

H TECHNICAL PROCEDURE

HAULMAAX® Rear Suspension

SUBJECT: Service Instructions

LIT NO: 17730-244

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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 HAULMAAX® rear suspension system.

NOTE

Use only Genuine Hendrickson parts for servicing this suspension system.

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

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson Tech Services for information on the latest version of this manual at 1-866-755-5968 (toll-free U.S. and Canada), 1-630-910-2800 (outside U.S. and Canada) or e-mail: techservices@hendrickson-intl.com.

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

SECTION 2

Product Description

Advanced engineering design methods and experience gathered from millions of Hendrickson suspensions created HAULMAAX, a rugged, yet lightweight rubber vocational rear suspension that saves weight over competitive suspensions for greater payloads and route consolidation.

Suspension weight is reduced for greater payloads and improved durability through innovative design, higher strength materials and advanced manufacturing methods. Proven with extensive vehicle durability and laboratory testing, HAULMAAX delivers the reliability and quality you've come to expect from Hendrickson, the leader in suspension technology.

The HAULMAAX spring system easily adjusts to the load for an enhanced combination of empty-ride quality and loaded stability. Most importantly, this innovative suspension significantly reduces wheel hop by eliminating the fixed pivot point found in the center bushings of other walking-beam suspensions.

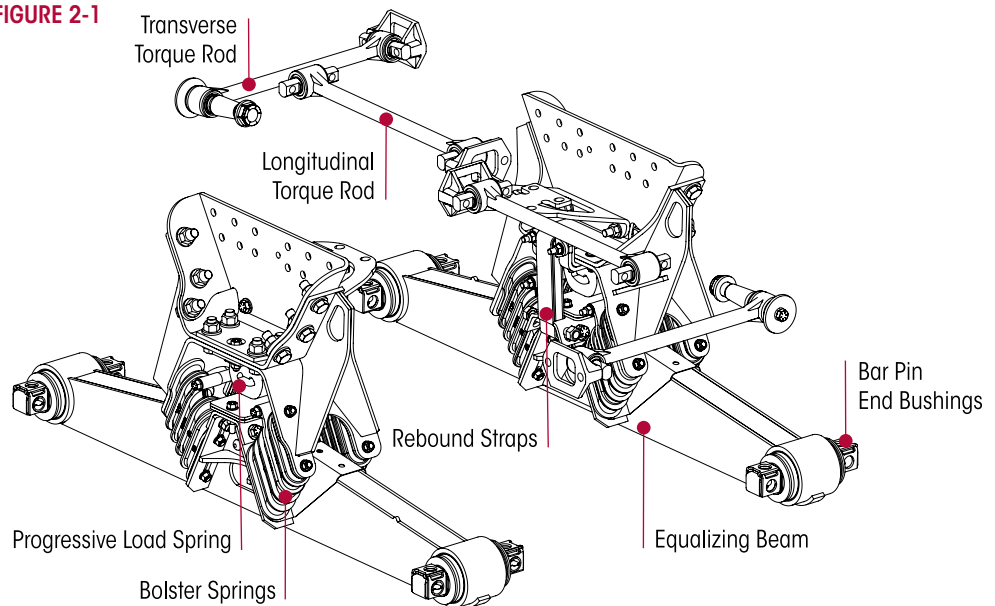
Extra wide bolster spring centers and a unique progressive load spring provide exceptional stability for demanding applications such as refuse, concrete mixers and dump.

- **Equalizing beam** — Formed and robotically-welded equalizing beam 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. The center bushing is also eliminated for reduced maintenance.
- **Bar pin end connection** — Rugged axle connection extends bushing life, and allows easy axle alignment and serviceability.
- **Saddle and frame brackets** — Lightweight, modular design simplifies installation.



- **Hendrickson torque rods** — Improve cornering by controlling lateral forces. Transverse torque rods ensure maximum lateral axle control and straight line suspension stability. Longitudinal torque rods engineered to optimize resistance to wind up during acceleration and braking.
- **Progressive load springs** — Newly designed to always engage for smoother ride and additional stability, and eliminate shim adjustments for lower maintenance (for most applications).
- **Premium rubber bolster springs** — The unique design works with the progressive load springs to deliver enhanced empty ride quality and loaded stability.
- **Optional shock absorbers** — Provide additional driver comfort. Shock absorbers are required for tractor and logging applications. Available as production or aftermarket options.
- **Tie-bar design** — Achieves greater column stiffness, improves suspension performance even when axles are misaligned, remains consistent with the ride quality and stability of the original design. The tie-bar design is equipped on the 46K capacity and an aftermarket option for 40K capacity.

FIGURE 2-1





HAULMAAX SPECIFICATIONS	40K	46K
Installed Weight ¹ (54" axle spacing)	855 lbs.	861 lbs.
Suspension Rating	40,000 lbs.	46,000 lbs.
Gross Vehicle Weight (GVW) Approval ²	73,000 lbs.	80,000 lbs.
Gross Combination Weight (GCW) Approval	160,000 lbs.	190,000 lbs.
Site Travel Rating ³	55,000 lbs.	60,000 lbs.
Diagonal Articulation ⁴	17 inches	
Lift Axles	Approved	
Ride Heights (loaded) ⁵	9.5", 10.5", 11.5", 13.25", 15.5"	
Axle Spacing ⁶	52", 54", 60", 72.5"	
Shock Absorber Applications ⁷	Tractors, Logging	

Hendrickson approves the use of HAULMAAX in the following vocational truck applications: dump, concrete mixer, refuse, logging, crane / boom, platform and fire / rescue.

1. Installed weight includes complete suspension, torque rods, axle brackets and frame brackets; add 31 pounds for shock absorbers.
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. Job-site 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.
5. HAULMAAX ride height measurements are taken from the centerline of the axle to the bottom of the truck frame.
6. Contact Hendrickson for availability of beam lengths.
7. Shock absorbers are required in tractor and logging applications. Ride and traction may be improved in other applications with shock absorbers. Ride performance can be subjective and may be dependent on many factors beyond the suspension design such as cab suspension, road conditions, body / auxiliary equipment, frame specifications, etc. Contact Hendrickson or your truck manufacturer / dealer for further information.



SECTION 3

Important Safety Notice

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

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 PARTS, ADVERSE VEHICLE HANDLING, PERSONAL INJURY, OR PROPERTY DAMAGE.

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

WARNING

LOAD CAPACITY

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

WARNING

MODIFYING COMPONENTS

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

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

WARNING

TRANSVERSE RODS

THE HAULMAAX SUSPENSION INCORPORATES 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 AND POSSIBLE TIRE CONTACT WITH THE FRAME. OPERATING A VEHICLE WITH NON-FUNCTIONAL TRANSVERSE TORQUE RODS CAN RESULT IN ADVERSE VEHICLE HANDLING, SEVERE PERSONAL INJURY, AND PREMATURE COMPONENT DAMAGE.

WARNING

PERSONAL PROTECTIVE EQUIPMENT

ALWAYS WEAR PROPER EYE PROTECTION AND OTHER REQUIRED PERSONAL PROTECTIVE EQUIPMENT TO HELP PREVENT PERSONAL INJURY WHEN PERFORMING VEHICLE MAINTENANCE, REPAIR OR SERVICE.



CAUTION

PROCEDURES AND TOOLS

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

WARNING

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 OR OTHER LIFTING DEVICE. ALWAYS SUPPORT A RAISED VEHICLE WITH RIGID SAFETY STANDS. FAILURE TO DO SO CAN CAUSE SERIOUS PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

WARNING

LOAD SPRING SHIM

AT LEAST ONE (1) LOAD SPRING SHIM MUST BE EQUIPPED ON EACH SIDE OF THE HAULMAAX SUSPENSION. FAILURE TO DO SO CAN CAUSE PREMATURE COMPONENT WEAR, EQUALIZING BEAM MISALIGNMENT, ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

CAUTION

IMPROPER VEHICLE LIFT OR SUPPORT METHOD

IMPROPER VEHICLE LIFT OR SUPPORT METHOD CAN CAUSE DAMAGE TO HAULMAAX REAR SUSPENSION BOLSTER SPRINGS, AND CAN VOID ANY WARRANTY COVERAGE. DO NOT LIFT OR SUPPORT THE VEHICLE AT ONLY 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

