

H TECHNICAL PROCEDURE

HN® VariRate® Spring Rear Suspension System

SUBJECT: Service Instructions

LIT NO: 17730-227

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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® Series Suspension System. Refer to Hendrickson Technical Publication 17730-285 for Fire/Rescue vehicles.

NOTE

Use only Genuine Hendrickson parts for servicing this suspension system.

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

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson Tech Services for information on the latest version of this manual at 855-743-3733 (toll-free U.S. and Canada), 630-910-2800 (outside U.S. and Canada) or e-mail: wtechservices@hendrickson-intl.com.

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

SECTION 2

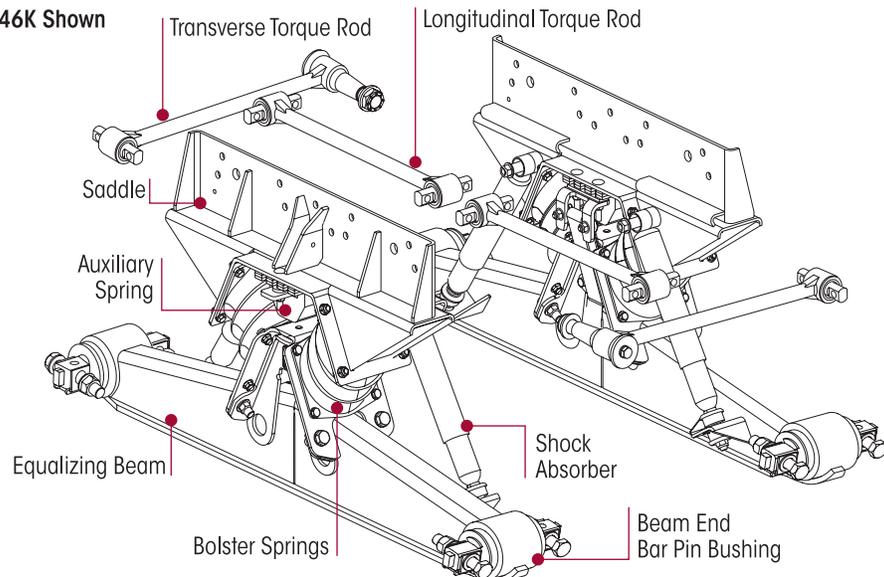
Product Description

The HN 40K • 46K • 52K pound capacity suspension systems uses VariRate® spring system which delivers a combination of superior stability, articulation and ride. Proven with extensive lab & vehicle durability testing, suspension weight has been reduced through innovative suspension design.

The vehicle manufacturer determines the vehicle capacity. To help determine the vehicle capacity, use the VIN number and contact the vehicle manufacturer. See the Parts List section of this publication to assist with identifying replacement parts.

FIGURE 2-1

HN 46K Shown





- **Auxiliary springs** — Engages while loaded to provide added stability when dumping or maneuvering.
- **Bar pin end connection** — Rugged axle connection extends bushing life and allows easy axle alignment capability for accurate wheel tracking, improved tire life and serviceability.
- **Equalizing beam** — Formed and robotically-welded equalizing beam design eliminates center bushings and lubrication requirements — significantly reducing scheduled maintenance. It provides a narrow profile for weight savings; distributes load equally between both axles for improved traction; lowers the center of gravity to increase stability and establishes a solid axle connection for improved handling.
- **Rubber bolster springs** — Lightweight, diagonally mounted rubber bolster springs deliver a smooth ride and outstanding articulation in empty or lightly loaded conditions. The wide spring centers enhance stability and eliminate need for cross tube.
- **Saddle and frame brackets** — Weight-saving, high-strength design increases carrying capacity and durability.
- **Shock absorbers** — Integrated design reduces axle hop and enhances ride quality.
- **ULTRA RODS®** — Heavy duty forgings reduce weight; yet provide improved durability over conventional rods. Transverse rods ensure maximum lateral axle control and straight line suspension stability and Longitudinal rods are engineered to optimize resistance to wind up during acceleration and braking hence improve cornering by controlling lateral forces. ULTRA ROD's unique bonded bushing greatly increases its service life. By eliminating the outer metal sleeve, Hendrickson made re-bushing faster and easier.
- **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

HN® SERIES SPECIFICATIONS	40K	46K	52K
Installed Weight ¹ (54 inch axle spacing)	935 lb	948 lb	955 lb
Suspension Rating	40,000 lb	46,000 lb	52,000 lb
Gross Vehicle Weight (GVW) Approval ²	73,000 lb	80,000 lb	80,000 lb
Gross Combination Weight (GCW) Approval	160,000 lb	190,000 lb	245,000 lb
Job-Site Travel Rating ³	55,000 lb	60,000 lb	65,000 lb
Diagonal Articulation ⁴	17 inch	17 inch	17 inch
Lift Axles ³	Approved	Approved	Approved
Axle Spacing	52", 54", 60", 72.5"	54", 60", 72.5"	54", 60"
Wheel Base Restriction	None	None	None

HN Series suspensions are intended for a wide range of applications*, including dump, refuse, mixer and logging . If you have any questions, contact Hendrickson or your local truck dealer

1. Installed weight includes complete suspension, torque rods, axle brackets, shock absorbers and frame brackets.
2. Contact Hendrickson for applications that may exceed GVW approval ratings.
3. Job-Site Travel Rating — operators using vehicles equipped with liftable pusher or tag axles must not exceed published ratings. Ratings are limited to no more than five percent of vehicle operation at speed not to exceed five mph. Liftable pusher or tag axles should only be raised (or unloaded) to improve vehicle maneuverability in job-site applications or when vehicle is empty. Job-site travel ratings are consistent with published axle manufacturer's limitations. Axle and suspension job-site travel specifications must not be exceeded.
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.

* Not approved for tractor applications.

SECTION 3

Important Safety Notice

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

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

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

■ EXPLANATION OF SIGNAL WORDS

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



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

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



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 DEATH OR SERIOUS INJURY.



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 service being performed a little easier and/or faster.

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



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

■ SAFETY PRECAUTIONS

WARNING

FASTENERS

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

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

WARNING

LOAD CAPACITY

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

WARNING

SUPPORT THE VEHICLE PRIOR TO SERVICING

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

WARNING

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

CAUTION

PROCEDURES AND TOOLS

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

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

MODIFYING COMPONENTS

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

WARNING

TORCH/WELDING

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

EXERCISE EXTREME CARE WHEN HANDLING OR PERFORMING MAINTENANCE IN THE AREA OF THE 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. DO NOT USE HEAT NEAR THE EQUALIZING BEAM. DO NOT NICK OR GOUGE THE EQUALIZING BEAM. SUCH IMPROPER ACTIONS CAN DAMAGE THE EQUALIZING BEAM AND CAUSE ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING**BAR PIN BUSHING END CONNECTION**

BAR PIN END BUSHINGS ARE CRITICAL COMPONENTS OF THE HN SUSPENSIONS. IF ANY SUCH COMPONENTS APPEAR DAMAGED OR WORN THE COMPONENT MUST BE REPLACED. FAILURE TO REPLACE SUCH WORN OR DAMAGED COMPONENTS CAN RESULT IN THE DEFORMATION OF PARTS, LOSS OF CLAMP FORCE, BOLT FAILURE, LOSS OF THE AXLE'S ALIGNMENT, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

IF BAR PIN END BUSHING MOVEMENT IS NOTED IN THE EQUALIZING BEAM END HUB, DO NOT OPERATE THE VEHICLE. REPLACE THE END BUSHINGS AND ALL CONNECTING PARTS. THE ABOVE CONDITION CAN RESULT IN POSSIBLE SEPARATION OF COMPONENTS, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY. .

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 (1) END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE (1) 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 ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING**TORQUE RODS**

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

WARNING**SHOCK ABSORBERS**

THE SHOCK ABSORBERS ARE THE REBOUND TRAVEL STOPS FOR THE SUSPENSION. ANYTIME THE AXLE INSTALLED ON THE SUSPENSION IS SUSPENDED IT IS MANDATORY THAT THE SHOCK ABSORBERS REMAIN CONNECTED. REPLACEMENT OF SHOCK ABSORBERS WITH NON-HENDRICKSON PARTS CAN ALTER THE REBOUND TRAVEL OF THE SUSPENSION.

CAUTION**IMPROPER VEHICLE LIFT OR SUPPORT METHOD**

IMPROPER VEHICLE LIFT OR SUPPORT METHOD CAN CAUSE DAMAGE TO HN REAR SUSPENSION BOLSTER SPRINGS, AND CAN VOID ANY WARRANTY COVERAGE. DO NOT LIFT OR SUPPORT THE VEHICLE ONLY AT ONE OF THE TWO REAR DRIVE AXLES. WHEN LIFTING OR SUPPORTING THE VEHICLE USING THE DRIVE AXLES, ENSURE BOTH DRIVE AXLES ARE LIFTED AND SUPPORTED TOGETHER. READ, UNDERSTAND AND COMPLY WITH ANY ADDITIONAL VEHICLE LIFT AND SUPPORT INSTRUCTIONS PROVIDED BY THE VEHICLE MANUFACTURER OR LIFT EQUIPMENT MANUFACTURER.

WARNING**PARTS CLEANING**

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

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

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

SECTION 4 Special Tools

BAR PIN END BUSHING TOOLS

Tiger Tool Part No. 15044

 Visit tigertool.com

INSTALLATION TOOLS
OTC Part No. 1757

 Visit otctools.com

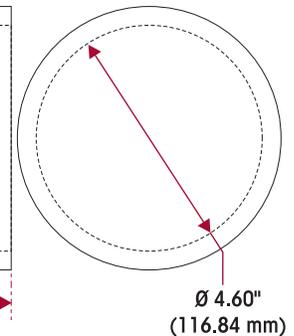
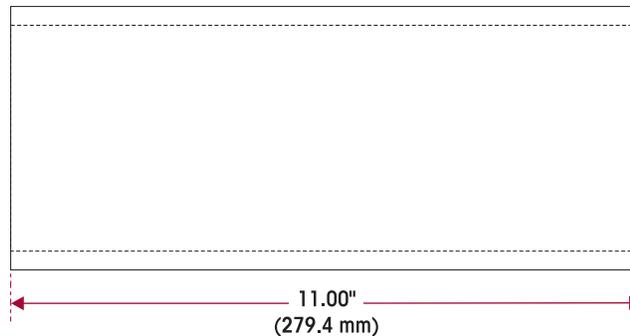
REMOVAL TOOLS
OTC Part No. 206457

 Visit otctools.com

OTC Part No. 302030

 Visit otctools.com


This shop-made tool is designed to receive bar pin bushings. The bushing tool is made from cold rolled steel or equivalent. The drawing is for reference only. Hendrickson does not supply this tool.

RECEIVING TOOL


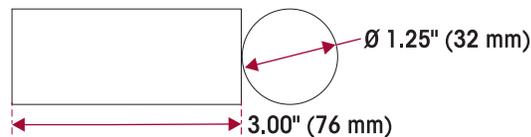
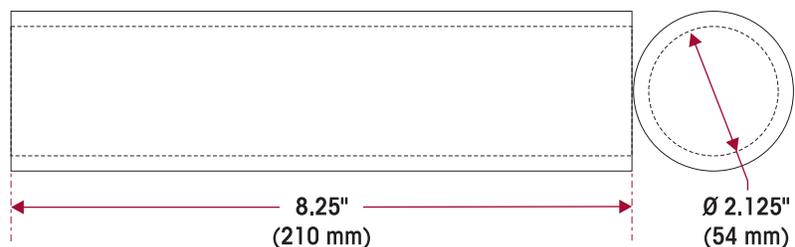
ULTRA ROD TORQUE ROD BUSHING TOOLS



Hendrickson

Part No. 66086-001L

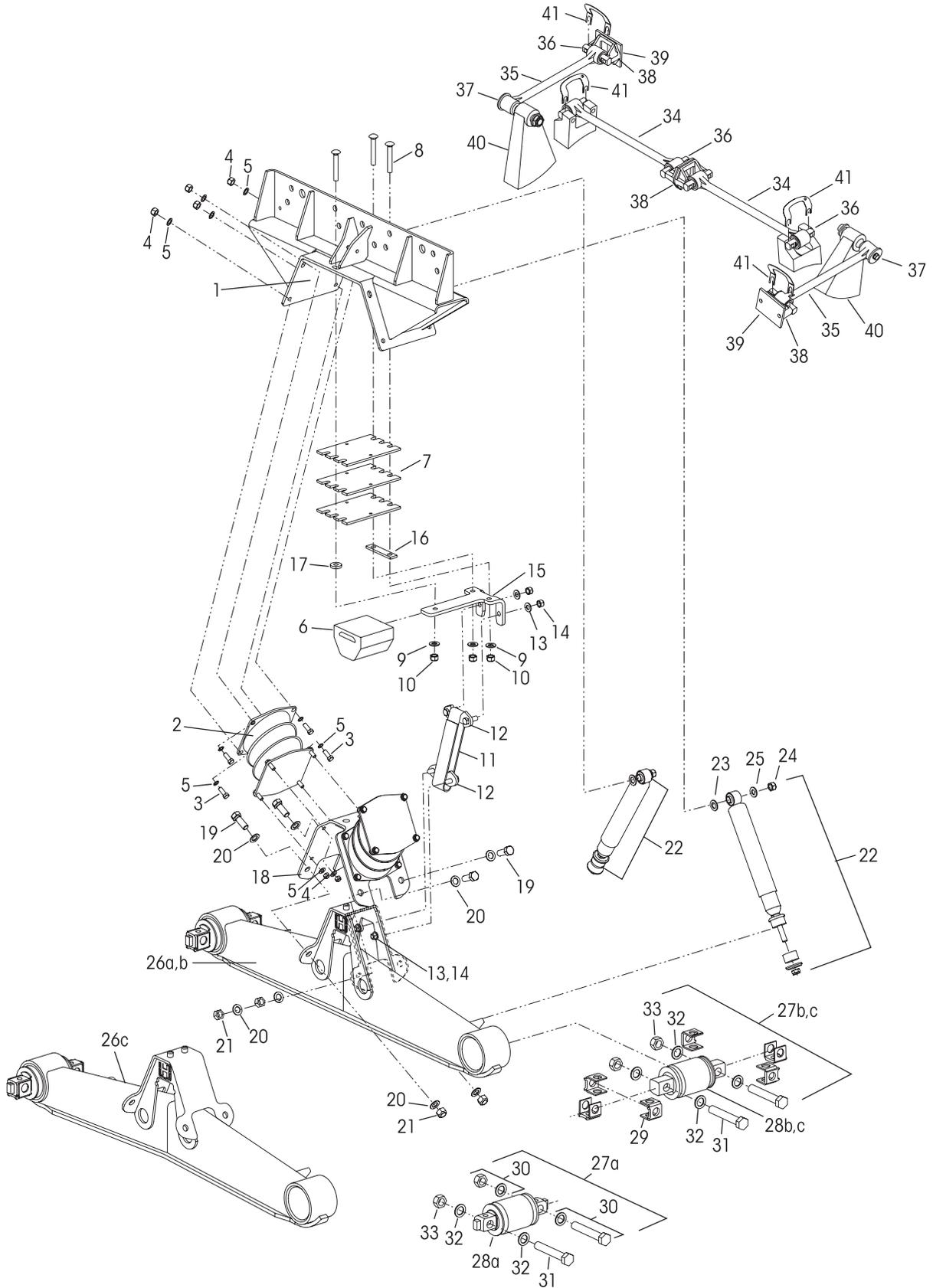
These shop-made tools are designed to install and remove torque rod bushings. Bushing tools are made from cold rolled steel or equivalent. The drawings are for reference only. Hendrickson does not supply these tools.

INSTALLATION / REMOVAL TOOL

RECEIVING TOOL


SECTION 5 Parts Lists

HN® 40K • 46K • 52K lb Capacity

Vehicles built after November 2000

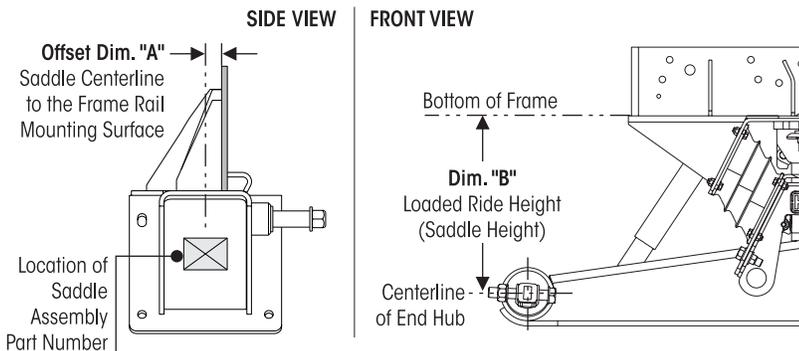




KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
1		Saddle Assembly, Includes Key Nos. 2-18 <i>See Figure 1 below to identify Part No.</i>	2
	95409-XXX	16½", 17½" or 18½", <i>Replaces 60686-OXX</i>	
	95410-XXX	20¼" or 22½", <i>Replaces 58650-OXX</i>	
	60879-000L	Bolster Spring Service Kit, One Set, (2 pc) Includes Key No. 2	
2		*Bolster Spring	4
	34013-462	Bolster Spring Fastener Service Kit, One Side, Includes Key Nos. 3-5	
3	25114-011	¾"-20 UNF x 1 ¼" Bolt	32
4	48949-000	¾"-20 UNF-2B Locknut	32
5	22962-027	¾" Washer	64
6	60314-000	Auxiliary Load Spring	2
7	58960-003L	Auxiliary Load Spring Shim	6
8	58196-006	½"-13 UNC x 2¾" Round Head Square Neck Bolt <i>Replaces 58196-005</i>	6
9	22962-011	½" Washer	6
10	49846-000	½"-13 UNC-2A Locknut	6
11	57878-003	Rebound Strap	2
	60639-000	Anchor Plate Assembly, Includes Key Nos. 12-14	4
12		*Anchor Plate	4
13		*½" Washer	8
14		*½"-13 UNC-2A Locknut	8
15	58948-001	Auxiliary Load Spring Mounting Plate	2
16	58949-000	Auxiliary Load Spring Mounting Plate Shim (Inboard - ¼" thick)	2
17	22962-020	Outboard Spacer (¼" thick)	2
18	58343-001	Saddle Vee Bracket	2
		Vee Bracket Fastener Service Kits,	
	58440-001	One Side, Includes Key Nos. 19-21	
	58440-002	Axle Set, Includes Key Nos. 19-21	
19	50764-006	¾"-10 UNC-2A x 2" Hex Head Bolt	8
20	22962-001	¾" Washer	16
21	49842-000	¾"-10 UNC-2B Locknut	8
22	60680-003L	Shock Absorber	4
23	22962-001	¾" Washer	4
24	30585-000	⅝" Upper Shock Locknut	4
25	22962-004	⅝" Upper Shock Washer	4
26		Equalizing Beam Assembly	2
a	58494-001	46K, 54" Non-Shim Type	
	58494-002	46K, 54" Shim Type	
	58494-005	40K • 46K, 60" Non-Shim Type	
	58494-006	40K • 46K, 60" Shim Type	
	58494-009	40K • 46K, 72½" Non-Shim Type	
	58494-010	40K • 46K, 72½" Shim Type	
b	59973-003	52K, 54" Shim Type	

