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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 the following suspension systems as installed on applicable Freightliner, Western Star, and Sterling vehicles:

- **AIRTEK®** (Referred to by Freightliner Trucks as Front AirLiner) — An integrated front air suspension and steer axle system that utilizes the STEERTEK NXT fabricated axle assembly. See Parts List Section in 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.

- **STEERTEK NXT** — A durable, lightweight, fabricated steer axle assembly.

**NOTE**

Use only Hendrickson Genuine parts for servicing this suspension system.

It is important to read and understand the entire Technical Procedure publication prior to performing any maintenance, service, repair, or rebuild of the product. The information in this publication contains parts lists, safety information, product specifications, features, proper maintenance, service, repair and rebuild instructions for the AIRTEK Suspension and the STEERTEK NXT axle.

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 1-866-755-5968 (toll-free U.S. and Canada), 630-910-2800 (outside U.S. and Canada) or e-mail: techservices@hendrickson-intl.com.

The latest revision of this publication is also available online at www.hendrickson-intl.com.
SECTION 2
Product Description

**AIRTEK** — Winner of the 2001 Automotive News and Cap Gemini Ernst & Young PACE Award for Product Innovation. AIRTEK is an integrated front air suspension and fabricated steer axle that work together to form an integrated torsion system. This lightweight system provides driver comfort and is ideal for a variety of applications including on-highway line and bulk haul operations. Utilizing a system approach, Hendrickson has engineered and optimized the following components to form a system delivering superior ride, stability and handling characteristics with reduced weight and maintenance.

**Air Springs** — Exclusive to Hendrickson, the lightweight air springs deliver an extremely soft ride. The air springs are engineered to support 50% of the vertical load while providing very low spring rate. The quick “snap” design and “push-to-connect” air supply design also provide fast and easy installation and removal.

**Leaf Spring Assembly** — With its innovative design, the leaf spring provides superior stability, performance and a soft ride. The patented leaf spring shares loads equally with the air spring. Durable rubber front and patented rear bushings are greaseless and only require periodic inspections.

**Shock Absorbers** — AIRTEK utilizes premium shocks that have been tested and tuned specifically for the AIRTEK system.

**Front and Rear Frame Brackets** — Optimized designs deliver weight reduction and proven durability.

**STEERTEK NXT** — Integrated into the AIRTEK system, the box-shaped design provides a stiffer axle and resists torsional, longitudinal and vertical loads more effectively than traditional I-Beam axles. Together with the front limbs of the leaf springs, the fabricated axle beam forms a torsion system, enhancing roll stability characteristics and improving handling.

**Axle Clamp Group** — The Clamp Group consists of the top pad, ¾” hex bolts, washers, and nylon locknuts

**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 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.

**Mechanical Spring Options** — The STEERTEK NXT axle is also available with existing Freightliner mechanical suspensions, see vehicle manufacturer for details.
TECHNICAL NOTES

1. AIRTEK is approved for 100% on-highway use with up to 10% off-highway uses; other applications that exceed 10% off-highway use must be pre-approved by Hendrickson. This system has a 12,000/12,500 pound capacity. System capacity represents maximum loads on tires at ground level.

2. The STEERTEK NXT axle is available with 69.0" or 70.97" kingpin intersections (KPI).

3. The STEERTEK NXT axle offers 4.25" and 5.36" axle beam drop heights. Axle beam drop is measured from the kingpin intersection to the top of the axle.

4. AIRTEK is available exclusively with the STEERTEK NXT axle. This system is anti-lock braking system (ABS) ready. STEERTEK NXT is compatible with most industry standard wheel ends and brakes, contact OEM for more information.

FIGURE 2-3 Front view of the axle showing approximate location of product identification.
SECTION 3
Important Safety Notice

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

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

Failure to follow the safety precautions in this manual can result in personal injury and/or property damage. Carefully read and understand all safety related information within this publication, on all decals and in 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.

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 that 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 Torque Specifications Section of this publication.
SAFETY PRECAUTIONS

FASTENERS
WARNING
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, 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 REGULARLY CALIBRATED TORQUE WRENCH. TORQUE VALUES SPECIFIED IN THIS TECHNICAL PUBLICATION ARE FOR HENDRICKSON SUPPLIED FASTENERS ONLY. IF NON HENDRICKSON FASTENERS ARE USED, FOLLOW TORQUE SPECIFICATION LISTED IN THE VEHICLE MANUFACTURER’S SERVICE MANUAL.

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

WHEN SERVICING THE VEHICLE OR ATTACHING AN AIR SPRING, PRIOR TO AIRING UP THE SUSPENSION SYSTEM, MAKE CERTAIN THE AIR SPRING LOCATOR IS INDEXED INTO THE UPPER AIR SPRING BRACKET PROPERLY. THE LOCK TABS ARE SNAPPED INTO PLACE, AND THE AIR SPRING IS FULLY SEATED ON THE AIR SPRING 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.

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

SHOCK ABSORBERS
WARNING
THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE AIR SPRINGS. ANYTIME THE FRONT AXLE ON AN AIRTEK 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.

REPAIR AND RECONDITIONING
WARNING
THE REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS IS NOT ALLOWED, SEE LABEL IN FIGURE 3-1. ANY SUSPENSION OR AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS 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, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.
**WARNING**

**AXLE CAMBER**

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.

Axle camber is not adjustable. Do not change the axle camber angle or bend the axle beam, see Figure 3-1. Bending the axle beam to change the camber angle can damage the axle and reduce axle strength, will void Hendrickson’s warranty and can cause loss of vehicle control, possibly causing personal injury or property damage.

**WARNING**

**AXLE KINGPINS**

SteerTek NXT / SteerTek 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.

**DANGER**

**STEERTEK NXT 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.

**FIGURE 3-1** Replace any safety decals that are faded, torn, missing, illegible, or otherwise damaged. Contact Hendrickson to order replacement labels.

---

**Vehicles built with STEERTEK NXT axle after November 2011**

![Image of axle with safety decals]

**Vehicles built with STEERTEK axle prior to November 2011**

![Image of axle with safety decals]
**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 SPRING SEATS. REFER TO VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS.

**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 SUCH ADJACENT PARTS AND 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**

**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**

**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 TOW STRAPS ARE NECESSARY TO TOW A DISABLED VEHICLE INTO 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 TOW STRAPS MAY BE WRAPPED AROUND THE FRONT STEERTEK NXT / STEERTEK 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 STEERTEK NXT / STEERTEK AXLE TO TOW THE VEHICLE, DOING SO WILL DAMAGE THE AXLE AND VOID ANY APPLICABLE WARRANTY, (SEE FIGURE 3-2). FOR DETAILED INSTRUCTIONS FOR ON-HIGHWAY TOWING, SEE TOWING PROCEDURE SECTION IN THIS PUBLICATION.

**FIGURE 3-2**

**OFF ROADWAY TOWING**

<table>
<thead>
<tr>
<th>ACCEPTABLE</th>
<th>UNACCEPTABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO USE Nylon Straps</td>
<td>DO NOT Use Chains</td>
</tr>
</tbody>
</table>
PERSONNEL PROTECTIVE EQUIPMENT
ALWAYS WEAR PROPER EYE PROTECTION AND OTHER REQUIRED PERSONAL PROTECTIVE EQUIPMENT TO HELP PREVENT PERSONAL INJURY WHEN YOU PERFORM VEHICLE MAINTENANCE, REPAIR OR SERVICE.

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

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 SPRING ASSEMBLY AND AXLE. DO NOT CONNECT ARC WELDING GROUND LINE TO THE SPRING ASSEMBLY OR AXLE. DO NOT STRIKE AN ARC WITH THE ELECTRODE ON THE SPRING ASSEMBLY OR AXLE. DO NOT USE HEAT NEAR THE SPRING ASSEMBLY OR AXLE. DO NOT NICK OR GOUGE THE SPRING ASSEMBLY OR AXLE. SUCH IMPROPER ACTIONS CAN CAUSE DAMAGE TO THE SPRING ASSEMBLY OR THE AXLE COULD FAIL, AND CAN CAUSE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

SUPPORT THE VEHICLE PRIOR TO SERVICING
PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO HELP PREVENT THE VEHICLE FROM MOVING. NEVER WORK UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH SAFETY STANDS. BLOCK THE WHEELS AND MAKE SURE THE UNIT WILL NOT ROLL BEFORE RELEASING BRAKES. A JACK CAN SLIP OR FALL OVER. SERIOUS PERSONAL INJURY CAN RESULT.

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 PROCEDURES:
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. 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.
SECTION 4
Parts Lists

AIRTEK for Freightliner — Vehicles built with STEERTEK NXT axle after November 2011
Models Cascadia, Coronado
<table>
<thead>
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<th>KEY NO.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>NO.REQ.</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>69116-002</td>
<td>Air Spring</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>60850-001</td>
<td>LH Air Spring Bracket</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>60850-002</td>
<td>RH Air Spring Bracket</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>59427-019</td>
<td>LH HCV &amp; Linkage Assembly</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>59427-034</td>
<td>RH HCV &amp; Linkage Assembly</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>59427-036</td>
<td>Includes Key Nos. 6-12a, 13</td>
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<td>7</td>
<td>59933-013</td>
<td>LH Height Control Valve</td>
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<td>59933-024</td>
<td>RH Height Control Valve</td>
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<tr>
<td>32</td>
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</tr>
</tbody>
</table>

**Tie Rod Assembly, Includes Key Nos. 53-55**
- 4.25" Drop, 200 Ackermann
- 4.25" Drop, 250 Ackermann
- 4.25" Drop, 300 Ackermann
- 4.25" Drop, 350 Ackermann
- 4.25" Drop, 400 Ackermann

**LH Tie Rod End Service Kit**
- 60961-025 | 4.25" Drop, Includes Key Nos. 54a, 56-57 |
- 60961-137 | 5.36" Drop, Includes Key Nos. 54b, 56-57 |

**RH Tie Rod End Service Kit**
- 60961-026 | 4.25" Drop, Includes Key Nos. 55a, 56-57 |
- 60961-138 | 5.36" Drop, Includes Key Nos. 55b, 56-57 |

**Tie Rod End Service Kit, One Side**
- 60961-069 | Stop Bolt Service Kit, One Side, Includes Key Nos. 58-59 |
- 60961-070 | Top Pad |
- 60961-071 | Dowel Pin, ½" Diameter, See table 1 on page 1/2 |
- 60961-072 | Front Axle Spacer, See table 1 on page 24 |

**RH Kingpin Bushing w/Roller Thrust Bearing Service Kit**
- 60961-630 | Includes Key Nos. 44-48, 50 & Loctite |

**RH Composite Thrust Bearing Service Kit**
- 60961-632 | Includes Key Nos. 48-49, 51 & Loctite |

**RH Roller Thrust Bearing Service Kit**
- 60961-633 | Includes Key Nos. 48, 50-51 & Loctite |

**RH Roller Thrust Bearing Service Kit**
- 60961-634 | Includes Key Nos. 48-49, 51 & Loctite |

**Tie Rod End Service Kit, Axle Set**
- 60961-010 | 4.25" Drop, Includes Kits Nos. 60961-025 & -026 |
- 60961-139 | 5.36" Drop, Includes Kits Nos. 60961-137 & -138 |

**LH Composite Thrust Bearing Service Kit**
- 60961-631 | Thrust Bearing Service Kit, Axle Set, Includes Kit Nos. 60961-632 & -630 |

**STEERTEK NXT**
- RH Roller Thrust Bearing Service Kit,
- LH Roller Thrust Bearing Service Kit,
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Vehicles built with STEERTEK NXT axle after November 2011
Model 4900 SA
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**Airtek® for Freightliner** — Vehicles built between 5/10 and 11/11
AIRTEK® for Western Star

Vehicles built with STEERTEK axle between June 2010 and November 2011
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SINGLE TO DUAL HEIGHT CONTROL VALVE CONVERSION KITS

Freightliner Vehicles built prior to May 2010 • Sterling Vehicles built prior to April 2009

Kit No. | Vehicle | EPA | Ride Height |
--- | --- | --- | --- |
58525-029 | • Columbia<br>• Century Class S/T<br>• LC Sterling (Set back) | 98/04 | 280 mm/315 mm |
58525-031 | • Columbia<br>• Century Class S/T<br>• LC Sterling (Set back) | 98/04 | 355 mm |
58525-033 | • Classic XL (Set Forward) | 98/04/07 | 355 mm |
58525-034 | • Columbia<br>• Century Class S/T<br>• LC Sterling (Set back)<br>• Cascadia | 07 | 355 mm |
58525-036 | • Classic XL (Set Forward) | 98/04/07 | 315 mm |
58525-037 | • Columbia<br>• Century Class S/T<br>• LC Sterling (Set back)<br>• Cascadia | 07 | 315 mm |

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.
### STEERTEK for Mechanical Suspension

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<td>&quot;½&quot; Socket head cap screw</td>
<td>4</td>
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<td>60937-000</td>
<td></td>
<td>Loctite® (Red) Compound Tube</td>
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### Tie Rod Assembly, 12K

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<th>KEY NO.</th>
<th>PART NO.</th>
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<th>NO.REQ.</th>
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<tr>
<td>60239-002</td>
<td></td>
<td>200 Ackermann, 70.9 KPI</td>
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<td>60239-003</td>
<td></td>
<td>250 Ackermann, 70.9 KPI</td>
<td>1</td>
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<tr>
<td>60239-004</td>
<td></td>
<td>150 Ackermann, 69 KPI</td>
<td>1</td>
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<td>60239-005</td>
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<td>200 Ackermann, 69 KPI</td>
<td>1</td>
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<tr>
<td>60239-006</td>
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<td>66699-001</td>
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<td>66699-002</td>
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<td>250 Ackermann, 69 KPI, Replaces 59948-003</td>
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<td>66699-003</td>
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<td>150, 200 Ackermann, 69 KPI, Replaces 59948-004, 59948-005</td>
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<tr>
<td>60961-010</td>
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<td>LH Tie Rod End Service Kit, Includes Key Nos. 16, 18-19</td>
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<td>60961-025</td>
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<td>4.25 Drop, Replaces 60961-083 &amp; -085</td>
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<td>60961-026</td>
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<td>LH Tie Rod End Service Kit, Includes Key Nos. 16-17</td>
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<td>60961-084</td>
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<td>4.25 Drop, Replaces 60961-084 &amp; -086</td>
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<td>60961-030</td>
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<td>5.36 Drop, Replaces 60961-030</td>
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<td>64000-001</td>
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<td>LH Tie Rod End</td>
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</tr>
<tr>
<td>64665-000</td>
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<td>4.25 Drop, Replaces 60400-001</td>
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<td>60961-009</td>
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<td>RH Tie Rod End</td>
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<td>4.25 Drop</td>
<td>1</td>
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<td>60961-043</td>
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<td>5.36 Drop, Replaces 60400-002</td>
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<td>4.25 Drop</td>
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<tr>
<td>60961-043</td>
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<td>½&quot; Flat Washer</td>
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</tr>
<tr>
<td>60961-044</td>
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<td>¼&quot; UNC Square Head Bolt</td>
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<td>60961-045</td>
<td></td>
<td>½&quot; UNC Hex Jam Nut</td>
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</tr>
<tr>
<td>60961-046</td>
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<td>Top Axle Wrap CST/Columbia 69 KPI, Coronado (WS) 70.9 KPI, Replaces 59952-003</td>
<td>2</td>
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<tr>
<td>59952-003</td>
<td></td>
<td>4.25 Drop, 315 mm Ride Ht., 5.36 Drop, 260 mm/280 mm Ride Ht.</td>
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<tr>
<td>59952-004</td>
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<td>4.25 Drop, 355 mm Ride Ht., 5.36 Drop, 315 mm Ride Ht., Replaces 59952-005, 59952-006</td>
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<td>Top Axle Wrap Liner</td>
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<td>Bottom Axle Wrap Liner</td>
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<td>59944-001</td>
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<td>Shock Absorber</td>
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</tr>
<tr>
<td>59423-002</td>
<td></td>
<td>Shock Bracket</td>
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<tr>
<td>59944-000</td>
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<td>Shock Spacer</td>
<td>2</td>
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</table>
### TABLE 1

**Freightliner • Western Star** – Vehicles built AFTER November 2011

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Axle Drop</th>
<th>Ride Height</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>LH Upper Steering Knuckle Assembly</td>
</tr>
<tr>
<td><strong>SET BACK</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Freightliner</strong></td>
<td>4.25&quot;</td>
<td>315 mm</td>
<td>60903-435</td>
</tr>
<tr>
<td>CASCADIA</td>
<td></td>
<td>355 mm</td>
<td>60903-436</td>
</tr>
<tr>
<td></td>
<td>5.36&quot;</td>
<td>280 mm</td>
<td>60903-434</td>
</tr>
<tr>
<td></td>
<td></td>
<td>315 mm</td>
<td>60903-435</td>
</tr>
<tr>
<td><strong>Western Star</strong></td>
<td>4.25&quot;</td>
<td>315 mm</td>
<td>60903-435</td>
</tr>
<tr>
<td>4900 SA</td>
<td></td>
<td>355 mm</td>
<td>60903-436</td>
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<tr>
<td></td>
<td></td>
<td>385 mm</td>
<td>60903-436</td>
</tr>
<tr>
<td><strong>SET FORWARD</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Freightliner</strong></td>
<td>4.25&quot;</td>
<td>315 mm</td>
<td>60903-438</td>
</tr>
<tr>
<td>CORONADO</td>
<td></td>
<td>355 mm</td>
<td>60903-439</td>
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<tr>
<td><strong>Western Star</strong></td>
<td>4.25&quot;</td>
<td>315 mm</td>
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<td>4900 SA</td>
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<td></td>
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<td>385 mm</td>
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### TABLE 2

**Freightliner** – Vehicles built between May 2010 and November 2011

**Western Star** – Vehicles built between June 2010 November 2011

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Axle Drop</th>
<th>Ride Height</th>
<th>PART NUMBER</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>LH Upper Steering Knuckle Assembly</td>
</tr>
<tr>
<td><strong>SET BACK</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Freightliner</strong>/Western Star</td>
<td>4.25&quot;</td>
<td>315 mm / 7.31&quot;</td>
<td>60903-035</td>
</tr>
<tr>
<td></td>
<td></td>
<td>355 mm / 8.81&quot;</td>
<td>60903-036</td>
</tr>
<tr>
<td><strong>Western Star</strong></td>
<td>4.25&quot;</td>
<td>385 mm / 10.06&quot;</td>
<td>60903-036</td>
</tr>
<tr>
<td><strong>Freightliner</strong></td>
<td>5.36&quot;</td>
<td>280 mm</td>
<td>60903-034</td>
</tr>
<tr>
<td></td>
<td></td>
<td>315 mm</td>
<td>60903-035</td>
</tr>
<tr>
<td><strong>SET FORWARD</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Freightliner</strong>/Western Star</td>
<td>4.25&quot;</td>
<td>315 mm / 7.31&quot;</td>
<td>60903-038</td>
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<tr>
<td></td>
<td></td>
<td>355 mm / 8.81&quot;</td>
<td>60903-039</td>
</tr>
<tr>
<td><strong>Western Star</strong></td>
<td>4.25&quot;</td>
<td>385 mm / 10.06&quot;</td>
<td>60903-039</td>
</tr>
</tbody>
</table>
NOTES:

* Not supplied by Hendrickson, used for reference only. Refer to OEM (vehicle manufacturer) for more information.
** Item included in assembly only, part not sold separately.
*** All new replacement STEERTEK axles and upper steering knuckle components for Freightliner, Sterling and Western Star Vehicles will incorporate 
  5/8" fine threaded holes for brake spider mounting bolts. Vehicles built prior to 6/28/2004 that are receiving a replacement of the STEERTEK axle or 
  upper knuckle will require — a change from coarse thread brake spider mounting bolts to fine thread brake spider mounting bolts. The brake spider 
  mounting bolts are supplied separately by Freightliner, Sterling and Western Star, refer to vehicle manufacturer for bolt dimensions and torque 
  specifications. Hendrickson will not be responsible for any damage to the STEERTEK upper knuckle components resulting from using the improper 
  brake spider mounting bolts.
**** Hendrickson supplies different tie rod assemblies and each type may take a different replacement tie rod end kit to service. Prior to ordering 
  find the part number on the tie rod tube, see Literature No. SEU-0223 or contact Hendrickson Parts (email: truckparts@hendrickson-intl.com) for 
  corresponding kit numbers.