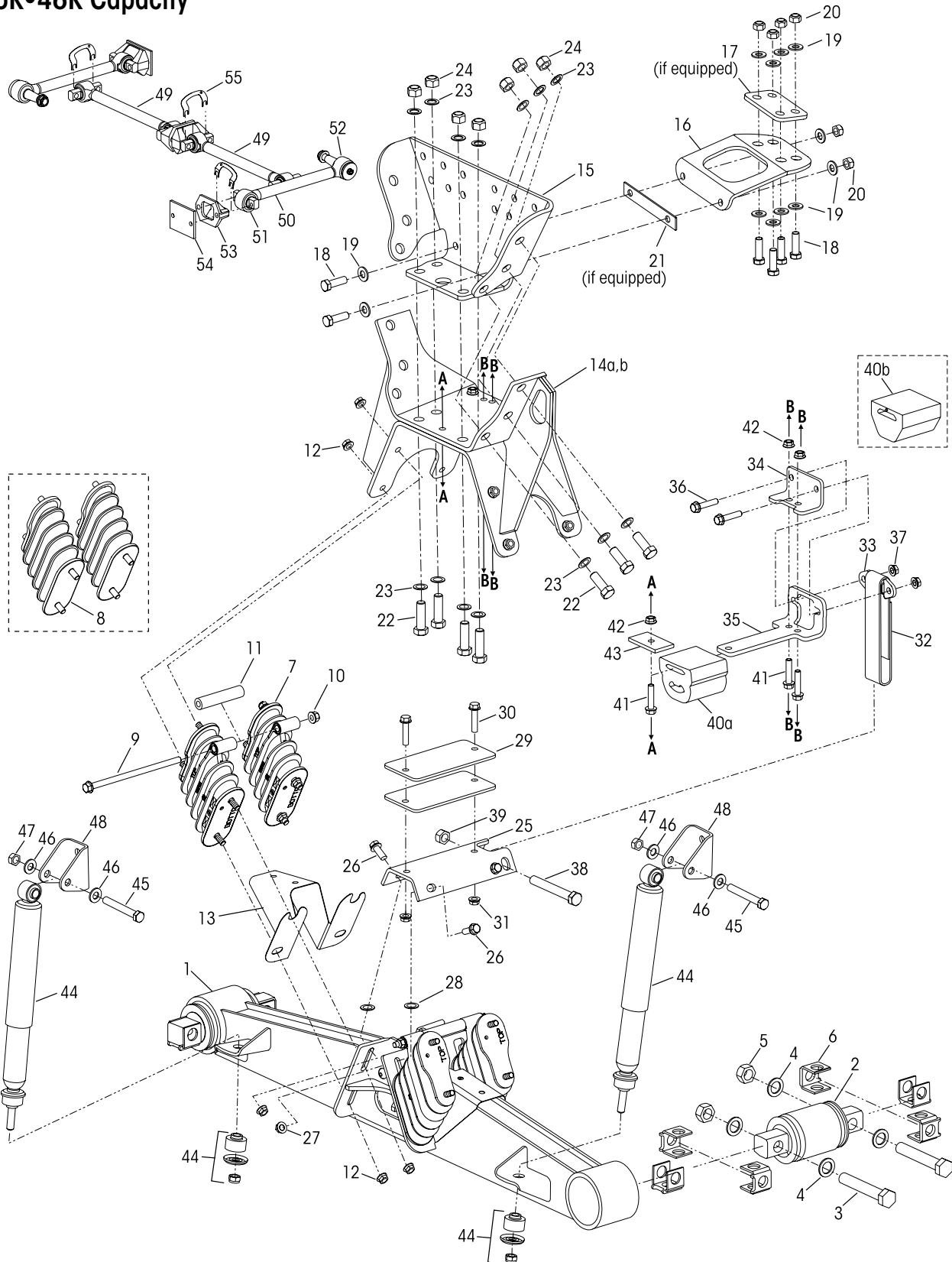
SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS, AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY, CAREFULLY FOLLOW THE MANUFACTURER'S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURES:

1. WEAR PROPER EYE PROTECTION.
2. WEAR CLOTHING THAT PROTECTS YOUR SKIN.
3. WORK IN A WELL-VENTILATED AREA.
4. DO NOT USE GASOLINE OR SOLVENTS THAT CONTAIN GASOLINE. GASOLINE CAN EXPLODE.
5. 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 WARRANTY.

SECTION 4 Parts List

40K•46K Capacity





			VEHICLE				VEHICLE
KEY NO.	PART NO.	DESCRIPTION	QTY.	KEY NO.	PART NO.	DESCRIPTION	QTY.
1		****Equalizing Beam Assembly, 40K • 46K	2	21		Inboard Spacer (<i>if equipped</i>)	As Req.
	64846-003	52", with Shock Bracket			60618-001	1/8" Thick	
	64847-003	52", without Shock Bracket			60618-002	3/8" Thick	
	64846-001	54", with Shock Bracket				Outboard Frame Bracket to Saddle Assembly	
	64847-001	54", without Shock Bracket				Fastener Kit, Includes Key Nos. 22-24	
	64846-002	60", with Shock Bracket			64179-038	Tandem Set	
	64847-002	60", without Shock Bracket			64179-039	One Side	
		****Equalizing Beam Assembly, 40K • 46K, with dual straps		22		*M20 x 2.5-6G x 65 mm Hex Bolt	20
	64846-006	52", with Shock Bracket		23		*M20 Hardened Washer	40
	64847-006	52", without Shock Bracket		24		*M20 x 2 1/2-6H Locknut	20
	64846-004	54", with Shock Bracket			57974-046	Contact Plate Service Kit, One Side, Includes Key Nos. 25-27	
	64847-004	54", without Shock Bracket		25	59191-000	Load Spring Contact Plate	2
	64846-005	60", with Shock Bracket		26		*5/8"-11 UNC x 1 1/2" Flange Bolt for Vehicles built after 11/07 ****Replaces 60818-001	8
	64847-005	60", without Shock Bracket		27		*5/8"-11 UNC Flange Nut for Vehicles built after 11/07 ****Replaces 60819-000	8
		Bar Pin End Bushing Service Kit, One Wheel End, Includes Key Nos. 2-6a		28		****Load Spring Contact Plate Spacer for Vehicles built prior to 11/07	8
	34013-088L	Shim Type		29	60791-000	Load Spring Shim 1/2" Thickness Quantity may vary for vehicles built prior to 07/15/14 equipped with Auxiliary Load Spring	4
	34013-188L	Rotating, Shim Type		30	60818-002	1/2"-13 UNC x 2 1/4" Flange Bolt	4
2		*Bar Pin Bushing	4	31	60819-000	1/2"-13 UNC Flange Nut	4
	34013-104	Bar Pin End Bushing Fastener Kit, One Wheel End, Includes Key Nos. 3-5			64179-028	Rebound Strap Service Kit, One Side, Includes Key Nos. 32-33, 36-39	
3		*1"-8 UNC x 6" Hex Bolt	8	32		*Rebound Strap	2
4		*1" Hardened Washer	16	33		*Rebound Clip	2
5		*1"-8 UNC Locknut	8	34	60613-000	Rebound Support Angle	2
6		Bar Pin Shim	8	35	59384-000	Load Spring Bracket	2
a	50131-000	0.25"/0.12" Standard		36	60818-002	1/2"-13 UNC x 2 1/4" Flange Bolt	4
b	50130-000	0.19"/0.19" Optional		37	60819-000	1/2"-13 UNC Flange Nut	4
c	57026-000	0.375" Optional flat shim		38	21867-007	3/4"-16 UNF x 6" Hex Bolt	2
	60961-712	Tie-bar Bolster Springs and Progressive Load Spring Service Kit, One Side, Includes two 64179-048 and one 60961-745 Service Kits		39	30191-000	3/4"-16 UNF Locknut	2
	64179-048	*Tie-bar Bolster Spring Service Kit, 2 Bolsters with 1 Wear Plate, Includes Key Nos. 7, 9-13				Progressive Load Spring Service Kits for vehicles built after 07/15/14	
	64179-049	*Bolster Spring Service Kit, 2 Bolsters with 1 Wear Plate, Includes Key Nos. 8, 12-13		60961-745		One Side, Includes Key Nos. 40a, 41-42	
7		*Tie-bar Bolster Spring	8	60961-747		Tandem Set, Includes Key Nos. 40a, 41-42 • Also use as a conversion kit for vehicles built prior to 07/15/14	
8		*Bolster Spring	8	60961-746		Weight Bias Kit with Shims, Includes Key Nos. 29-31, 40a, b, 41-42, Replaces 65902-004	
9	60818-003	1/2"-13 UNC x 10" Flange Bolt for Tie-bar	4	64179-004		Auxiliary Load Spring Service Kit, One Side, for vehicles built prior to 07/15/14 Includes Key Nos. 40b, 41-42	
10	60819-000	1/2"-13 UNC Flange Nut for Tie-bar	4	40		Load Spring	2
11	65742-000	Tie-bar Bolster Spring Spacer	4	a		*Progressive	
12	60819-000	1/2"-13 UNC Flange Nut	32	b		*Auxiliary	
13	64890-000L	Wear Plate, Replaces 60498-001 and 60498-002 4		41		*1/2"-13 UNC x 2 1/4" Flange Bolt	6
		Saddle Assembly Service Kit, Tandem Set,		42		*1/2"-13 UNC Flange Nut	6
	57974-051	HAULMAAX 40K, Includes Key No. 14a and Kit No. 57974-048		43	60874-000	Load Spring Spacer	2
	57974-050	HAULMAAX 46K, Includes Key No. 14b and Kit No. 57974-049				Single Shock Absorber Service Kit, (<i>if equipped</i>) Includes Key Nos. 44-47	
		Saddle Assembly Fastener Kit, Tandem Set,		64178-005		16 1/2" Saddle Height	
	57974-048	HAULMAAX 40K, Includes Key Nos. 12, 22-24, 26-27, 36-37, 41-42		64178-006		17 1/2" / 18 1/2" Saddle Height	
	57974-049	HAULMAAX 46K, Includes Key Nos. 9-12, 22-24, 26-27, 36-37, 41-42				Aftermarket Shock Absorber Kit for vehicles built with equalizing beams without welded shock absorber mounts, see Page 13	
14		***Saddle Assembly, Vehicles built after 01/13/03 2		44		Shock Absorber Assembly (<i>if equipped</i>)	4
a	64642-000	HAULMAAX 40K			60680-004L	16 1/2" Saddle Height (see Figure 4-2)	
b	64643-000	HAULMAAX 46K			60680-005L	17 1/2" / 18 1/2" Saddle Height (see Figure 4-2)	
15		***Outboard Frame Bracket, see Page 11 2		45	32043-005	5/8"-11 UNC x 4 1/4" Hex Bolt (<i>if equipped</i>)	4
		Inboard Frame Bracket, see Page 11 2		46	22962-004	5/8" Hardened Washer (<i>if equipped</i>)	8
16		Inboard Frame Bracket Shim, (46K, <i>if equipped,</i> 2		47	47764-000	5/8"-11 UNC Locknut (<i>if equipped</i>)	4
17	78441-000	<i>International Truck Only</i>)		48	60304-000	Upper Shock Bracket (<i>if equipped</i>)	4
18	32043-004	5/8"-11 UNC x 2 1/4" Hex Bolt 12					
		*****M16 Hex Bolt					
19	22962-004	5/8" Hardened Washer 24					
		*****M16 Hardened Washer					
20	47764-000	5/8"-11 UNC Locknut 12					
		*****M16 Locknut					

KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.	KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
49		One-piece Longitudinal Torque Rod Assembly, Straddle/Straddle		52		Taper Bushing	2
		ULTRA ROD®, Includes Key No. 51a		a	64697-000L	ULTRA ROD	
	62000-XXX	Front, Specify Length in mm	1	b	64400-004L	ULTRA ROD PLUS	
	62001-XXX	Rear, Specify Length in mm	1	c	66649-004L	XTRB	
		ULTRA ROD® PLUS™, Includes Key No. 51b		Optional Two-Piece Torque Rod Assembly with Bushings Service Kit			
	72000-XXX	Front, Specify Length in mm	1		60218-000	ULTRA ROD Straddle/Straddle	
	72001-XXX	Rear, Specify Length in mm	1		60215-000	ULTRA ROD Straddle/Taper	
	82XX-XXXX-XXX	*****TRAAX ROD™, Specify Length in mm	1		65781-000	ULTRA ROD PLUS Straddle/Taper	
50		*****One-piece Transverse Torque Rod Assembly, Straddle/Taper, Specify Length in mm	2		65781-001	XTRB Straddle/Straddle	
	62350-XXX	ULTRA ROD, Includes Key Nos. 51a-52a			65781-002	XTRB Straddle/Taper	
	72350-XXX	ULTRA ROD PLUS, Includes Key Nos. 51b-52b		53	22186-000	Torque Rod Frame Bracket	2
	92350-XXX	XTRB, Includes Key Nos. 51c-52c		54	45045-003	Back-up Plate (for Torque Rod)	2
	82XX-XXXX-XXX	*****TRAAX ROD		55	49689-000L	Torque Rod Shim	As Req.
51		Straddle Bushing	4		70867-001	P-80 Lubricant - 10 ml (Not Shown)	per Bushing 1
a	47691-000L	ULTRA BUSHING					
b	64400-002L	ULTRA ROD PLUS					
c	66649-002L	XTRB					

FIGURE 4-1 Outboard Frame Bracket Top View

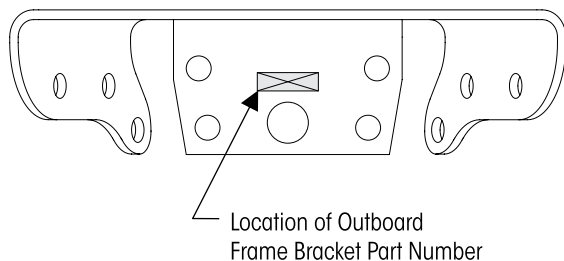
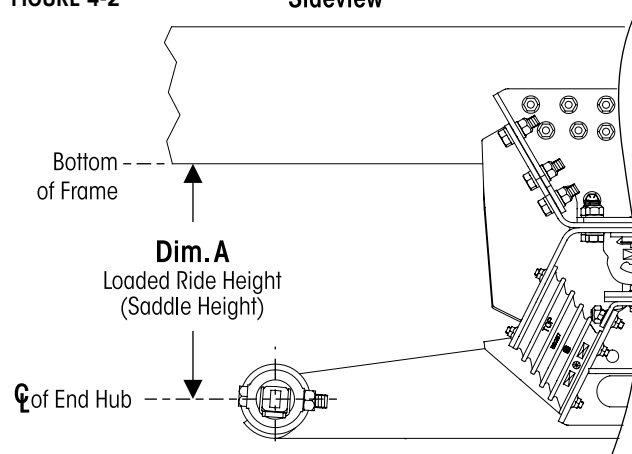


FIGURE 4-2 Sideview



NOTES:

- * Item included in kit / assembly only, part not sold separately.
- ** HAULMAAX 46K suspensions must be serviced with the new tie-bar bolster spring Kit No. 64179-048. All HAULMAAX 40K suspensions can be serviced using the existing bolster springs Kit No. 64179-049 or if preferred a Tie-bar Bolster Spring Kit No. 64179-048. Refer to Hendrickson Technical Bulletin Literature No. SEU-0225 for more information.
- *** For vehicles built prior to January 2003 it will be necessary to replace the saddle assembly with the current production saddle assembly and corresponding outboard frame bracket.
- **** For vehicles built prior to November 2007, Kit No. 57974-046 is required when replacing the load spring contact plate or equalizing beam.
- ***** Transverse torque rods are mandatory for the HAULMAAX suspensions regardless of axle spacing, see Literature No. 59310-004 and 59310-058 for more information.
- ***** Not supplied by Hendrickson, used for reference only. Refer to vehicle manufacturer for more information. Hendrickson is not responsible for components supplied by vehicle manufacturer.
- ***** TRAAX RODS are non-rebushable. The entire torque rod assembly must be replaced.

Hendrickson HAULMAAX / HN Gauge can be obtained online at www.hendrickson-intil.com/Litform

- Literature number 48422-546 – Bolster Spring
- Literature number 48422-590 – Progressive Load Spring

To obtain a new Hendrickson HAULMAAX decal, No. 60905-002, contact Hendrickson.



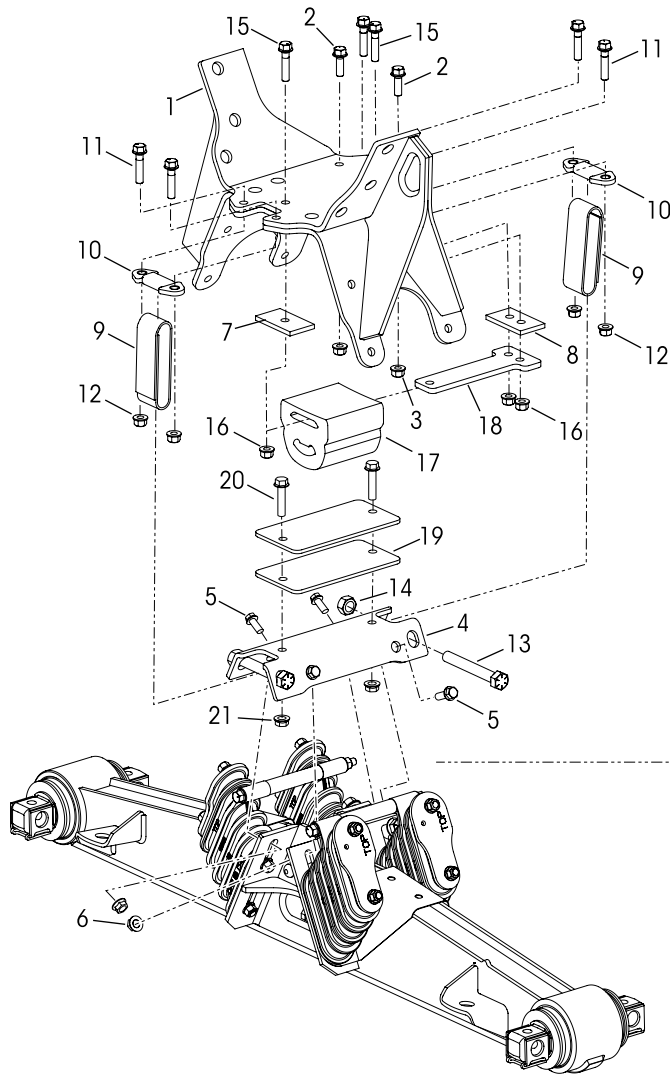
■ Outboard • Inboard Frame Bracket Selection Guides

Key No. 15		Outboard Frame Bracket — Vehicles built after 01/13/03					
Vehicle Manufacturer	Frame Width	Saddle Height = Dim. A in Figure 4-2					
		16½"	17½"	18½"	20¼"	22½"	25½"
Autocar	34"	64595-611	64595-612	64595-613			
CCC		64595-801 <i>replaces</i> 64595-001					
Freightliner	34.3" - 34.5"	64636-001	64636-002	64636-003			
GM	34.75"		64595-701				
International Truck	34.12" - 34.25"	64595-101			64595-105	64595-107	
	34.68" - 34.94"	64595-104		64595-114	64595-106	64595-108	64595-110
Mack	33.5"	64595-301	64595-302	64595-303			
	34.3"		64595-307				
Oshkosh	34"			64595-003			
Paccar		64595-001	64595-002	64595-003	64595-105		
	34.75"	64595-004	64595-005	64595-006			
Volvo	33.5"	64595-301					
Western Star	34"	64595-001	64595-002	64595-003			

Key No. 16			Inboard Frame Bracket					
Vehicle Manufacturer	Frame Width	Equalizing Beam Length	Saddle Height = Dim. A in Figure 4-2					
			16½"	17½"	18½"	20¼"	22½"	25½"
Autocar	34"	All	60617-601	60617-602	60617-603			
CCC			65078-001	65078-002	65078-003			
Freightliner	34.3"-34.5"		60617-501	60617-502	60617-503			
GM	34.75"			60617-701				
International Truck	34.12" - 34.25"		60617-101		60617-104	60617-103		69681-000
	34.68" - 34.94"			60617-201				
International Truck with shim	34.5"				65078-003			
Oshkosh	34"							
Paccar with liner	34", 34.75"		67545-001 <i>replaces</i> 65078-001	67545-002 <i>replaces</i> 65078-002	67545-003 <i>replaces</i> 65078-003			
Paccar without liner	34", 34.75"		65079-001	65079-002	65079-003			
Western Star	34"	60617-501	60617-502	60617-503				
Mack	33.5", 34.3"	52", 60"	64988-311					
		54"	64988-301					
Volvo	33.5"	54"	64988-302					
		52", 60", 72.5"	64988-312					



■ Production Dual Rebound Straps – Outrigger Applications



• Refer to Pages 8 and 9 for equalizing beam part information.

