TECHNICAL PROCEDURE

STEERTEK™ NXT • STEERTEK™ Front Steer Axle and SOFTEK® • AIRTEK® Front Suspension Systems for International Vehicles

SUBJECT: Service Instructions
LIT NO: 17730-252
DATE: February 2026 **REVISION:** H

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HENDRICKSON
The World Rides On Us®

SECTION 1
Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair and rebuild of following Hendrickson systems installed on applicable International vehicles:

- STEERTEK™ NXT front steer axle system for vehicles built after August 2011
- STEERTEK™ front steer axle system for vehicles built prior to August 2011
- AIRTEK® integrated front air suspensions and steer axle system for vehicles built prior to November 2010
- SOFTEK® integrated front monoleaf spring suspensions and steer axle system for vehicles built prior to June 2014

Refer to the Parts Lists section of this publication to determine the components that are manufactured by Hendrickson. For components not manufactured or supplied by Hendrickson contact the vehicle manufacturer for proper preventive maintenance and rebuild instructions.

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 parts lists, safety information, product specifications, features, and proper maintenance, service, repair, and rebuild instructions for STEERTEK NXT • STEERTEK front steer axle system, AIRTEK and SOFTEK 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 also available online at www.hendrickson-intl.com.

SECTION 2
Product Description

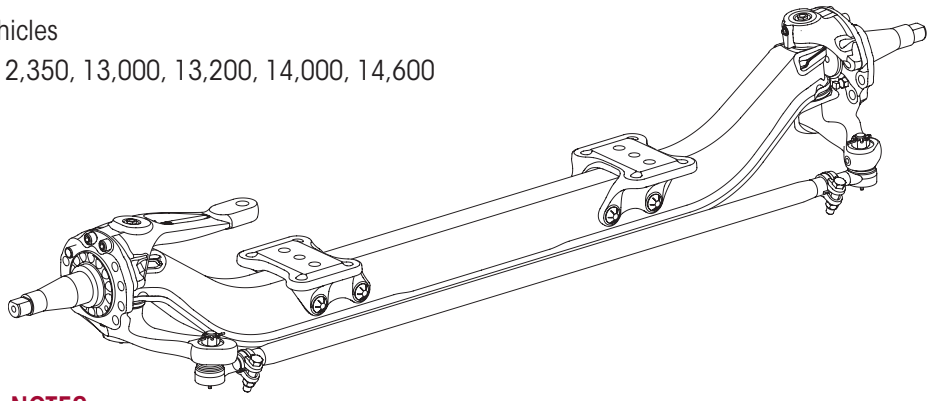
STEERTEK NXT Front Steer Axle — The box-shaped cross section resists horizontal, vertical, and twisting forces more effectively than I-beam axles to improve handling. Together with the front limbs of the leaf springs, the robotically welded axle beam forms a torsion system, enhancing roll stability characteristics and improving handling.

- **Axle Clamp Group** — The Clamp Group consists of the top pad, U-bolts, washers, and nylon locknuts
- **Integrated Axle Spring Seats** — Improve ground clearance, reduce part count, and simplify assembly.
- **Adjustable Tie Rod** — To help maximize tire life, the tie rod easily adjusts toe-in/out.
- **Steering Knuckles** — The steering and tie rod arms are integrated for increased strength and reduced weight. The unique steering knuckle packaging delivers up to a maximum of 50° wheel cut. The two-piece knuckle design makes replacing the kingpin bushings easier by eliminating the need to remove the kingpins.

FIGURE 2-1

STEERTEK NXT axle for International Vehicles

Capacities (pound): 10,000, 12,000, 12,350, 13,000, 13,200, 14,000, 14,600



STEERTEK NXT Axle for vehicles built after January 2025 shown

TECHNICAL NOTES

1. SOFTEK • AIRTEK systems are approved for on-highway use with up to 15 percent operation on off-highway application; other applications must be pre-approved by both Hendrickson and vehicle manufacturer. The system capacity rating of 12,000 pound for the suspension represents the maximum loads on tires at ground level.
2. The STEERTEK NXT axle is offered with Kingpin Intersections (KPI) of 69.02" and 70.89", and supports load capacities of 10,000, 12,000, 12,300, 13000, 13,200, 14000, and 14,600 pounds. It is available with axle beam drop heights of 4.25" and 5.36", measured from the kingpin intersection to the top of the axle.
3. STEERTEK NXT axle system weight is based on a 4.25" drop height and a 70.87" KPI axle. Weight includes axle beam with axle spring seats, knuckle/steering arm assemblies and tie rod assemblies.
4. SOFTEK • AIRTEK systems are integral to and available exclusively with the STEERTEK NXT axle. STEERTEK NXT can be used in applications that are up to 100 percent off-highway. Contact Hendrickson for approval and guidelines on any SOFTEK • AIRTEK application that exceeds 15 percent off-highway usage. This system is anti-lock braking system (ABS) ready. STEERTEK NXT is compatible with industry standard wheel ends and brakes. STEERTEK NXT is also available with mechanical suspension options. Contact Hendrickson or vehicle manufacturer for availability.
5. The STEERTEK NXT axle 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 Front view of axle showing approximate location of etched Product Identification

STEERTEK NXT Axle | Vehicles built after August 2011

STEERTEK Axle | Vehicles built prior to August 2011

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, and 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 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.

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

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

CAUTION — 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 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 THEIR 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

AIR SPRINGS

AIR SPRING ASSEMBLIES MUST BE COMPLETELY 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.

⚠ WARNING

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

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

SHOCK ABSORBERS

THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SUSPENSION. ANYTIME THE AXLE ON THE AIRTEK • SOFTEK SUSPENSION IS SUSPENDED IT IS MANDATORY THAT THE SHOCK ABSORBERS REMAIN CONNECTED. FAILURE TO DO SO CAN CAUSE THE AIR SPRINGS TO SEPARATE FROM THE PISTON AND RESULT IN PREMATURE AIR SPRING FAILURE. REPLACEMENT OF SHOCK ABSORBERS WITH NON-HENDRICKSON PARTS CAN ALTER THE REBOUND TRAVEL OF THE SUSPENSION.

⚠ WARNING

UNAUTHORIZED REPAIR OR RECONDITIONING

THE REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS IS NOT ALLOWED AS SHOWN ON LABEL IN FIGURE 3-1. ANY AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS MUST BE REPLACED. ALL MAJOR COMPONENTS ARE HEAT TREATED AND TEMPERED. THE COMPONENTS CANNOT 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.

⚠ WARNING

STEERTEK NXT • STEERTEK 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.

⚠ WARNING

DAMAGED AXLE COMPONENTS

IF A VEHICLE EQUIPPED WITH A STEERTEK NXT • STEERTEK 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.

⚠ 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, WILL VOID WARRANTY, AS APPLICABLE AND CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

⚠ WARNING

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.

⚠ WARNING

IMPROPER JACKING METHOD

IMPROPER JACKING METHOD CAN CAUSE STRUCTURAL DAMAGE AND RESULT IN LOSS OF VEHICLE CONTROL, SEVERE PERSONAL INJURY OR DEATH. DO NOT USE AXLE BEAM OUTBOARD OF AXLE SEATS. REFER TO VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS, SEE FIGURE 3-1.

⚠ WARNING

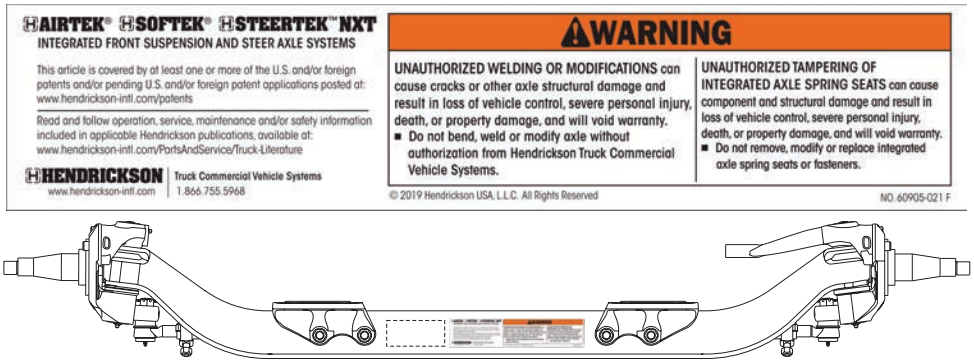
AXLE SPRING SEATS

THE INTEGRATED AXLE SPRING SEATS ON THE STEERTEK NXT AXLE ARE NON-SERVICEABLE. UNAUTHORIZED TAMPERING OF INTEGRATED AXLE SPRING SEATS CAN CAUSE COMPONENT AND STRUCTURAL DAMAGE AND RESULT IN LOSS OF VEHICLE CONTROL, SEVERE PERSONAL INJURY OR DEATH, PROPERTY DAMAGE, AND WILL VOID ANY APPLICABLE WARRANTY. DO NOT REMOVE, MODIFY OR REPLACE INTEGRATED AXLE SPRING SEAT OR FASTENERS, SEE FIGURE 3-1.

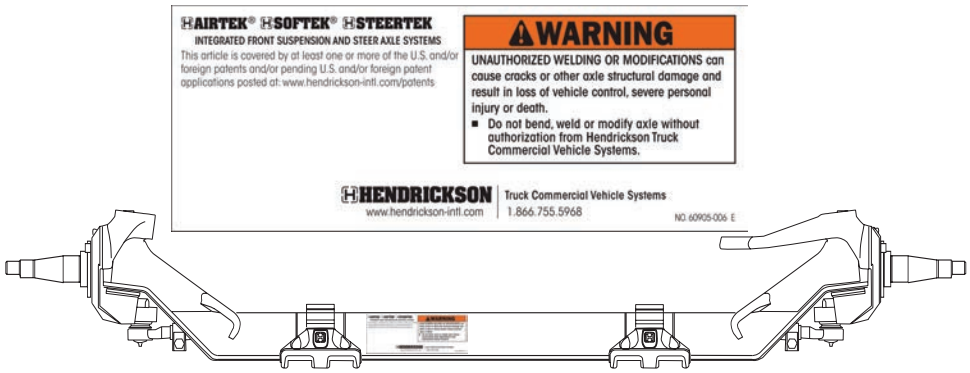
NOTE: REPLACE ANY SAFETY DECALS THAT ARE FADED, TORN, MISSING, ILLEGIBLE, OR OTHERWISE DAMAGED. CONTACT HENDRICKSON TO ORDER REPLACEMENT LABELS.

FIGURE 3-1

STEERTEK NXT Axle | Vehicles built after August 2011



STEERTEK Axle | Vehicles built prior to August 2011



⚠ 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:

1. WEAR PROPER EYE PROTECTION
2. WEAR CLOTHING THAT PROTECTS YOUR SKIN
3. WORK IN A WELL VENTILATED AREA
4. DO NOT USE GASOLINE, OR SOLVENTS THAT CONTAIN GASOLINE. GASOLINE CAN EXPLODE
5. ACIDIC SOLUTIONS CANNOT BE USED ON ALUMINUM COMPONENTS
6. HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED CORRECTLY. FOLLOW THE MANUFACTURER'S RECOMMENDED INSTRUCTIONS AND GUIDELINES CAREFULLY TO HELP PREVENT PERSONAL ACCIDENT 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.

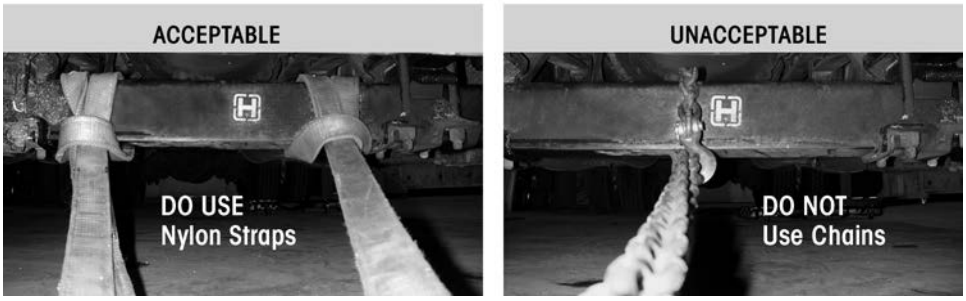
⚠ WARNING

OFF-ROADWAY TOWING

WHEN A VEHICLE IS DISABLED AND EQUIPPED WITH A STEERTEK NXT • STEERTEK AXLE, 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 IN THIS PUBLICATION.

FIGURE 3-2

OFF-ROADWAY TOWING



SECTION 4
Special Tools

KINGPIN BUSHING TOOLS

ADJUSTABLE STRAIGHT FLUTE REAMER
1.802" to 1.812" Cutting Diameter

McMaster-Carr #3141A28

EXTENSION PILOT TOOL

McMaster-Carr #3004A32

OR

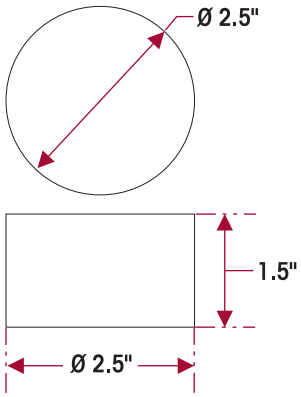
PRECISION-FINISH CYLINDER HONE
1.75" to 2.75" Cylinder ID

McMaster-Carr #7362A45

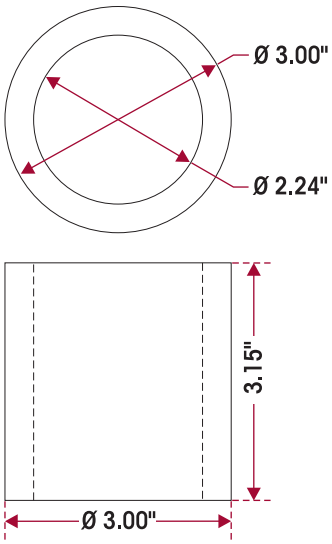
KINGPIN BUSHING AND SEAL TOOLS – SHOP MADE TOOLS

These shop made tools are designed to help 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**



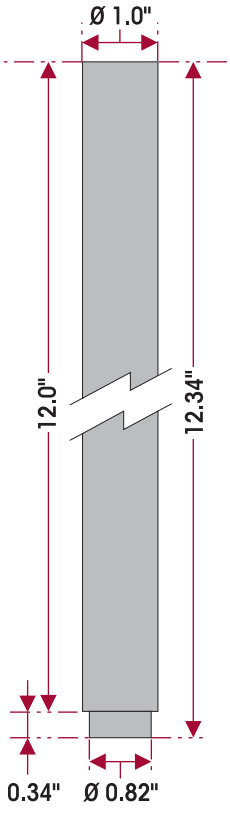
Bushing Receiving Tool
(press bushing replacement)



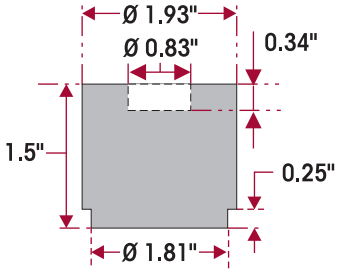
NOTE: *The bushing driver is necessary to sink the kingpin bushing flush into the steering knuckle bore.

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

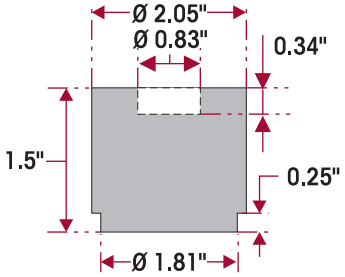
Kingpin Handle



Bushing Installer / Remover Tool
(to seat bushing)



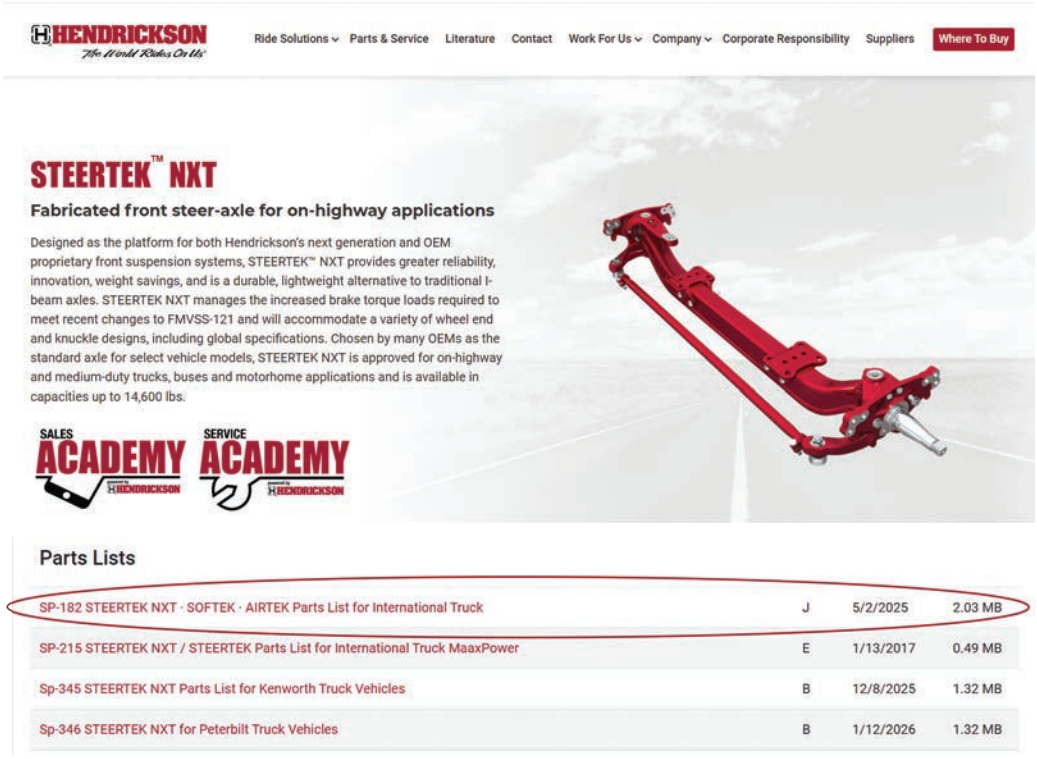
Seal Installer Tool
(to seat seal)



SECTION 5
Parts Lists

Refer to Hendrickson Literature Number SP-182, STEERTEK NXT • STEERTEK • SOFTEK and AIRTEK Parts List for International Truck Vehicles, available online at www.hendrickson-intl.com

FIGURE 5-1



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 a STEERTEK NXT or STEERTEK axle, please contact Hendrickson Tech Services at 855-743-3733 (U.S. and Canada) or send e-mail to: wdtechservices@hendrickson-intl.com.

Hendrickson recommends that a vehicle equipped with a STEERTEK NXT • STEERTEK axle 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 inside the STEERTEK NXT / STEERTEK axle clamp groups.

NOTE When lifting a vehicle with an under lift boom, care must be taken not to damage the underbody components.

1. Ensure there is sufficient clearance between the underbody components and the boom.
2. Release the tractor brakes.
3. 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.

- **STEERTEK NXT Axle** equipped on vehicles built **after** August 2011
  a. Use a Miller Short Frame Fork, Part No. 0200019, or comparable (3.25" Clearance), 4.5" Opening, 2" Shank, see Figure 6-2.
  b. Install the fork in the boom properly.
  c. The proper tow fork location is centered between the locknuts on the axle spring seats, see Figure 6-3.

FIGURE 6-2

FIGURE 6-3

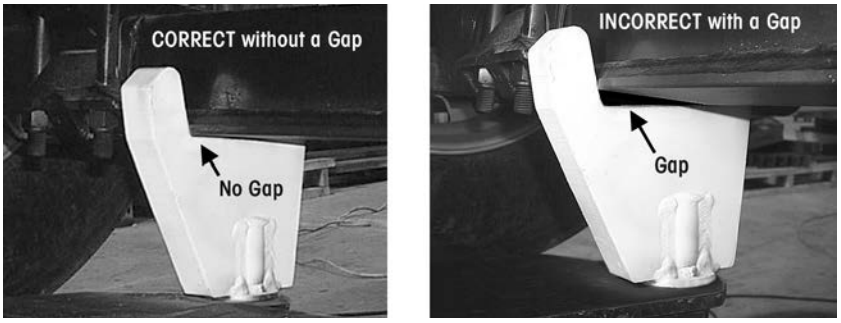
- **STEERTEK Axle** equipped on vehicles built **prior to** August 2011
  a. Install the fork in the boom properly.
  b. Position the proper tow forks directly under the axle, inside the axle clamp groups as shown in Figures 6-4 and 6-5.

FIGURE 6-4

FIGURE 6-5

4. Prior to lifting the vehicle, ensure that the bottom axle plate is flat in the tow fork to minimize any gap between the bottom axle plate and the tow fork, see Figure 6-6.
5. Lift vehicle and secure the vehicle to the boom.

FIGURE 6-6



OFF-ROADWAY TOWING

WARNING

WHEN A VEHICLE IS DISABLED AND EQUIPPED WITH A STEERTEK NXT • STEERTEK AXLE, 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 AND 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 6-7) IN A MANNER THAT IS ACCEPTABLE FOR TOWING THE VEHICLE FROM A REPAIR FACILITY PARKING LOT AND 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 6-7. FOR DETAILED TOWING INSTRUCTIONS FOR ON-HIGHWAY TOWING, SEE TOWING PROCEDURES SECTION IN THIS PUBLICATION.

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

FIGURE 6-7

SECTION 7
Preventive Maintenance

Following appropriate inspection procedures are important to help ensure the proper maintenance and operation of the AIRTEK • SOFTEK front suspension systems equipped with STEERTEK NXT • STEERTEK axles and component parts.

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	25,000 miles (40,200 km), every 6 months or whichever comes first	50,000 miles (80,400 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.				
AIRTEK Air Springs and Air Lines	■	■	■	
AIRTEK Belly Band	■	■		■
Clamp Group	■	■	■	■
Fasteners	■	■		■
Front Hangers and Shackle Brackets	■	■	■	
Front and Rear Spring Eye Connection	■	■	■	
Front Wheel Alignment	■	■		■
Leaf Spring Assembly	■	■	■	
Rear Spring Hangers and Thrust Washers	■			
Rear Spring Mount	■			
Ride Height	■	■		■
Shock Absorbers	■		■	
Steering Operation	■		■	
STEERTEK NXT • STEERTEK Axle Assembly and Tie Rods	■	■	■	
Tire Wear			■	
STEERTEK Axle Top and Bottom Axle Wrap Liners	■		■	
Top Pad	■	■	■	
Wear and Damage	■		■	

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

COMPONENT INSPECTION

- **AIRTEK Air springs and air lines** — Inspect for chaffing or any signs of spring or component damage.
- **AIRTEK Belly band** — Inspect for damage, cracks, dents, or loose fasteners. Any cracks require replacement. Replace as necessary.
- **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 hangers and shackle brackets** — Visually inspect for cracks or loose mounting hardware. Replace if necessary, refer to the Component Replacement section. Check the torque, see Torque Specifications section in this publication.
- **Front and rear spring eye connection** — Ensure the proper fastener torque values using a calibrated torque wrench on front and rear spring eye connection.
- **Front wheel alignment** — Refer to Front Wheel Alignment Specifications section of this publication
- **Leaf spring assembly** — Visually inspect for cracks. Replace if cracked or broken, see the Component Replacement section of this publication for replacement procedure.
- **Rear spring hangers and thrust washers** — Visually inspect for any signs of excessive wear to the thrust washers and rear hanger clamp. See Thrust Washer Inspection detailed in this section. Check for cracks or loose mounting hardware. Replace if necessary, see the Component Replacement section of this publication.
- **Rear spring mount** — Check for proper alignment with spring taper and check for proper torque on rear spring mount fasteners. Refer to the Torque Specifications section in this publication.
- **Ride height** — Verify the ride height, refer to the Alignment & Adjustments section of this publication.
- **Shock absorbers** — Visually inspect for any signs of dents or leakage, misting is not considered a leak. See Shock Absorber Inspection in this section.
- **Steering operation** — Check for looseness at all pivot points. Inspect and lubricate all pivot points. Refer to the Troubleshooting Guide section of this publication. All steering components must move freely through the full range of motion from axle stop to axle stop.
- **STEERTEK NXT • STEERTEK axle assembly and tie rods** — Visually inspect for any cracks or dents on the axle, refer to Tie Rod Ends in this section. The axle should be free of any nicks or gouges. Replace as necessary.
- **Tire wear** — Visually inspect tires for any wear patterns that may indicate suspension damage or misalignment. See Tire Inspection in this section.
- **STEERTEK axle Top and bottom axle wrap liners** — Visually inspect for any cracking or broken pieces on liner in load bearing areas. See Axle Wrap Liner Inspection in this section.
- **Top pad** — Visually inspect for cracks or loose mounting hardware. Replace if necessary, see the Component Replacement section of this publication.
- **Wear and damage** — Visually inspect all parts of suspension for wear and damage. Look for bent or cracked parts, replace as necessary.

LUBRICATION INTERVALS

For vehicles equipped with the STEERTEK NXT • STEERTEK axle, 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.

TABLE 7-1

STEERTEK NXT • STEERTEK 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 (40,200 km) or 90 days, whichever comes first.	Multipurpose Grease NGLI Grade 2 EP, 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-road 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 NGLI Grade 2 EP, 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		
MEDIUM-DUTY	Low Mileage Accumulation 95% Highway Surface No off-road operation City Delivery, Inner City Coach, Heavy-haul, school bus, motor home, transit coach Less than 50,000 miles per year (80,500 kilometers per year)	Kingpin Bushings	Maximum of 40,000 miles (64,000 km) or 6 months, whichever comes first.	Multipurpose Grease NGLI Grade 2 EP, 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

FIGURE 7-1
STEERTEK NXT
Upper Grease Zerk

STEERTEK NXT upper kingpin grease zerks are located on the inboard side of the steering knuckle and upper kingpin connection, see Figure 7-1. In some STEERTEK NXT models, the grease zerk is located on the bottom of lower steering knuckle.

STEERTEK kingpin grease zerks are located on the top and bottom of the kingpin grease caps.

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.
5. Lubricate kingpins through grease zerks on top and bottom of the steering knuckle, see Table 7-1.
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 locations, see Figures 7-2 and 7-3.

NOTE Greasing at the lower zerk should purge grease from the thrust bearing shell.

FIGURE 7-2

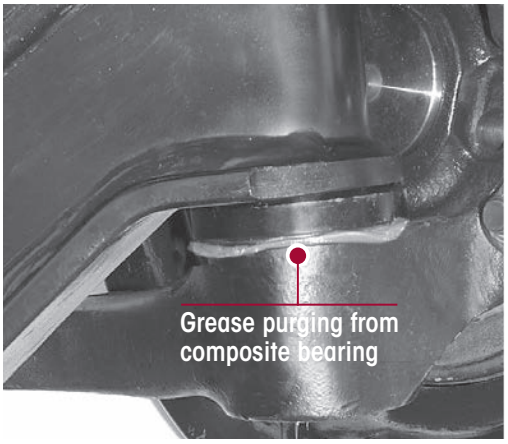
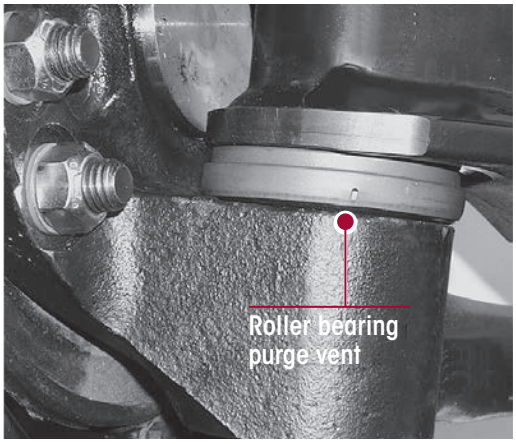


FIGURE 7-3



NOTE

On International Truck Vehicles, the STEERTEK NXT• STEERTEK axle is equipped with a composite thrust bearing on the left side and a steel roller thrust bearing on the right side, see Figures 7-4 and 7-5.

FIGURE 7-4

FIGURE 7-5

Top View of Thrust Bearings

Composite – Left Side **Roller – Right Side**

7. Remove the wheel chocks.

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).

CAUTION

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

CAUTION

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.

WARNING

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.

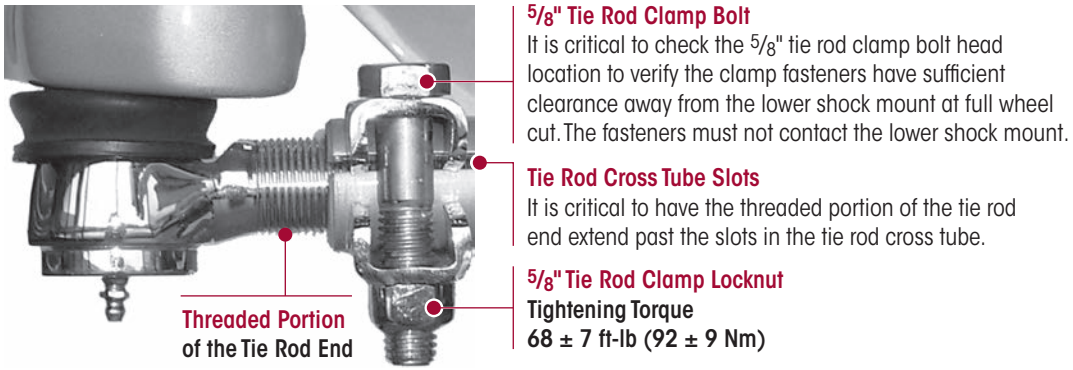
7. Verify the tie rod clamp bolt head does not contact the lower shock mount at full wheel cut, see Figure 7-6.

