



H[®] TECHNICAL PROCEDURE

AIRTEK[®] NXT Front Air Suspension with STEERTEK[™] NXT Axle for Freightliner[®] Cascadia[®] • Western Star[®] 57X Vehicles

SUBJECT: Service Instructions

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SECTION 1

Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair and rebuild of the Hendrickson AIRTEK® NXT front steer axle and suspension system for applicable Freightliner® Cascadia® • Western Star® 57X vehicles.

NOTE

Use only Hendrickson Genuine parts for servicing this suspension system.

It is important to read and understand this entire Technical Procedure publication and all work instructions and safety related information provided by the vehicle manufacturer prior to performing any maintenance, service, repair, or rebuild of this product. The information in this publication contains safety information, product specifications, features, and proper maintenance, service, repair, and rebuild instructions for AIRTEK NXT front steer axle and suspension systems.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson Tech Services for information on the latest version of this manual at 855-743-3733 (toll-free U.S. and Canada), 630-910-2800 (outside U.S. and Canada), or e-mail: wdtechservices@hendrickson-intl.com.

The latest revision of this publication is available online at www.hendrickson-intl.com.

SECTION 2

Product Description

Hendrickson's AIRTEK® NXT — the next generation air suspension system, combines the STEERTEK™ NXT axle and air suspension technology with an advanced lightweight integrated clamp group design. Hendrickson's advanced air suspension technology assists in protecting drivers from road irregularities and hazards, providing a premium ride. The new design is 65 pounds lighter than standard content to improve load capacity and help enhance fuel efficiency.

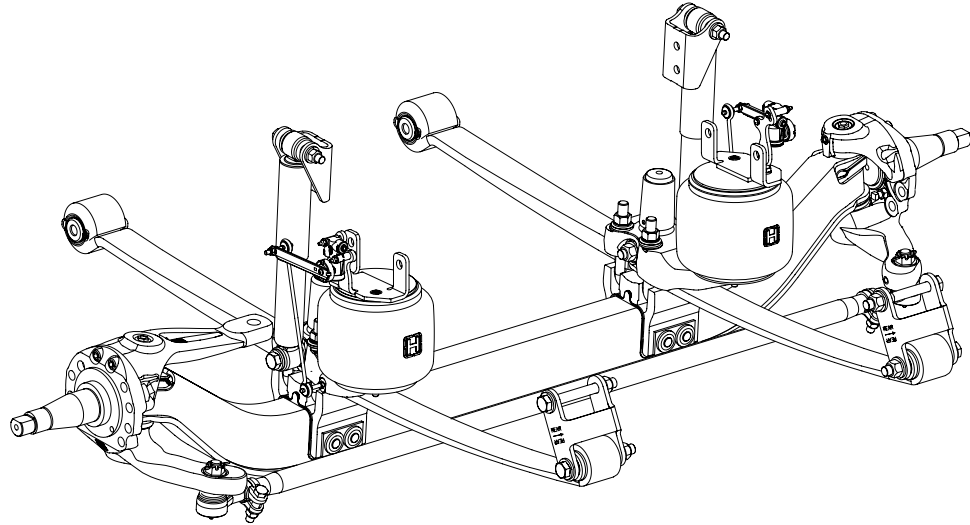
- **Improved ride and comfort** — Advanced air suspension technology assists in protecting drivers from road irregularities and hazards.
- **Air spring** — Exclusive air springs support a majority of the load to provide a low spring rate and to improve ride. Conventional bolt-on design provides durability.

STEERTEK NXT axle advanced clamp group — The box-shaped cross section resists horizontal, vertical and twisting forces more effectively than traditional I-beam axles which improves handling. Continuous beam architecture minimizes stress points for added durability. Weighs less than original I-beam and spring clamp group.

- **Brake Compatibility** — Compatible with drum or disc brakes.
- **Two-piece knuckle assembly** — Eliminates the need to remove the kingpin to service the knuckle.



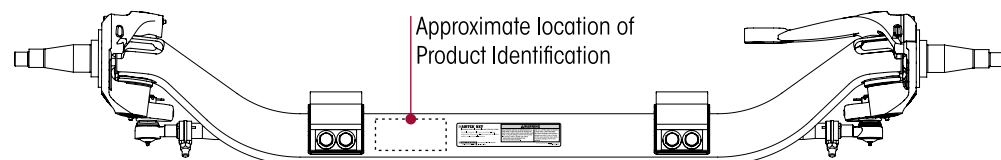
FIGURE 2-1



TECHNICAL NOTES

1. The AIRTEK NXT system is approved for on-highway usage. Other applications must be pre-approved by both Hendrickson and Freightliner / Western Star. This system has a 12,500 and 13,300 pound capacity. System capacity represents maximum loads on tires at ground level.
2. The AIRTEK NXT system is available with a wide track axle 70.87" Intersections (KPI).
3. The AIRTEK NXT system offers a 5.36" axle beam drop height, when combined with the axle wrap. Axle beam drop when measured from the kingpin intersection to the top of the axle is 5.36".
4. AIRTEK NXT suspension weight includes air springs, main springs, upper air spring bracket, shackle bracket assemblies, bushings, shocks, upper shock brackets, height control valves, and axle attachment hardware.
5. AIRTEK NXT system weight is based on a 5.36" drop height and a 70.87" KPI axle. Weight includes suspension, steer axle, knuckle/steering arm assemblies and tie rod assemblies.
6. This system is anti-lock braking system (ABS) ready. This system is compatible with industry standard wheel ends and brakes.
7. The AIRTEK NXT system product identification is etched on the front of the axle beam providing the following information, see Figure 2-2:
 - Axle part number: Identifies the features of the axle beam
 - Axle assembly number: Identifies the complete assembly, which includes the steering knuckles and bracket assemblies

FIGURE 2-2





SECTION 3

Important Safety Notice

Proper maintenance, service, and repair are important to the reliable operation of the suspension. The procedures recommended by Hendrickson and described in this technical publication are methods of performing such maintenance, service, and repair.

The warnings and cautions should be read carefully to help prevent personal injury and to assure that proper methods are used. Improper maintenance, service or repair may damage the vehicle, cause personal injury, render the vehicle unsafe in operation, or void the manufacturer's warranty.

Failure to follow the safety precautions in this manual can result in personal injury and/or property damage. Carefully read and understand all safety related information within this publication, on all decals and all such materials provided by the vehicle manufacturer before conducting any maintenance, service, or repair.

EXPLANATION OF SIGNAL WORDS

Hazard "Signal Words" (Danger-Warning-Caution) appear in various locations throughout this publication. Information accented by one of these signal words must be observed to help minimize the risk of personal injury to service personnel, or the possibility of improper service methods which may damage the vehicle or render it unsafe.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Additional 'Notes' or 'Service Hints' are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions indicate the use of these signal words as they appear throughout the publication.



INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN SERIOUS INJURY OR DEATH.



INDICATES A POTENTIAL HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, CAN RESULT IN SERIOUS INJURY OR DEATH.



INDICATES A POTENTIAL HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY, OR PROPERTY DAMAGE.

NOTE

An operating procedure, practice condition, etc. which is essential to emphasize.

SERVICE HINT

A helpful suggestion, which will make the servicing being performed a little easier and/or faster.

Also note that particular service operations may require the use of special tools designed for specific purposes. These special tools can be found in the Special Tools section of this publication.



The torque symbol alerts you to tighten fasteners to a specified torque value. Refer to the Torque Specifications section of this publication.



SAFETY PRECAUTIONS



WARNING

FASTENERS

DISCARD USED FASTENERS. ALWAYS USE NEW FASTENERS TO COMPLETE A REPAIR. FAILURE TO DO SO COULD RESULT IN FAILURE OF THE PART, OR MATING COMPONENTS, LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY, OR PROPERTY DAMAGE.

LOOSE OR OVER TORQUED FASTENERS CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, OR SEVERE PERSONAL INJURY. MAINTAIN CORRECT TORQUE VALUE AT ALL TIMES. CHECK TORQUE VALUES ON A REGULAR BASIS AS SPECIFIED, USING A TORQUE WRENCH THAT IS REGULARLY CALIBRATED. TORQUE VALUES SPECIFIED IN THIS TECHNICAL PUBLICATION ARE FOR HENDRICKSON SUPPLIED FASTENERS ONLY. IF NON-HENDRICKSON FASTENERS ARE USED, FOLLOW THE TORQUE SPECIFICATIONS LISTED IN THE VEHICLE MANUFACTURER'S SERVICE MANUAL.



WARNING

LOAD CAPACITY

ADHERE TO THE PUBLISHED CAPACITY RATINGS FOR THE SUSPENSIONS. ADD-ON AXLE ATTACHMENTS (I.E. SLIDING FIFTH WHEELS) AND OTHER LOAD TRANSFERRING DEVICES CAN INCREASE THE SUSPENSION LOAD ABOVE THE RATED AND APPROVED CAPACITIES WHICH COULD RESULT IN FAILURE AND LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.



WARNING

SUPPORT THE VEHICLE PRIOR TO SERVICING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.



CAUTION

PROCEDURES AND TOOLS

A TECHNICIAN USING A SERVICE PROCEDURE OR TOOL WHICH HAS NOT BEEN RECOMMENDED BY HENDRICKSON MUST FIRST SATISFY THEMSELVES THAT NEITHER HIS SAFETY NOR THE VEHICLE'S SAFETY WILL BE JEOPARDIZED BY THE METHOD OR TOOL SELECTED. INDIVIDUALS DEVIATING IN ANY MANNER FROM THE INSTRUCTIONS PROVIDED ASSUME ALL RISKS OF POTENTIAL PERSONAL INJURY OR DAMAGE TO EQUIPMENT INVOLVED.



WARNING

PERSONNEL PROTECTIVE EQUIPMENT

ALWAYS WEAR PROPER EYE PROTECTION AND OTHER REQUIRED PERSONAL PROTECTIVE EQUIPMENT TO HELP PREVENT PERSONAL INJURY WHEN PERFORMING VEHICLE MAINTENANCE, REPAIR, OR SERVICE.



WARNING

MODIFYING COMPONENTS

DO NOT MODIFY OR REWORK PARTS WITHOUT AUTHORIZATION FROM HENDRICKSON. DO NOT SUBSTITUTE REPLACEMENT COMPONENTS NOT AUTHORIZED BY HENDRICKSON. USE OF MODIFIED, REWORKED, SUBSTITUTE, OR REPLACEMENT PARTS NOT AUTHORIZED BY HENDRICKSON MAY NOT MEET HENDRICKSON'S SPECIFICATIONS, AND CAN RESULT IN FAILURE OF THE PART, LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY, OR PROPERTY DAMAGE, AND WILL VOID ANY APPLICABLE WARRANTIES. USE ONLY HENDRICKSON AUTHORIZED REPLACEMENT PARTS.



WARNING

TORCH / WELDING

DO NOT USE A CUTTING TORCH TO REMOVE ANY ATTACHING FASTENERS. THE USE OF HEAT ON SUSPENSION COMPONENTS WILL ADVERSELY AFFECT THE STRENGTH OF THESE PARTS. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

EXERCISE EXTREME CARE WHEN HANDLING OR PERFORMING MAINTENANCE IN THE AREA OF THE MAIN SUPPORT MEMBER. DO NOT CONNECT ARC WELDING GROUND LINE TO THE MAIN SUPPORT MEMBER. DO NOT STRIKE AN ARC WITH THE ELECTRODE ON THE MAIN SUPPORT MEMBER. DO NOT USE HEAT NEAR THE MAIN SUPPORT MEMBER ASSEMBLY. DO NOT NICK OR GOUGE THE MAIN SUPPORT MEMBER. SUCH IMPROPER ACTIONS CAN DAMAGE TO THE MAIN SUPPORT MEMBER ASSEMBLY AND CAN CAUSE AND CAN CAUSE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.



WARNING

STEERTEK NXT AXLE

UNAUTHORIZED WELDING OR MODIFICATIONS CAN CAUSE CRACKS OR OTHER AXLE STRUCTURAL DAMAGE AND RESULT IN LOSS OF VEHICLE CONTROL, SEVERE PERSONAL INJURY OR DEATH. DO NOT BEND, WELD OR MODIFY AXLE WITHOUT AUTHORIZATION FROM HENDRICKSON TRUCK COMMERCIAL VEHICLE SYSTEMS.



UNAUTHORIZED REPAIR AND RECONDITIONING

UNAUTHORIZED REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS ARE NOT ALLOWED, SEE LABEL IN FIGURE 3-1. ANY SUSPENSION OR AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATION MUST BE REPLACED. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. AIRTEK NXT COMPONENTS CAN NOT BE BENT, WELDED, HEATED, OR REPAIRED WITHOUT REDUCING THE STRENGTH OR LIFE OF THE COMPONENT. FAILURE TO FOLLOW THESE GUIDELINES CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.



DAMAGED AXLE COMPONENTS

IF A VEHICLE EQUIPPED WITH A AIRTEK NXT AXLE IS INVOLVED IN A CRASH, THE AXLE STEER KNUCKLES MUST BE DISASSEMBLED AND A THOROUGH INSPECTION OF THE AXLE MUST BE PERFORMED NOTING THE CONDITION OF THE AXLE BEAM, KINGPINS, AND KNUCKLE ASSEMBLIES, INCLUDING THE AREAS OF AXLE TO KINGPIN INTERFACE FOR ANY DAMAGE, GAPS, KINGPIN MOVEMENT OR PLAY. IF ANY COMPONENT APPEARS DAMAGED, OR THE KINGPINS APPEAR TO CONTAIN ANY DAMAGE, GAPS, MOVEMENT, OR PLAY, THE COMPLETE AXLE ASSEMBLY MUST BE REPLACED.

IN ADDITION, IN THE EVENT A CRASH RESULTS IN EXCESSIVE SIDE LOAD DAMAGE TO ADJACENT PARTS, SUCH AS A BENT WHEEL, HUB, OR SPINDLE, IT IS STRONGLY RECOMMENDED TO REPLACE THE COMPLETE AXLE ASSEMBLY.

CONTACT HENDRICKSON TECHNICAL SERVICES WITH ANY QUESTIONS. FAILURE TO REPLACE ANY DAMAGED COMPONENTS CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE, AND WILL VOID ANY APPLICABLE WARRANTIES.



IMPROPER JACKING METHOD

IMPROPER JACKING METHOD CAN CAUSE STRUCTURAL DAMAGE AND RESULT IN LOSS OF VEHICLE CONTROL, SEVERE PERSONAL INJURY OR DEATH. REFER TO VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS.



AXLE CAMBER IS NOT ADJUSTABLE

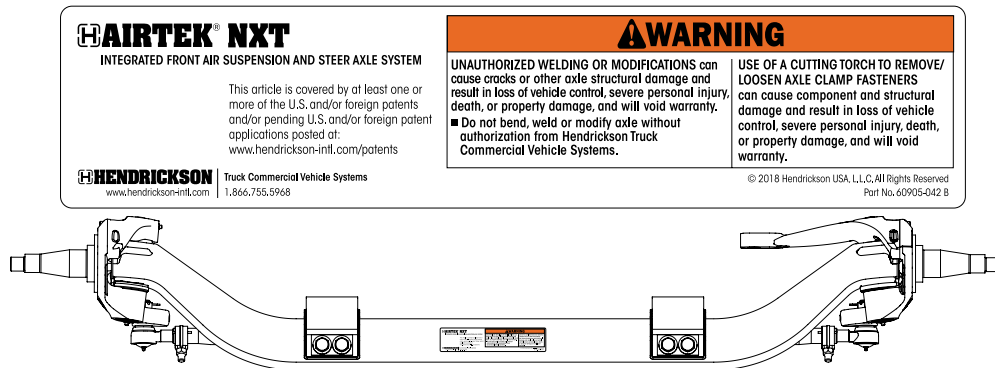
DO NOT CHANGE THE AXLE CAMBER ANGLE OR BEND THE AXLE BEAM, SEE FIGURE 3-1. BENDING THE AXLE BEAM TO CHANGE THE CAMBER ANGLE CAN DAMAGE THE AXLE AND REDUCE AXLE STRENGTH, WILL VOID HENDRICKSON'S WARRANTY AS APPLICABLE, AND CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.



AXLE KINGPINS

STEERTEK NXT IS A UNIQUE AXLE, IN THAT THE KINGPIN IS CRYOGENICALLY INSTALLED IN THE AXLE. THE KINGPIN IS A NON-REPLACEABLE COMPONENT OF THE AXLE ASSEMBLY. DO NOT TRY TO REMOVE THE KINGPIN. IF THE KINGPIN OR ADJACENT MATING SURFACE SHOW SIGNS OF DAMAGE OR MOVEMENT, DO NOT OPERATE THE VEHICLE AND IMMEDIATELY CONTACT THE HENDRICKSON TECH SERVICES DEPARTMENT.

FIGURE 3-1 NOTE: REPLACE ANY SAFETY DECALS THAT ARE FADED, TORN, MISSING, ILLEGIBLE, OR OTHERWISE DAMAGED. CONTACT HENDRICKSON TO ORDER REPLACEMENT LABELS.



SHOCK ABSORBERS

THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SPRINGS. ANYTIME THE FRONT AXLE ON THE SUSPENSION IS SUSPENDED IT IS MANDATORY THAT THE SHOCK ABSORBERS REMAIN CONNECTED. FAILURE TO DO SO COULD CAUSE THE REVERSE ARCH IN THE STEEL LEAF SPRINGS, POSSIBLY RESULTING IN PREMATURE STEEL LEAF SPRING FAILURE.



WARNING

AIR SPRINGS

AIR SPRING ASSEMBLIES MUST BE DEFLATED PRIOR TO LOOSENING ANY CLAMP GROUP HARDWARE. UNRESTRICTED AIR SPRING ASSEMBLIES CAN VIOLENTLY SHIFT. DO NOT INFLATE AIR SPRING ASSEMBLIES WHEN THEY ARE UNRESTRICTED. AIR SPRING ASSEMBLIES MUST BE RESTRICTED BY SUSPENSION OR OTHER ADEQUATE STRUCTURES. DO NOT INFLATE BEYOND THE PRESSURES RECOMMENDED BY THE AIR SPRING MANUFACTURER, CONTACT HENDRICKSON TECHNICAL SERVICES FOR DETAILS. IMPROPER USE OR OVER INFLATION MAY CAUSE AIR SPRING ASSEMBLIES TO BURST, CAUSE PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

WARNING

WHEN SERVICING THE VEHICLE OR ATTACHING AN AIR SPRING AND THE VEHICLE IS ON THE GROUND, PRIOR TO AIRING THE SUSPENSION SYSTEM MAKE CERTAIN THE AIR SPRING LOCATOR IS INDEXED INTO THE UPPER AIR SPRING BRACKET PROPERLY, AND THE AIR SPRING IS FULLY SEATED ON THE TOP PAD. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN PREMATURE AIR SPRING FAILURE, CAUSE PERSONAL INJURY, OR PROPERTY DAMAGE.

WARNING

PRIOR TO AND DURING DEFLATION AND INFLATION OF THE FRONT AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.

WARNING

OFF-ROADWAY TOWING

WHEN A VEHICLE IS DISABLED AND EQUIPPED WITH A AIRTEK NXT SYSTEM, CARE MUST BE TAKEN TO ENSURE THERE IS NO DAMAGE TO THE SUSPENSION OR AXLE WHEN TOWING THE VEHICLE. THE USE OF A TOW STRAP IS NECESSARY TO TOW A DISABLED VEHICLE TO A REPAIR FACILITY PARKING LOT INTO THE SHOP BAY. THE TOW STRAPS SHOULD BE CONNECTED TO THE TOW HOOKS PROVIDED BY THE VEHICLE MANUFACTURER AT THE FRONT OF THE BUMPER. IF THE USE OF TOW HOOKS IS NOT AN OPTION, THEN A TOW STRAP MAY BE WRAPPED AROUND THE FRONT AXLE, (SEE FIGURE 3-2) IN A MANNER THAT IS ACCEPTABLE FOR TOWING THE VEHICLE FROM A REPAIR FACILITY PARKING LOT INTO THE SHOP BAY. DO NOT USE A TOW CHAIN AROUND THE FRONT AXLE OR WITH A SINGLE POINT LOCATION TO TOW THE VEHICLE. DOING SO WILL DAMAGE THE AXLE AND VOID ANY APPLICABLE WARRANTY, SEE FIGURE 3-2. FOR DETAILED TOWING INSTRUCTIONS FOR ON-HIGHWAY TOWING, SEE TOWING PROCEDURES SECTION OF THIS PUBLICATION.

FIGURE 3-2



WARNING

PARTS CLEANING

SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS, AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY, CAREFULLY FOLLOW THE MANUFACTURER'S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURE:

- WEAR PROPER EYE PROTECTION.
- WEAR CLOTHING THAT PROTECTS YOUR SKIN.
- WORK IN A WELL-VENTILATED AREA.
- DO NOT USE GASOLINE, OR SOLVENTS THAT CONTAIN GASOLINE. GASOLINE CAN EXPLODE.
- HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED CORRECTLY. FOLLOW THE MANUFACTURER'S RECOMMENDED INSTRUCTIONS AND GUIDELINES CAREFULLY TO HELP PREVENT PERSONAL ACCIDENTS, OR INJURY.

DO NOT USE HOT SOLUTION TANKS OR WATER AND ALKALINE SOLUTIONS TO CLEAN GROUND OR POLISHED PARTS. DOING SO WILL CAUSE DAMAGE TO THE PARTS AND VOID ANY APPLICABLE WARRANTY.



SECTION 4 Special Tools

REAR LEAF SPRING BUSHING TOOLS

Hendrickson Part No. 66086-303
OTC Part No. 4263 Visit otctools.com



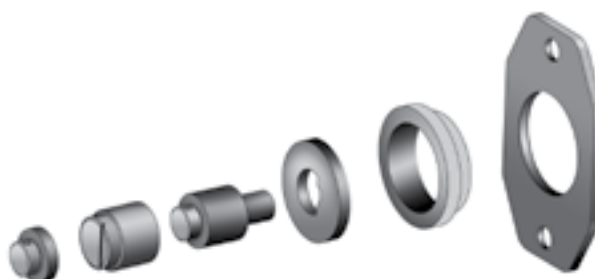
Hendrickson Part No. 66086-304
OTC Part No. 4261 Visit otctools.com



Hendrickson Part No. 66086-305 Adapter Set
OTC Part No. 4255 Visit otctools.com



Hendrickson Part No. 66086-302
OTC Part No. 4250 Visit otctools.com



KING PIN BUSHING TOOLS

ADJUSTABLE STRAIGHT FLUTE REAMER

1.802" to 1.812" Cutting Diameter

McMaster-Carr #3141A28

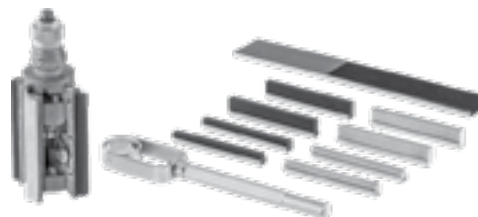


OR

PRECISION-FINISH CYLINDER HONE

1.75" to 2.75" Cylinder ID

McMaster-Carr #7362A45



EXTENSION PILOT TOOL

McMaster-Carr #3004A32

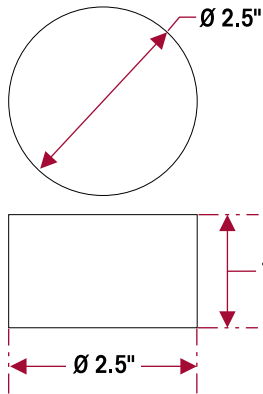




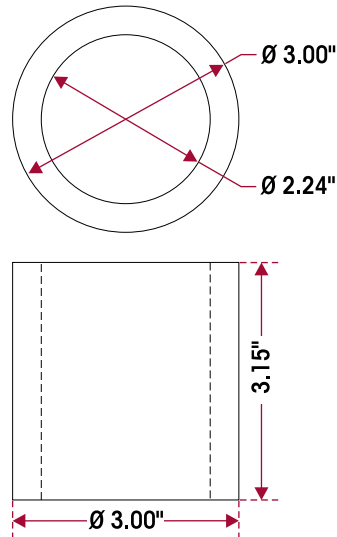
KINGPIN BUSHING AND SEAL – SHOP MADE TOOLS

These shop made tools are designed to install and remove kingpin bushings. Bushing tools are made from cold rolled steel or equivalent. Drawings are for reference only. Hendrickson does not supply these tools.

***Bushing Driver**



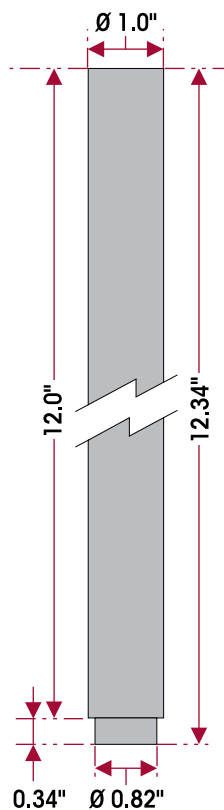
Bushing Receiving Tool
(press bushing replacement)



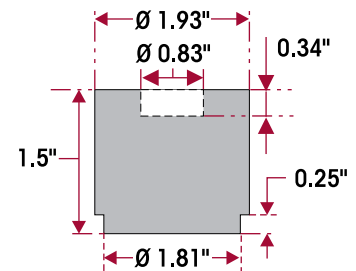
NOTE: *The bushing driver is necessary to sink the kingpin bushing flush into the steering knuckle bore.

NOTE: Kingpin Handle is used for both bushing installer / remover and seal installer tools

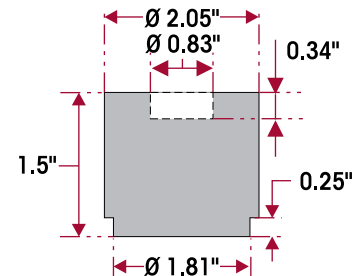
Kingpin Handle



Bushing Installer / Remover Tool
(to seat bushing)



Seal Installer Tool
(to seat seal)





SECTION 5 Parts List

Refer to [Hendrickson Literature Number SP-307, AIRTEK NXT Parts List for Freightliner Cascadia & Western Star 57X Vehicles](#), available online at www.hendrickson-intl.com

FIGURE 5-1

AIRTEK® NXT
Integrated front air suspension and fabricated steer axle system

In the spirit of innovation, Hendrickson has developed the AIRTEK® NXT next generation air suspension system. AIRTEK NXT combines the STEERTEK® NXT axle and air suspension technology with an advanced lightweight integrated clamp-group design. Hendrickson's advanced air suspension technology assists in protecting drivers from road irregularities and hazards, providing a premium ride. The new design is 65 pounds lighter than standard content to improve load capacity and help enhance fuel efficiency on the Freightliner Cascadia® & Western Star® 57X.

