



# **H** TECHNICAL PROCEDURE

## **SOFTEK® /AIRTEK® Front Suspension System for FCCC Motorhome Chassis**

**SUBJECT:** Service Instructions

**LIT NO:** 17730-253

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### TABLE OF CONTENTS

<b>Section 1</b>	<b>Introduction</b> . . . . .	2	<b>Section 9</b>	<b>Component Replacement</b> . . . . .	47
<b>Section 2</b>	<b>Product Description</b> . . . . .	2	Fasteners . . . . .	47	
<b>Section 3</b>	<b>Important Safety Notice</b> . . . . .	5	Height Control Valve – AIRTEK . . . . .	47	
<b>Section 4</b>	<b>Parts List</b> . . . . .	10	Air Spring – AIRTEK . . . . .	48	
<b>Section 5</b>	<b>Special Tools</b> . . . . .	18	Shock Absorber . . . . .	50	
<b>Section 6</b>	<b>Towing Procedures</b> . . . . .	19	Front Leaf Spring Frame Hanger . . . . .	51	
<b>Section 7</b>	<b>Preventive Maintenance</b> . . . . .	22	Rear Shackle Frame Bracket . . . . .	52	
Component Inspection . . . . .	22		Leaf Spring – SOFTEK . . . . .	54	
Clamp Group Re-Torque Interval . . . . .	23		Leaf Spring – AIRTEK . . . . .	57	
Lubrication Intervals . . . . .	24		Spring Eye Bushings . . . . .	60	
Kingpin Lubrication . . . . .	24		Bottom Axle Wrap (if equipped) . . . . .	60	
Tie Rod End Lubrication . . . . .	25		Top Axle Wrap in Chassis (if equipped) . . . . .	61	
Tie Rod End Inspection . . . . .	26		STEERTEK NXT / STEERTEK 1.5 Axle Removal . . . . .	63	
Front Thrust Washer Inspection . . . . .	28		STEERTEK Axle Removal . . . . .	70	
Rear Shackle Wear Pad Inspection . . . . .	28		Steering Knuckle Disassembly . . . . .	74	
Axle Wrap Liner Inspection (if equipped) . . . . .	30		Kingpin Preparation and Measurement . . . . .	74	
Shock Absorber Inspection . . . . .	30		Kingpin Bushing Removal . . . . .	76	
Tire Inspection . . . . .	32		Steering Knuckle Bore Measurement . . . . .	77	
Kingpin Bushing Inspection . . . . .	34		Kingpin Bushing Installation . . . . .	78	
Steering Knuckle Inspection . . . . .	35		Kingpin Bushing Reaming . . . . .	78	
			Kingpin Seal Installation . . . . .	80	
<b>Section 8</b>	<b>Alignment &amp; Adjustments</b> . . . . .	36	Steering Knuckle Assembly . . . . .	80	
Alignment Definitions . . . . .	36		Tie Rod End and Cross Tube . . . . .	82	
Inspection Prior to Alignment . . . . .	38		<b>Section 10</b>	<b>Plumbing Diagram</b> . . . . .	85
Front Wheel Alignment . . . . .	39		<b>Section 11</b>	<b>Torque Specifications</b> . . . . .	86
Steering Stop . . . . .	41		<b>Section 12</b>	<b>Troubleshooting Guide</b> . . . . .	94
Toe Setting . . . . .	42		<b>Section 13</b>	<b>Front Wheel Alignment Specifications</b> . . . . .	96
Spring Eye Re-Torque . . . . .	43		<b>Section 14</b>	<b>Reference Material</b> . . . . .	97
Height Control Valve Verification – AIRTEK . . . . .	44				

## SECTION 1

# Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair, and rebuild of the following Hendrickson equipment as installed on applicable FCCC Motorhome Chassis:

- **SOFTEK®** — An integrated steel spring front mechanical suspension with the STEERTEK NXT / STEERTEK 1.5 / STEERTEK axle.
- **AIRTEK®** — An integrated front air suspension with the STEERTEK NXT axle.
- **STEERTEK NXT / STEERTEK 1.5 / STEERTEK** — 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 SOFTEK / AIRTEK Suspensions and the STEERTEK NXT / STEERTEK 1.5 / STEERTEK 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), 1-630-910-2800 (outside U.S. and Canada) or e-mail: techservices@hendrickson-intl.com.

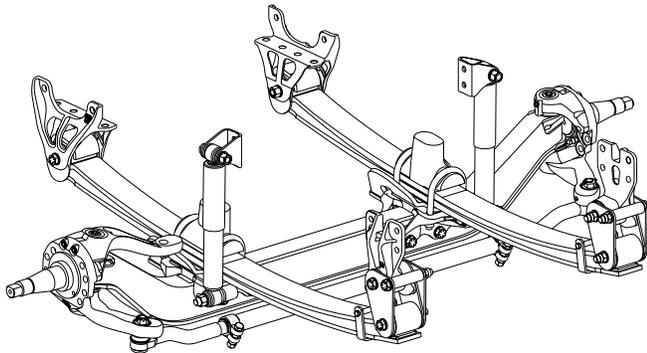
The latest revision of this publication is also available online at [www.hendrickson-intl.com](http://www.hendrickson-intl.com).

## SECTION 2

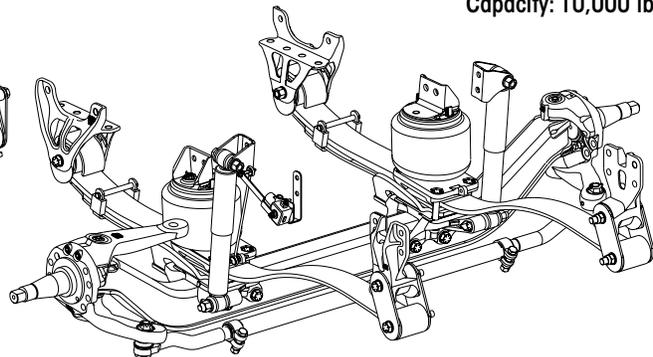
# Product Description

**FIGURE 2-1**

**SOFTEK Mechanical Suspension with STEERTEK NXT Axle**  
Capacity: 9,000 lb, 10,000 lb, 12,000 lb



**AIRTEK Air Suspension with STEERTEK NXT Axle**  
Capacity: 10,000 lb





**SOFTEK** — is an integrated front mechanical suspension and steer axle system designed for enhanced performance, durability and reduced maintenance. The advanced spring design of the SOFTEK integrated front mechanical suspension and steer axle system produces increased roll stability during cornering and crosswinds, creating a more stable platform. The design also delivers exceptional ride and handling for driver and passenger comfort, proving ideal for bus and motorhome applications.

**Heavy-duty parabolic leaf spring** — optimized two-leaf spring design and premium shocks result in an outstanding ride

**Jounce bumper** — integrated design enhances a smooth and comfortable ride

**Optimized steering system performance** — delivers an industry leading wheel cut of up to 55 degrees resulting in a tighter turning radius and outstanding maneuverability

**AIRTEK** — is an integrated front air suspension and steer axle system designed to deliver driver and passenger comfort, outstanding stability and extended vehicle life all in one package. Hendrickson's AIRTEK integrated front air suspension and steer axle system combines simple, functional design and state-of-the-art technology for superior ride, stability and handling. The same smooth, comfortable ride that cradles passengers and drivers reduces vibration-induced wear-and-tear to help extend overall vehicle and component life.

**High volume air springs** — support the vertical load and help produce a softer, more comfortable ride

**Leaf spring assembly** — forms a torsion system with the box section axle to increase roll stability

**Optimized steering system performance** — delivers an industry leading wheel cut of up to 55 degrees resulting in a tighter turning radius and superior maneuverability

**STEERTEK NXT Axle** — Integrated into the SOFTEK / AIRTEK system, the box-shaped axle 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, 3/4" U-bolts, washers and nylon Locknuts.

**Integrated Axle Seats** — Integrated axle seats to improve ground clearance, reduce part count, and simplify assembly.

**Adjustable Tie Rod** — To help maximize tire life, the tie rod easily adjusts toe-in/out.

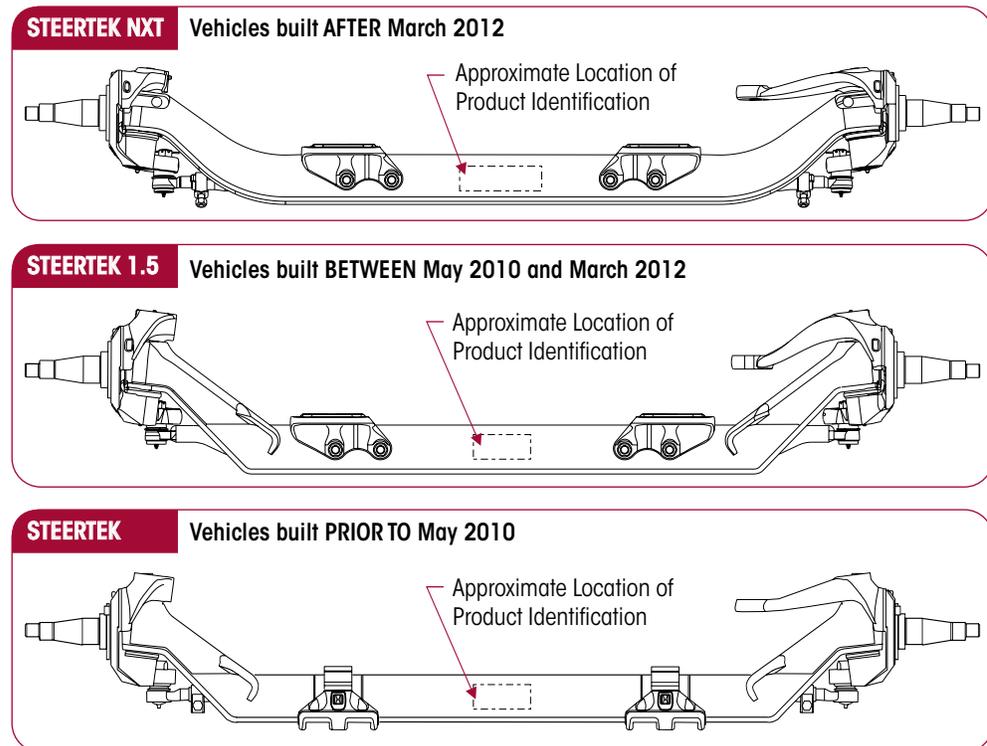
**Steering Knuckles** — The steering and tie rod arms are integrated for increased strength and reduced weight. The unique steering knuckle packaging delivers up to a maximum of 55° wheel cut. The two piece knuckle design makes replacing the kingpin bushings easier by eliminating the need to remove the kingpins.

## TECHNICAL NOTES

1. SOFTEK / AIRTEK is approved for 100% on-highway uses. All applications must comply with applicable Hendrickson specifications and must also be approved by the respective vehicle manufacturer with the vehicle in its original, as-built configuration. Contact Hendrickson and the respective vehicle manufacturer for approval of additional applications. This system has a 9,000, 10,000 and 12,000 pound capacity. System capacity represents maximum loads on tires at ground level.
2. STEERTEK NXT axle is available with 69.0" kingpin Intersection (KPI).
3. STEERTEK NXT axle offers 5.36" axle beam drop heights. Axle beam drop is measured from the kingpin intersection to the top of the axle spring seat (Top wrap).
4. SOFTEK suspension weight includes frame hangers, main springs, bushings, shocks, upper shock brackets and axle attachment hardware.
5. AIRTEK suspension weight includes frame and shackle bracket assemblies, main springs, bushings, air springs and air spring bracket, height control system, shocks, upper shock brackets and axle clamp group.
6. STEERTEK NXT axle system weight is based on a 4.25" drop height and a 69.0" KPI axle. Weight includes, the axle beam, knuckle/steering arm assemblies and tie rod assemblies.
7. SOFTEK / AIRTEK is integral to and 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 the vehicle or chassis and body manufacturer for more information.
8. STEERTEK NXT axle product identification is etched on the center front of the axle beam, providing the following information:
  - Axle part number: Identifies the features of the axle beam.
  - Axle assembly number: Identifies the complete assembly, which includes the steering knuckles and bracket assemblies.

**FIGURE 2-2**

Front view of axle showing approximate location of product identification.





### SECTION 3

## Important Safety Notice

Proper maintenance, service, and repair is important for 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.

All safety related information should be read carefully to help prevent personal injury and to assure that proper methods are used. Improper servicing may damage the vehicle, cause personal injury, render it unsafe in operation, or void 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.

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



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



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



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

#### NOTE

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

#### SERVICE HINT

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

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



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

## ■ SAFETY PRECAUTIONS

### WARNING

#### FASTENERS

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

### WARNING

#### LOAD CAPACITY

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

### 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

#### SHOCK ABSORBERS

THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE LEAF SPRINGS. ANYTIME THE FRONT AXLE ON AIRTEK/SOFTEK SUSPENSION IS SUSPENDED IT IS MANDATORY THAT THE SHOCK ABSORBERS REMAIN CONNECTED. FAILURE TO DO SO CAN CAUSE THE AIR SPRINGS (IF EQUIPPED) 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.

### WARNING

#### REPAIR AND RECONDITIONING

THE REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS IS NOT ALLOWED. SEE LABELS IN FIGURE 3-1, 3-2 AND 3-3. ANY AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS MUST BE REPLACED. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. AIRTEK AND SOFTEK 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.

**AXLE CAMBER IS NOT ADJUSTABLE.** DO NOT CHANGE THE AXLE CAMBER ANGLE OR BEND THE AXLE BEAM, SEE FIGURES 3-1, 3-2 AND 3-3. 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

#### 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, SEE FIGURES 3-1, 3-2 AND 3-3.

**NOTE:**

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

**FIGURE 3-1**

**STEERTEK NXT** Vehicles built **AFTER** March 2012

**HAIRTEK® SOFTEK® STEERTEK NXT**  
INTEGRATED FRONT SUSPENSION AND STEER AXLE SYSTEMS

Product and/or related components may be covered under one or more of the following patents:  
United States Patent Nos. 5938221, 6129369, 6616156, 6485040, 7862058, 7229088, Australian Patent Nos. 739738, 2001255740, 2002386922, Canadian Patent Nos. 2407033, 2323214, 2282375, 2603522, Mexican Patent Nos. 236599, 223541, 218317, 260294, India Patent No. 232011, European Patent Nos. 1037554, (DE, GB, FR, ES, IT, SE), 1044161 (DE, GB, FR, ES, IT, SE) and 1583672 (DE, GB, FR, IT, SE, BE, NL), Korean Patent No. 10-879897, Other United States and Foreign Patents Pending.

**HENDRICKSON**  
Truck Suspension Systems

**WARNING**

**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 Suspension Systems.

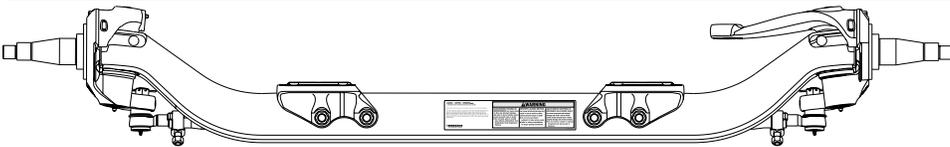
**IMPROPER JACKING METHOD** can cause structural damage and result in loss of vehicle control, severe personal injury or death.

- Do not use axle beam outboard of axle spring seats.
- Refer to vehicle manufacturer for proper jacking instructions.

**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 warranty.

- Do not remove, modify or replace integrated axle spring seat or fasteners

NO. 60905-021A


**FIGURE 3-2**

**STEERTEK 1.5** Vehicles built **BETWEEN** May 2010 and March 2012

**HAIRTEK® SOFTEK® COMTEK® STEERTEK**  
INTEGRATED FRONT SUSPENSION AND STEER AXLE SYSTEMS

THIS PRODUCT IS COVERED UNDER ONE OR MORE OF THE FOLLOWING PATENTS:  
US 5938221, US 6129369, US 6406008, US 6616156, US 6609764, US 6485040, AU 739738, OTHER U.S. AND FOREIGN PATENTS PENDING.

**HENDRICKSON**  
Truck Suspension Systems

**WARNING**

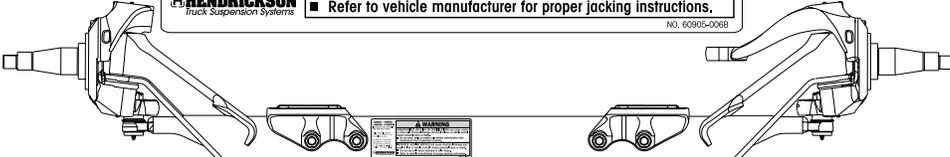
**UNAUTHORIZED WELDING OR MODIFICATIONS** can cause cracks or other axle structural damage and result in loss of vehicle control, severe personal injury or death.

- Do not bend, weld or modify axle without authorization from Hendrickson Truck Suspension Systems.

**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 wraps.
- Refer to vehicle manufacturer for proper jacking instructions.

NO. 60905-008B


**FIGURE 3-3**

**STEERTEK** Vehicles built **PRIOR** TO May 2010

**HAIRTEK® SOFTEK® COMTEK® STEERTEK**  
INTEGRATED FRONT SUSPENSION AND STEER AXLE SYSTEMS

THIS PRODUCT IS COVERED UNDER ONE OR MORE OF THE FOLLOWING PATENTS:  
US 5938221, US 6129369, US 6406008, US 6616156, US 6609764, US 6485040, AU 739738, OTHER U.S. AND FOREIGN PATENTS PENDING.

**HENDRICKSON**  
Truck Suspension Systems

**WARNING**

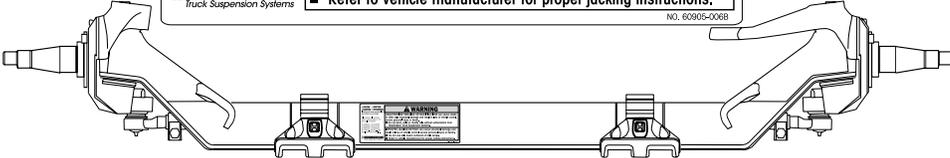
**UNAUTHORIZED WELDING OR MODIFICATIONS** can cause cracks or other axle structural damage and result in loss of vehicle control, severe personal injury or death.

- Do not bend, weld or modify axle without authorization from Hendrickson Truck Suspension Systems.

**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 wraps.
- Refer to vehicle manufacturer for proper jacking instructions.

NO. 60905-008B


**AXLE KINGPINS**

STEERTEK NXT / STEERTEK IS A UNIQUE AXLE, IN THAT THE KINGPINS ARE CRYOGENICALLY INSTALLED IN THE AXLE. THE KINGPINS ARE A NON-REPLACEABLE COMPONENT OF THE AXLE ASSEMBLY. DO NOT TRY TO REMOVE THE KINGPINS. IF THE KINGPINS SHOW SIGNS OF MOVEMENT, CONTACT THE HENDRICKSON TECHNICAL SERVICES DEPARTMENT.

** DANGER****STEEERTEK 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.

** 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 DEPARTMENT 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****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, WHICH CAN SLIP OR FALL OVER AND RESULT IN SERIOUS PERSONAL INJURY. ALWAYS SUPPORT A RAISED VEHICLE WITH SAFETY STANDS. BLOCK THE WHEELS AND MAKE SURE THE UNIT WILL NOT ROLL BEFORE RELEASING BRAKES.

** WARNING****TORCH/WELDING**

DO NOT USE A CUTTING TORCH TO REMOVE ANY ATTACHING FASTENERS. THE USE OF HEAT ON SUSPENSION AND AXLE 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 LEAF 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.

** WARNING****PARTS CLEANING**

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



**⚠ DANGER**

**AIR SPRINGS**

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

**⚠ WARNING**

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

**⚠ WARNING**

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

**⚠ CAUTION**

**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.

**⚠ WARNING**

**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.

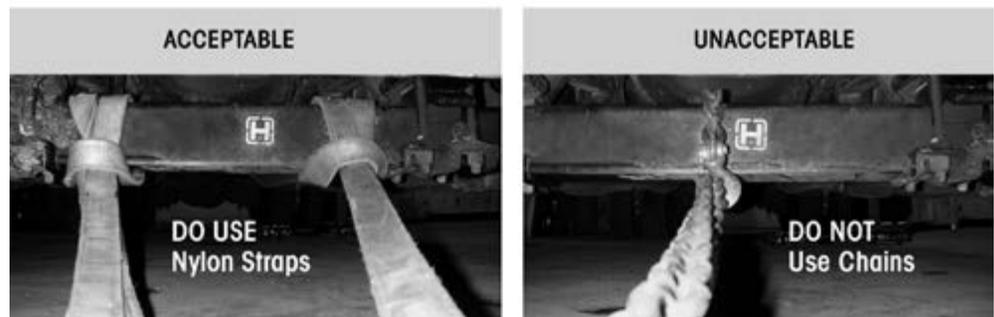
**⚠ WARNING**

**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 FROM 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 3-4, IN A MANNER THAT IS ACCEPTABLE FOR TOWING THE VEHICLE FROM A REPAIR FACILITY PARKING LOT INTO THE SHOP BAY. DO NOT USE A TOW CHAIN AROUND THE FRONT STEERTEK NXT / STEERTEK AXLE TO TOW THE VEHICLE, DOING SO WILL DAMAGE THE AXLE AND VOID ANY APPLICABLE WARRANTY, SEE FIGURE 3-4. FOR DETAILED INSTRUCTIONS FOR ON-HIGHWAY TOWING, SEE TOWING PROCEDURE SECTION OF THIS PUBLICATION.

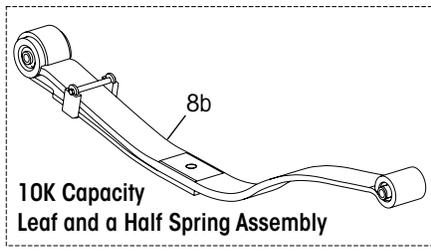
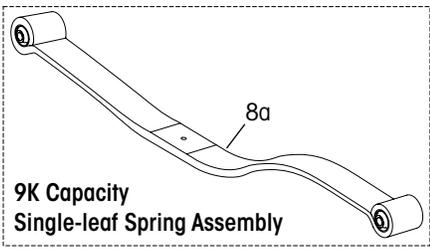
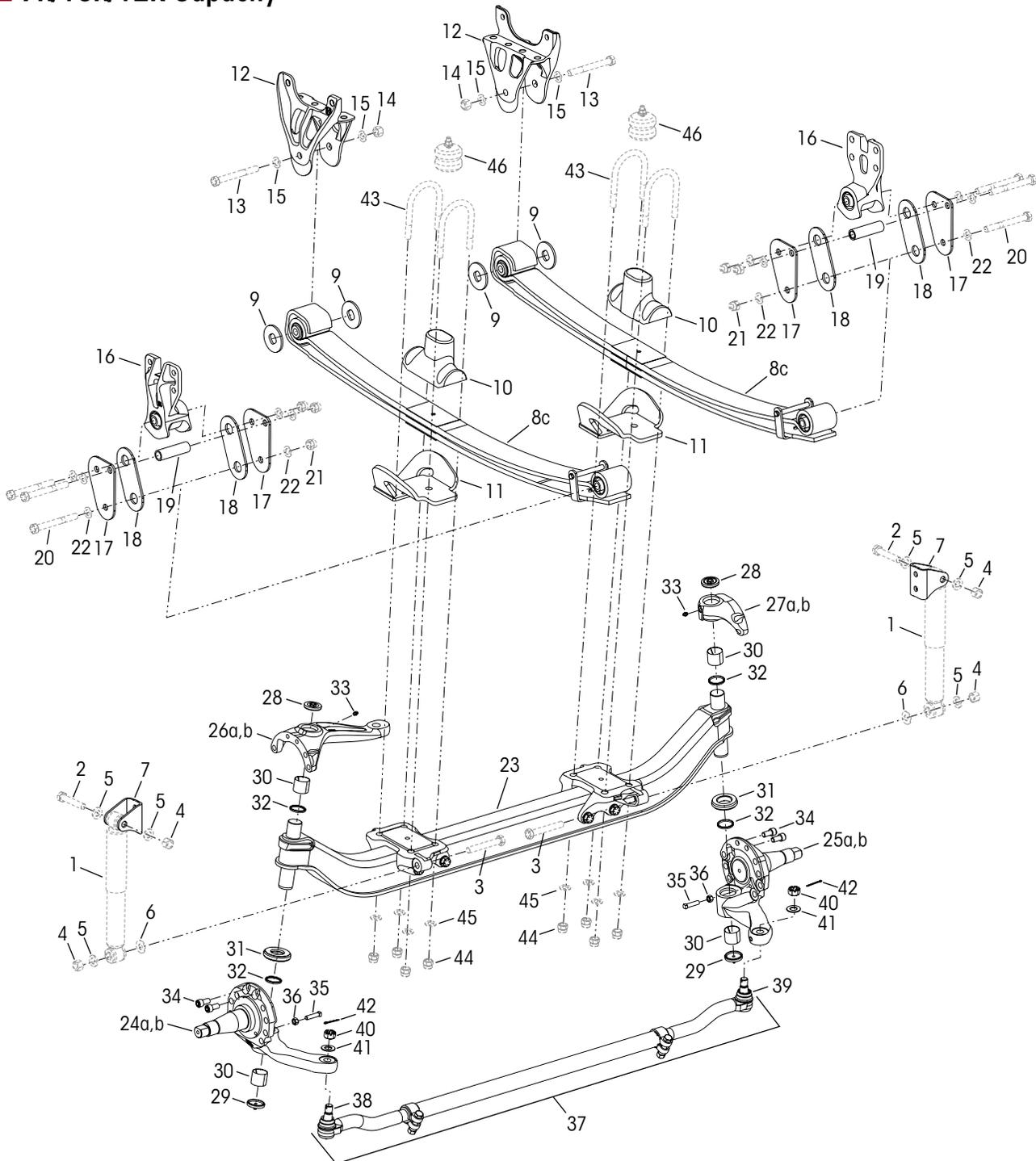
**FIGURE 3-4**

**OFF-ROADWAY TOWING**



# SECTION 4 Parts List

SOFTEK with **STEERTEK NXT** axle for vehicles built after March 2012  
 ■ 9K/10K/12K Capacity





# SOFTEK® with STEERTEK NXT axle for FCC Motorhome Chassis

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.	KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1		*Shock Absorber	2	26		LH Upper Steering Knuckle Assembly Includes Key Nos. 28, 30, 32-33	1
2		*3/4"-10 UNC Upper Shock Bolt - 4.0"	2	a	60903-251	Equipped with Hydraulic Brake	
3		*3/4"-10 UNC Lower Shock Bolt - 5.0"	2	b	60903-453	Equipped with Air Brake	
4		*3/4"-10 UNC Hex Locknut	4	27		RH Upper Steering Knuckle Assembly Includes Key Nos. 28, 30, 32-33	1
5		*3/4" Hardened Washer	6	a	60904-234	Equipped with Hydraulic Brake	
6		*Shock Spacer - 1/8" Thick	2	b	60904-432	Equipped with Air Brake	
7	59423-002	Shock Bracket	2		60961-630	<b>Kingpin Bushing and Roller Thrust Bearing Service Kit, One Side,</b> Includes Key Nos. 28-34, Loctite	
8		Spring Assembly, Includes Spring Eye Bushings	2	28	68687-003	Grease Cap Assembly, Upper	2
a	66415-002	9K, Single-leaf		29	68687-002	Grease Cap Assembly, Lower	2
b	65710-002	10K, Leaf and a Half		30	58909-001	Kingpin Bushing	4
c	68115-001	12K, 2-Leaf		31	64256-000	Roller Thrust Bearing	2
9	67493-000	Thrust Washer - Front Hanger	4	32	68731-000	Kingpin Seal	4
10	65714-000	Top Pad	2	33	33117-000	Grease Zerk	2
11	68759-004	Sway Bar Bracket	2	34	60236-001	5/8"-11 UNC Socket Head Cap Screw	4
12	66297-000	Front Hanger	2	Not Shown	60937-000	Loctite® (Red) Compound Tube	1
13		*3/4"-10 UNC Bolt - 6.5"	2		60961-069	<b>Stop Bolt Service Kit, One Side,</b> Includes Key Nos. 35-36	
14		*3/4"-10 UNC Locknut	2	35	60238-001	1/2"-13 UNC Square Head Bolt	2
15		*3/4" Hardened Washer	4	36	60240-000	1/2"-13 UNC Hex Jam Nut	2
16	64316-000	Rear Shackle Bracket and Bushing Assembly	2	37	68869-001	***Tie Rod Assembly, 9K/10K/12K 69 KPI, 5.36 Drop, 250 Ackermann Includes Key Nos. 38-40	1
17	66413-000	Rear Shackle Plate	4		60961-626	*** <b>Tie Rod End Service Kit, Axle Set,</b> Includes Kit Nos. 60961-624 & 60961-625	
18	64159-000	Rear Shackle Wear Pad	4		60961-624	*** <b>LH Tie Rod End Service Kit,</b> Includes Key Nos. 38, 40-42	
19	60631-000	Shackle Stop Tube	2		60961-625	*** <b>RH Tie Rod End Service Kit,</b> Includes Key Nos. 39-42	
20		*3/4"-10 UNC Hex Bolt - 6.5"	2	38	68935-001	***LH Tie Rod End	1
21		*3/4"-10 UNC Hex Nylocknut	6	39	68935-002	***RH Tie Rod End	1
22		*3/4" Hardened Washer	12	40		**7/8" Castle Nut	2
	68927-004	<b>STEERTEK NXT Axle Assembly, 250 Ackermann</b> Equipped with Hydraulic Brake, Includes Key Nos. 23, 24a-27a, 31, 34, 37, 41-42	1	41	22962-007	7/8" Flat Washer	2
	68927-005	Equipped with Air Brake, Includes Key Nos. 23, 24b-27b, 31, 34, 37, 41-42		42	17800-004	Tie Rod Nut Cotter Pin	2
23	68926-003M	Axle & Kingpin Assembly	1	43		*3/4"-16 UNF U-bolt - 6.5"	4
24		LH Lower Steering Knuckle Assembly, 250 Ackermann, Includes Key Nos. 29-30, 32, 35-36	1	44		*3/4"-16 UNF Hex Locknut	8
a	58900-267	Equipped with Hydraulic Brake		45		*3/4" Hardened Washer	8
b	58900-469	Equipped with Air Brake		46		*Auxiliary Spring	2
25		RH Lower Steering Knuckle Assembly, 250 Ackermann, Includes Key Nos. 29-30, 32, 35-36	1				
a	58900-268	Equipped with Hydraulic Brake					
b	58900-470	Equipped with Air Brake					

