer.

The title block page includes the reporting of errors and recommending improvements statement.

The table of contents lists the chapters and appendixes in this manual.

Chapters/Appendices

Chapter 1:	provides general information, location and description of major components, equipment data, and warranty coverage.
Chapter 2:	provides Operator instructions.
Chapter 3:	provides Operator/Crew PMCS.
Chapter 4:	provides Unit PMCS.
Chapter 5:	provides Unit troubleshooting.
Chapter 6:	provides Unit maintenance instructions.
Chapter 7:	provides Direct Support and General Support maintenance instructions.
Appendix A:	provides the publications referenced in this manual.
Appendix B:	provides the MAC.
Appendix C:	provides lubrication instructions.
Appendix D:	provides the COEI and BII lists.
Appendix E:	provides the AAL.
Appendix F:	provides the expendable and durable items.
Appendix G	provides converter box maintenance instructions.
Appendix H:	provides supplemental information.
Appendix I:	provides the RPSTL, CAGE codes, vendor list, NSN cross-reference index, and part number cross-reference index.

Alphabetical Index

An index is located at the end of this manual that provides an alphabetical listing of information and components/assemblies contained in this manual.

MANUAL CONTENT (Cont.)

DA Form 2028-2

DA Form 2028-2 is used to report errors and to recommend improvements for the tasks in this manual.

Metric Conversion Chart

The metric conversion chart converts English measurements to metric equivalents. Measurements in this manual are provided in both English and metric units.

Warnings, Cautions, and Notes

You must read and understand this manual BEFORE operating the M871A3 Semitrailer.

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

WARNING

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

CAUTION

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

NOTE

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

Warnings and cautions appear immediately preceding the step to which they pertain. It is important to read and thoroughly understand the warnings and/or cautions before beginning maintenance. Notes may precede or follow the steps to which they pertain, depending on what makes the most sense.

CHAPTER 1

INTRODUCTION

1-1. TYPE OF MANUAL

This manual is a Commercial Off-The-Shelf (COTS) Technical Manual (TM).

1-2. MODEL NUMBER AND EQUIPMENT NAME

M871A3 22-1/2 Ton, Drop Deck Breakbulk/Container Transporter Tactical Semitrailer.

1-3. TRANSPORTABILITY

NOTE

Specific tiedown transportability data for rail, truck, and fixed wing air movement can be found in MTMCTEA Pam 55-19, MTMCTEA Pam 55-20, and MTMCTEA Pam 55-24, respectively.

1. The M871A3 is transportable in a C-141 at the load master's discretion dependant on bulkhead height and height of cargo.

NOTE

The bulkhead is removable.

2. The M871A3, loaded/unloaded, is transportable by C-5 and C-5A fixed wing aircraft.
3. The M871A3, loaded/unloaded, is transportable by C-17 fixed wing aircraft.
4. The M871A3, loaded/unloaded, is transportable by rail and with ISO container (CONUS).
5. The M871A3, loaded/unloaded, is transportable by ship.
6. The M871A3, loaded/unloaded, is able to be loaded/off loaded onto roll-on/roll-off ships using 15 degree ramps.
7. The M871A3, loaded/unloaded, is transportable by barge as dictated by the length of the semitrailer and barge load capacity.
8. The M871A3, unloaded, is transportable by rotary wing aircraft. Reference FM 10-450-5.
9. The M871A3, unloaded, is transportable in C-130 fixed wing aircraft,

1-4. OPERATING UNDER UNUSUAL CONDITIONS

1. Extreme Cold.

   Startup:

   a. Be careful when placing the semitrailer in motion after a shutdown. Congealed lubricants can cause part failure.

   b. Tires and ground boards may freeze to the ground or tire flat spotting may occur if tires are under inflated.

1-4 OPERATING UNDER UNUSUAL CONDITIONS (Cont.)

c. Brake shoes may freeze to the brake drums and need to be heated to prevent damage to mating surfaces.

d. Refer to FM 9-207 and FM 21-305 for special instructions on driving hazards in snow and ice that may be encountered during extreme cold weather conditions.

Shutdown:

a. For short periods, park in a sheltered spot out of the wind; for longer shutdown periods, if high, dry ground is not available, prepare a footing of planks or brush.

b. Remove all buildup of ice and snow as soon as possible after shutdown.

c. Cover and shield the semitrailer with canvas covers if available. Keep the ends of covers off the ground to keep them from freezing to the ground. Drain air/moisture from air tanks.

2. Extreme Heat.

a. Refer to TB 43-0239 and FM 90-3 for maintenance and operations, respectively, under desert conditions.

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

c. Park the semitrailer where it will get maximum protection from heat, sun, and dust.

3. Rainy or Humid Conditions.

Frequently inspect, clean, and lubricate inactive equipment to prevent rust and fungus accumulation.

4. Operation in Salt Water Areas.

Salt water will cause rapid corrosion of metal parts. After operation, wash the semitrailer with fresh water. Clean, inspect, and lubricate equipment frequently.

5. Operation in Snow.

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

6. Operation in Mud or Sand.

CAUTION

Do not tow, pull, push, or lift semitrailer using rear bumper. This may damage equipment.

a. If wheels sink into mud, you may need to jack up the mired wheels and put planking or matting under them.

b. After operation in mud or sand clean, inspect and lubricate the semitrailer.

7. Operation on Rocky Terrain.

a. Before driving over stumps or rocks, make sure the semitrailer can clear them. Such objects can damage parts on the underside of the semitrailer. Beware of low hanging tree limbs that can damage cargo.

b. Be sure you have a serviceable spare tire because there is a greater chance of tire puncture.

1-4 OPERATING UNDER UNUSUAL CONDITIONS (Cont.)

8. Fording.

CAUTION

- **Do not exceed fording depth of 30 inches or damage to the equipment may result.**
- **Do not submerge ECU.**

Before Fording:

a. Before entering water, check bottom surface conditions. If bottom surface is too soft, do not ford.

b. Protect cables and terminals by spraying with ignition insulation compound.

c. ABS ECU must not be submerged in water (42 inches, ECU height).

After Fording:

a. After coming out of water, apply brakes a few times to help dry out brake linings. Make sure semitrailer brakes are working before driving at normal speeds.

b. Drain or dry all areas where water has collected, if mission allows.

c. Lubricate all unpainted surfaces. See lubrication chart, Appendix C, if mission allows.

d. Zerk fittings and hubs should not be affected by fording. Oil can points should be lubricated as specified by LO, Appendix C, if mission allows. There is no need to tear down wheel ends or clean and re-pack bearings.

1-5 GENERAL INSTRUCTIONS FOR CORROSION PROTECTION OF THE M871A3 SEMITRAILER

To insure a long operational life for the M871A3 Semitrailer the following is present to assist maintenance personnel. This is not meant to supercede or replace current support operations or authorized publications.

The M871A3 production Semitrailer is **not** undercoated at Fontaine Trailer Company prior to delivery. Worldwide operations present many environmental impacts on the semitrailer from salt water to ice/snow melt chemicals. Areas of conflict have their own ways of ventilating and damaging the semitrailer. All these impacts add up to shortened operational life.

TIPS:

a. Keep the semitrailer clean, which will allow for more complete inspection of welds and components.

b. Use low-pressure water, cleaning detergent and brushes for cleaning.

c. Flush out undercarriages, suspensions, wheel ends with clean low-pressure water if operations in a salt environment, especially fording, as soon as the mission allows.

d. Keep debris out of wheel ends and twistlock pockets.

e. Drain air tanks after operation to keep moisture and debris out of air system.

f. Annually clean deck wood and roll/spray on boiled linseed oil or a good commercial UV wood protectorate. Apply to top areas of upper and lower deck wood.

g. Protect all exterior areas from rust, clean off rust, prime metal and paint area.

h. Application of 10 wt. Oil at oil can points as specified by LO will help protect components and insure they will work when needed.

i. Keep bolster plate drain holes free of grease and debris so they drain/air out freely.

1-5. GENERAL INSTRUCTIONS FOR CORROSION PROTECTION OF THE M871A3 SEMITRAILER (Cont.)

CORROSION PROTECTION:

If undercarriage is damaged or requires repair, undercoat the undercarriage, frame, fillets, gussets or any other unprotected area re-coat with the following:

Rust Inhibitor:

NSN 8030-01-414-7423	(12)	16 oz. Bottles
NSN 8030-01-414-8947		5 gallon container
NSN 8030-01-414-7430		55 gallon drum
NSN 8030-01-414-1413		55 gallon drum with applicator and instruction video

This rust inhibitor is safe and contains no CFCs or hazmat. It will not bind hinges. It will not harm painted surfaces (to include CARC), plastics, rubber, glass or wiring. So if your aim with the applicator is not good do not worry about it. Clean it off CARC since it may add a shine/glare, which may wreck your whole day under certain conditions.

KINGPIN AND BOLSTER PLATE:

a. If the kingpin is replaced inspect the interior structure for rust.
b. Clean and protect the interior with rust inhibitor, do not plug up bolster plate drain holes.
c. Make sure all welds are protected both inside and out.
d. Inspect the kingpin and bolster plate in accordance with PMCS requirements.

PROTECTION SCHEDULING:

It is a good idea to periodically take a look at the undercoating especially after off-road operations. The following is suggested:

a. Monthly take a look at the condition of the undercoating.
b. Annually re-apply the rust inhibitor to insure the semitrailer is protected.
c. If operating in a salt or road chemical environment you should inspect/protect these areas as soon as possible.

1-6. EQUIPMENT DATA

a. Semitrailer:

Length, Bump Stops to Front Provisions	506.0 inches (42 ft 2 inches)
Width	97.1 inches (8 feet 1-1/8 inches)
Upper Deck Height	78.5 inches (6 feet 6-1/2 inches)
Drop Deck Height	55.5 inches (4 feet 7-1/2 inches)
Bulkhead Height	25.3 inches (2 feet 1-3/8 inches)
Top of Bulkhead to Ground	103.8 inches (8 feet 7-7/8 inches)
Bolster Plate to Ground at Level	62.5 inches (5 feet 2-1/2 inches)
Weight Empty	17,660 pounds
Maximum Payload	45,000 pounds
Combined Weight, Trailer with Maximum Payload	62,660 pounds
Center of Gravity from Front Bulkhead	297 inches (24 feet 9 inches)
Maximum Angle of Departure (loaded)	15 degrees
Ground Clearance at Axles	12 inches (approx.)
Fording Depth	30 inches
Kingpin Diameter	2 inches
Front of Trailer to Kingpin Center	24 inches
Kingpin Center to Center Line of Landing Gear	85 inches (7 feet 1 inch)

1-6. EQUIPMENT DATA (Cont.)

a. Semitrailer (Cont.):

Bolster Plate to Ground Height (loaded)	58 inches (4 feet 10 inches)
Bolster Plate to Ground Height (empty)	62 inches (5 feet 2 inches)
Angle of Departure (angle between rear tires and under ride protection)	46.8 degrees
Maximum Trailer Speed	55 mph
Side Slope Stability (maximum)	15%
Roll On/Roll Off (RO/RO)	15 degrees

b. Bridge Classification:

Empty with Prime Mover	Class 14
Empty w/o Prime Mover	Class 6
Cross-Country Loaded with Prime Mover	Class 25
Cross-Country Loaded w/o Prime Mover	Class 18
Highway Loaded with Prime Mover	Class 30
Highway Loaded w/o Prime Mover	Class 22

c. Hubodometer:

Manufacturer	Stemco
Accuracy	± 2%
Factory Calibration	Calibrated to Mid Life of Tire
Available	Factory Preset Mileage on Replacement Hubodometer
Model (part number)	650-0627

d. Wheel: Hub-Piloted

Manufacturer	Motor Wheel
Quantity (including spare)	9
Size	22.5 x 8.25
Material	Steel
Stud Holes	10
Type	1 Piece
Flange Nut Torque	450–500 lb-ft.
Type of Nut	Flange, All Right-Hand Threads
Lug Nut Size	1-5/16 inches

e. Tires:

Manufacturer	Michelin
Quantity (including spare)	9
Type	Tubeless Radial
Size	255/70R 22.5
Ply Rating (actual)	16 Ply
Load-Range	H
Cold Inflation Pressure (all)	115 psi
Tire Weight	95.7 pounds
Diameter	36.7 inches
Loaded Section Width	11.0 inches
Tread Depth New	18/32 (9/16 inch) (14.3 mm)

1-6. EQUIPMENT DATA (Cont.)

f. Mission Profile Maximum Speeds:

Highway 55 mph	25%
Secondary 35 mph	60%
Trails 15 mph	10%
Rough 10 mph	5%

g. Axles:

Manufacturer	Meritor
Number of Axles	2 (dual tandem)
Tube Diameter	5 inches
Tube Wall Thickness (heavy)	5/8 inch
Model Number	TQ4671Q2405TOA
Series	167H715ABS
Load Capacity (DOT rating)	20,000 pounds
Beam Capacity	25,000 pounds
Spindle, Center to Spindle Center Between Axles	49 inches
Track, Center to Center of Dual Wheels	71-1/2 inches

h. Brakes:

Manufacturer	Meritor
Series	Q Series
Size	16-1/2 x 7 inches
Type	Non-Asbestos
Activation	Air
System Air Pressure	100–125 psi
Lining and Shoe	Assembled

i. Brake Drum:

Manufacturer	Webb
Material	Sintered Iron
Drum Inside Diameter	16-1/2 inches

j. Wheel Bearings:

Manufacturer	Timken
Part Number, Inner (cone & rollers)	HM218248
Part Number, Outer (cone & rollers)	HM212049

k. Grease Seal:

Manufacturer	Scotseal (Chicago Rawhide)
Lip Style	46305 Classic, Triple Sealing Lips
Installation	Tool with Centering Plug Driven into Hub Bore, Pressfit.

l. "S" Cams

Manufacturer	Meritor
Length	24-9/64 inches
No. of Splines	28
Shaft Diameter	1-1/2 inch
Head Bushing Journal Size	1.62 inch
Application	16-1/2-inch Brakes

1-6. EQUIPMENT DATA (Cont.)

m. Hubs:

Manufacturer	Webb
No. of Studs	10
Type	ABS with Tone Ring Mounted

n. Automatic Slack Adjusters:

Manufacturer	Haldex
Series	409-10683
Model	5-1/2 inch
No. of Splines	28

o. Air Brake Chambers

Manufacturer	Holland/Anchorlok
Stroke	3.00 inches
Weight	20.2 pounds each
Type	Long Stroke
Part Number	166407
Model Number	3030-GC-LS
System Air Pressure	
Minimum:	100 psi
Maximum:	115 psi

p. Landing Legs:

Manufacturer	Binkley (Parts Supplier: Fontaine Trailer Co.)
Shoe Type	Locking Scissors (Fontaine)
Model	50,000 No Lube
Crank Radius	16-1/2 inch
Operation	2 Speed (high and low)
Retracted Height	40 inches
Extended Height	57.5 inches
Lifting Capacity (static)	170,000 pounds
Retracted Ground to Shoe Height	24 inches
Side Load per Leg	Up to 20,000 lb/leg
Operational Temperature	Range -65° to 250°F
Enhanced Grease System	Cranking Effort Reduced 10–15%
High Gear Ratio	4.5 to 1
Low Gear Ratio	34.4 to 1

q. Suspension/Trunnion:

Manufacturer	Hutchens Industries
Type	Single Point
Model	H 900-50
Springs	7 per pack, 2 packs
Leaf Width	5 inches
Capacity	50,000 pounds
Axle SpacingSprung:	51-1/2 inches
Trunnion Centers (TC)	22-1/8 inches
Spring Centers (SC)	38 inches
Trunnion/Axle Configuration	Overslung (OS) Axles Overslung (OS) Trunnion
Trunnion Hanger Height	4-1/2 inches
Trunnion Bushing	Polyurethane P/N: 20248-01 Full Orbitration

1-6. EQUIPMENT DATA (Cont.)

r. Converter/Main Electrical System:

CAUTION

To preclude damage to the Semitrailers converter box and electrical system either the 12 volt (7 pin) OR the 24 volt (12 pin) cable must be plugged into a converter box, only one or the other, *NOT* both. The converter box allows either 12 volts OR 24 volts to be utilized from the tractor, *not* both at the same time.

Manufacturer of Converter Box	Weldon Technologies, Inc.
Converter Box (military)	Solid State
Type of Ground System	Negative
System Voltage	12/24 volts
Tractor/Semitrailer	Multiplexing Capability

s. Lighting:

Blackout Lights	24 volts
Clearance Lights	LED 12/24 volts
Stop, Turn, Taillights	LED 12/24 volts
ABS Warning Light	12 volts

t. ABS System:

Manufacturer	Meritor WABCO
Model	4S/2M
System	4 Wheel Sensors, 1 ECU, 2 Modulators
Diagnostic Tool	Blink Code Adapter
Modulator Valves	1 External, 1 Internal (part of ECU)
ECU	12 volts

u. Hidden Manufacturers Serial Number ..... SerialNumber is Stamped into Front Drop Deck Underside Frame on Curbside

v. Component Weight Data:

Bulkhead	250 pounds (113.4 kilograms)
Landing Leg with Gear	200 pounds (90.7 kilograms)
Landing Leg w/o Gear	180 pounds (81.6 kilograms)
Single Wood Deck Board, 41 feet (12.5 meters)	140 pounds (63.5 kilograms)
Complete Decking Kit	1211 pounds (549.3 kilograms)
Steel Stowage Box	195 pounds (88.5 kilograms)
Stowage Box Side Panel	28 pounds (12.7 kilograms)
Radial Tire	96 pounds (43.5 kilograms)
Steel Wheel	83 pounds (37.6 kilograms)
Radial Tire and Wheel	179 pounds (81.2 kilograms)
Complete Single Point Suspension	1142 pounds (518.0 kilograms)
Spring Pack (7 leafs)	315 pounds (142.9 kilograms)
Dressed Axle Assembly	731 pounds (331.6 kilograms)
Air Brake Chamber	20 pounds (9.1 kilograms))
Air Reservoir Tank	23 pounds (10.4 kilograms)
All Plywood Side Racks, Tarp, and Bows	1150 pounds (521.6 kilograms)
Side Rack Stake (each)	9 pounds (4.1 kilograms)
Bow (each)	7 pounds (3.2 kilograms)
Maximum Deck Cargo Weight	45,000 pounds (20,412 kilograms)

1-7. WARRANTY COVERAGE

WTB TB 9-2330-326-14

1-8. EQUIPMENT CAPABILITIES AND FEATURES

The following 5-Ton prime movers are authorized to tow the M871A3:

M1088 FMTV Series
M915 Series
M931 Series
M932 Series
M818 Series

1-9. TIE-DOWNS AND TWISTLOCK QUANTITES AND CAPACITIES:

NOMENCLATURE	QUANTITY	LOCATION	DESIGN LOAD (EACH RING)
D-RING TIE DOWN, CARGO	36	UPPER AND LOWER DECK	15,000 LBS.
D-RING TIE-DOWN, AMMO	4	LOWER DECK	30,000 LBS.
D-RING RAIL/TRANSPORTABILITY	12	FRONT DROP FRAME (4)	80,000 LBS.
		REAR, UNDER RIDE PROTECTION (4) LIFTING D-RING (4)	80,000 LBS.
RETRACTABLE TWISTLOCKS	8	LOWER DECK	VERTICAL STRENGTH: 47,000 LBS. SHEAR STRENGTH: 90,000 LBS. LONGITUDINAL STRENGTH: 100,000 LBS.

1-10. ROWPU (REVERSE OSMOSIS WATER PURIFICATION UNIT)

The M871A3 is authorized to safely transport the ROWPU (Reverse Osmosis Water Purification Unit).

1-11. LADS (LAUNDRY ADVANCED SYSTEM)

The M871A3 is authorized to safely transport the LADS (Laundry Advanced System) with fuel pod/container.

The M871A3 Semitrailer(s) that are dedicated to the LADS are **NOT** equipped with side/rear panels, stakes, panel stowage rack and all hardware to support these items. In the event of redistribution of LADS configured trailers, the gaining unit will be responsible for acquiring all listed equipment at their own expense. The losing LADS unit(s) cannot be held responsible for these costs.

1-12. M871A3 TRANSPORTABILITY OF VEHICLES

Transportability capabilities are not specified for specific model vehicles to allow the soldier full flexibility of the Semitrailer platform to accomplish various missions. Cargo/vehicle security and safety should be within current/future MTMCTEA PAM requirements. The qualifications for safe vehicle transportability on the M871A3 Semitrailer are as follows:

1. Reference TM 9-2330-326-14&P, page: 1-9 for tie-down and twistlock capacities on the M871A3. **Do Not** overload the tie-down capacities.

2. Transported vehicle length not to exceed 30 feet (360 inches). This length is for a single vehicle or combination of vehicles utilizing the Semitrailer's lower deck.

3. Transported vehicle(s) may be stacked using both the lower and upper deck areas. The lower deck is 31 feet, and the upper deck is 10 feet. The rear vehicle must have it's rear wheels supported by the Semitrailers.

4. Transported vehicle(s) must not exceed a width of 102 inches. Proper blocking and cribbing must be applied when exceeding the deck width of 96 inches (8 feet).

5. Transported vehicle(s) total weight must not exceed 22 ½ tons (45,000 pounds) for both lower and upper decks on the Semitrailer.

6. Any transported vehicle(s), wheeled or tracked, meeting all the specification in items 1, 2, 3, 4, and 5 qualify for being transported on the M871A3 Semitrailer.

7. Line haul speeds when transporting a vehicle or vehicles must not exceed 55 m.p.h.

8. When transporting a vehicle or vehicles mission profile speeds are not to exceed the tractor's safe operational speeds, capabilities and the following:

Secondary Roads:	35 m.p.h.
Trails:	15 m.p.h.
Rough:	10 m.p.h.

9. A 4 meter height requirement must be considered when routing the Semitrailer transporting a vehicle or vehicles/

CHAPTER 2
OPERATOR INSTRUCTIONS

CAUTION

Fording:	**Antilock braking system ECU must not be submerged in water. Rain, sleet, or snow will not effect operation of ECU.**
Fording:	**Immediately after fording apply service brakes to expel water from air brake chamber. Flush chambers with fresh water if fording in salt water when mission allows.**
Light Discipline:	**For light discipline mission requirements DO NOT change, remove, or disable the electrical system wiring, lighting, or reflectors. Use duct tape to cover the lens on the ABS Warning Light and reflectors as needed to meet mission requirements.**

2-1. LANDING LEGS

1. Rotating the crank (1) operates the landing gear.

WARNING

Insure the landing leg scissors assemblies retaining (locking) pins do not present a contact hazard to personnel. The pins can extend outward and cause injury.

a. Turning the crank (1) clockwise lowers landing legs (2) for parking semitrailer.

b. Counterclockwise rotation raises legs (2) to towing position.

2. Pushing operating shaft (3) in engages low speed gear for ease and speed in raising or lowering legs (2).

3. Pulling operating shaft (3) out engages high speed gear for raising or lowering of legs.

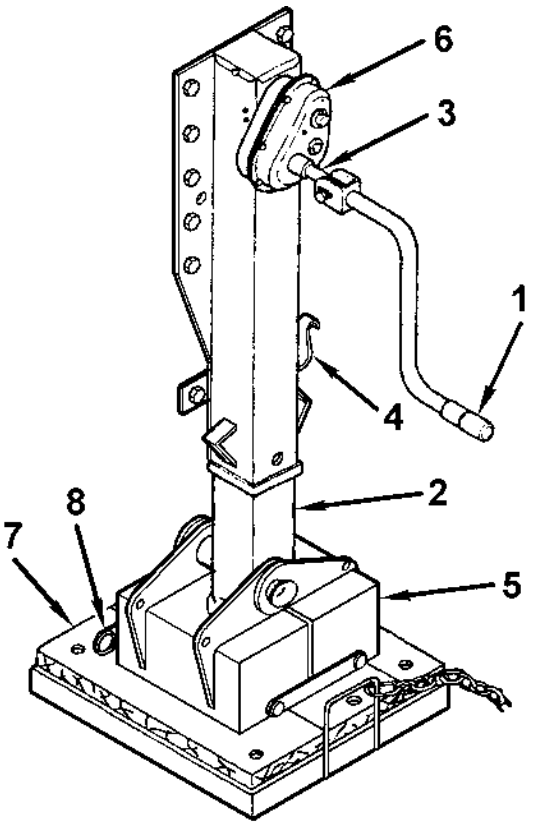
4. Crank hanger (4) holds the crank (1) when not in use.

5. Scissor shoe (5) keeps the leg (2) from sinking into the ground.

6. Landing leg gear box (6) is located on the right side (curbside) of the semitrailer.

7. Float pads (7) (ground board assemblies) are described in paragraph 2-2.

8. Retaining pins (8) lock scissor shoes in up or down position.

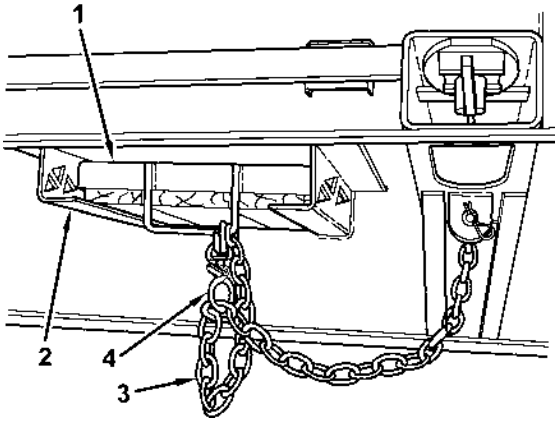


2-2. FLOAT PADS (GROUND BOARD ASSEMBLIES)

WARNING

- **For fifth wheel heights of 62 inches, as on the M1088, it is recommended that the ground boards are placed under the extended, and locked, scissors landing leg feet on the M871A3. Attempting to couple the tractor with the semitrailer below the fifth wheel height may cause injury to the personnel and damage to the equipment. Ground boards should be used both on soft and hard surfaces to preclude equipment damage.**

- **Watch hand and fingers when removing/installing ground boards. Injury to fingers/hand can occur.**

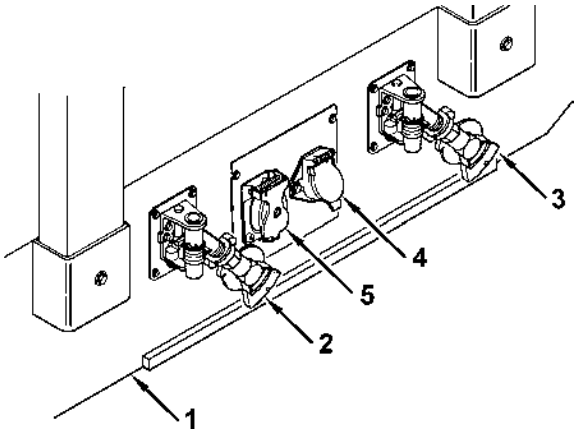


1. Two float pads (1) (ground board assemblies) are provided for placing under landing leg feet to keep them from sinking into soft ground.
2. Stored in brackets (2) welded to frame.
3. Chain (3) is hooked on frame. Snap hook (4) is provided to take up slack in chain (3).
4. As needed, remove float pad (1) for use under axle jack.

2-3. NOSE PLATE

WARNING

Service Air uses a blue seal, Emergency Air uses a red seal. Do not cross Service/Emergency air lines at glad-hands. Make sure they are hooked up correctly to meet brake air pressure requirements.



1. The nose plate (1) has the connections for the air lines and electrical cables from the towing vehicle to the semitrailer.

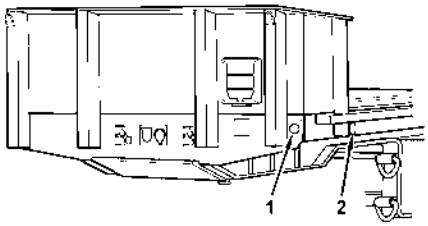
2. Service gladhand (2) and emergency gladhand (3) couplings provide the connection between the semitrailer brake system and the towing vehicle air supply system.

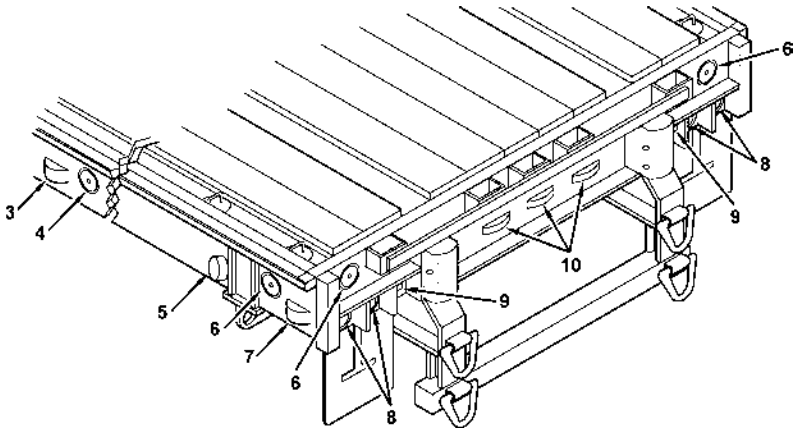
3. Electrical receptacles (4 and 5) provide the connections between the semitrailer lights and the towing vehicle electrical system. Both receptacles use spring loaded covers to keep foreign matter out when the cables are disconnected. The left (roadside) receptacle (4) is for 12 volt; the right (curbside) receptacle (5) is for 24 volt.

2-4. SERVICE LIGHTS

The semitrailer service lights and reflectors consist of the following:

- One amber clearance light (1) on each front corner
- One amber reflector (2) on each front corner
- One amber clearance light (3) on each side
- One amber reflector (4) on each side
- One ABS warning light (5) on driver's side
- Two red reflectors (6) on each rear corner
- One red clearance light (7) on each rear corner
- Four stop, turn, and taillights (8) on rear
- One blackout light (9) on each rear corner
- Three red clearance lights (10) mounted on a rear bar





2-5. KINGPIN

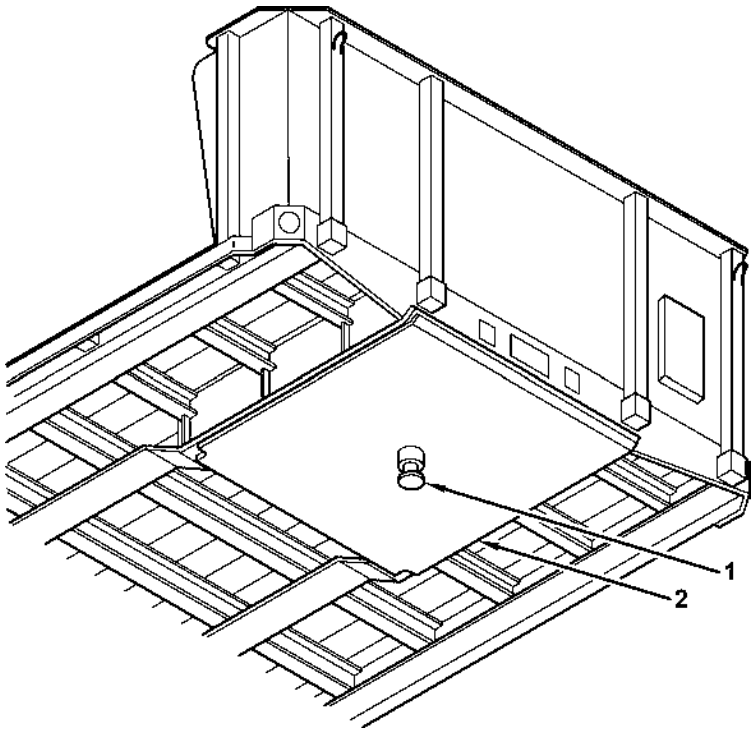
1. Kingpin (1) used to couple semitrailer to towing vehicle.

2. Protrudes from center of semitrailer kingpin plate (2).

WARNING

- **A 20-ft. (6.1 m) ISO container loaded against the drop deck panel will overload the fifth wheel rating of the M1088 by 4,500 lbs (2041 kg). The ISO should be loaded to the rear of the M871A3 to prevent stability/loading problems with the M1088. Failure to heed this warning may result in injury or death to operating personnel.**

- **Refer to the tractor technical manuals that are authorized to tow the M871A3 Semitrailer for maximum fifth wheel payload, and required position on sliding fifth wheel notched base, to preclude possible front axle overload on the tractor. Overloading may cause loss of load, injury to the personnel and damage to the equipment.**



2-6. SIDE BOARDS AND STAKES

1. The side panels (1) and rear panels (2) are used to contain bulk cargo such as bags of grain or sand.

2. Installed in sill holes between the stakes (3 and 4).

3. Rear (panel splice) stake (3) and corner stakes (4) are installed in sill holes to hold panels (L12 and R12) in place.

4. Cross chains (5) aid in supporting side panels (1) to contain bulk cargo.

5. Strap (7) is used to retain larger panels (1 and 2) in stowage rack (8) when not in use. Stakes (3 and 4) and smaller panels can be stowed within the bulkhead (6) when not in use.

CAUTION

Panel securing strap is wrapped around panels and rack. Do not attach strap ends to deck tie-downs.

NOTE

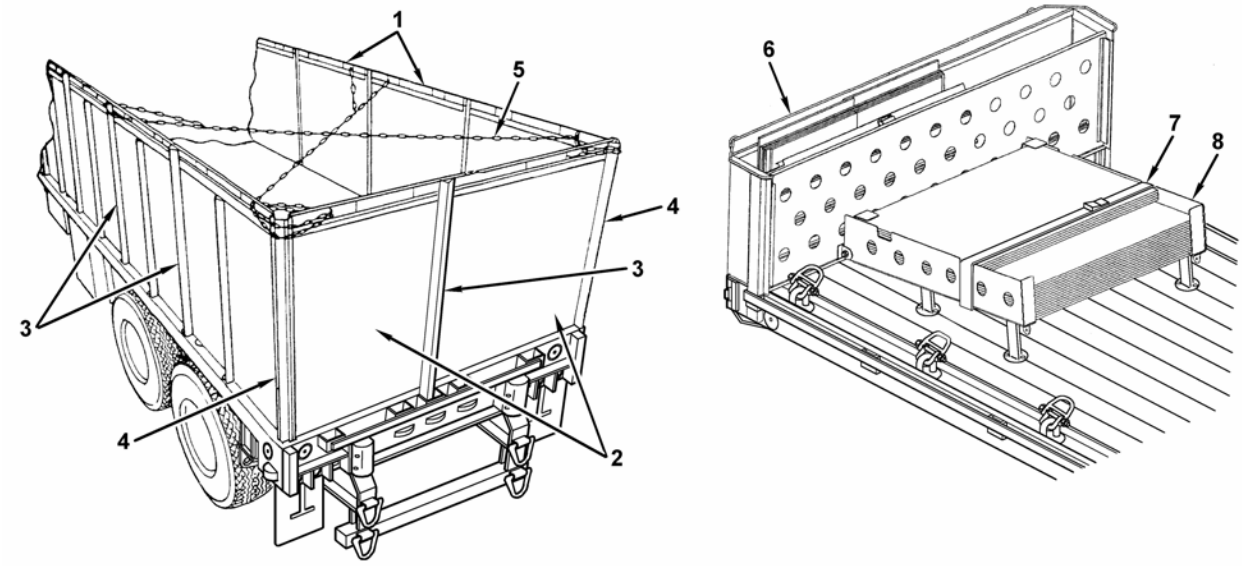
- **Additional information pertaining to side boards and stakes is located in Paragraphs 2-7 and 2-8.**

- **Storage rack with panels may be detached from trailer deck, forklifted off trailer, and stored when not required for mission. Make sure all hardware for mounting and strapping are with rack when stored separately from the trailer. All side/rear rack components may be stored/strapped with rack and tagged with trailer serial number if not required for the mission.**

- **During snow or freezing conditions, cover bulkhead storage area and storage rack with a tarp and secure with bungee cords. This will help prevent the stored components from freezing together. See AAL List, Table E-1, Page E-4 for Tarps.**

- **There are six (6) long stakes with metal loops at the top for attachment of cross chain hooks. The two (2) rear corner stakes must have their loops facing the inside.**

2-6. SIDE BOARDS AND STAKES (Cont.)



6. Cross chains are attached per the following:

   Forward: Cross chain hooks are attached to the stakes (with loops) between wood panels L4 and L5, and R4 and R5. The chains are crossed and their end hooks are attached to the loops located on the top outside of the bulkhead.

   Rear: Cross chain hooks are attached to the stakes (with loops) between panels L7 and L8, and R7 and R8. The chains are crossed and their end hooks are attached to the loops located at the top of the corner stakes.

2-7. SIDE BOARD ASSEMBLY.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (item 4, Appendix B)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover

WARNING

Make sure side/rear stakes and panels are secured before on-road operation to prevent injury to personnel and damage to vehicles.

NOTE

- **Replacement of individual side boards is a Unit Maintenance function.**
- **If side boards are not to be immediately reinstalled, arrange them in upper deck stowage rack in a sequence of decreasing size before securing. Remaining side boards are to be stored upright within bulkhead pocket. Insure arrangement of these smaller side boards allows placement of cross chains and corner and side stakes.**
- **Wood panels are stenciled L1 through L12 and R1 through R12. L12 and R12 are the rear panels.**
- **There is a total of 24 panels. Six (6) short panels for the upper deck, sixteen (16) long side panels and two (2) long rear panels.**
- **There is a total of 23 stakes used to support these panels. Four (4) short stakes for the upper deck, sixteen (16) long stakes for side panels, two (2) rear corner long stakes (with handles) and one (1) rear center stake.**
- **Of the twenty-three (23) total stakes, six (6) have chain loops at the top of them. These stakes must be positioned as follows:**

  Rear of semi-trailer: **Stakes between panels L7, L8 and R7, R8 and two rear corner stakes. Make sure corner stakes are positioned so loops face toward inside.**

  Front of semi-trailer: **Stakes between panels L4 and L5, the chains are crossed and attached to the bulkhead outer top chain loops.**

GENERAL PROCEDURES (Suggested):

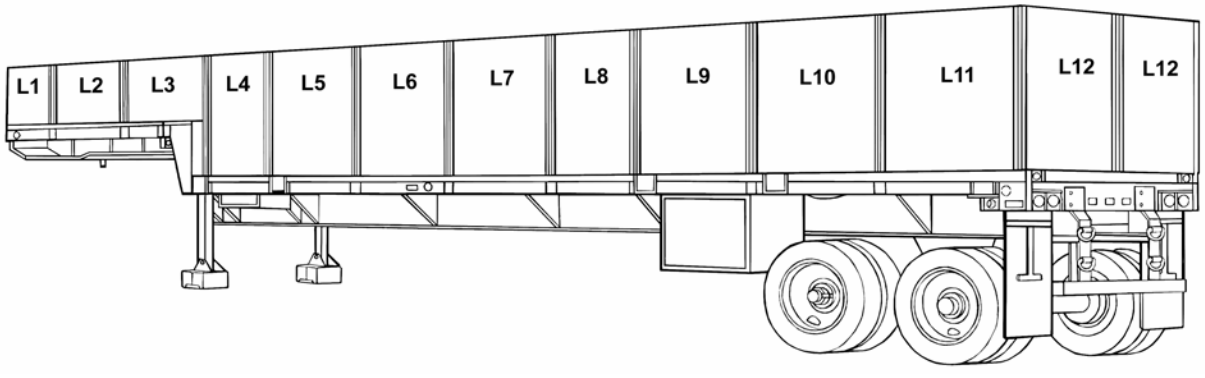
a. Installation. (See illustration below)

1. Install two (L12, R12 Rear Panels) 45 7/8"x 48" rear panels using two long corner stakes (with top chain loops facing inwards) and long rear center panel stake.
2. Install two panels L11 and R11 with long stakes to semitrailer.
3. Install L10, L9, L8, L7, R6, R7, R5, R4, and R10, R9, R8, R7, R6, R5, R4 to semitrailer using long stakes.

NOTE

Stakes between wood panels L7and L8 and R7 and R8 should have top loops on them for attachment of chains. Chains are crossed and attached to rear corner stakes which have top chain metal loops.

4. Install four upper deck short stakes and panels L3, L2, L1 and R3, R2, R1.
5. Install cross chain hooks to stake top metal loops and bulkhead hooks front and rear (4 chains with hooks).
6. Install two (L3, R3) 23-3/4" x 25 side boards (3) to semitrailer.
7. Install two (L2, R2) 47-3/4" x 25 side boards (2) to semitrailer.
8. Install two (L1, R1) 22-5/8" x 25 side boards (1) to semitrailer.
9. Install cross chains through metal loops of center and side stakes, as appropriate.



b. Installation Information. The side rack panels are stenciled. Left side panels (roadside) are identified with and "L" and a number. Right side panels (curbside) are identified with and "R" and a number. Rear panels are the same and are numbered L12 and R12. Start at the front of semitrailer and install them from 1 to 12 for both left and right sides, with the number 12(s) at the rear.

GENERAL PROCEDURES (Suggested) (Cont.):

c. Removal.

1. Remove cross chains from stakes and bulkhead, store in storage box.

2. Remove four upper deck panels and stakes. Store short panels and stakes in bulkhead.

3. Remove lower deck side panels and stakes. Store stakes in bulkhead. Store long panels on storage rack, in sequence, starting with lower panel number on the bottom and on up to the highest number on the top.

4. Remove rear long panel corner stakes and center stake. Store stakes in bulkhead and panels on storage rack.

5. Tighten strap on storage rack to secure panels.

d. Securing Tarp on Semitrailer.

1. With the tarp positioned over the bows, end panels and bulkhead, tarp guy ropes may be adjusted to secure the tarp. Additional bungee cords may be used as required.

2. The tarp is 47 feet long and 14.5 feet wide. It extends approximately 3 feet over each side rail and approximately 2+ feet on the ends.

3. Due to the drop deck configuration of the semitrailer, the tarp overhangs the upper deck side rails a few inches.

4. The last 4 front tarp grommets for the upper deck, on each side, will require the guy ropes to be shortened and/or the use of short rubber bungee cords.

CAUTION

Make sure no guy ropes or bungee cords cross over the 36 inch bolster plate area, to include the front kick up portion of bolster plate. They will interfere with coupling and will be cut during road movement causing tarp to become unsecured and damaged.

5. Use the underside main frame rails and slots in x-member supports for attaching guy ropes and bungee hooks. Use front lower bulkhead support for attaching guy ropes or bungee hooks. Keep ropes/bungee cords clear of bolster plate, king pin and kick up front area of bolster plate.

e. Follow-On Tasks.

1. Panels installed – Make sure panels and hardware are secured prior to road movement and at halts.

2. Panels Removed – Make sure panels and stakes are secured on stowage rack and in bulkhead prior to road movement and at halts.

3. Connect semitrailer to prime mover.

4. Raise Landing Legs.

2-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

1. BULKHEAD ASSEMBLY—Constructed of steel. It has the manifest box mounted on the front side and a stowage rack mounted on the backside. When carrying breakbulk cargo with the side rack installed, it will keep the load from shifting forward. Bulkhead is removable.

2. MANIFEST BOX—Used to store the cargo manifests.

3. FLOOR DECK—Constructed of apitong wood, it is screwed to the frame.

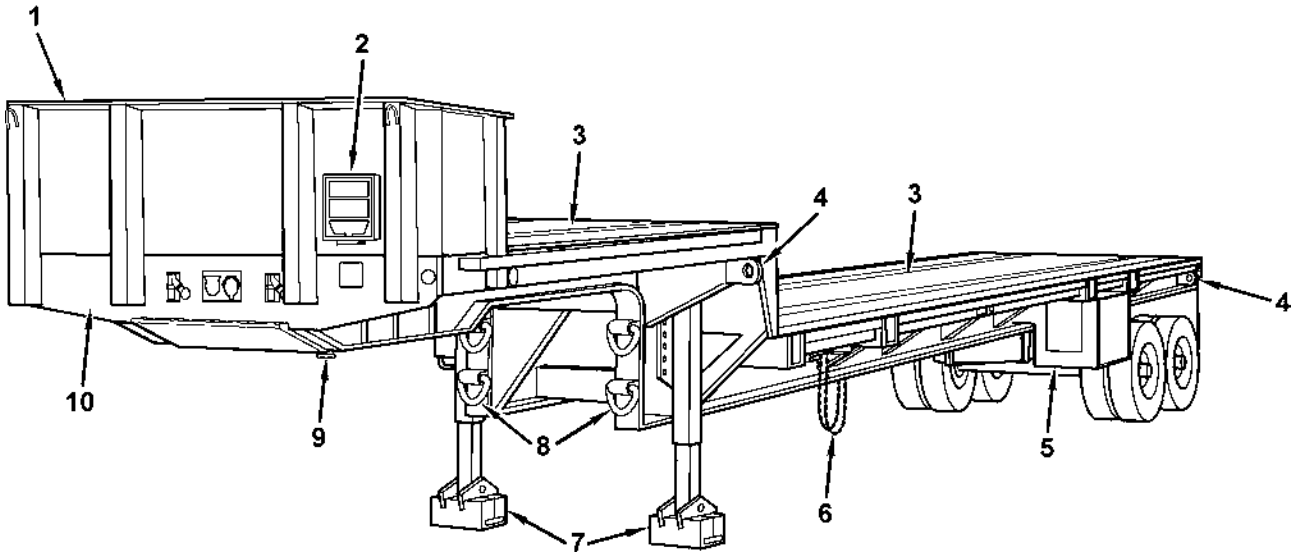
4. LIFT POINTS—Used to lift the semitrailer with a sling hoist. (D-Rings, 4 Points)

5. STOWAGE BOX—Constructed of steel. Used to store Basic Issue Items.

6. GROUND BOARDS—Held in place within a steel rack by two removable chains, these two assemblies are used to provide secure footing for a jack, jackstands, and landing legs ground support.

7. LANDING LEGS—Manually extended using a crank on the curbside leg when the semitrailer is uncoupled from the towing vehicle, and manually retracted when the semitrailer is coupled to the towing vehicle. Landing legs do not require grease lubrication. Ground board must be emplaced.

8. D-RINGS—Steel rings used to secure trailer during transport by airplane, rail, or truck (8 D-Rings).



2-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)

9. KINGPIN—Connects the semitrailer to the fifth wheel of the towing vehicle.

10. NOSE PLATE—Contains the electrical and air line connections. The nose plate also contains the electrical parts required for proper operation of the service lights.

11. SIDE BOARDS—Used when carrying breakbulk cargo. The side racks mount to the frame.

12. CORNER AND SIDE STAKES—Used to secure side boards when installed. The stakes mount to the frame.

13. MUD FLAPS—Keep mud and water from being splashed off the rear tires during rainy weather. Mud flaps also keep most of the rocks thrown up when traveling unimproved roads from being thrown off to the rear.

14. REAR BUMPER—Prevents damage to the suspension when backing the semitrailer into the dock and provides run-under protection to following vehicles.

15. TANDEM AXLE—Consists of the suspension system, brake system, axles, and the tires.

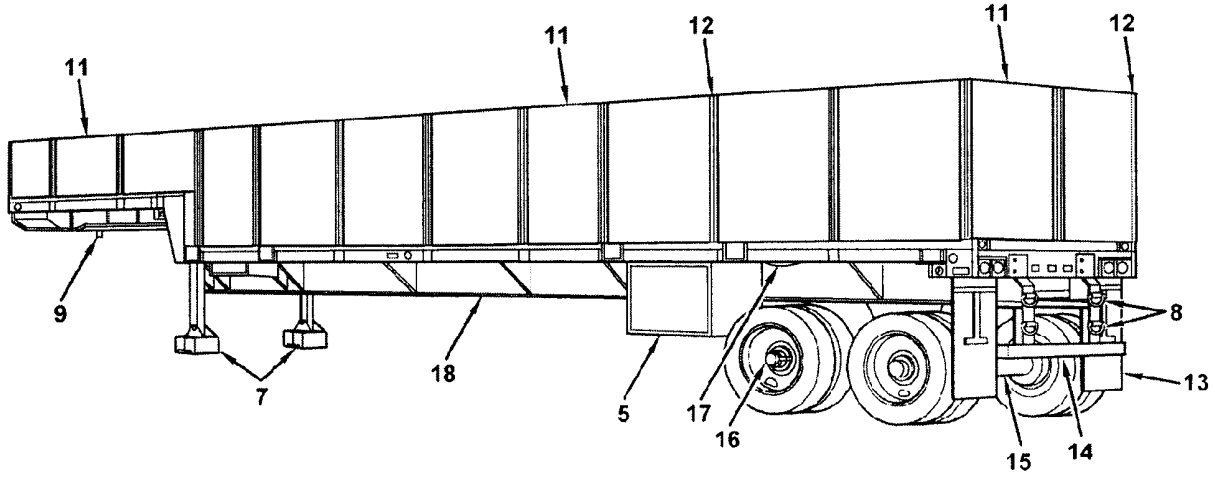
16. HUBODOMETER—Provides a record of miles transited by the semitrailer.

17. DRAIN CABLES—For draining air tanks. (2 Pull Cables)

18. FRAME—Constructed of steel. Provides the load bearing surface, mounting for the axles, suspension, kingpin, and side board mounting.

NOTE

There are a total of 40 cargo tiedowns on the upper and lower decks. Thirty-six (36) are cargo tiedowns, the four (4) larger tiedowns are ammunition tiedowns.



2-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)

19. DOCK BUMPERS—Prevent damage to the semitrailer and the dock when loading or unloading.

20. SERVICE LIGHTS—Includes the clearance, stop, turn, and tail lights.

21. RETRACTABLE TWIST LOCKS—Replaceable locks used to secure containerized cargo. (Quantity of 8)

CAUTION

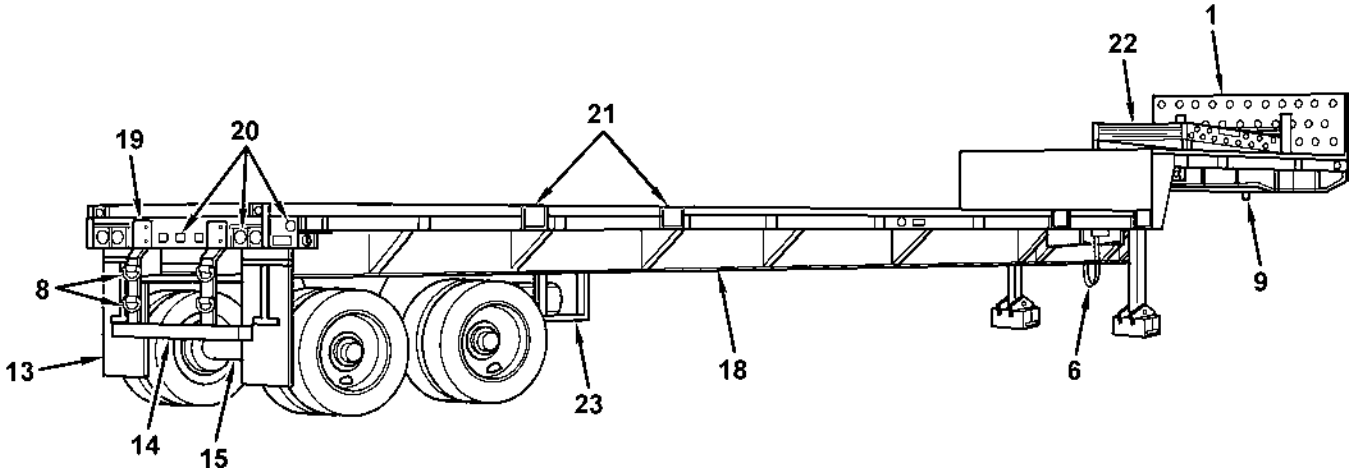
Retaining strap must be wrapped around stowage rack and panels then tightened/secured. Do not attach strap ends to deck cargo rings. This will cause the strap to prematurely wear and break, resulting in loss of panels during operation.

22. STOWAGE RACK—Constructed of steel and bolted to the bulkhead assembly. Used to secure sideboards and stakes when not in use. May be unbolted and forklifted out as an assembly for storage.

23. SPARE TIRE CARRIER—Carries the spare tire.

NOTE

There are a total of forty (40) cargo tie-downs on the upper and lower decks. Thirty-six (36) of these are utilized for cargo tie-downs, and the four (4) larger tie-downs are utilized for ammunition tie-owns.



CHAPTER 3

OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-1. GENERAL

To insure that the M871A3 Semitrailer is ready for operation at all times, it must be inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure, or injury to personnel. This section contains systematic instructions on inspections, adjustments, and corrections to be performed by the operator/crew.

While performing PMCS, read and follow all safety instructions in the warning summary at the front of this manual. Keep in mind all warnings and cautions throughout PMCS.

3-2. SERVICE INTERVALS

Perform PMCS, found in Table 3-1, at the following intervals:

Perform “Before” PMCS just before operating the semitrailer.

Perform “During” PMCS while operating the semitrailer.

Perform “After” PMCS immediately after operating the semitrailer.

Perform “Weekly” PMCS procedures must be done once each week on semitrailer.

Perform “Monthly” PMCS procedures must be done once each month on semitrailer.

3-3. REPORTING REPAIRS

All defects that the operator cannot fix must be reported on a DA Form 2404, Equipment Inspection and Maintenance Worksheet, or an electronic DA Form 5988E, if available, immediately after completing PMCS. If a serious problem is found, immediately report it to your supervisor. Remember, record any corrective action taken.

3-4. GENERAL PMCS PROCEDURES

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.

CAUTION

Do not use high-pressure water or steam to clean semitrailer. Use only low-pressure water and bristled brushes. Be especially careful when cleaning electrical system components to include lighting. Damage or impaired operation will result if this caution is not observed.

Keep equipment clean. Dirt, oil, and debris may cover up a serious problem. Clean as you work and as needed. Use approved solvent on all metal surfaces. Use soap and water on rubber, plastic, and painted surfaces. Spot paint as required to prevent corrosion.

3-4. GENERAL PMCS PROCEDURES (Cont.)

While performing specific PMCS procedures, inspect the following components:

Bolts, Nuts, and Screws. Insure that they are not loose, missing, bent, or broken. Report loose or missing bolts, nuts, and screws to Unit maintenance.

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

Electrical Conduit, Wires, and Connectors. Inspect for cracked or broken insulation, bare wires, and loose or broken connectors. Report loose connections and faulty wiring to Unit maintenance. Use dielectric grease on all pins and connectors.

Hose, Lines, and Fittings. Inspect for wear, damage, and leaks. Insure that clamps and fittings are tight. Report any damage, leaks, or loose fittings and clamps to Unit maintenance.

Check that components are adequately lubricated in accordance with Appendix C.

Operator/crew PMCS is provided in Table 3-1. Always perform PMCS in the order listed. Once it becomes a habit, anything that is not right can be spotted in a minute. PMCS is a good tool for learning about the semitrailer. Times to perform good PMCS will decrease as you become more familiar with its operation.

Before performing PMCS, read all the checks required for the applicable interval and prepare all the tools needed. Have several clean rags handy. Perform all inspections at the applicable interval.

The column headings in Table 3-1 are defined as follows:

Item No. Provides a logical sequence for PMCS to be performed and is used as a source of item numbers for the "TM ITEM NO." column when recording PMCS results on DA Form 2404. Item numbers also appear in the order that you must perform checks and services for the intervals listed.

3-5. SPECIFIC PMCS PROCEDURES

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

Item To Check/Service. Lists the system and common name of items that are to be inspected. Included in this column are specific servicing, inspection, replacement, or adjustment procedures to be followed.

Procedure. Provides the procedure that must be performed to check or service the item. Carefully follow these instructions. If you do not have the tools, have Unit maintenance perform the work.

Equipment Not Ready/Available If: Explains when the semitrailer is nonmission-capable. This column tells you when and why your equipment cannot be used.

NOTE

Mission requirements, urgency, safety, and common sense should be considered in determining NMC status of the semitrailer.

Table 3-1. Operator/Crew PMCS.

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
			NOTE **Perform weekly as well as before PMCS if:** • **You are the assigned operator but have not operated the semitrailer since the last weekly PMCS.** • **You are operating the semitrailer for the first time.**	
			CAUTION **Reference prime mover technical manual. Insure all operations are adhered to, i.e., coupling, fifth wheel load and position, load capabilities, speeds, on/off road operation, and adverse weather/road operations.** **NOTE** **Perform the following inspections and checks before connecting the semitrailer to the towing vehicle.**	
1	Before	Kingpin	a. Visually inspect kingpin for obvious damage and wear. Make sure kingpin and bolster plate are greased. b. Visually inspect bolster plate for obvious damage, bowing, and cracked welds. c. Check to make sure bolster plate drain holes are not plugged.	Kingpin is damaged or shows obvious wear. Bolster plate is bowed or welds are cracked. Bolster plate drain holes are plugged.
2	Before	Converter Box	Check for obvious damage or missing hardware.	Damaged or missing hardware.
3	Before	Voltage Receptacles	Visually check for damage.	Receptacles are damaged.
4	Before	Gladhands	Inspect gladhands for damage, missing or worn/cracked seals, missing hardware, and free swing-away operation.	Gladhands are damaged, seals worn/cracked or missing, missing hardware, and free operation.

Table 3-1. Operator/Crew PMCS (Cont.).

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
5	Before	Ground Boards Chock Blocks	Check for presence and damaged/missing hardware.	Ground boards cannot be safely secured in brackets or retaining hardware/ground boards are missing. Blocks are not present.
			CAUTION • **After coupling semitrailer with truck, the scissor shoes at the end of the landing legs must be unlocked, swung up, and locked in the up position to allow for maximum clearance.** • **Before uncoupling semitrailer, scissor shoes on the landing legs must be unlocked, swung down, and locked in the down position.** • **Chock front and rear of tires prior to coupling/uncoupling.** **NOTE** **The following checks must be done with the prime mover coupled to the semitrailer. Assistance is required when coupling and checking semitrailer lights.**	
6	Before	Intervehicular Air Hoses	Connect air lines to semitrailer gladhands. With tractor engine running, check air lines and gladhands for air leaks.	Air leaks are present.

Table 3-1. Operator/Crew PMCS (Cont.).

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
7	Before	Lights	**NOTE** • **Check for lose plug-in connectors. Make sure there is no debris between plug and connector and then make sure that plug-in is seated.** • **Mission requirements, urgency, safety, and common sense should be considered in determining NMC status of the semitrailer.** Connect intervehicular cable from tractor to semitrailer. Check lights for damage, proper operation, presence, and missing hardware. Notify Unit maintenance if there are problems in operation or damage is present.	Lights are damaged, do not operate, or missing hardware. NMC if required for mission.
8	Before	Reflectors	Look for presence, damage, and missing hardware.	Reflectors are missing and required for mission.
9	Before	ABS Warning Light	**NOTE** • **Tractor must be coupled before checking ABS warning light.** • **ABS warning light should not stay on when semitrailer is moving above 4 mph (6.4 km/h).** • **If mission requirements do not allow for troubleshooting of ABS system, continue on with mission until system can be properly diagnosed by Unit maintenance. Only modulation will be affected not stopping capacity of brake system.** Visually check that ABS warning light does not stay on. Notify Unit maintenance.	ABS light does not come on or stays on.

Table 3-1. Operator/Crew PMCS (Cont.)

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
10	Before	Landing Leg Assembly	**CAUTION** • **Use high gear for rapid lowering/raising semitrailer without a load on deck.** • **Use low gear for lifting/raising semitrailer with a load on deck.** • **Leave landing gear in low gear, in the full up position, when traveling on the road. Low gear will prevent over-the-road vibration from causing legs to wind-down (extend). Make sure crank handle is secure.** • **Crank operation:** **Facing crank, clockwise - retracts (raises) legs, and counterclockwise - extends (lowers) legs.** • **Push in - high gear, pull out - low gear.** • **Make sure landing legs are fully retracted and scissor shoes locked up before moving semitrailer.** a. Engage landing leg crank handle and raise and lower legs. Pull crank and check low-speed operation. Check for binding, damage, unequal leg movement and missing hardware. b. Check that scissor shoes have free movement, hardware is present, and shoes securely lock in place.	Scissor shoes bind, do not lock or unlock; and missing hardware.

Table 3-1. Operator/Crew PMCS (Cont.)

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
			CAUTION • **Rust near wheel nuts can mean low torque.** • **Check wheels (inner/outer) and hubcaps for grease leakage. When leakage is initially found, clean off all grease and recheck after operation. If grease leakage is still evident, notify Unit maintenance.** **NOTE** • **All wheel flange nuts have right hand threads.** • **Cold radial tire pressure should be 115 psi (793 kPa) for all tires.**	
11	Before	Radial Tires and Wheels	a. Inspect tires, including spare, for proper inflation, unusual tread wear, sidewall damage, cuts, foreign objects, valve stem damage, valve caps, and loose/missing dust shield plugs on wheels.	Tires are not properly inflated, damaged, or show unusual wear.
			WARNING **Make sure spare tire is secured in carrier and securing hardware is present. Failure to secure these properly can result in injury or death to personnel.**	Securing hardware is unserviceable or missing.
			b. Check wheels for damaged rims, rust, or leaking grease.	Wheel rims are damaged, rusty, or shows signs of leaking grease.
			c. Check for loose or missing wheel nuts. Notify Unit maintenance. All the nuts must be present and torqued to specifications.	
			Re-torque wheel nuts at first 100, 500, 1000 miles (161, 805, 1609 km), and every 6000 miles (9656 km) thereafter unless wheel is changed out. Then use re-torque schedule. Notify Unit maintenance. (See Appendix H-22.)	Nuts are loose or missing. Wheel nuts not torqued.

Table 3-1. Operator/Crew PMCS (Cont.)

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
12	Before	Spare Tire Carrier	**WARNING** **The spare tire and wheel weigh 179 lbs. (81.2 kg). This 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. Failure to do so could result in injury.** **NOTE** **When layed in carrier convex side should be in the up position.** Inspect spare tire carrier assembly for loose/missing hardware and cracked/broken welds.	Loose/missing hardware and cracked/broken welds.
13	Before	Hubcaps and Hubodometer	**CAUTION** **Do not stand on hubodometer.** a. Inspect hubcaps for damage, loose or missing hardware, and leakage. b. Inspect hubodometer for missing hardware, damage, and loose mounting bracket or gage.	Hubcap is leaking grease or hardware is loose or missing. Hubcap is leaking grease or hardware is loose or missing.
14	Before	Suspension	**WARNING** **Notify Unit maintenance at first month of new semitrailer operation or first 1000 miles (1609 km) (from hubodometer) that suspension nuts must be torqued. Reference item no. 1 of Unit PMCS. This could cause loss of suspension/parts which could result in injury to the personnel and damage to the equipment.** Visually inspect for broken or shifted leaf springs and loose or missing hardware. Notify Unit maintenance.	Springs have shifted or are broken and hardware is loose or missing.

Table 3-1. Operator/Crew PMCS (Cont.)

ITEM NO.	INTERVAL	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
15	Before	Air Reservoir Tanks	**WARNING** **Wear protective goggles if you are under semitrailer and need to operate drain valves. Avoid the air stream. Failure to do so could result in personal injury.** a. Make sure drain valves do not leak air. b. Inspect air tanks for damage, loose fittings, missing hardware, and any evidence of air leakage. c. Inspect drain valve pull cables for a frayed or broken condition.	Drain valves leak air. Any air leaks are present or hardware is missing.
16	Before	Stowage Box and Door	Open and close door, make sure hinge does not bind, and all mounting/securing hardware is tight and present. Make sure drain holes are not blocked. Insure jack is secure and door seal is in good condition. Keep box clean and serviceable.	Hardware loose or missing.
17	Before	Twist Locks	**CAUTION** **Make sure there is no debris in ISO container lock slots that would prevent twistlock engagement and positive locking** **Check to make sure there is no debris in the lock pocket that would interfere with lock operation. Make sure twist locks (all) operate freely and do not bind.**	Twist locks are required for mission.

Table 3-1. Operator/Crew PMCS (Cont.)

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
18	Before	Tiedowns	**CAUTION** **Deformation of any part of D-ring is not allowed. Notify Unit maintenance.** **Check all tie downs for missing hardware, damage, cracked welds, and deformation. Notify Unit maintenance.**	Damaged, deformed, and cracked welds are evident.
19	Before	Brakes	With prime mover coupled, prior to start of mission, have a person observe if trailer brakes are working. Release trailer brake pressure and slowly move tractor forward. Observe if trailer tires move. If tires move, brakes are not holding. Notify Unit maintenance, NMC, if trailer tires move when brakes are applied.	
20	During	ABS Warning Light	**NOTE** • **If ABS warning light 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 warning light. Do not remove or otherwise disable light.** Check that ABS warning light does not stay on.	

Table 3-1. Operator/Crew PMCS (Cont.)

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
21	During	Axles and Suspension	Listen for unusual noises, which are indications of possible problems. Be alert to conditions such as side pull, wandering, tracking of semitrailer, and load shift.	Unusual noises, semitrailer wanders, pulls to either side, or does not track.
22	During	General	Be alert to all conditions that may indicate unsafe operation or improperly secured cargo. Insure all prime mover TM procedures are adhered to for safe operation, i.e., coupling load limits, speeds, and fifth wheel settings for on/off road operation.	Unsafe conditions are identified.
23	After	Landing Leg Assembly	**CAUTION** **Do not use high-speed cranking mode for lifting and lowering of landing gear if there is a load on the semitrailer.** Inspect gearbox, braces, and leg assemblies for proper operation and tight mounting hardware. Insure there is no binding in operation, equal leg movement and the hand crank is present and can be safely stowed.	Legs bind, are unequal in movement, missing hardware, or hand-crank cannot be safely stowed.
24	After	Brake System	**WARNING** **A hot brake can cause serious burns. Exercise caution before attempting to touch brake drum after use. Radiated heat will be felt before brake drum is touched.** Cautiously feel brake drums for abnormal heat or cold. An abnormally hot drum indicates a possible dragging or grabbing brake. An abnormally cool drum indicates improper adjustment or a defective brake. Notify Unit maintenance.	Brake drums abnormally hot or cold.

Table 3-1. Operator/Crew PMCS (Cont.)

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
25	After	Air Reservoir Tanks	Pull reservoir drain cables to remove all condensation.	System is not drained of moisture.
26	After	Bolster Plate Drain Hole	Check to make sure bolster plate drain holes are not plugged with grease.	Bolster plate drain holes are plugged.
27	After	Semitrailer Cleanliness	After operation, especially in mud, salt environment, or fording conditions, flush out axles, axle ends, suspension, landing gear, underside/topside of semitrailer and stowage box with clean, low-pressure water: a. Clean and lubricate all parts as specified in the Appendix C to make sure water/debris is flushed out of system. b. Check all electrical connections for corrosion and security. c. Make sure all painted surfaces are touched up where necessary to prevent rust.	Not accomplished when mission permits or mission completed.
28	Weekly	Wheels	**NOTE** **Mission requirements, urgency, safety, and common sense should be considered in determining NMC status of semitrailer.** Check all wheels for handhold cracks, cracks between and around stud holes, rust streaks and grease stains. Notify Unit maintenance. (See Appendix H-24.)	Cracks or leakage is evident.
29	Monthly	Frame and Decking	Perform a visual inspection of semitrailer for evidence of corrosion and condition of upper and lower deck wood. Visually check all welds for rust and cracks. Notify Unit maintenance if corrosion or deck damage is evident.	

CHAPTER 4

UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-1. GENERAL

To ensure that the M871A3 Semitrailer is ready for operation at all times, it must be inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure, or injury to personnel. This section contains systematic instructions on inspections, adjustments, and corrections to be performed by Unit maintenance.

While performing PMCS, read and follow all safety instructions in the warning summary at the front of this manual. Keep in mind all warnings and cautions throughout PMCS.

4-2. SERVICE INTERVALS

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

- M • Monthly—once every month—1,000 Miles
- S • Semiannual—once every 6 months—6,000 Miles
- A • Annual—once each year—12,000 Miles
- T • Triennial—every 3 years—36,000 Miles
- MI • Mileage—at the indicated mileage

4-3. REPORTING REPAIRS

All defects must be reported on a DA Form 2404, Equipment Inspection and Maintenance Worksheet, or an electronic DA Form 5988E, if available, immediately after completing PMCS. If a serious problem is found, immediately report it to your supervisor. Remember, record any corrective action taken.

4-4. GENERAL PMCS PROCEDURES

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.

CAUTION

- **Do not use high-pressure water or steam to clean semitrailer. Use only low-pressure water and bristled brushes. Be especially careful when cleaning electrical system components to include lighting. Damage or impaired operation will result if this caution is not observed.**
- **Dielectric grease must be used on all electrical plug-ins, pins and contact points to prevent corrosion.**

Keep equipment clean. Dirt, oil, and debris may cover up a serious problem. Clean as you work and as needed. Use approved solvents on all metal surfaces. Use soap and water on rubber, plastic, and painted surfaces.

4-4. GENERAL PMCS PROCEDURES (Cont.)

While performing specific PMCS procedures, inspect the following components:

Bolts, Nuts, and Screws. Ensure that they are not loose, missing, bent, or broken. Tighten any that are loose.

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

Electrical Conduit, Wires, and Connectors. Inspect for cracked or broken insulation, bare wires, and loose or broken connectors. Report loose connections and faulty wiring to your supervisor. Use dielectric grease on all pins and connectors.

Hose, Lines, and Fittings. Inspect for wear, damage, and leaks. Ensure that clamps and fittings are tight. If a component is broken or worn, correct the problem if authorized by the Maintenance Allocation Chart (MAC) (Appendix B). Report any damage, leaks, or loose fittings and clamps to your supervisor.

Check that components are adequately lubricated in accordance with Appendix C.

4-5. SPECIFIC PMCS PROCEDURES

Unit PMCS is provided in Table 4-1. Always perform PMCS in the order listed. Once it becomes a habit, anything that is not right can be spotted in a minute. PMCS is a good tool for learning about the semitrailer. Times to perform good PMCS will decrease as you become more familiar with its operation.

Before performing PMCS, read all the checks required for the applicable interval and prepare all the tools needed. Have several clean rags handy. Perform all inspections at the applicable interval.

The column headings in Table 4-1 are defined as follows:

Item No. Provides a logical sequence for PMCS to be performed and is used as a source of item numbers for the "TM ITEM NO." column when recording PMCS results on DA Form 2404. Item numbers also appear in the order that you must perform checks and services for the intervals listed.

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

Item To Check/Service. Lists the system and common name of items that are to be inspected. Included in this column are specific servicing, inspection, replacement, or adjustment procedures to be followed.

Procedure. Provides the procedure that must be performed to check or service the item. Carefully follow these instructions. If you do not have the tools, have Unit maintenance perform the work.

Equipment Not Ready/Available If: Explains when the semitrailer is nonmission-capable.

NOTE

Mission requirements, urgency, safety, and common sense should be considered in determining NMC status of the semitrailer.

Table 4-1. Unit PMCS.

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			NOTE • **Perform Operator/Crew PMCS prior to, or in conjunction with, Unit PMCS if there is a delay between daily operation of the equipment and the Unit PMCS or regular operator is not assisting/participating.** • **Clean axle and suspension system with low-pressure water and fiber brush to allow for careful inspection.**	
1	M S A T MI First ? 1,000	Suspension Initial Torque	Torque suspension nuts to the following in-service dry torque values: 1-1/8”-12 UNF 880 lb-ft (1193 N•m) 3/4”-16 UNF 300 lb-ft (407 N•m) 5/8”-18 UNF 180 lb-ft (244 N•m) **NOTE** **New replacement installations/ hardware should have wet (oiled) fasteners. The following wet torque values apply:** **1-1/8”-12 UNF 670 lb-ft (908 N•m)** **3/4”-16 UNF 220 lb-ft (298 N•m)** **5/8”-18 UNF 130 lb-ft (176 N•m)**	Torque service requirements/schedule are not met. NMC if nuts, bolts, are damaged.

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			CAUTION **Any bumps, valleys, or warping of the bolster plate will cause uneven loading of the fifth wheel, which could result in damage to the top plate and poor lock life.** **CAUTION** • **The bolster plate should not bow upward (concave) more than 1/16 in. (1.58 mm) within a 19-in. (48.26-cm) radius from kingpin.** • **The bolster plate should not bow downward (convex) more than 1/4 in. (6.35 mm) within a 19-in. (48.26-cm) radius from kingpin or more than 1/8 in. (3.18 mm) at a 10-in. (254-mm) radius from kingpin.**	
2	M S A T MI Every ? 6,000	Bolster Plate	a. Clean bolster plate and kingpin. (See Appendix H-13.) Regrease after checks are completed. b. Check flatness of bolster plate using a 48 in. (1.22 m) straight edge. Check flat edge in all directions.	Bolster plate exceeds bowing criteria.

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
3	M S A T MI Every 6,000 ?	Kingpin	a. Inspect kingpin for straightness using a square. (See Appendix H-13.)	Kingpin is not square.
			b. Lube and clean kingpin and plate.	
			c. Dimensions and wear: **NOTE** Use kingpin gage to check wear, straightness, and flatness of kingpin and bolster plate.	
			1. Length: 3.324 +0.010/-0.000 in. (84.43 +0.25/-0.00 mm) (new)	
			2. Wear: upper diameter at the bolster plate should measure: New: 2.875 in. (73.03 mm) Worn: Max. 2.75 in. (69.9 mm)	Wear meets or exceeds maximum.
			3. The flat surfaces above and below the locking area are allowed no wear.	Wear is evident.
			4. Fifth wheel locking area on kingpin should measure: New: 2.000 in. (50.8 mm) Worn: Max. 1.87 in. (47.5 mm)	Wear meets or exceeds maximum.
			5. Surface damage criteria: Any burrs, nicks or gouges that exceed 0.12 in. (3.1 mm) in depth, or burrs that exceed this measurement in height on the upper diameter at bolster plate and/or at the locking area of kingpin, should have kingpin replaced. Notify Direct Support maintenance.	Surface damage meets or exceeds criteria.
3 (Cont.)		Kingpin (Cont.)	6. No burrs, nicks, or gouges are allowed on the lower collar area of the kingpin below the locking area. Notify Direct Support maintenance to replace kingpin.	Damage meets or exceeds criteria.

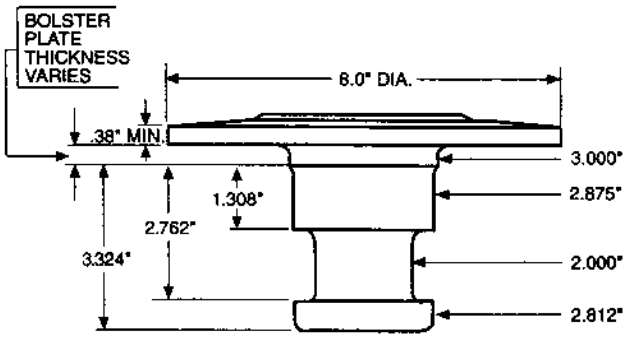


Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
3 (Cont.)		Kingpin (Cont.)	**CAUTION** **Direct Support maintenance:** **When replacing kingpin, inspect all supporting structures for rust, broken welds, and proper drainage. Structure area interior must be inspected and protected against rust. Proper drainage must be maintained.** 7. The area against the bolster plate and locking area on the kingpin should have no more than 10 burrs, nicks, or gouges that exceed 0.06 in. (1.5 mm) in depth on the entire surface area. If this criteria is met or exceeded, replace the kingpin. Notify Direct Support maintenance. Any burrs, nicks or gouges that meet or exceed 0.25” (6.4 mm) in length will require replacement of the kingpin. Notify Direct Support maintenance.	Damage meets or exceeds criteria. Damage meets or exceeds criteria.
4	M S A T MI ? Every 6,000	Converter Box	Check converter box and internal wiring for damage and connectors for security and corrosion. Use corrosion preventive compounds (dielectric) on all electrical contacts.	Wiring damaged, not secured, or corroded.
5	M S A T MI ? Every 6,000	Landing Legs	Check alignment of landing legs with a square. Legs must be parallel and square with trailer.	Legs are not parallel or square with trailer.
6	M S A T MI ? Every 6,000	Main Electrical Harness and All Electrical Connections	Check conditions of electrical harness for wear, frayed insulation, corrosion, and that connectors are secured. Use corrosion preventive compounds (dielectric) on all electrical contacts.	Harness is worn through, corroded, or unsecured. Electrical connections are loose or corroded.

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
7	M S A T MI Every **?** 6,000	Suspension	a. Check serviceability of suspension hardware. Check for wear and damage. Notify Direct Support maintenance.	Threads are worn or hardware damaged.
			b. Torque suspension nuts to the following in-service DRY torque values: 1-1/8”-12 UNF 880 lb-ft (1193 N•m) 3/4”-16 UNF 300 lb-ft (407 N•m) 5/8”-18 UNF 180 lb-ft (244 N•m)	Threads are worn or hardware damaged.
			c. New replacement installations/ hardware should have WET (oiled) fasteners. The following dry torque values apply: 1-1/8”-12 UNF 670 lb-ft (908 N•m) 3/4”-16 UNF 220 lb-ft (298 N•m) 5/8”-18 UNF 130 lb-ft (176 N•m)	Suspension nuts not torqued.
8	M S A T MI Every ? 6,000	Leaf Springs and Attaching Parts	a. Check for missing or damaged hangers, end caps, spring seats, adjustment plates, and hardware.	Leaf spring attachments or hardware is missing.
			b. Check for the following:	
			1. One or more of the leaves in any spring assembly are broken.	Leaf or leaves are not replaced.
			2. Any leaf or portion of any leaf in any spring assembly is missing or separated.	Leaf is missing or separated.
			3. Any broken main leaf in a spring assembly.	Main leaf is not replaced.
			NOTE **The three bottom leaves of each spring pack are the main leaves in each pack.**	

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
9	M S A T MI Every ? 6,000	Hubodometer	Check hubodometer bracket and gage for looseness and missing hardware. Torque gage nut to 15 lb-ft (20.3 N•m) max. **CAUTION** • **Do not use paints or solvents on hubodometer polycarbonate face.** • **Do not stand on hubodometer.** **NOTE** **If hubodometer has a bent or stripped stud, case damage, improper bracket, or hardware or case tampering, it will not perform properly.**	
10	M S A T MI Every ? 6,000	Hub Caps	**NOTE** **Inside of hub cap should have a light coat of grease. Do not plug vent hole.** Check hub caps (4) for leaks, damage, and missing hardware and torque nuts to 15 lb-ft (**N•m**) max **NOTE** **Inside of hub cap should have a light coat of grease. Do not plug vent hole.**	

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
11	M S A T MI ? Every 6,000	Reflectors	If screws are removed/replaced apply a light coat of antiseize compound to all threads.	
			WARNING • **No disassembly of air brake chamber is authorized. Before any work is performed on the spring brake system, chock the wheel front and rear to prevent semitrailer movement. When inspecting or caging air brake chambers, do not position yourself in front of, or in line with, the chamber. Serious injury or death may occur if this warning is not followed.** • **Discarded air brake chambers must be safely and properly disposed of. They should be disarmed prior to disposal to prevent present and future injury. (See Appendix H-20.)**	
12	M S A T MI ? Every 6,000	Air Brake Chamber	Clean and visually inspect clamp bands, castings (case), and fasteners for looseness, damage, and missing hardware or leaking air.	Hardware is loose or missing or castings are damaged or leaking air.

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
13	M S A T MI Every ? 6,000	Studs and Flange nuts	a. Check studs and flange nuts for damage. **NOTE** **All flange nuts and studs have right-hand threads,** b. Flange nut torque: Torque flange nuts to 50 lb-ft (67.8 N•m) and then tighten to 450–500 lb-ft (610–678 N•m) using DRY torque. c. Torquing sequence is as follows: Using DRY torque for flange nuts and studs, facing wheel, clockwise sequence starting at top (see Appendix H-57).	Studs or flange nuts are damaged or loose.
14	M S A T MI Every ? 6,000	Automatic Slack Adjusters (ASAs)	**CAUTION** • **Do not use air or electric tools to adjust ASAs.** • **Initial adjusting procedures start with measurements not tear-down.** Check for any binding, broken, worn or loose parts, missing hardware, evidence of an out-of-adjustment condition, worn clutch, and release action.	Binding, wear, loose parts, missing hardware, out-of-adjustment conditions are evident.
15	M S A T MI Every ? 12,000	Axles	Check axles for proper alignment (refer to Appendix H-38 and TB 9-2510-242-40, Nov 95, page 21-25). If suspension is damaged, notify Direct Support maintenance.	Axles are not in alignment.

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
16	M S A T MI Every ? 12,000	Wood Decking Corrosion	Apply a coat of UV wood or linseed oil protector to upper and lower deck surfaces.	Board(s) are broken or missing.
17	M S A T MI Every ? 36,000	Wheel Bearings	**WARNING** • **Do not use air pressure or a steel bristle brush to clean cones and rollers. Use kerosene or diesel fuel to clean bearings. Do not use gasoline. Do not rotate bearings using compressed air, as this will damage the polished surfaces. Bearing failure can cause injury.** • **At triennial brake inspection/service all brake wheel end components must be cleaned and inspected for wear/damage. Inspect all linings, springs, pins, rollers, clips and bushings on each axle end. Make sure seals show no signs of leakage on axle, spider or wheels. Use all components of replacement kits and balance repairs on both axle ends. Failure to comply can cause injury to personnel and damage to the equipment.** Clean, inspect, and repack inner and outer cones and rollers. Replace if damaged or worn.	Worn or damaged.
18	M S A T MI Every ? 36,000	Seals	Check condition of seals for indicators of problems. When seal is removed, it should be replaced. Use correct seal installation tool to drive/seat seal and never re-use a seal.	Seal is damaged, worn, or leaking.
19	M S A T MI Every ? 36,000	Spindle	Check spindle for damaged threads and surface area for rust/pitting. Notify Direct Support maintenance.	Spindle is damaged.

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
20	M S A T MI Every ? 36,000	Brake Drums	Check drums for cracking, heat discoloration, grooving, elongated bolt holes, out-of-round or worn beyond re-bore limit on drum. Notify Direct Support maintenance concerning wear, re-boring and out-of-round conditions.	Drum is cracked, severely over-heated, has elongated holes, or is out-of-round.
21	M S A T MI Every ? 36,000	ABS Sensors	**CAUTION** **Tap sensor to tone ring using a wood rod only. A metal rod will damage components.** Check that sensor pick-ups are lightly touching tone ring, or have a gap of no more than 0.040 in. (1.02 mm) between the tone ring and pick-up end.	
22	M S A T MI Every ? 36,000	Brake Systems	a. Check brake lining thickness, springs, anchor pins, bushings, and rollers for damage and wear. **WARNING** **Do not allow brake lining to wear to the point that the rivets touch the drum. This condition can cause brake failure, injury to personnel and damage to the equipment.** **CAUTION** **To ensure a balanced breaking system, both brake assemblies on an axle end should have like repairs accomplished at the same time.** b. See Appendix C for lubrication points.	Linings are worn to limit. Springs, anchor pins, bushings, and rollers are damaged or worn.

Table 4-1. Unit PMCS (Cont.)

ITEM NO.	INTERVAL M S A T MI	ITEM TO CHECK/ SERVICE	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
23	M S A T MI Every ? 36,000	"S" Cams	Check for wear and damage to spline, bushings, cam lobes, and retaining brackets. Replace bushings.	Damage/wear affects operation.
24	M S A T MI Every ? 36,000	Hubs	**WARNING** • **The triennial (3 years) 36,000 miles check/service is based on normal operation. Conditions identified such as hot brake drums, leakage/seepage of spindle/hub grease, brake lock-up, wheel end noise/damage, and impact damage will require inspection and repair be performed when the incident occurs, not at service interval. Failure to comply can cause injury to personnel and damage to the equipment.** • **A hot brake can cause serious burns. Exercise extreme caution before attempting to touch brake drum after use. Slowly move hand toward drum. If drum is overheated, radiated heat will be felt before actually touching drum.** Clean and check hubs for wear and damage, including tone rings. Replace hub with tone ring if damaged or worn.	Hub or tone ring is worn or damaged.

CHAPTER 5

UNIT TROUBLESHOOTING

5-1. GENERAL

The following is a list of Troubleshooting Procedures for the M871A3 located in Appendices G thru H:

CHAPTER 6

UNIT MAINTENANCE

6-1. GENERAL MAINTENANCE INSTRUCTIONS.

This Task Covers:

a. General b. Work Safety c. Cleaning Instructions d. Inspection Instructions
e. Repair Instructions f. Tagging Wires and Hoses g. Corrosion Protection

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

References:
TB 9-2510-242-40
TM 9-214
TM 9-247

Materials:
Brush, scrub (Item 48, Appendix F)
Cloth, abrasive (Item 1, Appendix F)
Rags, wiping (Item 10, Appendix F)
Solvent, cleaning (Item 11, Appendix F)

WARNING

For service and repair tasks on the semitrailer, the ground boards and tire chocks should be used to insure safe coupling and prevent semitrailer movement.

a. General.

These general maintenance instructions contain general shop practices and specific methods you must be familiar with to properly maintain your semitrailer. You should read and understand these practices and methods before performing any maintenance tasks.

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 teardown is not necessary. Disassemble equipment only as far as necessary to repair or replace damaged or broken parts.

Resources are not listed in the initial setup unless they apply to the procedure.

All tags and forms attached to equipment must be checked to learn the reason for equipment's removal from service. Modification Work Orders (MWOs) and technical bulletins must also be checked for equipment changes and updates.

In some cases, a part may be damaged by removal. If the part appears to be good, and other parts behind it are not defective, leave it on and continue with the procedure. Here are a few simple rules:

1. Do not remove dowel pins or studs unless loose, bent, broken, or otherwise damaged.
2. Do not remove bearings or bushings unless damaged. If you need to remove them to access parts behind, pull bearings and bushings out carefully.
3. Replace all gaskets, seals, lockwashers, cotter pins, preformed packings, and other locking hardware.
4. Insure all parts are lubricated as specified in Lubrication Order.

b. Work Safety.

Observe all warnings and cautions. Always use power tools carefully.

Protect yourself against injury. Wear protective gear such as safety goggles or lenses, safety shoes, rubber apron, and gloves.

When lifting heavy parts, have someone help you. Insure that lifting/stabilizing equipment is working properly, is suitable for the assigned task, and is secure against slipping.

All maintenance should be performed with:

- Prime mover in neutral with parking brake engaged, if attached.
- Prime mover engine stopped, if attached.
- Chock front and rear of tires.
- Ground boards emplaced.

c. 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.

CAUTION

Do not use high-pressure water or steam to clean semitrailer. Use only low-pressure water and bristled brushes. Be especially careful when cleaning electrical system components to include lighting. Damage or impaired operation will result if this caution is not observed.

General.

Cleaning instructions will be the same for a majority of parts and components that make up the semitrailer. The following should apply to all cleaning operations:

1. Clean all parts before inspection, after repair, and before assembly.

2. Keep hands free of grease which can collect dust, dirt, and grit.

3. After cleaning, all parts should be covered or wrapped to protect them from dust and dirt. Parts that are subject to rust should be lightly oiled.

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.

c. Cleaning Instructions (Cont.).

Clean inner and outer surfaces with cleaning solvent.

Remove grease and accumulated deposits with a stiff bristle brush.

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.

Clear all threaded holes with compressed air to remove dirt and cleaning fluids.

Oil Seals, Electrical Cables, and Flexible Hoses.

CAUTION

Do not wash oil seals, electrical harnesses, and flexible hoses with dry-cleaning solvent or mineral spirits. Serious damage or destruction of material would result.

Wash electrical cables and flexible hoses with a solution of soap and water and wipe dry.

Bearings.

Clean bearings in accordance with TM 9-214.

d. Inspection Instruction.

NOTE

All damaged areas should be marked for repair or replacement.

All components and parts must be carefully checked to determine if they are serviceable for use, can be repaired, or must be scrapped.

1. Inspect drilled and tapped (threaded) holes for the following:

   a. Wear, distortion, cracks, and any other damage in or around holes for wear, distortion, cracks, and any other damage.

   b. Threaded areas for wear, distortion (stretching), and evidence of cross-threading.

2. Inspect metal lines, flexible lines (hoses), and metal fittings for the following:

   a. Metal lines for sharp kinks, cracks, bad bends, and dents.

   b. Flexible lines for fraying, evidence of leakage, and loose metal fittings or connectors.

   c. Metal fittings and connectors for thread damage and worn or rounded hex heads.

d. Inspection Instructions.

3. Inspect castings, forgings, and machined metal parts for the following:

   a. Machined surfaces for nicks, burrs, raised metal, wear, and other damage

   b. Inner and outer surfaces for breaks and cracks.

4. Inspect bearings in accordance with TM 9-214.

e. Repair Instructions.

Any repair procedure peculiar to a specific part or component is covered in the section relating to that item. After repair, clean all parts thoroughly to prevent dirt, metal chips, or other foreign material from entering any working parts.

1. Repair casting, forgings, and machined metal parts using the following instructions:

   a. Repair minor cracked casting or forgings in accordance with TB 9-2510-242-40.

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.

   b. Repair minor damage to machined surfaces with a fine mill file or an abrasive cloth dipped in cleaning solvent.

   c. Replace any deeply nicked machined surface that could affect the assembly operation.

   d. Repair minor damage to threaded capscrew holes with thread tap of same size to prevent cutting oversize.

2. After repair, clean all parts thoroughly to prevent dirt, metal chips, or other foreign material from entering any working parts.

f. Tagging Wires and Hoses.

As soon as the first wire, hose, or tube is disconnected, write number “1” on two tags. Secure one tag to the wire, hose, or tube and the other tag to the terminal, nipple, or fitting. After disconnecting the second wire, hose, or tube, write number “2” on two tags. Secure one tag to the wire, hose, or tube, and the second tag to the terminal, nipple, or fitting. Do the same for all wires, hoses, and tubes.

Note which numbers you used, in pencil, on the illustrations in this manual. This will help you to accurately re-tag, if tags are removed to perform cleaning and maintenance work.

Remove all tags when finished.

g. Corrosion Protection.

General Instructions:

To insure a long operational life for the M871A3 semitrailer the following is presented to assist maintenance personnel. This is not meant to supersede or replace current support operations or authorized publications.

The M871A3 production semitrailer is **not** undercoated at Fontaine Trailer Company prior to delivery. Worldwide operations present many environmental impacts on the semitrailer from salt water to ice/snow melt chemicals. Areas of conflict have their own ways of ventilating and damaging the semitrailer. All these impacts add up to shortened operational life.

Tips:

- Keep the semitrailer clean, which will allow for more complete inspection of welds and components. Use low-pressure water, cleaning detergent, and brushes for cleaning.
- Flush out undercarriages, suspensions, and wheel ends with clean low-pressure water if operating in a salt environment, especially fording, as soon as the mission allows.
- Keep debris out of wheel ends and twistlock pockets.
- Annually clean deck wood and roll/spray on boiled linseed oil or a good commercial UV wood protectorate. Apply to top areas of upper and lower deck wood.
- Protect all exterior areas from rust—clean off rust, prime metal, and paint area.
- Application of 10 wt. oil at oil can points as specified by LO will help protect components and insure they will work when needed.
- Keep bolster plate drain holes free of grease and debris so they drain/air out freely to prevent interior corrosion.

Corrosion Protection:

If undercoating has worn off or damage/repair has taken it off the undercarriage, frame, fillets, gussets, or any other protected area, re-coat with the following:

Rust Inhibitor:	NSN 8030-01-414-7423	(12) 16 oz. (473 mL) bottles
	NSN 8030-01-414-8947	5 gallon (18.9 L) container
	NSN 8030-01-414-7430	55 gallon (208.2 L) drum
	NSN 8030-01-414-1413	55 gallon (208.2 L) drum with applicator and instruction video

Kingpin and Bolster Plate:

If the kingpin is replaced, inspect the interior structure for rust. Clean and protect the interior with rust inhibitor; do not plug up bolster plate drain holes. Make sure all welds are protected inside and out. Inspect the kingpin and bolster plate in accordance with PMCS requirements.

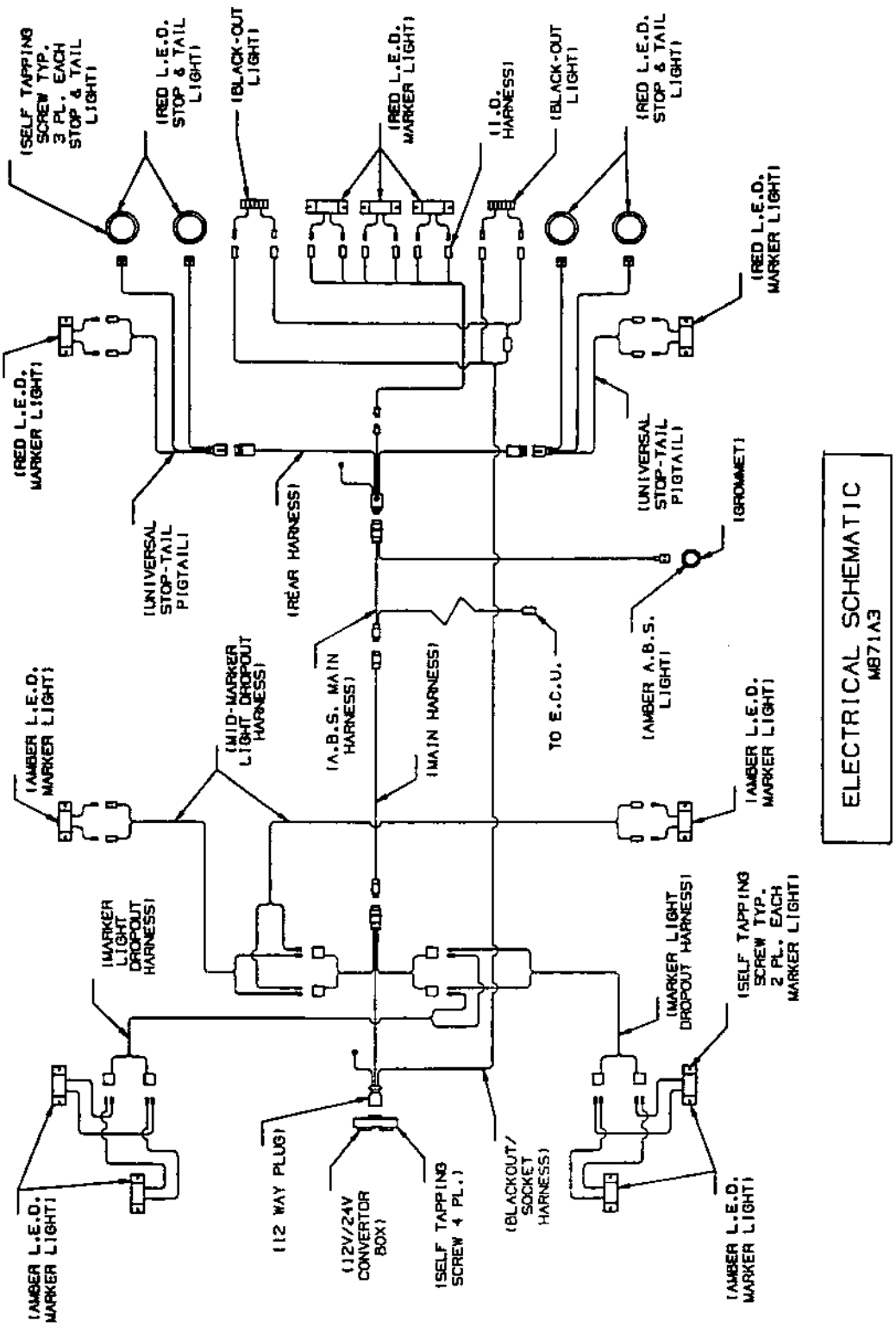
Protection Scheduling:

It is a good idea to periodically take a look at the undercoating, especially after off-road operations. The following is suggested:

- Monthy—Examine the condition of the undercoating.
- Annually—Reapply the rust inhibitor to insure the semitrailer is protected.

If operating in a salt or road chemical environment, you should inspect/protect these areas as soon as possible.

ELECTRICAL SCHEMATIC FOR M871A3



6-2. BLACKOUT LIGHTS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Dielectric grease (Item 34, Appendix F)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

References:
Appendix H-16
Electrical Schematic, Section 6, Page 6-6

WARNING

Disconnect all electrical power before performing any maintenance on the electrical system. Failure to do so could result in injury to personnel.

NOTE

- **Right and left blackout lights are removed and installed the same way. This procedure covers one blackout light.**
- **For detailed procedures and/or information, see referenced "H" Section.**

General Procedure:

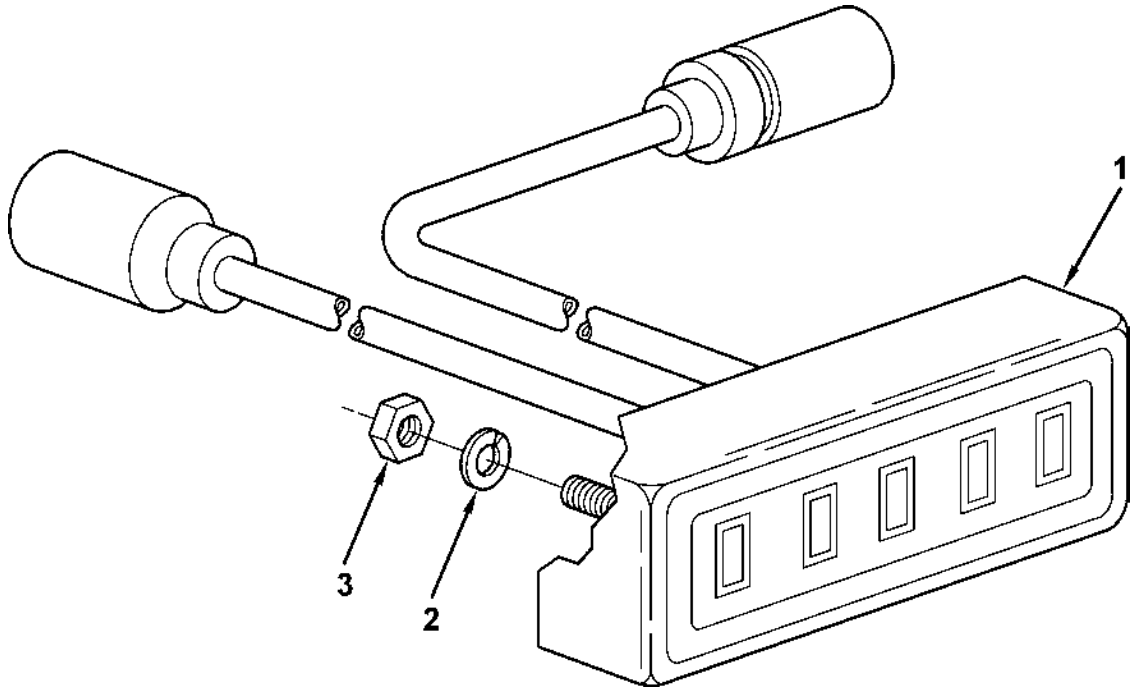
a. Removal.

1. Disconnect two connectors.
2. Remove two nuts (3), two lockwashers (2), and blackout light (1). Discard lockwashers.

General Procedure (Cont.):

b. Installation.

1. Install blackout light (1), two new lockwashers (2), and two nuts (3).
2. Apply dielectric grease on pins and then connect two connectors.



c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Raise landing legs.
3. Remove/store chocks and ground boards.
4. Connect power source and check to see if operational.

6-3. CLEARANCE LIGHTS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

Materials:
Compound, antiseize (Item 4, Appendix F)
Dielectric grease (Item 34, Appendix F)

References:
Appendix H-16
Electrical schematic, Section 6, Page 6-6

WARNING

Disconnect all electrical power before performing any maintenance on the electrical system. Failure to do so could result in injury to personnel.

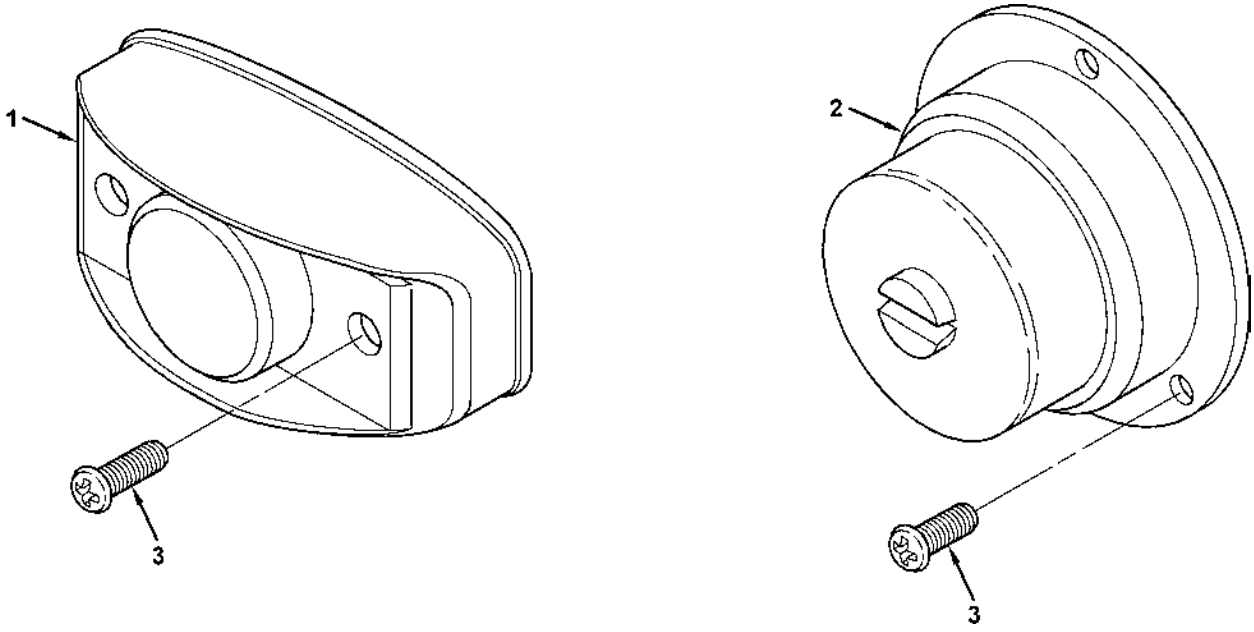
NOTE

- **There are nine clearance lights on the M871A3 semitrailer. The two front clearance lights (2) are held in place with three self-tapping screws. The seven remaining side and rear clearance lights (1) use two self-tapping screws each. This procedure removes and installs one front clearance light; the remaining clearance lights are removed and installed the same way.**
- **For detailed procedures and/or information see reference "H" Section.**

General Procedure:

a. Removal.

1. Disconnect wiring harness from clearance light connector behind bulkhead.
2. Remove three self-tapping screws (3) and clearance light (1 or 2). Discard screws.



b. Installation.

1. Apply antiseize compound to self-tapping screws. Install clearance light (1 or 2) and three new self-tapping screws (3).

2. Connect wiring harness connector to clearance light connector behind bulkhead. Apply dielectric grease to wiring harness pins.

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.

2. Raise landing legs.

3. Connect power source and check to see if operational.

6-4. LED TAILLIGHTS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Dielectric grease (Item 34, Appendix F)
Compound, Antiseize (Item 4, Appendix F)

Equipment Condition
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

References:
Appendix H-16
Electrical Schematic, Section 6, Page 6-6

WARNING

Disconnect all electrical power before performing any maintenance on the electrical system. Failure to do so could result in injury.

NOTE

- **There are four taillights and they are removed and installed the same way. This procedure covers one taillight.**
- **For detailed procedures and/or information see referenced "H" Section.**

General Procedure:

a. Removal.

1. Disconnect taillight connector from wiring harness connector behind bulkhead.
2. Disconnect ground wire from taillight behind bulkhead.

NOTE

Only the two outer taillights have ground wires.

3. Remove three self-tapping screws (2) and taillight (1). Discard screws.

b. Installation.

1. Install taillight (1) with three new self-tapping screws (2). Use a light coat of antiseize compound on screws.

2. Connect ground wire to taillight.

3. Connect taillight connector to wiring harness connector behind bulkhead. Use dielectric grease on pins.

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.

2. Raise landing legs.

3. Remove/store chocks and ground boards.

4. Connect power source and check to see if operational.

6-5. RECEPTACLE CONVERTER BOX.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (item 4, Appendix B-3)

Materials:
Dielectric grease (item 34, Appendix F)

Equipment Conditions:
Landing legs down
Trailer disconnected from prime mover
Tires chocked
Ground boards emplaced

References:
Appendix G
Electrical Schematic, Section 6, Page 6-6

WARNING

Disconnect all electrical power before performing any maintenance on the electrical system. Failure to do so could result in injury.

CAUTION

To avoid damage to the semitrailers converter box and electrical system either the 12 volt (7 pin) OR the 24 volt (12 pin) cable must be plugged into a converter box receptacle. Never plug *both* intervehicular cables into the semitrailers converter box, only one or the other - *NOT* both. The converter box allows either 12 volts OR 24 volts to be utilized from the tractor, not both at the same time.

NOTE

For detailed procedures and/or information see referenced Appendix G.

General Procedure:

a. Removal.

1. Remove four screws (3) and pull out receptacle converter box (2) as a unit.
2. Disconnect harness (1) from receptacle converter box (2).

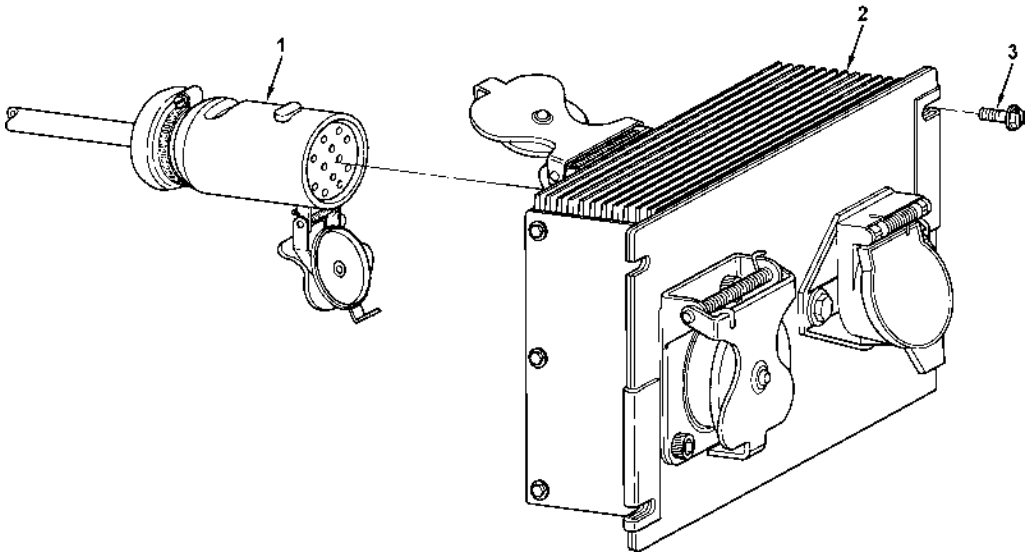
NOTE

Repair procedures for the receptacle converter box are located in Appendix G.

b. Installation.

1. Connect harness (1) to receptacle converter box (2). Use dielectric grease on pins.

2. Install receptacle converter box (2) with four screws (3). Use a light coat of antiseize compound on screws.



c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Raise landing legs.
3. Remove/store chocks and ground boards.
4. Connect power source and check to see if operational.

6-6. TRAILER WIRING HARNESSES REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Dielectric grease (Item 34, Appendix F)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Electrical power disconnected from semitrailer
Tires chocked
Ground boards emplaced

References:
Appendix H-33
Electrical schematic, Section 6, Page 6-6

WARNING

Disconnect all electrical power before performing any maintenance on the electrical system. Failure to do so could result in injury.

CAUTION

Use dielectric grease on all electrical connection(s) and grounds to prevent corrosion.

NOTE

See Appendix H-33 for technical data pertaining to ABS/ECU brake system.

General Procedure:

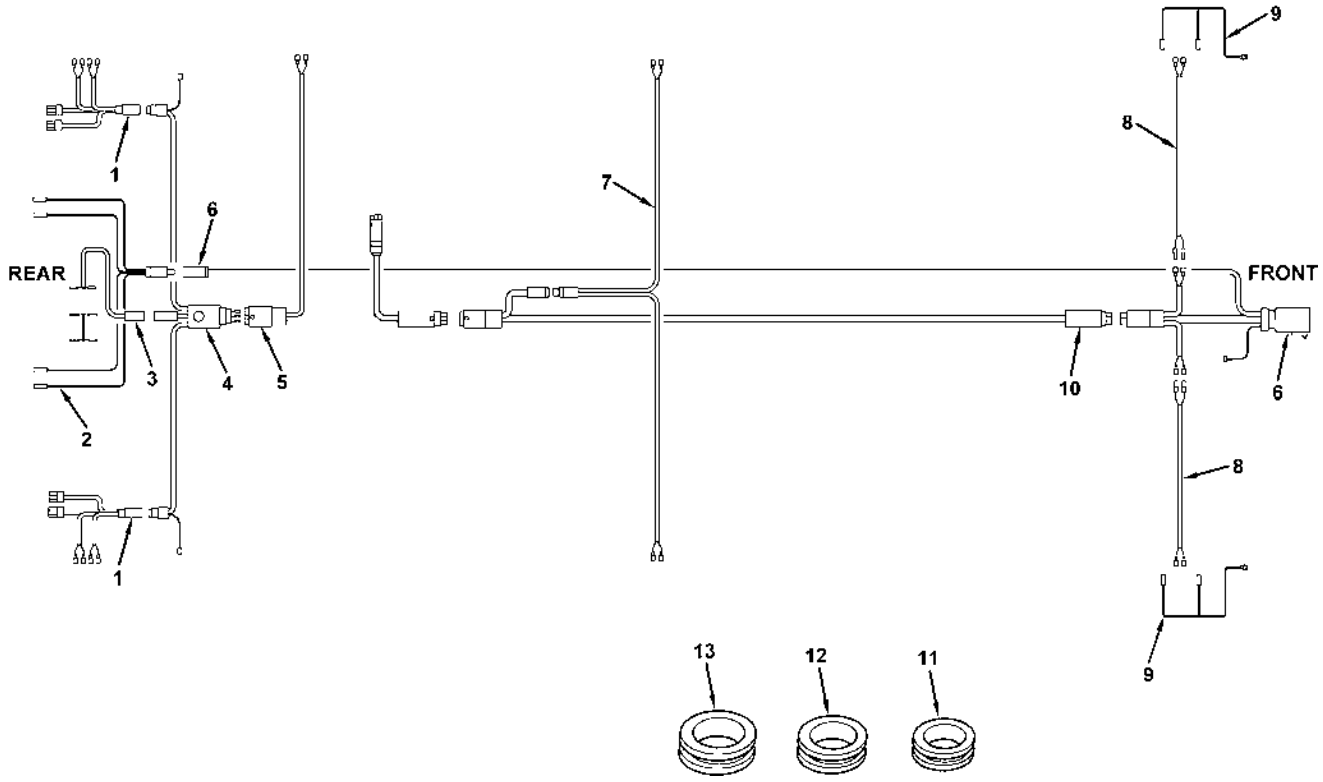
a. Removal.

1. Remove two wiring harnesses (1) from taillights, side clearance lights, and rear wiring harness (4).
2. Remove wiring harness (2) from two BO lights and BO socket wiring harness (6).
3. Remove wiring harness (3) from rear clearance lights and rear wiring harness (4).
4. Remove ABS main wiring harness (5) from ABS warning light, rear wiring harness (4), and main wiring harness (10).
5. Remove midturn ABS wiring harness (7) from two midside clearance lights and main wiring harness (10).
6. Remove two PL10 wiring harnesses (9) from front clearance lights and two PL10 marker wiring harnesses (8).

General Procedure (Cont.):

a. Removal (Cont.).

7. Remove two PL10 marker wiring harnesses (8) from BO socket wiring harness (6).
8. Remove BO socket wiring harness (6) and main wiring harness (10).
9. Remove damaged grommets (11–13) as necessary.



b. Installation.

1. Replace any damaged grommets (11–13) as necessary.

NOTE

Use dielectric grease on all pins.

2. Install BO socket wiring harness (6) and main wiring harness (10).
3. Install two PL10 marker wiring harnesses (8) to BO socket wiring harness (6).
4. Install two PL10 wiring harnesses (9) to two front marker lights and two PL10 marker wiring harnesses (8).
5. Install midturn ABS wiring harness (7) to two midside clearance lights and main wiring harness (10).
6. Install ABS main wiring harness (5) to ABS warning light, rear wiring harness (4), and main wiring harness (10)
7. Install wiring harness (3) to rear clearance lights, and rear wiring harness (4).
8. Install wiring harness (2) to two BO lights and BO light wiring harness (6).
9. Install two wiring harnesses (1) to taillights, side clearance lights, and rear wiring harness (4).

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Raise landing legs.
3. Remove/store chocks and ground boards.
4. Chock to ensure lighting system isoperational.

6-7. SERVICE BRAKES—S-CAMSHAFT REPLACEMENT.

This Task Covers:
a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Jack stands

Equipment Conditions:
Semitrailer disconnected from prime mover
Axles supported by jack stands
Tires and wheels removed (para. 6-18)
Brake drum removed (para. 6-9)
Brake shoes removed (para. 6-8)

Materials:
Grease, GAA (Item 6, Appendix F)

References:
Appendix C
Appendix H-34

WARNING

- **Air brake chambers (all) must be caged before working on the brake system to prevent serious injury to personnel and damage to equipment. Wheels must be chocked.**
- **The axle must be firmly supported to prevent shifting of the semitrailer. Shifting may cause serious injury to personnel and damage to equipment.**

CAUTION

Clean and check all S-cam brake components for wear and damage. Replace worn or damaged parts. At Triennial Service replace all O-rings, bushings, retainers, snap rings, lockwashers, and brackets on each axle end.

NOTE

- **There are four brake S-camshafts (two left and two right) and they are removed and installed the same way. Right and left does not mean left and/or right side. Left or right S-camshaft is specific to S-camshaft rotation in operation (see Appendix H-34). This procedure covers one brake S-camshaft.**
- **S-camshafts and related parts are to lubricated in accordance with Appendix C.**

General Procedure:

a. Removal.

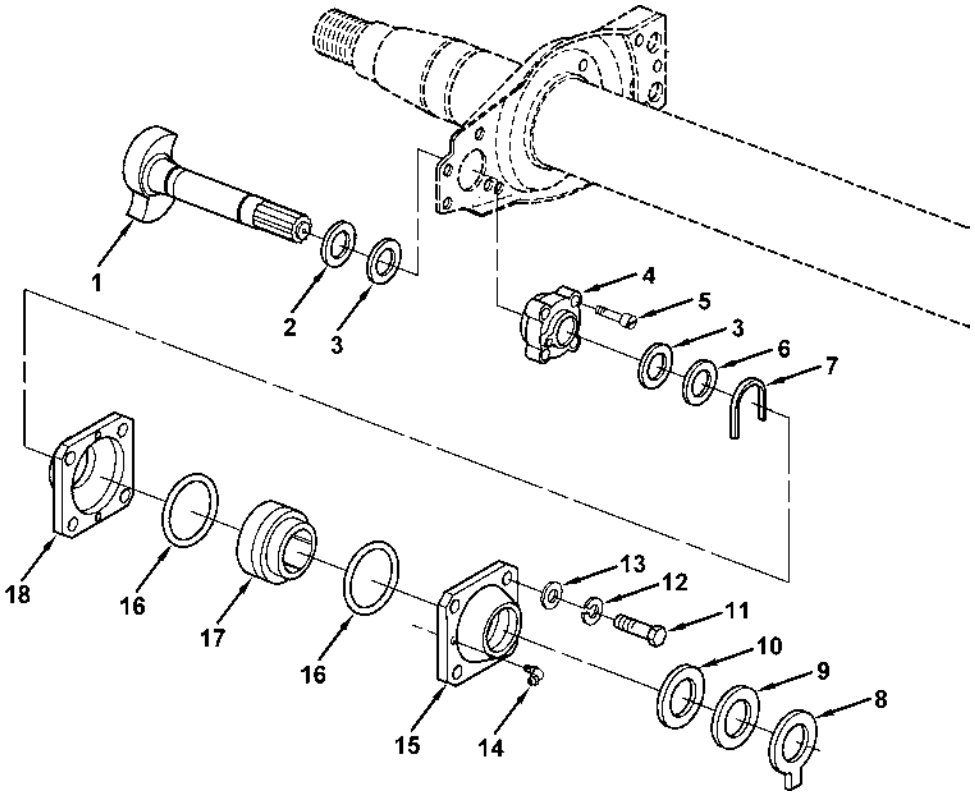
1. Remove snap ring (7) and retaining ring (8) from S-camshaft (1). Discard retaining ring.
2. Remove S-camshaft (1), washers (2), washers (3), washer (6), spacer (10), and washer (9) from bushing retainer (4).