SALES ACADEMY

Parts Lists

SP-307 AIRTEK NXT Parts List for Freightliner Cascadia Vehicles & Western Star 57X Vehicles	E	11/15/2022	0.91 MB
SP-362 AIRTEK NXT Parts List for Perce TDA	A	4/30/2025	1.43 MB

Tech Bulletins

SEU-0223 STEERTEK NXT - STEERTEK Tie Rod Assemblies & Initial Technical Bulletin	F	8/31/2023	0.24 MB
12463-041 - STEERTEK NXT Axle Kingpins - BK to 14.6K, They're Permanent!	B	7/19/2024	6.12 MB
12463-041FR Rivets d'essieu STEERTEK NXT - BK to 14.6K, ils sont permanents	B	7/19/2024	0.71 MB
12463-045 Truck Tech Tips Newsletter -- Truck Air Suspension 101	A	6/17/2025	10.28 MB
SEU-0244 Aftermarket Service Replacement Parts for Wheel-end and Brake Components	A	5/19/2025	0.25 MB
12463-046 Don't Get Bent Out of Shape - Inspect Those Bushings!	A	3/13/2026	1.82 MB

Service Guides/Manuals

17730-007 AIRTEK NXT for Freightliner Cascadia & Western Star 57X Vehicles	D	11/29/2022	7.22 MB
17730-018 AIRTEK NXT for Freightliner and Western Star Technical Procedures	A	2/21/2024	0.21 MB



SECTION 6 Towing Procedures

ON-HIGHWAY AND ON-ROADWAY

Please read, understand and comply with any additional towing instructions and safety precautions that may be provided by the vehicle manufacturer.

Hendrickson will not be responsible for any damage to the axle, suspension or other vehicle components resulting from any towing method or fixture not authorized by Hendrickson.

For questions regarding proper towing procedures for vehicles equipped with AIRTEK NXT system, please contact Hendrickson Tech Services at 855-743-3733 (U.S. and Canada) or send e-mail to: wtechservices@hendrickson-intl.com.

Hendrickson recommends that a vehicle equipped with an AIRTEK NXT steer axle and suspension system be towed by the following methods (listed in order of preference) for ON-HIGHWAY or ON-ROADWAY applications.

- **METHOD 1** — Wheel lift, the ideal towing procedure
- **METHOD 2** — Conventional axle fork

METHOD 1 — WHEEL LIFT

This method provides the greatest ease for towing the vehicle. Lifting at the tires helps reduce the risk of possible damage to the axle, suspension, and engine components during towing operations, see Figure 6-1.

FIGURE 6-1



METHOD 2 — CONVENTIONAL AXLE FORK

This is an alternative method for towing the vehicle but requires standard tow forks and designated lift points.

NOTE

When lifting a vehicle with an under lift boom, care must be taken not to damage the engine's oil pan. Vehicles equipped with a front fairing may require the removal of the front fairing prior to towing to prevent component damage.

- Ensure there is sufficient clearance between the underbody components and the boom.
- Release the tractor brakes.



- Install the safety straps prior to towing the vehicle. It is preferred to use nylon safety straps. Chains have a tendency to bind and may cause damage to the axle.

1. Use a tow fork with a minimum of 4.5" opening with a 2" shank, see Figure 6-2.
2. Install the fork in the boom properly.
3. The proper tow fork location is centered between the locknuts on the axle wraps, see Figure 6-3.

FIGURE 6-2



FIGURE 6-3



OFF-ROADWAY TOWING



WHEN A VEHICLE IS DISABLED AND EQUIPPED WITH A AIRTEK NXT SYSTEM, CARE MUST BE TAKEN TO ENSURE THERE IS NO DAMAGE TO THE SUSPENSION OR AXLE WHEN TOWING THE VEHICLE. THE USE OF A TOW STRAP IS NECESSARY TO TOW A DISABLED VEHICLE TO A REPAIR FACILITY PARKING LOT INTO THE SHOP BAY. THE TOW STRAPS SHOULD BE CONNECTED TO THE TOW HOOKS PROVIDED BY THE VEHICLE MANUFACTURER AT THE FRONT OF THE BUMPER. IF THE USE OF TOW HOOKS IS NOT AN OPTION, THEN A TOW STRAP MAY BE WRAPPED AROUND THE FRONT AXLE, (SEE FIGURE 6-4) IN A MANNER THAT IS ACCEPTABLE FOR TOWING THE VEHICLE FROM A REPAIR FACILITY PARKING LOT INTO THE SHOP BAY. DO NOT USE A TOW CHAIN AROUND THE FRONT AXLE OR WITH A SINGLE POINT LOCATION TO TOW THE VEHICLE. DOING SO WILL DAMAGE THE AXLE AND VOID ANY APPLICABLE WARRANTY, SEE FIGURE 6-4.

- NYLON STRAPS OR CHAINS ARE NOT RECOMMENDED FOR ON-HIGHWAY OR ON-ROADWAY TOWING

FIGURE 6-4





SECTION 7

Preventive Maintenance

Following appropriate inspection procedures are important to help ensure the proper maintenance and operation of the AIRTEK NXT suspension and steer axle system and component parts function to their highest efficiency.

**HENDRICKSON RECOMMENDED
INSPECTION INTERVALS**

PRE-DELIVERY	FIRST IN-SERVICE	PREVENTIVE MAINTENANCE	
within the first 100 miles (160 km)	1,000 miles (1,600 km), 100 hours or whichever comes first	ON-HIGHWAY 50,000 miles (80,000 km), every 6 months or whichever comes first	ON-HIGHWAY 100,000 miles (161,000 km), every 12 months or whichever comes first


Hendrickson recommends to visually inspect for proper assembly, function, overall condition, and any signs of damage. During the inspection intervals as shown, check for any unusual movement, loose or missing components, abrasive or adverse contact with other parts, damaged or cracked parts, and improper suspension function or alignment. Replace components as necessary.

Air Spring and Air Supply (Pneumatic Components)	■	■	■	
Axle Wrap and Axle Wrap Liner	■	■	■	
Clamp Group	■	■	■	
Fasteners	■	■		■
Front and Rear Spring Eye Connection	■	■	■	
Front Wheel Alignment	■	■		■
Leaf Spring Assembly	■	■	■	
Rear Shackle Plates	■	■	■	
Ride Height	■	■		■
Shock Absorber	■		■	
STEERTEK NXT Assembly and Tie Rods	■	■	■	
Steering Operation	■		■	
Tire Wear			■	
Wear and Damage			■	

See the vehicle manufacturer's applicable publications for other preventive maintenance requirements.



COMPONENT INSPECTION

- **Air spring** — Look for chafing or any signs of spring or component damage. Replace all worn or damaged parts.
- **Air supply (Pneumatic components)** — The air supply to the system plays a large role in the air springs' performance. Inspect, clean and replace, if necessary, any support products to the air springs, valves, regulators and air lines. See Air Fitting Inspection in this section if an air leak is suspected.
- **Axle wrap and axle wrap liner** — Check torque on axle clamp through bolts. Inspect axle seats for cracks or damage. Inspect axle wrap liners for any missing liner material. If liner material is missing disassemble axle clamp group and replace liners, see Component Replacement section of this publication.
- **Clamp group** — Visually inspect for any loose or damaged fasteners. Verify the clamp group is properly aligned and fasteners have the proper torque values maintained.
- **Fasteners** — Visually inspect for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to the specified torque. Refer to the  Torque Specifications section of this publication. Use a calibrated torque wrench to check torque in a tightening direction. As soon as the fastener starts to move, record the torque. Correct the torque if necessary. Replace any worn or damaged fasteners.

NOTE

Torque values shown in this publication apply only if Hendrickson supplied fasteners are used. If non-Hendrickson fasteners are used, follow the torque specifications listed in the vehicle manufacturer's service manual.

- **Front and rear spring eye connection** — Visually inspect for any wear or deterioration of bushings. Verify the connection is properly aligned and fasteners have the proper torque values maintained.
- **Front wheel alignment** — Verify the alignment is within the vehicle manufacturer's tolerances.
- **Leaf spring assembly** — Look for any cracks. Replace if cracked or broken. See Component Replacement section of this publication for replacement procedure.
- **Rear shackle plate** — Check for proper alignment with spring taper and check for proper torque on rear spring mount fasteners. Refer to the Torque Specifications section of this publication.
- **Ride height** — Verify the ride height, refer to the Alignment & Adjustments section of this publication.
- **Shock absorbers** — Look for any signs of dents or leakage, misting is not considered a leak. See Shock Absorber Inspection in this section.
- **STEERTEK NXT axle and tie rod** — Visually inspect for any cracks or dents on the axle, refer to Tie Rod Ends in this section. Replace as necessary.
- **Steering operation** — All steering components must move freely through the full range of motion from axle stop to axle stop. Check for looseness at all pivot points. Inspect and lubricate all pivot points. Refer to the Troubleshooting Guide section of this publication.
- **Tire wear** — Inspect tires for wear patterns that may indicate suspension damage or misalignment. See Tire Inspection in this section.
- **Wear and damage** — Inspect all parts of suspension for wear and damage. Look for bent or cracked parts. Replace all worn or damaged parts.



LUBRICATION INTERVALS

For vehicles equipped with the AIRTEK NXT system, regular lubrication intervals should be followed to help prevent premature wear to the kingpin bushings and tie rod ends, see Lubrication Specifications below.

NOTE The recommended service lubrication interval is a guideline, the vehicle may require increased lubrication interval depending on severity of operation.

AIRTEK NXT Greasing and Lubrication Specifications				
Application	Component	Greasing Intervals	Grease	Outside Temperature
GENERAL Does not include linehaul or medium-duty applications	Kingpin Bushings	Maximum of 25,000 miles (40,225 km) or 90 days, whichever comes first	Multipurpose Grease NLGI Grade 2 rated GC-LB or equivalent	Refer to the lubricant manufacturer's specifications for the temperature service limits applicable to your area
	Tie Rod Ends			
	Drag Link	See Vehicle Manufacturer		
Application Specific Recommendations				
ON-HIGHWAY Linehaul Only, High Mileage Accumulation 95% Highway Surface No off-roadway operation Greater than 50,000 miles per year (80,500 kilometers per year)	Kingpin Bushings	Maximum of 100,000 miles (161,000 km) or 1 year, whichever comes first	Multipurpose Grease NLGI Grade 2 rated GC-LB or equivalent	Refer to the lubricant manufacturer's specifications for the temperature service limits applicable to your area
	Tie Rod Ends			
	Drag Link	See Vehicle Manufacturer		

KINGPIN

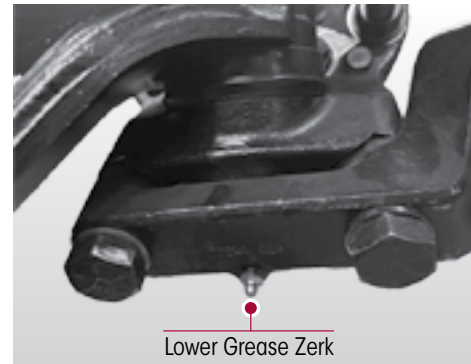
LUBRICATION

1. Place vehicle on the ground.
2. Chock the wheels and set parking brake.
3. Prior to greasing the kingpins on the vehicle, the suspension must be in a loaded condition.
4. Clean off all the grease zerks and grease gun tip with a clean shop towel prior to lubrication, see Figures 7-1 and 7-2.

FIGURE 7-1



FIGURE 7-2



5. Lubricate the kingpins through the grease zerks on the top and bottom of the steering knuckle, see Lubrication Specification chart above.
6. Force the required lubricant into the upper and lower kingpin grease zerks, until new lubricant flows out from the upper kingpin connection and steering knuckle and the thrust bearing purge location, see Figures 7-3 and 7-4.



FIGURE 7-3

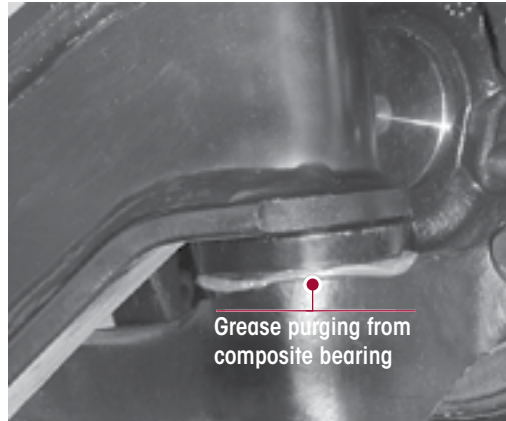
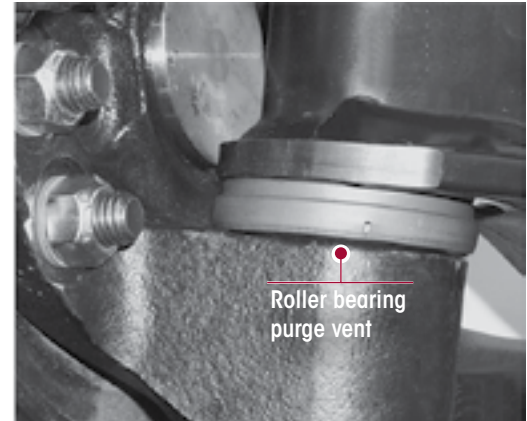


FIGURE 7-4



7. Remove wheel chocks.

NOTE

Greasing at the lower fitting should purge grease from the thrust bearing shell. The left side of the axle has a composite style thrust bearing and the right side of the axle has a steel roller thrust bearing, see Figure 7-5. Both purge in the same area.

FIGURE 7-5



TIE ROD ENDS

INSPECTION

Prior to inspection the entire system must be unloaded (i.e., the front end of the vehicle must be raised and supported with frame safety stands).



DO NOT GREASE THE TIE ROD ASSEMBLY BEFORE PERFORMING THE INSPECTION. DOING SO CAN INHIBIT EFFORTS TO DETERMINE ACTUAL WEAR.



REPLACE THE ENTIRE TIE ROD END IF THE BOOT IS TORN OR MISSING, FAILURE TO DO SO CAN CAUSE PREMATURE WEAR OF THE TIE ROD END.

1. Chock the rear wheels of the vehicle.
2. Use the bottom of the axle beam or the frame rails to raise the front end off the ground and support the frame with safety stands.
3. With the engine off, turn the wheels from full left to full right and then return to the straight-ahead position.
4. Check that the boots are in place and completely installed over the tie rod ends.
5. Check for cracking or tears in the boots. Also check the boot seals for damage. If the boot is damaged, replace the tie rod end.



THE COTTER PIN MUST BE INSTALLED CORRECTLY THROUGH THE TIE ROD END WITH THE CASTLE NUT TIGHTENED TO THE PROPER TORQUE SPECIFICATION IN ORDER TO SECURELY ATTACH THE TIE ROD. LOSS OF THE COTTER PIN CAN CAUSE THE TIE ROD END NUT TO BECOME LOOSE AND POSSIBLY RESULT IN TOTAL LOSS OF VEHICLE CONTROL.

6. Check that the tie rod end nut is installed and secured with a cotter pin. If the cotter pin is missing, check the nut torque specification and then install a new cotter pin. Always tighten the castle nut to specified torque when setting the cotter pin. **DO NOT** back off the nut to insert cotter pin.



WARNING

IT IS CRITICAL TO CHECK THE TIE ROD CLAMP BOLT HEAD LOCATION TO VERIFY THE CLAMP FASTENERS HAVE SUFFICIENT CLEARANCE AWAY FROM THE LOWER SHOCK MOUNT AT FULL WHEEL CUT. THE FASTENERS MUST NOT CONTACT THE LOWER SHOCK MOUNT. FAILURE TO DO SO CAN CAUSE ONE OR MORE COMPONENTS TO FAIL CAUSING LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

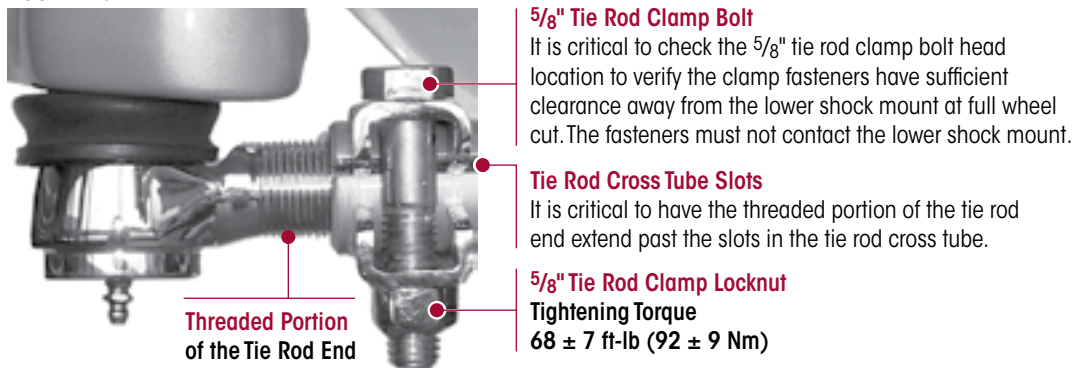
7. Verify the tie rod clamp bolt head does not contact the lower shock mount at full wheel cut, see Figure 7-6.

WARNING

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 7-6. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

8. Check that the tie rod end is threaded correctly into the cross tube and is engaged deeper than the end of the cross tube slot. The tie rod end must be visible the entire length of the cross tube slot, see Figure 7-6.

FIGURE 7-6



9. Check that grease zerks are installed. Replace a damaged grease zerk with a new one.

CAUTION

DO NOT USE THE FOLLOWING ITEMS OR METHODS TO CHECK FOR MOVEMENT OF THE TIE ROD ASSEMBLY, WHICH CAN CAUSE DAMAGE TO COMPONENTS:

- A CROW BAR, PICKLE FORK OR 2 x 4
- ANYTHING OTHER THAN HANDS USED TO GRASP AND ROTATE THE CROSS TUBE ASSEMBLY (CAN RESULT IN DAMAGE TO THE CROSS TUBE)
- EXCESSIVE PRESSURE OR FORCE APPLIED TO THE TIE ROD ENDS OR THE JOINTS OF THE ASSEMBLY

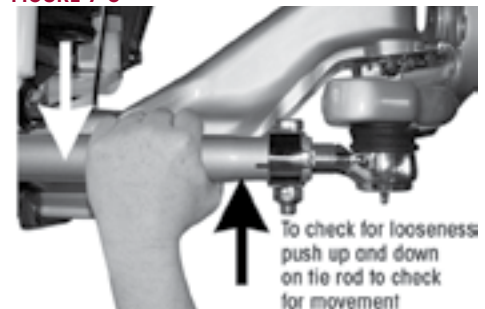
10. By hand or using a pipe wrench, with jaw protectors to avoid gouging the cross tube, rotate the cross tube toward the front of the vehicle and then toward the rear. After rotating, center the cross tube. If the cross tube will not rotate in either direction, replace both tie rod ends, see Figure 7-7.

11. Position yourself directly below the tie rod end. Using both hands, grab the assembly end as close to the tie rod end as possible (no more than 6" or 152.4 mm). Apply hand pressure with reasonable human effort vertically up and down in a push-pull motion several times (using approximately 75 ± 25 foot pounds of force). Check for any movement or looseness at both tie rod end locations, see Figure 7-8.

FIGURE 7-7



FIGURE 7-8



12. If there is any movement in the tie rod assembly, install a magnetic based dial indicator on the lower steering knuckle, see Figure 7-9.
13. Set the dial indicator to zero.
14. Apply hand pressure with reasonable human effort vertically up and down in a push-pull motion several times (using approximately 75 ± 25 pounds of force). Observe the reading on the dial indicator.
15. If the reading is more than 0.060", replace both tie rod ends at the next service interval.
16. If a tie rod end exhibits ≥ 0.125 " of movement by hand, the vehicle should be removed immediately from use and the tie rod end be replaced.

FIGURE 7-9

**NOTE**

According to the Commercial Vehicle Safety Alliance (CVSA), the "out of service" criteria for front steer axle tie rod assemblies on any commercial vehicle is: Any motion other than rotational between any linkage member and its attachment point of more than 0.125" (3 mm) measured with hand pressure only. (393.209(d)), (published in the North American Standard Out-of-Service Criteria Handbook, 2025.)

17. Remove the vehicle frame safety stands and lower the vehicle.
18. Remove the rear wheel chocks..

LUBRICATION PROCEDURE

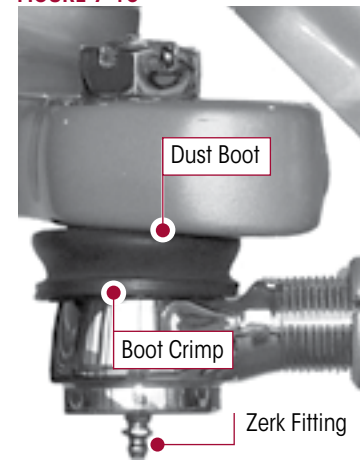
1. Turn the vehicle wheels straight ahead.
2. Chock the wheels.
3. Wipe the grease zerk and grease gun tip with clean shop towels.
4. Wipe the seal / boot clean with shop towels.
5. Attach a grease gun to the grease zerk. Either a hand or pneumatic grease gun is acceptable. If air operated grease gun is used, system air pressure should not exceed 150 psi (1035 kPa).



EXCEEDING THE MAXIMUM AIR PRESSURE TO THE GREASE ZERK CAN CAUSE DAMAGE TO THE DUST BOOT CAUSING COMPONENT FAILURE.

6. Dirt, water, and discolored old grease should flow from the relief vents or purge holes near the boot crimp or bellows area, see Figure 7-10.
7. Continue to purge grease until fresh grease flows from the purge area.
8. Tie rod ends are designed for lube service. If a tie rod end will not accept grease, proceed as follows:
 - a. Remove the grease zerk.
 - b. Inspect the threaded grease zerk hole in the tie rod end and remove any obstructions.
 - c. Install a new grease zerk.
 - d. Continue the lubrication procedure.

FIGURE 7-10

**NOTE**

If the tie rod end still does not accept grease following this procedure, replace the tie rod end (see Tie Rod End and Cross Tube in the Component Replacement section of this publication).

9. Remove the wheel chocks.



KINGPIN BUSHING

INSPECT STEERING KNUCKLE LATERAL MOVEMENT

NOTE

If one (1) bushing is worn or damaged, it is mandatory to replace both the top and bottom bushings on that knuckle assembly.

1. Chock the wheels to help prevent the vehicle from moving. Set the parking brake.
2. Use a jack to raise the vehicle. Support the vehicle with safety stands.
3. **CHECK THE UPPER KINGPIN BUSHING.** Install the base of a dial indicator onto the axle beam and place the tip against the side of the upper steering knuckle, see Figure 7-11.
4. Set the dial indicator to "0" zero.
5. Move the **TOP** of the tire in and out by applying reasonable constant pressure and then release, see Figure 7-13.
6. Check the reading on the dial indicator. If the dial indicator moves:
 - more than 0.015", the upper bushing is worn or damaged. Replace both kingpin bushings. Refer to Kingpin Bushing in the Component Replacement section of this publication.
 - less than 0.015", proceed to Step 7.
7. **CHECK THE LOWER KINGPIN BUSHING.** Install a dial indicator so that the base is on the axle and the indicator tip is against the side of the lower steering knuckle, see Figure 7-12.
8. Set the dial indicator to "0" zero.
9. Move the **BOTTOM** of the tire in and out. If the dial indicator moves:
 - More than 0.015", the lower bushing is worn or damaged. Replace both kingpin bushings. Refer to the Kingpin Bushing replacement procedure in the Component Replacement section of this publication.
 - Less than 0.015", proceed to Step 10.
10. Lower the vehicle and remove the safety stands.
11. Remove the wheel chocks.

FIGURE 7-11

Check the **UPPER** Kingpin Bushing



FIGURE 7-12

Check the **LOWER** Kingpin Bushing



FIGURE 7-13

Move the **TOP and BOTTOM** of the tire in and out



STEERING KNUCKLE

CHECKING VERTICAL END PLAY (UP AND DOWN MOVEMENT)

The operating spec for vertical end play on the steering knuckle is 0.008" to 0.030".

1. Chock the rear tires to help prevent the vehicle from moving.
2. Set the parking brakes.
3. Use a jack to raise the vehicle until both tires are 1" off the ground.
4. Support the vehicle with safety stands.
5. Place a dial indicator on each side of the axle as follows:
 - a. Index the wheels slightly (left or right)
 - b. Place the magnetic dial indicator base on the axle, see Figure 7-14.
 - c. Place the tip of the dial indicator on the top of the upper steering knuckle (not on the grease cap).
6. Set the dial indicator to "0" (zero).
7. Lower the jack.
8. If vertical end play is greater than 0.030", or below 0.008" an adjustment of the upper steering knuckle is necessary.
9. **Upper steering knuckle adjustment:** Refer to Steering Knuckle in Component Replacement section of this publication for proper shim installation / removal.

If the vertical end play is:

 - **Greater than 0.030"**— Loosen the socket head cap screws and **push down** on the upper knuckle assembly until the proper vertical end play is achieved.
 - **Less than 0.008"**— Loosen the socket head cap screws and **pull up** on the upper knuckle assembly until the proper vertical end play is achieved.
10. Re-tighten the socket head cap screws to 187 ± 12 foot pounds torque.
11. Remove the safety stands and lower the vehicle.
12. Remove wheel chocks.

FIGURE 7-14

Ensure the tip of the dial indicator is on the top of the upper steering knuckle and not on the grease cap



LEAF SPRING CLAMP GROUP U-BOLT LOCKNUTS RETORQUE INTERVALS

1. Clamp group U-bolt locknuts must be tightened to specified torque at preparation for delivery and must be retorqued at 1,000 miles. Thereafter follow the 6 month/50,000 mile visual inspection and annual retorque interval.

WARNING

ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

2. Ensure that the clamp group is properly aligned and the U-bolts are seated in the axle wrap, and the top pad is centered on the leaf spring, see Figure 7-15.
3. Check for the signs of component or bolt movement. If signs of movement are present, disassemble the clamp group fasteners, check for component wear or damage and replace components as necessary, then install new clamp group U-bolt fasteners. Follow assembly instructions per Component Replacement section in this publication.
4. Tighten the M20 clamp group U-bolt locknuts evenly in 100 foot pounds increments to 350 ± 20 foot pounds torque in the proper pattern to achieve uniform bolt tension, see Figure 7-16.



