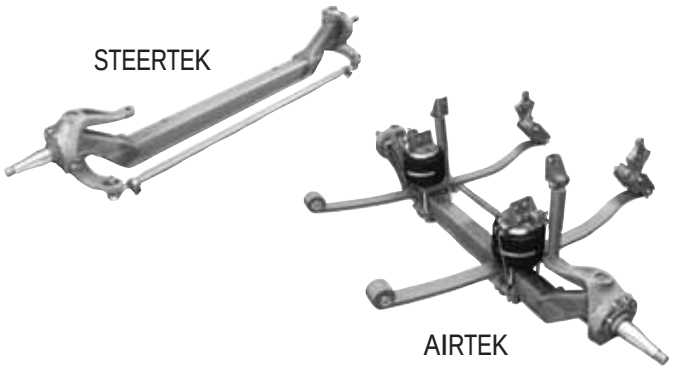


TECHNICAL PROCEDURE

AIRTEK®/ STEERTEK for Freightliner • Western Star

(Sterling Vehicles built prior to 04/2009)

SUBJECT: Service Instructions
LIT NO: 17730-243
DATE: July 2010 REVISION: D

TABLE OF CONTENTS

HENDRICKSON
The World Rides On Us™

SECTION 1

Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair, and rebuild of the following suspension systems as installed on applicable Freightliner, Western Star, and Sterling Vehicles:

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

  See Parts List Section in this publication to determine the components that are manufactured by Hendrickson. For components not manufactured or supplied by Hendrickson contact the vehicle manufacturer for proper preventive maintenance and rebuild instructions.

- STEERTEK — A durable, lightweight, fabricated steer axle assembly.
  - STEERTEK is also available with mechanical suspensions.

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 Suspension and the STEERTEK axle.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson Tech Services toll-free at 866.755.5968 or e-mail techservices@hendrickson-intl.com for information on the latest version of this manual.

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

SECTION 2

Product Description

FIGURE 2-1 AIRTEK – Freightliner Vehicles
• Built after May 2010

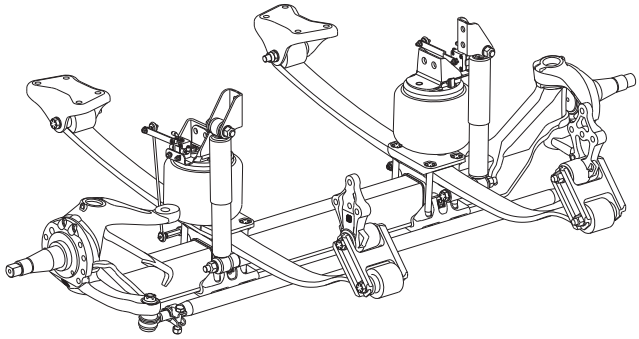


FIGURE 2-2 AIRTEK – Western Star Vehicles
• Built after June 2010

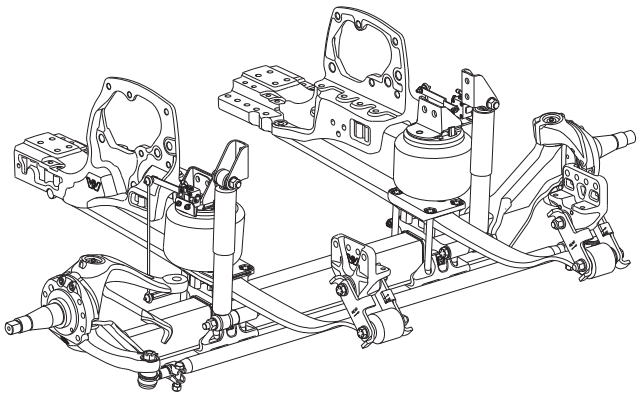
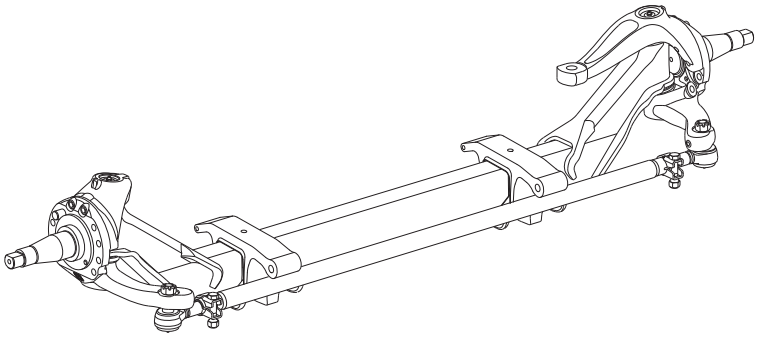


FIGURE 2-3 STEERTEK



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

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

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

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

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

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

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

- Top Axle Wrap
- Top Axle Wrap Liner
- Top pad
- Bottom Axle Wrap
- Bottom Axle Wrap Liner
- ¾" Bolts, Washers and Nylon Locknuts

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

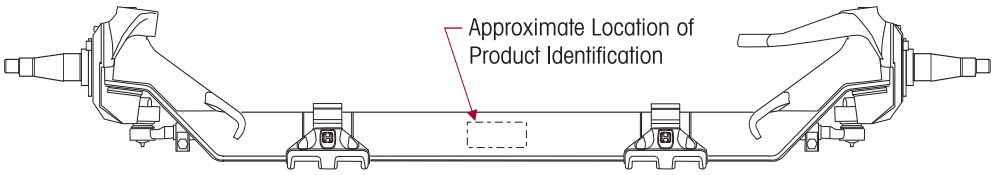
Steering Knuckles — The steering and tie rod arms are integrated for increased strength and reduced weight. The unique steering knuckle packaging delivers a maximum of 50° wheel cut. The two piece knuckle design makes replacing the kingpin bushings easier by eliminating the need to remove the kingpins.

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

TECHNICAL NOTES

1. AIRTEK is approved for 100% on-highway use with up to 10% off-highway uses; other applications that exceeds 10% off-highway use must be pre-approved by Hendrickson. This system has a 12,000/12,500 pound capacity. System capacity represents maximum loads on tires at ground level.
2. The STEERTEK axle is available with 69.0" or 70.97" kingpin intersections (KPI).
3. The STEERTEK axle offers 4.25" and 5.36" axle beam drop heights. Axle beam drop is measured from the kingpin intersection to the top of the axle.
4. AIRTEK is 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.

FIGURE 2-4 Front view of the STEERTEK axle showing approximate location of product identification.



SECTION 3

Important Safety Notice

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

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

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

EXPLANATION OF SIGNAL WORDS

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

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

The following definitions indicate the use of these signal words as they appear throughout the publication.

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

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

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

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

SERVICE HINT — A helpful suggestion that will make the servicing being performed a little easier and/or faster.

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

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

SAFETY PRECAUTIONS

⚠ WARNING

MODIFYING COMPONENTS

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

⚠ WARNING

FASTENERS

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

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

⚠ DANGER

AIR SPRINGS

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

⚠ WARNING

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

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

⚠ WARNING

TORCH/WELDING

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

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

⚠ WARNING

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

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.

⚠ 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.

⚠ WARNING

OFF ROADWAY TOWING

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

FIGURE 3-1 ACCEPTABLE

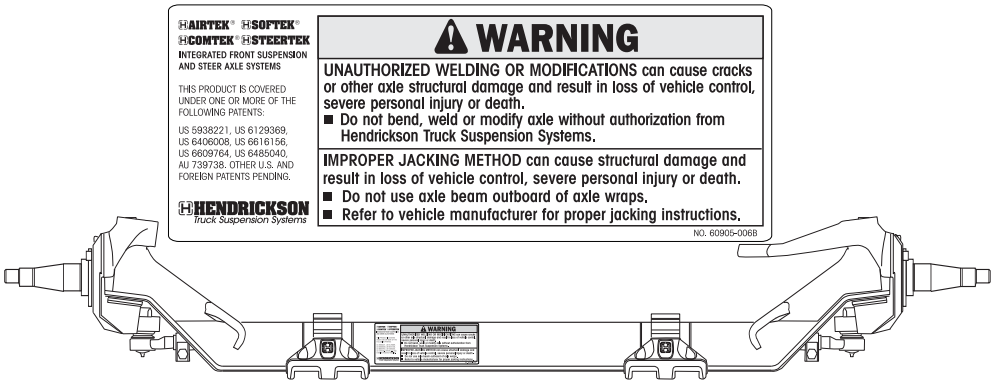
FIGURE 3-2 NOT ACCEPTABLE

⚠ WARNING

AXLE CAMBER

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 WILL DAMAGE THE AXLE AND REDUCE AXLE STRENGTH, AND WILL VOID HENDRICKSON'S WARRANTY. A BENT AXLE BEAM CAN CAUSE LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.

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



⚠ WARNING

KINGPINS

STEERTEK IS A UNIQUE AXLE, IN THAT THE KINGPIN IS CRYOGENICALLY INSTALLED IN THE AXLE. THE KINGPIN IS A NON-REPLACEABLE COMPONENT OF THE AXLE ASSEMBLY. DO NOT TRY TO REMOVE THE KINGPIN. IF THE KINGPIN SHOWS SIGNS OF MOVEMENT, CONTACT THE HENDRICKSON TECH SERVICES DEPARTMENT.

⚠ WARNING

REPAIR AND RECONDITIONING

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

DAMAGED COMPONENTS

IF A VEHICLE EQUIPPED WITH A STEERTEK AXLE IS INVOLVED IN A CRASH, A THOROUGH INSPECTION OF THE AXLE MUST BE PERFORMED NOTING THE CONDITION OF THE AXLE BEAM, KINGPINS, AND KNUCKLE ASSEMBLIES. IF ANY COMPONENT APPEARS DAMAGED, THE AXLE MUST BE REPLACED. IN THE EVENT THE CRASH 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

PERSONNEL PROTECTIVE EQUIPMENT

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

⚠ WARNING

SUPPORT THE VEHICLE PRIOR TO SERVICING

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

⚠ WARNING

PARTS CLEANING

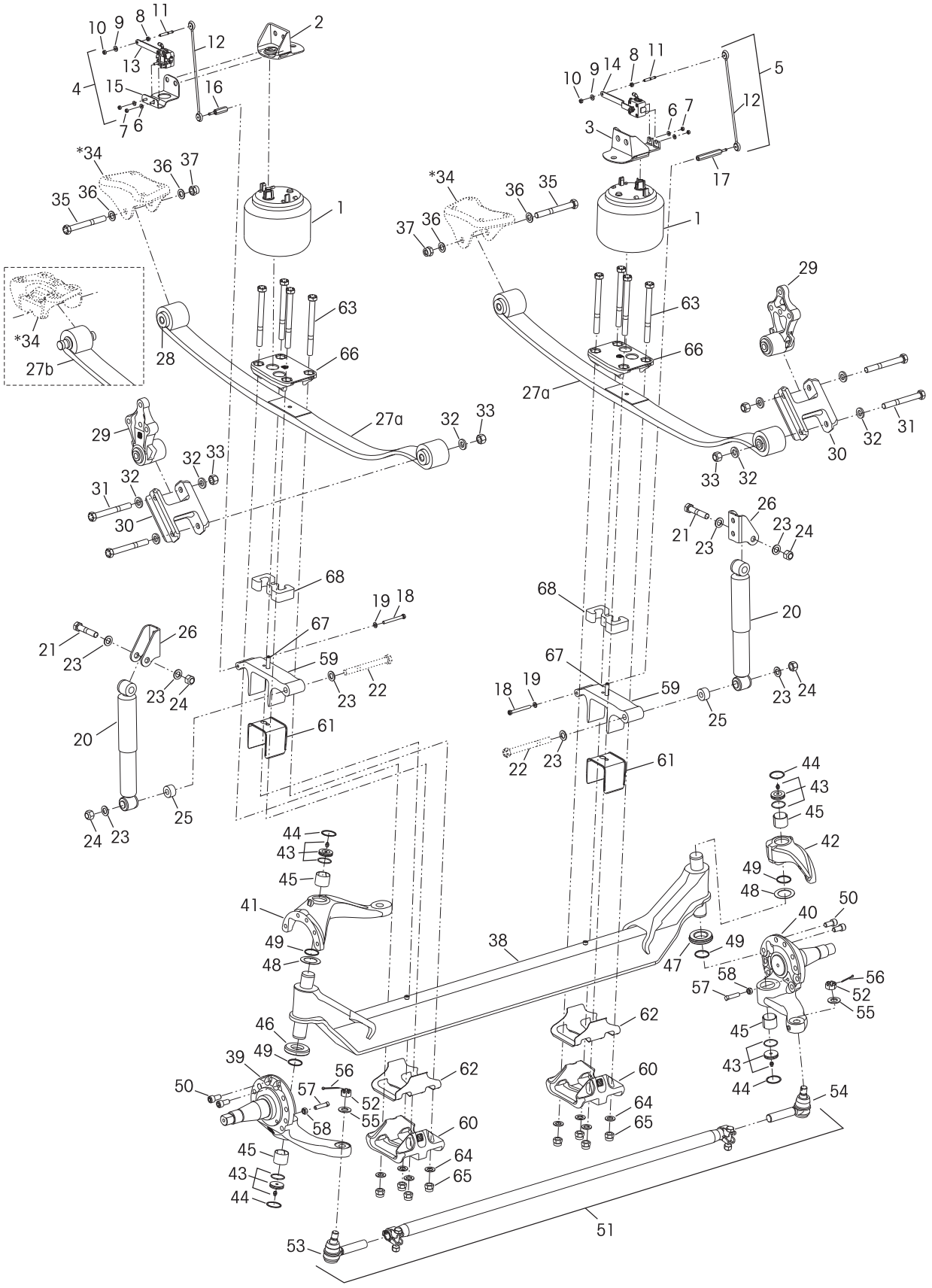
SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY, CAREFULLY FOLLOW THE MANUFACTURER'S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURES:

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.

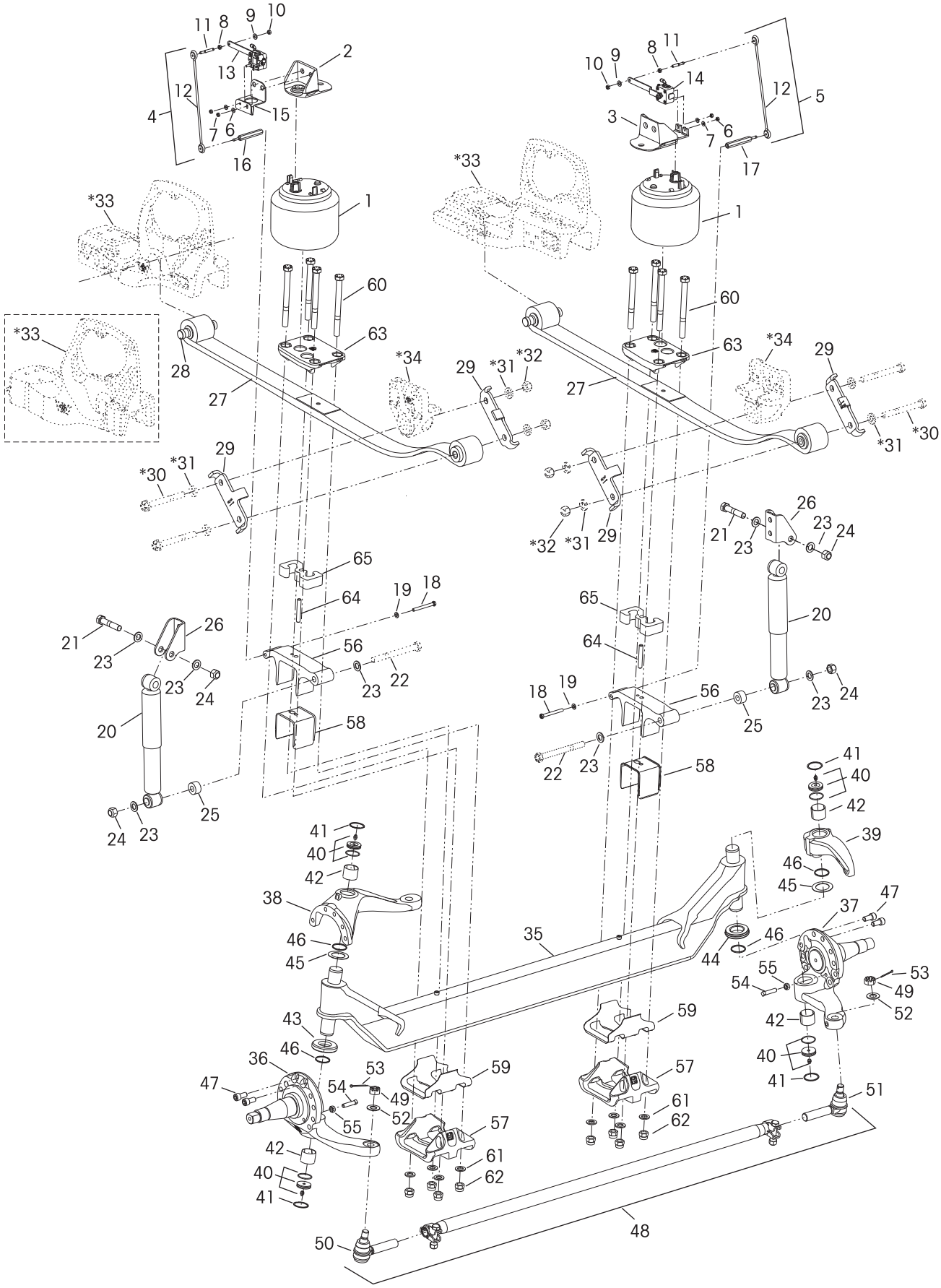
Parts Lists

AIRTEK for Freightliner – Vehicles built after May 2010



KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1	67874-002	Air Spring	2
2	60850-001	LH Air Spring Bracket	1
3	60850-002	RH Air Spring Bracket	1
4		LH HCV & Linkage Assembly	1
		Includes Key Nos. 6-13	
	59427-019	Set Back - Cascadia, Columbia, Century S/T	
	59427-031	Set Forward - Coronado	
5	59427-005	RH HCV & Linkage Assembly	1
		Includes Key Nos. 6-12, 14	
6	22962-028	¼" Hardened Washer	4
7	49983-000	¼"-20 UNC Locknut	4
8	17491-011	5⁄16"-18 UNC Nut	2
9	22962-029	5⁄16" Hardened Washer	2
10	59016-000	5⁄16"-18 UNC Locknut	2
11	59169-003	5⁄16"-18 UNC Stud	2
12	59428-001	Height Control Valve Linkage	1
13		LH Height Control Valve	1
	59935-013	Set Back	
	59935-023	Set Forward	
14	59935-002	RH Height Control Valve	1
15		LH HCV Support Bracket	1
	68675-002	Set Back	
	68675-003	Set Forward	
16		LH Link Mount	1
	59429-001	Set Back	
	59429-002	Set Forward	
17	59429-002	RH Link Mount	1
18	58035-006	⅜"-16 UNC 3.5" Hex Bolt	2
19	22962-015	⅜" Flat Washer	2
20	58913-012	Shock Absorber	2
21	50764-004	¾"-10 UNC 3.75" Upper Shock Bolt	2
22		*Lower Shock Bolt	2
23	22962-001	¾" Hardened Washer	8
24	49842-000	¾"-10 UNC Hex Locknut	4
25	59946-001	Shock Spacer	2
26	59423-001	Shock Bracket	2
		Leaf Spring Assembly	2
27a		• *With Front Eye Through Bolt Bushing,*	
		Includes Key No. 28	
	59930-061	LH, Set Back-Cascadia, Columbia, Century S/T	
	59930-062	RH, Set Back	
27b		• *With Front Eye Bar Pin Bushing*	
		Includes Key No. 28	
	59930-057	LH, Set Back	
	59930-058	RH, Set Back	
	59930-059	LH, Set Forward - Coronado	
	59930-060	RH, Set Forward	
28		**Spring Eye Bushing	2
	68274-001	Shackle Bracket Assembly	2
		Includes Key Nos. 29-33	
29	68127-001	Shackle Bracket and Bushing Assembly	2
30	67754-004	Shackle Plate	2
31	50764-018	¾"-10 UNC 6.5" Geomet Shackle Bolt	4
32	22962-040	¾" Washer Yellow Zinc (thick washer)	8
33	68596-000	¾"-10 UNC Zinc Wax Locknut	4
34		*Freightliner Hanger	2
35	68893-001	¾"-16 UNF 6.5" Geomet XL Front Eye Bolt	2
36	22962-044	¾" Washer Geomet XL (thick washer)	4
37	68894-001	¾"-16 UNF Zinc Wax Nylocknut	2
	70952-	Axle Assembly, Includes Key Nos. 38-62	1
		Contact Hendrickson Tech Services	
		for specific part number.	
38		Axle & Kingpin Assembly, 12K, 70.9 KPI	1
	64905-001	4.25" Drop	
	64905-003	5.36" Drop	
39		LH Lower Steering Knuckle Assembly	1
	58900-001	250 Ackermann	
	58900-003	200 Ackermann	
	58900-005	150 Ackermann	
40		RH Lower Steering Knuckle Assembly	1
	58900-002	250 Ackermann	
	58900-004	200 Ackermann	
	58900-006	150 Ackermann	
41		LH Upper Steering Knuckle Assembly	1
		(See chart on page 14)	
42	60904-032	RH Upper Steering Knuckle Assembly	1
	60961-040	Kingpin Bushing and Bearing Service Kit,	
		Axle Set, Includes Kit Nos. 60961-009 &-039	
	60961-009	LH Kingpin Bushing w/Composite Thrust	
		Bearing Service Kit, Includes Key Nos. 43-46,	
		48-50, Loctite	
	60961-039	RH Kingpin Bushing w/Roller Thrust	
		Bearing Service Kit,	
		Includes Key Nos. 43-45, 47-50 & Loctite	
43	59156-000	Grease Cap Assembly	4
44	58937-000	Retaining Ring	4
45	58909-000	Kingpin Bushing	4
	60961-043	Thrust Bearing Service Kit, Axle Set,	
		Includes Kit Nos. 60961-041 & -042	
	60961-041	LH Composite Thrust Bearing Service Kit,	
		Includes Key Nos. 46, 48-50 & Loctite	
	60961-042	RH Roller Thrust Bearing Service Kit,	
		Includes Key Nos. 47-50 & Loctite	
46	59828-000	LH Composite Thrust Bearing	1
47	64256-000	RH Roller Thrust Bearing	1
48	60259-002	Kingpin Shim	2
49	58910-000	Kingpin Seal	4
50	60236-001	⅝" Socket Head Cap Screw	4
Not Shown	60937-000	Loctite® (Red) Compound Tube	1
51		Tie Rod Assembly, 4.25", 5.36" Drop	1
		Includes Key Nos. 52-54	
	60239-001	250 Ackermann	
	60239-002	200 Ackermann	
	60239-003	150 Ackermann	
52		**⅞" Castle Nut	2
	60961-010	Tie Rod End Service Kit, Axle Set,	
		Includes Kit Nos. 60961-025 & -026	
	60961-025	LH Tie Rod End Service Kit,	
		Includes Key Nos. 53, 55-56	
	60961-026	RH Tie Rod End Service Kit,	
		Includes Key Nos. 54-56	
53	64000-001	LH Tie Rod End	1
54	64000-002	RH Tie Rod End	1
55	22962-007	⅞" Flat Washer	2
56	17800-004	Tie Rod Nut Cotter Pin	2
	60961-069	Stop Bolt Service Kit, One Side,	
		Includes Key Nos. 57-58	
57	60238-001	½"-13 UNC Square Head Bolt	2
58	60240-000	½"-13 UNC Hex Jam Nut	2
59		Top Wrap (See chart on page 14)	2
60	64722-001	Bottom Wrap	2
		Clamp Group Service Kit, One Side,	
		Includes Key Nos. 61-65	
	60961-013	280 mm/315 mm Ride Ht.	
	60961-014	355 mm Ride Ht.	
61	59449-000	Top Axle Wrap Liner	2
62	59845-000	Bottom Axle Wrap Liner	2
63		¾"-10 UNC Hex Bolt	8
	58917-016	8.5" Length, 280 mm/315 mm Ride Ht.	
	58917-017	10.0" Length, 355 mm Ride Ht.	
64	22962-001	¾" Flat Washer	8
65	17700-033	¾"-10 UNC-2B Nylon Locknut	8
66	59826-000	Top Pad	2
67		Dowel Pin, ½" Diameter	2
		(See chart on page 14)	
68		Front Axle Spacer (See chart on page 14)	1

AIRTEK for Western Star – Vehicles built after June 2010



KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1	67874-002	Air Spring	2
2	60850-001	LH Air Spring Bracket	1
3	60850-002	RH Air Spring Bracket	1
4		LH HCV & Linkage Assembly	
		Includes Key Nos. 6-13	1
	59427-019	Set Back, 7.31", 8.81" Ride Height	
	59427-031	Set Forward, 7.31", 8.81" Ride Height	
	59427-027	Set Back, 10.06" Ride Height	
	59427-032	Set Forward, 10.06" Ride Height	
5		RH HCV & Linkage Assembly	
		Includes Key Nos. 6-12, 14	1
	59427-005	7.31", 8.81" Ride Height	
	59427-009	10.06" Ride Height	
6	22962-028	¼" Hardened Washer	4
7	49983-000	¼"-20 UNC Locknut	4
8	17491-011	5/16"-18 UNC Nut	2
9	22962-029	5/16" Hardened Washer	2
10	59016-000	5/16"-18 UNC Locknut	2
11	59169-003	5/16"-18 UNC Stud	2
12		Height Control Valve Linkage	1
	59428-001	7.31", 8.81" Ride Height	
	59428-002	10.06" Ride Height	
13		LH Height Control Valve	1
	59935-013	Set Back	
	59935-023	Set Forward	
14	59935-002	RH Height Control Valve	1
15		LH HCV Support Bracket	1
	68675-002	Set Back	
	68675-003	Set Forward	
16		LH Link Mount	1
	59429-001	Set Back	
	59429-002	Set Forward	
17	59429-002	RH Link Mount	1
18	58035-006	3/8"-16 UNC 3.5" Hex Bolt	2
19	22962-015	3/8" Flat Washer	2
20	58913-012	Shock Absorber	2
21	50764-004	¾"-10 UNC 3.75" Upper Shock Bolt	2
22		*Lower Shock Bolt	2
23	22962-001	¾" Hardened Washer	8
24	49842-000	¾"-10 UNC Hex Locknut	4
25	59946-001	Shock Spacer	2
26	59423-001	Shock Bracket	2
27		Leaf Spring Assembly, Includes Key No. 28	2
	59930-053	LH Set Forward	
	59930-054	RH Set Forward	
	59930-055	LH Set Back	
	59930-056	RH Set Back	
28		**Front Spring Eye Bar Pin Bushing	2
29	68089-001	Shackle Plate	2
30		*¾"-10 UNC Shackle Bolt	4
31		*¾" Washer	8
32		*¾"-10 UNC Nut	4
33		*Western Star Front Hanger	
34		*Western Star Rear Hanger	
	70952-	Axle Assembly, Includes Key Nos. 35-57	1
		Contact Hendrickson Tech Services for specific part number.	
35		Axle & Kingpin Assembly, 12K, 70.9 KPI	1
	64905-001	4.25 Drop	
	64905-003	5.36 Drop	
36		LH Lower Steering Knuckle Assembly	1
	58900-001	250 Ackermann	
	58900-003	200 Ackermann	
	58900-005	150 Ackermann	
37		RH Lower Steering Knuckle Assembly	1
	58900-002	250 Ackermann	
	58900-004	200 Ackermann	
	58900-006	150 Ackermann	
38		LH Upper Steering Knuckle Assembly	1
		(See chart on page 14)	
39	60904-032	RH Upper Steering Knuckle Assembly	1
	60961-040	Kingpin Bushing and Bearing Service Kit, Axle Set, Includes Kit Nos. 60961-009 & -039	
	60961-009	LH Kingpin Bushing w/Composite Thrust Bearing Service Kit, Includes Key Nos. 40-43, 45-47, Loctite	
	60961-039	RH Kingpin Bushing w/Roller Thrust Bearing Service Kit, Includes Key Nos. 40-42, 44-47 & Loctite	
40	59156-000	Grease Cap Assembly	4
41	58937-000	Retaining Ring	4
42	58909-000	Kingpin Bushing	4
	60961-043	Thrust Bearing Service Kit, Axle Set, Includes Kit Nos. 60961-041 & -042	
	60961-041	LH Composite Thrust Bearing Service Kit, Includes Key Nos. 43, 45-47 & Loctite	
	60961-042	RH Roller Thrust Bearing Service Kit, Includes Key Nos. 44-47 & Loctite	
43	59828-000	LH Composite Thrust Bearing	1
44	64256-000	RH Roller Thrust Bearing	1
45	60259-002	Kingpin Shim	2
46	58910-000	Kingpin Seal	4
47	60236-001	5/8" Socket Head Cap Screw	4
Not Shown	60937-000	Loctite® (Red) Compound Tube	1
48		Tie Rod Assembly	1
		Includes Key Nos. 49-51	
	60239-001	250 Ackermann	
	60239-002	200 Ackermann	
	60239-003	150 Ackermann	
49		**7/8" Castle Nut	2
	60961-010	Tie Rod End Service Kit, Axle Set, Includes Kit Nos. 60961-025 & -026	
	60961-025	LH Tie Rod End Service Kit, Includes Key Nos. 50, 52-53	
	60961-026	RH Tie Rod End Service Kit, Includes Key Nos. 51-53	
50	64000-001	LH Tie Rod End	1
51	64000-002	RH Tie Rod End	1
52	22962-007	7/8" Flat Washer	2
53	17800-004	Tie Rod Nut Cotter Pin	2
	60961-069	Stop Bolt Service Kit, One Side, Includes Key Nos. 54-55	
54	60238-001	½"-13 UNC Square Head Bolt	2
55	60240-000	½"-13 UNC Hex Jam Nut	2
56		Top Wrap	2
		(See chart on page 14)	
57	64722-001	Bottom Wrap	2
		Clamp Group Service Kit, One Side, Includes Key Nos. 58-62	
	60961-013	7.31" Ride Ht.	
	60961-014	8.81" Ride Ht.	
	60961-019	10.06" Ride Ht.	
58	59449-000	Top Axle Wrap Liner	2
59	59845-000	Bottom Axle Wrap Liner	2
60		¾"-10 UNC Hex Bolt	8
	58917-016	8.5" Length, 7.31" Ride Ht.	
	58917-017	10.0" Length, 8.81" Ride Ht.	
	58917-018	11.5" Length, 10.06" Ride Ht.	
61	22962-001	¾" Flat Washer	8
62	17700-033	¾"-10 UNC-2B Nylon Locknut	8
63	59826-000	Top Pad	2
64		Dowel Pin, ½" Diameter	2
		(See chart on page 14)	
65		Front Axle Spacer	1
		(See chart on page 14)	

FREIGHTLINER – Vehicles built after May 2010 • WESTERN STAR – Vehicles built after June 2010						
		Page 11 Page 13	Key No. 41 Key No. 38	Key No. 59 Key No. 56	Key No. 67 Key No. 64	Key No. 68 Key No. 65
Make	Axle Drop	Ride Height	LH Upper Steering Knuckle Assembly Part Number	Top Wrap Part Number	Dowel Pin Part Number	Front Axle Spacer Part Number
SET BACK						
Freightliner / Western Star	4.25"	315 mm / 7.31"	60903-035	59952-021	57159-004	No Spacer
		355 mm / 8.81"	60903-036	59952-002	57159-005	60244-040
Western Star	4.25"	385 mm / 10.06"	60903-036	59952-002	57159-006	60244-070
Freightliner	5.36"	280 mm	60903-034	59952-021	57159-004	No Spacer
		315 mm	60903-035	59952-002	57159-005	60244-040
SET FORWARD						
Freightliner / Western Star	4.25"	315 mm / 7.31"	60903-038	59952-021	57159-004	No Spacer
		355 mm / 8.81"	60903-039	59952-002	57159-005	60244-040
Western Star	4.25"	385 mm / 10.06"	60903-039	59952-002	57159-006	60244-070

NOTES:

* Not supplied by Hendrickson, used for reference only. Refer to OEM (vehicle manufacturer) for more information.

