Overview

The Blue Bird Vision is equipped with either SofTek™ spring suspension or AirTek™ air suspension. Both use the SteerTek™ front axle, also manufactured by Hendrickson.™

Appendixes & Other References

Appendix 1. AirTek & SofTek With SteerTek Axle. Hendrickson Publication number 17730-248 covers maintenance, adjustment, and component replacement information on:

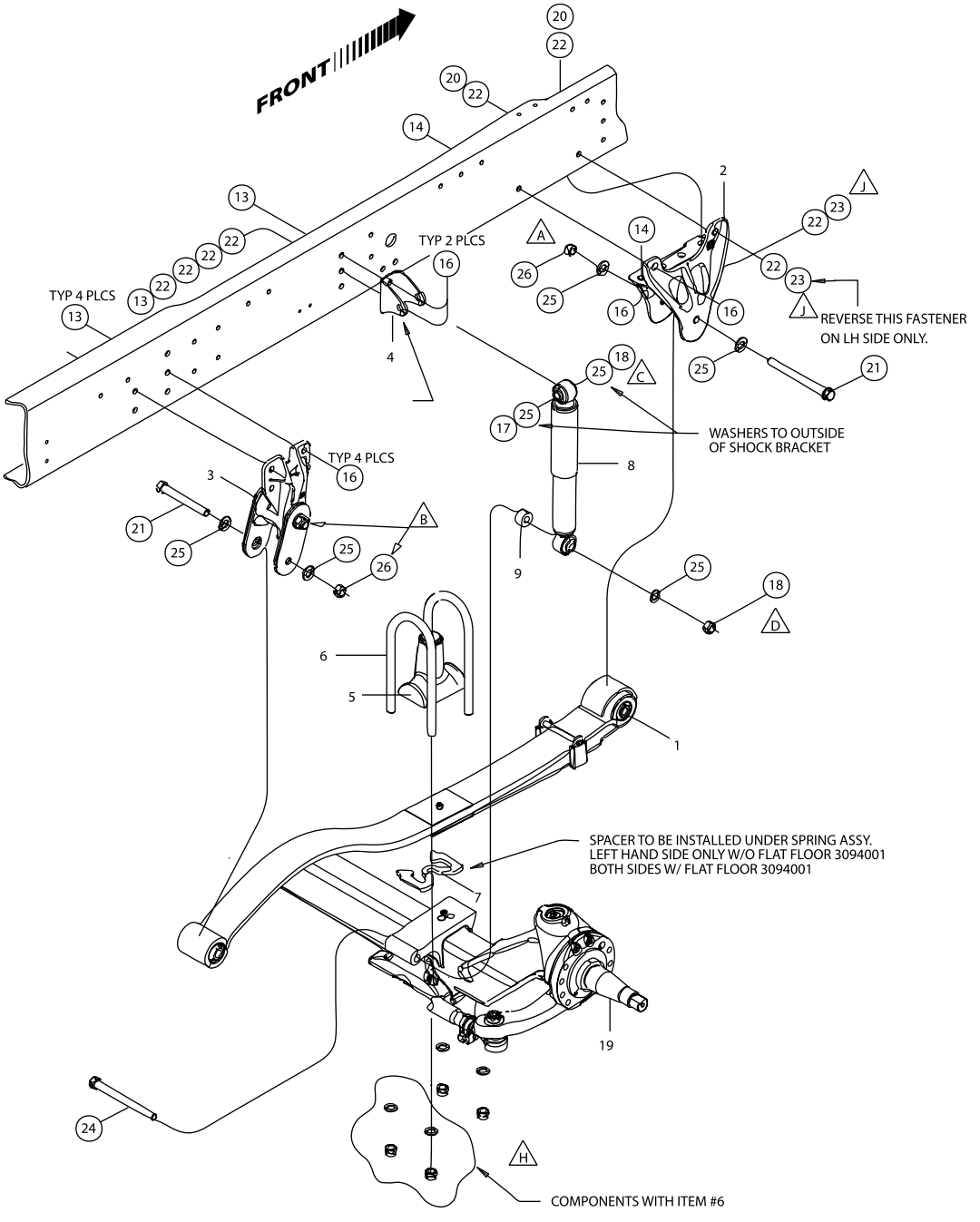
- The SteerTek axle, including wheel end components and steering linkage.
- AirTek front air suspension, including height control valves.
- SofTek leaf spring suspension.
- Front axle towing guidelines.

Also See: The Hydraulc Brakes chapter of this manual includes a procedure for removing the front disc rotor/hub assembly.

Maintenance

Maintenance of the front axle and suspension consists of periodic general inspection, checking tightness of fasteners, and lubricating grease fittings. Refer to the maintenance charts in this chapter (also included in the **Specs & Maintenance** chapter) for maintenance inspection intervals. The exploded illustrations in this chapter include torque specifications.

SofTek Front Suspension



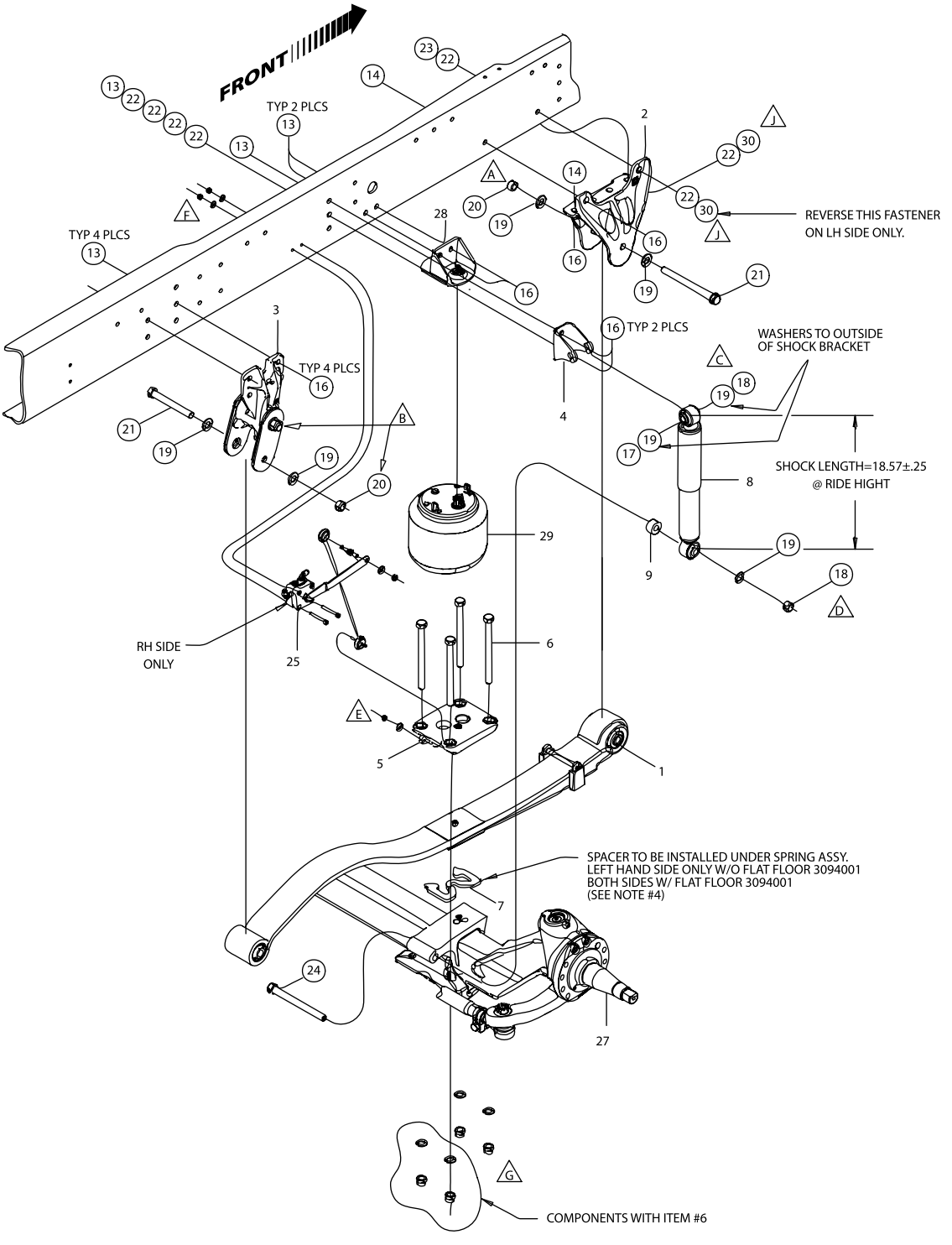
SofTek Front Suspension

KEY	PART NUMBER	DESCRIPTION	QUANTITY
1	0055000	SPRING ASSY, FRONT, SPRING SUSP, BBCV	2
2	0055001	HANGER, SUSP, FRONT, FRAME, BBCV	2
3	0055002	SHACKLE ASSY, SUSPENSION, FRONT, BBCV	2
4	0055003	BRACKET, SHOCK, SUSP, FRONT, FRAME, BBCV	2
5	0055005	AXLE STOP ASSY, SPRING SUSP, FRONT, BBCV	2
6	0055006	KIT, U-BOLT, SPRING SUSP, FRONT, BBCV	1
	0061443	KIT, U-BOLT, SUSP, FRONT, SPRING, BBCV	1
7	0055007	SPACER,10MM, SPRING SUSP, FRONT, BBCV	1
	0060514	SPACER, 50MM, SPRING SUSP, FRONT, BBCV	1
	0060515	SPACER, 60MM, SPRING SUSP, FRONT, BBCV	1
8	0055008	SHOCK ABSORBER, SUSP, FRONT, HEND	2
9	0055004	SPACER, SHOCK ABSORBER	2
13	0054994	PIN, FLG HEAD, HUCKSPIN, .62 X 2.238	12
14	0054995	PIN, FLG HEAD, HUCKSPIN, .62 X 2.755	4
16	0054997	COLLAR, HUCKSPIN, .62, HSCF-R20	16
17	0870873	CAPSCREW, HEX HD, ¾-10 X 4.0, GR8, YELZNDICH	2
18	0933879	NUT, HEX HD, ¾-10, PRVLG TORQ, GR8, CAD WAX	4
19	0030467	CHART, AXLE SPECIFICATION, STEER	REF
20	0939835	CAPSCREW, HEX HD, ⅝-11 X 2 ½, GR8, YELZNDICH	4
21	0054950	CAPSCREW, HEX HD, M20-2.5X170, GR10.9, OL ZINC	4
22	0929018	WASHER, FLAT, 21/32 X 1 ⅛ X 3/32, HRD YELZNDICH	10
23	0939827	NUT, HEX HD, ⅝-11, GR8,LOCK, CADMIUM WAX	4
24	1700749	CAPSCREW, GEX HD, ¾-10 X 8, GR 8, YEL ZN DICH	2
25	0607036	WASHER, FLAT, 13/16 X 1 ⅜ X 7/64 ZP, HRD	14
26	0054951	NUT, HEX HD, M-20-2.1.5, GR10.9, LOCK, OLIVE ZINC	4

Torque Requirements

KEY	DESCRIPTION	THREAD	TORQUE +- 5%
A	FRONT HANGER PIVOT	M-20-2.5	GR10.9 300 FT.LBS.
B	SHACKLE BRACKET PIVOT	M-20-2.5	GR10.9 300 FT.LBS.
C	UPPER SHOCK	¾"-10	GR8 125 FT.LBS.
D	LOWER SHOCK	¾"-10	GR8 25 FT.LBS.
E	LINKAGE ROD ASSY LOCKNUT	5/16"-18 UNC 2B	11 FT.LBS.
F	LEVELING VALVE LOCKNUT	¼-20 UNC 2B	8 FT.LBS.
G	KIT,BOLT,CLAMP GROUP	¾-16	295 FT.LBS.
H	KIT,U-BOLT,SPRING SUSP,FRONT	¾-16	295 FT.LBS.
J	FRONT HANGER BOLTS	⅝-11	15 FT.LBS.

AirTek Front Suspension



AirTek Front Suspension

KEY	PART NUMBER	DESCRIPTION	QUANTITY
1	0055009	SPRING ASSY, AIR SUSP, FRONT, BBCV	2
2	0055001	HANGER, SUSP, FRONT, FRAME, BBCV	2
3	0055002	SHACKLE ASSY, SUSPENSION, FRONT, BBCV	2
4	0055003	BRACKET, SHOCK, SUSP, FRONT, FRAME, BBCV	2
5	0055010	PAD, AXLE, TOP, AIR SUSP, FRONT, LH, BBCV	1
	0060524	PAD, AXLE, TOP, AIR SUSP, FRONT, RH, BBCV	1
6	0055011	KIT, BOLT, CLAMP GROUP, AIR SUSP, FRONT, BBCV	1
	0061444	KIT, BOLT, SUSP, FRONT, AIR, BBCV	1
7	0055007	SPACER, 10MM, SPRING SUSP, FRONT, BBCV	1
	0060514	SPACER, 50MM, SPRING SUSP, FRONT, BBCV	1
	0060515	SPACER, 60MM, SPRING SUSP, FRONT, BBCV	1
8	0055017	SHOCK ABSORBER, AIR SUSP, FRONT, HEND	2
9	0055004	SPACER, SHOCK ABSORBER	2
13	0054994	PIN, FLG HEAD, HUCKSPIN, .62 X 2.238	16
14	0054995	PIN, FLG HEAD, HUCKSPIN, .62 X 2.755	4
16	0054997	COLLAR, HUCKSPIN, .62, HSCF-R20	20
17	0870873	CAPSCREW, HEX HD, ¾-10 X 4.0, GR8, YELZNDICH	2
18	0933879	NUT, HEX HD, ¾-10, PRVLG TORQ, GR8, CAD WAX	4
19	0607036	WASHER, FLAT, 13/16 X 1 3/8 X 7/64 ZP, HRD	14
20	0054951	NUT, HEX HD, M20-2.50 GR10.9, LOCK, OLIVE ZINC	4
21	0054950	CAPSCREW, HEX HD, M20-2.5X170, GR10.9, OL ZINC	4
22	0929018	WASHER, FLAT, 21/32 X 1 1/8 X 3/32, HRD YELZNDICH	14
23	0939835	CAPSCREW, HEX HD, 5/8-11 X 2 ½, GR8, YELZNDICH	4
24	1700749	CAPSCREW, HEX HD, ¾-10 X 8, GR 8, YEL ZN DICH	2
25	0055014	LEVELING VALVE & LINKAGE ASSY	1
27	0030467	CHART, AXLE SPECIFICATION, STEER	REF
28	0055013	BRACKET, AIR SPRING SUPPORT, FRAME, AIR SUSP	2
29	0055012	SPRING ASSY, AIR, AIR SUSP	2
30	0939827	NUT, HEX HD, 5/8-11, GR8, LOCK, CADMIUM WAX	4

Torque Requirements

KEY	DESCRIPTION	THREAD	TORQUE +- 5%
A	FRONT HANGER PIVOT	M-20-2.5	GR10.9 300 FT.LBS.
B	SHACKLE BRACKET PIVOT	M-20-2.5	GR10.9 300 FT.LBS.
C	UPPER SHOCK	¾"-10	GR8 125 FT.LBS.
D	LOWER SHOCK	¾"-10	GR8 25 FT.LBS.
E	LINKAGE ROD ASSY LOCKNUT	5/16"-18 UNC 2B	11 FT.LBS.
F	LEVELING VALVE LOCKNUT	¼-20 UNC 2B	8 FT.LBS.
G	KIT,BOLT,CLAMP GROUP	¾-16	295 FT.LBS.
H	KIT,U-BOLT,SPRING SUSP,FRONT	¾-16	295 FT.LBS.
J	FRONT HANGER BOLTS	5/8-11	15 FT.LBS.

Front Axle & Suspension

OPERATION	INTERVAL: MONTHS/MILES WHICHEVER OCCURS FIRST first 1000 miles	6 / 6,000	12 / 12,000	NOTES
Spring Suspension				
Inspect visually		•		*Check for visual damage. See Hendrickson publication 17730-248.*
Check U-bolt torque	•		•	*Tighten to 285–305 ft. lbs (32–34 Nm).*
Lubricate steering grease fittings		•		*Use NLGI #2 EP or equivalent.*
Inspect spring pin lock bolts			•	*Tighten to 380–420 ft. lbs. (515–569 Nm).*
Inspect shackle bracket pivot bolt			•	*Tighten to 380–420 ft. lbs. (515–569 Nm).*
Inspect shocks			•	*Check for signs of leaks, wear, or damage.*
Torque shock mounting bolts			•	*TIghten to 215 ft. lbs. (25 Nm).*
Air Suspension				
Inspect visually		•		*Check for wear, damage, misalignment. See Hendrickson publication 17730-248.*
Check axle to suspension fasteners	•		•	*Tighten to 285–305 ft. lbs (32–34 Nm).*
Lubricate steering grease fittings		•		*Use NLGI #2 EP or equivalent. Lube with suspension loaded.*
Inspect pin lock bolts			•	*Tighten to 380–420 ft. lbs. (515–569 Nm).*
Inspect shackle bracket pivot bolt			•	*Tighten to 380–420 ft. lbs. (515–569 Nm).*
Torque shock mounting bolts			•	*TIghten to 215 ft. lbs. (25 Nm).*
Inspect air spring cushions		•		*Check for wear, abrasions, cuts, or other damage*
Check air spring fasteners			•	
Inspect shocks			•	*Check for signs of leaks, wear, or damage.*
Check suspension height		•		*Shock length, eye to eye: 18.5" ± .25". (470 ± 6mm).*
Check ride height control valve bolts		•		*TIghten to 8–10 ft. lbs. (11–14 Nm).*

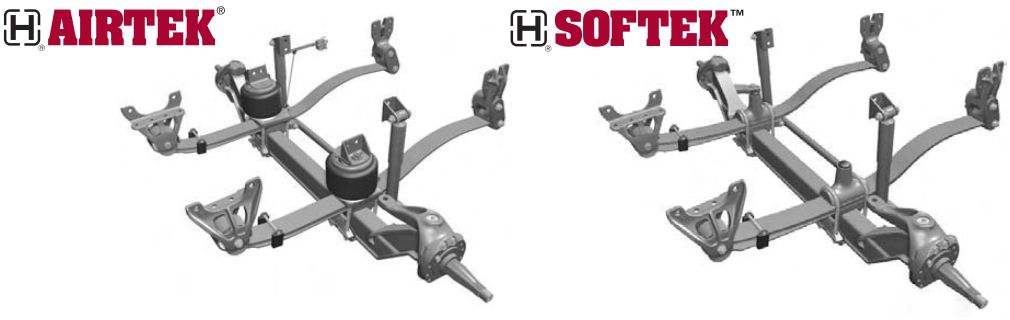


TABLE OF CONTENTS

SECTION 1
Introduction

This publication is to acquaint and assist maintenance personnel in preventive maintenance, service, repair, and rebuild for the following:

- **AIRTEK®** — Integrated front air suspension and steer axle (STEERTEK).
- **SOFTEK™**— Integrated front steel spring suspension and steer axle (STEERTEK).
- **STEERTEK** — A lightweight, formed and robotically welded 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 and rebuild instructions for the AIRTEK and SOFTEK Suspensions and the STEERTEK axle.

A Technical Procedure Quiz has been included at the back of this publication. Hendrickson will provide personalized AIRTEK Technical Procedure Quiz Achievement Certificate to candidates scoring 80% or higher on the test. Simply complete the test and fill in the enclosed answer sheet or on a separate sheet with the return address, name, phone number, and company name as it will appear on the award to:

Hendrickson
ATTN: Truck Marketing
800 S. Frontage Road
Woodridge, Illinois 60517

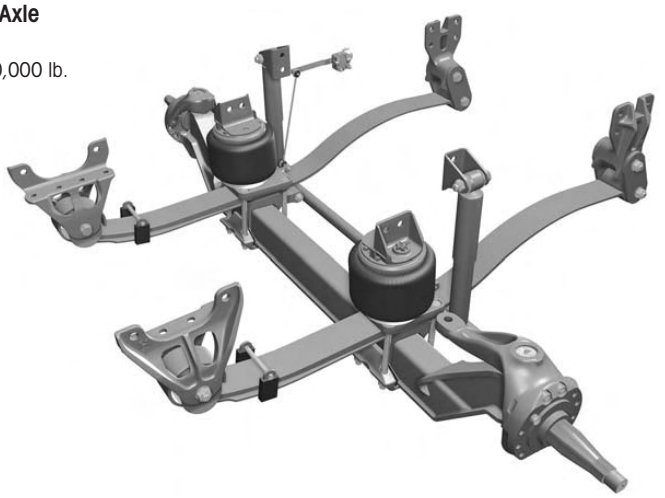
Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson Tech Services at 630-910-2800 for information on the latest version of this manual.

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

Figure 1-1

AIRTEK suspension system with STEERTEK Axle

Capacity: 10,000 lb.



SECTION 2

Product Description

SOFTEK — is an integrated front mechanical suspension and robotically welded steer axle that work together to form an integrated torsion system. This lightweight system provides driver comfort and is ideal for school bus applications. Utilizing a system approach, Hendrickson has engineered and optimized the following components to form a system delivering ride, stability and handling characteristics with reduced weight and maintenance.

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

Shock Absorbers – SOFTEK utilizes premium shocks that have been tested and tuned specifically for the SOFTEK system.

Frame Brackets — Optimized design delivers weight reduction and proven durability. The front and rear frame brackets are common between the SOFTEK and AIRTEK suspensions.

AIRTEK — Winner of the 2001 Automotive News and Cap Gemini Ernst & Young PACE Award for Product Innovation. AIRTEK is an integrated front air suspension and robotically welded steer axle that work together to form an integrated torsion system. This lightweight system provides driver comfort and body protection and is ideal for school bus applications. Utilizing a system approach, Hendrickson has engineered and optimized the following components to form a system delivering ride, stability and handling characteristics with reduced weight and maintenance.

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

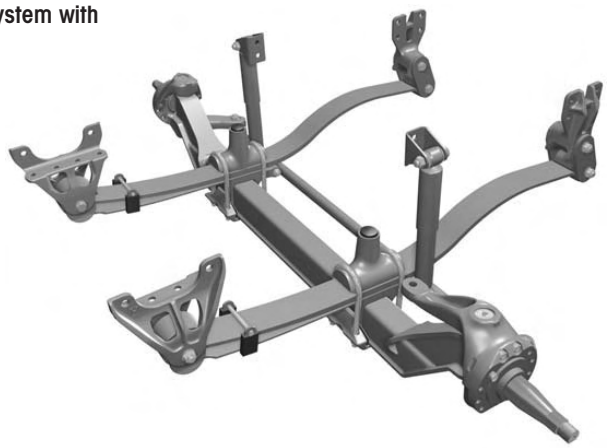
Leaf Spring Assembly — With its innovative design, the leaf spring provides superior stability, performance and a soft ride. The patented leaf spring shares loads with the air spring. Durable rubber front and patented rear bushings are greaseless and only require periodic inspections.

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

Figure 2-1

SOFTEK suspension system with STEERTEK Axle

Capacity: 10,000 lb.



AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

Axle Beam — The box-shaped design provides a stiffer axle and resists torsional, longitudinal and vertical loads more effectively than traditional axle beams. Together with the front limbs of the leaf springs, the robotically welded axle beam forms a torsion system, enhancing roll stability characteristics and improving handling.

Axle Clamp Group — The patented clamp group provides four-sided clamping pressure. The Clamp Group consists of the following:

- Top Axle Wrap
- Top Axle Wrap Liner
- Top Spring Pad
- Bottom Axle Wrap
- Bottom Axle Wrap Liner
- ¾" Bolts, Washers and Locknuts

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

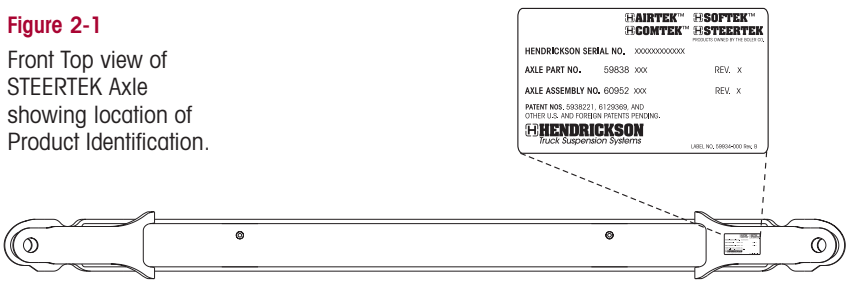
Knuckles – The steering and tie rod arms are integrated for increased strength and reduced weight. The unique steering knuckle packaging delivers a maximum of 50° wheel cut. The two piece knuckle design makes servicing the kingpin bushings easier.

TECHNICAL NOTES

1. AIRTEK and SOFTEK are approved for 100% on-highway uses; other applications must be pre-approved by Hendrickson Sales Engineering. These systems have a 10,000 pound capacity. System capacity represents maximum loads on tires at ground level.
2. The STEERTEK axle is available with 69" Kingpin Intersections (KPI).
3. The STEERTEK axle offers 5.63" axle beam drop heights. Axle beam drop is measured from the kingpin intersection to the top of the axle beam.
4. 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.
5. SOFTEK suspension weight includes frame and shackle bracket assemblies, steel leaf springs, bushings, shocks, upper shock brackets and axle clamp group.
6. STEERTEK axle weight is based on a 5.63" drop height and a 69" KPI. Axle weight includes, the axle beam, knuckle/steering arm assemblies and tie rod assemblies.
7. AIRTEK and SOFTEK are integral to and available exclusively with the STEERTEK axle. This system is anti-lock braking system (ABS) ready. STEERTEK is compatible with most industry standard wheel ends and brakes, contact OEM for more information.
8. The STEERTEK axle product identification tag is located on the top right hand side of the axle beam and provides 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 2-1

Front Top view of STEERTEK Axle showing 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, and on all decals and all applicable publications and materials provided by the vehicle manufacturer before conducting any maintenance, service or repair.

EXPLANATION OF SIGNAL WORDS

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

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

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

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

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

CAUTION — 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.

WARNINGS

WARNING

LOAD CAPACITY

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

WARNING

MODIFYING COMPONENTS

DO NOT MODIFY OR REWORK PARTS. DO NOT USE SUBSTITUTE PARTS OF THE SUSPENSION OR AXLE COMPONENTS. USE OF MODIFIED 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, AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE. USE ONLY HENDRICKSON AUTHORIZED REPLACEMENT PARTS. DO NOT MODIFY PARTS WITHOUT AUTHORIZATION FROM HENDRICKSON.

