TRUCK AIR SUSPENSIONS

TECHNICAL BULLETIN

No: **97117-109**

Subject: *PRIMAAX GEN II MAINTENANCE MANUAL*

Date: **MARCH 2020** **Revision: P**

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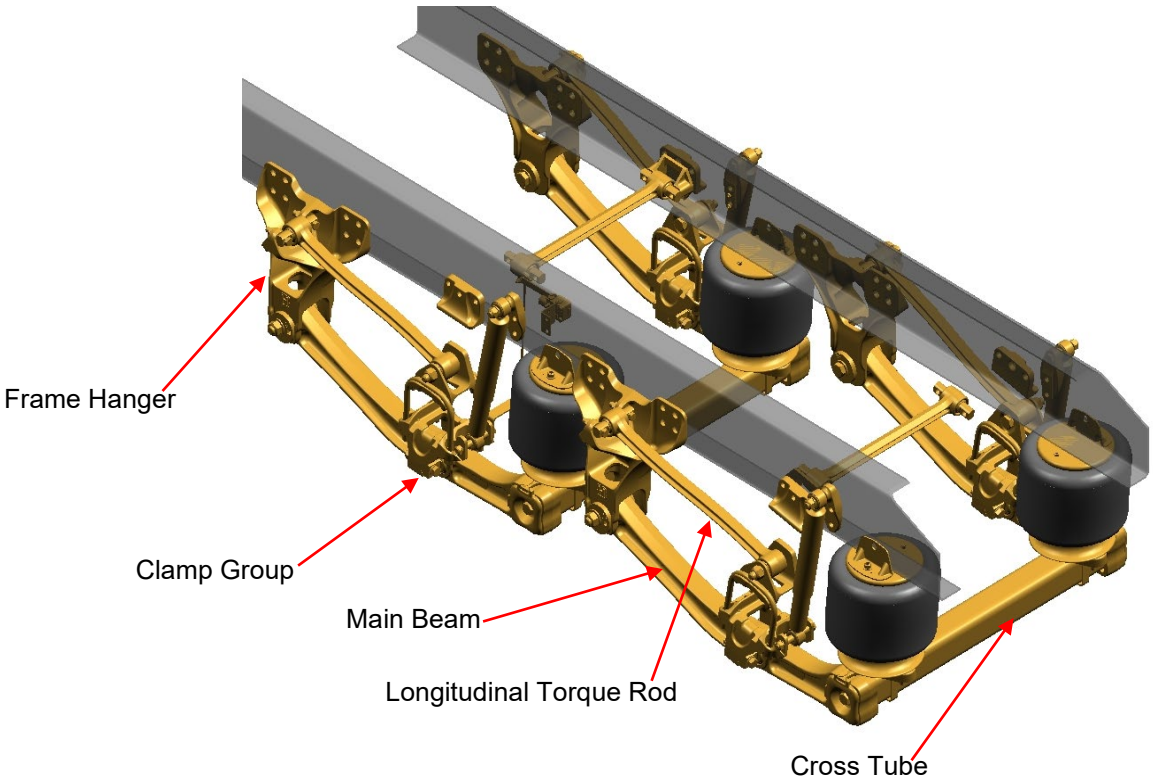
SECTION 1 Introduction

This publication is to acquaint and assist maintenance personnel in the preventative maintenance and rebuild of the PRIMAAX® Generation II suspension systems as supplied from Australia to the Asia Pacific region.

NOTE: Use only Genuine Hendrickson parts for servicing this suspension system. Most Hendrickson parts can be identified by the Hendrickson trademark.

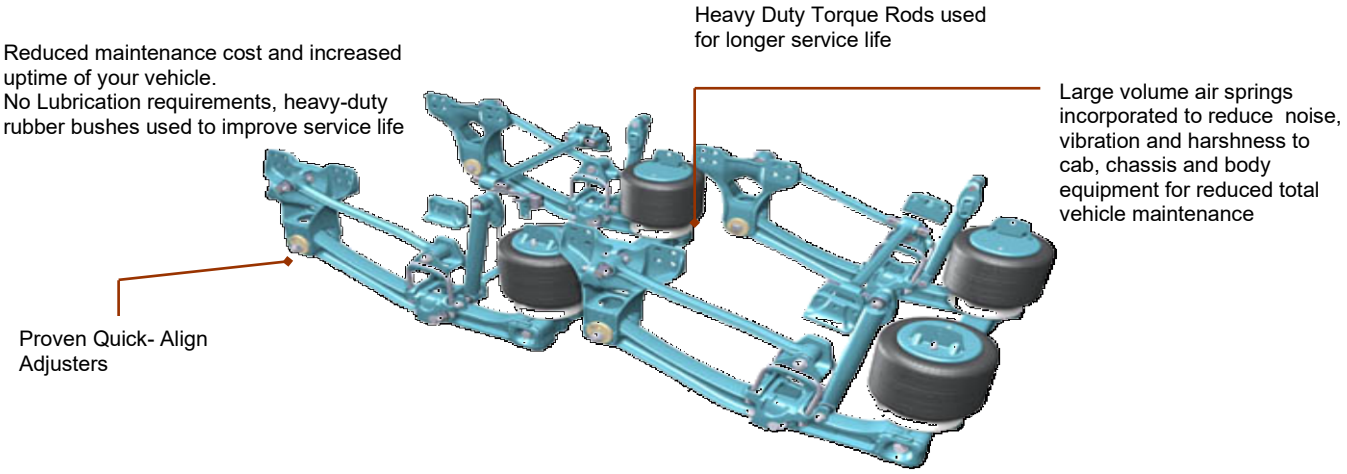
It is important to read and understand the entire Technical Bulletin prior to performing any maintenance, service, repair, or rebuild of the product. The information in this publication contains safety information, product specifications, features, maintenance, service, repair and rebuild instructions for the PRIMAAX® Suspension.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. For more information or to check for the latest version of this manual go to www.hendrickson.com.au



SECTION 2 Product Description

Figure 2-1



	PAX 230	PAX 460	PAX 520
Capacity	10,500 kg	18,000 kg	22,000 kg
Axle Configuration[1]	Single	Tandem	Tandem
GCM Approval[2]	80,000 kg	120,000 kg	140,000 kg
Axle Travel[3]	150 mm	150 mm	150 mm
Ground Clearance	273 mm	273 mm	273 mm
Ride Height[4]	200-273 mm	200-273 mm	200-273 mm
Engine Restrictions	None	None	None

- PRIMAAX® approved for vocational and heavy-haul vehicle applications including, but not limited to:
  Truck, Prime Mover, Tipper, Road Train, Agitator, Refuse, Logging, Fire/Rescue, Speciality and vehicles equipped with outriggers — contact Hendrickson or original equipment manufacturer for additional applications and information.
- Patent pending

Notes:

1. Installed weight includes complete suspension, torque rods, axle and frame brackets, and all hardware. Published weight is for standard PRIMAAX® suspension. Other configurations may change weight.
2. Contact Hendrickson or vehicle manufacturer for applications that may exceed GVW/GCW approval ratings.
3. Axle travel may be limited by vehicle manufacturer; axle stop settings may restrict suspension's articulation.
4. For different options, please contact Hendrickson or Authorised OEM for further information.

SECTION 3 IMPORTANT SAFETY NOTICE

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

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

Failure to follow the safety precautions in this manual can result in personal injury and/or property damage. Carefully read and understand all safety related information within this publication, on all decals and, that 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 minimise the risk of personal injury to service personnel, or possibility of improper service methods which may render it unsafe or damage the vehicle.

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.

NOTE: An operating procedure, practice condition, etc. which is essential to emphasise.

SERVICE HINT: A helpful suggestion which will make the servicing being performed a little easier and/or faster. Also note that some service operations may require the use of special tools designed for specific purposes.

WARNING

FASTENERS

LOOSE OR OVER TORQUED FASTENERS CAN CAUSE SEVERE PERSONAL INJURY, COMPONENT DAMAGE, LOSS OF VEHICLE CONTROL OR PROPERTY DAMAGE, MAINTAIN CORRECT TORQUE VALUE AT ALL TIMES. CHECK TORQUE VALUES ON A REGULAR BASIS AS SPECIFIED, USING A TORQUE WRENCH THAT IS REGULARLY CALIBRATED.

WARNING

LOAD CAPACITY

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

WARNING

MODIFYING COMPONENTS

DO NOT MODIFY OR REWORK PARTS WITHOUT AUTHORISATION FROM HENDRICKSON. DO NOT SUBSTITUTE PARTS OF THE SUSPENSION. USE OF MODIFIED OR REPLACEMENT PARTS NOT AUTHORISED BY HENDRICKSON MAY NOT MEET HENDRICKSON'S SPECIFICATIONS, AND CAN RESULT IN COMPONENT DAMAGE,
LOSS OF VEHICLE CONTROL, AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.
USE ONLY HENDRICKSON AUTHORISED REPLACEMENT PARTS.


WARNING

TORCH/WELDING
DO NOT USE A CUTTING TORCH TO REMOVE ANY ATTACHING FASTENERS. THE USE OF HEAT ON SUSPENSION COMPONENTS MAY ADVERSELY AFFECT THE STRENGTH OF THESE PARTS. EXERCISE EXTREME CARE WHEN HANDLING OR PERFORMING MAINTENANCE IN THE AREA OF THE SUPPORT BEAM.
DO NOT CONNECT ARC WELDING GROUND LINE TO THE SUPPORT BEAM. DO NOT STRIKE AN ARC WITH THE ELECTRODE ON THE SUPPORT BEAM AND AXLE. DO NOT USE HEAT NEAR THE SUPPORT BEAM ASSEMBLY. DO NOT NICK OR GOUGE THE SUPPORT BEAM. SUCH IMPROPER ACTIONS CAN DAMAGE THE SUPPORT BEAM. THE ASSEMBLY COULD FAIL, AND CAUSE POSSIBLE PERSONAL INJURY, LOSS OF VEHICLE CONTROL AND OR PROPERTY DAMAGE.


