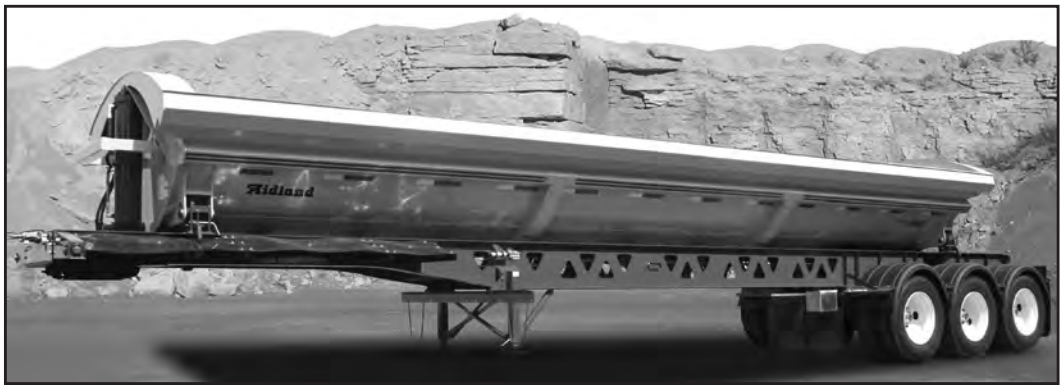
Ridland

MANUFACTURING LIMITED



SIDE DUMP
GRAVEL TRAILER

OPERATOR'S MANUAL

SIDE DUMP TRAILER

Warranty Registration Form
Inspection Report

Box 249
Rosenort, MB
R0G 1W0
CANADA

WARRANTY REGISTRATION

This form must be filled out by the dealer and signed by both the dealer and the customer at the time of delivery.

Customer's Name: _____ Dealer's Name: _____

Address: _____ Address: _____

City: _____ City: _____

Province/State: _____ Province/State: _____

Postal/Zip Code: _____ Postal/Zip Code: _____

Phone Number: (____) _____

Email: _____

Trailer Model: _____

Serial Number: _____

Delivery Date: _____

DEALER INSPECTION REPORT

___ Landing Gear Moves Freely and Crank Stowed
___ Air Lines Properly Stowed (No Air Leaks)
___ Electrical Lines Stowed
___ Tires at Specified Pressure
___ Wheels Properly Torqued
___ Brakes Adjusted
___ Check Integrity of All Frame & Hoist Pins

SAFETY

___ Safety Signs / Decals Installed
___ Manual Supplied
___ All Reflectors Installed and Clean
___ All Lights Functioning
___ Brakes Release at Proper Pressure

I have thoroughly instructed the buyer on the above described equipment which review included the Operator's Manual content, equipment care, adjustments, safe operation and applicable warranty policy.

Date: _____ Dealer's Rep. Signature: _____

The above equipment and Operator's Manual has been received by me and I have been thoroughly instructed and understood as to care, adjustments, safe operation and applicable warranty policy.

Date: _____ Owner's Signature: _____

WHITE	YELLOW	PINK
MIDLAND	DEALER	CUSTOMER

warranty@midlandtrailers.com

FOREWORD

The following instructions provide a general description of the proper procedures which must be considered before starting operations with any of Midland Manufacturing Limited's dump equipment.

Although the information in this manual was current on the date of issue, Midland Manufacturing Limited reserves the right to effect changes as the need occurs without notice or liability.

MIDLAND MANUFACTURING LIMITED
TRAILER WARRANTY

Midland Manufacturing Limited (hereafter referred to as “Midland”) warrants directly to you, the first retail customer; that each new trailer manufactured by Midland is free from defects in material and workmanship; provided that the trailer is being properly maintained; and that the trailer is being used in it’s normal intended service free from accident or collision.

Normal service means usage in the manner and for the purpose for which such trailer is generally manufactured, purchased and utilized; including the loading, unloading, and carriage of uniformly distributed legal loads of non corrosive cargo, in a manner which does not subject this vehicle to strains, impacts, and dump cycles greater than normally imposed by lawful use over properly maintained public roads, with gross vehicle weight, gross axle weights and concentrated loads not exceeding the labeled gross vehicle weight, gross axle weight and concentrated load ratings (also see "Usage Qualifier" note below).

The warranty shall (unless otherwise specified) be for the following period following the date of delivery:

- Structural components (manufactured by Midland) – five years (conditional / prorated)*
- Non-structural components (manufactured by Midland) – one year
- Midland does not warrant parts and accessories supplied by others. Midland assigns to the customer any warranties provided in favor of Midland with respect to any such parts and accessories; which may be legally assigned by Midland.

*** Prorated / Conditional warranty of components manufactured by Midland:**

- Structural components
  - 1st & 2nd year - 100% of repair.
  - 3rd year - 75% of repair.
  - 4th year - 50% of repair.
  - 5th year - 25% of repair.

- Non-structural components
  - One year - 100% parts and labor.

- Usage (years) Qualifier:
  Midland's warranty may be modified; at Midland's discretion, if said trailer(s) is subjected to exceptionally heavy use; i.e.: Trailer(s) running 24 hours/day, 7 days a week, or some similar scenario. Thus, for example, for every year in use; the trailer(s) is considered to be two (2) or more "usage" years old.

Midland’s warranty will not cover any repairs done without prior discussion;
quotation; and express written approval by Midland

Midland’s warranty coverage does not include:

- freight (of parts, components, or the trailer)
- downtime (loss of income)
- other incidental or consequential damages

Midland warranty does not cover:

- Parts that are not defective but which may wear out and have to be replaced; including but not limited to seals, lights, paint, suspension components, brake system components, brake linings, brake drums, bushings (suspension, joints, hinges, and knuckles), tires, wood pieces and the like.
- Alignments or adjustments which are normal maintenance items; not caused by a defect in any components or in the trailer.
- Any trailer or component of a trailer that has been altered (other than by Midland) in any way so as in the judgement of Midland; to affect its operation or reliability, or which has been subject to misuse, neglect or accident.

Warranty claims:

ON ANY REPAIRS UNDER WARRANTY, MIDLAND MUST BE CONTACTED AND OUR APPROVAL RECEIVED IN THE FORM OF A WARRANTY PURCHASE ORDER BEFORE ANY WORK IS DONE.

THE PURCHASER CLAIMING UNDER THIS WARRANTY SHALL SUBMIT A WARRANTY CLAIM IN THE PRESCRIBED FORM TO MIDLAND OR AN AUTHORIZED DEALER FOR INSPECTION BY AN AUTHORIZED COMPANY REPRESENTATIVE.

1) We will not accept warranty bills / invoices under any circumstances that have not received our prior authorization (including a warranty authorization number); based on a written quotation for the required repair work.

2) We are to supply all warranty parts unless agreed otherwise.

3) Any invoices covering warranty parts and / or labor that we consider excessive will be paid on the basis of our cost of such parts and / or labor as if the work had been done at our factory.

4) No warranty on parts will be paid for until the faulty parts have been returned prepaid, for our inspection, unless agreed otherwise.
   Midland will not be responsible for freight for returned parts except by prior arrangement and written authorization.

5) All invoices submitted, requesting warranty, must show the number of hours of labor and the rate being charged.

6) Midland must receive notice of a defect immediately after such defect is discovered and at the request of Midland or an authorized agent return the trailer to Midland or an authorized agent or other agreed upon location within 20 days after the trailer return is requested. **Note:** Warranty consideration may be influenced by "when a defect ought to have been discovered under normal circumstances"; in cases where the defect notification is not made in a timely manner.

7) Transportation expenses to and from a repair facility are the responsibility of the trailer owner.

WARRANTY DISCLAIMER AND LIMITATIONS OF LIABILITY:

Except for the above warranty, Midland makes no other express warranties and HEREBY EXCLUDES ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

IT IS AGREED THAT MIDLAND SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY including, but not limited to, loss of income, damage to vehicle, attachments, trucks or cargo, towing expenses, or injury to or death of persons.

No person is authorized to give any warranties or to assume any other liability on Midland’s behalf unless

made and assumed in writing by Midland and signed by an officer of Midland.

TIME LIMIT ON COMMENCING LEGAL ACTION:

While Midland undertakes to make reasonable efforts to resolve every warranty claim, if Midland does not accept as valid all or any part of a particular claim, then Midland will only be responsible under this warranty for such claim if it is enforced by legal action commenced within one year from the date that the breach of warranty occurred.

WARRANTY TRANSFER:

Warranty transfers to a second owner will be recognized provided:

- the said transfer takes place in the first twelve (12) months of service
- the said trailer is fully inspected and approved by Midland by way of a personal inspection by an authorized Midland agent
- a new warranty form is filled out and sent to Midland Manufacturing Limited immediately upon close of the transaction. (New Equipment Warranty forms are available from Midland).
- the second warranty form must be returned to Midland showing name of original purchaser and date the trailer was put into service as well as the date and name of the new owner. Any and all warranty periods are begun on the date of sale of the new trailer to the original retail customer.

OPERATORS MANUAL:

The purchaser acknowledges having received training in the safe operation of the trailer unit and further acknowledges that Midland does not assume any liability resulting from the operation of the trailer unit in any manner other than described in the operator's manual supplied at the time of purchase.

THIS AGREEMENT IS NOT VALID UNLESS A SIGNED COPY OF THE WARRANTY REGISTRATION FORM IS RECEIVED BY MIDLAND WITH 15 DAYS OF DATE OF DELIVERY; TO THE FIRST RETAIL CUSTOMER.

Midland Manufacturing Limited
Box 249
Rosenort, Manitoba, Canada R0G 1W0

COMPLIANCE PLATE LOCATION

The trailer compliance plate is mounted where indicated on the trailer, verifying compliance with all applicable Canadian and United States Motor Vehicle Safety Standards and discloses the Gross Vehicle Weight Rating (GVWR) and Gross Axle Weight Rating (GAWR). This plate also has the trailer Serial Number recorded and the date of manufacture.

1. **V.I.N.**
   Vehicle Identification Number.
2. **GROSS AXLE WEIGHT RATING (GAWR)**
   Gross axle weight rating is the "rated capacity at the tire-ground interface" and is to reflect the "weakest link" in the entire suspension system, whether it be springs, axles, wheels, rims or tires.
3. **GROSS VEHICLE WEIGHT RATING (GVWR)**
   The GVWR for semi-trailers is the sum of the trailer tare weight, and that uniformly distributed payload which will result in a suspension load at the tire-ground interface equal to the sum of the trailer's gross axle weight rating (GAWR) with a limitation imposed by practical or structural considerations.

CANADA

MANUFACTURED BY / FABRIQUÉ PAR

Midland MANUFACTURING LIMITED

BOX 249
ROSENORT, MANITOBA
CANADA
R0G 1W0
PHONE: 204-746-2348
www.midlandtrailers.com

CANADA 201 CMVSS NSVAC TRANSPORT

GVWR/ PNBV _____ KGS. DATE _____

VIN NIV _____

GAWR/PNBE	KGS.	TIRES/PNEU	RIM/JANTE	COLD INFL. PRESS./ PRESS. DE GONFL. À FROID PSI/LPC KPA
FRONT AXLE	10,000	11R 22.5 (G)	8.25 X 22.5	690 KPA
SECOND AXLE	10,000	11R 22.5 (G)	8.25 X 22.5	690 KPA
REAR AXLE	10,000	11R 22.5 (G)	8.25 X 22.5	690 KPA

TYPE: TRA/REM
PT# 1812391

MODEL _____

U.S.

MANUFACTURED BY

Midland MANUFACTURING LIMITED

BOX 249
ROSENORT, MANITOBA
CANADA
R0G 1W0
PHONE: (204) 746-2348

GVWR _____ LBS. DATE _____

VIN _____

GAWR	LBS.	TIRES	RIMS	COLD INFLATION PRESSURE
FRONT AXLE	20,000	11R 22.5 / 24.5	8.25 X 22.5 / 24.5	100PSI
SECOND AXLE	20,000	11R 22.5 / 24.5	8.25 X 22.5 / 24.5	100PSI
REAR AXLE	20,000	11R 22.5 / 24.5	8.25 X 22.5 / 24.5	100PSI

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

TYPE: TRAILER
PT# 1812352

MODEL _____

V.I.N. PLATE LOCATION

Always give your dealer the V.I.N. (Vehicle Identification Number) of your Midland End Dump Trailer unit when ordering parts or requesting service or other information.

The plate is located where indicated. Please mark the number in the space provided for easy reference. Also obtain and mark down the Model Number, Production Year and other pertinent information of your Trailer unit in the spaces provided.

SERIAL NUMBER LOCATION

Dealer Purchased From _____

Address _____

_____

V.I.N. Number _____ **Axles** _____

Model Number _____ **Wheels** _____

Length _____ **Tires** _____

Suspension _____ **Date Purchased** _____

TABLE OF CONTENTS

TABLE OF CONTENTS

1 INTRODUCTION

Midland Manufacturing appreciates having you for our customer and trust this unit will give you many years of trouble-free use. We are pleased to have you join a growing number of operators pulling Midland trailers.

We take pride in building products to meet the demands of a discerning buyer in the transportation industry. We have sought to anticipate your needs with respect to safety, convenience, design and engineering of your unit. Midland Manufacturing provides information and service support to its customers through its distributor and dealer network. Contact the dealer or Midland should you need assistance.

Safe, efficient and trouble free operation of your Midland Trailer requires that you and anyone else who will be operating or maintaining the Trailer, read this manual carefully and understand the Safety, Operation, Maintenance and Trouble Shooting information contained within the Operator's Manual. Failure to read and follow the instructions in the manual could lead to costly repairs; and even more importantly could lead to serious injury and possibly death.

This manual covers all the Side Dump Gravel Trailer models built by Midland.

Although some of the diagrams and pictures may not apply to all trailers, we have tried to show details of common adjustments and features that are on standard production units.

Use the Table of Contents or Index as a guide in locating the specific information applicable to your Trailer. Keep this manual handy for frequent reference and to pass on to new operators or owners.

OPERATOR ORIENTATION - The directions left and right as mentioned throughout this manual, are taken as if the operator was standing behind the trailer facing forward.

SAFETY ALERT SYMBOL

This Safety Alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

The Safety Alert symbol identifies important safety messages on the Midland Trailer and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

3 Big Reasons

Accidents Disable and Kill
Accidents Cost
Accidents Can Be Avoided

SIGNAL WORDS:

Note the use of the signal words **DANGER, WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guide-lines:

DANGER: Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

SAFETY

YOU are responsible for the **SAFE** operation and maintenance of your Midland Trailer. **YOU MUST** ensure that you and anyone else who is going to operate, maintain or work around the Trailer be familiar with all the operating and maintenance procedures and related **SAFETY** information contained in this manual.

Remember, **YOU** are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended procedures and follows all the safety precautions. Remember, accidents can be prevented. Do not risk injury or death.

- Remember, you are not just a driver; you are expected to be an effective and efficient operator. Drivers may only drive but an operator is a very safe, cost efficient and professional person.

- Trailer owners **MUST** give operating instructions to operators or employees **before** allowing them to operate the equipment, and at least annually thereafter.

- The most important safety device on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand **ALL** Safety and Operating instructions in the manual and to follow these. "All" accidents can be avoided.

- Midland feels that a person who has not read, understood and been trained to follow all operating and safety instructions is not qualified to operate the equipment. An untrained operator exposes himself and bystanders to possible serious injury or death.

- **DO NOT** modify the equipment in any way. Modification may impair the function and/or safety of the equipment and affect Trailer life.

- Think SAFETY! Work SAFELY!

2.1 GENERAL SAFETY

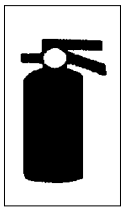
1. Read and understand the Operators Manual and all safety signs before operating, maintaining or adjusting the Trailer.

2. Only trained competent persons shall operate the Trailer. An untrained operator is not qualified to operate the unit.

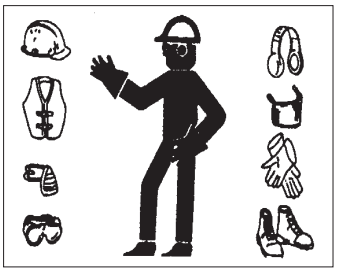
3. Have a first-aid kit available for use should the need arise and know how to use it.

4. Do not allow riders.

5. Have a fire extinguisher available for use should the need arise and know how to use it.



6. Wear appropriate protective gear. This list includes but is not limited to:
   - A hard hat
   - Protective shoes with slip resistant soles
   - Heavy gloves



7. Place all controls in neutral, stop truck engine, set park brake, remove ignition key and wait for all moving parts to stop and all air pressure to be fully exhausted before servicing, adjusting or repairing.

8. Do not drive while impaired.

2.2 OPERATING SAFETY

1. Read and understand all of the Operator's Manual and all safety signs before operating or adjusting the Midland Trailer.

2. Do not allow riders on any part of the trailer during either field operation or road and highway travel.

3. Drive very carefully when negotiating hilly or uneven terrain.

4. Keep hands, feet, clothing and hair away from all moving parts.

5. Place all controls in neutral, stop the truck engine, remove ignition key, set the park brake before adjusting, servicing or maintaining any part of the Trailer unit.

6. Stay away from side of trailer when truck engine is running. Keep others away.

7. Use care when dumping load. Always know where your operating partner is before moving tub to prevent injury.

8. Stay away from the side of tub when dumping load. Large objects in load or load itself can hit personnel. Keep others away.

9. Maintain king pin, fifth wheel assembly and all running gear in good condition at all times.

10. Clear the area of all bystanders, especially children, before starting up and operating the tractor and trailer.

11. Make sure that all lights and reflectors that are required by the local highways and transport authorities are in place, clean and can be seen clearly by all overtaking and oncoming traffic.

12. Do not operate unit with spring brakes caged or brakes disabled. Block wheels if unhooked.

13. Before disconnecting the tractor from the trailer unit(s) make sure that the tractor and trailer are on level ground and that the trailer wheels are securely blocked. Lower landing gear and provide extra support if the ground is soft. Do not unhook if trailer is loaded.

14. Do not dump unless the trailer is on firm level surface.

15. Review safety items with all personnel annually.

2.3 MAINTENANCE SAFETY

1. Read and understand all the information in the Operator's Manual regarding maintenance, adjusting and servicing the Trailer unit.

2. Place all controls in neutral, stop the truck engine, remove ignition key, set the park brake before adjusting, servicing or maintaining any part of the Trailer unit.

3. Follow good shop practices:
   - Keep service area clean and dry.
   - Be sure electrical outlets and tools are properly grounded.
   - Use adequate light for the job at hand.

4. Cage spring brake chamber before disassembling.

5. Block wheels before de-activating brakes.

6. Disconnect air lines and exhaust air system before working on discharge gates.

7. Maintain fasteners in running gear systems at their specified torque at all times.

8. Establish and maintain a Trailer Preventative Maintenance (TPM) program on your equipment. Some jurisdictions require this program and the maintenance of records on every commercial vehicle on the road for future reference.

2.4 HYDRAULIC SAFETY

1. Make sure that all components in the hydraulic system are kept in good condition and are clean.

2. Replace any worn, cut, abraded, flattened or crimped hoses or lines.

3. Relieve hydraulic pressure completely before working on hydraulic system.

4. Do not attempt any makeshift repairs to the hydraulic fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high-pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.

5. Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.

6. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.

7. Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are not damaged.

2.5 TRAVEL SAFETY

1. Read and understand all the information in the operator's manual regarding procedures and safety when operating the Trailer unit in the field or on the road.

2. Make sure all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.

3. Drive carefully and defensively at all times and especially when negotiating uneven or hilly terrain.

4. Do not allow riders on any part of the trailer.

5. Make sure you are in compliance with all local regulations regarding transporting on public roads and highways. Consult your local law enforcement agency for further details.

2.6 LOADING SAFETY

1. Do not drop load on trailer to prevent damaging sides or bottom.

2. Use common sense when loading material containing large rocks or frozen chunks to prevent damaging tub.

3. Do not exceed total carrying specifications for trailer.

2.7 TIRE SAFETY

1. Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death.

2. Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.

3. Have a qualified tire dealer or repair service perform required tire maintenance.

2.8 SAFETY SIGNS

1. Keep safety signs clean and legible at all times.

2. Replace safety signs that are missing or have become illegible.

3. Replaced parts that displayed a safety sign should also display the current sign.

4. Safety signs are available from your Distributor or the factory.

How to Install Safety Signs/Decals:

- Be sure that the installation area is clean and dry.

- Be sure temperature at the area of contact is above 50°F (10°C).

- Decide on the exact position before you remove the backing paper.

- Remove the smallest portion of the split backing paper.

- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.

- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.

- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

2.9 SIGN-OFF FORM

Midland Manufacturing follows the general Safety Standards specified by the Society of Automotive Engineers (SAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the Midland Trailer must read and clearly understand ALL Safety, Operating and Maintenance information presented in this manual.

Do not operate or allow anyone else to operate this equipment until such information has been reviewed and understood. Annually review this information with all personnel.

Make these periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment.

A sign-off sheet is provided for your record keeping to show that all personnel who will be working with the equipment have read and understand the information in the Operator's Manual and have been instructed in the operation of the equipment.

SIGN-OFF FORM

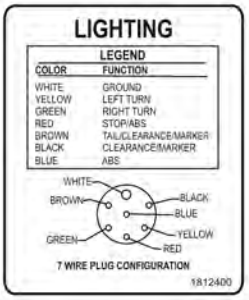
DATE	EMPLOYEE'S SIGNATURE	EMPLOYER'S SIGNATURE

3 SAFETY SIGN (DECAL) LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!

A



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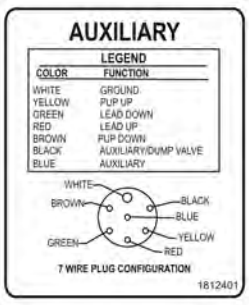

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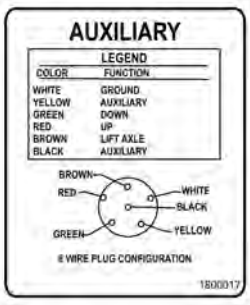

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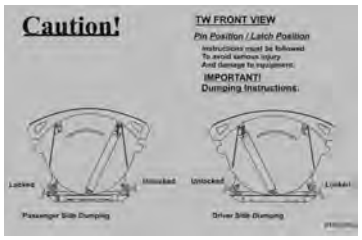
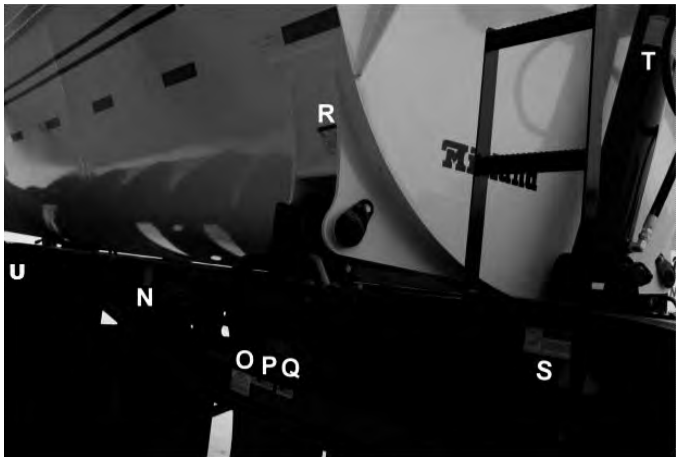


Front DS on autolift installed trailers

REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without signs, new signs must be applied. New signs are available from your authorized dealer or the factory.

The types of safety signs and locations on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!



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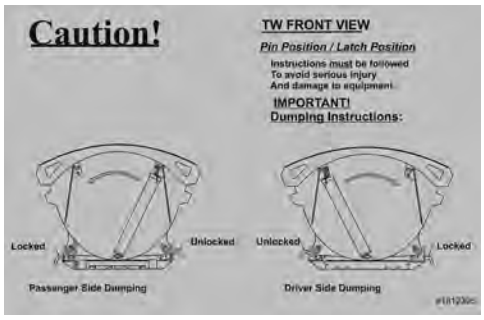


O

IMPORTANT

FOR SIDE DUMP TRAILERS

DO NOT EXHAUST SUSPENSION AIR BAGS PRIOR TO LOADING OR UNLOADING.

DUE TO ENHANCED FRAME STRESS: SAFETY, STRUCTURAL INTEGRITY, AND WARRANTY COULD BE COMPROMISED BY EXHAUSTING SUSPENSION AIR BAGS.

P

SUSPENSION DUMP

1800140

Q

FIFTH WHEEL

1800141

R

DANGER

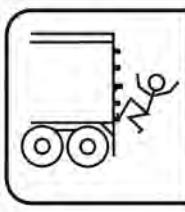
OVERHEAD HAZARD

TRUCK BOX COULD DROP SUDDENLY OR TIP UNEXPECTEDLY DURING OPERATION.

TO PREVENT SERIOUS INJURY OR DEATH:

1. DO NOT GO UNDER OR WITHIN TIPPING ARC OF TRAILER BOX FRAME WHEN HOIST IS OPERATING, KEEP OTHERS AWAY.
2. OPERATE HOIST ONLY WHEN IN CAB.
3. NEVER LEAVE A PARTLY RAISED VEHICLE.
4. ALWAYS SECURELY PROP OR BLOCK BOX FRAME BEFORE WORKING UNDER (EMPTY) BODY.
5. DISENGAGE PTO WHEN NOT USING HOIST.
6. DO NOT RAISE LOADED BODY UNLESS VEHICLE IS ON LEVEL GROUND.

S

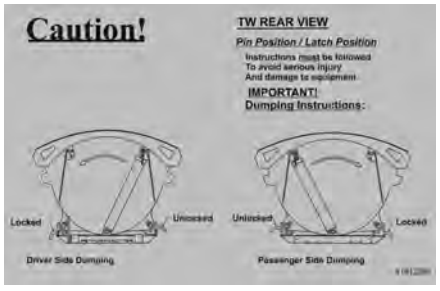


WARNING

Use discretion when climbing on any part of the trailer. DO NOT climb into the trailer body.

1812278

T



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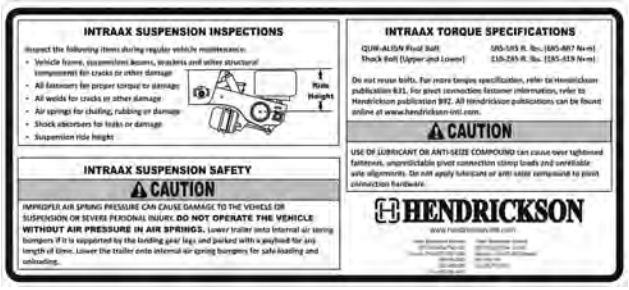

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THIS STAND TO BE USED ONLY WHEN TRAILER IS EMPTY

1812281

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RAR-260 Trailer Suspension - Torque Specifications

Fastener Type	Size	Torque Values foot-pound	Torque Values Newton-meter
Pivot Bolt - (Shear-Type) Pivot Nut - (Locknut) *Requires T-30 Torx® socket (RW 16100054).*	7/8" - 9NC	Do not lubricate bolt/nut threads. Use a 1" drive impact wrench to tighten the pivot bolt until the Torx® head is sheared off.	
Locknut - (Shock Absorber)	3/4"-10NC	200-230 ft-lb	271-312 N-m
Nut - (Air Spring)	3/4"-16NF	45-50 ft-lb	61-68 N-m
Locknut - (Air Spring)	1/2"-13NC	20-25 ft-lb	27-34 N-m
Locknut - (Air Spring - 25K O/S)	1/2"-13NC	45-50 ft-lb	61-68 N-m
Bolt - (Air Spring)	1/2"-13NC	20-25 ft-lb	27-34 N-m

Refer to the engineering drawing for component torque value. Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque.

CAUTION *Suspension is shipped with minimal torque applied to fasteners. It is the installer's responsibility to apply the proper torque values. All fasteners, except for shear-type pivot bolt, must be re-torqued after the first 6,000 miles of operation. Failure to install and maintain suspension component fasteners at torque specifications could result in suspension failure and void the warranty.*

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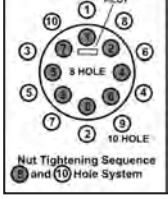
WARNING



Nut Tightening Sequence (8) and (10) Hole System

Failure to follow these instructions may result in wheel loss, which can lead to property damage, injury or death. Refer to the product service in owner's manual for additional information.

This vehicle is equipped with hub-piloted disc wheels, flange nuts, and **M22 x 1.5** studs. Tighten to 50 ft-lb torque in the sequence shown and then torque to **450-500** ft-lbs oiled* using the same tightening sequence. Retorque between 80-160 kms (50-100 miles) after installation and at each regularly scheduled service interval.

*Oiled - Apply two drops of oil to a point between the nut and flange and two drops to the two or three threads at the end of each stud

REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without signs, new signs must be applied. New signs are available from your authorized dealer or the factory.

4 OPERATION GUIDELINES

OPERATING SAFETY

1. Read and understand all the Operator's Manual and all safety signs before operating or adjusting the Midland Trailer.
2. Do not allow riders on any part of the trailer during either field operation or road and highway travel.
3. Drive very carefully when negotiating hilly or uneven terrain.
4. Keep hands, feet, clothing and hair away from all moving parts.
5. Place all controls in neutral, stop the truck engine, set park brake, remove ignition key and wait for all moving parts to stop and all air pressure be fully exhausted before servicing, adjusting, repairing or maintaining.
6. Stay away from side of trailer when truck engine is running. Keep others away.
7. Use care when dumping load. Always know where your operating partner is before moving trailer body to prevent injury.
8. Stay away from the side of trailer body when dumping load. Large objects in load or load itself can hit personnel. Keep others away.
9. Maintain king pin, fifth wheel assembly and all running gear in good condition at all times.
10. Clear the area of all bystanders, especially children, before starting up and operating the tractor and trailer.
11. Make sure that all lights and reflectors that are required by the local highways and transport authorities are in place, clean and can be seen clearly by all overtaking and oncoming traffic.
12. Do not operate unit with spring brakes caged or brakes disabled. Block wheels if unhooked.
13. Before disconnecting the tractor from the trailer unit(s) make sure that the tractor and trailer are on level ground and that the trailer wheels are securely blocked. Lower landing gear and provide extra support if the ground is soft. Do not unhook if trailer is loaded.
14. Do not dump unless vehicle is on firm level surface.
15. Review safety items with all personnel annually.