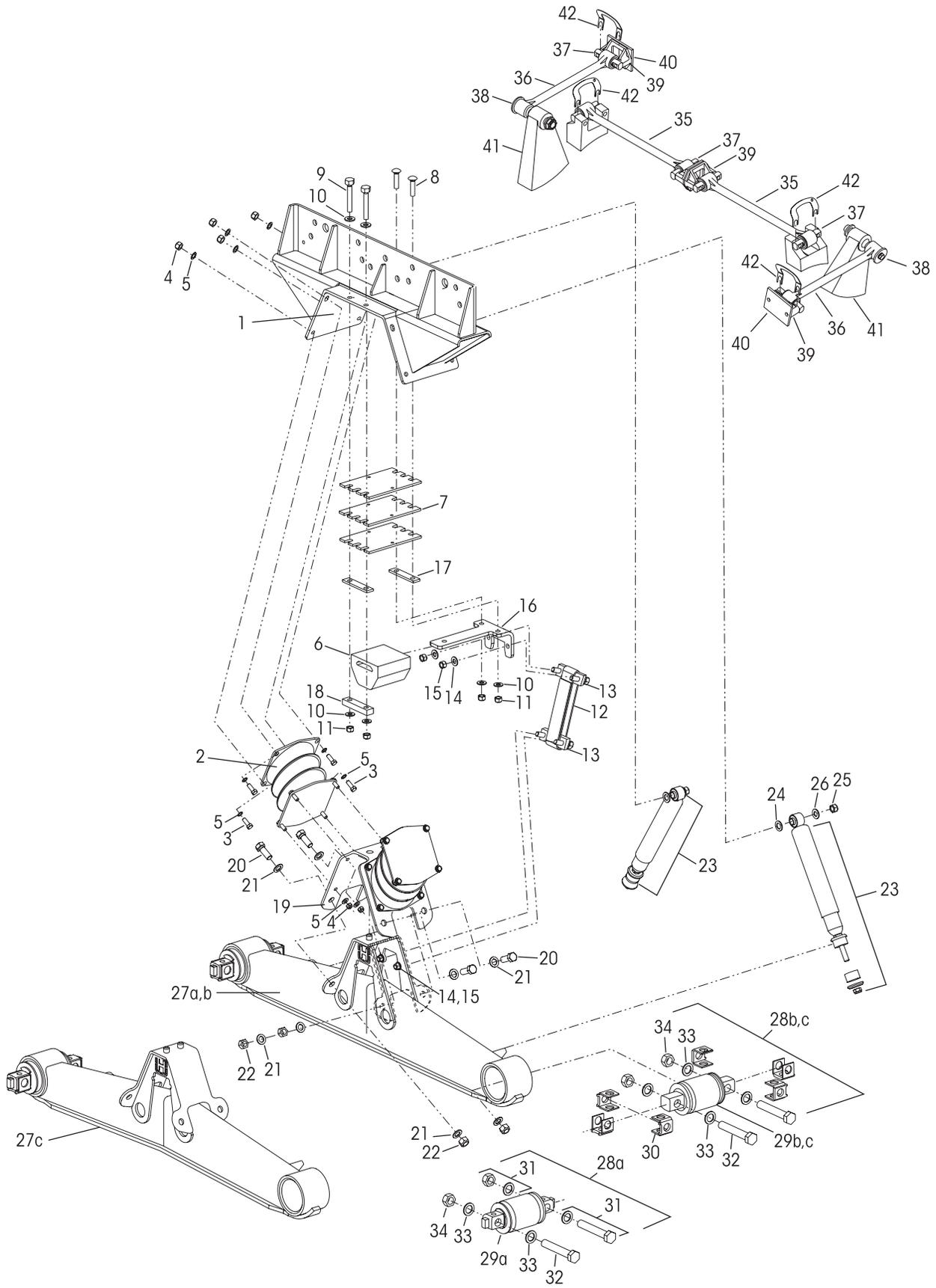
KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
c	57889-004	40K, 52" Non-Shim Type	
	57889-005	40K, 52" Shim Type	
	57889-001	40K, 54" Non-Shim Type	
	57889-002	40K, 54" Shim Type	
27		Bar Pin End Bushing Service Kit, One Wheel End,	
a	34013-087L	Non-Shim Type, 28a, 30	
b	34013-088L	Shim Type, Includes Key No. 28b, 29a-30	
c	34013-188L	Rotating, Shim Type, 28c, 29a-30	
28		*Bar Pin End Bushing	4
a		Non-Shim Type	
b		Shim Type	
c		Rotating, Shim Type	
29		Bar Pin Shim	8
a	50130-000	¾" • ¾" Standard	
b	50131-000	¼" • ⅛" Optional	
c	57026-000	⅜" Optional flat shim	
30	34013-104	Bar Pin End Bushing Fastener Kit, One Wheel End, Includes Key Nos. 31-33	
31	48941-000	1"-8 UNC x 6" Hex Bolt	8
32	22962-008	1" Hardened Washer	16
33	48942-000	1"-8 UNC Locknut	8
34		**One-piece Longitudinal Torque Rod Assembly, Straddle/Straddle, Specify Length in mm ULTRA ROD®, Includes Key No. 36	
	62000-XXX	Front	1
	62001-XXX	Rear	1
	8240-00XX-XXX	****TRAAX ROD®, <i>Replaces 72000-XXX and 72001-XXX</i>	2
35		***One-piece Transverse Torque Rod Assembly, Straddle/Taper, Specify Length in mm ULTRA ROD, Includes Key Nos. 36-37	2
	62350-XXX	ULTRA ROD, Includes Key Nos. 36-37	
	8244-0099-XXX	****TRAAX ROD, <i>Replaces 72350-XXX</i>	
	8233-0099-XXX	****TRAAX ROD, <i>Replaces 92350-XXX</i>	
36	47691-000L	Straddle Bushing	4
37	64697-000L	Taper Bushing	2
		Optional Two-Piece Torque Rod Assembly with Bushings Service Kit	
	60218-000	ULTRA ROD Straddle/Straddle	
	60215-000	ULTRA ROD Straddle/Taper	
	65781-000	ULTRA ROD PLUS Straddle/Taper	
	65781-001	XTRB Straddle/Straddle	
	65781-002	XTRB Straddle/Taper	
38	22186-000	Torque Rod Frame Bracket	2
39	45045-010	Backup Plate, <i>Replaces 45045-003</i>	2
40		****Transverse Rod Axle Bracket	2
41	49689-000	Torque Rod Shim	As Req.
	70867-001	P-80 Lubricant - 10 ml (Not Shown)	Per Bushing 1

FIGURE 1



To Identify the Saddle Assembly Part Number:

1. Check the saddle assembly for a visible part number.
2. If the part number is missing or illegible:
 - Measure **Offset (Dimension "A")** and **Saddle Height (Dimension "B")**.
 - Contact Hendrickson Tech Services with these measurements.
3. Alternatively, provide the vehicle manufacturer with the following to obtain the correct part number:
 - The **VIN** (Vehicle Identification Number).
 - The **Saddle Height (Dimension "B")**





HN® 40K • 46K • 52K – Vehicles built between 9/98 and 11/00

KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
1		Saddle Assembly, Includes Key Nos. 2-19 <i>See Figure 1 on Page 9</i>	2
	95409-XXX	1 1/2", 1 7/8" or 1 3/4", <i>Replaces 60686-OXX</i>	
	95410-XXX	2 1/4" or 2 1/2", <i>Replaces 58650-OXX</i>	
	60879-000L	Bolster Spring Service Kit, One Set, (2 pc) Includes Key No. 2	
2		*Bolster Spring	4
	34013-462	Bolster Spring Fastener Service Kit, One Side, Includes Key Nos. 3-5	
3	25114-011	7/16"-20 UNF x 1 1/4" Bolt	32
4	48949-000	7/16"-20 UNF-2B Locknut	32
5	22962-027	7/16" Washer	64
6	58947-000	Auxiliary Load Spring	2
7	58960-001	Auxiliary Load Spring Shim	6
8	58196-004	1/2"-13 UNC x 2 1/4" Round Head Bolt	4
9	24531-016	1/2"-13 UNC x 3 1/2" Bolt	4
10	22962-011	1/2" Washer	12
11	49846-000	1/2"-13 UNC-2A Locknut	8
12	57878-003	Rebound Strap	2
13	60639-000	Anchor Plate Assembly, Includes Key Nos. 14-15 <i>Replaces 59779-000</i>	4
14		*1/2" Washer	8
15		*1/2"-13 UNC-2A Locknut	8
16	58948-001	Auxiliary Load Spring Mounting Plate <i>Replaces 58948-000</i>	2
17	58949-000	1/4" Auxiliary Load Spring Mounting Plate Shim	4
18	58524-000	7/8" Rebound Strap Mounting Plate	2
19	58343-001	Saddle Vee Bracket <i>Replaces 58343-000</i>	2
		Vee Bracket Fastener Service Kit,	
	58440-001	One Side, Includes Key Nos. 20-22	
	58440-002	Axle Set, Includes Key Nos. 20-22	
20	50764-006	3/4"-10 UNC-2A x 2" Hex Head Bolt	8
21	22962-001	3/4" Washer	16
22	49842-000	3/4"-10 UNC-2B Locknut	8
23	60680-003L	Shock Absorber	4
24	22962-001	3/4" Washer	4
25	30585-000	5/8" Upper Shock Locknut	4
26	22962-004	5/8" Upper Shock Washer	4
27		Equalizing Beam Assembly	2
a	58494-001	46K, 54" Non-Shim Type	
	58494-002	46K, 54" Shim Type	
	58494-005	40K • 46K, 60" Non-Shim Type	
	58494-006	40K • 46K, 60" Shim Type	
	58494-009	40K • 46K, 72 1/2" Non-Shim Type	
	58494-010	40K • 46K, 72 1/2" Shim Type	
b	59973-003	52K, 54" Shim Type	

KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
c	57889-004	40K, 52" Non-Shim Type	
	57889-005	40K, 52" Shim Type	
	57889-001	40K • 46K, 54" Non-Shim Type	
	57889-002	40K • 46K, 54" Shim Type	
28		Bar Pin End Bushing Service Kit, One Wheel End,	
a	34013-087L	Non-Shim Type, 29a, 31	
b	34013-088L	Shim Type Includes Key No. 29b, 30-31	
c	34013-188L	Rotating, Shim Type, 29c, 30-31	
29		*Bar Pin End Bushing	4
a		Non-Shim Type	
b		Shim Type	
c		Rotating, Shim Type	
30		Bar Pin Shim	8
a	50130-000	3/16" • 3/16" Standard	
b	50131-000	1/4" • 1/8" Optional	
c	57026-000	3/8" Optional flat shim	
31	34013-104	Bar Pin End Bushing Fastener Kit, One Wheel End, Includes Key Nos. 32-34	
32	48941-000	1"-8 UNC x 6" Hex Bolt	8
33	22962-008	1" Hardened Washer	16
34	48942-000	1"-8 UNC Locknut	8
35		**One-piece Longitudinal Torque Rod Assembly, Straddle/Straddle, Specify Length in mm ULTRA ROD®, Includes Key No. 37	
	62000-XXX	Front	1
	62001-XXX	Rear	1
	8240-00XX-XXX	****TRAAX ROD, <i>Replaces 72000-XXX and 72001-XXX</i>	2
36		***One-piece Transverse Torque Rod Assembly, Straddle/Taper, Specify Length in mm ULTRA ROD, Includes Key Nos. 37-38 ****TRAAX ROD, <i>Replaces 72350-XXX</i> ****TRAAX ROD, <i>Replaces 92350-XXX</i>	2
	62350-XXX	ULTRA ROD, Includes Key Nos. 37-38	
	8244-0099-XXX	****TRAAX ROD, <i>Replaces 72350-XXX</i>	
	8233-0099-XXX	****TRAAX ROD, <i>Replaces 92350-XXX</i>	
37	47691-000L	Straddle Bushing	6
38	64697-000L	Taper Bushing	2
		Optional Two-Piece Torque Rod Assembly with Bushings Service Kit	
	60218-000	ULTRA ROD Straddle/Straddle	
	60215-000	ULTRA ROD Straddle/Taper	
	65781-000	ULTRA ROD PLUS Straddle/Taper	
	65781-001	XTRB Straddle/Straddle	
	65781-002	XTRB Straddle/Taper	
39	22186-000	Torque Rod Frame Bracket	2
40	45045-010	Backup Plate, <i>Replaces 45045-003</i>	2
41		****Transverse Rod Axle Bracket	2
42	49689-000	Torque Rod Shim	As Req.
	70867-001	P-80 Lubricant - 10 ml (Not Shown)	Per Bushing 1

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

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

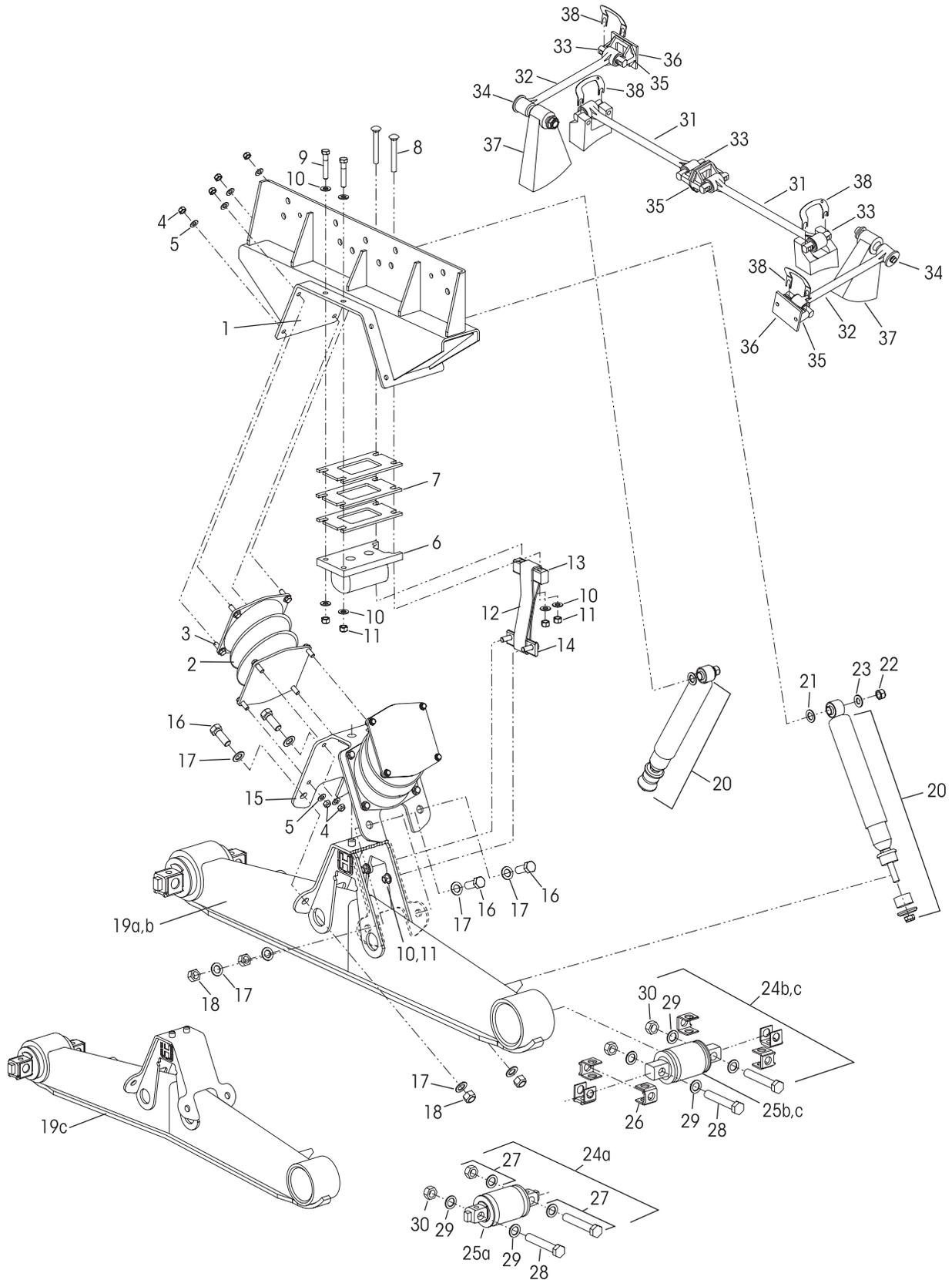
** Hendrickson's part number is stamped on the torque rod for identification. Be sure to include the suffix number when ordering, this number indicates torque rod length, The Hendrickson 2-piece torque rods can be used to create the desired length, see Torque Rod Selection Guide Literature No. 45745-148.

*** Transverse torque rods are mandatory for HN rear suspension regardless of axle spacing, refer to Hendrickson Literature No. 59310-004 and 59310-058.

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

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

Hendrickson **HAULMAAX / HN Bolster Gauge**, Literature No. 48422-546 can be obtained on-line at www.hendrickson-intl.com/litform.



