

TECHNICAL PROCEDURE

COMFORT AIR® Single Axle Air Suspension for Hino Vehicles

SUBJECT: Service Instructions

LIT NO: 17730-245

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SECTION 1

Introduction

This publication is to acquaint and assist maintenance personnel in the preventive maintenance and rebuild of the COMFORT AIR® single air suspension system for Hino vehicles.

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 Procedure publication prior to performing any maintenance, service, repair, or rebuild of the product. The information in this publication contains parts lists, safety information, product specifications, features, proper maintenance and rebuild instructions for the COMFORT AIR Suspension.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson Tech Services at 630-910-2800 or email (techservices@hendrickson-intl.com) for information on the latest version of this manual.

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

SECTION 2

Product Description

The COMFORT AIR rear suspension system for Hino vehicles, based on Hendrickson's proven HAS technology, is designed for medium-duty applications where cargo protection, empty ride, constant freight height and driver comfort are a requirement - i.e., beverage trucks, furniture, rental, emergency vehicles, recycling vehicles, sweepers, and tractors. The new system combines superior ride and handling with enhanced equipment protection.

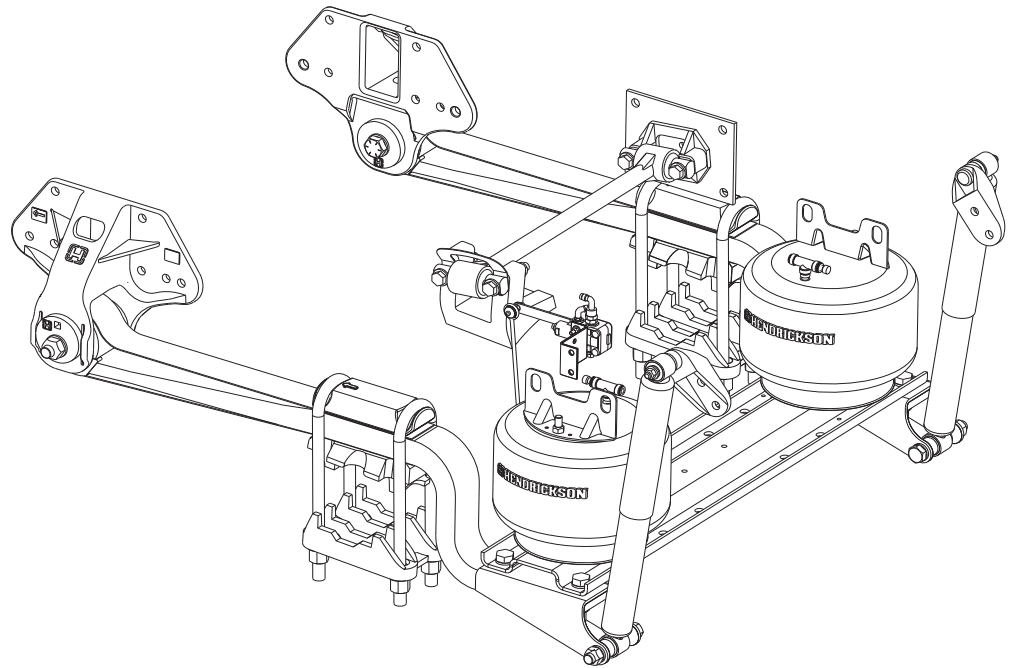
- Frame Hanger Bracket – Wide footprint distributes load over a larger area for reduced frame stress.
- QUIK-ALIGN® – Fast and easy alignment without shims, see Figure 2-1.
- Main Support Member – Extended-length generates lower spring rate for optimized roll stiffness providing a more comfortable and compliant ride.
- Shock Absorbers – Shock absorbers are tuned for optimum damping characteristics to provide driving comfort.
- Air Springs – Adjusts to changing load conditions to deliver superior ride quality.
- ULTRA ROD® – Lightweight and durable torque rod, the ULTRA ROD® is an integral component of the COMFORT AIR suspension system that enhances handling during cornering and helps maintain lateral axle position.
- Height Control Valve – Maintains precise ride height control through changing road surfaces, load, and driving conditions.



The COMFORT AIR rear suspension system for Hino vehicles is available in single axle suspension capacities up to 21,000 pounds, and a ride height of 8.5". The suspension weighs approximately 462 pounds and includes the frame hanger brackets, main support member assembly, axle clamp group, air springs, shock absorbers, cross channel, upper and lower shock brackets, ULTRA ROD transverse torque rod and frame bracket, height control system, and fasteners.

This COMFORT AIR suspension was specifically tailored for the Hino vehicle. The suspension mounting brackets use common frame hole locations with the mechanical suspension allowing relatively easy conversions to air ride.

FIGURE 2-1





SECTION 3

IMPORTANT SAFETY NOTICE




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

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

Failure to follow the safety precautions in this manual can result in personal injury and/or property damage. Carefully read and understand all safety related information within this publication, 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 minimize the risk of personal injury to service personnel, or possibility of improper service methods that may damage the vehicle or render it unsafe. 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 IMMEDIATE HAZARDS WHICH WILL RESULT IN SEVERE PERSONAL INJURY OR DEATH.
 WARNING	INDICATES HAZARDS OR UNSAFE PRACTICES WHICH COULD RESULT IN SEVERE PERSONAL INJURY OR DEATH.
 CAUTION	INDICATES HAZARDS OR UNSAFE PRACTICES WHICH COULD RESULT IN DAMAGE TO MACHINE OR MINOR PERSONAL INJURY.
NOTE	An operating procedure, practice condition, etc. which is essential to emphasize.
SERVICE HINT	A helpful suggestion which will make the servicing being performed a little easier and/or faster.

WARNINGS



WARNING

FASTENERS

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



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 AUTHORIZATION FROM HENDRICKSON. DO NOT SUBSTITUTE PARTS OF THE SUSPENSION. USE OF MODIFIED OR REPLACEMENT PARTS NOT AUTHORIZED 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 AUTHORIZED REPLACEMENT PARTS.



WARNING

TORCH/WELDING

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

SHOCK ABSORBERS

THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SUSPENSION. ANYTIME THE AXLE ON A COMFORT AIR SUSPENSION IS SUSPENDED IT IS MANDATORY THAT THE SHOCK ABSORBERS REMAIN CONNECTED. FAILURE TO DO SO CAN CAUSE THE AIR SPRINGS TO SEPARATE FROM THE PISTON AND RESULT IN PREMATURE AIR SPRING FAILURE AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

REPLACEMENT OF SHOCK ABSORBERS WITH NON-HENDRICKSON PARTS CAN ALTER THE REBOUND TRAVEL AND THE RIDE QUALITY 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 100 PSI AT DESIGN RIDE HEIGHT OF 8.5 INCHES (215MM) AND DO NOT EXCEED 40 PSI ABOVE 16.7 INCHES (424MM) AIR SPRING HEIGHT). CONTACT HENDRICKSON TECH SERVICES FOR DETAILS. IMPROPER USE OR OVER INFLATION MAY CAUSE ASSEMBLY TO BURST CAUSING PROPERTY OR COMPONENT DAMAGE AND/OR SEVERE PERSONAL INJURY.

INFLATE THE SUSPENSION SLOWLY AND MAKE SURE THAT THE RUBBER BLADDER OF THE AIR SPRING INFLATES UNIFORMLY AND IS NOT BINDING. FAILURE TO DO SO CAN CAUSE COMPONENT DAMAGE, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE, AND VOID THE WARRANTY.

DEFLATION: AIR SPRINGS MUST BE DEFLATED PRIOR TO LOOSENING ANY CLAMP GROUP HARDWARE. UNCONSTRAINED AIR SPRINGS WILL VIOLENTLY SHIFT WHICH CAN CAUSE PROPERTY DAMAGE OR SEVERE PERSONAL INJURY.

**CAUTION**

IF THE AIR SPRING IS BEING REMOVED, IT IS MANDATORY TO LUBRICATE THE LOWER AIR SPRING FASTENER 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 GASOLINE OR FLAMMABLE SOLVENTS THAT CAN EXPLODE.
5. HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED CORRECTLY. FOLLOW THE MANUFACTURER'S RECOMMENDED INSTRUCTIONS AND GUIDELINES CAREFULLY TO HELP PREVENT PERSONAL ACCIDENT OR INJURY.

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

**WARNING****QUIK-ALIGN FASTENERS**

DO NOT ASSEMBLE QUIK-ALIGN JOINT WITHOUT THE PROPER FASTENERS. USE ONLY DACROMET PLUS L PLATED FASTENERS TO SUSTAIN PROPER CLAMP FORCE. ANYTIME THE QUIK-ALIGN JOINT IS SERVICED NEW DACROMET PLUS L FASTENERS MUST BE USED. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR SEVERE 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, PROPERTY DAMAGE OR SEVERE PERSONAL INJURY.

**WARNING****U BOLT FASTENERS**

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

**WARNING****MAIN SUPPORT MEMBER**

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

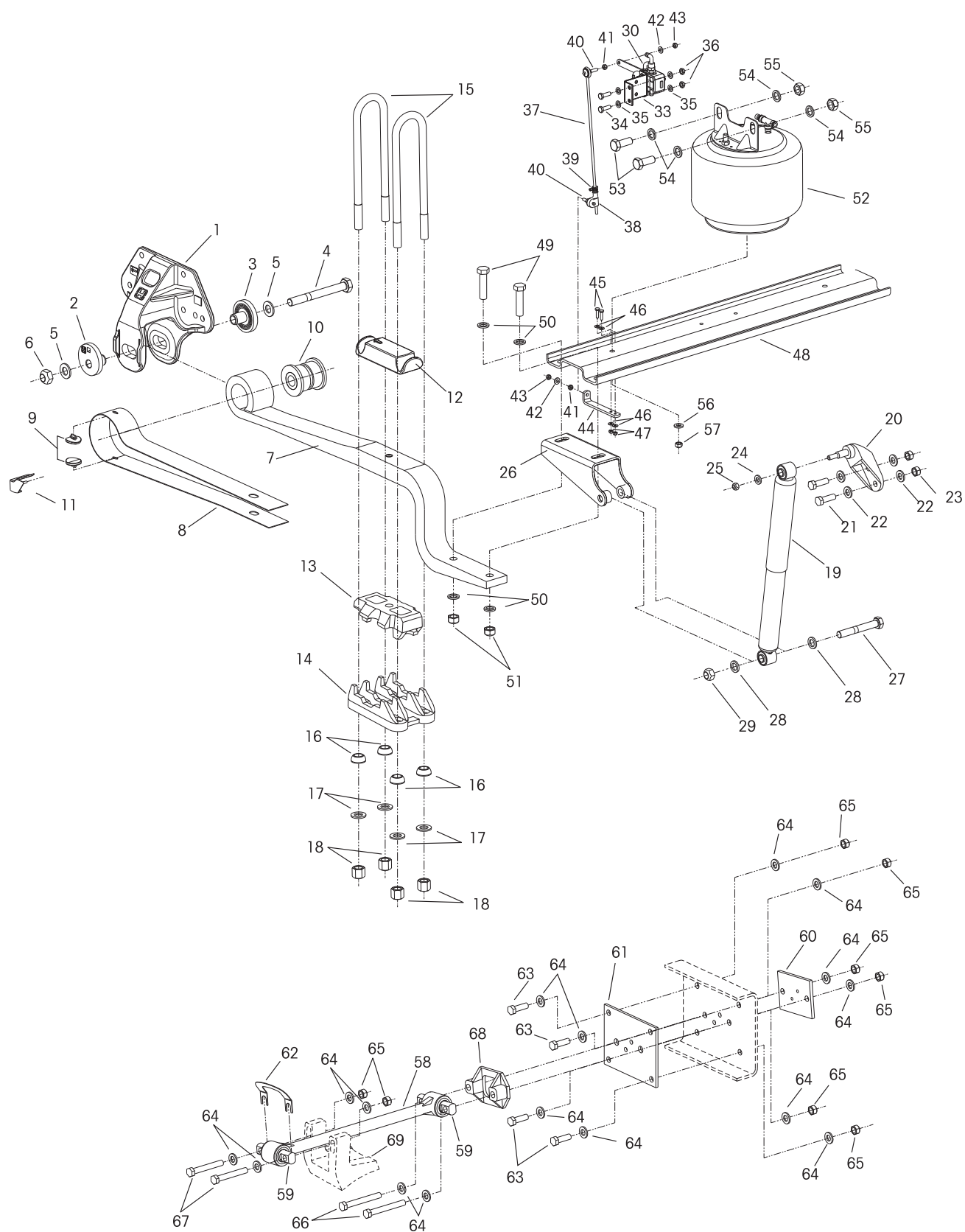
**WARNING****CROSS CHANNEL**

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

- DO NOT USE THE SUSPENSION CROSS CHANNEL AS A JACKING POINT
- REFER TO VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS