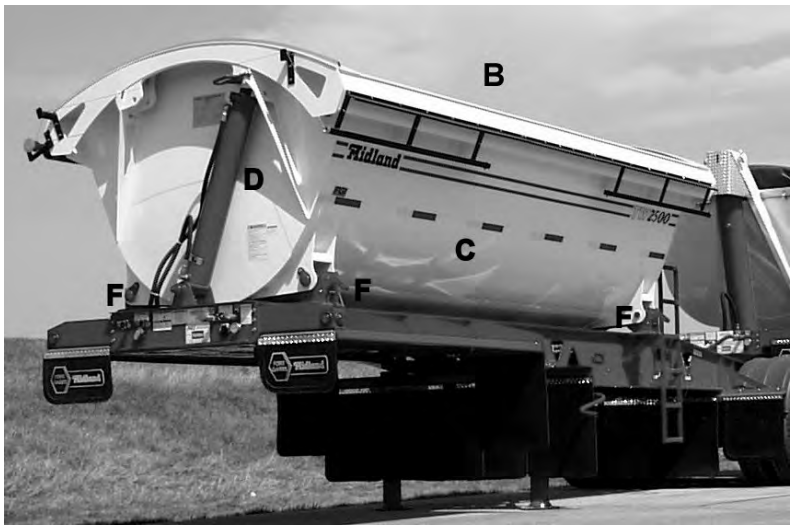
4.1 TO THE NEW OPERATOR OR OWNER

The Midland Side Dump Gravel Trailers combine light weight construction methods and high strength materials to become a safe, reliable and efficient material hauling unit. Be sure to familiarize yourself with the Trailer by reading and understanding this Operator's Manual and the Safety Alerts before attempting to operate it. With careful use and a good maintenance schedule, the unit will give many years of trouble-free use.

It is the responsibility of the owner and operator to be familiar with the weight and loading of your trailer or combinations of trailers. Trailer weight and loading vary from jurisdiction to jurisdiction. Be familiar with yours and any that you will be travelling through.

4.2 TERMINOLOGY

The Midland Side Dump Trailers are designed with hydraulic cylinders at the front and rear of the tub to lift and tilt for unloading. Each side of the tub is equipped with 2 latches/pivots to release/anchor the unit during unloading. They are available in dual or tri-axle models and single trailer or B-Train designs. Some of the standard models and typical features are shown.



A Tri-Axle Trailer
B Tandem-Axle Trailer
C Trailer Body
D Front Cylinder
E Rear Cylinder
F Latch/Pivot
G Push Block

Fig. 1 PRINCIPAL SYSTEMS

4.3 BREAK-IN

Break-in is the most important time in a Trailer's life. It is critical that the unit be checked frequently during the first 5000 miles to be sure that all components and systems are properly adjusted and performing as required.

The following inspection schedule is provided as a guide for normal operating conditions. More frequent inspections are recommended in severe or extreme conditions.

Inspect at:
50-100 miles (80-160 km), 1-2 hours
500 miles (800 km), 8-10 hours
1500 miles (2400 km), 25-30 hours
5000 miles (8000 km), 100 hours:

1. **Brakes**
   It takes a few weeks of operation for the brake shoes to mate with the drum contour and burnish the surface. During this period of time, the operator should check the brakes every day. After the first month, inspection of the brakes before each trip or every 10,000 miles is required. Check the function and adjustment of the brakes on each axle. All brakes should apply evenly. No shoes should drag on the drum when the brakes are not applied.

2. **Tires**
   Tires are designed to provide maximum life and performance when maintained at their specified inflation pressure. Although the tires are inflated to their specified pressure at the factory, the pressure can change and should be checked before going into service. Always use an accurate gauge to check the pressure when the tire is cold.

3. **Wheels/Rims**
   Although lug bolts and rim fasteners are always tightened to their specified torque at the factory, it is normal for them to lose some of their torque during the first few miles of operation. Always retorque lug bolts and rim fasteners to be sure that they stay tight. Then go to the retorquing interval defined in the Maintenance section of every 25,000 miles or more often if necessary. Keep all fasteners tightened to their specified torque to prevent damaging any components.

   Whenever a wheel is removed from an axle, the above retorquing procedure must be followed to be sure that the wheel is secured to the axle. If any component is damaged due to loose fasteners, it will have to be replaced.

4. **Axles**
   Each wheel bearing is assembled at the factory with the required pre-load (refer to Section 5.2.4). This pre-load should be checked to insure proper axle and bearing function. Check the temperature of the hub by hand after 10 to 15 miles (15 to 25 km) during the first trip. A hot hub must have the bearing pre-load reset before continuing.

   Jack the axle up and support it on a stand. Turn the wheel by hand. The wheel should turn freely. If it does not, check if the brakes are dragging or if the bearing has too much pre-load. If either of these conditions exist, correct before proceeding.

   Move the wheel laterally on the axle shaft. If the wheel wobbles, the bearing has lost its pre-load. Tighten bearing and set pre-load before continuing.

5. **Hub Oil Levels:**
   Oil bath hubs are used on all trailers and are filled at the factory. Check hubs frequently (at least daily) during the first few weeks of operation. Always check when the oil is cold and the trailer is on the level. Use the level mark on the hub face when checking oil level. Replace seals and gaskets if hub has an oil leak. Do not operate without oil in the hub.

4.3 BREAK-IN (cont'd)

6. **Suspension**
   A suspension system connects the axles to the frame. All fasteners must be maintained at their specified torque to ensure that all clamping and anchoring forces remain intact. If these forces are not maintained, components can shift or move and affect the performance and component life. Refer to Maintenance Section for the list of required torque values for all fasteners in suspension system. Any loosening can lead to component shifting, misalignment and/or twisting. Any of these items can cause erratic handling, broken components or rapid tire wear. Always tighten the nut end of fastener. Specified torque values apply only to nut end torquing.

7. **Axle Alignment**
   Axle alignment is properly set at the factory when the unit is new and will remain aligned unless fasteners loosen or components wear. Use a steel measuring tape to check the alignment. Refer to Maintenance Section for alignment checking procedure. Axles that are out of alignment can cause erratic handling characteristics, broken components and accelerated tire wear.

8. **Fifth Wheel Assembly Components**
   The king pin, upper and lower fifth wheel assemblies must be inspected to check for mechanical integrity of all components. All components and systems must be kept in good condition to safely and reliably transmit the accelerating, braking and side loads between the trailer, fifth wheel and towing vehicle.

   a. **King Pin:**
      Check the king pin for cracks, chips, or whether it is bent. Check that there are no cracks or distortions between the king pin and its anchor plate before resuming work.

   b. **Fifth Wheel Assembley:**
      The fifth wheel assembly consists of the king pin locking mechanism, surface plate, frame, pivot and anchor system. Check that the king pin locking mechanism locks and unlocks easily and that all moving surfaces are coated with grease. Check that the surface plate is clean and coated with grease.

      Check the surface plate, pivot and anchor frame for cracks, bends or distortions. Replace any damaged components. Retorque fasteners to maintain the proper clamping forces on all components to move or bend and create mechanical or safety problems during operation.

9. **Electrical and Air Lines**
   Electrical and air lines extend from the front of the unit to each light and air operated component. Although they are all anchored along their routing pathways from the factory, they occasionally do come loose and will sag. Inspect all electrical and air lines. Use plastic ties to secure line to frame if any are loose and sag. Replace if any are pinched, kinked, cut or abraded. Extra care should be taken in cold or extreme operating conditions. Ice, mud or brush can pull lines loose from their anchors and cause damage. Clean components, repair damage, re-anchor and install protectors if appropriate. Do not operate with damaged components.

4.4 CONTROLS

Before starting to work, all operators should familiarize themselves with the location and function of all controls.

Fig. 2 HYDRAULIC COUPLER

1. **Hydraulic System:**
   Each customer must provide controls in the tractor cab for operating the trailer.

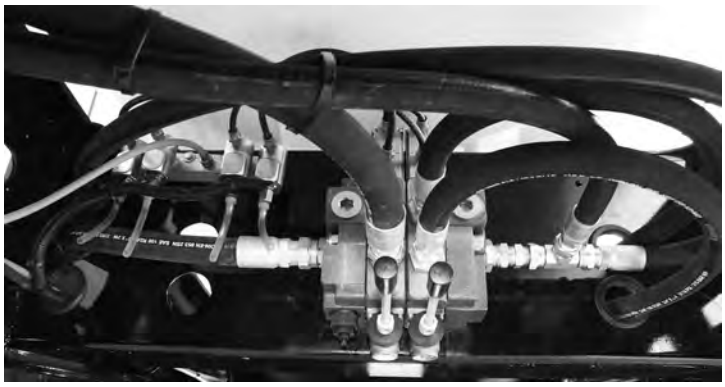
   a. **Requirements:**
   The trailer requires a 30 gpm oil supply at 2500 psi to operate the tub cylinders. Normally the oil supply is provided by PTO powered pump on the tractor. The oil is routed through a manual or electric valve to direct the oil to the required side of the cylinders. Review the tractor manual for details on PTO operation before starting.

   b. **Couplers:**
   Connect the oil supply lines from the tractor to the couplers on the front of the trailer when hooking up the unit. Always check to be sure the couplers are tight and not leaking. Do not operate if couplers are leaking.

   c. Manual System:
   In the manual system, a two way valve is mounted on the tractor or trailer frame to direct the flow of oil to the cylinder. Refer to schematic here and in Section 7 for a typical installation circuit.

   d. **Electrical System:**
   With a electrically controlled system, a control box is provided that mounts in the cab. This control box is equipped with a 2 push button switch to control the raising and lowering of the hoist. It is recommended that a toggle switch be installed in the power line to the control box to turn system off when not in use. Refer to the schematic here and in Section 7 for a typical hydraulic system. Refer to Section 7 for the electric control circuit wiring and plugs.

   e. **Electric Hydraulic Valve:**
   The electric hydraulic control valve that directs the flow of oil is mounted in the trailer frame.



Hydraulic valve with air-shift control TW2500/TW3500

Hydraulic valve with air-shift control TW2000/TW3000/TW4000

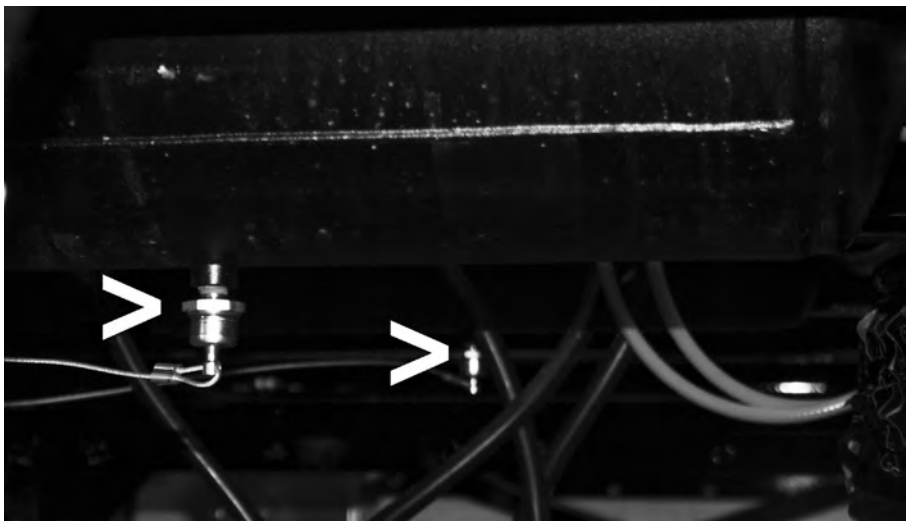
Fig. 3 HYDRAULIC SYSTEM

4.4 CONTROLS (cont'd)

2. **Tank Drain Valve:**
   Every air reservoir tank on the trailer is equipped with a spring-loaded valve that is used to drain the moisture. These valves are attached to a cable that extends out to the frame to allow the operator to drain moisture from the tanks. Pull on the cable to open the valve and drain the moisture from the tank. Release the cable to close the valve. Drain tank daily especially in humid or cold conditions.

IMPORTANT

During cold weather drain moisture from the air tanks every day to prevent ice build up. During cold weather operation, use only recommended air line antifreeze in the trailer air system. Alcohol or methyl hydrate is not to be used because they will remove vital lubricants causing premature failures of valves and components. Traces of these products will void any warranty consideration.



Tank Valve TW3000

Cable

Fig. 4 AIR TANK

4.4 CONTROLS (cont'd)

3. **Latches/Pivots:**
   Each side of the frame is designed with 2 latches/ pivots to control the motion of the tub when unloading. Each anchor has a pinned latch that holds or releases the pivot.

Location

Latched

Fig. 5 LATCHES/PIVOTS

4.4 CONTROLS (cont'd)

4. **Landing Gear:**
   A post type or manual position landing gear is available for your trailer.

   a. **Post Type:**
   The post type landing gear consists of an anchor bracket and extendable leg.

   To extend leg, pull the pin and let the leg drop down to the ground. If an anchor hole through the leg and bracket does not line up, lift the leg until the anchor pin can be installed. The trailer will drop down on the legs as the towing vehicle pulls away. Place pads under the legs in soft conditions.

IMPORTANT

Do not unhook the trailer when loaded if equipped with drop type landing gear.

   b. **Two Speed:**
   The landing gear uses a crank to set the position of the landing gear height. Pull the crank from its stowed position, mount on the driveshaft and push in to lock. For the high ratio drive, push the handle and driveshaft as far in as it will go. For the low ratio drive, pull the handle and shaft as far out as it will go.

   When changing drive ratios, it may be necessary to turn the crank slightly to align the gears. Turn the crank clockwise to lower the legs. Place pads under the legs in soft conditions.

Post Type

Two Speed (Typical)

Fig. 6 LANDING GEAR

4.5 PRE-OPERATION VEHICLE INSPECTION PROCEDURE

The safe and trouble-free use of a Midland Trailer requires the operator to maintain the unit in good operating condition. To assist the operator, a pre-operation checklist is provided that should be followed each time before the trailer is used.

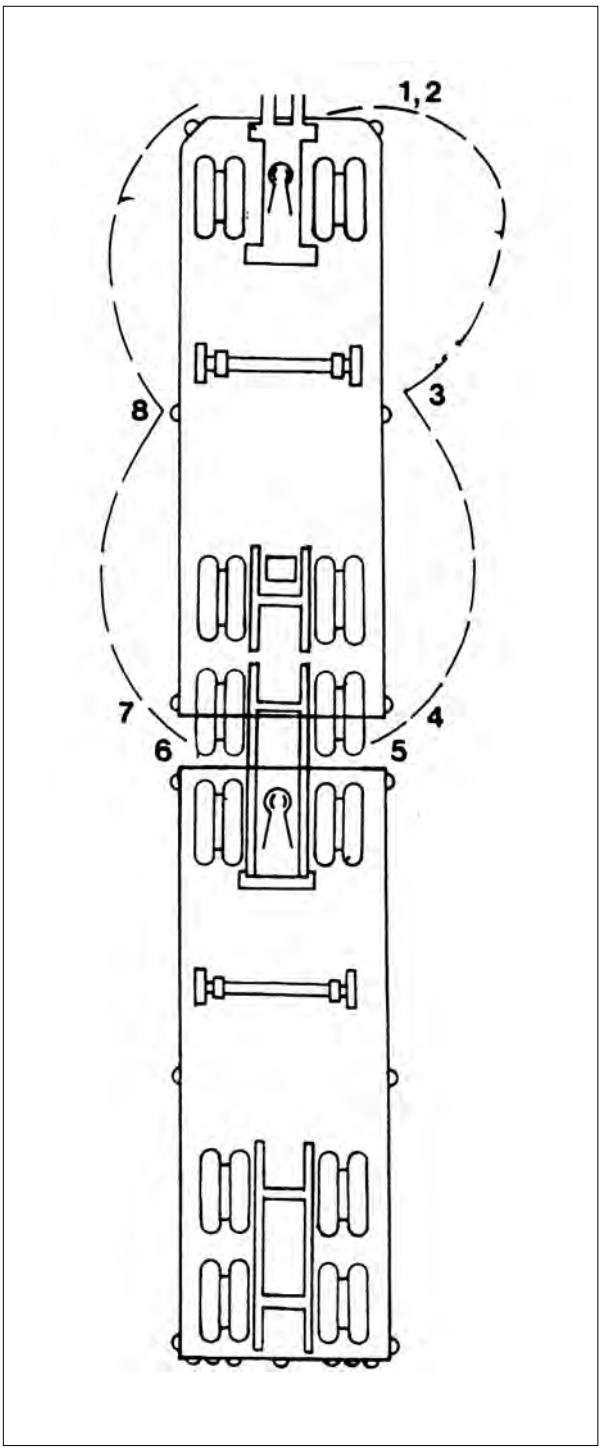


Fig. 7 WALKAROUND SEQUENCE

NOTE

The tractor items, part of the Department of Transport (D.O.T.) walk around sequence, have been omitted.

WALK AROUND SEQUENCE

Step 1 - Trailer Frontal Area

1. **Air and Electrical Connections**
   a. Glad hands properly mounted, free of damage, not leaking and not worn.

   b. Electrical line receptacle properly mounted, free of damage, plug adequately seated and safety catch engaged to prevent accidental disconnection.

   c. Hydraulic couplers properly seated and tightened, no leaks and properly secured against tangling, snagging and chafing, with sufficient slack for turning.

   d. Air, electrical and hydraulic lines properly secured to avoid tangling, snagging and chafing with sufficient slack for turns.

2. **Lights and Reflectors**
   a. Front trailer clearance and identification lights - should be clean, operating and proper color.

   b. Reflectors and conspicuousy tape clean and proper color.

3. **Hydraulic Cylinder**
   a. Free to move on pivot.

   b. No oil leaks.

Step 2 - Coupling System Area

1. **Fifth Wheel (Lower)**
   a. Securely mounted to frame.

   b. No missing or damaged parts.

   c. No visible space between upper and lower fifth wheel.

   d. Locking jaws around the shank and not the head of Kingpin.

   e. Release lever properly seated and safety latch lock engaged.

4.5 PRE-OPERATION (cont'd)

2. **Fifth Wheel (Upper)**
   a. Kingpin not worn, bent or damaged.

   b. Anchor frame not cracked, bent, worn or damaged.

3. **Air, Hydraylic and Electric Lines Visible From This Point**
   a. Should be secure from dangling, snagging and chafing.

   b. Should be free from damage and clean.

Step 3 - Right of Trailer Area

1. **Front Trailer Support (Landing Gear)**
   a. Fully raised and secured, no missing parts, not bent or otherwise damaged.

   b. Crank handle present and secured (typically on left side).

2. **Spare Tires**
   a. Carrier or rack not damaged.

   b. Tire and/or wheel securely mounted in the rack.

   c. Tire and wheel condition adequate. Proper spare tire size, correctly inflated.

3. **Lights and Reflectors**
   a. Trailer side clearance lights clean, operating and proper colour.

   b. Reflectors and conspicuously tape clean and proper colour.

4. **Frame and Body**
   a. Frame and cross members not bent, cracked, damaged or missing.

   b. Body parts not damaged or missing.

5. **Air Tank**
   a. Drain moisture from air tank(s) daily. Pull on cable attached to drain valve. Hold cable until the tank moisture is drained and the stream is clear.

NOTE

During cold weather drain moisture from the air tanks every day to prevent ice build up. During cold weather operation, use only recommended air line anti freeze in the trailer air system. Alcohol or methyl hydrate is not to be used because they will remove vital lubricants causing premature failures of valves and components. Traces of these products will void any warranty consideration.

Step 4 - Right Rear Trailer Wheel Area

1. **Dual Wheels**
   a. Condition of wheels and rims, no cracked or bent rims, broken spacers, studs, clamps or lugs.

   b. Condition of tires - properly inflated, valve stems not touching wheel rims or brake drums, valve caps in place, no serious cuts, bulges, tread wear or any signs of misalignment and no debris stuck between the tires.

   c. Tires all same type e.g. do not mix radial and bias types on the same axles.

   d. Wheel bearings and hub - no obvious leaking.

   e. Mud flaps in place and in good condition.

2. **Tandem or Triaxles**
   a. Repeat wheel and tire inspection as above.

   b. Flexible air lines not cracked, cut, crimped or otherwise damaged, secured against tangling, dragging or chafing.

3. **Suspension**
   a. **Mechanical:** Condition of spring(s), spring hangers, equalizers and U-bolts.

   b. **Air:** Condition of air bag(s), axle clamping bolts, pivot arm and height control valve.

   c. Axle alignment.

   d. Retorque all fasteners.

Step 5 - Brakes

1. **Brakes**
   a. Condition of brake drum(s).

   b. Condition of hoses, lines and valves.

   c. Check slack adjusters.

   d. Check air chamber mounting.

   e. Check spring brakes (if so equipped).

   f. Drain moisture from air tank with cable.

4.5 PRE-OPERATION (cont'd)

Step 6 - Right of Trailer Area

1. **Lights and Reflectors**
   a. Rear clearance and identification lights, clean and operating and proper colour.

   b. Reflectors and conspicuously tape clean and proper colour.

2. **Hydraulic Cylinder**
   a. Free to move on pivot.

   b. No oil leaks.

3. **Check "B" train 5th wheel:**
   Repeat same as Step 2 "Coupling System Area".

Step 7 - Left Rear Trailer Wheel Area

Check all items as done on right side (Step 4 "Right Rear Trailer Wheel Area").

Step 8 - Left Side of Trailer Area

Check all items as done on right side (Step 3 "Right Side of Trailer Area").

Step 9 - Trailer(s) Functional Check (Tractor Attatched)

1. Check for proper connection of the air brake glad-hands, hydraulic system couplers and secure contact of electrical connection.

2. Start engine.

3. Build up air pressure in the tractor-trailer systems.

4. Turn on lights and inspect for proper function of:
   a. Clearance lights.
   b. Identification lights.
   c. Turn signals and 4-way flasher.
   d. Sidemarker lights.
   e. Tail lights.
   f. Stop lights.

5. Check the function of brakes.
   a. Apply service brakes.
   b. Apply parking brakes.
   c. Apply emergency brakes.
   d. Stop engine.

      i. Release trailer emergency brakes.
      ii. Apply service brakes.

      Air loss should not exceed
      3 psi per minute on single vehicles.
      4 psi per minute on combination.

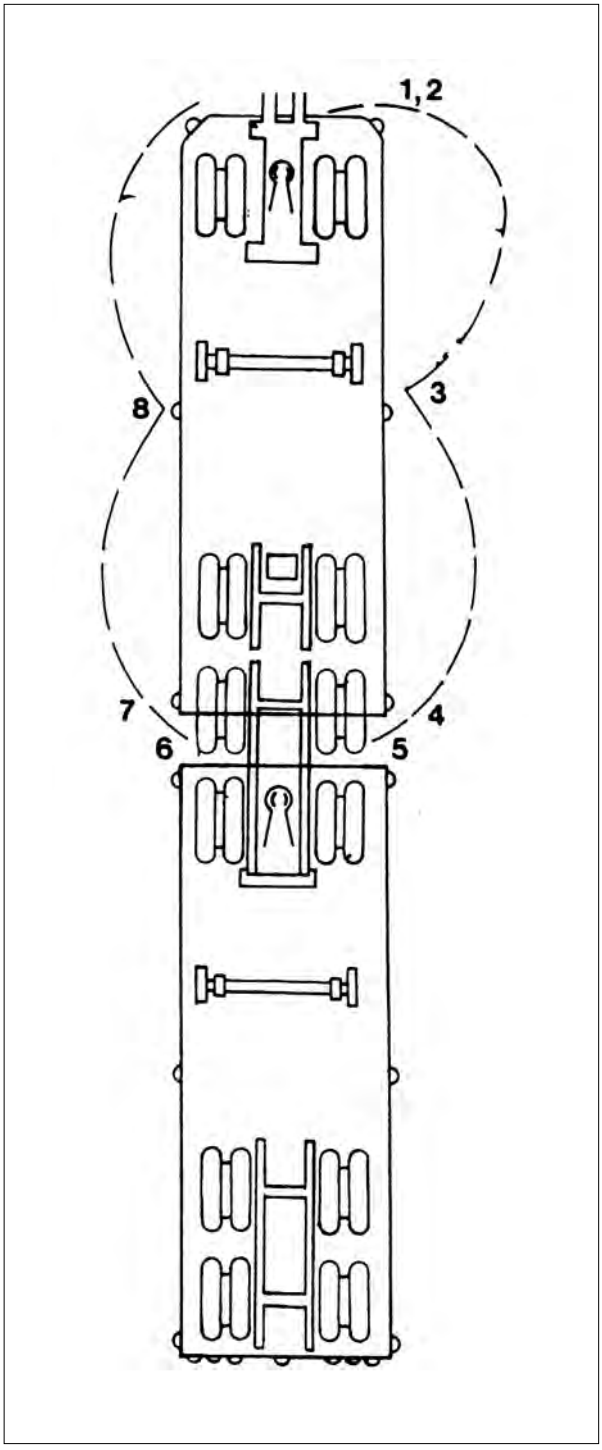


Fig. 8 WALKAROUND SEQUENCE

Step10 - On Trailer Transporting Hazardous Material

1. Check marking and placards.

2. Check for proper shipping papers.

4.6 HOOKING UP/UNHOOKING

Special care should be taken when hooking up or unhooking trailer to be sure the equipment is in good condition and all systems are functioning as required.

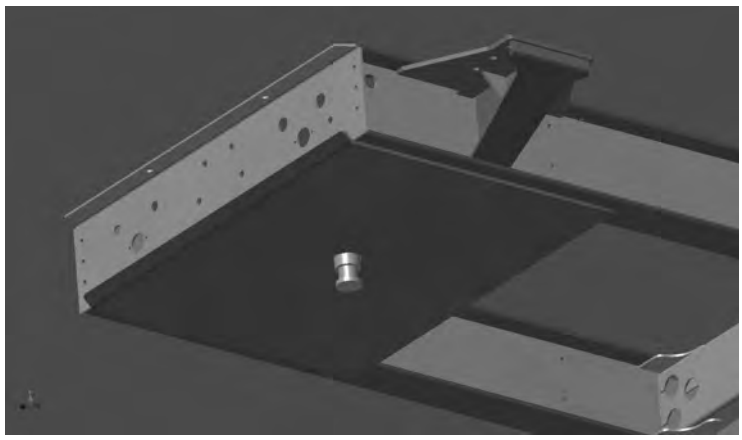
4.6.1 HOOKING UP

Follow this procedure when hooking up the trailer to towing vehicle (tractor or lead trailer):

1. Back the towing vehicle up in a straight line to the trailer and align the fifth wheel opening with the trailer king pin.

2. Stop before the fifth wheel makes contact with the trailer and apply the towing vehicle parking brake.

3. Inspect all the coupling components before hooking up:
   a. Inspect trailer coupling components. Check that king pin is not broken, bent or chipped. Check that the king pin mounting frame is not bent or cracked. If problems found, correct before proceeding.
   b. Inspect fifth wheel coupling components. Check that the fifth wheel assembly is securely anchored to the tractor frame. Check that the structure of the frame, pivot and fifth wheel is not bent, broken or cracked. Check that the jaws of the lock are open. If problems found, correct before proceeding.
   c. Be sure that the fifth wheel plate is cleaned and greased.



King Pin

Fifth Wheel

Fig. 9 COUPLING COMPONENTS

4. Open the coupler lock.

5. Tilt the fifth wheel plate back.

6. Check that the trailer is at the required height to slide onto the fifth wheel.
   a. Use the crank on the landing gear to raise or lower the trailer as required.
   b. On drop leg landing gear, care must be taken if the trailer is too low to climb up on the 5th wheel. It may be necessary to raise the trailer and repin the drop legs.

   The trailer frame should contact the fifth wheel just behind the pivot point as the towing unit backs under the trailer.

7. Block the trailer wheels.

8. Connect brake lines. Route the lines so they do not get pinched when the trailer is attached to the tow unit.

9. Check brake application by applying and releasing brakes. If brakes do not release, air lines may be crossed. Do not continue unless brakes are functioning properly.

10. Re-apply trailer brakes using trailer hand valve.

4.6.1 HOOKING UP (cont'd)

11. Back slowly under trailer keeping the king pin centered in the fifth wheel jaws.

12. Back up until the fifth wheel coupler locks on the trailer king pin.

13. Gently move the towing vehicle back and forth while the trailer brakes are engaged to check that the jaws have locked around the king pin.

14. Set parking brake, stop engine and dismount.

15. Visually check that the coupler jaws are securely locked around the king pin and the coupler release lever is in the locked position. Release and hook up again if the jaws are not securely locked around the king pin.

16. Check that the trailer front frame is resting on the fifth wheel.

17. Connect and secure the hydraulic line. Start hydraulic pump and check that there are no leaks.

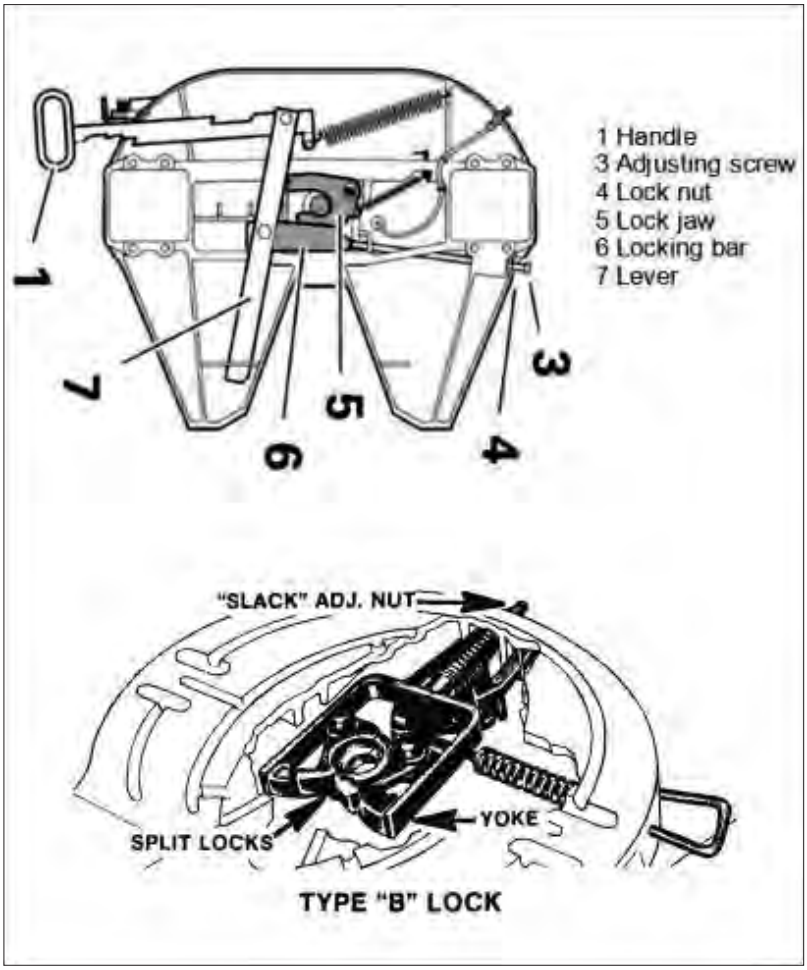


Fig. 10 COUPLER LOCKS

18. Connect and secure the electrical terminal. Check that all electrical circuits are completed and that all lights are working.

