TECHNICAL PROCEDURE

PRIMAAX® EX Tridem Rear Suspension for Mack Heavy Dump Truck (HDT) Vehicles

SUBJECT: Service Instructions
LIT NO: 17730-329
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HENDRICKSON
The World Rides On Us®

SECTION 1
Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair, and rebuild of PRIMAAX® EX tridem suspension system as installed on applicable Mack Heavy Dump Truck (HDT) Vehicles.

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

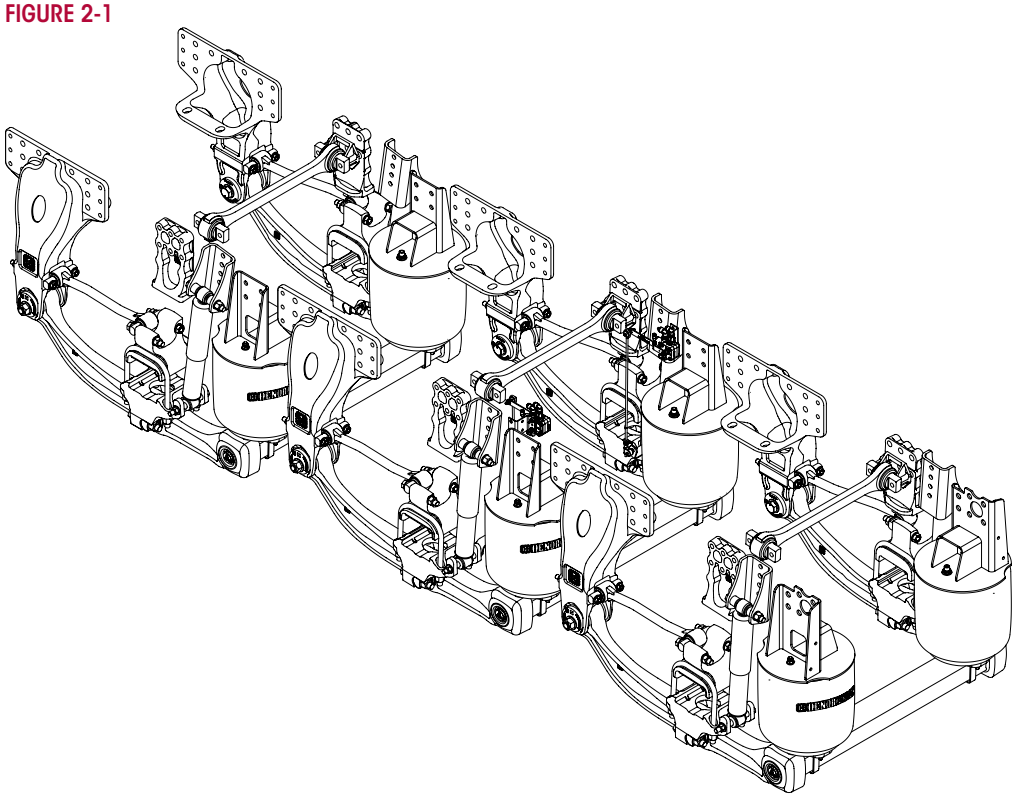
It is important to read and understand this entire Technical Procedure publication and all work instructions and safety related information provided by the vehicle manufacturer prior to performing any maintenance, service, repair, or rebuild of this product. The information in this publication contains parts lists, safety information, product specifications, features, proper maintenance, service, repair and rebuild instructions for the PRIMAAX EX tridem 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), 630-910-2800 (outside U.S. and Canada) or e-mail: techservices@hendrickson-intl.com.

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

SECTION 2
Product Description

FIGURE 2-1



PRIMAAX EX Tridem Severe-duty Vocational Air Suspension System — With its rugged, weight efficient design, PRIMAAX EX Tridem is a severe-duty vocational air suspension that delivers advanced suspension technology for the rigorous demands of vocational, severe-service, and heavy-haul applications. The system features a robust structural design with optimized suspension geometry for exceptional stability, handling and ride. Suspension-induced driveline vibration is significantly reduced with PRIMAAX EX compared to competitive trailing-arm air suspensions, resulting in higher driver comfort and less premature wear on expensive truck and body equipment.

- **Air springs** — Large volume, low frequency design for improved ride. Advanced design air springs lift and support the load with less air pressure.
- **Cast structural beams** — Integrated end caps for increased reliability. Utilize premium materials to improve durability. Robust rubber bushings help improve service life and eliminate lubrication requirements. Designed for increased disc brake clearance and compatibility.
- **D-pin axle connection and clamp group** — Decreases torsional axle stress for reduced maintenance and increased joint integrity. Integrated axle stop contact pads reduce axle stress. Newly designed torque rod bar-pin connection for increased reliability and reduced maintenance time.
- **Frame hangers** — Robust frame hangers enhance system durability to meet a variety of grueling vocational and severe-duty applications.
- **Heavy-duty shock absorbers** — Positioned and tuned for optimum damping characteristics and protect air springs from over-extension.
- **QUIK-ALIGN®** — Allows for easy axle alignment without shims. Reduces maintenance time and helps extend tire life.
- **Torque Rods** — Optimized configuration helps improve handling and roll stiffness for expanded applications. Premium retained rubber bushings for increased service life and resistance to walk-out. Designed for optimum clearance and articulation. Alternative torque rods available for disc brake use.

*PRIMAAX EX TRIDEM SPECIFICATIONS

	78K
Suspension Rating	78,000 lbs
Job-Site Travel Rating[1]	99,000 lbs
Ride Height[2]	15½"
Gross Combination Weight Approval[3]	Contact Vehicle Manufacturer
Axle Travel[4]	8"
Lift Axles	Approved
Axle Spacing	54"

*Current production specifications shown. PRIMAAX EX is approved for vocational and heavy-haul vehicle applications including, but not limited to: truck, tractor, dump, front and rear discharge mixers, logging, crane mounted, platform, fire / rescue, specialty and vehicles equipped with outriggers.

Contact Hendrickson or your truck manufacturer / dealer for further information.

1. Job-site travel rating — operators using vehicles equipped with liftable pusher or tag axles must not exceed published ratings. Job-site travel ratings are limited to no more than five percent of vehicle operation at a speed not to exceed five mph. Liftable pusher or tag axles should be raised (or unloaded) to improve vehicle maneuverability in job-site applications or when vehicle is empty. Job-site travel ratings are consistent with published axle manufacturer's limitations. Axle and suspension job-site travel specifications must not be exceeded.
2. For different ride height options, please contact Hendrickson, your truck manufacturer or dealer for further information.
3. Suspension must be paired with appropriate axle rating.
4. Axle travel may be limited by vehicle manufacturer; axle stop settings and the shock stroke may restrict suspension's articulation. Varying ride heights and configurations may restrict travel.

SECTION 3

Important Safety Notice

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

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

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

EXPLANATION OF SIGNAL WORDS

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

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

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.

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

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

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

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

■ SAFETY PRECAUTIONS

⚠ WARNING

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 A REGULAR BASIS AS SPECIFIED, USING A REGULARLY CALIBRATED TORQUE WRENCH. TORQUE VALUES SPECIFIED IN THIS TECHNICAL PUBLICATION ARE FOR HENDRICKSON SUPPLIED FASTENERS ONLY. IF NON-HENDRICKSON FASTENERS ARE USED, FOLLOW TORQUE SPECIFICATION LISTED IN THE VEHICLE MANUFACTURER'S SERVICE MANUAL.

⚠ WARNING

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 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 OF 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 VEHICLE MANUFACTURER'S FASTENER ORIENTATION WHEN PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR.

⚠ WARNING

LOAD CAPACITY

ADHERE TO THE PUBLISHED CAPACITY RATINGS FOR THE SUSPENSION. ADD-ON AXLE ATTACHMENTS AND OTHER LOAD TRANSFERRING DEVICES, SUCH AS LIFTABLE AXLES, 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

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.

⚠ CAUTION

PROCEDURES AND TOOLS

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

⚠ 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

PERSONAL 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

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 THE ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

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

⚠ WARNING

WORK SITE DUMPING

WHEN THE TRUCK/TRAILER BODY/BOOM/AND OR ATTACHMENT IS LIFTED IT IS MANDATORY TO COMPLETELY EXHAUST THE AIR FROM THE SUSPENSION SYSTEM TO HELP PROVIDE STABILITY WHEN LIFTED. FAILURE TO DO SO CAN RESULT IN ADVERSE VEHICLE HANDLING, ROLL-OVER, OR VEHICLE INSTABILITY, POSSIBLE PERSONAL INJURY, PROPERTY DAMAGE, OR DEATH. FIRST RAISE ANY AUXILIARY AXLES AND THEN EXHAUST ALL PRESSURE FROM REAR TRACTOR / TRAILER AND TRUCK AIR SUSPENSION SYSTEMS PRIOR TO RAISING THE BODY / BOOM OR ATTACHMENTS. FOLLOW THE VEHICLE MANUFACTURER'S OPERATING INSTRUCTIONS FOR MAINTAINING PROPER STABILITY.

⚠ 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

AIR SPRING PRESSURE RETENTION

SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME AIR PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT IN SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

⚠ 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 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 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

TORQUE RODS

THIS HENDRICKSON SUSPENSION REQUIRES TORQUE RODS FOR SUSPENSION PERFORMANCE AND VEHICLE STABILITY. IF THESE TORQUE RODS ARE DISCONNECTED OR ARE 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

SHOCK ABSORBERS

THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SUSPENSION. THE SHOCK ABSORBERS MUST REMAIN CONNECTED ANYTIME THE AXLE IS SUSPENDED OTHERWISE ALLOWED TO HANG ABOVE THE GROUND. 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.

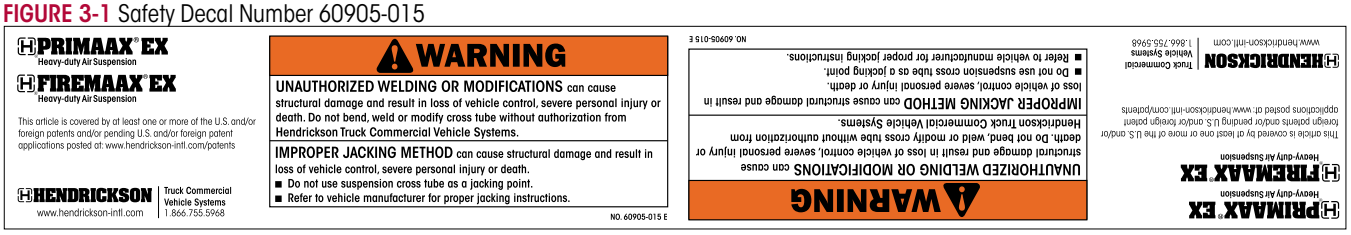
WARNING

CROSS TUBE

IMPROPER JACKING METHODS CAN CAUSE STRUCTURAL DAMAGE (SEE SAFETY DECAL, FIGURE 3-1) AND RESULT IN ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY OR DEATH AND WILL VOID HENDRICKSON'S WARRANTY.

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

FIGURE 3-1 Safety Decal Number 60905-015



- DO NOT USE THE SUSPENSION CROSS TUBE AS A JACKING POINT TO RAISE THE VEHICLE, SEE FIGURE 3-2
- REFER TO THE VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS, SEE FIGURE 3-3

FIGURE 3-2

FIGURE 3-3

WARNING

PARTS CLEANING

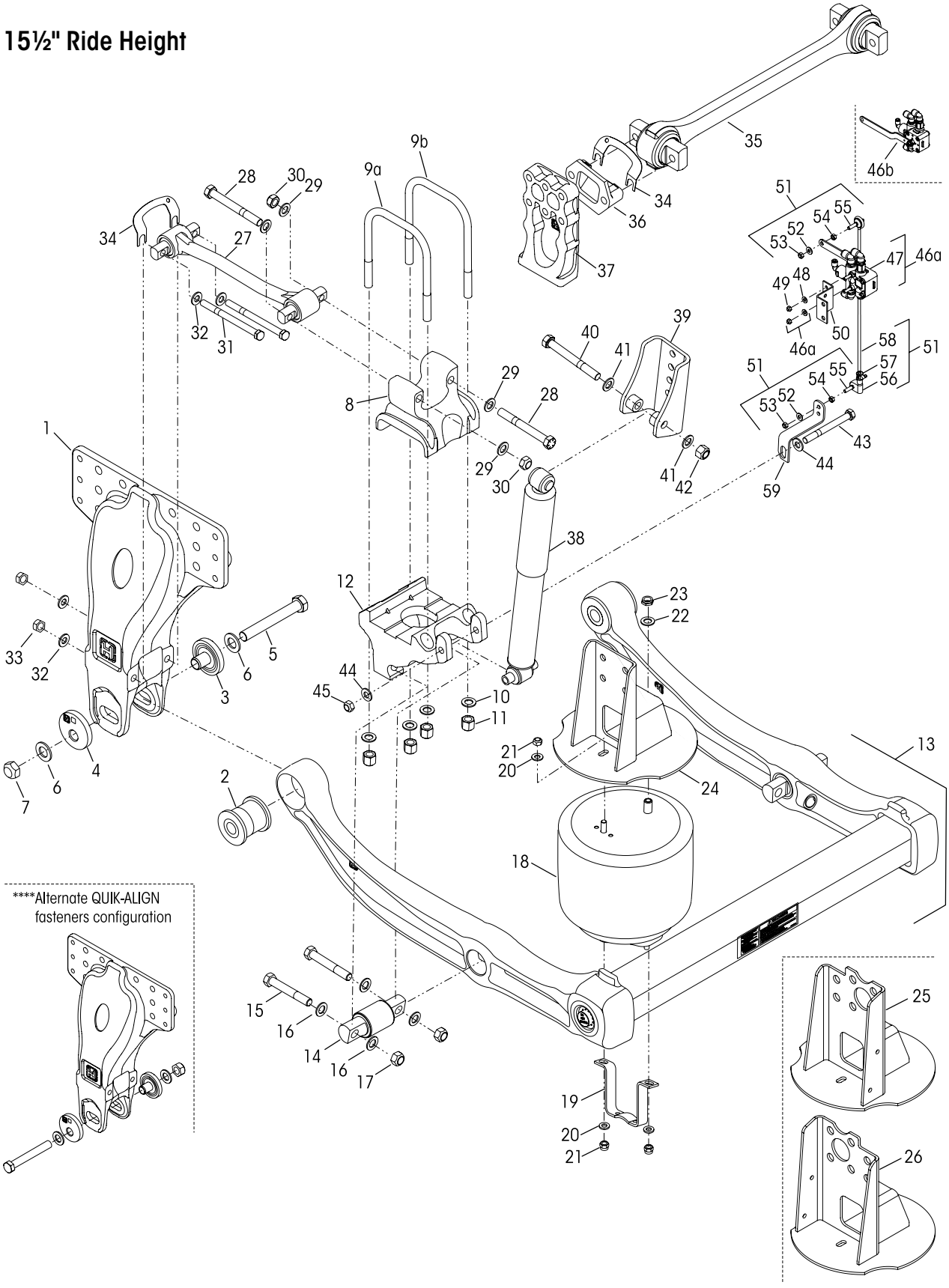
SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS, AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY, CAREFULLY FOLLOW THE MANUFACTURER'S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURES:

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

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

SECTION 4
Parts Lists

■ 15½" Ride Height



KEY NO.	PART NO.	DESCRIPTION	VEHICLE *QTY.
1	80735-004	Frame Hanger	6
		QUIK-ALIGN® Pivot Bushing Service Kit, Includes Keys Nos. 2-7, 60	
	60961-720	One Wheel End	
	60632-020	Axle Set	
		QUIK-ALIGN Collar Service Kit, Includes Keys Nos. 3-7	
	60632-019	One Wheel End	
	60632-021	Axle Set	
	60632-018	**QUIK-ALIGN Fastener Service Kit,** One Wheel End Includes Keys Nos. 5-7	
2	70425-001	QUIK-ALIGN Pivot Bushing	6
3	64633-000	QUIK-ALIGN Concentric Collar	6
4	64632-000	QUIK-ALIGN Eccentric Collar	6
5	68217-000	1"-14 UNF-2A x 7½" Hendrickson Coated Hex Bolt	6
6	68232-000	1" Hendrickson Coated Flat Washer	12
7	68218-000	1"-14 UNF-2B Hendrickson Coated Locknut	6
8	80731-004	Top Pad	6
		U-bolt Service Kit, Includes Key Nos. 9a-9b, 10-11	
	48718-120	One Wheel End	
	48718-117	Axle Set	
9		¾"-16 UNF-2A Square U-bolt	12
a	59367-007	10" Outboard	
b	59367-008	10½" Inboard	
10	22962-001	¾" Flat Washer	24
11	49685-000	¾"-16 UNF-2B U-bolt Locknut	24
12	80732-004	Bottom Cap	6
13	80863-004	U-Beam Assembly, Includes Key Nos. 2, 14	3
		D-pin Bushing Service Kits	
	34013-114	Single, Includes Key Nos. 14-17	
	56659-010	Fasteners Only, Axle Set, Includes Key Nos. 15-17	
14	65381-000	D-pin Bushing	6
15	30418-011	⅞"-14 UNF x 5" Bolt	12
16	22962-007	⅞" Flat Washer	24
17	29248-000	⅞"-14 UNF Locknut	12
18	67044-002	Air Spring	6
19	80734-004	Lower Air Spring Mounting Bracket	6
		Air Spring Fastener Service Kit, Upper/Lower, Includes Key Nos. 20-23	
	49177-023	One Wheel End	
	49177-003	Axle Set	
20	22962-014	½" Flat Washer	18
21	17700-010	½"-13 UNC Locknut	18
22	22962-001	¾" Flat Washer	6
23	17700-031	¾"-16 UNF Locknut	6
24	80730-004	Upper Air Spring Bracket	4
		Rear Drive Axle Upper Air Spring Bracket	
25	91286-104	Left Hand	1
26	91286-204	Right Hand	1
27		**Longitudinal Torque Rod Assembly, *See Table 1 below*	

KEY NO.	PART NO.	DESCRIPTION	VEHICLE *QTY.
		Longitudinal Torque Rod Fastener Service Kits	
		• To Top Pad	
	49176-024	Axle Set, Includes Key Nos. 28-30	
	58821-021	One Wheel End, Includes Key Nos. 28-30	
		• To Frame Hanger	
	49176-032	Axle Set, Includes Key Nos. 31-33	
	58821-027	One Wheel End, Includes Key Nos. 31-33	
		• To Top Pad and Frame Hanger	
	49176-031	Axle Set, Includes Key Nos. 28-33	
28	21867-007	¾"-16 UNF x 6" Hex Bolt	12
29	22962-001	¾" Flat Washer	24
30	30191-000	¾"-16 UNF Locknut	12
31	32043-016	⅝"-11 UNC-2B x 8" Hex Bolt	12
32	22962-004	⅝" Flat Washer	24
33	47764-000	⅝"-11 UNC-2A Locknut	12
34	49689-000	Shim	As Req.
35	80738-004	**Transverse TRAAX ROD™	3
36	80746-004	Transverse Torque Rod Frame Bracket	3
37	80742-004	Axle Stop, Frame Mounted	6
38	80733-004L	Shock Absorber	6
39	94304-004	Upper Shock Frame Bracket *Replaces 80743-001*	6
	50754-064	**Single Shock Absorber Fastener Service Kit** Includes Key Nos. 40-45	
40	50764-018	¾"-10 UNC-2A x 6½" Hex Bolt	6
41	22962-001	¾" Flat Washer	12
42	49842-000	¾"-10 UNC-2B Locknut	6
43	32043-007	⅝"-1 UNC-2A x 7" Lower Shock Bolt	6
44	22962-004	⅝" Flat Washer	12
45	47764-000	⅝"-11 UNC-2B Locknut	6
46		Height Control Valve Assembly, Includes Key Nos. 47-49	2
a	69031-004	Left Side Assembly (Drivers Side)	
b	69031-005	Right Side Assembly (Passenger Side)	
47		*Height Control Valve	2
48		*¼" Flat Washer	4
49		*¼"-20 UNC Locknut	4
50	80748-004	HCV Mounting Bracket	2
51	58994-062	HCV Linkage Assembly, Includes Key Nos. 52-58	2
52	22962-029	5/16" Flat Washer	4
53	59016-000	5/16"-18 UNC-2B Locknut	4
54	17491-011	5/16"-18 UNC-2B Nut	4
55	59169-000	5/16"-18 UNC Mounting Stud	4
56	58987-000	Valve Arm Joint	2
57	58969-000	Valve Arm Clamp	2
58	58993-010	HCV Extension Rod	2
59	80749-004	HCV Linkage Bracket	2
60	70867-001	P-80 Lubricant 10 ml (Not Shown)	per Bushing 1

TABLE 1	Key No. 27	♦ LONGITUDINAL TORQUE ROD PART NO.	
DRIVE AXLE LOCATION	**♦♦PINION ANGLE**	**LEFT HAND (DRIVERS SIDE)**	**RIGHT HAND (PASSENGER SIDE)**
Front	0°	93595-460A	93595-460B
Mid	2°	93595-475A	93595-475B
Rear	3°	93595-480A	93595-480B

♦ Longitudinal torque rod bushings are non-serviceable, the entire torque rod assembly requires replacement.