⚠ 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

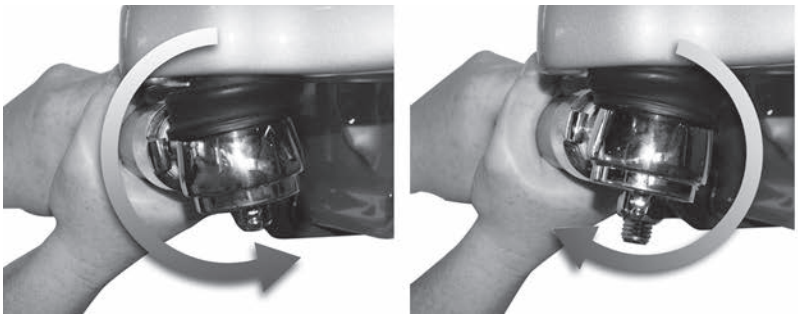


FIGURE 7-8

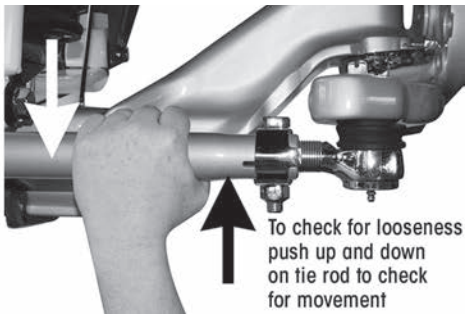


FIGURE 7-9

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.

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, 2026.)

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

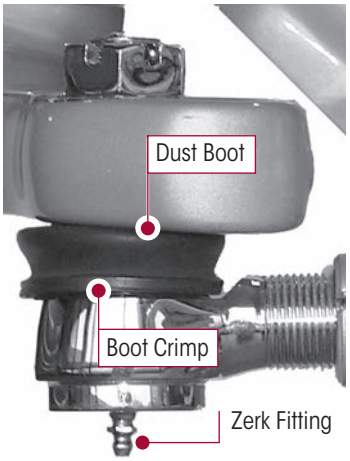
LUBRICATION PROCEDURE

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).

⚠ CAUTION

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

FIGURE 7-10



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.

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.

CLAMP GROUP

RE-TORQUE INTERVALS

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.

1. Clamp group locknuts must be torqued to specification at preparation for delivery and re-torqued at 1,000 miles thereafter. Follow the 6 month / 25,000 mile inspection and annual re-torque intervals.

WARNING

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

- **STEERTEK NXT Axle** — Ensure that the clamp group is properly aligned, the hex bolts are seated in the top pad properly, and the top pad is centered on the axle spring seat, see Figure 7-11.
- **STEERTEK Axle** — Ensure that the clamp group is properly aligned, the hex bolts are seated in the top pad properly and the bottom axle wrap is centered on the top axle wrap, see Figures 7-12 through 7-14.

2. Visually inspect for the signs of component or bolt movement. If signs of movement are present:
   a. Disassemble the clamp group fasteners, check for component wear or damage and replace as necessary, then install new clamp group fasteners.

FIGURE 7-11

STEERTEK NXT Axle

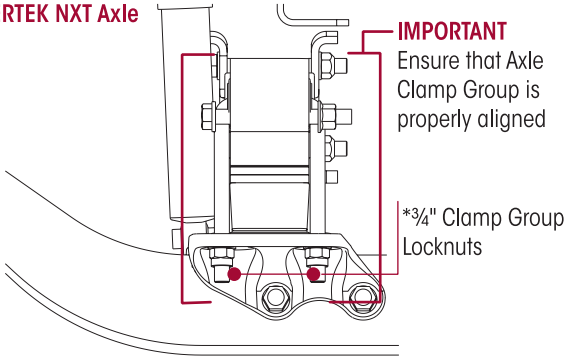
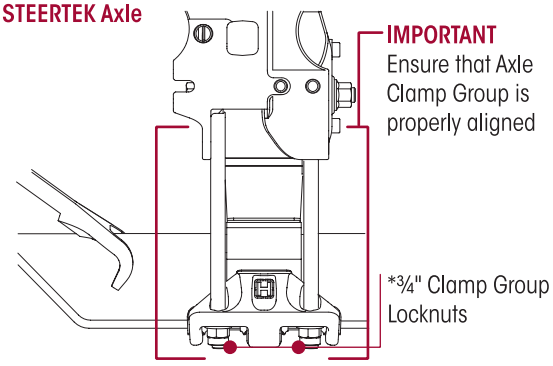


FIGURE 7-12

International 2-Leaf Mechanical Suspension

STEERTEK Axle



*Tightening torque specifications controlled by the vehicle manufacturer.

FIGURE 7-13

STEERTEK Axle equipped on SOFTEK Monoleaf

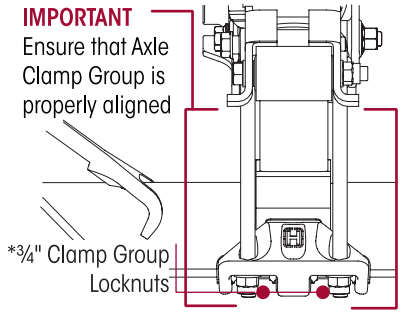
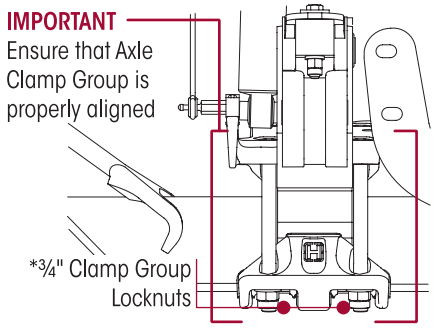
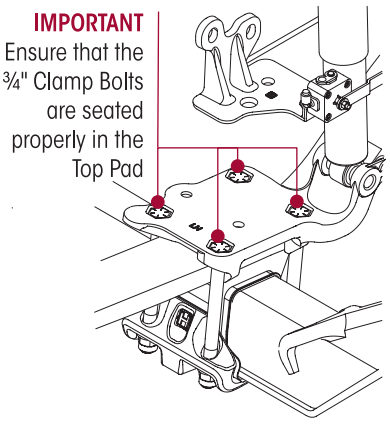


FIGURE 7-14

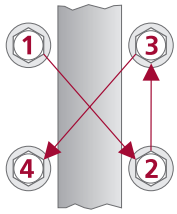
STEERTEK Axle equipped on AIRTEK





*Tightening torque specification controlled by the vehicle manufacturer.

FIGURE 7-15



3. Tighten the clamp group locknuts evenly in 50 foot pounds increments in the proper pattern, see Figure 7-15 to achieve uniform bolt tension as per- vehicle manufacturer's torque specification.

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 steering knuckle, see Figure 7-16.
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 7-18.
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 inside of the bottom of the knuckle, see Figure 7-17.
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 7-16

Check the UPPER Kingpin Bushing

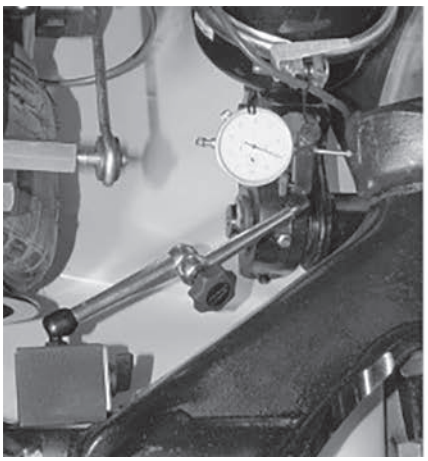


FIGURE 7-17

Check the LOWER Kingpin Bushing

FIGURE 7-18

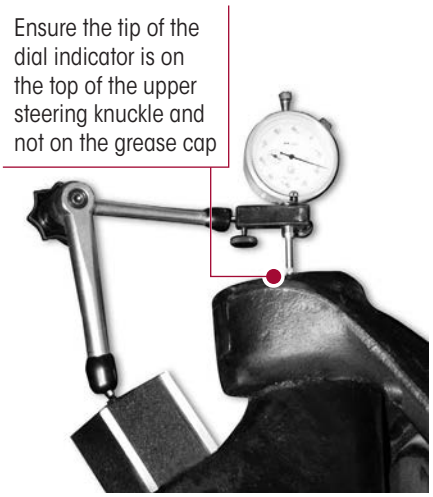
Move the TOP and BOTTOM of the tire in and out

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".

FIGURE 7-19



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 7-19.
   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.

   STEERTEK NXT Axle: Vehicles built **after** August 2011, if the vertical end play is:

   - **Greater than 0.030"**— Loosen the socket head cap screws and **push down** on the 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 knuckle assembly until the proper vertical end play is achieved.

   STEERTEK Axle: Vehicles built **prior** to August 2011, if the vertical end play is:

   - **Greater than 0.030"** — Install shims (Hendrickson Part No. 60259-002) between the top of the axle and the bottom of the upper steering knuckle to obtain the proper end play specification.
   - **Less than 0.008"** — Remove the shims (Hendrickson Part No. 60259-002) between the top of the axle and the bottom of the upper steering knuckle to obtain the proper end play specification.
10. Retighten the socket head cap screws to 187 ± 12 foot pounds torque.
11. Remove the safety stands and lower the vehicle.
12. Remove wheel chocks.

SHOCK ABSORBER INSPECTION

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 and SOFTEK suspension systems. If shock absorber replacement is necessary, Hendrickson recommends that the shock absorbers be replaced with identical Hendrickson Genuine parts 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 of this publication.

HEAT TEST AND PHYSICAL INSPECTION

FIGURE 7-20

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 a 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 7-20. 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. The rattling of metal parts can indicate that the shock absorber has an internal failure and the shock absorber should be replaced.

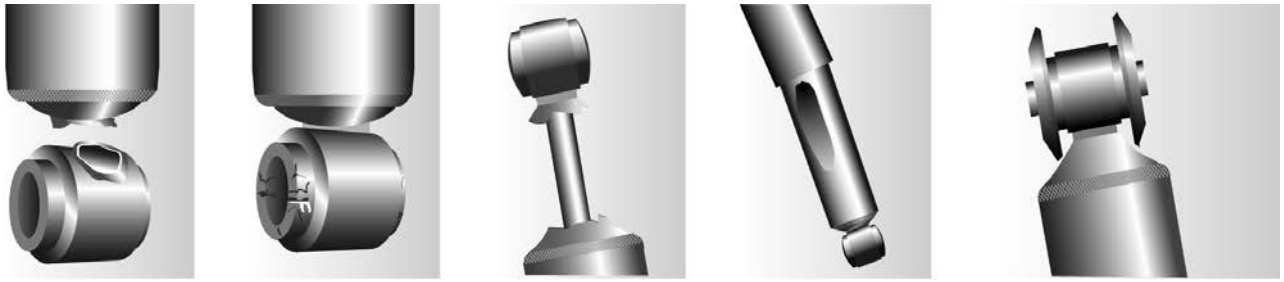
VISUAL INSPECTION

Look for these potential problems when doing a visual inspection, see Figure 7-21. Inspect the shock absorbers fully extended. Replace as necessary.

NOTE Figure 7-21 shows a general representation of an unacceptable shock absorber. Refer to your specific model's inspection guidelines for more details.

FIGURE 7-21

SHOCK ABSORBER VISUAL INSPECTION – UNACCEPTABLE CONDITIONS



Damaged upper or lower mount

Damaged upper or lower bushing

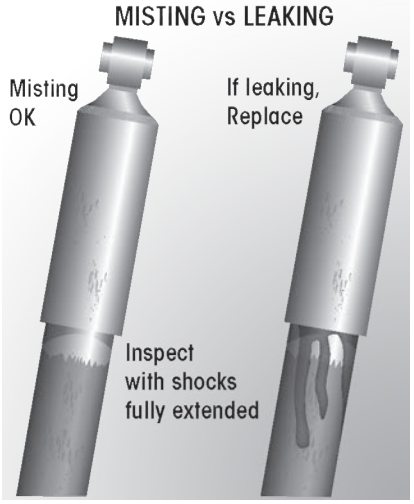
Damaged dust cover and / or shock body

Bent or dented shock absorber

Improper installation
Example: washer (if equipped) installed backwards

LEAKING VS. MISTING SHOCK ABSORBER VISUAL INSPECTION

FIGURE 7-22



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

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 a 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.

NOTE

AIRTEK•SOFTEK 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 7-22, underneath the main body (dust cover) of the shock absorber. Replace as necessary.

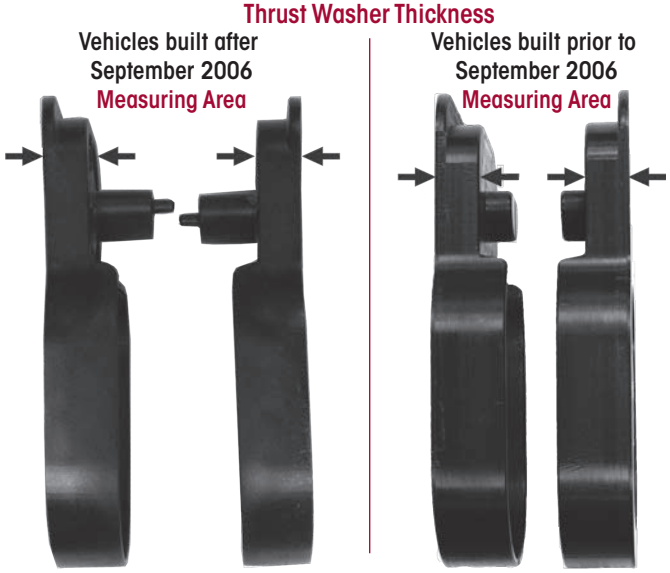
AIRTEK THRUST WASHER

In normal use, these components will function satisfactorily, even though the components may show some wear.

An indication that the rear mount/thrust washers are worn or need replacement is when the suspension exhibits one or more of the following conditions:

- Excessive lateral movement of the spring.
- The spring taper is making contact with the rear hanger clamp or the rear hanger.

FIGURE 7-23



NOTE

If one (1) thrust washer is worn out, Hendrickson recommends both thrust washers on that side of the suspension be replaced. Inspect the thrust washers on the other side of the vehicle and replace if necessary, see Thrust Washer in the Component Replacement section of this publication.

Thickness can be measured with a micrometer or a ruler. The thrust washers in Figure 7-23 show normal acceptable thickness.

- The normal thickness of a new thrust washer is $^{11}/_{16}$" (0.685") or 17.4 mm
- The minimum thickness allowable for a thrust washer is $^{9}/_{16}$" (0.560") or 14.2 mm

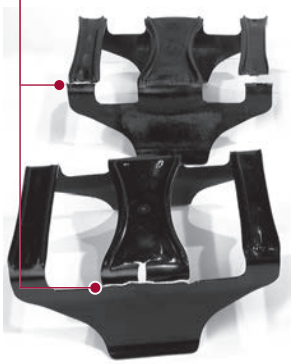
If one or more of these conditions is experienced, disassembly of the rear leaf spring hanger is required to replace the thrust washers.

STEERTEK AXLE WRAP LINER

INSPECTION PROCEDURE

- Axle wrap liners are installed on the **STEERTEK** axle to help prevent any type of abrasion on the axle at the clamp group area. Any time an axle wrap is removed, it is mandatory to replace the axle wrap liner.
- Liner Crack Criteria:
  It is possible for the axle wrap liner to crack during service. If the liner is cracked and all pieces are intact, it is not necessary to replace the liner. If the liner is broken out and pieces are missing, the liner must be replaced immediately, see Figure 7-24. See Axle Wrap replacement in the Component Replacement section of this publication.

FIGURE 7-24
Axle Wrap Liners Cracks



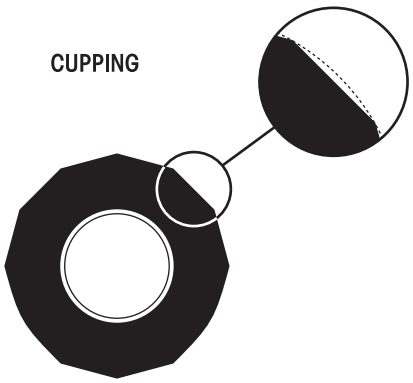
VISUAL TIRE INSPECTION

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 7-25



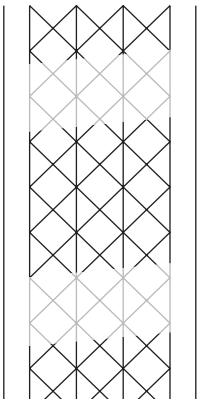
Cupping — Localized, dished out areas of fast wear creating a scalloped appearance around the tire. Cupping, which appears around the tire on the shoulder ribs, may also progress to adjoining ribs.

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 mismount 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.

FIGURE 7-26
DIAGONAL WEAR

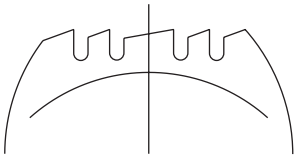


Diagonal Wear — Localized flat spots worn diagonally across the tread at approximately 25-35° angles, often repeating around the tread circumference. For more information.

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 7-27
FEATHER WEAR

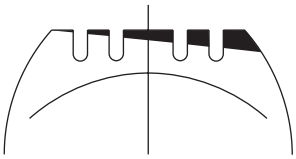


Feather wear — Tread ribs or blocks worn so that one side is higher than the other resulting in step–offs across the tread face. Generally, all ribs or blocks exhibit this wear.

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.

FIGURE 7-28
ONE-SIDED WEAR



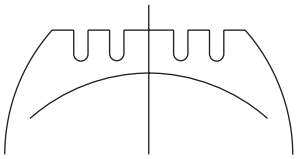
One-sided wear — Excessive wear on one side of tire extending from the shoulder towards the center of the tread.

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:

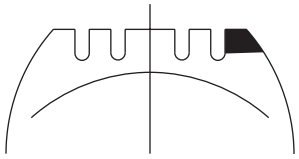
- **Tires** – Depending on severity, rotate tires to another axle position or, if worn to minimum tread depths, submit for possible retreading.
- **Vehicle** – Diagnose mechanical problem and correct.

FIGURE 7-29
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.

FIGURE 7-30
RAPID SHOULDER WEAR
(One Shoulder Only)



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.

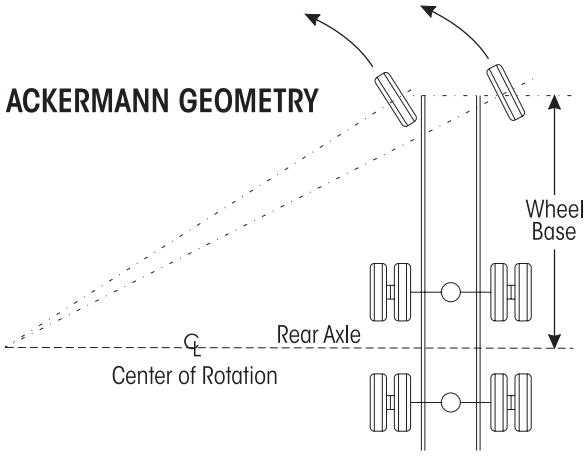
To correct this type of rapid shoulder wear:

- **Tires** – Change direction of rotation of tire. If shoulder wear is severe, remove and retread.
- **Vehicle** – Diagnose misalignment and/or mechanical condition and correct.

SECTION 8
Alignment & Adjustments

ALIGNMENT DEFINITIONS

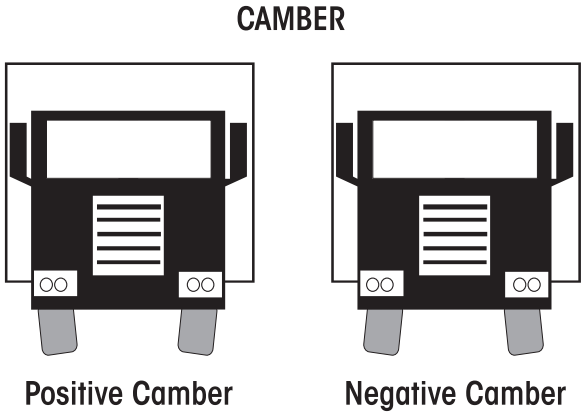
FIGURE 8-1



Ackermann steering geometry — The geometry of the four bar linkage consisting of the front axle, two knuckle assemblies, and tie rod assembly is designed to provide free rolling of front tire 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.

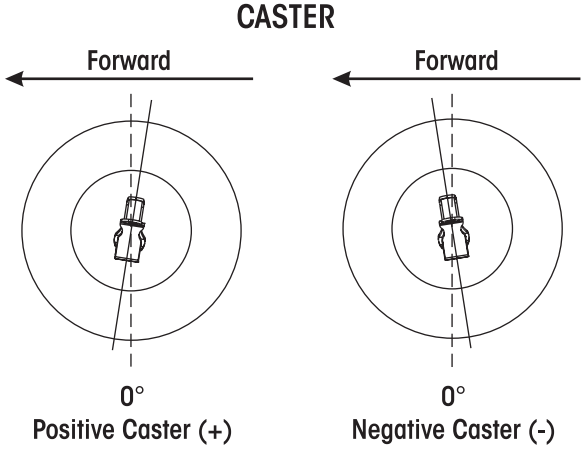
FIGURE 8-2



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

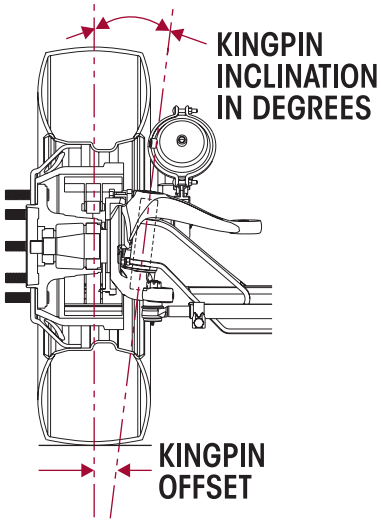


Caster — The forward or rearward tilt of the steering axle kingpin in reference to a vertical line. The angle is measured in degrees. Caster is positive when the top of the steering axis is titled rearward and is negative when the tilt is forward. Proper caster is important for directional stability 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.

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

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

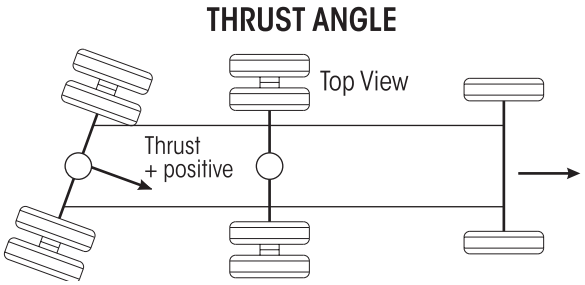
FIGURE 8-4



Kingpin Inclination (KPI) — 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.

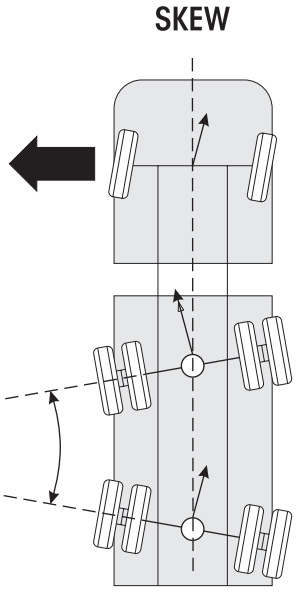
FIGURE 8-5



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.

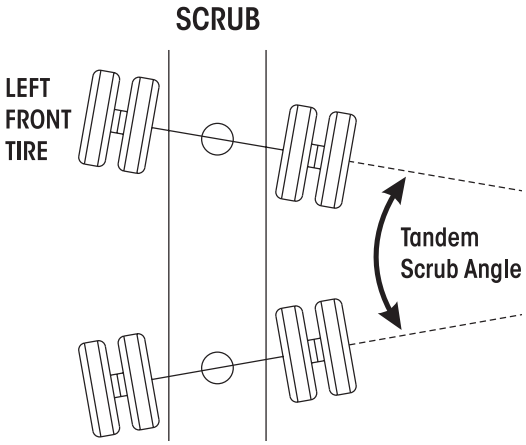
A steering correction is required to offset the effect of the thrust angles and keeps the vehicle traveling in a straight line. It results in a lateral offset between the steer and drive axle tires commonly referred to as "dog tracking."

FIGURE 8-6



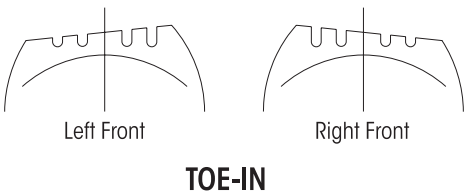
Scrub, Skew, Tram Angle or Parallelism — The angle formed by two thrust or tracking lines of a tandem (or multiple) axle vehicle. As indicated by the term "parallelism", the ideal condition is when the two thrust lines form a 0° angle, or are parallel to each other. Positive skew or tram is when the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

FIGURE 8-7



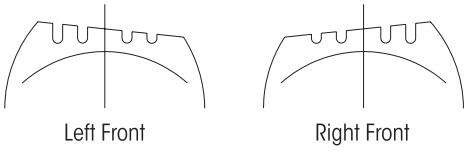
Any scrub angle other than 0° will cause the tandem axles to work against each other. The steer axle must be turned to offset the "push" of the tandem axles to keep the vehicle moving straight ahead. This causes every tire on the vehicle to "scrub". Tire wear from tandem scrubbing occurs at the leading 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 8-8



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

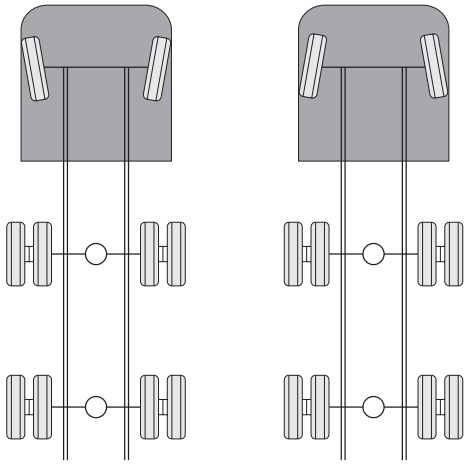


TOE-OUT

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 TOE-IN

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 OEM, tire OEM 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.

INSPECTION PRIOR TO ALIGNMENT

WHEELS AND TIRES

Examine and ensure 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 and ensure the following:

- All fasteners are installed and tightened to the specified torque, refer to the Torque Specifications section of 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.
- AIRTEK equipped – vehicle ride height is within specification, see Ride Height in this section.
- 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 and at the proper ride height (if AIRTEK equipped). Follow the vehicle or suspension manufacturer's guidelines.
- All fasteners, including U-bolts (if applicable) are installed and tightened to the specified torque.
- Ensure the leaf spring and leaf spring bushings are not worn or damaged.
- Ensure the torque rods (if equipped) 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 TMC's publication "Guidelines for Total Vehicle Alignment" (TMC RP 642).

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

- Every 50,000 miles (80,400 kms), or 12 months, 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

Follow wheel alignment inspection intervals as specified by the vehicle 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 8-11 and 8-12.

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

FIGURE 8-11

FIGURE 8-12

WARNING

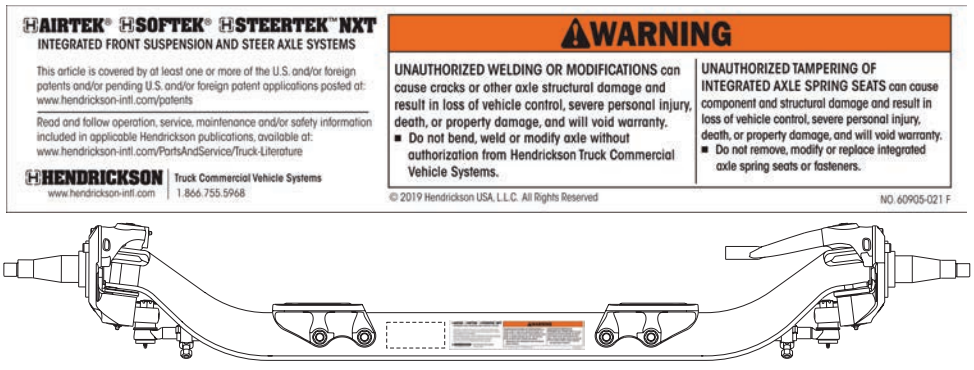
AXLE CAMBER IS NOT ADJUSTABLE. DO NOT CHANGE THE AXLE CAMBER ANGLE OR BEND THE AXLE BEAM. BENDING THE AXLE BEAM TO CHANGE THE CAMBER ANGLE CAN DAMAGE THE AXLE AND REDUCE AXLE STRENGTH, AND WILL VOID HENDRICKSON'S WARRANTY. A BENT AXLE BEAM CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL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

WARNING

THE INTEGRATED AXLE SPRING SEATS ON THE STEERTEK NXT AXLE ARE NON-SERVICEABLE. UNAUTHORIZED TAMPERING OF INTEGRATED AXLE SPRING SEATS CAN CAUSE COMPONENT AND STRUCTURAL DAMAGE AND RESULT IN LOSS OF VEHICLE CONTROL, SEVERE PERSONAL INJURY OR DEATH, PROPERTY DAMAGE, AND WILL VOID ANY APPLICABLE WARRANTY. DO NOT REMOVE, MODIFY OR REPLACE INTEGRATED AXLE SPRING SEAT OR FASTENERS.