Hendrickson AIRTEK Ride Height Gauge for Freightliner and Western Star Vehicles can be obtained on-line at 
http://72.3.226.140/literature/litform-new.asp
  • Literature number 45745-159
SECTION 5
Special Tools

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

KINGPIN BUSHING TOOLS

ADJUSTABLE STRAIGHT FLUTE REAMER

Adjustable Straight Flute Reamer

The dimension of cutting diameter must facilitate a range of 1.802" – 1.812"
STEEL LEAF SPRING EYE BUSHING TOOLS

Leaf Spring Driver
For Installation and Removal

Leaf Spring Receiver

Dimensions:
- Leaf Spring Driver: 1.50" x 0.75" x 5.60" x 2.00"
- Leaf Spring Receiver: 4.00" x 4.25" x Ø 2.50"
SECTION 6
Towing Procedure

ON-HIGHWAY AND ON-ROADWAY
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** — Towing the vehicle from the rear
- **METHOD 3** — Conventional axle fork
- **METHOD 4** — Spring eye and hanger lift method (may require the removal of fairings)

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.

Please contact Hendrickson Tech Services at 866-755-5968 or send e-mail to: techservices@hendrickson-intl.com with any questions regarding proper towing procedures for vehicles equipped with a STEERTEK NXT / STEERTEK axle.

**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 — TOWING VEHICLE FROM THE REAR**
This method is preferred when the proper equipment is not available to perform the wheel lift method and is necessary for wreckers not equipped with an under lift system.
METHOD 3 — AXLE FORK LIFT

This is an alternative method for towing the vehicle, but requires standard tow forks and designated lift points depending on which front axle is equipped on the vehicle, STEERTEK NXT or STEERTEK.

NOTE

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

- Place a spacer on the boom, to provide adequate clearance between the oil pan and the boom if necessary. Lift the vehicle in order to place spacer under tires. This will provide sufficient room under the axle to locate forks in the proper position.
- It is recommended to maintain the air in the air springs (if equipped) to help prevent damage to the air spring bump stop while towing the vehicle. An alternative air source may be necessary if the engine or compressor will not function. If the air spring is punctured, tow the steer axle suspension with the air springs deflated.
- Release the tractor brakes.
- Install 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 EQUIPPED (vehicles built after November 2011)

1. Use a Miller Short Frame Fork, Part No. 0200019, or comparable (3.25" Clearance), 4.5" Opening, 2" Shank, see Figure 6-2.
2. Install the fork in the boom properly.
3. The proper tow fork location is centered between the locknuts on the axle spring seats, see Figure 6-3.

STEERTEK EQUIPPED (Vehicles built prior to November 2011)

1. Install the fork in the boom properly.
2. Position the proper tow forks directly under the axle, inside the axle clamp groups as shown in Figures 6-4 and 6-5.
3. 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. Lift vehicle and secure the vehicle to the boom.

**FIGURE 6-6**

**METHOD 4 — SPRING EYE AND HANGER LIFT METHOD**

This method is permitted for under lift equipped units, caution must be taken as not to damage leaf spring, see Figure 6-7 for proper installation.

- Inspect ends of spring cradles for burrs or sharp edges that could damage spring.
- When securing the vehicle to the boom, it is preferred to use nylon safety straps. Chains have a tendency to bind and may cause damage to the axle.

**NOTE**

When lifting a vehicle with the under lift boom, see Figures 6-7 and 6-8, care must be taken as not to damage the engine oil pan. It may be necessary to remove the front fairing. If necessary place a block of wood between the top of the boom and the bottom of the axle.

**FIGURE 6-7**
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 6-9) IN A MANNER THAT IS ACCEPTABLE FOR TOWING THE VEHICLE FROM A REPAIR FACILITY PARKING LOT INTO THE SHOP BAY. DO NOT USE A TOW CHAIN AROUND THE FRONT AXLE OR WITH A SINGLE POINT LOCATION TO TOW THE VEHICLE. DOING SO WILL DAMAGE THE AXLE AND VOID ANY APPLICABLE WARRANTY, SEE FIGURE 6-9.

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

FIGURE 6-8

FIGURE 6-9

OFF-ROADWAY TOWING

Acceptable
- Do use nylon straps

Unacceptable
- Do not use chains
SECTION 7
Preventive Maintenance

The AIRTEK system installed on STEERTEK NXT / STEERTEK axle are low maintenance systems. Following appropriate inspection procedure is important to help ensure the proper maintenance and operation of the AIRTEK suspension system and component parts function to their highest efficiency.

HENDRICKSON RECOMMENDED PREVENTIVE MAINTENANCE INTERVALS

VISUAL INSPECTION

- The first 1,000 miles
- On-highway – every 50,000 miles (80,450 km) or 6 months, whichever comes first

COMPONENT INSPECTION

- Air Spring (if equipped) — Look for chaffing or any signs of spring or component damage.
- Clamp group — Check torque on clamp group mounting hardware. Refer to Torque Specifications Section of this publication.
- Fasteners — Look for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to the specified torque. See Torque Specification Section of this publication for recommended torque requirements. 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.
- Front and rear spring hangers — Check for cracks or loose mounting hardware. Replace if necessary, see Component Replacement Section of this publication for replacement procedure.
- Steering operation — All steering components on the axle assembly must move freely through the full range of motion from axle stop to axle stop.
- Rear spring mount — Check for proper alignment with spring taper and check for proper torque on rear spring mount fasteners. See Torque Specification Section of this publication for recommended torque requirements.
- Shackle bracket — Look for any signs of excessive wear to shackle and shackle bracket.
- Shock absorber — Look for any signs of dents or leakage, misting is not considered a leak. See Shock Absorber Inspection in this section.
- Steel leaf springs — Look for cracks. Replace if cracked or broken. Check the front and rear bushings for any wear or deterioration. Replace spring assembly if any of the previous conditions are observed. See Component Replacement Section of this publication for replacement procedure.
- Steering pivot points — Check for looseness at all pivot points on the axle assembly. Lubricate all pivot points, maximum interval is 25,000 miles. Refer to the Lubrication matrix in this section.
- STEERTEK NXT / STEERTEK axle — The axle should be free of any nicks or gouges. Inspect for any cracks or dents on axle.
- Thrust washers and rear hanger clamp — Look for any signs of excessive wear to the thrust washers and rear hanger clamp. See Thrust Washer Inspection detailed in this section.
- Tire wear — Inspect tires for wear patterns that may indicate suspension damage or misalignment. See Tire Inspection in this section.
- Top and bottom axle wrap liners (If equipped) — Look for any cracking or broken pieces on liner in load bearing areas. See Axle Wrap Liner Inspection in this section.
- **Top pad** — Look for cracks. Replace if necessary, see the Component Replacement Section of this publication for replacement procedure.
- **Wear and damage** — Inspect all parts of suspension for wear and damage. Look for bent or cracked parts. Replace all worn or damaged parts.

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

**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 chart below.

**NOTE**

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

### STEERTEK GREASING AND LUBRICATION SPECIFICATIONS

<table>
<thead>
<tr>
<th>Component</th>
<th>Greasing Interval</th>
<th>Grease</th>
<th>NLGI Grade</th>
<th>Outside Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingpin Bushings</td>
<td>Maximum of 25,000 miles (40,225 kilometers) or 90 days, whichever comes first.</td>
<td>Multipurpose Grease</td>
<td>2</td>
<td>Refer to the lubricant manufacturer’s specifications for the temperature service limits applicable to your area.</td>
</tr>
<tr>
<td>Tie Rod Ends</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drag Link</td>
<td></td>
<td></td>
<td></td>
<td>See Vehicle Manufacturer</td>
</tr>
</tbody>
</table>

**NOTE:** Lubrication greases acceptable for use on the STEERTEK axle will carry a designation of NLGI #2 EP and rated GC-LB or equivalent.

### KINGPIN LUBRICATION

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

**STEERTEK** kingpin grease zerks are located on the top and bottom of the kingpin grease caps.
1. Place vehicle on the ground.
2. Prior to greasing the kingpins on the vehicle, the suspension must be in a loaded condition.
3. Clean off all the grease zerks and grease gun tip with a clean shop towel prior to lubrication.
4. Lubricate the kingpins through the grease zerk on the top and bottom of the steering knuckle, see Lubrication Specification chart above.
5. Force the required lubricant into the upper and lower kingpin grease zerk, until new lubricant flows out from the upper kingpin connection and steering knuckle and the thrust bearing purge location, see Figures 7-2 and 7-3.

NOTE

Greasing at the lower fitting should purge grease from the thrust bearing shell. The left side of the axle has a composite style thrust bearing and the right side of the axle has a steel roller thrust bearing, see Figure 7-4. Both purge in the same area.

TIE ROD END LUBRICATION

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

EXCEEDING THE MAXIMUM AIR PRESSURE TO THE GREASE ZERKS CAN CAUSE DAMAGE TO THE DUST BOOT AND COMPONENT FAILURE.

5. Dirt, water, and discolored old grease should flow from the relief vents or purge holes near the boot crimp or bellows area, see Figure 7-5. Continue to purge grease until fresh grease flows from the purge area.
6. If the tie rod end is designed for lube service and it 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
   e. If the tie rod end will not accept grease following this procedure it will be necessary to replace the tie rod end, see Tie Rod End replacement in the Component Replacement Section of this publication
7. Apply grease until all the old grease is purged from the boot.
TIE ROD END INSPECTION

INSPECTION PROCEDURE

Before beginning this inspection procedure, the entire system must be unloaded (i.e., the front end of the vehicle must be raised and supported with 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. Block rear wheels of vehicle. Using the bottom of the axle beam or the frame rails, raise the front end off the ground and support with stands.

2. With the engine off, turn the wheels from full left to full right and then return to the straight-ahead position.

3. Check that the boots are in place and completely installed over the tie rod ends.

4. Check for cracking or tears in the boots. Also check the boot seals for damage. Replace the entire tie rod end if the boot is damaged.

WARNING

THE CORRECT COTTER PIN MUST BE INSTALLED 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 ADVERSELY AFFECT VEHICLE STEERING AND POSSIBLY RESULT IN TOTAL LOSS OF STEERING CONTROL.

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

6. Verify the 5/8" 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.

7. 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.

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

9. 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.

10. 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 152.4mm). Apply hand pressure with reasonable human effort vertically up and down in a push-pull motion several times (using approx. 50-100 pounds of force). Check for any movement or looseness at both tie rod end locations, see Figure 7-8.
11. If there is any movement in the tie rod assembly, install a magnetic based dial indicator on the Ackermann arm, see Figure 7-9.

12. Set the dial indicator to zero.

13. Apply hand pressure with reasonable human effort vertically up and down in a push-pull motion several times (using approximately 50-100 pounds of force). Observe the reading on the dial indicator.

14. If the reading is more than 0.060", replace both tie rod ends at the next service interval.

15. 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 1⁄8" (3mm) measured with hand pressure only. (393.209(d)), (published in the North American Standard Out-of-Service Criteria Handbook, April 1, 2006.)

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**CLAMP GROUP RE-TORQUE INTERVAL**

**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.

2. Clamp group locknuts must be re-torqued at 1,000 miles.

3. Thereafter follow the 6 month/50,000 mile inspection and annual re-torque interval.

4. **STEERTEK NXT Axle** – Ensure that the clamp group is properly aligned and the Hex Bolts are seated in the top pad, and the top pad is centered on the axle spring seat, see Figure 7-10.

   **STEERTEK Axle** – 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 7-11.
5. Check for signs of component or bolt movement.

6. If signs of movement are present, disassemble the clamp group fasteners, check for component wear or damage and replace as necessary. Install new clamp group fasteners and repeat Steps 1 through 5.

7. Tighten the clamp group locknuts evenly in 50 foot pounds increments in the proper pattern to achieve uniform bolt tension, see Figure 7-12.

   - **STEERTEK NXT Axle** – Refer to vehicle manufacturer’s torque specifications.
   - **STEERTEK Axle** – Tighten to 285-305 foot pounds torque

**TIRE INSPECTION**

The leading potential causes of tire wear according to TMC (The Technology & Maintenance Council) are the following in order of importance:

1. Tire Pressure
2. Toe Setting
3. Thrust Angle
4. Camber

The following tire inspection guidelines are based upon TMC recommended practices. Any issues regarding irregular tire wear where Hendrickson is asked for assistance, will require tire and alignment maintenance records as described in the TMC literature number RP 642 or TMC "Guidelines for Total Vehicle Alignment" publication.

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 are:

- Overall Fast Wear (miles per 32nd)
- Feather Wear
- Cupping
- Diagonal Wear
- Rapid Shoulder Wear (one shoulder only)
- One-Sided Wear
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. For more information, see TMC RP 219A publication, page 11. For information on how to accurately measure and record tire rates, see TMC RP 230 publication.

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, 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. Typical causes of feather wear include: excessive side force scrubbing, resulting from conditions of misalignment such as excessive toe, drive axle misalignment, worn, missing or damaged suspension components, bent tie rods or other chassis misalignment.

To correct this problem, tires can be rotated to another axle for maximum utilization of remaining tread. Additionally, diagnose the vehicle itself and correct misalignment condition as required. If steer tire feathers are in opposite directions, an improper toe condition is most likely the cause. For more information, see TMC RP 219A publication, page 5.

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.

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. See TMC RP 219A publication, page 7.

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

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.
Diagonal Wear — Can be described as localized flat spots worn diagonally across the tread at approximately 25-35° angles, often repeating around the tread circumference. For more information, see TMC RP 219A publication, page 20.

Diagonal wear is usually caused by bad wheel bearings, toe-out, mis-moungting 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. If the source of trouble is the vehicle, diagnose cause and correct as needed.

Rapid Shoulder Wear (One Shoulder Only) — Is defined as a tire worn on the edge of one shoulder, sometimes extending to inner ribs. It can progress to diagonal wipeout. For more information, see TMC RP 219A publication, page 22.

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.

One-sided wear—Is excessive wear on one side of tire extending from the shoulder towards the center of the tread. For more information, see TMC RP 219A, page 26.

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

**SHOCK ABSORBER INSPECTION**

Hendrickson uses a long service life, premium shock absorber on all AIRTEK suspensions. When the 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.

Inspection of the shock absorber can be performed by doing a heat test, and a visual inspection. For instructions on shock absorber replacement see the Component Replacement Section of this publication. It is not necessary to replace shock absorbers in pairs if one shock absorber requires replacement.
HEAT TEST
1. Drive the vehicle at moderate speeds on rough road for minimum of fifteen minutes.

DO NOT GRAB THE SHOCK AS IT COULD POSSIBLY CAUSE PERSONAL INJURY.

2. Lightly touch the shock body carefully below the dust cover, see Figure 7-19.

3. Touch the frame to get an ambient reference. A warm shock absorber is acceptable, a cold shock absorber should be replaced.

4. To inspect for an internal failure, remove and shake the suspected shock. Listen for the sound of metal parts rattling inside. Rattling of metal parts can indicate that the shock has an internal failure.

VISUAL INSPECTION
Look for these potential problems when doing a visual inspection. Inspect the shock absorbers fully extended. Replace as necessary.

LEAKING VS. MISTING SHOCK VISUAL INSPECTION
The inspection must not be conducted after driving in wet weather or a vehicle wash. Shocks needs to be free from water. Many shocks are often misdiagnosed as failures. Misting is the process whereby very small amounts of shock fluid evaporate at a high operating temperature through the upper seal of the shock. When the "mist" reaches the cooler outside air, it condenses and forms a film on the outside of the shock body. Misting is perfectly normal and necessary function of the shock. The fluid which evaporates through the seal area helps to lubricate and prolong the life of the seal.
A shock that is truly leaking and needs to be replaced will show signs of fluid leaking in streams from the upper seal. These streams can easily be seen when the shock is fully extended, underneath the main body (dust cover) of the shock. Look for these potential problems when doing a visual inspection. Inspect the shock absorbers fully extended. Replace as necessary.

**NOTE**

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

If the shock is damaged install new shock absorber as detailed in the Component Replacement Section of this publication.

**THRUST WASHER INSPECTION (If equipped)**

- **Freightliner** vehicles built prior to 05/2010
- **Western Star** vehicles built prior to 06/2010
- **Sterling** vehicles built prior to 04/2009

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:

1. Excessive lateral movement of the leaf spring.
2. The leaf spring taper is making contact with the rear hanger clamp or the rear hanger.
3. The location to measure the thrust washer thickness is shown in Figure 7-22. Thickness can be measured with a micrometer or a ruler.

   - The **normal** thickness of a new thrust washer is $\frac{7}{32}$" (0.22") or 5.6 mm
   - The **minimum** thickness allowable for a thrust washer is $\frac{3}{32}$" (0.090") or 2.3 mm

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

If one thrust washer is worn out, Hendrickson recommends both thrust washers on that side of the suspension be replaced. The rear hanger clamp should also be replaced with the thrust washers. Inspect the thrust washers on the other side of the vehicle and replace if necessary, see Thrust Washer replacement procedure in the Component Replacement Section of this publication.
KINGPIN BUSHING INSPECTION

INSPECTION PROCEDURE

1. Chock the wheels to help prevent the vehicle from moving. Set the parking brake.
2. Use a jack to raise the vehicle until the wheels are off the ground. Support the vehicle with safety stands.
3. **CHECKING THE UPPER KINGPIN BUSHING.** Install a dial indicator so that the base is onto the axle beam and the indicator tip is on the side of steering knuckle, see Figure 7-23.
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 7-25.