SECTION 4

Parts Lists





KEY NO.	PART NO.	DESCRIPTION	NO.REQ.	KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1		Spring Hanger		42	--	*5/16" Washer	2
	65081-001	Left Hand	1	43	--	*5/16" -18 UNC Locknut	2
	65081-002	Right Hand	1	44	65090-000	HCV Lower Linkage Bracket	1
	65119-002	QUIK-ALIGN Right Hand Service Kit (Includes Key Nos. 3-6)		45	65091-001	M6 x 1 Bolt 30mm	2
	65119-001	QUIK-ALIGN Left Hand Service Kit (Includes Key Nos. 2-6)		46	58246-016	M6 Hardened Washer	4
2	60662-000	QUIK-ALIGN Eccentric Collar	1	47	65092-000	M6 x 1 Locknut	2
3	60661-000	QUIK-ALIGN Concentric Collar	3	48	57317-007	Cross Channel	1
4	58705-005	7/8"-9 UNC x 8" Long Dacromet Bolt	2		57499-003	Cross Channel Fastener Service Kit (Includes Key Nos. 49 - 51)	
5	22962-034	7/8" Dacromet Hardened Washer	4	49	58258-001	M20 x 2.5 Bolt 80mm	4
6	60266-000	7/8"-9 UNC Dacromet Locknut	2	50	58246-007	M20 Hardened Washer	8
	65106-001	Main Support Member Ass'y (Includes Key Nos. 7-11)	2	51	58259-000	M20 x 2.5 Locknut	4
7	65106-000	Main Support Member	1	52	65086-002	Air Spring Ass'y	2
8	--	*Flexi-Wrap	1		58820-005	Air Spring Fastener Service Kit (Includes Key Nos. 53 - 57)	
	34013-109	Main Support Member Bushing Service Kit (Includes Key Nos. 4-6, and 9-11)		53	58258-004	M20 x 2.5 Bolt 50mm	4
9	59770-000	Isolator Pad	1	54	58246-007	M20 Hardened Washer	8
10	58648-000	MSM Pivot Bushing	1	55	58259-000	M20 x 2.5 Locknut	4
11	60392-000	Spring Eye Clip	1	56	58246-001	M12 Hardened Washer	2
12	65071-000	Top Pad	2	57	65089-000	M12 x 1.25 Locknut	2
13	56501-005P	Spring Seat - 4°	2	58	62000-595	**Transverse Torque Rod Ass'y 595mm (Includes Key No. 59)	1
14	50216-000	Axle Bottom Cap	2	59	47691-000H	Torque Rod Barpin Bushing	1
	58818-011	U-Bolt Bracket Fastener Kit (Includes Key Nos. 15-18)		60	65137-000	Outer Reinforcement Plate	1
15	58184-001	M22 x 1.5 U-Bolt 380mm	4	61	65095-000	Inner Reinforcement Plate	1
16	48574-001	Spherical Washer	8		58819-004	Transverse Torque Rod Fastener Service Kit (Includes Key Nos. 62- 67)	
17	58246-005	M22 Hardened Washer	8	62	49689-000	Shim (1.5mm)	1
18	58253-000	M22 x 1.5 High Nut	8	63	58244-002	M16 x 2 Bolt 50mm	4
19	60670-013	Shock Absorber	2	64	58246-003	M16 Hardened Washer	16
20	58516-002P	Upper Shock Bracket	2	65	58245-000	M16 x 2 Locknut	8
	65118-002	Upper Shock Bracket Service Kit (Includes Key Nos. 21- 25)		66	58244-005	M16 x 2 Bolt 130mm	2
21	58244-002	M16 x 2 Bolt 50mm	4	67	58244-009	M16 x 2 Bolt 110mm	2
22	58246-003	M16 Hardened Washer	8	68	22186-000	Transverse Torque Rod Frame Bracket	1
23	58245-000	M16 x 2 Locknut	4	69	--	Transverse Torque Rod Axle Bracket Supplied by Vehicle Manufacturer	1
24	58246-001	M12 Hardened Washer	2	Not Shown	60298-003	Torque Requirement Decal	
25	58248-000	M12 X 1.75 Locknut	2				
26	65098-000	Lower Shock Bracket	2				
27	58258-005	M20 x 2.5 Bolt 140mm	2				
28	58246-007	M20 Hardened Washer	4				
29	58259-000	M20 x 2.5 Locknut	2				
	65115-000	Height Control Valve System (Includes Key Nos. 30-33)	1				
30	60501-000	Height Control Valve	1				
31	22962-028	¼" HCV Washer (not shown)	2				
32	49983-000	¼" HCV Hex Nut (not shown)	2				
33	65097-000	HCV Mounting Bracket	1				
	65121-001	HCV Upper Frame Fastener Service Kit (Includes Key Nos. 34-36)					
34	58573-004	M10 x 1.5 Bolt 30mm	2				
35	58246-008	M10 Hardened Washer	4				
36	58581-000	M10 x 1.5 Locknut	2				
	58994-032	Linkage Rod Assembly (Includes Key Nos. 37-43)	1				
37	--	*Linkage Rod	1				
38	--	*Valve Arm Joint	1				
39	--	*Valve Arm Clamp	1				
40	--	*5/16" -18 UNC Stud	2				
41	--	*5/16" -18 UNC Jam Nut	2				

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

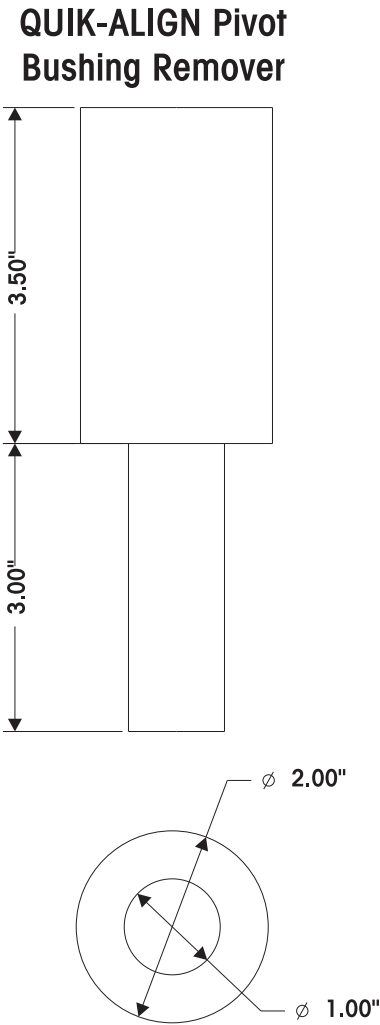
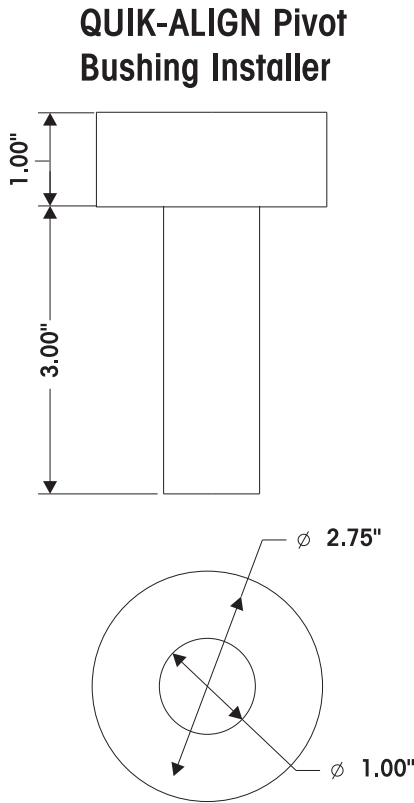
** Hendrickson two piece torque rods can be used to create the desired torque rod length, see literature number 45745-149 for more information. Hendrickson's literature is also available on our website: www.hendrickson-intl.com.

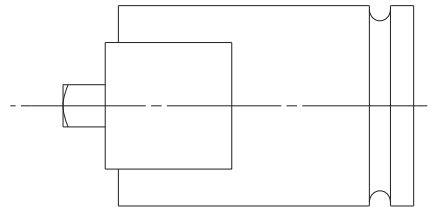
HENDRICKSON SERVICE KITS QUICK REFERENCE

65119-002	QUIK-ALIGN Right Hand Service Kit
65119-001	QUIK-ALIGN Left Hand Service Kit
34013-109	Main Support Member Bushing Service Kit
58818-011	U-Bolt Bracket Fastener Kit
65118-002	Upper Shock Bracket Service Kit
65121-001	HCV Upper Frame Fastener Service Kit
57499-003	Cross Channel Fastener Service Kit
58820-005	Air Spring Fastener Service Kit
58819-004	Transverse Torque Rod Fastener Service Kit



SECTION 5
Special Tools





SECTION 6

Preventive Maintenance

VISUAL INSPECTION

A visual inspection of the suspension should be performed at time of delivery and every 25,000 miles or every six months thereafter, whichever comes first, to help ensure all components function to their highest efficiency.

- **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 spring or component damage. Insure that the upper bead plate is tight against the underside of the frame. Check for any lateral slippage at the lower air spring bracket. Replace all worn or damaged parts.
- **Main Support Member Assembly** – Look for signs of looseness, cracks, or other damage. Inspect QUIK-ALIGN bushings for looseness, torn or shredded rubber. Inspect the cross channel connection for looseness or damage. Inspect flexi-wrap isolator pads for wear or damage. Inspect flexi-wrap for signs of looseness or damage. Check torque on QUIK-ALIGN fasteners, cross channel fasteners, and U-bolts. Correct the torque if necessary.
- **Fasteners** – Look 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 Chart in this publication for recommended torque requirements. Use a calibrated torque wrench to check torque in a tightening direction. As soon as the fastener starts to move, record the torque. Correct the torque if necessary. Replace any worn or damaged fasteners with genuine specified fasteners.
- **Frame Hanger Bracket** – Check for any signs of loosening or damage at the QUIK-ALIGN connections. Check for cracks, damage, or any signs of looseness at the mounting fasteners. Replace all worn or damaged parts.
- **Cross Channel** – Check for cracks, damage, metal shavings, or looseness at the main support member 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 bushing joint, this is a sign of excessive bushing wear and the bushing 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 in this section.
- **Tire Wear** – Inspect the tires for wear patterns that may indicate suspension damage or misalignment. Replace all worn or damaged parts.
- **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. Replace all worn or damaged parts.

MAIN SUPPORT MEMBER ASSEMBLY BUSHINGS

Bushings should function satisfactorily during normal vehicle operation. However, if the suspension is not maintained properly premature bushing wear can occur and will require replacement. The main support member assembly pivot bushing should be replaced if it exhibits excessive fore-aft movement or the vehicle is experiencing excessive tire wear on the rear axle. For instructions on bushing replacement, see the Component Replacement section of this publication.

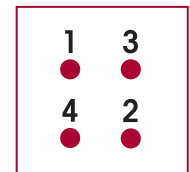
U BOLT LOCKNUTS

U Bolt locknuts must be re-torqued to specification using the proper technique.

NOTE

Tighten the U Bolt locknuts evenly to 400-450 foot pounds (545 - 610 Nm) in the proper sequence as shown in Figure 6-1. **DO NOT EXCEED SPECIFIED TORQUE ON U BOLT LOCKNUTS.**

FIGURE 6-1

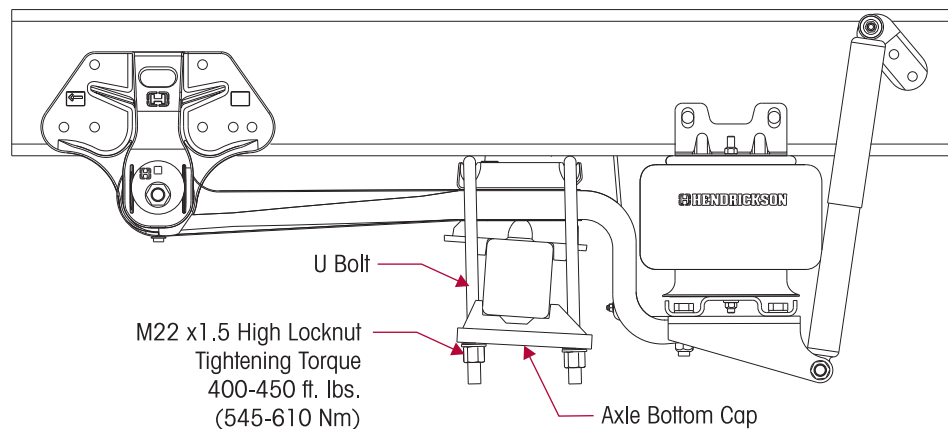


U-bolt locknuts must be re-torqued at the following intervals:

- At preparation for delivery.
- At 1,000 miles of service on a new vehicle or vehicle with serviced axle attachment assembly.
- Thereafter follow the 1-year/20,000 mile (30,000 Km) inspection and re-torque interval.

Current Hendrickson Truck Suspension Systems U Bolt locknuts for the COMFORT AIR suspension are M22 x 1.5 - class 10 high nuts with Dacromet L coating.

FIGURE 6-2



TRANSVERSE TORQUE RODS

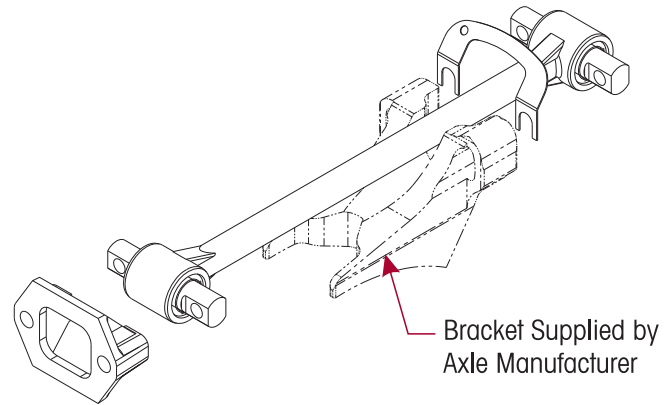
The transverse torque rod maintains lateral axle position during cornering. The vehicle manufacturer determines the length of the transverse torque rod. The mounting bracket at the axle end of the torque rod is furnished and welded into position on the axle housing by the axle or vehicle manufacturer, see Figure 6-2. It is important to check the tightening torque of the nuts during preventive maintenance service.

FIGURE 6-2

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

The torque rod may be renewed by pressing out the worn bushings and installing new replacement bushings. See torque rod removal and bushing replacement in Section 8 of this publication.

A two-piece rod is also available to cut and weld to the desired length, see Hendrickson publication no. 59310-001.



NOTE

Hendrickson recommends the use of Dacromet L, Class 10.9 bolts and Class 10 locknuts for all straddle mount torque rod attachments.

AIR FITTING INSPECTION

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

NOTE

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

HEIGHT CONTROL VALVE TEST

The height control valve test can be done with Barksdale Test Kit (Model 2250). If the Barksdale Inc. kit is used follow their instructions. If using shop tools you will need the following for proper testing:

KIT CONTENTS

- 160 pound minimum gauge that has a 5 pound graduation marks with a ¼" male brass connection
- 2" long ¼" Tubing inserted into brass connection of gauge
- ¼" Female straight adapter that mates to ¼" air hose
- ¼" NPT-¼" PTC Fitting
- ¼" NPT Plug
- Centering Pin (1/8" wooden dowel rod)
- Tool for air line removal

INSTRUCTIONS

1. Disconnect the height control linkage from the height control valve arm.

2. Lower height control valve linkage arm down to exhaust air from the suspension system.

3. Clean area around air fittings.

4. Disconnect the air lines from the air springs to the valve, at C1 and C2.

5. Plug C2 port.

6. Attach gauge tubing on C1 port, as shown in Figure 6-3.

7. Apply lubricant on tubing end to facilitate installation.

8. Move handle up to FILL mode. This pressurizes the test valve/gauge.

9. Move valve arm towards center and install centering pin in holes on the valve arm and the valve housing, as shown in Figure 6-4. Care must be exercised so as not to overshoot the center (blocked) mode of the valve, as this will cause the test volume to be exhausted.

10. Note pressure reading on gauge.

11. Observe pressure reading for a period of 30 seconds.

FIGURE 6-3
DIAGRAM

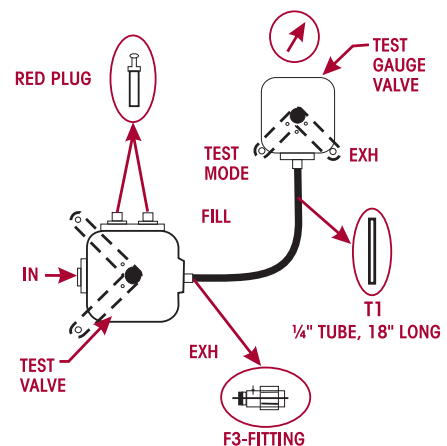


FIGURE 6-4

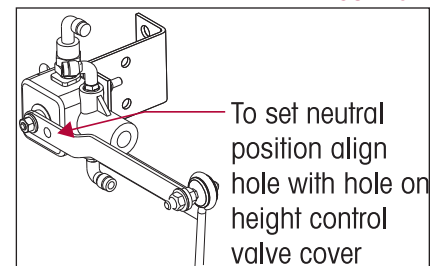
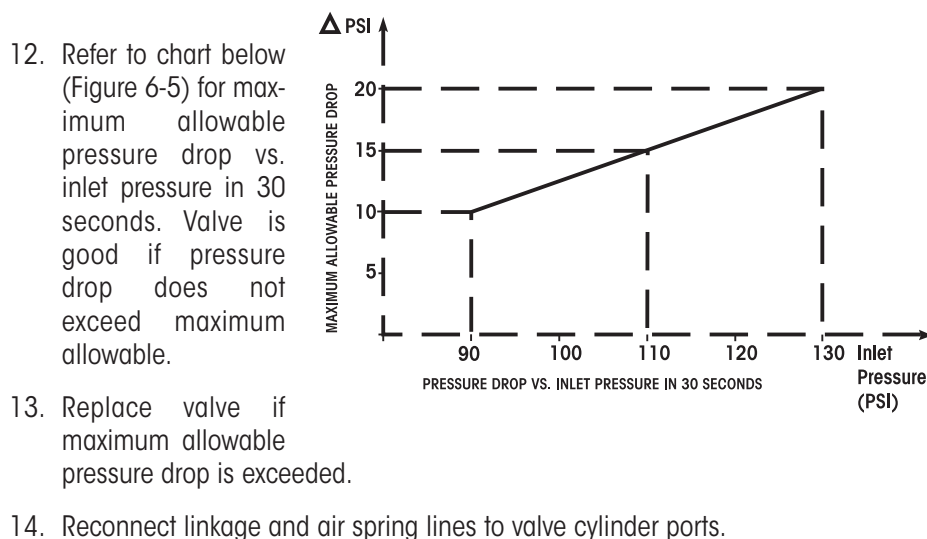


FIGURE 6-5

**NOTE**

If valve meets all the above characteristics, the valve is operating properly. Do not attempt to disassemble or repair valve, as this will void warranty.