FIGURE 8-13

STEERTEK NXT Axle | Vehicles built after August 2011



STEERTEK Axle | Vehicles built prior to August 2011

6. Check camber angle. **DO NOT** attempt to adjust. Refer to Camber in Front Wheel Alignment Specifications section.

NOTE Contact Hendrickson Tech Services for any questions regarding STEERTEK NXT integrated axle spring seats and / or fasteners.

7. It is necessary to verify that all ride heights (front and rear if AIRTEK equipped) are within the vehicle manufacturer's specifications prior to checking caster to get an accurate caster reading.
8. Check and adjust caster angle. Refer to Caster in the Front Wheel Alignment Specifications 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.
9. Check and adjust toe-in, refer to Toe Setting in this section.

STEERING STOP

ADJUSTMENT PROCEDURE

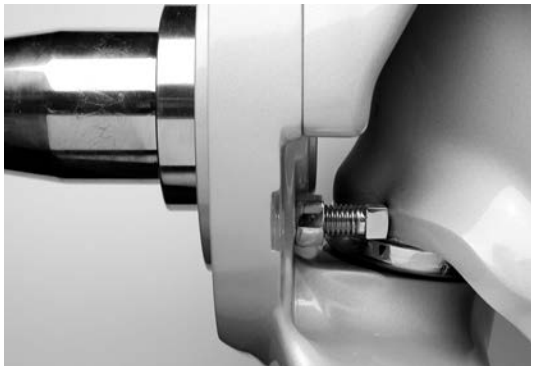
NOTE When the axle or lower steering knuckle is replaced, the steering stop must be checked.

⚠ WARNING

ALWAYS CHECK/RESET THE STEERING GEAR BOX POPPET WHEN THE WHEEL CUT IS DECREASED. FOLLOW 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 onto 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 8-14



NOTE It is very important that the sides of the square head axle stop bolts are set parallel to the axle beam to ensure a good contact point on the axle, see Figure 8-14.

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.

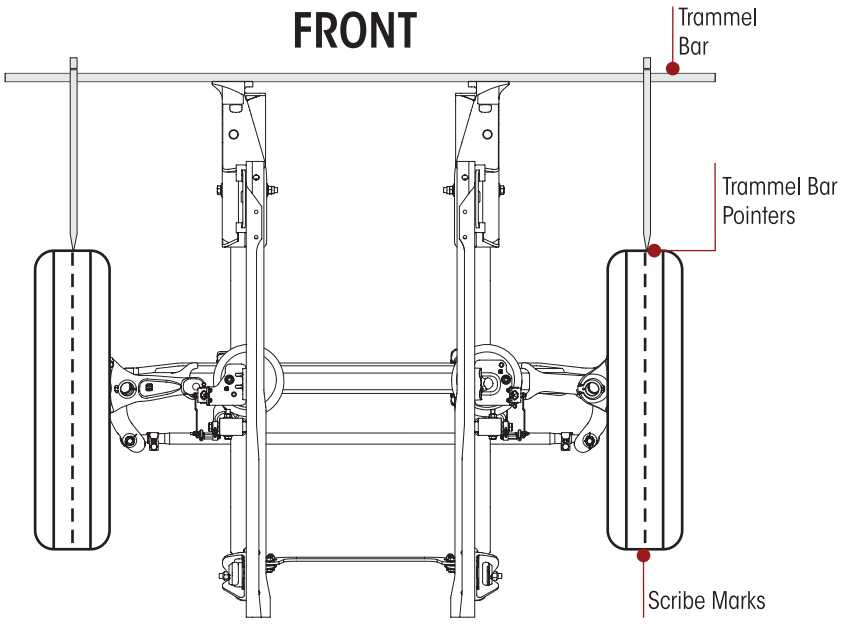
8. Use a trammel bar and measure the distance between the scribe marks at the rear of the steer axle tires. Record the measurement.

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.

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 8-15.

FIGURE 8-15



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 1/16" ± 1/32" (0.060" ± 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.

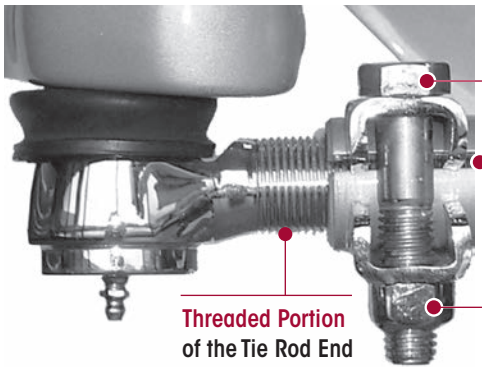
⚠ WARNING

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD (SEE FIGURE 8-16). 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.

12. Verify the tie rod clamp bolt head does not contact the lower shock mount at full wheel cut, see Figure 8-16.
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 8-16



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)

AIRTEK RIDE HEIGHT

VERIFICATION

IMPORTANT NOTE

The recommendation of the vehicle manufacturer is that dual ride height control valves are only to be installed on the front suspension when the rear suspension is equipped with a single ride 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. Drive the vehicle onto a level surface.
2. Free and center all suspension joints by slowly moving vehicle back and forth several times without using the brakes. **It is important when coming to a complete stop to verify that the brakes are released.**
3. Chock the front wheels.
4. Verify that the air system is at full operating pressure.

NOTE

Hendrickson recommends the following be performed during any type of ride height adjustment to help prevent socket head cap screws from loosening from the height control valve housing, and any subsequent air leaks from the height control valve.

5. Prior to adjusting the ride height control valve, clean the threads of the ¼" valve mounting fasteners to remove any debris and corrosion.

⚠ 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.

6. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to inflating or deflating the suspension system.

SERVICE HINT

It is very important that the leveling valve be cycled completely before and after any ride height adjustments. This cycling of the leveling valve will help to make the adjustment as accurate as possible.

7. Detach the lower rubber grommet of the height control valve linkage assembly (or assemblies) from the lower stud and exhaust the suspension system air by lowering the height control valve arm(s).
8. Re-attach the lower grommet of the height control valve linkage assembly (or assemblies) onto the lower stud to fill the suspension system with air. Wait until the airflow to front air springs has stopped.

9. The ride height is measured at the front of the air spring. Place the height gauge (Literature No. 45745-251) so the flat surface of the height gauge is against the side of the frame rail and the horizontal flat is sitting on top of the air spring bead plate. Align the bottom of the height gauge to the air spring piston flange as shown in Figures 8-17 and 8-18. Verify that the air spring height is within the "ACCEPTABLE" tolerance indicated on the height gauge.
10. If the air spring piston flange edge contacts the "BELOW SPEC" region, the ride is set too low. If the air spring piston flange contacts to the "ABOVE SPEC" region, the ride height is set too high. If the ride height is out of specification, the ride height **MUST** be adjusted.
11. If a height gauge is not available, measure the suspension reference ride height on the front axle (top front of the air spring to the bottom of the air spring piston flange). The reference ride height specification is 8⅛" ± 3⁄16", see Figure 8-19. If the reference ride height is out of specification, the ride height **MUST** be adjusted.

FIGURE 8-17
Dual Ride Height Verification

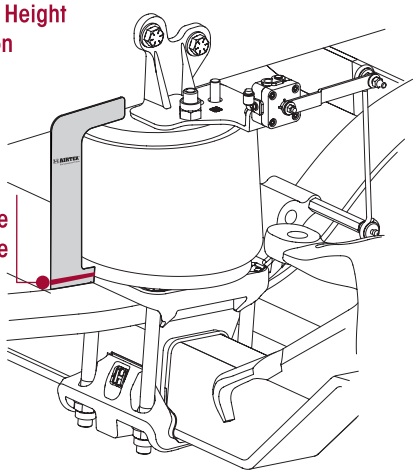


FIGURE 8-18
Single Ride Height Verification

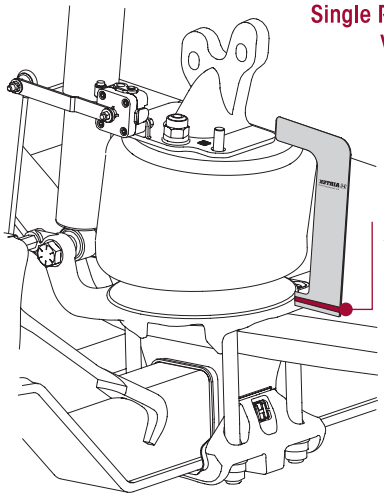
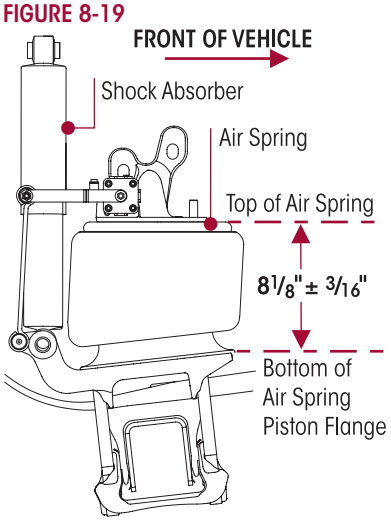


FIGURE 8-19



ADJUSTMENT

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

SERVICE HINT

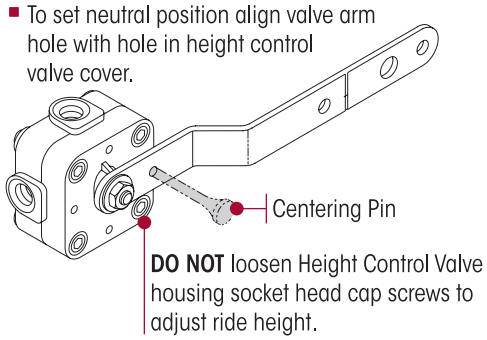
It is very important that the leveling valve be cycled completely before and after any ride height adjustments. Cycling of the leveling valve will help make the adjustment more accurate.

2. See 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 assembly (or assemblies) from the lower stud and exhaust the suspension system air by lowering the height control valve 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 leveling valve arm(s) to exhaust the air system until the suspension is at the proper ride height.
6. Use a ⅛" wooden dowel rod (golf tee) to set the neutral position for the height control valve(s) by aligning the hole in the leveling arm(s) with the hole in the height control valve cover, as shown in Figure 8-20. **DO NOT** use a metal rod or nail as this may cause damage to the height control valve.

NOTE

Hendrickson recommends the following be performed during any type of ride height adjustment to help prevent socket head cap screws from loosening from the height control valve housing, potentially causing subsequent air leaks from height control valve(s).

FIGURE 8-20



7. Prior to adjusting the height control valve(s), clean the threads of the mounting fasteners of any debris and corrosion.
8. Loosen the mounting locknuts.
9. Pivot the valve body about the mounting bolt so the link mount stud inserts directly into the center hole of the rubber grommet at the proper height. Check the rubber grommet for any tearing or damage, replace as necessary.

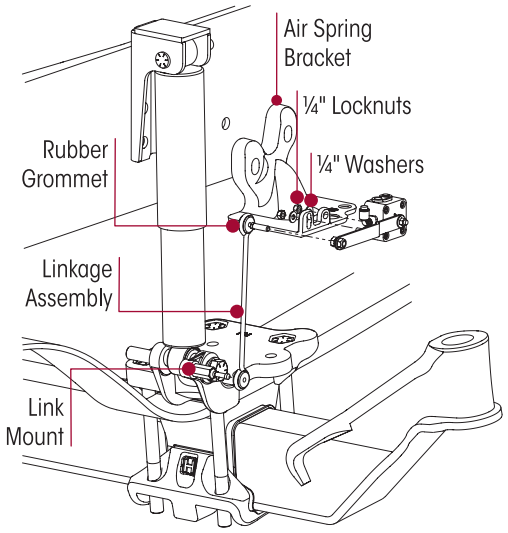
International Vehicles equipped with a single ride height control valve:

a. Facing the air spring from the outboard side of the vehicle, pivot the valve body counter clockwise to increase the ride height and clockwise to decrease the ride height.

International Vehicles equipped with dual ride height control valves:

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

FIGURE 8-21



10. Tighten the mounting locknuts to 8 ±1 foot pounds torque after the adjustment is made, see Figure 8-21. Install a (5 mm) Allen wrench in the bottom socket head cap screws to prevent the screws from turning while re-tightening the locknuts.
11. Remove the dowel from the height control valve(s).
12. Cycle the air from the system by lowering the height control valve arm.
13. Reconnect the height control valve linkage rubber grommet to the link mount(s). Allow the air suspension system to completely fill with air.
14. Recheck the ride height after adjustment (if equipped with dual height control valves, check both sides of the vehicle).
15. Repeat Steps 3 through 14 until the ride height is within specification.

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 the torque specifications listed in the vehicle manufacturer's service manual.

AIRTEK HEIGHT CONTROL VALVE

DISASSEMBLY

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the vehicle frame and support with safety stands.
4. Drain the air from the secondary air tank.

⚠ 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.

5. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
6. 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.
7. Exhaust the air in the air springs and deflate the front suspension.

⚠ CAUTION

THE PUSH-TO-CONNECT FITTINGS ARE NON-SERVICEABLE. IT IS NECESSARY TO CLEAN THE DIRT AND DEBRIS AWAY FROM THE PUSH-TO-CONNECT FITTINGS AND THE AIR LINES TO HELP PREVENT ANY FOREIGN MATERIAL FROM ENTERING THE AIR SPRING. AIR SYSTEM OR DAMAGING THE PUSH-TO-CONNECT FITTINGS. CLEAN PUSH-TO-CONNECT FITTINGS USING SOAPY WATER AND A SOFT BRISTLED BRUSH AND DRY WITH COMPRESSED AIR.

8. Disconnect the air line(s) from the height control valve(s), see Figure 9-1.
9. Remove the mounting fasteners.
10. Remove the height control valve.

ASSEMBLY

1. Attach the height control valve(s) on the mounting bracket as shown in Figure 9-1.
2. Attach the ¼" 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.

SERVICE HINT

When replacing or installing nylon air line tubing into push-to-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 push-to-connect fitting causing air leakage.

3. Attach the air lines to the height control valve(s), see Figure 9-3.
4. Install the height control valve linkage assembly(s).
5. Adjust the height control valve(s) to proper specifications. See the Alignment & Adjustments section of this publication for proper ride height adjustment.

FIGURE 9-1

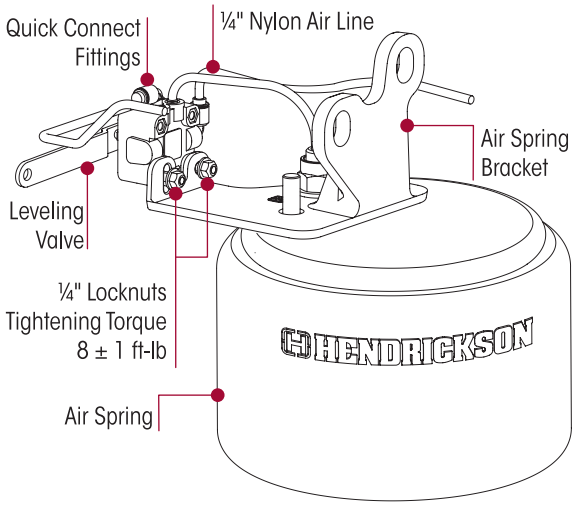


FIGURE 9-2

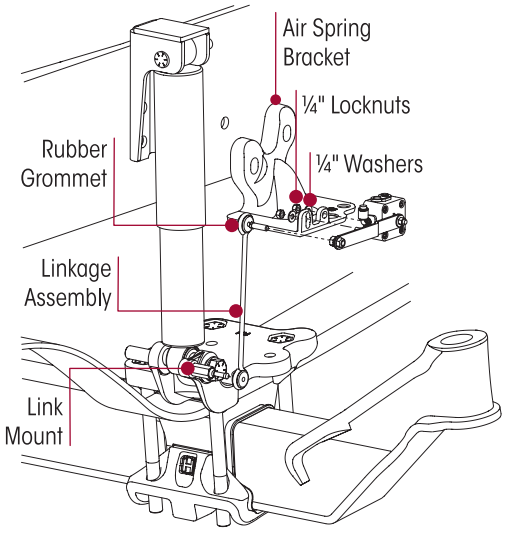
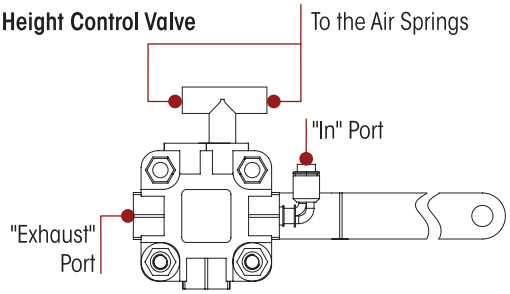
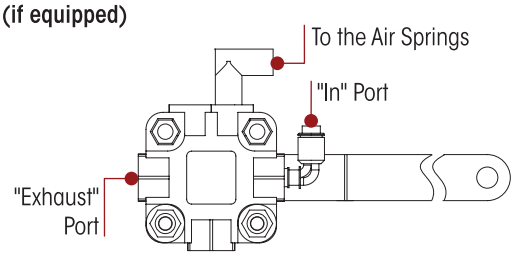


FIGURE 9-3

Single Height Control Valve



Dual Height Control Valve (if equipped)



6. After the adjustment is made, install a 3⁄16" Allen wretch in the bottom socket head cap screws to prevent the screws from turning while tightening the ¼" locknuts to torque.
7. Tighten the ¼" locknuts to 8 ± 1 foot pounds torque.
8. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to inflating or deflating the suspension system.
9. Inflate the suspension by connecting the linkage assembly to the height control valve arm and lower mounting bracket. Verify the air springs inflate uniformly without binding.
10. Lower the vehicle frame and remove safety stands.
11. Remove wheel chocks.

AIRTEK AIR SPRING

DISASSEMBLY

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the vehicle frame and support with safety stands.
4. Drain the air from the secondary air tank.

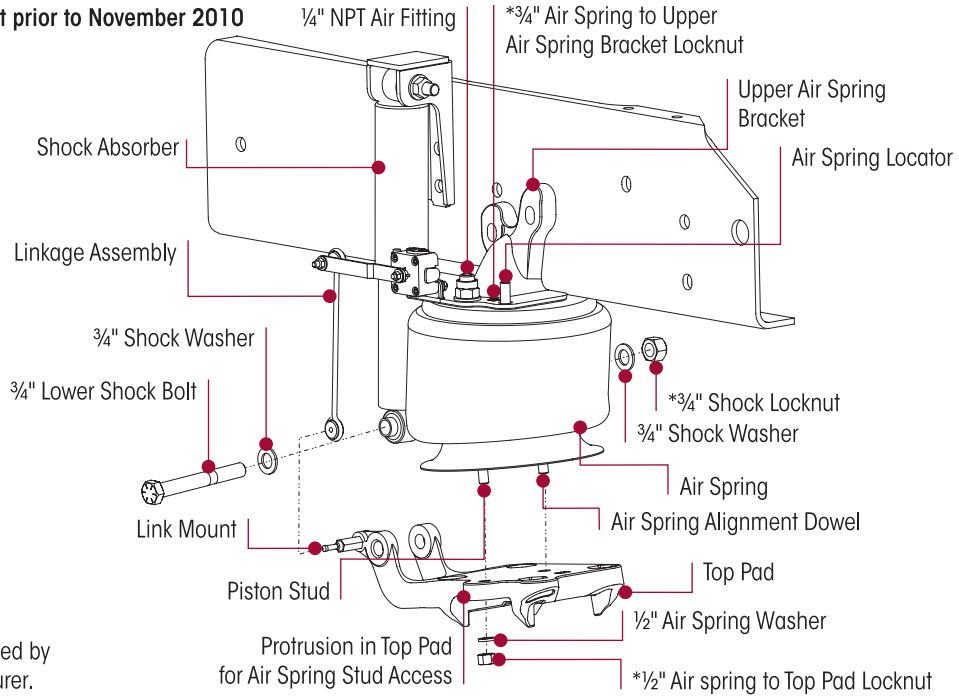
WARNING

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.

5. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
6. 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.

7. If the air spiring is damaged and the suspension is deflated, it will be necessary to raise the vehicle frame and support the vehicle with safety stands to obtain adequate clearance for air spring removal.
8. Disconnect the ¼" NPT air fitting from the air spring.
9. Remove the lower ½" air spring locknut from the piston stud to remove the air spring from the top pad and discard fasteners, see Figure 9-4.
10. Remove the ¾" upper air spring locknut from the air spring bracket, discard fasteners.
11. Remove the air spring.

FIGURE 9-4
AIRTEK | Vehicles built prior to November 2010

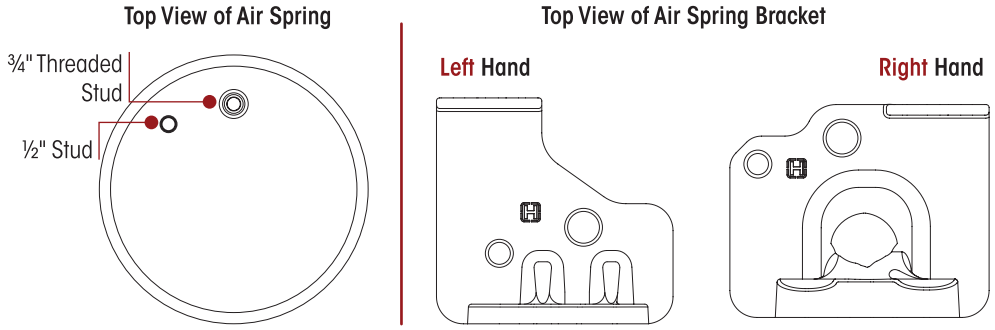


*Tightening torque specifications controlled by the vehicle manufacturer.

ASSEMBLY

1. Compress the air spring and slide into vertical position.
2. There is a locating ½" stud and ¾" threaded stud on top of the air spiring, see Figure 9-5.

FIGURE 9-5



3. There are two (2) studs on the bottom of the air spring. Guide studs through the air spring bracket and properly seat the lower air spring piston into the top axle pad. Secure the ½" locknut to the piston.
4. Tighten the ¾" upper air spring locknuts and the ½" lower air spring locknuts to vehicle manufacturer's torque specifications.

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

SHOCK ABSORBER

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

WARNING

THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SPRINGS. ANYTIME THE FRONT AXLE ON AN AIRTEK • SOFTEK SUSPENSION IS SUSPENDED IT IS MANDATORY THAT THE SHOCK ABSORBERS REMAIN CONNECTED. FAILURE TO DO SO COULD CAUSE THE AIR SPRINGS TO EXCEED THEIR MAXIMUM LENGTH, POSSIBLY CAUSING THE AIR SPRINGS TO SEPARATE FROM THE PISTON, OR CAUSE A REVERSE ARCH IN THE STEEL LEAF SPRINGS, POSSIBLY RESULTING IN PREMATURE STEEL LEAF SPRING FAILURE.

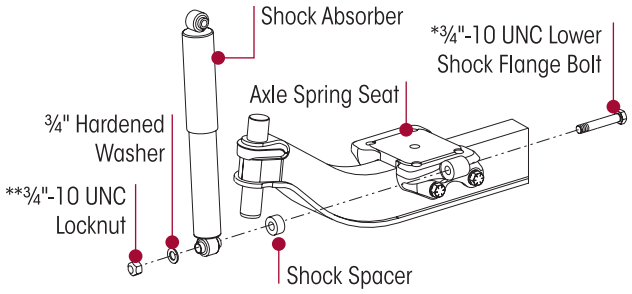
DISASSEMBLY

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Remove and discard the lower shock absorber mounting bolts and fasteners.
4. Remove and discard the upper shock absorber mounting bolts and fasteners.
5. Slide out the shock absorber.
6. Inspect the shock absorber mounting brackets and hardware for damage or wear, replace as necessary.

ASSEMBLY

1. Install the shock absorber into the upper shock mounting bracket.
2. Install the upper shock mounting bolt and fasteners.
3. Install the lower bolt from the inboard side to the outboard side of the axle spring seat•top pad•top axle wrap and attach the shock spacer (if equipped) and fasteners, see Figures 9-6 through 9-8.
4. Tighten both shock eye locknuts to vehicle manufacturer's torque specifications.
5. Remove wheel chocks.

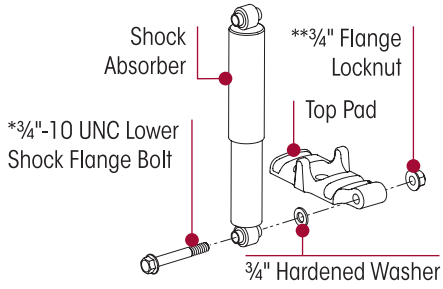
FIGURE 9-6
STEERTEK NXT Axle | Vehicles built after August 2011
Integrated Axle Seat Shown



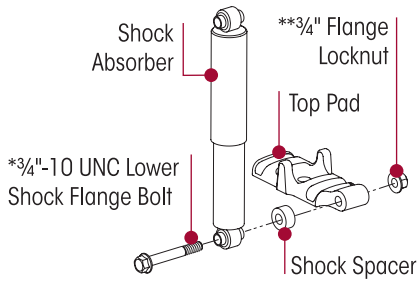
* Apply a thin coating of anti-seize compound to the shock absorber lower mounting bolt shank and to the inside bore of the aluminum top axle wrap•top pad•axle spring seat to help prevent seizing of the bolt to the aluminum axle wrap•top pad•axle spring seat.
** Tightening torque specifications controlled by the vehicle manufacturer.

FIGURE 9-7
SOFTEK Monoleaf | Vehicles built prior to June 2014

TranStar • Models 9200/9400/8600



LoneStar Model



ProStar Model

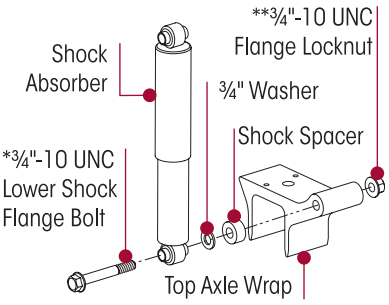
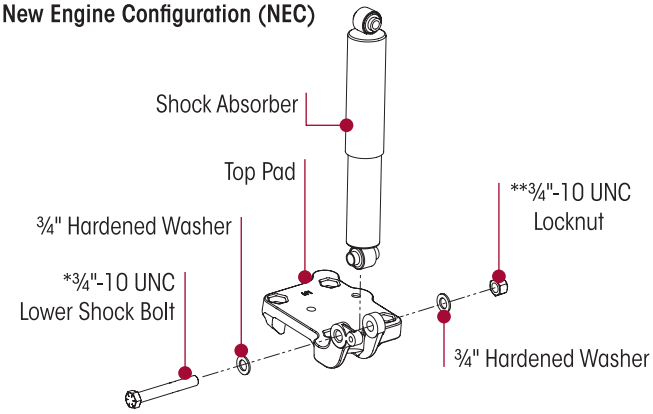
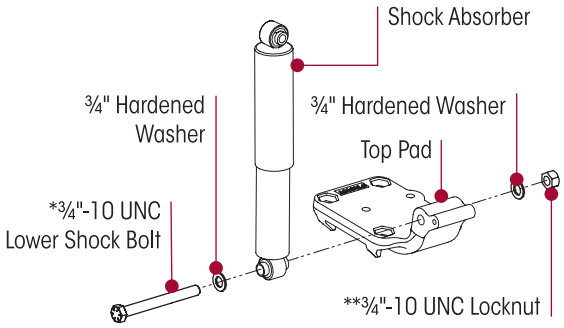


FIGURE 9-8
AIRTEK | Vehicles built between September 2006 and November 2010
New Engine Configuration (NEC)



AIRTEK | Vehicles built prior to September 2006
Prior to New Engine Configuration (PEC)



* Apply a thin coating of anti-seize compound to the shock absorber lower mounting bolt shank and to the inside bore of the aluminum top axle wrap•top pad•axle spring seat to help prevent seizing of the bolt to the aluminum axle wrap•top pad•axle spring seat.
** Tightening torque specifications controlled by the vehicle manufacturer.

AIRTEK REAR SPRING HANGER AND THRUST WASHERS (NEC)

NOTE

The AIRTEK with the **PEC** design rear spring hangers require modified hangers and other components contained in Kit Number 60961-131. See AIRTEK with PEC to NEC Rear Spring Hanger and Thrust Washer component replacement in this section.

DISASSEMBLY

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the vehicle frame and support with safety stands.

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.