19. Route the electrical, air and hydraulic lines to prevent snagging, dragging and pinching.

20. Raise the landing gear.
    a. Remove the anchor pins, raise leg and repin on the drop leg style.
    b. Use the crank to raise the legs if equipped with the crank style. Stow crank.

21. Remove blocks or chocks from the wheels.

22. Perform Pre-Trip Inspection before starting.

4.6.2 UNHOOKING

1. Position towing unit and trailer in a straight line on a clear, level and firm surface.

2. Apply the trailer brakes and the parking brakes on the tractor before dismounting.

3. Place blocks or chocks in front of and behind trailer wheels if not on a level surface.

4. Place large blocks or planks under landing gear if the ground is soft.

5. Lower landing gear:
   a. Remove pins from legs of post type landing gear. Raise leg slightly if required to install anchor pin.
   b. Use crank to lower leg on crank style landing gear. Lower leg until pads solidly contact the ground but do not lift trailer off fifth wheel. Stow crank.

6. Unhook fifth wheel coupler.

7. Charge trailer air system and apply brakes.

8. Release tractor unit parking brake and pull slowly forward until the trailer frame just slides down the fifth wheel ramp. Stop.

9. Set the parking brake on the tow unit before dismounting.

10. Check that the surface under the landing pads can support the trailer. Support with blocks or planks if required. This is particularly important if the trailer will be loaded while unhooked.

IMPORTANT

Only crank type landing gear can support a loaded trailer.

11. Disconnect air and hydraulic line and electrical connector.

12. Install glad hands on dead end connectors if so equipped.

13. Drive tow vehicle away from trailer.

14. Inspect the equipment. Document problems found so they can be corrected before the unit will be used the next time. Record problems and repairs for your files.

Post Type

Two Speed

Fig. 11 LANDING GEAR

4.7 LOADING/UNLOADING

It is the responsibility of the operator to review and be familiar with the trailer loading capacity specifications and be sure that you comply with any and all load limitations or restrictions applicable in the jurisdictions where you will be travelling. Exceeding the trailer weight specifications can result in damage to the structure and voids the manufacturer's warranty. Exceeding the road restrictions is illegal.

Fig. 12 LOADING

Loading/unloading procedures and instructions are covered but not limited to those summarized below:

A. **Loading**

1. Clear the area of bystanders and remove debris from loading area.

2. Position the trailer as required and set park brake before dismounting.

3. Be sure the tub is fully down resting on the latching/pivot points.

4. Minimize the drop height when loading.
   a. Position the loading equipment as close to the bottom of the trailer as possible.
   b. Do not load trailer unless hooked to towing unit.

5. Do not drop large dense objects into the trailer as they can damage the structure.

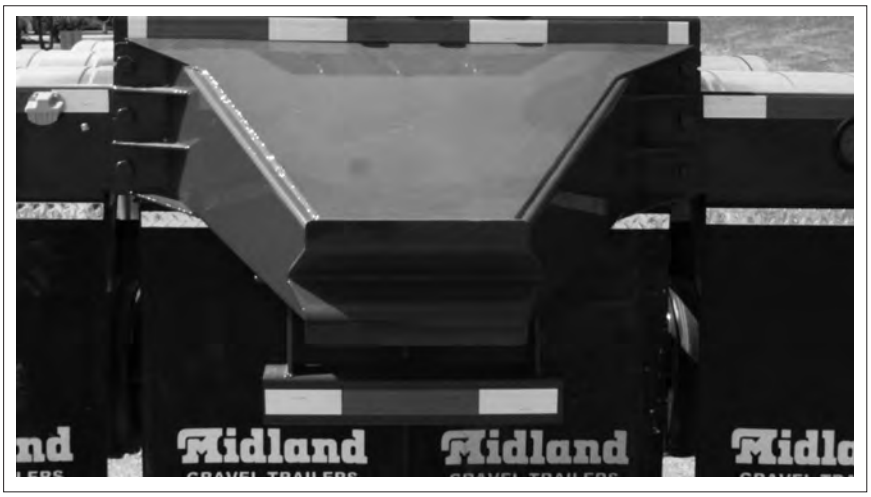


Fig. 13 PUSH BLOCK

6. Distribute the material evenly from side-to-side and front-to-rear during loading to equalize the structural and axle loading during transport.

7. Re-inflate the air bags if they were exhausted for loading.

8. Reinforced push blocks are available to attach to the back of the frame. This block will provide a place for the other equipment to push on the trailer should the need arise. The push block is not intended to be and should not be used as a lifting device.

9. Secure the trailer cover as required if so equipped.

4.7 LOADING/UNLOADING (cont'd)

B. **Unloading**

1. Clear the area of bystanders and remove debris from unloading area.

2. Determine the unloading side. Latch the pivot side and release lifting side.

3. Open and remove the tarp if so equipped.

4. Proceed to the unloading area.

5. When unloading a TW train configuration, always unload the pup prior to unloading the lead.

Latched

Fig. 14 ANCHORS

4.7 LOADING/UNLOADING (cont'd)

6. Engage PTO to start the flow of hydraulic oil.

7. Raise the tub to discharge material.

8. Stay away from the trailer while dumping to prevent being hit by material. Keep others away.

9. When handling material that does not flow evenly or requires dislodging, use extra care. A long stick or long handled shovel should be used while standing outside the tub. Have a back-up person there in case a problem arises. **Use common sense. Do not enter tub unless the hydraulic pump is turned off**.

10. Know the characteristics of the material being handled. Never enter the trailer if toxic material is being handled.

Fig. 15 UNLOADING

4.8 TRANSPORTING

By following the previous instructions, your Midland trailer unit has been hooked-up and is ready to go. Although all operating instructions are common sense, it is wise to review them periodically to refresh your memory. Good operational procedures result in a safe workplace for the operator and others.

4.8.1 OPERATING INSTRUCTIONS

Since this equipment can be used in a variety of conditions, it is difficult to give instructions appropriate for all applications. However, these general guidelines apply to all situations:

1. Be sure that the trailer is securely attached to the towing vehicle and locked into position.

2. Be sure that the air and hydraulic lines are securely connected and that they have sufficient slack for turns.

3. Ensure that the brakes are properly adjusted and in good working condition.

4. Ensure that the electrical harness is securely attached and all lights and reflectors are clean and operating.

5. Maintain the mud flaps in good condition to minimize road splash in wet conditions.

6. Always maintain the trailer in good mechanical condition.

4.8.2 BRAKING GUIDELINES

Safe, reliable and trouble-free operation of your trailer requires that the brakes be maintained in good operating condition at all times and the driver follows good application techniques when driving. The irresponsible use of brakes by the driver when travelling can contribute to low brake life or result in system malfunctions, short tire life and poor tire wear patterns. The following list summarizes some basic operational guidelines for the driver.

1. Check the function of the brake system before starting a trip.

2. Maintain a safe vehicle speed at all times. Slow down for rough road or slippery surface conditions, winding roads or congested areas.

3. Always provide sufficient vehicle spacing on the road to allow for a safe stopping distance.

4. Apply brakes gradually to produce an even deceleration until the vehicle is stopped.

5. Watch traffic patterns ahead. Anticipate pattern changes that could result in an emergency. Apply the brakes gradually in sufficient time to produce a controlled stop.

6. Shift to a lower gear to use engine compression as the retarding force when going down steep grades.

7. Do not apply brakes for a long period of time such as when travelling on a long downgrade. The brakes will overheat. Instead, apply both the tractor and trailer brakes for short periods of time giving the brakes a chance to cool between applications.

8. Dry the brakes by applying them several times after going through water.

9. Release the brakes just before going over railroad tracks or other rough conditions. By allowing the wheels to turn over rough road surfaces, there will be no shock loads to the brake system components or produce flat spots on the tires.

10. Wet, icy or snow-packed surfaces require special care. Make cautious, intermittent applications by fanning or pumping the brakes to reduce speed without skidding or locking the wheels.

11. Use caution when applying the tractor driveline brake should you lose the service brake system. Rapid and hard application of the driveline brake can result in axle or driveline component failures with the resulting loss of all braking systems.

12. Use wheel chocks, apply trailer and tractor parking brakes and place tractor in low gear when parking the unit.

13. Maximum brake retarding occurs just before the wheels lock up and the tires skid. Release the brakes should you feel them lock-up and reapply them.

14. When trailer brakes are applied with hot drums, it may result in a cracked drum. Allow them to cool before reapplying the brakes.

15. Fanning or repeated on-and-off applications will use up the system air reserves. This procedure is not recommended unless adverse road conditions are encountered. The wasting of air reserves in this way could result in insufficient application pressure should an emergency arise.

16. Hard or panic stops can overheat the linings and drums. Overheating will cause brake fade. Severe overheating and fade can result in the complete loss of braking capability. This will substantially reduce the expected life of brakes.

4.8.3 TIRES

When operating the trailer, it is the responsibility of the driver to check the tires frequently. Inflation pressures, wear patterns and matching are critical parameters that must be monitored. The following factors affect tire care:

1. **Inspection frequency:** Tires should always be checked before the start of a run and twice during the day or every 4 operating hours, whichever comes first. It is also a good practice to check the tires at each rest period during the day. When a driver hears unusual noise or experiences unusual handling characteristics, the first item to check is the tires. Problems found early, during frequent tire checks, can save more serious problems later on. A sampling of typical abnormal wear patterns are shown in the Maintenance section along with their causes. Always correct the cause of the tire wear problem before proceeding.

2. **Inflation pressure:** Tires should always be operated at their specified pressures. At their specified pressures, the tire is designed to run with the full width of the tread flat on the contact surface. Operating at other than specified pressures will change the tread contact patterns and can dramatically shorten tire life. In addition, the tires will run hotter and can lead to blow-outs.

   Check tire pressure when the tire is cold. A hot tire can read as much as 20 psi higher than a cold tire. If tires are over-inflated, check for poor load distribution, uneven surface contact, over-loading or poor operating conditions.

3. **Tire matching:** Do not mix ply types on the same axle. Their operating characteristics are different and will lead to uneven tire loading, rapid tire wear and adverse handling characteristics. Matching also includes combining tires that have the same amount of tread remaining. A tire with more tread has a larger rolling radius and will have to carry a higher load. The best performance will be obtained when the rolling radius is within 1/8" for all tires on an axle.

5 SERVICE AND MAINTENANCE

This section provides information on daily and periodic service and maintenance of the Trailer unit. Follow these recommendations for safe and dependable operation of the Trailer unit. Refer to the safety section at the front of the operator's manual for all applicable safe maintenance and operating procedures.

Be sure that all operators are familiar with the operation and maintenance procedures and related safety information contained in the operator's manual.

MAINTENANCE SAFETY

1. Read and understand all the information in the Operator's Manual regarding maintenance, adjusting and servicing the Trailer unit.

2. Place all controls in neutral, lower box or block box, stop the engine, remove ignition key and set the park brake before adjusting, servicing or maintaining any part of the Trailer unit.

3. Follow good shop practices:
   - Keep service area clean and dry.
   - Be sure electrical outlets and tools are properly grounded.
   - Use adequate light for the job at hand.

4. Cage spring brake chamber before disassembling.

5. Block wheels before de-activating brakes.

6. Disconnect air lines and exhaust air system before working on end gate.

7. Maintain fasteners in running gear systems at their specified torque at all times.

8. Establish and maintain a Trailer Preventative Maintenance (TPM) program on your equipment. Some jurisdictions require this program and the maintenance of records on every commercial vehicle on the road for future reference.

5.1 SERVICE

5.1.1 FLUIDS AND LUBRICANTS

1. Grease:
   Use an SAE multi-purpose lithium based grease with extreme pressure (EP) characteristics.

2. Wheel Hub Oil:
   a. Use an SAE 80W90 for normal temperature conditions (-10°F to 100°F ambients).

   b. Use an SAE 85W140 for hot temperature conditions (100°F and hotter ambients).

   c. Use an SAE 30W motor oil for ambients below -10°F.

      Capacity: 1 pint (500 ml)

3. Hydraulic Oil:
   Use an SAE 10W or 20-20W viscosity standard industrial hydraulic oil for all operating conditions.

   Cylinder Capacity: 265 - 230 litres, 60 U.S. gal
   250 & smaller - 200 litres, 50 U.S. gal.

4. Storing Lubricants
   Your Trailer can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

5.1.2 GREASING

Refer to Section 5.1.1 for recommended grease. Use the Service Record checklist provided to keep a record of all scheduled servicing.

1. It is recommended that a high-pressure air greaser be used for greasing to insure that the bushings receive sufficient lubricant.

2. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.

3. Replace and repair broken fittings immediately.

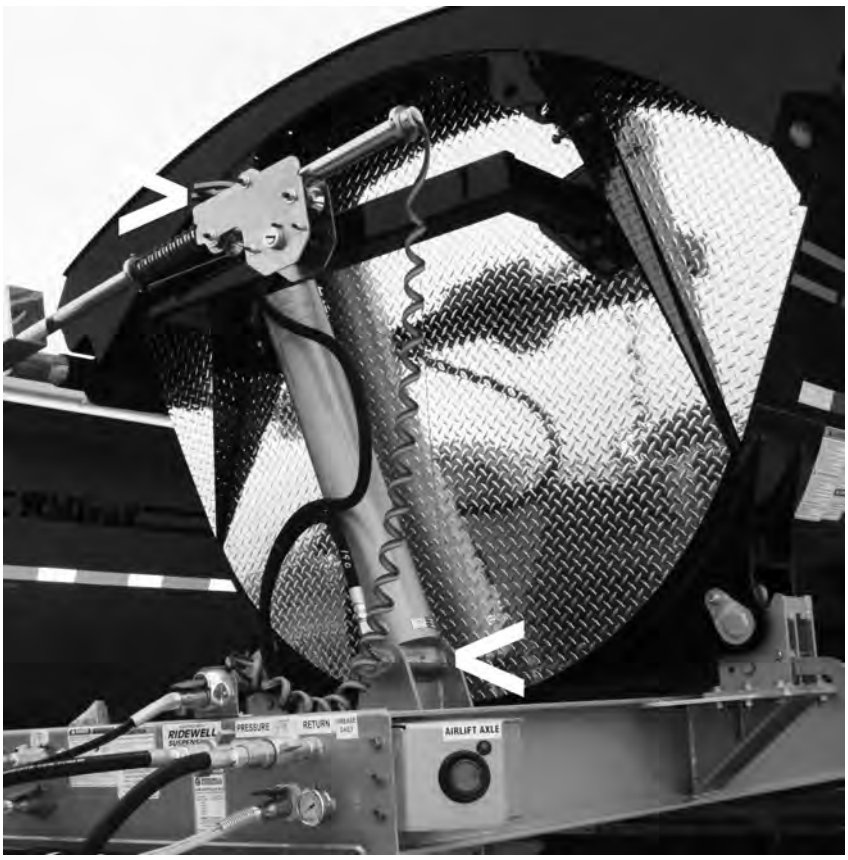
4. If fittings will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

5.1.3 SERVICING INTERVALS

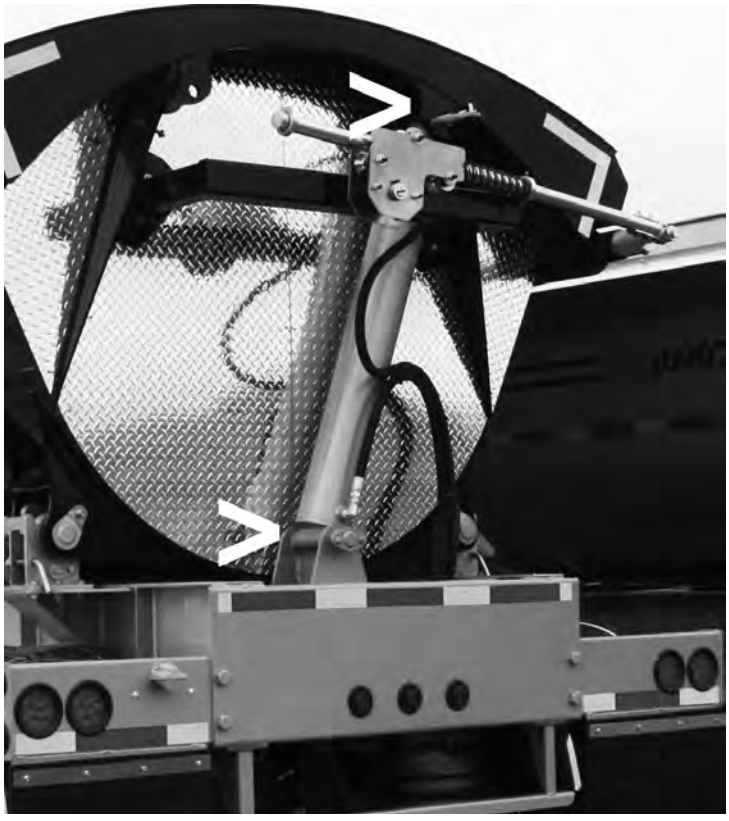
A standard servicing schedule is provided as a guide for your convenience. In unusual or extreme operating conditions, increase the frequency or perform additional service items to customize this schedule to your application.

Daily, 10 hours or 500 Miles

1. Grease the top and bottom hydraulic cylinder bushings on the front and rear (2 locations each cylinder).



Front



Rear

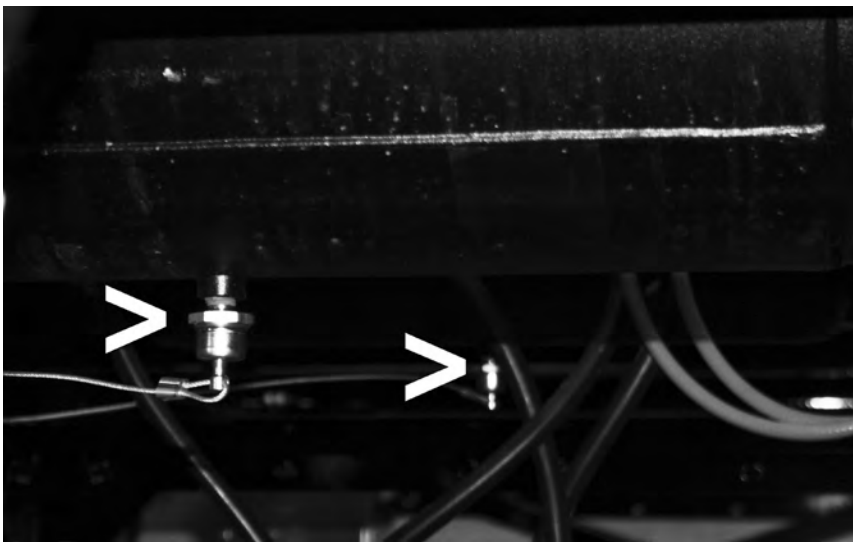
Fig. 16 CYLINDER BUSHINGS

5.1.3 SERVICING INTERVALS (cont'd)

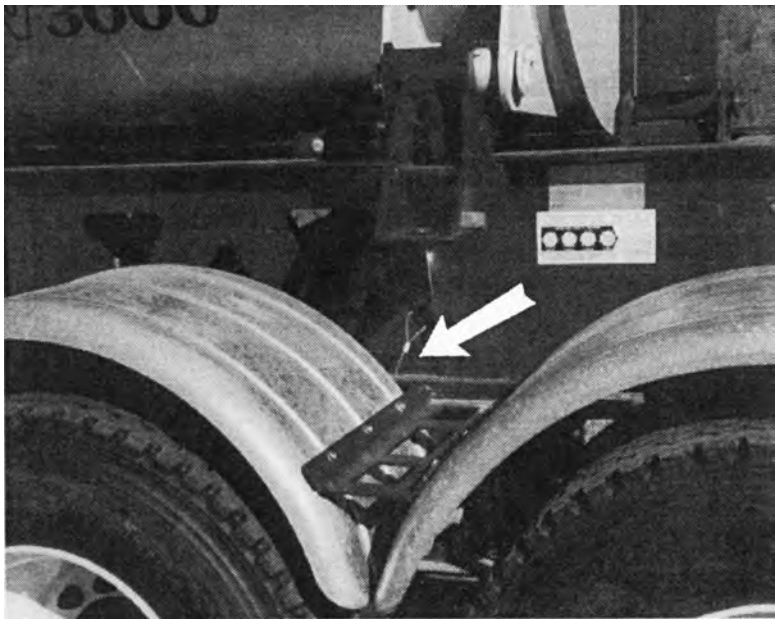
2. Drain moisture from air tanks (use cables to open drain valves).

IMPORTANT

During cold weather drain moisture from the air tanks every day to prevent ice build up. During cold weather operation, use only recommended air line anti freeze in the trailer air system. Alcohol or methyl hydrate is not to be used because they will remove vital lubricants causing premature failures of valves and components. Traces of these products will void any warranty consideration.



Valve (TW3000)



Drain Cable

Fig. 17 AIR TANK

5.1.3 SERVICING INTERVALS (cont'd)

3. Check tire air pressure. Add as required.

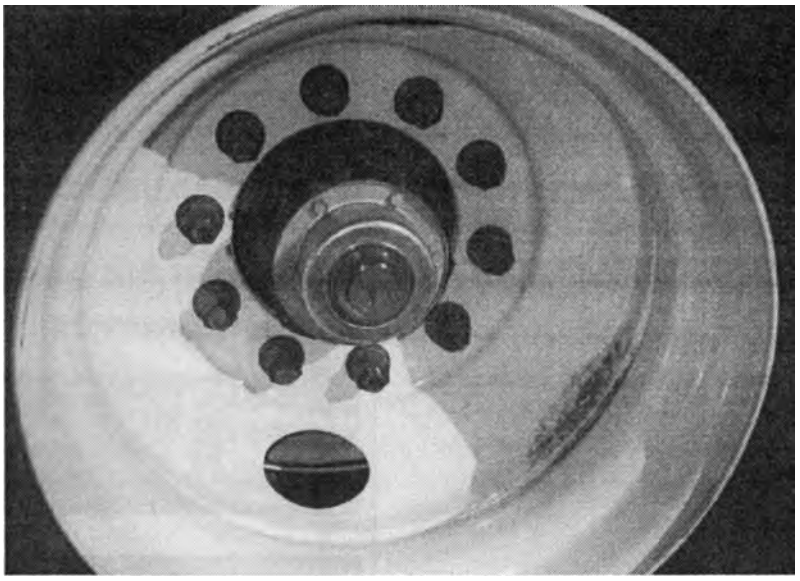


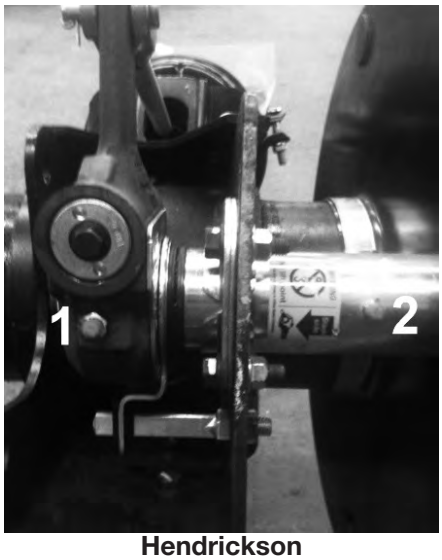
Fig. 18 TIRES (TYPICAL)

Weekly, 10 Days or 5000 Miles

1. Grease slack adjusters (1 location each adjuster).

2. Grease camshaft bearings (1 location each camshaft).

Ridewell configuration



Hendrickson configuration

Fig. 19 SLACK ADJUSTER (TYPICAL)

3. Grease fifth wheel.

   a. Pivots (2 locations).
   b. Surface

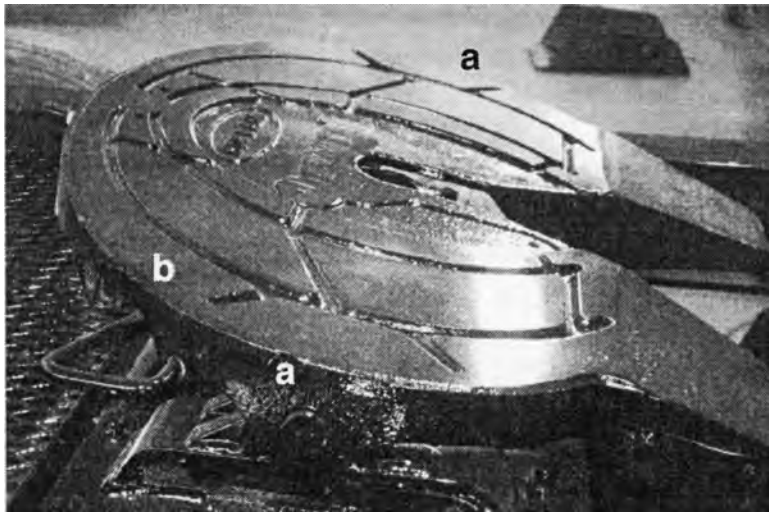
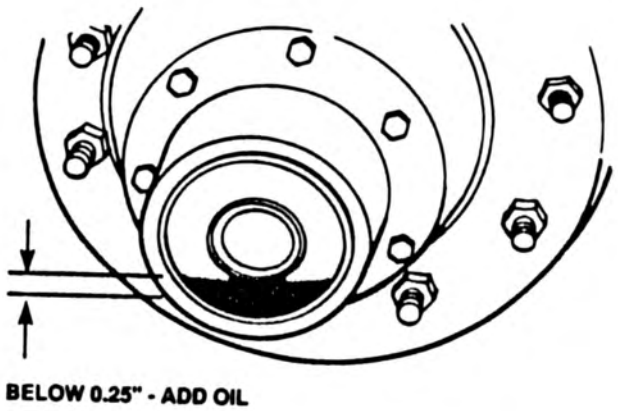


Fig. 20 FIFTH WHEEL COUPLER

5.1.3 SERVICING INTERVALS (cont'd)

4. Check wheel hub oil levels.



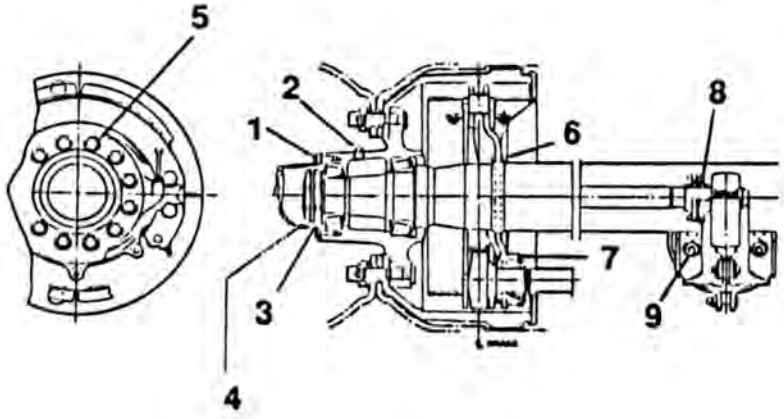
Schematic

Hub

Fig. 21 HUB OIL LEVEL

5. Retorque the following fasteners:

   a. Brake/wheel end system fasteners. Refer to Section 5.2.7.



Manual Bearing Adjustment

a. Tighten to 100 ft-lbs.
b. Completelt loosen.
c. Tighten to 50 ft-lbs.
d. Loosen 1/4 turn.

Fig. 22 BRAKE/WHEEL END

5.1.3 SERVICING INTERVALS (cont'd)

b. Landing gear bolts (Crank type only).

1/2 in. 125 ft. lbs.
5/8 in. 250 ft. lbs.

Fig. 23 LANDING GEAR MOUNTING BOLTS

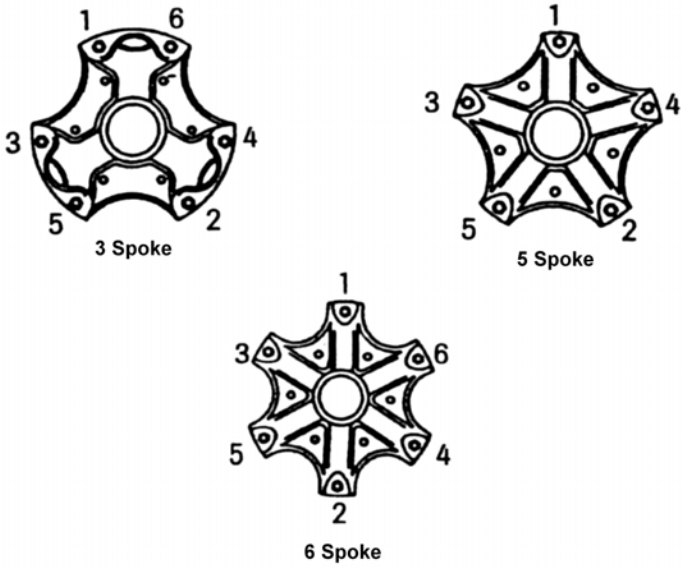
c. Retorque cast spoke wheel rim nuts if so equipped.