♦♦ Measured with the QUIK-ALIGN set at neutral position (12 O'Clock).

■ CROSS REFERENCE

HENDRICKSON PART NO.	MACK PART NO.	DESCRIPTION
17491-011	23490430	5/16"-18 UNC-2B Nut
17700-010	20760820	1/2"-13 UNC Locknut
17700-031	23490433	3/4"-16 UNF Locknut
21867-007	23490441	3/4"-16 UNF x 6" Hex Bolt
22962-001	25092158	3/4" Flat Washer
22962-004	25173404	5/8" Flat Washer
22962-007	23490435	7/8" Flat Washer
22962-014	23490436	1/2" Flat Washer
22962-028	23490437	1/4" Flat Washer
22962-029	23490438	5/16" Flat Washer
29248-000	85109234	7/8"-14 UNF Locknut
30191-000	23490440	3/4"-16 UNF Locknut
30418-011	23490443	7/8"-14 UNF x 5" Bolt
32043-007	23490444	5/8"-11 UNC-2A x 7" Bolt
32043-016	23490446	5/8"-11 UNC-2B x 8" Hex Bolt
47764-000	25157616	3/4"-11 UNC-2A Locknut
49685-000	20755348	3/4"-16 UNF-2B U-bolt Locknut
49689-000	24424092	Shim
49842-000	25153574	3/4"-10 UNC-2B Locknut
49983-000	23490445	1/4"-20 UNC Locknut
50764-018	23490447	3/4"-10 UNC-2A x 6 1/2" Hex Bolt
58969-000	23481879	Valve Arm Clamp
58987-000	23482698	Valve Arm Joint
58993-010	23482710	HCV Extension Rod
58994-062	23720464	HCV Linkage Assembly
59016-000	23490448	5/16"-18 UNC-2B Lock Nut
59169-000	23490449	5/16"-18 UNC Mounting Stud
59367-007	23490450	3/4"-16 UNF-2A Square U-bolt 10", Outboard
59367-008	23490451	3/4"-16 UNF-2A Square U-bolt 10 1/2", Inboard
60501-005	23720455	Height Control Valve
64632-000	20755337	QUIK-ALIGN Eccentric Collar
64633-000	20755339	QUIK-ALIGN Concentric Collar
65381-000		D-pin Bushing
67044-002	23482799	Air Spring
68217-000	21469179	1"-14 UNF-2A x 7 1/2"" Hendrickson coated Hex Bolt
68218-000	21469181	1"-14 UNF-2B Hendrickson coated Locknut
68232-000	21469187	1" Hendrickson coated Flat Washer
69031-004	23720458	Left Hand Height Control Valve Assembly (Drivers Side)
69031-005	23720461	Right Hand Height Control Valve Assembly (Passenger Side)
70425-001		QUIK-ALIGN Pivot Bushing
70867-001		P80 Lubricant 10 ml
80730-004	23856607	Front Upper Air Spring Bracket
80731-004		Top Pad
80732-004	23856608	Bottom Cap
80733-004	23856611	Shock Absorber
80734-004	23856606	Lower Air Spring Mounting Bracket
80735-004	23856609	Frame Hanger
80738-004	23939007	Transverse TRAAX ROD
80742-004	23856599	Axle Stop, Frame Mounted
80746-004	23856602	Transverse Torque Rod Frame Bracket
80748-004	23856613	HCV Mounting Bracket
80749-004	23856612	HCV Linkage Bracket
80863-004	23856610	U-beam Assembly
91286-104	23856615	Left Hand Rear Upper Air Spring Bracket
91286-204	23856616	Right Hand Rear Upper Air Spring Bracket
93595-460A		Left Hand Longitudinal Torque Rod, Front
93595-460B		Right Hand Longitudinal Torque Rod, Front
93595-475A		Left Hand Longitudinal Torque Rod, Mid
93595-475B		Right Hand Longitudinal Torque Rod, Mid
93595-480A		Left Hand Longitudinal Torque Rod, Rear
93595-480B		Right Hand Longitudinal Torque Rod, Rear
94304-004	23856604	Upper Shock Frame Bracket

NOTES: Quantities specified are for tridem suspension. Quantities of service kit components may vary from amount shown in lists.

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

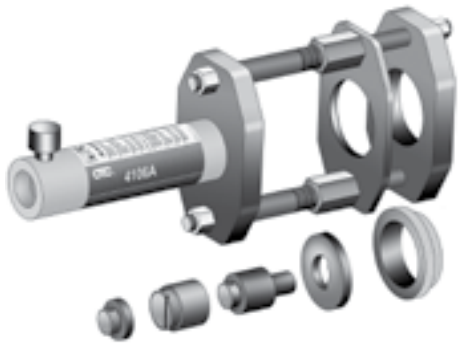
** Longitudinal and transverse torque rod bushings are non-serviceable, the entire torque rod assembly requires replacement. Visit TRAAX ROD website www.traaxrods.com for more information.

*** Alternate configuration of the QUIK-ALIGN fasteners. The locknuts located inboard will allow additional clearance for wider tires or tires with chains. Tightening is still required ONLY on the locknut.

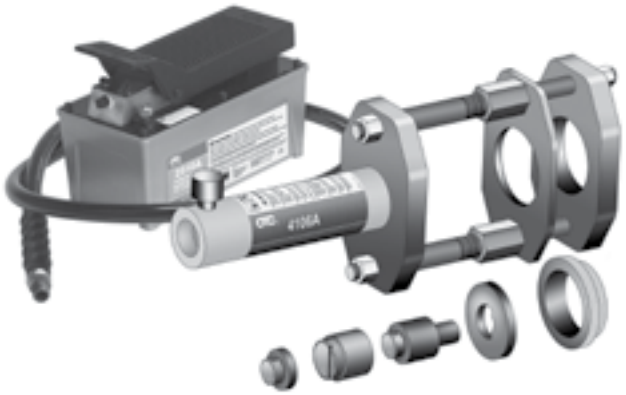
SECTION 5
Special Tools

D-PIN / QUIK-ALIGN PIVOT BUSHING SERVICE TOOLS

OTC Part No. 4246 Visit otctools.com



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

OTC Part No. 1767

Visit otctools.com

SECTION 6
Preventive Maintenance

HENDRICKSON RECOMMENDED INSPECTION INTERVALS

Following appropriate inspection procedures are important to help ensure the proper maintenance and operation of the PRIMAAX EX rear suspension and components function to their highest efficiency. Off-highway and severe service operating conditions may require more frequent inspections than on–highway service operation.

Hendrickson recommends to visually inspect for proper assembly and function, overall condition and any signs of damage. Check for all of the following as per the inspection intervals shown and replace components as necessary:

- Signs of unusual movement, loose or missing components, abrasive or adverse contact with other components, damaged or cracked parts and improper suspension function or alignment.

	PRE-DELIVERY	FIRST IN-SERVICE	PREVENTIVE MAINTENANCE		
	Within the first 500 miles (800 km)	1,000 miles (1,600 km), 100 hours, or whichever comes first	Off-highway 25,000 miles (40,000 km), 6 months, 1,200 hours, or whichever comes first	On-highway 50,000 miles (80,000 km), 12 months, 2,400 hours, or whichever comes first	50,000 miles (80,000 km), every 12 months, 2400 hours, or whichever comes first
All Fasteners	■	■			■
♦Air Springs and Air Supply	■	■	■	■	
♦Clamp Group Top Pad, U-bolts and Locknuts	■	■	■	■	
D-pin and Pivot Bushings	■	■	■	■	
Frame Hangers	■	■			■
Height Control Valves and Air Lines	■	■	■		
Lateral Alignment	■	■			■
♦QUIK-ALIGN Connection	■	■			■
Ride Height	■	■			■
Shock Absorber	■		■	■	
Tire Wear			■	■	
Top Pad / Longitudinal Torque Rod Connection	■	■	■	■	
Torque Rods	■	■		■	
♦U-beam Assembly	■	■	■	■	
Wear and Damage				■	

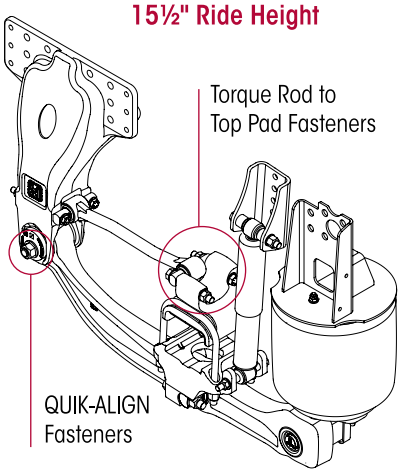
♦ Signifies performance critical components group

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

NOTE Figures 6-1 and 6-2 illustrate PRIMAAX EX suspension basic connections.

FIGURE 6-1

15½" Ride Height



Clamp Group Fasteners

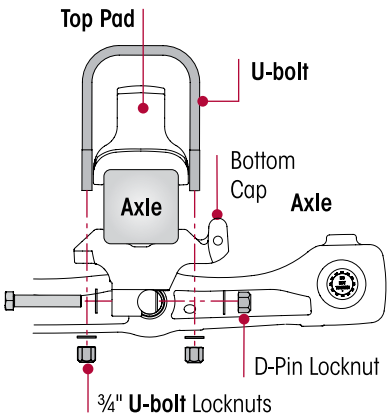
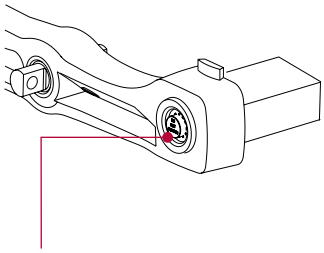


FIGURE 6-2

Integrated End Cap

PRIMAAX EX

DO NOT re-torque the integrated end cap.



INTEGRATED End Cap

DO NOT re-torque. **Tamper Resistant Cap** attached to integrated end cap bolts with SIKAFLEX 221 sealant applied around the cap.

COMPONENT INSPECTION

IMPORTANT NOTE Replace all worn or damaged parts.

- **All fasteners** — Visually inspect for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to a torque value within the specified torque range. See Torque Specification section in this publication for recommended torque requirements. Use a calibrated torque wrench to check torque in a tightening direction. As soon as the fastener starts to move, record the torque and correct the torque if necessary.
- **Air springs** — Visually inspect the outer surface of the air spring for 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. An ⅛" of slippage in either direction is acceptable. Verify all mounting hardware have the proper torque values maintained. See the Torque Specification section of this publication for recommended torque requirements.
- **Air supply (Pneumatic components)** — The air supply to the system plays a large role in the air springs' performance. Inspect, clean and replace, if necessary, any support products to the air springs, valves, regulators and air lines. See Air Fitting Inspection 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 the U-bolt Locknuts in this section.
- **D-pin and pivot bushings** — Visually inspect the connection for signs of looseness or movement. Visually inspect the bushing for wear.
- **Frame hangers** — 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 air leaks. Check all air lines for proper routing. Check for chafing or pinched air lines. Check the height control valve linkage for damage or interference with peripheral components.
- **Lateral alignment** — Verify the lateral alignment of the drive axles are within the vehicle manufacturer's tolerances.

- **QUIK-ALIGN connection** — Visually inspect the connection for signs of looseness or movement. Visually inspect the bushing for wear. Verify the connections have the proper torque values maintained. See the Torque Specification section of this publication for recommended torque requirements. See QUIK-ALIGN Fastener Warnings in the Important Safety Notice section of this publication prior to installing the QUIK-ALIGN connection.
- **Ride height** — Verify the ride height, refer to the Alignment & Adjustments section of this publication.
- **Shock absorbers** — Visually inspect for any signs of dents or leakage. Misting is not considered a leak, see Shock Absorber Inspection in this section.
- **Tire wear** — Visually inspect the tires for wear patterns that may indicate suspension damage or misalignment.
- **Top pad/Longitudinal torque rod connection** — Visually inspect the connection for signs of movement or damage. Use a lever check to help assess movement in this joint, see Longitudinal and Transverse Torque Rods in this section for proper inspection. Verify the top pad/longitudinal torque rod connections have the proper torque values maintained. See the Torque Specifications section of this publication for recommended torque requirements.
- **Torque rods (longitudinal and transverse)** — All torque rods must be inspected for looseness, torn or shredded rubber, and for proper fastener torque. If there is metal-to-metal contact in the bushing joint, this is a sign of excessive bushing wear and the torque rod needs to be serviced, see Longitudinal and Transverse Torque Rod inspection in this section.

NOTE

Torque rods assemblies equipped on the PRIMAAX EX suspension for Mack HDT vehicles have curled end hubs and are not re-bushable. The entire torque rod assembly must be replaced. This feature provides superior bushing retention in the torque rod end hub.

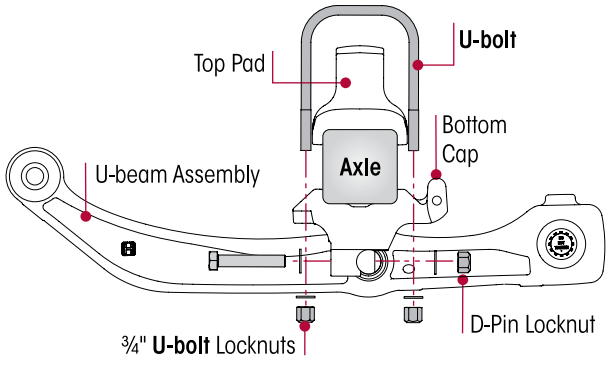
- **U-beam assembly**— Visually inspect for cracks, damage, metal shavings, or looseness at the U-beam connection. Visually inspect the overall condition of the U-beam for dents, dings, or other damage on the outer edges of the beam flanges. Visually inspect the D-pin bushings for tearing or extreme bulging. Check for any metal-to-metal contact in the bushed joints.
- **Wear and damage** — Visually inspect all parts of the suspension for wear and damage. Look for bent or cracked parts.

U-BOLT LOCKNUTS

NOTE

U-bolt clamp group hardware for the PRIMAAX EX suspension is ¾"-16 UNF Grade C locknuts and ¾"-16 UNF Grade 8 U-bolts which are phosphate and oil coated.

FIGURE 6-3

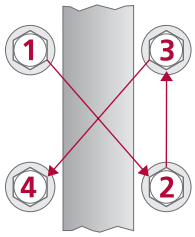


1. U-bolt locknuts (see Figure 6-3) must be torqued to specification at preparation for delivery.
2. U-bolt locknuts must be re-torqued at 1,000 miles.
3. Thereafter, follow the inspection and re-torque intervals below:
   - **Off-highway and severe service** – Every 25,000 miles or 6 months, whichever comes first.
   - **100% On-highway** – Every 50,000 miles or 12 months, whichever comes first.

Off-highway and severe service operating conditions require more frequent inspections than on-highway service operation.

SERVICE HINT Due to certain pinion angle configurations, the removal of the D-Pin bolts may be necessary to access the U-bolt locknuts, see Figure 6-3.

FIGURE 6-4



WARNING

IT IS IMPORTANT THAT THE U-BOLT CLAMP GROUP CONNECTION 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 evenly in 50 foot pound increments to 375 ± 25 foot pounds torque in the proper pattern to achieve uniform bolt tension, see Figures 6-4.

PIVOT BUSHING AND D-PIN BUSHING

WARNING

THE PIVOT BUSHING AND THE D-PIN BUSHING ARE CRITICAL COMPONENTS OF THE PRIMAAX EX SUSPENSIONS. IF ANY SUCH 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'S ALIGNMENT, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

There are two types of pivot bushing inspections for the PRIMAAX EX suspension. 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.

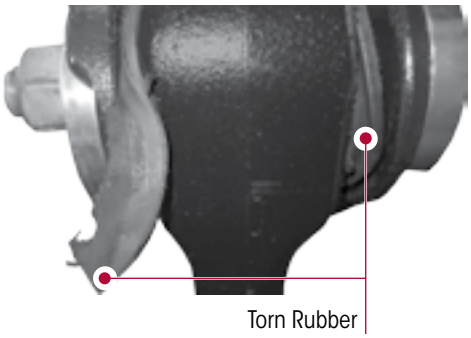
PIVOT BUSHING VISUAL INSPECTION

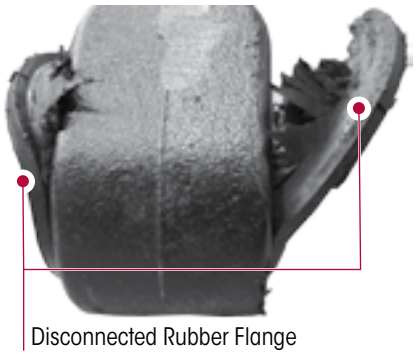
To perform pivot bushing visual inspection, it is not necessary to disassemble the pivot bushing connection. If the pivot bushing rubber flange(s) are intact and there are no signs of metal to metal contact the bushing does not require replacement.

