TECHNICAL PROCEDURE

COMFORT AIR® Rear Air Suspension for Lion Electric Type D Buses

SUBJECT: Service Instructions
LIT NO: 17730-351
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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 for the COMFORT AIR® air suspension system as installed on applicable Lion Electric Type D buses.

NOTE Use only Hendrickson Genuine Parts for servicing this suspension system.

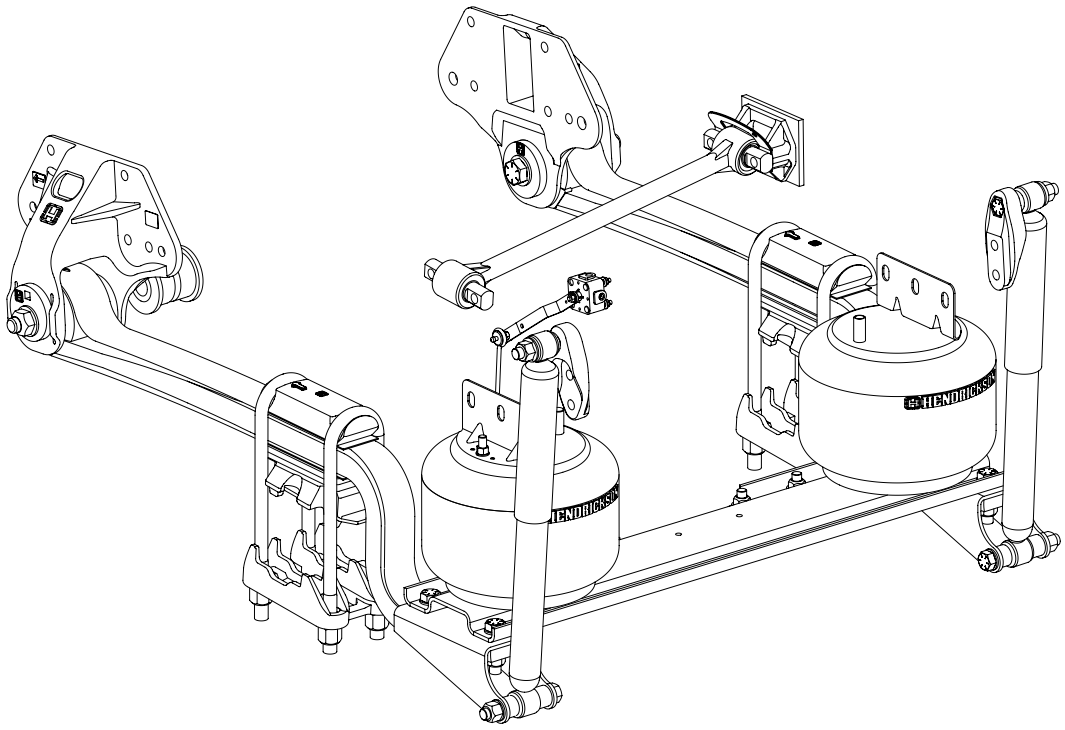
It is important to read and understand this entire Technical Procedure publication and all work instructions and safety related information provided by the vehicle manufacturer prior to performing any maintenance, service, repair, or rebuild of this product. The information in this publication contains parts lists, safety information, product specifications, features, proper maintenance, service, repair, and rebuild instructions for the COMFORT AIR Suspension.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson Tech Services for information on the latest version of this manual at 1-866-755-5968 (toll-free U.S. and Canada), 1-630-910-2800 (outside U.S. and Canada) or email: techservices@hendrickson-intl.com.

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

SECTION 2
Product Description

FIGURE 2-1



The COMFORT AIR rear air suspension system for applicable Lion Electric Buses delivers an innovative suspension solution for an electric bus. The system combines superior comfort, outstanding ride, improved handling, and reduced maintenance.

- **Air springs** — Adjusts to changing load conditions to help deliver superior ride quality
- **Frame hanger** — Wide footprint frame hanger bracket distributes the load over a larger area, reducing stress to the vehicle frame.
- **Height control valve** — Maintains precise ride height control through changing road surfaces, load, and driving conditions
- **Main support member** — Extended length generates a lower spring rate for optimized roll stiffness, providing a more comfortable and compliant ride.
- **QUIK-ALIGN® pivot connection** — Reduces maintenance time by offering a fast and easy method to adjust and set alignment without shims.
- **Shock absorbers** — Tuned for optimum damping characteristics to help provide maximum driving comfort.
- **ULTRA ROD® transverse torque rods** — Provides greater durability over conventional torque rods and enhance handling during cornering by controlling lateral forces to maintain axle position.

*COMFORT AIR Specifications for Lion Electric Type D Buses

	SINGLE 21K
Suspension Rating	21,000 lbs (9,525 kg)
Installed Weight[1]	461 lbs (209 kg)
Ride Height (loaded)[2]	8.66" (220 mm)

* All applications must comply with applicable Hendrickson specifications and must also be approved by the vehicle manufacturer with the vehicle in its original, as-built configuration. Contact Hendrickson and the vehicle manufacturer for approval of specific/additional applications.

1. The installed weight includes the complete suspension, torque rods, axle brackets, frame brackets, shock absorbers, and brackets.
2. The suspension ride height measurements are taken from the centerline of the axle to the bottom of the bus frame.

SECTION 3
Important Safety Notice

Proper maintenance, service and repair is 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 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 the possibility of improper service methods which may damage the vehicle or render it unsafe.

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

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

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

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

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

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

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

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

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

SAFETY PRECAUTIONS

WARNING

FASTENERS

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

LOOSE OR OVER TORQUED FASTENERS CAN CAUSE COMPONENT DAMAGE, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR POSSIBLE PERSONAL INJURY. MAINTAIN CORRECT TORQUE VALUE AT ALL TIMES. CHECK TORQUE VALUES ON REGULARLY 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.

ALL COMFORT AIR FASTENERS PROVIDED BY HENDRICKSON ARE HENDRICKSON COATED. METRIC FASTENERS ARE CLASS 10.9 BOLTS AND CLASS 10 LOCKNUTS AND NON-METRIC FASTENERS ARE GRADE 8 BOLTS AND GRADE C LOCKNUTS. DO NOT ASSEMBLE WITHOUT THE PROPER FASTENERS. USE ONLY HENDRICKSON COATED FASTENERS TO SUSTAIN PROPER CLAMP FORCE. FAILURE TO DO SO CAN CAUSE ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

WARNING

QUIK-ALIGN FASTENERS

DISCARD USED QUIK-ALIGN FASTENERS. ALWAYS USE NEW QUIK-ALIGN FASTENERS TO COMPLETE A REPAIR. FAILURE TO DO SO COULD RESULT IN FAILURE OF THE PART OR MATING COMPONENTS, ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY, OR PROPERTY DAMAGE.

DO NOT ASSEMBLE THE QUIK-ALIGN JOINT WITHOUT THE PROPER FASTENERS. USE ONLY HENDRICKSON COATED GENUINE FASTENERS TO SUSTAIN PROPER CLAMP FORCE. ENSURE THAT THE QUIK-ALIGN FASTENER'S TORQUE VALUES ARE SUSTAINED AS RECOMMENDED IN THE TORQUE SPECIFICATIONS SECTION IN THIS PUBLICATION. FAILURE TO FOLLOW THE ABOVE ITEMS CAN CAUSE ADVERSE VEHICLE HANDLING, PERSONAL INJURY OR PROPERTY DAMAGE AND WILL VOID ANY APPLICABLE WARRANTIES. FOLLOW THE VEHICLE MANUFACTURER'S FASTENER ORIENTATION WHEN PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR.

WARNING

U-BOLT FASTENERS

U-BOLTS THAT ARE FOUND TO BE LOOSE REQUIRE THAT MATING COMPONENTS BE INSPECTED FOR SIGNS OF WEAR. ANY WORN COMPONENTS MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE PREMATURE CLAMP GROUP FAILURE, COMPONENT DAMAGE, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR SEVERE PERSONAL INJURY. MAINTAIN CORRECT TORQUE VALUES AT ALL TIMES. CHECK TORQUE VALUES ON A REGULARLY AS SPECIFIED.

WARNING

LOAD CAPACITY

ADHERE TO THE PUBLISHED CAPACITY RATINGS FOR THE SUSPENSION. ADD-ON AXLE ATTACHMENTS AND OTHER LOAD-TRANSFERRING DEVICES CAN INCREASE THE SUSPENSION LOAD ABOVE ITS RATED AND APPROVED CAPACITIES, WHICH CAN RESULT IN COMPONENT DAMAGE AND ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING

PERSONNEL PROTECTIVE EQUIPMENT

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

WARNING

MODIFYING COMPONENTS

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

⚠ WARNING

SUPPORT THE VEHICLE PRIOR TO SERVICING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

⚠ WARNING

WHEN LIFTING THE VEHICLE TO PERFORM ANY VEHICLE SERVICE, ENSURE THE REAR AIR SUSPENSION DOES NOT FREELY HANG IN AN UNSUPPORTED CONDITION. USE SAFETY STANDS OR BLOCKS AS NEEDED TO FULLY SUPPORT THE SUSPENSION. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, MISALIGNMENT, PERSONAL INJURY, OR PROPERTY DAMAGE.

⚠ WARNING

ELECTRIC VEHICLE SAFETY

PRIOR TO PERFORMING ANY WORK ON THE VEHICLE, READ ALL WORK INSTRUCTIONS AND SAFETY INFORMATION PROVIDED BY THE VEHICLE MANUFACTURER AND MAKE SURE THAT THE STARTER SWITCH IS IN THE "OFF" POSITION, SET THE PARKING BRAKE, AND CHOCK THE TIRES.

TOOLS USED WHEN WORKING NEAR BATTERIES OR ELECTRICAL CONNECTIONS MUST BE CERTIFIED TO A RATING OF 1000 VDC TO HELP PREVENT INJURIES FROM ELECTRIC SHOCK. SHORT CIRCUITS BETWEEN COMPONENTS OR WIRES MUST BE AVOIDED.

⚠ CAUTION

PROCEDURES AND TOOLS

A TECHNICIAN USING A SERVICE PROCEDURE OR TOOL WHICH HAS NOT BEEN RECOMMENDED BY HENDRICKSON MUST FIRST SATISFY THEMSELVES THAT NEITHER THEIR SAFETY NOR THE VEHICLE'S SAFETY WILL BE JEOPARDIZED BY THE METHOD OR TOOL SELECTED. INDIVIDUALS DEVIATING IN ANY MANNER FROM THE INSTRUCTIONS PROVIDED WILL ASSUME ALL RISKS OF CONSEQUENTIAL PERSONAL INJURY, OR DAMAGE TO THE EQUIPMENT INVOLVED.

⚠ WARNING

TORCH / WELDING

DO NOT USE A CUTTING TORCH TO REMOVE ANY 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 ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY, OR PROPERTY DAMAGE.

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

⚠ WARNING

SHOCK ABSORBERS

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

⚠ WARNING

MAIN SUPPORT MEMBER

FAILURE OF THE MAIN SUPPORT MEMBER BETWEEN THE U-BOLTS WILL REQUIRE THE REPLACEMENT OF THE MAIN SUPPORT MEMBER AND ALL CLAMP GROUP COMPONENTS. FAILURE TO DO SO CAN RESULT IN CLAMP GROUP FAILURE AND FURTHER FAILURE TO THE MAIN SUPPORT MEMBER, WHICH CAN CAUSE ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE OR SEVERE PERSONAL INJURY.

⚠ WARNING

TORQUE RODS

THIS HENDRICKSON SUSPENSION REQUIRES TORQUE RODS FOR SUSPENSION PERFORMANCE AND VEHICLE STABILITY. IF THESE TORQUE RODS ARE DISCONNECTED OR NON-FUNCTIONAL, DO NOT OPERATE THE VEHICLE. OPERATING A VEHICLE WITH DISCONNECTED, OR NON-FUNCTIONAL TORQUE RODS CAN RESULT IN ADVERSE VEHICLE HANDLING, COMPONENT DAMAGE, SUSPENSION/VEHICLE DAMAGE, AND/OR SEVERE PERSONAL INJURY.

⚠ WARNING

CROSS CHANNEL

IMPROPER JACKING METHODS CAN CAUSE STRUCTURAL DAMAGE WHICH CAN CAUSE ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE OR SEVERE PERSONAL INJURY AND WILL VOID HENDRICKSON'S WARRANTY.

- REPLACE ANY SAFETY DECALS THAT ARE FADED, TORN, MISSING, ILLEGIBLE, OR OTHERWISE DAMAGED. CONTACT HENDRICKSON TO ORDER REPLACEMENT LABELS
- DO NOT USE THE SUSPENSION CROSS CHANNEL AS A JACKING POINT
- REFER TO THE VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS

⚠ CAUTION

AIR SPRING LOWER MOUNTING STUDS

IF THE AIR SPRING IS BEING REMOVED FOR AN ALTERNATE REPAIR, IT IS MANDATORY TO LUBRICATE THE LOWER AIR SPRING FASTENERS WITH PENETRATING OIL AND REMOVE WITH HAND TOOLS TO PREVENT DAMAGE TO THE LOWER AIR SPRING MOUNTING STUD. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE AND VOID WARRANTY.

⚠ WARNING

FAILURE TO PRESS THE AIR SPRING AGAINST THE UNDERSIDE OF THE FRAME WHILE TIGHTENING THE UPPER AIR SPRING BRACKET CAN RESULT IN COMPONENT DAMAGE AND PERSONAL INJURY OR PROPERTY DAMAGE.

⚠ WARNING

AIR SPRING INFLATION AND DEFLATION

PRIOR TO THE DISASSEMBLY OF THE SUSPENSION, AIR SPRING ASSEMBLIES MUST BE DEFLATED. 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 THE 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.

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

⚠ CAUTION

AIR SPRING INFLATION

INFLATE THE SUSPENSION SLOWLY AND MAKE SURE THE RUBBER BLADDER OF THE AIR SPRING INFLATES UNIFORMLY AND IS NOT BINDING. FAILURE TO DO SO CAN CAUSE DAMAGE TO THE AIR SPRING AND/OR MOUNTING BRACKETS AND VOID WARRANTY.

⚠ WARNING

PARTS CLEANING

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

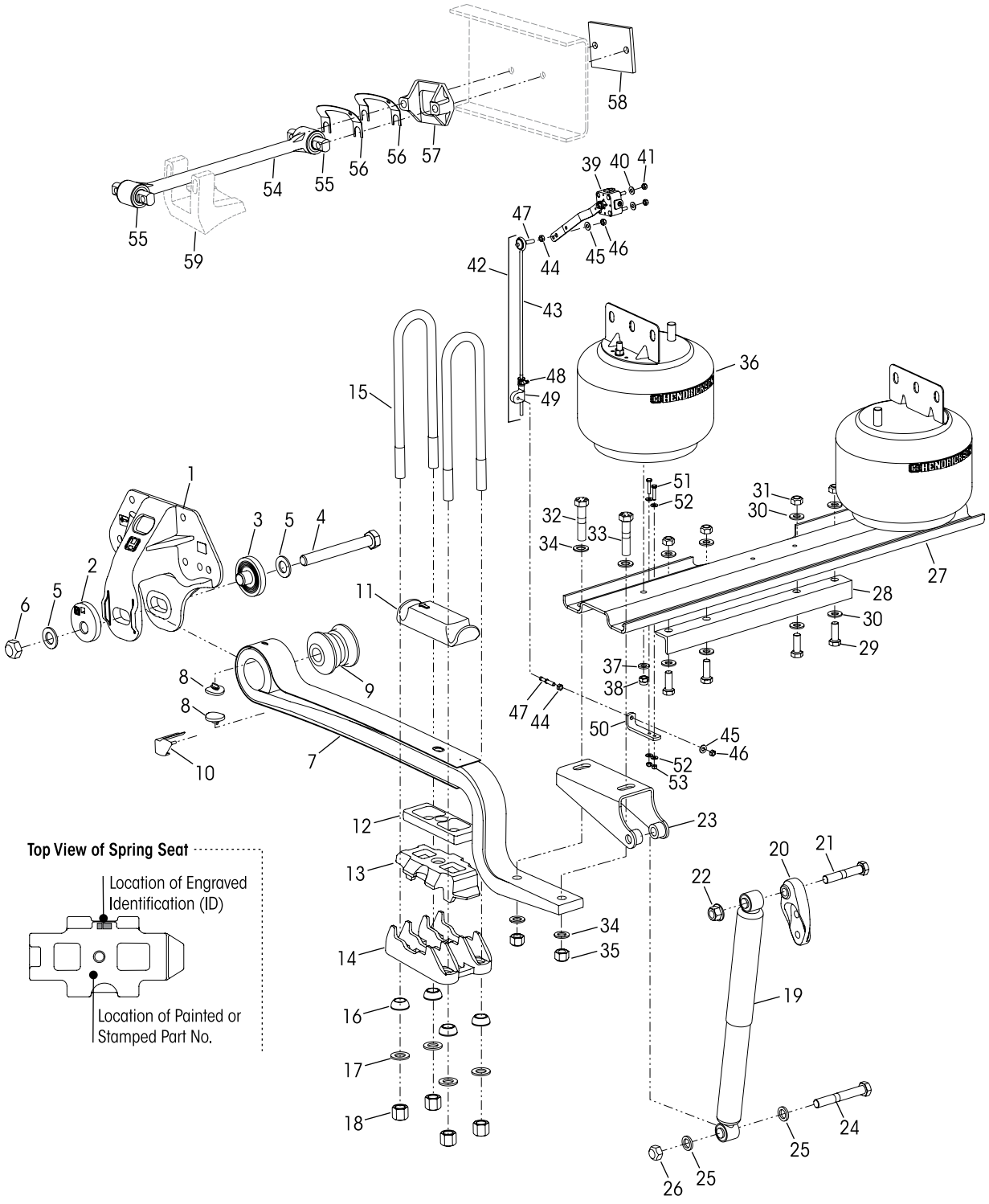
1. WEAR PROPER EYE PROTECTION
2. WEAR CLOTHING THAT PROTECTS YOUR SKIN
3. WORK IN A WELL VENTILATED AREA
4. DO NOT USE GASOLINE OR SOLVENTS THAT CONTAIN GASOLINE. GASOLINE CAN EXPLODE
5. HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED CORRECTLY. FOLLOW THE MANUFACTURER'S RECOMMENDED INSTRUCTIONS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

DO NOT USE HOT SOLUTION TANKS OR WATER AND ALKALINE SOLUTIONS TO CLEAN GROUND OR POLISHED PARTS. DOING SO WILL CAUSE DAMAGE TO THE PARTS AND VOID ANY APPLICABLE WARRANTY.