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

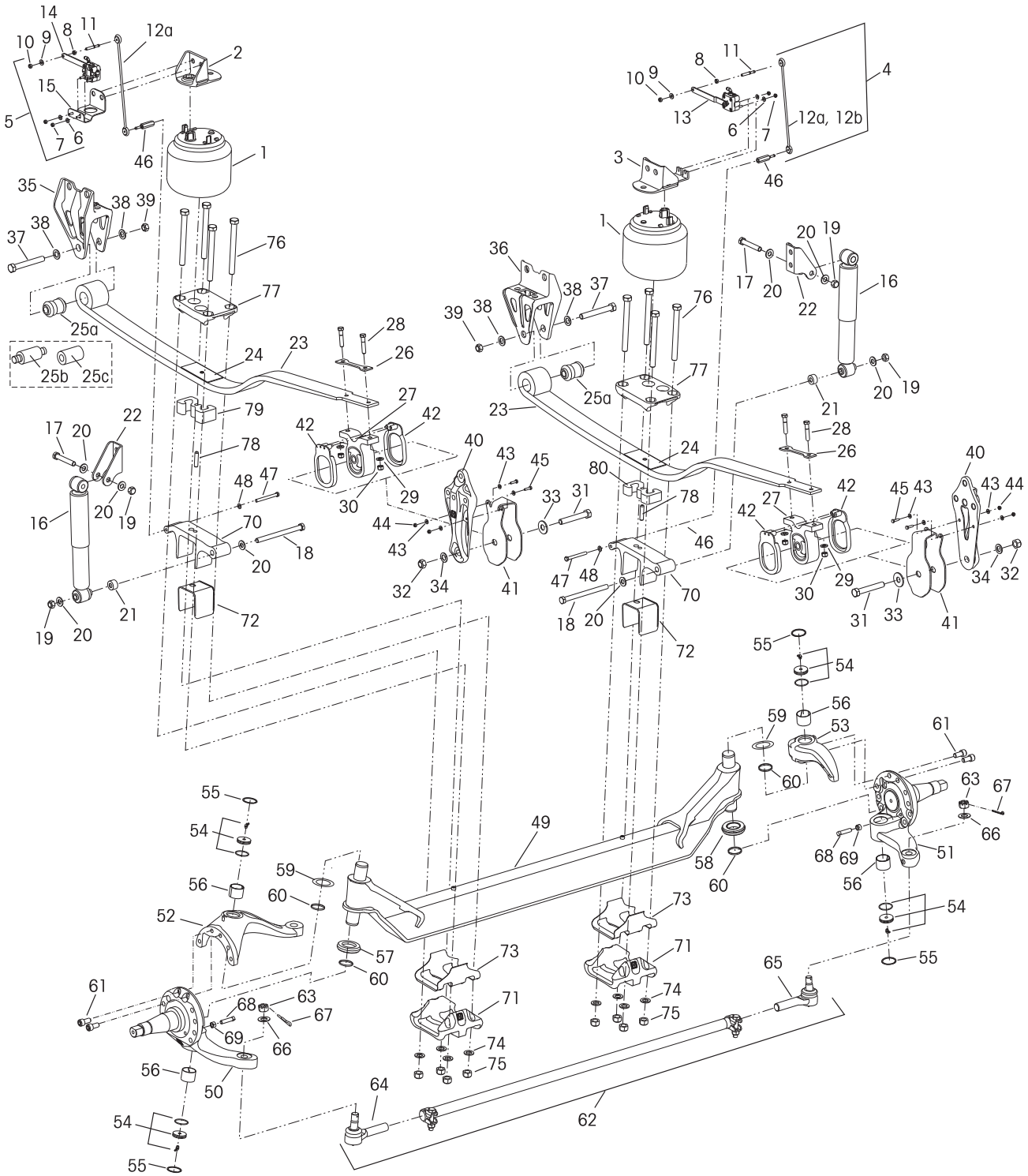
*** All new replacement STEERTEK axles and upper steering knuckle components for Freightliner, Sterling and Western Star Vehicles will incorporate ⅝" fine threaded holes for brake spider mounting bolts. Vehicles built prior to 6/28/2004 that are receiving a replacement of the STEERTEK axle or upper knuckle will require — a change from coarse thread brake spider mounting bolts to fine thread brake spider mounting bolts. The brake spider mounting bolts are supplied separately by Freightliner, Sterling and Western Star, refer to vehicle manufacturer for bolt dimensions and torque specifications. Hendrickson will not be responsible for any damage to the STEERTEK upper knuckle components resulting from using the improper brake spider mounting bolts.

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

HENDRICKSON AIRTEK RIDE HEIGHT GAUGE FOR FREIGHTLINER AND WESTERN STAR VEHICLES: Literature number 45745-159
Height Gauge can be obtained on-line at www.hendrickson-intl.com/literature/litform.asp

AIRTEK

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



KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1	59823-002L	Air Spring	2
2	60850-001	LH Air Spring Bracket	1
3	60850-002	RH Air Spring Bracket	1
4		RH HCV & Linkage Assembly	1
	59427-005	*Replaces 59427-001* Includes Key Nos. 6-12a, 14 Century Class S/T, Columbia 1350, Coronado, LC Sterling (Set Back), Western Star (Set Back/ Set Foward) 7.31"/8.0" Ride Ht.	
	59427-009	*Replaces 59427-002* Includes Key Nos. 6-11, 12b-13 Western Star (Set Back & Set Forward) 8.81"/10.06" Ride Ht.	
5	59427-019	LH HCV & Linkage Assembly • Vehicles equipped with dual HCVs, Includes Key Nos. 6-12a,14 • See page 19 for vehicles equipped with a single HCV	1
6	22962-028	¼" Hardened Washer	4
7	49983-000	¼"-20 UNC Locknut	4
8	17491-011	5/16"-18 UNC Nut	2
9	22962-029	5/16" Hardened Washer	2
10	59016-000	5/16"-18 UNC Locknut	2
11	59169-003	5/16"-18 UNC Stud	2
12a	59428-001	Height Control Valve Linkage	1
12b	59428-002	Height Control Valve Linkage	1
13	59935-002	RH Height Control Valve	1
14	59935-013	LH Height Control Valve	1
15		LH HCV Support Bracket • For vehicles equipped with dual HCVs	1
	66256-000	280mm/315mm, 355mm Ride Ht. Columbia, Century Class S/T, LC Sterling (Set Back) EPA 98/04, Coronado EPA 98/04/07	
	67636-000	315mm, 355mm Ride Ht., Classic XL (Set Forward) EPA 98/04/07	
	67637-000	315mm, 355mm Ride Ht., Columbia, Century Class S/T, LC Sterling (Set Back), Cascadia EPA 07	
16	58913-003L	Shock Absorber	2
17	50764-004	¾"-10 UNC 3.75" Upper Shock Bolt	2
18	58917-015	¾"-10 UNC 7.5" Lower Shock Bolt *Replaces 58917-009*	2
19	49842-000	¾"-10 UNC Hex Locknut	4
20	22962-001	¾" Hardened Washer	8
21	59946-001	Shock Spacer	2
22	59423-001	Shock Bracket	2
		Leaf Spring Assembly, Includes Key Nos. 23-30, 42	2
	59930-021	Century Class S/T, Columbia 1350, Western Star (Set Back), *Replaces 59930-001*	
	59930-023	LH Coronado, *Replaces 59930-003*	
	59930-024	RH Coronado, *Replaces 59930-004*	
	59930-025	LH LC Sterling (Set Back)	
	59930-026	RH LC Sterling (Set Back)	
	59930-027	LH Western Star (Set Forward)	
	59930-028	RH Western Star (Set Forward)	
	59930-029	LH Century, Cascadia	
	59930-030	RH Century, Cascadia	
23		**Leaf Spring, Included in Assembly above	2
24	59937-001	Galvanized Liner	2
		Spring Eye Bushing	2
25a	59259-002	Century Class S/T, Columbia, Western Star (Set Forward)	
25b		**Coronado	
25c		**LC Sterling (Set Back), Century, Cascadia	

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
	60961-616	Rear Spring Mount Service Kit, One Side, Includes Key Nos. 26-30	
26	58920-001	Spring End Plate, *Replaces 58920-000*	2
27	58918-000	Rear Spring Mount	2
28	30970-002	½"-20 UNF-2A 2.5" Hex Bolt *Replaces 24531-004*	4
29	22962-014	½" Flat Washer	4
30	17700-034	½"-20 UNF-2B Hex Nylon Locknut, *Replaces 49846-000*	4
	60961-003	Rear Spring Eye Hardware Service Kit, One Side, Includes Key Nos. 31-34, 42	
31	50764-008	¾"-10 UNC 5.0" Hex Bolt	2
32	49842-000	¾"-10 UNC Locknut	2
33	22962-033	¾" Wide Washer	2
34	22962-001	¾" Flat Washer	2
		LH Front Hanger Service Kit Includes Key Nos. 35, 37-39	
	60961-004	Century Class S/T, Columbia, LC Sterling (Set Back)	
	60961-005	Century Class S/T 1350, Columbia 1350	
	60961-017	Western Star (Set Back)	
		RH Front Hanger Service Kit Includes Key Nos. 36-39	
	60961-006	Century Class S/T, Columbia	
	60961-007	Century Class S/T 1350, Columbia 1350	
	60961-018	Western Star (Set Back)	
35		LH Front Hanger	1
	59832-001	Century Class S/T, Columbia, Western Star	
	60573-001	Century Class S/T 1350, Columbia 1350 *LC Sterling (Set Back) *Western Star (Set Forward)	
36		RH Front Hanger	1
	59832-002	Century Class S/T, Columbia, Western Star (Set Back)	
	60573-002	Century Class S/T 1350, Columbia 1350	
37	58917-003	¾"-10 UNC 5.5" Hex Bolt, *Replaces 50764-012*	2
38	22962-001	¾" Flat Washer	4
39	49842-000	¾"-10 UNC-2B Hex Locknut	2
40	59829-001	Rear Hanger, (Casting No. 59825-000) *Replaces 59829-000*	2
	60961-016	Rear Hanger Clamp Service Kit, One Side, Includes Key Nos. 33, 41-45	
41	59830-001	Rear Hanger Clamp, *Replaces 59830-000*	2
42	59346-001	Thrust Washer, *Replaces 59346-000*	4
43	22962-028	¼" Hardened Washer	8
44	49983-000	¼"-20 UNC Locknut	4
45	56935-001	¼"-20 UNC 1.25" Hex Bolt	4
	60961-008	Link Mount Service Kit, Axle Set, Includes Key Nos. 46-48	
46	59429-002	Link Mount, *Replaces 59310-001*	2
47	58035-006	3/8"-16 UNC 3.5" Hex Bolt	2
48	22962-015	3/8" Flat Washer	2
	70952-	Axle Assembly, Includes Key Nos. 49-73 Contact Hendrickson Tech Services for specific part number.	1
49		Axle & Kingpin Assembly, 12K	1
	64905-001	*Replaces 59924-001* - 4.25 Drop, 70.9 KPI Coronado, LC Sterling (Set Back) 315 mm/355 mm Ride Ht. Western Star (Set Back) 8.81"/10.06" Ride Ht.	
	64905-002	*Replaces 59924-002* - 4.25 Drop, 69 KPI Century Class S/T, Columbia, 315 mm/355 mm Ride Ht. Western Star (Set Forward) 8.81"/10.06" Ride Ht.	
	64905-004	*Replaces 59924-004* - 5.36 Drop, 69 KPI Century Class S/T, Columbia, 280 mm/315 mm Ride Ht. LC Sterling (Set Back) 280 mm Ride Ht. Western Star (Set Forward) 7.31" Ride Ht.	

■ See Notes on Page 14

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
50		LH Lower Steering Knuckle Assembly	1
	58900-001	250 Ackermann	
	58900-003	200 Ackermann	
	58900-005	150 Ackermann	
51		RH Lower Steering Knuckle Assembly	1
	58900-002	250 Ackermann	
	58900-004	200 Ackermann	
	58900-006	150 Ackermann	
52		***LH Upper Steering Knuckle Assembly	1
	60903-031	*Replaces 60903-001*	
		5.36 Drop, 69 KPI,	
		Century Class S/T, Columbia, 280 mm Ride Ht.	
		Western Star (Set Forward), 7.31" Ride Ht.	
		LC Sterling (Set Back), 280 mm Ride Ht.	
	60903-032	*Replaces 60903-002*	
		4.25/5.36 Drop, 69 KPI	
		Century Class S/T, Columbia, 315 mm Ride Ht.	
		Western Star (Set Forward), 8.81" Ride Ht.	
		LC Sterling (Set Back), 315 mm Ride Ht.	
	60903-033	*Replaces 60903-003*	
		4.25 Drop, 69 KPI	
		Century Class S/T, Columbia, 355 mm Ride Ht.	
		Western Star (Set Forward), 10.06" Ride Ht.	
		LC Sterling (Set Back), 355 mm Ride Ht.	
	60903-035	*Replaces 60903-005*	
		4.25 Drop, 70.9 KPI	
		Western Star (Set Back), 8.81" Ride Ht.	
		LC Sterling (Set Back), 315 mm Ride Ht.	
	60903-036	*Replaces 60903-006*	
		4.25 Drop, 70.9 KPI	
		Western Star (Set Back), 10.06" Ride Ht.	
		LC Sterling (Set Back), 355 mm Ride Ht.	
	60903-038L	*Replaces 60903-008*	
		4.25/5.36 Drop, 69 KPI	
		Coronado, 315 mm Ride Ht.	
	60903-039	*Replaces 60903-009*	
		4.25 Drop, 70.9 KPI	
		Coronado, 355 mm Ride Ht.,	
53	60904-032	***RH Upper Steering Knuckle Assembly	1
		Replaces 60903-002	
	60961-040	Kingpin Bushing and Bearing Service Kit, Axle Set, Includes Kit Nos. 60961-009 & -039	
	60961-009	LH Kingpin Bushing w/Composite Thrust Bearing Service Kit, Includes Key Nos. 54-57, 59-61, Loctite	
	60961-039	RH Kingpin Bushing w/Roller Thrust Bearing Service Kit, Includes Key Nos. 54-56, 58-61 & Loctite	
54	59156-000	Grease Cap Assembly	4
55	58937-000	Retaining Ring	4
56	58909-000	Kingpin Bushing	4
	60961-043	Thrust Bearing Service Kit, Axle Set, Includes Kit Nos. 60961-041 & -042	
	60961-041	LH Composite Thrust Bearing Service Kit, Includes Key Nos. 57, 59-61 & Loctite	
	60961-042	RH Roller Thrust Bearing Service Kit, Includes Key Nos. 58-61 & Loctite	
57	59828-000	LH Composite Thrust Bearing	1
58	64256-000	RH Roller Thrust Bearing	1
59	60259-002	Kingpin Shim	2
60	58910-000	Kingpin Seal	4
61	60236-001	5/8" Socket Head Cap Screw	4
Not Shown	60937-000	Loctite® (Red) Compound Tube	1

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
62		****Tie Rod Assembly, 12K	1
		•4.25 Drop,70.9 KPI,315 mm/7.31"/8.81" Ride Ht.	
	60239-001	150 Ackermann, *Replaces 64801-001*	
	60239-002	200 Ackermann, *Replaces 64801-002*	
	60239-003	250 Ackermann, *Replaces 64801-003*	
		•4.25 Drop, 69 KPI, 315/355mm Ride Ht.	
	60239-004	150 Ackermann, *Replaces 64801-004*	
	60239-005	200 Ackermann, *Replaces 64801-005*	
	60239-006	250 Ackermann, *Replaces 64801-006*	
		•5.36 Drop, 70.9 KPI, 280/315 mm Ride Ht.	
	66699-001	150 Ackermann, *Replaces 59948-001*	
	66699-001	200 Ackermann, *Replaces 59948-002*	
	66699-002	250 Ackermann, *Replaces 59948-003*	
		•5.36 Drop, 69 KPI, 280/315 mm Ride Ht.	
	66699-003	150 Ackermann, *Replaces 59948-004*	
	66699-003	200 Ackermann, *Replaces 59948-005*	
	66699-001	250 Ackermann, *Replaces 59948-006*	
63		**7/8" Castle Nut	2
		****Tie Rod End Service Kit, Axle Set,	
	60961-010	Includes Kit Nos. 60961-025 & -026 *Replaces 60961-081 & -082*	
	60961-139	Includes Kit Nos. 60961-137 & -138 *Replaces 60961-012*	
64		****LH Tie Rod End Service Kit,	
		Includes Key Nos. 66-67	
	60961-025	4.25 Drop, 69 & 70.9 KPI, *Replaces 60961-083 & 60961-085*	
	60931-137	5.36 Drop, 70.9 KPI, *Replaces 60961-029*	
65		****RH Tie Rod End Service Kit,	
		Includes Key Nos. 66-67	
	60961-026	4.25 Drop, 69 & 70.9 KPI, *Replaces 60961-084 & 60961-086*	
	60961-138	5.36 Drop, 70.9 KPI, *Replaces 60961-030*	
66	22962-007	7/8" Flat Washer	2
67	17800-004	Tie Rod Nut Cotter Pin	2
	60961-069	Stop Bolt Service Kit, One Side, Includes Key Nos. 68-69	
68	60238-001	1/2"-13 UNC Square Head Bolt	2
69	60240-000	1/2"-13 UNC Hex Jam Nut	2
70		Top Wrap	2
	59952-001	Century Class S/T, Columbia, LC Sterling (Set Back)	
		4.25 Drop, 315 mm Ride Ht.	
		5.36 Drop, 280 mm Ride Ht.	
		Coronado,	
		5.36 Drop, 280 mm/315 mm Ride Ht.	
	59952-002	Century Class S/T, Columbia, Coronado	
		4.25 Drop, 355 mm Ride Ht.	
		5.36 Drop, 315 mm Ride Ht	
		LC Sterling (Set Back)	
		4.25 Drop, 355 mm Ride Ht.	
	59952-007	Western Star (Set Back),	
		4.25 Drop, 8.81", 10.06" Ride Ht.	
		Western Star (Set Forward),	
		4.25 Drop, 10.06" Ride Ht.	
	59952-016	Western Star (Set Forward),	
		4.25 Drop, 8.81" Ride Ht.,	
		5.36 Drop, 7.31" Ride Ht.	
71	64722-001	Bottom Wrap, *Replaces 59440-001*	2
		Clamp Group Service Kit, One Side,	
		Includes Key Nos. 72-76	
	60961-013	Century Class S/T, Columbia	
		280 mm/315 mm Ride Ht.	
	60961-014	Century Class S/T, Columbia 355 mm Ride Ht.,	
		Western Star 8.81" Ride Ht.	
	60961-019	Western Star 10.06" Ride Ht.	
72	59449-000	Top Axle Wrap Liner	2
73	59845-000	Bottom Axle Wrap Liner	2

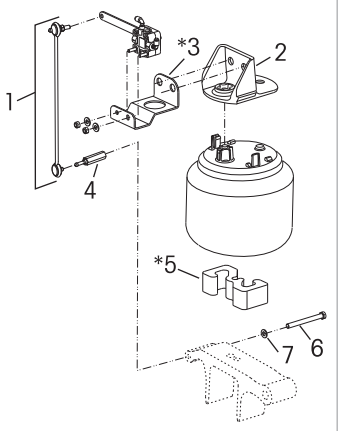
■ See Notes on Page 14

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
74	22962-001	¾" Flat Washer	8
75	17700-033	¾"-10 UNC-2B Nylon Locknut	8
76		¾"-10 UNC Hex Bolt	8
	58917-016	8.5" Length - Century Class S/T, Columbia	
	58917-017	10.0" Length - Western Star, 8.81" Ride Ht.	
	58917-018	11.5" Length - Western Star 10.06" Ride Ht.	
77	59826-000	Top Pad	2
78		Dowel Pin, ½" Diameter	2
	57159-004	Century Class S/T, Columbia, Coronado, LC Sterling (Set Back), 280 mm/315 mm Ride Ht.	
	57159-005	Century Class S/T, Columbia, Coronado, LC Sterling (Set Back), 5.36 Drop, 355 mm and 315 mm Ride Ht. Western Star (Set Back & Set Forward), 8.81" Ride Ht., 4.25 Drop,	
	57159-006	Western Star (Set Back & Set Forward) 10.06" Ride Ht., 4.25 Drop	
	57159-012	Western Star (Set Forward) 7.31" Ride Ht., 5.36 Drop	
79		LH Front Axle Spacer	1
	60244-010	10 mm - 280 mm/315 mm Ride Ht.	
	60244-030	30 mm - 280 mm/315 mm Ride Ht.	
		• For vehicles equipped with dual HCVs,	
	60244-035	Century Class S/T, Columbia, LC Sterling (Set Back) EPA 98/04, Coronado, Classic XL (Set Forward) EPA 98/04/07 - 35 mm	
	60244-045	Century Class S/T, Columbia, LC Sterling (Set Back), 355 mm Ride Ht., 4.25 Drop - 45 mm 315 mm Ride Ht., 5.36 Drop - 45 mm Western Star (Set Back & Set Forward) 8.81" Ride Ht., 4.25 Drop - 45 mm	
	60244-080	Western Star (Set Back & Set Forward) 10.06" Ride Ht., 4.25 Drop - 80 mm	
80		RH Front Axle Spacer	1
	60244-020	Western Star (Set Forward) 7.31" Ride Ht., 5.36 Drop - 20 mm	
	60244-035	Century Class S/T, Columbia, LC Sterling (Set Back) 355 mm Ride Ht., 4.25 Drop - 35 mm 315 mm Ride Ht., 5.36 Drop - 35 mm Western Star (Set Back & Set Forward) 8.81" Ride Ht., 4.25 Drop - 35 mm	
	60244-070	Western Star (Set Back & Set Forward) 10.06" Ride Ht., 4.25 Drop - 70 mm	

SINGLE TO DUAL HEIGHT CONTROL VALVE CONVERSION KITS

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

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



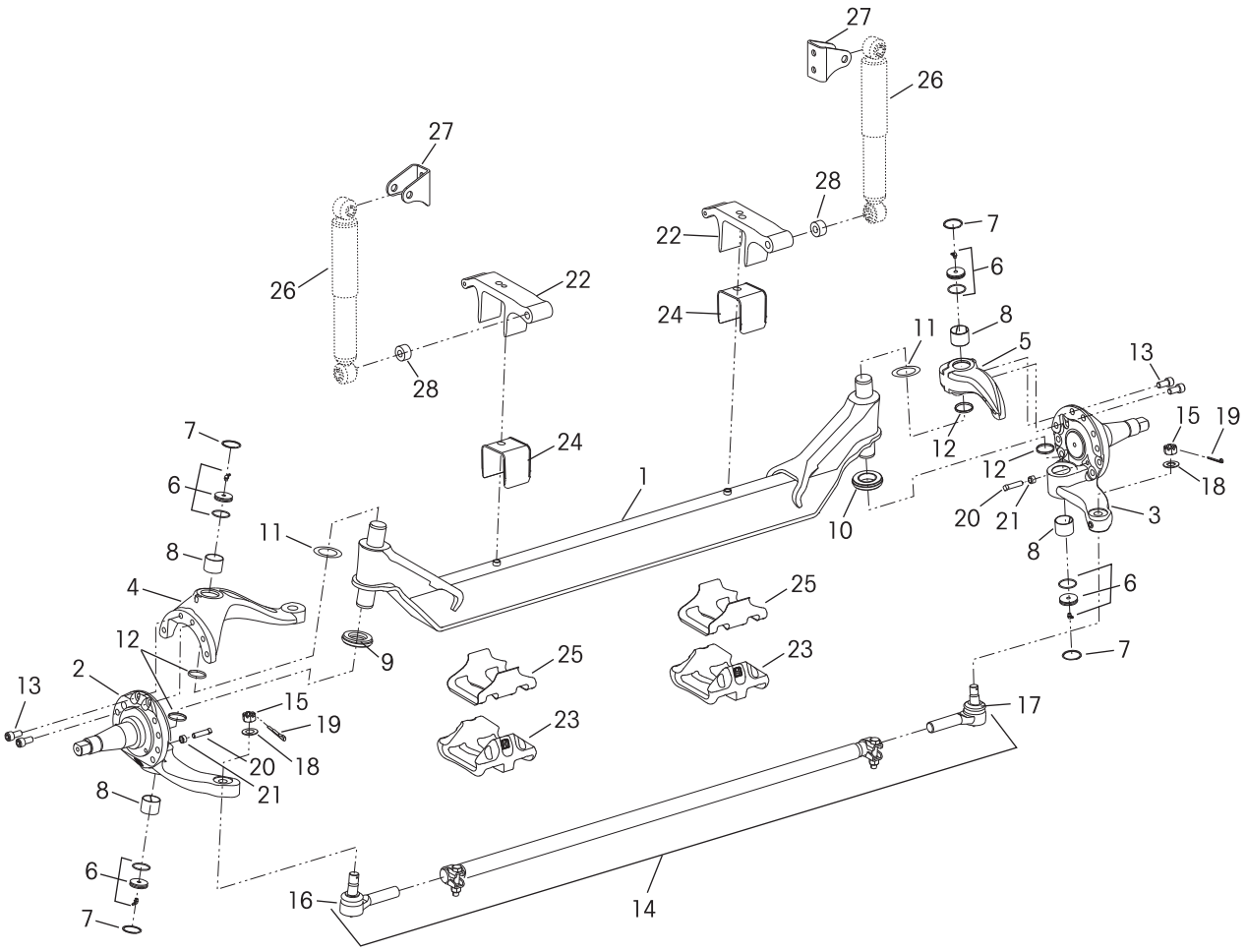
KIT CONTENTS

NO.	DESCRIPTION	QTY.
1	LH HCV, & Linkage Assembly, Includes Fasteners	1
2	Upper Air Spring Bracket	1
3	*LH HCV Support Bracket	1
4	Link Mount	1
5	*LH Front Axle Spacer	1
6	⅜"-16 UNC 3.5" Bolt	1
7	⅜" Hardened Washer	1

* May not be included in all kits

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

STEERTEK with Mechanical Suspension



KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
	70952-	Axle Assembly, Includes Key Nos. 1-25 Contact Hendrickson Tech Services for proper Axle Assembly part number.	1
1		Axle & Kingpin Assembly	1
	64905-001	Coronado, 4.25 Drop, 70.9 KPI, 315 mm/355 mm Ride Ht., *Replaces 59924-001*	
	64905-002	CST/Columbia, 4.25 Drop, 69 KPI, 315 mm/355 mm Ride Ht., *Replaces 59924-002*	
	64905-004	CST/Columbia, 5.36 Drop, 69 KPI, 280 mm/315 mm Ride Ht., *Replaces 59924-004*	
2		LH Lower Steering Knuckle Assembly	1
	58900-001	250 Ackermann	
	58900-003	200 Ackermann	
	58900-005	150 Ackermann	
3		RH Lower Steering Knuckle Assembly	1
	58900-002	250 Ackermann	
	58900-004	200 Ackermann	
	58900-006	150 Ackermann	
4		***LH Upper Steering Knuckle Assembly 12K, 4.25 Drop, 69 KPI,	1
	60903-034	280 mm Ride Ht., *Replaces 60903-004*	
	60903-035	315 mm Ride Ht., *Replaces 60903-005*	
	60903-036	355 mm Ride Ht., *Replaces 60903-006* 12K, 4.25/5.36 Drop, 70.9 KPI,	
	60903-038	315 mm Ride Ht., *Replaces 60903-008*	
	60903-039	355 mm Ride Ht., *Replaces 60903-009*	
5	60904-032	***RH Upper Steering Knuckle Assembly *Replaces 60903-002*	1
	60961-040	**Kingpin Bushing and Bearing Service Kit, Axle Set,** Includes Kit Nos. 60961-009 & -039	
	60961-009	**LH Kingpin Bushing w/Composite Thrust Bearing Service Kit,** Includes Key Nos. 6-9, 11-13, Loctite	
	60961-039	**RH Kingpin Bushing w/Roller Thrust Bearing Service Kit,** Includes Key Nos. 6-8, 10-13, Loctite	
6	59156-000	Grease Cap Assembly	4
7	58937-000	Retaining Ring	4
8	58909-000	Kingpin Bushing	4
	60961-043	**Thrust Bearing Service Kit, Axle Set,** Includes Kit Nos. 60961-041 & -042	
	60961-041	**LH Composite Thrust Bearing Service Kit,** Includes Key Nos. 9, 11-13, Loctite	
	60961-042	**RH Roller Thrust Bearing Service Kit,** Includes Key Nos. 10-13, Loctite	
9	59828-000	LH Composite Thrust Bearing	1
10	64256-000	RH Roller Thrust Bearing	1
11	60259-002	Kingpin Shim	2
12	58910-000	Kingpin Seal	4
13	60236-001	5/8" Socket head cap screw	4
Not Shown	60937-000	Loctite® (Red) Compound Tube	1

KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
14		****Tie Rod Assembly, 12K Includes Key Nos. 15-17	1
		• 4.25 Drop, 315 mm/355 mm Ride Ht.,	
	60239-001	150 Ackermann, 70.9 KPI	
	60239-002	200 Ackermann, 70.9 KPI	
	60239-003	250 Ackermann, 70.9 KPI	
	60239-004	150 Ackermann, 69 KPI	
	60239-005	200 Ackermann, 69 KPI	
	60239-006	250 Ackermann, 69 KPI	
		• 5.36 Drop, 280 mm/315 mm Ride Ht.,	
	66699-001	150, 200 Ackermann, 70.9 KPI *Replaces 59948-001, 59948-002* 250 Ackermann, 69 KPI, *Replaces 59948-006*	
	66699-002	250 Ackermann, 70.9 KPI *Replaces 59948-003*	
	66699-003	150, 200 Ackermann, 69 KPI *Replaces 59948-004, 59948-005*	
15		**7/8" Castle Nut	2
		****Tie Rod End Service Kit, Axle Set	
	60961-010	Includes Kit Nos. 60961-025 & -026 *Replaces 60961-081 & -082*	
	60961-139	Includes Kit Nos. 60961-137 & -138 *Replaces 60961-012*	
		****LH Tie Rod End Service Kit, Includes Key Nos. 16, 18-19	
	60961-025	4.25 Drop, *Replaces 60961-083 & -085*	
	60931-137	5.36 Drop, *Replaces 60961-029*	
		****RH Tie Rod End Service Kit, Includes Key Nos. 17-19	
	60961-026	4.25 Drop, *Replaces 60961-084 & -086*	
	60961-138	5.36 Drop, *Replaces 60961-030*	
16		****LH Tie Rod End	1
	64000-001	4.25 Drop	
	66645-001	5.36 Drop, *Replaces 64004-001*	
17		****RH Tie Rod End	1
	64000-002	4.25 Drop	
	66645-002	5.36 Drop, *Replaces 64004-002*	
18	22962-007	7/8" Flat Washer	2
19	17800-004	Tie Rod Nut Cotter Pin	2
20	60238-000	½"-13 UNC Square Head Bolt	2
21	60240-000	½"-13 UNC Hex Jam Nut	2
22		Top Axle Wrap	2
		CST/Columbia 69 KPI,	
	59952-003	4.25 Drop, 315 mm Ride Ht.; 5.36 Drop, 260 mm/280 mm Ride Ht.	
	59952-004	4.25 Drop, 355 mm Ride Ht.; 5.36 Drop, 315 mm Ride Ht.	
		Coronado (WS) 70.9 KPI,	
	59952-005	4.25 Drop, 315 mm Ride Ht.;	
	59952-006	4.25 Drop, 355 mm Ride Ht.; 5.36 Drop, 315 mm Ride Ht.	
23	64723-002	Bottom Axle Wrap, *Replaces 59440-002*	2
	60961-015	**Top/Bottom Axle Wrap Liner Service Kit, One Side,** Includes Key Nos. 24-25	
24	60508-000	Top Axle Wrap Liner	2
25	59845-000	Bottom Axle Wrap Liner	2
26		*Shock Absorber	2
27	59423-002	Shock Bracket	2
28	59946-001	Shock Spacer	2

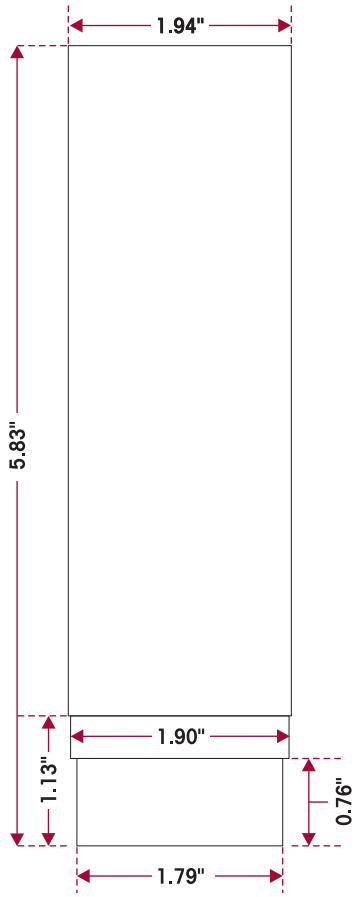
SECTION 5

Special Tools

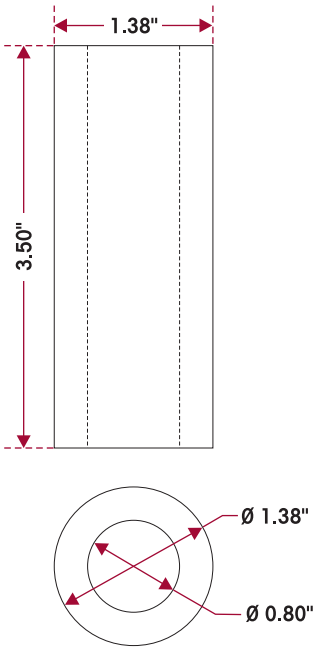
These shop made tools are designed to install and remove kingpin bushings. Bushing tools are made from cold rolled steel or equivalent. Drawings are for reference only. Hendrickson does not supply these tools.