SHOCK ABSORBER

Inspection of the shock absorber can be performed by doing a heat test, and a visual inspection. If the shock is damaged install new shock absorber as detailed in the Component Replacement section of this publication Hendrickson recommends that the shock absorbers be replaced with identical Hendrickson Genuine parts for servicing. It is not necessary to replace shock absorbers in pairs if one shock absorber requires replacement.

FIGURE 6-6

HEAT TEST

1. Drive the vehicle at a moderate speed on a rough road for fifteen minutes.

**WARNING**

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

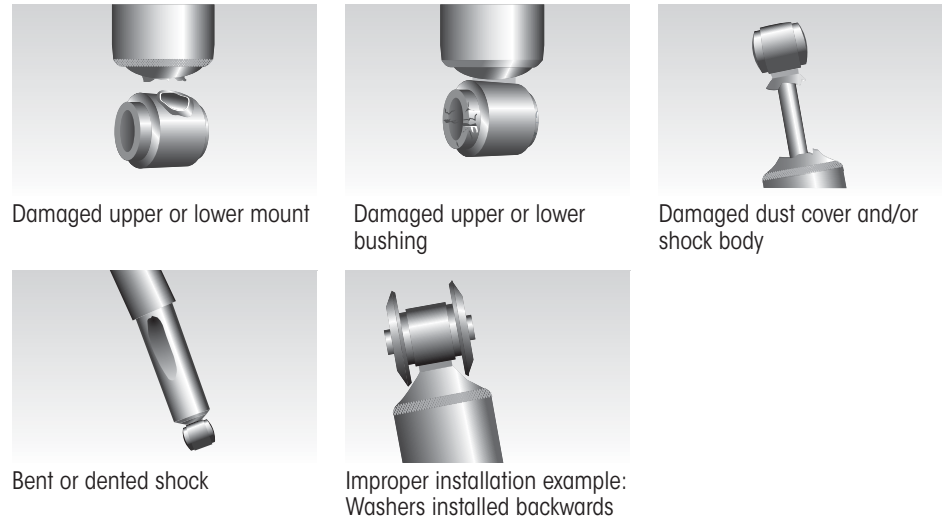
2. Lightly touch the shock body carefully below the dust cover, see Figure 6-6.
3. Touch the frame to get an ambient reference. A warm shock absorber is acceptable, a cold shock absorber should be replaced.
4. To inspect for an internal failure, remove and shake the suspected shock. Listen for the sound of metal parts rattling inside. Rattling of metal parts can indicate that the shock has an internal failure.



VISUAL INSPECTION

Look for these potential problems when doing a visual inspection, see Figure 6-7. Inspect the shock absorbers fully extended. Replace as necessary.

FIGURE 6-7



LEAKING VS. MISTING SHOCK VISUAL INSPECTION

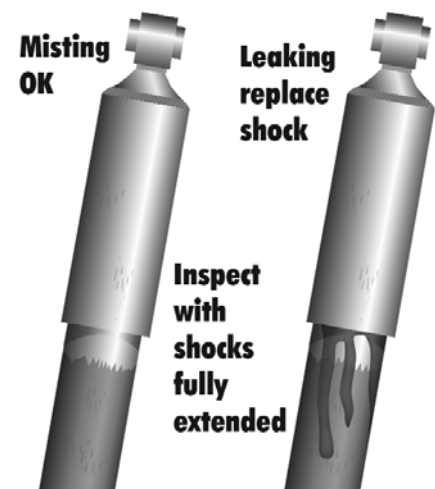
The inspection must not be conducted after driving in wet weather or a vehicle wash. Shocks need to be free from water. Many shocks are often mis-diagnosed as failures. Misting is the process whereby very small amounts of shock fluid evaporate at a high operating temperature through the upper seal of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

A shock that is leaking and needs to be replaced will show signs of fluid leaking in streams from the upper seal. These streams can easily be seen when the shock is fully extended, underneath the main body (dust cover) of the shock, see Figure 6-8. Look for these potential problems when doing a visual inspection. Inspect the shock absorbers fully extended. Replace as necessary.

NOTE

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

FIGURE 6-8



If the shock is damaged install new shock absorber as detailed in the Component Replacement section of this publication. Hendrickson recommends that the shock absorbers be replaced with identical Hendrickson Genuine parts for servicing. It is not necessary to replace shock absorbers in pairs if one shock absorber requires replacement.

SECTION 7

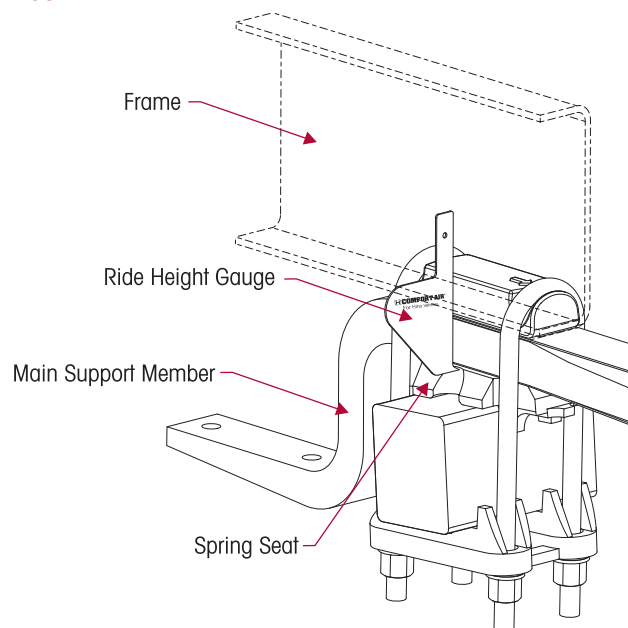
Alignment & Adjustments

RIDE HEIGHT ADJUSTMENT

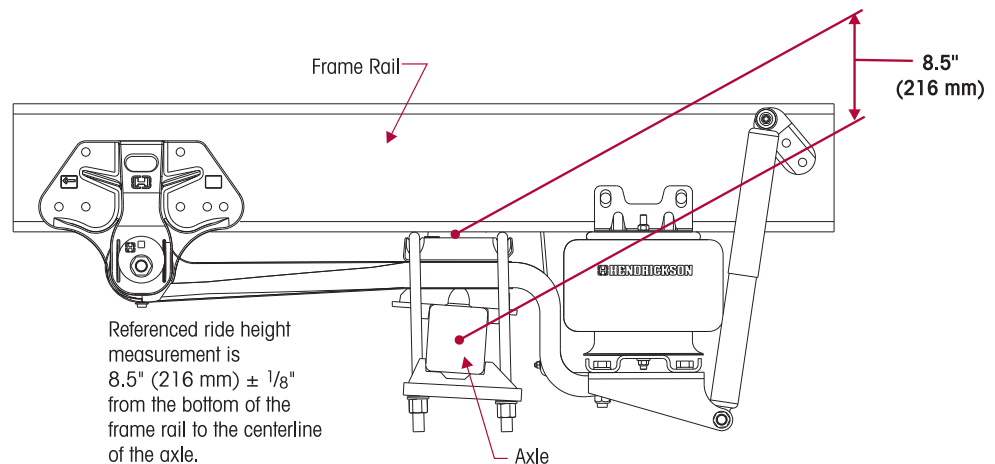
The Comfort Air suspension for Hino vehicles is equipped with a height control valve located above the left air spring on the inside of the left frame rail. Please refer to the Plumbing Diagram Section in this publication.

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. Chock the front wheels of the vehicle.
4. Verify the air system is at full operating pressure.
5. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to deflating or inflating the air system.
6. Cycle the air system. Disconnect the leveling valve arm from the rubber grommet. Lower the leveling valve arm to exhaust the air in the air springs and deflate the suspension. Reconnect the leveling valve arm to the rubber grommet to inflate the suspension, see Figure 7-1.
7. A ride height gauge (Hendrickson literature no. 45745-242) for the COMFORT AIR for Hino Vehicles is available from Hendrickson to simplify establishing the $4.5" \pm 1/8"$ ride height dimension as shown in Figure 7-1.
 - a. Hold the ride height gauge (Hendrickson literature no. 45745-242) vertically against the side of the frame rail and in contact with the bottom of the frame rail, see Figure 7-1. The bottom of the main support member must line up with the pointer of the ride height gauge ($\pm 1/8"$).

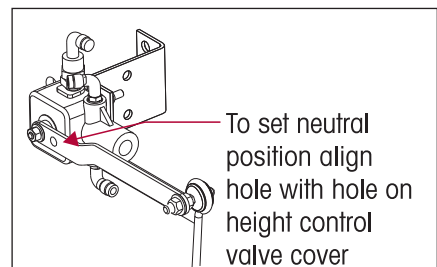
FIGURE 7-1



- b. If a height gauge is not available, the alternate method is to use a tape measure to check the referenced vertical ride height from the bottom of the frame rail to the centerline of the axle. Referenced vertical ride height is 8.5" \pm 1/8", see Figure 7-2).

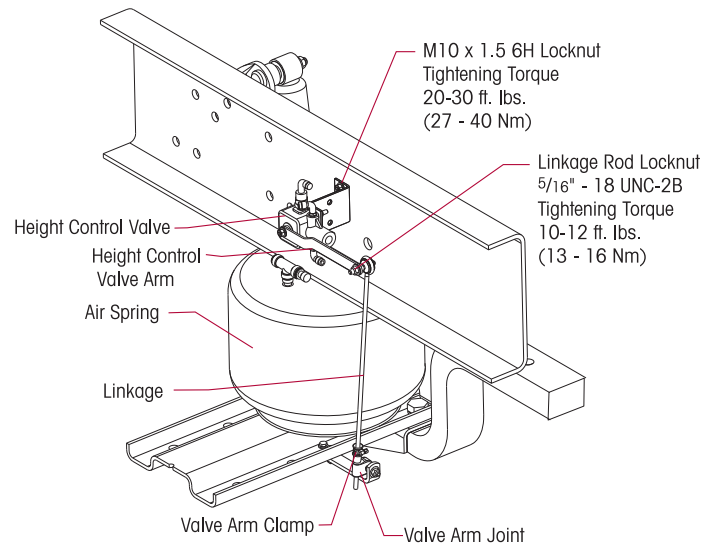
FIGURE 7-2


8. If an adjustment is required, verify that the air system is at full operating pressure.
9. See Air Spring Warnings and instructions in the Safety Notice Section of this publication prior to deflating or inflating the suspension system. Disconnect the height control valve's leveling arm from the rubber grommet. Lower the leveling valve arm to exhaust the air from the air springs and deflate the rear suspension.
10. Refill the suspension by raising the height control valve arm by hand, so that the suspension is above the proper ride height.
11. Lower the leveling valve arm to exhaust the air system until the suspension is at proper ride height.

FIGURE 7-3


12. Use a 1/8" wooden dowel rod (golf tee) to set the neutral position for the height control valve by aligning the hole in the leveling arm with the hole in the height control valve cover, as shown in Figure 7-3. **DO NOT USE A METAL ROD OR NAIL AS THIS MAY CAUSE DAMAGE TO THE HEIGHT CONTROL VALVE.**
13. Adjust the extension rod 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.
14. Reconnect the height control valve arm to the rubber grommet.
15. Tighten the clamp on the adjustable valve arm joint with a screwdriver until securely fastened, see Figure 7-4.

FIGURE 7-4



16. Remove the dowel from the height control valve.
17. 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 with a dump valve, cycle the height control valve's leveling arm as stated in steps number 4 through 6 above.
18. Recheck the ride height.
19. Repeat steps 3 through 18 until the ride height is within specification.

SERVICE HINT

It is very important that the leveling valve be cycled completely before and after any ride height adjustments. The cycling of the leveling valve will help make the adjustment more accurate. Be sure to maintain full system air pressure while setting or inspecting ride height.

NOTE

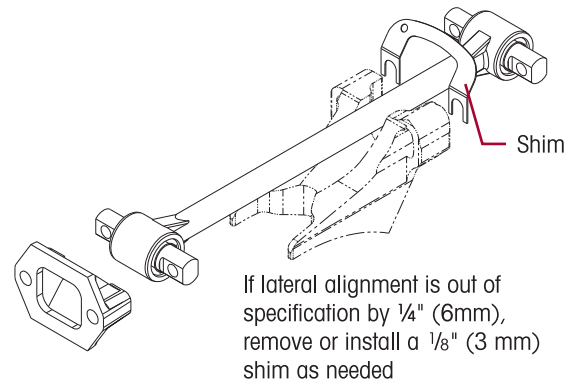
During cycle operation of the height control valve it is normal to experience a limited amount of exhaust noise.

LATERAL ALIGNMENT

1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used. Do not set the parking brake. Chock the front wheels of the vehicle.
2. Measure from the outside of the frame rail to the rim flange of the inner tire. Record the measurement.
3. Measure the same distance on the opposite side of the same axle. Record the measurement.

FIGURE 7-5

4. Subtract the two measurements to get a difference between the two. If the difference is greater than 1/8 inch (3mm) it will be necessary to correct the lateral alignment. Adding or removing shims that are located between the transverse torque rod and frame rail accomplishes this. 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 1/4 inch (6mm), remove or install a 1/8 inch (3mm) shim as needed, see Figure 7-5.

It is important to check the transverse torque rod fasteners for proper torque during preventive maintenance service intervals. See Tightening Torque Specifications Section in this publication.

PINION ANGLE

The vehicle manufacturer establishes drive axle pinion angles. If it is necessary to fine-tune the pinion angle it will be necessary to contact the vehicle manufacturer.


TO CHECK THE PINION ANGLE

1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used.
2. Verify vehicle is at the proper ride height (see ride height adjustment in this section).
3. Install a digital protractor on the axle housing as shown in Figure 7-6.
4. Check to see if the pinion angle is correct per the vehicle manufacturer's specifications. If an adjustment is needed please contact the vehicle manufacturer.