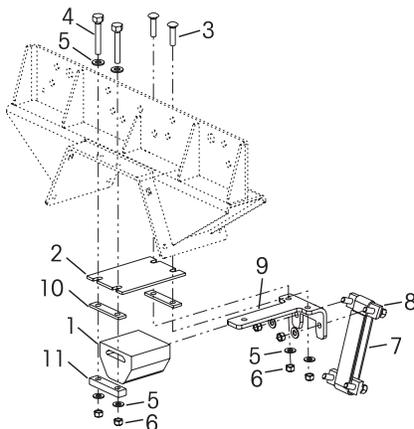


KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
1		Saddle Assembly, Includes Key Nos. 2-15 <i>See Figure 1 on Page 9</i>	2
	95409-XXX	1 1/2", 1 7/8" or 1 3/4", Replaces 60686-OXX	
	95410-XXX	2 1/4" or 2 1/2", Replaces 58650-OXX	
	60879-000L	Bolster Spring Service Kit, One Set, (2 pc) Includes Key No. 2	
2		*Bolster Spring	4
	34013-462	Bolster Spring Fastener Service Kit, One Side, Includes Key Nos. 3-5	
3	25114-011	7/16"-20 UNF x 1 1/4" Bolt	32
4	48949-000	7/16"-20 UNF-2B Locknut	32
5	22962-027	7/16" Washer	64
6		Auxiliary Load Spring (58189-000 no longer available, see conversion kit 57974-011 below)	2
7	57993-002	Auxiliary Load Spring Shim	6
8	58196-002	1/2"-13 UNC-2A x 3 1/2" Round Head Bolt	4
9	24531-017	1/2"-13 UNC-2A x 2 1/4" Hex Head Bolt	4
10	22962-011	1/2" Washer	16
11	49846-000	1/2"-13 UNC-2A Locknut	12
12	57878-003	Rebound Strap	2
13	58524-000	Rebound Strap Mounting Plate	2
14	60639-000	Anchor Plate Assembly, Includes Fasteners <i>Replaces 59779-000</i>	2
15	58343-001	Saddle Vee Bracket	2
	58440-001	Vee Bracket Fastener Service Kit, One Side, Includes Key Nos. 16-18	
	58440-002	Axle Set, Includes Key Nos. 16-18	
16	50764-006	3/4"-10 UNC-2A x 2" Hex Head Bolt	8
17	22962-001	3/4" Washer	16
18	49842-000	3/4"-10 UNC-2B Locknut	8
19		Equalizing Beam Assembly	2
a	58494-001	46K, 54" Non-Shim Type	
	58494-002	46K, 54" Shim Type	
	58494-005	40K • 46K, 60" Non-Shim Type	
	58494-006	40K • 46K, 60" Shim Type	
	58494-009	40K • 46K, 72 1/2" Non-Shim Type	
	58494-010	40K • 46K, 72 1/2" Shim Type	
b	59973-003	52K, 54" Shim Type	
c	57889-004	40K, 52" Non-Shim Type	
	57889-005	40K, 52" Shim Type	
	57889-001	40K • 46K, 54" Non-Shim Type	
	57889-002	40K • 46K, 54" Shim Type	
20	60680-003L	Shock Absorber	4
21	22962-001	3/4" Washer	4
22	30585-000	5/8" Locknut	4

KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
23	22962-004	5/8" Washer	4
24		Bar Pin End Bushing Service Kit, One Wheel End,	
a	34013-087L	Non-Shim Type, 25a, 27	
b	34013-088L	Shim Type, Includes Key No. 25b, 26a-27	
c	34013-188L	Rotating, Shim Type, 25c, 26a-27	
25		*Bar Pin End Bushing	4
a		Non-Shim Type	
b		Shim Type	
c		Rotating, Shim Type	
26		Bar Pin Shim	8
a	50130-000	3/16" • 3/16" Standard	
b	50131-000	1/4" • 1/8" Optional	
c	57026-000	3/8" Optional flat shim	
27	34013-104	Bar Pin End Bushing Fastener Kit, One Wheel End, Includes Key Nos. 28-30	
28	48941-000	1"-8 UNC x 6" Hex Bolt	8
29	22962-008	1" Hardened Washer	16
30	48942-000	1"-8 UNC Locknut	8
31		**One-piece Longitudinal Torque Rod Assembly, Straddle/Straddle, Specify Length in mm ULTRA ROD®, Includes Key No. 33	
	62000-XXX	Front	1
	62001-XXX	Rear	1
	8240-00XX-XXX	****TRAAX ROD, Replaces 72000-XXX and 72001-XXX	2
32		***One-piece Transverse Torque Rod Assembly, Straddle/Taper, Specify Length in mm ULTRA ROD, Includes Key Nos. 33-34 ****TRAAX ROD, Replaces 72350-XXX ****TRAAX ROD, Replaces 92350-XXX	2
	62350-XXX		
	8244-0099-XXX		
	8233-0099-XXX		
33	47691-000L	Straddle Bushing	6
34	64697-000L	Taper Bushing	2
		Optional Two-Piece Torque Rod Assembly with Bushings Service Kit	
	60218-000	ULTRA ROD Straddle/Straddle	
	60215-000	ULTRA ROD Straddle/Taper	
	65781-000	ULTRA ROD PLUS Straddle/Taper	
	65781-001	XTRB Straddle/Straddle	
	65781-002	XTRB Straddle/Taper	
35	22186-000	Torque Rod Frame Bracket	2
36	45045-010	Backup Plate, Replaces 45045-003	2
37		****Transverse Rod Axle Bracket	2
38	49689-000	Torque Rod Shim	As Req.
	70867-001	P-80 Lubricant - 10 ml (Not Shown)	Per Bushing 1

KEY NO. 6

AUXILIARY SPRING CONVERSION KIT NO. 57974-011



AXLE SET – INCLUDES KEY NOS. 1-11

KEY NO.	PART NO.	DESCRIPTION	QTY.
1	60314-000	Auxiliary Spring	2
2	58960-003	3/4"-Auxiliary Spring Shim	2
3	58196-006	1/2"-13 UNC x 2 3/4" Round Head Bolt	4
4	24531-016	1/2"-13 UNC x 3 1/2" Bolt	4
5	22962-011	1/2" Hardened Washer	14
6	49846-000	1/2"-13 UNC Locknut	14
7	57878-003	Rebound Strap	2
8	64700-000	Anchor Plate Assembly	4
9	58948-001	Auxiliary Spring Mounting Plate	2
10	58949-000	1/4" Auxiliary Spring Mounting Plate Shim	4
11	58524-000	7/8" Rebound Strap Mounting Plate	4



SECTION 6 Preventive Maintenance

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

HENDRICKSON RECOMMENDED INSPECTION INTERVALS	PRE-DELIVERY/ VISUAL INSPECTION	FIRST IN-SERVICE	PREVENTIVE MAINTENANCE		
	within the first 100 miles (160 km)	1,000 miles (1,600 km), 100 hours or whichever comes first	12,500 miles (20,000 km), every 3 months, 600 hours or whichever comes first	25,000 miles (40,000 km), every 6 months, 1,200 hours or whichever comes first	50,000 miles (80,000 km), every 12 months, 2,400 hours or whichever comes first

Hendrickson recommends to visually inspect for proper assembly, function, overall condition, and any signs of damage. During the inspection intervals as shown, check for any unusual movement, loose or missing components, abrasive or adverse contact with other parts, damaged or cracked parts, and improper suspension function or alignment. Replace components as necessary.

Alignment of Axles	■	■			■
Auxiliary Springs Bolster Springs Rebound Straps	■	■	■		
Equalizing Beam Assembly Beam End Connection Vee Bracket	■	■		■	
Fasteners	■	■			■
Saddle Assembly	■	■		■	
Shock Absorbers	■			■	
Torque Rods	■	■		■	
Wear and Damage			■		

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

COMPONENT INSPECTION

IMPORTANT NOTE

Replace all worn or damaged parts.

- **Alignment of axles** — Verify the alignment of axles are within the vehicle manufacturer’s tolerances.
- **Auxiliary spring, bolster spring and rebound straps** — See auxiliary spring and bolster spring inspection in this section.
- **Equalizing beam assembly, beam end connection** — Inspect 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** — Visually inspect for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to the specified torque. Refer to the Torque Specifications section of this publication. 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.

NOTE Torque values shown in this publication apply only if Hendrickson supplied fasteners are used. If non-Hendrickson fasteners are used, follow the torque specifications listed in the vehicle manufacturer's service manual.

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.

- **Saddle assembly** — Check all attaching fasteners for proper torque. Visually inspect the saddle for signs of movement on the frame rail or damage. Inspect the area around the saddle gussets for cracks. Saddles with a single center gusset may have the center gusset weld repaired and a center reinforcing bracket installed. Refer to Hendrickson Literature Number 59310-006 for specific details.
- **Shock absorber** — Look for any signs of dents or leakage. Misting is not considered a leak. See Shock Absorber Inspection in this section.
- **Torque rod** — All torque rods must be inspected for looseness, torn or shredded rubber, and proper fastener torque. See Torque Rod in this section.
- **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.

EQUALIZING BEAM END CONNECTIONS



BAR PIN END BUSHINGS ARE CRITICAL COMPONENTS OF THE HN SUSPENSIONS. IF ANY SUCH COMPONENTS APPEAR DAMAGED OR WORN THE COMPONENT MUST BE REPLACED. FAILURE TO REPLACE SUCH WORN OR DAMAGED COMPONENTS CAN RESULT IN THE DEFORMATION OF PARTS, LOSS OF CLAMP FORCE, BOLT FAILURE, LOSS OF THE AXLE'S ALIGNMENT, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

An inspection of the equalizing beam end connections is necessary **when a vehicle is in the shop for major repair work** or every six (6) months / 1,200 hours or 25,000 miles, whichever comes first. Periodic visual inspection by the driver and service personnel is also recommended. Off-highway and severe service operating conditions require more frequent inspections than on-highway service operations.

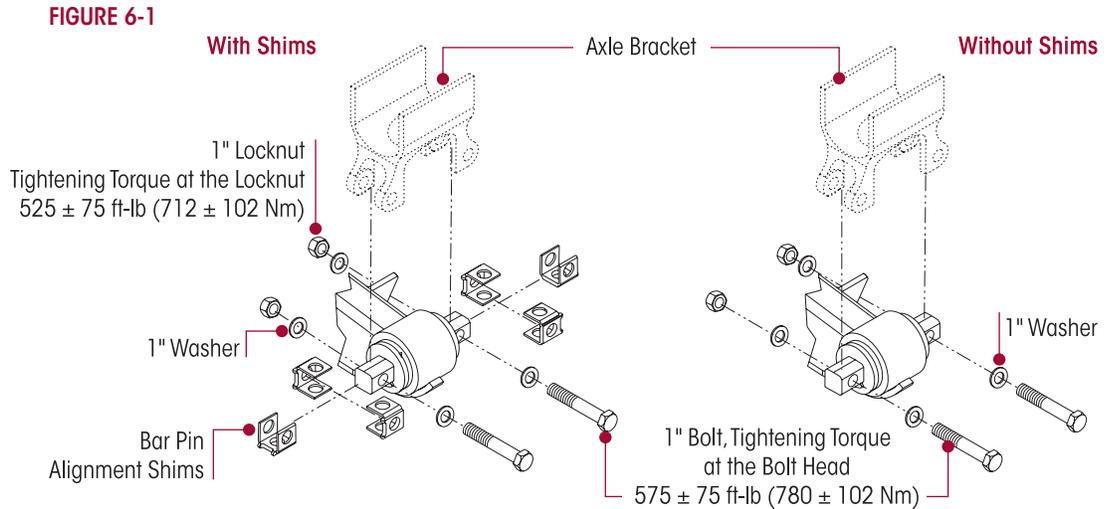
NOTE The equalizing beam end connections require that the fasteners be tightened to torque specifications to maintain the clamp load of the axle bracket legs to the bar pin. All bushing motion is accommodated by rubber deflection.

VISUAL INSPECTION

1. Chock the wheels.
2. Visually inspect suspension components for signs of movement or excessive wear.
 - Inspect alignment shims in equalizing beam end for looseness. Lightly tap on the alignment shims to see if they can be moved. If movement is detected, tighten fasteners to the proper torque value, see Figure 6-1.
 - Inspect equalizing beam end connection for signs of excessive wear or looseness.

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

- Look for worn, frayed or distorted rubber in the bar pin beam end bushing.



- The equalizing beam and bar pin should appear to be square with an equal amount of rubber exposed on both sides, see Figure 6-3.
- Look for the equalizing beam to be lower in the axle bracket, see Figure 6-4.
- Inspect for a shift in the equalizing beam compared to the bar pin. If the bar pin beam end bushing is visually offset, see Figure 6-2, a floor jack test should be performed, refer to Physical Inspection.

FIGURE 6-2
UNACCEPTABLE

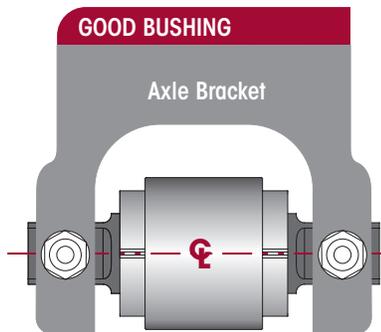


FIGURE 6-3
ACCEPTABLE

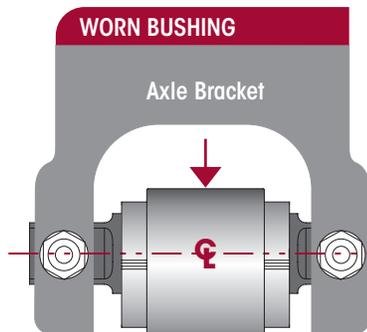
Bar Pin square and exhibits equal amount of rubber exposed outside of end hub



FIGURE 6-4

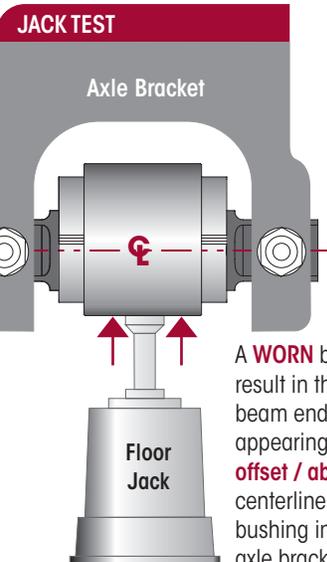


A **GOOD** bushing will result in the equalizing beam end hub appearing to be **centered** with the centerline of the end bushing in the axle bracket



A **WORN** bushing will result in the equalizing beam end hub appearing to be $\frac{5}{8}$ " (15 mm) **offset / below** the centerline of the end bushing in the axle bracket

FIGURE 6-5



A **WORN** bushing will result in the equalizing beam end hub appearing to be **offset / above** the centerline of the end bushing in the axle bracket

JACK TEST

1. Place a floor jack under each equalizing beam end as shown. Raise the floor jack to check for movement in the connection or rubber components, see Figure 6-5.

NOTE

The gap at each side of the visible rubber on the lower part of the end bushing is normal and is not an indication to replace the bushing. 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.

PHYSICAL INSPECTION

WARNING

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

1. If the bar pin end bushing movement or looseness is detected in the equalizing beam end hub, replace the end bushings and all connecting parts. Refer to the Component Replacement section of this publication.
2. Check and record torque values, as received, for each 1" bar pin fastener, see Figure 6-1. Ensure all fasteners are tightened to the following:
 - At the locknuts tighten to 525 ± 75 foot pounds torque or
 - At the bolt head tighten to 575 ± 75 foot pounds torque
3. Recheck equalizing beam end connections for signs of looseness.
4. If bar pin bushing looseness is still detected, **DO NOT** operate the vehicle. One or more components will require replacement, see the Component Replacement section of this publication.

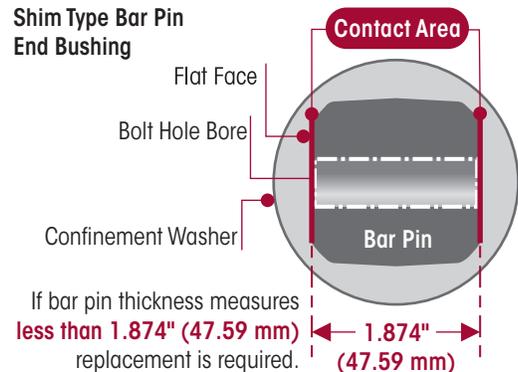
BAR PIN BUSHING

VISUAL INSPECTION

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

- If the contact area, see Figure 6-6 (the flat face area where the bar pin contacts the axle bracket), reveals signs of excessive wear. A bar pin thickness measures less than 1.874" (47.59 mm).
- Bar pin bolt holes bores reveal signs of elongation or wear.

FIGURE 6-6
Shim Type Bar Pin
End Bushing



BAR PIN SHIMS

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

- Visual inspection of the contact area on the shim reveals signs of excessive wear.
- If the thickness of any single leg on the shim is less than the measurement shown in Figure 6-7, replacement of the bar pin shim is required.

FIGURE 6-7

	Part Number 50130-000	Part Number 50131-000	Part Number 57026-000	Original Thickness of Shim Leg	Minimum Thickness Required	Part Number
	 $\frac{3}{16}$ " (4.8 mm) Legs	 $\frac{1}{4}$ " (6.4 mm) Leg	 $\frac{3}{8}$ " (9.5 mm) Leg	$\frac{3}{16}$ " (4.8 mm)	0.186" (4.7 mm)	50130-000
				$\frac{1}{8}$ " (3.2 mm)	0.123" (3.1 mm)	50131-000
				$\frac{1}{4}$ " (6.4 mm)	0.248" (6.3 mm)	50131-000
				$\frac{3}{8}$ " (9.5 mm)	0.371" (9.4 mm)	57026-000

AXLE BRACKET

The axle brackets are furnished and welded into position by the vehicle or axle manufacturer, if a repair or replacement is required, contact the vehicle/axle manufacturer for instructions

- **Visual Inspection** — Inspect the axle brackets for damage or cracks, see Figure 6-8. Any axle bracket that is found damaged or cracked must be repaired or replaced.
- **Physical Inspection** — Inspect the axle brackets for damage or cracks in the locations shown in Figures 6-8 and 6-9. Any axle bracket that is found damaged or cracked must be repaired or replaced.
 - Measure the dimensions between the axle bracket legs for the correct width in the locations shown in Figures 6-8 and 6-9. An axle bracket outside of the measurement range must be repaired or replaced.

FIGURE 6-8
SIDEVIEW

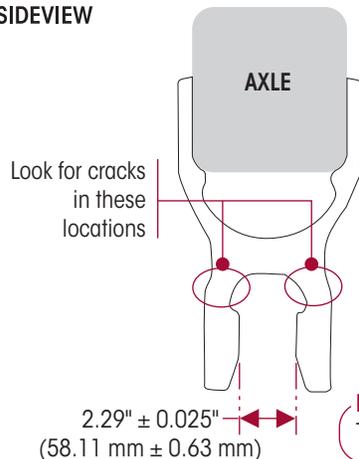
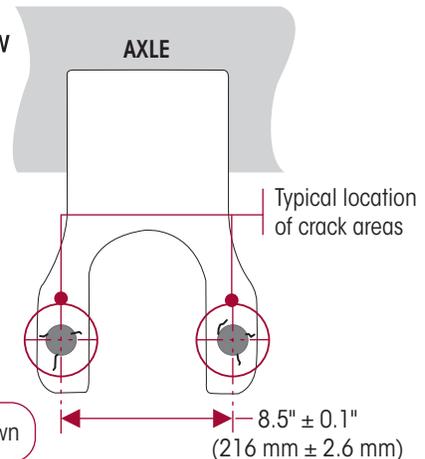


FIGURE 6-9
FRONT / REAR VIEW



NOTE
Typical axle bracket shown

LONGITUDINAL AND TRANSVERSE TORQUE RODS



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

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

- **Method 1** — For on-highway 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 torque rod end and pressure applied.