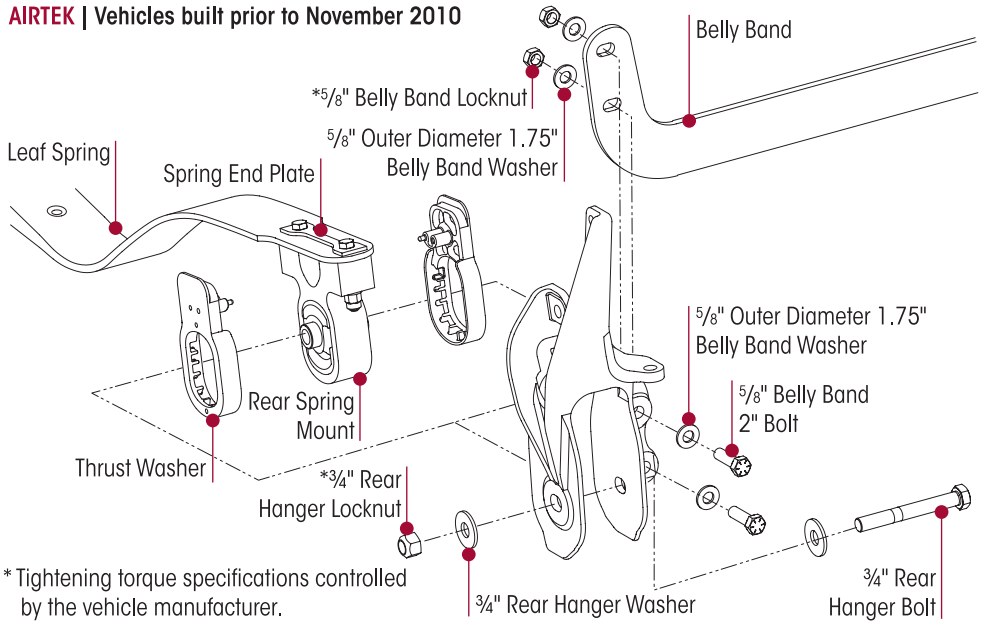
4. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
5. Disconnect the linkage assembly at the rubber grommet and lower the height control valve arm. This will exhaust the air pressure in the air springs.
6. Remove the air lines from air springs.
7. Remove the (2) mounting fasteners that connect the belly band (if equipped) to the rear hanger.

8. Suspend the front axle from the shock absorbers.
9. Remove the rear spring eye bolt and fastener.

SERVICE HINT A bottle jack may be required to raise the axle slightly to facilitate removal of the rear spring eye bolt.

10. Remove the hardware from the rear spring hanger. See manufacturer's guidelines.
11. Remove the rear hanger from the vehicle, see Figure 9-9
12. Remove the two (2) thrust washers from the rear spring mount.
13. Inspect the rear spring mount and both thrust washers for excessive wear or damage. See Thrust Washer Inspection in the Preventive Maintenance section of this publication.
14. If damaged or worn excessively, replace with Genuine Hendrickson Parts as detailed in the Component Replacement section of this publication.

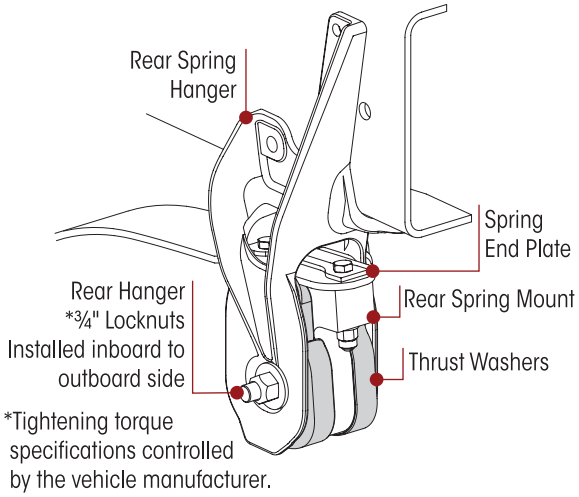
FIGURE 9-9
AIRTEK | Vehicles built prior to November 2010



ASSEMBLY

1. Install the thrust washers on the rear spring mount, see Figure 9-9.
2. Slide the rear hanger over the rear spring mount.
3. Install the rear spring hanger on the frame.
4. Install new frame mounting hardware. Follow manufacturer's guidelines.
5. Install belly band fasteners (if equipped). Tighten ⅝" locknuts to vehicle manufacturer's torque specifications.
6. Install ¾" x 6" rear hanger bolt from the inboard to outboard side.
7. Install the rear hanger fasteners. Tighten ¾" locknuts to vehicle manufacturer's torque specifications, see Figure 9-10.
8. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.

FIGURE 9-10



9. Install the air line into the air spring.
10. Air up the suspension.
11. Check the ride height and adjust if necessary, see the Alignment & Adjustments section of this publication for the proper ride height adjustment.
12. Lower the vehicle frame and remove safety stands.
13. Remove wheel chocks.

AIRTEK BELLY BAND

DISASSEMBLY

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Remove the four (4) belly band mounting fasteners and discard.
4. Remove belly band.

ASSEMBLY

1. Install belly band in front of mounting bracket.
2. Install the new belly band mounting fasteners, see Figure 9-9.
3. **PEC Vehicles built prior to September 2006**
   a. Install the new belly band mounting fasteners with the larger diameter washer located on the belly band side of the connection and with the smaller diameter washer located on the back of the rear hanger, see Figure 9-11b.
4. Tighten to vehicle manufacturer's torque specifications.
5. Remove the wheel chocks.

FIGURE 9-11a
BELLY BAND | New Engine Configuration (NEC)

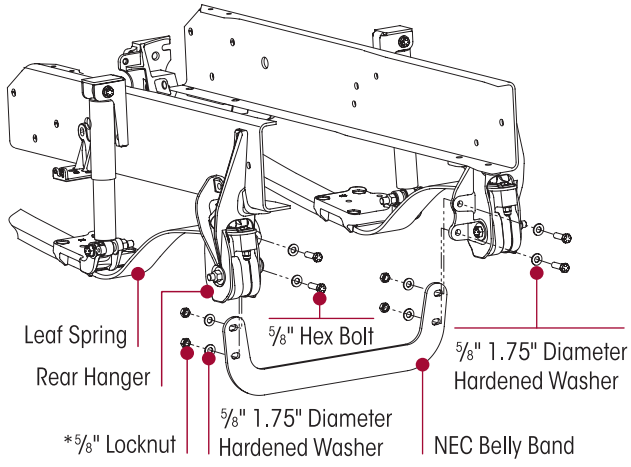
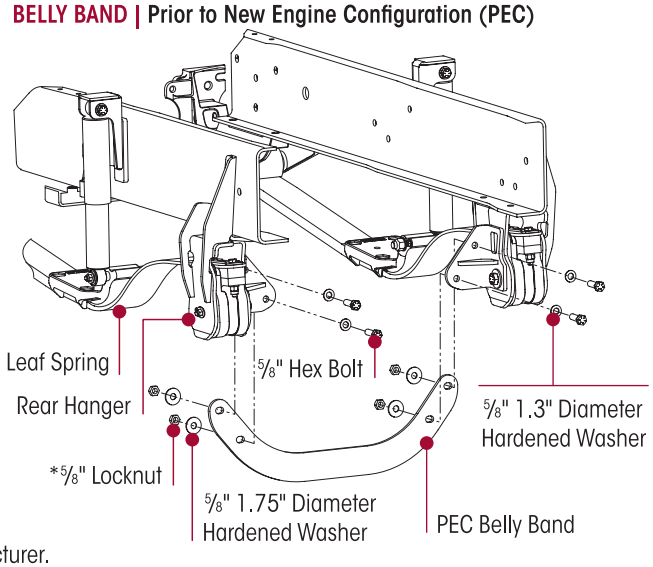


FIGURE 9-11b
BELLY BAND | Prior to New Engine Configuration (PEC)



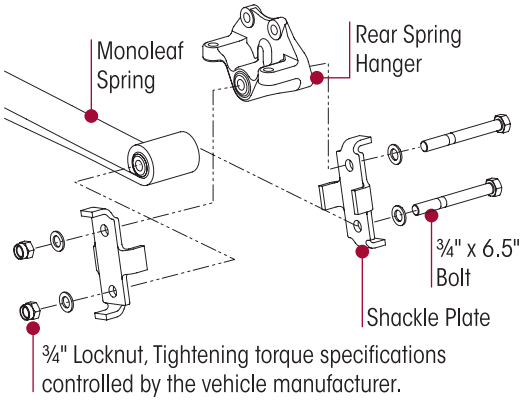
* Tightening torque specifications controlled by the vehicle manufacturer.

SOFTEK REAR SHACKLE BRACKET

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 assembly.
5. Remove rear shackle fasteners.
6. Remove shackle plates.

FIGURE 9-12
SOFTEK | Vehicles built prior to June 2014



ASSEMBLY

1. Install shackle bracket and fasteners, see Figure 9-12.
2. Tighten fasteners to the vehicle manufacturer's torque specifications.
3. Raise the vehicle and remove the safety stands.
4. Lower the vehicle.
5. Remove the wheel chocks.

AIRTEK LEAF SPRING ASSEMBLY

DISASSEMBLY

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

⚠ WARNING

DEFLATE AND DISCONNECT THE AIR SYSTEM PRIOR TO RAISING THE FRONT OF THE VEHICLE. 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.

3. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension 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. Disconnect the air lines from the air springs.
6. Install a floor jack with a 4" lifting plate below the axle and raise the truck.
7. Remove the tires per the vehicle manufacturer's instructions.
8. Install safety stands behind the rear spring mounts to support the vehicle. It may be necessary to remove peripheral components for installation.
9. Lower the jack allowing the axle to hang, but **DO NOT** remove the jack from the axle.
10. Loosen both front spring eye bolts, but **DO NOT** remove the bolts.
11. Remove both rear spring eye bolts.
12. Remove both lower shock absorber mounting bolts.

SERVICE HINT To ease in the removal of the spring eye bolts it may be necessary to raise or lower the axle slightly.

13. Disconnect the lower air spring mounting fasteners from the top pad and discard.
14. Loosen the clamp group locknuts for the leaf spring that is **NOT** being serviced. **DO NOT** remove clamp group locknuts at this time.

⚠ WARNING

DO NOT USE A CUTTING TORCH TO REMOVE CLAMP GROUP BOLTS OR ATTACHING FASTENERS. THE USE OF SUCH HEAT ON SUSPENSION COMPONENTS CAN 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.

15. Remove and discard the ¾" clamp group fasteners. Remove the top pad, bottom axle wrap and liner from the leaf spring that is being serviced, see Figure 9-13.
16. Lower the jack, allowing the suspension to pivot down out of the rear hanger.

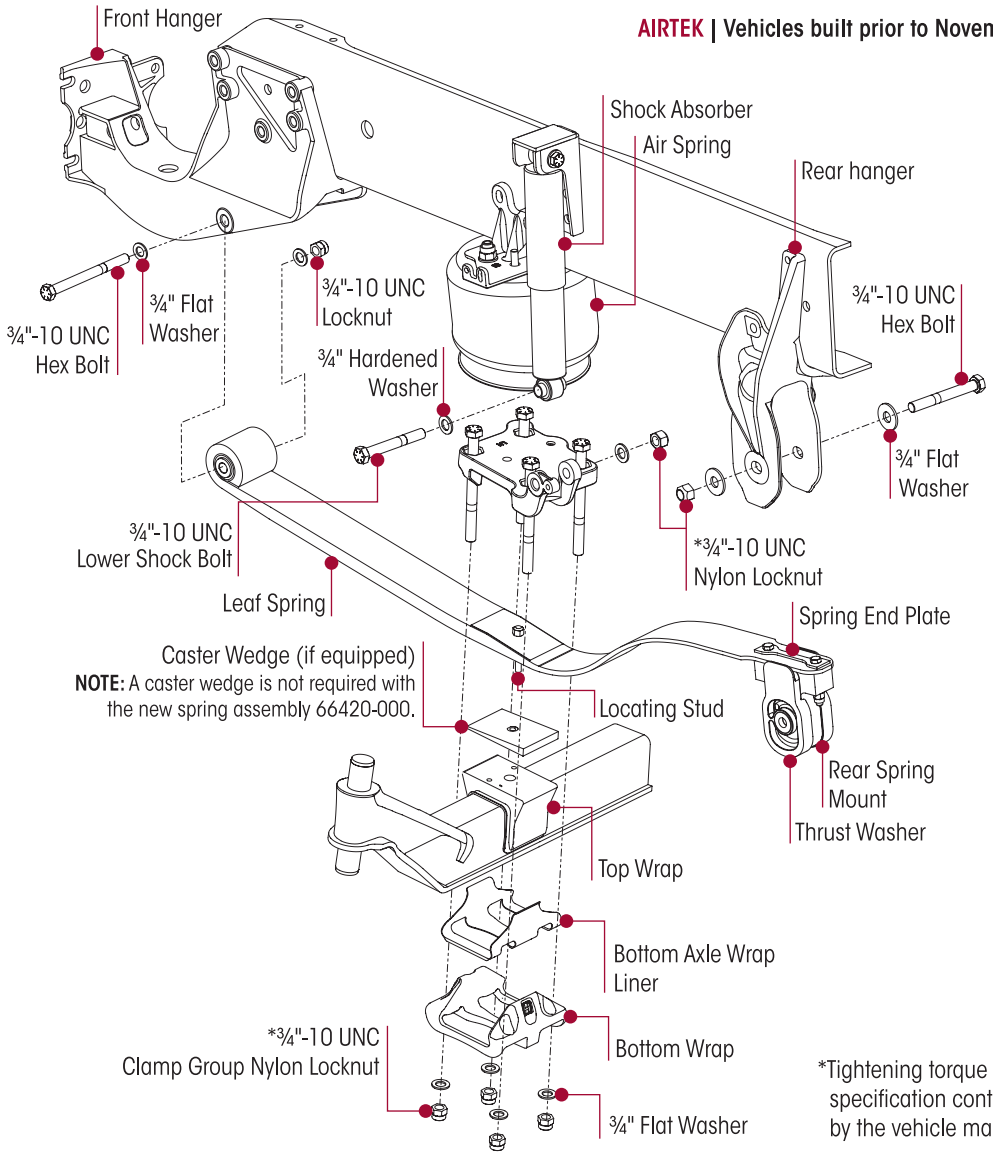
NOTE

Be aware of the amount and the orientation of caster wedges (if equipped) on the top axle wrap, they may slide during leaf spring removal. Caster wedges are supplied by the vehicle manufacturer. A caster wedge should not be used if the new spring part number is 66420-000. The proper caster is built into this spring part number.

17. Remove and discard the front spring eye bolt from the leaf spring being serviced.
18. Remove the leaf spring assembly. The approximate weight of the leaf spring is 60 pounds.

FIGURE 9-13

AIRTEK | Vehicles built prior to November 2010



ASSEMBLY

1. Install the leaf spring assembly over the axle and into the front spring hanger.
2. Install the ¾" front spring eye bolt and fastener, but **DO NOT** tighten.
3. Ensure to replace any caster wedges (if equipped) that may have been displaced during leaf spring disassembly, in the same orientation as removed prior to disassembly.

NOTE

Caster wedges are supplied by the vehicle manufacturer. A caster wedge should not be used if the new spring part number is 66420-000. The proper caster is built into this spring part number.

4. Engage the leaf spring to the axle with the leaf spring locating stud into the aligning hole of the top axle wrap.
5. Install the top pad on top of the leaf spring.

⚠ WARNING

DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

6. Install a new bottom axle wrap liner in the bottom axle wrap.
7. Install the bottom axle wrap.
8. Install the new clamp group fasteners. The clamp group locknuts must be replaced when the clamp group is removed.
9. Snug the clamp group fasteners to 100 foot pounds pre-torque.
10. Raise the axle and the rear spring assembly into the rear spring hanger.
11. Install the ¾" rear spring eye bolt in the rear hanger. The bolt must be installed from the inboard side to the outboard side, see Figure 9-13.
12. Install the lower shock mounting bolts from the outboard side to the inboard side.
13. Lower the floor jack

IMPORTANT NOTE

Only the weight of the axle should be on the spring at the time of the front and rear spring eye fasteners are tighten to torque.

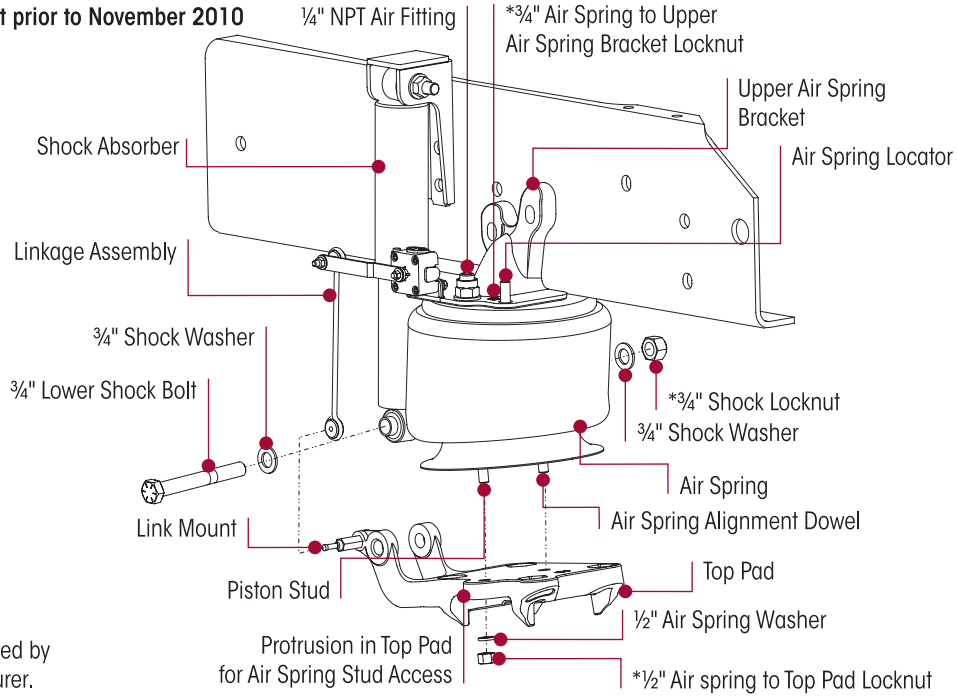
14. Tighten the lower shock mounting bolts to vehicle manufacturer's torque specifications.
15. Tighten the front and rear spring eye ¾" locknuts to vehicle manufacturer's torque specifications.
16. Install the air spring into the top pad using new hardware (nut and washer). Make sure the air spring piston seats into the top pad correctly, see Figure 9-14.
17. Install the tires.
18. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
19. Install air lines to the air spring.
20. Install the height control valve linkage and inflate the suspension to normal operating pressure.
21. Raise the vehicle and remove the safety stands.
22. Lower the vehicle.
23. Remove the floor jack.

⚠ 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.

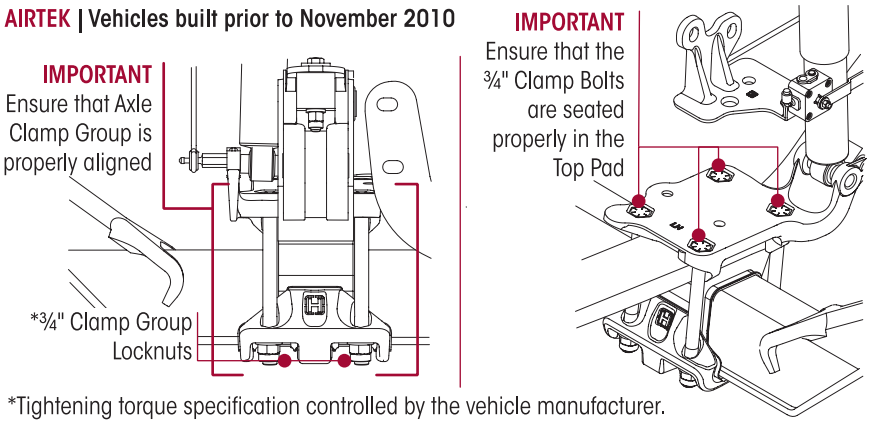
24. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figure 9-15.

FIGURE 9-14
AIRTEK | Vehicles built prior to November 2010



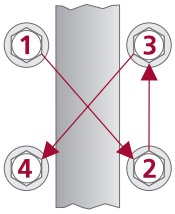
*Tightening torque specifications controlled by the vehicle manufacturer.

FIGURE 9-15
AIRTEK | Vehicles built prior to November 2010



*Tightening torque specification controlled by the vehicle manufacturer.

FIGURE 9-16



25. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-16.
26. Verify proper ride height. See Alignment & Adjustments section of this publication.
27. Remove the wheel chocks.

SOFTEK LEAF SPRING ASSEMBLY

DISASSEMBLY

1. Place the vehicle on a level floor and chock the wheels.
2. Raise the vehicle and support the vehicle with safety stands.
3. Suspend the front axle to remove the load from leaf spring assembly.
4. Remove the front and rear ¾" spring eye bolts fasteners. Loosen the ¾" shackle pivot bolt.

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

5. Remove the clamp group U-bolts and fasteners. Discard the fasteners.

⚠ WARNING DO NOT USE A CUTTING TORCH TO REMOVE CLAMP GROUP BOLTS OR ATTACHING FASTENERS. THE USE OF SUCH HEAT ON SUSPENSION COMPONENTS CAN 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.

SERVICE HINT If a clamp group locknut fails to come off the bolt, cut half way through the U-bolt with an abrasive cut off wheel, taking care not to contact the axle beam or other components. Using an impact wrench, spin the locknut to fracture the bolt and remove.

6. Remove the top pad from the leaf spring assembly and the bottom axle wrap, see Figure 9-17.
7. Remove the leaf spring and axle spacer assembly.

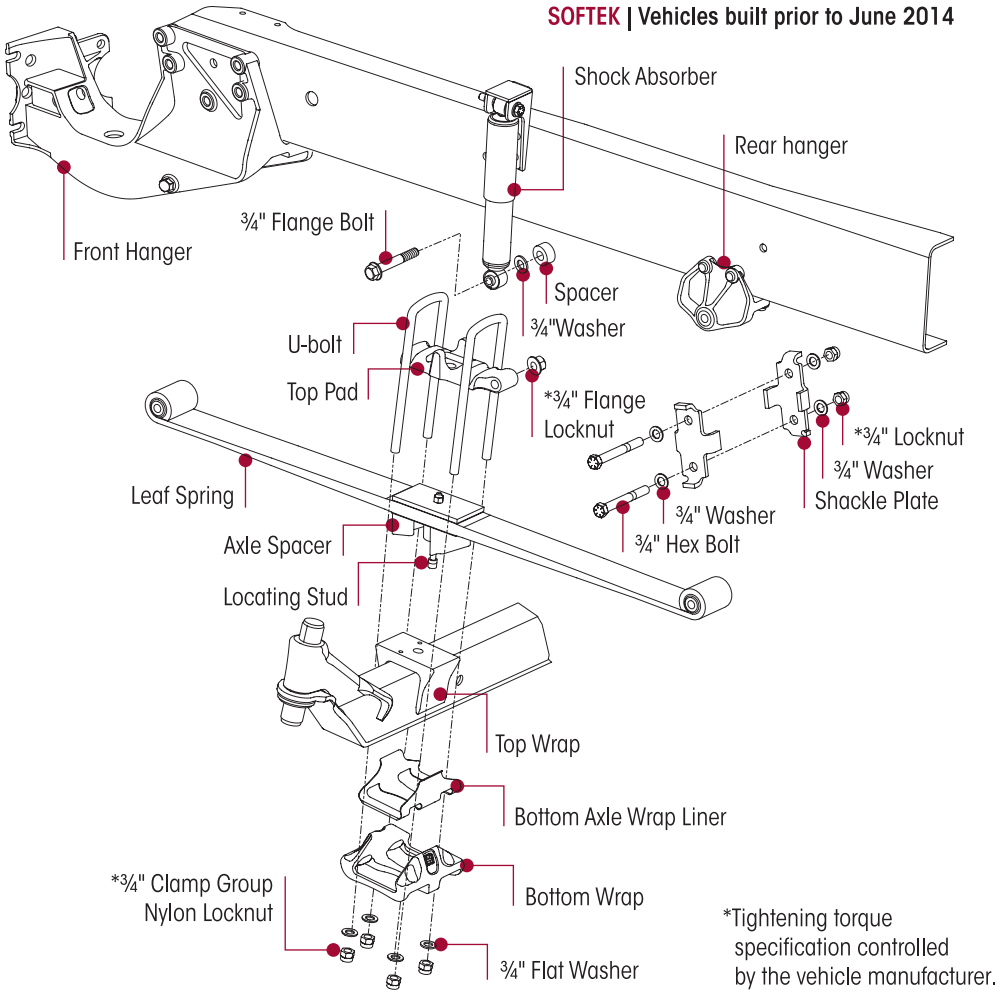
ASSEMBLY

1. Install the new spring and axle spacer assembly on the axle. Verify that the locating stud is engaged properly in the top axle wrap, see Figure 9-17.
2. Install the top pad with the shock mount (if equipped) facing the rear of the vehicle, see Figure 9-17.

⚠ WARNING DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

3. Remove and replace the bottom axle wrap liner located in the bottom axle wrap.

FIGURE 9-17



4. Install the bottom axle wrap.
5. Install the new ¾" clamp group U-bolts and fasteners. The U-bolts and fasteners must be replaced when the clamp group is disassembled.
6. Snug the clamp group, **DO NOT** tighten to torque at this time.
7. Raise the axle and the leaf spring assembly into the front hanger and rear shackle assembly.
8. Install the ¾" spring eye bolts and fasteners. Snug bolts. **DO NOT** tighten at this time. Front spring eye bolts are inserted from the outboard side to the inboard side to avoid component interference.

⚠ 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.

9. Ensure that the clamp group is properly aligned and the U-bolts are seated in the top pad, and the bottom axle wrap is centered with the top axle wrap, see Figure 9-18.
10. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-19.

FIGURE 9-18
SOFTEK | Vehicles built prior to June 2014

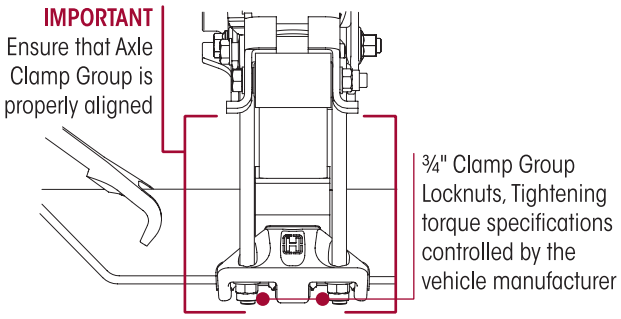
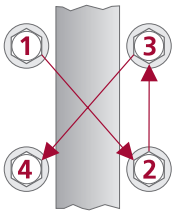


FIGURE 9-19



11. Remove the safety stands and load the front axle with the vehicle weight.
12. Tighten the ¾" spring eye bolt locknuts to the vehicle manufacturer's torque specifications, see Figures 9-17 and 9-18.
13. Lower the vehicle.
14. Remove the wheel chocks.

AIRTEK REAR SPRING MOUNT

DISASSEMBLY

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

⚠ 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.

3. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension 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. Support the vehicle with safety stands.
6. Install a floor jack with a 4" lifting plate below the axle and raise the truck.
7. Remove the tires.
8. Lower the jack allowing the axle to hang, but **DO NOT** remove the jack from the axle.

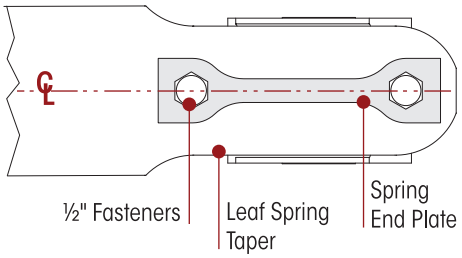
9. Loosen, **DO NOT REMOVE** both front spring eye bolts.
10. Remove both lower shock absorber mounting bolts.

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

11. Remove both rear spring eye bolts.
12. Disconnect both air springs from the top pads of the clamp groups.
13. Loosen the clamp group locknuts.
14. Lower the jack allowing the suspension to pivot down out of the rear hanger clamps.
15. Remove the ½" rear spring mounting fasteners.
16. Remove the rear spring mount.
17. Inspect the leaf spring taper for cracks or damage. Replace leaf spring if damaged.

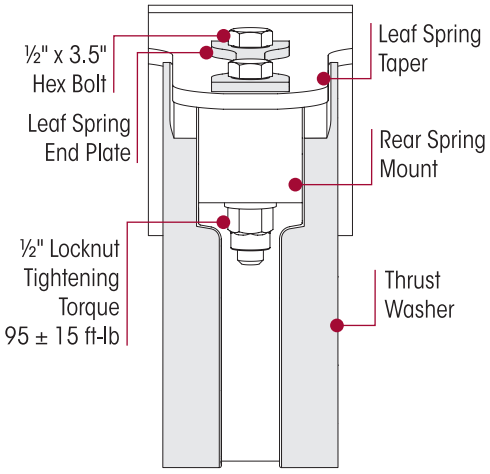
ASSEMBLY

FIGURE 9-20



1. Install the spring end plate so that it is centered on the spring taper, see Figure 9-20.
2. Install new ½" bolts through the spring end plate and spring taper.
3. Install the rear spring mount centered on the underside of the leaf spring taper.
4. Install new fasteners to snug, **DO NOT** tighten at this time.