- The U-beam is designed with the pivot bushing centered in the U-beam 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 6-5 and 6-6, 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 6-7, this could be a result of axle misalignment. If this condition is evident, pivot bushing replacement is required.

FIGURE 6-5 FIGURE 6-6 FIGURE 6-7

VISUAL INSPECTION – Torn, Disconnected or Missing Rubber Flange

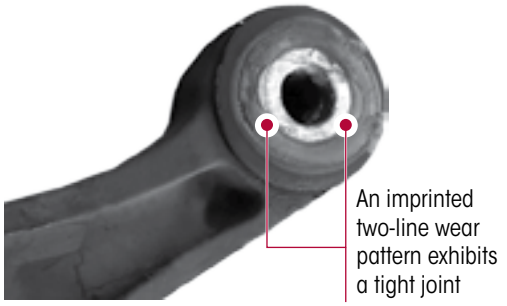




PIVOT BUSHING PHYSICAL INSPECTION

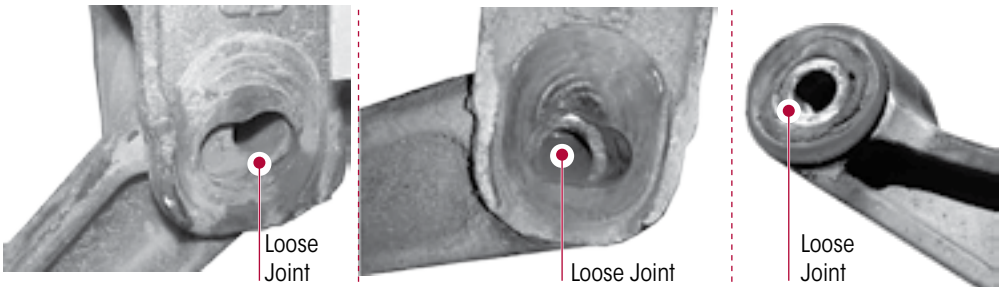
1. Remove the U-beam assembly, refer to U-beam Assembly in the Component Replacement of this publication.
2. After removal, inspect the pivot bushing connection, examine the pivot bushing inner metal area.
3. No replacement is needed if the bushing exhibits a tight joint, see Figure 6-8. An imprinted two-line wear pattern on the bushing inner metal indicates the pivot bushing is securely clamped in the frame hanger.

FIGURE 6-8
GOOD JOINT – No Replacement Needed



4. Inspect pivot bushing, replacement is necessary if any indications of the following are apparent, see Figure 6-9:
   - Signs of rust, distorted, separated or torn rubber, elongated or damaged bore. This could be a result of axle misalignment or loose fasteners.

FIGURE 6-9
PHYSICAL INSPECTION – Indications of a Loose Joint



5. 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 (1) 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
6. Check the suspension alignment and adjust if necessary. Refer to Alignment & Adjustments section of this publication.

D-PIN BUSHING VISUAL INSPECTION

It is not necessary to disassemble the D-Pin connection to perform a D-Pin visual inspection. The D-Pin bushing is designed with a layer of rubber in the bushing, it is acceptable to see a bead of rubber protruding from the bushing, see Figure 6-10.

D-Pin bushing replacement **IS REQUIRED** only when:

- Metal to metal contact wear marks on the D-pin outer metal are evident, see Figure 6-11
- D-pin outer metal is distorted, see Figure 6-11

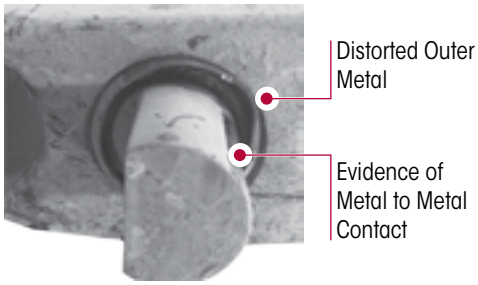
Refer to D-pin Component Replacement section in this Publication.

FIGURE 6-10

ACCEPTABLE D-PIN

FIGURE 6-11

UNACCEPTABLE D-PIN



LONGITUDINAL AND TRANSVERSE TORQUE RODS

⚠ WARNING

THIS HENDRICKSON SUSPENSION REQUIRES TORQUE RODS FOR SUSPENSION PERFORMANCE AND VEHICLE STABILITY. IF THESE TORQUE RODS ARE DISCONNECTED OR ARE 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.

INSPECTION

All torque rods need to be inspected during preventive maintenance and service for looseness.

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 will require replacement if any of these conditions are encountered.

Torque rod looseness inspection is necessary. With the vehicle shut down, a lever check can be made with a long pry bar placed under each torque rod end and pressure applied.

Torque rod length is determined by the original vehicle manufacturer, see Figure 6-12.

The transverse torque rods also control axle walk-out during cornering. The mounting bracket 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 6-12.

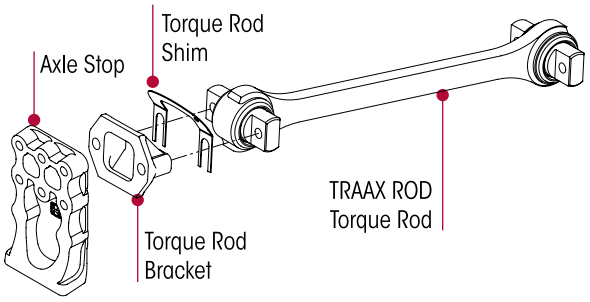
If the lateral alignment of the axles is incorrect, it may be necessary to add the shim to transverse torque rod, see Figure 6-12. Refer to Lateral Alignment in the Alignment & Adjustments section of this publication.

NOTE

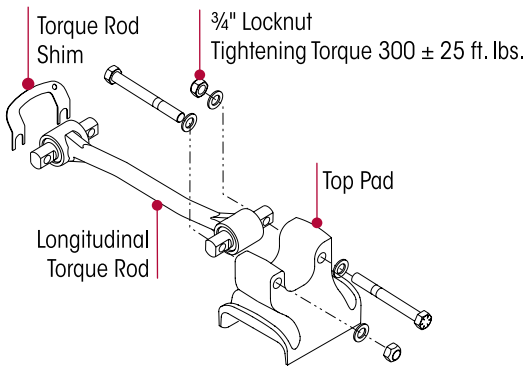
Hendrickson Suspension recommends Grade 8 bolts, hardened flat washer and Grade C locknuts be used for all straddle mount torque rod attachments.

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.

FIGURE 6-12
Transverse Torque Rod



Longitudinal Torque Rod



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 PRIMAAX EX 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 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 6-13

HEAT TEST AND PHYSICAL INSPECTION

1. **Heat Test:** Drive the vehicle with the lift axle, if equipped, down at moderate speeds on a rough road for minimum of fifteen minutes.

WARNING

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

   a. Perform 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 6-13. 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. 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. Inspect the shock absorbers fully extended. Replace as necessary.

FIGURE 6-14

SHOCK ABSORBER VISUAL INSPECTION – UNACCEPTABLE CONDITIONS

Damaged upper or lower mount

Damaged upper or lower bushing

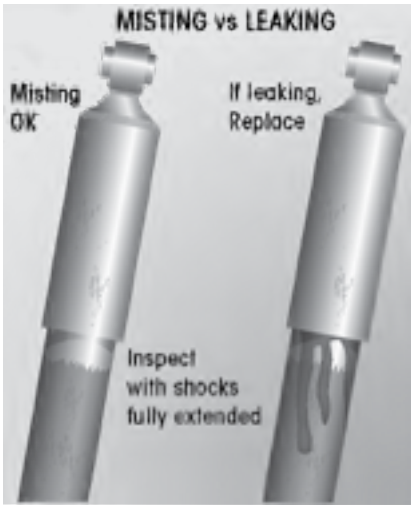
Damaged dust cover and / or shock body

Bent or dented shock absorber

Improper installation
Example: washer (if equipped) installed backwards

LEAKING VS. MISTING SHOCK ABSORBER

FIGURE 6-15



INSPECTION

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 necessary function of the shock absorber. The fluid which evaporates through the seal area helps to lubricate and prolong the life of the seal.

NOTE

PRIMAAX EX 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 6-15**.** These streams can easily be seen, underneath the main body (dust cover) of the shock absorber. Replace as necessary.

AIR FITTINGS

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. The only acceptable method for inspection of the height control valves is the height control valve test found in this section.

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.

SECTION 7
Alignment & Adjustments

RIDE HEIGHT – Dual Height Control Valves

FIGURE 7-1

Hendrickson requires dual height control valves (see Figure 7-1) for Mack HDT vehicles equipped with PRIMAAX EX tridem suspension.

INSPECTION

SERVICE HINT

When inspecting or setting ride height on a lightly loaded vehicle, such as, a bobtail tractor equipped with dual height control valves, it is necessary to have a load on the vehicle. Loading the vehicle to its normal operating condition, such as a tractor with a loaded trailer, increases ride height setting accuracy.

1. Drive the vehicle onto a level surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead.
3. **DO NOT** set the parking brake.
4. Chock front wheels of the vehicle.
5. 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 valves be 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 DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.

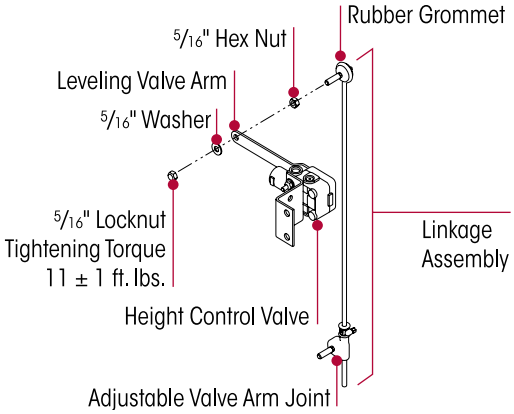
6. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.

⚠ WARNING

SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME AIR PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

7. Deflate the suspension by using one of the following appropriate methods:
   a. If vehicle is equipped with a suspension dump system in the cab, deflate the suspension air system by using the cab dump valve control.
   b. If not equipped with a suspension dump system, detach both the upper rubber grommets of the height control valve linkages from the height control valve arms and exhaust the suspension system air by lowering the height control valve arms, see Figure 7-2.

FIGURE 7-2



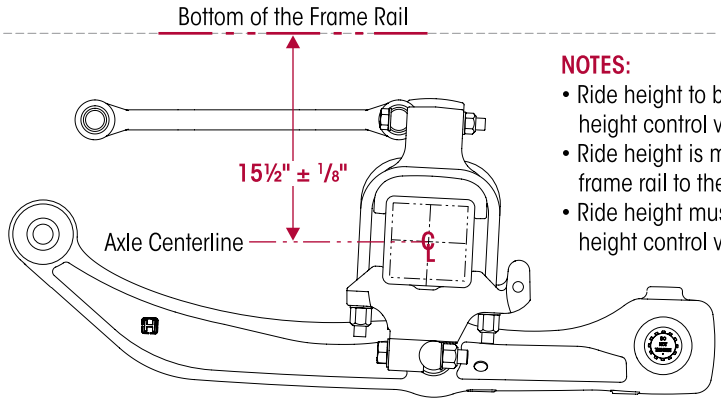
8. Inflate the suspension by using one of the following methods:
   a. If the vehicle is equipped with a suspension dump system in the cab, inflate the suspension air system by using the cab dump valve control. Allow the suspension system to inflate.
   b. If the vehicle is not equipped with a suspension dump system, raise the height control valve arms and attach the upper rubber grommets of the height control valve linkage to the height control valve arms. Allow the suspension system to inflate.
9. Measure the suspension ride height. Measure the distance from the bottom of the frame rail to the axle centerline on the wheel ends where the height control valves are located.

NOTE A vehicle equipped with dual height control valves must measure the ride height at each height control valve location.

NOTE All ride heights are measured on the axle attached to the height control valve(s). Ride height is measured from the bottom of the frame to the axle centerline.

10. Compare the measured ride height dimensions to the specified dimension for your suspension in Figure 7-3.
    a. If ride height **IS** 15½" ± ⅛" then height control valve adjustment is not required.
    b. If ride height is **NOT** 15½" ± ⅛" then height control valve adjustment is required. Refer to the Adjustment Procedure in this section.

FIGURE 7-3



ADJUSTMENT PROCEDURE

SERVICE HINT When inspecting or setting ride height on a lightly loaded vehicle, such as a bobtail tractor, equipped with dual height control valves, it is necessary to have a load on the vehicle. Loading the vehicle to its normal operating condition, such as a tractor with a loaded trailer, increases ride height setting accuracy.

1. Drive the vehicle onto a level surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used.
3. **DO NOT** set the parking brake.
4. Chock the front wheels of the vehicle.
5. When checking or adjusting ride height, verify and maintain the vehicle's air system at full operating pressure.

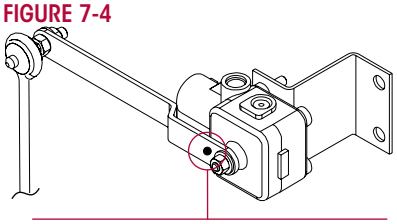
SERVICE HINT It is very important that the height control valves be cycled completely before and after any ride height adjustments. The cycling of the height control valves will help to make the adjustment more accurate.

6. See Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
7. 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.
8. Raise the height control valve arm by hand to refill the suspension air and to ensure the air springs are above the proper ride height.
9. Lower the height control valve arm to exhaust the suspension system air until the suspension reaches the proper ride height.

NOTE

Adjustments to one (1) height control valve may affect ride height setting on the other height control valve. Verify ride height is correct at both height control valves whenever an adjustment is made.

FIGURE 7-4



To set neutral position align hole with hole on height control valve cover

10. Use a ⅛" wooden dowel rod (golf tee) to set the neutral position for each height control valve by aligning the hole in the leveling arm with the hole in the height control valve cover, as shown in Figure 7-4. **DO NOT** use a metal rod or nail as this may cause damage to the height control valve.
11. Steps 7 to 9 might need to be repeated using one (1) height control valve at a time.
12. Adjust the linkage assembly so the rubber grommet can be reconnected to the height control valve arm at the proper height. Check the rubber components for any tearing or damage, replace as necessary.
13. Reconnect the rubber grommet to the height control valve arm.
14. Tighten the clamp on the adjustable valve arm joint with a screwdriver until securely fastened, see Figure 7-2.
15. Remove the dowel from the height control valves.
16. 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 the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead.
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. Correct as necessary. Refer to Ride Height Adjustment in this section.
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 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 7-5. Refer to the vehicle manufacturer 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 Pinion Angle Adjustment procedure in this section.
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 7-5

Drive axle pinion angles are established by the vehicle manufacturer. Bottom caps are machined to specific angles to meet the vehicle manufacturer's specified requirements. For the suspension bottom caps pinion angles, refer to the Parts List section of this publication.

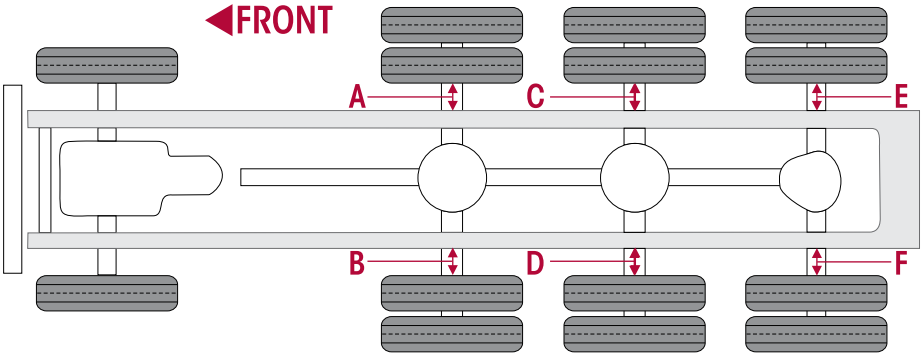
To check the pinion angle:

1. Verify the suspension is at the proper ride height (see the Ride Height Adjustment in this section).
2. Place a digital protractor on the axle housing as shown in Figure 7-5.
3. Verify the pinion angle is within the range specified by the vehicle manufacturer.
4. Follow the Pinion Angle Adjustment in this section if necessary to fine-tune the pinion angle.

AXLE LATERAL ALIGNMENT

1. Use a work bay with a level surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used.
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 **A, C** and **E**, see Figure 7-6.
6. Measure the same distance on the opposite side of the same axle. Record the measurement of **B, D** and **F**, see Figure 7-6.

FIGURE 7-6



7. 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. Refer to Longitudinal and Transverse Torque Rod section in Preventive Maintenance section of this publication.

NOTE Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts. Washers are not necessary when flanged fasteners are used.

AXLE ALIGNMENT

ADJUSTMENT INSTRUCTIONS

SERVICE HINT The eccentric collars (with the square drive feature) are located on the outboard side of the frame hangers with the concentric collars on the inboard side, see Figure 7-7. The total range of fore/aft axle adjustment is 1.0" ± ½".

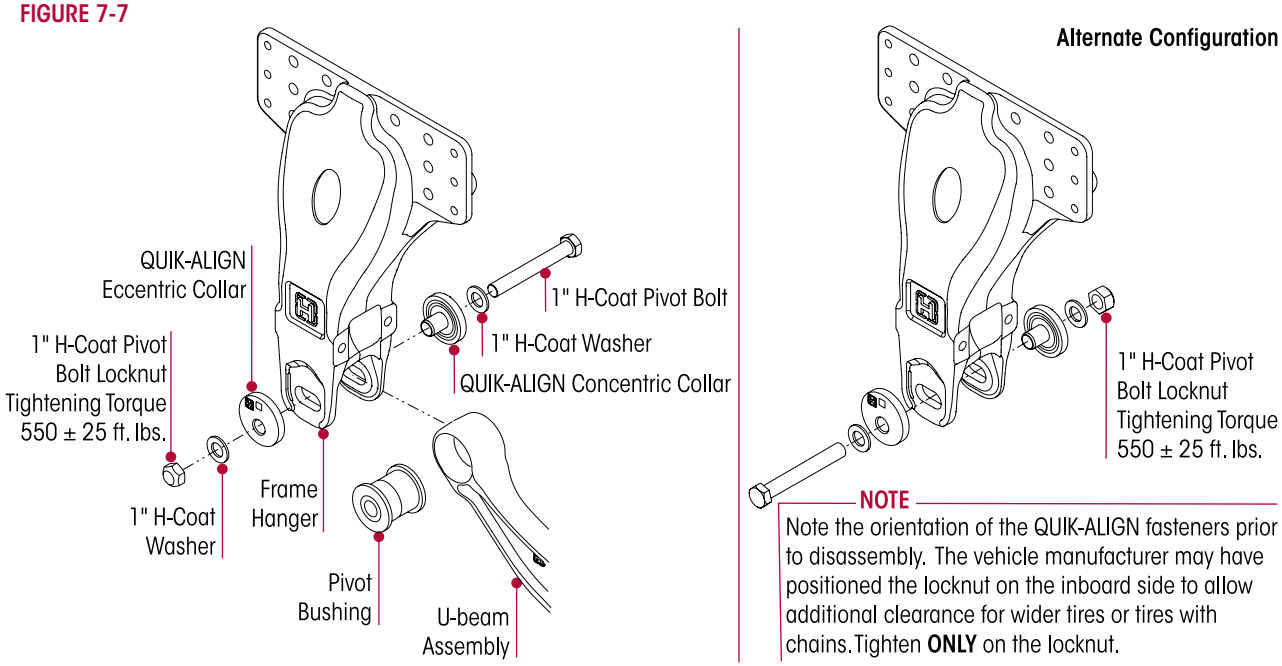
SERVICE HINT A suspension equipped with eccentric QUIK-ALIGN collars on both sides of an axle can be adjusted on both sides. A suspension equipped with an eccentric QUIK-ALIGN collar on only one side of the axle can be adjusted only on the side that has the eccentric QUIK-ALIGN collar. Contact the vehicle manufacturer for specifications.