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

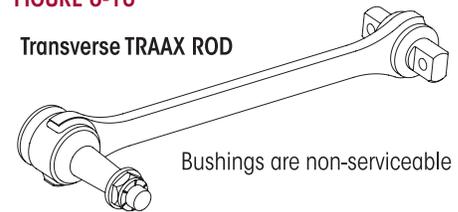
Longitudinal Torque rod length is determined by the vehicle manufacturer for optimum drive line angles. The longitudinal torque rods control these angles and also absorb acceleration and braking forces. The mounting brackets at the axle ends of the torque rods are furnished and welded into position on the axle housings by the 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. The longitudinal torque rod is equipped with straddle bushings, refer to the Torque Rod Bushing Component Replacement section of this publication.

The transverse **TRAAX ROD** straddle / taper mount bushings are non-serviceable and the entire assembly requires replacement, see Figure 6-10.

Torque rod end attaching fasteners are furnished by the vehicle manufacturer. The tightening torque of the locknuts must be checked during preventive maintenance service. Follow the vehicle manufacturer's specifications for torque values. It is important to check the **tightening torque** of the locknuts during preventive maintenance and service. Follow the tightening torque specifications and all applicable preventive maintenance, service and safety instructions issued by the respective vehicle manufacturers.

FIGURE 6-10

Transverse TRAAX ROD



Bushings are non-serviceable

BOLSTER SPRING

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.

NOTE

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.

NOTE

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.

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 rigid safety 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" (222.25 mm), see Figure 6-12, 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 6-12 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 Figures 6-11 and 6-12). An unloaded bolster spring may be inspected for any bonding separation by measuring at points indicated in Figure 6-12 as "////////". Any thin film or other residual rubber material on the metal plates resulting from the molding process may be ignored during inspection.

SERVICE HINT

Use **HN gauge Lit. No. 48422-546** (Figure 6-11) to help measure the bolster spring for cut or splits and bonding separation.

FIGURE 6-11 Lit. No. 48422-546 Gauge

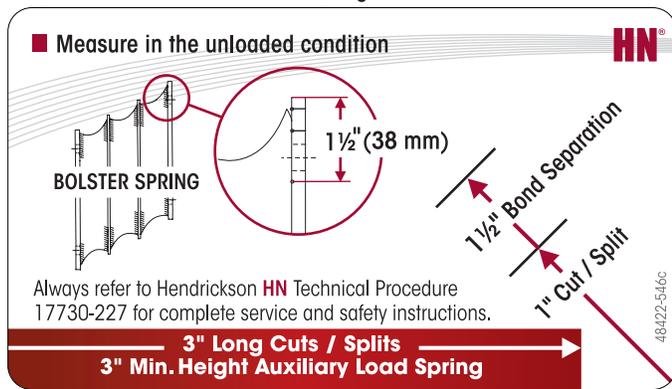
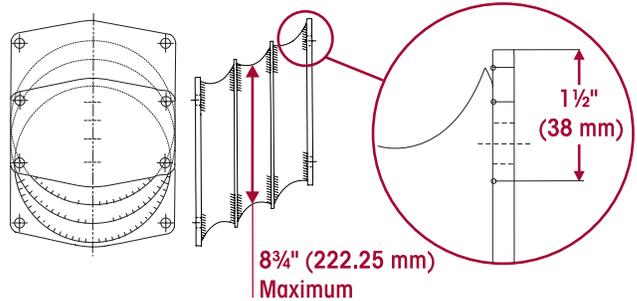


FIGURE 6-12



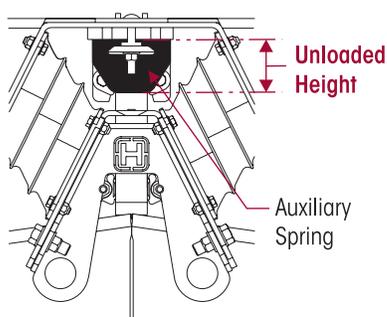
AUXILIARY SPRING

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.

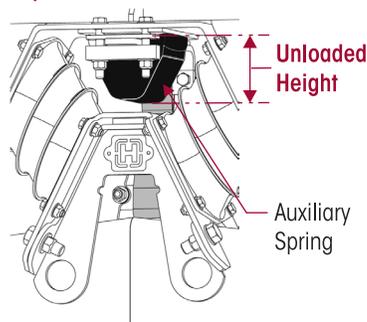
See Table 6-1 for the normal and minimum unloaded auxiliary spring height. If the unloaded height, see Figure 6-13, decreases below the minimum unloaded height as shown in the Table 6-1, replacement is required.

FIGURE 6-13

Auxiliary Spring configuration for vehicles built November 2000 to Current



September 1998 to November 2000



April 1996 to September 1998

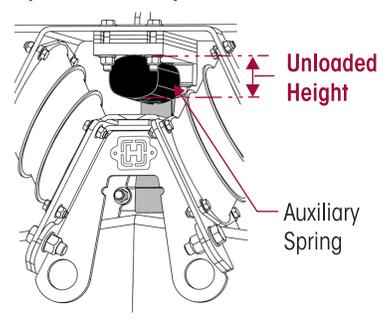


Table 6-1

Auxiliary Spring Unloaded Height			
Vehicles built between	Part No.	NORMAL	MINIMUM
November 2000-Current	60314-000	3 ³ / ₈ " (85.7 mm)	3" (76 mm)
	65902-003	2 ¹ / ₈ " (53.9 mm)	1 ¹⁵ / ₁₆ " (49.2 mm)
September 1998-November 2000	58947-000	4" (101.6 mm)	3 ¹ / ₂ " (88.9 mm)
April 1996-September 1998	58189-000	2 ³ / ₄ " (70.1 mm)	2" (50.8 mm)

SHOCK ABSORBER

NOTE

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

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

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



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

HEAT TEST AND PHYSICAL INSPECTION

1. **Heat Test:** Drive the vehicle with the lift axle down at moderate speeds on a rough road for a minimum of fifteen minutes.
 - a. Perform a heat test by carefully touching or placing a hand near the shock absorber body below the dust cover. Touch the frame to get an ambient reference, see Figure 6-14. A shock absorber that is warm to the touch is acceptable, a cold shock absorber should be replaced.
2. **Physical Inspection:** To inspect for an internal failure, remove and shake the suspected shock absorber. Listen for the sound of metal parts rattling inside. The rattling of metal parts can indicate that the shock absorber has an internal failure and the shock absorber should be replaced.

FIGURE 6-14


VISUAL INSPECTION

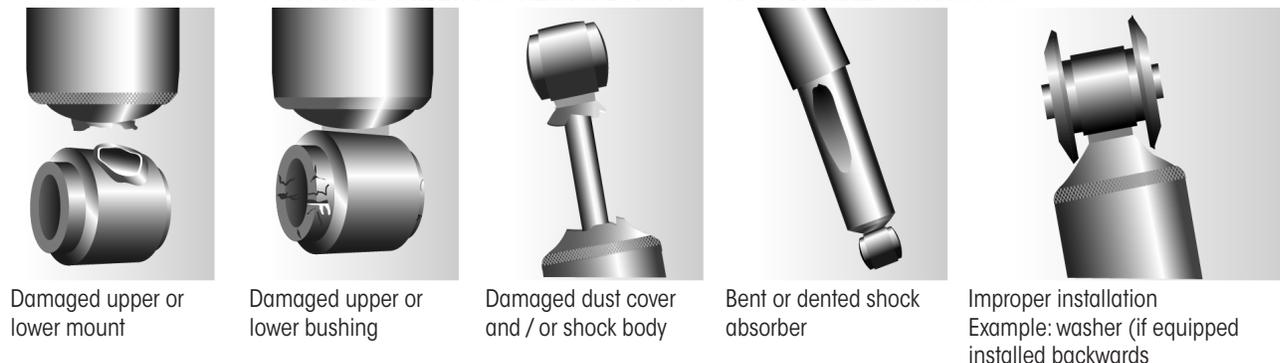
Inspect the shock absorbers in their fully extended position, be sure to look for any of the following potential conditions during the visual inspection. Replace as necessary.

NOTE

Figure 6-15 shows a general representation of an unacceptable shock absorber. Refer to your specific model's inspection guidelines for more details.

FIGURE 6-15

SHOCK ABSORBER VISUAL INSPECTION – UNACCEPTABLE CONDITIONS



LEAKING VS. MISTING SHOCK ABSORBER VISUAL INSPECTION

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

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

FIGURE 6-16



NOTE

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

Inspect the shock absorber fully extended. **A shock absorber that is truly leaking** will show signs of fluid **leaking in streams from the upper seal**, see Figure 6-16. These streams can easily be seen, underneath the main body (dust cover) of the shock absorber. Replace as necessary.

REBOUND STRAP

The rebound strap, see Figure 6-17, helps prevent the overextension of the bolster springs during normal vehicle operation. Periodic visual inspection of the rebound strap is required every six months. If the rebound strap is torn, frayed or not intact, replace as outlined in the Component Replacement section of this publication.

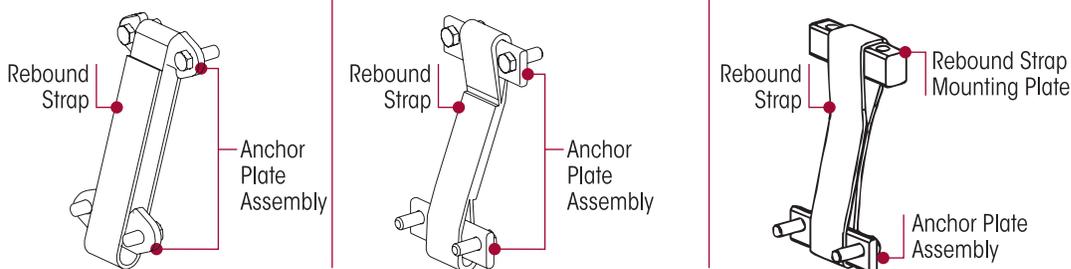
FIGURE 6-17

Rebound Straps for vehicles built

November 2000 to Current

September 1998 to November 2000

April 1996 to September 1998



SECTION 7

Alignment & Adjustments

DRIVE AXLE ALIGNMENT

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

1. Use a work bay with a level surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead.
3. **DO NOT** set the parking brake.
4. Chock the front wheels of the vehicle.
5. Confirm the vehicle is at the correct ride height as per vehicle manufacturer's specifications.
6. Verify all suspension components are in good condition. Repair or replace any worn or damaged suspension components before proceeding with the alignment process.
7. Ensure all drive axle tires are the same size and inflated to the correct tire pressure.
8. Use an alignment machine to calculate the drive axle readings.

NOTE

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

9. If the measurements are within the vehicle manufacturer's specifications, then the rear drive axle alignment is acceptable. Proceed to check the pinion angles of the drive axles (Step 11).
 - a. If the alignment of the rear drive axle **IS NOT** within the vehicle manufacturer's specifications, then the alignment of this axle **MUST** be corrected **BEFORE** checking the drive axle pinion angles.
 - b. Correct the alignment of this axle by following the Alignment Adjustment instructions as shown in this section.
10. After all drive axles are aligned, check the pinion angle of each drive axle with a digital protractor, see Figure 7-1. Refer to the vehicle manufacturer specifications for the required pinion angles.
 - a. If all pinion angles are within the vehicle manufacturer's specifications then proceed to Step 12.
 - b. If any pinion angle is out of the vehicle manufacturer's specifications it must be corrected. Follow the Pinion Angle Adjustment procedure in this section.
11. Recheck measurements to confirm adjustments until the correct alignment and pinion angles are achieved.
12. When all drive axle alignments and pinion angles are within the vehicle manufacturer's specifications then the alignment procedure is complete.
13. Remove the wheel chocks.

DRIVE AXLE PINION ANGLE

Drive axle pinion angles are established by the vehicle manufacturer. If pinion angle adjustment is required, check for proper angles with the vehicle manufacturer. Pinion angle is set by the longitudinal torque rod length.

FIGURE 7-1

To Check the Pinion Angle

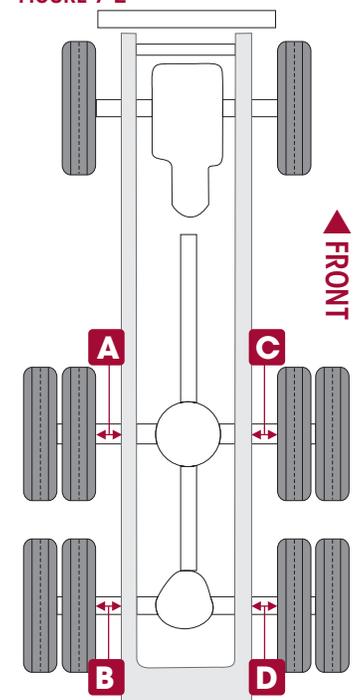
1. Use a work bay with a level floor.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Roll to a stop without the brakes being applied. **DO NOT** set the parking brake.
3. Chock the front wheels of the vehicle.
4. Place a digital protractor on the axle housing as shown in Figure 7-1.
5. Check to see if the pinion angle is correct per the vehicle manufacturer's specified range.
6. If necessary, add/remove shims at the longitudinal torque rod connections as required to achieve the proper pinion angle.
7. When the pinion angle is correct tighten all fasteners to the proper torque specifications per the vehicle manufacturer and recheck the pinion angles.
8. Remove wheel chocks.



AXLE LATERAL ALIGNMENT

1. Use a work bay with a level surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used.
3. **DO NOT** set the parking brake.
4. Chock the front wheels of the vehicle.
5. Measure from the outside of the frame rail to the rim flange of the inner tire. Record the measurements **A** and **B**, see Figure 7-2.
6. Measure the same distance on the opposite side of the same axle. Record the measurements **C** and **D**, see Figure 7-2.
7. Verify the axle lateral alignment is within the vehicle manufacturer's specifications. Adding or removing shims that are located between the transverse torque rod and frame rail will normally correct the axle lateral alignment.
 - A general rule of thumb is to use a shim with a thickness that is half of the difference between the two measurements.

FIGURE 7-2



EXAMPLE

If the axle lateral alignment is out of specification by $\frac{1}{4}$ " (6 mm), remove or install a $\frac{1}{8}$ " (3 mm) shim between the transverse torque rod and frame rail as needed. Refer to the Longitudinal and Transverse Torque Rod section in the Preventive Maintenance section of this publication.

NOTE

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

BAR PIN WITH SHIMS ALIGNMENT

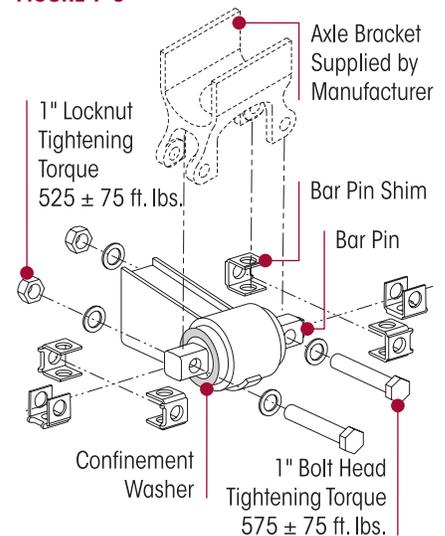
The alignment feature consists of specially designed, tightly tolerant steel shims which fill the $\frac{3}{8}$ " total gap between the bushing's bar pin and the axle bracket legs. The gap must be filled by placing the shims on the bushing assembly in one of the positions shown in Figures 7-3 and 7-5.

Hendrickson has three (3) shim design options for alignment, part number 50130-000 (provided), 50131-000 and 57026-000, see Figure 7-6.

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 (1) END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE (1) 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 ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

FIGURE 7-3



ALIGNMENT ADJUSTMENT PROCEDURE

NOTE

Computerized alignment equipment is the preferred method of measuring 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.

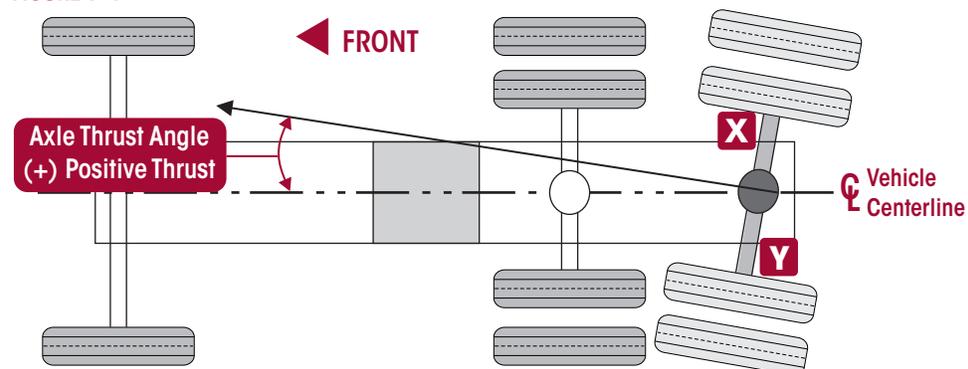
If the alignment of the drive axles is required, as determined by an alignment inspection procedure, the following steps will need to be performed.

1. Determine the direction of the axle thrust angle. Figure 7-4 illustrates the rear drive axle with a positive thrust angle.