3. Remove four screws (5) and bushing retainer (4).

a. Removal (Cont.).

4. Remove four screws (11), four lockwashers (12), four washers (13), retainer bushing (15), bushing bracket (17), two O-rings (16), and retainer bushing (18). Discard lockwashers and O-rings. Check for worn bushings.

5. Remove lubrication fitting (14) from retainer bushing (15).



b. Installation.

1. Install lubrication fitting (14) on retainer bushing (15).

2. Lube zerk fittings (see page C-4).

3. Install retainer bushing (18), bushing bracket (17), two new O-rings (16) and retainer bushing (15) onto S-camshaft (1) with four new lockwashers (12), four washers (13) and four screws (11).

4. Install bushing retainer (4) and four screws (5).

5. Lightly lube S-camshaft lobes with GAA grease. Wipe off excess grease.

6. Install S-camshaft (1) with washers (2), washers (3), washer (6), spacer (10), and washer (9).

7. Install S-camshaft (1), snap ring (7) and new retaining ring (8).

c. Follow-On Tasks.

1. Install brake shoes (para. 6-8).
2. Install brake drum (para. 6-9).
3. Install tire and wheel (para. 6-18).
4. Remove jack stands from axles.
5. Connect semitrailer to prime mover.
6. Road test to check for safe operation.

6-8. SERVICE BRAKES—SHOES AND LINING REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Jack stands

Equipment Conditions:
Semitrailer disconnected from prime mover
Other wheels chocked
Tires and wheels removed (para. 6-18)
Brake drum removed (para. 6-9)
Ground boards/Chocks emplaced

Materials:
Grease, GAA (Item 6, Appendix F)

References:
Appendix C - LO

WARNING

Clean and check service brakes and all brake components for wear and damage. Replace worn or damaged parts. At Triennial Service replace all springs, pins, rollers, clips, and bushings on each axle end. May cause injury to personnel and damage to the equipment.

CAUTION

Do not allow lining surfaces to become contaminated with any lubrication.

NOTE

There are four brake shoe assemblies and they are removed and installed the same way. This procedure covers one brake shoe assembly.

General Procedure:

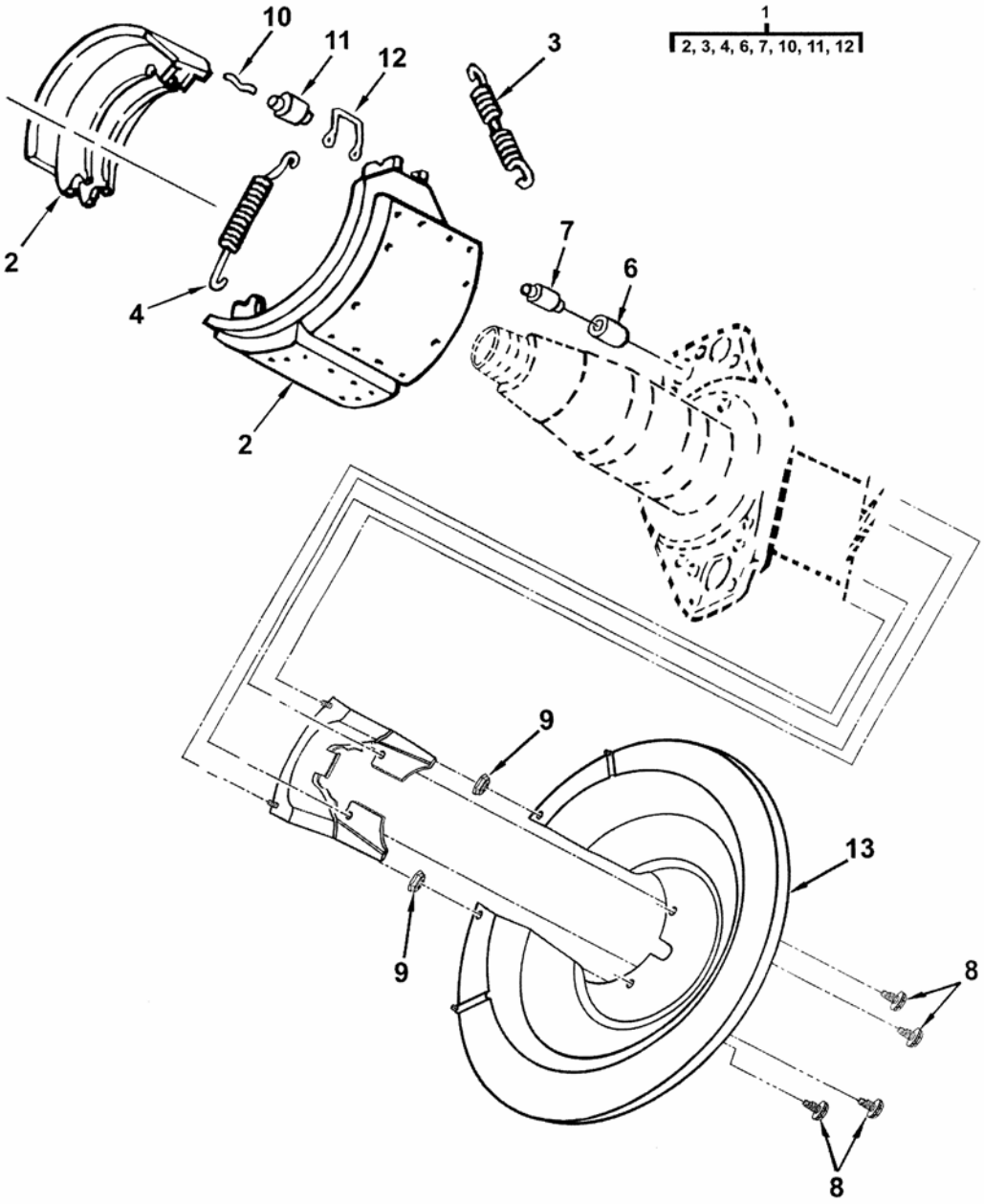
a. Removal.

1. Support axle on both side with jack stands.

2. Push S-cam end of lower shoe and lining (2) down. Pull lower roller retainer (12) to remove roller (11) and retainer (12).

a. Removal. (Cont.)

3. Lift S-cam end of upper shoe and lining (2). Pull upper roller retainer (12) to remove top roller (11) and retainer (12).
4. Lift free end of lower shoe and lining (2) and remove return spring (3).
5. Swing free end of lower shoe and lining (2) away from S-cam to release tension on retaining springs (4).
6. Remove two retaining springs (4) and shoes and linings (2).
7. Remove two anchor pins (7).



8. Use a hammer and suitable driver to remove two bushings (6) from spider.

b. Installation.

1. Drive two new bushings (6) into spider.
2. Lightly lube and install two new anchor pins (7) into bushings (6).
3. Place upper shoe and lining (2) in position on top anchor pin (7).

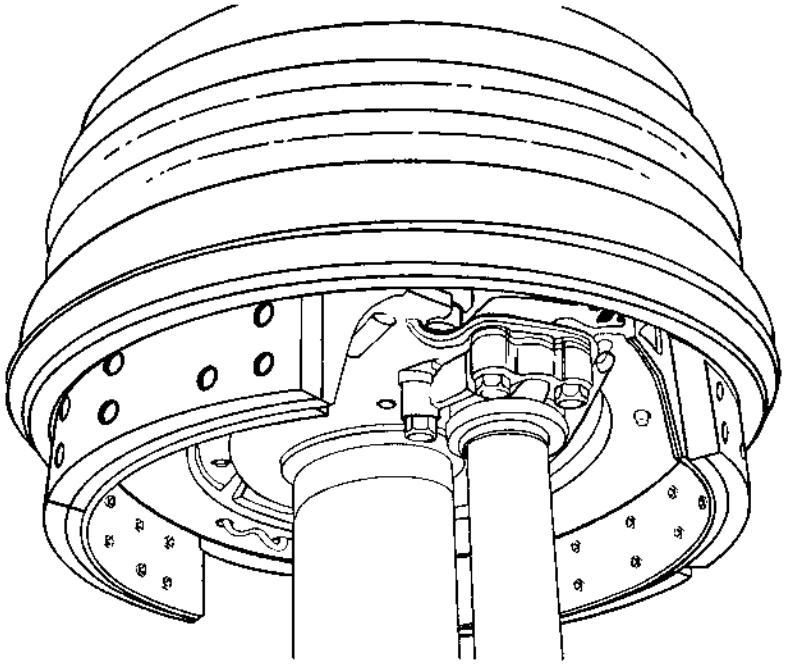
CAUTION

Install new anchor pins (11), retainers (12), and springs (3 and 4) at each shoe and lining replacement.

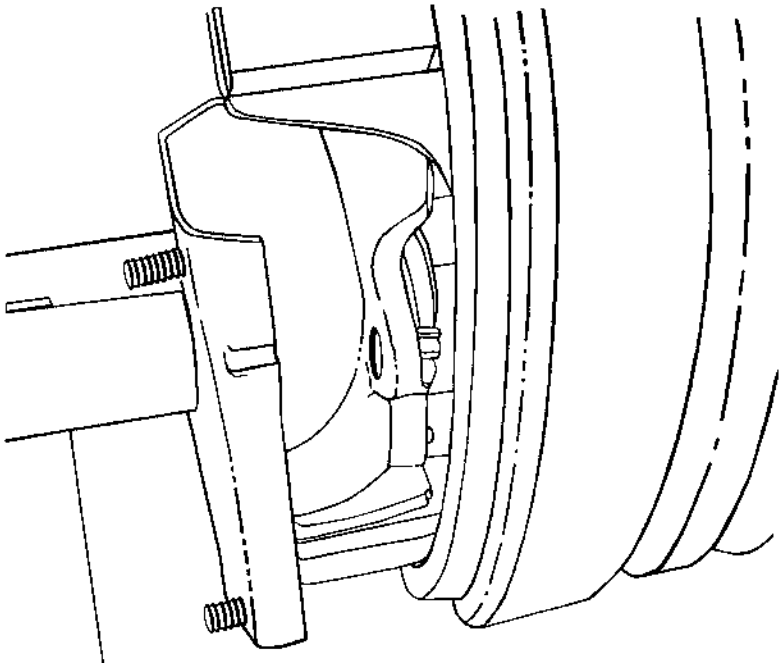
4. Hold lower shoe and lining (2) against bottom anchor pin (7) and install two retainer springs (4).
5. Swing free end of lower shoe and lining (2) to S-cam, pull shoe and lining up, and install return spring (3) on both shoe and lining (2) pins.
6. Install roller retainer (12) on bottom roller (11).
7. Install S-cam end of lower shoe and lining (2) down.
8. Squeeze sides of roller retainer (12) together so it fits between lower shoe and lining (2) webs. Position bottom roller (11) on webs and push roller retainer (12) between shoe and lining webs until it locks into web holes.
9. Install roller retainer (12) on top roller (11).
10. Pull S-cam end of upper shoe and lining (2) up.
11. Squeeze sides of roller retainer (12) together so it fits between upper shoe and lining webs. Position top roller (11) on webs and push roller retainer (12) between shoe and lining webs.
12. Adjust automatic slack adjusters as required manually.

c. Dust Shield Removal and Installation.

1. Remove the drum or move it outboard of the brake spider.

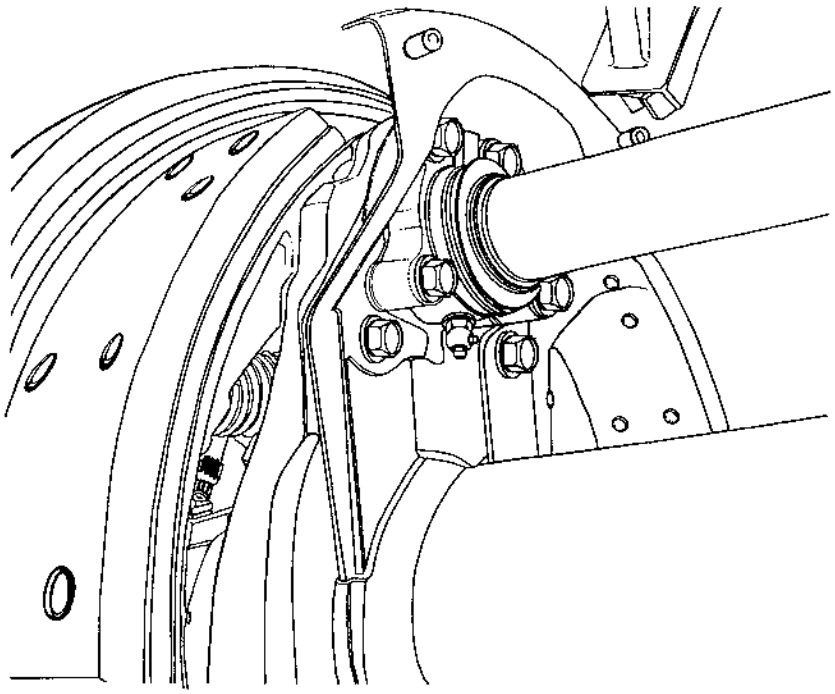


2. Assemble the filler plate onto the brake spider as shown. The tab on the filler plate must be hooked over the edge of the brake spider.

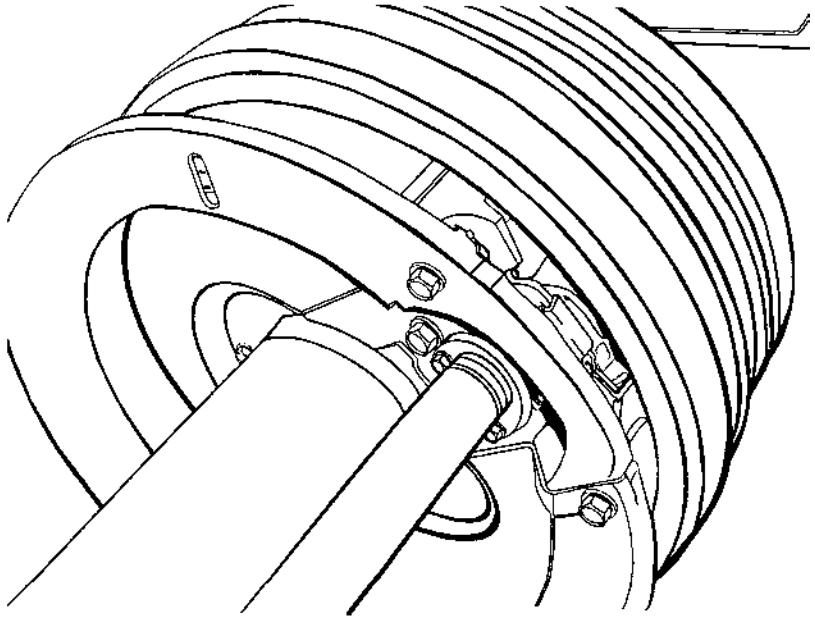


c. Dust Shield Removal and Installation. (Cont.)

3. Install the two self-tapping bolts to secure the filler plate on the brake spider.

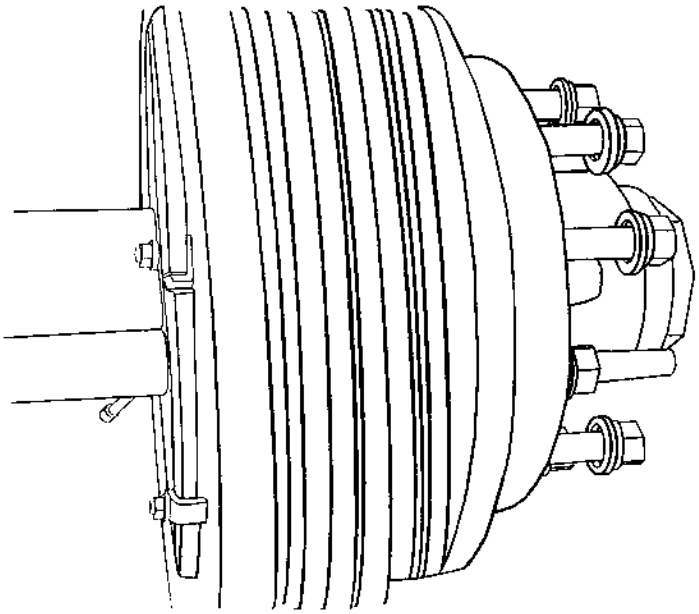


4. Assemble the large C-section of the dustcover onto the brake spider and over the filler plate studs. Install the two self-tapping bolts to hold the C-section onto the brake spider.



c. Dust Shield Removal and Installation. (Cont.)

5. Install the two nuts onto the filler plate studs to secure the filler plate to the C-section of the dustcover. Then, reposition the brake drum tight against the hub flange and check for any dustcover interferences. If there are any light interference conditions, the dust cover can be slightly displaced by using a small pry bar between the drum and dustcover in the area where they are rubbing.



a. Follow-On Tasks.

1. Install brake drum (para. 6-9).
2. Install tire and wheel (para. 6-18).
3. Remove jack stands.
4. Connect semitrailer to prime mover.
5. Raise landing legs.
6. Remove/store chocks and ground boards..
7. Road test to check for proper/safe operation.

6-9. HUBS AND DRUMS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Shop equipment auto repair, FM basic (Item 3, Appendix B-3)
Torque wrench (Item 8, Appendix B-3)
Floor jacks
Jack stands

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires and wheels removed (para. 6-18)
Tires chocked
Ground boards emplaced

References:
Appendix C
Appendix H-22
Appendix H-25
Appendix H-26
Appendix H-27
Appendix H-28
Appendix H-30
Appendix 31
Appendix H-35

WARNING

- **Jack must be positioned directly under axle to prevent slippage. Direct all personnel to stay clear of vehicle when vehicle is supported in the air. Failure to do so could result in serious injury and damage to equipment.**
- **To prevent shifting of trailer, floor jack should be used only on a hard, level surface. Use ground boards (Paragraph 6-24), if necessary. Chock tires.**

NOTE

- **ABS tone ring is part of hub assembly not a separate item of supply.**
- **There are four sets of hub and drums on the M871A3 Semitrailer. This procedure removes and installs one complete set.**
- **Repair, Turning, and Final Disposition of Drums are Direct Support tasks.**
- **Brake drums may be re-bored at Direct Support. Reference Appendix H-25.**
- **For detailed procedures and/or information see referenced "H" Sections.**

General Procedure:

a. Removal.

1. Remove brake drum (14) and 10 wheel studs (4) from hub (3).

2. Remove six screws (13), lockwashers (12), hubcap (11), and gasket (10) from hub (3). Discard lockwashers and gasket.

3. Remove keeper arm (9) and self-locking nut (8) from spindle. Discard keeper arm. See Appendix H-35.

4. Remove outer cone and rollers (1), inner tapered roller cup (2), hub (3), tapered cup (5), cone and rollers (6) and seal (7). Discard seal.

b. Installation.

CAUTION

Seal is tool installed, pressed into hub and must not be cocked or distorted. Spindle must be clean.

NOTE

Grease seal is installed in hub. Use of a seal installation tool is the best method for installation of seal.

1. Install new seal (7), cone and rollers (6), tapered cup (5), hub (3), tapered roller cup (2), and cone and rollers (1) onto spindle.

2. For installation of self-locking nut (8) and keeper arm (9) onto spindle, see Appendix H-35 (Pro-Torq Nut).

NOTE

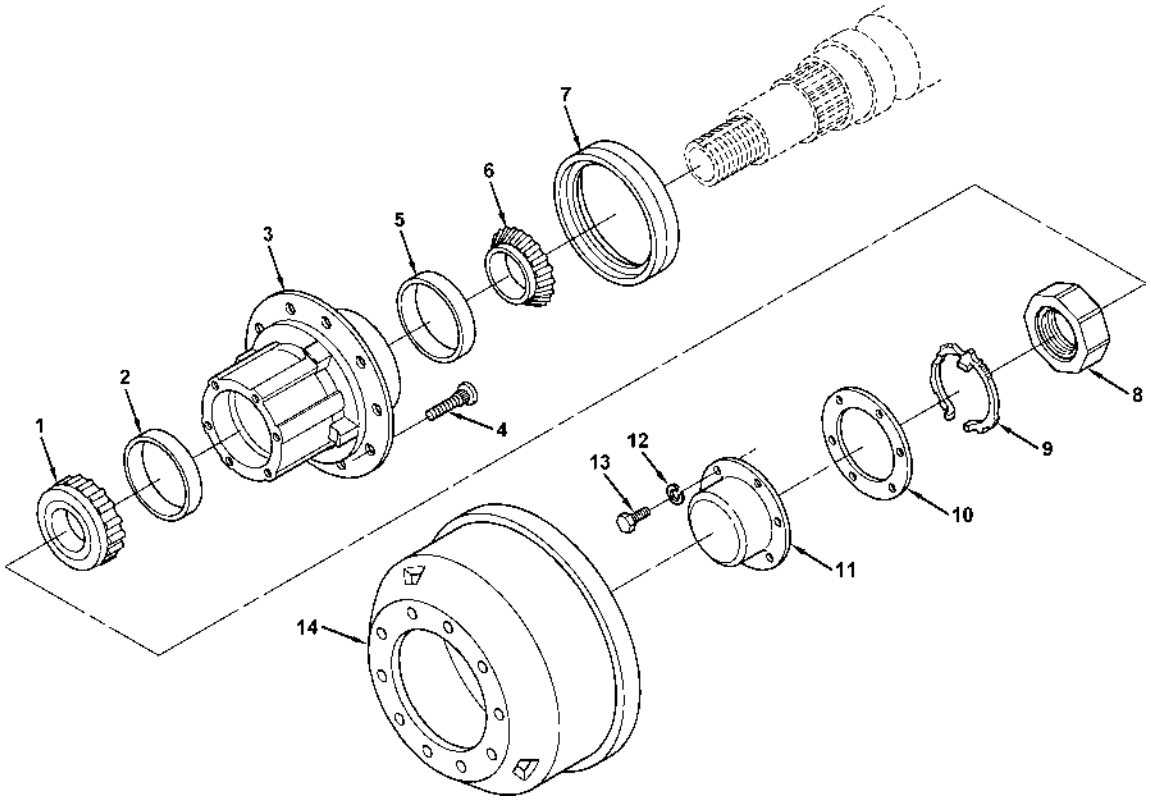
Hubcap fasteners shall be tightened to 15 lb-ft (20.3 N•m) of torque.

3. Install new gasket (10) and hubcap (11) onto hub (3) using six new lockwashers (12) and screws (13). Gasket should be dry.

NOTE

All flange nuts and studs are right-hand threads.

4. Seat brake drum (14) onto hub (3) using 10 wheel studs (4) as guides. Do not damage threads.



c. Follow-On Tasks.

1. Install tires and wheels (para. 6-18).
2. Connect semitrailer to prime mover.
3. Raise landing legs.
4. Remove/store chocks and ground boards.
5. Road test to check for safe operation.

6-10. AUTOMATIC SLACK ADJUSTERS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Adjustment d. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3
Jack stands

References:
Appendix C
Appendix H-37

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover and wheels chocked
Tires chocked

WARNING

Do not use teflon grease or molly-disulfide or white grease lubricant for lubricating slack adjusters. These lubricants will affect the Automatic Slack Adjuster (ASA) causing premature clutch failure, resulting in injury to personnel and damage to equipment.

CAUTION

- **Electrical or pneumatic tools shall not be used for slack adjustment.**
- **Initial adjustments procedures start with measurement not tear-down.**

NOTE

- **For detailed procedures and/or instructions see referenced "H" Section.**
- **There are four slack adjusters and they are removed and installed the same way. This procedure covers one slack adjuster.**

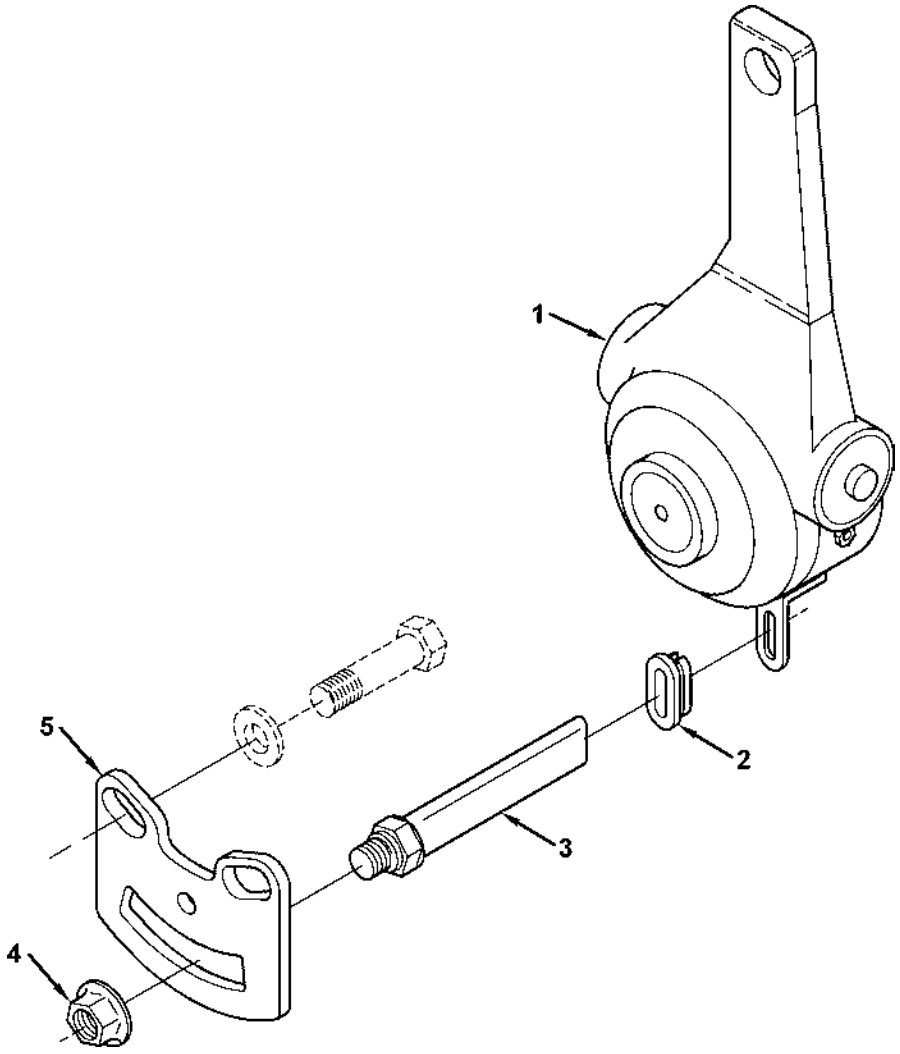
General Procedure:

a. Removal.

Remove nut (4), bracket (5), stud (3), and bushing (2) from slack adjuster (1).

b. Installation.

See Appendix H-37.



c. Adjustment.

See Appendix H-37.

d. Follow-On Tasks.

1. Remove wheel chocks.
2. Connect semitrailer to prime mover.
3. Raise landing legs.
4. Remove/store chocks and ground boards.
5. Road test to insure proper operation.

6-11. ECU VALVE REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Sealing compound (Item 46, Appendix F)

Equipment Conditions:
Landing legs down
Electrical power disconnected
Semitrailer disconnected from prime mover
Tires chocked on both sides of vehicle

References:
Appendix H-33

WARNING

Wear protective goggles when underneath trailer. Insure air tanks are drained of pressurized air. Failure to do so could result in injury to personnel.

CAUTION

Do not use Teflon tape.

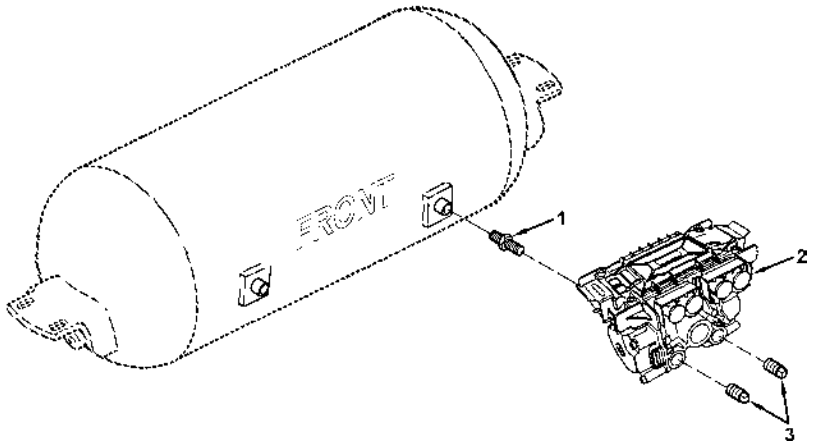
NOTE

See Appendix H-33 for technical data on air brake system.

General Procedure:

a. Removal.

1. Open drain valve on front air reservoir and allow air to escape.
2. Disconnect four sensor cables from ECU valve (2).
3. Disconnect electrical cables from ECU valve (2).
4. Remove two hoses and two elbows from curbside of ECU valve (2).
5. Remove two pipe plugs (3) from rear of ECU valve (2).
6 Remove two elbow fittings and two hoses from roadside of ECU valve (2).
7. Remove pipe nipple (1) from air reservoir and pull away ECU valve (2) from front air reservoir.



b. Installation.

1. Apply sealing compound to threads of elbows, pipe plugs (3), and nipple (1). Do not use Teflon tape.
2. Install elbows, hoses, pipe plugs (3), and pipe nipple (1) to ECU valve (2).
3. Install ECU valve (2) and nipple (1) on air reservoir.
4. Install two elbows and two hoses to curbside of ECU valve (2).
5. Connect all electrical cables to the ECU valve (2).
6. Connect all sensor cables to the ECU valve (2).
7. Close drain valve on air reservoir.

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Raise landing legs.
3. Remove/store chocks and ground boards.
4. Road test to check for air leaks and warning light operation.

6-12. ABS BRAKE POWER CONNECTIONS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

References:
Appendix H-33

Equipment Conditions:
Landing legs down, ground boards emplaced
Semitrailer disconnected from prime mover
Electrical power disconnected
Tires chocked

WARNING

Wear protective goggles when underneath trailer. Insure air tanks are drained of pressurized air. Failure to do so could result in injury to personnel.

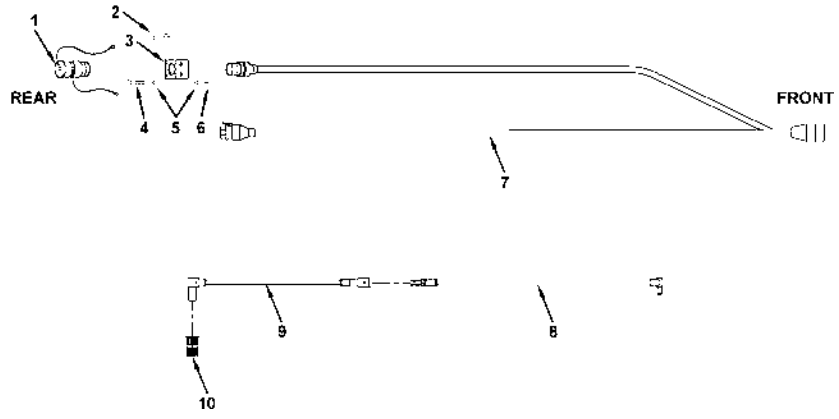
NOTE

See Appendix H-33 for technical data on air brake system.

General Procedure:

a. Removal.

1. Remove four sensor clips (10) from four sensors on inside hub of four inner wheels.
2. Remove four sensors (9) from inside hub of four inner wheels. Hand-install sensors or lightly push into clip using a wooden dowel rod.
3. Disconnect four sensor cables (8) from four sensors (9).
4. Disconnect four sensor cables (8) from ECU valve.
5. Disconnect diagnostic tool (1) from power/diagnostic cable (7).
6. Disconnect power/diagnostic cable (7) from ECU valve, power supply, and mounting bracket (3), removing four screws (4), eight washers (5), and four locknuts (6).



b. Installation.

1. Connect diagnostic/power cable (7) to ECU valve, power supply, and mounting bracket (3), installing four screws (4), eight washers (5) and four new locknuts (6).
2. Connect diagnostic tool (1) to diagnostic/power cable (7).
3. Connect four sensor cables (8) to ECU valve.
4. Connect four sensor cables (8) to four sensors (9).
5. Install four sensors (9) to inside hubs of the four inner wheels.
6. Secure sensors (9) to wheel hubs with sensor clips (10).

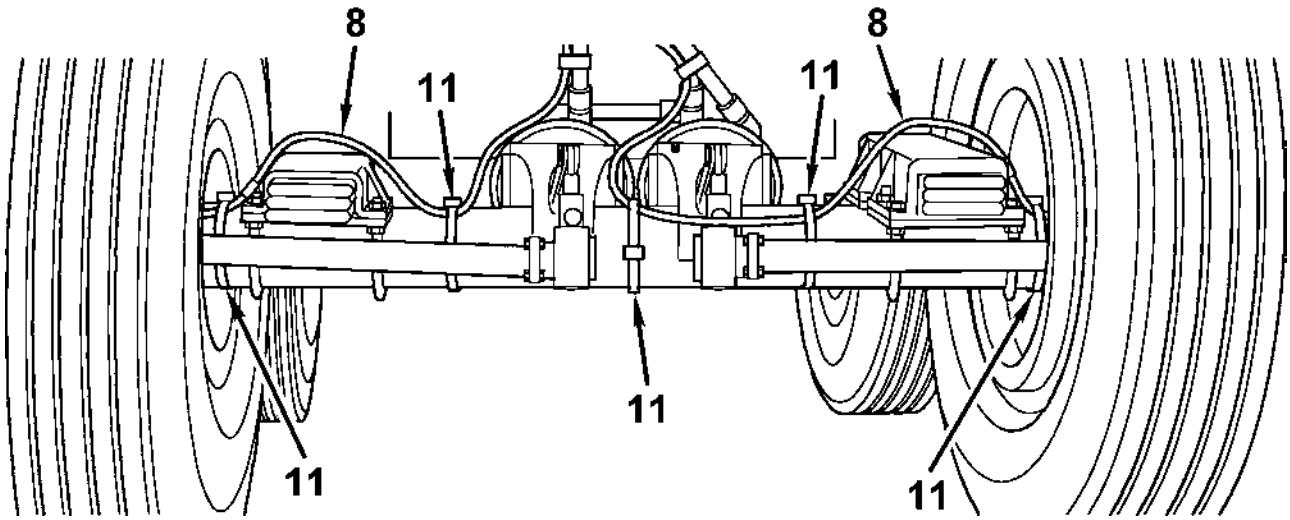
CAUTION

Sensor cables must be nylon strapped at the 12 o'clock or 3 o'clock position on the axle (top or rearward side of axle) to protect them during off-road operation. Use as many nylon straps as required to insure the cables are tightly secured to the axle ends.

NOTE

Attach nylon tiedown straps (11) to axle allowing for easy replacement—locking tab shall be situated within 90° of axle top.

7. Secure sensor cables (8) to axle with nylon tiedown straps (11).



c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Raise landing legs.
3. Remove/store chocks and ground boards.
4. Road test to check for ABS warning light operation.

6-13. AIR LINES AND FITTINGS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Jack stands

Equipment Conditions:
Semitrailer disconnected from prime mover
Landing legs down, ground boards emplaced
Tires chocked
Brake air reservoirs drained

References:
Appendix H-19
Appendix H-20
Appendix H-33
Paragraph 6-11
Paragraph 6-16

WARNING

- **Wear protective goggles when underneath trailer. Insure air tanks are drained of pressurized air. Failure to do so could result in injury to personnel.**
- **Insure air tanks are drained of all pressurized air. Pressurized air (100 psi/690 kPa) may cause injury to personnel or damage to the equipment.**
- **Do not over tighten hose end brass fittings. The fittings should be installed finger tight with an additional 1 to 1 ½ turn using a wrench. Do not twist hoses. Check for air leaks. Failure to heed this Warning may cause the fittings fail, brake lock-up and possible injury or death to personnel.**

NOTE

- **See Appendices H-19, H-20, and H-33 for technical data on the air brake system.**
- **To access glad-hand fitting and hoses upper deck boards must be removed. Check for leaks prior to re-installing boards. Deck boards DO NOT have to be removed to replace glad-hands.**

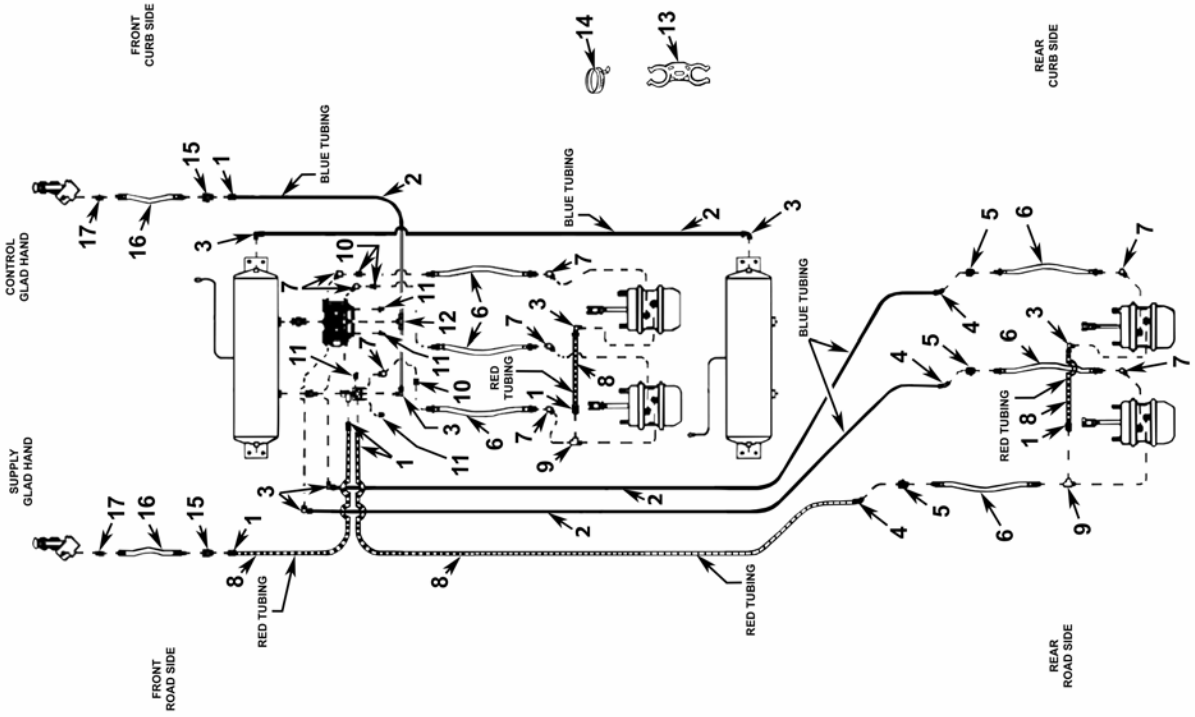
General Procedures:

a. Removal.

1. Remove hose clips (13) and hose clamps (14) as necessary.
2. Remove two adapters (17) from two gladhands and remove two hoses (16), remove tow adapters (15), tow tube adapters (1) and two tube s (2 & 8).
3. Remove adapter (1) from air reservoir.
4. Remove pipe tee (12) from ECU valve and elbow (3) from front air reservoir and remove tube (15).
5. Remove two elbows (3) from front and rear air reservoirs and remove tube (2).

a. Removal (Cont.).

6. Remove adapter (1) from front air reservoir.
7. Remove tube (8) from elbow (1), pipe coupling (5), and hose assembly (6).
8. Remove elbow (3), hose (8), adapter (1), and pipe tee (9) from air brake chambers.
9. Remove two elbows (7), hose assemblies (6), pipe couplings (5), and elbows (4).
10. Remove two elbows (3) from ECU valve and two tubes (2).
11. Remove elbow (3), tube (8), adapter (1), and pipe tee (9) from air brake chamber.
12. Remove three elbows (7), hose assemblies (6), and pipe bushings (10).
13. Remove two elbows (7) from ECU valve.
14. Remove elbow (7).
15. Remove two pipe plugs (11) from control valve (para. 6-16).
16. Remove two pipe plugs (11) from ECU valve (para 6-11).



b. Installation.

1. Install two pipe plugs (11) to ECU valve (para. 6-11).
2. Install two pipe plugs (11) to control valve (para. 6-16).
3. Install elbow (7).
4. Install two elbows (7) to ECU valve.

b. Installation (Cont.).

5. Install three pipe bushings (7), hose assemblies (1), and elbows (2).
6. Install pipe tee (9), adapter (1), tube (8), and elbow (3) to air brake chamber. Do not twist hoses.
7. Install two elbows (3) onto ECU valve and two tubes (2).
8. Install two elbows (4), pipe couplings (5), hose assemblies (6), and elbows (7) to two tubes (8).
9. Install pipe tee (9), adapter (1), hose (8), and elbow (3) to air brake chambers.
10. Install hose assembly (6), pipe coupling (5), and elbow (4) to tube (8).
11. Install adapter (1) to front air reservoir.
12. Install two elbows (3) to front and rear air reservoirs and install tube (2).
13. Install pipe tee (1) to ECU valve and elbow (3) to front air reservoir and install tube (15).
14. Install adapter (22) to air reservoir.
15. Install two adapters (1) to two gladhands and install tubes (2 & 8).
16. Install hose clamps (14) and hose clips (13) as necessary.

c. Follow-On Tasks.

NOTE

To access gladhand hoses and fitting upper deck boards (See Paragraph H-4, Page 13) must be removed. Deck boards do not have to be removed to replace gladhands.

1. Connect semitrailer to prime mover.
2. Raise landing legs.
3. Remove/store chocks and ground boards.
4. Pressurize system and check for leaks.
5. Road test system to insure proper operation.

6-14. AIR BRAKE CHAMBERS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Jack stands

Equipment Conditions:
Landing legs down/Ground boards emplaced
Semitrailer disconnected from prime mover
Tires chocked
Brake air reservoirs drained

References:
Appendix C
Appendix H-19
Appendix H-20
Appendix H-33
Appendix H-37

WARNING

- **No disassembly of air brake chamber is authorized. Before any work is performed on the spring brake system, chock the wheel front and rear to prevent semitrailer movement. When inspecting or caging air brake chambers, do not position yourself in front of, or in line with, the chamber. Serious injury or death may occur if this warning is not followed.**
- **Discarded air brake chambers must be safely and properly disposed of. They should be disarmed prior to disposal to prevent present and future injury. (See Appendix H-20.)**
- **Wear protective goggles when underneath trailer and opening drain valve and avoid the air stream. Failure to do so could result in injury to personnel.**
- **Air brake chambers (all) must be caged before working on them or the brake system to prevent serious injury to personnel and damage to equipment. Wheels must be chocked.**

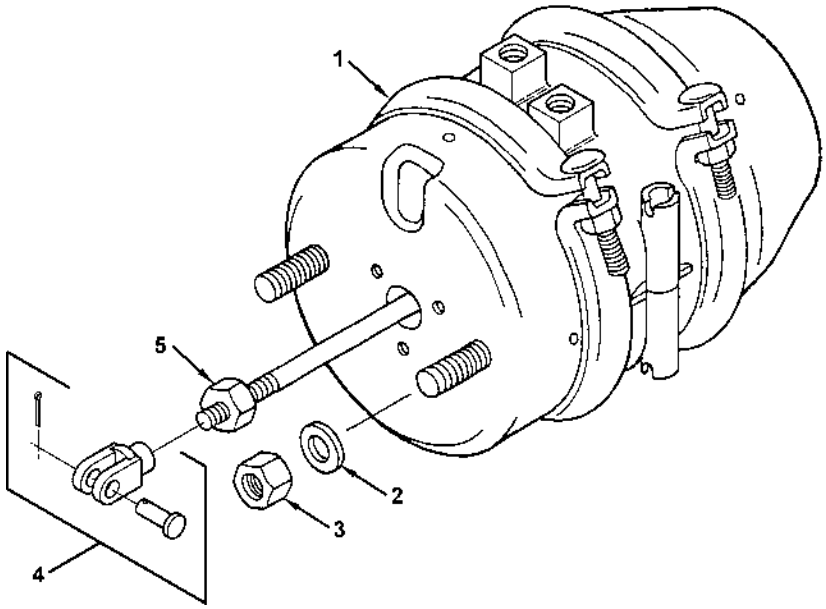
NOTE

- **See Appendices H-19, H-20, and H-33 for technical data on air brake system. See Appendix H-37 for technical data on automatic slack adjusters.**
- **There are four air brake chambers and they are removed and installed the same way. This procedure covers one air brake chamber.**

General Procedure:

a. Removal.

1. Loosen jamnut (5). Remove cotter pin, pin, yoke assembly (4) and jamnut. Replace cotter pin.
2. Remove two locknuts (3), two washers (2), and air brake chamber (1). Discard locknuts.



b. Installation.

1. Install air brake chamber (1), two washers (2), and two new locknuts (3).
2. Install jamnut (5), yoke assembly (4), pin, and new cotter pin. Tighten jamnut.

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Remove tire chocks.
3. Raise landing legs.
4. Remove/store ground boards.
5. Pressurize system.
6. Check system for air leaks.
7. Road test to check for safe opeation.

6-15. AIR RESERVOIRS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
ECU valve removed (Paragraph 6-11)
Ground boards emplaced

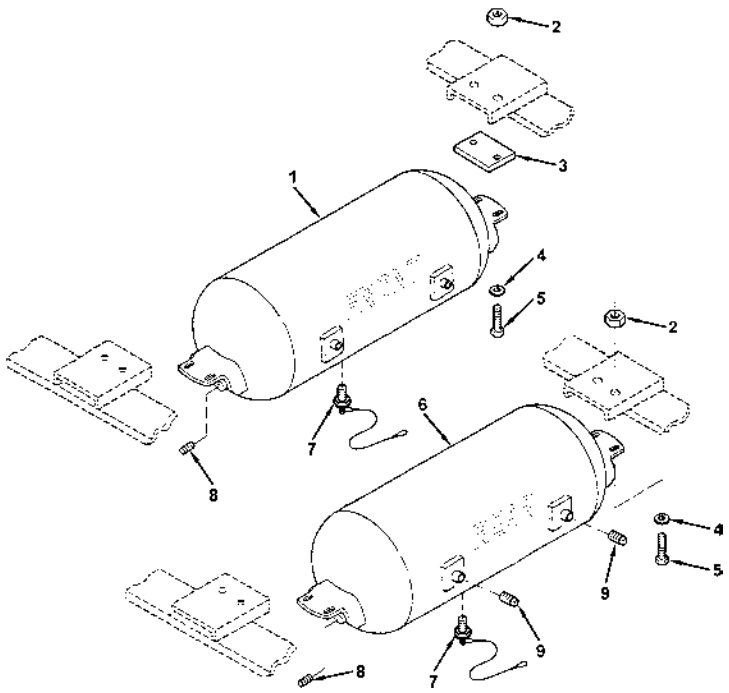
WARNING

- **Wear protective goggles when underneath semitrailer and opening drain valve and avoid the air stream. Failure to do so could result in injury to personnel.**
- **Insure all pressurized air has been drained from system.**

General Procedure:

a. Removal.

1. Remove four locknuts (2), four washers (4), four hex screws (5), two rubber pads (3), and front air reservoir (1) from mounts. Discard locknuts.
2. Remove drain valve (7) and pipe plug (8) from front air reservoir (1).
3. Remove four locknuts (2), four washers (4), four hex screws (5), two rubber pads (3), and rear air reservoir (6) from mounts. Discard locknuts.
4. Remove two pipe plugs (9), drain valve (7), and pipe plug (8) from rear air reservoir (6).



b. Installation.

1. Install two pipe plugs (9), drain valve (7), and pipe plug (8) to rear air reservoir (6).
2. Install rear air reservoir (6) to mounts using four hex screws (5), four washers (4), two rubber pads (3), and four new locknuts (2).
3. Install drain valve (7) and pipe plug (8) to front air reservoir (1).
4. Install front air reservoir (1) to mounts using four hex screws (5), four washers (4), two rubber pads (3), and four new locknuts (2).

c. Follow-On Tasks.

1. Install ECU control valve on rear tank (Paragraph 6-11).
2. Connect semitrailer to prime mover.
3. Remove tire chocks.
4. Raise landing legs.
5. Remove/store ground boards.
6. Pressurize system.
7. Check for air leaks.
8. Road test to insure safe operation.

6-16. AIR BRAKE CHAMBER CONTROL VALVE REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, no. 1 common (Item 1, Appendix B-3)

References:
Paragraph 6-13

Equipment Conditions:
Tires chocked on both sides
Brake air reservoirs drained
Ground boards emplaced

WARNING

- **Wear protective goggles when underneath trailer and opening drain valve and avoid the air stream. Failure to do so could result in injury to personnel.**
- **Insure all pressurized air has been drained from air tanks.**

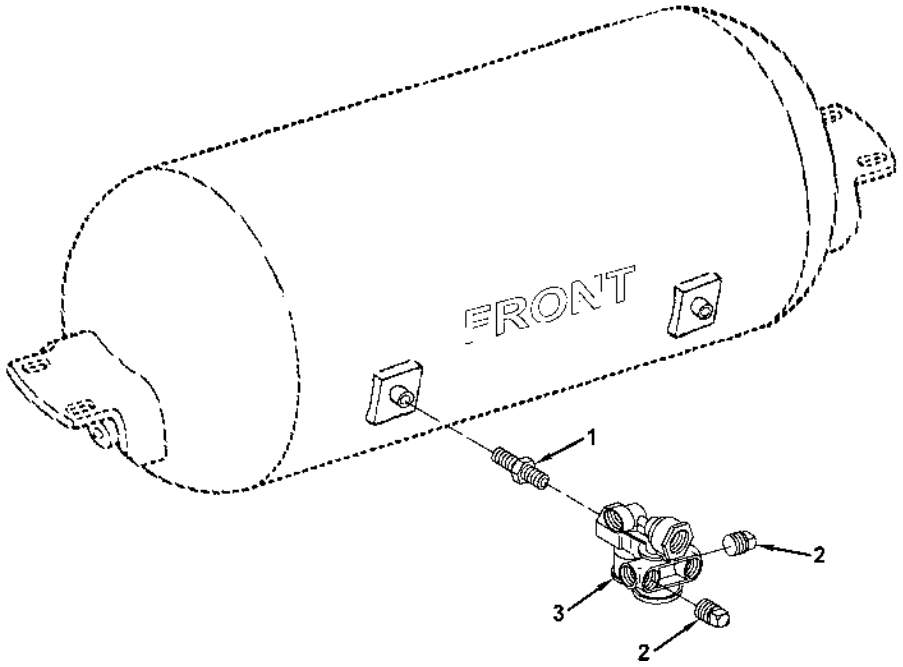
NOTE

- **Retain plugs and save after removal.**
- **The air lines connected to the air brake chamber control valve must be removed prior to this procedure. See Paragraph 6-13 for technical data on air lines and fittings.**

General Procedure:

a. Removal.

1. Remove air brake chamber control valve (3) with nipple (1) attached from front air reservoir.
2. Remove nipple (1) and pipe plugs (2) from air brake chamber control valve (3).



b. Installation.

1. Install nipple (1) to air brake chamber control valve (3) at RES port. Install pipe plugs (2).
2. Install air brake chamber control valve (3) with nipple (1) attached to front air reservoir.

c. Follow-On Tasks.

1. Couple semitrailer to prime mover.
2. Remove tire chocks from both sides and store.
3. Raise landing legs.
4. Remove/store ground boards.
5. Check for air leakage.
6. Road test to check for proper/safe operation.

6-17. SERVICE AND EMERGENCY SWIVEL COUPLINGS (GLADHANDS) REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Oil, lubricating (Item 9, Appendix F)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

References:
Appendix C

NOTE

Service and emergency couplings are removed and installed in the same way.

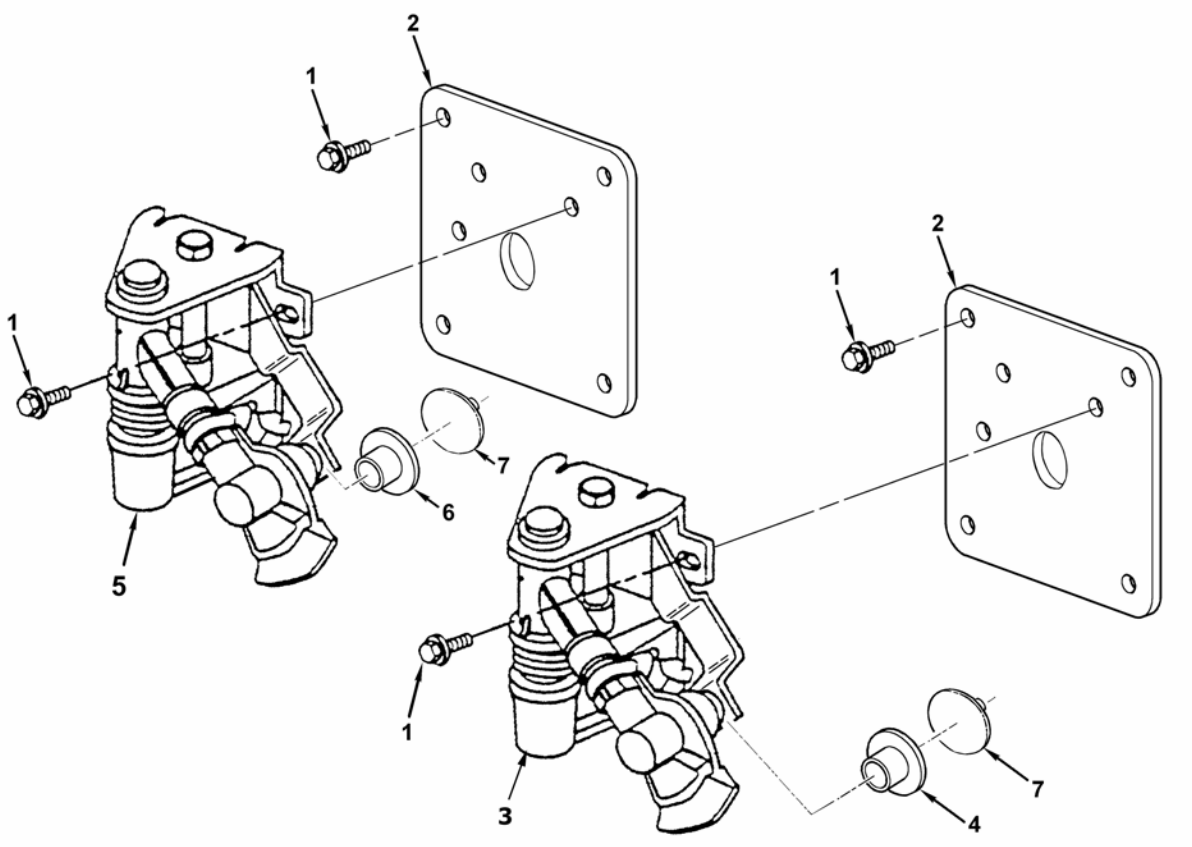
General Procedure:

a. Removal.

1. Remove three self-tapping screws (1) and swivel coupling (3 or 5). Discard self-tapping screws.
2. Remove seal (4 or 6) from swivel coupling (3 or 5). Discard seal (Red seal emergency air, blue seal service air.).
3. Remove four self-tapping screws (1) and plates (2) from semitrailer bulkhead. Discard self-tapping screws.

b. Installation.

1. Install plate (2) and four new self-tapping screws (1) to semitrailer bulkhead.
2. Install new seal (4 or 6) onto swivel coupling (3 or 5).
3. Install swivel coupling (3 or 5) and three new self-tapping screws (1).
4. If seal dust cover (7) is damaged, replace one or both dust covers.



c. Follow-On Tasks.

1. Lubricate swing arm with 10-wt. oil (Appendix C).
2. Connect semitrailer to prime mover.
3. Raise landing legs.
4. Remove/store chocks and ground boards.
5. Check for air leaks.

6-18. WHEEL ASSEMBLIES REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Torque wrench (Item 9, Appendix B-3)
Floor jack
Jack stands
BII jack
Ground boards

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

References:
Appendix H-22

WARNING

- **Jack must be positioned directly under axle to prevent slippage. Direct all personnel to stay clear of vehicle when vehicle is supported in the air. Failure to do so could result in serious injury and damage to equipment.**
- **To prevent shifting of trailer, floor jack should be used only on a hard, level surface.**
- **The spare tire and wheel weigh 179 lbs. (81.2 kg). This 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. Failure to do so could result in injury.**

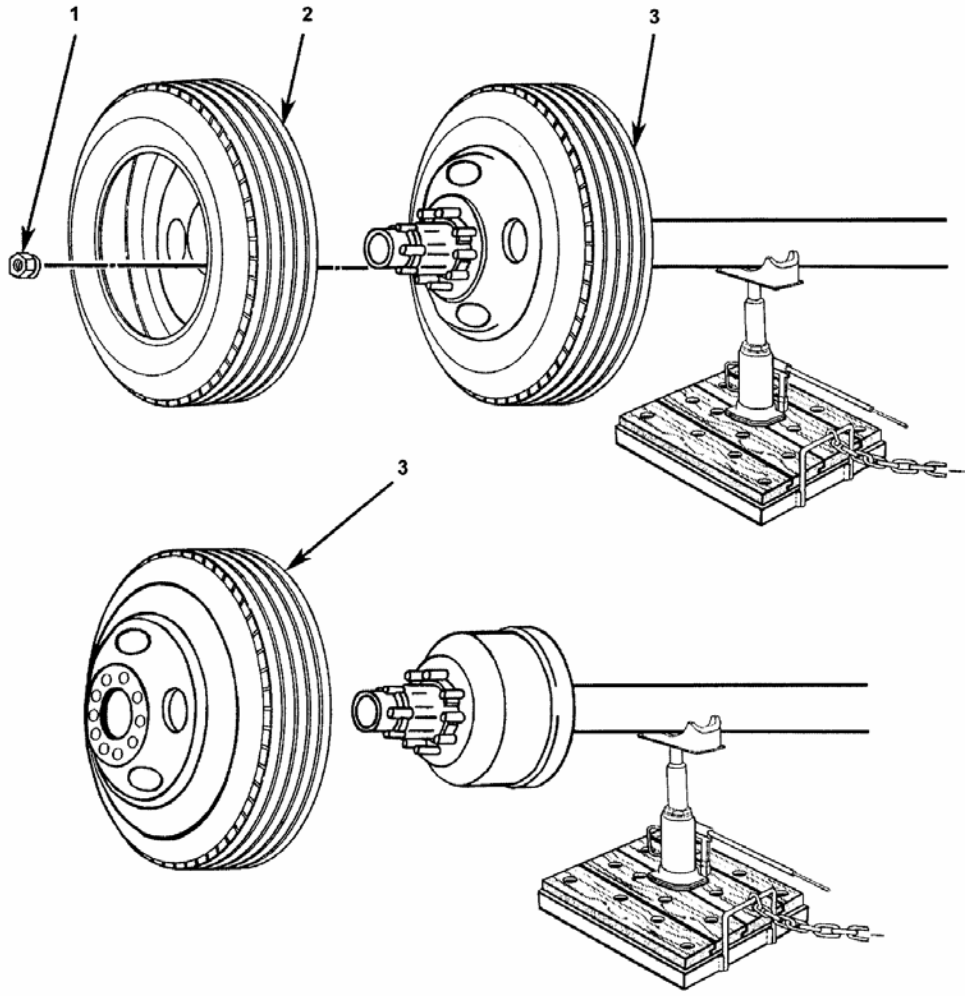
NOTE

- **Wheel replacement in the form of tire-changing is also an Operator task. If floor jacks and jack stands are not available, use Basic Issue 12-ton (10.9 metric ton) jack.**
- **There are eight tire and wheel assemblies and they are removed and installed the same way. This procedure covers one wheel assembly.**
- **For detailed procedures and/or instructions see referenced "H" Section.**

General Procedure:

a. Removal.

1. Chock tires on axle not being lifted.
2. Position jack on ground board under axle closest to where wheel(s) will be removed, as shown.
3. Loosen, but do not remove, 10 nuts (1) while semitrailer tires are in contact with ground. If necessary, use a cheater pipe for additional leverage.
4. Jack up axle until wheel assemblies (2 and 3) clear the ground.
5. Chock tires on axle not being lifted.
6. Remove 10 nuts (1) and wheel assemblies (2 and 3).



b. Installation.

1. Using a floor jack or 12-ton jack, raise axle high enough so that wheel assemblies (3 and 2) can be mounted on axle.

2. Install wheel assemblies (3 and 2) and 10 nuts (1).

WARNING

If flange nuts cannot be torqued, at first opportunity have Organization Maintenance torque flange nuts to proper specifications. See Item 3 under Installation. Periodically stop and check flange nuts for tightness if not properly torqued initially. This will cause the wheel assembly to separate, resulting in injury to personnel and damage to equipment.

CAUTION

To insure secure seating of wheel assembly, see Appendix H-22 for correct torquing sequence.

3. Lower wheel assemblies (3 and 2) to the ground and torque 10 nuts (1) to 450–500 lb-ft (610–678 N•m) of torque.

c. Follow-On Tasks.

1. Remove all jacks/stands.

2. Connect semitrailer to prime mover (if required).

3. Raise landing legs (if required).

4. Remove/store tire chocks and ground boards.

5. Check air pressure for 115 psi (793 kPa).

6. Insure proper torque has been applied to flange nuts.

6-19. DOCK BUMPERS AND SUSPENSION STOPS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

WARNING

Chock tires to prevent trailer movement.

NOTE

There are two dock bumpers and four suspension stops and they are removed and installed the same way. The following procedure covers either one dock bumper or one suspension stop.

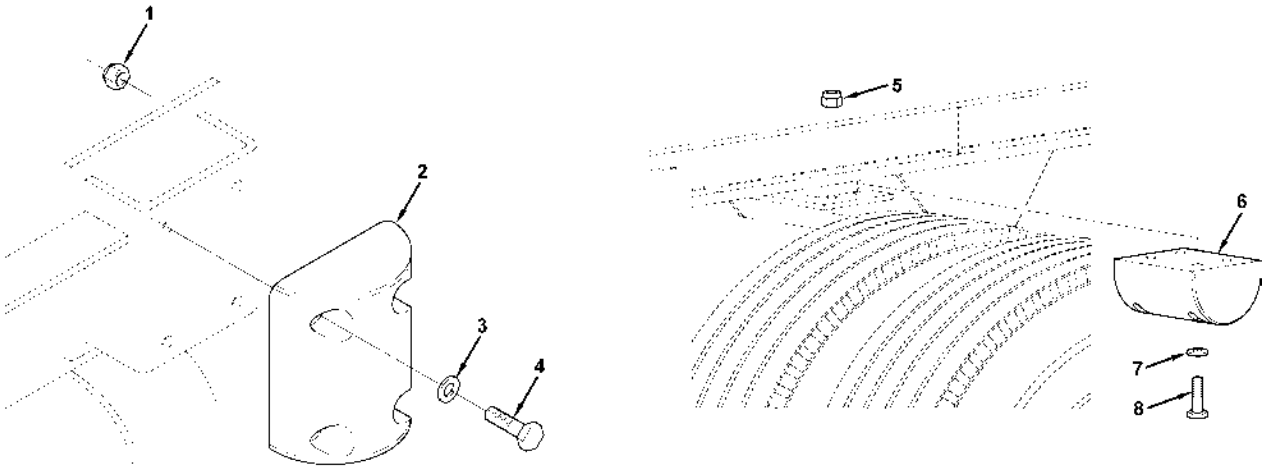
General Procedure:

a. Removal.

Remove four locknuts (1 or 5), four bolts (4 or 8), four washers (3 or 7), and bumper (2 or 6). Discard locknuts.

b. Installation.

Install bumper (2 or 6), four washers (3 or 7), four bolts (4 or 8), and four new locknuts (1 or 5).



c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Raise landing legs.
3. Remove/store chocks and ground boards.

6-20. RETRACTABLE TWIST LOCKS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks d. Service (Monthly)

Initial Setup:

Tools and Special Tools:	**Materials:**
Tool kit, general mechanic's (Item 4, Appendix B-3)	Oil, lubricating (Item 9, Appendix F)
Equipment Conditions:	**References:**
Landing legs down	Appendix C
Semitrailer disconnected from prime mover	Paragraph 6-1
Tires chocked	TM 9-237
Ground boards emplaced	TB 9-2510-242-10

CAUTION

Insure lock pockets are clean and all debris removed.

NOTE

- **Make sure twistlock pocket is clean and free of debris.**
- **Item 3, socket (cup) is welded in. This task is accomplished at Direct Support.**
- **There are eight retractable twist locks and they are removed and installed the same way. This procedure covers one retractable twist lock.**
- **See Paragraph 6-1 for additional service requirements.**

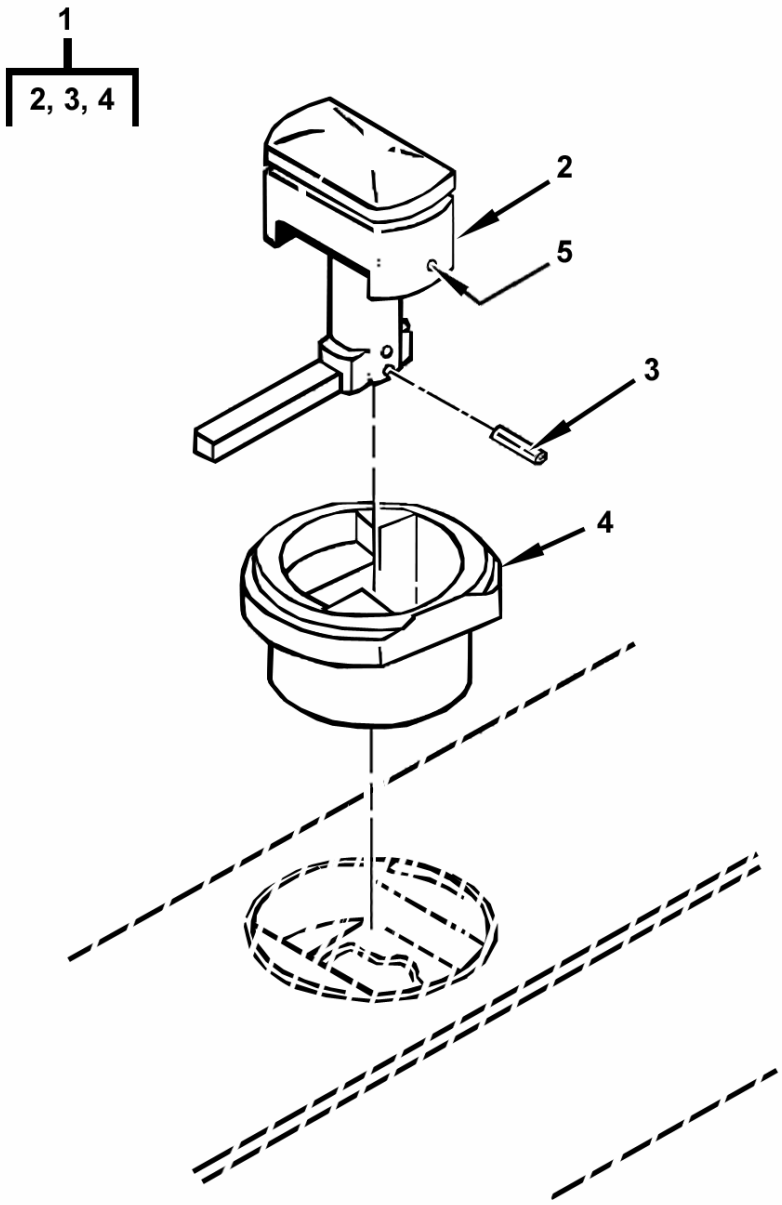
General Procedure:

a. Removal.

Remove pin (5), handle with twistlock (2). Discard pin.

b. Installation.

Install handle with twistlock (2 and new pin (5).



c. Follow-On Tasks.

1. Lubricate twistlock assembly with 10 wt. oil.
2. Make sure twistlock operates freely with no binding.
3. Connect semitrailer to prime mover.
4. Raise landing legs.
5. Remove/store chocks and ground boards.

6-21. TIEDOWN RINGS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Oil, lubricating (Item 9, Appendix F)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

References:
Appendix C
Paragraph 6-1

CAUTION

Replace damaged/deformed D-Rings.

NOTE

- **There are 4 ammunition and 36 cargo tiedown rings and they are removed and installed the same way. This procedure covers one tiedown ring.**
- **See Paragraph 6-1 for additional service requirements.**

General Procedure:

a. Removal.

Remove cotter key, nut, bolt, sleeve, upper ring, and lower ring.

b. Installation.

NOTE

Hand tighten nut against D-ring. Make sure D-ring does not bind.

Install lower ring into deck pinning, upper ring, sleeve, bolt, nut, and cotter key.

c. Follow-On Tasks.

1. Lubricate with 10-wt. oil (Appendix C).
2. Insure tiedown ring does not bind.
3. Connect semitrailer to prime mover.
4. Raise landing legs.
5. Remove and store chocks and ground boards.

6-22. SPARE TIRE CARRIER REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

References:
TM 9-237

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

WARNING

- **The spare tire weighs 179 lb (81.2 kg). This 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. Failure to do so could result in injury.**
- **Securing hardware for the carrier and tire must be present, serviceable and tight. Failure to comply with this Warning will result in injury or death to personnel.**

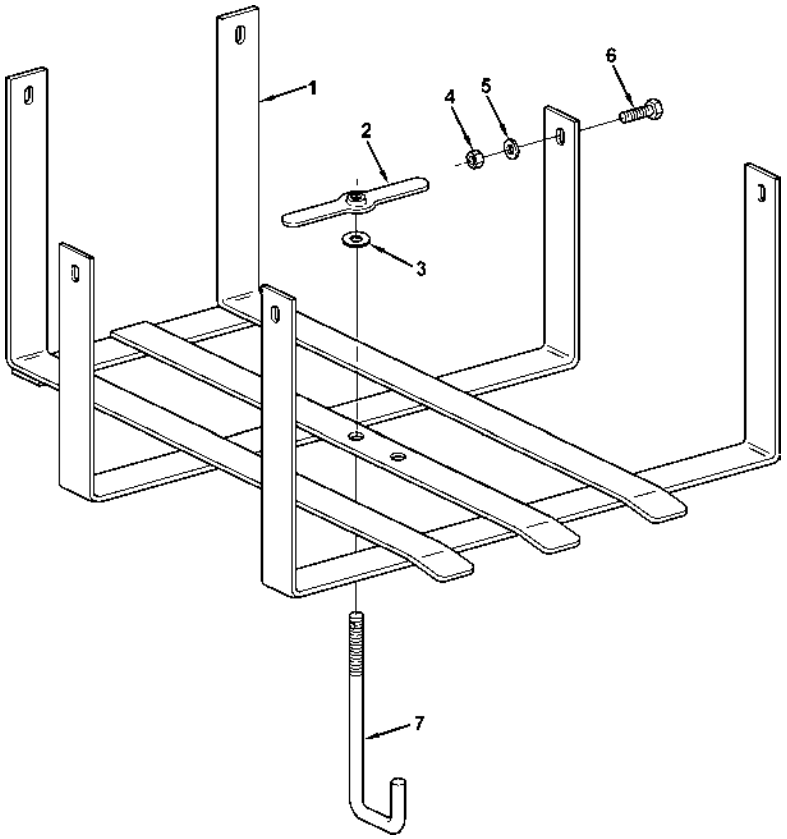
General Procedure:

a. Removal.

1. Remove padlock (if applicable).
2. Remove wing nut (2), washer (3), bolt hook (7), and spare tire from spare tire carrier (1).
3. Remove six locknuts (4), washers (5), hex bolts (6), and spare tire carrier (1). Discard locknuts.

NOTE

Broken slats on spare tire carrier may be re-welded at Direct Support. See TM 9-237 for welding instructions.



b. Installation.

1. Install spare tire carrier (1), six new locknuts (4), washers (5), and hex bolts (6).

NOTE

The spare tire is installed with the outside of the wheel on top (convex up).

2. Install spare tire bolt hook (7), washer (3), wing nut (2), to spare tire carrier (1).

c. Follow-On Tasks.

1. Check tire pressure for 115 psi (793 kPa).
2. Insure spare tire is secured in carrier.
3. Connect semitrailer to prime mover.
4. Raise landing legs.
5. Remove and store chocks and ground boards.

6-23. LANDING GEAR REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Oil, lubricating (Item 9, Appendix F)

Equipment Conditions:
Semitrailer disconnected from prime mover
Semitrailer blocked on jack stands
Tires chocked

References:
Appendix C
Appendix H-18

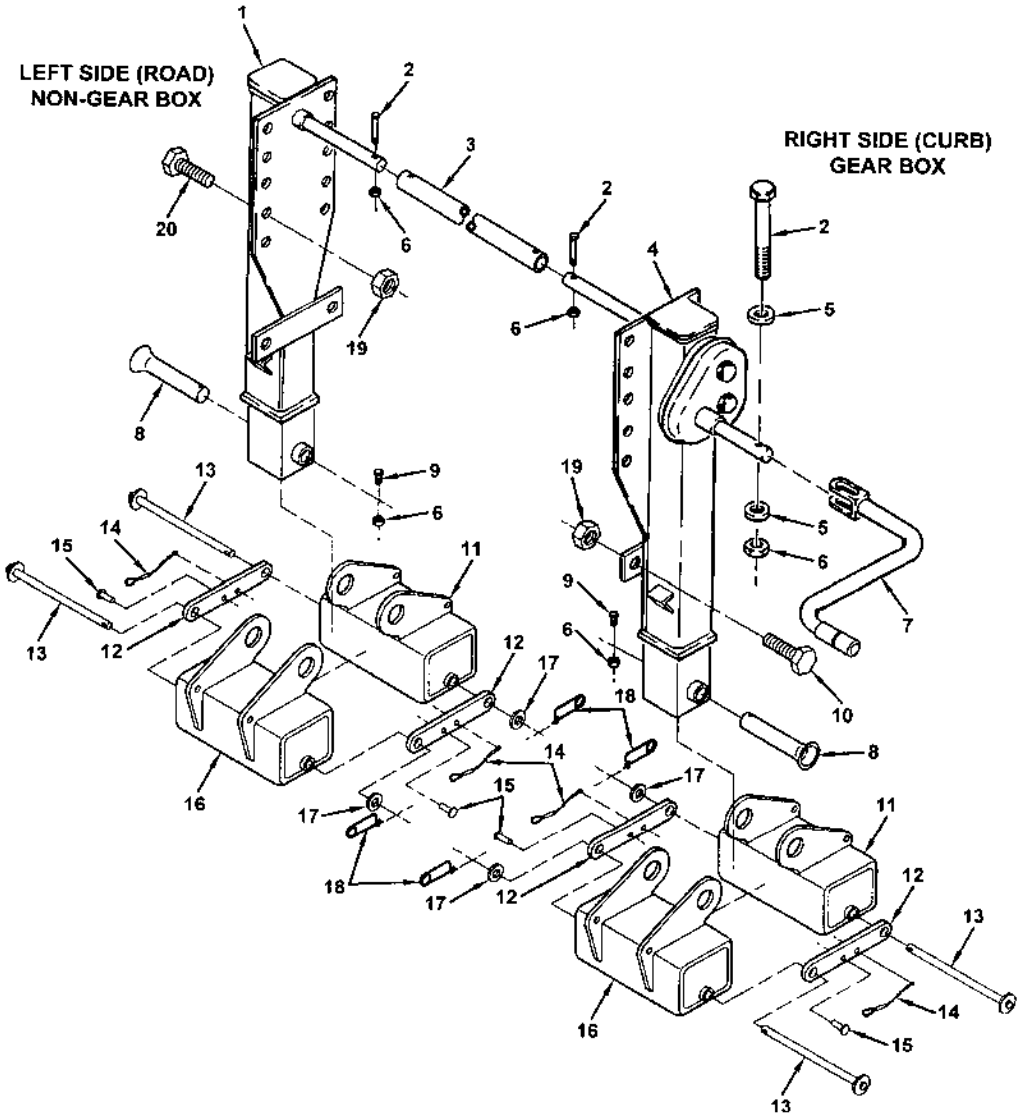
NOTE

For detailed procedures and/or instructions see reference "H" Section.

General Procedure:

a. Removal.

1. Remove two bolts (2) and self-locking nuts (6) from cross drive shaft (3). Discard self-locking nuts.
2. Remove 10 bolts (20) and locknuts (19) from landing leg upper bracket. Discard locknuts.
3. Remove two bolts (8) and locknuts (19) from landing leg lower bracket and remove landing leg (1) from semitrailer. Discard locknuts.
4, Remove hex screw (18), self-locking nut (6), and pull pin (9) from landing gear shoe assembly. Discard self-locking nut.
5. Remove two hitch pins (17), washers (16), ties (11), pins (12), front shoe assembly (10), and rear shoe assembly (15) from landing leg.
6. Remove two pop rivets (14) and lanyards (13) from landing leg (1). Discard pop rivets (if required).
7. Repeat steps 1–6 for remaining landing leg.
8. Remove bolt (4), two washers (5), and self-locking nut (6) from landing leg crank (7) and remove crank (7). Discard self-locking nut.



b. Installation.

1. Install two lanyards (13) into landing leg (1) using two new pop rivets (14).
2. Install front shoe assembly (10) to rear shoe assembly (15) using two hitch pins (17), washers (16), ties (11) and pins (12).
3. Install shoe assembly to landing leg (1) using pin (9), hex screw (18), and new self-locking nut (6).
4. Install landing leg (1) onto landing leg upper bracket using 10 bolts (20) and new locknuts (19).
5. Install landing leg (1) onto landing leg lower bracket using two bolts (8) and new locknuts (19).
6. Install landing leg (1) onto cross drive shaft (3) using bolt (2) and new self-locking nut (6).
7. Repeat steps 1–6 for remaining landing leg.
8. Install landing leg crank (7) onto landing leg (1) using bolt (4), two washers (5), and new self-locking nut (6).

c. Follow-On Tasks.

1. Lubricate with 10-wt. oil (Appendix C).
2. Retract/extend landing legs to insure smooth operation.
3. Emplace ground boards.
4. Lower landing legs.
5. Remove jack stands.
6. Remove tire chocks.
7. Connect semitrailer to prime mover.
8. Raise landing legs.
9. Remove and store ground boards.

6-24. GROUND BOARDS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked

WARNING

When removing or installing ground boards keep your fingers and thumbs clear of bracket to prevent injury.

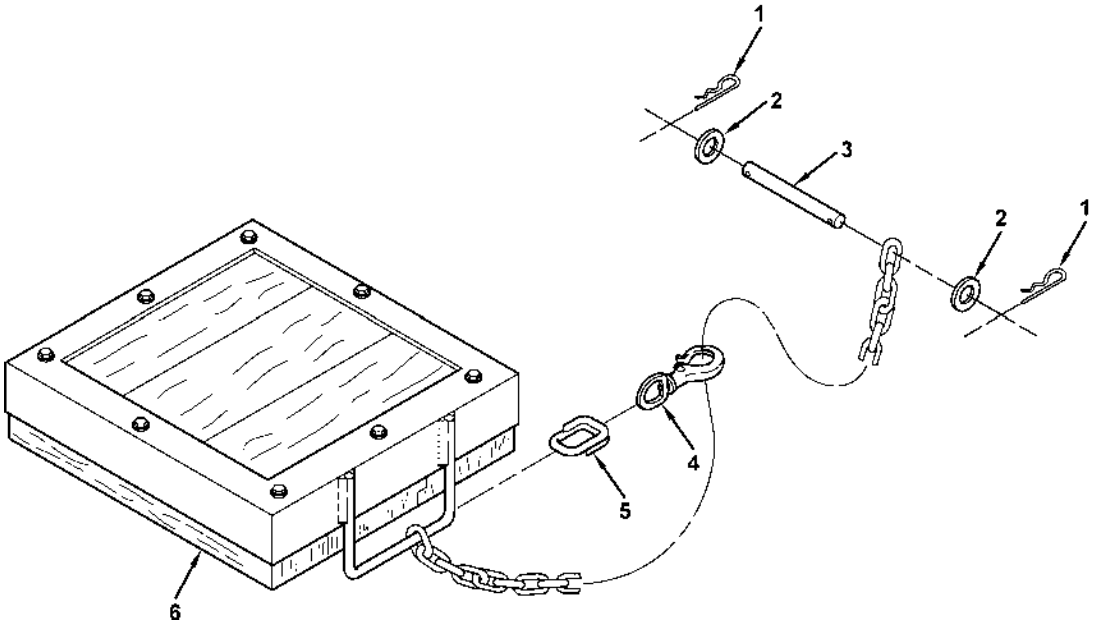
NOTE

There are two ground boards and they are removed and installed the same way. This procedure covers one ground board.

General Procedure:

a. Removal.

1. Remove two cotter pins (1), washers (2), and pin (3) from semitrailer bracket. Discard cotter pins.
2. Remove clip (4) and chain link (5) from chain and remove ground board (6) from semitrailer.



b. Installation.

1. Install ground board (6) onto semitrailer and install clip (4) and chain link (5).
2. Install two new cotter pins (1), washers (2), and one pin (3) to semitrailer bracket.

c. Follow-On Tasks.

1. Secure ground board (6) using clip (4) to take up slack in chain. Pull on handle to insure ground board will not slide out during operation.
2. Connect semitrailer to prime mover.
3. Remove tire chocks.
4. Raise landing legs.

6-25. BULKHEAD AND STOWAGE RACK ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Sideboards/stakes removed from bulkhead and stowage racks
Tires chocked
Ground boards emplaced

General Procedure:

a. Removal.

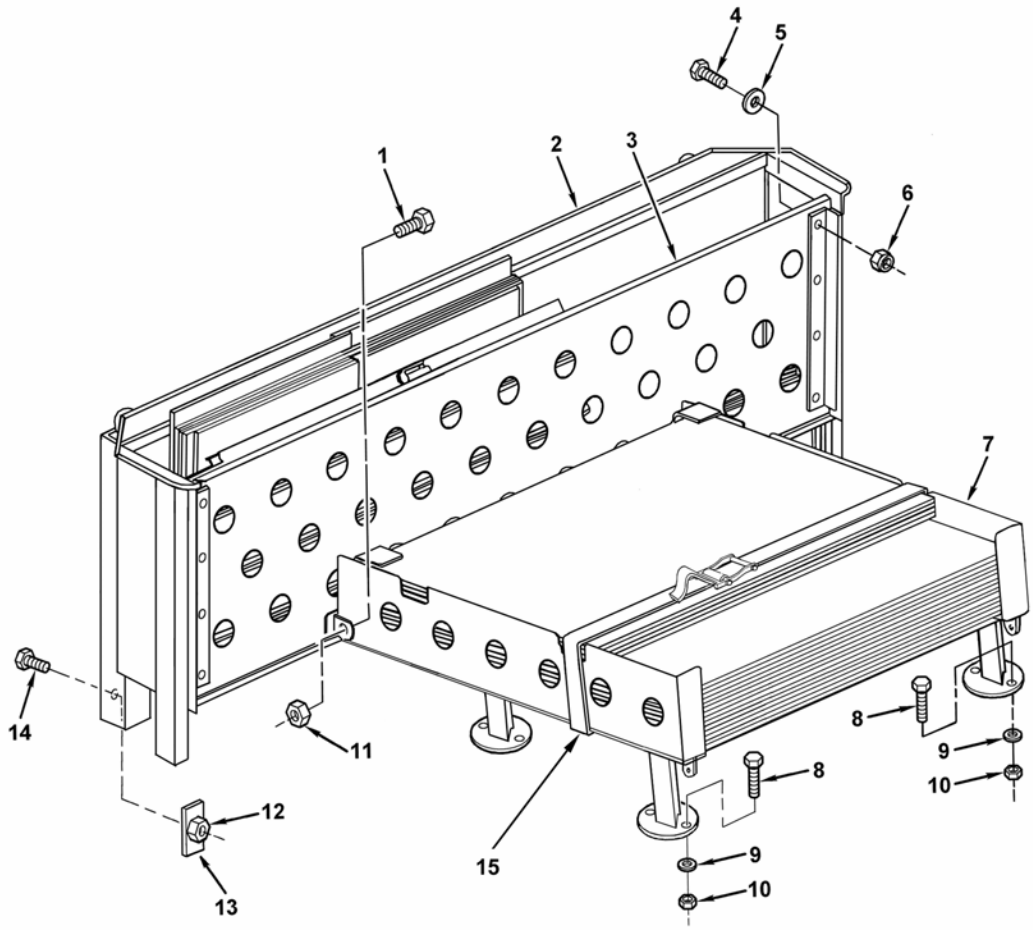
WARNING

Bulkhead assembly weights 250 pounds.

CAUTION

Retaining strap must be wrapped around stowage rack and panels then tightened/secured. Do not attach strap ends to deck cargo rings. This will cause the strap to prematurely wear and break, resulting in loss of panels during operation.

1. Remove two locknuts (11), two bolts (1), four locknuts (10), four washers (9), four bolts (8), and curbside and roadside stowage assemblies (7). Discard locknuts.
2. Remove eight nuts (6), eight lockwashers (5), eight bolts (4) and crossmember bulkhead assembly (3). Discard lockwashers.
3. Remove four nuts (12), four lockwashers (13), four bolts (14), and bulkhead assembly (2). Discard lockwashers.



b. Installation.

1. Install bulkhead assembly (2) using four bolts (14), four new lockwashers (13), and four nuts (12).
2. Install crossmember bulkhead assembly (3) using eight bolts (4), eight new lockwashers (5), and eight nuts (12).
3. Install roadside and curbside stowage assemblies (7) using four bolts (8), four washers (9), four new locknuts (10), two bolts (1), and two new locknuts (11).

c. Follow-On Tasks.

1. Insure all hardware is fastened securely.
2. Reinstall sideboards/stakes into stowage rack, strap, and secure in bulkhead stowage area.
3. Connect semitrailer to prime mover.
4. Remove tire chocks and ground boards.
5. Raise landing legs.

c. Follow-On Tasks (Cont.).

NOTE

- **Storage rack with panels may be detached from trailer deck, forklifted off trailer, and stored when not required for mission. Make sure all hardware for mounting and strapping are with rack when stored separately from the trailer. All side/rear rack components may be stored/strapped with rack and tagged with trailer serial number if not required for the mission.**

- **During snow or freezing conditions cover bulkhead stowage area and panel rack with a tarp and secure with bungee cords. This will help prevent the stored components from freezing together.**

- **Panel securing strap ends should not be secured to deck cargo rings. Strap should be secured around rack and panels.**

6-26. CORNER AND SIDE STAKES REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (item 4, Appendix B-3)

Equipment Conditions:
Semitrailer disconnected from prime mover
Landing legs down
Side boards removed
Tires chocked
Ground boards emplaced

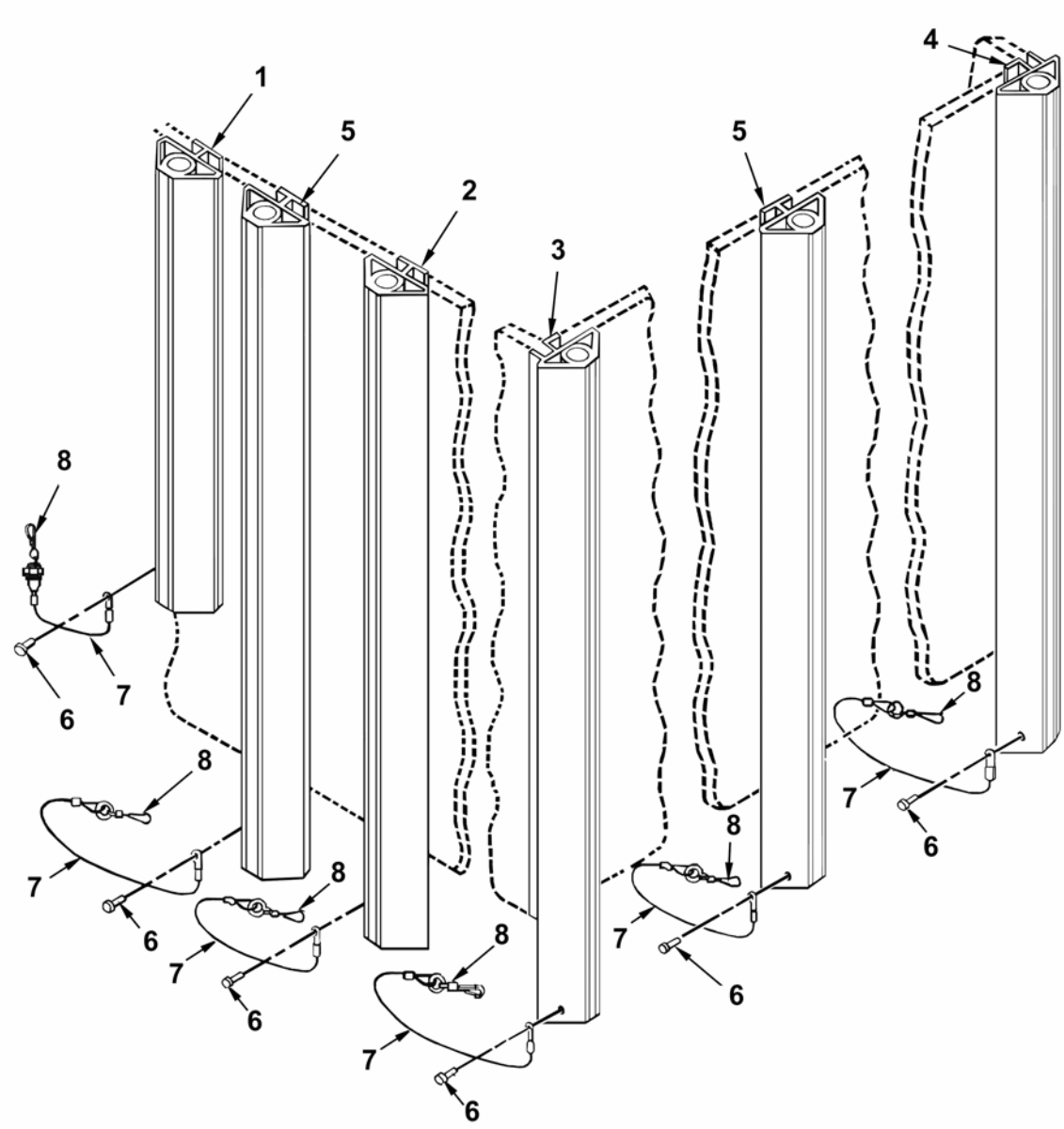
General Procedure:

a. Removal.

1. Remove two links (5), rivets (7), lanyards (6), and corner stakes (4). Discard rivets.
2. Remove 13 links (8), rivets (10), lanyards (9) and side stakes (3). Discard rivets.
3. Remove four links (13), rivets (11), lanyards (12), and side stakes (2). Discard rivets.
4. Remove six links (16), rivets (15), lanyards (14), and side stakes (1). Discard rivets.

b. Installation.

1. Install two corner stakes (4) using links (5), new rivets (7), and lanyards (6).
2. Install 13 side stakes (3) using links (8), new rivets (10), and lanyards (9).
3. Install four side stakes (2) using links (13), new rivets (11), and lanyards (12).
4. Install six side stakes (1) using links (16), new rivets (15), and lanyards (14).



c. Follow-On Tasks.

1. Install side/rear panels.
2. Ensure all stakes and panels are secured.
3. Connect semitrailer to prime mover.
4. Remove tire chocks and ground boards.
5. Raise and secure landing legs.

6-27. MUD FLAPS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

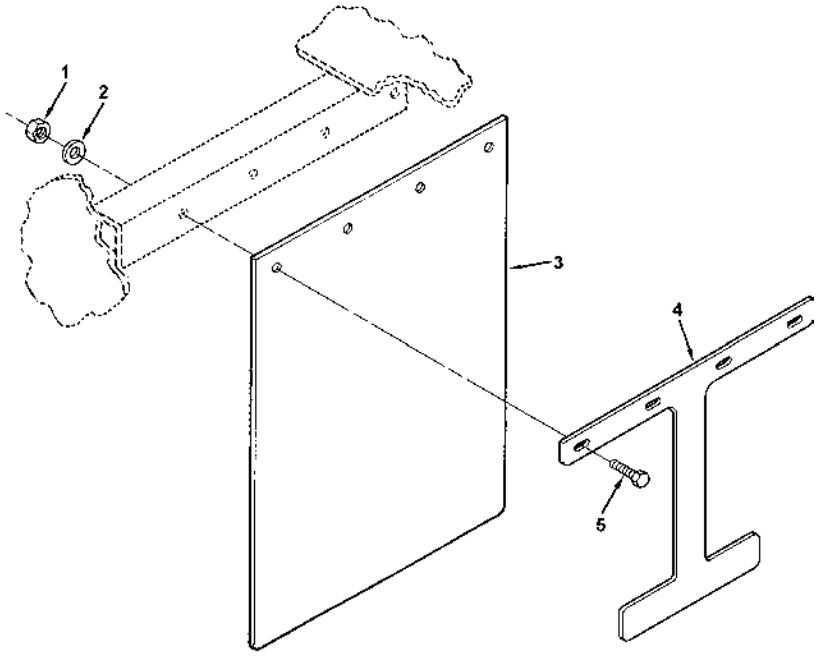
NOTE

There are two mud flaps and they are removed and installed the same way. This procedure covers one mud flap.

General Procedure:

a. Removal.

Remove four locknuts (1), four washers (2), and four screws (5) and remove anti-sail bracket (4) and mud flap (3) from semitrailer. Discard locknuts.



b. Installation.

Secure anti-sail bracket (4) and mud flap (3) to semitrailer using four new locknuts (1), washers (2), and screws (5).

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Remove tire chocks and ground boards.
3. Raise landing legs.

6-28. FLOOR DECK BOARDS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

References:
Appendix H-4

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

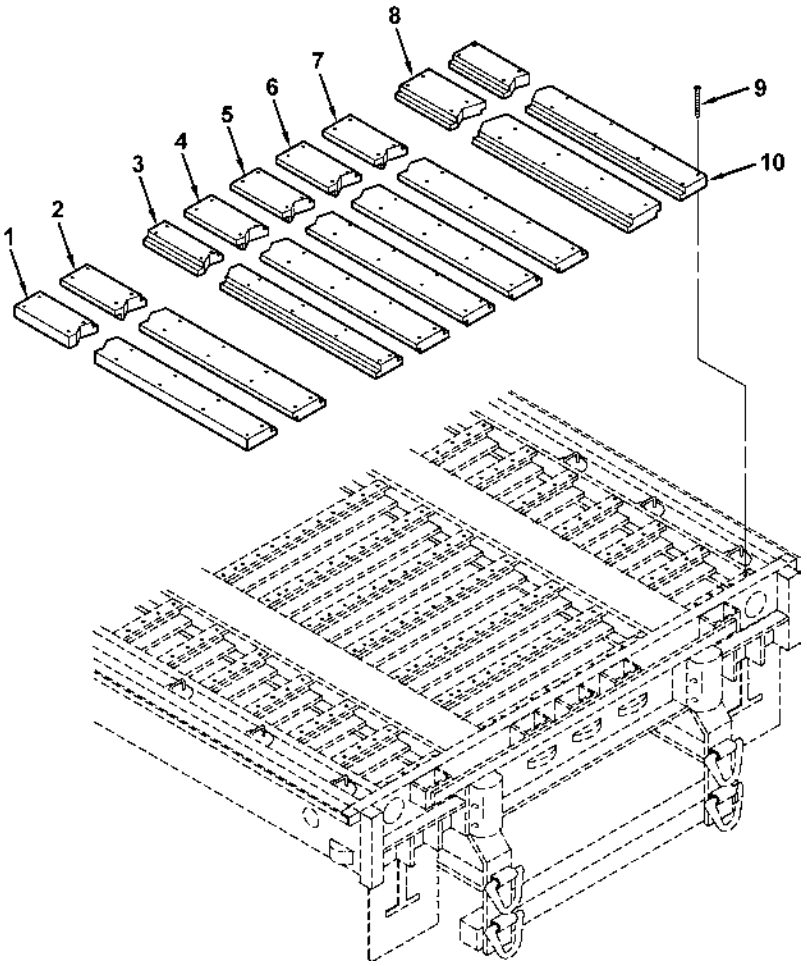
NOTE

- **For detailed procedures and/or instructions see referenced "H" Section.**
- **Deck screws must be ordered separately, they are not part of a kit.**

General Procedure:

a. Removal.

1. Remove flat head screws (9) from 6-5/8" wide floor board (1) and remove floor board (1) from semitrailer.
2. Remove flat head screws (9) from 7" wide floor board (2) and remove floor board (2) from semitrailer.
3. Remove flat head screws (9) from 3-5/8" wide floor board (3) and remove floor board (3) from semitrailer.
4. Remove flat head screws (9) from 7" wide floor board (4) and remove floor board (4) from semitrailer.
5. Remove flat head screws (9) from 7" wide floor board (5) and remove floor board (5) from semitrailer.
6. Remove flat head screws (9) from 7" wide floor board (6) and remove floor board (6) from semitrailer.
7. Remove flat head screws (9) from 7" wide floor board (7) and remove floor board (7) from semitrailer.
8. Remove flat head screws (9) from 7" wide floor board (8) and remove floor board (8) from semitrailer.
9. Remove flat head screws (9) from 6-5/8" wide floor board (10) and remove floor board (10) from semitrailer.



b. Installation.

1. Install 6-5/8” wide floor board (10) to semitrailer using flat head screws (9) as required.
2. Install 7” wide floor board (8) to semitrailer using flat head screws (9) as required.
3. Install 7” wide floor board (7) to semitrailer using flat head screws (9) as required.
4. Install 7” wide floor board (6) to semitrailer using flat head screws (9) as required.
5. Install 7” wide floor board (5) to semitrailer using flat head screws (9) as required.
6. Install 7” wide floor board (4) to semitrailer using flat head screws (9) as required.
7. Install 3-5/8” wide floor board (3) to semitrailer using flat head screws (9) as required.
8. Install 7” wide floor board (2) to semitrailer using flat head screws (9) as required.
9. Install 6-5/8” wide floor board (1) to semitrailer using flat head screws (9) as required.

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Remove chocks.
3. Raise landing legs.
4. Remove ground boards.

6-29. STOWAGE BOX REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Oil, lubricating (Item 9, Appendix F)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Stowage box emptied
Ground boards emplaced

References:
Appendix C
Paragraph 7-2, Page 7-7
TM 9-237

General Procedure:

a. Removal.

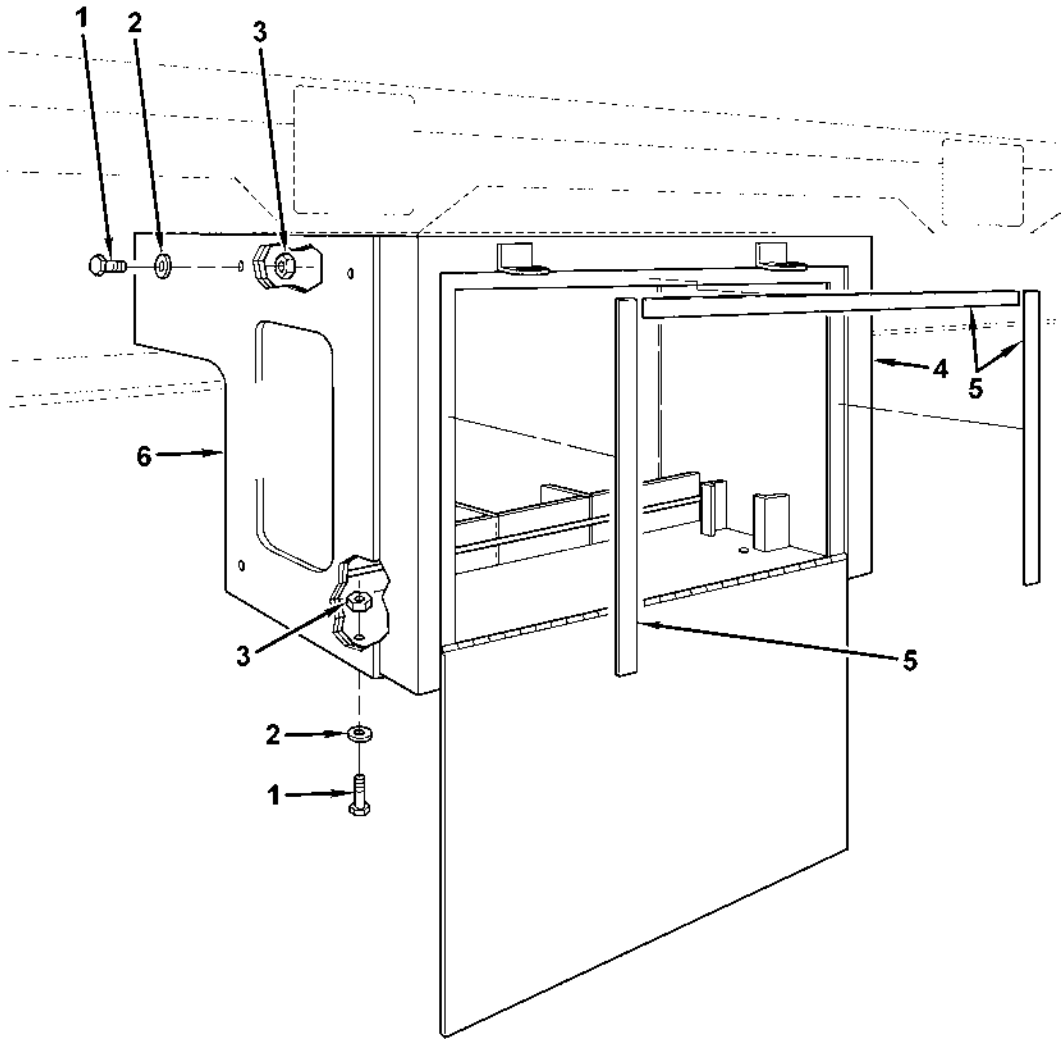
1. Remove weather stripping (5) from interior lip of storage box (4).
2. Remove 8 locknuts (3), 16 washers (2), and 8 bolts (1) from stowage box (4). Discard locknuts.
3. Remove stowage box (4) from semitrailer brackets (6).

NOTE

- **Replacement of stowage box side panels is a Direct Support function (see Paragraph 7-2, Page 7-7). See TM 9-237 for welding instructions.**
- **Paint entire box before installation of door seals.**

b. Installation.

1. Place stowage box (4) on semitrailer brackets (6). Set on side and slide in box and then bolt.
2. Install stowage box (4), 8 bolts (1), 16 washers (2), and 8 new locknuts (3).
3. Install weather stripping (5) onto exterior lip of storage box (4).



c. Follow-On Tasks.

1. Paint box as required.
2. Lubricate hinges with oil.
3. Replace BII items in stowage box and secure.

6-30. MANIFEST BOX REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

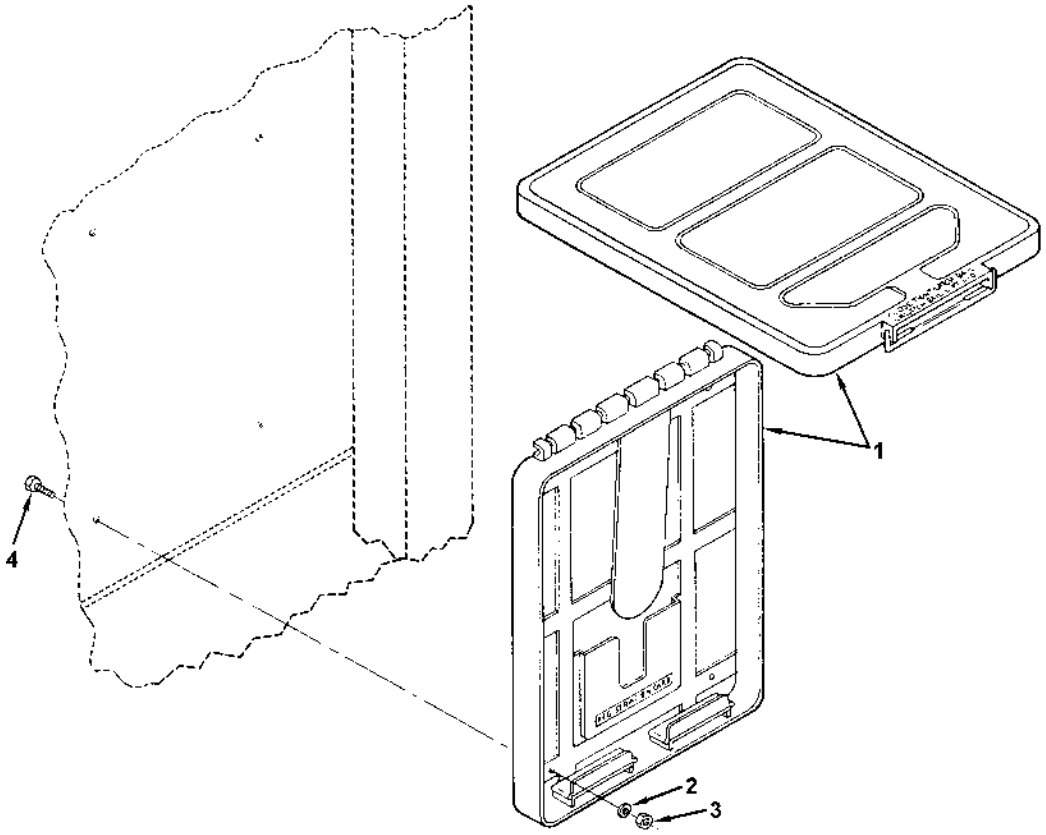
General Procedure:

a. Removal.

Remove four locknuts (3), washers (2), bolts (4), and document box (1) from semitrailer. Discard locknuts.

b. Installation.

Install document box (1), four bolts (4), washers (2), and new locknuts (3).



c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Remove chocks, and store.
3. Raise landing legs.
4. Remove and store ground boards.

6-31. REFLECTORS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Anti-seize compound (Item 40, Appendix F)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

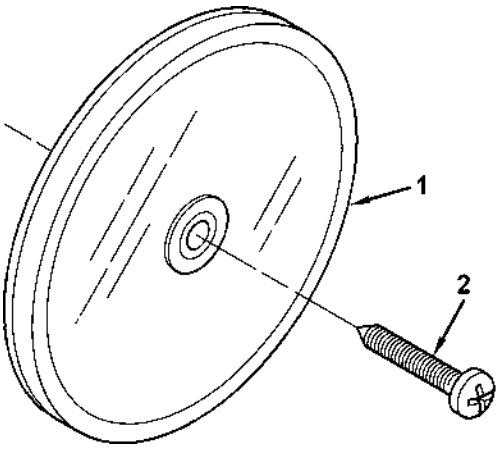
General Procedure:

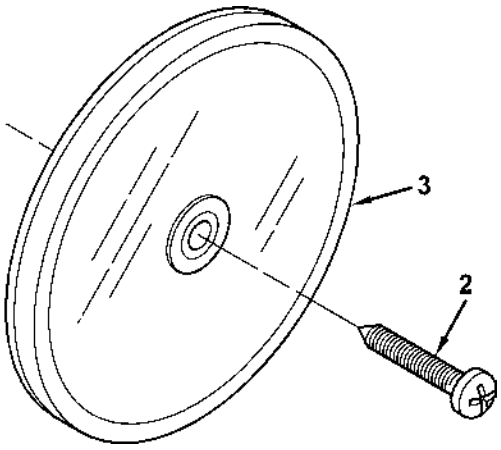
a. Removal.

NOTE

There are four amber reflectors and four red reflectors and they are all removed and installed the same way. This procedure covers one reflector.

Remove self-tapping screw (2) and amber reflector (1) or red reflector (3) from semitrailer. Discard self-tapping screw.





b. Installation.

Apply anti-seize compound to new self-tapping screw (2) and install amber reflector (1) or red reflector (3).

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Remove tire chocks.
3. Raise landing legs.
4. Remove and store ground boards.

6-32. DATA PLATES REPLACEMENT.

This Task Covers:

a. Removal b. Installation

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover

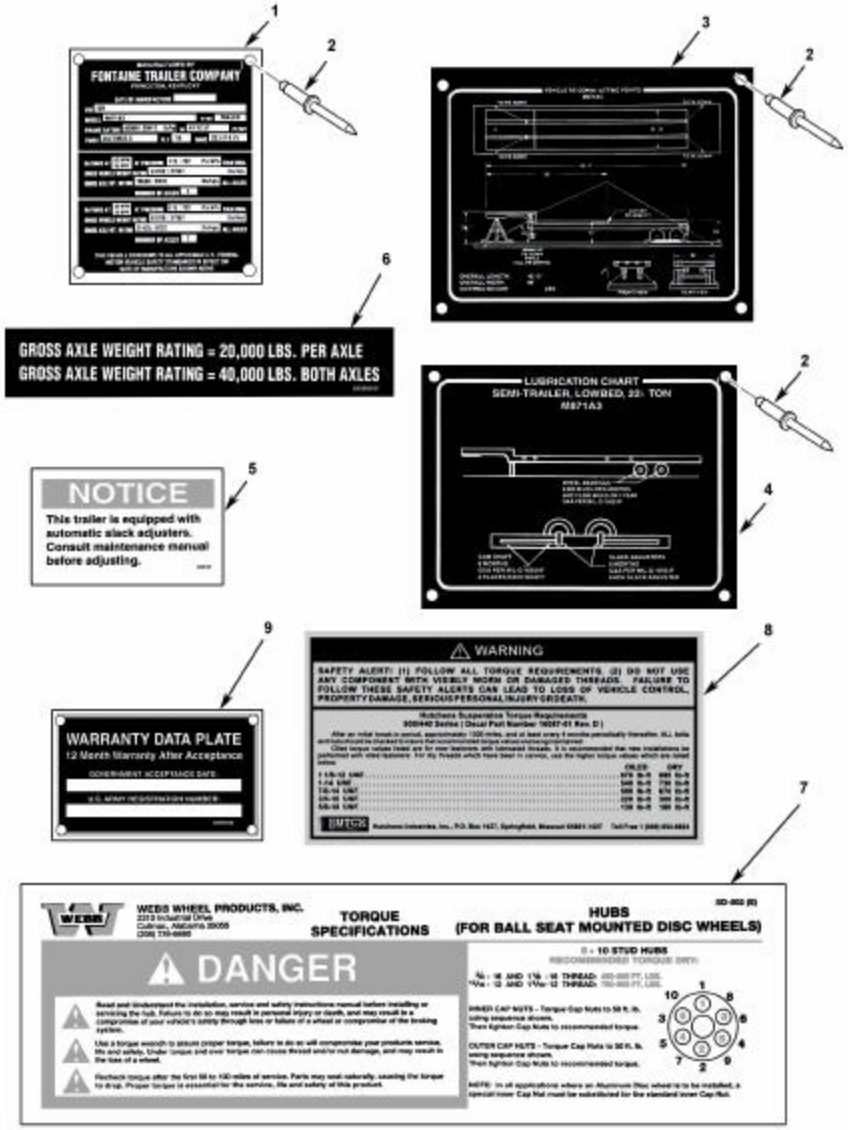
NOTE

Transcribe pertinent information onto new decals and data plates.

General Procedure:

a. Removal.

1. Drill out/chisel four rivets (2) and remove certification nameplate (1) from semitrailer. Discard rivets.
2. Drill out/chisel four rivets (2) and remove tiedown nameplate (3) from semitrailer. Discard rivets.
3. Drill out/chisel four rivets (2) and remove lubrication nameplate (4) from semitrailer. Discard rivets.
4. Remove ABS warning label (5) from semitrailer. Discard label.
5. Remove annual trailer inspection decal (6) from semitrailer. Discard label.
6. Remove trailer inspection decal (7) from semitrailer. Discard label.
7. Remove suspension decal (8) from semitrailer. Discard label.
8. Remove warranty data decal (9) from semitrailer. Discard label.



b. Installation.

1. Apply new warranty data decal (9) on semitrailer.
2. Apply new suspension decal (8) on semitrailer.
3. Install tiedown nameplate (3) on semitrailer using four new rivets (2).
4. Apply new trailer inspection decal (7) on semitrailer.
5. Apply new annual trailer inspection decal (6) on semitrailer.
6. Apply ABS warning label (5) on semitrailer.
7. Install lubrication nameplate (4) on semitrailer using four new rivets (2).
8. Install certification nameplate (1) on semitrailer using four new rivets (2).

6-33. ABS WARNING LIGHT REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Dielectric grease (Item 34, Appendix F)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

WARNING

Disconnect all electrical power before performing any maintenance on the electrical system. Failure to do so could result in injury to personnel.

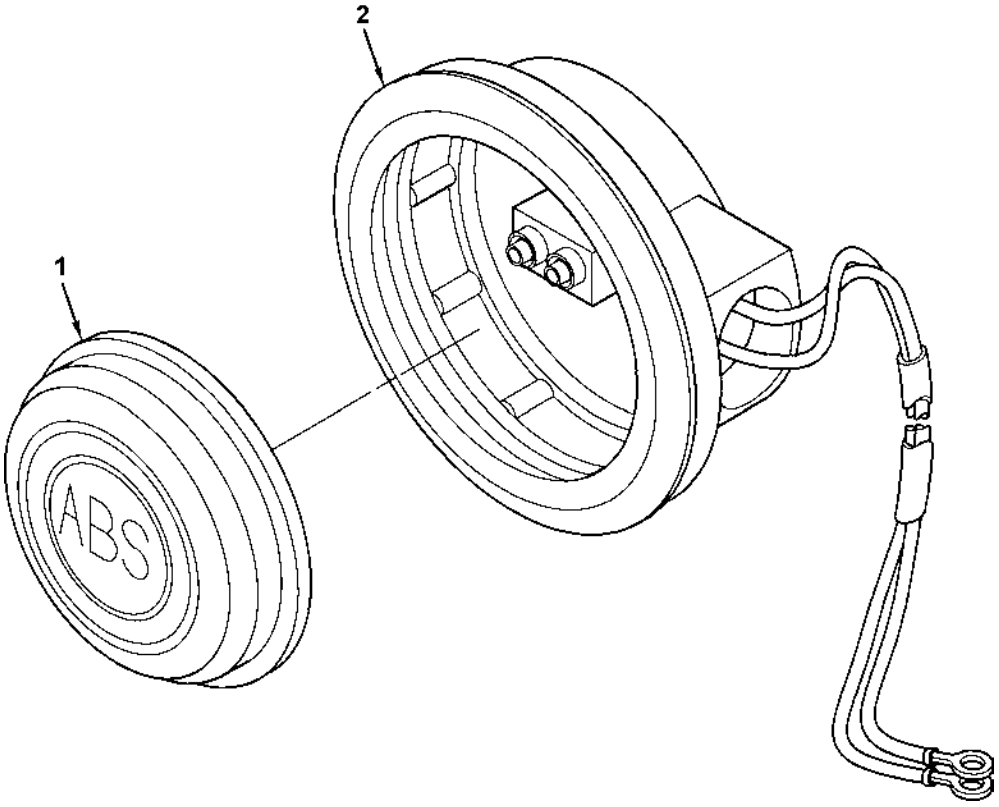
General Procedure:

a. Removal.

1. Remove grommet (2) from ABS warning light (1). Discard grommet.
2. Disconnect connectors from back of ABS warning light (1) and remove ABS warning light (1) from semitrailer.

b. Installation.