KINGPIN BUSHING TOOLS

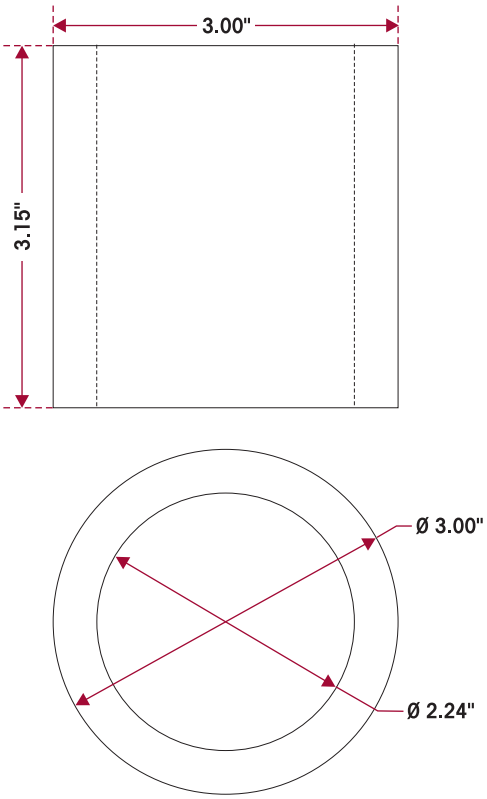
Kingpin Bushing Installer



Kingpin Bushing Remover



Steering Arm Receiver

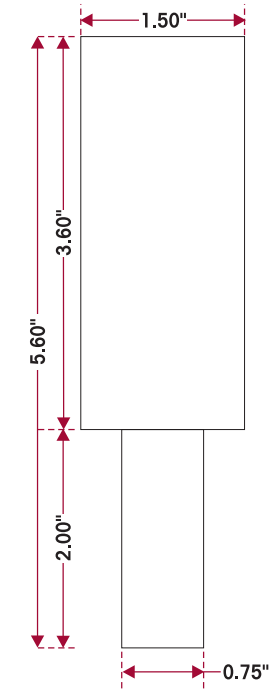


ADJUSTABLE STRAIGHT FLUTE REAMER

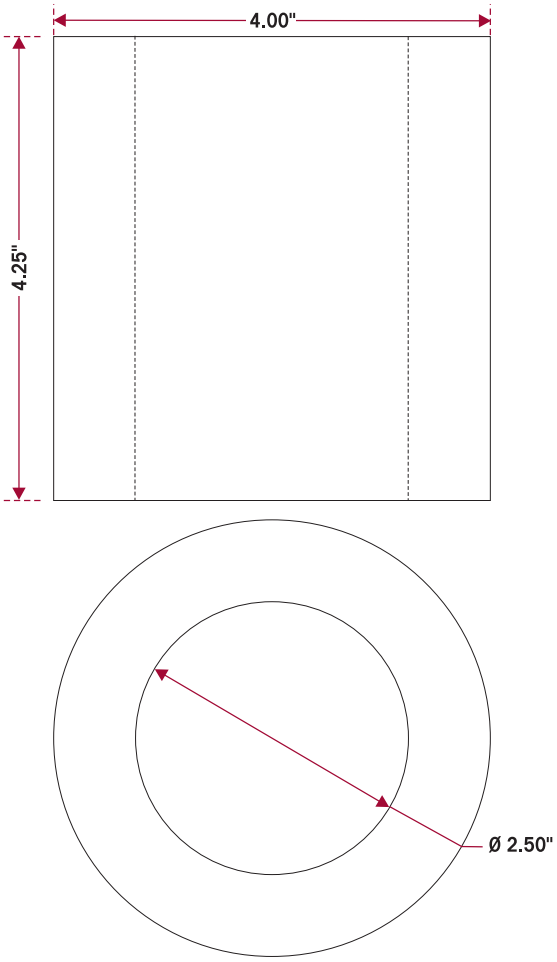
The dimension of cutting diameter must facilitate a range of 1.802" – 1.812"

STEEL LEAF SPRING EYE BUSHING TOOLS

Leaf Spring Driver
For Installation and Removal



Leaf Spring Receiver



SECTION 6

Towing Procedure

ON HIGHWAY AND ON ROADWAY

Hendrickson recommends that a vehicle equipped with a STEERTEK axle be towed by the following methods (listed in order of preference) for ON HIGHWAY or ON ROADWAY applications.

1. Wheel lift method, the ideal towing procedure
2. Towing the vehicle from the rear method
3. Conventional axle fork method
4. Spring eye and hanger lift method (may require the removal of fairings)

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

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

Contact Hendrickson Tech Services toll-free at 866.755.5968 or e-mail to: techservices@hendrickson-intl.com with any questions regarding proper towing procedures for vehicles equipped with a STEERTEK axle.

WHEEL LIFT METHOD—IDEAL

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

TOWING VEHICLE FROM THE REAR METHOD

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

AXLE FORK LIFT METHOD

This is an alternative method for towing the vehicle, but requires standard 5" forks, see Figures 6-2 and 6-3 and designated lift points inside the axle clamp groups. The following procedure must be used:

- Place a spacer on the boom, to provide adequate clearance between the oil pan and the boom if necessary. Lift the vehicle in order to place spacer under tires. This will provide sufficient room under the axle to locate forks in the proper position.
- Install the fork in the boom properly.
- Position the tow forks directly under the axle, inside the axle clamp groups as shown in Figure 6-2.

FIGURES 6-2 AND 6-3

Proper Tow Fork Location on inside clamp group on the STEERTEK Axle

FIGURE 6-4 - WITHOUT GAP

FIGURE 6-5 - WITH GAP

- Prior to lifting the vehicle, ensure that the bottom axle plate is flat in the tow fork to minimize any gap between the bottom axle plate and the tow fork, see Figures 6-4 and 6-5. It may be necessary to deflate the air in the steer axle suspension, and/or release the tractor brakes. Deflate the steer axle air springs by disconnecting the height control valve linkage and lowering the height control valve linkage arm. This will exhaust the air pressure in the steer axle air springs.

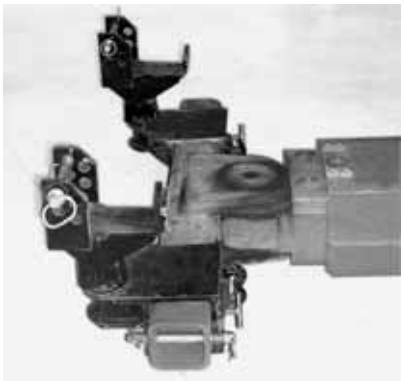
NOTE

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

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

SPRING EYE AND HANGER LIFT METHOD

FIGURE 6-6



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

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

NOTE

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

FIGURE 6-7

OFF ROADWAY TOWING METHOD

WARNING

WHEN A TRUCK IS DISABLED AND EQUIPPED WITH A STEERTEK AXLE, CARE MUST BE TAKEN TO ENSURE THERE IS NO DAMAGE TO THE SUSPENSION OR AXLE WHEN TOWING THE VEHICLE. THE USE OF A TOW STRAP IS NECESSARY TO TOW A DISABLED TRUCK INTO A REPAIR FACILITY. THE TOW STRAPS SHOULD BE CONNECTED TO THE TOW HOOKS PROVIDED BY THE VEHICLE MANUFACTURER AT THE FRONT OF THE BUMPER. IF THE USE OF TOW HOOKS IS NOT AN OPTION THEN A TOW STRAP MAY BE WRAPPED AROUND THE FRONT AXLE (SEE FIGURE 6-8) 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 6-9.

THE FOLLOWING METHODS ARE NOT RECOMMENDED FOR ON HIGHWAY OR ON ROADWAY TOWING

FIGURE 6-8

NYLON STRAPS ARE ACCEPTABLE FOR OFF ROADWAY TOWING

FIGURE 6-9

CHAINS ARE NOT ACCEPTABLE FOR OFF ROADWAY TOWING

SECTION 7

Preventive Maintenance

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

HENDRICKSON RECOMMENDED PREVENTIVE MAINTENANCE INTERVALS

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

COMPONENT INSPECTION

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

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

LUBRICATION INTERVALS

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
Kingpin 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				
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.

FIGURE 7-1

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 and grease gun tip 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 STEERTEK Greasing and Lubrication Specifications matrix above.
5. Force the required lubricant into the upper and lower kingpin grease fittings, until new lubricant flows from upper axle beam and knuckle locations, see grease purging from composite bearing in Figure 7-1.

NOTE

Greasing at the lower zerk should purge grease from the thrust bearing shell. The left side of the axle has a composite style thrust bearing, see Figure 7-2 and the right side of the axle has a steel roller thrust bearing, see Figure 7-3. Both purge in the same area.

FIGURE 7-2

FIGURE 7-3

TIE ROD END LUBRICATION

LUBRICATION PROCEDURE

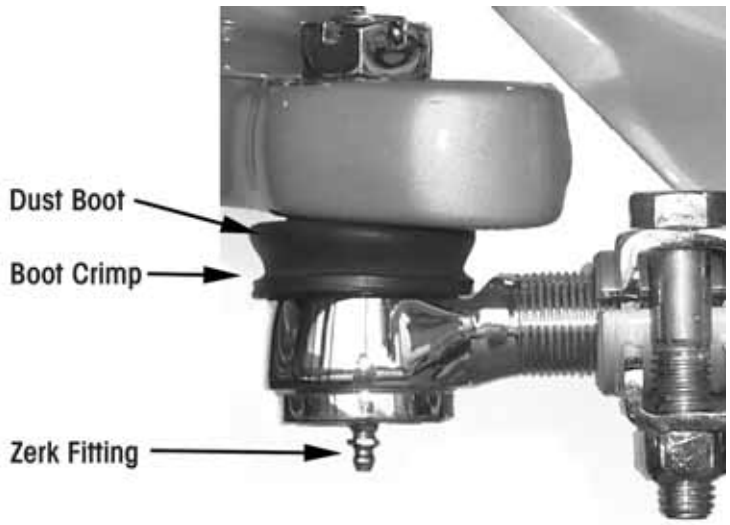
1. Turn the vehicle wheels straight ahead.
2. Wipe the zerk fitting and grease gun tip with clean shop towels.
3. Wipe the seal/boot clean with shop towels.
4. Attach a grease gun to the zerk fitting. Either a hand or pneumatic grease gun is acceptable. If air operated grease gun is used, system air 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 AND COMPONENT FAILURE.

5. Dirt, water, and discolored old grease should flow from the relief vents or purge holes near the boot crimp or bellows area, see Figure 7-4. Continue to purge grease until fresh grease flows from the purge area.

FIGURE 7-4



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 of this publication
7. Apply grease until all the old grease is purged from the boot.

TIE ROD END INSPECTION

INSPECTION PROCEDURE

Before beginning this inspection procedure, the entire system must be unloaded (i.e., the front end of the vehicle must be raised and supported with safety stands).

CAUTION

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

CAUTION

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

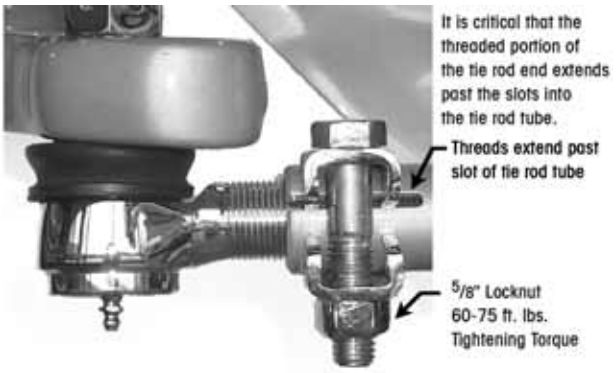
1. Block rear wheels of vehicle. Using the bottom of the axle beam or the frame rails, raise the front end off the ground and support with stands.
2. With the engine off, turn the wheels from full left to full right and then return to the straight-ahead position.
3. Check that the boots are in place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

WARNING

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

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

FIGURE 7-5



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 7-5.
7. Check that zerk fittings are installed. Replace a damaged zerk fitting with a new one.

CAUTION

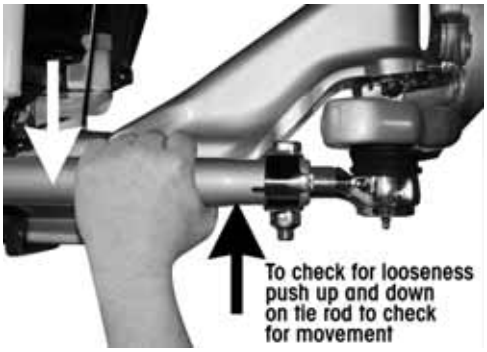
DO NOT USE THE FOLLOWING ITEMS OR METHODS TO CHECK FOR MOVEMENT OF THE TIE ROD ASSEMBLY. DAMAGE TO COMPONENTS CAN RESULT IF:

- A CROW BAR, PICKLE FORK, OR 2 x 4 ARE USED.
- ANYTHING OTHER THAN HANDS ARE 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, see Figure 7-6.

FIGURE 7-6

FIGURE 7-7



9. Position yourself directly below the tie rod end. Using both hands, grab the assembly end as close to the tie rod end as possible (no more than 6" or 152.4mm). Apply hand pressure with reasonable human effort vertically up and down in a push-pull motion several times (using approx. 50-100 pounds of force). Check for any movement or looseness at both tie rod end locations, see Figure 7-7.

FIGURE 7-8

10. If there is any movement in the tie rod assembly, install a magnetic based dial indicator on the Ackermann arm, see Figure 7-8.
11. Set the dial indicator to zero.
12. Apply hand pressure with reasonable human effort vertically up and down in a push-pull motion several times (using approximately 50-100 pounds of force). Observe the reading on the dial indicator.
13. If the reading is more than 0.060", replace both tie rod ends at the next service interval.
14. If a tie rod end exhibits 0.125" of movement by hand, the vehicle should be removed immediately from use and the tie rod end be replaced.

NOTE

According to the Commercial Vehicle Safety Alliance (CVSA), the vehicle “out of service” criteria is: Any motion other than rotational between any linkage member and its attachment point of more than ⅛" (3mm) measured with hand pressure only. (393.209(d)), (published in the North American Standard Out-of-Service Criteria Handbook, April 1, 2006.)

CLAMP GROUP RE-TORQUE INTERVAL

1. Clamp group locknuts must be torqued to specification at preparation for delivery.
2. Clamp group locknuts must be re-torqued at 1,000 miles.
3. Thereafter follow the 6 month/ 50,000 mile inspection and annual re-torque interval.
4. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figures 7-9 and 7-10.

FIGURE 7-9

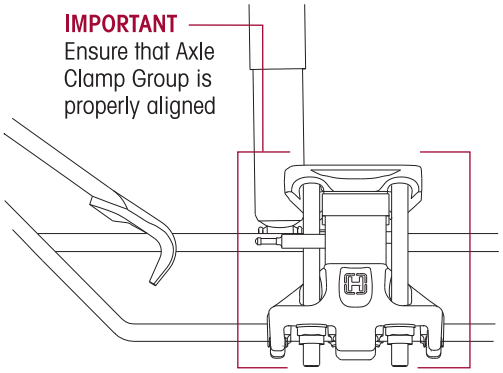


FIGURE 7-10

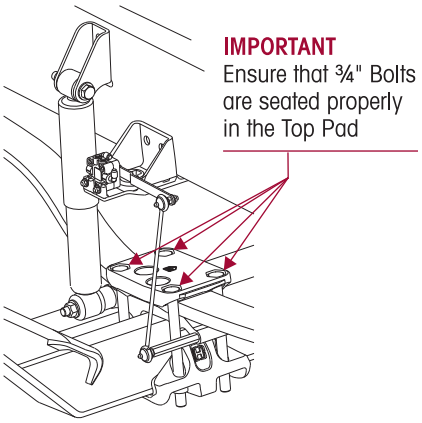
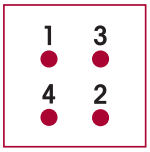


FIGURE 7-11



5. Check for signs of component or bolt movement.
6. If signs of movement are present, disassemble the clamp group fasteners, check for component wear or damage and replace as necessary. Install new clamp group fasteners and repeat Steps 1 through 5.
7. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 7-11.

TIRE INSPECTION

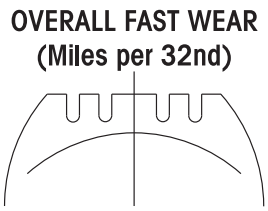
The leading causes of tire wear are the following in order of importance:

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

- The following tire Inspection guidelines are based upon TMC (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 RP 642 or TMC “Guidelines for Total Vehicle Alignment” publication.
- Tire wear is normally the best indicator of vehicle alignment condition. If tires are wearing too rapidly or irregularly, alignment corrections may be needed. The tire wear patterns described below can help isolate specific alignment problems.
- The most common conditions of concern are:
  - Overall Fast Wear (miles per 32nd)
  - Feather Wear
  - Cupping

- Diagonal Wear
- Rapid Shoulder Wear (one shoulder only)
- One-Sided Wear

FIGURE 7-12



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

FIGURE 7-13

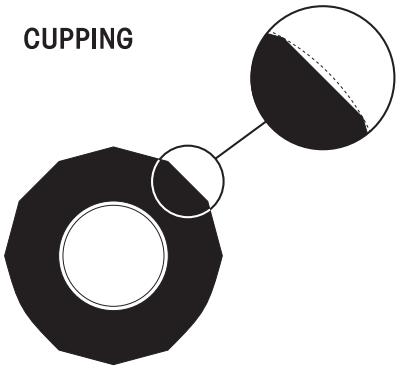
Feather Wear — Tread ribs or blocks worn so that one side is higher than the other resulting in step-offs across the tread face. Generally, ribs or blocks exhibit this wear. To spot this problem, do the following:

With one hand flat on the tread of the tire and a firm down pressure, slide your hand across the tread of the tire. In one direction, the tire will feel smooth and in the opposite direction there will be a sharp edge to the tread. Typical causes of feather wear include: excessive side force scrubbing, resulting from conditions of misalignment such as excessive toe, drive axle misalignment, worn, missing or damaged suspension components, bent tie rods or other chassis misalignment.

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

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

FIGURE 7-14



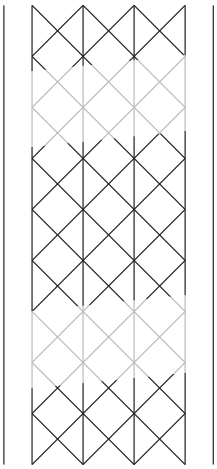
Cupping — Localized, dished out areas of fast wear creating a scalloped appearance around the tire. Cupping, which appears around the tire on the shoulder ribs, may also progress to adjoining ribs. See TMC RP 219A publication, page 7.

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

To solve cupping problems:

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

FIGURE 7-15
DIAGONAL WEAR

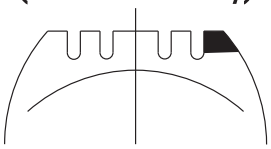


Diagonal Wear — Can be described as localized flat spots worn diagonally across the tread at approximately 25-35° angles, often repeating around the tread circumference. For more information, see TMC RP 219A publication, page 20.

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 7-16
RAPID SHOULDER WEAR (One Shoulder Only)



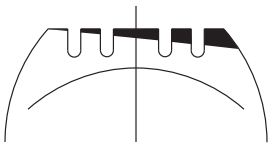
Rapid Shoulder Wear (One Shoulder Only) — Is defined as a tire worn on the edge of one shoulder, sometimes extending to inner ribs. It can progress to diagonal wipeout. For more information, see TMC RP 219A publication, page 22.

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

To correct this type of rapid shoulder wear:

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

FIGURE 7-17
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:

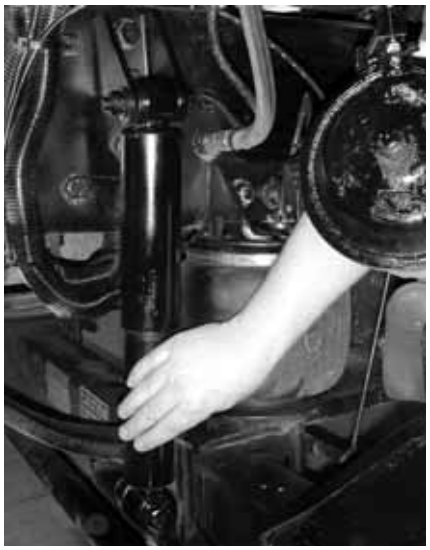
- *Tires* – Depending on severity, rotate tires to another axle position or, if worn to minimum tread depths, submit for possible retreading.
- *Vehicle* – Diagnose mechanical problem and correct.

SHOCK ABSORBER INSPECTION

Hendrickson uses a long service life, premium shock absorber on all AIRTEK suspensions. When the shock absorber replacement is necessary, Hendrickson recommends that the shock absorbers be replaced with identical Hendrickson Genuine parts for servicing. Failure to do so will affect the suspension performance, durability, and will void 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.

FIGURE 7-20



HEAT TEST

1. Drive the vehicle at moderate speeds on rough road for minimum of 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 7-20.
3. Touch the frame to get an ambient reference. A warm shock absorber is acceptable,a cold shock absorber should be replaced.
4. To inspect for an internal failure, remove and shake the suspected shock. Listen for the sound of metal parts rattling inside. Rattling of metal parts can indicate that the shock has an internal failure.

VISUAL INSPECTION

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

FIGURE 7-21

Damaged upper or lower mount

Damaged upper or lower bushing

Damaged dust cover and/or shock body

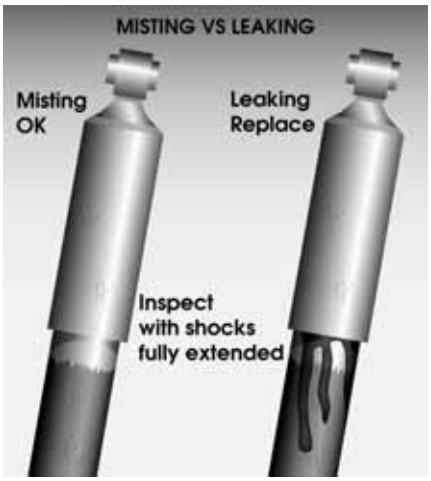
Bent or dented shock

Improper installation example: washers (if equipped) installed backwards.

LEAKING VS. MISTING SHOCK VISUAL INSPECTION

The inspection must not be conducted after driving in wet weather or a vehicle wash. Shocks needs to be free from water. Many shocks are often mis-diagnosed as failures. Misting is the process whereby very small amounts of shock fluid evaporate at a high operating temperature through the upper seal of the shock. When the “mist” reaches the cooler outside air, it condenses and forms a film on the outside of the shock body. Misting is perfectly normal and necessary function of the shock. The fluid which evaporates through the seal area helps to lubricate and prolong the life of the seal.

FIGURE 7-22



A shock that is truly leaking and needs to be replaced will show signs of fluid leaking in streams from the upper seal. These streams can easily be seen when the shock is fully extended, underneath the main body (dust cover) of the shock. Look for these potential problems when doing a visual inspection. Inspect the shock absorbers fully extended. Replace as necessary.

NOTE

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

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

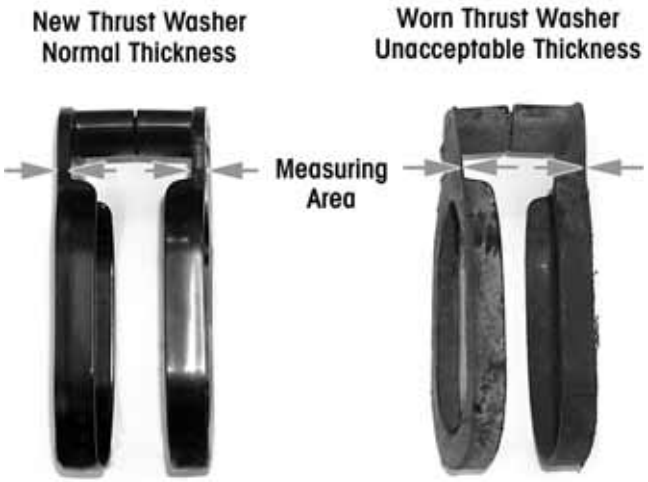
THRUST WASHER INSPECTION (if equipped)

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

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

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

FIGURE 7-23



1. Excessive lateral movement of the spring.
2. The spring taper is making contact with the rear hanger clamp or the rear hanger.
3. The thrust washers in Figure 7-23 shows normal and unacceptable thickness. Thickness can be measured with a micrometer or a ruler.

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

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

The normal thickness of a new thrust washer is $^{7}/_{32}$" (0.220") or 5.62 mm.
The minimum thickness allowable for a thrust washer is $^{3}/_{32}$" (0.090") or 2.25mm.

KINGPIN BUSHING INSPECTION

INSPECTION PROCEDURE

1. Chock the wheels to help prevent the vehicle from moving. Set the parking brake.
2. Use a jack to raise the vehicle until the wheels are off the ground. Support the vehicle with safety stands.
3. CHECKING THE UPPER KINGPIN BUSHING. Install the base of a dial indicator onto the axle beam, see Figure 7-24.
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 7-26.

FIGURE 7-24

FIGURE 7-25

FIGURE 7-26

6. Check the reading on the dial indicator. If the dial indicator moves more than 0.015", the upper bushing is worn or damaged. Replace both bushings. Refer to the Kingpin Bushing replacement procedure in the Component Replacement Section of this publication.
7. CHECKING THE LOWER KINGPIN BUSHING. Install a dial indicator so that the base is on the axle and the indicator tip is against the inside of the bottom of the knuckle, see Figure 7-25.
8. Set the dial indicator to “0” zero.
9. Move the bottom of the tire in and out. If the dial indicator moves more than 0.015", the lower bushing is worn or damaged. Replace both kingpin bushings. Refer to the Component Replacement Section of this publication.

NOTE

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

STEERING KNUCKLE INSPECTION

CHECKING VERTICAL END PLAY (UP AND DOWN MOVEMENT)

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

1. Chock the rear tires to help prevent the vehicle from moving.
2. Set the parking brakes.
3. Use a jack to raise the vehicle until both tires are 1" off the ground.
4. Place a dial indicator on each side of the axle as follows:
   a. Index the wheels slightly (left or right).
   b. Place the magnetic dial indicator base on the axle, see Figure 7-27.
   c. Place the tip of the dial indicator on the top of the upper steering knuckle (not on the grease cap).

FIGURE 7-27

5. Set the dial indicator to “0” (zero).
6. Lower the jack.
7. If vertical clearance is greater than 0.030" install shims (Hendrickson Part No. 60259-002) between the top of the axle and the bottom of the upper steering knuckle to obtain the proper clearance specification. See Steering Knuckle Assembly in the Component Replacement Section of this publication for proper shim installation.
8. If vertical clearance is below 0.008", adjust the upper steering knuckle to obtain the proper clearance specification. See Steering Knuckle Assembly in the Component Replacement Section of this publication for proper shim removal.

AXLE WRAP LINER INSPECTION

FIGURE 7-28

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:

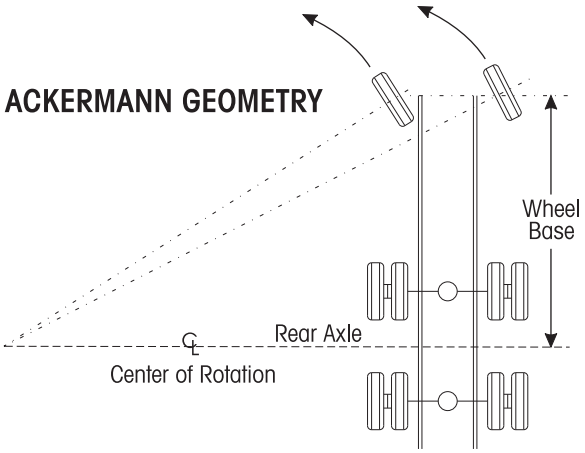
  It is possible for the axle wrap liner to crack during service. If the liner is cracked and all the pieces are intact it is not necessary to replace the liner. If the liner is broken out and there are pieces missing the liner must be replaced immediately, see Figure 7-28. Refer to Axle Wrap replacement in the Component Replacement Section of this publication.