WARNING

OFF ROADWAY TOWING

WHEN A VEHICLE IS DISABLED AND EQUIPPED WITH A STEERTEK AXLE, CARE MUST BE TAKEN TO INSURE THERE IS NO DAMAGE TO THE SUSPENSION OR AXLE WHEN TOWING THE VEHICLE. THE USE OF A TOW STRAP IS NECESSARY TO TOW A DISABLED VEHICLE INTO A REPAIR FACILITY. THE TOW STRAPS SHOULD BE CONNECTED TO THE TOW HOOKS PROVIDED BY THE MANUFACTURER AT THE FRONT OF THE BUMPER. IF THE USE OF TOW HOOKS IS NOT AN OPTION THEN A TOW STRAP MAY BE WRAPPED AROUND THE FRONT AXLE (SEE FIGURE 3-1) IN A MANNER THAT IS ACCEPTABLE FOR TOWING THE VEHICLE INTO THE SHOP. DO NOT USE A TOW CHAIN AROUND THE FRONT AXLE TO TOW THE VEHICLE, DOING SO WILL DAMAGE THE AXLE. SEE FIGURE 3-2. FOR DETAILED TOWING INSTRUCTIONS FOR ON-HIGHWAY TOWING SEE SECTION 5 .

Figure 3-1 ACCEPTABLE

Figure 3-2 NOT ACCEPTABLE

WARNING

TORCH/WELDING

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

⚠ WARNING

TORCH/WELDING (CONTINUED)

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

⚠ 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 CONSEQUENTIAL PERSONAL INJURY OR DAMAGE TO EQUIPMENT INVOLVED.

⚠ DANGER

AIR SPRINGS

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

⚠ WARNING

SHOCK ABSORBERS

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

⚠ WARNING

AXLE

AXLE CAMBER IS NOT ADJUSTABLE. DO NOT CHANGE THE AXLE CAMBER ANGLE OR BEND THE AXLE BEAM. BENDING THE AXLE BEAM (SEE FIGURE 3-3) TO CHANGE THE CAMBER ANGLE CAN DAMAGE THE AXLE AND REDUCE AXLE STRENGTH, AND WILL VOID HENDRICKSON'S APPLICABLE WARRANTIES. A BENT AXLE BEAM CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

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

WARNING

AXLE (CONTINUED)

STEERTEK IS A UNIQUE AXLE. THE KINGPIN IS CRYOGENICALLY INSTALLED INTO THE AXLE. THE KINGPIN IS A NON-REPLACEABLE COMPONENT OF THE AXLE ASSEMBLY. DO NOT TRY TO REMOVE THE KINGPIN. IF THE KINGPIN SHOWS SIGNS OF MOVEMENT, CONTACT HENDRICKSON TECHNICAL SERVICE.

THE REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS IS NOT ALLOWED AS SHOWN IN FIGURE 3-3. HENDRICKSON ADVISES REPLACING ALL COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. AIRTEK COMPONENTS CANNOT BE BENT, WELDED, HEATED, OR REPAIRED WITHOUT REDUCING THE STRENGTH OR LIFE OF THE COMPONENT. FAILURE TO FOLLOW THESE GUIDELINES CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

WARNING

AXLE (CONTINUED)

IF A VEHICLE EQUIPPED WITH A STEERTEK AXLE IS INVOLVED IN A ROLLOVER OR SUCH SEVERE INCIDENT, A THOROUGH INSPECTION OF THE AXLE SHOULD BE PERFORMED NOTING THE CONDITION OF THE AXLE BEAM, KINGPINS, AND KNUCKLE ASSEMBLIES. IF ANY COMPONENT APPEARS DAMAGED THE AXLE SHOULD BE REPLACED. IN THE EVENT THE ROLLOVER OR OTHER SUCH SEVERE INCIDENT RESULTED IN EXCESSIVE SIDE LOAD SUCH AS A BENT WHEEL, HUB, OR SPINDLE, IT IS STRONGLY RECOMMENDED TO REPLACE THE COMPLETE AXLE ASSEMBLY. CONTACT HENDRICKSON TECHNICAL SERVICES WITH ANY QUESTIONS. FAILURE TO REPLACE ANY DAMAGED COMPONENTS CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

WARNING

PERSONAL 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

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 WARRANTY.

WARNING

SUPPORT THE VEHICLE PRIOR TO SERVICING

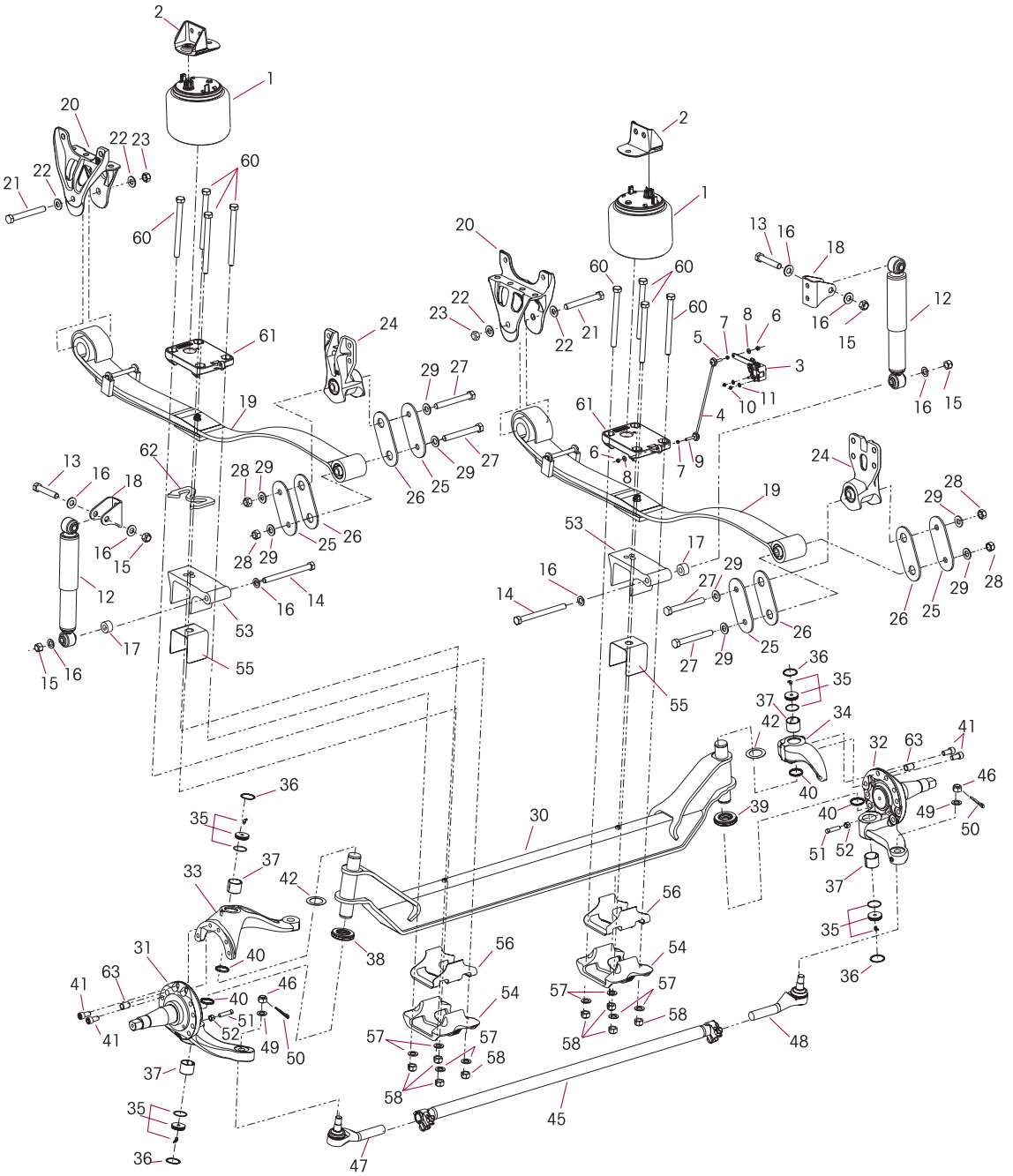
CHOCK THE WHEELS TO HELP PREVENT THE VEHICLE FROM MOVING. SUPPORT THE VEHICLE WITH SAFETY STANDS. DO NOT WORK UNDER A VEHICLE SUPPORTED ONLY BY A FLOOR JACK. A JACK CAN SLIP OR FALL OVER. SERIOUS PERSONAL INJURY CAN RESULT.

AIRTEK® WITH THE STEERTEK AXLE

SECTION 4

Parts Lists

AIRTEK®



AIRTEK® WITH THE STEERTEK AXLE

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1	64075-002	Air Spring	2
2	60850-001	Air Spring Bracket	2
	59427-008	HCV & Linkage Ass'y (Includes Key Nos. 3-11)	1
	64741-008	**Height Control Valve Kit** (Includes Key Nos. 3,5-8, 10, 11)	
3	**	Height Control Valve	1
4	59428-001	HCV Linkage Ass'y	1
	64742-001	**Stud Kits** (Includes Key Nos. 5-9)	
5	**	5/16" 18 UNC Stud 2.07"	1
6	**	5/16" 18 UNC Locknut	2
7	**	5/16" 18 UNC Nut	2
8	**	5/16" Hardened Washer	2
9	**	5/16" 18 UNC Stud 2.69"	1
10	**	¼" 20 UNC Locknut	2
11	**	¼" Hardened Washer	2
12	58913-008	Shock Absorber	2
13	*	¾" 10 UNC Upper Shock Bolt	2
14	*	¾" 10 UNC Lower Shock Bolt	2
15	*	¾" 10 UNC Hex Locknut	4
16	*	¾" Hardened Washer	8
17	59946-001	Shock Spacer	2
18	59423-002	Shock Bracket	2
19	60512-000	Spring Assy.	2
20	64488-000	Front Hanger	2
21	*	M20 Bolt	2
22	*	M20 Hardened Washer	4
23	*	M20 Locknut	2
	60961-068	Rear Shackle Bracket Ass'y Includes Key Nos. 24-29	2
24	64316-000	Rear Shackle Bracket	1
25	64314-000	Rear shackle plate	2
26	64159-000	Thrust Washer	2
27	58258-008	M20 x 2.5-6G Hexbolt 160MM	2
28	58259-001	M20 x 2.5-6H Locknut	2
29	58246-009	M20 Hardened Washer	4
	60952-XXX	Axle Ass'y (Includes Key Nos. 30-56) Contact Hendrickson Tech Serv. for Part No.	1
30	59924-004	Axle & Kingpin Ass'y, 6.5 & 8.5" Ride Ht.	1
31		LH Lower Steering Knuckle Ass'y	1
	58900-033	200 Ackerman Air Brake	
	58900-031	250 Ackerman Air Brake	
	58900-043	200 Ackerman Hydraulic Brake	
	58900-041	250 Ackerman Hydraulic Brake	
32		RH Lower Steering Knuckle Ass'y	1
	58900-034	200 Ackerman Air Brake	
	58900-032	250 Ackerman Air Brake	
	58900-044	200 Ackerman Hydraulic Brake	
	58900-042	250 Ackerman Hydraulic Brake	
33	60903-016	LH Upper Steering Knuckle Ass'y	1
34	60904-002	RH Upper Steering Knuckle Ass'y	1
	60961-040	**DX Bushing Service Kit**, (Axle Set) Includes Kit Nos. 60961-009 & -039	1
	60961-009	**LH DX Bushing w/Composite Thrust Bearing Service Kit** Includes Key Nos.35-38, 40-44	1
	60961-039	**RH DX Bushing w/Steel Roller Bearing Service Kit** Includes Key Nos.35-37, 39-44	1
35	59156-000	Grease Cap Assy.	2
36	58937-000	Retaining Ring	2
37	58909-000	DX Bushing	2
	60961-043	**Thrust Bearing Service Kit**, Axle Set Includes Key Nos. 60961-041 & 60961-042	1
	60961-041	**LH Thrust Bearing Composite Service Kit** Includes Key Nos. 38, 40-44	1
	60961-042	**RH Thrust Bearing Roller Service Kit** Includes Key Nos. 39-44	1
38	59828-000	LH Thrust Bearing – Composite	1
39	64256-000	RH Thrust Bearing – Roller	1
40	58910-000	Kingpin Seal	2
41	60236-001	5/8" Socket head cap screw	2
42	60259-002	Kingpin Shim	1
43	60259-001	Kin Pin Shim (Not Shown)	2
44	60937-000	Loctite (Red) Compound Tube (Not Shown)	1
		Tie Rod Ass'y (Includes 45 – 48)	1
	59948-005	12K, 5.63 Drop, 200 Ackerman	
	59948-006	12K, 5.63 Drop, 250 Ackerman	
	60961-012	**Tie Rod End Service Kit** (Axle Set) Includes Kit Nos. 60961-029 & -030	1
	60961-029	**LH Tie Rod Service Kit** Includes Key Nos. 46, 47, 49, 50	1
	60961-030	**RH Tie Rod Service Kit** Includes Key Nos. 46, 48-50	1
45	**	Tie Rod Center Tube	1
46	**	¾" Castle Nut (Included in Tie Rod Ass'y)	2
47	64004-001	LH Tie Rod End	1
48	64004-002	RH Tie Rod End	1
49	22962-007	7/8" Flat Washer	2
50	17800-004	Tie Rod Nut Cotter Pin	2
	60961-069	**Stop Bolt Kit** (Contains 1 each of Key Nos. 51 & 52)	
51	60238-001	½" 13 UNC Sq. Head Bolt	2
52	60240-000	½" 13 UNC Hex Jam Nut	2
53	59952-003	Top Wrap	2
54	64014-003	Bottom Wrap	2
		Clamp Group Service Kit (One side only) Includes Key Nos. 55–58, & 60	2
	60961-066	6.5" Ride Height	
	60961-067	8.5" Ride Height	
	60961-015	**Top/Bottom Axle Wrap Liner Service Kit** Includes Key Nos. 55-56	2
55	60508-000	Top Axle Wrap Liner	1
56	59845-000	Bottom Axle Wrap Liner	1
57	22962-001	¾" Flat Washer	4
58	17700-015	¾" 16 UNC-2B Nylon Locknut	4
59	18831-020	Dowel Pin 8.5" Ride Height (Not Shown)	2
60		¾" 16UNC Hex bolt	4
	21867-041	6.5" Ride Height, 8.5" Bolt Length	
	21867-042	8.5" Ride Height, 11.5" Bolt Length	
61		Top Pad	
	64516-001	LH	1
	64516-002	RH	1
62		LH Front Axle Spacer	1
	64536-010	6.5" Ride Ht.	
	64536-060	8.5" Ride Ht.	
(Not Shown)	64536-050	RH Front Axle Spacer 8.5" Ride Ht.	1
63	64246-000	ABS Sensor Sleeve	2

NOTE :

* Not supplied by Hendrickson, used for reference only. Refer to OEM (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.

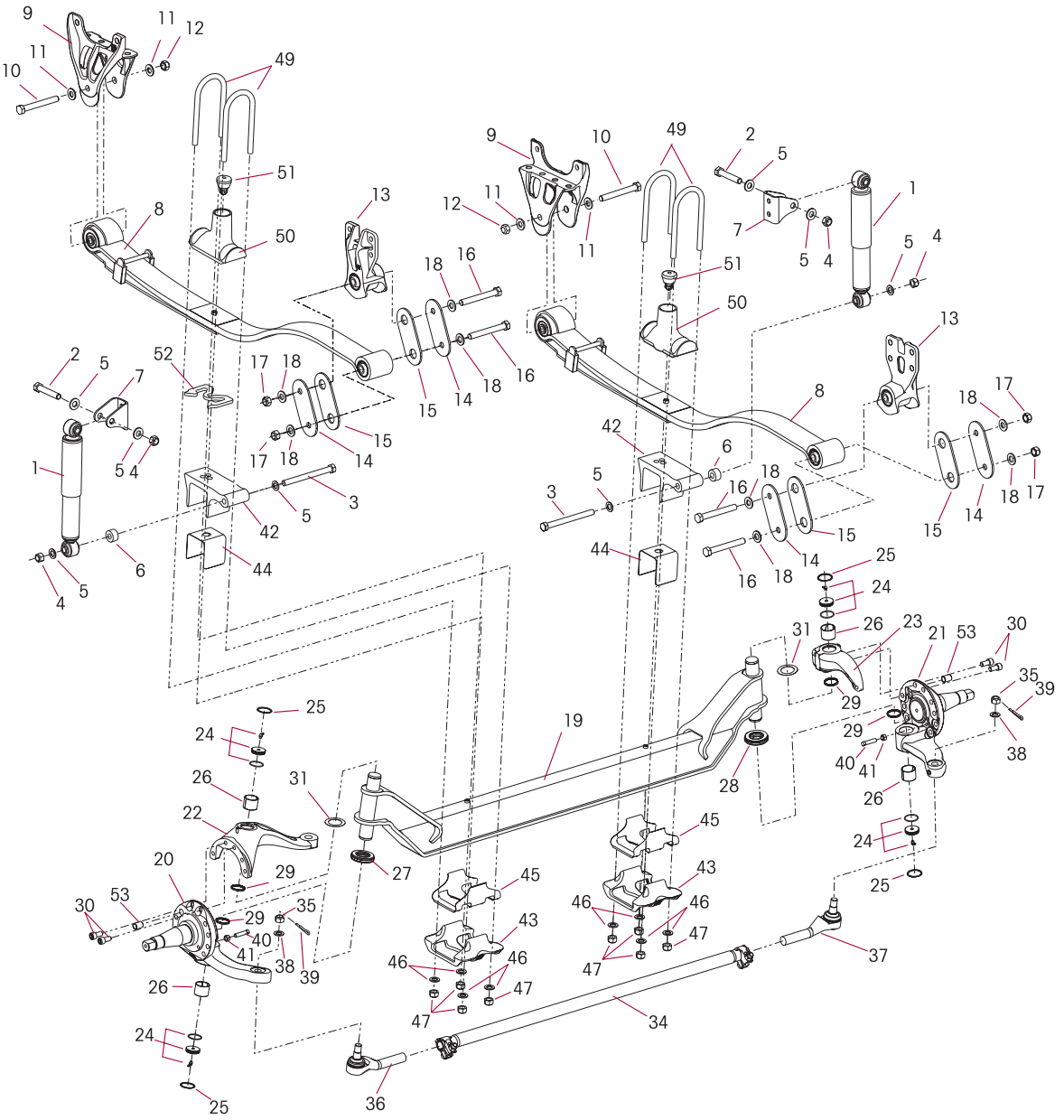
*** Quantities of Service Kit components may vary from amount shown in lists.

SOFTEK WITH THE STEERTEK AXLE

SECTION 4
Parts Lists

SOFTEK™

70



SOFTEK™ WITH THE STEERTEK AXLE

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1	58913-007	Shock Absorber	2
2	*	¾" 10 UNC Upper Shock Bolt	2
3	*	¾" 10 UNC Lower Shock Bolt	2
4	*	¾" 10 UNC Hex Locknut	4
5	*	¾" Hardened Washer	8
6	59946-001	Shock Spacer	2
7	59423-002	Shock Bracket	2
8	60511-000	Spring Assembly	2
9	64488-000	Front Hanger	2
10	*	M20 Bolt	2
11	*	M20 Hardened Washer	4
12	*	M20 Locknut	2
	60961-068	Rear Shackle Bracket Ass'y (Includes Key Nos. 13-18)	2
13	64316-000	Rear Shackle Bracket	1
14	64314-000	Rear Shackle Plate	2
15	64159-000	Thrust Washer	2
16	58258-008	M20 x 2.5-6G Hexbolt 160MM	2
17	58259-001	M20 x 2.5-6H Locknut	2
18	58246-009	M20 Hardened Washer	4
	60952-XXX	STEERTEK Axle Ass'y Contact Hendrickson Tech Serv. for Part No. (Includes Key Nos. 19-45)	1
19	59924-004	Axle & Kingpin Ass'y, 6.5 & 8.5" Ride Ht.	1
20		LH Lower Steering Knuckle Ass'y	1
	58900-033	200 Ackerman Air Brake	
	58900-031	250 Ackerman Air Brake	
	58900-043	200 Ackerman Hydraulic Brake	
	58900-041	250 Ackerman Hydraulic Brake	
21		RH Lower Steering Knuckle Ass'y	1
	58900-034	200 Ackerman Air Brake	
	58900-032	250 Ackerman Air Brake	
	58900-044	200 Ackerman Hydraulic Brake	
	58900-042	250 Ackerman Hydraulic Brake	
22	60903-016	LH Upper Steering Knuckle Ass'y	1
23	60904-002	RH Upper Steering Knuckle Ass'y	1
	60961-040	**DX Bushing Service Kit** (Axle Set) (Includes Kit Nos. 60961-009 & -039	1
	60961-009	**LH DX Bushing w/Composite Thrust Bearing Service Kit** (Includes Key Nos.24-27, 29-33)	1
	60961-039	**RH DX Bushing w/Roller Thrust Bearing Service Kit** (Includes Key Nos.24-26, 28-33)	1
24	59156-000	Grease Cap Assy.	2
25	58937-000	Retaining Ring	2
26	58909-000	DX Bushing	2
	60961-043	**Thrust Bearing Service Kit** (Axle Set) Includes Key Nos. 60961-041& -042	1
	60961-041	**LH Thrust Bearing - Composite Serv. Kit** Includes Key Nos. 27, 29-33	1
	60961-042	**RH Thrust Bearing - Roller Service Kit** Includes Key Nos. 28-33	1
27	59828-000	LH Thrust Bearing - Composite	1
28	64256-000	RH Thrust Bearing - Roller	1
29	58910-000	Kingpin Seal	2
30	60236-001	5/8" Socket Head Cap Screw	2
31	60259-002	Kingpin Shim	1
32	60259-001	Kingpin Shim (Not shown)	4
33	60937-000	Loctite (Red) Compound Tube (Not shown)	1
		Tie Rod Ass'y (Includes Key Nos. 34-37)	
	59948-005	12K, 5.63 Drop, 200 Ackerman	
	59948-006	12K, 5.63 Drop, 250 Ackerman	
	60961-012	**Tie Rod End Service Kit** (Axle Set) (Includes Kit Nos. 60961-029 & -030)	1
	60961-029	**LH Tie Rod Service Kit** (Includes Key Nos. 35-36, 38-39)	1
	60961-030	**RH Tie Rod Service Kit** (Includes Key Nos. 35, 37-39)	1
34	**	Tie Rod Center Tube	1
35	**	¾" Castle Nut (Included in Tie Rod Ass'y)	2
36	64004-001	LH Tie Rod End	1
37	64004-002	RH Tie Rod End	1
38	22962-007	7/8" Flat Washer	2
39	17800-004	Tie Rod Nut Cotter Pin	2
	60961-069	**Stop Bolt Kit** (Contains 1 each of Key Nos. 40 & 41)	
40	60238-001	½" 13 UNC Sq. Head Bolt	2
41	60240-000	½" 13 UNC Hex Jam Nut	2
42	59952-003	Top Wrap	2
43	64014-003	Bottom Wrap	2
		Clamp Group Service Kit (Includes Key Nos. 44-47, & 49) One side only	2
	60961-064	SOFTEK 6.5" Ride Height	
	60961-065	SOFTEK 8.5" Ride Height	
	60961-015	**Top/Bottom Axle Wrap Liner Service Kit** (Includes Key Nos. 44-45)	2
44	60508-000	Top Axle Wrap Liner	1
45	59845-000	Bottom Axle Wrap Liner	1
46	22962-001	¾" Flat Washer	4
47	17700-015	¾" 16 UNC-2B Nylon Locknut	4
48	18831-020	Dowel Pin 8.5" Ride Height (Not shown)	1
49		¾" 16 UNC U Bolt	2
	64804-100	6.5" Ride Height, 10.0" Length	
	64804-120	8.5" Ride Height, 12.0" Length	
50	64506-000	Top Pad	2
51	64080-000	Rubber Bump Stop	2
52		Front Axle Spacer LH	
	64536-010	6.5" Ride Ht.	1
	64536-060	8.5" Ride Ht.	1
Not Shown	64536-050	Front Axle Spacer RH, 8.5" Ride Ht.	1
53	64246-000	ABS Sensor Sleeve	2

NOTE:

* Not supplied by Hendrickson, used for reference only. Refer to OEM (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.

*** Quantities of Service Kit components may vary from amount shown in lists.

SECTION 5
Special Tools

KINGPIN BUSHING (DX BUSHING) TOOLS

Figure 5-1

Driver for King Pin Bushing installation

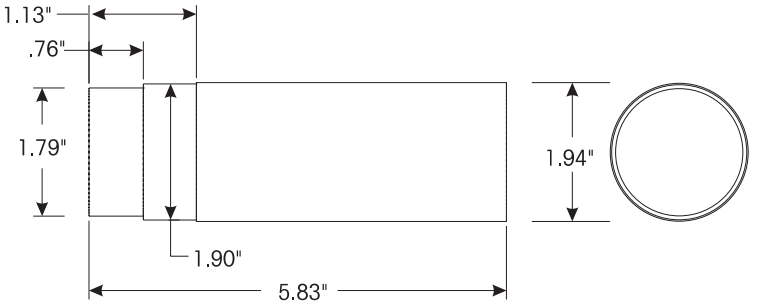


Figure 5-2

Driver for King Pin Bushing Removal

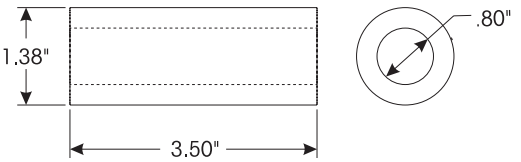


Figure 5-3

Steering Arm Receiver

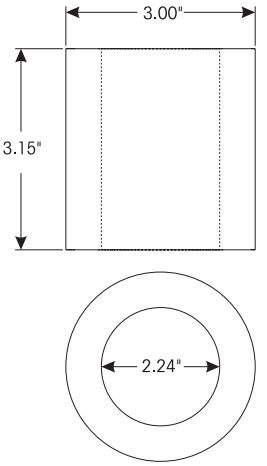


Figure 5-4

Adjustable Straight Flute Reamer
Dimension of Diameter Must Facilitate
A Cutting Range of 1.802" — 1.812"

SECTION 6

On Highway Recommended Towing Procedure

Hendrickson recommends that a vehicle equipped with a STEERTEK axle be towed by the following methods for **ON HIGHWAY** applications. Methods listed are in order of preference.

1. Wheel lift method, the ideal towing procedure
2. Axle fork method
3. Towing vehicle from the rear method

NOTE 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 with any questions regarding proper towing procedures for vehicles equipped with a STEERTEK axle.

WHEEL LIFT METHOD

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

Figure 6-1
Wheel lift method

AXLE FORK LIFT METHOD

This is an alternative method for towing the vehicle, but requires SPECIAL forks, (see Figure 6-2 and 6-3) and designated lift points. The following procedure must be used:

NOTE

When lifting a vehicle with an under lift boom, care must be taken not to damage the engine's oil pan. If necessary, place a block of wood between the top of the boom and the bottom of the axle.