1. Apply dielectric grease on pins and then connect connectors to back of ABS warning light (1).
2. Install new grommet (2) and ABS warning light (1) at semitrailer bracket.



c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Remove chocks.
3. Raise landing legs.
4. Remove ground boards.
5. Road test to insure proper operation.

6-34. HUBODOMETER REPLACEMENT.

This Task Covers:

a. Removal b. Installation C. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

References:
Appendix H-36

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Tires chocked
Ground boards emplaced

CAUTION

Do not stand on hubodometer.

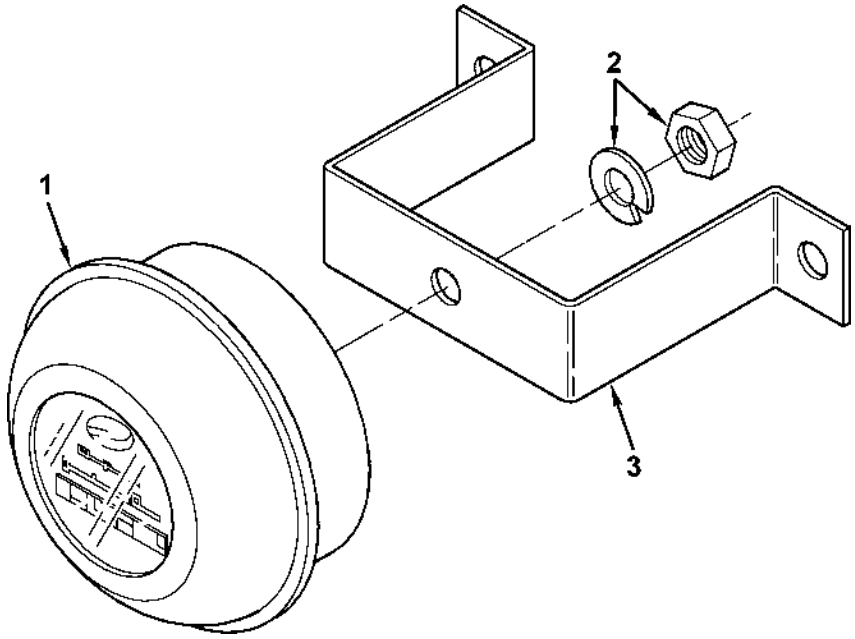
NOTE

- **For detailed procedures and/or instructions see referenced Paragraph H-36.**
- **When ordering a new hubodometer specify the mileage from the old hubodometer. Stemco will preset the mileage on the new hubodometer.**

General Procedure:

a. Removal.

Remove nut/lockwasher (2) and hubodometer (1) from vehicular bracket (3). Discard nut/lockwasher.



b. Installation.

Install hubodometer (1) and new nut/lockwasher (2) to vehicular bracket (3).

c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Remove chocks and tore.
3. Raise landing legs.
4. Remove ground boards and store.
5. Road test to see if operational.

6-35. CONSPICUITY TAPE REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (item 4, Appendix B-3)

Equipment Conditions:
Semitrailer disconnected from prime mover
Landing legs down
Tires chocked
Ground boards emplaced

a. Removal.

Remove conspicuity tape (1 thru 4) from semitrailer and rear bumper as necessary. Discard conspicuity tape.

b. Installation.

NOTE

- **Make sure surface area to be taped is clean and dry.**
- **There are three varieties of rolled conspicuity tape. Be certain to apply appropriate conspicuity tape only to the locations indicated below.**

b. Installation (Cont.).

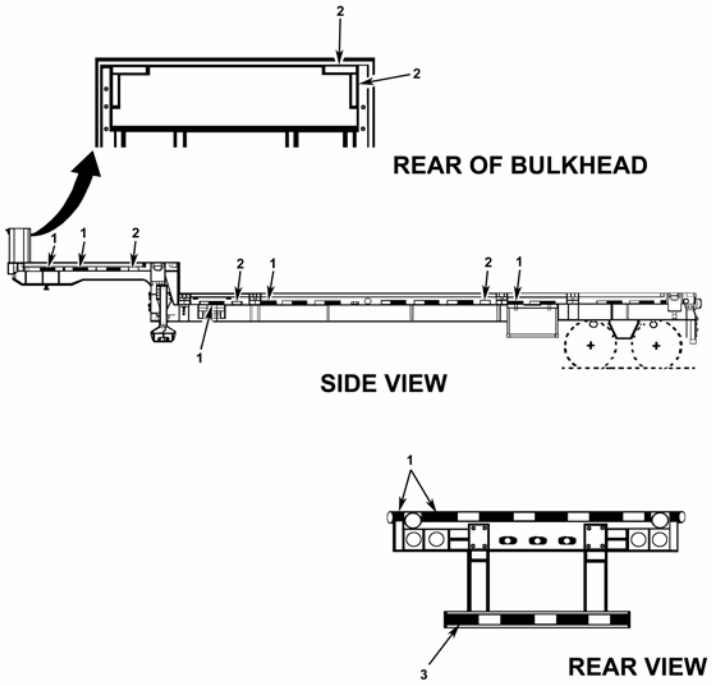
1. Cut 2” (5.1 cm) red/white conspicuity tape and apply red portion (1) and white portion (3). Center between tiedown and twist lock pockets.

2. Apply 2” (5.1 cm) red/white conspicuity tape (2) to side of semitrailer. Center between tiedown and twist lock pockets.

3. Apply four 12” (30.5 cm) long pieces of white conspicuity tape (4) to upper rear corners of bulkead.

4. Apply 2” (5.1 cm) red/white conspicuity tape (2) along full width of semitrailer rear.

5. Apply 1-1/2” (3.8 cm) red/white conspicuity tape (5) along full width of rear bumper.



c. Follow-On Tasks.

1. Connect semitrailer to prime mover.

2. Raise landing legs.

3. Remove and store chocks and ground boards.

CHAPTER 7

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

7-1. DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS.

This Task Covers:

a. General
b. Work Safety c. Cleaning Instructions
c. Cleaning Instructions
d. Inspection Instructions
e. Repair Instructions
f. Tagging Wires and Hoses
g. Corrosion Protection
h. Stowage Box Side Panels Replacement

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

References:
Paragraph 6-29
TB 9-2510-242-40
TM 9-214
TM 9-247

Materials:
Cloth, abrasive (Item 1, Appendix F)
Rags, wiping (Item 10, Appendix F)
Solvent, cleaning (Item 11, Appendix F)

WARNING

For service and repair tasks on the semitrailer, the ground boards and tire chocks should be used to insure safe coupling and prevent semitrailer movement.

a. General.

These general maintenance instructions contain general shop practices and specific methods you must be familiar with to properly maintain your semitrailer. You should read and understand these practices and methods before performing any maintenance tasks.

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 teardown is not necessary. Disassemble equipment only as far as necessary to repair or replace damaged or broken parts.

Resources are not listed in the initial setup unless they apply to the procedure.

All tags and forms attached to equipment must be checked to learn the reason for equipment's removal from service. Modification Work Orders (MWOs) and technical bulletins must also be checked for equipment changes and updates.

In some cases, a part may be damaged by removal. If the part appears to be good, and other parts behind it are not defective, leave it on and continue with the procedure. Here are a few simple rules:

a. General (Cont.).

1. Do not remove dowel pins or studs unless loose, bent, broken, or otherwise damaged.
2. Do not remove bearings or bushings unless damaged. If you need to remove them to access parts behind, pull bearings and bushings out carefully.
3. Replace all gaskets, seals, lockwashers, cotter pins, preformed packing, and other locking hardware.
4. Insure all parts are lubricated as specified in the Lubrication Order.

b. Work Safety.

Observe all warnings and cautions. Always use power tools carefully.

Protect yourself against injury. Wear protective gear such as safety goggles or lenses, safety shoes, rubber apron, and gloves.

When lifting heavy parts, have someone help you. Insure that lifting/stabilizing equipment is working properly, is suitable for the assigned task, and is secure against slipping.

All maintenance should be performed with:

- Semitrailer parking brake engaged.
- Prime mover in neutral with parking brake engaged, if attached.
- Prime mover engine stopped, if attached.
- Chock front and rear of tires.
- Ground boards emplaced.

c. 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.

CAUTION

Do not use high-pressure water or steam to clean semitrailer. Use only low-pressure water and bristled brushes. Be especially careful when cleaning electrical system components to include lighting. Damage or impaired operation will result if this caution is not observed.

General.

Cleaning instructions will be the same for a majority of parts and components that make up the semitrailer. The following should apply to all cleaning operations:

1. Clean all parts before inspection, after repair, and before assembly.
2. Keep hands free of grease which can collect dust, dirt, and grit.
3. After cleaning, all parts should be covered or wrapped to protect them from dust and dirt. Parts that are subject to rust should be lightly oiled.

c. Cleaning Instructions (Continued.)

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.

Clean inner and outer surfaces with cleaning solvent.

Remove grease and accumulated deposits with a stiff bristle brush.

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.

Clear all threaded holes with compressed air to remove dirt and cleaning fluids.

Oil Seals, Electrical Cables, and Flexible Hoses.

CAUTION

Do not wash oil seals, electrical harnesses, and flexible hoses with dry-cleaning solvent or mineral spirits. Serious damage or destruction of material would result.

Wash electrical cables and flexible hoses with a solution of soap and water and wipe dry.

Bearings.

Clean bearings in accordance with TM 9-214.

d. Inspection Instructions.

NOTE

All damaged areas should be marked for repair or replacement.

All components and parts must be carefully checked to determine if they are serviceable for use, can be repaired, or must be scrapped.

Inspect drilled and tapped (threaded) holes for the following:

1. Wear, distortion, cracks, and any other damage in or around holes for wear, distortion, cracks, and any other damage.

2. Threaded areas for wear, distortion (stretching), and evidence of cross-threading.

d. Inspection Instructions (Cont.).

Inspect metal lines, flexible lines (hoses), and metal fittings for the following:

1. Metal lines for sharp kinks, cracks, bad bends, and dents.
2. Flexible lines for fraying, evidence of leakage, and loose metal fittings or connectors.
3. Metal fittings and connectors for thread damage and worn or rounded hex heads.

Inspect castings, forgings, and machined metal parts for the following:

1. Machined surfaces for nicks, burrs, raised metal, wear, and other damage
2. Inner and outer surfaces for breaks and cracks.

Inspect bearings in accordance with TM 9-214.

e. Repair Instructions.

Any repair procedure peculiar to a specific part or component is covered in the section relating to that item. After repair, clean all parts thoroughly to prevent dirt, metal chips, or other foreign material from entering any working parts.

Repair casting, forgings, and machined metal parts using the following instructions:

1. Repair minor cracked casting or forgings in accordance with TB 9-2510-242-40.

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. Repair minor damage to machined surfaces with a fine mill file or an abrasive cloth dipped in cleaning solvent.
3. Replace any deeply nicked machined surface that could affect the assembly operation.
4. Repair minor damage to threaded capscrew holes with thread tap of same size to prevent cutting oversize.

After repair, clean all parts thoroughly to prevent dirt, metal chips, or other foreign material from entering any working parts.

f. Tagging Wires and Hoses.

As soon as the first wire, hose, or tube is disconnected, write number “1” on two tags. Secure one tag to the wire, hose, or tube and the other tag to the terminal, nipple, or fitting. After disconnecting the second wire, hose, or tube, write number “2” on two tags. Secure one tag to the wire, hose, or tube, and the second tag to the terminal, nipple, or fitting. Do the same for all wires, hoses, and tubes.

Note which numbers you used, in pencil, on the illustrations in this manual. This will help you to accurately re-tag, if tags are removed to perform cleaning and maintenance work.

Remove all tags when finished.

g. Corrosion Protection.

General Instructions:

To insure a long operational life for the M871A3 semitrailer the following is presented to assist maintenance personnel. This is not meant to supersede or replace current support operations or authorized publications.

The M871A3 production semitrailer is undercoated at Fontaine Trailer Company prior to delivery. Worldwide operations present many environmental impacts on the semitrailer from salt water to ice/snow melt chemicals. Areas of conflict have their own ways of ventilating and damaging the semitrailer. All these impacts add up to shortened operational life.

Tips:

Keep the semitrailer clean, which will allow for more complete inspection of welds and components. Use low-pressure water, cleaning detergent, and brushes for cleaning.

- Flush out undercarriages, suspensions, and wheel ends with clean low-pressure water if operating in a salt environment, especially fording, as soon as the mission allows.
- Keep debris out of wheel ends and twistlock pockets.
- Annually clean deck wood and roll/spray on boiled linseed oil or a good commercial UV wood protectorate. Apply to top areas of upper and lower deck wood.
- Protect all exterior areas from rust—clean off rust, prime metal, and paint area.
- Application of 10 wt. oil at oil can points as specified by LO will help protect components and insure they will work when needed.
- Keep bolster plate drain holes free of grease and debris so they drain/air out freely.

Corrosion Protection:

If undercoating has worn off or damage/repair has taken it off the undercarriage, frame, fillets, gussets, or any other protected area, re-coat with the following:

Rust Inhibitor:	NSN 8030-01-414-7423	(12) 16 oz. (473 mL) bottles
	NSN 8030-01-414-8947	5 gallon (18.9 L) container
	NSN 8030-01-414-7430	55 gallon (208.2 L) drum
	NSN 8030-01-414-1413	55 gallon (208.2 L) drum with applicator and instruction video

g. Corrosion Protection (Cont.)

Kingpin and Bolster Plate:

If the kingpin is replaced, inspect the interior structure for rust. Clean and protect the interior with rust inhibitor; do not plug up bolster plate drain holes. Make sure all welds are protected inside and out. Inspect the kingpin and bolster plate in accordance with PMCS requirements.

Protection Scheduling:

It is a good idea to periodically take a look at the undercarriage, especially after off-road operations. The following is suggested:

Monthy—Visually inspect the undercarriage for rust and damage. Touch up paint as required.

If operating in a salt or road chemical environment, you should inspect/protect these areas as soon as possible and wash these areas with clean water as soon as possible after operation.

7-2. STOWAGE BOX SIDE PANEL (2) REPLACEMENT

This Task Covers:

a. Removal b. Installation c. Follow-On Task

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Hydraulic floor jack

Materials:
Cloth, abrasive (Item 1, Appendix F)
Rags, wiping (Item 10, Appendix F)
Solvent, cleaning (Item 11, Appendix F)

Personnel Required:
Two (2)

Equipment Condition:
Ground boards and chocks emplaced
BII removed from box

References:
Paragraph 6-29
TB 9-2510-242-40
TM 9-214
TM 9-247

a. Removal.

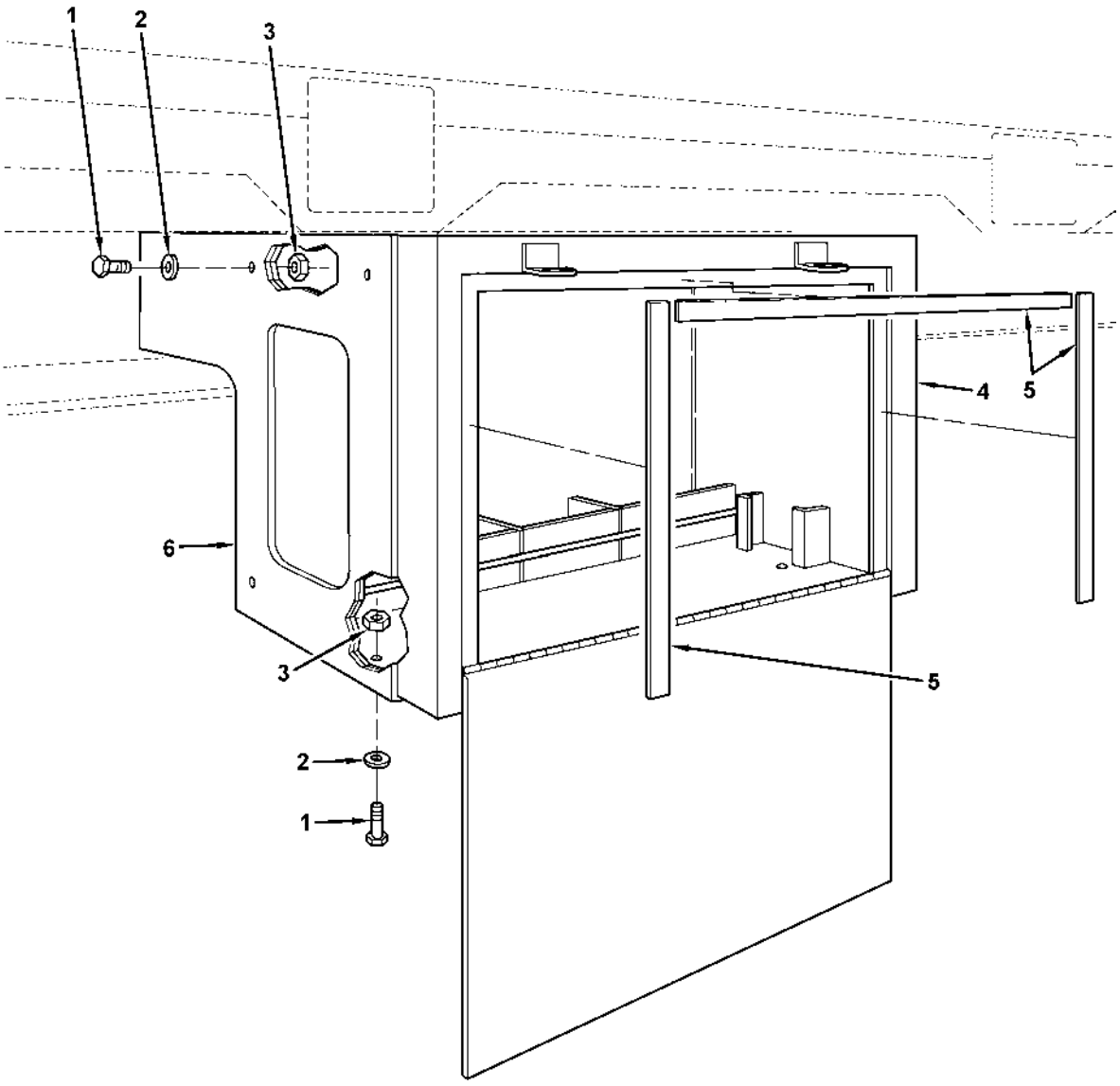
Remove stowage box from semitrailer frame (see Paragraph 6-29). Grind off old welds and prepare surface for welding of box support panels to frame and rail. Remove all rust, paint, and old weld material used to mount old box.

b. Installation.

1. Position new side panel brackets in place; there is a right and left bracket.
2. Tack weld one of the brackets in place.
3. Take box measurements to insure the box fits between both side panel brackets before tack welding the other bracket in place. The box should fit tightly between each side bracket.
4. When box is properly fit with side panels tacked in place, use a continuous weld on each side panel to weld brackets solidly to frame (beam) and rail.
6. Paint side panels; insure all bare metal is painted.
7. Slide box in on side panel lower rails and position box to insure box door can be fully opened and closed.
8. Use the side panel pre-drilled mounting holes as a guide for the holes to be drilled through the box. Center punch and drill the four 3/8 inch bottom holes required to mount the box to the side panels.
9. Insert the bolt with washer through the side panel mounting hole and box. Place another washer on the bolt inside the box and tighten bolt down with a locknut; repeat for other three mounting locations.
10. Lubricate paddle handle and hinge to insure smooth rust-free operation. Periodically lubricate handle and hinge to maintain serviceability.

Follow-On Tasks.

Secure BII in Stowage Box.



7-3. SUSPENSION REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Shop equipment auto repair, FM basic (Item 3, Appendix B)
Floor jacks
Jack stands

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Rear of semitrailer supported by jack stands
Tires and wheels removed (para. 6-18)
Hubs and brake drums removed (para. 6-9)

Personnel Required:
Two

References:
Paragraph 6-24
Appendix H-38

WARNING

- **Jack must be positioned directly under axle to prevent slippage. Direct all personnel to stay clear of vehicle when vehicle is supported in the air. Failure to do so could result in serious injury and damage to equipment.**
- **To prevent shifting of trailer, floor jack should be used only on a hard, level surface. Use ground boards (Paragraph 6-24), if necessary.**

NOTE

See Appendix-38 for technical data on suspension system.

a. Removal.

1. Remove eight bolts (1), washers (24), and locknuts (23) from trunnion center support. Discard locknuts.
2. Remove four hex bolts (2) and hex nuts (6) from two bottom brackets of trunnion center support.

WARNING

The trunnion must be firmly supported with jack stands or floor jacks prior to performing steps 3 and 4.

3. Remove four hex nuts (22), washers (21), and top plate (9) from two trunnion U-bolts (10) and separate lower trunnion hub (20) from upper trunnion hub (18).
4. Repeat step 3 on opposite side of semitrailer.

Removal. (Cont.)

WARNING

The trunnion is heavy and requires two persons to lift.

5. Remove two washers (3) and bushings (19) from both sides of trunnion tube (4) and remove trunnion tube (4) from suspension.

WARNING

The axles must be firmly supported with jack stands or floor jacks prior to performing steps 6 thru 10.

6. Remove 8 hex nuts (6) and 16 washers (5) from 4 U-bolts (17) and remove U-bolts (17) from 2 spring cap ends (12).

7. Repeat step 6 on opposite side of semitrailer.

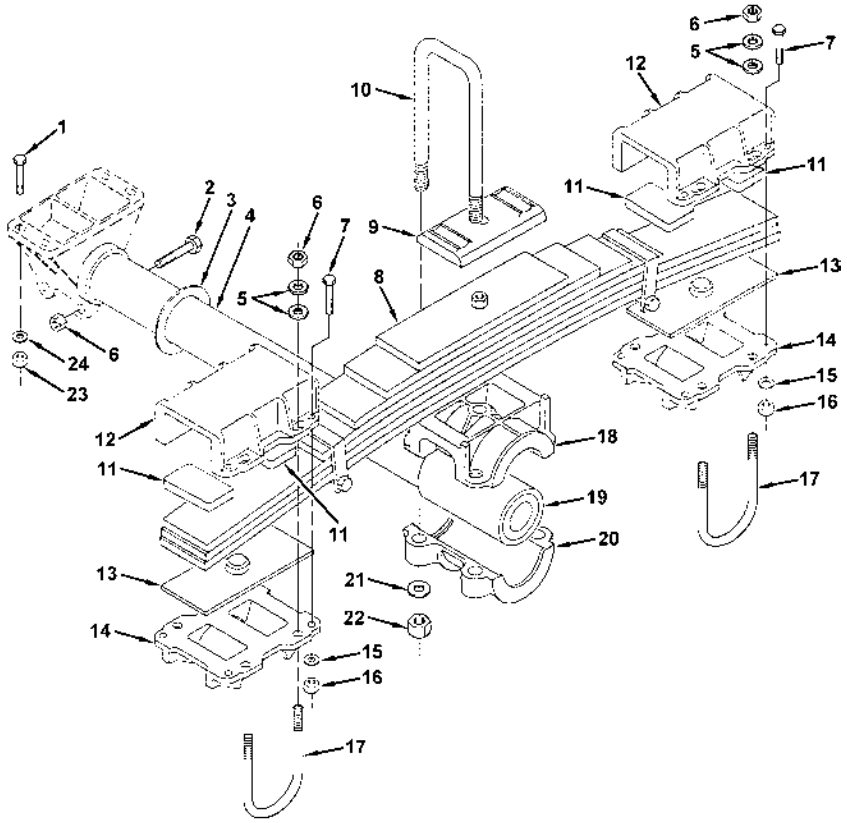
WARNING

Axles are heavy and may require two or more persons to lift.

8. Remove eight bolts (7), washers (15), and locknuts (16) from two spring cap ends (12). Discard locknuts.

9. Remove two spring seats (14), adjustment plates (13), and four rubber pads (11) from spring (8).

10. Repeat steps 8 and 9 on opposite side of semitrailer.



b. Installation.

1. Install two spring seats (14), adjustment plates (13), and four rubber pads (11) to spring (8) and secure using eight bolts (7), eight washers (15), eight new locknuts (16), and two spring cap ends (12).

2. Repeat step 1 on opposite side of trailer.

3. Install four U-bolts (17) to two spring cap ends (12) and secure using sixteen washers (5) and eight hex nuts (6).

4. Repeat step 3 on opposite side of trailer.

5. Install two washers (3) and bushings (19) to both sides of trunnion tube (4).

WARNING

Trunnion tube is heavy and requires two persons to lift.

6. Install trunnion tube (4) using two U-bolts (10), top plate (9), upper trunnion hub (18), lower trunnion hub (20), four washers (21), and four hex nuts (22).

7. Repeat step 6 on opposite side of trunnion.

8 Install four hex bolts (2) and four hex nuts (6) to two bottom brackets of trunnion center support.

9. Install eight bolts (1), washers (24), and new locknuts (23) to trunnion center support.

c. Follow-On Tasks.

1. Align axles (Appendix H-38).

2. Install hubs and brake drums (para. 6-9).

3. Install tires and wheels (para. 6-18).

4. Connect semitrailer to prime mover.

5. Raise landing legs.

6. Road test to insure for safe operation and tracking of axles.

7-4. D-RINGS REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Materials:
Oil, lubricating (Item 9, Appendix F)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover

References:
Appendix C
Paragraph 7-1
TM 9-237

NOTE

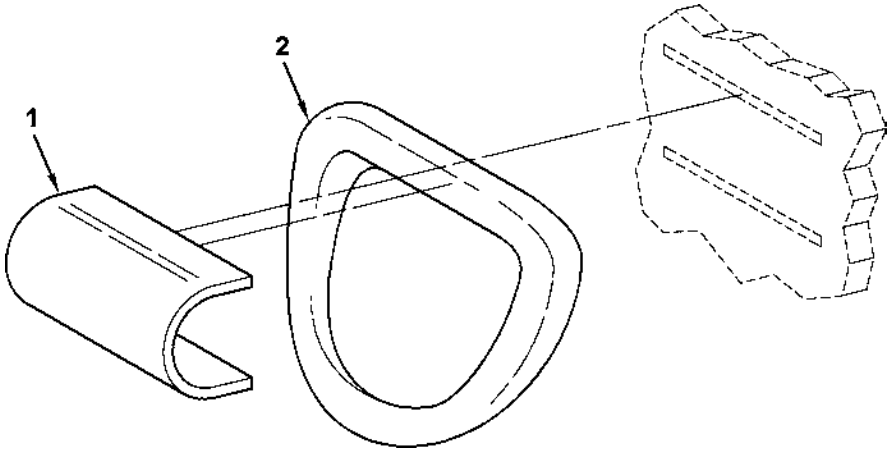
- **There are eight D-rings and they are removed and installed the same way. This procedure covers one D-ring.**
- **See Paragraph 7-1 for additional service requirements and TM 9-237 for welding instructions.**

a. Removal.

Remove welded bracket (1) and D-ring (2) from trailer. Discard bracket and deformed D-ring.

b. Installation.

Weld new bracket (1) onto trailer allowing for free movement of D-ring (2).



c. Follow-On Tasks.

1. Paint and lubricate with 10-wt. oil (Appendix C) where D-ring contacts bracket.
2. Connect semitrailer to prime mover.
3. Raise landing legs.

7-5. REAR BUMPER ASSEMBLY REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover

References:
Appendix C
Paragraph 7-1
TM 9-237

NOTE

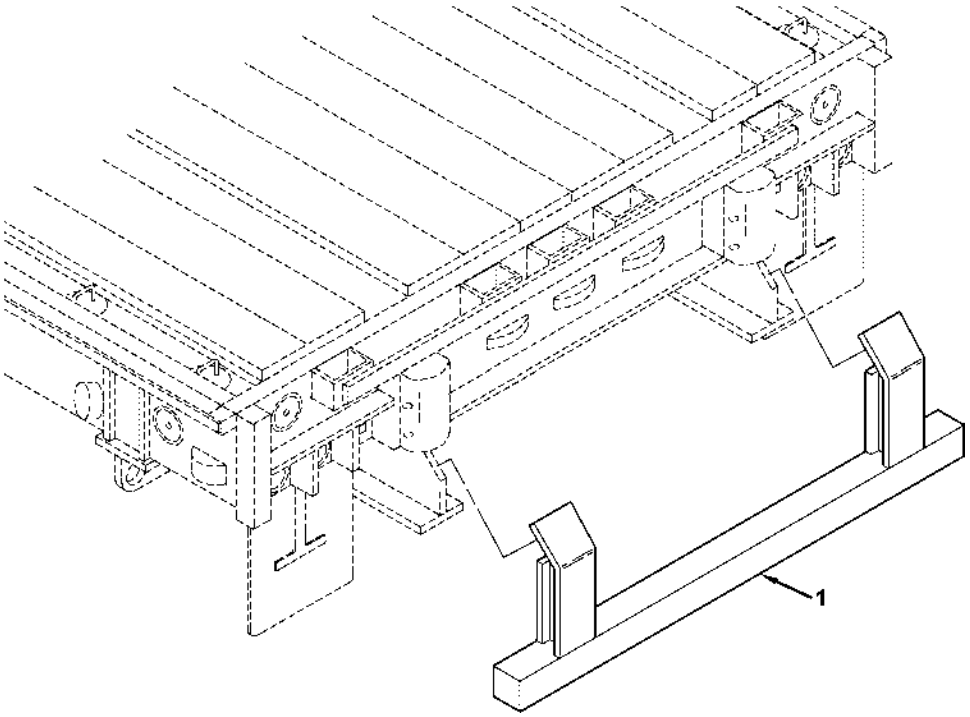
See Paragraph 7-1 for additional service requirements and TM 9-237 for welding instructions.

a. Removal.

Remove welded rear bumper assembly (1) from trailer.

b. Installation.

1. Weld rear bumper assembly (1) onto trailer.
2. Weld on four D-rings saddles with rings, new.
3. CARC paint rear bumper assembly (1).
4. Add conspicuity tape.
5. Lube D-rings.



c. Follow-On Tasks.

1. Connect semitrailer to prime mover.
2. Raise landing legs.

7-6. KINGPIN REPLACEMENT.

This Task Covers:

a. Removal b. Installation c. Follow-On Tasks

Initial Setup:

Tools and Special Tools:
Tool kit, general mechanic's (Item 4, Appendix B-3)
Shop equipment auto repair, FM Basic (Item 3, Appendix B-3)
Shop equipment welding Field Maintenance

References:
TM 9-237

Equipment Conditions:
Landing legs down
Semitrailer disconnected from prime mover
Front axle outer tires/wheels removed
Rear axle tires chocked

Personnel Required:
Two (2)

WARNING

- **Compressed air for cleaning purposes will not exceed 30 psi. Particles blown by air are hazardous. Make certain the air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield when using compressed air.**
- **Wear welding mask, gloves, and apron when welding or using cutting torch. Failure to wear adequate protective clothing may result in serious injury.**
- **Eye protection is required. Particles from grinding operations are hazardous to the eyes.**

CAUTION

Make sure electrical wiring, connectors, air lines and converter box are protected against damage/heat from the welding operation. Move or remove these items to protect them. Replace any damaged components.

NOTE

See Paragraph 7-1 for additional service requirements and TM 9-237 for welding instructions.

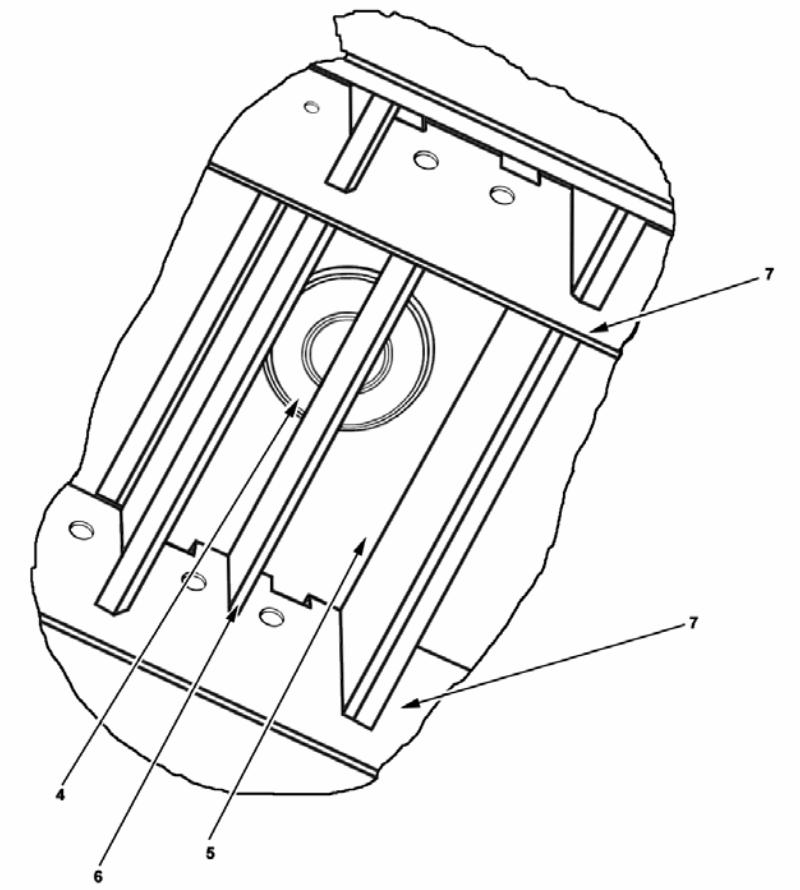
a. Removal.

1. With a T-40 torque bit remove the floor screws from the upper deck boards between the two center I beams. Mark each board location (for re-installation) then remove the boards using a pry bar.

2. Remove the 12/24 volt electrical connector box and the air connector glad-hands located on the front of the trailer. Pull the airlines and electrical harness cables away from the kingpin area.

3. Using the air-arc process, remove the welds securing the brace bar (6) on top of the kingpin (4). Again, using the air-arc process remove the welds directly securing the kingpin (4) mushroom to the bolster plate (5). A 300-amp welder is required along with an air supply of 90 psi. Care must be taken to minimize damage to the bolster plate (5).

4. Remove and discard the old kingpin (4)



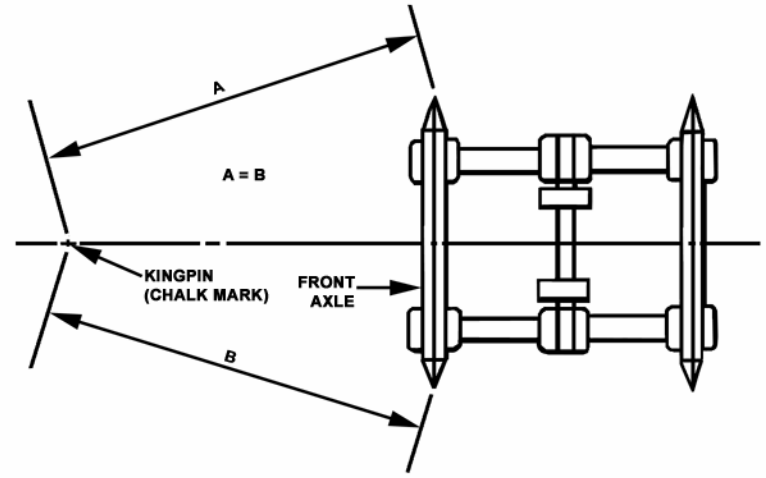
b. Site Preparation:

1. Grind the area of the bolster plate (5), where the new kingpin mushroom will sit, flush so the new kingpin will lie flat on the bolster plate.

2. Position new kingpin (4) on bolster plate (5).

3. Drop a plumb line with bob from the kingpin (4) to ground and mark spot with a chalk mark.

4. To center the kingpin (4), measure the distance from the chalk mark to the center of the hubcap on the front axle (A and B). The difference between measurements should be no more than 3/8 inch. This measurement is for kingpin positioning and is not to be confused with axle alignment procedures and specifications, which have closer tolerances.



5. If the measurements are not correct, adjust position of kingpin (4) on bolster plate (5) until measurements are within limits.

c. Welding:

1. Weld the kingpin (4) mushroom to the bolster plate (5) with a continuous 5/8 inch fillet weld. Welds are to be in accordance with MIL-STD- 1261, class 3. Use 70,000 psi electrode or wire of the following specifications: electrodes, mineral coated, low hydrogen, MIL-E_2200/6 type MIL-10015 or MIL-10016. Wire, use bare solid wire, and low alloy steel, MIL-E-23765/2 type 100S-1 or 110S-1.

2. Repeat step 6 two times to obtain a continuous 3-pass weld on the kingpin.

3. Inspect kingpin weld and the air-arc cut edges with dye penetrate or magnetic particle inspection. No cracks are allowable. Any cracks found must be ground out or otherwise repaired.

4. Weld into place the brace bar (6) initially removed from the over the kingpin. Weld each end to crossmembers (7) and the full length of the bar over the kingpin (4) and bolster plate (5).

d. Final:

1. Prime and paint the affected area to prevent corrosion as follows: Prime, per TT-P-636 or TT-P-634. Paint using chemical agent resistance coating (CARC) per MIL-C-46168 or MIL-C-53039.

2. Undercoat affected area completely with Carwell undercoating. DO NOT block drain holes.

3. Replace the floorboards to their original location as marked. Position the boards so the original holes drilled can be used. Screw the boards down using new floor screws.

e. Follow-On Tasks.

1. Install outer wheels w/tires on front axle.

2. Attach electrical connectors, airlines, glad-hands and converter box at front of trailer.

3. Grease bolster plate and kingpin with a light coat of GAA. Do not plug front and rear drain holes with grease.

4. Couple trailer to prime mover.

5. Retract landing gear and store chock blocks in stowage box. Secure ground boards in holding brackets.

6. Road test to insure safe operation.

GENERAL SUPPORT TASK.

7-7. TIRE REPAIR.

Refer to TM 9-2610-200-14 for instructions on tire maintenance.

APPENDIX A

REFERENCES

A-1. GENERAL

This appendix lists the publications referenced in this manual. DA PAM 25-30, Consolidated Index of Army Publications and Blank Forms, should be consulted frequently for the latest changes and revisions and for new publications relevant to material covered in this material.

A-2. FORMS

Recommended Changes to Publications and Blank Forms.....DA Form 2028
Recommended Changes to Equipment Technical Publication.....DA Form 2028-2
Organizational Control Record for Equipment.....DA Form 2401
Equipment Inspection and Maintenance Worksheet.....DA Form 2404
Maintenance Request.....DA Form 2407
Equipment Log Assembly (Records).....DA Form 2408
Preventive Maintenance Schedule and Record.....DD Form 314

Processing and Deprocessing Record for Shipment,
Storage and Issue of Vehicles and Spare Engines.....DD Form 1397

Report of Discrepancy (ROD).....SF Form 364
Product Quality Deficiency Report.....SF Form 368

A-3. REGULATIONS

The Army Physical Security Program.....AR 190-13
Security of Army Property at Unit and Installation Level.....AR 190-51
Environmental Protection and Enhancement.....AR 200-1
Dictionary of United States Army Terms.....AR 310-25
Authorized Abbreviations, Brevity Codes, and Acronyms.....AR 310-50
Accident Reporting and Records.....AR 385-40
Prevention of Motor Vehicle Accidents.....AR 385-55
Army Logistics Readiness and Sustainability.....AR 700-138
Reporting of Product Quality Deficiencies Across Component Lines.....AR 702-7
Army Materiel Maintenance Policy and Retail Maintenance Operations.....AR 750-1

A-4. FIELD MANUALS

NBC Contamination Avoidance.....FM 3-3
NBC Protection.....FM 3-4
NBC Decontamination.....FM 3-5
Field Behavior of NBC Agents (Including Smoke and Incendiaries).....FM 3-6
Mountain Operations.....FM 3-97.6
Ammunition Handbook.....FM 4-30.13
Route Reconnaissance and Classification.....FM 5-170
Vehicle Recovery Operations.....FM 9-43-2
Operation and Maintenance of Ordnance
Materiel in Cold Weather (0 Degrees F to Minus 65 Degrees F).....FM 9-207
General Fabric Repair.....FM 10-16

A-4. FIELD MANUALS (Cont.)

Camouflage	FM 20-3
First Aid for Soldiers	FM 21-11
Manual for the Wheeled Vehicle Driver (Distribution Restricted)	FM 21-305
Training in Units	FM 25-101
Basic Cold Weather Manual	FM 31-70
Northern Operations	FM 31-71
Railway Operating and Safety Rules	FM 55-21
Army Motor Transport Units and Operations	FM 55-30
Desert Operations (How to Fight)	FM 90-3
Operational Terms and Symbols	FM 101-5-1

A-5. TECHNICAL MANUALS

Inspection, Care and Maintenance of Antifriction Bearings	TM 9-214
Welding Theory and Application	TM 9-237 (1993)
Materials Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel and Related Materials Including Chemicals	TM 9-247
Operator's Unit, Direct Support and General Support, Maintenance Manual for Care, Maintenance Repair and Inspection of Pneumatic Tires and Inner Tubes	TM 9-2610-200-14
Painting Instructions for Army Materiel	TM 43-0139
Railcar Loading Procedures	TM 55-2200-001-12
Storage and Materials Handling	TM 743-200-1
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use	TM 750-244-6
Direct Support and General Support for Quality Control Inspector's Inspection Criteria	TM 750-245-4

A-6. PAMPHLETS AND BULLETINS

The Army Maintenance Management System (TAMMS)	DA PAM 750-8
Tiedown Handbook for Rail Movement	MTMCTEA Pam 55-19
Tiedown Handbook for Truck Movement	MTMCTEA Pam 55-20
Tiedown Handbook for Fixed Wing Air Movement	MTMCTEA Pam 55-24
Storage Serviceability Standard: Tracked Vehicles, Wheeled Vehicles, and Component Parts	SB 740-98-1
Towed Wheeled Vehicles, FSC Class 2330, Lunette Trailers and Semitrailers: Repair of Frames	TB 9-2510-242-40 (Nov 95)
Equipment Improvement Report and Maintenance Digest (U.S. Army Tank-automotive and Armaments Command) Tank and Automotive Equipment	TB 43-0001-39 Series
Maintenance Expenditure Limits for Tactical Wheeled Vehicles, FSC Group 23, FSC Classes 2320 and 2330	TB 43-0002-81
Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment and Materials Handling Equipment	TB 43-0209
Safety Inspection and Testing of Lifting Devices	TB 43-0142
Corrosion Prevention and Control Including Rust Proofing Procedures for Tactical Vehicles and Trailers	TB 43-0213
Inspection, Use and Tightening of Metal Fasteners Used on Tank-Automotive Equipment	TB 43-0218
Maintenance in the Desert	TB 43-0239

A-7. MISCELLANEOUS 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
Marine Lifting and Lashing Handbook ..... MTMCTEA Ref 97-55-22

Vehicle Preparation Handbook for
Fixed Wing Air Movement ..... MTMCTEA Ref 97-55-24

A-8. COMMERCIAL MANUALS

Meritor Trailer Axle ..... Manual No. 14, Revised 1-99

Complete Repairs, Tear Down, Cleaning, Welding, Alignment, Lubrication of Axle,
Brake Systems and ABS ..... Call: 1-800-535-5560

Meritor WABCO Easy-Stop Trailer
ABS Maintenance Manual No. 33, Revised 4-98
Basic and Standard ABS Systems (including 4S/2M System on M871A3) ..... Call: 1-800-535-5560

Meritor WABCO Blink Code Diagnostic Guide 4S/2M Easy StopTP-0173 ..... Call 1-800-535-5560

Meritor WABCO
Training Program-Student Manual, Issued 3-98
Module 1—Overview & Components
Module 2—Diagnosis and Repair
Easy-Stop Trailer ABSTP-9812 ..... Call: 1-800-535-5560

Hutchens IndustriesConfigurations and Parts Identification
900 Single Point Suspension Series ..... Call: 1-800-654-8824

Haldex Automatic Brake Adjusters, Service Manual Truck and Trailer Applications ..... Call: 1-800-821-8469

APPENDIX B

MAINTENANCE ALLOCATION CHART (MAC) – 2-LM

B-1. INTRODUCTION

The Army Maintenance System MAC

This introduction provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army maintenance system concept.

The MAC (Section B-2, immediately following this introduction) 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:

FIELD LEVEL	SUSTAINMENT LEVEL
Unit: Includes two sub column(s), **C** (Operator/Crew), and **O** (Organizational) maintenance.	**General Support:** Includes **H** sub column.
Direct Support: Includes **F** sub column.	**Depot:** Includes **D** sub column.

The Tools and Test Equipment (Section B-3, immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The Remarks (Section B-4, immediately following the Tools and Test Equipment) contain supplemental instructions and explanatory notes for a particular maintenance function.

Maintenance Functions

Maintenance Functions are Limited to and Defined as Follows:

1. 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). This includes scheduled inspection, gauging, and evaluation of cannon tubes.

2. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, e.g., load testing of lift devices and hydrostatic testing of pressure hoses.

3. 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. This includes scheduled exercising and purging of recoil mechanisms.

B-1. INTRODUCTION (Cont.)

Maintenance Functions (Cont.)

Maintenance Functions are Limited to and Defined as Follows (Cont.):

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

5. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

6. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments of 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.

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

8. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and the assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.

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

NOTE

The following definitions are applicable to the "repair" maintenance function:

- **Services—Inspect, test, service, adjust, align, calibrate, and/or replace, and painting/spot painting.**

- **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.)**

- **Disassembly/assembly—The step-by-step breakdown (taking apart) of a spare/ functional group coded item to the level of its least component, that is assigned a Source, Maintenance, and Recoverability (SMR) code for the level of maintenance under consideration (e.g., identified as maintenance significant.)**

- **Actions—Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.**

B-1. INTRODUCTION (Cont.)

Maintenance Functions are Limited to and Defined as Follows (Cont.):

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

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

Explanation of Columns in the MAC

Column (1)—Group Number. Column (1) lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00."

Column (2)—Component/Assembly. Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

Column (3)—Maintenance Function. Column (3) lists the functions to be performed on the item listed in Column (2). (For a detailed explanation of these functions, refer to subparagraph entitled "Maintenance Functions" immediately above.)

Column (4)—Maintenance Level. Column (4) specifies each level of maintenance authorized to perform each function listed in Column (3), by indicating work time required (expressed as man-hours in whole hours or decimals) in the appropriate sub column. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

FIELD LEVEL	SUSTAINMENT LEVEL
C — Operator or Crew maintenance	L — Specialized Repair Activity (SRA)
O — Organizational maintenance	H — General Support maintenance
F — Direct Support maintenance	D — Depot maintenance

B-1. INTRODUCTION (Cont.)

Explanation of Columns in the MAC (Cont.)

NOTE

The "L" maintenance level is not included in Column (4) of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" column of Column (4), and an associated reference code is used in the REMARKS Column (6). This code is keyed to the remarks and the SRA complete repair application is explained there. (Sustainment Level)

Column (5)—Tools and Equipment. Column (5) specifies, by code, those common tool sets (not individual tools), common Test, Measurement, and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in Section B-3, Tools and Test Equipment.

Column (6)—Remarks. When applicable, this column contains a letter code, in alphabetic order, which is keyed to the entries in Section B-4, Remarks.

Explanation of Columns in the Tools and Test Equipment

Column (1)—Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in Column (5) of the MAC.

Column (2)—Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

Column (3)—Nomenclature. Name or identification of the tool or test equipment. The Supply Catalog (SC) number is also included in this column (when applicable). The last line is the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (4)—National/NATO Stock Number. The National or NATO stock number of the tool or test equipment.

Column (5)—Tool Number. The manufacturer's part number, model number, or type number.

B-1. INTRODUCTION (Cont.)

Explanation of Columns in the Remarks

Column (1)—Remarks Code. The code recorded in Column (6), Section B-2.

Column (2)—Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section B-2.

B-2. MAC FOR M871A3 SEMITRAILER

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
06	**Electrical System**							**1**	**C,J,O**
0609	Lights, Stop & Tail, LED (Red)	Inspect	0.1						
		Test		0.3					
		Remove/Install		0.2					
		Replace		0.2					
	Lights, Blackout	Inspect	0.1						**C,O**
		Test		0.3					
		Remove/Install		0.2					
		Replace		0.2					
	Lights, Marker LED (Amber and Red)	Inspect	0.1						**C,O**
		Test		0.3					
		Remove/Install		0.1					
		Replace		0.1					
	Lights, Clearance LED (Red)	Inspect	0.1						**C,O**
		Test		0.2					
		Remove/Install		0.2					
		Replace		0.2					
0613	Wiring Harness (Front or Rear)	Inspect	0.2						**C,O**
		Test		0.5					
		Remove/Install		1.0					
		Repair		0.5					

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
0613 (Cont.)	Box, Converter	Inspect	0.1	0.1					O
		Test		0.3					
		Remove/Install		0.2					
		Replace		0.5					
		Repair		2.5					
11	**Rear Axle**							**1,3,4**	**G,I**
1100	Axle, Over Slung; Assembly Only	Inspect	0.2	0.2					
		Align		1.0	2.0				G
		Replace			5.0				
	Seat, Spring	Replace			0.5				Each Seat Spring
	Plate, Adjustment	Repalce			0.5				Each
	Dust Shield	Replace		0.5					Each Shield
12	**Brakes**							**4,5**	**B,C,L**
1202	Shoe Assembly, Brake	Inspect		0.3					
		Test		0.5					
		Replace		1.5					
	Anchors, Rollers, Retainers, Springs, Bushings, Pins	Inspect		0.5					B
		Remove/Install		0.5					
		Replace		0.5					

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
1202 (Cont.)	"S" Cams	Inspect		0.2					**B**
		Test		0.5					
		Remove/Install		0.5					
		Replace		0.7					
1206	Slack Adjuster, Automatic	Inspect	0.2	0.2					**C**
		Test		0.5					
		Service		0.1					
		Adjust		0.3					
		Replace		0.5					
		Repair		0.3					
1207	Control Unit, Electronic (ECU) and Module	Inspect		0.2					**J,O**
		Test		0.5					
		Replace		0.5					
	Sensor, Wheel w/Cable	Inspect		0.1					**B,O**
		Test		0.2					
		Adjust		0.3					
		Replace		0.3					
	Valve, Modulator	Test		0.1					**J**
		Replace		1.0					
	Cable, Diagnostic	Test		0.2					**O**
		Replace		0.2					

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
1207 (Cont.)	Adapter, Blink Code	Replace		0.1					O
1208	Chamber, Air Brake Long Stroke	Inspect	0.1						C
		Replace		1.0					
	Reservoir, Air	Inspect	0.1						
		Service	0.1						C
		Test		0.2					
		Replace		1.5					
	Valve, Air Drain & Pull Cables	Inspect	0.1						
		Replace		0.3					C
	Valve, Multifunction (SEALCO)	Inspect	0.1						J
		Test		0.5					
		Replace		0.5					
	Air Supply, Gladhand	Inspect	0.1						C
		Service		0.1					
		Replace		0.3					
		Repair		0.2					
	Valve, Relay	Inspect	0.1						J
		Replace		0.5					

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
1208 (Cont.)	Lines, Air	Inspect	0.1						C
		Replace		0.3					
13	**Wheel Assembly**							**3,4,5**	**B,L**
1311	Wheel	Inspect	0.1	0.1					
		Remove/Install		0.3					
		Service		0.2					
		Replace		0.5					
	Hub Caps	Replace		0.5					
	Drum, Brake	Inspect		0.2					
		Remove/Install		0.5					
		Replace		0.5					B
		Repair			1.0				
	Hubs w/Tone Rings	Inspect		0.2					B,J
		Remove/Install		0.3					
		Replace		0.5					
	Bearings, Inner/Outer (Cone Assembly and Cup)	Inspect		0.2					
		Service		0.3					B
		Replace		0.5					
	Seal, Wheel	Replace		0.3					B,N
	Spindle Nut, Pro-Torq	Adjust		0.3					
		Replace		0.3					

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
1313	Tires, Radial, and Spare Assemblies	Inspect	0.2						
		Service	0.2						
		Remove/Install	0.5	0.5					
		Replace	0.5	0.5					
		Repair				1.5			
15	**Frame, Towing Attachments**							**4,7**	**C,F,I,L,M**
1501	Weld Mounts, Frame	Inspect	0.2	0.3	0.3				
		Repair			3.0	3.0+			
	Twist lock	Inspect	0.1						
		Service	0.2						**C**
		Replace		0.5	1.5				
		Repair		0.6					
	Suspension Stops (4)	Inspect	0.2						
		Replace		0.5					
	Dock Bumpers, Rubber (2)	Replace		0.3					**C**
	Ammo Tiedown Deck “D” Rings (4)	Inspect	0.1	0.1					**C**
		Service	0.2						
		Replace		0.3					
		Repair		0.3					

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
1501 (Cont.)	Cargo Tiedown Deck “D” Rings (40)	Inspect	0.1	0.1					C
		Service	0.2						
		Replace		0.3					
		Repair		0.3					
	Rail/Shipment “D” Rings (12)	Inspect	0.1	0.1					
		Service	0.2						C
		Replace			0.8				
	Run Under Protection	Inspect	0.2		0.2				
		Replace			2.5				
1503	Kingpin (2 Inch)	Inspect	0.1	0.4					
		Test		0.5					I
		Service	0.2						
		Replace				3.0			
1504	Carrier, Spare Tire	Inspect	0.1						
		Replace		0.5					
		Repair			0.5				
1507	Gear, Landing & Shoes	Inspect	0.2						
		Service	0.1						C
		Replace		2.0					
		Repair		1.5					
	Crank Handle	Replace		0.1					

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
1507 (Cont.)	Ground Boards and Chocks	Replace		0.3					C
		Repair		0.2					
16	**Suspension**							**4,5,7**	**C,I,K**
1601	Spring Assembly, Leaf	Inspect		0.2	0.2				
		Adjust		1.5	1.5				
		Align			1.0				
		Replace			4.0				
	Tube, Trunnion, Over Slung	Inspect		0.2	0.2				
		Replace			4.0				
		Repair			2.0				
	Bushings, Polyurethane	Replace			1.5				C
	Plate, Adjustment	Align			0.5				C
		Replace			0.5				
	End Cap and Rubber Pad	Inspect	0.1	0.1					
		Replace		0.5					Each

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
18	**Body**							**4**	**C,D,E,L**
1801	Flaps, Mud, Antisail	Inspect	0.1						
		Replace		0.3					**C**
	Bulkhead	Service	0.2						**C**
		Replace		1.5					
		Repair		0.3					
1805	Decking	Inspect	0.2						**D,E**
		Service		0.5					
		Replace		4.0					
1808	Box, Stowage	Inspect	0.1						
		Service	0.1						
		Replace		0.5					
		Repair		0.3					
	Side Panel, Box	Replace			0.7				**Weld Each Side Panel**
	Side Board Storage Rack	Service	0.3						**C**
		Repair		0.3					
		Replace		0.5					

B-2. MAC FOR M871A3 SEMITRAILER (Cont.)

(1)	(2)	(3)	(4)					(5)	(6)
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
1808 (Cont.)	Box, Manifest	Replace		0.3					
22	**Accessory Items**							**1,4**	**C**
2202	Reflectors	Inspect	0.1						
		Replace		0.1					
	Conspicuity Tape	Inspect	0.1						
		Replace		0.1					**Each Section**
2210	Plates, Data and Decals	Replace		0.2					
42	**Electrical Equipment**							**1**	**C,L,O**
4209	Light, Warning, ABS	Inspect	0.1						
		Test		0.2					
		Replace		0.2					
47	**Gages (Non-Electrical)**								
4701	Hubodometer	Replace		0.2					
		Remove/Install		0.2					
		Repair		0.3					

B-3. TOOLS AND TEST EQUIPMENT

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER	(5) TOOL NUMBER
1	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No.1	4910-00-754-0654	SC 4910-95-CL-A74
2	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No.2	4910-00-754-0653	SC 4910-95-CL-A72
3	O,F,H	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power	4910-00-348-7696	SC 4910-95-CL-A31
4	O,F	Tool Kit, General Mechanic's Automotive	5180-00-177-7033	SC 5180-90-CL-N26
5	O,F	Shop Equipment, Automotive Maintenance and Repair	4910-00-754-0705	SC 4910-95-CL-A31
6	O,F	Wheel Bearing Wrench Set	5120-00-196-4586	
7	F	Shop Equipment, Welding, Field Maintenance	3470-00-357-7268	SC 3470-95-CL-A08
8	O	Torque Wrench, 0–200 lb-in. (0–22.6 N•m)	5120-00-853-4538	
9	O	Torque Wrench, 0–600 lb-ft (0–813 N•m)	5120-00-221-7983	

B-4. REMARKS

REFERENCE CODE	REMARKS
A	Times are for one axle only.
B	Times are for one axle end only.
C	Times are for each component/assembly.
D	Annual service to UV protect decking.
E	1.5 hours to replace each board.
F	Reference TB 9-2510-242-40.
G	Unit level checks only the axle alignment.
H	Tire is re-treadable, tire is not on a re-tread program.
I	Requires welding.
J	Component comes as an assembly only.
K	New suspension hardware requires wet (oiled) torque values. In service hardware requires dry torque values.
L	Spot painting, tire air/pressure check, oil can points, and cleaning for all like components.
M	Frame deficiencies need to be evaluated at the DS level to determine the events of repair. Some minor deficiencies may be handled at DS. Major repairs such as cracks and damage that requires alignment must go to GS.
N	A correct size seal driver must be used to prevent damage/cocking of seal. Hub bore must be clean and seal bottomed.
O	Dielectric grease must be used on pins and connectors.

APPENDIX C

LUBRICATION INSTRUCTIONS

C-1. GENERAL

This appendix contains lubrication instructions, showing location, intervals, and proper materials for lubricating the semitrailer. These instructions are mandatory.

C-2. DETAILED LUBRICATION INFORMATION

Clean lubrication points, grease fittings, and surrounding areas before applying lubricant.

Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

Clean and lubricate bearings as specified in TM 9-214.

Maintain a record of vehicle lubrication and report any discrepancies noted during lubrication. Refer to DA PAM 738-750 for maintenance forms and procedures to record and report any findings.

C-3. SPECIFIC LUBRICATION INSTRUCTIONS

Keep all lubricants in closed containers and store in a clean, dry place away from extreme heat. Keep container covers clean and do not allow dust, dirt, or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.

WARNING

Wipe excess lubricant from area of brake shoe linings to prevent any contamination of linings. Replace linings that have been contaminated with lubricant. Failure to follow this warning may cause brakes to malfunction, resulting in serious injury or death.

CAUTION

Grease streaks on the outside or inside of the wheel may indicate over packing of the grease, an improperly installed grease seal, damage to the axle end, loose hardware, or gasket damage.

Keep all external parts of equipment not requiring lubrication clean of lubricants.

Refer to FM 9-207 for lubrication instructions in cold weather.

After operation in mud, sandy, or dusty conditions, or when mission allows, clean and inspect all points of lubrication for fouled lubricants. Change lubricants as required.

C-4. LUBRICATION CHART AND DIAGRAM

Refer to Table C-1 for the lubrication chart. Intervals are based on normal operation. Adjust to compensate for abnormal and severe conditions or contaminated lubricants. During inactive periods, intervals may be extended commensurate with adequate preservation. Locations of lubrication points on semitrailer are shown in Figure C-1.

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-4. LUBRICATION CHART AND DIAGRAM (Cont.)

Clean fittings before lubrication using cleaning compound. Dry before lubricating.

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

Re-lubricate after washing or fording as necessary.

Table C-1. Lubrication Chart.

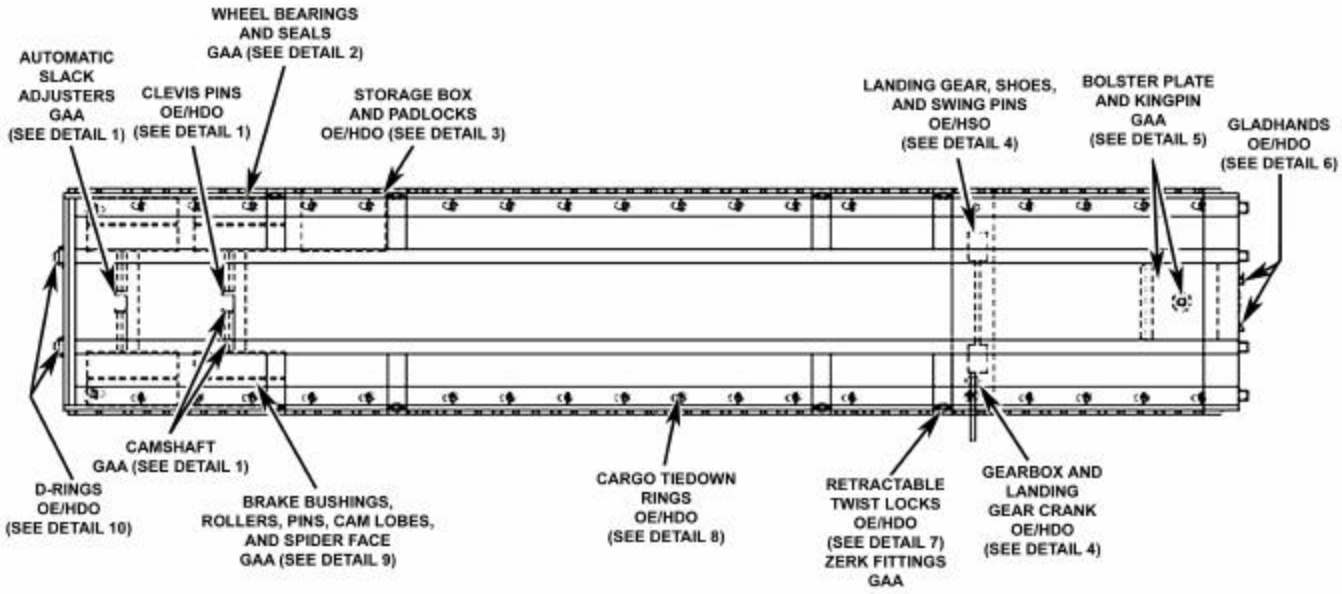
LUBRICATION POINTS	INTERVAL	LUBRICATION TYPE/SPECIAL INSTRUCTIONS/MAINTENANCE LEVEL ( )
ABS Sensor Body and Spring Clip	When replaced or removed from clip	GAA, light coat on sensor body, wipe off excess. When removed from spring clip, clean off old grease and apply a new light coat. (O)
Automatic Slack Adjuster	Semiannually or every 6,000 miles (9,656 km) Semiannually or every 6,000 miles (9,656 km)	GAA, zerk fittings. (O) OE/HDO-10, clevis pins, oil can points. (O)
Stowage Box and Padlocks	Monthly or every 1,000 miles (1,609 km)	OE/HDO-10, hinge/latch, oil can points. (C)
Twist Locks (8)	Monthly or every 1,000 miles (1,609 km)	Clean, oil can point OE/HDO-10 for housing. (C) GAA, zerk fittings (O)
Tiedown Rings Cargo (36) Ammo (4) Lift/Tie-down (12)	Monthly or every 1,000 miles (1,609 km)	OE/HDO-10, oil can points. (C)
Landing Gear Shoes, Swing Pins, and Crank Handle	Monthly or every 1,000 miles (1,609 km)	OE/HDO-10, oil can points. (C)
All Receptacle Pins and Connectors	When Taken Apart/Replaced	Dielectric Grease. Clean and Apply a Thin Coat. (O)

C-4. LUBRICATION CHART AND DIAGRAM (Cont.)

Table C-1. Lubrication Chart (Cont.)

LUBRICATION POINTS	INTERVAL	LUBRICATION TYPE/SPECIAL INSTRUCTIONS/MAINTENANCE LEVEL ( )
Kingpin and Bolster Plate	Monthly or every 1,000 miles (1,609 km)	GAA, clean, then apply thin coat on kingpin and bolster plate. (C) Make sure drain holes are not plugged.
Gladhand Springs and Bracket	Monthly or every 1,000 miles (1,609 km)	OE/HDO-10, oil can points. (C)
Wheel Bearings and Seals	Triennial or every 36,000 miles (57,935 km)	GAA, clean, inspect, and repack with clean GAA. (O) Replace seals. (O). Never reuse seals.
Brake Bushings, Rollers, Anchor Pins, “S” Cam Lobes, Spider Face, Splines	Triennial or every 36,000 miles (57,935 km)	GAA, light coat, wipe off excess. (O)
“S” Camshaft Support Bracket	Semiannually or every 6,000 miles (9,656 km)	GAA, zerk fittings. (O)
Spindles, Cam Follower Shaft, Journals	Triennial or every 36,000 miles (57,935 km)	GAA, light coat, wipe off excess. (O)

C-4. LUBRICATION CHART AND DIAGRAM (Cont.)



NOTE

Do not lubricate suspension system.

Figure C-1. Lubrication Diagram (Sheet 1 of 4).

C-4. LUBRICATION CHART AND DIAGRAM (Cont.)

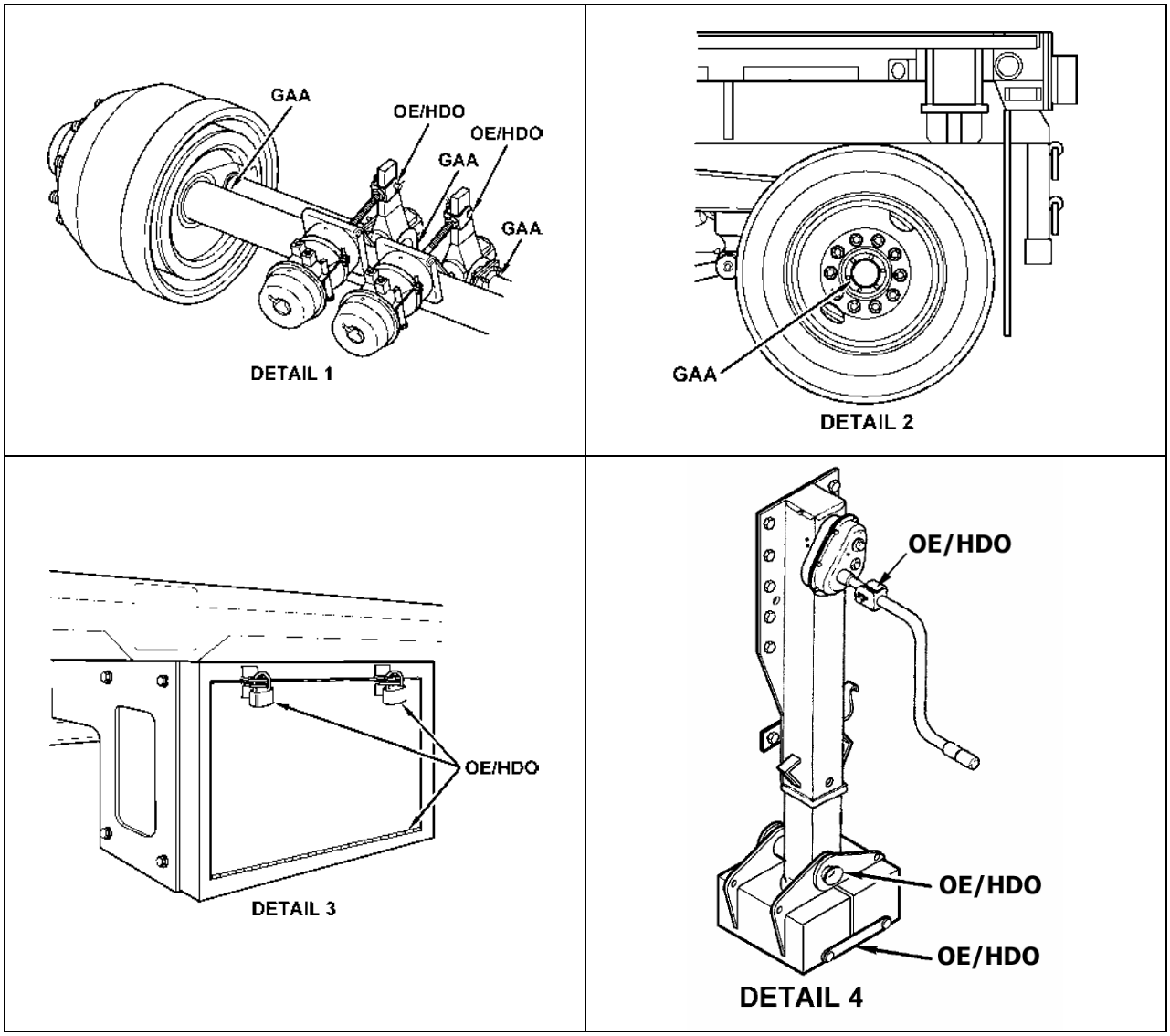


Figure C-1. Lubrication Diagram (Sheet 2 of 4).

C-4. LUBRICATION CHART AND DIAGRAM (Cont.)

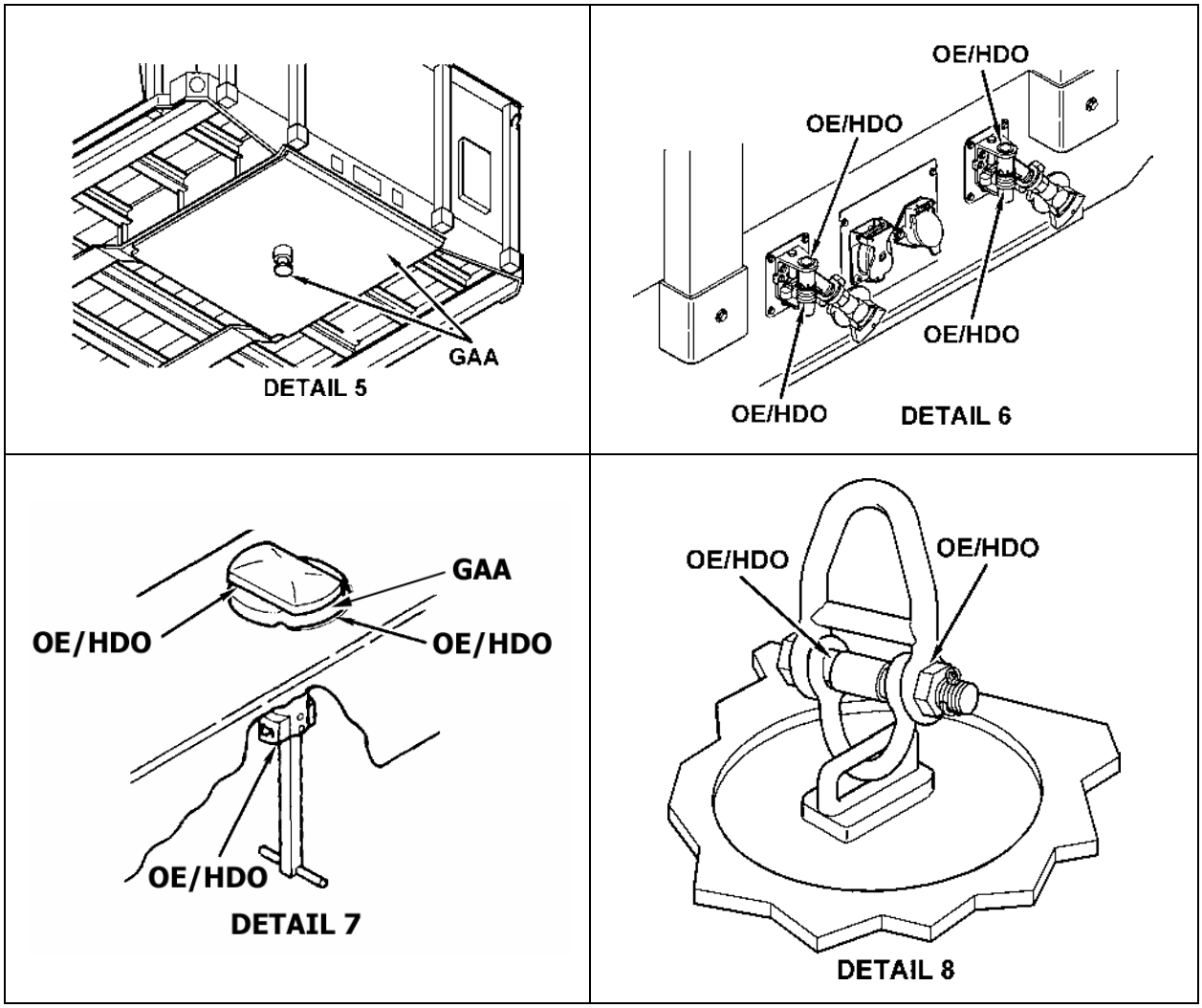


Figure C-1. Lubrication Diagram (Sheet 3 of 4).

C-4. LUBRICATION CHART AND DIAGRAM (Cont.)

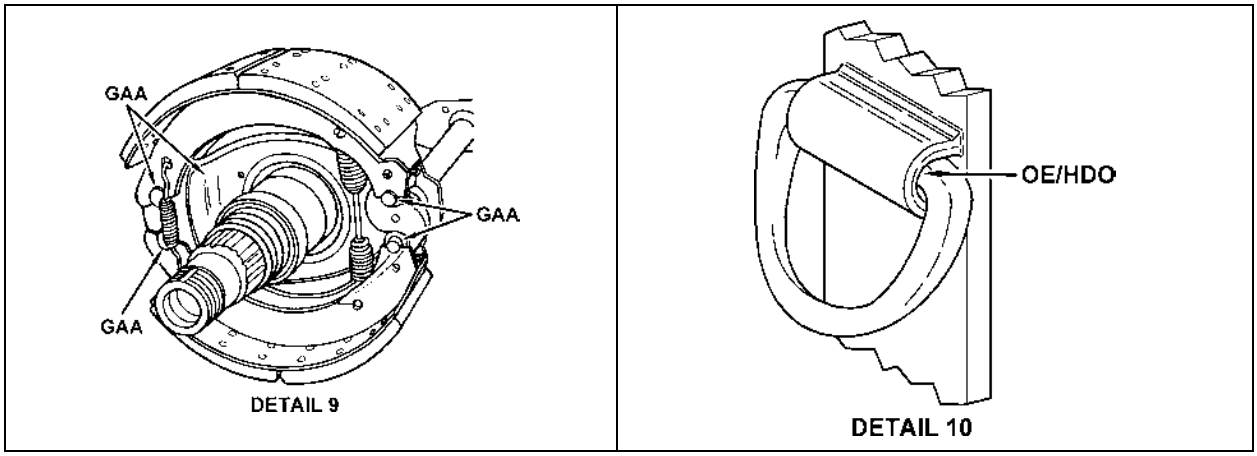


Figure C-1. Lubrication Diagram (Sheet 4 of 4).

C-5. LUBRICANTS

Table C-2 lists lubricants to be used in all temperature ranges and shows the intervals.

Table C-2. Lubricants.

—KEY—

LUBRICANTS	EXPECTED TEMPERATURES*		
	ABOVE +15°F (ABOVE -9°C)	+40°F to -15°F (+4°C to -26°C)	+40°F to-65°F (+4°C to -54°C)
OE/HDO (MIL-L-2104) Lubricating Oil, Internal Combustion Engine, Tactical Service	OE/HDO-30	OE/HDO-30	—
OEA (MIL-L-46167) Lubricating Oil, Internal Combustion Engine, Arctic	—	—	OEA
GAA (MIL-PRF-10924G) Grease, Automotive and Artillery	All Temperatures		

*For Arctic operation, refer to FM 9-207.

C-5. LUBRICANTS (Cont.)

COLD OPERATION:

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

S-CAMS (SPECIFIC):

1. When the wheels and hubs are removed, place a light film of lubricant on cam roller follower shafts, journals, and the top and bottom surface of the "S" cam. Wipe off any excess lubricant.

2. Automatic slack adjusters:

WARNING

Do not use any grease with Teflon, over 3% molysulfide content, or "white" grease in the automatic slack adjusters. These additives will adversely affect the friction clutch and cause it not to hold the adjustment, resulting in premature failure, injury to personnel and damage to the equipment.

CAUTION

It is important not to overfill wheel-end cavity with lubricant. Do not exceed grease level indicated below. Also, make sure excess grease is wiped away since it can contaminate brake linings and cause poor brake performance.

BEARINGS/HUBS:

1. Pack bearing cones with grease by forcing grease into the cavities between rollers and cage from the large end of the cone. The use of a pressure packer is recommended; otherwise pack the bearings by hand.

2. Apply a light coat of grease to the spindle bearing journals and wipe off excess.

3. Fill the hub cavity with grease to the outer cap's smallest diameter.

4. At the top of the spindle and as far back as possible, pump additional grease until it appears that the grease will run out. Install the outer bearing cone quickly.

5. Hub cavity will be filled approximately 1/3 full of grease (from the 4 to the 8 o'clock positions). This will involve installation of approximately 1-1/2 lb (0.7 kg) of grease.

6. Install the wheel retention hardware. Place a dab of grease across the face of the locknut for identification that hub cavity has been greased if caps are not to be immediately installed.

CAUTION

Brush a thin layer of GAA on the inside of the hub cap. Do not cover vent with grease. Do not pack the hub cap with grease. Do not coat the cap mounting flange with grease. Coating the cap vent will result in seepage of lubricant and may clog the vent.

C-5. LUBRICANTS (Cont.)

7. When brake shoes are replaced, apply an even coat of lubricant between contact face of anchor pin bushing, brake shoe area, and spider faces. Coat anchor pin completely. Wipe off all excess grease.

SUSPENSION:

Hutchens suspension does not require lubrication, but new replacement suspension hardware (nuts/threads) should be oiled before assembly and a wet torque applied. In-service torque values should have dry torque values applied.

GENERAL:
SEMITRAILER LUBRICATION REQUIREMENTS:

1. The lubrication requirements for the M871A3 Semitrailer consist of only two types of lubricant, GAA and OE/HDO, for oil can points. Only variants of the lubricating oil are authorized due to temperature variations.

2. All zerk fittings and lubrication points should be wiped clean prior to being lubed.

3. Re-lubricate the semitrailer zerk fittings if high-pressure washing is used. High-pressure or steam wash is not authorized for the M871A3.

4. If a padlock is used, make sure it is lubed and operational.

5. Reference TM 43-0139 for semitrailer painting and TB 43-0209 for stencil identification marking.

6. Current GAA stocks are 100% synthetic and allow for: Extended service intervals as long as seals and gaskets are not leaking grease. GAA quantity NSNs, as listed in the expendable and durable items list, will not change, as the GAA becomes 100% synthetic.

FORDING OPERATIONS:

1. Use common sense. If the mission/situation does not allow for after fording inspection, inspect the semitrailer when the mission allows.

2. Snubb the brakes three or four times to dry them out after fording.

3. If hubs were **hot** prior to fording there is a good chance water may have been sucked in through the hub cap. If cold or warm to touch they should be all right.

4. If hubs and seals showed any signs of leakage prior to fording they may be contaminated by water after fording semitrailer.

5. When mission allows, carefully remove hub caps to inspect for water contamination. If gasket is damaged it must be replaced.

6. Use low pressure fresh water to flush out all salt contamination, including road salt, from semitrailer to prevent corrosion.

APPENDIX D

BASIC ISSUE ITEMS (BII) LIST
(THERE IS NO COEI)

D-1. SCOPE

This appendix lists Basic Issue Items (BII) for the M871A3 Semitrailer to help you inventory items for safe and efficient operation of the equipment.

D-2. GENERAL

BII are required to place the semitrailer in operation, operate it, and do emergency repairs. Although shipped separately packaged, BII must be with the semitrailer during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the Table of Organization and Equipment (TOE)/Modified Table of Organization and Equipment (MTOE).

D-3. EXPLANATION OF COLUMNS

Column (1)—National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (2)—Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N). Identifies the Federal item name followed by a minimum description when needed. The line below the name and description is the CAGEC (in parentheses), the part number and manufacturer.

Column (3)—Quantity (Qty). Indicates the quantity of the item authorized to be used with/on the equipment.

NOTE

- **Semitrailers dedicated to ROWPU and LADS do not have side/rear rack assemblies or their storage rack.**
- **Do not use cross chains when using bows and tarp.**
- **Except for the diagnostic extension cable, blink code adapter diagnostic tool, side racks/hardware, splices, top rails, stakes, and twistlocks, everything else is over-packed in the stowage box. Upper, lower, and rear rack assemblies will be secured on upper deck.**
- **Basic Issue Items are in stowage box or on semitrailer. See Table D-1, Column (3), Quantity/Location, Pages D-3 and D-4.**

Table D-1. BII.

(1) NSN	(2) DESCRIPTION, CAGEC, P/N	(3) QTY	(4) LOCATION
5340-01-499-4251	Boards, ground w/attaching hardware: (0FBD6) – 07758002	2	In Side Brackets
4030-01-499-4227	Chain links: (0FBD6) – 50462035	2	In Side Brackets
5340-01-499-5549	Clips: (0FBD6) – 3919775	4	In Side Brackets
5315-01-499-3742	Pins: (0FBD6) – 08796002	2	In Side Brackets
5315-01-499-4271	Pins, cotter: (0FBD6) – 51182002	4	In Side Brackets
5310-01-499-3318	Washers: (0FBD6) – 02976010	4	In Side Brackets
5306-01-500-1994	Bolts, caging: (06721) – 10043, Haldex	4 (for long-stroke air brake chambers	On Air Chambers
2540-01-377-9255	Chock w/eye hook only (1) (9X737) – WC796R	4	In Stowage Box
2540-01-499-5553	Chock block Assembly: (1) (0FBD6) – 07758014	2 blocks, 1 chain, 2 snaps	In Stowage Box
4010-01-499-5145	(0FBD6) – 04626004: Chain (1)	2	In Stowage Box
5340-01-499-4157	Link, open, rigid eye: Snap hook , zinc plated (1) (0FBD6) – 50462030	4	In Stowage Box
5340-01-499-5562	Cinching straps: (0FBD6) – 50102099	3	In Stowage Box
5935-01-480-6241	Diagnostic adapter and cap, blink code: (78500) – S2237-Z-1222	1 adapter, 1 cap	Rear, Center of Trailer
6150-01-499-5143	Diagnostic cable, extension: (78500) – 449-364-152-0	1	Rear, Center of Trailer
2590-01-500-1997	Jack, 12-ton (10.89-metric ton) w/handles: (OFBD6) – 07758080	1 jack, 2 handles	In Stowage Box
3040-01-499-5565	Pipe extension, 1-inch (2.5-cm), cheater bar: (0FBD6) – 00016016	1	In Stowage Box

Table D-1. BII (Cont.)

(1) NSN	(2) DESCRIPTION, CAGEC, P/N	(3) QTY	(4) LOCATION
	Side and corner stake assemblies w/hardware		Bulkhead Storage
2510-01-499-7636	Corner stake assy: (0FBD6) – 04696002	2	Bulkhead Storage
2510-01-499-7639	Side stake assy, 30” (76.2 cm): (0FBD6) – 04696004	6	Bulkhead Storage
2510-01-499-3799	Side stake assy, 53” (134.6 cm): (0FBD6) – 04696001	4	Bulkhead Storage
2510-01-499-7638	Side stake assy, 53” (134.6 cm): (0FBD6) – 04696003	13	Bulkhead Storage
	Side rack cross chains w/hooks	4	In Stowage Box
	Chainw/hooks: (3DGR3) – S118673X-20	2	In Stowage Box
	Chain w/hooks: (3DGR3) – S118673X-25	2	In Stowage Box
	Complete Storage Rack Assembly w/Panels and all Hardware		
2540-01-515-3878	(0FBD6) – 04512107 Painted Tan	1 Assembly	Upper Deck
2540-01-515-3877	(0FBD6) – 04512076 Painted Green	1 Assembly	Upper Deck
	Twist lock assemblies: (94658) – F804-1-4	8	On Left and Right Rails
5120-01-170-4980	Wrench, hex handle: (0FBD6) – 50939002	1	In Stowage Box
5120-01-514-3465	Wrench, lug, double-end: (0FBD6) – 50939001	1	In Stowage Box

APPENDIX E

ADDITIONAL AUTHORIZATION LIST (AAL)

E-1. SCOPE

This appendix lists items you are authorized for the support of the M871A3 Semitrailer.

E-2. GENERAL

This appendix identifies items that do not have to accompany the semitrailer and do not have to be turned in with it. These items are all authorized to you by Common Table of Allowances (CTA), Modified Table of Organization and Equipment (MTOE), Table of Distribution and Allowances (TDA), or Joint Table of Allowances (JTA).

E-3. EXPLANATION OF LISTING

National Stock Numbers (NSN), descriptions, and quantity recommended are provided in Table E-1 to help you identify and request the additional items you require to support this equipment.

NOTE

Do not use cross chains when using bows and tarp.

Table E-1. AAL.

(1) NSN	(2) DESCRIPTION	(3) QUANTITY RECOMMENDED
3990-01-213-1746	Binder, load: (27404) – R-45	4—26,000 lb (11,794 kg), type IV
4010-01-499-5141	Cross chain (bulk): (39428) – 3592T31	4—20 ft (6.1 m) ea.
4030-00-539-8052	Hook, chain, “S”: (80210) – 498	4—spreader and corner chains 8—hooks
5340-01-346-4612	Padlock, w/chain keyed: (81346) – ASTM F883	2
2510-01-060-7116	Plate, cover, intermediate: (59306) – FB7556	6—7 x 8 ft (2.13 x 2.44 m), for carrying ammunition
5340-01-317-2657	Strap, elastic: (8S867) – 6	1 each—clip end, as required
5340-01-029-9085	Strap, rubber, tiedown: (13435) – 13034	1 each—w/S-hooks, as required
2540-01-138-3995	Tarpaulin, bow: (19207) – 12255591	11—9 lower deck, 2 upper deck
2540-01-304-2281	Tarpaulin, forest green: (19207) – 12255592	1—47 x 14.5 ft (14.33 x 4.42 m)
2540-01-333-2543	Tarpaulin, tan: (19207) – 12255592-1	1—47 x 14.5 ft (14.33 x 4.42 m)

Table E-1. AAL (Cont.)

(1) NSN	(2) DESCRIPTION	(3) QUANTITY RECOMMENDED
4010-00-033-6986	3/16-inch (4.8-mm) chains, 20 feet (6.1 m) long: (19207) – 819886	4
5340-00-980-9277	Tiedown assembly, non-nuclear: (19207) – 10900880	25—max/trailer (web)
1670-00-725-1437	Tiedown assembly, non-nuclear: (81349) – MIL-T-27260 Type CGU1B	25—max/trailer (web)
5340-01-204-3009	Tiedown assembly, nuclear: (19200) – MIL-PRF-71224	25—max/trailer (web)
8340-01-009-6285	Tarp, Weather resistant, 6 feet x 6 feet, Tan	Quantity as required
8340-00-841-6453	Tarp, Weather resistant, 5 feet x 5 feet, Olive drab	Quantity as required
8340-00-841-6454	Tarp, Weather resistant, 6 feet x 10 feet, Olive drab	Quantity as required
3940-01-449-2369	Net, Draft Cover, 6 ½ ‘ x 12’	Quantity as required
3940-01-449-2385	Net, Draft Cover, 8’ x 14’	Quantity as required

Table E-1. AAL (Cont.)

(1) NSN	(2) DESCRIPTION	(3) QUANTITY RECOMMENDED
3990-01-213-1746	Loadbinder, 26,000 lbs, Type IV	Quantity as required
4010-00-449-6573	Chain: ¾" x 12', WLL: 16,8000 lbs	Quantity as required
4010-00-803-8858	Chain: ½" x 12', WLL: 8,250 lbs	Quantity as required
2541-01-531-4064	Ladder, safety	Quantity as required
2590-01-532-8937	Ladder Bracket, Mounting (1 EA)	Quantity as required

APPENDIX F

EXPENDABLE AND DURABLE ITEMS LIST

F-1. SCOPE

This appendix lists expendable and durable items that you will need to operate and maintain the M871A3 Semitrailer. This list 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 8100, Army Medical Department Expendable/Durable Items.

F-2. EXPLANATION OF COLUMNS IN TABLE F-1

Column (1) Item Number. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., Use antiseize compound (Item 4, Appendix F)).

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

C = Operator/Crew
O = Organizational

Column (3) National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (4) Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N). This column provides the other information you need to identify the item.

Column (5) Unit of Measure (U/M). This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

Table F-1. Expendable and Durable Items List.

(1) ITEM NUMBER	(2) LEVEL	(3) NSN	(4) ITEM NAME, DESCRIPTION, CAGEC, P/N	(5) U/M
1	O		Cloth, abrasive (58536) A-A-1048:	
		5350-00-192-5047	80 grit—50 sheets	EA
		5350-00-192-5049	120 grit—50 sheets	EA
		5350-00-192-5051	180 grit—50 sheets	EA
2	O	5350-00-221-0872	Cloth, abrasive, crocus, 50 sheets (81348) P-C-458	EA
3	O	7920-01-004-7847	Cloth, lintfree Rymple cloth 301 purified	EA
4	O	8030-00-753-4953	Compound, antiseize (81349) MIL-A-13881	LB
5	O	7930-00-282-9699	Detergent, nonsudsing, general purpose, liquid (80244) MIL-D-16791, type 1: 1 gal (3.79 L)	GL
6	O		Grease, automotive and artillery (81349) MIL-PRF-10924G:	
		9150-01-197-7691	120-lb (54.4-kg) drum	LB
		9150-01-197-7688	2-1/4-oz (64-g) tube	OZ
		9150-01-197-7689	6-1/2-lb (2.95-kg) can	LB
		9150-01-197-7690	1-3/4-lb (0.79-kg) can	LB
		9150-01-197-7692	35-lb (15.9-kg) can	LB
		9150-01-197-7693	14-oz (397-g) cartridge	OZ
7	O	8540-00-262-7177	Hand cleaner, container (09177) 200-767-4A	EA
8	O		Lubricating oil, internal combustion engine Arctic, OEA (81349) MIL-L-46167:	
		9150-00-402-4478	1-qt (0.95-L) can	QT
		9150-00-402-2372	5-gal (18.93-L) can	GL
		9150-00-491-7197	55-gal (208.2-L) drum	GL

Table F-1. Expendable and Durable Items List (Cont.)

(1) ITEM NUMBER	(2) LEVEL	(3) NSN	(4) ITEM NAME, DESCRIPTION, CAGEC, P/N	(5) U/M
9	O		Lubricating oil, OE/HDO 10W (81349) MIL-L-2104:	
		9150-00-189-6727	1-qt (0.95-L) can	QT
		9150-00-186-6668	5-gal (18.93-L) can	GL
		9150-00-191-2772	55-gal (208.2-L) drum	GL
10	O	7920-00-205-1711	Rags: wiping, cotton and cotton synthetic: 50-lb (22.68-kg) bale (58536) A-A-531	LB
11	O		Solvent, cleaning compound (OJVH) PF05:	
		7930-01-328-2030	5-gal (18.93-L) can	GL
		7930-01-328-4058	55-gal (208.2-L) drum	GL
12	O		Solvent, cleaning compound (OK209) Breakthrough:	
		6850-01-378-0679	5-gal (18.93-L) can	GL
		6850-01-378-0666	55-gal (208.2-L) drum	GL
13	O		Solvent, cleaning compound (8S927) 0296-06:	
		6850-01-375-5553	5-gal (18.93-L) can	GL
		6850-01-375-5555	55-gal (208.2-L) drum	GL
14	O		Solvent, cleaning compound (OK209) SYKSOL 100:	
		6850-01-381-4423	5-gal (18.93-L) can	GL
		6850-01-381-4401	55-gal (208.2-L) drum	GL
15	O		Solvent, cleaning compound (OK209) SKYSOL:	
		6850-01-381-4420	5-gal (18.93-L) can	GL
		6850-01-381-4404	55-gal (208.2-L) drum	GL
16	O	8040-01-152-8105	Epoxy adhesive	KT
17	O	8040-00-152-0063	Vinyl adhesive	BT

Table F-1. Expendable and Durable Items List (Cont.)

(1) ITEM NUMBER	(2) LEVEL	(3) NSN	(4) ITEM NAME, DESCRIPTION, CAGEC, P/N	(5) U/M
18	O	5970-00-184-2002	Dielectric tape, electrical	RD
19	O	8030-01-159-4844	Sealant, silicone, RTV: 8-1/2-oz (241-g) tube (11862) 1052734	OZ
20	O	9905-00-537-8954	Tag, marker: 50 each (81349) MIL-T-12755	BX
21	O	5970-00-644-3167	Tape, insulation, electrical: 85-ft (25.9-m) roll (81348) HH-510	RL
22	O	8020-00-689-5379	Paint roller kit: 9-in. (22.86-cm) w/paint tray	KT
23	O	8020-00-682-6498	Paint roller cover: 9 in. (22.86 cm), 1-in. (2.54-cm) pile	EA
24	O	8030-01-414-7423	Carwell corrosion treatment (12) 16oz (454-g) bottles	EA
25	O	8030-01-414-8947	Carwell corrosion treatment 5-gal (18.93 L) can	GL
26	O	8030-01-414-7430	Carwell corrosion treatment 55-gal (208.2 L) drum	GL
27	O	8030-01-414-1413	Carwell corrosion treatment 55-gal (208.2 L) drum, Includes applicator and video	DRUM
28	O	7920-00-263-0328	Wooden extension handle: 60 in. (152.4 cm), for paint roller	EA
29	O		Wood water seal, UV protection: requires 4 gal (15.14 L)/deck	GL

Table F-1. Expendable and Durable Items List (Cont.)

(1) ITEM NUMBER	(2) LEVEL	(3) NSN	(4) ITEM NAME, DESCRIPTION, CAGEC, P/N	(5) U/M
30	O	8030-01-282-5626	Rubber preservative compound: (ozone protection for tires)	GL
31	O	5640-00-103-2254	Plastic-coated cloth tape: 2 in. (5.08 cm) wide, 60 yd (54.86 m)	RO
32	O	8010-00-152-3245	Boiled linseed oil for deck wood	GL
33	O	8010-00-684-8789	Boiled linseed oil for deck wood contains 5 gl	CN
34	O	9150-00-040-3891	Dielectric compound	TU
35	O	5640-00-103-2254	Tape, pressure sensitive, adhesive: 60 yd (54.86 m)	RO
36	O	5975-00-156-3253	Tiedown straps, nylon: 13-1/2 in. (34.29 cm)	HD
37	O	4730-00-289-8148	Cap, lubrication fitting, protective	EA
38	O	5340-00-450-5718	Caps, plugs, protective dust moisture	SET
39	O	8030-01-414-8947	Rust inhibitor: 5 gal (18.93 L) w/pump	CN
40	O	8030-00-015-1295	Anti-seize compound: 1 lb (0.45 kg)	CN
41	O	6810-00-264-6715	Molybdenum disulfide powder (graphite)	
42	O	8030-00-938-1947	Corrosion preventive compound	
43	O	9150-00-943-6880	Molybdenum disulfide grease	

Table F-1. Expendable and Durable Items List (Cont.)

(1) ITEM NUMBER	(2) LEVEL	(3) NSN	(4) ITEM NAME, DESCRIPTION, CAGEC, P/N	(5) U/M
44	O	8010-00-141-7838	Nonslip walkway paint Type II olive drab	GL
45	O	8010-00-641-0427	Nonslip walkway paint Type II black	GL
46	O	8030-00-252-3391	Nonhardening Type II sealing compound	TU
47	O	8040-00-455-5359	Automotive adhesive, black	TU
48	O	7920-00-061-0038	Brush, scrub (83421) 7920-00-061-0038	EA
49	O	8030-00-664-4944	Canvas preservative, liquid, or brush or spray	GL
50	O	8340-01-423-6231	Repair tape, tarp (for small repairs on polyester or duct material) (81349) – MIL-C-44103	

Table F-1. Expendable and Durable Items List (Cont.)

Water Dispersible (WD) CARC
MIL-DTL-64159 Type 1

COLOR NAME	COLOR NUMBER	KIT SIZE	NSN
Green 383	34094 34094 34094 34094	3 Pint Kit 3 Quart 3 Gallon 15 Gallon	8010-01-492-6637 8010-01-492-6638 8010-01-492-6639 8010-01-492-6640
Brown 383	30051 30051 30051 30051	3 Pint Kit 3 Quart 3 Gallon 15 Gallon	8010-01-492-6641 8010-01-492-6642 8010-01-492-6643 8010-01-492-6644
Tan 686A	33446 33446 33446 33446	3 Pint Kit 3 Quart 3 Gallon 15 Gallon	8010-01-492-6645 8010-01-492-6646 8010-01-492-6648 8010-01-492-6649
Black	37030 30730 37030 37030	3 Pint Kit 3 Quart 3 Gallon 15 Gallon	8010-01-492-6650 8010-01-492-6651 8010-01-492-6652 8010-01-492-6654

Table F-1. Expendable and Durable Items List (Cont.)

Water Dispersible (WD) CARC
MIL-DTL-64159 Type 2

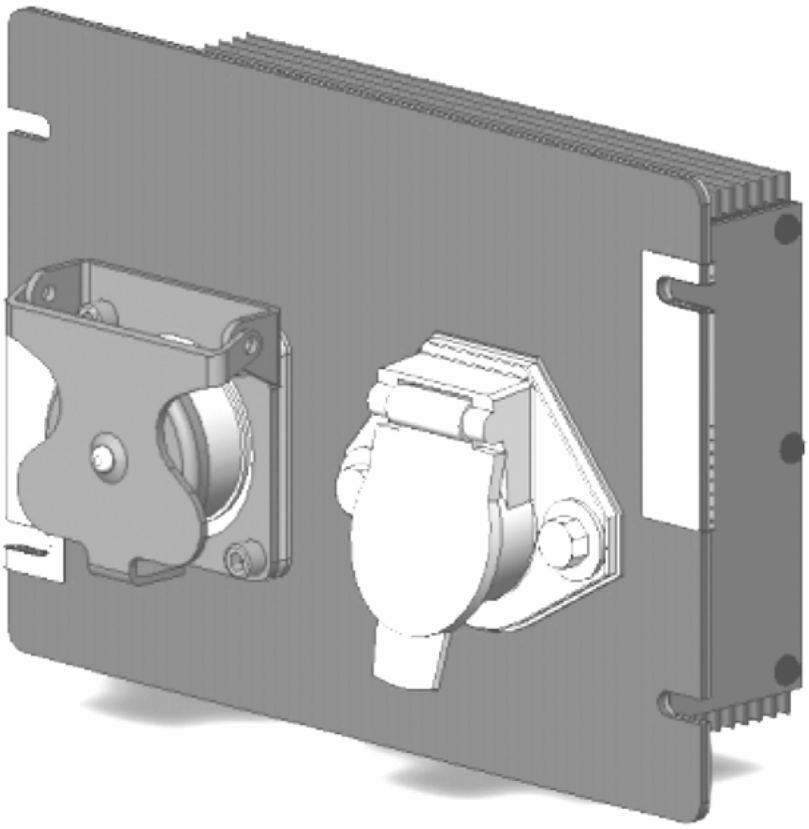
COLOR NAME	COLOR NUMBER	KIT SIZE	NSN
Green 383	34094 34094 34094 34094	3 Pint Kit 3 Quart 3 Gallon 15 Gallon	8010-01-493-3168 8010-01-493-3169 8010-01-493-3170 8010-01-493-3171
Brown 383	30051 30051 30051 30051	3 Pint Kit 3 Quart 3 Gallon 15 Gallon	8010-01-493-3172 8010-01-493-3173 8010-01-493-3174 8010-01-493-3175
Tan 686A	33446 33446 33446 33446	3 Pint Kit 3 Quart 3 Gallon 15 Gallon	8010-01-493-3176 8010-01-493-3177 8010-01-493-3179 8010-01-493-3180
Black	37030 30730 37030 37030	3 Pint Kit 3 Quart 3 Gallon 15 Gallon	8010-01-493-6682 8010-01-493-6683 8010-01-493-6690 8010-01-493-6691

APPENDIX G

RECEPTACLE CONVERTER BOX MAINTENANCE

G-1. RECEPTACLE CONVERTER BOX MAINTENANCE

Weldon FTM-2412
M871A3 Semitrailer Nose Box w/ Converter



Manual 0Z90-15-00 Rev 0, 20-JUN-2002

Notice

To ensure proper and reliable function, this product must be installed and serviced according to the direction of this manual. Poor grounding of this Module to the chassis may cause unstable voltage regulation to the ABS system. Ground potential of this Module and the ABS controller should be within 1V.

This module is designed to operate semi-trailers using 12V ABS systems and LED or other multi-voltage capable DOT (service) lighting. Internal wiring connections for the commercial DOT lighting are common between the military and commercial input connectors. The trailer's DOT lighting MUST be compatible with operating voltage of the tow vehicle.

There are no fuses within the module. Fuses or breakers within the tow vehicle must protect all circuits. The 12V ABS converter has internal protection circuitry that protects the converter in the event of a short or over current condition on the ABS power line.

General Description

The Weldon FTM-2412 Module is designed specifically for military semi-trailer operation with both military and commercial tow vehicles. The module provides for both military 12-pin and commercial 7-pin tow vehicle connections. The module contains a solid-state voltage regulator that supplies a fixed voltage to the trailer ABS system regardless of the tow vehicle's system voltage. An electromechanical relay is utilized to automatically separate the clearance/side-marker circuit from the tail/license lamp circuit when the commercial (J560) input connector is powered. When using a military tractor, the relay reverts to its normally-closed position to parallel these two trailer circuits.

Installation

1. The module shall be mounted to a rigid, electrically grounded member of the trailer using an appropriate grade of electrically conductive mounting bolts. See Figure 2 for mounting dimensions.
2. The back of the module shall be recessed into the trailer to provide protection to the gasketed side plates and the rear electrical connection.
3. A 12" service loop in the main trailer harness is recommended to allow removal of the module for service.
4. Application of electrical grease is recommended on each of the connectors to reduce oxidation of the contacts and provide a more reliable circuit.

Specifications

Operating Voltage (converter):	18-45VDC*
Operating Temperature:	-55 +105C
Output Over-Current Trip Point:	>5A
Storage Temperature:	-65 +125C
Weight:	3.3kg (7.25lbs)

**This is the operating voltage needed to maintain 12V output from converter module to power ABS. All other circuits are pass-through and do not have an operational voltage parameter.*

Service

When servicing the module, always insure that service brake is set on the tow vehicle.

Aviod disassembling the FTM-2412. If the module is opened, it will be necessary to replace the gaskets to prevent corrosion of internal components.

If the module is removed from the trailer for troubleshooting, it is necessary that a ground wire be attached from the module chassis to the trailer chassis for proper opertion.

When replacing the converter PCB assembly it is necessary to carefully remove the heat sink clips (2) and retaining hardware before attempting to remove the board. When installing a new unit, make sure that thermal pads are under the tabs of the two T0-220 transistors. These tabs must be isolated from the heat sink for proper operation. Install the mounting screw through the inductor and bracket before reinsalling the heat sink clips.

G-1. RECEPTACLE CONVERTER BOX MAINTENANCE (Cont.)

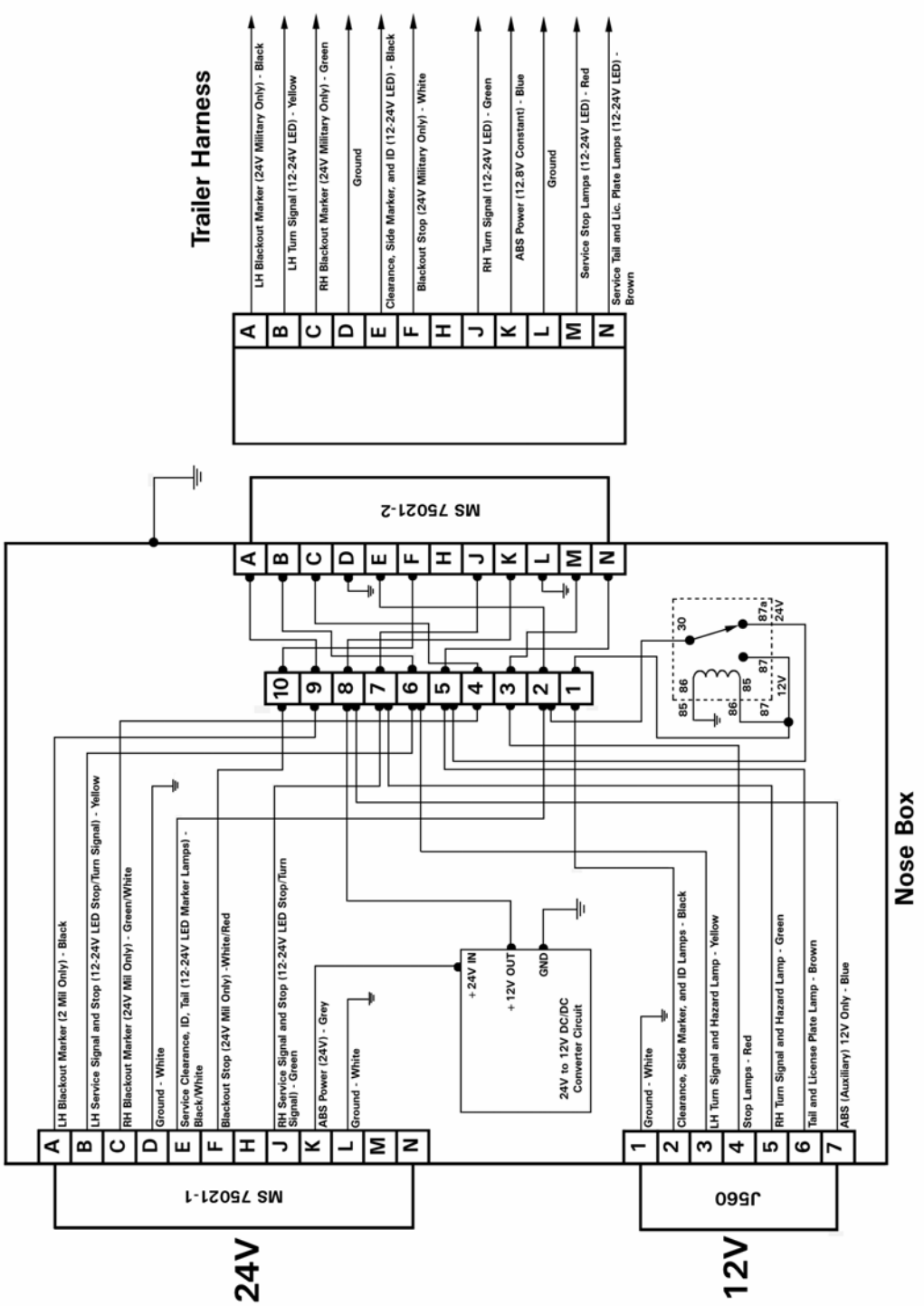


Figure 1 – Module Electrical Diagram

G-1. RECEPTACLE CONVERTER BOX MAINTENANCE (Cont.)

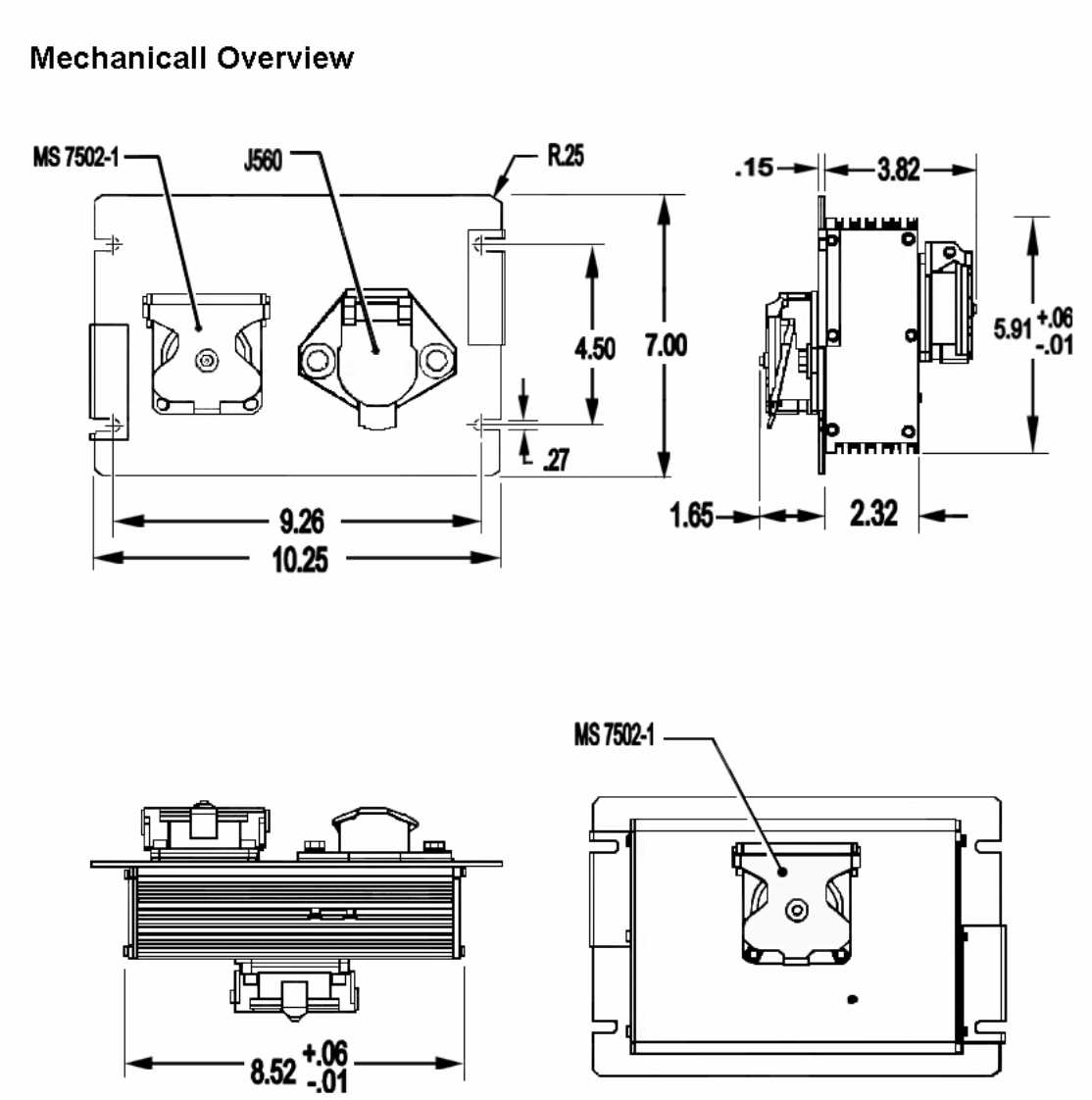


Figure 2 - Package Dimensions

G-1. RECEPTACLE CONVERTER BOX MAINTENANCE (Cont.)

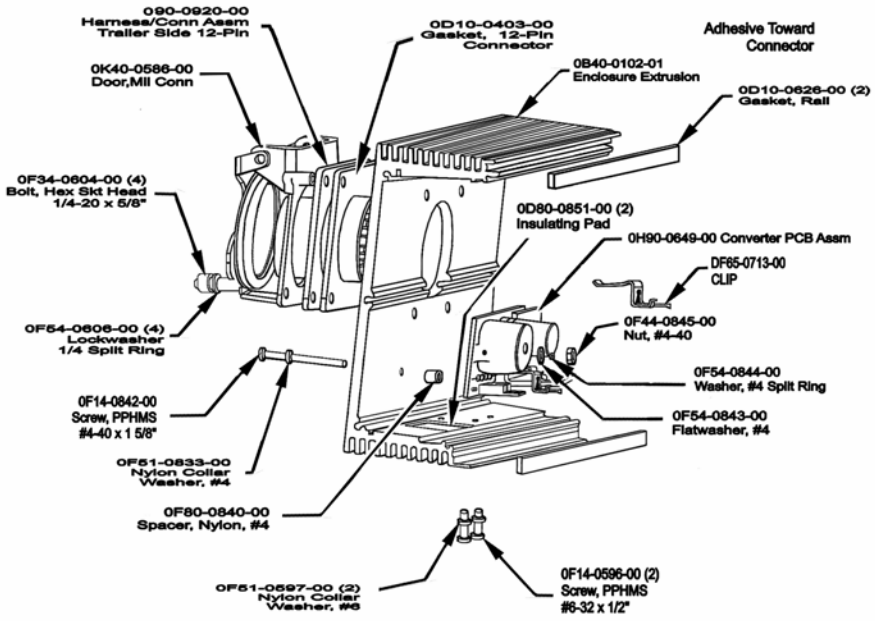


Figure 3 - 0N10-1038-00 Rear Module Sub-Assembly w/Trailer Connector and Converter Module

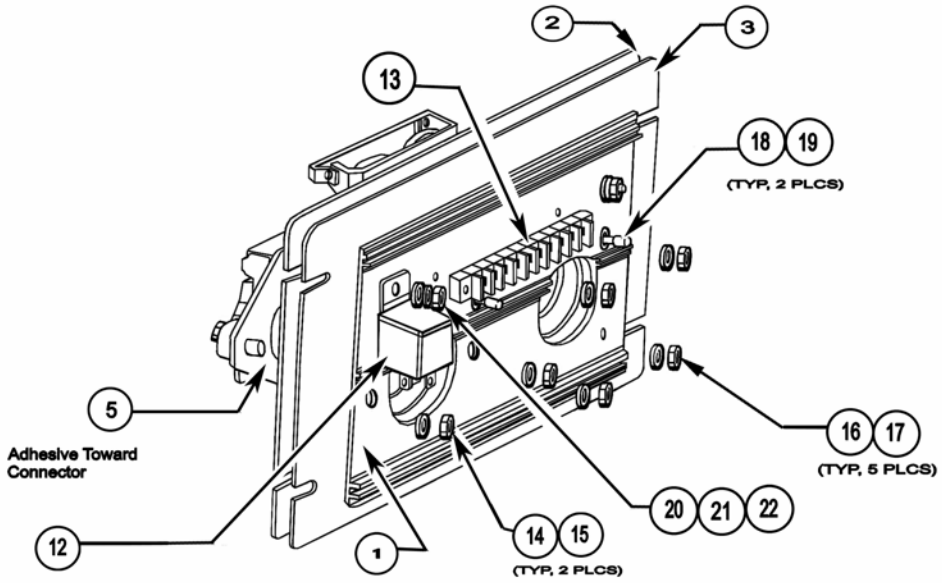


Figure 4 - 0N10-1037-00 Module Face Plate Sub-Assembly, Back Side

G-1. RECEPTACLE CONVERTER BOX MAINTENANCE (Cont.)