SECTION 4
Parts Lists

21K Capacity

8.66" Ride Height



KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
1		Frame Hanger	
	91330-001	Left Hand	1
	91330-002	Right Hand	1
		QUIK-ALIGN® Service Kit	
	60632-029	Left Hand, Includes Key Nos. 2-6	
	60632-030	Right Hand, Includes Key Nos. 3-6	
2		*QUIK-ALIGN Eccentric Collar	1
3		*QUIK-ALIGN Concentric Collar	3
4		*1"-14 UNC x 8" Hendrickson Coated Hex Bolt	2
5		*1" Hendrickson Coated Hardened Washer	4
6		*1"-14 UNC Hendrickson Coated Locknut	2
7	65106-001	Main Support Member Assembly	2
	34013-464	**Main Support Member Bushing Service Kit, One Side,** Includes Key Nos. 8-10, 60	
8	59770-000	Isolator Pad	4
9	58648-000L	Main Support Member Bushing	2
10	60392-000	Spring Eye Clip	2
11	65071-000	Top Pad	2
12	48902-000	Spring Seat Spacer - 1"	2
13	56501-004	Spring Seat - ID No. D04, *Refer to Page 8 for ID number location*	2
14	93302-000	Axle Bottom Cap	2
	91430-016	**U-bolt Kit, One Side,** Includes Kit No. 48718-157 and Key No. 15	
15		*⅞" 14 UNF x 15½" U-bolt	4
	48718-157	**U-bolt Fastener Service Kit, One Side**, Includes Key Nos. 16-18	
16		*Spherical Washer	8
17		*⅞" Hardened Washer	8
18		*⅞"-14 UNF Locknut	8
19	60670-030L	Shock Absorber	2
	66302-001	Upper Shock Bracket Assembly, Includes Key No. 20-22	2
20		*Upper Shock Bracket	2
21		*¾"-10 UNC Hex Bolt	2
22		*¾"-10 UNC Locknut	2
23	57355-000	Lower Shock Bracket	2
24		*¾"-10 UNC x 5½" Bolt	2
25		*¾" Hardened Washer	4
26		*¾"-10 UNC Locknut	2
27	64399-003	Cross Channel Assembly, Includes Key Nos. 28-31	1
28		*Cross Channel Support Bracket	1
29		*⅝"-11 UNC x 1¾" Hex Bolt	4
30		*⅝" Flat Washer	8
31		*⅝"-11 UNC Locknut	4
	50763-004	**Cross Channel Fastener Service Kit, Axle Set,** Includes Key Nos. 32-35	
32		*¾"-10 UNC x 3½" Bolt	2
33		*¾"-10 UNC x 3" Bolt	2
34		*¾" Hardened Washer	8
35		*¾"-10 UNC Locknut	4
36	91349-000	Air Spring Assembly, *Replaces 60929-002*	2
	49177-006	**Lower Air Spring Fastener Service Kit, Axle Set,** Includes Key Nos. 37-38	
37		*½" Hardened Washer	2
38		*½"-13 UNC Locknut	2
	60913-004	Height Control Valve Assembly, Includes Key Nos. 39-41	1
39	60841-000	Height Control Valve	1
40		*¼" HCV Washer	2
41		*¼" HCV Hex Nut	2
42	58994-009	Linkage Assembly, Includes Key Nos. 43-49	1
43		*Linkage Rod	1
44		*5⁄16"-18 UNC Jam Nut	2
45		*5⁄16" Washer	2
46		*5⁄16"-18 UNC Locknut	2
47		*5⁄16"-18 UNC Stud	2
48		*Valve Arm Clamp	1
49		*Adjustable Valve Arm Joint	1
50	56789-000	Lower Linkage Bracket	1
	57430-000	**Lower Linkage Bracket Service Kit,** Includes Key Nos. 51-53	
51		*¼"-20 UNC x 1¼" Hex Bolt	2
52		*¼" Hardened Washer	4
53		*¼"-20 UNC Locknut	2
54	62000-605	**ULTRA ROD® Transverse Torque Rod Assembly Includes Key No. 55	
55	47691-000L	Torque Rod Bar Pin Bushing	4
56	34013-343	**Torque Rod Shim Kit** (2 x 1.5 mm)	As Req.
57	22186-000	Transverse Torque Rod Frame Bracket	1
58	45045-010	Torque Rod Back-up Plate	1
59		Transverse Torque Rod Axle Bracket Supplied by Vehicle Manufacturer	2
60	70867-001	***P-80 Lubricant - 10 ml (Not Shown)	As Req.

NOTES: Quantities specified are for the vehicle. Quantities of service kit components may vary from amount shown in list.

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

** Hendrickson two piece torque rods can be used to create the desired torque rod length, see Torque Rod Selection Guide 45745-148 for more information.

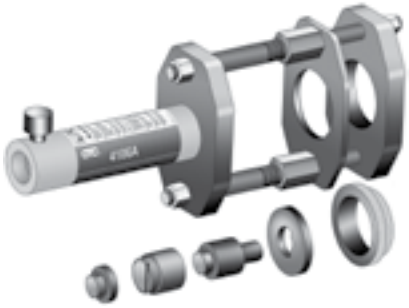
*** Use as a lubricant to install torque rod bushings and main support member pivot bushings.

SECTION 5
Special Tools

QUIK-ALIGN PIVOT BUSHING SERVICE TOOLS

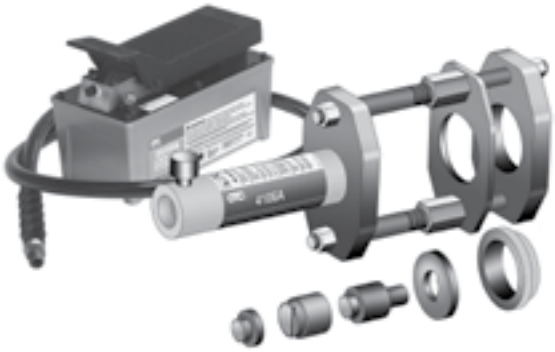
HENDRICKSON PART NO. 66086-202

OTC Part No. 4246 Visit otctools.com



HENDRICKSON PART NO. 66086-204

OTC Part No. 4247 Visit otctools.com



QUIK-ALIGN PIVOT BUSHING SERVICE TOOL

Hendrickson Part No. 66086-203L

Reference Literature No. 59310-061

QUIK-ALIGN SOCKET TOOL

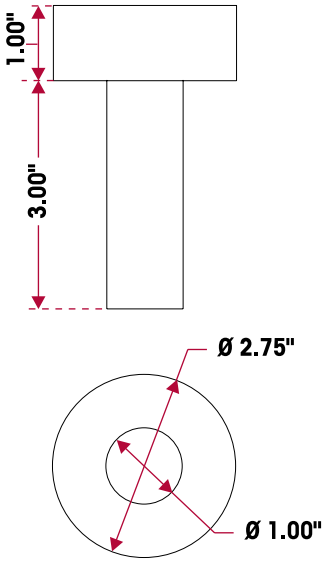
Hendrickson Part No. 66086-200

OTC Part No. 1767

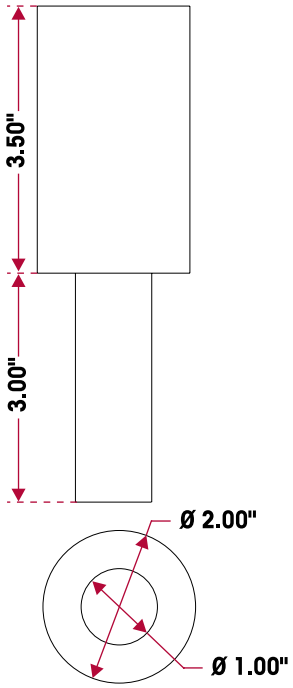
Visit otctools.com

These shop made tools are designed to service the QUIK-ALIGN pivot bushing. These tools are made from cold rolled steel or equivalent. Drawings are for reference only. Hendrickson does not supply these tools.

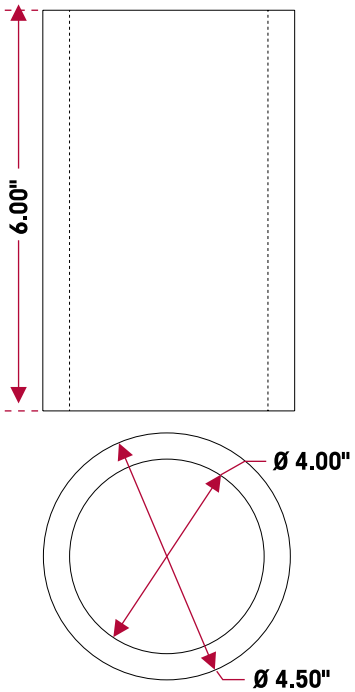
Pivot Bushing Installer



Pivot Bushing Remover



Pivot Bushing Receiver

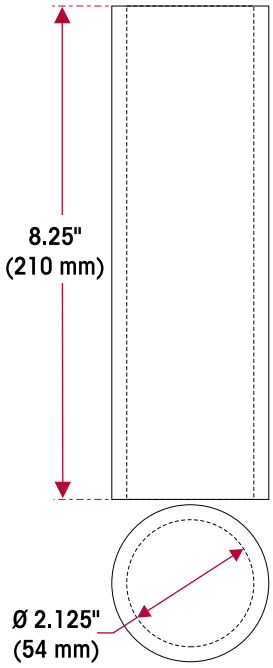


ULTRA ROD TORQUE ROD BUSHING TOOLS

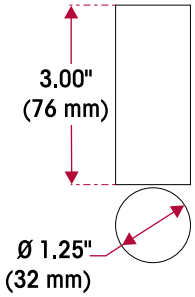
FUNNEL TOOL
Hendrickson Part No. 66086-001L

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

Receiving Tool



Installation / Removal Tool



SECTION 6
Preventive Maintenance

Following appropriate inspection procedures is important to help ensure the proper maintenance and operation of the COMFORT AIR rear air suspension system and components function to their highest efficiency.

NOTE Torque values shown in this publication 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.

HENDRICKSON RECOMMENDED INSPECTION INTERVALS	PRE-DELIVERY INSPECTION	FIRST IN-SERVICE INSPECTION	PREVENTIVE MAINTENANCE
Visually inspect for proper assembly and function. Check for all of the following and replace components as necessary: • Signs of unusual movement, loose or missing components • Signs of abrasive or adverse contact with other components • Damaged, or cracked parts • Improper suspension function or alignment	Within the first **100 Miles (160 km)**	Within the first **1,000 Miles (1,600 km), 100 Hours** or whichever comes first	On-Highway **20,000 Miles (32,000 km)**, **every 6 Months**, or whichever comes first
Visually inspect the overall condition, torque, and any signs of damage to: • Main Support Member • Spring Seat • Clamp group			
Inspect all fasteners for proper torque using a calibrated torque wrench as recommended in the Torque Specifications section of this publication: • QUIK-ALIGN fasteners • Clamp group U-bolt fasteners, see Figure 6-1			50,000 Miles (80,500 km), every 12 Months, or whichever comes first
Verify the lateral alignment of the drive axles are within the vehicle manufacturer's tolerances			
Verify the ride height. Refer to the Adjustment & Alignment section in this publication.			

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

⚠ WARNING

ELECTRIC VEHICLE SAFETY

PRIOR TO PERFORMING ANY WORK ON THE VEHICLE, READ ALL WORK INSTRUCTIONS AND SAFETY INFORMATION PROVIDED BY THE VEHICLE MANUFACTURER AND MAKE SURE THAT THE STARTER SWITCH IS IN THE "OFF" POSITION, SET THE PARKING BRAKE, AND CHOCK THE TIRES.

TOOLS USED WHEN WORKING NEAR BATTERIES OR ELECTRICAL CONNECTIONS MUST BE CERTIFIED TO A RATING OF 1000 VDC TO HELP PREVENT INJURIES FROM ELECTRIC SHOCK. SHORT CIRCUITS BETWEEN COMPONENTS OR WIRES MUST BE AVOIDED.

COMPONENT INSPECTION

- **Air spring** – Visually inspect the outer surface of the air spring for any chafing, uneven wear, cracks, or any signs of component damage. Ensure that the upper bead plate is tight against the underside of the frame. Check for any lateral slippage at the lower air spring bracket. A ⅛" of slippage in either direction is acceptable. Verify all mounting hardware have the proper torque values maintained. Refer to the Torque Specifications section in this publication.
- **Air supply (Pneumatic components)** — The air supply to the system plays a large role in the air springs' performance. Inspect and clean any support products to the air springs, valves, regulators and air lines and replace as necessary. See Air Fittings in this section if an air leak is suspected.
- **Clamp group** – Visually inspect for any loose or damaged fasteners. Verify the U-bolt locknuts have the proper torque values maintained, see U-bolt Locknuts in this section.
- **Cross channel** – Visually inspect for any cracks, damage, metal shavings, or looseness at the main support member connection.
- **Fasteners** – Visually inspect for any loose or damaged fasteners on the entire suspension. Ensure all fasteners are tightened to the specified torque range. See the Torque Specifications 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 and correct the torque if necessary.
- **Frame hanger** – Visually inspect for any signs of loose fasteners, movement, or damage. Verify the frame attaching fasteners have the proper torque values maintained. See the vehicle manufacturer for proper torque specifications.
- **Height control valve and air lines** – Check the suspension air system for any air leaks. Check all air lines for proper routing. Check for chafing or pinched air lines and any interference with peripheral components. Refer to the Air Fittings inspection procedure in this section.
- **Main support member assembly** – Look for any signs of looseness, cracks, or other damage. Inspect the cross channel connection for looseness or damage. Inspect the isolator puck for wear or damage. Inspect the Flexi-wrap for any signs of looseness or damage. Check the torque on the pivot bushing connection and the clamp group. Correct the torque as necessary. Replace all worn or damaged parts.
- **QUIK-ALIGN connection** — Visually inspect the pivot bushing connection for any signs of looseness or movement. Refer to the QUIK-ALIGN Pivot Bushing in this section. Verify the connections have the proper torque values maintained, refer to the Torque Specifications section in this publication and refer to the QUIK-ALIGN warning in the Important Safety Notice section of this publication prior to QUIK-ALIGN installation.
- **Shock absorbers** – Visually inspect for any signs of dents or leakage. Misting is not considered a leak, see Shock Absorbers in this section.
- **Tire wear** – Visually inspect the tires for any wear patterns that may indicate suspension damage or misalignment.
- **Torque rods** – All torque rods must be inspected for looseness, torn or shredded rubber, and proper fastener torque. See the Transverse Torque Rod inspection in this section.
- **Wear and damage** – Visually inspect all parts of the suspension for wear and damage, and replace as necessary.

AIR FITTINGS

INSPECTION

1. If an air leak is suspected, begin by building up the air system to normal operating pressure.
2. Spray all nylon tube air fittings with a soapy water solution to detect the leak location.

NOTE

Air lines and fittings may be inspected for leaks using a soapy water solution. The height control valve, however, cannot be inspected using this method. All height control valves have an allowable leakage rate.

3. If an air leak is located, ensure the tubing end is clean and in good condition and the end is cut square. Check to see if the tubing is binding, bent, or being pulled upon.
4. Visually inspect the air fitting's O-ring seal for signs of damage or contamination.

U-BOLT LOCKNUTS

NOTE

Hendrickson Truck Suspension Systems U-bolt clamp group hardware for the COMFORT AIR suspension are phosphate and oil coated ⅞"-14 UNF Grade C high locknuts and ⅞"-14 UNF Grade 8 U-bolts.

1. U-bolt locknuts must be torqued to specification at preparation for delivery.
2. U-bolt locknuts must be re-torqued at 1,000 miles.
3. Thereafter follow the 1-year / 50,000 miles (80,500 km), whichever comes first inspection re-torque interval.