• Refer to Page 11 for Outboard • Inboard Frame Bracket Selection Guides.

KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
		Saddle Assembly Service Kits, One Side,	
	34013-335	HAULMAAX 40K, Includes Key No. 1 and Kit No. 34013-336	
	34013-337	HAULMAAX 46K, Includes Key No. 1 and Kit No. 34013-338	
		Saddle Assembly Fastener Kits, One Side,	
	34013-336	HAULMAAX 40K, Includes Key Nos. 5-6, 11-12, 15-16 (Refer to Page 9 for more information on Key Nos. 12, 22-24)	
	34013-338	HAULMAAX 46K, Includes Key Nos. 5-6, 11-12, 15-16 (Refer to Page 9 for more information on Key Nos. 9-12, 22-24)	
1	79564-000	Saddle Assembly, Vehicles built with Dual Rebound Straps	2
2	60818-001	½"-13 UNC x 1½" Flange Bolt	4
3	60818-002	½"-13 UNC Flange Nut	4
	34013-339	Contact Plate Service Kit, One Side, Includes Key Nos 4-6	
4	59191-004	Load Spring Contact Plate	2
5	67290-001	⅝"-11 UNC x 1½" Flange Bolt	8
6	67291-000	⅝"-11 UNC Flange Nut	8

KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
7	60874-000	3⅜" Load Spring Spacer	2
8	60874-001	3¾" Load Spring Spacer	2
	34013-340	Rebound Strap Service Kit, One Side, Includes Key Nos. 9-14	
9		*Rebound Strap	4
10		*Rebound Clip	4
11	60818-002	½"-13 UNC x 2¼" Flange Bolt	8
12	60819-000	½"-13 UNC Flange Nut	8
13	21867-026	¾"-16 UNF x 5½" Bolt	4
14	30191-000	¾"-16 UNF Locknut	4
	34013-341	Progressive Load Spring Service Kit, One Side, Includes Key Nos. 15-17	
15	60818-002	½"-13 UNC x 2¼" Flange Bolt	6
16	60819-000	½"-13 UNC Flange Nut	6
17		*Progressive Load Spring	2
18	59384-005	Load Spring Bracket	2
19	60791-000	Load Spring Shim ¼" Thickness	4
20	60818-002	½"-13 UNC x 2¼" Flange Bolt	4
21	60819-000	½"-13 UNC Flange Nut	4

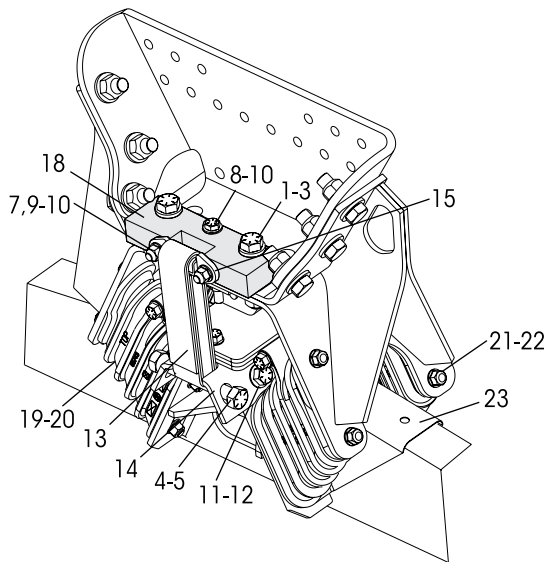


■ **Aftermarket Service Kits**

AFTERMARKET DUAL REBOUND STRAP ENHANCEMENT KIT FOR OUTRIGGER APPLICATIONS

Service Kit No.
64179-046 with Bolster Springs Tandem Set
64179-045 Tandem Set

Reference Lit. No. 59310-048



KEY NO.	PART NO.	DESCRIPTION	KIT QTY.
	64179-046	Rebound Strap Enhancement with Bolster Springs Tandem Set, Includes Key Nos. 1-23	
	64179-045	Rebound Strap Enhancement Tandem Set, Includes Key Nos. 1-18	
1	21867-007	3/4"-16 UNF x 6" Bolt	4
2	30191-000	3/4"-16 UNF Locknut	4
3	22962-001	3/4" Hardened Washer	4
4	50764-016	3/4"-10 UNC x 4" Bolt	4
5	66137-000	3/4"-10 UNC Flange Locknut	4
6	60818-002	1/2"-13 UNC x 2 1/4" Flange Bolt (Not Shown)	4
7	24531-009	1/2"-13 UNC x 4" Bolt	12
8	24531-014	1/2"-13 UNC x 5" Bolt	2
9	60819-000	1/2"-13 UNC Flange Nut	18
10	22962-011	1/2" Hardened Washer	14
11	67290-001	5/8"-11 UNC x 1 1/2" Flange Bolt	8
12	67291-000	5/8"-11 UNC Flange Nut	8
13	57878-017	Rebound Strap	4
14	59191-002	Load Spring Contact Plate	2
15	60612-000	Rebound Clip	2
16	60874-001	Load Spring Spacer (Not Shown)	2
17	68851-001	Inboard Rebound Support Block (Not Shown)	2
18	69026-000	Outboard Rebound Support Block	2
19		*Tie-bar Bolster Spring	8
20	65742-000	Bolster Spring Spacer	4
21	60818-003	1/2"-13 UNC x 10" Flange Bolt	4
22	60819-000	1/2"-13 UNC Flange Nut	36
23	64890-000	Wear Plate	4

AFTERMARKET SHOCK ABSORBER SERVICE KITS

Service Kit Nos. Saddle Ht. | For equalizing beams not equipped with lower shock mount

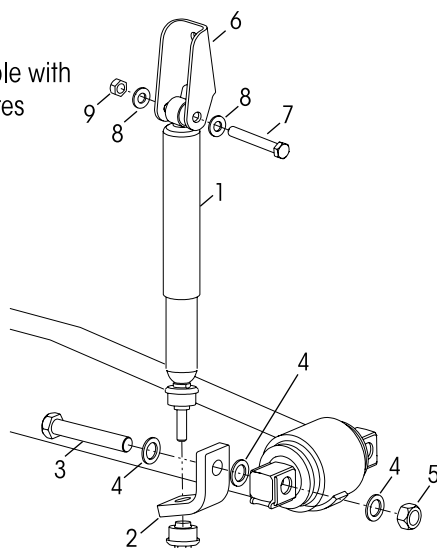
64178-003 16 1/2"

64178-004 17 1/2" / 18 1/2"

64178-009 16 1/2" (Mack)

Reference Lit. No. 59310-012

NOTE:
 Not available with 315 mm tires



KEY NO.	PART NO.	DESCRIPTION	KIT QTY.
	64178-003	Shock Absorber Service Kit, Tandem Set 16 1/2" Saddle Height, Includes Key Nos. 1a, 2a-b, 3-9	
	64178-004	17 1/2"/18 1/2" Saddle Height, Includes Key Nos. 1b, 2a-b, 3-9	
	64178-009	16 1/2" Saddle Height - Mack Only, Includes Key Nos. 1c, 2c, 3-9	
1		Shock Absorber Assembly	4
a	60680-004L	16 1/2" Saddle Height	
b	60680-005L	17 1/2"/18 1/2" Saddle Height	
c	60680-006L	16 1/2" Saddle Height - Mack	
2		Lower Shock Bracket	
a	64148-001	Front	2
b	64148-002	Rear (Not Shown)	2
c	64835-000	Mack Only, Front and Rear (Not Shown)	4
3	48941-006	1"-8 UNC x 7" Hex Bolt, <i>Replaces 48941-001</i>	4
4	22962-008	1" Hardened Washer	12
5	48942-000	1"-8 UNC Locknut	4
6	64146-000	Upper Shock Bracket	4
7	32043-005	5/8"-11 UNC x 4 1/2" Hex Bolt	4
8	22962-004	5/8" Hardened Washer	8
9	47764-000	5/8"-11 UNC Locknut	4

SECTION 5 Special Tools

BAR PIN END BUSHING TOOLS

INSTALLATION TOOL

Hendrickson Part No. 66086-103
OTC Part No. 1757 Visit otctools.com

Use with the equalizing beam removed from the truck, and in conjunction with OTC No. 51100 press plate and a 100 ton hydraulic shop press.



REMOVAL TOOLS

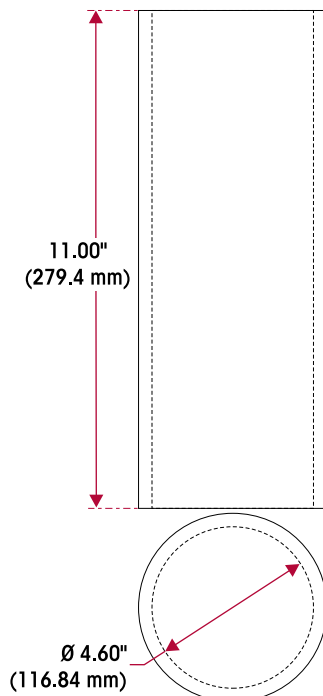
Hendrickson Part No. 66086-104
OTC Part No. 206457 Visit otctools.com



Hendrickson Part No. 66086-105
OTC Part No. 302030 Visit otctools.com



This shop made tool is made from cold rolled steel or equivalent. The drawing is for reference only. Hendrickson does not supply this tool.