FIGURE 7-15

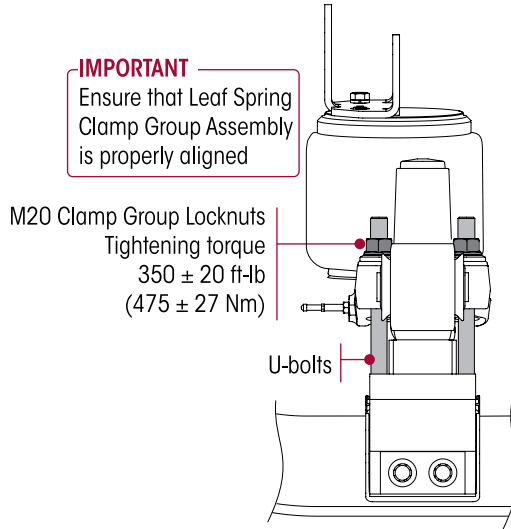
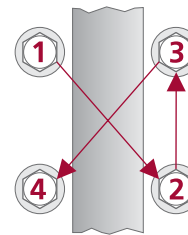


FIGURE 7-16



AXLE CLAMP THROUGH BOLTS



WARNING

A TECHNICIAN USING A SERVICE PROCEDURE OR TOOL WHICH HAS NOT BEEN RECOMMENDED BY HENDRICKSON MUST FIRST SATISFY HIMSELF THAT NEITHER HIS SAFETY NOR THE VEHICLE'S SAFETY WILL BE JEOPARDIZED BY THE METHOD OR TOOL SELECTED. INDIVIDUALS DEVIATING IN ANY MANNER FROM THE INSTRUCTIONS PROVIDED WILL ASSUME ALL RISKS OF CONSEQUENTIAL PERSONAL INJURY OR DAMAGE TO EQUIPMENT INVOLVED.



WARNING

LOOSE OR OVER TORQUED FASTENERS CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, OR SEVERE PERSONAL INJURY. MAINTAIN CORRECT TORQUE VALUES AT ALL TIMES. CHECK TORQUE VALUES ON A REGULAR BASIS AS SPECIFIED.

NOTE

A popping noise coming from the steer axle area may indicate loose fasteners. Proceed to the next service facility for a torque inspection to ensure the fasteners are tightened to specification.

1. Chock the wheels.
2. Tighten the axle clamp fasteners at the bolt head evenly in 140 foot pounds increments to 420 ± 20 foot pounds torque, see Figures 7-17 and 7-18.
3. To identify if the torque inspection is completed, apply a mark with torque seal to both the axle clamp and bolt heads.

TORQUE INSPECTION

FIGURE 7-17

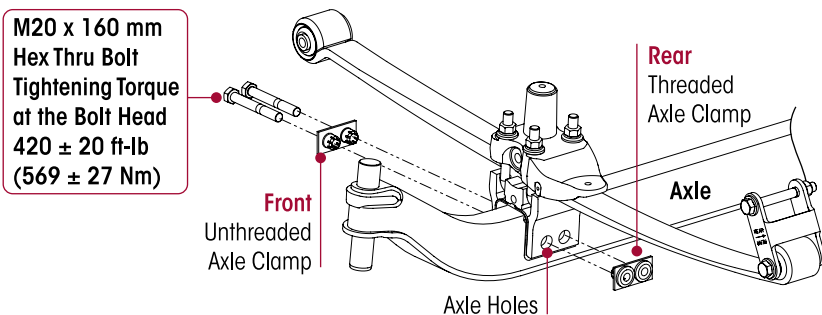
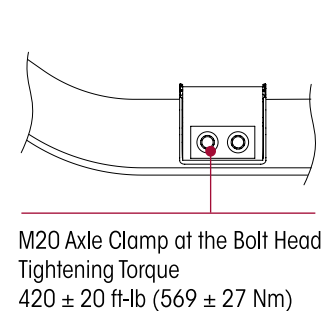


FIGURE 7-18



AXLE WRAP LINER

NOTE

Axle wrap liners are installed to help prevent any type of abrasion on the axle at the axle clamp group area. Any time an axle clamp group is removed it is mandatory that the axle wrap liner be replaced.



INSPECTION

Liner Crack Criteria — It is possible for the axle wrap liner to crack during service. If the liner is cracked and all the pieces are intact it is not necessary to replace the liner. If the liner is broken out and there are pieces missing the liner must be replaced immediately, refer to the Leaf Spring and Clamp Group Assembly in the Component Replacement section of this publication.

SHOCK ABSORBER

NOTE

It is not necessary to replace shock absorbers in pairs if one (1) shock absorber requires replacement.

Hendrickson uses a long service life, premium shock absorber on all AIRTEK NXT suspensions. If shock absorber replacement is necessary, Hendrickson recommends that the shock absorbers be replaced with identical Hendrickson Genuine part for servicing. Failure to do so will affect the suspension performance, durability, and will void any applicable warranty. See vehicle manufacturer’s applicable publications for other shock absorber inspection requirements.

Inspection of the shock absorber can be performed by doing a heat test, and a visual inspection. Replace as necessary, refer to the Component Replacement section in this publication.

FIGURE 7-19



HEAT TEST AND PHYSICAL INSPECTION

1. **Heat Test:** Drive the vehicle at moderate speeds on a rough road for minimum of fifteen minutes.



WARNING

DO NOT GRAB THE SHOCK ABSORBER AS IT COULD POSSIBLY BE HOT AND CAUSE PERSONAL INJURY.

- a. Perform heat test by carefully touching or placing a hand near the shock absorber body below the dust cover. Touch the frame to get an ambient reference, see Figure 7-19. A shock absorber that is warm to the touch is acceptable, a cold shock absorber should be replaced.
2. **Physical Inspection:** To inspect for an internal failure, remove and shake the suspected shock absorber. Listen for the sound of metal parts rattling inside. Rattling of metal parts can indicate that the shock absorber has an internal failure and the shock absorber should be replaced.

VISUAL INSPECTION

Look for these potential problems when doing a visual inspection, see Figure 7-20. Inspect the shock absorbers fully extended. Replace as necessary.

FIGURE 7-20

SHOCK ABSORBER VISUAL INSPECTION - UNACCEPTABLE CONDITIONS



Damaged upper or lower mount



Damaged upper or lower bushing



Damaged dust cover and / or shock body



Bent or dented shock absorber



Improper installation
Example: washer (if equipped installed backwards)

LEAKING VS. MISTING SHOCK ABSORBER VISUAL INSPECTION

The inspection must not be conducted after driving in wet weather or a vehicle wash. The shock absorber needs to be free from water.

Many shock absorbers are often misdiagnosed as failures. Misting is the process whereby very small amounts of shock absorber fluid evaporate at a high operating temperature through the upper seal of the shock absorber. When the "mist" reaches the cooler outside air, it condenses and forms a film on the outside of the shock absorber body. Misting is perfectly normal and necessary function of the shock absorber. The fluid which evaporates through the seal area helps to lubricate and prolong the life of the seal.

FIGURE 7-21



NOTE

AIRTEK NXT suspension systems are equipped with a premium seal on the shock absorber, however this seal will allow for misting to appear on the shock absorber body (misting is not a leak and is considered acceptable).

Inspect the shock absorber fully extended. **A shock absorber that is truly leaking** will show signs of fluid **leaking in streams from the upper seal**. These streams can easily be seen, see Figure 7-21, underneath the main body (dust cover) of the shock absorber. Replace as necessary.

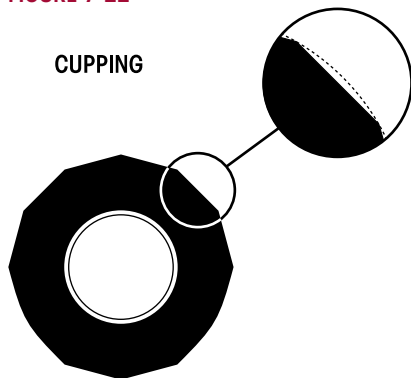
VISUAL TIRE INSPECTION

The following tire inspection guidelines are based upon Technology & Maintenance Council (TMC) recommended practices. Any issues regarding irregular tire wear where Hendrickson is asked for assistance, will require tire and alignment maintenance records, reference RP 642 in TMC Recommended Practices Manual.

Tire wear is normally the best indicator of vehicle alignment condition. If tires are wearing too rapidly or irregularly, alignment corrections may be needed. The tire wear patterns described below can help isolate specific alignment problems.

The most common conditions of concern for steer tires are: cupping, diagonal wear, feather wear, one-sided wear, overall fast wear (Miles per 32nd), and rapid shoulder wear (one shoulder only).

FIGURE 7-22



Cupping — Localized, dished out areas of fast wear creating a scalloped appearance around the tire. Cupping, which appears around the tire on the shoulder ribs, may also progress to adjoining ribs.

Cupping is usually a result of moderate-to-severe imbalance, improper rim/wheel mounting, excessive wheel end play or other assembly non-uniformity. It can also be due to lack of shock absorber control on some suspension types as well as loose kingpins.

To solve cupping problems:

Tires – Correct mismatch or balance problem. If ride complaints arise, steer tires may be rotated to drive or trailer axle.

Vehicle – Diagnose component imbalance condition, i.e., wheel, rim, hub, brake, drum. Correct as necessary.

Diagonal Wear — Is localized flat spots worn diagonally across the tread at approximately 25-35° angles, often repeating around the tread circumference. For more information.

Diagonal wear is usually caused by bad wheel bearings, toe out, mismounting of tire and wheel assembly to axle, and mismatched duals for size and/or inflation pressures. It may start as brake skid. Diagonal wear is aggravated by high speed empty or light load hauls.

To correct diagonal wear, reverse direction of rotation of the tire. If wear is excessive, true or retread tire. If the source of trouble is the vehicle, diagnose cause and correct as needed.

FIGURE 7-23
DIAGONAL WEAR

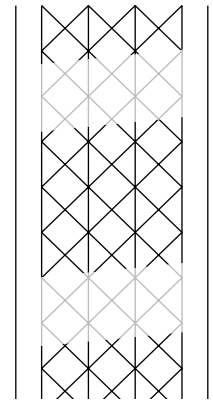
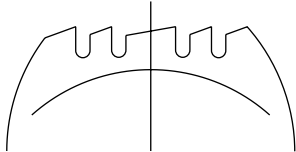


FIGURE 7-24
FEATHER WEAR



Feather wear — Tread ribs or blocks worn so that one side is higher than the other resulting in step-offs across the tread face. Generally, all ribs or blocks exhibit this wear.

To spot this problem do the following: With one hand flat on the tread of the tire and a firm down pressure, slide your hand across the tread of the tire. In one direction, the tire will feel smooth and in the opposite direction there will be a sharp edge to the tread.

If feather wear on both steer tires is in the same direction, drive axle or other chassis misalignment is indicated. If one steer tire shows feather wear and the other steer tire has normal wear, a combination of toe and drive axle or chassis misalignment is indicated.

One-sided wear — Is excessive wear on one side of tire extending from the shoulder towards the center of the tread.

One-sided wear is usually caused by improper alignment, worn kingpins, loose wheel bearings, excessive negative camber, excessive axle loads, nonparallel axles, or non-uniform tire and wheel assembly caused by improper bead seating or a bent wheel.

To correct one-sided wear:

Tires – Depending on severity, rotate tires to another axle position or, if worn to minimum tread depths, submit for possible retreading.

Vehicle – Diagnose mechanical problem and correct.

FIGURE 7-25
ONE-SIDED WEAR

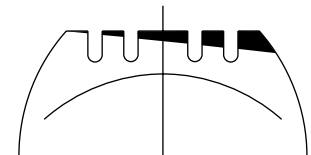
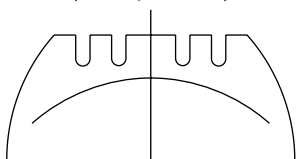


FIGURE 7-26
OVERALL FAST WEAR
(Miles per 32nd)



Overall Fast Wear — Fast wear can be described as exhibiting a good, but accelerated wear pattern. It is typically caused by operating conditions, such as mountainous terrain, frequency and severity of turning, abrasive road surfaces in combination with vehicle configurations and their attributes — such as power steering, heavy axle loads, high wheel cuts, setback axles, short wheel base tractors, long wheel base straight trucks. To correct this problem, consult with vehicle and tire manufacturers when specifying equipment or replacing tires. (TMC RP-230)

Rapid Shoulder Wear (one shoulder only) — Is a tire worn on the edge of one shoulder, sometimes extending to inner ribs. It can progress to diagonal wipeout.

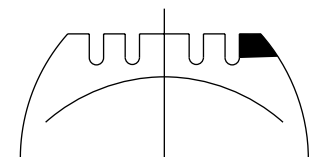
This wear condition is usually caused by excessive toe or excessive camber. These conditions can be created by a misaligned or bent axle and can also be caused by loose or worn wheel bearings.

To correct this type of rapid shoulder wear:

Tires – Change direction of rotation of tire. If shoulder wear is severe, remove and retread.

Vehicle – Diagnose misalignment and/or mechanical condition and correct.

FIGURE 7-27
RAPID SHOULDER WEAR
(One Shoulder Only)

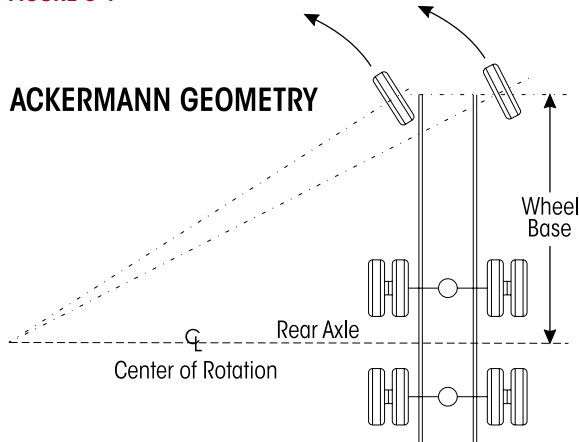


SECTION 8

Alignment & Adjustments

ALIGNMENT DEFINITIONS

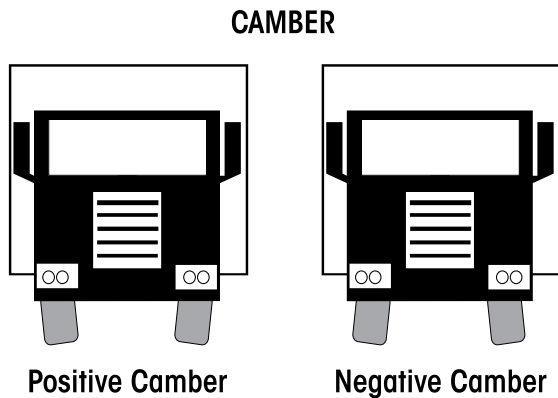
FIGURE 8-1



Lower Steering Knuckle (Ackermann Arm) Geometry — The geometry of the four bar linkage consisting of the front axle beam pivot points, tie rod arms, and cross tube and attempts to provide free rolling of front tires in a turn. Ackermann geometry is dependent upon the steering axle track-width and wheelbase of the vehicle. Improper geometry results in wheel scrub in turns which generally appears as toe wear on the tire, usually more wear on one side of the vehicle than the other due to the operational route of the vehicle.

Bump Steer (Feedback) — The feedback felt through the steering linkage to the steering wheel when a steer axle tire hits a bump in the road. This occurs because the axle-end of the drag link and the axle attachment point of the spring do not travel in parallel circular arcs as the suspension moves up and down. This condition can also be caused by trapped air in the power steering system.

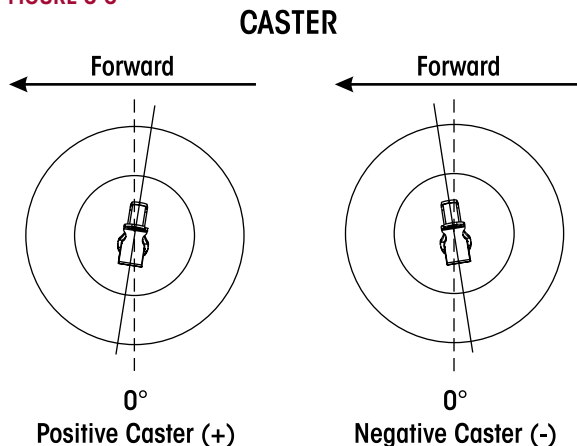
FIGURE 8-2



Camber — The angle formed by the inward or outward tilt of the wheel reference to a vertical line. Camber is positive when the wheel is tilted outward at the top and is negative when the wheel is tilted inward at the top.

Excessive positive camber may cause smooth wear on the outer half of the tire tread. Excessive negative camber may cause wear on the inner half of the tread. Static-unloaded camber angles are built into the axle to put the loaded tire perpendicular to the road.

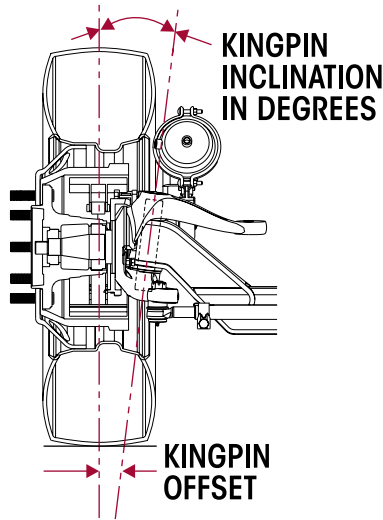
FIGURE 8-3



Caster — The forward or rearward tilt of the steering axle kingpin in reference to a vertical line. The angle is measured in degrees. Caster is positive when the top of the steering axis is tilted rearward and is negative when the tilt is forward. Proper caster is important for directional stability and returnability. Too much positive caster can cause shimmy, excessive steering effort and is normally a vehicle performance and handling consideration. Uneven positive caster may create a steering pull toward the side with the lower caster. This attribute may be used to compensate for crowned roads.



FIGURE 8-4



Kingpin Inclination — The inward tilt of the kingpin from the vertical. This front suspension parameter has a pronounced effect on steering effort and returnability. As the front wheels are turned around an inclined kingpin, the front of the truck is lifted. This lifting of the vehicle is experienced as steering effort when the turn is executed and exhibits itself as recovery force when the steering wheel is released.

Kingpin Offset — The distance between the center of the tire patch and intersection of the kingpin axis with the ground. This parameter of front end geometry is important in vehicles without power steering and has a major effect on static steering. If there is no kingpin offset, the tires must scrub around the center of the pin patch when turned in a static condition, resulting in higher static steering efforts.

Steering arm — The component that connects the drag link to the axle knuckle assembly.

FIGURE 8-5

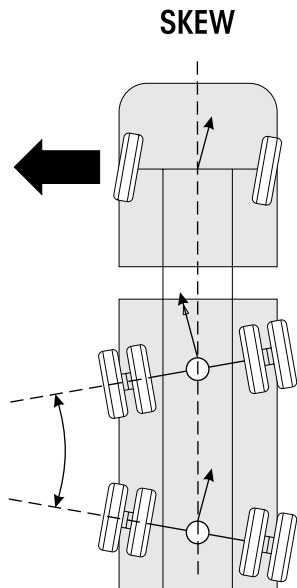
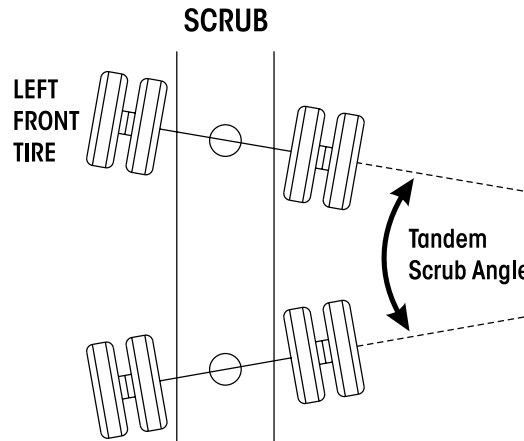


FIGURE 8-6

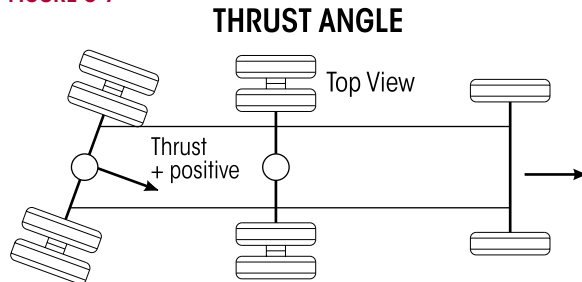


Scrub, skew, tram angle or parallelism — The angle formed by two thrust or tracking lines of a tandem (or multiple) axle vehicle. As indicated by the term "parallelism", the ideal condition is when the two thrust lines form a 0° angle, or are parallel to each other. Positive skew or tram is when the distance between the right axle ends is less than the distance between the left.

Any scrub angle other than 0° will cause the tandem axles to work against each other. The steer axle must be turned to offset the "push" of the tandem axles to keep the vehicle moving straight ahead. This causes every tire on

the vehicle to "scrub". Tire wear from tandem scrubbing occurs at the leading edge of the steer tires in a pattern called "inside/ outside" wear, that is, the inside edge of the left steer tire and the outside edge of the right steer tire will exhibit irregular wear for example. Additional tire wear may occur on all tandem axle tires.

FIGURE 8-7



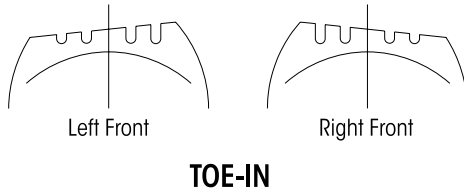
Thrust Angle, Tracking, or Square — The angle formed by the centerline of the vehicle frame (geometric centerline) and the direction that an axle points. As indicated by the term "square", the ideal value for the angle is 0° or when the axle centerline is at 90° or perpendicular to the geometric centerline. Thrust or tracking to the right is positive, and to the left is negative.

A steering correction is required to offset the effect of the thrust angles and keeps the vehicle traveling in a straight line. It results in a lateral offset between the steer and drive axle tires commonly referred to as "dog tracking."

Tie Rod Arm (lower steering knuckle, cross tube arm) — The component that transmits steering forces between left and right axle knuckle assemblies through the cross tube assembly.

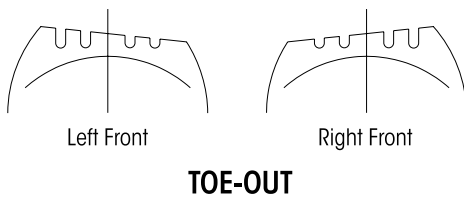


FIGURE 8-8



Toe-in — is when the horizontal line intersects in front of the wheels, or the wheels are closer together in front than in the back. Toe-in is commonly designated as positive, toe-out as negative. Excessive toe-in wears the outside edge of the tires. Steer axle toe is adjustable to reduce wear to the leading edge of the tire and also to avoid road wander. Toe is adjusted in a static, unloaded condition so that the tires will run in a straight line under a dynamic, loaded condition.

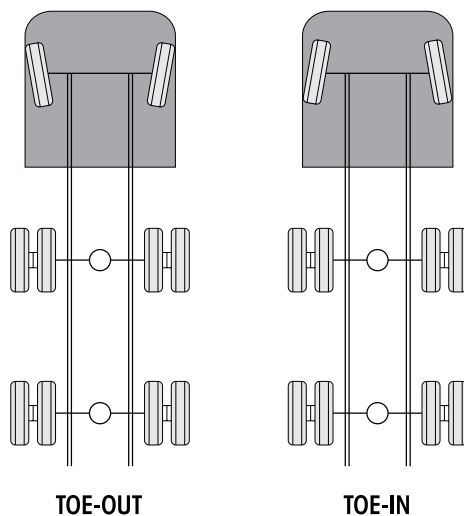
FIGURE 8-9



Toe-out — Is when the horizontal lines intersect behind the wheels, or the wheels are closer together in back than in front. Toe-in is commonly designated as positive, toe-out as negative. Excessive toe-out wears the inside edge of the tires. Steer axle toe is adjustable to reduce wear to the leading edge of the tire and also to avoid road wander. Toe is adjusted in a static, unloaded condition so that the tires will run in a straight line under a dynamic, loaded condition.

FIGURE 8-10

TOTAL TOE



Toe-Out on Turns — (See Ackermann Geometry). Excessive turning angles such as those encountered in pickup and delivery operations may contribute to premature tire wear. Be advised that the greater turning angles, the more that toe and camber change. If you have any doubt regarding the optimum turning angles for your operation, contact the vehicle's manufacturer, axle manufacturer, tire manufacturer and alignment equipment manufacturer for advice.

Total Toe — The angle formed by two horizontal lines through the planes of two wheels. Steer axle toe is adjustable to reduce wear to the leading edge of the tire and also to avoid road wander. Toe is adjusted in a static, unloaded condition so that the tires will run in a straight line under a dynamic, loaded condition.

DUAL RIDE HEIGHT VERIFICATION

YOU WILL NEED:

- Lit No. 45745-436 Height Gauge for AIRTEK NXT Freightliner New Cascadia • Western Star 57X Vehicles, can be obtained online at www.hendrickson-intl.com/Lifform

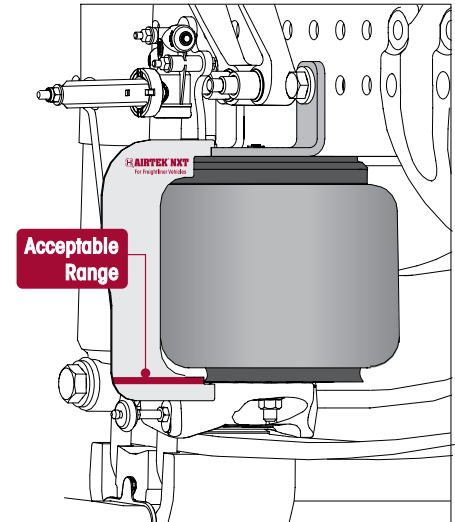
The recommendation of the vehicle manufacturer is that dual height control valves are only to be installed on the front suspension when the rear suspension is equipped with a single height control valve system. This arrangement is best suited to keep the vehicle level versus having dual height control systems on both the front and rear suspensions.

1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all the wheels positioned straight ahead.
2. Try to roll to a stop without the brakes being applied.
3. Chock the drive wheels. **DO NOT** set parking brake.
4. Verify that the air system is at full operating pressure.
5. Detach the lower rubber grommet of the height control valve linkage from the lower stud and exhaust the suspension system air by lowering the height control valve linkage arms.
6. Re-attach the lower grommet of the height control valve linkages onto the lower studs to fill the suspension system with air. Wait until the airflow to the front air springs has stopped.