SERVICE HINT

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

FIGURE 7-4



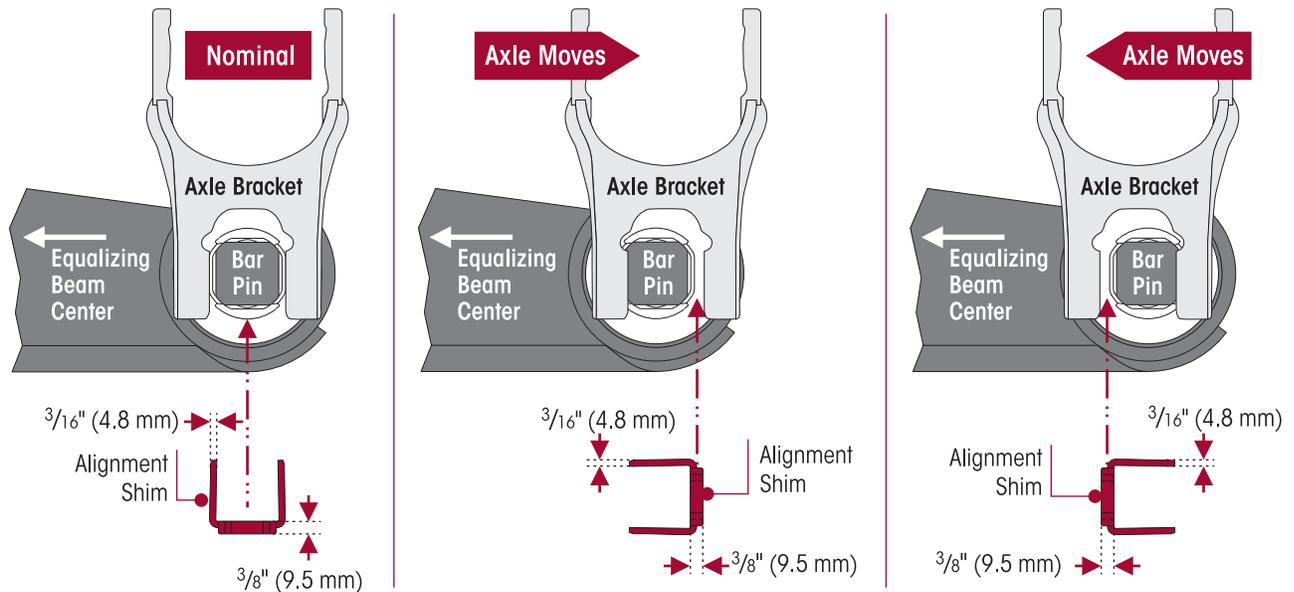
SERVICE HINT

Axle movement is in the same direction as the increased shim thickness, see Figure 7-5.

2. Chock the wheels of the front axles to prevent vehicle movement during service.
3. Raise the frame of the vehicle to remove the load from the suspension.
4. Support the frame with safety stands.

5. Support the equalizing beam and remove the fasteners from the end bushing where the bar pin alignment shim adjustment is being made.
6. Adjust shim thickness to move the axle in the desired direction, see Figure 7-5.

FIGURE 7-5



WARNING

EACH EQUALIZING BEAM END BUSHING HAS ONE (1) INBOARD AND ONE (1) OUTBOARD ALIGNMENT SHIM, FOR A TOTAL OF FOUR (4) SETS OF TWO (2) ALIGNMENT SHIMS PER SUSPENSION. EACH SET OF ALIGNMENT SHIMS FOR A PARTICULAR BEAM END BUSHING MUST BE INSTALLED IN THE SAME ORIENTATION. SHIM ORIENTATION MAY DIFFER FOR EACH BEAM END BUSHING, SEE FIGURE 7-3. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN THE FRACTURE OF EITHER THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

CAUTION

BAR PIN ALIGNMENT SHIM (PART NO. 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE BUSHING, SEE FIGURE 7-6. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE.

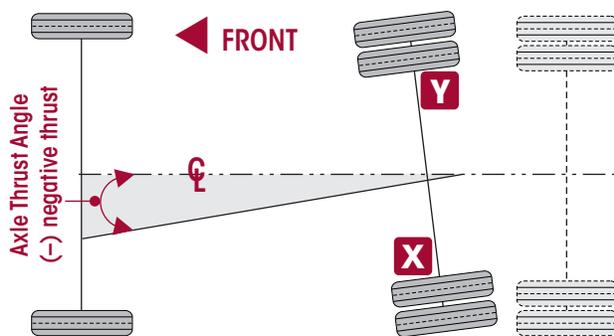
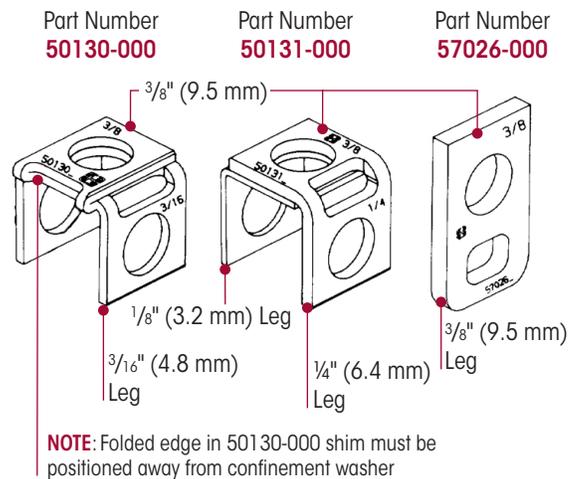
7. Install new end bushing fasteners and tighten to:
 - At the **locknut** to 525 ± 75 foot pounds torque, or
 - At the **bolt head** to 575 ± 75 foot pounds torque
8. Remove support and lower the vehicle.
9. Verify the axles' alignments are within the vehicle manufacturer's tolerance.
10. Set brakes and remove wheel chocks from the vehicle.

FIGURE 7-6

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. Rotating the shim pairs 90° will change the axle alignment in $\pm \frac{3}{16}$ " increments. If a finer adjustment is required use 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. A $\frac{3}{8}$ " flat shim is also available (P/N 57026-000).
- $\frac{1}{16}$ " shim thickness 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.



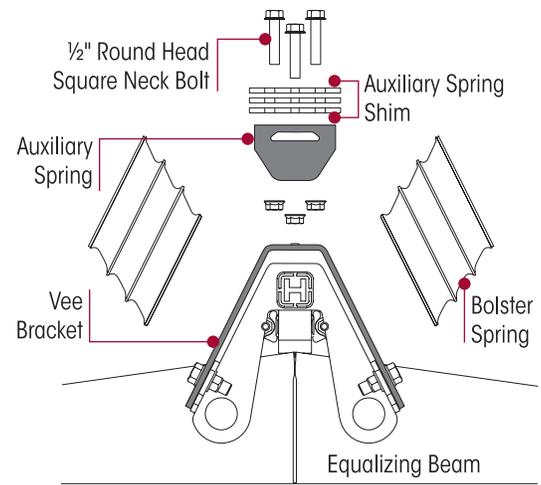
Example: The alignment equipment shows the front drive axle to have a **0.40° Negative thrust angle** to the left. This will require a $\frac{1}{4}$ " shim thickness increase to the **FRONT SIDE** of the left front equalizing beam end bushing bar pin. If there is less than $\frac{1}{4}$ " of adjustment available at this location then some of the adjustment will have to be made at the **REAR SIDE** of the right front end bushing bar pin. 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° negative thrust angle.

AUXILIARY SPRING SHIM

■ EVALUATION

The HN 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 brackets. When loaded, the weight of the vehicle compresses the bolster springs so the auxiliary spring engages the vee bracket thereby increasing roll stability. Vehicles with a low unladen tandem weight or a high center of gravity **may require** increased roll stability. On these vehicles, auxiliary spring shims can be added above the auxiliary spring so the auxiliary spring and the vee bracket engage sooner. This may eliminate any gap between the auxiliary springs and the vee bracket.

FIGURE 7-7





Production vehicles specified with the HN suspension are typically equipped with three (3) auxiliary spring shims, see Figure 7-7. Some vehicles are manufactured with less shims to minimize the need for adjustment after the body equipment is installed.

To achieve optimal ride quality and stability the unladen tandem weight of some vehicles will dictate the auxiliary spring shim arrangement, see Table 7-1.

TABLE 7-1
RECOMMENDED NUMBER OF AUXILIARY SPRING SHIMS FOR THE FOLLOWING APPLICATIONS

**VEHICLE / APPLICATION	*Unladen Tandem Weight With Body / Equipment Installed		
	NORMAL 10,000-18,000 lb	MEDIUM 18,001-23,000 lb	HEAVY 23,001-28,000 lb
Dump Truck	3 Shims	2 Shims	2 Shims
Refuse Front Load Dump		5 Shims	5 Shims
Refuse Front Load Eject		2 Shims	1 Shim
Refuse Rear Load Eject		2 Shims	1 Shim
Refuse Side Loader		2 Shims	1 Shim
Refuse Side Loader Dump		5 Shims	5 Shims
Refuse Recycler Dump		5 Shims	5 Shims
Refuse Recycler Eject		2 Shims	1 Shim
Transit Mixer		3 Shims	1 Shim
Crane Carrier		5 Shims	5 Shims
* Matrix based on extensive field testing under varying conditions. ** Contact Hendrickson Tech Services for applications not listed.			

ADJUSTMENT NOTES

- Both sides of the HN suspension **MUST** have an equal number of auxiliary spring shims, in place or a vehicle lean may result.
- A maximum of five (5) and a minimum of one (1) auxiliary shim(s) may be installed per side above the auxiliary spring.
- After determining the proper amount of shims required, install or remove the shims as needed, see Auxiliary Spring Shim Adjustment in this section.

■ ADJUSTMENT

DISASSEMBLY

- Chock the front wheels of the vehicle.
- Remove the fasteners that attach the auxiliary spring shims to the auxiliary spring mounting plate, see Figure 7-8.

SERVICE HINT

If the auxiliary spring is in contact with the auxiliary spring shims, it will be necessary to raise the frame of the vehicle to service the auxiliary spring shims.

- Remove or install additional shims as per the guidelines detailed in Table 7-1.

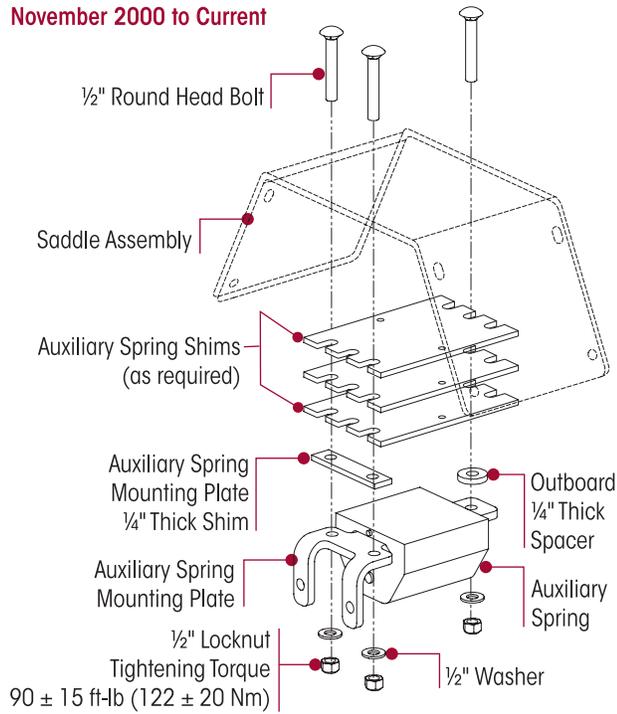
ASSEMBLY

NOTE

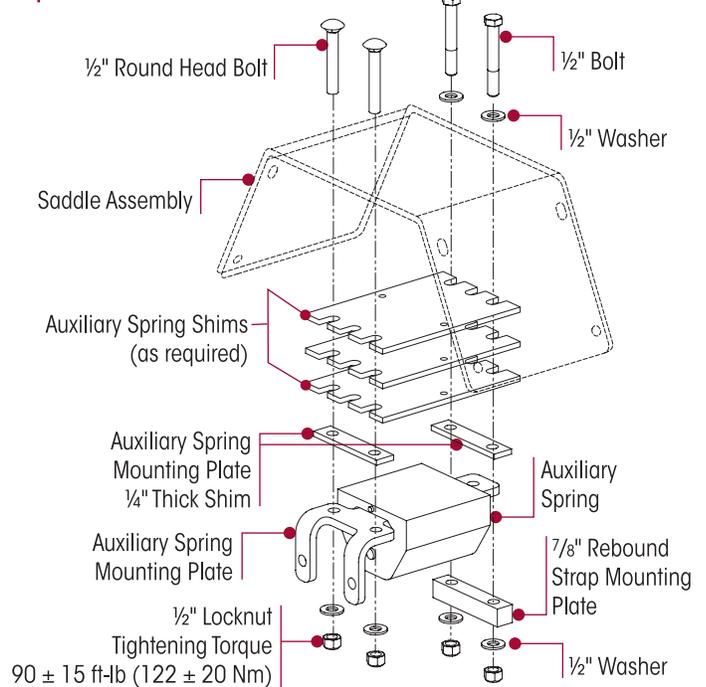
The bolt length varies with the amount of shims installed. Ensure there is at least three (3) threads exposed past the locknut.

1. Install the fasteners that attach the auxiliary spring shims to the auxiliary spring mounting plate and tighten to 90 ± 15 foot pounds torque, see Figure 7-8.
2. Remove wheel chocks.

FIGURE 7-8
November 2000 to Current



September 1998 to November 2000



SECTION 8

Component Replacement

FASTENERS

Hendrickson recommends that when servicing a vehicle, replace all 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 the torque specifications listed in the vehicle manufacturer's service manual.

NOTE

Hendrickson recommends the use of to use Class 10.9 bolts and locknuts and hardened washers or 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.

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.
3. Remove the fasteners connecting the auxiliary spring to the saddle and the auxiliary spring outboard spacer, see Figure 8-2. Remove the auxiliary spring.
4. Loosen, **DO NOT** remove, the eight (8) $\frac{7}{16}$ " fasteners connecting the bolster springs to the saddle assembly.
5. Remove the eight (8) $\frac{7}{16}$ " fasteners connecting the bolster springs to the vee bracket.
6. Remove the four (4) $\frac{3}{4}$ " fasteners from the vee bracket and the equalizing beam. Remove the vee bracket.
7. Remove the upper shock absorber fasteners, from the upper shock brackets. Push the shock absorbers down and clear of the upper shock brackets.

FIGURE 8-1

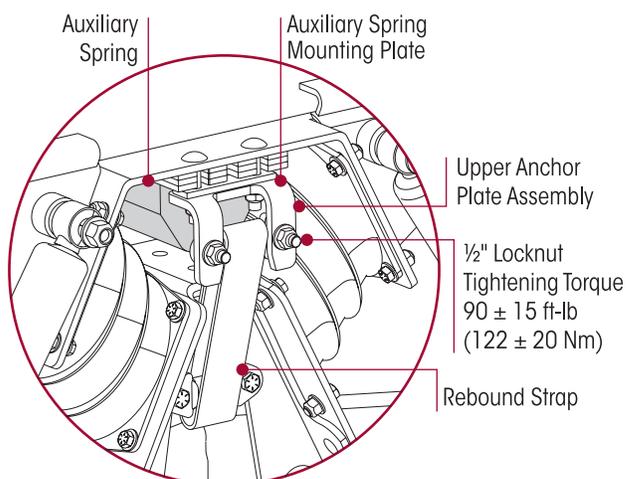
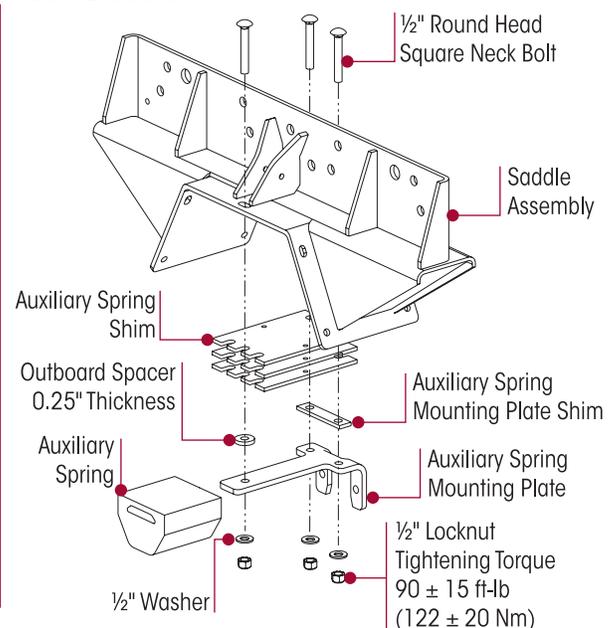


FIGURE 8-2

Vehicles built after November 2000 shown



8. Raise the rear of the vehicle to clear the bolster springs from the equalizing beam. Support the vehicle at this height.
9. Remove the eight (8) $\frac{7}{16}$ " fasteners that connect the bolster springs to the saddle, and remove the bolster springs, see Figure 8-3.

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.

10. Remove saddle to frame fasteners per the vehicle manufacturer's specifications.
11. 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 AT THE RUBBER SIDE OF THE BOLSTER SPRINGS TO PREVENT THE BOLSTER SPRINGS FROM BEING DAMAGED BY THE THREADED ENDS OF BOLTS.

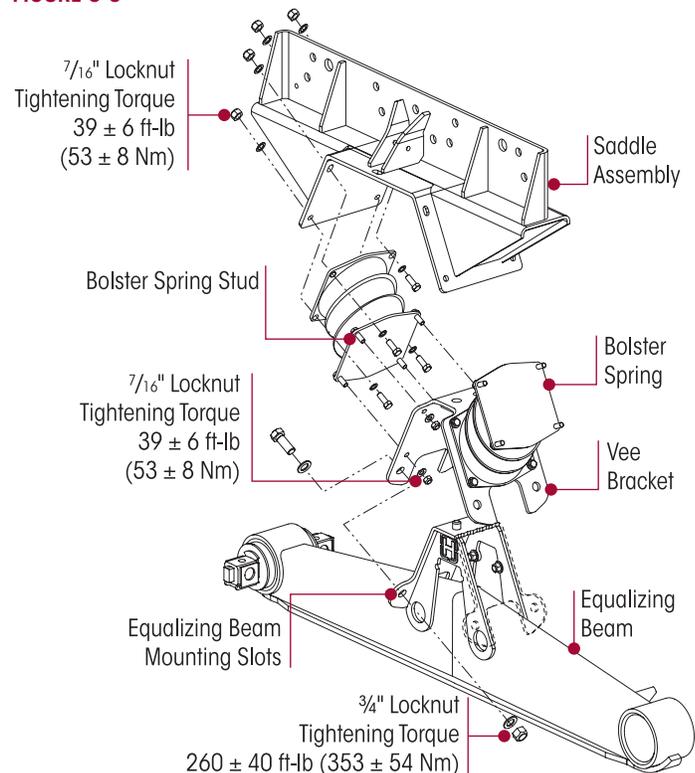
2. Mount the bolster springs to the saddle and loosely install the eight (8) $\frac{7}{16}$ " fasteners on the bolster spring. Ensure the bolt heads are positioned to at the rubber side of the bolster springs. **DO NOT** tighten at this time.