FIGURE 7-6


REAR AXLE ALIGNMENT

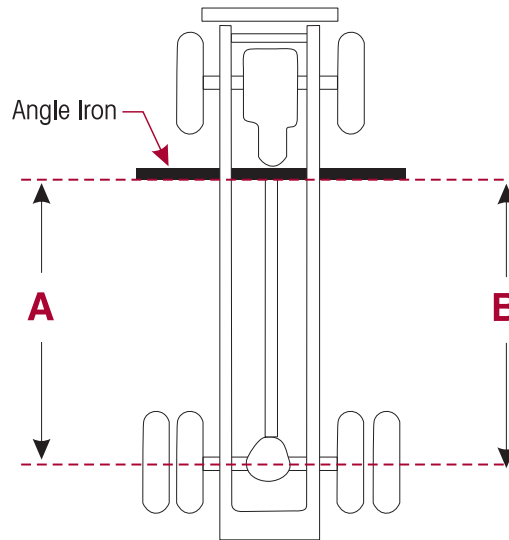
Proper rear axle alignment is essential for maximum ride quality, performance, and tire service life. The recommended alignment procedure is described below. This procedure should be performed if excessive or irregular tire wear is observed, or any time the main support member assembly is removed for service. The following procedure should be performed after all repairs are completed.

NOTE It is important to have the QUIK-ALIGN locknut pre-torqued to  100 foot pounds (135 Nm) on the left side of vehicle only. All other suspension fasteners must be tightened to their specified torque values. The total range of rear axle alignment adjustment is 1.0" (25.4mm).

NOTE Use a new QUIK-ALIGN kit for any axle alignment or disassembly of the QUIK-ALIGN connection. This ensures proper clamping force is applied to the connection.

1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used.
2. Chock front wheels of vehicle.
3. Verify proper ride height is set. For proper ride height instructions see Ride Height Adjustment in this section of this publication.

FIGURE 7-7



4. Using "C" clamps, securely clamp a six-foot piece of STRAIGHT bar stock or angle iron across the lower frame flange as shown in Figure 7-7. Select a location as far forward of the drive axle as possible where components will not interfere.
5. Accurately square straight edge to frame using a carpenter's square.
6. Using a measuring tape, measure from the straight edge to the forward face of the drive axle arm at the centerline of the spring seat on both sides of vehicle as shown in Figure 7-7, A and B. If both sides measure within the vehicle manufacturer's specifications then the alignment of drive axle is acceptable. If measurement A and B are not within specifications then proceed to steps 7 through 11.

7. Remove the existing left side Quik-Align hardware and replace with a new left side Quik-Align service kit (kit no. 65119-001). Tighten the Quik Align locknut to 100 foot pounds (135 Nm), see Figure 7-8. This will hold the eccentric flanged washer in place against the hanger face, and within the adjustment guide, but loose enough to permit the eccentric flanged washer to rotate freely.
8. Using an alignment tool or ½" square drive breaker bar rotate the left eccentric alignment collar to align axle (Clockwise rotation moves axle forward, counter clockwise rotation moves axle rearward). A 90° rotation of the QUIK-ALIGN collar will move axle fore and aft ± ½" from center.


WARNING

DO NOT ASSEMBLE THE QUIK-ALIGN JOINT WITHOUT PROPER FASTENERS. USE ONLY DACROMET PLUS L PLATED FASTENERS TO SUSTAIN PROPER CLAMP FORCE. FAILURE TO DO SO COULD CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH.

ENSURE THAT THE QUIK-ALIGN FASTENERS TORQUE VALUE IS SUSTAINED AS RECOMMENDED IN THE TORQUE REQUIREMENTS SECTION OF THIS PUBLICATION. FAILURE TO DO SO COULD CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, SEVERE PERSONAL INJURY, OR DEATH.

9. Measure from the straight edge to the forward face of the axle arm to verify both sides of axle are equal and tighten the 7/8" x 9 QUIK-ALIGN locknuts to 550-600 foot pounds (745-810 Nm) torque, see Figure 7-8.

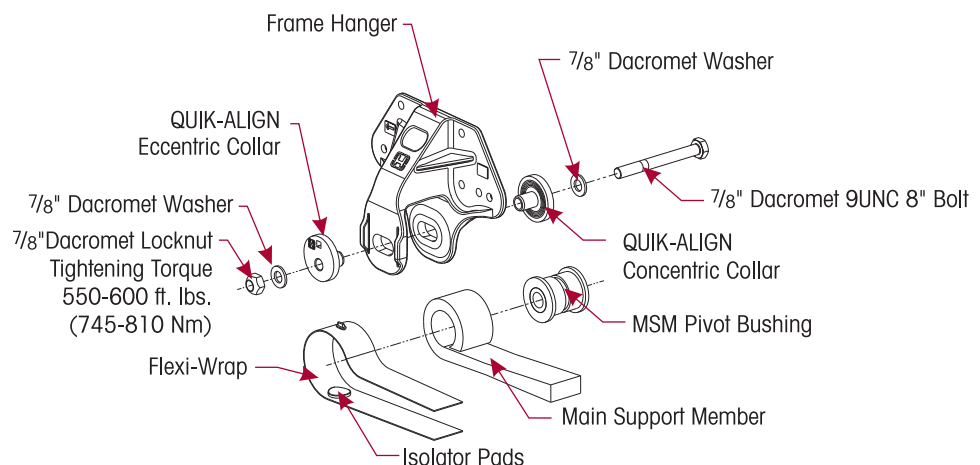
NOTE

The Eccentric collar (1 per suspension) is located on the outside of the left frame hanger. The concentric collars (3 per suspension) are located on the inside of the left frame hanger and both outside and inside of the right frame hanger.

NOTE

Axle adjustment is applied to the **LEFT** side of the vehicle only. If adjustment to the right side of the vehicle is necessary, it will require replacement of the outside concentric collar with an eccentric collar (Hendrickson Part No. 60662-000) and repeat steps 6 through 10 on the right side of the vehicle.

10. Following alignment of axle, move vehicle back and forth several times prior to removing straight edge from frame, and recheck measurements to confirm adjustments.
11. Repeat steps 6 through 10 until alignment is achieved.

FIGURE 7-8


SECTION 8

Component Replacement

FASTENERS

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

AIR SPRING

DISASSEMBLY

1. Chock the front wheels.
2. Support the frame of the vehicle at ride height.

**WARNING**

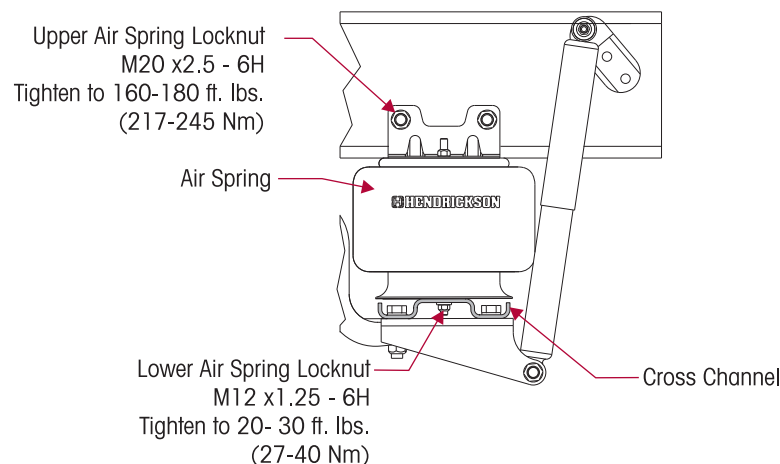
THE VEHICLE MUST BE FIRMLY SUPPORTED WITH JACK STANDS PRIOR TO SERVICING. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

3. Disconnect the height control linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.
4. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to deflating the suspension system. Lower the leveling valve arm to exhaust the air in the air springs and deflate the rear suspension.
5. Remove the air line from the air spring.

SERVICE HINT

If the air spring is being removed for an alternate repair and will be reused it will be necessary to lubricate the lower mounting stud with penetrating oil prior to removal of the locknut. This will help prevent the air spring mounting stud from breaking during the removal process.

FIGURE 8-1



6. **Using hand tools only**, remove the M12 x 1.25 lower air spring mounting locknut. This will help prevent the air spring mounting stud from breaking during the removal process.

7. Remove the two M20 x 2.5 x 50mm fasteners from the upper air spring mounting bracket and the frame.
8. Remove the air spring.

INSPECTION

1. Inspect the mounting surfaces and lower air spring mount for any damage. Replace as necessary.
2. Inspect upper air spring bracket for cracks. Replace as necessary.



ASSEMBLY

1. Install the air spring between the frame and cross channel, see Figure 8-1.



CAUTION

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.

2. Hold the air spring tight against the bottom frame flange and tighten the two M20 x 2.5 x 50mm upper air spring mounting fasteners to  160-180 foot pounds (217-245 Nm).
3. Install the air spring lower mounting stud through the cross-channel hole. Attach the M12 washer and M12 x 1.25 locknut to the lower mounting stud of the air spring. **USING HAND TOOLS ONLY**, tighten the locknut to  20-30 foot pounds (27-40 Nm).
4. Connect the air line to the air spring.
5. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to inflating the suspension system. Inflate the suspension by connecting the height control valve linkage to the height control valve arm. Verify the air springs inflate uniformly without binding.
6. Remove the frame supports.
7. Remove the wheel chocks.
8. Verify proper ride height adjustment, (see ride height adjustment Alignment and Adjustment Section of this publication).

CROSS CHANNEL

The following procedure is recommended to replace the cross channel:

DISASSEMBLY

1. Chock the front wheels.
2. Support the frame of the vehicle at ride height.



WARNING

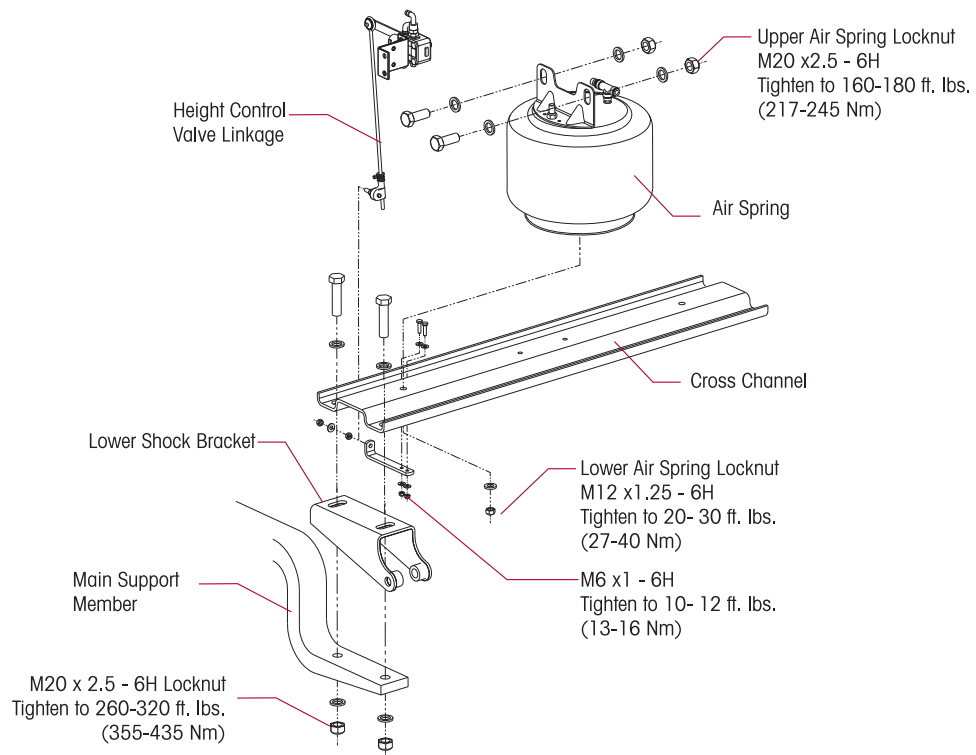
THE VEHICLE MUST BE FIRMLY SUPPORTED WITH JACK STANDS PRIOR TO SERVICING. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

3. Remove the air springs as detailed in the AIR SPRING Disassembly in this section.
4. Remove the two M6 x 1 fasteners holding the height control valve's lower bracket to the cross channel. Remove the bracket.
5. Remove the four M20 x 2.5 x 80mm bolts from the cross channel.
6. Remove the cross channel.



INSPECTION

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

FIGURE 8-2





ASSEMBLY

1. Place cross channel on top of the lower shock bracket and main support member.
2. Loosely install the two M20 x 2.5 x 80mm bolt through the cross channel holes, lower shock bracket and main support member on each end of the cross channel.
3. Tighten the cross channel fasteners to  260-320 foot pounds (355-435 Nm).
4. Install the height control valve's lower bracket to the cross channel using two M6 x 1 x 30mm fasteners. Tighten the fasteners to  10-12 foot pounds (13-16 Nm).
5. Install the air spring between the frame and cross channel, see Figure 8-2.



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.

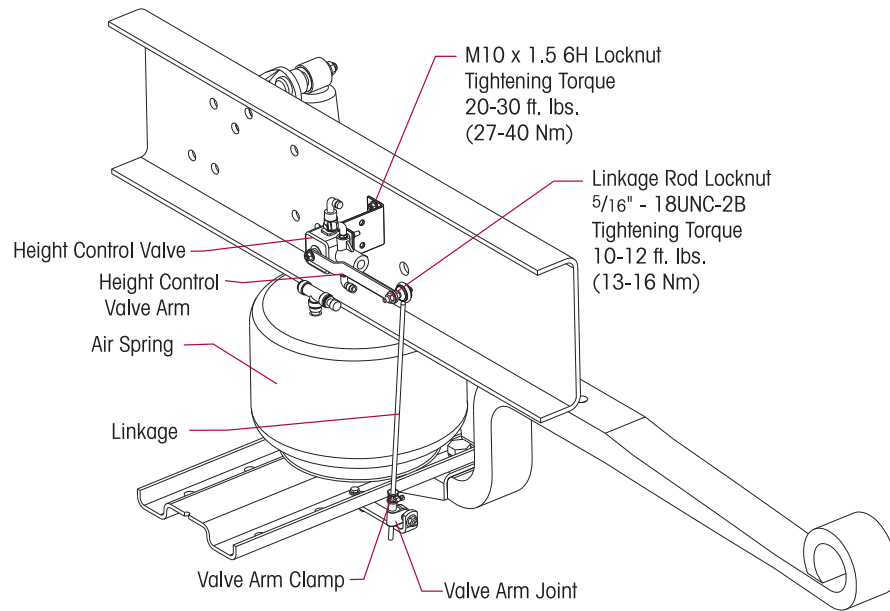
6. Hold the air spring tight against the bottom frame flange and tighten the two M20 x 2.5 x 50mm upper air spring mounting fasteners to  160-180 foot pounds (217-245 Nm).
7. Install the air spring lower mounting stud through the cross-channel hole. Attach the M12 washer and M12 x 1.25 locknut to the lower mounting stud of the air spring. **USING HAND TOOLS ONLY**, tighten the locknut to  20-30 foot pounds (27-40 Nm).
8. Connect the air line to the air spring.
9. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to inflating the suspension system. Inflate the suspension by connecting the height control valve linkage to the height control valve arm. Verify the air springs inflate uniformly without binding.
10. Remove the frame supports.
11. Remove the wheel chocks.
12. Verify proper ride height adjustment, (see ride height adjustment in the Alignment and Adjustment Section of this publication).