7. Hold the Hendrickson AIRTEK NXT ride height gauge (Literature Number 45745-436) vertically, see Figure 8-11. Place the gauge so the upper notch is flush against the bottom air spring bracket. The lower air spring piston flange edge should contact the lower region marked "ACCEPTABLE" indicated on the gauge. Repeat procedure for the other side of the vehicle.

FIGURE 8-11



8. If the air spring piston flange edge is in contact with the "BELOW SPEC" region, the ride is set too low. If the air spring piston flange contacts the "ABOVE SPEC" region, the ride height is set too high. If the ride height is out of specification it will be necessary to adjust the ride height.
9. If a ride height gauge is not available, measure the suspension ride height on the front axle:
 - **Referenced ride height** (top front of the air spring to the bottom of the air spring piston flange) is $8" \pm \frac{1}{8}"$.

If the ride height is out of specification, it will be necessary to adjust the ride height.

ADJUSTMENT PROCEDURE

1. Verify that the air system is at full operating pressure.

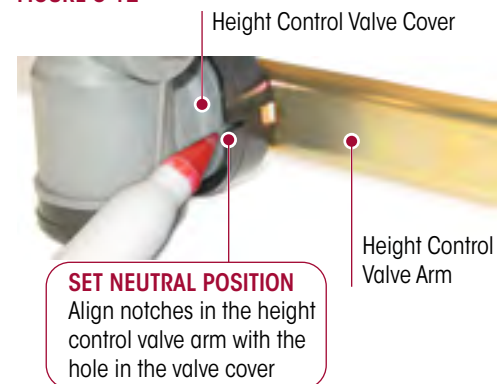
SERVICE HINT

It is very important that the leveling valve be cycled completely before and after any ride height adjustments. Cycling of the leveling valve will help make the adjustment more accurate.

2. See the Air Spring Safety Notice in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
3. Cycle the air system. Detach the lower rubber grommet(s) of the height control valve linkage(s) from the lower stud and exhaust the suspension system air by lowering the height control valve linkage arm.
4. Refill the suspension by raising the height control valve arm(s) by hand, so that the air springs are above the proper ride height.
5. Lower the height control valve arm(s) to exhaust the air system until the suspension is at the proper ride height as measured on the AIRTEK NXT ride height gauge (Literature Number 45745-436).

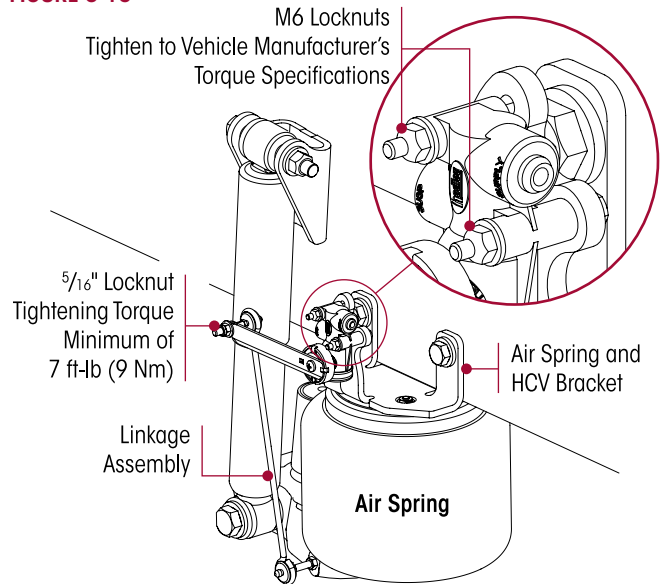
FIGURE 8-12

6. Rotate lever and set to neutral position (deadband) for the height control valve(s) by aligning the notches in the height control valve arm(s) with the hole in the height control valve cover, as shown in Figure 8-12.
7. With the height control valve at the neutral position (deadband), adjust the height control valves by loosening the mounting locknuts and rotating the valve body in the mounting bracket so the link mount stud inserts directly into the center hole of the rubber grommet at the proper height.



8. Facing the air spring from the outboard side on the left side of the vehicle, pivot the valve body counter clockwise to increase the ride height and clockwise to decrease the ride height. On the right side of the vehicle, pivot the valve body clockwise to increase the ride height and counter clockwise to decrease the ride height.

9. Tighten the height control valve mounting locknuts to the vehicle manufacturer's specifications, after the adjustment is made, see Figure 8-13.
10. Cycle the air from the system by lowering the height control valve arm.
11. Reconnect the height control valve linkage rubber grommet to the link mounts. Allow the air suspension system to completely fill with air.
12. Recheck the ride height on both sides of the vehicle after adjustment.
13. Repeat adjustment if necessary until the ride height is within specification.

FIGURE 8-13


INSPECTION PRIOR TO ALIGNMENT

WHEELS AND TIRES

Examine the following items:

- The tires are inflated to the manufacturer's specified tire pressure.
- The steer axle tires are the same size and type.
- The lug nuts are tightened to manufacturer's specified torque.
- The wheels are balanced and check for tire to rim runout.
- The wheels and tires are free of excessive wear and damage.
- Wheel bearing end play is within vehicle manufacturer's specification.

FRONT SUSPENSION

Inspect the following:

- All fasteners are installed and tightened to the specified torque, refer to the Torque Specifications section in this publication.
- Leaf springs are free of wear or damage.
- Air springs are free of wear or damage.
- Shock absorbers are free of wear and damage.
- Verify the rear suspension ride height is within specification if equipped with an air suspension. Follow manufacturer's guidelines (if equipped).
- Front and rear spring mounts for wear or damage.

TIE ROD ENDS

Perform the Tie Rod Inspection procedure, refer to the Preventive Maintenance section in this publication.

REAR AXLE AND REAR SUSPENSION

Rear axle misalignment can cause front tire wear. If the outer edge of one front tire is worn and the inner edge of the other front tire is worn, check the following:



- Ensure the rear axle is correctly aligned. Refer to the procedure from the vehicle or suspension manufacturer.
- All fasteners, including U-bolts (if applicable) are installed and tightened to the specified torque.
- Ensure the leaf springs are not worn or damaged.
- Ensure the bushings in the leaf springs are not worn or damaged.
- Ensure the torque rods (if used) are correctly adjusted (if adjustable).
- Verify the vehicle frame is not bent or twisted.
- Refer to any additional recommendations and specifications from the vehicle, rear axle, and/or suspension manufacturer. Reference the TMC (The Technology & Maintenance Council) Guidelines for Total Vehicle Alignment.

FRONT WHEEL ALIGNMENT

Hendrickson recommends technicians review the TMC Guidelines for Total Vehicle Alignment (TMC RP 642).

Check total (front and rear) vehicle wheel alignment when any of the following occurs:

- Every 100,000 miles (161,000 km), or 12 months (normal maintenance), whichever comes first.
- When the vehicle does not steer correctly.
- When correcting a tire wear condition.

For **rear** wheel alignment specifications and adjustment, refer to the vehicle manufacturer.

The **front** wheel alignment specifications can be found in the Front Wheel Alignment Specifications section of this publication. There are two types of front wheel alignment:

1. **Minor alignment** – a minor front wheel alignment is done **for all** normal maintenance conditions, see below.
2. **Major alignment** – a major alignment is done when uneven or excessive tire wear is evident, or response at the steering wheel is sluggish, or the need for major wheel alignment check and adjustment is required, see below.

MINOR FRONT WHEEL ALIGNMENT

Perform a minor front wheel alignment in the following sequence:

1. Inspect all systems that affect wheel alignment. Refer to the Inspection Prior to Alignment in this section.
2. Check the wheel bearing end play per the vehicle manufacturer's instructions.
3. Check and adjust toe if necessary, refer to Toe Setting in this section.
4. Check and adjust the vehicle ride height, see Ride Height in this section.

MAJOR FRONT WHEEL ALIGNMENT

Be certain to follow wheel alignment inspection intervals as specified by the original equipment manufacturer. Before performing a major front wheel alignment it is recommended that alignment equipment calibration be checked to ensure proper vehicle alignment.

Major wheel alignment is accomplished in the following sequence of operation:

1. Inspect all the systems that influence the wheel alignment. Refer to the Inspection Prior to Alignment in this section.
2. Check and adjust the maximum turn angle, refer to the Steering Stop Adjustment Procedure in this section, see Figures 8-14 and 8-15.
3. If the vehicle is equipped with power steering, check the pressure relief in the power steering system and reset if necessary. Refer to the vehicle manufacturer regarding the subject: Adjusting the Pressure Relief in the Power Steering System.



FIGURE 8-14



FIGURE 8-15



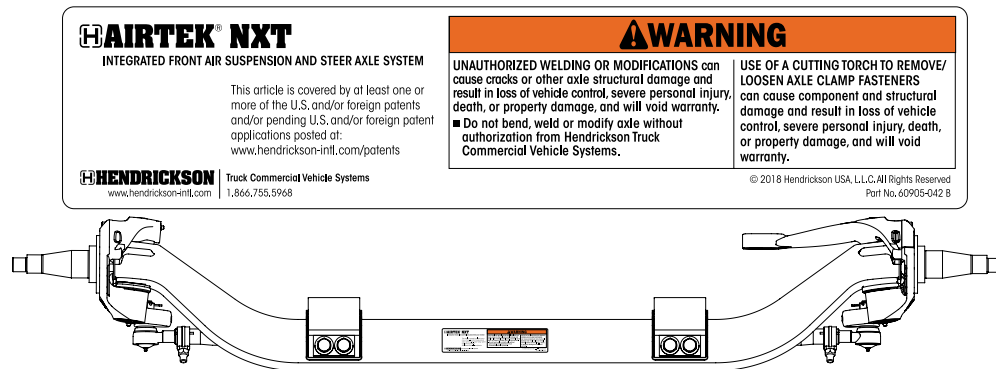
4. Check the turning angle. Refer to the original equipment manufacturer specifications.
5. Check the kingpin (or steering axis) inclination. Refer to the Kingpin Inclination under Alignment Definitions in this section.

WARNING

AXLE CAMBER IS NOT ADJUSTABLE. DO NOT CHANGE THE AXLE CAMBER ANGLE OR BEND THE AXLE BEAM. BENDING THE AXLE BEAM TO CHANGE THE CAMBER ANGLE CAN DAMAGE THE AXLE AND REDUCE AXLE STRENGTH, AND WILL VOID HENDRICKSON'S WARRANTY. A BENT AXLE BEAM CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE, SEE FIGURE 8-16.

6. Check the camber angle. **DO NOT** attempt to adjust. Refer to the Camber in the Alignment Definitions in this section.

FIGURE 8-16



SERVICE HINT

Ensure the rear air suspension (if equipped) ride height is within specification prior to performing a caster measurement or adjustment. The rear ride height must be correct to achieve proper caster.

7. Check and adjust caster angle. Refer to the "Caster" in the Alignment Definitions in this section. **The use of two (2) different angle caster shims will not change cross caster.** Cross caster is the difference between the caster readings for left and right side of the vehicle.
8. Check and adjust toe-in, refer to the Toe Setting in this section.

**STEERING STOP
ADJUSTMENT PROCEDURE**

NOTE

When the axle or lower steering knuckle is replaced, the steering stop must be checked.

WARNING

ALWAYS CHECK/RESET THE STEERING GEAR BOX POPPET WHEN THE WHEEL CUT IS DECREASED. FOLLOW VEHICLE MANUFACTURER'S GUIDELINES FOR THE GEAR BOX POPPET RESETTING PROCEDURE. FAILURE TO DO SO CAN RESULT IN PREMATURE FAILURE OF THE AXLE OR STEERING KNUCKLE. THIS CONDITION CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE AND VOID ANY APPLICABLE WARRANTY.

1. Drive the vehicle on turntables and chock the rear wheels.
2. Measure the wheel cut. The wheel cut is determined by steering the tires. Wheel cut is measured at the inside wheel only, therefore the tires must be turned to the full lock position for each **right hand and left hand** direction. Refer to the vehicle manufacturer for exact specifications.

FIGURE 8-17

**NOTE**

It is important that the sides of the square head stop bolts are set parallel to the axle beam to ensure a good contact point on the axle, see Figure 8-17.

3. **Increase** the wheel cut:
 - a. Loosen the jam nuts and screw the axle stop bolts **in (clockwise)**.
 - b. Tighten the stop bolts to 50 ± 10 foot pounds torque.
4. **Decrease** the wheel cut:
 - a. Loosen the jam nuts and screw the axle stop bolts **out (counter-clockwise)**.
 - b. Tighten the stop bolts to 50 ± 10 foot pounds torque.
5. Measure the wheel cut and check for any interference with related steering components.
6. Remove wheel chocks.

TOE SETTING

1. Place the vehicle on a level floor with the wheels in a straight ahead position.
2. Raise the vehicle and support the front axle with safety stands.
3. Chock the rear wheels of the vehicle.
4. Use paint and mark the center area of tread on both steer axle tires around the complete outer diameter of the tires.
5. Scribe a line through both steer axle tires in the painted area around the complete outer diameter of the tires.
6. Raise the vehicle and remove the safety stands.
7. Set the vehicle on the ground.

NOTE

DO NOT measure toe-in with the front axle off the ground. The weight of the vehicle must be on the front axle when toe-in is measured.

8. Use a trammel bar and measure the distance between the scribe marks at the rear of the steer axle tires. Record the measurement.
9. Install the trammel bar and measure the distance between the scribe marks at the front of the steer axle tires. Record the measurement, see Figure 8-18.

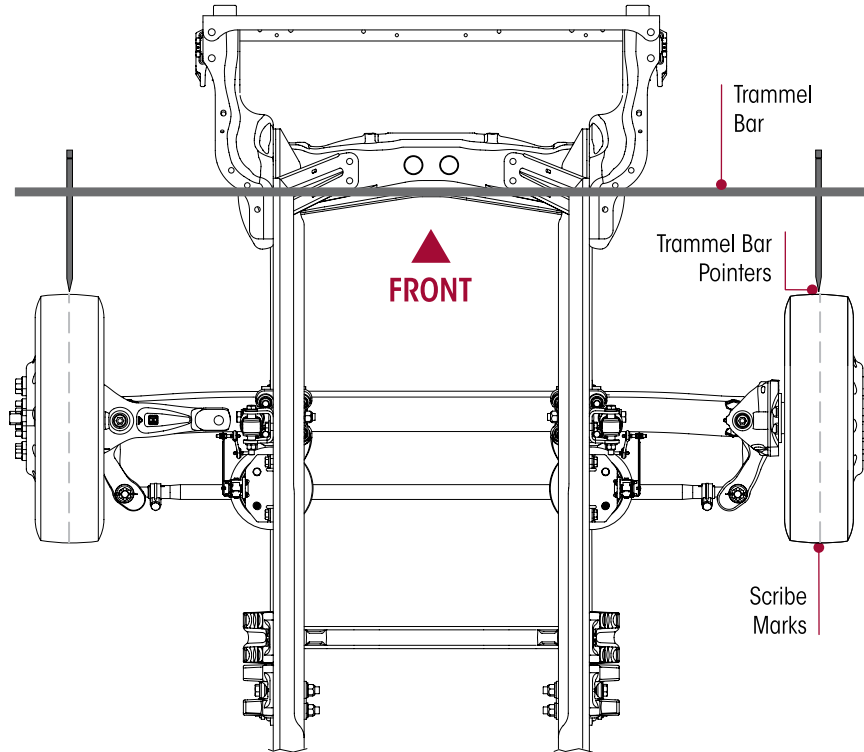
NOTE

When setting up the trammel bar the pointers should be level with the spindles at the front and rear of the steer axle tires.

10. To calculate the toe setting subtract the front measurement from the rear measurement. The difference between the two will equal the toe-in/toe-out measurement.
11. If the toe measurement is not within the specifications of $\frac{1}{16}'' \pm \frac{1}{32}''$ (0.060" \pm 0.030"), it will be necessary to adjust the toe setting as per the following procedure.
 - a. Loosen the tie rod cross tube clamp bolts and locknuts.
 - b. Turn the tie rod cross tube until the specified toe-in distance is achieved.
 - c. Tighten the bolt and locknut on the tie rod cross tube to 68 ± 7 foot pounds torque.



FIGURE 8-18

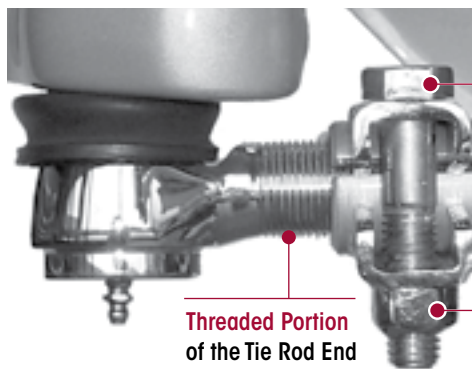


WARNING

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD (SEE FIGURE 8-19). IT IS CRITICAL TO CHECK THE 5/8" TIE ROD CLAMP BOLT HEAD LOCATION TO VERIFY THE CLAMP FASTENERS HAVE SUFFICIENT CLEARANCE AWAY FROM THE LOWER SHOCK MOUNT AT FULL WHEEL CUT. THE FASTENERS MUST NOT CONTACT THE LOWER SHOCK MOUNT. FAILURE TO DO SO CAN CAUSE ONE OR MORE COMPONENTS TO FAIL CAUSING LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

12. Verify the tie rod clamp bolt head does not contact the lower shock mount at full wheel cut, see Figure 8-19.
13. Repeat Steps 1-12 until the correct toe setting is achieved.
14. Remove the vehicle frame safety stands and lower the vehicle.
15. Remove the rear wheel chocks.

FIGURE 8-19



5/8" Tie Rod Clamp Bolt

It is critical to check the 5/8" tie rod clamp bolt head location to verify the clamp fasteners have sufficient clearance away from the lower shock mount at full wheel cut. The fasteners must not contact the lower shock mount.

Tie Rod Cross Tube Slots

It is critical to have the threaded portion of the tie rod end extend past the slots in the tie rod cross tube.

5/8" Tie Rod Clamp Locknut
Tightening Torque
68 ± 7 ft-lb (92 ± 9 Nm)

LEAF SPRING EYE RE-TORQUE

This procedure to retorque is necessary when replacing the: front hanger, shackle bracket and/or the leaf spring assembly.

RETORQUE PROCEDURE

1. Chock the rear wheels of the vehicle to prevent movement.
2. Verify ride height and adjust if necessary, see Ride Height adjustment procedure in this section.

NOTE

DO NOT remove the front and rear spring eye bolts.

3. Loosen, **DO NOT REMOVE** front and rear spring eye bolts with the weight of the vehicle on the suspension.
4. Let the suspension settle.
5. Tighten the front and rear spring eye bolt locknuts per the vehicle manufacturer's torque specifications.
6. Affix a straight edge to the bottom of the frame rail in front of the air spring, see Figure 8-20.
7. With the vehicle on a level surface, measure the distance from the top of the straight edge to the ground on both sides of the vehicle and record the measurements.
8. Measure the difference from one side to the other.
9. Do a road test and repeat measurement Steps 6 to 8.
10. If the difference in measurement from one side to the other is less than ½", the vehicle is level. If measurement difference is more than ½" contact the vehicle manufacturer or Hendrickson Tech Services.
11. Remove the rear wheel chocks.

FIGURE 8-20



SECTION 9

Component Replacement

FASTENERS

Hendrickson recommends that when servicing the vehicle to replace the removed fasteners with new equivalent fasteners. Maintain correct torque values at all times. Check torque values as specified, see Hendrickson's Torque Specifications section of this publication. If non-Hendrickson fasteners are used follow torque specifications listed in the vehicle manufacturer's service manual.

HEIGHT CONTROL VALVE AND LINKAGE ASSEMBLY

The vehicle manufacturer recommends dual height control valves are only to be installed on the front suspension when the rear suspension is equipped with a single height control valve system. This arrangement is best suited to keep the vehicle level versus having dual height control systems on both the front and rear suspensions.

DISASSEMBLY

1. Exhaust the air from the secondary air tank.



PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.

2. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
3. Deflate the air springs by removing the height control valve linkage at the rubber grommet and lowering the height control linkage arm. This will exhaust the air pressure in the air springs.



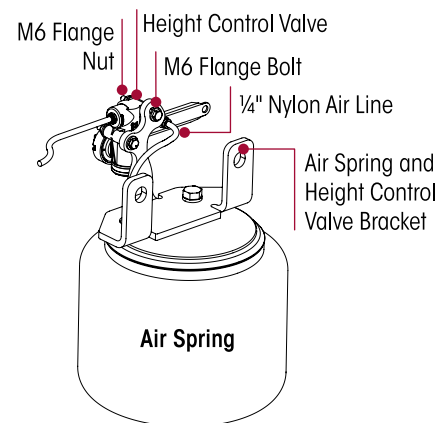
THE PUSH TO CONNECT FITTINGS ON AIRTEK AIR SPRING AND HEIGHT CONTROL VALVES ARE NON SERVICEABLE. IF THE AIR SPRING IS TO BE REINSTALLED; CARE MUST BE TAKEN TO REMOVE DIRT AND DEBRIS FROM THE PUSH-TO-CONNECT FITTING. FAILURE TO DO SO CAN RESULT IN THE PUSH-TO-CONNECT FITTING FAILING TO SEAL PROPERLY WITH THE AIR LINE.

4. Remove the air lines from the height control valve, see Figure 9-1. The air lines are push-to-connect. Push in on the air line to release tension, push down on the collar and pull out the air line.
5. Remove the two (2) M6 mounting fasteners from the air spring and height control valve bracket, see Figure 9-1.
6. Remove the height control valve.

ASSEMBLY

1. Attach the height control valve on the air spring and height control valve bracket as shown in Figure 9-1.
2. Attach the M6 fasteners. **DO NOT** tighten the locknuts to specified torque until after the proper ride height is attained. Mount the height control valve parallel to the flange of the upper air spring bracket, see Figure 9-2.

FIGURE 9-1

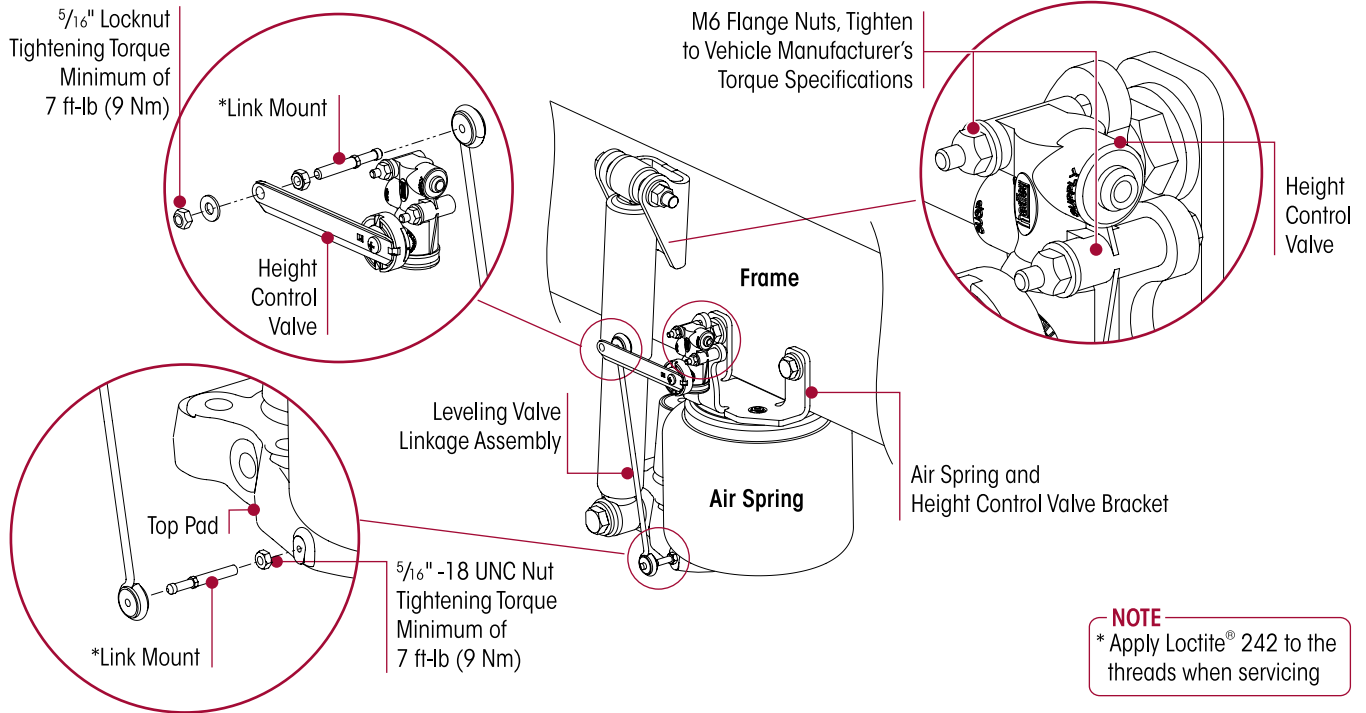


SERVICE HINT

When replacing or installing nylon air line tubing into quick-connect fittings it is critical that the end of the air line is cut square. Improper cut of the end of the air line tubing can cause the air line to seat improperly in the quick connect fitting causing air leakage.



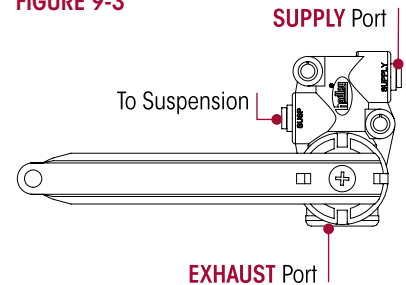
FIGURE 9-2



NOTE
* Apply Loctite® 242 to the threads when servicing

3. Attach the air lines to the height control valve, see Figure 9-3.
4. If link mount is removed from top pad, apply Loctite® 242 to link mount threads. Be careful to apply the adhesive to metal only, see Figure 9-2. Install the nut and link mount to the top pad.
5. Install the leveling valve linkage assembly.
6. Adjust the height control valve to the proper specifications. See the Alignment & Adjustments section of this publication for proper ride height adjustment.
7. Tighten the M6 locknuts to Vehicle Manufacturer's Torque Specifications, see Figure 9-2.

FIGURE 9-3



AIR SPRING

DISASSEMBLY

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Raise the vehicle with a floor jack.
4. Support the frame with safety stands.