**NOTE:** \* Not supplied by Hendrickson, used for reference only. Refer to vehicle manufacturer for more information.

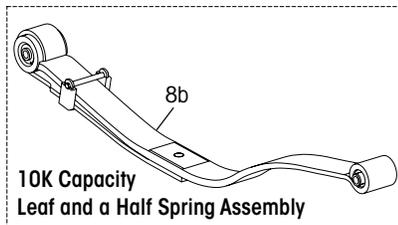
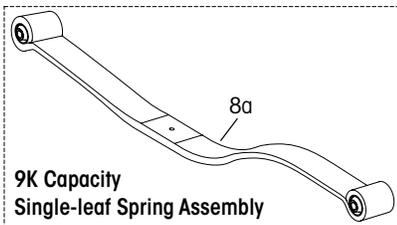
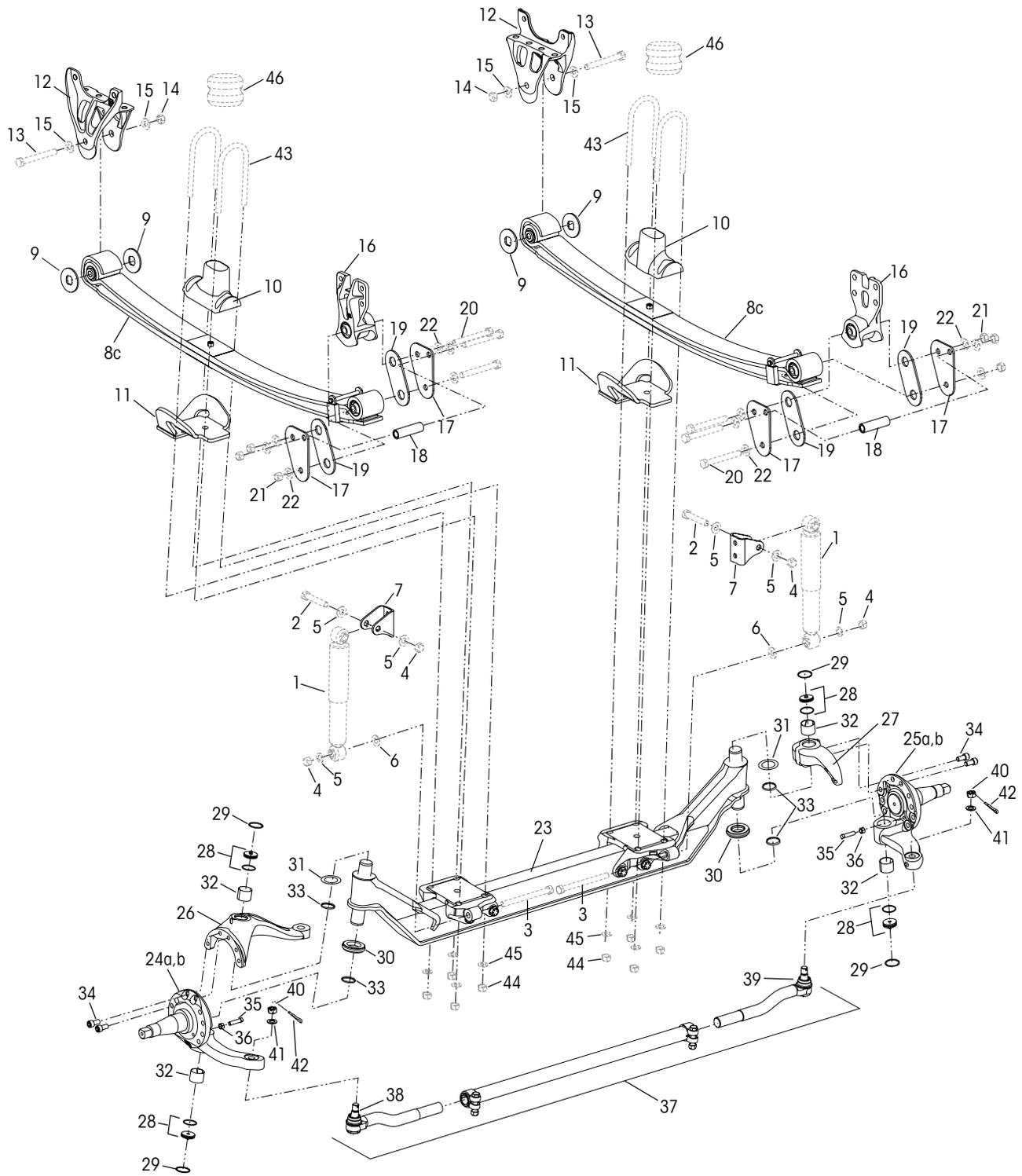
Hendrickson is not responsible for components supplied by vehicle manufacturer. For assistance with maintenance and rebuild instructions on these components see vehicle manufacturer.

\*\* Item included in assembly only, part not sold separately.

\*\*\* The tie rod assembly is designed for use on a suspension with hydraulic brakes, it is not designed for vehicles with air brakes.

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 Hendrickson Publication No. SEU-0223 or contact Hendrickson Truck Parts for corresponding kit numbers.

SOFTEK with **STEERTEK 1.5** axle for vehicles built between May 2010 and March 2012  
 ■ 9K/10K/12K Capacity





# SOFTEK® with STEERTEK 1.5 axle for FCC Motorhome Chassis

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.	KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1		*Shock Absorber	2	26	60903-051	LH Upper Steering Knuckle Assembly Includes Key Nos. 32-33	1
2		*3/4"-10 UNC Upper Shock Bolt - 4.0"	2	27	60904-034	RH Upper Steering Knuckle Assembly Includes Key Nos. 32-33	1
3		*3/4"-10 UNC Lower Shock Bolt - 5.0"	2		60961-039	<b>Kingpin Bushing w/Roller Thrust Bearing Service Kit, One Wheel End,</b> Includes Key Nos. 28-34 and Loctite	
4		*3/4"-10 UNC Hex Locknut	4	28	59156-000	Grease Cap Assembly	4
5		*3/4" Hardened Washer	6	29	58937-000	Retaining Ring	4
6		* Shock Spacer - 1/8" Thick	2		60961-042	<b>Roller Thrust Bearing Service Kit, One Wheel End,</b> Includes Key Nos. 31-34 and Loctite	
7	59423-002	Shock Bracket	2	30	64256-000	Roller Thrust Bearing	2
8		Spring Assembly, Includes Spring Eye Bushings	2	31		Kingpin Shim (As required)	
a	66415-002	9K, Single-leaf			60259-001	0.005" Thickness	4
b	65710-002	10K, Leaf and a Half			60259-002	0.047" Thickness	1
c	68115-001	12K, 2-Leaf		32	58909-000	Kingpin Bushing	4
9	67493-000	Thrust Washer - Front Hanger	4	33	58910-001	Kingpin Seal	4
10	65714-000	Top Pad	2	34	60236-001	5/8"-11 UNC Socket Head Cap Screw	4
11	68759-003	Sway Bar Bracket	2	Not Shown	60937-000	Loctite (Red) Compound Tube	2
12	66297-000	Front Hanger	2		60961-069	<b>Stop Bolt Service Kit, One Side,</b> Includes Key Nos. 35-36	
13		*3/4"-10 UNC Bolt - 6.5"	2	35	60238-001	1/2"-13 UNC Square Head Bolt	2
14		*3/4"-10 UNC Locknut	2	36	60240-000	1/2"-13 UNC Hex Jam Nut	2
15		*3/4" Hardened Washer	4	37	68869-001	***Tie Rod Assembly, 9K/10K/12K 69 KPI, 5.36 Drop, 250 Ackermann Includes Key Nos. 38-40	1
16	64316-000	Rear Shackle Bracket and Bushing Assembly	2		60961-626	*** <b>Tie Rod End Service Kit, Axle Set,</b> Includes Kit Nos. 60961-624 & 60961-625	
17	66413-000	Rear Shackle Plate	4		60961-624	*** <b>LH Tie Rod End Service Kit,</b> Includes Key Nos. 38, 40-42	
18	60631-000	Rear Shackle Stop Tube	2		60961-625	*** <b>RH Tie Rod End Service Kit,</b> Includes Key Nos. 39-42	
19	64159-000	Rear Shackle Wear Pad	4	38	68935-001	***LH Tie Rod End	1
20		*3/4"-10 UNC Hex Bolt - 6.5"	6	39	68935-002	***RH Tie Rod End	1
21		*3/4"-10 UNC Hex Nylocknut	6	40		**7/8" Castle Nut	2
22		*3/4" Hardened Washer	12	41	22962-007	7/8" Flat Washer	2
	68927-004	<b>STEERTEK 1.5 Axle Assembly, 250 Ackermann</b> Equipped with Hydraulic Brake, <i>Replaces 66928-004, Includes Key Nos. 23, 24a-25a, 26-31, 34-37, 41-42</i>	1	42	17800-004	Tie Rod Nut Cotter Pin	2
	68927-005	Equipped with Air Brake, <i>Replaces 66928-005, Includes Key Nos. 23, 24b-25b, 26-31, 34-37, 41-42</i>		43		*3/4"-16 UNF U-bolt - 6.5"	4
23	66926-003M	Axle & Kingpin Assembly, <i>Replaces 66926-002</i>	1	44		*3/4"-16 UNF Hex Locknut	8
24		LH Lower Steering Knuckle Assembly, 250 Ackermann, Includes Key Nos. 32-33	1	45		*3/4" Hardened Washer	8
a	58900-067	Equipped with Hydraulic Brake		46		*Auxiliary Spring	2
b	58900-095	Equipped with Air Brake					
25		RH Lower Steering Knuckle Assembly, 250 Ackermann, Includes Key Nos. 32-33	1				
a	58900-068	Equipped with Hydraulic Brake					
b	58900-096	Equipped with Air Brake					

**NOTE:** \* Not supplied by Hendrickson, used for reference only. Refer to vehicle manufacturer for more information.

Hendrickson is not responsible for components supplied by vehicle manufacturer. For assistance with maintenance and rebuild instructions on these components see vehicle manufacturer.

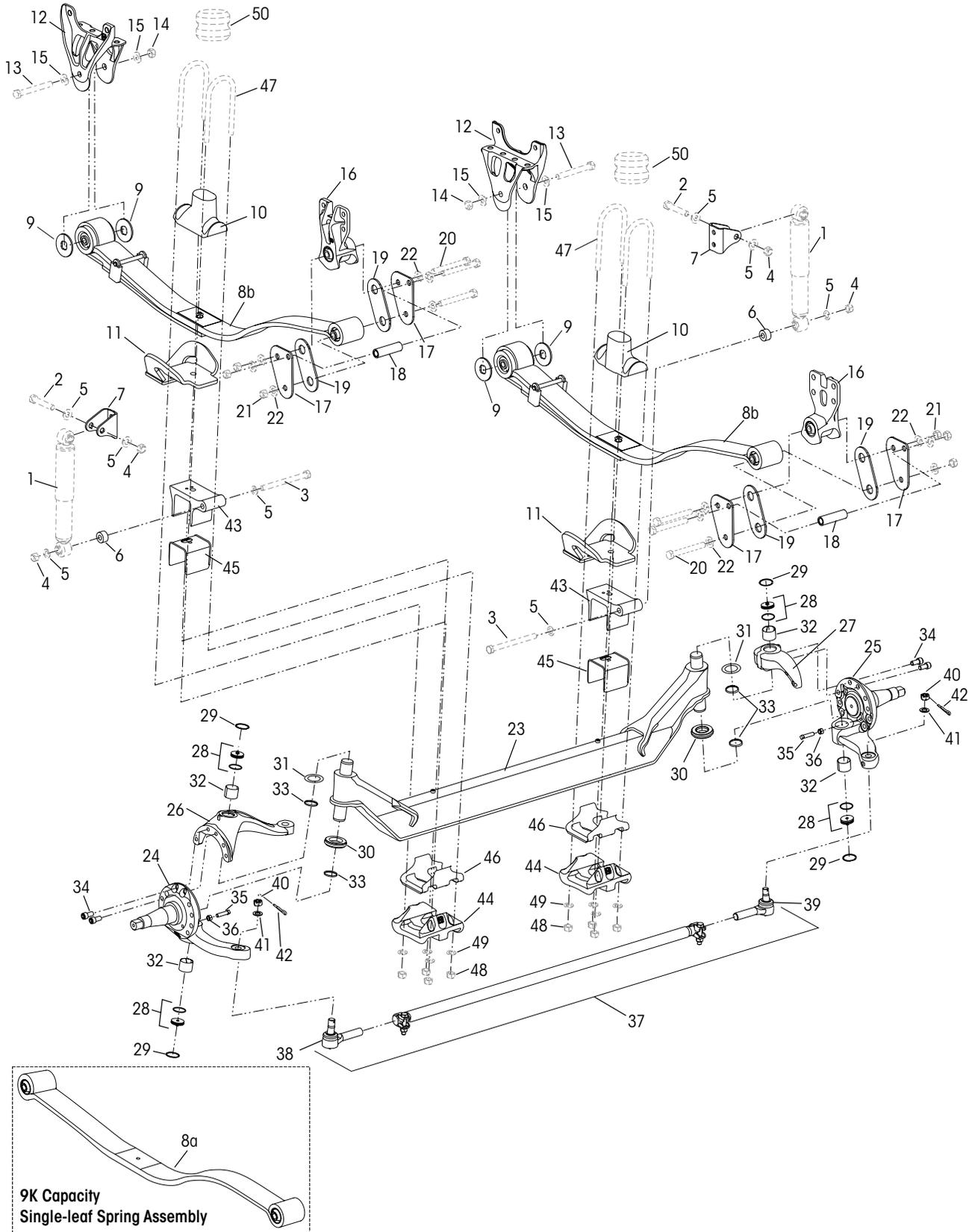
\*\* Item included in assembly only, part not sold separately.

\*\*\* The tie rod assembly is designed for use on a suspension with hydraulic brakes, it is not designed for vehicles with air brakes.

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 Hendrickson Publication No. SEU-0223 or contact Hendrickson Truck Parts for corresponding kit numbers.

SOFTEK with **STEERTEK** axle for vehicles built prior to May 2010

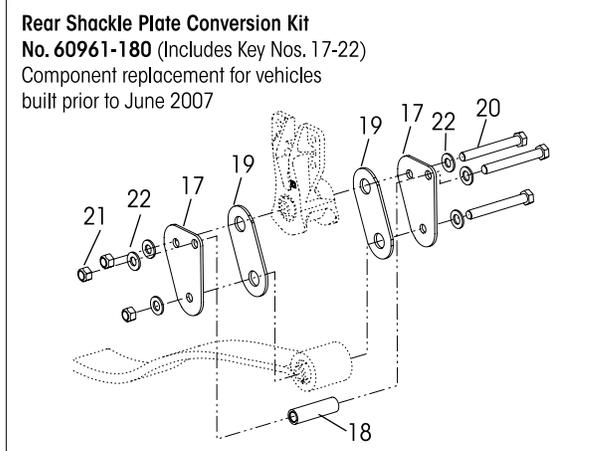
■ 9K/10K Capacity





# SOFTEK® with STEERTEK axle for FCC Motorhome Chassis

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.	KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1		*Shock Absorber	2	30	64256-000	Roller Thrust Bearing	2
2		*3/4"-10 UNC Upper Shock Bolt - 4.0"	2	31		Kingpin Shim (As required)	
3		*3/4"-10 UNC Lower Shock Bolt - 5.0"	2		60259-001	0.005" Thickness	4
4		*3/4"-10 UNC Hex Locknut	4		60259-002	0.047" Thickness	1
5		*3/4" Hardened Washer	8	32	58909-000	Kingpin Bushing	4
6	59946-002	Shock Spacer	2	33	58910-001	Kingpin Seal, <i>Replaces 58910-000</i>	4
7	59423-002	Shock Bracket	2	34	60236-001	5/8"-11 UNC Socket Head Cap Screw	4
8		Spring Assembly, Includes Spring Eye Bushings	2	Not Shown	60937-000	Loctite (Red) Compound Tube	2
a	66415-002	9K, Single-leaf			60961-069	<b>Stop Bolt Service Kit, One Side,</b> Includes Key Nos. 35-36	
b	65710-002	10K, <i>Replaces 65710-001</i>					
9	67493-000	Thrust Washer - Front Hanger <i>Replaces 65899-000</i>	4	35	60238-001	1/2"-13 UNC Square Head Bolt	2
10	65925-000	Top Pad	2	36	60240-000	1/2"-13 UNC Hex Jam Nut	2
11	68759-003	Sway Bar Bracket, <i>Replaces 66233-001</i>	2	37	60239-007	****Tie Rod Assembly, 9/10K, 69 KPI, 5.36 Drop, 250 Ackermann, Includes Key Nos. 38-40, <i>Replaces 64801-006</i>	1
12	66297-000	Front Hanger, <i>Replaces 65711-000</i>	2		60961-010	**** <b>Tie Rod End Service Kit, Axle Set,</b> Includes Kit Nos. 60961-025 & -026 <i>Replaces 60961-081</i>	
13		*3/4"-10 UNC Bolt - 6.5"	2		60961-025	**** <b>LH Tie Rod End Service Kit,</b> Includes Key Nos. 38, 40-42, <i>Replaces 60961-083</i>	
14		*3/4"-10 UNC Locknut	2		60961-026	**** <b>RH Tie Rod End Service Kit,</b> Includes Key Nos. 39-42, <i>Replaces 60961-084</i>	
15		*3/4" Hardened Washer	4	38	64000-001	****LH Tie Rod End, <i>Replaces 65033-001</i>	1
16	64316-000	Rear Shackle Bracket and Bushing Assembly	2	39	64000-002	****RH Tie Rod End, <i>Replaces 65033-002</i>	1
17	66413-000	Rear Shackle Plate <i>**Rear Shackle Plate 64314-000. Replace with Conversion Kit No. 60961-180</i>	4	40		***7/8" Castle Nut	2
18	60631-000	Rear Shackle Stop Tube	2	41	22962-007	7/8" Flat Washer	2
19	64159-000	Rear Shackle Wear Pad	4	42	17800-004	Tie Rod Nut Cotter Pin	2
20		*3/4"-10 UNC Hex Bolt - 6.5"	6	43	59952-024	Top Axle Wrap	2
21		*3/4"-10 UNC Hex Locknut	6	44	64723-002	Bottom Axle Wrap	2
22		*3/4" Hardened Washer	12	45	60508-000	Top Axle Wrap Liner	2
	70952-XXX	<b>STEERTEK Axle Assembly,</b> Includes Key Nos. 23-31, 34-37, 41-46 Contact Hendrickson Tech Services for Part No.	1	46	59845-000	Bottom Axle Wrap Liner	2
23	64905-004	Axle & Kingpin Assembly	1	47		*3/4"-16 UNF U-bolt - 10.0"	4
24		LH Lower Steering Knuckle Assembly Includes Key Nos. 32-33	1	48		*3/4"-16 UNF Hex Locknut	8
	58900-063	• 200 Ackermann Equipped with Hydraulic Brake		49		*3/4" Hardened Washer	8
	58900-067	• 250 Ackermann Equipped with Hydraulic Brake		50		*Auxiliary Spring	2
	58900-001	Equipped with Air Brake					
25		RH Lower Steering Knuckle Assembly Includes Key Nos. 32-33	1				
	58900-064	• 200 Ackermann Equipped with Hydraulic Brake					
	58900-068	• 250 Ackermann Equipped with Hydraulic Brake					
	58900-002	Equipped with Air Brake					
26	60903-051	LH Upper Steering Knuckle Assembly Includes Key Nos. 32-33	1				
27	60904-034	RH Upper Steering Knuckle Assembly Includes Key Nos. 32-33	1				
	60961-039	<b>Kingpin Bushing w/Roller Thrust Bearing Service Kit, One Wheel End,</b> Includes Key Nos. 28-34 and Loctite					
28	59156-000	Grease Cap Assembly	4				
29	58937-000	Retaining Ring	4				
	60961-042	<b>Roller Thrust Bearing Service Kit, One Wheel End,</b> Includes Key Nos. 31-34 and Loctite					



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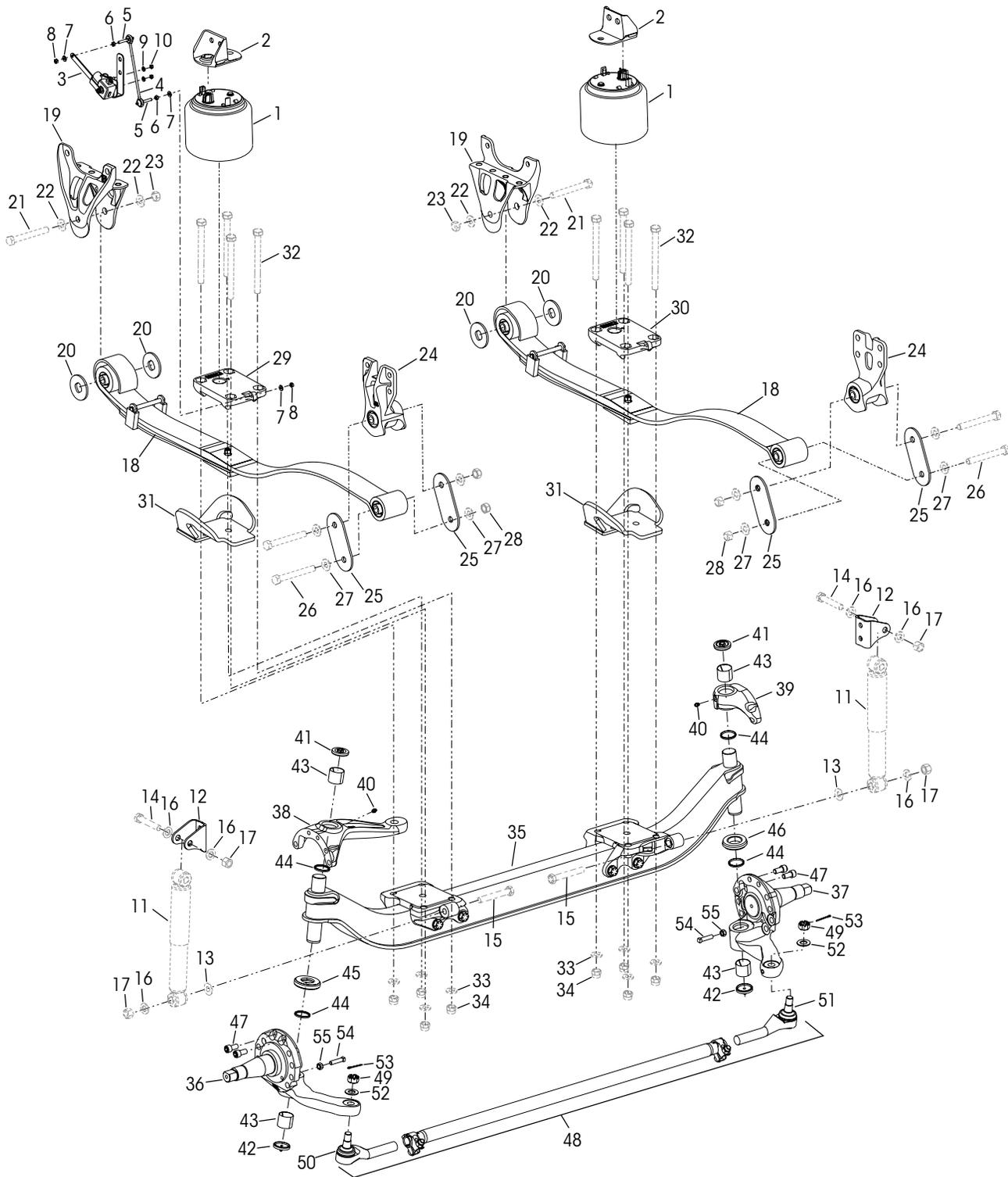
\*\* No longer available. See Rear Shackle Plate Conversion Kit No. 60961-180.

\*\*\* Item included in assembly only, part not sold separately.

\*\*\*\* The tie rod assembly is designed for use on a suspension with hydraulic brakes, it is not designed for vehicles with air brakes.  
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 Hendrickson Publication No. SEU-0223 or contact Hendrickson Truck Parts for corresponding kit numbers.



AIRTEK with **STEERTEK NXT** axle  
 ■ 10K Capacity





# AIRTEK® with STEERTEK NXT axle for FCC Motorhome Chassis

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.	KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1	64075-002L	Air Spring	2	37	58900-470	RH Lower Steering Knuckle Assembly Includes Key Nos. 42-44, 54-55	1
2	60850-001	Air Spring Bracket	2	38	60903-436	LH Upper Steering Knuckle Assembly Includes Key Nos. 40-41, 43-44	1
	70417-000	HCV, Link Mount & Linkage Assembly, Includes Key Nos. 3-10	1	39	60904-432	RH Upper Steering Knuckle Assembly Includes Key Nos. 40-41, 43-44	1
3	60501-000	Height Control Valve	1		60961-628	<b>Kingpin Bushing and Bearing Service Kit, Axle Set</b> , Includes Kit Nos. 60961-629 & -630	
4	59428-002	HCV Linkage	1		60961-629	<b>LH Kingpin Bushing w/Composite Thrust Bearing Service Kit</b> , Includes Key Nos. 40-45, 47, Loctite	
5	59169-003	5/16"-18 UNC Stud	2		60961-630	<b>RH Kingpin Bushing w/Roller Thrust Bearing Service Kit</b> , Includes Key Nos. 40-44, 46-47 & Loctite	
6	17491-011	5/16"-18 UNC 2B Nut	2	40	33117-000	Grease Zerk	2
7	22962-029	5/16" Flat Washer	3	41	68687-003	Grease Cap Assembly, Upper	2
8	59016-000	5/16"-18 UNC 2B Nut	2	42	68687-002	Grease Cap Assembly, Lower	2
9	22962-028	1/4" Flat Washer	2	43	58909-001	Kingpin Bushing	4
10	49983-000	1/4"-20 UNC Locknut	2		60961-631	<b>Thrust Bearing Service Kit, Axle Set</b> , Includes Kit Nos. 60961-632 & -633	
11		*Shock Absorber	2		60961-632	<b>LH Composite Thrust Bearing Service Kit</b> , Includes Key Nos. 44-45, 47 & Loctite	
12	59423-002	Shock Bracket	2		60961-633	<b>RH Roller Thrust Bearing Service Kit</b> , Includes Key Nos. 44, 46-47 & Loctite	
13		*Shock Spacer - 1/8" Thick	2	44	68731-000	Kingpin Seal	4
14		*3/4"-10 UNC Upper Shock Bolt - 4.0"	2	45	59828-000	LH Composite Thrust Bearing	1
15		*3/4"-10 UNC Lower Shock Bolt - 5.0"	2	46	64256-000	RH Roller Thrust Bearing	1
16		*3/4" Flat Washer	6	47	60236-001	5/8"-11 UNC Socket Head Cap Screw	4
17		*3/4"-10 UNC Hex Locknut	4	Not Shown	60937-000	Loctite® (Red) Compound Tube	1
18	53468-000	Leaf Spring Assembly	2	48	68869-001	***Tie Rod Assembly, Includes Key Nos. 49-51	1
19	66297-000	Front Hanger	2	49		***7/8" Castle Nut	2
20	67493-000	Thrust Washer - Front Hanger	4		60961-626	*** <b>Tie Rod End Service Kit, Axle Set</b> , Includes Kit Nos. 60961-624 & 60961-625	
21		*3/4"-10 UNF Hex Bolt - 6.5"	2		60961-624	*** <b>LH Tie Rod End Service Kit</b> , Includes Key Nos. 50, 52-53	
22		*3/4" Flat Washer	4		60961-625	*** <b>RH Tie Rod End Service Kit</b> , Includes Key Nos. 51-53	
23		*3/4"-10 UNF 2B Locknut	2	50	68935-001	***LH Tie Rod End	1
24	66510-001	Rear Shackle Bracket and Bushing Assembly	2	51	68935-002	***RH Tie Rod End	1
25	64314-000	Rear Shackle Plate	4	52	22962-007	7/8" Flat Washer	2
26		*3/4"-10 UNC Hex Bolt - 6.5"	4	53	17800-004	Tie Rod Nut Cotter Pin	2
27		*3/4" Washer	8		60961-069	<b>Stop Bolt Service Kit, One Side</b> , Includes Key Nos. 54-55	
28		*3/4"-10 UNC Hex Locknut	4	54	60238-001	1/2"-13 UNC Square Head Bolt	2
29	64516-001	LH Top Pad	1	55	60240-000	1/2"-13 UNC Hex Jam Nut	2
30	64516-002	RH Top Pad	1				
31	68759-004	Sway Bar Bracket	2				
32		*3/4"-16 UNF Hex Bolt - 5.5"	8				
33		*3/4" Flat Washer	8				
34		*3/4"-16 UNF 2B Locknut	8				
	68927-006	<b>STEERTEK NXT</b> Axle Assembly, 69" KPI, 5.36" Drop, 250 Ackermann, Includes Key Nos. 35-39, 45-48, 52-53	1				
35	68926-003M	Axle & Kingpin Assembly	1				
36	58900-469	LH Lower Steering Knuckle Assembly Includes Key Nos. 42-44, 54-55	1				

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\*\*\* The tie rod assembly is designed for use on a suspension with hydraulic brakes, it is not designed for vehicles with air brakes.