SECTION 8

Alignment & Adjustments

ALIGNMENT DEFINITIONS

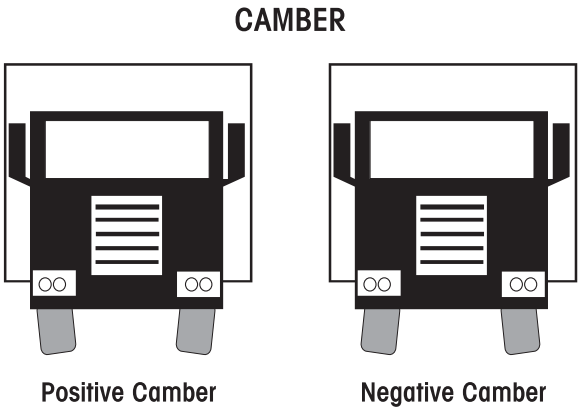
FIGURE 8-1



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

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

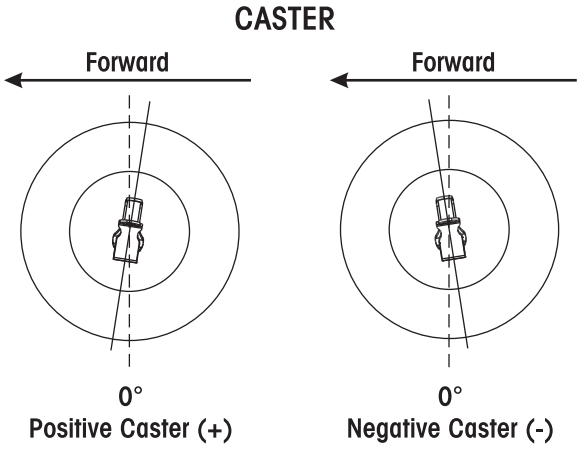
FIGURE 8-2



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

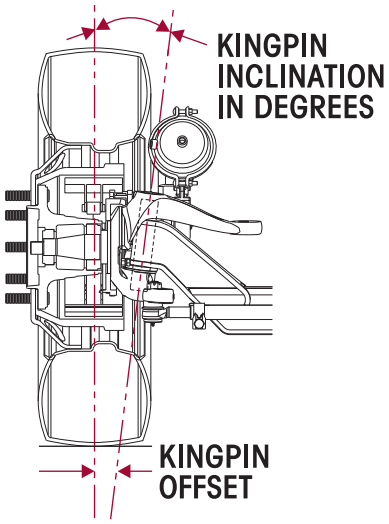
Excessive positive camber may cause smooth wear on the outer half of the tire tread. Excessive negative camber may cause wear on the inner half of the tread. Static-unloaded camber angles are built into the axle to put the loaded tire perpendicular to the road.

FIGURE 8-3



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

FIGURE 8-4

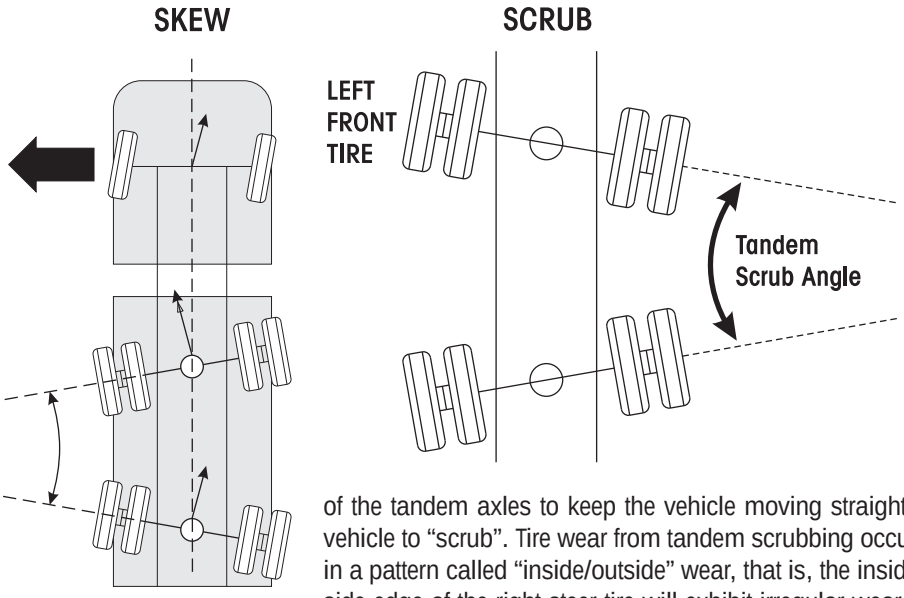


Kingpin Inclination — The inward tilt of the kingpin from the vertical. This front suspension parameter has a pronounced effect on steering effort and returnability. As the front wheels are turned around an inclined kingpin, the front of the truck is lifted. This lifting of the vehicle is experienced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

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

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

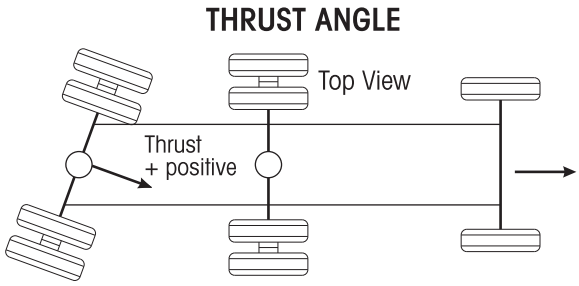
FIGURE 8-5



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

Any scrub angle other than 0° will cause the tandem axles to work against each other. The steer axle must be turned to offset the “push” of the tandem axles to keep the vehicle moving straight ahead. This causes every tire on the vehicle to “scrub”. Tire wear from tandem scrubbing occurs at the leading edge of the steer tires in a pattern called “inside/outside” wear, that is, the inside edge of the left steer tire and the outside edge of the right steer tire will exhibit irregular wear for example. Additional tire wear may occur on all tandem axle tires.

FIGURE 8-6



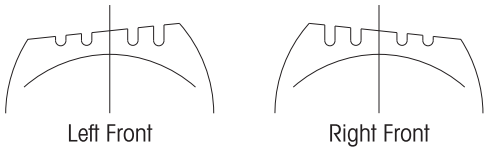
Thrust Angle, Tracking, or Square — The angle formed by the centerline of the vehicle frame (geometric centerline) and the direction that an axle points. As indicated by the term “square”, the ideal value for the angle is 0° or when the axle centerline is at 90° or perpendicular to the geometric centerline.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

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

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

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

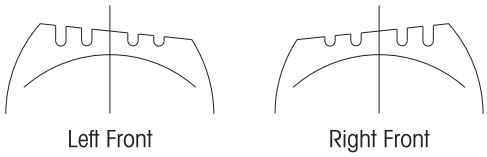
FIGURE 8-7



TOE-IN

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

FIGURE 8-8



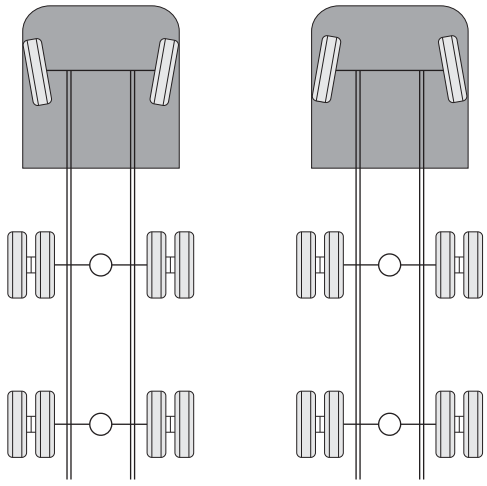
TOE-OUT

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

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

FIGURE 8-9

TOTAL TOE



INSPECTION PRIOR TO ALIGNMENT

WHEELS AND TIRES

Examine the following items:

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

FRONT SUSPENSION

Inspect the following:

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

INSPECT TIE ROD ENDS

Perform the Tie Rod Inspection procedure, refer to the Preventive Maintenance Section of this publication.

REAR AXLE AND REAR SUSPENSION

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

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

FRONT WHEEL ALIGNMENT

Hendrickson recommends technicians review TMC (Technology & Maintenance Council) literature number RP 642 or TMC "Guidelines for Total Vehicle Alignment" publication.

Refer to the AIRTEK / STEERTEK front wheel alignment specifications in this 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 the vehicle ride height as specified in the Preventive Maintenance Section of this publication.
4. Check toe-in and adjust if necessary.

MAJOR FRONT WHEEL ALIGNMENT

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

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

1. Inspect all the systems that influence the wheel alignment. Refer to the Inspection Prior to Alignment in this section.
2. Check and adjust the maximum turn angle, refer to the Steering Stop Adjustment Procedure in this section, see Figures 8-10 and 8-11.
3. If the vehicle is equipped with power steering, check the pressure relief in the power steering system and reset if necessary. Refer to vehicle manufacturer regarding the subject: Adjusting the Pressure Relief in the Power Steering System.

FIGURE 8-10

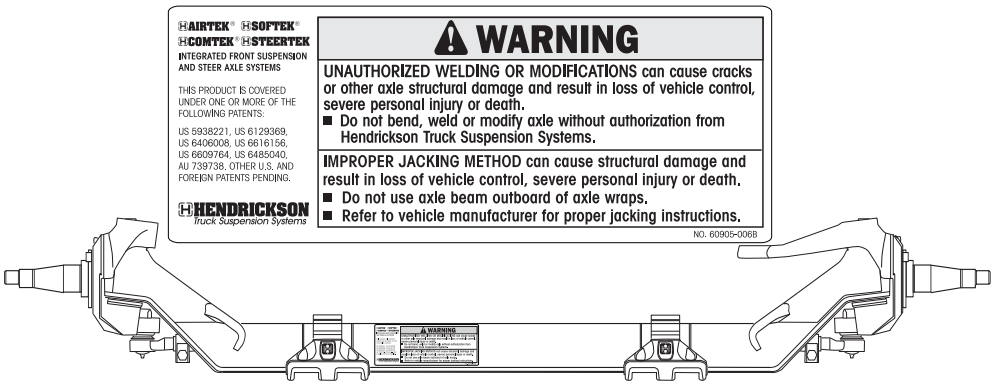
FIGURE 8-11

4. Check the turning angle (toe-out during vehicle turns or the Ackermann angle). Refer to OEM specifications.
5. Check the kingpin (or steering axis) inclination. Refer to “Kingpin Inclination”, under Alignment Definitions in this section.
6. Check the camber angle. DO NOT attempt to adjust. Refer to “Camber” under Alignment Definitions in this section.

WARNING

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

FIGURE 8-12



7. Check and adjust caster angle. Refer to “Caster” under Alignment Definitions in this section. The use of two different angle caster shims will not change cross caster. Cross caster is the difference between the caster readings for left and right side of the vehicle.

SERVICE HINT

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

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

SINGLE RIDE HEIGHT VERIFICATION

1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all the wheels positioned straight ahead. Try to roll to a stop without the brakes being used.
2. Chock drive wheels. DO NOT set parking brake.

DANGER

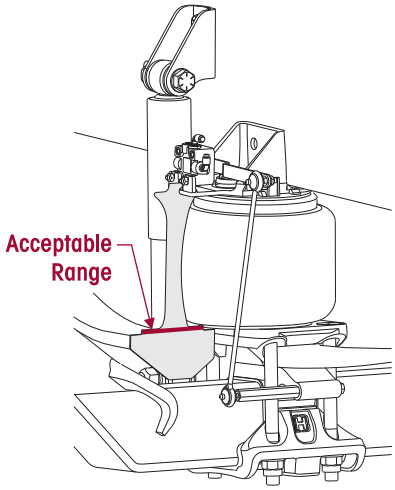
AIR SPRING ASSEMBLIES MUST BE DEFLATED PRIOR TO LOOSENING ANY CLAMP GROUP HARDWARE. UNRESTRICTED AIR SPRING ASSEMBLIES CAN VIOLENTLY SHIFT. DO NOT INFLATE AIR SPRING ASSEMBLIES WHEN THEY ARE UNRESTRICTED. AIR SPRING ASSEMBLIES MUST BE RESTRICTED BY SUSPENSION OR OTHER ADEQUATE STRUCTURE. DO NOT INFLATE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

3. Cycle the air system. Detach the upper rubber grommet of the height control valve linkage from the upper stud and exhaust the suspension system air by lowering the height control valve linkage arm.

SERVICE HINT

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

FIGURE 8-13



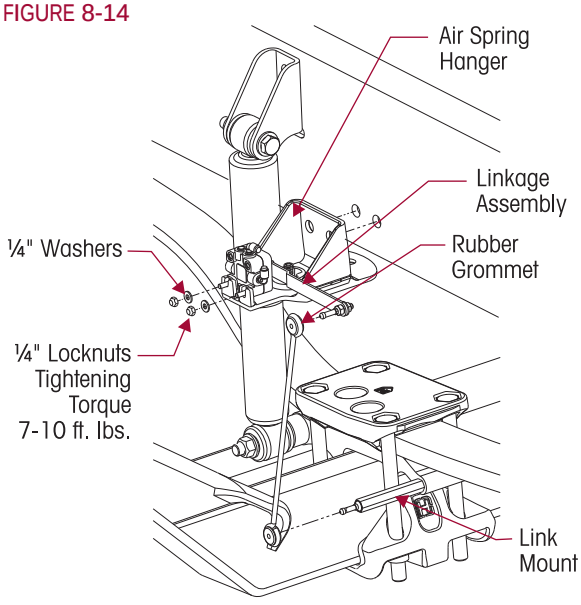
4. Re-attach the upper grommet of the height control valve linkage onto the upper stud to fill the suspension system air. Wait until the airflow to front air springs has stopped.
5. Hold the ride height gauge vertically, see Figure 8-13, and place the gauge (Hendrickson Airtek Height Gauge Lit No. 45745-159), so that the upper notch feature is placed between the height control valve mounting bolts and is flush against the bottom of the air spring bracket. The air spring piston flange edge should contact the lower region marked “ACCEPTABLE”.

   Measure the suspension ride height on the front axle (air spring height 7⅞" ± ⅛") if ride height gauge is not available, the ride height measurement can be taken from the bottom of the upper air spring bracket to the bottom of the air spring piston flange.
6. If the air spring piston flange edge contacts the “BELOW SPEC” region, the ride height is set too low, see Figure 8-13. If the air spring piston flange contacts the “ABOVE SPEC” region the ride height is set too high.

ADJUSTMENT PROCEDURE

1. Detach the upper grommet of the height control valve linkage from the upper stud and lower the linkage arm. This will exhaust the air pressure in the air springs.
2. Prior to adjusting the height control valve, clean the threads of the ¼" fasteners of any debris and corrosion.
3. Adjust the height control valve by loosening the mounting locknuts and pivoting the valve body about the mounting bolt.
4. Facing the air spring from the outboard side of the vehicle, pivot the valve body clockwise to increase the ride height and counter clockwise to decrease the ride height.

FIGURE 8-14



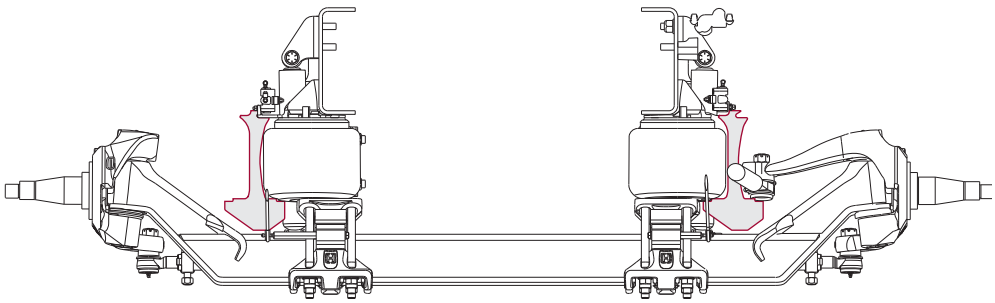
5. After the adjustment is made, place a 3/16" allen wrench on the bottom socket head cap screws to prevent the screws from turning while resentencing the ¼" locknuts.
6. Tighten the mounting ¼" locknuts, tightening torque 7-10 foot pounds, see Figure 8-14.
7. Repeat adjustment Steps 1 through 6 until the air spring piston flange aligns into the “ACCEPTABLE” region of the gauge, see Figure 8-13.

DUAL RIDE HEIGHT VERIFICATION

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

1. Drive the vehicle onto a level surface.
2. Free and center all suspension joints by slowly moving vehicle back and forth several times without using the brakes. It is IMPORTANT when coming to a complete stop to verify the brakes are released.
3. Chock drive wheels.
4. Verify that the air system is at full operating pressure.
5. Detach the lower rubber grommet of the height control valve linkage from the lower stud and exhaust the suspension system air by lowering the height control valve linkage arms.
6. Re-attach the lower grommet of the height control valve linkages onto the lower studs to fill the suspension system with air. Wait until the airflow to the front air springs has stopped.
7. The referenced ride height is measured at the front of the air spring. Place the gauge, (Hendrickson AIRTEK ride height gauge, Literature Number 45745-159) so the flat surface of the gauge is against the side of the frame rail, the horizontal flat is sitting below the height control valve brackets on each side. Align the bottom of the height gauge to the air spring piston flange as shown in Figure 8-15. Verify that the air spring height is within the “ACCEPTABLE” tolerance indicated on the gauge.

FIGURE 8-15



8. If the air spring piston flange edge is in contact to the “BELOW SPEC” region, the ride is set too low. If the air spring piston flange contacts the “ABOVE SPEC” region, the ride height is set too high. If the ride height is out of specification it will be necessary to adjust the ride height.
9. If a ride height gauge is not available, measure the suspension referenced ride height on the front axle (top front of the air spring to the bottom of the air spring piston flange height 7⅞" ± ⅛"). If the referenced ride height is out of specification, it will be necessary to adjust the ride height.

ADJUSTMENT PROCEDURE

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

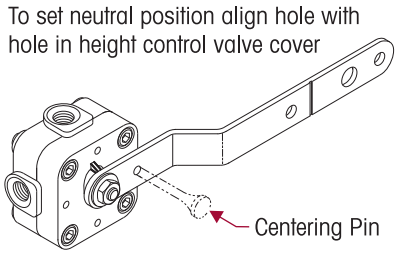
SERVICE HINT

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

2. See Air Spring Safety Notice in the Important Safety Notice Section of this publication prior to deflating or inflating the suspension system. Cycle the air system. Detach the lower rubber grommet(s) of the height control valve linkage(s) from the lower stud and exhaust the suspension system air by lowering the height control valve linkage arm.

3. Refill the suspension by raising the height control valve arm(s) by hand, so that the air springs are above the proper ride height.
4. Lower the leveling valve arm(s) to exhaust the air system until the suspension is at the proper ride height.
5. Use a ⅛" wooden dowel rod (golf tee) to set the neutral position for the height control valve(s) by aligning the hole in the leveling arm(s) with the hole in the height control valve cover, as shown in Figure 8-16. DO NOT use a metal rod or nail as this may cause damage to the height control valve.

FIGURE 8-16

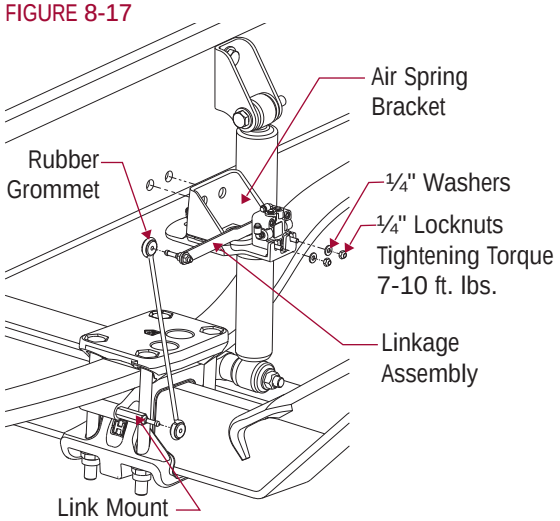


NOTE

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

6. Prior to adjusting the height control valves, clean the threads of the mounting fasteners of any debris and corrosion.
7. To adjust the height control valve, loosen the mounting locknuts.
8. Adjust the height control valves by loosening the mounting locknuts and pivoting the valve body about the mounting bolt so the link mount stud inserts directly into the center hole of the rubber grommet at the proper height. Check the rubber grommet for any tearing or damage, replace as necessary.

FIGURE 8-17



9. Facing the air spring from the outboard side for the left side of the vehicle, pivot the valve body counter clockwise to increase the ride height and clockwise to decrease the ride height. For the right side of the vehicle, pivot the valve body clockwise to increase the ride height and counter clockwise to decrease the ride height.
10. Tighten the mounting locknuts to 7-10 foot pounds torque after the adjustment is made, see Figure 8-17. Install a (5 mm) allen wrench in the bottom socket head cap screws to prevent the screws from turning while re-tightening the locknuts. Remove the dowel from the height control valves.
11. Cycle the air from the system by lowering the height control valve arm.
12. Reconnect the height control valve linkage rubber grommet to the link mounts. Allow the air suspension system to completely fill with air.
13. Recheck the ride height after adjustment, (if equipped with dual height control valves check both sides of the vehicle).
14. Repeat adjustment Steps 2 through 12 until the ride height is within specification.

DAY CAB RIDE HEIGHT ADJUSTMENT

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

STEERING STOP

ADJUSTMENT PROCEDURE

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

The steering stop adjustment procedure is as follows:

1. Drive truck onto turntables and chock the rear wheels.
2. Measure the wheel cut. The wheel cut is determined by steering the tires. Wheel cut is measured at the inside wheel only, therefore the tires must be turned to the full lock position for each right hand and left hand direction. Refer to the vehicle manufacturer for exact specifications.
3. Increase the wheel cut by loosening the jam nuts and screw the axle stops in clockwise.
4. Tighten the jam nuts.

FIGURE 8-18

NOTE

It is very important that the sides of the square head axle stops are set parallel to the axle beam to ensure a good contact point on the axle, see Figure 8-18.

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

WARNING

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

TOE SETTING

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

NOTE

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

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

8. Install the trammel bar and measure the distance between the scribe marks at the front of the steer axle tires. Record the measurement, see Figure 8-19.

NOTE

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

9. To calculate the toe setting subtract the front measurement from the rear measurement, the difference between the two will equal the toe-in/toe-out measurement.
10. If the toe measurement is not within the specifications of 1/16" ± 1/32" (0.060 ± 0.030), it will be necessary to adjust the toe setting. Refer to the following procedure.
    a. Loosen the tie rod cross tube clamp bolts and locknuts.
    b. Turn the tie rod cross tube until the specified toe-in distance is achieved.

⚠ WARNING

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 8-20. FAILURE TO DO SO CAN CAUSE COMPONENT TO FAIL CAUSING LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

    c. Tighten the bolt and locknut on the tie rod cross tube to 60-75 foot pounds torque.

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

FIGURE 8-19

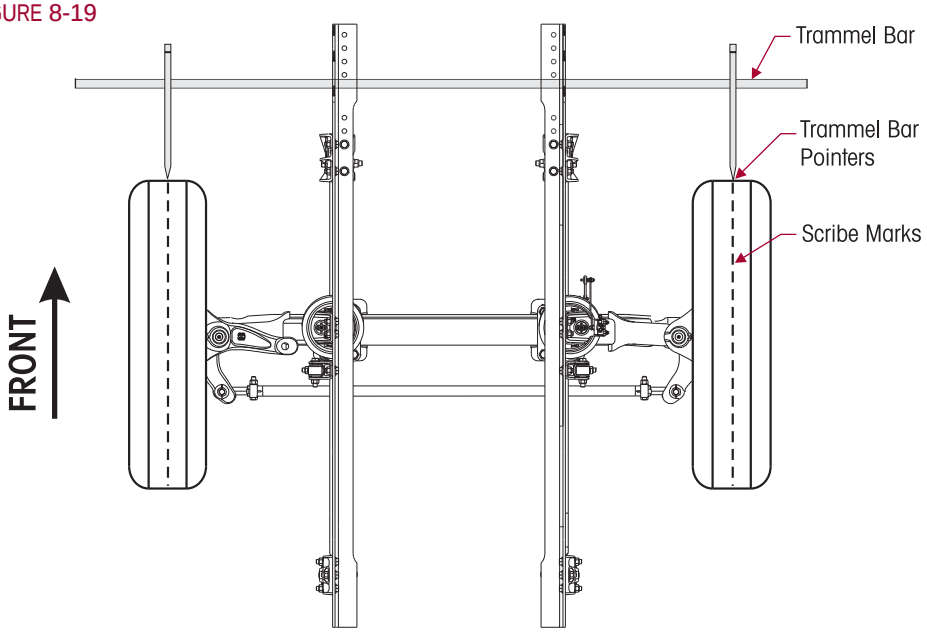
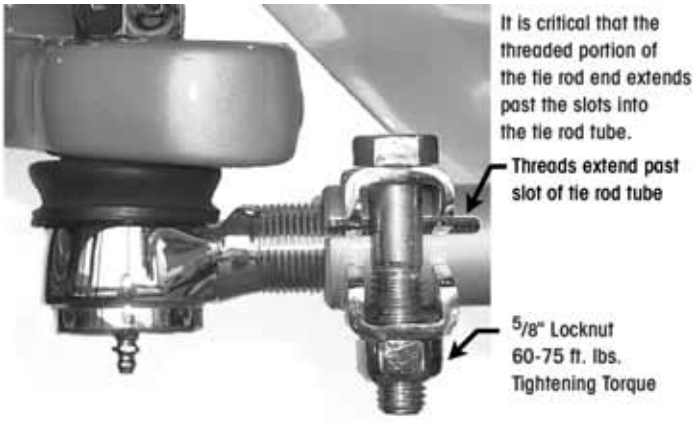


FIGURE 8-20



SPRING EYE RE-TORQUE

This procedure to re-torque is necessary when replacing: The front hanger, rear hanger, steel leaf spring.

NOTE

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

RE-TORQUE PROCEDURE

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

⚠ WARNING

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

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

⚠ CAUTION

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

5. Disconnect the air lines to the air springs.
6. Raise the truck and install frame stands in front of the leaf spring hangers under the radiator area or behind the rear spring mounts.
7. Lower the front axle. Allow at least 3" of wheel clearance to the ground. The shock absorbers must be connected. DO NOT reverse arch springs.

⚠ WARNING

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

8. Loosen all four (4) front and rear spring eye bolts, see Figure 8-21. The suspension may drop down slightly. DO NOT remove the spring eye bolts. The tires must not contact the ground.
9. Let the suspension settle.
10. ■ Front hanger not suppled by Hendrickson, tighten the front spring eye locknuts to vehicle manufacturer's specifications.
    - ■ Front hanger supplied by Hendrickson, tighten the front spring eye ¾" locknuts to 285-305 foot pounds torque.
11. Tighten the rear spring eye ¾" locknuts to the torque specified in the Torque Specifications Section of this publication.
12. Jack the front axle and remove the frame stands.
13. Lower the vehicle.
14. Check the air springs to verify that they are seated properly and install the air lines into the air springs.

FIGURE 8-21 Shown Freightliner vehicles built prior to 05/2010

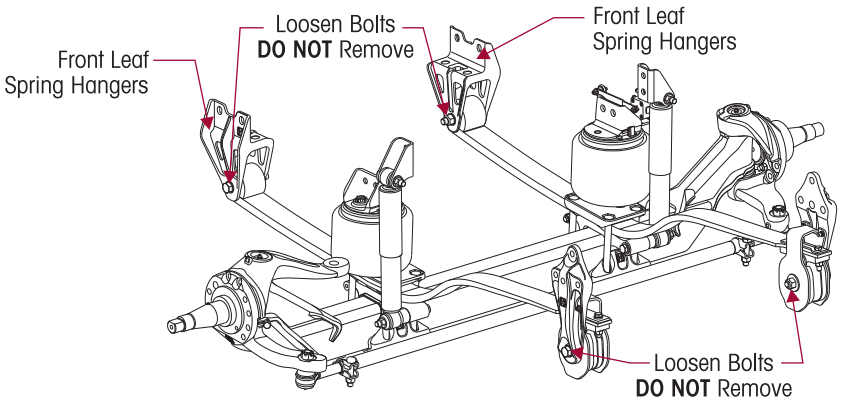
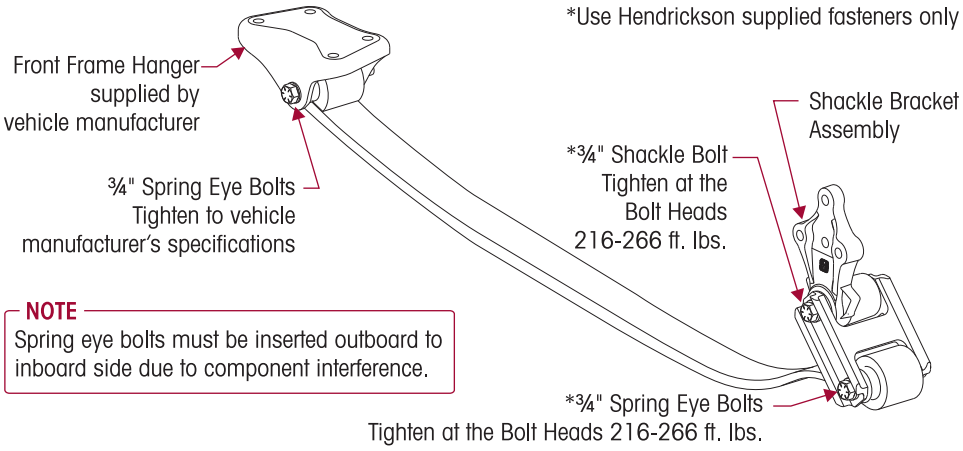


FIGURE 8-22 Shown Freightliner vehicle built after 05/2010



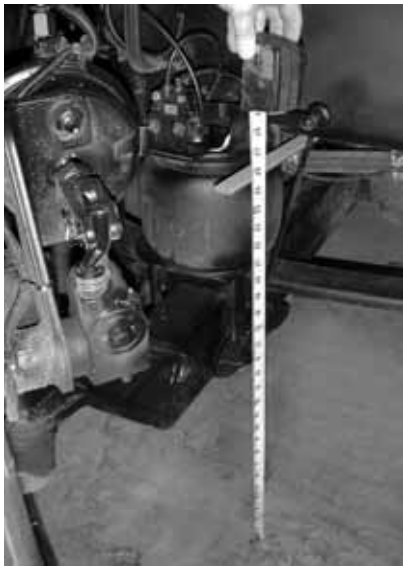
NOTE
Spring eye bolts must be inserted outboard to inboard side due to component interference.

WARNING

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

15. Reconnect the height control valve and air up the system.
16. Affix a straight edge to the bottom of the frame rail in front of the air spring, see Figure 8-23.
17. 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.
18. Measure the difference from one side to the other.
19. Do a road test and repeat measurement Steps 14 to 16.
20. If the measurement is less than 3/8" then attach the front fairing. If measurement is more than 3/8" contact Hendrickson Tech Services.