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 bushings. Refer to the Kingpin Bushing replacement procedure in the Component Replacement Section of this publication.

7. **CHECKING 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 7-24.
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 Component Replacement Section of this publication.

**NOTE**
If one bushing is worn or damaged, it is mandatory to replace both the top and bottom bushings on that knuckle assembly.
STEERING KNUCKLE INSPECTION

CHECKING VERTICAL END PLAY (UP AND DOWN MOVEMENT)
The operating spec for vertical clearance on the steering knuckle is 0.008" to 0.030".

1. Chock the rear tires to help prevent the vehicle from moving.
2. Set the parking brakes.
3. Use a jack to raise the vehicle until both tires are 1" off the ground.

4. 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 7-26.
   c. Place the tip of the dial indicator on the top of the upper steering knuckle (not on the grease cap).
5. Set the dial indicator to "0" (zero).
6. Lower the jack.
7. If vertical end play is greater than 0.030", or below 0.008" an adjustment of the upper knuckle is necessary.

ADJUSTMENT

STEERTEK NXT axle (after November 2011)
1. ■ 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.
   ■ If the vertical end play is 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.
2. Retighten the socket head cap screws to 190 ± 10 foot pounds (258 ± 14 Nm) torque.

NOTE

ONLY if the vehicle is built prior to November 2011 equipped with the STEERTEK axle can the vertical end play be further adjusted with a shim. The STEERTEK NXT axle does not use a shim.

STEERTEK axle (prior to November 2011)
3. ■ If 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 vertical end play specification.
   ■ If the vertical end play is less than 0.008", remove shims (Hendrickson part no. 60259-002) between the top of the axle and the bottom of the upper steering knuckle to obtain the proper vertical end play specification.
AXLE WRAP LINER INSPECTION (If equipped)

NOTE
Axle Wrap Liners are not equipped on vehicles built with STEERTEK NXT axle after November 2011.

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 that the axle wrap liner be replaced.
- Liner Crack Criteria:
  It is possible for the axle wrap liner to crack during service. If the liner is cracked and all the pieces are intact it is not necessary to replace the liner. If the liner is broken out and there are pieces missing the liner must be replaced immediately, see Figure 7-27. Refer to Axle Wrap replacement in the Component Replacement Section of this publication.
ALIGNMENT DEFINITIONS

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

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

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.

Caster — The forward or rearward tilt of the steering axle kingpin in reference to a vertical line. The angle is measured in degrees. Caster is positive when the top of the steering axis is tilted rearward and is negative when the tilt is forward. Proper caster is important for directional stability and returnability. Too much positive caster can cause shimmy, excessive steering effort and is normally a vehicle performance and handling consideration. Uneven positive caster may create a steering pull toward the side with the lower caster. This attribute may be used to compensate for crowned roads.
Kingpin Inclination — The inward tilt of the kingpin from the vertical. This front suspension parameter has a pronounced effect on steering effort and return-ability. As the front wheels are turned around an inclined kingpin, the front of the truck is lifted. This lifting of the vehicle is experienced as steering effort when the turn is executed and exhibits itself as recovery force when the steering wheel is released.

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

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

Scrub, Skew, Tram Angle or Parallelism — The angle formed by two thrust or tracking lines of a tandem (or multiple) axle vehicle. As indicated by the term "parallelism", the ideal condition is when the two thrust lines form a 0° angle, or are parallel to each other. Positive skew or tram is when the distance between the right axle ends is less than the distance between the left. Any scrub angle other than 0° will cause the tandem axles to work against each other. The steer axle must be turned to offset the "push" of the tandem axles to keep the vehicle moving straight ahead. This causes every tire on the vehicle to "scrub". Tire wear from tandem scrubbing occurs at the leading edge of the steer tires in a pattern called "inside/outside" wear, that is, the inside edge of the left steer tire and the outside edge of the right steer tire will exhibit irregular wear for example. Additional tire wear may occur on all tandem axle tires.

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

A steering correction is required to offset the effect of the thrust angles and keeps the vehicle traveling in a straight line. It results in a lateral offset between the steer and drive axle tires commonly referred to as "dog tracking."
Tie Rod Arm (Ackermann-Arm, Cross Tube Arm) — The component that transmits steering forces between left and right axle knuckle assemblies through the cross tube assembly.

**FIGURE 8-7**

**TOE-IN**

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 8-8**

**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 8-9**

**TOTAL TOE**

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

- The tires are inflated to the vehicle manufacturer’s specified tire pressure.
- The steer axle tires are the same size and type.
- The lug nuts are tightened to the vehicle manufacturer’s specified torque.
- The wheels are balanced and check for tire to rim runout.
- The wheels and tires are free of excessive wear and damage.
- Wheel bearing end play is within vehicle manufacturer’s specification.
FRONT SUSPENSION
Inspect the following:
- All fasteners are installed and tightened to the specified torque. See Torque Specification Section of this publication.
- Leaf springs are free of wear or damage.
- Air springs are free of wear or damage (if equipped).
- Shock absorbers are free of wear and damage.
- Vehicle ride height for both the front and rear are within specification. Follow the vehicle manufacturer's guidelines (if equipped).
- Front and rear spring mounts for wear or damage.

INSPECT TIE ROD ENDS
Perform the Tie Rod Inspection procedure, refer to the Preventive Maintenance Section of 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:
- Make sure the rear axle (especially a tandem axle) is correctly aligned. Refer to the procedure from the manufacturer of the vehicle or the suspension.
- All fasteners including U-bolts (if applicable) are installed and tightened to the specified torque.
- The leaf springs are not worn or damaged.
- The bushings in the leaf springs are not worn or damaged.
- The torque rods (if used) are correctly adjusted (if adjustable).
- The frame is not bent or twisted.
- Refer to any additional recommendations and specifications from the vehicle manufacturer on rear axles and suspensions. Reference the TMC (The Technology & Maintenance Council) Guidelines for Total Vehicle Alignment.

FRONT WHEEL ALIGNMENT
Hendrickson recommends technicians review The Technology & Maintenance Council’s publication (TMC) “Guidelines for Total Vehicle Alignment” (TMC RP 642).
Check total (front and rear) vehicle wheel alignment when any of the following occurs:
- Every 80,000 to 100,000 miles, or 12-18 months (normal maintenance).
- When the vehicle does not steer correctly.
- To correct a tire wear condition.

For rear wheel alignment specifications and adjustments refer to the vehicle manufacturer. The AIRTEK front wheel alignment specifications can be found in the 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 the minor front wheel alignment in the following sequence:
1. Inspect all systems that affect wheel alignment. Refer to "Inspection Prior to Alignment" in this section.
2. Check the wheel bearing endplay.
3. Check and adjust toe.
4. Check and adjust the vehicle ride height as specified in the Preventive Maintenance Section of this publication.

MAJOR FRONT WHEEL ALIGNMENT
Be certain to follow wheel alignment inspection intervals as specified by the original equipment manufacturer. Before performing a major front wheel alignment it is recommended that alignment equipment calibration be checked to ensure proper vehicle alignment.
Major wheel alignment is accomplished in the following sequence of operation:
5. Inspect all the systems that influence the wheel alignment. Refer to "Inspection Prior to Alignment" in this section.
6. Check and adjust the maximum turn angle, refer to "Steering Stop Adjustment Procedure" in this section, see Figures 8-10 and 8-11.
7. If the vehicle is equipped with power steering, check the pressure relief in the power steering system and reset if necessary. Refer to vehicle manufacturer regarding the subject: Adjusting the Pressure Relief in the Power Steering System.
8. Check the turning angle (toe-out during vehicle turns or the Ackermann angle). Refer to original equipment manufacturer specifications.
9. Check the kingpin (or steering axis) inclination. Refer to "Kingpin Inclination", under Alignment Definitions in this section.

AXLE CAMBER IS NOT ADJUSTABLE. DO NOT CHANGE THE AXLE CAMBER ANGLE OR BEND THE AXLE BEAM. BENDING THE AXLE BEAM TO CHANGE THE CAMBER ANGLE CAN DAMAGE THE AXLE AND REDUCE AXLE STRENGTH, AND WILL VOID HENDRICKSON’S WARRANTY. A BENT AXLE BEAM CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE, SEE FIGURE 8-12.

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

NOTE
Contact Hendrickson Tech Services for any questions regarding STEERTEK NXT integrated axle spring seats and / or fasteners.
FIGURE 8-12
Vehicles built with STEERTEK NXT axle after November 2011

10. Check the camber angle. DO NOT attempt to adjust. Refer to "Camber" under Alignment Definitions in this section.

SERVICE HINT
Prior to checking caster confirm that the vehicle is at its proper ride height front and rear. The front and rear ride height must be correct to achieve proper caster.

11. Check and adjust caster angle. Refer to "Caster" under Alignment Definitions in this section.

NOTE
The use of two 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.

12. Check and adjust toe-in, refer to adjusting the "Toe-In" under Alignment Definitions of this section.

SINGLE RIDE HEIGHT VERIFICATION

1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all the wheels positioned straight ahead. Try to roll to a stop without the brakes being used.

2. Chock drive wheels. DO NOT set parking brake.

DANGER
AIR SPRING ASSEMBLIES MUST BE DEFLATED PRIOR TO LOOSENING ANY CLAMP GROUP HARDWARE. UNRESTRICTED AIR SPRING ASSEMBLIES CAN VIOLENTLY SHIFT. DO NOT INFLATE AIR SPRING ASSEMBLIES WHEN THEY ARE UNRESTRICTED. AIR SPRING ASSEMBLIES MUST BE RESTRICTED BY SUSPENSION OR OTHER ADEQUATE STRUCTURE. DO NOT INFLATE BEYOND Pressures Recommended by AIR SPRING MANUFACTURER. CONTACT HENDRICKSON TECHNICAL SERVICES FOR DETAILS. IMPROPER USE OR OVER INFLATION MAY CAUSE AIR SPRING ASSEMBLIES TO BURST, CAUSING PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.
3. Cycle the air system. Detach the upper rubber grommet of the height control valve linkage from the upper stud and exhaust the suspension system air by lowering the height control valve linkage arm.

**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.

4. Re-attach the upper grommet of the height control valve linkage onto the upper stud to fill the suspension system air. Wait until the airflow to front air springs has stopped.

5. Hold the ride height gauge vertically, see Figure 8-13, and place the gauge (Hendrickson AIRTEK Height Gauge Lit No. 45745-159), so that the upper notch feature is placed between the height control valve mounting bolts and is flush against the bottom of the air spring bracket. The air spring piston flange edge should contact the lower region marked "ACCEPTABLE".

Measure the suspension ride height on the front axle (air spring height 7 7/8” ± 1/8”) if ride height gauge is not available, the ride height measurement can be taken from the bottom of the upper air spring bracket to the bottom of the air spring piston flange.

6. If the air spring piston flange edge contacts the "BELOW SPEC" region, the ride height is set too low, see Figure 8-13. If the air spring piston flange contacts the "ABOVE SPEC" region the ride height is set too high.

**ADJUSTMENT PROCEDURE**

1. Detach the upper grommet of the height control valve linkage from the upper stud and lower the linkage arm. This will exhaust the air pressure in the air springs.

2. Prior to adjusting the height control valve, clean the threads of the ¼” fasteners of any debris and corrosion.

3. Adjust the height control valve by loosening the mounting locknuts and pivoting the valve body about the mounting bolt.

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

5. After the adjustment is made, place a 3/16” allen wrench on the bottom socket head cap screws to prevent the screws from turning while resentencing the ¼” locknuts.

6. Tighten the mounting ¼” locknuts, tightening torque 7-10 foot pounds, see Figure 8-14.

7. Repeat adjustment Steps 1 through 6 until the air spring piston flange aligns into the "ACCEPTABLE" region of the gauge, see Figure 8-13.
DUAL RIDE HEIGHT VERIFICATION

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

1. 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 the brakes are released.
3. Chock drive wheels.
4. Verify that the air system is at full operating pressure.
5. Detach the lower rubber grommet of the height control valve linkage from the lower stud and exhaust the suspension system air by lowering the height control valve linkage arms.
6. Re-attach the lower grommet of the height control valve linkages onto the lower studs to fill the suspension system with air. Wait until the airflow to the front air springs has stopped.
7. The referenced ride height is measured at the front of the air spring. Place the gauge, (Hendrickson AIRTEK ride height gauge, Literature Number 45745-159) so the flat surface of the gauge is against the side of the frame rail, the horizontal flat is sitting below the height control valve brackets on each side. Align the bottom of the height gauge to the air spring piston flange as shown in Figure 8-15. Verify that the air spring height is within the “ACCEPTABLE” tolerance indicated on the gauge.

**FIGURE 8-15**

8. If the air spring piston flange edge is in contact to the “BELOW SPEC” region, the ride is set too low. If the air spring piston flange contacts the “ABOVE SPEC” region, the ride height is set too high. If the ride height is out of specification it will be necessary to adjust the ride height.
9. If a ride height gauge is not available, measure the suspension referenced ride height on the front axle (top front of the air spring to the bottom of the air spring piston flange height 7 7/8” ± 1/8”). If the referenced ride height is out of specification, it will be necessary to adjust the ride height.

ADJUSTMENT PROCEDURE

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

**SERVICE HINT**

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

2. See Air Spring Safety Notice in the Important Safety Notice Section of this publication prior to deflating or inflating the suspension system. Cycle the air system. Detach the lower rubber grommet(s) of the height control valve linkage(s) from the lower stud and exhaust the suspension system air by lowering the height control valve linkage arm.
3. Refill the suspension by raising the height control valve arm(s) by hand, so that the air springs are above the proper ride height.

4. Lower the height control valve arm(s) to exhaust the air system until the suspension is at the proper ride height.

5. Use a ½" wooden dowel rod (golf tee) to set the neutral position for the height control valve(s) by aligning the hole in the height control valve arm(s) with the hole in the height control valve cover, as shown in Figure 8-16. 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 the height control valve.

6. Prior to adjusting the height control valves, clean the threads of the mounting fasteners of any debris and corrosion.

7. To adjust the height control valve, loosen the mounting locknuts.

8. Adjust the height control valves by loosening the mounting locknuts and pivoting 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.

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

10. Tighten the mounting locknuts to 7-10 foot pounds torque after the adjustment is made, see Figure 8-17. Install a (5 mm) allen wrench in the bottom socket head cap screws to prevent the screws from turning while re-tightening the locknuts. Remove the dowel from the height control valves.

11. Cycle the air from the system by lowering the height control valve arm.

12. Reconnect the height control valve linkage rubber grommet to the link mounts. Allow the air suspension system to completely fill with air.

13. Recheck the ride height after adjustment, (if equipped with dual height control valves check both sides of the vehicle).

14. Repeat adjustment Steps 2 through 12 until the ride height is within specification.

**DAY CAB RIDE HEIGHT ADJUSTMENT**

1. Chock the wheels.

2. See Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

3. Inflate the air system to the vehicle operating air pressure.
4. Disconnect the height control valve link from the height control valve arm.
5. Lower the height control valve arm to exhaust the air from the air springs.
6. Inflate the suspension by raising the height control valve arm.
7. Continue to inflate the air springs until the height of the air springs are above 7\(\frac{7}{8}\)" as measured from the bottom of the upper air spring bracket to the bottom of the air spring piston flange.
8. If the ride height gauge is being used continue inflation until the air springs are above specification as noted on the gauge.
9. Lower the arm to deflate the air springs until the air springs are at the height of 7\(\frac{7}{8}\)" as measured from the designated points or until the air spring height is in the acceptable range on the gauge.
10. Once the air springs are at the 7\(\frac{7}{8}\)" ride height center the height control valve arm in the center of the deadband.
11. Insert a golf tee through the height control valve arm and into the height control valve body.
12. Move the height control link so it is in-line with the mounting stud on the height control valve arm.
13. The tapered tip of the mounting stud should index the hole in the rubber grommet on the height control valve link.
14. If the tapered stud does not line up with the grommet, loosen the two ¼" mounting nuts on the upper air spring bracket.
15. Rotate the height control valve until the tapered stud lines up with the hole in the rubber grommet.
16. Tighten the two mounting nuts.
17. Remove the golf tee and lower the height control valve arm to deflate the suspension.
18. Reconnect the height control valve arm to the height control valve link.
19. Allow the suspension to completely inflate.
20. Recheck the ride height with the gauge or by measuring from the previously designated points.
21. Repeat until the proper ride height is obtained.

**STEERING STOP**

**ADJUSTMENT PROCEDURE**

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

The steering stop adjustment procedure is as follows:

1. Drive truck 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.
3. Increase the wheel cut by loosening the jam nuts and screw the axle stops in clockwise.
4. Tighten the jam nuts.
5. Decrease the wheel cut by loosening the jam nuts and screw the axle stops out counter-clockwise.
6. Tighten the jam nuts to 40-60 foot pounds.

**NOTE**

It is very important that the sides of the square head axle stops are set parallel to the axle beam to ensure a good contact point on the axle, see Figure 8-18.
7. Measure the wheel cut and check for any interference with related steering components.

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

**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 jack stands.
3. Use paint and mark the center area of tread on both steer axle tires around the complete outer diameter of the tires.
4. Scribe a line through both steer axle tires in the painted area around the complete outer diameter of the tires.
5. Raise the vehicle and remove the jack stands.
6. 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.

7. Use a trammel bar and measure the distance between the scribe marks at the rear of the steer axle tires. Record the measurement.
8. 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 8-19.

**FIGURE 8-19**
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. 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.

10. 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. Refer to 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.

WARNING

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 8-20. FAILURE TO DO SO CAN CAUSE COMPONENT TO FAIL CAUSING LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.
   c. Tighten the bolt and locknut on the tie rod cross tube to 60-75 foot pounds torque.

FIGURE 8-20

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.

11. Verify the 5/8” tie rod clamp bolt head does not contact the lower shock mount at full wheel cut.

12. Repeat Steps 1-9 until the correct toe setting is achieved.

SPRING EYE RE-TORQUE

This procedure to re-torque is necessary when replacing:

- Front hanger
- Rear hanger
- Steel leaf spring.

NOTE

After January 2007, Hendrickson front hangers, (Part Nos. 59832-001, 59832-002, 60573-001, 60573-002) were no longer used in production in the United States, although still available for component replacement in the aftermarket. Vehicles equipped with a non-Hendrickson hangers, see the vehicle manufacturer for assistance with maintenance and rebuild instructions.
RE-TORQUE PROCEDURE

1. Chock the wheels.
2. Remove the front fairing or air tank(s) if equipped.

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

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

4. Deflate the air springs by removing the height control valve linkage and lowering the linkage arm. This will exhaust the air pressure in the air springs.