WARNING

WORK SITE DUMPING
WHEN THE BED OF THE TRUCK/TRAILER IS TILTED, IT IS MANDATORY TO COMPLETELY EXHAUST THE AIR FROM THE SUSPENSION SYSTEM TO HELP PROVIDE STABILITY ON UNEVEN TERRAIN. FAILURE TO DO SO COULD RESULT IN LOSS OF VEHICLE CONTROL, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE.


WARNING

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 JEOPARDISED 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

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


WARNING

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

AIR SPRING INFLATION
DO NOT INFLATE AIR SPRING ASSEMBLY WHEN IT IS UNRESTRICTED. ASSEMBLY MUST BE RESTRICTED BY THE SUSPENSION OR OTHER ADEQUATE STRUCTURE. DO NOT INFLATE BEYOND PRESSURES OF 690 kPa AT DESIGN RIDE HEIGHT.
CONTACT HENDRICKSON TECH SERVICES FOR DETAILS. IMPROPER USE OR OVER INFLATION CAN CAUSE ASSEMBLY TO BURST CAUSING SEVERE PERSONAL INJURY PROPERTY AND/OR COMPONENT DAMAGE.


CAUTION

INFLATE THE SUSPENSION SLOWLY AND MAKE SURE THAT THE RUBBER BLADDER OF THE AIR SPRING INFLATES UNIFORMLY AND IS NOT BINDING. FAILURE TO DO CAN CAUSE DAMAGE TO THE UPPER AIR SPRING MOUNTING BRACKET AND VOID WARRANTY.

WARNING

AIR SPRING DEFLATION

AIR SPRINGS MUST BE DEFLATED PRIOR TO LOOSENING ANY CLAMP GROUP HARDWARE. UNCONSTRAINED AIR SPRINGS WILL VIOLENTLY SHIFT, RESULTING IN PERSONAL INJURY, DEATH OR PROPERTY DAMAGE.
IF THE AIR SPRING IS BEING REMOVED, 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

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 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 MACHINED OR POLISHED PARTS. DOING SO WILL CAUSE DAMAGE TO THE PARTS AND VOID WARRANTY.

WARNING

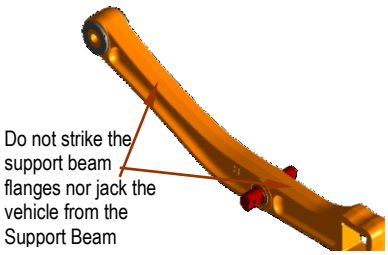
QUIK-ALIGN FASTENERS

DO NOT ASSEMBLE QUIK-ALIGN JOINT WITHOUT THE PROPER FASTENERS. USE ONLY DACROMET PLUS XL PLATED FASTENERS TO SUSTAIN PROPER CLAMP FORCE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.
ENSURE THAT QUIK-ALIGN FASTENER TORQUE VALUES ARE SUSTAINED AS RECOMMENDED IN THE TORQUE REQUIREMENTS SECTION OF THIS PUBLICATION. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL RESULTING IN PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING

SUPPORT BEAM AND CROSS TUBE ASSEMBLY

DO NOT STRIKE SUSPENSION COMPONENTS WITH A HAMMER. HOWEVER, THE SUPPORT BEAM AND CROSS TUBE JOINT REQUIRES BLUNT FORCE ON THE SUPPORT BEAM AT THE JOINT TO DISLODGE THE TWO COMPONENTS.
ALL BLUNT FORCE MUST BE APPLIED FLUSH TO THE THICKEST PART OF THE SUPPORT BEAM AT THE INBOARD CORNER JOINT. FAILURE TO STRIKE THE SUPPORT BEAM SQUARELY MAY RESULT IN COMPONENT DAMAGE, PREMATURE FAILURE AND VOID WARRANTY.



WARNING

CROSS TUBE ASSEMBLY

IMPROPER JACKING METHODS CAN CAUSE STRUCTURAL DAMAGE AND RESULT IN LOSS OF VEHICLE CONTROL, SEVERE PERSONAL INJURY OR DEATH AND WILL VOID HENDRICKSON'S WARRANTY.

- **DO NOT USE THE SUSPENSION SUPPORT BEAM OR THE CROSS TUBE AS A JACKING POINT.**
- REFER TO VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS.

WARNING

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

Figure 3-2

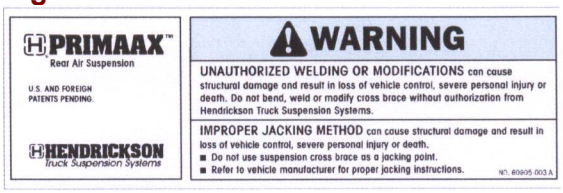
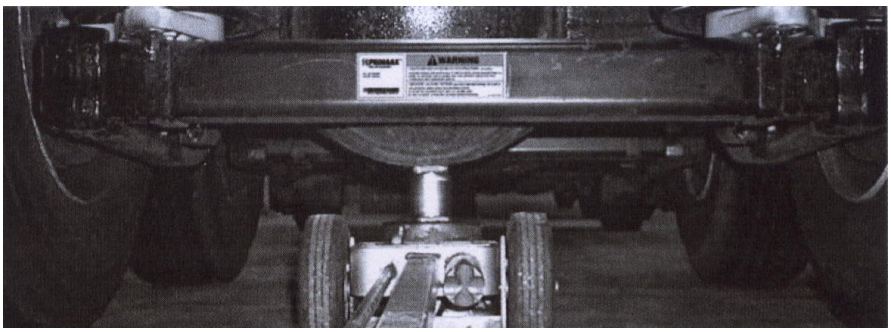


Figure 3-3
IMPROPER JACKING

Figure 3-4
PROPER JACKING AT THE DIFFERENTIAL ASSEMBLY



SECTION 4 Preventative Maintenance

Visual Inspection

A visual inspection of the suspension should be performed every 25,000 km or every six months, whichever comes first. To help ensure all components function to their highest efficiency, any component seen to be loose or damaged should be re-tightened to the specified torque requirements or replaced as necessary.

Interval	Kilometres	Action
Original Equipment Manufacturer Installation	Nil	Torque all fasteners
Pre-Delivery Inspection	Nil	Inspect and check torque of all fasteners
Initial Dealer Service	4,500	Inspect and check torque of all fasteners
25,000 Kilometre Service	25,000	Visual Inspection of Suspension System
50,000 Kilometre Service	50,000	Inspect and check torque of all fasteners

- ***Wear and Damage*** — Inspect all parts of the suspension for wear and damage. Look for bent or cracked parts. Replace all worn or damaged parts.
- ***Air Spring*** — Look for chafing 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. Up to 46 mm of slippage in either direction is acceptable. Replace all worn or damaged parts.
- ***Fasteners***—Look for any loose or damaged fasteners on the entire suspension. If any fasteners are found to be loose or damaged, replace or tighten to the torque value within the specified torque range. See Torque Specification Chart in this publication for recommended torque requirements.
  Use a calibrated torque wrench to torque in a tightening direction. As soon as the fastener starts to move, record the torque then correct the torque to the specified torque range. Replace any worn or damaged fasteners with genuine specified fasteners.
- ***Support Beam Assembly***—Check the overall condition of the support beam for dents, dings, or other damage on the outer edges of the support beam flanges. Check the D-Pin bushes for tearing or extreme bulging. Check for any metal to metal contact in the bushed joints. Replace all worn or damaged parts.
- ***Frame Hanger Bracket*** — Check for any signs of loosening or damage at the Quick-Align connections or longitudinal torque rod connections. Replace all worn or damaged parts.

- ***Cross Tube*** — Check for cracks, damage, metal shavings, or looseness at the beam connection. Replace all worn or damaged parts.
- ***Torque Rods*** — All torque rods must be inspected for looseness, torn or shredded rubber, and for proper torque. If there is metal to metal contact in the bush joint, this is a sign of excessive bush wear and the bush needs to be replaced. Replace all worn or damaged parts.
- ***Shock Absorbers*** — Look for any signs of dents or leakage. Misting is not considered a leak. See Shock Absorber Inspection Procedures.
- ***Tyre Wear*** — Inspect the Tyres for wear patterns that may indicate suspension damage or misalignment. Replace all worn or damaged parts.
- ***Height Control Valve and Air Lines*** — Check ride height is set to specifications. 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. Replace all worn or damaged parts.

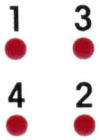
U Bolts

1. U Bolt locknuts must be torqued to specification at pre-delivery.
2. U Bolt locknuts must be re-torqued at 1,500 Km.
3. U Bolt locknuts must be re-torqued at 4,500 Km.
4. Thereafter follow the 1 year/50,000 Kilometre inspection and re-torque interval.

Current Hendrickson Truck Suspension Systems U Bolt locknuts for the PRIMAAX® suspension are 3/4” -16 UNF and are phosphate and oil coated.