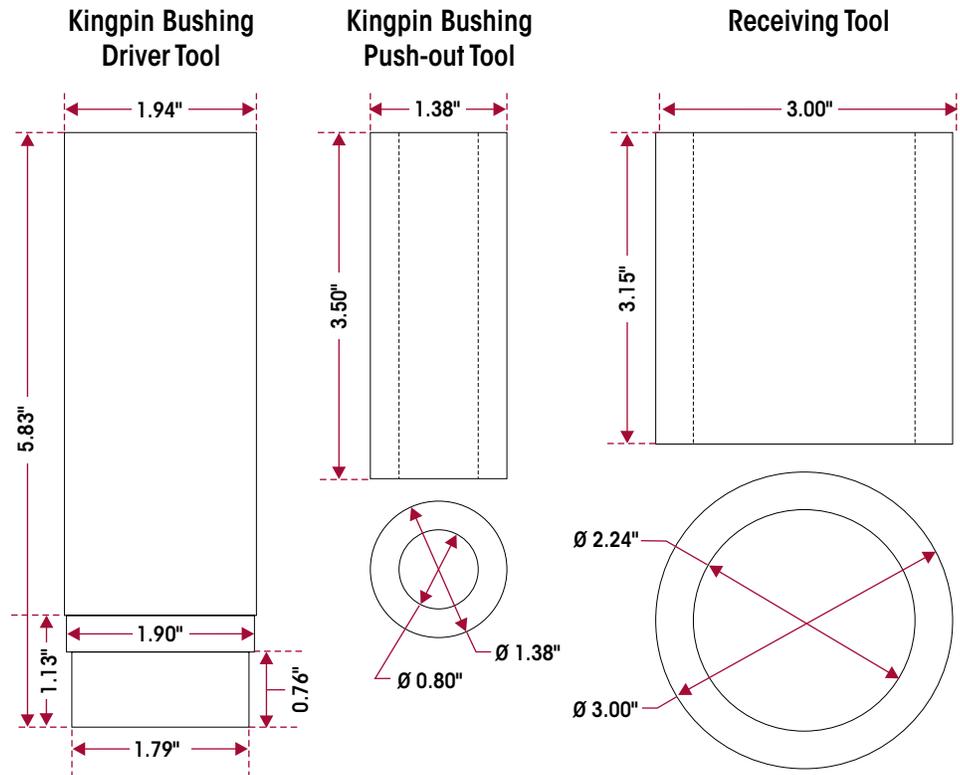
Hendrickson supplies different tie rod assemblies and each type may take a different replacement tie rod end kit to service. Prior to ordering find the part number on the tie rod tube, see Hendrickson Publication No. SEU-0223 or contact Hendrickson Truck Parts for corresponding kit numbers.

## 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.

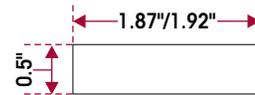
### KINGPIN BUSHING TOOLS

#### STEERTEK 1.5 / STEERTEK



#### STEERTEK NXT

#### Kingpin Bushing Installer / Remover Tool



### ADJUSTABLE STRAIGHT FLUTE REAMER

The dimension of cutting diameter must facilitate a range of 1.802" – 1.812"





## SECTION 6 Towing Procedures

### 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 method, the ideal towing procedure
- **METHOD 2** — Conventional axle tow fork method

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 toll-free at 1-866-755-5968 (U.S. and Canada) or send e-mail to: [techservices@hendrickson-intl.com](mailto: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.

It may be necessary to raise the vehicle and place a block of wood under the tires to provide adequate clearance below the axle to locate the wheel lift equipment for towing, see Figure 6-2.

FIGURES 6-1

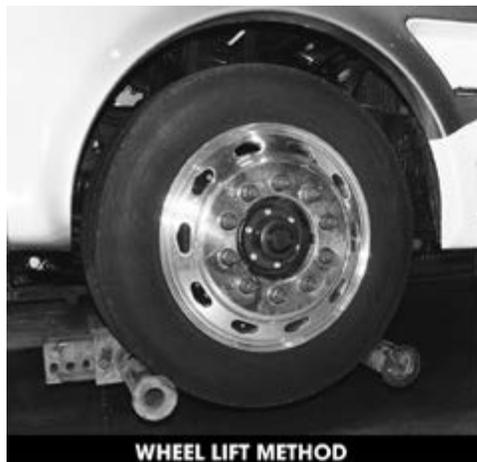
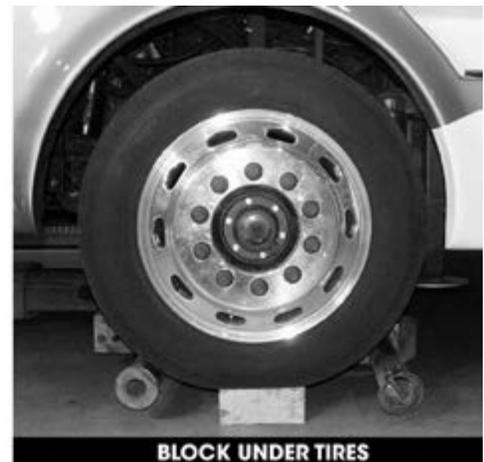


FIGURE 6-2



## METHOD 2 — AXLE TOW FORK LIFT

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

### 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.

- If necessary 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 tow 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.
- Secure the vehicle prior to towing. Install safety straps, 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 March 2012)

1. Use a Miller Short Frame Tow Fork, Part No. 0200019, or comparable (3.25" Clearance), 4.5" Opening, 2" Shank, see Figure 6-3.
2. Install the tow fork in the boom properly.
3. The proper tow fork location is centered between the locknuts on the axle spring seats, see Figure 6-4.

FIGURE 6-3



FIGURE 6-4



### STEERTEK equipped (vehicles built PRIOR to March 2012)

1. Install the tow fork in the boom properly. Use industry approved tow forks.
2. Position the proper tow forks directly under the axle, inside the axle clamp groups as shown in Figures 6-5 and 6-6.

FIGURE 6-5



FIGURE 6-6





- 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 6-7. Lift vehicle and secure the vehicle to the boom.

FIGURE 6-7



### OFF-ROADWAY TOWING METHOD

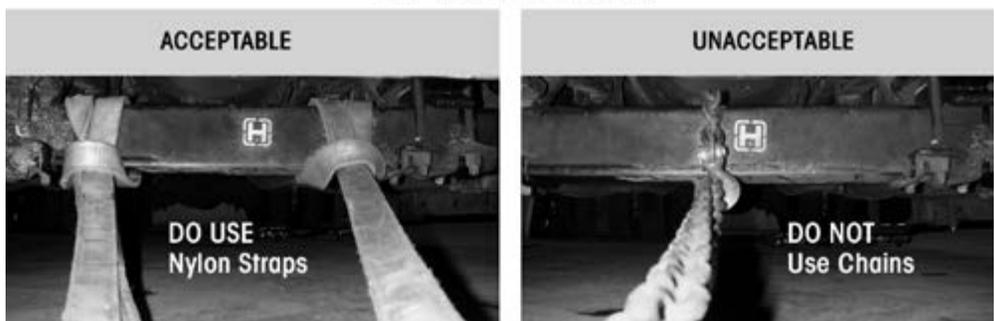
 **WARNING**

WHEN A VEHICLE IS DISABLED AND EQUIPPED WITH A STEERTEK NXT / STEERTEK AXLE, CARE MUST BE TAKEN TO ENSURE THERE IS NO DAMAGE TO THE SUSPENSION OR AXLE WHEN TOWING THE VEHICLE. THE USE OF TOW STRAPS ARE NECESSARY TO TOW A DISABLED VEHICLE FROM 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 6-8, 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 6-8.

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

FIGURE 6-8

### OFF-ROADWAY TOWING



## SECTION 7

# Preventive Maintenance

The SOFTEK® / AIRTEK® is low maintenance suspension. Following appropriate inspection procedure is important to help ensure the proper maintenance and operation of the suspension system and component parts function to their highest efficiency. Visual inspection must include the following items and other referenced in this section. Look for bent or cracked parts. Replace all worn or damaged parts.

### HENDRICKSON RECOMMENDED PREVENTIVE MAINTENANCE INTERVALS

- **The first 1,000 miles**
- **On-highway** – every 10,000 miles (16,100 km) or 6 months, whichever comes first

### COMPONENT INSPECTION

- **Air spring** — Look for chaffing or any signs of spring or component damage.
- **Clamp group** — Check torque on clamp group mounting hardware. Refer to the vehicle manufacturer's torque specifications.
- **Fasteners** — Look for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to the specified torque. Refer to  Torque Specifications Section of this publication. Use a calibrated torque wrench to check torque in a tightening direction. As soon as the fastener starts to move, record the torque. Correct the torque if necessary. Replace any worn or damaged fasteners.
- **Front hangers and rear shackle brackets** — Check for cracks or loose mounting hardware. Replace if necessary, see the Component Replacement Section of this publication for replacement procedure.
- **Front thrust washers and rear shackle wear pads** — Look for any signs of excessive wear to the thrust washers / wear pads. See Front Thrust Washer / Rear Shackle Wear Pad Inspection detailed in this section.
- **Shock absorbers** — 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 bushing for any wear or deterioration. Replace if necessary, see the 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.
- **Steering pivot points** — Check for looseness at all pivot points on the axle assembly. Inspect and lubricate all pivot points. Refer to the Troubleshooting Guide Section of this publication.
- **STEERTEK NXT / STEERTEK axle** — The axle should be free of any nicks or gouges. Inspect for any cracks or dents on axle. See "Damaged Axle Components" warnings on page 8.
- **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 and auxiliary spring** — Look for cracks and or missing auxiliary spring. Replace if necessary, see Component Replacement Section of this publication.
- **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 (OEM's) applicable publications for other preventive maintenance requirements.



### 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 torque to specification at preparation for delivery.
2. Clamp group locknuts must be re-torqued at 1,000 miles (1,609 km).
3. Thereafter follow the 6 month/ 25,000 miles (40,000 km) inspection and annual re-torque interval.

**WARNING**

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

4. Ensure that the clamp group is properly aligned and the U-bolts/hex bolts are seated in the top pad, and the sway bar bracket, top/bottom axle wrap (if equipped) is centered on the axle seat, see Figure 7-1 and 7-2.
5. Check for the 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, then install new clamp group fasteners and repeat Steps 1 through 5.

FIGURE 7-1

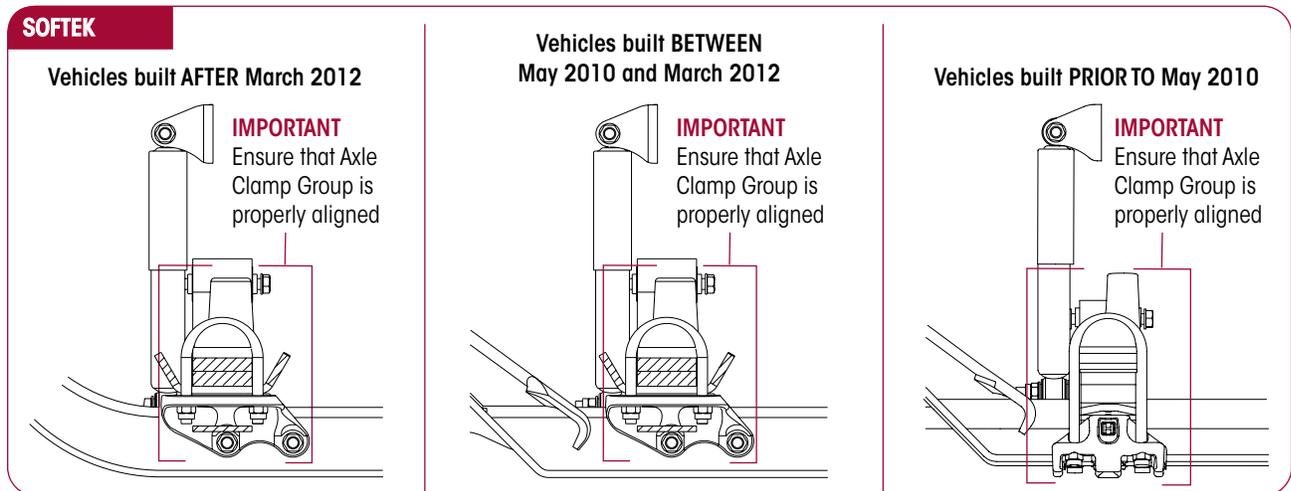
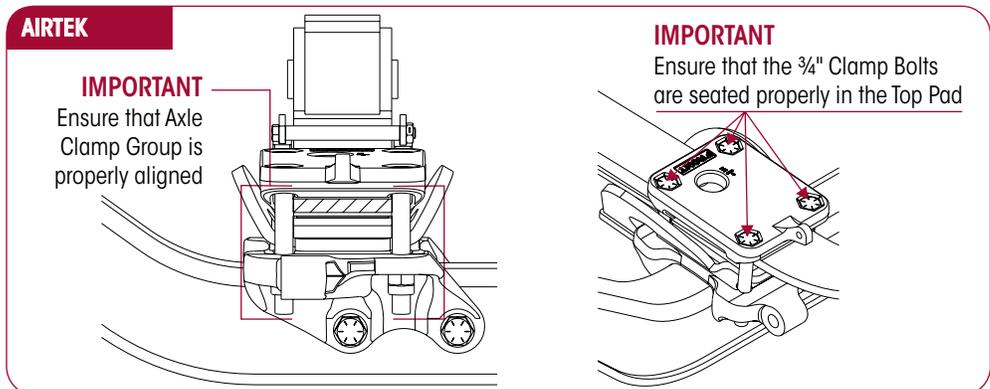
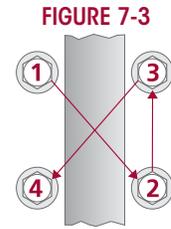


FIGURE 7-2





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



### 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 NXT / STEERTEK GREASING AND LUBRICATION SPECIFICATIONS				
Component	Greasing Interval	Grease	NLGI Grade	Outside Temperature
Kingpin Bushings	Maximum of 25,000 miles (40,000 kilometers), or for 90 days, whichever comes first.	Multipurpose Grease	2	Refer to the lubricant manufacturer's specifications for the temperature service limits applicable to your area.
Tie Rod Ends				
Drag Link	See Vehicle Manufacturer			

**NOTE:** Lubrication greases acceptable for use on the STEERTEK NXT / 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 7-4. On some models of the STEERTEK NXT a grease zerk is located on the bottom of lower steering knuckle on the inboard side. This is determined by the vehicle manufacturer.

**STEERTEK 1.5 / STEERTEK** kingpin grease zerks are located on the top and bottom of the kingpin grease caps.

- Place vehicle on the ground.
- Prior to greasing the kingpins on the vehicle, the suspension must be in a loaded condition.
- Clean off all the grease zerks and grease gun tip with a clean shop towel prior to lubrication.
- Lubricate the kingpins through the grease zerks on the top and bottom of the steering knuckle, see Lubrication Specification chart above.
- Force the required lubricant into the upper and lower kingpin grease zerks, until new lubricant flows out from the upper kingpin connection and steering knuckle and the thrust bearing purge location, see Figures 7-5 and 7-6.

FIGURE 7-4



**FIGURE 7-5**

**FIGURE 7-6**

**NOTE**

Greasing at the lower zerk 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 7-7. Both purge in the same area.

**FIGURE 7-7**

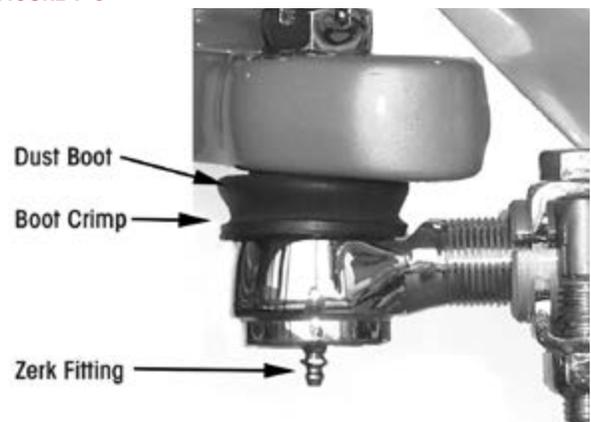
**TIE ROD END LUBRICATION**
**LUBRICATION INTERVALS**

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).

**CAUTION**

EXCEEDING THE MAXIMUM AIR PRESSURE TO THE GREASE ZERK CAN CAUSE DAMAGE TO THE DUST BOOT CAUSING 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 7-8. 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.

**FIGURE 7-8**




- 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. Refer to Tie Rod End replacement in Component Replacement Section of this publication.
7. Apply grease until all the old grease is purged from the boot and fresh grease is coming out.

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

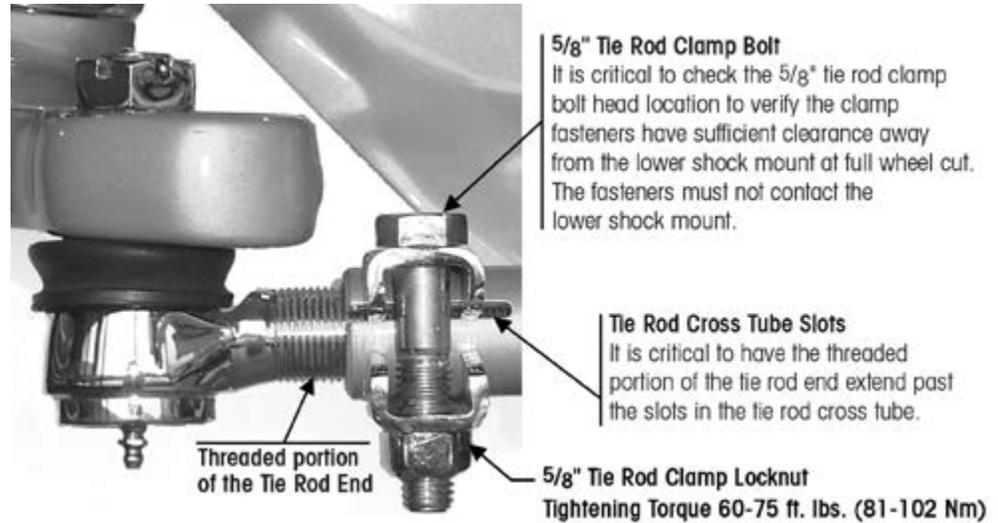
IT IS CRITICAL TO CHECK THE 5/8" TIE ROD CLAMP BOLT HEAD LOCATION TO VERIFY THE CLAMP FASTENERS HAVE SUFFICIENT CLEARANCE AWAY FROM THE LOWER SHOCK MOUNT AT FULL WHEEL CUT. THE FASTENERS MUST NOT CONTACT THE LOWER SHOCK MOUNT. FAILURE TO DO SO CAN CAUSE ONE OR MORE COMPONENTS TO FAIL CAUSING LOSS OF 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 7-9.

#### WARNING

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 7-9. 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 7-9.

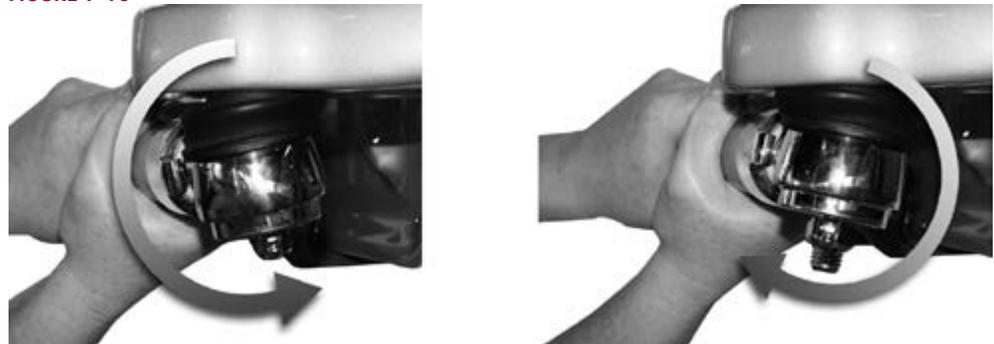
**FIGURE 7-9**


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

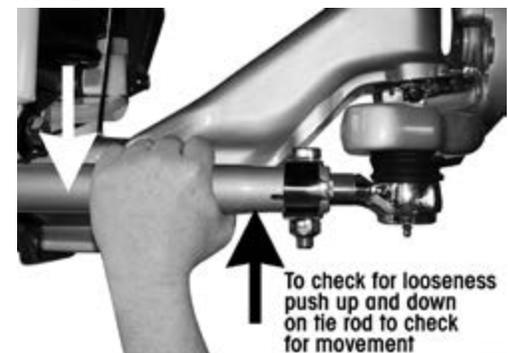
**CAUTION**

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

- A CROW BAR, PICKLE FORK OR 2 X 4.
  - ANYTHING OTHER THAN HANDS USED TO GRASP AND ROTATE THE CROSS TUBE ASSEMBLY (CAN RESULT IN DAMAGE TO THE CROSS TUBE).
  - EXCESSIVE PRESSURE OR FORCE APPLIED TO THE TIE ROD ENDS OR THE JOINTS OF THE ASSEMBLY.
9. By hand or using a pipe wrench, with jaw protectors to avoid gouging the tie rod 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 7-10.

**FIGURE 7-10**

**FIGURE 7-11**

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 152.4 mm). Apply hand pressure with reasonable human effort vertically up and down in a push-pull motion several times (using approximately 50-100 foot pounds of force). Check for any movement or looseness at both tie rod end locations, see Figure 7-11.



11. If there is any movement in the tie rod assembly, install a magnetic based dial indicator on the Ackermann arm, see Figure 7-12.
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 foot pounds). 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 either tie rod end exhibits  $\geq 0.125$ " of movement by hand, the vehicle should be removed immediately from use and tie rod end replaced.

FIGURE 7-12

**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  $\frac{1}{8}$ " (3 mm) measured with hand pressure only. (393.209(d)), (published in the North American Standard Out-of-Service Criteria Handbook, April 25, 2013.)

**FRONT THRUST WASHER INSPECTION**

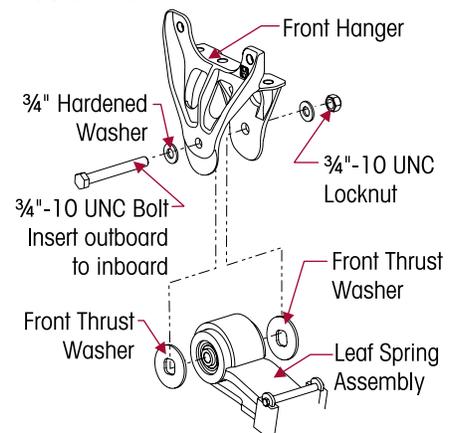
In normal use these components will function satisfactorily, even though the components may show some wear. An indication that the front thrust washers are worn, or need replacement is when the suspension exhibits one or more of the following conditions:

1. Excessive lateral movement of the spring.
2. Thrust washer thickness measured with a micrometer or a ruler at less than  $\frac{3}{32}$ " (0.090").

If one or more of these conditions is experienced, disassembly of the front hanger assembly is required to replace the thrust washers.

If one thrust washer is worn out, Hendrickson recommends both thrust washers on that side of the suspension be replaced. Inspect the thrust washers on the other side of the vehicle and replace if necessary.

FIGURE 7-13

**REAR SHACKLE WEAR PAD INSPECTION**

In normal use these components will function satisfactorily, even though the components may show some wear. An indication that the rear shackle wear pad are worn, or need replacement is when the suspension exhibits one or more of the following conditions:

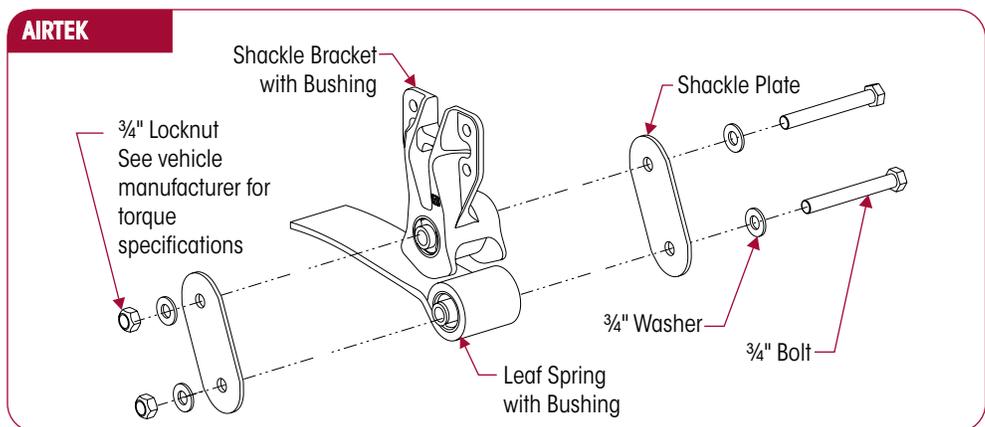
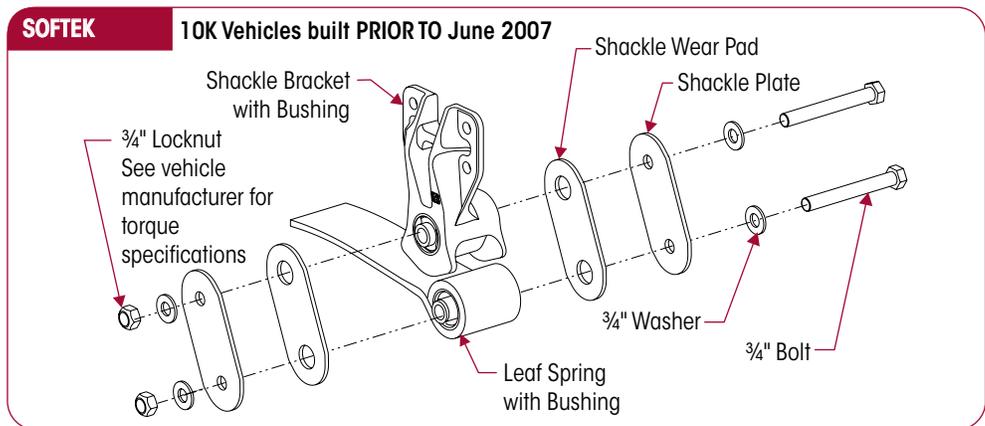
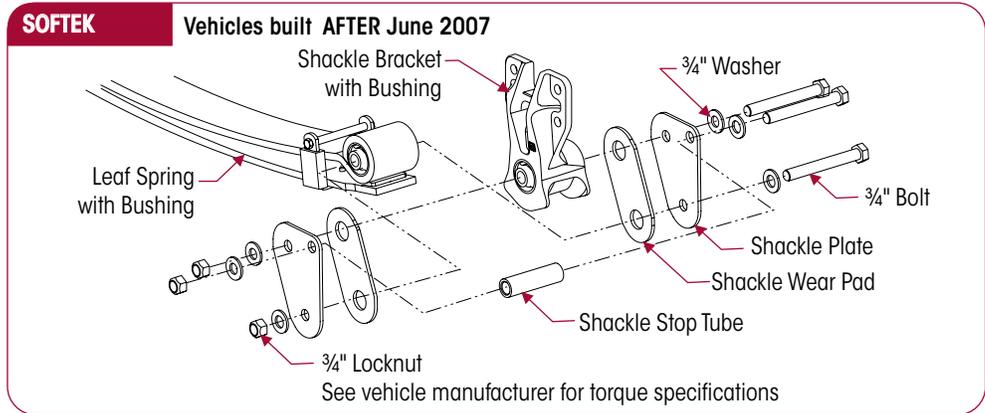
1. Excessive lateral movement of the spring.
2. Wear pad thickness measured with a micrometer or a ruler at less than  $\frac{3}{32}$ " (0.090").



If one or more of these conditions is experienced, disassembly of the rear shackle assembly is required to replace the wear pads.

If one wear pad is worn out, Hendrickson recommends both wear pads on that side of the suspension be replaced. Inspect the wear pads on the other side of the vehicle and replace if necessary.

**FIGURE 7-14**



## AXLE WRAP LINER INSPECTION (if equipped)

### ■ Vehicles built prior to May 2010

#### 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 7-15. See Axle Wrap replacement in Component Replacement Section of this publication.

FIGURE 7-15



## SHOCK ABSORBER INSPECTION

Hendrickson uses a long service life, premium shock absorber on all SOFTEK / 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 the 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 CAN POSSIBLY CAUSE PERSONAL INJURY.**

2. Lightly touch the shock body carefully below the dust cover, see Figure 7-16.
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.

FIGURE 7-16



**WARNING**

#### VISUAL INSPECTION

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



FIGURE 7-17



### LEAKING VS. MISTING SHOCK VISUAL INSPECTION

The inspection must not be conducted after driving in wet weather or a vehicle wash; shocks need to be free from water. Many misting 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

The SOFTEK / AIRTEK suspension is 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 a new shock absorber as detailed in the Component Replacement Section of this publication.

FIGURE 7-18



## TIRE INSPECTION

The leading causes of excess tire wear are the following, in order of importance:

- a. Improper Tire Pressure
  - b. Improper Toe Setting
  - c. Improper Thrust Angle
  - d. Improper Camber
- The following tire inspection guidelines are based upon Technology & Maintenance Council (TMC) recommended practices. Any issues regarding irregular tire wear where Hendrickson is asked for assistance, will require tire and alignment maintenance records, reference TMC's literature numbers RP 219A, RP 230, or RP 642.
  - 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

FIGURE 7-19

### OVERALL FAST WEAR (Miles per 32nd)

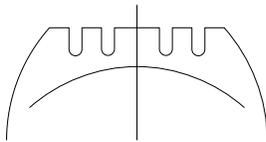
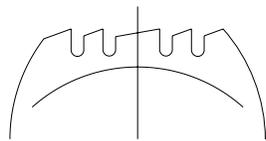


FIGURE 7-20

### FEATHER WEAR



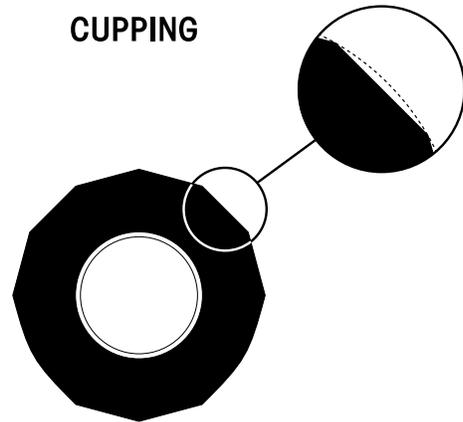
**Overall Fast Wear** — Fast wear can be described as exhibiting a good, but accelerated wear pattern. It is typically caused by operating conditions, such as mountainous terrain, frequency and severity of turning, abrasive road surfaces in combination with vehicle configurations and their attributes—such 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.