⚠ WARNING

THE U-BOLT CLAMP GROUP CONNECTION MUST BE PROPERLY ALIGNED AND HAVE THE PROPER TORQUE VALUES MAINTAINED. METAL SURFACES CAN WORK AND WEAR AGAINST OTHER RELATED CLAMP GROUP COMPONENTS IF NOT PROPERLY ALIGNED OR PROPERLY TIGHTENED TO MAINTAIN THE PROPER CLAMP FORCE. FAILURE TO DO SO CAN CAUSE PREMATURE COMPONENT WEAR, POSSIBLE SEPARATION OF THE CLAMP GROUP, CAUSING ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

4. Tighten the U-bolt locknuts in the proper sequence, shown in Figure 6-2, evenly in 50 foot pounds increments to achieve uniform bolt tension to 425 ± 25 foot pounds torque.

FIGURE 6-1

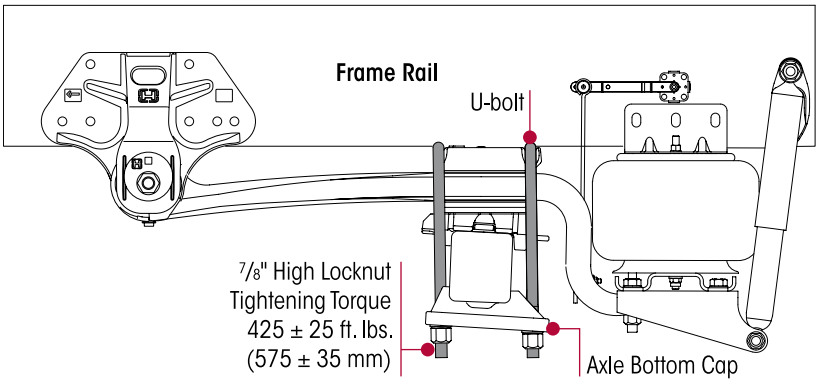
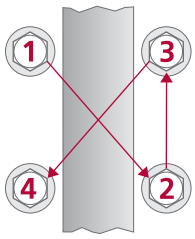


FIGURE 6-2



QUIK-ALIGN PIVOT BUSHING

⚠ WARNING

THE QUIK-ALIGN PIVOT BUSHINGS ARE CRITICAL COMPONENTS OF THE COMFORT AIR SUSPENSIONS. IF THESE COMPONENTS APPEAR DAMAGED OR WORN THE COMPONENT MUST BE REPLACED. FAILURE TO REPLACE SUCH WORN OR DAMAGED COMPONENTS CAN RESULT IN THE DEFORMATION OF PARTS, LOSS OF CLAMP FORCE, BOLT FAILURE, LOSS OF THE AXLE ALIGNMENT, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

There are two types of QUIK-ALIGN pivot bushing inspections. The pivot bushing can be visually inspected by looking at the outer rubber flange(s) of the bushing. If the visual inspection warrants, a physical inspection can be conducted in which disassembly is required.

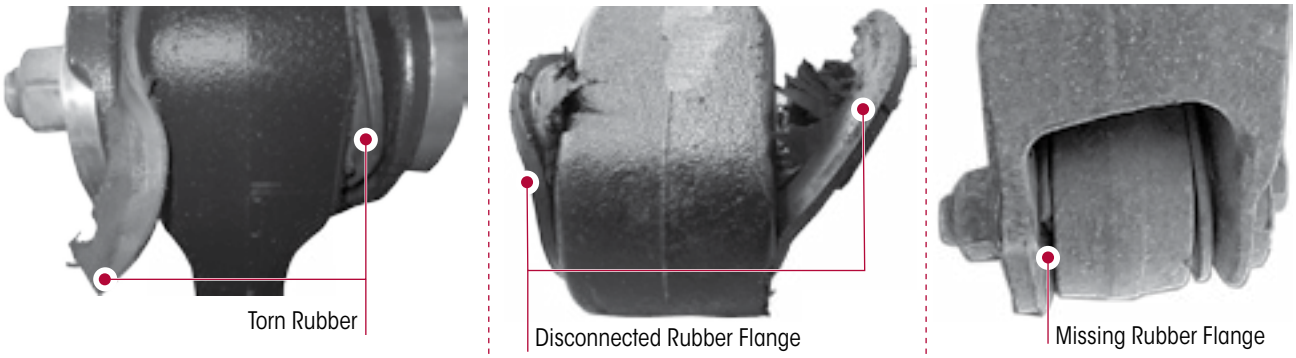
VISUAL INSPECTION

It is not necessary to disassemble the pivot bushing connection to perform the pivot bushing visual inspection. If the pivot bushing rubber flange(s) are intact and there are no signs of metal to metal contact the bushing does not require replacement.

- The main support member is designed with the pivot bushing centered in the end hub. If the pivot bushing is not centered in the end hub, it is an indication that the pivot bushing could be worn and a pivot bushing physical inspection is required.
- If the pivot bushing shows signs of torn, separated, or disconnected rubber, see Figures 6-3 and 6-4, this could be a result of axle misalignment. If this condition is evident, a pivot bushing physical inspection is required.
- If the outer rubber flange(s) is missing, or there are shards of rubber visible, see Figure 6-5, this could be a result of axle misalignment. If this condition is evident, pivot bushing replacement is required.

FIGURE 6-3 FIGURE 6-4 FIGURE 6-5

VISUAL INSPECTION – Torn, Disconnected or Missing Rubber Flange



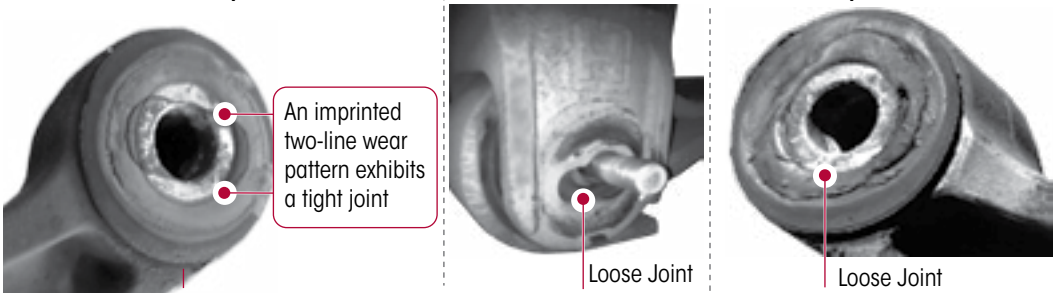
PHYSICAL INSPECTION

1. Remove the main support assembly as detailed in the Component Replacement section of this publication.
2. After removal, inspect the pivot bushing connection and examine the pivot bushing inner metal area.
   - **No replacement is needed** if the bushing exhibits a tight joint, see Figure 6-6. An imprinted two-line wear pattern on the bushing inner metal indicates the pivot bushing is securely clamped in the frame hanger.
   - **Replacement is necessary** if any indications of the following are apparent, see Figure 6-7: Signs of rust, distorted, separated or torn rubber, elongated or damaged bore. This could be a result of axle misalignment or loose fasteners.
3. Inspect the inside of the frame hanger legs and the QUIK-ALIGN collars. If any of the following are present, the pivot bushing and one or more of the mating components may require replacement:
   - Evidence of wear marks on the inside of the frame hanger legs indicating metal to metal contact or movement.
   - The snout of the QUIK-ALIGN concentric or eccentric collar is elongated or damaged.
4. Check the suspension alignment and adjust if necessary. Refer to the Alignment & Adjustments section of this publication.

FIGURE 6-6 FIGURE 6-7

PHYSICAL INSPECTION

GOOD JOINT – No Replacement Needed **INDICATIONS OF A LOOSE JOINT – Replacement Needed**



TRANSVERSE TORQUE RODS

WARNING

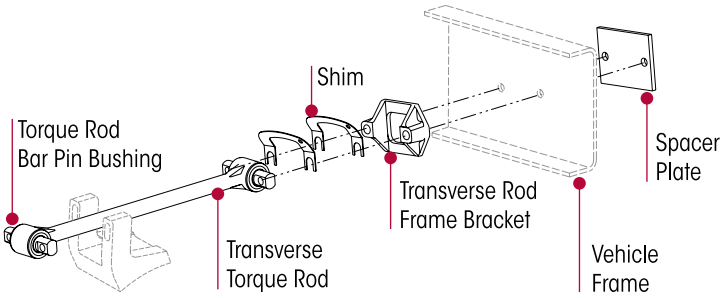
THIS HENDRICKSON SUSPENSION REQUIRES TORQUE RODS FOR SUSPENSION PERFORMANCE AND VEHICLE STABILITY. IF THESE TORQUE RODS ARE DISCONNECTED OR NON-FUNCTIONAL, DO NOT OPERATE THE VEHICLE. OPERATING A VEHICLE WITH DISCONNECTED OR NON-FUNCTIONAL TORQUE RODS CAN RESULT IN ADVERSE VEHICLE HANDLING, COMPONENT DAMAGE, SUSPENSION/VEHICLE DAMAGE, AND/OR SEVERE PERSONAL INJURY.

NOTE Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts for all straddle mount torque rod attachments.

VISUAL INSPECTION

Visually inspect **(1) torque rod bushings** for any torn or shredded rubber material interfaces or elongated oval shapes and **(2) torque rods** for any metal-to-metal contact, bent, cracked, or broken components. The torque rod and/or the torque rod bushings will require replacement if any of these conditions are encountered.

FIGURE 6-8



PHYSICAL INSPECTION

Inspect torque rod bushings for signs of looseness per the following method.

With the vehicle shut down perform a lever check. Place a long pry bar under each torque rod end and apply pressure to check for looseness.

- The transverse torque rods also control axle walk-out during cornering. The mounting brackets at the axle housing end of the torque rods are furnished and welded into position on the axle housings by the axle or vehicle manufacturer, see Figure 6-8.

ULTRA ROD Torque rod straddle bushings may be replaced by pressing out the worn bushings and installing new replacement bushings, refer to the Component Replacement section of this publication.

NOTE It is important that the **tightening torque** of the locknuts be checked during preventive maintenance and service. Follow the tightening torque specifications and all applicable preventive maintenance, service, and safety instructions issued by the respective vehicle and suspension manufacturers.

SHOCK ABSORBERS

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

Hendrickson uses a long service life, premium shock absorber on all COMFORT AIR suspensions. When the shock absorber replacement is necessary, Hendrickson recommends that the shock absorbers be replaced with identical Hendrickson Genuine parts for servicing. Failure to do so will affect the suspension performance, durability, and will void any applicable warranty. See the vehicle manufacturer's applicable publications for other shock absorber inspection requirements.

Inspection of the shock absorber can be performed by doing a heat test, and a visual inspection. Replace as necessary, refer to the Component Replacement section of this publication.

FIGURE 6-9

HEAT TEST AND PHYSICAL INSPECTION

1. **Heat Test:** Drive the vehicle at moderate speeds on a rough road for a minimum of fifteen minutes.

WARNING

DO NOT GRAB THE SHOCK ABSORBER AS IT COULD POSSIBLY BE HOT AND CAUSE PERSONAL INJURY.

   a. Perform a heat test by carefully touching or placing a hand near the shock absorber body below the dust cover. Touch the frame to get an ambient reference, see Figure 6-9. A shock absorber that is warm to the touch is acceptable, a cold shock absorber should be replaced.

2. **Physical Inspection:** To inspect for an internal failure, remove and shake the suspected shock absorber. Listen for the sound of metal parts rattling inside. The rattling of metal parts can indicate that the shock absorber has an internal failure and the shock absorber should be replaced.

VISUAL INSPECTION

Look for these potential problems when doing a visual inspection, see Figure 6-10. Inspect the shock absorbers fully extended. Replace as necessary.

FIGURE 6-10

SHOCK ABSORBER VISUAL INSPECTION – UNACCEPTABLE CONDITIONS

Damaged upper or lower mount

Damaged upper or lower bushing

Damaged dust cover and / or shock body

Bent or dented shock absorber

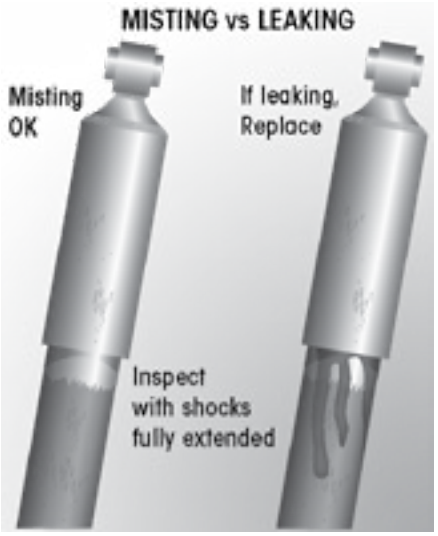
Improper installation Example: washer (if equipped) installed backwards

LEAKING VS. MISTING SHOCK ABSORBER

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

Many shock absorbers are often misdiagnosed as failures. Misting is the process whereby very small amounts of shock absorber fluid evaporate at a high operating temperature through the upper seal of the shock absorber. When the "mist" reaches the cooler outside air, it condenses and forms a film on the outside of the shock absorber body. Misting is perfectly normal and a necessary function of the shock absorber. The fluid which evaporates through the seal area helps to lubricate and prolong the life of the seal.

FIGURE 6-11



NOTE

The COMFORT AIR suspension system is equipped with a premium seal on the shock absorber, however, this seal will allow for misting to appear on the shock absorber body (misting is not a leak and is considered acceptable).

Inspect the shock absorber fully extended. **A shock absorber that is truly leaking** will show signs of fluid **leaking in streams from the upper seal**, see Figure 6-11**.** These streams can easily be seen, underneath the main body (dust cover) of the shock absorber. Replace as necessary.

SECTION 7
Alignments & Adjustments

WARNING

ELECTRIC VEHICLE SAFETY

PRIOR TO PERFORMING ANY WORK ON THE VEHICLE, READ ALL WORK INSTRUCTIONS AND SAFETY INFORMATION PROVIDED BY THE VEHICLE MANUFACTURER AND MAKE SURE THAT THE STARTER SWITCH IS IN THE "OFF" POSITION, SET THE PARKING BRAKE, AND CHOCK THE TIRES.

TOOLS USED WHEN WORKING NEAR BATTERIES OR ELECTRICAL CONNECTIONS MUST BE CERTIFIED TO A RATING OF 1000 VDC TO HELP PREVENT INJURIES FROM ELECTRIC SHOCK. SHORT CIRCUITS BETWEEN COMPONENTS OR WIRES MUST BE AVOIDED.

RIDE HEIGHT

INSPECTION

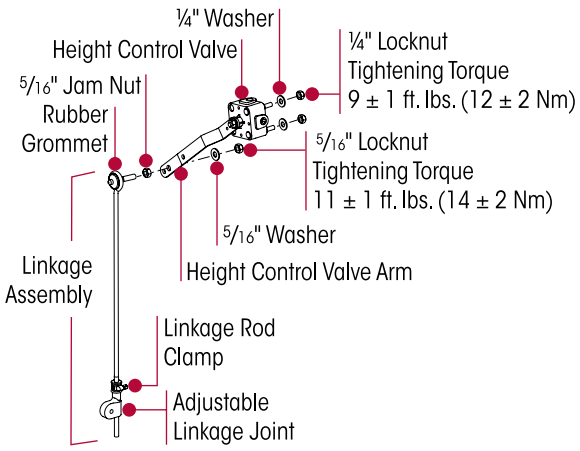
1. Drive the vehicle onto a level surface.
2. Relax the suspension by slowly moving vehicle back and forth several times in a straight line without using the brakes.
3. Chock front wheels. **DO NOT** set parking brake.
4. Verify that the air system is at full operating pressure.

SERVICE HINT It is very important that the height control valve is cycled completely before and after any ride height adjustments. The cycling of the height control valve will help to make the adjustment more accurate.

WARNING

PRIOR TO AND DURING THE 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.

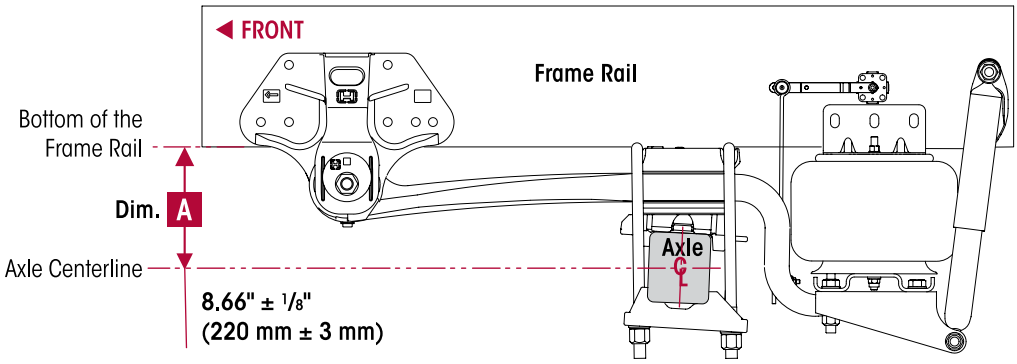
FIGURE 7-1



5. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
6. Cycle the air system.
7. Deflate the suspension. Detach the upper rubber grommet of the linkage assembly from the upper stud and exhaust the suspension system air by lowering the height control valve arm, see Figure 7-1.
8. Inflate the suspension. Raise the height control valve arm and attach the upper rubber grommet of the linkage assembly to the height control valve arm. Allow the suspension system to inflate.
9. Re-attach the upper grommet of the linkage assembly onto the upper stud to fill the suspension system with air. Wait until the airflow to the air springs has stopped.
10. Measure the suspension ride height on the side of the axle where the height control valve is located.
11. Ride height is measured from the bottom of the frame to the axle centerline **(Dimension A)**. The ride height specification is 8.66" ± ⅛" (220 mm ± 3 mm), see Figure 7-2.