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

Figure 6-1



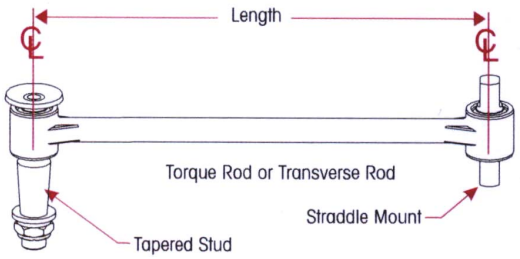
Tighten the U Bolt locknuts evenly to 440 Nm (325 ft/lb) torque in the correct sequence and in increments of 135 Nm (100 ft/lb). As shown in figure 6-1.

Longitudinal and Transverse Torque Rods

All torque rods should be inspected for looseness, torn or shredded rubber, and proper fastener torque checked in accordance to the maintenance schedule.

To inspect for looseness, torn or shredded rubber with the brakes applied, slowly rock an empty vehicle with power while a mechanic visually checks the action at both ends. Or with the vehicle shut down, a lever check can be made with a long pry bar placed under each rod end and pressure applied.

Figure 6-2



The tapered stud attaching fasteners are furnished by Hendrickson. The straddle mount torque rod end attaching fasteners are furnished by the vehicle manufacturer. It is important that the tightening torque of the nuts be checked during normal preventative maintenance scheduled.
Follow the vehicle manufacturer's specifications for tightening torque values.

The length of the longitudinal torque rods is determined by the truck manufacturer for optimum drive line angles. The longitudinal torque rods along with the bottom caps maintain these angles and control acceleration and brake forces.
The length of the transverse rods is also determined by the vehicle manufacturer in order to centre the axles under the frame. If the lateral alignment of the axles is incorrect, it may be necessary to shim the transverse torque rod at the straddle mount end.
Shims can be installed between the transverse torque rod and the transverse torque rod frame bracket or between the transverse torque rod and axle tower bracket. Refer to vehicle manufacturer for proper shim location, also see Lateral Alignment in the Alignment Section of this publication.

The transverse torque rods also control axle walk-out during cornering.

The mounting brackets at the axle housing end of the torque rods are furnished and welded into position on the axle housings by the axle or vehicle manufacturer.

Both types of torque rods, transverse and longitudinal may have attaching ends designated “straddle mount,” “tapered stud,” or "through bolt".

Whether the rod ends are straddle mount, through bolt, or tapered stud, torque rod bushes can be renewed by pressing out the worn end and installing a replacement bush. See Component Replacement section in this publication.

Shock Absorber Inspection

Figure 6-4

HEAT TEST

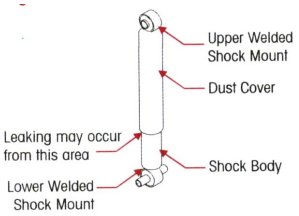
1. Drive the vehicle at moderate speeds for fifteen minutes.
2. Use a Heat Gun aimed at below the dust cover.
3. Aim at the frame to get an ambient temperature Reference
4. A warm shock absorber indicates that it has dampening force and is working, a cold shock absorber should be replaced.

WARNING

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

Shock Absorber Visual Inspection Procedure

Figure 6-5



Inspect the shock absorbers fully extended. Shock absorbers will need to be replaced for any of the following:

1. Damaged upper or lower mounting eyes.
2. Damaged upper or lower bush.
3. Damaged dust cover and/or shock body.
4. Leaking shock absorber, when streams of fluid travel down the side of the shock absorber, particularly from the upper seal, this seal will allow for misting to appear on the shock body *(misting is not a leak and is considered acceptable).*
5. Shock absorber is damaged internally, jammed in the collapsed position. It can also be determined by removing the shock, shake and listen to the sound of metal parts rattling inside the shock body.
6. Worn internal valving or dampening mechanisms.

SECTION 5 Alignment & Adjustments

Ride Height Adjustment

The PRIMAAX® suspension is equipped with a height control valve located on the front drive axle. Please refer to the Plumbing Diagram Section in this publication.

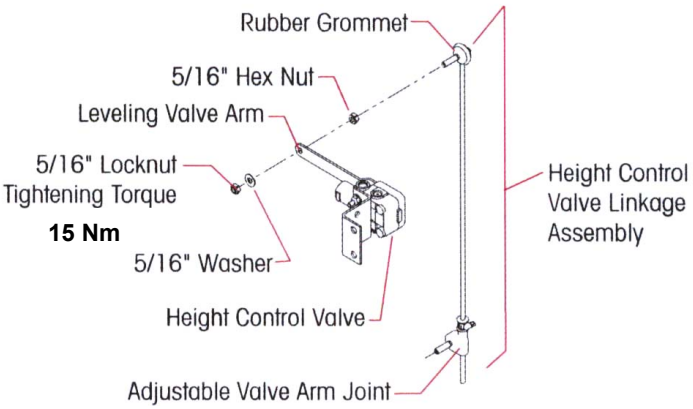
1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Move the vehicle in a forward and reverse motion to release any potential loads on the suspension prior to final positioning. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used.

2. Chock the front wheels of the vehicle. Do not set the parking brake.

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

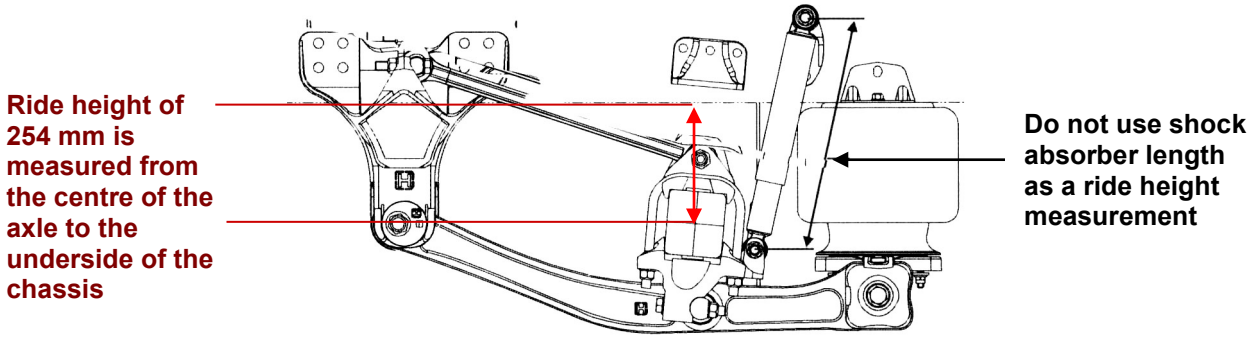
4. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to deflating or inflating the air system. Cycle the air system. Disconnect the levelling valve arm(s) from the rubber grommet. Lower the levelling valve arm to exhaust the air in the air springs and deflate the suspension. Reconnect the levelling valve arm to the control rod to inflate the suspension.

Figure 7-1



5. Using a tape measure, measure the referenced vertical ride height on the front the centreline of axle to the underside of the chassis rail. This measurement is to be 254 mm (10 inches).

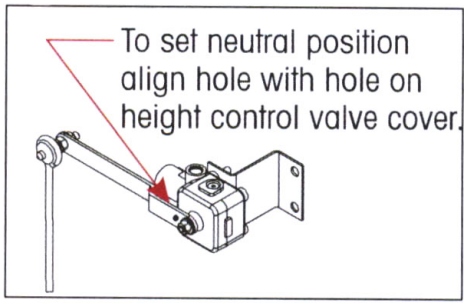
Figure 7-2 Standard Ride Height



6. If an adjustment is required, verify that the air system is at full operating pressure.
7. Refill the suspension by raising the height control valve arm by hand, so that the air springs are above the proper ride height.
8. Lower the levelling valve arm to exhaust the air system until the suspension is at proper ride height.
9. Use a 4.5 mm wooden dowel rod (golf tee) to set the neutral position for the height control valve by aligning the hole in the levelling arm with the hole in the height control valve cover.

   DO NOT use a metal rod or nail as this may cause damage to the height control valve.

Figure 7-4



10. Adjust the extension rod so rod can be reconnected to the height control valve arm at the proper height.
11. Connect the height control valve arm to the rod.
12. Adjust the rod to this valve arm setting and tighten locking nut.
13. Remove the dowel from the height control valve.
14. If equipped with a suspension dump system in the cab, cycle the suspension air system by using the cab dump valve control. If not equipped, cycle the height control valve levelling arms stated in step number 4.
15. Recheck the ride height.
16. Repeat steps 3 through 14 until the ride height is within specification.

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

Lateral Alignment

If it is necessary to check the lateral alignment, measure from the outside of the frame rail to the rim flange of the inner tyre. Record the measurement. Measure the same distance on the opposite side of the same axle. Record the measurement. Subtract the two measurements to get a difference between the two. If the difference is greater than 3 mm (1/8") it will be necessary to correct the lateral alignment. This is accomplished by adding or removing shims that are located between the transverse torque rod and the bottom cap. A general rule of thumb is to use a shim with a thickness that is half of the difference between the two measurements.

Example: *If the lateral alignment is out of specification by 10 mm, remove or install a 5 mm shim.*

The 5/8" mounting fasteners used with the straddle mount transverse torque rod are furnished by the vehicle manufacturer. It is important to check the locknuts for proper torque specification during preventative maintenance service intervals.

Follow the vehicle manufacturer's specifications for tightening torque values.