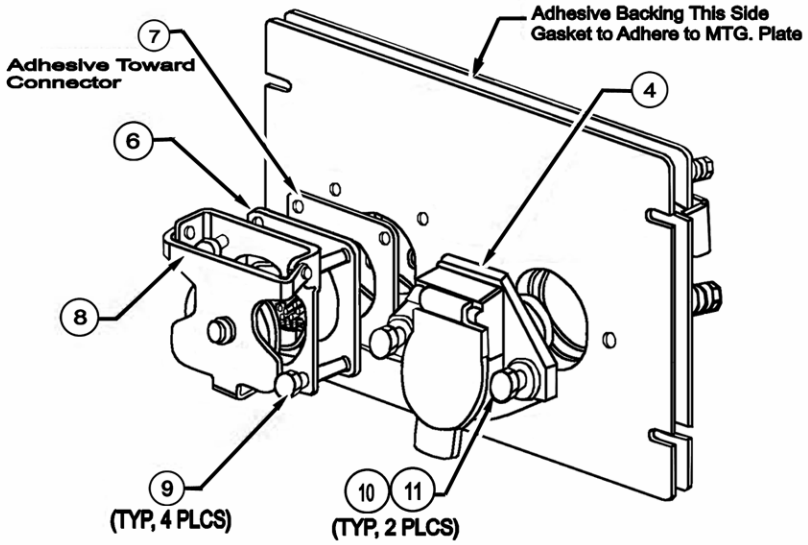


Figure 5 - 0N10-1037-00 Module Face Plate Sub-Assembly, Back Side

Table 1: 0N10-1037-00 Face Plate Assembly Bill of Material

Item	Part Number	Description	Qty.
1	0B40-0105-01	Base Extrusion, 24-12 Converter	1
2	0J10-0877-00	Mounting Plate	1
3	0D10-0878-00	Gasket, Mounting Plate	1
4	0L90-0922-00	Connection/Harness, 7 Pos. Trailer Receptacle w/Pins	1
5	0D10-0883-00	Gasket, 7 Pin Trailer Receptacle	1
6	0L90-0921-00	Connection/Harness, 12 Pos. Trailer Receptacle w/Pins	1
7	0D10-0403-00	Gasket, Mounting, 12 Pos. Trailer Receptacle	1
8	0K40-0586-00	Door, Connector, Use with 12 Pos. Trailer receptacle	1
9	0F34-0603-00	Bolt, Hex Socket Hd. 1/4-20 x 1” Stl. w/ASTM B633-85 Finish	4
10	0F34-0598-00	Bolt, hex Hd. 5/16-18 x 1” Stl. w/ASTM B633-85 Finish	2
11	0F54-0601-00	Washer, 5/16 Flat, Stl. w/ASTM B633-85 Finish	2
12	0440-0841-00	Relay, SPST, 30A, 12V Coil	1
13	0K29-0906-00	Terminal Block, 10 Pos. w/Barriers, Flange Mt., Non-Feed thru	1
14	0F44-0599-00	Nut, 5/16-18, Hex, Stl. w/ASTM B633-85 Finish	2
15	0F54-0602-00	Washer, 5/16 Split Ring, Stl. w/ASTM B633-85 Finish	2
16	0F44-0605-00	Nut, 1/4-20, Hex, Stl. w/ASTM B633-85 Finish	5
17	0F54-0606-00	Washer, 1/4 Split Ring, Stl. w/ASTM B633-85 Finish	5
18	0F14-0596-00	Screw, #6-32 x 1/2” PPHMS, Stl. w/ASTM B633-85 Finish	2
19	0F54-0608-00	Washer, #6 Int. Star, Stl. w/ASTM B633-85 Finish	2
20	0F44-0911-00	Nut, #10-24, Hex, Stl. w/ASTM B633-85 Finish	1
21	0F54-0913-00	Washer, #10 Split ring, Stl. w/ASTM B633-85 Finish	1
22	0F54-0912-00	Washer, #10 Flat, Stl. w/ASTM B633-85 Finish	1

G-1. RECEPTACLE CONVERTER BOX MAINTENANCE (Cont.)

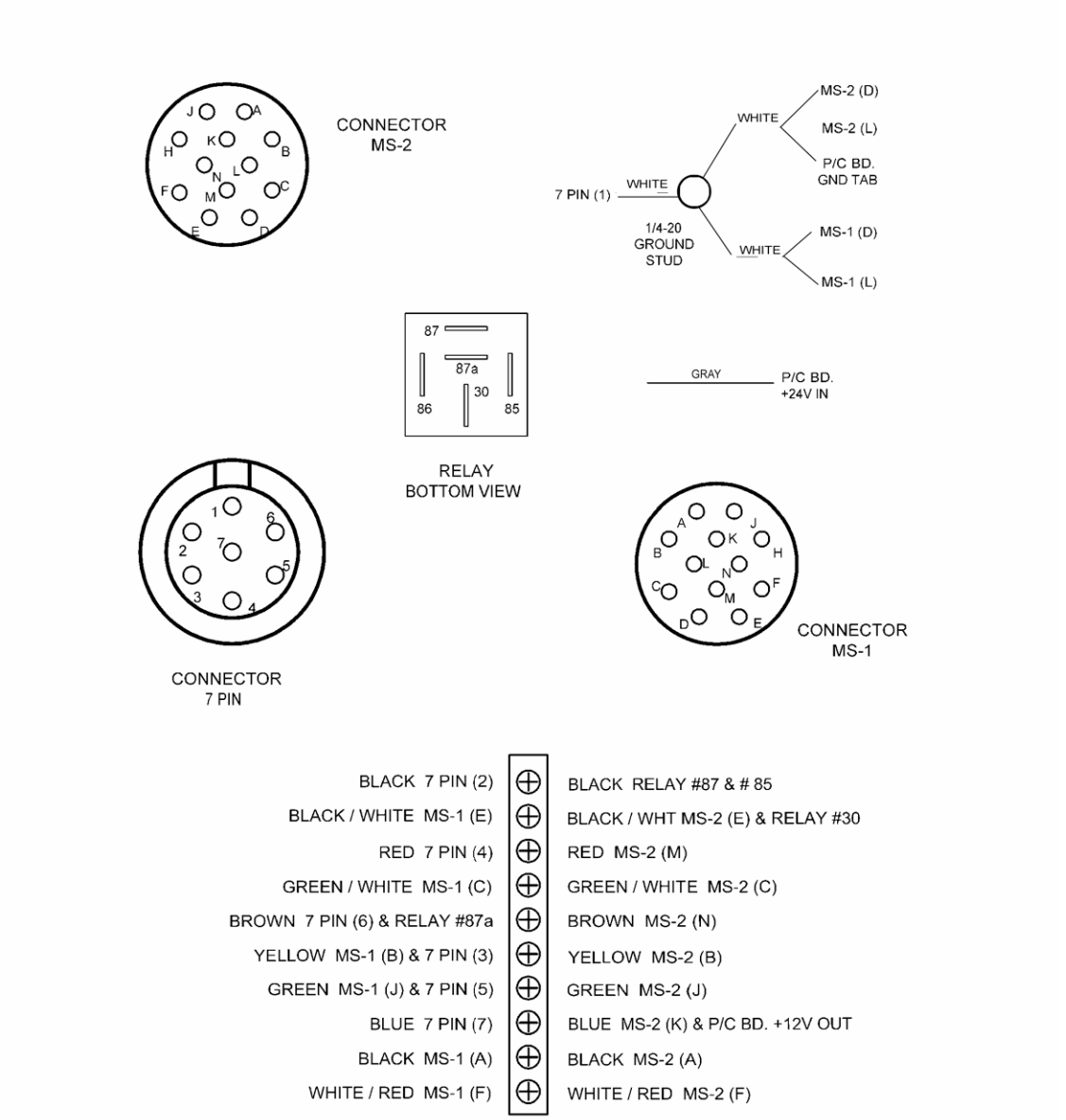


Figure 6 – 0T40-0989-00 Internal Wiring Description

G-1. RECEPTACLE CONVERTER BOX MAINTENANCE (Cont.)

Troubleshooting

Problem	Action
ABS Fault w/ 24V Tow Vehicle	Do not remove the FTM-2412 from the trailer for these tests unless instructed. With tractor connected to military connector of trailer, tractor power on, and service brake applied: Check converter regulation by measuring the voltage across pin 7 (12V converter output for ABS) and pin 1 (ground) of the J560 commercial connector. The J560 connector is used as a convenient measurement point when the 24-pin military harness is applied. The reading from pin 7 to pin 1 of the J560 should be ~12V. If 12V is measured, then the converter is working properly. Now check from pin 1 to the trailer chassis ground (not the converter box itself). If the voltage is >1V then there is not a good ground between the converter box and the ABS chassis ground. Remove the FTM-2412, clean the ground straps and the chassis connection points. Reassemble and retest. If no voltage or low voltage is measured across pins 1 and 7 of the J560 connector, check the following: 1. There is 24V supply from the tow vehicle on pin K of the military connector. 2. That there is not a short on the ABS power circuit of the trailer harness. If there is a good 24V supply into the converter and the ABS power circuit is not shorted then the converter board should be replaced. If 24V is measured across pins 1 and 7 of the J560 connector, check the converter to trailer chassis ground as described above. If the ground is good and 24V is still present on the ABS power then the converter board should be replaced.
ABS Fault w/ 12V Tow Vehicle	This is a pass-through circuit in the FTM-2412 for the J560 ABS power. The ABS controller will see the voltage from the 12V tow vehicle as applied to pin 7 of the J560 connector. Continuity through the FTM-2412 may be confirmed by measuring from pin 7 to pin K of the 24-pin connector on the trailer harness side. If continuity does not exist, check for corrosion on the connector terminals. If still no continuity, there is a bad internal connection and the FTM-2412 must be serviced.
No Clearance, Side Marker or ID Lights	These are pass-through circuits within the FTM-2412. Check that lamp(s) are functional before troubleshooting wiring or converter box. Check that voltage is available on the appropriate wires from the tow vehicle. Check that the trailer has a solid ground with the tow vehicle. Check continuity of the pass-through circuits in the FTM-2412 per the diagram shown in Figure 1 of this manual. Check for corrosion or oxidation of connector pins on the module and the connecting harnesses (tow vehicle and trailer). If 24V is on tow vehicle harness Pin-E but is not measured on trailer harness Pin-N then the FTM-2412 internal relay is bad and should be replaced.
Trailer Lights are Dim	Service lamps must be capable of 12-24V operation. If a 24V lamp is used it will be very dim on a 12V tow vehicle. Check for corrosion on connector pins and clean if necessary. Check that there is a solid ground connection between the trailer and the two vehicle.

APPENDIX H

SUPPLEMENTAL INFORMATION

H-1. SCOPE

This appendix contains the following supplemental information:

H-2. 10/20 INSPECTION CHECKLIST

Model: _____

Serial Number:_____

Registration Number: _____

Document Number: _____

Mechanic/Inspector's Name: _____

Location: _____

Unit: _____

Date: _____

Complete checklist for Semitrailer being inspected. Fill in name of mechanic/inspector. Check all appropriate areas, i.e., accept/reject/corrected. Note defects and corrections on last sheet.

H-2. 10/20 INSPECTION CHECKLIST (Cont.)

NOTE

During the walk around inspection, examine semitrailer for general appearance including paint, workmanship type defects, and missing or damaged equipment. Paint scratches that do not penetrate top coat are acceptable.

Key: **A** = **A**ccept **R** = **R**eject **C** = **C**orrected

1. Front, Top, and Sides of Semiltrailer:	A	R	C
a. Gladhands/Hardware:			
(1) Gladhands for damage and leakage	___	___	___
(2) Gladhands for unclean mounting surfaces	___	___	___
(3) Fittings and seals for wear and presence	___	___	___
b. Converter Box:			
(1) Damage and/or missing hardware	___	___	___
(2) Pins missing or damaged	___	___	___
c. Data Plates/Labels/Decals:			
(1) Presence	___	___	___
(2) Damage/legibility	___	___	___
d. Bulkhead:			
(1) Retaining hardware loose/missing	___	___	___
(2) Damage	___	___	___
(3) Document box condition	___	___	___
e. Kingpin/Bolster Plate:			
(1) Any damage ___	___	___	___
(2) Weld cracks ___	___	___	___
(3) Light coat of lubricant on kingpin and bolster plate	___	___	___
f. Landing Legs/Shoes/Handcrank:			
(1) Damage and secure mounting	___	___	___
(2) Smooth operation	___	___	___
(3) Hardware missing	___	___	___

H-2. 10/20 INSPECTION CHECKLIST (Cont.)

1. Front, Top, and Sides of Semitrailer (Cont.)	A	R	C
g. Decking:			
(1) Damage	___	___	___
(2) Condition	___	___	___
h. Side/rear Board Storage Rack: (If required)			
(1) Damage	___	___	___
(2) Missing hardware	___	___	___
i. Reflectors:			
(1) Presence	___	___	___
(2) Damage or missing hardware	___	___	___
j. Side/Rear/Racks, Stakes, and Hardware: (if required)			
(1) Damaged or missing hardware	___	___	___
(2) Condition of racks	___	___	___
k. Spare Tire Carrier/Hardware:			
(1) Presence _____	___	___	___
(2) Damaged or missing hardware	___	___	___
l. Bll:			
(1) Presence	___	___	___
(2) Condition/Secured	___	___	___
m. Groundboards/Chocks and Hardware:			
(1) Presence	___	___	___
(2) Condition	___	___	___
n. Twistlocks and Tiedowns:			
(1) Damaged	___	___	___
(2) Condition	___	___	___

H-2. 10/20 INSPECTION CHECKLIST (Cont.)

	A	R	C
2. Lighting, Warning and Safety:			
(1) Damaged or hardware missing	___	___	___
(2) Corroded connectors	___	___	___
(3) Operation	___	___	___
3. Main Electrical Harness:			
(1) Damaged or hardware missing	___	___	___
(2) Corroded connectors	___	___	___
4. ABS Sensor Cables, ECU, Modules, Diagnostic Adapter, and Cables:			
(1) Damaged or missing hardware or cables	___	___	___
(2) Blink code adapter cable and cap damaged or missing	___	___	___
(3) Corroded connectors	___	___	___
(4) Operation	___	___	___
5. Hoses, Lines, and Hardware:			
a. Hoses and Lines:			
(1) Missing or damaged	___	___	___
(2) Loose or twisted	___	___	___
(3) Evidence of leakage	___	___	___
6. Stowage Box:			
Damage or missing hardware/seal	___	___	___
7. Hubodometer:			
(1) Presence	___	___	___
(2) Damage and missing hardware	___	___	___
8. Hubcaps:			
Damaged or missing hardware	___	___	___
9. Air tanks, Air Brake Chamber, and ASAs:			
(1) Presence	___	___	___
(2) Damage or missing/loose hardware	___	___	___
(3) Operation	___	___	___
(4) Moisture drained from air tanks	___	___	___

H-2. 10/20 INSPECTION CHECKLIST (Cont.)

	A	R	C
10. Suspension and Hardware, Correct Torques:			
(1) Damage or loose/missing hardware _____	___	___	___
(2) Nuts torqued to specification _____	___	___	___
11. Axles:			
(1) Damage or loose/missing hardware _____	___	___	___
(2) Apparent misalignment _____	___	___	___
12. Tires, Wheels, Valves, and Caps:			
(1) Damaged valves or missing caps _____	___	___	___
(2) All tires for damage and unusual tread wear _____	___	___	___
(3) Proper inflation, including spare _____	___	___	___
(4) Wheels for damage and rust_____	___	___	___
(5) Presence, torque, and condition of all mounting hardware _____	___	___	___
13. Overall Condition:			
(1) Paint_____	___	___	___
(2) Lubrication, oil can points_____	___	___	___
(3) Corrosion protection _____	___	___	___
(4) Clean and mission ready_____	___	___	___
(5) Presence of Basic Issue Items_____	___	___	___

H-2. 10/20 INSPECTION CHECKLIST (Cont.)

10/20 INSPECTION SUMMARY SHEET

DEFICIENCY (brief description/corrective action)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

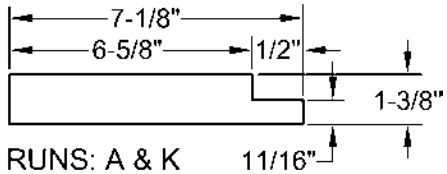
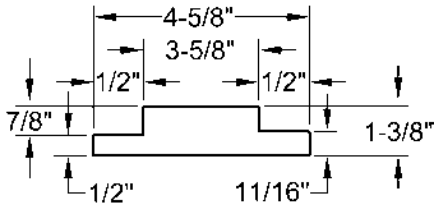
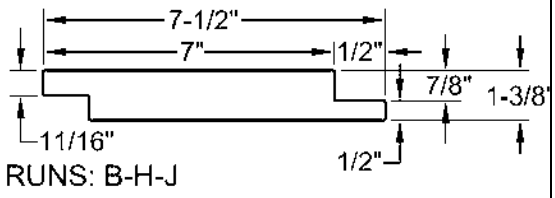
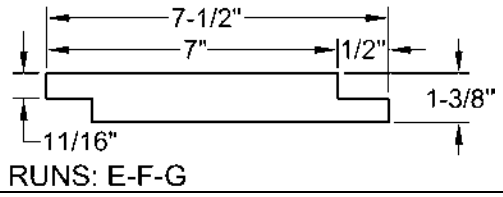
H-3. MAINTENANCE EXPENDITURE LIMITS (MEL)

Semitrailer age in years and MEL percentages for the M871A3 Semitrailer:

Age in Years	MEL
1	95%
2	90%
3–6	85%
7–9	75%
10–14	65%
15–18	55%
19–21	45%
22	35%
23	25%
24	10%
25	0%

H-4. WOOD DECKING

Fontaine Trailers 1-3/8 x 96 x 41'-0" MIL #M871A3

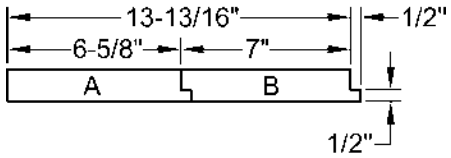
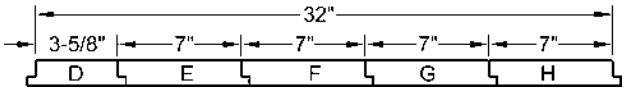
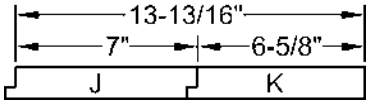
	NO. OF PCS. FOR 1 KIT	LENGTH	NO. OF PCS. FOR ____ KITS:
	2	41'-0"	
	1	41'-0"	
	3	41'-0"	
	NO. OF PCS. FOR 1 KIT	**LENGTH**	**NO. OF PCS. FOR ____ KITS:**
	3	41'-0"	
	9	TOTALS	

H-4. WOOD DECKING (Cont.)

Fontaine Trailers 1-3/8 x 96 x 41'-0" MIL #M871A3 (Cont.)

The following part numbers are for the M871A3 decking only. The deck boards are Apitong, single length RLT.

The CAGE to be used for this decking is: 8N013 (Overseas Hardware Co.).
Secondary reference CAGE is: OFBD6 (Fontaine Trailer Co.).

P/N	BOARD QUANTITY	BOARD LENGTH	
M871A3-A M871A3-B	1 1	41' 0" 41' 0"	
M871A3-D M871A3-E M871A3-F M871A3-G M871A3-H	1 1 1 1 1	41' 0" 41' 0" 41' 0" 41' 0" 41' 0"	
M871A3-J M871A3-K	1 1	41' 0" 41' 0"	
	Total 9 boards		

NOTE

- **The 41' 0" long boards are for both upper and lower decks on the semitrailer. The single length boards must be cut, approximately 10 feet for the upper deck and approximately 31 feet for the lower deck. Measure twice and cut once.**
- **Deck screws are not part of deck kit and must be ordered separately.**
- **The kit and boards are apitong and do not require pressure treatment. Unless specified, they are shipped without pressure treatment. Each board is proof load tested for safe working stress.**
- **If you encounter any problems in shipping or installation, the manufacturer—Overseas Hardwoods Company, Mobile, Alabama—can be reached at 800-999-7616, FAX: 334-457-7633, email: chuck@overseashardwoods.com.**
- **Treating the apitong flooring on an annual basis with boiled linseed oil or a UV wood preservative will increase the life of the decking. The preservative should be applied by spraying it on or with the use of a roller. It takes approximately 4-5 gallons for good coverage of the decking.**

H-4. WOOD DECKING (Cont.)

Fontaine Trailers 1-3/8 x 96 x 41'-0" MIL #M871A3 (Cont.)

Removal

1. Remove screws and all old deck boards. Properly dispose of boards and screws.
2. Grind flush all screws that have not been removed from crossmembers.
3. Insure all crossmembers are painted/undercoated prior to installation of new decking.

Installation

1. Premark all trailer crossbeam centers so their location can be identified after boards have been laid in place.

NOTE

To fit rail boards, minor trimming may be required. Lift and tilt boards so they properly fit in the ship-lapped grooves and rails as per enclosed illustrations.

2. Reference the Overseas drawings for individual board sizes and letter identification of each board.

NOTE

Multiple letters identifying a board indicates a run of the same board or the board must be turned end to end to fit as per drawing. Do not modify a board to make it fit, follow the drawings and ship-lap positioning. The board may be end trimmed if required as all decks are not the same.

3. Drill boards and crossmembers at the same time to insure match up of holes. Countersink holes in deck boards before drilling in screws.
4. Drill screws through floorboards into crossmembers using two screws per crossmember that board overlays.

NOTE

- **If a finger joint in the deck board overlays a crossmember, screws may be drilled through the finger joint. Do not try to cut the board so the finger joint does not lay over a crossmember.**
- **Steps 3 and 4 can be accomplished in one operation by using self-tapping deck screws.**

5. Repeat steps 2 thru 4 for the remaining deck boards.

NOTE

Deck screws are not part of deck kit and must be ordered separately.

H-4. WOOD DECKING (Cont.)

Fontaine Trailers 1-3/8 x 96 x 41'-0" MIL #M871A3 (Cont.)

Care of Wood Decking on Trailers

Platform trailers that are idle and parked outdoors for an extended period of time are exposed to the elements where they may suffer weather damage. This damage results from excess sunlight and/or moisture. The damage from sunlight may take the form of shrinkage to the top face of the decking causing cracks to appear between boards. Often this will be accompanied by concave cupping and season checks, i.e., (cracks). Such cracks may cause other problems. Cracks fill with rainwater and absorption of water into the wood deck can lead to degradation as trapped water penetrates the interior portion of the boards.

Prevention of weather damage can be greatly minimized by application of good water repellent w/wood preservative to all visible surfaces of the decking. Cost of labor to apply the treatment and the material itself is modest when compared to potential degradation from weather elements. It takes less than an hour's labor to apply the repellent using a hand-held roller, or as preferred, a hand-held, pump-up sprayer.

An ideal treatment is Woodguard produced by ISK Bioscience of Memphis, TN. Approximately 4 gallons (15.14 L) (or less) will cover 400 sq ft (37 sq m) (8 ft x 50 ft [2.4 m x 15.24 m]) of wood that comprises the trailer deck. Forty gallons (150 L) or more can be ordered directly from ISK Biosciences (telephone number: 1-800-248-7961). Fewer than 40 gallons (150 L) can be purchased by calling a distribution center at 1-800-524-1093). Any product like Thompson's Water Seal with UV protection may be used on an annual basis to protect the wood decking. The important thing to keep in mind is that the wood decking should be protected against sunlight and moisture to insure the longest life for the wood.

H-5. WHAT'S A "BOARD FOOT"?

One of the most widely used terms in the lumber industry that many "non lumber" customers have difficulty understanding is the unit of measurement called "board foot." We attempt to clarify this nomenclature here as well as define other equally confusing terminology.

A **board foot** is the unit of measurement for most lumber items and is nothing more than a measurement of the volume of wood. One board foot is equivalent to a piece of wood measuring 12" x 12" square by 1" thick (144 cubic inches). Thus, in a block of wood 12" x 12" x 12" (1 cubic foot in volume), there are 12 board feet.

Of course, not all wood is produced in nice, easy-to-calculate 12" squares, so conversion to board feet from various sizes of typical lumber is needed to establish a common denominator with which all can identify.

To calculate board feet, first state the dimensions of the width and thickness in inches, then the length of the lumber in feet. Next, multiply the width x thickness x length and divide by 12. Thus, in a 2" x 8" x 12' plank there are 16 board feet, or 16 bf (2" x 8" x 12'/12) = 16 bf.

Other typical board foot measurements are:

1" x 4" x 10'0" = 3.33 bf
4" x 6" x 14' 0" = 28.00 bf
6" x 8" x 8'6" = 34.00 bf
12" x 12" x 32'0" = 384.00 bf

H-5. WHAT'S A "BOARD FOOT"?

Board feet can also be expressed as: BF, MBF (1000 BF), FBM (foot board measure), or MFBM (1000 foot board measure).

Nominal is a description of size based on the lumber dimension in its rough sawn, green, unseasoned condition. Unless otherwise specified, the board footage is based on lumber's nominal dimension.

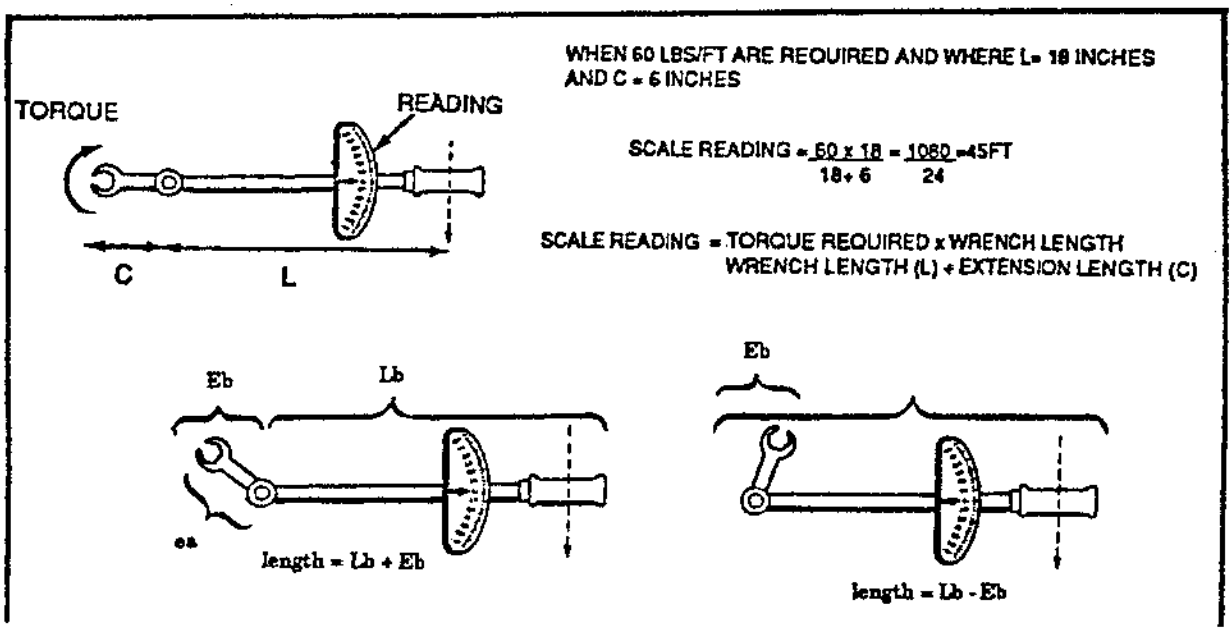
Lumber or timbers are often surfaced (also called dressed, or planed) down from nominal dimensions to a **net** dimension. Further, the selling price of a 2" x 8" x 12' pine plank, surfaced four sides (S4S) to 1-1/2" x 7-1/4" x 11'4" would still be based on its nominal dimensions of 16 board feet, not on the actual net dimensions of 10.27 board feet. If the lumber is sold in its rough sawn condition, the nominal and the net dimensions would be the same.

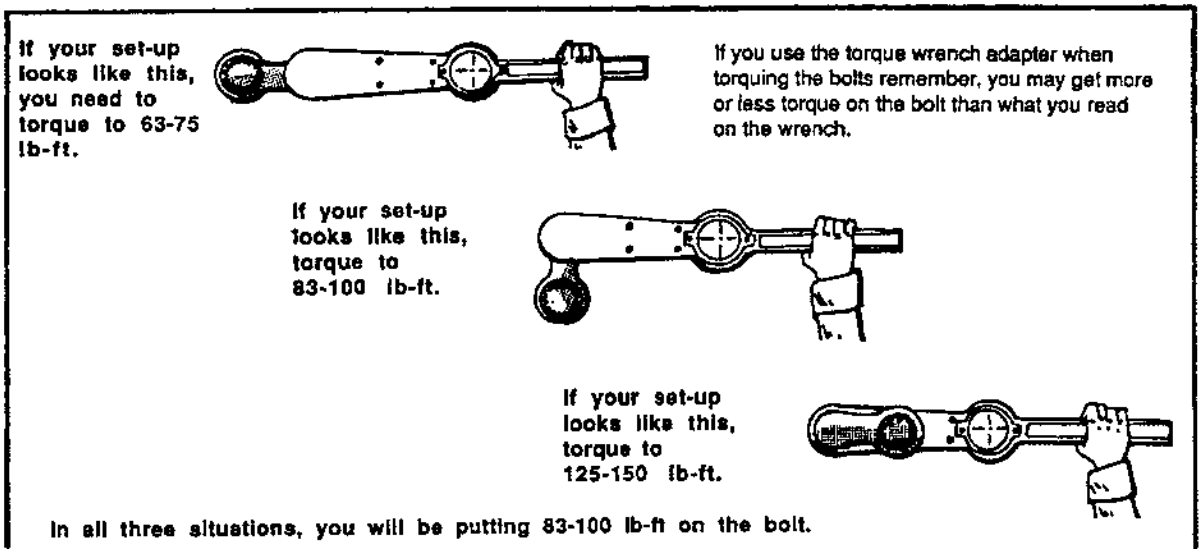
The standard net dimension of surfaced 1" softwood board is 3/4", whereas 2" and thicker is surfaced to 1/2" under nominal dimensions. The net width dimensions get a bit trickier to describe. Normally, in boards and construction lumber, the net dimension is 1/2" under nominal width for material 6" or less wide, and 3/4" under nominal width for material 8" or wider. The net dimensions of surfaced timbers are normally 1/2" under nominal dimensions but can be specified to any net dimension.

H-6. TORQUE TABLE

Tightening Metal Fasteners

When torquing a fastener, select a wrench whose range fits the required torque value. A torque wrench is most accurate from 25–75% of its stated range. A wrench with a stated range of 0–100 lb-ft. (0–136 N•m) will be most accurate from 25–75 lb-ft. (34–102 N•m). The accuracy of readings will decrease as you approach 0 lb-ft. or 100 lb-ft. (136 N•m). The following ranges are based on this principle.





H-6. TORQUE TABLE (Cont.)

STATED RANGE	MOST EFFECTIVE RANGE
0–200 lb-in. (0–23 N•m)	50–150 lb-in. (6–17 N•m)
0–600 lb-ft. (0–813 N•m)	50–450 lb-ft. (68–610 N•m)
0–170 lb-ft. (0–23 N•m)	44–131 lb-ft. (60–178 N•m)
15–75 lb-ft. (20–102 N•m)	30–60 lb-ft. (41–81 N•m)

Installation and Torquing

Matching Nuts. Matching nuts require a minimum height (see page H-22) equal to the basic diameter of the bolt. The same is true of tapped holes. In tapped softer materials, the depth of the tapped hole should be 1-1/2 times the basic diameter of the bolt.

Thread Protrusion. In all installations, bolts, studs, and screws must extend through the nut at least a length equivalent to two complete threads (see page H-22). This applies to both self-locking and plain nuts.

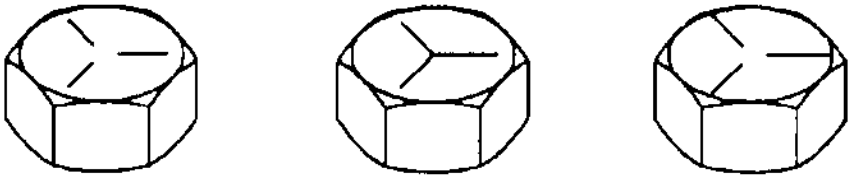
Torquing Self-Locking Nuts. To obtain the correct recommended torque value on self-locking nuts, the nut must be tightened until it is one turn from the beginning of seating. At this point, if the torque is less than 1/3 of the recommended torque, it should be disregarded and the nut tightened to the recommended torque value. If the torque is 1/3 or more of the recommended torque, it should be added to the recommended torque. Example: The recommended torque is 50–70 lb-in. (6–8 N•m). The torque at one turn from seating is 30 lb-in. (3 N•m). The correct torque wrench reading would be 80–100 lb-in. (9–11 N•m).

Retorquing Fasteners. Procedures intended for installing metal fasteners can cause incorrect reading when used to check or retorque already installed fasteners during maintenance. Before checking or retorquing an already installed threaded fastener, first mark the fastener and its companion components so the marks are in line. Second, back it off a 1/4 turn to loosen it. Torque it to the specification with an even steady pull on the torque wrench. The marks should be in line; if not, the marks will indicate the fastener was under or over torqued.

Standard Torque Charts. Standard torque charts have been established for dry and wet torque conditions. Surface variations such as thread roughness, scale paint, lubrication (oil, grease, etc.), hardening, and plating may alter these values considerably. The following are standard torque charts.

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 5 (3 lines):

CAPSCREW HEAD MARKINGS

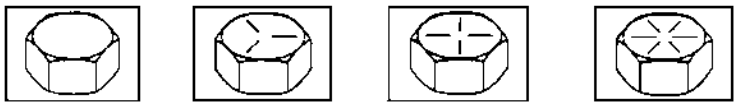


H-6. TORQUE TABLE (Cont.)

Look down the column under the picture until the torque limit in foot-pounds for the diameter and threads per inch of the screw being installed is found.

Table H-1. Torque Limits for Dry Fasteners.

SAE CAPSCREW HEAD MARKINGS

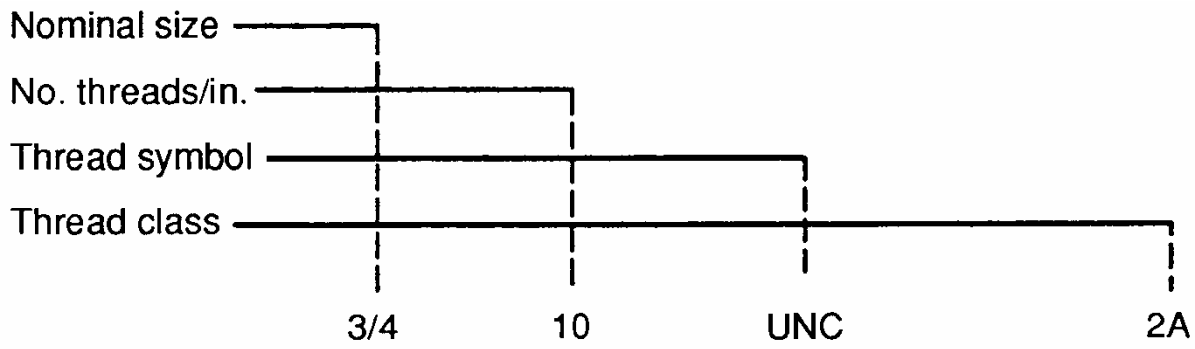


SIZE			TORQUE							
			SAE GRADE No. 1 or 2		SAE GRADE No. 5		SAE GRADE No. 6 or 7		SAE GRADE No. 8	
DIA. IN.	THREADS PER INCH	MMs	FOOT-POUNDS	N•m	FOOT-POUNDS	N•m	FOOT-POUNDS	N•m	FOOT-POUNDS	N•m
1/4	20	6.35	5	6.78	8.0	10.85	10	13.56	12.0	16.27
1/4	28	6.35	6	8.14	10.0	13.56	—	—	14.0	18.98
5/16	18	7.94	11	14.92	17.0	23.05	19	25.76	24.0	32.52
5/16	24	7.94	13	17.63	19.0	25.76	—	—	27.0	36.61
3/8	16	9.53	18	24.41	31.0	42.04	34	46.10	44.0	59.66
3/8	24	9.53	20	27.12	35.0	47.46	—	—	49.0	66.44
7/16	14	11.11	28	37.97	49.0	66.44	55	74.58	70.0	94.92
7/16	20	—	30	40.68	55.0	74.58	—	—	78.0	105.77
1/2	13	12.70	39	52.88	75.0	101.70	85	115.26	105.0	142.38
1/2	20	—	41	55.60	85.0	115.26	—	—	120.0	162.78
9/16	12	14.28	51	69.16	110.0	149.16	120	162.72	155.0	210.18
9/16	18	—	55	74.58	120.0	162.72	—	—	170.0	230.52
5/8	11	15.88	63	85.43	150.0	203.40	167	226.45	210.0	284.76
5/8	18	—	95	128.82	170.0	230.52	—	—	240.0	325.44
3/4	10	19.05	105	142.38	270.0	356.12	280	379.68	375.0	506.50
3/4	16	—	115	155.94	295.0	400.02	—	—	420.0	596.52
7/8	9	22.23	160	216.96	375.0	536.62	440	596.64	605.0	820.38
7/8	14	—	175	237.30	435.0	599.85	—	—	675.0	915.30
1	8	25.40	235	318.66	590.0	800.04	660	694.96	910.0	1233.96
1	14	—	250	338.00	660.0	894.96	—	—	990.0	1342.44
1-1/8	—	25.58	—	—	800.0	1064.8	—	—	1280.0	1735.7
					880.0	1193.3			1444.0	1952.8
1-1/4	—	31.75	—	—	—	—	—	—	1820.0	2467.9
									2000.0	2712.0
1-3/8	—	34.93	—	—	1460.0	1979.8	—	—	2300.0	3227.3
					1680.0	2278.1			2720.0	3688.3
1-1/2	—	38.10	—	—	1940.0	2630.6	—	—	3160.0	4285.0
					2200.0	2963.2			3560.0	4827.4

H-7. 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, which is a measure of the degree between threads of the 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.

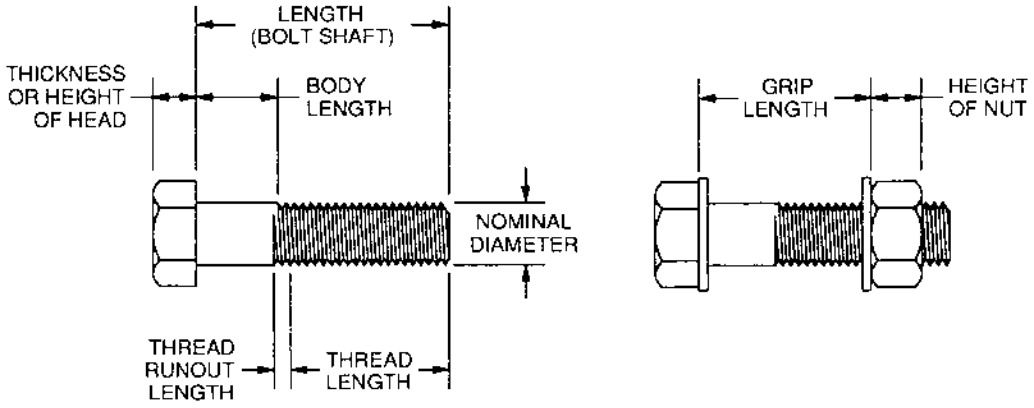
Thread Classes and Description		
EXTERNAL	INTERNAL	INTERNAL
1A	1B	LOOSE FIT
2A	2B	MEDIUM FIT
3A	3B	CLOSE FIT



NOTE

Unless followed with -LH (e.g., 3/4-10 UNC-2A-LH), threads are right-hand.

H-7. FASTENER SIZE AND THREAD PATTERN (Cont.)



H-8. FASTENER GRADE

SAE Screw and Bolt Markings	
SCREWS	**BOLTS**
SAE GRADE 2 NO MARKING SAE GRADE 3 2 RADIAL DASHES 180° APART SAE GRADE 5 3 RADIAL DASHES 120° APART	SAE GRADE 6 4 RADIAL DASHES 90° APART SAE GRADE 7 5 RADIAL DASHES 72° APART SAE GRADE 8 6 RADIAL DASHES 60° APART

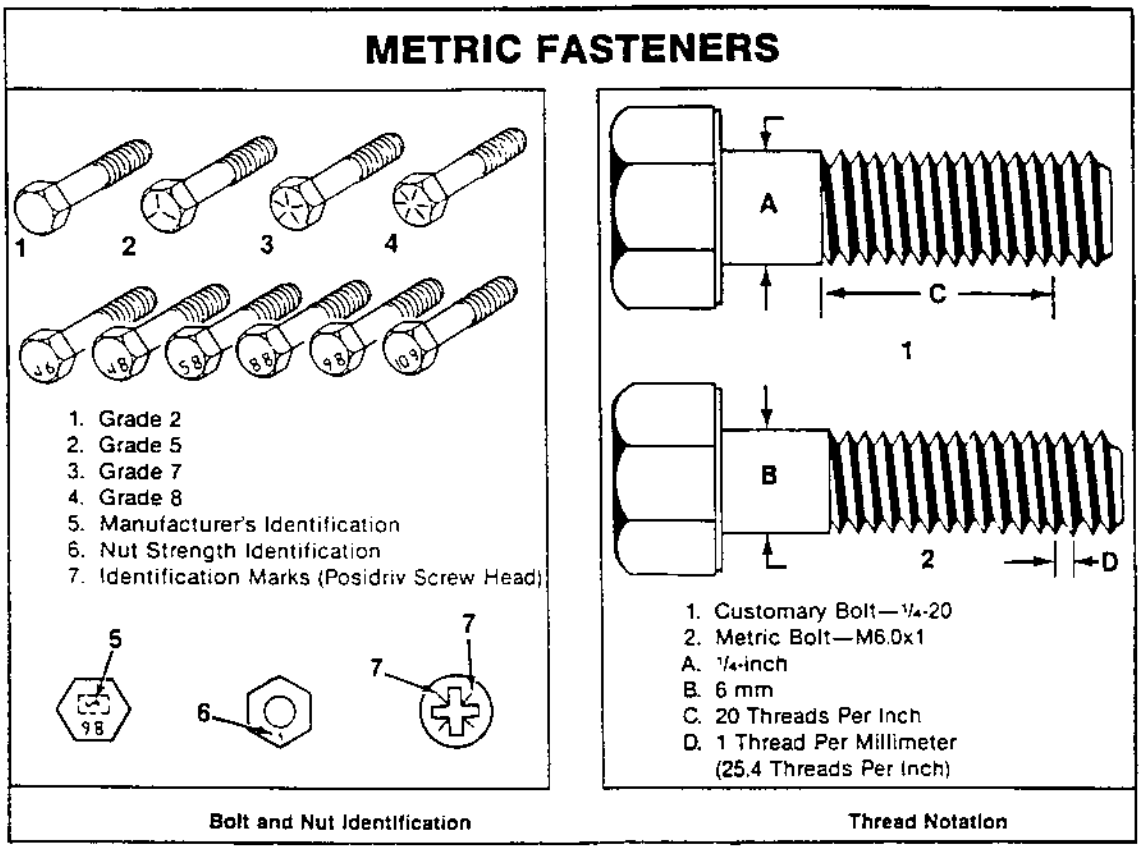
Markings on Hex Locknuts:

GRADE A—No Marks
GRADE B—3 Marks
GRADE C—6 Marks

GRADE A—No Notches
GRADE B—One Notch
GRADE C—Two Notches

GRADE A—No Marks
GRADE B—Letter B
GRADE C—Letter C

H-9. METRIC FASTENERS



H-10. CONVERTING POUND-FEET TO NEWTON-METERS

POUND FEET TO NEWTON-METRES

ft-lb	0	1	2	3	4	5	6	7	8	9	ft-lb
	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	
–		1.3558	2.7116	4.0675	5.4233	6.7791	8.1349	9.4907	10.8465	12.2024	–
10	13.5582	14.9140	16.2698	17.6256	18.9815	20.3373	21.6931	23.0489	24.4047	25.7605	10
20	27.1164	28.4722	29.8280	31.1838	32.5396	33.8954	35.2513	36.6071	37.9629	39.3187	20
30	40.6745	42.0304	43.3862	44.7420	46.0978	47.4536	48.8094	50.1653	51.5211	52.8769	30
40	54.2327	55.5885	56.9444	58.3002	59.6560	61.0118	62.3676	63.7234	65.0793	66.4351	40
50	67.7909	69.1467	70.5025	71.8584	73.2142	74.5700	75.9258	77.2816	78.6374	79.9933	50
60	81.3491	82.7049	84.0607	85.4165	86.7724	88.1282	89.4840	90.8398	92.1956	93.5514	60
70	94.9073	96.2631	97.6189	98.9747	100.3305	101.6863	103.0422	104.3980	105.7538	107.1096	70
80	108.4654	109.8213	111.1771	112.5329	113.8887	115.2445	116.6003	117.9562	119.3120	120.6678	80
90	122.0236	123.3794	124.7353	126.0911	127.4469	128.8027	130.1585	131.5143	132.8702	134.2260	90
100	135.5818	136.9376	138.2934	139.6493	141.0051	142.3609	143.7167	145.0725	146.4283	147.7842	100

H-11. CONVERTING FRACTIONS (INCHES) TO DECIMALS (INCHES) AND METRIC EQUIVALENTS

FRACTIONS (Inches) TO DECIMALS (Inches) and METRIC EQUIVALENTS

FRACTION (Inches)	DECIMAL (Inches)	MM	FRACTION (Inches)	DECIMAL (Inches)	MM	FRACTION (Inches)	DECIMAL (Inches)	MM	FRACTION (Inches)	DECIMAL (Inches)	MM
1/64	.016	.397	17/64	.266	6.747	33/64	.516	13.097	49/64	.766	19.447
1/32	.031	.794	9/32	.281	7.144	17/32	.531	13.494	25/32	.781	19.844
3/64	.047	1.191	19/64	.297	7.541	35/64	.547	13.891	51/64	.797	20.241
1/16	.063	1.588	5/16	.313	7.938	9/16	.563	14.288	13/16	.813	20.638
5/64	.078	1.984	21/64	.328	8.334	37/64	.578	14.684	53/64	.828	21.034
3/32	.094	2.381	11/32	.344	8.731	19/32	.594	15.081	27/32	.844	21.431
7/64	.109	2.778	23/64	.359	9.128	39/64	.609	15.478	55/64	.859	21.828
1/8	.125	3.175	3/8	.375	9.525	5/8	.625	15.875	7/8	.875	22.225
9/64	.141	3.572	25/64	.391	9.922	41/64	.641	16.272	57/64	.891	22.622
5/32	.156	3.969	13/32	.406	10.319	21/32	.656	16.669	29/32	.906	23.019
11/64	.172	4.366	27/64	.422	10.716	43/64	.672	17.066	59/64	.922	23.416
3/16	.188	4.763	7/16	.438	11.113	11/16	.687	17.463	15/16	.938	23.813
13/64	.203	5.159	29/64	.453	11.509	45/64	.703	17.859	61/64	.953	24.209
7/32	.219	5.556	15/32	.469	11.906	23/32	.719	18.256	31/32	.969	24.606
15/64	.234	5.953	31/64	.484	12.303	47/64	.734	18.653	63/64	.984	25.003
1/4	.250	6.350	1/2	.500	12.700	3/4	.750	19.050	1	1.000	25.400

H-12. CONVERSION FACTORS

ENGLISH/METRIC
METRIC/ENGLISH

Length	x	Conversion	=	Converting To
Inch	x	25.40	=	Millimeters
Millimeters	x	0.03937	=	Inches
Feet	x	0.3048	=	Meters
Meters	x	3.281	=	Feet
Miles	x	1.609	=	Kilometers
Kilometers	x	0.6214	=	Miles
Ohms/kilometers	x	0.3048	=	Ohms/1000 feet
Ohms/1000 feet	x	3.2808	=	Ohms/kilometer

Area	x	Conversion	=	Converting To
Sq. inch	x	6.452	=	Sq. centimeter
Sq. centimeter	x	0.1550	=	Sq. inch
Sq. foot	x	0.0929	=	Sq. meter
Sq. meter	x	10.76	=	Sq. foot
Sq. mile	x	2.590	=	Sq. kilometer
Sq. kilometer	x	0.3861	=	Sq. mile
Circular mil	x	1,000,000	=	Circular inch
Circular mil	x	0.7854	=	Sq. mil

ENGLISH/METRIC
METRIC/ENGLISH

Volume	x	Conversion	=	Converting To
Cu. inch	x	16.39	=	Cu. centimeter
Cu. centimeter	x	0.06102	=	Cu. inch
Cu. foot	x	0.02832	=	Cu. meter
Cu. meter	x	35.31	=	Cu. foot

Mass	x	Conversion	=	Converting To
Ounce	x	28.35	=	Gram
Gram	x	0.03527	=	Ounce
Pound	x	0.4536	=	Kilogram
Kilogram	x	2.205	=	Ounce
Kilogram/kilometer	x	0.6214	=	Pounds/1000 feet
Pounds/1000 feet	x	1.4881	=	Kilogram/kilometer

H-12. CONVERSION FACTORS (Cont.)

METRIC PREFIXES

Prefix	Value	Symbol	Prefix	Value	Symbol
Tera	10^{12}	T	Deci	10^{-1}	d
Giga	10^{9}	G	Centi	10^{-2}	c
Mega	10^{6}	M	Milli	10^{-3}	m
Kilo	10^{3}	K	Micro	10^{-6}	μ
Hecto	10^{2}	H	Nano	10^{-9}	n
Deca	10^{1}	da	Pico	10^{-12}	p

H-13. KINGPIN MAINTENANCE AND REPLACEMENT RECOMMENDATIONS

SUBJECT: Kingpin Maintenance and Replacement Recommendations

KINGPIN MAINTENANCE:

Inspection and maintenance of the trailer upper coupler and kingpin is just as important as the inspection and maintenance of its mating component, the fifth wheel. The following procedures are based upon recommendations outlined in SAE J2228. They should be completed every three months, or 30,000 miles, to assure proper and safe kingpin/fifth wheel coupling:

1. **Upper Coupler Plate Flatness:** Using a 48″ straight edge, check the flatness in all directions. Any bumps, valleys or warping will cause uneven loading of the fifth wheel, which could result in damage to the top plate and poor lock life. Replace the trailer upper coupler plate if flatness exceeds the specifications shown in *Figure 1*.
2. **Inspect the Kingpin for Straightness:** Using a square or Holland Kingpin Gage (TF-0110) check to see if the kingpin is bent. A bent kingpin accelerates lock wear and may interfere with proper fifth wheel locking. This also may indicate damage. The kingpin should be replaced if it exceeds 1° from square in any direction (see *Figure 1*).
3. **Inspect the Kingpin for Proper Length:** Using a Holland Kingpin Gage, check the length as shown in *Figure 2*.

CAUTION

If a lube plate is used in your operation, make sure to check the kingpin length. The kingpin must be sized to compensate for the thickness of the lube plate. For more information, see Holland Service Bulletin XL-SB4. Otherwise, the kingpin will be too short. If the kingpin length is improper, the kingpin should be replaced.

4. **Inspect the Kingpin for Wear:** Using a Holland Kingpin Gage, check the wear on both the 2″ and 2.88″ diameters. Wear of 1/8″ (.13″) is indicated if the appropriate diameter enters the gage slot. Replace the kingpin if the gage slides into the appropriate gage slot (see *Figure 3*).
5. **Check the Kingpin Mounting:** In addition to being a safety hazard, a loose mounting will cause excessive chucking and rapid lock wear. Reinstall or replace any kingpin which is not securely mounted.
6. **Check the Kingpin for Damage:** Inspect the kingpin for any nicks, gouges, deformation or cracks which may interfere or affect the safe use of the kingpin. Replace the kingpin if any damage is noted.

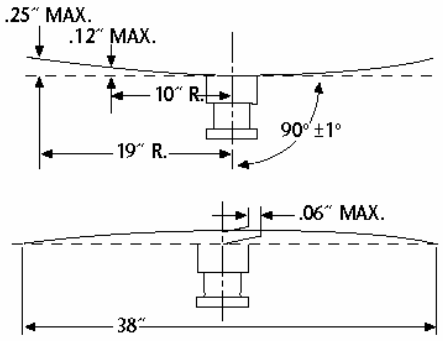


FIGURE 1

FIGURE 2

FIGURE 3

H-13. KINGPIN MAINTENANCE AND REPLACEMENT RECOMMENDATIONS (Cont.)

KINGPIN WELD REPAIRS PROHIBITED:

Kingpins are made from quenched and tempered alloy steel. Weld repairs of any type will affect the strength and wear resistance of the kingpin. Additionally, arc strikes or weld craters could develop a stress riser, leading to a fatigue failure. For these reasons, Holland warns against any weld repairs. If any deficiencies are noted during kingpin inspection, the kingpin should be replaced (see ***Figure 4***).

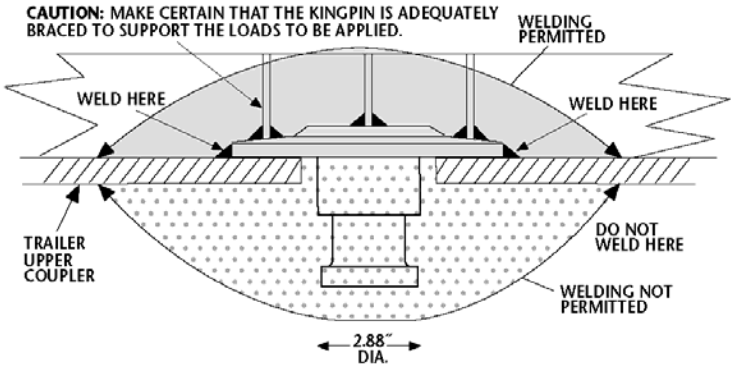
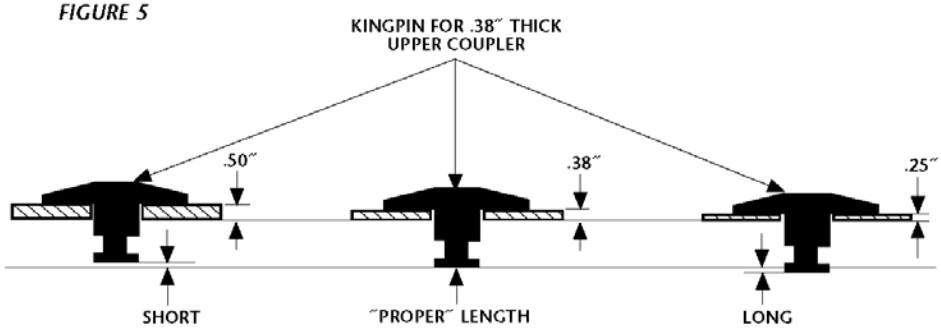


FIGURE 4

KINGPIN REPLACEMENT RECOMMENDATIONS:

1. A kingpin should be selected which is similar to the type removed, or if of a different style, one which can be adequately braced. The kingpin must also be matched to the thickness of the upper coupler to maintain the SAE dimensions. Kingpins are manufactured in different lengths to match the thickness of the upper coupler. Improper selection will result in a kingpin that is too long or too short. See ***Figure 5***.

FIGURE 5



2. **Installation Procedure Recommendations:** Because of its important role, the kingpin must be properly installed. Proper installation includes an adequate upper coupler design, with bracing, which meets the requirements of SAE J133 and welding personnel who are properly trained and certified. To determine the specific material used in your kingpin, refer to the proper kingpin literature. The kingpin must not be welded to the upper coupler at the 2.88″ diameter interface (see ***Figure 4***). Finally, the installer should take adequate precautions to protect the trailer, himself, and others during the installation process (see Holland Service Bulletin XL-SB14 for additional welding procedures on motor vehicles).

WARNING

When welding, use a procedure which assures a sound, good quality weld which protects the welding operator and others. Overwelding may cause distortion and damage and underwelding may not develop sufficient strength. A low hydrogen process and AWS E70XX filler metal are recommended. Take precautions to insure that the vehicle electrical system is not damaged by the welding.

H-14. FIFTH WHEEL AND UPPER COUPLER CONNECTIONS

SUBJECT: Fifth Wheel and Upper Coupler Connections

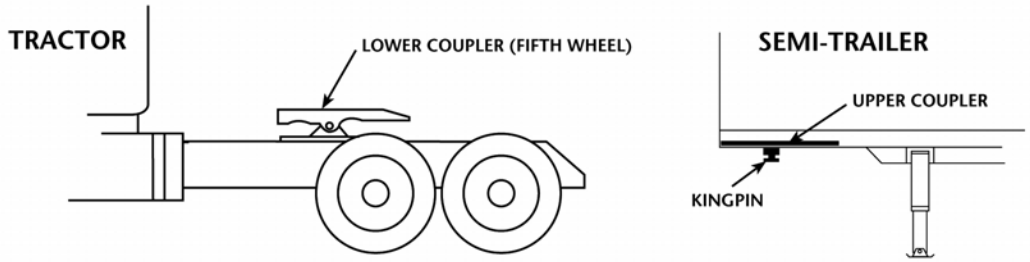


FIGURE 1

Fifth wheels and upper couplers are a system that work together and both must be designed to ensure an even distribution of the trailer's vertical load between the two surfaces. Upper coupler designs utilizing thinner, high-strength materials in combination with smaller and more widely spaced support structures may increase upper coupler deflection. Increased deflections in the upper coupler (see ***FIGURES 3***, ***4*** and ***5***) can lead to fifth wheel center loading, premature upper coupler wear, and difficult release handle operation.

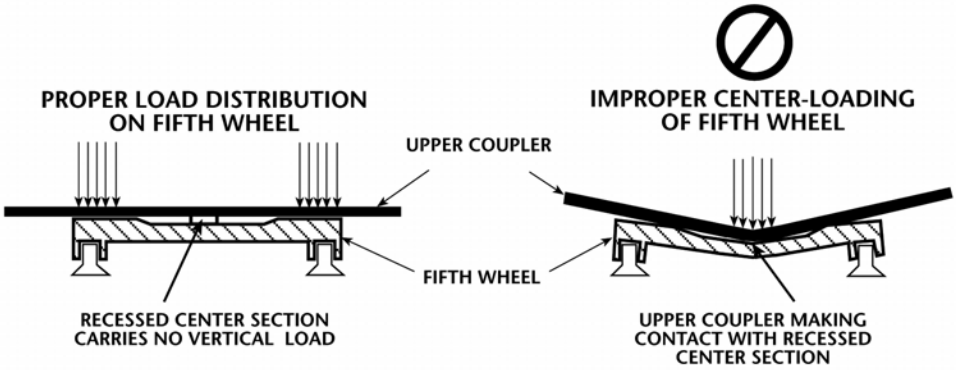


FIGURE 2

"CENTER-LOADING"

A Holland fifth wheel is designed to carry its load over the machined surfaces of the fifth wheel top plate. The center section of the fifth wheel is purposely recessed to prevent it from carrying any vertical load (see ***FIGURE 2***). A "bowed" upper coupler can cause the vertical load to be concentrated in the center of the fifth wheel (see ***FIGURE 3***). "Center-loading" causes the fifth wheel to act like a beam, flexing up and down over every bump and ripple in the road. This continuous flexing can lead to top plate cracking.

Identification: *Center-loading can often be identified by shiny spots in the recessed area of the top plate and in the mating area on the upper coupler. Additionally, a straight edge placed across the fifth wheel or upper coupler may reveal inadequate contact area due to deflections on the mating surfaces.*

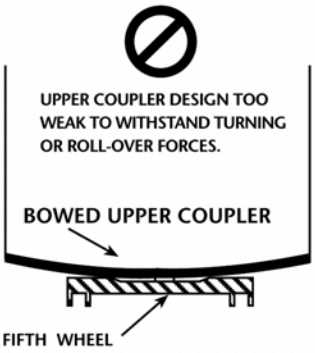


FIGURE 3

PREMATURE WEAR / UPPER COUPLER FAILURE

A wavy upper coupler or severely distorted fifth wheel can result in inadequate surface contact (see ***FIGURE 4***). Inadequate contact dramatically increases surface pressures, pushing (scraping) grease out of the way and leading to bare steel-on-steel contact. This will cause galling, premature wear, and potential failure as the fifth wheel will begin to wear through the upper coupler.

Identification: *Severe wear areas, galling, and/or dry spots in either the upper coupler or fifth wheel.*

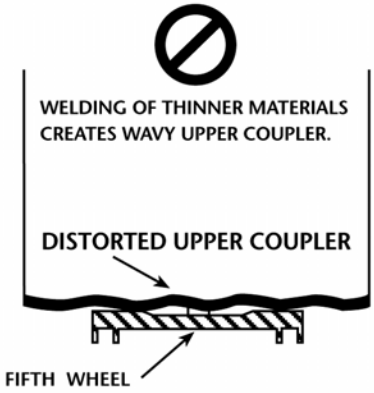


FIGURE 4

DIFFICULT RELEASE HANDLE OPERATION

Heavy loading and inadequate upper coupler strength can cause the upper coupler to "bow", pulling the kingpin upward when the trailer weight is resting on the fifth wheel (see ***FIGURE 5***). The release handle will be difficult to pull because the kingpin is pulling up on the fifth wheel locks.

Identification: *The release handle is easy to pull when weight is removed from the fifth wheel top plate, but difficult to pull when there is a load on the upper coupler and fifth wheel. This condition may not be detected by using a straight edge because the upper coupler may be straight when unloaded, but deflect severely under load.*

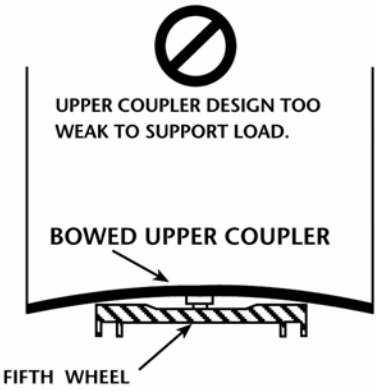


FIGURE 5

PREVENTIVE MEASURES

These conditions can be eliminated by taking the following preventive measures:

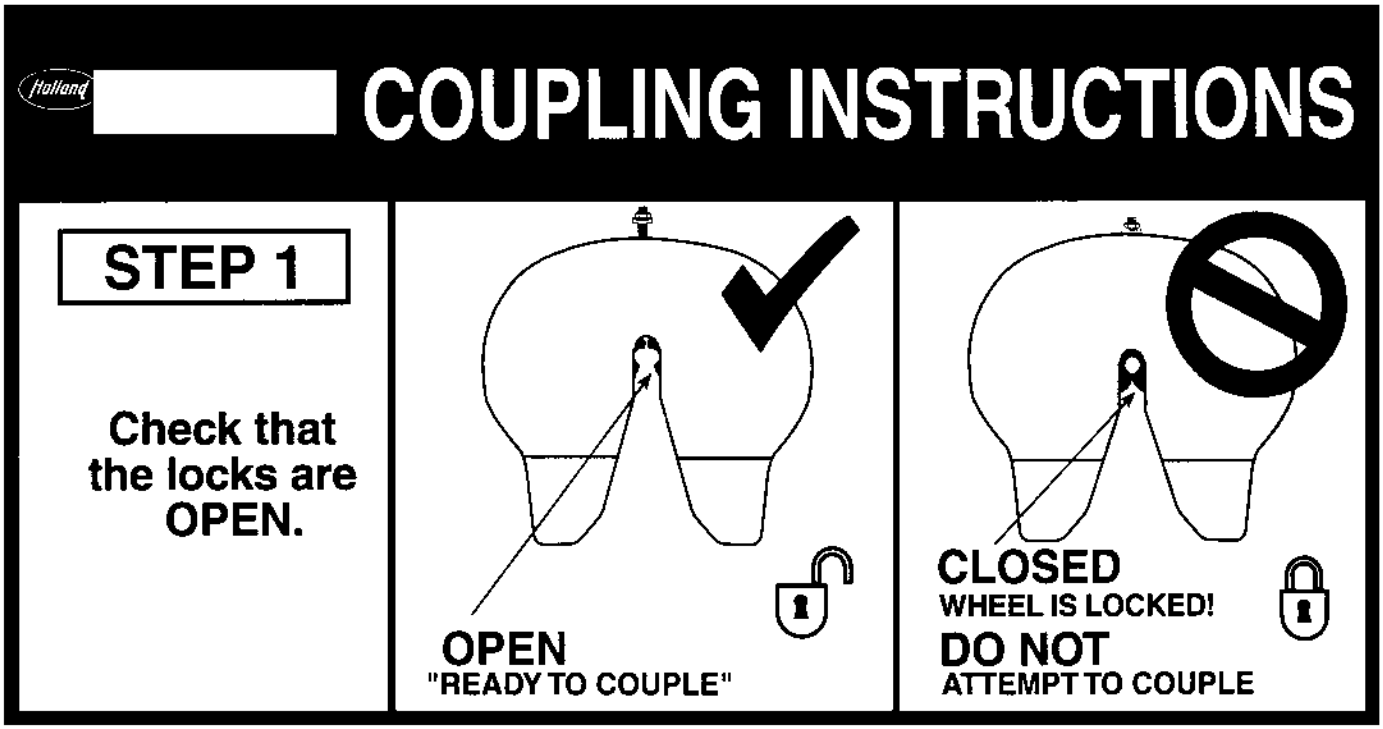
1. Specify trailer upper couplers and bracing which are appropriate for the trailer application.

   Please note that the allowable limits for upper coupler plate bowing provided in SAE recommended practice J700b are **maximum** allowable deflections on worn, in-service units before repairs are required. New upper couplers should be designed to withstand normal loading with minimal deflection and should **NOT** be designed to deflect to the SAE limits. (Refer to Holland Service Bulletin XL-SB20 for additional information on upper coupler specifications.)

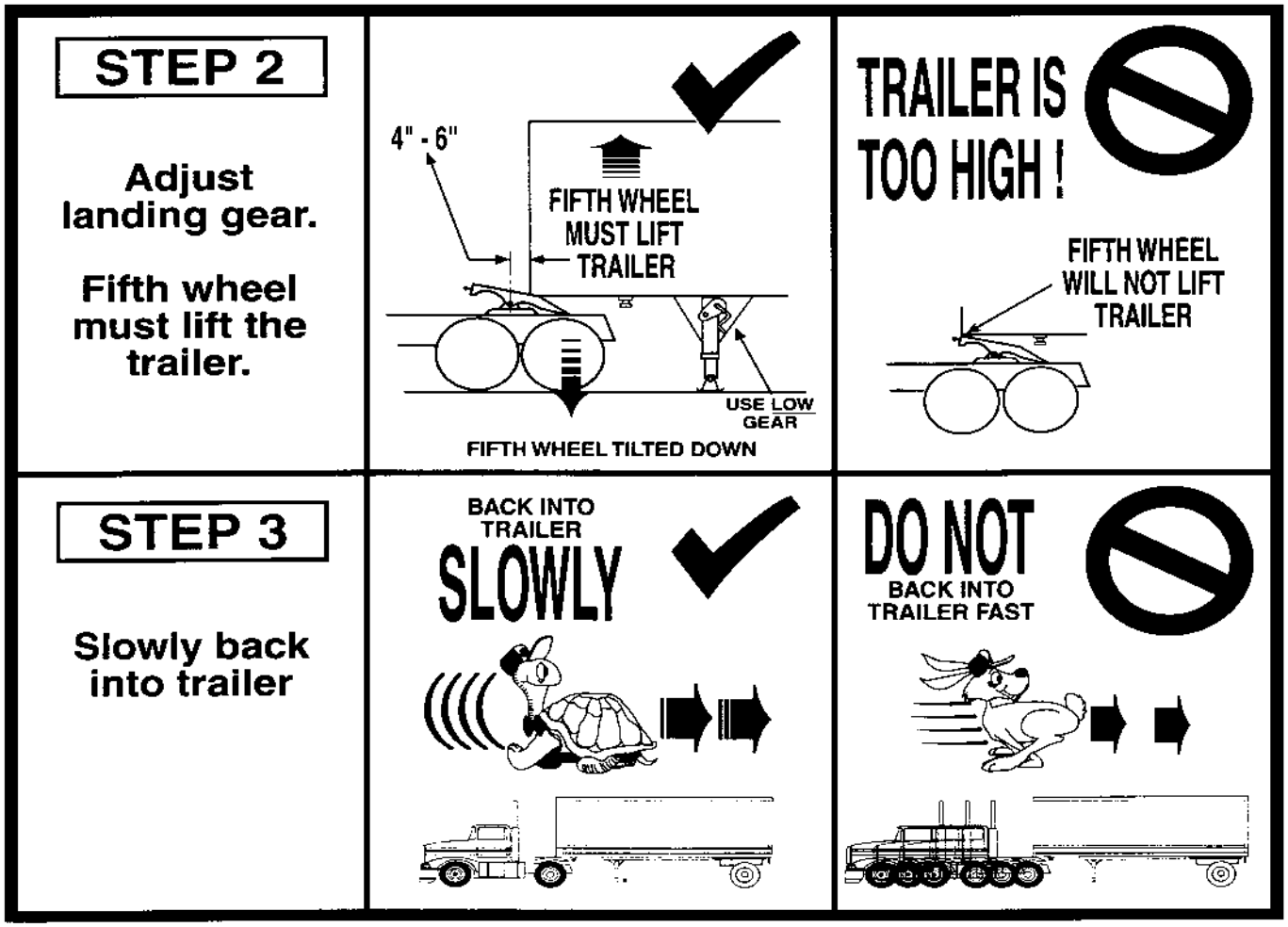
2. Use fifth wheel greases with EP (extreme pressure) characteristics.

3. Conduct regular inspections and repairs of upper couplers and fifth wheels which exhibit any of these problems. A good guideline for these inspections can be found in the Holland publication "How to Get the Most From Your Holland Fifth Wheel" and is available from any Holland warehouse distributor.

H-15. COUPLING INSTRUCTIONS



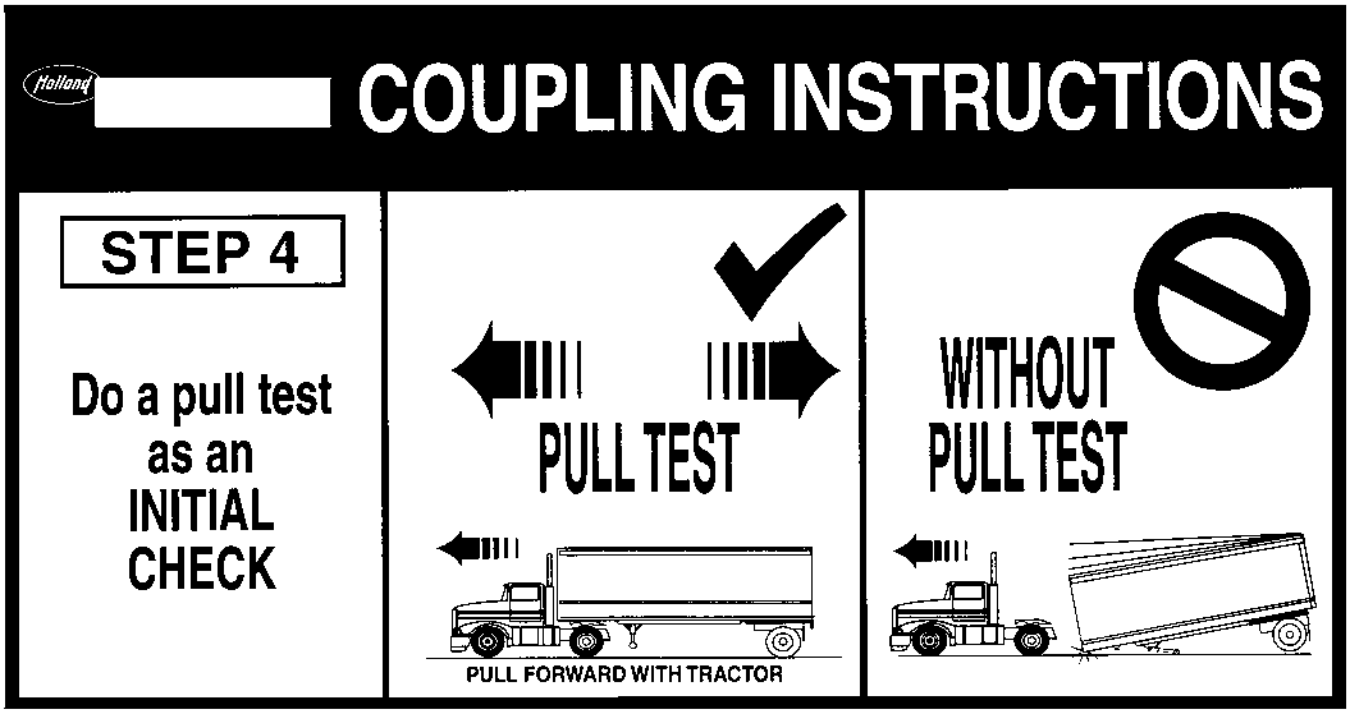
H-15. COUPLING INSTRUCTIONS (Cont.)



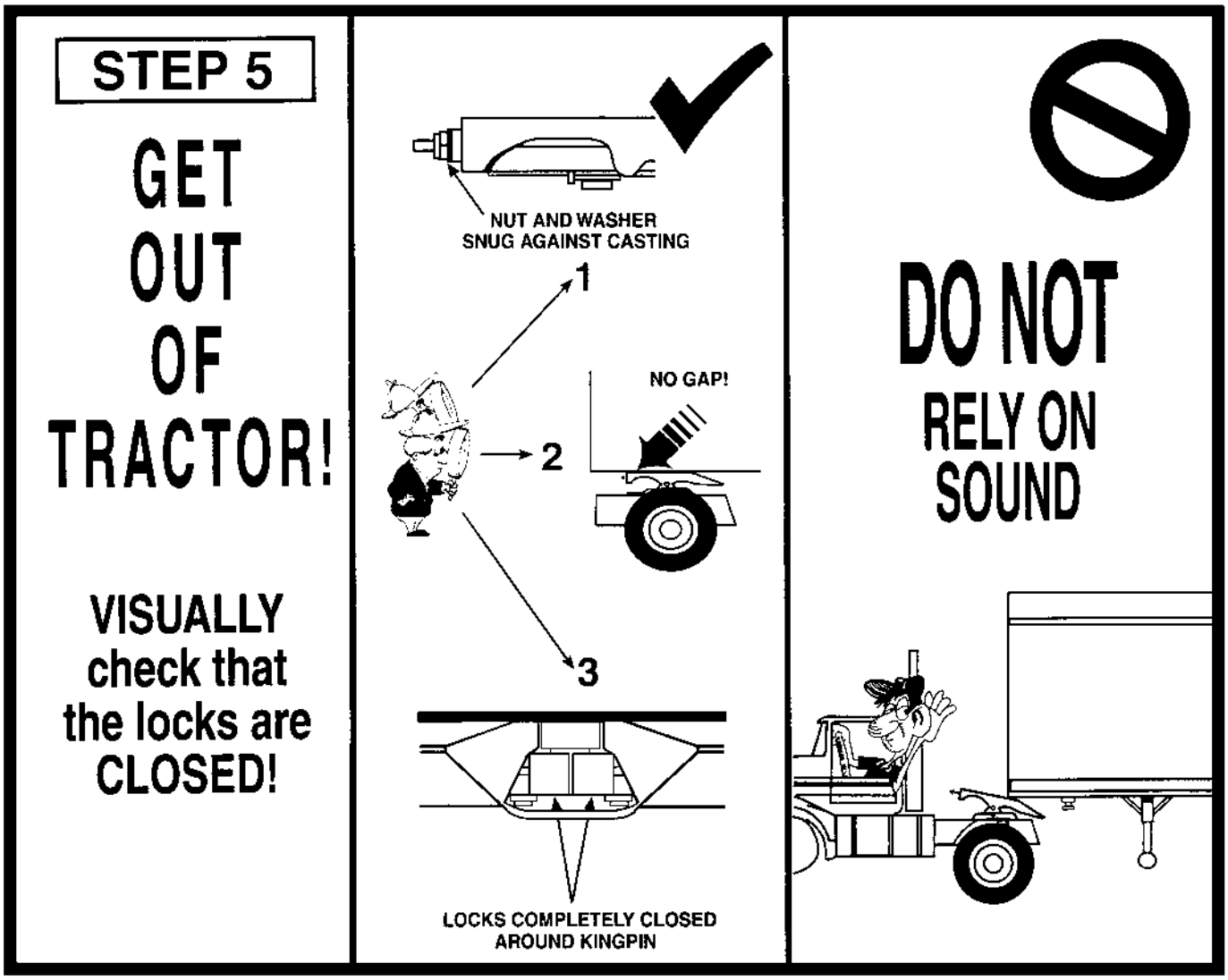
CAUTION

As a safety precaution, chock tires front and rear, to prevent trailer movement and damage to landing legs during coupling/uncoupling operations.

H-15. COUPLING INSTRUCTIONS (Cont.)



H-15. COUPLING INSTRUCTIONS (Cont.)



H-16. TECHNICAL INFORMATION FOR LED AND FILAMENT BULB LIGHTING LED

Lens and housings that are polycarbonate, if cleaned with solvents, will result in the softening, crazing, and/or cracking of the plastic. This is especially true of polycarbonate lamps and mounting bases, which may be under stress in their normal applications. The following cleaners are compatible with polycarbonate (not a complete list):

1. Mild soap and water
2. Mineral spirits
3. #1 and #3 denatured alcohol
4. White kerosene
5. Methyl, isopropyl, and isobutyl alcohols
6. Polycarbonate cleaners

The following must not be used to clean polycarbonate (not a complete list):

1. Acetone
2. Gasoline
3. Carbon tetrachloride
4. Liquid detergents
5. Stanisol naphtha
6. Oils

All lamps will last longer if they run cool. Dirt on the lens increases the heat, so keep them as clean as possible. Other people must see your truck/trailer and that is one of the purposes of the lighting system—to be seen.

WARNING

Certain lighting products generate heat. Care should be taken to avoid contact with flammable materials. The unit can generate enough heat to cause injury to personnel and damage to the equipment.

Tips to Prolong Lighting Life

1. Never use a test probe to pierce wire insulation when troubleshooting lighting problems. Wicking action takes place which causes moisture to travel along the wire strands and corrode critical connections. If probing a harness or wire is necessary, make sure the puncture is completely sealed.

2. To correct voltage problems, discover the real cause. Under-voltage often is caused by poor connections. To correct under-voltage, don't just increase the voltage—find out what caused the under-voltage.

3. Many discarded lamps are still in good condition. First, test with

   a. A bulb with stretched or broken filaments was subject to vibration.
   b. A yellowish, whitish, or bluish glaze on the bulb indicates a rupture in the bulb glass envelope.
   c. A dark metallic finish indicates a poor seal in bulb.

NOTE

Test all lamps one more time before you discard them. Up to 20% of lamps discarded are still in good operating condition.

4. Lubricate sockets, pigtails, battery terminals, and connections with non-conductive anti-corrosion compound. The purpose of the sealant is to totally encapsulate and protect against corrosion and water.

H-16. TECHNICAL INFORMATION FOR LED AND FILAMENT BULB LIGHTING LED (Cont.)

Tips to Prolong Lighting Life (Cont.)

5. Look for loose, bare or unsupported wire, and fixtures. Harnesses and wiring should be on the underside of the top frame members rather than on the bottom where dirt and road splash collect.
6. You should never crank a truck when any lights or accessories are on. Also, never leave markers and hazard lights on when parked against a dock. Melted lenses are a sure sign that the vehicle has been parked against a dock while the lights were on.
7. Inspect the grommets that house the lamps. As they age, they eventually will deteriorate from sunlight, ozone, and harmful chemicals. New grommets restore shock protection, security, and improve appearance.

H-17. 10 TIRE TIPS

The following information was developed from commercial analysis and is presented to give a better understanding of the preventive maintenance.

1. A 15% under inflation of a tire can result in:
    a. An 8% drop in tread wear (mileage)
    b. A 2.5% drop in fuel mileage
2. Proper inflation drastically reduces tire blowouts.
3. On the average, a tire in good condition, properly sealed, just sitting in place, will lose 2 psi (14 kPa) per month of air pressure.
4. Inflation pressure run just 10% under recommended tire pressure, can cause casing to be unfit for re-treading.
5. Dual wheels:
    a. Matching and matting are very important
    b. Never use a bias ply and a radial tire on the same wheel position

    Mismatching causes:

    a. The larger diameter tire to become overloaded
    b. Overheating
    c. Loss of traction on smaller diameter tire
    d. Irregular wear
    e. Tread or ply separation
    f. Tire body breaks
    g. Blowouts
6. Repair punctures from inside of tire.
7. Remove the tire before the tread depth reaches 2/32 in. (1.6 mm).
8. Inflated tires can have an internal pressure force of 40,000 lb (275,800 kPa).
9. After just 50–100 miles (80–160 km) of service on a new vehicle or new tires, re-torque wheel nuts.
10. A tire cage is a must and could save a life.

H-18. LANDING GEAR OPERATING, MAINTENANCE, AND REPAIR PROCEDURES

Do not deviate from these instructions. Any changes or deviations will void all warranties, expressed or implied, unless written consent is first obtained from the factory.

OPERATION OF HOLLAND FORMULA 150 LANDING GEAR:

NOTE: Holland Formula 150 2-speed gearbox has high and low range gears. High range gear is to be used only for rapid traverse up from and down to the ground and is not intended to lift or lower any load. For additional information, see Holland publication XL-FW302-XX, entitled "Fifth Wheel Operating Instructions."

CAUTION

- Always grip crank handle securely.
- Always grip crank handle securely with both hands before shifting.
- Never shift landing gear under load.
- Never leave the crank unsecured.
- Never raise or lower a loaded trailer in high gear.

TO EXTEND:

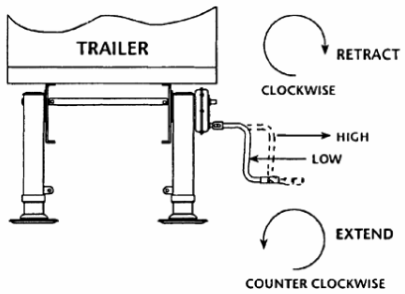
On outside mounted landing gear, engage the crank with the crankshaft and turn the crank clockwise. Inside mounted landing gear are extended by turning the crank counterclockwise. Using high gear, lower the landing gear until the pads make contact with the ground. To reduce the load on the fifth wheel, shift to low gear and crank an additional four to eight turns. Leave the landing gear in low gear and store the crank handle in the holder provided.

TO RETRACT:

On outside mounted landing gear, engage crank with crankshaft and turn the crank counterclockwise. Inside mounted landing gear are retracted by turning the crank clockwise. Retract the landing gear using low gear until unloaded. Then shift to high gear and continue cranking until fully retracted. Leave the crankshaft engaged to prevent road vibration wind-down. Store the crank in the holder provided.

Before operating, identify the mounting style of your landing gear — inside or outside mount (*see figures below*).

OUTSIDE MOUNT

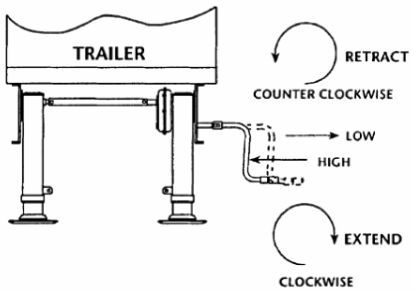


- Push crank handle in for **low** speed.
- Pull crank handle out for **high** speed.
- Turn crank:

  Counterclockwise = extend

  Clockwise = retract

INSIDE MOUNT



- Push crank handle in for **high** speed.
- Pull crank handle out for **low** speed.
- Turn crank:

  Counterclockwise = retract

  Clockwise = extend

H-18. LANDING GEAR OPERATING, MAINTENANCE, AND REPAIR PROCEDURES (Cont.)

To Remove Tractor from Semitrailer:

1. Position the semitrailer so that the landing gear shoes will rest on a firm level surface when landing gear is extended.
2. Emplace ground boards under scissor shoes.
3. Shift landing gear to high gear and extend landing gear until shoes contact ground boards
4. Chock trailer tires..
5. Shift landing gear to low gear and lift semitrailer approximately 1 in. (2.54 cm).
6. Unlock fifth wheel, uncouple airlines, and drive the tractor out from under the semitrailer.

To Connect Tractor to Semitrailer:

1. Insure that the semitrailer is at a sufficient height to allow coupling of the tractor and semitrailer.
2. Chock trailer tires, front and rear of the tire.
3. Connect airlines from tractor to semitrailer, then lock semitrailer brakes and back tractor under semitrailer, then lock fifth wheel.
4. Retract landing gears to fully retracted position.
5. Remove and properly store/secure chocks and ground boards. Engage crank handle to prevent wind down.
6. Store crank on the crank holder.

Lubrication—No Lube™. Landing legs have oil can points only.

No additional grease is required.

Landing Gears Hard To Crank—Check the Following:

1. Cross drive shaft in a bind or tight between shafts. Bolts must be loose and cross driveshaft free to move in slots provided.
2. To determine which leg turns hard, remove cross drive shaft bolt and crank each leg on the jackshaft.
3. Inadequate lubrication. See lubrication instructions in Appendix C.
4. Alignment. Legs must be timed together, parallel to each other and perpendicular to the semitrailer crossmembers.
5. Upper housing or retracting tube may be bent.

H-18. LANDING GEAR OPERATING, MAINTENANCE, AND REPAIR PROCEDURES (CONT.)

6. Landing gear jackshafts and/or shift shaft binding.

7. Bent retracting screw. Replace entire retracting leg assembly.

Troubleshooting—General:

NOTE

Replace the entire leg if these defects are found.

1. Right-hand leg (gearbox leg) operates but left-hand leg does not move. Broken cross driveshaft bolt or damaged cross driveshaft. (Replace)

2. Legs will not operate when turning jackshaft. Damaged pinion or bevel gear.

3. Right-hand leg will not operate; shift shaft will turn but jackshaft does not turn. Damaged input, idler, and/or output gear.

4. Leg locked and will not turn. Bent retracting screw or damaged riser nut and screw. Replace entire retracting leg assembly.

5. Right-hand leg will not stay fully shifted in low gear. Shift lock ball and shift lock spring missing or damaged shift lock spring.

6. Noisy gearbox. Check that shift shaft movement is 1 in. (2.54 cm) when shifted between gears.

CAUTION

Landing gears are designed to meet T.T.M.A. recommended practice RP-4 and A.A.R.-931 requirements.

When operating the landing gears, it is necessary to observe some cautions. By doing so you will insure long trouble-free service by observing the following:

1. Do not over extend or over retract landing gears.

2. Never drop semitrailer on landing gears. Always extend landing gears until shoes contact ground, then lift semitrailer approximately 1 in. (2.54 cm) before removing tractor from semitrailer.

3. Always chock tires front and rear prior to coupling.

4. Always insure that the landing gear shoes or footpads will rest on hard ground surface or concrete pad. If necessary, place shoes on a support plank to prevent the landing gears from sinking into the ground surface. (This is especially important with liquid cargo where a shift in the contents could overturn the semitrailer.) Use ground boards to insure correct/safe couplingheight and prevent shoes from sinking in soft ground.

H-18. LANDING GEAR OPERATING, MAINTENANCE, AND REPAIR PROCEDURES (CONT.)

5. **Always retract landing gears fully before moving the semitrailer.**

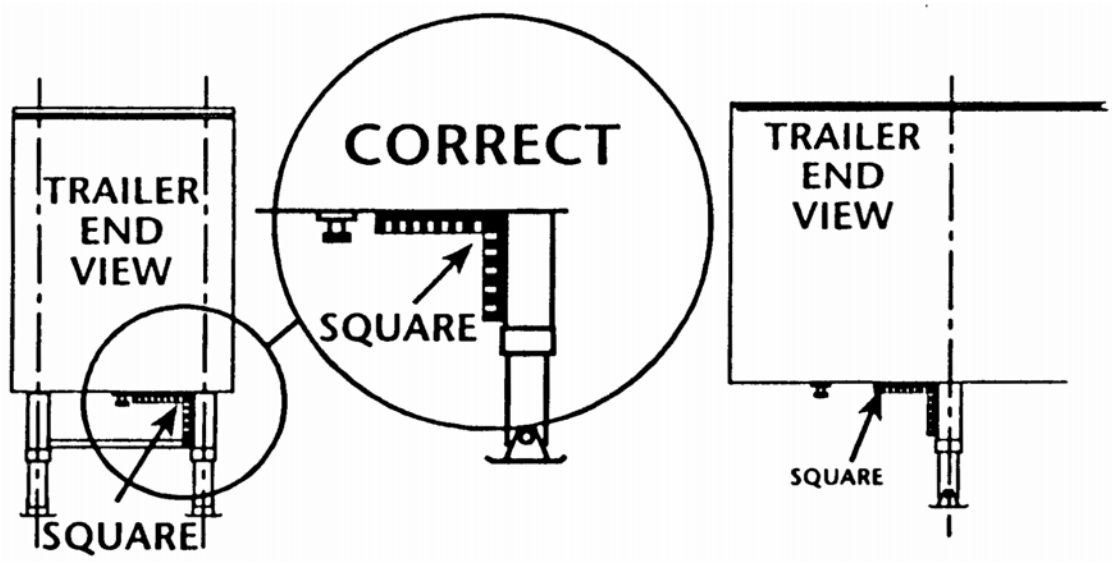
6. **Always store the crank on the crank holder after extending or retracting the landing gear.**

7. **Replace all damaged or missing parts.**

8. **Failure to replace worn or damaged riser nut and retracting screw assembly could cause a failure.**

Alignment

Using a square, check that both landing gear legs are square with the semitrailer and parallel with each other as shown. Bent or damaged legs are an indication of possible damage to the lift screw, lift nut, or other internal components and should be replaced.



H-19. HOW TO IDENTIFY ANCHORLOK SPRING BRAKES

SPRING BRAKES

LC = Life Seal Brake

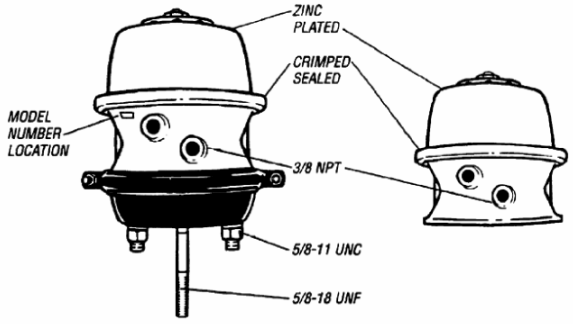
LP = Life Seal Piggyback

LS = Long Stroke

XLS = Extra Long Stroke

HO = High Output

LIFE SEAL BRAKE



Metric Unit: All Threads are M16 x 1.5

GC = Sealed Combination Brake

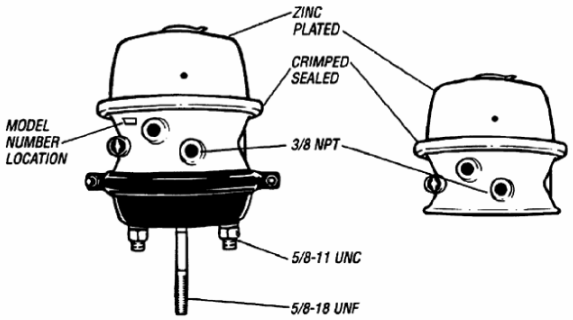
GP = Sealed Piggyback Brake

LS = Long Stroke

XLS = Extra Long Stroke

HO = High Output

GOLD SEAL BRAKE



Metric Unit: All Threads are M16 x 1.5

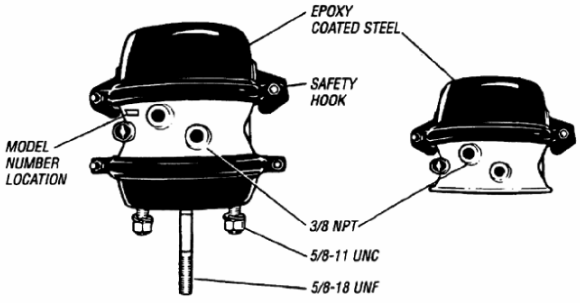
C = Clamp Combination Brake

P = Clamp Piggyback Brake

LS = Long Stroke

HO = High Output

CLAMP TYPE BRAKE



Metric Unit: All Threads are M16 x 1.5

6

H-20. SEALED BRAKE INSTALLATION AND SERVICE

GENERAL SAFETY PRECAUTIONS

⚠ DANGER: A spring brake contains a very powerful compression spring. Failure to comply with all of the following instructions may result in forceful release of the piggyback or spring chamber and its contents which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

IMPORTANT: ALWAYS BLOCK WHEELS to prevent vehicle rollaway when performing any brake maintenance.

- If spring brake shows structural damage DO NOT cage the spring and DO NOT attempt to service it. Replace the complete unit. To prevent severe personal injury when removing an uncaged spring brake from a vehicle, cut the service push rod making sure to relieve all force on it. After cutting the push rod, remove the spring brake from the vehicle, then disarm the spring brake using a suitable safety chamber *(See page 35 - Figure 36).*
- Never strike any part of the spring brake with a hammer or any other heavy object; structural damage may result.
- Do not drop spring brake, as compression spring may forcefully release.
- If air pressure is used to aid in the caging process, do not tighten the release tool more than finger tight. The air pressure must always be exhausted after the spring has been mechanically caged prior to any disassembly.
- On all Holland Anchorlok Gold Seal & Life Seal Spring Brakes, the emergency diaphragm cannot be replaced. Replace the complete piggyback. *(Follow instructions listed under "Mechanical Release" on pages 22-24 for Gold Seal brakes. Page 25 for Life Seal brakes. And "Piggyback Installation Instructions" on pages 31 and 32).*
- Do not use any diaphragms with protrusions on the service side of any Holland Anchorlok Spring Brake. Use of "piloted diaphragms" on the service side will result in a reduction of stroke length.
- Long Stroke Spring Brakes are easily identified by the square air ports on the adapter *(Figure 3)*, and the letters "LS" stamped into the spring brake.

FIG 1 - Gold Seal Spring Brake

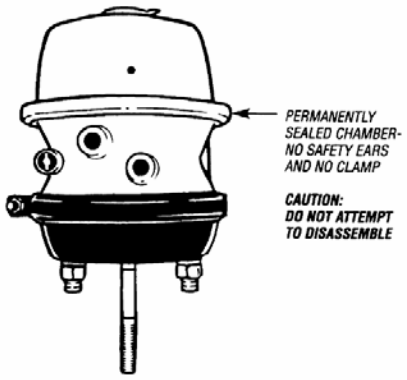


FIG 2 - Life Seal Spring Brake

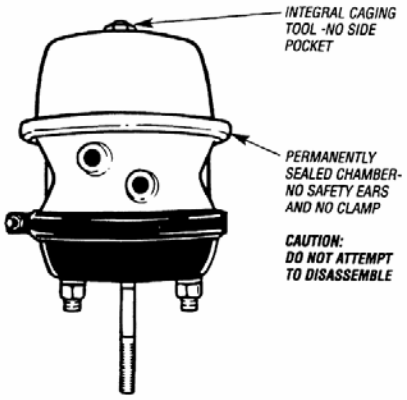
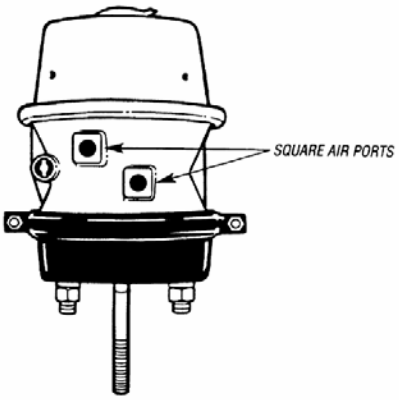


FIG 3 - Gold Seal & Life Seal Long Stroke Spring Brake



H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

Gold Seal - Mechanical Release of Spring Brake

⚠ DANGER: Read page 21 carefully. Do not attempt to mechanically release (cage) the spring on a spring brake if it shows structural damage. Caging the spring or disassembly of the chamber may result in the forceful release of the spring chamber and its contents which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE. Remove complete spring brake and replace with new unit.

⚠ DANGER: DISARM spring chamber before discarding old brake. To disarm, use a suitable Safety Chamber (see page 35). Failure to disarm assembly prior to disposal may, in time, result in spontaneous release of the spring chamber and its contents, causing death, personal injury and/or property damage.

NOTE: *There are no safety ears or clamp on a Sealed Type Brake (See Figure 1, Page 21).*

TO CAGE PARK BRAKE COMPRESSION SPRING (RELEASE PARK BRAKE)

IMPORTANT: ALWAYS BLOCK WHEELS to prevent vehicle rollaway when performing any brake maintenance.

1. Remove dust plug from release tool key hole in center of spring chamber *(Figure 4).*
2. Remove release tool assembly from side pocket of adapter *(Figure 4).*
3. Insert release tool through key hole in chamber into the pressure plate *(Figure 5 Arrow A).*
4. Turn release stud 1/4 turn clockwise *(Figure 5 Arrow B).*
5. Pull on release tool to ensure stud crosspin is properly seated in the pressure plate.
6. Assemble release tool washer and nut on release stud, finger tighten only *(Figure 5).*

Continued on next page

FIG 4

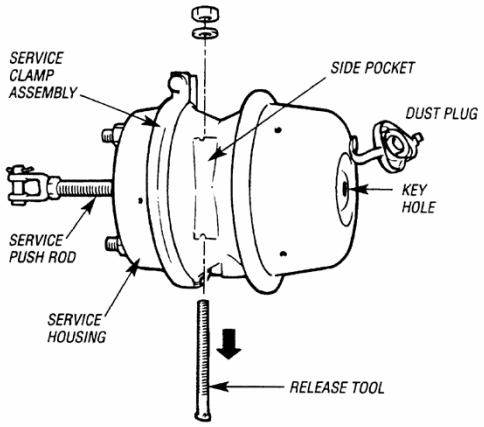
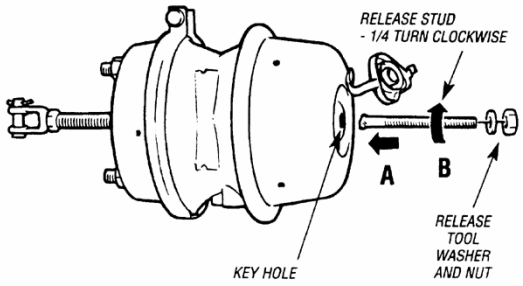


FIG 5



H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

Gold Seal - Mechanical Release of Spring Brake (Continued)

⚠ DANGER: The below listed instructions only apply when spring brake is not pressurized. If air pressure is used to compress the spring, do not tighten release tool more than finger tight. Torquing the release tool nut while the spring brake is pressurized can cause pressure plate damage resulting in sudden release of the spring which could CAUSE DEATH OR SEVERE PERSONAL INJURY. Air pressure must be released after caging, prior to any disassembly.

7. Turn release tool nut clockwise with hand wrench **(DO NOT USE HIGH SPEED AND/OR POWER DRIVEN IMPACT WRENCH)** and make certain push rod is retracting *(Figure 6)*.

IMPORTANT: Do not over torque release tool assembly. Over torquing release tool can cause pressure plate damage. GOLD-SEAL S-Cam type 35 ft. lb. (47 Nm Maximum, clockwise).

IMPORTANT: To ensure the compression spring is fully caged, the release tool length (X dimension) (Figure 6) should measure as shown in Table 1.

FIG 6

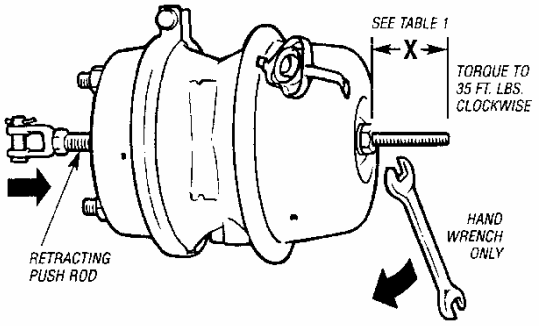


TABLE 1

MODEL	STROKE	X - MINIMUM
2424	2 1/4"	2.915" (740mm)
2424LS	2 1/2"	2.915" (740mm)
2430	2 1/4"	2.915" (740mm)
2430LS	2 1/2"	2.915" (740mm)
2430XLS	3"	3.463" (880mm)
3030	2 1/2"	2.915" (740mm)
3030LS	3"	3.537" (898mm)
3636	3"	3.602" (915mm)

NOTE: *If dimension of release tool (X dimension) length is less than the minimum measurement, then brake unit must be replaced.*

PRESSURIZED PARK BRAKE CAGING RECOMMENDATIONS

1. **DO NOT use a high speed and/or power-driven impact wrench to cage brake.**
2. It is recommended to use air pressure (100-120 PSI) in the chamber to collapse the compression spring before turning the release tool nut with a hand wrench. Proper caging will be complete when a slight resistance is felt after turning the release tool nut.

IMPORTANT: To insure the compression spring is fully caged, the release tool length (X dimension) (Figure 6) should measure as shown in Table 1.

Continued on next page

H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

Combination Spring Brake Installation Instructions

INSTALLATION PREPARATION

IMPORTANT: Spring brake must be caged prior to performing installation procedures. If brake is not caged, follow steps on page 21-25 for safety instructions and mechanical release of spring brake.

NOTE: *In an effort to maximize the life of Holland Anchorlok spring brakes, Holland Neway recommends the following brake mounting guidelines when installing Holland Anchorlok spring brakes on your vehicle(s).*

CUT PUSH ROD TO CORRECT INSTALLATION LENGTH

IMPORTANT: Before installing a new combination spring brake, it is necessary to determine the correct service push rod length to insure proper alignment for efficient operation of the spring brake.

NOTE: *Units are furnished with a universal fully threaded push rod and must be cut to the correct length.*

IMPORTANT: Place blocks under wheels to prevent vehicle rollaway before removing spring brake actuators.

NOTE: *If spring brake unit being replaced is not available to take measurements from, follow the procedures listed under step 5, Page 27.*

1. **Remove worn or non-functional spring brake unit from vehicle:** Determine manufacturer and model of unit to be replaced. Refer to that manufacturer's service manual for caging and removal instructions.
2. Make sure the spring chamber of the removed actuator is fully released (power spring caged) and the service brake push rod is fully retracted to zero stroke position (i.e. brake fully released).
3. Measure and record the "Y" and "Z" dimensions from unit to be replaced *(Figure 13)*.

   "Y" dimension = The dimension from bottom of actuator to end of piston rod.

   "Z" dimension = The dimension from bottom of actuator to centerline of clevis pin.
4. Take measured "Y" dimension *(Figure 13)* from the ***removed*** unit and mark push rod of ***new*** unit to be cut.

Continued on next page

FIG 13

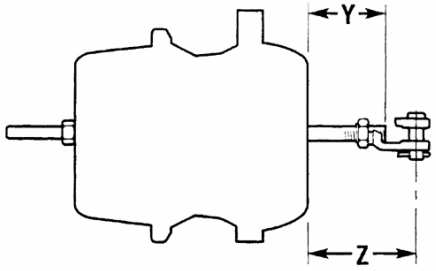
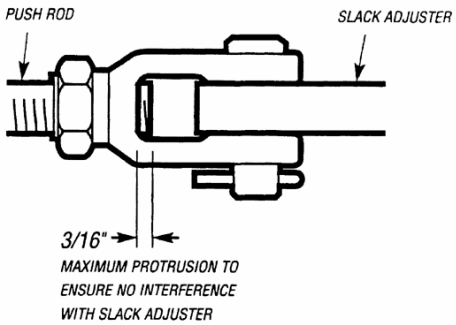


FIG 14



H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

Combination Spring Brake Installation Instructions (Continued)

NOTE: *Step 5 lists the procedures to determine correct push rod length when the spring brake being replaced is not available. Move ahead to step 6 if correct push rod length is already determined.*

5. To determine the correct push rod length of the brake to be installed, measure the "B" dimension as shown (Figure 15) and subtract the setup stroke as listed in *(Table 4, page 29)*. With the spring brake fully caged:
   "B" minus Setup Stroke = Push Rod Length including Clevis. *(Figure 16)*

NOTE: *Setup stroke is only to establish push rod length. (See step 6 on page 29)*

EXAMPLE:
For a typical Type 30 spring brake, if "B" *(Figure 15)* = 5.0 inches, setup stroke = 1 1/2 inches *(Table 4, page 11)*. The push rod length from mounting face to centerline of main clevis pin should measure: 5 minus 1 1/2 = 3 1/2 in. with the spring brake caged. *(Figure 16)*

6. Before marking push rod to be cut on **new** unit, be sure the spring chamber is caged and the push rod is fully retracted to the zero stroke position. **Refer to mechanical release instructions:** Pages 22-24 for Gold Seal brakes. Page 25 for Life Seal brakes.

NOTE: *When determining the push rod cut-off length, the length of the threaded rod protruding between the clevis legs must not exceed 3/16" to insure no interference with the operation of the slack adjuster (Figure 14).*

7. Thread clevis jam nut past the mark on push rod. Align bottom edge of nut with mark to use as a guide for cutting. Use a sharp hack-saw and cut push rod on the mark.
8. After cutting rod, thread jam nut off to clean up threads.

FIG 15

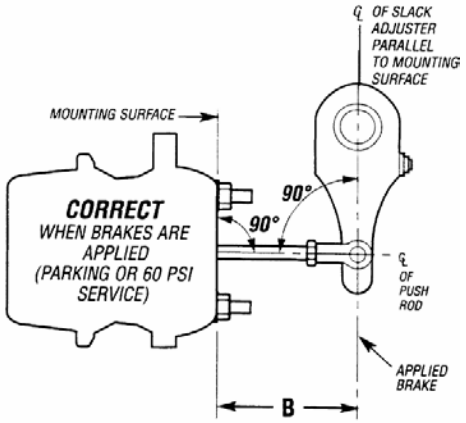
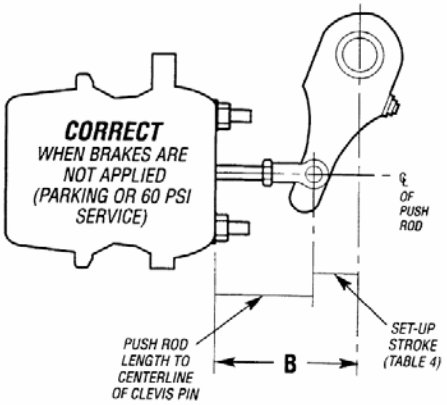


FIG 16



H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

Combination Spring Brake Installation Instructions (Continued)

MOUNTING SPRING BRAKE TO MOUNTING BRACKET

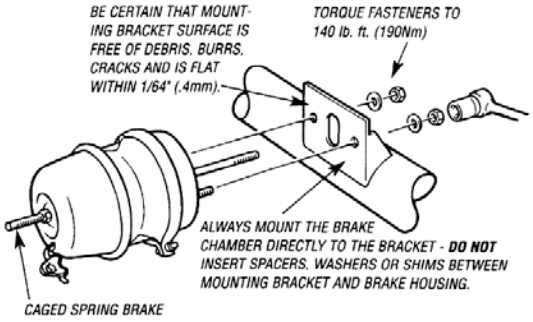
When attaching spring brakes to mounting brackets the following checks and instructions should be performed:

1. Mounting brackets must be inspected to assure that bracket surface is free from debris, burrs, cracks, weld spatter and is flat within 1/64" (.4mm) *(Figure 17)*.
2. Attach spring brake directly to mounting bracket on axle. Fasten with mounting hardware *(Figure 17)*. Torque to specifications listed in Table 3 below.

IMPORTANT: *Always mount brake chamber directly to bracket, if a reinforcement plate is necessary, follow the guidelines for plate attachment below.* ***DO NOT insert spacers, washers or shims between mounting bracket and brake housing.*** *(Figure 17) Consult the bracket manufacturer for your application if a reinforcement plate may be necessary.*

NOTE: *In some cases it may be necessary to rotate air ports*

FIG 17



ATTACHMENT GUIDELINES

When attaching a reinforcement plate to the brake mounting bracket face the following guidelines must be followed:

1. Attach .25" (6mm) steel plate 7" x 7" (178 mm x 178mm) square, to brake mounting bracket face. Secure with (2) 5/8" or M16 bolts, washers and nuts, and torque to 50 ft. lb. (67.5 Nm) *(Figure 18)*.
2. Weld reinforcement plate to brake mounting bracket see *(Figure 19)* for suggested weldment locations. For exact location and weld size, refer to axle manufacturer's guidelines. Allow welds to cool and remove bolts *(Figure 19)*.
3. Attach spring brake directly to new reinforcement plate. Fasten with mounting hardware *(Figure 20)*. Torque to specifications listed in Table 3.

FIG 18

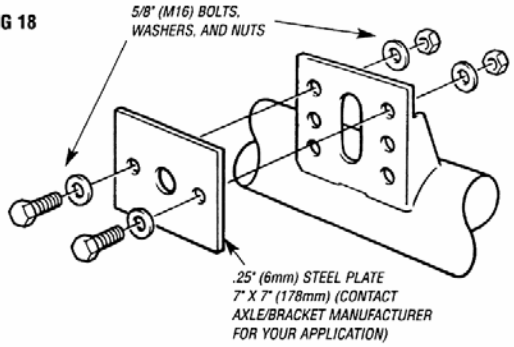


FIG 19

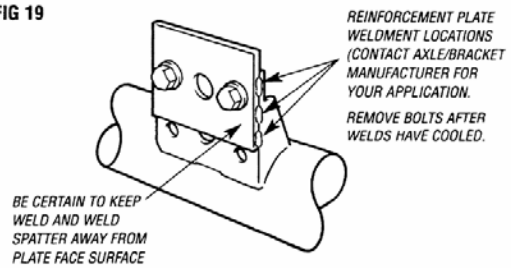
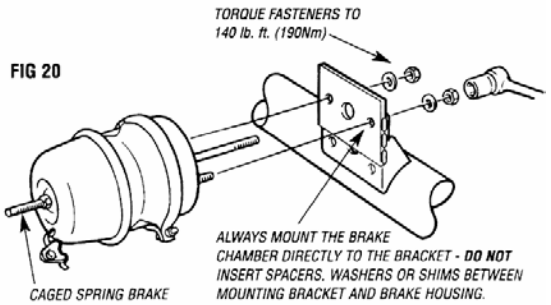


TABLE 3 INSTALLATION TORQUE VALUES

	TORQUE
Mounting Hardware	130-150 lb. ft. (177-203 Nm)
Jam Nut	15-25 lb. ft. (20-34 Nm)
Ports	10 lb. ft. max (14 Nm max)
LIFE SEAL - Release Tool Nut	55 lb. ft. (74 Nm)
GOLD SEAL - Release Tool Nut	25-35 lb. ft. (34-47 Nm)
GOLD SEAL - Release Tool Nut (in side pocket)	5-8 lb. ft. (7-11 Nm)
Carriage Bolt Nuts (for clamps)	20-30 lb. ft. (27.1-40.7 Nm)

Continued on next page

FIG 20



H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

Combination Spring Brake Installation Instructions (Continued)

ATTACH CLEVIS AND AIR LINES

1. Thread jam nut back onto the push rod a sufficient length to allow assembly of the clevis.
2. Thread clevis onto the push rod. Clevis from removed unit may be reused provided clevis pin hole is not worn. Adjust clevis to the same "Z" dimension as measured from the removed unit *(Figure 13, Page 26)*.
3. Hold clevis to prevent it from turning and tighten jam nut against clevis to torque specifications. (See Table 3, page 10 for Installation Torque Values). The clevis must be adjusted so that it has full thread engagement on the push rod (from flush to 3/16" protrusion) (Figure 14, Page 26).
4. Connect the service and emergency air line to the proper air ports. Torque to specifications listed in Table 3, page 28.
5. Connect clevis to the slack adjuster using clevis and cotter pins, and uncage the spring brake. **Refer to uncaging procedures:** Pages 22-24 for Gold Seal brakes. Page 25 for Life Seal brakes.

IMPORTANT: If push rod is not long enough to reach slack adjuster mounting hole, DO NOT physically pull push rod out to reach mounting hole.

6. Adjust the slack adjuster to the listed setup stroke (See Table 4). (Figure 22)

VERIFY PROPER INSTALLATION

1. With the brake applied, the following conditions must occur: a.) push rod 90° to the centerline of slack adjuster; b.) push rod 90° to the mounting face of the spring brake (Figure 23).

TABLE 4 STROKE VALUES

CHAMBER TYPE	AVAILABLE STROKE (INCHES)	RECOMMENDED CHAMBER STROKE RANGE MINIMUM	MAXIMUM	SET-UP STROKE APPLIED BRAKE*‡
09	1-3/4"		– 1"	1-3/8"
12	1-3/4"	(Should	– 1"	1-3/8"
16	2-1/4"	be as	– 1-1/2"	1-3/8"
20	2-1/4"	short a	– 1-1/2"	1-3/8"
20XLS**	3"	stroke as	– 2-1/4"	1-3/4"
24	2-1/4"	possible	– 1-1/2"	1-3/8"
24LS**	2-1/2"	without	– 1-3/4"	1-1/2"
24XLS**	3"	brake	– 2-1/4"	1-3/4"
30	2-1/2"	dragging.)	– 1-3/4"	1-1/2"
30LS**	3"		– 2-1/4"	1-3/4"
36	3"		– 2-1/4"	1-3/4"

* Stroke length measured by applying parking brake or 60 PSIG service brake application
** Long Stroke
‡ Typical setup stroke values
NOTICE: For special applications consult vehicle, brake or slack adjuster manufacturers.

Continued on next page

FIG 21

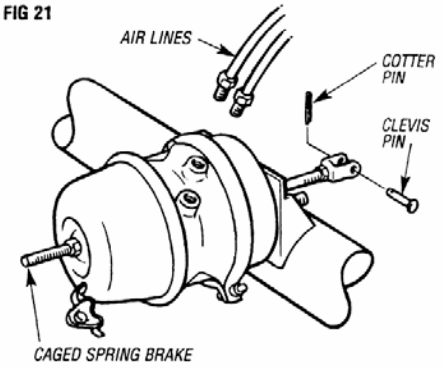


FIG 22

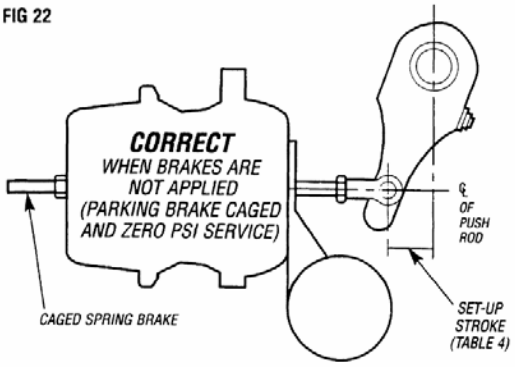
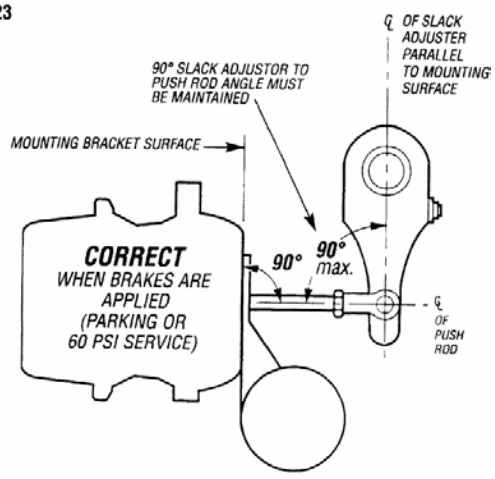


FIG 23



H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

Combination Spring Brake Installation Instructions (Continued)

IMPORTANT: Incorrect push rod slack adjuster setup will result in improper brake operation.

2. *If the setup results in the condition depicted in Figure 24 or Figure 25, the spring brake is misaligned and must be corrected by one or more of the following:*

   Figure 24 **a.)** shorten push rod, **b.)** align spring brake on mounting bracket, **c.)** mount clevis in proper slack adjuster hole.

   Figure 25 **a.)** lengthen push rod, **b.)** align spring brake on mounting bracket, **c.)** mount clevis in proper slack adjuster hole.

If misalignment cannot be corrected, consult with foundation brake manufacturer for verification of correct mounting bracket position.

3. Once the spring brake and push rod are set properly *(Figure 23, Page 29)*, release the brakes and follow vehicle manufacturer's instructions for brake adjustment.

IMPORTANT: After installation, check for proper emergency operation, service operation and brake adjustment.

SPECIAL INSTRUCTIONS FOR GOLD SEAL BRAKES

1. Remove bottom most vent hole plugs from mounted spring brakes *(Figure 26 and 27)*.

IMPORTANT: Removing the bottom most plug will allow the spring chamber to breath and allow for drainage of condensation. Spring brake longevity will be adversely affected if the bottom most plug is not removed. All other vent holes must be plugged. Additional plugs (Part Number 999 90 28) can be purchased from your local Holland Anchorlok distributor.