**CAUTION**
CARE MUST BE TAKEN TO REMOVE DIRT AND DEBRIS FROM THE PUSH-TO-CONNECT FITTING. FAILURE TO DO SO COULD RESULT IN THE PUSH-TO-CONNECT FITTING FAILING TO SEAL WITH THE AIR LINE.

5. Disconnect the air lines to the air springs.

6. Raise the truck and install frame stands in front of the leaf spring hangers under the radiator area or behind the rear spring mounts.

7. Lower the front axle. Allow at least 3" of wheel clearance to the ground. The shock absorbers must be connected. **DO NOT** reverse arch springs.

**WARNING**
ANYTIME THE FRONT AXLE ON AN AIRTEK SUSPENSION IS SUSPENDED IT IS MANDATORY THAT THE SHOCK ABSORBERS REMAIN CONNECTED. THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SPRINGS. FAILURE TO DO SO COULD CAUSE THE AIR SPRINGS TO EXCEED THEIR MAXIMUM LENGTH, CAUSING THE AIR SPRINGS TO SEPARATE FROM THE PISTON. REVERSE ARCHING THE STEEL LEAF SPRINGS CAN RESULT IN PREMATURE STEEL LEAF SPRING FAILURE.

8. Loosen all four (4) front and rear spring eye bolts, see Figure 8-21. The suspension may drop down slightly. **DO NOT** remove the spring eye bolts. The tires must not contact the ground.

**FIGURE 8-21**

9. Let the suspension settle.

10. Tighten the front spring eye locknuts to:

**STEERTEK NXT AXLE** — refer to vehicle manufacturer’s torque specifications.

**STEERTEK AXLE** — refer to Torque Specifications Section of this publication.

11. Tighten the rear spring eye locknuts to the torque specified in the Torque Specifications Section of this publication, see Figure 8-22.

12. Jack the front axle and remove the frame stands.

13. Lower the vehicle.
14. Check the air springs to verify that they are seated properly and install the air lines into the air springs.

**WARNING**

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

Reconnect the height control valve and air up the system.

15. Affix a straight edge to the bottom of the frame rail in front of the air spring, see Figure 8-23.

16. With the vehicle on a level surface measure the distance from the top of the straight edge to the ground on both sides of the vehicle and record the measurements.

17. Measure the difference from one side to the other.

18. Do a road test and repeat measurement Steps 14 to 16.

19. If the measurement is less than 3/8" then attach the front fairing. If measurement is more than 3/8" contact Hendrickson Tech Services.
SECTION 9
Component Replacement

FASTENERS
Hendrickson recommends that when servicing the vehicle to replace the removed fasteners with new equivalent fasteners for AIRTEK and STEERTEK NXT / STEERTEK components. Maintain correct torque values at all times. Check torque values as specified. See Hendrickson’s Torque Specification Section of this publication. If non-Hendrickson fasteners are used follow torque specifications listed in the vehicle manufacturer’s service manual.

HEIGHT CONTROL VALVE

DISASSEMBLY
1. Drain the air from the secondary air tank.

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

2. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

3. Deflate the air springs by removing the height control valve linkage at the rubber grommet and lowering the height control linkage arm. This will exhaust the air pressure in the air springs.

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

4. Remove the air lines from the height control valve, see Figure 9-1. The air lines are push-to-connect. Push in on the air line to release tension, push down on the collar and pull out the air line.

5. Remove the two ¼” mounting nuts and washers.

6. Remove the height control valve.

ASSEMBLY
1. Attach the height control valve on the mounting bracket as shown in Figure 9-1.

2. Attach the ¼” washers and the locknuts. 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 quick-connect fittings it is critical that the end of the air line is cut square. Improper cut of the end of the air line tubing can cause the air line to seat improperly in the quick connect fitting causing air leakage.

3. Attach the air lines to the height control valve, see Figure 9-3.
4. Install the height control valve linkage assembly.
5. Adjust the height control valve to proper specifications. See the Alignment & Adjustments Section of this publication for proper ride height adjustment.
6. Tighten the ¼” locknuts to 7-10 foot pounds torque.

FIGURE 9-3

AIR SPRING

DISASSEMBLY

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

WARNING

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

CAUTION

IF THE AIR SPRING IS TO BE RE-INSTALLED; INSPECT LOCK-TABS FOR DAMAGE OR CRACKS PRIOR TO RE-INSTALLATION. CARE MUST BE TAKEN TO REMOVE DIRT AND DEBRIS FROM THE PUSH-TO-CONNECT FITTING. FAILURE TO DO SO COULD RESULT IN THE PUSH-TO-CONNECT FITTING FAILING TO SEAL WITH THE AIR LINE.

WARNING

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

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
4. Raise the truck with floor jack.
5. Support the frame with frame stands.
6. Lower the axle.
7. 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.
8. Separate the air spring from the upper air spring bracket by applying downward pressure on air spring, see Figure 9-4, pushing outward on the lock-tabs outside the bracket, and inward on inlet lock-tabs, see Figure 9-6 for lock locations. This will dislodge the air spring from the upper air spring bracket.
9. Apply upward pressure between the base of the air spring and the top pad. This will dislodge the air spring from the top pad, see Figure 9-5.
10. Remove the air spring.

ASSEMBLY

11. Compress the air spring and slide into vertical position. There is a locating nodule on the air spring to index the position in the upper air spring bracket. Make sure the lock tabs click in place.

12. Pull the air spring up into the upper air spring bracket until the air spring snaps into place in the upper air spring bracket. Verify all four lock-tabs are engaged, see Figure 9-6.

13. Properly seat the air spring piston into the top axle pad and install the air line into the air spring.

SERVICE HINT

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

WARNING

WHEN SERVICING THE VEHICLE OR ATTACHING AN AIR SPRING, PRIOR TO AIRING UP THE SUSPENSION SYSTEM, MAKE CERTAIN THE AIR SPRING LOCATOR IS INDEXED INTO THE UPPER AIR SPRING BRACKET PROPERLY. THE LOCK TABS ARE SNAPPED INTO PLACE, AND THE AIR SPRING IS FULLY SEATED ON THE AIR SPRING 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 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.

14. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

15. Raise the vehicle.

16. Remove the frame stands and lower the frame.

17. Air up the suspension.

18. Check the air spring for leaks.

19. Check the ride height and adjust if necessary. See Alignment & Adjustments Section of this publication for the proper ride height adjustment.

20. Remove the wheel chocks.

**SHOCK ABSORBER**

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

**WARNING**

THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SPRINGS. ANYTIME THE FRONT AXLE ON AN AIRTEK 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 the lower mounting bolts, fasteners, and spacer.

4. Remove the upper 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 mounting bracket.

2. Install the upper shock mounting bolt, washers and locknut.

3. Vehicles built with **STEERTEK NXT** axle
   a. Apply a thin coating of anti-seize compound to the shock absorber lower mounting bolt shank, shock spacer, and to the mating face and inside bore of the STEERTEK NXT integrated spring seat. This is necessary to help prevent seizing of the bolt to the spring seat, see Figure 9-7.
   b. Install the lower bolt from the inboard side to the outboard side of the integrated spring seat and attach the spacer, washer, and locknut, see Figure 9-7.
   c. Tighten the shock eye locknuts to vehicle manufacturer’s specifications.
   d. Proceed to Step 6.
4. Vehicles built with STEERTEK axle
   a. Apply a thin coating of anti-seize compound to the shock absorber lower mounting bolt shank, to the mating face of the axle wrap and spacer, and to the inside bore of the aluminum axle wrap. This is necessary to help prevent seizing of the bolt to the aluminum axle wrap, see Figure 9-8.
   b. Install the lower bolt from the inboard side to the outboard side of the top axle wrap and attach the spacer, washer, and locknut, see Figure 9-8.
   c. Proceed to Step 5.
5. Tighten the shock eye locknuts to 225-255 foot pounds torque.
6. Remove the wheel chocks.

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**FRONT LEAF SPRING HANGER**

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**NOTE**

After January 2007, Hendrickson front hangers, (Part Nos. 59832-001, 59832-002, 60573-001, 60573-002) were no longer used in production in the United States, although still available for component replacement in the aftermarket. Vehicles equipped with a non-Hendrickson hangers, see the vehicle manufacturer for assistance with maintenance and rebuild instructions.

**DISASSEMBLY**

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the frame.
4. Support the frame with frame stands.
5. Suspend the front axle from the shock absorbers.
**WARNING**

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

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

7. Deflate the air springs by removing the height control valve linkage at the rubber grommet and lowering the height control linkage arm. This will exhaust the air pressure in the air springs.

**CAUTION**

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

8. Disconnect the air lines at the air springs.

9. Remove the front leaf spring eye mounting bolt and hardware.

**SERVICE HINT**

A bottle jack may be required to raise the axle slightly in order to remove mounting bolt, then lower until front spring eye is clear of hanger.

10. Remove the frame mounting fasteners from the hanger. See the vehicle manufacturer’s guidelines for huck removal, if equipped.

11. Remove the front hanger.

12. Inspect the front hanger mounting surfaces on the frame for cracks or fretting.

13. Inspect the front spring eye bushing for damage or excessive wear. If damaged or worn excessively replacement is necessary, see the Spring Eye Bushing Replacement in this section.

**ASSEMBLY**

1. Install the new hanger flush to the bottom of the frame. Left and Right hanger designation is located on outboard of the hanger, see Figure 9-9.

2. Install the new frame hardware. See vehicle manufacturer’s guidelines.

**SERVICE HINT**

A bottle jack may be required to raise the front axle to facilitate installation of the front spring eye bolt.

3. Install the ¾" spring eye bolt. Tighten ¾" locknut to 285-305 foot pounds torque. See Spring Eye Re-torque Procedure in the Alignment & Adjustments Section of this publication.

4. Raise the truck and remove the jack stands or frame support.

5. Lower the vehicle and reconnect the air lines to the air springs.

**WARNING**

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

6. Check the air springs to verify that they are properly seated to the air spring brackets and top pad.

7. Install the height control valve linkage assembly.

8. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
9. Air up the system.
10. Remove wheel chocks.

REAR SHACKLE ASSEMBLY
STEERTEK AXLE – Freightliner vehicles built after 05/2010 • Western Star vehicles built after 06/2010

DISASSEMBLY
1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the frame.
4. Support the vehicle with frame stands.
5. Suspend the front axle from the shocks.

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.
7. Deflate the air springs by removing the height control valve linkage and lowering the leveling valve arm. This will exhaust the air pressure in the air springs.
8. Remove the air lines from the air springs.
9. Remove the rear ¾" spring eye and shackle pivot bolts, washers and locknuts.

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 frame fasteners from the shackle bracket, per vehicle manufacturer’s guidelines.
11. Remove the shackle bracket from the vehicle, see Figures 9-10a and 9-10b.
12. Inspect the shackle assembly for excessive wear or damage.
13. If damaged or worn excessively, replace with Genuine Hendrickson Parts.

**NOTE** Spring eye bolts must be inserted outboard toinboard side due to component interference.
ASSEMBLY

NOTE
Verify the orientation of the two piece shackle prior to installation, see Figure 9-10b.

1. Install the shackle bracket assembly on the frame.
2. Install new frame fasteners, per the vehicle manufacturer’s guidelines.
3. Install the shackle with the ¾" bolts, washers and locknuts. Snug the shackle bolts, **DO NOT** tighten at this time.
4. Remove the frame stands and lower frame.
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 lines into the air springs.
7. Install the height control valve linkage and inflate the suspension to normal ride height.
8. With the vehicle at the proper ride height, tighten ¾" shackle locknuts to 216-266 foot pounds torque, see Figure 9-11.
9. Remove the wheel chocks.

FIGURE 9-11

**REAR SPRING HANGER**

**STEERTEK AXLE** – **Freightliner** vehicles built prior to 05/2010 • **Western Star** vehicles built prior to 06/2010 • **Sterling** vehicles built prior to 04/2009

DISASSEMBLY

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the frame.
4. Support the frame with frame stands.
5. Suspend the front axle from the shock absorbers.

**WARNING**
PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.
6. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
7. Deflate the air springs by detaching the upper rubber grommet of the height control valve linkage from the upper stud and exhaust the suspension system air by lowering the height control valve linkage arm.

8. Remove the air lines from air springs.

**SERVICE HINT**

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

9. Remove the ¾" rear spring mount fasteners, see Figure 9-12.

10. Remove the two ¼" x 1" hex bolts from the rear hanger clamp and the rear hanger, see Figure 9-12.

11. Remove the frame mounting fasteners from the rear leaf spring hanger. See vehicle manufacturer’s guidelines.

12. Remove the rear hanger from the vehicle, see Figure 9-12.

**FIGURE 9-12**

13. Remove the rear hanger clamp from the rear spring mount.

14. Remove the two thrust washers from the rear spring mount.

15. Inspect the rear spring mount, rear hanger clamp and both thrust washers for excessive wear or damage. See Thrust Washer Inspection in the Preventive Maintenance Section of this publication.

16. If damaged or worn excessively, replace with Genuine Hendrickson Parts as detailed in this section.

**ASSEMBLY**

1. Install the thrust washers on the rear spring mount.

2. Install the rear spring hanger on the frame.

3. Install new frame mounting fasteners. Follow vehicle manufacturer’s guidelines.

4. Slide the rear hanger clamp over the rear spring mount.

5. Install the two ¼" bolts and fasteners into rear hanger clamp and rear hanger assembly. Tighten ¼" locknuts to 7-10 foot pounds torque, see Figure 9-12.

6. Raise the axle to install the rear spring mounts into the rear hanger clamps.

7. Place the 2" outside diameter washer against the rear hanger clamp on the inboard side, see Figure 9-12.
8. Install ¾" x 5" rear spring mount bolt from the inboard side.
9. Install the ¾" washer and locknut. Tighten the ¾" locknuts to 285-305 foot pounds torque, see Figure 9-13.

10. Raise the vehicle and remove the frame stands.
11. Lower the vehicle and remove the jack.
12. Install the air lines into the air springs.
13. See Air Spring Warnings and instructions in the Important Safety Notice Section of this publication prior to deflating or inflating the suspension system.
14. Inflate the suspension to normal operating pressure.
15. Remove wheel chocks.

**THRUST WASHER AND REAR HANGER CLAMP**

STEERTEK AXLE – Freightliner vehicles built prior to 05/2010 • Western Star vehicles built prior to 06/2010 • Sterling vehicles built prior to 04/2009

**DISASSEMBLY**

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

**WARNING**

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

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
4. Deflate the air springs by detaching the upper rubber grommet of the height control valve linkage from the upper stud and exhaust the suspension system air by lowering the height control valve linkage arm.
5. Remove the air lines from the air springs.
6. Raise the frame.
7. Support the frame with frame stands.
8. Suspend the front axle. There must be enough clearance to allow the rear spring mount to clear the bottom of the rear spring hanger.
9. Support the axle with a floor jack.

**SERVICE HINT**

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

10. Loosen both front ¾" x 5½" spring eye bolts, **DO NOT** remove the bolts.
11. Remove both rear ¾" x 5" rear spring mount hex bolts.
12. Remove the lower shock mounting bolts.
13. Lower the jack until the rear spring mounts are below the spring hangers.
14. Remove the ¼" x 1¼" rear hanger clamp bolts and remove the rear hanger clamp, see Figure 9-12.
15. Remove the two thrust washers from the rear spring mount, see Figure 9-12.
16. Inspect the spring mount for torn rubber, if the metal sleeve is worn through or if the housing is cracked. If any of these conditions exist replacement is necessary.

**ASSEMBLY**
1. Install two new thrust washers on the rear spring mount.
2. Install the new rear hanger clamp and snug the ¼" x 1¼" mounting bolts.
3. Tighten bolts to 7-10 foot pounds torque.
4. Raise the axle to install the rear spring mounts into the rear hanger clamps.
5. Install the rear spring eye mounting bolts from the inside facing out.
6. Apply a thin coating of anti-seize to the lower shock mounting bolts.
7. Install the lower shock mounting bolts from the inside facing out, see Figure 9-14, and tighten to 225-255 foot pounds torque.

**FIGURE 9-14**

8. Remove the jack and let the suspension hang.
9. Tighten the front spring eye locknuts:
   - To vehicle manufacturer’s specifications for the front hanger not supplied by Hendrickson
   - To 285-305 foot pounds for the front hanger supplied by Hendrickson
10. Tighten the rear spring mount ¾” locknuts to 285-305 foot pounds torque.
11. Raise the frame and remove the frame stands.
12. Install the air lines into the air springs.
13. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
14. Inflate the suspension to normal operating pressure.
15. Remove wheel chocks.

**LEAF SPRING**

**STEERTEK NXT AXLE – Freightliner • Western Star vehicles built after 11/2011**

**STEERTEK AXLE – Freightliner vehicles built between 05/2010 and 11/2011 • Western Star vehicles built between 06/2010 and 11/2011**

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

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

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

4. Deflate and disconnect the air system prior to raising the front of the vehicle.

5. Remove the air from the air system by disconnecting the height control valve linkage(s) at the rubber grommet(s) and allowing the lever to drop. This will exhaust air from the system.

6. Connect 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.

7. Disconnect the air lines at the air springs.

8. Raise the vehicle.

9. Support the vehicle with frame stands.

10. Suspend the front axle to remove the load from leaf spring assembly.

11. Remove the air spring, see Air Spring Disassembly in this section.

12. Support the axle with a jack.

13. Remove the ¾” Grade 8 clamp group locknuts and discard.

**SERVICE HINT**

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

**WARNING**

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

14. Vehicles built with **STEERTEK NXT** axle after November 2011

**WARNING**

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.

**NOTE**

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

a. Remove the top pad, galvanized liner from the leaf spring assembly, see Figure 9-15.

b. Proceed to Step 16.
15. Vehicles built with STEERTEK axle prior to November 2011
   a. Remove the top pad, front axle spacer (if equipped), galvanized liner, and the bottom axle wrap from the spring that is going to be removed, see Figure 9-16.

16. Remove the leaf spring assembly.

ASSEMBLY
1. Vehicles built with STEERTEK NXT axle
   a. Install the new leaf spring assembly on the axle. Verify that the dowel pin is engaged properly in the axle spring seat, see Figure 9-15.
   b. Install the new galvanized liner and the top pad onto the leaf spring.
   c. Proceed to Step 3.

2. Vehicles built with STEERTEK axle
   a. Install the new leaf spring and axle spacer onto the axle over dowel pin located on the top axle wrap, see Figure 9-16.
   b. Install the new galvanized liner and the top pad onto the leaf spring.
   c. Remove and replace the bottom axle wrap liner located in bottom axle wrap.
   d. Install the bottom axle wrap.
3. Install the new ¾" clamp group fasteners. The locknuts must be replaced when the clamp group is removed to prevent premature bolt fatigue.