⚠ WARNING 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, PERSONAL INJURY, OR PROPERTY DAMAGE.

⚠ WARNING

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

FIGURE 7-7



NOTE

Note the orientation of the QUIK-ALIGN fasteners prior to disassembly. The vehicle manufacturer may have positioned the locknut on the inboard side to allow additional clearance for wider tires or tires with chains. Tighten **ONLY** on the locknut.

1. Support the frame at ride height.

⚠ WARNING

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

2. See additional Air Spring Warnings and Instructions in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
3. Disconnect the height control 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. (See vehicle manufacturer's instructions).

⚠ WARNING

SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME AIR PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

4. Using the measurements from the Drive Axle Alignment Inspection Procedure in this section, determine which QUIK-ALIGN collar will need adjusting to correct the axle alignment.

SERVICE HINT If the axle can be adjusted on both sides, begin the adjustment on the side that is furthest out of specification.

NOTE Use a new QUIK-ALIGN pivot bolt kit (see the Parts List section of this publication) for any axle alignment or disassembly of the QUIK-ALIGN connection. This will help ensure that the proper clamp load is applied to the connection and help prevent the joint to slip in service.

5. On the side being adjusted, remove the QUIK-ALIGN fastener and replace it with a QUIK-ALIGN fastener. Snug the QUIK-ALIGN fastener to 50-100 foot pounds. This will hold the eccentric flanged collar in place against the frame hanger face, and within the adjustment guide, but loose enough to permit the QUIK-ALIGN eccentric flanged collar to rotate freely.
6. See additional Air Spring Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the suspension system.
7. Connect the linkage assembly to the height control valve arm to inflate the suspension. Verify the air springs inflate uniformly without binding.
8. Verify the vehicle is at the correct ride height.

NOTE

When adjusting the alignment of an axle, the fasteners connecting the longitudinal torque rod to the frame hanger, above the QUIK-ALIGN collar being adjusted, must be loose at the frame hanger. This will allow the longitudinal torque rod to move freely with the axle while the alignment is adjusted. Failure to do so will result in bushing preload in all rubber connections on that side of the axle, shortening component life.

9. On the side of the axle being adjusted, loosen the fasteners connecting the longitudinal torque rod to the frame hanger. Remove any existing shims from this connection. Leave connection loose at this time.
10. Use a QUIK-ALIGN socket tool, Figure 7-8 (also see Tool section of this publication) and impact gun, see Figure 7-9, or a ½" square drive breaker bar to rotate the QUIK-ALIGN eccentric collar to align the axle.

FIGURE 7-8

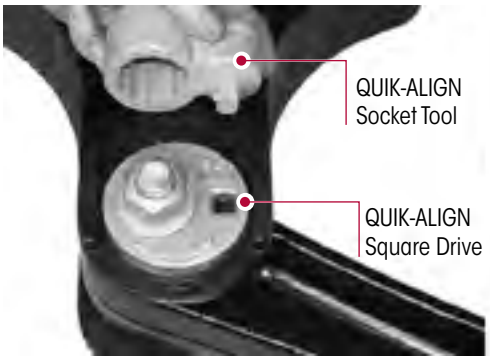


FIGURE 7-9

11. Once the correct axle alignment is achieved, use a calibrated torque wrench to tighten the 1" QUIK-ALIGN locknuts to 550 ± 25 foot pounds torque.
12. Fill any gap between the frame hanger and longitudinal torque rod with shims.
13. Tighten the longitudinal torque rod fasteners to the proper specification, see Torque Specification section of this publication per model designation.
14. Verify the ride height is within the vehicle manufacturer's specifications, refer to the Ride Height procedure in this section. Then proceed to the Drive Axle Alignment Inspection procedure in this section.

PINION ANGLE ADJUSTMENT

ADJUSTMENT OF 1.5 DEGREES OR LESS

NOTE

When correcting the pinion angle of an axle the correction must be in equal amounts on both sides of the axle. However, the total number of shims per side may differ due to axle alignment.

SERVICE HINT

A general rule of thumb is, ⅛" change in the shim pack thickness will increase or decrease the pinion angle by ½ degree.

1. Loosen the fasteners connecting the longitudinal torque rods to the frame hangers.

2. Install or remove shims as required in **equal amounts** to both sides of the axle to achieve the proper pinion angle, see Figure 7-10. Therefore, to increase the pinion angle install shims, to decrease the pinion angle remove shims.
3. Tighten the longitudinal torque rod fasteners to the proper specification, see Torque Specification section of this publication per model designation.
4. Verify the pinion angle is within the vehicle manufacturer's specifications.

ADJUSTMENT OF MORE THAN 1.5 DEGREES

If an adjustment of more than 1.5 degrees is required, it will be necessary to replace the bottom cap with a bottom cap that will achieve the desired pinion angle. After replacement of the bottom cap perform the drive axle alignment procedure. See Pinion Angle Chart in the Parts List section of this publication.

FIGURE 7-10

SECTION 8
Component Replacement

FASTENERS

When servicing a vehicle, Hendrickson recommends replacing 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.

AIR SPRING • UPPER AIR SPRING BRACKET

DISASSEMBLY

1. Chock the wheels.
2. Support the frame with safety stands.
3. Disconnect the height control valve arm(s) from the linkage assembly.

⚠ WARNING

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

4. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
5. Lower the height control valve arm(s) to exhaust the air in the air springs and deflate the rear suspension.

⚠ WARNING

SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME AIR PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

6. Remove the air lines 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 it will be necessary to clean and lubricate the lower mounting fasteners with penetrating oil to prevent damage to the lower mounting stud.
8. Remove and discard the lower air spring mounting fasteners using **HAND TOOLS** only.
9. Remove the lower air spring mounting bracket from the cross tube.
10. Remove and discard the upper air spring mounting bracket fasteners from the frame per the vehicle manufacturer's instructions.
11. Remove the air spring.
12. Remove and discard the fasteners securing the upper air spring bracket assembly to the frame rail per vehicle manufacturer's specifications.
13. Inspect the upper air spring bracket assembly, mounting surfaces and lower air spring mounting bracket for any damage. Replace as necessary.

ASSEMBLY

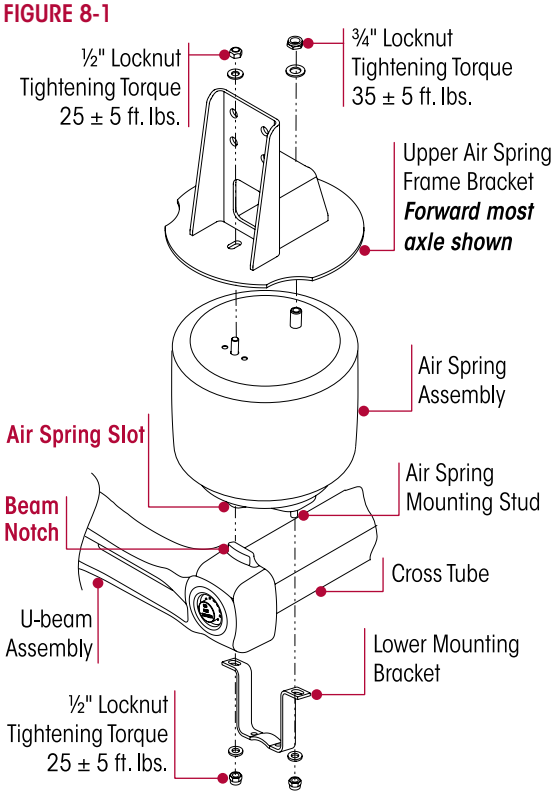
1. Loosely attach the upper air spring bracket assembly to the frame rail.

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 against the underside of the frame and tighten the frame fasteners to the proper torque per the original equipment manufacturers specifications.

FIGURE 8-1



3. Attach the air spring to the upper air spring bracket assembly and tighten
   a. ½" locknuts to 25 ± 5 foot pounds torque, see Figure 8-1.
   b. ¾" locknuts to 35 ± 5 foot pounds torque, see Figure 8-1
4. Install the air spring between the frame and the cross tube. Ensure the **air spring slot** in the bottom of the air spring engages the **beam notch** on the top of the beam, see Figure 8-1.
5. Install the lower air spring mounting bracket around the cross tube, engaging the mounting air spring studs, see Figure 8-1.
6. Using **HAND TOOLS** only, install the lower mounting locknuts and tighten to 25 ± 5 foot pounds torque, see Figure 8-1.
7. Install the air line fitting to the air spring using Teflon (or equivalent) thread seal.
8. Reconnect the air line to the air spring.
9. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
10. Reconnect the linkage assembly to height control valve arm to inflate the suspension.
11. Inflate the suspension slowly and verify that the air spring bladder inflates 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.

HEIGHT CONTROL VALVE

NOTE This procedure is for servicing a height control valve supplied by Hendrickson. Contact the vehicle manufacturer for instructions when servicing a non-Hendrickson height control valve.

DISASSEMBLY

1. Chock the wheels of the vehicle.
2. Support the frame with safety stands.
3. Disconnect the linkage assembly from the height control valve arm.

WARNING

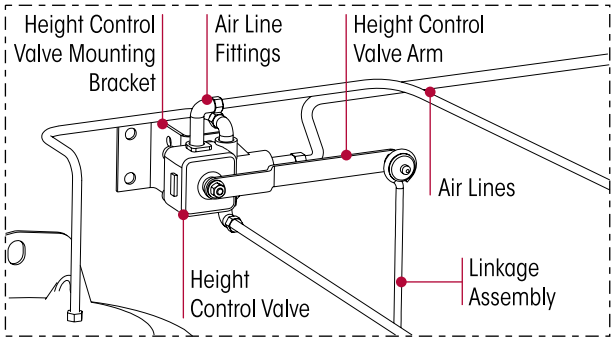
PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.

4. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
5. Lower the height control valve arm(s) to exhaust the air in the air springs and deflate the rear suspension, see Figure 8-2.

WARNING

SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME AIR PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

FIGURE 8-2



6. Remove the air lines and air fittings from the height control valve.
7. Remove and discard the locknut fasteners that attach the height control valve to the frame mounting bracket. **DO NOT** back out the studs from the height control valve body. Loosening the studs may cause the height control valve to leak.
8. Remove the height control valve, see Figure 8-2.

ASSEMBLY

1. Install the height control valve to the frame mounting bracket by attaching the ¼" washers and locknuts. Tighten to 9 ± 1 foot pounds torque.
2. Install the upper linkage assembly to the height control valve. Install the lower linkage assembly to lower linkage bracket. Install fasteners and tighten to 10 ± 2 foot pounds torque.
3. Install the air line fittings and air lines into the height control valve using Teflon (or equivalent) thread seal. Refer to the Plumbing Diagrams section of this publication.
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. Inflate the suspension by connecting the linkage assembly to the height control valve arm. Verify the air springs inflate uniformly without binding.
6. Remove the frame safety stands.
7. Verify proper ride height. Refer to the Alignment & Adjustments section of this publication.
8. 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

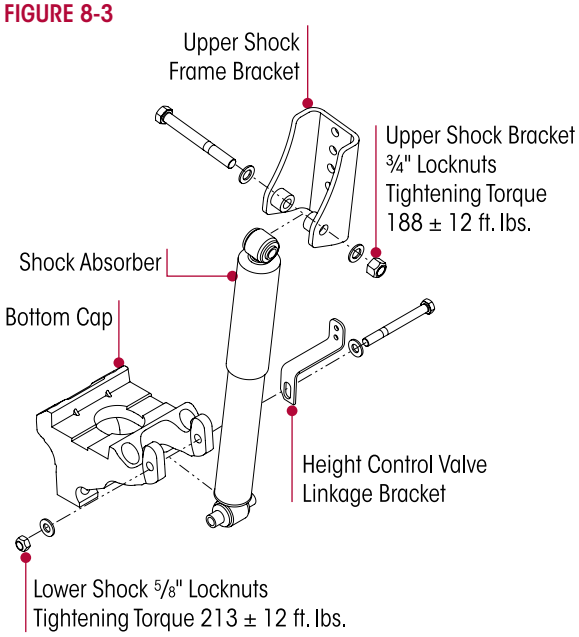
THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SUSPENSION. THE SHOCK ABSORBERS MUST REMAIN CONNECTED ANYTIME THE AXLE IS SUSPENDED OTHERWISE ALLOWED TO HANG ABOVE THE GROUND. FAILURE TO DO SO CAN CAUSE THE AIR SPRINGS TO SEPARATE FROM THE PISTON AND RESULT IN PREMATURE AIR SPRING FAILURE. REPLACEMENT OF SHOCK ABSORBERS WITH NON-HENDRICKSON PARTS CAN ALTER THE REBOUND TRAVEL OF THE SUSPENSION.

DISASSEMBLY

NOTE If may be necessary to remove the height control valve linkage bracket for shock absorber replacement, if so, mark the position of the linkage bracket to facilitate reinstallation.

1. Chock the wheels of the vehicle.
2. Remove and discard the **lower** shock absorber mounting fasteners and, if necessary, the height control valve linkage bracket, see Figure 8-3.
3. Remove and discard the **upper** shock absorber mounting fasteners.
4. Slide the shock absorber out of the **upper** shock frame bracket.
5. Inspect the shock absorber mounting brackets and hardware for damage or wear. Replace if necessary. Refer to Preventive Maintenance section of this publication.

FIGURE 8-3



ASSEMBLY

1. Install the upper shock absorber mounting bracket (if removed).
2. Install the shock absorber into the upper shock bracket.
3. Install the upper shock absorber mounting fasteners.
4. Slide the lower shock absorber mount into the bottom cap.
5. Install the lower shock absorber mounting fasteners and height control valve linkage bracket (if removed).
6. Tighten the upper shock absorber mounting locknut to 188 ± 12 foot pounds torque, see Figure 8-3.
7. Tighten the lower shock absorber mounting locknut to 213 ± 12 foot pounds torque, see Figure 8-3.
8. Verify proper ride height. Refer to the Alignment & Adjustments section of this publication.
9. 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 ARE 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 TRAAX ROD torque rod assemblies are not re-bushable. The entire torque rod assembly must be replaced. This feature provides superior bushing retention in the torque rod end hub.

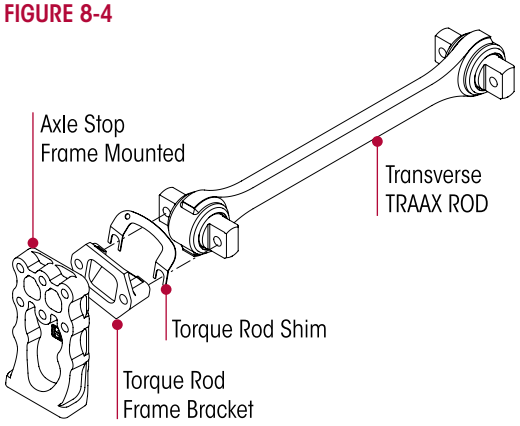
DISASSEMBLY

1. Chock the wheels of the vehicle.

SERVICE HINT Note the quantity and location of shims, see Figure 8-4, removed to maintain the lateral alignment of the axle during assembly. See Alignment & Adjustments section of this publication.

2. Remove and discard the torque rod mounting fasteners and shims (if equipped) as per the vehicle manufacturer's instructions.
3. Remove the transverse torque rod.
4. Inspect the mounting surfaces for any wear or damage. Repair or replace as necessary.

FIGURE 8-4



ASSEMBLY

1. Install the transverse torque rod.
2. Install the mounting fasteners (supplied by vehicle manufacturer) and any shims with the same quantity and location as prior to removal to maintain lateral alignment.

NOTE Hendrickson recommends using Grade 8 bolts and Grade C locknuts for all torque rod attachments.

3. Prior to tightening, ensure that the vehicle is at the proper ride height.
4. Tighten all fasteners to the vehicle manufacturer's torque specifications.
5. Check the lateral alignment. If not within vehicle manufacturer's specified range, a lateral alignment is necessary. See Lateral Alignment in the Alignment & Adjustments section of this publication.
6. Remove the wheel chocks.

LONGITUDINAL TORQUE ROD

NOTE Torque rod assemblies equipped on the PRIMAAX EX suspension for Mack HDT vehicles have curled end hubs and are not re-bushable. The entire torque rod assembly must be replaced. This feature provides superior bushing retention in the torque rod end hub.

DISASSEMBLY

1. Chock the wheels of the vehicle.

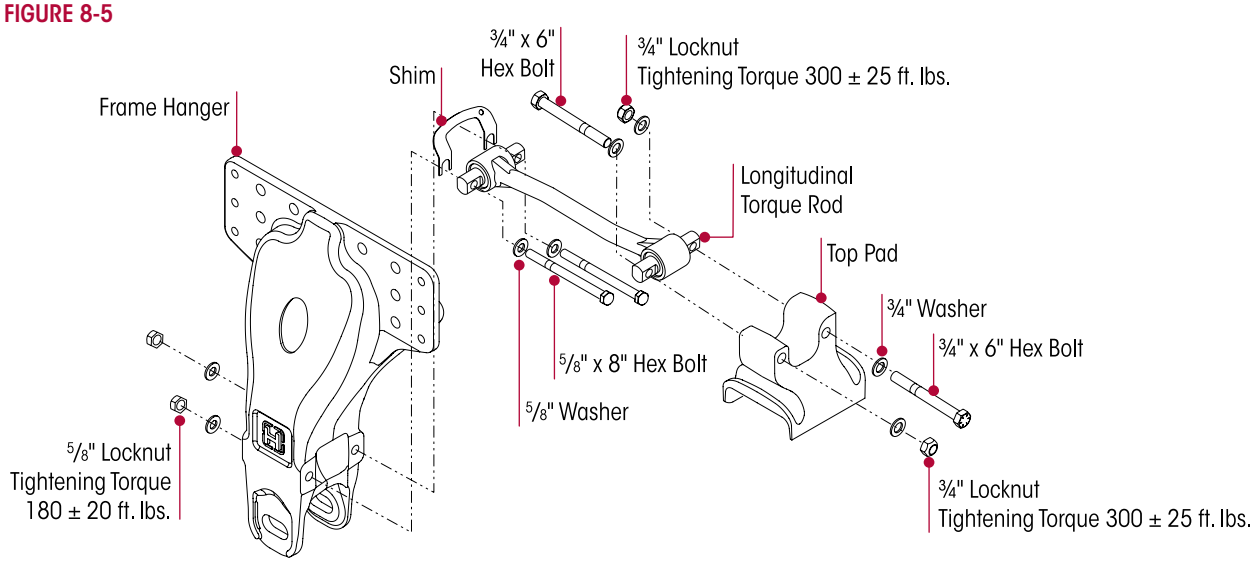
SERVICE HINT Note the quantity of shims removed to maintain the correct pinion angle of the axle at assembly. See Alignment & Adjustments section of this publication.