TORQUE ROD BUSHING FUNNEL TOOLS

ULTRA ROD

Hendrickson Part No. 66086-001L

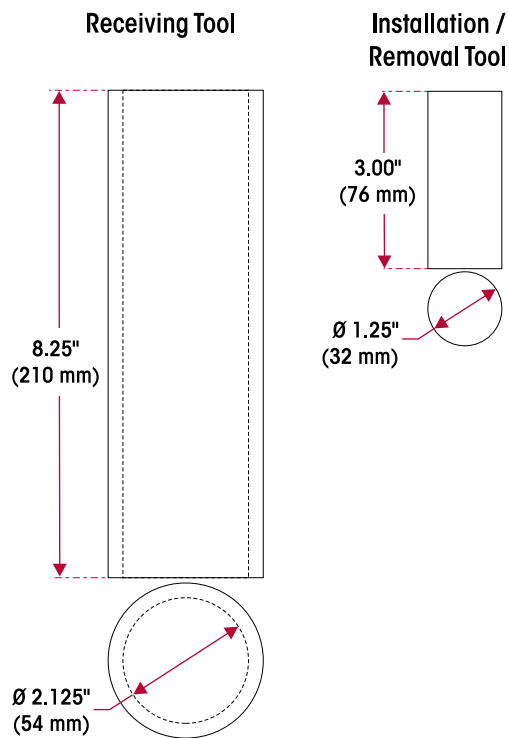
ULTRA ROD PLUS

Hendrickson Part No. 66086-000L

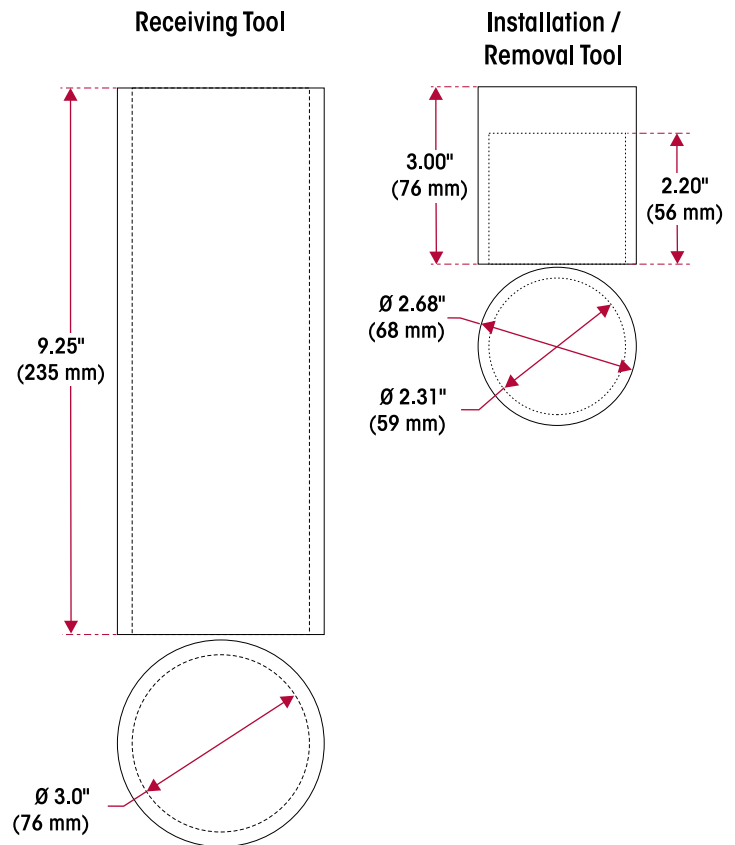


These shop made tools are designed for the torque rod bushings. Bushing tools are to be made from cold rolled steel or equivalent. Drawing is for reference only. Hendrickson does not supply this tools.

ULTRA ROD BUSHING



ULTRA ROD PLUS AND XTRB BUSHING





SECTION 6 Preventive Maintenance

Following appropriate inspection procedures is important to help ensure the proper maintenance and operation of the suspension system and component parts. Hendrickson recommends the HAULMAAX heavy-duty rear suspension be inspected at pre-delivery, the first 1,000 miles and at the regular preventive maintenance intervals. Off-highway and severe service operating conditions require more frequent inspections than on-highway service operation. Inspection must include the following items and other components referenced in this section.

PROGRESSIVE LOAD SPRING PRE-DELIVERY INSPECTION



THE HAULMAAX SUSPENSION MUST BE EQUIPPED WITH AT LEAST ONE (1) LOAD SPRING SHIM ON EACH SIDE OF THE SUSPENSION. FAILURE TO DO SO CAN CAUSE PREMATURE COMPONENT WEAR, EQUALIZING BEAM MISALIGNMENT, ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

Check for proper use of progressive load spring shims (minimum of one (1) shim and maximum of four (4) shims), which is dependent on the following criteria:

- For applications where increasing stability is required, equally install additional shims per side. This may eliminate any gap between the load spring and the top load spring shim which is acceptable. Refer to the Alignment & Adjustments Section of this publication.

HENDRICKSON RECOMMENDED INSPECTION INTERVALS	PRE-DELIVERY INSPECTION	FIRST IN-SERVICE INSPECTION	PREVENTIVE MAINTENANCE
Inspect load springs, rebound straps, wear plates and bolster springs / tie-bar bolster springs.	Within the first 100 miles (160 km)	Within the first 1,000 miles (1,600 km) or 100 hours	Every 3 months / 600 hours
Inspect the equalizing beam end connections			Every 6 Months / 1200 Hours or 25,000 miles (40,000 km)
Visually inspect for proper assembly and function. Check for all of the following and replace components as necessary. <ul style="list-style-type: none"> • Signs of unusual movement, loose or missing components • Signs of abrasive or adverse contact with other components • Damaged, bent or cracked parts 			Every 12 Months / 2400 Hours
Inspect fasteners for proper torque as recommended in the Torque Specification Section of this publication with special attention to the following suspension connections: <ul style="list-style-type: none"> • Saddle to the outboard frame bracket connection • Equalizing beam end connections • Inboard frame bracket to the cross member connections • Load spring contact plate to equalizing beam assembly connections 			
Verify the lateral alignment of axles are within the vehicle manufacturer's tolerances			



COMPONENT INSPECTION

Following the appropriate inspection procedures is important to help ensure the proper maintenance and operation of the HAULMAAX suspension system and component parts. Look for bent or cracked parts. Replace all worn or damaged parts.

- **Equalizing beam assembly** — Check the overall condition of the equalizing beam for dents, dings, or other damage. Check the equalizing beam end connections for tearing or extreme bulging. Check for any metal-to-metal contact in the bushed joints, see Equalizing Beam End Connection Section of this publication.
- **Fasteners** — Look for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to a torque value within the specified torque range. See recommended torque specifications for Hendrickson supplied fasteners in Torque Specification Section of this publication. For fasteners not supplied by Hendrickson, see vehicle manufacturer. Use a calibrated torque wrench to check torque in the tightening direction. As soon as the fastener starts to move, record the torque. Correct the torque if necessary.

NOTE

Hendrickson recommends the use of Grade 8 bolts, hardened flat washers, and Grade C locknuts. Washers are not necessary when flange head fasteners are used.

- **Frame brackets** — Look for any signs of wear and damage.
- **Bolster springs / tie-bar bolster springs, load springs, and rebound straps** — See the Bolster Springs, Load Springs – Progressive or Auxiliary, and Rebound Straps in this section.
- **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.
- **Shock absorbers** (if equipped) — Look for any signs of dents or leakage, see Shock Absorbers in this section.
- **Torque rods** — All torque rods must be inspected every six (6) months for looseness, torn or shredded rubber, bushing walk-out, and for proper fastener torque. If there is metal-to-metal contact in the bushing joint, this is a sign of excessive bushing wear and the bushing needs to be replaced.
- **Wear and damage** — Inspect all parts of the suspension for wear and damage. Look for bent or cracked parts.
- **Wear plates** — Look for any signs of wear and damage, see Wear Plates in this section.

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

LONGITUDINAL AND TRANSVERSE TORQUE RODS



WARNING

THE HAULMAAX SUSPENSION INCORPORATES 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 AND POSSIBLE TIRE CONTACT WITH THE FRAME. OPERATING A VEHICLE WITH NON-FUNCTIONAL TRANSVERSE TORQUE RODS CAN RESULT IN ADVERSE VEHICLE HANDLING, SEVERE PERSONAL INJURY, AND PREMATURE COMPONENT DAMAGE.

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

- **Method 1 — Procedure 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.

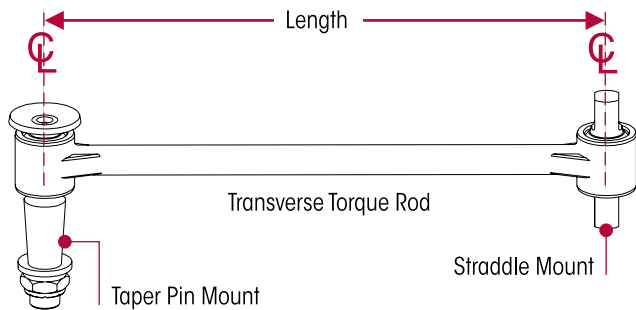
NOTE

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

Visually inspect torque rod bushings for torn or shredded rubber, inspect for bent, cracked or broken torque rods and for end hubs that have an elongated oval shape. The torque rod and or torque rod bushings will require replacement if any of these conditions are encountered.

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 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.

FIGURE 6-1



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

The longitudinal rod is straddle/straddle mount, and **the transverse rod** is straddle mount / taper pin mount, as shown in Figure 6-1.

Whether the torque rod is equipped with straddle or taper pin bushings, (see Figure 6-1) they can be replaced by pressing out the worn bushing and installing a new genuine Hendrickson bushing. Refer to the Torque Rod Bushings Component Replacement Section of this publication for replacement instructions.

BOLSTER SPRINGS

Inspect all four (4) bolster springs on a periodic basis, see Figure 6-2. Actual bolster spring / tie-bar bolster spring service condition and performance may vary depending upon suspension and vehicle configuration, operation, service and other factors.