FIGURE 9-21

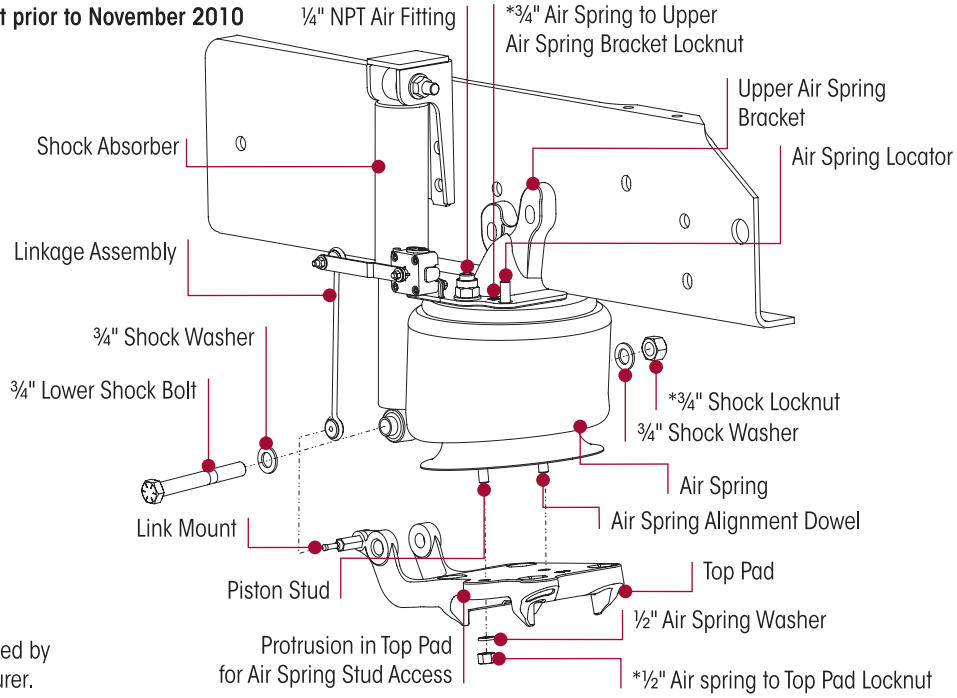


5. Align the rear spring mount and the leaf spring taper so that the mating surfaces are flush with each other, see Figure 9-21.
6. Tighten rear spring mount locknuts to 95 ± 15 foot pounds torque.
7. Raise the leaf springs into the rear hangers.
8. Install the rear spring eye bolts.
9. Install the lower shock absorber mounting bolts.
10. Install the air spring into the top pad. Make sure the air spring piston seats into the top pad correctly, see Figure 9-22.
11. Lower the floor jack and allow the suspension to hang.
12. Install the tires.
13. Raise the vehicle and remove the safety stands.
14. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
15. Install air lines to the air spring.
16. Install the height control valve linkage and inflate the suspension to normal operating pressure.
17. Remove the floor jacks.

⚠ 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.

18. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figure 9-23.

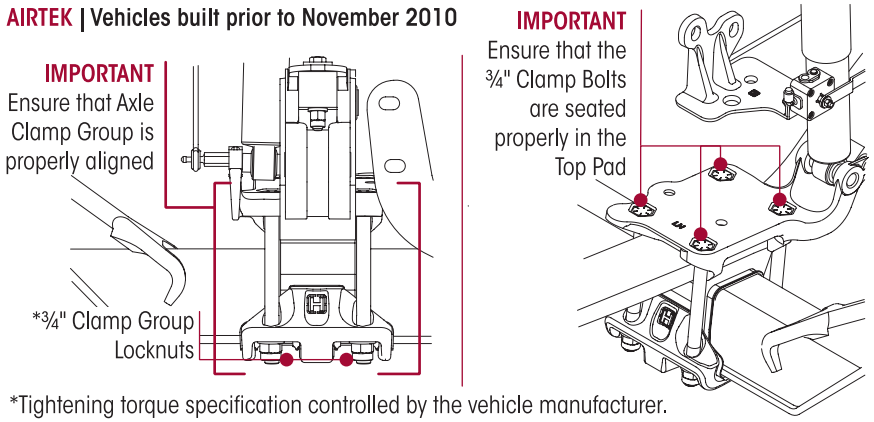
FIGURE 9-22
AIRTEK | Vehicles built prior to November 2010



*Tightening torque specifications controlled by the vehicle manufacturer.

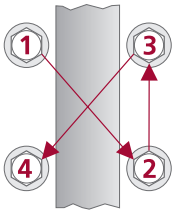
19. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-24
20. Tighten the lower shock mounting bolts to vehicle manufacturer's torque specifications.
21. Tighten the front and rear spring eye ¾" locknuts to vehicle manufacturer's torque specifications.
22. Verify proper ride height, see Alignment & Adjustments section of this publication.
23. Remove the wheel chocks.

FIGURE 9-23
AIRTEK | Vehicles built prior to November 2010



*Tightening torque specification controlled by the vehicle manufacturer.

FIGURE 9-24



FRONT LEAF SPRING EYE BUSHING

Spring eye bushings for the SOFTEK / AIRTEK front leaf spring are designed for extended service life. In the event of premature/excessive wear or damage, careful consideration must be given to the contributing factor(s), which must be corrected to help prevent the new bushings from sustaining wear/damage in the same manner. The front bushings are not replaceable components, therefore the front leaf spring assembly must be replaced in the event of premature/excessive wear or damage.

STEERTEK BOTTOM AXLE WRAP

- **SOFTEK Monoleaf and AIRTEK Vehicles equipped with STEERTEK Axle**

DISASSEMBLY

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the vehicle frame and support with safety stands.
4. **SOFTEK equipped vehicles** – proceed to Step 8.
   AIRTEK equipped vehicles – continue to Step 5.
5. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.

⚠ 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.

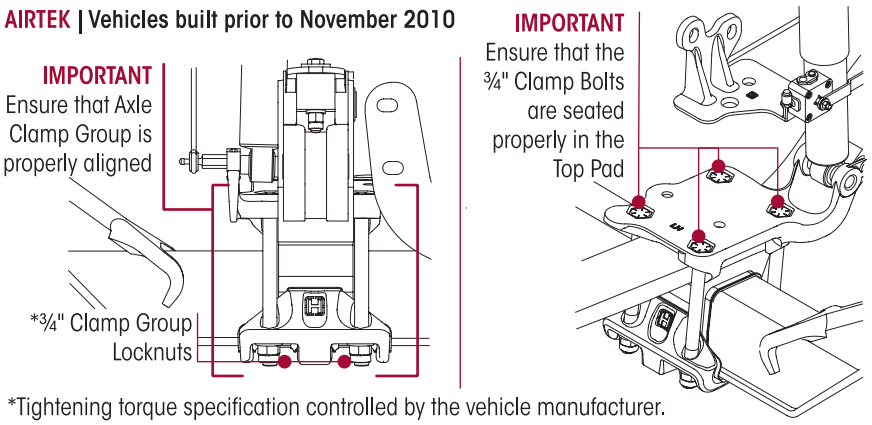
6. Disconnect the linkage assembly at the rubber grommet and lower the height control valve arm. This will exhaust the air pressure in the air springs.
7. Remove air spring on side being replaced, see Air Spring Replacement in this section.

⚠ WARNING

DO NOT USE A CUTTING TORCH TO REMOVE CLAMP GROUP BOLTS OR ATTACHING FASTENERS. THE USE OF SUCH HEAT ON SUSPENSION COMPONENTS CAN 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.

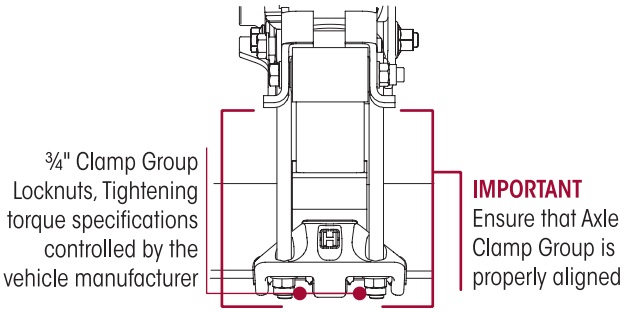
8. Remove the ¾" clamp group bolts and fasteners on the side being replaced, see Figures 9-25 and 9-26.

FIGURE 9-25
AIRTEK | Vehicles built prior to November 2010

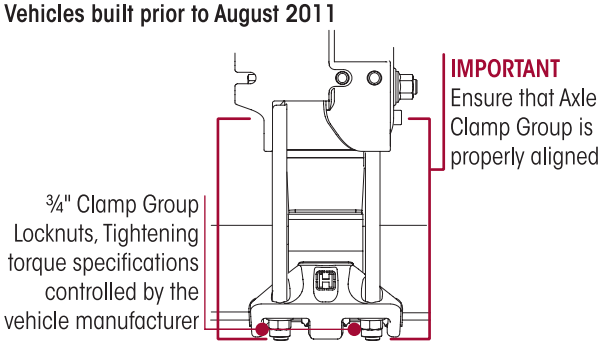


*Tightening torque specification controlled by the vehicle manufacturer.

FIGURE 9-26
SOFTEK | Vehicles built prior to June 2014



International 2-Leaf Mechanical Suspension | Vehicles built prior to August 2011



9. Remove bottom axle wrap. It may be necessary to use a dead blow mallet to dislodge axle wrap.
10. Once removed, inspect the axle wrap for damage and replace if necessary.
11. Discard the used bottom axle wrap liner.

ASSEMBLY

WARNING

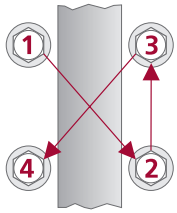
DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

1. Install the new bottom axle wrap liner into bottom axle wrap.
2. Install the bottom axle wrap on axle.
3. Install the new ¾" clamp group fasteners.

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.

FIGURE 9-27



4. Ensure that the clamp group is properly aligned and the bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figures 9-25 and 9-26.
5. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-27.
6. **SOFTEK equipped vehicles** – proceed to Step 10.
   AIRTEK equipped vehicles – continue to Step 7.
7. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to inflating or deflating the suspension system.
8. Install the air spring, see Air Spring Assembly in this section.
9. Install the height control valve linkage and inflate the suspension to normal operating pressure.
10. Lower the vehicle and remove the safety stands.
11. Remove wheel chocks.

STEERTEK TOP AXLE WRAP IN CHASSIS

- **SOFTEK Monoleaf and AIRTEK Vehicles equipped with STEERTEK Axle**

DISASSEMBLY

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the vehicle frame and support with safety stands.
4. **SOFTEK equipped vehicles** – proceed to Step 9
   AIRTEK equipped vehicles – continue to Step 5

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.

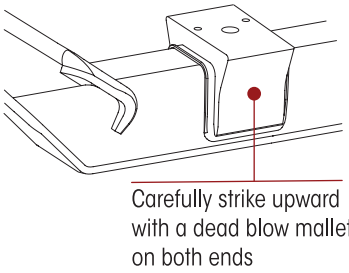
5. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
6. Disconnect the linkage assembly at the rubber grommet and lower the height control valve arm. This will exhaust the air pressure in the air springs.
7. Disconnect the air lines at the air springs.
8. Remove the air spring, see Air Spring Disassembly in the Component Replacement section of this publication.

9. Support the axle with a floor jack.
10. Lower the floor jack and suspend the front axle to remove the load from the leaf springs.

WARNING

DO NOT USE A CUTTING TORCH TO REMOVE CLAMP GROUP BOLTS OR ATTACHING FASTENERS. THE USE OF SUCH HEAT ON SUSPENSION COMPONENTS CAN 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.

FIGURE 9-28



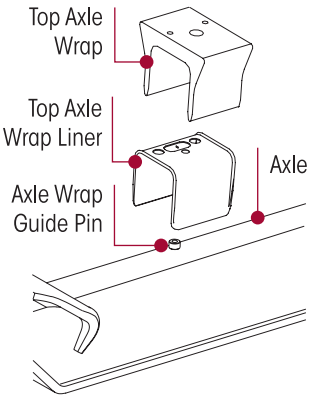
11. Remove the ¾" clamp group fasteners from the side being serviced.
12. Remove the lower shock mounting bolt from the side being serviced.
13. Remove the top pad, the bottom axle wrap and liner. Discard the liner.
14. Remove the front and rear leaf spring eye bolts.
15. Remove the leaf spring assembly and caster wedge (if equipped).
16. Strike the axle wrap with a dead blow mallet at the front and rear on the underside of the axle wrap to dislodge it from the axle, see Figure 9-28.
17. Clean and inspect the axle wrap and axle for cracks or damage, replace if cracks or damage are present.

ASSEMBLY

WARNING

DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

FIGURE 9-29



1. Install the new axle wrap liner on the axle.
2. Spray the top of the axle wrap liner and the inside of the axle wrap with a silicon lubricant.
3. Position the axle wrap on the axle over the axle wrap liner, see Figure 9-29.
4. Protect the top surface of the axle wrap with a block of wood, cardboard, or shop towels.

CAUTION

DO NOT STRIKE THE TOP AXLE WRAP WITH A HAMMER. HENDRICKSON RECOMMENDS USING A PLASTIC DEAD BLOW MALLET WITH CARE WHEN INSTALLING THE AXLE WRAP.

5. Using a dead blow mallet drive the axle wrap onto the axle indexing the axle guide pin until the axle wrap is firmly seated on the axle.
6. Install the caster wedge (if equipped).
7. Install the leaf spring assembly into the front and rear hangers.

SERVICE HINT A bottle jack may be required to raise the axle slightly to install the spring eye bolts.

8. Install the ¾" spring eye bolts in the front and rear hangers. The rear spring eye bolt must be installed from the inboard side to the outboard side, see Figure 9-30.
9. Install the leaf spring and wrap leaf assembly on the axle wrap (indexing the dowel pin if equipped).
10. Install the top pad on the leaf spring with the directional identification (if equipped) facing the front of the vehicle, see Figure 9-31.
11. Install new clamp group hex bolts into the top pad.

FIGURE 9-30

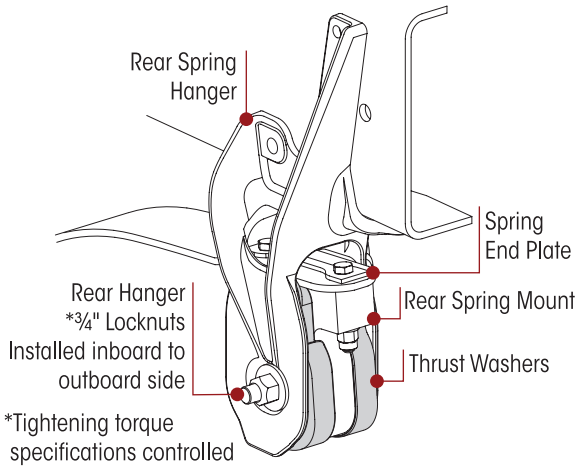
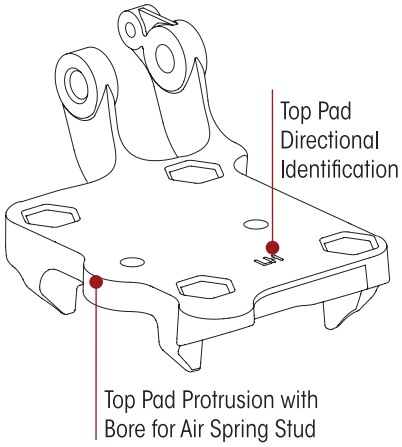


FIGURE 9-31



WARNING

DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

12. Remove and replace the bottom axle wrap liner.
13. Install the bottom axle wrap.
14. Install the new clamp group (Grade C) fasteners.

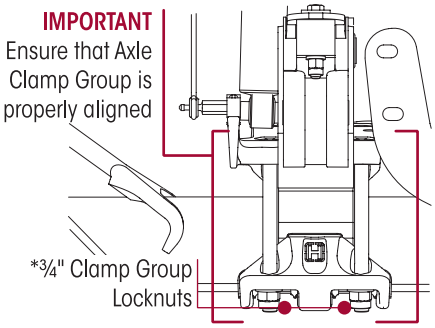
WARNING

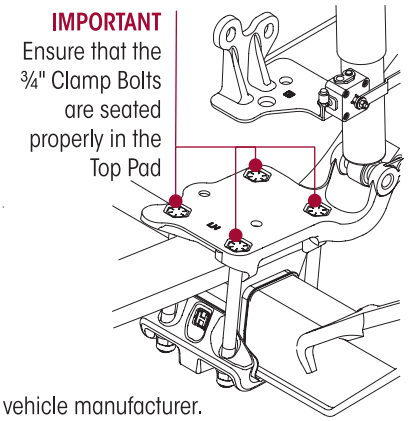
ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

15. Ensure that the clamp group is properly aligned and the U-bolts/hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figures 9-32 and 9-33.

FIGURE 9-32

AIRTEK | Vehicles built prior to November 2010

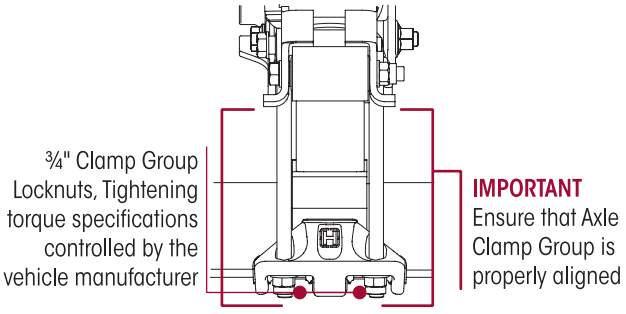




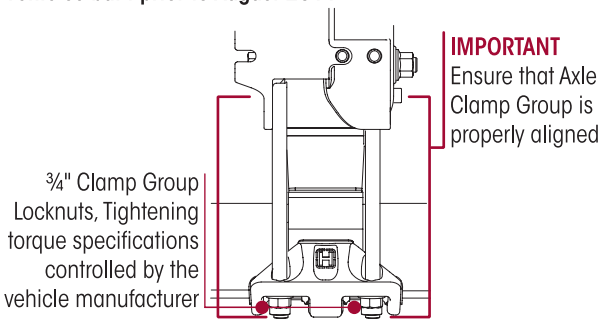
*Tightening torque specification controlled by the vehicle manufacturer.

FIGURE 9-33

SOFTEK | Vehicles built prior to June 2014



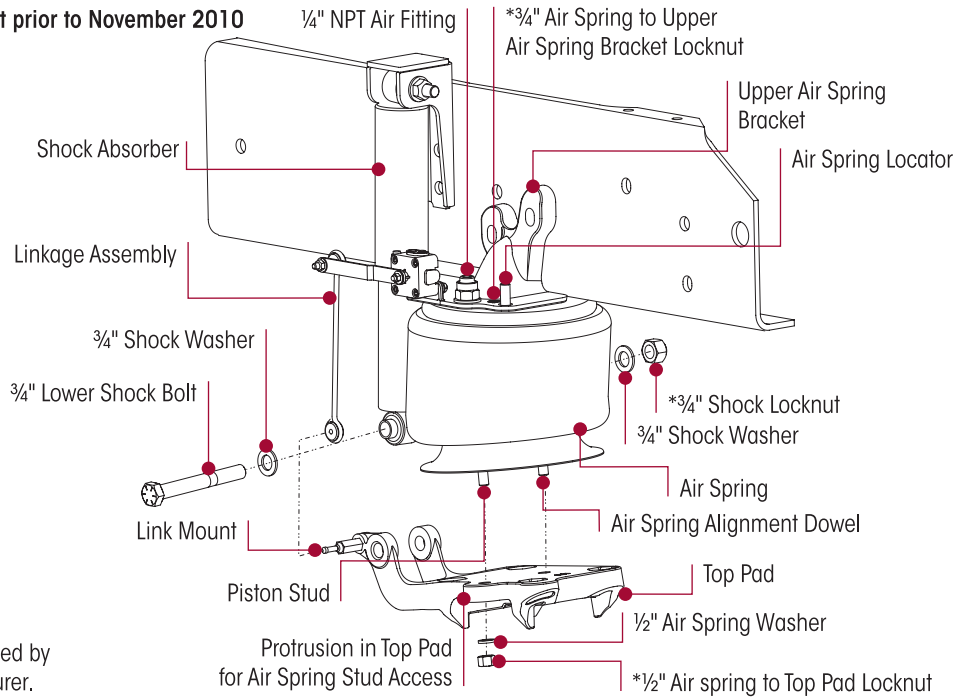
International 2-Leaf Mechanical Suspension | Vehicles built prior to August 2011



16. Snug the clamp group fasteners to 100 foot pounds pre-torque. **DO NOT** tighten at this time.
17. Apply a thin coating of anti-seize to the lower shock mounting bolt.
18. Install the lower shock mounting bolts from the outboard side to the inboard side.
19. **SOFTEK equipped vehicles** – proceed to Step 26.

    AIRTEK equipped vehicles – continue to Step 20.
20. Install the air spring into upper air spring mounting bracket and the top pad. Make sure the air spring piston seats into the top pad correctly, see Figure 9-34.

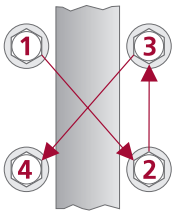
FIGURE 9-34
AIRTEK | Vehicles built prior to November 2010



*Tightening torque specifications controlled by the vehicle manufacturer.

21. Attach new air spring mounting fasteners. Tighten upper air spring mounting fastener and the lower air spring mounting fastener to vehicle manufacturer's torque specifications.
22. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
23. Install air lines to the air spring.

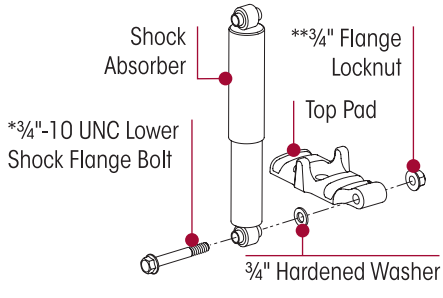
FIGURE 9-35



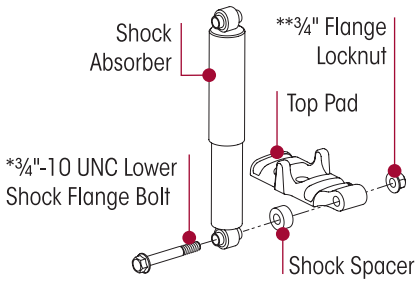
24. Install the height control valve linkage and inflate the suspension to normal operating pressure.
25. Verify proper ride height. See Alignment & Adjustments section of this publication.
26. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-35.
27. Tighten the lower shock mounting bolts to vehicle manufacturer's torque specifications, see Figures 9-36 and 9-37.
28. Tighten the ¾" spring eye locknuts to vehicle manufacturer's torque specifications.
29. Lower the floor jack and load the front axle with the truck's weight. Remove the floor jack.
30. Remove the safety stands.
31. Remove the wheel chocks.

FIGURE 9-36
SOFTEK Monoleaf | Vehicles built prior to June 2014

TranStar • Models 9200/9400/8600



LoneStar Model



ProStar Model

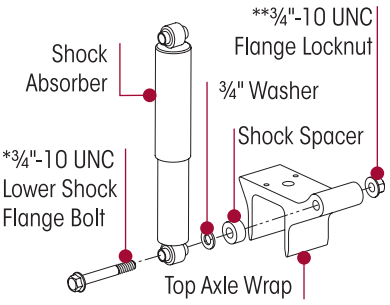
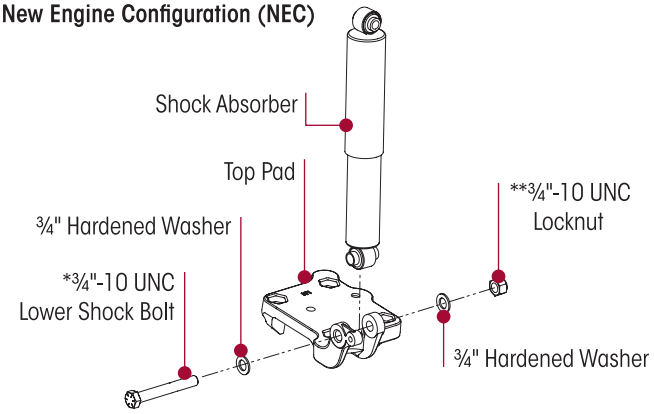
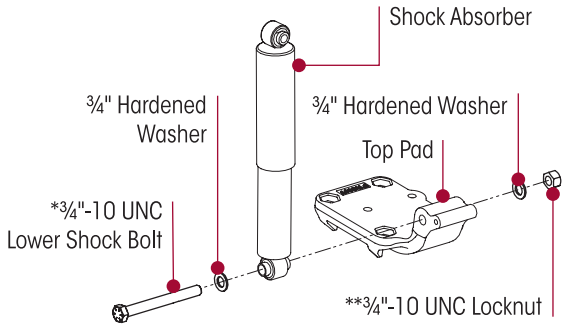


FIGURE 9-37
AIRTEK | Vehicles built between September 2006 and November 2010
New Engine Configuration (NEC)



AIRTEK | Vehicles built prior to September 2006
Prior to New Engine Configuration (PEC)



* Apply a thin coating of anti-seize compound to the shock absorber lower mounting bolt shank and to the inside bore of the aluminum top axle wrap•top pad•axle spring seat to help prevent seizing of the bolt to the aluminum axle wrap•top pad•axle spring seat.
** Tightening torque specifications controlled by the vehicle manufacturer.

STEERTEK NXT AXLE

■ **Vehicles built with STEERTEK NXT Axle after August 2011**

NOTE Clamp group consists of top pad, U-bolts, washers and locknuts.

Refer to Figure 9-38 when replacing the components of the STEERTEK NXT axle.

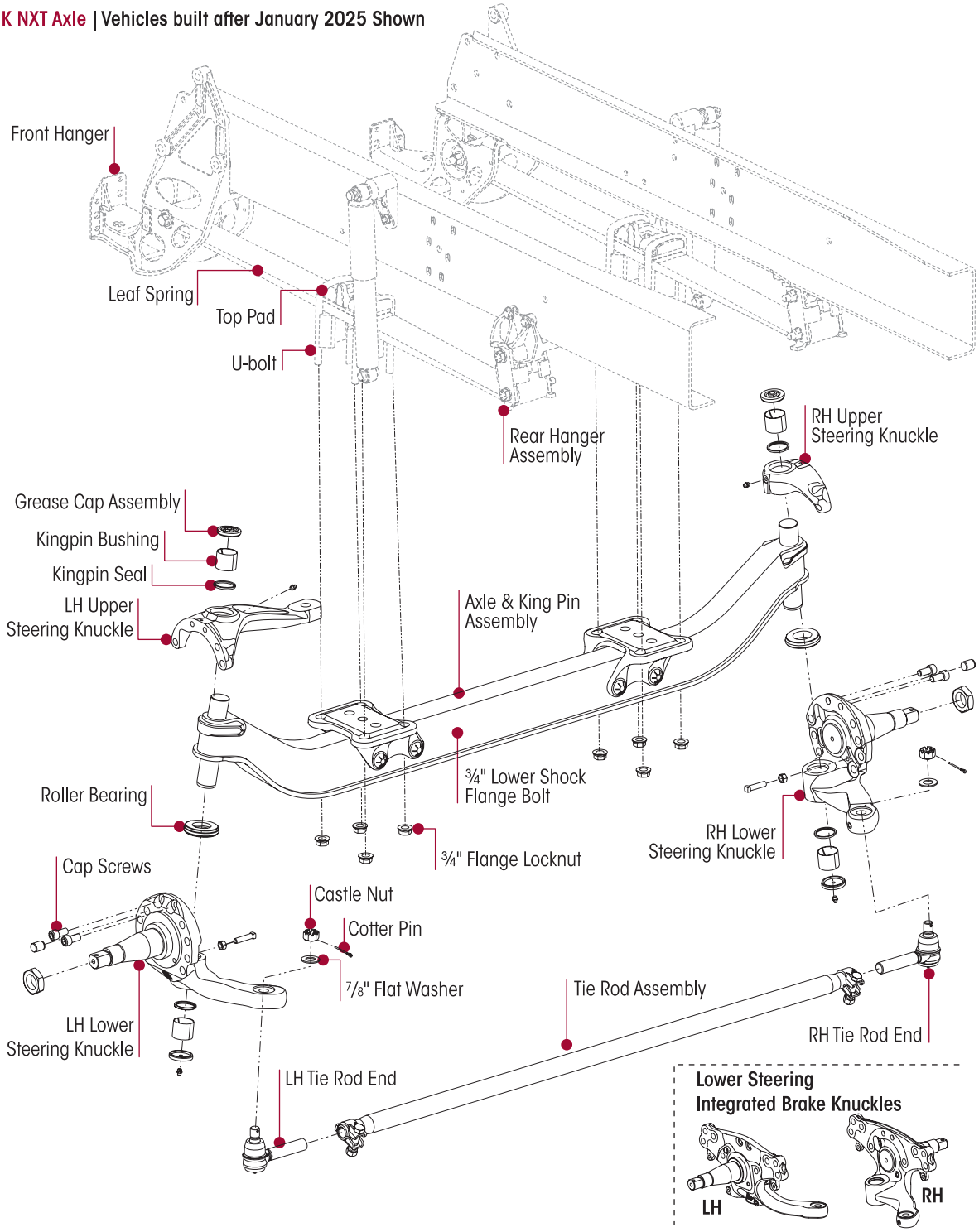
⚠ WARNING

DO NOT USE A TORCH ON CLAMP GROUP BOLTS OR ANY OTHER PART OF THE AIRTEK/SOFTEK SUSPENSIONS. IF THE CLAMP GROUP BOLTS WILL NOT COME LOOSE WITH AN IMPACT WRENCH, USE A CUT OFF WHEEL AND CUT THE SHANK OF THE BOLT. THE USE OF A TORCH CAN CAUSE DAMAGE TO CERTAIN AIRTEK COMPONENTS THAT CAN RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

STEERTEK NXT AXLE REMOVAL

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the vehicle frame and support the vehicle with safety stands.
4. Suspend the front axle with the shocks attached.
5. Remove the front wheels, hubs, brake shoes, ABS sensors, and backing plate assembly.
6. Disconnect the drag link from the steering arm.
7. Support the axle with a floor jack.