- Place a block of wood on top of the boom and lift the vehicle in order to place spacers under tires. This will provide sufficient room under the axle to locate forks in the proper position.
- Install the fork in the boom properly with the angled arm of the fork facing forward.
- Position the forks directly under the center of the bottom axle wraps, and lift vehicle. The indentions in the center of the wrap will locate the forks and maintain their position.

⚠ CAUTION

DO NOT TOW THE VEHICLE FROM THE AXLE. TOWING THE VEHICLE BY THE AXLE WILL CAUSE SCARRING AND RESULTANT DAMAGE TO THE AXLE AND VOID WARRANTY.

- When securing the vehicle to the boom, it is preferred to use nylon safety straps. Chains have a tendency to bind and may cause damage to the axle.

Figure 6-2
Axle Fork Dimensions

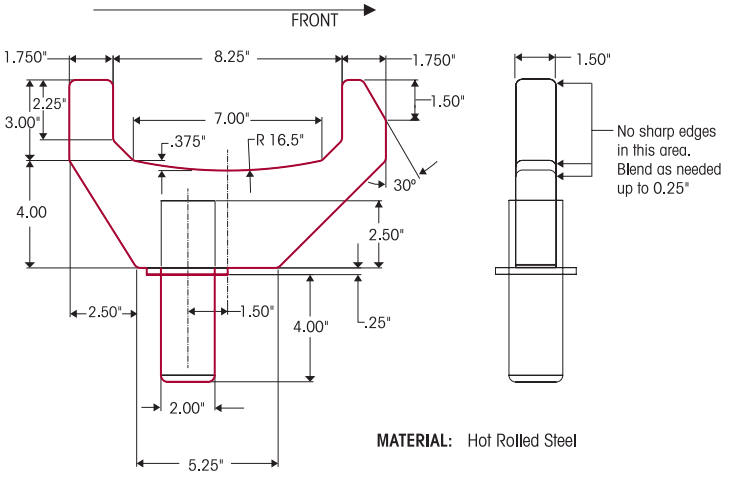


Figure 6-3

TOWING VEHICLE FROM THE REAR METHOD

This method is preferred when the proper equipment is not available to perform the wheel lift method or the axle fork method, and is necessary for wreckers not equipped with an under lift system.

OFF ROADWAY TOWING METHOD

WARNING

WHEN A VEHICLE IS DISABLED AND EQUIPPED WITH A STEERTEK AXLE, CARE MUST BE TAKEN TO INSURE THERE IS NO DAMAGE TO THE SUSPENSION OR AXLE WHEN TOWING THE VEHICLE. THE USE OF A TOW STRAP IS NECESSARY TO TOW A DISABLED VEHICLE INTO A REPAIR FACILITY. THE USE OF TOW STRAPS SHOULD BE CONNECTED TO THE TOW HOOKS PROVIDED BY THE MANUFACTURER AT THE FRONT OF THE BUMPER. IF THE USE OF TOW HOOKS IS NOT AN OPTION THEN A TOW STRAP MAY BE WRAPPED AROUND THE FRONT AXLE (SEE FIGURE 6-4) IN A MANNER THAT IS ACCEPTABLE FOR TOWING THE VEHICLE INTO THE SHOP. DO NOT USE A TOW CHAIN AROUND THE FRONT AXLE TO TOW THE VEHICLE, DOING SO WILL DAMAGE THE AXLE AND VOID WARRANTY. SEE FIGURE 6-5.

THESE METHODS ARE NOT RECOMMENDED FOR ON HIGHWAY TOWING

Figure 6-4
NYLON STRAPS ARE ACCEPTABLE FOR ONLY OFF ROADWAY TOWING

Figure 6-5
CHAINS ARE NOT ACCEPTABLE FOR OFF ROADWAY TOWING

SECTION 7
Preventive Maintenance

LUBRICATION

For vehicles equipped with the 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.

STEERTEK GREASING AND LUBRICATION SPECIFICATIONS

Component	Greasing Interval	Grease	NLGI Grade	Outside Temperature
King Pin Bushings	Maximum of 25,000 miles (40,225 kilometers) or 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				
Steering Arm Drag Link	See Vehicle Manufacturer			

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

KINGPIN LUBRICATION

On the Hendrickson STEERTEK front axle the kingpin grease fittings are located on the top and bottom of the kingpin grease caps.

1. Place vehicle on the ground.
2. Prior to greasing the kingpins on the vehicle, the suspension must be in a loaded condition.
3. Clean off all the grease fittings with a clean shop towel prior to lubrication.
4. Lubricate the kingpins through the grease fittings on the top and bottom of the steering knuckle, see Lubrication Specification Matrix above.
5. Force the required lubricant into the upper and lower kingpin grease fittings, until new lubricant flows from grease purging locations, see Figure 7–1 and 7–2.

A. Upper axle beam and knuckle.

B. Lower axle beam and thrust bearing purge vents.

NOTE Greasing at the lower zerk should purge grease from the thrust bearing shell. The right hand side of the axle has a steel roller thrust bearing (See Figure 7-1) and the left side of the axle has a composite style thrust bearing (See Figure 7-2). Bothe purge in the same area.

Figure 7-1

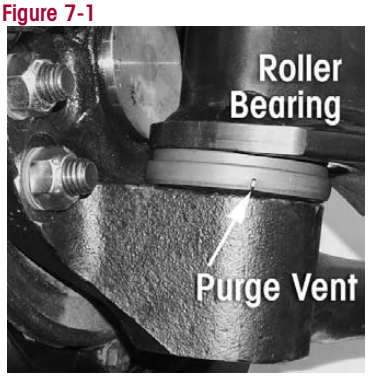


Figure 7-2

TIE ROD END LUBRICATION

LUBRICATION PROCEDURE

Lubrication Procedure

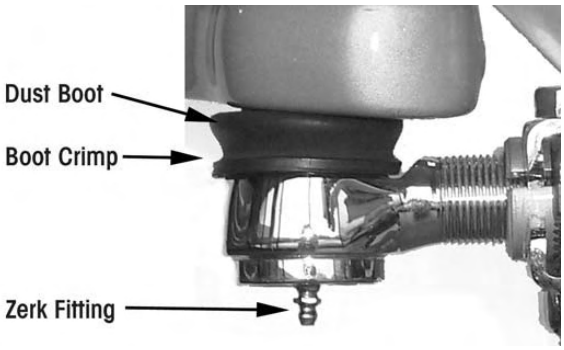
1. Turn the vehicle wheels straight ahead.
2. Wipe the zerk fitting clean with shop towels.
3. Wipe the seal/boot clean with shop towels.
4. Attach a grease gun to the zerk fitting. Either a hand or pneumatic grease gun is acceptable. If air operated grease gun is used, system air pressure should not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

⚠ CAUTION

EXCEEDING THE MAXIMUM AIR PRESSURE TO THE ZERK FITTING 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 7-3.

Figure 7-3



6. If the tie rod end is designed for lube service and it will not accept grease proceed as follows:
   a. Remove the zerk fitting.
   b. Inspect the threaded zerk fitting hole in the tie rod end and remove any obstructions.
   c. Install a new zerk fitting.
   d. Continue the lubrication procedure.
   e. If the tie rod end will not accept grease following this procedure it will be necessary to replace the tie rod end, (see Tie Rod End replacement in the Component Replacement Section).
7. Apply grease until all the old grease is purged from the boot.

VISUAL INSPECTION

The AIRTEK and SOFTEK are low maintenance suspensions. However it is necessary to visually inspect the following items every 25,000 miles (80,450 km) or every six months, whichever comes first, to help ensure all such components function to their highest efficiency.

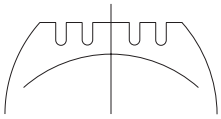
- **Wear and damage** – Inspect all parts of suspension for wear and damage. Look for bent or cracked parts. Replace all worn or damaged parts.
- **Air spring** – Look for chaffing or any signs of spring or component damage.
- **Fasteners** – Look for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to the specified torque. See Torque Specification Chart in this publication for recommended torque requirements. Use a calibrated torque wrench to check torque in a tightening direction. As soon as the fastener starts to move, record the torque. Correct the torque if necessary. Replace any worn or damaged fasteners.
- **Thrust washers and rear shackle bracket** – Look for any signs of excessive wear to the thrust washers, shackles and shackle bracket. See Thrust Washer Inspection detailed in this section.
- **STEERTEK axle** – The axle should be free of any nicks or gouges. Inspect for any cracks or dents on axle.
- **Shocks** – Look for any signs of dents or leakage, misting is not considered a leak. See Shock Absorber Inspection in this section.
- **Top and bottom axle wrap liners** – Look for any cracking or broken pieces on liner in load bearing areas. See Axle Wrap Liner Inspection in this section.
- **Steel leaf spring and wrap leaf assembly** –Look for cracks. Check the front and rear bushings for any wear or deterioration. Replace spring assembly if any of the previous conditions are observed. See the Component Replacement Section in this publication for replacement procedure.
- **Front hangers and shackle brackets** – Check for cracks or loose mounting hardware. Replace if necessary, see the Component Replacement Section in this publication for replacement procedure.
- **Top Pad (AIRTEK)** –Look for any cracks or damage. Replace if necessary, see the Component Replacement section in this publication for replacement procedure.
- **Top pad and bump stop (SOFTEK)** –Look for cracks and or missing rubber bump stops. Replace if necessary, see the Component Replacement section in this publication for replacement procedure.
- **Steering pivot points** – Check for looseness at all pivot points. Inspect and lubricate all pivot points. Refer to the Trouble Shooting section in the Appendix of this publication.
- **Operation** – All steering components must move freely through the full range of motion from steering stop to steering stop.
- **Tire wear** – Inspect tires for wear patterns that may indicate suspension damage or misalignment. See Tire Inspection in this section.

TIRE INSPECTION

- The following tire Inspection guidelines are based upon TMC (The Technology & Maintenance Council) recommended practices. Any issues regarding irregular tire wear where Hendrickson is asked for assistance, will require tire and alignment maintenance records as described in the TMC literature number RP642 or TMC "Guidelines for Total Vehicle Alignment" publication.
- Tire wear is normally the best indicator of vehicle alignment condition. If tires are wearing too rapidly or irregularly, alignment corrections may be needed. The tire wear patterns described below can help isolate specific alignment problems.
- The most common conditions of concern are:
  - Overall Fast Wear (Miles per 32nd)
  - Feather Wear
  - Cupping
  - Diagonal Wear
  - Rapid Shoulder Wear (One Shoulder Only)
  - One-Sided Wear

Figure 7-4

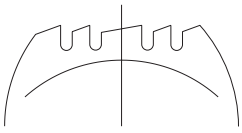
OVERALL FAST WEAR
(Miles per 32nd)



Overall Fast Wear — Fast wear can be described as exhibiting a good, but accelerated wear pattern. It is typically caused by operating conditions, such as mountainous terrain, frequency and severity of turning, abrasive road surfaces in combination with vehicle configurations and their attributes-such as power steering, heavy axle loads, high wheel cuts, setback axles, short wheel base tractors, long wheel base straight trucks. To correct this problem, consult with vehicle and tire manufacturers when specifying equipment or replacing tires. For more information, see TMC RP 219 publication, page 11. For information on how to accurately measure and record tire rates, see TMC RP 230 publication.

Figure 7-5

FEATHER WEAR



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

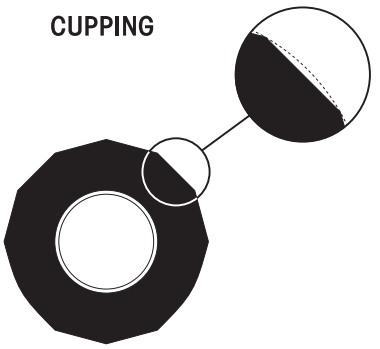
AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

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.

Figure 7-6

CUPPING



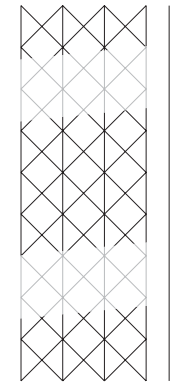
To solve cupping problems:

Tires - Correct mismount or balance problem. If ride complaints arise, steer tires may be rotated to drive axle.

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

Figure 7-7

DIAGONAL WEAR



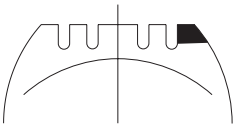
Diagonal Wear — Can be described as localized flat spots worn diagonally across the tread at approximately 25-35° angles, often repeating around the tread circumference. For more information, see TMC RP 219A publication, page 20.

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

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

Figure 7-8

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.

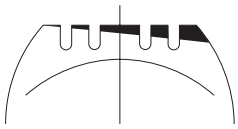
This wear condition is usually caused by excessive toe or excessive camber. These conditions can be created by a misaligned or bent axle and can also be caused by loose or worn wheel bearings.

To correct this type of rapid shoulder wear:

Tires – Change direction of rotation of tire. If shoulder wear is severe, replace tire.

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

Figure 7-9
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.

SHOCK ABSORBER INSPECTION

Figure 7-10

Hendrickson uses a long service life, premium shock absorber on all AIRTEK and SOFTEK suspensions. When 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 for fifteen minutes.

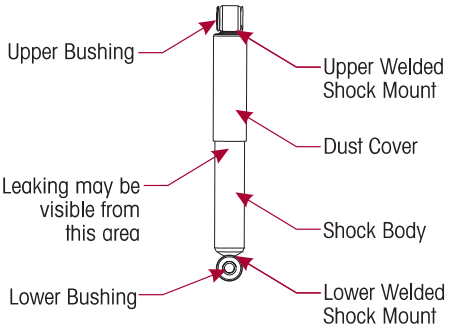
WARNING

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

2. Lightly touch the shock body carefully below the dust cover, see Figure 7-10.
3. Touch the frame to get an ambient reference. A warm shock absorber is acceptable, a cold shock absorber should be replaced.

SHOCK ABSORBER VISUAL INSPECTION PROCEDURE

Figure 7-11



Inspect the shock absorbers fully extended. Shock absorbers (see Figure 7-11), will need to be replaced for any of the following:

- Damaged upper or lower mount
- Damaged upper or lower bushing
- Damaged dust cover and/or shock body
- Bent or dented shock
- Leaking shock, when streams of fluid travel down the side of the shock,particularly from the upper seal. The 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).
- Shock is damaged internally, or jammed in the collapsed position. Interanl damage can also be determined by removing the shock, shake and listen for the sound of metal parts rattling inside the shock body.

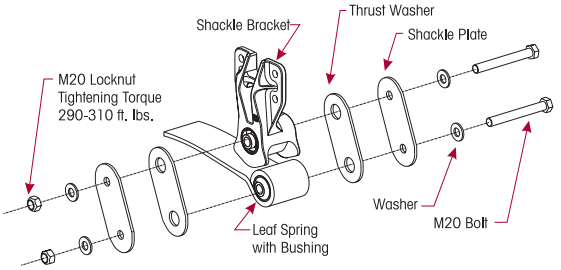
SHACKLE THRUST WASHER INSPECTION

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

An indication that the shackle 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. The rear spring eye and or thrust washers are in contact with the shackle plates.
3. Normal and unacceptable thickness of the thrust washers (See Figure 7-12) can be measured with a micrometer or a ruler.
   - The normal thickness of a new thrust washer is 3/16" (.187").
   - The minimum thickness allowable for a thrust washer is 3/32" (.090").
   - If one or more of these conditions is experienced, disassembly of the rear shackle 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. See Shackle Thrust Washer replacement procedure in the Component Replacement Section of this publication.

Figure 7-12



AXLE WRAP LINER INSPECTION

Figure 7-13

Axle Wrap Liners
Unacceptable Cracks

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 7-13. See Axle Wrap replacement in the Component Replacement Section of this publication.

KINGPIN BUSHING INSPECTION

INSPECTION PROCEDURE

1. Chock the wheels to help prevent the vehicle from moving. Set the parking brake.

Figure 7-14

2. Use a jack to raise the vehicle until the wheels are off the ground. Support the vehicle with safety stands.
3. **CHECKING THE UPPER KINGPIN BUSHING**. Install the base of a dial indicator onto the axle beam. Place the tip of the indicator against the inside of the upper steering knuckle. See Figure 7-14.
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 7-15.

Figure 7-15

6. Check the reading on the dial indicator. If the dial indicator moves more than 0.015", the upper bushing is worn or damaged. Replace both bushings. Refer to the Kingpin Bushing replacement procedure in the Component Replacement Section of this publication.
7. **CHECKING THE LOWER KINGPIN BUSHING**. Install a dial indicator so that the base is on the axle and the indicator tip is against the inside of the bottom knuckle.
8. Set the dial indicator to "0" zero.
9. Move the bottom of the tire in and out. If the dial indicator moves more than 0.015", the lower bushing is worn or damaged. Replace both kingpin bushings. Refer to the Component Replacement Section of this publication.

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

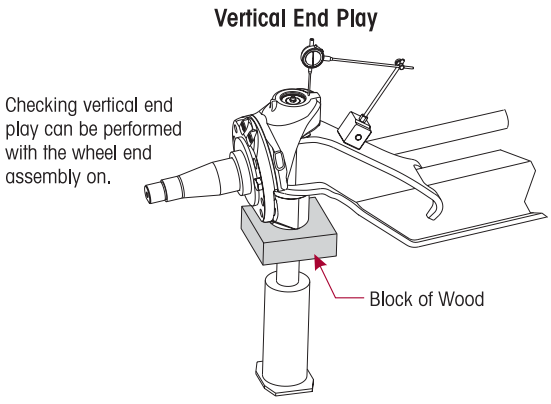
STEERING KNUCKLE INSPECTION

CHECKING VERTICAL END PLAY (UP AND DOWN MOVEMENT)

1. Chock the tires to help prevent the vehicle from moving.
2. Set the parking brakes.
3. Use a jack to raise the vehicle off the ground. Support the front axle with safety stands.
4. Place a dial indicator on each side of the axle as follows:
   a. Turn wheels straight ahead.
   b. Place the magnetic dial indicator base on the axle.
   c. Place the tip of the dial indicator on the top of the upper kingpin connection or steering arm.
5. Place a jack and a wood block (with a hole that allows clearance for the lower kingpin grease fitting) under the lower kingpin grease cap area. See Figure 7-16.
6. Set the dial indicator to "0" (zero).
7. Raise the jack until the dial indicator shows the end of vertical travel. Measure and record the dial indicator reading. Vertical (up and down) inspection clearance must be .008" to .030".
8. If vertical clearance is greater than .030" install shims (Hendrickson part no. 60259-001) between the top of the axle and the bottom of the upper kingpin connection or steering arm to obtain the proper clearance specification. See Knuckle Assembly in the Component Replacement Section for proper shim installation.

Figure 7-16

9. If vertical clearance is below .008", remove shims from between the top of the axle and the bottom of the upper kingpin connection or steering arm to obtain the proper clearance specification.
   See Knuckle Assembly in the Component Replacement Section for proper shim removal.
10. Lower the jack.



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 MAY PROVIDE INACCURATE RESULTS TO DETERMINE WEAR.

CAUTION

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

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

WARNING

A COTTER PIN MUST BE INSTALLED THROUGH THE TIE ROD END WITH THE CASTLE NUT TIGHTENED TO TORQUE SPECIFICATION TO SECURELY ATTACH THE TIE ROD. LOSS OF THE COTTER PIN WILL ALLOW THE TIE ROD END NUT TO BECOME LOOSE AND AFFECT VEHICLE STEERING AND POSSIBLY RESULT IN TOTAL LOSS OF STEERING CONTROL.

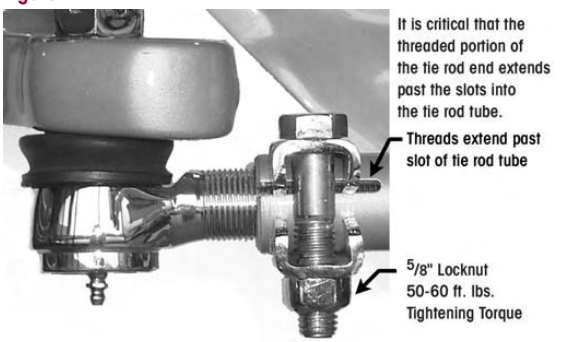
5. Check that the tie rod end nut is installed and secured with a cotter pin. If the cotter pin is missing, check the nut torque specification and then install a new cotter pin. Always tighten the castle nut to specified torque (see see Torque Specifications in the appendix of this publication) when setting the cotter pin. Do not back off the nut to insert cotter pin.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

⚠ WARNING

IT IS CRITICAL THAT THE THREADED PORTION OF THE TIE ROD END EXTENDS PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 8-11. FAILURE TO DO SO CAN CAUSE COMPONENT TO FAIL CAUSING LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

Figure 7-17



6. 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 7-17.
7. Check that zerk fittings are installed. Replace a damaged zerk fitting with a new one. Some tie rod ends are non-greaseable and will not have zerk fittings. Do not install fitting if tie rod end is a non-greaseable type.

⚠ CAUTION

DO NOT USE THE FOLLOWING ITEMS OR METHODS TO CHECK FOR MOVEMENT OF THE TIE ROD ASSEMBLY. DAMAGE TO COMPONENTS CAN RESULT IF:

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

8. By hand, or using a pipe wrench with jaw protectors to avoid gouging the cross tube, rotate the cross tube toward the front of the vehicle and then toward the rear. After rotating, center the cross tube. If the cross tube will not rotate in either direction, replace both tie rod ends.
9. Position yourself directly below the ball stud socket. Using both hands, grab the assembly end as close to the socket as possible (no more than six inches or 152.4mm). Apply hand pressure with reasonable human effort vertically up and down in a push-pull motion several times. Check for any movement or looseness at both tie rod end locations.
10. If there is any movement in the tie rod assembly, replace the damaged tie rod end.

Reference the TMC RP 645 Tie Rod End Inspection and Maintenance Procedure for additional information.

SECTION 8

Alignment & Adjustments

INSPECTION PRIOR TO ALIGNMENT

WHEELS AND TIRES

Examine the following items:

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

FRONT SUSPENSION

Inspect the following:

- All fasteners are installed and tightened to the specified torque. See Torque Specification Section in the appendix of this publication.
- Leaf springs are free of wear or damage.
- Air springs are free of wear or damage (if equipped).
- Shock absorbers are free of wear and damage.
- Vehicle ride height for both the front and rear are within specification. Follow manufacturers guidelines (if equipped).
- 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

The rear axle 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 is correctly aligned. Refer to the procedure from the manufacturer of the vehicle or the suspension.
- All fasteners 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 manufacturer of vehicle on rear axles and suspensions. Reference the TMC (The Technology & Maintenance Council) Guidelines for Total Vehicle Alignment.

FRONT WHEEL ALIGNMENT

Hendrickson recommends technicians review the TMC's publication (RP642) TMC (The Technology & Maintenance Council) "Guidelines for Total Vehicle Alignment".

The AIRTEK/SOFTEK front wheel alignment specifications can be found in the Appendix (A-5 and A-6) of this technical publication.

Check the total vehicle wheel alignment when the following occur:

- Every 80,000 to 100,000 miles, or 12–18 months (normal maintenance).
- When the vehicle does not steer correctly.
- To correct a tire wear condition.
- There are two types of front wheel alignment:
  1. *Minor alignment* – a minor front wheel alignment is done for all normal maintenance conditions, see below.
  2. *Major alignment* – a major alignment is done when uneven or excessive tire wear is evident, or response at the steering wheel is sluggish, or the need for major wheel alignment check and adjustment is required, see below.

MINOR FRONT WHEEL ALIGNMENT

Perform the minor front wheel alignment in the following sequence:

1. Inspect all systems that affect wheel alignment. Refer to "Inspection Prior to Alignment" in this section.
2. Check the wheel bearing end play.
3. Check and adjust toe.
4. Check and adjust the vehicle ride height as specified in the Preventive Maintenance Section of this publication.

MAJOR FRONT WHEEL ALIGNMENT

Be certain to follow wheel alignment inspection intervals as specified by the original equipment manufacturer. Before performing a major front wheel alignment it is recommended that alignment equipment calibration be checked to insure 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 (see "Steering Stop Procedure" in this section). See Figures 8-1 and 8-2.

Figure 8-1

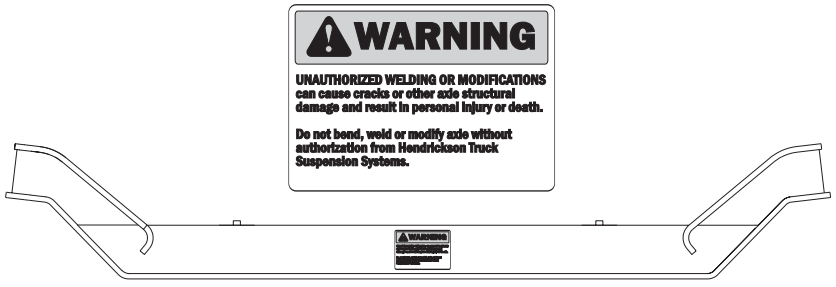
Figure 8-2

3. If the vehicle has power steering, check and adjust, if necessary, the pressure relief in the power steering system. Refer to "Adjusting the Pressure Relief in the Power Steering System" (see Vehicle Manufacturer's Specifications), see Steer Stops in the Alignment and Adjustment Section of this publication.
4. Check the turning angle. Refer to OEM specifications.
5. Check the kingpin (or steering axis) inclination. Refer to "Kingpin Inclination", in the Definitions under the Alignment and Adjustment Section of this publication.

⚠ 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 APPLICABLE WARRANTIES. A BENT AXLE BEAM CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE. SEE FIGURE 8-3.

Figure 8-3



6. Check the camber angle. Do not attempt to adjust. Refer to "Camber Angle in the Definitions under the Alignment and Adjustment Section of this publication.
7. It is necessary to verify that all ride heights (front and rear) are within specifications prior to checking caster to get an accurate caster reading.
8 Check and adjust caster angle. Refer to "Caster Angle" in the Definitions under the Alignment and Adjustment Section of this publication.

NOTE The use of two different angle caster shims will not change cross caster. Cross caster is the difference between the caster readings for left and right side of the vehicle.