HEIGHT CONTROL VALVE



DISASSEMBLY

1. Chock the wheels of the vehicle.
2. Remove the height control valve's linkage assembly from the height control valve arm and lower mounting bracket by sliding the rubber grommets off their studs.
3. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to deflating the suspension system. Lower the leveling 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 air fittings from the height control valve.
6. Remove the 1/4" washers and locknuts that attach the height control valve to the frame mounting bracket.
7. Remove the height control valve, see Figure 8-3.

FIGURE 8-3



ASSEMBLY

1. Re-install the air fittings into the height control valve. Ensure the Teflon® thread sealing ring is seated around the base of the fitting's hex shoulder. Torque to  3-15 foot pounds (4-20 Nm).
2. Install the height control valve to the frame mounting bracket by attaching the 1/4" washers and locknuts. Torque to  20-30 foot pounds (27-40 Nm).
3. Install the air lines to the height control valve. Reference the Plumbing Diagram Section of this publication.
4. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to inflating the suspension system. Inflate the suspension by connecting the height control valve linkage to the height control valve arm and lower mounting bracket. Verify the air springs inflate uniformly without binding.
5. Remove the frame supports.
6. Remove the wheel chocks.
7. Verify proper ride height adjustment, (see ride height adjustment in the Adjustment & Alignment Section of this publication).

SHOCK ABSORBER

DISASSEMBLY

1. Chock the wheels of the vehicle.
2. Support the frame of the vehicle at ride height.

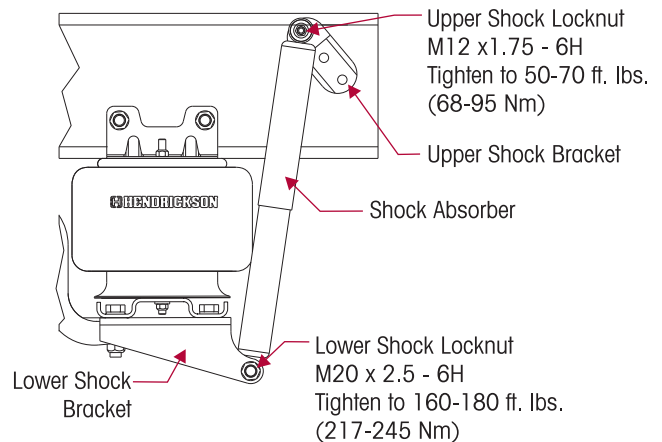


WARNING

THE VEHICLE MUST BE FIRMLY SUPPORTED WITH JACK STANDS PRIOR TO SERVICING. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

3. Disconnect the height control linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.
4. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to deflating the suspension system. Lower the leveling valve arm to exhaust the air in the air springs and deflate the rear suspension.
5. Remove the M20 x 2.5 x 140mm through bolt from the lower shock absorber mount see Figure 8-4.
6. Slide the shock absorber out of the lower mounting bracket.
7. Remove the M12 x 1.75 locknut from the upper shock absorber mounting stud.
8. Remove the shock absorber from the upper mounting stud.
9. Inspect the shock absorber mounting brackets and hardware for damage or wear, and replace as necessary, see Preventive Maintenance Section in this publication.

FIGURE 8-4



ASSEMBLY

1. Install the shock absorber onto the upper mounting stud.
2. Install the M12 washer and M12 x 1.75 locknut on the upper shock absorber mounting stud.
3. Install the M20 x 2.5 x 140mm fastener and M20 washer through the lower shock mount and lower shock bracket. Install M20 washer and M20 x 2.5 locknut. Tighten the locknut to 160-180 foot pounds (217-245 Nm).
4. Tighten the upper shock absorber M12 x 1.75 locknut to 50-70 foot pounds (68-95 Nm), see Figure 8-4.

SHOCK ABSORBER LOWER MOUNTING BRACKET

DISASSEMBLY

1. Chock the front wheels.
2. Support the frame of the vehicle at ride height.

WARNING



THE VEHICLE MUST BE FIRMLY SUPPORTED WITH JACK STANDS PRIOR TO SERVICING. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

3. Disconnect the height control linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.
4. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to deflating the suspension system. Lower the leveling valve arm to exhaust the air in the air springs and deflate the rear suspension.
5. Remove the air lines from the air springs.
6. Remove the M20 x 2.5 x 140mm through bolt from the lower shock absorber mount see Figure 8-4.
7. Slide the shock absorber out of the lower mounting bracket.
8. Remove the four M20 x 2.5 x 80mm bolts from the cross channel.
9. Using a floor jack under the center of the cross channel, raise the cross channel slightly and remove the lower mounting bracket off the main support member.

INSPECTION

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

ASSEMBLY

1. Install the lower shock absorber mounting bracket over the end of the main support member.
2. Lower the cross channel on top of the main support member and the lower shock absorber mounting bracket.
3. Loosely install the two M20 x 2.5 x 80mm bolts and M20 washers through the cross channel holes, lower shock absorber mounting bracket and main support member on each end of the cross channel, see Figure 8-2.
4. Install M20 locknuts and M20 washers on the cross channel bolts. Tighten the cross channel fasteners to  260-320 foot pounds (355-435 Nm).
5. Slide the shock absorber's lower mount into the lower shock absorber mounting bracket.
6. Install the M20 x 2.5 x 140mm bolt and M20 washer through the lower shock absorber mount and lower shock absorber mounting bracket. Install the M20 washer and M20 x 2.5 locknuts. Tighten the fastener to  160-180 foot pounds (217- 245 Nm).
7. Reconnect the air lines to the air springs.
8. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to inflating the suspension system. Inflate the suspension by connecting the height control valve linkage to the height control valve arm. Verify the air springs inflate uniformly without binding.

9. Remove the frame supports.
10. Remove the wheel chocks.
11. Verify proper ride height adjustment, (see ride height adjustment Adjustments & Alignment Section of this publication).

TRANSVERSE TORQUE ROD

DISASSEMBLY

1. Chock the wheels of the vehicle.
2. Support the frame of the vehicle at ride height.



WARNING

THE VEHICLE MUST BE FIRMLY SUPPORTED WITH JACK STANDS PRIOR TO SERVICING. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

3. Disconnect the height control linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.
4. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to deflating the suspension system. Lower the leveling valve arm to exhaust the air in the air springs and deflate the rear suspension.

SERVICE HINT

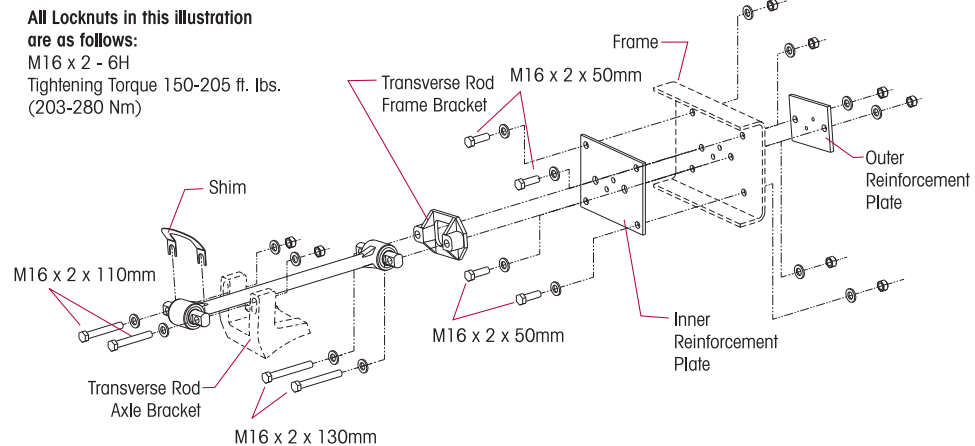
Note the quantity and location of shims removed during disassembly. The same quantity must be reinstalled in the same location in order to maintain the lateral alignment of the axle prior to disassembly. The lateral alignment procedure will need to be performed after assembly. See Alignment Section in this publication.

5. Remove the two M16 x 2 x 110mm torque rod-to-axle bracket mounting fasteners, see Figure 8-5.
6. Remove the two M16 x 2 x 130mm torque rod-to-frame mounting fasteners.
7. Remove the transverse torque rod.
8. If servicing the inner or outer reinforcement plates remove the four M16 x 2 x 50 mm fasteners from the frame rails, see Figure 8-5.

INSPECTION

1. Inspect the torque rod mating surfaces for any wear or damage. Repair as necessary.
2. Inspect the rubber bushings for wear or damage, replace as necessary.
3. Inspect the torque rod for straightness, wear, or cracks, replace as necessary.
4. Inspect the inner and outer reinforcement plates for wear or damage, replace as necessary.
5. Inspect the frame rail for wear or damage, repair as necessary.

FIGURE 8-5

**ASSEMBLY**

1. If the inner or outer reinforcement plate was serviced install the M16 x 2 x 50mm bolts and M16 washers through the inner reinforcement plate, frame rail, and outer reinforcement plate, see Figure 8-5.
2. Loosely install the M16 washers and M16 x 2 locknuts.
3. Install the torque rod.
4. Install the two M16 x 2 x 130 mm bolts and M16 washers through the torque rod barpin, any shims that were removed, transverse torque rod frame bracket, inner reinforcement plate, frame, and outer reinforcement plate.
5. Loosely install the two M16 washers and two M16 x 2 locknuts.
6. Install the two M16 x 2 x 110 mm bolts and M16 washers through the torque rod barpin and axle bracket. Re-install any shims that were removed.
7. Loosely install the two M16 washers and two M16 x 2 locknuts.

NOTE

Hendrickson recommends the use of Dacromet L, Class 10.9 bolts and Class 10 locknuts for all straddle mount torque rod attachments.

8. Prior to tightening torque rod fasteners ensure the vehicle is at the proper ride height. Tighten the two M16 x 2 x 110mm torque rod-to-axle bracket mounting fasteners and the two M16 x 2 x 130 mm torque rod-to-frame mounting fasteners to 150-205 foot pounds (203-280 Nm), see Figure 8-5.
9. Tighten the four M16 x 2 x 50mm reinforcement plate-to-frame rail fasteners to 150-205 foot pounds (203-280 Nm).
10. Check the lateral alignment and verify it is within specifications. See Alignment Section of this publication.

TORQUE ROD BUSHING

DISASSEMBLY

You will need:

- A vertical press with a capacity of at least 10 tons.
- A receiving tool (5" long, 2" inner diameter by ¼" wall steel tubing)



CAUTION

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

1. Remove the torque rod as detailed in the Component Replacement Section of this publication.
2. Install the torque rod in the press. Support the torque rod end on the receiving tool with the end of the torque rod centered on the tool. Be sure the torque rod is squarely supported on the press bed.
3. Push directly on the bushing straddle mount bar pin until the end of the straddle mount is level with the top of the torque rod end tube. Press until the bushing clears the torque rod end tube.

INSPECTION

1. Inspect the torque rod for straightness, wear, or cracks. Replace as necessary.
2. Clean and inspect the inner diameter of the torque rod end tubes. Break any sharp edges and remove any nicks with an emery cloth or a rotary sander (See Figure 8-6).

ASSEMBLY

NOTE

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

1. Lubricate the inner diameter of the torque rod end tube and the new rubber bushing with vegetable base oil (cooking oil), see Figure 8-7.
2. Support the torque rod end tube on the receiving tool with the end tube of the torque rod centered on the receiving tool. The straddle mount bar pin bushings must have the mounting flats positioned perpendicular to axis of the torque rod.
3. Press directly on the straddle mount bar pin. The rubber bushings of the bar pin must be centered within the torque rod end tubes.
4. When pressing in the new bushings overshoot the desired final position by approximately 3/16", see Figure 8-8.
5. Press the straddle mount bar pin again from opposite side to center the bar pin within the torque rod end tube, see Figure 8-9.
6. Wipe off excess lubricant. Allow the lubricant four hours to dissipate before operating vehicle.

CAUTION

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

7. Install torque rod assembly as detailed in the Component Replacement section of this publication.

Figure 8-6**Figure 8-7****Figure 8-8****Figure 8-9**

CLAMP GROUP

• TOP PAD • SPRING SEAT • BOTTOM CAP



WARNING

THE PROCEDURE TO DISASSEMBLE THE CLAMP GROUP IS DONE WITH THE OTHER MAIN SUPPORT MEMBER PROPERLY CONNECTED TO THE FRAME HANGER AND AXLE. FAILURE TO HAVE THE OTHER MAIN SUPPORT MEMBER CONNECTED PROPERLY COULD ALLOW THE AXLE TO SHIFT RESULTING IN POSSIBLE DAMAGE TO COMPONENTS AND/OR PERSONAL INJURY. IF THE OTHER MAIN SUPPORT MEMBER ISN'T PROPERLY CONNECTED TO THE FRAME HANGER AND AXLE IT WILL BE NECESSARY TO SUPPORT THE AXLE PINION TO KEEP THE AXLE FROM SHIFTING.

DISASSEMBLY

1. Chock the front wheels.
2. Support the frame of the vehicle at ride height.



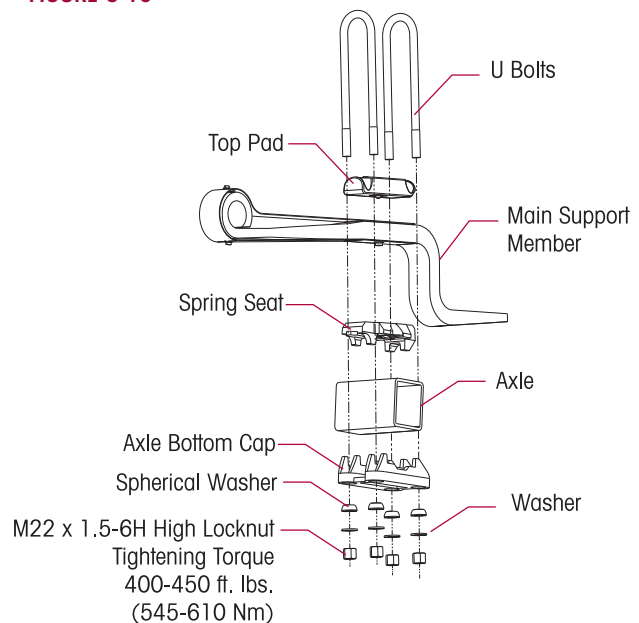
WARNING

THE VEHICLE MUST BE FIRMLY SUPPORTED WITH JACK STANDS PRIOR TO SERVICING. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

3. Disconnect the height control linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.
4. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to deflating the suspension system. Lower the leveling valve arm to exhaust the air in the air springs and deflate the rear suspension.

FIGURE 8-10

5. On the side being serviced, remove the U-bolt locknuts and washers and discard them, see Figure 8-10.
6. Remove the axle bottom cap and top pad.
7. Remove fasteners from cross channel on the opposite side from the side being serviced.