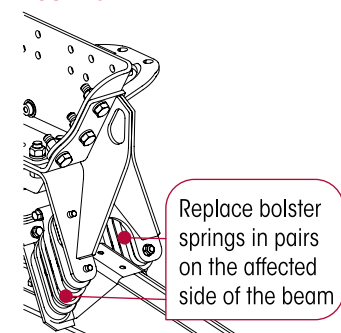
INSPECTION

The following inspection guidelines are intended to assist vehicle operators and maintenance personnel in examining the bolster springs / tie-bar bolster springs and determining when replacements may be needed.

In the event one (1) bolster spring / tie-bar bolster spring on one (1) 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, see Figure 6-2. The new bolster springs will tend to settle to some degree, and return the vehicle to its original condition. The following procedure is recommended for proper inspection.

1. Chock the **FRONT** wheels to prevent movement of the vehicle during inspection of the suspension.
2. Raise the rear of vehicle approximately 4"-5" (just prior to lifting wheels off ground), and support with stands.
3. Inspect all bolster springs using the following criteria. If cuts, splits, or bonding separation are detected in the rubber, measure the depth of the damaged area using a six-inch machinist scale to determine if replacement is required.
 - **Bent, burred or overhanging edges** of the bolster spring metal plates may occur due to mishandling in service. If the rubber is not trapped, and there are no sharp metal edges in contact with the free surface of the rubber, this condition is acceptable.

FIGURE 6-2





- **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. In the unloaded condition, if the bolster spring rubber is swollen beyond the edge of the metal plates, then tie-bar bolster spring replacement is necessary.
- **A Hendrickson HAULMAAX • HN gauge** (Lit. No. 48422-546) is available to help measure the bolster spring for cut or splits and bonding separation, see Figure 6-3.

FIGURE 6-3 HAULMAAX • HN Gauge – Lit. No. 48422-546

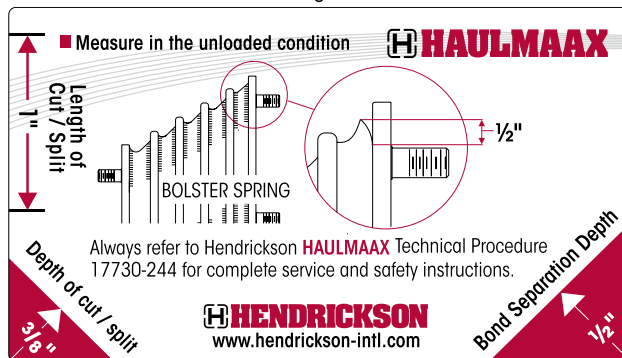
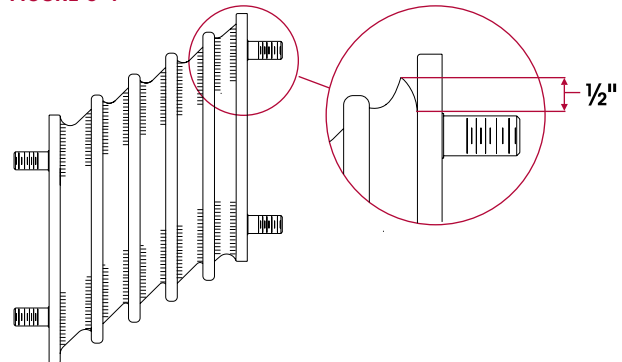


FIGURE 6-4



- **Cuts or Splits** in the rubber of over 1.0" in length and an average depth of 3/8" 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 6-4 as "//////".
- **Bonding separation** of the rubber from a bonded metal surface to a depth of up to 1/2" is acceptable. If any bonding separation is more than 1/2" deep, both bolster springs should be replaced on the affected side of the vehicle (see Figure 6-4). An unloaded bolster spring may be inspected for any bonding separation by measuring at points indicated in Figure 6-4 as "//////". Any thin film or other residual rubber material on the metal plates resulting from the molding process may be ignored during inspection.

LOAD SPRINGS – PROGRESSIVE OR AUXILIARY

A visual inspection of the progressive load spring / auxiliary load spring, see Figure 6-5, is required every three (3) months. If the load spring is damaged or is less than the minimum unloaded height of 3", replace as outlined in the Load Springs – Progressive or Auxiliary Component Replacement Section of this publication.

- **A Hendrickson HAULMAAX Gauge** (Lit. No. 48422-590) is available to help measure the load spring minimum height, to be used with an 3/8" extension, see Figure 6-6.

FIGURE 6-5

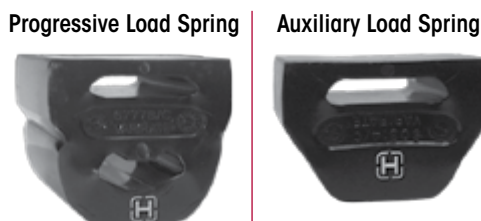
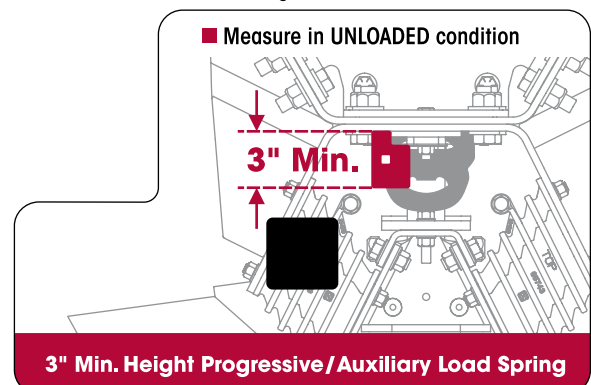


FIGURE 6-6 HAULMAAX Gauge – Lit. No. 48422-590



- **Progressive load spring** — Unloaded normal height is 4¼", if the height of an unloaded progressive load spring decreases to 3.0" or less, replacement is required, see Figure 6-7.
- **Auxiliary load spring** — Unloaded normal height is 3¾", if the height of an unloaded auxiliary load spring decreases to 3.0" or less, replacement is required, see Figure 6-8.

FIGURE 6-7

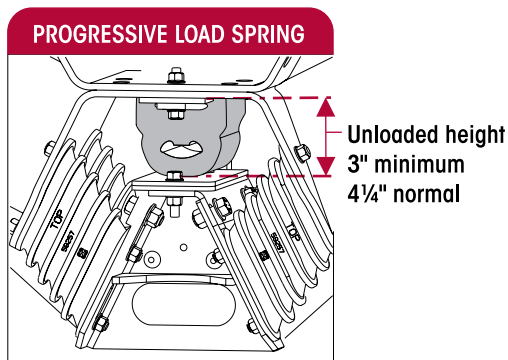
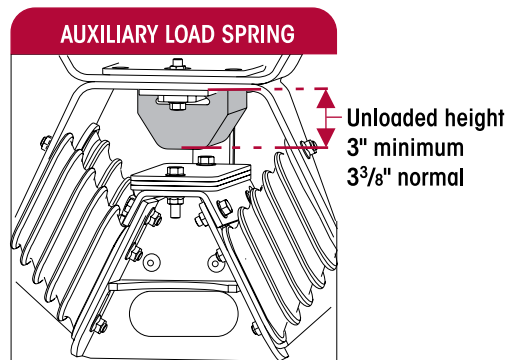


FIGURE 6-8



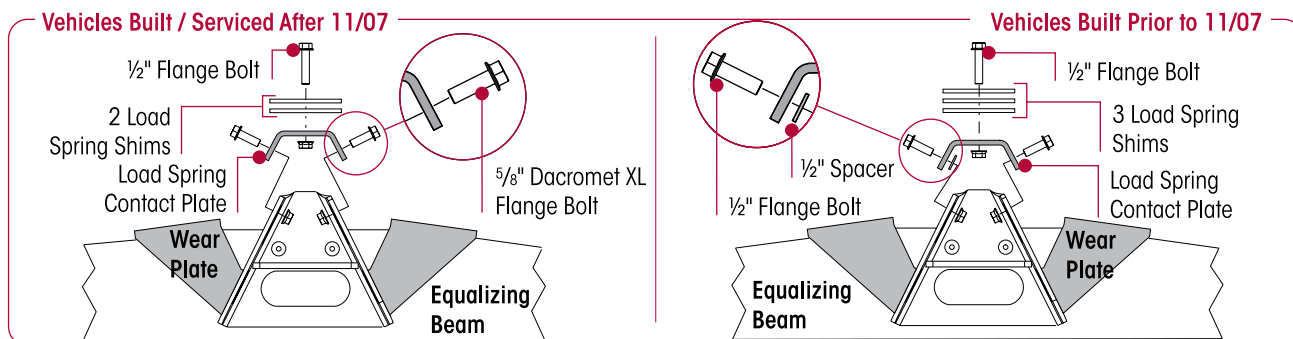
WEAR PLATES

The wear plate is a formed stainless steel component located between the bolster springs / tie-bar bolster springs and the equalizing beam, see Figure 6-9. The function of the wear plate is to prevent chafing of the equalizing beam by the bolster springs / tie-bar bolster springs during certain operational maneuvers. If the wear plate is cracked or worn through, replace as outlined, see Bolster Springs in the Component Replacement Section of this publication.

NOTE

Vehicles manufactured from November 2003 through November 2007 require the installation of load spring contact plate spacers between the contact plate and the equalizing beam, see Figure 6-9.

FIGURE 6-9



REBOUND STRAPS

The rebound strap helps prevent the overextension of the bolster springs / tie-bar bolster springs during normal vehicle operation. If the rebound strap is torn, frayed or not intact, replace as outlined in the Standard Rebound Straps or the Production or Aftermarket Dual Rebound Straps Component Replacement Section of this publication.

EQUALIZING BEAM END CONNECTION

NOTE

The equalizing beam end connections require that the fasteners are 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.

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, 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 operation.