FIGURE 8-23



SECTION 9

Component Replacement

FASTENERS

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

HEIGHT CONTROL VALVE

DISASSEMBLY

1. Drain the air from the secondary air tank.

⚠ WARNING

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

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

⚠ CAUTION

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

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

FIGURE 9-1

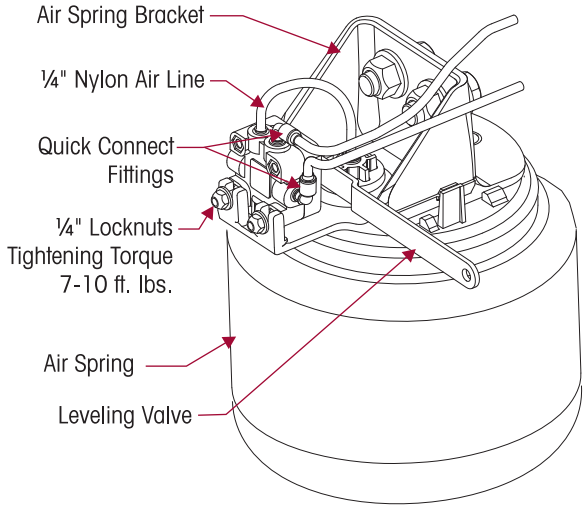
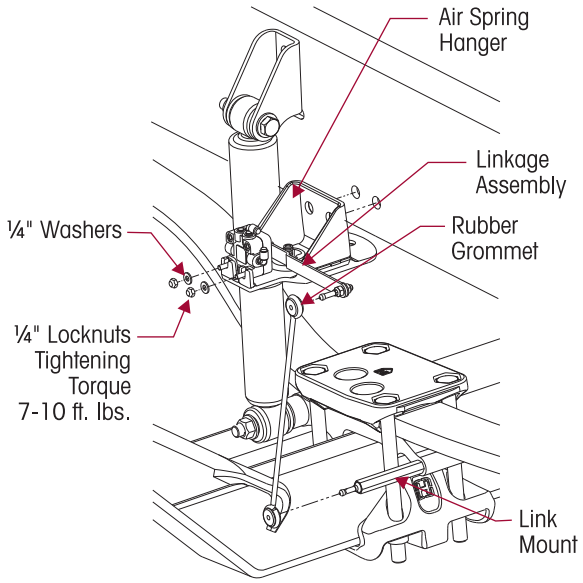


FIGURE 9-2



5. Remove the two ¼" mounting nuts and washers.
6. Remove the height control valve.

ASSEMBLY

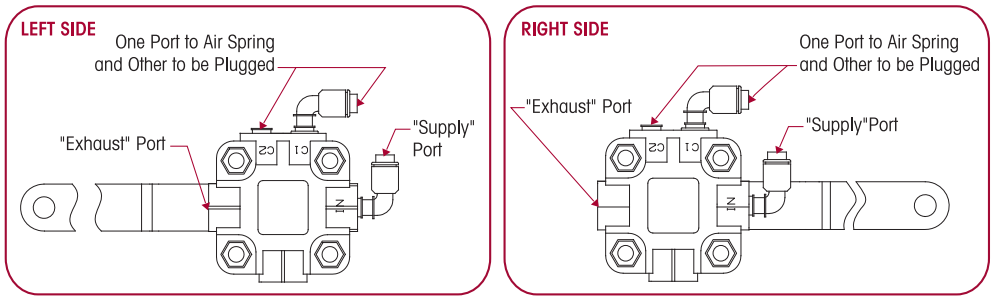
1. Attach the height control valve on the mounting bracket as shown in Figure 9-1.
2. Attach the ¼" washers and the locknuts. DO NOT tighten the locknuts to specified torque until after the proper ride height is attained. Mount the height control valve parallel to the flange of the upper air spring bracket, see Figure 9-2.

SERVICE HINT

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

3. Attach the air lines to the height control valve, see Figure 9-3.

FIGURE 9-3



4. Install the height control valve linkage assembly.
5. Adjust the height control valve to proper specifications. See the Alignment & Adjustments Section of this publication for proper ride height adjustment.
6. Tighten the ¼" locknuts to 7-10 foot pounds torque.

AIR SPRING

DISASSEMBLY

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

WARNING

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

CAUTION

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

WARNING

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

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

4. Remove the air from the air system by disconnecting the height control valve linkage at the rubber grommet and allowing the lever to drop. This will exhaust air from the system.
5. Raise the truck with floor jack.
6. Support the frame with frame stands.
7. Lower the axle.
8. Raise the frame to allow for air spring removal.
9. Separate the air spring from the upper air spring bracket by applying downward pressure on air spring, see Figure 9-4, pushing outward on the lock-tabs outside the bracket, and inward on inlet lock-tabs, see Figure 9-6 for lock locations. This will dislodge the air spring from the upper air spring bracket.
10. Apply upward pressure between the base of the air spring and the top pad. This will dislodge the air spring from the top pad, see Figure 9-5.
11. Remove the air spring.

FIGURE 9-4

FIGURE 9-5

ASSEMBLY

1. Compress the air spring and slide into vertical position. There is a locating nodule on the air spring to index the position in the upper air spring bracket. Make sure the lock tabs click in place.
2. 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.
3. Properly seat the air spring piston into the top axle pad and install the air line into the air spring.

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.

⚠ WARNING

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

⚠ WARNING

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

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

SHOCK ABSORBER

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

⚠ WARNING

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

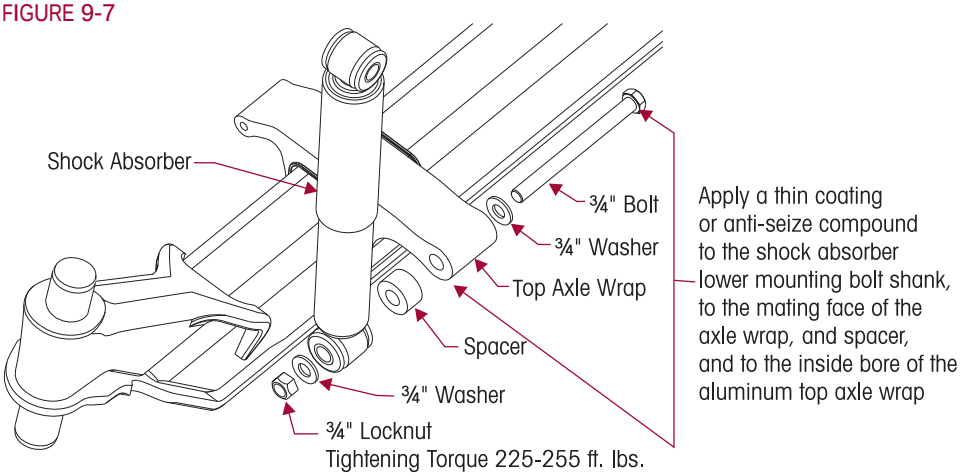
DISASSEMBLY

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

ASSEMBLY

1. Install the shock absorber into the upper mounting bracket.
2. Install the upper shock mounting bolt, washers and locknut.
3. 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.

FIGURE 9-7



4. Install the lower bolt from the inboard side to the outboard side of the top axle wrap and attach the spacer, washer, and locknut, see Figure 9-7.
5. Tighten both of the shock eye locknuts to 225-255 foot pounds torque.
6. Remove the wheel chocks.

FRONT LEAF SPRING HANGER

NOTE

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

DISASSEMBLY

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

⚠ WARNING

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

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

⚠ CAUTION

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

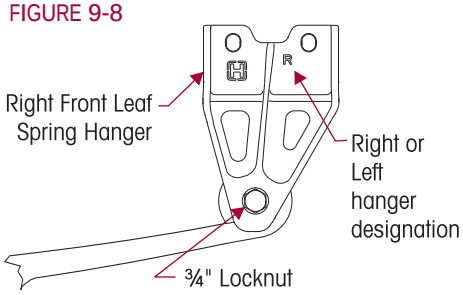
8. Disconnect the air lines at the air springs.
9. Remove the front leaf spring eye mounting bolt and hardware.

SERVICE HINT

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

10. Remove the frame mounting fasteners from the hanger. See the vehicle manufacturer's guidelines for huck removal, if equipped.
11. Remove the front hanger.
12. Inspect the front hanger mounting surfaces on the frame for cracks or fretting.
13. Inspect the front spring eye bushing for damage or excessive wear. If damaged or worn excessively replacement is necessary, see the Spring Eye Bushing Replacement in this section.

FIGURE 9-8



ASSEMBLY

1. Install the new hanger flush to the bottom of the frame. Left and Right hanger designation is located on outboard of the hanger, see Figure 9-8.
2. Install the new frame hardware. See vehicle manufacturer's guidelines.

SERVICE HINT

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

3. Install the ¾" spring eye bolt. Tighten ¾" locknut to 285-305 foot pounds torque. See Spring Eye Re-torque Procedure in the Alignment & Adjustments Section of this publication.
4. Raise the truck and remove the jack stands or frame support.
5. Lower the vehicle and reconnect the air lines to the air springs.

WARNING

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

6. Check the air springs to verify that they are properly seated to the air spring brackets and top pad.
7. Install the height control valve linkage assembly.
8. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
9. Air up the system.
10. Remove wheel chocks.

SHACKLE ASSEMBLY

Freightliner built after 05/2010 • Western Star built after 06/2010

DISASSEMBLY

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

WARNING

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

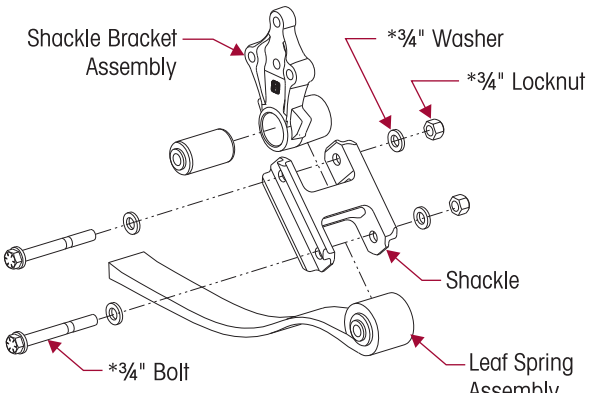
6. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.
7. Deflate the air springs by removing the height control valve linkage and lowering the leveling valve arm. This will exhaust the air pressure in the air springs.
8. Remove the air lines from the air springs.
9. Remove the rear ¾" spring eye and shackle pivot bolts, washers and locknuts.

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

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

FIGURE 9-9a

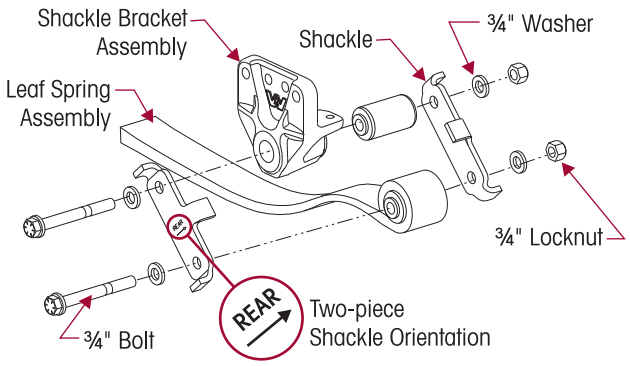
Freightliner Vehicles built after May 2010



*Use Hendrickson supplied fasteners only

FIGURE 9-9b

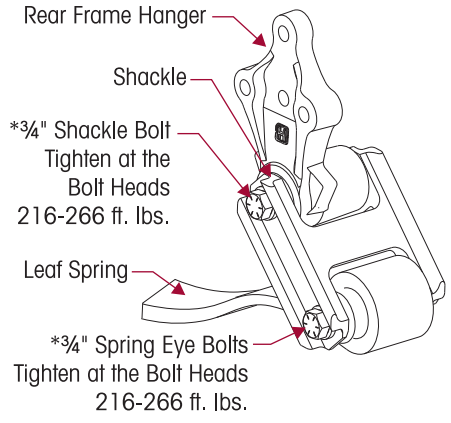
Western Star Vehicles built after June 2010



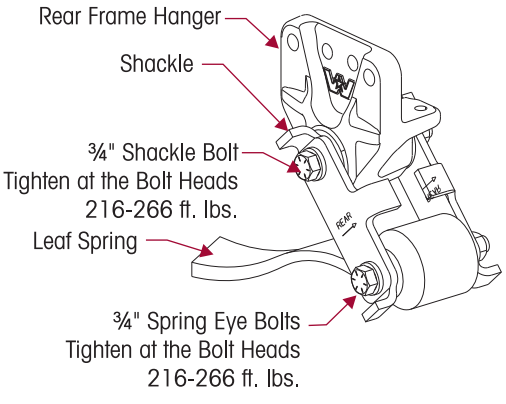
NOTE
Spring eye bolts must be inserted outboard to inboard side due to component interference.

FIGURE 9-10

Freightliner Vehicles built after May 2010



Western Star Vehicles built after June 2010



*Use Hendrickson supplied fasteners only

ASSEMBLY

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

1. Install the shackle bracket assembly on the frame.
2. Install new frame fasteners, per the vehicle manufacturer's guidelines.
3. Install the shackle with the ¾" bolts, washers and locknuts. Snug the shackle bolts, DO NOT tighten at this time.
4. Remove the frame stands and lower frame.5. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to inflating or deflating the suspension system.
6. Install the air lines into the air springs.
7. Install the height control valve linkage and inflate the suspension to normal ride height.
8. With the vehicle at the proper ride height, tighten ¾" shackle locknuts to 216-266 foot pounds torque, see Figure 9-10.
9. Remove the wheel chocks.

REAR SPRING HANGER

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

DISASSEMBLY

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

WARNING

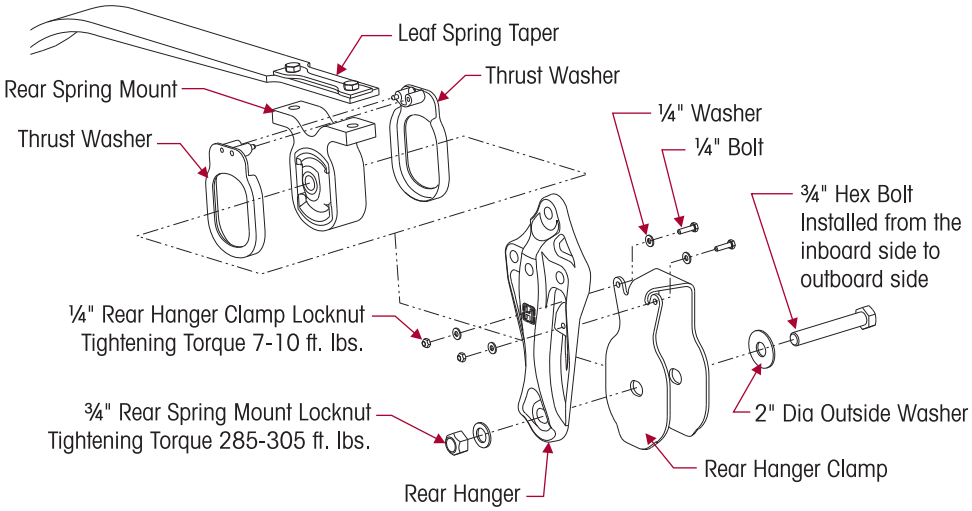
PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.

6. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
7. Deflate the air springs by detaching the upper rubber grommet of the height control valve linkage from the upper stud and exhaust the suspension system air by lowering the height control valve linkage arm.
8. Remove the air lines from air springs.

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

9. Remove the ¾" rear spring mount fasteners, see Figure 9-11.
10. Remove the two ¼" x 1" hex bolts from the rear hanger clamp and the rear hanger., see Figure 9-11.
11. Remove the frame mounting fasteners from the rear leaf spring hanger. See vehicle manufacturer's guidelines.
12. Remove the rear hanger from the vehicle, see Figure 9-11.

FIGURE 9-11

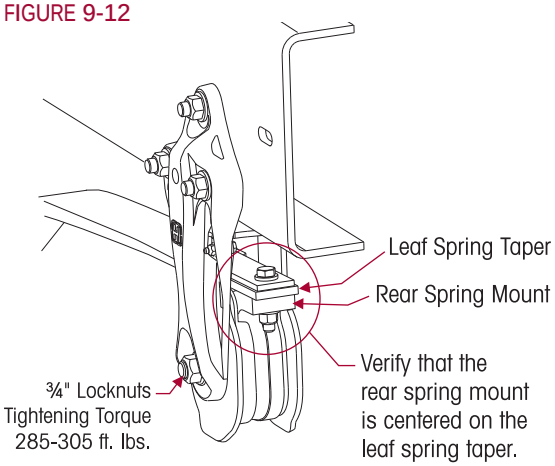


13. Remove the rear hanger clamp from the rear spring mount.
14. Remove the two thrust washers from the rear spring mount.
15. Inspect the rear spring mount, rear hanger clamp and both thrust washers for excessive wear or damage. See Thrust Washer Inspection in the Preventive Maintenance Section of this publication.
16. If damaged or worn excessively, replace with Genuine Hendrickson Parts as detailed in this section.

ASSEMBLY

1. Install the thrust washers on the rear spring mount.
2. Slide the rear hanger clamp over the rear spring hanger.
3. Install the two ¼" bolts and fasteners into rear hanger clamp and rear hanger assembly. Tighten ¼" locknuts to 7-10 foot pounds torque, see Figure 9-12.
4. Install the rear spring hanger on the frame.

FIGURE 9-12



5. Install new frame mounting fasteners. Follow vehicle manufacturer's guidelines.
6. Raise the axle to install the rear spring mounts into the rear hanger clamps.
6. Place the 2" outside diameter washer against the rear hanger clamp on the inboard side, see Figure 9-11.
7. Install ¾" x 5" rear spring mount bolt from the inboard side.
8. Install the ¾" washer and locknut. Tighten the ¾" locknuts to 285-305 foot pounds torque, see Figure 9-12.
9. Lower the jack and let the suspension hang.
10. Raise the vehicle and remove the frame stands.
11. Lower the vehicle and remove the jack.
12. Install the air lines into the air springs.

13. See Air Spring Warnings and instructions in the Important Safety Notice Section of this publication prior to deflating or inflating the suspension system.
14. Inflate the suspension to normal operating pressure.
15. Remove wheel chocks.

THRUST WASHER AND REAR HANGER CLAMP

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

DISASSEMBLY

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

⚠ WARNING

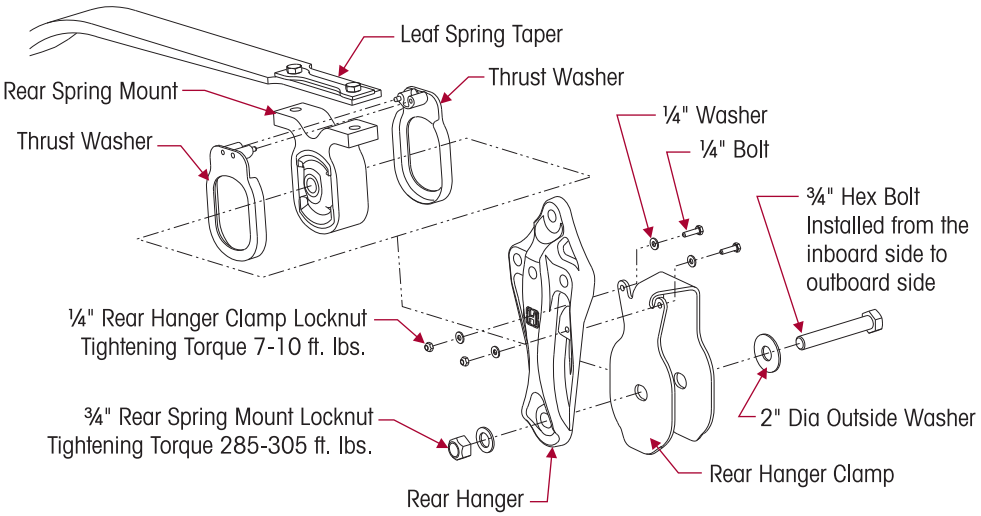
PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.

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

SERVICE HINT

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

FIGURE 9-13



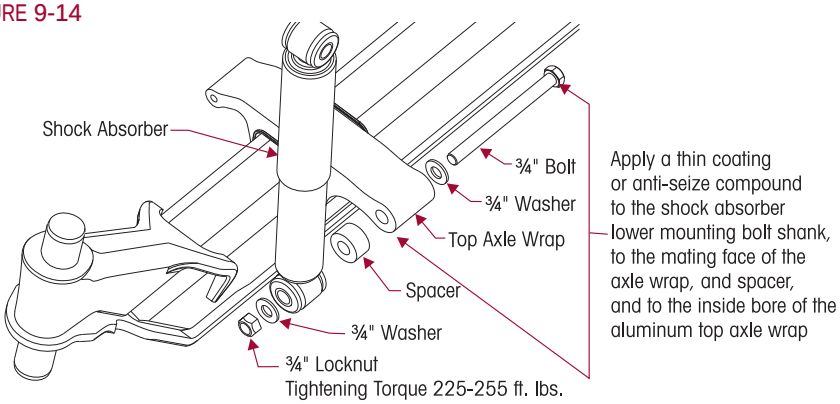
10. Loosen both front ¾" x 5½" spring eye bolts, DO NOT remove the bolts.
11. Remove both rear ¾" x 5" rear spring mount hex bolts.
12. Remove the lower shock mounting bolts.
13. Lower the jack until the rear spring mounts are below the spring hangers.

14. Remove the ¼" x 1¼" rear hanger clamp bolts and remove the rear hanger clamp, see Figure 9-13.
15. Remove the two thrust washers from the rear spring mount, see Figure 9-13.
16. Inspect the spring mount for torn rubber, if the metal sleeve is worn through or if the housing is cracked. If any of these conditions exist replacement is necessary.

ASSEMBLY

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

FIGURE 9-14



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

LEAF SPRING

Freightliner vehicles built after 05/2010 • Western Star vehicles built after 06/2010

DISASSEMBLY

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

⚠ WARNING

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

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
4. Deflate and disconnect the air system prior to raising the front of the vehicle.
5. Remove the air from the air system by disconnecting the height control valve linkage(s) at the rubber grommet(s) and allowing the lever to drop. This will exhaust air from the system.

⚠ WARNING

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.

6. Disconnect the air lines at the air springs.
7. Raise the truck.
8. Support the frame with frame stands.
9. Suspend the front axle to remove the load from leaf spring assembly.
10. Remove the air spring, see Air Spring Disassembly in this section.
11. Support the axle with a jack.
12. Remove the front and rear spring eye bolts and fasteners.

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

⚠ WARNING

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

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

⚠ CAUTION

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

14. Remove the ¾" clamp group bolts, nuts, washers, top pad, front axle spacer (if equipped), galvanized liner, and the bottom axle wrap from the spring that is going to be removed, see Figure 9-15.
15. Remove the leaf spring assembly.

FIGURE 9-15

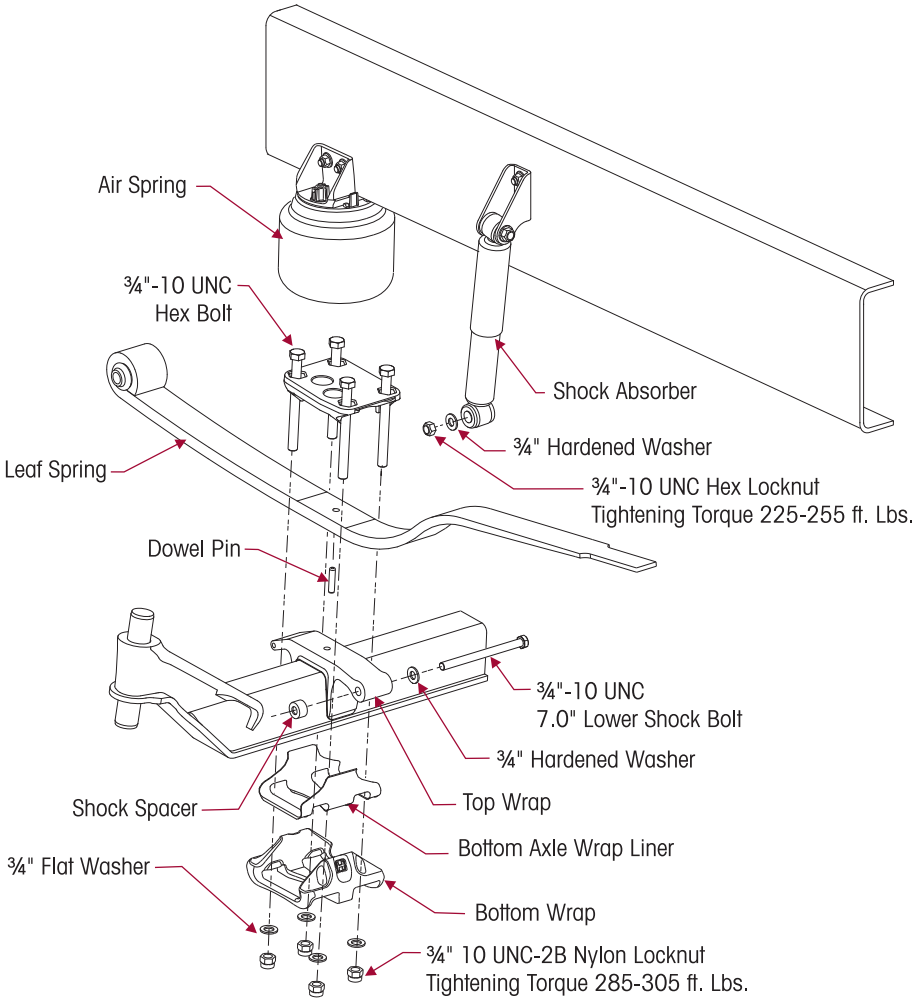
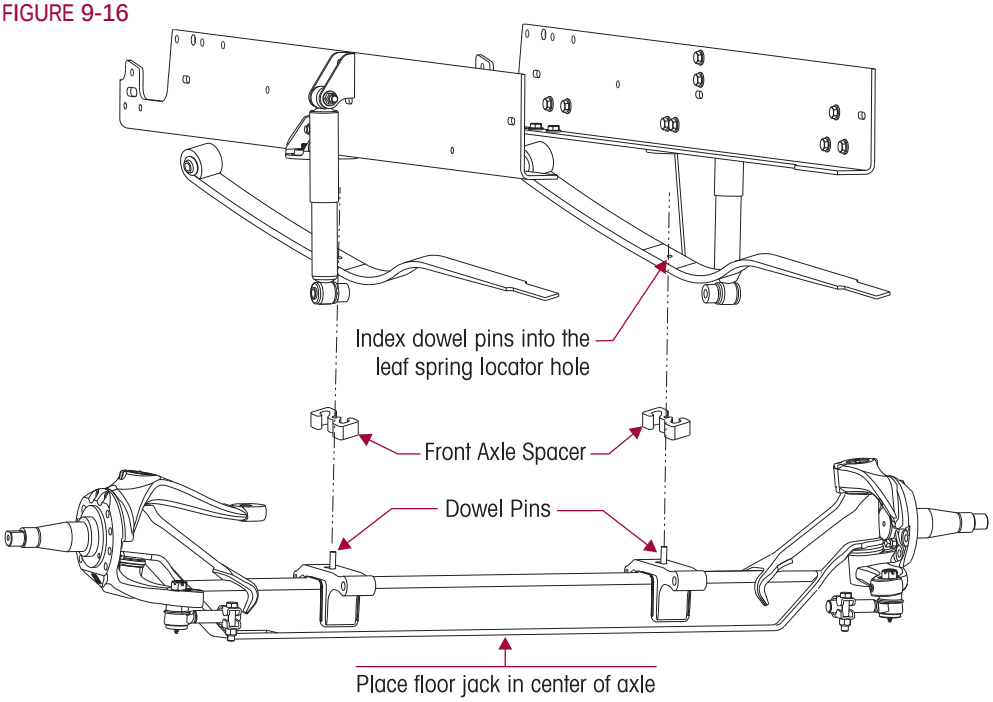


FIGURE 9-16



ASSEMBLY

1. Install the spring onto the axle over dowel pin located on the top axle wrap, see Figure 9-16.
2. Install the new galvanized liner and the top pad 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 the new 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.
8. Install the ¾" hex bolt in the front hanger. Snug bolt.
9. Install the ¾" hex bolt in the shackle bracket. Snug bolt.
10. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered against the top axle wrap, see Figures 9-17 and 9-18.

FIGURE 9-17

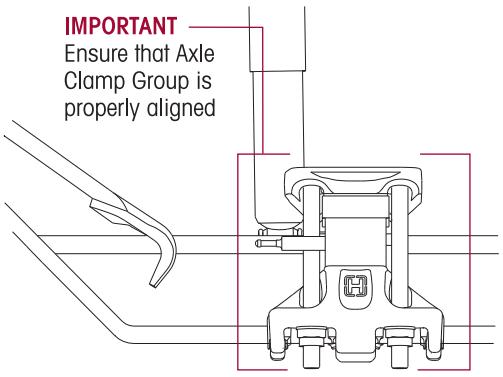


FIGURE 9-18

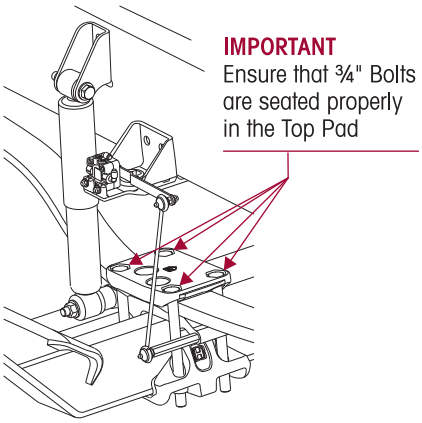
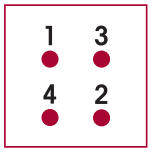


FIGURE 9-19



11. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-19.
12. Install air spring.
13. Remove the frame supports and load the front axle with the trucks weight.
14. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
15. Install air lines, and air up system.
16. Install the height control valve linkage and inflate the suspension to normal operating pressure.
17. Verify proper ride height. See Alignment and Adjustment Section of this publication.
18. Tighten the front spring eye ¾" bolt head to vehicle manufacturer's specifications.
19. Install and tighten the adapter bolts to vehicle manufacturer's specification.
20. Tighten the rear spring eye ¾" bolt heads to 216-266 foot pounds torque.
21. Remove the frame stands.
22. Remove the wheel chocks.

