

H TECHNICAL PROCEDURE

HN® FR Series Rear Suspension

SUBJECT: Service Instructions

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SECTION 1

Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair and rebuild of the HN® FR Series suspension system for Fire/Rescue vehicles.

NOTE

Use only  Hendrickson parts for servicing this suspension system.

It is important to read and understand the entire Technical Procedure publication prior to performing any maintenance, service, repair, or rebuild of this product. The information in this publication contains parts lists, safety information, product specifications, features, proper maintenance, service, repair and rebuild instructions for the HN FR Series suspension.

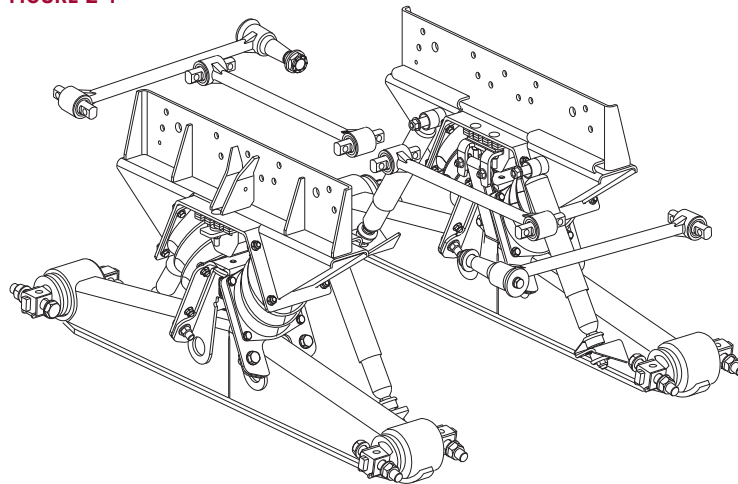
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The latest revision of this publication is also available online at www.hendrickson-intl.com

SECTION 2

Product Description

FIGURE 2-1



HN FR Series Suspension System offers an ideal combination of stability, ride quality, light weight, and articulation. With over a century of experience in the design and manufacturing of heavy-duty truck suspensions, Hendrickson introduces yet another landmark product for the fire and rescue industry. The HN FR family of rubber suspensions delivers the exceptional performance that the industry has come to expect from the leader in suspension technology. With ratings up to 58,000 pounds, the HN FR Series offers a full range of rubber suspensions to meet the unique needs of the fire and rescue industry.

The innovative spring system allows the equalizing beam to pivot without a need for center bushings. The bolster springs, together with rubber bushings in the equalizing beam ends, accommodate the articulation of the axles without friction or metal-to-metal contact.



Subsequently, the HN FR Series suspension reduces scheduled maintenance, which helps lower operating costs.

- **VariRate® Spring System** — Delivers a combination of superior stability, articulation and ride. System can be tailored to meet the specific needs of unique vehicle applications
- **Rubber bolster springs** — Diagonally-mounted rubber bolster springs deliver a smooth ride and outstanding articulation. Wide spring centers enhance stability and eliminate the need for the cross tube.
- **Auxiliary springs** — Engage to provide added stability for more demanding applications.
- **Equalizing beam** — Formed and robotically-welded equalizing beam eliminates center bushings and lubrication requirements — significantly reducing scheduled maintenance; provides a narrow profile for weight savings; distributes load equally between both axles for improved traction; and establishes a solid axle connection for improved handling.
- **Bar pin beam end connection** — Rugged axle connection extends bushing life and allows easy axle alignment and serviceability.
- **Saddle / frame brackets** — Weight-saving, high-strength design increases carrying capacity and durability.
- **Rebound Control Strap** — Protects bolster springs from severe rebound tension
- **Torque Rods** — Enhance handling during braking and cornering. Transverse rods ensure axle position and lateral stability. Longitudinal rods engineered to optimize resistance to axle wind-up.

HN® FR SPECIFICATIONS

	HN 422FR	HN 482FR	HN 542FR	HN 582FR
Installed Weight¹	888 lbs.	911 lbs.	991 lbs.	1,011 lbs.
Suspension Rating²	42,000 lbs.	48,000 lbs.	54,000 lbs.	58,000 lbs.
GVW Approval³	73,000 lbs.	80,000 lbs.	80,000 lbs.	90,000 lbs.
Diagonal Articulation⁴	17"			
Ride Heights	9.5", 10.5", 11.5", 13.25", 15.5"			
Axle Spacing⁵	52", 54"	54"	54", 60"	54", 60"

1. Installed weight includes complete suspension at 9.5" ride height and 54" axle spacing.
2. Capacity ratings approved for fire and rescue applications only.
3. Contact Hendrickson for applications that may exceed GVW approval ratings.
4. Suspension articulation may exceed vehicle's capability and may be limited by vehicle manufacturer; vehicle manufacturer installed axle stops may restrict suspension's articulation.
5. Additional beam lengths available, contact Hendrickson Application Engineering.

SECTION 3

Important Safety Notice

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

The warnings and cautions should be read carefully to help prevent personal injury and to assure that proper methods are used. Improper maintenance, service or repair may damage the vehicle, cause personal injury, render 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 which may damage the vehicle or render it unsafe.



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

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



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



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



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

NOTE

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

SERVICE HINT

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

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



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

■ SAFETY PRECAUTIONS

WARNING

FASTENERS

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

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

WARNING

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 REPLACEMENT COMPONENTS NOT AUTHORIZED BY HENDRICKSON. USE OF MODIFIED, REWORKED, SUBSTITUTE OR REPLACEMENT PARTS NOT AUTHORIZED BY HENDRICKSON MAY NOT MEET HENDRICKSON'S SPECIFICATIONS, AND CAN RESULT IN FAILURE OF THE PART, LOSS OF VEHICLE CONTROL, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE, AND WILL VOID ANY APPLICABLE WARRANTIES. USE ONLY HENDRICKSON AUTHORIZED REPLACEMENT PARTS.

WARNING

TORCH/WELDING

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

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

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.

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/HER 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****TRANSVERSE TORQUE RODS**

HN FR SUSPENSIONS INCORPORATE TRANSVERSE RODS FOR VEHICLE STABILITY. IF THESE COMPONENTS ARE DISCONNECTED OR ARE NON-FUNCTIONAL, THE VEHICLE SHOULD NOT BE OPERATED. FAILURE TO DO SO CAN RESULT IN ADVERSE VEHICLE HANDLING, LOSS OF VEHICLE CONTROL, POSSIBLE TIRE CONTACT WITH THE FRAME, PREMATURE COMPONENT DAMAGE, OR SEVERE PERSONAL INJURY.

 **WARNING****SUPPORT THE VEHICLE PRIOR TO SERVICING**

DO NOT AT ANY TIME WORK AROUND OR UNDER A VEHICLE SUPPORTED ONLY ON LIFTING DEVICES. THE VEHICLE MUST BE SECURELY CHOCKED AND SUPPORTED ON RIGID STANDS OF SUFFICIENT STRENGTH BEFORE WORK MAY COMMENCE.

 **WARNING****PARTS CLEANING**

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

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

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

SECTION 4 Special Tools

BAR PIN ADAPTER SET INSTALLATION TOOL

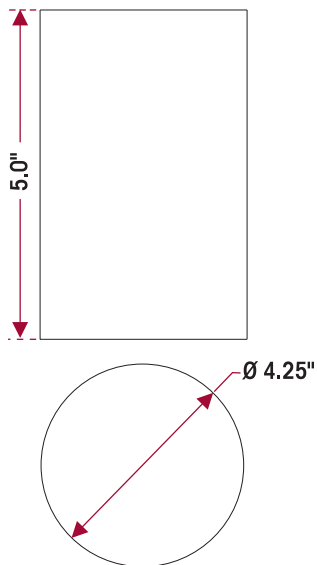
OTC Tool No. 1757



Servicing bar pin end bushings used on HN FR equalizing beam suspensions requires the use of special tooling. OTC's No. 1757 adapter set is used with the beam removed from the truck, and in conjunction with OTC No. 51100 press plate and a 100-ton hydraulic shop press.

To order, contact OTC, 507.455.7000 or visit: www.otctools.com for an OTC distributor.

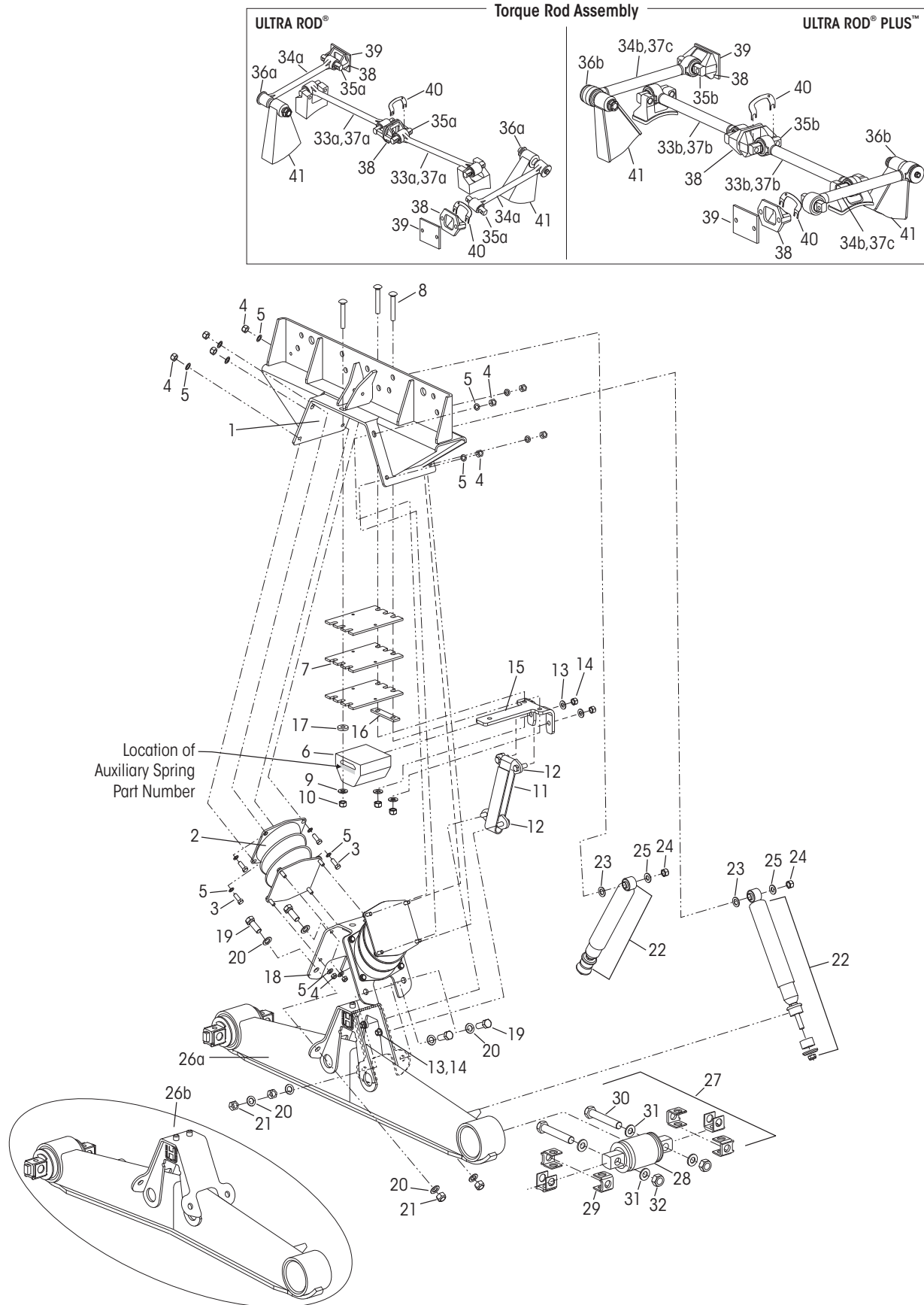
BAR PIN END BUSHING RECEIVING TOOL



This shop made tool is designed to receive bar pin end bushing. Bushing tool is made from cold rolled steel or equivalent. Drawing is for reference only. Hendrickson does not supply this tool.

SECTION 5 Parts Lists

■ HN FR Series





KEY NO.	PART NO.	DESCRIPTION	NO.REQ.	KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1		HN FR Saddle Assembly, See Figure 1 below Includes Key Nos. 2-18 16½", 17½", 18½" or 19" 17½" or 22½"	2	27		Bar Pin End Bushing Service Kit, One Wheel End, Includes Key Nos. 28-32 Non-Shim Type Shim Type Rotating, Shim Type	
	60686-OXX				34013-087L		
	58650-OXX				34013-088L		
	60879-000L	Bolster Spring Kit, One Side, (2 pcs), Includes Key No. 2			34013-188L		
2		*Bolster Spring	4	28		*Bar Pin End Bushing	4
3	25114-011	¾"-20 UNF 1.25" Bolt	32	29		Bar Pin Shim	8
4	48949-000	¾"-20 UNF-2B Locknut	32		50130-000	0.19" / 0.19"	
5	22962-027	¾" Washer	64		50131-000	0.25"/0.12" (Not shown)	
6		Auxiliary Spring Assembly, See part no. located on the component	2		57026-000	0.375"	
	60314-000	3¾" Height			56659-001	Bar Pin Beam End Mounting Fastener Kit, Axle Set, Includes Key Nos. 30-32	
	65902-003	2½" Height		30	48941-000	1"-8 UNC 6.0" Hex Bolt	8
7	58960-003	Auxiliary Spring Shim	6	31	22962-008	1" Hardened Washer	16
8	58196-006	½"-13 UNC-2A Round Head Square Neck Bolt	6	32	48942-000	1"-8 UNC Locknut	8
9	22962-011	½" Washer	6	33		Two-Piece Longitudinal Torque Rod Kit, Straddle/Straddle, Includes Tube End, Spacer End	
10	49846-000	½"-13 UNC-2A Locknut	6	a	60218-000	ULTRA ROD, 27" Max., Includes Key Nos. 35a	
11	57878-003	Rebound Strap	2	b	60223-000	ULTRA ROD, 35" Max., Includes Key Nos. 35a	
	60639-000	Anchor Plate Assembly, Includes Key Nos. 12-14	4	34		**Two-Piece Transverse Torque Rod Kit, Straddle/Taper, Includes Tube End, Spacer End	
12		*Anchor Plate	4	a	60215-000	ULTRA ROD, Includes Key Nos. 35a-36a	
13		*½" Washer	8	b	65781-000	ULTRA ROD PLUS, Includes Key Nos. 35b-36b	
14		*½"-13 UNC-2A Locknut	8	35		Straddle Bushing	2
15	58948-001	Auxiliary Spring Mounting Plate	2	a	47691-000H	ULTRA ROD	
16	58949-000	Auxiliary Spring Mounting Plate Shim (Inboard - ¼" thick)	2	b	64400-002L	ULTRA ROD PLUS	
17	22962-020	½" Washer (Outboard - ¼" thick)	2	36		Taper Bushing	2
18	58343-001	Saddle Vee Bracket	2	a	64697-000H	ULTRA ROD	
	58440-001	Vee Bracket Fastener Kit, One Side, Includes Key Nos. 19-21		b	64400-004L	ULTRA ROD PLUS	
19	50764-006	¾"-10 UNC-2A Hex Head Bolt	8	37		**One-Piece Torque Rod Assembly, Includes Bushings, See selection guide on page 10	
20	22962-001	¾" Washer	16	a		ULTRA ROD	
21	49842-000	¾"-10 UNC-2B Locknut	8	b		ULTRA ROD PLUS Straddle/Straddle	
22	60680-003L	Shock Absorber	4	c		ULTRA ROD PLUS Straddle/Taper	
23	22962-001	¾" Washer	4	38		Torque Rod Frame Bracket	4
24	30585-000	⅝" Upper Shock Locknut	4		22186-000	4¾"	
25	22962-004	⅝" Upper Shock Washer	4		46015-000	5¼"	
26		Equalizing Beam Assembly	2	39		Backup Plate	2
a	58494-002	54" Shim Type HN 482FR			45045-003	4¾"	
a	59973-003	54" Shim Type HN 542FR / 582FR			46869-005	5¼"	
a	59973-005	60" Shim Type HN 542FR / 582FR		40		Torque Rod Shim, See selection guide on page 10	8
b	57889-002	54" Shim Type HN 422FR		41		***Transverse Rod Axle Bracket	2
b	57889-005	52" Shim Type HN 422FR					