Table 1 Recommended Wheel Bolt Torque (Spoke Wheels)

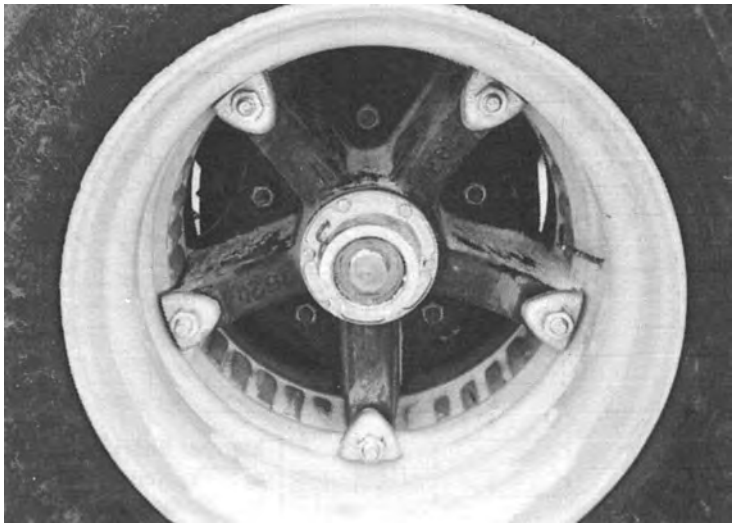
Bolt Size	Ft-lbs Torque (Dry)
5/8" - 11	150 - 175
3/4" - 10	210 - 260

IMPORTANT

Do not over-torque fasteners. Over-torquing can strip threads, collapse spacers or lead to other problems that cause loose fasteners. Use an accurate torque wrench when tightening fasteners.



Torquing Sequence



Wheel (Typical)

Fig. 24 CAST WHEEL RIM NUTS

5.1.3 SERVICING INTERVALS (cont'd)

d. Retorque for stud pilot inner and outer wheel nuts if so equipped.

Table 2 Recommended Wheel Stud Torque (Disc Wheels)

Stud Size	Wheel Type	Ft-lbs Torque (Dry)
3/4" - 16	Disc	450 - 500
1-1/8" - 16	Disc	450 - 500
15/16" - 12	Disc	750 - 900
1-5/16" - 12	Disc	750 - 900
	Bud Unimount 10	390 - 440
	WHD-8	400 - 600

e. Retorque hub piloted wheel single nuts if so equipped.

Table 3 Recommended Wheel Stud Torque

Stud Size	Ft-lbs Torque (Oiled)
M22 x 1.5 (33 mm or 1-1/2 Hex)	450 - 500
M20 x 1.5 (30 mm Hex)	280 - 330

IMPORTANT

Do not over-torque fasteners. Over-torquing can strip threads, collapse spacers or lead to other problems that cause loose fasteners. Use an accurate torque wrench when tightening fasteners.

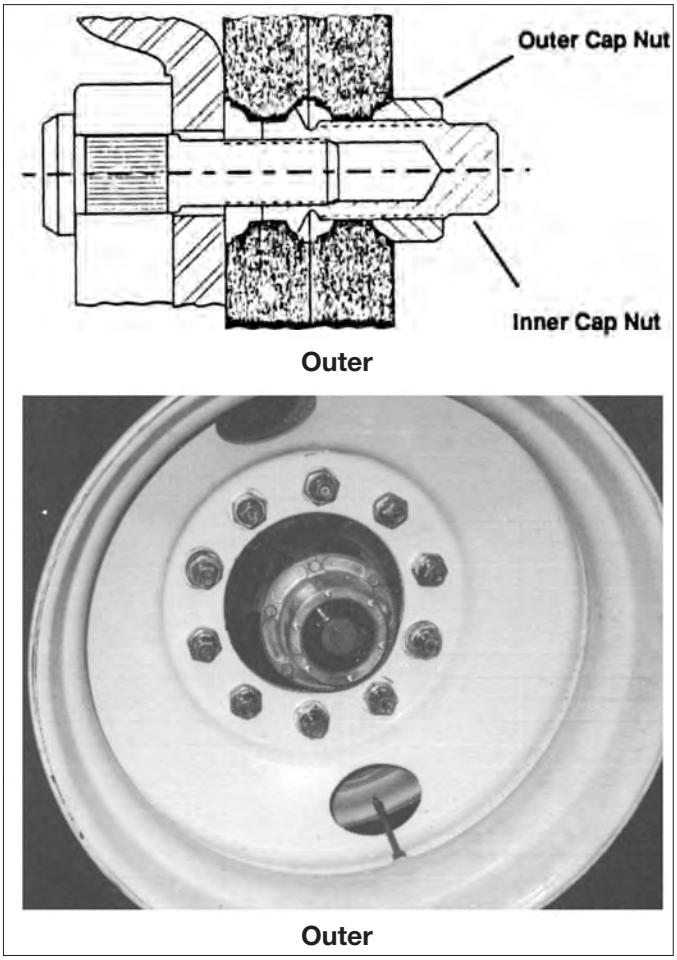


Fig. 25 10 STUD WHEEL NUTS

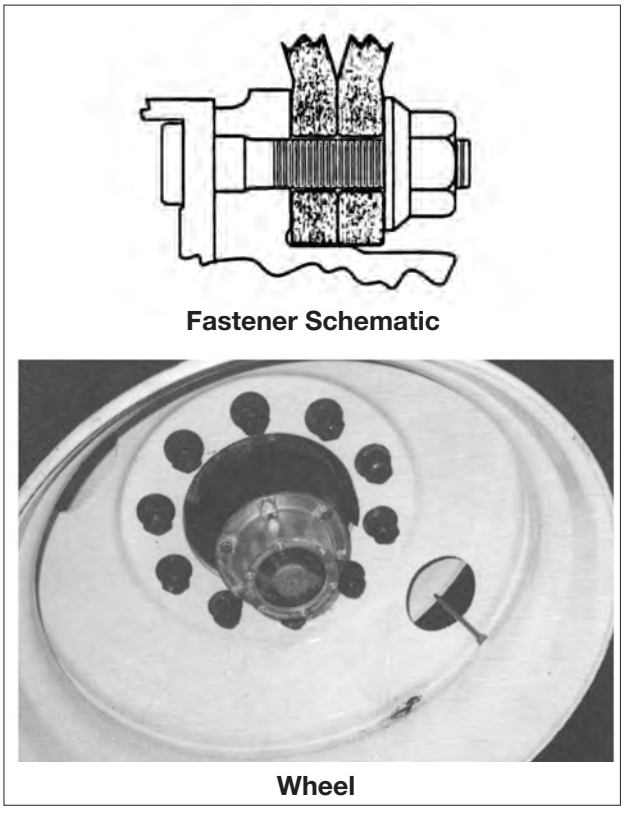


Fig. 26 SINGLE NUTS

5.1.3 SERVICING INTERVALS (cont'd)

f. Retorque suspension system fasteners (Refer to charts for torque levels in Maintenance Section 5.2.10.1 and 5.2.10.2). Also refer to suspension manufacturer's recommendation in accompanying manual.

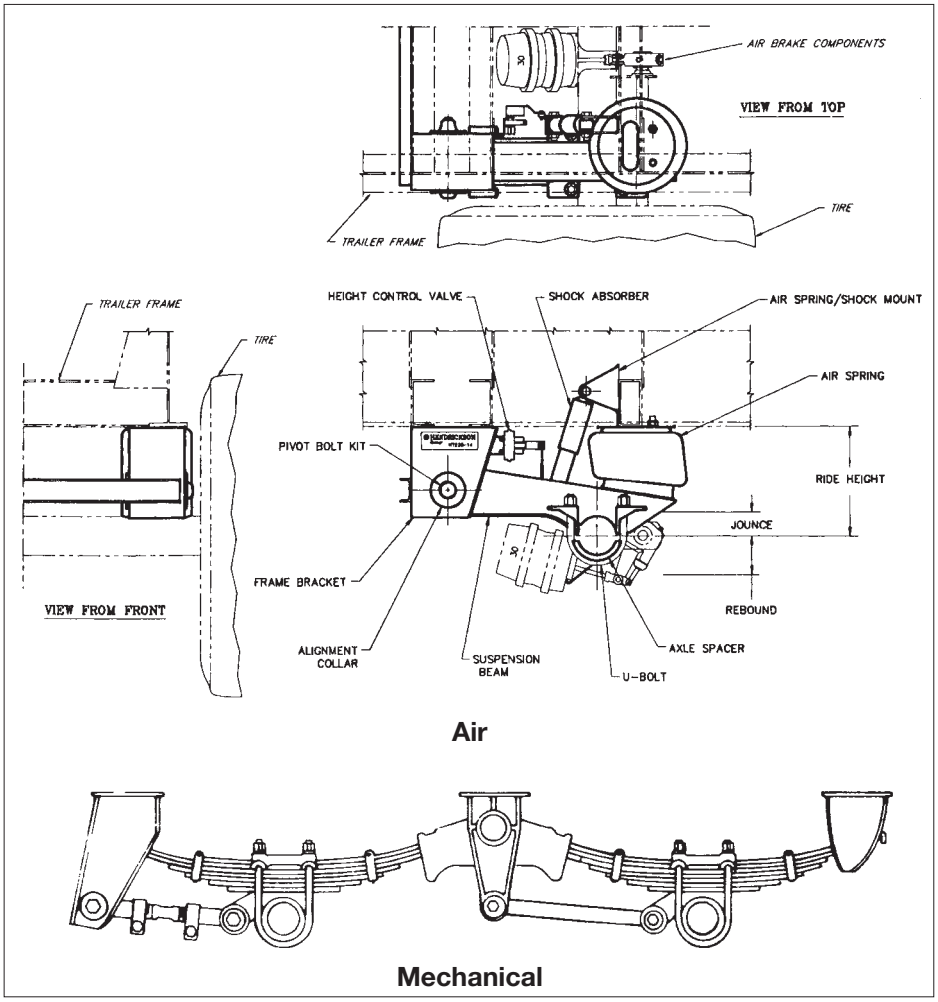


Fig. 27 SUSPENSION SYSTEM U-BOLTS

g. Retorque push block mounting bolts (if so equipped) to 600 ft. lbs.

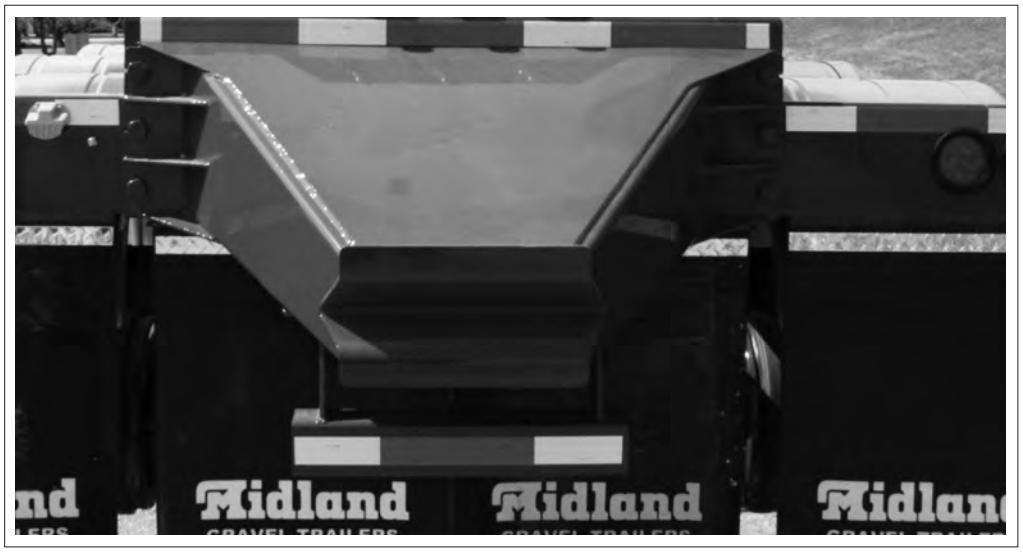


Fig. 28 PUSH BLOCK MOUNTING BOLTS

5.1.3 SERVICING INTERVALS (cont'd)

10,000 Miles (15,000 kms) or Monthly

1. Grease landing gear bearings (3 locations) (crank type only).

Although your landing gear was properly greased and packed with high quality lubricants when manufactured, it is necessary to periodically add more grease to maintain proper lubrication and satisfactory performance for your particular application.

Periodically adding grease to your landing gear should be part of your preventative maintenance program and should be done every six months or more often, if required.

For **low temperature operations** (under 20° F) use a lithium or an anhydrous calcium extreme pressure grease that operates down to -65°F.

For **cold weather operations**, it is also recommended to fill the gearbox approximately 3/4 full with grease. This helps minimize moisture accumulation, which can freeze, causing hard gear cranking.

Lubricate as follows: (see ***FIGURE 1***)

1. Fully retract the landing gear, then using high gear, lower the leg 2-3 turns and lubricate the lift-screw assembly through grease fitting "**A**" (see landing gear legs shown below). Apply ½ lb. of grease.
2. Lubricate the gearbox, using grease fitting "**B**". Apply ¼ lb. of grease
3. Lubricate the bevel gear using grease fitting "**C**". Apply ¼ lb. of grease
4. Distribute the lubrication by fully extending and retracting the leg several times.

Figure # 1

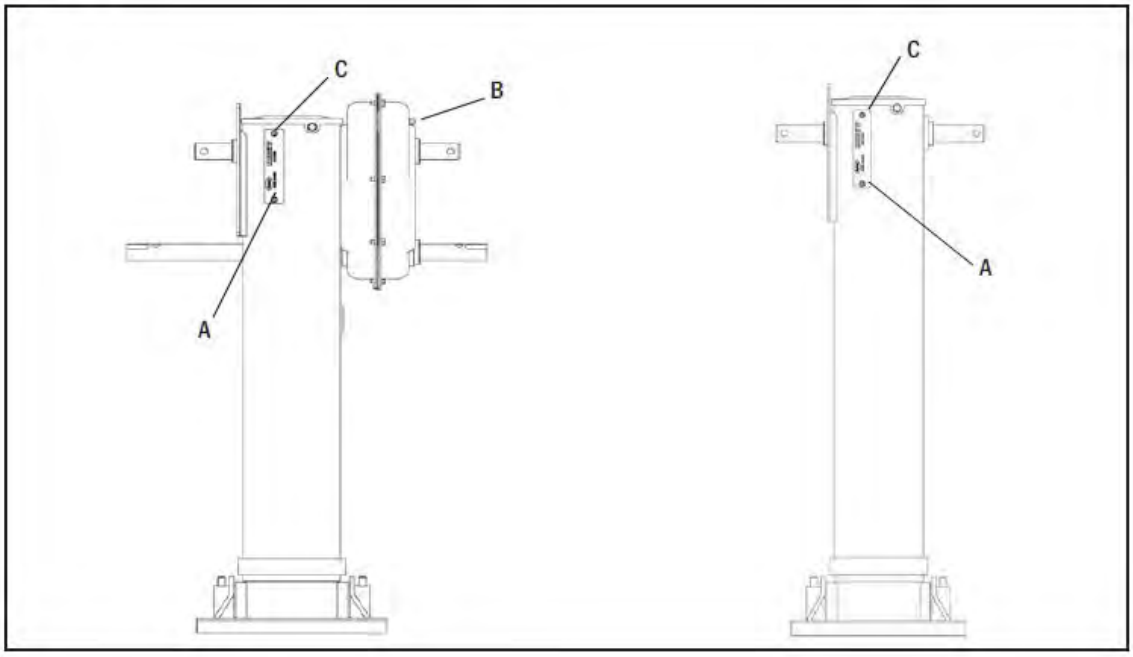


Fig. 29 LANDING GEAR (TYPICAL)

5.1.3 SERVICING INTERVALS (cont'd)

2. Retorque fasteners.
   a. Landing gear.

Fig. 30 LANDING GEAR

   b. Torque mechanical system suspension (refer to Section 5.2.10.2).

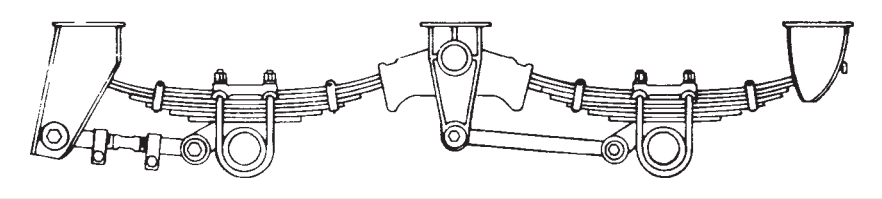


Fig. 31 MECHANICAL SUSPENSION SYSTEM

25,000 Miles (40,000 kms), Quarterly or Every 3 Months

1. Check condition of wheel ends. Release brakes, jack up the axle and spin the wheel.

   Check:
   a. Wheel bearings.
   b. Wobble.
   c. Rims and tires.
   d. Brake drag.

Fig. 32 WHEEL END

5.1.3 SERVICING INTERVALS (cont'd)

2. Inspect frame and structure for bends, distortion or cracks.

    a. Kingpin.
    b. Fifth wheel and mounts.
    c. Longitudinal and transverse frames.
    d. Latch/Pivot structure.
    e. Hydraulic cylinder anchor structure.
    f. Suspension system anchorage.
    g. Axles.
    h. Optional accessories.
    i. Push block.

Fig. 33 TRAILER (TW3500 &TW2000)

3. Inspect electrical system components for:

    a. Binding.
    b. Rubbing/abrasion.
    c. Looseness/dangling.
    d. Cracks/tears in harness.
    e. Burned out lights.
    f. Check that front electrical connector plug anchor female trailer receptacle.

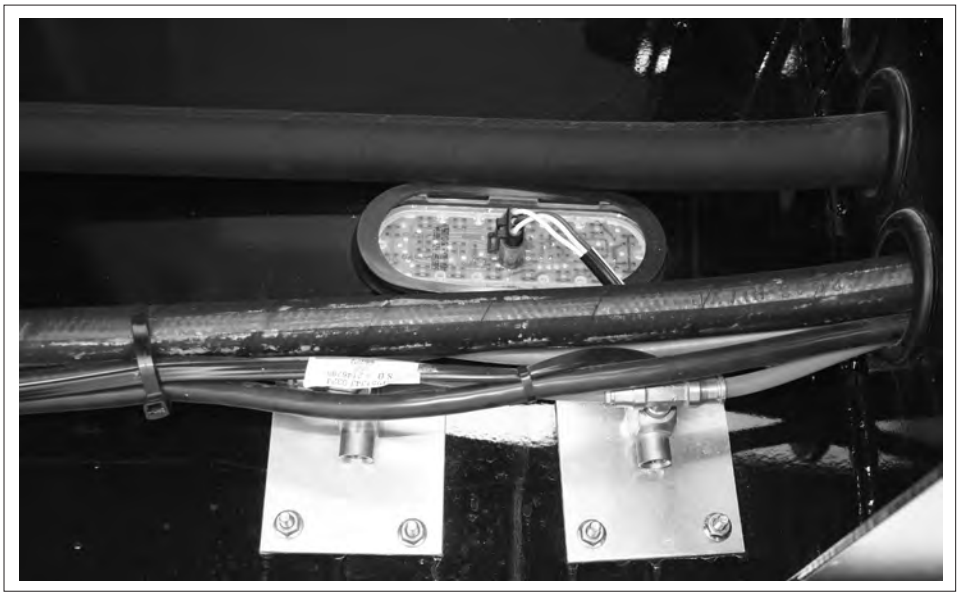


Fig. 34 ELECTRICAL (TYPICAL)

5.1.3 SERVICING INTERVALS (cont'd)

4. Inspect hydraulic system components for:

   a. Binding.
   b. Rubbing/abrasion.
   c. Looseness/ dangling.
   d. Leaks - Tighten leaking fittings.

Cylinder/Couplers

Valves

Fig. 35 HYDRAULIC SYSTEM

5. Inspect air system and components for:

   a. Perform leak-down test.
   b. Rubbing/ abrading.
   c. Cracked hoses.

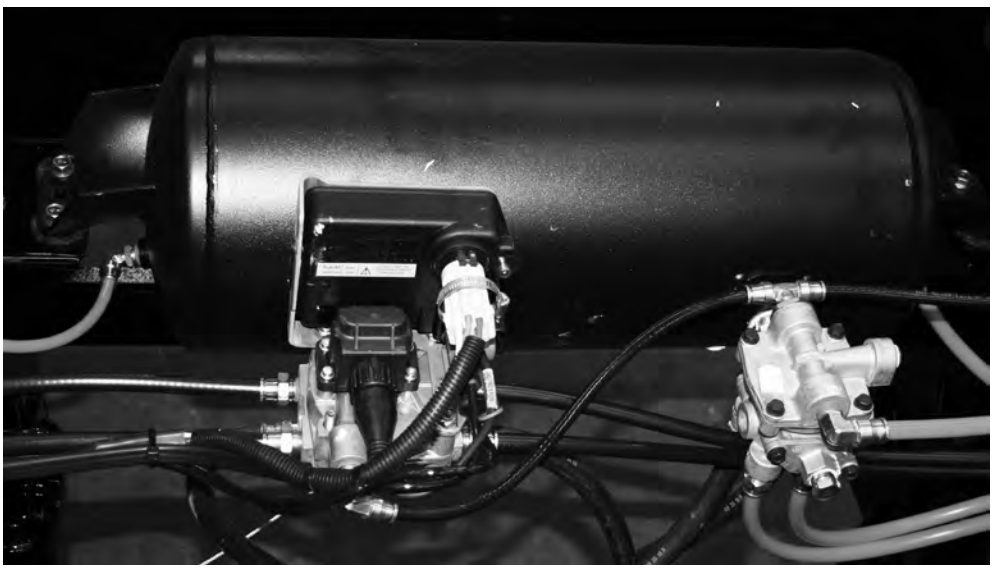


Fig. 36 AIR SYSTEM (TYPICAL)

5.1.3 SERVICING INTERVALS (cont'd)

6. Clean gladhand screens.

Fig. 37 SCREENS

7. Check brake lining thickness. Replace as required.

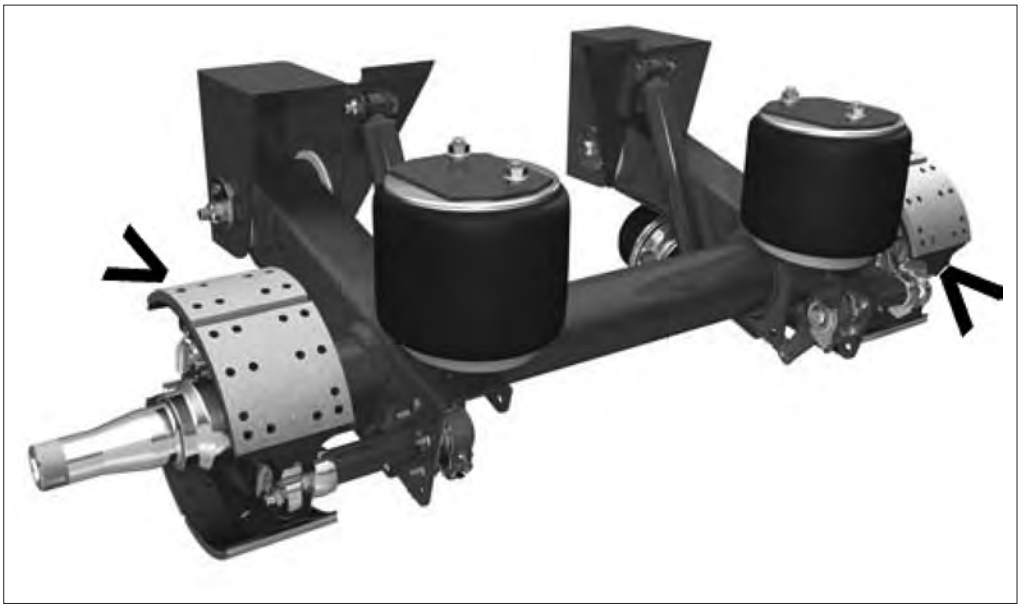


Fig. 38 BRAKE LINING

5.1.3 SERVICING INTERVALS (cont'd)

100,000 Miles (150,000 kms) or Annually

1. Reline brakes as required.

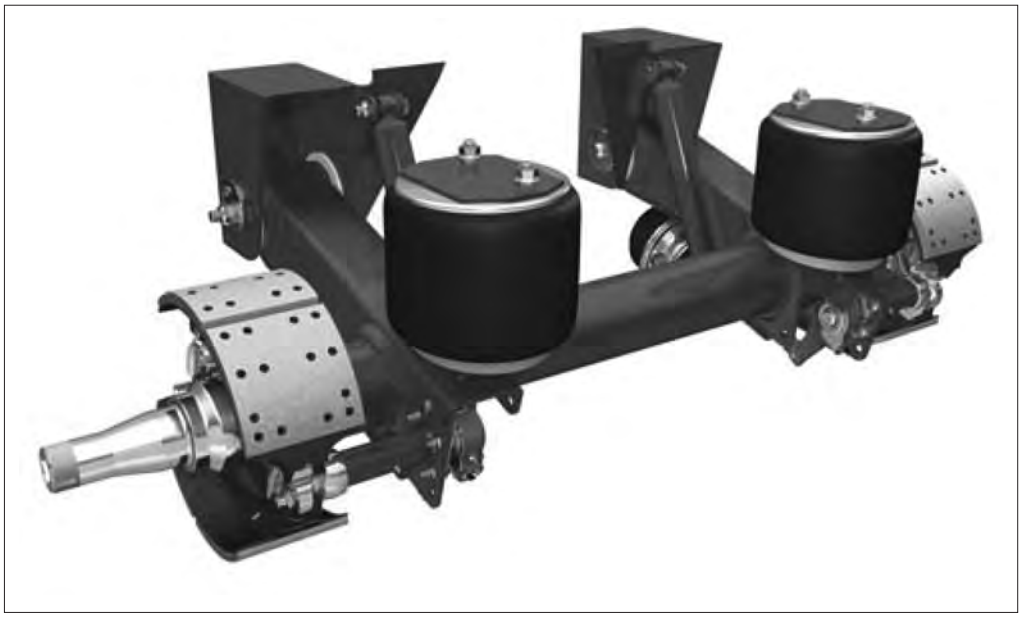


Fig. 39 BRAKE LINING

2. Change oil in hubs.

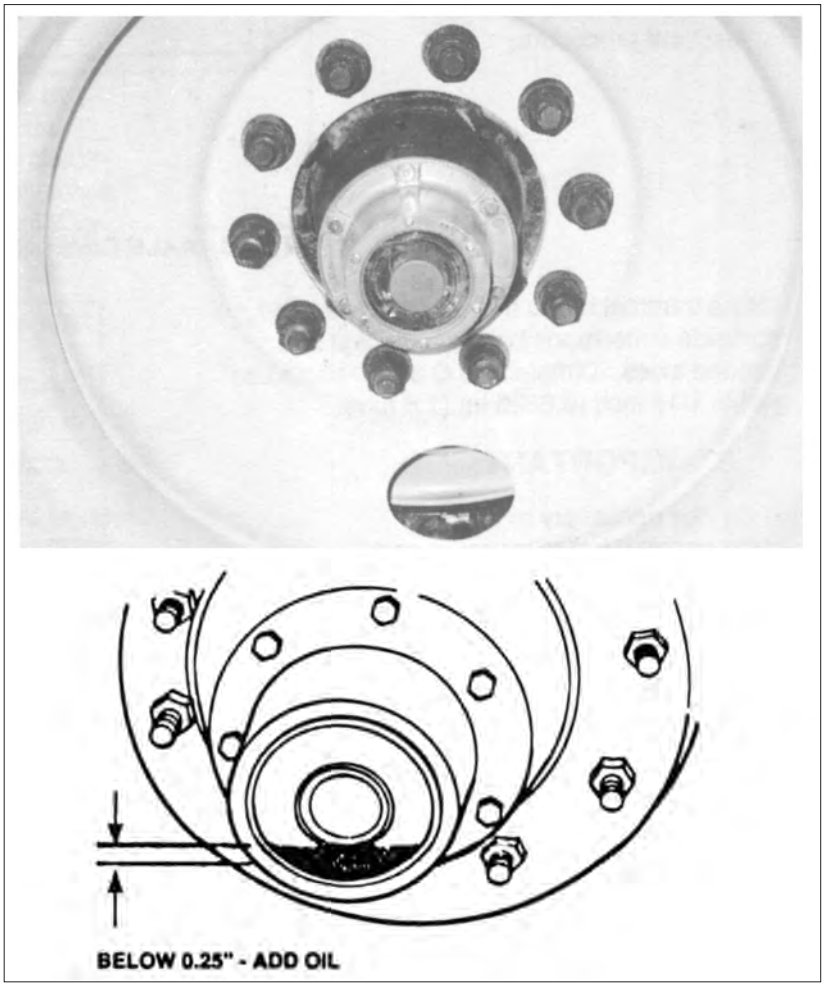


Fig. 40 HUB OIL (TYPICAL)

5.1.4 SERVICING RECORD SUMMARY (LUBRICATION)

LOCATION	DESCRIPTION	FREQUENCY	LUBRICANT
Fifth wheel Coat pivot pins and lock	Coat bearing surface	Daily or as needed.	Chassi grease.*
Landing gear	Gearbox and screws.	Periodic basis (weekly).	Chassi grease.*
Wheels	Check oil level.	Weekly, 10 Days or 5000 miles (8000 km).	
	Bearings.	25,000 miles (40,000 km).	SAE 80W90 gear oil.
	Change oil.	100,000 miles (150,000 km).	SAE 80W90 gear oil.
Brakes			
Camshaft bearing	Lubricate.	5,000 miles (8,000 km) or monthly.	Chassi grease.*
Slack Adjuster	Lubricate.	5,000 miles (8,000 km) or monthly.	Chassi grease.*
Brake shoe anchor pin bushing	Lubricate.	30,000 miles (50,000 km) or yearly.	Chassi grease.*
Also at brake reline.		As appropriate.	

* Use good quality lithium based extreme pressure grease throughout. MIL-G25013C in below -40°F.

NOTE: Do not use excessive lubricant.