2. Remove and discard the fasteners and shims (if equipped) that connect the longitudinal torque rod to frame hanger, see Figure 8-5.
3. Remove and discard the fasteners that connect the longitudinal torque rod to top pad, see Figure 8-5.
4. Remove the longitudinal torque rod.
5. Inspect the mounting surfaces for any wear or damage, replace if necessary.

ASSEMBLY

1. Install the longitudinal torque rod.
2. Install the fasteners and any shims that were removed, see Figure 8-5.

FIGURE 8-5



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

NOTE It is mandatory to have the vehicle at proper ride height prior to tightening the longitudinal torque rod locknuts to torque specifications. Refer to Ride Height Inspection in the Alignment & Adjustments section of this publication.

3. Tighten the ¾" longitudinal torque rod to top pad fasteners to 300 ± 25 foot pounds torque.
4. Tighten the ⅝" longitudinal torque rod to frame hanger fasteners to 180 ± 20 foot pounds torque.
5. When assembly is complete check the drive axle pinion angles, see the Alignment & Adjustments section of this publication.
6. Remove the wheel chocks.

U-BEAM ASSEMBLY

DISASSEMBLY

1. Chock the front wheels.
2. Support the frame at ride height with safety stands.
3. Raise and support the axle being serviced with safety stands.
4. Remove the wheel assembly per the vehicle manufacturer's instructions.
5. Disconnect the linkage assemblies from the height control valve arms.

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

⚠ WARNING SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT IN SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

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. Lower the height control valve arm(s) to exhaust the air in the air springs and deflate the rear suspension.

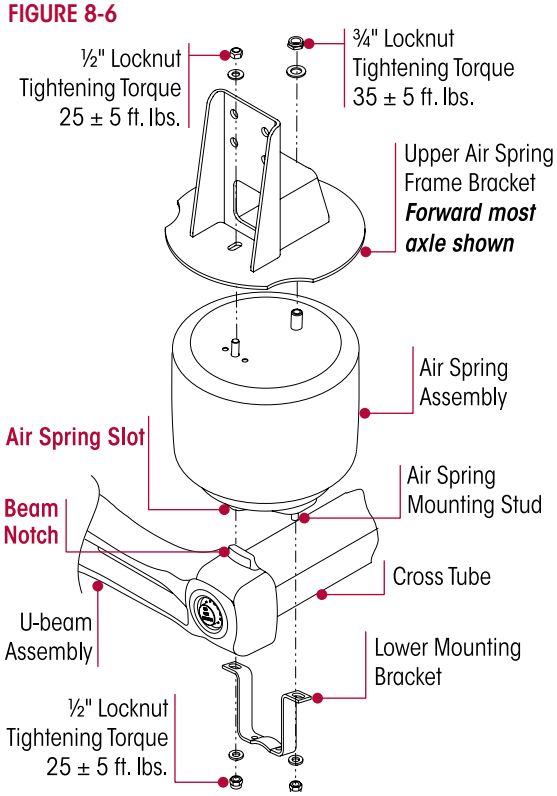
8. Remove the air line from the air spring.

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.

9. Lubricate the lower mounting fasteners of the air springs with penetrating oil. This will help prevent the air spring mounting studs from breaking during the removal process.
10. Remove and discard the lower mounting fasteners from the air springs using **HAND TOOLS** only.
11. Remove both the lower air spring mounting brackets to disconnect the air springs from the cross tube, see Figure 8-6.

FIGURE 8-6



WARNING

USE ONLY A FLOOR JACK EQUIPPED WITH A FOUR INCH CONTACT PLATE TO SUPPORT THE U-BEAM ASSEMBLY AT THE CROSS TUBE TO FACILITATE SAFE LOWERING AND RAISING OF THE U-BEAM ASSEMBLY. DO NOT USE A BOTTLE JACK, WHICH DOES NOT HAVE ENOUGH CONTACT AREA AND CAN BE UNSTABLE. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE OR RESULT IN PERSONAL INJURY

12. Install a floor jack with a 4" contact plate to support the U-beam assembly at the cross tube.

SERVICE HINT

Each frame hanger will have a pair of QUIK-ALIGN collars. Note which type of QUIK-ALIGN collar is removed from which frame hanger location to facilitate the assemble process. Any eccentric (with the square drive feature, see Figure 8-7) QUIK-ALIGN collar should be mounted on the outboard side of the frame hanger. Axle thrust angles can only be corrected on frame hangers equipped with eccentric QUIK-ALIGN collars.

13. Mark the position of the QUIK-ALIGN **square drive** in relation to the frame hanger and note the **orientation of the fasteners** prior to loosening the QUIK-ALIGN connection. This will facilitate the axle alignment process after the repair is complete, see Figure 8-7.
14. Loosen both the QUIK-ALIGN fasteners, **DO NOT** remove at this time.
15. Remove and discard D-pin fasteners on both sides of the suspension.

SERVICE HINT

It may be necessary to rotate the QUIK-ALIGN eccentric collars to allow the full disengagement of the D-pins into the bottom caps.

SERVICE HINT

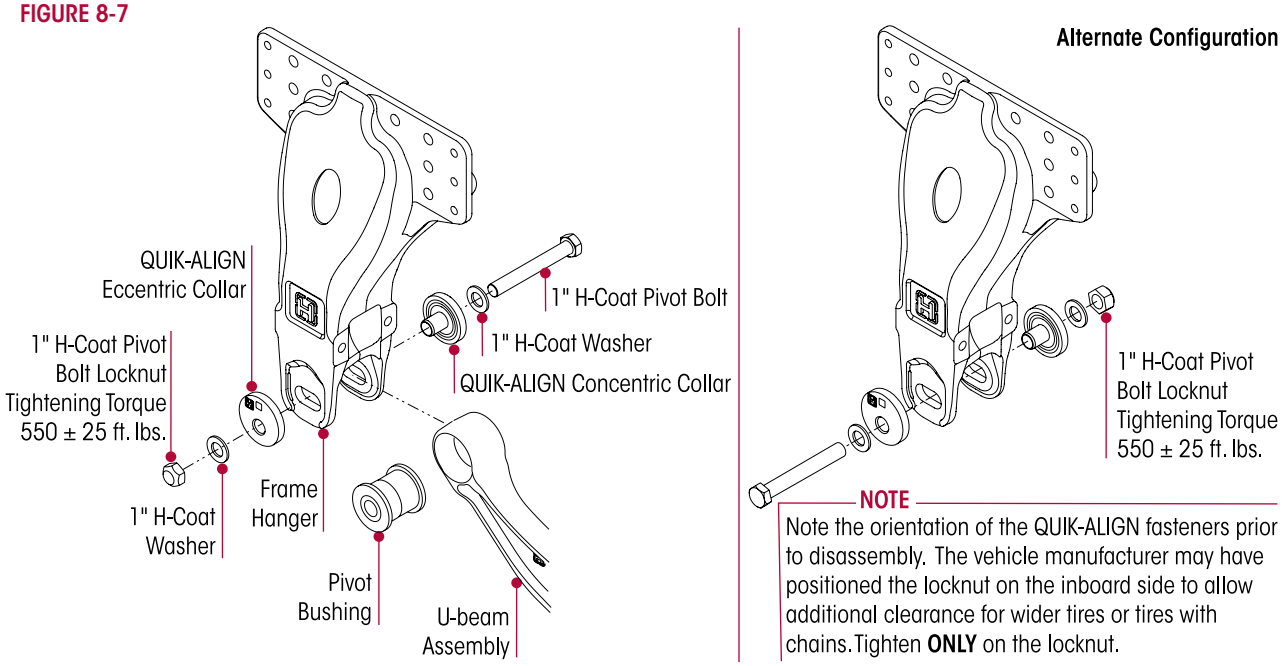
It may be necessary to raise the front of the differential to allow the D-pins to disengage the bottom caps.

WARNING

THE WEIGHT OF THE U-BEAM ASSEMBLY IS APPROXIMATELY 225 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

16. Lower the floor jack and pivot the U-beam assembly down.
17. Remove and discard the QUIK-ALIGN fasteners.
18. Remove QUIK-ALIGN eccentric and concentric collars.

FIGURE 8-7



NOTE It may be necessary to use a pry bar to push the U-beam assembly out of the frame hangers.

19. Remove the U-beam assembly from the hangers.
20. Remove the U-beam assembly from the vehicle.
21. Inspect the U-beam assembly for any damage or wear and replace as necessary.

ASSEMBLY

1. Clean the QUIK-ALIGN slots in the hangers and collars of any dirt and debris and inspect for any wear or damage. Replace as necessary.
2. Prior to installing the U-beam assembly, verify the clamp group is tightened to the proper torque.

⚠ WARNING THE WEIGHT OF THE U-BEAM ASSEMBLY IS APPROXIMATELY 225 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

3. Install the U-beam assembly into the frame hangers.

⚠ WARNING 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, PERSONAL INJURY, OR PROPERTY DAMAGE.

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

NOTE Use a new QUIK-ALIGN pivot bolt kit (see the Parts List section of this publication) for any axle alignment or disassembly of the QUIK-ALIGN connection. This will help ensure that the proper clamp load is applied to the connection and help prevent the joint to slip in service.

4. Verify the correct QUIK-ALIGN collar (eccentric/concentric) is in the correct location as noted in the disassembly procedure.

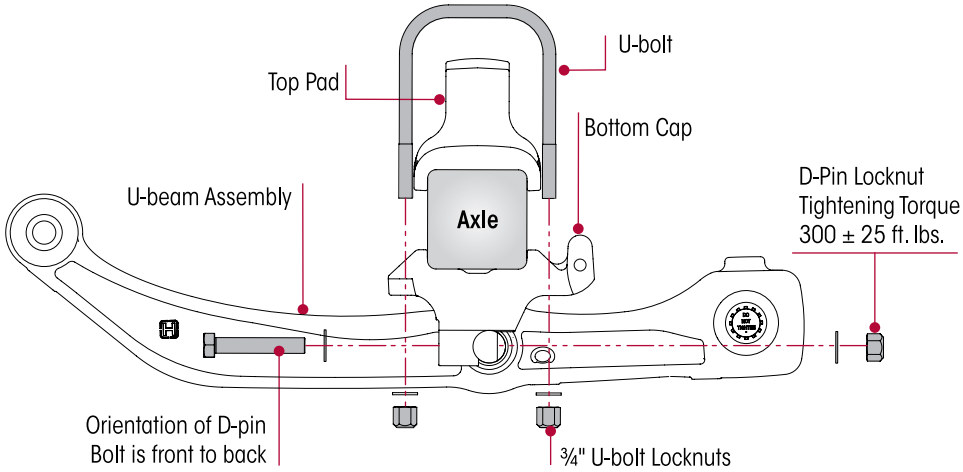
5. Install QUIK-ALIGN connection with new Hendrickson fasteners and snug to about 50-100 foot pounds torque, **DO NOT** tighten at this time. The final torque must be done after the alignment is complete.
6. Position the U-beam assembly on a floor jack.
7. Raise the U-beam assembly until the D-pins engage in the bottom cap.

SERVICE HINT It may be necessary to rotate the QUIK-ALIGN eccentric collars to allow the full engagement of the D-pins into the bottom caps.

SERVICE HINT It may be necessary to raise or lower the front of the differential to allow the D-pins to engage in the bottom cap. Use a drift pin if necessary to align the D-pins with the bottom cap.

8. Install the D-pin fasteners from front to back, see Figure 8-8.

FIGURE 8-8



9. Remove the floor jack supporting the U-beam assembly.
10. Tighten D-Pin fasteners to 300 ± 25 foot pounds torque.
11. Install the air spring between the frame and cross tube, refer to Air Spring in this section.
12. Install the wheel assemblies per the vehicle manufacturer's instructions.
13. Remove the axle safety stands.
14. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
15. Connect the linkage assemblies to the height control valve arms to inflate the suspension.
16. Remove frame safety stands.
17. Remove the wheel chocks.

NOTE Alignment and QUIK-ALIGN final torque are necessary anytime the U-beam assembly is removed.

18. Check the alignment and adjust if necessary. See Alignment & Adjustments section of this publication.
19. Once the correct axle alignment is achieved, use a calibrated torque wrench to tighten the 1" QUIK-ALIGN locknuts to 500 ± 25 foot pounds torque.

D-PIN BUSHING

You will need:

- Hendrickson Tool Part Nos. 66086-204 • 66086-202 (OTC Nos. 4247 • 4246), refer to the Special Tools section of this publication

REMOVAL		✔	✔	✔
INSTALLATION	✔		✔	✔
D-PIN BUSHING	 **575164** Saddle	 **575163** Adapter Pin	 **576421** D-pin Adapter	 **575167** Alignment Tool

DISASSEMBLY

1. Mark the U-beam assembly to show the alignment of the existing D-pin. Install the alignment tool over the D-pin, and place the clamping plate over the alignment tool, see Figure 8-9.
2. Assemble the clamping nuts to the threaded rods.
3. Insert a threaded rod through the **upper** holes in the clamping plate and the head plate. Install a hex nut on the threaded rod, but **DO NOT** tighten at this time.
4. Insert a threaded rod through the **lower** holes in the clamping plate and the head plate. Install a hex nut on the threaded rod, but **DO NOT** tighten at this time.
5. Tighten the clamping nuts to the clamping plate, see Figure 8-10.

FIGURE 8-9

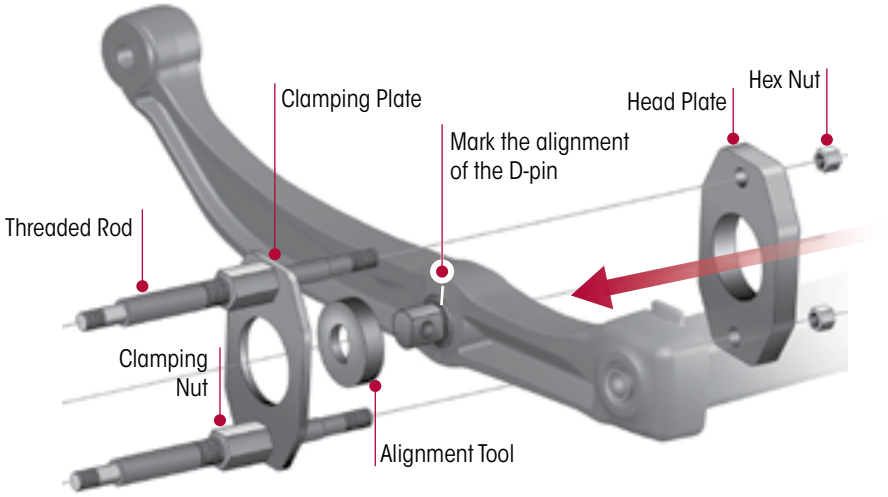
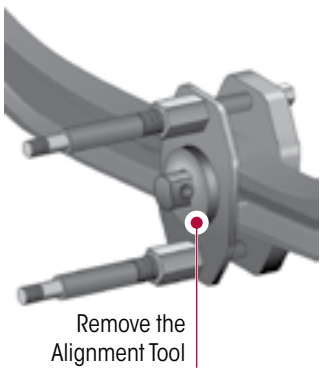


FIGURE 8-10

TOOL ASSEMBLY
After Steps 1-5



6. Ensure the clamping plate and head plate are parallel to each other.
7. Remove the alignment tool.

WARNING

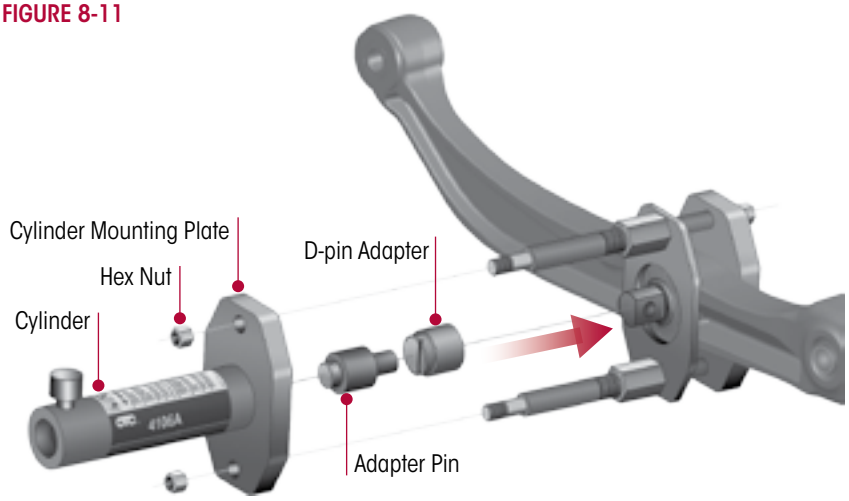
TO HELP PREVENT PERSONAL INJURY, THE CYLINDER MUST BE FULLY THREADED INTO THE CYLINDER MOUNTING PLATE.

8. Thread the cylinder into the cylinder mounting plate, see Figure 8-11.
9. Install the cylinder mounting plate onto the end of the threaded rods. Adjust the clamping nuts as needed to fit the threaded rods through the holes in the cylinder mounting plate. Assemble the hex nuts on the threaded rods. Tighten the hex nuts on both ends of the threaded rods.
10. Place the D-pin adapter over the D-pin.
11. Insert the adapter pin into the head of the cylinder.

WARNING

TO HELP PREVENT PERSONAL INJURY, THE HYDRAULIC PUMP RATING MUST NOT EXCEED 10,000 PSI.

FIGURE 8-11



12. Prepare the hydraulic pump for use by following the manufacturer's instructions provided with the pump regarding hookup, venting, priming, and operation.

WARNING

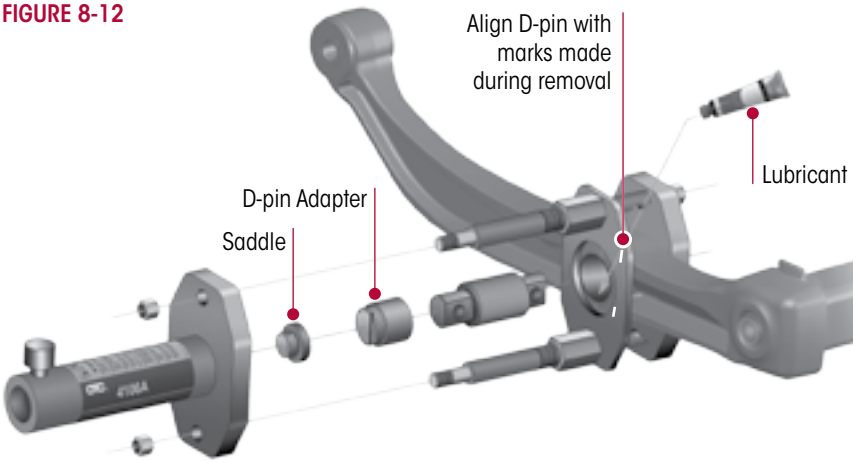
TO HELP PREVENT PERSONAL INJURY STAY CLEAR OF THE HYDRAULIC PUMP, ADJACENT TOOLS, AND THE DIRECTION OF THE HYDRAULIC FORCE WHILE THE D-PIN IS BEING EXTRACTED.