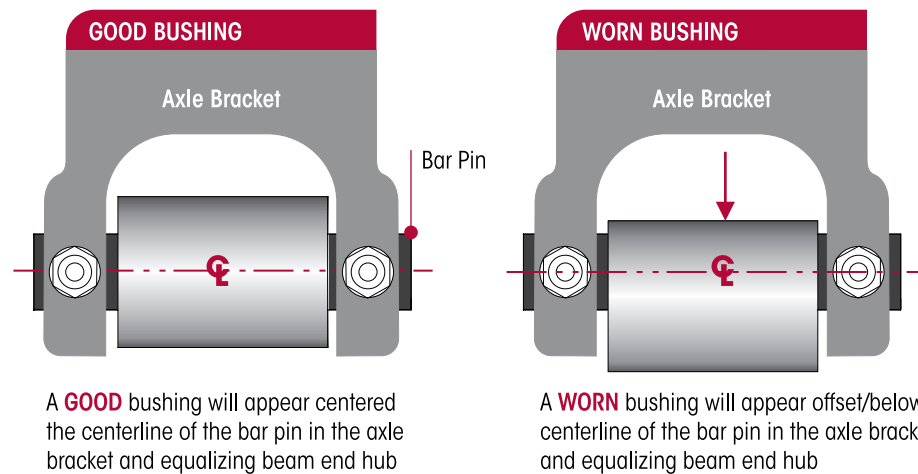
VISUAL INSPECTION

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 the movement is detected, refer to the bar pin fastener re-torque in the Equalizing Beam Component Replacement Section.
 - 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, see Figure 6-10.
- Look for the equalizing beam to be lower in the axle bracket, see Figure 6-10.
- If the bar pin beam end bushing is visually offset a floor jack test should be performed. See Physical Inspection.

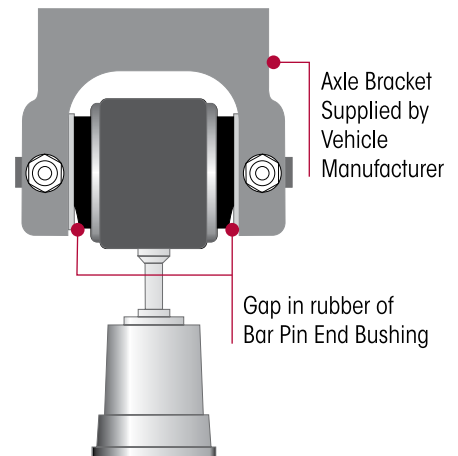
FIGURE 6-10

PHYSICAL INSPECTION
NOTE

The gap at each side of the visible rubber on the lower part of the bar pin end bushing is normal, see Figure 6-11, it is not an indication to replace the bushing. 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.

WARNING

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

1. Place a floor jack under each beam end as shown. Raise the floor jack to check for movement in the connection or rubber components, see Figure 6-11.

FIGURE 6-11




2. If 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 Bar Pin End Bushing Component Replacement Section of this publication.

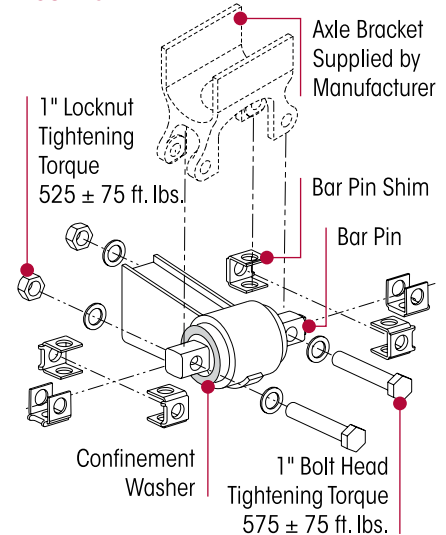
3. Check and record torque values, as received, for each 1" bar pin fastener, see Figure 6-12. Ensure all fasteners are tightened to the following:

- At the locknuts tighten to 525 ± 75 foot pounds torque or
- At the bolt head tighten to 575 ± 75 foot pounds torque

4. Recheck equalizing beam end connections for signs of looseness.

- Inspect alignment shims in equalizing beam end for looseness. Lightly tap on the alignment shims to see if they can be moved. If the movement is detected, refer to the bar pin fastener re-torque in the Equalizing Beam Component Replacement Section.
- Inspect equalizing beam end connection for signs of excessive wear or looseness.

FIGURE 6-12



NOTE

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

5. If bar pin bushing looseness is still detected, **DO NOT** operate the vehicle. One or more components will require replacement, see Component Replacement Section of this publication.

AXLE BRACKET

FIGURE 6-13
SIDEVIEW

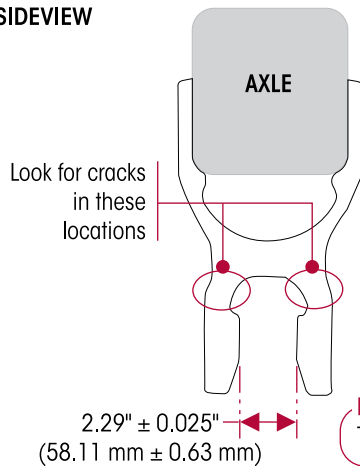
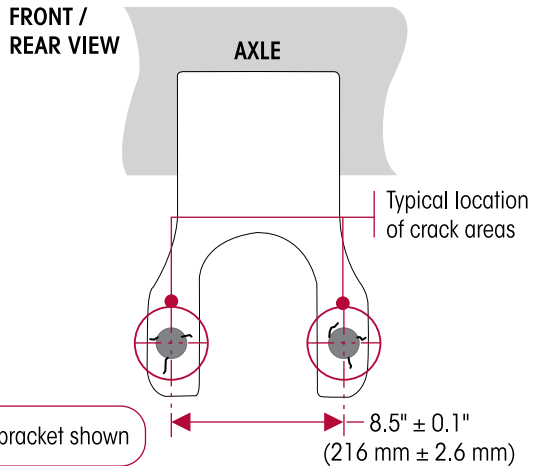


FIGURE 6-14
FRONT / REAR VIEW



NOTE
Typical axle bracket shown

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

- **Visual Inspection** — when inspecting the equalizing beam end connection also inspect the axle brackets for damage or cracks, see Figure 6-13. Any axle bracket that is found damaged or cracked must be repaired or replaced.



- **Physical Inspection** — When an equalizing beam is removed for repair, or an inspection of the equalizing beam end connection reveals movement:
 - Inspect the axle brackets for damage or cracks in the locations shown in Figures 6-13 and 6-14. Any axle bracket that is found damaged or cracked must be repaired or replaced.
 - Measure the distance between the axle bracket legs for correct width, refer to Figures 6-13 and 6-14 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.

BAR PIN END BUSHINGS

VISUAL INSPECTION

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

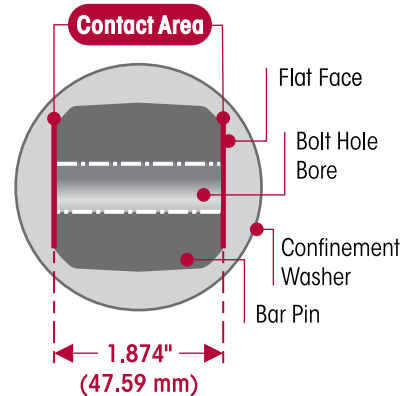
- If the contact area, see Figure 6-15 (the flat face area where bar pin contacts the axle bracket) reveal signs of excessive wear. A bar pin thickness measurement of less than 1.874" (47.59 mm).
- If the bar pin bolt holes bores reveal signs of elongation or wear, see Figure 6-15.

BAR PIN SHIMS

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

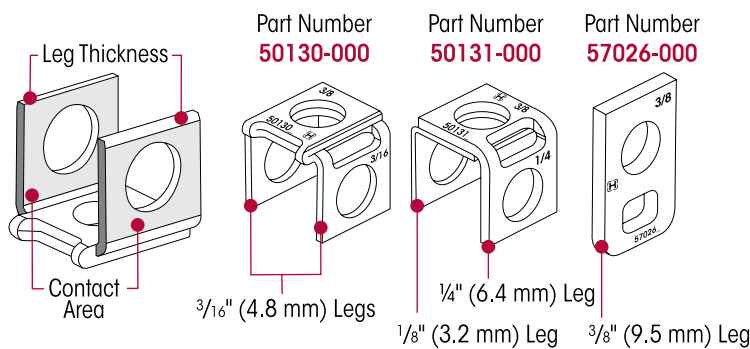
- Visual inspection of contact area on the shim reveals signs of excessive wear.
- The thickness of any single leg on the shim, is less than the measurement shown in Figure 6-16, replacement of bar pin shim is required.

FIGURE 6-15
Shim Type Bar Pin End Bushing



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

FIGURE 6-16



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

SHOCK ABSORBERS (if equipped)

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

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

Inspection of the shock absorber can be performed by doing a heat test, and a visual inspection. For instructions on shock absorber replacement see the Component Replacement Section of this publication.

NOTE **Tractor and Logging applications** — Shock absorbers are mandatory in tractor and logging applications. The flexibility of the HAULMAAX suspension allows customers to specify the suspension with or without shock absorbers. In many applications, the use of shock absorbers minimizes wheel hop and can improve ride and traction. Ride performance can be subjective and may be dependent on many factors beyond the suspension design, such as cab suspension, road conditions, body/auxiliary equipment, frame specifications, etc.

Based on testing and field experience, wheel hop conditions may exist in tractor and logging applications. Therefore, in order to help minimize wheel hop and improve ride performance, Hendrickson requires that HAULMAAX suspensions used in tractor and logging applications be ordered and operated with shock absorbers.