NOTE: Equalizing beam axle brackets for drive axles are supplied by the axle manufacturer.

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

** Transverse rods are mandatory for HN Suspension regardless of axle spacing. See Literature No. 59310-004 for more information. Hendrickson's part number is stamped on the rod for identification. Be sure and include suffix number when ordering, this number indicates rod length. The Hendrickson 2-piece ULTRA RODS® can be used to create the desired length, see Torque Rod Selection Guide Literature No. 45745-148.

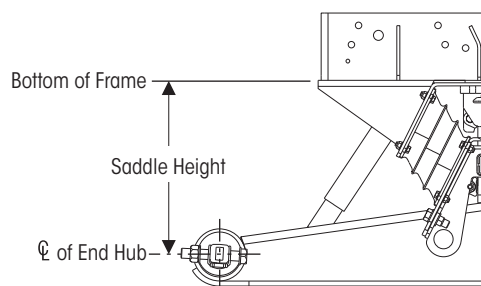
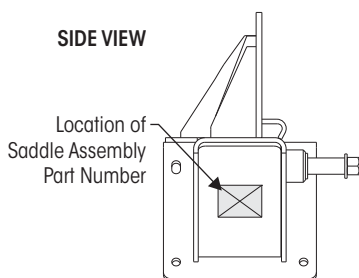
*** Not supplied by Hendrickson, used for reference only. Refer to vehicle manufacturer for more information. Hendrickson is not responsible for components supplied by vehicle manufacturer. For assistance with maintenance and rebuild instructions on these components, see vehicle manufacturer.

FIGURE 1
SADDLE ASSEMBLY (KEY NO. 1)

Locate the part number on the saddle assembly

OR

If the saddle assembly number is not legible or available, have the VIN number and saddle height (for part verification) and contact vehicle manufacturer for part number. Questions? Contact Hendrickson Truck Parts





■ SELECTION GUIDE

ONE PIECE TORQUE ROD ASSEMBLY								
Longitudinal Torque Rod						Transverse Torque Rod		
Key No. 37a			Key No. 37b			Key No. 37c		
ULTRA ROD Straddle/Straddle Assembly			ULTRA ROD PLUS Straddle/Straddle Assembly			ULTRA ROD PLUS Straddle/Taper Assembly		
Length	Part No.	Capacity	Length	Part No.	Capacity	Length	Part No.	Capacity
22.83"	62001-580	HN 422FR	19.49"	72100-495	HN 542FR/582FR	19.69"	72950-500	HN 522
23.82"	62000-605	HN 482FR	22.05"	72100-560	HN 522	19.88"	72950-505	HN 522
28.15"	62000-715	HN 422FR	23.03"	72100-585	HN 542FR/582FR	24.02"	72350-610	HN 542FR
29.13"	62001-740	HN 482FR	23.62"	72400-600	HN 542FR	24.02"	72950-610	HN 542FR/582FR
			25.00"	72100-635	HN 542FR/582FR	24.21"	72950-615	HN 542FR/582FR
			26.97"	72100-685	HN 522	24.41"	72350-620S	HN 422FR/482FR
			28.54"	72100-725	HN 542FR/582FR	25.43"	72350-630S	HN 422FR
			28.94"	72401-735	HN 542FR			

TORQUE ROD SHIMS			
Part No.	Shim Thickness	Shim Length	Fasteners
49689-000	0.060"	4¾"	¾" and ⅝" Fasteners
49689-001	0.080"		
65640-002	0.060"	5¼"	¾" and ⅝" Fasteners
65640-003	0.120"		
67779-002	0.060"	5¼"	⅞" Fasteners
67779-003	0.120"		

SECTION 6

Preventive Maintenance

Hendrickson recommends that preventive maintenance be performed on a regular basis to help ensure all components function to their highest efficiency. Proper preventive maintenance programs can also help control repair costs and eliminate downtime. All new equipment should undergo an initial pre-service inspection, and be inspected at the following intervals.

HENDRICKSON RECOMMENDED PREVENTIVE MAINTENANCE INTERVALS

■ PRE-DELIVERY INSPECTION

1. Visually inspect suspension for proper assembly.
2. Check all fasteners for proper torque with special attention to the equalizing beam end connections.
3. Set auxiliary spring shims to required specifications, the number of shims is dependent on the following criteria:
 - Vehicle empty weight
 - Vehicle application
 - Roll stability versus ride requirements
4. Verify the lateral alignment of axles are within the vehicle manufacturer's tolerances (consult the applicable vehicle manufacturer's instructions).

■ INSPECTION AT ONE (1) MONTH

1. Visually inspect suspension components, check for:
 - Proper suspension function
 - Signs of unusual movement, loose or missing components
 - Signs of abrasive or adverse contact with other components
 - Damaged, bent or cracked parts
2. Check all fasteners for proper torque with special attention to the equalizing beam end connections.

■ PREVENTIVE MAINTENANCE

1. Every three months inspect auxiliary springs and bolster springs.
2. Every six months inspect equalizing beam end connections and Torque rods.
3. Every twelve months:
 - a. Visually inspect suspension for proper assembly
 - b. Check all fasteners for proper torque with special attention to the equalizing beam end connections.
 - c. Verify the lateral alignment of axles are within the vehicle manufacturer's tolerances (consult the applicable vehicle manufacturer's instructions)
 - d. Visually inspect suspension components. Check for all of the following and replace components as necessary:
 - Proper suspension function
 - Signs of unusual movement, loose or missing components
 - Signs of abrasive or adverse contact with other components
 - Damaged, bent or cracked parts

SAFETY REMINDER

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

Failure to follow the applicable safety precautions can result in personal injury and/or property damage. Carefully read and understand all safety related information within the applicable Hendrickson publications, on all decals and those provided by the vehicle manufacturer before operating the vehicle, or conducting any maintenance, service or repair.



WARNING

OVERLOADED SUSPENSIONS CAN CAUSE COMPONENT FAILURE, LOSS OF VEHICLE CONTROL, SEVERE PERSONAL INJURY OR DEATH.

- DO NOT EXCEED SUSPENSION CAPACITY RATINGS.
- DO NOT OPERATE AUXILIARY LIFT AXLES OR OTHER LOAD TRANSFERRING DEVICES IN ANY WAY THAT CAN OVERLOAD THE SUSPENSION.

COMPONENT INSPECTION

The following inspection should be performed at recommended maintenance intervals. Visually inspect all parts of the suspension for signs of wear, damage or movement. Look for bent or cracked parts. Replace all worn or damaged parts.

IMPORTANT NOTE

Replace all worn or damaged parts.

- **Auxiliary spring and Bolster spring** — See Auxiliary Spring Assembly and Bolster Springs in this section.
- **Equalizing beam assembly** — Check the overall condition of the equalizing beam for cracks, dents, dings, or other damage on the outer edges of the beam. Check the beam end connections every six months for tearing or extreme bulging. Check for any metal-to-metal contact in the bushed joints. Replace all worn or damaged parts.
- **Fasteners** — All fasteners must be inspected at pre-delivery, after the first month, and every twelve months thereafter. 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 Section of this publication for Hendrickson recommended torque requirements. Use a calibrated torque wrench to check torque in the tightening direction. As soon as the fastener starts to move, record the torque. Correct the torque if necessary. Replace any worn or damaged fasteners.

NOTE

Hendrickson recommends the use of Grade 8 bolts, Grade C locknuts and hardened washers for all suspension component attachments.

- **Saddle assembly** — Check all attaching fasteners for proper torque. Visually inspect the saddle for signs of movement on the frame rail or damage and welds for cracks. Inspect the area around the saddle gussets for cracks.
- **Torque rods** — All torque rods should be inspected every six months. Check for wear, damage and proper function. Visually inspect for signs of unusual movement, loose, or missing fasteners. The torque rods must be connected and in good working condition when operating the vehicle.
- **Vee Bracket** — Raise the vehicle frame and visually inspect the Vee bracket for wear or damage. Look for excessive wear or cracks on the Vee bracket's auxiliary spring contact surface. Replace all worn or damaged parts.
- **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.

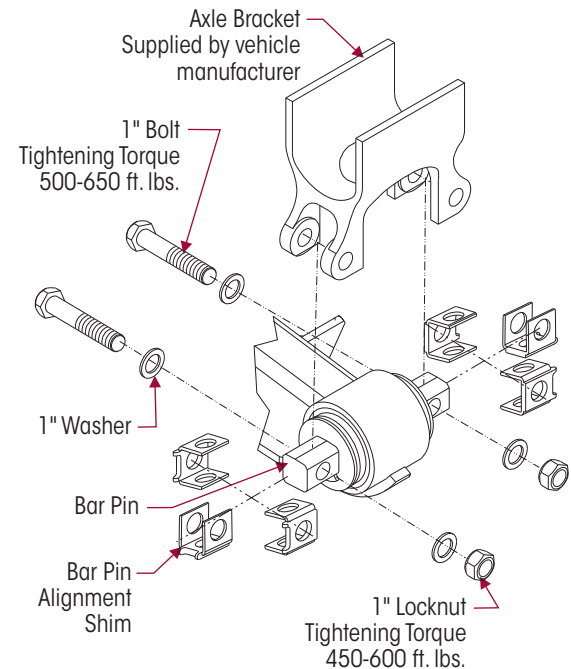
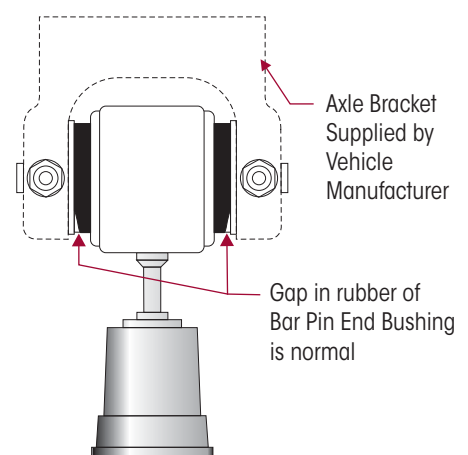
See vehicle manufacturer's applicable publications for other preventive maintenance requirements.

EQUALIZING BEAM END CONNECTION

The equalizing beam end connection for the HN FR is bar pin style with a rubber bushing and alignment shims as shown in Figure 6-1. An inspection of the equalizing beam end connection is necessary when a vehicle is in the shop for major repair work or every six months, whichever comes first.

This equalizing beam end connection requires that the fasteners are kept tight to maintain the clamp load of the axle bracket legs to the bar pin. All bushing motion is accommodated by rubber deflection. Tighten the equalizing beam 1" end fasteners to:

- At the locknut to 450-600 foot pounds torque, or
- At the bolt head to 500-650 foot pounds

FIGURE 6-1

FIGURE 6-2


INSPECTION

1. Chock the wheels.
2. Visually inspect suspension components for signs of movement or excessive wear.
 - a. Inspect alignment shims in equalizing beam end for looseness. Lightly tap on the alignment shims to see if they can be moved.
 - b. Inspect equalizing beam end connection for signs of excessive wear or looseness. An equalizing beam end connection, which is visibly cleaner than the other connections, may indicate a loose connection.
 - c. Look for worn, frayed, or distorted rubber in the equalizing beam end bushing.
 - d. Look for the equalizing beam to be lower in the beam hanger.
 - e. The gap on each side of the visible rubber at the lower end of the end bushing is normal and not an indication to replace the bushing, see Figure 6-2. Because all rubber end bushings are in compression, with the load bearing on the top side, the lower side of the rubber is slightly relieved, allowing the rubber to move inward, and a gap appears.
 - f. Place a jack under each equalizing beam end as shown. Raise the jack to check for movement in the connection or rubber components, see Figure 6-2.

WARNING

IF BAR PIN MOVEMENT OR LOOSENESS IS NOTED IN THE EQUALIZING BEAM END HUB, DO NOT OPERATE THE VEHICLE. REPLACE THE RUBBER END BUSHINGS AND ALL CONNECTING PARTS. THE ABOVE CONDITION CAN RESULT IN COSTLY REPAIR, DOWNTIME, POSSIBLE SEPARATION OF COMPONENTS, LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, OR PERSONAL INJURY.