SERVICE HINT

Removing the cross channel bolts from the opposite side allows accessibility to the clamp group being serviced without removing the main support member and the air spring.

8. Place a floor jack under the cross channel near the main support member being serviced. Raise the cross channel and main support member enough to remove the spring seat from under the main support member.

INSPECTION

WARNING

FAILURE OF THE MAIN SUPPORT MEMBER BETWEEN THE U-BOLTS WILL REQUIRE THE REPLACEMENT OF ALL CLAMP GROUP COMPONENTS. FAILURE TO DO SO CAN RESULT IN PREMATURE MAIN SUPPORT MEMBER OR CLAMP GROUP FAILURE, WHICH MAY RESULT IN LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE AND/OR PERSONAL INJURY.

1. Inspect the main support member assembly for damage. Replace as necessary.
2. Inspect the top pad, spring seat and axle bottom cap for excessive wear and cracks. Replace as necessary.
3. Inspect the axle housing for any cracks or wear. Repair or replace as necessary.

ASSEMBLY

1. Install the spring seat on the axle housing making sure to engage the alignment dowel on the axle housing with the hole in the bottom of the spring seat, see Figure 8-10. Make sure the thicker end of the spring seat is to the rear of the vehicle.
2. Lower the main support member assembly on the spring seat making sure the dowel pin on the bottom of the main support member engages both the Flexi-wrap and spring seat dowel pin holes.
3. Install top pad on the top of the main support member assembly making sure the dowel on the bottom of the top pad engages the Flexi-wrap and main support dowel pin holes.

WARNING

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

4. Install **NEW** U-bolts, spherical washers, flat washers, and locknuts.

NOTE

Current Hendrickson U-bolts for the COMFORT AIR for Hino suspensions are M22 x 1.5 with a Dacromet Plus L coating. Locknuts are M22 x 1.5 class 10 with a Dacromet Plus L coating.

5. Verify that the top pad and bottom cap are installed correctly.

NOTE

The arrow on these parts should be facing towards the front of the vehicle.



6. Lower the cross-channel onto the opposite side lower shock bracket and main support member. Install the two M20 x 2.5 x 80mm fasteners and M20 washers through the cross-channel, lower shock bracket and main support member. Loosely install the M20 x 2.5 locknuts and M20 washers. Do not tighten at this time.
7. Verify that the U-bolts are seated properly in the channels of the top pad.
8. Verify the Flexi-wrap and main support member are centered in the frame hanger.
9. Snug U-bolts prior to tightening, applying a crisscross pattern, (approximately  100 foot pounds (136Nm) tightening torque), see Figure 8-11.
10. Tighten the cross-channel fasteners to  260-320 foot pounds (355-435 Nm).

FIGURE 8-11

11. Tighten the U-bolt locknuts evenly to 400-450 foot pounds (545-610 Nm) and in the proper sequence, see Figure 8-11.
12. Rap the top of the U-bolts with a dead blow mallet, and retighten to 400-450 foot pounds (545-610 Nm). **DO NOT EXCEED SPECIFIED TORQUE ON U-BOLT LOCKNUTS**, see Figure 8-12.

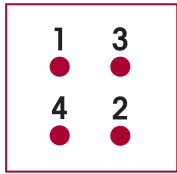
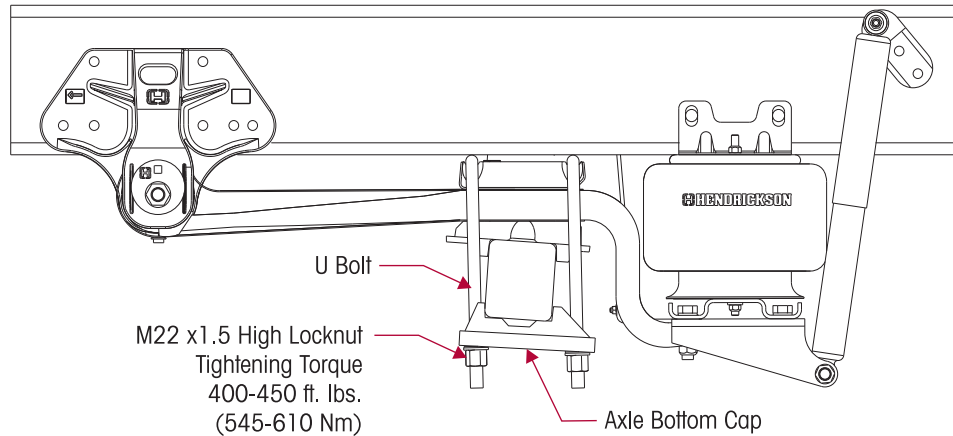


FIGURE 8-12



13. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to inflating the suspension system. Connect the leveling valve linkage rod to the height control valve arm to inflate the suspension.
14. Remove the frame supports.
15. Remove the wheel chocks.
16. Align vehicle. Alignment is necessary anytime the main support member is removed to complete the repair. See Alignment Section of this publication.

FRAME HANGER

The frame hanger should function satisfactorily during normal vehicle operation. Replacement is required when the frame hanger has been damaged or worn.



CAUTION

THIS PROCEDURE TO DISSASSEMBLE THE CLAMP GROUP IS DONE WITH THE OTHER MAIN SUPPORT MEMBER PROPERLY CONNECTED TO THE FRAME HANGER AND AXLE. FAILURE TO HAVE THE OTHER MAIN SUPPORT MEMBER CONNECTED PROPERLY COULD ALLOW THE AXLE TO SHIFT RESULTING IN POSSIBLE DAMAGE TO COMPONENTS AND/OR PERSONAL INJURY. IF THE OTHER MAIN SUPPORT MEMBER ISN'T PROPERLY CONNECTED TO THE FRAME HANGER AND AXLE IT WILL BE NECESSARY TO SUPPORT THE AXLE PINION TO KEEP THE AXLE FROM SHIFTING.

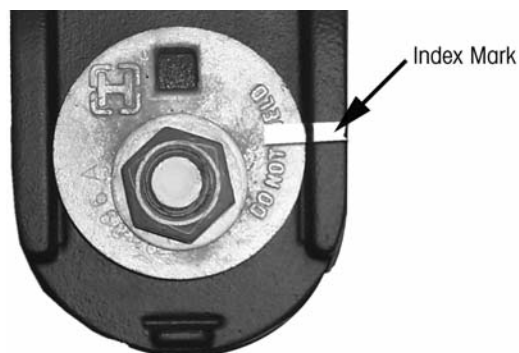
DISASSEMBLY

1. Chock the front wheels.
2. Support the frame of the vehicle at ride height.

**WARNING**

THE VEHICLE MUST BE FIRMLY SUPPORTED WITH JACK STANDS PRIOR TO SERVICING. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

3. Disconnect the height control valve's linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.
4. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to deflating the suspension system. Lower the leveling valve arm to exhaust the air in the air springs and deflate the rear suspension.

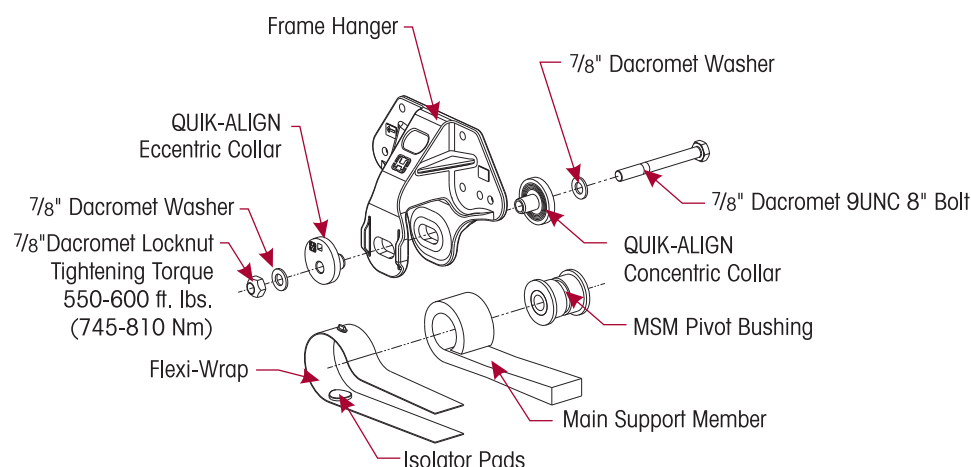
FIGURE 8-13

5. Mark the position of the QUICK-ALIGN collar relative to the frame hanger, see Figure 8- 3.

SERVICE HINT

Marking the position of the QUICK-ALIGN collar will create a starting point for the alignment procedure following reassembly.

6. Remove the 7/8" x 9 QUICK-ALIGN locknut and pivot bolt, see Figure 8-14.

FIGURE 8-14

7. Remove the QUICK-ALIGN collars that connect the main support member to the frame hanger.
8. Remove the six M16 Huck bolt fasteners that attach the frame hanger to the vehicle per the vehicle manufacturer's instructions.
9. Remove the frame hanger.

INSPECTION

1. Inspect mounting surface of hanger and frame for any damage or wear. Repair or replace as necessary.
2. Inspect the main support member assembly and pivot bushing for wear or damage. Replace as necessary.

ASSEMBLY

1. Slide the frame hanger over the main support member's pivot bushing. Make sure the arrow on the frame hanger points towards the front of the vehicle, see Figure 8-14.
2. Install new hanger to frame rail fasteners as detailed by the vehicle manufacturer.




WARNING

DO NOT ASSEMBLE THE QUIK-ALIGN JOINT WITHOUT THE PROPER FASTENERS. USE ONLY HENDRICKSON DACROMET PLUS L 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 FASTENER 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.


NOTE

Use a new main support member QUIK-ALIGN Kit (see Parts Lists Section in this publication) for any axle alignment or disassembly 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.

3. Install NEW hardware (NEW QUIK-ALIGN collars, 7/8"x 9 Dacromet pivot bolt, washers and locknut). Be sure QUIK-ALIGN eccentric collar is on the outboard side of the LEFT frame hanger. Verify that the nose of each QUIK-ALIGN collar is installed correctly into the sleeve of the pivot bushing, and the flanged side is flat against the frame hanger face and within the alignment guides. Align the QUIK-ALIGN collar with the marks made on the frame hanger prior to disassembly. Snug the 7/8"x 9 pivot bolt locknut to approximately  100 foot pounds (136 Nm) of torque.

NOTE

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

4. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to inflating the suspension system.
5. Reconnect the leveling valve arm to the height control valve arm. Inflate the suspension slowly and verify that the air spring bladder inflates uniformly without binding.
6. Remove the frame support.
7. Confirm the vehicle's ride height is within specifications. Adjust as necessary. See Ride Height Adjustment section of this publication.
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 QUIK-ALIGN fasteners to  550-600 foot pounds (745-810 Nm).
10. Remove chocks from front wheels.

MAIN SUPPORT MEMBER ASSEMBLY

The main support member assembly should function satisfactorily during normal vehicle operation. Replacement is only required when the main support member assembly has been damaged or worn.

CAUTION

THIS PROCEDURE TO REPLACE A MAIN SUPPORT MEMBER IS DONE WITH THE OTHER MAIN SUPPORT MEMBER PROPERLY CONNECTED TO THE FRAME HANGER AND AXLE. FAILURE TO HAVE THE OTHER MAIN SUPPORT MEMBER CONNECTED PROPERLY COULD ALLOW THE AXLE TO SHIFT RESULTING IN POSSIBLE DAMAGE TO COMPONENTS AND/OR PERSONAL INJURY. IF BOTH MAIN SUPPORT MEMBERS ARE TO BE REMOVED IT WILL BE NECESSARY TO SUPPORT THE AXLE PINION TO KEEP THE AXLE FROM SHIFTING.

DISASSEMBLY

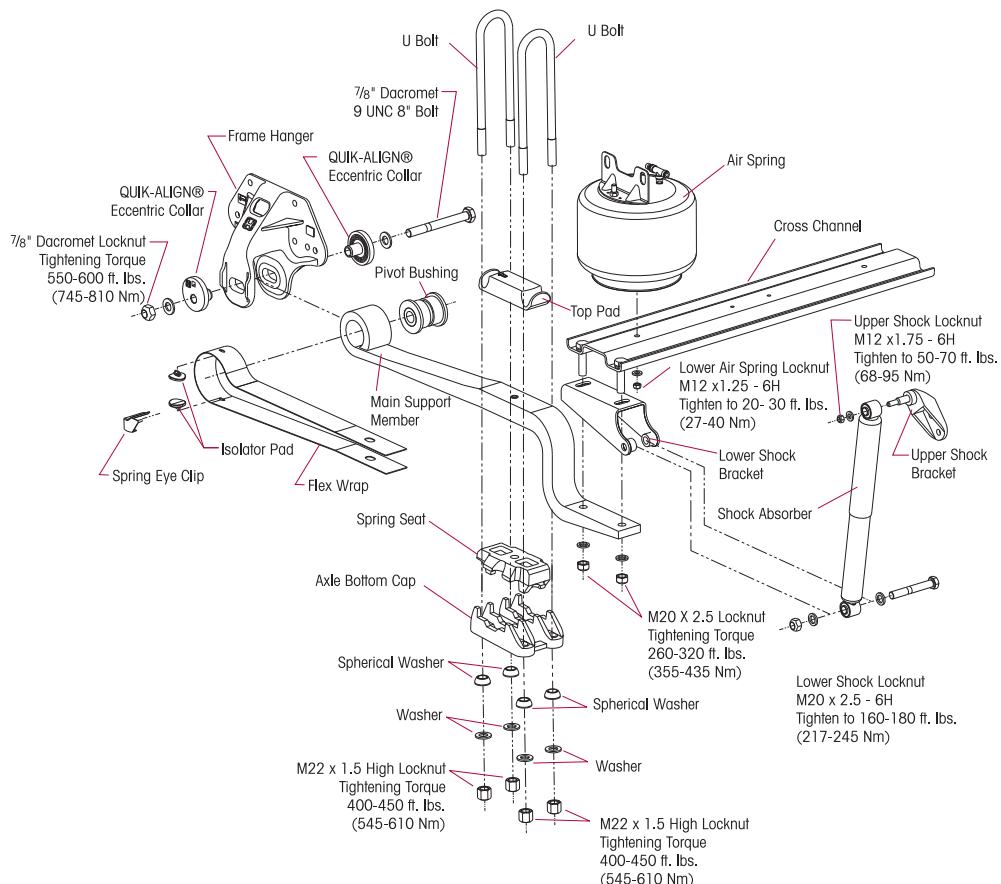
1. Chock the front wheels.
2. Support the frame of the vehicle at ride height.

WARNING

THE VEHICLE MUST BE FIRMLY SUPPORTED WITH JACK STANDS PRIOR TO SERVICING. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

3. Disconnect the height control linkage assembly from the height control valve arm by sliding the rubber grommet from the stud.
4. Remove the air springs and cross channel as detailed in the Air Spring and Cross Channel Disassembly instructions in this section, see Figure 8-15.