FIG 24

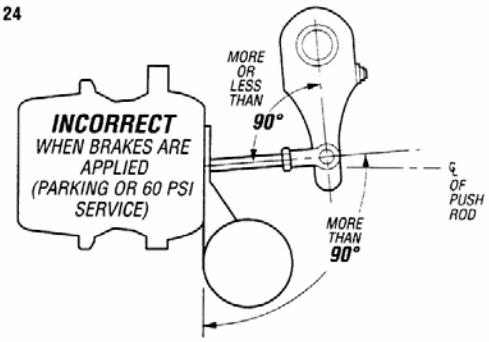


FIG 25

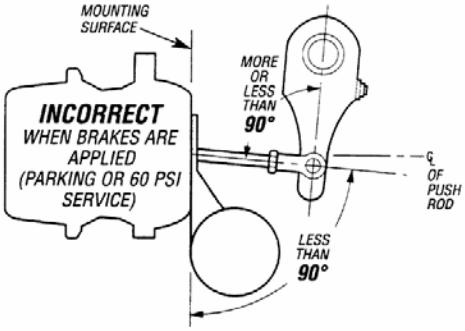


FIG 26 - GOLD SEAL ONLY

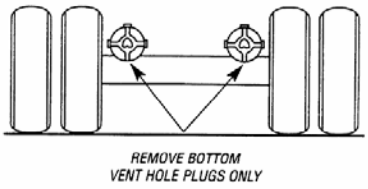
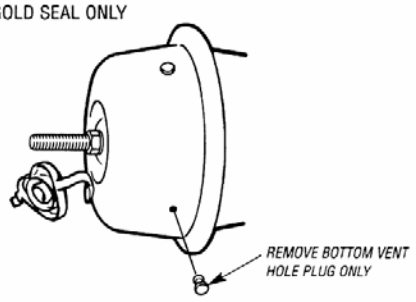


FIG 27 - GOLD SEAL ONLY



H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

Disarming Introduction

The proper disposal of old spring brake chambers is a concern of commercial industry and should be a concern of all maintenance shops. ALL retired spring brake chambers (actuators) must be safely disarmed before they are disposed of to prevent serious personal injury from accidental sudden release of the high-energy spring (as much as 2700 pounds [12,010 Newtons]) in the parking chamber.

It is recommended that the coils of the power spring be cut with an acetylene gas torch prior to disposal. This simple procedure renders the power spring inoperable, permitting the chamber to be safely discarded.

Reference the attached drawing with material list for fabrication of the Spring Brake Disarming Chamber as engineered by Lear Siegler Truck Products Corporation.

WARNING

Spring air brake chambers should never be rebuilt. Never attempt to loosen or remove the housing retaining clamp(s) bolts or repair the chamber in any way. Serious injury or death will occur.

- **This disarming chamber is to be fabricated at the Direct Support or higher Level.**
- **An annual inspection of this disarming chamber will be accomplished at the DOL or Depot Level QA/QC as in the case for tire cages.**
- **DOL will certify inspection of the disarming chamber by stamping or applying data plate.**
- **There will be NO substitution of ANY materials used to fabricate this chamber. Materials and welding standard/locations specified on the drawing are to be used in this fabrication. This is a safety device.**

Never operate an acetylene gas torch without wearing proper clothing and eye protection.

Disarming Instructions

1. Place the single/piggyback or combination/tandem spring brake chamber in the fabricated/inspected disarming chamber. Air brake chamber should be uncaged with caging bolt removed.

2. Position the air brake chamber so the spring brake head can easily be accessed through the slots in the disarming chamber. If the air brake chamber does not fit in the disarming chamber it may be necessary to cut off the service push-rod. Close the hinged access door of the disarming chamber and lock hasps with bolts and nuts.

H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)

3. Through one of the slot openings in the disarming chamber use an acetylene gas torch to cut a hole (1-1/2 to 2 inches [3.8 to 5.1 cm]) in the air brake chamber head to expose the power coil spring. DO NOT cut the power spring. See enclosed drawing for approximate location to cut hole on housing side.

4. Repeat the above process to the opposite side of the spring brake head. Cutting two holes opposite each other provides the torch with sufficient oxygen for cutting the power spring.

5. Cutting the first power spring coil may produce a low-pitched “pop” or may cause the spring brake chamber to jump in the disarming chamber. Repeat this cutting process through the slot opening on the opposite side of the disarming chamber

WARNING

DO NOT cut the spring brake chamber clamp bolts before cutting the power spring coils. The spring coils MUST be cut FIRST. If this WARNING is *NOT* heeded, the spring will prematurely release 2,000 lbs of pressure, and become an unexpected projectile that could cause injury or death to personnel and damage to the equipment.

6. To make sure you have completely cut the power spring coils, use a screwdriver or similar tool to insure that the coils are loose inside the head of the spring brake chamber.

WARNING

DO NOT PLACE YOUR HANDS OR FINGERS INSIDE THE DISARMING CHAMBER.

If the coils can be moved, the spring brake chamber has been rendered safe and can be properly discarded.

Supplementary Information

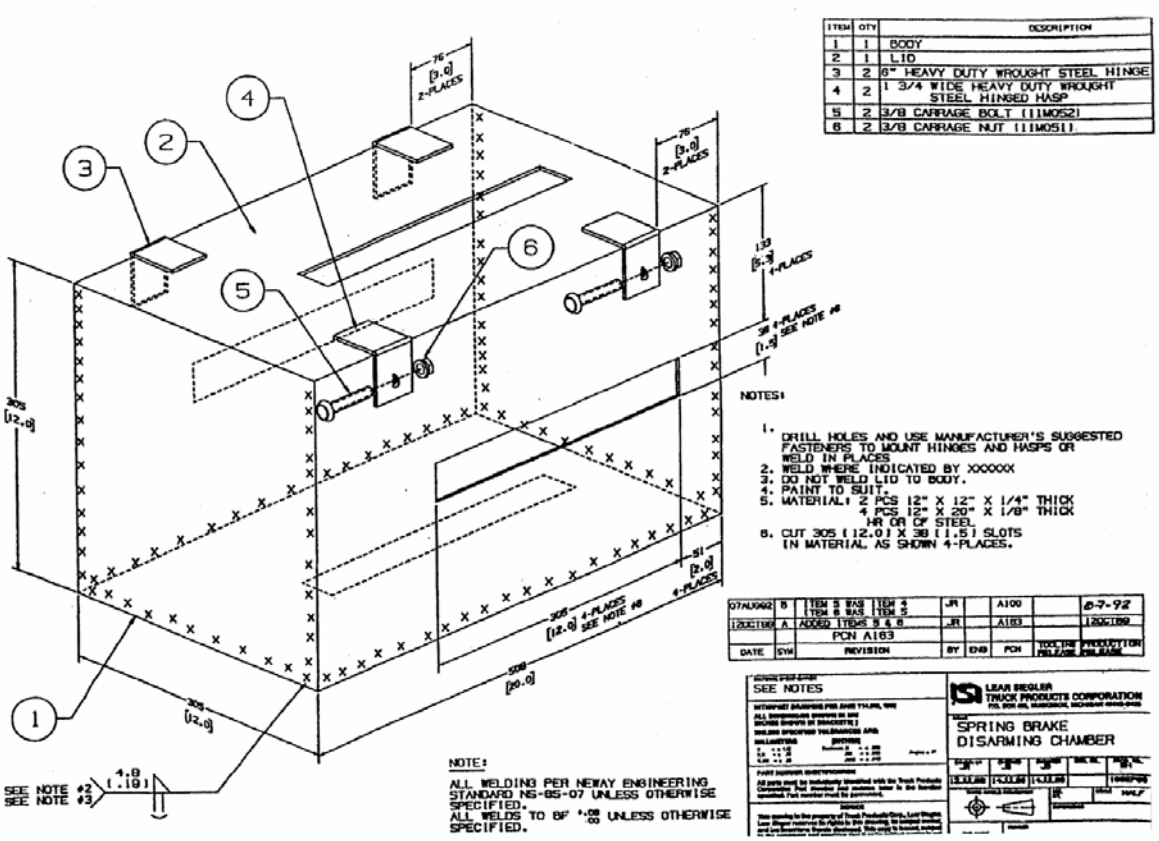
Many manufacturers do not rebuild or condone the use of rebuilt air brake chambers. This is because they are very important safety devices that actuate foundation brakes and perform vital parking and emergency brake functions. Because they operate in the worst possible environments under the most severe conditions, it is impossible to accurately determine the condition and service life remaining in critical components such as the non-pressure housing (mounting base), flange case (center section), power spring, and center push-rod seal. These are all components that are typically “cleaned up” and/or repainted and reused in rebuilt actuators. With a rebuilt actuator, you have no reliable way of knowing which components have been replaced and how long the unit can be expected to last.

If you do not have the capability to fabricate this disarming chamber and inspect it for safety there is a commercially built disarming chamber available from Jack Garner & Sons Welding which is AWS Code welded, has positive locking, and is portable. This disarming box runs approximately $310. They may be reached at 717-367-2638 or 717-653-6551, FAX: 717-367-7906, E-Mail: jack.garner@worldnet.att.net. Their product “The Box #743” may be viewed at: http://www13.ivenue.com/jackgarnerandsonsinc.

Maintenance Levels

Chamber Fabrication: D/S and above
Disarming Procedures: Organizational and above

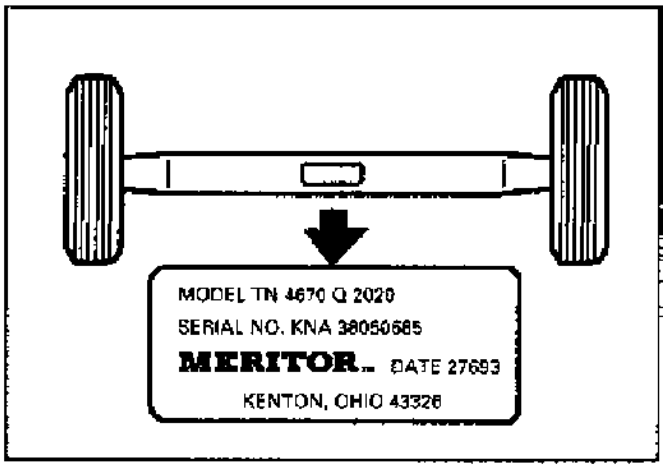
H-20. SEALED BRAKE INSTALLATION AND SERVICE (Cont.)



H-21. AXLES

Axle Identification

All of the information necessary to identify a particular trailer axle is located on the trailer axle identification tag. Located at the center of the axle beam, this ID tag is stamped with the axle model number, serial number, and date of manufacture.



1. The model number is composed of letters and digits. For example, TN-4670-Q-2020. This number is used to identify the axle assembly when ordering replacement parts.

2. The serial number is composed of letters and digits. For example, KNA-38050685. This number can be used to identify a particular trailer axle, and the material and components used to build the axle.

3. The date of manufacture is indicated by a Julian date. For example, 27693. The first three digits (276) indicate the 276th day of the year, or October 3rd. The last two digits (93) indicate the year, or 1993.

H-21. AXLES (Cont.)

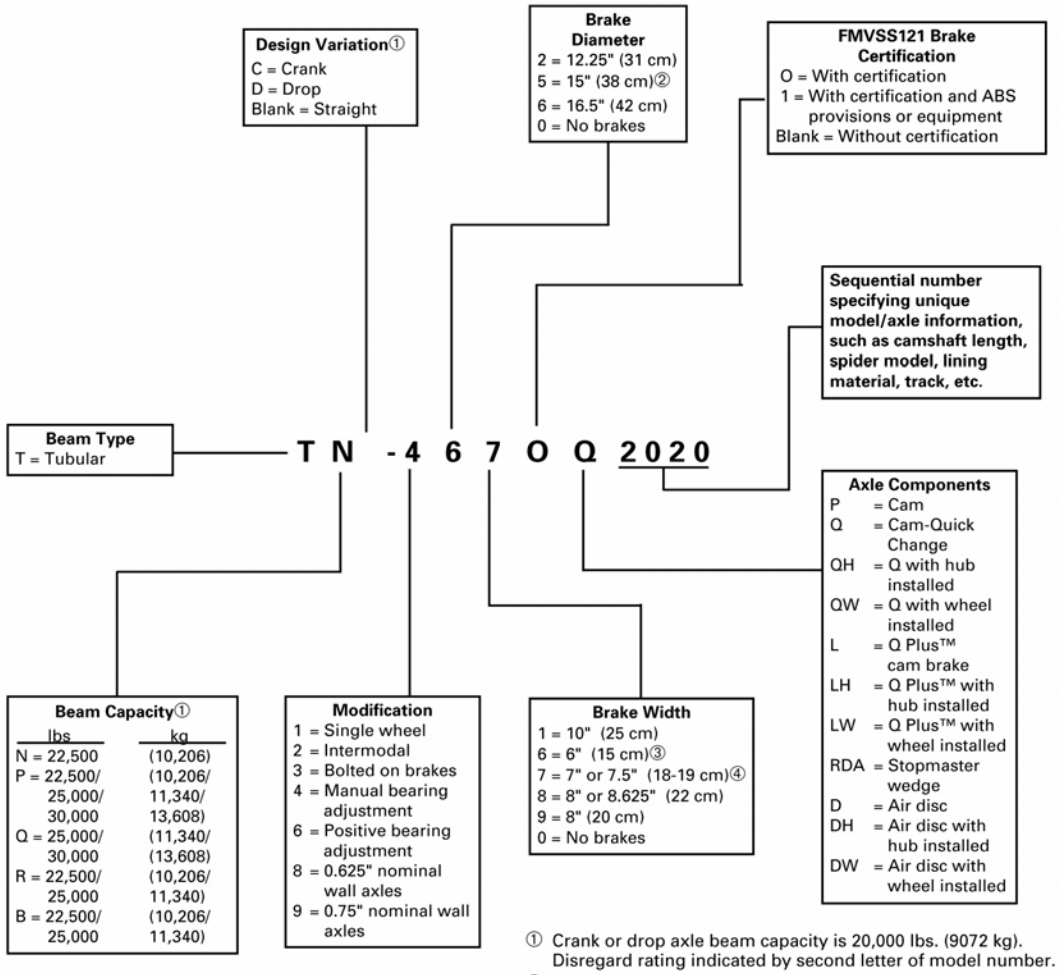
Model Numbers

Model Numbers

Model numbers for Meritor trailer axles are composed of letters and digits; for example, TQD 4670 Q 52. These letters and digits indicate the weight capacity and type of components installed on the axle. For a more comprehensive list of Meritor current production trailer axle models, refer to publication No. TP-8301, *Trailer Axle Specifications.*

Meritor aftermarket model numbers differ from the current production model numbers detailed below. Refer to Meritor Parts Catalog No. PB-8857 for a chart detailing these numbers.

Current Production Model Numbers



① Crank or drop axle beam capacity is 20,000 lbs. (9072 kg). Disregard rating indicated by second letter of model number.

② Denotes either brake drum or brake rotor diameter.

③ Denotes either brake shoe width or disc brake pad size (60 square inches)

④ Denotes either 7" on 16.5" diameter brakes or 7.5" on 12.25" diameter brakes

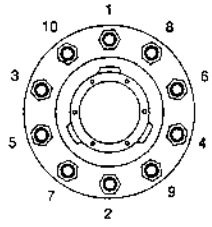
H-22. HUB PILOTED DISC WHEELS

HUB PILOTED DISC WHEELS

TORQUE SPECIFICATIONS

10 STUD HUBS

RECOMMENDED TORQUE: 450 - 500 Ft. Lb.



10 STUD

Recheck Torque after first 50 to 100 miles of service.

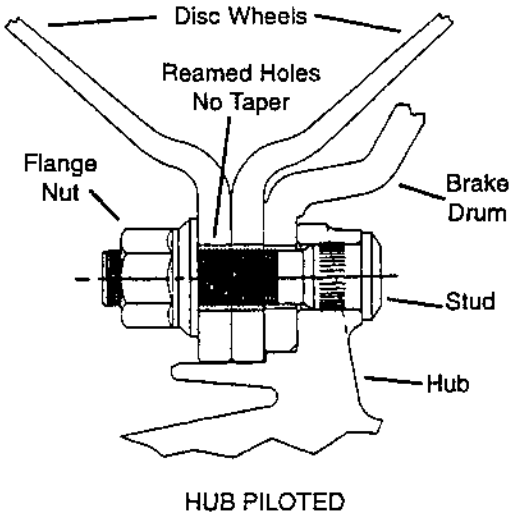


Illustration of hub piloted mounting.

H-22A. OSHA STANDARD MULTI-SINGLE PIECE WHEEL

SECTION XV: OSHA STANDARD 29 CFR PART 1910.177 (SERVICING MULTI-PIECE AND SINGLE PIECE RIM WHEELS) – (EXCERPT)

1910.177 Servicing multi-piece and single piece rim wheels.

(a) ***Scope.***

(1) This section applies to the servicing of multi- piece and single piece rim wheels used on large vehicles such as trucks, tractors, trailers, buses and off-road machines. It does not apply to the servicing of rim wheels used on automobiles, or on pickup trucks and vans utilizing automobile tires or truck tires designated "LT".

(2) This section does not apply to employers and places of employment regulated under the Construction Safety Standards, 29 CFR Part 1926; the Agriculture Standards, 29 CRF part 1915; or the Longshoring Standards, 29 CRF part 1916.

(3) All provisions of this section apply to the servicing of both single piece rim wheels and multi-piece rim wheels unless designated otherwise.

(b) ***Definitions.***

Barriers - means a fence, wall or other structure or object placed between a single piece rim wheel and an employee during tire inflation, to contain the rim wheel components in the event of the sudden release of the contained air of the single piece rim wheel.

Charts - means the U.S. Department of Labor, Occupational Safety and Health Administration publications entitled "Demounting and Mounting Procedures for Truck/Bus Tires" and "Multi-piece Rim Matching Chart," the National Highway Traffic Safety Administration (NHTSA) publications entitled: "Demounting and Mounting Procedures Truck/Bus Tires" and "Multi-piece Rim Matching Chart," or any other poster which contains at least the same instructions safety precautions and other information contained in the charts that is applicable to the types of wheels being serviced.

Installing a rim wheel – means the transfer and attachment of an assembled rim wheel onto a vehicle axle hub. ***Removing*** – means the opposite of installing.

Mounting a tire – means the assembly or putting together of the wheel and tire components to form a rim wheel, including inflation. ***Demounting*** – means the opposite of mounting.

Multi-piece rim wheel – means the assemblage of a multi-piece wheel with the tire tub and other components.

Multi-piece wheel – means a vehicle wheel consisting of two or more parts, one of which is a side or locking ring designed to hold the tire on the wheel by interlocking components when the tire is inflated.

Restraining device – means an apparatus such as a cage rack, assemblage of bars and other components that will constrain all rim wheel components during an explosive separation of a multi-piece wheel, or during the sudden release of the contained air of a single piece rim wheel.

Rim manual – means a publication containing instructions from the manufacturer or other qualified organization for correct mounting, demounting, maintenance, and safety precautions peculiar to the type of wheel being serviced.

Rim wheel – means an assemblage of tire, tube and liner (where appropriate), and wheel components.

Service or servicing – means the mounting and demounting of rim wheels, and related activities such as inflating, deflating, installing, removing, and handling.

Service area – means that part of an employer's premises used for the servicing of rim wheels, or any other place where an employee services rim wheels.

(b) ***Definitions*** (cont.).

Single piece rim wheel – means the assemblage of the single piece rim wheel with the tire and other components.

Single piece wheel – means a vehicle consisting of one part, designed to hold the tire on the wheel when the tire is inflated.

Trajectory – means any potential path or route that a rim wheel component may travel during an explosive separation, or the sudden release of the pressurized air, or an area at which an airblast from a single piece rim wheel may be released. The trajectory may deviate from paths which are perpendicular to the assembled position of the rim wheel at the time of separation or explosion. (See Appendix A of this manual for examples of trajectories.)

Wheel – means that portion of the rim wheel which provides the method of attachment of the assembly to the axle of a vehicle and also provides the means to contain the inflated portion of the assembly (i.e., the tire and/or tube).

(c) ***Employee training.***

(1) The employer shall provide a program to train all employees who service rim wheels in the hazards involved in serving those rim wheels and the safety procedures to be followed.

(i) The employer shall assure that no employee services any rim wheel unless the employee has been trained and instructed in correct procedures of servicing the type of wheel being serviced, and in the safe operating procedures described in paragraph (f) and (g) of this section.

(ii) Information to be used in the training program shall include, at a minimum, the applicable data contained in the charts (rim manuals) and the contents of this standard.

(2) Where an employer knows or has reason to believe that any of his employees is unable to read and understand the charts or rim manual, the employer shall assure that the employee is instructed concerning the contents of the charts and rim manual in a manner which the employee is able to understand. The employer shall assure that each employee demonstrates and maintains the ability to service rim wheels safety, including performance of the following tasks:

(i) Demounting of tires (including deflation);

(ii) Inspection and identification of the rim wheel components;

(iii) Mounting of tires (including inflation with a restraining device or other safeguard required by this section);

(iv) Use of the restraining device or barrier, and other equipment required by this section;

(v) Handling of rim wheels;

(vi) Inflation of the tire when a single piece rim wheel is mounted on a vehicle;

(vii) An understanding of the necessity of standing outside the trajectory both during inflation of the tire and during inspection of the rim wheel following inflation and;

(viii) Installation and removal of rim wheels.

(3) The employer shall evaluate each employee's ability to perform these tasks and to service rim wheels safely, and shall provide additional training as necessary to assure that each employee maintains his or her proficiency.

H-22A. OSHA STANDARD MULTI-SINGLE PIECE WHEEL (continued)

SECTION XV: OSHA STANDARD 29 CFR PART 1910.177 (SERVICING MULTI-PIECE AND SINGLE PIECE RIM WHEELS) – (EXCERPT) (continued)

(d) ***Tire servicing equipment.***

(1) The employer shall furnish a restraining device for inflating tires on multi-piece wheels.

(2) The employer shall provide a restraining device or barrier for inflating tires on single piece wheels unless the rim wheel for inflating tires on single piece

(3) Restraining devices and barriers shall comply with the following requirements::

(i) Each restraining device or barrier shall have the capacity to withstand the maximum force that would be transferred to it during a rim wheel separation occurring at 150 per cent of the maximum tire specification pressure for the type of rim wheel being service.

(ii) Restraining devices and barriers shall be capable of preventing the rim wheel components from being thrown outside or beyond the device or barrier for any rim wheel positioned within or behind the device.

(iii) Restraining devices and barriers shall be visually inspected prior to each day's use and after any separation of the rim wheel components or sudden release of container air. Any restraining device or barrier exhibiting damage such as the following defects shall be immediately removed from service:

(A) Cracks at welds;
(B) Cracked or broken components;
(C) Bent or sprung components caused by mishandling, abuse, tire explosion or rim wheel separation;
(D) Pitting of components due to corrosion; or
(E) Other structural damage which would decrease its effectiveness.

(iv) Restraining devices or barriers removed from service shall not be returned to service until they are repaired and re-inspected. Restraining devices or barriers requiring structural repair such as component replacement or rewelding shall not be returned to service until they are certified by either the manufacturer or a Registered Professional Engineer as meeting the strength requirements of paragraph (d)(3)(i) of this section.

(4) The employer shall furnish and assure that an air line assembly consisting of the following components be used for inflating tires:

(i) A clip-on chuck;

(ii) An in-line valve with a pressure gauge or a pre-settable regulator; and

(iii) A sufficient length of hose between the clip-on chuck and the in-line valve (if one is used) to allow the employee to stand outside the trajectory.

(5) Current charts or rim manuals containing instructions for the type of wheels being serviced shall be available in the service area.

(6) The employer shall furnish and assure that only tools recommended in the rim manual for the type of wheel being serviced are used to service rim wheels.

(e) ***Wheel component acceptability***.

(1) Multi-piece wheel components shall not be interchanged except as provided in the charts or in the applicable rim manual.

(2) Multi-piece wheel components and single piece wheels shall be inspected prior to assembly. Any wheel or wheel component which is bent out of shape, pitted from corrosion, broken, or cracked shall not be used and shall be marked or tagged unserviceable and removed from the service area. Damaged or leaky valves shall be replaced.

(3) Rim flanges, rim gutters, rings, bead seating surfaces and the bead areas of tires shall be free of any dirt, surface rust, scale or loose flaked rubber build-up prior to mounting and inflation.

(4) The size (bead diameter and tire/wheel widths0 and type of both the tire and the wheel shall be checked for compatibility prior to assembly of the rim wheel.

(f) ***Safe operating procedure—multi-piece rim wheels.*** The employer shall establish a safe operating procedure for servicing multi-piece rim wheels and shall assure that employees are instructed in and follow that procedure. The procedure shall include at least the following elements:

(1) Tires shall be completely deflated before demounting by removal of the valve core.

(2) Tires shall be completely deflated by removing the valve core before the rim wheel is removed from the axle in either of the following situations:

(i) When the tire has been driven under-inflated at 80% or less of its recommended pressure, or

(ii) When there is obvious or suspected damage to the tire or wheel components.

(3) Rubber lubricant shall be applied to bead and rim mating surfaces during assembly of the wheel and inflation of the tire, unless the tire or wheel manufacturer recommends against it.

H-22A. OSHA STANDARD MULTI-SINGLE PIECE WHEEL (Excerpt) (continued)

SECTION XV: OSHA STANDARD 29 CFR PART 190.177 (SERVING MULTI-PIECE AND SINGLE PIECE RIM WHEELS). (continued)

(4) If a tire on a vehicle is under-inflated but has more than 80% of the recommended pressure, the tire may be inflated while the rim wheel is on the vehicle provided remote control inflation equipment is used, and no employees remain in the trajectory during inflation.

(5) Tires shall be inflated outside a restraining device only to a pressure sufficient to force the tire bead onto the rim ledge and create an airtight seal with the tire and bead.

(6) Whenever a rim wheel is in a restraining device the employee shall not rest or lean any part of his body or equipment on or against the restraining device.

(7) After tire inflation, the tire and wheel components shall be inspected while still within the restraining device to make sure that they are properly seated and locked. If further adjustment to the tire or wheel components is necessary, the tire shall be deflated by removal of the valve core

(8) ***Safe operating procedure—single piece rim wheels.*** The employee shall establish a safe operating procedure for servicing single piece rim wheels and shall assure that employees are instructed in and follow that procedure. The procedure shall include at least the following elements: before the adjustment is made.

(9) No attempt shall be made to correct the seating of side and lock rings by hammering, striking or forcing the components while the tire is pressurized.

(10) Cracked, broken, bent or otherwise damaged rim components shall not be reworked, welded, brazed, or otherwise heated.

(11) Whenever multi-piece rim wheels are being handled, employees shall stay out of the trajectory unless the employer can demonstrate that performance of the servicing makes the employee's presence in the trajectory necessary.

(12) No heat shall be applied to a multi-piece wheel or wheel component.

(g) ***Safe operating procedure—single piece rim wheels.*** The employee shall establish a safe operating procedure for servicing single piece rim wheels and shall assure that employees are instructed in and follow that procedure. The procedure shall include at least the following elements:

(1) Tires shall be completely deflated by removal of the valve core before demounting.

(2) Mounting and demounting of the tire shall be done only from the narrow ledge side of the wheel. Care shall be taken to avoid damaging the tire breads while mounting tires on wheels. Tires shall be mounted only on compatible wheels of matching bead diameter and width.

(3) Nonflammable rubber lubricant shall be applied to bead and wheel mating surfaces before assembly of the rim wheel, unless the tire or wheel wheel manufacturer recommends against the use of any rubber lubricant.

(4) If a tire changing machine is used, the tire shall be inflated only to the minimum pressure necessary to force the tire bead onto the rim ledge while on the tire changing machine.

(5) If a bead expander is used, it shall be removed before the valve core is installed and as soon as the rim wheel becomes airtight (the tire bead slips onto the bead seat).

(6) Tires may be inflated only when contained within a restraining device, positioned behind a barrier or bolted on the vehicle with the lug nuts fully tightened.

(7) Tires shall not be inflated when any flat, solid surface is in the trajectory and within one foot of the sidewall.

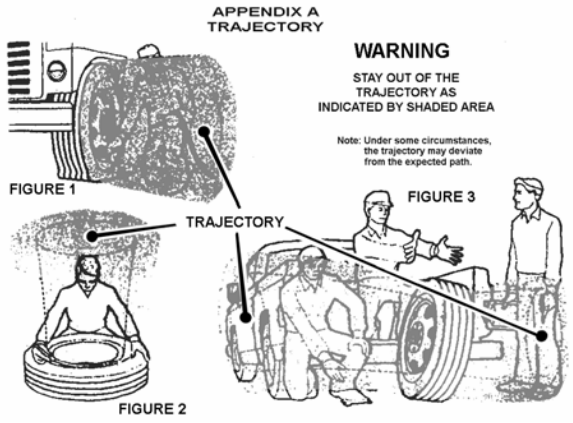
(8) Employees shall stay out of the trajectory when inflating a tire.

(9) Tires shall not be installed to more than the inflation pressure stamped in the sidewall unless a higher pressure is recommended by the manufacturer.

(10) Tires shall not be inflated above the maximum pressure recommended by the manufacturer to seat the tire bead firmly against the rim flange.

(11) No heat shall be applied to a single piece wheel.

(12) Cracked, broken, bent, or otherwise damaged wheels shall not be reworked, welded, brazed, or otherwise heated.



Appendix B – Ordering Information for the OSHA Charts

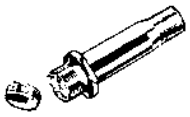
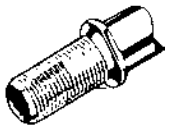
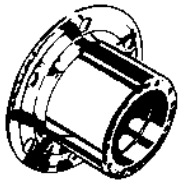
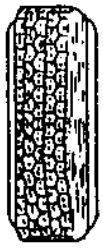
OSHA has printed two charts entitled "Demounting and Mounting Procedures for Truck/Bus Tires" and "Multi-piece Rim Matching Chart", as part of a continuing campaign to reduce accidents among employees who service large vehicle rim wheels.

Reprints of the charts are available through the Occupational Safety and Health Administration (OSHA) Area and Regional Offices. The address and telephone number of the nearest OSHA office can be obtained by looking in the local telephone directory under U.S. Government, U.S> Department of Labor, Occupational Safety and Health Administration. Single copies are available without charge.

Individuals, establishments and other organizations desiring single or multiple copies of these charts may order them from the OSHA Publications Office, U.S> Department of Labor, Room N-3101, Washington, DC 20210. Telephone (202) 219-4667.

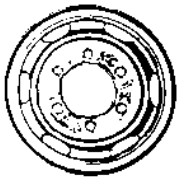
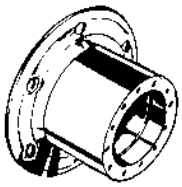
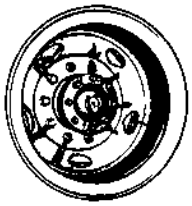
H-23. TROUBLESHOOTING HUBS

Hubs Using Piloted Disc Wheels

Example	Problem	Cause	Solution
	Broken studs	1. Loose capnuts 2. Overloading	Replace the broken stud and the stud on each side of the broken stud. If more than two studs are broken, replace the entire set.
	Stripped threads on studs or capnuts	Excessive torque	Replace stud and/or capnut and re-torque to specifications.
	Damaged inner or outer capnuts	1. Loose wheel 2. Overloading	Replace capnuts. Check for proper stud standout and re-torque to specifications.
	Damaged threads on stud or cap nut	Sliding wheel on threads	Replace studs or capnuts per installation instructions.
	Worn mounting face on hub	1. Loose capnuts 2. Overloading	Replace hub following assembly procedures. When reassembling inboard-mounted brake drum to hub, tighten back nuts to specifications.
	Uneven tire wear	1. Improper tire alignment 2. Loose bearing adjustment 3. Loose or worn suspension bushings 4. Low tire pressure	Align per wheel service instructions. Check bearing for wear and replace or readjust as required. Check with suspension manufacturer. Inflate to recommended pressure.

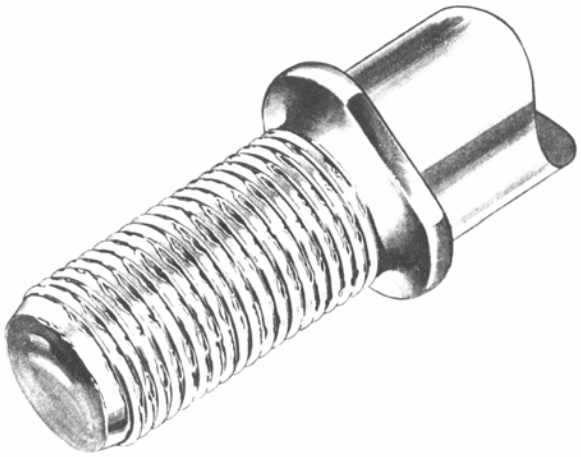
H-23. TROUBLESHOOTONG HUBS (Cont.)

Hubs Using Piloted Disc Wheels (Cont.)

Example	Problem	Cause	Solution
	Worn or elongated stud holes	1. Loose capnuts 2. Overloading	Replace hub following assembly procedures. When reassembling inboard-mounted brake drum to hub, tighten nuts to specifications.
	Damaged stud and groove	Loose back nuts	Replace hub following assembly procedures. When reassembling inboard mounted brake drum to hub, tighten back nuts to specifications.
	Stud standout wrong	Improper stud or wrong brake drum	Replace studs or drum. Recommended standout is 1.31 to 1.44 in. (3.32–3.65 cm). When changing from composite to cast drum, studs may have to be changed.
	Rust streaks	Loose capnuts	Follow torque specifications.

H-24. TROUBLESHOOTING WHEEL PROBLEMS

What to look for
MUTILATED THREADS



What caused them

Sliding wheel across studs during wheel assembly.

What to do about them

Replace studs.

Follow proper wheel assembly procedure.

What to look for
LOOSE DRUM

What caused it

Body length of stud too long.

Back nut not firmly sealed against drum.

What to do about it

Replace stud.

Be sure to use stud with correct body length.

What to look for
LOOSE INNER WHEEL

What caused it

Too much stud standout from mounting face of hub, permitting wheel nut to bottom out.

What to do about it

Replace stud.

Be sure stud is of correct length.

H-24. TROUBLESHOOTING WHEEL PROBLEMS (Cont.)

What to look for
BROKEN STUDS

What caused them

Loose cap nuts.

Overloading.

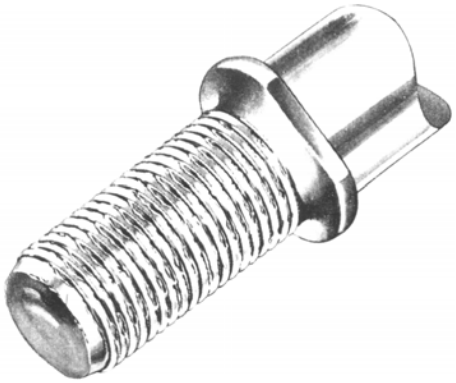
What to do about them

Replace stud.

Replace stud.

Follow proper torque procedure.

What to look for
STRIPPED THREADS



What caused them

Excessive torque.

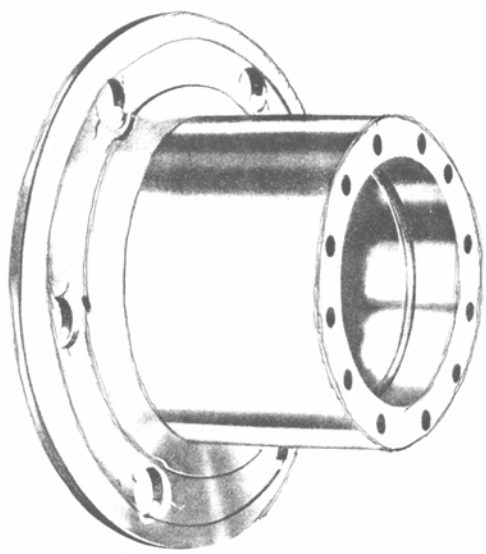
What to do about them

Replace stud.

Follow proper torque procedure.

H-24. TROUBLESHOOTING WHEEL PROBLEMS (Cont.)

What to look for
WORN STUD GROOVE



What caused it

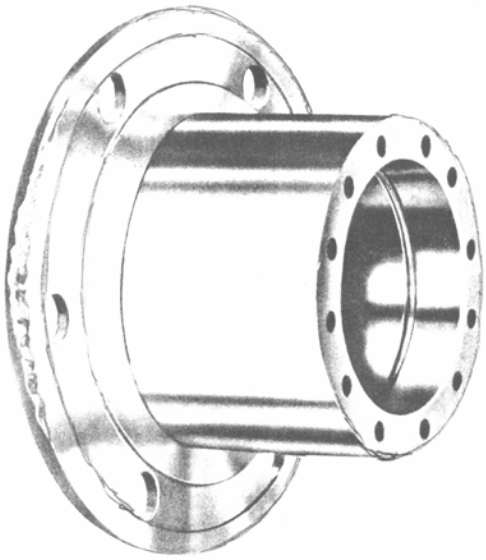
Stud turning in groove.

Insufficient torque on back nut.

What to do about it

Replace hub and follow proper torque procedure.

What to look for
WORN MOUNTING FACE ON HUB



What caused it

Loose wheel assembly.

What to do about it

Replace hub and follow proper torque procedure.

H-24. TROUBLESHOOTING WHEEL PROBLEMS (Cont.)

What to look for
METAL BUILD-UP AROUND STUD HOLES, OUT-OF-ROUND OR WORN STUD HOLES

What caused them

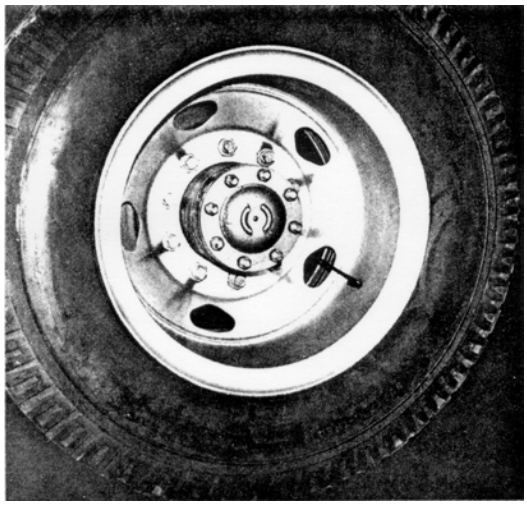
Loose capnuts.

What to do about them

Replace wheel.

Follow proper torque procedure.

What to look for
RUST STREAKS FROM STUD HOLES



What caused them

Loose capnuts.

What to do about them

Check complete assembly.

Replace damaged parts.

Follow proper torque procedure.

H-24. TROUBLESHOOTING WHEEL PROBLEMS (Cont.)

What to look for
CRACKED RIMS

What caused them

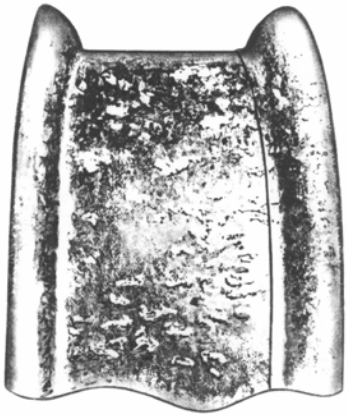
Overload or overinflation.

What to do about them

Replace wheel.

Match wheel ratings against actual load and inflation pressures required.

What to look for
RIM CORROSION



What caused it

Poor paint maintenance.

Water in air supply with tubeless tires.

What to do about it

If corrosion is slight, wire brush and repaint.

If corrosion is severe, replace wheel.

H-24. TROUBLESHOOTING WHEEL PROBLEMS (Cont.)

What to look for WHEEL CRACKS	What to look for WHEEL CRACKS
Hand hole to hand hole. Hand hole to stud hole. Hand hole to rim. 	Stud hole to stud hole. 
What caused them Overloading.	**What caused them** Loose capnuts.
What to do about them Check actual load on axle. Install new wheel according to loading requirements.	**What to do about them** Check for worn mounting face. Check for loose studs in hub. Check for worn stud groove. Check for cracked or broken studs. Replace any damaged parts. Install new wheel. Follow proper torque procedure.

H-25. BRAKE DRUM RE-BORE LIMITS AND/OR MAXIMUM WEAR DIAMETER

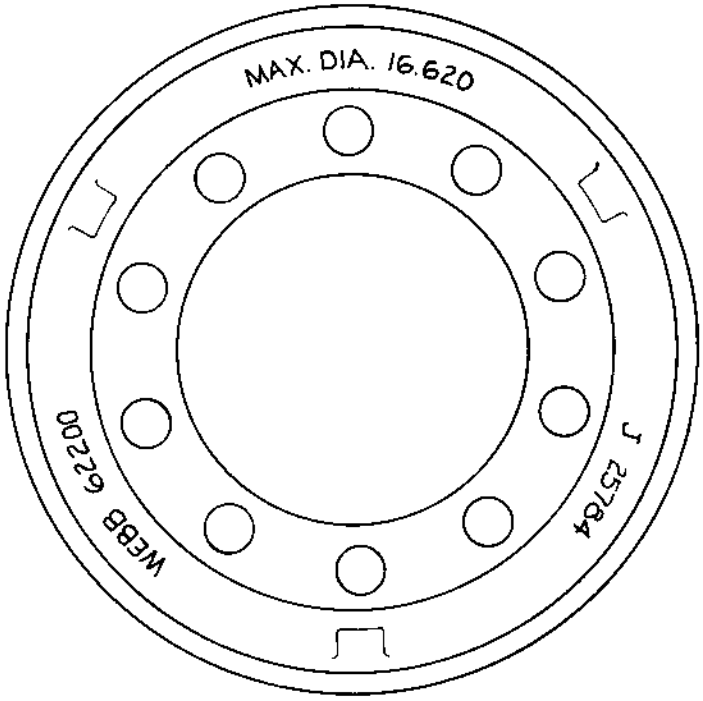
This information is furnished to advise the importance of the re-bore limits and/or maximum wear diameter as shown on our Webb brake drums. This dimension is cast on our brake drums as indicated on the drawing below. The dimension is the maximum safe diameter to which a drum may be turned, ground, and/or worn.

To insure product safety, it is critical that any brake drum reaching this dimension by turning, grinding, and/or wearing be considered unsafe and immediately replaced. Any brake drum exceeding this dimension is considered a safety hazard, and is not subject to warranty consideration.

Additional Information

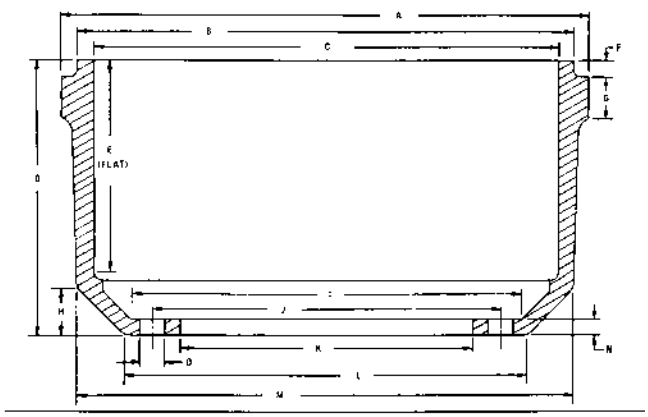
The dimension shown on our brake drums is the current maximum diameter and supersedes any previously published information.

Most Webb brake drums allow a maximum diameter of 0.120 over the nominal new diameter. This allows 0.080 for re-boring and an additional 0.040 for wear.



H-26. BRAKE DRUM DATA SHEET

When selecting a Webb replacement drum, the manufacturer's name and part number is helpful. If this information is not available, a replacement drum can be selected by comparing dimensions. A drawing is shown at the right, which indicates the dimensions required to determine the existence of a replacement drum. If all of the dimensions shown are not available, we must have at least dimensions **C, D, E, J, K, and O** to make a selection.



A. Overall Diameter of Drum
B. Dust Shield Recess Diameter, If Applicable
C. Brake Face Diameter
D. Overall Depth
E. Brake Surface Flat
F. Depth of Dust Shield Recess
G. Squeeler Band Thickness
H. Distance from Outside of Backface to Start of Taper
I. Inside Finished Diameter
J. Bolt Circle Diameter
K. Pilot Diameter
L. Outside Finished Diameter
M. Diameter at Taper
N. Backplate Thickness
O. Bolt Holes: Number and Size

H-27. BRAKE DRUM SERVICE INFORMATION

To achieve maximum life and optimum performance, proper brake maintenance and brake balance are essential. The following procedures are suggested as a means of obtaining maximum service and to determine the need for replacement.

1. Inspection of Brake Drums

When relining brakes, the brake drum should be cleaned and inspected. To be suitable for further service, the brake drum should pass the following checks:

A. The brake surface should be free of scoring, excessive heat checks, and free of cracks.

B. The brake surface diameter should be within the maximum diameter cast or stamped on the drum.

C. The mounting holes and pilot must be round and true.

D. The mounting surface must be clean and flat.

If any of the above conditions are not met, the brake drum should be replaced.

2. Turning the Brake Surface

It may be desirable to turn or resurface the braking surface to remove small heat checks or other surface defects. The following should be noted when turning:

A. When resurfacing a drum, allow at least 0.040 under the maximum diameter for additional wear. This usually means the drum may be turned a total of 0.080 over the brake surface diameter of a new brake drum.

Example:	New drum diameter	16.500
	Re-bore allowance	0.080
	16.580Diameter after re-bore limit is reached	16.580
	Wear allowance	0.040
	Maximum diameter	16.620

H-27. BRAKE DRUM SERVICE INFORMATION (Cont.)

2. Turning the Brake Surface (Cont.)

CAUTION

Do not turn or wear a brake drum beyond the maximum diameter stamped or cast on the brake drum.

B. The maximum diameter or discard diameter is the maximum diameter to which the brake drum may be turned or worn and still be usable. If any portion of the brake surface exceeds the maximum diameter it must be discarded. The maximum diameter is 0.120 over the nominal new diameter unless stated otherwise on the casting. The maximum diameter cast into the back plate portions of the brake drum supersedes all published information.

3. Determining Replacement

Replacement of the brake drum is required if any of the following conditions exist:

1. Brake drum is cracked.
2. The brake surface is heat checked, grooved, or worn beyond the re-bore limit of 0.080, or maximum diameter.
3. The back plate is cracked.
4. The boltholes are elongated.
5. Brake drum is known to have been severely overheated.
6. Brake drum is out-of-round.

When selecting a Webb replacement drum, the manufacturer's name and part number are helpful. If this information is not available, a replacement drum can be selected by comparing dimensions. A drawing is shown on page H-70 with the dimensions required to determine the existence of a replacement drum. If all the dimensions shown are not available, we must have at least the following dimensions from page H-70 to make a selection:

C. Brake Face Diameter
D. Overall Depth of Drum
E. Brake Surface Flat
J. Bolt Circle Diameter
K. Pilot Diameter
O. Bolt Hole Number and Size
Other Drilling or Special Features

H-27. BRAKE DRUM SERVICE INFORMATION (Cont.)

4. Replacement Procedures

Cleanliness is most important. After removing the brake drum to be replaced, make sure all mounting surfaces on the spoke wheel or hub are clean. All foreign material should be removed to insure proper attachment of the brake drum.

Step 1. Assemble the brake drum to the hub.

NOTE

Hubs using an outboard mount drum do not have to be removed from the axle to facilitate brake drum replacement. It is suggested, however, that the torque on the spindle nut be checked to make sure it is correct.

Step 2. Make sure the brakes are fully released and adjusters are fully backed off.

Step 3. Place the assembly on the axle and adjust the bearings.

Step 4. Inspect the lining location on the brake surface.

Step 5. Adjust the brakes.

NOTE

All adjustments should be made when brake drums are cold with brakes fully released.

a. Standard Slack Adjusters—Raise the axle until the wheel can be turned freely. If the slack adjuster has a positive lock mechanism, depress the locking sleeve to disengage it. Turn the adjusting screw until the brakes begin to drag, and then back off the adjustment so that the wheel turns freely. When adjustment is completed, the adjusting screw nut should be positioned so the locking sleeve engages the adjusting nut screw. In the case of the ball indent type, the ball should engage the indent on the plunger shaft.

b. Automatic Slack Adjusters—Require initial manual adjustment. Consult the manufacturer's literature for adjustment procedure.

H-28. TROUBLESHOOTING BRAKE DRUMS

Troubleshooting Information

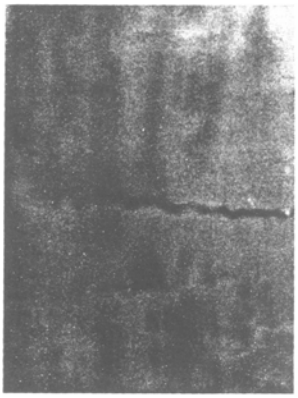
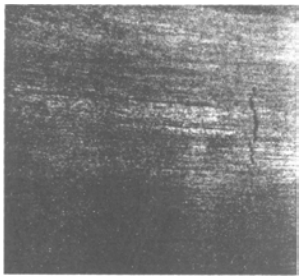
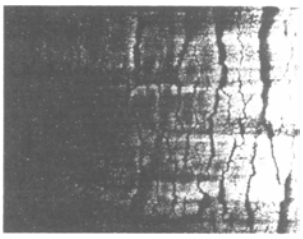
Replacement of the brake drum is required if any of the following conditions exist:

1. Brake drum is cracked.
2. The brake surface is heat checked, grooved, or worn beyond the re-bore limit of 0.080, or maximum diameter.
3. The back plate is cracked.
4. The boltholes are elongated.
5. Brake drum is known to have been severely overheated.
6. Brake drum is out-of-round enough that truing would exceed re-bore limit.

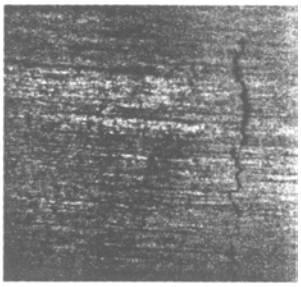
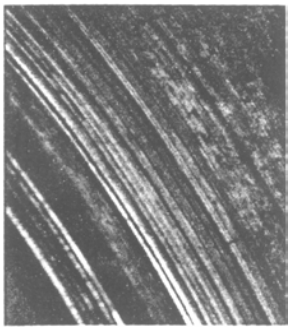
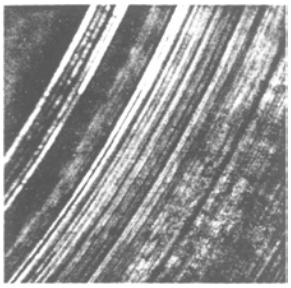
H-28. TROUBLESHOOTING BRAKE DRUMS (Cont.)

NOTE

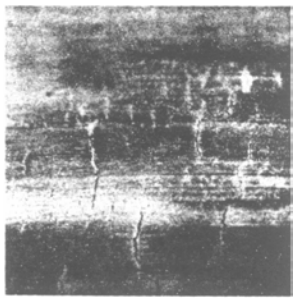
Brake drums should be replaced in pairs to achieve the same braking power on the axle.

EXAMPLE	PROBLEM	CAUSE	SOLUTION
	Cracked brake drum (new)	Mishandling	Replace brake drum.
	Cracked brake drum (used)	Heat checks connect together and grow through drum section	Replace brake drum. Check brake balance, brake return springs, brake adjustment, and lining type within vehicle combination.
	Cracked brake drum (used, low mileage)	Improper shoe contact	Replace brake drum. Shoes must contact drum at the center of the shoe.
	Light heat check	Normal condition	Does not impair brake performance. Brake drum may be turned with normal limit. See maintenance instructions regarding turning of brake surface.
	Heavy heat check	Imbalanced brake system, dragged brakes, or driver abuse. Caused by constant heating and cooling of brake surface.	Replace brake drum. Check brake balance, brake return springs, brake adjustment, and lining type within vehicle combination.

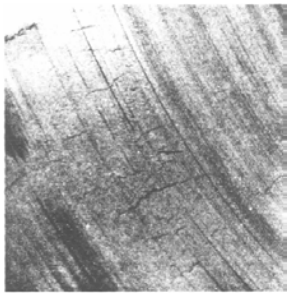
H-28. TROUBLESHOOTING BRAKE DRUMS (Cont.)

EXAMPLE	PROBLEM	CAUSE	SOLUTION
	Fine grooves	Abrasive material or poor quality brake lining	Re- bore brake drum within normal limits or replace the drum and lining. See maintenance instructions regarding turning of brake surface.
	Grooves coinciding with rivet holes	Loose rivets or bolts or foreign material collecting in rivet holes	Re-bore brake drums within normal limits or replace the drum and lining. See maintenance instructions regarding turning of brake surface.
	Grooves along edges of lining	Abrasive material collecting at edges of lining	Dust shield may cause or cure this problem. Re-bore brake drum within normal limits. See maintenance instructions regarding turning of brake surface.

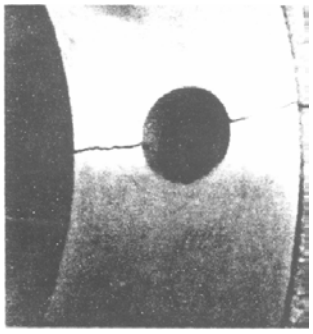
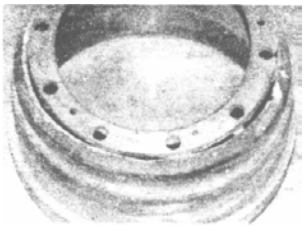
H-28. TROUBLESHOOTING BRAKE DRUMS (Cont.)

EXAMPLE	PROBLEM	CAUSE	SOLUTION
	Blue or discolored brake surface	Excessive heat from dragging brakes or brake imbalance between tractor and trailer	Re-bore brake drum within normal limits or replace. Look for weak or broken return springs or binding brake actuation system. See maintenance instructions regarding turning of brake surface.
	Heat spotted or hard spots in brake surface	High localized heating and cooling cycles	Grind hard spot and re-bore brake drum within normal limits. See maintenance instructions regarding turning of brake surface.
Photo Not RequiredFor Explanation	Out-of-round: balance	Balance weight has fallen off or a balanced drum was not specified	Re-bore brake drum. Specify balanced brake drums when ordering replacement.

H-28. TROUBLESHOOTING BRAKE DRUMS (Cont.)

EXAMPLE	PROBLEM	CAUSE	SOLUTION
Photo Not Required For Explanation	Out-of-round: variation in diameter	Heat distortion	Re-bore brake drum within normal limits or replace. See maintenance instructions regarding turning of brake surface.
	Out-of-round: concentricity	Improper fit to pilot or improper seating on wheel or hub	Clean all mounting surfaces. Check for correct fit and clearance to wheel.
	Excessive wear	Abrasive material between lining and drum or poor quality lining	Check maximum diameter and re-bore within limit or replace. See maintenance instructions regarding turning of brake surface.
	Grease-stained drums	Leaking oil seal or improper lubrication of brake components	Repair source of oil or grease leak. Clean the brake drums and replace the linings.
	Polished brake surface	Normal condition for non-asbestos lining Improperly cured brake linings	Remove glaze with emery cloth or re-bore drum within normal limits. See maintenance instructions regarding turning of brake surface.

H-28. TROUBLESHOOTING BRAKE DRUMS (Cont.)

EXAMPLE	PROBLEM	CAUSE	SOLUTION
Photo Not Required For Explanation	Faded or diminished brake powder	High temperature in brake system, improperly adjusted brakes or inferior brake lining	Check brake drum, brake lining condition, brake adjustment, and brake balance. Avoid operating conditions or loads that create excessive brake temperature.
	Noise, chatter, or pulsating during brake application	Heat spotted drums, grease-stained drums, loose brake drum or brake components	The brake drum should be removed and checked for one or more of these conditions and the appropriate action (as described in this section) should be taken to resolve the condition.
	Crack between the pilot and a bolt hole	Improper handling	Replace brake drum.
		Installation on dirty hub	Replace brake drum. Clean the hub prior to installing replacement brake drum.
	Mounting flange separated from hoop section of the brake drum	Installation on dirty hub	Replace brake drum. Clean the hub prior to installing replacement brake drum.
		Wheel hitting the drum	Wrong application. Replace brake drum with correct part number.

H-29. TROUBLESHOOTING SPRING PARKING BRAKE

Points covered in this troubleshooting guide apply to service brake and spring parking brake actuators. No effort is made to completely cover entire vehicle air brake system.

Insufficient Service Brake Application When Service Pedal is Depressed.

1. Restricted air flow or low air pressure to service chamber.
2. Worn brake lining or drums worn or cracked.
3. Improper brake adjustment (auto or manual slack adjusters).
4. Automatic adjusters not operating properly.
5. Improper service pushrod-to-slack-adjuster alignment or geometry (refer to vehicle manufacture's recommendations).
6. Bent or broken cam brackets or chamber mounting brackets (cam brakes).
7. Ruptured diaphragm.
8. Air leak in lines, fittings, or valves and at actuator clamp ring.
9. Improper pushrod length (not to vehicle manufacture's specifications).

Insufficient Spring Brake Application.

While most of the causes listed for "insufficient service brake application" will apply here, there are additional items which should be checked.

1. Broken power spring.
2. Insufficient size of spring brake or improper output force.
3. Spring brake was not fully released during brake adjustment.

Excessive Leakage—Service Brake Applied

1. Leaking brake chamber diaphragm.
2. Leaking hoses, tubes, or fittings.
3. Faulty valves.
4. Inspect for leakage at clamp ring. Tighten to 25-30 lb ft (33.895N.m–40.674N.m) torque if leakage is found.

Excessive Leakage—Spring Brakes Released By Air

1. Leaking diaphragm or main seal in spring section.
2. Leaking pushrod seal.
3. Leaking hoses, tubes, or fittings.

H-29. TROUBLESHOOTING SPRING PARKING BRAKE (Cont.)

Dragging Brakes

A. Service

1. Broken return spring in service section.
2. Service application air not exhausting properly or fast enough-clogged parts or defective valves.
3. Restricted or collapsed hose or tubing.
4. Broken brake shoe return springs.
5. Camshaft linkage binding.
6. Auto slacks over-adjusting.

B. Spring Brakes

1. Leaking diaphragm or seal in spring brake section.
2. Service or parking system pressure leakage causing spring brakes to partially apply.
3. Broken return spring in spring brake section (double diaphragm type).

Service Brakes Apply When Spring Brakes Are Released By Air.

1. Leaking pushrod seal between spring brake and service section.
2. Improper plumbing.

Leak Thru Service Exhaust Ports—Spring Brakes Released By Air

Leaking pushrod seal between spring brake and service section.

H-29. TROUBLESHOOTING SPRING PARKING BRAKE (Cont.)

Spring Brakes Will Not Release (Normal Operation)

1. Insufficient air pressure.
2. Air leaks in spring brake air system.
3. Restrictions in spring brake air system.
4. Ruptured diaphragm and/or seal in spring brake section.
5. Broken spring causing malfunction.

Spring Brakes Cannot Be Mechanically Released

1. Release bolt stripped or broken.
2. Broken internal release mechanism.
3. Broken power spring blocking full release.

H-30. CR SCOTSEAL

PURPOSE

The purpose of this material is to help you reduce premature wheel-end failures by tracking down their causes. To begin with, a CR wheel end system is made up of high quality parts designed for reliability and long life. When a part doesn't reach its intended service life, it suffers premature failure. And this calls for an investigation.

Tracking wheel end failure requires a planned, consistent approach to require and maintenance, like the sample procedures shown here. Investigation damage to a CR Scotseal or Scotseal Plus wheel seal requires taking the seal apart. In these unitized designs, the seal and sealing surface are inside, making it easy, once the surface is exposed, to track what has happened.

Reading the failure modes of bearings and hub caps is simply matching up the visible damage to a short list of causes. If questions arise that aren't covered here, contact your CR sales representative. We'll be glad to provide further help.

For proper installation instructions on Scotseal, Scotseal Plus, bearings, and accessories, the following materials are available; Fleet Self Study Guide (457935), Bearing Self Study Guide (457640), and Scotseal and Scotseal Plus Installation video (458304).

PROCEDURE

Inspect for Indications of Leakage:

Under vehicle inspection

- Grease present past the seal.
- Greasel contaminated hub, brake hardware, and brake shoes.

External leakage

- Grease present around hup cap exterior.
- Grease present on wheels and exterior axle areas by dust shields.

Disassembling the Wheel End:

WARNING

Block wheels. Support vehicle on stands.

- Check condition of hub cap. Check flange.
- Check bolts and hub flange area on drive axle.

Remove Hub Cap:

Check condition of lube

- Cloudy or milky indicates water.
- Shiny indicates bearing wear.
- Gritty, sandy indicates contamination.
- Smells burnt indicates overheating.

Check condition of fastening system

- Verify end-play measurement before removing fastener.
- Examine outer nut and return spring.

H-30. CR SCOTSEAL (Cont.)

Remove Outer Bearing:

Remove wheel or hub assembly, using a wheel dolly

Check spindle

- Threads damaged
- Chamfer damaged

Set bearings aside for inspection

Remove seal

- Check hub.
- Condition of chamfer.
- Nicks, burrs, for damage.

These are the key seal failure modes to look for. They will account for virtually all of your premature seal failures:

1. Improper installation

   Wrong tool, or no tool used

2. Cocked installation

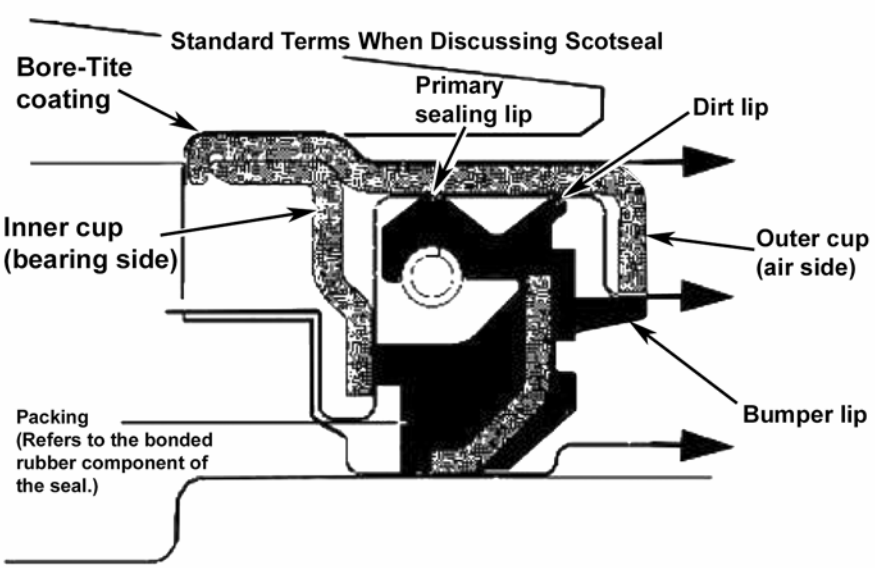
3. Improper bearing adjustment

4. Seal spinning on spindle

   Hit spindle
   Spindle imperfections

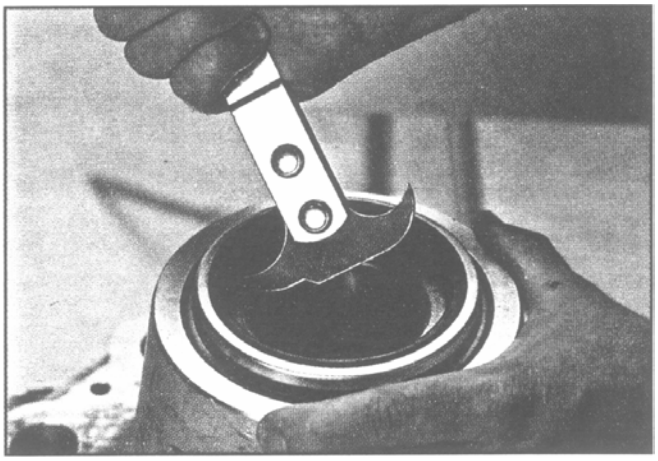
5. Hub imperfections

6. Installed over a wear ring



H-30. CR SCOTSEAL (Cont.)

How To Remove a Scotseal:



The first step is removing the Scotseal from the hub. You do this by inserting a pry bar (crow's foot) between the seal and the bearing cone. The bar should rest on the inner race to avoid damaging the bearing.

Do not clean the seal. In this case, dirt can be helpful in providing valuable clues.

NOTE

The Scotseal maintains a metal to metal contact between the seal O.D. and the hub bore surface as well as a metal contact between the packing I.D. and the spindle.

Installation:

1. Thoroughly clean the wheel hub and seal bore.
2. Thoroughly clean the spindle and spindle threads.
3. Pre-lube the inner bearing with GAA lubricant.
4. Place seal onto hub bore and insert drive tool into the seal. Hold tool handle firmly and straight. Drive seal into hub bore with firm hammer strokes.

CAUTION

Seal must be squarely seated when bottomed in hub bore. Check for freedom of movement by manually moving the seal packing up and down. A free movement of the packing is required for proper bearing end play adjustment.

H-31. BEARINGS

Typical failure modes in tapered wheel bearings include:

1. Improper bearing adjustment (see page H-92)

   Clearance not within specs

2. Misalignment (see page H-93)

   Bearing centerlines do not line up

3. Contamination (see page H-94)

   Metal, abrasive particles, or moisture

4. Improper lubrication (see page H-95)

   Wrong viscosity
   Insufficient amount
   Degraded lubricant

5. Installation damage (see page H-95)

   Wrong tool or no tool used
   Hammering on bearing components

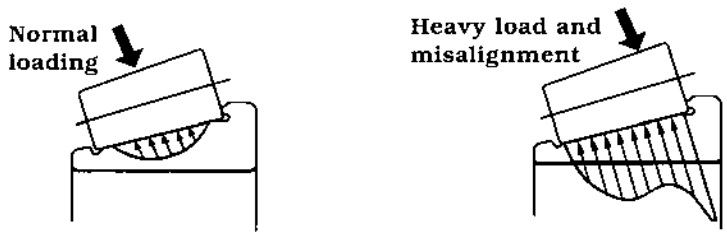
6. Impact loads (see page H-96)

   Improper installation
   Severe service
   Hitting curbs or potholes

7. Other damage (see page H-97)

   Poor fit
   Electric arcing
   Service fatigue

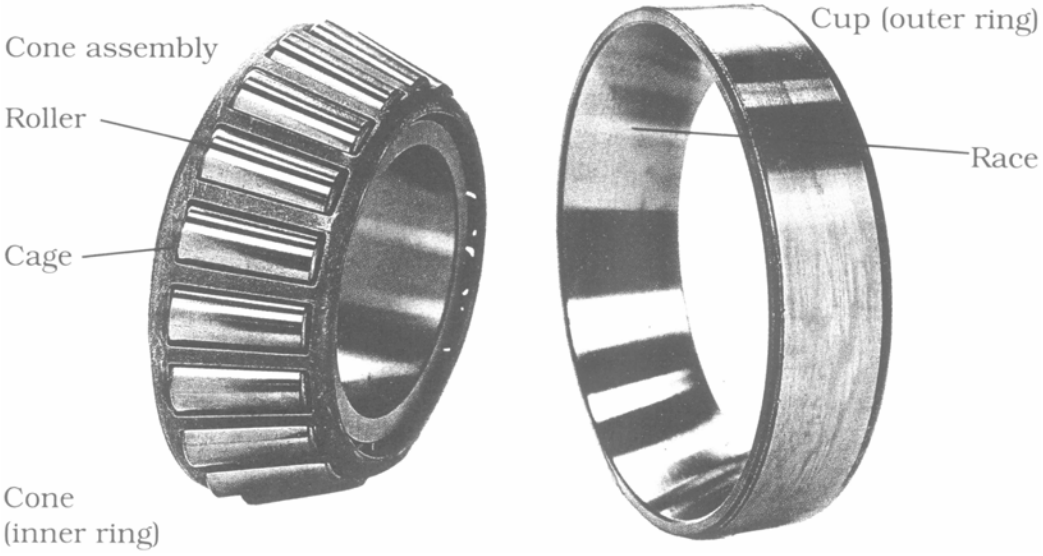
Tapered Bearing Loading Patterns



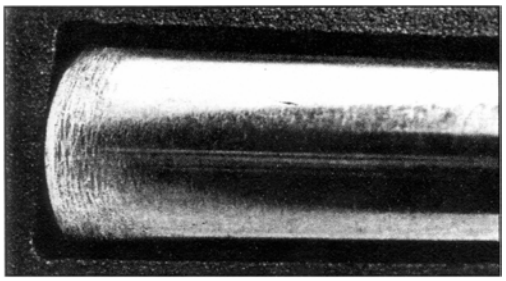
Over-tightening the adjusting nut or not seating the bearing properly shifts the load pattern on the bearing surfaces. Wear becomes uneven on the rollier surface, roller, flange and race and the bearing fails prematurely.

H-31. BEARINGS (Cont.)

Standard Terms When Discussing Bearings

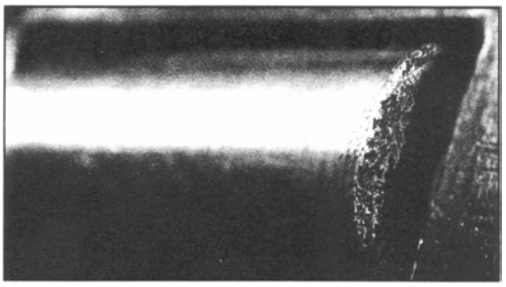


Improper Bearing Adjustment



Large end of roller shows smearing, spalling, or galling.

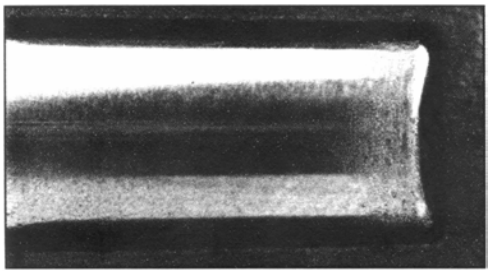
Bearing adjustment too tight.



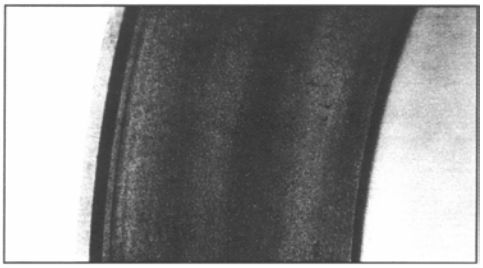
Roller end shows spalling due to heavy loading against inner ring flange. Excessive overload is the culprit.

H-31. BEARINGS (Cont.)

Improper Bearing Adjustment (Cont.)

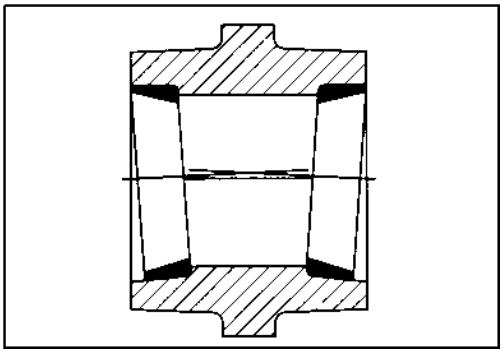


Small end of roller is worn. Probable cause: bearing adjustment too loose.

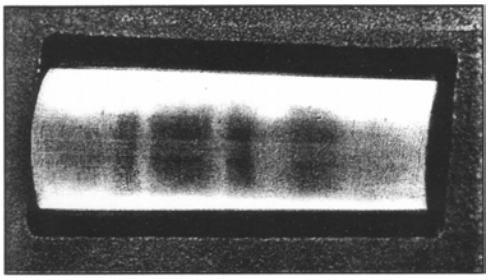


Inside of race shows wear. Bearing adjusted too tight.

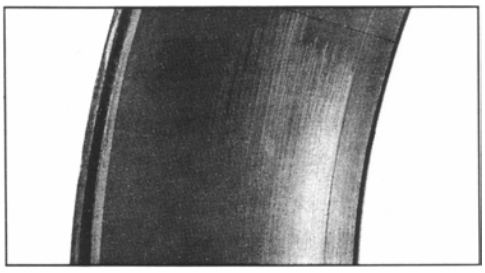
Misalignment



Misalignment occurs when the centerlines of the two bearings are not parallel to each other. The causes can be an improperly seated bearing, where dirt or burrs prevent a flush mount; an outer cap installed without the proper tool; a warped shaft; or nut faces that are out-of-line.



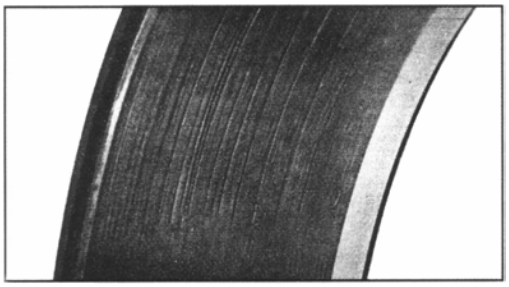
Roller worn and spalling at an angle. Probable cause: misalignment, cocked bearing.



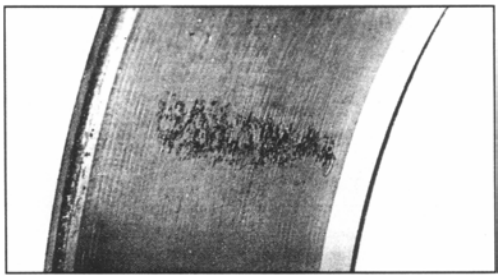
Severe wear on one side, little wear on opposite side. Misaligned operation.

H-31. BEARINGS (Cont.)

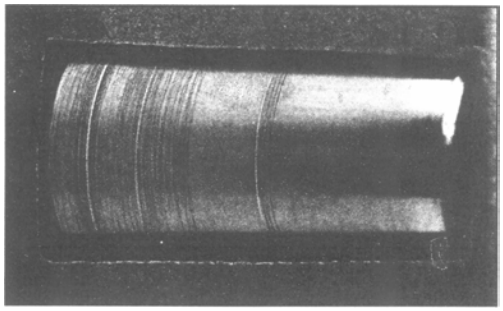
Contamination



Grooves in the race indicate hard particles in the lubricant.



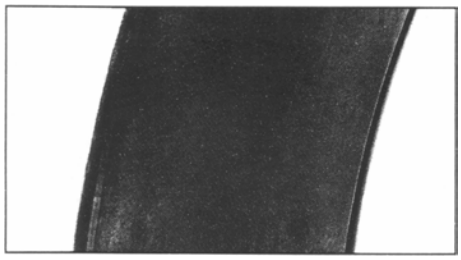
Etching of the metal generally indicates water contamination, allowing oxidation to attack the surfaces.



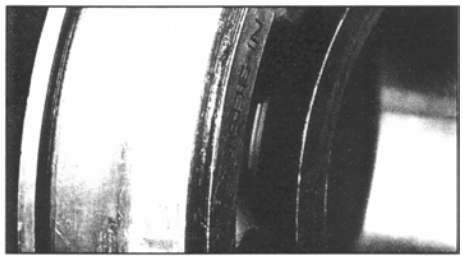
Scoring around the roller indicates contamination by dirt, grit (from outside), or metal particles (from internal damage).

H-31. BEARINGS (Cont.)

Improper Lubrication

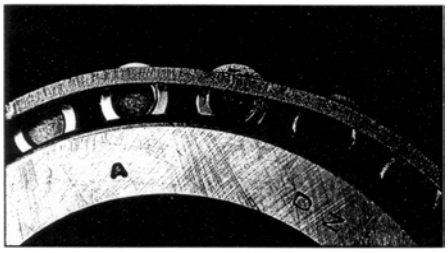


Flaking metal lifting off across the full surface. Probable causes: lubrication break-down, improper viscosity, or lack of lube.

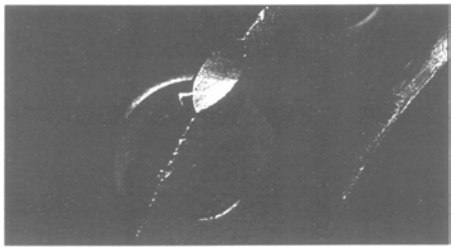


Discoloration indicates high heat. Low lubricant levels can produce high heat which further breaks down viscosity.

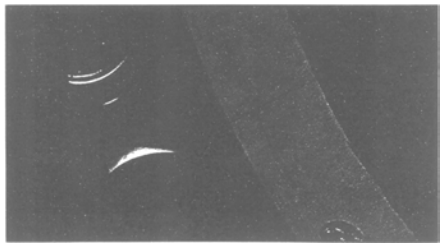
Installation Damage



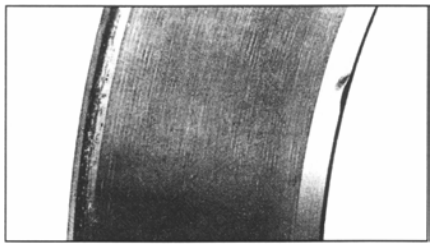
Deformed ribs indicate rough handling, poor installation, or excessive press fit from a wrong application or distorted hub.



Nicks in the cage or retainer. Probable cause: drift used during installation.



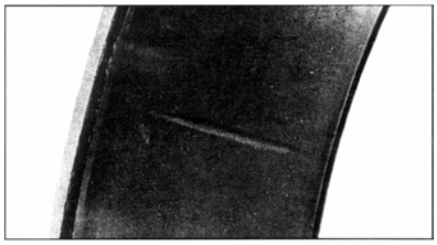
Broken inner ring indicates excessive interference fit and excessive installation pressure.



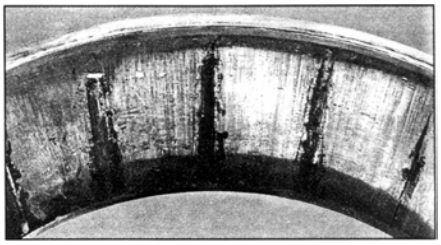
Dings and dents in the bearing surfaces indicate a drift was used during installation.

H-31. BEARINGS (Cont.)

Impact Loads

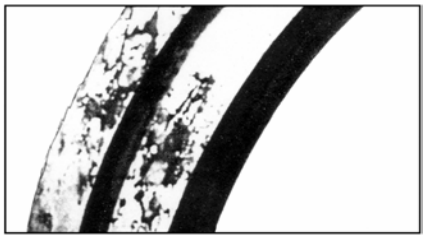


Dents across the race indicate a sharp, high impact. Cause could be hitting pot holes or excessive installation pressure.

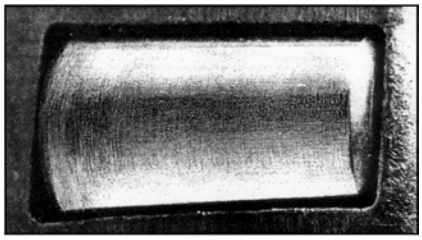


Dents caused by impact loads may progress to spalled or galled tracks across the surface.

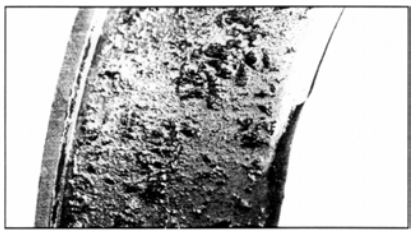
Other Damage



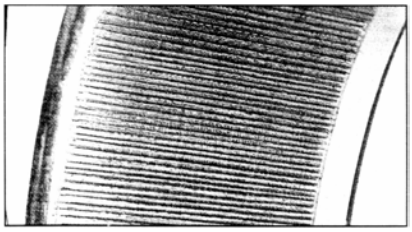
Fretting corrosion of the outer surface is often the result of a loose fitting bearing. Probable cause: a worn hub or spindle.



Overheated bearing metal goes from a straw-brown at 300°F (149°C) to a deep purple at over 700°F (371°C). The causes are lack of lube, misadjustment, or excessive loading.

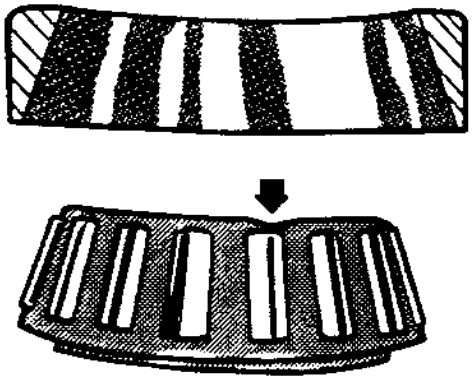


Spalling occurs as fatigued metal lifts off the surface. This can be the normal end of bearing life, improper lubrication, or excessive loading.



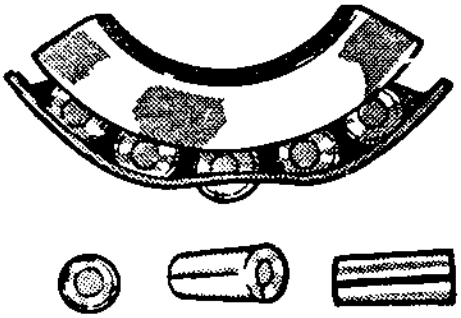
Light pitting can be caused by electrical arcing. The probable cause is electrical welding grounded through the axle.

H-31. BEARINGS (Cont.)



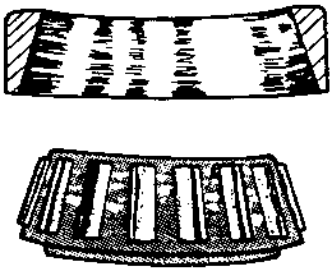
BENT CAGE

Cage damaged due to improper handling or tool usage. Replace bearing.



BENT CAGE

Cage damaged due to improper handling or tool usage. Replace bearing.

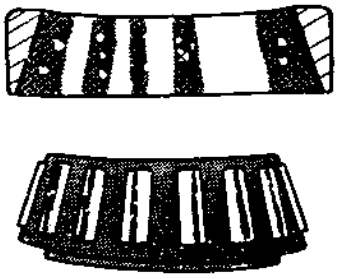


CAGE WEAR

Wear around outside diameter of cage and roller pockets caused by abrasive material and inefficient lubrication.

Clean related parts.

Clean seals and replace bearings.



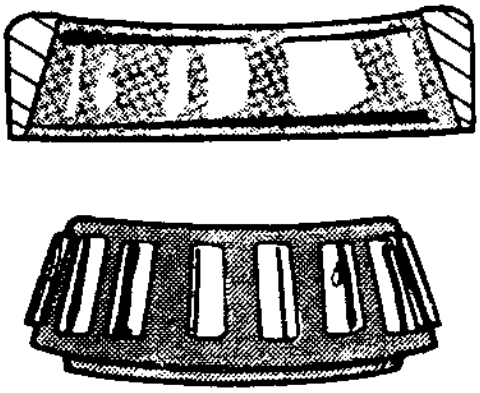
INDENTATIONS

Surface depressions on race and rollers caused by hard particles of foreign material.

Clean all parts and housings.

Check seals and replace bearings if rough or noisy.

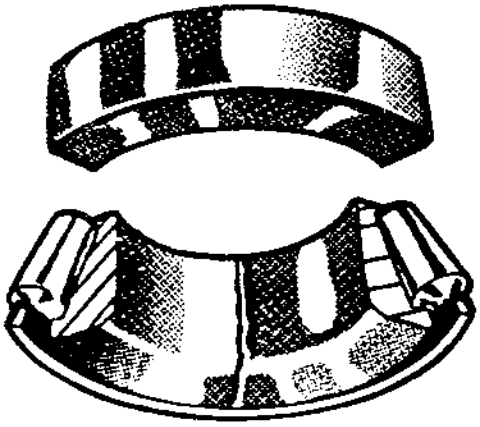
H-31. BEARINGS (Cont.)



MISALIGNMENT

Outer race misalignment due to foreign object.

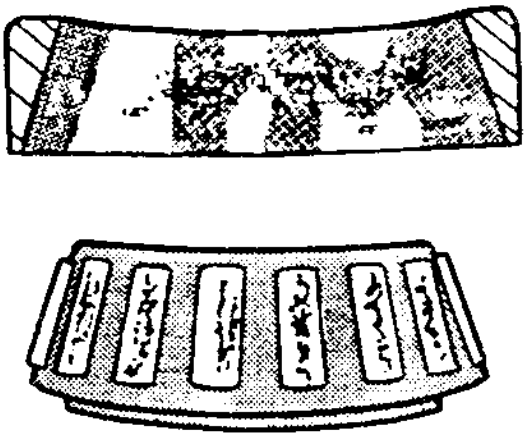
Clean related parts and replace bearing. Make sure races are properly seated.



CRACKED INNER RACING

Race cracked due to improper fit, cocking, or poor bearing seats.

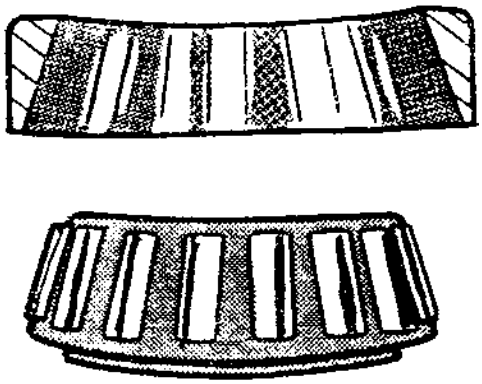
Replace bearing and correct bearing seats.



FATIGUE SPALLING

Flaking of surface metal resulting from fatigue.

Replace bearing and clean related parts.

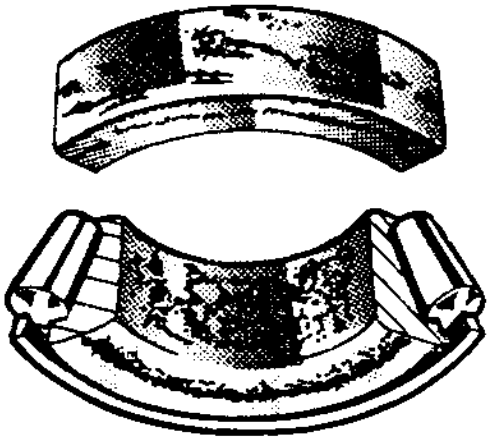


BRINELLING

Surface indentations in raceway caused by rollers either under impact loading or vibration while the bearing is not rotating.

Replace bearing if rough or noisy.

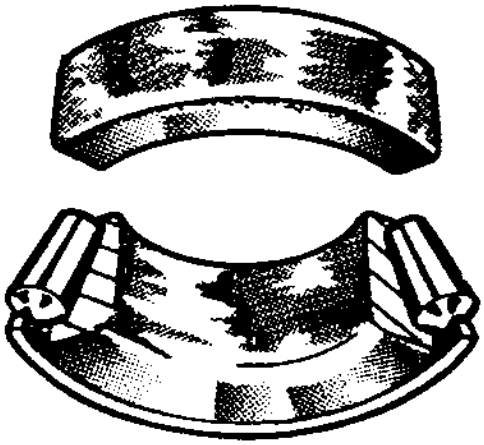
H-31. BEARINGS (Cont.)



FRETTAGE

Corrosion set up by small relative movement of parts with no lubrication.

Replace bearing. Clean related parts. Check seals and check for proper lubrication.

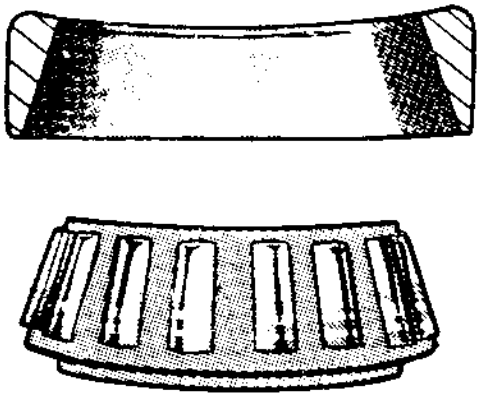


SMEARS

Smearing of metal due to slippage. Slippage can be caused by poor fits, lubrication, overheating, overloads, or hauling damage.

Replace bearings. Clean related parts and check for proper fit and lubrication.

H-31. BEARINGS (Cont.)

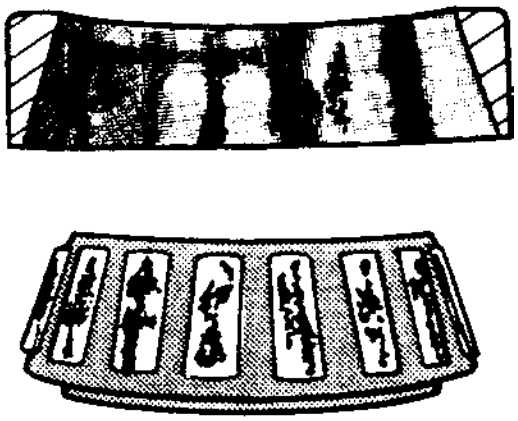


STAIN DISCOLORATION

Discoloration can range from light brown to black caused by incorrect lubricant or moisture.

Reuse bearings if stains can be removed by light polishing or if no evidence of overheating is observed.

Check seals and related parts for damage.



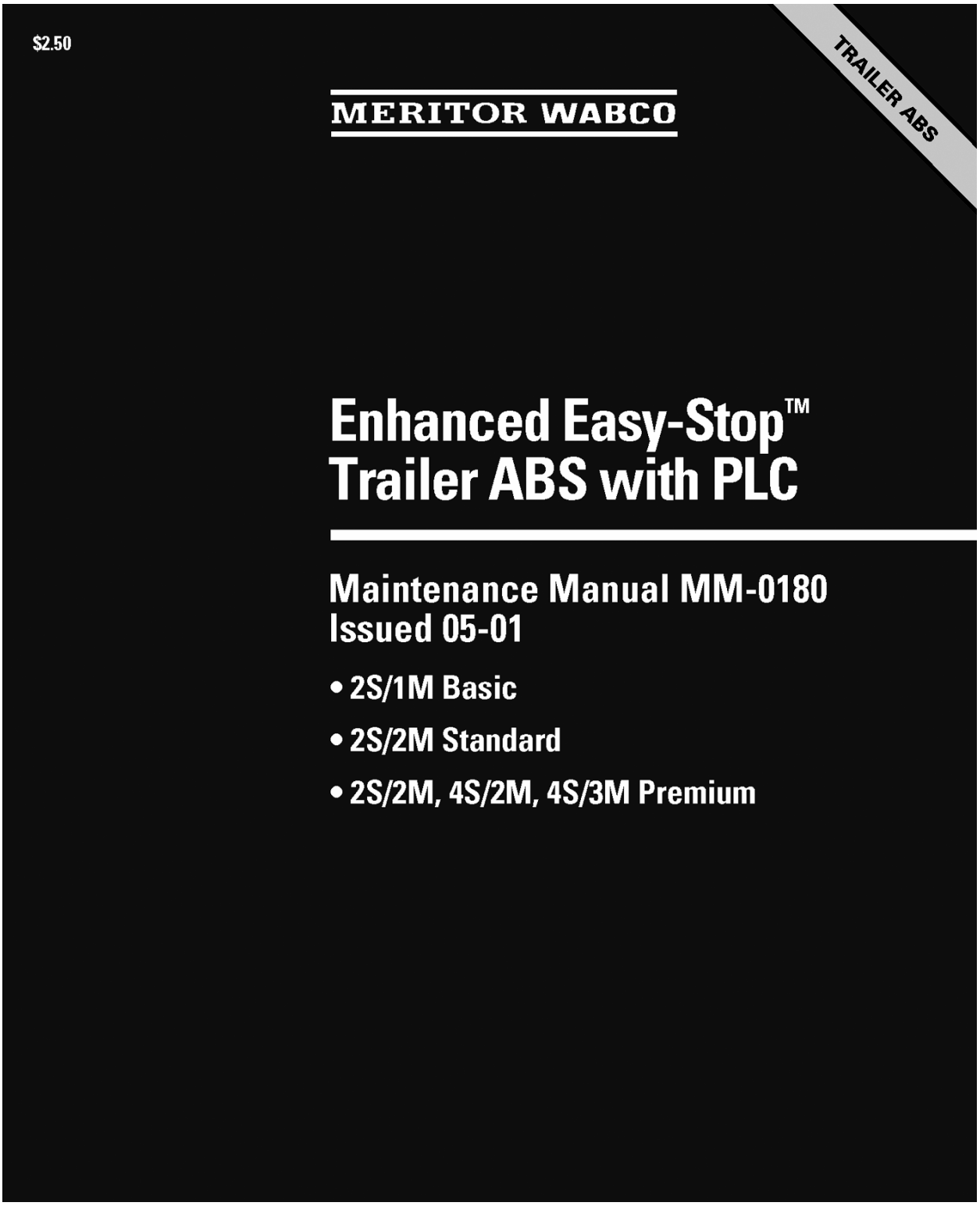
HEAT DISCOLORATION

Heat discoloration can range from faint yellow to dark blue resulting from overload or incorrect lubricant.

Excessive heat can cause softening of races or rollers. To check for loss of temper on races or rollers, a simple file test may be made. A file drawn over a tempered part will grab and cut metal, whereas a file drawn over a hard part will glide readily with no metal cutting.

Replace bearings if overheating damage is indicated. Check seals and other parts.

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC



Service Notes

MERITOR WABCO

Before You Begin

This manual contains maintenance procedures for Meritor WABCO's Enhanced Easy-Stop™ Trailer ABS with PLC. Before you begin procedures:

1. Read and understand all instructions and procedures before you begin to service components.
2. Read and observe all Caution and Warning safety alerts that precede instructions or procedures you will perform. These alerts help to avoid damage to components, serious personal injury, or both.
3. Follow your company's maintenance and service, installation, and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.

Safety Alerts, Torque Symbol and Notes

⚠ **WARNING**	A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.
⚠ **CAUTION**	A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components and possible serious injury.
T	A torque symbol alerts you to tighten fasteners to a specified torque value.
NOTE	A Note provides information or suggestions that help you correctly service a component.

Access Information on ArvinMeritor's Web Site

Additional maintenance and service information for ArvinMeritor's commercial vehicle systems component lineup is also available at arvinmeritor.com.

To access information, click on Products & Services/Tech Library Icon/HVS Publications. The screen will display an index of publications by type.

Additional Information

Call ArvinMeritor's Customer Service Center at 800-535-5560 to order the following publications.

- *Enhanced Easy-Stop™ Installation Guide* (Wall Chart) (TP-0155)
- *Blink Code Diagnostics Card for Easy-Stop™ and Enhanced Easy-Stop™* (TP-0173)
- *Driver Tips* (SP-93161)*
- *How to Brake with ABS audio cassette* (SP-94126)*
- *Enhanced Easy-Stop™ Training Guide Workbook* (TP-0143)
- *Trailer ABS Service and Support Reference Card* (TP-9803)
- *Trailer ABS Technical Service Support Reference Card* (TP-9804)
- *What Every Driver Should Know About ABS* (T-96159V)
- *Enhanced Easy-Stop™ Training Video* (T-0197V)
- *Drivetrain Plus™ by ArvinMeritor Technical Electronic Library* on CD. Features product and service information on most Meritor, ZF Meritor and Meritor WABCO products. $20. Order TP-9853.

*For Spanish version, add SP to the item number. For French version, add FR to the item number.

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

MERITOR WABCO

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H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Table of Contents

MERITOR WABCO

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Asbestos and Non-Asbestos Fibers

⚠ ASBESTOS FIBERS WARNING:

The following procedures for servicing brakes are recommended to reduce exposure to asbestos ?ber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from ArvinMeritor.

Hazard Summary

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the ?rst exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Speci?c recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

   DANGER: ASBESTOS CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY RESPIRATORS AND PROTECTIVE

   CLOTHING ARE REQUIRED IN THIS AREA.

2. Respiratory Protection. Wear a respirator equipped with a high-ef?ciency (HEPA) ?lter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.

3. Procedures for Servicing Brakes.

   a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.

   b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to ?ow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.

   c. If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.

   d. Wear a respirator equipped with a HEPA ?lter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA ?lter.

   e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA ?lter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, ?ammable solvents, or solvents that can damage brake components as wetting agents.

4. Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA ?lter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA ?lter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA ?lter, wet the ?lter with a ?ne mist of water and dispose of the used ?lter with care.

5. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA ?lter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.

6. Waste Disposal. Dispose of discarded linings, used rags, cloths and HEPA ?lters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

H-33.ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

NON-ASBESTOS FIBERS WARNING:

The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos ?ber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from ArvinMeritor.

Hazard Summary

Most recently manufactured brake linings do not contain asbestos ?bers. These brake linings may contain one or more of a variety of ingredients, including glass ?bers, mineral wool, aramid ?bers, ceramic ?bers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and ef?ciency and can result in serious breathing dif?culty. Some scientists believe other types of non-asbestos ?bers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic ?ber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic ?bers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Speci?c recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.

2. Respiratory Protection. OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m^3 as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.

   Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-ef?ciency (HEPA) ?lter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.

3. Procedures for Servicing Brakes.

   a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.

   b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to ?ow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.

   c. If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a ?ne mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.

   d. Wear a respirator equipped with a HEPA ?lter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA ?lter.

   e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA ?lter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, ?ammable solvents, or solvents that can damage brake components as wetting agents.

4. Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA ?lter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA ?lter approved by NIOSH or MSHA, to minimize exposure. When you replace a HEPA ?lter, wet the ?lter with a ?ne mist of water and dispose of the used ?lter with care.

5. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA ?lter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.

6. Waste Disposal**.** Dispose of discarded linings, used rags, cloths and HEPA ?lters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal**.**

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Maintenance Manual Information

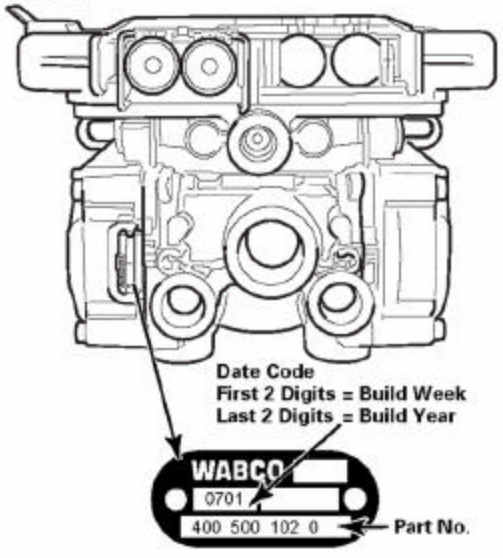
This manual contains service and diagnostic information for Meritor WABCO Enhanced Easy-Stop™ Trailer ABS with Power Line Carrier (PLC) capability.

Identifying Enhanced Easy-Stop Trailer ABS

To identify Enhanced Easy-Stop, check the identification tag on the Electronic Control Unit (ECU). **Figure 1.1**. The part numbers for Enhanced Easy-Stop systems are:

- 400 500 101 0 (2S/1M Basic for standard trailers)
- 400 500 104 0 (2S/1M Basic for dollies and steerables)
- 400 500 102 0 (2S/2M Standard)
- 400 500 103 0 (2S/2M, 4S/2M and 4S/3M Premium)

Figure 1.1



If you are servicing or using blink code diagnostics for Easy-Stop Trailer ABS (Easy-Stop ECUs with part numbers other than those listed above), please use Meritor WABCO Maintenance Manual 33.

If you are not able to identify the version, or to request service literature, please contact ArvinMeritor's Customer Service Center at 800-535-5560.

This manual does not contain Original Equipment Manufacturer (OEM) installation instructions. New installations require the following documentation:

- Enhanced Easy-Stop Basic (2S/1M): TP-20212
- Enhanced Easy-Stop Standard (2S/2M): TP-20213
- Enhanced Easy-Stop Premium (2S/2M, 4S/2M and 4S/3M): TP-20214

Enhanced Easy-Stop Trailer ABS Parts

Parts book PB-96133 lists Meritor WABCO Easy-Stop replacement parts. To obtain a copy, contact ArvinMeritor's Customer Service Center at 800-535-5560.

For warranty information, contact ArvinMeritor's Customer Service Center (800-535-5560) and ask for TP-99128, *Meritor WABCO Trailer ABS Warranty Procedure*.

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

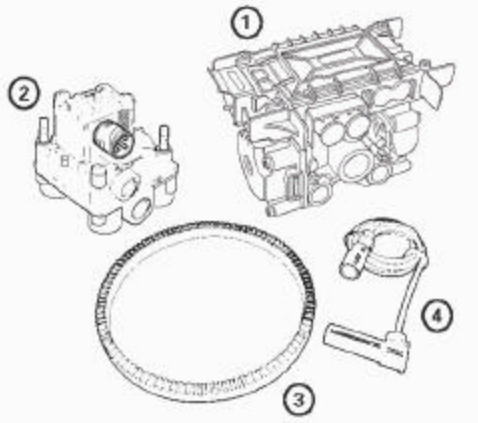
Section 1
Introduction

MERITOR WABCO

What Is Meritor WABCO's Enhanced Easy-Stop Trailer ABS?

Meritor WABCO's Easy-Stop Trailer ABS is an electronic, self-monitoring system that works with standard air brakes. In addition, Enhanced Easy-Stop includes Power Line Carrier (PLC) capability. PLC information is included in the ABS Q & A Section of this manual. The major components of the system are the **Electronic Control Unit (ECU)/Valve Assembly, ABS modulator valve (for 3M systems), tooth wheel** and **wheel speed sensor. Figure 1.2.**

Figure 1.2



1. ECU/Valve Assembly
2. External ABS Modulator Valve (for 3M configurations)
3. Tooth Wheel
4. Wheel Speed Sensor

System Configuration

The ABS **configuration** defines the number of wheel speed sensors and ABS modulator valves used in a system. For example, a **2S/1M** configuration includes two wheel sensors and one ABS modulator valve. A **2S/2M** configuration includes two wheel sensors and two ABS modulator valves. A **4S/2M** configuration includes four wheel sensors and two ABS modulator valves.

A 4S/3M configuration consists of an ECU/dual modulator valve assembly and one external ABS modulator valve.

There is a specific ECU/valve assembly for each configuration:

- For 2S/1M Basic, the assembly consists of an ECU and a single modulator valve assembly
- For 2S/2M Standard and 2S/2M, 4S/2M and 4S/3M Premium, the assembly consists of an ECU and a dual modulator valve assembly (one valve that combines the function of two modulator valves). The 2S/2M Standard valve has only two sensor outlets and cannot be upgraded.

How Trailer ABS Works

Meritor WABCO ABS is an electronic system that monitors and controls wheel speed during braking. The system works with standard air brake systems.

ABS monitors wheel speeds at all times and controls braking during wheel lock situations. The system improves vehicle stability and control by reducing wheel lock during braking.

The ECU receives and processes signals from the wheel speed sensors. When the ECU detects a wheel lockup, the unit activates the appropriate modulator valve, and air pressure is controlled.

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

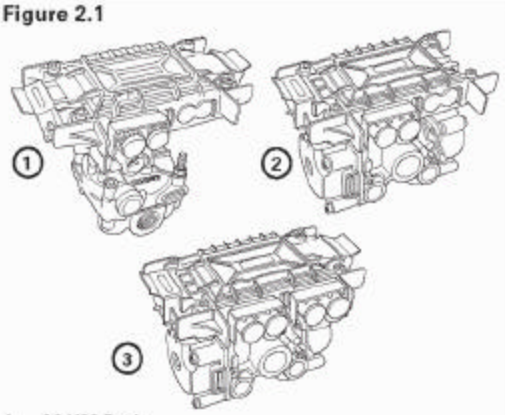
Two ABS indicator lamps (one on the dash and one on the side of the trailer) let drivers know the status of the system.

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

ECU/Valve Assembly (Figure 2.1)

- 12 volt
- Integrated ECU and ABS relay valve
  - — ECU and valve assembly are serviceable items.
- The ECU/Valve Assembly may be mounted with the sensors facing either the front or rear of the trailer.

Figure 2.1



1. 2S/1M Basic
2. Standard
3. Premium

ABS External Modulator Valve (Figure 2.2)

- Controls air pressure to the brake chambers where it is plumbed.
- During ABS operation, the valve adjusts air pressure to the brake chambers to control braking and prevent wheel lock.
- Used in conjunction with ECU/Valve Assembly for 3M systems.

Sensor with Molded Socket (Figure 2.3)

- Measures the speed of a tooth wheel rotating with the vehicle wheel.
- Produces an output voltage proportional to wheel speed.

Sensor Spring Clip (Figure 2.4)

- Holds the wheel speed sensor in close proximity to the tooth wheel.

Tooth Wheel (Figure 2.5)

- A machined ring mounted to the machined surface on the hub of each ABS-monitored wheel.

Figure 2.2

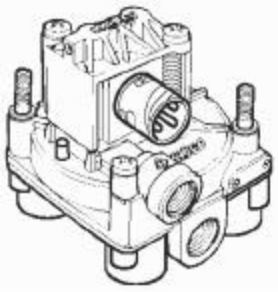


Figure 2.3

Figure 2.4

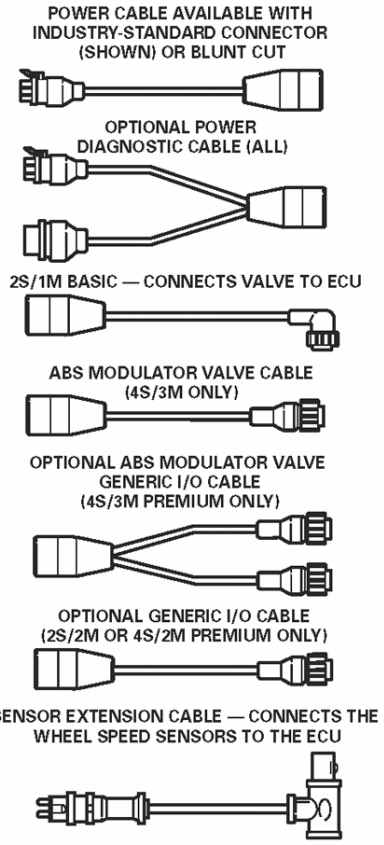
Figure 2.5

Section 2
System Components

MERITOR WABCO

Cables for Enhanced Easy-Stop (Figure 2.6)

Figure 2.6



Easy-Stop Trailer ABS Indicator Label

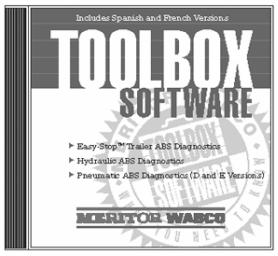
- Provides information about the operation of the ABS indicator lamp and illustrates blink code fault locations.
- Label is self-adhesive and is mounted on the trailer near the ABS indicator lamp.
- If there is no warning label on your trailer, let your supervisor know. Labels are available from Meritor WABCO. Ask for Part Number TP-95172.

TOOLBOX Software (Figure 2.7)

TOOLBOX Software is a PC-based diagnostics program that can display wheel speed data, test individual components, verify installation wiring and more.

Version 4.1 (or higher) supports Enhanced Easy-Stop with PLC, and runs in Windows® 95, 98, NT, 2000 and Me. An RS232 to J1708 converter box is required.

Figure 2.7



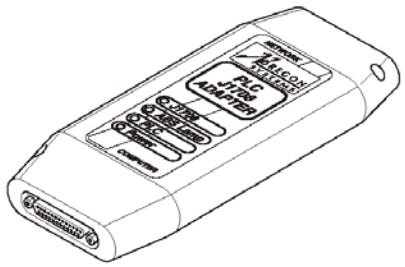
Available from SPX (Kent-Moore), 800-328-6657

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

PLC/J1708 Adapter (Figure 2.8)

- Simulates the tractor ABS lamp, ensuring that the trailer ABS is capable of "lighting the light."
- Simulates the trailer ABS lamp, ensuring that the tractor is capable of "lighting the light."
- Use as a trailer/tractor tester to ensure that PLC is functioning properly.

Figure 2.8



Available from Noregon Systems, 336-768-4337

MPSI Pro-Link® 9000 Diagnostic Tool (Figure 2.9)

- Provides diagnostic and testing capability for ABS components.
- Requires a Multiple Protocol Cartridge (MPC) and Meritor WABCO applications card, version 2.0 or higher, for use with Enhanced Easy-Stop with PLC.

Figure 2.9

Available from SPX (Kent Moore), 800-328-6657

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

MERITOR WABCO

PARTS BOOK

PB-96133
Revised 11-01

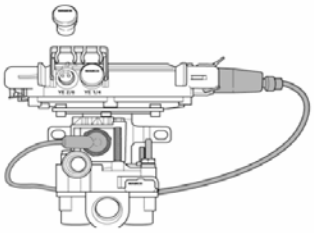
ENHANCED EASY-STOP™ WITH PLC AND EASY-STOP™ TRAILER ABS

Parts listed in this book are service (replacement) parts. The service part number is the same as the production number except that it is preceded by an ***S***.

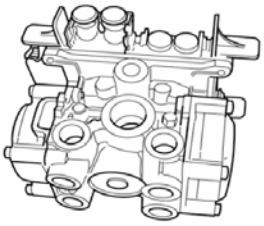
ECU/MODULATOR VALVE ASSEMBLY - Enhanced Easy-Stop

- Used on trailers produced after March 1, 2001.
- Complete Enhanced Easy-Stop Assembly consists of an ECU, single or dual modulator valve, and for the BASIC, a bracket.
- Replacement parts may be ordered separately or as a complete assembly.

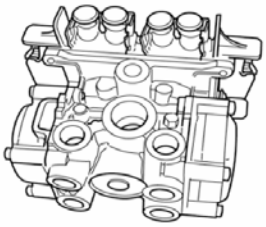
BASIC ECU/SINGLE MODULATOR VALVE ASSEMBLY 2S/1M ONLY



STANDARD ECU/DUAL MODULATOR VALVE ASSEMBLY 2S/2M ONLY



PREMIUM ECU/DUAL MODULATOR VALVE ASSEMBLY 2S/2M, 4S/2M, 4S/3M



ECU/Modulator Valve Assembly	ECU Only	Single or Dual Modulator Valve Only	Bracket (Basic Only)
S400 500 101 0 2S/1M Basic with bracket MSH - Recommended for use with standard trailers. Do not use with turntables, steerables or dollies.	S446 108 201 0	S472 195 033 0 (single)	S478 407 058 4
S400 500 104 0 2S/1M Basic with bracket MAR - Recommended for use with turntables, steerables and dollies.	---	S472 195 033 0 (single)	S478 407 058 4
S400 500 102 0 2S/2M Standard	---	---	---
S400 500 103 0 2S/2M, 4S/2M, 4S/3M Premium	---	---	---

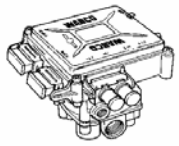
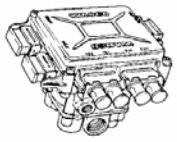
S = Number of Sensors M = Number of Modulator Valves

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

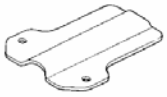
m = meters in. = inches ft. = feet

ECU/MODULATOR VALVE ASSEMBLY - Easy-Stop

- Used on trailers produced prior to March 2001.
- All ECUs have an external diagnostic port.

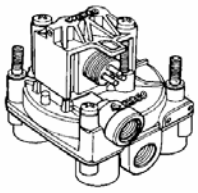
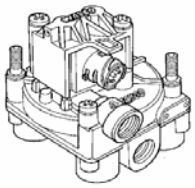
	Part Number	ABS System	Comments
	**S472 500 011 0**	2S/1M Use with steerable axles, turntables or dollies.	12 volt. Integrated electronic control unit and ABS relay valve.
	S472 500 021 0	2S/1M Recommended for use with standard trailers. Do not use with steerables, turntables or dollies.	
	**S472 500 012 0**	2S/1M 2S/2M 4S/2M	12 volt. Integrated electronic control unit and ABS relay valve.
	S472 500 013 0	4S/3M	

EASY-STOP ECU/VALVE ASSEMBLY MOUNTING BRACKET

	Part Number	Height	Comments
	**S3305-T-1242**	7.37 in. (.18m)	Bracket used to remote mount ECU/valve assembly to trailer frame. Not for use with Enhanced Easy-Stop.

ABS RELAY VALVE

- For Easy Stop 2M and 3M Systems and Enhanced Easy-Stop 3M Systems.

	Part Number	Operating Pressure psi (bar)	Port Sizes	Comments
	**R955212** For use on trailers produced prior to 4-1-99.	145 (10)	Supply (Port 1) - 3/4"-14 Dryseal NPTF Delivery (Port 2) - 3/8"-18 Dryseal NPTF Exhaust (Port 3) - No thread	Kit includes modulator valve and adapter cable. 12 volt, 3-4 psi crack pressure, 2 supply ports, 4 delivery ports. Replaces S472 195 032 0 S472 195 027 0 S472 195 026 0 S472 195 023 0
	**S472 195 033 0** For use on trailers produced 4-1-99 or later.		Control (Port 4) - 3/8"-18 Dryseal NPTF	Use with bayonet style cable connectors

Relay valve adaptor cables are available as follows:
S894 601 132 2 converts the 431 series relay valve cables from bayonet style to screw type connector.
S894 601 133 2 converts the 421 series relay valve cables from screw type to bayonet style connector.

S = Number of Sensors M = Number of Modulator Valves

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

m = meters in. = inches ft. = feet

CONNECTION CABLE FOR TRAILER ABS RELAY VALVES - Enhanced Easy-Stop

	Part Number	Length	Comments
	S894 606 275 2	1.65 ft. (.5m)	Used with 2S/1M Basic ECU/Modulator Valve Assembly - connects the relay valve to the ECU. Right angle connector.
	S449 441 015 0 S449 441 030 0 S449 441 060 0 S449 441 080 0 S449 441 110 0	5 ft. (1.5m) 10 ft. (3m) 20 ft. (6m) 26 ft. (8m) 36 ft. (11m)	Used with Premium ECU/Modulator Valve Assembly in 3M installations. Straight connector.
	S449 442 010 0	3 ft. (1m)	Optional generic Input/Output cable for use with 2S/2M or 4S/2M Premium ECU/Dual Modulator Valve Assemblies.
	S449 404 048 0 S449 404 055 0	10 ft. & 3 ft. (3m and 1m) 26 ft. & 3 ft. (8m and 1m)	Optional "Y" Modulator Valve/generic Input/Output cable for use with 4S/4M Premium ECU/Dual Modulator Valve Assemblies.

CONNECTION CABLE FOR ABS RELAY VALVES - Easy-Stop

	Part Number	Length	Comments
	S449 421 008 0	2.75 ft. (.8m)	Three-wire cable with connector. Connects the relay valve to the ECU. Connector thread - M24 x 1. For use with trailers produced prior to 4-1-99.
	S449 421 015 0 Replaces: 894 604 194 0	5 ft. (1.5m)	
	S449 421 020 0 Replaces: 894 604 195 0	7 ft. (2m)	
	S449 421 110 0	36 ft. (11m)	
	S449 421 150 0	49 ft. (15m)	

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

m = meters in. = inches ft. = feet

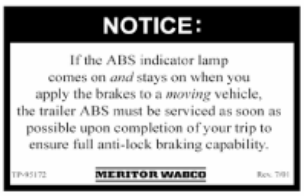
POWER CABLE - Easy-Stop

NOTE: If you are replacing a 3-conductor power cable (part numbers S894 604 197 2 or S894 604 196 2), order a 4-conductor replacement cable.

	Part Number	Length	Comments
	**S449 315 010 0**	3 ft. (1m)	4-conductor power cable. (May be used to replace 3-conductor cables - see note above.)
	S449 315 030 0 Replaces: 449 312 030 0	10 ft. (3m)	
	S449 315 110 0 Replaces: 449 312 110 0	36 ft. (11m)	
	S449 315 150 0 Replaces: 449 312 150 0	49 ft. (15m)	
	S449 315 200 0 Replaces: 449 312 200 0	66 ft. (20m)	
	**S894 606 037 0**	1.27 ft. (.5m)	4-conductor pigtail power cable. Sold with industry-standard harness connector.
	S894 604 944 0	3 ft. (1m)	
	S894 606 051 0	10 ft. (3m)	
	S894 604 945 0	13 ft. (4m)	
	S894 606 038 0	14 ft. (4.7m)	
	S894 606 050 0	20 ft. (6m)	
	**S449 332 140 0** Replaces: 449 312 150 0 449 313 150 0	49 ft. (15m)	5-conductor power cable. Provides signal for tractor dash-mounted trailer ABS indicator lamp.
	S449 332 180 0 Replaces: 449 312 200 0 449 313 200 0	66 ft. (20m)	

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

TRAILER ABS WARNING LABEL



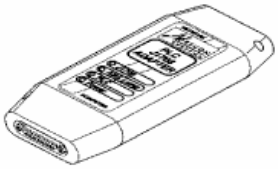
Part Number	Comments
TP-95172	This label provides information about the operation of the ABS indicator lamp. Label is self-adhesive and is mounted on the trailer near the ABS indicator lamp.