9. Check and adjust toe-in, refer to adjusting the Toe-In under "Definitions" under the Alignment and Adjustment Section of this publication.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

SPRING EYE RE-TORQUE

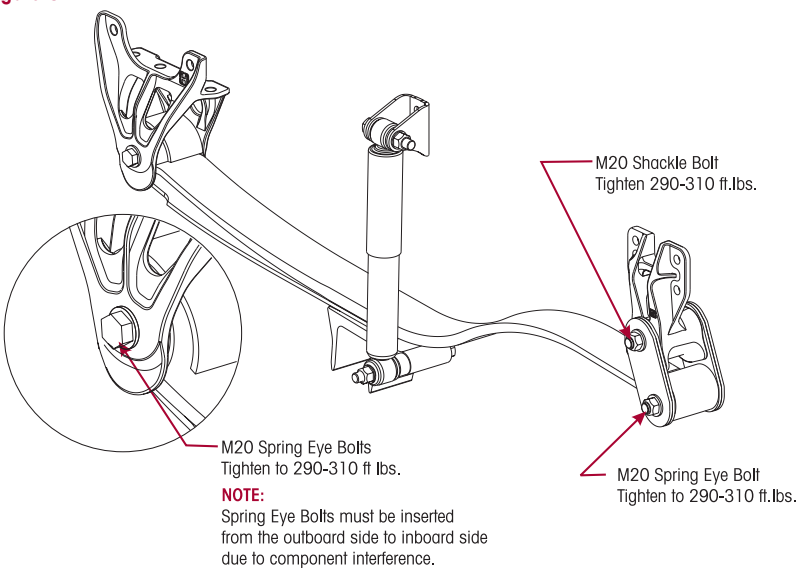
This procedure to re-torque is necessary when replacing

- Front hanger
- Shackle assembly
- Steel leaf spring assembly

AIRTEK RE-TORQUE PROCEDURE

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

Figure 8-4



3. Loosen all six (6) front and rear spring eye bolts, see Figure 8-4.

NOTE Do not remove the spring eye bolts.

4. Let the suspension settle.
5. Tighten the front M20 spring eye bolt locknuts to 290 to 310 foot pounds torque.
6. Tighten the rear M20 spring eye bolt and shackle bolt locknuts to 290 to 310 foot pounds torque.
7. Affix a straight edge to the bottom of the frame rail in front of the air spring, see Figure 8-5.
8. 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.
9. Measure the difference from one side to the other.
10. Do a road test and repeat measurement steps 7 to 9.
11. If the measurement is less than 3/8" the vehicle is level. If measurement is more than 3/8" contact Hendrickson Tech Services.

SOFTEK RE-TORQUE PROCEDURE

1. Chock the wheels.
2. Loosen all six (6) front and rear spring eye bolts, see Figure 8-4.

NOTE Do not remove the spring eye bolts.

3. Let the suspension settle.
4. Tighten the front M20 spring eye bolt locknuts to 290 to 310 foot pounds torque.
5. Tighten the rear M20 spring eye bolt and shackle bolt locknuts to 290 to 310 foot pounds torque.
6. Affix a straight edge to the bottom of the frame rail behind frame hanger , see Figure 8-5.
7. With the vehicle on a level surface measure the distance from the top of the straight edge to the ground on both sides of the vehicle and record the measurements.
8. Measure the difference from one side to the other.
9. Do a road test and repeat measurement steps 7 to 9.
9. If the measurement is less than 3/8" the vehicle is level. If measurement is more than 3/8" contact Hendrickson Tech Services.

Figure 8-5

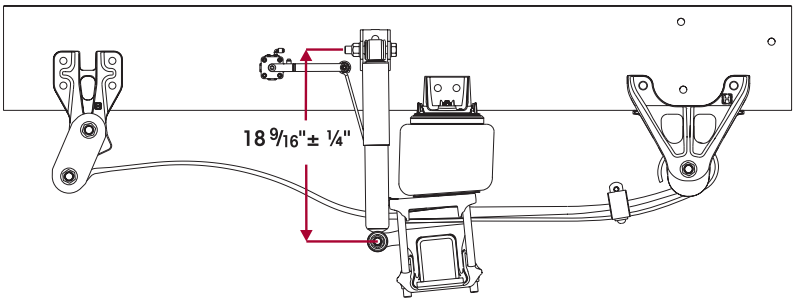
AIRTEK RIDE HEIGHT ADJUSTMENT

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.

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. Prior to adjusting the height control valve, clean the threads of the ¼" valve mounting fasteners to remove any debris and corrosion.
   - The above procedure should also be performed in the event an air leak is detected in the height control valve. If air continues to leak after the socket head cap screws have been properly re-tightened, the height control valve should be replaced.
5. 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.

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

Figure 8-6

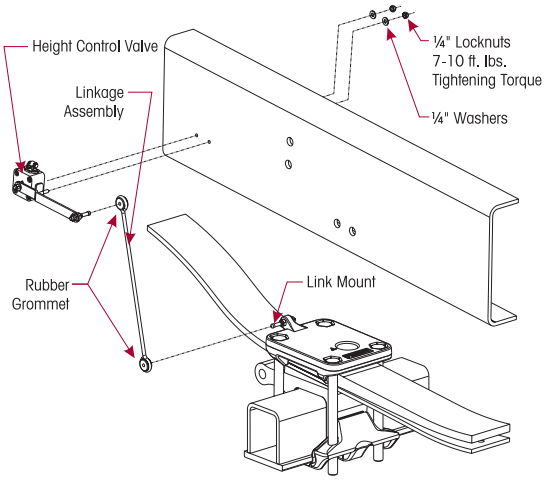


8. The reference ride height measurement is 18 9/16" ± ¼". See Figure 8-6. If the reference measurement is not within 18 9/16" ± ¼", the ride height MUST be adjusted. See chart below.

MODEL	AIRTEK		COMFORT AIR	
Blue Bird Vision	RIDE HEIGHT	SHOCK ABSORBER LENGTH	RIDE HEIGHT	SHOCK ABSORBER LENGTH
	From the bottom of the frame to the center of axle	At ride height with a tolerance of ¼"	From the bottom of the frame to the bottom of the main support member.	At ride height with a tolerance of ¼"
	12½"	18 9/16"	4 7/8"	22¾"

9. Detach the upper grommet of the height control valve linkage from the stud on the leveling valve arm and exhaust suspension system air.

Figure 8-7



10. Adjust the height control valve by loosening the ¼" mounting locknuts and pivoting the valve body about the mounting bolt.

NOTE 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.

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

12. Tighten the ¼" mounting locknuts to 8-10 foot pounds, (see Figure 8-7) and repeat steps 4 through 10 until the reference measurement equals 18 9/16" ± ¼". See Figure 8-6.

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.

HEIGHT CONTROL VALVE TEST

The height control valve test can be done with Barksdale Test Kit (Model 55521).

KIT CONTENTS

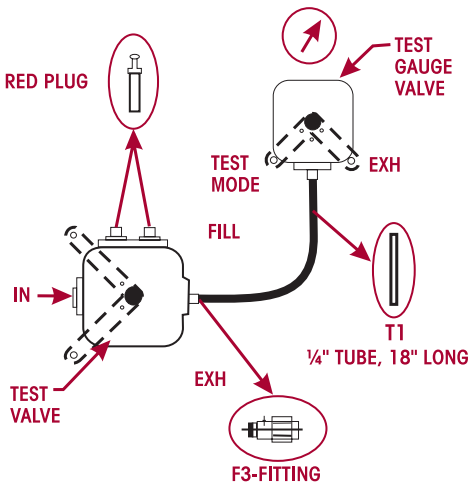
QTY.	DESCRIPTION	QTY.	DESCRIPTION
1	Gauge	1	Tool
1	(F3) Fitting	2	Plug
1	Flush plug	1	Fitting
1	Valve	1	O-Ring
1	(T1) Tubing ¼"		

HEIGHT CONTROL VALVE TEST INSTRUCTIONS

1. Disconnect linkage from valve handle.
2. Lower height control valve linkage arm down to exhaust air from the suspension system.
3. Remove the tubing from both air spring ports, see Figure 8-8. Place supplied tool around the tubing, press down to pull out tubing. **DO NOT CUT THE TUBING.**
4. Install the red plugs supplied into the air spring ports.
5. Use needle nose pliers to remove the "flapper" from the valve exhaust port.

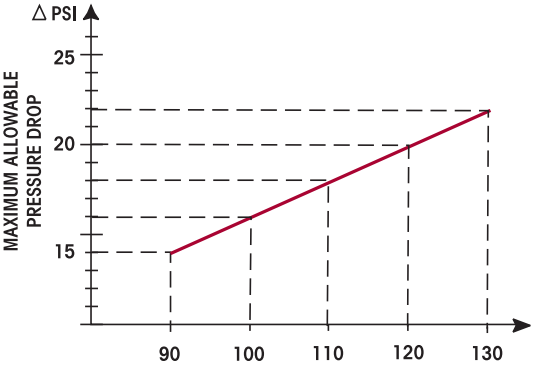
Figure 8-8

DIAGRAM



6. Install hex fitting F3 (the one with a small pin protruding) into the exhaust port. To install hex fitting into exhaust port align pin on fitting with slot on exhaust port, push in and rotate clockwise to stop.
7. Connect one end of the tubing (T1) to this port and one end into the test gauge valve.
8. Rotate the test gauge valve handle to test mode. See diagram in Figure 8-8.
9. Rotate handle on valve being tested to fill mode.
10. Observe pressure reading for a period of 30 seconds.
11. Refer to chart for maximum allowable pressure drop vs. inlet pressure in 30 seconds, see Figure 8-9. The valve is good if the maximum pressure amount is not exceeded.

Figure 8-9



PRESSURE DROP VS. INLET PRESSURE IN 30 SECONDS. FOR LEAKAGE RATE OF 50 cc/min

12. Rotate vehicle valve handle to exhaust mode.
13. Rotate test gauge valve handle to test mode. Repeat steps 10, 11.
14. Replace valve if maximum allowable drop is exceeded.

    This test is complete. Remove test gauge valve and fitting from the exhaust port. Remove the red plugs from the air spring ports. Reconnect the air spring tubing to the valve, ensuring that the air lines are pushed fully into the PTC fittings. Reconnect the linkage to the valve handle. Suspension height will automatically return to the correct position.

TOE SETTING

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

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

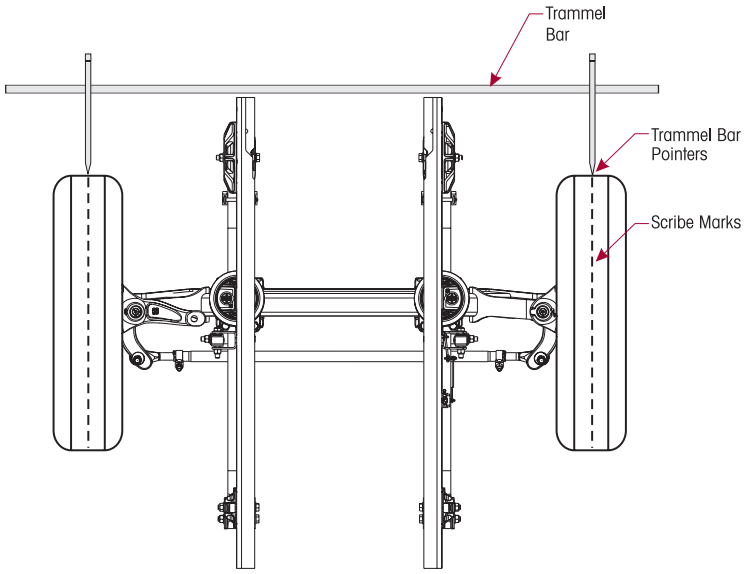
7. Use a trammel bar and measure the distance between the scribe marks at the rear of the steer axle tires. Record the measurement.
8. Install the trammel bar and measure the distance between the scribe marks at the front of the steer axle tires. Record the measurement. See Figure 8-10.

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

9. To calculate the toe setting subtract the front measurement from the rear measurement, the difference between the two will equal the toe in/toe out measurement.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

Figure 8-10

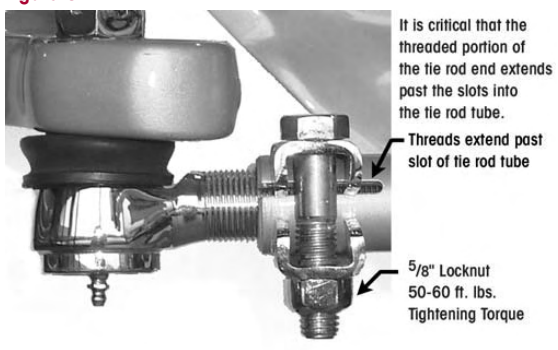


10. If the toe measurement is not within the specifications of 1/16" ± 1/32" (.060 ± .030), it will be necessary to adjust the toe setting. Refer to the following procedure.
    a. Loosen the tie rod cross tube clamp bolts and locknuts.
    b. Turn the tie rod cross tube until the specified toe-in distance is achieved.

⚠ WARNING

IT IS CRITICAL THAT THE THREADED PORTION OF THE TIE ROD END EXTENDS PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 8-11. FAILURE TO DO SO CAN CAUSE COMPONENT TO FAIL CAUSING LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

Figure 8-11



    c. Tighten the bolt and locknut on the tie rod cross tube to 50-60 foot-pounds torque.

11. Repeat steps 1-9 until the correct toe setting is achieved.

STEERING STOP

ADJUSTMENT PROCEDURE

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

The steering stop adjustment procedure is as follows:

1. Drive vehicle on turntables and chock the rear wheels.
2. Measure the wheel cut. The wheel cut is determined by steering the tires. Wheel cut is measured at the inside wheel only, therefore the tires must be turned to the full lock position for each right hand and left hand direction. Refer to the vehicle manufacturer for exact specifications. See Figure 8-12 and 8-13.

Figure 8-12

Figure 8-13

3. Increase the wheel cut by by loosening the jam nuts and screw the axle stops in clockwise.
4. Tighten the jam nuts.

NOTE

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

Figure 8-14

5. Decrease the wheel cut by loosening the jam nuts and screw the axle stops out counter–clockwise.
6. Tighten the jam nuts to 40 to 60 foot-pounds.
7. Measure the wheel cut and check the tie rod clearance.

⚠ WARNING

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

WHEEL END ADJUSTMENT

This procedure follows the guidelines of TMC RP 618.

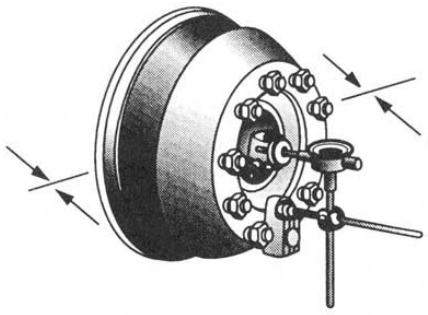
1. Lubricate the bearing with clean axle lubricant of the same type used in the hub assembly.
2. After the wheel hub and bearings are assembled on the spindle, tighten the inner (adjusting) nut to 200 foot pounds torque while rotating the wheel hub assembly.
3. Back off the inner (adjusting) nut one full turn. Rotate the wheel.
4. Re-tighten the inner (adjusting) nut to 50 foot pounds torque while rotating the wheel hub assembly.
5. Back off the inner (adjusting) nut one third turn.
6. Install the locking washer. If dowel pin and washer are not aligned, remove the washer and turn it over and reinstall. If required, loosen the inner (adjusting) nut just enough for alignment.

CAUTION NEVER TIGHTEN THE INNER (ADJUSTING) NUT FOR ALIGNMENT AT THIS POINT OF THE PROCEDURE. THIS MAY PRE-LOAD THE BEARING AND CAUSE PREMATURE FAILURE.

7. Install and tighten the outer (jam) nut to 200 foot pounds torque.

NOTE This adjustment allows the wheel to rotate freely with 0.001" to 0.005" end play.

Figure 8-15



With indicator mounted at bottom push/pull at sides of drum

8. Verify end play with a dial indicator. See Figure 8-15. Wheel end play is the free movement of the wheel assembly along the spindle axis.
   a) Make sure the brake drum to hub fasteners are tightened to the manufacturers specifications.
   b) Attach a dial indicator with its magnetic base to the hub or brake drum.
   c) Adjust the dial indicator so that its plunger or pointer is against the end of the spindle with its line of action parallel to the axis of the spindle.
   d) Grasp the wheel assembly at the 3 o'clock and 9 o'clock positions. Push the wheel in and out while oscillating it to seat the bearings. Read bearing end play as the total indicator movement.

NOTE If end play is not within specification, readjustment is required.

9. Re-adjustment Procedure

   Excessive End Play

   If the end play is too loose, remove the outer (jam) nut and pull the washer away from the inner (adjusting) nut, but not off the spindle. Tighten the inner (adjusting) nut to the next alignment hole of the washer. Reassemble the washer and re-tighten the outer (jam) nut to 200 foot pounds torque. Verify end play with a dial indicator.

Insufficient End Play

If end play is not present, remove the outer (jam) nut and pull the washer away from the inner (adjusting) nut, but not off the spindle. Loosen the inner (adjusting) nut to the next alignment hole of the washer. Re-assemble the washer and re-tighten the outer (jam) nut to 200 foot pounds torque. Verify end play with a dial indicator.

Fine Tuning Adjustment

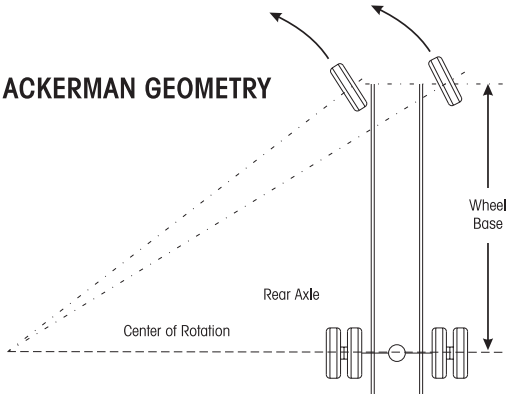
If after performing the readjustment procedures, end play is 0.004"-0.005" range, repeat the appropriate procedures, removing the washer from the spindle, tighten or loosen the inner (adjusting) nut the equivalent of ½ of an alignment hole, or reversing the alignment washer, and re-installing it onto the spindle. Reassemble and re-tighten the outer (jam) nut to 200 foot pounds torque. Verify end play with a dial indicator.

Secure outer nut by bending one washer tang over the outer nut.

⚠ CAUTION BEFORE OPERATING THE VEHICLE, THE WHEEL HUB CAVITIES AND BEARINGS MUST BE LUBRICATED TO PREVENT FAILURE.

ALIGNMENT DEFINITIONS

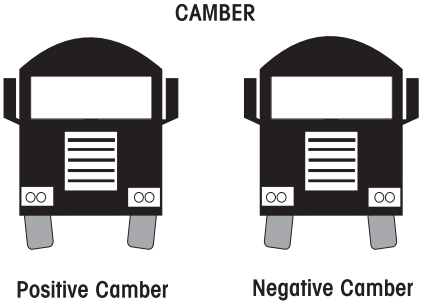
Figure 8-15



Ackerman Steering Geometry The geometry of the four bar linkage consisting of the front axle beam, pivot points, and tie rod assembly, attempts to provide free rolling of front tire in a turn. Ackerman 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 8-16



Camber — The angle formed by the inward or outward tilt of the wheel relative to its vertical axis. 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.

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Caster — The forward or rearward tilt of the steering axle kingpin relative to its vertical axis. The tilt angle is measured in degrees. Caster is positive when the top of the kingpin is titled rearward and is negative when the top of the kingpin is tilted forward. Proper caster is important for directional stability and wheel 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. Insufficient positive camber may result in vehicle wander.

Figure 8-17

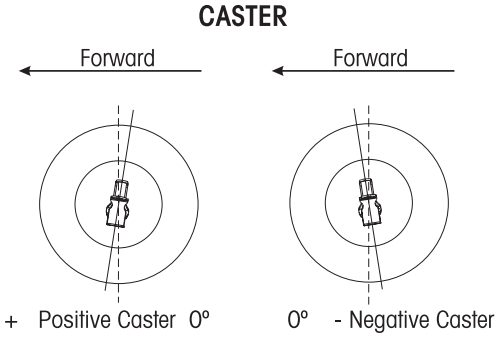
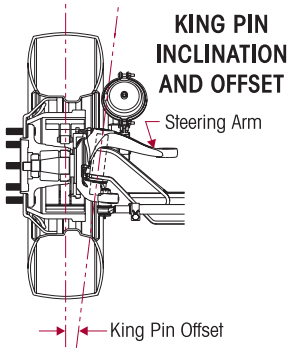


Figure 8-18

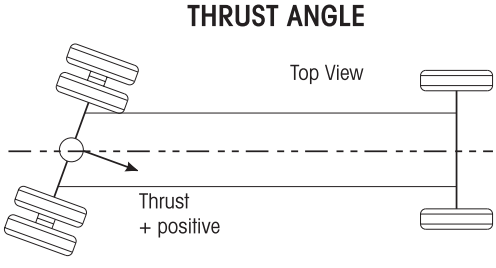


Kingpin Inclination (KPI) — The inward tilt of the kingpin from the vertical. This front suspension parameter has a pronounced effect on steering effort and returnability. As the front wheels are turned around an inclined kingpin, the front of the vehicle is lifted. This lifting of the vehicle is experienced 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 8-19

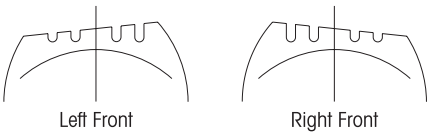


Thrust Angle, Tracking, or Square The angle formed by the centerline of the vehicle frame (geometric centerline) and the direction that an axle points. As indicated by the term "square", the ideal value for the angle is 0° or when the axle centerline is at 90° or perpendicular to the geometric centerline. 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 (Ackerman-Arm, Cross Tube Arm) — The component that transmits steering forces between left and right axle knuckle assemblies through the cross tube assembly.

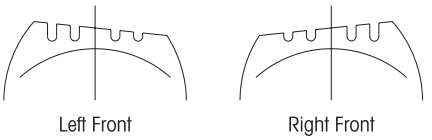
Figure 8-20



TOE IN

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

Figure 8-21

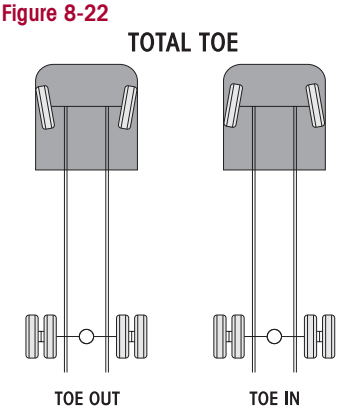


TOE OUT

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

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

Figure 8-22



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.

SECTION 9

Component Replacement

FASTENERS

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

SPACERS

Due to the inherent weight bias on the left side of a vehicle, Hendrickson has installed a 10 mm spacer between the leaf spring and the upper axle wrap of the standard model "C" type chassis equipped with either the AIRTEK or SOFTEK to compensate the differential weight. The spacer is an extruded aluminum component in the shape of the letter "W". The unique shape identifies the spacer as being exclusive to Blue Bird.

- In the case of the flat floor model chassis, an additional two inches of ride height is required. In order to accommodate the additional height, "W" spacers have been installed on both sides of the suspension. A 50 mm spacer is placed on the right side of the chassis, and a 60 mm spacer is placed on the left.

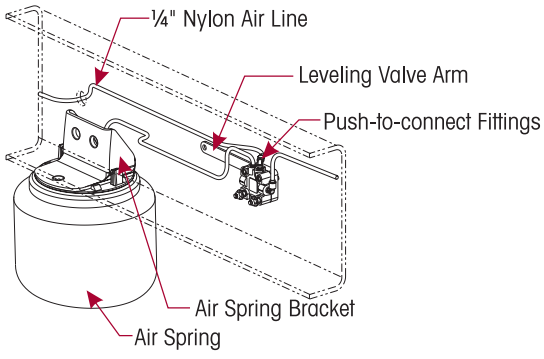
When servicing the suspension, ensure the correct spacer is installed in the proper location.

AIRTEK – HEIGHT CONTROL VALVE

DISASSEMBLY

1. Drain the air from the secondary air tank.
2. Deflate the air springs by removing the height control valve linkage at the rubber grommet and lowering the height control linkage arm. This will exhaust the air pressure in the air springs.

Figure 9-1



⚠ 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.

3. Remove the 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.

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4. Remove the two ¼" mounting nuts and washers.
5. 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.

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 (18½", measured at the shock absorber). See the Alignment and Adjustment Section in this publication for proper ride height adjustment.
6. Tighten the ¼" locknuts to 7-10 foot pounds torque.

Figure 9-2

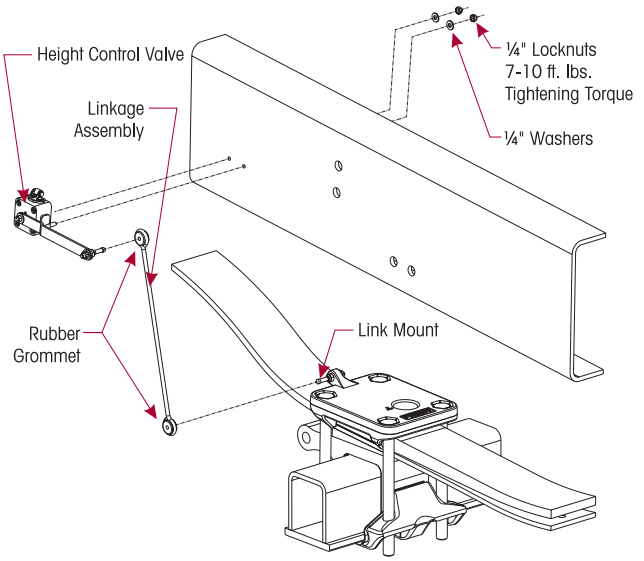
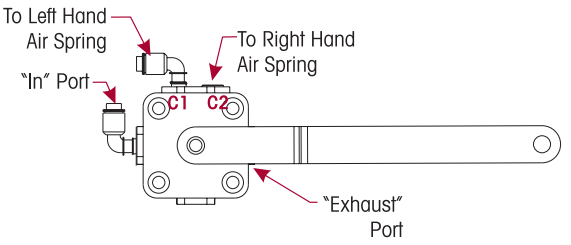


Figure 9-3



AIRTEK – AIR SPRING

DISASSEMBLY

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

⚠ WARNING

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

4. 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 COULD RESULT IN THE PUSH-TO-CONNECT FITTING FAILING TO SEAL WITH THE AIR LINE.

5. Disconnect the air line to the air spring.
6. Raise the frame to allow for air spring removal.
7. 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.
8. Apply upward pressure between the base of the air spring and the top pad casting. This will dislodge the air spring from the top pad casting. See Figure 9-5.
9. Remove the air spring.

Figure 9-4

Figure 9-5

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

ASSEMBLY

1. Insert the air spring into the top pad casting. Make sure the lock tabs click in place.
2. 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.
3. 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.

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.

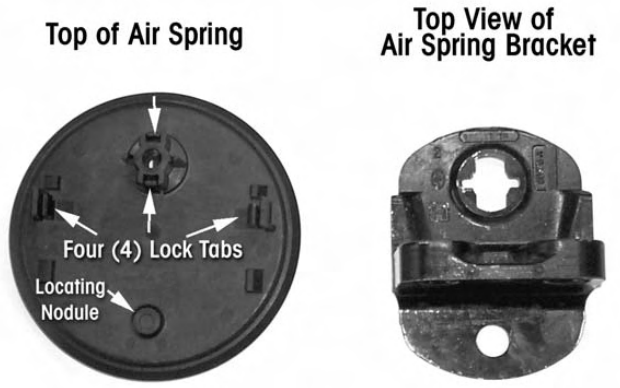
4. Install the air line into the air spring.