13. Connect the hydraulic hose from the hydraulic pump to the cylinder.
14. Operate the pump to extend the cylinder piston and apply pressure to push the D-pin out of the support beam of the U-beam assembly.

ASSEMBLY

1. Clean and thoroughly lubricate the entire surface of the inside diameter of the U-beam assembly d-pin hub, see Figure 8-12.

FIGURE 8-12



2. Insert the saddle tool into the head of the cylinder.
3. Assemble the D-pin and the D-pin adapter as shown. Align the D-pin adapter with the alignment marks made during the removal procedure.
4. Operate the pump to extend the cylinder piston and apply enough pressure to hold the tool and components. Check the alignment of the D-pin. The centerline of the D-pin must be aligned with the centerline of the inside diameter of the U-beam assembly D-pin hub.

WARNING

TO HELP PREVENT PERSONAL INJURY STAY CLEAR OF THE HYDRAULIC PUMP, ADJACENT TOOLS, AND THE DIRECTION OF THE HYDRAULIC FORCE WHILE THE D-PIN IS BEING EXTRACTED.

5. Operate the pump to apply pressure to install the D-pin completely into the support beam of the U-beam assembly.

QUIK-ALIGN PIVOT BUSHING

You will need:

- **Method A:** Hendrickson Tool Part Nos. 66086-202 • 66086-204 (OTC Nos. 4246 • 4247) and **Method B:** 66086-203L, refer to the Special Tools section in this publication

METHOD A – Using Tool Nos. 66086-202 • 66086-204

REMOVAL	✔	✔	✔	✔
INSTALLATION	✔		✔	✔
QUIK-ALIGN BUSHING	 **575163** Adapter Pin	 **576421** D-pin Adapter	 **575165** Bushing Support	 **575167** Alignment Tool

DISASSEMBLY

1. Insert the adapter pin through the alignment tool and into the pivot bushing hole as shown in Figure 8-13.
2. Insert the bushing support over the pivot bushing.
3. Assemble the clamping nuts to the threaded rods.
4. Insert a threaded rod through the upper holes in the clamping plate and the head plate while positioning the head plate over the bushing support. Install a hex nut on the threaded rod, but **DO NOT** tighten at this time.
5. Insert a threaded rod through the lower holes in the clamping plate and the head plate. Install a hex nut on the threaded rod, but **DO NOT** tighten at this time.
6. Tighten the clamping nuts to the clamping plate, see Figure 8-14.
7. Remove the alignment tool and adapter pin.

FIGURE 8-13

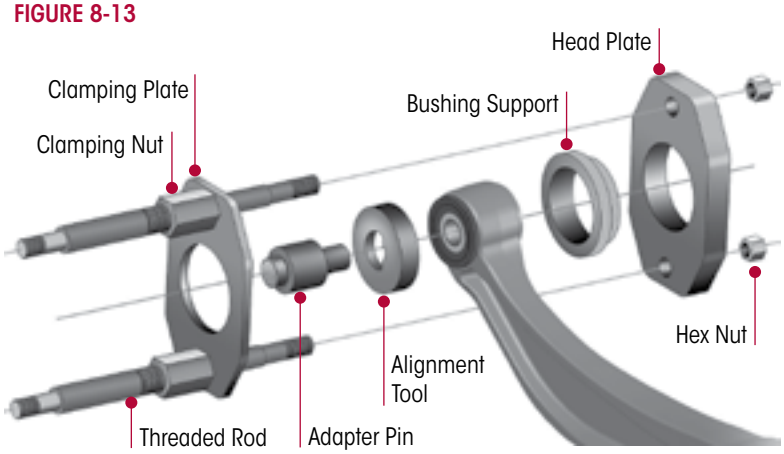
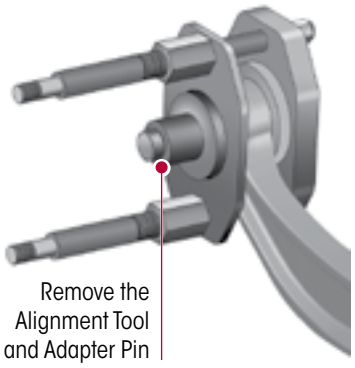


FIGURE 8-14
Tool assembly after Steps 1-6

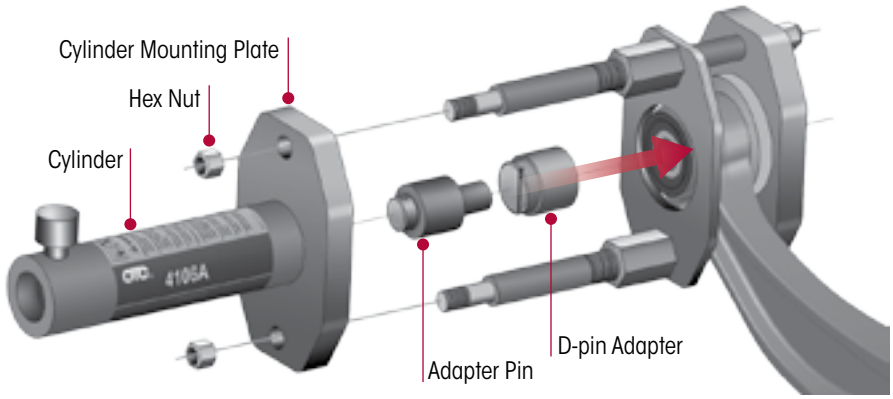


WARNING

TO HELP PREVENT PERSONAL INJURY, THE CYLINDER MUST BE FULLY THREADED INTO THE CYLINDER MOUNTING PLATE.

8. Thread the cylinder into the cylinder mounting plate, see Figure 8-15.
9. Install the cylinder mounting plate onto the end of the threaded rods. Adjust the clamping nuts as needed to fit the threaded rods through the holes in the cylinder mounting plate. Assemble the hex nuts on the threaded rods. Tighten the hex nuts on both ends of the threaded rods.
10. Hold the D-pin adapter over the pivot bushing until contact is made with the adapter pin.
11. Insert the adapter pin into the head of the cylinder.

FIGURE 8-15



WARNING

TO HELP PREVENT PERSONAL INJURY, THE HYDRAULIC PUMP RATING MUST NOT EXCEED 10,000 PSI.

12. Prepare the hydraulic pump for use by following the instructions provided with the pump regarding hookup, venting, priming, and operation.

WARNING

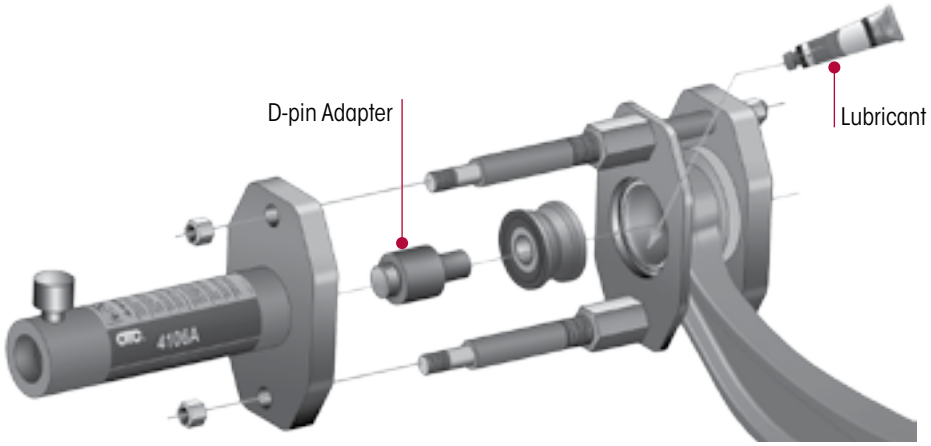
TO HELP PREVENT PERSONAL INJURY STAY CLEAR OF THE HYDRAULIC PUMP, ADJACENT TOOLS, AND THE DIRECTION OF THE HYDRAULIC FORCE WHILE THE D-PIN IS BEING EXTRACTED.

13. Connect the hydraulic hose from the hydraulic pump to the cylinder.
14. Operate the pump to extend the cylinder piston and apply pressure to push the pivot bushing out of the support beam of the U-beam assembly.

ASSEMBLY

1. Clean and thoroughly lubricate the entire surface of the inside diameter of the support beam of the U-beam assembly, see Figure 8-16.

FIGURE 8-16



2. Insert the adapter pin into the head of the cylinder.
3. Place the pivot bushing on the end of the adapter pin as shown.
4. Operate the pump to extend the cylinder piston and apply enough pressure to hold the tool and components. Check the alignment of the pivot bushing.

WARNING

TO HELP PREVENT PERSONAL INJURY STAY CLEAR OF THE HYDRAULIC PUMP, ADJACENT TOOLS, AND THE DIRECTION OF THE HYDRAULIC FORCE WHILE THE PIVOT BUSHING IS BEING EXTRACTED.

5. Operate the pump to apply pressure to install the pivot bushing completely into the support beam of the U-beam assembly.

METHOD B – Using Tool No. 66086-203L

SERVICE HINT

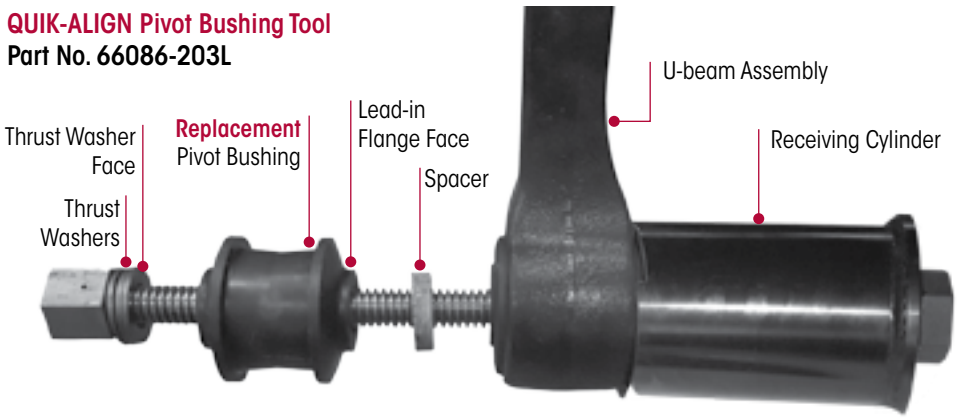
Use the QUIK-ALIGN Pivot Bushing Tool No. 66086-203L to help with the installation and removal of QUIK-ALIGN pivot bushings. The tool allows the existing pivot bushing to be pushed out from the U-beam assembly into the receiving cylinder. Then follow a similar procedure to push in the replacement pivot bushing, see Figure 8-17.

FIGURE 8-17

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



WARNING

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

1. Remove the U-beam assembly from the vehicle per the U-beam Disassembly procedure in this section.
2. After removal, place U-beam assembly on the floor or suitable work area.

PIVOT BUSHING REMOVAL

NOTE

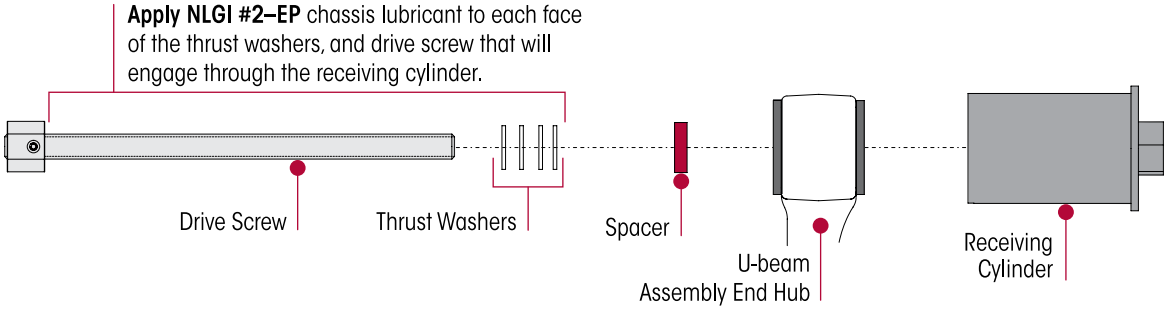
When replacing a pivot bushing it is recommended to replace both pivot bushings on the U-beam assembly.

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

- QUIK-ALIGN pivot bushing service tool (Part No. 66086-203L), see Figure 8-17.
- ¾" Impact wrench (impact gun), some ½" impact wrenches may work.

1. Install the pivot bushing tool as shown in Figure 8-18.
2. Remove and discard thrust washers (if equipped) and any loose rubber or debris from the existing pivot bushing.
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 8-18.

FIGURE 8-18



4. Snug the threaded drive screw to hold the thrust washers, spacer, U-beam assembly with the existing pivot bushing and the receiving cylinder in place, see Figure 8-19.
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 8-20.

FIGURE 8-19

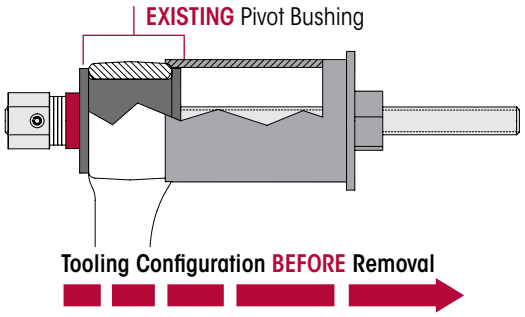
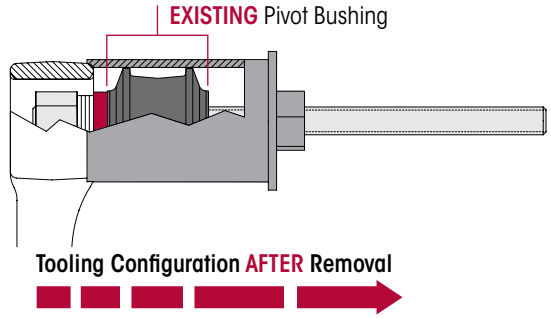


FIGURE 8-20



6. Remove and discard pivot bushing.
7. Repeat Steps 1 through 6 for the other side of the U-beam assembly, as recommended.

END HUB INSPECTION

Inspect the inner bore of the U-beam assembly end hub and remove any loose debris or rubber residue from the bushing mating surface.

PIVOT BUSHING INSTALLATION

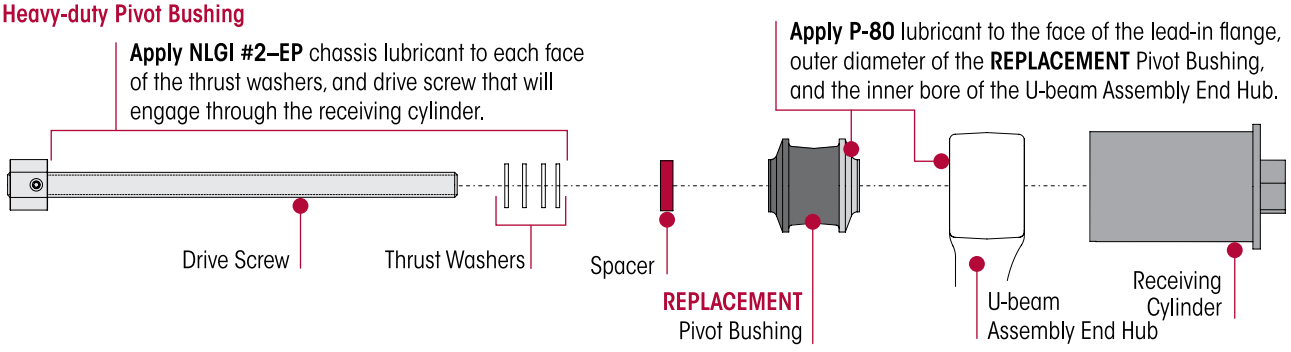
1. Clean the inner diameter of the U-beam assembly end hub with brake cleaner.
2. Apply NLGI #2–EP (Extreme Pressure) chassis lubricant to each face of the thrust washers and to the drive screw that will engage through the receiving cylinder, see Figure 8-21.

NOTE

DO NOT use petroleum or soap based 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, the outer diameter of the replacement pivot bushing, and the inner diameter of the U-beam assembly end hub, see Figure 8-21.

FIGURE 8-21
Heavy-duty Pivot Bushing



4. Snug the threaded drive screw to hold the thrust washers, spacer, pivot bushing, and the U-beam assembly with the receiving cylinder in place, see Figure 8-22.
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 8-23.
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 beam end hub, see Figure 8-24. Center the pivot bushing to help prevent bulging and bushing preload. This is known as the "Bump Back" procedure.

FIGURE 8-22

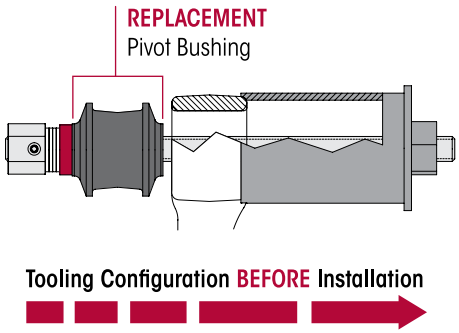


FIGURE 8-23

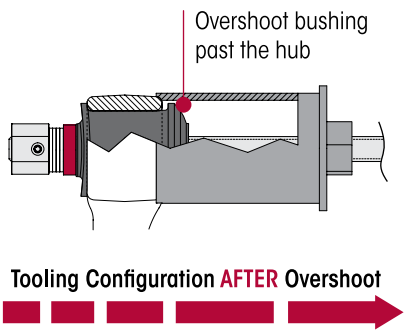
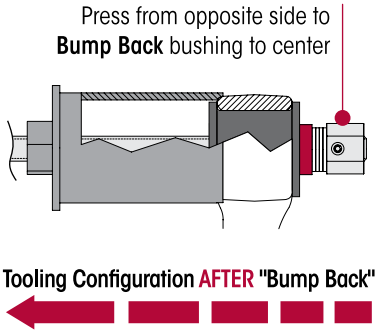


FIGURE 8-24



7. Repeat for the other side of the U-beam assembly, as recommended:
8. Allow the lubricant four (4) hours to dissipate before fully operating the vehicle.
9. Install the U-beam assembly, follow the installation procedure as detailed in this section.

TOP PAD

DISASSEMBLY

1. Chock the front wheels.
2. Support the frame at ride height with safety stands.
3. Raise and support the axle being serviced.
4. Remove the wheel assembly per the vehicle manufacturer's instructions.
5. Disconnect the height control valve arm(s) from the linkage assembly.