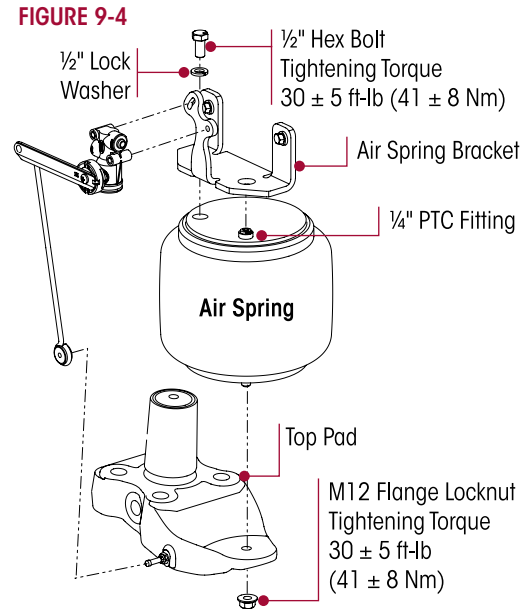


PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.



WHEN SERVICING THE VEHICLE OR ATTACHING AN AIR SPRING AND THE VEHICLE IS ON THE GROUND, PRIOR TO AIRING THE SUSPENSION SYSTEM MAKE CERTAIN THE AIR SPRING LOCATOR IS INDEXED INTO THE UPPER AIR SPRING BRACKET PROPERLY, AND THE AIR SPRING IS FULLY SEATED ON THE TOP PAD. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PREMATURE AIR SPRING FAILURE, CAUSE PERSONAL INJURY, OR PROPERTY DAMAGE.

5. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
6. Lower the axle.
7. Remove the air from the air system by disconnecting the height control valve linkage at the lower rubber grommet and allowing the lever to drop. This will exhaust air from the system.
8. Disconnect the ¼" PTC air fitting from the air spring.
9. Remove the lower M12 air spring locknut from the piston stud to remove the air spring from the top pad and discard the fasteners, see Figure 9-4.
10. Remove the ½" upper air spring bolt and lock washer, see Figure 9-4.
11. Remove the air spring.



ASSEMBLY

1. Compress the air spring and slide it into the vertical position.
2. Locate ¼" PTC fitting and ½" threaded stud on top of the air spring.
3. Guide the bottom stud and properly seat the lower air spring piston into the top pad. Secure the M12 locknut to the piston, see Figure 9-4.

SERVICE HINT

DO NOT twist the air spring bladder when tightening the locknut.

4. Tighten the ½" upper air spring locknut and the M12 lower air spring flange locknut to 30 ± 5 foot pounds torque.

WARNING

WHEN SERVICING THE VEHICLE OR ATTACHING AN AIR SPRING AND THE VEHICLE IS ON THE GROUND, PRIOR TO AIRING THE SUSPENSION SYSTEM MAKE CERTAIN THE AIR SPRING LOCATOR IS INDEXED INTO THE UPPER AIR SPRING BRACKET PROPERLY, AND THE AIR SPRING IS FULLY SEATED ON THE TOP PAD. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PREMATURE AIR SPRING FAILURE, CAUSE PERSONAL INJURY, OR PROPERTY DAMAGE.

5. See Air Spring Warnings and instructions in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
6. Install the air line into the air spring.
7. Raise the vehicle with a floor jack and remove the frame safety stands.
8. Lower the vehicle to the ground.
9. Air up the suspension.
10. Check the air spring for leaks.
11. Check the ride height and adjust if necessary, see the Alignment & Adjustments section of this publication for the proper ride height adjustment.
12. Remove the wheel chocks.



SHOCK ABSORBER

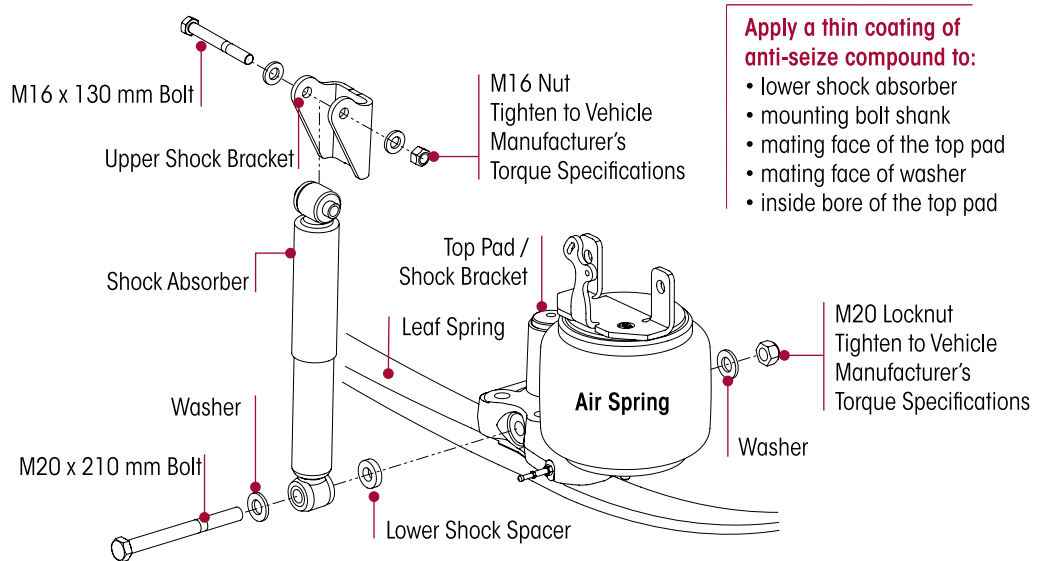
NOTE

It is not necessary to replace the shock absorber in pairs if only one (1) shock requires replacement.

DISASSEMBLY

1. Remove the lower shock absorber mounting fasteners from the top pad, see Figure 9-5.
2. Remove the upper shock absorber mounting fasteners.
3. Slide out the shock absorber.
4. Inspect the shock absorber mounting brackets and hardware for damage or wear, and replace as necessary.

FIGURE 9-5



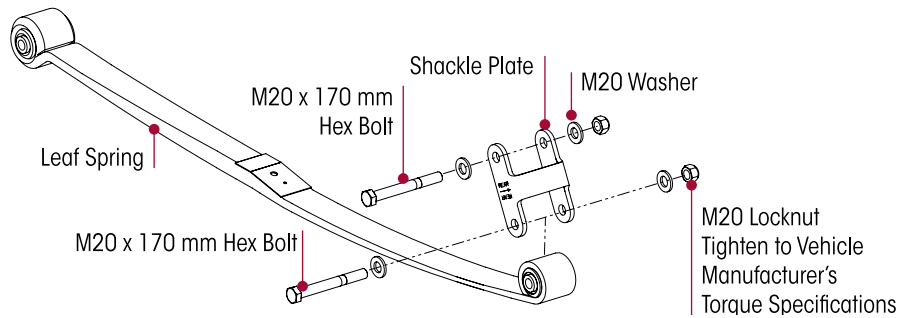
ASSEMBLY

1. Install the shock absorber into the **upper** shock bracket.
2. Install the **upper** shock absorber mounting fasteners.
3. **Apply a thin coating of anti-seize compound** to the shock absorber **lower** mounting bolt shank, to the mating face of the top pad, washers, and the inside bore of the aluminum top pad. **This is necessary to help prevent seizing of the bolt to the aluminum top pad**, see Figure 9-5.
4. Install the lower bolt from the outboard side to the inboard side of the top pad and attach the spacer, washer, and locknut, see Figure 9-5.
5. Tighten the upper and lower shock absorber fasteners to the vehicle manufacturer's torque specifications.

REAR SHACKLE

DISASSEMBLY

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Raise the vehicle and support the frame with safety stands.
4. Suspend the front axle to remove the load from the shackle plate.
5. Remove the rear shackle plate fasteners, see Figure 9-6.
6. Remove the shackle plate.

FIGURE 9-6

ASSEMBLY

1. Install the shackle plate and fasteners, see Figure 9-6.
2. Snug the fasteners, **DO NOT** tighten at this time.
3. Raise the vehicle and remove the frame stands.
4. Lower the vehicle.
5. Inflate the suspension to ride height.
6. Tighten the shackle plate fasteners to the vehicle manufacturer's torque specifications.
7. Remove the wheel chocks.

LEAF SPRING AND CLAMP GROUP ASSEMBLY – MODULE
DISASSEMBLY

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Raise the vehicle high enough to lower the spring eye bushing out of the hangers or shackles.
4. Raise and support the axle with a safety stand.
5. Remove the wheel assembly on the side being serviced per the vehicle manufacturer's instructions.
6. See Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
7. Remove the air spring as per the Air Spring instructions in this section.
8. Suspend the front axle to remove the load from the leaf spring assembly.
9. Remove the lower shock absorber mounting bolts.
10. Loosen the front spring eye fasteners on both sides. **DO NOT** remove fasteners at this time.
11. Remove the lower M12 air spring flange locknuts from the piston stud from both sides.
12. Remove and discard the rear spring eye fasteners.
13. Lower the axle and leaf spring assembly.

SERVICE HINT

To ease in the removal of the spring eye bolts, it may be necessary to raise the axle slightly.

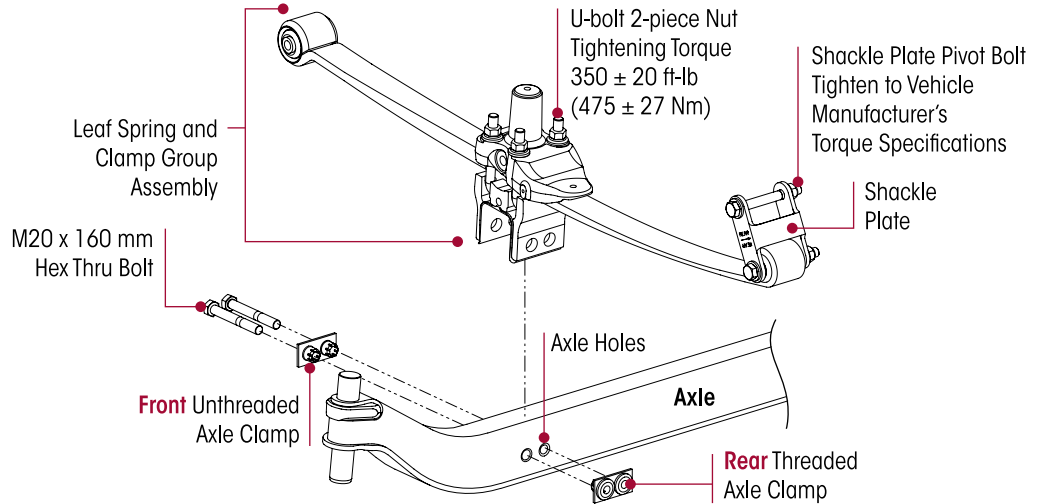
14. Remove the two (2) **M20 axle** clamp hex thru bolts, see Figure 9-7.
15. Remove the front and rear axle clamps from the axle wrap, see Figure 9-7.
16. Remove the front spring eye bolt, this will allow the front of the leaf spring to lower from the front hanger.
17. Remove the leaf spring and clamp group assembly from the axle.


WARNING

THE WEIGHT OF THE LEAF SPRING AND CLAMP GROUP ASSEMBLY IS APPROXIMATELY 90 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.



FIGURE 9-7



ASSEMBLY



WARNING

WHEN PLACING THE LEAF SPRING AND CLAMP GROUP ASSEMBLY IN A VISE IT IS NECESSARY TO PROTECT THE MACHINED SURFACES FROM GOUGES OR MARRING BY USING BRASS JAWS (SOFT JAWS) SEE FIGURE 9-8. FAILURE TO DO SO CAN CAUSE PREMATURE PART DAMAGE, DAMAGE TO THE LEAF SPRING AND CLAMP GROUP ASSEMBLY, LOSS OF WARRANTY, LOSS OF VEHICLE CONTROL, CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

SERVICE HINT

It is acceptable to mount the leaf spring and clamp group components in a brass jaws (soft jaws) vise when performing the tightening procedure.

1. Secure the clamp group assembly in a suitable holding device, such as brass jaws (soft jaws) vice, see Figure 9-8.
2. Ensure the clamp group U-bolt locknuts are tightened evenly in 100 foot pounds increments to 350 ± 20 foot pounds torque in the proper pattern to achieve uniform bolt tension, see Figure 9-9.
3. Ensure the leaf spring is centered between the U-bolt legs and square to the axle.
4. Install the new axle wrap liner under the axle wrap (liner tabs snap to the sides of the axle wrap), see Figure 9-10.

FIGURE 9-8

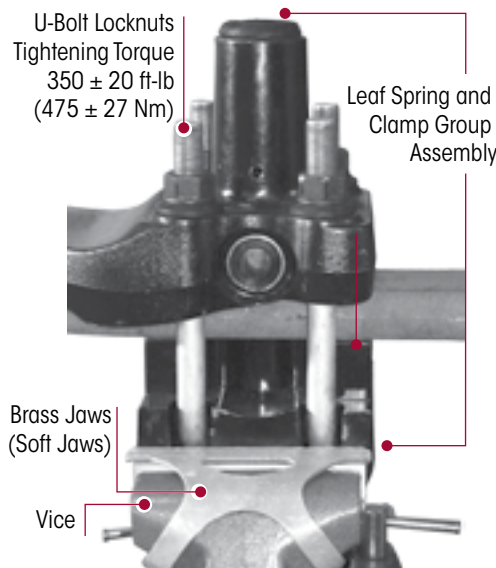


FIGURE 9-9

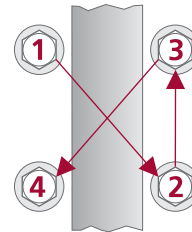
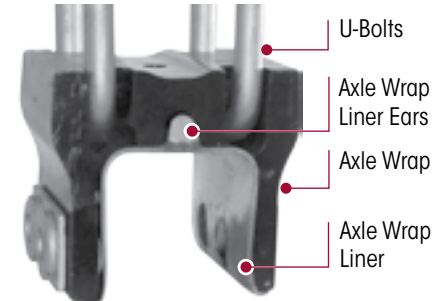


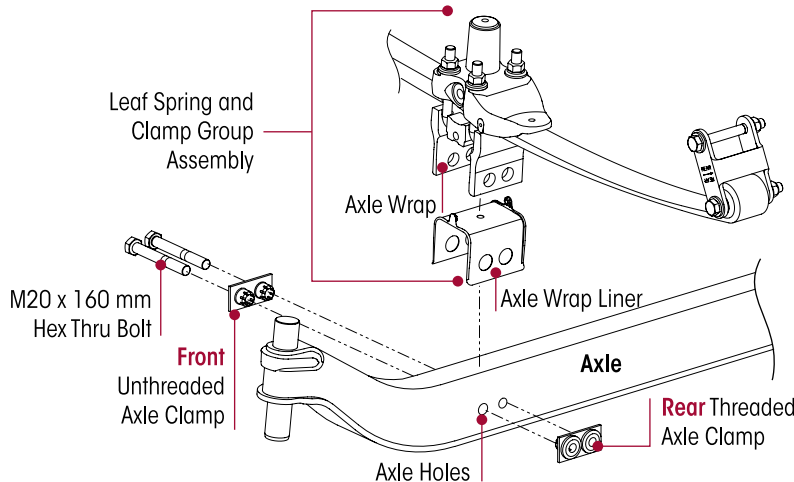
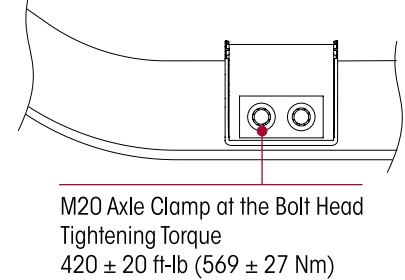
FIGURE 9-10



WARNING

THE WEIGHT OF THE LEAF SPRING AND CLAMP GROUP ASSEMBLY IS APPROXIMATELY 90 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

5. Install the new leaf spring and clamp group assembly (approximate weight is 90 pounds) on the axle. Ensure the axle wrap liner holes are lined up with the axle wrap and axle holes, see Figure 9-11.
6. Install the front and rear axle clamps through the axle wrap, axle wrap liner, and axle, see Figure 9-11.
7. Install the M20 hex thru bolts into the axle clamps. Snug the bolts, **DO NOT** tighten at this time.

FIGURE 9-11

FIGURE 9-12


8. Raise the axle and the front of the leaf spring assembly into the front hanger.
9. Install the front spring eye bolts and fasteners. Snug the bolts, **DO NOT** tighten at this time.
10. Place the rear leaf spring assembly into the shackle bracket and install the spring eye fasteners. Snug fasteners, **DO NOT** tighten at this time.
11. Install the lower shock bolt, refer to the Shock Absorber installation instructions in this section, see Figure 9-5.
12. Install the air spring, refer to Air Spring in this section.
13. Install the wheel end assembly per the vehicle manufacturer's instructions.
14. Remove the frame safety stands and load the front axle with the vehicle weight.
15. Raise the vehicle to ride height.
16. Tighten the **axle clamp fasteners** at the bolt head evenly in 140 foot pounds increments to 420 ± 20 foot pounds torque, see Figure 9-12.
17. Tighten the **front and rear** spring eye fasteners to the vehicle manufacturer's torque specifications.
18. Remove the wheel chocks.

SPRING EYE BUSHINGS

NOTE

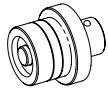

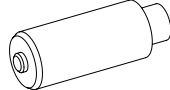
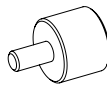

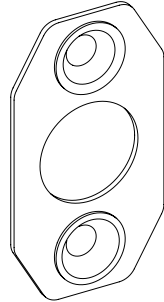
Front spring eye bushings ARE NOT replaceable. It is necessary to replace the entire leaf spring assembly if the front spring eye bushing requires replacement.

The AIRTEK NXT spring eye bushings for the leaf spring assembly are designed for extended service life. In the event of premature or excessive wear or damage, careful consideration must be given to the contributing factors that caused the wear. These conditions must be corrected in order to help prevent the new spring eye bushings from sustaining wear or damage in the same manner. Hendrickson recommends that in the event of high-mileage front spring eye bushing wear, the leaf spring assembly be replaced.



You will need:

- Hendrickson Tool Nos. 66086-303 and 66086-305 or 66086-304 (OTC Nos. 4263 and 4255 or 4261), refer to the Special Tools section in this publication.

REMOVAL		✓	✓	✓	✓	✓
INSTALLATION	✓	✓		✓	✓	✓
						
	581730 Cylinder Adapter	581731 Spacer	581734 Extractor	581678 Alignment Tool	581683 Bushing Support Small Adapter	581682 Clamping Plate

REAR SPRING EYE BUSHING DISASSEMBLY



WARNING

DO NOT USE HEAT OR A CUTTING TORCH TO REMOVE THE REAR SPRING EYE BUSHINGS FROM THE STEEL SPRING. THE USE OF SUCH HEAT CAN ADVERSELY AFFECT THE STRENGTH OF THE SPRING. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

There are two options to prepare for rear spring eye bushing replacement:

- **OPTION 1 Leaf Spring and Clamp Group Assembly In-Chassis** — Replace rear spring eye bushings in-chassis, proceed to **In-Chassis Preparation**.
- **OPTION 2 Leaf Spring and Clamp Group Assembly Removed from Chassis** — Remove the entire leaf spring and clamp group assembly per Leaf Spring and Clamp Group Assembly instructions in this section then proceed to **Tool Setup**.

OPTION 1 – In-chassis Preparation

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Raise the vehicle high enough to lower the spring eye bushing being replaced out of the hangers or shackles. If necessary remove the tires for greater access.
4. Support the vehicle with safety stand.
5. Suspend the front axle to remove the load from the leaf spring assembly.
6. Support the axle with a safety stands.
7. Remove and discard the lower shock absorber mounting fasteners, refer to the Shock Absorber instructions in this publication, see Figure 9-5.

SERVICE HINT

To ease in the removal of the rear spring eye clamp bolts, it may be necessary to raise the axle slightly.

8. Rear spring eye bushings.
 - a. Loosen the front spring eye bolts from both sides.
 - b. Remove rear shackle bolts from both sides.

SERVICE HINT

Remove the lower air spring fasteners if necessary.

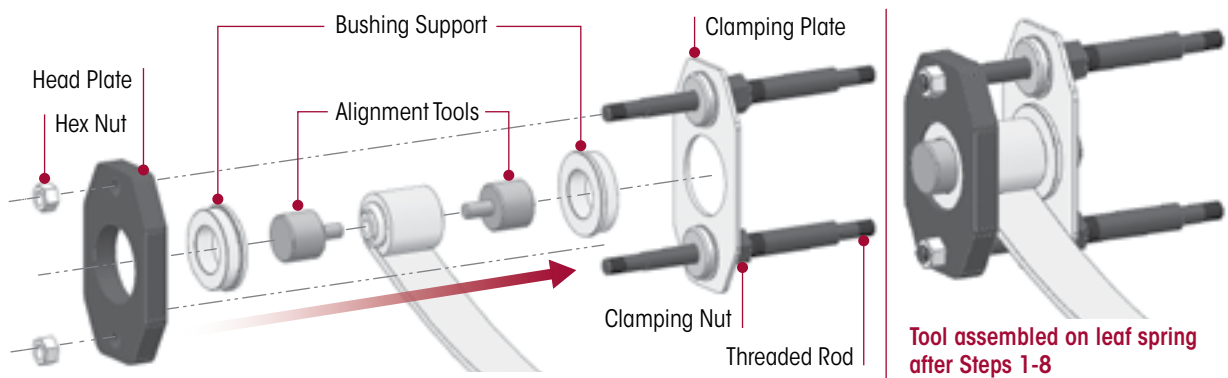
- c. Lower the axle and spring assembly to gain access to replace the rear spring eye bushings.



OPTION 1 & 2 – Tool Setup

1. Insert the **two (2) alignment tools** into the spring eye bushing as shown in Figure 9-13.
2. Place the **two (2) bushing support adapters** over the alignment tools with the wider diameter facing the spring eye, see Figure 9-13.
3. Place the **head plate** over the bushing support adapter on the far side of the leaf spring and the **clamping plate** over the other bushing support adapter, see Figure 9-13.
4. Insert threaded rod assemblies through the holes in the clamping plate and the head plate, see Figure 9-13.
5. Install hex nuts on the end of the threaded rod, fully seated and hand tighten.
6. Tighten the clamping nuts against the clamping plate ¼ to ½ turn past hand tightening.
7. Carefully remove the **two (2) alignment tools**.
8. Place the cylinder mounting plate over the rods and secure with nuts.

FIGURE 9-13



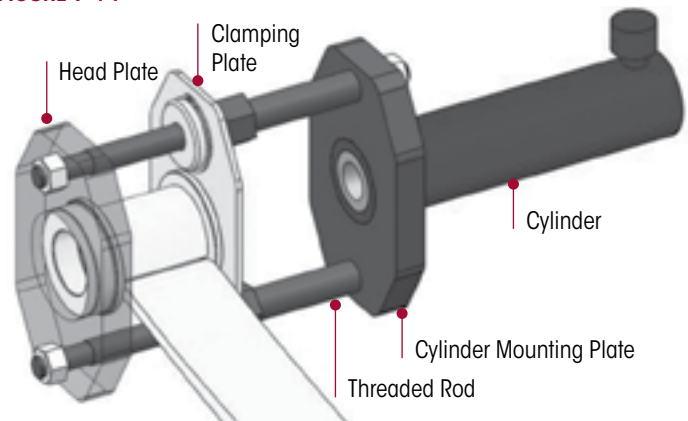
WARNING

TO PREVENT PERSONAL INJURY, THE CYLINDER MUST BE FULLY THREADED INTO THE CYLINDER MOUNTING PLATE, SEE FIGURE 9-14.

9. Thread the cylinder into the cylinder mounting plate, see Figure 9-14. Ensure threads are fully engaged. Connect the cylinder to the hydraulic pump.

FIGURE 9-14

10. Prepare the hydraulic pump for use by following the instructions provided with the pump regarding hookup, venting, priming, and operation.



WARNING

TO HELP PREVENT PERSONAL INJURY, PUMP CAPACITY MUST NOT EXCEED 10,000 PSI.

REAR SPRING EYE BUSHING REMOVAL

1. Insert the extractor into the hydraulic cylinder rod, see Figure 9-15.



WARNING

TO HELP PREVENT PERSONAL INJURY FROM POSSIBLE BREAKAGE UNDER PRESSURE, DO NOT STAND IN THE VICINITY OF THE TOOL WHILE THE BUSHING IS BEING EXTRACTED. IT IS ESPECIALLY IMPORTANT TO NOT STAND IN THE DIRECTION OF THE HYDRAULIC FORCE.

2. Activate the hydraulic pump to extend the cylinder and drive out the rear spring eye bushing, see Figure 9-16.
3. Retract the cylinder and remove the extractor from the cylinder rod.
4. Clean spring eye bore.

FIGURE 9-15

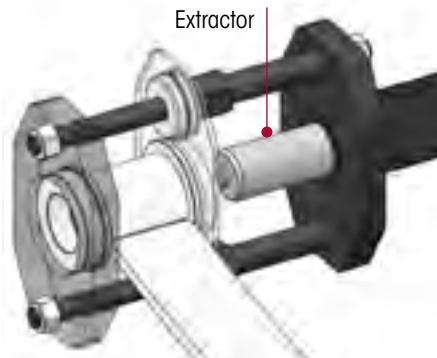
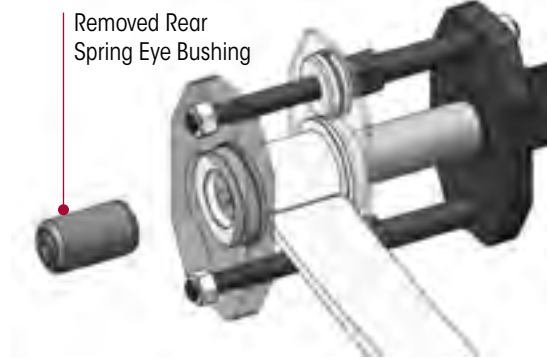


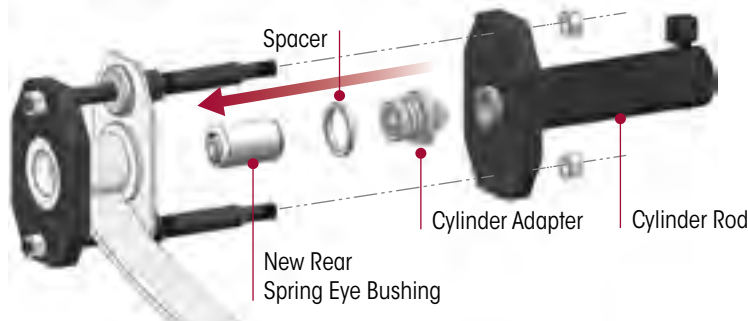
FIGURE 9-16



BUSHING INSTALLATION

1. Insert the **cylinder adapter** into the cylinder rod, see Figure 9-17.
2. Place **one (1) spacer** over the cylinder adapter.
3. Apply Loctite® 680 adhesive to the new rear bushing and spring eye bore, being careful to apply the adhesive to metal only. **DO NOT** apply adhesive to the rubber part of the bushing.
4. Hold the replacement rear spring eye bushing against the face of the cylinder adapter, see Figure 9-17.