12. **If the measured (Dimension A) ride height is:**
    - Within specification, then a height control valve adjustment is not required.
    - Out of specification, then a height control valve adjustment is required. Follow the Adjustment procedure below.

FIGURE 7-2



ADJUSTMENT

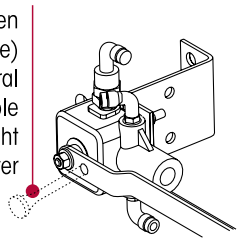
1. Drive the vehicle onto a level surface.
2. Relax the suspension by slowly moving vehicle back and forth several times in a straight line without using the brakes.
3. Chock front wheels. **DO NOT** set parking brake.
4. When checking or adjusting ride height, verify and maintain the vehicle's air system is at full operating pressure.

SERVICE HINT

It is very important that the height control valve is cycled completely before and after any ride height adjustments. The cycling of the height control valve will help to make the adjustment more accurate.

5. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
6. Detach the upper rubber grommet of the linkage assembly from the height control valve arm
7. Lower the height control valve arm to exhaust the suspension system air.
8. Refill the suspension by raising the height control valve arm by hand, so that the suspension is above the proper ride height.
9. Lower the height control valve arm to exhaust the suspension air system until the suspension is within ride height specification.

FIGURE 7-3



10. Use a 1/8" wooden dowel rod (golf tee) to set the neutral position for the height control valve by aligning the hole in the leveling arm with the hole in the height control valve cover, as shown in Figure 7-3. **DO NOT** use a metal rod or nail as this may cause damage to the height control valve.
11. Adjust the linkage assembly rod so the rubber grommet can be reconnected to the height control valve arm at the proper ride height. Check the rubber components for any tearing or damage, replace as necessary.
12. Reconnect the height control valve arm to the rubber grommet.
13. Tighten the clamp on the linkage assembly with a screwdriver until securely fastened.
14. Remove the wooden dowel from the height control valve.

SERVICE HINT

It is very important that the height control valve be cycled completely before and after any ride height adjustments. The cycling of the leveling valve will help make the adjustment more accurate. Be sure to maintain full system air pressure while setting or inspecting ride height. Note, during height control valve cycle operation it is normal to experience a limited amount of exhaust noise.

15. Verify the ride height.
16. Repeat Steps 6 through 15 until the ride height is within specification.
17. Remove the wheel chocks.

DRIVE AXLE ALIGNMENT INSPECTION

Proper alignment is essential for maximum ride quality, performance, and tire service life, the recommended alignment procedure is described below. This procedure should be performed if excessive or irregular tire wear is observed, or any time the QUIK-ALIGN connection is loosened or removed.

1. Use a work bay with a level surface.
2. Relax the suspension by slowly moving vehicle back and forth several times in a straight line without using the brakes.
3. **DO NOT** set the parking brake.
4. Chock the front wheels of the vehicle.
5. Verify and maintain the air system at full operating pressure.
6. Verify the vehicle is at the correct ride height. Refer to Ride Height Adjustment in this section. Correct as necessary.
7. Verify all suspension components are in good condition. Repair or replace any worn or damaged suspension components before proceeding with the alignment process.
8. Ensure all drive axle tires are the same size and inflated to the correct tire pressure.
9. Use an alignment machine to calculate the drive axle readings.

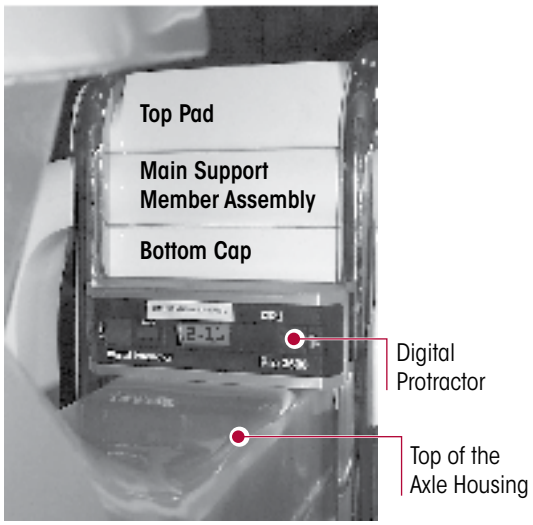
NOTE

Depending on your alignment equipment, enter the vehicle year, make, model, and design into the system's computer to determine the vehicle manufacturer's alignment specifications per the alignment equipment instructions. That data will be compared to the vehicle's actual alignment status to determine necessary corrections. Some systems allow you to simply scan the VIN to recall specs. Vehicle manufacturers have set specific alignment specifications.

10. If the measurements are within the vehicle manufacturer's specifications, then the rear drive axle alignment is acceptable. Proceed to check the pinion angles of the drive axles (Step 11).
    a. If the alignment of the rear drive axle **IS NOT** within the vehicle manufacturer's specifications, then the alignment of this axle **MUST** be corrected **BEFORE** checking the drive axle pinion angles.
    b. Correct the alignment of this axle by following the Axle Alignment Adjustment instructions as shown in this section.
11. After all drive axles are aligned, check the pinion angle of each drive axle with a digital protractor, see Figure 7-4. Refer to the vehicle manufacturer's specifications for the required pinion angles.
    a. If all pinion angles are within the vehicle manufacturer's specifications then proceed to Step 12.
    b. If any pinion angle is out of the vehicle manufacturer's specifications it must be corrected. Follow the vehicle manufacturer's procedure.
12. Recheck measurements to confirm adjustments until the correct alignment and pinion angles are achieved.
13. When all drive axle alignments and pinion angles are within the vehicle manufacturer's specifications then the alignment procedure is complete.
14. Remove the wheel chocks.

AXLE PINION ANGLE

FIGURE 7-4



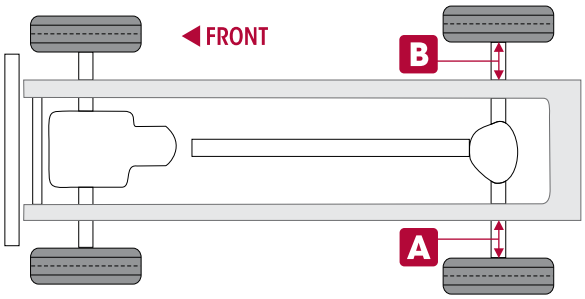
Drive axle pinion angles are established by the vehicle manufacturer.

To check the pinion angle:

1. Verify the suspension is at the proper ride height (see the Ride Height Inspection in this section).
2. Place a digital protractor on the axle housing as shown in Figure 7-4.
3. Verify the pinion angle is within the range specified by the vehicle manufacturer.
4. Contact the vehicle manufacturer if it is necessary to fine-tune the pinion angle.

AXLE LATERAL ALIGNMENT

FIGURE 7-5

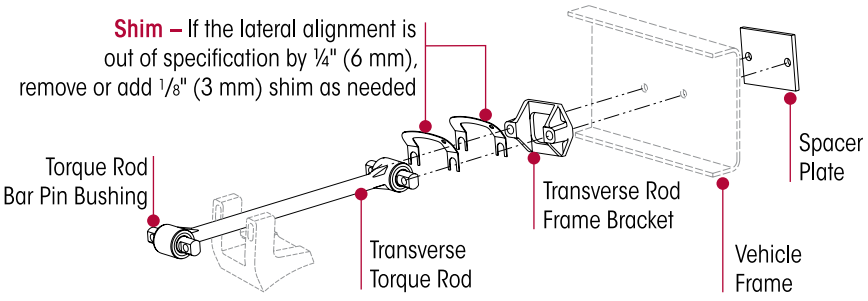


1. Use a work bay with a level surface.
2. Relax the suspension by slowly moving vehicle back and forth several times in a straight line without using the brakes. It is **IMPORTANT** when coming to a complete stop to verify the brakes are released.
3. **DO NOT** set the parking brake.
4. Chock the front wheels of the vehicle.
5. Measure from the outside of the frame rail to the rim flange of the inner tire. Record the measurement for dimensions **A** and **B**, see Figure 7-5.
6. Verify the axle lateral alignment is within the vehicle manufacturer's specifications. Adding or removing shims that are located between the transverse torque rod and the frame rail will normally correct the axle lateral alignment.
   - A general rule of thumb is to use a torque rod shim with a thickness that is half of the difference between the two measurements.

EXAMPLE

If the axle lateral alignment is out of specification by ¼" (6 mm), remove or install a ⅛" (3 mm) torque rod shim between the transverse torque rod and frame rail as needed, see Figure 7-6.

FIGURE 7-6

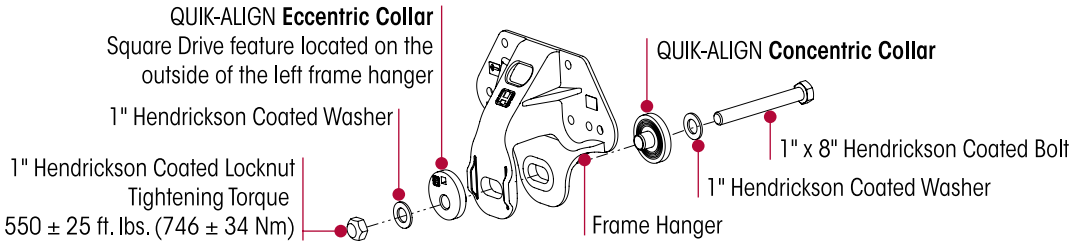


AXLE ALIGNMENT ADJUSTMENT

NOTE The eccentric collar with the square drive feature (one (1) per suspension) is located on the outside of the left frame hanger. The concentric collars (three (3) per suspension) are located on the inside of the left frame hanger and both outside and inside of the right frame hanger, see Figure 7-7.

NOTE Axle adjustment is applied to the **LEFT** side of the vehicle only. If an adjustment to the right side of the vehicle is necessary, it will require the replacement of the outside concentric collar with an eccentric collar and repeat Steps 1 to 4 on the right side of the vehicle.

FIGURE 7-7



WARNING DISCARD USED QUIK-ALIGN FASTENERS. ALWAYS USE NEW QUIK-ALIGN FASTENERS TO COMPLETE A REPAIR OR SERVICE. FAILURE TO DO SO COULD RESULT IN FAILURE OF THE PART OR MATING COMPONENTS, ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY, OR PROPERTY DAMAGE.

WARNING DO NOT ASSEMBLE THE QUIK-ALIGN JOINT WITHOUT THE PROPER FASTENERS. USE ONLY HENDRICKSON COATED GENUINE FASTENERS TO SUSTAIN PROPER CLAMP FORCE. ENSURE THAT THE QUIK-ALIGN FASTENERS TORQUE VALUES ARE SUSTAINED AS RECOMMENDED IN THE TORQUE SPECIFICATIONS SECTION IN THIS PUBLICATION. FAILURE TO FOLLOW THE ABOVE ITEMS CAN CAUSE ADVERSE VEHICLE HANDLING, PERSONAL INJURY OR PROPERTY DAMAGE AND WILL VOID ANY APPLICABLE WARRANTIES. FOLLOW THE VEHICLE MANUFACTURER'S FASTENER ORIENTATION WHEN PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR.

1. Support the frame at ride height with safety stands.

WARNING PRIOR TO AND DURING THE 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 Warnings and Instructions in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
3. Disconnect the linkage assembly from the height control valve arm. Lower the height control valve arm to exhaust the air in the air springs and deflate the rear suspension.
4. Use the measurements from the **Drive Axle Alignment Inspection** procedure in this section to determine if an adjustment is necessary, if so correct the axle alignment.
5. Remove the existing **left side** QUIK-ALIGN fasteners and replace them with a new QUIK-ALIGN service kit, see the Parts List section of this publication. This will help ensure that the proper clamp load is applied to the connection and help prevent the joint to slip in service.
6. Tighten the QUIK-ALIGN locknut to 100 foot pounds. This will hold the eccentric flanged washer (see Figure 7-7) in place against the hanger face and within the adjustment guide, but loose enough to permit the eccentric flanged washer to rotate freely.
7. Use a QUIK-ALIGN socket tool (refer to the Special Tools section of this publication) and an impact gun, or a ½" (13 mm) square drive breaker bar to rotate the QUIK-ALIGN eccentric collar to align the axle.
8. Clockwise rotation moves the axle forward, counter-clockwise rotation moves the axle rearward. A 90° rotation of the QUIK-ALIGN collar will move the axle fore and aft ± ½" (13 mm) from the center.
9. Use an alignment machine to calculate the drive axle readings.

NOTE

Depending on your alignment equipment, enter the vehicle year, make, model and design into the system's computer to determine the vehicle manufacturer's alignment specifications per the alignment equipment instructions. That data will be compared to the vehicle's actual alignment status to determine necessary corrections. Some systems allow you to simply scan the VIN to recall specs. Vehicle manufacturers have set specific alignment specifications.

10. If the measurements are:
    a. Within the vehicle manufacturer's specifications, then the rear drive axle alignment is acceptable, proceed to Step 11.
    b. If not within the vehicle manufacturer's specifications, repeat Steps 5 to 9 until alignment is achieved.
11. Once the rear drive axle alignment is achieved, tighten the QUIK-ALIGN locknuts to 550 ± 25 foot pounds torque, see Figure 7-7.
12. After the drive axle is aligned, check the pinion angle of the drive axle with a digital protractor, see Figure 7-4. Refer to the vehicle manufacturer's specifications for the required pinion angles.
    a. If the pinion angles are within the vehicle manufacturer's specifications then proceed to Step 13.
    b. If any pinion angle is out of the vehicle manufacturer's specifications it must be corrected. Contact the vehicle manufacturer.
13. When all drive axle alignments and pinion angles are within the vehicle manufacturer's specifications then the alignment adjustment is complete.

SECTION 8
Component Replacement

⚠ WARNING

ELECTRIC VEHICLE SAFETY

PRIOR TO PERFORMING ANY WORK ON THE VEHICLE, READ ALL WORK INSTRUCTIONS AND SAFETY INFORMATION PROVIDED BY THE VEHICLE MANUFACTURER AND MAKE SURE THAT THE STARTER SWITCH IS IN THE "OFF" POSITION, SET THE PARKING BRAKE, AND CHOCK THE TIRES.

TOOLS USED WHEN WORKING NEAR BATTERIES OR ELECTRICAL CONNECTIONS MUST BE CERTIFIED TO A RATING OF 1000 VDC TO HELP PREVENT INJURIES FROM ELECTRIC SHOCK. SHORT CIRCUITS BETWEEN COMPONENTS OR WIRES MUST BE AVOIDED.

FASTENERS

Hendrickson recommends when servicing the vehicle, replace all 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 & LINKAGE ASSEMBLY

DISASSEMBLY

1. Chock the wheels of the vehicle.

⚠ WARNING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

2. Support the frame with safety stands.
3. Remove and discard the fasteners that connect the upper linkage assembly to the height control valve arm.

⚠ WARNING

PRIOR TO AND DURING THE 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.

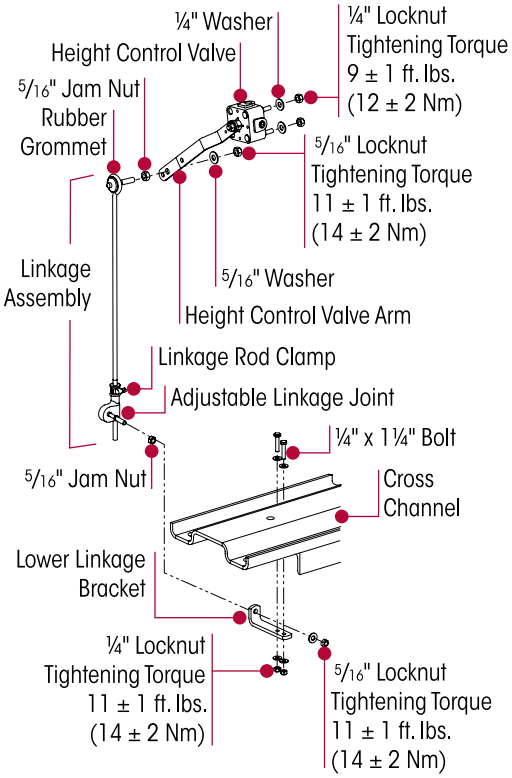
4. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
5. Lower the height control valve arm to exhaust the air from the air springs.
6. Remove the air lines from the height control valve.
7. Remove the air fittings from the height control valve.
8. Remove the ¼" fasteners that attach the height control valve to the frame mounting bracket.
9. Remove the height control valve, see Figure 8-1.
10. If replacement of the linkage assembly is necessary, remove lower mounting fasteners from the lower linkage bracket, see Figure 8-1.