⚠ WARNING

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

5. Air up the suspension.
6. Check the air spring for leaks.
7. Check the ride height and adjust if necessary. See the Maintenance Section of this publication for the proper ride height adjustment.
8. Remove the wheel chocks.

Figure 9-6



AIRTEK – FRONT LEAF SPRING HANGER

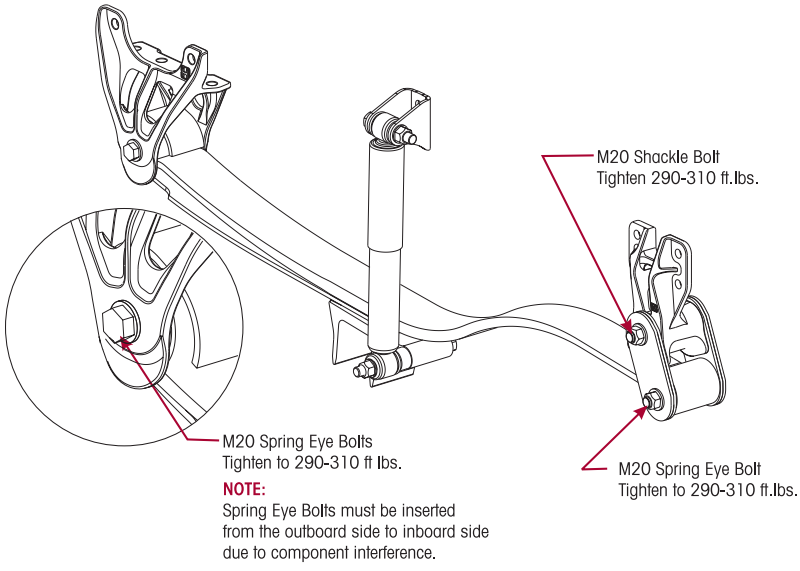
DISASSEMBLY

1. Raise the frame.
2. Suspend the front axle from the shock absorbers.
3. Support frame with frame stands.
4. Deflate the air springs by removing the height control valve linkage and lowering the leveling valve arm. This will exhaust the air pressure in the air springs.
5. Remove the air lines from air springs.
6. Remove the M20 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.

7. Remove the frame mounting fasteners from the hanger. See manufacturer's guidelines.
8. Remove the hanger from the vehicle, see Figure 9-7.

Figure 9-7



ASSEMBLY

1. Install the new hanger on the frame.
2. Install new frame fasteners. Follow manufacturer's guidelines.
3. Install the new M20 spring eye bolt from the outboard side of the hanger (see Figure 9-7), washers and locknut.
4. Remove the frame stands and lower frame.
5. Install the air lines into the air springs.
6. Install the height control valve linkage and inflate the suspension to normal operating pressure.
7. Tighten M20 locknut to 290 to 310 foot pounds torque.

SOFTEK – FRONT LEAF SPRING FRAME HANGER

DISASSEMBLY

1. Raise the frame.
2. Support the frame with frame stands.
3. Suspend the front axle from the shocks.
4. Remove the M20 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.

5. Remove the frame mounting fasteners from the hanger. See manufacturer's guidelines.
6. Remove the hanger from the vehicle, see Figure 9-7.

ASSEMBLY

1. Install the new hanger on the frame.
2. Install new frame fasteners. Follow manufacturer's guidelines.
3. Install the new M20 spring eye bolt from the outboard side of the hanger (see Figure 9-7), washers and locknut.
4. Remove the frame stands and lower frame.
5. Tighten M20 locknut to 290 to 310 foot pounds torque.

AIRTEK – REAR SHACKLE FRAME BRACKET

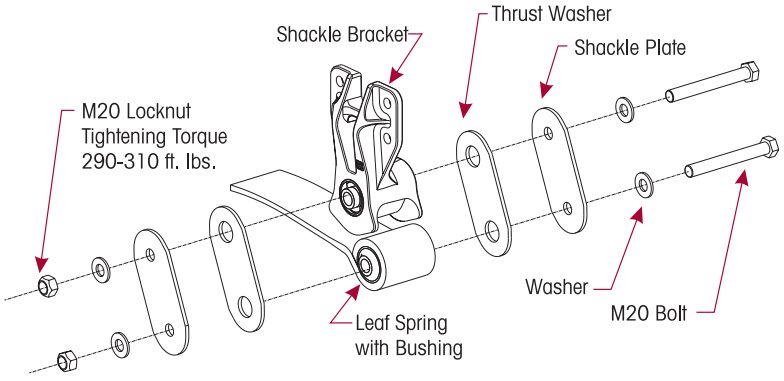
DISASSEMBLY

1. Raise the frame.
2. Suspend the front axle from the shocks.
3. Support the frame with frame stands.
4. Deflate the air springs by removing the height control valve linkage and lowering the leveling valve arm. This will exhaust the air pressure in the air springs.
5. Remove the air lines from air springs.
6. Remove the rear M20 spring eye and shackle pivot bolts, washers and locknuts.

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

7. Remove the frame fasteners from the shackle bracket. See manufacturer's guidelines.
8. Remove the shackle bracket from the vehicle, see Figure 9-8.
9. Inspect the shackle assembly and both thrust washers for excessive wear or damage. See Thrust Washer Inspection in the Maintenance Section of this publication. Hendrickson recommends the thrust washers be replaced when this assembly is serviced.
10. If damaged or worn excessively, replace with Genuine Hendrickson Parts as detailed in the Component Replacement Section of this publication.

Figure 9-8



ASSEMBLY

1. Install the shackle bracket on the frame.
2. Install new frame fasteners. Follow manufacturer's guidelines.
3. Install the thrust washers and shackle plates with the M20 bolts, washers and locknuts.
4. Remove the frame stands and lower frame.
5. Install the air lines into the air springs.
6. Install the height control valve linkage and inflate the suspension to normal ride height.
7. Tighten M20 locknuts to 290 to 310 foot pounds torque. See Figure 9-8.

SOFTEK – REAR SHACKLE FRAME BRACKET

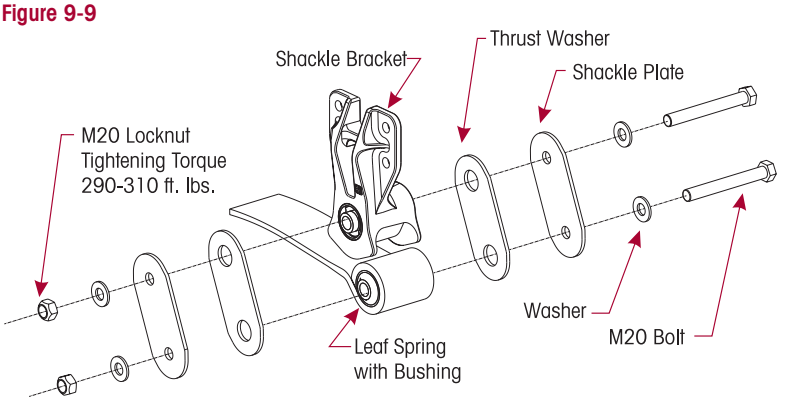
DISASSEMBLY

1. Raise the frame.
2. Support the frame with frame stands.
3. Suspend the front axle from the shocks.
4. Remove the rear M20 spring eye and shackle pivot bolts, washers and locknuts.

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

5. Remove the frame fasteners from the shackle bracket. See manufacturer's guidelines.
6. Remove the shackle bracket from the vehicle, see Figure 9-8.
7. Inspect the shackle assembly and both thrust washers for excessive wear or damage. See Thrust Washer Inspection in the Maintenance Section of this publication. Hendrickson recommends the thrust washers be replaced when this assembly is serviced.
8. If damaged or worn excessively, replace with Genuine Hendrickson Parts as detailed in the Component Replacement Section of this publication.

Figure 9-9

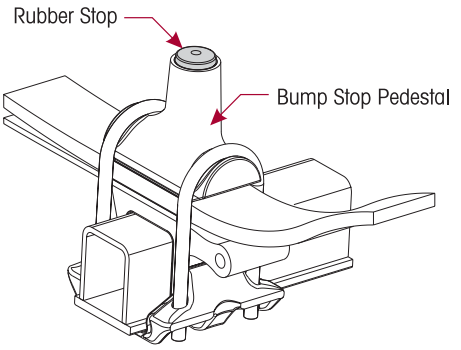


ASSEMBLY

1. Install the shackle bracket on the frame.
2. Install new frame fasteners. Follow manufacturer's guidelines.
3. Install the thrust washers and shackle plates with the M20 bolts, washers and locknuts. See Figure 9-9.
4. Remove the frame stands and lower frame.
5. Tighten M20 locknuts to 290 to 310 foot pounds torque.

SOFTEK – RUBBER AXLE STOP

Figure 9-10



REMOVAL

1. Insert a small pry bar between the rubber stop and the inside of the bump stop pedestal.
2. Apply downward force on the pry bar and pull the rubber stop out of the bump stop pedestal. See Figure 9-10.
3. Inspect the bump stop pedestal and frame rail flange for any contact damage.
4. Clean any debris from inside the bump stop pedestal.

INSTALLATION

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

AIRTEK – THRUST WASHERS

DISASSEMBLY

1. Chock the wheels.
2. Raise the frame.
3. Support the frame with frame stands.
4. Deflate the air springs by removing the height control valve linkage and lowering the leveling valve arm. This will exhaust the air pressure in the air springs.
5. Remove the air lines from the air springs.
6. Suspend the front axle from the shocks.
7. Remove the M20 spring eye and shackle pivot bolts, washers and locknuts.
8. Remove the shackle plates and thrust washers.

ASSEMBLY

1. Install the NEW thrust washers and shackle plates with the M20 bolts, washers and locknuts. See Figure 9-9.
2. Remove frame stands and lower frame.
3. Install air lines into the air springs.
4. Install the height control valve linkage and inflate the suspension to normal ride height.
5. Tighten M20 locknuts to 290 to 310 foot pounds torque.

SOFTEK – THRUST WASHERS

DISASSEMBLY

1. Chock the wheels.
2. Raise the frame.
3. Support the frame with frame stands.
4. Suspend the front axle from the shocks.
5. Remove the M20 spring eye and shackle pivot bolts, washers and locknuts.
6. Remove the shackle plates and thrust washers.

ASSEMBLY

1. Install the NEW thrust washers and shackle plates with the M20 bolts, washers and locknuts. See Figure 9-9.
2. Remove frame stands and lower frame.
3. Tighten M20 locknuts to 290 to 310 foot pounds torque.

AIRTEK – LEAF SPRING

Hendrickson recommends that when replacing spring and wrap leaf assemblies, ensure they have the same camber designation. The camber designation is located on the top front limb of the spring and will be defined with a (+), (0), or a (-) camber.

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

DISASSEMBLY

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Raise the frame.
4. Support the frame with frame stands.
5. Deflate the air springs by removing the height control valve linkage and lowering the height control valve arm. This will exhaust the air pressure in the air springs.

⚠ CAUTION THE PUSH-TO-CONNECT FITTINGS ARE NOT REPLACEABLE. 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.

6. Disconnect the air lines at the air springs.
7. Suspend the front axle to remove the load from leaf spring assembly.
8. Remove the air spring (see Air Spring disassembly in this section).
9. Remove the front and rear M20 spring eye bolts washer and locknuts. Loosen the M20 shackle pivot bolt.

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

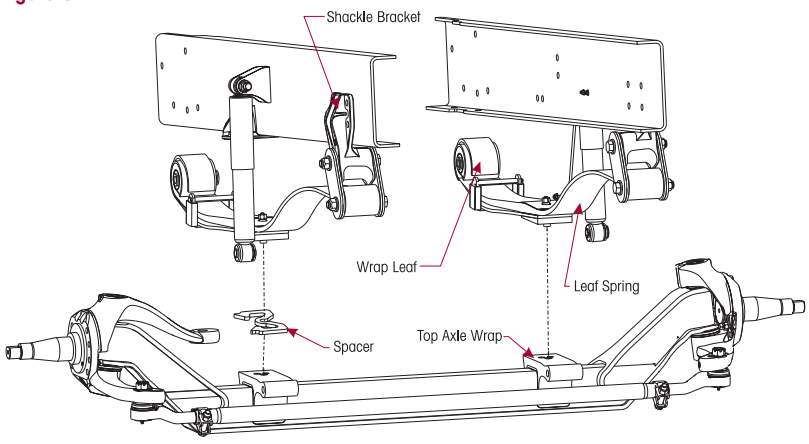
10. Remove the ¾" clamp group locknuts and discard.

⚠ 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.

11. Remove the ¾" clamp group bolts, the top pad casting, galvanized liner and the bottom axle wrap and liner. Discard the clamp group bolts. See Figure 9-33.
12. Remove the spring assembly.

Figure 9-11



ASSEMBLY

1. Install the new spring and wrap leaf assembly on the axle. Verify the center bolt is located properly in the top axle wrap and spacer (if equipped). See Figure 9-11.
2. Install the new galvanized liner and the top pad casting onto the spring.
3. Remove and replace the bottom axle wrap liner located in bottom axle wrap.
4. Install the bottom axle wrap.
5. Install the new ¾" clamp group bolts, washers, and locknuts. The locknuts must be replaced when the clamp group is removed, to prevent premature bolt fatigue.
6. Snug the clamp group, DO NOT torque at this time.
7. Raise the axle and the spring assembly into the front hanger and rear shackle assembly.
8. Install the M20 spring eye bolts, washers and locknuts. Snug bolts. Do not tighten.
9. Insure that the clamp group is properly aligned and the hex bolts are seated in the top pad casting, and the bottom axle wrap is centered with the top axle wrap. See Figure 9-12.

Figure 9-12

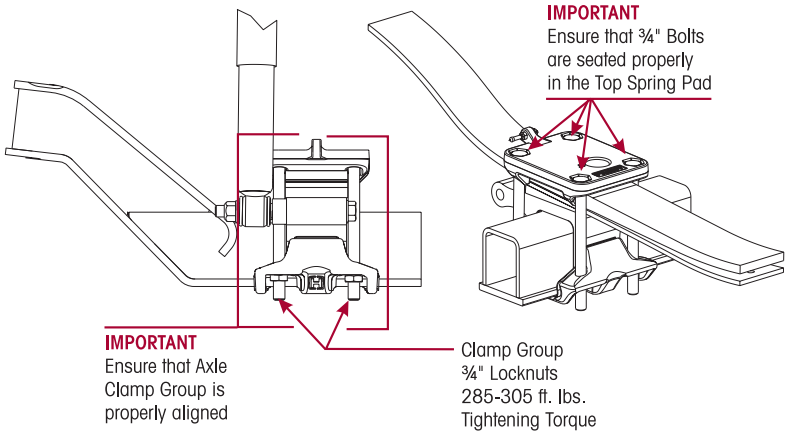
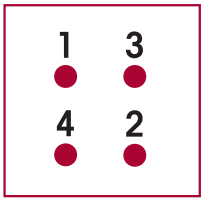
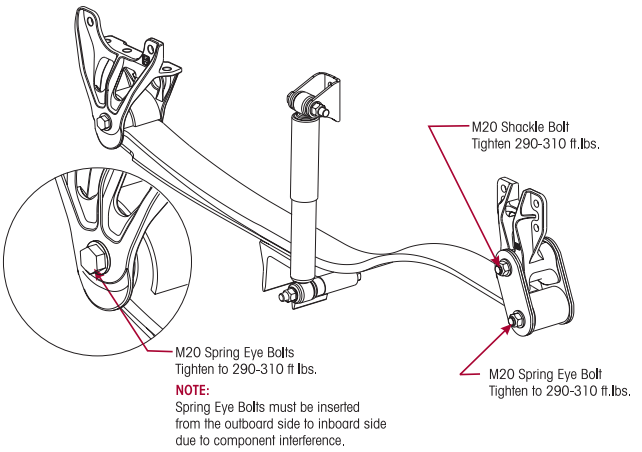


Figure 9-13



10. Tighten the clamp group locknuts evenly to 385-305 foot pounds torque in the proper sequence, see Figure 9-13.
11. Install air spring.
12. Install air lines, and air up system.
13. Remove the frame supports and load the front axle with the vehicle weight.
14. Verify proper ride height. See Alignment and Adjustment Section in this publication.
15. Tighten the M20 spring eye bolt locknuts to 290 to 310 foot pounds. See Figure 9-14.

Figure 9-14



SOFTEK — LEAF SPRING

Hendrickson recommends that when replacing spring and wrap leaf assemblies, ensure they have the same camber designation. The camber designation is located on the top front limb of the spring and will be defined with a (+), (0), or a (-) camber.

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 M20 spring eye bolts washer and locknuts. Loosen the M20 shackle pivot bolt.

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

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

⚠ WARNING

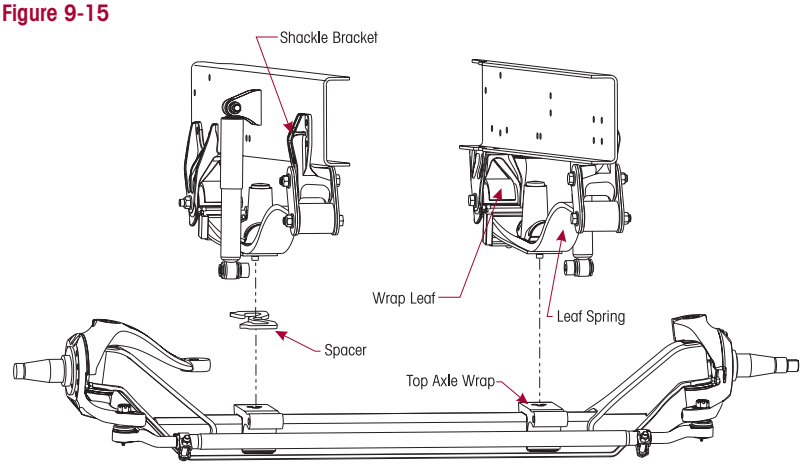
DO NOT USE A CUTTING TORCH TO REMOVE CLAMP GROUP BOLTS OR ATTACHING FASTENERS. THE USE OF SUCH HEAT ON SUSPENSION COMPONENTS CAN ADVERSELY AFFECT THE STRENGTH OF THESE PARTS. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

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.

11. Remove the top pad casting, galvanized liner and the bottom axle wrap. See Figure 9-39.
12. Remove the spring assembly.

Figure 9-15

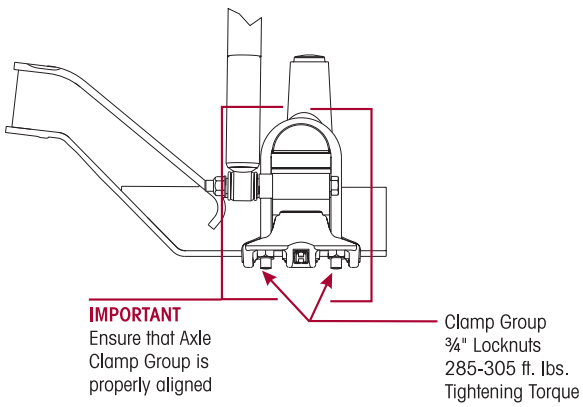


ASSEMBLY

1. Install the new spring and wrap leaf assembly on the axle. Verify that the center bolt is located properly in the top axle wrap and spacer (if equipped). See Figure 9-15
2. Install the new galvanized liner and the top pad casting onto the spring.
3. Remove and replace the bottom axle wrap liner located in bottom axle wrap.
4. Install the bottom axle wrap..
5. Install the new ¾" clamp group U bolts, washers, and locknuts. The locknuts must be replaced when the clamp group is removed, to prevent premature bolt fatigue.
6. Snug the clamp group, **DO NOT** torque at this time.
7. Raise the axle and the spring and wrap leaf assembly into the front hanger and rear shackle assembly.
8. Install the M20 spring eye bolts, washers and locknuts. Snug bolts. Do not tighten.

Figure 9-16

9. Insure that the clamp group is properly aligned and the U bolts are seated in the top pad casting, and the bottom axle wrap is centered with the top axle wrap. See Figure 9-16.



10. Tighten the clamp group locknuts evenly to 285-305 foot pounds torque in the proper sequence, see Figure 9-17.
11. Remove the frame supports and load the front axle with the vehicle weight.
12. Tighten the M20 spring eye bolt locknuts to 290 to 310 foot pounds torque. See Figure 9-18.

Figure 9-17

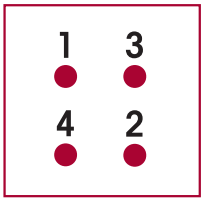
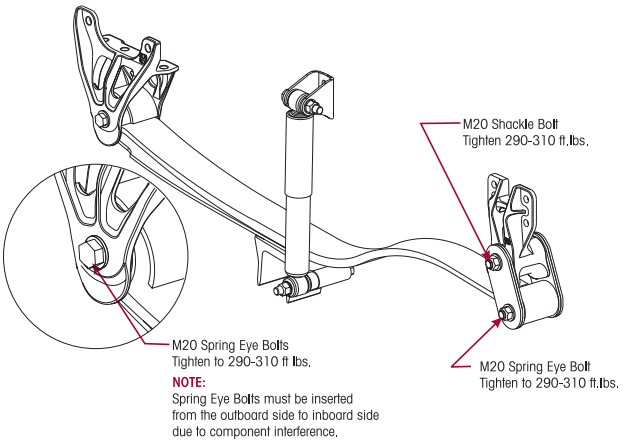


Figure 9-18



SPRING EYE BUSHINGS

The spring eye bushings for the AIRTEK and SOFTEK spring and wrap leaf assemblies are designed to provide extended service life. If a premature failure occurs careful consideration must be given to the contributing factor that made the bushing fail. This must be corrected in order to prevent the new bushing from failing in the same manner. The front and rear bushings are permanently installed in the spring leaf and are not serviceable. If a bushing fails prematurely, the spring and wrap leaf assembly must be replaced. Follow the procedure for the Front Leaf Spring removal in the Component Replacement Section of this manual.

SHOCK ABSORBER

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

DISASSEMBLY

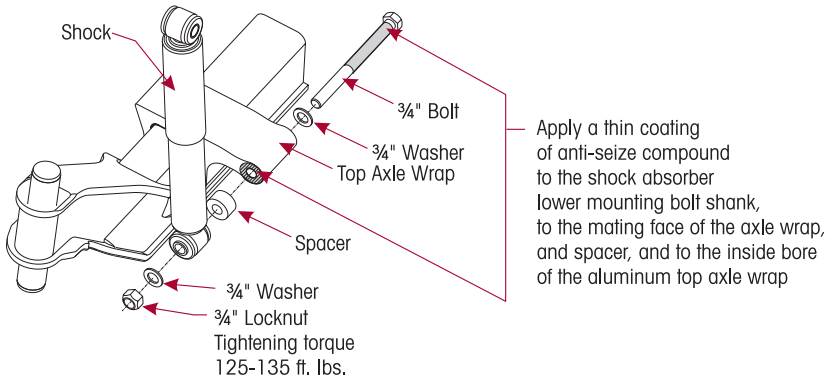
1. Remove the ¾" lower mounting bolt, fasteners, and spacer.
2. Remove the ¾" upper mounting bolt and fasteners.
3. Slide out the shock absorber out of the upper bracket and off of the lower mounting bolt.
4. Inspect the shock absorber mounting brackets and hardware for damage or wear, replace as necessary.

ASSEMBLY

1. Install the shock absorber into the upper mounting bracket.
2. Install the upper ¾" shock mounting bolt, washers and locknut.

3. 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.
4. Install the lower ¾" bolt from the inboard side to the outboard side of the top axle wrap and attach the spacer, washer, and locknut. See Figure 9-19.
5. Tighten both upper and lower ¾" locknuts to 125-135 foot pounds torque. See Figure 9-19

Figure 9-19



AIRTEK BOTTOM AXLE WRAP

DISASSEMBLY

1. Chock the wheels
2. Support the frame with frame stands.
3. Deflate the air springs by disconnecting the height control valve linkage and lowering the height control valve arm. This will exhaust the air pressure in the air springs.

⚠ WARNING

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

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.

4. Remove ¾" hex bolts, washers and locknuts. Removal of the air spring will be required. See Air Spring Replacement instructions in this section. Discard fasteners.
5. Remove bottom axle wrap. It may be necessary to use a dead blow mallet to dislodge axle wrap.
6. Once removed inspect axle wrap for damage. Replace if necessary.
7. Discard used bottom axle wrap liner.

ASSEMBLY

1. Install new bottom axle wrap liner into bottom axle wrap.
2. Install bottom axle wrap on axle.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

Figure 9-20

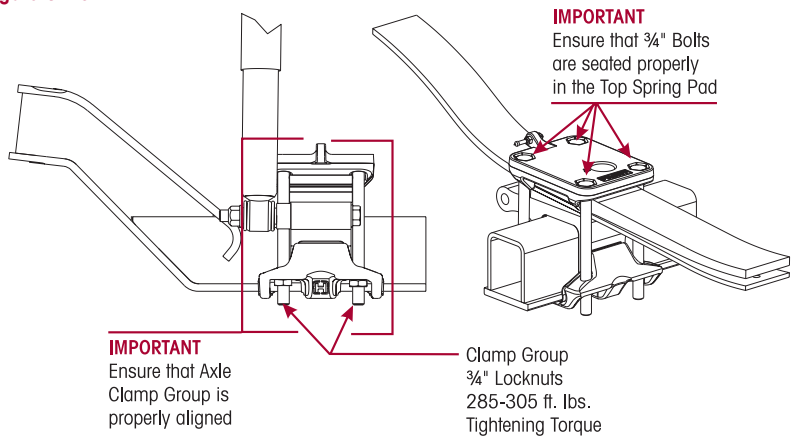
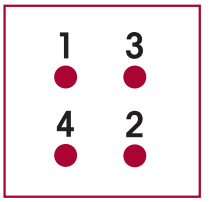


Figure 9-21



3. Install new ¾" clamp group bolts, washers and locknuts. Insure that the clamp group is properly aligned and the hex bolts are seated in the top pad casting, and the bottom axle wrap is centered on the top axle wrap. See Figure 9-20.
4. Tighten locknuts evenly to 285-305 foot pounds torque. See Figure 9-21 for proper torque sequence.
5. Install Air spring. See Air Spring assembly in the Component Replacement section of this publication.

SOFTEK – BOTTOM AXLE WRAP

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.

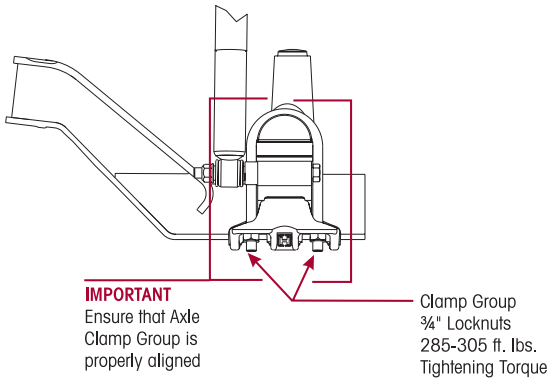
3. Remove ¾" U bolts, washers and locknuts. Discard fasteners.
4. Remove bottom axle wrap. It may be necessary to use a dead blow mallet to dislodge axle wrap.
5. Once removed inspect axle wrap for damage. Replace if necessary.
6. Discard used bottom axle wrap liner.