FIGURE 8-15

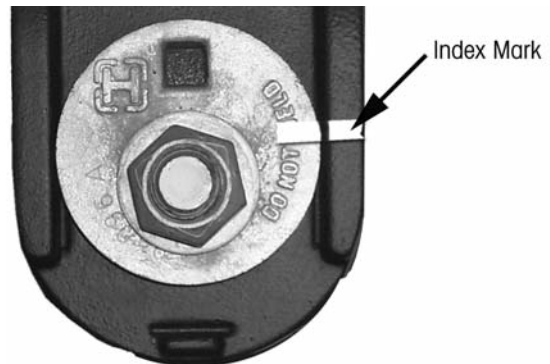


5. Lift and rotate the shock absorber and lower mounting bracket away from the main support assembly.

6. Mark the position of the QUIK-ALIGN collar relative to the frame hanger, see Figure 8-16.

SERVICE HINT

Marking the position of the QUIK-ALIGN collar will create a starting point for the alignment procedure following reassembly.

FIGURE 8-16

7. On the side being serviced, remove the U-bolts locknuts and washers and discard them.
8. Remove the axle bottom cap and top pad.
9. Lift the back of the main support member assembly and remove the axle seat from under main support member. Lower the main support member onto the axle housing.
10. Support the main support member by placing a hydraulic jack under the main support member's pivot bushing. Remove the 7/8" pivot bolt, nut and QUIK-ALIGN collars that connect the main support member assembly to the frame hanger.

**CAUTION**

THE USE OF LEATHER GLOVES IS RECOMMENDED FOR REMOVING THE MAIN SUPPORT MEMBER ASSEMBLY. THIS WILL REDUCE THE POSSIBILITY OF PERSONAL INJURY FROM THE METAL EDGE OF THE FLEXI-WRAP.

11. Slide the pivot bushing down and out of the frame hanger. Remove the main support assembly.

INSPECTION**WARNING**

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

1. Clean any dirt and debris from the QUIK-ALIGN slots in the hangers. Inspect the frame hanger for excessive wear, cracks and proper frame hanger fastener torque. Replace as necessary.
2. Inspect the main support member for damage. Replace as necessary.
3. Inspect the Flexi-wrap for excessive wear or damage. Replace as necessary.
4. Inspect the top pad, spring seat and axle bottom cap for excessive wear and cracks. Replace as necessary.
5. Inspect the axle housing for any cracks or wear. Repair or replace as necessary.
6. Inspect the cross-channel for straightness, excessive wear and cracks. Replace as necessary.

7. Inspect the air spring for damage. Inspect the lower piston and the upper air spring mount for cracks.
8. Inspect the shock absorber for leaks and the mounts for excessive wear, cracks, and proper frame hanger fastener torque. Replace as necessary.

ASSEMBLY

NOTE

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



WARNING

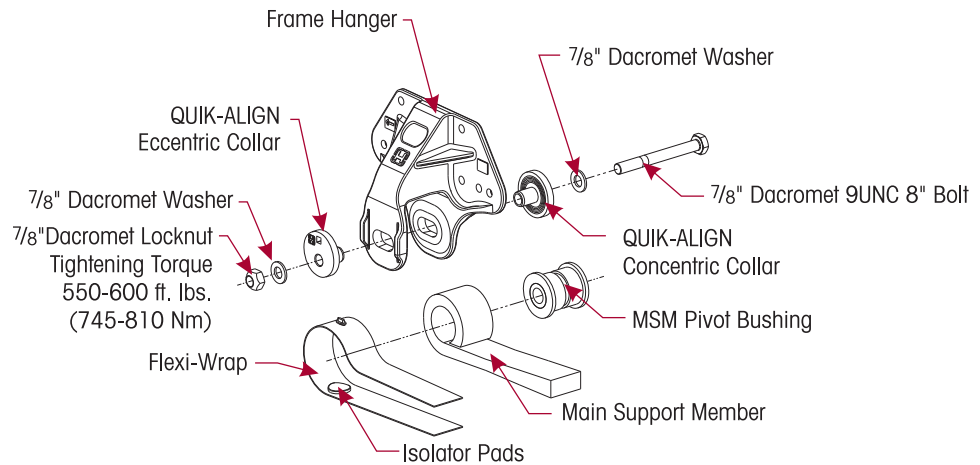
DO NOT STRIKE SUSPENSION COMPONENTS WITH A HAMMER. DO NOT NICK OR GOUGE THE MAIN SUPPORT MEMBER. SUCH IMPROPER ACTIONS CAN CAUSE DAMAGE; THE MAIN SUPPORT MEMBER ASSEMBLY COULD FAIL, AND CAUSE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.



WARNING

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

1. Ensure the Flexi-wrap is installed and centered on the main support member assembly. A strip of fiber tape for and aft of the alignment dowel pin will assist in keeping the assembly intact during installation. Verify the two rubber isolator pads are installed in the flexi-wrap, see Figure 8-15.
2. Lay the main support member assembly on top of the axle and support the front with a hydraulic jack.
3. Align the bushing of the main support member assembly under the opening of the frame hanger and jack into place.
4. Install NEW hardware, NEW QUIK-ALIGN collars, 7/8"x 9 Dacromet pivot bolt, washers and locknut. Tighten to 100 foot/pounds of torque. Be sure QUIK-ALIGN eccentric collar is on the outboard side of the frame hanger. Verify that the nose of each QUIK-ALIGN collar is installed correctly into pivot bushing sleeve, and the flanged side is flat against the frame hanger face within the alignment guides, see Figure 8-17.

FIGURE 8-17


5. Raise the rear of the main support member assembly and install the spring seat on the axle, engaging the dowel pin. Make sure thicker end of the spring seat is to the rear of the vehicle.
6. Lower the main support member assembly onto the spring seat making sure the dowel pin engages the dowel pin hole in the spring seat.

SERVICE HINT

It may be necessary to rotate the QUIK-ALIGN eccentric collar to move the main support member assembly forward or rearward in order to engage the dowel pin hole.

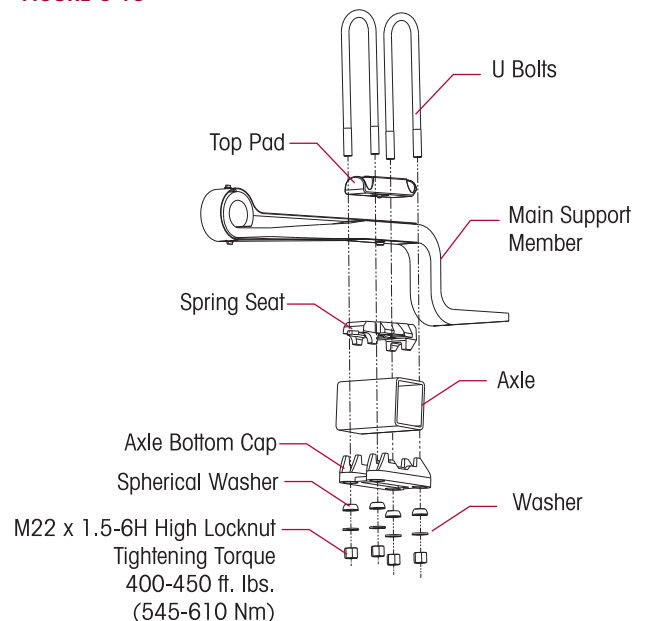
NOTE

The arrow on the top pad and bottom cap must be facing towards the front of the vehicle.

7. Install the top pad, bottom axle cap, U-bolts, washers, and locknuts ensuring all dowel pins stay engaged. Verify that the top pad and bottom cap are installed correctly.
8. Verify that the U-bolts are seated properly in the channels of the top pad, see Figure 8-18.

FIGURE 8-18

9. Before tightening the U-bolts, verify the Flexi-wrap is centered on the main support member and centered in the frame hanger. Using a crisscross pattern, tighten U-bolts evenly to approximately 100 foot pounds (136Nm) of torque.
10. Install the shock absorber and the lower shock mount onto the rear of the main support member assembly, see Figure 8-20.



11. Install the cross-channel onto the rear of the main support member assemblies. Loosely install the cross-channel retaining fasteners.

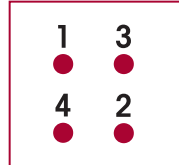
SERVICE HINT

It may be necessary to loosen the U-bolts in order to align the cross-channel holes with the main support member assemblies. **DO NOT STRIKE SUSPENSION COMPONENTS WITH A HAMMER.**

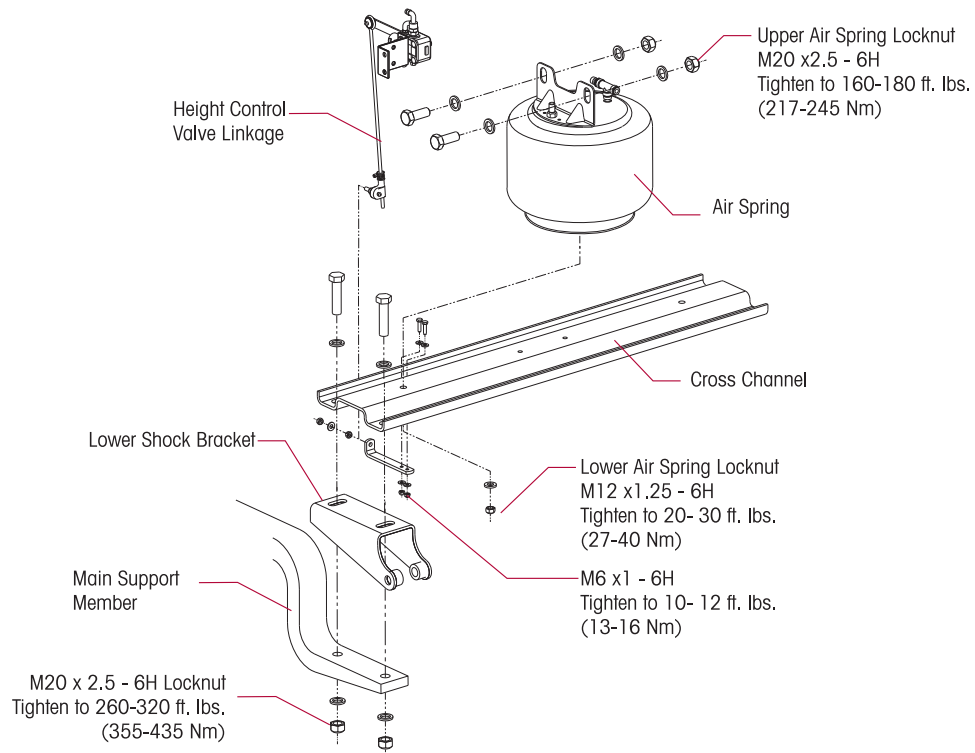
NOTE

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

12. Tighten the U-bolt locknuts evenly and in the proper sequence as shown in Figure 8-19. Tighten the M22 x 1.5 locknuts to 400-450 foot pounds (545-610 Nm).

FIGURE 8-19



13. Rap the top of the U-bolts with a dead blow mallet, and retighten to 400-450 foot pounds (545-610 Nm). **DO NOT EXCEED SPECIFIED TORQUE ON U BOLT LOCKNUTS**, see Figure 8-18.
14. Tighten the four M20 x 2.5 cross-channel fasteners to 260-320 foot pounds (355-435 Nm), see Figure 8-20.

FIGURE 8-20

15. Hold the air spring tight against the bottom frame flange and tighten the upper air spring mounting fasteners to 260-320 foot pounds (355-435 Nm).

**CAUTION**

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.

16. Install the air spring lower mounting stud through the cross-channel hole. Attach the M12 washer and M12 x 1.25 locknut to the lower mounting stud of the air spring. **USING HAND TOOLS ONLY**, tighten the locknut to  20-30 foot pounds (27-40 Nm), see Figure 8-20.
17. See Air Spring Warnings and Instructions in the Safety Notice Section of this publication prior to inflating the suspension system. Reconnect the leveling valve arm to the height control valve arm. Inflate the suspension slowly and verify that the air spring bladder inflates uniformly without binding.
18. Remove all jacks and supports.
19. Confirm the vehicle's ride height is within specifications. Adjust as necessary, see Ride Height Adjustment Section of this publication).
20. Verify that the axle is in proper alignment, see the Alignment and Adjustment Section in this publication.
21. After the correct alignment of the axle is achieved tighten the QUIK-ALIGN fasteners to  550-600 foot pounds (745-810 Nm).

MSM PIVOT BUSHING

DISASSEMBLY

You will need:

- A vertical shop press with a capacity of at least 10 tons.
- A receiving tool made from a 6" long piece of 4" I.D. by .25" wall steel tubing (see Tools section of this publication).
- A 6" long piece of 1 3/4" O.D. round steel bar stock with a 1 1/2" x 1 3/8" O.D. machined pilot push out tool.

1. Cut the splicing tape that holds the flex-wrap to the center of the main support member assembly.
2. Slide the flex-wrap off of the main support member.
3. Install the main support member in the press. Support the main support member on the receiving tool with the end hub centered on the tool. Be sure the main support member is squarely supported on the press bed, see Figure 8-21.

FIGURE 8-21



NOTE

At the time of manufacture, a spring eye clip was used to insert the pivot bushing into the spring eye of the the main support member, see Figures 8-22 and 8-23. If spring eye clip is equipped on the main support member you have the option to carefully press out the bushing from the opposite side of the spring eye (where the spring eye clip is NOT visible). If the spring eye clip is not damaged it can be used again to facilitate the pressing in of the pivot bushing into the spring eye. If clip is damaged and a replacement (part number 60392-000) is not available the alternative method is to use the tape option as shown in Figure 8-24.

FIGURE 8-22

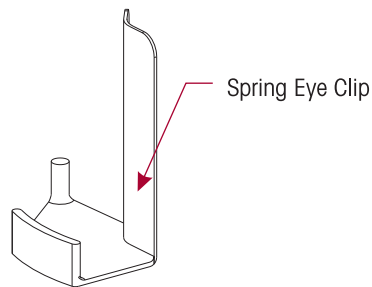
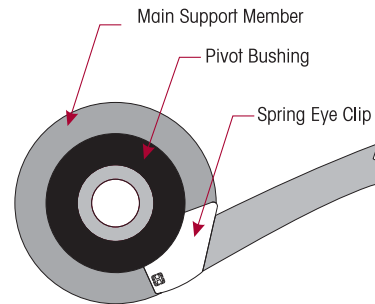


FIGURE 8-23

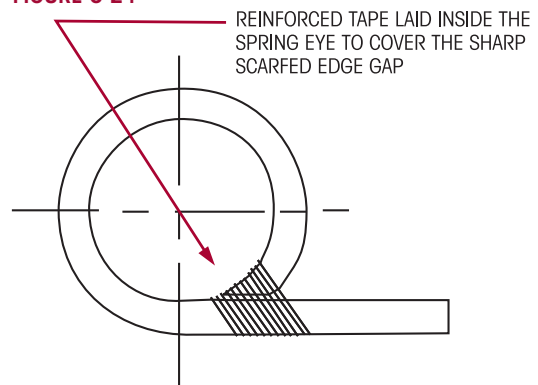


4. Center the push out tool on inner sleeve and press out the old bushing. (These bushings are not cartridge type bushings. They do not have outer metals).
5. Clean and inspect the I.D. of the main support member eye.