CAUTION

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

3. Remove the frame supports and lower the vehicle, guide the eight (8) lower bolster spring studs into the vee brackets. Ensure the vee bracket sits at the bottom of the mounting slots on the beam, see Figure 8-3.
4. Install the eight (8) lower $\frac{7}{16}$ " fasteners on the bolster spring.
5. Tighten all sixteen bolster spring fasteners to \mathbb{R} 39 \pm 6 foot pounds torque.
6. Mount the lower anchor plate assembly on the equalizing beam. Tighten to \mathbb{R} 90 \pm 15 foot pounds torque, see Figure 8-3.
7. Install the shock absorber fasteners, tighten to \mathbb{R} 80 \pm 10 foot pounds torque.
8. Mount auxiliary spring and auxiliary spring shims to saddle by installing the $\frac{1}{2}$ " bolts and fasteners, see Figure 8-2.
9. Tighten to auxiliary spring fasteners to \mathbb{R} 90 \pm 15 foot pounds torque.
10. Mount the upper anchor plate assembly to auxiliary spring mounting plate by installing the two (2) $\frac{1}{2}$ " bolts and fasteners and tighten to \mathbb{R} 90 \pm 15 foot pounds torque, see Figure 8-1.
11. Remove wheel chocks.

FIGURE 8-3



AUXILIARY SPRING

NOTE

Tire removal is not necessary to service the auxiliary spring.

DISASSEMBLY

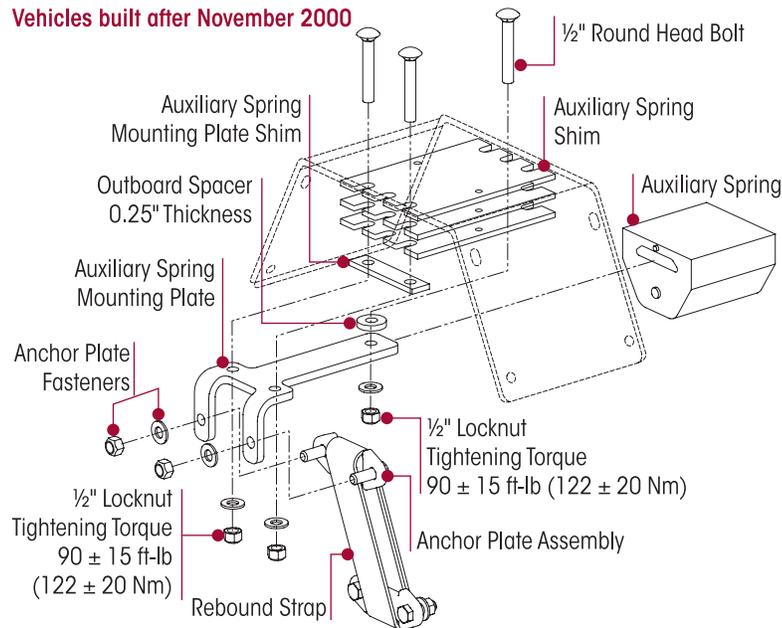
1. Chock the front wheels of the vehicle.
2. Raise the frame of the vehicle just enough to remove the load from the bolster springs. Support the frame at this height.
3. Remove the fasteners securing the auxiliary spring mounting plate to the saddle, see Figure 8-1.
4. Slide the auxiliary spring off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

ASSEMBLY

1. Slide the auxiliary spring onto the auxiliary spring mounting plate.
2. Install the auxiliary spring mounting plate to the saddle.
 - a. **Auxiliary Spring (November 2000 - Current)**
 - i. 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.
 - ii. Install the outboard fasteners through the saddle, auxiliary spring shim(s), 0.25" thick outboard spacer, and auxiliary spring mounting plate.

FIGURE 8-4

Vehicles built after November 2000



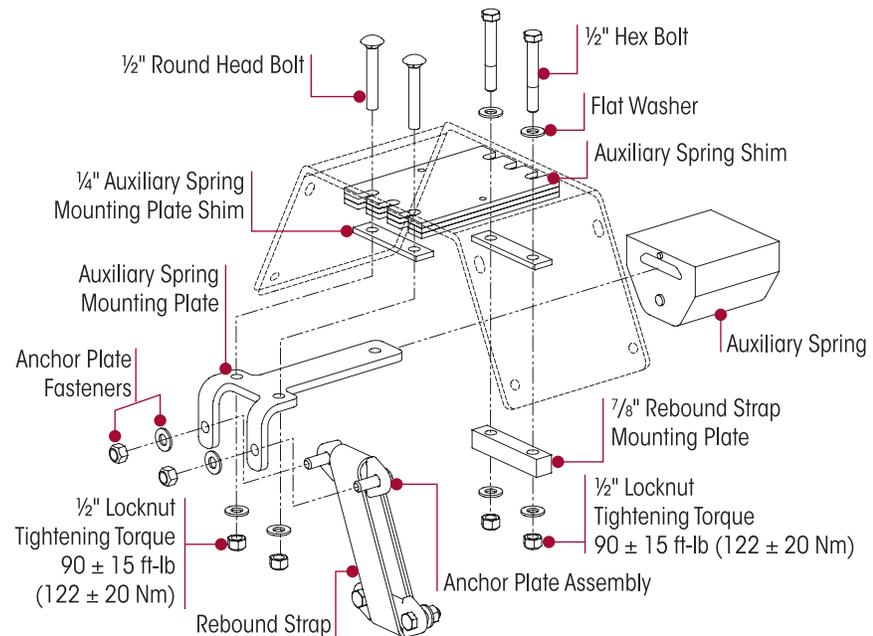
b. Auxiliary Spring (September 1998 to November 2000)

- i. Install the auxiliary spring shim(s) if removed; one of the auxiliary spring mounting plate shims, and the auxiliary spring mounting plate onto the inboard fasteners. Loosely install the washers and locknuts, see Figure 8-5.
- ii. Install the outboard fasteners through the saddle, the auxiliary spring shim(s), the other auxiliary spring mounting plate shim, and the rebound strap mounting plate. Loosely install the washers and locknuts on the outboard fasteners, see Figure 8-5.

c. Auxiliary Spring (April 1996 to August 1998)

- i. Auxiliary spring is no longer available. Use conversion kit no. 57974-011, see Parts Lists section of this publication, or contact Hendrickson Tech Services.

FIGURE 8-5
Vehicles built between September 1998 and November 2000



3. Tighten the fasteners to 90 ± 15 foot pounds torque.
4. Remove the frame supports and lower the vehicle completely.
5. Remove the wheel chocks.

REBOUND STRAP

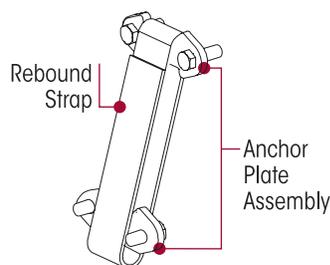
DISASSEMBLY

1. Chock the front wheels.
2. Vehicle should be in the loaded condition for the rebound strap to be slack enough for removal.
3. From the inboard side of the saddle remove the $\frac{1}{2}$ " locknuts and $\frac{1}{2}$ " flat washers from the top of the rebound strap anchor plate assembly (11/00-current and 9/98-11/00) or the rebound strap mounting plate (4/96-9/98).
4. From the outboard side remove the $\frac{1}{2}$ " locknuts and $\frac{1}{2}$ " flat washers from the anchor plate assembly of the rebound strap. This will free the rebound strap, anchor plate assembly and if applicable (4/96-9/98) rebound strap mounting plate. Slide off and free both ends of rebound strap from the anchor plate assembly and if applicable (4/96-9/98) the rebound strap mounting plate, see Figure 8-6.

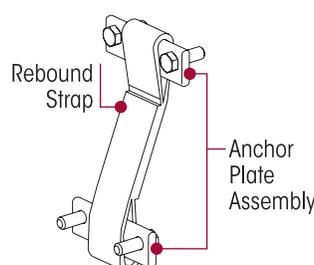
SERVICE HINT

The anchor plate assembly welds of bolt heads do not need to be cut or separated to replace rebound strap.

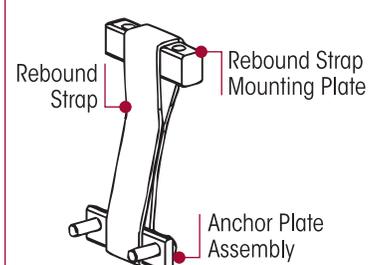
FIGURE 8-6
Rebound Straps for vehicles built
November 2000 to Current



September 1998 to November 2000



April 1996 to September 1998



ASSEMBLY

1. Replace rebound strap by reversing procedure.
 - **Vehicles built AFTER 9/98:** Slide one strap end loop over each end of anchor plate assembly, see Figure 8-6.
 - **Vehicles built PRIOR TO 9/98:** Slide one strap end loop over the mounting plate and the other over the anchor plate assembly, see Figure 8-6.
2. From the inboard side of the saddle, place the rebound strap back to its original position.
3. From the inboard side reinstall $\frac{1}{2}$ " flat washers and locknuts to \mathbb{R} 90 \pm 15 foot pounds.
4. From the outboard side reinstall the $\frac{1}{2}$ " flat washers and locknuts of the anchor plate assembly to the equalizing beam and torque the $\frac{1}{2}$ " locknuts to \mathbb{R} 90 \pm 15 foot pounds.
5. Remove the wheel chocks.

BOLSTER SPRING

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.

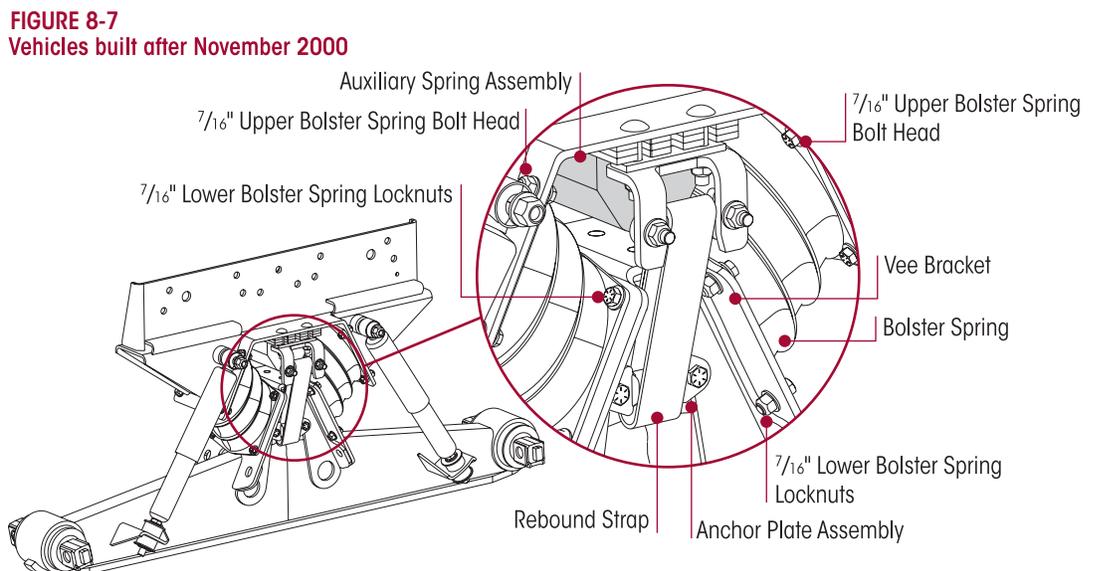
DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. From the outboard side, remove the fasteners securing the anchor plate assembly to the auxiliary spring mounting plate. Remove the anchor plate.
3. Remove the fasteners securing the bolster springs to the saddle and vee bracket (8 per bolster).
4. Raise the frame of the vehicle just enough to remove the load from the bolster springs. Support the frame at this height.
5. Remove the bolster springs.

ASSEMBLY



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 BOLTS.



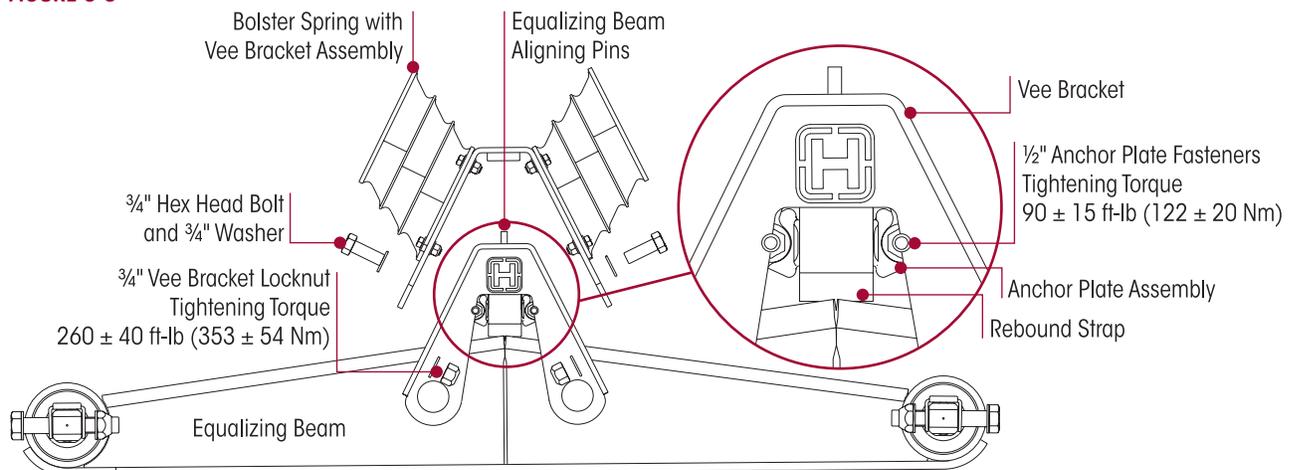
1. Install the bolster springs between the vee bracket and saddle.
2. Loosely install the fasteners securing the bolsters to the saddle and the vee bracket assembly making sure the fastener heads are on the rubber side of the bolsters, see Figure 8-7.
3. Once all fasteners have been loosely installed 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.
5. Install the anchor plate through the rebound strap loop.
6. Install the anchor plate and fasteners to the auxiliary spring mounting plate.
7. Tighten the anchor plate fastener locknuts to 90 ± 15 foot pounds.

VEE BRACKET

DISASSEMBLY

1. Chock the wheels.
2. Remove the $\frac{5}{8}$ " locknut, retainer washer, and rubber bushing from the bottom of both shock absorbers.
3. To remove the lower anchor plate fasteners, gain access from the outboard side through the opening of the vee-plate, see Figure 8-8. Remove the rebound strap anchor plate assembly and free the lower section of the rebound strap and anchor plate assembly from the equalizing beam.
4. Remove the lower bolster spring fasteners on the side being serviced (4 fasteners per bolster).
5. Raise the frame enough to clear the vee bracket from the equalizing beam aligning pins, see Figure 8-8.
6. Remove the four vee bracket $\frac{3}{4}$ " fasteners.
7. Remove the vee bracket from the equalizing beam.

FIGURE 8-8



ASSEMBLY

1. Mount vee bracket over aligning pins on equalizing beam, see Figure 8-8.
2. Install the four vee bracket fasteners. **DO NOT** tighten at this time.
3. Lower the frame enough to align the four **lower** bolster spring holes to the vee bracket.
4. Install the $\frac{7}{16}$ " **lower** bolster spring fasteners.
5. Completely lower the vehicle.
6. Torque all loosened or removed bolster spring fasteners to 39 ± 6 foot pounds torque.
7. Torque vee bracket $\frac{3}{4}$ " fasteners to 260 ± 40 foot pounds torque.

8. Reattach the lower end of the rebound strap and anchor plate to the equalizing beam.
9. Install the lower anchor plate assembly fasteners, gain access from the outboard side through the opening of the vee-plate, see Figure 8-8. Tighten fasteners to \mathbb{R} 90 ± 15 foot pounds torque.
10. Reinstall the rubber bushing, 5/8" retainer washer, and locknut at the bottom of both shock absorbers to the equalizing beam.
11. Tighten shock absorber fasteners to \mathbb{R} 70-90 foot pounds torque.

SHOCK ABSORBER

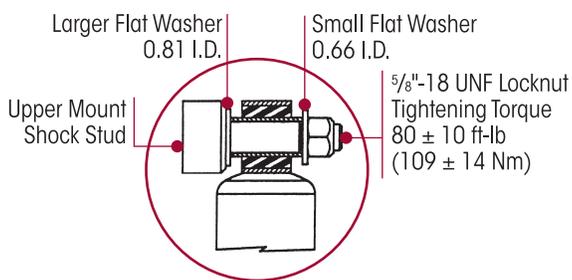
DISASSEMBLY

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.

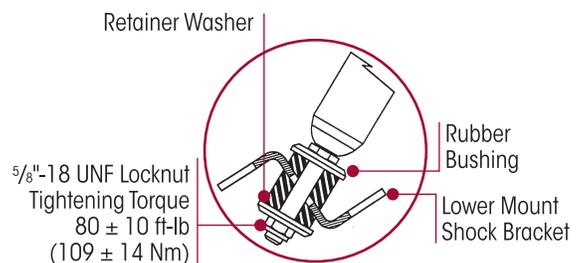
ASSEMBLY

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 8-9 and 8-10.

**FIGURE 8-9
UPPER SHOCK ABSORBER**



**FIGURE 8-10
LOWER SHOCK ABSORBER**



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. Tighten fasteners to \mathbb{R} 80 ± 10 foot pounds torque.

EQUALIZING BEAM

DISASSEMBLY



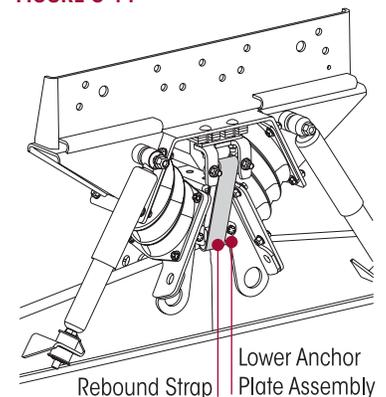
IF THE VEE BRACKET LOCATED BETWEEN THE EQUALIZING BEAM AND THE BOLSTER SPRINGS IS DAMAGED, IT MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE DAMAGE TO MATING COMPONENTS. IF REPLACEMENT IS NEEDED, REFER TO VEE BRACKET REPLACEMENT IN THIS SECTION.

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.