ASSEMBLY

1. Install new bottom axle wrap liner into bottom axle wrap.

2. Install bottom axle wrap on axle.

Figure 9-22



3. Install new ¾" U bolts, washers and locknuts. Insure that the clamp group is properly aligned and the U bolts are seated in the top pad casting, and the bottom axle wrap is centered with the top axle wrap. See Figure 9-22.
4. Tighten locknuts evenly to 285-305 foot pounds torque. See Figure 9-21 for proper torque sequence.

AIRTEK — TOP AXLE WRAP (IN CHASSIS)

DISASSEMBLY

1. Chock the wheels
2. Raise the vehicle and suspend the front axle to remove the load from the spring and wrap leaf assembly.
3. Support the frame with frame stands.

⚠ DANGER

AIR SPRINGS MUST BE DEFLATED PRIOR TO LOOSENING ANY CLAMP GROUP HARDWARE. UNCONSTRAINED AIR SPRINGS CAN VIOLENTLY SHIFT, RESULTING IN POSSIBLE PERSONAL INJURY, DEATH OR PROPERTY DAMAGE.

4. Deflate the air springs by disconnecting the height control valve linkage and lowering the height control valve arm. This will exhaust the air pressure in the air springs.
5. Disconnect the air lines at the air springs.
6. Remove the air spring (See Air Spring disassembly in the Component Replacement section of this publication).
7. Support the axle with a jack.
8. Remove the front and rear M20 spring eye bolts, washers and locknuts.

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.

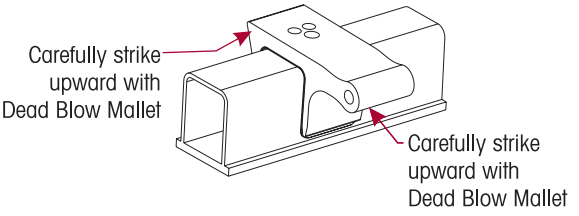
9. Remove the ¾" clamp group bolts, washers and locknuts. Discard fasteners.
10. Remove the top pad casting, the galvanized liner, and the bottom axle wrap.
11. Remove the lower shock mounting bolt.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

12. Remove the spring and wrap leaf assembly.

Figure 9-23

13. 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 9-23.

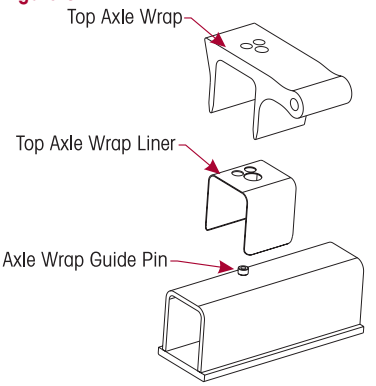


14. Clean and inspect the axle wrap and axle wrap line for cracks or damage, replace each if cracks or damage are present.

ASSEMBLY

1. Install the new axle wrap liner on the axle.
2. Spray the axle wrap liner and the axle wrap with a silicon lubricant.
3. Position the axle wrap on the axle, see Figure 9-24.

Figure 9-24



⚠ CAUTION

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

4. Protect the top surface of the axle wrap with a block of wood, cardboard, or shop towels.
5. Install a bottle jack between the axle wrap and frame rail flange.
6. Jack the axle wrap down into position on the axle, using care to make sure the axle wrap bore indexes the locating bushing on the axle.

IMPORTANT NOTE For the Flat Floor Models install the intermediate dowel pin into the axle wrap.

7. Install the spring and wrap leaf assembly on the axle wrap (indexing the dowel pin if equipped).
8. Install the galvanized liner and the top pad casting on the spring and wrap leaf assembly.
9. Remove and replace the bottom axle wrap liner.
10. Install the bottom axle wrap.
11. Install the new ¾" clamp group bolts, washers, and locknuts.
12. Snug the clamp group, **DO NOT** torque at this time.
13. Use a jack and raise the axle and spring assembly into the front spring hanger and shackle assembly.

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

14. Install the M20 spring eye bolts in the front spring hanger and rear shackle assembly.

15. Insure that the clamp group is properly aligned and the hex bolts are seated in the top pad casting, and the bottom axle wrap is centered with the top axle wrap. See Figure 9-25.

Figure 9-25

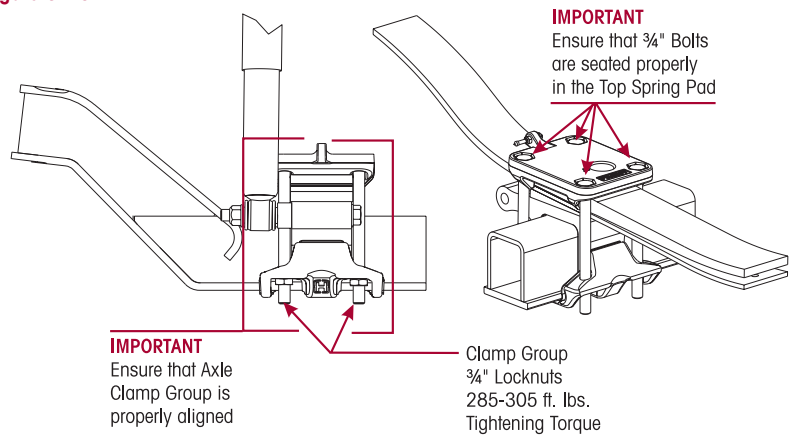
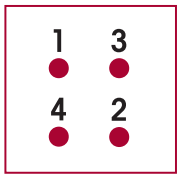
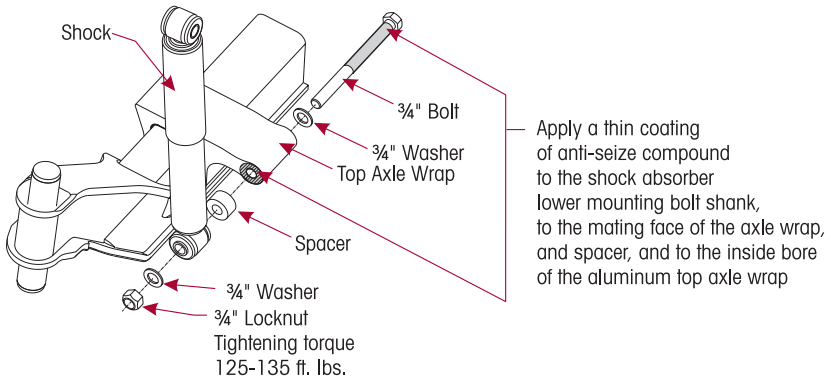


Figure 9-26



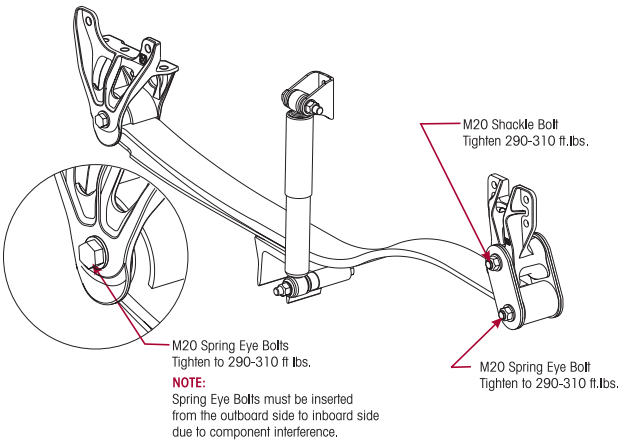
17. Tighten the ¾" clamp group locknuts evenly to 285-305 foot pounds torque in the proper sequence, see Figure 9-26.
18. Apply a thin coating of anit-seize to the lower shock mounting bolt.
19. Install the ¾" lower shock bolt to the top axle wrap (oriented from the inboard side to the outboard side), washer, and locknut. See Figure 9-27.

Figure 9-27



20. Tighten the ¾" locknut to 125-135 foot pounds torque.
21. Remove the jack from the axle.
22. Remove the frame stands.
23. Attach air lines to the air springs.
24. Air up system to proper ride height. (See Ride Height Adjustment in the Alignment & Adjustment Section of this publication).
25. Tighten the M20 spring eye bolt locknuts to 290 to 310 foot pounds torque. See Figure 9-28.

Figure 9-28



SOFTEK TOP AXLE WRAP (IN CHASSIS)

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 M20 spring eye bolts, washers and locknuts. Loosen the M20 shackle pivot bolt.

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

5. Support the axle with a jack.

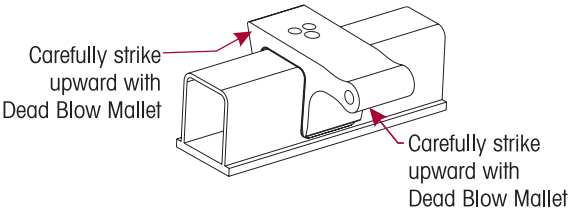
⚠ WARNING

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

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.

6. Remove the ¾" clamp group U bolts, washers and locknuts. Discard fasteners.
7. Remove the top pad casting and the bottom axle wrap.
8. Remove the lower shock mounting bolt.
9. Remove the spring and wrap leaf assembly.

Figure 9-29

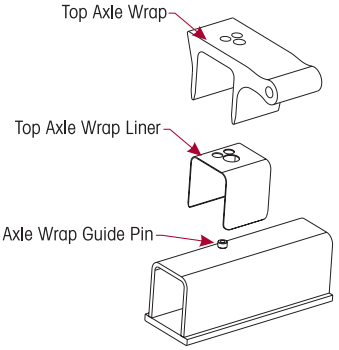


10. Strike the axle wrap with a dead blow mallet at the front and rear on the underside of the axle wrap to dislodge it from the axle. See Figure 9-29.
11. Clean and inspect the axle wrap and axle wrap liners for cracks or damage, replace each if cracks or damage are present.

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 axle wrap on the axle, see Figure 9-30.

Figure 9-30



⚠ CAUTION

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

4. Protect the top surface of the axle wrap with a block of wood, cardboard, or shop towels.
5. Install a bottle jack between the axle wrap and frame rail flange.
6. Jack the axle wrap down into position on the axle, using care to make sure the axle wrap bore indexes the locating bushing on the axle.
7. Install the spring and wrap leaf assembly on the axle wrap indexing the center bolt in the locating hole.
8. Install the top pad casting on the spring and wrap leaf assembly.
9. Remove and replace the bottom axle wrap liner.
10. Install the bottom axle wrap.
11. Install the new ¾" clamp group U bolts, washers, and locknuts.
12. Snug the clamp group, **DO NOT** torque at this time.
13. Use a jack and raise the axle and spring assembly into the front spring hanger and shackle assembly.

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

14. Install the M20 spring eye bolts, washer and locknuts in the front spring hanger and rear shackle assembly.
15. Insure that the clamp group is properly aligned and the U bolts are seated in the top pad casting, and the bottom axle wrap is centered with the top axle wrap. See Figure 9-31.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

Figure 9-31

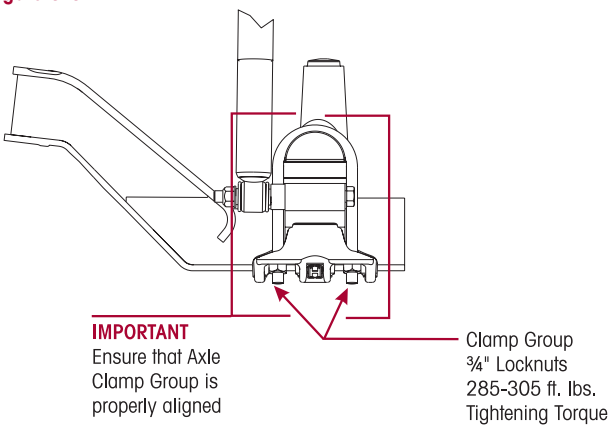
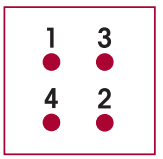


Figure 9-32



17. Tighten the ¾" clamp group locknuts evenly to 285-305 foot pounds torque in the proper sequence, see Figure 9-32.
18. Apply a thin coating of anit-seize to the lower shock mounting bolt.
19. Install the ¾" lower shock bolt to the top axle wrap (oriented from the inboard side to the outboard side), washer, and locknut. See Figure 23.
20. Tighten the ¾" locknut to 125-135 foot pounds torque.
21. Remove the jack from the axle.
22. Remove the frame stands.
23. Tighten the M20 spring eye bolt locknuts to 290 to 310 foot pounds torque.

AIRTEK – FRONT AXLE ASSEMBLY

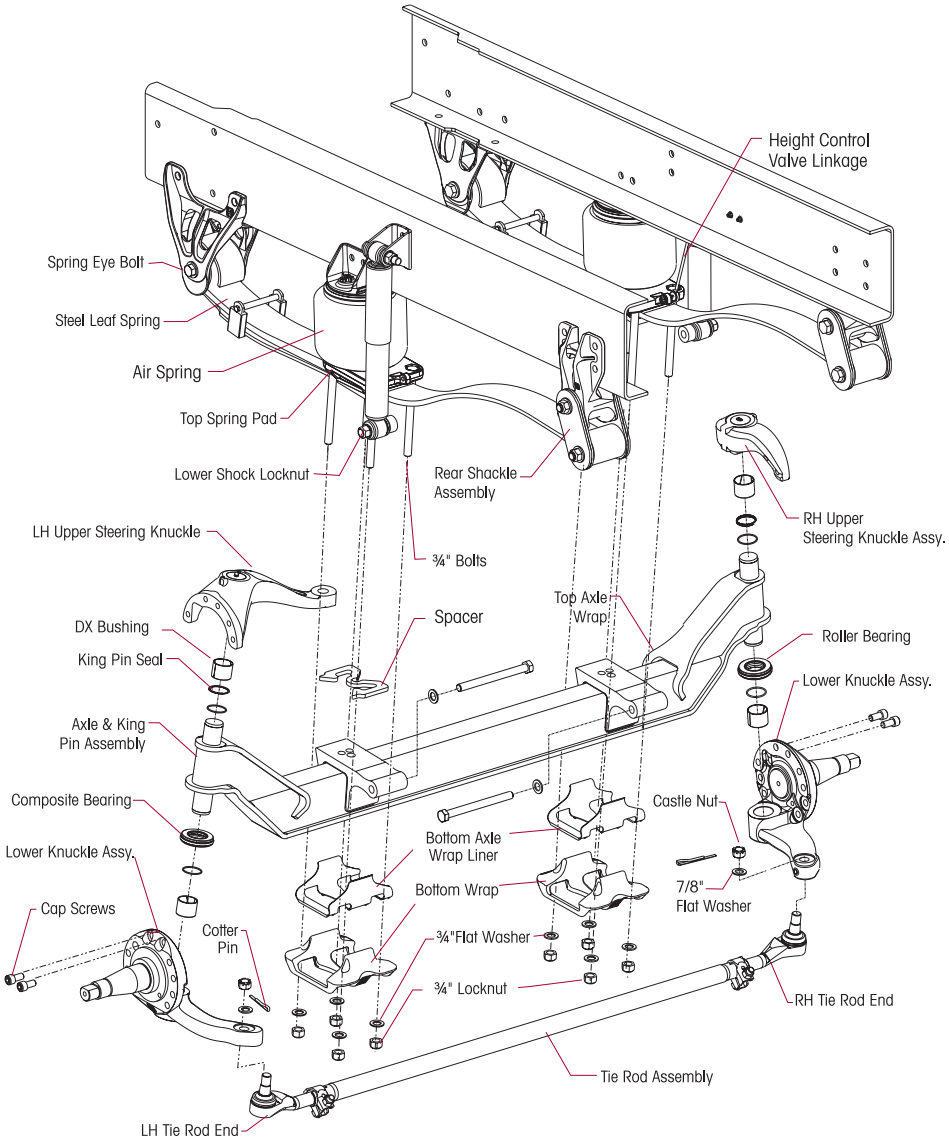
DISASSEMBLY

Refer to Figure 9-33 when replacing the components of the STEERTEK axle as shown.

AXLE CLAMP GROUP

- Top Axle Wrap
- Top Axle Wrap Liner
- Top Spring Pad
- Bottom Axle Wrap
- Bottom Axle Wrap Liner
- ¾" Bolts, Washers and Locknuts

Figure 9-33



AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

⚠ WARNING

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

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.

1. Deflate the air springs by removing the height control valve linkage and lowering the leveling valve arm.
2. Raise the vehicle.
3. Support the frame and suspend the front axle with the shocks attached.
4. Remove the front wheels, hubs, brake shoes and backing plate assembly.
5. Disconnect the drag link from the steering arm.

⚠ CAUTION

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

6. Unseat both of the air springs at the axle top pad casting.
7. Support the axle.

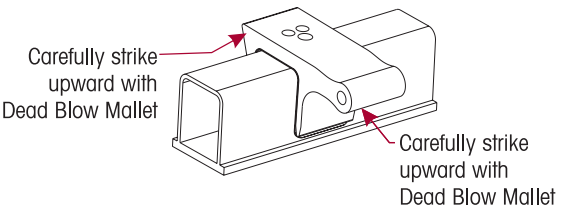
⚠ WARNING

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. AIRTEK COMPONENTS CANNOT BE BENT, WELDED, HEATED, OR REPAIRED WITHOUT REDUCING THE STRENGTH OR LIFE OF THE COMPONENT. FAILURE TO FOLLOW THESE GUIDELINES CAN CAUSE LOSS OF VEHICLE CONTROL, AND POSSIBLE PERSONAL INJURY OR DEATH OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

8. Remove the lower shock mounting locknuts and washers. Remove the shock absorbers from the lower mounting bolts and push clear of spring assembly.
9. Remove the ¾" clamp group bolts, washers, and locknuts. Discard fasteners.
10. Lower the axle and remove from the vehicle.

AIRTEK FRONT AXLE-REMOVED FROM CHASSIS

Figure 9-34



DISASSEMBLY

1. Remove the bottom axle wrap and liner from the axle.
2. Strike the top axle wrap with a dead blow mallet at the front and rear on the underside of the axle wrap to dislodge it from the axle. See Figure 9-34.
3. After removal of the top axle wrap from the axle inspect for cracks or fretting.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

4. Remove the tie rod assembly. See Tie Rod disassembly in this Section.

⚠ WARNING

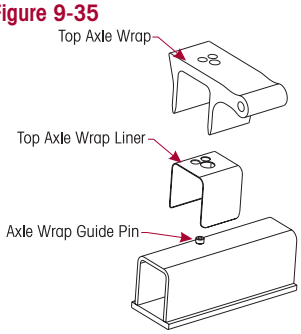
REMOVAL OF THE CAP SCREWS WILL ALLOW THE STEERING KNUCKLE TO SEPARATE FROM THE AXLE. THE BACKBONE MUST BE SUPPORTED BEFORE REMOVAL OF THESE TWO (2) CAP SCREWS. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE OR PERSONAL INJURY.

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

PRE-ASSEMBLY

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

Figure 9-35



⚠ CAUTION

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

⚠ WARNING

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

SERVICE HINT

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

2. Install the top axle wrap, the axle wrap must be aligned with the guide pin on the axle.
3. At this point in the assembly do not install anything further on the axle.

⚠ WARNING

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

⚠ DANGER

AIR SPRINGS MUST BE DEFLATED PRIOR TO LOOSENING ANY CLAMP GROUP HARDWARE. UNCONSTRAINED AIR SPRINGS WILL VIOLENTLY SHIFT, RESULTING IN POSSIBLE PERSONAL INJURY, DEATH OR PROPERTY DAMAGE.

1. Deflate the air springs by removing the height control valve linkage and lowering the linkage arm. This will exhaust the air pressure in the air springs (if equipped).
2. Raise the vehicle.
3. Support the frame and suspend the front axle with the shocks attached.
4. Remove the front wheels and hubs.
5. Disconnect the drag link from the steering arm.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

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.

6. Unseat both of the air springs at the axle top pad. See Air Spring Replacement in this Section.
7. Support the axle.

WARNING

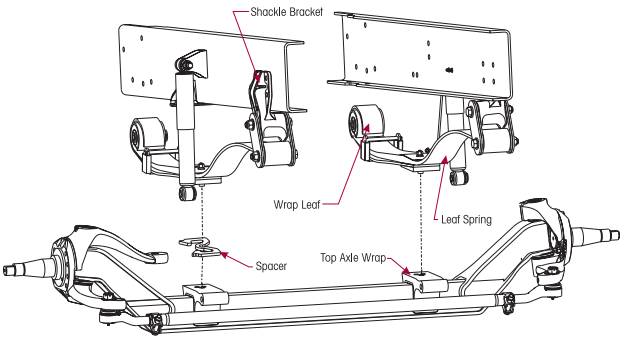
THE REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS IS NOT ALLOWED. HENDRICKSON ADVISES REPLACING ALL COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. AIRTEK COMPONENTS CANNOT BE BENT, WELDED, HEATED, OR REPAIRED WITHOUT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

8. Disconnect and remove the lower shock mounting bolts.
9. Remove the ¾" clamp group fasteners and discard.
10. Lower the axle and remove from the vehicle.

ASSEMBLY

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Raise the axle into position, see Figure 9-36. Care must be taken at this point to insure that the front leaf spring assemblies' center bolt align correctly in the top axle wrap.

Figure 9-36



3. Install the galvanized liner between the main springs and the top pad castings.
4. Install the new bottom axle wrap liners on the bottom axle wraps.
5. Install the bottom axle wraps on the axle.
6. Install the new ¾" clamp group bolts, washers and locknuts. Snug the bolts , **DO NOT** tighten to torque at this time.
7. Install the shock absorbers on the ¾" lower shock mounting bolts. Install the washers and locknuts and tighten to 125-135 foot-pounds torque.
8. Insure that the clamp groups are properly aligned and the hex bolts are seated in the top pad castings, and the bottom axle wraps are centered on the top axle wraps. See Figure 9-37.

Figure 9-37

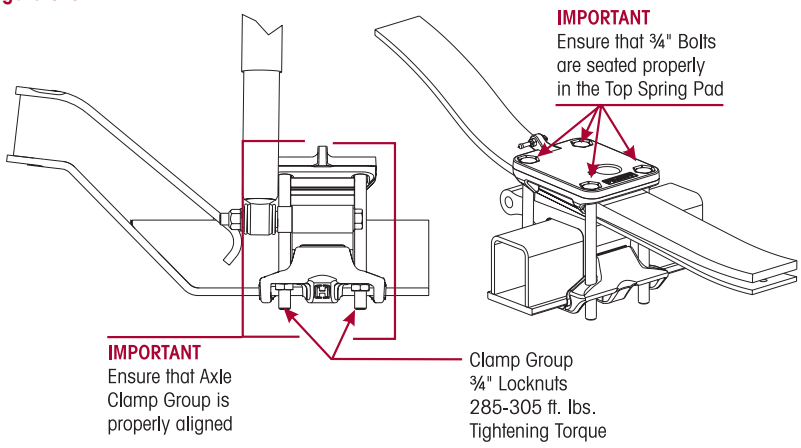
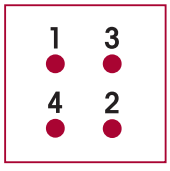


Figure 9-38



9. Tighten the ¾" clamp group locknuts evenly to 285-305 foot pounds torque in the proper sequence, see Figure 9-38.
10. Install the steering knuckles as per the Steering Knuckle replacement instructions in this Section.
11. Install the tie rod tube.
12. Install the 7/8" hardened washers on the ackerman arm and the castle nuts. Tighten the castle nuts to 185 foot pounds, then rotate until the first castle slot lines up with the cotter pin bore in the tie rod end. Do not back off nut for cotter pin installation.
13. Install the cotter pins.
14. Connect the drag link. Install the castle nut. Tighten the castle nut to 185 foot pounds, then rotate until the first castle slot lines up with the cotter pin bore in the drag link. Do not back off nut for cotter pin installation.
15. Install cotter pin.
16. Install the brake backing plate assemblies.
17. Install the brakes, hubs, and wheels as per manufacturer's guidelines.
18. Fill the hubs with the proper lube (see manufacturer's guidelines for recommended lubrication).
19. Grease the front steering components as per lubrication guidelines in the Maintenance Section of this publication.
20. Reconnect the height control valve and air up the system.
21. Adjust ride height per instructions in the Alignment and Adjustments Section of this publication.

SOFTEK – FRONT AXLE ASSEMBLY

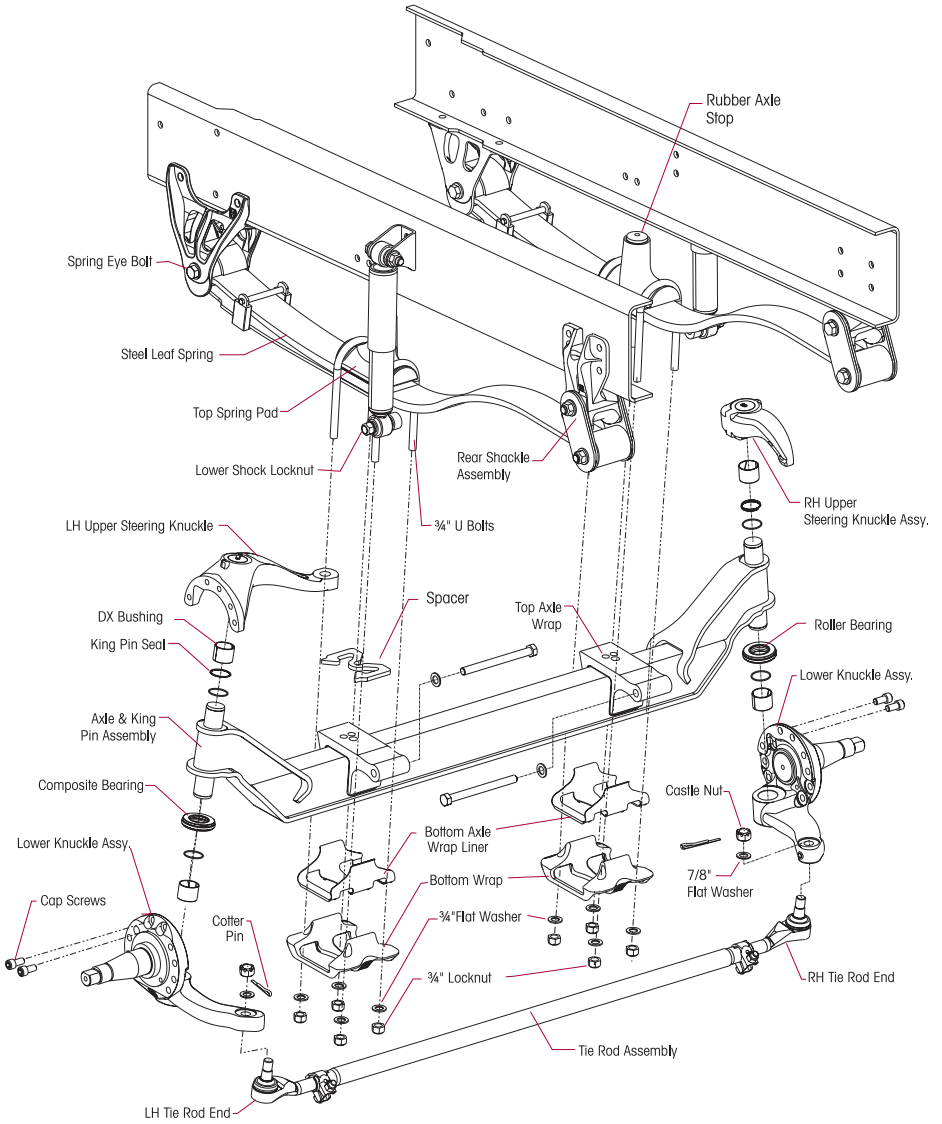
DISASSEMBLY

Refer to Figure 9-39 when replacing the components of the STEERTEK axle as shown.