FIGURE 9-38
STEERTEK NXT Axle | Vehicles built after January 2025 Shown



WARNING THE INTEGRATED AXLE SPRING SEATS ON THE STEERTEK NXT AXLE ARE NON-SERVICEABLE. DO NOT REMOVE, MODIFY OR REPLACE INTEGRATED FASTENERS, DOING SO CAN CAUSE STRUCTURAL DAMAGE AND RESULT IN LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH AND VOID ANY APPLICABLE WARRANTY.

SERVICE HINT If a clamp group nut fails to come off bolt, cut half way through the bolt with an abrasive cut off wheel, taking care not to contact axle beam or other components. Using an impact wrench, spin the locknut to fracture the bolt and remove.

⚠ WARNING

DO NOT REPAIR OR RECONDITION SUSPENSION OR AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS. ALL SUCH DAMAGED OR OUT OF SPECIFICATION COMPONENTS MUST BE REPLACED. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. STEERTEK NXT COMPONENTS CANNOT 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, AND POSSIBLE PERSONAL INJURY OR DEATH OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

8. Disconnect and remove the lower shock mounting bolts and shock spacer (if equipped).
9. Remove the ¾" clamp group bolts and fasteners.
10. Lower the axle and remove from the vehicle.

STEERTEK NXT AXLE DISASSEMBLY (Removed from Chassis)

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

⚠ 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.

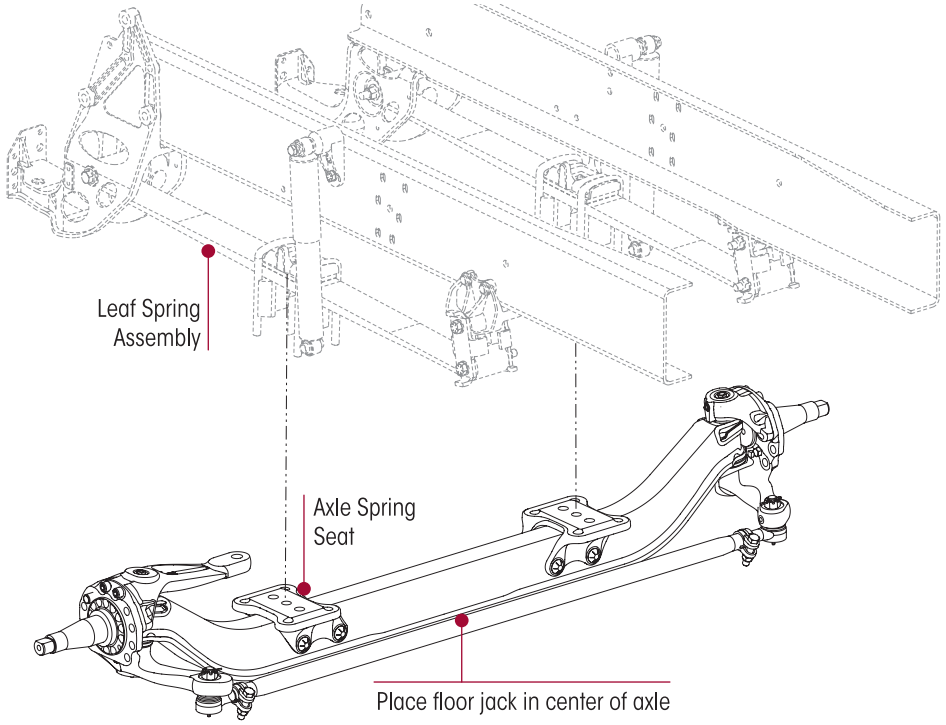
2. Remove the two (2) ⅝" socket head cap screws from the steering knuckle assembly.
3. Remove the steering knuckle, thrust bearing.
4. After complete removal of the one side, repeat steps 1-3 for the opposite side of the axle.
5. Inspect the steering kingpin bushings for excessive wear. If worn, replace the kingpin bushings and seals. See the Kingpin Bushing replacement instructions in this section.

STEERTEK NXT AXLE INSTALLATION

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Raise the axle into position. Ensure that the front leaf spring assembly's center bolt is aligned correctly in the axle spring seat, see Figure 9-39.

FIGURE 9-39

STEERTEK NXT Axle | Vehicles built after January 2025 Shown

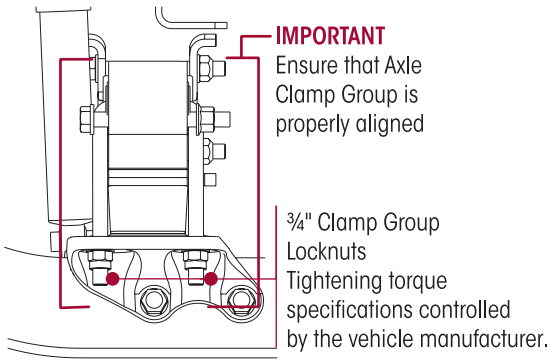


3. Install the top pad.
4. Install the new clamp group fasteners. **DO NOT** tighten to torque specifications at this time.

WARNING

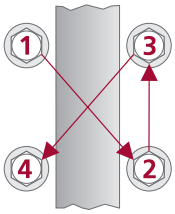
ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

FIGURE 9-40
STEERTEK NXT Axle | Vehicles built after August 2011



5. Ensure the clamp group is properly aligned and the U-bolts are seated in the top pad, and the top pad is centered on the axle spring seat, see Figure 9-40.
6. Snug the clamp group fasteners to 100 foot pounds pre-torque.
7. Install the steering knuckles as per the Steering Knuckle Assembly instructions in this section.
8. Install the tie rod assembly in the Ackermann arms.
9. Install the ⅞" hardened washers on the Ackermann arm and the castle nuts. Tighten the castle nuts to 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.
10. Install the tie rod end cotter pin.
11. Connect the drag link in the steering arm.
12. Install the castle nut on the drag link taper stud. Tighten the castle nut to 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.
13. Install the drag link cotter pin.
14. Install and tighten the lower shock mounting bolts and spacer (if equipped) to vehicle manufacturer's torque specifications.
15. Install the brake backing plate assemblies and ABS sensor and torque all fasteners per manufacturer's specifications.
16. Install the brakes, hubs, and wheels per the manufacturer's guidelines.
17. Raise the vehicle and remove the safety stands.
18. Lower the floor jack and load the front axle with the truck's weight. Remove the floor jack.

FIGURE 9-41



19. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-41.
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.

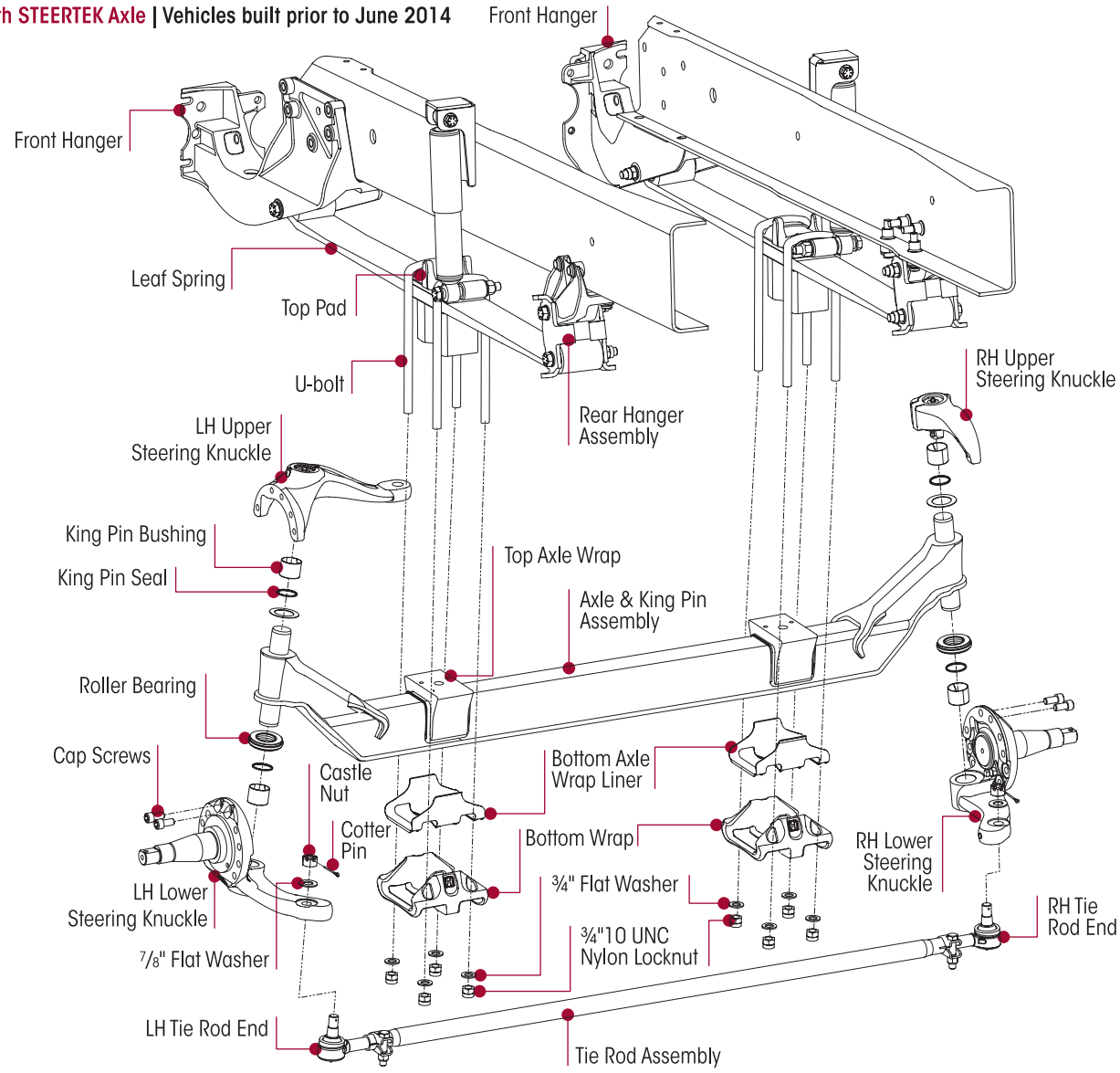
STEERTEK AXLE

- **Vehicles built with STEERTEK Axle prior to August 2011**

NOTE STEERTEK axle clamp group consists of ¾" bolts, washers, nylon locknuts, top axle wrap, top axle wrap liner, top pad, bottom axle wrap and bottom axle wrap liner.

Refer to Figures 9-42 and 9-43 when replacing the components of the STEERTEK axle.

FIGURE 9-42
SOFTEK with STEERTEK Axle | Vehicles built prior to June 2014



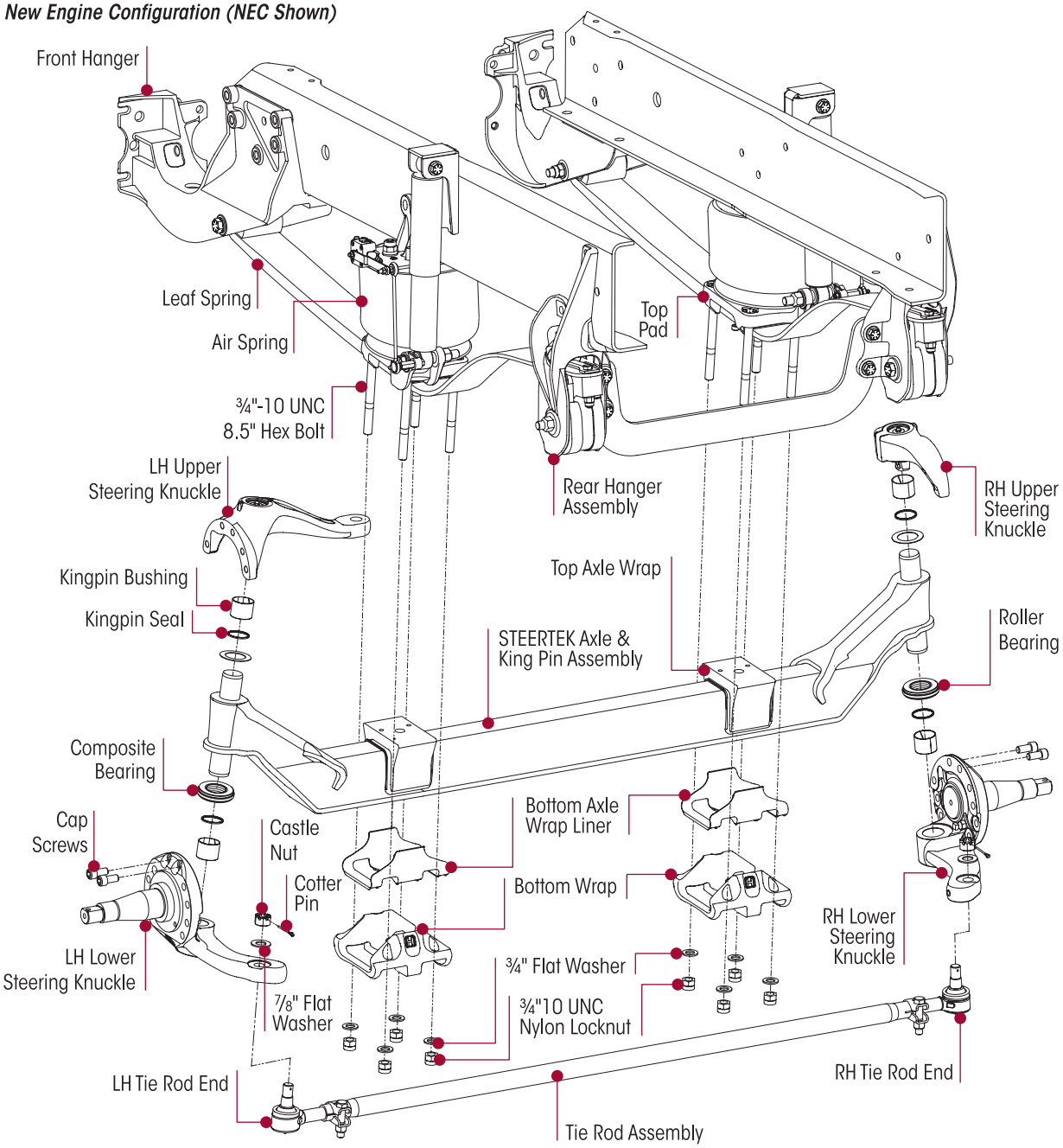
⚠ WARNING

DO NOT USE A TORCH ON CLAMP GROUP BOLTS OR ANY OTHER PART OF THE AIRTEK SUSPENSION. IF THE CLAMP GROUP BOLTS WILL NOT COME LOOSE WITH AN IMPACT WRENCH, USE A CUT OFF WHEEL AND CUT THE SHANK OF THE BOLT. THE USE OF A TORCH CAN CAUSE DAMAGE TO CERTAIN SOFTEK / AIRTEK COMPONENTS THAT CAN RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

STEERTEK AXLE REMOVAL

1. Place the vehicle on level floor and chock the wheels.
2. **SOFTEK equipped vehicles** — proceed to Step 5.

FIGURE 9-43
AIRTEK with STEERTEK Axle | Vehicles built after September 2006
New Engine Configuration (NEC Shown)



⚠ 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.

3. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
4. **AIRTEK equipped vehicles** — 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. Raise the vehicle frame and support with safety stands.
6. Suspend the front axle with the shock absorbers attached.
7. Remove the front wheels, hubs, brake shoes, ABS sensors, and backing plate assembly.

⚠ WARNING

DO NOT REPAIR OR RECONDITION SUSPENSION OR AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS. ALL SUCH DAMAGED OR OUT OF SPECIFICATION COMPONENTS MUST BE REPLACED. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. AIRTEK COMPONENTS CANNOT 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, AND POSSIBLE PERSONAL INJURY OR DEATH OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

8. Disconnect the drag link from the steering arm.
9. **SOFTEK equipped vehicles** — proceed to Step 13.
10. **AIRTEK equipped vehicles** — Remove lower air spring mounting fasteners for both air springs at the axle top pad and unseat from the top pad.
11. Support the axle with a floor jack.

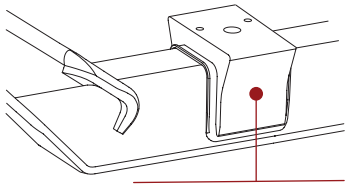
SERVICE HINT

If a clamp group nut fails to come off bolt, cut half way through the bolt with an abrasive cut off wheel, taking care not to contact axle beam or other components. Using an impact wrench, spin the locknut to fracture the bolt and remove.

12. Remove the ¾" clamp group bolts and fasteners.
13. Lower the axle and remove from the vehicle.

STEERTEK CLAMP GROUP DISASSEMBLY (Removed from Chassis)

FIGURE 9-44



Carefully strike upward with a dead blow mallet on both ends

1. Remove the bottom axle wrap and liner from the axle.
2. Strike the top axle wrap with a dead blow mallet at the front and rear on the underside of the axle wrap to dislodge it from the axle, see Figure 9-44.
3. After removal of the top axle wrap from the axle, inspect for cracks or fretting.
4. Remove the tie rod assembly, see Tie Rod in this section.

⚠ 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.

5. Remove the two (2) ⅝" socket head cap screws from the steering knuckle assembly.
6. Remove the steering knuckle, thrust bearing, and shims (if equipped).
7. After complete removal of one side, repeat steps 1-6 for the opposite side of the axle.
8. Visually inspect the kingpin bushings for excessive wear. If worn, replace the kingpin bushings and seals. Refer to Kingpin Bushing in this section.

STEERTEK CLAMP GROUP ASSEMBLY

⚠ WARNING

DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

⚠ CAUTION

DO NOT STRIKE THE TOP AXLE WRAP WITH A HAMMER. DAMAGE TO THE ALUMINUM AXLE WRAP WILL OCCUR. USE A PLASTIC DEAD BLOW MALLET WITH CARE WHEN INSTALLING THE AXLE WRAP.

⚠ WARNING

SECURELY INSTALL THE TOP WRAP TO THE AXLE. FAILURE TO DO SO CAN CAUSE LOSS OF CONTROL OF THE VEHICLE, PERSONAL INJURY OR PROPERTY DAMAGE.

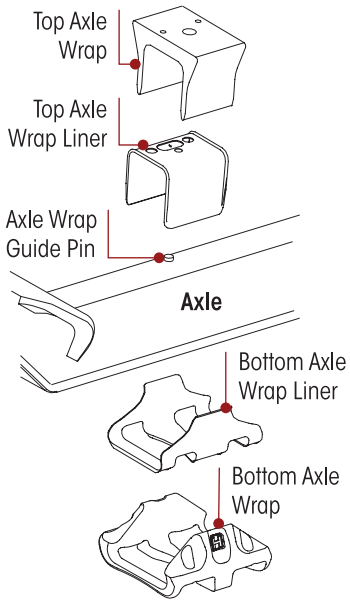
1. Install the new upper axle wrap liner on the axle. Index the liner with the axle's guide pin, see Figure 9-45.

SERVICE HINT

Apply a lubricant (such as an aerosol silicone) to the outer surface of the plastic liner to aid in assembly of the top axle wrap.

2. Install the top axle wrap, see Axle Wrap Assembly instructions located in this section. The axle wrap must be aligned with the guide pin on the axle.
3. At this time, **DO NOT** install anything further on the axle.

FIGURE 9-45



AXLE INSTALLATION

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Install PEC caster wedges (if equipped).
3. Raise the axle into position. Ensure that the front leaf spring assembly's center bolt is aligned correctly in the top axle wrap, see Figures 9-46 and 9-47.

FIGURE 9-46
SOFTEK Monoleaf | Vehicles built prior to June 2014

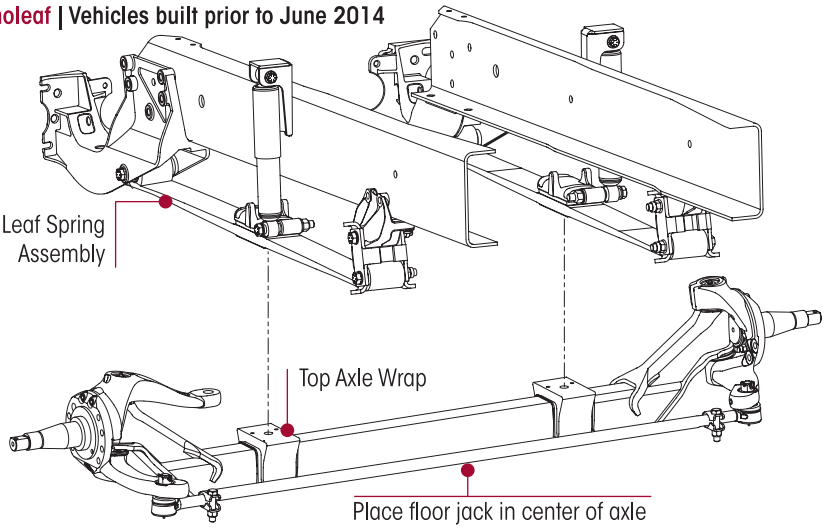
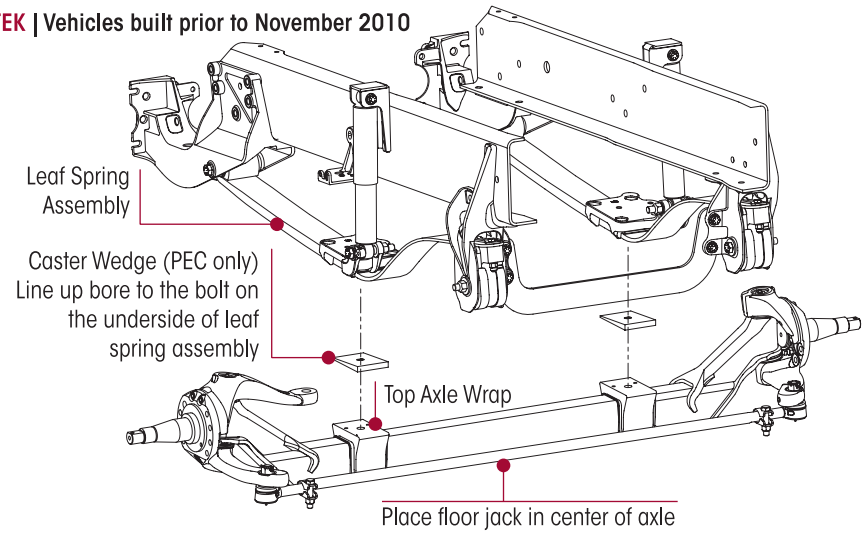


FIGURE 9-47
AIRTEK | Vehicles built prior to November 2010



⚠ WARNING

DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

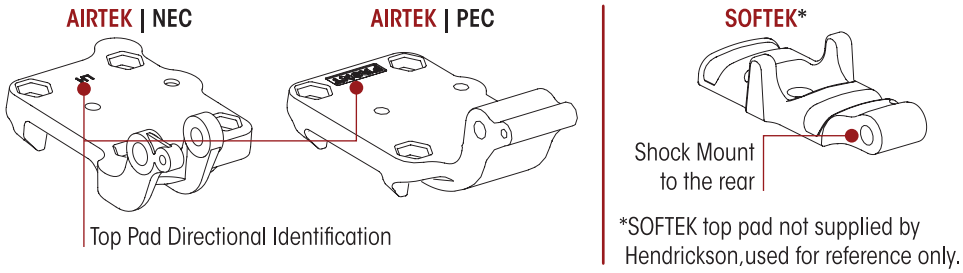
4. Install the new bottom axle wrap liners on the bottom axle wraps.
5. Install the bottom axle wrap on the axle.

⚠ 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.

6. Install the top pad with the directional identification facing the front of the vehicle, see Figure 9-48.
7. Install the new clamp group fasteners.

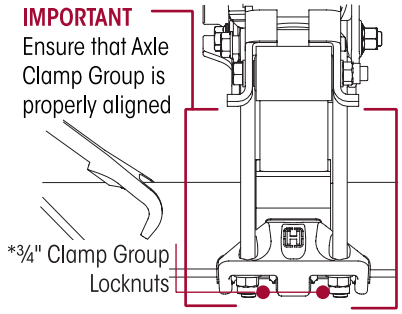
FIGURE 9-48



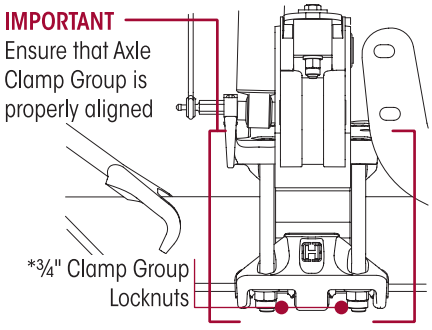
8. Ensure the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figure 9-49.
9. Snug the clamp group fasteners to 100 foot pounds pre-torque.
10. **SOFTEK equipped vehicles** — proceed to Step 13.
11. See Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.

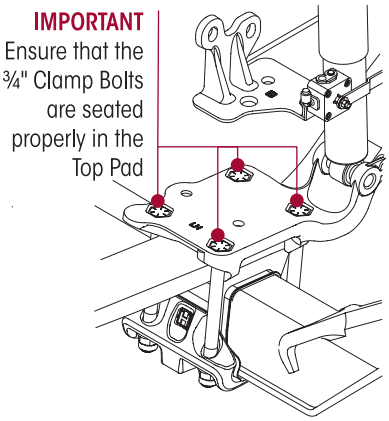
FIGURE 9-49

STEERTEK Axle equipped on SOFTEK Monoleaf



STEERTEK Axle equipped on AIRTEK

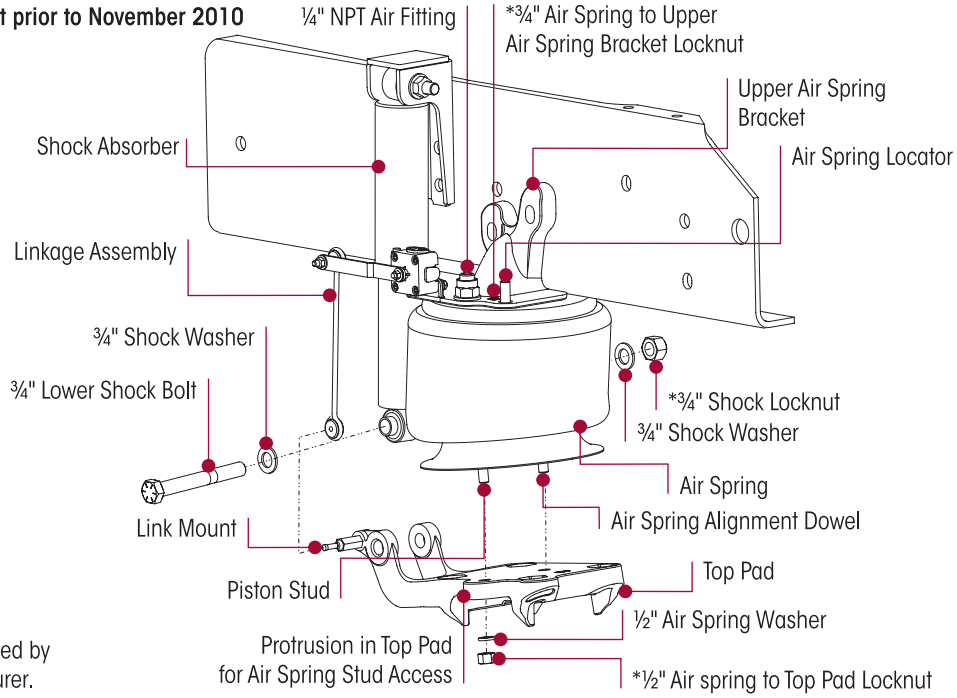




*Tightening torque specification controlled by the vehicle manufacturer.

12. **AIRTEK equipped vehicles** — Engage the air springs into the top pad and install new lower air spring mounting fasteners. Tighten the lower air spring mounting fastener to vehicle manufacturer's torque specifications, see Figure 9-50.
13. Install the lower shock mounting bolts.
14. Install the steering knuckles as per the Steering Knuckle replacement instructions in this section
15. Install the tie rod assembly.
16. Install the ⅞" hardened washers on the Ackermann arm and the castle nuts.
17. Tighten the castle nuts to 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.
18. Install the tie rod end cotter pin.

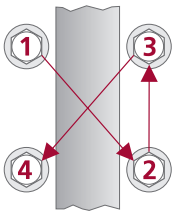
FIGURE 9-50
AIRTEK | Vehicles built prior to November 2010



*Tightening torque specifications controlled by the vehicle manufacturer.

19. Connect the drag link. Install the castle nut to install the steering arm. Tighten the castle nut to 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.
20. Install the drag link cotter pin.
21. Install the brake backing plate assemblies and ABS sensor and torque all fasteners per manufacturer's specifications.
22. Install the brakes, hubs, and wheels per the manufacturer's guidelines.
23. Raise the vehicle and remove the safety stands.
24. Lower the floor jack and load the front axle with the truck's weight. Remove the floor jack.
25. **SOFTEK equipped vehicles** — proceed to Step 27.
26. **AIRTEK equipped vehicles** — Install the height control valve linkage and inflate the suspension to normal operating pressure.

FIGURE 9-51



27. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-51.
28. Tighten the lower shock mounting bolts to vehicle manufacturer's torque specifications.
29. **SOFTEK equipped vehicles** — proceed to Step 31.
30. **AIRTEK equipped vehicles** — Reconnect the height control valve and air up the suspension.
31. Verify proper ride height. See Alignment & Adjustments section of this publication.
32. Remove the wheel chocks.
33. Fill the hubs with the proper lubricant, (see manufacturer's guidelines for recommended lubrication), if required.
34. Grease the front steering components as per lubrication guidelines in the Preventive Maintenance section of this publication.