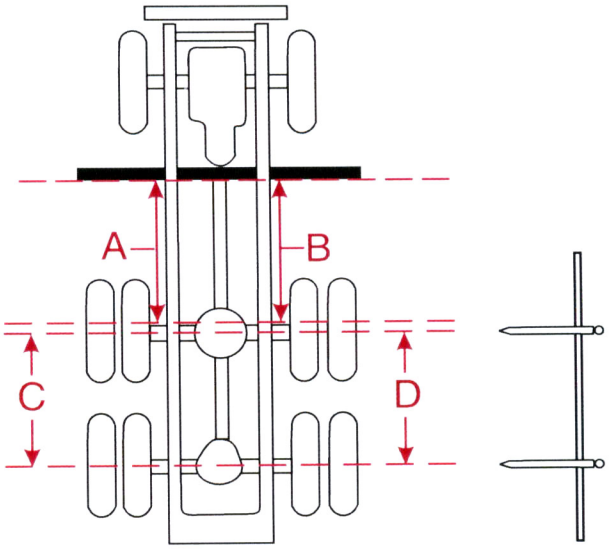
All torque rods should be inspected for looseness, torn or shredded rubber, and proper torque every six months. A lever check can be made with a long pry bar placed under each rod end and pressure applied.
Rod ends can be renewed by pressing out the worn bush and installing a replacement bush. In the event of structural damage, the entire torque rod assembly should be replaced. The torque rods are made to a specified length or a two-piece torque rod that can be cut and welded to the desired length if available.

Rear Axle Alignment

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

1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Move the vehicle in a forward and reverse motion to release any potential loads on the suspension prior to final positioning. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used.
2. Chock the front wheels of the vehicle. Do not set the parking brake.
3. Verify that the proper ride height is set. For the proper ride height instructions see Ride Height Adjustment in this publication.
4. If axle alignment equipment is not available, using "C" clamps, securely clamp a six foot piece of STRAIGHT bar stock or angle iron across the lower frame. Select a location for the angle iron as far forward of the drive axle as possible where components will not interfere.

Figure 7-6



5. Accurately square the straight edge to the frame using a carpenter's square.

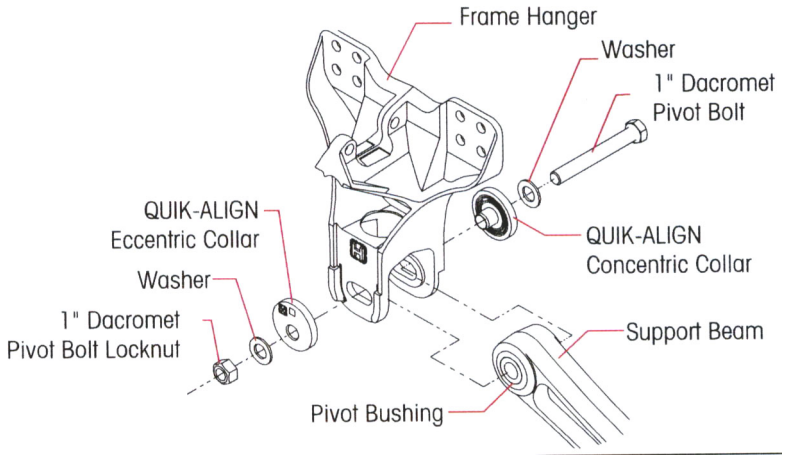
6. Using a measuring tape, measure from the straight edge to the forward face of the front drive axle arms at the centreline on both sides of the vehicle as shown in Figure 7-6, **A** and **B**. If both sides measure within the vehicle manufacturer's specifications, alignment of the front drive axle is acceptable.

7. If the front drive axle is within specification, proceed to check the rear drive axle.

8. Using a trammel bar measure from spindle centre to spindle centre on both sides of the vehicle. See Figure 7-6, **C** and **D**. If both sides measure within original equipment manufacturer's specifications, alignment of the rear drive axle is acceptable.

9. If not within specifications, perform alignment correction procedure.

Figure 7-7



10. To allow the axle to move freely, it is important to have all QUIK–ALIGN pivot bolt locknuts snugged tight on the axle that is being aligned. This will hold the eccentric flanged collar in place against the hanger face, and within the adjustment guide, but loose enough to permit the eccentric flanged collar to rotate freely.

11. The 3/4” longitudinal torque rod to frame hanger locknuts must be loose to allow the axle to move during the alignment process. These are re-shimmed at the end of the procedure, see Fig 7-13. All other suspension fasteners must be tightened to their specified torque values.

Figure 7-8

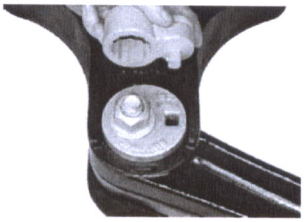
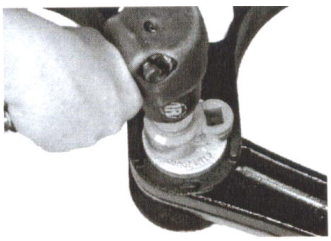


Figure 7-9



12. Use a QUICK-ALIGN Socket tool (Refer to the 97114-070 parts list for all special tools available) and Impact Gun (Figure 7-8 and 7-9), or a 3/4” square drive socket and breaker bar to rotate the QUIK-ALIGN eccentric collar to align the axle. A 180º rotation of the QUIK-ALIGN collar, from the full forward position, will move the axle rearward up to a maximum of 25 mm. A general rule of thumb is to adjust half the distance out of specification.

Example: 10 mm out of specification would require a 5 mm adjustment of the QUIK-ALIGN to bring the axle square to the centreline of the vehicle.

Figure 7-10
Axle Full Forward Position

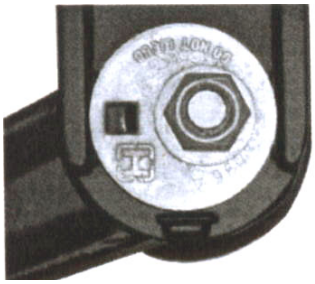


Figure 7-11
Axle Full Aft Position

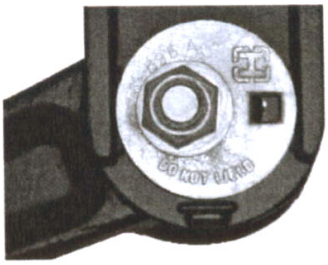
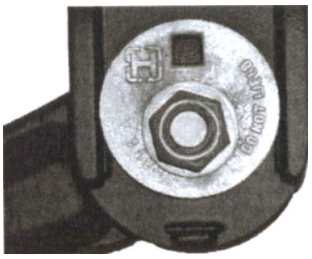


Figure 7-12
Axle Centre Position



13. Once the correct axle alignment is achieved, use a calibrated torque wrench to tension the QUIK-ALIGN locknuts to the specified value to complete the alignment.

14. Re-check the ride height and the axle alignment to verify that it is within specifications; see Rear Axle Alignment Inspection Section.

15. Check the pinion angles with a digital protractor. Refer to the vehicle manufacturer specifications for the required pinion angles. (see Figure 7-13)

16. If the angles are within the vehicle manufacturer's specifications, fill the gap between the bar pin torque rod and frame hanger with shims. Torque the longitudinal Rod bolts to the specified values.

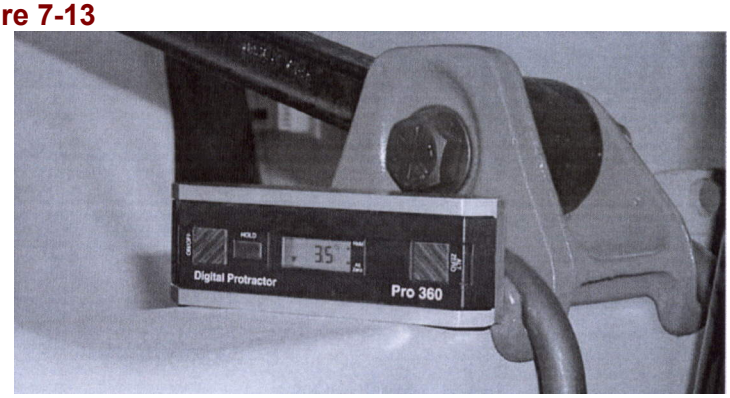
17. If it is necessary to fine tune the pinion angle it is possible to increase or decrease the pinion angle by using one of the following appropriate procedures.

Pinion Angle

Drive axle pinion angles are established by the vehicle manufacturer. If it is necessary to fine tune the pinion angle see the Alignment Section of this publication.

To check the pinion angle, verify first that the suspension is at the proper ride *height (see Ride Height Adjustment in this Section).* Install a digital protractor on the axle. Check that the pinion angle is correct to the vehicle manufacturer's specifications.

Figure 7-13

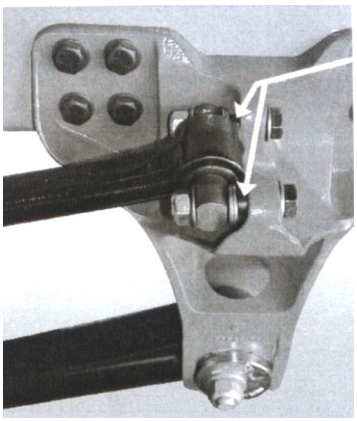


Pinion Angle Adjustment

FOR LESS THAN 1.5 DEGREES

Figure 7-14

Install or remove shims between the longitudinal torque rod and the frame hanger to achieve the recommended pinion angle.
To increase the pinion angle, install shims and to decrease the pinion angle remove shims.
A general rule of thumb is, 1/8" change in the shim pack thickness will increase or decrease the pinion angle by 1/2 degree.



Add or remove shims to maintain or adjust pinion angle

PINION ANGLE ADJUSTMENT

FOR MORE THAN 1.5 DEGREES

If the required change in pinion angle is greater than 1.5 degrees, you must replace the bottom cap with one that will achieve the desired pinion angle after pinion angle adjustment, use a calibrated torque wrench to tighten the 3/4” longitudinal torque rod to frame hanger.