**FIGURE 7-21**

**CUPPING**

**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 end play or other assembly non-uniformity. It can also be due to lack of shock absorber control on some suspension types.

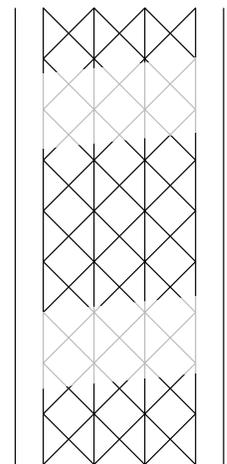
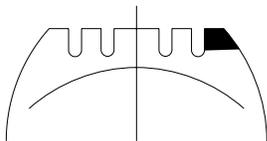
To solve cupping problems:

- Tires – Correct mismatch or balance problem. If ride complaints arise, steer tires may be rotated to drive or trailer axle.
- Vehicle – Diagnose component imbalance condition, i.e., wheel, rim, hub, brake, drum. Correct as necessary.

**Diagonal Wear** — 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-mounting 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 tire. If the source of trouble is the vehicle, diagnose cause and correct as needed.

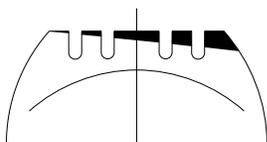
**FIGURE 7-22**
**DIAGONAL WEAR**

**FIGURE 7-23**
**RAPID SHOULDER WEAR (One Shoulder Only)**


**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.

**FIGURE 7-24**
**ONE-SIDED WEAR**


**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.

## KINGPIN BUSHING INSPECTION

### INSPECTION PROCEDURE (Steering Knuckle Lateral Movement)

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 jack stands.
3. **CHECKING THE UPPER KINGPIN BUSHING.** Install the base of a dial indicator onto the axle beam and face the tip against the steering knuckle, see Figure 7-25.
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 7-27.
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 upper and lower 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 7-26.

FIGURE 7-25

#### CHECKING UPPER KINGPIN BUSHING



FIGURE 7-26

#### CHECKING LOWER KINGPIN BUSHING



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 upper and lower 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 upper and lower bushings on that knuckle assembly.

FIGURE 7-27



## STEERING KNUCKLE INSPECTION

### CHECKING VERTICAL END PLAY (UP AND DOWN MOVEMENT)

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

1. Chock the rear tires to help prevent the vehicle from moving.
2. Set the parking brakes.
3. Use a jack to raise the vehicle until the wheels are off the ground. Support the vehicle with jack stands.
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 7-28.
  - 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.

**FIGURE 7-28**



### ADJUSTMENT

#### STEERTEK NXT AXLE (AFTER March 2012)

1.
  - If the vertical end play is **greater than 0.030"**, loosen the socket head cap screws, see Figure 7-29, 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, see Figure 7-29, and **pull up** on the knuckle assembly until the proper vertical end play is achieved.
2. Retighten the socket head cap screws to 175-200 foot pounds torque.

**FIGURE 7-29**



### NOTE

If the vehicle is built **PRIOR to** March 2012 and equipped with the **STEERTEK** axle, the vertical end play may be further adjusted with a shim. The **STEERTEK NXT** axle does not use a shim.

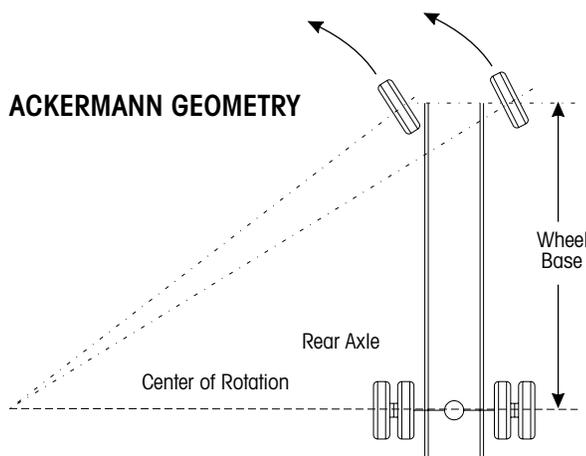
#### STEERTEK AXLE (PRIOR to March 2012)

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.

## SECTION 8 Alignment & Adjustments

### ALIGNMENT DEFINITIONS

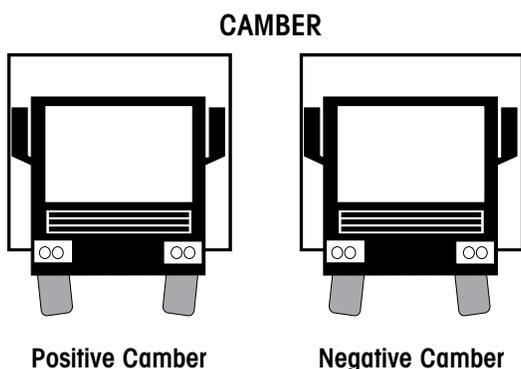
FIGURE 8-1



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

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

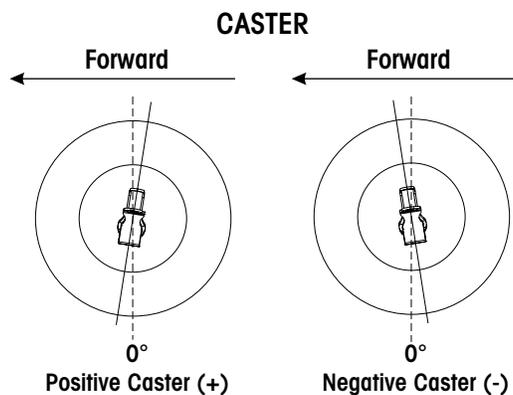
FIGURE 8-2



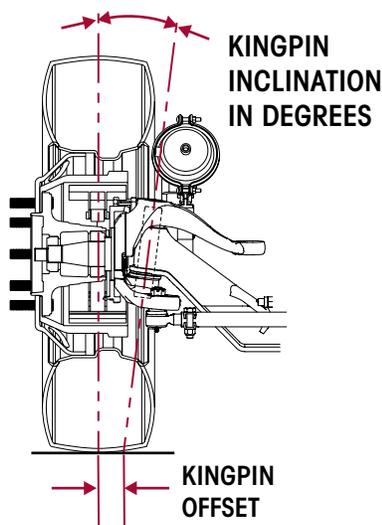
**Camber** — The angle formed by the inward or outward tilt of the wheel in reference to a vertical line. Camber is positive when the wheel is tilted outward at the top and is negative when the wheel is tilted inward at the top.

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

FIGURE 8-3



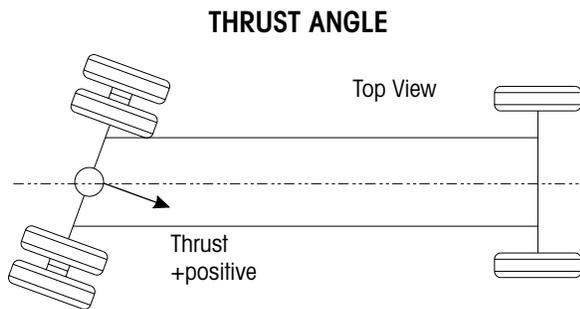
**Caster** — The forward or rearward tilt of the steering axle kingpin in reference to a vertical line. The angle is measured in degrees. Caster is positive when the top of the steering axis is tilted rearward and is negative when the tilt is forward. Proper caster is important for directional stability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

**FIGURE 8-4**


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

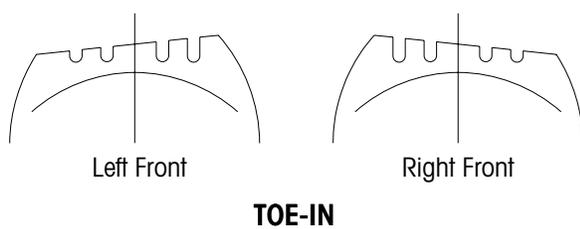
**Kingpin Offset** — The distance between the center of the tire patch and intersection of the kingpin axis with the ground. This parameter of front end geometry is important in vehicles without power steering and has a major effect on static steering. If there is no kingpin offset, the tires must scrub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

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

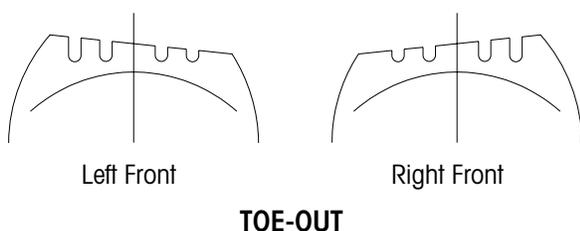
**FIGURE 8-5**


**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 8-6**


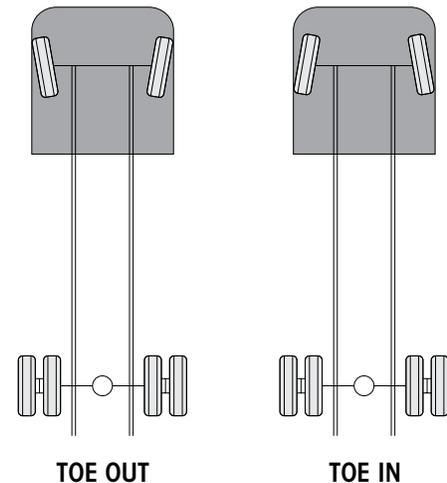
**Toe-in** — is when the horizontal line intersects in front of the wheels, or the wheels are closer together in front than in the back. Toe-in is commonly designated as positive, toe-out as negative. Excessive toe-in wears the outside edge of the tires. Steer axle toe is adjustable to reduce wear to 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 8-7**


**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 8-8

## TOTAL TOE



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

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

## INSPECTION PRIOR TO ALIGNMENT

### WHEELS AND TIRES

Examine the following items:

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

### FRONT SUSPENSION

Inspect the following:

- All fasteners are installed and tightened to the specified torque. See Torque Specifications Section of this publication.
- Leaf springs are free of wear or damage.
- Shock absorbers are free of wear and damage.
- Front and rear spring mounts for wear or damage.

### INSPECT TIE ROD ENDS

Perform "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 and the ride height is within specifications (if equipped). Refer to the procedure provided by the vehicle or suspension manufacturer.
- 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 manufacturers of the vehicle rear axles and suspensions. Reference the TMC (Technology & Maintenance Council) Guidelines for Total Vehicle Alignment (TMC RP 642).

## FRONT WHEEL ALIGNMENT

Hendrickson recommends technicians refer to the TMC (Technology & Maintenance Council) Guidelines for Total Vehicle Alignment (TMC RP642).

Check the total (front and rear) vehicle wheel alignment when the following occur:

- Every 12-18 months (normal maintenance).
- When the vehicle does not steer correctly.
- When an unusual or excess tire wear condition exists.

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

The SOFTEK / AIRTEK front wheel alignment specifications can be found in the Alignment Section of this publication. There are two types of front wheel alignment:

- Minor alignment** – a minor front wheel alignment is done **for all** normal maintenance conditions, see below.
- 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 end play.
3. Check toe-in and adjust if necessary.

## MAJOR FRONT WHEEL ALIGNMENT

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

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

1. Inspect all the systems that influence the wheel alignment. Refer to the Inspection Prior to Alignment in this section.
2. Check and adjust the maximum turn angle, refer to the Steering Stop Adjustment Procedure in this section, see Figures 8-9 and 8-10.

**FIGURE 8-9**



**FIGURE 8-10**





3. If the vehicle is equipped with power steering, check the pressure relief in the power steering system and reset if necessary. Refer to the vehicle manufacturer regarding the subject: Adjusting the Pressure Relief in the Power Steering System.
4. Check the turning angle (toe-out during vehicle turns or the Ackermann angle). Refer to the vehicle manufacturer or chassis and body manufacturer for specifications.
5. Check the kingpin (or steering axis) inclination. Refer to Kingpin Inclination under the Alignment Definitions in this section.
6. Check the camber angle. **DO NOT** attempt to adjust. Refer to Camber Angle under the Alignment Definitions in this section.

FIGURE 8-11

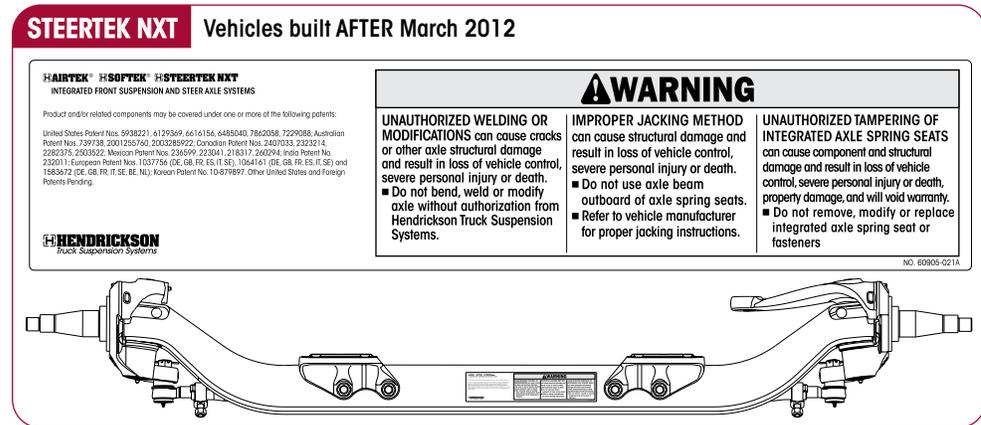


FIGURE 8-12

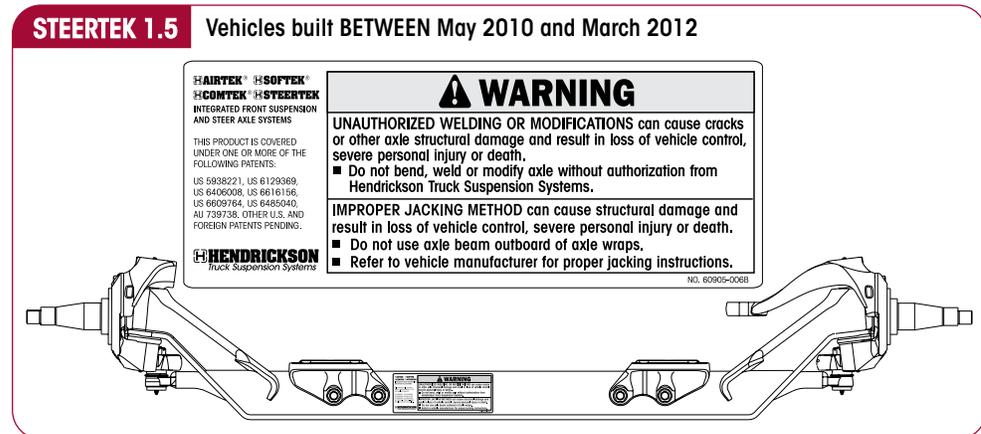
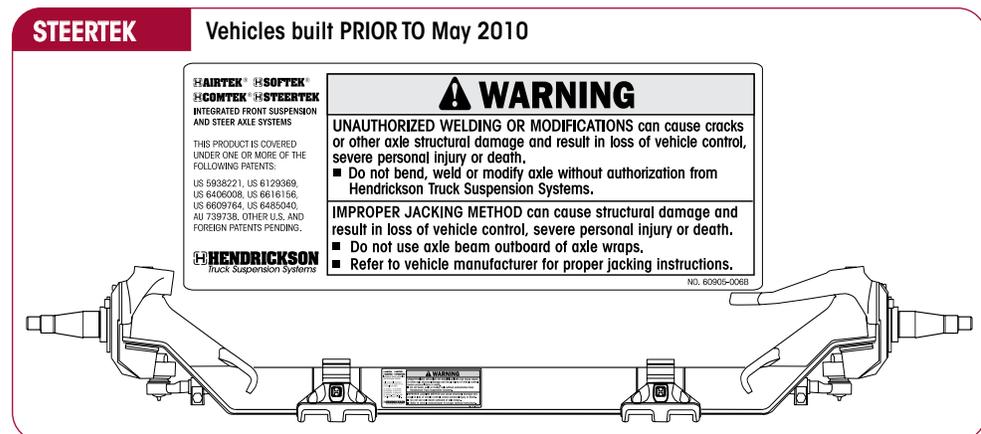


FIGURE 8-13





## WARNING

AXLE CAMBER IS NOT ADJUSTABLE. DO NOT CHANGE THE AXLE CAMBER ANGLE OR BEND THE AXLE BEAM. BENDING THE AXLE BEAM TO CHANGE THE CAMBER ANGLE CAN DAMAGE THE AXLE AND REDUCE AXLE STRENGTH, AND WILL VOID HENDRICKSON'S WARRANTY. A BENT AXLE BEAM CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE, SEE FIGURES 8-11, 8-12 AND 8-13.



## WARNING

UNAUTHORIZED TAMPERING OF STEERTEK NXT 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, SEE FIGURE 8-11 AND 8-12. 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.

7. Check and adjust caster angle. Refer to Caster Angle under the Definitions in this section. **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.

## SERVICE HINT

Prior to checking caster confirm that the vehicle is at its proper ride height on the rear suspension (if applicable). The rear ride height must be correct to achieve proper caster.

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

## STEERING STOP

### ADJUSTMENT PROCEDURE

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



## WARNING

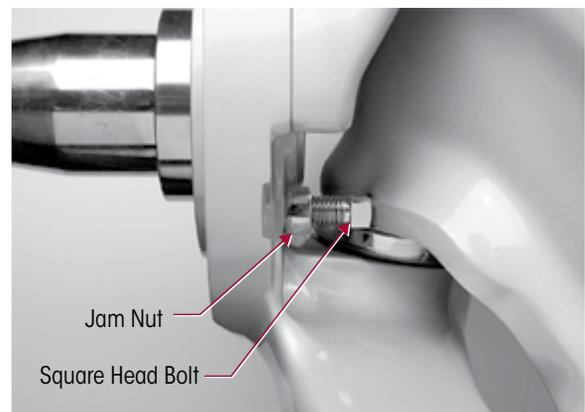
ALWAYS CHECK/RESET THE STEERING GEAR BOX POPPET WHEN THE WHEEL CUT IS DECREASED. FOLLOW THE MANUFACTURER'S GUIDELINES FOR THE GEAR BOX POPPET RESETTING PROCEDURE. FAILURE TO DO SO CAN RESULT IN PREMATURE FAILURE OF THE AXLE OR STEERING KNUCKLE. THIS CONDITION CAN CAUSE LOSS OF VEHICLE CONTROL, PERSONAL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

The steering stop adjustment procedure is as follows:

1. Drive motorhome onto turntables and chock the rear wheels.

FIGURE 8-14

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, see Figure 8-14.

## 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 8-14.

5. Decrease the wheel cut by loosening the jam nuts and screw the axle stops out counterclockwise.
6. Tighten the jam nuts to  40-60 foot pounds.
7. Measure the wheel cut and check for any interference with related steering components.

### 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 of the tread on both steer axle tires around the complete outer diameter of the tires.
4. Scribe a line through the painted center marks around the complete outer diameter of both steer axle tires.
5. Raise the vehicle and remove the jack stands.
6. Set the vehicle on the ground.

#### NOTE

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

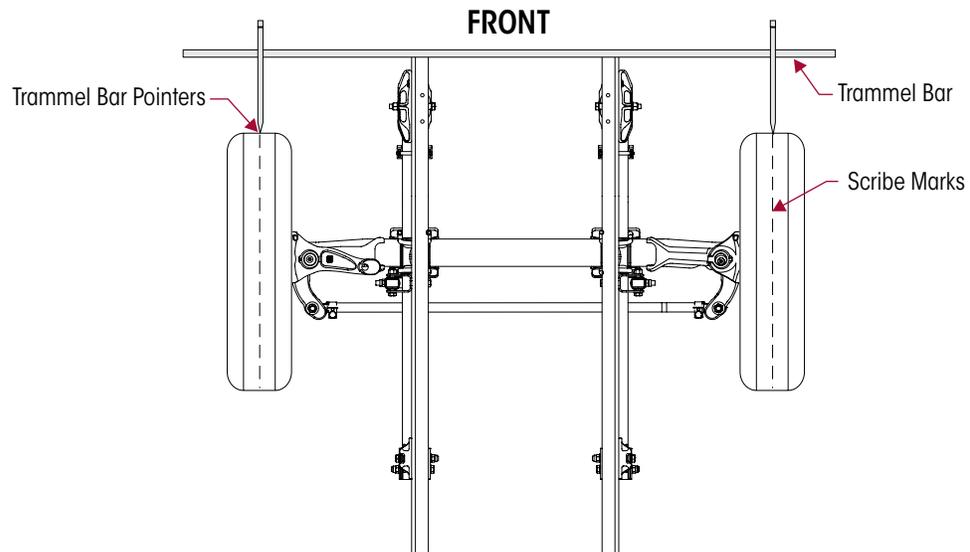
7. Use a trammel bar and measure the distance between the scribe marks at the rear of the steer axle tires. Record the measurement.

#### 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.

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 8-15.

**FIGURE 8-15**



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  $\frac{1}{16}'' \pm \frac{1}{32}''$  ( $0.060'' \pm 0.030''$ ), 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 setting is achieved.
  - c. Tighten the bolt and locknut on the tie rod cross tube to  60-75 foot pounds torque.



**WARNING**

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 8-16. FAILURE TO DO SO CAN CAUSE COMPONENT TO FAIL CAUSING LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

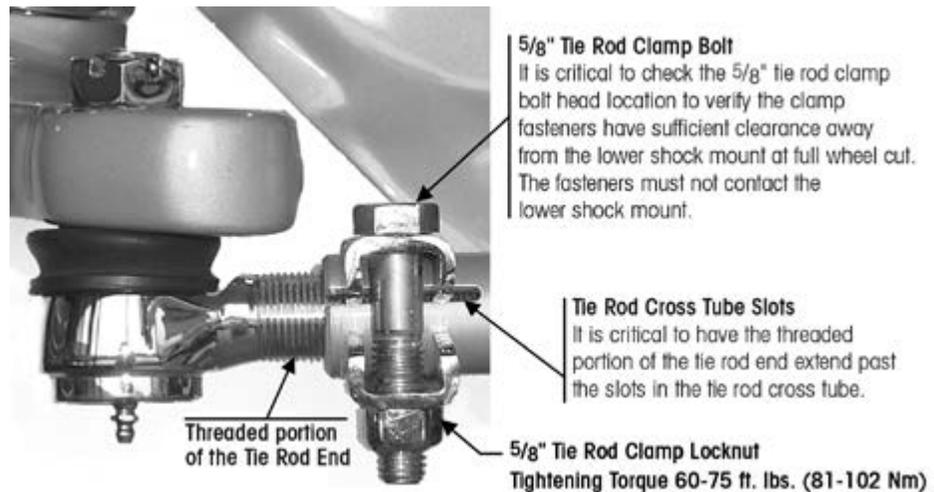


**WARNING**

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.

11. Verify the 5/8" tie rod clamp bolt head does not contact the lower shock mount at full wheel cut, see Figure 8-16.
12. Repeat Steps 1-9 until the correct toe-in setting is achieved.

**FIGURE 8-16**



### SPRING EYE RE-TORQUE

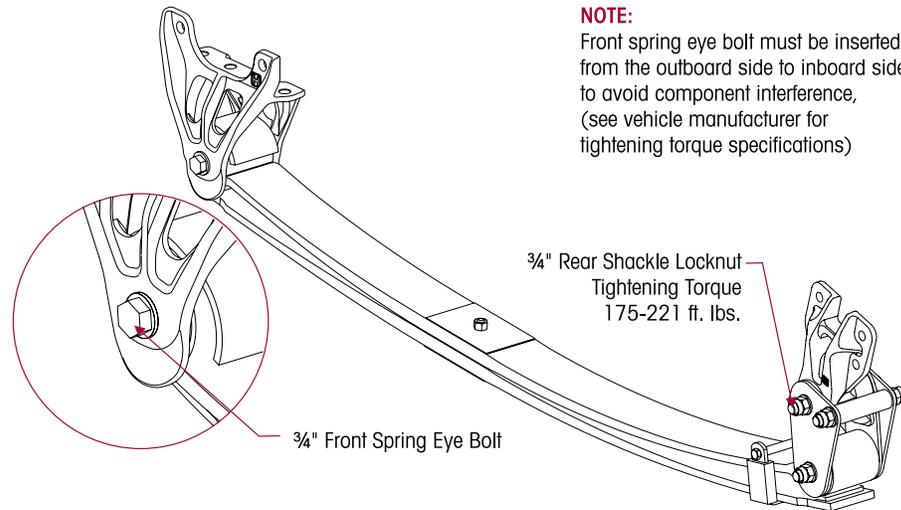
This procedure to re-torque is necessary when replacing

- Front hanger
- Shackle assembly
- Steel leaf spring assembly

### RE-TORQUE PROCEDURE

1. Chock the rear wheels of the vehicle to prevent movement.
2. Loosen, **DO NOT REMOVE** all six (6), (or eight if equipped) front and rear 3/4" spring eye bolts, see Figure 8-17.
3. Let the suspension settle.
4. Tighten the front 3/4" spring eye bolt locknuts per the vehicle manufacturer's torque specifications.
5. Tighten the rear 3/4" spring eye bolt and shackle bolt locknuts per the vehicle manufacturer's torque specifications.

FIGURE 8-17

**NOTE:**

Front spring eye bolt must be inserted from the outboard side to inboard side to avoid component interference, (see vehicle manufacturer for tightening torque specifications)

FIGURE 8-18



6. Affix a straight edge to the bottom of the frame rail behind the frame hanger, see Figure 8-18.
7. With the vehicle on a level surface, measure the distance from the top of the straight edge to the ground on both sides of the vehicle and record the measurements.
8. Measure the difference from one side to the other.
9. Remove wheel chocks and perform a road test.
10. Chock the rear wheels of the vehicle to prevent movement.
11. Repeat the measurement in Steps 6 through 8.
12. If the difference in measurement from one side to the other is less than 1/2", the vehicle is level. If measurement difference is more than 1/2" contact the vehicle manufacturer.
13. Remove the wheel chocks.

### HEIGHT CONTROL VALVE VERIFICATION – AIRTEK

1. Drive the vehicle onto a level surface.
2. Free and center all suspension joints by slowly moving vehicle back and forth several times without using the brakes. **It is important when coming to a complete stop to verify that the brakes are released.**
3. Chock front wheels.
4. Verify that the air system is at full operating pressure.

**NOTE**

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

5. Prior to adjusting the height control valve, clean the threads of the 1/4" valve mounting fasteners to remove any debris and corrosion.



## WARNING

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

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

## SERVICE HINT

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

- 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.
- Re-attach the upper grommet of the height control valve linkage onto the upper stud to fill the suspension system with air by raising the height control valve linkage arm. Wait until the airflow to front air springs has stopped.
- Measure the suspension reference ride height on the shock absorber, see Figure 8-19 and, measuring from the center of the top mounting bolt to the center of the bottom mounting bolt.

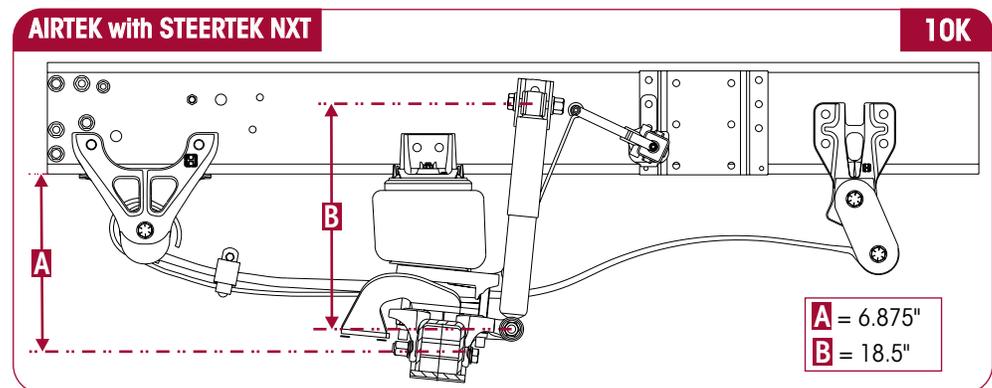
- The referenced ride height measurement is specified in Table 8-1. If the reference measurement is not within  $\pm \frac{1}{4}$ " of specification, the ride height MUST be adjusted, see Ride Height Adjustment in this section. If the ride height measurement is within specification, then no adjustment is necessary, proceed to next step.

TABLE 8-1

AIRTEK – Reference Ride Height	
Dimension A	Dimension B
From the bottom of the frame to the center of axle	Shock absorber length
6.875"	18.5"

- Remove wheel chocks.

FIGURE 8-19



## RIDE HEIGHT ADJUSTMENT PROCEDURE

- 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.

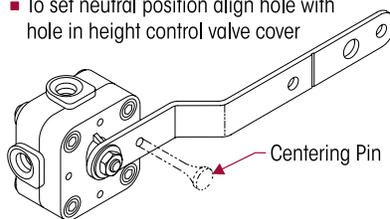
- See Air Spring Safety Notice in the Important Safety Notice Section of this publication prior to deflating or inflating the suspension system. Cycle the air system.
- Cycle the air system. Detach the lower rubber grommet(s) of the height control valve linkage(s) from the lower stud and exhaust the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

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

- Use a 1/8" 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 8-20. **DO NOT** use a metal rod or nail as this may cause damage to the height control valve.