3. If bar pin movement or looseness is detected in the equalizing beam end hub, **DO NOT** operate vehicle. Replace the equalizing beam end bushings and all connecting parts. Refer to the Component Replacement Section of this publication.
4. Check and record torque values, as received, for each 1" bar pin fastener. Correct torque values as required making sure all fasteners are tightened to:
 - At the **locknuts** to 450-600 foot pounds torque or
 - At the **bolt head** to 500-650 foot pounds
5. Recheck equalizing beam end connections for signs of looseness.
 - Inspect alignment shims in equalizing beam end for looseness. Lightly tap on the alignment shims to see if they can be moved.
 - Inspect equalizing beam end connection for signs of excessive wear or looseness.

NOTE

An equalizing beam end connection, which is visibly cleaner than the other connections, may indicate a loose connection.

6. If bar pin looseness is still detected in the equalizing beam end hub, **DO NOT** operate the vehicle. One or more components will require replacement, see Component Replacement Section of this publication.

AXLE BRACKETS

The axle brackets are furnished and welded into position by the vehicle or axle manufacturer.

- **When inspecting the equalizing beam end connection** also inspect the axle brackets for damage or cracks, see Figure 6-3. Measure the dimension as shown in Figure 6-3, any axle bracket that is found damaged or cracked must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.
- **When an equalizing beam is removed for repair, or an inspection of the equalizing beam end connection reveals movement,** measure the distance between the axle bracket legs for correct width. Refer to Figure 6-4 for measurement location and dimensions. An axle bracket outside of the measurement range must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.

FIGURE 6-3

Axle Bracket* Leg Dimensions

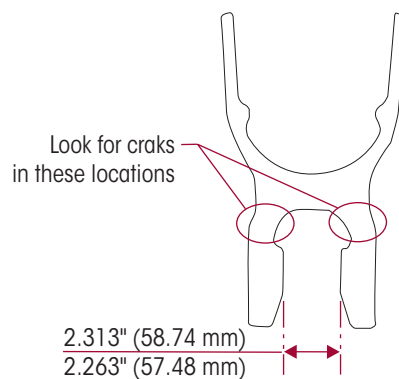
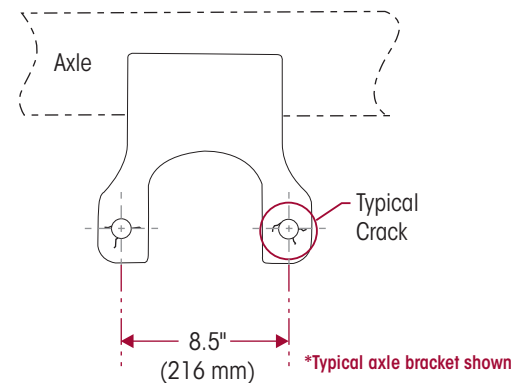


FIGURE 6-4

Axle Bracket* Leg

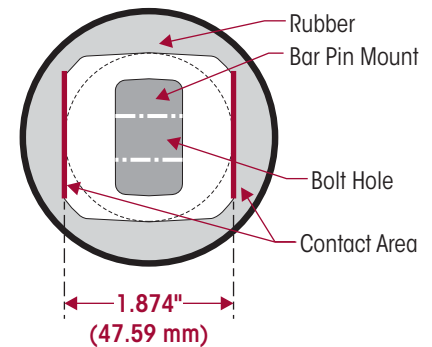


BAR PIN END BUSHING

An indication that the bar pin end bushing requires replacement is when one or more of the following conditions apply:

- Visual inspection of contact area (the flat face area where bar pin contacts the axle bracket) on the bar pin reveals signs of excessive wear. If the thickness of the bar pin in the contact area measures less than 1.874" (47.59 mm), bar pin end bushing requires replacement, see Figure 6-5.
- Visual inspection of the bolt holes in the bar pin reveals signs of elongation or wear, see Figure 6-5.

FIGURE 6-5



If bar pin measurement is **less than 1.874" (47.59 mm)**, component replacement is required.

BAR PIN SHIM

An indication that the bar pin shims require replacement is when one or more of the following conditions apply:

- Visual inspection of contact area on the shim reveals signs of excessive wear.
- The thickness of any single leg on the shim, is less than the measurement shown in Figure 6-6, replacement of bar pin shim is required.

FIGURE 6-6

Leg Thickness	Thickness of Shim Leg	Minimum Thickness Required
	1/8"	0.123" (3.1 mm)
	3/16"	0.186" (4.7 mm)
	1/4"	0.248" (6.3 mm)
	3/8"	0.371" (9.4 mm)

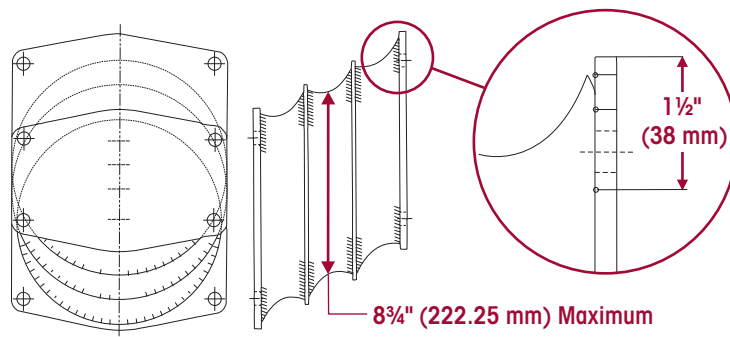
BOLSTER SPRINGS

Inspect all four bolster springs on a periodic basis. Actual bolster spring service condition and performance may vary depending upon suspension and vehicle configuration, operation, service and other factors. The following inspection guidelines are intended to assist vehicle operators and maintenance personnel in examining the bolster springs and determining when replacements may be needed. In the event one bolster spring on one equalizing beam assembly shows signs of damage or excessive wear, Hendrickson recommends that both bolster springs installed on that equalizing beam assembly be replaced. When the bolster springs are replaced on one side only, the vehicle may lean slightly. The new bolster springs will tend to settle to some degree, and return the vehicle to its original condition. The following procedure is recommended for proper inspection.

1. Chock the front wheels to prevent movement of the vehicle during inspection of the suspension.
2. Raise rear of vehicle approximately 4.0" - 5.0", (102 mm - 127 mm) just prior to lifting wheels off ground, and support with stands.
3. Inspect all bolster springs using the following criteria. If cuts, splits, or bonding separation are detected in the rubber, measure the depth of the damaged area using a six-inch machinist scale to determine if replacement is required.
 - **Bent, burred or overhanging edges** of the bolster spring metal plates may occur due to mishandling in service. If the rubber is not trapped, and there are no sharp metal edges in contact with the free surface of the rubber, this condition is acceptable.
 - **Creases** formed by folding of the rubber surface under load are acceptable. These creases appear as stripes on the surface, polished by wear or covered with tacky rubber.

- **Minor oil and grease contamination** in the rubber due to vehicle operation is acceptable. A slight change in shape of the rubber due to permanent set should not be mistaken for oil and grease contamination. Certain softening of the rubber surface is acceptable. However, unacceptable swelling due to contamination will require bolster spring replacement. Measure bolster springs in the unloaded state. If the rubber diameter of the bolster spring exceeds 8¾" (222.3 mm), see Figure 6-7, then bolster spring replacement is necessary.
- **Cuts or Splits** in the rubber of over 3.0" (76 mm) in length and an average depth of 1.0" (25.4 mm) are not acceptable and require bolster spring replacement. In particular, look for signs of cuts or splits in the rubber at points indicated in Figure 6-7 as "//////".
- **Bonding separation** of the rubber from a bonded metal surface to a depth of up to 1½" (38 mm) is acceptable. If any bonding separation is more than 1½" (38 mm) deep, both bolster springs should be replaced on the affected side of the vehicle (see Figure 6-7). An unloaded bolster spring may be inspected for any bonding separation by measuring at points indicated in Figure 6-7 as "//////". Any thin film or other residual rubber material on the metal plates resulting from the molding process may be ignored during inspection.

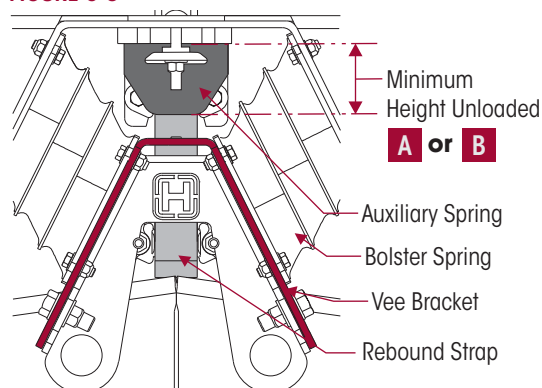
FIGURE 6-7



AUXILIARY SPRING ASSEMBLY

A visual inspection of the auxiliary spring is required every three months. It is acceptable to have some scuffing on the bottom edges of the auxiliary spring due to contact with the bolster springs and/or Vee bracket. If the auxiliary spring is damaged, replace the auxiliary spring as outlined in the Component Replacement Section of this publication. See the following chart for the new unloaded auxiliary spring height. If the minimum unloaded height decreases than shown in the chart replacement is required, see Figure 6-8.

FIGURE 6-8



Auxiliary Spring			
	Part Number	Unloaded Height	Minimum Unloaded Height
A	60314-000	3¾" (85.7 mm)	3.0" (76 mm)
B	65902-003	2⅞" (53.9 mm)	1⅞" (49.2 mm)

REBOUND STRAP

Periodic inspection of the rebound strap, see Figure 6-8, is required every six (6) months. If the rebound strap is torn, frayed, or not intact replace as outlined in the Components Replacement Section of this publication.

LONGITUDINAL AND TRANSVERSE TORQUE RODS

WARNING

HN FR SUSPENSIONS INCORPORATE TRANSVERSE RODS FOR VEHICLE STABILITY. IF THESE COMPONENTS ARE DISCONNECTED OR ARE NON-FUNCTIONAL, THE VEHICLE SHOULD NOT BE OPERATED. FAILURE TO DO SO CAN RESULT IN ADVERSE VEHICLE HANDLING, LOSS OF VEHICLE CONTROL, POSSIBLE TIRE CONTACT WITH THE FRAME, PREMATURE COMPONENT DAMAGE, OR SEVERE PERSONAL INJURY.

All torque rods need to be inspected for looseness by one of the following methods.

- **Method 1** — **For Tractor applications only** with brakes applied, slowly rock the empty vehicle with power while a mechanic visually checks the action at both ends.
- **Method 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.

Visually inspect torque rod bushings for torn or shredded rubber, inspect for bent, cracked, or broken torque rods and also for end hubs that have an elongated "oval" shape. Any of these conditions require component replacement.

The length of the torque rods is determined by the truck manufacturer for optimum drive line angle and alignment. The longitudinal torque rods control pinon angles and also absorb acceleration and braking forces. The transverse torque rods control the side to side inputs such as cornering. The mounting brackets at the axle ends of the torque rods are furnished and welded into position on the axle housings by vehicle manufacturer or the axle manufacturer. A two-piece torque rod is also available to cut and weld to the desired length, see Hendrickson publication 45745-148.

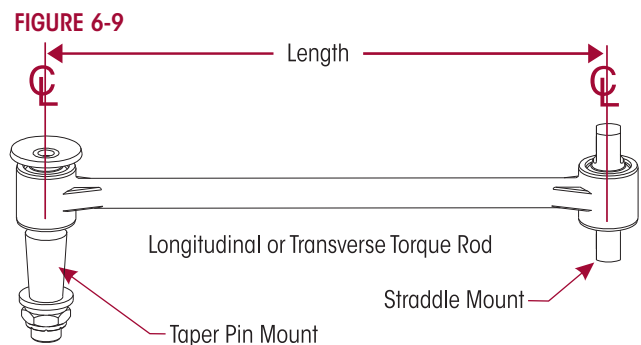
Straddle mount torque rod end attaching fasteners are furnished by the vehicle manufacturer. It is important that the tightening torque of the locknuts be checked during preventive maintenance service. Follow the vehicle manufacturer's specifications for torque values.

NOTE

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

The longitudinal rod is straddle/straddle mount, and the transverse rod it straddle mount / taper pin mount, as shown in Figure 6-9.

Whether the bushings are straddle mount or taper pin mount, (see Figure 6-9) they can be replaced by pressing out the worn bushing and installing a new genuine Hendrickson bushing. Refer to the technical procedure for the proper replacement instructions for your specific suspension system.



SECTION 7

Alignment & Adjustments

DRIVE AXLE ALIGNMENT INSPECTION PROCEDURE

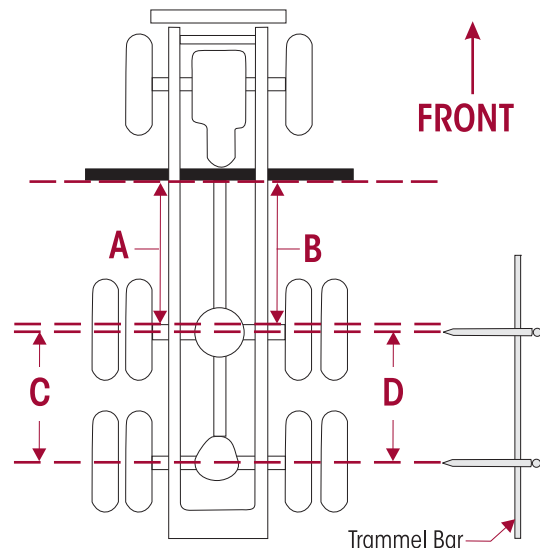
Proper alignment is essential for maximum ride quality, performance, and tire service life. The following recommended alignment procedure as described below, should be performed if excessive or irregular tire wear is observed.

NOTE

Proper vehicle alignment can only be achieved when all axles are aligned to the vehicle's centerline and the steering axle's caster, camber and toe-in settings are within specifications. If, however, axle alignment equipment is not available the alignment of the drive axles may be checked by performing the following steps.

1. Use a work bay with a level, flat 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 and maintain the air system at full operating pressure.
5. Verify all suspension components are in good condition. Repair or replace any worn or damaged suspension components before proceeding with the alignment process.
6. Ensure all drive axle tires are the same size.