ASSEMBLY

1. Install the height control valve to the frame mounting bracket by attaching ¼" fasteners. Tighten to 9 ± 1 foot pounds torque, see Figure 8-1.
2. Re-install the air fittings into the height control valve using the Teflon® (or equivalent) thread seal.
3. Install the air lines to the height control valve. Refer to the Plumbing Diagram section of this publication.

4. Install the upper linkage assembly and attach the 5/16" fasteners to the height control valve arm. Tighten to 11 ± 1 foot pounds torque, see Figure 8-1.
5. Install the lower linkage assembly and attach the 5/16" fasteners to the linkage bracket. Ensure the jam nut is properly installed. Tighten to 11 ± 1 foot pounds torque, see Figure 8-1.
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. Inflate the suspension. Verify the air springs inflate uniformly without binding.
8. Verify proper ride height. Refer to the Alignment & Adjustments section of this publication.
9. Remove the frame safety stands.
10. Remove the wheel chocks.

FIGURE 8-1



AIR SPRING

DISASSEMBLY

1. Chock the front wheels.

WARNING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

2. Support the frame with safety stands.
3. Disconnect the height control valve arm from the linkage assembly.

WARNING

PRIOR TO AND DURING THE 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. Lower the height control valve arm to exhaust the air in the air springs and deflate the rear suspension.
6. Remove the air line from the air spring.

CAUTION

IF THE AIR SPRING IS BEING REMOVED FOR AN ALTERNATE REPAIR, IT IS MANDATORY TO LUBRICATE THE LOWER AIR SPRING FASTENERS WITH PENETRATING OIL AND REMOVE WITH HAND TOOLS TO PREVENT DAMAGE TO THE LOWER AIR SPRING MOUNTING STUD. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE AND VOID WARRANTY.

7. If the air spring is being removed for an alternate repair, use hand tools only. It will be necessary to clean and lubricate the lower mounting fasteners with penetrating oil. This will help prevent the air spring mounting studs from breaking during the removal process.
8. Remove and discard the ½" lower air spring mounting locknut, see Figure 8-2.

9. Remove and discard the upper air spring mounting fasteners per vehicle manufacturer's instructions.
10. Remove the air spring.

INSPECTION

Inspect the air spring mounting surfaces for any damage. Replace as necessary.

ASSEMBLY

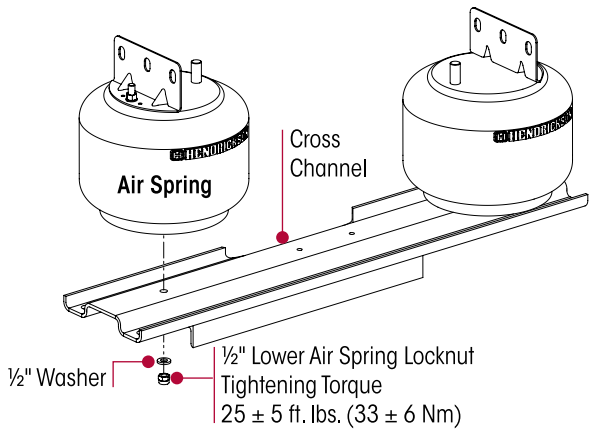
1. Install the air spring between the frame and the cross channel.

⚠ WARNING

FAILURE TO PRESS THE UPPER AIR SPRING BRACKET ASSEMBLY AGAINST THE UNDERSIDE OF THE FRAME WHILE TIGHTENING THE UPPER AIR SPRING FASTENERS CAN RESULT IN COMPONENT DAMAGE AND PERSONAL INJURY OR PROPERTY DAMAGE.

2. Press the upper air spring bracket assembly firmly against the underside of the frame and tighten the frame fasteners to the proper torque per the original equipment manufacturer's specifications.
3. Install the lower air spring mounting stud through the cross-channel hole. Attach the ½" fasteners to the lower mounting stud of the air spring. **USING HAND TOOLS ONLY,** tighten the locknut to 25 ± 5 foot pounds torque, see Figure 8-2.

FIGURE 8-2



4. Install the air line fitting to the air spring using Teflon (or equivalent) thread seal.
5. Reconnect the air line to the air spring.
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. Reconnect the linkage assembly to the height control valve arm to inflate the suspension.
8. Inflate the suspension slowly and verify that the air spring bladder inflates uniformly without binding.
9. Remove the frame safety stands.
10. Verify proper ride height. Refer to the Alignment & Adjustments section of this publication.
11. Remove the wheel chocks.

SHOCK ABSORBER

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

⚠ WARNING

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

DISASSEMBLY

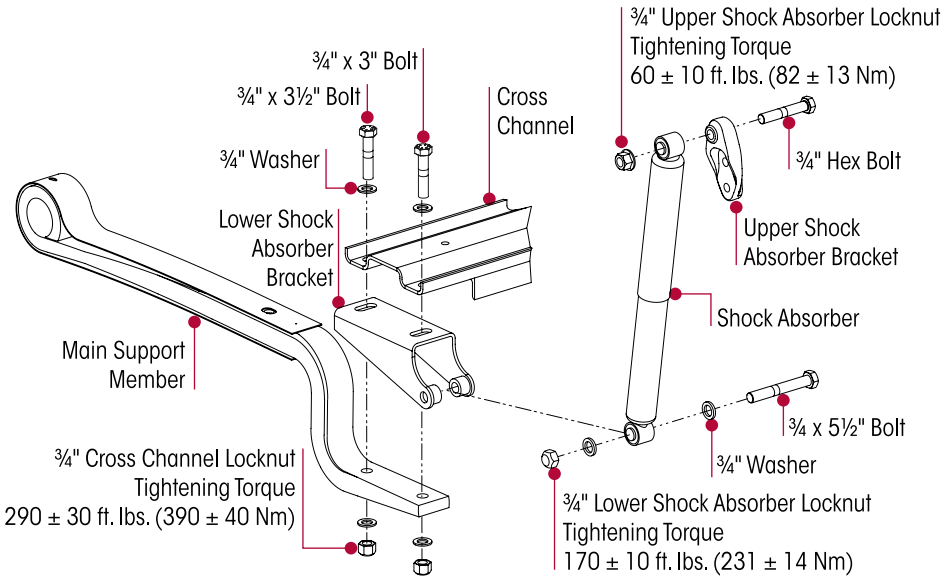
1. Chock the wheels of the vehicle.

2. Remove and discard the ¾" fasteners from the lower shock absorber bracket, see Figure 8-3.
3. Slide the shock absorber out of the lower shock absorber bracket.
4. Remove and discard the ¾" locknut from the upper shock absorber mounting bracket.
5. Remove the shock absorber from the upper shock absorber bracket.

INSPECTION

Inspect the shock absorber mounting surfaces and replace as necessary.

FIGURE 8-3



ASSEMBLY

1. Install the shock absorber onto the upper shock absorber bracket and attach the ¾ fasteners.
2. Install the ¾" fasteners through the lower shock absorber bracket. Tighten the locknut to 170 ± 10 foot pounds torque, see Figure 8-3.
3. Tighten the ¾" upper shock absorber locknut to 60 ± 10 foot pounds torque, see Figure 8-3.
4. Verify proper ride height. Refer to the Alignment & Adjustments section of this publication.
5. Remove the wheel chocks.

LOWER SHOCK ABSORBER BRACKET

DISASSEMBLY

1. Chock the front wheels.
2. Raise the frame of the vehicle at ride height and support it with safety stands.

WARNING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

3. Disconnect the linkage assembly from the height control valve arm.

WARNING

PRIOR TO AND DURING THE 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. Lower the height control valve arm to exhaust the air in the air springs and deflate the rear suspension.
6. On the side being serviced, remove the lower air spring fasteners.
7. Remove the ¾" through bolt from the lower shock absorber mount, see Figure 8-3.
8. Remove the air lines from the air springs and compress to facilitate the removal of the lower shock bracket.
9. Slide the shock absorber out of the lower shock bracket.
10. Use a floor jack under the center of the cross channel and raise the cross channel slightly to facilitate removal of the lower shock bracket.
11. Remove and discard the ¾" fasteners that connect the cross channel and lower shock bracket to the main support member assembly on the side being serviced.
12. Remove the lower shock bracket.

INSPECTION

1. Inspect the shock absorber mounting brackets for damage or wear, and replace as necessary, see the Preventive Maintenance section of this publication.

ASSEMBLY

1. Install the lower shock absorber mounting bracket over the end of the main support member.
2. Lower the cross channel on top of the main support member and the lower shock absorber mounting bracket.
3. Loosely install the two (2) ¾" fasteners through the cross channel holes, lower shock bracket and main support member on each end of the cross channel, see Figure 8-3.
4. Install ¾" fasteners on the cross channel bolts. Tighten the cross channel fasteners to 290 ± 30 foot pounds torque.
5. Slide the shock absorber lower mount into the lower shock absorber mounting bracket.
6. Install the ¾" fasteners through the lower shock absorber mount and lower shock bracket. Tighten the fasteners to 170 ± 10 foot pounds torque, see Figure 8-3.
7. Reconnect the air lines to the air springs.
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. Inflate the suspension by connecting the linkage to the height control valve arm. Verify the air springs inflate uniformly without binding.
10. Remove the frame safety stands.
11. Verify proper ride height. Refer to the Alignment & Adjustments section of this publication.
12. Remove the wheel chocks.

CROSS CHANNEL

DISASSEMBLY

1. Chock the front wheels.

WARNING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

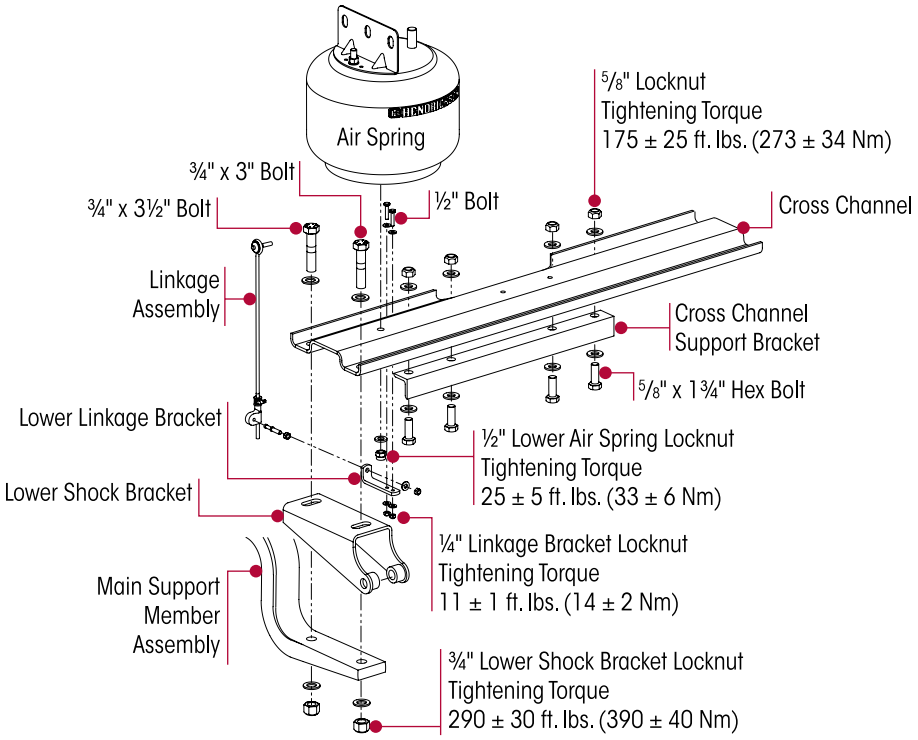
2. Raise and support the frame of the vehicle at ride height with safety stands.
3. Remove the air springs as detailed in the Air Spring instructions in this section.

4. Remove the lower linkage bracket fasteners to the cross channel. Remove the bracket.
5. Remove the four (4) ¾" fasteners from the cross channel to the main support member, see Figure 8-4.
6. Remove the cross channel.

INSPECTION

1. Inspect the mounting surfaces and lower air spring mount for any damage. Replace as necessary.
2. Inspect the cross channel for straightness, excessive wear, and cracks. Replace as necessary.

FIGURE 8-4



ASSEMBLY

1. Attach cross channel support bracket to cross channel. Tighten ⅝" locknuts to 175 ± 25 foot pounds torque, see Figure 8-4.
2. Place the cross channel on top of the lower shock bracket and main support member.
3. Loosely install the two (2) ¾" bolts through the cross channel holes, lower shock bracket and main support member on each end of the cross channel, see Figure 8-4.
4. Tighten the cross channel fasteners to 290 ± 30 foot pounds torque, see Figure 8-4.
5. Install the lower linkage bracket to the cross channel using two (2) ¼" fasteners. Tighten the fasteners to 11 ± 1 foot pounds torque.
6. Install the air spring between the frame and the cross channel.

WARNING

FAILURE TO PRESS THE AIR SPRING AGAINST THE UNDERSIDE OF THE FRAME WHILE TIGHTENING THE UPPER AIR SPRING BRACKET CAN RESULT IN COMPONENT DAMAGE AND PERSONAL INJURY OR PROPERTY DAMAGE.

7. Hold the air spring tight against the bottom frame flange and tighten the upper air spring mounting fasteners to vehicle manufacturer's specifications.
8. Install the air spring lower mounting stud through the cross-channel hole. Attach the ½" fasteners to the lower mounting stud of the air spring. **USING HAND TOOLS ONLY,** tighten the locknut to 25 ± 5 foot pounds torque.
9. Connect the air line to the air spring.

10. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
11. Inflate the suspension by connecting the linkage assembly to the height control valve arm. Verify the air springs inflate uniformly without binding.
12. Remove the frame safety stands.
13. Verify proper ride height. Refer to the Alignment & Adjustments section of this publication.
14. Remove the wheel chocks.

TRANSVERSE TORQUE ROD

WARNING

THIS HENDRICKSON SUSPENSION REQUIRES TORQUE RODS FOR SUSPENSION PERFORMANCE AND VEHICLE STABILITY. IF THESE TORQUE RODS ARE DISCONNECTED OR NON-FUNCTIONAL, DO NOT OPERATE THE VEHICLE. OPERATING A VEHICLE WITH DISCONNECTED OR NON-FUNCTIONAL TORQUE RODS CAN RESULT IN ADVERSE VEHICLE HANDLING, COMPONENT DAMAGE, SUSPENSION/VEHICLE DAMAGE, AND/OR SEVERE PERSONAL INJURY.

DISASSEMBLY

1. Chock the wheels of the vehicle.

WARNING

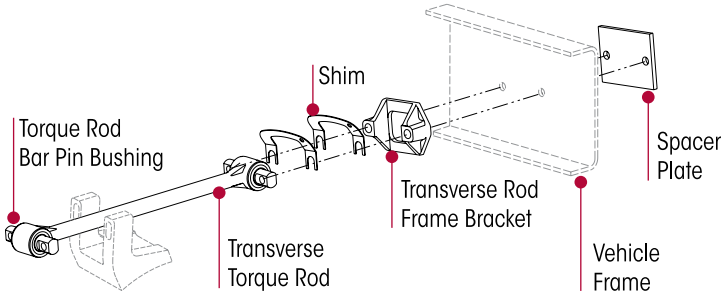
PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

SERVICE HINT

Note the quantity and location of shims removed during disassembly. The same quantity **MUST** be reinstalled in the same location to maintain the lateral alignment of the axle prior to disassembly. The lateral alignment procedure will need to be performed after assembly, see the Alignment & Adjustments section of this publication.

2. Remove the torque rod-to-axle bracket mounting fasteners, see Figure 8-5.
3. Remove the torque rod-to-frame mounting fasteners, see Figure 8-5.
4. Remove the transverse torque rod.

FIGURE 8-5



INSPECTION

Inspect the rubber bushings, spacer plates, and the frame rail for wear or damage, repair or replace as necessary.

ASSEMBLY

1. Install the transverse torque rod bracket on the inboard side of the frame rail.
2. Install the same amount of shims in the same location as prior to removal.
3. Install the spacer plate on the outboard side of the frame rail.
4. Loosely install the fasteners to the frame rail and axle bracket. **DO NOT** tighten to torque at this time.

5. Prior to tightening the transverse torque rod fasteners to the proper torque, ensure the vehicle is at the proper ride height, see the Alignment & Adjustment section of this publication.
6. Tighten the fasteners to vehicle manufacturer's specifications.

NOTE

Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts for all straddle mount torque rod attachments.

7. Check the lateral alignment and verify it is within specifications, see the Alignment & Adjustments section of this publication.
8. Remove the wheel chocks.

TORQUE ROD BUSHING

DISASSEMBLY

You will need:

- A vertical press with a capacity of at least 10 tons
- A receiving, installation, and removal tool. See the Special Tools section of this publication for tool specifications.

CAUTION

DO NOT USE HEAT OR USE A CUTTING TORCH TO REMOVE THE BUSHINGS FROM THE TORQUE ROD. THE USE OF HEAT WILL ADVERSELY AFFECT THE STRENGTH OF THE TORQUE ROD; HEAT CAN CHANGE THE MATERIAL PROPERTIES, A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN THE ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE AND VOID WARRANTY.