WARNING

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

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

WARNING

SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME AIR PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

7. Lower the height control valve arm(s) to exhaust the air in the air springs and deflate the rear suspension.

SERVICE HINT

Note the quantity of shims removed to maintain the correct pinion angle of the axle at assembly. Refer to the Alignment & Adjustments section of this publication.

8. Remove and discard the fasteners from the longitudinal torque rod to top pad joint. Remove the shims (if equipped), see Figure 8-25.

NOTE

Due to certain pinion angle configurations, the removal of the D-pin bolts may be necessary to access the U-bolt locknuts.

WARNING

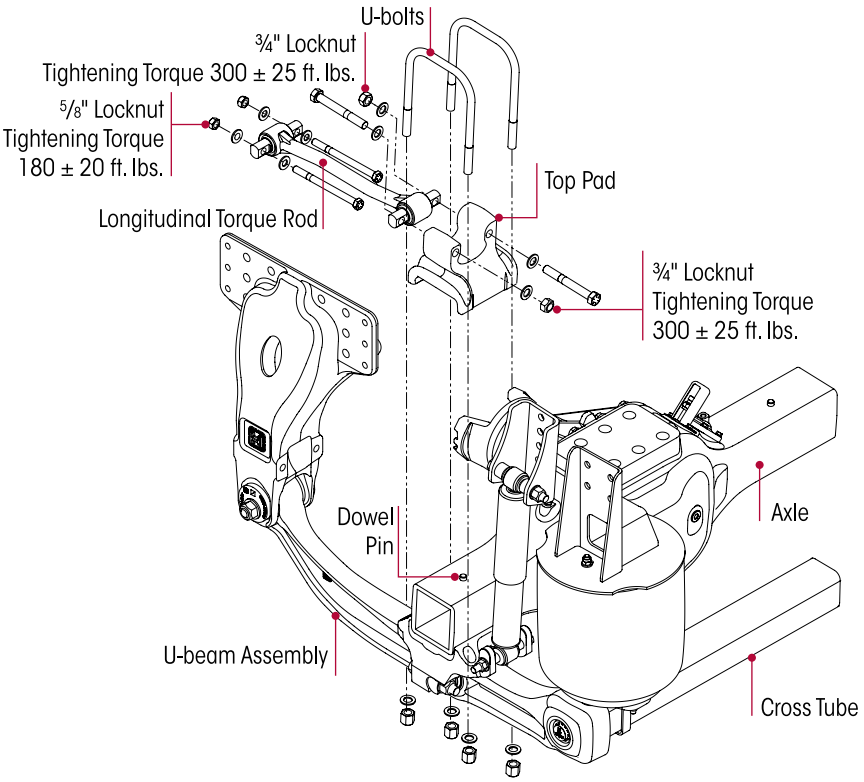
USE ONLY A FLOOR JACK EQUIPPED WITH A FOUR INCH CONTACT PLATE TO SUPPORT THE U-BEAM ASSEMBLY AT THE CROSS TUBE TO FACILITATE SAFE LOWERING AND RAISING OF THE U-BEAM ASSEMBLY. DO NOT USE A BOTTLE JACK, WHICH DOES NOT HAVE ENOUGH CONTACT AREA AND CAN BE UNSTABLE. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE OR RESULT IN PERSONAL INJURY.

WARNING

THE WEIGHT OF THE U-BEAM ASSEMBLY IS APPROXIMATELY 225 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

9. Support the U-beam assembly with a floor jack that is equipped with a 4" contact plate.
10. Remove and discard the U-bolt fasteners from the clamp group.
11. Remove the top pad.
12. Inspect the top pad and the axle housing for any cracks or damage. Replace if necessary.

FIGURE 8-25



ASSEMBLY

1. Install the top pad on the top of the axle engaging the dowel pin. Care should be taken to ensure the taller ear of the top pad is mounted to the inboard side of the suspension, see Figure 8-26.

NOTE Current Hendrickson Truck Suspension Systems U-bolt locknuts for the PRIMAAX EX suspension are ¾"-16 Grade C and are phosphate and oil coated.

FIGURE 8-26

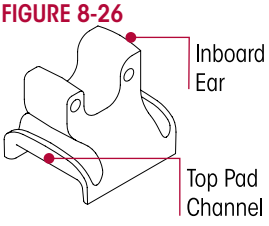
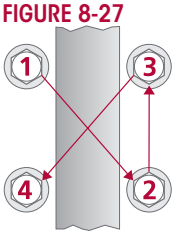
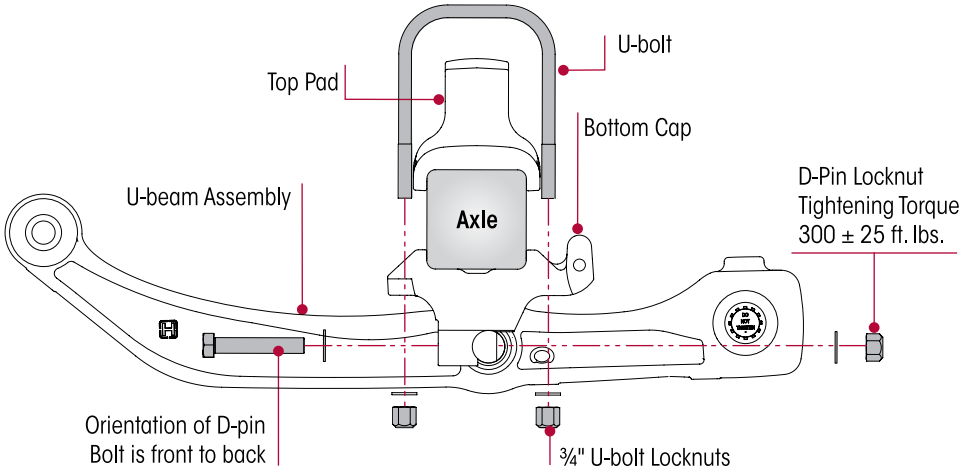


FIGURE 8-27



2. Install the new U-bolts and fasteners.
3. Verify that the U-bolts are seated properly in the top pad channels, see Figure 8-26.
4. Tighten the U-bolt locknuts evenly in 50 foot pound increments in the proper pattern to achieve uniform bolt tension, see Figure 8-27.
5. Rap the top of the U-bolts with a dead blow mallet, and retighten to the proper torque. **DO NOT** exceed specified torque on U-bolt locknuts. Tighten the ¾" locknuts to 375 ± 25 foot pounds torque.
6. Tighten the D-Pin fasteners to 300 ± 25 foot pounds torque if loosened or removed during disassembly, see Figure 8-28.
7. Remove the safety stand from the U-beam assembly.
8. Install the fasteners on the longitudinal torque rod, **DO NOT** tighten at this time.

FIGURE 8-28



9. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
10. Connect the linkage assembly to the height control valve arm(s) to inflate the suspension.
11. Remove the frame safety stands.

NOTE It is mandatory to have the vehicle at proper ride height prior to tightening the longitudinal torque rod fasteners to torque specifications.

12. Tighten the longitudinal torque rod fasteners to the required specification, see the Torque Specifications section of this publication.
13. Install wheel assemblies per the vehicle manufacturer's instructions.
14. Remove axle safety stands and lower the axle.
15. Remove the wheel chocks.

BOTTOM CAP

NOTE It is not necessary to loosen the QUIK-ALIGN connection to service the bottom cap therefore alignment is preserved during service. If the QUIK-ALIGN connection is loosened during service, alignment is required after service is completed.

DISASSEMBLY

1. Chock the front wheels.
2. Support the frame at ride height with safety stands.
3. Raise and support the axle being serviced.
4. Remove the wheel assembly per the vehicle manufacturer's instructions.
5. Disconnect the linkage assembly from the height control valve arm(s).

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

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

⚠ WARNING SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME AIR PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

7. Lower the height control valve arm(s) to exhaust the air in the air springs and deflate the rear suspension.
8. Clean and lubricate the lower mounting fasteners of the air springs with penetrating oil. This will help prevent the air spring mounting studs from breaking during the removal process.
9. Remove the lower mounting fasteners from both air springs using **HAND TOOLS** only, refer to Air Spring in this section.

WARNING

USE ONLY A FLOOR JACK EQUIPPED WITH A FOUR INCH CONTACT PLATE TO SUPPORT THE U-BEAM ASSEMBLY AT THE CROSS TUBE TO FACILITATE SAFE LOWERING AND RAISING OF THE U-BEAM ASSEMBLY. DO NOT USE A BOTTLE JACK, WHICH DOES NOT HAVE ENOUGH CONTACT AREA AND CAN BE UNSTABLE. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE OR RESULT IN PERSONAL INJURY.

WARNING

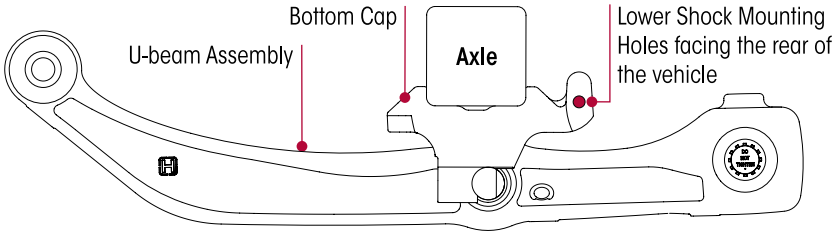
THE WEIGHT OF THE U-BEAM ASSEMBLY IS APPROXIMATELY 225 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

10. Support the U-beam assembly at the cross tube with a floor jack that is equipped with a four inch (4") contact plate.
11. Remove and discard the lower shock absorber mounting fastener from the side being serviced.
12. Raise the front of the differential to facilitate the removal of the D-pins from the bottom caps.
13. Remove and discard the D-pin fasteners from the D-pin / bottom cap assembly on both side of the U-beam assembly.
14. Lower the floor jack to pivot the U-beam assembly down from the bottom caps.
15. Pivot the lower shock mount out of the bottom cap.
16. Remove and discard the clamp group U-bolt fasteners and discard.
17. Remove the bottom cap and inspect for damage or wear. Replace as necessary.

ASSEMBLY

1. Install the top pad (if removed) on the top of the axle engaging the dowel pin. See Top Pad in this section.
2. Install the bottom cap on the axle in the proper direction, with the lower shock mounting holes facing the rear of the vehicle, see Figure 8-29.

FIGURE 8-29



NOTE

Current Hendrickson Truck Suspension Systems U-bolt locknuts for the PRIMAAX EX suspension are ¾" -16 Grade C and are phosphate and oil coated.

3. Install the new U-bolts. Verify that the U-bolts are seated properly in the top pad channels and through the bottom cap.
4. Install the new U-bolt fasteners and hand tighten, **DO NOT** tighten to torque at this time.

CAUTION

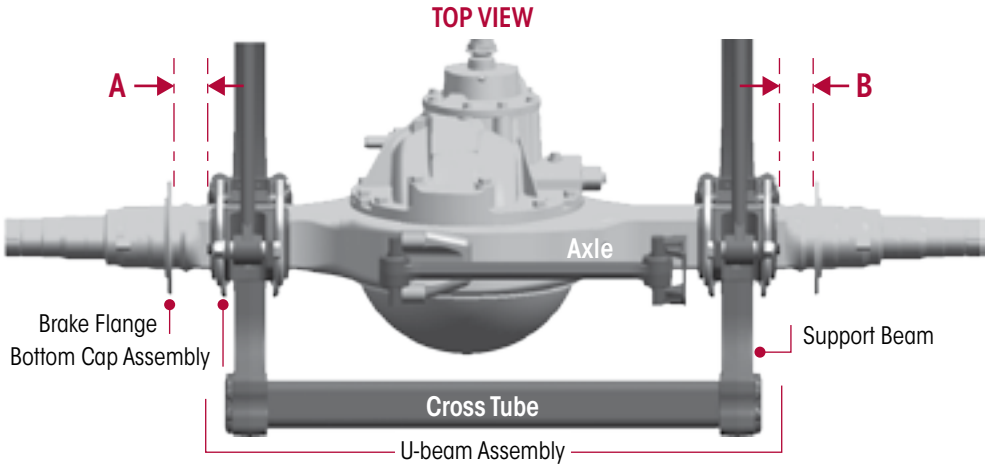
PRIOR TO TIGHTENING THE U-BOLTS TO THE FINAL TORQUE, ENSURE THE U-BEAM ASSEMBLY AND THE BOTTOM CAP ASSEMBLY ARE CENTERED ON THE AXLE (**A** = **B** ± ⅛"), SEE FIGURE 8-30. FAILURE TO DO SO COULD CAUSE PREMATURE COMPONENT WEAR OR CAUSE UNEVEN LOAD DISTRIBUTION.

5. Center the U-beam assembly, and the bottom cap assembly on the axle (**A** = **B** ± ⅛"), see Figure 8-30.

SERVICE HINT

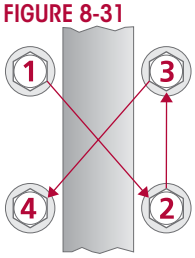
It may be necessary to raise the front of the differential to allow the D-pins to engage the bottom cap.

FIGURE 8-30



6. Raise the U-beam assembly until the D-pins engage in the bottom cap.
7. Install the D-pin fasteners with the bolt heads on the forward side of the bottom cap.
8. Lower the front differential to allow the full engagement of the D-pins into the bottom caps.
9. Prior to tightening the D-pin fasteners, verify the bottom cap is centered over the support beam.
10. Tighten the D-pin fasteners to 300 ± 25 foot pounds torque.

FIGURE 8-31



11. Tighten the U-bolt locknuts evenly in 50 foot pound increments in the proper pattern to achieve uniform bolt tension, see Figure 8-31.
12. Rap the top of the U-bolts with a dead blow mallet, and retighten to the proper torque. **DO NOT** exceed the specified tightening torque specified on the U-bolt locknuts. Tighten the ¾" locknuts to 375 ± 25 foot pounds torque.
13. Pivot the shock back into the lower shock mount and install the lower shock absorber mounting fasteners. Tighten the ⅝" locknuts to 213 ± 12 foot pounds torque. Refer to Shock Absorber in this section.
14. Install the air spring between the frame and the cross tube, refer to Air Spring in this section.
15. Install the wheel assembly per the vehicle manufacturer's instructions.
16. Remove the safety stands and lower the frame of the vehicle.
17. See additional Air Spring Cautions and Warnings in the Important Safety Notice section of this publication prior to deflating or inflating the air system.
18. Connect the linkage assembly to the height control valve arm(s) to inflate the suspension.
19. Remove the wheel chocks.

FRAME HANGER

WARNING

THIS PROCEDURE TO REPLACE A FRAME HANGER, IS DONE WITH THE REMAINING FRAME HANGERS CONNECTED TO THE FRAME AND IT IS ALSO NECESSARY THAT THE U-BEAM ASSEMBLY AND THE LONGITUDINAL TORQUE RODS ARE ATTACHED TO THE REMAINING FRAME HANGERS. FAILURE TO DO SO COULD CAUSE THE AXLE TO SHIFT RESULTING IN POSSIBLE DAMAGE TO COMPONENTS OR PERSONAL INJURY.

SERVICE HINT

Increasing the pinion angle may facilitate the disassembly/assembly of the frame hanger. To increase the pinion angle place a floor jack under the axle pinion and raise slightly. This will increase the pinion angle slightly easing disassembly/assembly.

DISASSEMBLY

1. Chock the front wheels.
2. Support the frame at ride height with safety stands.
3. Raise and support the axle being serviced.
4. Remove the wheel assembly per the vehicle manufacturer's instructions.
5. Disconnect the linkage assembly from the height control valve arm(s).

WARNING

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

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

WARNING

SOME VEHICLE APPLICATIONS, SUCH AS VEHICLES EQUIPPED WITH OUTRIGGERS, RETAIN SOME AIR PRESSURE IN THE AIR SPRINGS AT ALL TIMES. PRIOR TO PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR OF THE SUSPENSION, VERIFY EACH AIR SPRING IS COMPLETELY DEFLATED. FAILURE TO DO SO COULD RESULT SERIOUS PROPERTY DAMAGE AND/OR SEVERE PERSONAL INJURY.

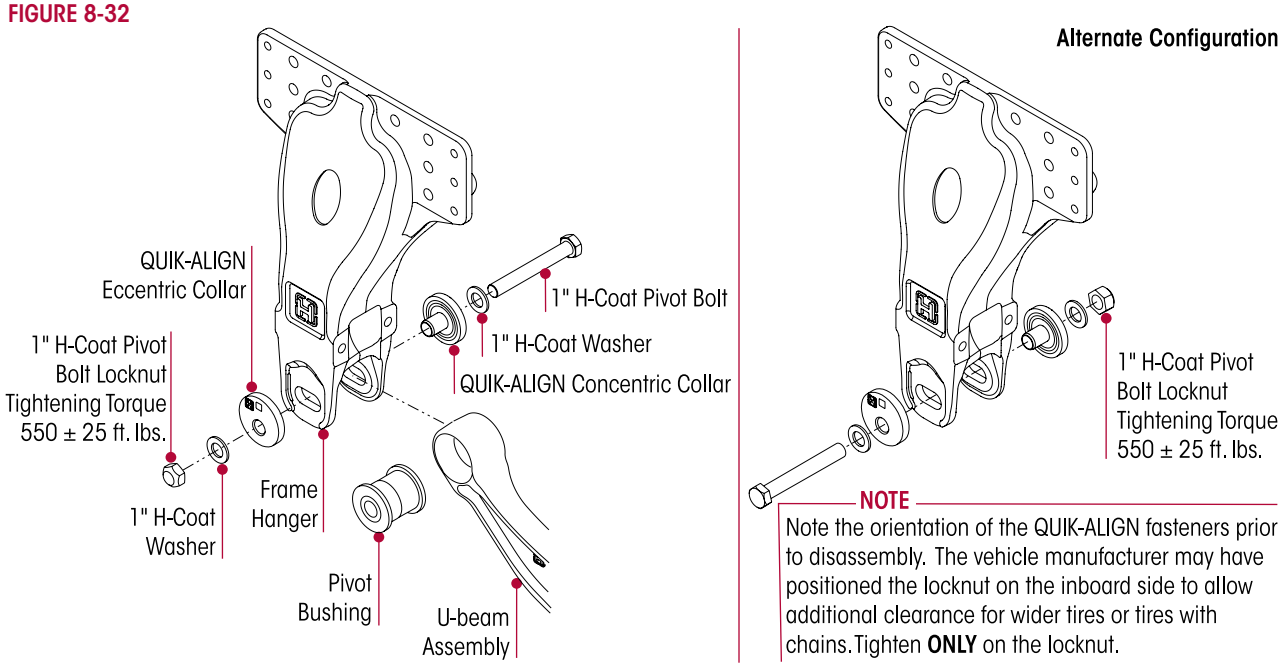
7. Lower the height control valve arm(s) to exhaust the air in the air springs and deflate the rear suspension.