FIGURE 7-1



7. Securely clamp a six-foot piece of STRAIGHT bar stock or angle iron across the lower frame flange as shown in Figure 7-1. Select a location for the bar stock or angle iron as far forward of the drive axle as possible where components will not interfere.
8. Accurately square the bar stock or angle iron to the frame using a carpenter's square.
9. Using a measuring tape, measure from the straight edge to the forward face of the front drive axle arms on both sides of the vehicle as shown in Figure 7-1, **A** and **B**.
10. Calculate the difference between measurements **A** and **B**.
 - a. If the front drive axle is within vehicle manufacturer's specifications, proceed to check the rear drive axle (Step 11).
 - b. If alignment of the front drive axle **IS NOT** within the vehicle manufacturer's specifications, then the alignment of this axle **MUST** be corrected **BEFORE** measuring the rear drive axle alignment (Step 11). Correct the alignment of this axle by following the bar pin alignment instructions.

NOTE

Since the remaining drive axle will be aligned relative to the front drive axle, it is essential that the front drive axle is aligned within the vehicle manufacturer's specifications prior to the alignment of the remaining drive axle.

11. Using a trammel bar, measure the distance from the spindle center of the front drive axle to the spindle center of the rear drive axle on both sides of the vehicle; see Figure 7-1, **C** and **D**.
12. Calculate the difference between measurements **C** and **D**.
 - a. If the measurements are within the vehicle manufacturer's specifications, then the rear drive axle alignment is acceptable.
 - b. If alignment of the rear drive axle **IS NOT** within the vehicle manufacturer's specifications, then the alignment of this axle **MUST** be corrected. Correct the alignment of this axle by following the bar pin alignment instructions.
13. Recheck measurements to confirm adjustments. Repeat Steps 9 through 12 until the correct alignment is achieved.
14. When all drive axle alignments are within the vehicle manufacturer's specifications then the alignment procedure is complete.

BAR PIN ALIGNMENT

The alignment feature consists of specially designed, tightly tolerance steel shims which fill the $\frac{3}{8}$ " (9.5 mm) total gap between the bushing's bar pin and the axle bracket legs. The gap must be filled by placing the shims on the bushing assembly in one of the positions shown in Figure 7-2 or 7-3. Hendrickson has three shim designs options for alignment, part number 50130-000 (provided), 50131-000 and 50132-000, see Figure 7-5.

WARNING

A BAR PIN SHIM MUST BE INSTALLED AT EACH BOLT LOCATION. THE SAME PART NUMBER SHIM IN THE SAME ORIENTATION MUST BE USED AT BOTH BOLT LOCATIONS ON ANY ONE END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE SHIM AT EACH BOLT LOCATION. USE GENUINE HENDRICKSON BAR PIN SHIMS, DO NOT USE STANDARD WASHERS. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN IMPROPER VEHICLE ALIGNMENT, FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

ALIGNMENT ADJUSTMENT

If alignment of the drive axles is required, as determined by an alignment inspection procedure, the following steps will need to be performed.

1. Determine direction of axle thrust angle. Figure 7-4 illustrates the forward drive axle with a thrust angle to the left (-negative thrust).

SERVICE HINT

Axle movement is in the same direction as the increased shim thickness, see Figure 7-3.

FIGURE 7-2

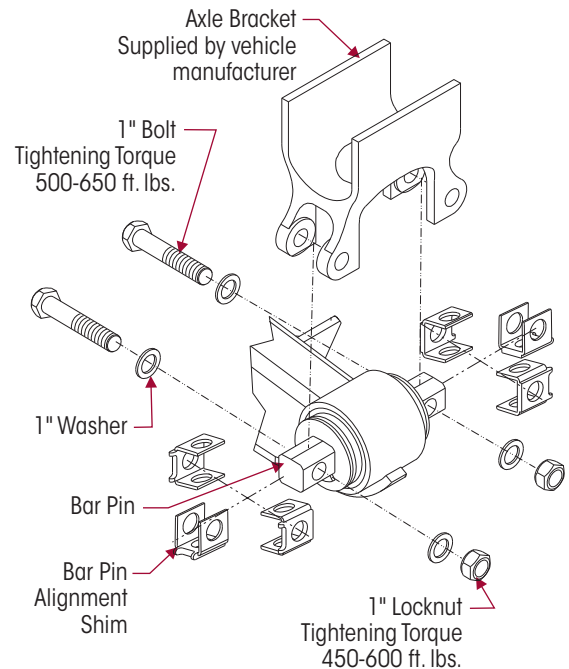
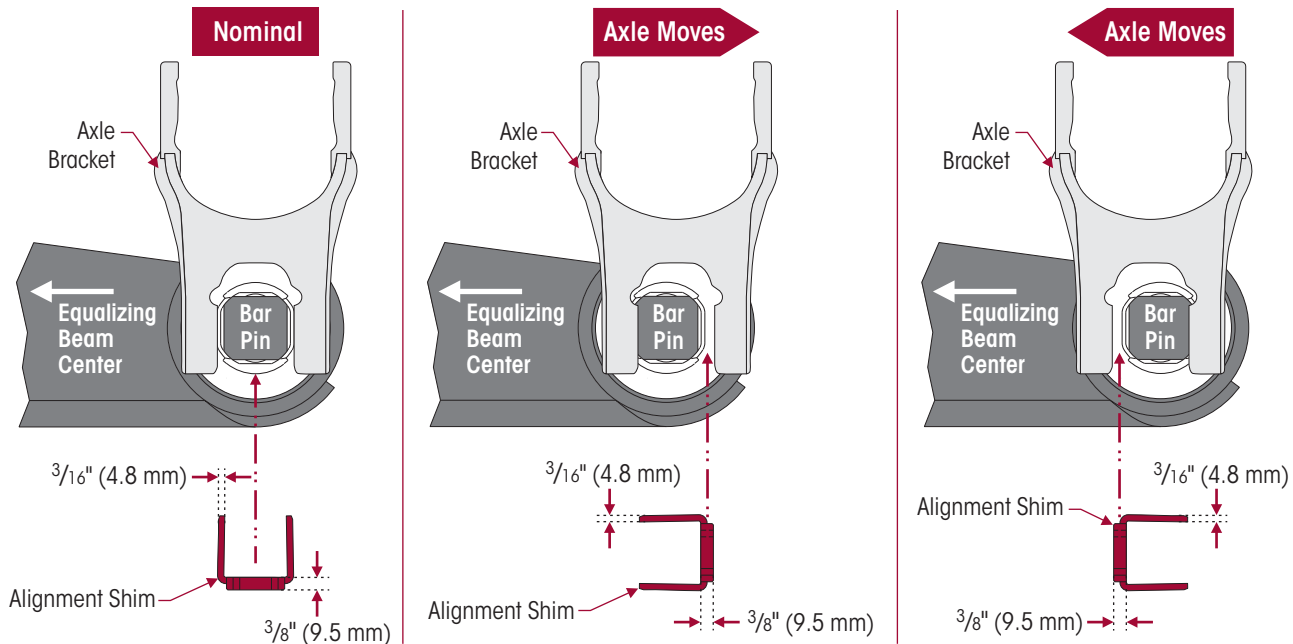


FIGURE 7-3



2. To determine where to adjust shim thickness use measurement **A** and **B** for front drive axle or **C** and **D** for rear drive axle, see Figure 7-1.

SERVICE HINT

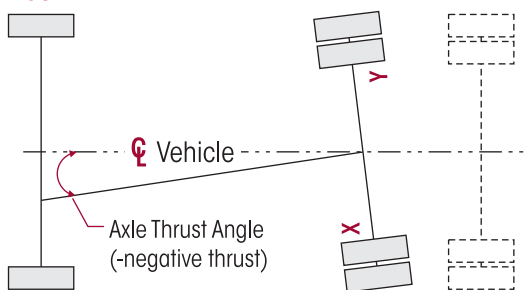
Axle adjustment will be on the side of the bar pin where shim thickness is increased. For example, to correct the axle thrust angle illustrated in Figure 7-4, shim thickness will need to be increased at the front of the bar pin (Location **X**) and/or the rear of the bar pin (Location **Y**).

NOTE

Computerized alignment equipment, such as a Hunter WT100 series, is the preferred method of alignment. Laser alignment equipment may be used, however, to calculate the shim thickness required the target offset must be converted to thrust angle, see alignment equipment manufacturer for procedures.

3. Chock the wheels of the front axles to prevent vehicle movement during service.
4. Raise the frame of the vehicle to remove the load from the suspension. Support the frame at this height with frame stands.
5. Support the equalizing beam and remove the fasteners from the end bushing where the bar pin alignment shim adjustment is being made.

FIGURE 7-4

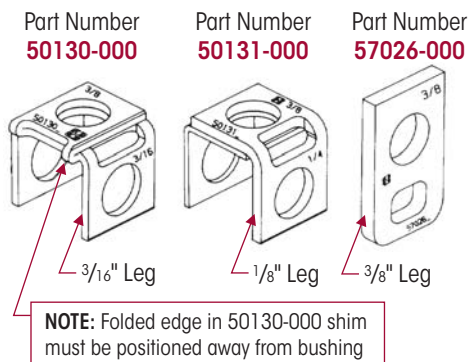


BAR PIN ALIGNMENT SHIMS

The following service notes will help when performing Hendrickson equalizing beam bar pin alignment

- The standard alignment shims supplied with each suspension (P/N 50130-000) have two $\frac{3}{16}$ " legs and a $\frac{3}{8}$ " back, see Figure 7-5. Rotating the shim pairs 90° will change the axle alignment in $\pm \frac{3}{16}$ " increments. If finer adjustments are required use an optional alignment shim (P/N 50131-000). This alignment shim has one $\frac{1}{8}$ " leg, one $\frac{1}{4}$ " leg, and a $\frac{3}{8}$ " back. A total of $\frac{3}{4}$ " adjustment is achievable to the axle. An optional $\frac{3}{8}$ " flat shim is also available (P/N 57026-000), see Figure 7-5.
- Shim thickness of $\frac{1}{16}$ " increases 0.10° of thrust angle.
- To accomplish a thrust angle adjustment rotate the alignment shims on the bar pin of the end bushing. Axle movement will be in the direction of the shim thickness increase
- Axle thrust angle may be adjusted at either wheel end on an axle. If insufficient adjustment is available at one wheel end, the opposing wheel end will also need to be adjusted, but in the opposite direction.

FIGURE 7-5



EXAMPLE: The alignment equipment shows the front drive axle to have a 0.40° thrust angle to the left. This will require a $\frac{1}{4}$ " shim thickness increase to the front side of the left front equalizing beam end bushing. If there is less than $\frac{1}{4}$ " of adjustment available at this location then some of the adjustment will have to be made at the rear of the right front end bushing. In this case a $\frac{1}{8}$ " shim thickness increase at the front side of the left front bar pin AND a $\frac{1}{8}$ " shim thickness increase at the rear side of the right front bar pin will correct the 0.40° thrust angle.

6. Adjust shim thickness to move the axle in the desired direction, see Figure 7-3.

WARNING

EACH EQUALIZING BEAM END BUSHING HAS ONE INBOARD AND ONE OUTBOARD ALIGNMENT SHIM, FOR A TOTAL OF FOUR SETS OF TWO ALIGNMENT SHIMS PER SUSPENSION. EACH SET OF ALIGNMENT SHIMS MUST BE INSTALLED IN THE SAME ORIENTATION ON ALL OF THE FOUR BAR PINS. EACH OF THE FOUR EQUALIZING BEAM END SHIM LOCATIONS CAN DIFFER IN ORIENTATION. SEE FIGURE 7-2. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN THE FRACTURE OF EITHER THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING

THE BAR PIN ALIGNMENT SHIM (P/N 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE BUSHING, SEE FIGURE 7-5. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE, IMPROPER ALIGNMENT, DAMAGE OR FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

7. Install new end bushing fasteners and tighten to:
 - At the **locknut** to 450-600 foot pounds torque, or
 - At the **bolt head** to 500-650 foot pounds
8. Remove support and lower the vehicle.
9. Verify the axle's alignments are within the vehicle manufactures tolerance.
10. Set brakes and remove wheel chocks.

AUXILIARY SPRING SHIM EVALUATION

The HN FR suspension uses a dual spring design to achieve a good empty ride while maintaining a stable ride when loaded. When empty, the vehicle rides on the bolster springs and there is an air gap between the auxiliary springs and the Vee bracket. When loaded, the weight of the vehicle compresses the bolster springs until the auxiliary spring engages the Vee bracket, thereby increasing roll stability. However, vehicles with a high unladen tandem weight or a high center of gravity may require high roll stability at all times. On these vehicles, auxiliary spring shims may be added until the auxiliary spring and the Vee bracket are engaged at all times. This will eliminate any gap between the auxiliary springs and the Vee bracket. A maximum of five (5) shims may be installed above each auxiliary spring.

NOTE

Both sides of the HN FR suspension must have an equal number of shims in place or a vehicle lean may result.

Most production vehicles are manufactured with three (3) auxiliary spring shims above the auxiliary spring, see Figure 7-6. However, some vehicles are manufactured with only one shim to minimize the need for adjustment after the body equipment is installed.

To achieve optimal ride quality and stability the unladen tandem weight of a vehicle will dictate the auxiliary spring shim arrangement necessary above the auxiliary spring, see chart below for details.

TABLE 7-1

RECOMMENDED AUXILIARY SHIM CONFIGURATION	
UNLADEN TANDEM WEIGHT WITH BODY / EQUIPMENT / EMPTY TRAILER INSTALLED	
10,000–18,000 lbs.	18,001–28,000 lbs.
STD–3 Shims	2 Shims

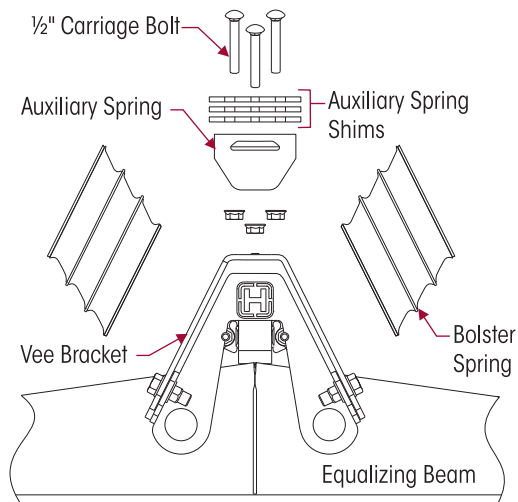
DISASSEMBLY

1. Chock the wheels.
2. Loosen the nuts that attach the auxiliary spring assembly to the saddle.
3. Remove or install additional shims as recommended.