4. Snug the clamp group, DO NOT tighten at this time.

5. Raise the axle and the leaf spring assembly into the front hanger and rear shackle.

6. Install the ¾" hex bolt in the front hanger. Snug bolt, DO NOT tighten at this time.

7. Install the ¾" hex bolt in the shackle bracket. Snug bolt, DO NOT tighten at this time.

8. Vehicles built with STEERTEK NXT Axle

   a. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the top pad is centered with the axle spring seat see Figure 9-17.
b. Tighten the clamp group locknuts evenly in 50 foot pounds increments in the proper pattern to achieve uniform bolt tension, see Figure 9-18, to vehicle manufacturer’s specifications.

c. Proceed to Step 11.

9. Vehicles built with STEERTEK Axle

a. 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 9-19.

10. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-18.

11. Install the air spring.

12. Remove the frame supports and load the front axle with the vehicle weight.

13. Install the air lines, and air up the vehicle.

14. Install the height control valve linkage and inflate the suspension to normal operating pressure (ride height).

15. Verify the vehicle is at the proper ride height. See Alignment and Adjustment Section of this publication.
16. Tighten the front spring eye bolt head to 216-266 foot pounds torque.
17. Install and tighten the adapter bolts to vehicle manufacturer’s specification.
18. Tighten the rear spring eye bolt heads to 216-266 foot pounds torque.
19. Remove the wheel chocks.

**LEAF SPRING**

**STEERTEK AXLE – Freightliner** vehicles built prior to 05/2010 • **Western Star** vehicles built prior to 06/2010 • **Sterling** vehicles built prior to 04/2009

**DISASSEMBLY**
1. Place the vehicle on a level floor.
2. Chock the wheels.
3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
4. Deflate the air springs by detaching the upper rubber grommet of the height control valve linkage from the upper stud and exhaust the suspension system air by lowering the height control valve linkage arm.
5. Install a floor jack with a four (4) inch lifting plate below the axle and raise the truck.
6. Remove the tires.
7. Install frame stands behind the rear spring mounts. It may be necessary to remove peripheral components for installation of the frame stands.
8. Lower the jack allowing the axle to hang, but **DO NOT** remove the jack from the axle.
9. Loosen both front spring eye bolts, but **DO NOT** remove the ¾” bolts.
10. Remove both rear spring mount ¾” hex bolts.
11. 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.

12. Disconnect both air springs from the top pads of the clamp groups.
13. Loosen the clamp group Grade 8 nylon locknuts for the leaf spring that is not being replaced.

**CAUTION**
**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.

14. Remove the ¾” clamp group bolts, nuts, washers, top pad, front axle spacer, galvanized liner, and the bottom axle wrap from the spring that is going to be removed, see Figure 9-20.
15. Lower the jack allowing the suspension to pivot down out of the rear hanger clamps.
16. Remove the ¾” front spring eye bolt from the leaf spring that is being removed.
17. Remove the leaf spring assembly. Approximate weight of the leaf spring is 48 pounds.

**ASSEMBLY**
1. Lubricate the front spring eye bushing and the front hanger with a vegetable base oil (cooking oil). **DO NOT** use petroleum or soap base lubricant, it can cause an adverse reaction with the spring eye bushing material.
2. Install the spring over the axle and into the front spring hanger.
3. Install the ¾” front spring eye bolt and fastener, but **DO NOT** tighten.

4. Engage the spring to the axle with the dowel pin located on the top axle wrap. It may be necessary to loosen the other clamp group to allow the axle to pivot when installing the spring on the dowel pin.

5. Install the new galvanized liner and the top pad onto the leaf spring.

6. Install a new bottom axle wrap liner in the bottom axle wrap.

7. Install the bottom axle wrap.

8. Install the new ¾” clamp group bolts, washers, and the new locknuts. The locknuts must be replaced when the clamp group is removed, to prevent premature bolt fatigue.

9. Snug the clamp group, **DO NOT** torque at this time.

10. Raise the axle and the rear spring assembly into the rear spring hanger.

11. Install the ¾” rear spring mount bolts in the rear hangers. The bolt must be installed from the inboard side to the outboard side with the large 2” diameter washer against the rear hanger clamp on the inboard side, see Figure 9-20.
12. Lubricate the lower shock mounting bolts with anti-seize and install the bolts from the inboard side to the outboard side.
13. Lower the floor jack allowing the suspension to hang by the eye bolts and shock mounts.

**IMPORTANT NOTE**

Only the weight of the axle should be on the spring at the time of the front spring eye and rear spring mount bolt tightening torque. See Spring Eye Re-torque procedure in the Alignment & Adjustments Section of this publication.

14. Tighten the lower shock mounting bolts to 225-255 foot pounds torque.
15. Tighten the front spring eye and rear spring mount ¾" locknuts to 285-305 foot pounds torque.
16. Install the tires.
17. Install air springs into the top pads. Make sure the air spring piston seats into the top pad correctly.
18. Remove the frame supports and load the front axle with the trucks weight.
19. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
20. Install air lines, and air up system.
21. Verify proper ride height. See Alignment and Adjustment Section of this publication.
22. 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 9-21.

**FIGURE 9-21**

23. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-22.
24. Remove the wheel chocks.
**REAR SPRING MOUNT (If equipped)**

**STEERTEK AXLE** – Freightliner vehicles built prior to 05/2010 • Western Star vehicles built prior to 06/2010 • Sterling vehicles built prior to 04/2009

**DISASSEMBLY**

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

**WARNING**

Prior to and during deflation and inflation of the air suspension system, ensure that all personnel and equipment are clear from under the vehicle and around the service area. Failure to do so can cause serious personal injury, death, or property damage.

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
4. Deflate the air springs by detaching the upper rubber grommet of the height control valve linkage from the upper stud and exhaust the suspension system air by lowering the height control valve linkage arm.
5. Support the vehicle with frame stands. It may be necessary to remove peripheral components for installation of the frame stands.
6. Install a floor jack with a 4 inch lifting plate below the axle and raise the truck.
7. Remove the tires, if necessary,
8. Lower the jack allowing the axle to hang, but **DO NOT** remove the jack from the axle.

**SERVICE HINT**

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

9. Loosen both front leaf spring eye bolts, but **DO NOT** remove the bolts.
10. Remove both rear leaf spring mount bolts.
11. Remove both lower shock absorber mounting bolts.
12. Disconnect both air springs from the top pads of the clamp groups.
13. Loosen the clamp group Grade 8 nylon 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 rear spring mount.
17. Inspect the leaf spring taper for cracks or damage. Replace spring if damaged.

**ASSEMBLY**

1. Install the spring end plate so that it is centered on the spring taper, see Figure 9-23.
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 washers and locknuts to snug. **DO NOT TIGHTEN** at this time.
5. Align the rear spring mount and the leaf spring taper so that the mating surfaces are flush with each other, see Figure 9-24.
6. Tighten rear spring mount locknuts to 80-110 foot pounds torque.
7. Install the thrust washers on the rear spring mount.
8. Raise the leaf springs into the rear hangers.
9. Place the 2" outside diameter washer against the rear hanger clamp on the inboard side.
10. Install the rear spring eye mounting bolts from the inside facing out.
11. Snug rear spring eye bolts. **DO NOT** tighten.

13. Install the air spring into the top pad. Make sure the air spring piston seats into the top pad correctly.

14. Install tires, if removed.

15. Raise the vehicle and remove the frame supports.

16. Lower the vehicle and remove the floor jacks.

17. Install air lines to the air spring.

18. See Air Spring Warnings and instructions in the Important Safety Notice Section of this publication prior to deflating or inflating the suspension system.

19. Install the height control valve linkage and inflate the suspension to normal operating pressure.

20. 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 Figures 9-21.

21. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 280-305 foot pounds torque in the proper pattern to achieve uniform bolt tension, see Figure 9-22.

22. Tighten the lower shock mounting bolts to vehicle manufacturer’s specifications.

23. Tighten the front and rear spring eye fasteners to vehicle manufacturer’s specifications.

24. Verify proper ride height, see Alignment & Adjustments Section of this publication.

25. Remove wheel chocks.

**FRONT LEAF SPRING EYE BUSHING (If equipped)**

*STEERTEK AXLE – Freightliner vehicles built prior to 05/2010 • Western Star vehicles built prior to 06/2010 • Sterling vehicles built prior to 04/2009*

**NOTE**

For Freightliner vehicles built after 05/2010 and Western Star vehicles built after 06/2010, spring eye bushings are not serviceable. The Coronado spring eye bushing is non-serviceable, refer to the Parts List Section of this publication.

The AIRTEK spring eye bushing is designed for the life of the leaf spring, if premature wear occurs careful consideration must be given to the contributing factor that cause the wear. This must be corrected in order to prevent the new bushing from wearing in the same manner. Hendrickson recommends that in the event of a high mileage bushing wear that the front leaf spring be replaced.
DISASSEMBLY

Follow the procedure for the Front Leaf Spring removal shown in this section.

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

Once the steel spring is removed from the chassis it will be necessary to use:

- A hydraulic press with an minimum operating capacity of 5 tons.
- A receiving tool – see specifications in the Special Tools Section of this publication.
- Removal and installation driver, see Figure 9-25, see specifications in the Special Tools Section of this publication.

1. Support and center the steel leaf spring end hub on the receiving tool. The steel leaf spring must be level to distribute the vertical pushing load equally on the bushing.

2. Place the bushing driver center on the spring eye bushing.

3. Press out the spring eye bushing. Push directly on the driver until the bushing clears the steel leaf spring eye bore, see Figure 9-26.

4. Inspect the spring eye for any cracks or burrs. If cracks are present replacement of the steel leaf spring is necessary.

5. Remove any nicks or burrs with an emery cloth or a rotary sander to provide a smooth surface for the bushing installation.

6. Cut a strip of 3M Scotch® #890T black fiber tape (duct tape or equivalent) 1” x 6” long.

7. Feed the tape into the spring eye, adhesive side facing gap in the eye. Center the tape equally around each end, see Figure 9-27.

8. Support and center the steel spring on the receiving tool.

9. Center the new bushing on spring eye bore and line up on the hydraulic press.
10. Press the bushing into spring eye bore. It will be necessary to overshoot the desired final position by approximately \( \frac{3}{16} \)”. Press the bushing again from the opposite side to center the bushing in the spring eye bore, see Figure 9-28.

11. Once the bushing is installed follow procedure for Front Leaf Spring component replacement in this section.

**BOTTOM AXLE WRAP (If equipped)**

**STEERTEK AXLE** – Vehicles built prior to 11/2011

**DISASSEMBLY**

1. Chock the wheels.
2. Support the frame with frame stands.

**WARNING**

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

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

5. Remove Air Spring on side being replaced. See Air Spring component replacement instructions in this section.
6. Remove \( \frac{3}{4} \)” hex bolts and Grade 8 nylon locknuts.
7. Remove bottom axle wrap. It may be necessary to use a dead blow mallet to dislodge axle wrap.
8. Once removed inspect axle wrap for damage. Replace if necessary.
9. Discard used bottom axle wrap liner.

**ASSEMBLY**

1. Install new bottom axle wrap liner into bottom axle wrap.
2. Install bottom axle wrap on axle.
3. Install new \( \frac{3}{4} \)” hex bolts (if removed) and Grade 8 nylon locknuts. 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 9-29.
4. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-30.

5. Install the air spring (if removed). Follow Air Spring Assembly instructions in this section.

6. Remove the frame stands.

7. Remove the wheel chocks.

**TOP AXLE WRAP (IN CHASSIS - If equipped)**

STEERTEK AXLE – Vehicles built prior to 11/2011

**DISASSEMBLY**

1. Chock the wheels.

**WARNING**

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

2. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

3. Deflate the air springs by disconnecting the height control valve linkage and lowering the height control valve linkage arm. This will exhaust the air pressure in the air springs.

4. Disconnect the air lines at the air springs.

5. Raise the truck and remove the tires.

6. Support the frame with frame stands.

7. Lower the floor jack and suspend the front axle to remove the load from the leaf springs.

8. Remove the air springs, see Air Spring Disassembly in this section.

9. Install a floor jack that has a four inch lifting plate in the center of the axle.

10. Secure the axle on the jack to prevent the axle from rolling off the floor jack.

**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.

11. Remove the ¾" clamp group hex bolts and fasteners.
12. Remove the top pad casting, the bottom axle wrap and liner.
13. Remove the lower shock mounting bolts.
14. Lower the axle from the leaf springs.

15. Remove the dowel pin, alignment shim and spacer (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 9-31.
17. Clean and inspect the axle wrap and axle for cracks or damage, replace each if cracks or damage are present.

**ASSEMBLY**

1. Install the new axle wrap liner on the axle.
2. Spray the axle wrap liner and the axle wrap with a silicon lubricant.
3. Position the axle wrap on the axle, see Figure 9-32.
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.

**SERVICE HINT**

To facilitate the installation of the top axle wrap, it may be helpful to slide the axle outside of the frame rail to obtain a clear path to strike the axle with a dead blow mallet.

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 dowel pin(s) into the axle wrap.
7. Install the alignment shims and spacer (if equipped).
8. Raise the axle assembly and engage the dowel pins in the leaf spring bore.
9. Install the top pad with the arrows facing inboard on the leaf spring.
10. Install new clamp group hex bolts into the top pad.
11. Remove and replace the bottom axle wrap liner.
12. Install the bottom axle wrap.
13. Install the new clamp group washers and nylon locknuts (Grade 8).
14. 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 Figures 9-33.
15. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-34.

16. Apply a thin coating of anti-seize to the lower shock mounting bolt.

17. Install the lower shock bolt from the inboard side to the outboard side of the top axle wrap and attach the spacer, washer, and locknut.

18. Tighten the shock eye locknuts to 225-255 foot pounds torque.

19. Install the air springs.

20. Raise the vehicle and remove the frame stands.

21. Lower the vehicle and remove the jack from the axle.

22. Attach the air lines to the air springs.

23. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

24. Air up the system to normal operating pressure.

25. Remove the wheel chocks.
FRONT AXLE ASSEMBLY

STEERTEK NXT AXLE – Vehicles built after 11/2011

The axle clamp group consist of the top pad, ¾" bolts, washers and nylon locknuts

FIGURE 9-35

Vehicles built with STEERTEK NXT axle after 11/2011
STEERTEK NXT AXLE REMOVAL
STEERTEK NXT AXLE – Vehicles built after 11/2011

DISASSEMBLY
Refer to Figure 9-35 when replacing the components of the STEERTEK NXT axle as shown.

**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 AIRTEK COMPONENTS THAT CAN RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

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

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

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

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

4. Deflate the air springs by disconnecting the height control valve linkage and lowering the height control valve linkage arm. This will exhaust the air pressure in the air springs (if equipped).
5. Raise the vehicle.
6. Support the vehicle with frame stands.

**DANGEROUS**
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.

7. Suspend the front axle with the shocks attached.
8. Remove the front wheels, hubs, brake shoes, ABS sensors, and backing plate assembly.
9. Disconnect the drag link from the steering arm.

**CAUTION**
IF THE AIR SPRING IS TO BE RE-INSTALLED; CARE MUST BE TAKEN TO REMOVE DIRT AND DEBRIS FROM THE PUSH-TO-CONNECT FITTING. FAILURE TO DO SO COULD RESULT IN THE PUSH-TO-CONNECT FITTING FAILING TO SEAL WITH THE AIR LINE. INSPECT LOCK-TABS FOR DAMAGE OR CRACKS PRIOR TO RE-INSTALLATION.

10. Unseat both of the air springs at the axle top pad.
11. Support the axle with a floor jack.
THE REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS IS NOT ALLOWED. ANY SUSPENSION OR AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS 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, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

12. Disconnect and remove the lower shock mounting bolts.
13. Remove the ¾" clamp group bolts and fasteners.
14. Lower the axle and remove from the vehicle.

- STEERTEK NXT AXLE (Removed from Chassis)

**AXLE REMOVAL**

1. Remove the tie rod assembly. See Tie Rod Disassembly 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 SEE THEM CAN CAUSE COMPONENT DAMAGE OR PERSONAL INJURY.

2. Remove the two 5/8" socket head cap screws from the steering knuckle assembly.
3. Remove the steering knuckle and thrust bearing.
4. After complete removal of the one side, repeat Steps 1 through 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.

**AXLE INSTALLATION**

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Raise the axle into position, see Figure 9-36. Care must be taken at this point to ensure that the dowel pins align correctly with the front leaf springs.

**FIGURE 9-36**

Vehicles built with STEERTEK NXT axle after November 2011
3. Install the galvanized liner between the main spring and the top pad. The top pad is installed with the air spring bores positioned outboard, see Figure 9-37.

4. Install the new clamp group ¾" hex bolts and the new ¾" nylon lock nuts (Grade 8). Snug the ¾" bolts, DO NOT tighten to torque at this time.

5. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the top pad is centered on the axle spring seat, see Figures 9-38.

6. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-39.

7. Install the steering knuckles as per the Steering Knuckle replacement instructions in this section.

8. Install the tie rod assembly in the Ackermann arms.

9. Install the 7/8" 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 pins.

11. Connect the drag link in the steering arms.

12. 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.

13. Install the drag link cotter pin.


15. Install the brake backing plate assemblies and ABS sensor.

16. Install the brakes, hubs, and wheels as per the vehicle manufacturer’s guidelines.

17. Fill the hubs with the proper lube, see vehicle manufacturer’s guidelines for recommended lubrication, if required.
18. Grease the front steering components as per lubrication guidelines in the Preventive Maintenance Section of this publication.

19. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

20. Reconnect the height control valve and air up the system.

21. Check ride height per instructions in the Alignment & Adjustments Section of this publication.

22. Remove the wheel chocks.

**FRONT AXLE ASSEMBLY**

**STEERTEK AXLE – Vehicles built prior to 11/2011**

The axle clamp group consist of the Top Axle Wrap, Bottom Axle Wrap, Top Axle Wrap Liner, Bottom Axle Wrap Liner, Top pad and ¾” Bolts, Washers and Nylon Locknuts

FIGURE 9-40

Vehicles built with STEERTEK axle prior to 11/2011
STEERTEK AXLE REMOVAL

STEERTEK AXLE – Vehicles built prior to 11/2011

DISASSEMBLY
Refer to Figure 9-40 when replacing the components of the STEERTEK axle as shown.

⚠️ 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 AIRTEK COMPONENTS THAT CAN RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.
1. Place the vehicle on level floor.
2. Chock the wheels.

⚠️ WARNING
PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.
3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
4. Deflate the air springs by disconnecting the height control valve linkage and lowering the height control valve linkage arm. This will exhaust the air pressure in the air springs (if equipped).
5. Raise the vehicle.
6. Support the vehicle with frame stands.
7. Suspend the front axle with the shocks attached.
8. Remove the front wheels, hubs, brake shoes, ABS sensors, and backing plate assembly.
9. Disconnect the drag link from the steering arm.