SERVICE HINT

Each frame hanger will have a pair of QUIK-ALIGN collars. Any eccentric (with the square drive feature, see Figure 8-32) QUIK-ALIGN collar should be mounted on the outboard side of the frame hanger. Axle thrust angles can only be corrected on frame hangers equipped with eccentric QUIK-ALIGN collars.

8. Remove and discard QUIK-ALIGN fasteners. Note the QUIK-ALIGN collar and fastener orientation, see Figure 8-32. The collars may be reused if they are not damaged.

FIGURE 8-32



NOTE

Note the orientation of the QUIK-ALIGN fasteners prior to disassembly. The vehicle manufacturer may have positioned the locknut on the inboard side to allow additional clearance for wider tires or tires with chains. Tighten **ONLY** on the locknut.

SERVICE HINT

Note the quantity of longitudinal shims removed to maintain the correct pinion angle of the axle at assembly. See Alignment & Adjustments section of this publication.

a. Remove and discard the longitudinal torque rod fasteners. Remove shim (if equipped) that attach the to the frame hanger.

9. Remove the frame hanger fasteners from the vehicle frame rail per the vehicle manufacturer's specifications.

10. Remove the frame hanger.
11. Inspect the mounting surface for any damage or wear.
12. Inspect the QUIK-ALIGN pivot bushing and torque rod bushings for wear or damage, replace as necessary. Refer to Pivot Bushing in the Preventive Maintenance section of this publication.

ASSEMBLY

1. Slide the new frame hanger over the QUIK-ALIGN bushing.
2. Install the new frame hanger fasteners that attach the to the vehicle frame rail and tighten per the vehicle manufacturer's specifications.

WARNING

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, PERSONAL INJURY, OR PROPERTY DAMAGE.

WARNING

DO NOT ASSEMBLE 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 OF 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 VEHICLE MANUFACTURER'S FASTENER ORIENTATION WHEN PERFORMING ANY MAINTENANCE, SERVICE, OR REPAIR.

NOTE

Use a new QUIK-ALIGN pivot bolt kit (see the Parts List section of this publication) for any axle alignment or disassembly of the QUIK-ALIGN connection. This will help ensure that the proper clamp load is applied to the connection and help prevent the joint to slip in service.

3. Install the new QUIK-ALIGN collars and fasteners that attach to the frame hanger with the eccentric collar on the outboard side of the vehicle, see Figure 8-32. Verify that the nose of each QUIK-ALIGN collar is installed correctly into the pivot bushing sleeve, and the flanged side is flat against the frame hanger face within the alignment guides. Snug QUIK-ALIGN locknuts to 50-100 foot pounds torque, **DO NOT** tighten at this time.
4. Install the longitudinal torque rod mounting fasteners and install any shims that were removed during disassembly. Tighten the fasteners to the proper specification, see Torque Specification section of this publication per model designation.
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. Connect the linkage assembly to the height control valve arm(s) to inflate the suspension properly.
7. Remove frame safety stands.
8. Verify that the axle is in proper alignment, see Alignment & Adjustments section of this publication.

NOTE

It is mandatory to have the vehicle at proper ride height prior to tightening the QUIK-ALIGN locknuts to torque specifications.

9. Once the correct axle alignment is achieved, use a calibrated torque wrench to tighten 1" QUIK-ALIGN locknut to 550 ± 25 foot pounds torque.
10. Verify the correct pinion angle on the axle per the original equipment manufacturer's specifications. Adjust as necessary per the Alignment & Adjustments section of this publication.
11. Remove the wheel chocks.

AXLE STOPS

DISASSEMBLY

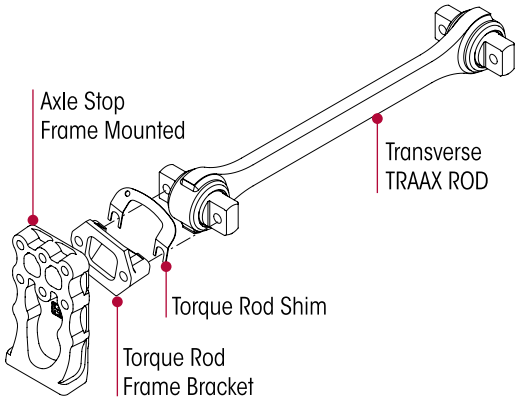
1. Chock the wheels.

SERVICE HINT

The axle stop fasteners secure the transverse torque rod to the inside of the frame rail. It may be necessary to remove and replace one fastener at a time to facilitate axle stop replacement and help prevent the torque rod from shifting.

2. Remove the fasteners connecting the axle stop to the frame per the vehicle manufacturer's instructions.
3. Remove the axle stop, see Figure 8-33.
4. Inspect the frame rail mounting surfaces for any cracks or damage and replace or repair as necessary per the vehicle manufacturer's instructions.

FIGURE 8-33



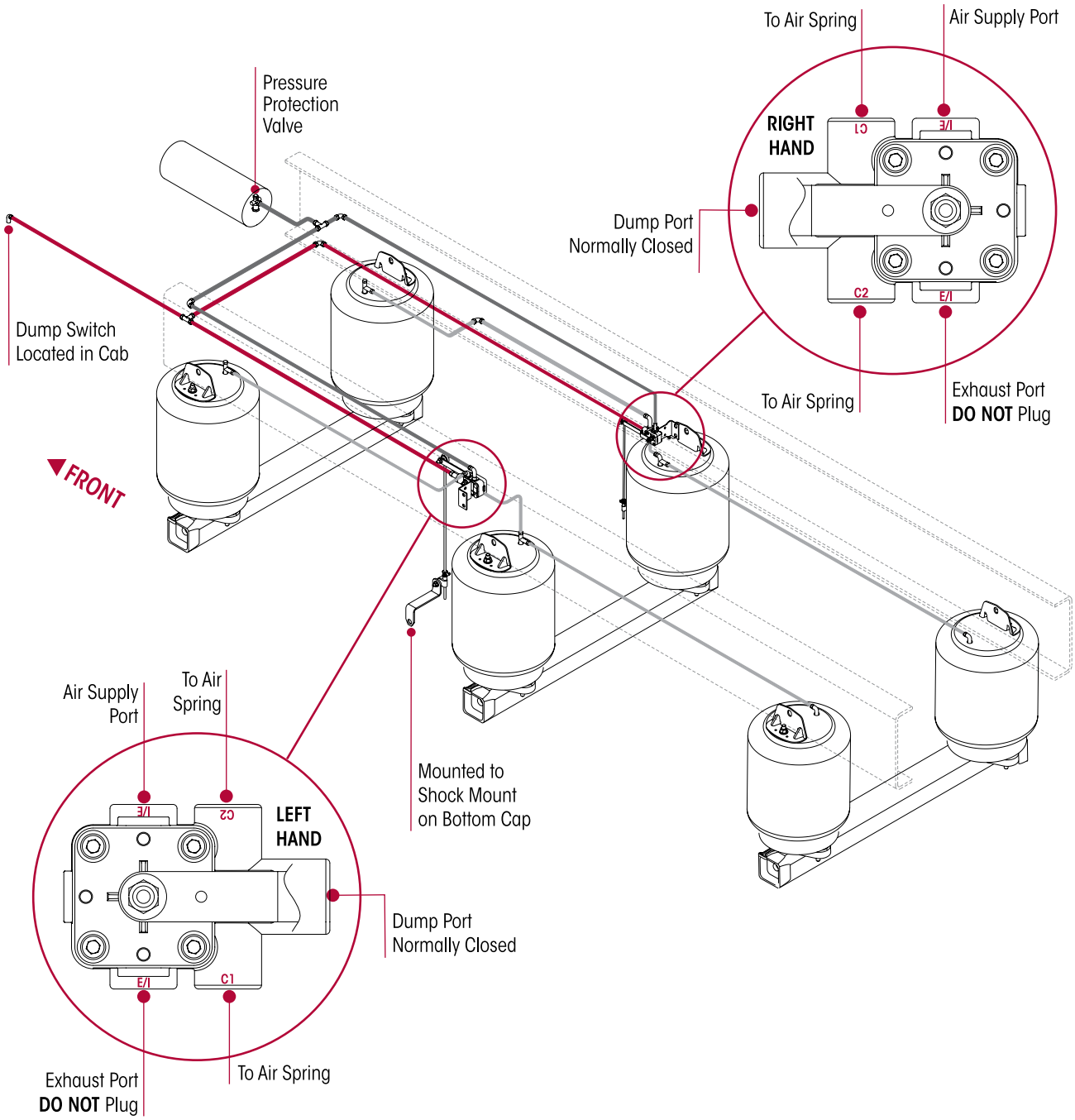
ASSEMBLY

1. Install the axle stop on the outboard side of the frame rail with the torque rod frame bracket on the inboard side.
2. Install and tighten the new mounting fasteners per the vehicle manufacturer's installation and torque specifications.
3. Remove the wheel chocks.

SECTION 9

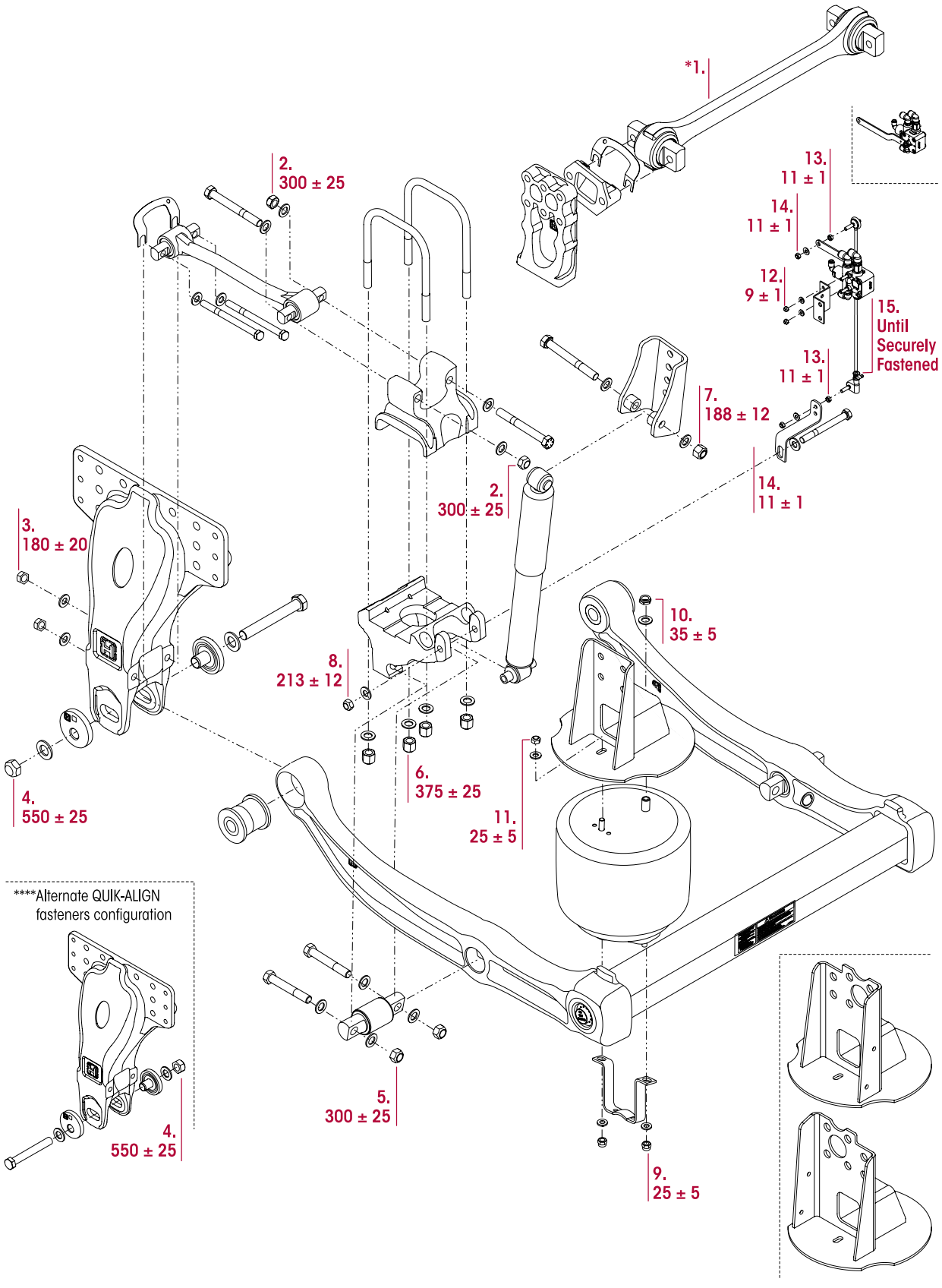
Plumbing Diagram

HENDRICKSON RECOMMENDED PLUMBING DIAGRAM



SECTION 10
Torque Specifications

HENDRICKSON RECOMMENDED
TORQUE VALUES PROVIDED IN FOOT POUNDS



PRIMAAX EX Tridem for Mack HDT Vehicles

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS				
NO	**COMPONENT**	**QUANTITY**	**SIZE**	***TORQUE VALUE (IN FOOT POUNDS)**
	Frame fasteners are furnished and installed by the vehicle manufacturer. Vehicle manufacturer may use an equivalent HUCK fastener at frame mount. See vehicle manufacturer for torque requirements.			
1	Transverse TRAAX ROD			*
2	Longitudinal Torque Rod to Top Pad	12	¾"-16 UNF	**300 ± 25
3	Longitudinal Torque Rod to Frame Hanger	12	⅝"-11 UNC	180 ± 20
4	U-beam Assembly to QUIK-ALIGN Bushing	6	1"-8 UNC	**550 ± 25
5	U-beam Assembly to Center D-pin Bushing	12	⅞"-14 UNF	300 ± 25
6	U-bolt Locknuts	12	¾"-16 UNF	**375 ± 25
7	Upper Shock Absorber Locknuts	6	¾"-10 UNC	188 ± 12
8	Lower Shock Absorber Locknuts	6	⅝"-11 UNC	213 ± 25
9	Air Spring Assembly to Lower Air Spring Mounting Bracket	18	½"-13 UNC	25 ± 5
10	Air Spring Assembly to Upper Air Spring Mounting Bracket	6	¾"-16 UNF	35 ± 5
11	Upper Air Spring Assembly	18	½"-13 UNC	25 ± 5
12	Height Control Valve to Height Control Valve Frame Bracket	6	¼"-20 UNC	9 ± 1
13	Height Control Valve Linkage Jam Nut	6	5⁄16"-18 UNC	11 ± 1
14	Height Control Valve Linkage to HCV and HCV Linkage Bracket	6	5⁄16"-18 UNC	11 ± 1
15	Height Control Valve Linkage Clamp	6		Until Securely Fastened

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

** See Preventive Maintenance section of this publication for re-torque intervals.

SECTION 11
Troubleshooting Guide

PRIMAAX EX Tridem for Mack HDT Vehicles

TROUBLESHOOTING GUIDE		
CONDITION	**POSSIBLE CAUSE**	**CORRECTION**
Suspension has harsh or bumpy ride	Air spring is not inflated to specification or damaged	Repair the air system and check the ride height. See Ride Height in the Alignment & Adjustments section of this publication.
	Ride height set incorrectly	Adjust the ride height to the proper setting. See Ride Height Adjustment in the Alignment & Adjustments section of this publication.
	Suspension is overloaded	Redistribute the load to correct weight.
	Broken support beam	Replace the broken U-beam assembly.
Irregular tire wear	Incorrect tire inflation pressure	Correct the tire pressure per the vehicle manufacturer and tire manufacturer specifications.
	Incorrect alignment	Correct the alignment. Refer to the Alignment & Adjustments section of this publication.
	Worn QUIK-ALIGN bushing	Replace the QUIK-ALIGN bushing.
	Loose QUIK-ALIGN attachment	Replace the QUIK-ALIGN connection, and check vehicle alignment. Adjust if necessary. Check frame hanger for wear around QUIK-ALIGN plates and replace if necessary.
	Worn torque rod bushings	Replace the torque rod bushings as necessary.
Excessive driveline vibration	Incorrect pinion angle(s)	Adjust the pinion angle(s), refer to the vehicle manufacturer for specifications.
	Loose QUIK-ALIGN attachment	Replace the QUIK-ALIGN connection, and check the vehicle alignment. Adjust if necessary. Check the frame hanger for wear around the QUIK-ALIGN collars and replace if necessary.
	Ride height is set incorrectly	Adjust the ride height to proper setting. See Ride Height in the Alignment & Adjustments section of this publication.
	Broken support beam	Replace the U-beam assembly.
Suspension is noisy	Loose QUIK-ALIGN attachment	Replace the QUIK-ALIGN connection, and check the vehicle alignment. Adjust if necessary. Check the frame hanger for wear around the QUIK-ALIGN plates and replace if necessary.
	Loose U-bolts	Tighten the U-bolts to specifications, see Torque Specifications section of this publication.
	Worn bushings	Replace the bushings as necessary.
Vehicle is bouncing excessively	Damaged or leaking shock absorber	Replace the shock absorber.
	Ride height set incorrectly	Adjust the ride height to proper setting. See Ride Height in the Alignment & Adjustments section of this publication.

PRIMAAX EX Tridem for Mack HDT Vehicles

TROUBLESHOOTING GUIDE (continued)		
CONDITION	**POSSIBLE CAUSE**	**CORRECTION**
Vehicle leaning	Air spring not inflated to specification or damaged	Repair the air system and check the ride height. See Ride Height in the Alignment & Adjustments section of this publication.
	Load not centered	Redistribute the load.
	Frame twisted	Straighten the frame per vehicle manufacturer's guidelines.
	Broken support beam	Replace the broken U-beam assembly.
	Axle housing bent or broken	Replace the axle housing per vehicle manufacturer guidelines and align the vehicle.
	Loose U-bolts	Tighten the U-bolts to specification, see Torque Specifications section of this publication.
	Front suspension	Inspect and repair the front suspension.
Suspension will not reach ride height	Suspension is overloaded	Redistribute the load to correct weight.
	Air Spring leaking or damaged	Replace the air spring.
	Leak in the air system	Inspect the air fittings, see Air Fitting in the Preventive Maintenance section of this publication. If necessary, repair air system and check the ride height. See Ride Height in the Alignment & Adjustments section of this publication.
	Air line obstructed or improperly connected	Repair the air system and check the ride height. See Ride Height in the Alignment & Adjustments section of this publication.
	HCV dump port activated	Check the HCV dump port for proper connection and function.
Air springs deflate when parked	Leak in the air system	Inspect the air fittings, see Air Fittings in the Preventive Maintenance section of this publication. If necessary, repair the air system and check the ride height. See Ride Height in the Alignment & Adjustments section of this publication.
	Malfunctioning height control valve	See the test procedure in the Preventive Maintenance section of this publication, replace height control valve as necessary.
Excessive frame slope	Ride height set incorrectly	Adjust the ride height to proper setting. See Ride Height in the Alignment & Adjustments section of this publication. Contact Hendrickson Tech Services.
	Suspension is overloaded	Redistribute the load to correct weight.

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 your truck dealer or Hendrickson at **1.866.755.5968** (toll-free) or **1.630.910.2800** for additional information.*

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