5.2 PERIODIC MAINTENANCE AND ADJUSTMENTS

MAINTENANCE SAFETY

1. Read and understand all the information in the Operator's Manual regarding maintenance, adjusting and servicing the Trailer unit.

2. Place all controls in neutral, lower box or block box, stop the engine, remove ignition key and set the park brake before adjusting, servicing or maintaining any part of the Trailer unit.

3. Follow good shop practices:
   - Keep service area clean and dry.
   - Be sure electrical outlets and tools are properly grounded.
   - Use adequate light for the job at hand.

4. Cage spring brake chamber before disassembling.

5. Block wheels before de-activating brakes.

6. Disconnect air lines and exhaust air system before working on end gate.

7. Maintain fasteners in running gear systems at their specified torque at all times.

8. Establish and maintain a Trailer Preventative Maintenance (TPM) program on your equipment. Some jurisdictions require this program and the maintenance of records on every commercial vehicle on the road for future reference.

RIDEWELL SUSPENSION TORQUE CHART

RAR-240 Monopivot

ITEM	SIZE	TORQUE (FT-LB)	TORQUE (N•m)
Pivot Bolt/Nut	1 1/4" - 7NC	1,000	1,350
Shock Bolt/Nut	3/4" - 10NC	200	270
Air Spring Bolt/Nut	1/2" - 13NC	25	35
Air Spring Bolt/Nut	3/4" - 16NF	50	70

After suspension has been in operation for approximately 6,000 miles (10,000 km), all fasteners must be re-tightened to specified torque. Repeat every 50,000 miles (80,000 km).

DO NOT OVER-TORQUE!

Your trailer can only operate at top efficiency when it is maintained in good operating condition. The maintenance procedures are summarized from the component manufacturers instructions included with this manual. Only standard industry and component procedures are required to keep your trailer in top condition. All maintenance intervals are established for normal operating conditions. In light or intermittent conditions, the servicing and maintenance intervals can be extended. In heavy, extended or severe off-highway application, reduce the intervals for servicing and maintenance to keep the equipment in good condition. When a problem is found, correct the condition before continuing.

A good maintenance program will find conditions early when they are easily and quickly corrected before they become major problems. Operating your trailer in a defective condition, can lead to serious mechanical problems or can create safety hazards for the driver, bystanders or other operators.

5.2.1 TORQUE SPECIFICATION SUMMARY

Table 4 Recommended Torque Specifications

1. Air Ride Suspension

TRAILER SUSPENSION BOLT TORQUE VALUES[1]

COMPONENT DESCRIPTION	FT-LBS	N•m
QUIK-ALIGN® Pivot Connection	505 to 595	685 to 807
Welded Pivot Connection (1 1/8 inches)	750 to 825	1017 to 1119
U-Bolts (HT Series)	475 to 525	644 to 712
Shock Bolts	210 to 235	285 to 319
Upper Air Spring Nuts (3/4 inch)	80 to 100	108 to 136
Upper Air Spring Nuts (1/2 inch)	40 to 50	54 to 68
Lower Air Spring Bolts (HT Series, AAEDT 30K, AAEDL 30K and HRRNT 40K / HRRNT 50K)	40 to 50	54 to 68
Lower Air Spring Nut (INTRAAX® and VANTRAAX®)	55 to 60	75 to 81
Brake Chamber Mounting Nut (INTRAAX)	100 to 110	136 to 149
S-Cam Support Bearing Mounting Nut (INTRAAX)	35 to 45	47 to 61
Hubcap Mounting Bolts	12 to 18	16 to 24
Body Rail Clip	65 to 75	88 to 102
Lift Mechanism Air Spring, Actuator (3/4 inch)	45 to 55	61 to 75
Lift Mechanism Air Spring, Actuator (3/8 inch)	15 to 20	20 to 27

COMPONENT DESCRIPTION	IN-LBS	N•m
ABS Bracket Bolt and Nut (INTRAAX)	75 to 100	8 to 11
Disc Brake Dust Shield Clamp	50 to 70	5.6 to 7.9
Drum Brake Dust Shield Clamp	90 to 125	10 to 14
Height Control Valve Mounting	60 to 80	7 to 9

[1] Torque values in this table are for fasteners as supplied by Hendrickson Trailer Suspension Systems.

IMPORTANT: DO NOT APPLY ADDITIONAL LUBRICANT TO FASTENER THREADS. DOING SO WILL REDUCE THE FRICTION BETWEEN FASTENER COMPONENTS, WHICH CAN LEAD TO OVERTIGHTENING, UNPREDICTABLE CLAMP LOADS AND UNRELIABLE FASTENER CONNECTIONS

RAR-260 Trailer Suspension - Torque Specifications

Fastener Type	Size	Torque Values foot-pound	Torque Values Newton-meter
Pivot Bolt - (Shear-Type) Pivot Nut - (Locknut) *Requires E-20 Torx® socket (RW 26T00054)*	7/8" - 9NC	Do not lubricate bolt/nut threads. Use a 1" drive impact wrench to tighten the pivot bolt until the Torx® head is sheared off.	
Locknut - (Shock Absorber)	3/4"-10NC	200-230 ft-lb	271-312 N-m
Nut - (Air Spring)	3/4"-16NF	45-50 ft-lb	61-68 N-m
Locknut - (Air Spring)	1/2"-13NC	20-25 ft-lb	27-34 N-m
Locknut - (Air Spring - 25K O/S)	1/2"-13NC	45-50 ft-lb	61-68 N-m
Bolt - (Air Spring)	1/2"-13NC	20-25 ft-lb	27-34 N-m

Refer to the engineering drawing for component torque value. Torque values reflect a lubricated thread condition (Nuts are not lubed). Do not overtorque.

CAUTION *Suspension is shipped with minimal torque applied to fasteners. It is the installer's responsibility to apply the proper torque values. All fasteners, except for shear-type pivot bolt, must be re-torqued after the first 6,000 miles of operation. Failure to install and maintain suspension component fasteners at torque specifications could result in suspension failure and void the warranty.*

5.2.1 TORQUE SPECIFICATION SUMMARY (cont'd)

Table 4 Recommended Torque Specifications (cont'd)

2. Mechanical Suspension

⚠ 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
9600-9700 Series (Decal Part Number 16086-01 Rev. J)

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 1/8-7 (9600 / 9700 Rocker Bolt)	590 lb-ft	790 lb-ft
1-14 or 1-8 (9700 Radius Rod Bolt)	540 lb-ft	720 lb-ft
7/8-14 (Axle U-Bolts & 9600 Radius Rod Bolt)	350 lb-ft	470 lb-ft
3/4-16 (Axle U-Bolts)	310 lb-ft	420 lb-ft
5/8-18 (Radius Rod Clamp Bolt)	130 lb-ft	170 lb-ft
5/8-18 (Spring Retainer Bolt)	35 lb-ft	50 lb-ft

Hutchens Industries, Inc., P.O. Box 1427, Springfield, Missouri 65801-1427 Toll Free 1 (800) 654-8824

21B LEAF SPRING SUSPENSION

TORQUE REQUIREMENTS		
(cast hangers)		
1. Tighten 3/4" or 7/8" U-bolt nuts	300-325 FP	410-440 Nm
2. Tighten 1" torque arm end nuts	140-160 FP	190-220 Nm
3. Tighten 5/8" torque arm clamp nuts	125-150 FP	170-205 Nm
4. Tighten 1" equalizer capscrews	400-450 FP	540-610 Nm
5. Tighten 1/2" spring retainer nuts	70-80 FP	95-110 Nm
(fab hangers)		
1. Tighten 3/4" or 7/8" U-bolt nuts—steel springs	300-325 FP	410-440 Nm
2. Tighten 3/4" or 7/8" U-bolt nuts (composite springs)	250 FP	340 Nm
3. Tighten 11/4" equalizer shaft fastener nuts	575-625 FP	780-850 Nm
4. Tighten 21/2" equalizer shaft fastener nuts m (F.W.WB 54"-65 1/2")	300-325 FP	410-440 Nm
5. Tighten 11/2" equalizer shaft fastener nuts (F.W.WB 72"-109")	200-225 FP	270-305 Nm
6. Tighten 1" torque arm bolt nuts	140-160 FP	190-220 Nm
7. Tighten 5/8" torque arm clamp nuts	125-150 FP	170-200 Nm
8. Tighten 3/4" torque arm clamp nuts	175-200 FP	240-270 Nm
9. Tighten 1/2" spring retainer nuts	70-80 FP	95-110 Nm

ft lb = Foot - Pounds; Nm = Newton - Meters

3. Wheel End Components

Description	Torque Range (lb-ft)	Torque Range N.m	Fastener Size
1. Hub-cap bolts	10-15	13-20	5/16"
2. Hub fill plug	15-20	20-27	3/8"
3. Adjustment nut - manual bearing adjustment (double nut)	Tighten to 100, loosen, tighten to 50, loosen 1/4 turn	136 68	Size depends on axle model and adjustment method.
4. Jam nut - manual bearing adjustment	250-300	340-408	
5. Brake mounting bolt	130-165	177-224	5/8"
6. Two-piece dust shield bolts (shown)			
* Forged spider	15-20	20-27	3/8"
7. Bolt-on bushing bolts	25-35	34-48	3/8"
8. Cam bushing bolts	25-35	34-48	3/8"
9. Air chamber nuts	80-125	109-170	5/8"

4. Wheel Nut

Stud Size	Wheel Type	Ft-lbs Torque (Dry)
3/4" - 16	Disc	450 - 500
1-1/8" - 16	Disc	450 - 500
	Bud Unimount 10 WHD-8	390 - 440
		400 - 600

Bolt Size	Ft-lbs Torque (Dry)
5/8" - 11	150 - 175
3/4 ' - 10	210 - 260

5.2.2 KINGPIN AND OSCILLATING FIFTH WHEEL PLATE

The kingpin at the front of the trailer is the structural component used to transmit accelerating and decelerating loads into the trailer frame. It must be in good condition to perform as required.

Visually inspect the kingpin as part of the pre-trip inspection, at 5,000 miles (8,000 km) or weekly and annually as part of your normal preventative maintenance program. Be sure the kingpin does not have excessive wear, looseness, chipped out areas, cracks or bent mounting frame. If any kingpin shows such defects, it should be replaced immediately.

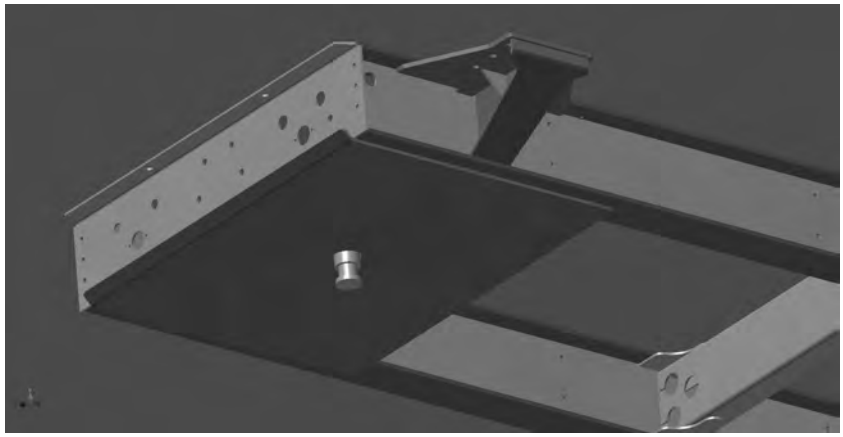


Fig. 41 KINGPIN

Visually inspect the frame and structure of the mounting frame for bends, cracks or distortions as part of the pre-trip inspection procedure. Thoroughly inspect the structural integrity of the assembly every 25,000 miles (40,000 km) or every three months as part of your preventative maintenance program. Repair the mounting frame if any structural defects are found.

IMPORTANT

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. Otherwise, the kingpin will be too short. If the kingpin length is improper, the kingpin should be replaced.

5.2.3 FIFTH WHEEL

A fifth wheel system is used on the rear of the front B train unit and on the towing tractor to secure the kingpin and carry the weight of the attached trailer. It must be maintained in good condition to perform as intended.

Visually inspect the fifth wheel as part of the pre-trip inspection to check for cracks, bends, chips or distortions of the frame and upper plate.

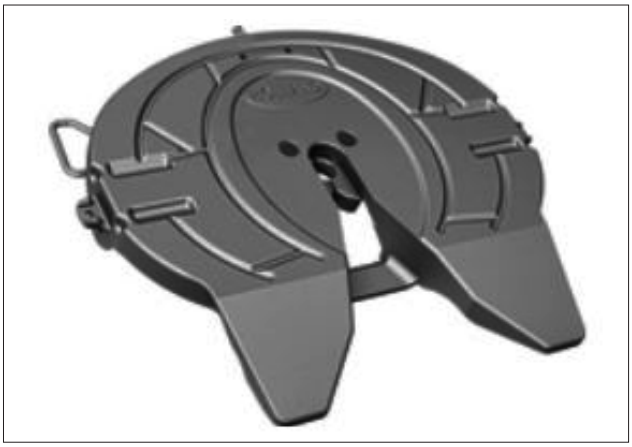


Fig. 42 FIFTH WHEEL

NOTE

Use a high-pressure washer or steam cleaner to remove all the grit and grease from the fifth wheel assembly prior to each weekly inspection. Apply a fresh coat of grease to the fifth wheel assembly prior to hooking-up the trailer.

Clean the assembly every 5,000 miles (8,000 km) or weekly and annually to perform a thorough inspection. Check the frame and upper plate for cracks, bends, chips or distortions.

When the components are clean, check that the lock closes completely around the kingpin.

To Adjust the lock:

1. Obtain a Holland kingpin lock tester and place in the throat of the lock. Close the lock.

2. The jaws should be snug around the tester but not binding.

3. Use the adjusting nut on the front edge of the fifth wheel to set the clearance of the jaws.

4. Use a light oil to lubricate all moving parts prior to returning to service.

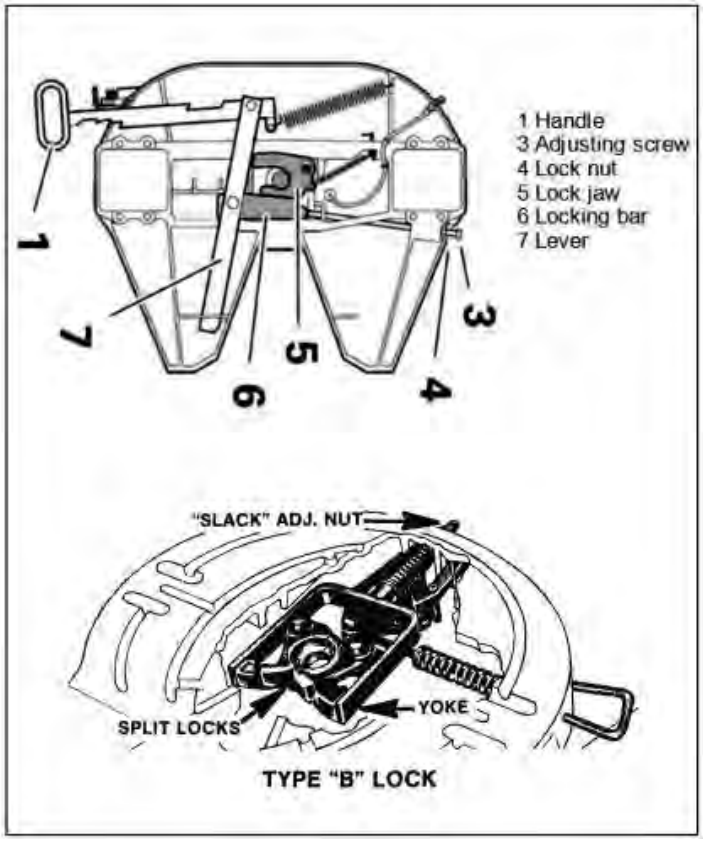


Fig. 43 KINGPIN LOCK

5.2.4 AXLE ALIGNMENT

A standard axle is used as the main transverse structural member to transmit loads between the trailer frame and the surface contacting components. All running gear components are attached to or part of the axle assembly.

Although there is very little that can go wrong with the axle itself, loose, bent or damaged attaching components can cause the axle to go out of alignment. This misalignment will be found during the regularly scheduled 25,000 mile inspection. However, axle misalignment shows itself most commonly by accelerated tire wear and dogtracking by the trailer. Visually check the tire wear when checking air pressure. The driver should identify these handling characteristics to service personnel or correction.

To check axle alignment, follow this procedure:

1. Select a working area that is level, with a compacted surface and is large enough to provide access from all sides.

2. Move the trailer forward and backward several times to remove any binding from the components.

3. Stop the trailer when moving in the forward direction without using trailer brakes. This will give the components a forward bias with no binding.

4. Unhook the trailer and support on the landing gear at the normal highway height and parallel to the ground.

5. Install a commercially available axle extender on each axle or remove the wheels to prevent any components from interfering with the measurements.

5.2.4 AXLE ALIGNMENT (cont'd)

6. Attach an S hook to a steel tape and measure the distance between the kingpin and the end of each axle. Dimensions A and B should be equal within ± 1/8 inch (0.125 in) (3.1 mm).

7. Adjust the suspension mounting system as required to set dimension A and B within 1/8 inch (0.125 in) (3.1 mm). Refer to suspension system instruction brochure for detailed adjustment procedure.

8. Use a trammel bar to measure the road and curbside dimensions between the first and second axles. Dimensions C and D should be within 1/16 inch (0.0625 in) (1.6 mm).

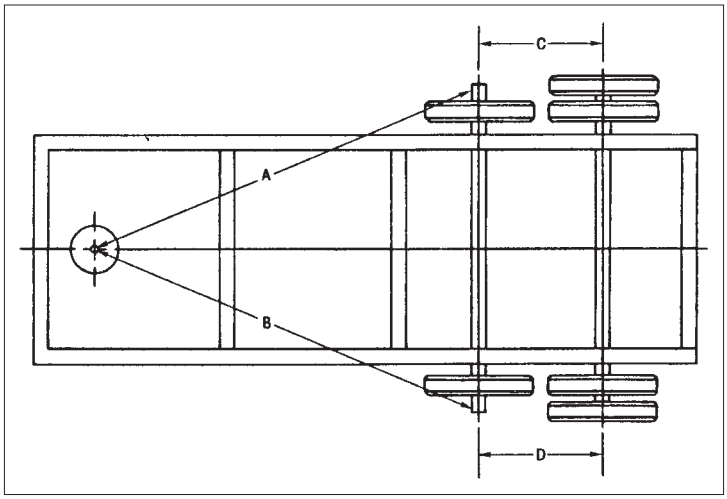


Fig. 44 AXLE DIMENSIONS

IMPORTANT

It may be necessary to build a large trammel bar to measure and clear the discharge gates.

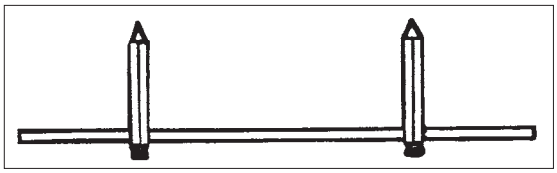


Fig. 45 TRAMMEL BAR

9. Set the suspension system as required to set this dimension to its recommended tolerance.

10. Repeat measuring and adjustment procedure on the third axle if so equipped.

11. Tighten all fasteners to their specified torque. Do not allow any suspension system or running gear fasteners to loosen.

IMPORTANT

Always use a torque wrench when tightening fasteners. The correct torque on a fastener provides the proper clamping force on the adjacent components and they will perform as expected.

12. The front axle must be aligned to the kingpin with second and third axles adjusted to the front axle.

13. Always check axle alignment after repairing the suspension system.

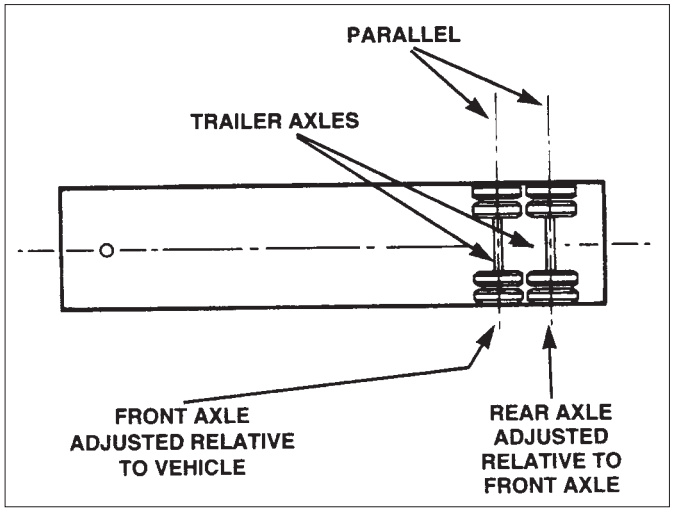


Fig. 46 ALIGNED

5.2.5 WHEEL HUBS/BEARINGS

All axles use an oil bath design for lubricating wheel bearings. It is a virtual zero maintenance system providing that the oil remains in the hub.

Visually check the hub every day for leaks when checking tire pressure during pre-trip, daily, refuelling, or rest stop inspections. If oil leaks are detected on any hub, repair the leak and refill the hub before proceeding.

A. **Oil Leaks:**
Visually inspect the hub for leaks every time the tire pressures are checked. Leaks will normally be visible as dust collects on the escaping oil. Stop and correct the leak immediately to prevent running the hub low on oil. Running low or without oil will quickly overheat the hub and cause the bearings to seize. Change the oil in the hub when installing new seals to correct a leak.

B. **Oil Levels:**
1. Check the oil level in each wheel hub every 5,000 miles (8,000 km) or weekly and whenever an oil leak is found. Clean the end plate of the hub to remove the dust, dirt or mud build-up.

   The oil should be visible to the top of the outer concentric circle of the end cap. Add oil as required through the fill plug in the hub. Always use clean oil and prevent contaminants from entering the hub when adding or changing oil.

2. Change the oil every 100,000 miles (160,000 km), annually or whenever the axle nuts are retorqued or the brakes are relined. The hub cavities must be opened when retorquing axle nuts or reiling the brakes and changing oil should be done as part of the procedure.

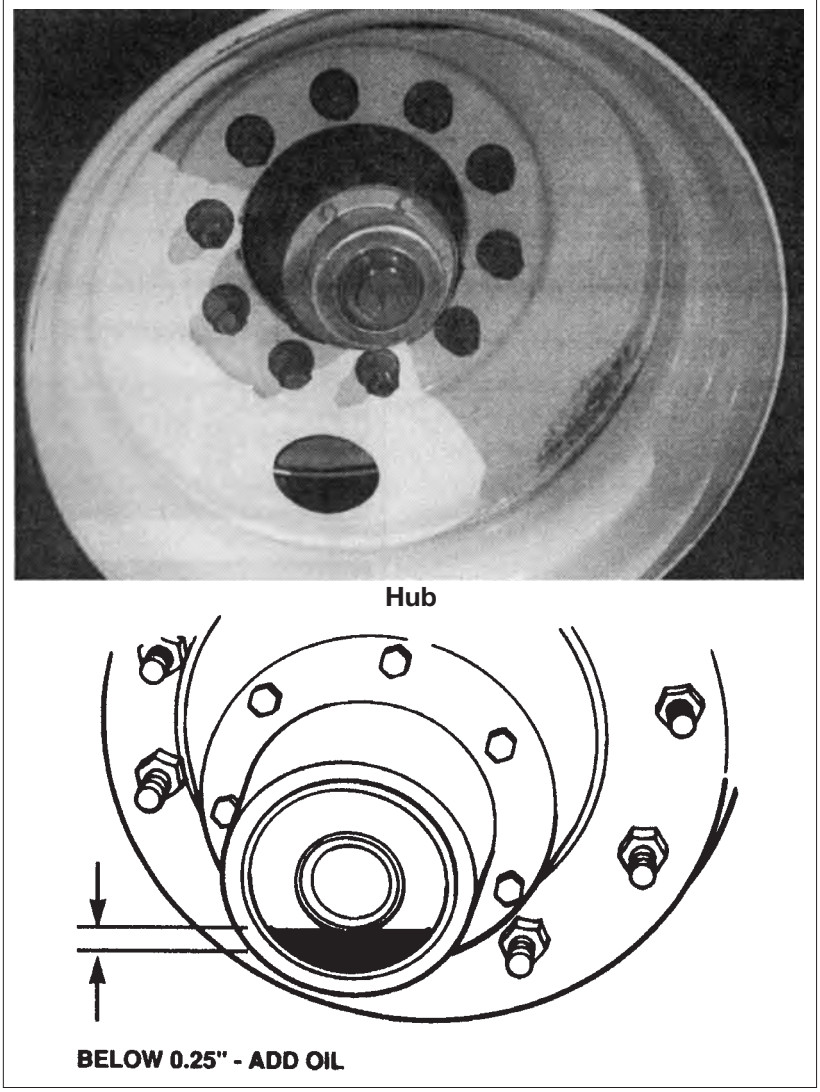


Fig. 47 OIL LEVEL

5.2.5 WHEEL HUBS/BEARINGS (cont'd)

C. **Wheel Bearings:**
Wheel bearings carry and transmit the load between the wheels and the axles. In addition to proper lubrication, the bearings must have the recommended pre-load to perform as expected. Bearing pre-load is set and controlled by the torque of the wheel nuts on the end of each spindle. Each hub must seat securely on its bearings to prevent wobble or stop in the system. Turning the wheel or wobbling it indicates the condition and tightness of the hub/bearing assembly.

1. **Turning/Wobble:**
   a. Park the trailer on a level, hard surface and release the brakes.

   b. Place chocks in front of and behind each wheel.

   c. Jack each axle up until the tire clears the ground.

   d. Support the axle on a safety stand to prevent slipping or tipping.

   e. Turning the wheel slowly to check the condition of the bearings and to determine if the brakes are dragging.

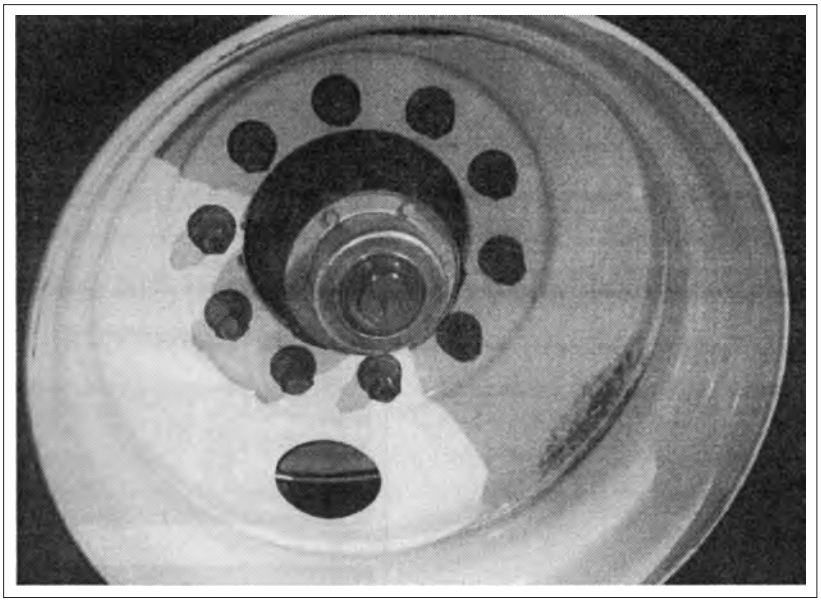


Fig. 48 WHEELS

   f. **Dragging Brakes:** Can be felt as a steady drag on the turning of the wheel or at the same position or arc or the rotation. Adjust the brakes to eliminate the drag before resuming work.

   g. **Bearing Condition:** Can be felt as the wheel turns. Bearings in good condition turn easily and smoothly. Bearings in poor or bad condition can be felt through the wheels as scraping, grinding, dragging or bumps. Replace bearings before resuming work.

   h. **Wobble:** Grasp each side of the wheel or tire and wiggle the wheel and assembly. If the wheel or hub wobble on the spindle, the bearings have lost their pre-load and the wheel bearing adjusting nut requires tightning.

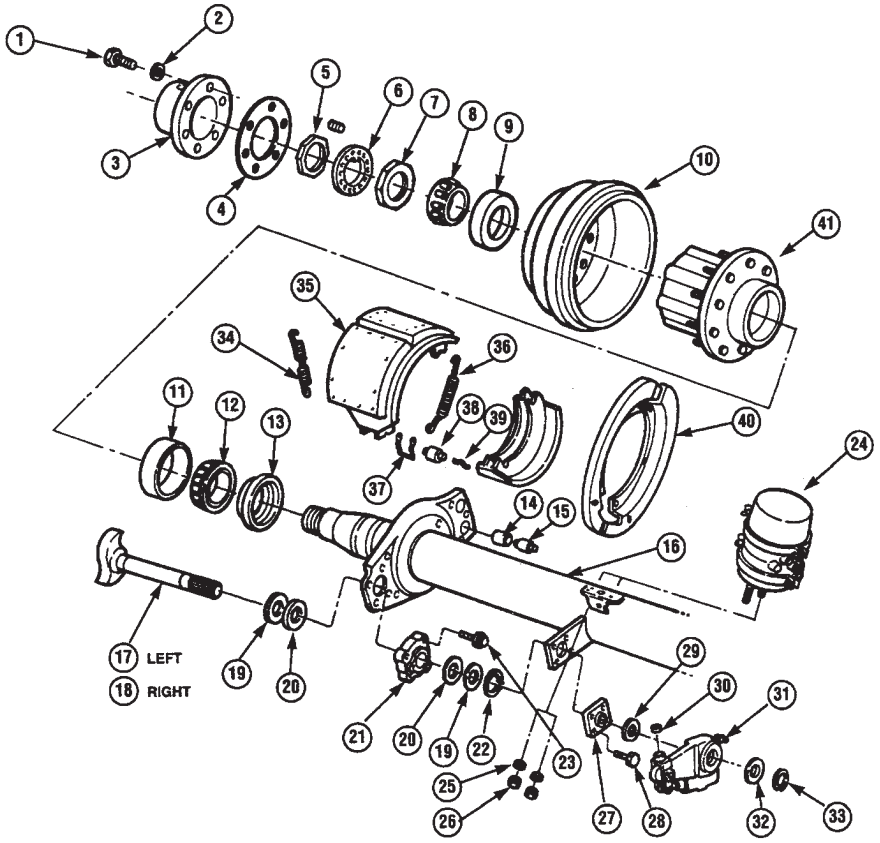
NOTE

If the bearings are not in good condition, replace them before setting the pre-load.