Following the alignment of the axles, move the vehicle back and forth several times prior to removing the straight edge from the frame, and recheck measurements to confirm adjustments. Repeat steps 1 through 11 until the correct alignment and pinion angle is achieved.

NOTE: **Prior to tightening the QUIK-ALIGN locknuts to torque specifications, it is mandatory that the vehicle is at the proper ride height.**

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

WARNING ***DO NOT ASSEMBLE THE QUIK-ALIGN JOINT WITHOUT THE PROPER FASTENERS. USE ONLY HENDRICKSON DACROMET PLUS XL PLATED FASTENERS TO SUSTAIN THE PROPER CLAMP FORCE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.***
ENSURE THAT THE QUIK-ALIGN FASTENERS TORQUE VALUE IS SUSTAINED AS RECOMMENDED IN THE TORQUE REQUIREMENTS SECTION OF THIS PUBLICATION, FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL RESULTING IN PERSONAL INJURY OR PROPERTY DAMAGE.

Alignment Instructions

NOTE: **Use a new QUIK-ALIGN pivot bolt kit *(refer to the 97114-070 Parts List)* for any axle alignment or Dismantling of the QUIK-ALIGN connection. This ensures that the proper clamp load is applied to the connection, so that the joint will not slip in service.**

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. The total range of forward/rearward axle adjustment is 25 mm.**

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

NOTE: **Prior to tightening the 1" QUIK-ALIGN locknuts to torque specifications, it is mandatory that the vehicle is at the proper ride height.**
Once the correct axle alignment is achieved, use a calibrated torque wrench to tighten the 1" QUIK-ALIGN locknuts to specified value to complete the alignment.
Re-check the ride height and the axle alignment to verify that it is within specifications; see Rear Axle Alignment Inspection in this Section.

NOTE: **Use a new support beam QUIK-ALIGN pivot bolt kit and a new longitudinal torque rod QUIK-ALIGN bolt kit, *(refer to the 97114-070 Parts List)* for any axle alignment or Dismantling of the QUIK-ALIGN connection. This ensures that the proper clamp load is applied to the connections, so that the joints will not slip in service.**

SECTION 6 Component Replacement

Fasteners

Hendrickson recommends that when servicing the vehicle to replace the removed fasteners with new equivalent fasteners. Always maintain correct torque values. Check torque values as specified. Genuine Hendrickson fasteners must be used following the torque specifications listed in this manual.

Air Spring

Dismantling

1. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication.
2. Chock the wheels.
3. Support the frame.
4. Disconnect the height control valve levelling valve arm from the rubber grommet.
5. Prior to deflating the suspension system. Lower the levelling valve arm to exhaust the air in the air springs and deflate the rear suspension.
6. Remove the air line from the air spring.
7. If the air spring is being removed for an alternate repair, it will be necessary to lubricate the lower mounting fasteners with penetrating oil and remove with hand tools from the air spring. This will prevent the air spring mounting studs from breaking during the removal process.
8. Remove the lower air spring mounting bracket from the cross tube.
9. Remove the fasteners from the upper air spring mounting bracket and the frame.
10. Remove the air spring.

Assembly

1. Inspect the mounting surfaces and lower air spring mounting bracket for any damage, replace if necessary.
2. Install the air spring between the frame and cross tube so that the locating tab indexes the end cap.
3. Hold the air spring tight against the frame flange and tighten the upper air spring mounting fastener per original equipment manufacturer's specifications.
4. Install the lower air spring mounting bracket over the cross tubes, indexing the mounting studs on the air spring.
5. Install the lower mounting fasteners and tighten to the specified value.
6. Connect the air line to the air spring.
7. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to inflating the suspension system. Inflate the suspension slowly and verify that the air spring bladder inflates uniformly without binding.
8. Remove the frame supports.
9. Remove the wheel chocks.

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.**

Height Control Valve

Dismantling

1. Chock the wheels of vehicle.
2. Disconnect the height control valve levelling valve arm from the rubber grommet.
3. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to deflating the suspension system. Lower the levelling valve arm to exhaust the air in the air springs and deflate the rear suspension.
4. Remove the air lines from the height control valve.
5. Remove the brass fittings from the ride height control valve.
6. Remove the 1/4" washers and locknuts that attach the ride height control valve to the frame mounting bracket.
7. Remove the ride height control valve.

ASSEMBLY

1. Install the brass fittings into the height control valve. DO NOT use Teflon tape or pipe sealing compound.
2. Install the height control valve to the frame mounting bracket by attaching the 1/4" washers and locknuts.
3. Tighten to the specified value. Install the air lines to the height control valve. Reference the Plumbing Diagram Section of this publication.
4. Install the height control valve link assembly to the ride height control valve arm. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to inflating the suspension system.
5. Inflate the suspension by connecting the height control valve linkage to the height control valve arm.
6. Cycle the suspension a minimum of 3 times. Verify proper ride height adjustment after cycling, (see ride height adjustment Preventative Maintenance Section of this publication).

Shock Absorbers

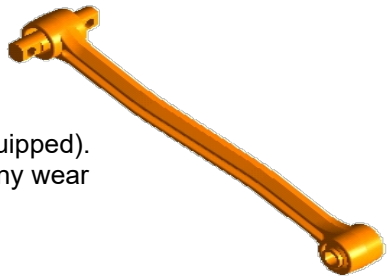
DISMANTLING

1. Chock the wheels of the vehicle.
2. Remove the lower shock absorber mounting fasteners.
3. Remove the upper shock absorber mounting fasteners.
4. Slide the shock absorber out of the mounting brackets.
5. Inspect the shock absorber mounting brackets and hardware for damage or wear, replace as necessary.

ASSEMBLY

1. Install the shock absorber into the upper mounting bracket.
2. Install the upper shock absorber mounting fasteners.
3. Install the lower shock absorber mounting fasteners.
4. Ensure that the vehicle is at the correct ride height prior to setting the shock absorber mounting bolts to torque.
5. Tighten the upper shock absorber mounting 3/4” locknuts to the specified value.
6. Tighten the lower shock absorber mounting 5/8" locknuts to the specified value.

Longitudinal Torque Rod



DISMANTLING

1. Chock the wheels of the vehicle.
2. Remove the torque rod mounting fasteners and shims (if equipped).
3. Remove the torque rod. Inspect the mounting surfaces for any wear or damage, replace if necessary.

ASSEMBLY

1. Install the torque rod. Install the mounting fasteners and any shims that were removed.
2. Tighten all fasteners to the required specification; see Hendrickson Recommended Torque Specifications Section in this publication.
3. Tighten all fasteners to the required specification; see Hendrickson Recommended Torque Specifications Section in this publication.
4. When assembly is complete check the pinion angle on both sides of the axle housing. Tighten all fasteners to the required specification; see Hendrickson Recommended Torque Specifications Section in this publication.

SERVICE HINT: **Be aware of the quantity of shims removed to maintain the correct pinion angle of the axle at assembly. See Alignment Section in this publication.**

NOTE: **Prior to tightening the 3/4” straddle bush and the 7/8" top pad through bolt locknuts to the specified torque specifications, it is mandatory that the vehicle is at the proper ride height.**

Transverse Torque Rod

DISMANTLING

1. Chock the wheels of the vehicle.
2. Remove the torque rod mounting fasteners.
3. Remove the torque rod. Inspect the mounting surfaces for any wear or damage.

ASSEMBLY

1. Install the torque rod. Install the mounting fasteners and any shims that were removed.
2. Prior to tightening ensure that the vehicle is at the proper ride height.
3. Tighten all fasteners to the required torque specification. Refer to original equipment manufacturer for specifications.
4. Check the lateral axle alignment to verify correct amounts of shims are installed. See Alignment Section of this publication.

NOTE: Never assume the lateral alignment was correct prior to work commencing.

SERVICE HINT: **Be aware of the quantity of shims removed to maintain the correct pinion angle of the axle at assembly. See Alignment Section in this publication.**

Transverse Torque Rod Bush

DISMANTLING

Special tooling required: A vertical press with a capacity of at least 10 tons. A receiving tool (5" long, 2" inner diameter by 1/4" wall steel tubing).

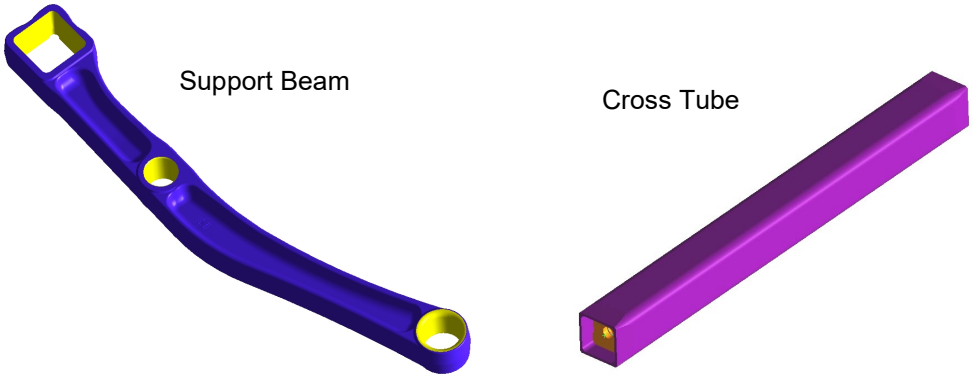
1. Remove the torque rod as detailed in Component Replacement Section of this publication.
2. Support the torque rod end on the receiving tool with the end the tube of torque rod centred on the tool. Ensure the torque rod is squarely supported on the press bed.
3. Push directly on the bush straddle mount bar pin until top of the bush is level to the top of torque rod end tube. Press until the bush clears the torque rod end tube.
4. Clean and inspect the inner diameter of the torque rod ends, removing any nicks with an emery cloth or a rotary sander.