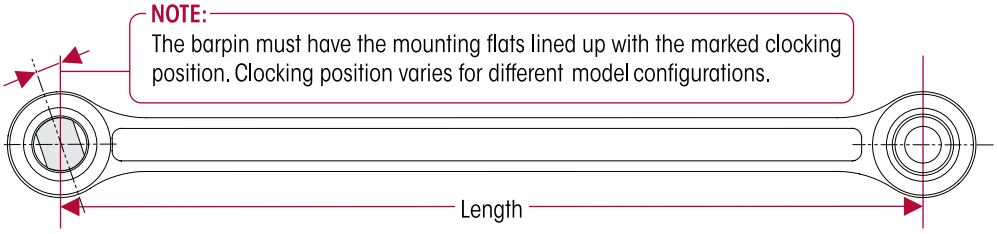
1. Remove the torque rod as detailed in this section.

SERVICE HINT

When servicing a straddle mount bar pin type bushing, **mark the clocking position** of the straddle mount bar pin flats on the torque rod end hub before disassembly. This clocking mark will serve as a guide when installing the new bushing assembly so the original clocking position can be retained.

2. When replacing a straddle mount bar pin type bushing assembly, mark the clocking position of the bushing assembly's bar pin flats with a paint stick on the torque rod end hub prior to disassembly, see Figure 8-6.

FIGURE 8-6



3. Install the torque rod in the press. Support the torque rod end on the receiving tool with the end of the torque rod centered on the tool. Be sure the torque rod is squarely supported on the press bed.
4. Push directly on the inner metal of the bushing assembly until the bushing assembly clears the torque rod end tube.
5. Clean and inspect the inner diameter of the torque rod ends.

ASSEMBLY

NOTE

DO NOT use a petroleum or soap base lubricant. Such lubricants can cause adverse reactions with the bushing, such as deterioration of the rubber, causing premature failure.

1. Lubricate the inner diameter of the torque rod end hub and the new rubber bushing with P-80 Lubricant (refer to the Parts List section of this publication) or light Naphthenic Base Oil, such as 60 SUS at 100°F, see Figure 8-7.

2. Support the torque rod end hub on the receiving tool with the end hub of the torque rod centered on the receiving tool.

SERVICE HINT When replacing a straddle mount bar pin type bushing assembly, verify the correct clocking position of the straddle mount bar pin flats prior to installing the bushing assembly in the torque rod end hub.

3. Verify the bar pin flats are clocked correctly.
4. Press directly on the inner metal of the bushing assembly.
5. When pressing in the new bushings overshoot the desired final position by approximately 3⁄16", see Figure 8-8.
6. Press the inner metal of the bushing assembly again from the opposite side to center the bushing and inner metal within the torque rod end hub, see Figure 8-9.
7. Wipe off excess lubricant. Allow the lubricant four (4) hours to dissipate before the operating vehicle.

FIGURE 8-7

FIGURE 8-8

FIGURE 8-9

CAUTION IF THE TORQUE ROD ASSEMBLY IS NOT ALLOWED THE ALLOTTED TIME FOR THE LUBRICANT TO DISSIPATE, THE BUSHING MAY SLIDE FROM THE TORQUE ROD END TUBE. THE BUSHING WILL THEN NEED TO BE REMOVED AND A NEW BUSHING RE-INSTALLED.

8. Install the torque rod assembly as detailed in this section.

MAIN SUPPORT MEMBER & CLAMP GROUP

NOTE The main support member assemblies come fully assembled with the pivot bushing, Flexi-wrap, liners, and spring eye clip, refer to the Part List section of this publication.

DISASSEMBLY

CAUTION THE PROCEDURE TO DISASSEMBLE THE MAIN SUPPORT MEMBER AND CLAMP GROUP IS DONE WITH THE OTHER MAIN SUPPORT MEMBER PROPERLY CONNECTED TO THE FRAME HANGER AND AXLE. FAILURE TO HAVE THE OTHER MAIN SUPPORT MEMBER CONNECTED PROPERLY COULD ALLOW THE AXLE TO SHIFT RESULTING IN POSSIBLE DAMAGE TO COMPONENTS AND/OR PERSONAL INJURY. IF BOTH MAIN SUPPORT MEMBERS REQUIRE REPLACEMENT, IT WILL BE NECESSARY TO SUPPORT THE AXLE PINION TO PREVENT THE AXLE FROM SHIFTING.

1. Chock the front wheels.

WARNING PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

2. Raise and support the frame of the vehicle at ride height with safety stands.
3. Disconnect the linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.

⚠ WARNING

PRIOR TO AND DURING THE 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. Lower the height control valve arm to exhaust the air in the air springs and deflate the rear suspension.
6. Remove the air spring as detailed in the Air Spring instructions in this section.
7. Remove the shock absorber as detailed in the Shock Absorber instructions in this section.
8. Remove the cross channel as detailed in the Cross Channel instructions in this section.

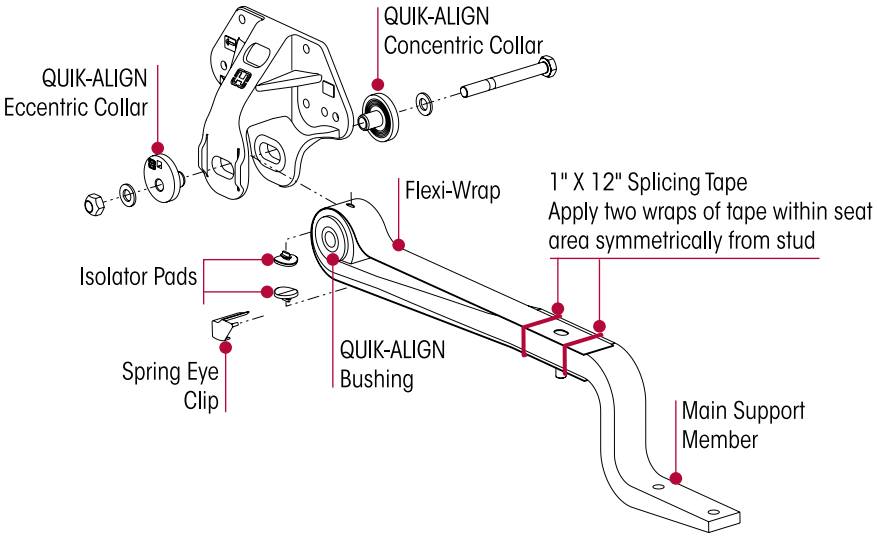
SERVICE HINT

Mark the position of the QUIK-ALIGN collar square drive will provide a starting point for the alignment procedure following assembly.

FIGURE 8-10

9. On the side being serviced, mark the position of the QUIK-ALIGN square drive collar relative to the frame hanger, see Figure 8-10.
10. On the side being serviced, remove and discard the U-bolts and fasteners.
11. Remove the axle bottom cap, spacer, and top pad. Lift the back of the main support member assembly and remove the axle seat from under the main support member. Lower the main support member onto the axle housing.
12. Support the main support member by placing a hydraulic jack under the pivot bushing.
13. Remove and discard the pivot bolt and fasteners.
14. Remove the QUICK ALIGN collars that connect the main support member assembly to the frame hanger, see Figure 8-11.
15. Slide the pivot bushing down and out of the frame hanger.
16. Remove the main support assembly.

FIGURE 8-11



INSPECTION

WARNING

U-BOLTS AND U-BOLT FASTENERS MUST BE REPLACED WHEN DISASSEMBLED. FAILURE TO DO SO CAN CAUSE PREMATURE CLAMP GROUP FAILURE, COMPONENT DAMAGE, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR SEVERE PERSONAL INJURY. MAINTAIN CORRECT TORQUE VALUE AT ALL TIMES. CHECK TORQUE VALUES ON A REGULAR BASIS AS SPECIFIED.

1. Clean any dirt and debris from the QUIK-ALIGN slots in the hangers. Inspect the frame hanger for excessive wear, cracks, and proper frame hanger fastener torque. Replace as necessary.
2. Inspect the cross channel for straightness, excessive wear, and cracks. Replace as necessary.
3. Inspect the air spring for damage. Inspect the lower piston, upper and lower air spring mount for cracks. Inspect the shock absorber, refer to the Preventive Maintenance section in this publication. Replace as necessary.
4. Inspect the top pad, spring seat, and axle bottom cap for excessive wear and cracks or fretting. Replace as necessary.
5. Inspect the axle housing for any cracks or wear. Repair or replace as necessary per the axle manufacturer and/or the vehicle manufacturer.

ASSEMBLY

WARNING

DO NOT STRIKE SUSPENSION COMPONENTS WITH A HAMMER. DO NOT NICK OR GOUGE THE MAIN SUPPORT MEMBER. SUCH IMPROPER ACTIONS CAN CAUSE DAMAGE; THE MAIN SUPPORT MEMBER ASSEMBLY COULD FAIL AND CAUSE ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING

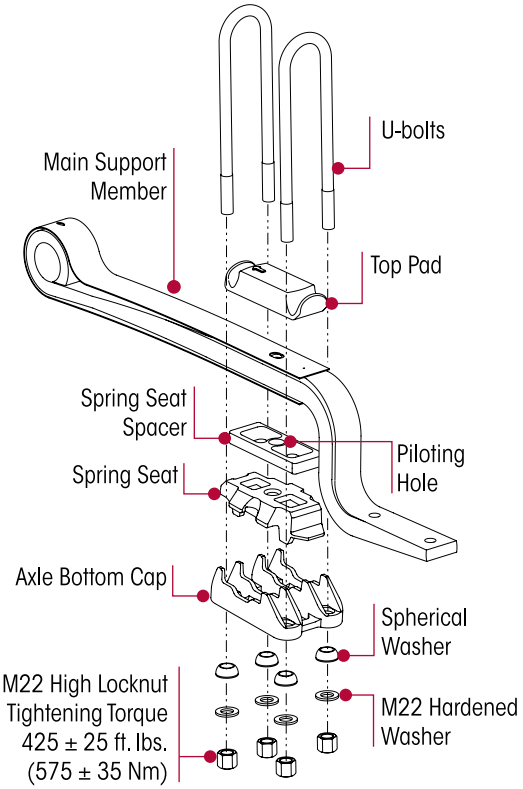
WHEN SERVICING THE MAIN SUPPORT MEMBER DO NOT DETACH THE FLEXI-WRAP FROM THE MAIN SUPPORT MEMBER. REPLACE COMPONENT WITH ONLY A NEW MAIN SUPPORT MEMBER ASSEMBLY, THAT INCLUDES THE FLEXI-WRAP. A MAIN SUPPORT MEMBER MAY FAIL WHEN REPLACED IMPROPERLY, CAUSING POSSIBLE ADVERSE VEHICLE HANDLING, PERSONAL INJURY, AND/OR PROPERTY DAMAGE.

SERVICE HINT

Ensure the Flexi-wrap is installed and centered on the main support member assembly. A strip of splicing tape for and aft of the alignment dowel pin will assist in keeping the assembly intact during installation. Verify the two (2) rubber isolator pads are installed in the Flexi-wrap, see Figure 8-11.

1. Install the spring seat and spacer on top of the axle housing. Verify the thicker end of the spring seat is to the rear of the vehicle.
2. Lower the main support member assembly on the spacer and spring seat.
3. Ensure the main support member assembly engages both the flexi-wrap and spring seat locator holes.
4. Position the main support member assembly with the center piloting hole in the spring seat and spacer.
5. Ensure to engage the alignment locator on the axle housing with the hole in the bottom of the spring seat.
6. Install the top pad on the top of the Flexi-wrap of the main support member, see Figure 8-12.

FIGURE 8-12



7. Ensure the locator hole on the bottom of the top pad engages the Flexi-wrap and main support locator holes. Verify the Flexi-wrap is positioned on the top of the main support member assembly.
8. Align the pivot bushing of the main support member assembly under the opening of the frame hanger and jack into place.

⚠ WARNING

DO NOT ASSEMBLE THE QUIK-ALIGN JOINT WITHOUT THE PROPER FASTENERS. USE ONLY HENDRICKSON COATED GENUINE FASTENERS TO SUSTAIN PROPER CLAMP FORCE. ENSURE THAT THE QUIK-ALIGN FASTENER'S TORQUE VALUES ARE SUSTAINED AS RECOMMENDED IN THE TORQUE SPECIFICATIONS SECTION IN THIS PUBLICATION. FAILURE TO FOLLOW THE ABOVE ITEMS CAN CAUSE ADVERSE VEHICLE HANDLING, PERSONAL INJURY OR PROPERTY DAMAGE AND WILL VOID ANY APPLICABLE WARRANTIES. FOLLOW THE VEHICLE MANUFACTURER'S FASTENER ORIENTATION WHEN PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR.

NOTE

Ensure that QUIK-ALIGN eccentric collar is on the outboard side of the frame hanger. Verify that the nose of each QUIK-ALIGN collar is installed correctly into the bushing sleeve, and the flanged side is flat against the frame hanger face within the alignment guides, see Figure 8-11.

9. Install the QUIK-ALIGN collars and fasteners and tighten to 100 foot pounds of torque.
10. Install the U-bolts and fasteners.
11. Verify that the top pad and bottom cap are aligned and installed properly.
12. Install the shock absorber and the lower shock mount onto the rear of the main support member assembly, see Figure 8-13.
13. Install the cross-channel onto the rear of the main support member assemblies. Loosely install the cross-channel retaining fasteners, see Figure 8-13.

FIGURE 8-13

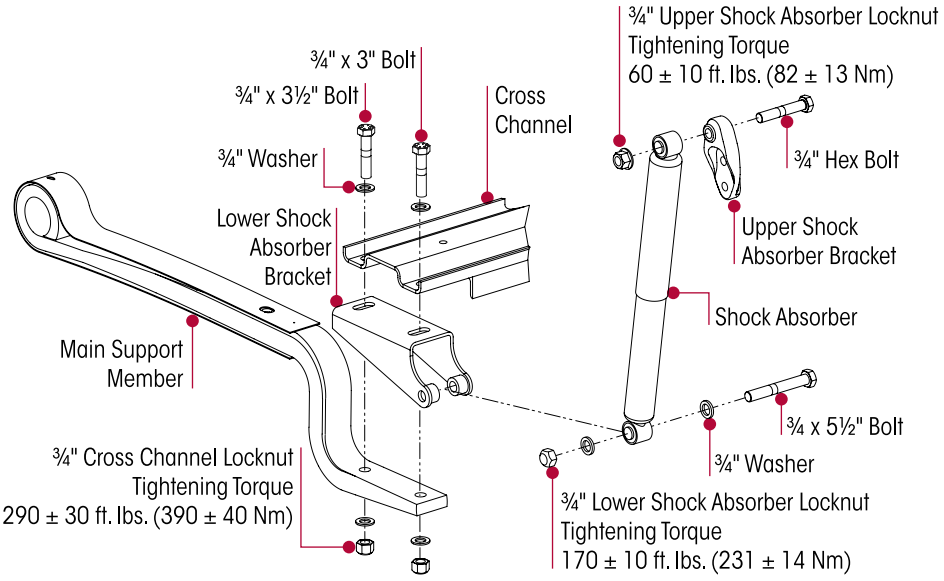
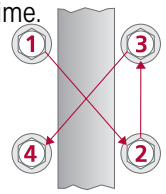


FIGURE 8-14



14. Loosely install the clamp group ¾" locknuts and washers. **DO NOT** tighten at this time.
15. Verify that the U-bolts are seated properly in the channels of the top pad, see Figure 8-12.
16. Verify the Flexi-wrap and main support member are centered in the frame hanger, see Figure 8-11.
17. Snug the U-bolts prior to tightening using a crisscross pattern, (approximately 100 foot pounds tightening torque), see Figure 8-14.
18. Tighten the lower cross channel fasteners to 290 ± 30 foot pounds torque.
19. Install the air spring as detailed in the Air Spring instructions in this section.

WARNING

IT IS IMPORTANT THAT THE U-BOLT CLAMP GROUP CONNECTION BE PROPERLY ALIGNED AND HAVE THE PROPER TIGHTENING TORQUE VALUES MAINTAINED. METAL SURFACES CAN WORK AND WEAR AGAINST OTHER RELATED CLAMP GROUP COMPONENTS IF NOT PROPERLY ALIGNED OR PROPERLY TIGHTENED TO MAINTAIN THE PROPER CLAMP FORCE. FAILURE TO DO SO CAN CAUSE PREMATURE COMPONENT WEAR, POSSIBLE SEPARATION OF THE CLAMP GROUP, CAUSING ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

20. Tighten the U-bolt locknuts evenly in 50 pound increments to 425 ± 25 foot pounds torque in the crisscross pattern to achieve uniform bolt tension, see Figure 8-14. Rap the top of the U-bolts with a dead blow mallet, and retighten to the specified torque. **DO NOT e**xceed the specified torque on U-bolt locknuts.
21. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
22. Inflate the suspension by connecting the linkage assembly to the height control valve arm. Verify the air springs inflate uniformly without binding.
23. Remove the frame supports.
24. Verify the vehicle ride height is within specifications and adjust as necessary, see Ride Height in the Alignment & Adjustments section of this publication.
25. Align the vehicle. Alignment is necessary anytime the main support member is removed to complete the repair, see the Alignment & Adjustments section in this publication.