5.2.5 WHEEL HUBS/BEARINGS (cont'd)

C. **Wheel Bearings (cont'd):**

2. **Bearing Pre-load:**
   a. Place a pan under the hub drain plug.
   b. Remove the drain plug from the hub and drain the oil.
   c. Remove the hub end plate and lay to the side.
   d. Remove the set screw from the jam nut.
   e. Remove the jam nut and perforated lock washer from the spindle.
   f. Use a torque wrench to tighten the adjusting nut 100 ft-lbs. (136 N.m) while rotating the wheel assembly in both directions.
   g. Back the adjusting nut off to zero torque.
   h. Retorque the adjusting nut again to 50 ft-lbs (68 N.m) of torque while rotating the wheel assembly in both directions.
   i. Loosen the nut 1/4 turn.
   j. Install the perforated lock washer. Be sure the adjusting nut pin aligns with the hole in the lock washer. Turn washer over and/or adjusting parts as required.
   k. Install jam nut and tighten to 250-300 ft-lbs. (340-408 N.m.)



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Capscrew	22	Capscrew
2	Lockwasher	23	Air chamber
3	Hub cap	24	Lockwasher
4	Gasket	25	Locknut
5	Wheel bearing jam nut	26	Camshaft bushing assembly
6	Lockwasher	27	Capscrew
7	Wheel bearing adjusting nut	28	Washer slack adjuster
8	Cone outer wheel bearing	29	Locknut - slack adjuster
9	Cup - bearing outer	30	Automatic slack adjuster
10	Brake drum	31	Washer slack adjuster
11	Cup - bearing inner	32	Snap ring slack adjuster
12	Cone - bearing inner	33	Spring - brake shoe return
13	Seal wheel-bearing	34	Brake show and lining assy.
14	Bushing anchor pin	35	Spring - brake shoe retaining
15	Pin anchor	36	Retainer - brake shoe roller
16	Beam axle	37	Roller - brake shoe
17	Camshaft (left)	38	Pin - shoe return spring
18	Camshaft (right)	39	Dust shield
19	Washer	40	Hub
20	Seal	41	
21	Bushing		
	Snap ring		

Fig. 49 SPINDLE COMPONENTS

5.2.5 WHEEL HUBS/BEARINGS (cont'd)

C. **Wheel Bearings (cont'd):**

l. Check bearing end play by:
   i. Attaching a magnetic base dial gauge indicator to the end of the spindle.

   ii. Push the wheel in while rotating the wheel slightly until the dial gauge reading doesn't change.

   iii. Zero dial gauge.

   iv. Pull wheel assembly out while rotating wheel slightly until dial reading doesn't change.

   v. Dial indicator will read bearing end play.

   vi. If end play does not register between 0.001-0.010 inches (0.025-0.25 mm), replace bearings or hub components until it does.

m. Install a new gasket on hub face cap.

n. Install hub face cap and tighten mounting cap screws to their specified torque.

o. Add the specified amount of oil to the hub and secure fill plug. Check for leaks. Correct leaks before resuming operation.

p. Remove safety stand from under axle and lower wheel to the ground.

q. Repeat checks on all other axles.

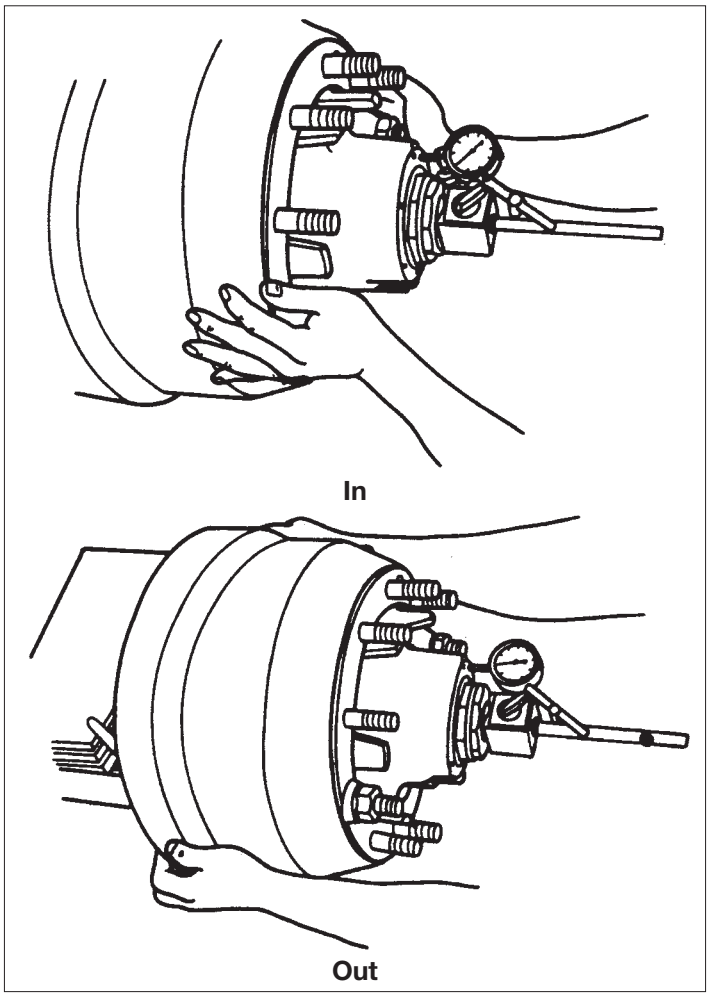


Fig. 50 DIAL INDICATOR

5.2.6 WHEELS

A variety of steel or aluminum wheels can be used on the trailer depending on customer preference or application requirements. Wheels must be maintained in good condition and all fasteners tightened to their specified torque level to obtain the expected life and performance.

Loose fasteners are the most common cause of wheel problems on a trailer. Always retorque the wheel fasteners per the break-in schedule of 100, 500, 1500 and 5,000 miles (160, 800, 2500 and 8000 km) when the unit is new and after a wheel has been removed. Always use an accurate or calibrated torque wrench when tightening fasteners. A loose fastener is defined as one that is not tightened to its specified torque. A loose fastener does not provide the required clamping, anchoring or holding forces to stabilize the adjacent components. Insufficient clamping forces can lead to flexing, bending, cracking, hole elongation or other component deterioration that cause failures and/ or accidents. Always keep fasteners tightened to their specified torque. Over-torquing can overload certain components, causing compression cracks and strip nuts or studs. Over-torquing fasteners can be as detrimental as under-torquing. Always tighten fasteners to their specified torque.

Use an accurate torque wrench to retorque wheel fasteners every 10,000 miles (15,000 km) or monthly whichever comes first. Always retorque wheels per the break-in schedule whenever a wheel is removed and remounted.

Always follow the recommended mounting procedure when installing wheels to the trailer.

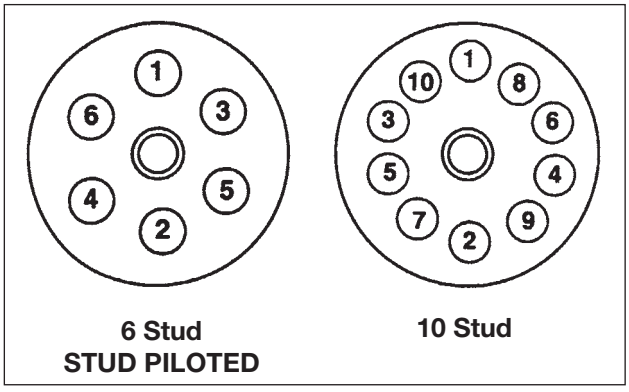


Fig. 51 NUT TORQUE SEQUENCE

1. **Disc Wheels (Stud Pilot Style):**
   a. Mount single or inner dual wheel on hub. Be careful not to damage the threads on any of the studs.
   b. Snug the nuts up in the alternating sequence shown to center it on the hub and insure an even contact between the wheel and hub.

   c. Tighten nuts to their specified torque using the same alternating sequence.

IMPORTANT

Left-hand threads are used on the left side of the vehicle. Right-hand threads on right.

   d. Mount outer dual. Do not damage the threads when sliding the wheel over the studs.
   e. Snug up the nuts in the alternating sequence shown to center it on the hub and to provide even contact.
   f. Tighten the outer wheel nuts to their specified torque

IMPORTANT

When retorquing inner nuts of double nut design, always back off outer nut several turns, then retorque them.

Table 5 Recommended Wheel Stud Torque (Disc Wheels)

Stud Size	Wheel Type	Ft-lbs Torque (Dry)
3/4"-16	Disc	450 - 500
1-1/8"-16	Disc	450 - 500
15/16-12	Disc	750 - 900
1-5/16-12	Disc	750 - 900
	Bud Unimount 10	390 - 440
	WHD-8	400 - 600

5.2.6 WHEELS (cont'd)

2. **Hub Piloted Wheels:**
   a. Mount inner wheel on the hub.

   b. Slide on the hub guide until the wheel is snug against the hub. Be careful not to damage the threads on any of the studs.

   c. Mount outer dual wheel on the hub and snug up against the inner wheel.

NOTE

Add a drop or 2 of oil on the end of the bolt, threads and the nuts and flanges.

   d. Install nuts and tighten in alternate sequence shown.

Table 6 Recommended Wheel Bolt Torque

Stud Size	Ft-lbs Torque (Oiled)
M22 x 1.5 (33 mm or 1-1/2 Hex)	450 - 500
M20 x 1.5 (30 mm Hex)	280 - 330

3. **Rim/Wheel (Cast Spoke):**
   a. Inspect and clean all the parts. Replace any damaged components.

   b. Place rims and spacer band on wheel. Be sure to space valve stem between spokes.

   c. Secure clamps evenly in position.

   d. Snug up the nuts in the alternating sequence shown to allow the inside rim to seat itself on the mounting bevel and avoid wheel wobble.

   e. Tighten the nuts evenly in small increments in the shown alternating sequence until all nuts are tightened to their specified torque.

Table 7 Recommended Wheel Bolt Torque (Spoke Wheels)

Bolt Size	Ft-lbs Torque (Dry)
5/8" - 11	150 - 175
3/4" - 10	210 - 260

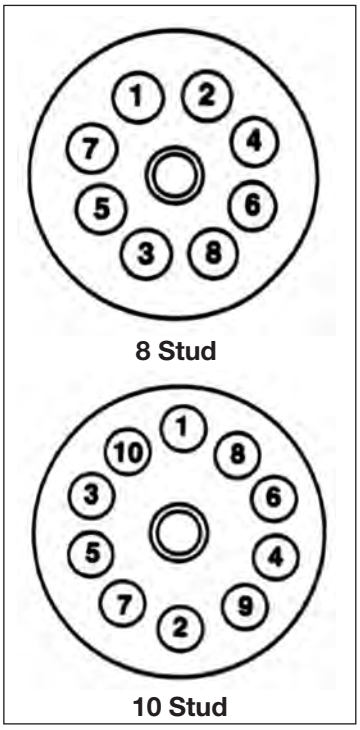


Fig. 52 HUB PILOTED

IMPORTANT

Do not over-torque fasteners. Over-torquing can strip threads, collapse spacers or lead to other problems that cause loose fasteners. Use an accurate torque wrench when tightening fasteners.

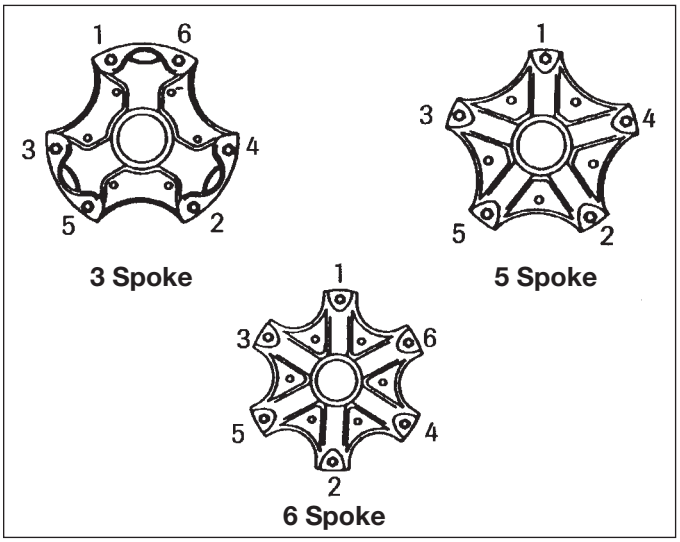


Fig. 53 RIM/WHEEL TORQUE SEQUENCE

5.2.7 TIRES

Tires are one of the most important components on a trailer and must be maintained in top condition to obtain their desired load carrying capacity and durability. Tire wear rate can be used as an indicator of the condition of the axle alignment or suspension system. Poorly maintained tires will wear rapidly or deteriorate and fail quickly and suddenly. A poorly maintained tire can and will affect adjacent components leading to their potential failure as well.

Proper tire maintenance includes but is not limited to:

1. **Inflation Pressure:**
   Operating at an incorrect inflation pressure is the most common maintenance problem with tires. Tires should be checked frequently to be sure they are at their specified pressure.

   It is recommended that tire pressure be checked at the start of each working day and at least one other time during the day. Always use an accurate hand gauge when checking the pressure and check each tire. Carry it with your unit so it is always available when needed. The most accurate pressure is obtained when the tire is cold. Every tire has its specified operating pressure molded into the sidewall. Adjust the pressure as required to obtain the specified inflation pressure when the tire is cold.

   Tire pressure will normally increase 10 to 15 psi during operation as the tire heats up. If the pressure exceeds this normal increase, it indicates the tire may be overloaded, underinflated, driven too fast, improperly sized or a combination of these factors. Identify the cause of the problem and correct it before resuming work.

   a. **Underinflation:**
   Operating at lower than the specified pressure is a tire's worst enemy. Use an accurate tire pressure gauge to check the pressure at the start of each working day, every few hours during the day and/or whenever the handling characteristics change suddenly. Underinflation will increase tread wear and cause a deterioration of the tire body leading to a separation of the tread from the body. An underinflated tire is soft and deflects more than it should causing fatigue cracks or breaks in the body cord construction leading to sudden air loss.

   Operation with a low or flat tire on a dual will generate a lot of heat in the underinflated tire from internal friction that it can and will disintegrate or catch on fire. It also causes overloading of the adjacent tire on the axle or axles and could lead to their failure also.

   b. **Overinflation:**
   Inflating a tire over its specified pressure can lead to serious problems also. Overinflation creates a more rigid tire that does not absorb road shocks as well as it should. Shock loading from impacting bumps or pot holes can break the fabric of the tire and/or transmit the higher loads into the rim, wheel and adjacent components causing them to fail as well. Overinflated tires cut, snag or puncture more easily than properly inflated tires. Also overinflating tire will not increase its load carrying capacity.

5.2.7 TIRES (cont'd)

2. **Tire Matching and Spacing on Duals**
   Tires on a dual assembly must be matched for size (diameter or rolling radius) and type of construction to obtain the desired and expected performance and life.

   a. **Matching of Size:**
   Tire sizes can vary between manufacturers and as they wear. Special care must be taken to be sure the tire size (rolling radius, diameter or circumference) is within the following dimensions:

   Rolling radius: 1/8 inch (3 mm)
   Diameter: 1/4 inch (6 mm)
   Circumference: 3/4 inch (19 mm)

   Measure the tire when it is mounted, inflated to its specified pressure and not loaded. The easiest method is to use a steel tape to measure the circumference of the tire.

   Unequal sized tires will require the larger tire to carry more of the load and potentially overload it. Overloading accelerates the wear and can lead to tire failure. When the one tire fails, the remaining tire or tires will then also be overloaded. The smaller tire will not contact the road surface properly and will wear in an irregular manner giving poor durability.

   b. **Tire Construction:**
   Customers can use radial or bias ply tires on their trailer. However, it is recommended that different types of tires not be mixed on an axle. Each type of tire has different deflection, cornering and spring characteristics. These differing characteristics cause the tires to always fight each other during operation and will give erratic handling and poor wear characteristics when mounted on the same axle. Different types can be mounted on different axles but not on the same axle.

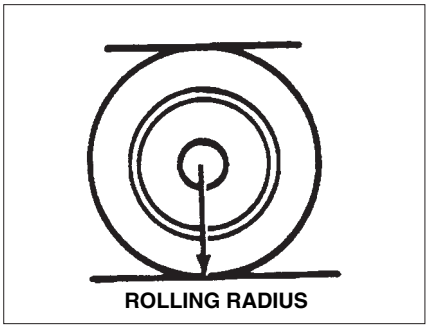


Fig. 54 TIRE DIMENSIONS

   c. **Tire Spacing:**
   A wide variety of rims can be used on the trailer and each will provide a different offset. Select the rims to provide sufficient space and clearance between the sidewalls of the tires. Normally there should be at least 2 inches (50 mm) and 3 inches (75 mm) between the sidewall of a bias ply and radial dual tire assembly respectively. This spacing will provide sufficient clearance for each type of tire to deflect as they rotate and when they impact a pothole or bump in the road. If they touch during operation, they will wear or abrade at the contact point. In addition, tires that are too close do not shed dirt, trash or stones that can get between them during operation as well as properly spaced tires.

5.2.8 BRAKES

All components in the brake system must be maintained in good condition for the system to perform at top efficiency. It is recommended that brakes and associated components be checked, serviced and maintained per the Preventative Maintenance Schedule (PMP) for the trailer. In this section, the basic brake disassembly and assembly procedure will be covered. Refer to the axle manufacturers service manual for a more detailed repair and rebuilding procedure.

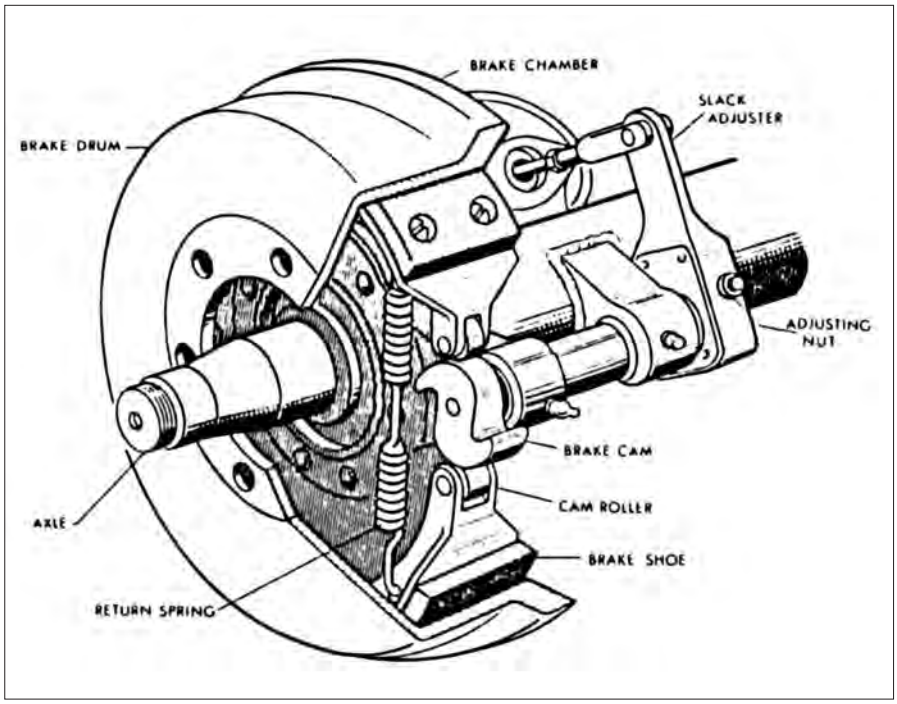


Fig. 55 BRAKE SYSTEM

Check brakes frequently to keep them in top condition. Poorly maintained brakes will not stop the trailer as effectively as well-maintained brakes and in the extreme could fail completely leaving no brakes or no ability to stop the unit.

It is recommended that the driver checks the brakes at least once during each working day when checking tire pressure and performing a quick visual of the unit. Place your hand on each brake drum to check the temperature of the drum. All drums should be approximately the same temperature if the system is functioning properly. If any drum is significantly warmer or colder than the rest, it indicates a problem. Determine the cause of the problem and correct it before resuming work. By discovering and correcting it while it is a minor issue; major repair, expense and down time can be prevented.

At 25,000 miles (40,000 km) or every 3 months when the axle is raised off the ground for the complete wheel end inspection, check the brakes at the same time. When the wheels are turned by hand, the wheel end should decrease speed slowly. If it does not, the brakes could be dragging or there could be a problem with the bearings. Dragging brakes will also be detected by hot drums during the daily drum temperature checks. Adjust the brakes to correct the problem.

5.2.8 BRAKES (cont'd)

Remove the brake dust covers (if so equipped) to access the shoes. Check the thickness of the linings. Reline or replace shoes when the lining thickness is less than 1/8 inch (3 mm). Uneven wear among the brake shoes on a trailer indicate that the braking system has not been set or maintained properly causing uneven application and wear. If uneven lining wear appears, reset the system to provide even application of all the shoes. Do not operate when the linings are less than 1/8 inch (3 mm) to prevent the lining anchor rivet or bolts from contacting the drum. Head contact with the drum will cut grooves in the surface and require extra machining to remove them when rebuilding the brakes.

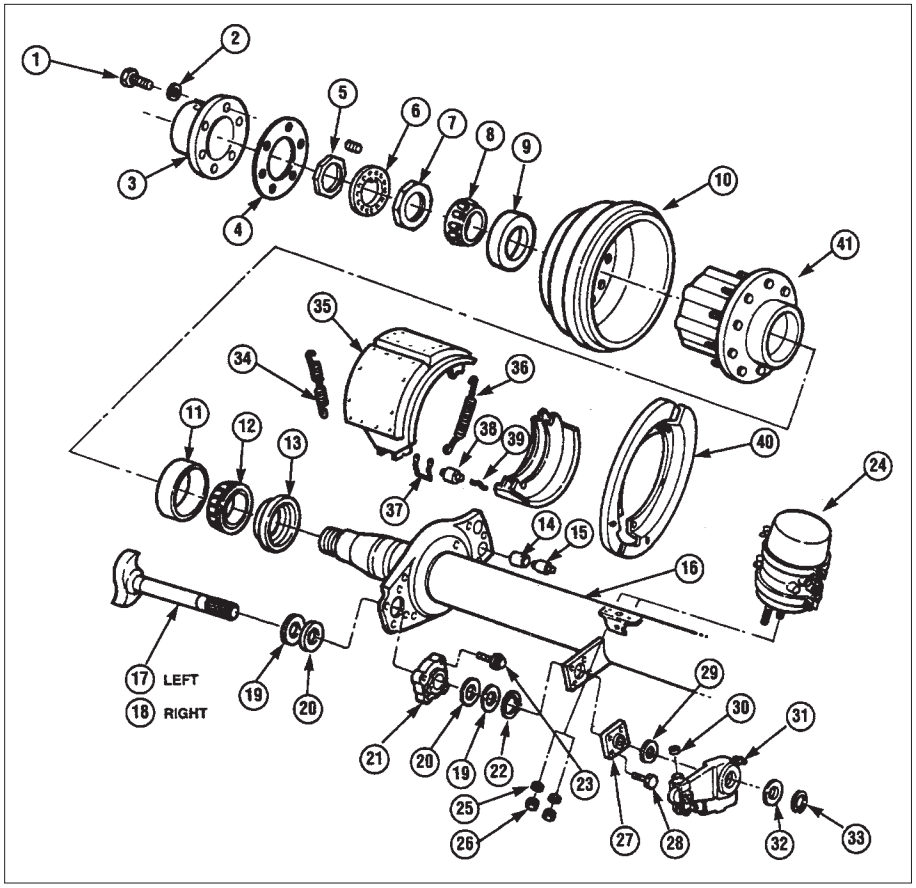


Fig. 56 EXPLODED VIEW

Several types of friction material are available for use on the brake shoes. Each has its own friction coefficient and braking characteristics. Select the one that best fits your application but do not mix materials on the same trailer. Differing materials require different application forces to obtain the same braking force and a braking system can only apply one force when it is properly set.

Recent changes in environmental laws have banned the use of asbestos including brake linings. Always use the appropriate safety gear when removing brake shoes containing asbestos from your trailer. Replace the shoes that are equipped with approved material.

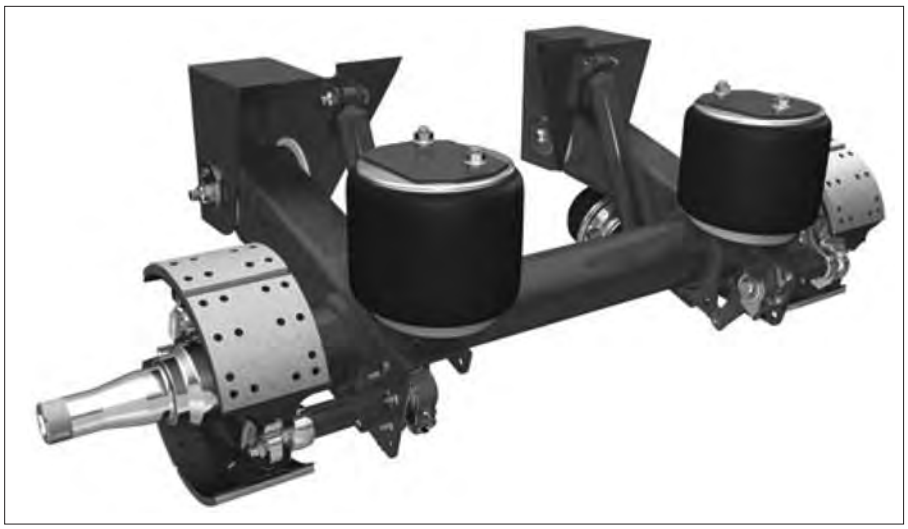


Fig. 57 AXLE

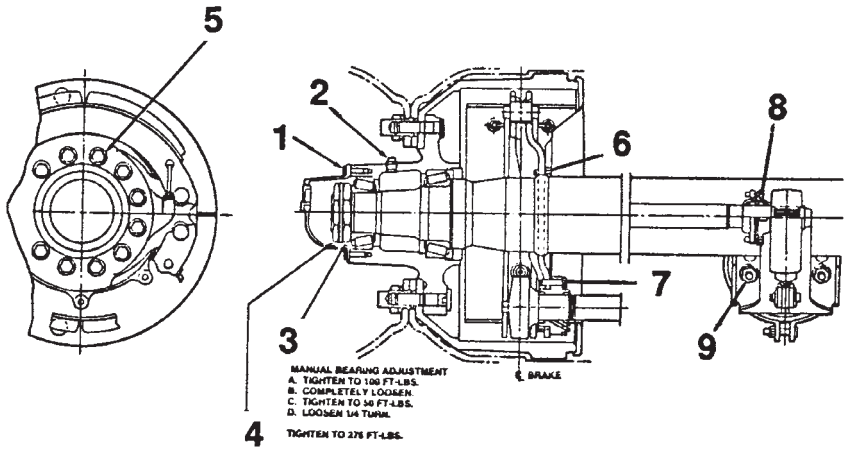
5.2.8 BRAKES (cont'd)

A. **Removing Brakes:**

1. Position the trailer on a level hard surface.
2. Exhaust all the air from the air system.
3. Jack the axle up and place on safety stands.
4. Remove the wheel assembly from the axle.
5. Release the slack adjuster (Refer to Section 5.2.6).
6. Disable or cage spring brakes if so equipped.
7. Drain oil from hub and remove spindle end components.
8. Remove the hub and drum assembly. Support with a hoist as the assembly slides off the spindle. Use a puller if required.
9. Remove roller retaining clip from the bottom and top brake shoe cam rollers.
10. Disconnect and remove bottom shoe return spring.
11. Rotate bottom shoe to remove retaining springs.
12. Lift top shoe to remove.
13. Disconnect push rod from slack adjuster.
14. Back off and remove slack adjuster.
15. Remove cam shaft.

B. **Installing Brakes:**

1. Inspect all the components. Replace any that are cracked, bent or worn.
2. Lubricate the camshaft spline, slack adjuster gear and slack adjuster pins with anti-seize compound.
3. Install cam shaft and slack adjuster. Secure with snap rings.
4. Adjust slack adjuster to its required angle and attach to the push rod. Release slack adjuster pawl if so equipped.
5. Use a good quality brake grease to lubricate the anchor pins and rollers where they contact the brake shoes.
6. Place the upper shoe in position.
7. Place the lower shoe in position and attach 2 new retaining springs.
8. Rotate lower shoe forward and attach new brake shoe return spring.
9. Install both cam rollers and secure with retainers.
10. Install and secure the remaining wheel and components.
11. Repeat with other wheel ends as required.
12. Tighten all fasteners to their specified torque.



Description	Torque Range		Fastener Size
	(lb-ft)	N.m	
1. Hub-cap bolts	10-15	13-20	5/16"
2. Hub fill plug	15-20	20-27	3/8"
3. Adjustment nut - manual bearing adjustment (double nut)	Tighten to 100, loosen, tighten to 50, loosen 1/4 turn	136 68	Size depends on axle model and ajustment method.
4. Jam nut - manual bearing adjustment	250-300	340-408	
5. Brake mounting bolt	130-165	177-224	5/8"
6. Two-piece dust shield bolts (shown)			
• Forged spider	15-20	20-27	3/8"
7. Bolt-on bushing bolts	25-35	34-48	3/8"
8. Cam bushing bolts	25-35	34-48	3/8"
9. Air chamber nuts	80-125	109-170	5/8"

Fig. 58 BRAKE/WHEEL END COMPONENTS

5.2.9 SLACK ADJUSTERS

5.2.9.1 HALDEX AUTOMATIC SLACK ADJUSTER

The Haldex S-ABA automatic brake adjuster is a clearance sensing brake adjuster that maintains a nominal distance or clearance between lining and drum.