TOOTH WHEEL INFORMATION

Comments
Works with the sensor to let the ECU know how fast a wheel is turning. A tooth wheel is mounted at the hub of each ABS sensed wheel. Meritor WABCO does not manufacture tooth wheels. Before replacing a tooth wheel, contact either the OEM or the hub manufacturer to see if the wheel and hub are sold as one unit.

DIAGNOSTIC & TEST EQUIPMENT

PLC TESTER - Enhanced Easy-Stop
PLC/J1708 Adapter



The PLC/J1708 adapter can be used to check PLC diagnostics, and troubleshoot communication malfunctions between the tractor and the trailer.

The adapter simulates the tractor ABS lamp. This lets you know there is a PLC signal - the trailer ABS is capable of lighting the dash-mounted Trailer ABS lamp.

The PLC/J1708 adapter is available from Noregon Systems, 336-768-4337.

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

NUMERICAL PARTS LIST

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

MERITOR WABCO

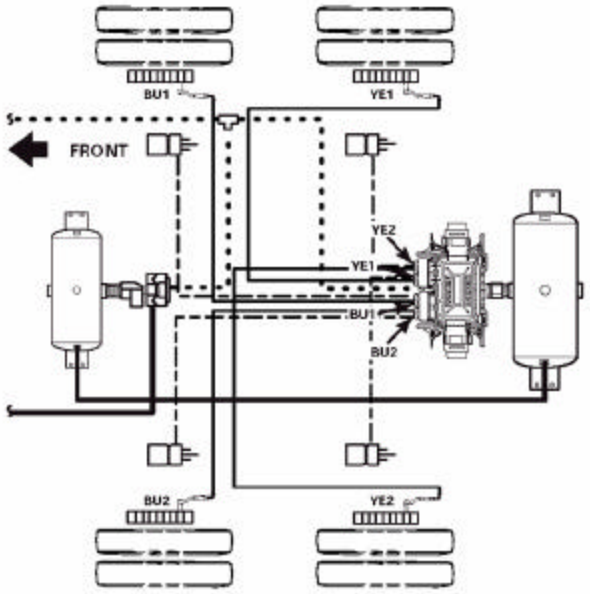
Meritor WABCO
Vehicle Control Systems
3331 West Big Beaver, Suite 300
Troy, MI 48084 U.S.A.
800-535-5560
001-800-889-1834 (llamada sin costo desde Mexico)
http://www.meritorwabco.com

Printed in U.S.A.

Revised 11/01
PB-96133/05060

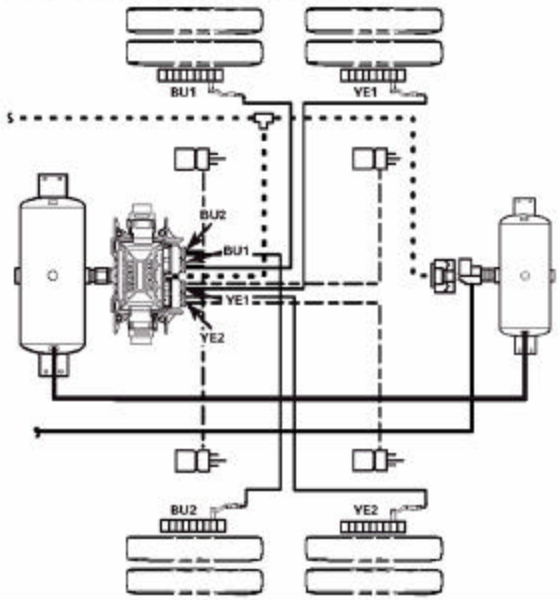
Figure 4.7

4S/2M PREMIUM — TYPICAL AXLE CONTROL INSTALLATION — MOUNTED WITH SENSORS FACING FRONT OF TRAILER



NOTE: Spring brake lines not shown.

4S/2M PREMIUM — TYPICAL AXLE CONTROL INSTALLATION — MOUNTED WITH SENSORS FACING REAR OF TRAILER



FRONT

NOTE: Spring brake lines not shown.

SERVICE/CONTROL LINES
SENSOR CABLES
SERVICE BRAKE
SUPPLY AIR

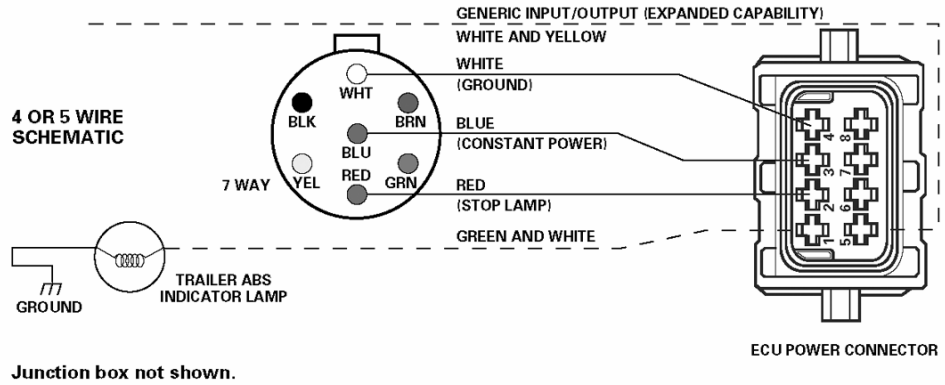
H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Section 4
System Configurations

MERITOR WABCO

Power Cable Wiring Diagrams

Figure 4.11



NOTE

PLC signal is transmitted on the blue wire of the standard 12V-harness system.

⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

The ABS is an electrical system. When you work on the ABS, take the same precautions that you must take with any electrical system to avoid serious personal injury. As with any electrical system, the danger of electrical shock or sparks exists that can ignite flammable substances. You must always disconnect the battery ground cable before working on the electrical system.

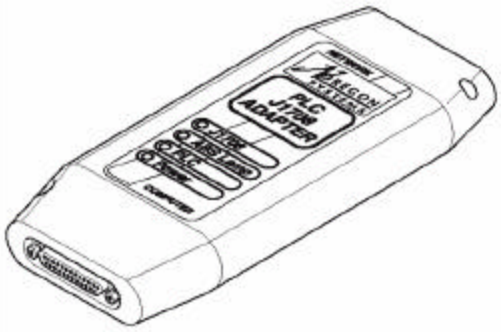
Diagnostics

There are three methods used to get fault information from the ECU:

- TOOLBOX Software
- Pro-Link 9000
- Blink code diagnostics
  - — Ignition power activation
  - — Diagnostic tool

There is also a new diagnostic tool for checking PLC, the PLC/J1708 adapter. **Figure 5.1**.

Figure 5.1



Available from Noregon Systems, 336-768-4337

Important PLC Information for Blink Code Diagnostics

Blink Code 17 indicates a PLC failure. If PLC does not seem to be operating properly, but there is no Blink Code 17, the ECU is functioning properly and does not need to be replaced; however, there could be a problem in the trailer's wiring harness. Check the wiring system and make the necessary repairs. If the problem persists, contact the customer service center for assistance.

TOOLBOX Software

Meritor WABCO TOOLBOX Software is a PC-based diagnostic program. Version 4.1 (or higher) runs in Windows® 95, 98, NT, 2000 or Me and provides diagnostic capabilities by communicating with the ECU. Trailer ABS screens are described in this manual. Refer to the owner's manual for detailed operating instructions.

TOOLBOX Software has the following functions.

- Supports Enhanced Easy-Stop with PLC.
- Displays both constant and changing information from the ECU being tested.
- Displays both active and stored system faults, as well as the appropriate repair instructions.
- Activates system components to verify:
  - — System integrity
  - — Proper component operation
  - — Installation wiring

NOTE: A J1587/J1708 to RS232 or PLC to J1708 interface is required to run this software.

TOOLBOX Software is available from SPX (Kent-Moore), 800-345-2233.

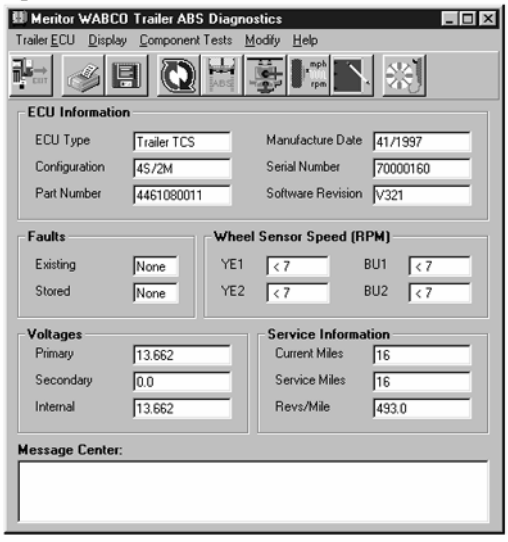
H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Section 5
Diagnostics

MERITOR WABCO

Main Screen

Figure 5.2

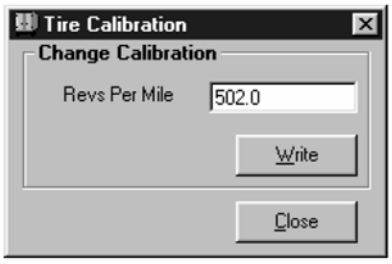


This screen provides icon and pull-down menu task selections. It also provides information about the current state of the Meritor WABCO Enhanced Easy-Stop Trailer ABS. ECU information is read once from the ECU and does not change. Wheel speed, voltages, faults and information are read and updated continuously.

In the Service Information field, the ECU, working with a constant powered tractor, can act as a mileage counter. This field can also be used to set service intervals. **Figure 5.2**.

Tire Calibration

Figure 5.3

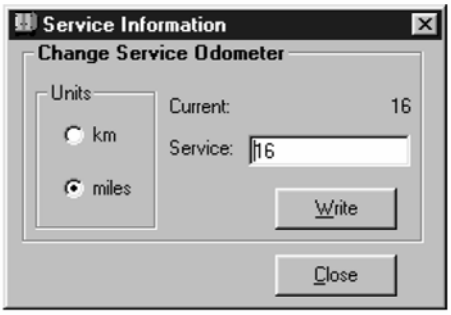


The programmed number of tire Revs Per Mile is displayed on the Tire Calibration screen. Range is 150.0 to 634.0 rpm. The default value is 502.0. To change this value, type in the Revs Per Mile, then press the Write button. **Figure 5.3**.

NOTE: Trailers with 12-1/4" brakes use an 80-tooth tone ring (tooth wheel). Use a value of 80% of the tire manufacturers recommended revolutions per mile (Revs Per Mile X 0.80).

Service Information

Figure 5.4

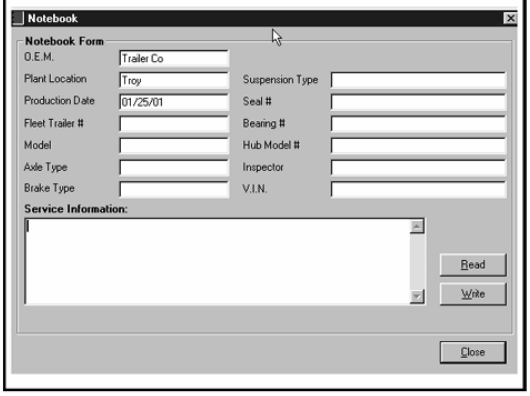


The mileage between scheduled maintenances is displayed on the Service Information screen in km or miles.

When the mileage displayed elapses, the Enhanced Easy-Stop Trailer ABS indicator lamp on the side of the trailer will flash eight times. It will continue to flash eight times whenever the ignition switch is turned on until this parameter is changed. **Figure 5.4**.

Notebook

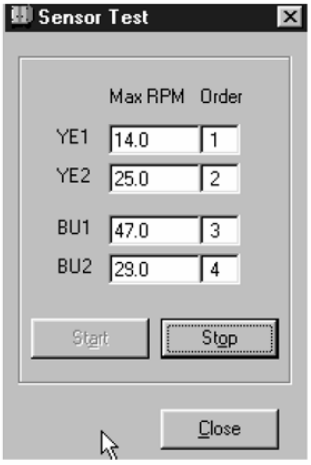
Figure 5.5



The Notebook Form field of this screen is used to store and review information about a specific vehicle. **Figure 5.5**.

Sensor Test

Figure 5.6



The Sensor Test screen is used to determine the correct installation, wiring and functionality of the wheel speed sensors.

The screen display will provide maximum sensor RPM for installed sensors (unused sensor positions will be grayed out). Check the order field to verify sensors are installed in the correct location. **Figure 5.6**.

Report Information

Figure 5.7

The Report Information screen allows the user to store and retrieve information about a specific vehicle, including the Vehicle Identification Number (VIN) and Employee numbers. **Figure 5.7**.

An example of a storable (or printable) report is displayed in **Figure 5.8**.

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Section 5
Diagnostics

MERITOR WABCO

Meritor WABCO ABS Fault Report

Figure 5.8

Meritor WABCO ABS Fault Report

Date:	September 13, 2000
Time:	5:25 PM
Page:	1
VIN:	12345678
Employee Information:	KILEY
ABS System Configuration:	4S/2M
ECU Revision:	V 3 2 2 ' ' ' '
Part Number:	446-108-000-1
Serial Number:	5 9 3 0 3 9 4 8 ' ' ' ' ' ' ' ' '
Date of Manufacture:	13/1999'
Current Miles:	0.0
Service Miles:	0.0
Tire Calibration:	495.0

Fault #	Description	Status	SID	FMI	Count
1	Ext. modulator BLUE open circuit detected	Active	9	5	1
2	Ext. modulator BLUE open circuit detected	Stored	9	5	1

Sensor Test Results:

Sensor	Max RPM	Order
YE1	40.0	1
YE2	59.0	2
BU1	50.0	3
BU2	38.0	4

Valve Tests Performed:

Valve	Status (Tested / Not Tested / NA)
Yellow	Tested
Blue	Tested
Red	N/A

Save and Print

1. Click on the heading Trailer ECU and click Save. A window will appear asking for the VIN and Employee number.
2. Provide this information and close the window.
3. Go back to the heading Trailer ECU and click Print.
4. You will be asked to input the VIN and Employee number.
5. Click Print.

Blink Code Diagnostics

The Meritor WABCO Enhanced Easy-Stop Trailer ABS ECU detects any electrical fault in the trailer ABS. Each of the faults has a code. When a fault occurs, the ECU stores the code for that fault in the memory.

There are two kinds of faults: active and stored. Active faults are those currently existing in the system, such as a broken wire. Stored faults are faults that have occurred but do not presently exist. Active faults can be cleared only after repairs are completed. Stored faults can only be diagnosed with TOOLBOX Software or the Pro-Link® 9000.

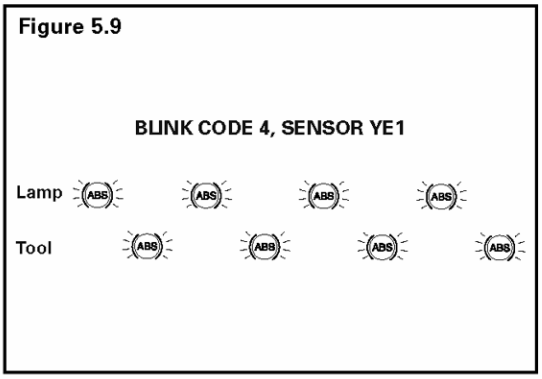
The ECU signals a malfunction by lighting both the internal and external indicator lamp when a fault exists. The external ABS indicator lamp is usually mounted on the left rear of the trailer, near the rear wheels.

There are two ways to obtain blink codes:

- Ignition Power Activation (recommended method)
- Diagnostic Tool

NOTE: In previous versions of Easy-Stop, the blink code tool and the ABS indicator lamp would flash the blink code at the same time. With Enhanced Easy-Stop, this does not happen. The codes are displayed one blink at a time, first on the trailer ABS lamp, then on the blink code tool, as illustrated in **Figure 5.9**.

Figure 5.9



Although the ECU can store multiple faults in its memory, it only displays one blink code at a time. This is why it is important to recheck the blink codes after repairing a fault. If there are additional codes in the memory, they only blink after you have repaired the first fault.

Stored faults, clear all and end of line test modes are available with the TOOLBOX Software or the Pro-Link 9000.

Ignition Power Activation

Ignition Power Activation is the process of using the vehicle's ignition switch (or interrupting the power on the blue wire by some other means) to display blink codes on the trailer ABS indicator lamp located on the side of the trailer. This method is for constant power vehicles only.

To obtain blink codes using ignition power activation, perform the following procedure:

1. Turn the ignition switch on for no longer than 5 seconds. The ABS indicator lamp will be on.
2. Turn the ignition switch off. The ABS indicator lamp will go out.
3. Turn the ignition switch on. The ABS indicator lamp will then come on, then go out.
4. The blink code will be displayed three times by the ABS indicator lamp on the trailer.

NOTE: For ignition power activation, power is provided by the ignition switch.

Section 5
Diagnostics

MERITOR WABCO

Table C: Blink Codes

BLINK CODES		
Blink Code	**Problem Area**	**Action**
3	Sensor BU1	Determine sensor location. Check sensor installation. Make necessary repairs.
4	Sensor YE1	Determine sensor location. Check sensor installation. Make necessary repairs.
5	Sensor BU2	Determine sensor location. Check sensor installation. Make necessary repairs.
6	Sensor YE2	Determine sensor location. Check sensor installation. Make necessary repairs.
7	External ABS modulator valve	Verify proper electrical installation. Check power supply. Make necessary corrections.
9	Internal modulator failure, inlet valve #2	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
10	Internal modulator failure, inlet valve #1	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
11	Internal modulator failure, outlet valve	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
14	Power Supply	Verify proper electrical installation. Check power supply. Make necessary corrections.
15	ECU Failure	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
16	SAE J1708 Failure	Internal failure, contact Meritor WABCO.
17	SAE J2497 (PLC) Failure	Internal failure, contact Meritor WABCO.
18	Generic I/O Failure	Verify proper electrical installation. Check power supply. Make necessary corrections.

Diagnostic Tool (Blink Code Check)

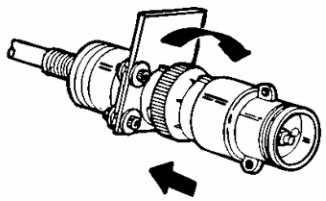
The red dust cap on the diagnostic tool protects the tool during shipping. The tool and the LED are independently sealed against contamination.

The SAE J1587 connector must be protected from contamination when the diagnostic tool is not installed. Reinstall the gray cap when the connector is not in use.

Use the following procedures to install the diagnostic tool in the SAE J1587 connector.

1. Remove the gray protective cap from the J1587 connector.
   - — Turn the cap counterclockwise.
   - — Pull off the cap.
2. Align the notches on the tool with the notches on the connector.
3. Insert the tool firmly in the connector.
4. Firmly turn the gray ring of the tool clockwise to secure it in place. **Figure 5.10**.
5. After removing the diagnostic tool, replace the gray protective cap.

Figure 5.10



6. Make sure the vehicle is stationary:
   - Emergency brake ON
   - Wheels properly chocked
7. Provide 12 volts DC power (9.5 to 14 volts is acceptable range) to the ECU/Valve Assembly.

8. Check the ABS indicator lamp on the trailer. If:
   - The indicator lamp comes ON briefly, then goes OFF: There is no fault in system.
   - The indicator lamp comes ON and stays ON: There is an existing fault. Go to Step 9.
9. Press the blink code switch **once** for **one second** and release the switch.
10. **When there is an existing fault:** The ABS indicator lamp will flash between **three** and **eighteen** times to identify the existing fault.
11. **When there are existing faults:** You must repair existing faults.
12. After you identify an existing fault, turn the power to the ECU **OFF**. Repair the fault. Turn the power to the ECU back **ON**.
13. Repeat Step 9. If there are no other existing faults in the system, the ABS indicator lamp will come **ON**, go **OFF** and remain **OFF**.
14. If you have just repaired a sensor gap fault, the ECU is "waiting" to see a 4-mph signal on sensed wheels. Until this 4 mph is sensed by the ECU, the ABS indicator lamp on the trailer will remain **ON**.

MPSI Pro-Link 9000 Diagnostic Tool

The MPSI Pro-Link 9000 diagnostic tool can test for existing and stored faults, read and clear fault codes, and test components, for Meritor WABCO tractor and trailer ABS.

SPX (Kent-Moore) offers Kit J 38500-404 that contains the Meritor WABCO ABS Multiple Protocol Cartridge (MPC), a Meritor WABCO applications card, and the manual *Meritor WABCO ABS/ATC Systems*, which contains complete information and operating instructions for the MPSI Pro-Link 9000 diagnostic tool. Order the kit from SPX (Kent-Moore), 28635 Mound Road, Warren, MI 48092-3499; phone 800-345-2233.

NOTE: A J 38500-60A Deutsch cable is also required. It is available from SPX (Kent-Moore).

⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

The ABS is an electrical system. When you work on the ABS, take the same precautions that you must take with any electrical system to avoid serious personal injury. As with any electrical system, the danger of electrical shock or sparks exists that can ignite flammable substances. You must always disconnect the battery ground cable before working on the electrical system.

NOTE: Disconnect power from the ECU/Valve Assembly before you remove any components. Failure to disconnect power from the ECU can cause faults to be recorded and stored in ECU memory.

⚠ CAUTION

Use the following procedures to avoid damage to the electrical system and ABS components.

When welding on an ABS-equipped vehicle is necessary, disconnect the power connector from the ECU.

Wheel Speed Sensor

How to Remove a Sensor

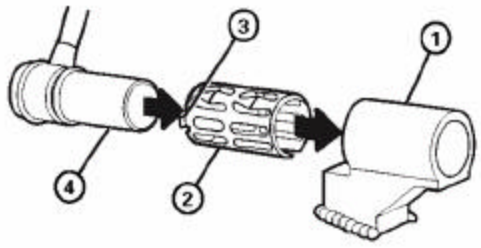
1. Follow the vehicle manufacturer's instructions to back off the slack adjuster and remove the tire, wheel and drum.
2. Hold the sensor, not the cable, and use a twisting motion to pull the sensor out of its mounting block.
3. Remove the spring clip from the mounting block.
4. Remove any fasteners that hold the sensor cable to other components.
5. Disconnect the sensor cable from the extension cable.

How to Install a Sensor

Sensor locations vary according to suspension types. Typically, a spring suspension has sensors on the forward axle, and an air suspension has sensors on the rear axle.

1. Apply a mineral oil-based grease 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 300°F (–40° to 150°C).
2. Push the spring clip into the sensor holder from the inboard side, until the spring clip tabs are against the sensor holder. Push the sensor into the spring clip as far as possible. **Figure 6.1**.

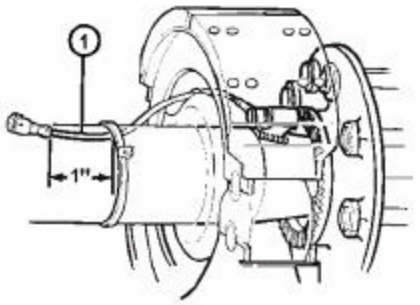
Figure 6.1



1. Sensor Holder
2. Spring Clip
3. Spring Clip Tab
4. Sensor

3. Route the sensor cable toward the brake chamber, over the brake spider, and behind the axle. Secure the cable to the axle between the brake spider and the suspension brackets. Continue to route the sensor cable behind the spring seats. Secure the cable to the axle one inch from the molded sensor plug. **Figure 6.2**.

Figure 6.2

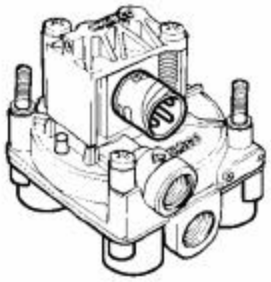


1. Sensor Cable

4. Install the wheel hub carefully, so that the tooth wheel pushes against the sensor as you adjust the wheel bearings. After installation there should be no gap between the sensor and the tooth wheel. During normal operation a gap of 0.040-inch is allowable.
5. **Sensor Output Voltage Test:** 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 toward the tooth wheel. Recheck the sensor output.

ABS Relay Valve (Figure 6.3)

Figure 6.3



⚠ WARNING

Release all pressure from the air system before you disconnect any components. Pressurized air can cause serious personal injury.

How to Remove a Standard ABS Relay Valve

1. Release all pressure from the air system.
2. Disconnect the cable from the valve.
3. Attach labels to identify all of the air lines.
4. Disconnect the air lines from the valve.
5. Remove the mounting fasteners if the valve is not nipple-mounted directly to the air tank.
6. Remove the valve.

How to Install a Standard ABS Relay Valve

⚠ CAUTION

You must use Schedule 80 pipe nipple (3/4-inch NPTF) to nipple-mount the ABS relay valve securely to the reinforced air tank to avoid possible serious personal injury and damage to components.

1. Install the valve with two lock nuts and washers as required. Tighten the hex nuts to a torque of 18 lb-ft (24 N•m) or nipple-mount the valve directly to the air tank with Schedule 80 pipe nipple (3/4-inch NPTF). T
2. Connect the air lines to the ports according to the labels installed when the air lines were disconnected.
3. Connect the cable to the valve.
4. Pressurize the brake system. Apply the brakes and verify there are no air leaks.

The ECU/Valve Assembly

WARNING

Release all pressure from the air system before you disconnect any components. Pressurized air can cause serious personal injury.

How to Remove the ECU/Valve Assembly

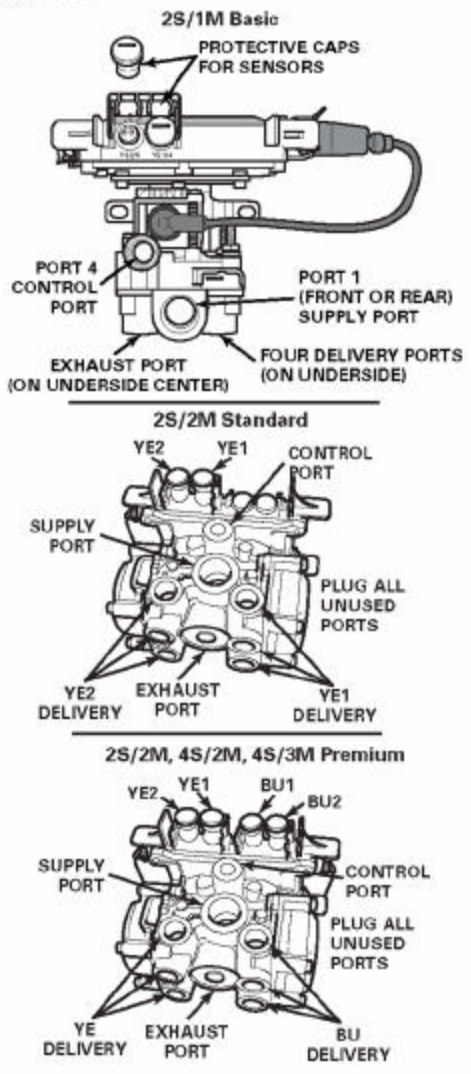
1. Release all pressure from the air system.
2. Attach labels to identify all air lines.
3. Disconnect the air lines from the ECU/Valve Assembly.
4. Disconnect the power (or power/diagnostic) cable, additional relay valve cable (if used), and all sensor cables from the ECU/Valve Assembly. **Figure 6.4**.
5. Remove the ECU/Valve Assembly from its mounting location:
   A. **Bracket-mounted:** Loosen and remove the two mounting bolts and lock nuts that hold the assembly to the cross member. Remove the assembly.
   B. **Nipple-mounted to Air Tank:** Unscrew the assembly from the air tank.
6. If the assembly being replaced is under warranty, please return it to the trailer OEM for replacement.

How to Install the ECU/Valve Assembly

NOTE: The ECU/Valve Assembly is supplied with black protective caps on each sensor connector.

NOTE: When a sensor cable is not plugged into a sensor connector, the black cap must remain on the connector to protect it from dirt and contamination. **Figure 6.4**.

Figure 6.4



H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Section 6
Component Replacement

MERITOR WABCO

CAUTION

You must use a Schedule 80 pipe nipple (3/4-inch NPTF) to nipple mount the ECU/Valve Assembly securely to the air tank to avoid possible serious personal injury and damage to components.

Tank-Mounted

WARNING

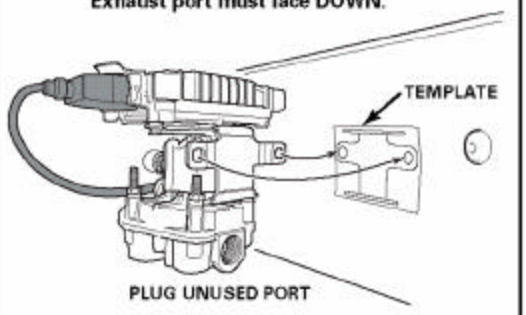
You must use a Schedule 80 hex nipple (3/4-inch NPTF) to mount the ECU/single modulator valve assembly securely to the air tank to avoid possible serious personal injury and damage to the component.

1. Use a 3/4-inch Schedule 80 hex nipple to attach ECU/single modulator valve assembly to a reinforced air tank. Do not overtighten.

NOTE: Meritor WABCO does not recommend use of a vise when installing the hex nipple. Use of a vise may cause overclamping. Overclamping may damage the internal components of the ECU/single modulator valve assembly.

2. Use a 3/4-inch pipe plug to plug unused supply port (Port 1). Apply SAE-standard, DOT-approved Teflon tape or paste-type thread sealant to all pipe threads beyond the first two threads. Pipes with pre-applied thread sealant may also be used.
3. Rotate and tighten the ECU/single modulator valve assembly until the exhaust port faces down and the connection is secure. Use a torque wrench or ratchet with extension at the 3/4-inch pipe plug installed on the front supply port (Port 1). **Figure 6.5**.

Figure 6.5



Bracket-Mounted to Cross Member of Vehicle (2S/1M Basic)

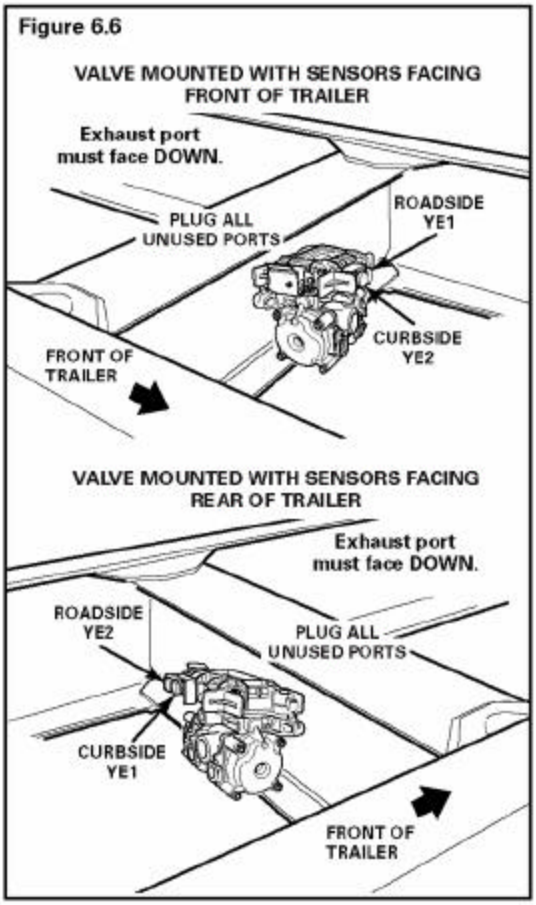
1. Install a 3/4-inch NPTF fitting in supply port (Port 1). Use a 3/4-inch pipe plug to plug unused supply port (Port 1).
   - Use a 3/4-inch pipe plug to plug unused supply port (Port 1). Apply SAE-standard, DOT-approved Teflon tape or paste-type thread sealant to all pipe threads beyond the first two threads. Pipes with pre-applied thread sealant may also be used.
2. Attach mounting bracket to vehicle cross member midway between the side rails, close to the brake chambers the valve serves.
3. Use two 3/8-inch Grade 8 bolts with prevailing torque nuts and washers to attach assembly to the vehicle cross member. Tighten bolts to 18 lb-ft (24 N•m).

Mounted to Cross Member of Vehicle — Standard and Premium Mounting Bracket Not Supplied

NOTE: When mounting the ECU/dual modulator valve assembly to the trailer cross member, refer to SAE specification J447, *Prevention of Corrosion of Motor Vehicle Body and Chassis Components.* Follow all recommendations and procedures. Your supervisor should have a copy of this specification. **Figure 6.6.**

1. Install a 3/4-inch NPTF fitting in supply port. Use a 3/4-inch pipe plug to plug unused supply port (Port 1).
   - Apply SAE-standard, DOT-approved Teflon tape or paste-type thread sealant to all pipe plugs beyond the first two threads. Pipes with pre-applied thread sealant may also be used.
2. Use two 3/8-inch Grade 8 bolts with prevailing torque nuts to attach assembly. Tighten bolts to 18 lb-ft (24 N•m). 1
3. Connect the air lines to the ports. Follow the label markers installed when the air lines were disconnected.
4. Connect the sensor cables, external relay valve cable (if used), and power or power/diagnostic cable to the ECU/Valve Assembly. Use the black protective connector caps included with the replacement assembly to cover unused cable connectors.
5. Perform End of Line Check before returning the trailer to service.

Figure 6.6



H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Section 6
Component Replacement

MERITOR WABCO

Replacing the ECU or Modulator Valve

With Enhanced Easy-Stop, the ECU and modulator valve may be replaced individually. To do this, follow the instructions for removing the complete assembly, then remove the valve from the ECU.

NOTES:

For 2S/1M installations where the valve is readily accessible, it may not be necessary to remove the entire assembly to replace the valve.

For 2S/1M bracket-mounted installations, the bracket does not need to be removed to replace the ECU or valve.

2S/1M Basic Only

To separate the ECU from the bracket, loosen and remove the three hex nuts from the underside of the bracket. These three hex nuts hold the assembly together.

To separate the bracket from the valve, remove the three hex nuts. **Figure 6.7**.

To attach the ECU to the bracket, tighten the three hex nuts to 6 lb-ft (8 N•m).

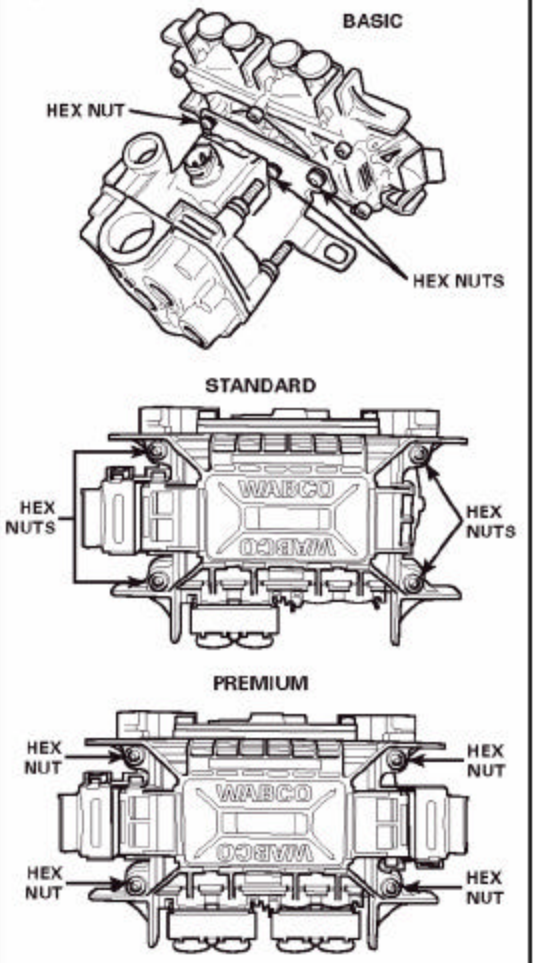
To attach the valve to the bracket, tighten the three hex nuts to 12 lb-ft (16 N•m).

All Standard and Premium Installations

Loosen and remove the four hex nuts holding the assembly together. **Figure 6.7**.

To attach the valve to the ECU, tighten the four hex nuts to 5 lb-ft (6 N•m).

Figure 6.7



How to Test Wheel Speed Sensors

NOTE: At initial installation, no gap must exist between the sensor and the tooth wheel.

NOTE: After you install a hub, always check that the sensor is adjusted properly.

Operating the trailer can cause a gap to develop between the sensor and the tooth wheel. If the gap exceeds 0.040-inch, the system may not function correctly.

To adjust the sensor, twist and push the sensor through the sensor bracket as far as possible or until the sensor touches the tooth wheel.

Sensor Test Procedure

1. Disconnect power to the ECU/Valve Assembly.
2. Disconnect the sensor electrical connector from the ECU/Valve Assembly.
3. Connect the volt/ohm meter leads to the two wire component terminals inside the disconnected connector.
4. When checking the resistance, the meter must read 900-2000 ohms.
5. Check and replace the sensor and cables as required.
6. Repeat Steps 1-5 for each sensor in the system.

Sensor Output Voltage Test

1. Disconnect power from the ECU/Valve Assembly.
2. Connect the AC volt/ohm meter leads to the sensor terminals inside the connector.
3. Rotate the corresponding wheel at a constant speed of one-half revolution per second.
4. The output voltage must be greater than 0.2 volts AC.
5. When there is no reading:
   A. Trace the cable to verify that the cable connects to the wheel you turned.
   B. Check that you turned the correct wheel.
   C. Check that the system is wired correctly.
   D. Check that the sensor touches the tooth wheel.
6. If the volt/ohm meter still indicates no reading or a low reading after following the above procedures, check and replace the component and cables as required.
7. Repeat Steps 1-5 for each sensor in the system.

Check ABS Functions

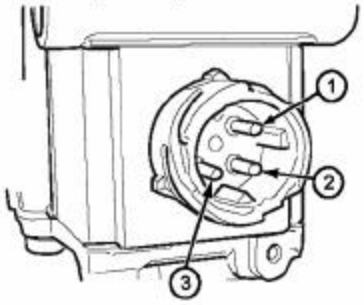
- Meritor WABCO recommends that you test a vehicle's ABS after a new installation and after you diagnose, repair and erase faults in the ABS.
- Perform end of line check using TOOLBOX Software or the Pro-Link 9000.

ABS External Modulator Valve

Measure resistance across each valve solenoid coil terminal and ground on the ABS valve to ensure 4.0 to 8.0 ohms. Valve and cable pinouts are illustrated in **Figure 7.1**.

Figure 7.1

Bayonet-Style Connector



1. Exhaust Solenoid (blue wire)
2. Inlet Solenoid (brown wire)
3. Ground Terminal

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Section 7
Sensor Adjustment & Component Testing

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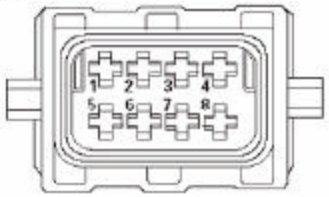
- To check the cable and the ABS valve as one unit, measure resistance across pins 5 and 6 and 5 and 7 on the ECU connector of the harness. Resistance should be between 4.0 and 8.0 ohms for each measurement. **Figure 7.2.**

Figure 7.2



5. **Ground Terminal**
6. **Exhaust Solenoid**
7. **Inlet Solenoid**

- If the resistance is greater than 8.0 ohms, clean the electrical contacts. Check the resistance again.

End of Line Testing

End of line testing is required on all Enhanced Easy-Stop installations. To run these tests, Meritor WABCO recommends you use TOOLBOX Software.

TOOLBOX Software and general test procedures are included in this manual. If you are using a Pro-Link, refer to the operating manual for test instructions.

End of Line Testing Procedure Using TOOLBOX Software (All Installations)

NOTE: If you are testing an installation that has a power only cable, temporarily install a Meritor WABCO combination power/diagnostics "Y" style cable or use the PLC/J1708 Adapter.

1. Connect the diagnostic connector on the cable to the PC serial port/SAE diagnostic interface (J1587/J1708 to RS232 interface).

   NOTE: Refer to the Software Owner's Manual, TP-99102, for instructions for running TOOLBOX Software.

2. Display the **Trailer ABS Main Screen.**
3. Verify power supply:
   - Apply 12 volts DC to the blue wire (constant). Check the screen for proper voltage (9.5 to 14 volts). Constant power voltage is displayed in the **Primary** field. **Figure 7.3.**
   - Apply 12 volts DC to the red wire (stoplight power). Check the screen for proper voltage (9.5 to 14 volts). Stoplight power voltage is displayed in the **Secondary** field. **Figure 7.3.**

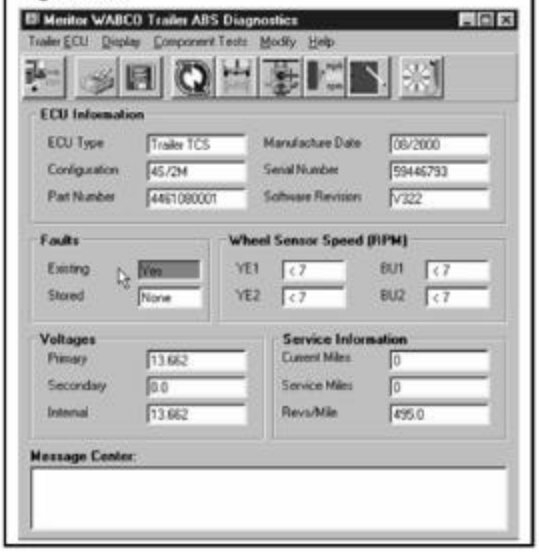
   NOTE: The internal field is not applicable to this test.

4. Check the Faults field on the Main Screen:

   NONE – No faults present, proceed with end of line test.

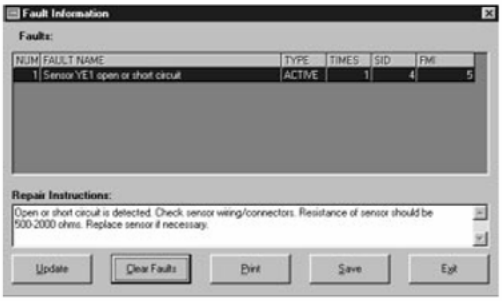
   YES – Faults present, double-click on "YES" to bring up the fault information screen.

Figure 7.3



Use the information in the ***Repair Instructions*** field to make the necessary repairs. **Figure 7.4**.

Figure 7.4



Verify Proper Valve and Lamp Installation (2S/1M Basic)

To verify valve and lamp installations with TOOLBOX Software:

1. At the Trailer ***Main Screen*** click on ***Component Test***, then select ***Valves/Lamp*** to display the ***Valve Activation*** Screen. **Figure 7.5**.
2. The Red valve indicator will be selected. Click on the ***Activate*** button and listen for the valve to click, indicating a good installation. The ***Test Status*** box at the bottom of the menu will also display the status of this test.
3. Click on the ***Test*** button to activate the ABS indicator lamp — this is the lamp that is mounted on the side of the trailer. The lamp will flash eight times, indicating lamp installation is OK. The ***Test Status*** box at the bottom of the menu will also display the status of this test.
4. Click on ***Close*** to exit.

Figure 7.5

2S/2M, 4S/2M, 4S/3M (Standard and Premium)

To verify valve and lamp installations with TOOLBOX Software:

1. Apply 12 volts DC to the ABS.
2. Apply air to the emergency line to fill the air tanks and release the spring brakes.
3. Apply air to the control line.
4. At the Trailer ***Main Screen*** click on ***Component Test***, then select ***Valves/Lamp*** to display the ***Valve Activation*** Screen. The ***Yellow*** valve indicator will be highlighted. **Figure 7.6**.

NOTE: Selecting "All Valves" will sequence all of the valves beginning with the ***Yellow*** valve.

5. Click on the Activate button.

Section 7
Sensor Adjustment & Component Testing

MERITOR WABCO

6. Check for proper air line installation. To do this, observe the slack adjusters:
   - If the ECU faces ***the front of the trailer,*** the slack adjusters will move in and out as the ***curbside*** portion of the dual modulator valve cycles. If this does not happen, the air lines are not properly connected. Make the necessary repairs.
   - If the ECU faces ***the rear of the trailer,*** the slack adjusters will move in and out as the ***roadside*** portion of the dual modulator valve cycles. If this does not happen, the air lines are not properly connected. Make the necessary repairs.

   NOTE: The Test Status box at the bottom of the menu will display the status of this test.

7. Repeat this test for the ***Blue*** valve.
   A. Repeat Steps 1-3.
   B. Select the ***Blue*** valve from the valve activation screen.
   C. Click on the activate button to verify proper valve installation (***Blue***).
   D. Check for proper air line installation. To do this, observe the slack adjusters.
      - If the ECU faces ***the front of the trailer,*** the slack adjusters will move in and out as the ***roadside*** portion of the dual modulator valve cycles. If this does not happen, the air lines are not properly connected. Make the necessary repairs.
      - If the ECU faces ***the rear of the trailer,*** the slack adjusters will move in and out as the ***curbside*** portion of the dual modulator valve cycles. If this does not happen, the air lines are not properly connected. Make the necessary repairs.

8. **For 4S/3M installations:** Repeat this test for the red valve.

   Red: The external relay valve designated RED (RD) is an axle control valve. It controls brake chambers on one or two axles. It is important that delivery lines from port #2 are plumbed as shown on the installation drawings. The 4S/3M system is designed to be used with a variety of trailer configurations. Call ArvinMeritor's Customer Service Center at 800-535-5560 for additional information.

9. Click on the ***Test*** button to activate the ABS indicator lamp — this is the lamp that is mounted on the side of the trailer. The lamp will flash eight times, indicating lamp installation is OK. The ***Test Status*** box at the bottom of the menu will display the status of this test. **Figure 7.6**.
10. Click on ***Close*** to exit.

Figure 7.6

Sensor Installation Test (All Installations)

To test the sensor installation:

1. Raise both sensed wheel ends off of the ground.
2. Apply air to the emergency line to fill the air tanks and release the spring brakes so that the wheels can be rotated.
3. Apply 12 volts DC to the ABS.
4. At the ***Trailer Main Menu,*** click on ***Component Test,*** then select ***Sensor Test*** to display the **Sensor Test** screen.
5. Click on the ***Start*** button to start the test.
6. Rotate the sensed wheel ends at a rate of 1/2 revolution per second. This rate equals a wheel speed of approximately 4 mph (7 kph).

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

7. Check the screen for sensor output. **Figure 7.7**.
   - Make sure there is sensor output. If sensor output is displayed, sensor test is complete.
   - If there is no sensor output, verify that a tone ring has been installed and that the sensor is pushed all the way in against the tone ring. Make the necessary repairs and repeat the sensor test. If the problem persists, contact Meritor WABCO.
8. Check ***Order*** fields to verify sensors were installed in the right location based on orientation of the valves. **Figure 7.7**.

   NOTE: Refer to page 45 of this manual for sensor locations.

Figure 7.7

End of Line Testing without TOOLBOX Software

2S/1M Basic

1. Apply 12 volts DC power to the ABS.
2. The ECU/single modulator valve assembly should click two times.
3. If the indicator lamp **comes on** for three seconds and **goes out**:

   This indicates a proper installation. The end of line test is complete.

   If the ABS indicator lamp **comes on** and **stays on**, check the sensor installation:

   A. Remove the power from the ABS and raise the sensed wheels so they may be rotated.

   B. Repeat Step 1 and Step 2.

   C. Rotate each sensed wheel — one at a time — at a rate **less than 25 rpm**.

   The ABS indicator lamp should now go out and stay out indicating a proper installation. The end of line test is complete.
4. If the ABS lamp does not go out, there is a sensor gap problem or hardware fault. Adjust the sensor and, if necessary, perform a fault code check.

Inspect the Sensor and Air Line Installation (2S/2M, 4S/2M and 4S/3M Premium)

Sensor Installation

1. Look at the sensor connectors on the ECU/dual modulator valve assembly. Make sure the connectors are routed to the proper wheel end location, as follows:

ECU/Dual Modulator Valve Assembly Mounted with Sensors Facing Front of Trailer

- 2S/2M
  - — Connect curbside sensor at YE1.
  - — Connect roadside sensor at BU1.
- * • 4S/2M
  - — Connect curbside front sensor at YE1.
  - — Connect curbside rear sensor at YE2.
  - — Connect roadside front sensor at BU1.
  - — Connect roadside rear sensor at BU2.
- * • 4S/3M — Sensor locations vary by type of installation. Refer to diagrams for specific sensor locations.
  - — Connect curbside sensor at YE1.
  - — Connect curbside sensor at YE2.
  - — Connect roadside sensor at BU1.
  - — Connect roadside sensor at BU2.

ECU/Dual Modulator Valve Assembly Mounted with Sensors Facing Rear of Trailer

- 2S/2M
  - — Connect curbside sensor at BU1.
  - — Connect roadside sensor at YE1.
- * • 4S/2M
  - — Connect curbside front sensor at BU1.
  - — Connect curbside rear sensor at BU2.
  - — Connect roadside front sensor at YE1.
  - — Connect roadside rear sensor at YE2.
- * • 4S/3M — Sensor locations vary by type of installation. Refer to diagrams for specific sensor locations.
  - — Connect curbside sensor at BU1.
  - — Connect curbside sensor at BU2.
  - — Connect roadside sensor at YE1.
  - — Connect roadside sensor at YE2.

* **If the lift axle is sensed in 4S/2M and 4S/3M installations:** Sensors YE2 and BU2 must always be used on the lift axle to avoid an unwanted ABS indicator lamp illumination.

2. If sensors are not properly installed, make the necessary repairs.

Air Line Installation

1. Make sure all unused air ports are plugged and that the exhaust port is facing DOWN.
2. Look at the air line installation to make sure all air lines are properly installed.
   - If the ECU/dual modulator valve assembly is mounted with the sensors facing the **front** of the trailer, the air lines for the three delivery ports located under the YE sensor connectors must be routed to **curbside**; the air lines for the three delivery ports on the opposite side of the valve must be routed to roadside. Refer to **Figure 7.10**.
   - If the ECU/dual modulator valve assembly is mounted with the sensors facing the **rear** of the trailer, the air lines for the three delivery ports located under the YE sensor connectors must be routed to **roadside**; the air lines for the three delivery ports on the opposite side of the valve must be routed to curbside. Refer to **Figure 7.11**.

Figure 7.10
ECU/DUAL MODULATOR VALVE MOUNTED WITH SENSORS FACING FRONT OF TRAILER

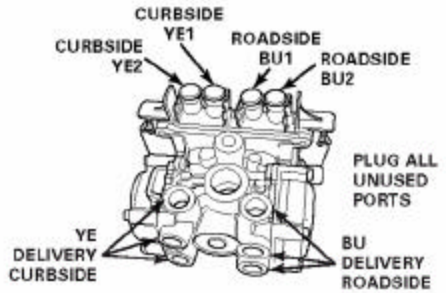
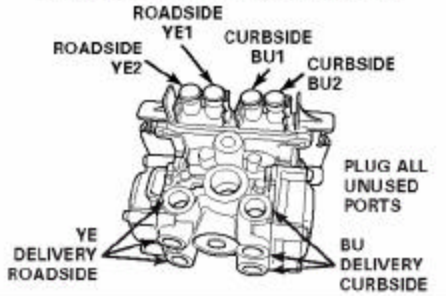


Figure 7.11
ECU/DUAL MODULATOR VALVE MOUTED WITH SENSORS FACING REAR OF TRAILER



CAUTION

Per Fontaine Trailer Company for the 4S/2M WABCO ABS:

- **The following supercedes the WABCO sensor routing information presented on previous page H-127 of the Commercial Manual, as far as how the sensor cables are routed on the M871A3 Semitrailer from the ECU.**

- **The ECU (Electronic Control Unit) is located on the rear side of the front air tank.**

- **The ECU sensor connectors (4) point to the rear.**

- **The sensor cables from the ECU are routed as follows:**

  1. **YE1 from ECU to curbside rear sensor. (R/R)**
  2. **YE2 from ECU to roadside rear sensor. (L/R)**
  3. **BU1 from ECU to curbside front sensor. (R/F)**
  4. **BU2 from ECU to roadside front sensor. (L/F)**

- **Sensor cables must be routed per above in order to insure proper operation.**

Section 7
Sensor Adjustment & Component Testing

MERITOR WABCO

3. If air lines are not properly routed, make the necessary repairs.

Perform End of Line Test (Standard and Premium Installations)

1. Apply 12 volts DC power to the ABS.
2. The ECU/dual modulator valve assembly should click four times.
3. If the indicator lamp **comes on** for three seconds then **goes out**, this indicates a proper installation. The end of line test is complete.

   If the ABS indicator lamp **comes on** and **stays on**, check the sensor installation:

   A. Remove the power from the ABS and raise the sensed wheels so they may be rotated.

   B. Apply emergency air to fill the air tanks and release the spring brakes so that the wheels may be rotated.

   C. Repeat Step 1 and Step 2.

   D. Rotate each sensed wheel — one at a time — at a rate of **less than 25 rpm**.

   The ABS indicator lamp should now go out and stay out indicating a proper installation. The end of line test is complete.
4. If the ABS lamp does not go out, there is a sensor gap problem or hardware fault. Adjust the sensor and, if necessary, perform a fault code check.

Sensor Gap Adjustment (All Installations)

Push sensor into its holder until it contacts the tooth wheel. At installation, there must be no gap between the sensor and the tooth wheel.

Measure the AC voltage output. Value should be 0.2 volt AC when wheel is rotated at a rate of 1/2 revolution per second.

Fault Code Check (All Installations)

Use constant power activation to perform the fault code check, as follows:

1. Apply constant power to the ECU/dual modulator valve assembly **for more than one, but less than five seconds**.
2. Remove power.
3. Reapply power.
4. Check the trailer ABS indicator lamp on the side of the trailer. The fault code will be displayed three times.
5. Find the fault on the table and make the necessary repairs.
6. After making the necessary corrections, repeat the end of line test.

MERITOR WABCO

Section 7
Sensor Adjustment & Component Testing

BLINK CODES		
Blink Code	**Problem Area**	**Action**
3	Sensor BU1	Determine sensor location. Check sensor installation. Make necessary repairs.
4	Sensor YE1	Determine sensor location. Check sensor installation. Make necessary repairs.
5	Sensor BU2	Determine sensor location. Check sensor installation. Make necessary repairs.
6	Sensor YE2	Determine sensor location. Check sensor installation. Make necessary repairs.
7	External ABS modulator valve	Verify proper electrical installation. Check power supply. Make necessary corrections.
9	Internal modulator failure, inlet valve #2	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
10	Internal modulator failure, inlet valve #1	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
11	Internal modulator failure, outlet valve	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
14	Power Supply	Verify proper electrical installation. Check power supply. Make necessary corrections.
15	ECU Failure	Verify proper installation. If code continues, contact Meritor WABCO for assistance.
16	SAE J1708 Failure	Internal failure, contact Meritor WABCO.
17	SAE J2497 (PLC) Failure	Internal failure, contact Meritor WABCO.
18	Generic I/O Failure	Verify proper electrical installation. Check power supply. Make necessary corrections.

Trailer Identification

An Easy-Stop Trailer ABS warning label is generally affixed to the trailer near the ABS trailer indicator lamp.

If this label is not on the trailer, let your supervisor know. Labels are available from Meritor WABCO. Ask for Part Number TP-95172.

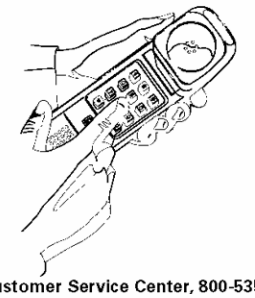
For additional assistance, contact ArvinMeritor's Customer Service Center at 800-535-5560.

Before calling the ArvinMeritor Customer Service Center, be prepared to provide the following information about the trailer you are working on:

1. Trailer make and model year.
2. What is the symptom/complaint? What is the component doing or not doing?
3. What is the ABS blink code or MPSI Pro-Link 9000 reading?
4. Have any resistance and/or voltage measurements been taken?
5. What is the result of visual inspection of connectors, harness and components?
6. When does the symptom occur (vehicle moving, compressor unloading, etc.)?
7. Does the trailer have any unusual characteristics (for example, mismatched tires or larger than normal air consumption)?
8. Were maintenance manuals available? If so, which ones were used?
9. What is the part number of the ECU/Valve Assembly? What is the system configuration?

By having the above information ready when you call, your customer service technician will be better equipped to assist you. Figure 7.12.

Figure 7.12



ArvinMeritor Customer Service Center, 800-535-5560

MERITOR WABCO

Appendix I

Trailer ABS Indicator Lamp on Vehicle Dash

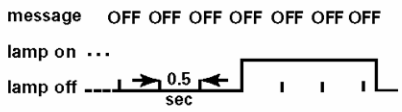
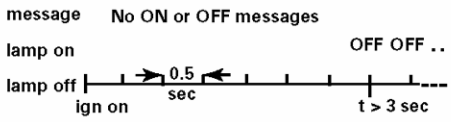
The trailer ABS indicator lamp on vehicle dash applies to Trailer ABS only. The lamp is controlled by a signal to the tractor ECU, which is sent over the power line (PLC function). When a trailer ABS fault is detected, an ON message is sent. When no fault is detected, the ECU receives an OFF message.

Table D illustrates trailer ABS lamp operation at power-up or ignition on. **Table E** depicts lamp responses that occur during operation.

Lamp turn ON and OFF messages do not turn the lamp ON or OFF instantly. The delay between the receipt of the message and the lamp response time is intentional, because it prevents erratic lamp activity.

NOTE: For doubles or triples, the lamp does not distinguish between trailers. A system fault in any of the trailers will activate the trailer ABS indicator lamp.

Table D: Dash-Mounted Trailer ABS Indicator Lamp Operation — Bulb Check (Information for Drivers)

Signal from trailer to tractor ECU	Status of Trailer ABS Lamp on vehicle dash	Explanation
Single or Multiple Trailers 	Trailer ABS lamp comes on at ignition, OFF message is detected within three seconds of ignition, Trailer ABS lamp goes out.	Bulb Check performed AND Trailer ABS system is OK. In this case, the lamp is ON for a Bulb Check only.
Single or Multiple Trailers 	Trailer ABS lamp does not come on within three seconds of ignition.	No Bulb Check, trailer added after initial power-up, system OK. There was no trailer PLC message for at least three seconds following ignition ON.

ON = Turn ON message to "trailer ABS" lamp

OFF = Turn OFF message to "trailer ABS" lamp

Removing a trailer with a fault will cause ABS lamp to turn off. Remember to have trailer with fault repaired as soon as possible before returning to service.

H-33. ENHANCED EASY-STOP TRAILER ABS WITH PLC (Cont.)

Appendix I

MERITOR WABCO

Table E: Dash-Mounted Trailer ABS Indicator Lamp Operation (Information for Service Technicians)

Signal from trailer to tractor ECU	Status of Trailer ABS Lamp on vehicle dash	Explanation	Action
Single or Multiple Trailers message: No ON or OFF messages lamp on lamp off: 0.5 sec	Trailer ABS lamp does not come on within three seconds of ignition.	Not using the PLC system (no trailer connected) or trailer not equipped with PLC or fault in PLC system.	Use lamp on side of trailer to identify fault. Make necessary repairs.
Single Trailer message: OFF OFF OFF ON ON ON ON ON lamp on lamp off: 0.5 sec	Trailer ABS lamp comes on.	Trailer ABS fault(s) occurred during operation and still exists.	
Multiple Trailers/Dollies message: OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF ON ON ON ON lamp on lamp off: 0.5 sec			
Single Trailer message: ON ON OFF OFF OFF OFF OFF OFF lamp on lamp off: 0.5 sec, t + 2.5	Trailer ABS lamp comes on but goes out after 2.5 seconds after fault is detected.	Trailer ABS fault occurred during operation and the fault was corrected.	None
Multiple Trailers/Dollies message: OFF OFF OFF OFF OFF OFF OFF ON ON OFF OFF OFF OFF OFF lamp on lamp off: 0.5 sec, t + 2.5			
Single Trailer message: ON ON ON No ON or OFF messages lamp on lamp off: 0.5 sec, t, t + 10 sec	ABS lamp is off, comes on, then goes off, 10 seconds after loss of messages.	ABS fault existed, then signal was lost because trailer disconnected or PLC fault.	Use lamp on side of trailer to identify fault. Make necessary repairs.
Multiple Trailers/Dollies message: OFF OFF OFF OFF OFF OFF OFF ON ON lamp on lamp off: 0.5 sec, t + 2.5		ABS fault existed, then trailer with fault lost signal because trailer was disconnected or PLC fault.	
Single Trailer to Multiples message: OFF OFF OFF ON ON ON ON ON ON lamp on lamp off: 0.5 sec	ABS lamp is on and stays on when a new trailer with no new fault is added.	There was a fault in existence before the new trailer was added AND the ignition was not turned off before the trailer was added.	
Single Trailer to Multiples message: ON ON ON ON ON ON ON ON ON lamp on lamp off: 0.5 sec	ABS lamp is on and stays on when a new trailer with a new fault is added.	ABS fault was in existence before the new trailer was added AND the ignition was not turned off before the trailer was added AND the new trailer has an ABS fault.	

ON = Turn ON message to "trailer ABS" lamp

OFF = Turn OFF message to "trailer ABS" lamp

Removing a trailer with a fault will cause ABS lamp to turn off. Remember to have trailer with fault repaired as soon as possible before returning to service.

H-34. SERVICE BRAKES S-CAMSHAFTS AND SHOES

Single Axle

- Always reline both wheels of a single axle at the same time.
- Always install the same linings and drums on both wheels of a single axle.

Tandem Axle

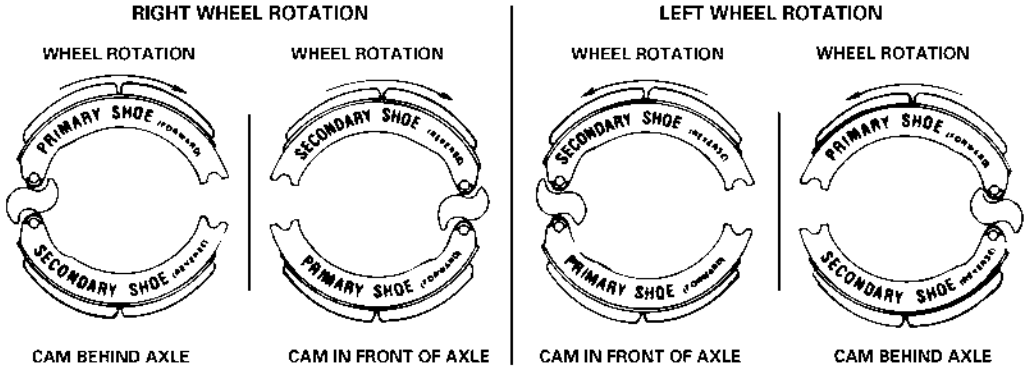
- Always reline all four wheels of a tandem axle at the same time.
- Always install the same linings and drums on all four wheels of a tandem axle.

Primary Shoe Locations

The first shoe past the cam in the direction of wheel rotation is the primary shoe. Refer to **Figure 7.1** to determine primary and secondary shoe locations.

1. The primary shoe can be either at the **TOP** or the **BOTTOM** position, depending on the location of the cam.
2. **If the cam is BEHIND the axle:** The **TOP** shoe is the primary shoe.
3. **If the cam is in FRONT of the axle:** The **BOTTOM** shoe is the primary shoe.

Figure 7.1



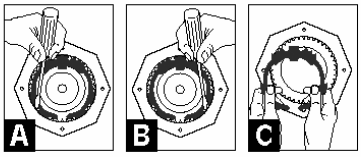
H-35. PRO-TORQ SPINDLE NUT

INSTALLATION

PRO-TORQ® Installation Procedure & Wheel Bearing Adjustment

STEP 1.

Remove the Keeper from the Nut:

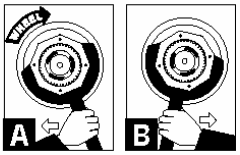


A, B, C

Use a screwdriver to carefully pry the keeper arm from the undercut groove on each side until the keeper is released.

STEP 2.

Seat The Bearing:



A Use a torque wrench to torque the nut to the specifications listed below while rotating the wheel to seat the bearings.

B Back the nut off until it is loose.

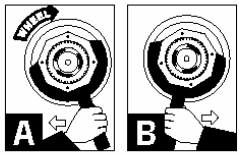
RECOMMENDED SEATING TORQUE AND TOOLS REQUIRED FOR INSTALLATION

Part Numbers	Seating Torque	(3/4" Drive) Socket Req'd	Owatonna Co. Ref. Part No.	Euclid Int'l Ref. Part No.
Steering Spindle Nut 448-4836 (150012), 448-4837 (150018)	200 ft-lbs	2 1/2" 6 point	1921	E-1921
Drive Axle Nut 449-4973 (325012), 449-4974 (262512)	200 ft-lbs 200 ft-lbs	4 3/8" 8 point 3 3/4" 8 point	1917 1925	E-1917 E-1925
Trailer Axle Nut 447-4743 (262516C)	200 ft-lbs	3 3/4" 8 point	1925	E-1925
Trailer Axle Nut 447-4723 (348012), 447-4724 (348012E)	200 ft-lbs	4 13/16" 8 point	1941	E-1597

Note: Ford application 12,000 lbs SIFCO Steer Axle requires OEM inner washer to be installed prior to installation of PRO-TORQ nut system.

STEP 3.

Adjust The Bearing:



A Use a torque wrench to torque the nut to the specifications while rotating the wheel.

B Back the nut off one raised face mark.

WARNING

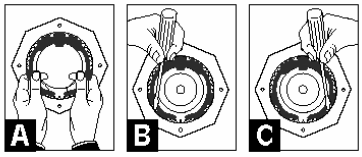
Failure to follow this instruction could cause the wheel to come off and cause bodily injury. Failure to back off the nut will cause the bearing to run hot and be damaged.

ADJUSTING TORQUE AND BACKOFF

Part Numbers	Adjusting Torque	Backoff
Steering Spindle Nut 448-4836 (150012)	100 ft-lbs	1/4 turn
Steering Spindle Nut 448-4837 (150018)	75 ft-lbs	1/3 turn
Drive Axle Nut 449-4973 (325012), 449-4974 (262512)	100 ft-lbs	1/8 turn
Trailer Axle Nut 447-4743 (262516C)	100 ft-lbs	1/4 turn
Trailer Axle Nut 447-4723 (348012), 447-4724 (348012E)	100 ft-lbs	1/8 turn

STEP 4.

Install the Keeper:



ORANGE SIDE FACING OUT

A Insert the keeper tab into the undercut groove of the nut and engage the keyway tang in the axle keyway. Insert keeper tab with bent legs facing out.

B Engage the mating teeth.

C Compress and insert the keeper arms, one at a time, into the undercut groove with a screwdriver.

For Steering Spindle Nut 448-4836 (150012) Only:

A Align the flat of the keeper with the milled flat on the spindle and insert the single keeper tab into the undercut groove of the nut. Insert keeper tab with bent legs facing out.

B Engage the mating teeth.

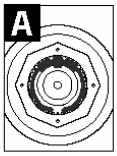
C Compress and insert the keeper arms, one at a time, into the undercut groove with a screwdriver.

WARNING

Failure to follow this instruction could cause the wheel to come off and cause bodily injury. Do not bend or manipulate keyway tang in any way. Doing so may cause the tang to break off in service.

STEP 5.

Inspect the Installation:



A Failure to follow this instruction could cause the wheel to come off and cause bodily injury. Make sure that the keeper tab and keeper arms are fully seated into the undercut groove. Inspect keyway tang to insure it does not contact the bottom of the keyway. If contact exists, immediately notify your PRO-TORQ representative.

THIS PROCEDURE WILL CONSISTENTLY PRODUCE A BEARING SETTING OF .001" TO .005" END PLAY.

WARNING

Failure to follow this instruction could cause the wheel to come off and cause bodily injury. The PRO-TORQ Spindle Nut is sold as an assembly with the keeper in place. **DO NOT** attempt to place the nut on the spindle or tighten or loosen the nut on the spindle while the keeper is locked inside the nut. Doing so may deform the keeper and allow the nut to unthread during operation.

PRO-TORQ®
ADVANCED AXLE SPINDLE NUTS

PRO-TORQ® is a registered trademark of Stemco Inc.

H-35. PRO-TORQ SPINDLE NUT (Cont.)

TRAILER AXLE NUTS

Applications and Specifications

Stemco Part Number

447-4723

Ceromet Part Number: ***348012***
Replacement Keeper No.: ***450-4723,*** *(Ceromet No. K3480)*
Tool Socket: ***4 13/16" - 8 point (OTC# 1941)***
Thread Size: ***3.480" - 12***
Outer Bearing Part No.: ***HM518445/HM518410***

FRUEHAUF AXLES
PROPAR Series

INGERSOLL AXLES
F24H

ROCKWELL AXLES
TP Series

Stemco Part Number

447-4743

Ceromet Part Number: ***262516C***
Replacement Keeper No.: ***450-4743,*** *(Ceromet No. K2625)*
Tool Socket: ***3 3/4" - 8 point (OTC# 1925)***
Thread Size: ***2 5/8" - 16***
Outer Bearing Part No.: ***HM212049/HM212011***

DANA SPICER AXLES
D-20, D-21, D-22, DD-21, DD-22, K-21, K-22, K-25, K-30

EATON AXLES
C, C2, CD, CD2, CE, ESA-225J, EST, EST-225J, EST-230J, ETA 230C, ETA 225D, ETA 225J, H23L, H25R, HCE, HJ, HJE, J, JE, JH, LA-15, T-18C, 20L-77, 22L, 22R, 23L, 23R, 25R

STEMCO™

H-35. PRO-TORQ SPINDLE NUT (Cont.)

Pro-Torq® Interchange Guide

PRO-TORQ® Advanced Spindle Nuts

Axilok	STEMCO
AX 12-1500	448-4836
AX 12-3250	449-4973
AX 12-3480	447-4723
AX 12-3500	447-4724
AX 16-2625	447-4743
AX 18-1500	448-4837

Batco	STEMCO
06-201	447-4743
06-203	447-4743
06-204	448-4836
06-210	448-4836
06-226	447-4723
06-348	448-4837
06-354	448-4836
06-358	448-4836
06-403	447-4743
06-404	447-4743
06-411	449-4973
06-412	449-4973
06-424	447-4743
06-425	447-4743
06-470	449-4974
06-472	449-4974
06-482	449-4973
06-484	449-4973

BWP	STEMCO
M-682	447-4743
M-684	447-4743
M-685	448-4836
M-1524	448-4836
M-1956	448-4836
M-1959	448-4836
M-1972	447-4743
M-1974	447-4743
M-1978	449-4973
M-1980	449-4973
M-1984	447-4743

BWP	STEMCO
M-1986	447-4743
M-1990	449-4973
M-1992	449-4973
M-1996	447-4723

Ceromet	STEMCO
150012	448-4836
150018	448-4837
262512	449-4974
262516C	447-4743
325012	449-4973
348012	447-4723
348012E	447-4724
K1501	450-4836
K1502	450-4837
K2625	450-4743
K3250	450-4973
K3480	450-4723

Dana	STEMCO
10284	447-4743
10286	447-4743
10406	447-4743
10408	447-4743

Eaton	STEMCO
F-940	447-4743
F-941	447-4743
F-1529	447-4743
F-1530	447-4743
X-115	448-4836
11249	449-4973
19186	447-4743
31927	449-4973
34090	447-4743
128333	448-4837
820394	447-4743
820395	447-4743

Euclid	STEMCO
E-540	447-4743
E-572	447-4743
E-576	448-4836
E-1087	448-4836
E-2296	448-4836
E-2299	448-4836
E-2303	449-4973
E-2305	449-4973
E-2420	447-4743
E-2422	447-4743
E-2460	447-4743
E-2466	449-4973
E-2468	449-4973
E-2550	447-4723
E-4861	448-4837
E-6140	449-4973

Ford	STEMCO
D5HZ-3104A	448-4837
D7HZ-4255A	449-4974
D7HZ-4245A	449-4974
E4HS-4255-AA	449-4973
F2HS-3276-AA	448-4837

STEMCO

H-35. PRO-TORQ SPINDLE NUT (Cont.)

Pro-Torq® Interchange Guide

PRO-TORQ® Advanced Spindle Nuts

Fruehauf	STEMCO
ACE-8510-001	447-4723
530088	448-4836

K-B Axle	STEMCO
KBE-10227	447-4743

Kershaw	STEMCO
10284	447-4743
10286	447-4743

Leland	STEMCO
L-176	447-4743
L-178	447-4743
L-195	448-4836
L-1331	448-4836
L-1334	448-4836
L-1347	447-4743
L-1349	447-4743
L-1353	449-4973
L-1355	449-4973
L-1359	447-4743
L-1361	447-4743
L-1365	449-4973
L-1367	449-4973
L-1395	447-4723

Meritor	STEMCO
A-1227-A-105	448-4836
A-1227-S-331	449-4973
1227-B-106	448-4836
1227-B-756	447-4743
1227-B-1484	447-4723
1227-C-549	447-4743
1227-E-1045	449-4974
1227-K-947	448-4837
1227-K-1389	447-4723
1227-L-194	448-4836
1227-M-715	449-4974

Meritor	STEMCO
1227-R-330	449-4973
1227-R-1240	449-4973
1227-T-228	447-4743
1227-T-540	447-4743
1227-U-541	448-4836
1227-W-517	449-4973
1227-X-102	448-4836
1227-Z-1040	449-4974
1227-P-1160	447-4743

Navistar	STEMCO
1607743C1	448-4836
1607744C1	449-4973
2037474C1	448-4837
2501559C1	449-4974

Spicer	STEMCO
M10HN101	447-4743
M10HN102	447-4743
M10HN128	448-4836
M10HN158	447-4743
M103102-001	447-4743

Std. Forge	STEMCO
103100-1	447-4743
103102-001	447-4743
103103-002	447-4743
103104-001	447-4743
103105	448-4836
105013	447-4743

Transit	STEMCO
TP-157	448-4836
TP-431	448-4836
TP-489	447-4743
TP-490	447-4743
TP-1572	449-4973
TP-1943	449-4973

Transit	STEMCO
TP-1970	448-4836
TP-1973	448-4836
TP-1977	449-4973
TP-1978	449-4973
TP-1988	447-4743
TP-1989	447-4743
TP-1997	447-4743
TP-1999	447-4743

STEMCO

H-35. PRO-TORQ SPINDLE NUT (Cont.)

STEMCO

PRO-TORQ SPINDLE NUT WARRANTY

Stemco warrants that all Product shall conform to descriptions on purchase orders, and shall be free of defects in materials and workmanship which would be discovered by following Stemco's standards of manufacture and inspection at the time said Product was manufactured. This warranty shall remain in effect for one year following shipment of Product. This warranty is limited to repairing or replacing Product which the parties investigation show were defective at the time of delivery.

All Product subject to this warranty will be returned, F.O.B.: Stemco Inc, 300 Industrial Blvd., Longview, TX 75602, for examination, repair, or replacement.

This warranty does not cover any defect, malfunction, or failure caused by or resulting from improper or unauthorized service maintenance, installation, repair, or use not within the working specifications for which Product was designed, or from abuse, neglect, tampering with, or any other cause beyond the control of Stemco.

PRO-TORQ® is the registered trademark of Stemco Inc.

Specifications contained in this catalog were in effect at the time the publication was approved for printing, and are subject to change without notice or liability.

STEMCO™

A Higher Standard of Performance.™

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P.O. Box 1989 • Longview, Texas 75606-1989
800-527-8492 • 903-758-9981 • Fax 800-874-4297
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H-35. PRO-TORQ SPINDLE NUT (Cont.)

NOTE

The Pro-Torq spindle nut is composed of two parts, the nut and a steel spring keeper which is painted orange on the side that must be facing out.

REMOVAL

1. Use a small blade screwdriver to carefully pry each keeper arm from the undercut groove in the nut and release the orange keeper from the nut. The arms are on opposite sides of the open end of the keeper.

WARNING

A new orange keeper arm must be replaced if it is damaged when removed or installed in the nut. It is recommended to replace the keeper arm each time it is removed. The original nut may be reused, the original keeper may be re-used if not damaged. Failure to heed this WARNING may cause injury or death to personnel and damage to the equipment due to wheel-end loss.

CAUTION

Failure to remove the orange keeper before removing the nut will result in damaged threads to both the nut and the axle end spindle. Over torque of the nut will result in stripped threads.

INSTALLATION

1. Thread the nut, without keeper arm, onto the axle spindle threaded end, keeper side facing out. Hand tighten nut against outer bearing.

2. While slowly rotating the wheel/hub use a torque wrench and socket to torque the nut to 200 lb-ft (271 N•m). Wheel/hub must be rotated slowly while torque is applied. This action will seat the inner and outer bearings.

3. Using the torque wrench and socket, back off the nut until it is hand tight.

4. While slowly rotating the wheel/hub, using the torque wrench and socket, re-torque the nut to 100 lb-ft (136 N•m). Wheel/hub must be rotated slowly when torque is applied. This action will apply the final seat to the inner and outer bearings.

H-35. PRO-TORQ SPINDLE NUT (Cont.)

5. Back nut off 1/4 turn.

NOTE

After 1/4 back-off, nut should be movable by hand.

6. Install the keeper, orange side facing out, by inserting the keeper square outer tab into the undercut groove on the nut aligned with the square cut keyway groove on the spindle. Rotate the keeper into position so that the inner keeper tang tilts into the square spindle keyway. The teeth on the keeper will engage the teeth on the nut. Do not force the keeper into position. Force will damage the keeper. Use only a small bladed screwdriver for installation of the keeper.

7. If the square inner tang does not line up with the spindle square keyway, back the nut off very slightly until it does (no more than one tooth). This back-off will engage the keeper and nut teeth if this did not happen in Step 6. Using a small bladed screwdriver carefully compress and insert the keeper arms, one at a time, into the undercut groove in the nut. Again, the orange side of the keeper MUST be facing out.

8. Inspect the installation to make sure that the keeper outer tab and the keeper arms are fully seated into the undercut groove in the nut. Use the small bladed screwdriver to gently flex the keeper arms to insure they fully engage the groove in the nut. Visually inspect the seating and that the teeth are fully engaged in the nut teeth.

9. Inspect the square keeper tang to make sure it does not contact the bottom of the square groove on the axle spindle.

10. Check the bearing setting by using a dial indicator to verify the bearing end play. The nut will produce a consistent setting of between 0.001–0.003 inch (0.025–0.076 mm) end play.

CAUTION

- **Keeper orange side must be facing out.**
- **Only a small, bladed screwdriver is required to move/install the orange keeper.**
- **The orange keeper square tang must not bottom in the spindle square keyway.**
- **No other washers or lock rings are required for this installation.**
- **Orange keeper teeth must fully engage nut teeth.**

11. If there are any installation problems or concerns please contact Stemco Customer Service at 1-800-527-8492.

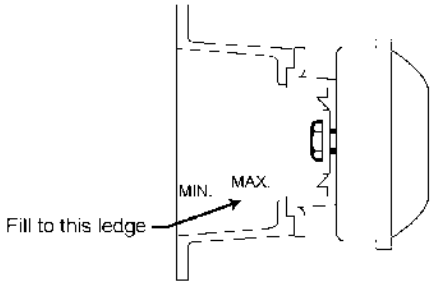
H-36. HUBODOMETER

STEMCO HUBODOMETER INSTALLATION INSTRUCTIONS

1. Mount hubodometer to face of hub cap or bracket.
2. Use washer under locknut.
3. Use 15-ft. lbs. of torque to tighten locknut.
   DO NOT USE AIR IMPACT WRENCH.
   DO NOT EXCEED 15-ft. lbs. OF TORQUE.
4. If necessary, use strap wrench to hold hubodometer while tightening.
5. DO NOT USE PAINTS, SOLVENTS OR THINNERS ON THE HUBODOMETER FACE, GRILAMID HUB CAP OR HUBODOMETER HUB CAP WINDOW.

The recommended torque for the 3/8" pipe plug for aluminum hub caps is 9 ft.-lbs. A suitable sealant may be used on the pipe plug threads if desired. On grilamid hub caps with plastic fill plug and o-ring, tighten to a torque not to exceed 10 ft.-lbs.

The proper oil level for the Stemco hubodometer window is indicated by the inside protruding ledge of the window. (See drawing.)



8/96 Order Entry 1-800-527-8492 Fax 1-800-874-4297

H-36. HUBODOMETER (Cont.)

General:

Hubdometer:

1. Basically a driveless, mechanical meter, hub mounted odometer. The name Hubdometer is actually a registered trademark name for a specific STEMCO product.

2. The accuracy of the Hubdometer is plus or minus 2%.

3. It is specifically calibrated to a tire size, make and model and to the mid-life of the tire tread, not the depth of new tire treads.

4. To prelude the mechanically curious from opening the Hubdometer case to find out how it works the following is provided, which contains the following:

   a. An independent main shaft to protect it from front (face) damage.

   b. A spring-loaded counterweight to reduce spin.

   c. A brass on steel worm gear.

   d. An externally pinioned odometer mechanism using low friction molded components.

   e. The case is hermetically sealed to prevent moisture from getting in.

5. The Hubdometer works basically the same as the odometer in a car except that it is not driven or electrical. It is an independent mechanical device.

6. There are three basic ways to mount the Hubdometer:

   a. As a single component hubcap with the Hubdometer

   b. As a mount on to a hubcap.

   c. On a universal mounting bracket that is bolted to the hubcap.

7. It may be used either “wet” (oil) hubs or “dry” (grease) hubs.

Installation:

1. What if you have to replace a Hub?

   If a new Hubdometer is installed, will it read zero miles, and will the original mileage from the old Hubdometer be lost?

   Although true, there is a way to preclude this problem. When ordering the new Hubdometer from the manufacturer request that the mileage be set to what was registered on the old Hubdometeer. There is normally a nominal fee for this but it is well worth the cost n order to keep a running record of mileage and service intervals, no up-dates or confusion.

H-36. HUBODOMETER (Cont.)

Care of the Hubdometer:

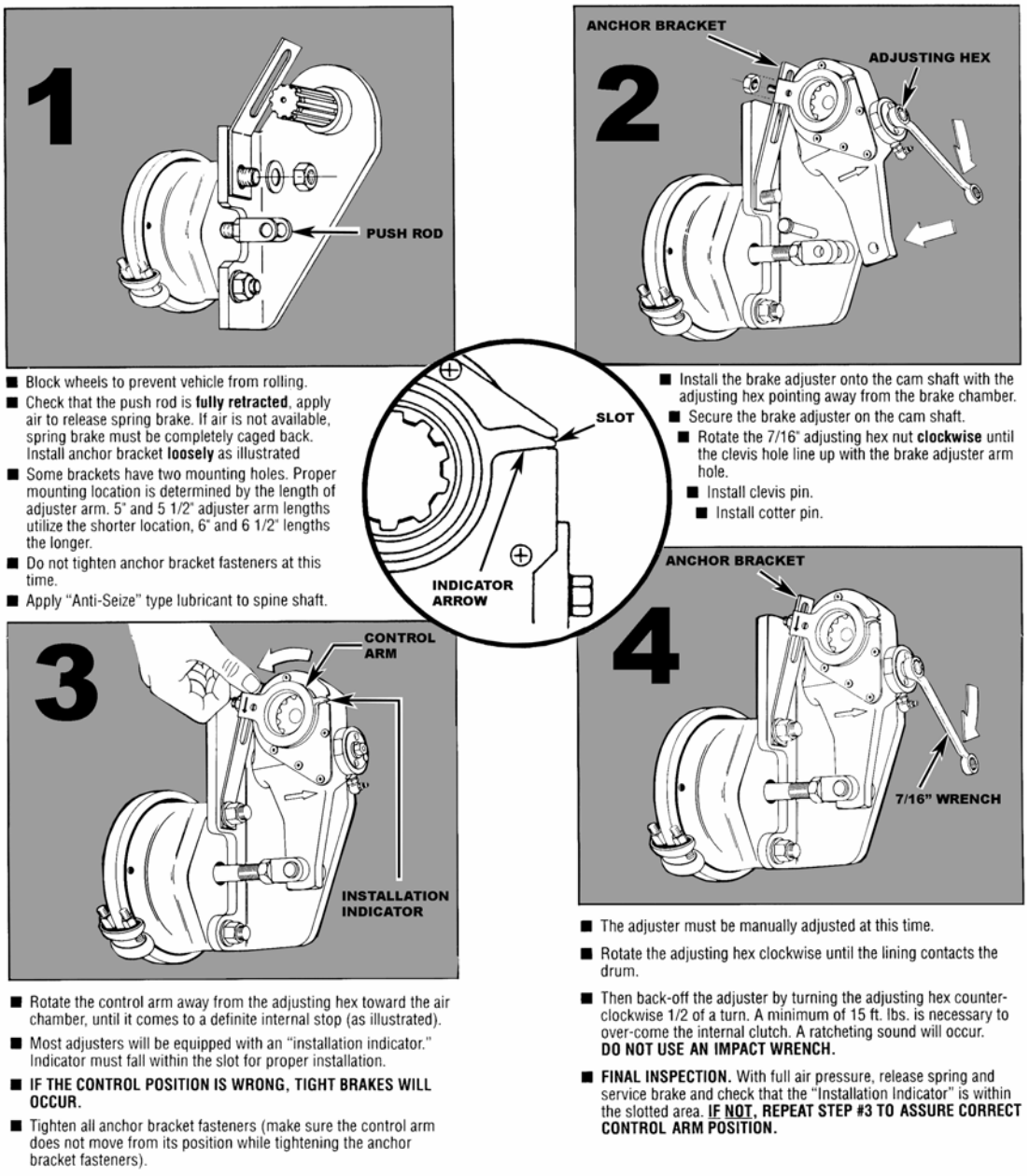
CAUTION

- **Do not stand on it, kick it or rest things like boots and wheels on it. It will survive all those on-off road ventures but excessive personal involvement may shorten its life.**
- **Do not use solvents, thinners or paints on the Hubdometer face. If reflective glare is a problem tape over the face except for the odometer reading so you can check the mileage as needed.**
- **Do not use air or electrical tools when removing or installing it. Use only hand-tools. If it slips when you loosen or tighten the meter lock nut put a strap wrench around the meter to hold it.**
- **Normally only 15 ft.lbs of torque (max) are required to secure the lock nut, no more.**

The Hubdometer will keep accurate track of the mileage on your semitrailer and offer a way to identify when service is required and document service intervals. It does not need much in the ways of service but it does need to be somewhat protected against damage.

H-37. AUTOMATIC SLACK ADJUSTERS

INSTALLATION



- Block wheels to prevent vehicle from rolling.
- Check that the push rod is **fully retracted**, apply air to release spring brake. If air is not available, spring brake must be completely caged back. Install anchor bracket **loosely** as illustrated
- Some brackets have two mounting holes. Proper mounting location is determined by the length of adjuster arm. 5" and 5 1/2" adjuster arm lengths utilize the shorter location, 6" and 6 1/2" lengths the longer.
- Do not tighten anchor bracket fasteners at this time.
- Apply "Anti-Seize" type lubricant to spine shaft.

- Install the brake adjuster onto the cam shaft with the adjusting hex pointing away from the brake chamber.
- Secure the brake adjuster on the cam shaft.
- Rotate the 7/16" adjusting hex nut **clockwise** until the clevis hole line up with the brake adjuster arm hole.
- Install clevis pin.
- Install cotter pin.

- Rotate the control arm away from the adjusting hex toward the air chamber, until it comes to a definite internal stop (as illustrated).
- Most adjusters will be equipped with an "installation indicator." Indicator must fall within the slot for proper installation.
- **IF THE CONTROL POSITION IS WRONG, TIGHT BRAKES WILL OCCUR.**
- Tighten all anchor bracket fasteners (make sure the control arm does not move from its position while tightening the anchor bracket fasteners).

- The adjuster must be manually adjusted at this time.
- Rotate the adjusting hex clockwise until the lining contacts the drum.
- Then back-off the adjuster by turning the adjusting hex counter-clockwise 1/2 of a turn. A minimum of 15 ft. lbs. is necessary to over-come the internal clutch. A ratcheting sound will occur. **DO NOT USE AN IMPACT WRENCH.**
- **FINAL INSPECTION.** With full air pressure, release spring and service brake and check that the "Installation Indicator" is within the slotted area. **IF NOT, REPEAT STEP #3 TO ASSURE CORRECT CONTROL ARM POSITION.**

NOTE

Flat stud nut is torqued to 40 to 50ft.lbs max. Reference Figure 9, in RPSTL, Items 3 and 4.

H-37. AUTOMATIC SLACK ADJUSTERS (Cont.)

INSTALLATION AND ADJUSTMENT OF AUTOMATIC SLACK ADJUSTERS (ASAs)

WARNING

Make sure the wheels are chocked before servicing the semitrailer. Release the parking brake and check that the push rod is fully released. If the push rod is not fully released, the ASA cannot be installed properly. Semitrailer movement may cause injury or death to personnel and damage to the equipment.

1. Chock wheels to prevent semitrailer from moving. Check that the push rod on the air brake chamber is FULLY RETRACTED. Apply air pressure to release spring brake.

NOTE

If air pressure is not available, spring brake must be completely caged back. Install anchor bracket but do not tighten air brake chamber nut, leave loose.

Proper mounting location is determined by the length of the adjuster arm—5 and 5-1/2 inch (12.7 and 14.0 cm) adjuster arm lengths utilize the shorter location, 6 and 6-1/2 inch (15.2 and 16.5 cm) lengths use the longer location. Do not tighten anchor bracket fasteners at this time. Apply “anti-seize” type lubricant to “S” cam spline shaft.

2. Install the ASA onto the “S” cam shaft with the adjusting hex pointing away from the air brake chamber. Secure the ASA on the “S” cam shaft. Rotate the 7/16-inch (11 mm) adjusting hex nut CLOCKWISE until the clevis hole on the air brake chamber clevis lines up with the ASA arm clevis hole. Install clevis pin and cotter pin.

3. Rotate the control arm on the ASA, arm with indicator arrow, away from the adjusting hex (toward the air brake chamber) until it comes to a definite internal stop. Indicator arrow must fall within the slot for proper installation. IF THE CONTROL POSITION IS WRONG, TIGHT BRAKES WILL OCCUR. Tighten all anchor bracket fasteners, making sure the ASA control arm does not move from its position while tightening the anchor bracket fasteners.

4. The ASA must be manually adjusted at this time. Rotate the adjusting hex CLOCKWISE, using a 7/16-inch (11 mm) box head wrench, until the brake lining contacts the drum. Then back off the adjuster by turning the adjusting hex COUNTER-CLOCKWISE one-half of a turn. A minimum of 15 ft-lb (20.3 N•m) is necessary to overcome the internal clutch. A ratcheting sound will occur. DO NOT USE AN IMPACT WRENCH FOR ANY ADJUSTMENTS.

5. FINAL INSPECTION: With full air pressure, release spring brake chamber push rod and check that the “Installation Indicator” arrow is within the slotted area. If arrow is not within slotted area the control arm must be reset (see Step 3).

H-37. AUTOMATIC SLACK ADJUSTERS (Cont.)

HOW TO MEASURE PUSH ROD STROKE

NOTE

The maximum effective push rod stroke, as recommended by the air brake chamber manufacturer, must be less than 2.5 inches (6.4 cm).

1. With a tape measure, measure the movement of the push rod from the completely released position to the applied position (90–100 psi [621–690 kPa] Brake Application).

2. This movement can also be measured by:

   a. Put a mark on the push rod where it exits the air brake chamber (BRAKE RELEASED).
   b. Apply the brake.
   c. Measure the movement of the mark to the face of the air brake chamber housing.

BRAKE RELINE/CHECKING PROCEDURE

1. Rotate the adjustment hex COUNTER-CLOCKWISE approximately 1/2 turn to create excessive brake lining to drum clearance.

2. Apply the brakes.

3. On release of brakes observe the adjustment hex rotation. This rotation indicates the ASA is making an adjustment and is working properly.

NOTE

Placing a 7/16-inch (11 mm) box end wrench on the hex adjustment will make the movement easier to see.

4. On each subsequent brake release, the amount of adjustment and push rod stroke will be reduced until proper clearance is achieved.

5. During brake reline, check the de-adjustment torque. Place a 7/16-inch (11 mm) torque wrench on the adjustment hex. Turn the hex COUNTER-CLOCKWISE and check that the clutch does not slip at a torque LESS than 13 ft-lb (17.6 N•m). A ratcheting sound should occur. If the clutch slips at a lesser torque (less than 13 ft-lb [17.6 N•m]) then the ASA must be replaced.

H-37. AUTOMATIC SLACK ADJUSTERS (Cont.)

BRAKE TROUBLESHOOTING

NOTE

- **The ASA is NOT a cure-all for foundation brake deficiencies.**
- **If the proper push rod stroke cannot be maintained be sure to thoroughly check the other brake components.**
- **This check could also avoid unnecessary ASA replacement.**

1. Check the foundation brake for:
   a. Worn cam shaft and bushings
   b. Broken shoe return springs
   c. Air chambers not releasing
   d. Worn or broken brake components
   e. Loose wheel bearings

2. Check the ASA for:
   a. Proper push rod stroke
   b. Proper ASA installation
   c. Loose, broken, or bent adjuster brackets
   d. Worn clutch assembly
   e. Adjuster not fully releasing

AXLE REPLACEMENT:

It is recommended that the following items be replaced on semitrailers when new axles are installed to ensure safe operation. The following is for the dual axle semitrailer and are listed in the TM RPSTL:

PART	QUANTITY PER AXLE/TRUNNION
Adjustment Plates	2
Spring Seats	2
Rubber Pads	4
U-Bolts	4
Spring End Cap Bolts	8
Spring End Cap Washers	16
Spring End Cap Locking Nuts	8
Spring End Cap Locking Nut Washers	8
Trunnion Bushings	2
Trunnion U-Bolt Washers	8
Trunnion Hub Hex Nuts	8

- Follow the TM instructions for installation (See H-38, Page H-173)
- Check end caps for damage, replace if damaged.
- Spring seats must be tack welded in place when axles are adjusted parallel to each other and perpendicular to trunnion tube.
- Weld the spring seats to the axle using 3/8” welds. Assemble axle U-bolts to spring end caps.
- Axles must be aligned using the kingpin as the center point.
- Adjustment plates must be welded after axle has been aligned.
- Torque: **Wet** (oiled) torque limits are for *new* fasteners installed.
  Dry torque limits are for *in-service* parts.

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION

Table of Contents

Preface

In the mid-1950's Hutchens' engineers realized an urgent need for a heavier, more rugged, single point tandem that would allow more oscillation without wear and have an adjustable alignment feature. After thorough research and severe road testing, Hutchens introduced the Hutch 800 model suspension in weight capacities of 36,000, 42,000, 50,000 and 60,000 lbs.

The 800 single point suspension remained virtually unchanged until the very early 1970's. At that time a split trunnion casting, which permits easy maintenance and replacement of trunnion bushings should it become necessary, replaced the solid one-piece casting that had been used previously. This model was known as the 800A.

Still in the early 1970's Hutchens introduced the 800B. The 800B had inverted trunnion U-bolts that allowed easier maintenance since the trunnion U-bolt nuts were now on the underside of the suspension. Underslung axle configurations were added as well.

In the mid-1970's Hutchens began offering the 900 model single point suspension. The 900 offers many improvements over earlier single points offered to the market. Greater versatility of axle spacing and spring selection is provided through the use of a wide selection of springs specifically designed for different load carrying capacities. The 900 offered spring box ends for square axles as well as round axles.

In the late 1980's Hutchens introduced a lighter-weight, three-leaf spring, single point suspension in weight capacities of 44,000 and 50,000 lbs. Taking advantage of advances in leaf spring engineering and manufacturing technology, the three-leaf 903 redefined lightweight suspension performance in heavy-duty applications. The addition of this innovative spring to the rugged 900 series further broadened an already versatile suspension line.

In this booklet we define the 900 Series' Applications, Capacities, Features and Options. We also describe what information is required to order your 900 Series suspension. Isometric drawings and Bills of Materials are presented for easier identification of parts. An installation section is included as well. This 900 publication supersedes all previously issued materials relating to the 900 Series suspension, its installation and its usage. Usage of outdated materials can result in improper installation of the suspension. The last page of this booklet contains a Numerical Listing Of Parts found within this publication. Parts are listed in numerical order, and are followed by a parts description and page numbers on which they can be found.

Before beginning any installation procedures, the customer should read all installation instructions thoroughly. Should you have any questions concerning the 900 Series or any of its predecessors, please contact Hutchens for assistance.

Application

The 900 Series suspensions are designed for heavy-duty and/or off-road applications. The 900 is a single point suspension connected to the trailer frame by a trunnion located at the center of the suspension. This makes it ideal for logging, heavy load hauling and dump operations.

Capacity

The 900 Series suspensions are available in Gross Tandem Weight Ratings (G.T.W.R.) of 36,000, 42,000, 44,000, 50,000 and 60,000 lbs.

Features

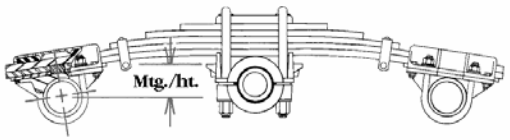
- Cast steel parts poured in our own foundry, shot peened and prime painted.
- Extra heavy-duty 5" wide leaf springs.
- Accurate spring alignment preserved by the use of rugged spring guides on the trunnion casting.
- A split trunnion casting permits easy maintenance and replacement of trunnion bushings.
- Axle alignment and realignment made possible by adjustable plates within the spring-end boxes. One adjustment plate on each axle is welded at the factory. After axle alignment is completed, the installer welds the other adjustment plate to ensure sustained axle alignment.
- For increased life and flexibility, thick rubber pads are used above the spring leaves in the axle boxes. This construction permits greater twist freedom in the spring box...a standard flexibility feature that reduces wear and promotes better ride characteristics.

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

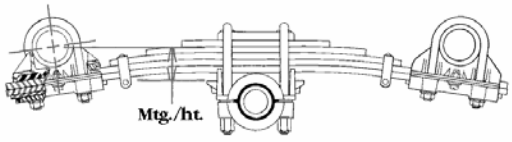
Options

Standard 900 Series suspensions are available in capacities of 36,000, 42,000, 50,000 and 60,000 lbs. Additionally, lightweight two-leaf and three-leaf units are available in capacities of 36,000, 44,000 and 50,000 lbs.

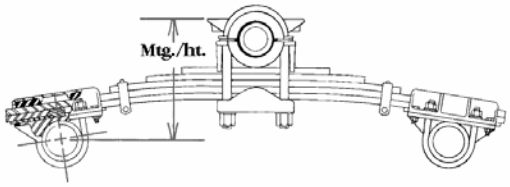
Numerous mounting heights (Mtg./ht. = the vertical distance from the center line of the axle to the top of the trunnion hanger), axle and trunnion combinations are possible. These include overslung (OS, springs over axles) and underslung (US, springs under axles) axle units as well as overslung (springs over trunnion) and underslung (springs under trunnion) trunnion configurations.



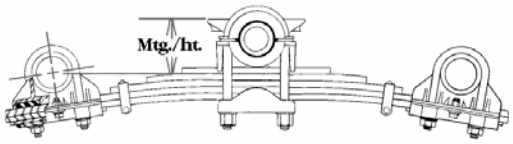
Overslung Axles – Overslung Trunnion
(Formerly Overslung Axles – Standard Trunnion)



Underslung Axles – Overslung Trunnion
(Formerly Underslung Axles – Standard Trunnion)

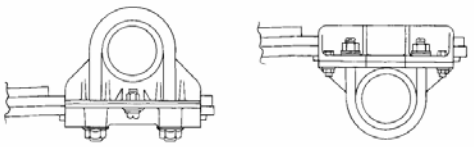


Overslung Axles – Underslung Trunnion
(Formerly Overslung Axles – Optional Trunnion)

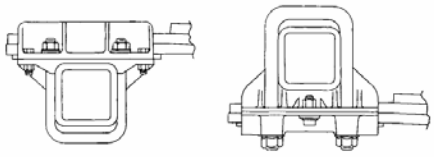


Underslung Axles – Underslung Trunnion
(Formerly Underslung Axles – Optional Trunnion)

Axle boxes to accommodate 5", 5 3/4" and 6" round axles or 5" x 5" square axles are available.

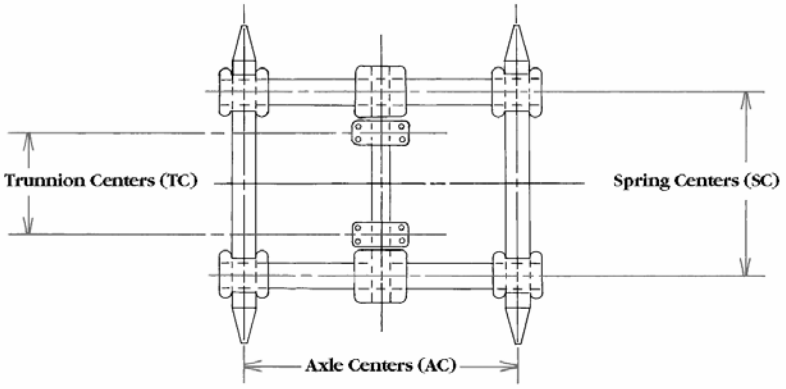


Axle Box for Round Axle



Axle Box for Square Axle

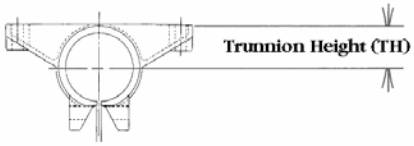
Several different axle centers (AC) are available. **See Axle Specifications And Mounting Heights Charts on Page 4.**



Standard spring centers (SC) for the 900 Series suspensions are 38". Other spring centers can be furnished upon request.

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

Trunnion hanger heights (TH) of 2 1/2", 4 1/2", 6 1/2" and 8 1/2" are obtainable.



Standard trunnion hanger spacing (TC) is 22 1/8" (for 38" spring centers). Trunnion centers of 20 1/8" can be specified while maintaining 38" spring centers.

Trunnion bushings of either rubber or Polyurethane ("free oscillating") are available. Unless otherwise specified, trunnion bushings are assumed to be rubber.

When installing your 900 Series suspension, adequate vertical clearance must be provided for the tires, springs and U-bolts. This is usually accomplished through the use of a mounting bracket or pedestal.

How To Order Your 900 Series Single Point Suspension System

With so many options available on the 900 Series suspensions, each unit must be ordered by a description of the unit desired. Any abbreviations listed are defined in the Options section of this booklet. Such abbreviations are commonly found in Hutchens suspension notation.

1. Determine which 900 Series suspension will meet your weight requirements – 36,000#, 42,000#, 44,000#, 50,000#, or 60,000# GTWR.
2. Select a mounting height (Mtg./ht.) that corresponds to your particular situation. **See Axle Specifications And Mounting Heights Charts on Page 4.**

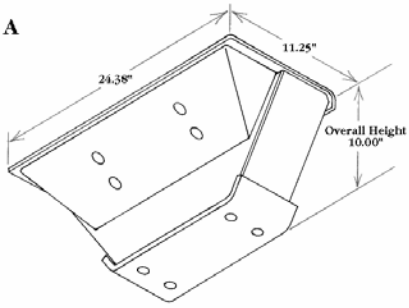
From this chart please note that mounting height is dependent upon:

3. Axle configuration – Overslung or Underslung.
4. Axle size – 5", 5 3/4", 6" Round or 5" x 5" Square (Hutchens does not manufacture or sell axles).
5. Trunnion configuration – Overslung or Underslung.
6. Trunnion Hanger Height (TH) – 2 1/2", 4 1/2", 6 1/2" or 8 1/2". In many instances more than one combination will result in the same mounting height.

Therefore, all the aforementioned factors should be taken into consideration when ordering as well as the following:

7. Axle Centers (AC) – **See Axle Specifications And Mounting Heights Charts on Page 4.**
8. Spring Centers (SC)
9. Trunnion Centers (TC)
10. To help ease the installation of your 900 Series suspension you may wish to order a pair of Hutch mounting brackets (Part #16793-01). **See Fig. A below.**

Fig. A



Example: A 900 Series suspension with a GTWR of 42,000 lbs., a mounting height of 4" for overslung (OS) 5" round axles, an overslung (OS) trunnion configuration with a trunnion hanger height (TH) of 2 1/2", axle centers (AC) of 50 1/2", spring centers (SC) of 38", and trunnion centers (TC) of 22 1/8" would be ordered as follows:

Quantity	Suspension Model	Axle Config.	Trunnion Config.	Axle Size	Trunnion Height	Axle Centers	Spring Centers	Trunnion Centers
1 ea.	900-42	OS (axles)	OS (trun.)	5" Rd.	2 1/2 TH	50 1/2 AC	38 SC	22 1/8 TC

Example: A 900 Series suspension with a GTWR of 50,000 lbs., a mounting height of 9 1/2" for underslung (US) 5" x 5" square axles, an underslung (US) trunnion configuration with a trunnion hanger height (TH) of 6 1/2", axle centers (AC) of 53", spring centers (SC) of 36", trunnion centers (TC) of 20 1/8" utilizing a three-leaf spring* and free oscillating trunnion bushings** would be ordered as follows:

Quantity	Suspension Model	Axle Config.	Trunnion Config.	Axle Size	Trunnion Height	Axle Centers	Spring Centers	Trunnion Centers	Spring * Type
1 ea.	900-50	US (axles)	US (trun.)	5" x 5" Sq.	6 1/2 TH	53 AC	36 SC	20 1/8 TC	3 leaf w/ free oscillating bushing**

* Three-leaf springs are available for 44,000 and 50,000 lb. units only and must be specified.
** Must be specified.

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

Overslung Axle Specifications And Mounting Heights For Models:

900-36 through 900-44 with 2.5 Trunnion Ht., 5" Rd. & 5" x 5" Sq. Axles
900-50 and 900-60 with 4.5 Trunnion Ht., 5" Rd. & 5" x 5" Sq. Axles

Model Description	Gross Tandem Weight Rating (GTWR)	Spring Number	Number of Spring Leaves	Nominal Axle Spacing		Mounting Height			
						Overslung Trunnion		Underslung Trunnion	
				Unloaded	Loaded	Unloaded	Loaded	Unloaded	Loaded
900-36	36,000	10054-00	5	48.00	48.75	4.00	3.00	15.00	14.00
900-36	36,000	11151-00	5	50.50	51.50	4.00	2.50	15.00	13.50
900-36	36,000	16258-01	Tapered 2	50.50	51.50	4.00	2.50	13.35	11.85
900-42	42,000	9997-00	6	48.00	48.75	4.00	3.00	15.75	14.75
900-42	42,000	9998-00	6	50.50	51.50	4.00	2.75	15.75	14.62
900-44	44,000	12258-01	Tapered 3	50.50	51.50	4.00	2.87	14.50	13.37
900-50	50,000	10055-00	7	48.00	48.75	6.00	5.00	18.50	17.12
900-50	50,000	9999-00	7	50.50	51.50	6.00	4.62	18.50	17.50
900-50	50,000	12258-01	Tapered 3	50.50	51.50	6.00	4.62	16.50	15.12
900-50	50,000	10000-00	8	54.00	55.25	6.50	5.00	19.75	18.25
900-60	60,000	10001-00	9	54.00	55.25	6.50	4.75	20.50	18.75
With 4.5 Trunnion Height Add (900-36 thru 44)/(900-50 & 60)						2.00/0.00	2.00/0.00	2.00/0.00	2.00/0.00
With 6.5 Trunnion Height Add (900-36 thru 44)/(900-50 & 60)						4.00/2.00	4.00/2.00	4.00/2.00	4.00/2.00
With 8.5 Trunnion Height Add (900-36 thru 44)/(900-50 & 60)						6.00/4.00	6.00/4.00	6.00/4.00	6.00/4.00
When 5.75" or 6" Rd. Axles Are Used Add						.50	.50	.50	.50

Mounting heights shown for models 900-50 & 60 are based on a 4.50 high trunnion bracket. Do not use the 2.50 high bracket on models with 50,000 lbs. GTWR or greater.

Underslung Axle Specifications And Mounting Heights For Models:

900-36 through 900-44 with 2.5 Trunnion Ht., 5" Rd. & 5" x 5" Sq. Axles
900-50 and 900-60 with 4.5 Trunnion Ht., 5" Rd. & 5" x 5" Sq. Axles

Model Description	Gross Tandem Weight Rating (GTWR)	Spring Number	Number of Spring Leaves	Nominal Axle Spacing		Mounting Height			
						Overslung Trunnion		Underslung Trunnion	
				Unloaded	Loaded	Unloaded	Loaded	Unloaded	Loaded
900-36	36,000	10054-00	5	50.50	50.00	-4.25	-5.25	6.75	5.75
900-36	36,000	11151-00	5	53.00	52.25	-4.25	-5.75	6.75	5.25
900-36	36,000	16258-01	Tapered 2	53.00	52.25	-4.25	-5.75	5.10	3.60
900-42	42,000	9997-00	6	50.62	50.00	-5.00	-6.00	6.75	5.75
900-42	42,000	9998-00	6	53.00	52.25	-5.00	-6.25	6.75	5.50
900-44	44,000	12258-01	Tapered 3	53.00	52.25	-5.00	-6.12	5.50	4.37
900-50	50,000	10055-00	7	50.62	50.00	-3.00	-4.00	9.50	8.50
900-50	50,000	9999-00	7	53.00	52.25	-3.00	-4.37	9.50	8.12
900-50	50,000	12258-01	Tapered 3	53.00	52.25	-3.00	-4.37	7.50	6.12
900-50	50,000	10000-00	8	57.00	56.00	-2.50	-4.00	10.75	9.25
900-60	60,000	10001-00	9	57.00	56.00	-2.50	-4.25	11.50	9.75
With 4.5 Trunnion Height Add (900-36 thru 44)/(900-50 & 60)						2.00/0.00	2.00/0.00	2.00/0.00	2.00/0.00
With 6.5 Trunnion Height Add (900-36 thru 44)/(900-50 & 60)						4.00/2.00	4.00/2.00	4.00/2.00	4.00/2.00
With 8.5 Trunnion Height Add (900-36 thru 44)/(900-50 & 60)						6.00/4.00	6.00/4.00	6.00/4.00	6.00/4.00
When 5.75" or 6" Rd. Axles Are Used Subtract						-.50	-.50	-.50	-.50

Mounting heights shown for models 900-50 & 60 are based on a 4.50 high trunnion bracket. Do not use the 2.50 high bracket on models with 50,000 lbs. GTWR or greater.

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

900 Tapered Leaf (shown) and Multi-Leaf – 36 thru 60,000

Bill of Materials

Item	Part No.	Quantity: Overslung Trunnion, Overslung Axle	Quantity: Overslung Trunnion, Underslung Axle	Quantity: Underslung Trunnion, Overslung Axle	Quantity: Underslung Trunnion, Underslung Axle	Description
1	See Chart A, Page 8	2	2	2	2	Trunnion Hanger
2	10376-00	4	4	4	4	Hex Bolt 3/4" – 16 UNF x 4 1/2" GR5
3	895-00	2	2	2	2	Washer, 7GA x 4 1/32 ID x 5 3/4 OD
4	See Chart B, Page 8	1	1	1	1	Trunnion Tube
5	See Chart C, Page 8	4	4	4	4	U-Bolt, Trunnion
6	9640-00	2	2	0	0	Top Plate – Cast, Square U-Bolt
7	See Chart D, Below	2	2	2	2	Spring
8	See Chart E, Page 8	4	4	4	4	Spring End Cap
9	841-00	20	4	20	4	Hex Nut, Self Locking 3/4" – 16 UNF
10	9293-00	16	8	16	8	Hex Bolt, 5/8" – 18 UNF x 2" GR5
11	817-00	32	0	32	0	Washer, 1/8" x 13/16 ID x 1 1/2 OD
12	814-00	8	8	8	8	Rubber Pad – Plain
13	10608-00	4	4	4	4	Adjustment Plate
14	See Chart F, Page 8	4	4	4	4	Spring Seat
15	10273-00	16	8	16	8	Washer, 1/8" x 21/32 ID x 1 15/16 OD
16	11513-03	16	8	16	8	Hex Locknut 5/8" – 18 UNF
17	See Chart G, Page 8	8	8	8	8	U-Bolt – Axle
18	12919-01‡	2	2	2	2	Galvanized Liner – .040 x 4.75 x 10.00
19	891-00	2	2	2	2	Trunnion Hub – Upper Half
20	890-00	2	2	2	2	Rubber Bushing, Trunnion Hub
	20248-01	2	2	2	2	Free Oscillating Trunnion Bushing*
21	898-00	2	2	—	—	Trunnion Hub – Lower Half
	892-00	—	—	2	2	Trunnion Hub – Lower Half
22	837-00	8	8	8	8	Washer, 1/8" x 1 1/4 ID x 2 1/4 OD
23	836-00	8	8	8	8	Hex Nut, 1 1/8" – 12 UNF x 1 1/2 HI
24	10562-00	0	16	0	16	Flange Nut – Self Locking 1-14 UNS
25	820-00	0	0	2	2	Spring Clamp Plate
26	10488-00	4	4	4	4	Pressure Plate, 5" x 5" Axle Only

Chart D – Spring Identification ** (Item #7)

Unit Weight Capacity (lbs.)	36,000	36,000	36,000	42,000	42,000	44/50,000	50,000	50,000	50,000	60,000
Number of Leaves	Tapered 2‡	5	5	6	6	Tapered 3‡	7	7	8	9
Spring Part No.	16258-01	10054-00	11151-00	9997-00	9998-00	12258-01	10055-00	9999-00	10000-00	10001-00

* Available upon request, must be specified.

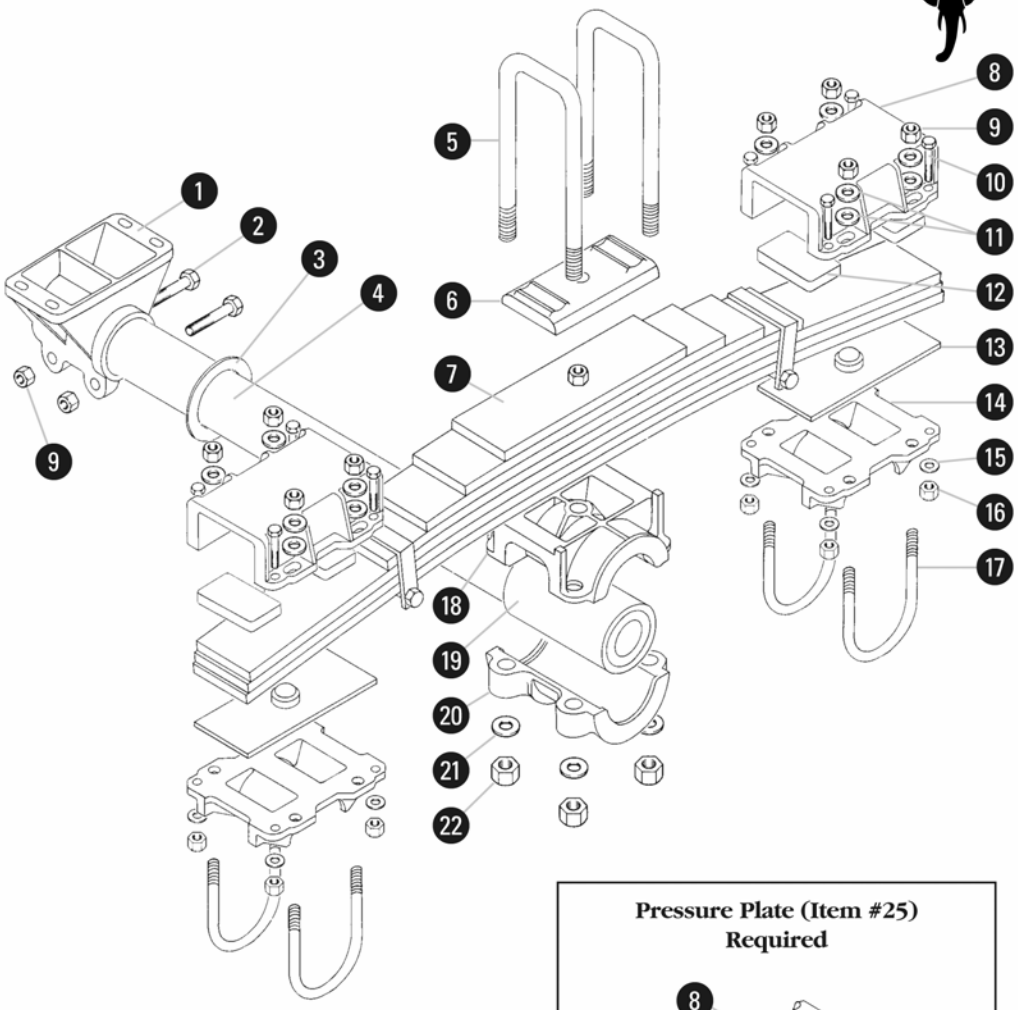
** For a detailed description of axle spacings, mounting heights, etc. obtained when utilizing the above springs, see the Axle Specifications And Mounting Heights Charts on Page 4.