ASSEMBLY

1. Re-assemble fasteners and tighten locknuts to 90-105 foot pounds torque.
2. Remove the wheel chocks.

FIGURE 7-6



SECTION 8

Component Replacement

FASTENERS

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

SERVICE HINT

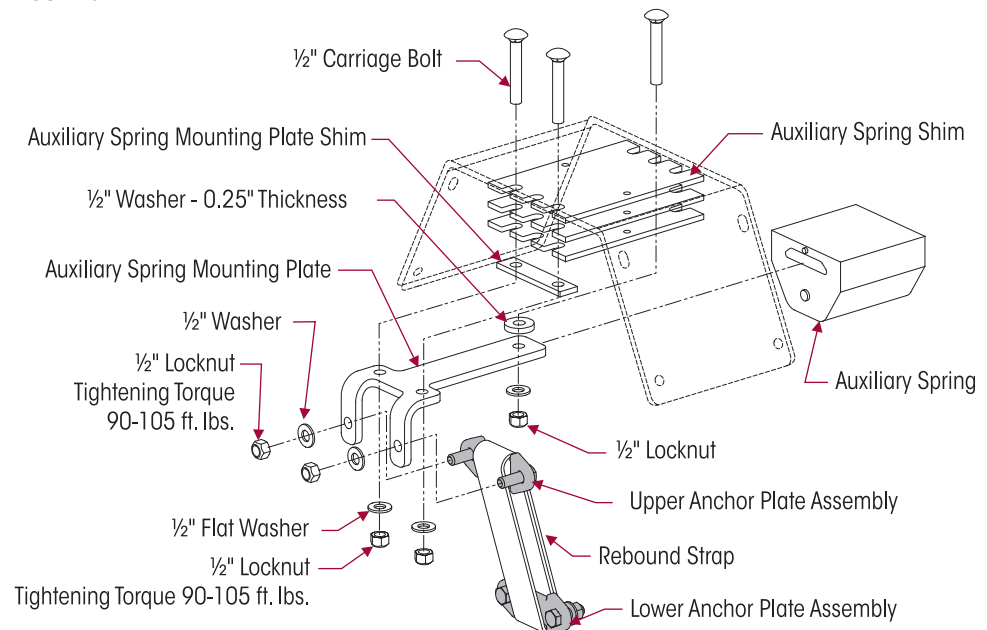
When replacing components on the HN FR suspension, work one side of the vehicle at a time and only lift the vehicle enough to remove load and component. This will help maintain axle orientation and help reduce labor time.

SADDLE

DISASSEMBLY

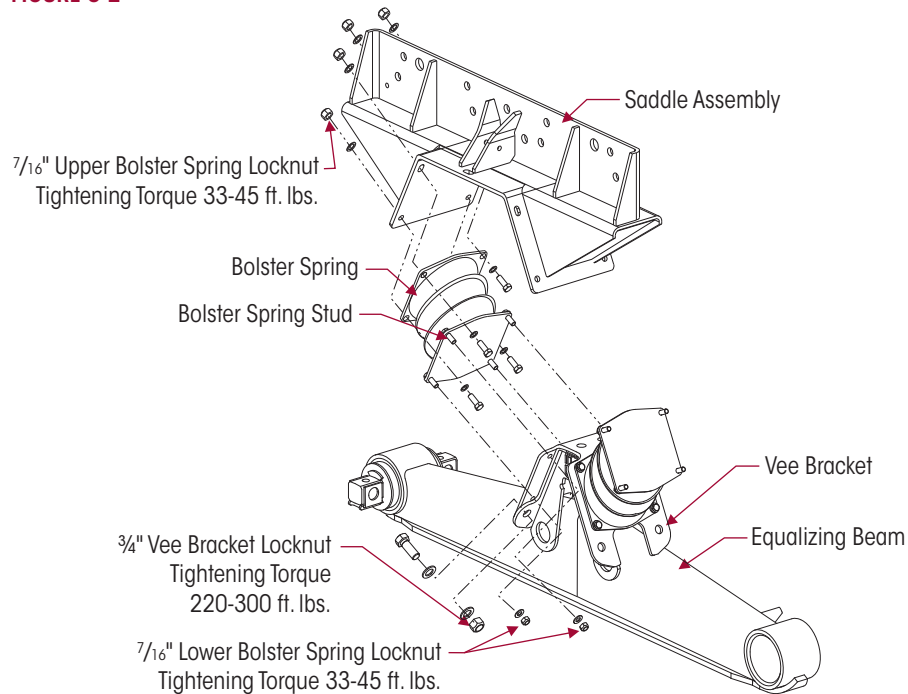
1. Chock the front wheels of the vehicle.
2. Remove the fasteners from the upper anchor plate assembly and auxiliary spring mounting plate, see Figure 8-1. Remove anchor plate.
3. Remove the three (3) carriage bolts securing the auxiliary spring to the saddle assembly. Remove the auxiliary spring, auxiliary spring mounting plate and auxiliary spring mounting plate shim and 1/2" washer, see Figure 8-1.

FIGURE 8-1



4. Loosen, **DO NOT** remove, the upper eight (8) 7/16" fasteners connecting the bolster springs to the saddle assembly, see Figure 8-2.
5. Remove the lower eight (8) 7/16" fasteners connecting the bolster springs to the Vee bracket, see Figure 8-2.

FIGURE 8-2



6. Raise the rear of the vehicle to clear the bolster springs from the equalizing beam. Support the vehicle at this height with frame stands.
7. Remove the eight (8) 7/16" fasteners that connect the bolster springs to the saddle, and remove the bolster springs, see Figure 8-2.

WARNING

THE WEIGHT OF THE SADDLE IS APPROXIMATELY 175 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

8. Remove saddle to frame fasteners per the vehicle manufacturer's specifications.
9. Remove the saddle.

ASSEMBLY

1. Mount the saddle to frame and tighten fasteners per the vehicle manufacturer's specifications.

WARNING

THE BOLSTER SPRING BOLT HEADS MUST BE POSITIONED TOWARDS THE BOLSTER SPRINGS TO PREVENT THE BOLSTER SPRINGS FROM BEING DAMAGED BY THE THREADED ENDS OF THE BOLTS.

2. Mount the bolster springs to the saddle and loosely install the eight (8) **upper** 7/16" fasteners on the bolster spring. Ensure the bolt heads are positioned towards the bolster springs. **DO NOT** tighten at this time.

CAUTION

IF THE VEE BRACKET LOCATED BETWEEN THE EQUALIZING BEAM AND THE BOLSTER SPRINGS IS DAMAGED, REPLACEMENT IS REQUIRED. FAILURE TO DO SO CAN CAUSE DAMAGE TO MATING COMPONENTS.

3. Remove the frame supports and lower the frame until the bolster springs lightly touch the Vee bracket.

WARNING

THE BOLSTER SPRING BOLT HEADS MUST BE POSITIONED TOWARDS THE BOLSTER SPRINGS TO PREVENT THE BOLSTER SPRINGS FROM BEING DAMAGED BY THE THREADED ENDS OF THE BOLTS.

4. Install the eight (8) 7/16" **lower** bolster spring fasteners through the bolster springs and the Vee-bracket. Ensure the bolt heads are positioned towards the rubber bolster springs. **DO NOT** tighten at this time.
5. After all sixteen (16) bolster spring fasteners are installed completely lower the vehicle onto the bolster springs.

6. Tighten all sixteen (16) bolster spring fasteners to 33-45 foot pounds torque, see Figure 8-2.
7. Install the auxiliary spring components to the saddle, see Figure 8-1.
 - a. Install the inboard fasteners through the saddle. Install the auxiliary spring shim(s), auxiliary spring mounting plate, and auxiliary spring mounting plate shim onto the inboard fasteners. Loosely install the washers and locknuts on the inboard fasteners. **DO NOT** tighten at this time.
 - b. Install the outboard fastener through the saddle and auxiliary spring shim(s), ½" auxiliary spring 0.25" thick washer, and the auxiliary spring mounting plate.
8. Tighten the auxiliary spring fasteners to 90-105 foot pounds torque.
9. Install the **upper** anchor plate assembly through the rebound strap. Install the **upper** anchor plate to the auxiliary spring mounting plate.
10. Tighten the **upper** anchor plate fasteners to 90-105 foot pounds torque.
11. Remove the wheel chocks.

AUXILIARY SPRING

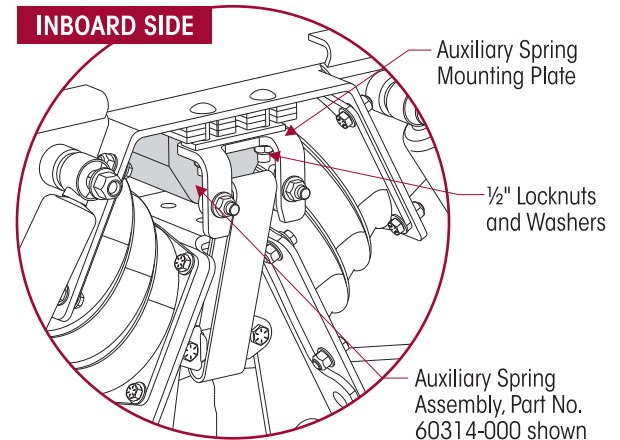
SERVICE HINT

Tire removal is not necessary to service the auxiliary spring.

DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Raise the frame of the vehicle just enough to remove the load from the bolster springs. Support the frame at this height with frame stands.
3. Remove the fasteners securing the auxiliary spring mounting plate to the saddle, see Figure 8-3.
4. Slide the auxiliary spring off the auxiliary spring mounting plate.

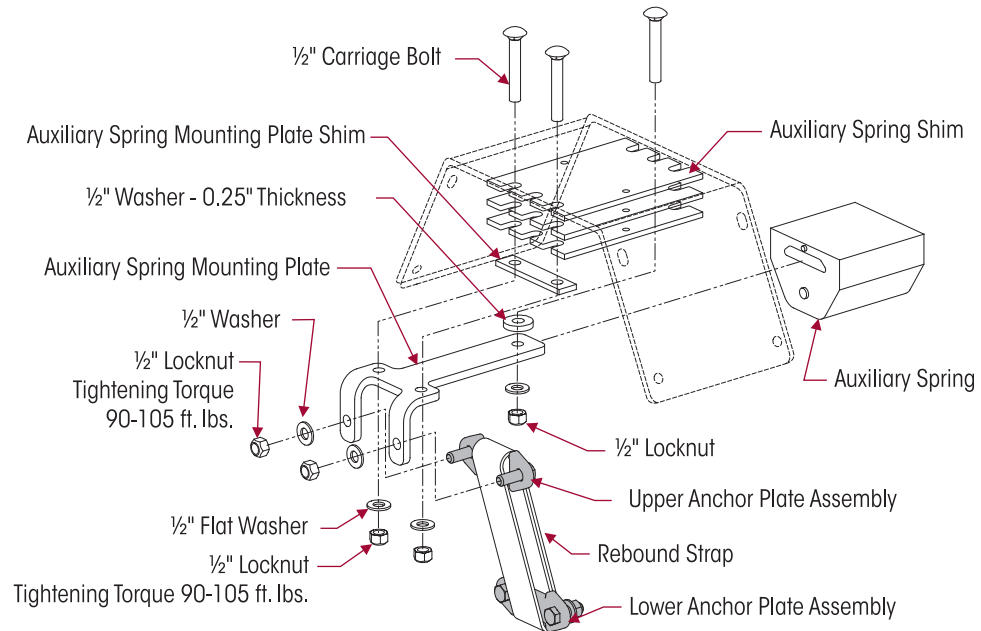
FIGURE 8-3



ASSEMBLY

1. Slide the auxiliary spring onto the auxiliary spring mounting plate.
2. Install the auxiliary spring mounting plate to the saddle.
 - a. Install the auxiliary spring shim(s) if removed, auxiliary spring mounting plate and auxiliary spring mounting plate shim onto the inboard fasteners. Loosely install the washers and locknuts, see Figure 8-4. **DO NOT** tighten at this time.
 - b. Install the outboard fasteners through the saddle, auxiliary spring shim(s), ½" auxiliary spring 0.25" thick washer, and auxiliary spring mounting plate.
3. Tighten the fasteners to 90-105 foot pounds torque.
4. Remove the frame supports and lower the vehicle completely.
5. Remove the wheel chocks.

FIGURE 8-4



REBOUND STRAP

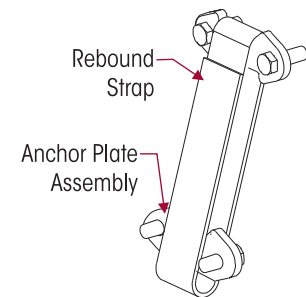
DISASSEMBLY

SERVICE HINT

Vehicle may need to be in the loaded condition for the rebound strap to be slack enough for removal.

1. Chock the front wheels.
2. From the inboard side of the saddle remove the 1/2" locknuts and 1/2" flat washers from the top of the upper anchor plate assembly of the rebound strap.
3. From the outboard side remove the 1/2" locknuts and 1/2" flat washers from the lower anchor plate assembly of the rebound strap. This will free the rebound strap and anchor plate assembly. Slide off, and free both ends of rebound strap from the anchor plate assembly, see Figure 8-5.

FIGURE 8-5



SERVICE HINT

The anchor plate assembly welds of bolt heads **DO NOT** need to be cut or separated to replace rebound strap.