FIGURE 9-17



WARNING

TO PREVENT PERSONAL INJURY, PUMP CAPACITY MUST NOT EXCEED 10,000 PSI.

WARNING

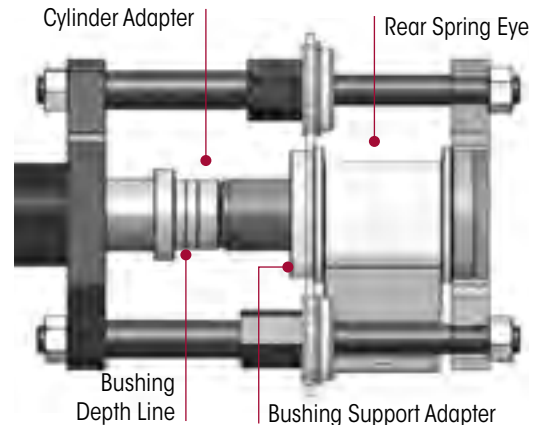
TO PREVENT PERSONAL INJURY FROM POSSIBLE BREAKAGE UNDER PRESSURE, DO NOT STAND IN THE VICINITY OF THE TOOL WHILE THE BUSHING IS BEING INSTALLED. IT IS ESPECIALLY IMPORTANT TO NOT STAND IN THE DIRECTION OF THE HYDRAULIC FORCE.

5. Activate the pump to extend the cylinder.
6. Guide the rear spring eye bushing into the spring eye, and remove hand after partially inserted.
7. Continue to extend the cylinder until the spacer is pressed against the bushing support adapter. This will set the proper depth of the replacement spring eye bushing.

SERVICE HINT

If a different bushing depth is required (up to 10 mm deeper than nominal), the operator can reference the lines machined into the diameter of the cylinder adapter. When the bushing depth line shown in Figure 9-18 is flush with the face of the bushing support adapter, the proper nominal depth has been achieved

FIGURE 9-18





8. Wipe away any residual Loctite® 680 adhesive from exposed faces of the bushing, spring, and tools.
9. Verify all components are aligned.
10. If performing **OPTION 1** (In-chassis) proceed to Leaf Spring Installation, if **OPTION 2** (leaf spring and clamp group assembly removed from chassis), proceed to the Leaf Spring and Clamp Group Assembly installation instructions in this section.

OPTION 1 – Leaf Spring Installation

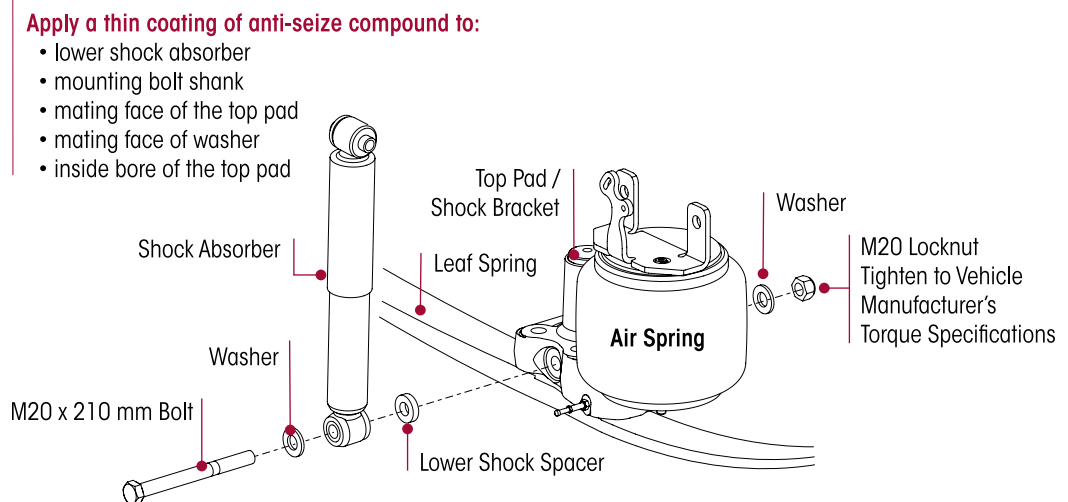
1. **After rear bushing installation**, raise the axle and leaf spring assembly to engage the rear spring eye bushings into the shackle brackets.
2. Install the spring eye bolt fasteners into the shackle.

SERVICE HINT

Install the lower air spring fasteners if removed.

3. Snug the front and rear spring eye fasteners to 50 foot pounds.
4. **Apply a thin coating of anti-seize compound** to the shock absorber **lower** mounting bolt shank, to the mating face of the top pad, washers, and the inside bore of the aluminum top pad. **This is necessary to help prevent seizing of the bolt to the aluminum top pad**, see Figure 9-19.
5. Install the lower bolt from the outboard side to the inboard side of the top pad and attach the washer and locknut, see Figure 9-19.
6. Tighten the lower shock eye fasteners per the vehicle manufacturer’s torque specifications.
7. Install tires if removed.
8. Raise the vehicle and remove the frame safety stands.
9. Lower the vehicle.
10. Inflate suspension to ride height.
11. Tighten both front and rear spring eye fasteners to the required torque.
12. Remove the wheel chocks.

FIGURE 9-19



LEAF SPRING CLAMP GROUP COMPONENTS

The clamp group instructions can be used to replace different components in the leaf spring clamp group, such as the top pad, axle wrap, axle wrap liner, or axle stop.

DISASSEMBLY

1. Remove the leaf spring assembly and clamp group assembly per the instructions in this section.
2. Remove and discard the axle wrap liner.

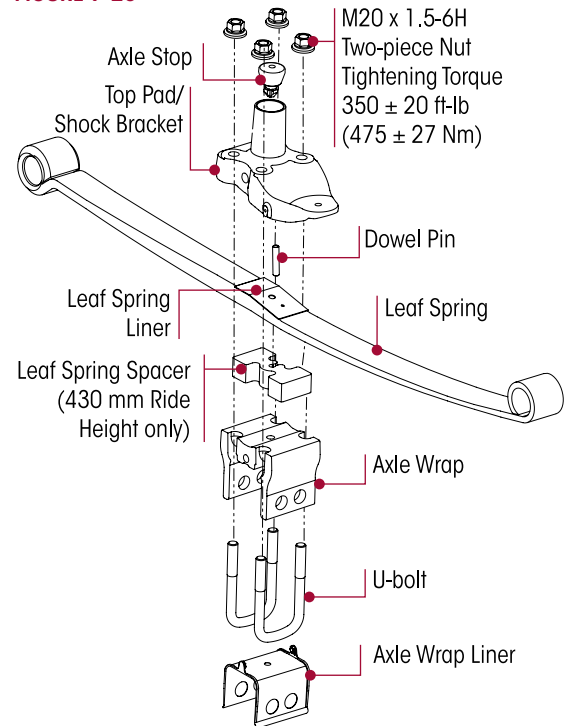


3. Remove and discard the U-bolt fasteners.
4. Remove the axle stop and top pad.
5. Remove and discard the leaf spring liners.
6. Remove the leaf spring assembly.
7. If equipped, prior to removal note the orientation of the leaf spring spacer (430 mm ride height only) to facilitate installation. Remove the leaf spring spacer.
8. Remove the dowel pin from the leaf spring.
9. Inspect all clamp group components for any damage and replace as necessary.

ASSEMBLY

1. Install the U-bolts below the axle wrap with the U-bolt threads up, see Figure 9-20.
2. If equipped, install the leaf spring spacer (430 mm ride height only) in the same orientation and location as prior to removal onto the axle wrap, see Figure 9-20.
3. Install the leaf spring assembly onto the leaf spring spacer or the axle wrap.
4. Install the dowel pin in the leaf spring assembly.
5. Install the top pad on top of the leaf spring assembly.
6. Guide the U-bolts from the underside of the axle wrap into the holes on the top pad, see Figure 9-20. Loosely install U-bolt locknuts and hand tighten. **DO NOT** tighten to torque at this time.

FIGURE 9-20



WARNING

WHEN PLACING THE LEAF SPRING AND CLAMP GROUP ASSEMBLY IN A VISE IT IS NECESSARY TO PROTECT THE MACHINED SURFACES FROM GOUGES OR MARRING BY USING BRASS JAWS (SOFT JAWS) SEE FIGURE 9-21. FAILURE TO DO SO CAN CAUSE PREMATURE PART DAMAGE, DAMAGE TO THE LEAF SPRING AND CLAMP GROUP ASSEMBLY, LOSS OF WARRANTY, LOSS OF VEHICLE CONTROL, CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

SERVICE HINT

It is acceptable to mount the leaf spring and clamp group components in brass jaws (soft jaws) vise when performing the tightening procedure.

7. Secure the clamp group assembly in a suitable holding device, such as a brass jaws (soft jaws) vice, see Figure 9-21.
8. Ensure the clamp group U-bolt locknuts are tightened evenly in 100 foot pounds increments to $\boxed{350} \pm 20$ foot pounds torque in the proper pattern to achieve uniform bolt tension, see Figure 9-22.
9. Ensure the leaf spring is centered between the U-bolt legs and square to the axle.
10. Install the axle wrap liner under the axle wrap (liner tabs snap to the sides of the axle wrap), see Figure 9-23.

WARNING

THE WEIGHT OF THE LEAF SPRING AND CLAMP GROUP ASSEMBLY IS APPROXIMATELY 90 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

11. Install the new leaf spring and clamp group assembly (approximate weight 90 pounds) on the axle. Ensure that the axle wrap liner holes are aligned with the axle wrap and axle holes, see Figure 9-24.



FIGURE 9-21

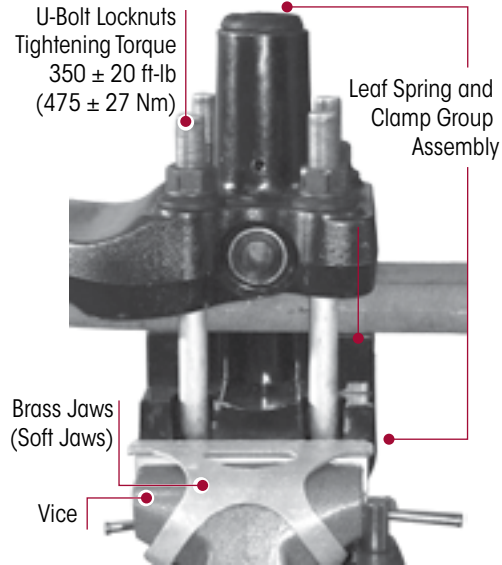


FIGURE 9-22

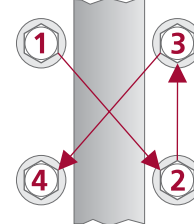
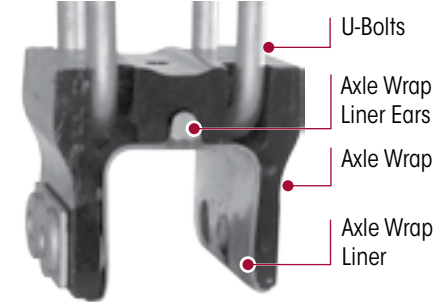


FIGURE 9-23



12. Install the front and rear axle clamps through the axle wrap, axle wrap liner, and axle. See Figure 9-24.
13. Install the M20 hex thru bolts into the axle clamps. Snug bolts. **DO NOT** tighten at this time.
14. Raise the axle and the leaf spring assembly into the front hanger. Install the front spring eye bolts and fasteners. Snug bolts, **DO NOT** tighten at this time.
15. Install the rear shackle assembly and rear spring eye bolts and fasteners. Snug bolts, **DO NOT** tighten at this time.
16. Install the lower shock bolt per the Shock Absorber installation instructions in this section.
17. Install the tire per the vehicle manufacturer's instructions.
18. Remove the safety stands from the frame and load the front axle with the vehicle weight.
19. Inflate the suspension to ride height.
20. Tighten the axle clamp fasteners at the bolt head evenly in 140 foot pounds increments to $\boxed{420 \pm 20}$ foot pounds torque, see Figure 9-25.
21. Tighten the front and rear spring eye hanger clamp locknuts to the vehicle manufacturer's torque specifications.
22. Remove the wheel chocks.

FIGURE 9-24

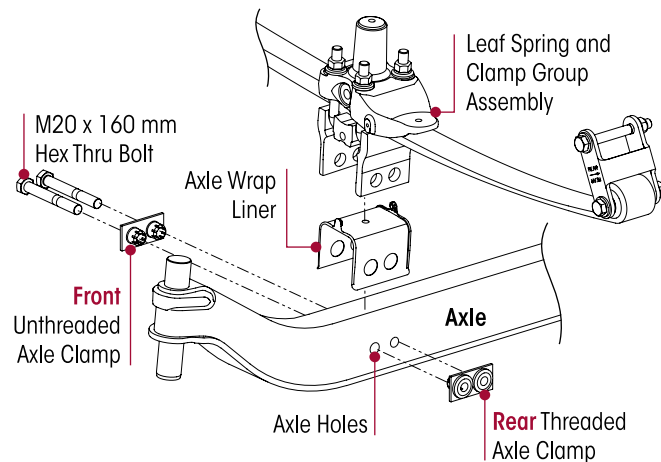
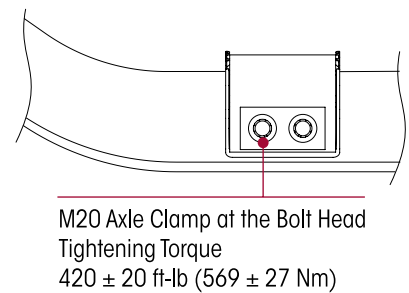


FIGURE 9-25



RUBBER BUMP STOP

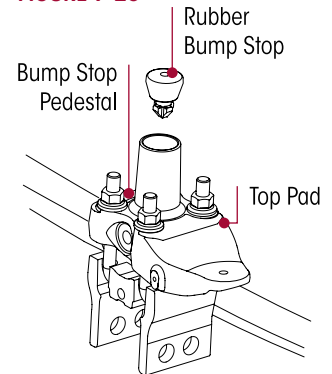
REMOVAL

1. Insert a small pry bar between the rubber bump stop and the inside of the bump stop pedestal.
2. Apply downward force on the pry bar and pull the rubber axle stop out of the bump stop pedestal, see Figure 9-26.
3. Inspect the bump stop pedestal and frame rail flange for any contact damage.
4. Clean any debris from inside the bump stop pedestal.

INSTALLATION

1. Lubricate the new rubber bump stop with soapy water.
2. Install the rubber axle stop on the bump stop pedestal.
3. Apply downward force on the rubber bump stop until it is seated firmly in the bump stop pedestal.

FIGURE 9-26



STEERTEK NXT AXLE

STEERTEK NXT AXLE REMOVAL

Refer to [Hendrickson Literature Number SP-307](http://www.hendrickson-intl.com), available online at www.hendrickson-intl.com when replacing the AIRTEK NXT components.

1. Place the vehicle on a level floor.
2. Chock the wheels.

WARNING

DO NOT USE A TORCH ON AXLE CLAMP BOLTS OR ANY OTHER PART OF THE AIRTEK NXT SUSPENSION. THE USE OF A TORCH CAN CAUSE DAMAGE TO CERTAIN AIRTEK NXT COMPONENTS WHICH CAN RESULT IN LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
4. Disconnect the linkage assembly at the rubber grommet and lower the height control valve arm. This will exhaust the air pressure in the air springs.
5. Exhaust the air in the air springs and deflate the front suspension.

WARNING

AIR SPRING ASSEMBLIES MUST BE DEFLATED PRIOR TO LOOSENING ANY CLAMP GROUP HARDWARE. UNRESTRICTED AIR SPRING ASSEMBLIES CAN VIOLENTLY SHIFT. DO NOT INFLATE AIR SPRING ASSEMBLIES WHEN THEY ARE UNRESTRICTED. AIR SPRING ASSEMBLIES MUST BE RESTRICTED BY SUSPENSION OR OTHER ADEQUATE STRUCTURE. DO NOT INFLATE BEYOND PRESSURES RECOMMENDED BY AIR SPRING MANUFACTURER, CONTACT HENDRICKSON TECHNICAL SERVICES FOR DETAILS. IMPROPER USE OR OVER INFLATION MAY CAUSE AIR SPRING ASSEMBLIES TO BURST, CAUSING PROPERTY DAMAGE AND / OR SEVERE PERSONAL INJURY.

6. Raise the frame and support the vehicle with safety stands.
7. Suspend the front axle with the shocks attached.

WARNING

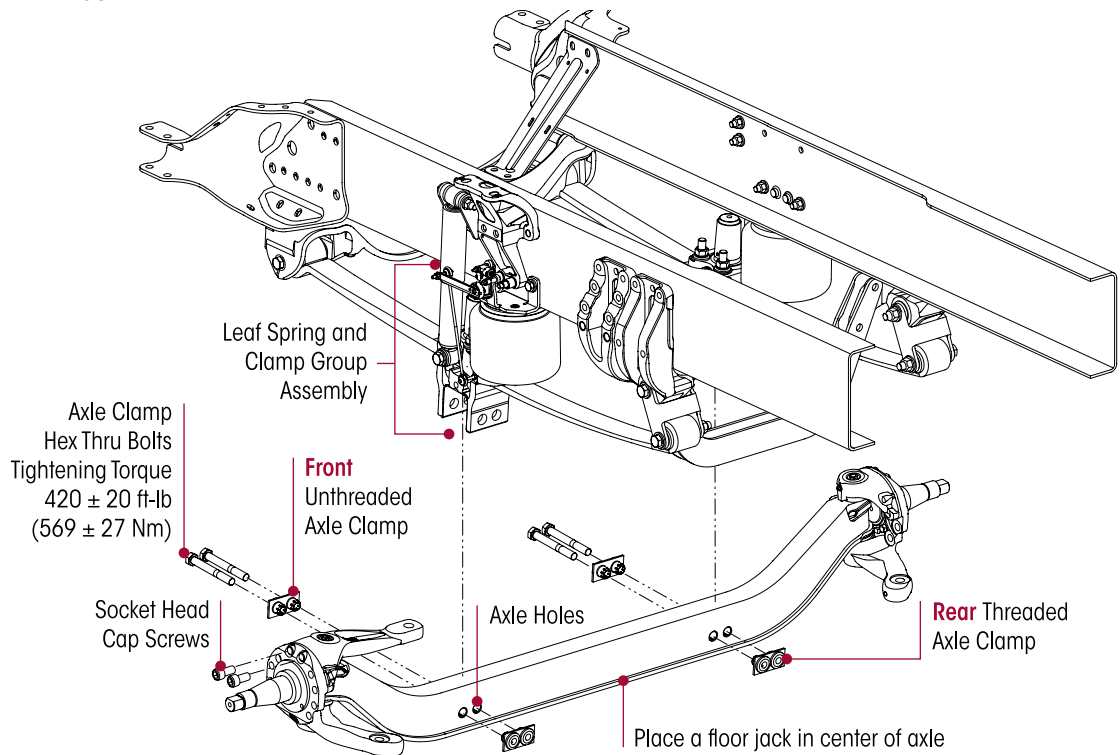
UNAUTHORIZED REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS ARE NOT ALLOWED. ANY SUSPENSION OR AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATION MUST BE REPLACED. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. AIRTEK NXT COMPONENTS CAN NOT BE BENT, WELDED, HEATED, OR REPAIRED WITHOUT REDUCING THE STRENGTH OR LIFE OF THE COMPONENT. FAILURE TO FOLLOW THESE GUIDELINES CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

8. Remove the wheel assemblies per the vehicle manufacturer's instructions.



9. Disconnect the drag link from the steering arm.
10. Unseat both air springs at the axle top pad, refer to the Air Spring instructions in this section.
11. Support the axle with a floor jack.
12. Remove the M20 axle clamp hex through bolts and clamps, see Figure 9-27.
13. Lower the axle and remove from the vehicle.

FIGURE 9-27



STEERTEK NXT AXLE DISASSEMBLY (REMOVED FROM CHASSIS)

1. Remove the tie rod assembly, refer to the Tie Rod in this section.



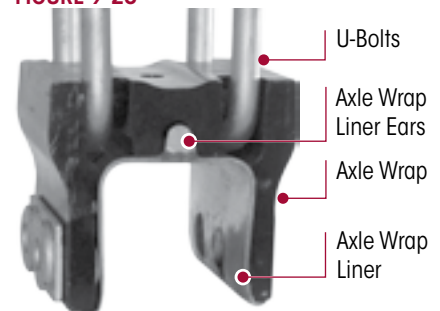
REMOVAL OF THE CAP SCREWS WILL ALLOW THE STEERING KNUCKLE TO SEPARATE FROM THE AXLE. THE STEERING KNUCKLE MUST BE SUPPORTED BEFORE REMOVAL OF THESE TWO (2) CAP SCREWS. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE OR PERSONAL INJURY.

2. Remove the two (2), 5/8" socket head cap screws from the steering knuckle assembly, see Figure 9-27.
3. Remove the steering knuckle and thrust bearing.
4. After the complete removal of one side, repeat Steps 1 and 3 for the opposite side of the axle.
5. Visually inspect the kingpin bushings for excessive wear. If worn, replace the kingpin bushings and seals, refer to the Kingpin Bushing in this section.

STEERTEK NXT AXLE INSTALLATION

1. Place the new axle on the floor jack and position the axle under the vehicle, see Figure 9-27.
2. Install the new axle wrap liner under the axle wrap (liner tabs snap to the side of the axle wrap), see Figure 9-28.
3. Raise the axle into position.

FIGURE 9-28



4. Ensure the axle wrap liner holes are lined up with the axle wrap and axle holes, see Figure 9-29.

FIGURE 9-29

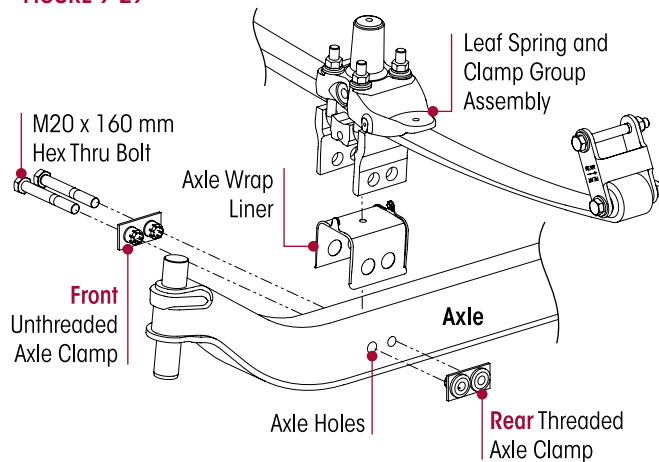
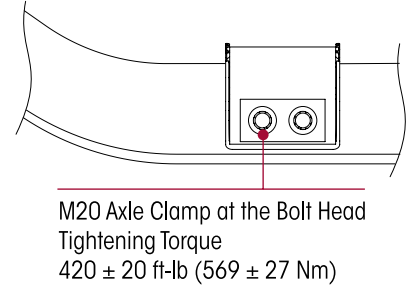


FIGURE 9-30



5. Install the front unthreaded and rear threaded axle clamps through the axle wrap, axle wrap liner, and axle, see Figure 9-29.
6. Install the new M20 hex thru bolts. **DO NOT** tighten to torque at this time, see Figure 9-29.
7. Snug the axle clamp fasteners to 100 foot pounds.
8. Install the steering knuckles, refer to the Steering Knuckle Assembly instructions in this section.
9. Install the tie rod assembly into the lower steering knuckle (Ackermann arms).
10. Install the $\frac{7}{8}$ " hardened washers on the Ackermann arm and the castle nuts. Tighten the castle nuts to \mathbb{R} 185 foot pounds, then rotate until the first castle slot lines up with the cotter pin bore in the tie rod end. **DO NOT** back off nut for cotter pin installation.
11. Install the tie rod end cotter pin.
12. Connect the drag link in the steering arm.
13. Install the castle nut on the drag link taper stud. Tighten the castle nut to \mathbb{R} 185 foot pounds, then rotate until the first castle slot lines up with the cotter pin bore in the drag link. **DO NOT** back off nut for cotter pin installation.
14. Install the drag link cotter pin.
15. Install the brake backing plate assemblies and ABS sensor and torque all fasteners per the manufacturer's specifications.
16. Install the wheel end assembly per the vehicle manufacturer's guidelines.
17. Raise the vehicle and remove the frame safety stands.
18. Lower the vehicle and load the front axle with the truck's weight. Remove the floor jack.
19. Tighten the axle clamp fasteners at the bolt head evenly in 140 foot pounds increments to \mathbb{R} 420 ± 20 foot pounds torque, see Figure 9-30.
20. Remove the wheel chocks.
21. Fill the hubs with the proper lubricant, (see manufacturer's guidelines for recommended lubrication), if required.
22. Grease the front steering components as per lubrication guidelines in the Preventive Maintenance section of this publication.

STEERING KNUCKLE DISASSEMBLY

NOTE

Steering knuckle component replacement includes kingpin preparation and measurement, kingpin bushing removal, steering knuckle bore measurement, kingpin bushing installation, reaming or honing, and kingpin seal installation.

You will need:

- A hydraulic shop press with a minimum forcing capacity of 2.5 tons
- Kingpin Bushing and Seal Installer/Remover tool, Driver and Receiver Tool, refer to the Special Tool section of this publication.

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Support the vehicle with safety stands under the axle.
4. Remove the wheel end assemblies per the vehicle manufacturer's instructions.