NOTE

Prior to tightening the QUIK-ALIGN fasteners, U-bolts, or lower shock bracket fasteners to specifications, it is mandatory that the vehicle be positioned at the proper ride height.

26. After the correct alignment of the axle is verified, tighten the QUIK-ALIGN fasteners to 550 ± 25 foot pounds torque.
27. Remove the wheel chocks.

FRAME HANGER

DISASSEMBLY

1. Chock the front wheels.

WARNING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO PREVENT THE VEHICLE FROM MOVING OR ROLLING. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED BY ONLY A FLOOR JACK. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

2. Raise and support the frame of the vehicle at ride height and support with safety stands.

WARNING

PRIOR TO AND DURING THE 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 of the Important Safety Notice section in this publication prior to deflating or inflating the air system.
4. Disconnect the linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.
5. Lower the height control valve arm to exhaust the air in the air springs and deflate the rear suspension.

FIGURE 8-15

Square Drive
Prior to disassembly Mark the position of the square drive.

SERVICE HINT

Mark the position of the QUIK-ALIGN collar square drive prior to the removal of QUIK-ALIGN fasteners, this will facilitate the axle alignment process after the repair is complete, see Figure 8-15.

6. On the side being serviced, mark the position of the QUIK-ALIGN collar **square drive** in relation to the frame hanger and note the **orientation of the fasteners** prior to loosening the QUIK-ALIGN connection, see Figure 8-15.
7. On the side being serviced, remove and discard the QUIK-ALIGN fasteners, see Figure 8-16.
8. Remove the QUIK-ALIGN collars that connect the main support member to the frame hanger.
9. Remove the fasteners that attach the frame hanger to the frame rail per the vehicle manufacturer's instructions.
10. Remove the frame hanger.

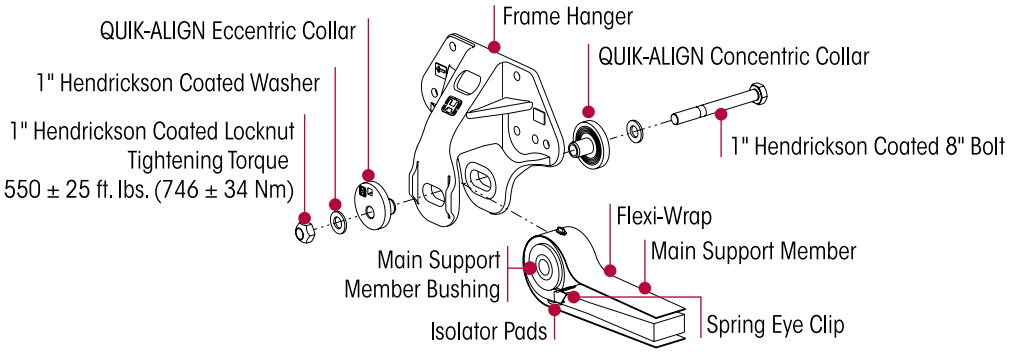
INSPECTION

1. Inspect the mounting surface of the frame rail for any damage or wear. Repair or replace as necessary.
2. Inspect the main support member assembly and pivot bushing for wear or damage. Replace as necessary per instructions in this section.

ASSEMBLY

1. Slide the frame hanger over the main support member's bushing. Make sure the arrow on the frame hanger points towards the front of the vehicle, see Figure 8-16.
2. Install the frame hanger to frame rail fasteners per the vehicle manufacturer's instructions.

FIGURE 8-16



⚠ WARNING

DO NOT ASSEMBLE THE QUIK-ALIGN JOINT WITHOUT THE PROPER FASTENERS. USE ONLY HENDRICKSON COATED GENUINE FASTENERS TO SUSTAIN PROPER CLAMP FORCE. ENSURE THAT THE QUIK-ALIGN FASTENER'S TORQUE VALUES ARE SUSTAINED AS RECOMMENDED IN THE TORQUE SPECIFICATIONS SECTION IN THIS PUBLICATION. FAILURE TO FOLLOW THE ABOVE ITEMS CAN CAUSE ADVERSE VEHICLE HANDLING RESULTING IN PERSONAL INJURY OR PROPERTY DAMAGE AND WILL VOID ANY APPLICABLE WARRANTIES. FOLLOW THE VEHICLE MANUFACTURER'S FASTENER ORIENTATION WHEN PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR.

NOTE

Use a new QUIK-ALIGN Kit (see the Parts Lists section in this publication) for any axle alignment or disassembly of the QUIK-ALIGN connection. This helps to ensure that the proper clamp load is applied to the connections so that the joints will not slip in service.

3. Install the QUIK-ALIGN collars and fasteners.

NOTE

Ensure that QUIK-ALIGN eccentric collar is located on the outboard side of the LEFT frame hanger. Verify that the nose of each QUIK-ALIGN collar is properly installed into the sleeve of the pivot bushing with the flanged side flat against the frame hanger face within the alignment guides.

4. Align the QUIK-ALIGN collar with the marks made on the frame hanger prior to disassembly.

5. Snug the pivot bolt locknut to approximately 100 foot pounds of torque. **DO NOT** tighten to the specified torque at this time.
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. Inflate the suspension by connecting the linkage assembly to the height control valve arm. Verify the air springs inflate uniformly without binding.
8. Remove the frame safety stands.
9. Verify the vehicle's ride height is within specifications and adjust as necessary, see Ride Height in the Alignment & Adjustments section of this publication.
10. Verify that the axle is in proper alignment, see the Alignment & Adjustments section in this publication.

NOTE Prior to tightening the QUIK-ALIGN locknuts to final torque specifications, it is mandatory that the vehicle be positioned at the proper ride height and alignment.

11. After alignment of the axle is verified, tighten the QUIK-ALIGN fasteners to 550 ± 25 foot pounds torque, see Figure 8-16.
12. Remove the wheel chocks.

QUIK-ALIGN PIVOT BUSHING

NOTE There are two methods to replace the QUIK-ALIGN bushing.

METHOD A – Using a Shop Press

METHOD B – Hendrickson Tool No. 66086-203L, see the procedure in this section

METHOD A – Using a Shop Press

You will need:

- A vertical shop press with a capacity of at least 10 tons.
- A receiving tool and push-out tool, see the Special Tools section of this publication.

DISASSEMBLY

1. Remove the main support member from the vehicle, see Main Support Member & Clamp Group in this section.
2. Note the main support member components' location and orientation prior to disassembly. Disassemble the flexi-wrap from the main support member assembly. Inspect the main support member attaching components for wear and replace as necessary (clip bolt spacer, spring clip sleeve, spring eye clip, isolator pad, see Figure 8-22). Refer to the Part List section for replacement components.
3. Place the main support member in the shop press.
4. Squarely support the main support member on the receiving tool with the end hub centered on the tool, see Figure 8-17.

FIGURE 8-17

NOTE

At the time of manufacture, a spring eye clip was used to insert the bushing into the spring eye of the main support member, see Figures 8-18 and 8-19. If the spring eye clip is equipped on the main support member you have the option to carefully press out the bushing from the opposite side of the spring eye (where the spring eye clip is NOT visible). If the spring eye clip is not damaged, it can be used again to facilitate the installation of the bushing into the spring eye. If the clip is damaged and a replacement (Part No. 60392-000) is not available the alternative method is to use the tape option as shown in Figure 8-20.

FIGURE 8-18

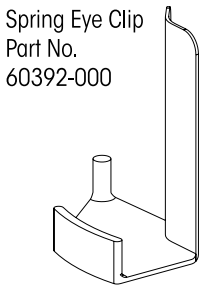


FIGURE 8-19

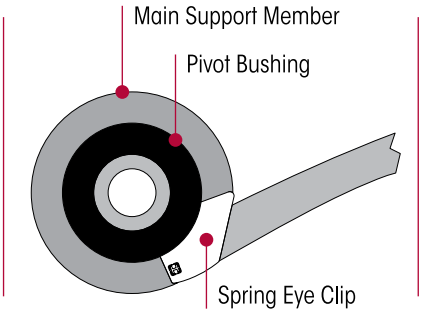
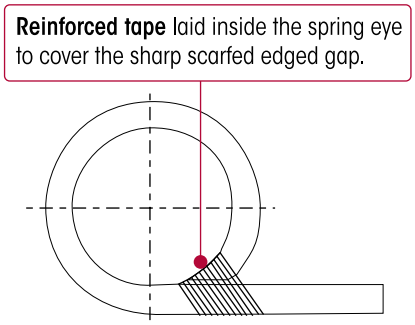


FIGURE 8-20



5. Center the push-out tool on the inner sleeve and press out the old bushing. (These bushings are not cartridge type bushings, they do not have outer metals).
6. Clean and inspect the inner diameter of the eye of the main support member.

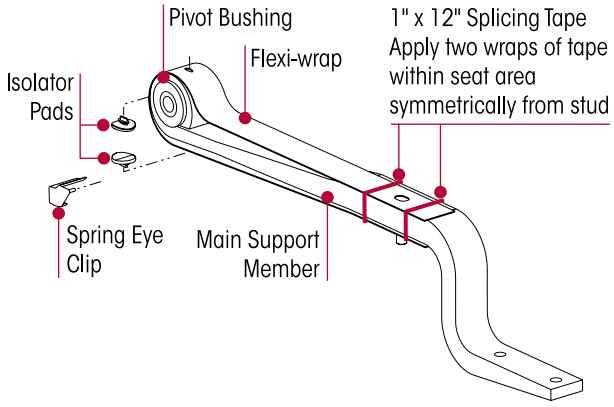
ASSEMBLY

1. Insert the spring eye clip into the gap of the main support member eye, (see note above). If the spring eye clip is damaged and a replacement (Part No. 60392-000) is not available the alternative method is to cut a strip of 3M Scotch #890T black fiber tape, or heavy-bodied duct tape 1" x 6" long.
2. Feed the tape into the spring eye, adhesive side facing the gap in the eye. Center the tape equally around each end.
3. Pull the tape tight, and wrap it around the outside of the eye. Additional tape may be required depending on the gap size. Ensure that the gap is completely covered, see Figure 8-20.
4. Use P-80 Lubricant or light Naphthenic Base Oil, such as 60 SUS at 100°F to lubricate the inner diameter of the leaf spring bore and the new rubber bushing (refer to Parts List section of this publication) **DO NOT** use petroleum or soap base lubricant, it can cause an adverse reaction with the bushing material, such as deterioration.
5. Place the main support member on the press on top of the receiving tool.
6. Center the main support member end hub centered on the receiving tool. Ensure the main support member is squarely supported on the press bed.
7. Locate the machined pilot of the push-out tool on the inner sleeve, and press in the new bushing. Bushings must be centered within the spring eye.
8. When pressing in the new bushings, over-shoot the desired final position by 3⁄16" and press again from the opposite side to center the bushing within the main support member assembly, see Figure 8-21.

FIGURE 8-21

9. Trim all protruding tape from the underside of the spring eye. Wipe off the excess lubricant. Allow the lubricant four (4) hours to dissipate before operating the vehicle.
10. Assemble the main support member assembly Flexi-wrap and components in the same configuration as prior to disassembly.
11. Install the two (2) new isolator pads inside the flexi-wrap eye, see Figure 8-22.
12. Slide the flexi-wrap around the main support member and rotate into position, see Figure 8-22.

FIGURE 8-22



⚠ CAUTION

DO NOT WRAP TAPE AROUND THE MAIN SUPPORT MEMBER ASSEMBLY MORE THAN TWICE, AS THIS WOULD CREATE HIGH SPOTS IN THE CLAMP GROUP. FAILURE TO DO SO CAN CAUSE PREMATURE WEAR OR DAMAGE TO THE MAIN SUPPORT MEMBER ASSEMBLY.

13. Use two (2) 1" x 12" long strips of splicing tape to keep the main support member components together, see Figure 8-22.
14. Install the main support member assembly as detailed in this section.

METHOD B – Using Tool No. 66086-203L

SERVICE HINT

Use the QUIK-ALIGN Pivot Bushing Tool No. 66086-203L to assist with the installation and removal of QUIK-ALIGN pivot bushings. The tool allows the existing pivot bushing to be pushed out from the main support member assembly into the receiving cylinder. Then follow a similar procedure to push in the replacement pivot bushing, see Figure 8-23.

MAIN SUPPORT MEMBER ASSEMBLY REMOVAL

1. Remove the main support member assembly from the vehicle as detailed in this section.
2. After removal, place the main support member assembly on the floor or a suitable work area.

PIVOT BUSHING

To replace the QUIK-ALIGN pivot bushing you will need:

- QUIK-ALIGN pivot bushing service tool (Part No. 66086-203L), see Figure 8-23
- ¾" Impact wrench (impact gun), some ½" impact wrenches may work

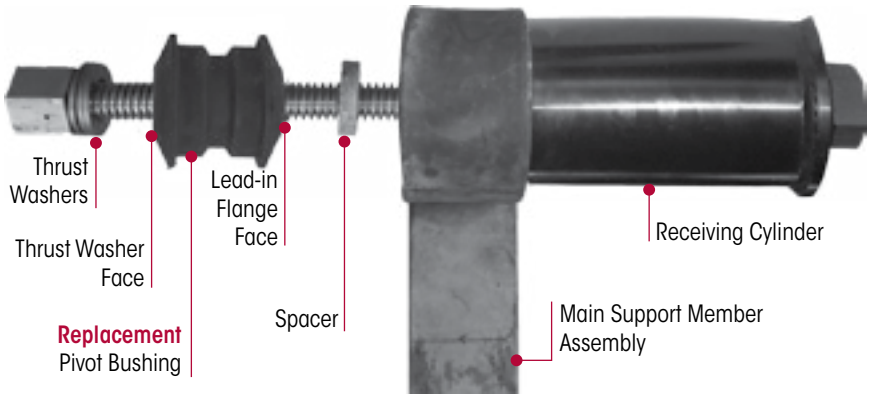
FIGURE 8-23

QUIK-ALIGN Pivot Bushing Tool
Part No. 66086-203L

NOTE

Apply NLGI #2–EP chassis lubricant to each face of the thrust washers and to the drive screw that will engage through the receiving cylinder.

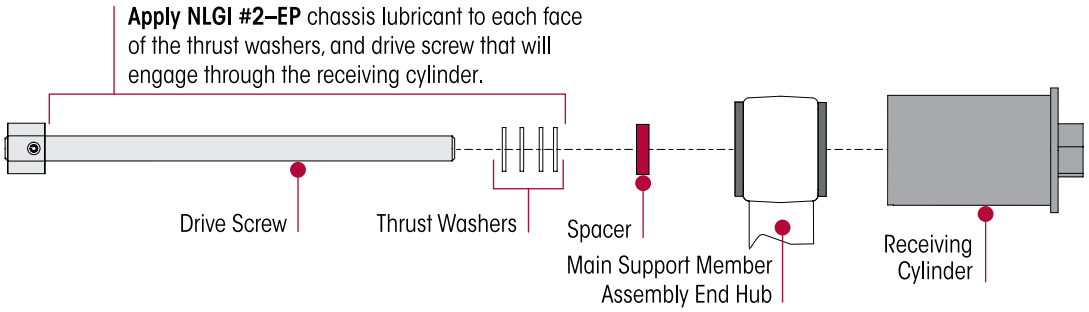
Apply P80 lubricant to the face of the lead-in flange and the outer diameter of **NEW** pivot bushing



REMOVAL

1. Install the pivot bushing tool as shown in Figure 8-24.
2. Remove and discard thrust washers (if equipped) and any loose rubber or debris from the existing pivot bushing.

FIGURE 8-24



3. Apply NLGI #2–EP (Extreme Pressure) chassis lubricant to each face of the thrust washers and to the drive screw that will engage through the receiving cylinder, see Figure 8-24.
4. Snug the threaded drive screw to hold the thrust washers, spacer, and main support member assembly with the existing pivot bushing and the receiving cylinder in place, see Figure 8-25.
5. Using a ¾" impact wrench, rotate the drive screw in a continuous motion without stopping until the pivot bushing is removed from the end hub. The existing pivot bushing will enter into the receiving cylinder, see Figure 8-26.
6. Remove and discard pivot bushing.
7. Repeat Steps 1 through 6 for the other side of the main support member assembly, as recommended.