**FIGURE 8-20**

- To set neutral position align hole with hole in height control valve cover


**NOTE**

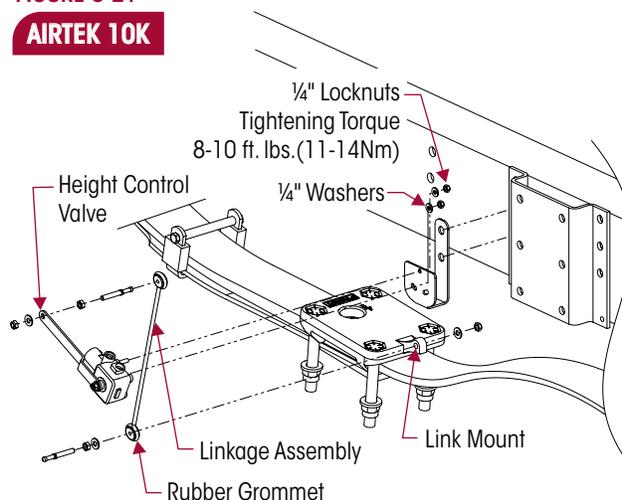
Hendrickson recommends the following be performed during any type of ride height adjustment to help prevent socket head cap screws from loosening from the height control valve housing, potentially causing subsequent air leaks from the height control valve.

- Prior to adjusting the height control valves, clean the threads of the mounting fasteners of any debris and corrosion.
- To adjust the height control valve, loosen the mounting locknuts.
- 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.
- 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.

**FIGURE 8-21**
**AIRTEK 10K**
**SERVICE HINT**

It is necessary to place a 3/16" Allen wrench in the head of the mounting bolts while adjusting ride height to prevent movement of the bolts, which can cause air leakage in the body of the leveling valve.

- Tighten the mounting locknuts to 8-10 foot pounds (11-13 Nm) torque after the adjustment is made, see Figure 8-21. Install a (5 mm) allen wrench in the bottom socket head cap screws to prevent the screws from turning while re-tightening the locknuts.



- Remove the dowel from the height control valves.
- Cycle the air from the system by lowering the height control valve arm.
- Reconnect the height control valve linkage rubber grommet to the link mounts. Allow the air suspension system to completely fill with air.
- Recheck the ride height after adjustment, (if equipped with dual height control valves check both sides of the vehicle).
- Repeat adjustment Steps 2 through 14 until the ride height is within specification.
- Remove wheel chocks.



## SECTION 9

# Component Replacement

### FASTENERS

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

### HEIGHT CONTROL VALVE – AIRTEK

#### DISASSEMBLY

1. Drain the air from the secondary air tank.



#### WARNING

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

2. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.
3. Exhaust 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. Lower the height control valve lever arm. This will exhaust air from the system.



#### CAUTION

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

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 vehicle frame 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 flange of the frame, see Figure 9-2.

FIGURE 9-1

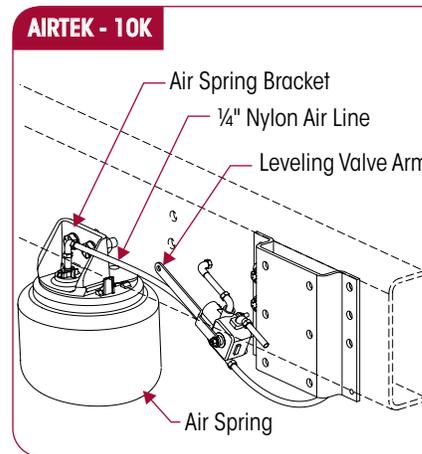
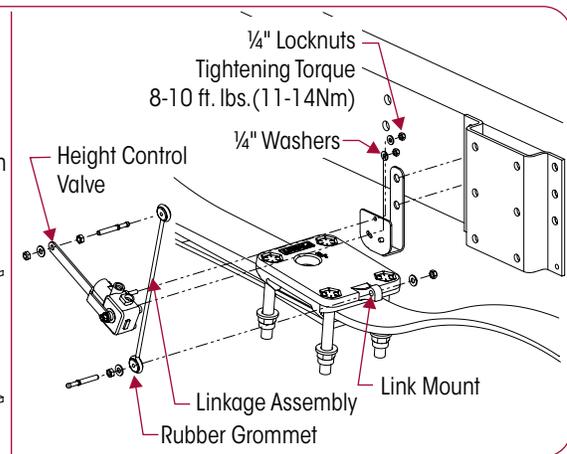


FIGURE 9-2



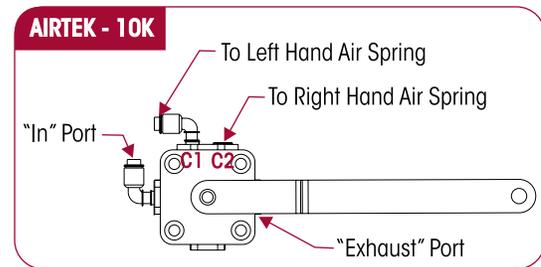
**SERVICE HINT**

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 1/4" locknuts to 8-10 foot pounds (11-14 Nm) torque.

FIGURE 9-3



**AIR SPRING – AIRTEK**

**DISASSEMBLY**

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

**WARNING**

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

**WARNING**

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

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.



- Remove the air from the air system by disconnecting the height control valve linkage at the rubber grommet of the height control valve arm and allow the arm to drop. This will exhaust air from the system.

**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 CAN RESULT IN THE PUSH-TO-CONNECT FITTING FAILING TO SEAL WITH THE AIR LINE.

- Disconnect the air line to the air spring.
- Raise the frame to allow for air spring removal.
- 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. This will dislodge the air spring from the upper air spring bracket.
- 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.
- Remove the air spring.

FIGURE 9-4



FIGURE 9-5

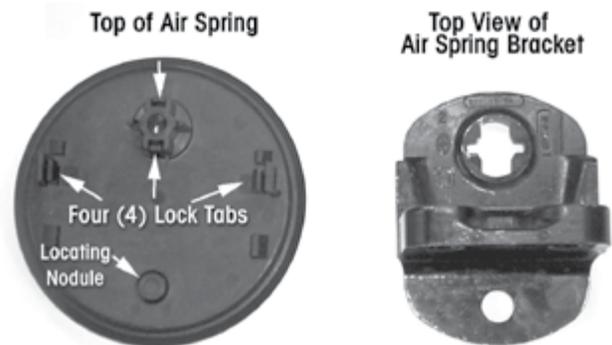


**ASSEMBLY**

- Insert the air spring into the top pad. Make sure the lock tabs click in place.
- 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.

- 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.

FIGURE 9-6



**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.

- Install the air line into the air spring.

**WARNING**

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

5. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.
6. Air up the suspension.
7. Check the air spring for leaks.
8. Check the ride height and adjust if necessary. See Alignment & Adjustments Section of this publication for the proper ride height adjustment.
9. Remove the wheel chocks.

**SHOCK ABSORBER****NOTE**

This component is not supplied by Hendrickson. Hendrickson is not responsible for components supplied by the vehicle manufacturer. For assistance with maintenance and rebuild instructions on this component, see the vehicle manufacturer.

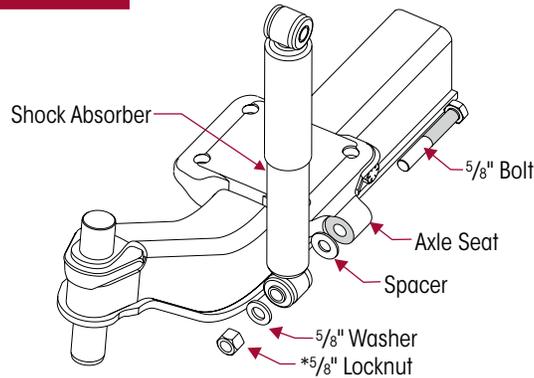
It is not necessary to replace the shock absorber in pairs if only one shock requires replacement.

**DISASSEMBLY**

1. Remove the lower mounting bolts, fasteners, and spacer.
2. Remove the upper mounting bolts and fasteners.
3. Slide out the shock absorber.
4. Inspect the shock absorber mounting brackets and hardware for damage or wear, replace as necessary.

**ASSEMBLY**

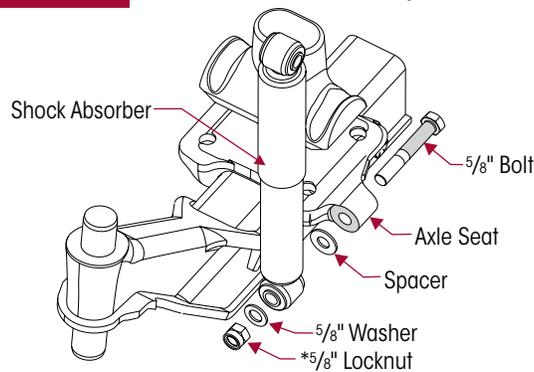
1. Install the shock absorber into the upper mounting bracket.
2. Install the upper shock mounting bolt, washers and locknut.
3. ■ **Vehicles built after May 2010:**
  - a. Apply a thin coating of anti-seize compound to the shock absorber lower mounting bolt shank, to the mating face of the axle seat and spacer, and to the inside bore of the axle seat. This is necessary to help prevent seizing of the bolt to the axle seat.
  - b. Install the lower bolt from the inboard side to the outboard side of the axle seat and attach the spacer, washer, and locknut, see Figure 9-7.
- **Vehicles built prior to May 2010:**
  - 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.
  - 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 9-7.
4. Tighten upper and lower shock eye locknuts per vehicle manufacturer's torque specifications.

**FIGURE 9-7**
**STEERTEK NXT Vehicles built AFTER March 2012**


**Apply a thin coating of anti-seize compound to:**

- lower shock absorber
- mounting bolt shank
- mating face of the axle seat
- Spacer
- inside bore of the axle seat

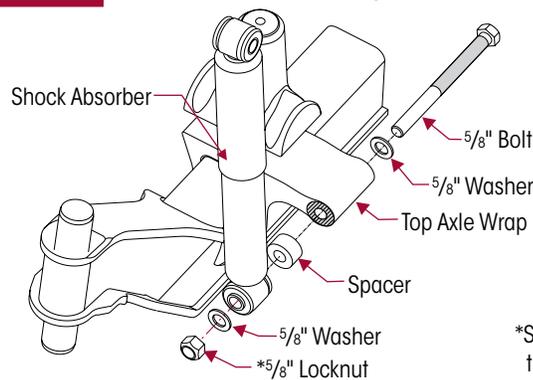
\*See vehicle manufacturer for tightening torque specifications.

**STEERTEK 1.5 Vehicles built BETWEEN May 2010 and March 2012**


**Apply a thin coating of anti-seize compound to:**

- lower shock absorber
- mounting bolt shank
- mating face of the axle seat
- spacer
- inside bore of the axle seat

\*See vehicle manufacturer for tightening torque specifications.

**STEERTEK Vehicles built PRIOR TO May 2010**


**Apply a thin coating of anti-seize compound to:**

- lower shock absorber
- mounting bolt shank
- mating face of the axle wrap
- Spacer
- inside bore of the aluminum top axle wrap

\*See vehicle manufacturer for tightening torque specifications.

## FRONT LEAF SPRING FRAME HANGER

### 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 shock absorbers.
6. **SOFTEK** equipped vehicles – proceed to Step 10.

**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.

7. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.
8. **AIRTEK** equipped vehicles – Exhaust 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. Lower the height control valve lever arm. This will exhaust air from the system.
9. Remove the air lines from air springs (if equipped).
10. Remove the  $\frac{3}{4}$ " spring eye bolt, washers and locknut.

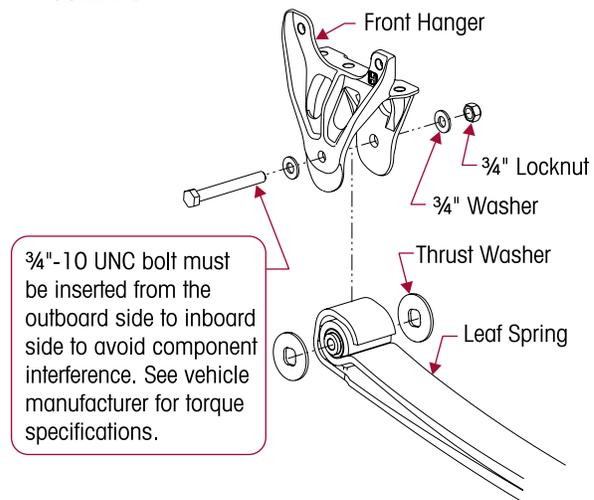
**SERVICE HINT**

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

11. Remove the frame mounting fasteners from the hanger per manufacturer's guidelines.
12. Remove the hanger from the vehicle, see Figure 9-8.

**FIGURE 9-8****ASSEMBLY**

1. Install the new front hanger on the frame.
2. Install new frame fasteners per the vehicle manufacturer's guidelines.
3. Install the new  $\frac{3}{4}$ " spring eye bolt from the outboard side of the hanger and attach fasteners, see Figure 9-8.
4. Remove the frame stands and lower the frame.
5. **SOFTEK** equipped vehicles – proceed to Step 9.
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. **AIRTEK** equipped vehicles – Install the air lines into the air springs.
8. Install the height control valve linkage and inflate the suspension to normal operating pressure.
9. Tighten  $\frac{3}{4}$ " locknut to vehicle manufacturer's specifications.
10. Remove the wheel chocks.

**REAR SHACKLE FRAME BRACKET****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.
6. **SOFTEK** equipped vehicles – proceed to Step 10.

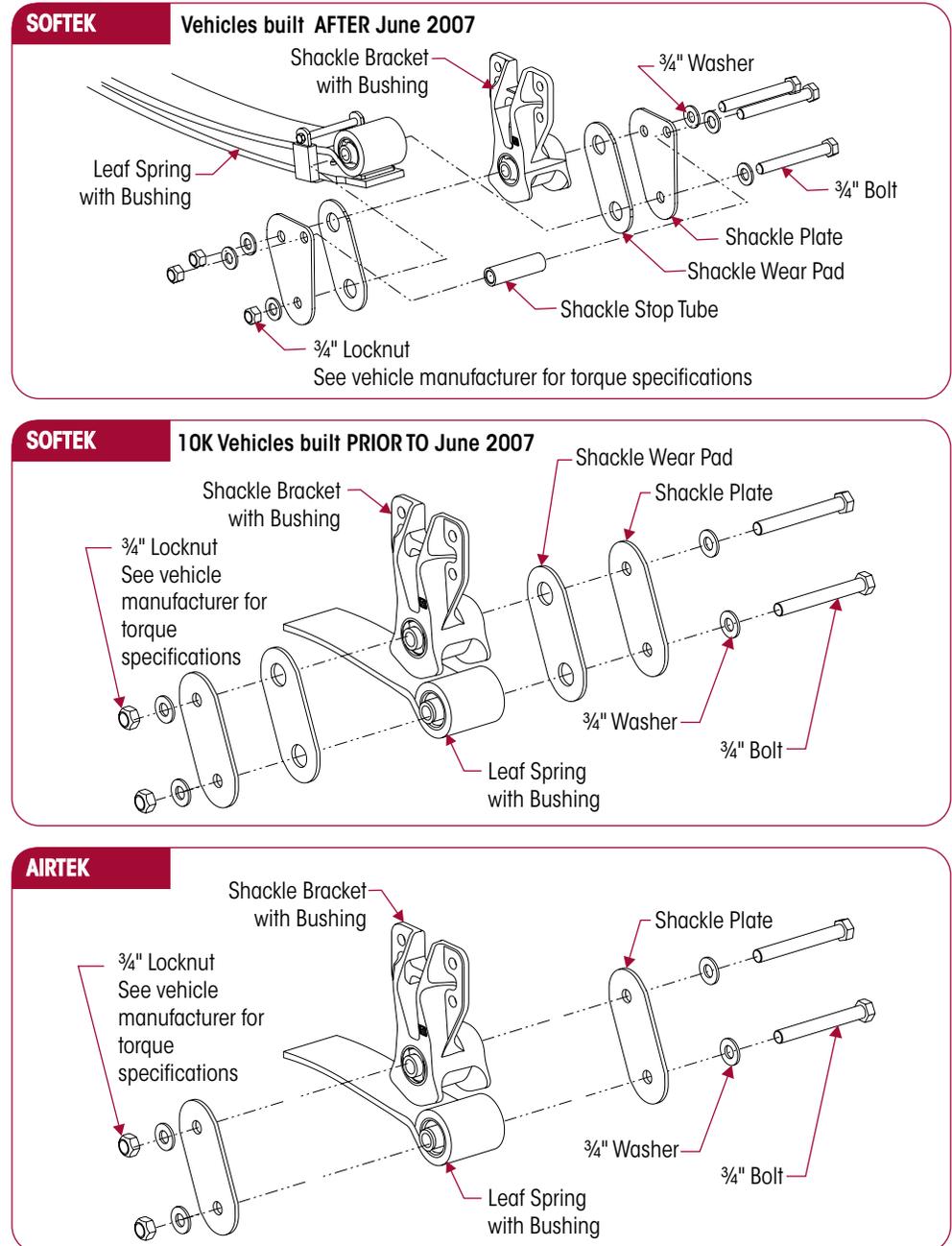


**WARNING**

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.

7. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.
8. **AIRTEK** equipped vehicles – Exhaust 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. Lower the height control valve lever arm. This will exhaust air from the system.
9. Remove the air lines from air springs (if equipped).
10. Remove the rear  $\frac{3}{4}$ " spring eye and shackle pivot bolts, washers and locknuts.

**FIGURE 9-9**



**SERVICE HINT**

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

11. Remove the frame fasteners from the shackle bracket per manufacturer's guidelines.
12. Remove the shackle bracket from the vehicle, see appropriate configuration, Figures 9-9.
13. Inspect the shackle assembly and both shackle wear pads (if equipped) for excessive wear or damage. See Rear Shackle Wear Pads Inspection in the Preventive Maintenance Section of this publication. Hendrickson recommends the wear pads be replaced when this assembly is serviced.
14. If damaged or worn excessively, replace with genuine Hendrickson parts as detailed in this section.

**ASSEMBLY**

1. Install the shackle bracket on the frame.
2. Install the new frame fasteners per the vehicle manufacturer's guidelines.
3. Install the shackle wear pads (if equipped) and shackle plates with the ¾" bolts, washers and locknuts. Snug the shackle bolts. **DO NOT** tighten.
4. Remove the frame stands and lower the frame.
5. **SOFTEK** equipped vehicles – proceed to Step 9.
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. **AIRTEK** equipped vehicles – Install the air lines into the air springs.
8. Install the height control valve linkage and inflate the suspension to normal ride height.
9. Tighten ¾" shackle locknuts to the vehicle manufacturer's torque specifications, see Figure 9-9.
10. Remove the wheel chocks.

**LEAF SPRING – SOFTEK****DISASSEMBLY**

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Raise the vehicle.
4. Support the frame with frame stands.
5. Suspend the front axle to remove the load from leaf spring assembly.
6. Remove the front and rear ¾" spring eye bolts, washers and locknuts. Loosen the ¾" shackle pivot bolt.

**SERVICE HINT**

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

7. Remove the ¾" clamp group U-bolts, washers and locknuts. Discard the fasteners.

**WARNING**

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

**SERVICE HINT**

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



- 8. **STEERTEK NXT** axle — vehicles built **AFTER** March 2012
- STEERTEK 1.5** axle — vehicles built **BETWEEN** May 2010 and March 2012

 **WARNING**

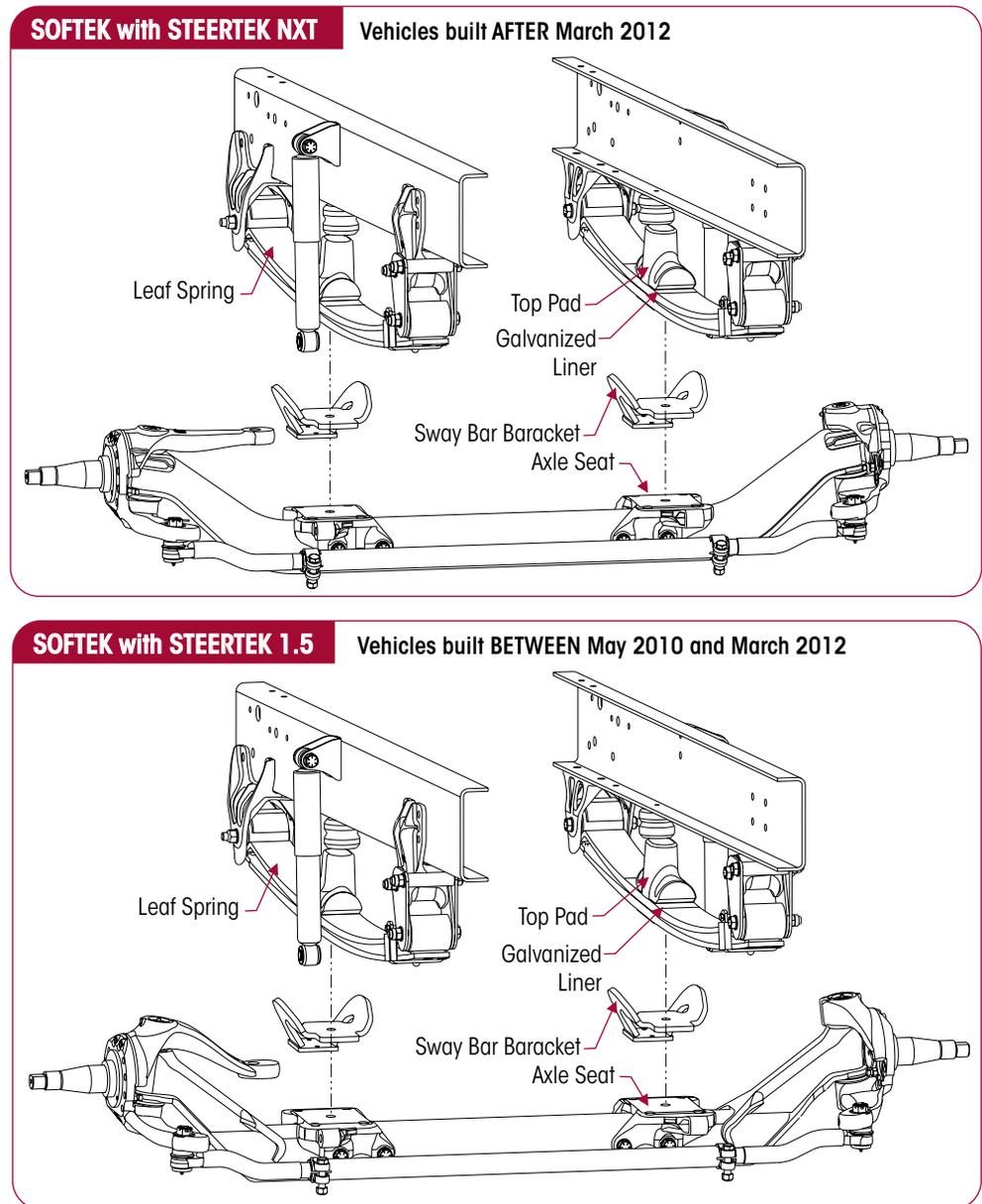
UNAUTHORIZED TAMPERING OF INTEGRATED AXLE SPRING SEATS CAN CAUSE COMPONENT AND STRUCTURAL DAMAGE AND RESULT IN LOSS OF VEHICLE CONTROL, SEVERE PERSONAL INJURY OR DEATH, PROPERTY DAMAGE, AND WILL VOID ANY APPLICABLE WARRANTY. DO NOT REMOVE, MODIFY OR REPLACE INTEGRATED AXLE SPRING SEAT OR FASTENERS.

**NOTE**

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

- a. Remove the top pad, galvanized liner and sway bar bracket from the leaf spring assembly that is going to be removed, see Figure 9-10.
- b. Proceed to Step 10.

**FIGURE 9-10**



9. **STEERTEK** axle — vehicles built **PRIOR** to May 2010
  - a. Remove the top pad, sway bar bracket, galvanized liner, and the bottom axle wrap from the leaf spring that is going to be removed, see Figure 9-11.
10. Remove the leaf spring assembly.

FIGURE 9-11

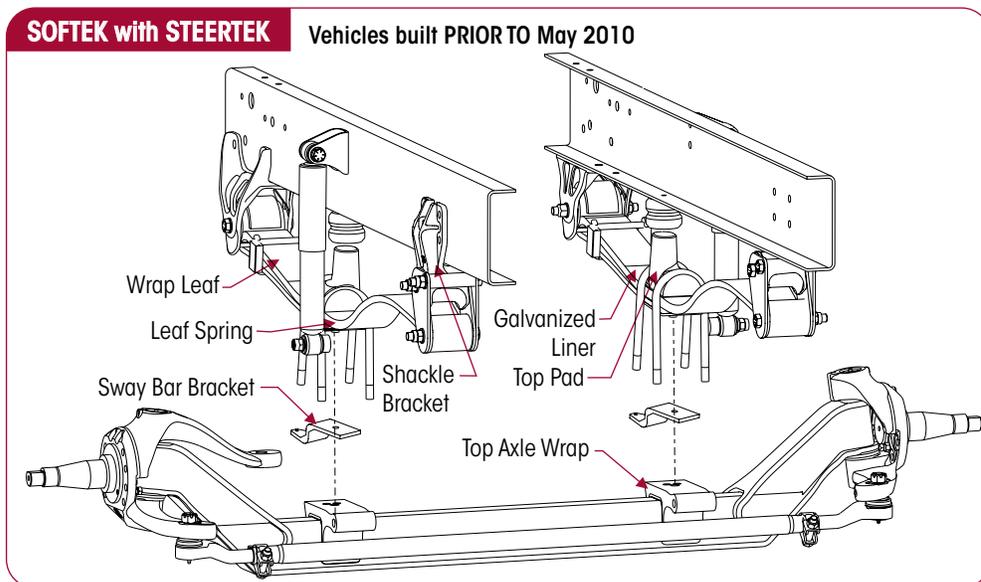
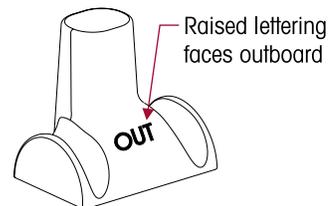


FIGURE 9-12

**ASSEMBLY**

1. Install sway bar bracket.
2. Install the new leaf spring assembly on the axle. Verify that the center bolt is located properly in the axle seat and sway bar bracket, see Figures 9-10 and 9-11.
3. Install the new galvanized liner and the top pad with the raised lettering "OUT" facing outboard side on the spring, see Figure 9-12.
4. **STEERTEK NXT** axle — vehicles built **AFTER** March 2012  
**STEERTEK 1.5** axle — vehicles built **BETWEEN** May 2010 and March 2012
  - a. Proceed to Step 6.
5. **STEERTEK** axle — vehicles built **PRIOR** to May 2010
  - a. Install the bottom axle wrap.
  - b. Proceed to Step 6.
6. Install the new  $\frac{3}{4}$ " clamp group U-bolts, washers, and locknuts. The locknuts must be replaced when the clamp group is removed, to prevent premature bolt fatigue.
7. Snug the clamp group, **DO NOT** torque at this time.
8. Raise the axle and the leaf spring assembly into the front hanger and rear shackle assembly.
9. Install the  $\frac{3}{4}$ " spring eye bolts, washers and locknuts. Snug bolts. **DO NOT** tighten. Front spring eye bolts are inserted from the outboard side to the inboard side to avoid component interference.
10. Ensure that the clamp group is properly aligned and the U-bolts are seated in the top pad, and the sway bar bracket is centered on the axle seat, see Figure 9-13.



FIGURE 9-13

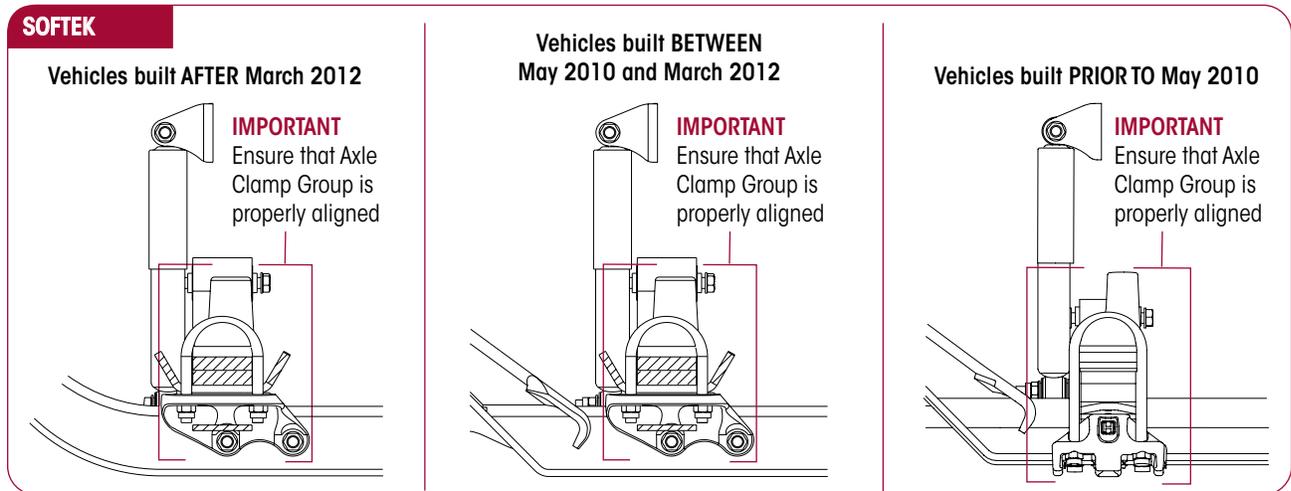
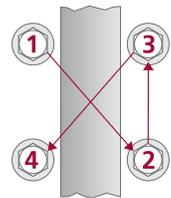


FIGURE 9-14



11. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-14.
12. Remove the frame supports and load the front axle with the vehicle weight.
13. Tighten the front  $\frac{3}{4}$ " spring eye bolt locknuts to the vehicle manufacturer's torque specifications.
14. Remove the wheel chocks.