⚠️ CAUTION
IF THE AIR SPRING IS TO BE RE-INSTALLED; CARE MUST BE TAKEN TO REMOVE DIRT AND DEBRIS FROM THE PUSH-TO-CONNECT FITTING. FAILURE TO DO SO COULD RESULT IN THE PUSH-TO-CONNECT FITTING FAILING TO SEAL WITH THE AIR LINE. INSPECT LOCK-TABS FOR DAMAGE OR CRACKS PRIOR TO RE-INSTALLATION.
10. Unseat both of the air springs at the axle top pad.
11. Support the axle with a floor jack.

⚠️ 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.
12. Disconnect and remove the lower shock mounting bolts.
13. Remove the ¾” clamp group bolts and fasteners.
14. Lower the axle and remove from the vehicle.
STEERTEK AXLE (Removed from Chassis)

CLAMP GROUP DISASSEMBLY

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 9-41.
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 Disassembly 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 5/8" socket head cap screws from the steering knuckle assembly.
6. Remove the steering knuckle, thrust bearing, and shim pack if equipped.
7. After complete removal of the one side, repeat Steps 1 through 6 for the opposite side of the axle.
8. 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.

CLAMP GROUP ASSEMBLY

1. Install the new upper axle wrap liner on the axle. Index the liner with the axle’s guide pin, see Figure 9-42.

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.

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, the axle wrap must be aligned with the guide pin on the axle.
3. IMPORTANT: Install the dowel pin into the top axle wrap.
4. At this point in the assembly DO NOT install anything further on the axle.
FRONT AXLE INSTALLATION

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Raise the axle into position, see Figure 9-43. Care must be taken at this point to ensure that the dowel pins align correctly with the front leaf springs.

3. Install the galvanized liner between the main spring and the top pad. The top pad is installed with the air spring bores positioned outboard, see Figure 9-44.
4. Install the new bottom axle wrap liner and front axle spacer on the bottom axle wrap.
5. Install the bottom axle wrap on the axle.
6. Install the new clamp group ¾” hex bolts and the new ¾” nylon lock nuts (Grade 8). Snug the ¾” bolts, **DO NOT** tighten to torque at this time.
7. Install the lower shock mounting bolts and tighten to 225-255 foot-pounds torque.
8. 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 Figures 9-45.
9. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-46.

10. Install the steering knuckles as per the Steering Knuckle replacement instructions in this section.

11. Install the tie rod tube.

12. Install the 7/8" 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.

13. Install the cotter pins.

14. 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.

15. Install cotter pin.

16. Install the brake backing plate assemblies and ABS sensor.

17. Install the brakes, hubs, and wheels as per the vehicle manufacturer’s guidelines.

18. Fill the hubs with the proper lube, see vehicle manufacturer’s guidelines for recommended lubrication, if required.

19. Grease the front steering components as per lubrication guidelines in the Preventive Maintenance Section of this publication.

20. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

21. Reconnect the height control valve and air up the system.

22. Check ride height per instructions in the Alignment & Adjustments Section of this publication.

23. Remove the wheel chocks.
STEERING KNUCKLE DISASSEMBLY

All new replacement STEERTEK axles and upper steering knuckle components for Freightliner, Sterling and Western Star Vehicles will incorporate 5/8” fine threaded holes for brake spider mounting bolts. Vehicles built prior to 6/28/2004 that are receiving a replacement of the STEERTEK axle or upper knuckle will require — a change from coarse thread brake spider mounting bolts to fine thread brake spider mounting bolts. The brake spider mounting bolts are supplied separately by Freightliner, Sterling and Western Star, refer to vehicle manufacturer for bolt dimensions and torque specifications.

**NOTE**

Hendrickson will not be responsible for any damage to the STEERTEK upper knuckle components resulting from using the improper brake spider mounting bolts.

**DISASSEMBLY**

See tools needed to remove and install kingpin bushing under the Special Tools Section of this publication.

The steering knuckle disassembly and assembly includes the Kingpin Preparation and Measurement and Kingpin Bushing Removal process.

1. Remove the wheel and hub assembly.
2. Remove the brake components from steering knuckle.
3. Remove the tie rod assembly.

**SERVICE HINT**

Lightly tap the side of the Ackermann arm with a mallet to separate the tie rod end from the Ackermann arm, see Figure 9-47.

4. Remove the drag link from the knuckle.

**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) socket head cap screws that connect upper kingpin connection to the steering knuckle, see Figure 9-48.

**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.

6. Remove the lower steering knuckle from the kingpin by sliding it down the kingpin.

7. Remove the upper steering knuckle by sliding it up off the kingpin.

### KINGPIN PREPARATION AND MEASUREMENT

**CLEANING THE GROUND OR 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**

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

1. **WEAR PROPER EYE PROTECTION.**
2. **WEAR CLOTHING THAT PROTECTS YOUR SKIN.**
3. **WORK IN A WELL VENTILATED AREA.**
4. **DO NOT** USE GASOLINE, SOLVENTS OR OTHER MATERIALS THAT CONTAIN GASOLINE THAT CAN EXPLODE.

HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED CORRECTLY. FOLLOW THE VEHICLE 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. DAMAGE TO THE PARTS WILL RESULT.

THE STEERTEK NXT / STEERTEK 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. IF THE KINGPIN SHOWS SIGNS OF MOVEMENT, CONTACT HENDRICKSON PRODUCT ENGINEERING - TECH SERVICES.

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 9-49 through 9-52.

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 9-53 through 9-56.

   Kingpin minimum dimension is 1.802"
KINGPIN BUSHING REMOVAL

You will need:
- A hydraulic shop press with a minimum forcing capacity of 2.5 tons (or use an arbor press)
- Kingpin Bushing Tools, see Special Tool Section in this publication
  - Push-out Tool
  - Driver Tool
  - Receiving Tool
  - STEERTEK NXT (Vehicles built after November 2011) Remover / Installer Tool

**WARNING**

BEFORE APPLYING HYDRAULIC PRESSURE TO ANY TOOLING SET-UP, ALWAYS CHECK TO ENSURE THE PRESS PLATE, ADAPTERS, 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 FIGURES 9-57 AND 9-58. IMPROPER SUPPORT TO THE STEERING KNUCKLES CAN CAUSE COMPONENT DAMAGE.
1. **STEERTEK axle** (Vehicles built prior to November 2011)
   a. Remove the grease cap retaining ring.
   b. Ensure that each part of the steering knuckle assembly is squarely supported on the receiving tool before applying hydraulic pressure to press out the kingpin bushings, see Figure 9-57 through 9-59.
   c. Remove the grease zerk in the grease cap.
   d. Place a driver on top of the grease cap and press out the kingpin bushing and seal using the grease cap.
   e. Proceed to Step 3.

2. **STEERTEK NXT axle** (Vehicles built after November 2011)
   a. Remove the threaded grease cap and grease zerk.
   b. Ensure that each part of the steering knuckle assembly is squarely supported on the receiving tool before applying hydraulic pressure to press out the kingpin bushings, see Figure 9-57 through 9-59.
   c. Place the STEERTEK NXT installer/remover tool in the steering knuckle/kingpin bore. Then place the kingpin bushing push-out tool on top of the installer/remover.
   d. Press out the kingpin bushing.

3. Clean the parts and inspect for reassembly, see Figure 9-60.

**STEERING KNUCKLE BORE MEASUREMENT**

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

1. Measure the upper knuckle bore inside diameter at two locations. Always use an inside micrometer or a telescoping gauge when taking a knuckle bore measurement. Some out-of-roundness at the top and bottom of the bore edges is acceptable. Steering knuckle bore diameter is 1.938" ± 0.003".

2. Measure the upper and lower bore in two positions and at two locations. The two positions must be 90° opposed from each other, see Figures 9-61 through 9-63. If the average measurement is more than the knuckle bore maximum diameter specification, replace the knuckle.
**KINGPIN BUSHING INSTALLATION**

You will need:
- A hydraulic shop press with a minimum forcing capacity of 2.5 tons.

**WARNING**

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

1. Install the lower or upper steering knuckle in the press. Ensure that each part of the steering knuckle assembly is squarely supported on the receiving tool before applying hydraulic pressure to press in the kingpin bushings.

2. Always install the kingpin bushing from the machined side (axle side) of the lower steering knuckle using a bushing driver, (see driver specifications in the Special Tools Section of this publication). Press in bushing to a depth of no less than 15/64" (0.236") or 6 millimeters and no more than 5/16" (0.32") or 8 millimeters, see Figures 9-64 and 9-66.

3. Following this procedure it is necessary to ream the kingpin bushings to fit the kingpins, see Kingpin Bushing Reaming Instructions in this section.

**KINGPIN BUSHING REAMING**

**WARNING**

REAM THE KINGPIN BUSHINGS WITH AN ADJUSTABLE STRAIGHT FLUTE REAMER. DO NOT HONE OR BURNISH THE KINGPIN BUSHINGS. HONING OR BURNISHING WILL DAMAGE THE BUSHINGS AND VOID ANY APPLICABLE WARRANTY.

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. Install the lower steering knuckle assembly in a vise with brass jaws.

**SERVICE HINT**
It is acceptable to mount the knuckle components in a vise either vertically or horizontally when performing the reaming procedure.

2. Install the reamer into the lower steering knuckle until the blades touch the kingpin bushing.
3. Rotate the reamer with light downward pressure. Rotate the reamer smoothly. **DO NOT** apply too much pressure, see Figures 9-67 and 9-68.

4. Slide the reamer out of the lower steering knuckle assembly. If it is necessary to remove the reamer from the top, rotate the reamer opposite of cutting rotation.
5. Clean and remove all kingpin bushing material from the knuckle assembly. Take special attention to remove material from the grease channels and dimples.
6. Clean the 5/8” brake backing plate bolts with a wire wheel and run a tap through the threads of the upper kingpin connection/steering arm and then flush out with brake cleaner and dry with compressed air.

**PRIOR TO INSTALLATION ENSURE THAT ALL RESIDUAL LOCTITE MATERIAL IS REMOVED FROM THE MOUNTING BOLTS AND THE THREAD BORES IN THE UPPER KINGPIN CONNECTION OR STEERING ARM, 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 part, socket head cap screw comes with a pre-applied loctite compound.

7. Install the steering arm and upper kingpin connection on the kingpin.
8. Check for the proper fit by rotating the knuckle assembly back and forth to verify there is no binding on the kingpin, see Figures 9-69 and 9-70.
9. If the bushing is too tight repeat Steps 1 through 8 until the proper clearance is achieved.

**NOTE**

Bushing size is to be 0.001" larger than the kingpin size.

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**KINGPIN SEAL INSTALLATION**

1. Place the steering knuckle assembly in a vise with brass jaws 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 9-71.

3. Use a kingpin bushing driver tool (see Special Tool Section) and press seal firmly into the steering knuckle assembly.

4. **STEERTEK NXT** — Double Lip design, see Figure 9-72. Install the kingpin seal until it bottoms out in the kingpin bore.

5. **STEERTEK** — Single Lip design, see Figure 9-73. Install the kingpin seal until it makes contact with the kingpin bushing.

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**STEERING KNUCKLE ASSEMBLY ASSEMBLY**

After replacement of the kingpin bushings it is necessary to re-assemble the steering knuckle assemblies. The STEERTEK NXT/STEERTEK axle is equipped with two different thrust bearings installed. The composite thrust bearing is installed on the left side of the axle. The roller bearing is installed on the right side of the axle, see Figure 9-74. **DO NOT** substitute aftermarket components when servicing.

1. Install the thrust bearing on the lower kingpin with the seal facing up toward axle (the black seal will designate the top side), see Figure 9-74.
2. Install the shim, if equipped, on the upper kingpin.

3. Pack the bushing dimples on the upper and lower steering knuckles with multi purpose Lithium based grease (NLGI Grade 2) before installation.

4. Install the upper steering knuckle on the upper arm kingpin.

5. Install the lower steering knuckle on the lower kingpin and install the old socket head cap screws loose into the top two threaded holes.

6. Install a bottle jack under the lower knuckle and slightly raise the knuckle until it is possible to thread in the (3) brake backing plate bolts by hand. These are for guide purposes only.

7. Snug the two socket head cap screws.

8. Lower the bottle jack so that all the vertical end play is on the underside of the axle.

9. 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 9-75.

10. Zero the dial indicator.

11. Raise the bottle jack until there is NO CLEARANCE between the knuckle assembly and the bottom of the axle, slightly lifting the axle.

12. Check the reading on the dial indicator. The specification for vertical travel on the steering knuckle during assembly is 0.008" to 0.011".

13. If the clearance is above 0.011", loosen the socket head cap screws and push down on the knuckle assembly until the proper vertical end play is achieved.

   If the clearance is below 0.008", loosen the socket head cap screws and pull up on the knuckle assembly until the proper vertical end play is achieved.

**NOTE**

**ONLY** if the vehicle is built prior to November 2011 equipped with the STEERTEK axle can the vertical end play be further adjusted with a shim.

**STEERTEK Axle (prior to November 2011)**

- If the vertical clearance is above 0.011", add a 0.005" shim
- If the vertical clearance is below 0.008", it may be necessary to remove a 0.005" shim

**NOTE**

The socket head cap screw comes with a pre-applied loctite compound.

**WARNING**

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

14. Remove one old socket head cap screw and replace with new socket head cap screw.
15. Remove second socket head cap screw and replace with new socket head cap screw. Tighten both socket head cap screws to 175-200 foot pounds torque.

16. Recheck the vertical end play with the dial indicator or a 0.010" feeler gauge, see Figure 9-75.

17. Remove the brake spider bolts, they should thread out freely.

18. Remove the bottle jack and continue assembling the wheel ends.

**IMPORTANT NOTE**

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

19. Apply loctite to the three brake spider bolts prior to installation into the brake spider. Tighten bolts to 175-200 foot pounds torque.

**WARNING**

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

20. Install the tie rod end into the lower steering knuckle arm.

21. Tighten the castle nuts to 185 foot pounds torque then rotate the castle nut to the next castle slot and install cotter pin.

22. Install the drag link into the steering arm and tighten to the vehicle manufacturer’s specifications.

23. Install new O-rings on the grease caps and lubricate O-rings with grease.

24. **STEERTEK Axle** – Install new grease caps and retaining rings.

   **STEERTEK NXT Axle** – Install new grease caps. Note the grease caps on the STEERTEK NXT axle are threaded, tighten to 50-70 foot pounds torque. Install new grease zerk and tighten to a minimum of 15 foot pounds, see Figure 9-76.

**FIGURE 9-76**

25. Install brakes, drums, wheels and tires.

26. Remove jack and safety stands.

27. Grease steering knuckles with the vehicle on the floor.

28. Remove the wheel chocks.
TIE ROD END AND CROSS TUBE

NOTE
Hendrickson supplies different tie rod configurations. Prior to ordering find the part number on the tie rod tube. See Hendrickson Technical Bulletin Literature No. SEU-0223 for additional information or contact Hendrickson Truck Parts (e-mail: truckparts@hendrickson-intl.com).

DISASSEMBLY
1. Chock the wheels.
2. Position the steer axle tires straight ahead.
3. Remove the cotter pin and castle nut.
4. Lightly tap the side of the Ackermann arm to loosen the tie rod end from the Ackermann arm, see Figure 9-77.
5. Repeat Steps 3 and 4 to remove the other tie rod end.
6. Remove the cross tube and tie rod ends from the vehicle.
7. Mount the cross tube in a soft jaw vice.
8. Remove the hardware from the clamp on the cross tube.
9. Count the exposed threads on the tie rod end being replaced.
10. Remove the tie rod end from the cross tube.

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.

11. If the opposing tie rod end is being replaced repeat Steps 8 through 10.
12. Inspect the cross tube for dents, cracks, or thread damage. Replace the cross tube if needed.

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 Ackermann arm.
- A left hand threaded tie rod end will be installed into the left side Ackermann arm.

2. Install the new tie rod end into the cross tube, leaving the same amount of threads exposed that were counted on the failed tie rod end prior to removal.

WARNING
THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 9-78. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

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.

3. Replace the opposing tie rod end if necessary by repeating Steps 2 and 3.
**WARNING**

**Figure 9-78**

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

4. If replacing opposing tie rod end is not necessary it is critical that the cross tube will rotate in the opposing tie rod end.

5. Install the cross tube into the Ackermann arms.

6. Tighten the castle nuts to 185 foot pounds torque then rotate the castle nut to the next castle slot and install cotter pin.

7. Grease tie rod ends. See Lubrication Chart for required lubricant in the Preventive Maintenance Section of this publication.

8. Set the toe, see Toe Adjustment Procedure in the Alignment & Adjustments Section of this publication.

**DUAL HEIGHT CONTROL VALVE CONVERSION**

**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.

1. Place vehicle on level floor.

2. Chock the wheels.

3. Install frame stands to maintain ride height.

**WARNING**

IF THE AIR SPRING IS TO BE RE-INSTALLED; INSPECT LOCK-TABS FOR DAMAGE OR CRACKS PRIOR TO RE-INSTALLATION. CARE MUST BE TAKEN TO REMOVE DIRT AND DEBRIS FROM THE PUSH-TO-CONNECT FITTING. FAILURE TO DO SO COULD RESULT IN THE PUSH-TO-CONNECT-FITTING FAILING TO SEAL WITH THE AIR LINE.

**WARNING**

WHEN SERVICING THE VEHICLE OR ATTACHING AN AIR SPRING, PRIOR TO AIRING UP THE SUSPENSION SYSTEM, MAKE CERTAIN THE AIR SPRING LOCATOR IS INDEXED INTO THE UPPER AIR SPRING BRACKET PROPERLY, THE LOCK TABS ARE SNAPPED INTO PLACE, AND THE AIR SPRING IS FULLY SEATED ON THE AIR SPRING 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 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.

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

4. Remove the air from the air system by disconnecting the height control valve linkage(s) at the rubber grommet(s) and allowing the lever(s) to drop. This will exhaust air from the system.

5. Remove the delivery line from the left air spring.

6. Remove the left air spring.

7. Loosen the right side clamp group.

8. Loosen and remove the left clamp group mounting fasteners and discard.

9. Install a jack underneath the left leaf spring in front of the axle.

10. Raise the jack and lift the left leaf spring off the axle seat. Position the jack far enough away from the axle to allow removal of the axle spacer, see Figure 9-79.

FIGURE 9-79

It may be necessary to remove the dowel pin to get the axle spacer out.

11. Remove the axle spacer from the left leaf spring and clamp group and replace with the new axle spacer provided in the kit which reduces the spacer by 10 mm. If there is no spacer in the kit, DO NOT use a spacer on the left hand side. It is not necessary to cut the dowel pin.