LEAF SPRING

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

DISASSEMBLY

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

WARNING

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

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

SERVICE HINT

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

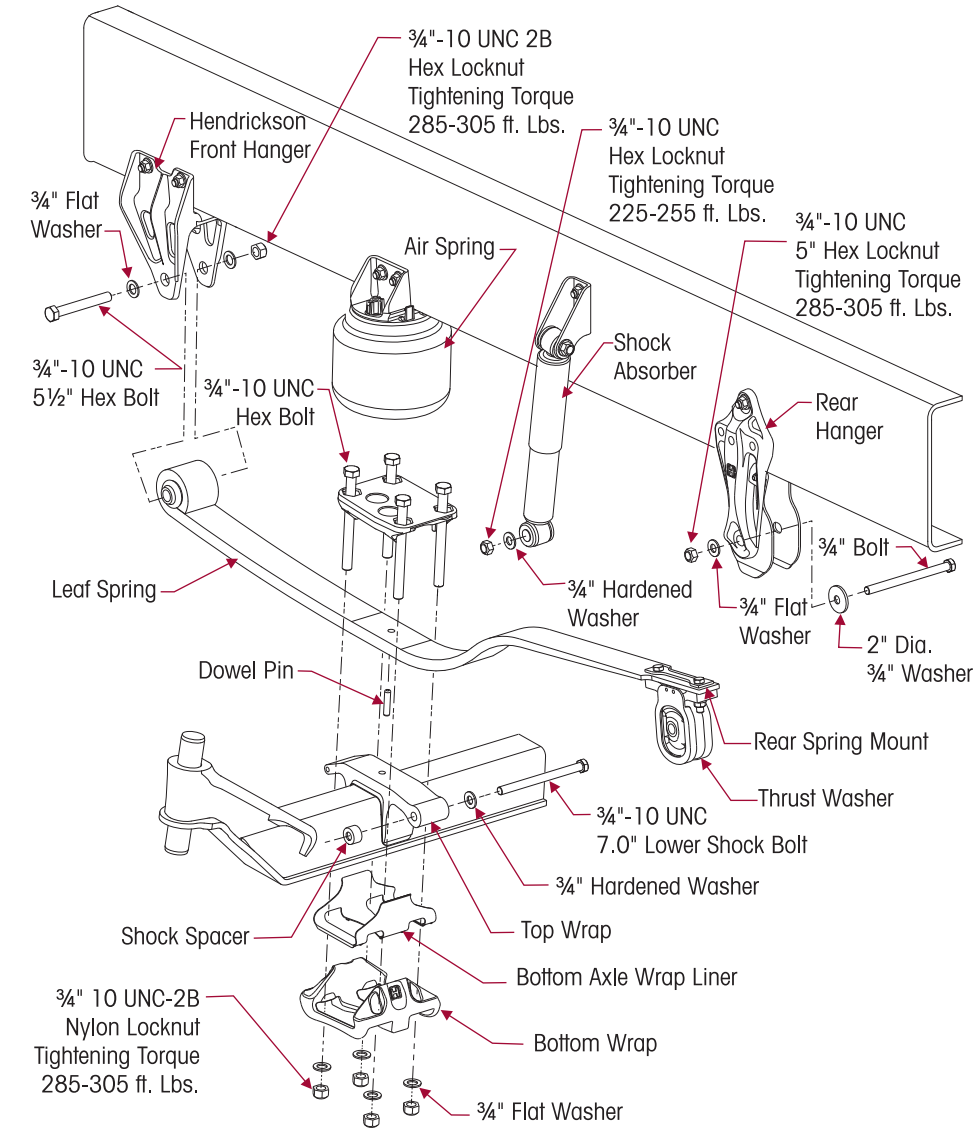
12. Disconnect both air springs from the top pads of the clamp groups.
13. Loosen the clamp group Grade 8 nylon locknuts for the leaf spring that is not being replaced.

CAUTION

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

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

FIGURE 9-20



ASSEMBLY

1. Lubricate the front spring eye bushing and the front hanger with a vegetable base oil (cooking oil). DO NOT use petroleum or soap base lubricant, it can cause an adverse reaction with the spring eye bushing material.
2. Install the spring over the axle and into the front spring hanger.
3. Install the ¾" front spring eye bolt and fastener, but DO NOT tighten.
4. Engage the spring to the axle with the dowel pin located on the top axle wrap. It may be necessary to loosen the other clamp group to allow the axle to pivot when installing the spring on the dowel pin.
5. Install the new galvanized liner and the top pad onto the leaf spring.
6. Install a new bottom axle wrap liner in the bottom axle wrap.
7. Install the bottom axle wrap.
8. Install the new ¾" clamp group bolts, washers, and the new locknuts. The locknuts must be replaced when the clamp group is removed, to prevent premature bolt fatigue.
9. Snug the clamp group, DO NOT torque at this time.
10. Raise the axle and the rear spring assembly into the rear spring hanger.

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

IMPORTANT NOTE

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

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

FIGURE 9-21

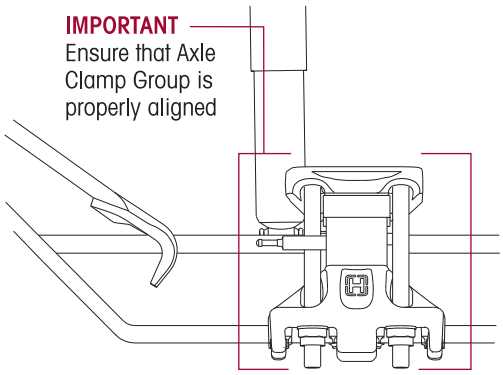
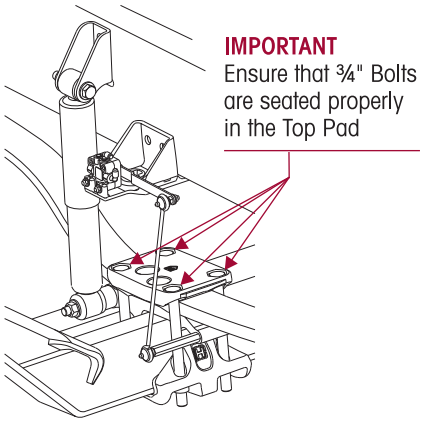
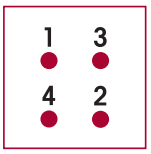


FIGURE 9-22



23. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-23.
24. Remove the wheel chocks.

FIGURE 9-23



REAR SPRING MOUNT

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

DISASSEMBLY

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

WARNING

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

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

SERVICE HINT

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

10. Loosen both front leaf spring eye bolts, but DO NOT remove the bolts.
11. Remove both rear leaf spring mount bolts.
12. Remove both lower shock absorber mounting bolts.
13. Disconnect both air springs from the top pads of the clamp groups.
14. Loosen the clamp group Grade 8 nylon locknuts.
15. Lower the jack allowing the suspension to pivot down out of the rear hanger clamps.
16. Remove the ½" rear spring mounting fasteners.
17. Remove rear spring mount.
18. Inspect the leaf spring taper for cracks or damage. Replace spring if damaged.

ASSEMBLY

1. Install the spring end plate so that it is centered on the spring taper, see Figure 9-24.
2. Install new ½" bolts through the spring end plate and spring taper.
3. Install the rear spring mount centered on the underside of the leaf spring taper.
4. Install new washers and locknuts to snug. DO NOT TIGHTEN at this time.
5. Align the rear spring mount and the leaf spring taper so that the mating surfaces are flush with each other, see Figure 9-25.

FIGURE 9-24

FIGURE 9-25

6. Tighten rear spring mount locknuts to 80-110 foot pounds torque.
7. Install the thrust washers on the rear spring mount.
8. Raise the leaf springs into the rear hangers.
9. Place the 2" outside diameter washer against the rear hanger clamp on the inboard side.
10. Install the rear spring eye mounting bolts from the inside facing out.
11. Snug rear spring eye bolts. DO NOT tighten.
12. Apply a thin coating of anti-seize to the lower shock mounting bolts.
13. Install lower shock absorber mounting bolts.
14. Install the air spring into the top pad. Make sure the air spring piston seats into the top pad correctly
15. Lower the floor jack and allow the suspension to hang.
16. Install tires.
17. Raise the vehicle and remove the frame supports.
18. Install air lines to the air spring.
19. See Air Spring Warnings and instructions in the Important Safety Notice Section of this publication prior to deflating or inflating the suspension system.
20. Install the height control valve linkage and inflate the suspension to normal operating pressure.
21. Remove the floor jacks.
22. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figures 9-21 and 9-22.
23. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 280-305 foot pounds torque in the proper pattern to achieve uniform bolt tension, see Figure 9-23.
24. Tighten the lower shock mounting bolts to vehicle manufacturer's specifications.
25. Tighten the front and rear spring eye fasteners to vehicle manufacturer's specifications.
26. Verify proper ride height, see Alignment & Adjustments Section of this publication.
27. Remove wheel chocks.

FRONT LEAF SPRING EYE BUSHING

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

NOTE

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

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

FIGURE 9-26

DISASSEMBLY

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

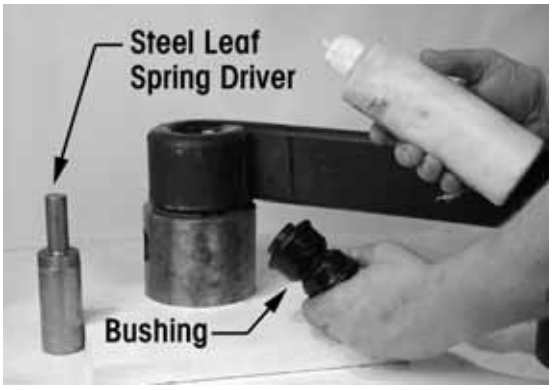
⚠ WARNING

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

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

- A hydraulic press with an minimum operating capacity of 5 tons.
- A receiving tool – see specifications in the Special Tools Section of this publication.
- Removal and installation driver, see Figure 9-26, see specifications in the Special Tools Section of this publication.

FIGURE 9-27



1. Support and center the steel leaf spring end hub on the receiving tool. The steel leaf spring must be level to distribute the vertical pushing load equally on the bushing.
2. Place the bushing driver center on the spring eye bushing.
3. Press out the spring eye bushing. Push directly on the driver until the bushing clears the steel leaf spring eye bore, see Figure 9-27.
4. Inspect the spring eye for any cracks or burrs. If cracks are present replacement of the steel leaf spring is necessary.
5. Remove any nicks or burrs with an emery cloth or a rotary sander to provide a smooth surface for the bushing installation.

FIGURE 9-28

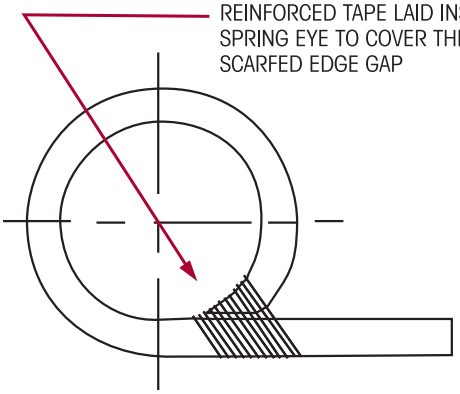


FIGURE 9-29

ASSEMBLY

1. Lubricate inner diameter of steel spring bore and the new rubber bushing with a vegetable base oil (cooking oil). DO NOT use petroleum or soap base lubricant, it can cause an adverse reaction with the spring eye material, see Figure 9-27.
2. Cut a strip of 3M Scotch® #890T black fiber tape (duct tape or equivalent) 1" x 6" long.
3. Feed the tape into the spring eye, adhesive side facing gap in the eye. Center the tape equally around each end, see Figure 9-28.
4. Support and center the steel spring on the receiving tool.
5. Center the new bushing on spring eye bore and line up on the hydraulic press.
6. Press the bushing into spring eye bore. It will be necessary to overshoot the desired final position by approximately 3/16". Press the bushing again from the opposite side to center the bushing in the spring eye bore, see Figure 9-29.
7. Once the bushing is installed follow procedure for Front Leaf Spring component replacement in this section.

BOTTOM AXLE WRAP– ALL MODELS

DISASSEMBLY

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

⚠ WARNING

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

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

⚠ WARNING

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

5. Remove Air Spring on side being replaced. See Air Spring component replacement instructions in this section.
6. Remove ¾" hex bolts and Grade 8 nylon locknuts.

7. Remove bottom axle wrap. It may be necessary to use a dead blow mallet to dislodge axle wrap.
8. Once removed inspect axle wrap for damage. Replace if necessary.
9. Discard used bottom axle wrap liner.

ASSEMBLY

1. Install new bottom axle wrap liner into bottom axle wrap.
2. Install bottom axle wrap on axle.
3. Install new ¾" hex bolts (if removed) and Grade 8 nylon locknuts. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figures 9-30 and 9-31.

FIGURE 9-30

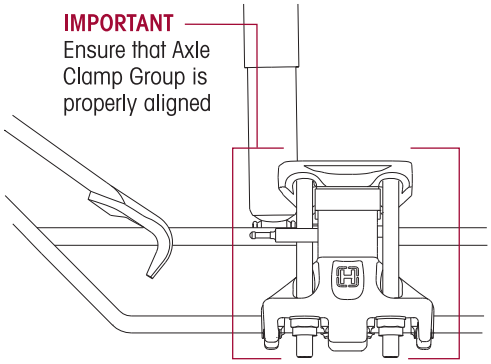


FIGURE 9-31

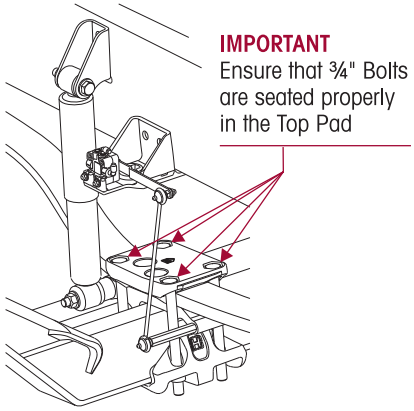
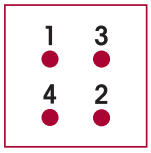


FIGURE 9-32



4. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-32.
5. Install the air spring (if removed). Follow Air Spring Assembly instructions in this section.
6. Remove the frame stands.
7. Remove the wheel chocks.

TOP AXLE WRAP (IN CHASSIS) – ALL MODELS

DISASSEMBLY

1. Chock the wheels.

WARNING

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

2. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
3. Deflate the air springs by disconnecting the height control valve linkage and lowering the height control valve linkage arm. This will exhaust the air pressure in the air springs.
4. Disconnect the air lines at the air springs.
5. Raise the truck and remove the tires.
6. Support the frame with frame stands.
7. Lower the floor jack and suspend the front axle to remove the load from the leaf springs.

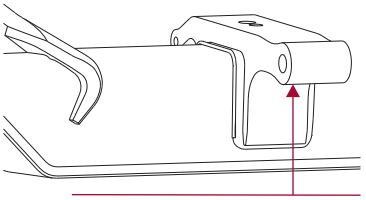
8. Remove the air springs, see Air Spring Disassembly in this section.
9. Install a floor jack that has a four inch lifting plate in the center of the axle.
10. Secure the axle on the jack to prevent the axle from rolling off the floor jack.

⚠ WARNING

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

11. Remove the ¾" clamp group hex bolts and fasteners.
12. Remove the top pad casting, the bottom axle wrap and liner.
13. Remove the lower shock mounting bolts.
14. Lower the axle from the leaf springs.
15. Remove the dowel pin, alignment shim and spacer (if equipped).
16. Strike the axle wrap with a dead blow mallet at the front and rear on the underside of the axle wrap to dislodge it from the axle, see Figure 9-33.
17. Clean and inspect the axle wrap and axle for cracks or damage, replace each if cracks or damage are present.

FIGURE 9-33

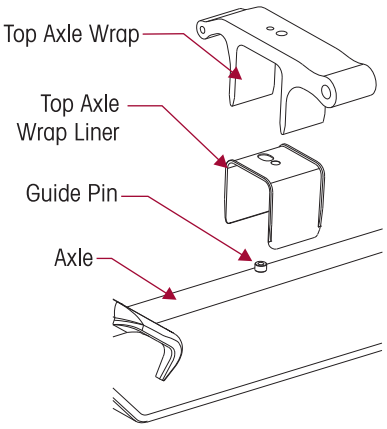


Carefully strike upward with dead blow mallet on both ends

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 9-34.
4. Protect the top surface of the axle wrap with a block of wood, cardboard, or shop towels.

FIGURE 9-34



⚠ CAUTION

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

SERVICE HINT

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

5. Using a dead blow mallet drive the axle wrap onto the axle indexing the axle guide pin until the axle wrap is firmly seated on the axle.
6. Install the dowel pin(s) into the axle wrap.
7. Install the alignment shims and spacer (if equipped).
8. Raise the axle assembly and engage the dowel pins in the leaf spring bore.
9. Install the top pad with the arrows facing inboard on the leaf spring.
10. Install new clamp group hex bolts into the top pad.
11. Remove and replace the bottom axle wrap liner.
12. Install the bottom axle wrap.
13. Install the new clamp group washers and nylon locknuts (Grade 8).

14. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figures 9-35 and 9-36.

FIGURE 9-35

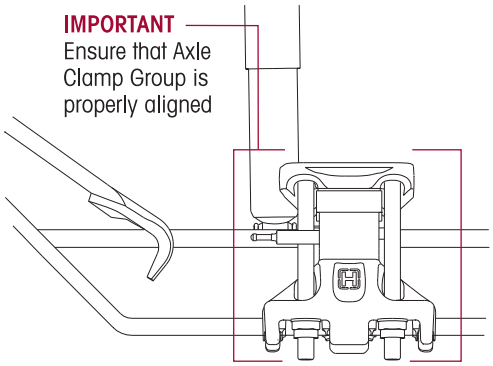


FIGURE 9-36

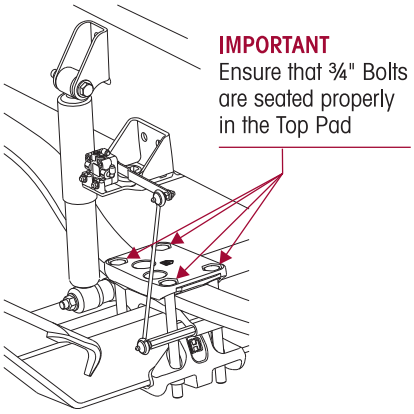
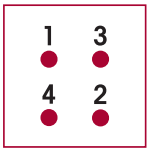


FIGURE 9-37



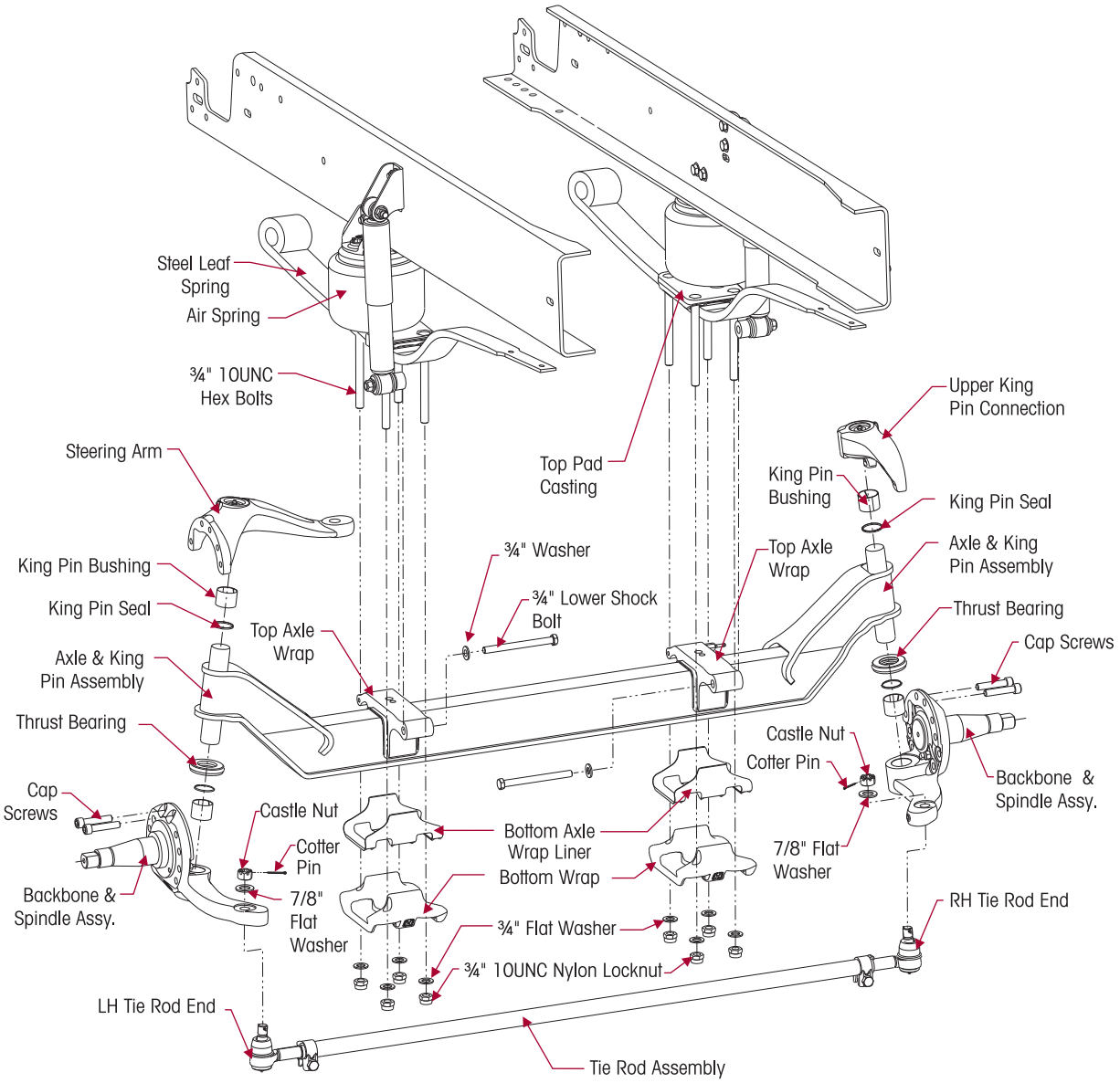
15. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-37.
16. Apply a thin coating of anti-seize to the lower shock mounting bolt.
17. Install the lower shock bolt from the inboard side to the outboard side of the top axle wrap and attach the spacer, washer, and locknut.
18. Tighten the shock eye locknuts to 225-255 foot pounds torque.
19. Install the air springs.
20. Raise the vehicle and remove the frame stands.
21. Lower the vehicle and remove the jack from the axle.
22. Attach the air lines to the air springs.
23. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
24. Air up the system to normal operating pressure.
25. Remove the wheel chocks.

FRONT AXLE ASSEMBLY

The axle clamp group consist of the following components:

- Top Axle Wrap
- Top Axle Wrap Liner
- Top pad
- Bottom Axle Wrap
- Bottom Axle Wrap Liner
- ¾" Bolts, Washers and Nylon Locknuts

FIGURE 9-38



STEERTEK AXLE REMOVAL

DISASSEMBLY

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

⚠ WARNING

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

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

⚠ WARNING

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

3. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
4. Deflate the air springs by disconnecting the height control valve linkage and lowering the height control valve linkage arm. This will exhaust the air pressure in the air springs (if equipped).
5. Raise the vehicle.
6. Support the vehicle with frame stands.
7. Suspend the front axle with the shocks attached.
8. Remove the front wheels, hubs, brake shoes, ABS sensors, and backing plate assembly.
9. Disconnect the drag link from the steering arm.

⚠ CAUTION

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

10. Unseat both of the air springs at the axle top pad.
11. Support the axle with a floor jack.

⚠ WARNING

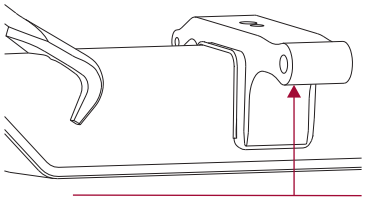
DO NOT REPAIR OR RECONDITION SUSPENSION OR AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATIONS. ALL SUCH DAMAGED OR OUT OF SPECIFICATION COMPONENTS MUST BE REPLACED. ALL MAJOR HENDRICKSON COMPONENTS ARE HEAT TREATED AND TEMPERED. AIRTEK COMPONENTS CANNOT BE BENT, WELDED, HEATED, OR REPAIRED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

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

STEERTEK AXLE (Removed from Chassis)

CLAMP GROUP DISASSEMBLY

FIGURE 9-39



Carefully strike upward with dead blow mallet on both ends

1. Remove the bottom axle wrap and liner from the axle.
2. Strike the top axle wrap with a dead blow mallet at the front and rear on the underside of the axle wrap to dislodge it from the axle, see Figure 9-39.
3. After removal of the top axle wrap from the axle inspect for cracks or fretting.
4. Remove the tie rod assembly. See Tie Rod Disassembly in this section.

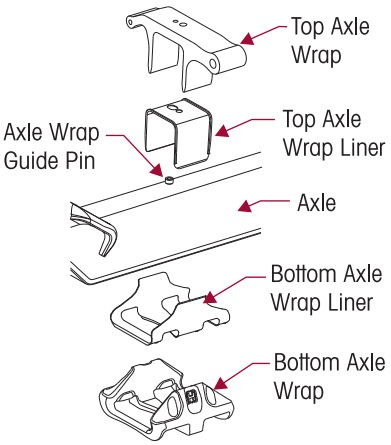
⚠ WARNING

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

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

CLAMP GROUP ASSEMBLY

FIGURE 9-40



1. Install the new upper axle wrap liner on the axle. Index the liner with the axle's guide pin, see Figure 9-40.

⚠ CAUTION

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

⚠ WARNING

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

SERVICE HINT

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

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

FRONT AXLE INSTALLATION

1. Place the new axle on the floor jack and position the axle under the vehicle.
2. Raise the axle into position, see Figure 9-41. Care must be taken at this point to ensure that the dowel pins align correctly with the front leaf springs.

FIGURE 9-41

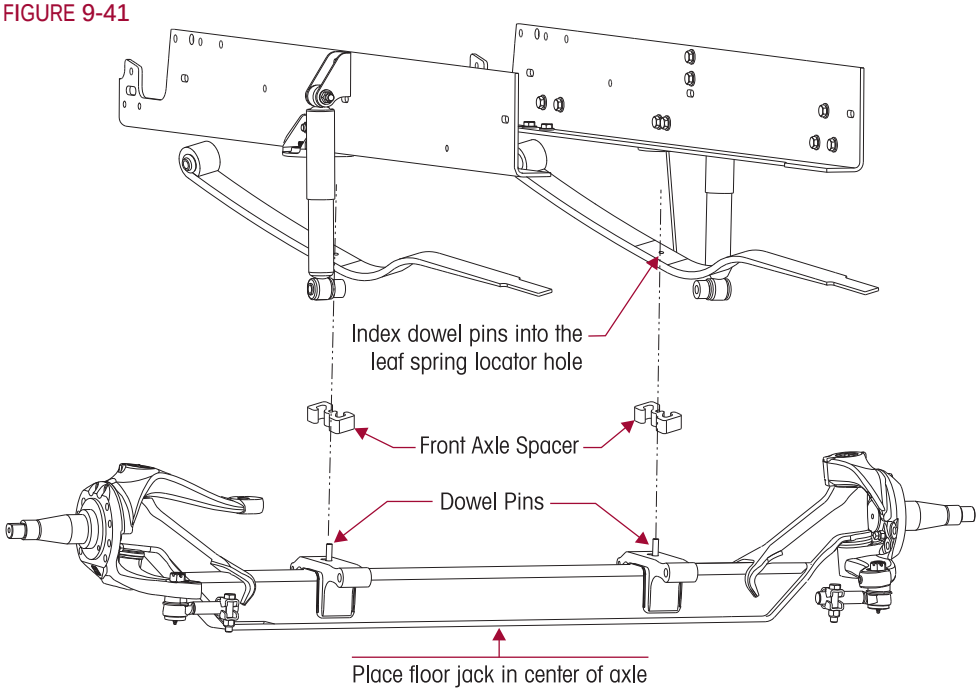
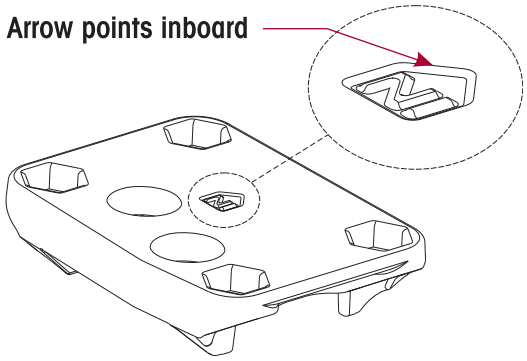


FIGURE 9-42



3. Install the galvanized liner between the main spring and the top pad. The top pad is installed with the air spring bores positioned outboard, see Figure 9-42.
4. Install the new bottom axle wrap liner and front axle spacer on the bottom axle wrap.
5. Install the bottom axle wrap on the axle.
6. Install the new clamp group ¾" hex bolts and the new ¾" nylon lock nuts (Grade 8). Snug the ¾" bolts , DO NOT tighten to torque at this time.
7. Install the lower shock mounting bolts and tighten to 225-255 foot-pounds torque.
8. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figures 9-43 and 9-44.

FIGURE 9-43

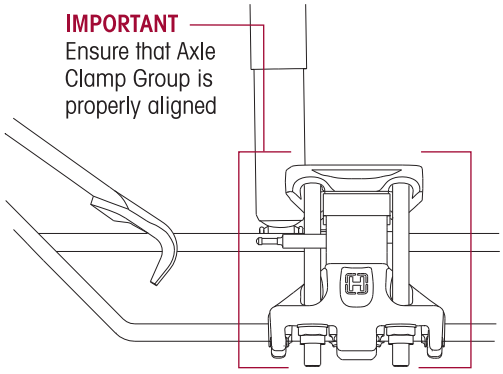


FIGURE 9-44

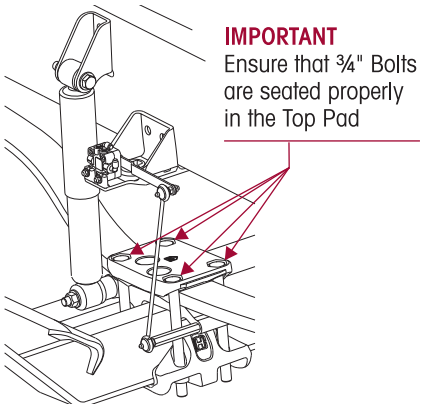
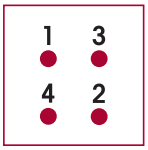


FIGURE 9-45

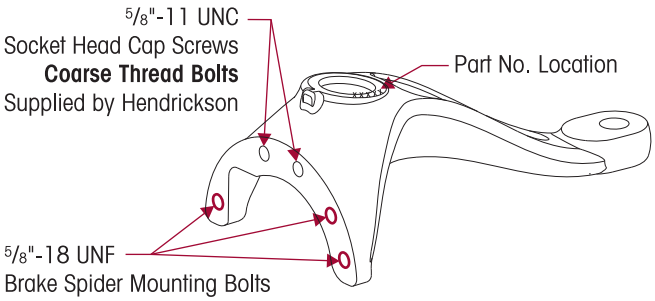


9. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper sequence to achieve uniform bolt tension, see Figure 9-45.
10. Install the steering knuckles as per the Steering Knuckle replacement instructions in this section.
11. Install the tie rod tube.
12. Install the 7/8" hardened washers on the ackermann arm and the castle nuts. Tighten the castle nuts to 185 foot pounds, then rotate until the first castle slot lines up with the cotter pin bore in the tie rod end. DO NOT back off nut for cotter pin installation.
13. Install the cotter pins.
14. Connect the drag link. Install the castle nut to install the steering arm. Tighten the castle nut to 185 foot pounds, then rotate until the first castle slot lines up with the cotter pin bore in the drag link. DO NOT back off nut for cotter pin installation.
15. Install cotter pin.
16. Install the brake backing plate assemblies and ABS sensor.
17. Install the brakes, hubs, and wheels as per the vehicle manufacturer's guidelines.
18. Fill the hubs with the proper lube, see vehicle manufacturer's guidelines for recommended lubrication, if required.
19. Grease the front steering components as per lubrication guidelines in the Preventive Maintenance Section of this publication.
20. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
21. Reconnect the height control valve and air up the system.
22. Check ride height per instructions in the Alignment & Adjustments Section of this publication.
23. Remove the wheel chocks.