CAUTION

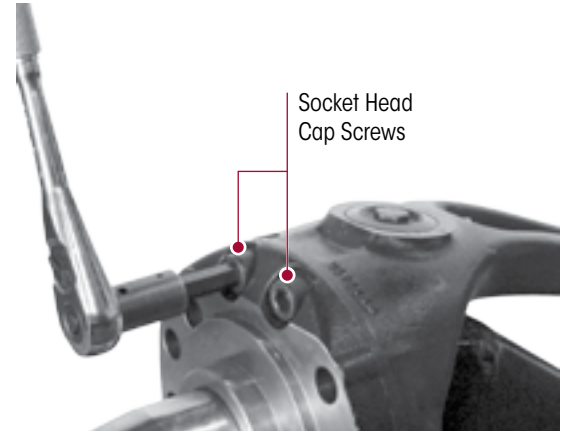
DO NOT USE A PICKLE FORK STYLE TOOL TO SEPARATE THE TIE ROD END FROM THE STEERING KNUCKLE ARM. DOING SO WILL RESULT IN DAMAGE TO THE GREASE BOOT.

5. Remove the tie rod assembly using a 7/8" -14 tie rod end removal tool to separate the tie rod end from the lower steering knuckle, refer to Tie Rod End and Cross Tube in this section.
6. Remove the drag link from the steering knuckle if necessary per the vehicle manufacturer's instructions.

WARNING

REMOVAL OF THE CAP SCREWS WILL ALLOW THE STEERING KNUCKLE TO SEPARATE FROM THE AXLE. THE STEERING KNUCKLE MUST BE SUPPORTED BEFORE REMOVAL OF THESE TWO (2) CAP SCREWS. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE OR PERSONAL INJURY.

7. Remove the two socket head cap screws that connect the upper kingpin to the steering knuckle, see Figure 9-31.

FIGURE 9-31

SERVICE HINT

Remove the grease zerks from the knuckle assemblies. This will allow the knuckle assemblies to freely slide up and down the kingpins without creating back pressure.

8. Remove the grease zerks from the knuckle assemblies.
9. Remove the lower steering knuckle from the kingpin by sliding it down the kingpin.
10. Remove the upper steering knuckle by sliding it up off the kingpin.

KINGPIN PREPARATION & MEASUREMENT
Cleaning the Ground and Polished Parts

- Use a cleaning solvent to clean ground or polished parts and surfaces. **DO NOT USE GASOLINE.**
- **DO NOT** clean ground or polished parts in a hot solution tank or with water, steam, or alkaline solutions. These solutions will cause corrosion of the parts.

Cleaning the Rough Parts

- Rough parts can be cleaned with the ground or polished parts. Rough parts can also be cleaned in hot solution tanks with a weak alkaline solution. The parts must remain in the hot solution tanks until they are completely cleaned and heated.

Drying the Cleaned Parts

- Parts must be dried immediately after cleaning. Dry the parts with clean paper towels, clean rags, or compressed air. **DO NOT** dry bearings by spinning with compressed air. Damage to the bearings will result.

Preventing Corrosion on Cleaned Parts

- Apply a light coating of oil to all cleaned and dried parts that are going to be reused. **DO NOT** apply oil to the brake lining or the brake drums. If parts are to be stored, apply an effective rust inhibitor to all surfaces.

WARNING

TO HELP PREVENT SERIOUS EYE INJURY, ALWAYS WEAR PROPER EYE PROTECTION WHEN YOU PERFORM VEHICLE MAINTENANCE OR SERVICE.

WARNING

THE STEERTEK NXT HAS A UNIQUE AXLE. THE KINGPIN IS CRYOGENICALLY INSTALLED IN THE AXLE. THE KINGPIN IS A NON-REPLACEABLE COMPONENT OF THE AXLE ASSEMBLY. DO NOT TRY TO REMOVE THE KINGPIN. DOING SO WILL DAMAGE THE AXLE AND MAY CAUSE LOSS OF VEHICLE CONTROL, PERSONAL INJURY OR PROPERTY DAMAGE. IF THE KINGPIN SHOWS SIGNS OF MOVEMENT, CONTACT HENDRICKSON PRODUCT ENGINEERING - TECH SERVICES.

WARNING

SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS, AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY, CAREFULLY FOLLOW THE MANUFACTURER'S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURE:

- WEAR PROPER EYE PROTECTION.
- WEAR CLOTHING THAT PROTECTS YOUR SKIN.
- WORK IN A WELL-VENTILATED AREA.
- DO NOT USE GASOLINE, OR SOLVENTS THAT CONTAIN GASOLINE. GASOLINE CAN EXPLODE.
- HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED CORRECTLY. FOLLOW THE MANUFACTURER'S RECOMMENDED INSTRUCTIONS AND GUIDELINES CAREFULLY TO HELP PREVENT PERSONAL ACCIDENTS, OR INJURY.

DO NOT USE HOT SOLUTION TANKS OR WATER AND ALKALINE SOLUTIONS TO CLEAN GROUND OR POLISHED PARTS. DOING SO WILL CAUSE DAMAGE TO THE PARTS AND VOID ANY APPLICABLE WARRANTY.

1. Prepare and polish the kingpin by removing all grease and excess debris using a fine grit (220 grit or higher) emery cloth and parts solvent, see Figures 9-32 through 9-35.

FIGURE 9-32



FIGURE 9-34

Kingpin
Before Cleaning

FIGURE 9-33



FIGURE 9-35

Kingpin
After Cleaning

2. Inspect the kingpin for wear or damage. Use a micrometer and measure the upper and lower kingpin in two locations. Positions must be 90° opposed from each other. If the kingpin has less than following diameter, replacement of the axle is necessary, see Figures 9-36 through 9-39.

Kingpin minimum dimension is: 1.802" for 10,000 to 14,600 pound capacity.



FIGURE 9-36



FIGURE 9-37



FIGURE 9-38



FIGURE 9-39



KINGPIN BUSHING

You will need, refer to the Special Tools section of this publication:

- A **hydraulic shop press** with a minimum forcing capacity of 2.5 tons (or an arbor press) or use hand tools. If a shop press is not available to remove/install the kingpin bushings, an acceptable **optional method** is to use a hammer along with the appropriate shop made tools on a work bench
- Kingpin Bushing and Seal Tools (including Kingpin Handle, Kingpin Bushing Installer/Remover Tool, Bushing Driver and Bushing Receiving Tool)
- An adjustable straight flute reamer with extension pilot tool **or** precision-finish cylinder hon.
- Vise with brass jaws (soft jaws)

NOTE

If one (1) bushing is worn or damaged, it is mandatory to replace both the upper and lower bushings on that knuckle assembly.



WARNING

BEFORE APPLYING HYDRAULIC PRESSURE TO ANY TOOLING SET-UP, ALWAYS CHECK TO ENSURE THE PRESS PLATE, TOOLS, AND COMPONENTS BEING WORKED ON ARE POSITIONED PROPERLY, I.E. "IN LINE" WITH THE RAM OF THE PRESS. IMPROPER POSITIONING CAN CAUSE PERSONAL INJURY OR COMPONENT DAMAGE.



CAUTION

PRIOR TO APPLYING HYDRAULIC PRESSURE TO REMOVE OR INSTALL THE KINGPIN BUSHING, SUPPORT THE LOWER STEERING KNUCKLE AS SHOWN IN FIGURE 9-40. IMPROPER SUPPORT TO THE STEERING KNUCKLE CAN CAUSE COMPONENT DAMAGE.

KINGPIN BUSHING REMOVAL

NOTE

To remove the kingpin bushing, always **drive the bushing from the non-machined surface** of the upper or lower steering knuckle.

1. Remove the threaded grease cap and grease zerk.
2. Place the **machined surface** of the upper or lower steering knuckle face down (axle side down), ensure that each part of the steering knuckle assembly is squarely supported on the bushing receiving tool before applying hydraulic pressure to press out the kingpin bushings, see Figures 9-40 and 9-41.
3. From the **non-machined surface** of the upper or lower steering knuckle, use the kingpin bushing installer/remover tool (see Special Tools section of this publication) to drive the kingpin bushing and kingpin seal out of the steering knuckle, see Figure 9-42.
4. Clean the parts and inspect for reassembly, see Figure 9-43.



FIGURE 9-40



FIGURE 9-41



FIGURE 9-42



FIGURE 9-43



STEERING KNUCKLE BORE MEASUREMENT

Complete the following steering knuckle bore inspection and measurement instructions prior to installing the kingpin bushing.

FIGURE 9-44



FIGURE 9-45



FIGURE 9-46



1. Measure the upper and lower steering knuckle bore inside diameter at two locations. Always use an inside micrometer or a telescoping gauge when taking a knuckle bore measurement. The two positions must be 90° opposed from each other, see Figures 9-44 through 9-46. Some out-of-roundness at the top and bottom of the bore edges is acceptable.

Steering knuckle bore diameter specification is: 1.938" ± 0.003" for 10,000 to 14,600 pound capacity

- a. If the average measurement is more than the knuckle bore maximum diameter specification, steering knuckle replacement is necessary.

KINGPIN BUSHING INSTALLATION

WARNING

BEFORE APPLYING HYDRAULIC PRESSURE TO ANY TOOLING SET-UP, ALWAYS CHECK TO ENSURE THE PRESS PLATE, TOOLS, AND COMPONENTS BEING WORKED ON ARE POSITIONED PROPERLY, I.E. "IN LINE" WITH THE RAM OF THE PRESS. IMPROPER POSITIONING CAN CAUSE PERSONAL INJURY OR COMPONENT DAMAGE.

NOTE

If a shop press is not available to remove / install the kingpin bushings, an acceptable optional method is to use a hammer along with the shop made tools (kingpin bushing driver, receiving tool, kingpin handle, bushing installer / remover and seal installer tools) on a work bench.

NOTE

To install the kingpin bushing, always drive the bushing from the machined side of the steering knuckle.

1. Place the **machined surface** of the upper / lower steering knuckle **face up** (axle side up). Ensure that each part of the steering knuckle assembly is squarely supported before applying hydraulic pressure to press in the kingpin bushing, see Figure 9-47.
2. From the **machined surface** of the steering knuckle, use the kingpin bushing driver tool to drive the kingpin bushing flush into steering knuckle, see Figure 9-48.



3. Use the kingpin bushing installer/remover tool to sink the kingpin bushing into the steering knuckle bore to just below the seal bore, see Figures 9-49 and 9-50.
4. Properly size the kingpin bushings to fit the kingpins, see instructions in the Kingpin Bushing Reaming / Honing instructions in this section.

FIGURE 9-47



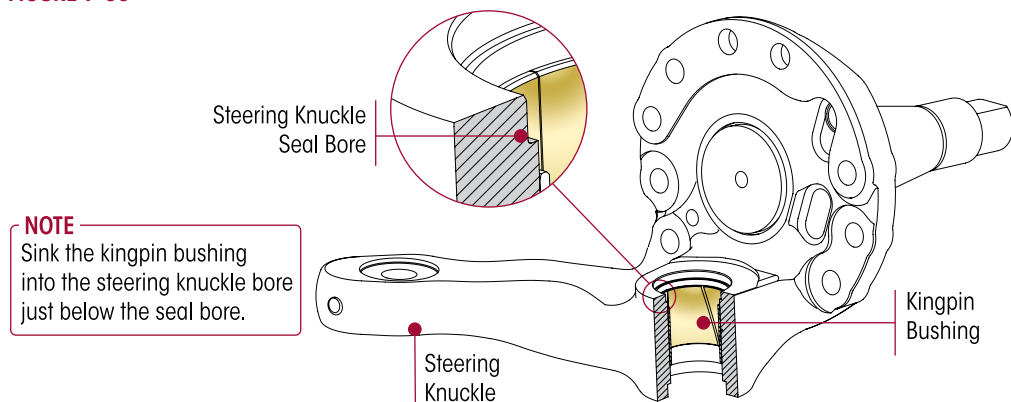
FIGURE 9-48



FIGURE 9-49



FIGURE 9-50



KINGPIN BUSHING REAMING / HONING

Once new replacement kingpin bushings are installed, they will need to be properly sized to fit the respective kingpins using one of the following two methods:

METHOD A – REAMING OR METHOD B – HONING

NOTE

Bushing inner diameter size is to be 0.001" larger than the measured kingpin outer diameter size.



DO NOT BURNISH THE KINGPIN BUSHINGS. BURNISHING WILL DAMAGE THE BUSHINGS AND VOID ANY APPLICABLE WARRANTY.



WHEN INSTALLING THE STEERING KNUCKLE COMPONENTS IN A VISE, IT IS NECESSARY TO PROTECT THE MACHINED SURFACES FROM GOUGES OR MARRING BY USING BRASS JAWS (SOFT JAWS). FAILURE TO DO SO CAN CAUSE PREMATURE PART DAMAGE, DAMAGE TO THE STEERING KNUCKLE COMPONENTS, LOSS OF WARRANTY, LOSS OF VEHICLE CONTROL, CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.



PRIOR TO STEERING KNUCKLE INSTALLATION ENSURE THAT ALL RESIDUAL LOCTITE MATERIAL IS REMOVED FROM MOUNTING BOLTS AND THREAD BORES IN THE STEERING KNUCKLES, AND NEW LOCTITE 277 OR EQUIVALENT IS APPLIED TO HELP ENSURE THE BOLTS SUSTAIN THE PROPER TORQUE REQUIREMENT. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL RESULTING IN PERSONAL INJURY OR PROPERTY DAMAGE.

■ Method A – Reaming

NOTE

Prior to reaming, re-assemble the steering knuckle, see Figures 9-51 and 9-52.

1. Place the steering knuckle (equipped with a replacement kingpin bushing) in a vise with brass jaws (soft jaws), see Figures 9-51 and 9-52.



2. Install the reamer onto the end of the extension pilot tool and position the extension pilot tool through the kingpin bushing.

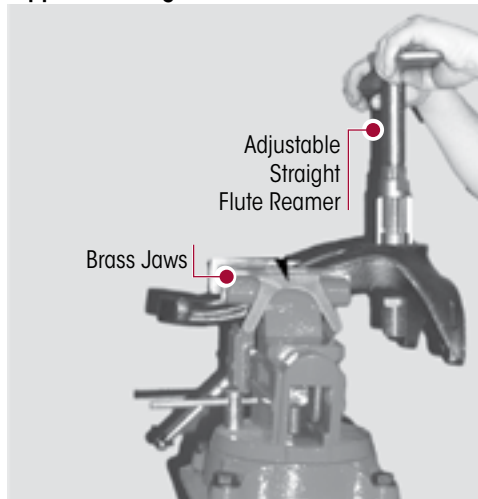
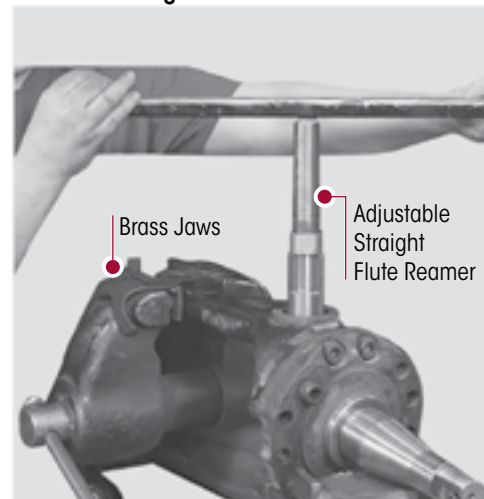
SERVICE HINT

The pilot tool helps keep the reamer straight during the reaming process.

3. Slide the reamer into the steering knuckle until the blades touch the kingpin bushing inner diameter surface.
4. Rotate the reamer with a light **DOWNWARD** pressure. **DO NOT** apply too much force. Rotate the reamer smoothly, see Figures 9-51 and 9-52.

NOTE

To remove the reamer, rotate the tool in the opposite cutting direction.

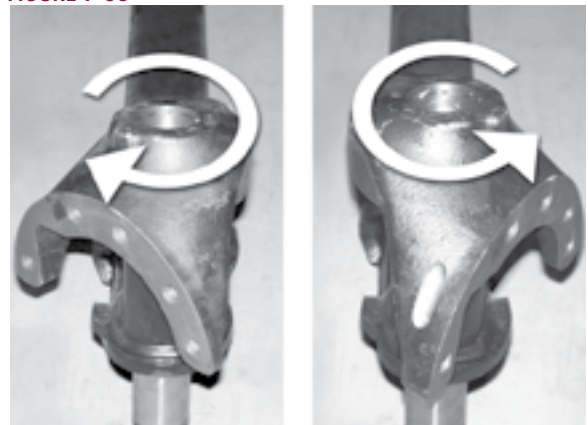
FIGURE 9-51**Upper Steering Knuckle in Vise Shown****FIGURE 9-52****Lower Steering Knuckle in Vise Shown**

5. Remove the steering knuckle from the vise and repeat Steps 1 through 4 for the other mating steering knuckle equipped with a replacement kingpin bushing.
6. Clean and remove all loose kingpin bushing material created by the reaming operation from the steering knuckle(s). Take special attention to remove material from the grease channels and dimples.
7. Clean the $\frac{5}{8}$ " brake backing plate bolts with a wire wheel and run a tap through the threads of the steering knuckle and then flush out with brake cleaner and dry with compressed air.
8. Lightly lubricate the mating kingpins with penetrating oil.
9. Temporarily install the steering knuckle on the mating kingpin to ensure a close slip fit.

NOTE

If the steering knuckle does not fit onto the kingpin, **DO NOT** force it.

10. Rotate the steering knuckle back and forth to verify there is no binding on the kingpin, see Figure 9-53.
11. If either of the bushings are too tight, repeat Steps 1 through 10 until proper clearance is achieved.
12. After verifying that the kingpin is free of binding, remove the steering knuckle assembly. Proceed with the Kingpin Seal Installation procedure.

FIGURE 9-53



■ **Method B – Honing**

1. Assemble the cylinder hone with clean, dry honing stones.

SERVICE HINT

If the honing stones are damaged or oily, they should be replaced.

2. Ensure the wiper blocks are clean and dry, see Figure 9-54.
3. Place the steering knuckle (equipped with a replacement kingpin bushing) on a work surface.
4. Size the precision cylinder hone slightly smaller than the kingpin bushing inner diameter and insert it into the kingpin bushing, see Figures 9-55 and 9-56.
5. Increase the precision cylinder hone's diameter until there is just enough pressure on the kingpin bushing inner diameter to hold the hone in place.
6. Connect a power drive to the precision cylinder hone, see Figure 9-56.

FIGURE 9-54

STEERTEK NXT Axle
Upper Steering Knuckle Shown

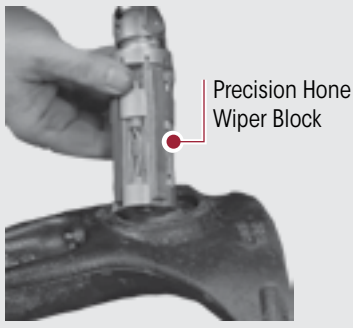


FIGURE 9-55

STEERTEK NXT Axle
Precision Hone in Kingpin Bushing Shown

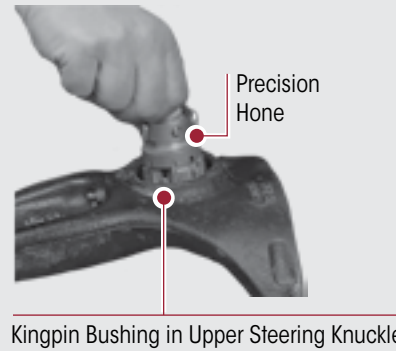


FIGURE 9-56



7. Using the power drive, rotate the precision cylinder hone about ten revolutions in the kingpin bushing. The power drive should rotate at a speed of **less than 30 revolutions per minute (RPM)**.
8. Stop the power drive rotation.
9. Reduce the precision cylinder hone's diameter and remove it from the kingpin bushing.
10. Remove the steering knuckle from the work surface and repeat Steps 1 through 9 for the other steering knuckle.
11. Clean and remove all loose kingpin bushing material created by the honing operation from the steering knuckle(s). Take special attention to remove material from the grease channels and dimples.

NOTE

If the steering knuckle does not fit onto the kingpin, **DO NOT** force it.

12. Perform Steps 7 through 10 in the Method A – Reaming section of this publication.
13. If either of the bushings are too tight, repeat steps 1 through 12 in the Method B – Honing section, until proper clearance is achieved.
14. After verifying that the kingpin is free of binding, remove the steering knuckle assembly. Proceed with the Kingpin Seal Installation procedure.

KINGPIN SEAL INSTALLATION



WARNING

WHEN INSTALLING STEERING KNUCKLE COMPONENTS IN A VISE IT IS NECESSARY TO PROTECT THE MACHINED SURFACES FROM GOUGES OR MARRING BY USING BRASS JAWS. FAILURE TO DO SO CAN CAUSE PREMATURE PART DAMAGE, DAMAGE TO THE STEERING KNUCKLE COMPONENTS, LOSS OF WARRANTY, LOSS OF VEHICLE CONTROL, CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.



FIGURE 9-57

Magnification of lip seal
Lip seal faces toward axle



FIGURE 9-58

STEERTEK NXT
Magnification of the kingpin bushing and a **DOUBLE** lip seal installed in the steering knuckle.



1. Place the steering knuckle assembly in a vise with brass jaws (soft jaws), see Figures 9-51 and 9-52, or place on a suitable workbench. The steering knuckle will have the **machined surface** facing up (axle side up).
2. Lay the kingpin seal into the bore of the steering knuckle. The seal lip should face outward or toward the axle, see Figure 9-57.
3. Use the seal installer tool (see tools specifications of this publication) and press seal firmly into the steering knuckle assembly.
4. Install the kingpin seal until it bottoms out in the kingpin bore, see Figure 9-58.

STEERING KNUCKLE ASSEMBLY

After the replacement of the kingpin bushings, it is necessary to re-assemble the steering knuckle assemblies. **DO NOT** substitute aftermarket components when servicing.

NOTE

Hendrickson STEERTEK NXT axle is installed with a left hand composite bearing and a right hand roller bearing configuration.

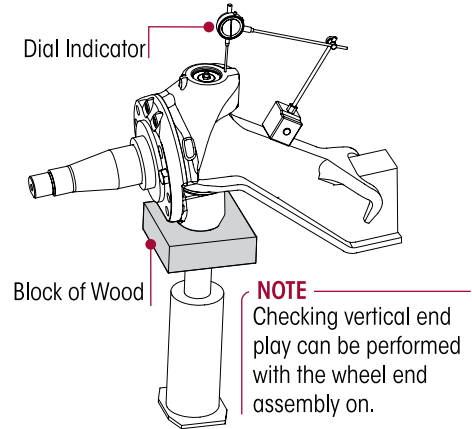
FIGURE 9-59

Top View of Thrust Bearings



1. Install the composite thrust bearing on the lower kingpin on the left side and the roller thrust bearing on the right side with the seal facing up toward the axle (the black seal will designate the top side), see Figure 9-59.
2. Pack the bushing dimples on the upper and lower steering knuckles with multi-purpose Lithium based grease (NLGI Grade 2) before installation.
3. Install the upper steering knuckle on the upper arm kingpin.
4. Install the lower steering knuckle on the lower kingpin and install the old socket head cap screws loose into the top two (2) threaded holes.
5. Install a bottle jack under the lower knuckle and slightly raise the knuckle until it is possible to thread in the three (3) brake backing plate bolts by hand. These are for guide purposes only.
6. Snug the two socket head cap screws.
7. Lower the bottle jack so that all the vertical end play is on the underside of the axle.
8. Affix a magnetic base dial indicator on the axle and place the tip of the dial indicator on top of the knuckle assembly, see Figure 9-60.

9. Zero the dial indicator.
10. Raise the bottle jack until there is **NO CLEARANCE** between the knuckle assembly and the bottom of the axle, slightly lifting the axle.
11. Check the reading on the dial indicator. The specification for vertical travel on the steering knuckle during assembly is 0.008" to 0.011".
12. If the clearance is:
 - **Above 0.011"**, loosen the socket head cap screws and **push down** on the knuckle assembly until the proper vertical end play is achieved.
 - **Below 0.008"**, loosen the socket head cap screws and **pull up** on the knuckle assembly until the proper vertical end play is achieved.

FIGURE 9-60

NOTE

The Hendrickson Genuine part, socket head cap screw comes with a pre-applied Loctite compound.

WARNING

PRIOR TO INSTALLATION ENSURE THAT ALL RESIDUAL LOCTITE MATERIAL IS REMOVED FROM THE MOUNTING BOLTS AND THE THREAD BORES IN THE UPPER STEERING KNUCKLE, AND NEW LOCTITE 277 OR EQUIVALENT IS APPLIED TO HELP ENSURE THAT THE BOLTS SUSTAIN THE PROPER TORQUE REQUIREMENT. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL RESULTING IN PERSONAL INJURY OR PROPERTY DAMAGE.

13. Remove one (1) old socket head cap screw and replace it with new socket head cap screw.
14. Remove the second socket head cap screw and replace with a new socket head cap screw. Tighten both socket head cap screws to \mathbb{R} 188 ± 12 foot pounds torque.
15. Recheck the vertical end play with the dial indicator, see Figure 9-60 or a 0.010" feeler gauge.
16. Remove the brake spider bolts, they should thread out freely.
17. Remove the bottle jack and continue assembling the wheel ends.

IMPORTANT NOTE

It is critical to apply Loctite to the three (3) brake spider bolts to ensure that these bolts sustain the proper torque requirement of the steering knuckle assembly.

18. Apply Loctite to the three (3) brake spider bolts prior to installation into the brake spider. Tighten bolts to \mathbb{R} 188 ± 12 foot pounds torque.

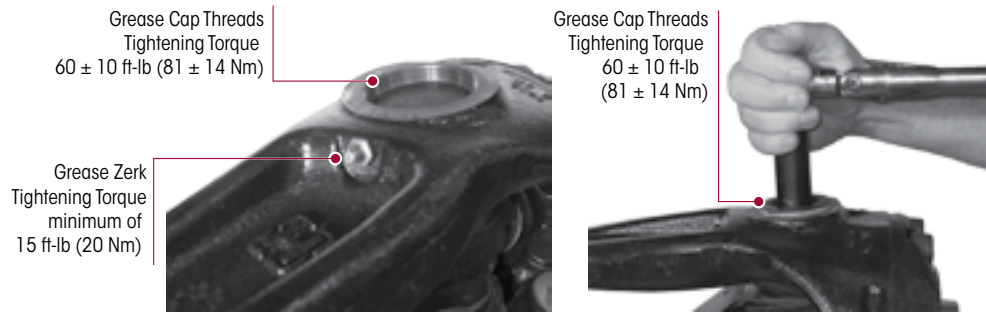
WARNING

DO NOT GREASE KNUCKLES WITHOUT THE BRAKE SPIDER INSTALLED AND TIGHTENED TO PROPER TORQUE. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE RESULTING IN FAILURE AND LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

19. Install the tie rod end into the lower steering knuckle arm.
20. Tighten the castle nuts to \mathbb{R} 185 foot pounds torque then rotate the castle nut to the next castle slot and install the cotter pin.
21. Install the drag link into the steering arm and tighten to the vehicle manufacturer's specifications.
22. Install the new threaded grease caps and tighten to \mathbb{R} 60 ± 10 foot pounds torque, see Figures 9-61. **Allow 30 minutes** for thread sealant to cure before greasing. Install new grease zerk and tighten to a minimum of \mathbb{R} 15 foot pounds, see Figure 9-61.