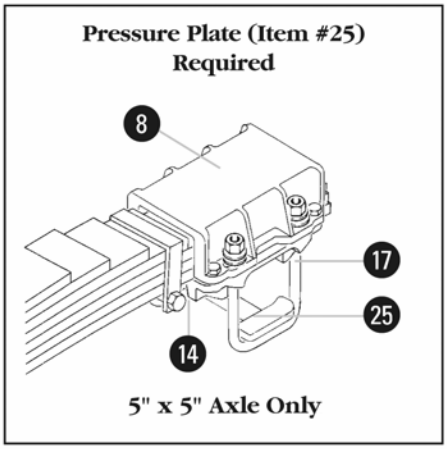
‡ A galvanized liner is required on the tension surface (bottom side) of the spring when taper leaf (2 and 3 leaf) springs are utilized. Liners are not required on flat plate (5, 6, 7, 8 and 9 leaf) springs.

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

Overslung Trunnion — Overslung Axle

900





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H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

900 — 36, 42, 44, 50 and 60,000

Chart A – Trunnion Hanger (Item #1)

	Trunnion Hanger Height			
	2 1/2"	4 1/2"	6 1/2"	8 1/2"
Part No.	850-01	10476-03	849-01	897-01

Chart B – Trunnion Tube (Item #4)

	Spring Centers/Trunnion Hanger Centers				
Unit Weight Capacity (lbs.)	38"/22.12"	36"/20.12"	44"/28.12"	42"/26.12"	41"/25.12"
36,000 - 44,000	893-01	893-04	893-07	893-09	893-11
50,000 and 60,000	893-02	893-05	893-08	893-10	893-12

Chart C – Trunnion U-Bolt (Item #5)

Unit Weight/Spring	Trunnion Configuration			
Capacity (lbs.)/Part No.	Overslung	Lgth.	Underslung	Lgth.
36,000/10054-00	9639-01	12 5/16"	835-02	13 3/4"
36,000/11151-00	9639-01	12 5/16"	835-02	13 3/4"
36,000/16258-01	9639-10	11"	835-01	12 3/8"
42,000/9997-00	9639-02	13 1/8"	835-03	14 5/8"
42,000/9998-00	9639-02	13 1/8"	835-03	14 5/8"
44,000/12258-01	9639-01	12 5/16"	835-02	13 3/4"
50,000/10055-00	9639-03	13 15/16"	835-04	15 3/8"
50,000/9999-00	9639-03	13 15/16"	835-04	15 3/8"
50,000/12258-01	9639-01	12 5/16"	835-02	13 3/4"
50,000/10000-00	9639-04	14 11/16"	835-06	16 1/8"
60,000/10001-00	9639-05	15 1/2"	835-05	17"

Chart E – Spring End Cap (Item #8)

	Unit Weight	Axle Configuration	
Axle Size	Capacity (lbs.)	Overslung	Underslung
5" Rd. – 5" x 5" Sq.	36,000	10049-00	10050-02
	42-60,000	9937-00	9941-02
5 3/4" Rd. – 6" Rd.	36,000	10049-00	—
	42-60,000	9937-00	9942-02

Chart F – Spring Seat (Item #14)

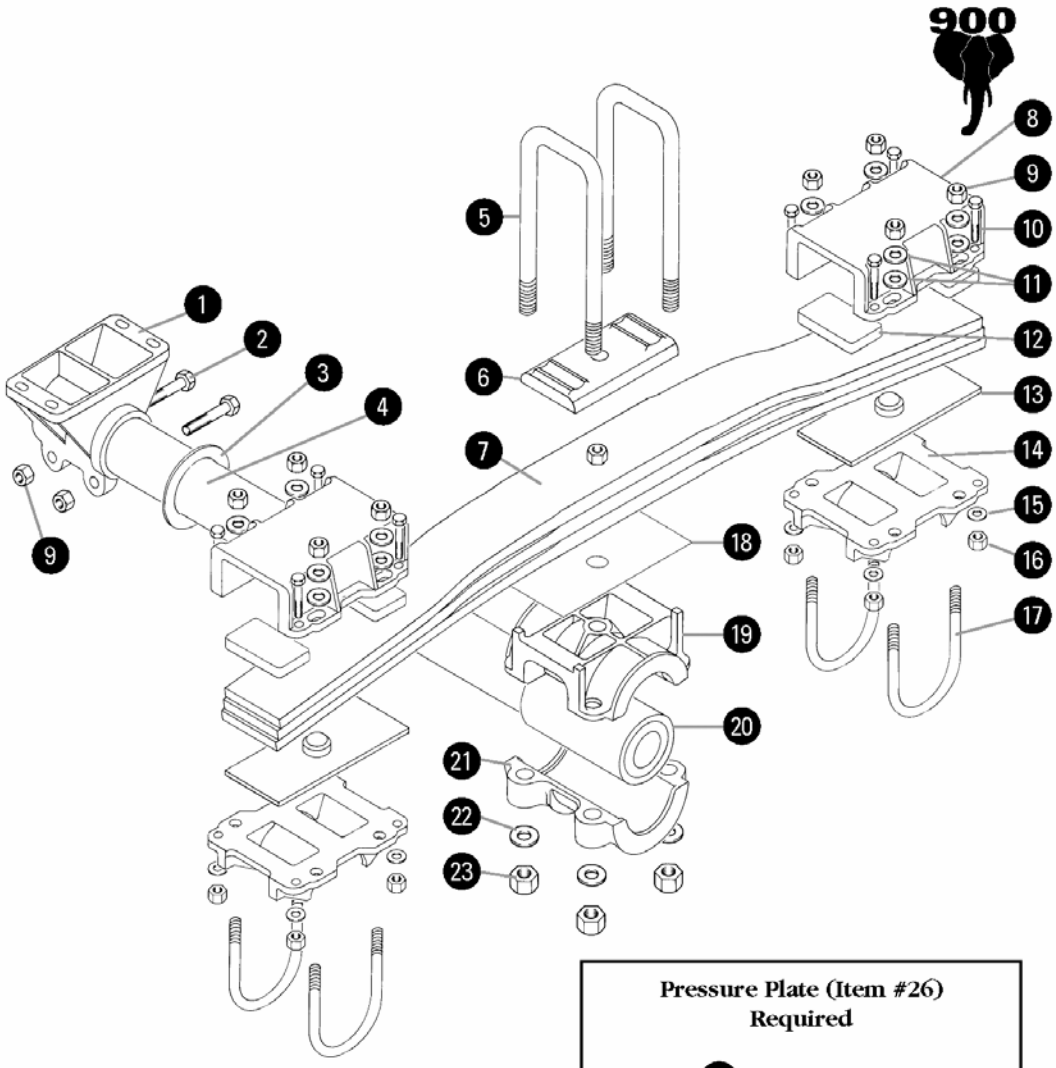
	Axle Configuration	
Axle Size	Overslung	Underslung
5" Rd.	9934-02	9938-00
5" x 5" Sq.	9935-02	9939-00
5 3/4" Rd.	9936-03	9940-00
6" Rd.	9936-04	9940-01

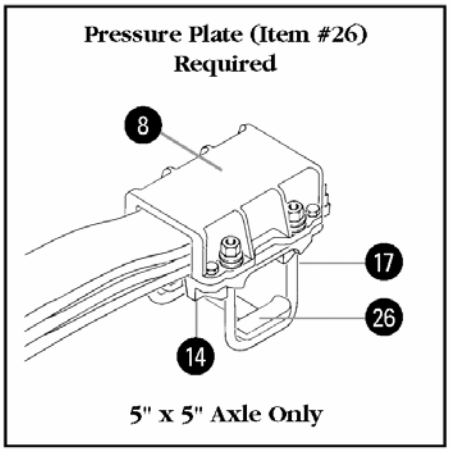
Chart G – Axle U-Bolt (Item #17)

	Unit Weight	Axle Configuration			
Axle Size	Capacity (lbs.)	Overslung	Lgth.	Underslung	Lgth.
5" Rd.	36,000	10060-01	7"	10064-01	9 3/4"
	42-60,000	10060-01	7"	10064-02	10 1/2"
5" x 5" Sq.	36,000	10063-02	7 7/8"	10067-02	10 1/2"
	42-60,000	10063-02	7 7/8"	10067-03	11 1/8"
5 3/4" Rd.	36,000	10061-01	8"	10065-01	11 1/2"
	42-60,000	10061-01	8"	10065-01	11 1/2"
6" Rd.	36,000	10062-01	8"	10066-01	11 1/2"
	42-60,000	10062-01	8"	10066-01	11 1/2"

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

Overslung Trunnion — Overslung Axle





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H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

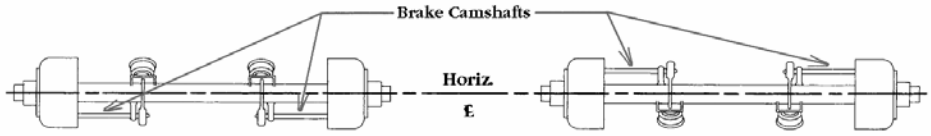
Installation

Pre-Installation

The 900 single point suspension is shipped assembled - except for the axle U-bolts, nuts and washers which are packaged separately. On each axle there is one adjustment plate factory welded, and one that is welded by the installer following axle alignment. Refer to the preceding pages for detailed component information, unit capacity, and mounting heights. Before beginning any installation procedures, the customer should read all installation instructions thoroughly.

Prior to installation check for interference between brake camshafts and suspension components. Recommended camshaft locations are as follows:

Fig. 1



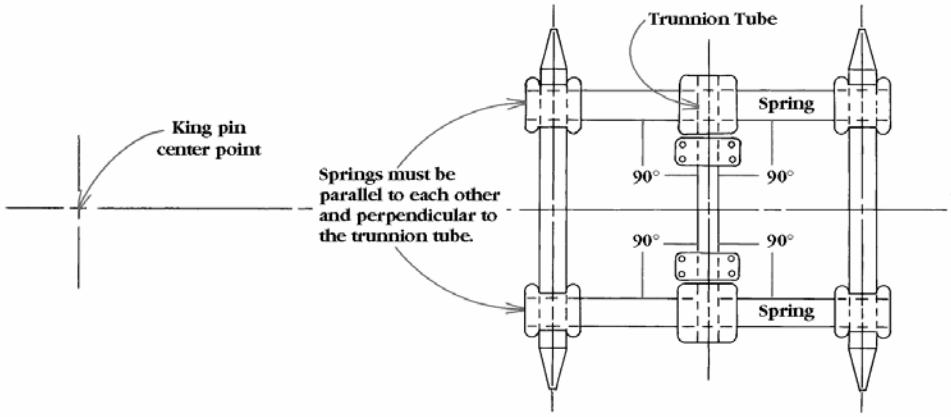
Overslung Axle Configuration
Locate brake camshafts at the axles horiz. centerline or below

Underslung Axle Configuration
Locate brake camshafts at the axles horiz. centerline or above

Inspect the suspension assembly to be certain that spring alignment has not been destroyed during shipment.

Set the suspension on the axles. Check to see that the springs are parallel to each other and perpendicular to the trunnion tube. **See Fig. 2.** Be sure the nuts on the trunnion hub U-bolts are torqued to specification.

Fig. 2

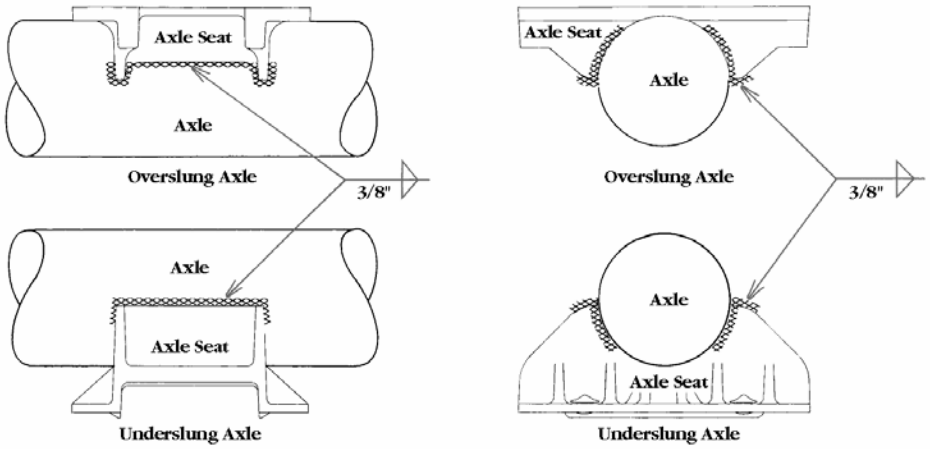


Axle Installation

1. With the axle camber up, locate the center of both axles by measuring between the brake flanges and marking the center.
2. Place the suspension on the axles, making certain that the axle seats are an equal distance from the center of the axle. All axle seats should measure the same distance from the brake flanges.
3. Align the camber marks on the top of the axle with the centerline of the axle seats. Be certain that all axle seats fit the axle properly. If necessary, grind the axle seats to ensure that they fit properly, and are horizontal and parallel.
4. Tack-weld seats in place and recheck to make certain they are still level, parallel, and in the proper location and alignment.

Important: On underslung models, axle seats must be located beneath axles. **See Fig. 3.** Be certain that the camber marks are on top of the axle.

Fig. 3

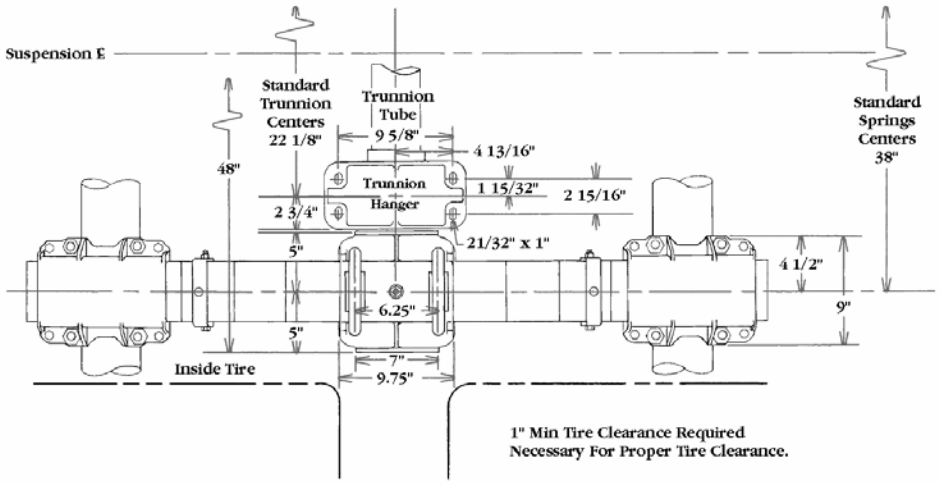


5. Check tire clearance with the suspension at this time. **See Fig. 4.**
6. Following the axle manufacturer's welding recommendations, weld the axle seats to the axle using 3/8" fillet welds on front and rear of the axle seats. **See Fig. 3.**

Caution: Do not attach welding ground clamps to U-bolts, springs or axles except to designated weld points. These parts should be protected from weld splatter.

7. Assemble axle U-bolts to spring end boxes, but do not tighten.

Fig. 4



Preparing Trailer Frame For Mounting Tandem Assembly

Determine suspension location on the trailer frame by measuring from the king pin to outside of the frame at desired location and marking each side at the suspension's centerline. The frame should now be prepared for mounting of the suspension in one of the following three ways:

1. Use of the optional Hutch mounting brackets (Part #16793-01). Two each are required. **See Fig. A on Page 3.**

Note: Additional bracing (furnished by the installer) connecting one mounting bracket with the other is recommended. **See Fig. 5 on Page 11.**

2. Fabrication of your own mounting bracket.
3. Bolting directly to the frame.

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

Note: When any of the aforementioned methods of mounting the suspension are utilized a "minimum dimension" must be maintained between the trunnion tube centerline and the top of the suspension components. **See Fig. 5.** This minimum dimension is tabulated in **Chart H**.

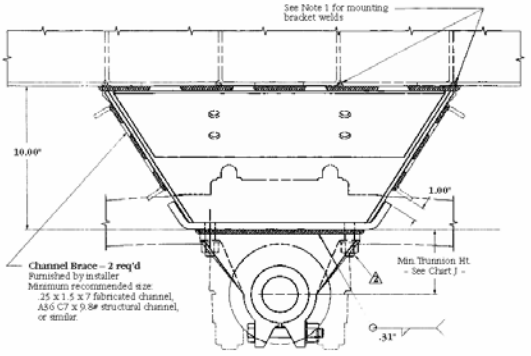
Chart H

Model	Number of Spring Leaves	Minimum Dimension Overslung Trunnion	Minimum Dimension Underslung Trunnion
900-36	2	9"	4 1/2"
900-36	5	10 1/2"	4 1/2"
900-42	6	11 1/4"	4 1/2"
900-44	3	10"	4 1/2"
900-50	3	10"	4 1/2"
900-50	7	12"	4 1/2"
900-50	8	12 3/4"	4 1/2"
900-60	9	13 1/2"	4 1/2"

Installation Using Hutchens Mounting Brackets (Part #16793-01)

Fig. 5

Side View (Typ)



Channel Frame End View

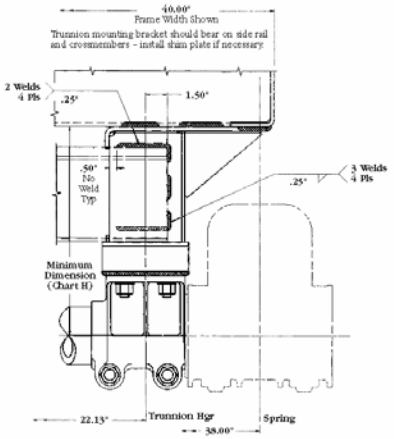
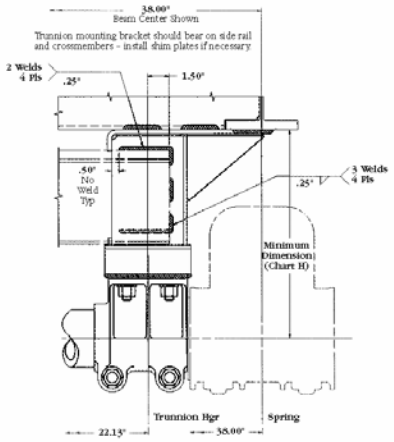


Chart J

Number of Spring Leaves	2	3	5	6	7	8	9
Min Trunnion Hanger Ht.	2.50	4.50	4.50	4.50	6.50	6.50	6.50

I Beam Frame End View



Note:

1. a) The upper trailer structure shown is intended to be a generic representation of a typical installation, and is not intended to be a detailed recommendation for a fabrication of a trailer subframe.

   b) The welds attaching the mounting bracket to the subframe will be determined by the configuration of the structure, and are the responsibility of the trailer manufacturer.

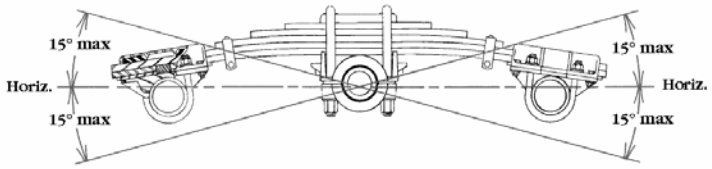
   c) As a general recommendation, the frame bracket should be welded to the trailer structure with either a solid weld or skip welds that cover at least 60% of the mounting bracket perimeter. Do not weld within 1/2" of any raw edges of the trailer main rails or crossmembers. Welding should be in accordance with AWS E70XX procedures or equivalent.
2. Mounting bracket bolts are to be furnished by installer – size 5/8" fastener, Grade 5 or better.

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

Bump-Outs

When rubber bushings are utilized in the trunnion connection, the maximum oscillation at the trunnion hub should not exceed 15° above or below horizontal. **See Fig. 10.** Spring end boxes are designed to accept bump-outs or stops, which the installer should provide to assure tire clearance or to limit oscillation – whichever becomes critical first.

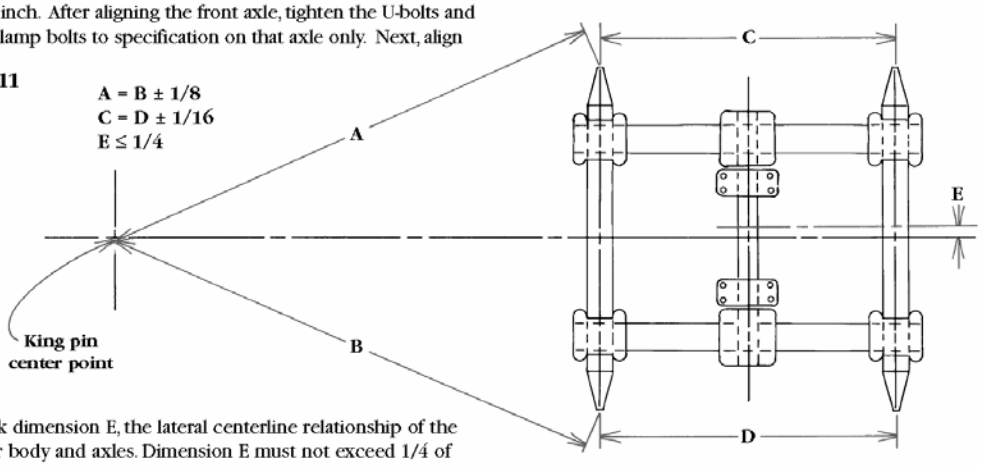
Fig. 10



Axle Alignment

After the suspension has been installed under the trailer, the axles should be properly aligned in relation to the trailer king pin in the following manner: Measure the distance from the king pin to the centerline of the spindles on the front axle. As noted in **Fig. 11**, dimensions A and B must be equal within 1/8 of an inch. After aligning the front axle, tighten the U-bolts and end clamp bolts to specification on that axle only. Next, align the rear axle with the front axle. As noted in **Fig. 11**, dimensions C and D must be equal within 1/16 of an inch. After aligning the rear axle with the front axle, tighten the U-bolts and end clamp bolts on the rear axle. Refer to TTMA RP No. 71-90 (Trailer Axle Alignment) for more detail.

Fig. 11



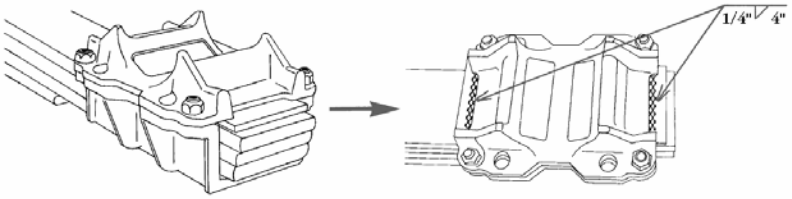
Check dimension E, the lateral centerline relationship of the trailer body and axles. Dimension E must not exceed 1/4 of an inch. At this time, recheck the alignment of the front axle with the king pin, and the rear axle with the front axle. After alignment has been accomplished, tighten the U-bolts and nuts to specification.

Adjustment Plate Welding

On each axle there is one adjustment plate that is welded at the factory and one that is not.

After alignment has been completed, weld the unwelded alignment plate exactly like the one that has been welded at the factory. See Fig. 12.

Fig. 12



CAUTION – These adjustment plates MUST BE WELDED BEFORE operating the trailer.

Check all fasteners (U-bolts, end cap, trunnion hub, etc.) to make sure they are torqued to specification. Torque for all fasteners should be checked after an initial break-in period, and periodically thereafter. **See Decal Note on Page 14.**

H-38. SUSPENSION CONFIGURATIONS AND PARTS IDENTIFICATION (Cont.)

Numerical Listing of Parts

Part No.	Description	Pg. #
814-00	Rubber Pad - Plain	5
817-00	Washer - 1/8 x 13/16 ID x 1 1/2 OD	5
820-00	Spring Clamp Plate	5
835-01	U-Bolt - 1.067 DIA, 5 7/8 RD x 12 3/8	8
835-02	U-Bolt - 1.067 DIA, 5 7/8 RD x 13 3/4	8
835-03	U-Bolt - 1.067 DIA, 5 7/8 RD x 14 5/8	8
835-04	U-Bolt - 1.067 DIA, 5 7/8 RD x 15 3/8	8
835-05	U-Bolt - 1.067 DIA, 5 7/8 RD x 17	8
835-06	U-Bolt - 1.067 DIA, 5 7/8 RD 16 1/8	8
835-07	U-Bolt - 1.067 DIA, 5 7/8 RD x 13 1/2	8
836-00	Hex Nut - 1 1/8 - 12 UNF, 1 1/2 HI	5
837-00	Washer - 1/8 x 1 1/4 ID x 2 1/4 OD	5
841-00	Hex Nut - Self Locking, 3/4 - 16 UNF	5
849-01	Trunnion Hgr. - Cast, 6 1/2 HI, 11 LG	8
850-01	Trunnion Hgr. - Cast, 2 1/2 HI, 11 LG	8
852-00	Spacer - Trunn Hgr, 2 High, 11 LG	12
890-00	Rubber Bushing - Trunnion Hub	5
891-00	Trunnion Hub - Upper Half, Cast	5
892-00	Trunnion Hub - Lower Half, Cast	5
893-01	Trunnion Tube - 1/2 Wall, 48 LG	8
893-02	Trunnion Tube - 3/4 Wall, 48 LG	8
893-04	Trunnion Tube - 1/2 Wall, 46 LG	8
893-05	Trunnion Tube - 3/4 Wall, 46 LG	8
893-07	Trunnion Tube - 1/2 Wall, 54 LG	8
893-08	Trunnion Tube - 3/4 Wall, 54 LG	8
893-09	Trunnion Tube - 1/2 Wall, 52 LG	8
893-10	Trunnion Tube - 3/4 Wall, 52 LG	8
893-11	Trunnion Tube - 1/2 Wall, 51 LG	8
893-12	Trunnion Tube - 3/4 Wall, 51 LG	8
895-00	Washer - 7 GA x 4 1/32 ID x 5 3/4 OD	5
897-01	Trunnion Hgr. - Cast 8 1/2 HI, 11 LG	8
898-00	Trunnion Hub - Lower Half, Cast	5
9293-00	Hex Bolt - 5/8 - 18 UNF x 2, GR 5	5
9639-01	U-Bolt - 1.067 DIA, 5 1/8 SQ, 12 5/16	8
9639-02	U-Bolt - 1.067 DIA, 5 1/8 SQ, 13 1/8	8
9639-03	U-Bolt - 1.067 DIA, 5 1/8 SQ, 13 15/16	8
9639-04	U-Bolt - 1.067 DIA, 5 1/8 SQ, 14 11/16	8
9639-05	U-Bolt - 1.067 DIA, 5 1/8 SQ, 15 1/2	8
9639-09	U-Bolt - 1.067 DIA, 5 1/8 SQ, 12	8
9639-10	U-Bolt - 1.067 DIA, 5 1/8 SQ, 11	8
9640-00	Top Plate - Cast, SQ U-Bolt	5
9934-02	Spring Seat - Adj., 5 RD, OS	8
9935-02	Spring Seat - Adj., 5 SQ, OS	8
9936-03	Spring Seat - Adj., 5 3/4 RD, OS	8
9936-04	Spring Seat - Adj., 6 RD, OS	8
9937-00	Spring End Cap - OS	8
9938-00	Spring Seat - 5 RD, US	8
9939-00	Spring Seat - 5 SQ, US	8
9940-00	Spring Seat - 5 3/4 RD, US	8
9940-01	Spring Seat - 6 RD, US	8
9941-02	Spring End Cap - Adj., 5 RD & 5 SQ, US	8
9942-02	Spring End Cap - Adj., 5 3/4 RD & 6 RD, US	8
9997-00	Spring Assembly - 6 Leaf, 42,000 LB, 48 AC	4, 5, 8
9998-00	Spring Assembly - 6 Leaf, 42,000 LB, 50.5 AC	4, 5, 8
9999-00	Spring Assembly - 7 Leaf, 50,000 LB, 50.5 AC	4, 5, 8
10000-00	Spring Assembly - 8 Leaf, 50,000 LB, 54 AC	4, 5, 8
10001-00	Spring Assembly - 9 Leaf, 60,000 LB, 54 AC	4, 5, 8
10049-00	Spring End Cap - OS, 36,000 LB	8
10050-02	Spring End Cap - US, 36,000 LB	8
10054-00	Spring Assembly - 5 Leaf, 36,000 LB, 48 AC	4, 5, 8
10055-00	Spring Assembly - 7 Leaf, 50,000 LB, US	4, 5, 8
10060-01	U-Bolt - 0.706 DIA, 5 RD x 7	8
10061-01	U-Bolt - 0.706 DIA, 5 3/4 RD x 8	8
10062-01	U-Bolt - 0.706 DIA, 6 RD x 8	8
10063-02	U-Bolt - 0.706 DIA, 5 SQ x 7 7/8	8
10064-01	U-Bolt - 0.949 DIA, 5 RD x 9 3/4	8
10064-02	U-Bolt - 0.949 DIA, 5 RD x 10 1/2	8
10065-01	U-Bolt - 0.949 DIA, 5 3/4 RD x 11 1/2	8
10066-01	U-Bolt - 0.949 DIA, 6 RD x 11 1/2	8
10067-02	U-Bolt - 0.949 DIA, 5 SQ x 10 1/2	8
10067-03	U-Bolt - 0.949 DIA, 5 SQ x 11 1/8	8
10273-00	Washer - 1/8 x 21/32 ID x 1 5/16 OD	5
10376-00	Hex Bolt - 3/4 - 16 UNF x 4 1/2 LG	5
10476-03	Trunnion Hgr. - Cast, 4 1/2 HI	8
10488-00	Pressure Plate - Cast, 5 SQ	5
10562-00	Flange Locknut - 1-14 UNS, GR F & CAD.PL.	5
10608-00	Plate - Adj.	5
11151-00	Spring Assembly - 5 Leaf, 36,000 LB, 50.5 AC	4, 5, 8
11513-03	Hex Locknut - 5/8 - 18 UNF GrC	5
12258-01	Spring Assembly - 3 Leaf	4, 5, 8
12919-01	Galvanized Liner - .040 x 4.75 x 10.00	5
12970-01	Spacer - Trunn Hgr, 1 High, 11 LG	12
16087-01	Decal - 900 Series	14
16258-01	Spring Assembly - 2 Leaf	4, 5, 8
16793-01	Mounting Bracket - H900, 10.00 HI	3, 11
20248-01	Trunnion Bushing - Free Oscillating	5

Important: Warning Decal Note

When the installation of your "Hutch" single point suspension is complete and the trailer has been painted, a torque requirement decal (Part No. 16087-01 Rev.A) should be installed in plain view, preferably on the driver's side of the trailer immediately above the suspension. It is essential that the correct decal is in plain view on each trailer. Decals are shipped with the suspension. If decals are not received, or if for any reason additional decals are wanted, contact our Customer Service Department at (417) 862-5012 or fax (417) 862-2317 and decals will be shipped promptly at no charge.

⚠ WARNING

SAFETY ALERT! (1) FOLLOW ALL TORQUE REQUIREMENTS. (2) DO NOT USE ANY COMPONENT WITH VISIBLY WORN OR DAMAGED THREADS. FAILURE TO FOLLOW THESE SAFETY ALERTS CAN LEAD TO LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, SERIOUS PERSONAL INJURY OR DEATH.

Hutchens Suspension Torque Requirements
900 Series (Decal Part Number 16087-01 Rev. A)

After an initial break in period approximately 1000 miles, and at least every 4 months periodically thereafter, ALL bolts and nuts should be checked to insure that recommended torque values are being maintained.
Oiled torque values listed are for new fasteners with lubricated threads. It is recommended that new installations be performed with oiled fasteners. For dry threads which have been in service, use the higher torque values which are noted below.

	OILED	DRY
1 1/8-12 UNF	670 lb-ft	880 lb-ft
1-14 UNF	540 lb-ft	750 lb-ft
3/4-16 UNF	220 lb-ft	300 lb-ft
5/8-18 UNF	130 lb-ft	180 lb-ft

Hutchens Industries, Inc., P.O. Box 1427, Springfield, MO 65801-1427 Toll Free 1 (800) 654-8824

RPSTL INTRODUCTION

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 M871A3 Semitrailer dropdeck, tactical, dual purpose, breakbulk/container, transporter, 22 ½ ton. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

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.

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:

Source Code	**Maintenance Code**		**Recoverability Code**	**Demilitarization Code**
xx	x	x	x	x
1st two positions: How to get an item.	3rd position: Who can Install, replace, or use item.	4th position: Who can complete repair* on the item.	5th position: Who determines disposition action Items on Unserviceable items.	6th position: Method and degree of demilitarizing items when required.

*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.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LISTS AND SPECIAL TOOLS LIST WORK PACKAGES. (Cont.)

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:

Source Code	Application/Explanation
PA PB PC PD PE PF PG	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. **NOTE** Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance level indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.
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	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.
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	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.
XA	Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to NOTE below.)
XB	If an item is not available from salvage, order it using the CAGEC and P/N.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer's P/N.
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.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LISTS AND SPECIAL TOOLS LIST WORK PACKAGES. (Cont.)

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:

NOTE

There are 2 Levels of Maintenance: Field and Sustainment.

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. (Field Level)
O -	Unit level/AVUM maintenance can remove, replace, and use the item. (Field Level)
F -	Direct support/AVIM maintenance can remove, replace, and use the item. (Field Level)
H -	General support maintenance can remove, replace, and use the item. (Sustainment Level)
L -	Specialized repair activity can remove, replace, and use the item. (Sustainment Level)
D -	Depot can remove, replace, and use the item. (Sustainment Level)

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.
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 -	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
O -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the unit level.
F -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support level.
H -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level.
D -	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot level.
L -	Reparable 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 it's 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.

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 sown 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.

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	When using this column to locate an
(e.g., 5385-01-574-1476)	item, ignore the first four digits of the
NIIN	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.

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:

Code	Used On
DLH	M871A3

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.

NOTE

The Princeton, Kentucky fontaine Plant is the order entry point for M871A3 parts support. For parts inquiries call (270) 365-1177 0r (877) 462-3866. This Plant's CAGEC is: 3DGR3.

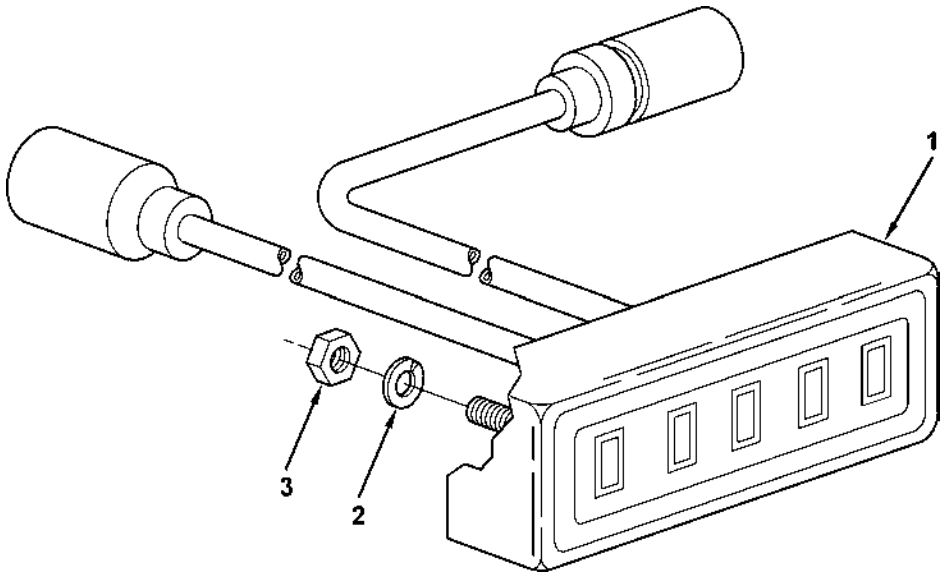


Figure 1. Blackout light

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 0609 LIGHTS		
						FIG. 1 BLACKOUT LIGHT		
CAABA	1	PFOZZA	6220-01-088-5915	5A910	12258212	TAILLIGHT ASSY., BLACKOUT 24 VOLT.....	2	
CAAM	2	PFOZZA	5310-00-045-3299	96906	MS35338-42	WASHER, LOCK NO. 8	4	
CAAN	3	PFOZZA	5310-00-934-9757	96906	MS35649-282	NUT,PLAIN,HEXAGON H 8-32	4	
						END OF FIGURE		

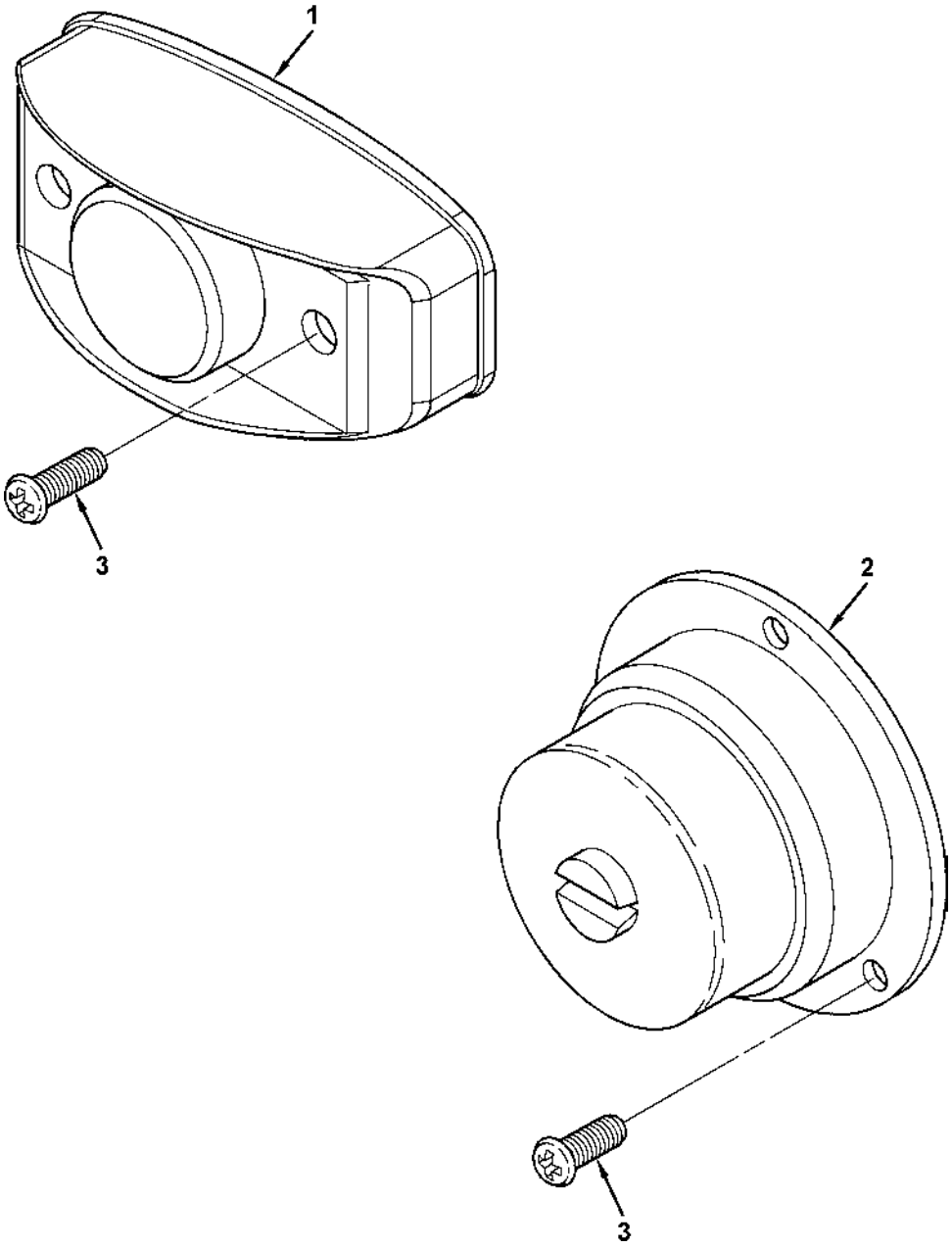


Figure 2. Clearance Lights

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 0609 LIGHTS		
						FIG. 2 CLEARANCE LIGHTS		
CAAFB	1	PFOZZA	6220-01-482-6113	13548	07406	LIGHT,MARKER,CLEARANCE,LED, RED	5	
CAAEB	1	PFOZZA	6220-01-482-5574	13548	07407	LIGHT,MARKER,CLEARANCE,LED, AMBER	2	
CADJ	2	PFOZZA	6220-01-499-3374	12662	M165A-MV	LIGHT,MARKER,CLEARANCE,AMBER LED	2	
CADH	3	PFOZZA	5305-01-499-3342	0FBD6	52100013	SCREW, SELF TAPPING	20	
						END OF FIGURE		

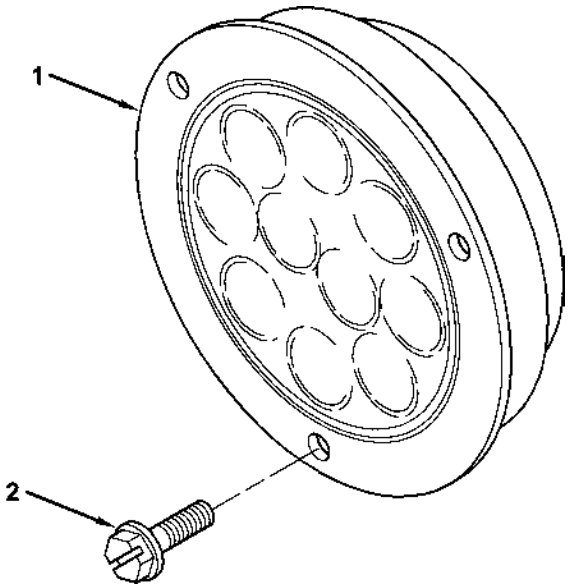


Figure 3. LED Taillight

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 0609 LIGHTS		
						FIG. 3 LED TAILLIGHT		
CAACA	1	PFOZZA	6220-01-499-3350	12662	M418R-2	TAILLIGHT,LED.....	4	
CAAL	2	PFOZZA	5305-01-499-5551	0FBD6	52100010	SCREW,HEXAGON HEAD.....	12	
						END OF FIGURE		

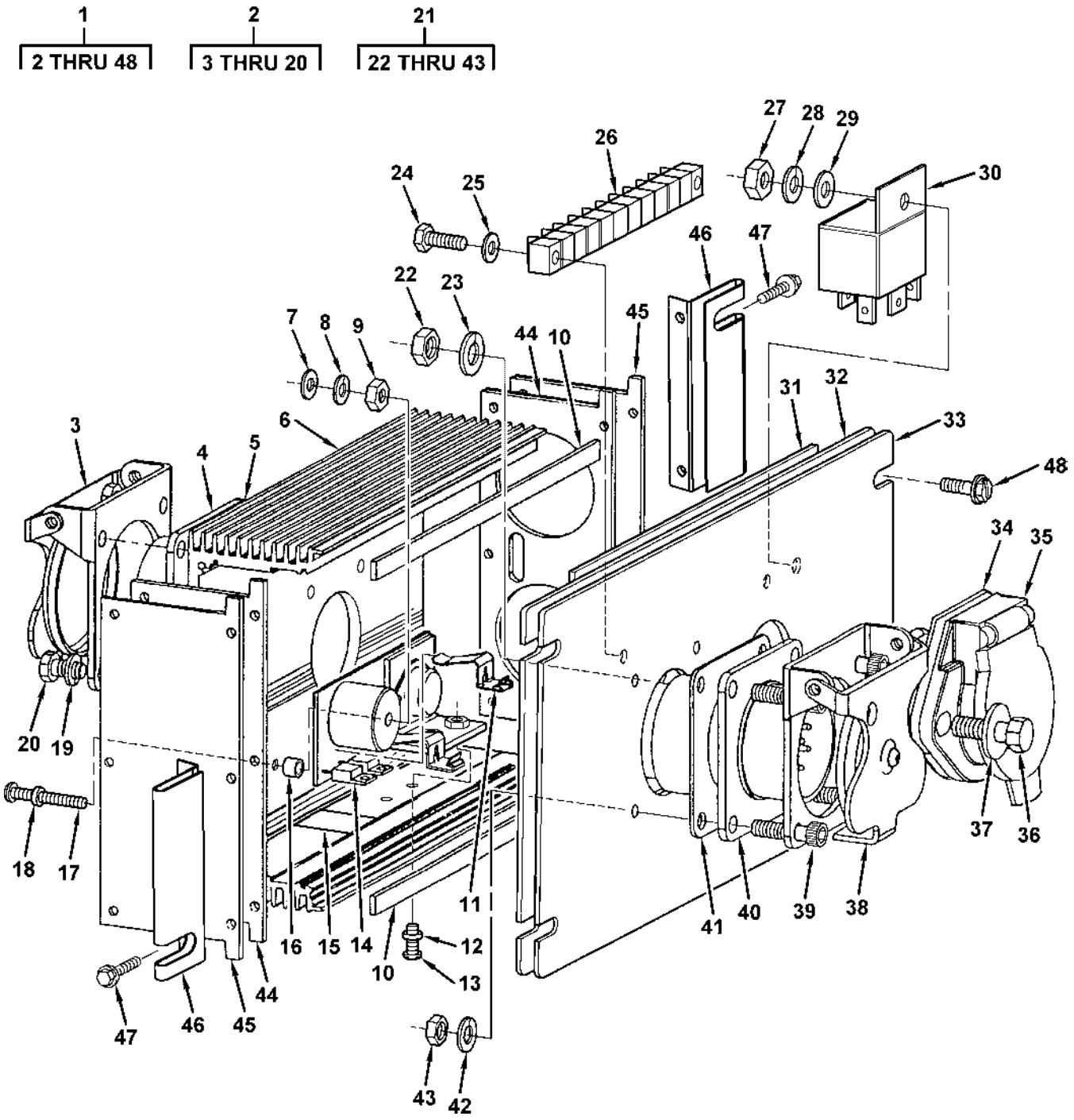


Figure 4. Converter Box

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 0613 HULL OR CHASSIS WIRING HARNESS		
						FIG. 4 CONVERTER BOX		
CAAK	1	PFOOO	6130-01-504-7552	0FBD6	50506003	CONVERTER BOX	1	
CAAT	2	XDOZZA		60359	0N10-1038-00	·ENCLOSURE ASSY, TRAILER SIDE	1	
CAAQ	3	PFOZZA	5935-01-503-8418	60359	OK40-0586-00	···DOOR, CONNECTOR, RECEPTICLE	1	
CAAR	4	PFOZZA	5330-01-503-8319	60359	0L90-0920-00	··CONNECTOR, HARNESS	1	
CAAS	5	PFOZZA	5330-01-503-8305	60359	0D10-0403-00	··GASKET, MOUNTING,12 PIN	1	
CKAG	6	PFOZZA	5999-01-504-6246	60359	0B40-0102-01	··ENCLOSURE EXTRUSION	1	
CKCG	7	PFOZZA	5310-01-504-6467	60359	0F54-0843-00	··FLATWASHER #4	1	
CKBU	8	PFOZZA	5310-01-504-6468	60359	0F54-0844-00	··WASHER, SPLIT RING #4	1	
CKBN	9	PFOZZA	5310-01-504-6469	60359	0F44-0845-00	··NUT #4-40	1	
CAAX	10	PFOZZA	5999-01-503-8427	60359	0D10-0626-00	··GASKET, BOTTOM PLATE	2	
CKBG	11	PFOZZA	5340-01-504-6471	60359	0F65-0713-00	··CLIP	1	
CKCU	12	PFOZZA	5310-01-504-6472	60359	0F51-0597-00	··WASHER, COLLAR, NYLON #6	2	
CKCN	13	PFOZZA	5305-01-504-6475	60359	0F14-0596-00	··SCREW #6-32 X 1/2"	2	
CKAU	14	PFOZZA	5998-01-504-6248	60359	0H90-0649-00	··CIRCUIT BOARD	1	
CKAN	15	PFOZZA	5970-01-504-7545	60359	0D80-0851-00	··INSULATING PAD	2	
CKDG	16	PFOZZA	5365-01-504-7546	60359	0F80-0840-00	··SPACER,NYLON #4	1	
CKDU	17	PFOZZA	5305-01-504-6477	60359	0F14-0842-00	··SCREW #4-40X1 5/8”	1	
CKDN	18	PFOZZA	5310-01-504-6481	60359	0F51-0833-00	··WASHER,COLLAR,NYLON #4	1	
CABR	19	XDOZZA		60359	0F54-0606-00	··WASHER, SPLIT RING 1/4	4	
CABT	20	PFOZZA	5305-00-068-0501	60359	0F34-0604-00	··BOLT, HEX SOCKET 1/4-20X5/8	4	
CABE	21	XDOZZA		60359	0N10-1037-00	· ENCLOSURE ASSY, TRACTOR SIDE	1	
CAAU	22	PFOZZA	5310-00-880-7744	60359	0F44-0599-00	··NUT, HEX 5/16-18	2	
CAAV	23	PFOZZA	5310-00-243-2259	60359	0F54-0602-00	··WASHER, SPLIT RING 5/16	2	
CKEU	24	PFOZZA	5305-01-504-6475	60359	0F14-0596-00	··SCREW #6-32X1/2	2	
CKFG	25	PFOZZA	5310-01-504-6482	60359	0F54-0608-00	··WASHER,STAR #6	2	
CKEG	26	PFOZZA	2920-01-504-9917	60359	0K29-0906-00	··TERMINAL BLOCK	1	
CKFN	27	PFOZZA	5310-01-504-6483	60359	0F44-0911-00	··NUT,HEX,#10-24	1	
CKFU	28	PFOZZA	5310-01-504-6485	60359	0F54-0913-00	··WASHER,SPLIT RING	1	
CKGN	29	PFOZZA	5310-01-504-6487	60359	0F54-0912-00	··FLATWASHER #10	1	
CKHG	30	PFOZZA	5945-01-504-6254	60359	0440-0841-00	··RELAY	1	
CKGU	31	PFOZZA	5975-01-504-7548	60359	0B40-0105-01	··BASE EXTRUSION,24-12 CONVERTER	1	
CABD	32	PFOZZA	5999-01-503-8421	60359	0D10-0878-00	··GASKET, MOUNTING	1	
CKEN	33	PFOZZA	5340-01-504-7551	60359	0J10-0877-00	··MOUNTING PLATE	1	
CABF	34	PFOZZA	5999-01-503-8420	60359	0D10-0883-00	··GASKET, MOUNTING	1	
CABH	35	PFOZZA	5935-01-503-8417	60359	0L90-0922-00	··CONNECTOR, HARNESS	1	
CABJ	36	PFOZZA	5305-01-014-4252	60359	0F34-0598-00	··BOLT, HEX HEAD 5/16-18X1	2	

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
CABK	37	PFOZZA	5310-00-044-6363	60359	OF54-0601-00	··FLATWASHER, 5/16	2	
CABL	38	PFOZZA	5935-01-503-8418	60359	0K40-0586-00	··DOOR, CONNECTOR	1	
CABM	39	PFOZZA	5305-00-001-4822	60359	0F34-0603-00	··BOLT, HEX SOCKET HEAD 1/4-20X1	4	
CABP	40	PFOZZA	5935-01-503-8429	60359	OL90-0921-00	··CONNECT0R, HARNESS	1	
CABQ	41	PFOZZA	5330-01-503-8305	60359	0D10-0403-00	··GASKET, MOUNTING	1	
CABR	42	XDOZZA		60359	0F54-0606-00	··WASHER, SPLIT RING 1/4	4	
CABS	43	PFOZZA	5310-00-001-9833	60359	0F44-0605-00	··NUT, HEX 1/4-20	4	
CAAW	44	PFOZZA	5999-01-503-8428	60359	0D10-0621-00	· GASKET, END PLATE	2	
CAAY	45	PFOZZA	5999-01-503-8422	60359	0J10-0648-01	· PLATE, END	2	
CAAZ	46	PFOZZA	5975-01-503-8687	60359	0J13-1278-00	· STRAP, GROUND	2	
CABB	47	XDOZZA		60359	0F24-0738-00	· SCREW, #6X1/2	12	
CAAL	48	PFOZZA	5301-01-499-5551	0FBD6	52100010	· SCREW 1/4X3/4	4	

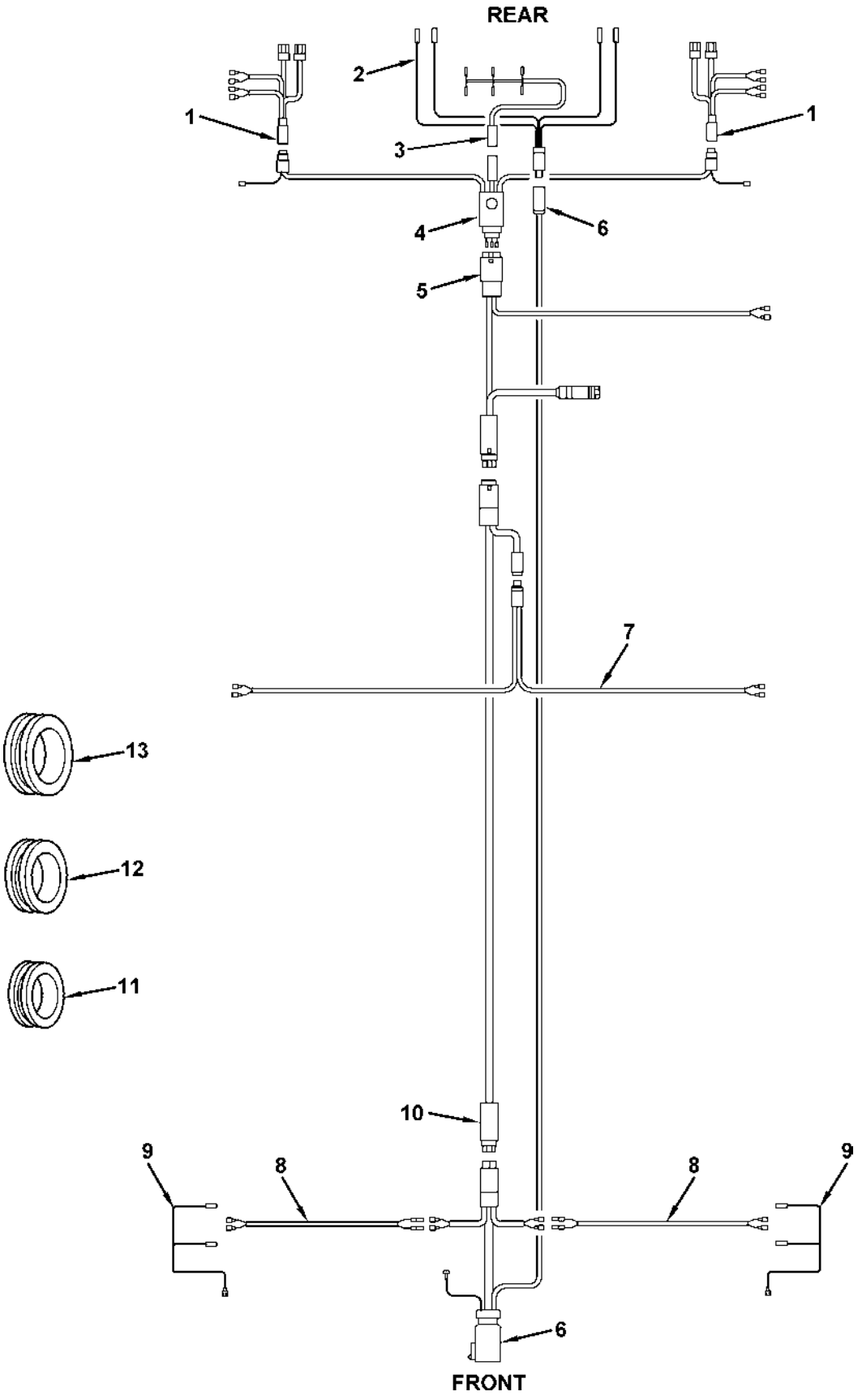


Figure 5. Wiring Harnesses

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 0613 CHASSIS WIRING HARNESS		
						FIG. 5 WIRING HARNESSES		
CACN	1	PFOZZA	6150-01-499-3332	64466	28161-028	HARNESS, PIGTAIL	2	
CACU	2	PFOZZA	6150-01-499-3289	64466	50851109	HARNESS, PIGTAIL, BO LIGHT	1	
CACG	3	PFOZZA	6150-01-499-3311	64466	72203-012	HARNESS	1	
CABG	4	PFOZZA	6150-01-499-3315	64466	25150-028	HARNESS, REAR	1	
CABN	5	PFOZZA	6150-01-499-3320	64466	17900-086	HARNESS, ABS MAIN	1	
CABU	6	PFOZZA	6150-01-499-3321	64466	PT1383	HARNESS, BO SOCKET	1	
CADA	7	PFOZZA	6150-01-499-3323	64466	63400-227	HARNESS, MIDTURN ABS	1	
CACA	8	PFOZZA	6150-01-499-3327	64466	52302-036	HARNESS, PL-10 MARKER	2	
CADG	9	PFOZZA	6150-01-499-3328	64466	82100-008	HARNESS,PL 10	2	
CABA	10	PFOZZA	6150-01-499-3329	64466	18125-400	HARNESS, MAIN	1	
CADK	11	PFOZZA	5325-00-279-1248	70485	2763	GROMMET, NONMETALLIC, CLEARANCE AND ABS LIGHT WIRING	11	
CADL	12	PFOZZA	5325-01-105-9454	70485	2570	GROMMET, NONMETALLIC	60	
CADM	13	PFOZZA	5325-01-499-3362	0FBD6	50824060	GROMMET, NONMETALLIC	4	
						END OF FIGURE		

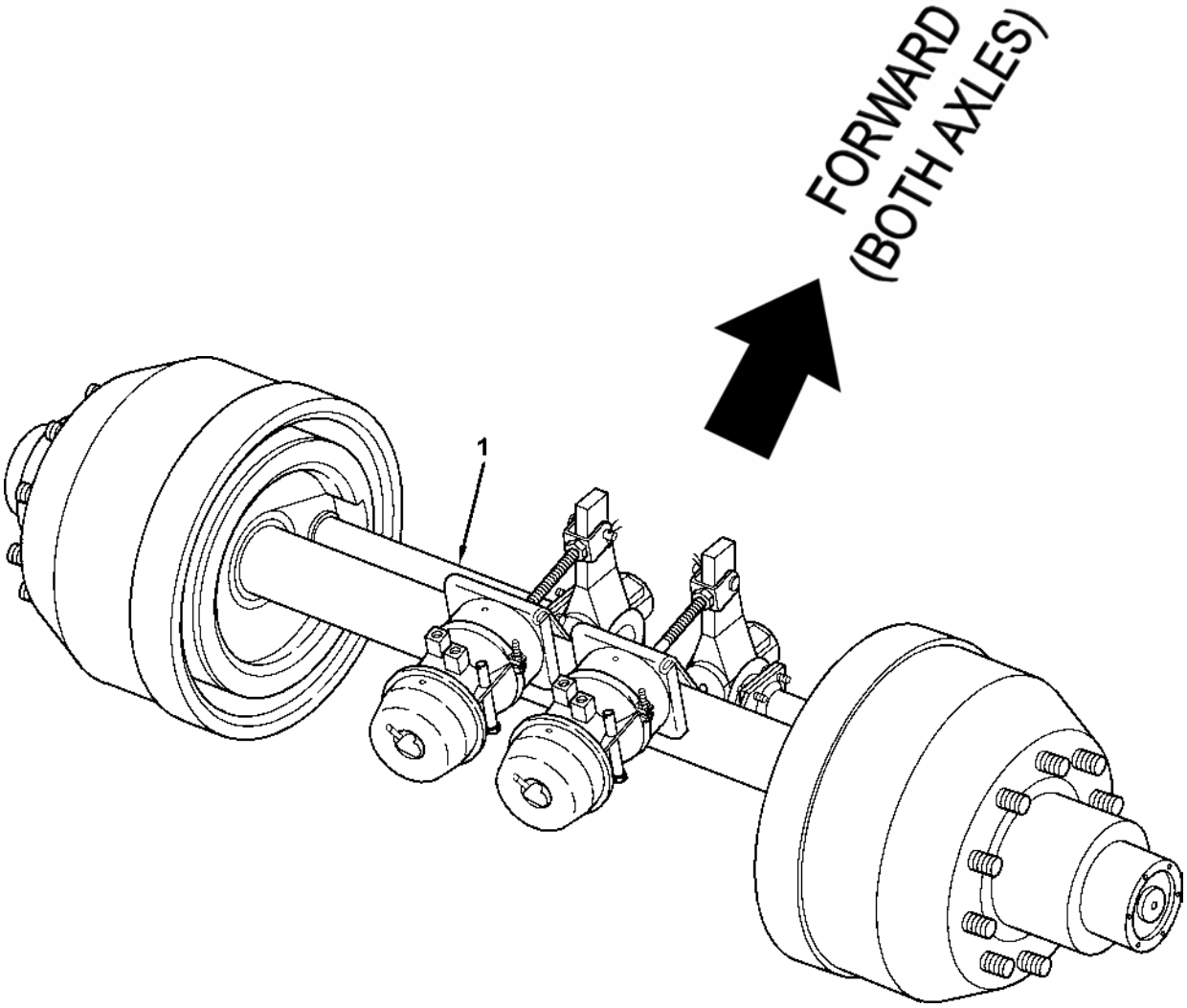


Figure 6. Axle Assembly

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1100 REAR AXLE ASSEMBLY		
						FIG. 6 AXLE ASSEMBLY		
CBABB	1	PFFZZA	2520-01-499-5403	OFBD6	50045217	AXLE ASSEMBLY, COMPLETE	2	
						END OF FIGURE		

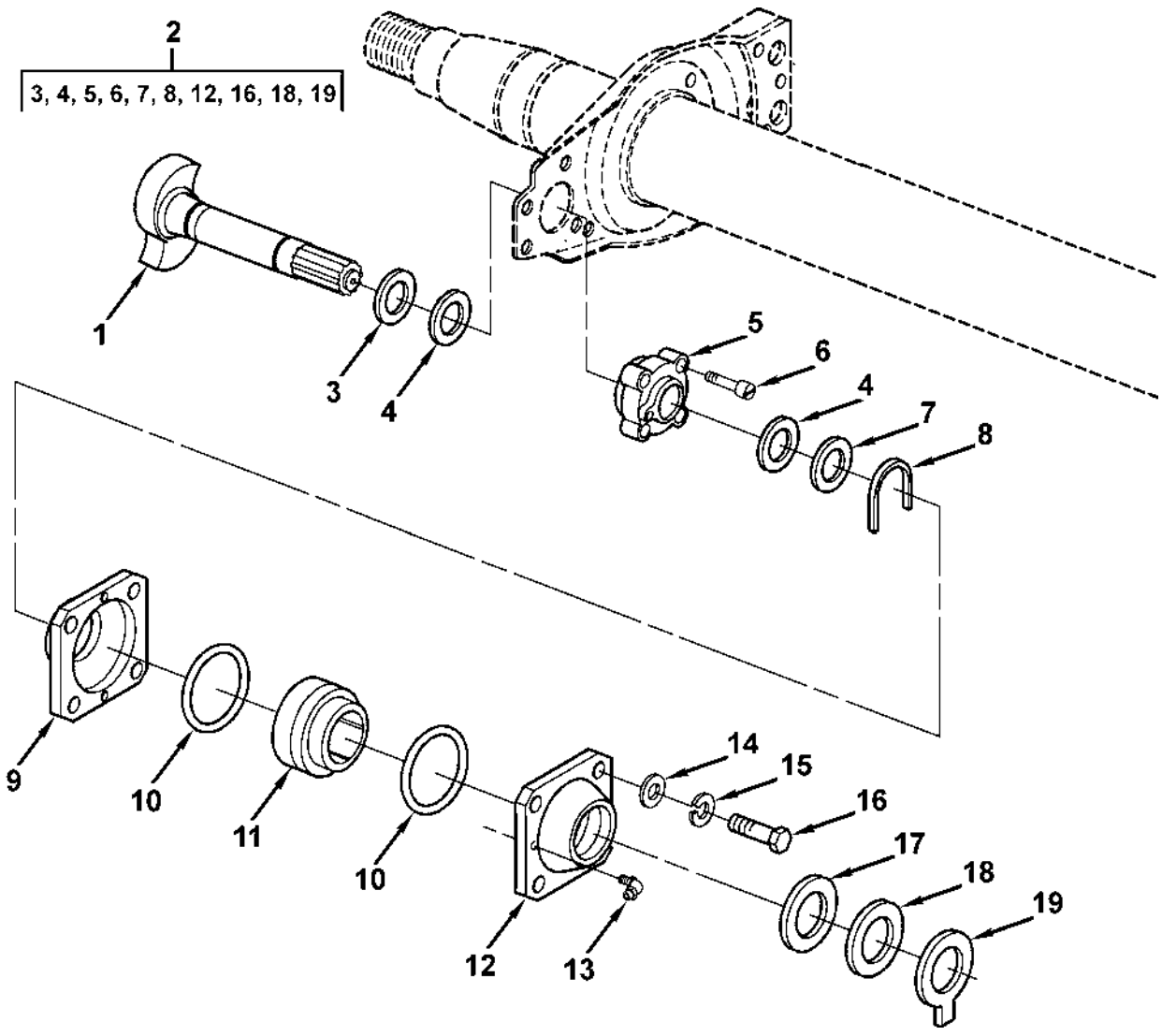


Figure 7. Brake Camshaft

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1202 SERVICE BRAKES		
						FIG. 7 BRAKE CAMSHAFT		
CBAR	1	PFOZZA	2530-01-499-3135	78500	2210-D-6868	CAMSHAFT,ACTUATING, RH, Q-PLUS	2	
CBAS	1	PFOZZA	2530-01-499-3159	78500	2210-E-6869	CAMSHAFT,ACTUATING, LH, Q-PLUS	2	
	2	KFOOOA		78500	KIT8078	CAMSHAFT REPAIR KIT	4	
CBAQ	3	PFOZZA	5310-01-499-3382	78500	1229-R-4100	WASHER, OUTER, PART OF KIT 8078	1	
CBAM	4	PFOZZA	5330-01-328-6090	78500	1205-Q-2123	SEAL, PART OF KIT 8078	2	
CBAP	5	PF0ZZA	2530-01-359-8091	78500	A3105-L-1078	BUSHING, RETAINER, PART OF KIT 8078	1	
CBAN	6	PFOZZA	5305-01-359-1367	78500	10-X-1421	SCREW, MACHINE, PART OF KIT 8078	4	
CBAL	7	PFOZZA	5310-01-499-3372	78500	1229-S-4101	WASHER, INNER, PART OF KIT 88078	1	
CBAK	8	PFOZZA	5325-01-499-3380	78500	1229-T-4102	RING, SNAP, PART OF KIT 8078	1	
CBAW	9	PFOZZA	3120-01-499-3388	78500	1225-R-1058	BUSHING, SUPPORT	4	
CBAV	10	PFOZZA	5331-00-205-3583	78500	1205-X-726	O-RING	8	
CBAU	11	XD0ZZA		78500	A-3105-K-219	BUSHING, NYLON	4	
CBAU	12	PFOZZA	2530-01-311-8410	78500	A-3105-V-282	CAM BUSHING, ASSY, PART OF KIT 8078	1	
CBAJ	13	PFOZZA	4730-01-499-3385	78500	2297-B-5046	FITTING, ZERK	4	
CBAH	14	PFOZZA	5310-01-499-3459	78500	WA-36	FLATWASHER	16	
CBAG	15	PFOZZA	5310-00-261-7340	78500	WA16	WASHER,LOCK	16	
	16	PFOZZA	5305-01-315-3563	78500	10-X-1348	SCREW, MACHINE, PART OF KIT 8078	4	
CBAE	17	PFOZZA	5365-00-753-4865	78500	1229-J-868	WASHER, SPACER	4	
CBAD	18	PFOZZA	5310-01-133-5373	78500	1229-B-1848	OWASHER, FLAT, PART OF KIT 8078	2	
CBAC	19	PFOZZA	5325-00-204-5061	78500	1229-X-1116	RING, STRAP, PART OF KIT 8078	1	
						END OF FIGURE		

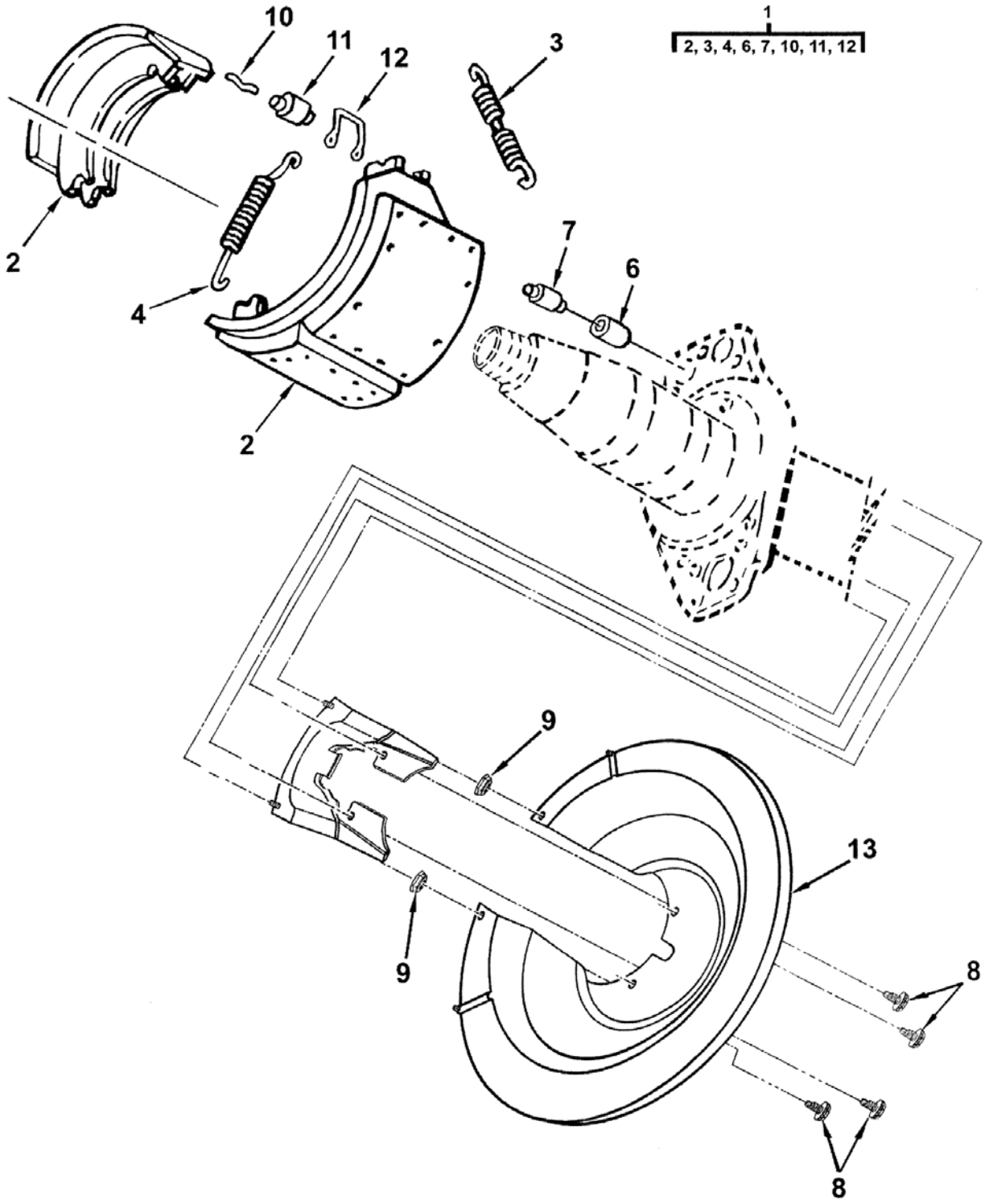


Figure 8. Service Brake

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1202 SERVICE BRAKES		
						FIG. 8 SERVICE BRAKE (QTY IS FOR 2 AXLES)		
CCBEA	1	KFOOOA	2530-01-496-9836	78500	KSR2024707QP	LINED SHOE KIT, Q-PLUS, NON-ASBESTOS, 2 WHEEL ENDS (1 AXLE)	2	
CCBBB	2	PFOZZA	2530-01-499-5407	78500	SR2024707QP	LINING AND SHOE, PART OF KIT KSR2024707QP, 1 WHEEL END	4	
CCBEA	3	PFOZZA	5360-01-499-3396	78500	2258-W-803	SPRING,RETURN, H.D., PART OF KIT KSR2024707QP	4	
CCBF	4	PFOZZA	5360-01-158-1974	78500	2258-Q-615S	SPRING, RETAINEING, PART OF KIT KSR2024707QP	8	
CCBHKA	5	KFOOOA	5340-01-499-3618	78500	3264-A-1457	SHIELD, DUST KIT (1) (COMPLETE DUST SHIELD ASSEMBLY FOR 1 AXLE END)	4	
CCBGH	6	PFOZZA	3120-00-255-6042	78500	1225-B-496	BUSHING, ANCHOR PIN PART OF KIT KSR2024707QP	8	
CCBG	7	PFOZZA	5315-01-129-6898	78500	1259-N-274	PIN, ANCHOR, PART OF KIT KSR2024707QP	8	
CDAY	8	XDOZZA		0FBD6	50172106	BOLT, SELF-TAP, DUST SHIELD (4)	16	
CDAZ	9	XDOZZA		0FBD6	50995152	NUT, LOCK, DUST SHIELD (2)	8	
CCBJ	10	PFOZZA	5315-00-784-0637	78500	1218-G-85	PIN, SPRING RETURN PART OF KIT KSR2024707QP	8	
CCBC	11	PFOZZA	3120-00-322-6430	78500	1779-R-18	ROLLER, BRAKESHOE, PART OF KIT KSR2024707QP	8	
CCBD	12	PFOZZA	5340-01-328-4418	78500	3105-B-210	RETAINER, ROLLER, PA RT OF KIT KSR2024707QP	8	
CCBE	13	PFOZZA		78500	21220719	PLUG, DUST SHIELD, (2 PER DUST SHIELD, TOTAL OF 8)	8	
						END OF FIGURE		

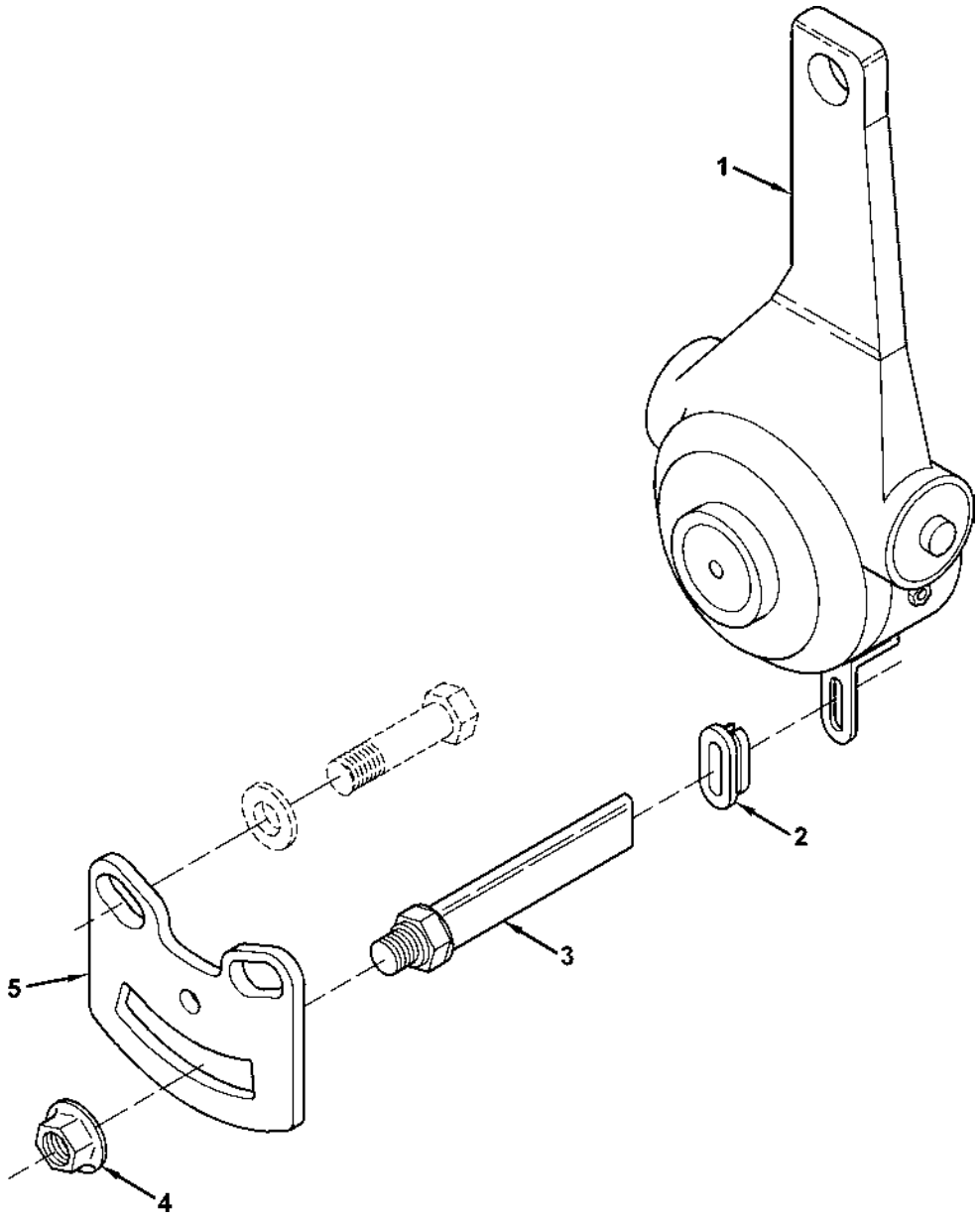


Figure 9. Slack Adjuster

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1206 MECHANICA L BRAKE SYSTEM		
						FIG. 9 SLACK ADJUSTER		
CCAQ	1	PFOZZA	2530-01-499-3399	78502	409-10683	SLACK ADJUSTER,AUTOMATIC.....	4	
CCAT	2	PFOZZA	5365-01-499-3408	78502	452-10125	BUSHING,RECTANGULAR PART OF KIT P/N 427-10558.....	4	
CCAS	3	PFOZZA	5340-01-499-3404	78502	442-10290	STUD PART OF KIT, P/N 427-10563	4	
CCAU	4	PFOZZA	5310-01-499-3438	78502	443-10204	NUT, FLANGE PART OF KIT P/N 427-10563 OR KIT P/N 427-10558.....	4	
CCAR	5	PFOZZA	5340-01-499-3405	78502	445-10467	BRA CKET PART OF KIT P/N 427-10563	4	
						END OF FIGURE		

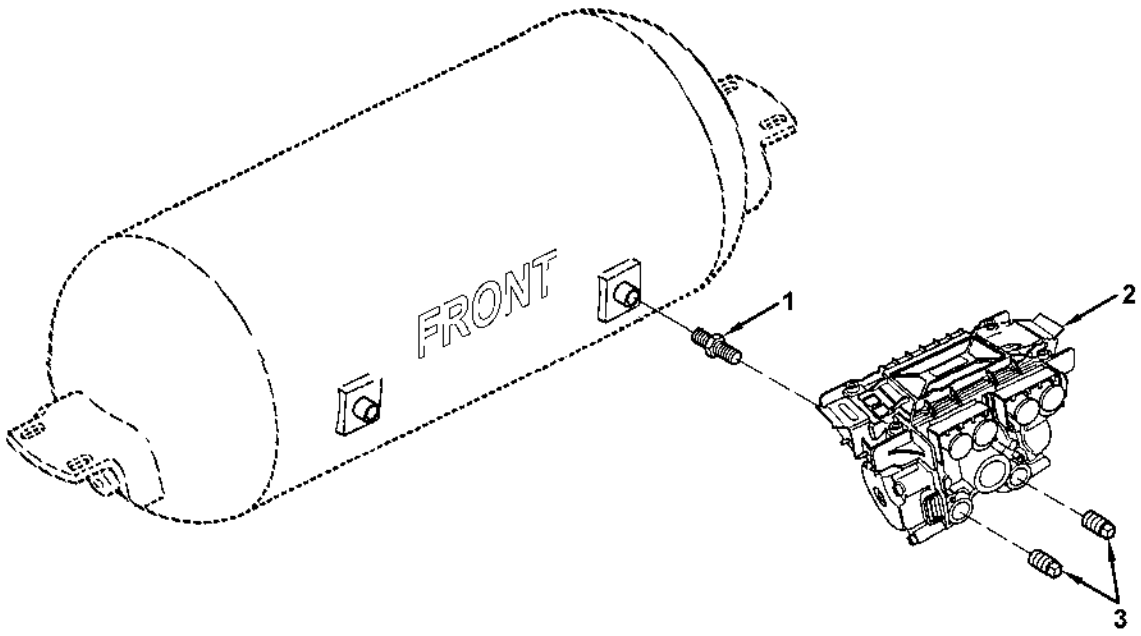


Figure 10. ECU/Valve Assembly

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1207 ELECTRICAL BRAKE SYSTEM		
						FIG. 10 ECU VALVE ASSEMBLY		
CCBM	1	PFOZZA	4730-01-499-3406	78500	S3325X12X12	NIPPLE,HEX WITH MODULE.....	1	
CCADA	2	PFOZZA	4810-01-499-3407	78500	S4005001030	VALVE ASSEMBLY,ECU.....	1	
CCBN	3	PFOZZA	4730-01-499-4270	0FBD6	51205007	PLUG, PIPE.....	6	
						END OF FIGURE		

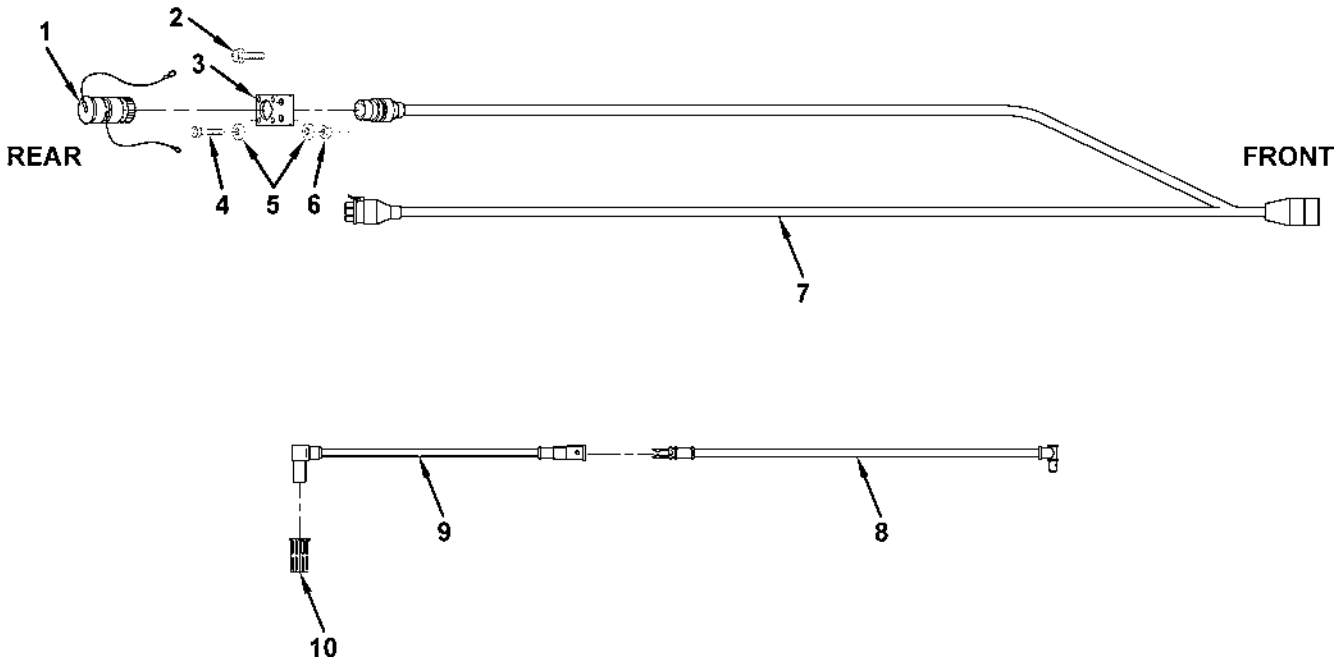


Figure 11. ABS Brake Power Connectors

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1207 ELECTRICAL BRAKE SYSTEM		
						FIG. 11 ABS BRAKE POWER CONNECTIONS		
CCAN	1	PFOZZA	5935-01-480-6241	78500	S2237-Z-1222	CONNECTOR, RECEPTACLE, ELECTRICAL.....	1	
CAAL	2	PFOZZA	5303-01-499-5551	0FBD6	52100010	SCREW .25 X .75.....	2	
CKHN	3	PFOZZA	2590-01-522-2672	78500	S3155-L-1234	BRACKET, MOUNTING.....	1	
CKRN	4	XDOZZA		39428	92196A130	SCREW,SOCKET HEAD, CAP #5-40	4	
CKRU	5	XDOZZA		39428	92141A006	FLATWASHER #5.....	8	
CKSA	6	PFOZZA	5310-00-045-8839	39428	91839A006	LOCKNUT #5-40	4	
CCAJA	7	PFOZZA	6150-01-499-3397	78500	S4493641520	CABLE ASSEMBLY,SPECIAL	1	
CCAF	8	PFOZZA	2530-01-499-3170	78500	S4497130300	EXTENSION,SENSOR.....	4	
CCAG	9	PFOZZA	2530-99-782-3392	78500	S4410328080	SENSOR WITH SOCKET.....	4	
CCAM	10	PFOZZA	5340-01-499-3481	78500	S8997598154	SPRING CLIP,SENSOR	4	
						END OF FIGURE		

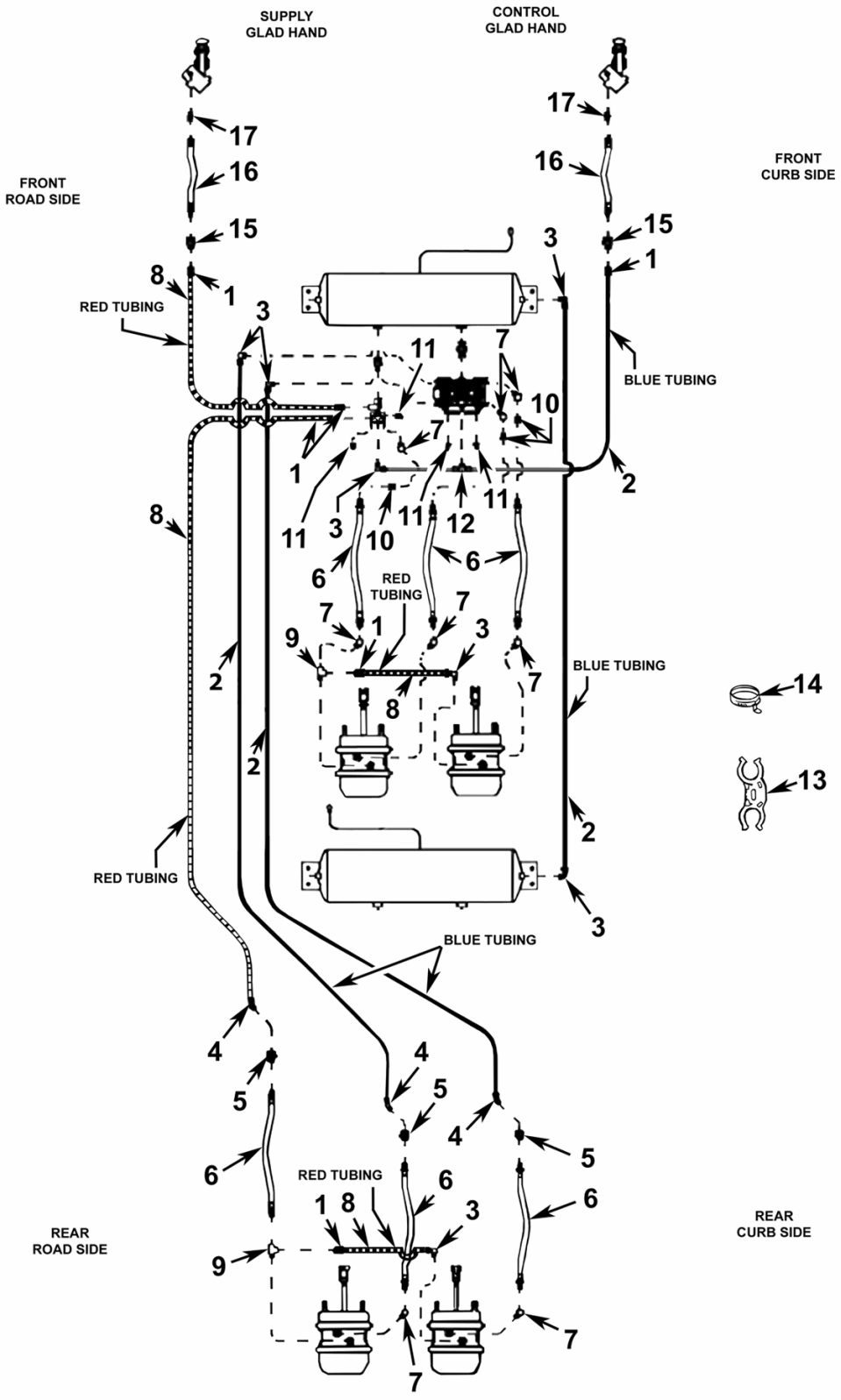


Figure 12. Air Lines and Fittings

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1208 AIR BRAKE SYSTEM		
						FIG. 12 AIR LINES AND FITTINGS		
CCBV	1	PAOZZA	4730-01-096-9128	93061	68NTA-6-6	ADAPTER, STRAIGHT PIPE TO TUBE.....	6	
CCCK	2	PFOZZA	4720-01-287-9322	61424	PFT-6B-BLU	TUBING, BLUE, 3/8", MAKE FROM NSN 4720-01-287-9322	AR	
CCBW	3	PAOZZA	4730-01-244-1226	93061	VS269NTA-6-6	ELBOW, PIPE TO TUBE.....	7	
CCBY	4	PAOZZA	4730-01-365-9072	93061	VS279NTA-6-4	ELBOW, PIPE TO TUBE.....	3	
CCBP	5	PAOZZA	4730-01-164-3365	93061	207ACBH-4	COUPLING, PIPE.....	3	
CCBZ	6	PFOZZA	4720-01-499-3490	93061	50866003	HOSE ASSEMBLY	6	
CCBT	7	PFOZZA	4730-00-277-8257	79470	3350X6	ELBOW, PIPE	8	
CCCJ	8	PFOZZA	4720-01-287-9313	61424	PFT-6B-RED	TUBING, RED 3/8", MA KE FROM NSN 4720-01-287-9313	AR	
CCBU	9	PFOZZA	4730-00-469-7797	93061	2225P-6	TEE, PIPE.....	2	
CCBQA	10	PFOZZA	4730-00-202-6491	93061	209P-6-4	BUSHING, PIPE.....	3	
CCBN	11	PFOZZA	4730-01-499-4270	0FBD6	51205007	PLUG, PIPE.....	4	
CCBX	12	PAOZZA	4730-01-283-1877	93061	VS272NTA-6-6	TEE, PIPE TO TUBE.....	2	
CCBS	13	PFOZZA	5340-01-499-3717	93061	50491010	CLIP, HOSE.....	12	
CCBR	14	PFOZZA	4730-01-499-3709	93061	50487001	CLAMP, HOSE.....	4	
	15	PFOZZA		0FBD6	50104001	TERMINAL, BOLT, ASSY……	5	
	16	PFOZZA		0FBD6	50866009	HOSE, 3/8”……	2	
	17	PFOZZA		0FBD6	50501006	ADAPTER, CONN…….	2	
						END OF FIGURE		

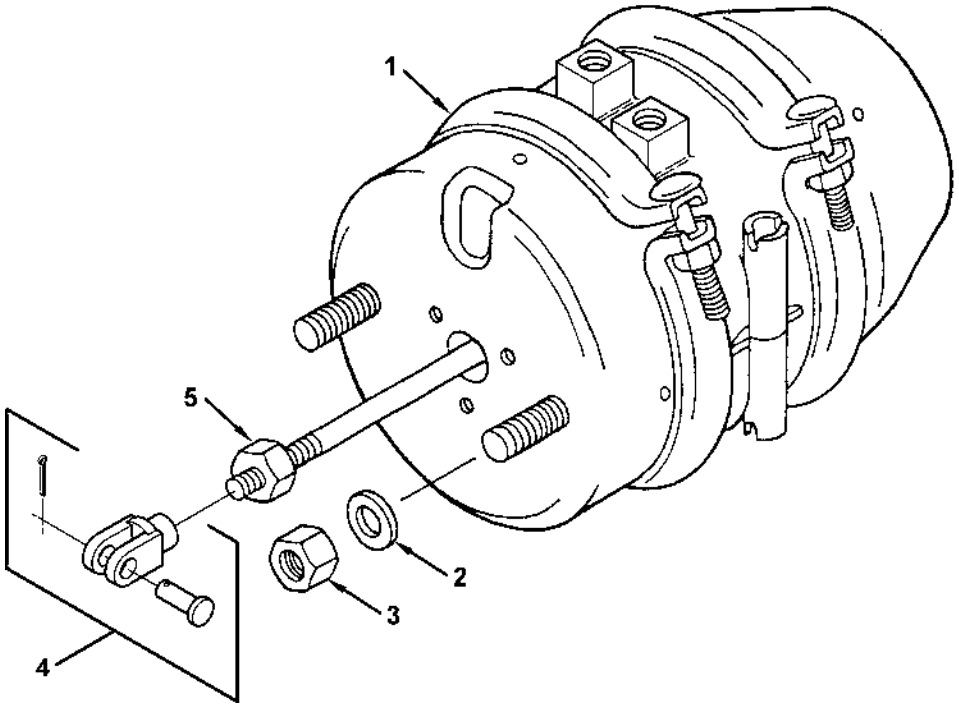


Figure 13. Air Brake Chamber

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1208 AIR BRAKE SYSTEM		
						FIG. 13 AIR BRAKE CHAMBER		
CCCFA	1	PFOZZD	2530-01-504-2552	06721	166407	CHAMBER,AIR BRAKE,LONG STROKE.....	4	
CCAP	2	PFOZZA	5310-01-499-5412	06721	9999093	WASHER, FLAT.....	8	
CCAW	3	PFOZZA	5310-01-499-5413	06721	9999095	LOCKNUT.....	8	
CCAV	4	PFOZZA	2520-01-499-3439	0FBD6	52125333	YOKE ASSEMBLY	4	
CKVG	5	XDOZZA		06721	9999070	NUT,JAM.....	4	
						END OF FIGURE		

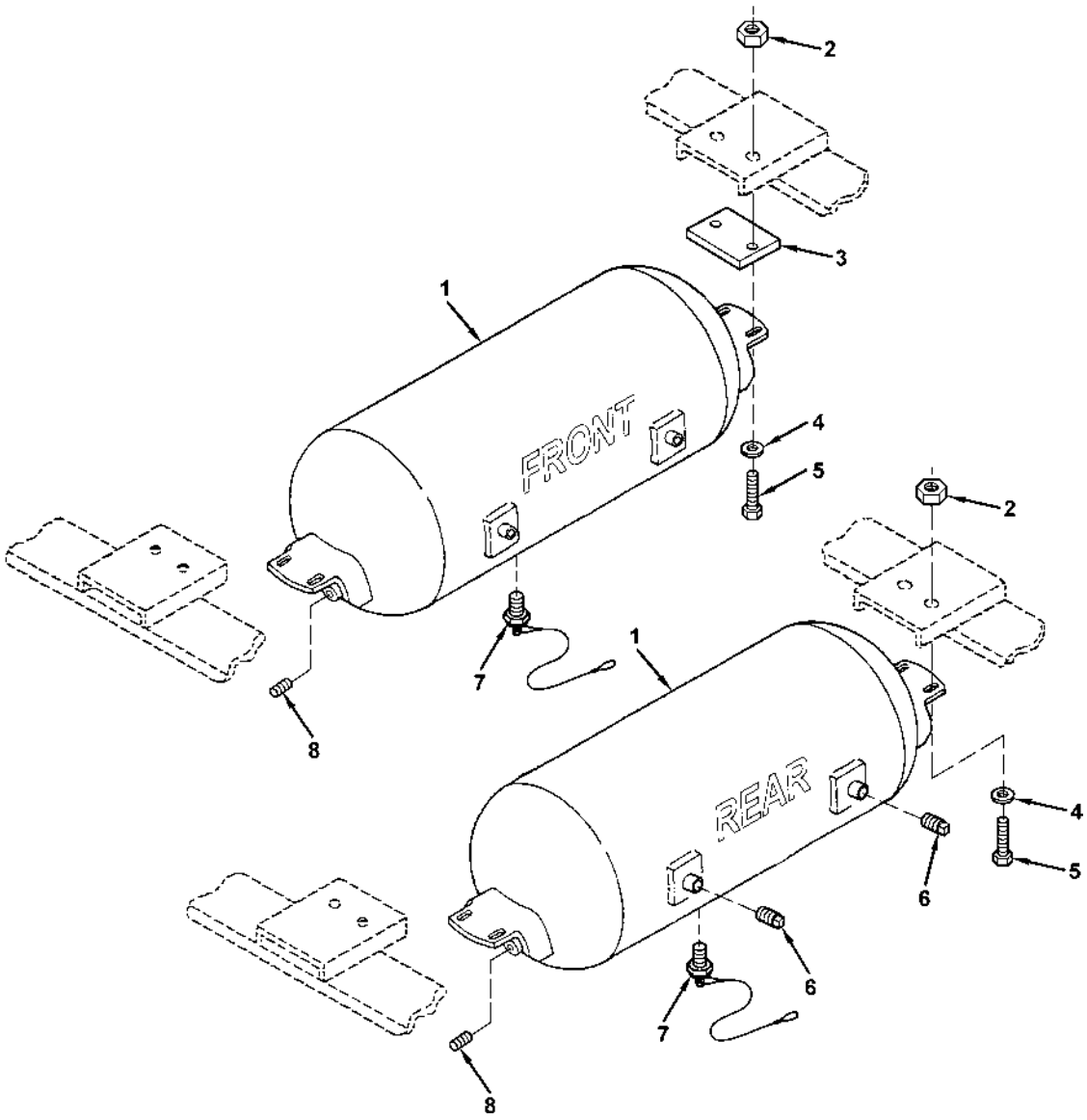


Figure 14. Air Reservoirs

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1208 AIR BRAKE SYSTEM		
						FIG. 14 AIR RESERVOIRS		
CCCC	1	PFOZZA	2530-01-499-3629	62173	8022	TANK, PRESSURE.....	2	
CCCH	2	PFOZZA	5310-01-499-3456	OFBD6	50995054	NUT, LOCK.....	8	
CCCL	3	PFOZZA	9320-01-499-3458	OFBD6	51029007	PAD, RUBBER.....	4	
CCCE	4	PFOZZA	5310-01-499-3461	OFBD6	55752005	WASHER, FLAT.....	8	
CBET	5	PFOZZA	5305-01-499-3465	OFBD6	50172008	SCREW,CAP,HEXAGON HEAD.....	8	
CCCA	6	PFOZZA	4730-01-499-3360	OFBD6	51205015	PLUG, PIPE.....	2	
CCCD	7	PFOZZA	4820-01-499-3653	0N972	401095	VALVE, DRAIN W/48” CABLE.....	2	
CCBN	8	PFOZZA	4730-01-499-4270	OFBD6	51205007	PLUG, PIPE.....	2	
						END OF FIGURE		

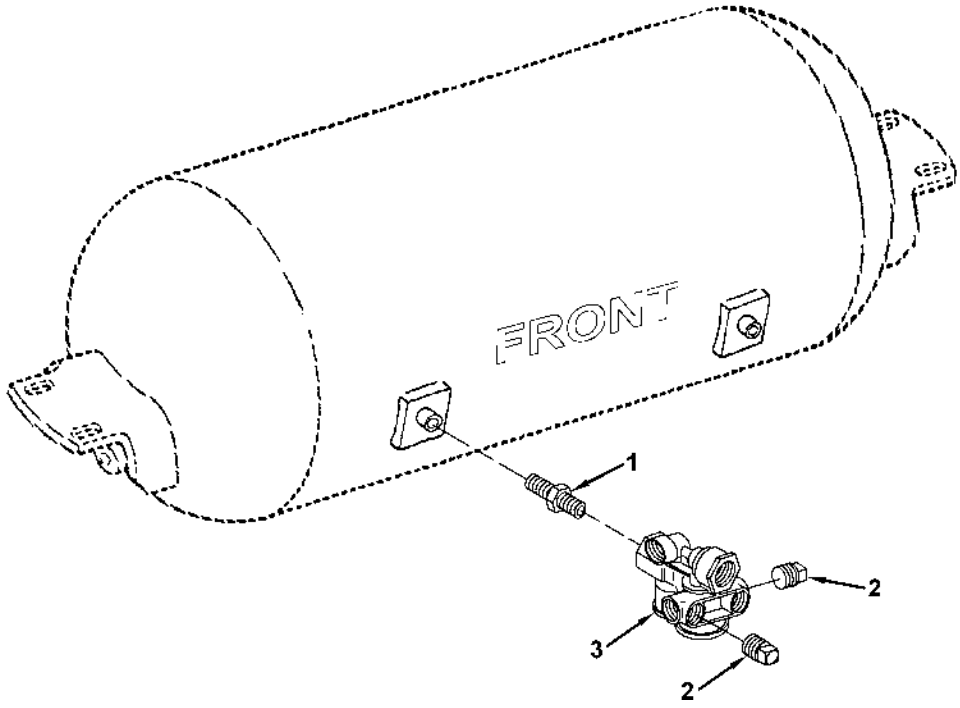


Figure 15. Air Brake Chamber Control Valve

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1208 AIR BRAKE SYSTEM		
						FIG. 15 AIR BRAKE CHAMBER CONTROL VALVE		
CCBL	1	PFOZZA	4730-01-499-3663	78500	S3325X12X8	NIPPLE,HEX REDUCER	1	
CCBN	2	PFOZZA	4730-01-499-4270	0FBD6	51205007	PLUG, PIPE.....	2	
CCAK	3	PFOZZA	4820-01-497-8729	10125	55710035	VALUE, MULTIFUNCTION SPRING BRAKE CONTROL VALVE.....	1	
						END OF FIGURE		

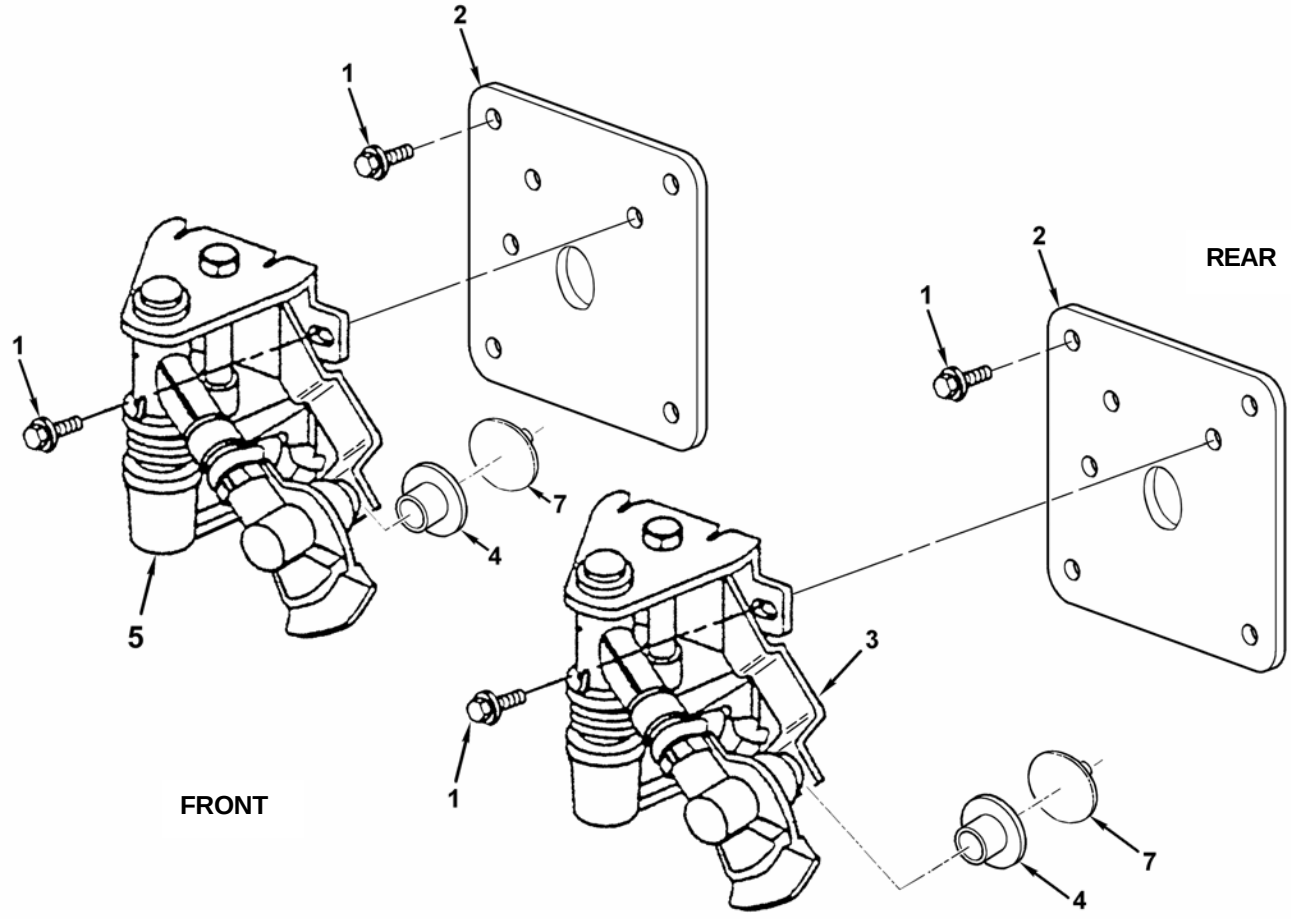


Figure 16. Gladhands

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1208 AIR BRAKE SYSTEM		
						FIG. 16 GLADHANDS		
CAAL	1	PFOZZA	5305-01-499-5551	0FBD6	52100010	SCREW, HEX HEAD.....	14	
CCCB	2	PFOZZA	5340-01-499-3150	0FBD6	04511014	PLATE.....	2	
CCABA	3	PFOOOA	4730-01-499-3471	0N972	441105	COUPLING,SWIVEL,EMERGENCY	1	
CKHU	4	PFDZZA	5330-01-504-8614	45152	4HA892	SLOAN TRANS. POLYURETHANE (RED)	1	
CCACA	5	PFOOOA	4730-01-499-3466	0N972	441106	·COUPLING,SWIVEL,SERV ICE	1	
CKJG	6	PFDZZA	5330-01-504-8610	45152	4HA89	SLOAN TRANS. POLYURETHANE (BLUE)	1	
	7	PFOZZA		ON972	441743	CUP, DUST COVER……..	2	
						END OF FIGURE		

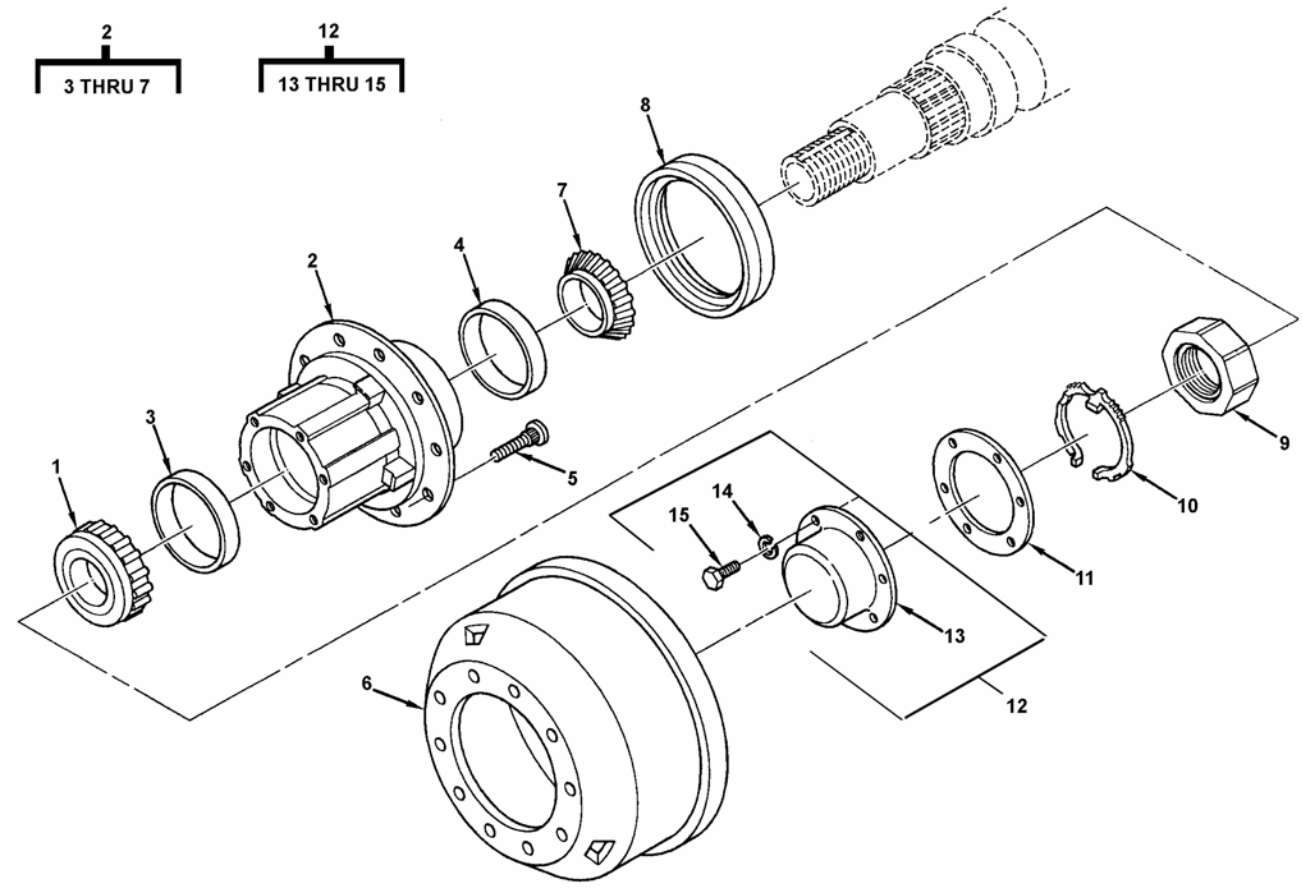


Figure 17. Hub and Drum

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1311 WHEEL ASSEMBLY		
						FIG. 17 HUB AND DRUM		
CDAK	1	PFOZZA	3110-00-293-8998	60038	HM212049	CONE AND ROLLERS, OUTER	4	
CDBAA	2	PFOZZA	2530-01-499-3476	18889	20231UH3T	DRUM, HUB WITH MACHINE TONE RING, 10 R/H STUDS, INNER AND OUTER BEARING CUPS	4	
CDAQ	3	PFOZZA	3110-00-293-8997	60038	HM212011	CUP,TAPERED ROLLER, OUTER	4	
CDAR	4	PFOZZA	3110-00-618-0249	60038	HM218210	CUP,TAPERED, INNER	4	
CDBB	5	PFOZZA	5307-01-440-1364	18889	101162	·WHEEL STUD, R/H	40	
CDBD	6	PFOFFA	2530-01-449-9475	18889	66884	BRAKE DRUM	4	
CDAJ	7	PFOZZA	3110-00-618-0248	60038	HM218248	CONE AND ROLLERS, INNER	4	
CDAS	8	PFOZZA	5330-01-090-2107	78500	1205-P-1212	SEAL,PLAIN, GREASE	4	
CDATA	9	PFOZZA	5310-01-499-5416	26151	447-4743	NUT,PRO-TORQ AND KEEPER	4	
CDAUA	10	XDOZZA		26151	450-4743	KEEPER,ARM (ONLY)	4	
CDAWA	11	PFOZZA	5330-01-499-3487	80201	453795	GASKET	4	
CDAXA	12	PFOOOO	2530-01-499-5421	80201	C/R1343	HUBCAP ASSEMBLY	4	
CKSG	13	PFOZZA	2530-01-504-9853	80201	453969	·HUBCAP	4	
CKSN	14	PFOZZA	5306-00-226-4827	80204	B1821BH031C100N	·BOLT,MACHINE 5/16-18	24	
CKSU	15	PFOZZA	5310-00-407-9566	96906	MS35338-45	·WASHER,LOCK 5/16	24	
						END OF FIGURE		