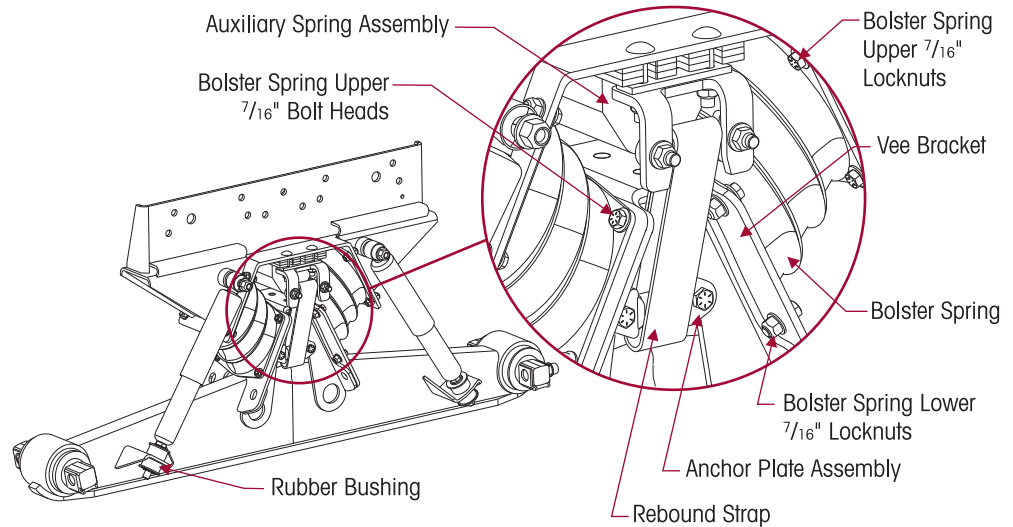
ASSEMBLY

1. Install the upper anchor plate through the rebound strap
2. Attach the upper anchor plate to the auxiliary spring mounting plate. Tighten the fasteners to 90-105 foot pounds torque.
3. Install the lower anchor plate through the rebound strap.
4. Attach the lower anchor plate to the equalizing beam. Tighten the fasteners to 90-105 foot pounds torque.
5. Remove the wheel chocks.

BOLSTER SPRINGS

NOTE

Replacement of bolster springs is possible from under the vehicle without the removal of the tires, rims or wheels. Hendrickson recommends that both bolster springs on one side of vehicle be replaced even if only one shows wear.

FIGURE 8-6

DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove the fasteners securing the anchor plate assembly to the auxiliary spring mounting plate. Remove the anchor plate assembly.
3. Remove the fasteners securing the bolster springs to the saddle and equalizing beam (8 per bolster), see Figure 8-6.
4. Raise the frame of the vehicle just enough to remove the load from the bolster springs. Support the frame at this height with frame stands.
5. Remove the bolster springs.

ASSEMBLY
CAUTION

THE BOLSTER SPRING MOUNTING BOLT HEADS MUST BE POSITIONED AT THE RUBBER SIDE OF THE BOLSTER SPRINGS TO PREVENT THE BOLSTER SPRINGS FROM BEING DAMAGED BY THE THREADED ENDS OF THE BOLTS.

1. Install the bolster springs between the equalizing beam and saddle.
2. Loosely install the fasteners securing the bolsters to the saddle and the equalizing beam assembly making sure the bolt heads are towards the bolster springs.
3. Once all fasteners have been **loosely** installed remove the frame supports and lower the vehicle to place the full load of the vehicle on the suspension.
4. Tighten the bolsters spring fastener locknuts to 33-45 foot pounds torque.
5. Install the anchor plate assembly through the rebound strap loop.
6. Install the anchor plate assembly and fasteners to the auxiliary spring mounting plate.
7. Tighten the anchor plate assembly fastener locknuts to 90-105 foot pounds torque.
8. Remove the wheel chocks.

VEE BRACKET

DISASSEMBLY

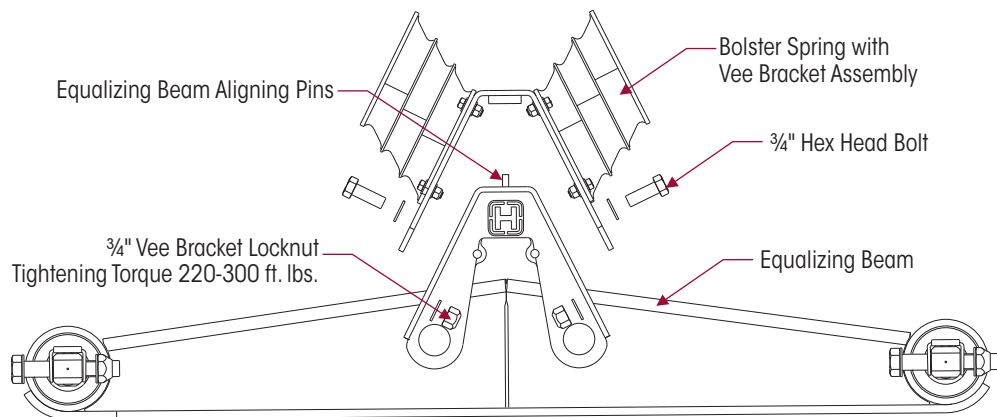
1. Chock the wheels.

SERVICE HINT

Access to the lower anchor plate assembly fasteners can be gained from the outboard side of the equalizing beam.

2. Remove the lower anchor plate assembly from the inboard side of the equalizing beam. Access to the fasteners can be gained from the outboard side of the equalizing beam.
3. Remove the lower bolster spring fasteners on the side being serviced (4 fasteners per bolster).
4. Raise the frame enough to clear the Vee bracket from the equalizing beam aligning pins, see Figure 8-7. Support the frame at this height with frame stands.
5. Remove the four (4) Vee bracket $\frac{3}{4}$ " fasteners.
6. Remove the Vee bracket from the equalizing beam.

FIGURE 8-7



ASSEMBLY

1. Mount Vee bracket over aligning pins on equalizing beam, see Figure 8-7.
2. Install the four Vee bracket fasteners. **DO NOT** tighten at this time.

CAUTION

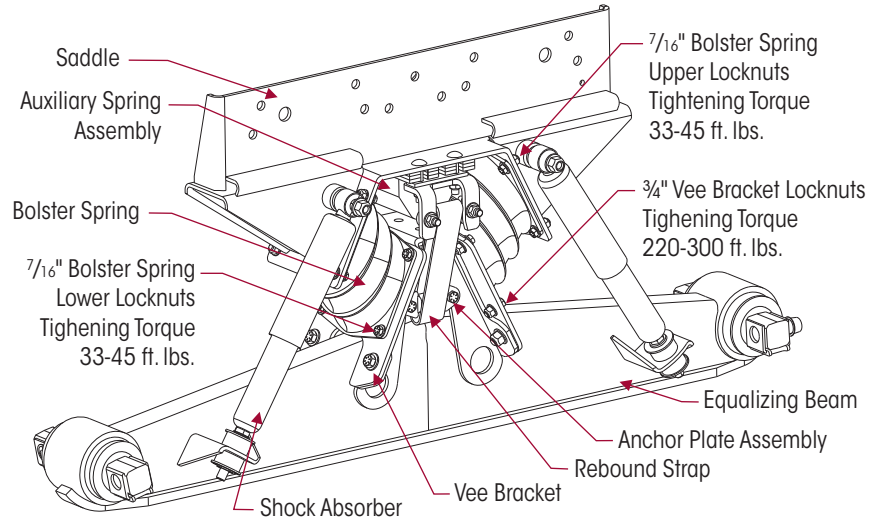
THE BOLSTER SPRING MOUNTING BOLT HEADS MUST BE POSITIONED AT THE RUBBER SIDE OF THE BOLSTER SPRINGS TO PREVENT THE BOLSTER SPRINGS FROM BEING DAMAGED BY THE THREADED ENDS OF THE BOLTS.

3. Lower the frame enough to align the four (4) **lower** bolster spring holes to the Vee bracket.
4. Loosely install the fasteners securing the bolsters to the saddle and the equalizing beam assembly making sure the bolt heads are towards the bolster springs.
5. Completely lower the vehicle.
6. Tighten all bolster spring locknuts to 33-45 foot pounds torque, see Figure 8-8.
7. Tighten Vee bracket $\frac{3}{4}$ " locknuts to 220-300 foot pounds torque, see Figure 8-8.

SERVICE HINT

Access to the lower anchor plate assembly fasteners can be gained from the outboard side of the equalizing beam.

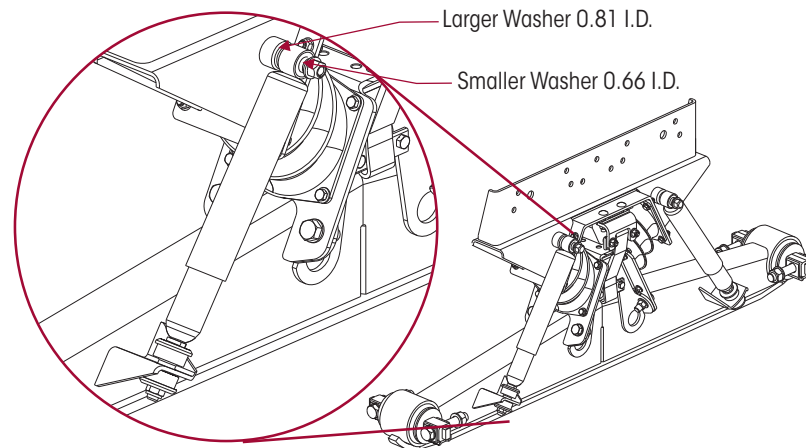
8. Install the lower anchor plate assembly through the rebound strap and attach it to the equalizing beam. Tighten the fasteners to 90-105 foot pounds torque.
9. Remove the wheel chocks.

FIGURE 8-8


SHOCK ABSORBERS

DISASSEMBLY

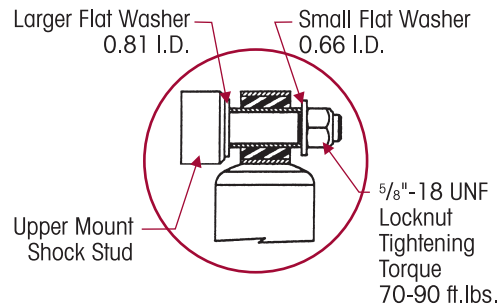
1. Remove the shock absorbers by loosening and removing the 5/8" locknuts, retainer washers, flat washers, and rubber bushings from the bottom and top of both shock absorbers, see Figure 8-9.

FIGURE 8-9


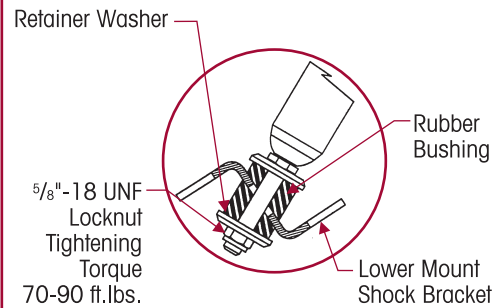
ASSEMBLY

1. Replace the shock absorbers by installing the 5/8" UNF locknuts, retainer washers, flat washers and rubber bushings from the bottom and top of both shock absorbers as shown in Figures 8-10 and 8-11 .
2. The larger 0.81" I.D. flat washers fit over the shoulder of the upper mount shock stud, and the smaller 0.66" I.D. flat washers are then installed over the threaded end of the upper mount shock stud, see Figure 8-10.
3. Install on lower shock a retainer washer, rubber bushing above shock mount, then install a rubber bushing, retainer washer and 5/8" locknut below the shock mount, see Figure 8-11. Torque all locknuts to 70-90 foot pounds.

**FIGURE 8-10
UPPER SHOCK**



**FIGURE 8-11
LOWER SHOCK**



EQUALIZING BEAM

DISASSEMBLY



CAUTION

IF THE VEE BRACKET LOCATED BETWEEN THE EQUALIZING BEAM AND THE BOLSTER SPRINGS IS DAMAGED, IT MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE DAMAGE TO MATING COMPONENTS. IF REPLACEMENT IS NEEDED, REFER TO VEE BRACKET REPLACEMENT IN THIS SECTION.

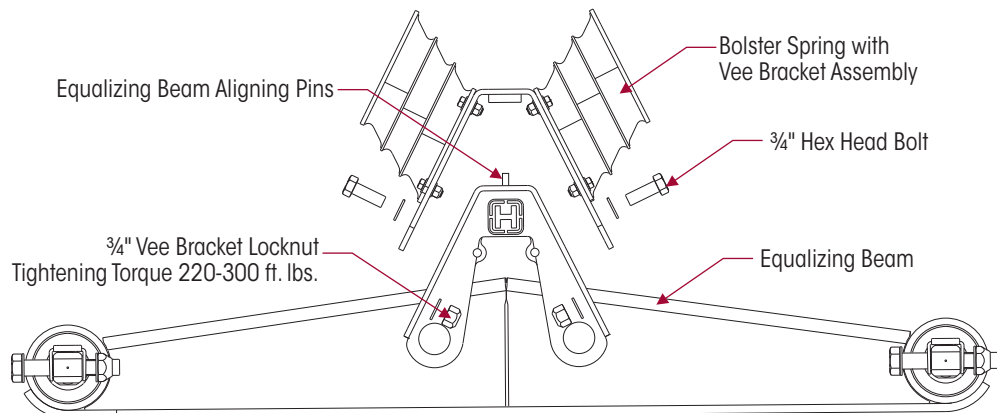
1. Chock the **FRONT** wheels of the vehicle.
2. If both equalizing beams need replacement repeat Steps 3 through 9 for removal of the opposing equalizing beam **AFTER** the first equalizing beam is reassembled.

SERVICE HINT

Access to the lower anchor plate assembly fasteners can be gained from the outboard side of the equalizing beam.

3. Remove the lower end of the rebound strap from the equalizing beam by removing the lower anchor plate and fasteners, see Figure 8-8.
4. Remove the (4) fasteners that connect the Vee bracket to the equalizing beam, see Figure 8-12.

FIGURE 8-12



5. Raise the frame of the vehicle until the Vee bracket is 2"-3" above the equalizing beam. Support the frame at this height with frame stands.

NOTE

Prior to disassembly of the equalizing beam bar pin fasteners, note the orientation of the bar pin alignment shims, see Figure 8-13. It is required that the bar pin alignment shims are installed in the same orientation and location as removed to preserve the existing vehicle alignment. Improper vehicle alignment can increase tire wear.

- Note the orientation and location of the bar pin shims, see Figure 8-13.


WARNING

THE WEIGHT OF THE EQUALIZING BEAM ASSEMBLY IS APPROXIMATELY 155 POUNDS. PRIOR TO REMOVING THE BAR PIN BOLTS FROM THE EQUALIZING BEAM, SUPPORT THE END OF THE EQUALIZING BEAM TO PREVENT FROM DROPPING. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

- Support the center of the equalizing beam being serviced.
- Remove and discard bar pin fasteners that connect the end bushing bar pin to the axle bracket.

NOTE

Prior to removing both equalizing beams, support the pinion of each drive axle. Failure to do so can result in personal injury or allow the axles to shift making reassembly more difficult.

- Lower the beam support and remove the equalizing beam from the axle brackets.