STEERTEK NXT • STEERTEK STEERING KNUCKLE DISASSEMBLY

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.

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.

1. Note the orientation of steering arm before removal.
2. Place the vehicle on level floor.
3. Chock the wheels.
4. Support the vehicle with safety stands.
5. Raise and support the axle with safety stands.
6. Remove the wheel assemblies per the vehicle manufacturer's instructions.
7. Remove the caliper and brake assembly from the steering knuckle per the vehicle manufacturer's instructions.
8. Remove the hub and rotor assembly per the 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.

9. 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.
10. 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.

11. Remove the two socket head cap screws that connect the upper kingpin to the steering knuckle, see Figure 9-52.

FIGURE 9-52

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.

12. Remove the grease zerks from the knuckle assemblies.
13. Remove the lower steering knuckle from the kingpin by sliding it down the kingpin.
14. Remove the upper steering knuckle by sliding it up off the kingpin.

STEERTEK NXT • STEERTEK 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 PROCEDURES:

- 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 ACCIDENT 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 9-53 through 9-56.

FIGURE 9-53

FIGURE 9-54

FIGURE 9-55

FIGURE 9-56

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 1.802" diameter, replacement of the axle is necessary, see Figures 9-57 through 9-60. **Kingpin minimum dimension is 1.802".**

FIGURE 9-57

FIGURE 9-58

FIGURE 9-59

FIGURE 9-60

STEERTEK NXT • STEERTEK KINGPIN BUSHING

To conduct kingpin bushing removal, reaming or honing, and installation; and kingpin seal installation, **You will need:**

- **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, refer to the Special Tools section of this publication.
- An adjustable straight flute reamer with extension pilot tool **or** precision-finish cylinder hone, refer to the Special Tools section in this publication.
- 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 9-61. 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. **STEERTEK NXT** axle, vehicles built **after** August 2011 – Remove the threaded grease cap and grease zerk.

STEERTEK axle, vehicles built **prior to** August 2011 – Remove the threaded grease cap retaining ring.

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 9-61 and 9-62.
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 9-63.
4. Clean the parts and inspect for reassembly, see Figure 9-64.

FIGURE 9-61

FIGURE 9-62

FIGURE 9-63

FIGURE 9-64

STEERING KNUCKLE BORE MEASUREMENT

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

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 9-65 through 9-67. 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".
   a. If the average measurement is more than the knuckle bore maximum diameter specification, steering knuckle replacement is necessary.

FIGURE 9-65

FIGURE 9-66

FIGURE 9-67

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.

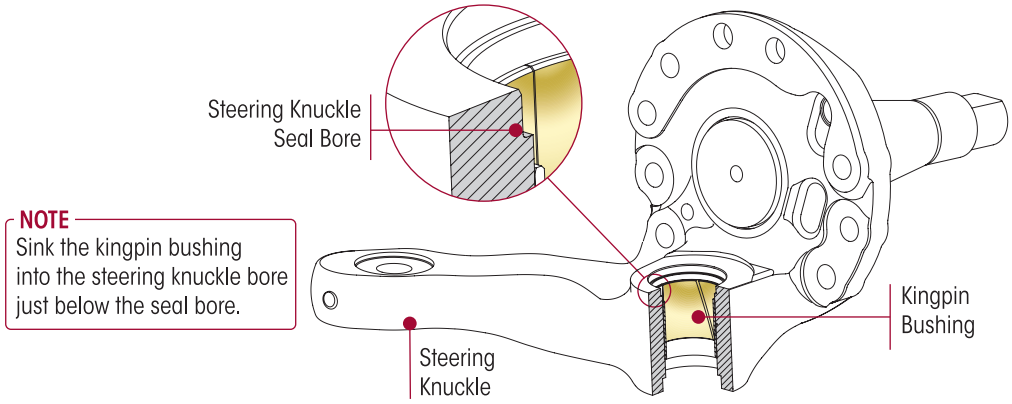
1. Place the **machined surface** of the upper/lower steering knuckle **face up** (axle side up). Ensure that each part of the steering knuckle assembly is squarely supported before applying hydraulic pressure to press in the kingpin bushing, see Figure 9-68.
2. From the **machined surface** of the steering knuckle, use the kingpin bushing driver tool to drive the kingpin bushing flush into steering knuckle, see Figure 9-69.
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 9-70 and 9-71.
4. Properly size the kingpin bushings to fit the kingpins, see instructions in the Kingpin Bushing Reaming / Honing instructions in this section.

FIGURE 9-68

FIGURE 9-69

FIGURE 9-70

FIGURE 9-71



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.

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

WARNING 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.

WARNING 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 9-72 and 9-73.

1. Place the steering knuckle (equipped with a replacement kingpin bushing) in a vise with brass jaws (soft jaws), see Figures 9-72 and 9-73.
2. Install the reamer onto the end of the extension pilot tool and position the extension pilot tool through the kingpin bushing.

FIGURE 9-72
Upper Steering Knuckle in Vise Shown

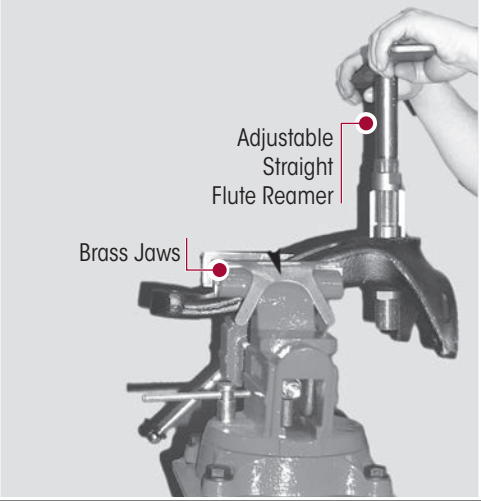
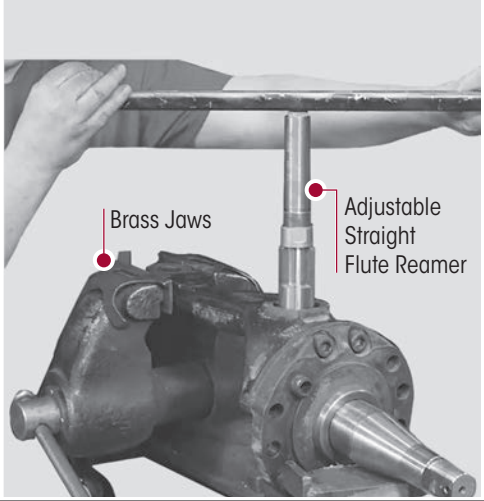


FIGURE 9-73
Lower Steering Knuckle in Vise Shown



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 9-72 and 9-73.

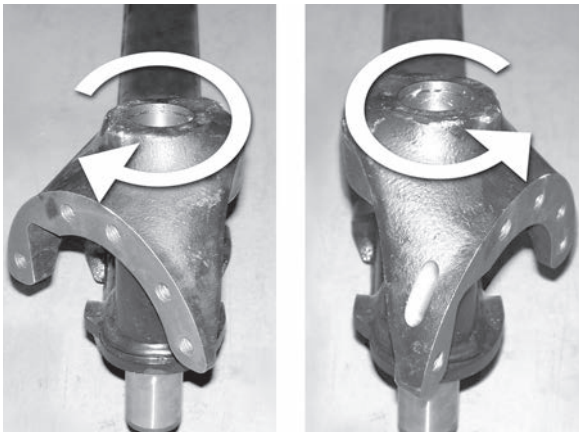
NOTE To remove the reamer, rotate the tool in the opposite cutting direction.

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 ⅝" 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 9-74.
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 9-74



■ 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 9-75.
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 9-75 and 9-76.
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 9-77.
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.

FIGURE 9-75

STEERTEK NXT Axle
Upper Steering Knuckle Shown

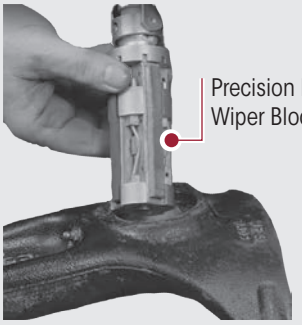


FIGURE 9-76

STEERTEK NXT Axle
Precision Hone in Kingpin Bushing Shown

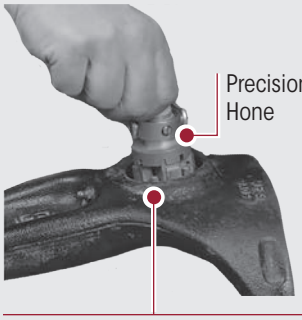
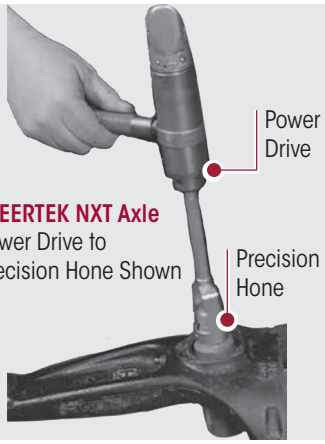


FIGURE 9-77



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 8 through 11 in the Method A – Reaming section of this publication.
13. If either of the bushings are too tight, repeat steps 1 through 12 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.

1. Place the steering knuckle assembly in a vise with brass jaws (soft jaws), see Figures 9-72 and 9-73, 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 9-78.

3. Use the seal installer tool (see tools specifications of this publication) and press seal firmly into the steering knuckle assembly.
4. **STEERTEK NXT** axle, **double lip** design, see Figure 9-79 – Install the kingpin seal until it bottoms out in the kingpin bore.

   STEERTEK axle, **single lip** design, see Figure 9-80 – Install the kingpin seal until it makes contact with the kingpin bushing.

FIGURE 9-78

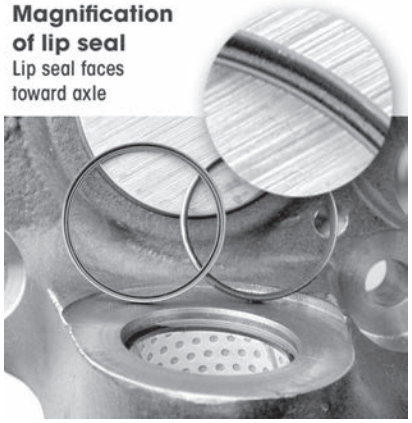


FIGURE 9-79

FIGURE 9-80

STEERING KNUCKLE ASSEMBLY

After 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 • STEERTEK axles are installed with a left hand composite thrust bearing and a right hand roller thrust bearing configuration.

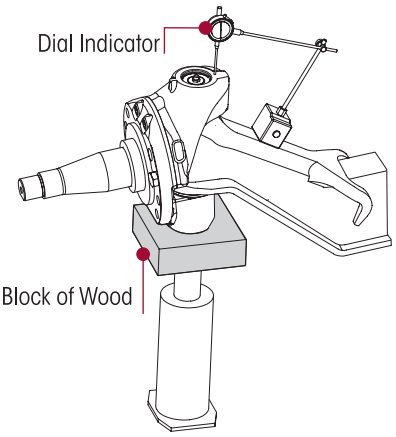
FIGURE 9-81

Top View of Thrust Bearings

Composite – Left Side **Roller – Right Side**

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 axle (the black seal will designate the top side, see Figure 9-81).
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 kingpin.
4. Install the lower steering knuckle on the lower kingpin and install (temporarily) 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 (2) 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 9-82.
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.

FIGURE 9-82



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. **STEERTEK NXT** axle – vehicles built **after** August 2011. If vertical 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 two (2) socket head cap screws and **pull up** on the knuckle assembly until the proper vertical end play is achieved

    STEERTEK axle – vehicles built **prior** to August 2011. If the vertical clearance is:
    - **Above 0.011"**, add a 0.005" shim
    - **Below 0.008"**, it may be necessary to remove a 0.005" shim

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.

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

13. Remove one (1) old socket head cap screw and replace with new socket head cap screw.
14. Remove second socket head cap screw and replace with new socket head cap screw. Tighten both socket head cap screws to 188 ± 12 foot pounds torque.
15. Recheck the vertical end play with the dial indicator, see Figure 9-82 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 steering knuckle assembly.

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

WARNING

DO NOT GREASE THE STEERING KNUCKLES WITHOUT THE BRAKE SPIDER INSTALLED AND TIGHTENED TO THE PROPER TORQUE PER THE BRAKE MANUFACTURER'S SPECIFICATIONS. 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 185 foot pounds torque then advance the castle nut to the next hex face to install the cotter pin. **DO NOT** back off the castle nut to install cotter pin.
21. Install the drag link into the steering arm and tighten to the vehicle manufacturer's specifications.
22. **STEERTEK NXT** axle:
    a. Install the new threaded grease caps and tighten to 60 ± 10 foot pounds torque, see Figures 9-83 and 9-84. **Allow 30 minutes** for thread sealant to cure before greasing.
    b. 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 9-85.
    c. 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 9-86.

    STEERTEK axle – Install new grease caps and retaining rings.

23. Install the brakes, drums, wheels and tires per the vehicle manufacturer's instructions.
24. Raise the vehicle and remove the safety stands.
25. Lower the vehicle.
26. Grease steering knuckles with the vehicle on the floor.
27. Remove the wheel chocks from the vehicle.

FIGURE 9-83

FIGURE 9-84

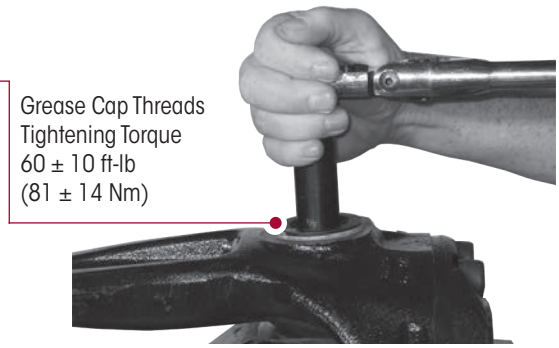


FIGURE 9-85

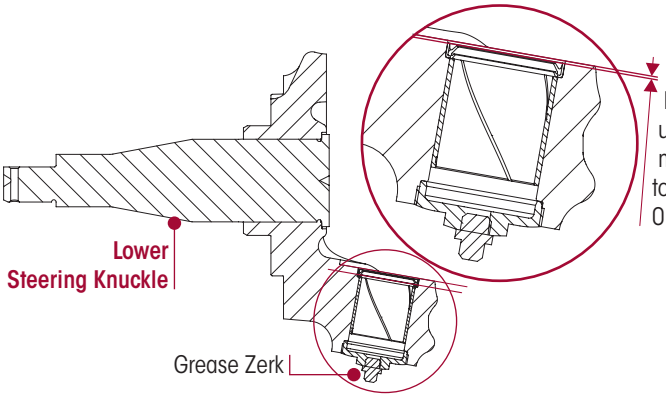
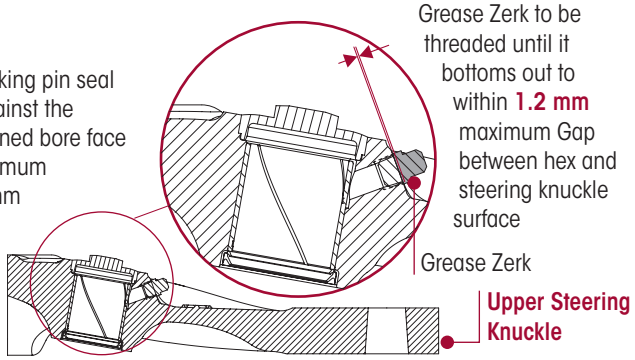


FIGURE 9-86



TIE ROD END AND CROSS TUBE

You will need:

- 7/8" -14 tie rod end removal tool (see Figure 9-88)

DISASSEMBLY

1. Chock the wheels.
2. Position the steer axle tires straight ahead.
3. Remove the cotter pin and castle nut, see Figure 9-87.

FIGURE 9-87

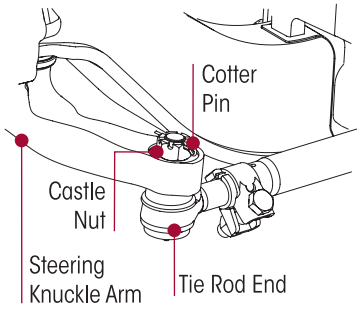


FIGURE 9-88

7/8" -14 Tie Rod End Removal Tool

4. Use a 7/8"-14 tie rod end removal tool (see Figure 9-88) to separate the tie rod end from the steering knuckle arm.
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 and make note of the number of exposed threads on the tie rod end being replaced, see Figure 9-89.

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 AND 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 being replaced repeat Steps 8 through 10.
12. Visually inspect the cross tube for dents, cracks, or thread damage, replace as necessary.

ASSEMBLY

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

NOTE

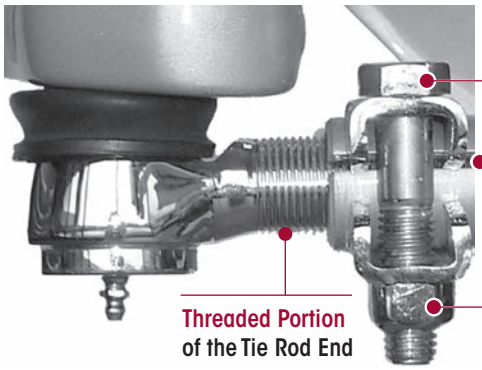
When installing the cross tube the thread direction of the tie rod ends are as follows:
- A right hand threaded tie rod end will be installed into the right side tie rod arm.
- A left hand threaded tie rod end will be installed into the left side tie rod arm.

2. Install the new tie rod end into the cross tube, leaving the same amount of threads exposed that were counted on the removed 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 9-89. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

FIGURE 9-89



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)

3. If replacing the opposing tie rod end is not necessary, it is critical that the ball and socket are free to rotate in the opposing tie rod end.
4. Replace the opposing tie rod end if necessary, by repeating Steps 1 and 2.
5. Install both tie rod ends into the lower steering knuckles.
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. **DO NOT** back off the castle nut to install cotter pin.

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.

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 Toe Adjustment in the Alignment & Adjustments section of this publication.
10. After the alignment is acceptable, tighten the tie rod to tie rod tube fasteners to 68 ± 7 foot pounds tightening torque, see Figure 9-89.
11. Remove the wheel chocks.

SINGLE TO DUAL HEIGHT CONTROL VALVE CONVERSION

Hendrickson has Dual Height Control Valve Conversion Kits available to convert from a single height control valve to dual height control valves, (Kit number 60961-116), see Parts List section in this publication.

NOTE 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.

DISASSEMBLY

1. Place vehicle on level floor and chock the wheels.

⚠ 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.

2. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
3. Remove the air from the air system by disconnecting the height control valve linkage at the rubber grommet and allowing the lever to drop. This will exhaust air from the system.

⚠ CAUTION THE HEIGHT CONTROL VALVE FITTINGS ARE NON-SERVICEABLE. IF THE HEIGHT CONTROL VALVE IS TO BE RE-INSTALLED; CARE MUST BE TAKEN TO REMOVE DIRT AND DEBRIS FORM THE PUSH-TO-CONNECT FITTINGS. FAILURE TO DO SO CAN RESULT IN THE PUSH-TO-CONNECT FITTINGS FAILING TO SEAL PROPERLY WITH THE AIR LINE.

4. Disconnect the delivery air line to the right air spring at the T-fitting.
5. Remove the T-fitting from the right air spring.

ASSEMBLY

1. Install the new left side height control valve assembly on the left side upper air spring bracket and connect the new height control valve linkage to the bracket on the top pad.
2. Inspect the air line removed from the T-fitting to the right air spring. Trim the end square if necessary. Insert the air line into the right air spring.
3. Install a new air line from the left height control valve delivery port into the left air spring. Cut the new line to length and ensure that the ends of the line are cut square. Make sure that air lines are fully seated in the fittings.
4. Acquire access to the air lines inside the left frame rail. Cut plastic ties as necessary to gain access to the air lines routed inside the frame rail.
5. The supply line from the foot valve will continue to be the supply line for both height control valves. It will be necessary to cut the supply line install a T-fitting at or near a frame rail hole location closest to the left height control valve.
6. Cut to length and install an air line from the T-fitting to the right height control valve supply port.
7. Trace former left air spring delivery line (which will now be the left height control valve supply line).
8. Cut this line to length and insert into the T-fitting.
9. Install new plastic ties and secure all air lines inside the right frame rail. This should complete the installation and plumbing of the height control valves, see Dual Height Control Valve in the Plumbing Diagram section of this publication.
10. Air up vehicle system to proper air pressure.
11. Install height control valve linkage assembly(s) and inflate suspension to normal operating pressure.
12. Remove wheel chocks.
13. Verify proper ride height, see Alignment & Adjustments section of this publication.

SECTION 10

Front Wheel Alignment Specifications

AIRTEK • SOFTEK for International Truck Vehicles

FRONT SUSPENSION ALIGNMENT SPECIFICATIONS						
CAMBER[1]	DESIGN SPECIFICATION		RANGE			
	AIRTEK	SOFTEK	AIRTEK		SOFTEK	
			Minimum	Maximum	Minimum	Maximum
LEFT	0.00°±1.0°	0.0°±1.0°	-1.0°	+1.0°	-1.0°	+1.0°
RIGHT	-0.25°±1.0°	-0.25°±1.0°	-1.25°	+0.75°	-1.25°	+0.75°
CROSS	0.25°±1.0°	0.0°	-0.75°	+1.25°	—	+2.0°

CAMBER NOTES:

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

CASTER[2,3,5]	DESIGN SPECIFICATION		RANGE			
	AIRTEK	SOFTEK	AIRTEK		SOFTEK	
			Minimum	Maximum	Minimum	Maximum
LEFT	6.0°±1.0°	5.0°±1.0°	+5.0°	+7.0°	+4.0°	+6.0°
RIGHT	6.0°±1.0°	5.0°±1.0°	+5.0°	+7.0°	+4.0°	+6.0°
CROSS[4]	0.0°	0.0°	—	+1.5°	—	+1.5°

CASTER NOTES:

2. Caster is determined with the vehicle at specified ride height for air suspension or at rated load for mechanical suspension systems. It is critical that the vehicle front and rear ride height is within specifications prior to performing a caster measurement or adjustment. See Hendrickson ride height specifications4 and procedure.
3. 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.
4. **The Cross caster angle is not adjustable – DO NOT** bend axle or otherwise try to adjust cross caster. If found out of specifications notify Hendrickson Tech Services for further information. Changes to caster can be attained by using caster shims as provided by the vehicle manufacturer or chassis and 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.**
5. **Example of caster adjustment:** 2.5° Right Hand/3° Left Hand would require one (1), 1.0 shim on each side to increase caster and achieve 3.5° Right Hand / 4.0° Left Hand, which is in specification. **DO NOT** attempt to use uneven shims.

Hendrickson recommends the following practices[7]:

	DESIGN SPECIFICATION[6]	RANGE	
		Minimum	Maximum
TOTAL TOE[2]	1/16" ± 1/32" (0.06" ± 0.03")	1/32" (0.03")	3/32" (0.09")

TOE-IN NOTES:

6. 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.
7. For International 2-Leaf mechanical suspension with STEERTEK axle, refer to vehicle manufacturer's specifications

SECTION 11

Troubleshooting Guide

STEERTEK NXT • STEERTEK AXLE • SOFTEK • AIRTEK for International 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 kingpin 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 scheduled frequency.
	Incorrect lubrication procedures	Use the correct lubrication procedures.
	Lubrication interval not compatible with operating conditions	Change the lubrication interval to match operating condition.
	Worn or missing seals	Replace the worn or missing seals.
Vibration or shimmy of front axle during operation	Caster out of specification	Verify the ride height is within specification, then adjust caster to specification.
	Wheels and/or tires out of balance	Balance or replace the wheels and/or tires.
	Worn shock absorber(s)	Replace the shock absorber(s).
	Worn thrust washers	Replace the thrust washers.
	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 vehicle manufacturer's specification.
	Tires out of balance	Balance or replace the tires.
	Incorrect toe setting	Adjust the toe-in to Hendrickson's specification.
	Incorrect steering arm geometry	Repair the steering system as necessary.
	Worn kingpin bushings	Replace the kingpin bushings.
	Excessive wheel bearing end play	Check the specified wheel nut torque, replace worn or damaged wheel bearings.
	Wheel bearing adjustment	Adjust the wheel bearing to the manufacturers specifications.
	Low pressure in the power steering system	Repair the power steering system.
Vehicle is hard to steer	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	Verify the ride height is within specification, then adjust 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 troubleshooting procedures per steering gear manufacturer's guidelines.
	Steering gear box internal problem	Perform steering gear troubleshooting procedures per steering gear manufacturing guidelines.

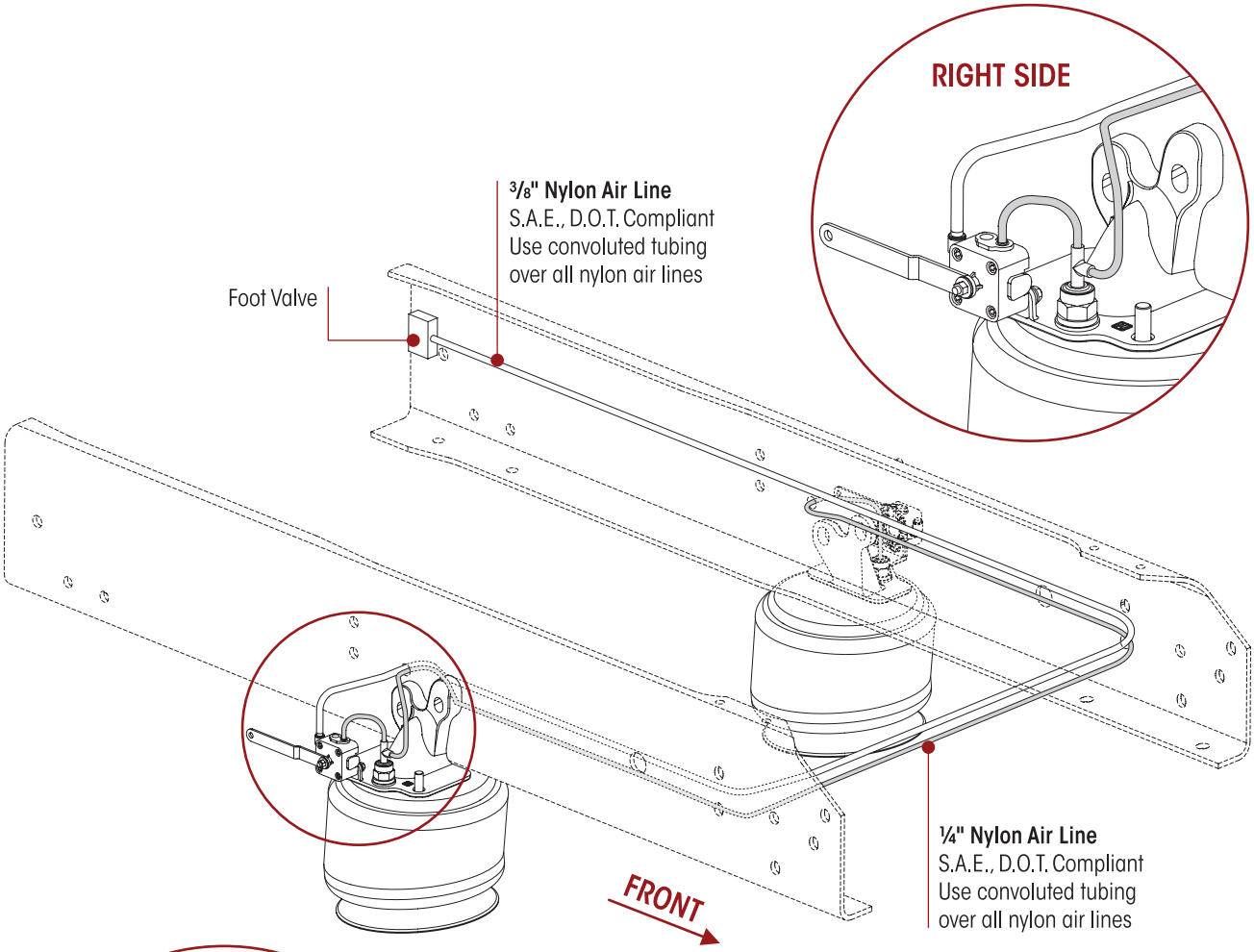
STEERTEK NXT • STEERTEK AXLE • SOFTEK • AIRTEK for International Vehicles

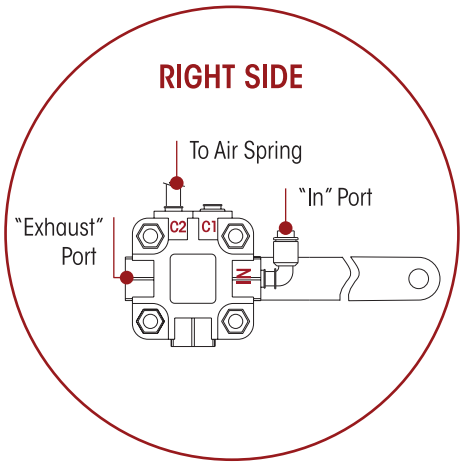
TROUBLESHOOTING GUIDE (CONTINUED)		
CONDITION	**POSSIBLE CAUSE**	**CORRECTION**
Tie rod ends are worn and require replacement	Tie rod ends need lubrication	Lubricate the tie rod end. Ensure the lubrication schedule is followed.
	Severe operating conditions	Increase the frequency of inspection and lubrication 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 vehicle manufacturer's specified pressure.
	Steering gear poppets improperly set or malfunctioning	Check for the proper operation or adjust poppets to the vehicle manufacturer's specifications.
	Axle stops improperly set	Set the axle stops to the vehicle manufacturer's specifications.
	Severe duty cycle service	Increase the frequency of inspection and lubrication intervals
Worn or broken steering ball stud	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 specified lubricant.
	Power steering stops out of adjustment	Adjust the steering stops to Hendrickson's specifications.
Suspension has harsh or bumpy ride	Air spring not inflated	Check the air supply to air spring, repair or replace as necessary.
	Air spring ride height out of specification	Adjust the ride height to the proper specification.
	Broken or worn leaf spring	Replace the leaf spring assembly.
	Front suspension overloaded	Redistribute the steer axle load.
	Broken shock absorber	Replace the shock absorber.
Restricted steering radius	Steering stops not adjusted correctly	Adjust the steering stops to achieve correct wheel cut.
Vehicle leans	Ride height incorrect	Adjust the 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 spring eye re-torque procedure. See the Alignment & Adjustment section of this publication.
	Leaf spring broken	Replace the leaf spring assembly.
	Excessive weight bias	Contact the vehicle manufacturer or Hendrickson Tech Services.
Vehicle wanders	Caster out of specifications	Verify the ride height is within specification, then adjust caster to specification. See Front Wheel Alignment Specifications in this publication.
	Incorrect toe setting	Adjust the toe to specification.
	Air in the power steering system	Remove the air from the power steering systems.
	Rear ride height out of adjustment	Adjust the ride height to vehicle manufacturer's specification.
	Front ride height out of adjustment	Adjust the ride height to Hendrickson's specification.