ASSEMBLY

1. Lubricate the inner diameter of the torque rod ends and the new rubber bushes with a suitable installation lubricant, such as P-80 (Hendrickson part number 70867-001). DO NOT use a petroleum or soap base lubricant, it can cause an adverse reaction with the bush, such as deterioration of the rubber.
2. Press in the new bushes. Support the torque rod end on the receiving tool with the end tube of torque rod centred on the receiving tool. The straddle mount bar pin bushes must have the mounting flats positioned at zero degrees to shank of the torque rod.
3. Press directly on the straddle mount bar pin of bush. The rubber bushes of the bar pin must be centred within the torque rod end tubes.
4. When pressing in the new bushes, overshoot the desired final position by approximately 5 mm.
5. Press the bush again from opposite side to centre the bar pin within the torque rod end, Wipe off excess lubricant. Allow the lubricant to dissipate for four hours before operating the vehicle.
7. Install torque rod assembly as detailed in the Component Replacement section of this publication.

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

Support Beam Assembly and Cross Tube



DISMANTLING

1. Chock the front wheels.
2. Support the frame.
3. Support the axle.
4. Remove the tyres on the axle being serviced.
5. Disconnect the levelling valve arm from the control rod.
6. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to deflating or deflating the suspension system. Lower the levelling valve arm to exhaust the air in the air springs and deflate the rear suspension.
7. Lubricate the lower mounting fasteners with penetrating oil and remove the fasteners from the air spring mounting studs.
8. Remove both the lower air spring mounting brackets to disconnect both air springs from the cross tube.
9. Install a floor jack to support the cross tube and support beam assembly.
10. Loosen the QUIK-ALIGN locknuts, DO NOT remove at this time.
11. Remove all four (4) D-pin bolts on both sides of the suspension.
12. Lower the floor jack and pivot the cross tube and support beam ‘U’ assembly down.
13. Remove the QUIK-ALIGN bolts, washers, locknuts, and collars.
14. Remove both support beams from the hangers.
15. Remove the support beams and cross tube as an assembly from the vehicle.
16. Remove the end cap on the support beam(s) being removed from the cross tube.
17. Dislodge the support beam from the cross tube by hitting the support beam directly in front of the inboard corner joint.
18. The support beam and cross tube joint requires shock load on the support beam at the joint to dislodge the two components. All blunt force must be applied flush to the thickest part of the support beam at the inboard corner joint. Continue striking the support beam until it is completely dislodged from the cross tube. Inspect all components for any damage or wear and replace as necessary.

ASSEMBLY

1. Clean the cross tube exterior from any rust or debris using a wire wheel. When installing a new cross tube, ensure all preservative is removed prior to installation.
2. Clean the bore on the support beam assembly that accommodates the cross tube to remove corrosion or preservatives.
3. Clean the QUIK-ALIGN slots in the hangers from any dirt and debris.
4. Clean the QUIK-ALIGN collars of any dirt and debris and inspect for any wear or damage. Replace as necessary.
5. Place both beams and cross tube on the floor for preassembly.
6. Install the cross tube into the support beams one side at a time.
7. Install and tighten the end caps to the specified torque value.
8. Position the support beam and cross tube as an assembly on a floor jack.
9. Raise the support beam and cross tube as an assembly until the D-pins engage in the bottom cap.
10. Install the D-pin fasteners.
11. Install the support beams and cross tube as an assembly into the hangers. Apply lubricant to the pivot bush rubbers to allow easy fitment into the hangers.
12. Install QUIK-ALIGN connection with new Dacromet fasteners and tighten to the specified torque value.
13. Tighten D-Pin locknuts to the specified torque value.
14. Attach the air springs to the cross tube.
15. Install the wheels.
16. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to inflating the suspension system.
17. Connect the levelling valve link rod to the height control valve arm(s) to Inflate the suspension.
18. Alignment is necessary anytime the support beam is removed.

WARRANTY **PRESERVATIVE MUST BE REMOVED FROM ALL NEW BEAMS AND CROSSTUBES PRIOR TO ASSEMBLY. FAILURE TO DO SO WILL PREVENT CORRECT CLAMPING FORCE AT THE CONNECTION WHICH WILL LEAD TO PREMATURE COMPONENT FAILURE AND MAY RESULT IN PERSONAL INJURY OR LOSS OF VEHICLE CONTROL.**

NOTE: **THE WEIGHT OF THE SUPPORT BEAMS AND CROSS TUBE ASSEMBLY IS APPROXIMATELY 100 kgs. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.**

NOTE: **DO NOT STRIKE SUSPENSION COMPONENTS WITH A HAMMER. HOWEVER, THE SUPPORT BEAM AND CROSS TUBE JOINT REQUIRES BLUNT FORCE ON THE SUPPORT BEAM AT THE JOINT TO DISLODGE THE TWO COMPONENTS. ALL BLUNT FORCE MUST BE APPLIED FLUSH TO THE THICKEST PART OF THE SUPPORT BEAM AT THE INBOARD CORNER JOINT, FAILURE TO STRIKE THE SUPPORT BEAM SQUARELY MAY RESULT IN COMPONENT DAMAGE, PREMATURE FAILURE AND VOID WARRANTY.**

NOTE: **IT MAY BE NECESSARY TO USE A PRY BAR TO DISENGAGE THE D-PINS FROM THE BOTTOM CAPS. IT ALSO MAY BE NECESSARY TO USE A PRY BAR TO PUSH THE SUPPORT BEAMS OUT OF THE FRAME HANGERS.**

SERVICE HINT: **When support beam removal is required it is necessary to remove both support beams and the cross tube as an assembly.**

SERVICE HINT: **It may be necessary to raise 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.**

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

D-Pin Bush

Special tools required: a vertical shop press with a capacity of at least 10 tons. A D-Pin Removal Tool, Installation Tool, and Receiving Tool.

DISMANTLING

1. Remove the support beam assembly. Follow support beam removal procedure in the Component Replacement Section of this publication.
2. Place the support beam in a shop press on top of the receiving tool with both ends of the support beam supported squarely on the press bed.
3. Mark the clocking position of the D-pin bush on the support beam with a paint stick.
4. Install the D-Pin Removal Tool squarely centred on the D-Pin bush.
5. Push directly on the D-pin Removal Tool until the D-Pin bush is pressed out of the support beam bore.
6. Clean the support beam bore with a wire wheel. Inspect the inner diameter of the D-Pin bore on the support beam, check for any damage to the support beam bore, replace as necessary.

ASSEMBLY

1. Place the support beam in a shop press on the receiving tool with the bevelled edge of the D-Pin bore facing up. Both ends of the support beam must be supported squarely on the press bed.
2. Lubricate the support beam D-pin bore and the D-Pin bush retaining sleeve with chassis grease.
3. Line up the D-pin bush with the clocking line that was put on the support beam prior to the removal of the D-pin bush.
4. Install the D-pin bush installation tool and press in the new D-pin bush until the confinement sleeve protrudes equally on both sides of the support beam assembly.
5. Install the support beam assembly.
6. Follow support beam installation procedure in the Component Replacement Section of this publication.

Quick-align Pivot Bush

DISMANTLING

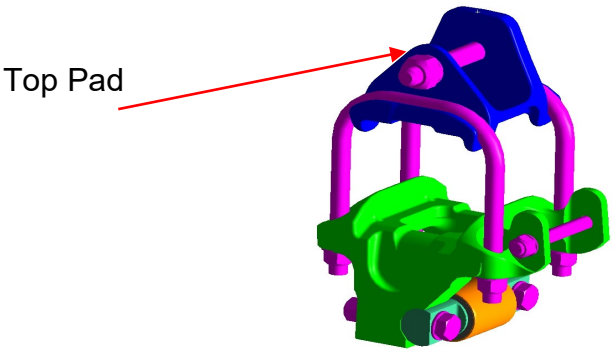
Special tools required: A vertical shop press with a capacity of at least 10 tons. A 6" long piece of 4" inner diameter by 1/4" wall steel tubing receiving tool is required.

1. Remove the support beam assembly. Follow the support beam removal procedure in the Component Replacement Section of this publication.
2. Place the support beam in a shop press.
3. Support the support beam on the receiving tool with the beam eye centred on the receiving tool. Be sure the support beam is squarely supported on the press bed.
4. Centre the push out tool on the inner sleeve and press out the old bush, (these bushes are not cartridge type bushes, they do not have outer metals).
5. Clean and inspect the inside diameter of the support beam eye.

ASSEMBLY

1. Lubricate the inner diameter of the support beam eye with a suitable lubricant, such as P-80 (Hendrickson part number 70867-001). **DO NOT** use petroleum or soap base lubricant, it can cause an adverse reaction with the bush material, such as deterioration.
2. Support the support beam on the receiving tool with the beam eye centred on the tool. Be sure the support beam is squarely supported on the press bed.
3. Place the QUIK-ALIGN bush installer tool (Refer to the 97114-070 parts list for all special tools available) on the QUIK-ALIGN bush.
4. Press in the new bush. Bushes must be centred within the support beam eye. When pressing in the new bushes over-shoot desired final position by 3/16" and press again from the opposite side to centre the bush within the support beam eye bore, if necessary.
5. Install the support beam assembly.
6. Follow support beam installation procedure in the Component Replacement Section of this publication.