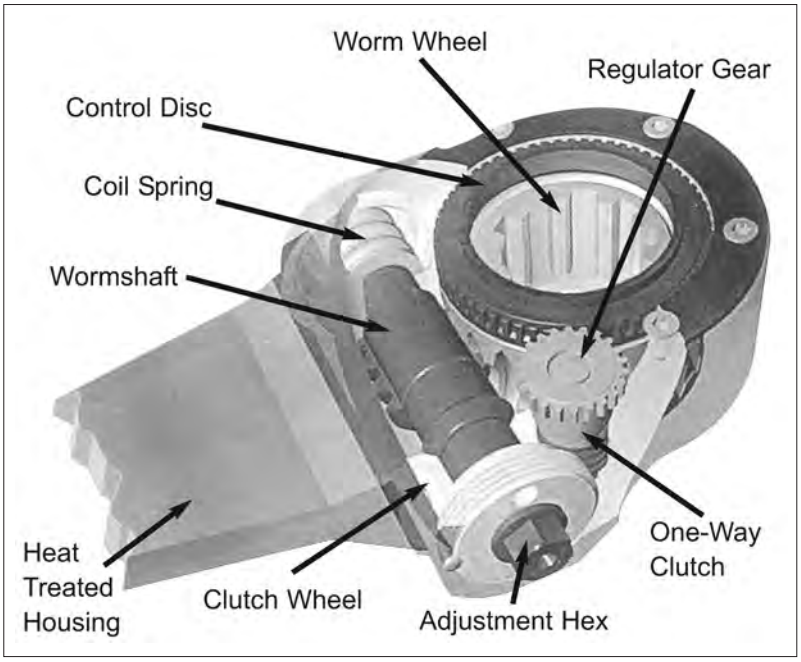


Fig. 59 HALDEX SLACK ADJUSTER (TYPICAL)

When the Adjuster is Installed:
With the brake in the released position, the control arm is fixed to the anchor bracket. The adjustment hex is rotated until the shoes contact the brake drum and then backed
off 1/2 turn. When the brake is applied on the first application, the endless rack rotates to the correct position and sets itself.

When the Brake Applies:
When the brake is applied, the adjustment regulator rotates through the normal clearance angle and the shoes contact the drum. The torque increases and the wormshaft is moved axially, causing the coil spring to be compressed and the clutch wheel to disengage. The adjustment components are free to rotate as the brake continues to apply.

When the Brake Releases:
When the brake is released, the torque decreases returning the wormshaft to the clutch wheel and re-engaging the teeth. The adjustment regulator rotates through the normal clearance angle and the brake is released. If lining wear has taken place the adjustment regulator advances the clutch wheel reducing the excess clearance during the release stroke.

5.2.9 SLACK ADJUSTERS (cont'd)

5.2.9.2 AUTOMATIC SLACK ADJUSTER MAINTENANCE

In an S-cam type foundation brake, the final link between the pneumatic system and the foundation brake is the slack adjuster. The arm of the slack adjuster is fastened to the push rod of the chamber with a clevis and the spline end is installed on the brake camshaft.

Primarily, the slack adjuster is a lever that converts the linear force of the air chamber push rod into a torque which turns the brake camshaft and applies the brakes.

IMPORTANT

Automatic slack adjusters are for brake adjustment and will not compensate for faulty foundation brakes.

Routine Visual/Operational Checks

- Haldex strongly recommends that routine visual/ operational checks, including brackets and control arms, be performed at each Preventative Maintenance Service Interval.

- Adjusters or anchor brackets that have visual damage, or which fail the operational checks, MUST be replaced immediately.

- Automatic adjusters should not be operated as manual adjusters except as may be necessary to get the vehicle off the road for service.

Service and Lubrication Intervals for Standard Haldex AA1 and S-ABA Brake Adjusters

Adjuster Type	Manufacture Date	Lubrication Interval	Type of Lubricant	Visual Check Interval
Standard Adjuster 409-10...	Prior to 6/1/96	50,000 miles or every 3 months	Standard Chassis Grease	Each Preventative Maintenance Service Interval
Reduced Maintenance Adjuster 409-10...	After 6/1/96	Once a year	Standard Chassis Grease	Each Preventative Maintenance Service Interval
No-Lube™ Adjuster 429-10...	After 6/1/96	None	Sealed Unit	Each Preventative Maintenance Service Interval
S-ABA Adjuster 409-20...	n/a	Once a year	Standard Chassis Grease	Each Preventative Maintenance Service Interval

Notes:

No-Lube™ automatic brake adjusters are manufactured without a grease fitting and are identified by a 429 prefix.

Moly-disulfide grease should not be used because it may affect the function of the internal friction clutches and reduce the reliability of the automatic adjustment.

In no case should the lubrication interval exceed the published intervals shown above.

5.2.9 SLACK ADJUSTERS (cont'd)

5.2.9.2 AUTOMATIC SLACK ADJUSTER MAINTENANCE (cont'd)

AUTOMATIC SLACK ADJUSTERS
While automatic slack adjuster designs vary in the manner in which they are installed and operate, all are designed to automatically maintain a predetermined shoe-to-drum clearance or brake chamber stroke. Some automatic slack adjusters adjust upon the brake application stroke, others adjust upon release. Automatic slack adjusters can greatly reduce manual adjustments. **Automatic slack adjusters do not reduce the need for periodic maintenance.**

Automatic Brake Adjuster Checking Procedures

If the brake adjuster is not maintaining the proper applied stroke, **before removing the brake adjuster**, check the condition of the foundation brake. **If after inspecting the foundation brake** no apparent problems are found, inspect the automatic brake adjuster to determine if it is operating properly. The inspection can be performed on or off the vehicle using the following procedures.

Note:
- Block wheels to prevent vehicle from rolling.
- Ensure system reservoir pressure is at 90-100 PSI.
- Check that push rod is fully retracted; apply air to release spring brake.
- If air is not available, spring brake must be manually caged back.
- Do not use air tools on brake adjuster!

Automatic Brake Adjuster Operational Check

Functional operation of the brake adjuster can be performed on the vehicle by using the following procedure:

- Block wheels to prevent vehicle from rolling.
- Ensure reservoir pressure is at 90-100 psi.
- Check that the push rod is fully retracted; apply air to release spring brake. If air is not available, spring brake must be manually caged back.

Manually de-adjust brakes (turn adjustment hex counterclockwise one full turn) to create an excessive lining to drum clearance condition. (A ratcheting sound should occur.)

Make a full service brake application. On release, allow sufficient time for air chamber to fully retract.

During the brake release, observe rotation of the adjustment hex (attaching a wrench on the hex or scribing the hex will make this rotation easier to see).

This rotation indicates that an excessive clearance condition has been determined by the brake adjuster, and it is making an adjustment to compensate. On each subsequent brake **release**, the amount of adjustment and push rod travel will be reduced until the desired lining to drum clearance is achieved.

If rotation of the adjustment hex is not observed, refer to Foundation Brake Operational Check and Troubleshooting Procedures at www.haldex.com. If foundation brake assembly checks out okay and hex still does not turn, check control arm and mounting bracket for possible worn, bent or broken components. If the control arm and mounting bracket check out okay, replace the adjuster and hardware per Installation Instructions at www.haldex.com.

On Vehicle Inspection

Component	Cause	Action
Excessive chamber push rod travel	Improper anchor bracket connection to control arm	If anchor bracket to control arm connection is worn, loose, bent or broken, it must be re-secured or replaced.
	Low clutch torque	Rotate the 7/16" adjustment hex one full turn counterclockwise. Replace brake adjuster if the torque is less than 13 ft. lbs. or no racheting sound occurs.
	Unknown	Perform automatic brake adjuster operational check (see below).

5.2.9 SLACK ADJUSTERS (cont'd)

5.2.9.2 AUTOMATIC SLACK ADJUSTER MAINTENANCE (cont'd)

BRAKE ADJUSTMENT PROCEDURE

NOTE

All adjustments should be made with cold brake drums and the brakes fully released.

WARNING

To avoid possible injury, proper precautions must be taken to prevent automatic actuation of the brake chambers while adjusting slack adjusters. Always block the wheels or mechanically secure the vehicle. Spring brakes must be mechanically caged or released with air. All brakes should be released.

Foundation Brake Operational Check and Troubleshooting

Note:
- Block wheels to prevent vehicle from rolling.
- Ensure system reservoir pressure is at 90-100psi.
- Check that push rod is fully retracted; apply air to release spring brake.

North American Commercial Vehicle Safety Alliance (CVSA) Uniform Vehicle Inspection Criteria
The applied stroke of the brake should be checked per CVSA guidelines at 90-100 PSI reservoir pressure. Applied stroke should be at or less than the specified re-adjustment limits as follows:

Standard Clamp Type Brake Chamber

Type	Adjustment Limit	Type	Adjustment Limit
9	1-3/8"	24	1-3/4"
12	1-3/8"	30	2"
16	1-3/4"	36	2-1/4"
20	1-3/4"		

Long Stroke Type Brake Chamber

Type	Adjustment Limit	Type	Adjustment Limit
16L	2"	24LS	2-1/2"
20L	2"	30LS	2-1/2"
24L	2"		

NOTE: Long stroke chambers are identified with square air ports or port bosses and special trapezoid ID tags.

5.2.9 SLACK ADJUSTERS (cont'd)

5.2.9.2 AUTOMATIC SLACK ADJUSTER MAINTENANCE (cont'd)

Free Stroke

Measuring the Free Stroke
Free stroke is the amount of movement of the adjuster arm required to move the brake shoes against the drum. With brakes released, measure from the face of the chamber to the center of the clevis pin “A” (fig. 13). Use a lever to move the brake adjuster until the brake shoes contact the drum “B” (fig. 13). The difference between the fully retracted and drum contact measurement “B”–“A” (fig. 13), is the free stroke. The free stroke range should fall between 3/8"–3/4".

Free Stroke Within Range
If the free stroke is good, but the applied stroke is too long, there is probably a problem with the foundation brake. Check the following and reference CVSA out-of-service criteria:

Component	Cause	Action
Brake drums	Cracked or out of round	Replace or check drum run out
Brake shoes	Shoe span out of spec	Refer to OEM specs and replace if necessary
Brake shoes	Uneven lining wear	Check spider concentricity
Brake shoes	Shoe pad missing	Remove & replace shoes
Brake shoes	Cracked shoes	Remove & replace shoes
Cam bushings	Excessive movement	Remove & replace cam bushings per OEM specs
Camshaft	Flat spots on cam head	Replace camshaft
Camshaft	Cracked/broken splines	Replace camshaft
Camshaft	Worn bearing journals	Replace camshaft
Chamber bracket	Broken/bent	Replace bracket
Clevis yoke and pin	Worn	Remove & replace
Return springs	Broken/stretched or missing	Remove & replace springs
Rollers	Flat spots, grooved pin/worn	Remove & replace roller and pin
Rollers	Wrong size	Remove & replace with correct parts
Spider anchor pins	Grooved or scored/worn	Replace spider or pins, as appropriate for OEM

5.2.9 SLACK ADJUSTERS (cont'd)

5.2.9.2 AUTOMATIC SLACK ADJUSTER MAINTENANCE (cont'd)

Free Stroke Above the Range

If the free stroke is above the range and the applied stroke is too long, there is a problem with the foundation brake or the adjuster. Check the following:

Component	Cause	Action
Camshaft	Binding	Remove, replace, lubricate camshaft
Camshaft bushings	Excessive movement	Remove and replace cam bushings per OEM specs
Camshaft bushings	Binding shaft	Lubricate camshaft bushings or replace
Air chamber return springs	Broken, weak, missing	Replace chamber
Air chamber push rod	Binding on chamber housing	Check adjuster for proper shimming and air chamber position for proper adjuster arm length
Air system	Not exhausting completely	Check for cause of air problem and repair
Shoe return springs	Broken, weak, missing	Replace springs
Automatic brake adjuster	Unknown	Check automatic brake adjuster for proper installation. Refer to Installation Instructions at www.haldex.com.
Automatic brake adjuster	Unknown	Refer to Automatic Brake Adjuster Checking Procedures and Operational Check at www.haldex.com.

Free Stroke Below the Range

If the free stroke is less than 3/8", a dragging brake can occur. Check the following:

Component	Cause	Action
Wheel bearing	Out of adjustment	Readjust per OEM specs
Automatic brake adjuster	Unknown	Check automatic brake adjuster for proper control arm position. Refer to Installation Instructions at www.haldex.com.
Automatic brake adjuster	Unknown	Refer to Automatic Brake Adjuster Checking Procedures and Operational Check at www.haldex.com.

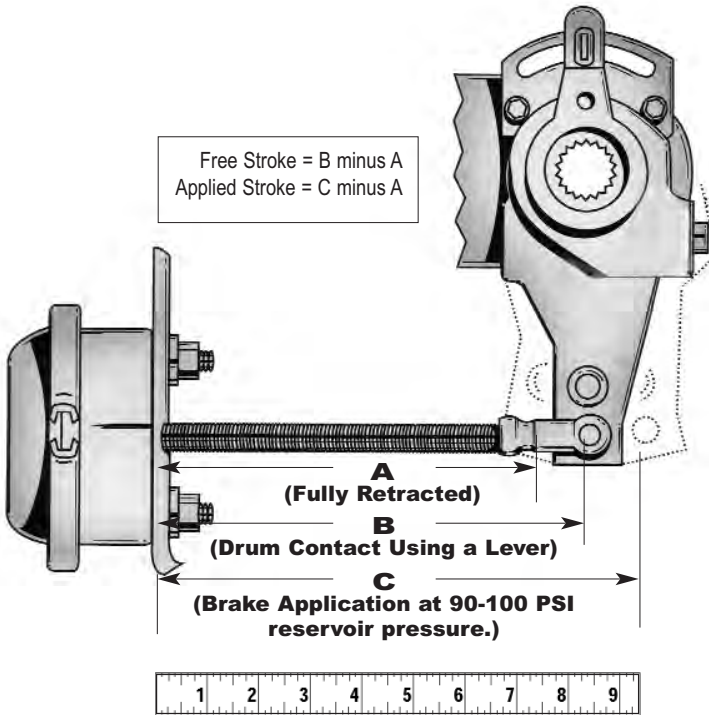


Figure 13
Stroke Measurements (taken from face of air chamber to center of clevis pin)

5.2.9 SLACK ADJUSTERS (cont'd)

5.2.9.2 AUTOMATIC SLACK ADJUSTER MAINTENANCE (cont'd)

FAILURE ANALYSIS

Automatic Slack Adjuster Failure Analysis
If the power stroke is at or more than the maximum stroke, measure free stroke to determine if the slack adjuster is operational.

FREE STROKE MEASUREMENT
Free stroke is the amount of slack arm movement required to move the brake shoes against the drum. To measure free stroke, perform the following:

1. With brakes released, measure from the brake chamber face to the center of the clevis pin.

2. With a lever, pry the slack adjuster arm untilthe brake shoes contact the drum and measure the slack adjuster movement (see Fig. 72).

3. The difference between the brake released and applied measurements is the free stroke. The free stroke should be 3/8" - 5/8". If the free stroke is in the correct range, the out of spec stroke is due to a foundation brake problem. Check for missing or worn components, cracked brake drums, or improper lining-to-drum contact. If the free stroke is greater than recommended, an automatic slack adjuster function test should be performed.

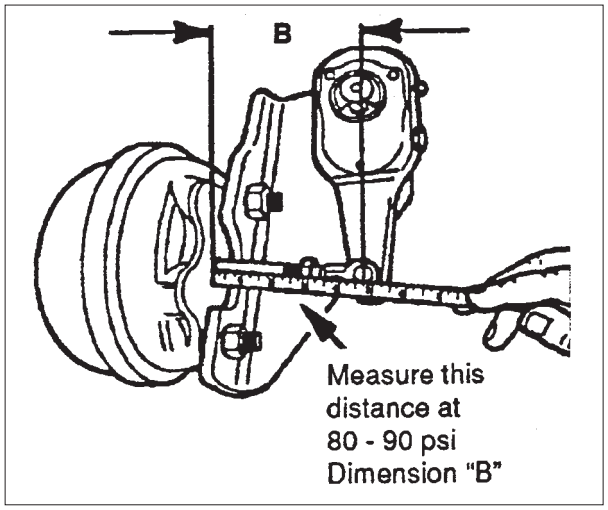
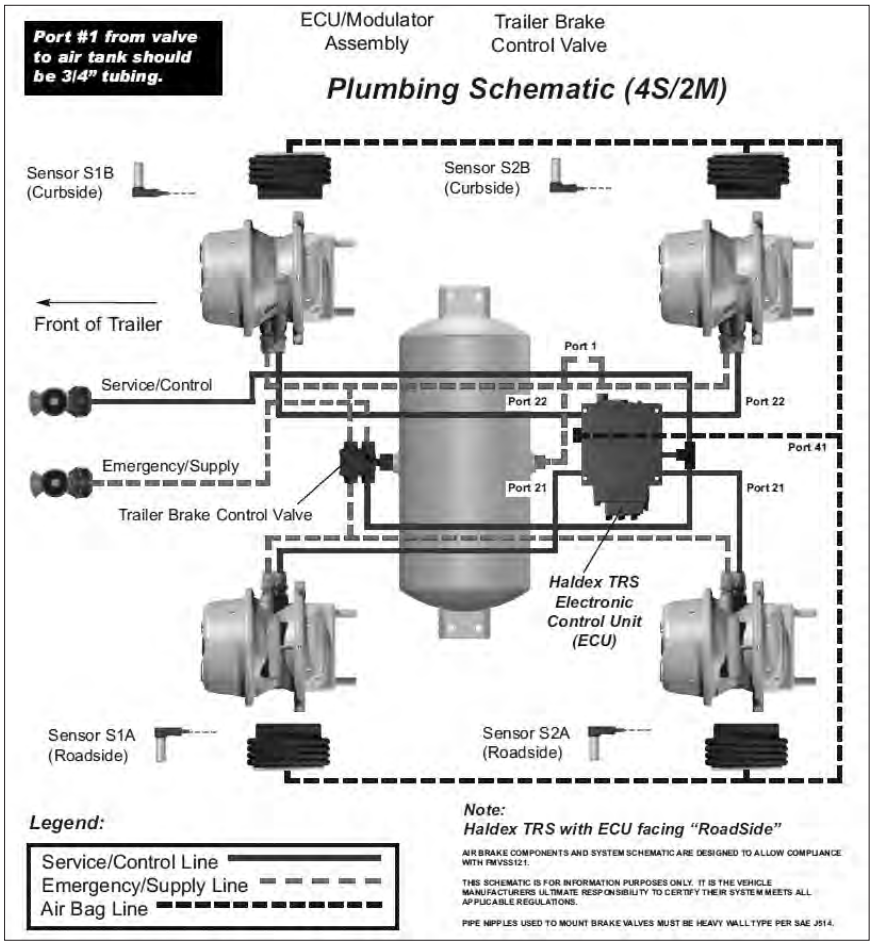


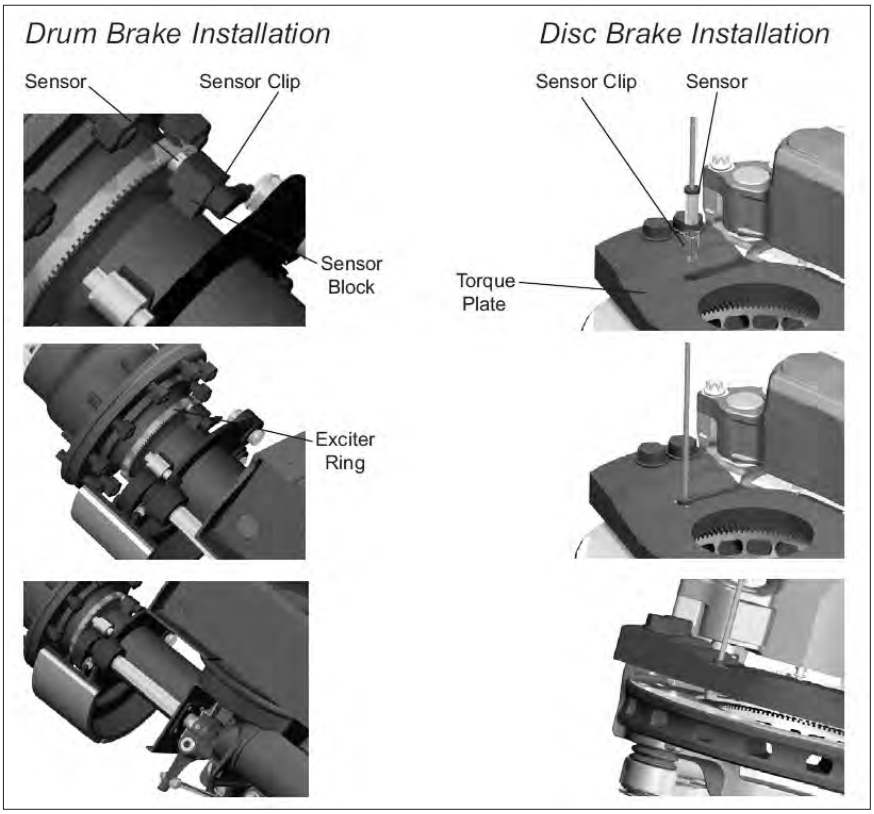
Fig. 60 FREE STROKE

5.2.10 TRAILER ABS

Each trailer is designed with an ABS (Automatic Braking System) to increase the effectiveness of the brakes during stopping. The system consists of valves, sensors, exciter rings and an Electric Control Unit.



Review the brochures included in the documentation package to become familiar with the ABS system and installation. The system is installed on each axle and controlled by the air system.



5.2.11 AIR CHAMBER/SPRING BRAKE

Air chambers mounted on the axle use the air supply/ pressure from the tractor to apply the service brakes for stopping the vehicle. In addition this air chamber may be equipped with a spring brake that applies the brake when the service side of the brake loses air. The spring brake side of the system is used as a parking and/or emergency brake if the service side fails.

Spring brakes should not be serviced by anyone in the field unless they have been trained in the proper procedure. Do not open the air chamber unless the spring is caged or locked out. Do not work on the brakes unless the springs are caged or locked out. Do not move the trailer if the springs are caged.

When caging or locking out the spring brakes, follow this procedure:

1. Place chocks in front of and behind the trailer wheels.

2. Insert the release bolt, stored on the side of the chamber, into the hole in the head and through the piston.

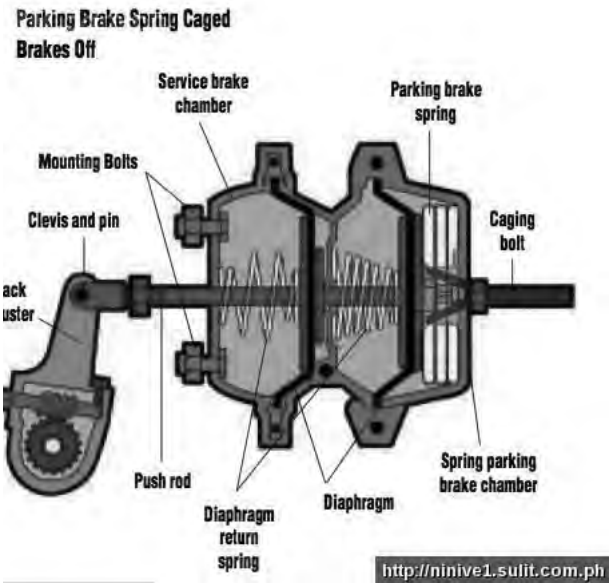
3. Turn the release bolt clockwise until it stops and locks.

4. Pull release bolt out as far as possible and run the nut down while holding the bolt in place.

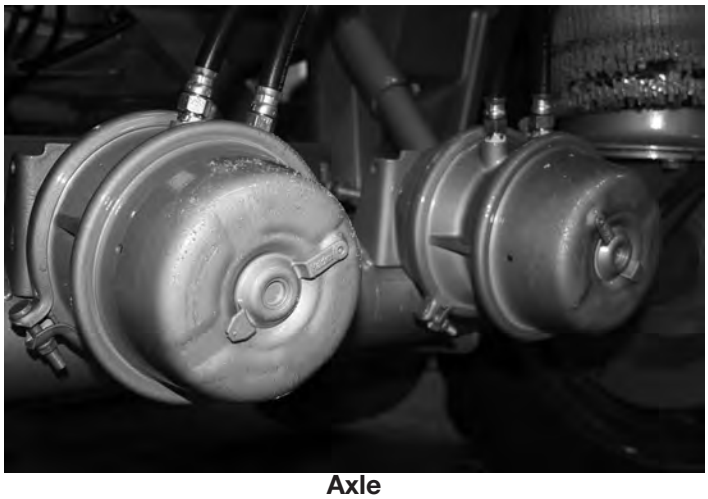
5. Use a wrench to turn the release bolt nut clockwise until the bolt extends about 3 inches.

6. Be sure the release bolt is locked in position.

7. Always release the spring before placing the trailer back in service.



Schematic



Axle

Fig. 61 SPRING BRAKE

5.2.12 SUSPENSION SYSTEM

The suspension system is the group of components that connect the axle to the main trailer frame and absorb the shock loads from the road. Midland trailers can be equipped with either a mechanical or air ride suspension system. Either system works well and will provide many years of trouble-free service.

5.2.21.1 AIR RIDE SUSPENSION

An air ride suspension consists of air springs that are inflated and pressurized by the trailer air system and controlled by a height control valve. It is a simple system that requires minimal servicing and maintenance to perform well.

TRAILER SUSPENSION BOLT TORQUE VALUES[1]

COMPONENT DESCRIPTION	FT-LBS	N•m
QUIK-ALIGN® Pivot Connection	505 to 595	685 to 807
Welded Pivot Connection (1 1/8 inches)	750 to 825	1017 to 1119
U-Bolts (HT Series)	475 to 525	644 to 712
Shock Bolts	210 to 235	285 to 319
Upper Air Spring Nuts (3/4 inch)	80 to 100	108 to 136
Upper Air Spring Nuts (1/2 inch)	40 to 50	54 to 68
Lower Air Spring Bolts (HT Series, AAEDT 30K, AAEDL 30K and HRRNT 40K / HRRNT 50K)	40 to 50	54 to 68
Lower Air Spring Nut (INTRAAX® and VANTRAAX®)	55 to 60	75 to 81
Brake Chamber Mounting Nut (INTRAAX)	100 to 110	136 to 149
S-Cam Support Bearing Mounting Nut (INTRAAX)	35 to 45	47 to 61
Hubcap Mounting Bolts	12 to 18	16 to 24
Body Rail Clip	65 to 75	88 to 102
Lift Mechanism Air Spring, Actuator (3/4 inch)	45 to 55	61 to 75
Lift Mechanism Air Spring, Actuator (3/8 inch)	15 to 20	20 to 27

COMPONENT DESCRIPTION	IN-LBS	N•m
ABS Bracket Bolt and Nut (INTRAAX)	75 to 100	8 to 11
Disc Brake Dust Shield Clamp	50 to 70	5.6 to 7.9
Drum Brake Dust Shield Clamp	90 to 125	10 to 14
Height Control Valve Mounting	60 to 80	7 to 9

1. Torque values in this table are for fasteners as supplied by Hendrickson Trailer Suspension Systems.

IMPORTANT: DO NOT APPLY ADDITIONAL LUBRICANT TO FASTENER THREADS. DOING SO WILL REDUCE THE FRICTION BETWEEN FASTENER COMPONENTS, WHICH CAN LEAD TO OVERTIGHTENING, UNPREDICTABLE CLAMP LOADS AND UNRELIABLE FASTENER CONNECTIONS

Fig. 62 HENDRICKSON SUSPENSION BOLT TORQUE VALUES

Visually inspect the trailer at the start of the day or trip to check the condition of the suspension. Ensure that the ride height is set as per proper specifications. Also, check for loose fasteners or damaged components. Correct any problems before placing the trailer into service. Problems caught early and corrected minimize cost and downtime.

Every 5,000 miles (8,000 km) or monthly, check the clearance around all the suspension system components. Correct any interference problem. Retorque all the fasteners to their specified torque.

Every 25,000 miles (40,000 km) or 3 months, visually inspect all components and welds for cracks, distortions or other damage. Repair or replace all defective components before placing unit into service.

RIDEWELL SUSPENSION TORQUE CHART

RAR-240 Monopivot

ITEM	SIZE	TORQUE (FT-LB)	TORQUE (N•m)
Pivot Bolt/Nut	1 1/4" - 7NC	1,000	1,350
Shock Bolt/Nut	3/4" - 10NC	200	270
Air Spring Bolt/Nut	1/2" - 13NC	25	35
Air Spring Bolt/Nut	3/4" - 16NF	50	70

After suspension has been in operation for approximately 6,000 miles (10,000 km), all fasteners must be re-tightened to specified torque. Repeat every 50,000 miles (80,000 km).

DO NOT OVER-TORQUE!

RAR-260 Trailer Suspension - Torque Specifications

Fastener Type	Size	Torque Values foot-pound	Torque Values Newton-meter
Pivot Bolt - (Shear-Type) Pivot Nut - (Locknut) *Requires E-20 Torx® socket (RW #6100054)*	7/8" - 9NC	Do not lubricate bolt/nut threads. Use a 1" drive impact wrench to tighten the pivot bolt until the Torx® head is sheared off.	
Locknut - (Shock Absorber)	3/4"-10NC	200-230 ft-lb	271-312 N-m
Nut - (Air Spring)	3/4"-16NF	45-50 ft-lb	61-68 N-m
Locknut - (Air Spring)	1/2"-13NC	20-25 ft-lb	27-34 N-m
Locknut - (Air Spring - 25K O/S)	1/2"-13NC	45-50 ft-lb	61-68 N-m
Bolt - (Air Spring)	1/2"-13NC	20-25 ft-lb	27-34 N-m

Refer to the engineering drawing for component torque value. Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque.

CAUTION *Suspension is shipped with minimal torque applied to fasteners. It is the installer's responsibility to apply the proper torque values. All fasteners, except for shear-type pivot bolt, must be re-torqued after the first 6,000 miles of operation. Failure to install and maintain suspension component fasteners at torque specifications could result in suspension failure and void the warranty.*

Fig. 63 RIDEWELL SUSPENSION BOLT TORQUE VALUES

5.2.12 SUSPENSION SYSTEM (cont'd)

5.2.12.1 AIR RIDE SUSPENSION (cont'd)

Typical repairs include but are not limited to:

1. **Air Spring Replacement:**
   Air springs are designed to be virtually trouble-free throughout their life. Problems seldom occur unless they are cut, punctured, abraded, pinched or torn and then they must be replaced.

   a. Block the wheels to prevent trailer movement.

   b. Exhaust air from the suspension system.

   c. Raise and support the frame on safety stands.

   d. Disconnect the air lines to the air spring(s).