SECTION 12
Plumbing Diagrams

AIRTEK Single Height Control Valve

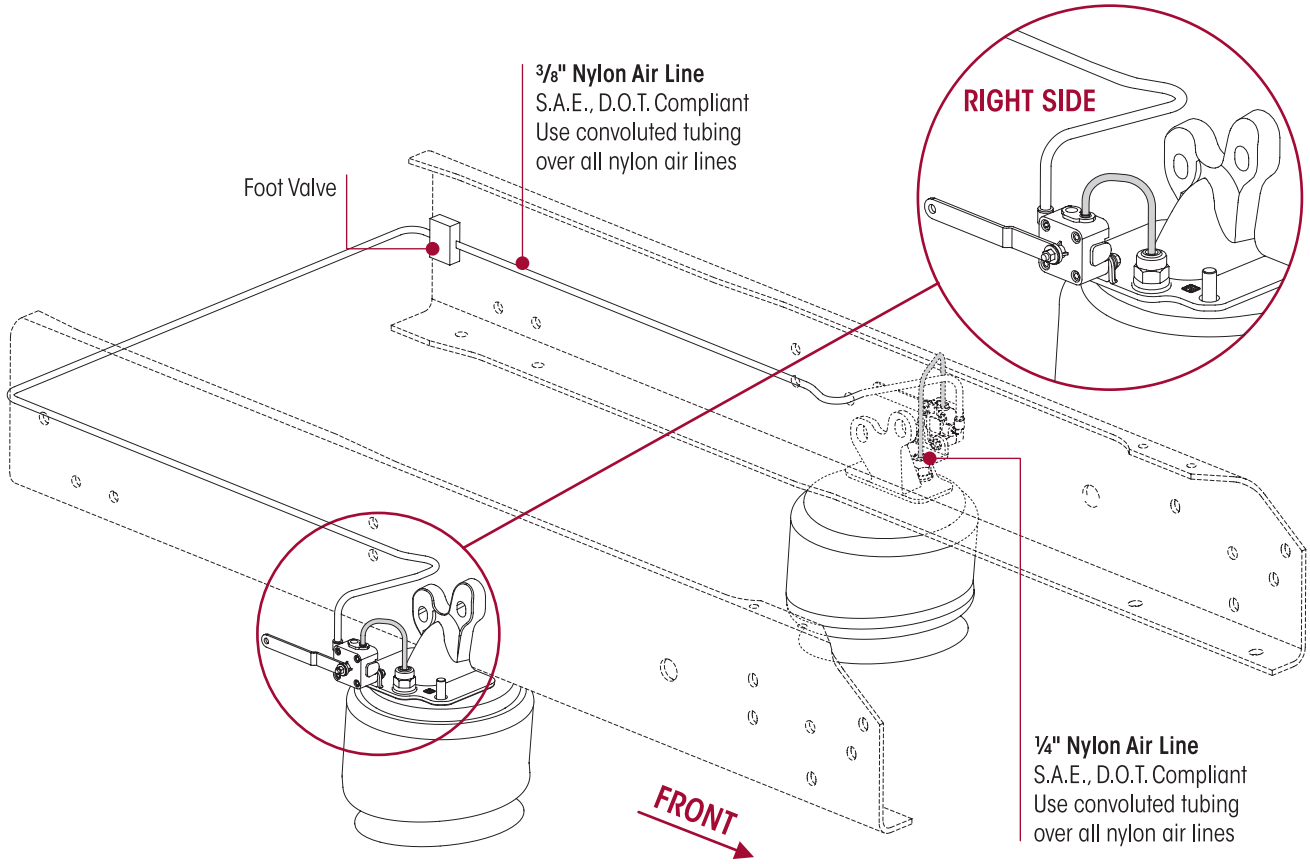
When replacing or installing nylon air line tubing into push-to-connect fittings it is critical that the end of the air line is cut square. Improper cut of the end of the air line tubing can cause the air line to seat improperly in the push-to-connect fitting causing air leakage.

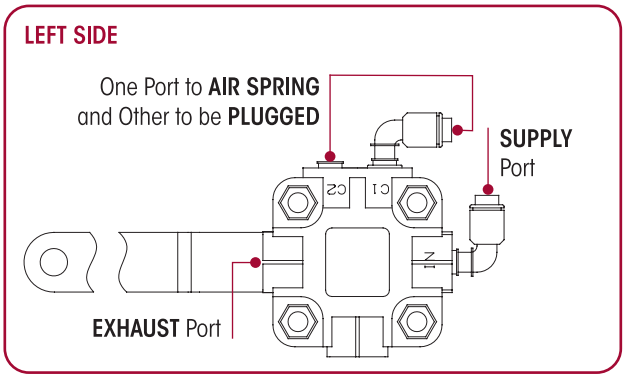


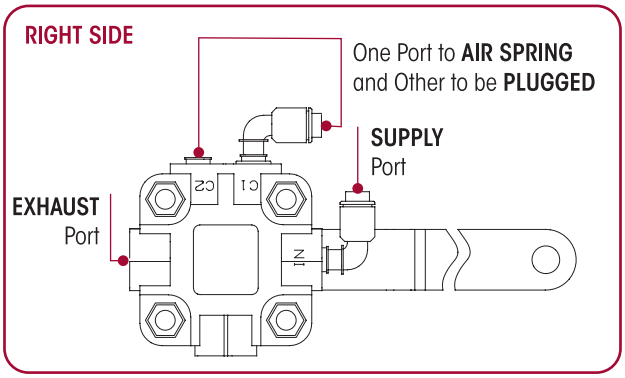


AIRTEK Dual Height Control Valves

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.





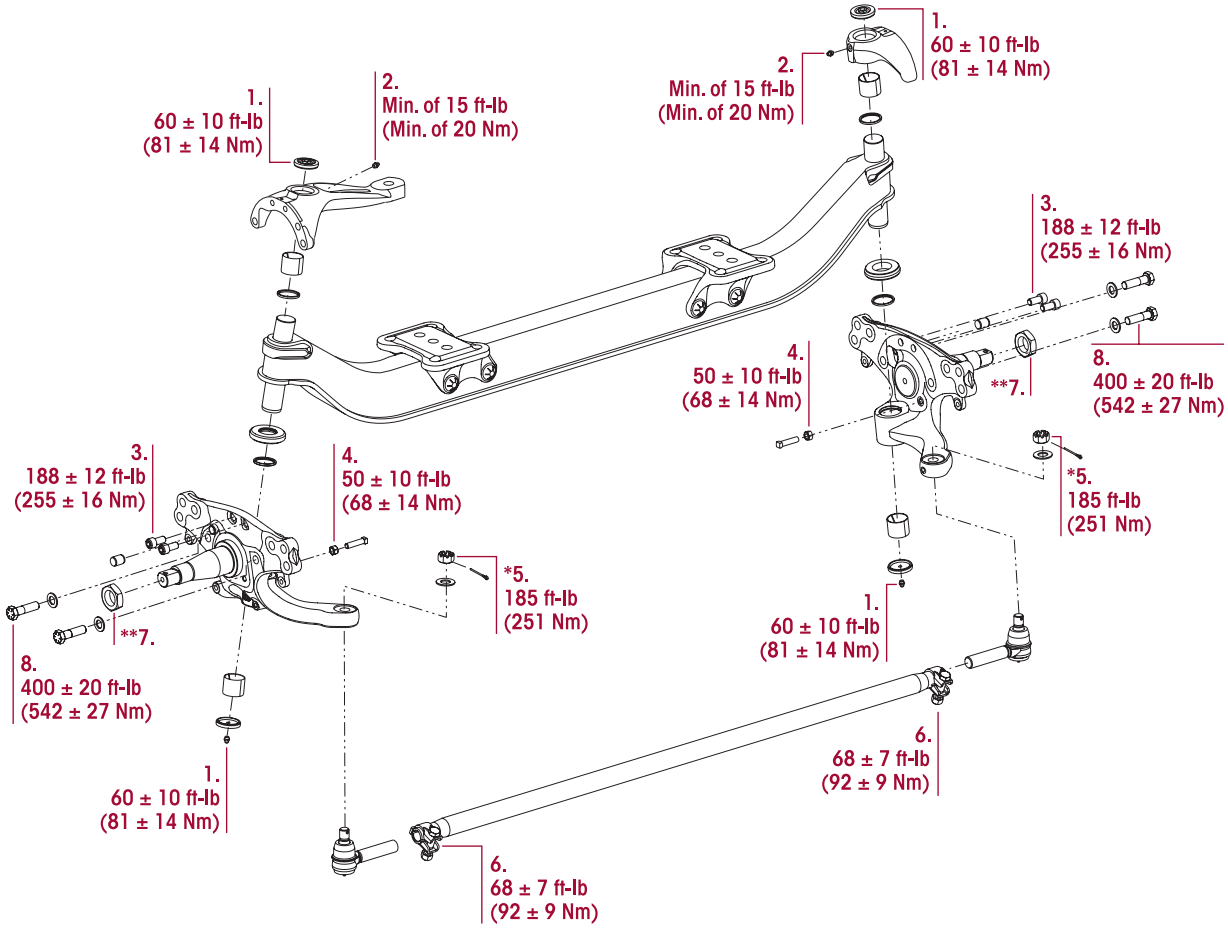


SECTION 13
Torque Specifications

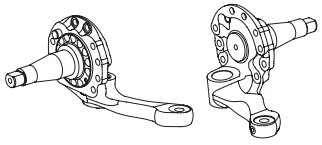
Hendrickson Recommended Torque Values
Provided in Foot Pounds and in Newton Meters

STEERTEK NXT Axle with Cross Caster Knuckle Assembly
- Medium-duty with Standard Brake Knuckle
- Heavy-duty with Standard Brake Knuckle | Integrated Brake Knuckle (IBK)

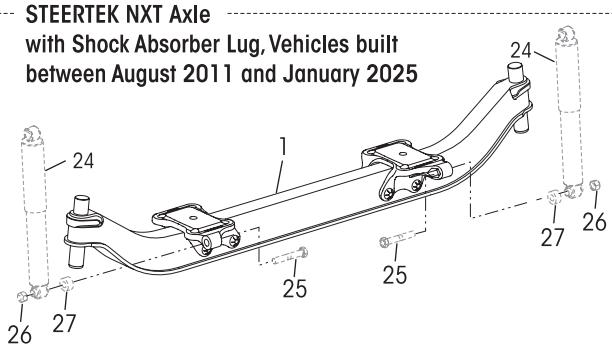
International Models for Vehicles built:
after January 2025 – LT • RH • MV • IC Bus CE Series
between August 2011 and January 2025 – LT • LS • RH • PROSTAR • LONESTAR • TRANSTAR Series



Standard Brake Knuckle



STEERTEK NXT Axle
with Shock Absorber Lug, Vehicles built between August 2011 and January 2025



STEERTEK NXT Axle with Cross Caster Assembly
Vehicles built after January 2025

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. **All hardware ¼" and greater is Grade 8 with no additional lubrication.**					
1	Grease Cap Assembly	4	½"	60 ± 10	81 ± 14
2	Grease Zerk	2	—	Min. of 15	Min. of 20
3	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	⅝"	188 ± 12	255 ± 16
4	Knuckle / Axle Wheel Stop Bolt	2	½" Jam Nut	50 ± 10	68 ± 14
5	Tie Rod Ends / Drag Link to Steering Knuckle	2	⅞" Castle Nut	*185	*251
6	Tie Rod Tube to Tie Rod Ends	2	⅝"	68 ± 7	92 ± 9
7	Spindle Nut	2	1½"	**	**
8	Integrated Knuckle Attachment Fasteners	4	¾"	400 ± 20	542 ± 27

NOTES: * Tighten the castle nut to 185 foot pounds, then advance castle nut to the next hex face to install cotter pin. **DO NOT** back off castle nut for cotter pin installation.

** Torque value is based on wheel end hardware, contact the vehicle manufacturer for specification.

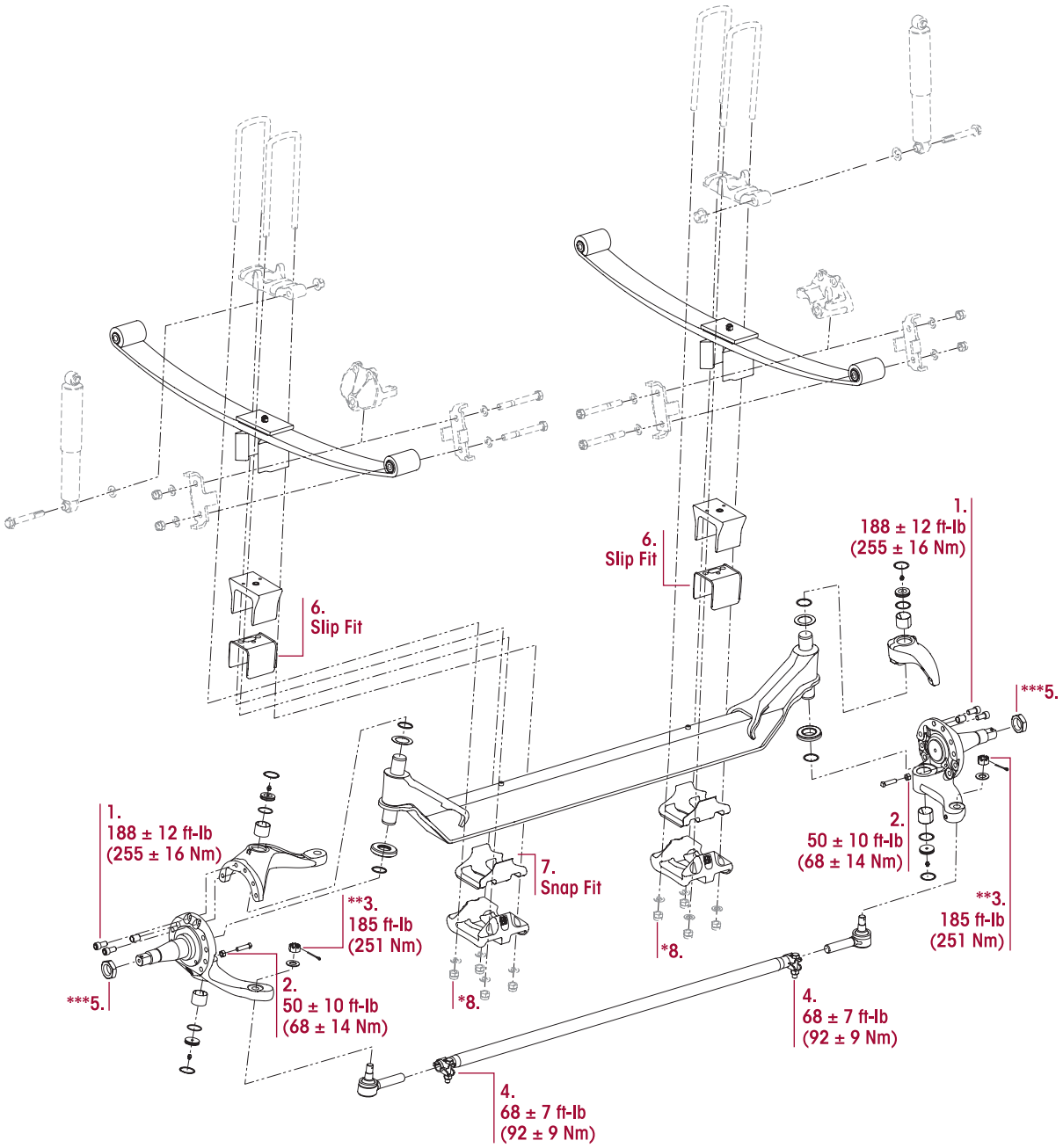
SOFTEK Monoleaf with STEERTEK Axle

Vehicles built prior to June 2014

for International Models:

LoneStar 12.35K lb • **ProStar** 12K, 12.35K lb • **TranStar** 12K lb • **9200 / 9400 / 8600** 12K lb capacity

Hendrickson Recommended Torque Values
Provided in Foot Pounds and in Newton Meters



SOFTEK Monoleaf with STEERTEK Axle
Vehicles built prior to June 2014

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. **All hardware ¼" and greater is Grade 8 with no additional lubrication.**					
1	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	⅝"	188 ± 12	255 ± 16
2	Knuckle / Axle Wheel Stop Bolt	2	½" Jam Nut	50 ± 10	68 ± 14
3	Tie Rod Ends / Drag Link to Steering Knuckle	2	⅞" Castle Nut	**185	**251
4	Tie Rod Tube to Tie Rod Ends	2	⅝"	68 ± 7	92 ± 9
5	Spindle Nut	2	1½"	***	***
6	Top Axle Wrap Liner	2	—	Slip Fit	Slip Fit
7	Bottom Axle Wrap Liner	2	—	Snap Fit	Snap Fit
8	Clamp Group Fasteners	8	¾"	*	*

NOTES: * Fasteners originally supplied by the vehicle manufacturer. Follow the torque specifications listed in the vehicle manufacturer's manual. Hendrickson is not responsible for maintaining vehicle manufacturer's torque values.

** Tighten the castle nut to 185 foot pounds, then advance castle nut to the next hex face to install cotter pin. **DO NOT** back off castle nut for cotter pin installation.

*** Torque value is based on wheel end hardware, contact the vehicle manufacturer for specification.

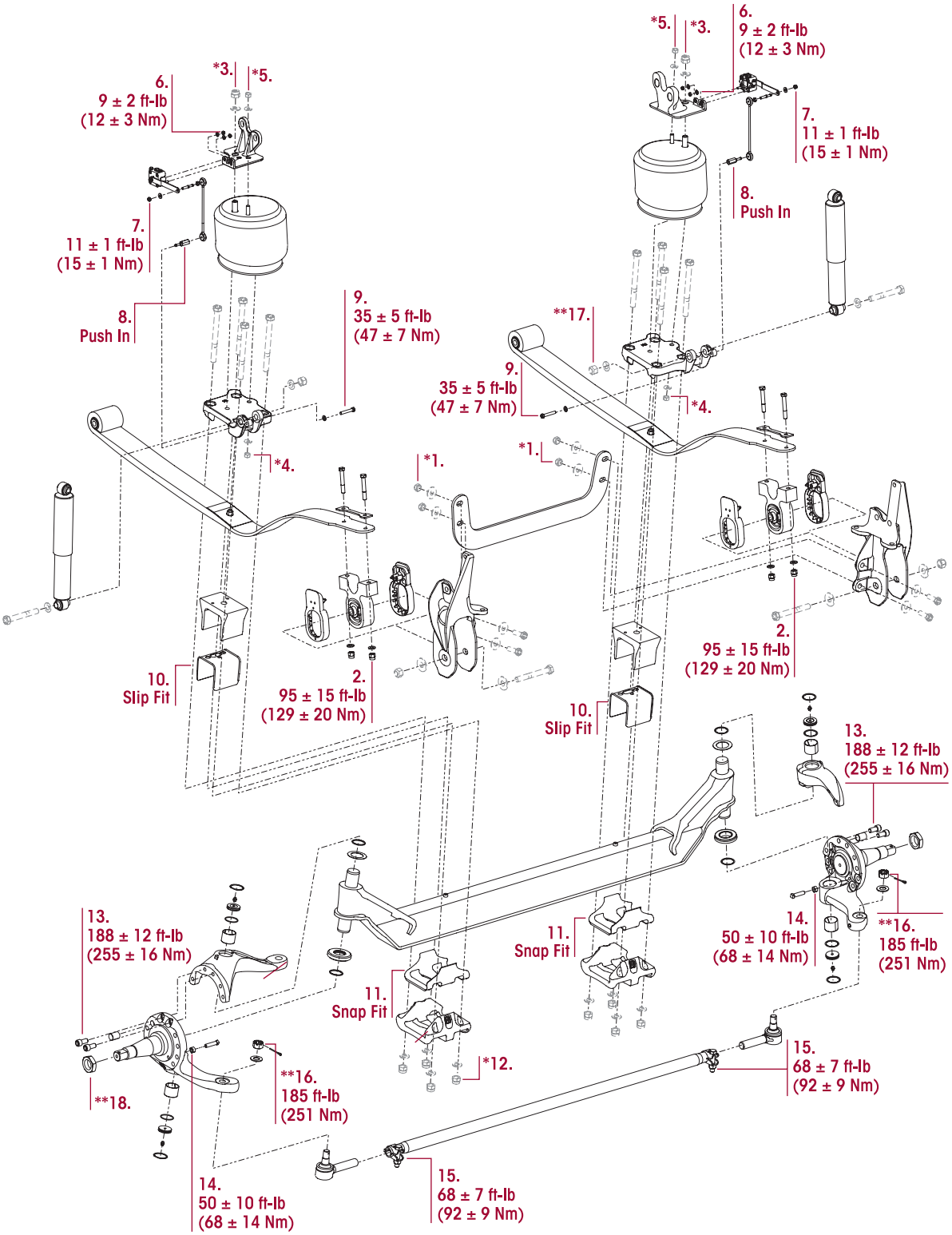
AIRTEK with STEERTEK Axle

Vehicles built between September 2006 and November 2010

New Engine Configuration (NEC)

for International Models: 9200 / 9400

Hendrickson Recommended Torque Values
Provided in Foot Pounds and in Newton Meters



AIRTEK with STEERTEK Axle • New Engine Configuration (NEC)

Vehicles built between September 2006 and November 2010

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. **All hardware ¼" and greater is Grade 8 with no additional lubrication.**					
1	Rear Spring Hanger to Belly Band	4	⅝"	*	*
2	Rear Spring Mount to Leaf Spring	2	½"	95 ± 15	129 ± 20
3	Air Spring to Air Spring Bracket	2	¾"	*	
4	Air Spring to Top Pad	2	½"	*	*
5	Air Spring Bracket to Frame	2	⅝"	*	*
6	Height Control Valve to Air Spring Bracket	2	¼"	9 ± 2	12 ± 3
7	Linkage Rod to Height Control Valve Arm	1	5/16"	11 ± 1	15 ± 1
8	Linkage Rod to Link Mount	None	Grommet	Push In	Push In
9	Link Mount to Top Pad	1	⅜"	35 ± 5	47 ± 7
10	Top Axle Wrap Liner	4	Formed	Slip Fit	Slip Fit
11	Bottom Axle Wrap Liner	4	Formed	Snap Fit	Snap Fit
	WARNING DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE AND/OR PERSONAL INJURY.				
12	Clamp Group Hardware	8	¾"	*	*
	WARNING ENSURE THE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING THE HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, OR PERSONAL INJURY.				
13	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	⅝"	188 ± 12	255 ± 16
14	Knuckle / Axle Wheel Stop Bolt	2	⅝" Jam Nut	50 ± 10	68 ± 14
15	Tie Rod Tube to Tie Rod Ends	2	⅝"	68 ± 7	92 ± 9
16	Tie Rod Ends / Drag Link to Steering Knuckle	2	⅞" Castle Nut	**185	**251
17	Lower Shocks Eye Bolts	2	¾"	*	*
18	Spindle Nut	2	1½"	***	***

NOTE: * Fasteners originally supplied by the vehicle manufacturer. Follow the torque specifications listed in the vehicle manufacturer's manual. Hendrickson is not responsible for maintaining vehicle manufacturer's torque values.

** Tighten the castle nut to 185 foot pounds, then advance castle nut to the next hex face to install cotter pin. **DO NOT** back off castle nut for cotter pin installation.

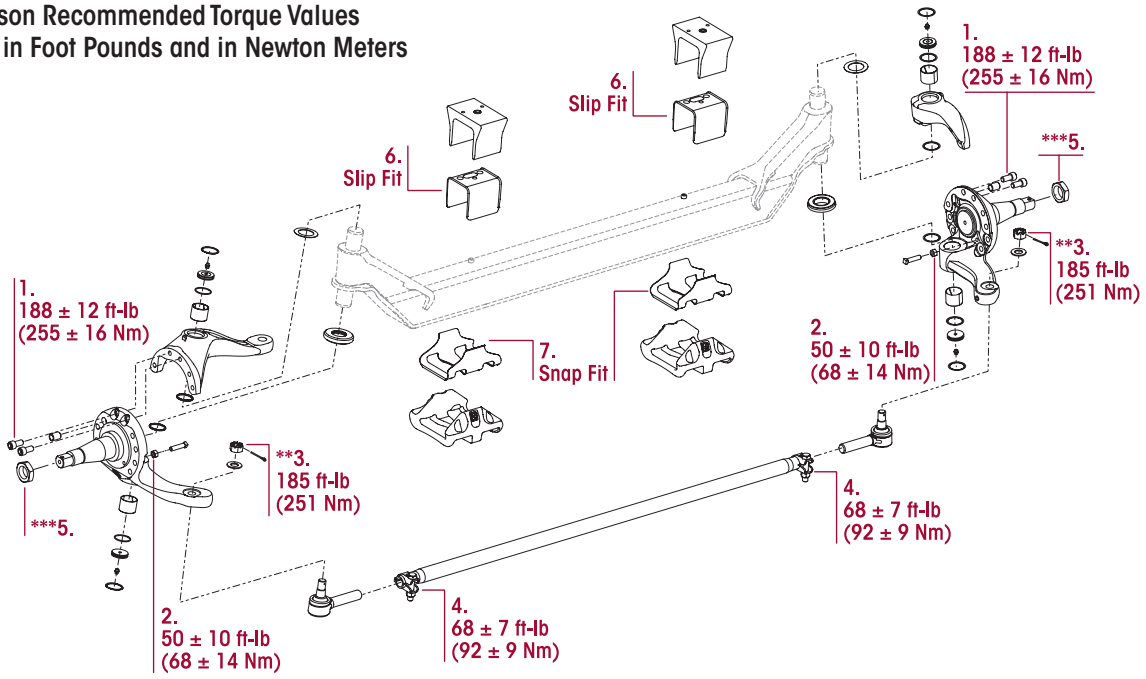
*** Torque value is based on wheel end hardware, contact the vehicle manufacturer for specification.

STEERTEK Axle Assembly

Vehicles built prior to August 2011

for International Models: **ProStar** 12K, 12.35K, 13.2K, 14K, 14.6K lb • **TranStar** 12K, 13K, 14K lb • **LoneStar** 12.35K, 13.2K, 14K, 14.6K lb • **9200 / 9400 / 8600** 12K lb capacity

Hendrickson Recommended Torque Values
Provided in Foot Pounds and in Newton Meters



STEERTEK Axle • Vehicles built prior to August 2011

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. **All hardware ¼" and greater is Grade 8 with no additional lubrication.**					
1	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	⅝"	188 ± 12	255 ± 16
2	Knuckle / Axle Wheel Stop Bolt	2	½" Jam Nut	50 ± 10	68 ± 14
3	Tie Rod Ends / Drag Link to Steering Knuckle	2	⅞" Castle Nut	**185	**251
4	Tie Rod Tube to Tie Rod Ends	2	⅝"	68 ± 7	92 ± 9
5	Spindle Nut	2	1½"	***	***
6	Top Axle Wrap Liner	2	—	Slip Fit	Slip Fit
7	Bottom Axle Wrap Liner	2	—	Snap Fit	Snap Fit

NOTES: * Fasteners originally supplied by the vehicle manufacturer. Follow the torque specifications listed in the vehicle manufacturer's manual. Hendrickson is not responsible for maintaining vehicle manufacturer's torque values.

** Tighten the castle nut to 185 foot pounds, then advance castle nut to the next hex face to install cotter pin. **DO NOT** back off castle nut for cotter pin installation.

*** Torque value is based on wheel end hardware, contact the vehicle manufacturer for specification.

SECTION 14
Reference Material

This technical publication covers Hendrickson Truck 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.*

HENDRICKSON

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