ASSEMBLY

1. Insert the spring eye clip (if equipped) into the gap of the main support member eye, (see note above). If spring eye clip is damaged and a replacement (part number 60392-000) is not available the alternative method is to cut a strip of 3M Scotch #890T black fiber tape, or heavy bodied duct tape 1" x 6" long.
2. Feed the tape into the spring eye, adhesive side facing gap in the eye. Center the tape equally around each end.
3. Pull the tape tight, and wrap it around the outside of the eye. Additional tape may be required depending on gap size. Ensure that the gap is completely covered, see Figure 8-24.

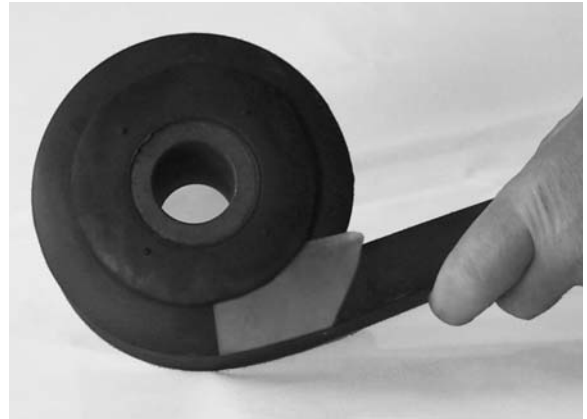
FIGURE 8-24



4. Lubricate inner diameter of steel spring bore and the new rubber bushing with a vegetable base oil (cooking oil). **DO NOT** use petroleum or soap base lubricant, it can cause an adverse reaction with the bushing material, such as deterioration.
5. Install the main support member in the press. Place the main support member on the receiving tool with the end hub centered on the receiving tool. Be sure the main support member is squarely supported on the press bed.

FIGURE 8-25

6. Locate the machined pilot of the push out tool on inner sleeve, and press in the new bushing. Bushings must be centered within the spring eye. When pressing in the new bushings, over-shoot desired final position by $\frac{3}{16}$ " and press again from opposite side to center the bushing within the main support member assembly, see Figure 8-25.



7. Trim all protruding tape from the underside of the eye. Wipe off excess lubricant. Allow the lubricant four hours to dissipate before operating vehicle.
8. Replace the two isolator pads inside the flexi-wrap eye.
9. Slide flexi-wrap around main support member eye and rotate into position.
10. Tape the assembly together using two 1" x 12" long strips of splicing tape.

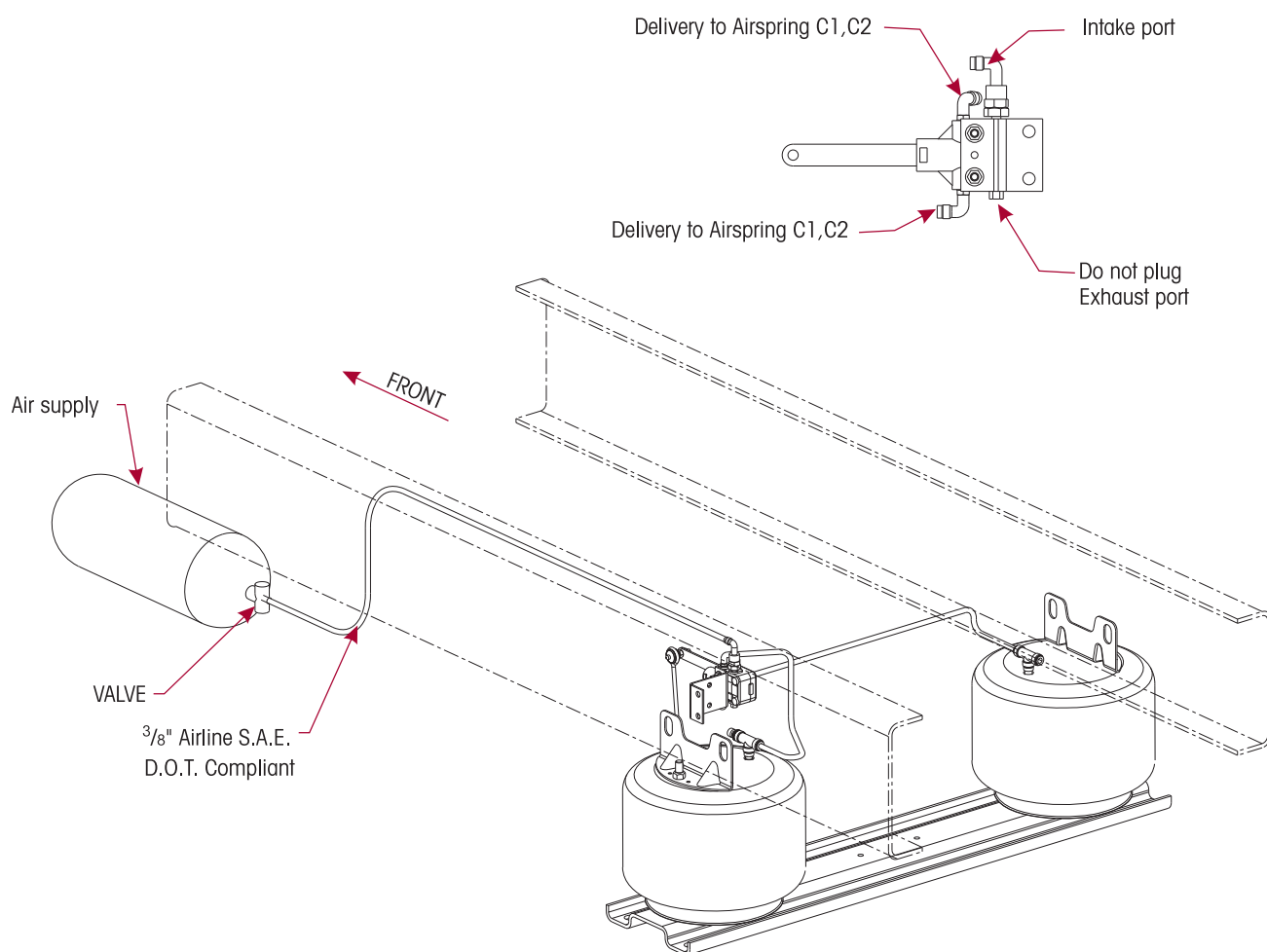
**CAUTION**

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

11. Re-install main support member assembly per instructions in this section.

SECTION 9

Plumbing Diagram





SECTION 10

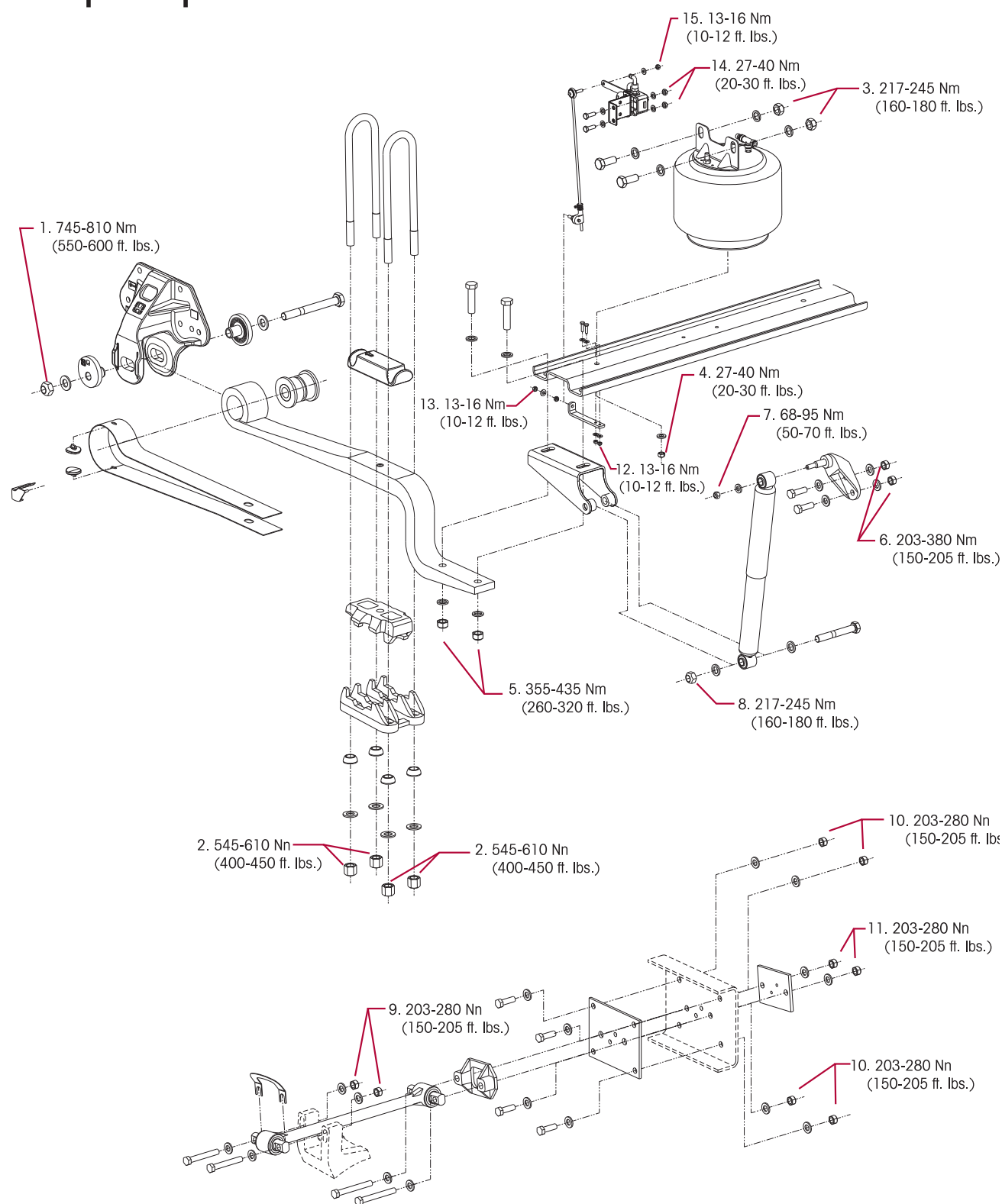
Trouble Shooting Guide

COMFORT AIR FOR HINO TROUBLE SHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTION
Vehicle bouncing excessively	Leaking shock absorber	Replace shock absorber.
	Damaged shock absorber	Replace shock absorber.
	Air spring(s) not inflated	Check air supply to air spring, repair as necessary.
	Incorrect ride height	Adjust ride height to proper setting. See Ride Height Adjustment in the Alignment and Adjustment Section of this publication.
Suspension has harsh or bumpy ride	Broken main support member assembly	Replace main support member assembly.
	Damaged height control valve	Replace height control valve.
	Incorrect ride height	Adjust ride height to proper setting. See Ride Height Adjustment in the Alignment and Adjustment Section of this publication.
Excessive driveline vibration	Incorrect ride height	Adjust ride height to proper setting. See Ride Height Adjustment in the Alignment and Adjustment Section of this publication.
	Broken main support member assembly	Replace main support member assembly.
	Air spring(s) not inflated	Check air supply to air spring, repair as necessary.
Vehicle leans	Broken main support member assembly	Replace main support member assembly.
	Axle connection not torqued correctly	Perform U-bolt retorquing procedure. See Torque Specification Section of this publication.
	Worn pivot bushing	Replace pivot bushing.
	Air spring(s) not inflated	Check air supply to air spring, repair as necessary.
Suspension is noisy	Loose QUIK-ALIGN® attachment	Replace QUIK-ALIGN connection and check suspension alignment. Check frame hanger for wear around QUIK-ALIGN assembly and fasteners and replace as necessary.
	Loose U-bolts	Perform U-bolt re-torque procedure. See Torque Specification Section of this publication.
	Worn main support member isolator pads	Replace worn isolator pads.
Irregular tire wear	Worn pivot bushing	Replace pivot bushing.
	Loose QUIK-ALIGN attachment	Replace QUIK-ALIGN connection and check suspension alignment. Check frame hanger for wear around QUIK-ALIGN assembly and fasteners and replace as necessary.
Main support member broken between U-bolts	Loose U-bolts	Replace main support assembly and all mating parts.
Quik-Align or frame hanger worn	Loose fasteners and/or the re-use of old fasteners	Replace all worn parts and replace fasteners with new Dacromet Plus L fasteners.

SECTION 11

Torque Specifications





HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO	COMPONENT	SIZE	RECOMMENDED TORQUE		MILES (KILOMETERS)
1.	QUIKALIGN® (See Warning below) Dacromet Bolt (Grade 8 with a minimum tensile strength of 160,000 psi) Dacromet Locknut (Grade C)	7/8" - 9 UNC	745-810 Nm	550-600 ft. lbs.	20,000 (30,000)
2.	U Bolts	M22	545-610 Nm	400-450 ft. lbs.	20,000 (30,000)
3.	Air Spring to Frame	M20	217-245 Nm	160-180 ft. lbs.	20,000 (30,000)
4.	Air Spring to Cross Channel	M12	27-40 Nm	20-30 ft. lbs.	100,000 (150,000)
5.	Cross Channel to Main Support Member	M20	355-435 Nm	260-320 ft. lbs.	20,000 (30,000)
6.	Upper Shock Bracket to Frame	M16	203-280 Nm	150-205 ft. lbs.	20,000 (30,000)
7.	Shock Absorber to Upper Shock Bracket	M12	68-95 Nm	50-70 ft. lbs.	100,000 (150,000)
8.	Shock Absorber to Lower Shock Bracket	M20	217-245 Nm	160-180 ft. lbs.	100,000 (150,000)
9.	Transverse Torque Rod to Axle Bracket	M16	203-280 Nm	150-205 ft. lbs.	20,000 (30,000)
10.	Inner Reinforcement Plate to Frame	M16	203-280 Nm	150-205 ft. lbs.	100,000 (150,000)
11.	Transverse Torque Rod to Frame Bracket	M16	203-280 Nm	150-205 ft. lbs.	20,000 (30,000)
12.	Linkage Rod Bracket to Cross Channel	M6	13-16 Nm	10-12 ft. lbs.	20,000 (30,000)
13.	Lower Linkage Rod to Bracket Cadmium Plate Locknut (Grade C)	5/16"	13-16 Nm	10-12 ft. lbs.	20,000 (30,000)
14.	Height Control Valve Bracket to Frame	M10	27-40 Nm	20-30 ft. lbs.	100,000 (150,000)
15.	Linkage Rod to Height Control Valve Arm Cadmium Plate Locknut (Grade C)	5/16"	13-16 Nm	10-12 ft. lbs.	100,000 (150,000)

**WARNING****FASTENERS**

ALL COMFORT AIR FASTENERS FOR HINO VEHICLES ARE DACROMET COATED. METRIC BOLTS ARE CLASS 10.9 AND USE CLASS 10.0 LOCKNUTS. NON-METRIC FASTENERS ARE DETAILED AS SPECIFIED ABOVE. DO NOT ASSEMBLE WITHOUT THE PROPER FASTENERS. USE ONLY DACROMET PLUS L PLATED FASTENERS TO SUSTAIN PROPER CLAMP FORCE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.

**WARNING****QUIK-ALIGN FASTENERS**

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.

NOTE: For torque recommendations for vehicle manufacturer supplied axle and frame mount hardware.

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

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