FIGURE 8-25

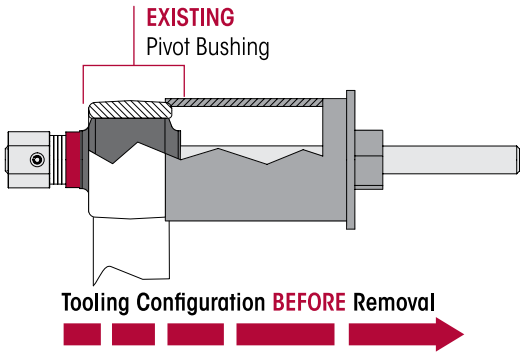
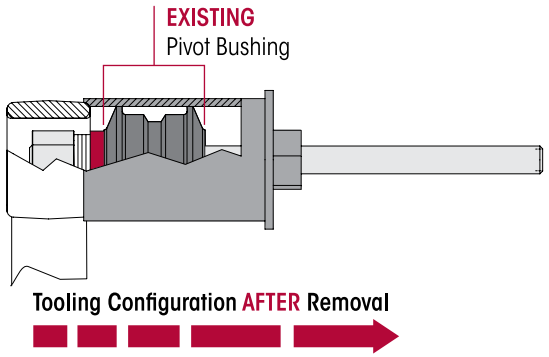


FIGURE 8-26



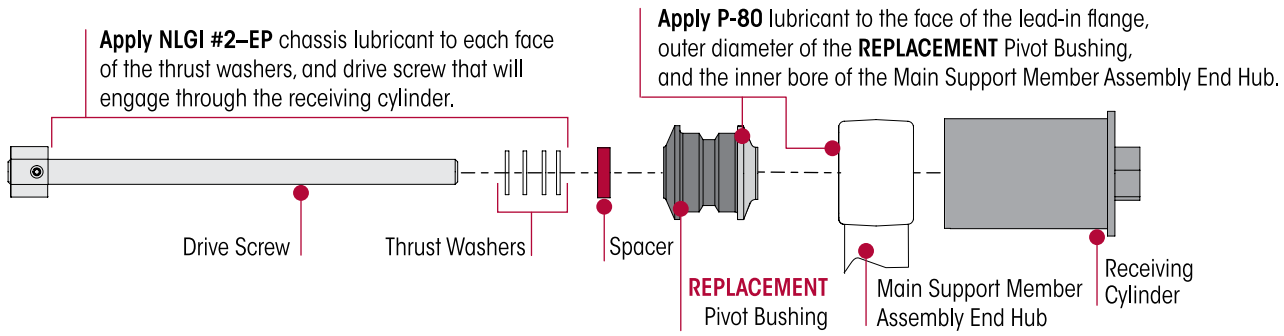
END HUB INSPECTION

1. Inspect the inner bore of the main support member assembly end hub and remove any loose debris or rubber residue from the bushing mating surface.

INSTALLATION

1. Clean the inner diameter of the main support member assembly end hub with brake cleaner.
2. Apply NLGI #2–EP (Extreme Pressure) chassis lubricant to each face of the thrust washers and to the drive screw that will engage through the receiving cylinder, see Figure 8-27.

FIGURE 8-27



NOTE **DO NOT** use petroleum or soap base lubricant, it can cause an adverse reaction with the bushing material, such as deterioration. P-80 lubricant is supplied in the QUIK-ALIGN Pivot Bushing Kits.

3. Apply P-80 lubricant to the face of the lead-in flange, to the outer diameter of the replacement pivot bushing, and the inner diameter of the main support member assembly end hub, see Figure 8-27.
4. Snug the threaded drive screw to hold the thrust washers, spacer, pivot bushing, and main support member assembly with the receiving cylinder in place, see Figure 8-28.
5. Using a ¾" impact wrench, rotate the drive screw in a continuous motion without stopping until the pivot bushing is seated in the hub and slightly overshoots the opposite end of the hub. It is necessary to overshoot the desired final position, see Figure 8-29.
6. Remove and reverse the installation tool, then from the opposite side of the hub press the pivot bushing again to center the bushing within the main support member end hub, see Figure 8-30. Center the pivot bushing to help prevent bulging and bushing preload. This is known as the "Bump Back" procedure.
7. Repeat for the other main support member assembly.
8. Allow the lubricant four (4) hours to dissipate before fully operating the vehicle.

FIGURE 8-28

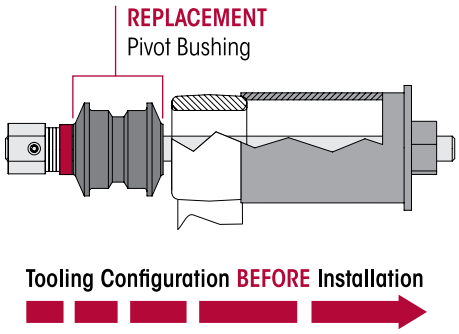


FIGURE 8-29

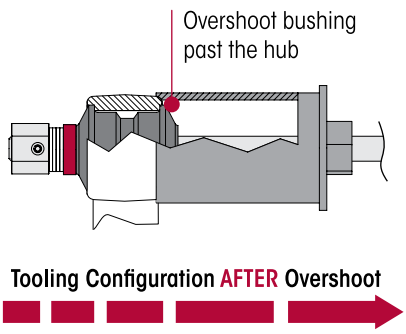
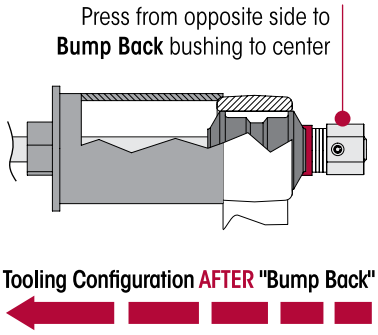


FIGURE 8-30

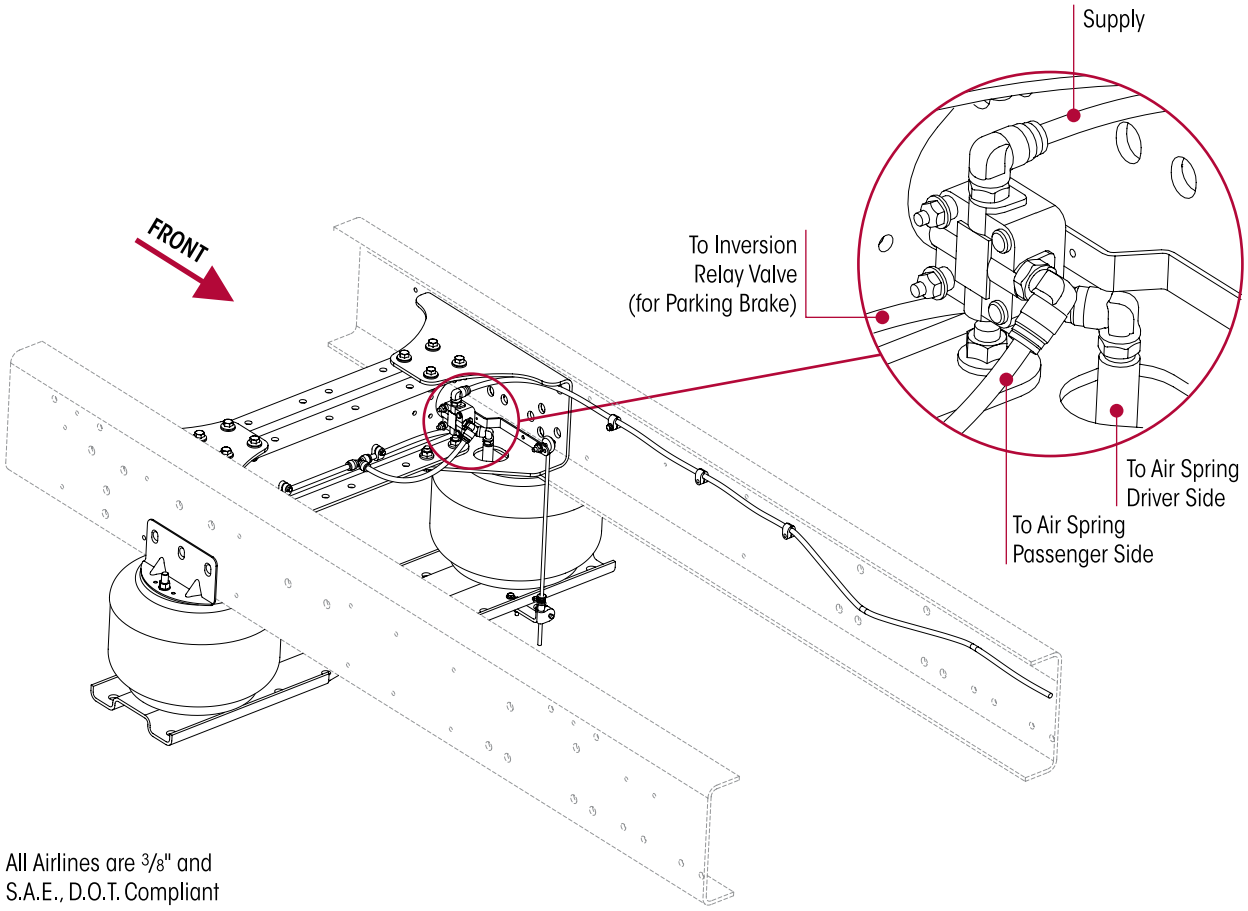


MAIN SUPPORT MEMBER ASSEMBLY INSTALLATION

1. Follow the Main Support Member Assembly installation procedure as detailed in this section.

SECTION 9
Plumbing Diagram

NOTE Common example configuration shown. Contact vehicle manufacturer for specific plumbing requirements.



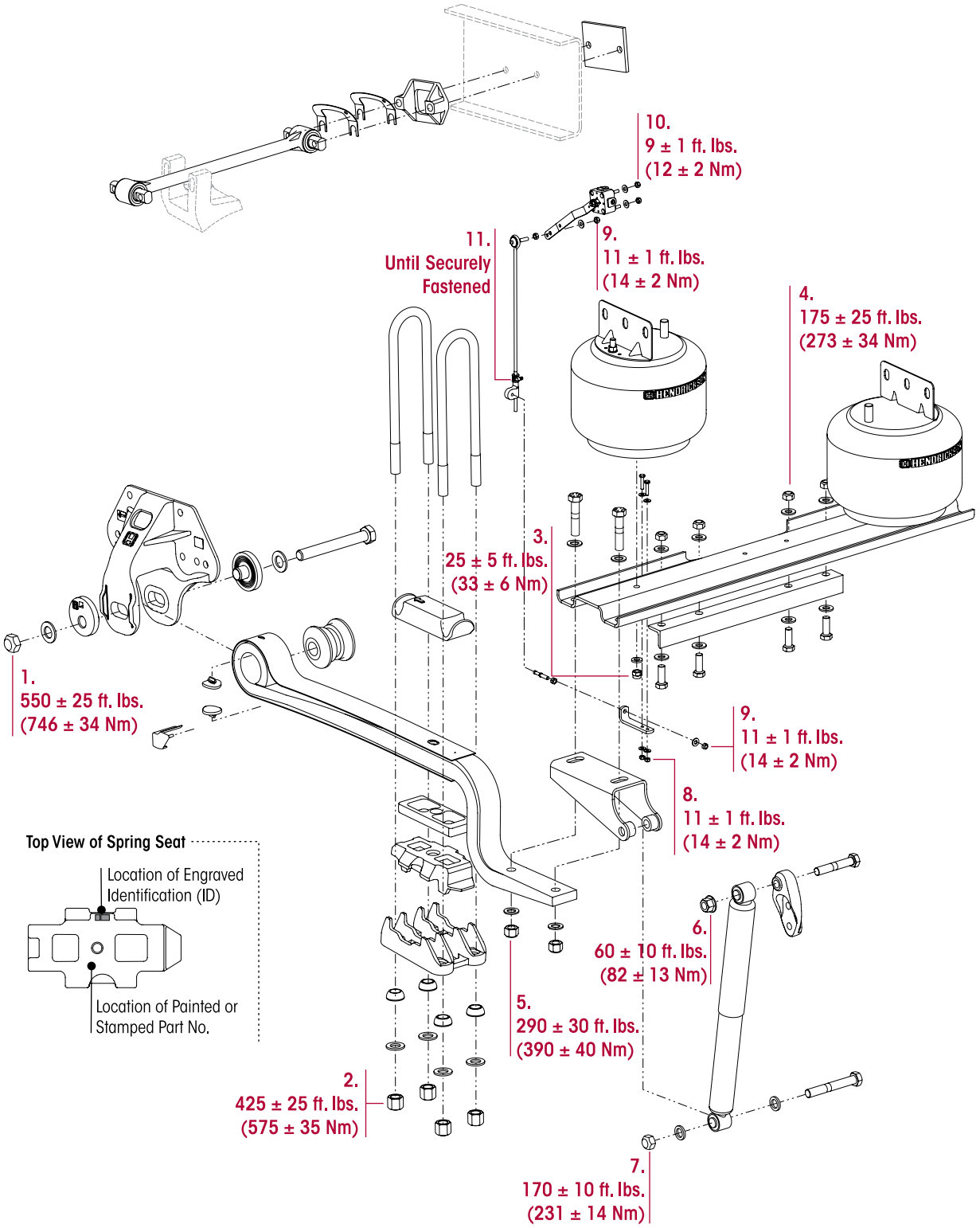
All Airlines are 3/8" and
S.A.E., D.O.T. Compliant

SECTION 10
Torque Specifications

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

21K Capacity

8.66" Ride Height



COMFORT AIR 21K for Lion Electric Type D Buses

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS					
NO	COMPONENT	FASTENER		*TORQUE VALUE	
		QUANTITY	SIZE	Foot Pounds	Nm
1	QUIK-ALIGN (See Warning below) Hendrickson Coated Fasteners (Grade 8 with a minimum tensile strength of 160,000 psi) Hendrickson Coated Locknut (Grade C)	2	1"-14 UNC	550 ± 25	746 ± 34
	⚠ WARNING ENSURE THAT THE QUIK-ALIGN FASTENER TORQUE VALUES ARE SUSTAINED AS RECOMMENDED. FAILURE TO DO SO CAN CAUSE ADVERSE VEHICLE HANDLING RESULTING IN PERSONAL INJURY OR PROPERTY DAMAGE.				
2	U-bolts	4	7/8"-14 UNF	**425 ± 25	**575 ± 35
3	Air Spring to Cross Channel	2	1/2"-13 UNC	25 ± 5	33 ± 6
4	Cross Channel to Cross Channel Support Bracket	4	5/8"-11 UNC	175 ± 25	273 ± 34
5	Cross Channel to Main Support Member	4	3/4"-10 UNC	290 ± 30	390 ± 40
6	Shock Absorber to Upper Shock Bracket	2	3/4"-10 UNC	60 ± 10	82 ± 13
7	Shock Absorber to Lower Shock Bracket	2	3/4"-10 UNC	170 ± 10	231 ± 14
8	Linkage Rod Bracket to Cross Channel	2	1/4"-20 UNC	11 ± 1	14 ± 2
9	Linkage Rod to Height Control Valve Arm	1	5/16"-18 UNC	11 ± 1	14 ± 2
10	Height Control Valve Bracket to Frame	2	1/4"-20 UNC	9 ± 1	12 ± 2
11	Linkage Rod Clamp	2		Until Securely Fastened	

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

** Torque clamp group fasteners uniformly.

SECTION 11

Troubleshooting Guide

COMFORT AIR for Lion Electric Type D Buses

TROUBLESHOOTING GUIDE		
CONDITION	**POSSIBLE CAUSE**	**CORRECTION**
Vehicle bouncing excessively	Leaking or damaged shock absorber	Replace the shock absorber.
	Air spring(s) not inflated	Check the air supply to the air springs, repair as necessary.
	Incorrect ride height	Adjust the ride height to proper setting. See Ride Height in the Alignment & Adjustments section of this publication.
Suspension has harsh or bumpy ride	Broken main support member assembly	Replace the main support member assembly.
	Damaged height control valve	Replace the height control valve.
	Incorrect ride height	Adjust the ride height to the proper setting. See Ride Height in the Alignment & Adjustments section of this publication.
Excessive driveline vibration	Incorrect ride height	Adjust the ride height to the proper setting. See Ride Height in the Alignment & Adjustments section of this publication.
	Broken main support member assembly	Replace the main support member assembly.
	Air spring(s) not inflated	Check the air supply to air spring, repair as necessary.
Vehicle leans	Broken main support member assembly	Replace the main support member assembly.
	Axle connection not torqued correctly	Perform a U-bolt re-torque procedure. See Preventive Maintenance section of this publication.
	Worn main support member bushing	Replace the main support member bushing.
	Air spring(s) not inflated	Check the air supply to air springs, repair as necessary.
Suspension is noisy	Loose QUIK-ALIGN connection	Replace the QUIK-ALIGN connection and check suspension alignment. Check frame hanger for wear around the QUIK-ALIGN collars and fasteners, replace as necessary.
	Loose U-bolts	Perform a U-bolt re-torque procedure. See the Preventive Maintenance section of this publication.
	Worn main support member isolator pads	Replace the worn isolator pads.
Irregular tire wear	Worn main support member bushing	Replace the main support member bushing.
	Loose QUIK-ALIGN connection	Replace the QUIK-ALIGN connection and check the suspension alignment. Check the frame hanger for wear around QUIK-ALIGN collars and fasteners, replace as necessary.
Main support member broken between U-bolts	Loose U-bolts	Replace the main support assembly and all mating parts.
QUIK-ALIGN or frame hanger worn	Loose fasteners and/or the re-use of old fasteners	Replace all worn parts and replace fasteners with new Hendrickson coated fasteners.

Actual product performance may vary depending upon vehicle configuration, operation, service and other factors.
All applications must comply with applicable Hendrickson specifications and must be approved by the respective vehicle manufacturer with the vehicle in its original, as-built configuration.
Contact Hendrickson for additional details regarding specifications, applications, capacities, and operation, service and maintenance instructions.

*Call Hendrickson at **1.866.755.5968** (toll-free) or **1.630.910.2800** for additional information.*

HENDRICKSON

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