ASSEMBLY
NOTE

All equalizing beams are manufactured with the bar pin flats perpendicular to the equalizing beam's axis. It is not necessary to adjust the bar pins to the same pinion angle as prior to disassembly. The rubber in the bushings will gradually allow the bar pins to adapt to the pinion angles of the drive axles. This is a normal function of the bar pin bushings.

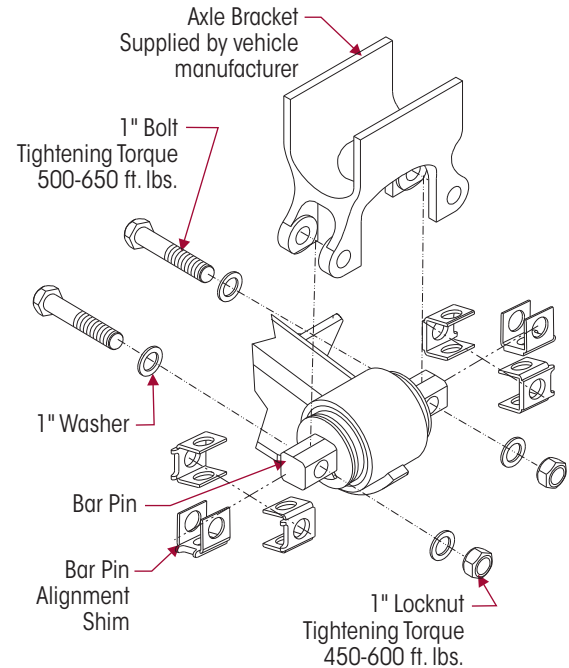
SERVICE HINT

Installing the front bar pins prior to the rear bar pins will ease in the installation of the equalizing beam.


WARNING

THE WEIGHT OF THE EQUALIZING BEAM ASSEMBLY IS APPROXIMATELY 155 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

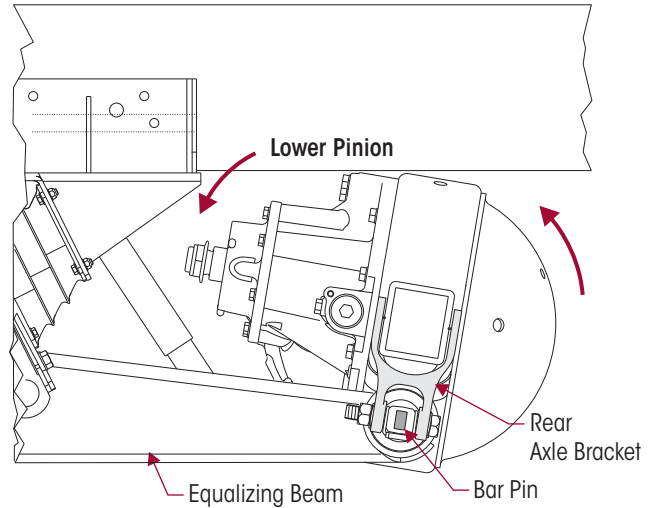
- Mount the equalizing beam into the **FRONT** drive axle brackets. **DO NOT** install the alignment shims at this time.
- Slide a $\frac{3}{4}$ " bolt through both front axle brackets and the bar pin holes to temporarily support the beams.
- Lift the **REAR** of the beam until the front bar pin flats are parallel to the front drive axle bracket legs, see Figure 8-14.

FIGURE 8-13


WARNING

A BAR PIN SHIM MUST BE INSTALLED AT EACH BOLT LOCATION. THE SAME PART NUMBER SHIM IN THE SAME ORIENTATION MUST BE USED AT BOTH BOLT LOCATIONS ON ANY ONE END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE SHIM AT EACH BOLT LOCATION. USE GENUINE HENDRICKSON BAR PIN SHIMS, DO NOT USE STANDARD WASHERS. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN IMPROPER VEHICLE ALIGNMENT, FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

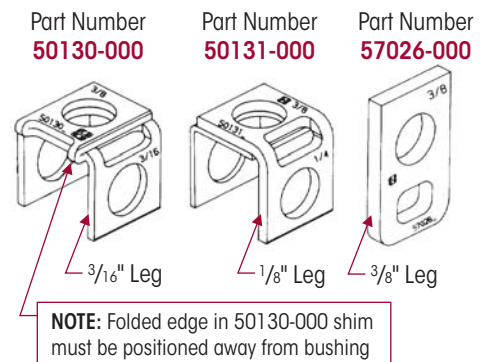
FIGURE 8-14



WARNING

THE BAR PIN ALIGNMENT SHIM (P/N 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE BUSHING, SEE FIGURE 8-15. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE, IMPROPER ALIGNMENT, DAMAGE OR FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

FIGURE 8-15



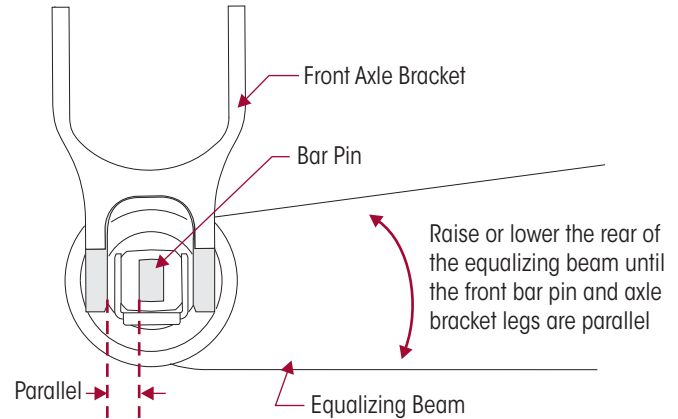
4. Partially install the **FRONT INBOARD** bar pin alignment shim and verify that the shim is in the same orientation as prior to disassembly, see Figure 8-13.
5. To complete installation of the alignment shim, remove the temporary 3/4" bolt from the inboard bar pin hole and complete installation of the inboard alignment shim.
6. Install the NEW 1" inboard bar pin fasteners. **DO NOT** tighten at this time.
7. Repeat Steps 4 through 6 for the **FRONT OUTBOARD** alignment shim.
8. Chock the **REAR** drive axle wheels to prevent movement while installing the rear bar pin into the axle bracket.
9. Support the current axle position of the rear axle pinion with a jack to assist with the installation of the rear bar pin.

NOTE

Prior to disassembly of the longitudinal torque rod, note the quantity and orientation of the longitudinal torque rod shims. It is required that the longitudinal torque rod shims are installed in the same orientation and location as removed to preserve the existing pinion angle.

10. Disconnect the longitudinal torque rod from the axle bracket, see vehicle manufacturer's specifications.
11. Release the rear parking brakes, this will allow the rear axle to rotate without rotating the tires.
12. Lower the rear drive pinion until the rear drive axle bracket legs are parallel to the rear bar pin flats, see Figure 8-16.

FIGURE 8-16



13. Mount the equalizing beam into the **REAR** drive axle brackets. **DO NOT** install the bar pin alignment shims at this time.
14. Slide a $\frac{3}{4}$ " bolt through all rear axle bracket and the bar pin holes to temporarily support the beams.
15. Partially install the **REAR INBOARD** bar pin alignment shim and verify that the shim is in the same orientation as prior to disassembly, see Figure 8-13.
16. To complete installation of the alignment shim, remove the temporary $\frac{3}{4}$ " bolt from the inboard bar pin hole and complete installation of the inboard alignment shim.
17. Install NEW 1" inboard bar pin fasteners. **DO NOT** tighten at this time.
18. Repeat steps 15 through 17 for the **REAR OUTBOARD** bar pin alignment shim.
19. Install the longitudinal torque rod as per the vehicle manufacturer's specifications.
20. Re-apply rear parking brake.

NOTE

Prior to assembly of the longitudinal torque rod, note the quantity and orientation of the longitudinal torque rod shims. It is required that the longitudinal torque rod shims are installed in the same orientation and location as removed to preserve the existing alignment.

21. Install the longitudinal torque rod and any longitudinal torque rod shims in the same orientation as prior to disassembly. Tighten the fasteners to the vehicle manufacturer's specifications.
22. Re-apply rear parking brake.

NOTE

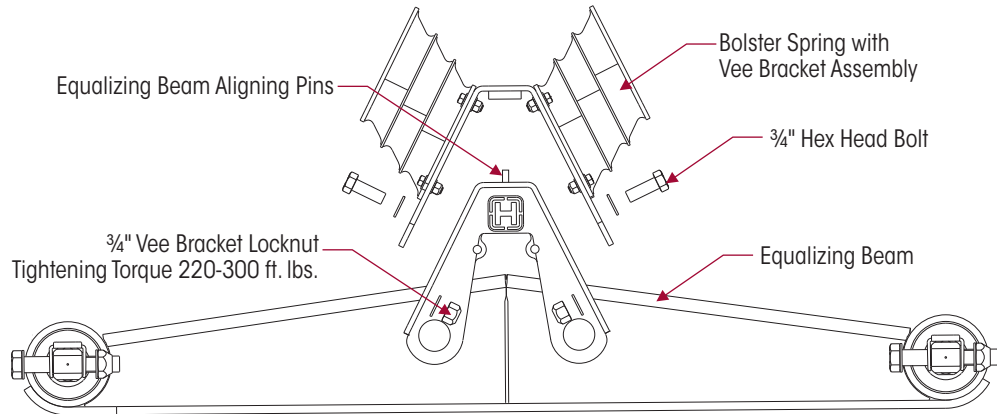
Prior to assembly of the rear fasteners, ensure that all the bar pin shims are installed in the same orientation as prior to disassembly.

23. Tighten the bar pin **locknuts** to 450-600 foot pounds torque, or if tightening on the **bolt head**, tighten to 500-650 foot pounds torque.
24. Remove the frame supports and lower the frame until the Vee bracket lightly touches the equalizing beam.
25. Slowly lower the frame while ensuring the alignment pins on the top of the equalizing beam engage the hole in the Vee bracket. Lower the frame until the weight of the vehicle is supported by the suspension.
26. Ensure the Vee bracket is fully seated on the equalizing beam and the alignment pins on the top of the equalizing beam are fully engaged in the Vee bracket holes, see Figure 8-17.
27. Install the fasteners that attach the Vee bracket to the equalizing beam. Tighten the fasteners to 220-300 foot pounds torque.

SERVICE HINT

Access to the lower anchor plate assembly fasteners can be gained from the outboard side of the equalizing beam.

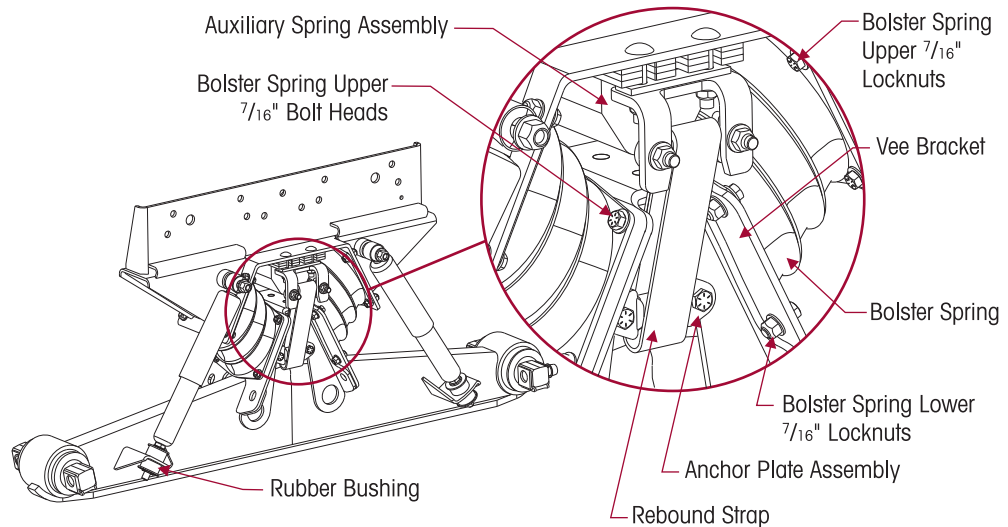
FIGURE 8-17



28. Install the lower anchor plate assembly through the rebound strap and attach it to the equalizing beam, see Figure 8-18. Tighten the fasteners to 90-105 foot pounds torque.

29. Remove the wheel chocks

FIGURE 8-18



BAR PIN END BUSHINGS

NOTE

Hendrickson bar pin service kits containing alignment shims, (Kit No. 34013-088L) or (Rotating Bar Pin Bushing Kit No. 34013-188) contain all the components required for one equalizing beam end, see Parts List Section of this publication.

YOU WILL NEED:

- A shop press with a capacity of at least 100 tons
- Bar pin adapter set tool – Refer to Special Tools Section of this publication for the tools to remove and install the bar pin style rubber end bushings
- Receiving tool – The receiving tool is a shop made tool which completely supports the beam hub being serviced and is tall enough to receive the bushing as it is being pressed in or out, see Special Tools Section of this publication

**WARNING**

WHEN REMOVING AND INSTALLING BUSHINGS IN THE EQUALIZING BEAMS, FOLLOW THE PROCEDURES OUTLINED IN THIS PUBLICATION. DO NOT USE A CUTTING TORCH TO REMOVE THE BUSHING OUTER METALS PRESSED IN THE EQUALIZING BEAM BORES. WELDING, TORCHING OR ATTACHING MATERIAL TO THE EQUALIZING BEAM MUST NEVER BE PERFORMED. THE USE OF HEAT CAN ADVERSELY AFFECT THE STRENGTH OF THE EQUALIZING BEAMS AND CAN CAUSE DAMAGE TO THE EQUALIZING BEAM ASSEMBLY, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

**WARNING**

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

NOTE

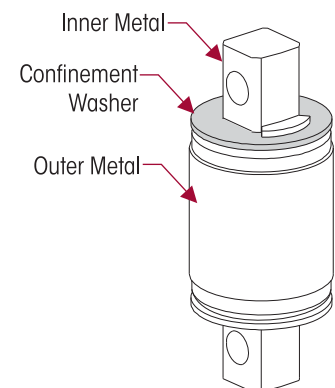
Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used then hardened structural washers must be used under bolt heads and locknuts.

BAR PIN END BUSHING REMOVAL**NOTE**

Whenever an equalizing beam is removed for repair, or inspection of the equalizing beam end connection reveals movement, measure the distance between the axle bracket legs for correct width. Refer to Axle Bracket in Preventive Maintenance Section of this publication for measurement location and dimensions. An axle bracket outside of the measurement range must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.