## LEAF SPRING – AIRTEK

### DISASSEMBLY

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

**WARNING**

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

3. Exhaust 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. Lower the height control valve lever arm. This will exhaust air from the system.
4. Install a floor jack with a 4 inch lifting plate below the axle and raise the truck.
5. Remove the tires.
6. Install frame stands behind the rear spring mounts. It may be necessary to remove peripheral components for installation of the frame stands.
7. Lower the jack allowing the axle to hang, but do not remove the jack from the axle.
8. Loosen both front spring eye bolts, but **DO NOT** remove the bolts.
9. Loosen the  $\frac{3}{4}$ " shackle pivot bolt.
10. Remove both rear spring eye bolts.
11. Remove both lower shock absorber mounting fasteners.

### SERVICE HINT

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

12. Disconnect the air lines at the air springs.
13. Disconnect the bottom of the air springs from the top pad, see Air Spring Disassembly in this section.

**WARNING**

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

**SERVICE HINT**

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

14. Loosen the clamp group locknuts for the leaf spring that **IS NOT** being replaced.
15. Lower the jack allowing the suspension to pivot down out of the rear hanger clamps.
16. Remove the clamp group fasteners from the leaf spring being replaced and discard.

**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.

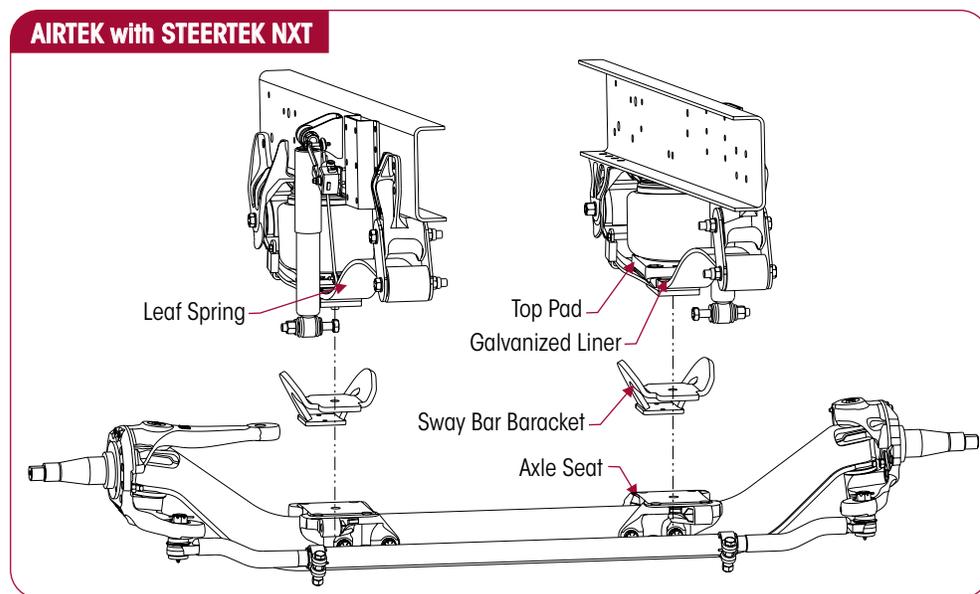
- DO NOT REMOVE, MODIFY OR REPLACE INTEGRATED AXLE SPRING SEAT OR FASTENERS.

**NOTE**

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

17. Remove the top pad, galvanized liner and sway bar bracket from the leaf spring assembly that is going to be removed, see Figure 9-15.
18. Remove the leaf spring assembly.

**FIGURE 9-15**



**ASSEMBLY**

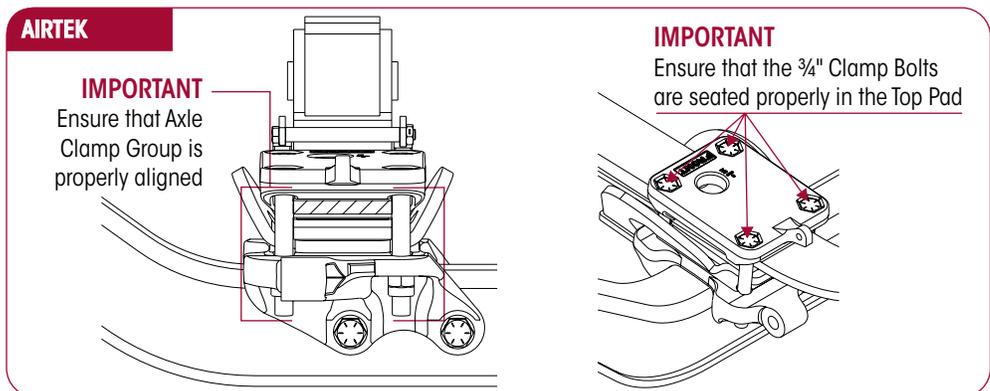
1. Install sway bar bracket.
2. Install the new leaf spring assembly on the axle. Verify that the center bolt is located properly in the axle seat and sway bar bracket, see Figure 9-15.
3. Install the new galvanized liner and the top pad.

4. Install the new 3/4" clamp group U-bolts, washers, and locknuts. The locknuts must be replaced when the clamp group is removed, to prevent premature bolt fatigue.
5. Snug the clamp group, **DO NOT** torque at this time.
6. Raise the axle and the leaf spring assembly into the front hanger and rear shackle assembly.
7. Install the 3/4" spring eye bolts, washers and locknuts. Snug bolts. **DO NOT** tighten. Front spring eye bolts are inserted from the outboard side to the inboard side to avoid component interference.
8. Install the lower shock mounting bolts from the inboard side to the outboard side.
9. Lower the floor jack and allow the suspension to hang by the spring eye bolts and shock mounts.

**IMPORTANT NOTE**

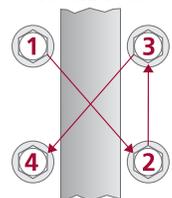
Only the weight of the axle should be on the spring at the time of the front and rear spring eye tightening torque. See the Spring Eye Re-torque procedure in the Alignment & Adjustments Section of this publication.

10. Tighten the lower shock mounting bolts per the vehicle manufacturer's specifications.
11. Tighten the front and rear spring eye per the vehicle manufacturer's specifications.
12. Install the air springs into the top pads per the Air Spring Component Assembly instructions in this publication. Make sure the air spring piston seats into the top pad correctly.
13. Ensure that the clamp group is properly aligned and the U-bolts are seated in the top pad, and the sway bar bracket is centered on the axle seat, see Figure 9-16.

**FIGURE 9-16**


14. Install the tires.
15. Raise the vehicle and remove the frame supports and load the front axle and then lower the vehicle.
16. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.
17. Install air lines, and air up system.

18. Tighten the clamp group locknuts evenly in 50 foot pounds increments to vehicle manufacturer's specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-17.
19. Verify proper ride height, see Alignment & Adjustments Section of this publication.
20. Tighten the 3/4" spring eye bolt locknuts to vehicle manufacturer's specifications.
21. Remove the wheel chocks.

**FIGURE 9-17**


## SPRING EYE BUSHINGS

The spring eye bushings for the SOFTEK / AIRTEK leaf spring and wrap leaf assemblies are designed to provide extended service life. If premature wear to the bushing occurs, careful consideration must be given to the contributing factor that caused the wear. Such factors must be corrected in order to prevent the new bushing from sustaining similar premature/excessive wear or damage in the same manner. The front and rear bushings are permanently installed in the spring leaf and are not serviceable. In the event of premature/excessive wear or damage, Hendrickson requires that the front leaf spring assembly be replaced. Follow the procedure for the Front Leaf Spring assembly in this section.

## BOTTOM AXLE WRAP (if equipped)

### ■ Vehicles built prior to May 2010

#### DISASSEMBLY

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

#### WARNING

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

#### SERVICE HINT

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

3. Remove the  $\frac{3}{4}$ " U-bolts, washers and locknuts. Discard fasteners.
4. Remove the bottom axle wrap. It may be necessary to use a dead blow mallet to dislodge axle wrap.
5. Once removed inspect the axle wrap for damage. Replace if necessary.
6. Discard the used bottom axle wrap liner.

#### ASSEMBLY

#### WARNING

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

1. Install the new bottom axle wrap liner into bottom axle wrap.
2. Install the bottom axle wrap on axle.
3. Install new  $\frac{3}{4}$ " U-bolts, washers and locknuts. Ensure that the clamp group is properly aligned, the U-bolts are seated in the top pad, and the bottom axle wrap is centered with the top axle wrap, see Figure 9-18.
4. Tighten locknuts evenly in 50 foot pounds increments to vehicle manufacturer's specifications in proper pattern to achieve uniform bolt tension, see Figure 9-19.
5. Remove frame stands and lower vehicle.
6. Remove the wheel chocks.

FIGURE 9-18

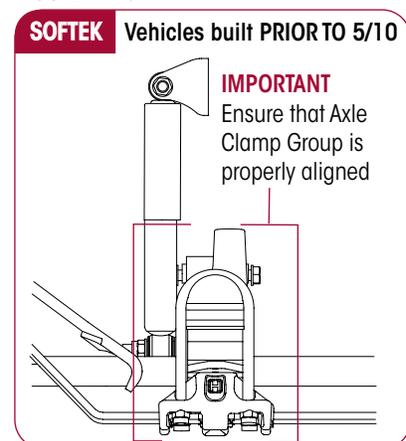
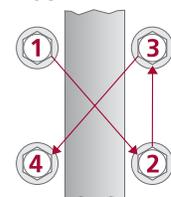


FIGURE 9-19



## TOP AXLE WRAP IN CHASSIS (if equipped)

### ■ Vehicles built prior to May 2010

#### DISASSEMBLY

1. Chock the wheels
2. Raise the vehicle and suspend the front axle to remove the load from the leaf spring and wrap leaf assembly.
3. Support the frame with frame stands.
4. Remove the front and rear 3/4" spring eye bolts, washers and locknuts. Loosen the 3/4" shackle pivot bolt.

#### SERVICE HINT

A bottle jack may be required to raise the axle slightly in order to remove spring eye bolts.



#### WARNING

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

#### SERVICE HINT

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

5. Support the axle with a jack.
6. Remove the 3/4" clamp group U-bolts, washers and locknuts. Discard fasteners.
7. Remove the top pad and the bottom axle wrap.
8. Remove the lower shock mounting bolt.
9. Remove the sway bar bracket, leaf spring and wrap leaf assembly.

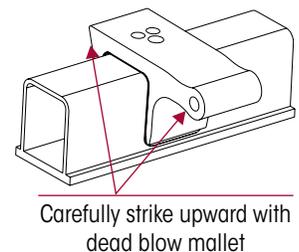


#### CAUTION

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

10. 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 9-20.

**FIGURE 9-20**

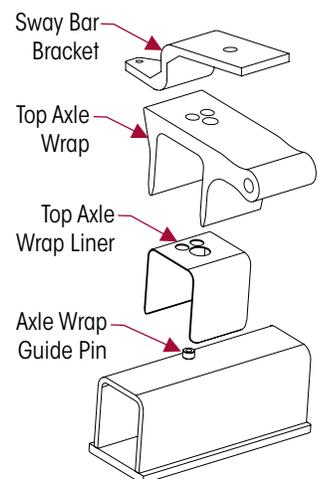


11. Clean and inspect the axle wrap and axle wrap liners for cracks or damage, replace each if cracks or damage are present.

#### 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 top axle wrap on the axle, see Figure 9-21.
4. Protect the top surface of the axle wrap with a block of wood, cardboard, or shop towels.

**FIGURE 9-21**

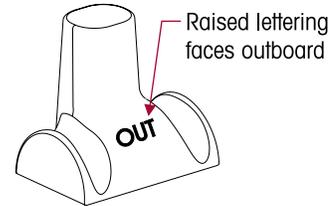


#### CAUTION

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

5. Make sure the axle wrap bore indexes the locating axle wrap guide pin and is fully seated on the axle.
6. Install the leaf spring assembly on the top axle wrap indexing the center bolt thru the sway bar bracket into the locating hole.
7. Install the top pad with the raised lettering "OUT" facing outboard side on the spring and wrap leaf assembly, see Figure 9-22.
8. Remove and replace the bottom axle wrap liner.
9. Install the bottom axle wrap.
10. Install the new 3/4" clamp group U-bolts, washers, and locknuts.
11. Snug the clamp group, **DO NOT** torque at this time.
12. Use a jack and raise the axle and spring assembly into the front spring hanger and shackle assembly.

FIGURE 9-22



**SERVICE HINT**

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

13. Install the 3/4" spring eye bolts, washer and locknuts in the front spring hanger and rear shackle assembly.
14. Ensure that the clamp group is properly aligned and the U-bolts are seated in the top pad, and the bottom axle wrap is centered with the top axle wrap, see Figure 9-23.

FIGURE 9-23

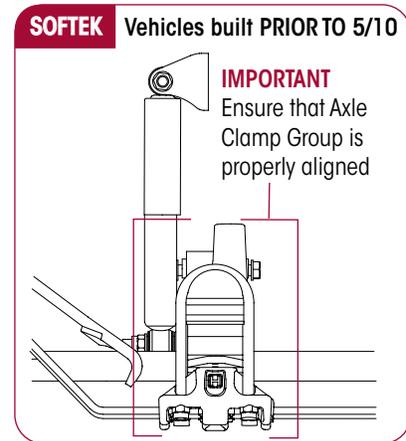
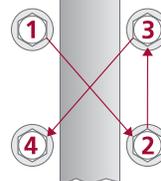
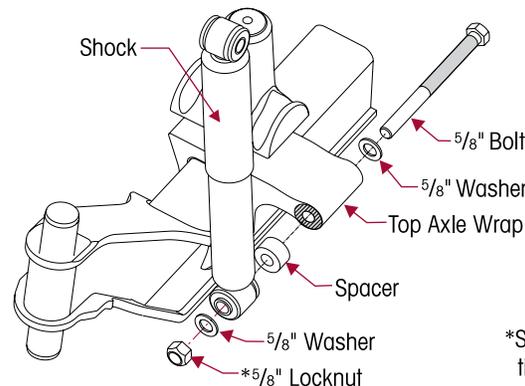


FIGURE 9-24



15. Tighten the 3/4" clamp group locknuts evenly in 50 foot pounds increments per vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-24.
16. Apply a thin coating of anti-seize to the lower shock mounting bolt, see Figure 9-25.
17. Install the 5/8" lower shock bolt to the top axle wrap (oriented from the inboard side to the outboard side), washer, and locknut, see Figure 9-25.

FIGURE 9-25



**Apply a thin coating of anti-seize compound to:**

- lower shock absorber
- mounting bolt shank
- mating face of the axle wrap
- spacer
- inside bore of the aluminum top axle wrap

\*See vehicle manufacturer for tightening torque specifications.



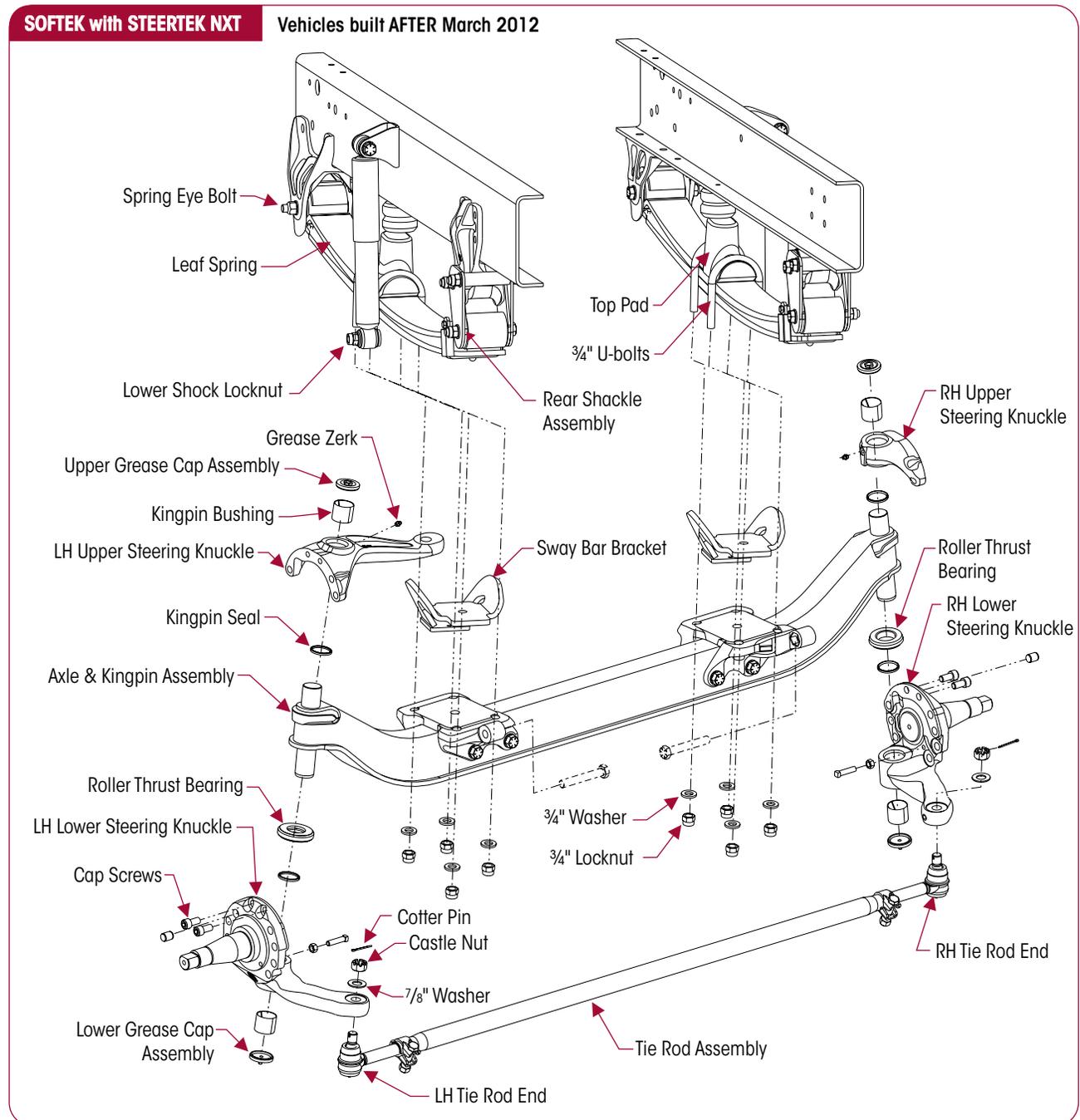
18. Tighten the  $\frac{5}{8}$ " locknut per vehicle manufacturer's torque specifications.
19. Remove the jack from the axle.
20. Remove the frame stands.
21. Tighten the  $\frac{3}{4}$ " spring eye bolt locknuts per vehicle manufacturer's torque specifications.
22. Remove wheel chocks.

## STEERTEK NXT / STEERTEK 1.5 AXLE REMOVAL

### ■ Vehicles built AFTER March 2012 with SOFTEK / STEERTEK NXT

The axle clamp group consist of a top pad,  $\frac{3}{4}$ " U-bolts, washers, and nylon locknuts

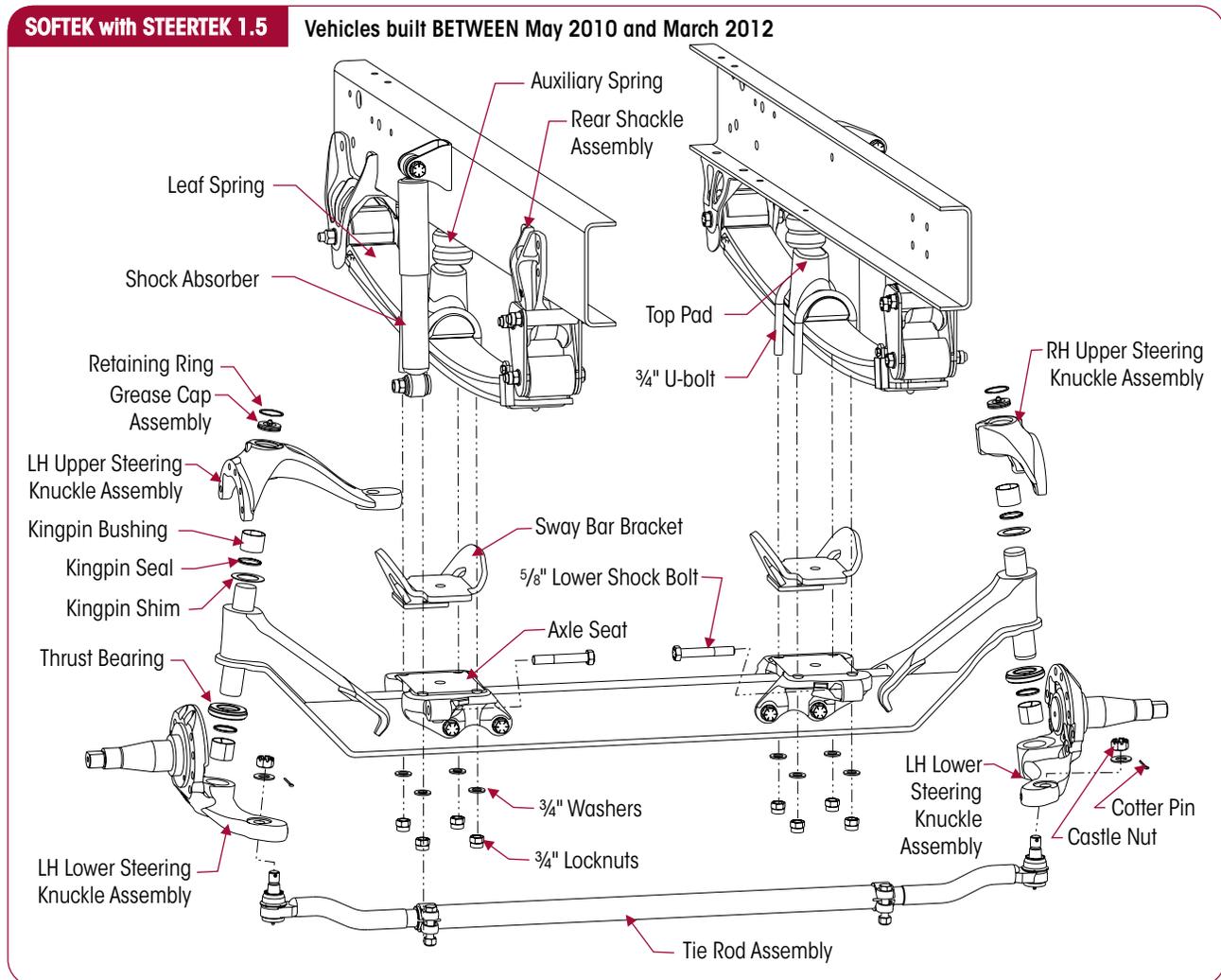
FIGURE 9-26



■ Vehicles built BETWEEN May 2010 and March 2012 with SOFTEK / STEERTEK 1.5

The axle clamp group consist of a top pad, 3/4" U-bolts, washers, and nylon locknuts

FIGURE 9-27



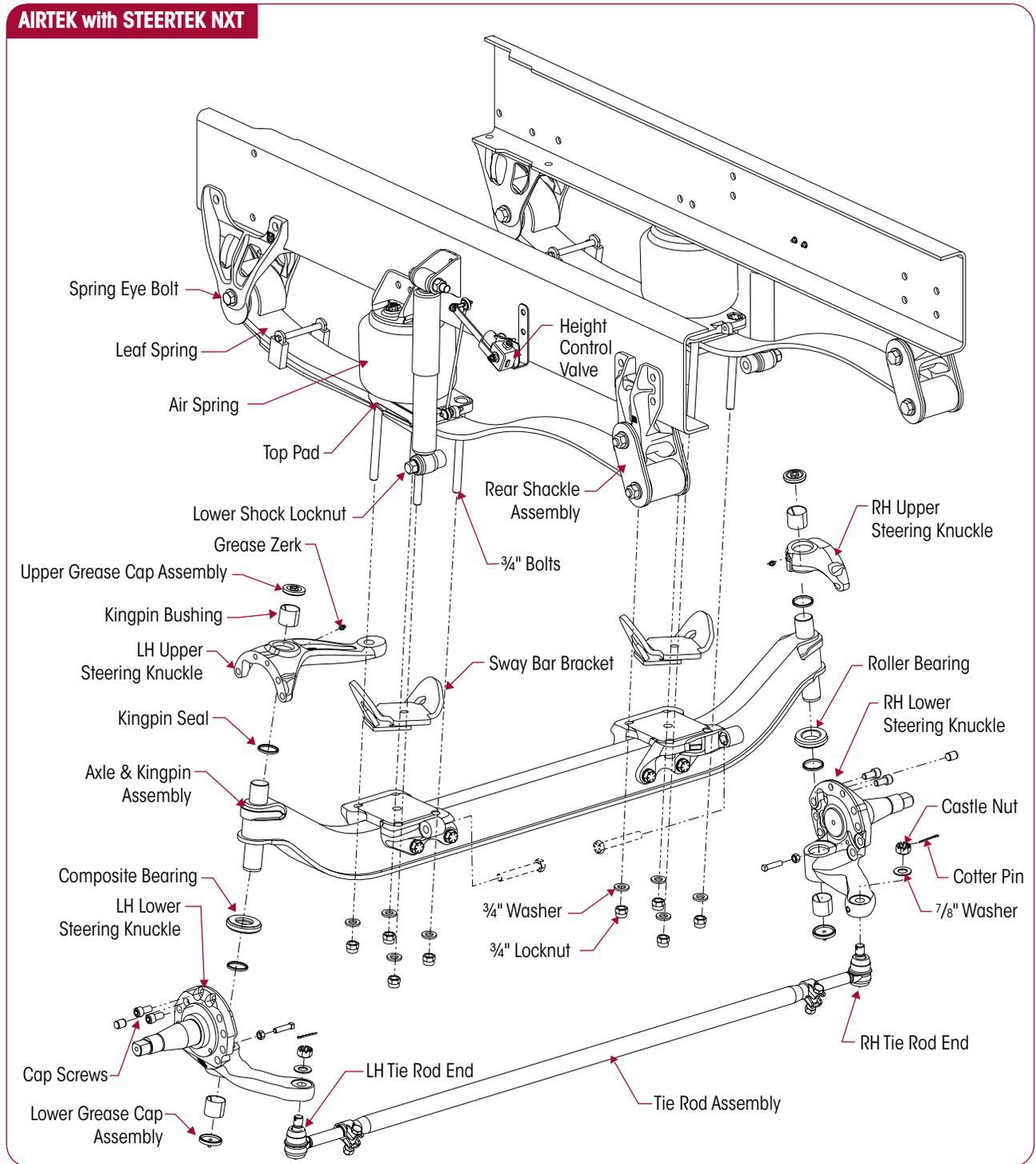


■ Vehicles built AFTER March 2012 with AIRTEK / STEERTEK NXT

The axle clamp group consist of a top pad, 3/4" hex bolts, washers, and nylon locknuts

FIGURE 9-28

AIRTEK with STEERTEK NXT



## STEERTEK NXT / STEERTEK 1.5 AXLE REMOVAL

### ■ Vehicles built AFTER May 2010

#### AXLE DISASSEMBLY

Refer to Figures 9-26, 9-27 and 9-28 when replacing the components of the STEERTEK NXT / STEERTEK 1.5 axle as shown.

#### WARNING

DO NOT USE A TORCH ON CLAMP GROUP BOLTS OR ANY OTHER PART OF THE SOFTEK / 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 SUSPENSION 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.
3. **SOFTEK** equipped vehicles – proceed to Step 6.

#### 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.

4. 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.

5. **AIRTEK** equipped vehicles – Exhaust 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. Lower the height control valve lever arm. This will exhaust air from the system.
6. Raise the vehicle.
7. Support the vehicle with the frame stands.

#### DANGER

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.

8. Suspend the front axle with the shocks attached.
9. Remove the front wheels, hubs, brake shoes, ABS sensors, and backing plate assembly.
10. Disconnect the drag link from the steering arm.
11. **SOFTEK** equipped vehicles – proceed to Step 13.

#### 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.

12. **AIRTEK** equipped vehicles – Unseat both of the air springs at the axle top pad.
13. Support the axle with a floor jack.



## WARNING

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.

14. If the vehicle is equipped with the shock absorbers attached to the integrated axle spring seat, it will be necessary to remove the lower shock mounting locknuts and washers. Remove the shock absorbers from the lower mounting bolts and push clear of spring assembly.

## SERVICE HINT

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

15. Remove the 3/4" clamp group fasteners and discard.
16. Lower the axle and remove from the vehicle.

## ■ STEERTEK NXT / STEERTEK 1.5 AXLE (Removed from Chassis)

### CLAMP GROUP DISASSEMBLY

1. Remove sway bar bracket.
2. Remove the tie rod assembly, refer to the 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.