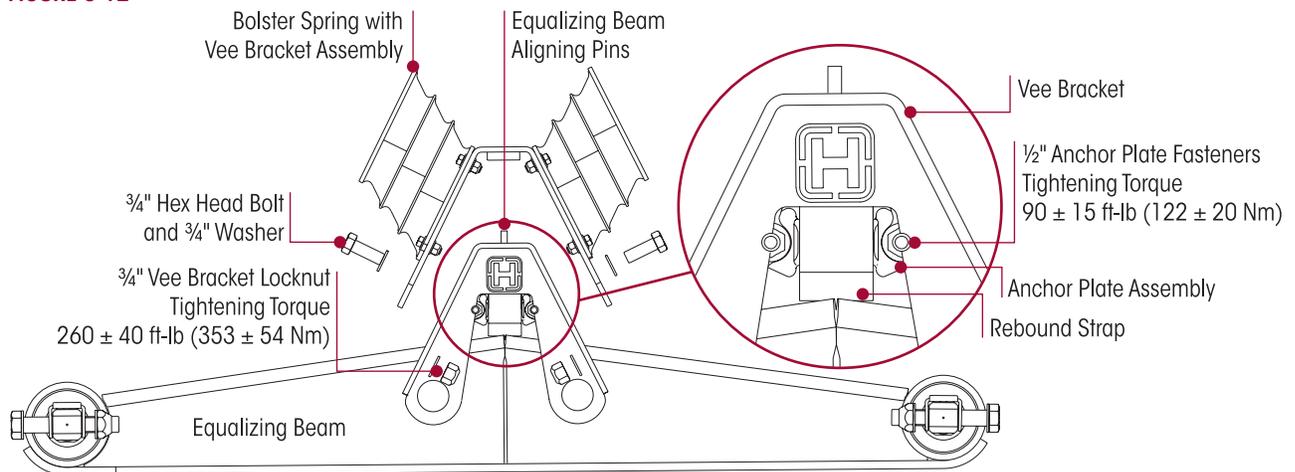
SERVICE HINT

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

FIGURE 8-11



- Remove the lower end of the rebound strap from the equalizing beam by removing the lower anchor plate and fasteners, see Figure 8-11.
- Remove the (4) fasteners that connect the Vee bracket to the equalizing beam, see Figure 8-12.

FIGURE 8-12


- 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.

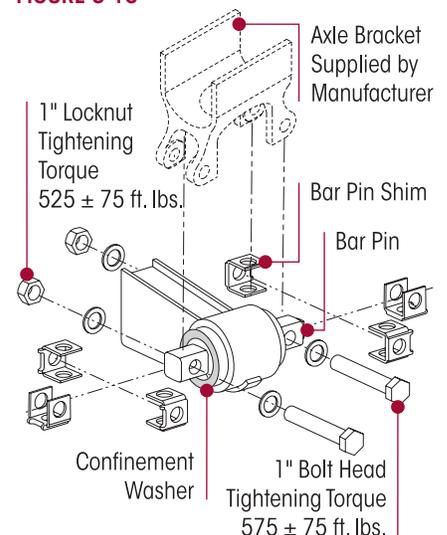
- Lower the beam support and remove the equalizing beam from the axle brackets.

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.

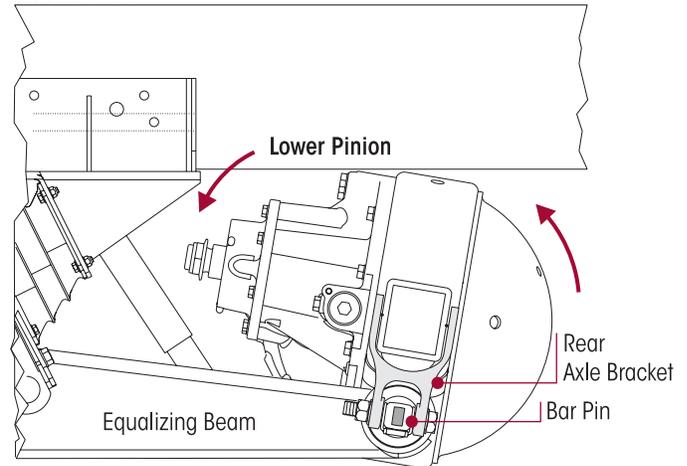
FIGURE 8-13


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.

1. Mount the equalizing beam into the **FRONT** drive axle brackets. **DO NOT** install the alignment shims at this time.
2. Slide a 3/4" bolt through both front axle brackets and the bar pin holes to temporarily support the beams.
3. 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 8-14



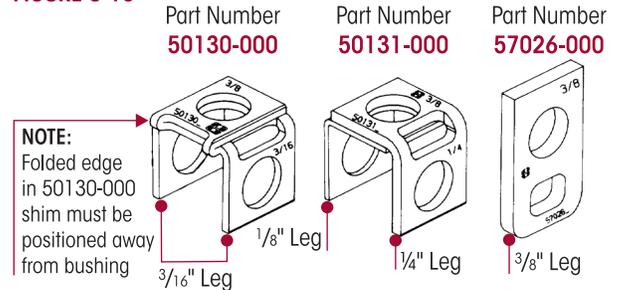
WARNING

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.

WARNING

THE BAR PIN ALIGNMENT SHIM (PART NO. 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



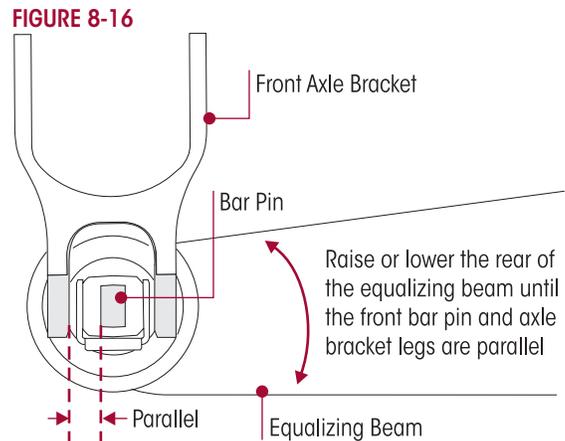
4. Partially install the **FRONT INBOARD** bar pin alignment shim and verify that the shim is in the same orientation as prior to disassembly, see Figure 8-15.
5. To complete installation of the alignment shim, remove the temporary 3/4" bolt from the inboard bar pin hole and complete installation of 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.
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.

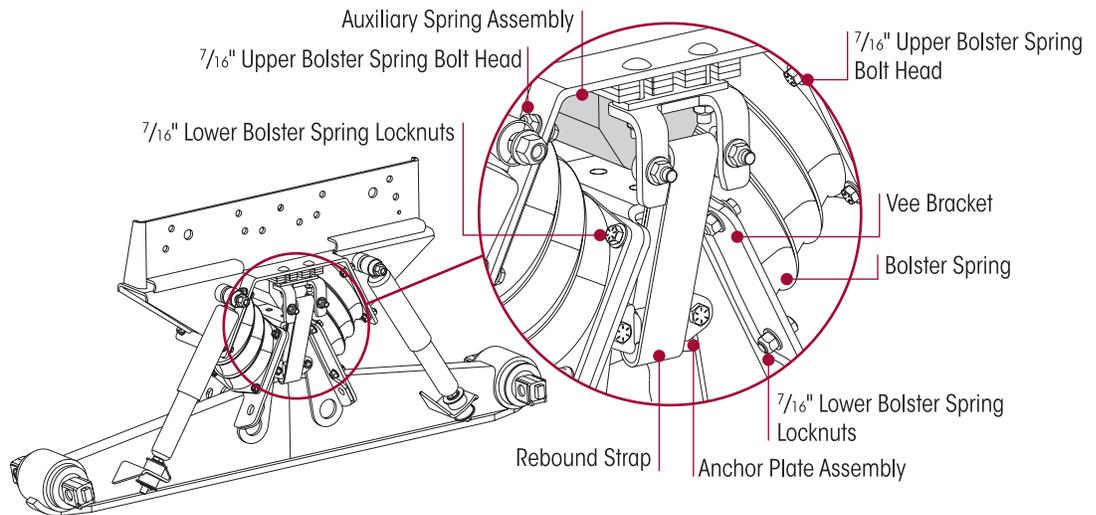
23. Tighten the bar pin **locknuts** to \mathbb{R} 525 \pm 75 foot pounds torque, or if tightening on the **bolt head**, tighten to \mathbb{R} 575 \pm 75 foot pounds torque.
24. Remove the frame supports and lower the frame until the Vee bracket lightly touches the equalizing beam.
25. Slowly lower the 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 8-12.
27. Install the fasteners that attach the Vee bracket to the equalizing beam. Tighten the fasteners to \mathbb{R} 260 \pm 40 foot pounds torque.

SERVICE HINT

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

28. Install the lower anchor plate assembly through the rebound strap and attach it to the equalizing beam, see Figure 8-17. Tighten the fasteners to \mathbb{R} 90 \pm 15 foot pounds torque.
29. Remove the wheel chocks

FIGURE 8-17
Vehicles built after November 2000



BAR PIN END BUSHING

You will need:

- A shop press with a capacity of at least 100 tons
- A shop made bar pin receiving tool, see the Special Tools section of this publication.
- See end bushing service kits in the Parts List section of this publication.

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 the Parts List 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.

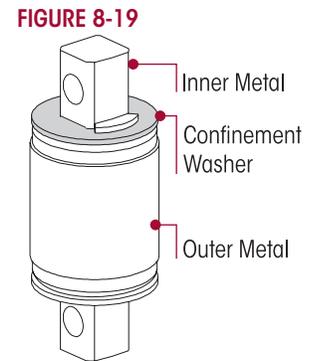
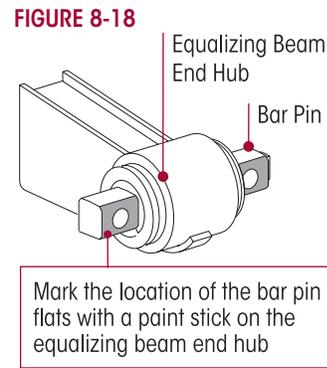
EQUALIZING BEAM REMOVAL

Remove the equalizing beam from the vehicle as detailed in the Equalizing Beam in this section.

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. Place the equalizing beam in the shop press with the beam end hub squarely supported on the receiving tool.
2. Prior to removal, note the orientation of the bar pin flats, see Figure 8-18.
3. Mark the orientation on the equalizing beam with a paint stick.



4. Press on the end bushing inner metal, see Figure 8-19, until the inner metal is flush with the top of the beam end hub. This will dislodge the confinement washer and move the bushing rubber away from the outer metal of the bushing so the removal tool can be installed.
5. Center the end bushing removal tool directly on the bushing's outer metal (see Figure 8-19) and press the bushing out of the beam end hub.
6. After removing the equalizing beam end bushings, clean and inspect each beam end hub bore.

INSPECTION

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

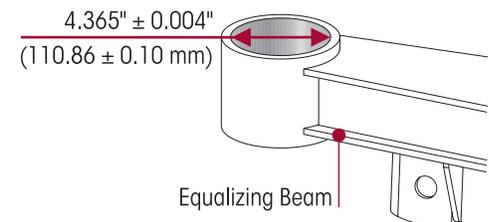
WARNING

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 the bar pin end bushings, the following steps will minimize the chance of damaging a new bar pin end bushing.

1. Clean the equalizing beam 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. If the end hub bore is not within the specified range, equalizing beam replacement is required.
 - The equalizing beam end hub bore diameter is $4.365" \pm 0.004"$ (110.86 ± 0.10 mm), see Figure 8-20.

FIGURE 8-20
Equalizing Beam End Hub Bore Diameter



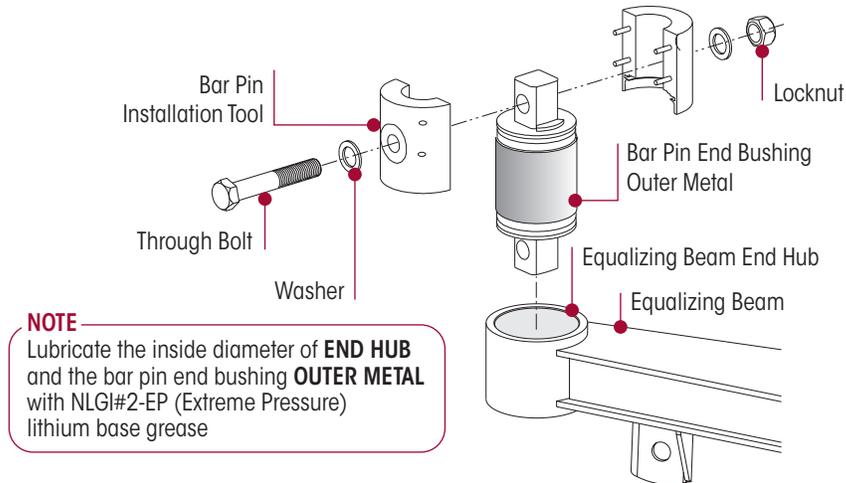
NOTE

Always use the bushing's outer metal for pressing operations, unless otherwise instructed. Pressing on the bushings 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 squarely supported on the press bed or receiving tool.
2. Install the end bushing installation tool (see 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.
3. Lubricate the inside diameter of the equalizing beam end hub **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 end bushing and installation tool on the end hub. Verify the bar pin is aligned with the paint stick markings as prior to disassembly.

NOTE

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

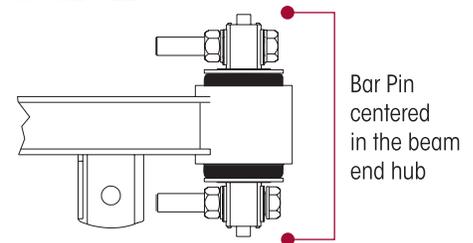
5. Verify the end bushing's outer metal is in alignment with the end hub. Equalizing beam and end bushing damage will result if the bushings are pressed in at an angle.



CARE MUST BE TAKEN DURING THE INSTALLATION OF THE BUSHING. DO NOT PUSH ON THE BAR PIN, DOING SO WILL CAUSE DAMAGE TO THE END 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 8-22.
7. Install the equalizing beam assembly onto the vehicle as detailed in Equalizing Beam in this section.

FIGURE 8-22



LONGITUDINAL TORQUE ROD

DISASSEMBLY

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 alignment.

1. Chock the front wheels of the vehicle.
2. Support the pinion on the axle being serviced.

SERVICE HINT

To remove all the load from the longitudinal torque rod, raise or lower the pinion as needed. This will ease the removal of the longitudinal torque rod.

3. Remove and discard the fasteners that connect the longitudinal torque rod to the cross member and torque rod axle brackets.
4. Remove longitudinal torque rod, see Figure 8-23.

ASSEMBLY
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.

1. Install longitudinal torque rod by attaching the fasteners to the cross member and torque rod axle brackets, see manufacturer's specification's for tightening torque requirements.
2. Verify proper pinion angle, and correct with drop in shims between the torque rod bar pin and the cross member or torque rod axle bracket depending on the direction of adjustment needed. Contact the vehicle manufacturer for proper pinion angle specifications.

FIGURE 8-23
Longitudinal Torque Rod Assembly

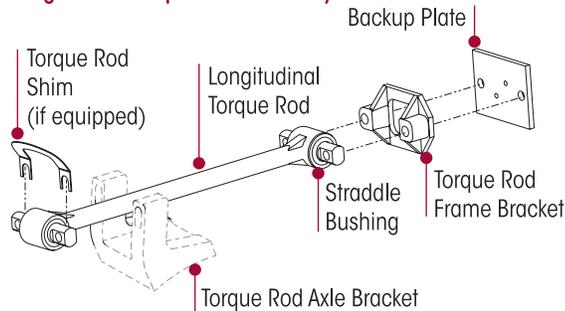
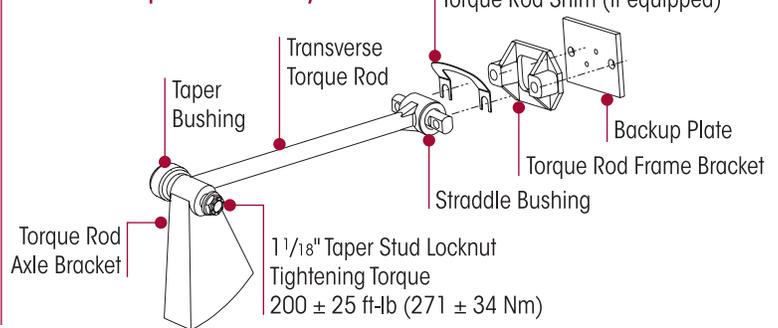


FIGURE 8-24
Transverse Torque Rod Assembly


TRANSVERSE TORQUE ROD


HN 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.

DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove the fasteners that connect the transverse torque rod to the frame bracket, and the 1 1/4" nylon locknut and washer from the tapered stud and torque rod axle bracket.
3. Remove the transverse torque rod, see Figure 8-24.

ASSEMBLY
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.

1. Install the transverse torque rod to the frame bracket and the torque rod axle bracket. See manufacturer specifications for torque requirements of the frame fasteners. Tighten the 1 1/4" nylon locknut to 200 ± 25 foot pounds torque.
2. Verify the vehicle's lateral axle alignment is correct (centered ± 1/4"). Correct as needed with drop in shims between the torque rod bar pin and the frame bracket, see Figure 8-24.
3. Remove the wheel chocks.

TORQUE ROD BUSHING

You will need:

- A vertical press with a capacity of at least 10 tons
- Shop made receiving tool and installation/removal tool, refer to the Special Tools section of this publication for more information.
- Funnel Tool Part No. 66086-001 (ULTRA ROD)

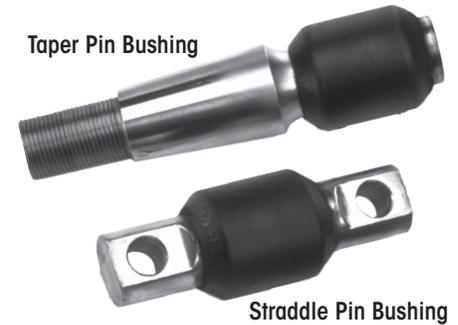
BUSHING REMOVAL

WARNING

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

1. Remove the torque rod as detailed in the Torque Rod Disassembly instructions in this section.
2. Support the torque rod end tube centered on the receiving tool.
3. **Straddle Pin Bushing:**
 - a. Ensure the torque rod is squarely supported on the press bed for safety.
 - b. Push directly on the straddle mount bar pin until the top of the bar pin is level with the top of torque rod end tube.
 - c. Place the push out tool directly on top of the bar pin and press until the bushing clears the torque rod end tube.
4. **Taper Pin Bushing:**
 - a. Remove the fasteners from the tapered bar pin bushing.
 - b. Support the torque rod end on the receiving tool with the tapered stud pointing up and the end tube centered on the tool.
 - c. Ensure the torque rod is squarely supported on the press bed for safety.
 - d. Push directly on the tapered stud until the bushing clears the torque rod end tube.