1. Remove equalizing beam assembly from vehicle as detailed in the equalizing beam disassembly instructions in this section.
2. Place the equalizing beam in the shop press with the beam end hub squarely supported on the press bed.
3. Press on the end bushing inner metal, see Figure 8-19, of the end bushing until the inner metal is flush with the top of the equalizing beam end hub. This will dislodge the confinement washer and move the bushing rubber away from the outer metal of the bushing so the push out tool can be installed, see Special Tools Section of this publication.
4. Center the bushing push out tool directly on the bushing's outer metal and press the bushing out of the equalizing beam end hub.
5. After removing the bar pin end bushings, thoroughly inspect each end hub bore.

FIGURE 8-19
BAR PIN END BUSHING

**INSPECTION**

After removing the bar pin end bushings, thoroughly inspect the beam bores. If the equalizing beam is damaged from end bushing removal, replacement of the equalizing beam is required, replace with a new equalizing beam. **DO NOT** re-bush or otherwise use an equalizing beam that has been damaged.

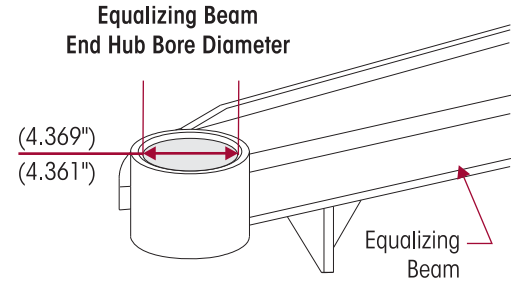
**WARNING**

FAILURE TO REPLACE AN EQUALIZING BEAM THAT HAS BEEN DAMAGED FROM BUSHING REMOVAL CAN RESULT IN THE FAILURE OF THAT BEAM, LEADING TO LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

When installing bar pin end bushings the following steps will minimize the chance of damaging a new bushing:

1. Clean the end hub bores with emery cloth or hone, removing any nicks or metal buildup from bushing removal.
2. Measure the equalizing beam end hub bore inner diameter and the bushing outer diameter. The Hendrickson specification for the equalizing beam end hub bore diameter of equalizing beam is 4.369" / 4.361", see Figure 8-20. If components are **NOT** within the specified range, replacement is required.
3. The end hub bore may have a more substantial leading chamfer at one end of the bore than the other. Take advantage of the larger chamfer by pressing in the new bushing from this end.

FIGURE 8-20

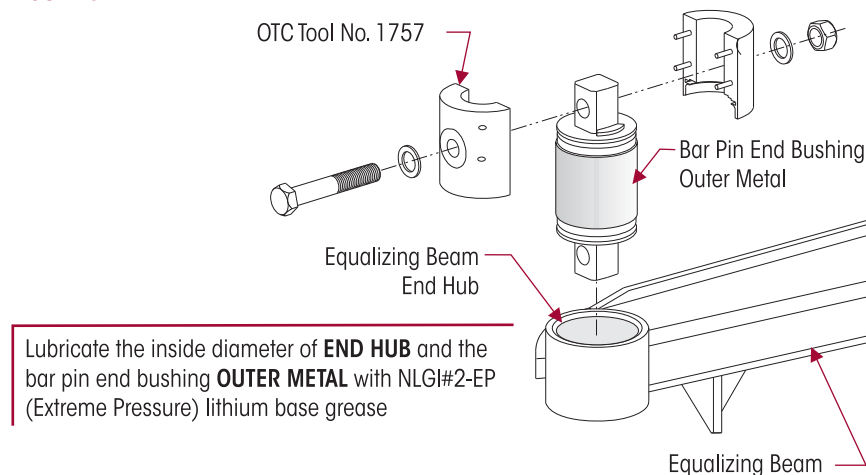
**NOTE**

Always use the bushing's outer metal for pressing operations, unless otherwise instructed. Pressing on the bushing's inner metal may damage the bushing requiring bushing replacement.

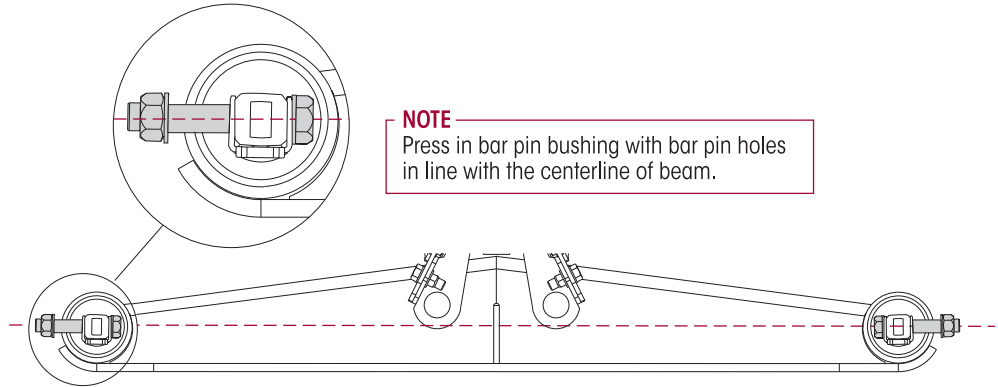
BAR PIN END BUSHING INSTALLATION

1. Place the equalizing beam in a shop press with the end hub (see Figure 8-21) squarely supported on the press bed or receiving tool, see Special Tools Section of this publication.
2. Install OTC 1757 end bushing installation tool (refer to Special Tools Section of this publication) on the new end bushing as shown in Figure 8-21. Tighten the through bolt until the two halves of the tool touch. The installation tool compresses the rubber between the inner and outer metal of the bushing to allow press force to be transmitted only to the outer metal of the bushing.
3. Lubricate the equalizing beam end hub inside diameter AND the bar pin end bushing's outer metal with a heavy layer of NLGI #2 – EP (Extreme Pressure) lithium base grease, see Figure 8-21.

FIGURE 8-21



4. Position the equalizing beam end bushing and installation tool on the end hub. Verify the bolt holes in the end bushing are in line with the beam axis, see Figure 8-22.

FIGURE 8-22

NOTE

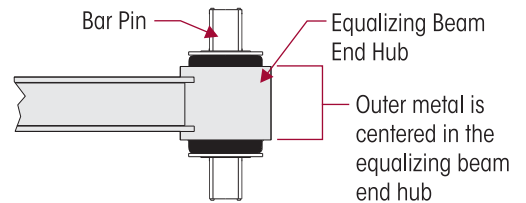
The end bushing must be square with the equalizing beam end hub before pressing the end bushing into the equalizing beam. End bushings pressed in at an angle will damage the end bushing and the equalizing beam.

5. Verify the end bushing's outer metal is square with the end hub. Equalizing beam and end bushing damage will result if the bushings are pressed in at an angle.


CAUTION

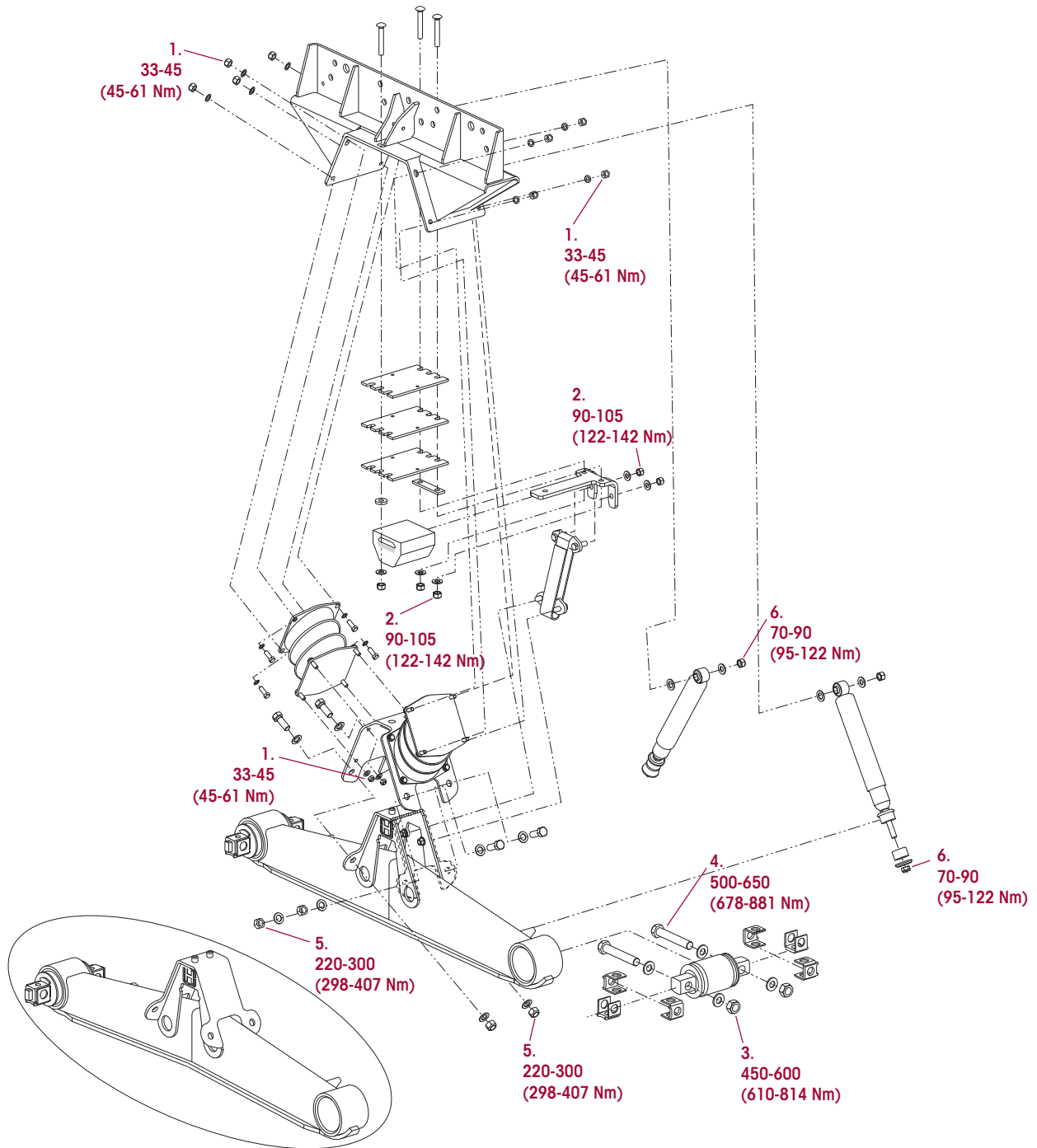
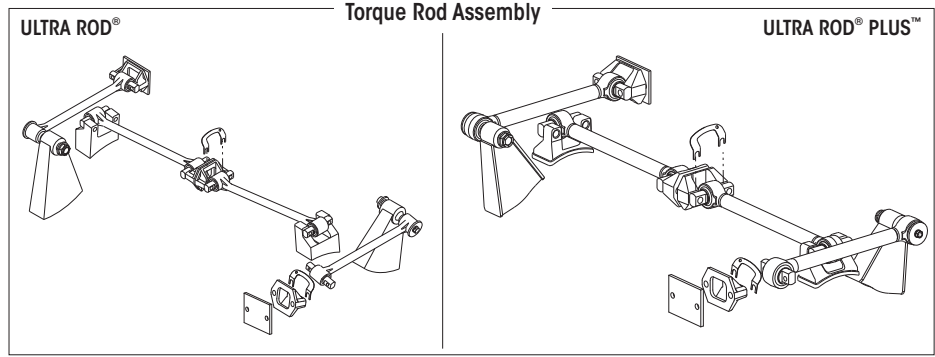
CARE MUST BE TAKEN DURING THE INSTALLATION OF THE BUSHING. DO NOT PUSH ON THE INNER METAL OF THE BUSHING, DOING SO WILL CAUSE DAMAGE TO THE BUSHING AND VOID WARRANTY.

6. Install the end bushing into the end hub by pressing on the installation tool until the installation tool contacts the end hub. This will center the bushing in the end hub, see Figure 8-23.
7. Install the equalizing beam assembly into vehicle as detailed in equalizing beam assembly in this section.

FIGURE 8-23


SECTION 9 Torque Specifications

Hendrickson Recommended
Torque Values Provided
in Foot Pounds and
Newton Meters





HN® FR Series

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS					
NO.	DESCRIPTION	QTY.	HENDRICKSON THREAD/GRADE	TORQUE VALUE	
				FOOT POUNDS	Nm
	Frame fasteners are furnished and installed by the vehicle manufacturer. Vehicle manufacturer may use an equivalent HUCK fastener at frame mount.				
1	Bolster Spring Bolt Locknut	32	7/16"-20 UNF-2B Grade C	33-45	45-61
2	Auxiliary Spring Locknut	6	1/2"-13 UNC-2B Grade C	90-105	122-142
3	Bar Pin Bushing Locknut	8	1"-8 UNC Grade C	450-600	610-814
4	Bar Pin Bushing Bolt Head	8	1"-8 UNC-2A Grade 8	500-650	678-881
5	Vee Bracket Locknut	8	3/4"-10 UNC-2B Grade C	220-300	298-407
6	Shock Absorber Locknut	4	5/8"-18 UNF-2B Grade C	70-90	95-122
NOTE:	Torque values listed above apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow torque specification listed in vehicle manufacturer's service manual.				



SECTION 10 Troubleshooting Guide

HN® FR SERIES		
CONDITION	POSSIBLE CAUSE	CORRECTION
Suspension has harsh or bumpy ride	Incorrect auxiliary spring adjustment	Adjust auxiliary spring to proper setting. See Auxiliary Spring Adjustment in the Preventative Maintenance Section of this publication.
	Damaged auxiliary spring assembly	Replace auxiliary spring assembly.
	Damaged bolster spring assembly	Replace bolster spring assembly.
Vehicle leans	Incorrect auxiliary spring adjustment	Adjust auxiliary spring to proper setting. See Auxiliary Spring Adjustment in the Preventative Maintenance Section of this publication.
	Damaged auxiliary spring assembly	Replace auxiliary spring assembly.
	Damaged bolster spring assembly	Replace bolster spring assembly.
Irregular tire wear	Incorrect axle alignment	Align axles. Refer to vehicle manufacturer's specifications.

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