FIGURE 9-61



23. Ensure the kingpin bushing is installed properly below the kingpin seal. Push kingpin seal up against the machined bore face to minimum 0.25 mm, see Figure 9-62.
24. Install new grease zerk and thread until it bottoms out to: within a 1.2 mm maximum gap between hex and steering knuckle surface, see Figure 9-63.
25. Install the brakes, drums, wheels and tires per the vehicle manufacturer's instructions.
26. Raise the vehicle and remove the safety stands.
27. Lower the vehicle.
28. Grease steering knuckles with the vehicle on the floor.
29. Remove the wheel chocks from the vehicle.

FIGURE 9-62

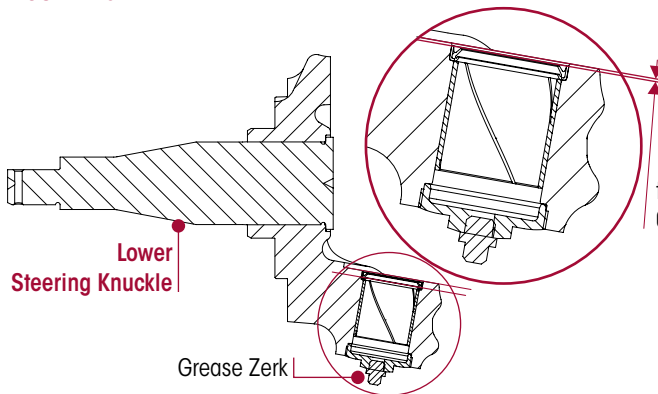
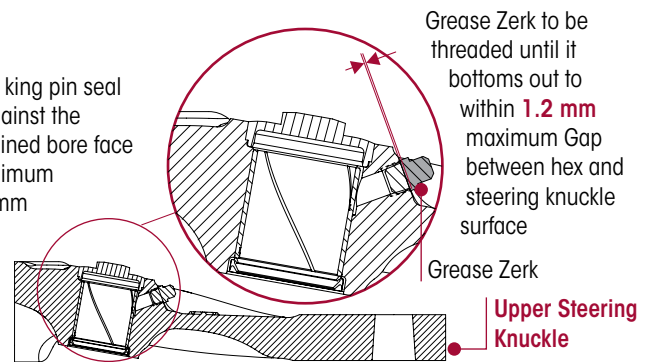


FIGURE 9-63

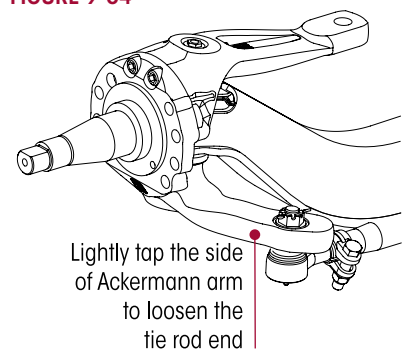


TIE ROD END AND CROSS TUBE

DISASSEMBLY

1. Chock the wheels.
2. Position the steer axle tires straight ahead.
3. Remove the cotter pin and castle nut from the tie rod end.
4. Lightly tap the side of the lower steering knuckle to loosen the tie rod end from the lower steering knuckle, see Figure 9-64.
5. Repeat Steps 3 and 4 to remove the other tie rod end to remove the tie rod assembly.
6. Remove the tie rod assembly from the vehicle.
7. Mount the cross tube in a soft jaw vice.
8. Remove the tie rod clamp hardware from the cross tube.
9. Count the exposed threads on the tie rod end being replaced.

FIGURE 9-64





WARNING

DO NOT HEAT THE CROSS TUBE WITH A TORCH TO FACILITATE THE REMOVAL OF THE TIE ROD END. THE USE OF SUCH HEAT CAN ADVERSELY AFFECT THE STRENGTH OF THE CROSS TUBE. A COMPONENT DAMAGED IN THIS MANNER WILL RESULT IN LOSS OF WARRANTY AND CAN RESULT IN THE LOSS OF VEHICLE CONTROL, AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

10. Remove the tie rod end from the cross tube.
11. If the opposing tie rod end is also being replaced, repeat Steps 8 through 10.
12. Inspect the cross tube for dents, cracks, or thread damage and replace as necessary.

ASSEMBLY

1. Lubricate the new tie rod end threads with Anti-Seize.

NOTE

When installing the cross tube, the thread direction of the tie rod ends are as follows:

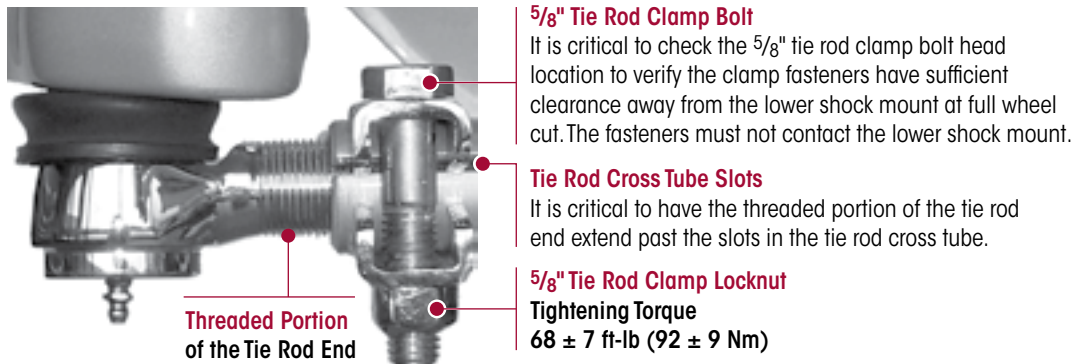
- A right hand threaded tie rod end will be installed into the right side lower steering knuckle.
- A left hand threaded tie rod end will be installed into the left side lower steering knuckle.

2. Install the new tie rod end(s) into the cross tube, leaving the same amount of threads exposed that were counted on the removed tie rod end.
3. If the opposing tie rod end requires replacement, it is critical that the ball and socket are free to rotate in the opposing tie rod end.

WARNING

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 9-65. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL, AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

FIGURE 9-65



4. Replace the opposing tie rod end if necessary, by repeating Steps 1 and 2.
5. Install the tie rod end(s) into the tie rod arm.

WARNING

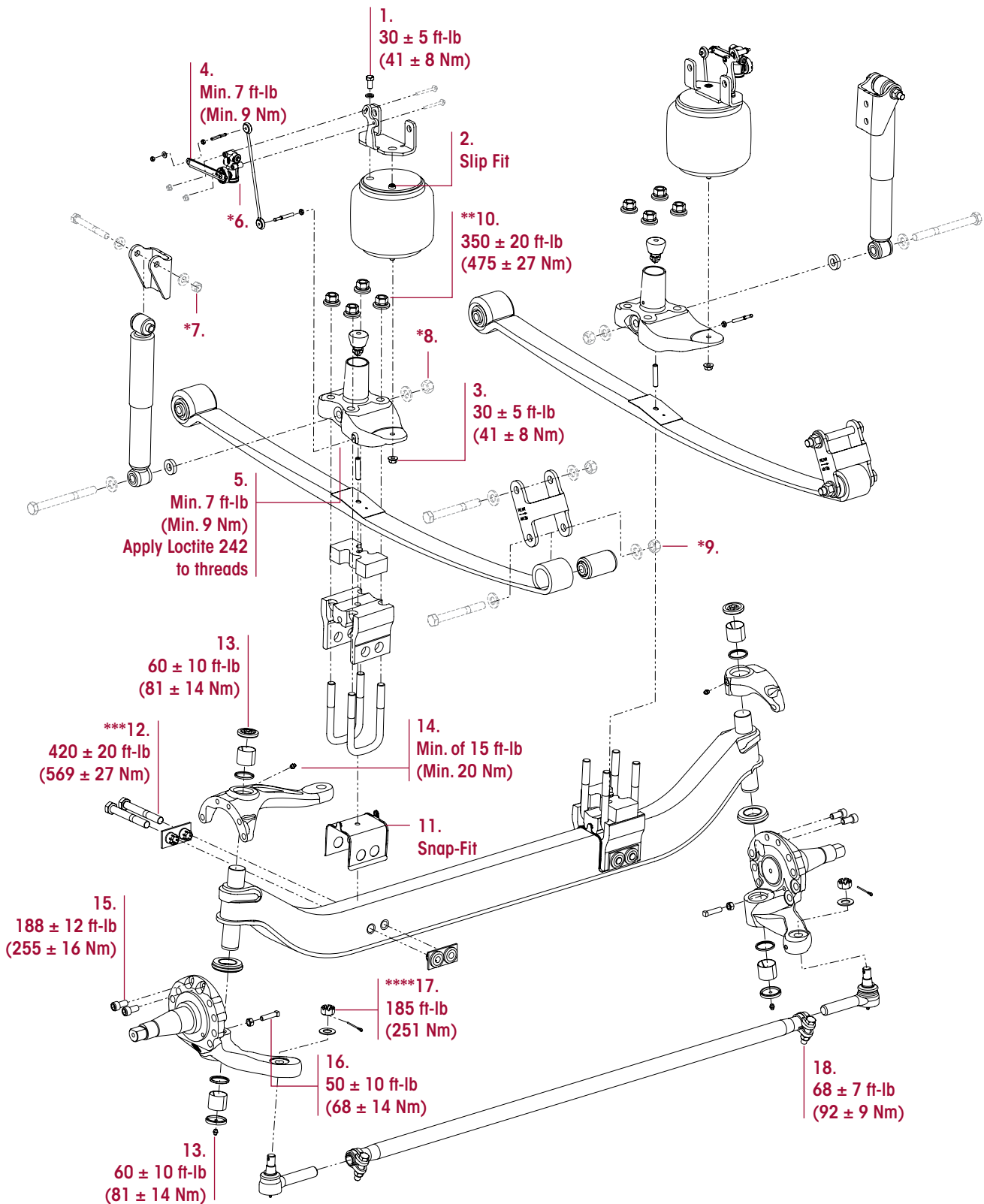
IT IS CRITICAL TO CHECK THE 5/8" TIE ROD CLAMP BOLT HEAD LOCATION TO VERIFY THE CLAMP FASTENERS HAVE SUFFICIENT CLEARANCE AWAY FROM THE LOWER SHOCK MOUNT AT FULL-WHEEL CUT. THE FASTENERS MUST NOT CONTACT THE LOWER SHOCK MOUNT. FAILURE TO DO SO CAN CAUSE ONE OR MORE COMPONENTS TO FAIL CAUSING LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

6. Install the tie rod assembly by placing both tie rod ends into the lower steering knuckles.
7. Tighten the castle nuts to 185 foot pounds torque, then rotate the castle nut to the next castle slot and install the cotter pin.
8. Grease the tie rod ends with the specified lubricant, see lubrication specifications and procedure in the Preventive Maintenance section of this publication.
9. Set the toe, refer to the Toe Adjustment procedure in the Alignment & Adjustments section of this publication.
10. Remove the wheel chocks



SECTION 10 Torque Specifications

HENDRICKSON RECOMMENDED TORQUE VALUES
PROVIDED IN FOOT POUNDS AND IN
NEWTON METERS





**AIRTEK NXT
for Freightliner Cascadia • Western Star 57X Vehicles**

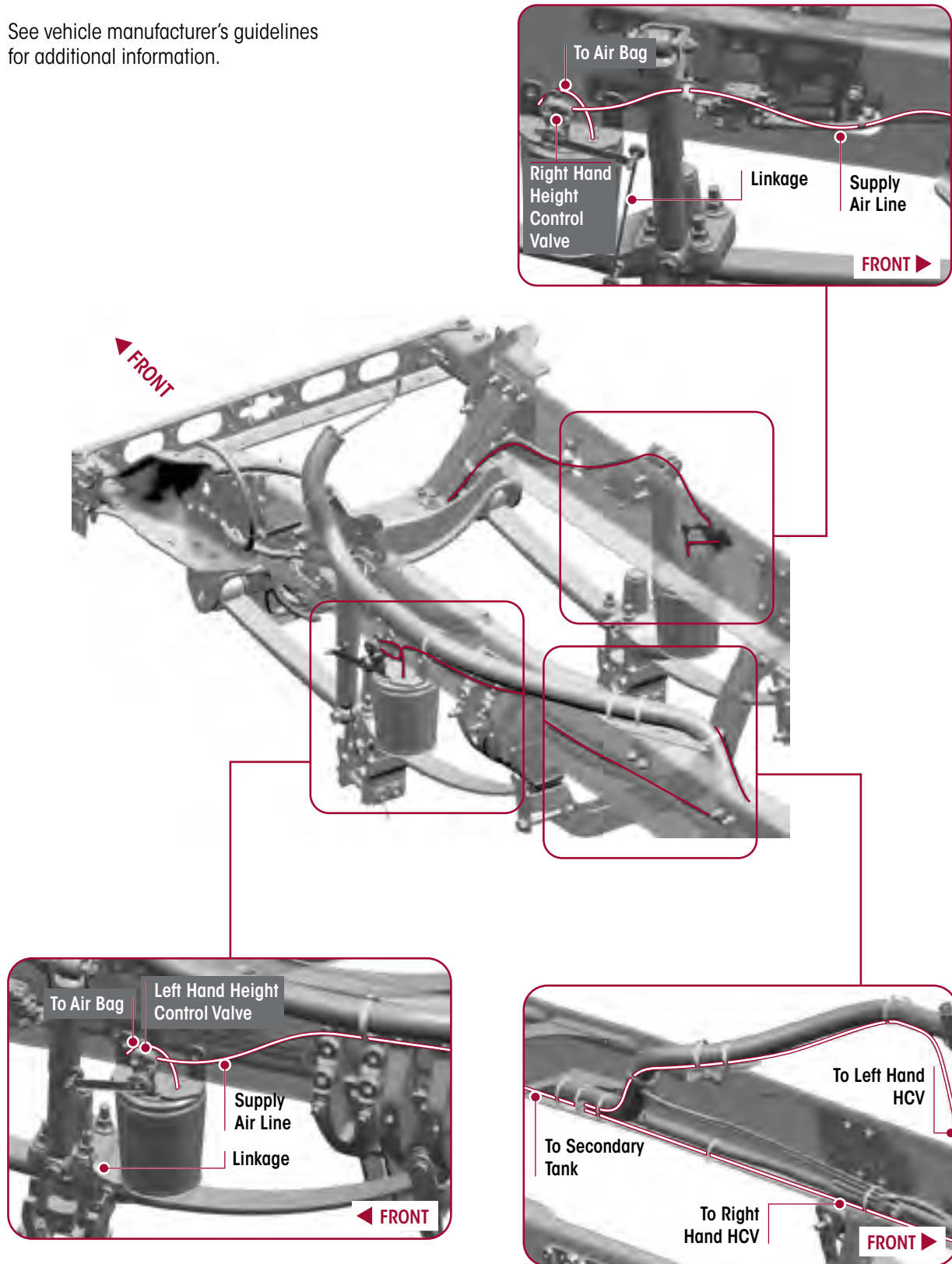
HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	FASTENER		TORQUE VALUE	
		QTY.	SIZE	FOOT POUNDS	NEWTON METERS
	Frame fasteners are furnished and installed by the vehicle manufacturer. Vehicle manufacturer may use an equivalent huck fastener at frame mount.				
1	Air Spring Threaded Stud	2	½"	30 ± 5	41 ± 8
2	Air Spring PTC Fitting		¼"	Slip Fit	
3	Air Spring to Top Pad	2	M12	30 ± 5	41 ± 8
4	Height Control Valve to Linkage Rod	2	5/16"	Minimum of 7	Minimum of 9
5	Link Mount to Top Pad	2	5/16"	Minimum of 7	Minimum of 9
6	Height Control Valve to Air Spring Bracket	4	M6	*	*
7	Upper Shock Absorber	2	M16	*	*
8	Lower Shock Absorber to Top Pad/Shock Bracket	2	M20	*	*
9	Rear Shackle to Clamp Group Assembly	4	M20	*	*
10	Clamp Group U-bolt Fastener	4	M20	**350 ± 20	**475 ± 27
11	Axle Wrap Liner	2		Snap Fit	
	<div style="background-color: #f4a460; padding: 2px;"> WARNING ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE OR PERSONAL INJURY.</div>				
12	Axle Clamp to Axle at the Bolt Head	4	M20	***420 ± 20	***569 ± 27
13	Grease Cap Assembly - Upper and Lower	4	½"	60 ± 10	81 ± 14
14	Grease Zerk	2		Minimum of 15	Minimum of 20
15	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	5/8"	188 ± 12	255 ± 16
16	Knuckle / Axle Wheel Stop Bolt	2	½"	50 ± 10	68 ± 14
17	Tie Rod Ends / Drag Link to Steering Knuckle	2	7/8" Castle Nut	****185	****251
18	Tie Rod Tube to Tie Rod Ends	2	5/8"	68 ± 7	92 ± 9
	<p>• All hardware ¼" and greater is Grade 8 with no additional lubrication.</p>				
	<p>NOTES:* Not supplied by Hendrickson, used for reference only. Follow the torque specification listed in the vehicle manufacturer's service manual.</p> <p>** Tighten the M20 clamp group U-bolt locknuts evenly in 100 foot pounds increments in the proper pattern to achieve uniform bolt tension.</p> <p>*** Tighten the axle clamp fasteners at the bolt head evenly in 140 foot pounds increments.</p> <p>**** Tighten to 185 foot pounds torque, advance nut to next hex face to install cotter pin. DO NOT back off nut for cotter pin installation.</p>				



SECTION 11 Plumbing Diagram

See vehicle manufacturer's guidelines for additional information.





SECTION 12

Alignment Specifications

AIRTEK NXT
for Freightliner Cascadia • Western Star 57X Vehicles

FRONT SUSPENSION ALIGNMENT SPECIFICATIONS

CAMBER ¹	DESIGN SPECIFICATION	RANGE	
		MINIMUM	MAXIMUM
LEFT	0.00° ± 1.0°	-1.0°	+1.0°
RIGHT	-0.25° ± 1.0°	-1.25°	+0.75°
CROSS	0°	—	+2°

CAMBER NOTES:

- ¹ The camber angle is not adjustable. **DO NOT** bend the axle or otherwise try to adjust camber. If found out of specification, notify Hendrickson Tech Services for further information.

CASTER ^{1,2}	DESIGN SPECIFICATION	RANGE	
		MINIMUM	MAXIMUM
LEFT	4°+1° / 4°-0.5°	+3.5°	+5°
RIGHT	4°+1° / 4°-0.5°	+3.5°	+5°
CROSS ³	0°	—	+1.5°

CASTER NOTES:

- ¹ Caster is to be measured with the vehicle at specified ride height for air suspension systems. Ensure the vehicle front and rear ride height are within specification prior to performing a caster measurement or adjustment. See Hendrickson's ride height specifications and procedure in this publication.
- ² In most cases actual vehicle caster is defined with the frame rails at zero slope. Refer to the vehicle manufacturer's specifications for correct frame rail slope. (Both the alignment surface and the vehicle's frame rails should be level during execution of alignment procedures). For vehicles with a positive frame rake (higher in rear) add the frame slope (in degrees) to the caster reading to determine true vehicle caster.
- ³ **The cross caster angle is not adjustable – DO NOT** bend axle or otherwise try to adjust cross caster. If caster measurement falls outside of the specification, notify Hendrickson Tech Services for further information. Changes to caster can be attained by using caster shims provided by the chassis or body manufacturer. Caster shims must match, side to side to reduce uneven loading to the suspension components. **The use of two (2) different angle caster shims will not correct cross caster.**
- Example of caster adjustment: 2.5° Right Hand / 3° Left Hand, would require one, 1.0 shim on each side to increase caster and achieve 3.50° Right Hand / 4.00° Left Hand, which is in specification. **DO NOT** attempt to use uneven shims.

Hendrickson recommends the following practices:

	DESIGN SPECIFICATION ¹	RANGE	
		MINIMUM	MAXIMUM
TOTAL TOE	1/16" ± 1/32" (0.06" ± 0.03")	1/32" (0.03")	3/32" (0.09")

TOE-IN NOTES:

- ¹ Toe-in is to be set and adjusted in the normal vehicle unladed configuration. Actual vehicle curb weight on the ground. Toe should be checked at the tires front and rear tread center, at a distance above ground equal to the tire's rolling radius.



SECTION 13 Troubleshooting Guide

AIRTEK NXT for Freightliner Cascadia • Western Star 57X Vehicles

TROUBLESHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTION
Worn or damaged kingpins and kingpin bushings	Dirt in system– contaminated lubricant	Polish and inspect the kingpin, replace the bushing and seals, then follow the specified lubrication procedures.
	Incorrect lubricant	Lubricate the axle with the specified lubricant.
	Axle not lubricated at scheduled frequency	Lubricate the axle at the scheduled frequency.
	Incorrect lubrication procedures	Use the correct lubrication procedures.
	Lubrication interval not compatible with operating conditions	Change the lubrication intervals to match the operating conditions.
	Worn or missing seals	Replace the worn or missing seals.
Vibration or shimmy of front axle during operation	Caster out of specification	Check the ride height and adjust caster to specification
	Wheels and/or tires out of balance	Balance or replace the wheels and/or tires.
	Worn shock absorbers	Replace the shock absorbers.
	Worn thrust washers and rear hanger clamps	Replace the thrust washers and the rear hanger clamps.
	Broken engine mount	Replace the engine mount.
	Wheel bearing adjustment	Adjust the wheel bearing to the vehicle manufacturer's specifications.
Excessive wear on tires or uneven tire tread wear	Tires have incorrect air pressure	Adjust the tire pressure to the vehicle manufacturer's specifications.
	Tires out of balance	Balance or replace the tires.
	Incorrect tandem axle alignment	Align the tandem axles.
	Incorrect toe setting	Adjust the toe-in to the vehicle manufacturer's specifications.
	Incorrect steering arm geometry	Repair the steering system as necessary.
	Worn kingpin bushings	Replace kingpin bushings.
	Excessive wheel bearing end play	Adjust the wheel nut torque to the vehicle manufacturer's specifications, replace worn or damaged wheel bearings.
	Wheel bearing adjustment	Adjust the wheel bearing to the vehicle manufacturer's specifications.
Vehicle is hard to steer	Low pressure in the power steering system	Repair the power steering system.
	Steering linkage needs lubrication	Lubricate the steering linkage.
	Steering knuckles are binding	Check the vertical clearance.
	Incorrect steering arm geometry	Repair the steering system as necessary.
	Caster out of specification	Check the ride height and adjust the caster to specification.
	Tie rod ends hard to move	Replace the tie rod ends.
	Worn thrust bearing	Replace the thrust bearing.
	Steering gear box internal problem	Perform the steering gear trouble shooting procedures per steering gear box manufacturer's guidelines.



**AIRTEK NXT
for Freightliner Cascadia • Western Star 57X Vehicles**

TROUBLESHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTION
Tie rod ends are worn	Tie rod ends need lubrication	Lubricate the tie rod end. Ensure the lubrication schedule is followed.
	Severe operating conditions	Increase the frequency of inspection and the lubrication intervals.
	Damaged boot on tie rod end	Replace the tie rod end.
Bent or broken cross tube, tie rod end ball stud or tie rod end NOTE: Damaged components require replacement	Pump/gear relief valve pressure setting exceeds system specifications	Adjust the power steering system to manufacturer's specified pressure.
	Steering gear poppets improperly set or malfunctioning	Check for proper operation or adjust the poppets to the vehicle manufacturer's specifications.
	Axle stops improperly set	Set the axle stops to vehicle manufacturer's specifications.
	Severe duty cycle service	Increase the frequency of inspection and lubrication intervals.
Worn or broken steering ball stud NOTE: Damaged components require replacement	Drag link fasteners tightened past specified torque	Tighten the drag link fasteners to the specified torque.
	Lack of lubrication or incorrect lubricant	Lubricate the linkage with the specified lubricant.
	Power steering stops out of adjustment	Adjust the steering stops to vehicle manufacturer's specifications.
Suspension has harsh or bumpy ride	Air spring not inflated	Check the air supply to air spring, repair as necessary.
	Air spring ride height is out of specification	Adjust the ride height to proper specification.
	Broken or worn leaf spring	Replace the leaf spring.
	Front suspension overloaded	Redistribute the steer axle load.
Restricted steering radius	Steering stops not adjusted correctly	Adjust the steering stops to achieve correct wheel cut.
Vehicle leans	Ride height incorrect	Adjust ride height to specification
	Air spring(s) are not inflated	Repair the source of air pressure loss.
	Suspension is not torqued correctly at installation	Perform AIRTEK NXT spring hanger retorque procedure. See Torque Specifications section of this publication.
	Leaf spring broken	Replace the leaf spring.
	Excessive weight bias	Contact the vehicle manufacturer or Hendrickson Tech Services.
Vehicle wanders	Caster out of specifications	Check ride height prior and adjust caster to specification
	Incorrect toe setting	Adjust toe to specification
	Fifth wheel not greased	Grease fifth wheel
	Air in the power steering system	Remove air form the power steering systems
	Rear ride height out of adjustment	Adjust ride height to specification
	Front ride height out of adjustment	Adjust ride height to specification



SECTION 14

Reference Material

This technical publication covers Hendrickson Truck Commercial Vehicle suspension's recommended procedures for our parts/products. Other components play a major role in overall performance and Hendrickson recommends you follow the specific vehicle manufacturer's recommendation for care and maintenance. Some recommended procedures have been developed by TMC and Hendrickson supports these recommendations.

To obtain copies of TMC's Recommended Practices Manual at:

TMC / ATA Headquarters
950 North Glebe Road, Suite 210
Arlington, VA 22203-4181

Phone: 703-838-1763
website: tmc.trucking.org
online ordering: atabusinessolutions.com/Shopping

Actual product performance may vary depending upon vehicle configuration, operation, service and other factors. All applications must comply with applicable Hendrickson specifications and must be approved by the respective vehicle manufacturer with the vehicle in its original, as-built configuration. Contact Hendrickson for additional details regarding specifications, applications, capacities, and operation, service and maintenance instructions.

Call Hendrickson at 630.910.2800 or 855.RIDERED (855.743.3733) for additional information.



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