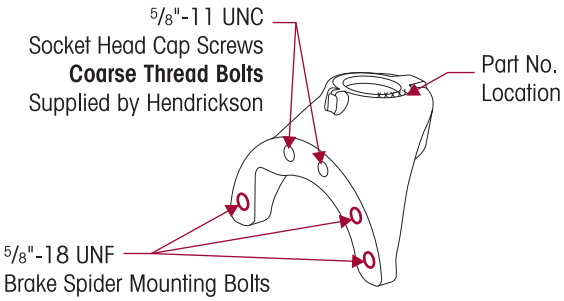
STEERING KNUCKLE DISASSEMBLY

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

New Left Hand Upper Steering Knuckle



New Right Hand Upper Steering Knuckle



NOTE

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

DISASSEMBLY

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

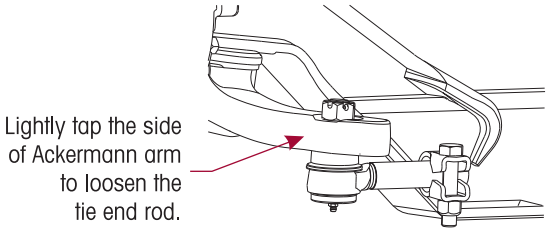
The steering knuckle disassembly and assembly includes the Kingpin Preparation and Measurement and Kingpin Bushing Removal process.

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

SERVICE HINT

Lightly tap the side of the Ackermann arm with a mallet to separate the tie rod end from the Ackermann arm, see Figure 9-46.

FIGURE 9-46



4. Remove the drag link from the knuckle.

⚠ WARNING

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

5. Remove the two (2) socket head cap screws that connect upper kingpin connection to the steering knuckle, see Figure 9-47.

SERVICE HINT

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

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

FIGURE 9-47

KINGPIN PREPARATION AND MEASUREMENT

CLEANING THE GROUND OR POLISHED PARTS

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

CLEANING THE ROUGH PARTS

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

DRYING THE CLEANED PARTS

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

PREVENTING CORROSION ON CLEANED PARTS

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

⚠ WARNING

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

⚠ WARNING

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

1. WEAR PROPER EYE PROTECTION.
2. WEAR CLOTHING THAT PROTECTS YOUR SKIN.
3. WORK IN A WELL VENTILATED AREA.
4. DO NOT USE GASOLINE, SOLVENTS OR OTHER MATERIALS THAT CONTAIN GASOLINE THAT CAN EXPLODE.
5. HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED CORRECTLY. follow the VEHICLE MANUFACTURER'S RECOMMENDED INSTRUCTIONS AND GUIDELINES CAREFULLY TO HELP PREVENT PERSONAL ACCIDENT OR INJURY.

⚠ CAUTION

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

THE STEERTEK HAS A UNIQUE AXLE. THE KINGPIN IS CRYOGENICALLY INSTALLED IN THE AXLE. THE KINGPIN IS A NON-REPLACEABLE COMPONENT OF THE AXLE ASSEMBLY. DO NOT TRY TO REMOVE THE KINGPIN. IF THE KINGPIN SHOWS SIGNS OF MOVEMENT, CONTACT HENDRICKSON PRODUCT ENGINEERING - TECH SERVICES.

1. Prepare and polish the kingpin by removing all grease and excess debris using a fine grit (220 grit or higher) emery cloth and parts solvent, see Figures 9-48 through 9-51.

FIGURE 9-48

FIGURE 9-49

FIGURE 9-50 Kingpin before cleaning

FIGURE 9-51 Kingpin after cleaning

2. Inspect the kingpin for wear or damage. Use a micrometer and measure the upper and lower kingpin in two locations. Positions must be 90º opposed from each other. If the kingpin has less than 1.802" diameter, replacement of the axle is necessary, see Figures 9-52 through 9-55.

   kingpin minimum dimension is 1.802"

FIGURE 9-52

FIGURE 9-53

FIGURE 9-54

FIGURE 9-55

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 LOWER STEERING KNUCKLE AS SHOWN IN FIGURES 9-56 AND 9-57. 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.
4. Install the lower steering knuckle upside down in press. Be sure to support the lower steering knuckle assembly so that it sits in-line with the press, see Figure 9-57.
5. Use the same procedure to remove the kingpin bushing in the upper kingpin connection or the steering arm, see Figures 9-57 through 9-58.
6. Clean the parts and inspect for reassembly, see Figure 9-59.

FIGURE 9-56

FIGURE 9-57

FIGURE 9-58

FIGURE 9-59

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 a an inside micrometer or a telescoping gauge when taking a knuckle bore measurement. Some out-of-roundness at the top and bottom of the bore edges is acceptable. Steering knuckle bore diameter is 1.938" ± 0.003".
2. Measure the upper and lower bore in two positions and at two locations. The two positions must be 90º opposed from each other, see Figures 9-60 through 9-62. If the average measurement is more than the knuckle bore maximum diameter specification, replace the knuckle.

FIGURE 9-60

FIGURE 9-61

FIGURE 9-62

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 lower steering knuckle using a bushing driver, (see driver specifications in the Special Tools Section of this publication). Press in bushing to a depth of no less than $^{15}/_{64}$" (0.236") or 6 millimeters and no more than $^{5}/_{16}$" (0.32") or 8 millimeters, see Figures 9-64 and 9-65.
4. Following this procedure it is necessary to ream the kingpin bushings to fit the kingpins, (see Kingpin Bushing Reaming Instructions).

FIGURE 9-63

FIGURE 9-64

FIGURE 9-65

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.

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

SERVICE HINT

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

2. Install the reamer into the lower steering knuckle until the blades touch the kingpin bushing.
3. Rotate the reamer with light downward pressure. Rotate the reamer smoothly. DO NOT apply too much pressure, see Figures 9-66 and 9-67.

FIGURE 9-66

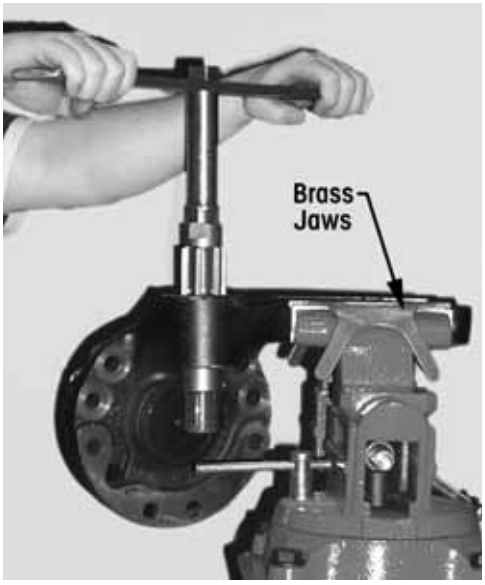
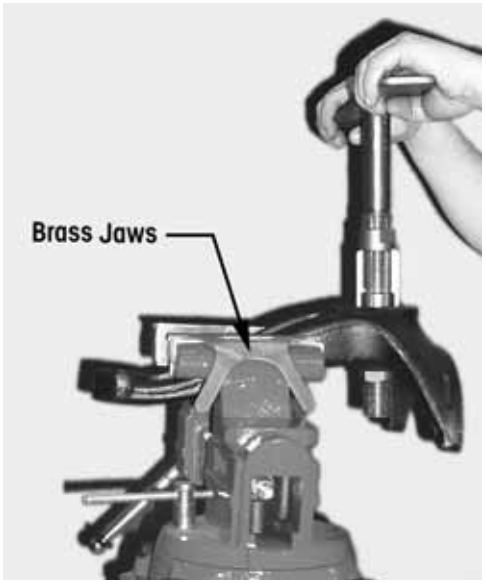


FIGURE 9-67



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

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

NOTE

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

7. Install the steering arm and upper kingpin connection on the kingpin.
8. Check for the proper fit by rotating the knuckle assembly back and forth to verify there is no binding on the kingpin, see Figures 9-68 and 9-69.
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.

FIGURE 9-68

FIGURE 9-69

KINGPIN SEAL INSTALLATION

1. Place the steering or upper kingpin connection in a vise with brass jaws or place on a suitable workbench. The steering arm or upper kingpin connection will have the machined surface facing up (axle side up).
2. Lay the kingpin seal into the bore of the steering arm or upper kingpin connection. The seal lip should face outward or toward the axle.
3. Use a bushing driver tool and press seal firmly into the lower steering knuckle or steering knuckle.
4. Install the kingpin seal until it makes contact with the kingpin bushing, see Figures 9-70 and 9-71.

FIGURE 9-70

FIGURE 9-71

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 9-72 and 9-73. The left bearing is a composite style, and the right bearing is a steel roller. Proper placement of the bearings (i.e., left knuckle composite, right knuckle steel roller) is essential for maximum steering performance. DO NOT substitute aftermarket components when servicing.

FIGURE 9-72

FIGURE 9-73

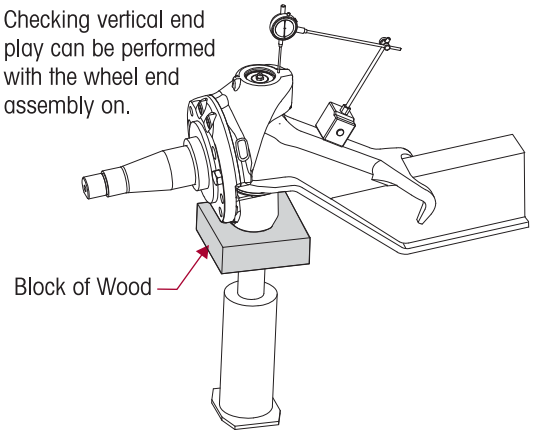
1. Install the thrust bearing on the lower kingpin with the seal facing up toward axle (the black seal will designate the top side). The composite thrust bearing is installed on the left side of the axle. The roller bearing is installed on the right side of the axle, see Figures 9-72 and 9-73.
2. Install 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.

6. Install a bottle jack under the lower knuckle and slightly raise the knuckle until it is possible to thread in the three (3) brake backing plate bolts by hand. These are for guide purposes only.
7. Snug the two socket head cap screws.
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 9-74.
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.

FIGURE 9-74



Checking vertical end play can be performed with the wheel end assembly on.

12. Check the reading on the dial indicator. The specification for vertical travel on the steering knuckle during assembly is 0.008" to 0.011".
13. If the clearance is above 0.011", loosen the socket head cap screws and push down on the knuckle assembly until the proper vertical clearance is achieved. Add (0.005") shim if necessary.
14. If the clearance is below the 0.008", loosen the two socket head cap screws and pull up on the knuckle assembly until the proper vertical clearance is achieved. If the 0.008" minimum clearance is unattainable it may be necessary to remove a 0.005" shim.

NOTE

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

WARNING

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

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 0.010" feeler gauge, see Figure 9-74.
17. Remove the brake spider bolts, they should thread out freely.
18. Remove the bottle jack and continue assembling the wheel ends.

IMPORTANT NOTE

Loctite applied to the three brake spider bolts is a critical procedure to ensure that these bolts sustain the torque requirement of Steering knuckle assembly.

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

WARNING

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

20. Install the tie rod end into the lower steering knuckle arm.
21. Tighten the castle nuts to 185 foot pounds torque then rotate the castle nut to the next castle slot and install cotter pin.
22. Install the drag link into the steering arm and tighten to 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 brakes, drums, wheels, tires and grease steering knuckles with the vehicle on the floor.
26. Remove jack and safety stands.

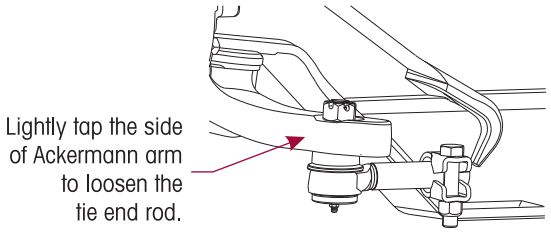
TIE ROD END AND CROSS TUBE

NOTE: Hendrickson supplies different tie rod configurations. Prior to ordering find the part number on the tie rod tube. See Hendrickson Technical Bulletin SEU-0223 for additional information or contact Hendrickson Truck Parts.

DISASSEMBLY

1. Chock the wheels.
2. Position the steer axle tires straight ahead.
3. Remove the cotter pin and castle nut.
4. Lightly tap the side of the Ackermann arm to loosen the tie rod end from the Ackermann arm, see Figure 9-75.
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.

FIGURE 9-75



⚠ WARNING

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

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

ASSEMBLY

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

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

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

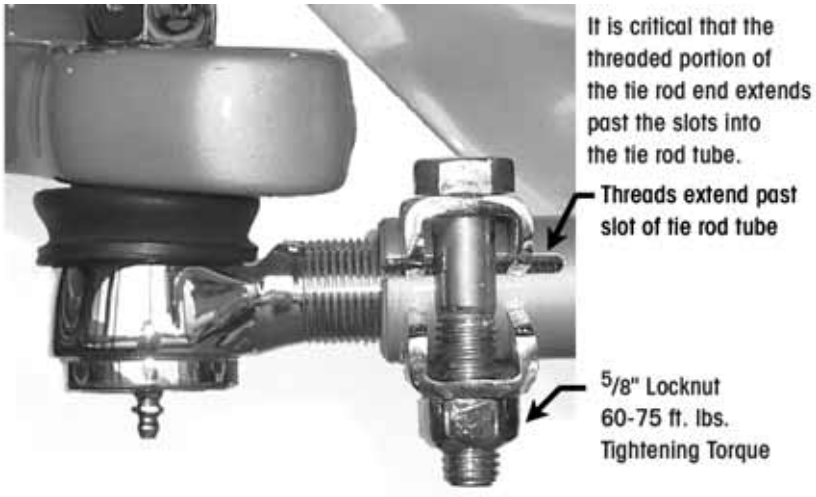
2. Install the new tie rod end into the cross tube, leaving the same amount of threads exposed that were counted on the failed tie rod end prior to removal.

⚠ WARNING

THE THREADED PORTION OF THE TIE ROD END MUST EXTEND PAST THE SLOTS INTO THE TIE ROD CROSS TUBE, SEE FIGURE 9-76. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

3. Replace the opposing tie rod end if necessary by repeating Steps 2 and 3.
4. If replacing opposing tie rod end is not necessary it is critical that the cross tube will rotate in the opposing tie rod end.

FIGURE 9-76



WARNING

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

5. Install the cross tube into the Ackermann arms.
6. Tighten the castle nuts to 185 foot pounds torque then rotate the castle nut to the next castle slot and install cotter pin.
7. Grease tie rod ends. See Lubrication Chart for required lubricant in the Preventive Maintenance Section of this publication.
8. Set the toe, see Toe Adjustment Procedure in the Alignment & Adjustments Section of this publication.

DUAL HEIGHT CONTROL VALVE CONVERSION

NOTE

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

1. Place vehicle on level floor.
2. Chock the wheels.
3. Install frame stands to maintain ride height.

WARNING

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

WARNING

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

⚠ WARNING

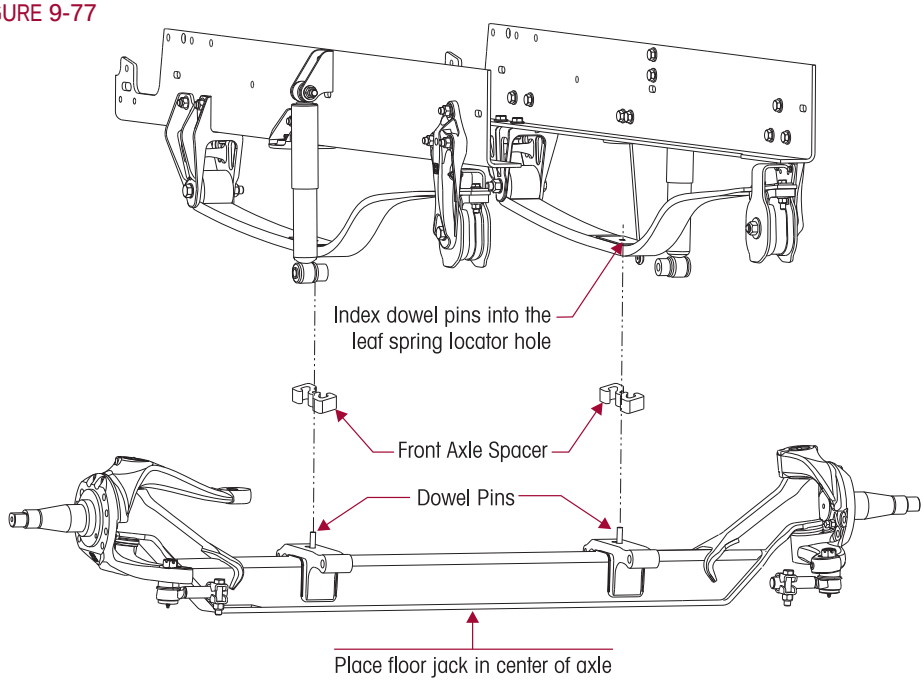
PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.

⚠ DANGER

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

4. Remove the air from the air system by disconnecting the height control valve linkage(s) at the rubber grommet(s) and allowing the lever(s) to drop. This will exhaust air from the system.
5. Remove the delivery line from the left air spring.
6. Remove the left air spring.
7. Loosen the right side clamp group.
8. Loosen and remove the left clamp group mounting fasteners and discard.
9. Install a jack underneath the left leaf spring in front of the axle.
10. Raise the jack and lift the left leaf spring off the axle seat. Position the jack far enough away from the axle to allow removal of the axle spacer, see Figure 9-77.

FIGURE 9-77



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

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

12. Reinstall the dowel pin in the axle wrap if removed.
13. Lower the leaf spring onto the axle wrap. Ensure the dowel pin engages the leaf spring and the top pad.
14. Install new ¾" clamp group fasteners.

15. Ensure that the clamp group is properly aligned and the hex bolts are seated in the top pad, and the bottom axle wrap is centered on the top axle wrap, see Figure 9-78.

FIGURE 9-78

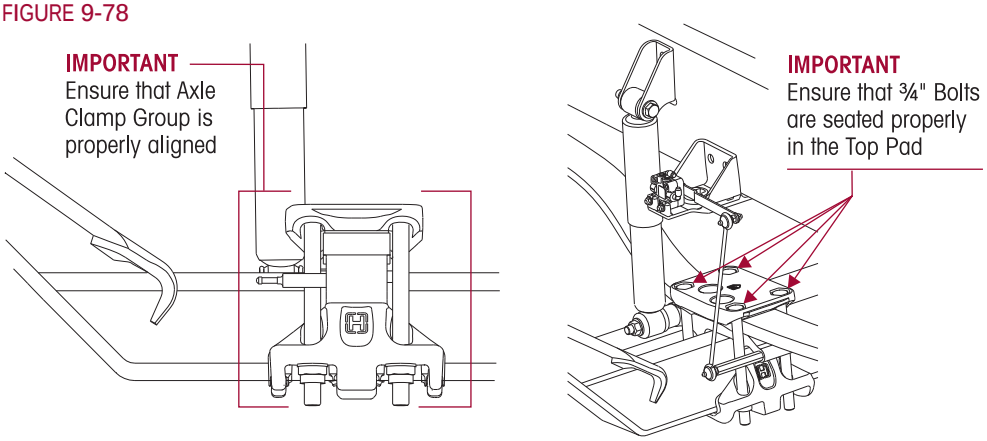
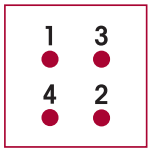
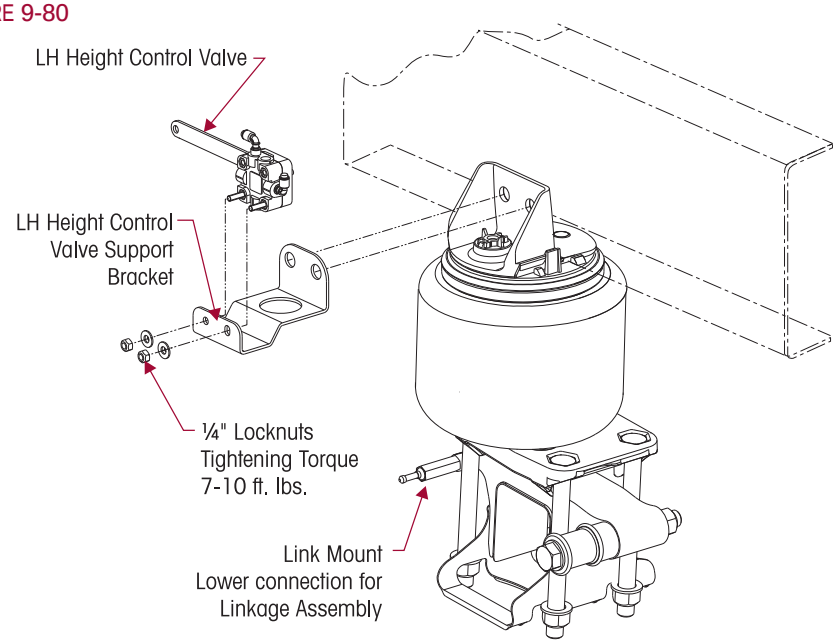


FIGURE 9-79



16. Tighten the clamp group locknuts evenly in 50 foot pounds increments to 285-305 foot pounds torque in the proper pattern to achieve uniform bolt tension, see Figure 9-79.
17. Remove the left upper air spring bracket and discard. Follow the vehicle manufacturer's procedure for Huck bolt removal.
18. Install the new left upper air spring bracket and height control valve mounting bracket, see Figure 9-80.

FIGURE 9-80



19. Tighten the upper left air spring fasteners to vehicle manufacturer's specifications.
20. Install the new left side height control valve assembly on the left side upper air spring mounting bracket. The height control valve mounts on the inboard side of the bracket.
21. Install the left air spring.
22. Install the new height control valve link mount on the left top wrap.
23. Install the left air spring delivery line into the new height control valve supply port.
24. Install a new ¼" air line from the left height control valve delivery port and into the left air spring fitting.

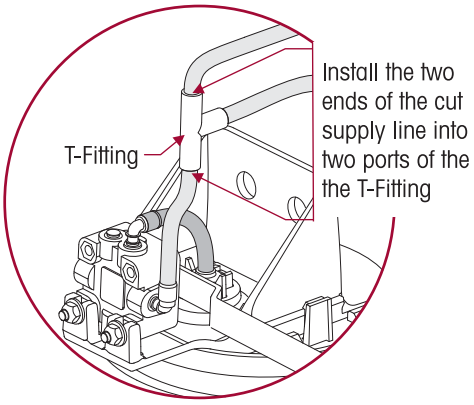
25. Cut the new line to length. Ensure that the ends of the line are cut square and air lines are fully seated in the fittings.

NOTE

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

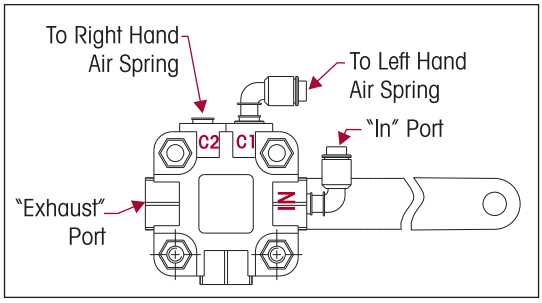
26. It will be necessary to cut the supply line where it is routed (through the right frame rail hole or underneath the frame rail) and install a T-fitting at this location, see Figure 9-81.

FIGURE 9-81



27. Install the two ends of the cut supply line into the two T-fitting ports.
28. Remove the former left air spring delivery line from the right height control valve, this will now be converted to the left height control valve supply line.
29. Install the air line into the remaining port on the T-fitting supply line inside the right frame rail. Trim line if necessary.
30. There are two options to plumb the right height control valve to the right air spring, see Figure 9-82.

FIGURE 9-82



OPTION 1:

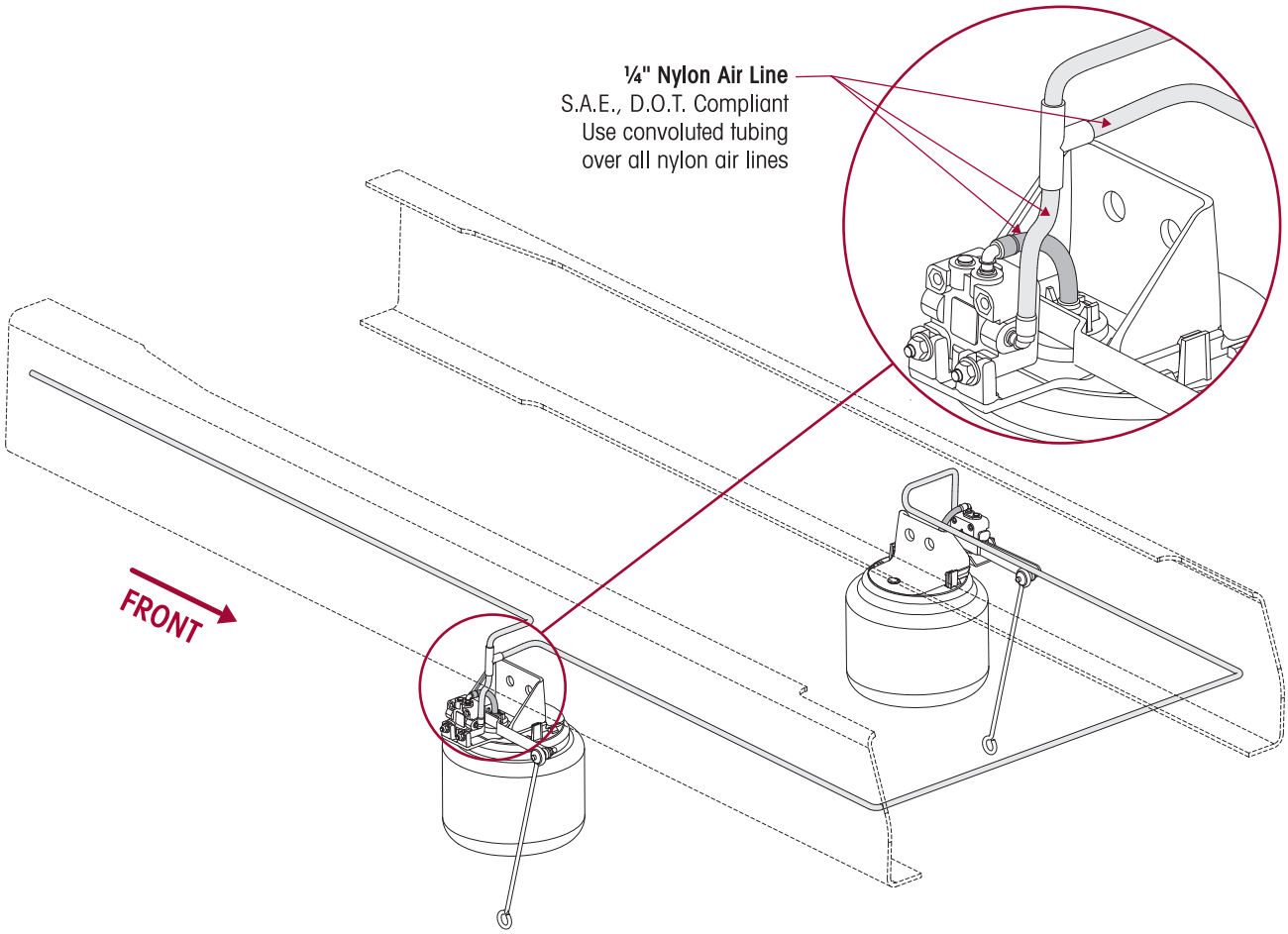
- Plug one delivery port on the right height control valve with a suitable fitting.
- Install an air line from the remaining delivery port to the right air spring.
- It is acceptable to reuse the old line if it is in good condition.

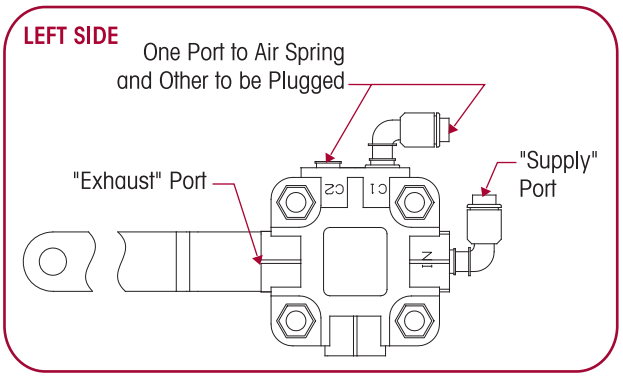
OPTION 2:

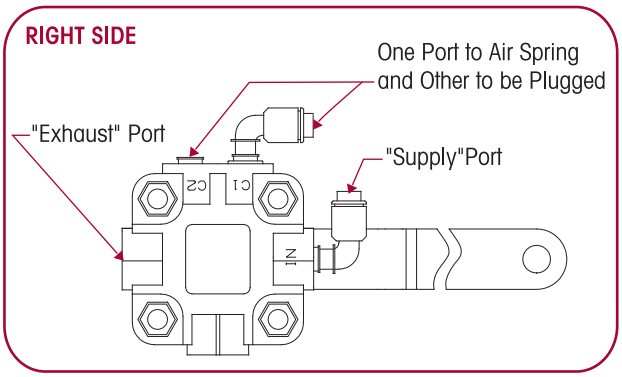
- Install two air lines into the delivery ports of the right height control valve.
- Cut one line and install a T-fitting.
- Insert the other delivery line into the T-fitting.
- Cut to length and install a line out of the T-fitting and into the air spring.

31. Secure all air lines inside the frame rail with plastic ties as necessary.
32. See additional Air Spring Cautions and Warnings in the Important Safety Notice Section of this publication prior to deflating or inflating the air system.
33. Air up the suspension.
34. Install the height control valve linkage(s) and inflate the suspension to normal operating pressure.
35. Remove the wheel chocks.
36. Verify proper ride height and adjust if necessary. Refer to the Alignment & Adjustments Section of this publication.