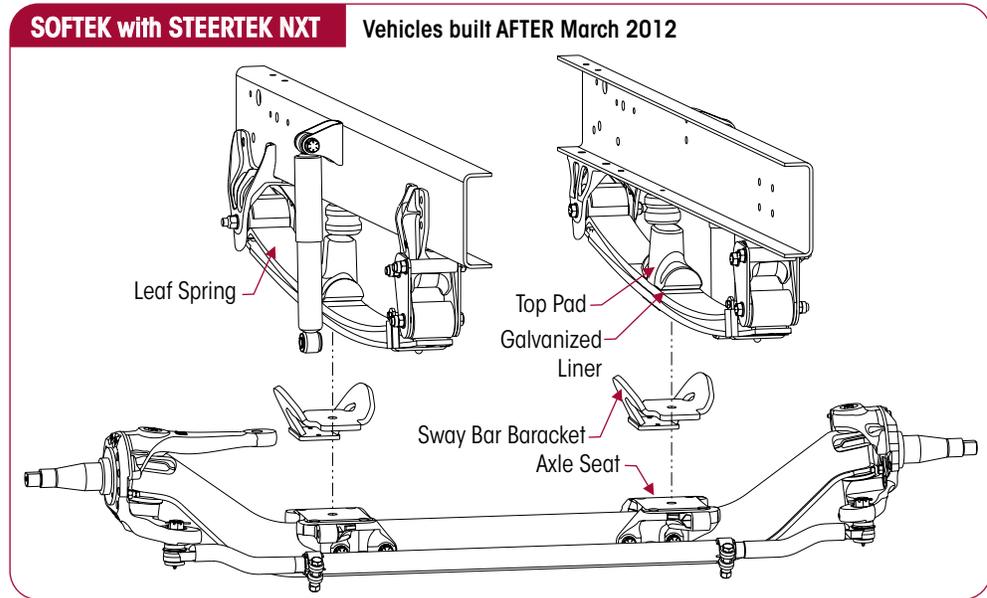
3. Remove the two 5/8" socket head cap screws from the steering knuckle assembly.
4. Remove the steering knuckle, thrust bearing, and shim pack if equipped.
5. After complete removal of the one side, repeat Steps 1-4 for the opposite side of the axle.
6. Inspect the steering kingpin bushings for excessive wear. If worn, replace the kingpin bushings and seals. See Kingpin Bushing replacement instructions in this section.

### AXLE ASSEMBLY

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Raise the axle into position. Care must be taken at this point to ensure that the leaf spring bolt aligns with the axle seat, see Figures 9-29.
3. Install the galvanized liner between the leaf spring and the top pad, see Figure 9-29.
4. Slide the sway bar bracket over the axle seat, verify that the dowel pin holes align correctly with the dowel pin on the leaf spring and wrap leaf assembly.
5. Completely raise the axle, fully engaging the leaf spring assembly into the axle seat and sway bar bracket.

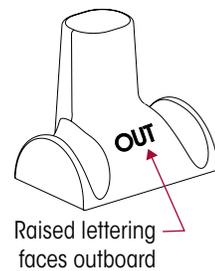


FIGURE 9-29

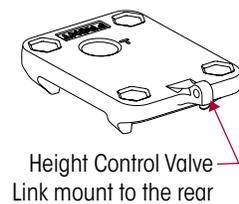


6. Install the top pad with the directional identification facing correctly on the vehicle, see Figure 9-30.
7. Install the new 3/4" clamp group U-bolts, washers and locknuts. Snug the bolts, **DO NOT** tighten to torque at this time.

FIGURE 9-30  
SOFTEK 9K/10K/12K



AIRTEK 10K



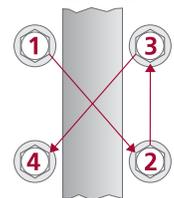
**WARNING**  
ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

8. Ensure that the clamp groups are properly aligned and the U-bolts / hex bolts are seated in the top pad, and the sway bar brackets are centered on the axle seat, see Figure 9-31.

FIGURE 9-31

<p><b>SOFTEK</b> Vehicles built AFTER 3/12</p>	<p>Vehicles built BETWEEN 5/10 and 3/12</p>	<p><b>AIRTEK</b></p> <p><b>IMPORTANT</b> Ensure that Axle Clamp Group is properly aligned</p>	<p><b>IMPORTANT</b> Ensure that the 3/4" Clamp Bolts are seated properly in the Top Pad</p>
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9. **SOFTEK** equipped vehicles — proceed to Step 12.
10. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.
11. **AIRTEK** equipped vehicles: Engage the air springs into the top pad. The bottom of the air spring snaps into the top pad.
12. Install the steering knuckles as per the Steering Knuckle replacement instructions in this section.
13. Install the tie rod assembly as per the Tie Rod End and Cross Tube assembly instructions in this section.
14. Install the  $\frac{7}{8}$ " 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.
15. Install the tie rod end cotter pins.
16. 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.
17. Install the drag link cotter pin.
18. If the vehicle is equipped with the shock absorbers attached to the integrated axle spring seat, install the lower shock mounting bolts and tighten to vehicle manufacturer's specifications.
19. Install the brake backing plate assemblies per the manufacturer's guidelines.
20. Install the brakes, hubs, and wheels as per manufacturer's guidelines.
21. Fill the hubs with the proper lube per the manufacturer's guidelines for recommended lubrication.
22. Grease the front steering components as per lubrication guidelines in the Preventive Maintenance Section of this publication.
23. Raise the vehicle and remove the frame stands.
24. Lower the vehicle.
25. **SOFTEK** equipped vehicles — proceed to Step number 27.
26. **AIRTEK** equipped vehicles — connect the height control valve and air up the system.

**FIGURE 9-32**


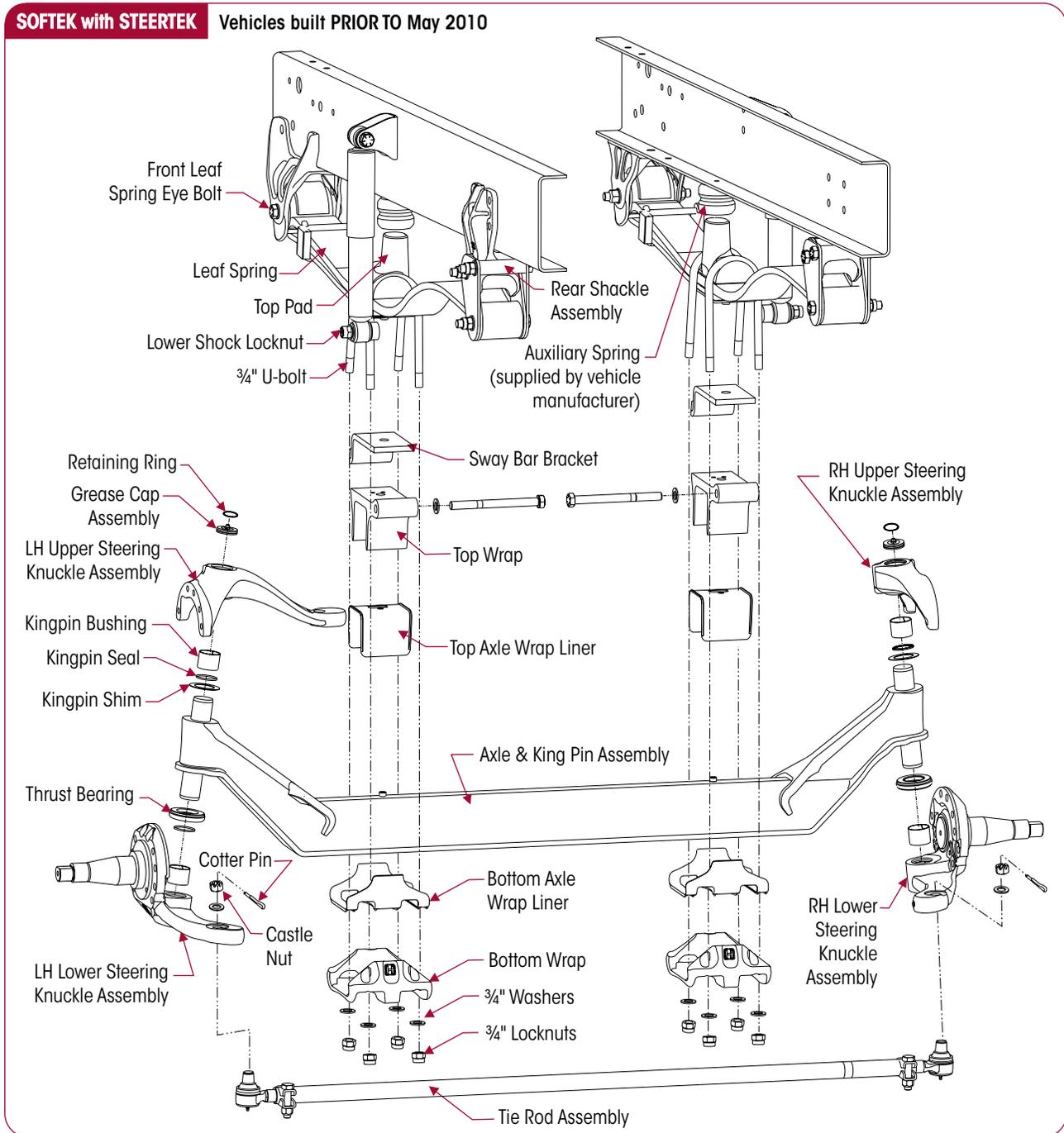
27. Tighten the  $\frac{3}{4}$ " clamp group locknuts evenly in 50 foot pounds increments per vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-32.
28. **SOFTEK** equipped vehicles — proceed to Step 30.
29. **AIRTEK** equipped vehicles — Adjust ride height per instructions in the Alignment & Adjustments Section of this publication.
30. Remove the wheel chocks.

## STEERTEK AXLE REMOVAL

### ■ Vehicles built PRIOR TO May 2010

**AXLE CLAMP GROUP** consist of the Top Axle Wrap, Bottom Axle Wrap, Top Axle Wrap Liner, Bottom Axle Wrap Liner, Top Pad, 3/4" U-bolts, washers and nylon locknuts

FIGURE 9-33



## STEERTEK AXLE REMOVAL

### ■ Vehicles built PRIOR TO May 2010

#### AXLE DISASSEMBLY

Refer to Figure 9-33 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 SOFTEK / 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 SUSPENSION COMPONENTS THAT CAN RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

1. Raise the vehicle.
2. Support the frame and suspend the front axle with the shocks attached.
3. Remove the front wheels, hubs, brake shoes, ABS sensors, and backing plate assembly.
4. Disconnect the drag link from the steering arm.
5. Support the axle.

#### WARNING

THE REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS IS NOT ALLOWED. HENDRICKSON ADVISES REPLACING ALL COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. SOFTEK / 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.

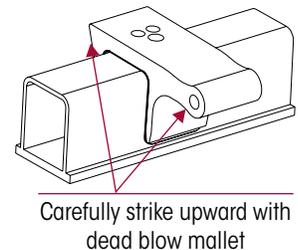
6. Disconnect and remove the lower shock mounting bolts.
7. Remove the 3/4" clamp group bolts and fasteners.
8. Lower the axle and remove from the vehicle.

### ■ STEERTEK AXLE (Removed from Chassis)

#### CLAMP GROUP DISASSEMBLY

1. Remove the bottom axle wrap and liner from the axle.
2. Remove sway bar bracket.
3. 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 9-34.
4. After removal of the top axle wrap from the axle inspect for cracks or fretting.
5. Remove the tie rod assembly, refer to the Tie Rod Disassembly in this section.

**FIGURE 9-34**



#### 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.

6. Remove the two 5/8" socket head cap screws from the steering knuckle assembly.
7. Remove the steering knuckle, thrust bearing, and shim pack if equipped.
8. After complete removal of the one side, repeat Steps 1-5 for the opposite side of the axle.
9. Inspect the steering kingpin bushings for excessive wear. If worn, replace the kingpin bushings and seals. See Kingpin Bushing replacement instructions in this section.

### CLAMP GROUP ASSEMBLY

**WARNING**

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

1. Install the new top axle wrap liner on the axle. Index the liner with the axle's guide pin, see Figure 9-35.

**CAUTION**

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

**WARNING**

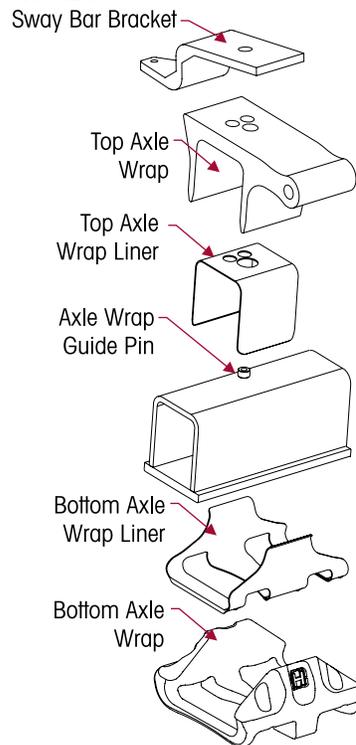
SECURELY INSTALL THE TOP AXLE WRAP TO THE AXLE. FAILURE TO DO SO CAN CAUSE LOSS OF CONTROL OF THE VEHICLE, PERSONAL INJURY OR PROPERTY DAMAGE.

**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. At this point in the assembly **DO NOT** install anything further on the axle.

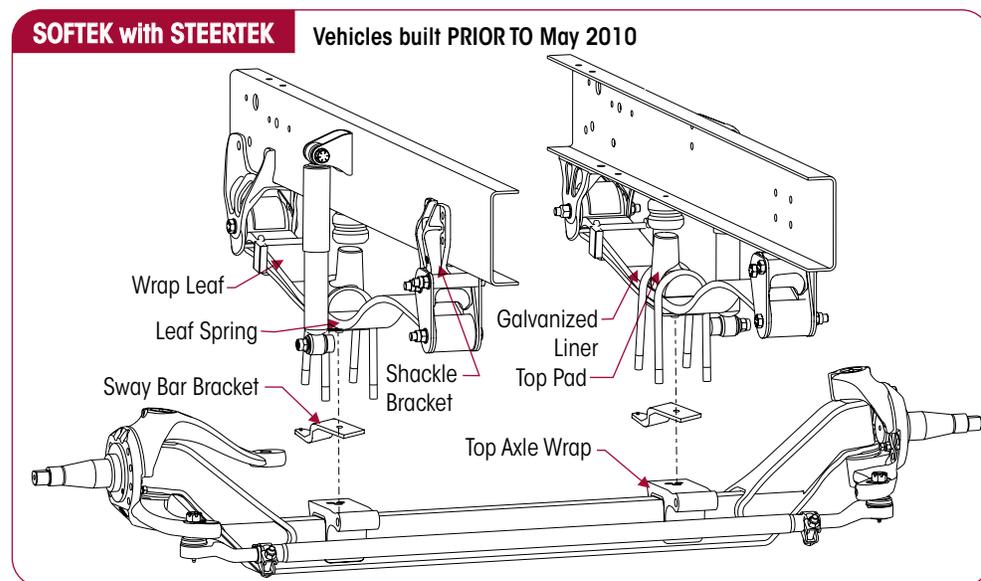
FIGURE 9-35



### AXLE ASSEMBLY

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Raise the axle into position. Care must be taken at this point to ensure that the leaf spring bolt aligns with the axle top wrap and sway bar, see Figure 9-36.
3. Slide the sway bar bracket over the axle wrap, verify that the dowel pin holes align correctly with the dowel pin on the leaf spring and wrap leaf assembly.
4. Completely raise the axle, fully engaging the leaf spring assembly into the axle wrap and sway bar bracket.

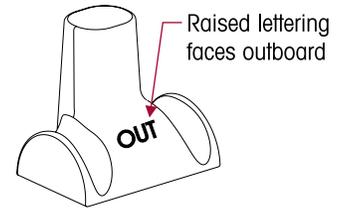
FIGURE 9-36





5. Install the top pad with the raised lettering "OUT" facing outboard side on the spring and wrap leaf assembly, see Figure 9-37.

FIGURE 9-37



**WARNING**

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

6. Install the new bottom axle wrap liners on the bottom axle wraps.
7. Install the bottom axle wraps on the axle.
8. Install the new 3/4" clamp group U-bolts, washers and locknuts. Snug the bolts, **DO NOT** tighten to torque at this time.
9. Install the shock absorbers on 5/8" lower shock mounting bolts. Install the washers and locknuts and tighten per vehicle manufacturer's torque specifications.

**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.

10. Ensure that the clamp groups are properly aligned and the U-bolts are seated in the top pad, and the bottom axle wraps are centered with the top axle wraps, see Figure 9-38.

FIGURE 9-38

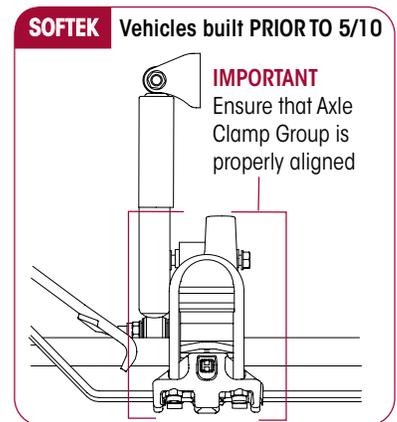
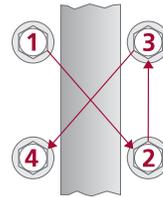


FIGURE 9-39



11. Tighten the 3/4" clamp group locknuts evenly in 50 foot pounds increments per vehicle manufacturer's torque specifications in the proper pattern to achieve uniform bolt tension, see Figure 9-39.
12. Install the steering knuckles as per the Steering Knuckle replacement instructions in this section.
13. Install the tie rod tube.
14. 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.
15. Install the tie rod end cotter pins.
16. 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.
17. Install the drag link cotter pin.
18. Install the brake backing plate assemblies per the manufacturer's guidelines.
19. Install the brakes, hubs, and wheels as per manufacturer's guidelines.
20. Fill the hubs with the proper lube per the manufacturer's guidelines for recommended lubrication.
21. Grease the front steering components as per lubrication guidelines in the Preventive Maintenance Section of this publication.

## STEERING KNUCKLE DISASSEMBLY

### DISASSEMBLY

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

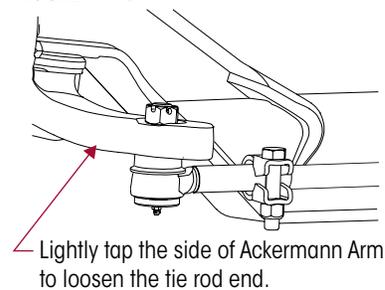
The steering knuckle disassembly and assembly includes the Kingpin Preparation and Measurement and Kingpin Bushing Removal process.

1. Place the vehicle on level floor.
2. Chock the wheels.
3. Raise the frame.
4. Support the vehicle with frame stands.
5. Remove the wheel and hub assembly.
6. Remove the brake components from steering knuckle.
7. 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 9-40.

FIGURE 9-40



8. Remove the drag link from the knuckle if necessary.

### 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.

9. Remove the 2 socket head cap screws that connect upper kingpin connection to the steering knuckle, see Figure 9-41.
10. Remove the lower steering knuckle from the kingpin by sliding it down the kingpin.
11. Remove the upper steering knuckle by sliding it up off the kingpin.

FIGURE 9-41



## ■ KINGPIN PREPARATION AND MEASUREMENT

### CLEANING GROUND AND POLISHED PARTS

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

### 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 MANUFACTURER’S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURES:

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

 **CAUTION**

DO NOT USE HOT SOLUTION TANKS OR WATER AND ALKALINE SOLUTIONS TO CLEAN GROUND OR POLISHED PARTS. DAMAGE TO THE PARTS WILL RESULT.

 **WARNING**

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 SHOWS SIGNS OF MOVEMENT, CONTACT THE HENDRICKSON TECHNICAL SERVICES DEPARTMENT.

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 9-42 through 9-45.

**FIGURE 9-42**



**FIGURE 9-43**



**FIGURE 9-44**



**FIGURE 9-45**



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 9-46 through 9-49.

**Kingpin minimum dimension is 1.802"**

**FIGURE 9-46**



**FIGURE 9-47**



**FIGURE 9-48**



**FIGURE 9-49**



## ■ 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 of this publication
- Push-out Tool, Driver Tool, Receiving Tool, STEERTEK NXT (Vehicles built AFTER March 2012) will also need 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 9-50 AND 9-51. IMPROPER SUPPORT TO THE STEERING KNUCKLES CAN CAUSE COMPONENT DAMAGE.

1. **STEERTEK** axle (Vehicles built **PRIOR** to March 2012)
  - 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 Figures 9-50 through 9-52.
  - 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.

**FIGURE 9-50**

**FIGURE 9-51**

**FIGURE 9-52**

**FIGURE 9-53**


2. **STEERTEK NXT** axle (Vehicles built **AFTER** March 2012)
  - 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 9-50 through 9-52.
  - c. Place the STEERTEK NXT installer/remove tool in the steering knuckle/kingpin bore. Then place the kingpin bushing push-out tool on top of the installer/remove.
  - d. Press out the kingpin bushing.
3. Clean the parts and inspect for reassembly, see Figure 9-53.

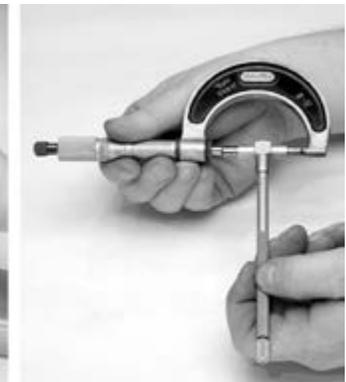
### ■ STEERING KNUCKLE BORE MEASUREMENT

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  $1.938" \pm 0.003"$ .
2. Measure the upper and lower bore in two positions and at two locations. The two positions must be  $90^\circ$  opposed from each other, see Figures 9-54 through 9-56. If the average measurement is more than the knuckle bore maximum diameter specification, replace the knuckle.

**FIGURE 9-54**

**FIGURE 9-55**

**FIGURE 9-56**


## ■ KINGPIN BUSHING INSTALLATION

### You will need:

- A hydraulic shop press with a minimum forcing capacity of 2.5 tons.
- Kingpin bushing driver, refer to the Special Tools Section of this publication.
- Adjustable straight flute reamer, refer to the Special Tools Section of this publication.

### 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 upper / lower 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 upper / 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  $1\frac{5}{64}$ " (0.236") or 6 millimeters and no more than  $\frac{9}{16}$ " (0.32") or 8 millimeters, see Figures 9-57 through 9-59.
3. Following this procedure it is necessary to ream the kingpin bushings to fit the kingpins, see Kingpin Bushing Reaming Instructions in this section.

FIGURE 9-57



FIGURE 9-58



FIGURE 9-59



## ■ KINGPIN BUSHING REAMING

### CAUTION

REAM THE KINGPIN BUSHINGS WITH AN ADJUSTABLE STRAIGHT FLUTE REAMER (SEE SPECIAL TOOLS SECTION OF THIS PUBLICATION). DO NOT HONE OR BURNISH THE KINGPIN BUSHINGS. HONING OR BURNISHING WILL DAMAGE THE BUSHINGS AND VOID ANY APPLICABLE WARRANTY.

### WARNING

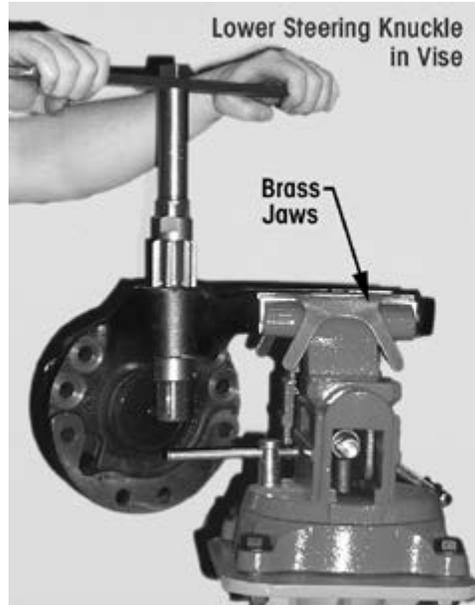
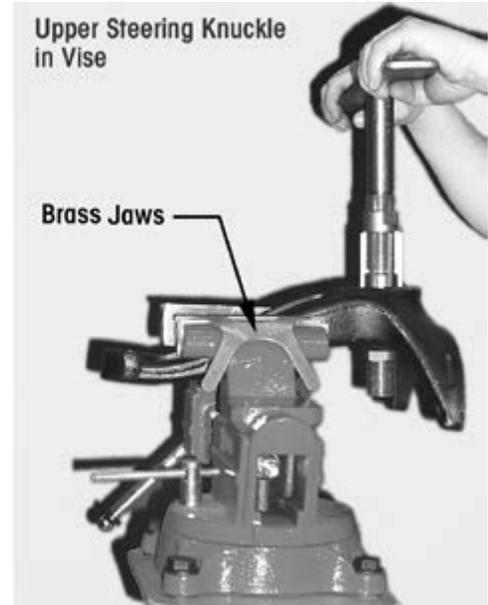
WHEN INSTALLING UPPER / LOWER STEERING KNUCKLE IN A VISE IT IS NECESSARY TO PROTECT THE MACHINED SURFACES FROM GOUGES OR MARRING BY USING BRASS JAWS. FAILURE TO DO SO CAN CAUSE PREMATURE PART DAMAGE, DAMAGE TO THE UPPER / LOWER STEERING KNUCKLE, LOSS OF WARRANTY, LOSS OF VEHICLE CONTROL, CAUSING PERSONAL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

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

### SERVICE HINT

It is acceptable to mount the upper / lower steering knuckle in a vise either vertically or horizontally when performing the reaming procedure.

2. Install the reamer into the upper / 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 9-60 and 9-61.

**FIGURE 9-60**

**FIGURE 9-61**


4. Slide the reamer out of the upper / 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  $\frac{5}{8}$ " brake backing plate bolts with a wire wheel and run a tap through the threads of the upper / lower steering knuckle and then flush out with brake cleaner and dry with compressed air.

**WARNING**

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

**NOTE**

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

7. Install the upper / lower steering knuckle assembly on the kingpin.

**FIGURE 9-62**

**FIGURE 9-63**


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 9-62 and 9-63.
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.

## ■ KINGPIN SEAL INSTALLATION

**WARNING**

WHEN INSTALLING UPPER / LOWER STEERING KNUCKLE 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 UPPER / LOWER STEERING KNUCKLE, LOSS OF WARRANTY, LOSS OF VEHICLE CONTROL, CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

1. Place the upper / lower 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 9-64.
3. Use a kingpin bushing driver tool (see Special Tool Section) and press seal firmly into the upper / lower steering knuckle assembly.
4. **STEERTEK NXT** — Double Lip design, see Figure 9-65. Install the kingpin seal until it bottoms out in the kingpin bore.
5. **STEERTEK** — Single Lip design, see Figure 9-66. Install the kingpin seal until it makes contact with the kingpin bushing.

FIGURE 9-64

**Magnification of lip seal**  
Lip seal faces toward axle

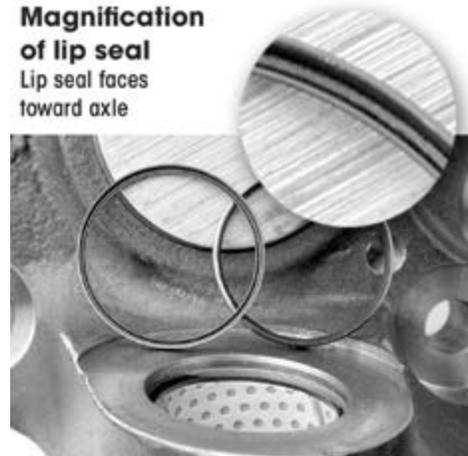


FIGURE 9-65

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



FIGURE 9-66

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



## 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

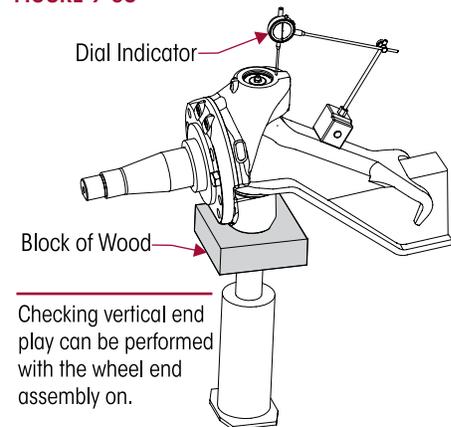
FIGURE 9-67



bearing is installed on the right side of the axle, see Figure 9-67. 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 9-67.
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 9-68.

**FIGURE 9-68**



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**

The vertical end play can be further adjusted with a shim **ONLY** for the vehicle built **PRIOR to March 2012** equipped with **STEERTEK** axle.

**STEERTEK Axle (PRIOR to March 2012)**

- 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 (237-271 Nm) torque.
16. Recheck the vertical end play with the dial indicator or a 0.010" feeler gauge, see Figure 9-68.

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 (237-271 Nm) 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 (251 Nm) 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 (67-95 Nm) torque. Install new grease zerk and tighten to a minimum of 15 foot pounds (20 Nm), see Figure 9-69.

**FIGURE 9-69**

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.

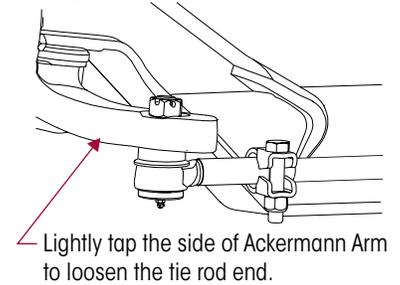
**TIE ROD END AND CROSS TUBE****NOTE**

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 9-70.
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.

**FIGURE 9-70**

**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**

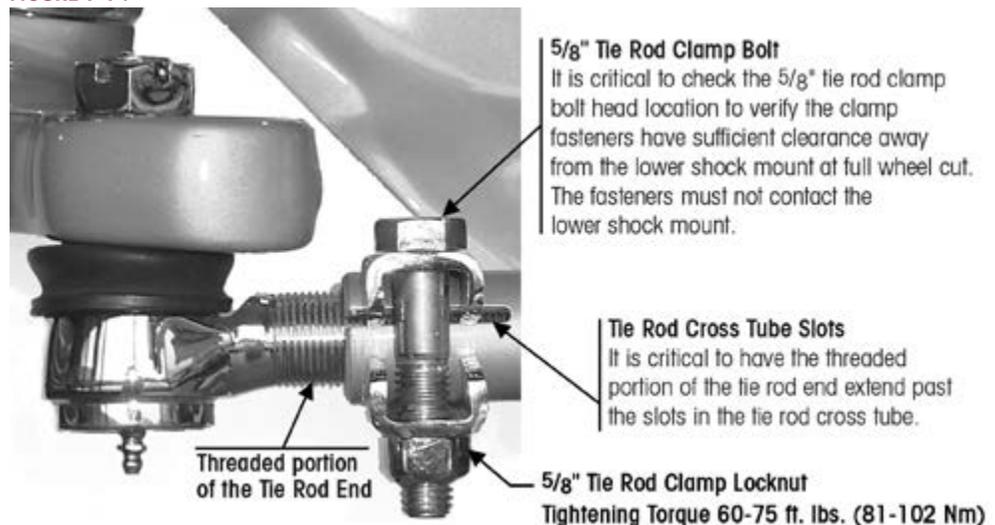
When installing the cross tube the thread direction of the tie rod ends are as follows:

- 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 9-71. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

**FIGURE 9-71**


**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**

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.