AXLE CLAMP GROUP

- Top Axle Wrap
- Top Axle Wrap Liner
- Top Spring Pad
- Bottom Axle Wrap
- Bottom Axle Wrap Liner
- ¾" U Bolts, Washers and Locknuts

Figure 9-39



⚠ WARNING

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

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.

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 and backing plate assembly.
4. Disconnect the drag link from the steering arm.
5. Support the axle.

⚠ WARNING

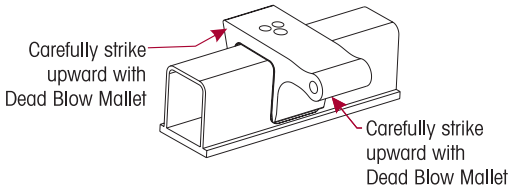
THE REPAIR OR RECONDITIONING OF SUSPENSION OR AXLE COMPONENTS IS NOT ALLOWED. HENDRICKSON ADVISES REPLACING ALL COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. AIRTEK COMPONENTS CANNOT BE BENT, WELDED, HEATED, OR REPAIRED WITHOUT 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. Remove the lower shock mounting locknuts and washers. Remove the shock absorbers from the lower mounting bolts and push clear of spring assembly.
7. Remove the ¾" clamp group U bolts, washers, and locknuts. Discard fasteners.
8. Lower the axle and remove from the vehicle.

STEERTEK FRONT AXLE – REMOVED FROM CHASSIS.

DISASSEMBLY

Figure 9-40



1. Remove the bottom axle wrap and liner from the axle.
2. Strike the top axle wrap with a dead blow mallet at the front and rear on the underside of the axle wrap to dislodge it from the axle. See Figure 9-40.
3. After removal of the top axle wrap from the axle inspect for cracks or fretting.
4. Remove the tie rod assembly. See Tie Rod disassembly in this Section.

⚠ WARNING

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

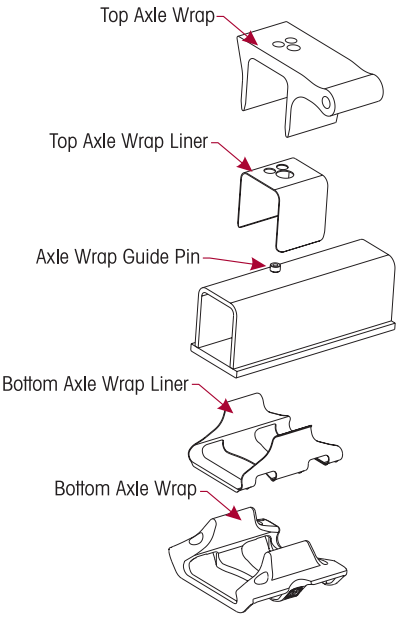
5. Remove the two 5/8" socket head cap screws from the steering knuckle assembly.
6. Remove the steering knuckle, thrust bearing, and shim pack if equipped.

AIRTEK® & SOFTEK™ WITH THE STEERTEK AXLE

7. After complete removal of the one side, repeat steps 1-6 for the opposite side of the axle.
8. Inspect the steering kingpin bushings for excessive wear. If worn, replace the kingpin bushings and seals. See the Kingpin Bushing replacement instructions in this Section.

PRE-ASSEMBLY

Figure 9-41



1. Install the new upper axle wrap liners on the axle. Index the liners with the axle's guide pin, see Figure 9-41.

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

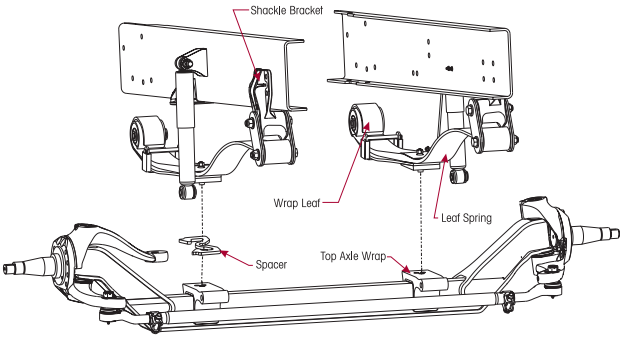
SECURELY INSTALL THE TOP WRAP TO THE AXLE. FAILURE TO DO SO CAN CAUSE LOSS OF CONTROL OF THE VEHICLE, PERSONAL INJURY OR PROPERTY DAMAGE.

SERVICE HINT

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

2. Install the top axle wrap, the axle wrap must be aligned with the guide pin on the axle.
3. At this point in the assembly do not install anything further on the axle.

Figure 9-42



ASSEMBLY

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Raise the axle into position, see Figure 9-42. Care must be taken at this point to insure that the dowel pins align correctly with the spring and wrap leaf assemblies.
3. Install the top pad castings on the spring and wrap leaf assembly. See Figure 9-43.
4. Install the new bottom axle wrap liners on the bottom axle wraps.
5. Install the bottom axle wraps on the axle.

6. Install the new ¾" clamp group U bolts, washers and locknuts. Snug the bolts , **DO NOT** tighten to torque at this time.
7. Install the shock absorbers on ¾" lower shock mounting bolts. Install the washers and locknuts and tighten to 125-135 foot-pounds torque.
8. Insure that the clamp groups are properly aligned and the U bolts are seated in the top pad castings, and the bottom axle wraps are centered with the top axle wraps. See Figure 9-43.

Figure 9-43

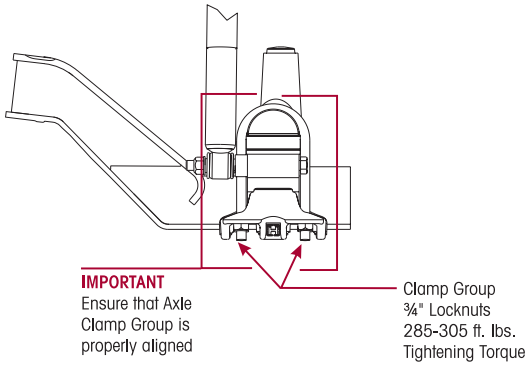
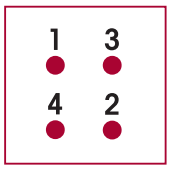


Figure 9-44



9. Tighten the ¾" clamp group locknuts evenly to 285-305 foot pounds torque in the proper sequence, see Figure 9-44.
10. Install the steering knuckles as per the Steering Knuckle replacement instructions in this Section.
11. Install the tie rod tube.
12. Install the 7/8" hardened washers on the ackerman arm and the castle nuts. Tighten the castle nuts to 185 foot pounds, then rotate until the first castle slot lines up with the cotter pin bore in the tie rod end. Do not back off nut for cotter pin installation.
13. Install the cotter pins.
14. Connect the drag link. Install the castle nut. Tighten the castle nut to 185 foot pounds, then rotate until the first castle slot lines up with the cotter pin bore in the drag link. Do not back off nut for cotter pin installation.
15. Install cotter pin.
16. Install the brake backing plate assemblies.
17. Install the brakes, hubs, and wheels as per manufacturer's guidelines.
18. Fill the hubs with the proper lube (see manufacturer's guidelines for recommended lubrication).
19. Grease the front steering components as per lubrication guidelines in the Maintenance Section of this publication.

STEERING KNUCKLE

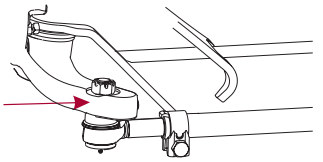
See tools needed to remove and install kingpin bushing under the Preparation Section of this publication. The steering knuckle disassembly and assembly includes the preparation and replacement process of the kingpin bushings.

DISASSEMBLY

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

Service Hint Lightly tap the side of the ackerman arm with a mallet to separate the tie rod end from the ackerman arm, see Figure 9-45.

Figure 9-45



4. Remove the drag link from the knuckle.

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

5. Remove the 2 socket head cap screws that connect the upper and lower steering knuckle. See Figure 9-46

Figure 9-46

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

6. Remove the lower steering knuckle from the kingpin by sliding it down the kingpin.
7. Remove the upper steering knuckle from axle by sliding it up off the kingpin.

KINGPIN PREPARATION AND MEASUREMENT

CLEANING THE GROUND OR POLISHED PARTS

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

CLEANING THE ROUGH PARTS

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

DRYING THE CLEANED PARTS

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

PREVENTING CORROSION ON CLEANED PARTS

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

⚠ WARNING

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

⚠ WARNING

SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY, CAREFULLY FOLLOW THE 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.

⚠ 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 IS A UNIQUE AXLE. THE KINGPIN IS CRYOGENICALLY INSTALLED IN THE AXLE. THE KINGPIN IS A NON-REPLACEABLE COMPONENT OF THE AXLE ASSEMBLY. DO NOT TRY TO REMOVE THE KINGPIN. IF THE KINGPIN SHOWS SIGNS OF MOVEMENT, CONTACT HENDRICKSON TECHNICAL SERVICE.

1. Prepare and polish the kingpin by removing all grease and excess debris.
2. If necessary use a fine grit (220 grit or higher) emery cloth and parts solvent. See Figure Nos. 9-47 through 9-48.

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Figure 9-47

Figure 9-48

Figure 9-49
Kingpin Before Cleaning

Figure 9-50
Kingpin After Cleaning

3. Inspect the kingpin for wear or damage. Use a micrometer and measure the upper and lower kingpin in two locations. Positions must be 90º opposed from each other. If the kingpin has less than 1.802" diameter, replacement of the axle is necessary. See Figure Nos. 9-51 through 9-54.

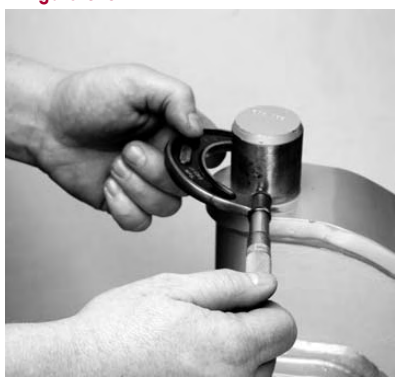
   Kingpin minimum dimension is 1.802"

Figure 9-51

Figure 9-52

Figure 9-53

Figure 9-54



KINGPIN BUSHING REMOVAL

1. Remove the retaining ring for the grease cap.
2. A hydraulic shop press with a minimum forcing capacity of 2.5 tons (minimum press capacity of 5,000 psi or use an arbor press) will be required.

⚠ 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.

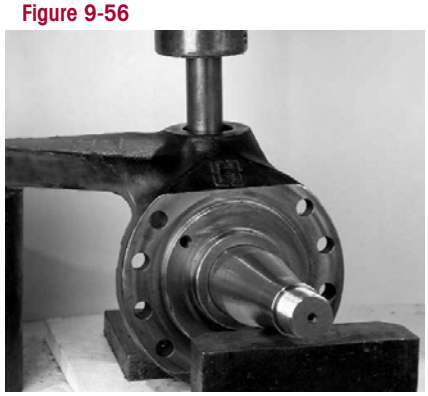
⚠ CAUTION

BEFORE APPLYING HYDRAULIC PRESSURE TO REMOVE OR INSTALL THE KINGPIN BUSHING, SUPPORT THE STEERING ARM OR KINGPIN CONNECTION AS SHOWN IN FIGURE NOS. 9-55 AND 9-56. IMPROPER SUPPORT TO THE STEERING KNUCKLES CAN CAUSE COMPONENT DAMAGE.

3. Use the grease cap to press out the kingpin bushing and seal. Remove the grease zerk in the grease cap or use a hollow driver, (see Figure 9-56) to press out the kingpin bushing.

Figure 9-55

Figure 9-56



4. Install the lower steering knuckle upside down in press. Be sure to support the knuckle so that it sits in-line with the press, see Figure 9-56.
5. Use the same procedure to remove the kingpin bushing in the upper steering knuckle, see Figure Nos. 9-57 and 9-58.
6. Clean the parts and then inspect for reassembly..

Figure 9-57

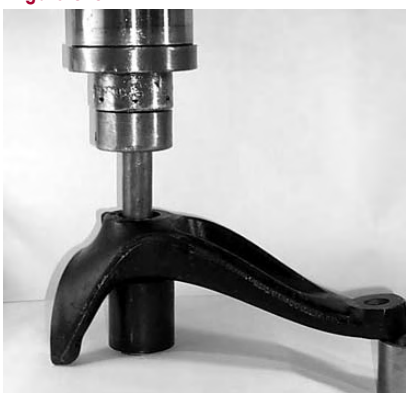


Figure 9-58

STEERING KNUCKLE BORE MEASUREMENT

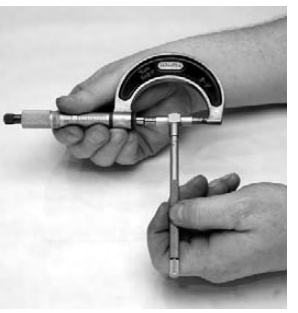
Complete the following steering knuckle bore inspection and the measurement instructions prior to installing the kingpin bushing.

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" ± .003"
2. Measure the upper and lower bore in two positions and at two locations. The two positions must be 90º opposed from each other. See Figure Nos. 9-59 through 9-61. If the average measurement is more than the knuckle bore maximum diameter specification, replace the knuckle.

Figure 9-59

Figure 9-60

Figure 9-61



KINGPIN BUSHING INSTALLATION

1. A hydraulic shop press with a minimum forcing capacity of 5 tons will be required.

⚠ 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.

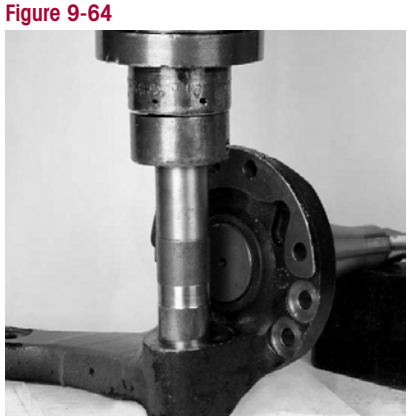
2. Install the lower or upper steering knuckle in the press.
3. Install the kingpin bushing from the machined side (axle side) of the knuckle using a bushing driver, (see driver specifications in the Tools Needed Section of this publication). Press in bushing to a depth of no less than 15/64" (.236") or 6 millimeters and no more than 5/16" (.32") or 8 millimeters, see Figure Nos. 9-62 and 9-63.

Figure 9-62

Figure 9-63

4. After this procedure it is complete, it is necessary to ream the kingpin bushings to fit the kingpins. Refer to the Kingpin Bushing Reaming Instructions in this section.

Figure 9-64



KINGPIN BUSHING REAMING

CAUTION

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

WARNING

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

Figure 9-65

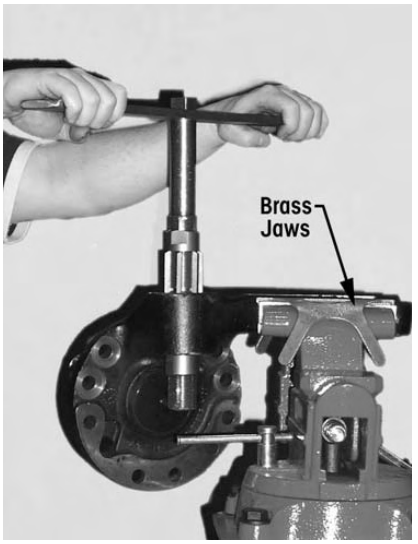
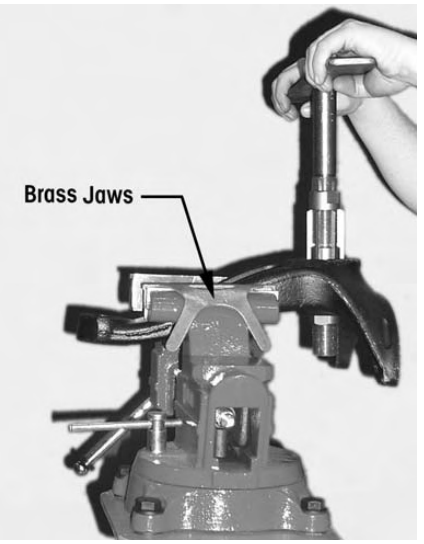


Figure 9-66



1. Install the knuckle assembly in a vise with brass jaws.

SERVICE HINT

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

2. Install the reamer into the 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 9-65 and 9-66.
4. Slide the reamer out of the bottom of the 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 DX bushing material from the knuckle assembly. Take special attention to remove material from the grease channels and dimples.
6. Clean the 5/8" brake backing plate bolts with a wire wheel and run a tap through the threads of the upper steering knuckle and 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 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.

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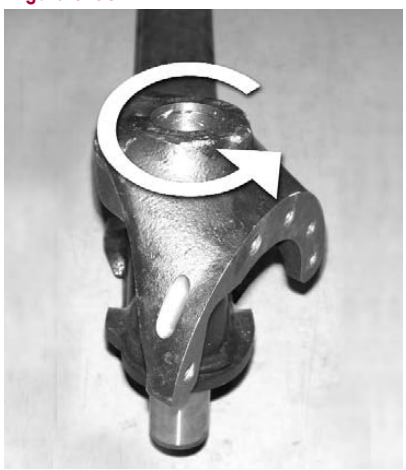
NOTE The Ⓗ Hendrickson Genuine part, socket head cap screw comes with a pre-applied loctite compound.

7. Install the lower and upper steering knuckles on the kingpin.
8. Check for the proper fit by rotating the knuckle assembly back and forth to verify there is no binding on the kingpin, see Figures 9-67 and 9-68.

Figure 9-67

Figure 9-68



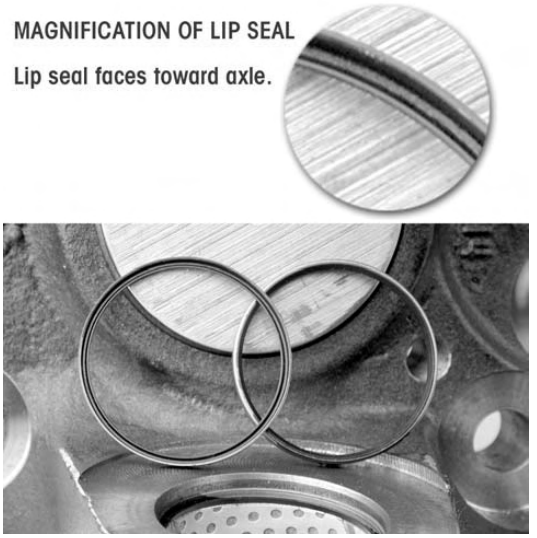
9. If the bushing is too tight repeat steps 1 through 8 until the proper clearance is achieved.

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

KINGPIN SEAL INSTALLATION

1. Place the lower or upper steering knuckle in a vise with brass jaws or place on a suitable workbench. The lower or upper steering knuckle will have the machined surface facing up (axle side up).
2. Lay the kingpin seal into the bore of the knuckle. The seal lip should face outward, or toward the axle.
3. Use a bushing driver tool and press seal firmly into the knuckle.
4. Install the kingpin seal until it makes contact with the kingpin bushing, see Figure Nos. 9-62 and 9-63.

Figures 9-62



Figures 9-63

STEERING KNUCKLE ASSEMBLY

ASSEMBLY

After replacement of the kingpin bushings it is necessary to reassemble the steering knuckle assemblies.

The STEERTEK axle is equipped with two different thrust bearings installed. See Figures 9-58 and 9-59. The right-hand (curb side) is a steel roller bearing, and the left-hand side is a composite style bearing. Proper placement of the bearings (i.e., right knuckle steel roller, left knuckle composite) is essential for maximum steering performance. Do not substitute aftermarket components when servicing.

Figure 9-58

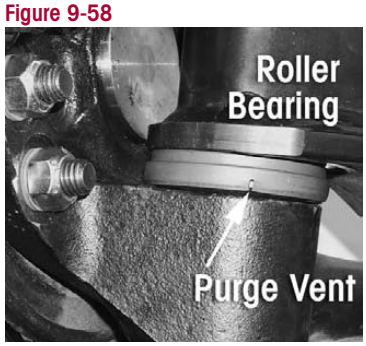


Figure 9-59

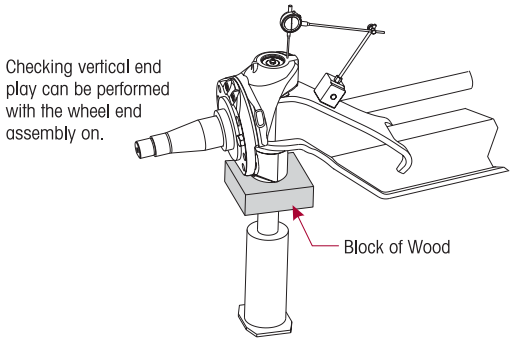
1. Install the thrust bearing on the lower kingpin with the seal facing up toward axle (the black seal will designate the top side). The composite thrust bearing is installed on the left side of the axle. The roller bearing is installed on the right side of the axle. See Figures 9-58 and 9-59.
2. Install the shim 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.

SERVICE HINT

The easiest way to achieve this is with the grease caps not installed in the knuckle assemblies. This eliminates back pressure. The assembly can then freely slide up and down on the kingpin. If the grease caps are still installed, remove the grease zerks to avoid creating back pressure. Grease zerks will be re-installed at the end of the procedure.

Figure 9-60

Vertical End Play



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.

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8. Lower the bottle jack so that all the vertical clearance 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 9-60.
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 assemblies is .008" to .011".
13. If the clearance is above .008" to .011" loosen the two socket head cap screws. Push down on the knuckle assembly until the proper vertical clearance is achieved. Add (.005") shim if necessary.
14. If the clearance is below the .008" to .011" pull up on the knuckle assembly until the proper vertical clearance is achieved.

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

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

15. Remove the old socket head cap screws, one at a time and install the new socket head cap screws and tighten to 175-200 foot pounds torque.
16. Recheck the vertical clearance with the dial indicator or a .010" feeler gauge. See Figure 9-60.
17. Remove the brake backing plate bolts, they should thread out freely.
18. Remove the bottle jack and continue assembling the wheel ends.
19. Apply loctite to the three brake backing plate bolts prior to installation of the lower backing plate. Tighten bolts to 140-160 foot pounds torque.

IMPORTANT NOTE Loctite applied to the three brake backing plate bolts is a critical procedure to ensure that these bolts sustain the torque requirement of the steering knuckle assembly.

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

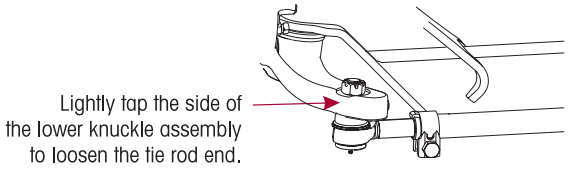
20. Install the tie rod end into the lower steering knuckle arm.
21. Tighten the castle nuts to 185 foot pounds torque then rotate the castle nut to the next castle slot and install cotter pin.
22. Install the drag link into the steering arm and tighten to vehicle manufacturer's specifications.
23. Install new o-rings on the grease caps and lubricate o-rings with grease.
24. Install grease caps and new retaining rings.
25. Install tires and grease steering knuckles with the vehicle on the floor.

TIE ROD END AND CROSS TUBE

DISASSEMBLY

1. Chock the wheels.
2. Position the steer axle tires straight ahead.
3. Remove the cotter pin and castle nut.
4. Lightly tap the side of the steering knuckle arm to loosen the tie rod end from the ackerman arm. See Figure 9-61.

Figure 9-61



5. Repeat to steps 3 and 4 to remove the other tie rod end.
6. Remove the cross tube and tie rod ends from the vehicle.
7. Mount the cross tube in a soft jaw vice.
8. Remove the hardware from the clamp on the cross tube.
9. Count the exposed threads on the tie rod end being replaced.
10. Remove the tie rod end from the cross tube.

⚠ WARNING

DO NOT HEAT THE CROSS TUBE WITH A TORCH TO FACILITATE THE REMOVAL OF THE TIE ROD END. THE USE OF SUCH HEAT CAN ADVERSELY AFFECT THE STRENGTH OF THE CROSS TUBE. A COMPONENT DAMAGED IN THIS MANNER WILL RESULT IN LOSS OF WARRANTY, AND CAN RESULT IN THE 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 Ackerman arm.
- A left hand threaded tie rod end will be installed into the left side Ackerman 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

IT IS CRITICAL THAT THE THREADED PORTION OF THE TIE ROD END EXTENDS PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 9-62. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

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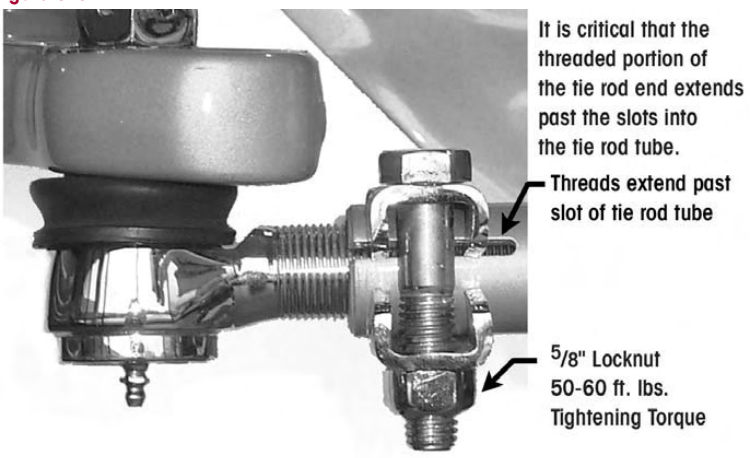
Figure 9-62



3. Replace opposing tie rod end if necessary by repeating steps 2 and 3.
4. It is critical that the cross tube rotate in the opposing tie rod end, even if it is not replaced.