Top Pad



DISMANTLING

1. Chock the front wheels.
2. Support the frame.
3. Disconnect the levelling valve arm from the control rod. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to deflating or deflating the suspension system.
4. Lower the levelling valve arm to exhaust the air in the air springs and deflate the rear suspension.
5. Remove the through bolt from the longitudinal torque rod to access the U bolt locknuts.
6. Support the support beam assembly. Remove the U bolts from the clamp group. Remove the top pad.
7. Inspect the top pad and the axle housing for any cracks, elongation of the mounting holes or damage. Replace if necessary.

SERVICE HINT: **Due to certain pinion angle configuration the removal of the D-pin bolts may be necessary**

ASSEMBLY

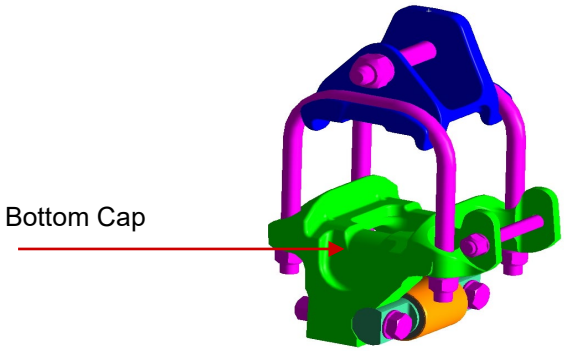
1. Install the top pad on the top of the axle engaging the dowel pin.
2. Install new U bolts, washers, and locknuts.
3. Verify that the U bolts are seated properly in the channels of the top pad.
4. Tighten the U bolt locknuts evenly and tighten to the correct torque in the correct sequence.
5. Rap the top of the U bolts with a dead blow mallet and retighten to the correct torque.

DO NOT EXCEED SPECIFIED TORQUE ON U BOLT LOCKNUTS.

6. Tighten the 3/4” locknuts to the specified torque value.
7. Tighten the 3/4” D-pin bolts to the specified torque setting if loosened or removed during dismantling.
8. Remove the floor jack or bottle jack from the support beam assembly.
9. Install the through bolt on the longitudinal torque rod,
10. DO NOT tighten at this time. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to inflating the suspension system.
11. Connect the levelling valve link rod to the height control valve arm to inflate the suspension.
12. Remove the frame stands.
13. Tighten the longitudinal torque rod through bolt to the specified torque setting.
14. Remove the wheel chocks.

NOTE: **Prior to tightening the longitudinal torque rod through bolt Locknut to torque specifications, it is mandatory that the vehicle is at the proper ride height.**

Bottom Cap



DISMANTLING

1. Chock the wheels of the axle.
2. Raise the frame of the vehicle to remove the load from the suspension.
3. Support the frame. Remove tyres if necessary.
4. Support the axle.
5. Disconnect the levelling valve arm from the Link Rod.
6. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to deflating or deflating the suspension system.
7. Lower the levelling valve arm to exhaust the air in the air springs and deflate the rear suspension.
8. Remove the lower shock absorber mounting fasteners.
9. Remove the S-cam support bracket fasteners and support bracket (if equipped).
10. Support the support beams and cross tube assembly with a floor jack that equipped with a four inch support plate.
11. Remove the D-pin fasteners.
12. Raise the front of the differential to facilitate removal of the D-pins from the bottom caps.
13. Lubricate the lower mounting fasteners with penetrating oil and remove with hand tools from the air spring mounting studs.
14. Remove both the lower air spring mounting brackets to disconnect both air springs from the cross tube.
15. Loosen the QUIK-ALIGN bolts but do not remove QUIK-ALIGN mounting hardware.
16. Pivot the support beams and cross tube assembly down from the bottom caps.
17. Remove the U bolt locknuts and washers.
18. Remove the bottom cap and inspect for damage or wear. Replace as necessary.

NOTE : **THE USE OF A FLOOR JACK EQUIPPED WITH A 100 mm SUPPORT PLATE IS MANDATORY TO SUPPORT THE SUPPORT BEAM AND CROSS TUBE ASSEMBLY. DO NOT USE A BOTTLE JACK, THE USE OF A BOTTLE JACK WILL NOT ENGAGE THE CROSS TUBE TO FACILITATE SAFE LOWERING AND RAISING OF THE SUPPORT BEAMS AND CROSS TUBE ASSEMBLY.**
FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE OR RESULT IN PERSONAL INJURY.

NOTE: **THE WEIGHT OF THE SUPPORT BEAMS AND CROSS TUBE ASSEMBLY IS APPROXIMATELY 100 kg.**
CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

SERVICE HINT: **Mark the position of the QUIK-ALIGN square drive in relationship to the frame hanger with a paint stick prior to loosening the QUIK-ALIGN connection. This will facilitate the axle alignment process after the repair is complete.**

SERVICE HINT: **It may be necessary to rotate the QUIK-ALIGN eccentric collars to the full rearward position to facilitate the removal and installation of the D-pins into the bottom caps.**

ASSEMBLY

1. Install the new U bolts.
2. Install the bottom axle cap in the axle in the proper direction, with the lower shock mounting holes facing the rear of the vehicle.
3. Attach the 3/4” washers and the locknuts.
4. Align the clamp group; verify that the top pad is indexed properly on the dowel located on the top of the axle beam.
5. Verify that the U bolts are seated properly in the channels of the top pad.
6. Tighten the U bolt locknuts evenly and tighten to the proper torque in the proper sequence. 3/4”
7. 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**.
8. Tighten the 3/4” locknuts to the specified torque settings.
9. Install the lower shock absorber mounting fasteners.
10. Tighten the 5/8" locknuts the specified torque settings.
11. Install the S-Cam support bracket and fasteners (if equipped).
12. Tighten the 3/8" locknuts and the 5/16" locknuts to the specified torque settings.
13. Raise the support beam and cross tube assembly until the D-pins engage in the bottom cap.
14. Install the D-pin fasteners and install from front to back.
15. Lower the bottle jack from the front of the differential to allow the full engagement of the D-pins into the bottom caps.
16. Tighten the D-Pin 3/4” locknuts to the specified torque settings.
17. Attach the air springs to the cross tube.
18. Install the Tyres (if removed).
19. Remove the jack stands and lower the frame of vehicle.
20. See Air Spring Cautions and Warnings in the Safety Notice Section of this publication prior to deflating or inflating the suspension system.
21. Connect the levelling valve link rod to the height control valve arm to Inflate the suspension.
22. Alignment is necessary anytime the support beam is removed to complete the repair. See Alignment Section of this publication.

SERVICE HINT: **It may be necessary to squeeze the U bolts slightly to facilitate installation through the bottom axle cap.**

SERVICE HINT: **It may be necessary to rotate the QUIK-ALIGN eccentric collars to pull the axle forward to allow the full engagement 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 engage the bottom cap.**

Axle Bump Stops

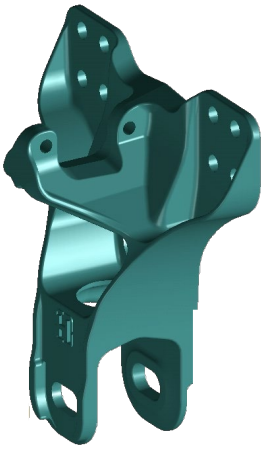
DISMANTLING

1. Chock the wheels.
2. Remove the fasteners connecting the axle bump stop to the frame.
3. Remove the axle stop.
4. Inspect the frame rail mounting surfaces for any cracks or damage.

ASSEMBLY

1. Install the axle bump stop on the frame.
2. Install new mounting fasteners.
3. Tighten axle stop fasteners to the vehicle manufacturers torque specifications.
4. Install any items removed
5. Remove the wheel chocks.

Frame Hanger



Replacement of the hanger is required when the frame hanger has been damaged or worn.

THE PROCEDURE TO REPLACE A FRAME HANGER, IS DONE WITH THE REMAINING FRAME HANGERS CONNECTED TO THE FRAME AND IT IS ALSO NECESSARY THAT THE SUPPORT BEAMS AND THE LONGITUDINAL TORQUE RODS ARE ATTACHED TO THE THREE REMAINING FRAME HANGERS.

DISMANTLING

1. Chock the front wheels.
2. Support the frame
3. Disconnect the levelling valve arm from Control Rod.
4. Lower the levelling valve arm to exhaust the air in the air springs and deflate the rear suspension.
4. Remove the QUIK-ALIGN lock nut and pivot bolt and discard.
5. Remove the QUIK-ALIGN collars that connect the support beam to the frame hanger.
6. Remove the fasteners that attach the longitudinal torque rod to the frame hanger.
7. Remove the fasteners that attach the frame hanger to the vehicle per vehicle manufacturer specifications.
8. Remove the frame hanger.
9. Inspect mounting surface for any damage or wear.
10. Inspect the QUIK-ALIGN pivot washers, bush and torque rod bushes for wear or damage, replace as necessary.