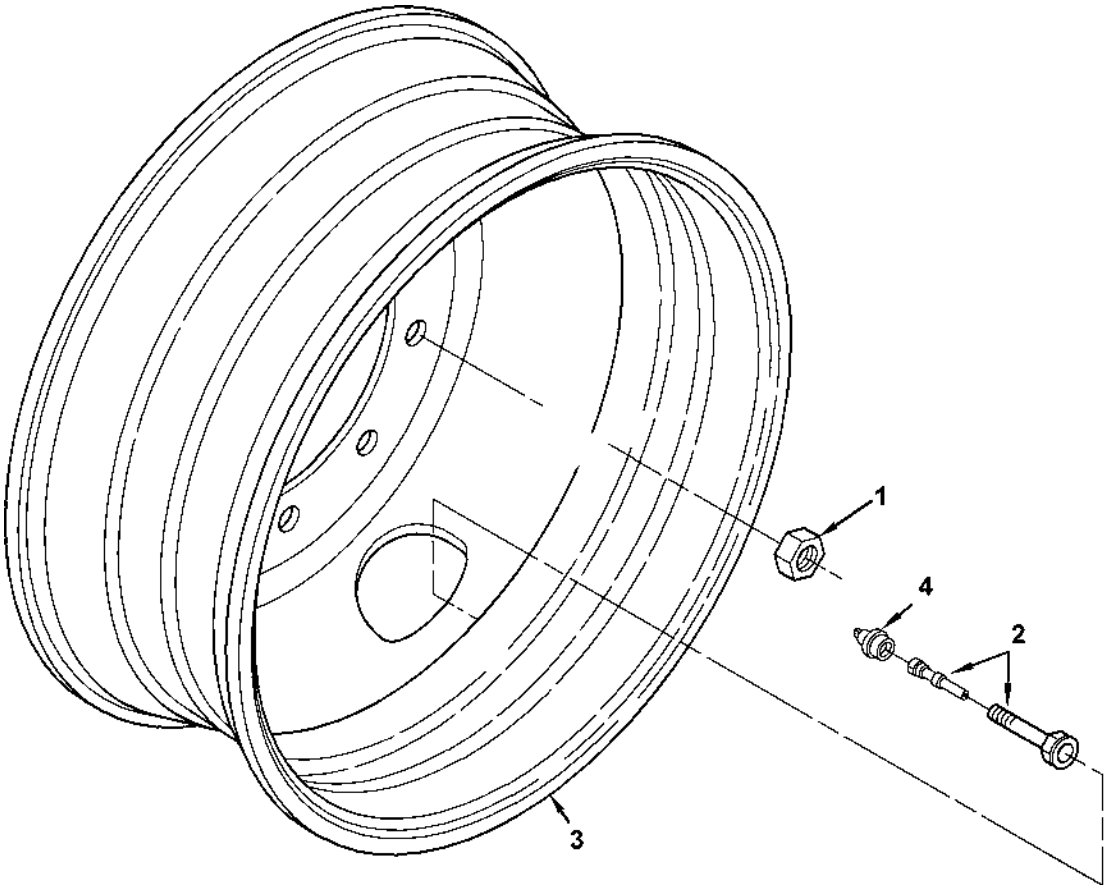


Figure 18. Wheel Assembly

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1311 WHEEL ASSEMBLY		
						FIG. 18 WHEEL ASSEMBLY		
CDBE	1	PFOZZA	5310-01-499-3489	0FBD6	50990007	NUT,FLANGE, RHT HAND (ALL)	40	
CDAD	2	PFOZZA	2640-00-555-2823	27783	TR572	VALVE,PNEUMATIC TIRE.....	9	
CDAB	3	PFOZZA	2530-01-441-9700	6H865	90541E	WHEEL,PNEUMATIC TIRE.....	9	
CDAC	4	PFOZZA	2640-01-098-2029	17875	627	CAP, PNEUMATIC VALVE	9	
CDABC	5	ALOHHA	2530-01-508-2780	0FBD6	55830320	TIRE AND WHEEL ASSEMBLY, O.D.	AR	
CDABB	6	ALOHHA	2530-01-508-2786	0FBD6	55830325	TIRE AND WHEEL ASSEMBLY, TAN	AR	
						END OF FIGURE		

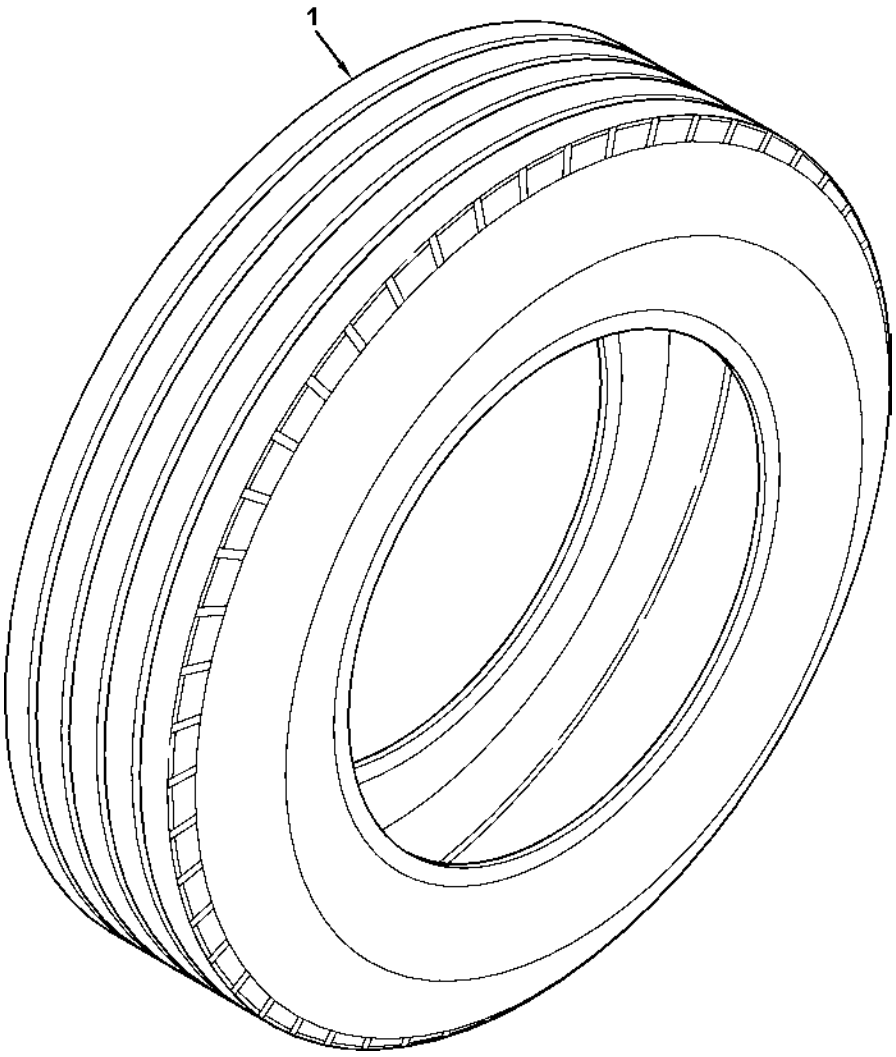


Figure 19. Tire

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1313 TIRES AND TUBES		
						FIG. 19 TIRE		
CDACB	1	PCOHHA	2610-01-519-0940	12195	61737	TIRE.....	9	
						END OF FIGURE		

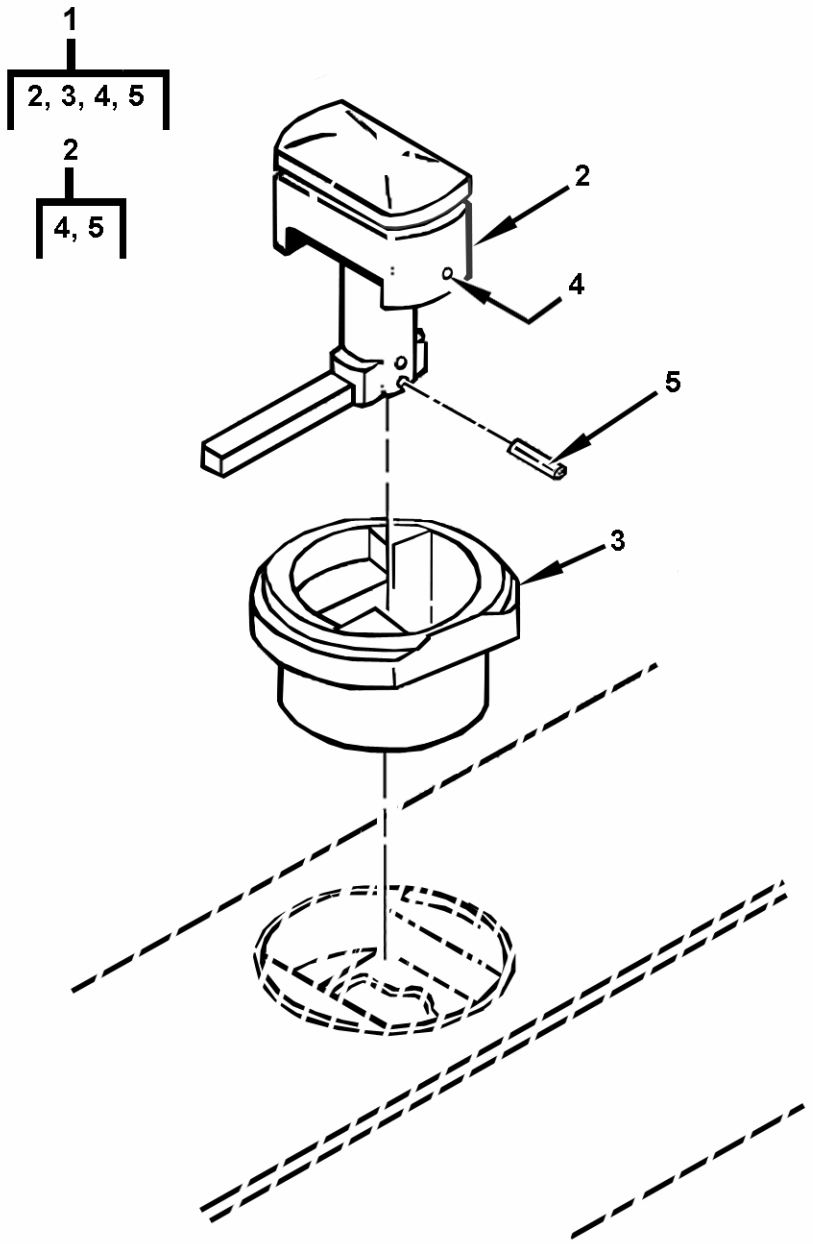


Figure 20. Retractable Twist Lock

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1501 FRAME ASSEMBLY		
						FIG. 20 RETRACTABLE TWIST LOCK		
YAANA	1	PFFZZA	5325-01-514-9957	94658	F804-1-3	FASTENER ASSEMBLY, TURN-LOCK (TWISTLOCK ASSEMBLY, ISO W/SOCKET (CUP)	8	
	2	PFOZZA	2510-01-499-4290	94658	F804-1-4	·TWISTLOCK, ISO W/ HA NDLE, (W/O CUP)	8	
XAAH	3	XDFZZA		94658	PH2969-1	·CUP SOCKET, ONLY.....	8	
YAANB	4	PFOZZA	4730-00-050-4203	81343	AS15001-1	ZERK FITTING ……	8	
CECEA	5	PFOZZA	5315-01-499-4196	94658	PRP08-36L	·PIN,ROLL, ONLY	8	
						END OF FIGURE		

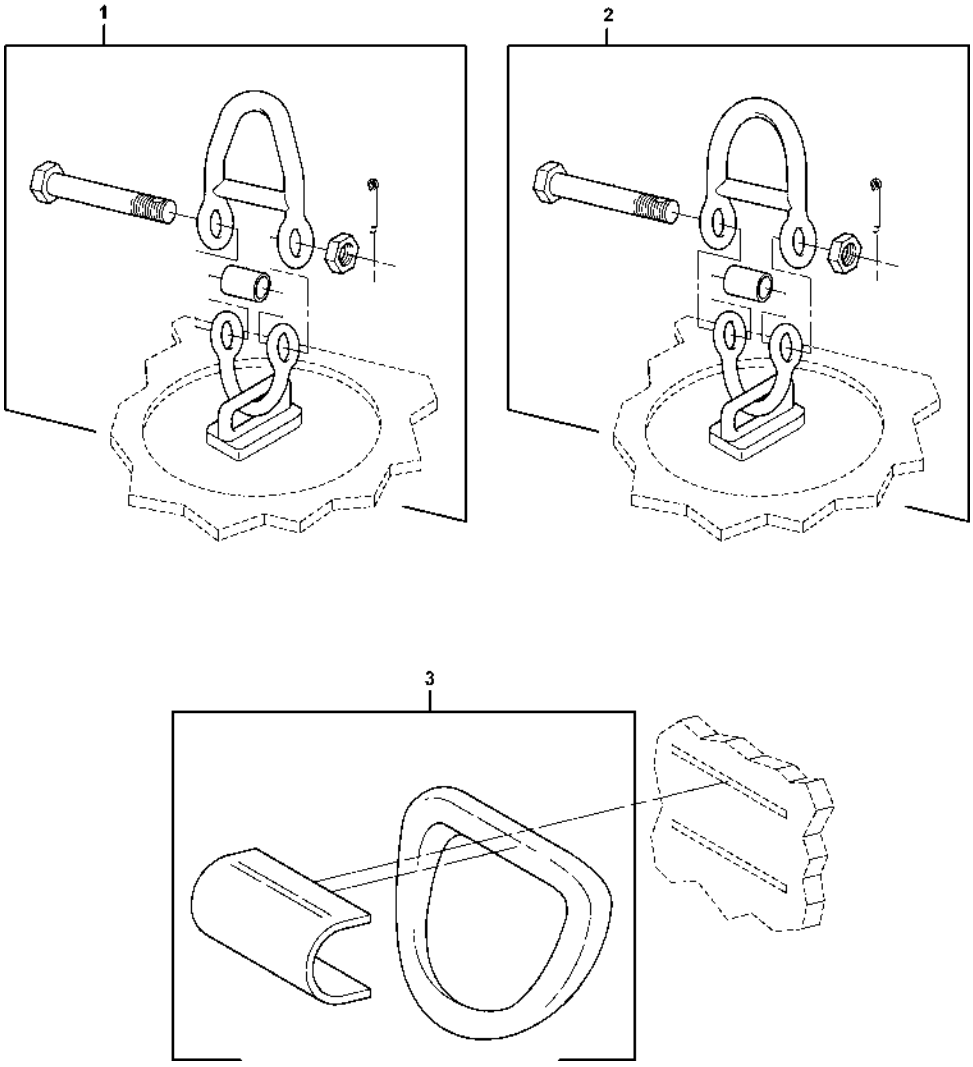


Figure 21. Tiedown Rings

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1501 FRAME ASSEMBLY		
						FIG. 21 TIEDOWN RINGS		
CKMN	1	XDFZZA		94658	F-133-15-1	TIE-DOWN ASSEMBLY, CARGO, DECK	36	
CKNG	2	XDFZZA		94658	F-133-30-1	TIE-DOWN ASSEMBLY, AMMO, DECK.....	4	
CKVA	3	PFFZZA	5365-01-504-7554	94658	F643-1-6	D-RING ASSY, RAIL & LIFT	12	
						END OF FIGURE		

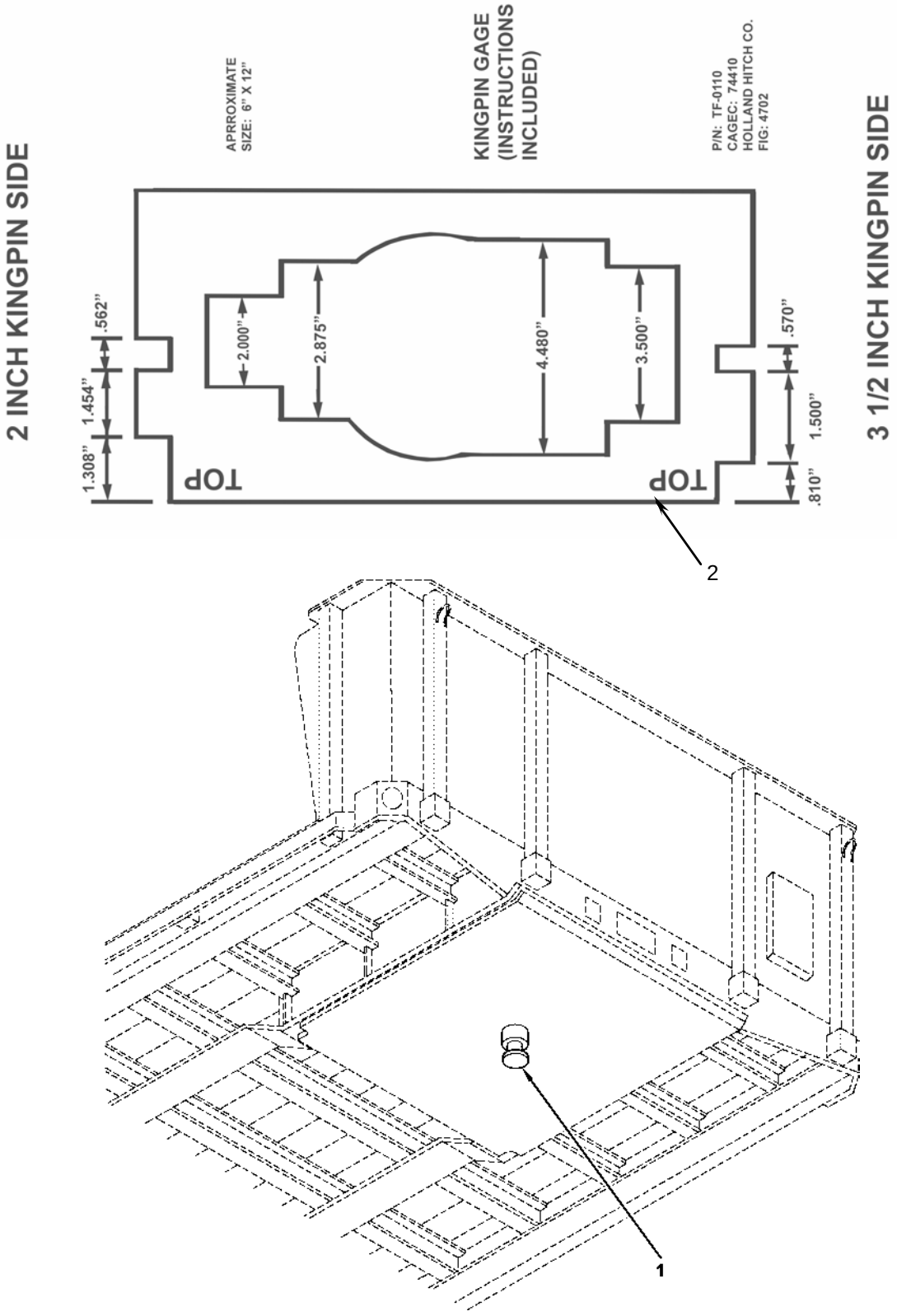


Figure 22. Kingpin

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1503 PINTLES AND TOWING ATTACHMENTS		
						FIG. 22 KINGPIN		
CEAU	1	PFFZZA	2510-01-315-6287	74410	KP-T-809-F	KINGPIN,FIFTH WHEEL 2” SAE, ...	1	
APPEN	2	PFOZZA		74410	TF-0110	GAGE, KINGPIN (FOR MEASURING KINGPIN WEAR)(ITEM NOT SHOWN)	1	
						END OF FIGURE		

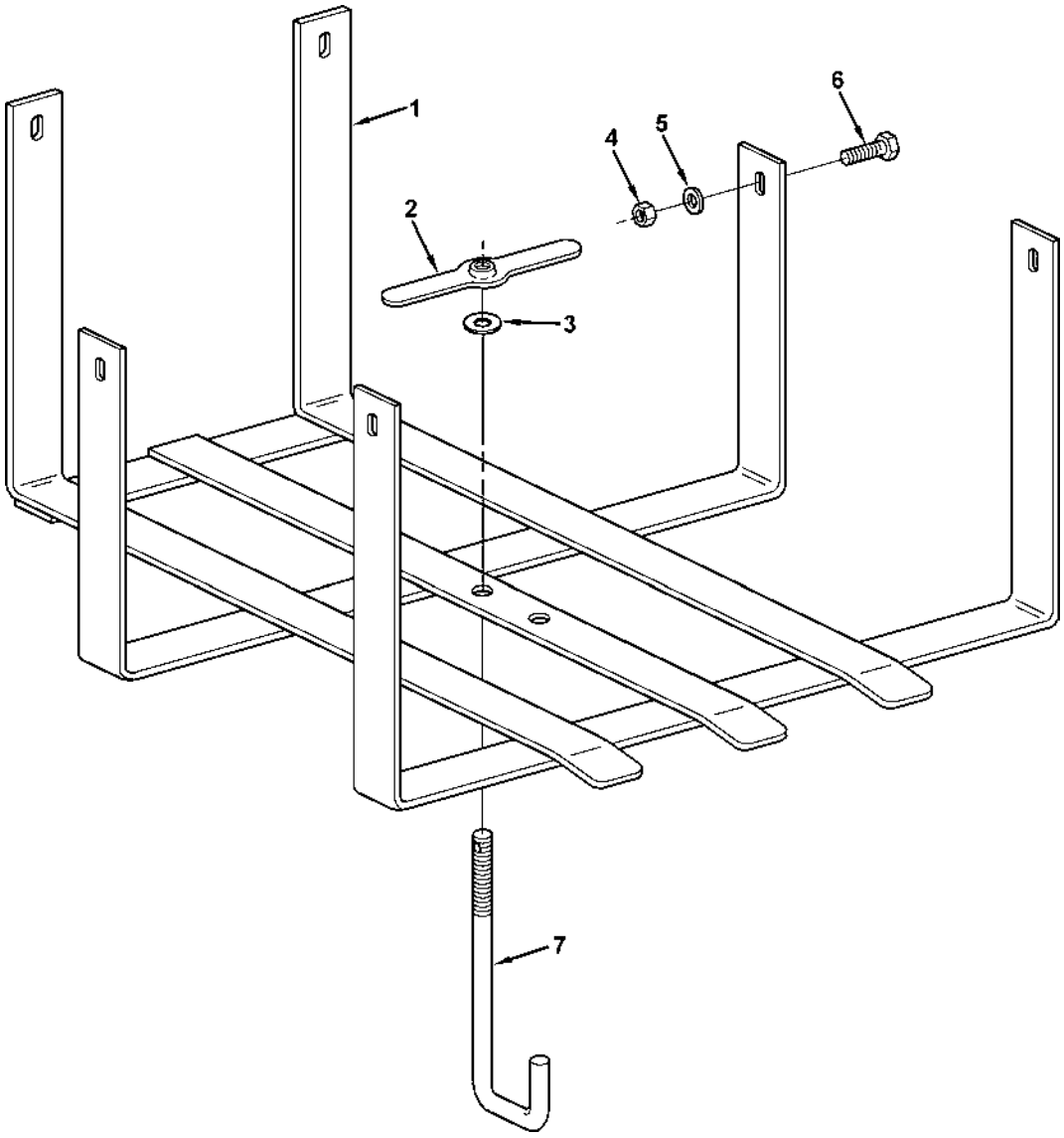


Figure 23. Spare Tire Carrier

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1504 SPARE TIRE CARRIER		
						FIG. 23 SPARE TIRE CARRIER		
CEBB	1	PFOFFA	2590-01-499-5122	0FBD6	08476006	SPARE TIRE CARRIER.....	1	
CEAZ	2	PFOZZA	5310-01-499-5123	0FBD6	07758013	WING NUT.....	1	
CEBE	3	PFOZZA	5310-01-499-5125	0FBD6	02976011	WASHER.....	1	
CCCH	4	PFOZZA	5310-01-499-3456	0FBD6	50995054	NUT, LOCK.....	6	
CEBD	5	PFOZZA	5310-01-499-3461	0FBD6	55752005	WASHER, FLAT.....	6	
CEBC	6	PFOZZA	5305-01-499-3465	0FBD6	50172008	BOLT, HEX HEAD.....	6	
CEAY	7	PFOZZA	5306-01-499-5128	0FBD6	50177001	BOLT,HOOK (J BOLT)	1	
						END OF FIGURE		

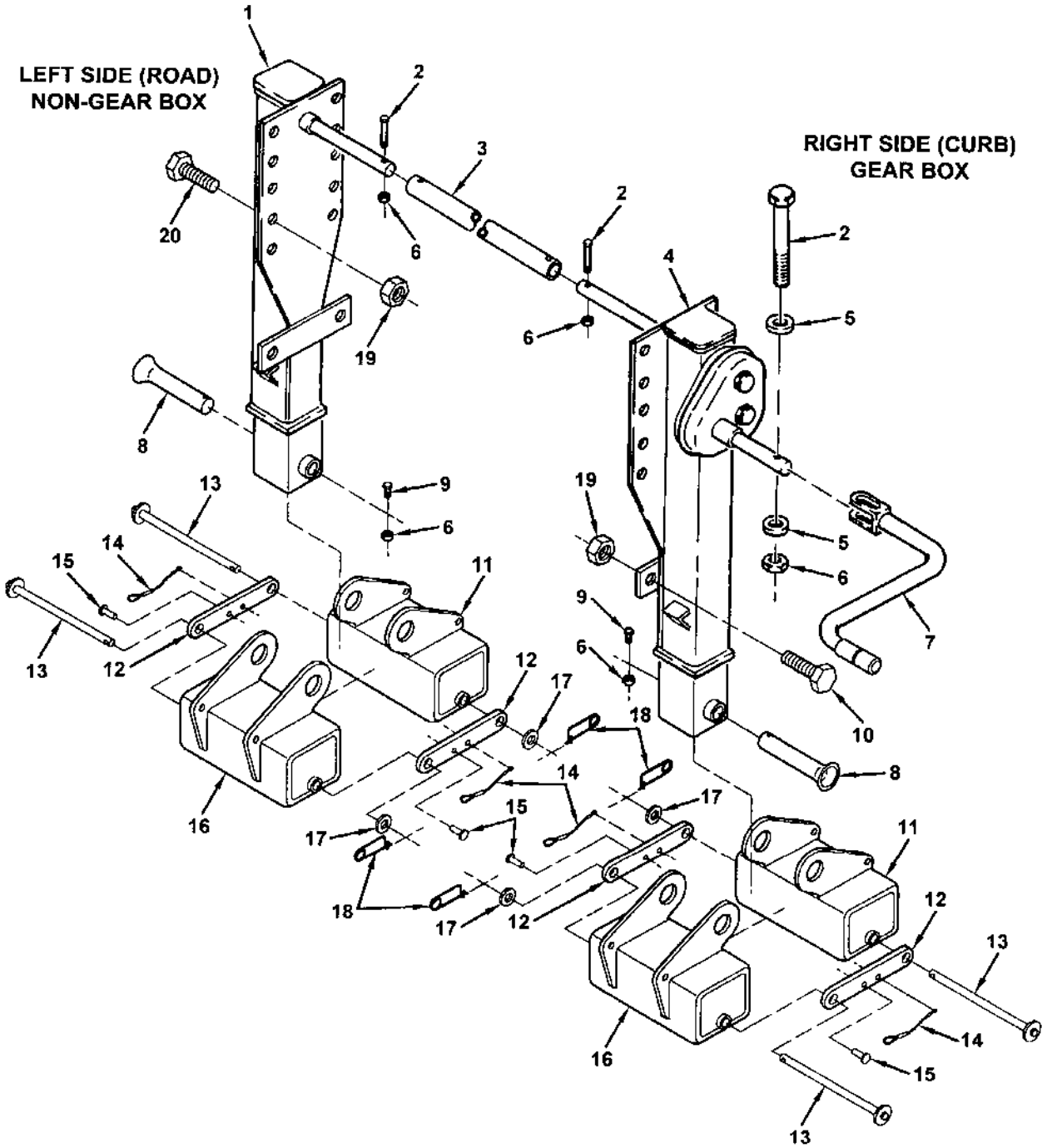


Figure 24. Landing Gear

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1507 LANDING GEAR		
						FIG. 24 LANDING GEAR		
CEAFA	1	PFOZZA	2590-01-499-5434	0FBD6	50890077	LANDING GEAR 1-SP, LEG,NO GEAR BOX	1	
CECJ	2	PFOZZA	5305-00-269-3217	80205	MS90725-67	SCREW, CAP, HEXAGON HEAD	3	
CECH	3	PFOZZA	2530-01-499-3708	99411	LG0094-4250	SHAFT, CROSS DRIVE	1	
CEAGA	4	PFOZZA	2590-01-499-5437	0FBD6	50890078	LANDING GEAR2-SP	1	
CECK	5	PFOZZA	5310-01-174-0431	99411	PP0016-03	WASHER,FLAT	2	
CECL	6	PFOZZA	5310-01-126-9404	24617	9422277	NUT, SELF-LOCKING, HEXAGON	5	
CEBK	7	PFOZZA	5340-01-175-0564	99411	LG0083-05	CRANK,HAND	1	
CECM	8	PFOZZA	5315-01-316-7547	99411	LG0070-02	PIN, STRAIGHT, HEADLESS	2	
CECN	9	PFOZZA	5305-00-115-9526	80204	B1821BH038C075D	SCREW, CAP, HEXAGON HEAD	2	
CEAR	10	PFOZZA	5305-01-499-3712	0FBD6	50174010	BOLT	4	
CEAJ	11	PFOZZA	2530-01-499-3718	0FBD6	01546002	SHOE ASSEMBLY, FRONT	2	
CEAM	12	PFOZZA	5340-01-499-5543	0FBD6	02302044	PLATE,TIE	4	
CEBJ	13	PFOZZA	5315-01-499-5545	0FBD6	01578006	PIN ASSEMBLY	4	
CEBX	14	PFOZZA	4010-01-499-7594	0FBD6	50450016	LANYARD	4	
CEBY	15	PFOZZA	5320-01-499-5546	0FBD6	52050001	POP RIVET	4	
CEAK	16	PFOZZA	2530-01-499-5547	0FBD6	01546003	SHOE ASSEMBLY,REAR	2	
CEBH	17	PFOZZA	5310-01-499-3318	0FBD6	02976010	WASHER	4	
CEAX	18	PFOZZA	5315-01-499-4271	0FBD6	51182002	PIN, CLIP, RETAINING	4	
CEAT	19	PFOZZA	5310-01-499-4273	0FBD6	50995065	NUT,LOCK	24	
CEAQ	20	PFOZZA	5305-01-499-4202	0FBD6	50174006	BOLT,HEX HEAD	20	
						END OF FIGURE		

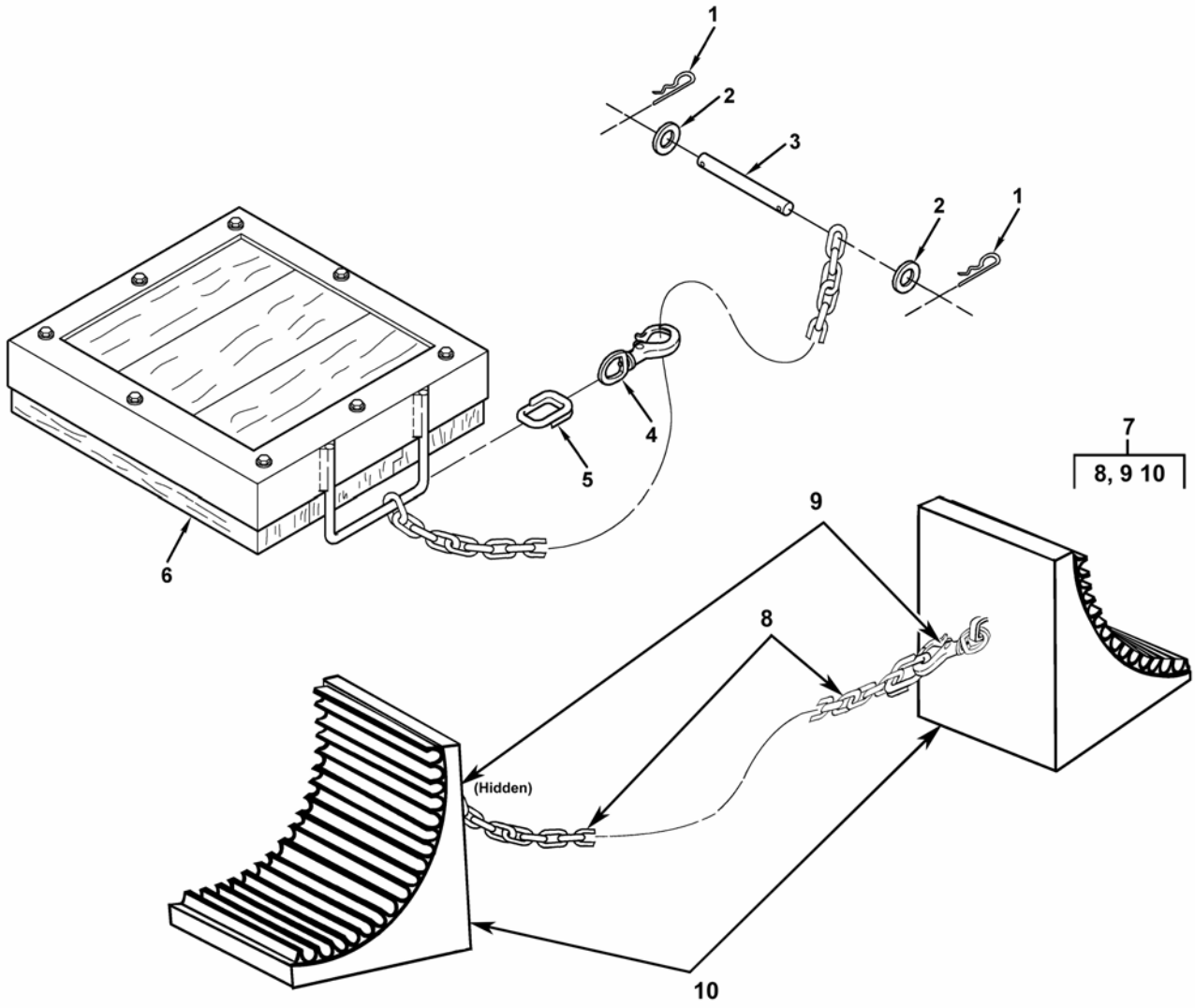


Figure 25. Ground Board Assembly
and Chock Blocks

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1507 LANDING GEAR		
						FIG. 25 GROUND BOARD/CHOCK BLOCKS ASSEMBLY		
CEAX	1	PFOZZA	5315-01-499-3472	0FBD6	51182002	PIN,COTTER	4	
CEBH	2	PFOZZA	5310-01-499-3318	0FBD6	02976010	WASHER.....	4	
CEAW	3	PFOZZA	5315-01-499-3472	0FBD6	08796002	PIN.....	2	
CEBFA	4	PFOZZA	5340-01-499-5549	39428	3919T15	CLIP.....	4	
CEBG	5	PFOZZA	4030-01-499-4227	0FBD6	50462035	CHA IN LINK, OPEN END	2	
CEAV	6	PFOZZ	5340-01-499-4251	0FBD6	07758002	BOARD,GROUND JACK.....	2	
	7	PFOOOA	2540-01-499-5553	0FBD6	07758014	CHOCK BLOCK ASSEMBLY: BLOCKS (2), CHAIN (1,) CLIPS (2)	2	
	8	PFOZZA	4010-01-499-5145	0FBD6	04626004	CHAIN	2	
	9	PFOZZA	5340-01-499-4157	0FBD6	50462030	LINK OPEN, RIGID	4	
	10	PFOZZA	2540-01-377-9255	0FBD6	50468001 (WC764R)	CHOCK, WHEEL)	4	
						END OF FIGURE		

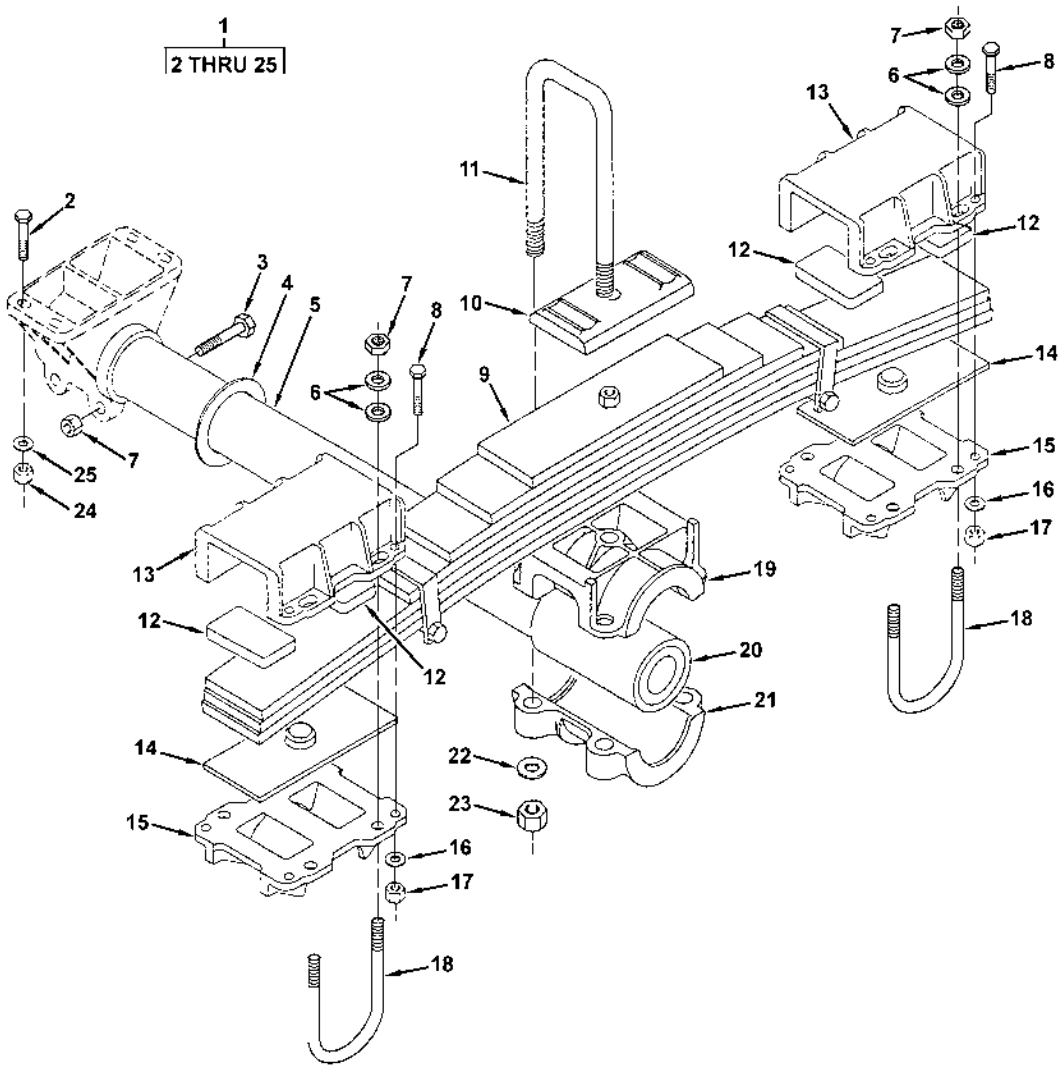


Figure 26. Suspension

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1601 SPRINGS		
						FIG. 26 SUSPENSION		
CFAEA	1	XDFFFA		0FBD6	5490008	SUSPENSION, ASSY, COMPLETE, LESS AXLES	1	
CFBB	2	PFFZZA	5305-01-499-4217	0FBD6	50174017	BOLT,HEX HEAD	8	
CFAB	3	PFFZZA	5306-01-347-5921	92967	10376-00	BOLT,MACHINE	4	
CFAC	4	PFFZZA	5310-01-098-7247	92967	895-00	WASHER	2	
CFAZ	5	PFFZZA	4710-01-240-9431	92967	893-02	TRUNNION TUBE	1	
CFAJ	6	PFFZZA	5310-01-098-7245	92967	817-00	WASHER,FLAT	32	
CFAG	7	PFFZZA	5310-01-098-7827	92967	841-00	NUT,SELF-LOCKING,HEX HEAD	20	
CFAH	8	PFFZZA	5305-00-726-2551	92967	9293-00	SCREW,CAP,HEXAGON HEAD	16	
CFAE	9	PFFZZA	5360-01-499-4204	92967	10055-00	SPRING	2	
CFBA	10	PFFZZA	2510-01-101-2559	92967	9640-00	PLATE,WEAR,LEAF	2	
CFAD	11	PFFZZA	5306-01-098-7198	92967	9639-03	U-BOLT,TRUNNION	4	
CFAK	12	PFFZZA	2590-01-100-9001	92967	814-00	PAD,CUSHIONING	8	
CFAF	13	PFFZZA	2510-01-100-7167	92967	9937-00	END CAP,SPRING	4	
CFAL	14	PFFZZA	2510-01-101-2890	92967	10608-00	PLATE,ALIGNMENT	4	
CFAM	15	PFFZZA	2510-01-100-9270	92967	9934-02	SEAT,LEAF SPRING	4	
CFAN	16	PFFZZA	5310-01-098-7244	92967	10273-00	WASHER,FLAT	16	
CFAP	17	PFFZZA	5310-01-499-4209	92967	11513-03	LOCKNUT,HEX HEAD	16	
CFAQ	18	PFFZZA	5306-01-098-7197	92967	10060-01	U-BOLT	8	
CFAR	19	PFFZZA	2520-01-101-0935	92967	891-00	HUB,TRUNNION, UPPER	2	
CFATA	20	PFFZZA	5365-01-316-3300	92967	20248-01	BUSHING,NONMETALLIC	2	
CFAU	21	PFFZZA	2520-01-101-2551	92967	898-00	HUB,TRUNNION, LOWER	2	
CFAV	22	PFFZZA	5310-01-098-7246	92967	837-00	WASHER,FLAT	8	
CFAW	23	PFFZZA	5310-01-098-7236	92967	836-00	NUT,PLAIN,HEXAGON	8	
CEAT	24	PFFZZA	5310-01-499-4273	0FBD6	50995065	NUT, LOCK	8	
CFBC	25	PFFZZA	5310-01-499-4211	0FBD6	55752009	WASHER,FLAT	8	
						END OF FIGURE		

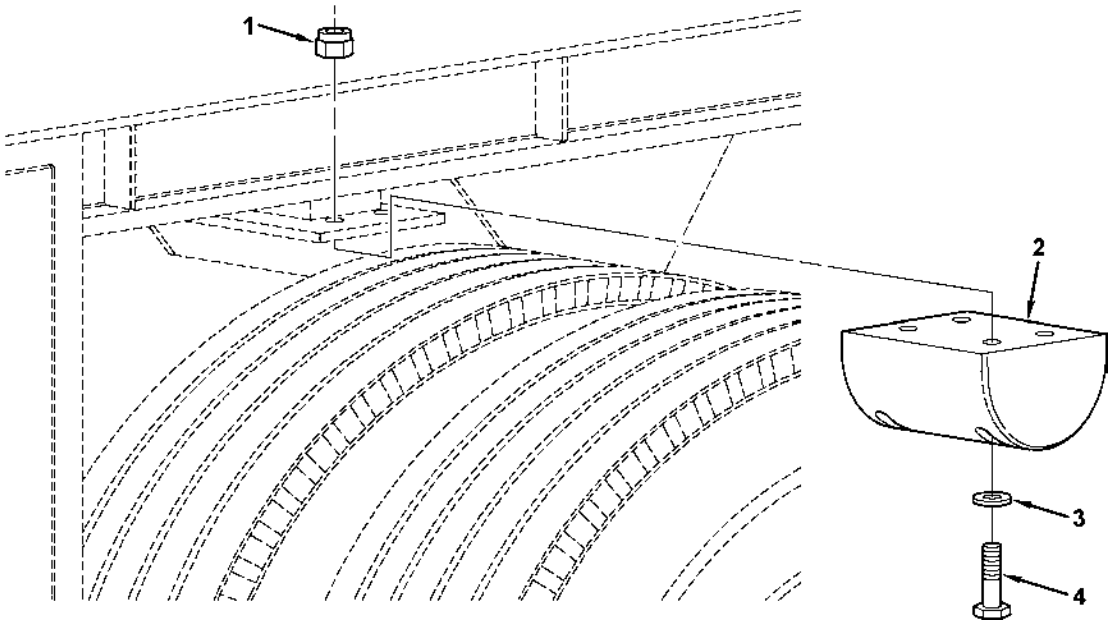


Figure 27. Suspension Stops

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1601 SUSPENSION		
						FIG. 27 SUSPENSION STOPS		
CEBN	1	PFOZZA	5310-01-499-3682	0FBD6	50995056	NUT, LOCK.....	16	
CEAEA	2	PFOZZA	5340-01-499-4186	72384	SL-4000	BUMPER,RUBBER	4	
CEBL	3	PFOZZA	5310-01-499-3687	0FBD6	55752007	WASHER, FLAT.....	16	
CEBM	4	PFOZZA	5305-01-499-5426	0FBD6	50173013	BOLT.....	16	
						END OF FIGURE		

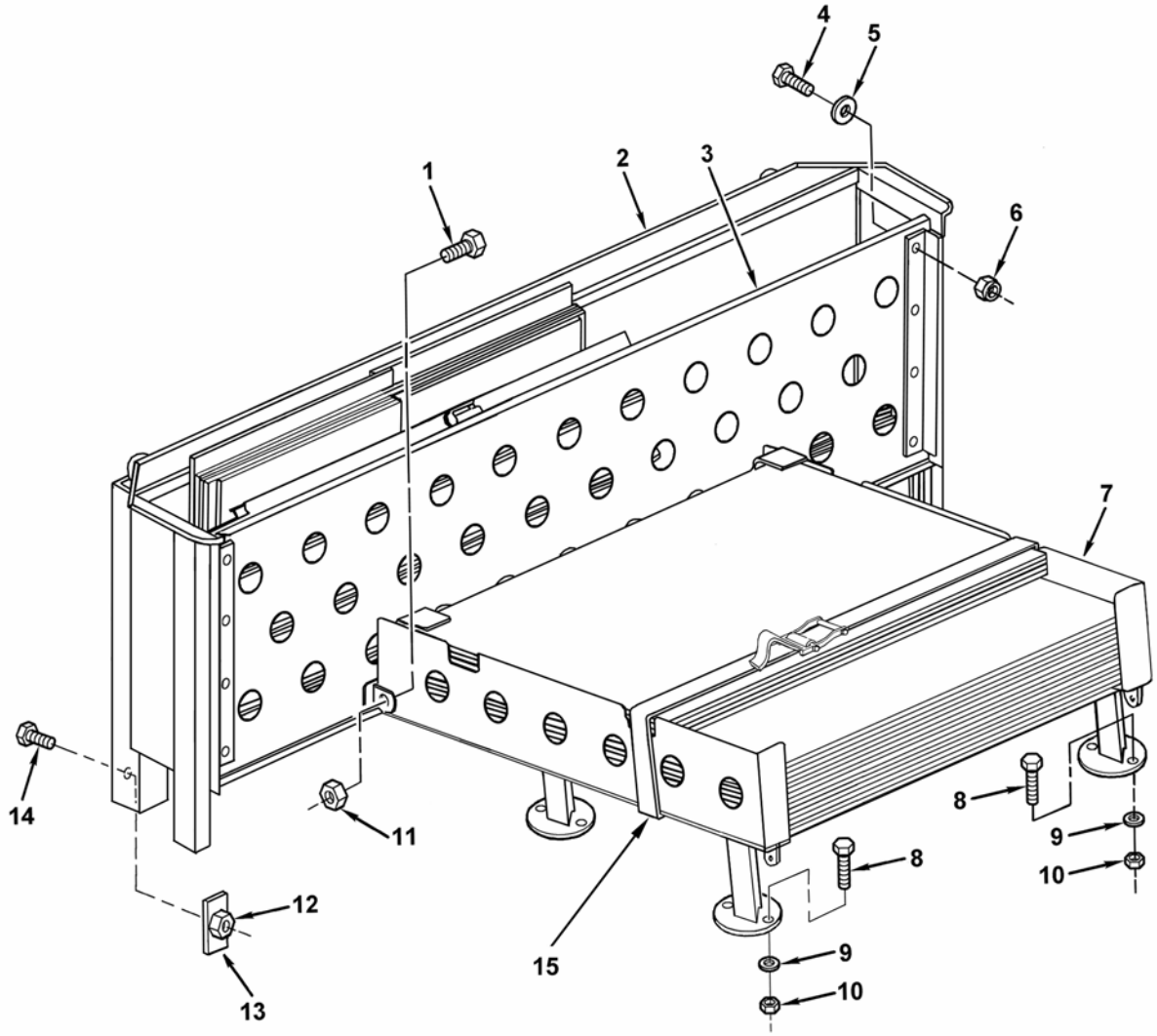


Figure 28. Bulkhead and Stowage Rack Assembly

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1801 BODY ASSEMBLIES		
						FIG. 28 BULKHEAD AND STOWAGE RACK ASSEMBLY		
ZACH	1	PFOZZA	5305-01-499-5131	0FBD6	50173012	BOLT 1”.....	2	
ZABL	2	PFOZZA	5340-01-499-7601	0FBD6	09599007	BULKHEAD ASSEMBLY.....	1	
ZABF	3	PFOZZA	2590-01-499-7607	0FBD6	07758006	CROSSMEMBER ASSEMBLY, BULKHEAD.....	1	
ZADG	4	PFOZZA	5306-01-504-6135	0FBD6	50170007	BOLT,HEX HEAD.....	8	
ZADY	5	PFOZZA	5310-01-499-4253	0FBD6	50995050	LOCKNUT,.25-20.....	8	
ZADZ	6	PFOZZA	5310-01-504-6159	0FBD6	55752003	FLATWASHER,.25	8	
ZABG	7	PFOZZA	2590-01-499-5103	0FBD6	07758085	RACK ASSEMBLY, STOWAGE ROADSIDE.....	1	
ZABH	7	PFOZZA	2590-01-499-5096	0FBD6	07758086	RACK ASSEMBLY, STOWAGE CURBSIDE	1	
ZADN	8	PFOZZA	5306-01-504-6162	0FBD6	50172010	BOLT, .38X2.5.....	4	
ZADU	9	PFOZZA	5310-01-499-3461	0FBD6	55752005	FLATWASHER .38	4	
ZADX	10	PFOZZA	5310-01-499-3456	0FBD6	50995054	LOCKNUT .38-16N	4	
ZACG	11	PFOZZA	5310-01-499-4219	0FBD6	50985056	NUT .5”.....	2	
ZACK	12	PFOZZA	5310-01-499-4219	0FBD6	50985056	NUT .5".....	4	
ZACL	13	PFOZZA	5310-01-499-4235	0FBD6	55754007	WASHER, LOCK.....	4	
ZACM	14	PFOZZA	5305-01-499-7665	0FBD6	50173008	BOLT 3/4".....	4	
	15	XDOZZA		0FBD6	50102098	STRAP, PANEL, SECURING…….	2	
						END OF FIGURE		

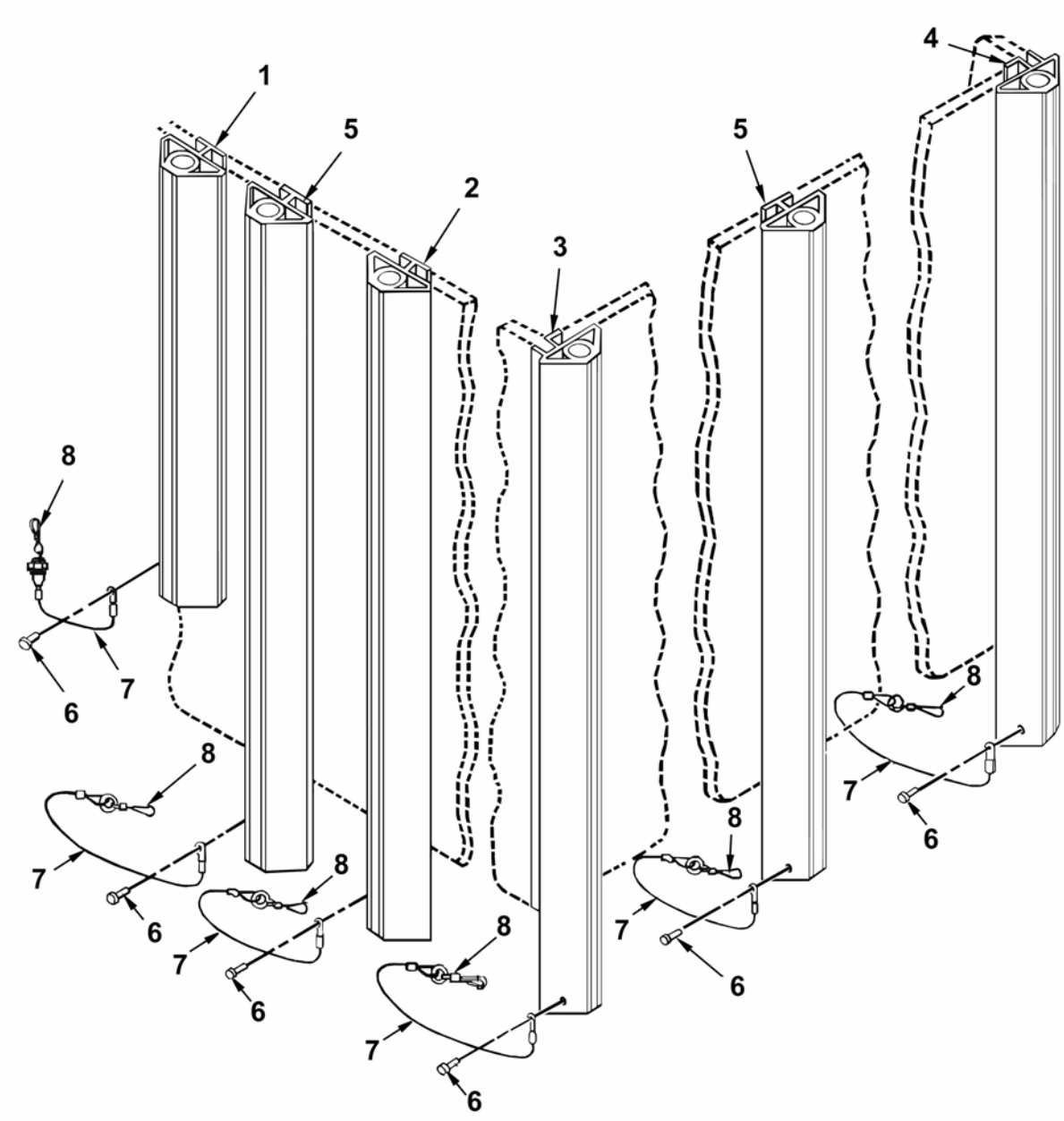


Figure 29. Front, Side and Rear Stakes

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1801 BODY ASSEMBLIES		
						FIG. 29 FRONT SIDE AND REAR STAKES		
ZAAN	1	PFOZZA	2510-01-499-7639	OFBD6	04696004	SHORT STAKES, UPPER DECK	4	
ZAAK	2	PFOZZA	2510-01-499-3799	0FBD6	04696001	LONG STAKES, W/CHAIN LOOP	4	
	3	PFOZZA	2510-01-499-7636	0FBD6	04696002	LONG STAKE, W/CHAIN LOOP, LEFT REAR	1	
	4	PFOZZA		0FDB6	04696005	·LONG STAKE, W/CHAIN LOOP, RIGHT REAR	1	
	5	PFOZZA	2510-01-499-7638	0FDB6	04696003	·LONG STAKESSIDES AND REAR CENTER	13	
ZACE	6	PFOOOA	5320-01-499-5546	0FDB6	52050001	RIVET, POP'	23	
ZACD	7	PFOZZA	4010-01-499-7594	0FBD6	50450016	·LANYARD, STEEL CABLE	23	
ZACF	8	PFOZZA	5340-01-499-4157	0FDB6	50462030	·LINK, RIGID EYE	23	

END OF FIGURE

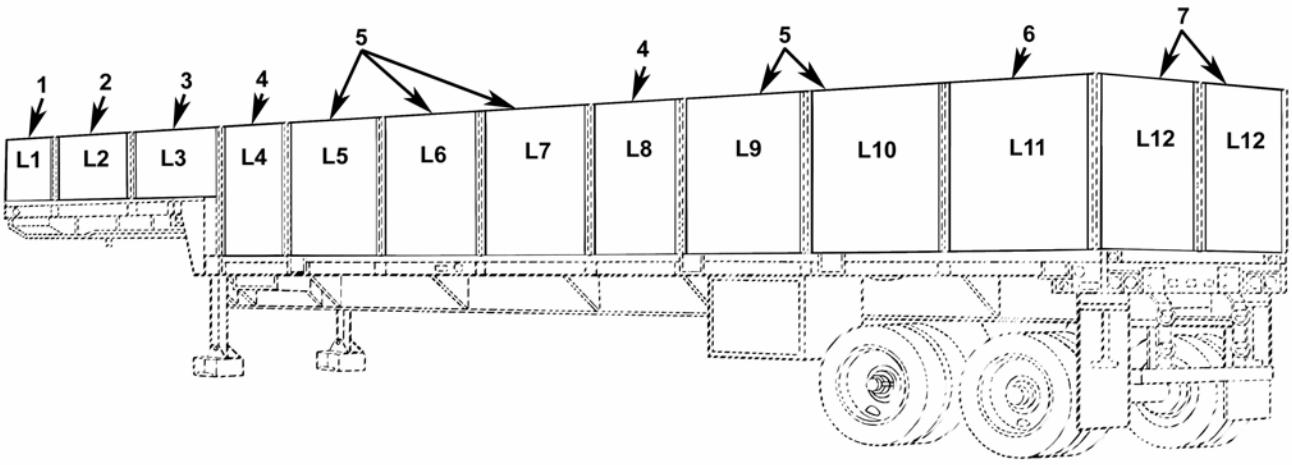


Figure 30. Side Board

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1801 BODY ASSEMBLIES		
						FIG. 30 SIDE BOARD		
ZAAB	1	PFOOOA	5530-01-499-3366	0FBD6	04694011	PANELS, WOOD, L1, R1.....	2	
ZAAC	2	PFOZZA	5530-01-499-3375	0FBD6	04694010	·PANELS, WOOD, L2, R2.....	2	
ZAAD	3	PFOZZA	5530-01-499-3379	0FBD6	04694009	·PANELS, WOOD, L3, R3.....	2	
ZAAF	4	PFOZZA	5530-01-499-3386	0FBD6	04694005	·PANELS, WOOD, L4, L8, R4, R8	4	
ZAAG	5	PFOZZA	5530-01-499-3391	0FBD6	04694006	·PANELS, WOOD, L5, L6, L7, L9, L10, R5, R6, R7, R9, R10.....	10	
ZAAH	6	PFOZZA	5330-01-499-3395	0FBD6	04694007	·PANELS, WOOD, L11, R11.....	2	
ZAAJ	7	PFOZZA	5330-01-499-3398	0FBD6	04694008	·PANELS, WOOD, L12, R12.....	2	
						END OF FIGURE		

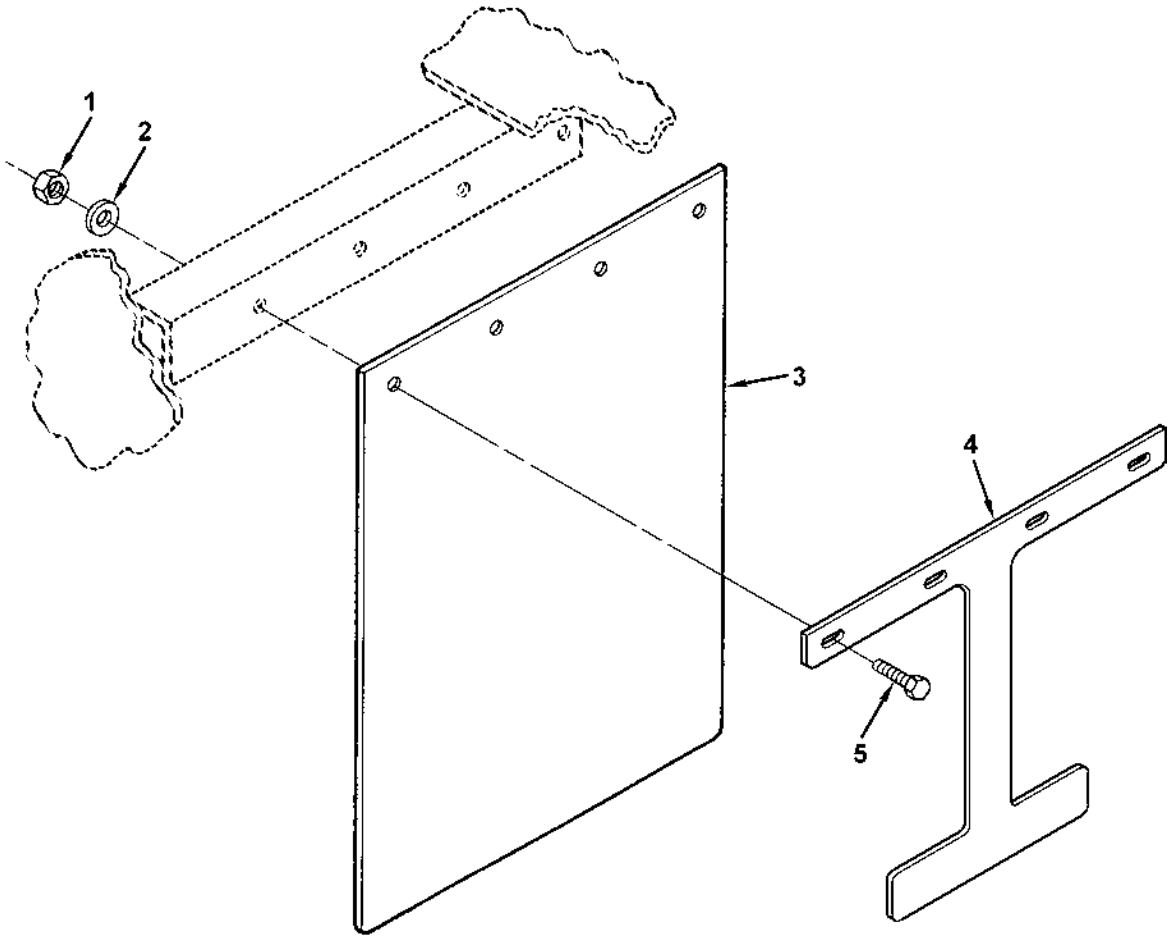


Figure 31. Mud Flaps

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1801 BODY ASSEMBLIES		
						FIG. 31 MUD FLAPS		
CGAD	1	PFOZZA	5310-01-499-3456	0FBD6	50995054	NUT.....	8	
CGAS	2	PFOZZA	5310-01-499-3461	0FBD6	55752005	WASHER, FLAT.....	8	
CGABA	3	PFOZZA	2540-01-499-4246	0FBD6	50822014	ANTISAIL, MUDFLAP.....	2	
CGACA	4	PFOZZA	5340-01-499-3409	0FBD6	07430072	BRACKET,REAR ANTISAIL.....	2	
CGAF	5	PFOZZA	5305-01-499-3465	0FBD6	50172008	BOLT.....	8	
						END OF FIGURE		

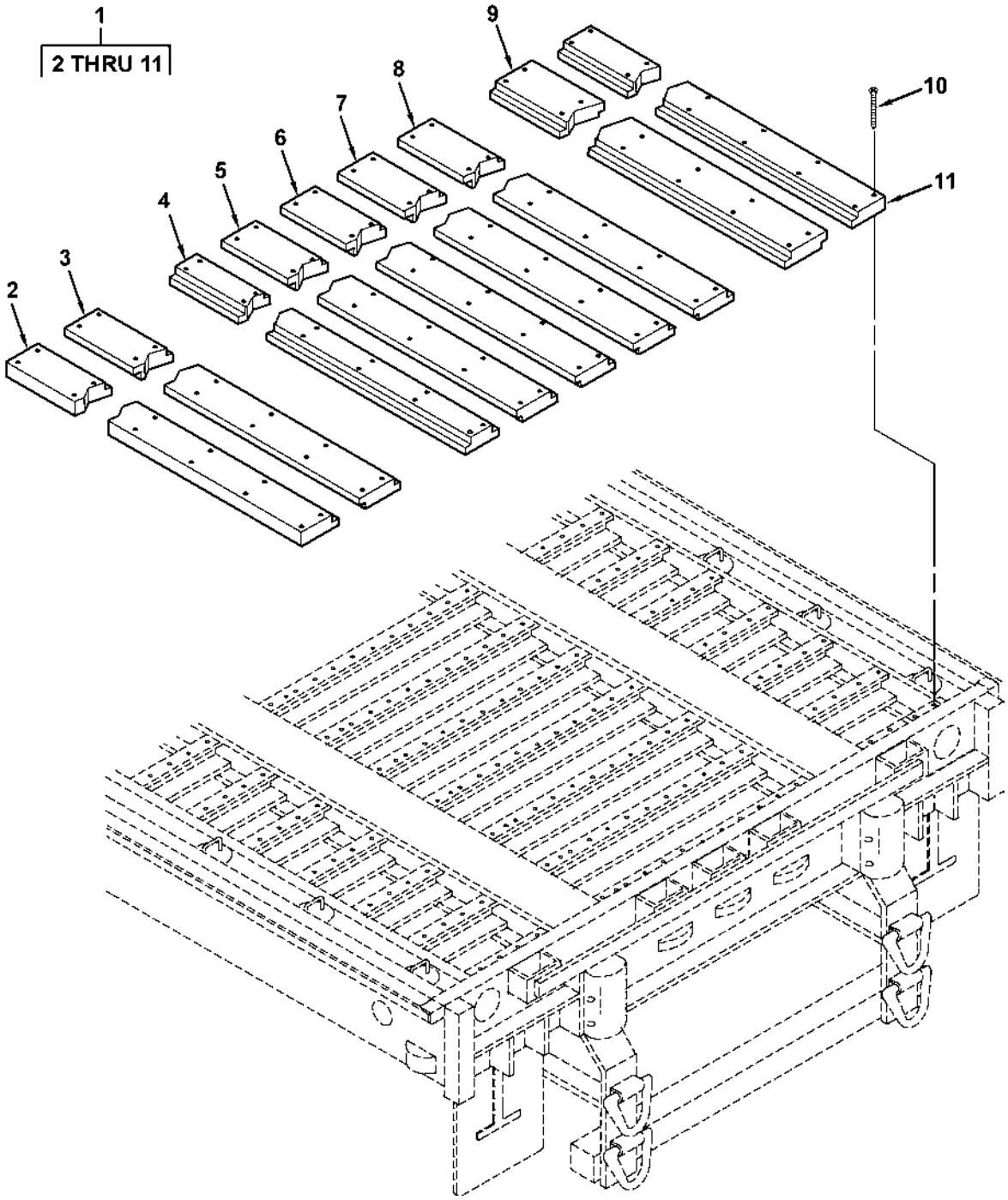


Figure 32. Floor Deck Boards

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						ROUP 1805 FLOORS, SUBFLOORS AND RELATED COMPONENTS		
						FIG. 32 FLOOR DECK BOARDS		
XAAG	1	KFOOOA	2510-01-499-5138	8N013	M871A3-KIT	APITONG DECK KIT, 9 BOARDS.....	1	
CGAHA	2	PFOZZA	5510-01-504-6162	8N013	M871A3-A	BOARD, FLOOR 6-5/8 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
CGAJA	3	PFOZZA	5510-01-504-6168	8N013	M871A3-B	BOARD, FLOOR 7 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
CGAKA	4	PFOFFA	5510-01-504-6170	8N013	M871A3-D	FLOOR 3-5/8 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
CGALA	5	PFOZZA	5510-01-504-6172	8N013	M871A3-E	BOARD, FLOOR 7 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
CGAMA	6	PFOZZA	5510-01-504-6174	8N013	M871A3-F	BOARD, FLOOR 7 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
CGANA	7	PFOZZA	5510-01-504-6175	8N013	M871A3-G	BOARD, FLOOR 7 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
CGAPA	8	PFOZZA	5510-01-504-6176	8N013	M871A3-H	BOARD, FLOOR 7 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
CGAQA	9	PFOZZA	5510-01-504-6177	8N013	M871A3-J	BOARD, FLOOR 7 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
CGAZ	10	PFOZZA	5305-01-499-7657	0FBD6	52116040	SCREW, FLAT HEAD (NOT PART OF KIT).....	1300-1600	
CGARA	11	PFOZZA	5510-01-504-6180	8N013	M871A3-K	BOARD, FLOOR 6-5/8 IN.WIDE, PART OF KIT M871A3-KIT.....	1	
						END OF FIGURE		

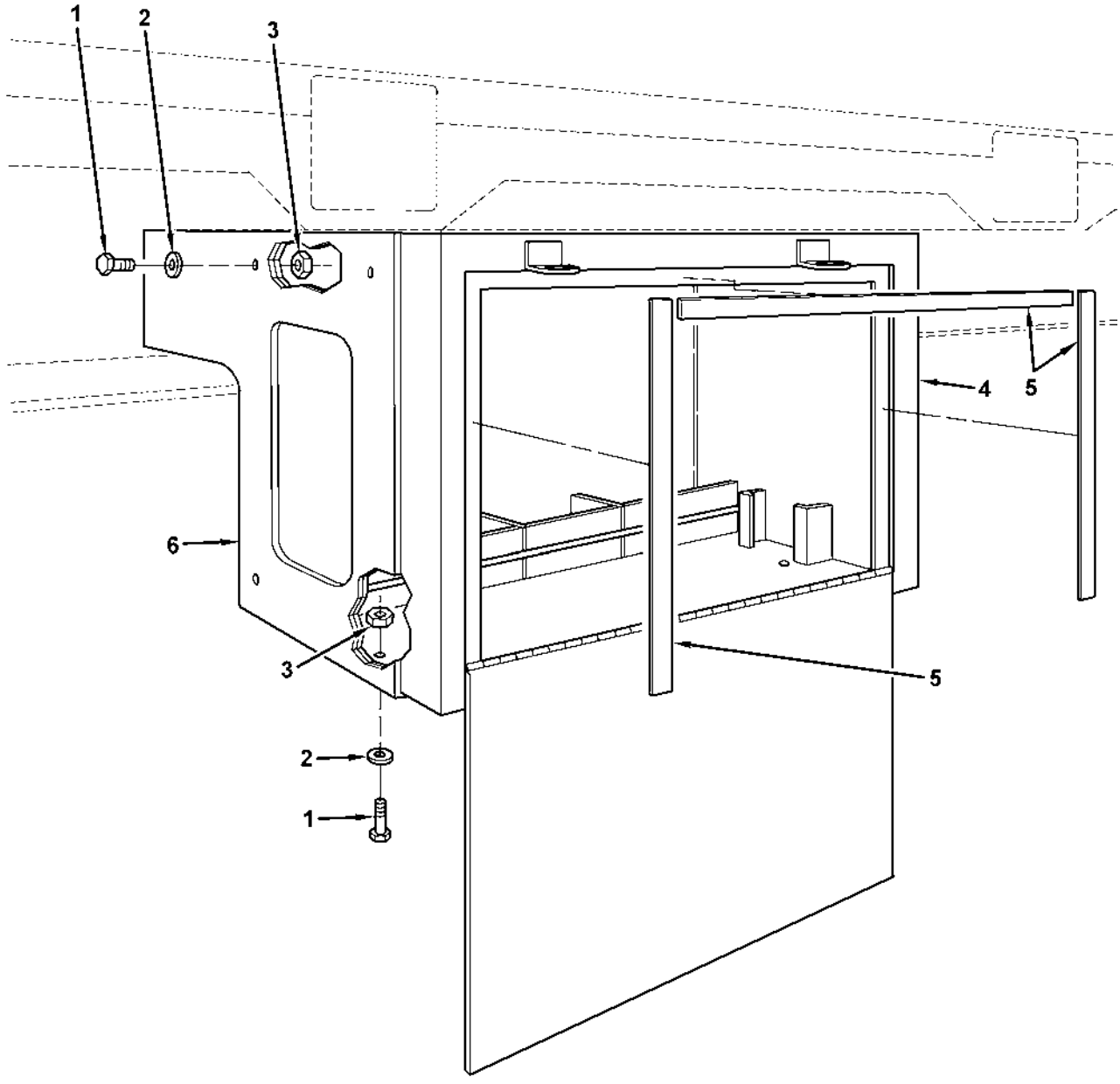


Figure 33. Stowage Box

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1808 BODY, CAB, HOOD AND HULL		
						FIG. 33 STOWAGE BOX		
CGAW	1	PFOZZA	5305-01-499-7665	0FBD6	50173008	BOLT	8	
CGAY	2	PFOZZA	5310-01-499-3687	0FBD6	55752007	WASHER,FLAT	16	
CGAX	3	PFOZZA	5310-01-499-3682	0FBD6	50995056	LOCKNUT	8	
CGAV	4	PFOFFA	2540-01-499-3425	0FBD6	00166005	STOWAGE BOX ASSY	1	
CKPU	5	XDOZZA		0FBD6	52600090	STRIP, WEATHER	3	
CKQG	6	PFFZZA	5340-01-504-6182	0FBD6	00028261	BRACKET,LEFT	1	
CKQN	6	PFFZZA	5340-01-504-6183	0FBD6	00028262	BRACKET,RIGHT	1	
						END OF FIGURE		

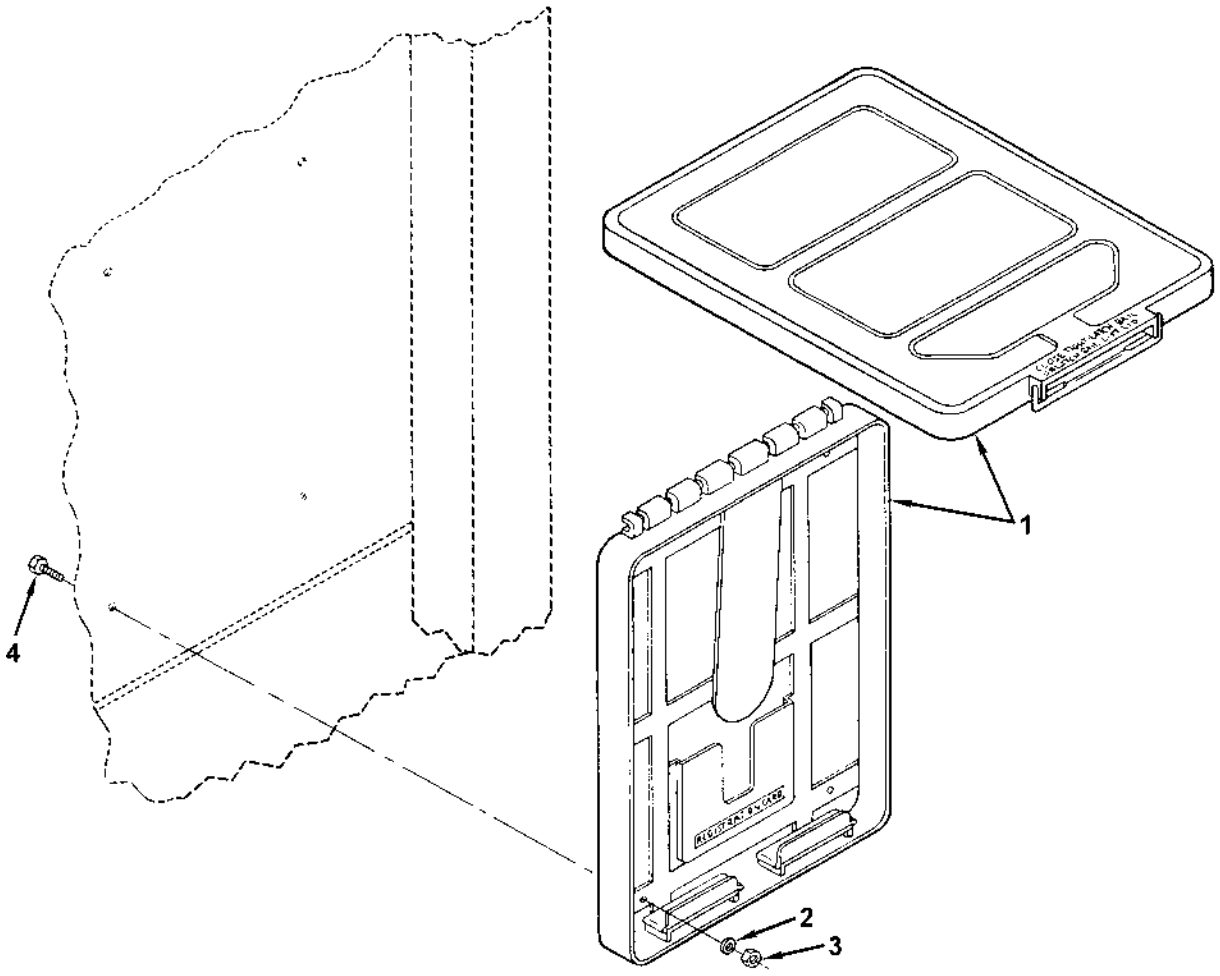


Figure 34. Manifest Box

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 1808 STOWAGE RACKS, BOXES, STRAPS, CASES, ETC.		
						FIG. 34 MANIFEST BOX		
CGAQ	1	PAOZZA	7520-01-324-3687	1JA34	550	BOX,DOCUMENT	1	
CGAU	2	PFOZZA	5310-01-504-6159	0FBD6	55752003	WASHER, FLAT .25 Z/PLATED	4	
CGAT	3	PFOZZA	5310-01-499-4253	0FBD6	50995050	NUT, LOCK .25-20 NLN/INSERT.....	4	
CGAR	4	PFOZZA	5305-01-499-4256	0FBD6	50170005	BOLT, HEX HEAD .25X1 GR5	4	
						END OF FIGURE		

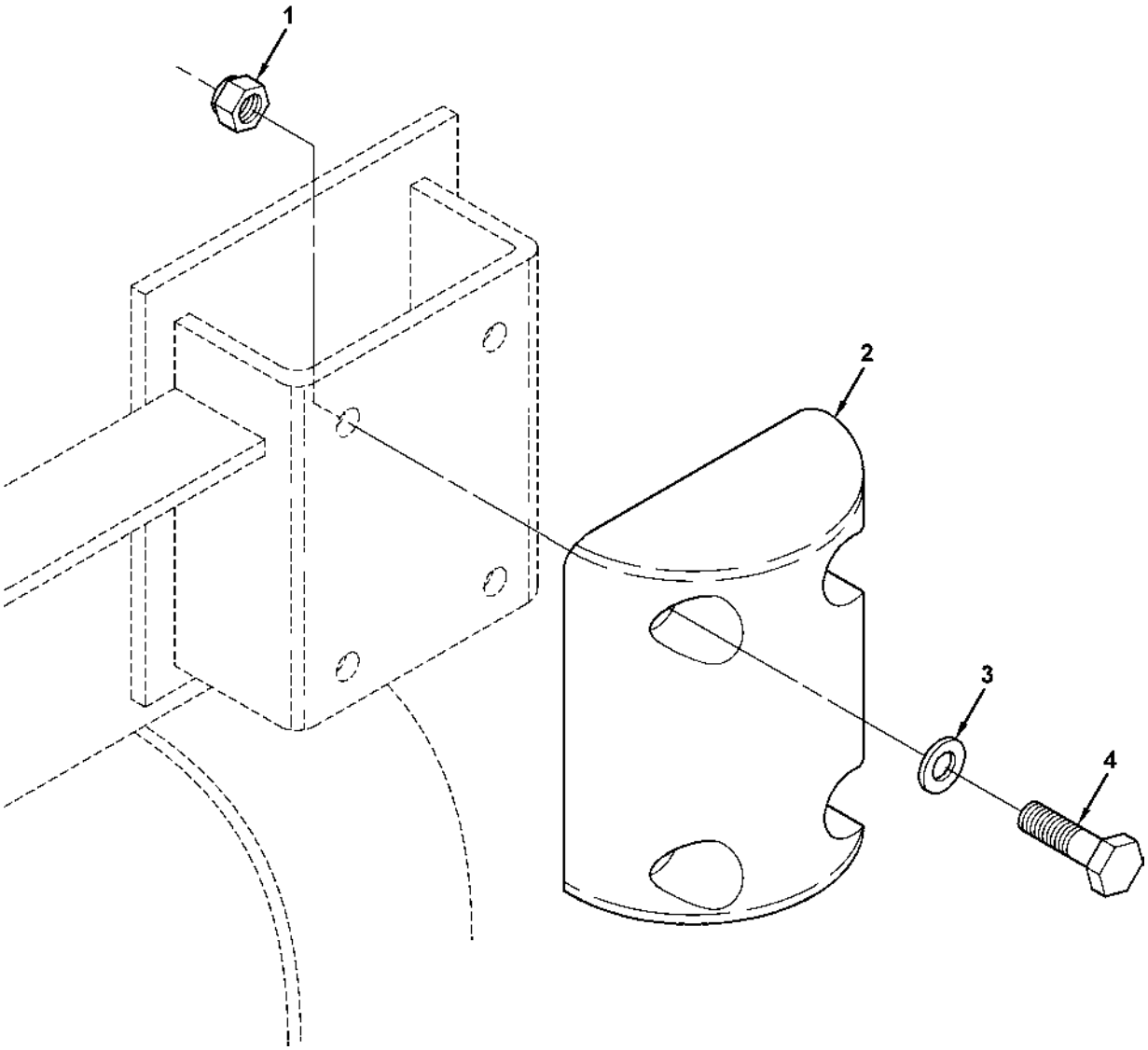


Figure 35. Rubber Dock Bumpers

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 2101 BUMPER AND GUARDS		
						FIG. 35 RUBBER DOCK BUMPERS		
CEBN	1	PFOZZA	5310-01-499-3682	0FBD6	50995056	NUT, LOCK	8	
CEAEA	2	PFOZZA	5340-01-499-4186	72384	SL-4000	BUMPER,RUBBER.....	2	
CEBL	3	PFOZZA	5310-01-499-3687	0FBD6	55752007	WASHER, FLAT.....	8	
CEBM	4	PFOZZA	5305-01-499-5426	0FBD6	50173013	BOLT	8	
						END OF FIGURE		

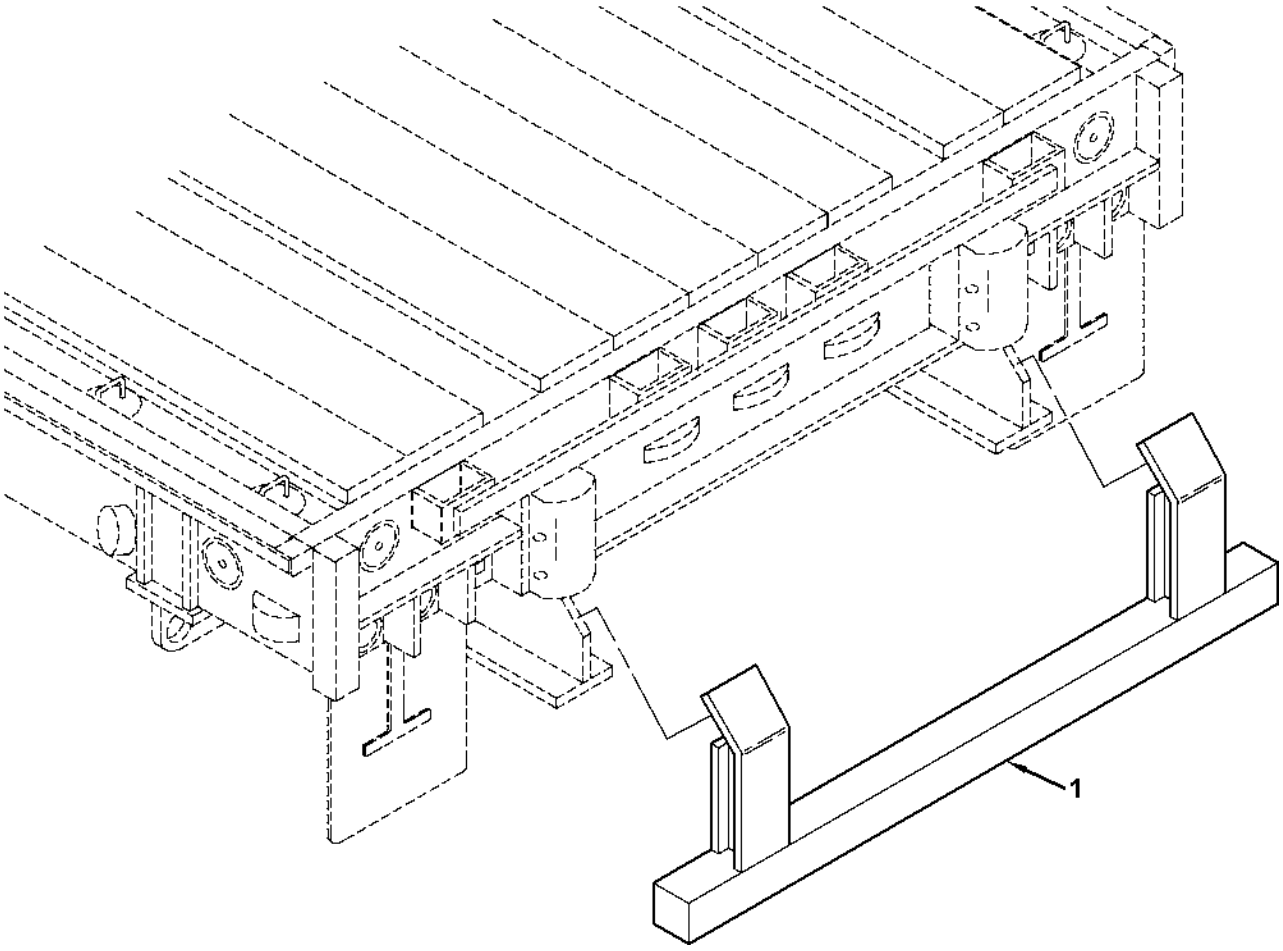


Figure 36. Run Under Protection

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 2101 BUMPER AND GUARDS		
						FIG. 36 RUN UNDER PROTECTION		
CKQU	1	XDFZZA		OFBD6	01590107	RISER, BUMPER ASSY	1	
						END OF FIGURE		

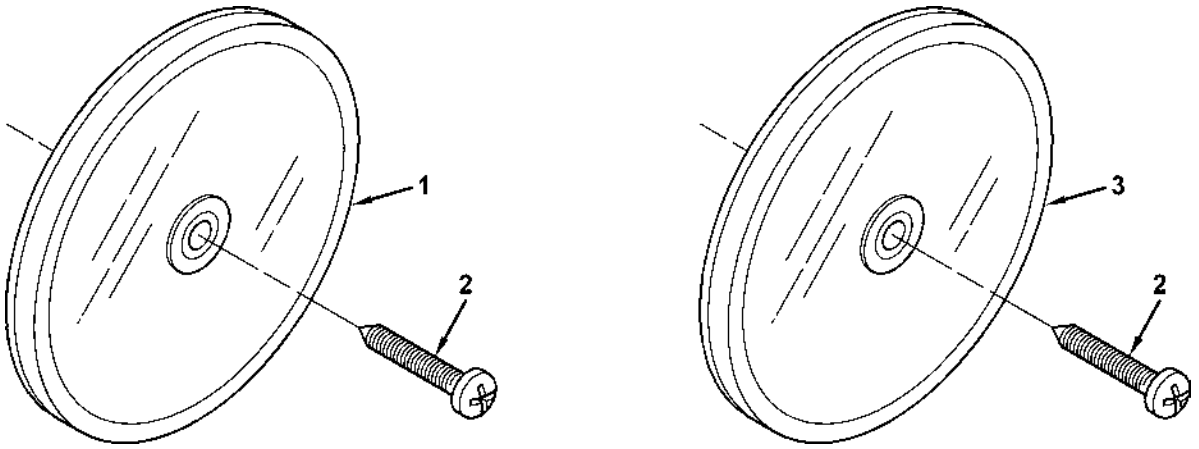


Figure. 37. Reflectors

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 2202 ACCESSORIES ITEMS		
						FIG. 37 REFLECTORS		
CHABB	1	PAOZZA	9905-01-070-0471	13548	98007Y	REFLECTOR,INDICATING AMBER, 2“.....	4	
CHAD	2	PFOZZA	5305-01-499-5551	0FBD6	52100010	SCREW,TAPPING.....	8	
CHACB	3	PAOZZA	9905-01-069-7282	13548	98007R	REFLECTOR,INDICATING RED, 2”.....	4	
						END OF FIGURE		

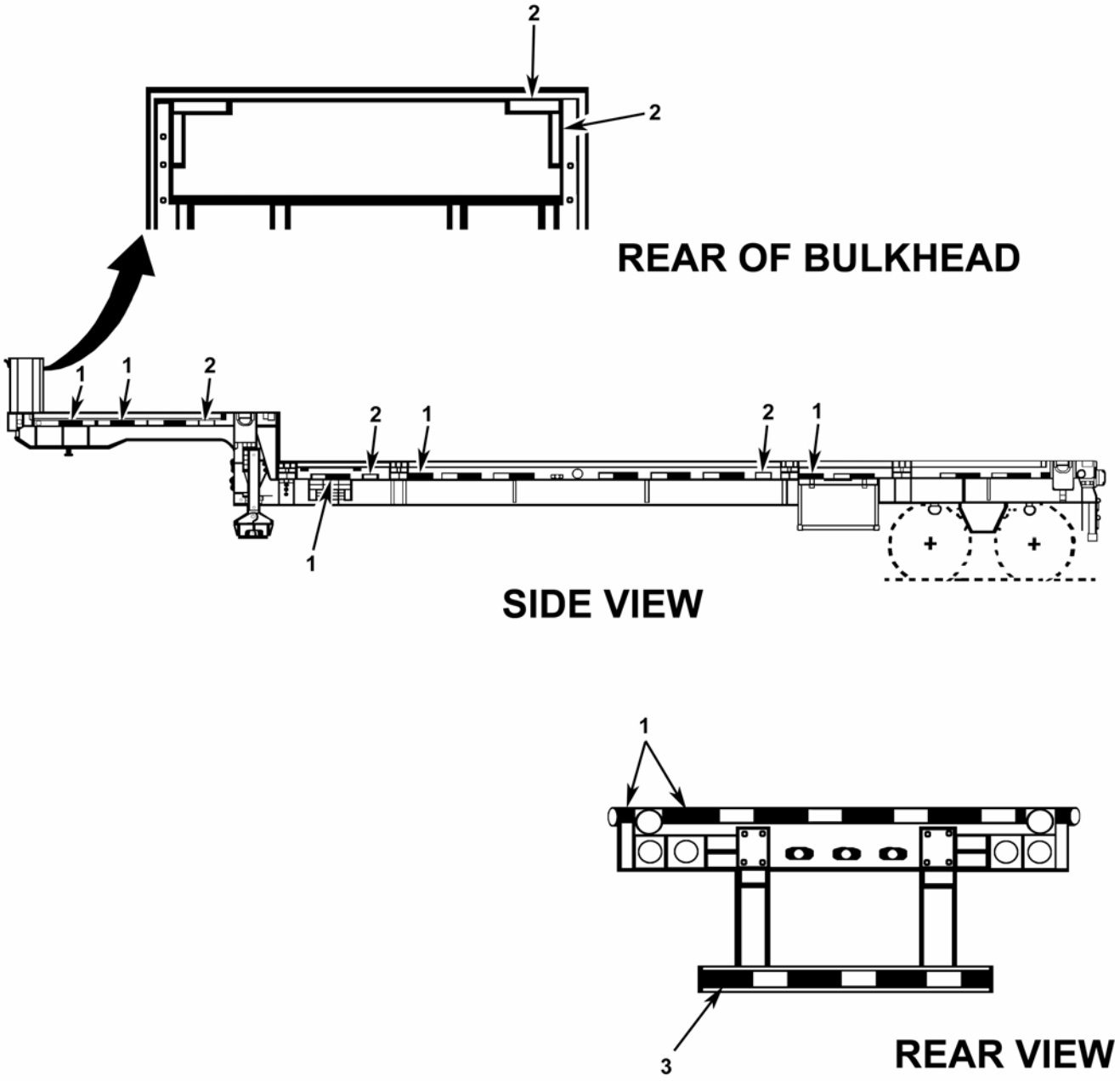


Figure 38. Conspicuity Tape

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 2202 ACCESSORIES ITEMS		
						FIG. 38 CONSPICTUITY TAPE		
CKUA	1	PFOZZA	9390-01-504-6185	3DGR3	51457019	CONSPICUITY TAPE, RED/WHITE,2”.....	V	
CKUG	2	XDOZZA	9390-01-509-0712	3DGR3	51457017	CONSPICUITY TAPE, WHITE,2”.....	V	
CKUN	3	PFOZZA	9390-01-504-6187	3DGR3	51457022	CONSPICUITY TAPE, RED/WHITE, 1 1/2”.....	V	
						END OF FIGURE		

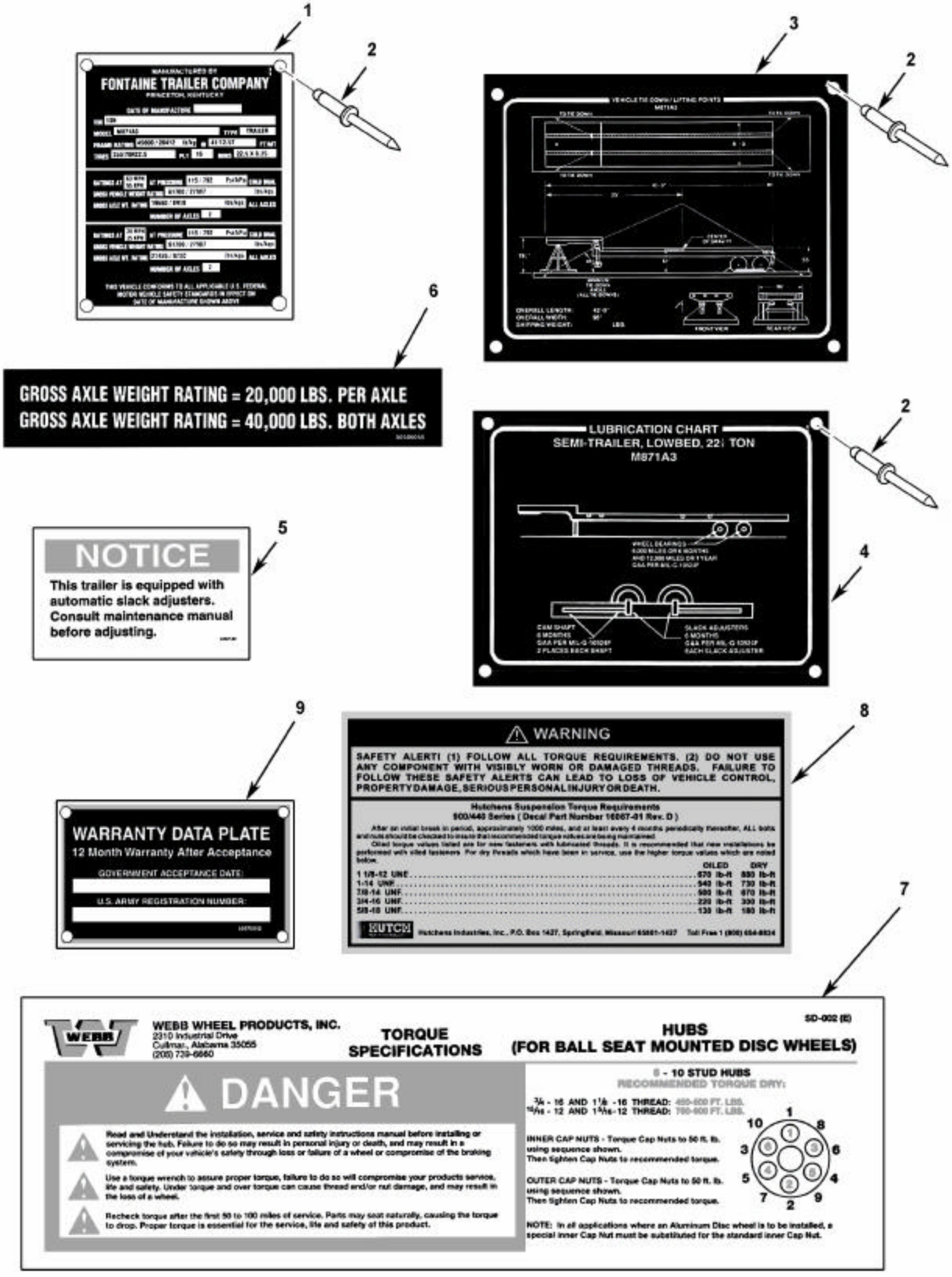


Figure 39. Data Plates

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 2210 DATA PLATES		
						FIG. 39 DATA PLATES		
CJAB	1	PFOZZA	7690-01-499-4257	0FBD6	50976003	PLATE, MANUFACTURED BY	1	
CJAH	2	PFOZZA	5320-00-850-3282	07707	AD48BS	RIVET, BLIND.....	16	
CJAC	3	PFOZZA	7690-01-499-4258	0FBD6	50976040	PLATE,TIE-DOWN/LIFTING	1	
CJAD	4	PFOZZA		0FBD6	50976041	PLATE,LUBRICATION.....	1	
	5	PCOZZA		0FBD6	50507-65	DECAL, AUTO SLACK ADJUSTERS	1	
	6	PCOZZA	9690-01-499-4259	0FBD6	50507098	DECAL, AXLE GROSS WEIGHT.....	1	
	7	PCOZZA	7690-01-499-4261	18889	50507096	DECAL, TORQUE, WHEELS.....	1	
CJAA	8	PCCZZA	7690-01-499-3759	92967	16087-01	REV E DECAL, TORQUE SUSPENSION.....	1	
CKRG	9	PFOZZA		0FBD6	50976042	PLATE, WARRANTY	1	
						END OF FIGURE		

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 3307 SPECIAL PURPOSE KITS		
						FIG. 40 KITS		
						ITEM 1 PLISN AND NSN ARE UNAVAILABLE AT THIS TIME. THEREFOR:		
						THE BREAKDOWN ITEM(S)/PART(S) ARE BEING PROVIDED INSTEAD.		
	1	KFOOOA		78500	KIT 8078	BUSHING, REPA IR KIT	4	
·CBAQ		·PFOZZA	·5310-01-499-3382	·78500	·1229-R-4100	·WASHER, OUTER.....	1	
·CBAM		·PFOZZA	·5330-01-328-6090	·78500	·1205-Q-2123	·SEAL	2	
·CBAP		·PFOZZA	·2530-01-354-8091	·78500	·A-3105-L-	·BUSHING, RETAINER.....	1	
·CBAN		·PFOZZA	·5305-01-359-1367	·78500	1078	·SCREW, MACHINE.....	4	
·CBAL		·PFOZZA	·5310-01-499-3372	·78500	·10-X-1421	·WASHER, INNER.....	1	
·CBAK		·PFOZZA	·5325-01-499-3380	·78500	·1229-S-4101	·RING, SNAP.....	1	
·CBAU		·PFOZZA	·2530-01-311-8410	·78500	·1229-T-4102	·CAM BUSHING, ASSY.....	1	
·		·PFOZZA	·5305-01-315-3563	·78500	·A-3105-V-282	·SCREW, MACHINE.....	4	
·CBAD		·XDOZZA	·5310-01-133-5373	·78500	·10-X-1348	·WASHER, FLAT.....	2	
·CBAC		·PFOZZA	·5325-00-204-5061	·78500	·1229-B-1848 ·1229-X-1116	·RING, SNAP.....	1	
CBEA	2	KFOOOA	2530-01-496-9836	78500	KSR202 4707QP	LINED SHOE KIT, Q PLUS BRAKES (1 KIT REQUIRED FOR EA CH AXLE)	4	
		PFOZZA	2530-01-499-5407	78500	2 4747QP	·SHOE & LINING (1 SET)	2	
		PFOZZA	5360-01-158-1974	78500	2258-RQ-615	·SPRING, RETAINING (2)	2	
		PFOZZA	3120-00-322-6430	78500	1779-R-18	·ROLLER, BRAKE SHOE (2)	2	
		PFOZZA	3120-00-255-6042	78500	1225-B-496	·ANCHOR, PIN BUSHING (2)	2	
		PFOZZA	5315-01-129-6898	78500	1259-N-274	·PIN, ANCHOR (2)	2	
		PFOZZA	5340-01-328-4418	78500	3105-B-210	·RETAINER, ROLLER (2)	2	
		PFOZZA	5315-00-784-0637	78500	1218-G-85	·PIN, RETURN SPRING (2)	2	
		PFOZZA	5360-01-499-3396	78500	2258-W-803	RETURN SPRING, HEAVY DUTY (1)	2	
		PFOZZA	2530-01-499-5407	78500	SR202 4707QP	LINNING & SHOE, Q-PLUS (FOR 1 AXLE **ONLY**) (REASON FOR AVAILABILITY OF LINGING & SHOE **ONLY** IS IF THE LININGS ARE DAMAGED/STAINED DURING REPLACEMNT, DON'T HAVE TO BUY ANOTHER COMPLETE KIT)	2	
XAAB	3	KFOZZA	2530-01-499-3440	78502	427-10558	PARTS KIT, STUD..... ·NUT (4) ..... ·STUD (4) ..... ·BUSHING (4)	4	

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 3307 SPECIAL PURPOSE KITS (CONT.)		
						FIG. 40 KITS (CONT.)		
						ITEM 1 PLISN AND NSN ARE UNAVAILABLE AT THIS TIME. THEREFOR:		
						THE BREAKDOWN ITEM(S)/PART(S) ARE BEING PROVIDED INSTEAD.		
	4	KFOOOA		78500	KIT 8078	CAMSHAFT REPAIR KIT (FOR 1 AXLE END ONLY), KIT CONTAINS:	4	
		·PFOZZA	·2530-01-359-8091	·78500	·A-3105-L-1078	·BUSHING, RETAINER.....	1	
		·PFOZZA	·5330-01-328-6090	·78500	·1205-Q-2123	·SEAL.....	2	
		·PFOZZA	·5310-01-499-3382	·78500	·1229-R-4100	·WASHER, OUTER.....	1	
		·PFOZZA	·6310-01-499-3372	·78500	·1229-S-4101	·WASHER. INNER.....	1	
		·PFOZZA	·5325-01-499-3380	·78500	·1229-T-4102	·RING, SNAP.....	1	
		·PFOZZA	·5305-01-359-1367	·78500	·10-X-1421	·SCREW, MACHINE.....	4	
		·PFOZZA	·5325-00-204-5061	·78500	·1229-X-1116	·RING, SNAP.....	1	
		·PFOZZA	·5310-01-133-5373	·78500	·1229-B-1848	·WASHER, FLAT.....	1	
		·PFOZZA	·2530-01-311-8410	·78500	·A-3105-V-282	·ASSEMBLY, CAM BUSHING.....	2	
		·PFOZZA	·5305-01-315-3563	·78500	·10-X-1348	·SCREW, MACHINE.....	4	
	5	PFOZZA		78500		S-CAM, Q-PLUS BRAKES (1 PER AXLE END, 2 RIGHT(S) AND 2 LEFT(S) PER TRAILER):	4	
		·PFOZZA	·2530-01-499-3135	·78500	·2210-D-6868	·S-CAMS, Q-PLUS BRAKES (RIGHT- HAND, 2 PER TRAILER) ……	2	
		·PFOZZA	·2530-01-499-3159	·78500	·2210-E-6869	·S-CAMS, Q-PLUS BRAKES (LEFT- HAND, 2 PER TRAILER)	2	
	6	PFOZZA	2530-01-311-8410	78500	A-3105-V-282	BRACKET, CAMSHAFT SUPPORT W/BUSHING AND ZERK FITTING (4 PER TRAILER). THIS PART REPLACES THECAMSHAFT BRACKECT W/BUSHING IF DAMAGED OR WORN. ..	4	
XAAC	7	KFOZZA	2530-01-499-3446	78502	427-10563	KIT, BRACKET (SLACK ADJUSTER) ..... ·BRACKET (1) ·STUD (1) ·NUT (1)	V	
XAAD	8	KFOZZA	2590-01-499-3453	78502	400-10211	KIT, ASA SERVICE (SLACK ADJUSTER) ..... ·SLACK ADJUSTER (1) ·BRACKET (1)	V	
XAAJ	9	KFOZZA	2510-01-499-5135	94658	RK804-3-1A	KIT, TWISTLOCK HANDLE REPLACEMENT..... ·HANDLE (1) ·PIN, ROLL (1)	V	
XAAG	10	KFOOOA	2510-01-499-5138	8N013	M871A3KIT	KIT, FLOOR, 9 BOARDS	V	
						END OF FIGURE		

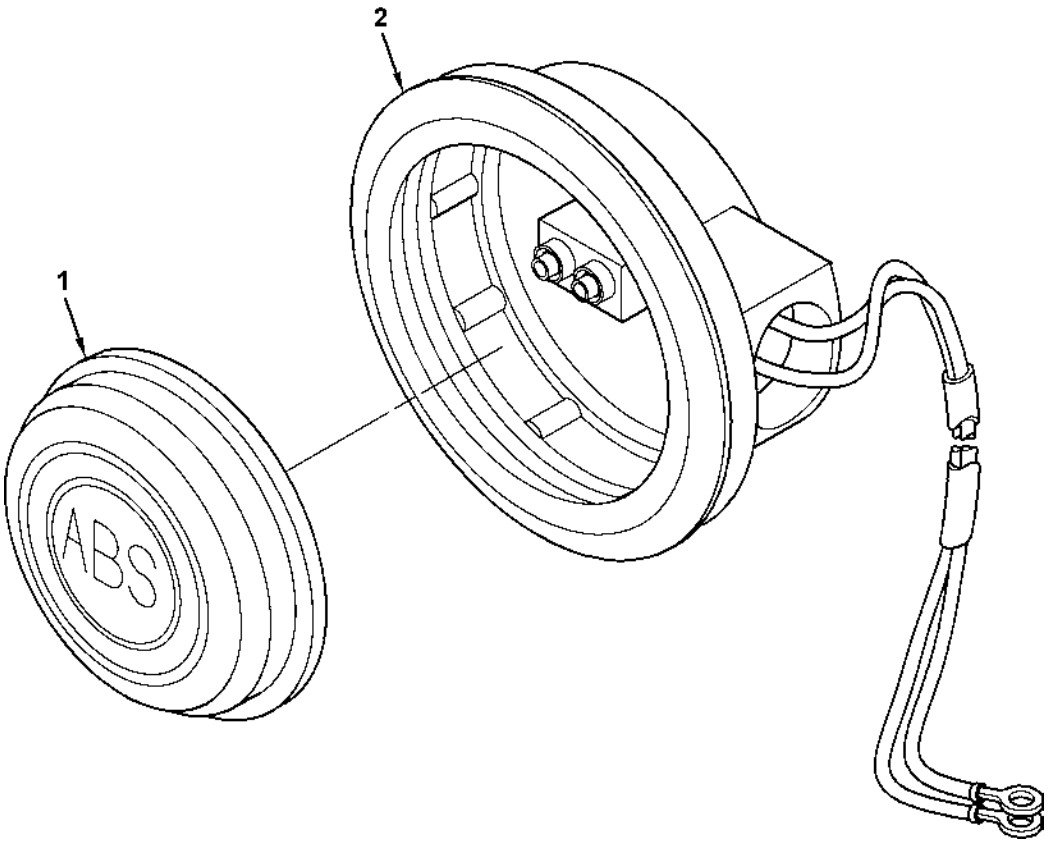


Figure 41. ABS Warning Light

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 4209 SIGNALLING DEVICES		
						FIG. 41 ABS WARNING LIGHT		
CAAD	1	PFOZZA	6240-01-499-4267	13548	650-0672	LAMP,SEALED.....	1	
CAAP	2	PFOZZA	5325-01-499-3619	13548	30702	GROMMET,MOUNT	1	
						END OF FIGURE		

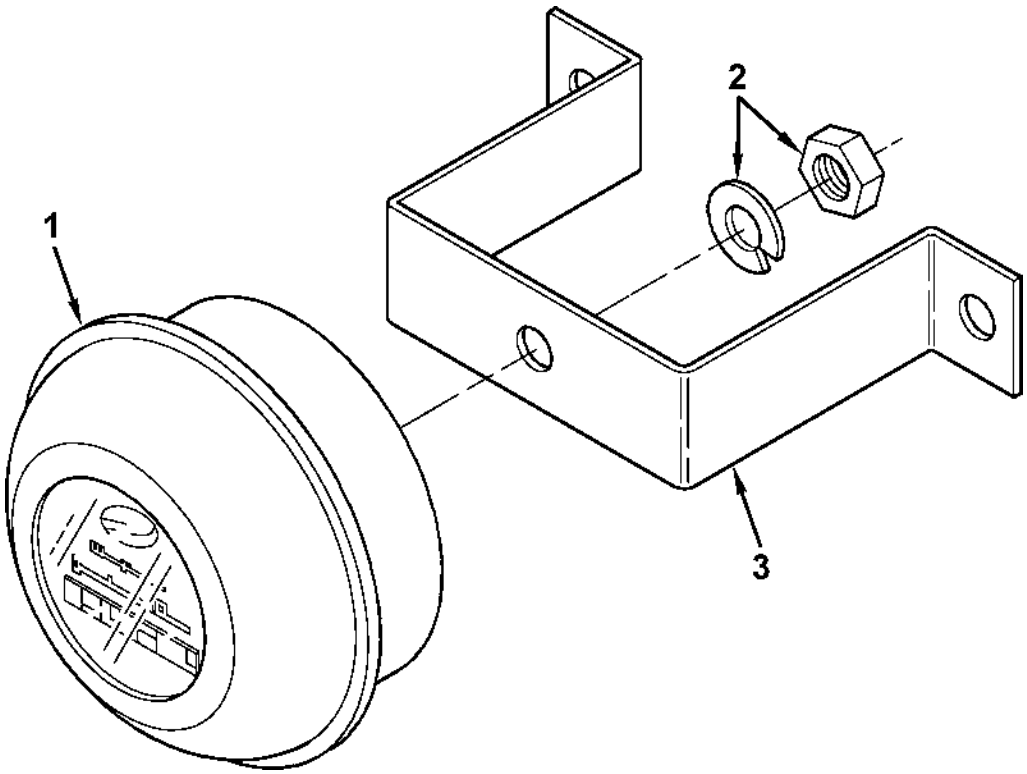


Figure 42. Hubodometer

PLISN	(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY	TM-CODE 2RY
						GROUP 4701 GAGES NON-LECTRICAL)		
						FIG. 42 HUBODOMETER		
CDAF	1	PFOOOA	5840-01-499-3484	26151	650-0672	HUBODOMETER.....	1	
CDAL	2	PFOZZA	5310-01-499-3654	26151	641-0004	·NUT/LOCKWASHER	1	
CDAG	3	PFOZZA	2590-01-450-0304	26151	610-0065	BRACKET, VEHICULAR.....	1	
						END OF FIGURE		

CAGE CODE/VENDOR LIST

CAGE CODE	COMPANY	PHONE NUMBER
0FBD6	FONTAINE TRAILER CO. 430 LETSON RD. HALEYVILLE, AL 35565	1(800) 821-6535
3DGR3	FONTAINE PRINCETON PLANT 100 FONTAINE ROAD PRINCETON, KY 42445	1 (877) 462-3866
0N972	SLOAN TRANSPORTATION CO. 534 E. 48TH STREET HOLLAND, MI 49423	1(616) 396-1291
0ACK2	AMERICAN STANDARD INC. WABCO 24901 NORTHWESTERN HWY. SOUTHFIELD, MI 48075-2203	1(313) 424-9490
1JA34	KING JAMES & CO. 22145 65TH AVE TUALATIN, OR 97062	1(503) 638-5292
6H865	MOTOR WHEEL CORP. 720 NORRIS ST. YPSILANTI, MI 48198	1(313) 481-2160
8N013	OVERSEAS HARDWOODS CO. 1110 MONTLIMAR, SUITE 950 MOBILE, AL 36609	1(800) 999-7616
06721	HALDEX MIDLAND BRAKE CORP. 10930 N. POMONA AVE. KANSAS CITY, MO 64153-1256	1(816) 801-2543
07707	POP FASTENERS 510 RIVER RD. SHELTON, CT 06484-4517	1(203) 924-9341
10125	SEALCO AIR CONTROLS 215 E. WHATKINS ST. PHOENIX, AZ 85004-2927	1(602) 253-1007
12195	MICHELIN NORTH AMERICA ONE PARKWAY SOUTH PO BOX 19001 GREENVILLE, SC 29602	1(864) 458-6968
12662	PETERSON MFG. CO. 4200 E. 135TH ST. GRANDVIEW, MO 64030-2875	1(816) 765-2000
13548	TRUCK-LITE CO. INC. 310 E.ELMWOOD AVE. FALCONER, NY 14733-1421	1(716) 665-6214
17875	EATON CORP. 2564 DURHAM RD. ROXBORO, N.C. 27573	1(336) 503-6442

CAGE CODE/VENDOR LIST

CAGE CODE	COMPANY	PHONE NUMBER
18889	WEBB WHEEL MARMON CORPORATION 2310 INDUSTRIAL DR. SW CULLMAN, AL 35055-6331	1(205) 739-6660
19207	US ARMY TANK AUTOMOTIVE COMMAND 11 MILE RD. WARREN, MI 48397-5000	1(586) 514-5000
24617	GENERAL MOTORS CORP. 3044 W. GRAND BLVD. DETROIT, MI 48202-3091	1(248) 680-5070
26151	STEMCO INC. 300 INDUSTRIAL DR. LONGVIEW, TX 75602-4720	1(800) 527-8492
27783	SCHRADER-BRIDGEPORT 1609 AIRPORT RD. MONROE, NC 28810-7393	1(704) 289-4535
39428	MCMASTER-CARR SUPPLY CO. 600 COUNTY LINE RD. ELMHURST, IL 60126	1(630) 833-0300
60038	TIMKEN CORP. 1835 DUEBER AVE. SW CANTON, OH 44706-2798	1(330) 438-3000
60359	WELDON TECHNOLOGIES INC. 3656 PARAGON DR. COLUMBUS, OH 43228	1(614) 529-7230
62173	OVERHILL MFG. INC. RT 1 BOX 417 STRAFFORD, MO 65757	1(417) 736-2163
64466	PHILLIPS MFG. 1215 W. WASHINGTON BLVD. MONTEBELLO, CA 90640-6013	1(213) 726-2222
70485	ATLANTIC INDIA RUBBER CO. INC. 1425 LAKE AVE.60098 WOODSTOCK, IL	1(815) 334-9230
72384	DIAMOND RUBBER PRODUCTS 4000 50TH ST. SW BIRMINGHAM, AL 35221-1848	1(205) 925-3791
74410	HOLLAND HITCH CO. 467 OTTAWA AVE. HOLLAND, MI 49423	1(888) 396-6501
78500	MERITOR HEAVY VEHICLE SYSTEMS 2135 W. MAPLE RD. TROY, MI 48084-7121	1(248) 646-5440

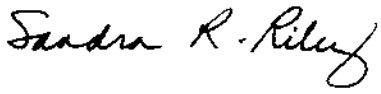
CAGE CODE/VENDOR LIST

CAGE CODE	COMPANY	PHONE NUMBER
78502	HALDEX INC. 2400 NE CORONADA DR. BLUE SPRINGS, MO 64013-4080	1(800) 821-8469
80201	CHICAGO RAWHIDE 900 N. STATE ST. ELGIN, IL 60123-7651	1(800) 882-0008
80204	AMERICAN NATIONAL STANDARDS INSTITUTE 25 WEST 43RD STREET 4TH FLOOR NEW YORK, NY 10036	1(212) 642-4906
80205	NATIONAL AEROSPACE STANDARDS	
92967	HUTCHENS INDUSTRIES INC. 215 N. PATTERSON AVE. SPRINGFIELD, MO 65805	1(417) 862-5012
93061	PARKER-HANNIFIN CORP. 300 PARKER DR. OTSEGO, MI 49078	1(616) 694-9411
93066	HOOVER UNIVERSAL MEATAL SEATING DIV. ADRIAN, MI	
94658	PECK & HALE 180 DIVISION AVE. WEST SAYVILLE, NY 11796	1(631) 589-2510
96906	MILITARY STANDARDS	
99411	BINKLEY/HOLLAND HITCH 101 S. ELM ST. WARRENTON, MO 63383-192	1(636) 456-3455

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:



SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army
0535702

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TO: *(Forward to proponent of publication or form) (Include ZIP Code)* Technical Publication Information Office TACOM-RI 1 Rock Island Arsenal, Rock Island, IL 61299-7630	**FROM:** *(Activity and location) (Include ZIP Code)* (Your Mailing Address)	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2330-326-14&P	24 February 2006	**Semitrailer, Tactical, Drop Deck Breakbulk/Container Transporter, 22 ½ Ton, M871A3**

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Exact wording of recommended change must be given)*
07	565		11	Fig 92		Art Work does not show schematic of ring diagram.
11	565		29	Fig 92		NSN is incorrect.

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
John Doe SSG	XXX-XXXX	John Doe

DA FORM 1 FEB 74 **2028** REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED.

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PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2330-326-14&P	24 February 2006	**Semitrailer, Tactical, Drop Deck, Breakbulk/Container Transporter, 22 ½ Ton, M871A3**

PAGE NO.	COLM NO.	LINE NO.	FEDERAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPROTED	RECOMMENDED ACTION

PART III - REMARKS ***(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)***

SAMPLE

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
John Doe SSG	XXX-XXXX	John Doe

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

5/9 (°F – 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° + 32) = F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound–Feet	Newton–Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton–Meters	Pound–Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

PIN: 080713-000