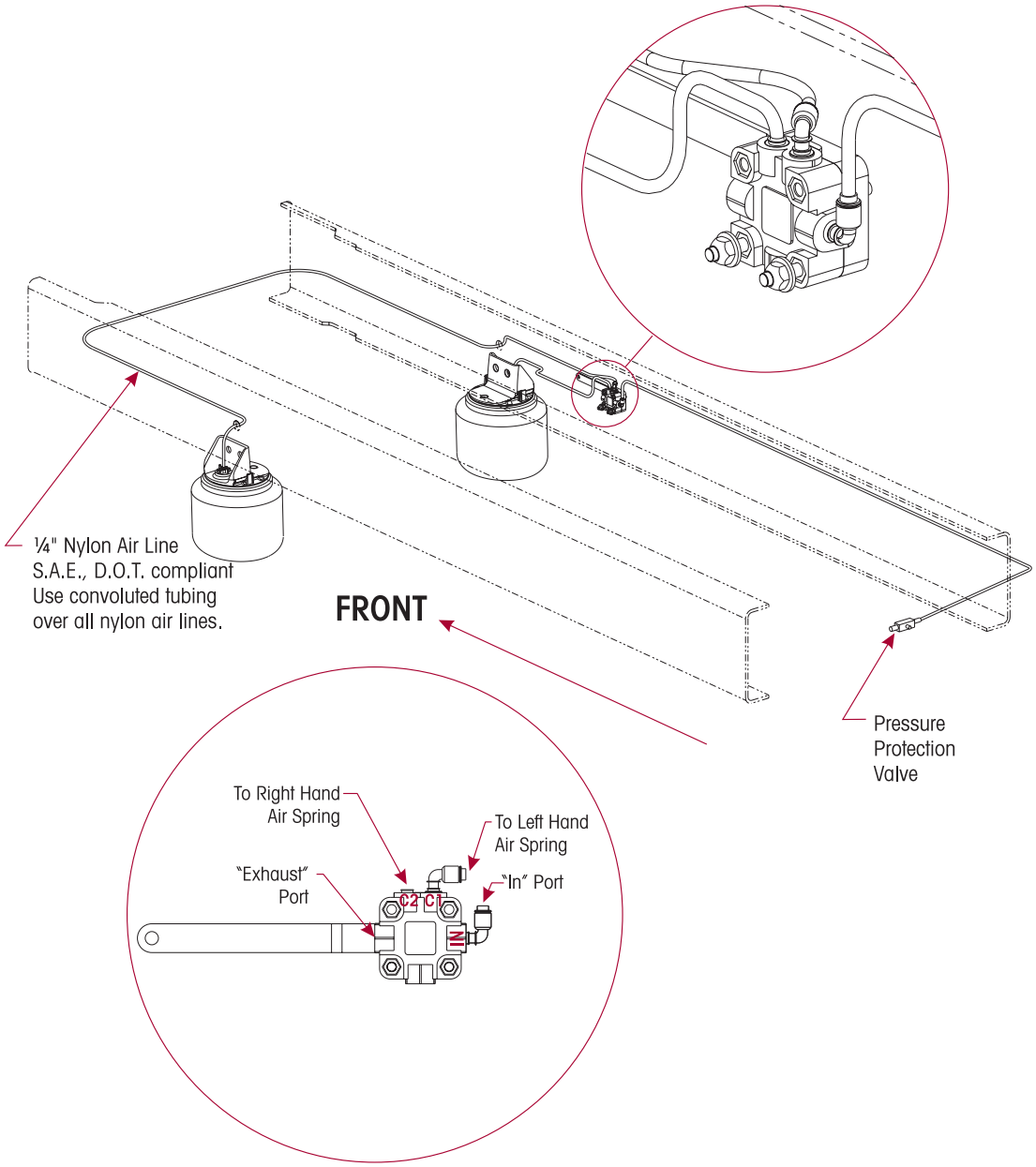
⚠ WARNING

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 PERSONAL INJURY OR PROPERTY DAMAGE.

5. Install the tie rod end into the lower steering knuckle.
6. Tighten the castle nuts to 185 foot pounds torque then rotate the castle nut to the next castle slot and install cotter pin.
7. Grease tie rod ends. Refer to the Lubrication Chart for required lubricant in the Maintenance Section of this publication.
8. Set the toe, refer to the Toe Adjustment Procedure in the Alignment and Adjustment Section in this publication.

SECTION 10
AIRTEK Plumbing Diagram

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



Reference Material

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

TMC

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

TMC/ATA
2200 Mill Road
Alexandria, VA 22314

Phone: 703-838-1763
website: tmc.truckline.com
online ordering: www.truckline.com/store

Important References

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

Video

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

Other

TMC T0400	Wheel Bearing Adjustment Procedure Wall Chart

AIRTEK/SOFTEK

	DESIGN SPECIFICATION NOMINAL	TOLERANCE BAND
LEFT CAMBER	0.00	+/- 1°
RIGHT CAMBER	0.00	+/- 1°
CROSS CAMBER	0.00	MAX 2°

CAMBER NOTES:
The camber angle is not adjustable. Do not bend axle or otherwise try to adjust camber. If found out of specifications, notify Hendrickson Tech Services for further information.

LEFT CASTER	4.1°	+/-1°
RIGHT CASTER	4.1°	+/-1°
CROSS CASTER	0.00	MAX 1°

CASTER NOTES:
Caster is determined with the vehicle at normal ride height. It is critical that the vehicle ride height is within specifications prior to performing a caster measurement or adjustment. See Hendrickson ride height setting procedure for front suspension in the Adjustment Section of this publication.

Refer to the OEM specifications for the rear suspension ride height setting procedure.

In most cases actual vehicle caster is defined with the frame rails at zero slope. Refer to the OEM 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 Technical Services for further information. Changes to caster can be attained by using caster shims as provided by the OEM. 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 (1), 1.000 shim on each side to increase caster and achieve 3.50 RH/4.00 LH, which is in spec. Do not attempt to use uneven shims.

TOTAL TOE	1/16" ± 1/32" (0.060" ± 0.030")

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.

AIRTEK/SOFTEK

TROUBLE SHOOTING GUIDE

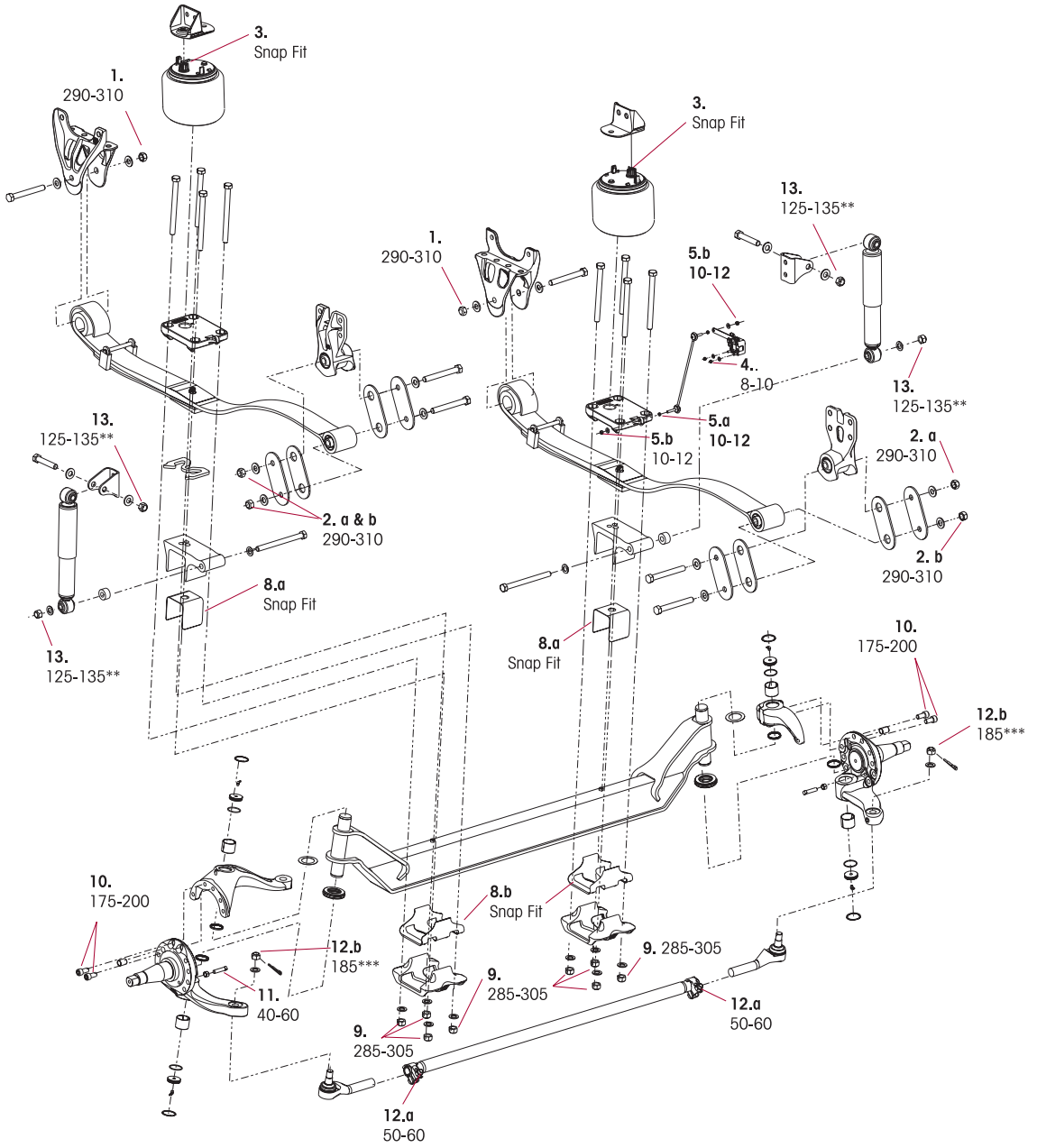
CONDITION	POSSIBLE CAUSE	CORRECTION
Worn or damaged king pins and king pin bushings.	Dirt in system-contaminated lubricant	Polish and inspect king pin, replace bushings and seals, then follow specified lubrication procedures
	Incorrect lubricant	Lubricate axle with specified lubricant
	Axle not lubricated at scheduled frequency	Lubricate 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.	Ride height out of adjustment	Adjust ride height to specification
	Caster is out of adjustment	Adjust caster
	Wheels and/or tires out of balance	Balance or replace wheels and/or tires
	Engine mount broken	Replace engine mount
	Worn shock absorbers	Replace shock absorbers
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 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
Vehicle is hard to steer.	Low pressure in the power steering system	Repair power steering system
	Steering linkage needs lubrication	Lubricate steering linkage
	King pins are binding	Replace steel leaf spring. King pins and bushings are not serviceable
	Incorrect steering arm geometry	Repair steering system as necessary
	Thrust bearing will not take grease	Replace thrust bearing
	Caster out of adjustment	Set proper ride height then adjust caster as necessary
	Tie rod ends binding	Replace tie rod ends
	Worn thrust bearing	Replace thrust bearing
Tie rod ends are worn and require replacement.	Tie rod ends need lubrication	Lubricate tie rod ends. 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

AIRTEK/SOFTEK

TROUBLE SHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTION
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 manufacturer's specified pressure
	Steering gear poppets improperly set or malfunctioning	Check for proper operation or adjust poppets to OEM specifications
	Axle stops improperly set	Set axle stops to OEM 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 to torque
	Lack of lubrication or incorrect lubricant	Lubricate linkage with specified lubricant
	Power steering stops out of adjustment	Adjust steering stops to OEM specifications
Suspension has harsh or bumpy ride	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
	Broken or worn leaf spring	Replace leaf spring
	Front suspension overloaded	Redistribute steer axle load
Restricted steering radius	Steering stops not adjusted correctly	Adjust steering stops to achieve correct wheel cut.
Vehicle leans	Air spring(s) are not inflated	Repair source of air pressure loss.
	Leaf spring broken	Replace leaf spring
	Suspension is not torqued correctly at installation	Perform spring hanger re-torque procedure See Torque Specification Section of this publication
	Missing axle W spacer	Check that W spacer was replaced after service, replace if necessary
Vehicle wanders	Caster out of adjustment	Set proper ride height, then adjust caster as necessary
	Incorrect toe setting	Adjust toe to specification
	Air in the power steering system	Remove air from the power steering system
	Rear ride height out of adjustment	Adjust ride height to specification
	Front ride height out of adjustment	Adjust ride height to specification

RECOMMENDED VALUES PROVIDED IN FOOT POUNDS



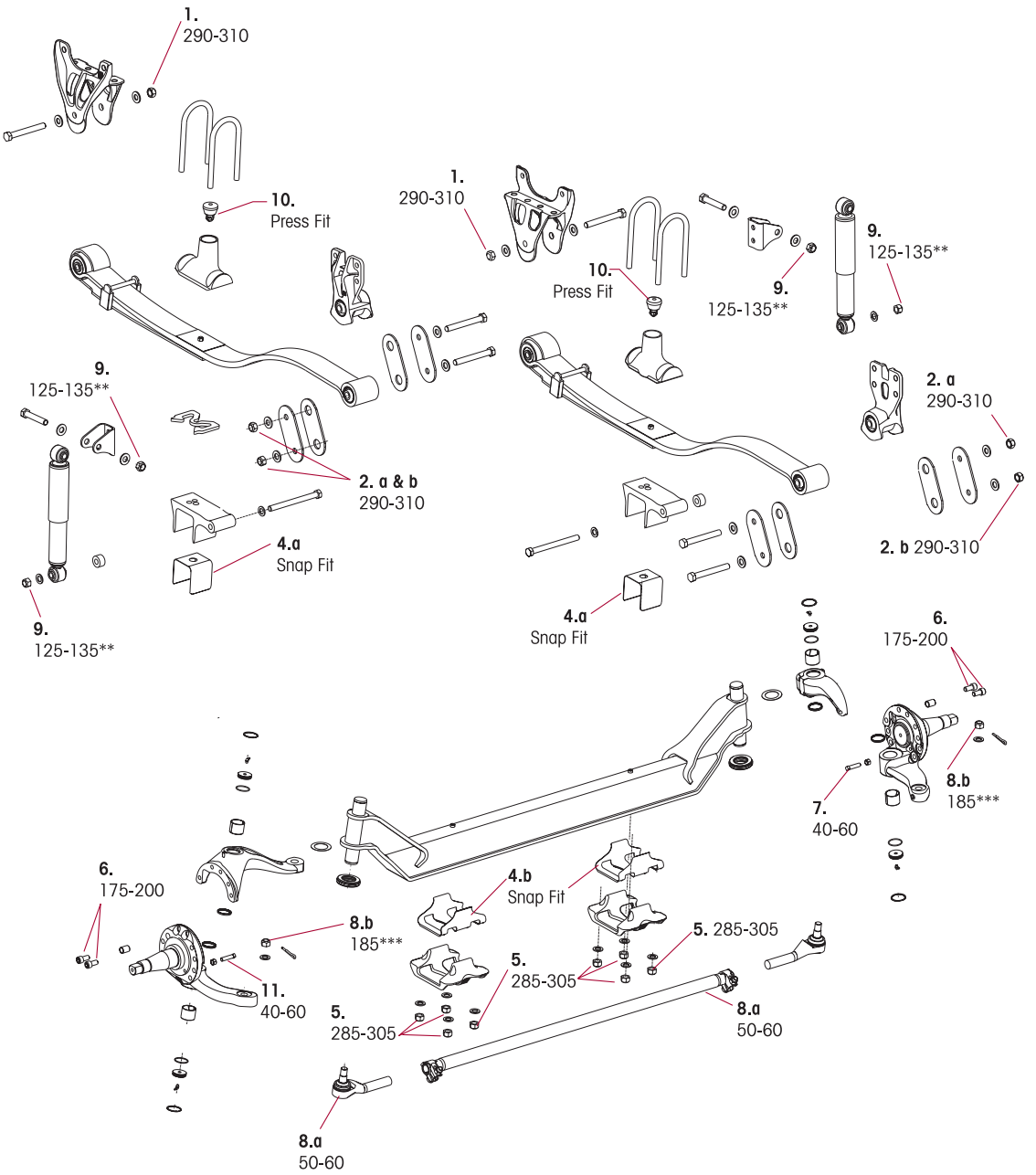
AIRTEK
HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO	COMPONENT		QUANTITY	SIZE	TORQUE FT./LBS.
1.	Frame Hanger to Spring Eye		2	M20	290-310
2.	Rear Shackle Bracket	A.Thrust washers & Shackle Plate	2	M20	290-310
		B. Spring Eye	2	M20	290-310
3.	Air Spring		2	Self-locking	Snap-Fit
4.	Height Control Valve to Frame		2	¼"	8-10
5.	HCV Linkage	A. Hex Nut	2	5/16"	10-12
		B. Locknut	2	5/16"	10-12
6.	HCV Linkage Grommet	A. HCV Arm	1	Grommet	Push In
		B. Top Pad	1	Grommet	Push In
7.	Spring Center Aligning Dowel Pin (Flat Floor Bus)*		2	¾"	Loose Fit
8.	Axle Clamp Group Liners	A. Upper	2	Formed	Snap Fit
		B. Lower	2	Formed	Snap Fit
	⚠ WARNING DO NOT ASSEMBLE CLAMP GROUP WITHOUT DELRIN LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.				
	⚠ WARNING INSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.				
9.	Clamp Group Hardware		8	¾"	285-305
10.	Knuckle Attachement Bolt (Socket Head Cap Screw)		4	5/8"	175-200
11.	Knuckle/Axle Wheel Stop Bolt		2	½" Jam Nut	40-60
12.	Tie Rod	A. Tie Rod End	2	5/8"	50-60
		B. Lower Steering Knuckle (Castle Nut)***	2	7/8"	185***
13.	Shock Eye Bolts***		4	¾"	125-135**

NOTE: All hardware ¼" and greater is Grade 8 with no additional lubrication.
Frame mount hardware in most cases are Huck style fasteners supplied by the OEM.

NOTE:
* Denote items not shown on illustration.
** All hardware grayed out in the matrix; if non Hendrickson fasteners are used, follow torque specification listed in vehicle manufacturer's service manual. Torque values listed above apply only if Hendrickson supplied fasteners are used.
*** Torque to specified value, advance nut to next hex face to install cotter pin. DO NOT back off nut for cotter pin installation.

RECOMMENDED VALUES PROVIDED IN FOOT POUNDS



SOFTEK
HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO	COMPONENT		QUANTITY	SIZE	TORQUE FT./LBS.
1.	Frame Hanger to Spring Eye		2	M20	290-310
2.	Shackle Bracket to	A.Thrust washers & Shackle Plate	2	M20	290-310
		B. Spring Eye	2	M20	290-310
3.	Spring Center Aligning Dowel Pin (Flat Floor Bus)*		2	¾"	Loose Fit
4.	Axle Clamp Group Liners	A. Upper	2	Formed	Snap Fit
		B. Lower	2	Formed	Snap Fit
	⚠ WARNING DO NOT ASSEMBLE CLAMP GROUP WITHOUT DELRIN LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.				
	⚠ WARNING INSURE 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.	Clamp Group Hardware		8	¾"	285-305
6.	Knuckle Attachement Bolt (Socket Head Cap Screw)		4	5/8"	175-200
7.	Knuckle/Axle Wheel Stop Bolt		2	½" Jam Nut	40-60
8.	Tie Rod	A. Tie Rod End	2	5/8"	50-60
		B. Lower Steering Knuckle (Castle Nut)***	2	7/8"	185***
9.	Shock Eye Bolts**		4	¾"	125-135
10.	Rubber Axle Stop		2	----	Press Fit
NOTE:	All hardware ¼" and greater is Grade 8 with no additional lubrication. Frame mount hardware in most cases are Huck style fasteners supplied by the OEM.				
NOTE:	* Denote items not shown on illustration. ** All hardware grayed out in the matrix; if non Hendrickson fasteners are used, follow torque specification listed in vehicle manufacturer's service manual. Torque values listed above apply only if Hendrickson supplied fasteners are used. *** Torque to specified value, advance nut to next hex face to install cotter pin. DO NOT back off nut for cotter pin installation.				

Technical Procedure Publication Quiz

1) What three items have the greatest influence on tire wear?
   a) Toe
   b) Air Pressure
   c) Camber
   d) Thrust Angle

2) Caster may be increased or decreased using shims or wedges.
   True or False

3) Cross caster may be changed using shims or wedges.
   True or False

4) You may bend a STEERTEK axle to correct for improper camber settings.
   True or False

5) In an unladen vehicle the correct toe setting for the STEERTEK axle is?
   a) 0 to negative 1/16"
   b) 0 to positive 1/32"
   c) Positive 1/32" to positive 3/32"
   d) Positive 1/16" +/- 1/32"

6) When reducing wheel cut on the STEERTEK axle it is necessary to check the steering gear box poppets.
   True or False

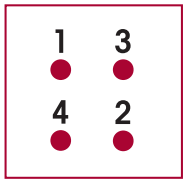
7) The torque requirement for the M20 front hanger and shackle bracket eyebolts are the same.
   True or False

8) The shackle brackets are interchangeable from right to left.
   True or False

9) When servicing the AIRTEK clamp group a technician should always replace the following items.
   a) ¾" hex bolts and locknuts.
   b) Bottom axle wrap liner.
   c) Upper axle wrap liner, if removed.
   d) All of the above.

10) What is the clamp group final torque?
   a) 500 - 550 ft. pounds.
   b) 310 - 360 ft. pounds.
   c) 285 - 305 ft. pounds.
   d) 450 + 50 ft. pounds.

11) What is the torque sequence for the clamp group? See Figure below.



a) 1,3,2,4
b) 1,4,2,3
c) 1,2,3,4
d) The torque sequence does not matter.

12) For a vehicle equipped with a STEERTEK axle it is an acceptable practice to tow vehicle using a chain wrapped around the axle.

True or False.

13) When re-bushing the front spring eye it is necessary to:

a) Heat the spring eye.
b) Press the bushing in and out.
c) Remove the front spring hanger.
d) Spring bushings are not serviceable.

14) To remove the STEERTEK knuckle you must:

a) Drive the kingpin out of the axle bore.
b) Remove the locking pins before driving the kingpin out.
c) Remove the two 5/8" socket head cap screws and separate the knuckle assembly.
d) None of the above.

15) What is the maximum allowable range for lateral movement of the steering knuckle?

a) .001" - .006"
b) .75" - 1.00"
c) .008" - .011"
d) No more than .015"

16) When AIRTEK ride height is checked, it is not necessary to cycle the leveling valve before checking the ride height.

True or False

17) Worn kingpins are easily removed and replaced.

True or False

18) The lower shock eye bolt mounting torque is:

a) 150 -250 ft. pounds.
b) 250 - 282 ft. pounds.
c) Not critical.
d) None of the above.

19) When replacing the shackle bracket bolts the new bolts should be installed.

a) From the outside facing in.
b) It does not matter what direction the bolts are facing.
c) From the inside facing out.
d) None of the above.

20) The STEERTEK axle combined with the clamp group and stiff front spring limb help to make the AIRTEK/SOFTEK torsionally rigid and reduce body roll.

True or False

21) How many grease points are there on the STEERTEK axle?

a) 2
b) 6
c) 8
d) None

22) Although the AIRTEK/SOFTEK are low maintenance, it is recommended to do a visual inspection on the axle and suspension every _____ miles.

a) 100,000 or 1 year.
b) 50,000 or 6 months.
c) Never
d) None

23) It is acceptable to replace a failed shock absorber with any brand that will fit.

True or False

24) A shock that is misting is classified as a leaking shock and should be replaced immediately.

True or False

25) Prior to performing a total vehicle alignment the following components must be inspected.

a) Front and rear spring mounts.
b) Steer axle tires.
c) Ride height.
d) All of the above.

26) Wheel bearing adjustment has no impact on tire wear.

True or False

27) When the clamp group is disassembled the use of a cutting torch is acceptable to help remove seized bolts and nuts.

True or False

28) Prior to steering knuckle re-assembly it is critical that residual Loctite be removed from the upper kingpin connection.

True or False

29) AIRTEK/SOFTEK are available exclusively with the STEERTEK axle.

True or False

30) Are the Thrust Bearings different on each side of the axle?

a) Yes
b) No

31) To heat test a shock absorber you should drive a vehicle at moderate speeds for fifteen minutes.

True or False

32) The combination of the air spring and mechanical spring support 100% of the vertical load on the AIRTEK suspension. What is the load ratio distribution between the two springs?
   a) 50% air spring - 50% leaf spring.
   b) 80% air spring - 20% leaf spring.
   c) Ratio will fluctuate with load.
   d) None of the above.

33) If the kingpin bushing is worn, then both bushings on that knuckle need to be replaced.
   True or False

34) The unique packaging of the steering knuckle will allow up to _____ degrees of wheel cut on the STEERTEK axle.
   a) 50°
   b) 32°
   c) 87°
   d) None of the above.

35) A pre-alignment inspection reveals a tie rod end is worn out of specification. What is the correct action needed to complete the alignment?
   a) Fill the tie rod with grease to absorb excessive play.
   b) Replace the tie rod and reset toe before alignment.
   c) Perform alignment and then replace tie rod end and reset toe.
   d) Align vehicle and do not repair tie rod end.

36) The air spring height can be measured at three different points on the suspension.
   True or False

37) The shackle assembly requires lubrication at what interval?
   a) 15,000 miles.
   b) 30,000 miles.
   c) 45,000 miles.
   d) Never

38) The seal on the thrust bearings are installed facing down.
   a) True
   b) False
   c) Doesn't matter.

39) Who do you refer to for details on the wheel end adjustment?
   a) Component Manufacturer.
   b) Vehicle Manufacturer.
   c) Tire Manufacturer.
   d) Hendrickson.

40) How many fasteners are required to mount the air spring?
   a) 4
   b) 3
   c) 2
   d) None

41) The air spring is located directly over the center of the axle for:
    a) Good ride.
    b) Good handling.
    c) Load distribution.
    d) All of the above.

42) The front and rear spring eye bolts should be torqued when the front axle is hanging off the ground.
    True or False

43) Which side of the axle is the composite thrust bearing located?
    a) Right
    b) Left
    c) Both

44) What steering alignment setting is affected by improper ride height?
    a) Toe
    b) Caster
    c) Camber
    d) No affect

45) The AIRTEK/SOFTEK use the same shock absorber.
    True or False

CERTIFICATE

Hendrickson will provide a personalized AIRTEK/SOFTEK Technical Procedure Quiz Achievement Certificate to candidates scoring 80% or higher on the test. Simply complete the test and fill in the enclosed answer sheet or on a separate sheet with the return address, name, phone number, and company name, as it will appear on the award to:

Hendrickson
ATTN: Truck Marketing
800 S. Frontage Road
Woodridge, Illinois 60517