FIGURE 9-83


¼" Nylon Air Line
S.A.E., D.O.T. Compliant
Use convoluted tubing
over all nylon air lines
FRONT


LEFT SIDE
One Port to Air Spring
and Other to be Plugged
"Exhaust" Port
"Supply"
Port
C2
C1
Z

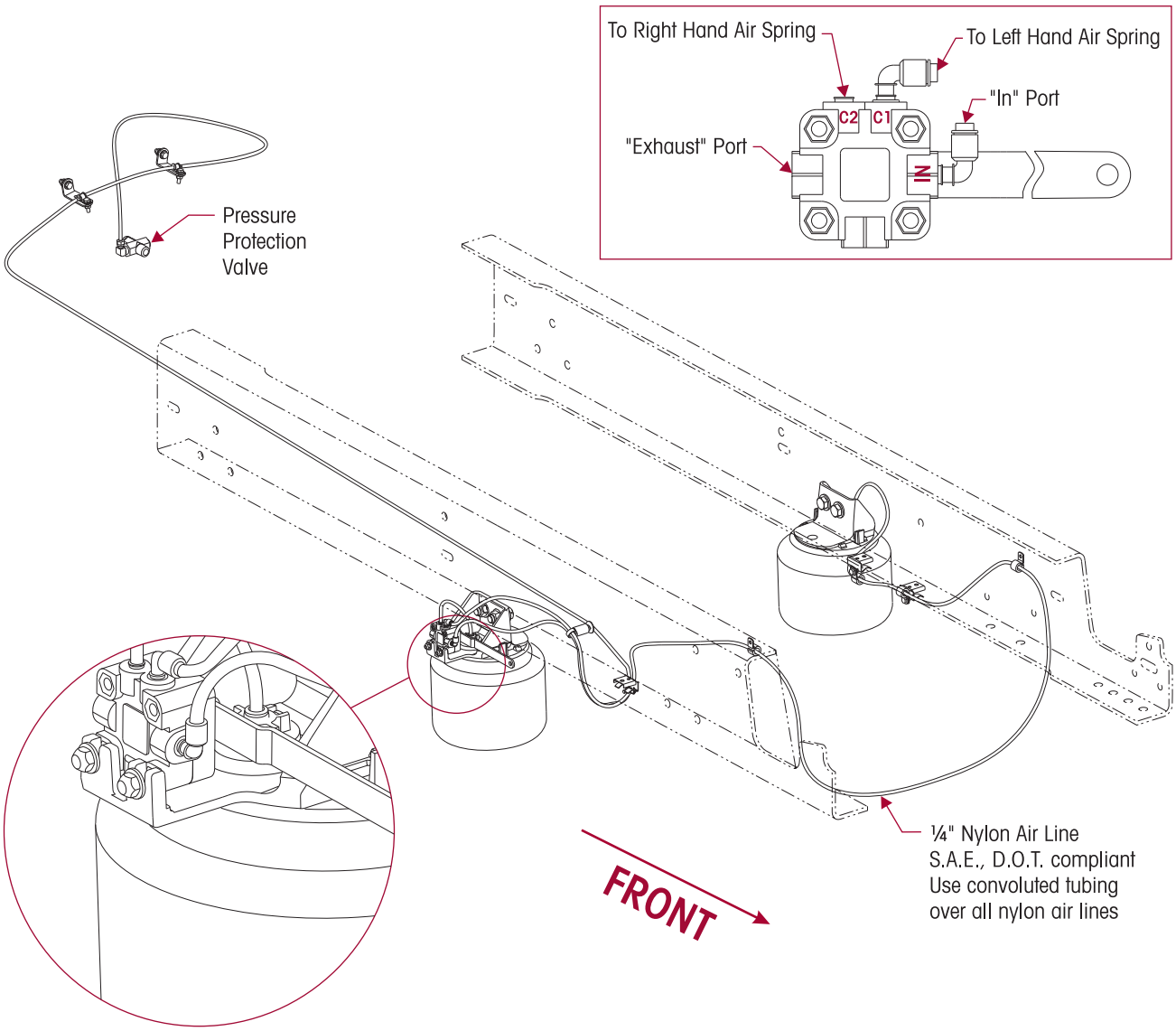

RIGHT SIDE
One Port to Air Spring
and Other to be Plugged
"Exhaust" Port
"Supply"Port
C2
C1
Z

SECTION 10

AIRTEK Plumbing Diagrams

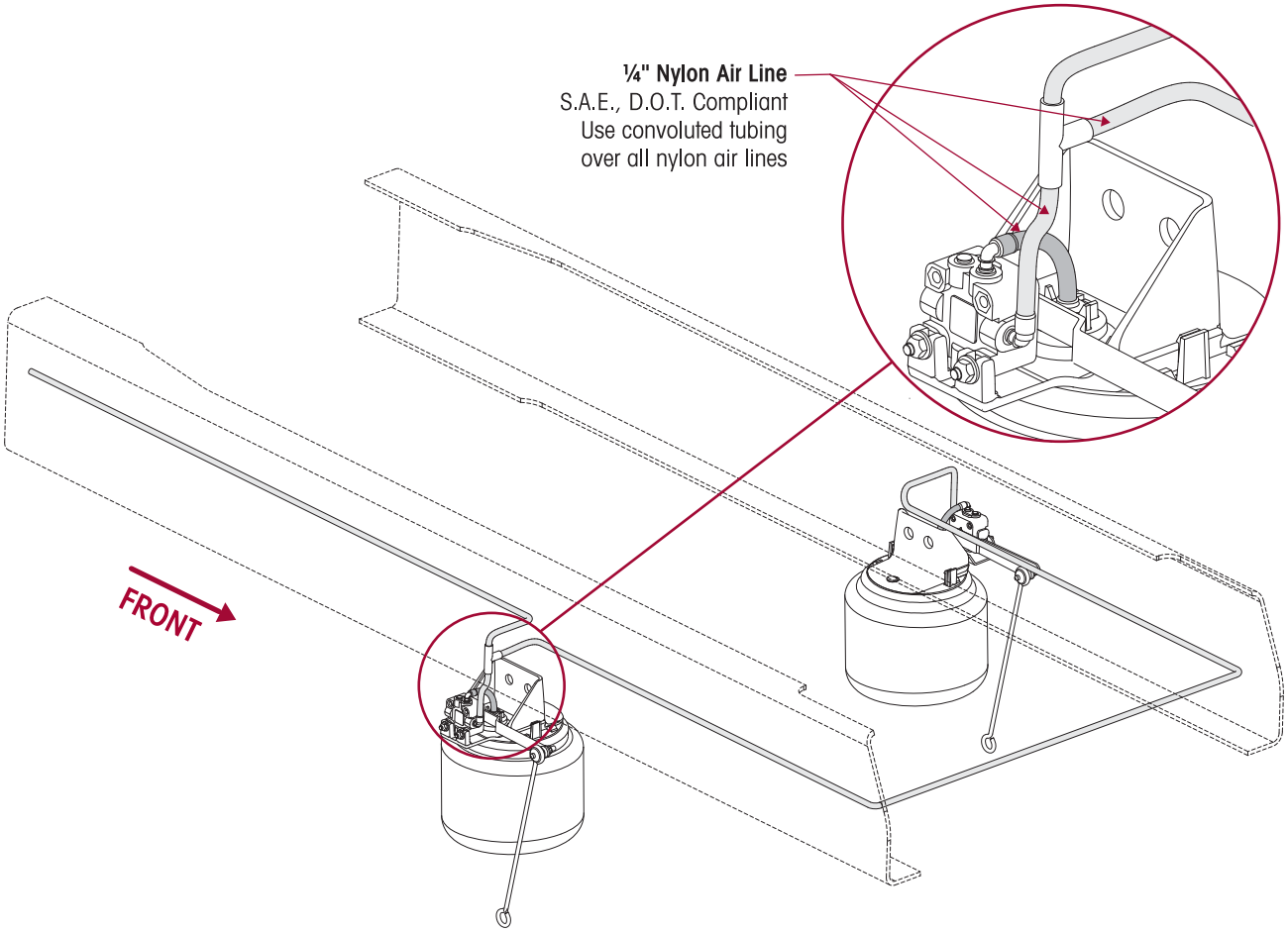
SINGLE PLUMBING DIAGRAM

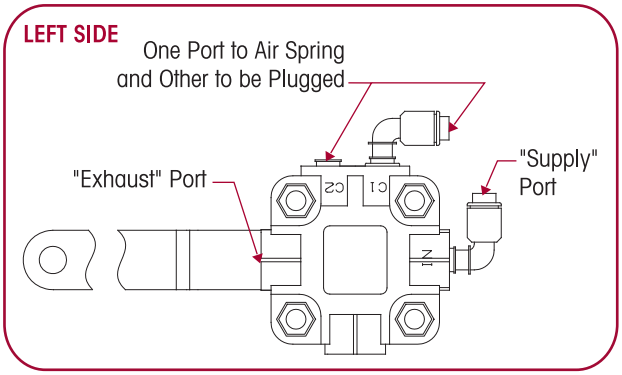
When replacing or installing nylon air line tubing into quick-connect fittings it is critical that the end of the air line is cut square. Improper cut of the end of the air line tubing can cause the air line to seat improperly in the quick connect fitting causing air leakage.

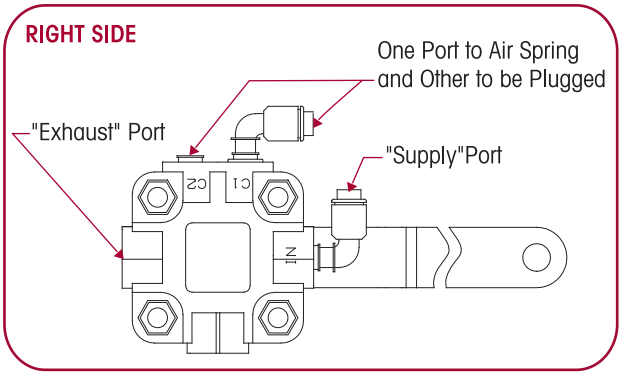


DUAL PLUMBING DIAGRAM

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







SECTION 11

Troubleshooting Guide

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

AIRTEK		
TROUBLESHOOTING GUIDE (CONTINUED)		
CONDITION	POSSIBLE CAUSE	CORRECTION
Tie rod ends are worn and require replacement	Tie rod ends need lubrication	Lubricate tie rod end. Make sure lubrication schedule is followed.
	Severe operating conditions	Increase frequency of inspection and lubrication intervals
	Damaged boot on tie rod end	Replace tie rod end
Bent or broken cross tube, tie rod end ball stud or tie rod end NOTE: Damaged components require replacement	Pump/gear relief valve pressure setting exceeds system specifications	Adjust power steering system to 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 lightened past specified torque	Tighten drag link fasteners to the specified torque
	Lack of lubrication or incorrect lubricant	Lubricate linkage with specified lubricant
	Power steering stops out of adjustment	Adjust steering stops to 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	Ride height incorrect	Adjust ride height to specification
	Air spring(s) are not inflated	Repair source of air pressure loss
	Suspension is not torqued correctly at installation	Perform AIRTEK spring hanger re-torque procedure. See Torque Specification Section of this publication
	Leaf spring broken	Replace leaf spring
	Excessive weight bias	Contact vehicle manufacturer or Hendrickson Tech Services
Vehicle wanders	Caster out of specifications	Check ride height prior and adjust caster to specification
	Incorrect toe setting	Adjust toe to specification
	Fifth wheel not greased	Grease fifth wheel
	Air in the power steering system	Remove air form the power steering systems
	Rear ride height out of adjustment	Adjust ride height to specification
	Front ride height out of adjustment	Adjust ride height to specification

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

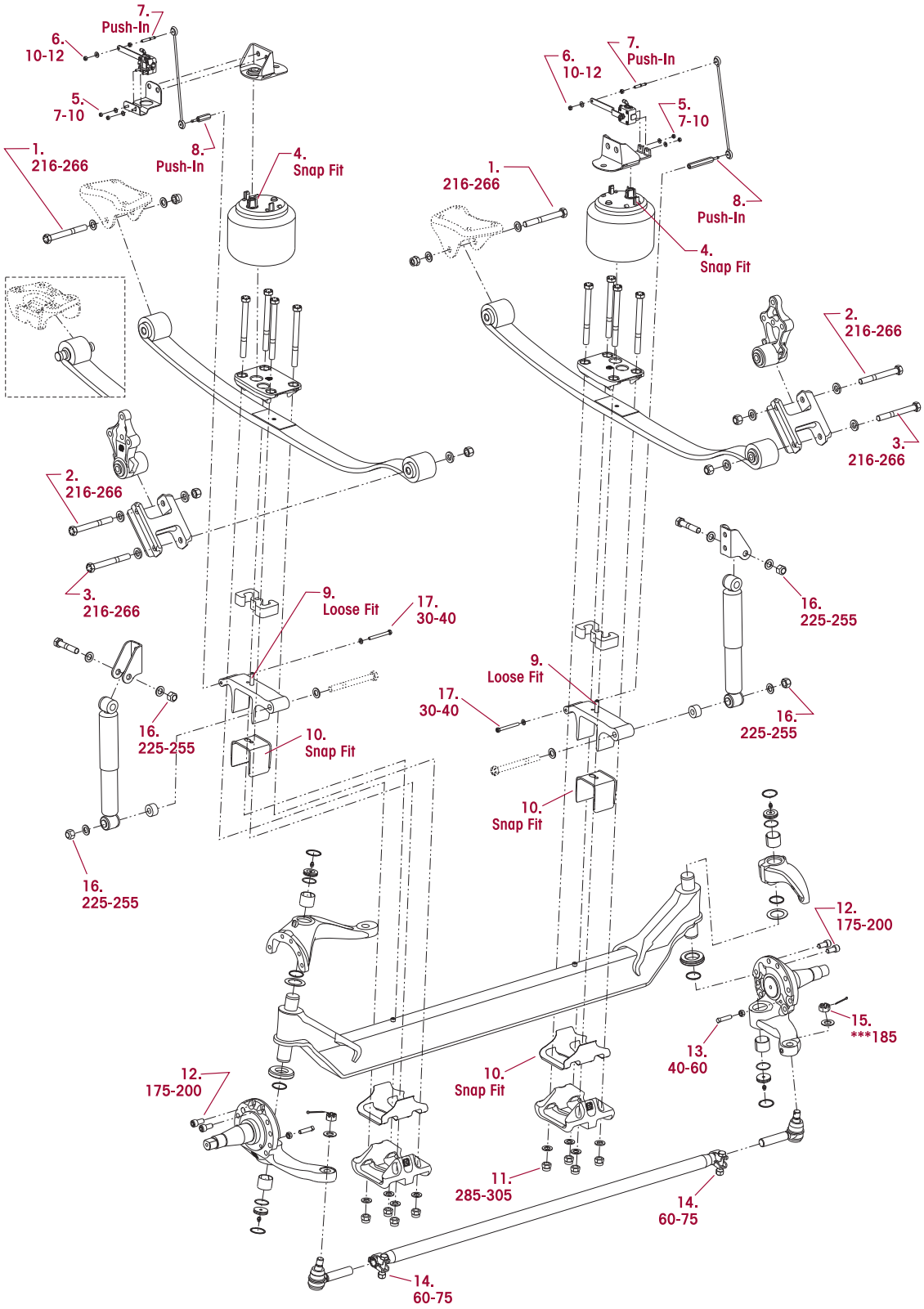
STEERTEK		
TROUBLESHOOTING GUIDE (CONTINUED)		
CONDITION	POSSIBLE CAUSE	CORRECTION
Tie rod ends are worn and require replacement	Tie rod ends need lubrication	Lubricate tie rod end. Make sure lubrication schedule is followed.
	Severe operating conditions	Increase frequency of inspection and lubrication intervals
	Damaged boot on tie rod end	Replace tie rod end
Bent or broken cross tube, tie rod end ball stud or tie rod end NOTE: Damaged components require replacement	Pump/gear relief valve pressure setting exceeds system specifications	Adjust power steering system to 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
	Axle stops improperly set	Increase frequency of inspection and lubrication intervals
Worn or broken steering ball stud	Drag link fasteners lightened past specified torque	Tighten drag link fasteners to the specified torque
	Lack of lubrication or incorrect lubricant	Lubricate linkage with specified lubricant
	Power steering stops out of adjustment	Adjust steering stops to OEM specifications
Suspension has harsh or bumpy ride	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	Leaf spring broken	Replace leaf spring
	Excessive weight bias	Contact the vehicle manufacturer or Hendrickson Tech Services
Vehicle wanders	Caster out of specification	Adjust caster to specification
	Incorrect toe setting	Adjust toe to specification
	Fifth wheel not greased	Grease fifth wheel
	Air in the power steering system	Remove air form the power steering systems

SECTION 12

Torque Specifications

HENDRICKSON RECOMMENDED TORQUE
VALUES PROVIDED IN FOOT POUNDS

AIRTEK – Freightliner Vehicles built after May 2010



AIRTEK

Freightliner Vehicles built after May 2010

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	*QUANTITY	SIZE	**TORQUE VALUE (in foot pounds)
Frame Fasteners Furnished & Installed by Vehicle Manufacturer				
1	Front Frame Hanger to Front Leaf Spring Eye at the Bolt Head	2	¾"	216-266
2	Shackle Bracket to Shackle at the Bolt Head	2	¾"	216-266
3	Shackle Bracket to Rear Leaf Spring Eye at the Bolt Head	2	¾"	216-266
4	Air Spring	None	Self Locking	Snap Fit
5	Height Control Valve to Air Spring Bracket	2	¼"	7-10
6	Height Control Valve to Linkage Rod	1	5/16"	10-12
7	Height Control Valve Stud to Linkage Grommet	None	Grommet	Push In
8	Link Mount to Linkage Grommet	None	Grommet	Push In
9	Spring Center Alignment Pin	1	½"	Loose Fit
10	Axle Wrap Liners for Clamp Group	None	Formed	Snap Fit
	⚠ WARNING DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.			
11	Clamp Group Hardware	*4	¾"	285-305
	⚠ WARNING ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.			
12	Knuckle Attachment Bolt (Socket Head Cap Screw)	*2	5/8"	175-200
13	Knuckle / Axle Wheel Stop Bolt	*1	5/8" Jam Nut	40-60
14	Tie Rod Tube to Tie Rod Ends	2	5/8"	60-75
15	Tie Rod Ends to Lower Steering Knuckle	2	7/8" Castle Nut	***185-300
16	Shock Eye Bolts	2	¾"	225-255
17	Link Mount to Top Axle Wrap	1	3/8"	30-40

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

NOTES:

Frame fasteners are furnished and installed by the vehicle manufacturer. Vehicle manufacturer may use an equivalent HUCK fastener at frame mount.

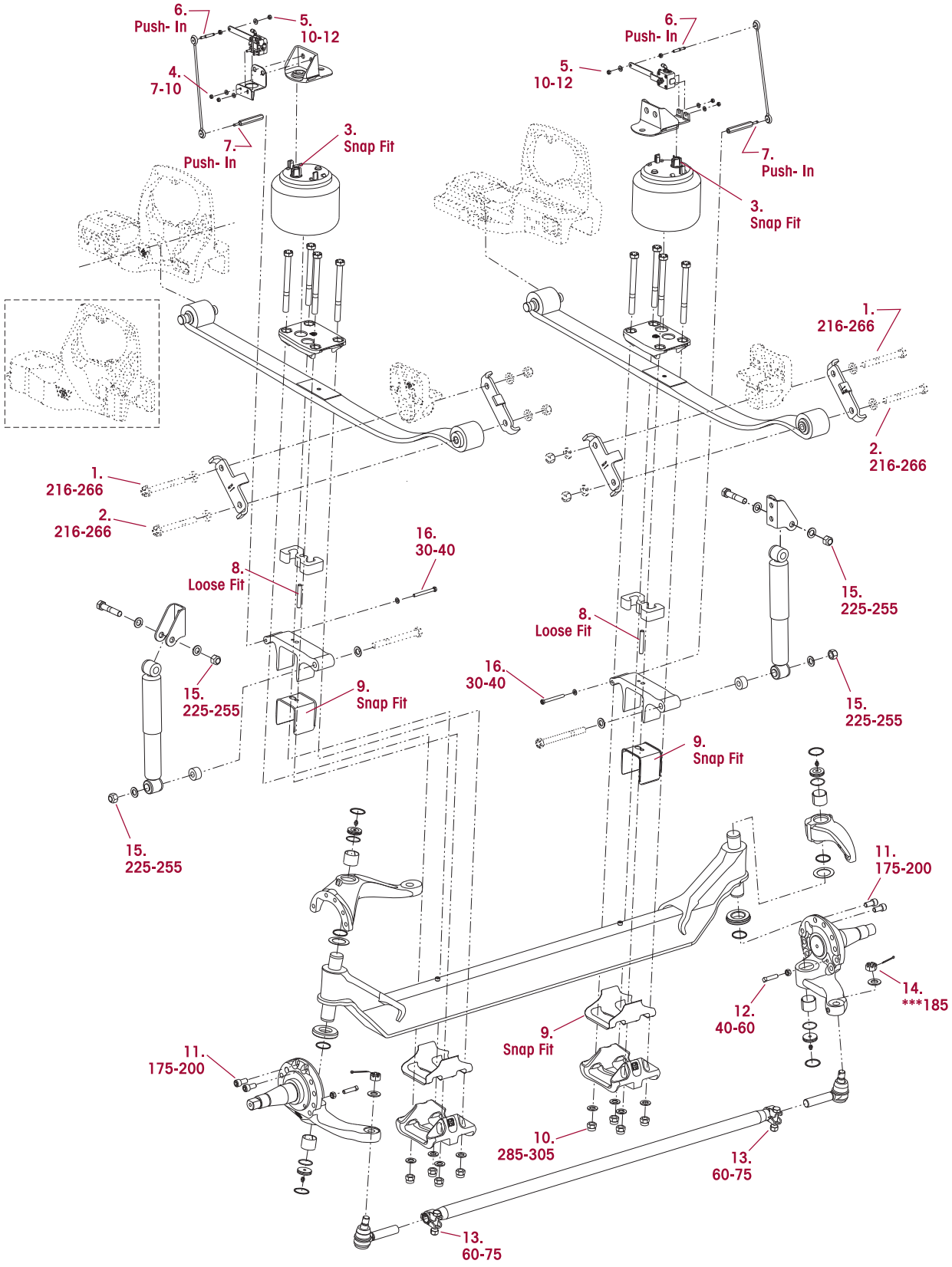
* Quantity listed on a per-side basis.

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

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

AIRTEK – Western Star Vehicles built after June 2010

HENDRICKSON RECOMMENDED TORQUE
VALUES PROVIDED IN FOOT POUNDS



AIRTEK

Western Star Vehicles built after June 2010

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	*QUANTITY	SIZE	**TORQUE VALUE (in foot pounds)
Frame Fasteners Furnished & Installed by Vehicle Manufacturer				
1	Shackle Bracket to Shackle at the bolt head	2	¾"	216-266
2	Shackle Bracket to Rear Leaf Spring Eye at the bolt head	2	¾"	216-266
3	Air Spring	None	Self Locking	Snap Fit
4	Height Control Valve to Air Spring Bracket	2	¼"	7-10
5	Height Control Valve to Linkage Rod	1	5/16"	10-12
6	Height Control Valve Stud to Linkage Grommet	None	Grommet	Push In
7	Link Mount to Linkage Grommet	None	Grommet	Push In
8	Spring Center Alignment Pin	1	½"	Loose Fit
9	Axle Wrap Liners for Clamp Group	None	Formed	Snap Fit
	⚠ WARNING DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.			
10	Clamp Group Hardware	*4	¾"	285-305
	⚠ WARNING ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.			
11	Knuckle Attachment Bolt (Socket Head Cap Screw)	*2	5/8"	175-200
12	Knuckle / Axle Wheel Stop Bolt	*1	5/8" Jam Nut	40-60
13	Tie Rod Tube to Tie Rod Ends	2	5/8"	60-75
14	Tie Rod Ends to Lower Steering Knuckle	2	7/8" Castle Nut	***185-300
15	Shock Eye Bolts	2	¾"	225-255
16	Link Mount to Top Axle Wrap	1	3/8"	30-40

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

NOTES:

All torques shown in gray denotes recommended torques for fasteners originally supplied by the vehicle manufacturer. Frame fasteners are furnished and installed by the vehicle manufacturer. Vehicle manufacturer may use an equivalent HUCK fastener at frame mount.

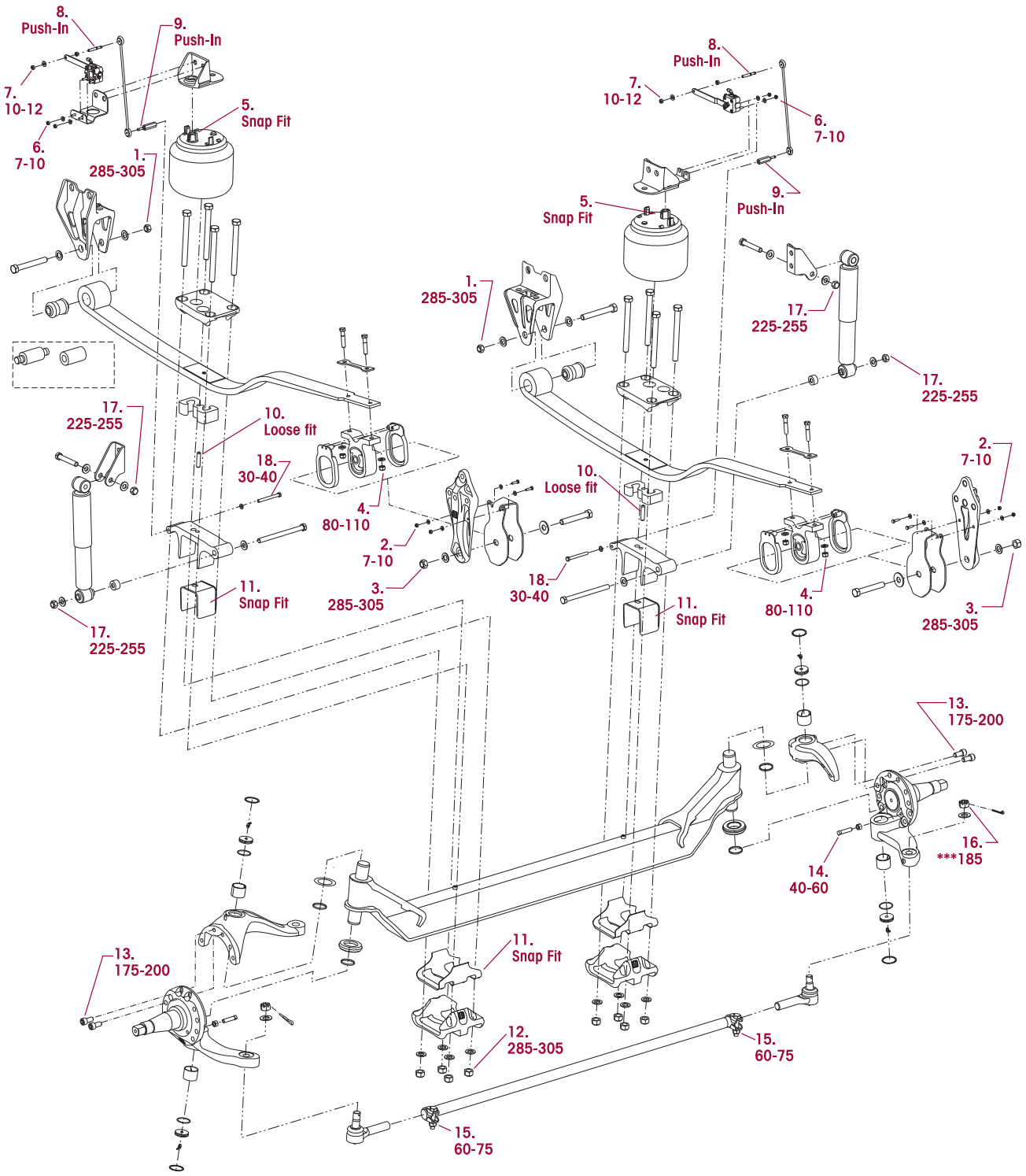
* Quantity listed on a per-side basis.

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

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

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

HENDRICKSON RECOMMENDED TORQUE VALUES PROVIDED IN FOOT POUNDS



AIRTEK

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

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	*QUANTITY	SIZE	**TORQUE VALUE (in foot pounds)
Frame Fasteners Furnished & Installed by Vehicle Manufacturer				
1	Front Frame Hanger to Front Leaf Spring Eye	2	¾"	285-305
2	Rear Hanger to Rear Hanger Clamp	4	¼"	7-10
3	Rear Hanger to Rear Spring Mount	2	¾"	285-305
4	Rear Spring Mount to Rear Leaf Spring	2	½"	80-110
5	Air Spring	None	Self Locking	Snap Fit
6	Height Control Valve to Air Spring Bracket	2	¼"	7-10
7	Height Control Valve to Linkage Rod	1	5/16"	10-12
8	Height Control Valve Stud to Linkage Grommet	None	Grommet	Push In
9	Link Mount to Linkage Grommet	None	Grommet	Push In
10	Spring Center Alignment Pin	1	½"	Loose Fit
11	Axle Wrap Liners for Clamp Group	None	Formed	Snap Fit
	⚠ WARNING DO NOT ASSEMBLE CLAMP GROUP WITHOUT AXLE WRAP LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.			
12	Clamp Group Hardware	*4	¾"	285-305
	⚠ WARNING ENSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.			
13	Knuckle Attachment Bolt (Socket Head Cap Screw)	*2	5/8"	175-200
14	Knuckle / Axle Wheel Stop Bolt	*1	5/8" Jam Nut	40-60
15	Tie Rod Tube to Tie Rod Ends	2	5/8"	60-75
16	Tie Rod Ends to Lower Steering Knuckle	2	7/8" Castle Nut	***185-300
17	Shock Eye Bolts	2	¾"	225-255
18	Link Mount to Top Axle Wrap (Right Side Only if Single HCV, both Sides if Dual Height Valves)	1	3/8"	30-40

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

NOTES:

Frame fasteners are furnished and installed by the vehicle manufacturer. Vehicle manufacturer may use an equivalent HUCK fastener at frame mount.

* Quantity listed on a per-side basis.

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

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

SECTION 13

Front Wheel Alignment Specifications

AIRTEK and STEERTEK w/ Mechanical Suspension – All Models

FRONT AIR MODULE SUSPENSION ALIGNMENT SPECIFICATION

	DESIGN SPECIFICATION		RANGE			
CAMBER[1]	AIRTEK	STEERTEK with Mechanical Suspension	AIRTEK		STEERTEK with Mechanical Suspension	
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
LEFT	0.0º ± 1.0º	0.0º ± 1.0º	-1.0º	+1.0º	-1.0º	+1.0º
RIGHT	- 0.0º ± 1.0º	- 0.0º ± 1.0º	-1.0º	+1.0º	-1.0º	+1.0º
CROSS	Max 2.0º	Max 2.0º	—	—	—	—

CAMBER NOTES:

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

	DESIGN SPECIFICATION		RANGE			
CASTER[1,2]	AIRTEK	STEERTEK with Mechanical Suspension	AIRTEK		STEERTEK with Mechanical Suspension	
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
LEFT	3.75º ± 1º	See vehicle manufacturer's specifications	+2.75º	+4.75º	See vehicle manufacturer's specifications	
RIGHT	3.75º ± 1º		+2.75º	+4.75º		
CROSS[3]	Max 2.0º	Max 2.0º	—	—	—	—

CASTER NOTES:

1 Caster is determined with the vehicle at specified ride height for air suspension or at rated load for mechanical suspension systems. It is critical that the vehicle front and rear ride height is within specifications prior to performing a caster measurement or adjustment. See Hendrickson ride height specifications and procedure.

2 In most cases actual vehicle caster is defined with the frame rails at zero slope. Refer to the vehicle manufacturer's specifications for correct frame rail slope. (Both the alignment surface and the vehicle's frame rails should be level during execution of alignment procedures). For vehicles with a positive frame rake (higher in rear) add the frame slope (in degrees) to the caster reading to determine true vehicle caster.

3 The cross caster angle is not adjustable – DO NOT bend axle or otherwise try to adjust cross caster. If found out of specifications notify Hendrickson Tech Services for further information. Changes to caster can be attained by using caster shims as provided by the vehicle manufacturer or chassis and body manufacturer. Caster shims must match, side to side, to reduce uneven loading to the suspension components. The use of two different angle caster shims will not correct cross caster.

4 Example of caster adjustment: 2.5º RH/3º LH, would require one, 1.0 shim on each side to increase caster and achieve 3.5° RH/4.0° LH, which is in specification. DO NOT attempt to use uneven shims.

Hendrickson recommends following TMC[2] practices:

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

TOE-IN NOTES:

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

2 In most instances total toe is set by the vehicle manufacturer or body builder. Consult the vehicle manufacturer for specifications.

SECTION 14

Reference Material

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

TMC

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

TMC/ATA
2200 Mill Road
Alexandria, VA 22314

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

Important References

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

Video's

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

Other

TMC T0400	Wheel bearing Adjustment Procedure Wall Chart

www.hendrickson-intl.com

HENDRICKSON

Truck Suspension Systems
800 South Frontage Road
Woodridge, IL 60517-4904 USA

630.910.2800
Fax 630.910.2899

17730-243 Rev D 7-10

Printed in United States of America