SERVICE HINT

12. Reinstall the dowel pin in the axle wrap if removed.

13. Lower the leaf spring onto the axle wrap. Ensure the dowel pin engages the leaf spring and the top pad.

15. 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 9-80.

**FIGURE 9-80**

16. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper pattern to achieve uniform bolt tension, see Figure 9-81.

17. Remove the left upper air spring bracket and discard. Follow the vehicle manufacturer’s procedure for Huck bolt removal.

18. Install the new left upper air spring bracket and height control valve mounting bracket, see Figure 9-82.

**FIGURE 9-82**

19. Tighten the upper left air spring fasteners to vehicle manufacturer’s specifications.

20. Install the new left side height control valve assembly on the left side upper air spring mounting bracket. The height control valve mounts on the inboard side of the bracket.

21. Install the left air spring.

22. Install the new height control valve link mount on the left top wrap.

23. Install the left air spring delivery line into the new height control valve supply port.
24. Install a new ¼" air line from the left height control valve delivery port and into the left air spring fitting.

25. Cut the new line to length. Ensure that the ends of the line are cut square and air lines are fully seated in the fittings.

**NOTE**

The supply line from the tank will continue to be the supply line for both height control valves.

26. It will be necessary to cut the supply line where it is routed (through the right frame rail hole or underneath the frame rail) and install a T-fitting at this location, see Figure 9-83.

27. Install the two ends of the cut supply line into the two T-fitting ports.

28. Remove the former left air spring delivery line from the right height control valve, this will now be converted to the left height control valve supply line.

29. Install the air line into the remaining port on the T-fitting supply line inside the right frame rail. Trim line if necessary.

30. There are two options to plumb the right height control valve to the right air spring, see Figure 9-84.

**OPTION 1:**
- Plug one delivery port on the right height control valve with a suitable fitting.
- Install an air line from the remaining delivery port to the right air spring.
- It is acceptable to reuse the old line if it is in good condition.

**OPTION 2:**
- Install two air lines into the delivery ports of the right height control valve.
- Cut one line and install a T-fitting.
- Insert the other delivery line into the T-fitting.
- Cut to length and install a line out of the T-fitting and into the air spring.

31. Secure all air lines inside the frame rail with plastic ties as necessary.

32. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.

33. Air up the suspension.

34. Install the height control valve linkage(s) and inflate the suspension to normal operating pressure.

35. Remove the wheel chocks.

36. Verify proper ride height and adjust if necessary. Refer to the Alignment & Adjustments Section of this publication.
SECTION 10
Plumbing Diagrams

SINGLE PLUMBING DIAGRAM

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

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.

½" Nylon Air Line
S.A.E., D.O.T. Compliant
Use convoluted tubing over all nylon air lines
SECTION 11
Torque Specifications

ΑIRTEK for Freightliner Vehicles built with STEERTEK NXT axle after November 2011

HENDRICKSON RECOMMENDED TORQUE VALUES
PROVIDED IN FOOT POUNDS

Torque Specifications
**AIRTEK® with STEERTEK NXT for Freightliner Vehicles**

**Freightliner Vehicles built after November 2011**

### HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

<table>
<thead>
<tr>
<th>NO.</th>
<th>COMPONENT</th>
<th>QUANTITY</th>
<th>SIZE</th>
<th>*TORQUE VALUE (in foot pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front Frame Hanger to Front Leaf Spring Eye at the Bolt Head</td>
<td>2</td>
<td>¾&quot;</td>
<td>216-266</td>
</tr>
<tr>
<td>2</td>
<td>Shackle Bracket to Shackle at the Bolt Head</td>
<td>2</td>
<td>¾&quot;</td>
<td>216-266</td>
</tr>
<tr>
<td>3</td>
<td>Shackle Bracket to Rear Leaf Spring Eye at the Bolt Head</td>
<td>2</td>
<td>¾&quot;</td>
<td>216-266</td>
</tr>
<tr>
<td>4</td>
<td>Air Spring</td>
<td>None</td>
<td>Self Locking</td>
<td>Snap Fit</td>
</tr>
<tr>
<td>5</td>
<td>Height Control Valve to Air Spring Bracket</td>
<td>2</td>
<td>¼&quot;</td>
<td>7-10</td>
</tr>
<tr>
<td>6</td>
<td>Height Control Valve to Linkage Rod</td>
<td>1</td>
<td>5/16&quot;</td>
<td>10-12</td>
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<tr>
<td>7</td>
<td>Height Control Valve Stud to Linkage Grommet</td>
<td>None</td>
<td>Grommet</td>
<td>Push In</td>
</tr>
<tr>
<td>8</td>
<td>Link Mount to Linkage Grommet</td>
<td>None</td>
<td>Grommet</td>
<td>Push In</td>
</tr>
<tr>
<td>9</td>
<td>Spring Center Alignment Pin</td>
<td>1</td>
<td>½&quot;</td>
<td>Loose Fit</td>
</tr>
<tr>
<td>10</td>
<td>Clamp Group Hardware</td>
<td>4</td>
<td>¾&quot;</td>
<td>285-305</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>NO.</th>
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<th>SIZE</th>
<th>*TORQUE VALUE (in foot pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Knuckle Attachment Bolt (Socket Head Cap Screw)</td>
<td>2</td>
<td>5/8&quot;</td>
<td>175-200</td>
</tr>
<tr>
<td>12</td>
<td>Knuckle / Axle Wheel Stop Bolt</td>
<td>1</td>
<td>5/8&quot; Jam Nut</td>
<td>40-60</td>
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<tr>
<td>13</td>
<td>Tie Rod Tube to Tie Rod Ends</td>
<td>2</td>
<td>5/8&quot;</td>
<td>60-75</td>
</tr>
<tr>
<td>14</td>
<td>Tie Rod Ends to Lower Steering Knuckle</td>
<td>2</td>
<td>7/8&quot; Castle Nut</td>
<td>**185</td>
</tr>
<tr>
<td>15</td>
<td>Shock Eye Bolts</td>
<td>2</td>
<td>¾&quot;</td>
<td>225-255</td>
</tr>
<tr>
<td>16</td>
<td>Link Mount to Axle Seat</td>
<td>1</td>
<td>3/8&quot;</td>
<td>30-40</td>
</tr>
<tr>
<td>17</td>
<td>Grease Cap Assembly, Upper and Lower</td>
<td>4</td>
<td>½&quot;</td>
<td>50-70</td>
</tr>
<tr>
<td>18</td>
<td>Grease Zerk</td>
<td>2</td>
<td></td>
<td>Minimum of 15</td>
</tr>
</tbody>
</table>

• All hardware ¼" and greater is Grade 8 with no additional lubrication.

**NOTES:**

* All hardware shown in gray denotes fasteners originally supplied by the vehicle manufacturer. Torque values shown apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow the torque specification listed in the vehicle manufacturer’s service manual.

** Tighten to 185 foot pounds torque, advance nut to next hex face to install cotter pin. DO NOT back off nut for cotter pin installation.
Vehicles built with STEERTEK NXT axle after November 2011

HENDRICKSON RECOMMENDED TORQUE VALUES
PROVIDED IN FOOT POUNDS
## AIRTEK

**Western Star Vehicles built after November 2011**

### HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

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<th>COMPONENT</th>
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<th>SIZE</th>
<th><em>TORQUE VALUE (in foot pounds)</em></th>
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<td></td>
<td>Frame fasteners are furnished and installed by the vehicle manufacturer. Vehicle manufacturer may use an equivalent HUCK fastener at frame mount.</td>
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<td><em>216-266</em></td>
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<tr>
<td>2</td>
<td>Shackle Bracket to Shackle at the Bolt Head</td>
<td>2</td>
<td>¼&quot;</td>
<td><em>216-266</em></td>
</tr>
<tr>
<td>3</td>
<td>Shackle Bracket to Rear Leaf Spring Eye at the Bolt Head</td>
<td>2</td>
<td>¼&quot;</td>
<td><em>216-266</em></td>
</tr>
<tr>
<td>4</td>
<td>Air Spring</td>
<td>None</td>
<td>Self Locking</td>
<td>Snap Fit</td>
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<tr>
<td>5</td>
<td>Height Control Valve to Air Spring Bracket</td>
<td>2</td>
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<td>6</td>
<td>Height Control Valve to Linkage Rod</td>
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**WARNING**

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**NOTES:**

* All hardware shown in gray denotes fasteners originally supplied by the vehicle manufacturer. Torque values shown apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow the torque specification listed in the vehicle manufacturer’s service manual.

** Tighten to 185 foot pounds torque, advance nut to next hex face to install cotter pin. DO NOT back off nut for cotter pin installation.
Vehicles built with STEERTEK axle between May 2010 and November 2011

HENDRICKSON RECOMMENDED TORQUE VALUES
PROVIDED IN FOOT POUNDS
### AIRTEK

**Freightliner Vehicles built between May 2010 and November 2011**

#### HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

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<th>SIZE</th>
<th>*TORQUE VALUE (in foot pounds)</th>
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<td></td>
<td><strong>WARNING</strong> DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.</td>
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<tr>
<td>1</td>
<td>Front Frame Hanger to Front Leaf Spring Eye at the Bolt Head</td>
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<tr>
<td>4</td>
<td>Air Spring</td>
<td>None</td>
<td>Self Locking</td>
<td>Snap Fit</td>
</tr>
<tr>
<td>5</td>
<td>Height Control Valve to Air Spring Bracket</td>
<td>2</td>
<td>1/4&quot;</td>
<td>7-10</td>
</tr>
<tr>
<td>6</td>
<td>Height Control Valve to Linkage Rod</td>
<td>1</td>
<td>5/8&quot;</td>
<td>10-12</td>
</tr>
<tr>
<td>7</td>
<td>Height Control Valve Stud to Linkage Grommet</td>
<td>None</td>
<td>Grommet</td>
<td>Push In</td>
</tr>
<tr>
<td>8</td>
<td>Link Mount to Linkage Grommet</td>
<td>None</td>
<td>Grommet</td>
<td>Push In</td>
</tr>
<tr>
<td>9</td>
<td>Spring Center Alignment Pin</td>
<td>1</td>
<td>1/2&quot;</td>
<td>Loose Fit</td>
</tr>
<tr>
<td>10</td>
<td>Axle Wrap Liners for Clamp Group</td>
<td>None</td>
<td>Formed</td>
<td>Snap Fit</td>
</tr>
<tr>
<td>11</td>
<td>Clamp Group Hardware</td>
<td>*4</td>
<td>3/4&quot;</td>
<td>285-305</td>
</tr>
<tr>
<td>12</td>
<td>Knuckle Attachment Bolt (Socket Head Cap Screw)</td>
<td>*2</td>
<td>5/8&quot;</td>
<td>175-200</td>
</tr>
<tr>
<td>13</td>
<td>Knuckle / Axle Wheel Stop Bolt</td>
<td>*1</td>
<td>5/8&quot; Jam Nut</td>
<td>40-60</td>
</tr>
<tr>
<td>14</td>
<td>Tie Rod Tube to Tie Rod Ends</td>
<td>2</td>
<td>5/8&quot;</td>
<td>60-75</td>
</tr>
<tr>
<td>15</td>
<td>Tie Rod Ends to Lower Steering Knuckle</td>
<td>2</td>
<td>7/8&quot; Castle Nut</td>
<td>**185</td>
</tr>
<tr>
<td>16</td>
<td>Shock Eye Bolts</td>
<td>2</td>
<td>3/4&quot;</td>
<td>225-255</td>
</tr>
<tr>
<td>17</td>
<td>Link Mount to Top Axle Wrap</td>
<td>1</td>
<td>3/4&quot;</td>
<td>30-40</td>
</tr>
</tbody>
</table>

- **All hardware 1/4" and greater is Grade 8 with no additional lubrication.**

**NOTES:**

- * All hardware shown in gray denotes fasteners originally supplied by the vehicle manufacturer. Torque values shown apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow the torque specification listed in the vehicle manufacturer’s service manual.
- ** Tighten to 185 foot pounds torque, advance nut to next hex face to install cotter pin. DO NOT back off nut for cotter pin installation.
- **Vehicles** built with **STEERTEK** axle between June 2010 and November 2011

**HENDRICKSON RECOMMENDED TORQUE VALUES**
**PROVIDED IN FOOT POUNDS**

*1.* 216-266
*2.* 216-266

1175-200

14. **185**

13. 60-75

10. 285-305

12. 40-60

15. 225-255

16. 30-40

9. Snap Fit

8. Loose Fit

15. 225-255

16. 30-40

8. Loose Fit

15. 225-255

15. 225-255

15. **225-255**

216-266

216-266

7. Push-In

3. Snap Fit

6. Push-In

4. 7-10

13. 60-75

12. 40-60

12. 40-60

11. **185**

11. 175-200

14. **185**

9. Snap Fit

16. 30-40

15. 225-255

15. 225-255

11. 175-200

15. 225-255

15. 225-255

16. 30-40

8. Loose Fit

15. 225-255

15. 225-255

15. 225-255

15. **225-255**
**AIRTEK® with STEERTEK for Western Star Vehicles**

**Western Star Vehicles built between June 2010 and November 2011**

**HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS**

<table>
<thead>
<tr>
<th>NO.</th>
<th>COMPONENT</th>
<th>QUANTITY</th>
<th>SIZE</th>
<th>*TORQUE VALUE (in foot pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frame fasteners are furnished and installed by the vehicle manufacturer. Vehicle manufacturer may use an equivalent HUCK fastener at frame mount.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Shackle Bracket to Shackle at the bolt head</td>
<td>2</td>
<td>¾&quot;</td>
<td>216-266</td>
</tr>
<tr>
<td>2</td>
<td>Shackle Bracket to Rear Leaf Spring Eye at the bolt head</td>
<td>2</td>
<td>¾&quot;</td>
<td>216-266</td>
</tr>
<tr>
<td>3</td>
<td>Air Spring</td>
<td>None</td>
<td>Self Locking</td>
<td>Snap Fit</td>
</tr>
<tr>
<td>4</td>
<td>Height Control Valve to Air Spring Bracket</td>
<td>2</td>
<td>¼&quot;</td>
<td>7-10</td>
</tr>
<tr>
<td>5</td>
<td>Height Control Valve to Linkage Rod</td>
<td>1</td>
<td>5/16&quot;</td>
<td>10-12</td>
</tr>
<tr>
<td>6</td>
<td>Height Control Valve Stud to Linkage Grommet</td>
<td>None</td>
<td>Grommet</td>
<td>Push In</td>
</tr>
<tr>
<td>7</td>
<td>Link Mount to Linkage Grommet</td>
<td>None</td>
<td>Grommet</td>
<td>Push In</td>
</tr>
<tr>
<td>8</td>
<td>Spring Center Alignment Pin</td>
<td>1</td>
<td>½&quot;</td>
<td>Loose Fit</td>
</tr>
<tr>
<td>9</td>
<td>Axle Wrap Liners for Clamp Group</td>
<td>None</td>
<td>Formed</td>
<td>Snap Fit</td>
</tr>
</tbody>
</table>

**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.

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<tr>
<td>10</td>
<td>Clamp Group Hardware</td>
<td>*4</td>
<td>¾&quot;</td>
<td>285-305</td>
</tr>
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</table>

**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.

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<td>175-200</td>
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<td>*1</td>
<td>5/8&quot; Jam Nut</td>
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<td>Tie Rod Tube to Tie Rod Ends</td>
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<td>5/8&quot;</td>
<td>60-75</td>
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<td>¾&quot;</td>
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<td>16</td>
<td>Link Mount to Top Axle Wrap</td>
<td>1</td>
<td>3/8&quot;</td>
<td>30-40</td>
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**NOTES:**  
* All hardware shown in gray denotes fasteners originally supplied by the vehicle manufacturer. Torque values shown apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow the torque specification listed in the vehicle manufacturer’s service manual.

**WARNING**  
Tighten to 185 foot pounds torque, advance nut to next hex face to install cotter pin. **DO NOT** back off nut for cotter pin installation.
- Vehicles built with STEERTEK axle
  - Freightliner Vehicles built prior to May 2010 • Western Star Vehicles built prior to June 2010 • Sterling Vehicles built prior to April 2009

HENDRICKSON RECOMMENDED TORQUE VALUES
PROVIDED IN FOOT POUNDS

Torque Specifications

120
### AIRTEK

**Freightliner** Vehicles built prior to May 2010 • **Western Star** Vehicles built prior to June 2010 • **Sterling** Vehicles built prior to April 2009

### HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Front Frame Hanger to Front Leaf Spring Eye</td>
<td>2</td>
<td>¾&quot;</td>
<td>*285-305</td>
</tr>
<tr>
<td>2</td>
<td>Rear Hanger to Rear Hanger Clamp</td>
<td>4</td>
<td>¼&quot;</td>
<td>7-10</td>
</tr>
<tr>
<td>3</td>
<td>Rear Hanger to Rear Spring Mount</td>
<td>2</td>
<td>¾&quot;</td>
<td>285-305</td>
</tr>
<tr>
<td>4</td>
<td>Rear Spring Mount to Rear Leaf Spring</td>
<td>2</td>
<td>½&quot;</td>
<td>80-110</td>
</tr>
<tr>
<td>5</td>
<td>Air Spring</td>
<td>None</td>
<td>Self Locking Snap Fit</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Height Control Valve to Air Spring Bracket</td>
<td>2</td>
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</tr>
<tr>
<td>7</td>
<td>Height Control Valve to Linkage Rod</td>
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<td>Height Control Valve Stud to Linkage Grommet</td>
<td>None</td>
<td>Grommet</td>
<td>Push In</td>
</tr>
<tr>
<td>9</td>
<td>Link Mount to Linkage Grommet</td>
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<td>Grommet</td>
<td>Push In</td>
</tr>
<tr>
<td>10</td>
<td>Spring Center Alignment Pin</td>
<td>1</td>
<td>½&quot;</td>
<td>Loose Fit</td>
</tr>
<tr>
<td>11</td>
<td>Axle Wrap Liners for Clamp Group</td>
<td>None</td>
<td>Formed</td>
<td>Snap Fit</td>
</tr>
<tr>
<td>12</td>
<td>Clamp Group Hardware</td>
<td>*4</td>
<td>¾&quot;</td>
<td>285-305</td>
</tr>
</tbody>
</table>

**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.

<table>
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<th>COMPONENT</th>
<th>QUANTITY</th>
<th>SIZE</th>
<th>*TORQUE VALUE (in foot pounds)</th>
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<tr>
<td>13</td>
<td>Knuckle Attachment Bolt (Socket Head Cap Screw)</td>
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<td>Tie Rod Ends to Lower Steering Knuckle</td>
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<td>Shock Eye Bolts</td>
<td>2</td>
<td>¾&quot;</td>
<td>225-255</td>
</tr>
<tr>
<td>18</td>
<td>Link Mount to Top Axle Wrap (Right Side Only if Single HCV, both Sides if Dual Height Valves)</td>
<td>1</td>
<td>3/8&quot;</td>
<td>30-40</td>
</tr>
</tbody>
</table>

**ALL HARDWARE ¼" AND GREATER IS GRADE 8 WITH NO ADDITIONAL LUBRICATION.**

### NOTES:

* All hardware shown in gray denotes fasteners originally supplied by the vehicle manufacturer. Torque values shown apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow the torque specification listed in the vehicle manufacturer's service manual.