FIGURE 8-25



BUSHING INSTALLATION

1. Clean and inspect the inner diameter of the torque rod end tubes.

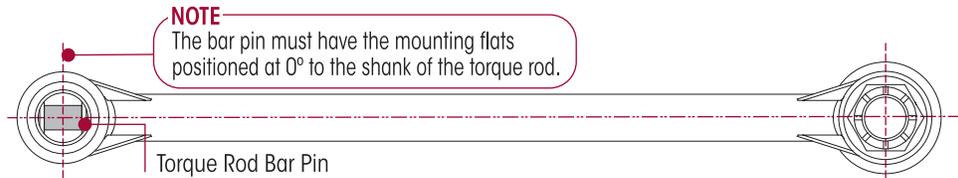
SERVICE HINT

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

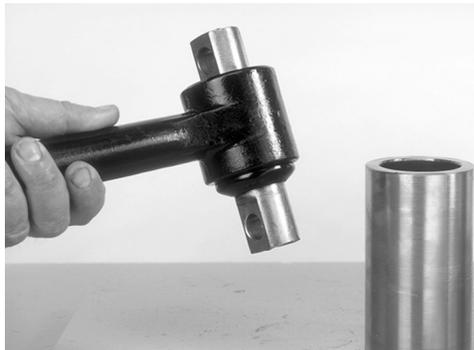
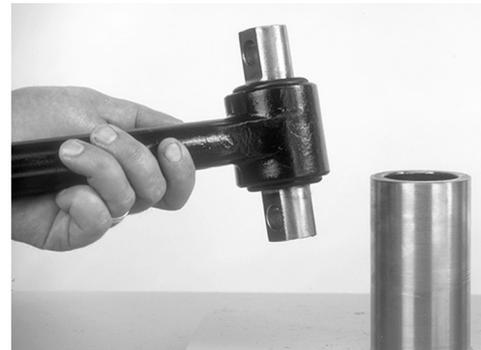
2. Lubricate the inner diameter of the torque rod end hub and the new rubber bushing (see Figure 8-26) with P-80 Lubricant (refer to Parts List section of this publication) or light Naphthionic Base Oil, such as 60 SUS at 100°F.
3. Support the torque rod end tube centered on the receiving tool. Ensure the torque rod is squarely supported on the press bed for safety. The straddle mount bar pin bushings must have the mounting flats positioned at zero degrees to the shank of the torque rod, see Figure 8-27.

FIGURE 8-26



FIGURE 8-27


4. Push directly on the straddle mount bar pin, or the tapered stud. The bushing must be centered within the end tubes of the torque rod.
 - When pushing in the new bushings, overshoot the desired final position by approximately $\frac{3}{16}$ " , see Figure 8-28.
 - Push the bushing again from the opposite side to center the bar pin, or tapered stud within the end tube, see Figure 8-29.

FIGURE 8-28

FIGURE 8-29

CAUTION

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

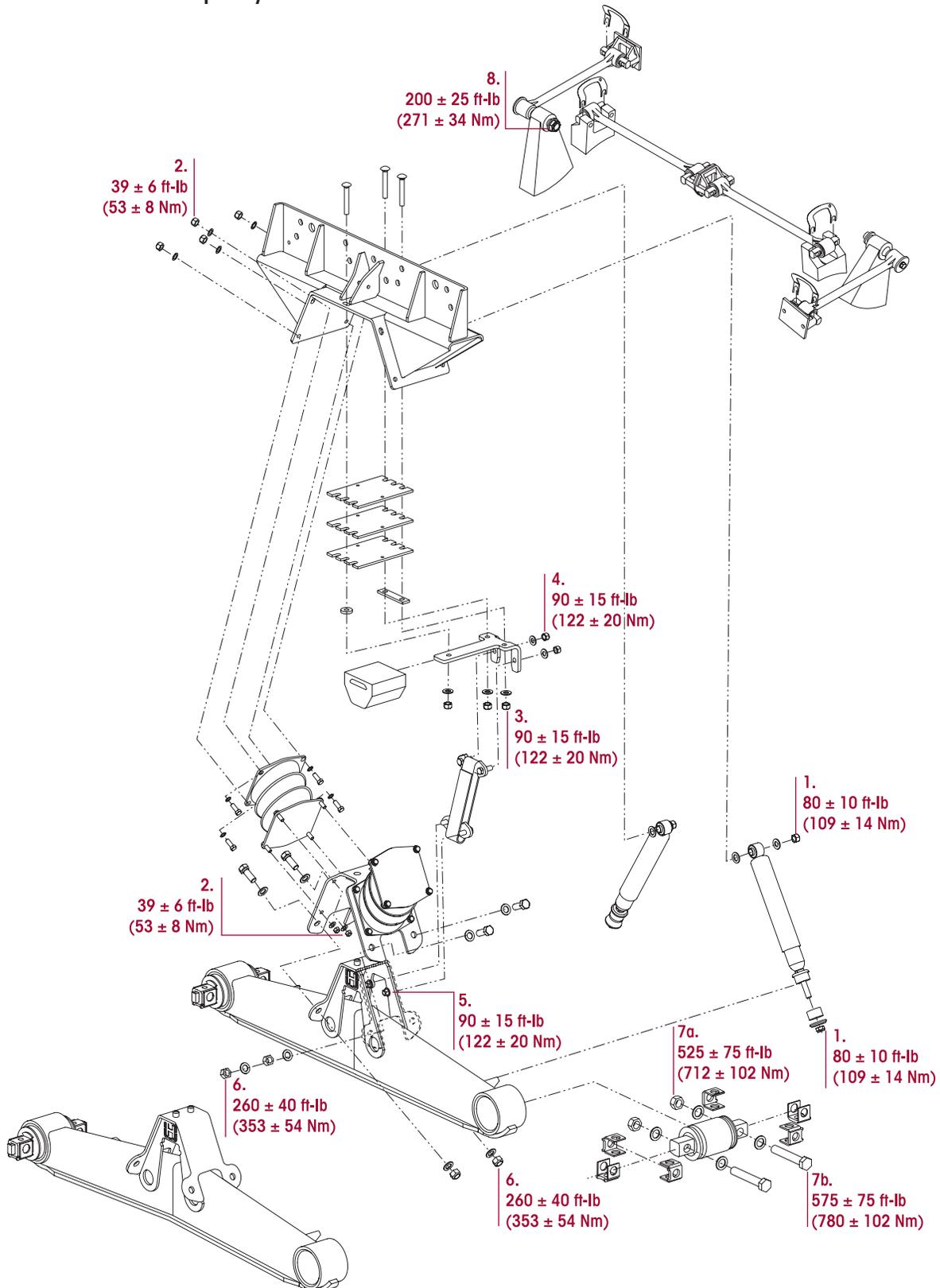
5. Wipe off the excess lubricant. Allow the lubricant four (4) hours to dissipate prior to operating the vehicle.
6. Replace the torque rod assembly as detailed in the Transverse Torque Rod Assembly in this section.

SECTION 9 Torque Specifications

Hendrickson recommended torque values provided in Foot Pounds and in Newton Meters

HN® 40K • 46K • 52K lb Capacity

Vehicles built after November 2000





**HN® 40K • 46K • 52K lb Capacity
Vehicles built after November 2000**

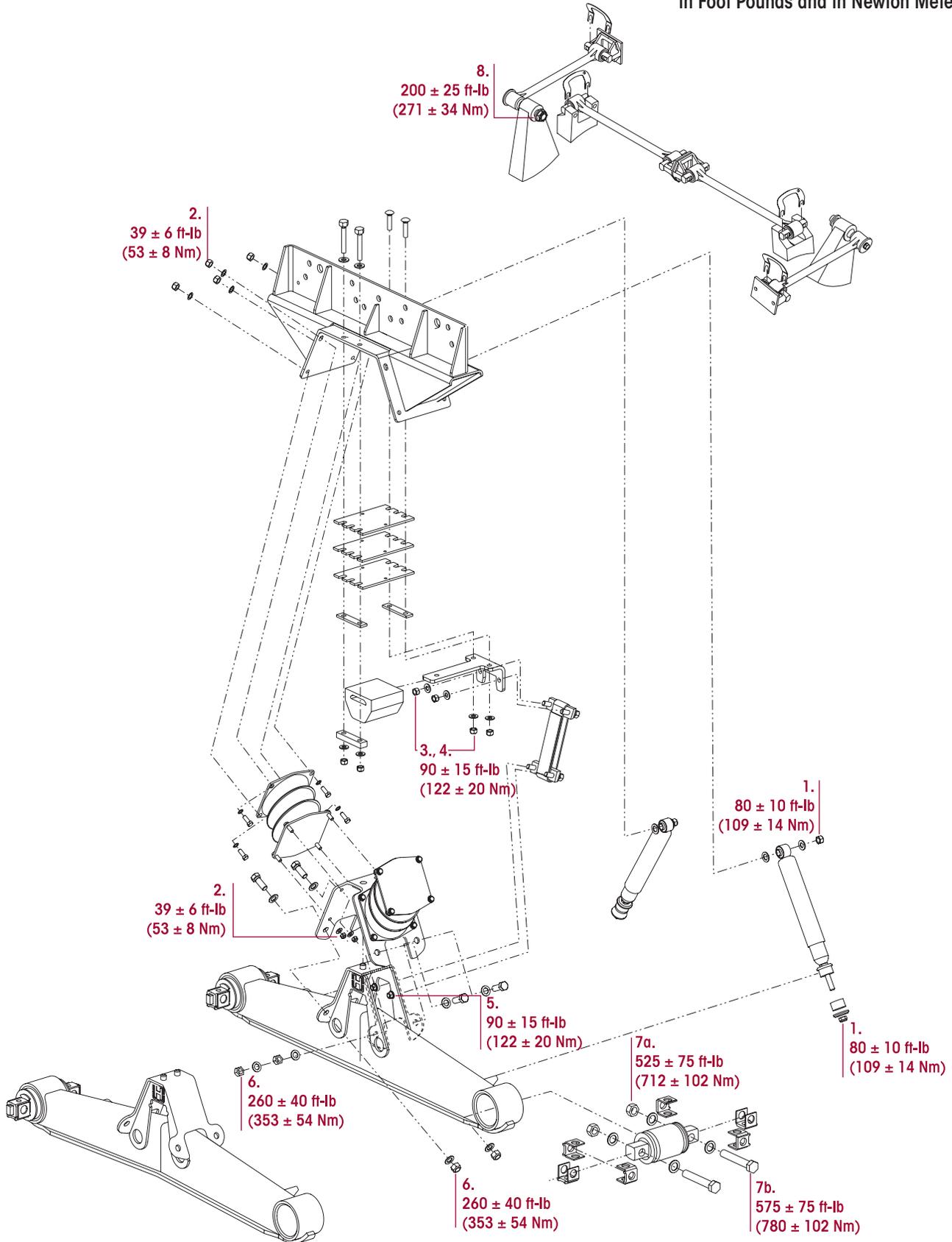
HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	FASTENERS		*TORQUE VALUE		
		QUANTITY	SIZE	IN FOOT POUNDS	IN NEWTON METERS	
	Frame fasteners are furnished and installed by the vehicle manufacturer.					
1	Shock Absorber Upper and Lower Locknut	4	5/8"-18 UNF-2B Grade C	80 ± 10	109 ± 14	
2	Bolster Spring Locknut	32	7/16"-20 UNF-2B Grade C	39 ± 6	53 ± 8	
3	Saddle Assembly to Auxiliary Spring Mounting Plate	6	1/2"-13 UNC-2B Grade C	90 ± 15	122 ± 20	
4	Auxiliary Spring Mounting Plate to Anchor Plate	4	1/2"-13 UNC-2B Grade C	90 ± 15	122 ± 20	
5	Anchor Plate to Equalizing Beam Assembly	4	1/2"-13 UNC-2B Grade C	90 ± 15	122 ± 20	
6	Vee Bracket Locknut	8	3/4"-10 UNC-2B Grade C	260 ± 40	353 ± 54	
7a	Bar Pin Bushing	at the Locknut	4	1"-8 UNC Grade C	525 ± 75	712 ± 102
7b		at the Bolt Head	4	1"-8 UNC-2A Grade 8	575 ± 75	780 ± 102
8	Transverse Torque Rod Tapered Stud Locknut	2	1 1/4"-12 UNC-2B Grade 5	200 ± 25	271 ± 34	
NOTE:	* 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.					

HN® 40K • 46K • 52K lb Capacity

Vehicles built between September 1998 and November 2000

Hendrickson recommended torque values provided
in Foot Pounds and in Newton Meters





HN® 40K • 46K • 52K lb Capacity
Vehicles built between September 1998 and November 2000

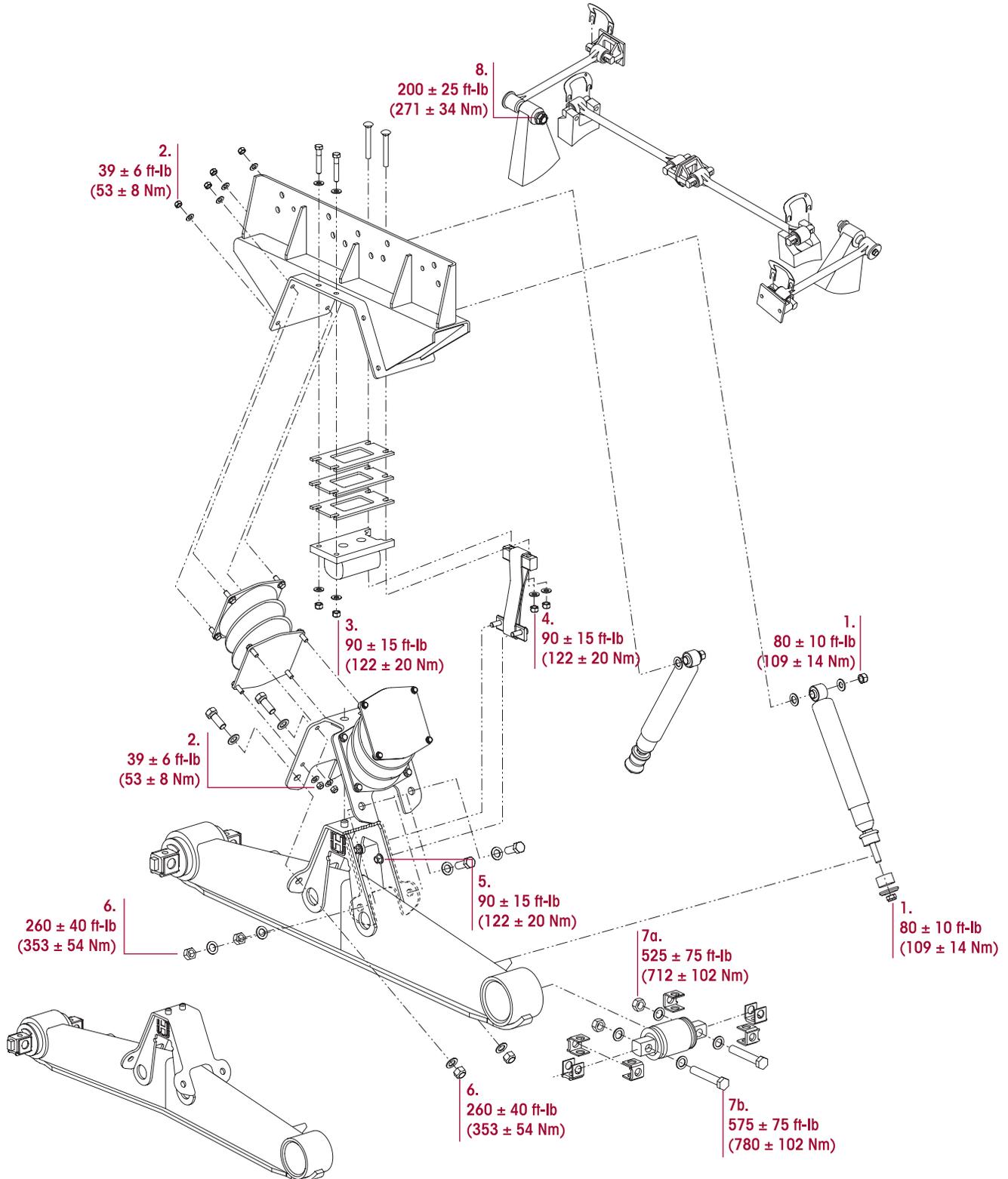
HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	FASTENERS		*TORQUE VALUE		
		QUANTITY	SIZE	IN FOOT POUNDS	IN NEWTON METERS	
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2	Bolster Spring Locknut	32	7/16"-20 UNF-2B Grade C	39 ± 6	53 ± 8	
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8	Transverse Torque Rod Tapered Stud Locknut	2	1 1/4"-12 UNC-2B Grade 5	200 ± 25	271 ± 34	
NOTE:	* 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.					

HN® 40K • 46K • 52K

Vehicles built between April 1996 and August 1998

Hendrickson recommended torque values provided in Foot Pounds and in Newton Meters





HN® 40K • 46K • 52K lb Capacity
Vehicles built between April 1996 and August 1998

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	FASTENERS		*TORQUE VALUE		
		QUANTITY	SIZE	IN FOOT POUNDS	IN NEWTON METERS	
	Frame fasteners are furnished and installed by the vehicle manufacturer.					
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NOTE:	* 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.					



SECTION 10 Troubleshooting Guide

HN SERIES

TROUBLESHOOTING GUIDE		
CONDITION	POSSIBLE CAUSE	CORRECTION
Vehicle bouncing excessively	Vehicle not equipped with shock absorbers	Install an aftermarket shock kit, see the Parts List section of this publication.
	Leaking or damaged shock absorber	Replace the shock absorber.
Suspension has harsh or bumpy ride	Incorrect auxiliary spring adjustment	Adjust auxiliary spring to proper setting. See Auxiliary Spring Adjustment in the Alignment & Adjustments section of this publication.
	Damaged auxiliary spring	Replace auxiliary spring.
	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 Alignment & Adjustments section of this publication.
	Damaged auxiliary spring(s) assembly	Replace auxiliary spring(s) assembly.
	Damaged bolster spring(s) assembly	Replace bolster spring(s) assembly.
Irregular tire wear	Incorrect axle alignment	Align the axles. Refer to the vehicle manufacturer's specifications.
	Damaged, bent, cracked suspension component	Replace damaged component
Bolster springs rubbing beam	Incorrect lateral axle alignment	Align axles. Refer to vehicle manufacturer's specifications.
Loose or missing suspension fasteners	Suspension is overloaded	Redistribute the load to correct weight.
	Frequent hard stop/start	Verify the torque is to specification and increase the fastener inspection interval.
		Review driving habits to reduce frequency of hard stop /start.

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

Call Hendrickson at **630.910.2800** or **855.RIDERED (855.743.3733)** for additional information.



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