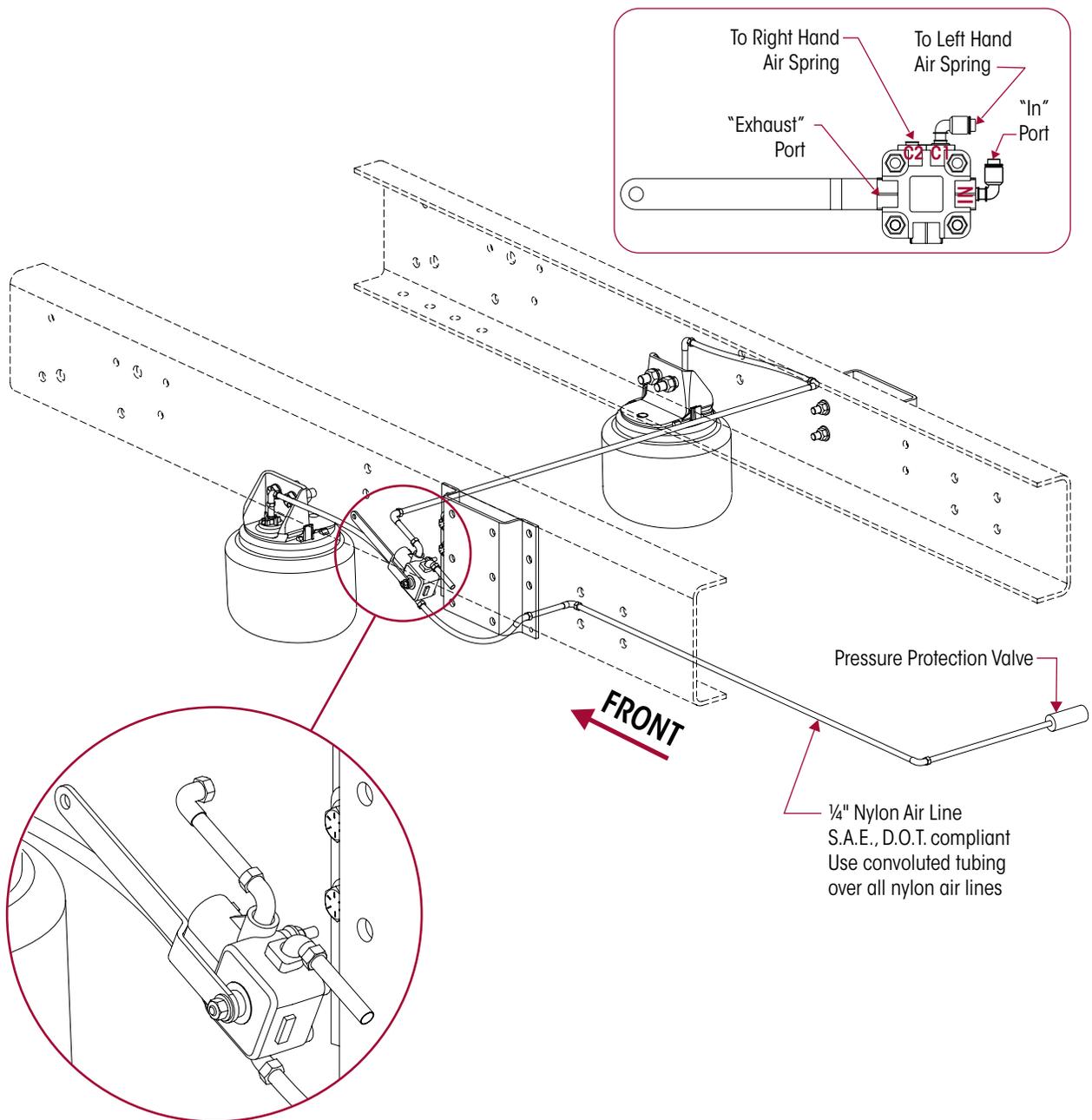
4. If replacing opposing tie rod end is not necessary it is critical that the cross tube will rotate in the opposing tie rod end.
5. Install the cross tube into the Ackermann arms.
6. Tighten the castle nuts to  185 foot pounds (251 Nm) torque then rotate the castle nut to the next castle slot and install 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.
9. Remove the wheel chocks.



## SECTION 10 Plumbing Diagram

### AIRTEK SINGLE HEIGHT CONTROL VALVE

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.



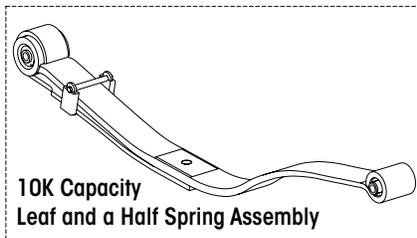
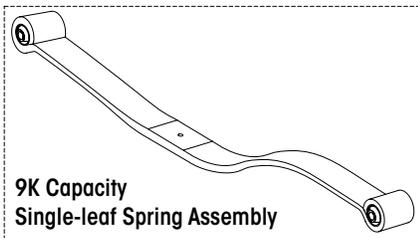
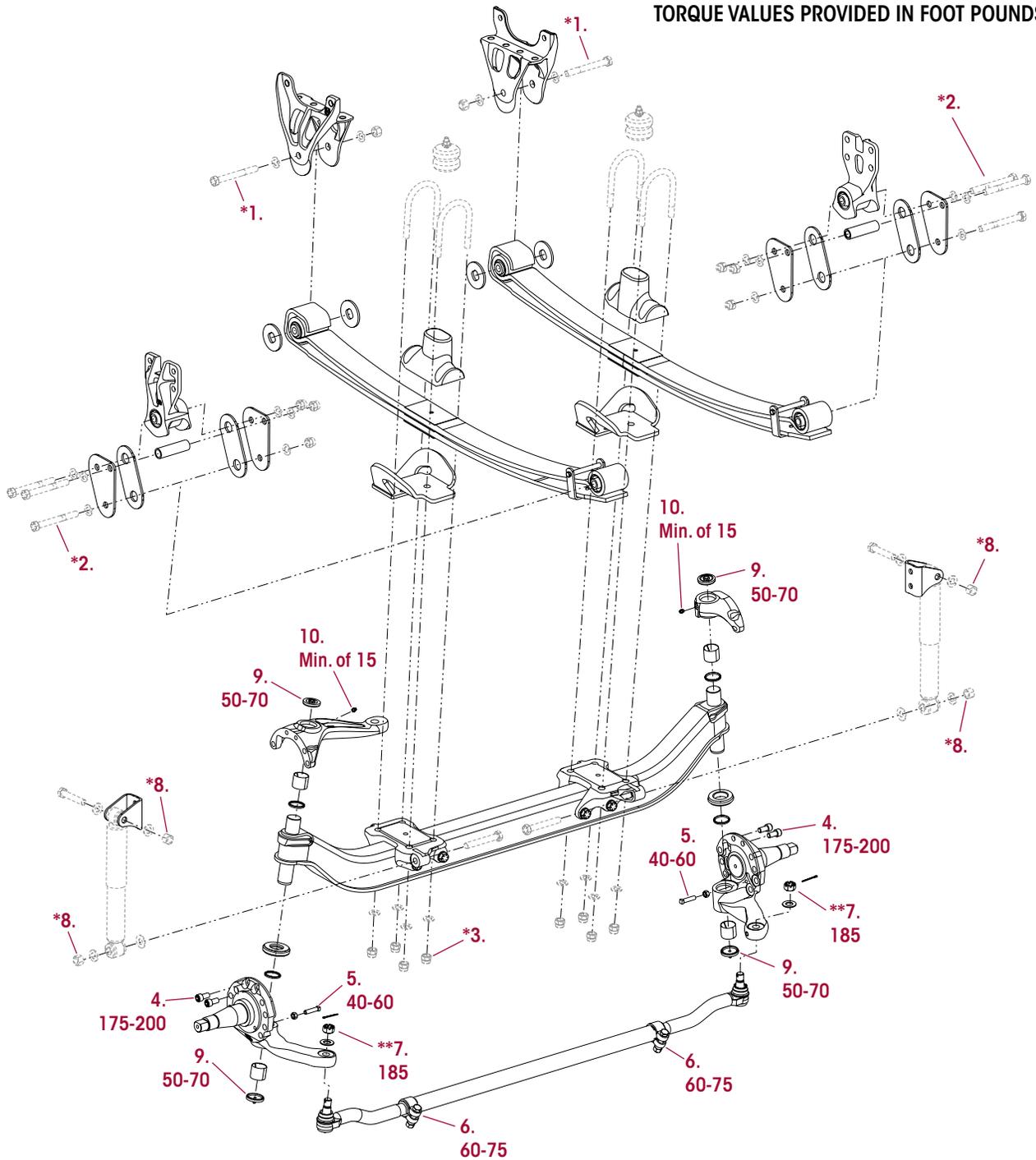
# SECTION 11

## Torque Specifications

SOFTEK with **STEERTEK NXT** axle for vehicles built after March 2012

■ 9K/10K/12K Capacity

HENDRICKSON RECOMMENDED  
TORQUE VALUES PROVIDED IN FOOT POUNDS





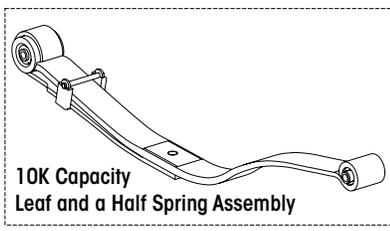
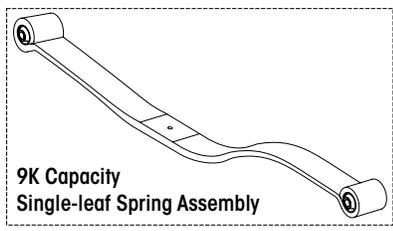
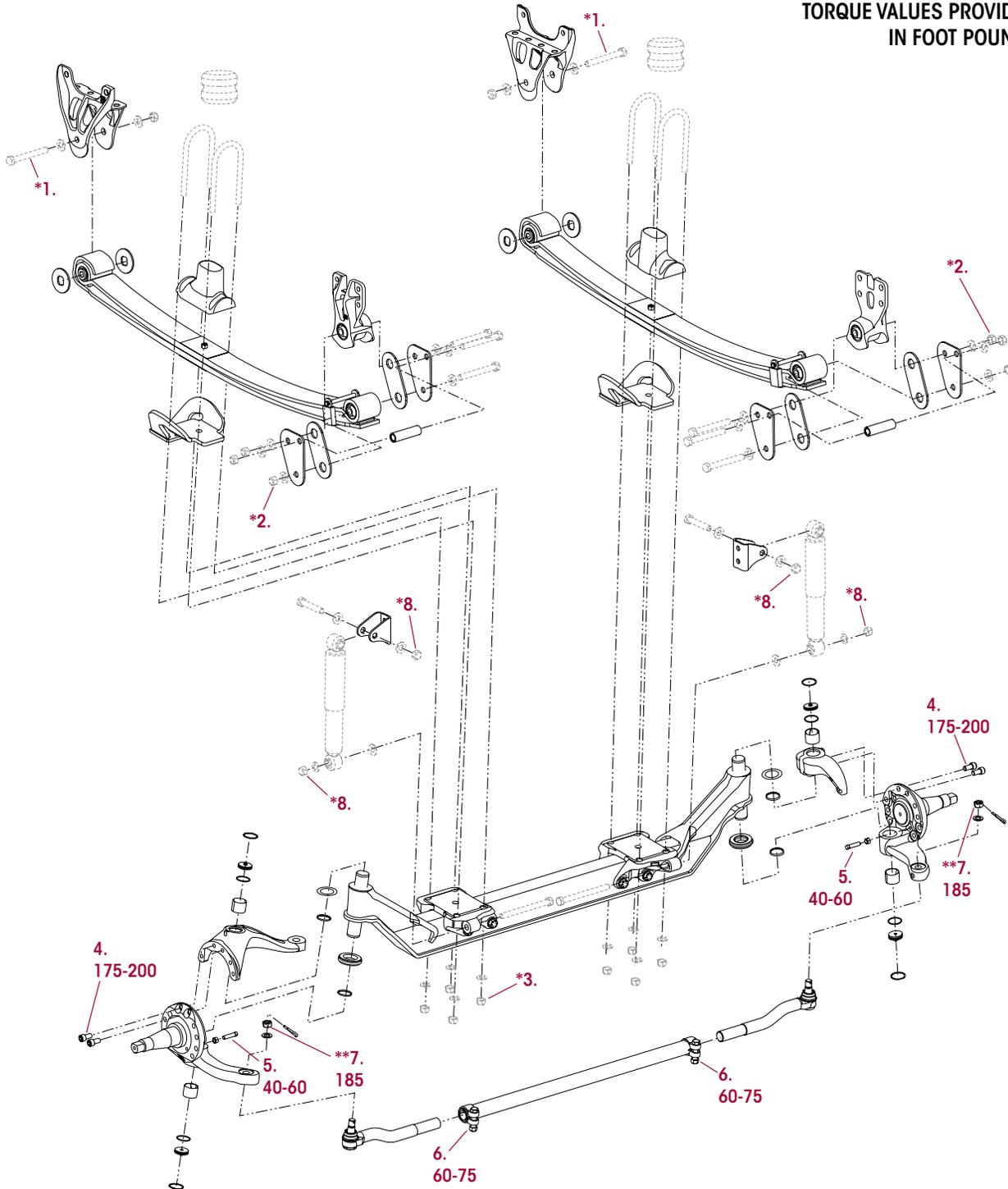
**SOFTEK with STEERTEK NXT Axle for FCCC Motorhome Chassis  
built after March 2012**

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS				
NO.	COMPONENT	QUANTITY	SIZE	TORQUE VALUE in foot pounds
1	Front Frame Hanger to Leaf Spring Eye Fasteners (Bolt inserted from the outboard to inboard side)	2	¾"	*
2	Rear Shackle Bracket Fasteners	4	¾"	*
3	Clamp Group Fasteners	4	¾"	*
<b>WARNING</b> 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.				
4	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	5/8"	175-200
5	Knuckle / Axle Wheel Stop Bolt	2	5/8"	40-60
6	Tie Rod Tube to Tie Rod End	2	5/8"	60-75
7	Tie Rod End to Lower Steering Knuckle (Castle Nut)	2	7/8"	**185
8	Shocks Eye Upper and Lower Fasteners	4	5/8"	*
9	Grease Cap Assembly, Upper and Lower	4	½"	50-70
10	Grease Zerk	2		Minimum of 15
<ul style="list-style-type: none"> <li>• All hardware ¼" and greater is Grade 8 with no additional lubrication.</li> <li>• Frame mount hardware in most cases huck style fasteners supplied by the vehicle or chassis and body manufacturer.</li> </ul>				
<b>NOTES:</b>				
* All fasteners highlighted in gray in the matrix are not supplied by Hendrickson. Torque values provided are controlled and subject to change by the vehicle manufacturer. Refer to vehicle manufacturer's service manual for more information.				
** Torque to 185 foot pounds, advance nut to next hex face to install cotter pin. <b>DO NOT</b> back off nut for cotter pin installation.				



SOFTEK with **STEERTEK 1.5** axle for vehicles built between May 2010 and March 2012  
 ■ 9K/10K/12K Capacity

HENDRICKSON RECOMMENDED  
 TORQUE VALUES PROVIDED  
 IN FOOT POUNDS





**SOFTEK with STEERTEK 1.5 Axle for FCCC Motorhome Chassis  
built between May 2010 and March 2012**

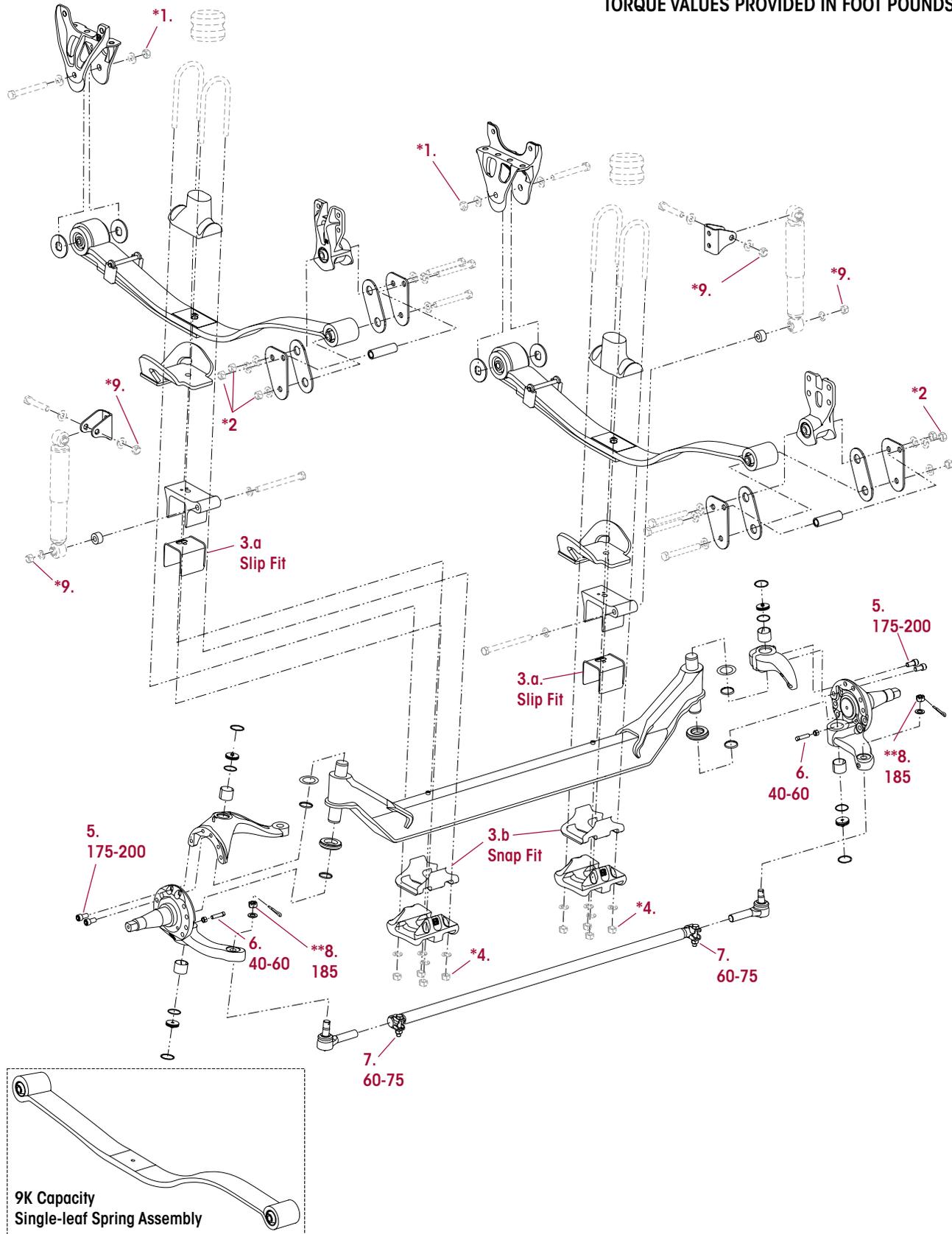
HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS				
NO.	COMPONENT	QUANTITY	SIZE	TORQUE VALUE in foot pounds
1	Front Frame Hanger to Leaf Spring Eye Fasteners (Bolt inserted from the outboard to inboard side)	2	¾"	*
2	Rear Shackle Bracket Fasteners	4	¾"	*
3	Clamp Group Fasteners	4	¾"	*
<b>WARNING</b> ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.				
4	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	5/8"	175-200
5	Knuckle / Axle Wheel Stop Bolt	2	5/8"	40-60
6	Tie Rod Tube to Tie Rod End	2	5/8"	60-75
7	Tie Rod End to Lower Steering Knuckle (Castle Nut)	2	7/8"	**185
8	Shocks Eye Upper and Lower Fasteners	4	5/8"	*
<ul style="list-style-type: none"> <li>• All hardware ¼" and greater is Grade 8 with no additional lubrication.</li> <li>• Frame mount hardware in most cases huck style fasteners supplied by the vehicle or chassis and body manufacturer.</li> </ul>				
<b>NOTES:</b>				
* All fasteners highlighted in gray in the matrix are not supplied by Hendrickson. Torque values provided are controlled and subject to change by the vehicle manufacturer. Refer to vehicle manufacturer's service manual for more information.				
** Torque to 185 foot pounds, advance nut to next hex face to install cotter pin. <b>DO NOT</b> back off nut for cotter pin installation.				



SOFTEK with **STEERTEK** axle for vehicles built prior to May 2010

■ 9K/10K Capacity

HENDRICKSON RECOMMENDED  
TORQUE VALUES PROVIDED IN FOOT POUNDS





**SOFTEK with STEERTEK Axle for FCCC Motorhome Chassis  
built prior to May 2010**

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS				
NO.	COMPONENT	QUANTITY	SIZE	TORQUE VALUE in foot pounds
1	Front Frame Hanger to Leaf Spring Eye Fasteners (Bolt inserted from the outboard to inboard side)	2	3/4"	*
2	Rear Shackle Bracket Fasteners	4	3/4"	*
3	Axle Wrap Liners for Clamp Group	4	Formed	Slip Fit
	<b>WARNING</b> DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.			
4	Clamp Group Fasteners	4	3/4"	*
	<b>WARNING</b> 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.			
5	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	5/8"	175-200
6	Knuckle / Axle Wheel Stop Bolt	2	5/8"	40-60
7	Tie Rod Tube to Tie Rod End	2	5/8"	60-75
8	Tie Rod End to Lower Steering Knuckle (Castle Nut)	2	7/8"	**185
9	Shocks Eye Upper and Lower Fasteners	4	5/8"	*
<ul style="list-style-type: none"> <li>• All hardware 1/4" and greater is Grade 8 with no additional lubrication.</li> <li>• Frame mount hardware in most cases huck style fasteners supplied by the vehicle or chassis and body manufacturer.</li> </ul>				
<b>NOTES:</b>				
* All fasteners highlighted in gray in the matrix are not supplied by Hendrickson. Torque values provided are controlled and subject to change by the vehicle manufacturer. Refer to vehicle manufacturer's service manual for more information.				
** Torque to 185 foot pounds, advance nut to next hex face to install cotter pin. <b>DO NOT</b> back off nut for cotter pin installation.				





## AIRTEK with STEERTEK NXT Axle for FCCC Motorhome Chassis

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS				
NO.	COMPONENT	QUANTITY	SIZE	TORQUE VALUE in foot pounds
1	Front Frame Hanger to Leaf Spring Eye Fasteners (Bolt inserted from the outboard to inboard side)	2	3/4"	*
2	Rear Shackle Bracket Fasteners	4	3/4"	*
3	Air Spring	2	Self-Locking	Snap Fit
4	Height Control Valve to Frame	2	1/4"	8-10
5	HCV Linkage to HCV Arm	1	5/16"	10-12
6	HCV Linkage to Top Pad	1	5/16"	10-12
7	HCV Linkage Grommet to HCV Arm	1	Grommet	Push In
8	HCV Linkage Grommet to Top Pad	1	Grommet	Push In
9	Clamp Group Hardware	8	3/4"	*
	 <b>WARNING</b> 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.			
10	Knuckle Attachment Bolt (Socket Head Cap Screw)	4	5/8"	175-200
11	Knuckle / Axle Wheel Stop Bolt	2	1/2" Jam Nut	40-60
12	Tie Rod Tube to Tie Rod Ends	2	5/8"	60-75
13	Tie Rod Ends to Lower Steering Knuckle	2	7/8" Castle Nut	**185
14	Grease Cap Assembly, Upper and Lower	4	1/2"	50-70
15	Grease Zerk	2		Minimum of 15
16	Shocks Eye Upper and Lower Fasteners	4	3/4"	*
<p>• All hardware 1/4" and greater is Grade 8 with no additional lubrication.            Frame mount hardware in most cases are Huck style fasteners supplied by the OEM.</p>				
<p><b>NOTE:</b> * All hardware information in the matrix denotes recommended torques for fasteners originally supplied by the vehicle manufacturer. If Hendrickson supplied fasteners are used, tighten to Hendrickson torque values, if non Hendrickson fasteners are used, follow torque specifications listed in the vehicle manufacturer's service manual. Hendrickson is not responsible for maintaining vehicle manufacturer's torque values.</p> <p>** Torque to 185 foot pounds (251 Nm), advance nut to next hex face to install cotter pin. Do not back off nut for cotter pin installation.</p>				



## SECTION 12

# Troubleshooting Guide

SOFTEK / AIRTEK For FCCC Motorhome Chassis		
TROUBLESHOOTING GUIDE		
CONDITION	POSSIBLE CAUSE	CORRECTION
Worn or damaged kingpins and kingpin bushings	Dirt in system– contaminated lubricant	Polish and inspect kingpin, replace bushing and seals, then follow specified lubrication procedures
	Incorrect lubricant	Lubricate axle with specified lubricant
	Axle not lubricated at scheduled frequency	Lubricant axle at scheduled frequency
	Incorrect lubrication procedures	Use correct lubrication procedures
	Lubrication interval not compatible with operating conditions	Change lubrication interval to match operating conditions
	Worn or missing seals	Replace worn or missing seals
Vibration or shimmy of front axle during operation	Caster out of specification	Adjust caster
	Wheels and/or tires out of balance	Balance or replace wheels and/or tires
	Worn shock absorbers	Replace shock absorbers
	Wheel bearing adjustment	Adjust wheel bearing to vehicle manufacturer's specifications.
	Brake rotor is warped	See vehicle manufacturer for brake support component.
Excessive wear on tires or uneven tire tread wear	Tires have incorrect air pressure	Adjust tire pressure to manufacturer's specification
	Tires out of balance	Balance or replace tires
	Incorrect axle alignment	Align axles
	Incorrect toe setting	Adjust toe-in to vehicle manufacturer's specification
	Incorrect steering arm geometry	Repair steering system as necessary
	Excessive wheel bearing end play	Check specified wheel nut torque, replace worn or damaged wheel bearings
	Wheel bearing adjustment	Adjust wheel bearing to vehicle manufacturer's specifications
Vehicle is hard to steer	Low pressure in the power steering system	Repair power steering system
	Steering linkage needs lubrication	Lubricate steering linkage
	Steering knuckles are binding	Check vertical clearance
	Incorrect steering arm geometry	Repair steering system as necessary
	Caster out of adjustment	Adjust caster as necessary
	Tie rod ends hard to move	Grease or if problem persists replace tie rod ends
	Worn thrust bearing	Replace thrust bearing



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



## SECTION 13

## Front Wheel Alignment Specifications

SOFTEK / AIRTEK FOR FCCC MOTORHOME CHASSIS						
FRONT AIR MODULE SUSPENSION ALIGNMENT SPECIFICATION						
CAMBER <sup>1</sup>	DESIGN SPECIFICATION		RANGE			
	SOFTEK	AIRTEK	SOFTEK		AIRTEK	
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
LEFT	0.0° ± 1.0°	0.0° ± 1.0°	-1.0°	+1.0°	-1.0°	+1.0°
RIGHT	-0.25° ± 1.0°	-0.25° ± 1.0°	-1.25°	+0.75°	-1.25°	+0.75°
CROSS	0.0° Max 2°	0.0° Max 2°	—	—	—	—

**CAMBER NOTES:**

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

CASTER <sup>1,2</sup>	DESIGN SPECIFICATION		RANGE			
	SOFTEK	AIRTEK	SOFTEK		AIRTEK	
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
LEFT	5.2° ± 1.0°	5.6° ± 1.0°	+4.2°	+6.2°	+4.6°	+6.6°
RIGHT	5.2° ± 1.0°	5.6° ± 1.0°	+4.2°	+6.2°	+4.6°	+6.6°
CROSS <sup>3</sup>	0.0° Max 2°	0.0° Max 2°	—	—	—	—

**CASTER NOTES:**

- 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.
- 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.
- 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.**
- Example of caster adjustment:** 2.5° RH/3° LH, would require one, 1.0 shim on each side to increase caster and achieve 3.50° RH/4.00° LH, which is in specification. **DO NOT** attempt to use uneven shims.

**HENDRICKSON RECOMMENDS FOLLOWING TMC<sup>1</sup> PRACTICES:**

	DESIGN SPECIFICATION <sup>1</sup>	RANGE	
		MINIMUM	MAXIMUM
TOTAL TOE <sup>2</sup>	1/16" ± 1/32" (0.06" ± 0.03")	1/32" (0.03")	3/32" (0.09")

**TOE-IN NOTES:**

- Toe-in is to be set and adjusted in the normal vehicle unladed configuration. Actual vehicle curb weight on the ground. Toe should be checked at the tires front and rear tread center, at a distance above ground equal to the tire's rolling radius.
- 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 Suspension System's recommended procedures for our parts/products. Other components play a major role in overall performance and Hendrickson recommends to follow the specific vehicle manufacturer'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, videos, or charts, contact TMC at:

TMC/ATA	Phone: 703-838-1763
2200 Mill Road	website: <a href="http://tmc.truckline.com">tmc.truckline.com</a>
Alexandria, VA 22314	online ordering: <a href="http://www.truckline.com/store">www.truckline.com/store</a>

### 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

### Videos

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

### Other

TMC T0400	Wheel bearing Adjustment Procedure Wall Chart
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