** Tighten to 185 foot pounds torque, advance nut to next hex face to install cotter pin. DO NOT back off nut for cotter pin installation.
## SECTION 12
Troubleshooting Guide

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>POSSIBLE CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worn or damaged kingpins and kingpin bushings</td>
<td>Dirt in system– contaminated lubricant</td>
<td>Polish and inspect kingpin, replace bushing and seals, then follow specified lubrication procedures</td>
</tr>
<tr>
<td></td>
<td>Incorrect lubricant</td>
<td>Lubricate axle with specified lubricant</td>
</tr>
<tr>
<td></td>
<td>Axle not lubricated at scheduled frequency</td>
<td>Lubricant axle at scheduled frequency</td>
</tr>
<tr>
<td></td>
<td>Incorrect lubrication procedures</td>
<td>Use correct lubrication procedures</td>
</tr>
<tr>
<td></td>
<td>Lubrication interval not compatible with operating conditions</td>
<td>Change lubrication interval to match operating conditions</td>
</tr>
<tr>
<td></td>
<td>Worn or missing seals</td>
<td>Replace worn or missing seals</td>
</tr>
<tr>
<td>Vibration or shimmy of front axle during operation</td>
<td>Caster out of specification</td>
<td>Check ride height prior and adjust caster to specification</td>
</tr>
<tr>
<td></td>
<td>Wheels and/or tires out of balance</td>
<td>Balance or replace wheels and/or tires</td>
</tr>
<tr>
<td></td>
<td>Worn shock absorbers</td>
<td>Replace shock absorbers</td>
</tr>
<tr>
<td></td>
<td>Worn thrust washers and rear hanger clamps</td>
<td>Replace thrust washers and rear hanger clamps</td>
</tr>
<tr>
<td></td>
<td>Broken engine mount</td>
<td>Replace engine mount</td>
</tr>
<tr>
<td></td>
<td>Wheel bearing adjustment</td>
<td>Adjust wheel bearing to the vehicle manufacturer’s specifications.</td>
</tr>
<tr>
<td>Excessive wear on tires or uneven tire tread wear</td>
<td>Tires have incorrect air pressure</td>
<td>Adjust tire pressure to the vehicle manufacturer’s specification.</td>
</tr>
<tr>
<td></td>
<td>Tires out of balance</td>
<td>Balance or replace tires</td>
</tr>
<tr>
<td></td>
<td>Incorrect tandem axle alignment</td>
<td>Align tandem axles</td>
</tr>
<tr>
<td></td>
<td>Incorrect toe setting</td>
<td>Adjust toe-in to the vehicle manufacturer’s specification</td>
</tr>
<tr>
<td></td>
<td>Incorrect steering arm geometry</td>
<td>Repair steering system as necessary</td>
</tr>
<tr>
<td></td>
<td>Worn kingpin bushings</td>
<td>Replace kingpin bushings</td>
</tr>
<tr>
<td></td>
<td>Excessive wheel bearing end play</td>
<td>Check specified wheel nut torque, replace worn or damaged wheel bearings</td>
</tr>
<tr>
<td></td>
<td>Wheel bearing adjustment</td>
<td>Adjust wheel bearing to the vehicle manufacturer’s specifications.</td>
</tr>
<tr>
<td>Vehicle is hard to steer</td>
<td>Low pressure in the power steering system</td>
<td>Repair power steering system</td>
</tr>
<tr>
<td></td>
<td>Steering linkage needs lubrication</td>
<td>Lubricate steering linkage</td>
</tr>
<tr>
<td></td>
<td>Steering knuckles are binding</td>
<td>Check vertical clearance</td>
</tr>
<tr>
<td></td>
<td>Incorrect steering arm geometry</td>
<td>Repair steering system as necessary</td>
</tr>
<tr>
<td></td>
<td>Caster out of specification</td>
<td>Check ride height prior and adjust caster to specification</td>
</tr>
<tr>
<td></td>
<td>Tie rod ends hard to move</td>
<td>Replace tie rod ends</td>
</tr>
<tr>
<td></td>
<td>Worn thrust bearing</td>
<td>Replace thrust bearing</td>
</tr>
<tr>
<td></td>
<td>Steering gear box internal problem</td>
<td>Perform steering gear trouble shooting procedures per steering gear manufacturing guidelines.</td>
</tr>
<tr>
<td>CONDITION</td>
<td>POSSIBLE CAUSE</td>
<td>CORRECTION</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>Tie rod ends are worn and require replacement</td>
<td>Tie rod ends need lubrication</td>
<td>Lubricate tie rod end. Make sure lubrication schedule is followed.</td>
</tr>
<tr>
<td></td>
<td>Severe operating conditions</td>
<td>Increase frequency of inspection and lubrication intervals</td>
</tr>
<tr>
<td></td>
<td>Damaged boot on tie rod end</td>
<td>Replace tie rod end</td>
</tr>
<tr>
<td>Bent or broken cross tube, tie rod end ball stud or tie rod end</td>
<td>Pump/gear relief valve pressure setting exceeds system specifications</td>
<td>Adjust power steering system to manufacturer’s specified pressure</td>
</tr>
<tr>
<td></td>
<td>Steering gear poppets improperly set or malfunctioning</td>
<td>Check for proper operation or adjust poppets to OEM specifications</td>
</tr>
<tr>
<td></td>
<td>Axle stops improperly set</td>
<td>Set axle stops to OEM specifications</td>
</tr>
<tr>
<td></td>
<td>Severe duty cycle service</td>
<td>Increase frequency of inspection and lubrication intervals</td>
</tr>
<tr>
<td>NOTE: Damaged components require replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worn or broken steering ball stud</td>
<td>Drag link fasteners lightened past specified torque</td>
<td>Tighten drag link fasteners to the specified torque</td>
</tr>
<tr>
<td></td>
<td>Lack of lubrication or incorrect lubricant</td>
<td>Lubricate linkage with specified lubricant</td>
</tr>
<tr>
<td></td>
<td>Power steering stops out of adjustment</td>
<td>Adjust steering stops to OEM specifications</td>
</tr>
<tr>
<td>Suspension has harsh or bumpy ride</td>
<td>Air spring not inflated</td>
<td>Check air supply to air spring, repair as necessary</td>
</tr>
<tr>
<td></td>
<td>Air spring ride height out of specification</td>
<td>Adjust ride height to proper specification</td>
</tr>
<tr>
<td></td>
<td>Broken or worn leaf spring</td>
<td>Replace leaf spring</td>
</tr>
<tr>
<td></td>
<td>Front suspension overloaded</td>
<td>Redistribute steer axle load</td>
</tr>
<tr>
<td>Restricted steering radius</td>
<td>Steering stops not adjusted correctly</td>
<td>Adjust steering stops to achieve correct wheel cut</td>
</tr>
<tr>
<td>Vehicle leans</td>
<td>Ride height incorrect</td>
<td>Adjust ride height to specification</td>
</tr>
<tr>
<td></td>
<td>Air spring(s) are not inflated</td>
<td>Repair source of air pressure loss</td>
</tr>
<tr>
<td></td>
<td>Suspension is not torqued correctly at installation</td>
<td>Perform AIRTEK spring hanger re-torque procedure. See Torque Specification Section of this publication</td>
</tr>
<tr>
<td></td>
<td>Leaf spring broken</td>
<td>Replace leaf spring</td>
</tr>
<tr>
<td></td>
<td>Excessive weight bias</td>
<td>Contact vehicle manufacturer or Hendrickson Tech Services</td>
</tr>
<tr>
<td>Vehicle wanders</td>
<td>Caster out of specifications</td>
<td>Check ride height prior and adjust caster to specification</td>
</tr>
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<td></td>
<td>Incorrect toe setting</td>
<td>Adjust toe to specification</td>
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<tr>
<td></td>
<td>Fifth wheel not greased</td>
<td>Grease fifth wheel</td>
</tr>
<tr>
<td></td>
<td>Air in the power steering system</td>
<td>Remove air from the power steering systems</td>
</tr>
<tr>
<td></td>
<td>Rear ride height out of adjustment</td>
<td>Adjust ride height to specification</td>
</tr>
<tr>
<td></td>
<td>Front ride height out of adjustment</td>
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<tr>
<td>Vibration or shimmy of front axle during operation</td>
<td>Caster out of specification</td>
<td>Adjust caster</td>
</tr>
<tr>
<td></td>
<td>Wheels and/or tires out of balance</td>
<td>Balance or replace wheels and/or tires</td>
</tr>
<tr>
<td></td>
<td>Worn shock absorbers</td>
<td>Replace shock absorbers</td>
</tr>
<tr>
<td></td>
<td>Wheel bearing adjustment</td>
<td>Adjust wheel bearing to vehicle manufacturer’s specifications</td>
</tr>
<tr>
<td>Excessive wear on tires or uneven tire tread wear</td>
<td>Tires have incorrect air pressure</td>
<td>Adjust tire pressure to the manufacturer’s specification</td>
</tr>
<tr>
<td></td>
<td>Tires out of balance</td>
<td>Balance or replace tires</td>
</tr>
<tr>
<td></td>
<td>Incorrect tandem axle alignment</td>
<td>Align tandem axles</td>
</tr>
<tr>
<td></td>
<td>Incorrect toe setting</td>
<td>Adjust toe-in to the vehicle manufacturer’s specification</td>
</tr>
<tr>
<td></td>
<td>Incorrect steering arm geometry</td>
<td>Repair steering system as necessary</td>
</tr>
<tr>
<td></td>
<td>Excessive wheel bearing end play</td>
<td>Check specified wheel nut torque, replace worn or damaged wheel bearings</td>
</tr>
<tr>
<td></td>
<td>Wheel bearing adjustment</td>
<td>Adjust wheel bearing to the vehicle manufacturer’s specifications</td>
</tr>
<tr>
<td>Vehicle is hard to steer</td>
<td>Low pressure in the power steering system</td>
<td>Repair power steering system</td>
</tr>
<tr>
<td></td>
<td>Steering linkage needs lubrication</td>
<td>Lubricate steering linkage</td>
</tr>
<tr>
<td></td>
<td>Steering knuckles are binding</td>
<td>Check vertical clearance</td>
</tr>
<tr>
<td></td>
<td>Incorrect steering arm geometry</td>
<td>Repair steering system as necessary</td>
</tr>
<tr>
<td></td>
<td>Caster out of adjustment</td>
<td>Adjust caster as necessary</td>
</tr>
<tr>
<td></td>
<td>Tie rod ends hard to move</td>
<td>Replace tie rod ends</td>
</tr>
<tr>
<td></td>
<td>Worn thrust bearing</td>
<td>Replace thrust bearing</td>
</tr>
</tbody>
</table>
### STEERTEK NXT / STEERTEK

**TROUBLESHOOTING GUIDE (Continued)**

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>POSSIBLE CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tie rod ends are worn and require replacement</td>
<td>Tie rod ends need lubrication</td>
<td>Lubricate tie rod end. Make sure lubrication schedule is followed.</td>
</tr>
<tr>
<td></td>
<td>Severe operating conditions</td>
<td>Increase frequency of inspection and lubrication intervals</td>
</tr>
<tr>
<td></td>
<td>Damaged boot on tie rod end</td>
<td>Replace tie rod end</td>
</tr>
<tr>
<td>Bent or broken cross tube, tie rod end ball stud or tie rod end</td>
<td>Pump/gear relief valve pressure setting exceeds system specifications</td>
<td>Adjust power steering system to manufacturer’s specified pressure</td>
</tr>
<tr>
<td><strong>NOTE:</strong> Damage components require replacement</td>
<td>Steering gear poppets improperly set or malfunctioning</td>
<td>Check for proper operation or adjust poppets to OEM specifications</td>
</tr>
<tr>
<td></td>
<td>Axle stops improperly set</td>
<td>Set axle stops to OEM specifications</td>
</tr>
<tr>
<td></td>
<td>Axle stops improperly set</td>
<td>Increase frequency of inspection and lubrication intervals</td>
</tr>
<tr>
<td>Worn or broken steering ball stud</td>
<td>Drag link fasteners lightened past specified torque</td>
<td>Tighten drag link fasteners to the specified torque</td>
</tr>
<tr>
<td></td>
<td>Lack of lubrication or incorrect lubricant</td>
<td>Lubricate linkage with specified lubricant</td>
</tr>
<tr>
<td></td>
<td>Power steering stops out of adjustment</td>
<td>Adjust steering stops to OEM specifications</td>
</tr>
<tr>
<td>Suspension has harsh or bumpy ride</td>
<td>Broken or worn leaf spring</td>
<td>Replace leaf spring</td>
</tr>
<tr>
<td></td>
<td>Front suspension overloaded</td>
<td>Redistribute steer axle load</td>
</tr>
<tr>
<td>Restricted steering radius</td>
<td>Steering stops not adjusted correctly</td>
<td>Adjust steering stops to achieve correct wheel cut</td>
</tr>
<tr>
<td>Vehicle leans</td>
<td>Leaf spring broken</td>
<td>Replace leaf spring</td>
</tr>
<tr>
<td></td>
<td>Excessive weight bias</td>
<td>Contact the vehicle manufacturer or Hendrickson Tech Services</td>
</tr>
<tr>
<td>Vehicle wanders</td>
<td>Caster out of specification</td>
<td>Adjust caster to specification</td>
</tr>
<tr>
<td></td>
<td>Incorrect toe setting</td>
<td>Adjust toe to specification</td>
</tr>
<tr>
<td></td>
<td>Fifth wheel not greased</td>
<td>Grease fifth wheel</td>
</tr>
<tr>
<td></td>
<td>Air in the power steering system</td>
<td>Remove air form the power steering systems</td>
</tr>
</tbody>
</table>

---

**NOTE:**

- Damaged components require replacement.
SECTION 13
Front Wheel Alignment Specifications

<table>
<thead>
<tr>
<th>AIRTEK and STEERTEK w/ Mechanical Suspension – All Models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FRONT AIR MODULE SUSPENSION ALIGNMENT SPECIFICATION</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAMBER1</th>
<th>DESIGN SPECIFICATION</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AIRTEK</td>
<td>STEERTEK with Mechanical Suspension</td>
</tr>
<tr>
<td></td>
<td>MINIMUM</td>
<td>MAXIMUM</td>
</tr>
<tr>
<td>LEFT</td>
<td>0.0° ± 1.0°</td>
<td>-1.0°</td>
</tr>
<tr>
<td>RIGHT</td>
<td>- 0.0° ± 1.0°</td>
<td>-1.0°</td>
</tr>
<tr>
<td>CROSS</td>
<td>Max 2.0°</td>
<td>Max 2.0°</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>CASTER1,2,4</th>
<th>DESIGN SPECIFICATION</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AIRTEK</td>
<td>STEERTEK with Mechanical Suspension</td>
</tr>
<tr>
<td></td>
<td>MINIMUM</td>
<td>MAXIMUM</td>
</tr>
<tr>
<td>LEFT</td>
<td>3.75° ± 1°</td>
<td>See vehicle manufacturer's specifications</td>
</tr>
<tr>
<td>RIGHT</td>
<td>3.75° ± 1°</td>
<td>See vehicle manufacturer's specifications</td>
</tr>
<tr>
<td>CROSS3</td>
<td>Max 2.0°</td>
<td>Max 2.0°</td>
</tr>
</tbody>
</table>

**CASTER NOTES:**
1 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 specifications and procedure.
2 In most cases actual vehicle caster is defined with the frame rails at zero slope. Refer to the vehicle manufacturer’s specifications for correct frame rail slope. (Both the alignment surface and the vehicle’s frame rails should be level during execution of alignment procedures). For vehicles with a positive frame rake (higher in rear) add the frame slope (in degrees) to the caster reading to determine true vehicle caster.
3 The cross caster angle is not adjustable – **DO NOT** bend axle or otherwise try to adjust cross caster. If 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 different angle caster shims will not correct cross caster.**
4 **Example of caster adjustment:** 2.5° RH/3° LH, would require one, 1.0 shim on each side to increase caster and achieve 3.5° RH/4.0° LH, which is in specification. **DO NOT** attempt to use uneven shims.

**Hendrickson recommends following TMC2 practices:**

<table>
<thead>
<tr>
<th>TOTAL TOE2</th>
<th>DESIGN SPECIFICATION1</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/16&quot; ± 1/32&quot; (0.06&quot; ± 0.03&quot;)</td>
<td>1/32&quot; (0.03&quot;)</td>
</tr>
</tbody>
</table>

**TOE-IN NOTES:**
1 Toe-in is to be set and adjusted in the normal vehicle unloaded 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.
2 In most instances total toe is set by the vehicle manufacturer or body builder. Consult the vehicle manufacturer for specifications.
SECTION 14
Reference Material

This technical publication covers Hendrickson Truck Commercial Vehicle Systems’ recommended procedures for our parts/products. Other components play a major role in overall performance and Hendrickson recommends you follow the specific OEM’s recommendation for care and maintenance. Some recommended procedures have been developed by The Technology & Maintenance Council (TMC) and Hendrickson supports these recommendations. We have compiled a list of these below.

**TMC**

To obtain copies of the following RP’s, video’s, or charts, contact TMC at:

TMC/ATA
2200 Mill Road
Alexandria, VA 22314
Phone: 703-838-1763
website: tmc.truckline.com
online ordering: www.truckline.com/store

**Important References**

- TMC RP 214B Tire/Wheel End Balance and Runout
- TMC RP 216 Radial Tire Conditions Analysis Guide
- TMC RP 219A Radial Tire Wear Conditions and Causes
- TMC RP 222A User’s Guide to Wheels and Rims
- TMC RP 230 Tire Test Procedures for Tread wear, Serviceability, and Fuel Economy
- TMC RP 514 Pre-Alignment Inspection
- TMC RP 618 Wheel Bearing Adjustment Procedure
- TMC RP 620B Front End Alignment Steering Geometry
- TMC RP 708A Trailer Axle Alignment
- TMC RP 642 Guidelines For Total Vehicle Alignment
- TMC RP 644 Wheel End Conditions Analysis Guide
- TMC RP 645 Tie Rod End Inspection and Maintenance Procedure

**Video’s**

- TMC T0326 Wheel End Maintenance
- TMC T0372 Tire Pre-Trip Inspection Guidelines

**Other**

- TMC T0400 Wheel bearing Adjustment Procedure Wall Chart