ASSEMBLY

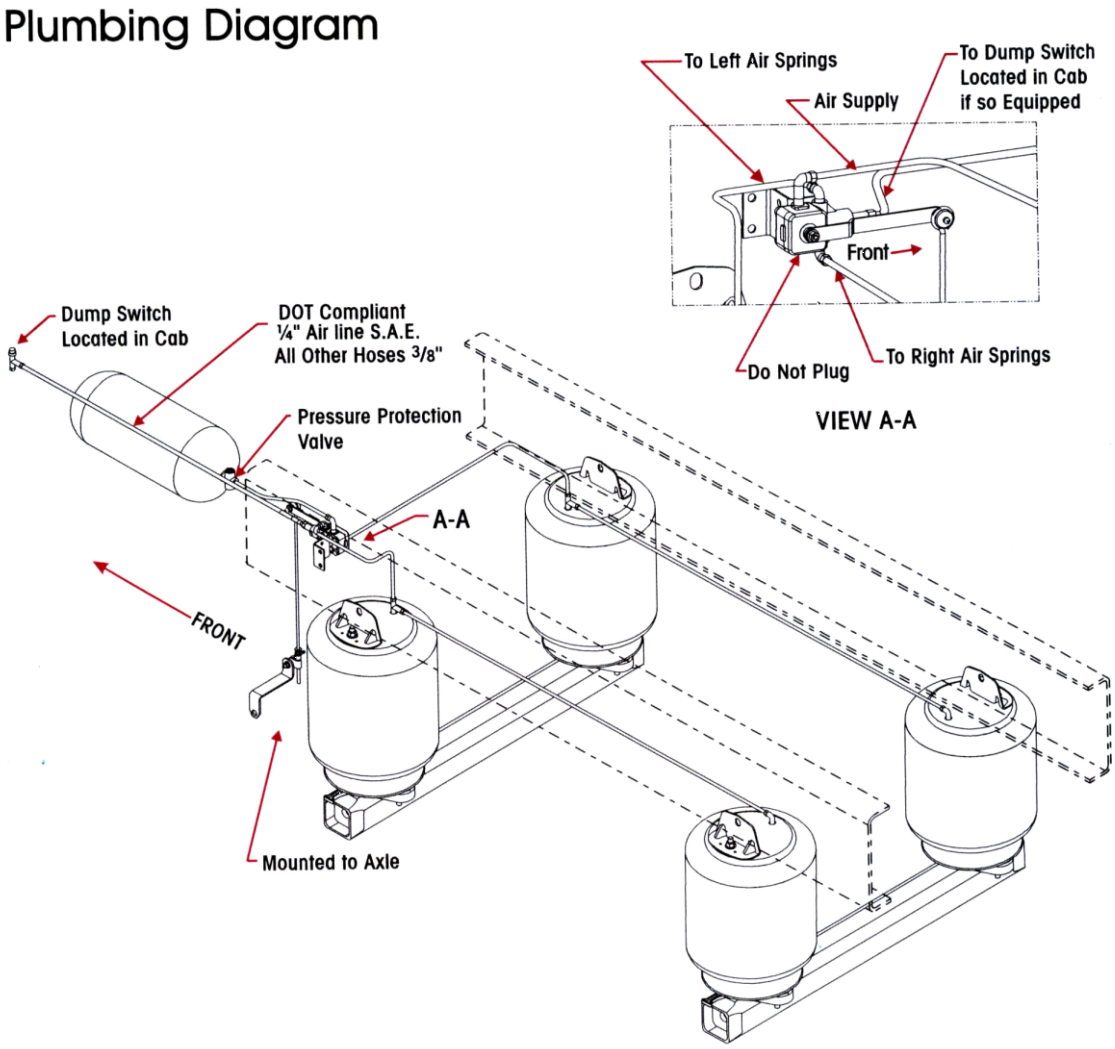
1. Slide the new frame hanger over the support beam QUIK-ALIGN bush.
2. Install the new fasteners from hanger to frame rail and tighten per vehicle manufacturer specifications.
3. Install the new QUIK-ALIGN collars and the new mounting hardware that attach the support beam to the frame hanger
4. Verify that the nose of each QUIK-ALIGN collar is installed correctly into pivot bush sleeve, and the flanged side is flat against the frame hanger face within the alignment guides.
5. Attach the new QUIK-ALIGN mounting hardware.
6. Install the torque rod mounting 3/4” fasteners.
7. Connect the levelling valve link rod(s) to the height control valve arm(s) to Inflate the suspension properly.
8. Verify that the axle is in proper alignment. See Alignment Section in this publication.
9. After the correct alignment of the axle is verified tighten the 1" QUIK-ALIGN locknuts to the specified torque settings.
10. Tighten the longitudinal 3/4” mounting fasteners to specified torque settings.
11. Verify the correct pinion angle on the axle per original equipment manufacturers specifications.
12. Remove the chocks from the front wheels.

SERVICE HINT: **Be aware of the quantity of shims removed to maintain the correct pinion angle of the axle at assembly. See Alignment Section in this publication.**

NOTE: **Use a new support beam QUIK-ALIGN Bolt Kit *(refer to the 97114-070 Parts List)* for any axle alignment or Dismantling of the QUIK-ALIGN connection. This ensures that the proper clamp load is applied to the connections, so that the joints will not slip in service.**

NOTE: **Prior to tightening the QUIK-ALIGN locknuts to torque specifications, it is mandatory that the vehicle is at the proper ride height.**

SECTION 7 Plumbing Diagram



SECTION 8 Torque Specifications

PRIMAAX RECOMMENDED TORQUE SPECIFICATIONS

NO	COMPONENT		QTY	SIZE	TORQUE Nm (ft/lb)
1	Frame Hanger **		16	3/4" - 10 UNC	505 (375)
2	Longitudinal Torque Rod	A. To Forward Hanger Mount	4	3/4" – 16 UNF	400 (300)
		B. To Rear Top Pad Mount	2	7/8" – 14 UNF	750 (550)
		C. To Rear Top Pad Mount	2	M24	980 (725)
3	Beam Assembly	A. QUIK-ALIGN ****	2	1" – 14 UNF	750 (550)
		A. QUIK-ALIGN	2	1 – 8 UNC	850 (625)
		B. QUIK-ALIGN – Extreme Duty	2	1"1/4 – 12 UNF	1,760 (1,300)
		C. Centre D-Pin Bush	2	3/4" – 16 UNF	400 (300)
		D. Cross Tube End Cap	2	7/8" – 9 UNC	750 (550)
4	U Bolt Locknuts		8	3/4" – 16 UNF	440 (325)
5	Shock Absorber	A. Upper Mount Locknuts	2	3/4" – 10 UNC	250 (185)
		B. Lower Mount Locknuts	2	5/8" –11 UNC	285 (210)
6	Upper Shock Absorber Bracket to Frame **		4	5/8" – 11 UNC	285 (210)
7	Air Spring Assembly	A. To Frame **	2	5/8" – 11 UNC	285 (210)
		B. Lower to Cross Tube	4	1/2" – 13 UNC	35 (25)
8	Axle Stop to Frame **		6	5/8" – 11 UNC	285 (210)
9	Height Control Valve to Frame Bracket		2	1/4" – 20 UNC	15 (10)
10	HCV Linkage	A. Jam Nut	2	5/16"– 18 UNC	15 (10)
		B. Locknut to HCV	2	5/16"–18 UNC	15 (10)
		C. Clamp	1		Until Securely Fastened

NOTE

* Quantities shown are per axle except for items 9 & 10.

** Denotes items not shown on the illustration

*** All Hardware should be checked for correct tension at Assembly, Pre-Delivery, First Service and thereafter at 50,000 km intervals

**** Introduction of 1"-14 UNF QUIK-ALIGN bolt Oct 2010 thread & torque change

SECTION 9 Trouble Shooting Guide

PRIMAAX TROUBLESHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTION
Suspension has harsh or bumpy ride	Air spring not inflated to specification or damaged	Repair air system and check ride height.
	Ride Height Set Incorrectly	Adjust ride height to proper setting.
	Suspension is overloaded	Redistribute load to correct weight.
	Broken support beam	Replace broken support beam assembly.
Irregular Tyre Wear	Incorrect tyre inflation pressure	Correct Tyre pressure per vehicle manufacturer and tyre manufacturer specifications.
	Worn QUIK-ALIGN bush	Replace QUIK-ALIGN bush.
	Loose QUIK-ALIGN attachment	Replace 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 bushes	Replace Torque rod bushes
Excessive driveline vibration	Incorrect pinion angle(s)	Adjust pinion angle(s), refer to vehicle manufacturer for specifications.
	Ride Height Set Incorrectly	Adjust ride height to proper setting.
	Broken support beam	Replace broken support beam assembly
	Air spring not inflated to specification or damaged	Repair air system and check ride height.
Excessive vehicle bouncing	Damaged or leaking shock absorber	Replace shock absorber.
	Ride height set incorrectly	Adjust ride height to proper setting.
Suspension noisy	Loose QUIK-ALIGN attachment	Replace QUIK-ALIGN connection, and check vehicle alignment.
	Loose U Bolts	Tighten U Bolts to specification.
	Loose end caps	Inspect end caps and support beam to cross tube connection & repairs as necessary.
	Worn Torque Rod bushes	Replace Torque rod bushes.
Vehicle leaning	Repair air system and check ride height	Air spring not inflated to specification or damaged.
	Load not centred	Redistribute the load.
	Frame Twisted	Straighten frame as per manufacturers specifications.
	Broken support beam	Replace broken support beam assembly.
	Loose U Bolts	Tighten U Bolts to specification.
	Front Suspension	Inspect and repair front suspension.

Amendment Table

Date	Revision	Page	Notes
Nov-2010	Rev O	Page 1	Header Layout and Revision to O
Nov-2010	Rev O	Page 32	Add 1”-14 UNF Quick Align Torque 750 Nm
Mar-2020	Rev P	All	Remove parts & tools sections. Revise document, ECN 11679.

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