NOTE

Do not raise frame too high unless shock absorbers are installed to prevent over-extending the air spring.

   e. Loosen mounting bolts and remove air spring(s).

   f. Install new air spring(s).

   g. Tighten mounting bolts to their specified torque of 50 ft. lbs. (68 N.m).

   h. Install air lines and tighten to their specified torque.

   i. Repeat on other air springs.

   j. Remove stands from under frame.

2. **Shock Absorber Replacement:**
   Shock absorbers remove energy from the suspension system as the trailer encounters holes and bumps on the road surface. They also act as a stop for the air springs to prevent the axle from moving too far away from the frame and tearing or damaging the air spring.

   a. Remove the upper and lower mounting bolts.

   b. Remove old shock and install new one.

   c. Secure shock by tightening mounting bolts to their specified torque of 250 ft. lbs. (338 N.m).

IMPORTANT

Use only correct manufacturer specific components replacement parts. Substitute parts do not work with the suspension system.

3. **Pivot Bushing:**
   For pivot bushing replacements please see your dealer or trailer repair shop.

5.2.12 SUSPENSION SYSTEM (cont'd)

5.2.12.1 AIR RIDE SUSPENSION (cont'd)

4. **Air Control (Ride Height Control):**
An air ride suspension system uses the air from the tractor to pressurize the air springs. A single height control valve is used to monitor the height of the frame above the axle and add/exhaust air from the system as required to maintain this dimension. Normally this dimension is set for your trailer and seldom changes.

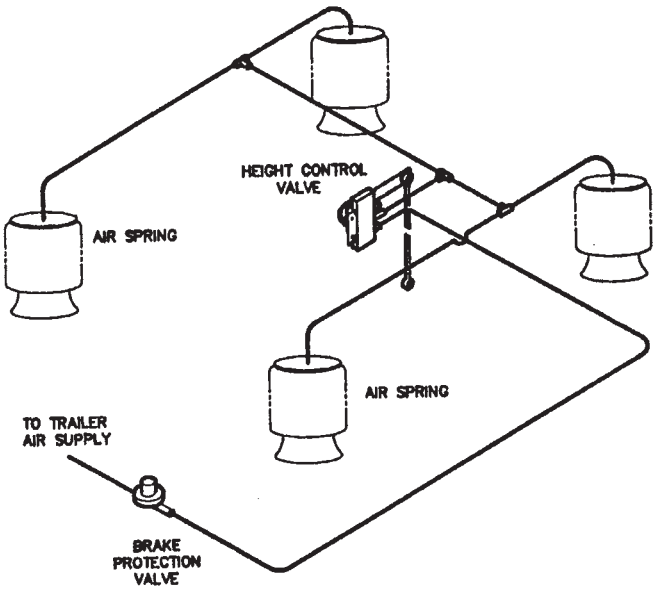
The height control valve is located on one of the axles and controls the adding/exhausting of air to the air springs. As the dimension between the frame and axle increases, the control lever moves down and air is exhausted from the system. As the dimension decreases, air is added to raise the frame. All valves incorporate a 5 to 15 second time delay to minimize jerking or cycling. Replace valve if not functioning properly.

Check ride height after first use and periodically thereafter to maintain proper ride height. Improper ride height can cause severe component damage and void your warranty. Maintaining correct ride height is the responsibility of the operator.

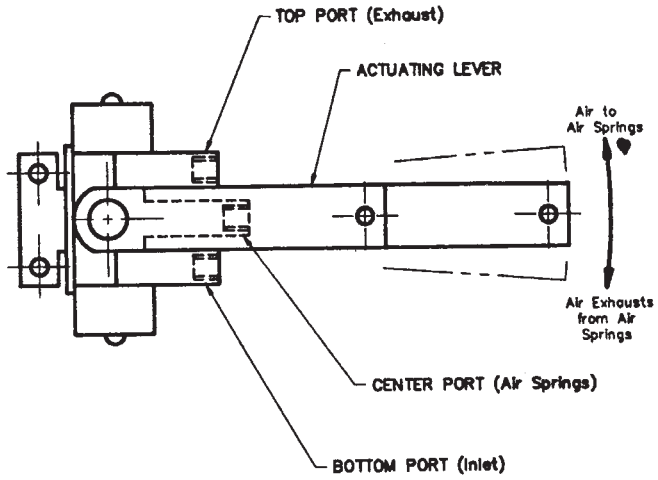
There are two different ride heights (15" and 17"). All trailers with the exception of B-Train Lead are 17" ride height. The B-Train Lead is 15". This measurement is taken from the center of the axle to the underside of the frame.

NOTE

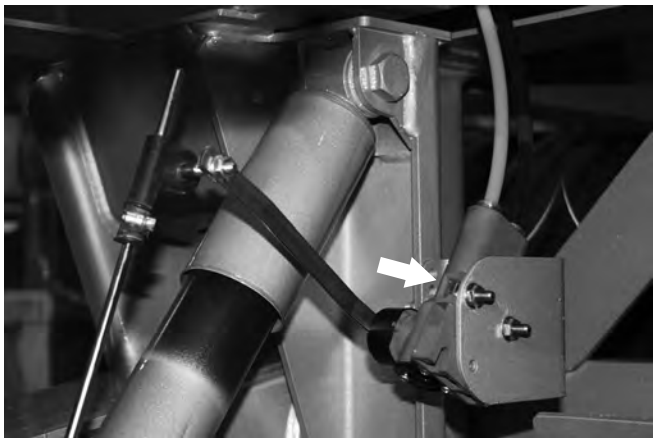
Measure the axle that has the ride height control mounted to it. The other axle(s) may have more or less distance between the frame and axle depending on the height of fifth wheel. If ride height is incorrect contact your dealer.



System Schematic



Valve Schematic



Valve

Fig. 64 RIDE HEIGHT CONTROL

5.2.12 SUSPENSION SYSTEM (cont'd)

5.2.12.1 AIR RIDE SUSPENSION (cont'd)

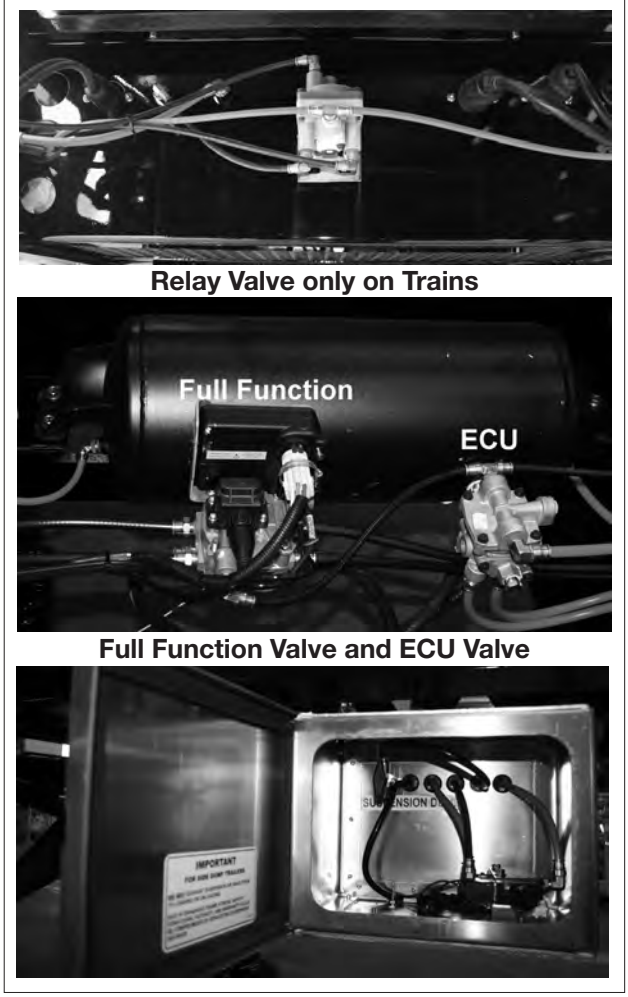
5. **Dump Valve:**
   All air control systems are equipped with a dump valve that allows the operator to exhaust the air from the system as required.

   a. Always dump the air when parking the trailer and before unhooking.

   b. Dumping the air when unloading is not recommended.

Fig. 65 DUMP VALVE

6. **Air System Control Box:**
   All air control systems are equipped with valve(s). There can be multiple configurations depending on the options the trailer(s) was built with.



Relay Valve only on Trains

Full Function Valve and ECU Valve

Fig. 66 AIR SYSTEM CONTROL BOX

5.2.12 SUSPENSION SYSTEM (cont'd)

5.2.12.2 MECHANICAL SUSPENSION

Two types of mechanical suspensions are available on the trailer and must be specified and ordered from the factory. Both work well and provide the customer with a choice.

The two types of suspension for the tandem and triaxle models are the Reyco 21B 8 leaf and the Hutch 9700 3 leaf. Both are designed to require minimal service and maintenance on a trailer. However, these service intervals and maintenance procedures must be followed:

Service Intervals:

1. Follow the break-in procedure specified in Section 4.3.

2. Visually inspect the suspension at the start of the day or trip for bent, broken or loose components. Always correct these conditions and perform a complete check-out of the suspension before placing the trailer back in service.

3. After each additional 25,000 miles (40,000 km), or every 3 months, retorque all the fasteners to their specified torque per the following table. Always use an accurate torque wrench when retorquing fasteners and attach to the nut.

4. 25,000 miles (40,000 km) or every 3 months, inspect the following:

   a. Check position of clamp if moveable clamps used. Clamping legs must be centered over slot in end tube.

   b. Check fit and function of all bushings.

   c. Check all hanger and hanger bracing welds for cracks.

   d. Check all other welds for signs of cracks or distortion.

   e. Check fit of springs in hangers and equalizers.

   f. Check equalizers for excessive wear at spring ends.

   g. Check suspension system alignment.

5. In addition to checking the alignment at the recommended intervals, axle alignment should be checked when any of the following conditions occur:

   a. Discovery of loose fasteners or components.

   IMPORTANT

   A loose fastener is defined as one whose torque has dropped below its specified level.

   b. Discovery of elongated holes in a suspension system component.

   c. Whenever bushings are replaced.

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
9600-9700 Series (Decal Part Number 16086-01 Rev. J)

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 1/8-7 (9600 / 9700 Rocker Bolt)	590 lb-ft	790 lb-ft
1-14 or 1-8 (9700 Radius Rod Bolt)	540 lb-ft	720 lb-ft
7/8-14 (Axle U-Bolts & 9600 Radius Rod Bolt)	350 lb-ft	470 lb-ft
3/4-16 (Axle U-Bolts)	310 lb-ft	420 lb-ft
5/8-18 (Radius Rod Clamp Bolt)	130 lb-ft	170 lb-ft
5/8-18 (Spring Retainer Bolt)	35 lb-ft	50 lb-ft

Hutchens Industries, Inc., P.O. Box 1427, Springfield, Missouri 65801-1427 Toll Free 1 (800) 654-8824

REYCO 21B LEAF SPRING SUSPENSION

TORQUE REQUIREMENTS		
(cast hangers)		
1. Tighten 3/4" or 7/8" U-bolt nuts	300-325 FP	410-440 Nm
2. Tighten 1" torque arm end nuts	140-160 FP	190-220 Nm
3. Tighten 5/8" torque arm clamp nuts	125-150 FP	170-205 Nm
4. Tighten 1" equalizer capscrews	400-450 FP	540-610 Nm
5. Tighten 1/2" spring retainer nuts	70-80 FP	95-110 Nm
(fab hangers)		
1. Tighten 3/4" or 7/8" U-bolt nuts—steel springs	300-325 FP	410-440 Nm
2. Tighten 3/4" or 7/8" U-bolt nuts (composite springs)	250 FP	340 Nm
3. Tighten 11/4" equalizer shaft fastener nuts	575-625 FP	780-850 Nm
4. Tighten 21/2" equalizer shaft fastener nuts m (F.W.WB 54"-65 1/2")	300-325 FP	410-440 Nm
5. Tighten 11/2" equalizer shaft fastener nuts (F.W.WB 72"-109")	200-225 FP	270-305 Nm
6. Tighten 1" torque arm bolt nuts	140-160 FP	190-220 Nm
7. Tighten 5/8" torque arm clamp nuts	125-150 FP	170-200 Nm
8. Tighten 3/4" torque arm clamp nuts	175-200 FP	240-270 Nm
9. Tighten 1/2" spring retainer nuts	70-80 FP	95-110 Nm

ft lb = Foot - Pounds; Nm = Newton - Meters

5.2.12 SUSPENSION SYSTEM (cont'd)

5.2.12.3 SUSPENSION SYSTEM SCHEMATICS

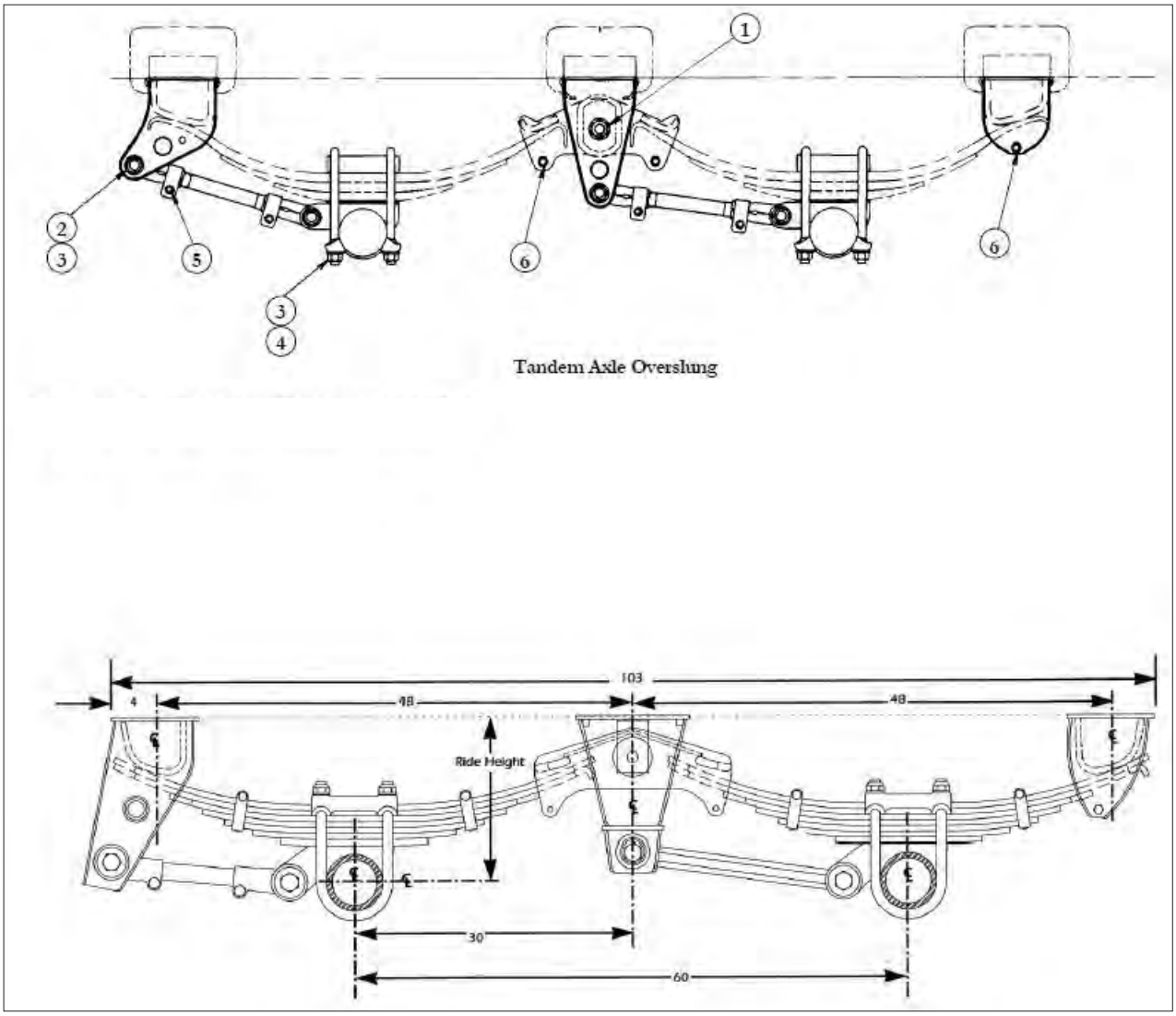


Fig. 67 Midland Lift Axle

5.2.13 AIR SYSTEM

Trailers are equipped with an air system, that is pressurized by a compressor on the tractor, for operating the "discharge gates", brakes and air suspension (if so equipped). All components must be in good condition for the system to function and perform as intended. The air system must be inspected to be kept in good condition and functional checks performed to be sure it is operating as required.

5.2.13.1 AIR SYSTEM INSPECTION

The pre-trip or pre-start inspection include several air system related checks, inspections or tasks including but not limited to:

Daily

1. Check that the glad hands are clean and in good condition. Check seals in glad hand Clean, repair or replace as required.

2. Check that the air hoses between the tractor and the trailer are routed to prevent rubbing, chaffing or pinching. Reroute to correct condition if required.

3. Drain moisture from all air tanks. Pull on the cable attached to drain valve on the bottom of each tank until the water or spray no longer can be seen.

IMPORTANT

Tanks must be drained daily in high humidity and cold temperature conditions to prevent getting water or ice in the system. During cold weather operation use only recommended air line anti freeze in the trailer air system. Alcohol or methyl hydrate is not to be used because they will remove vital lubricants causing premature failures of valves and components. Traces of these products will void any warranty consideration.

4. Check that all the lines and hoses conveying air along the frame are tied up and secured to prevent dragging, scuffing or snagging. Tie up or protect as required to correct the condition. Damaging an air system component can cause a sudden loss of pressure and result in a loss of service brakes.

IMPORTANT

New FMVSS-121 regulations mandate higher pressures in the supply line to insure proper brake operation. Set the compressor pressure for cut-in to 105 psi and cut-out to 120 psi. Do not use additives in the air systems.system.

5.2.13.2 AIR SYSTEM FUNCTIONAL

A vehicle air system is a combination of the components on the tractor and the trailer. All must be maintained in good condition for the entire system to function as required. Although a visual check will indicate the outer condition of the components, it does not indicate the leaks or responsiveness of the system. To evaluate the integrity and responsiveness of the system, perform these functional checks:

1. Attach the trailer to a tractor and connect all the air and electrical lines.

2. Block wheels.

3. Stop tractor engine and exhaust air from all tanks.

4. Start engine and run at fast idle (1200-1500 RPM) to charge the air system.

   Verify that:

   a. Low pressure alarm goes off when the system pressure drops below 50 psi.

   b. Increasing the system pressure between 50 psi and 80 psi takes less than 3 minutes.

   c. The compressor cuts out when the system pressure drops below 120 psi.

   d. Fan brakes to use air. Compressor must engage when system pressure drops below 105 psi.

NOTE

Release spring brakes before fanning service brakes.

5. Push emergency valve to charge trailer system. Apply and release service brakes.

6. Build system up to 120 psi and stop engine.

   Verify that:

   a. Main tank pressure does not drop more than 18 psi when brakes are fully applied using brake pedal. If pressure drop exceeds 18 psi, adjust brakes and recheck.

   b. System pressure should not drop more than 4 psi per minute. Listen for audible leaks.

   c. Release foot valve to drop main reservoir pressure. Brakes should dynamite automatically when the pressure drops below 60 psi.

   Adjust or repair system until these conditions are met.

5.2.14 ELECTRICAL SYSTEM

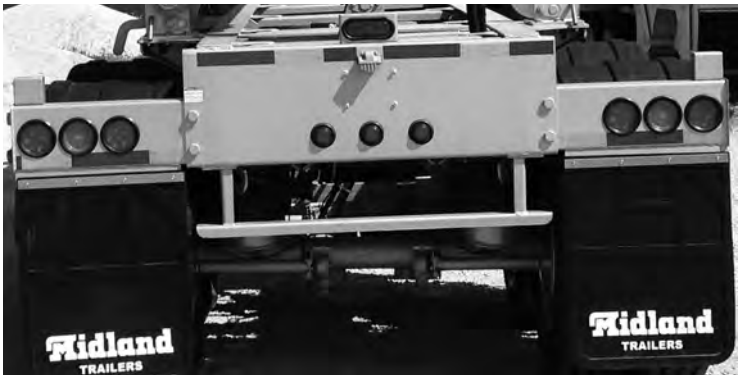
All trailers are equipped with an electrical system for providing power for lights and electrical controls. All components are designed to minimize the effects of foul weather and adverse operating conditions. However, it is the responsibility of the operator to check and verify that all components are in good condition and functioning as intended.

During the daily or pre-trip inspection, always verify that each light functions as required. It may be helpful to work with another individual to verify the function of the brake or turn signal lights. A properly functioning electrical system is the only way an operator can communicate his intentions to other drivers. Checking the electrical system includes but is not limited to:

1. Replace any bulb that is burned out.
2. Clean all reflective lenses. Replace any that are cracked or broken.
3. Clean all connections and terminals to a light that is flickering.
4. Reroute and secure any wires or cables that are dangling or have snagged on something.
5. Check the integrity of the seal around each light. Replace any seal that is cracked or damaged.

Electrical Connectors

Side Signal



Rear

Fig. 68 LIGHTING

Table 11 Trailer Light Requirements

Function	P/N	Size (Watts)
Tail Lamp		8
Signal/Brake		27
Side Signal		27
Clearance		8
Marker		5

Subject to change based on design & model.

6 TROUBLE SHOOTING

In the following section, we have listed problems, causes and solutions to the problems that you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this trouble shooting section and through the specifically related components manufacturer's manuals. please call your local Midland dealer or distributor. Before you call, please have this Operator's Manual and the serial numbers from your trailer ready.

PROBLEM	CAUSE	SOLUTION
Trailer "Dog-Tracks"...	Trailer out of alignment.	Realign per procedure provided by the suspension manufacturer.

PROBLEM	CAUSE	SOLUTION
Tires		
High or uneven tire wear.	Over or under inflation.	Inflate to proper pressure.
	Loose wheel stud nuts or clamps.	Tighten wheel stud nuts or clamps.
	Loose or tight wheel bearing.	Adjust bearings.
	Axle bent or out of alignment.	Straighten, align or replace axle.
	Tires not properly matched.	Match tires.
	Improper acting brakes.	Correct brakes as required.
	Rapid stopping.	Apply brakes slowly when approaching stops.
	High speed.	Reduce speed.
Scuffed tires.	Over or under inflation.	Inflate to proper pressure.
	Excessive speed on turns.	Reduce speed.
Wobbly tires.	Tire wobble due to uneven rim clamping.	Torque tighten all rim clamps.
	Worn or damaged wheel bearings.	Replace bearings.
	Bent wheel or rim.	Replace wheel or rim.
	Bent axle.	Replace or straighten axle.
Dog tracking.	Leaf spring broken.	Replace leaf or complete spring.
	Bent axle.	Replace or straighten axle.
	Frame or suspension (axles) out of alignment.	Straighten frame or align axles.
Loss of tire air pressure.	Puncture in tire.	Repair or replace tire.
	Faulty valve or valve core.	Replace valve assembly or core.
	Wheel or rim damage.	Replace wheel or rim.

PROBLEM	CAUSE	SOLUTION
Electrical		
Lights flicker or do not come on.	Bad connection.	Check electrical system circuits.
	Frayed wires.	Repair as required.
	Battery on tractor not sufficiently charged.	Charge battery.
	Damaged or disconnected wire on ground cable.	Repair or replace cable.
	Poor ground at sockets.	Repair as necessary.
Complete loss of trailer lights.	Broken main harness.	Repair or replace.
	Junction box failure.	Replace junction box.
	Frayed wires.	Repair as required.
	Damaged or disconnected ground cable.	Repair or replace cable as required.
	Loose or corroded connection in ground lead between tractor and trailer.	Repair or replace.
Lights flash improperly or appear to be crossed.	Internal short in junction box.	Replace junction box.

PROBLEM	CAUSE	SOLUTION
Air System		
Excessive compressor cycling.	Air leak.	Check air line fittings and hose connections on service or supply line. Check service chamber at clamp housing, push rod for damage. Check service chamber diaphragm. Check emergency chamber clamp and vent holes for leakage. Repair or replace air chamber as required. Check FFVII brake valve. Repair or replace as required.
Trailer brakes slow and sluggish.	System or component failure.	Check slack adjuster and chamber/ spring brake push rod alignment for interference. Assure slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment. Assure open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows. Assure adequate tractor brake function. Have authorized service center check for adequate pressure and timing balance relative to tractor/ trailer application.

PROBLEM	CAUSE	SOLUTION
Air System (cont'd)		
Trailer brakes drag.	System or component failure	Assure emergency line maintains 120 psi pressure; check and maintain governor at max. cut-in. Check slack adjuster and chamber/ spring brake push rod alignment for interference. Assure slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment. Assure open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows. Check for trapped service air pressure at trailer service/ delivery hoses. If air pressure is noted, check for full release of all application valves (tractor/truck/ trailer).
Trailer brakes won't apply (service).	System or component failure.	Check air delivery to emergency system. Check air delivery to service gladhand. Check air delivery to air chamber or spring brake. Check air delivery to all reservoirs at system working pressure. Check slack adjuster and chamber/ spring brake push rod alignment for interference. Check slack adjuster and chamber/ spring brake push rod angle 90° applied with proper adjustment.
Park/emer brakes won't release.	System or component failure.	Check air jumper hoses are not crossed between tractor and trailer. Check air delivery to emergency gladhands exceeds 120 psi. Check air delivery to FFV valve. Check air delivery to all reservoirs at system working pressure.

PROBLEM	CAUSE	SOLUTION
Air System (cont'd)		
Park/emer brakes won't release (cont'd).	System or component failure (cont'd).	Check open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows. Check that brake shoes are not frozen to drums.
Park/emer brakes won't hold.	System or component failure.	Check slack adjuster and chamber/ spring brake push rod alignment for interference. Assure slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment.
Air reservoir leaks or loose mounting.	System or component failure.	Replace/use rubber grommets with integral brackets.
Semi-trailer "Runs-Up" on tractor.	Check brake linkage.	Assure slack adjuster and chamber/spring brake push rod angle 90° applied with proper adjustment. Check gladhand connection. Assure open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows. Have authorized service center check for adequate pressure and timing balance relative to tractor/ trailer application.
Poor braking performance.	Uneven brakes.	Check slack adjuster and chamber/ spring brake push rod angle 90° applied with proper adjustment. Check slack adjuster and chamber/ spring brake push rod angle 90° applied with proper adjustment. Check open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows. Check a leak free system by applying service brake and inspecting.

PROBLEM	CAUSE	SOLUTION
Air System (cont'd)		
Poor braking performance (cont'd).	Trailer brake lining wear excessive.	Have authorized service center check for adequate pressure and timing balance relative to tractor/ trailer application. Proceed per problem "trailer brakes drag."
	Trailer brakes slow to apply.	Check slack adjuster and chamber/ spring brake push rod angle 90° applied with proper adjustment. Check air delivery to all reservoirs at system working pressure. Check open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows. Have authorized use of "jumper hose analyser" and duplex gauge to pin-point brake imbalance. Check functional return spring in service chamber or spring brake. Check open lines - no kinks, bends, closed shut-off cocks, restrictions, excessive elbows.
	Trailer service brakes slow to release.	Have authorized use of "jumper hose analyser" and duplex gauge to pin-point brake imbalance.
	Slack adjuster not auto-adjusting.	Check for damaged actuator rod. Replace as required. Slack adjuster internal components seized. Replace.
	Cracked housing.	Replace slack adjuster.
	Worn clevis pin bushing.	Replace bushing

PROBLEM	CAUSE	SOLUTION
Air System (cont'd)		
Poor braking performance (cont'd).	Full function valve (FFV) leaks at exhaust port with all brakes released.	Replace FFV valve.
	Full function valve (FFV) leaks at exhaust port with service brakes applied.	Replace FFV valve.
	Spring parking brake (service only service chamber side of spring brake) drags or won't release.	Check for: - Improper adjustment, restriction or broken line. - Diaphragm failure. - System pressure too low (120 psi min). - Improper manual release. - Broken return spring (spring side). - Broken power spring. - Replace entire unit or piggy-back emergency section.
	Spring parking brake (service only service chamber side of spring brake) leaks when pressurized for park brake release.	Check for: - Ruptured spring side diaphragm. - Hose leaks.

7 BOLT TORQUE

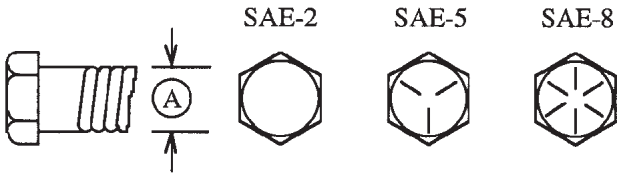
7.1 BOLT TORQUE

CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

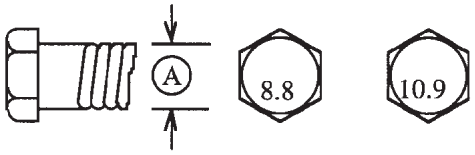
ENGLISH TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque*					
	SAE 2		SAE 5		SAE 8	
	(N.m)	(lb-ft)	(N.m)	(lb-ft)	(N.m)	(lb-ft)
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	160	305	220
3/4"	225	165	390	290	540	400
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970



METRIC TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque*			
	8.8		10.9	
	(N.m)	(lb-ft)	(N.m)	(lb-ft)
M3	.5	.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	2710



Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

* Torque value for bolts and capscrews are identified by their head markings.

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PRINTED IN CANADA
ISSUE DATE: JANUARY, 2002
REPRINT: SEPTEMBER, 2021

PART NUMBER: 0400000