HEAT TEST INSPECTION

1. Drive the vehicle at moderate speeds on rough road for minimum of fifteen minutes.

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

2. Use an infrared thermometer to check the temperature of the shock absorber. This can also be performed by carefully touching the shock absorber body below the dust cover. Touch the frame to get an ambient reference, see Figure 6-17. A warm shock absorber is acceptable, a cold shock absorber should be replaced.
3. To inspect for an internal failure, remove and shake the suspected shock absorber. Listen for the sound of metal parts rattling inside. Rattling of metal parts can indicate that the shock absorber has an internal failure and the shock absorber should be replaced.

FIGURE 6-17

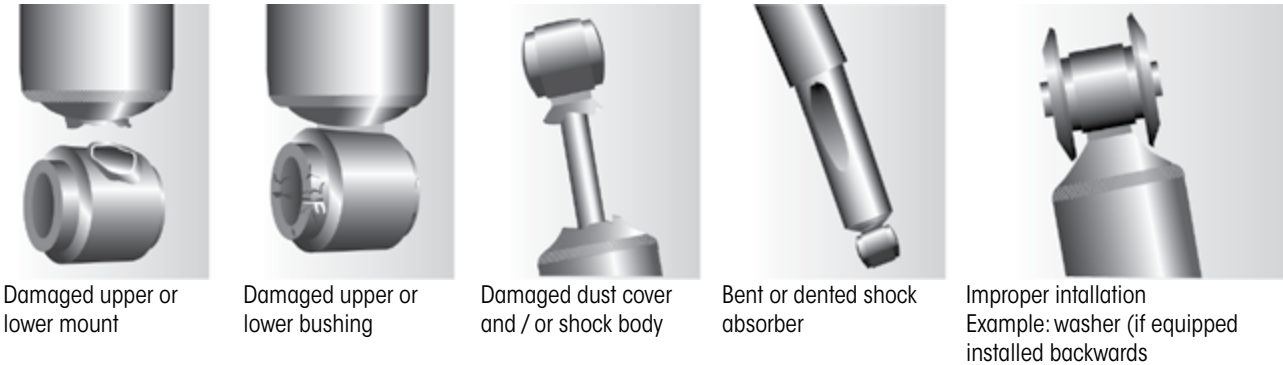


VISUAL INSPECTION

Look for these potential problems, see Figure 6-18, when doing a visual inspection. Inspect the shock absorbers fully extended. Replace as necessary.

FIGURE 6-18

SHOCK ABSORBER VISUAL INSPECTION - UNACCEPTABLE CONDITIONS



Damaged upper or lower mount

Damaged upper or lower bushing

Damaged dust cover and / or shock body

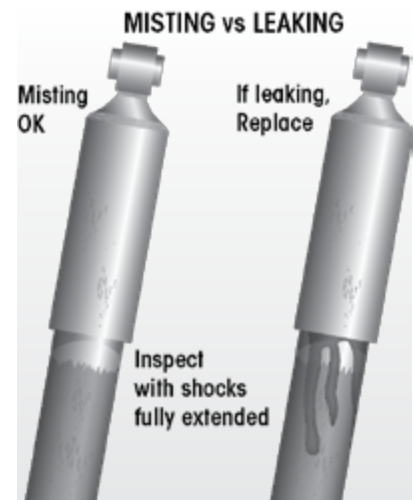
Bent or dented shock absorber

Improper installation
Example: washer (if equipped installed backwards)

LEAKING VS. MISTING SHOCK 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 6-19



NOTE

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

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

SECTION 7

Alignment & Adjustments

The points on the suspension that control alignment are:

- The location of the frame hangers on the frame as installed by the vehicle manufacturer.
- The location of the equalizing beam hangers on the axles as installed by the axle manufacturer or the truck manufacturer.

DRIVE AXLE ALIGNMENT

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

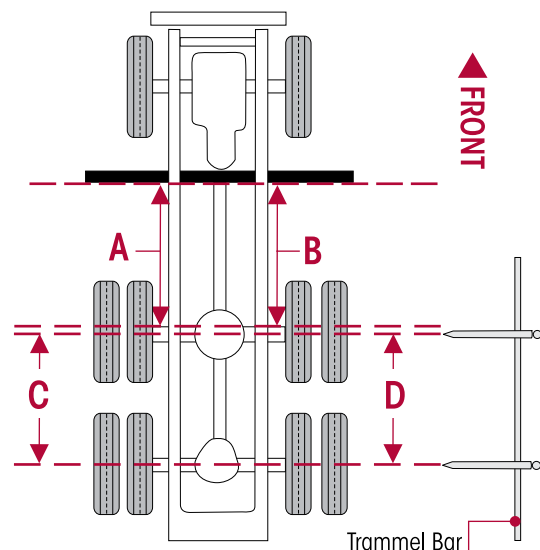
NOTE

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

INSPECTION

1. Use a work bay with a level, flat surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead.
3. **DO NOT** set the parking brake. Chock the **FRONT** wheels of the vehicle.
4. Verify all suspension components are in good condition. Repair or replace any worn or damaged suspension components before proceeding with the alignment process.
5. Ensure all drive axle tires are the same size.
6. Securely clamp a six-foot piece of **STRAIGHT** bar stock or angle iron across the lower frame flange as shown in Figure 7-1. Select a location for the bar stock or angle iron as far forward of the drive axle as possible where components will not interfere.
7. Accurately square the bar stock or angle iron to the frame using a carpenter's square.
8. Using a measuring tape, measure from the straight edge to the forward face of the front drive axle arms on both sides of the vehicle as shown in Figure 7-1, **A** and **B**.
9. Calculate the difference between measurements **A** and **B**.
 - a. If the **front** drive axle is within vehicle manufacturer's specifications, proceed to check the rear drive axle (Step 11).
 - b. If alignment of the **front** drive axle **IS NOT** within the vehicle manufacturer's specifications, then the alignment of this axle **MUST** be corrected **BEFORE** measuring the rear drive axle alignment (Step 11). Correct the alignment of this axle by following the bar pin alignment instructions.

FIGURE 7-1



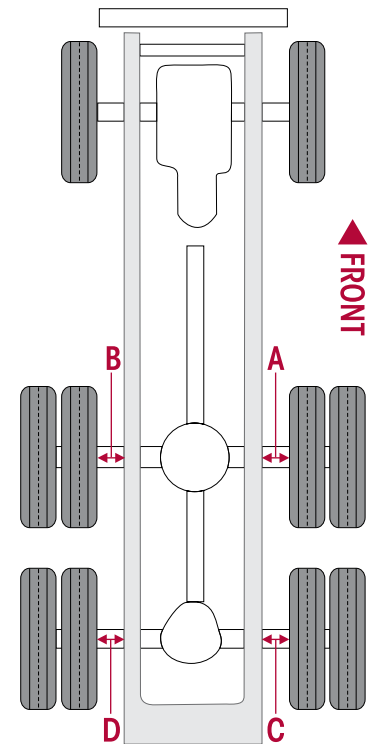
NOTE

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

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

LATERAL ALIGNMENT

1. Use a work bay with a level floor.
2. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used. **DO NOT** set the parking brake.
3. Chock the **FRONT** wheels of the vehicle.
4. Measure from the outside of the frame rail to the rim flange of the inner tire. Record the measurement **A** and **B**, see Figure 7-2.
5. Measure the same distance on the opposite side of the same axle. Record the measurement **C** and **D**, see Figure 7-2.
6. Verify the 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 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 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 Longitudinal and Transverse Torque Rod Section in Preventive Maintenance Section of this publication.

NOTE

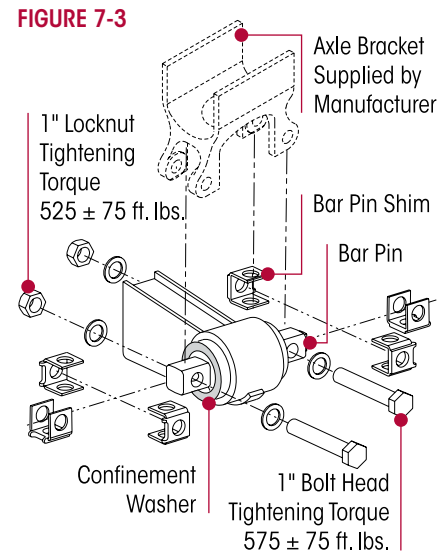
Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts be used for all torque rod attachments.

BAR PIN WITH SHIMS ALIGNMENT

The alignment feature consists of specially designed, tightly tolerance 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 designs 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.



ALIGNMENT ADJUSTMENT PROCEDURE

NOTE

Computerized alignment equipment, such as a Hunter WT100 series, 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 alignment of the drive axles is required, as determined by an alignment inspection procedure, the following steps will need to be performed.

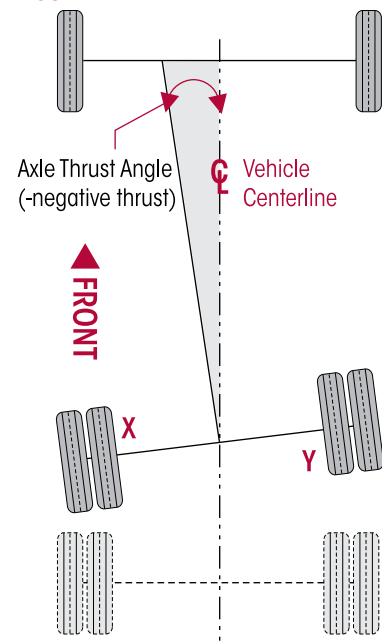
1. Determine direction of axle thrust angle. Figure 7-4 illustrates the forward drive axle with a thrust angle to the left (-negative thrust).

SERVICE HINT

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

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

FIGURE 7-4



SERVICE HINT

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

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.



WARNING

THE 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, IMPROPER ALIGNMENT, DAMAGE OR FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

FIGURE 7-5

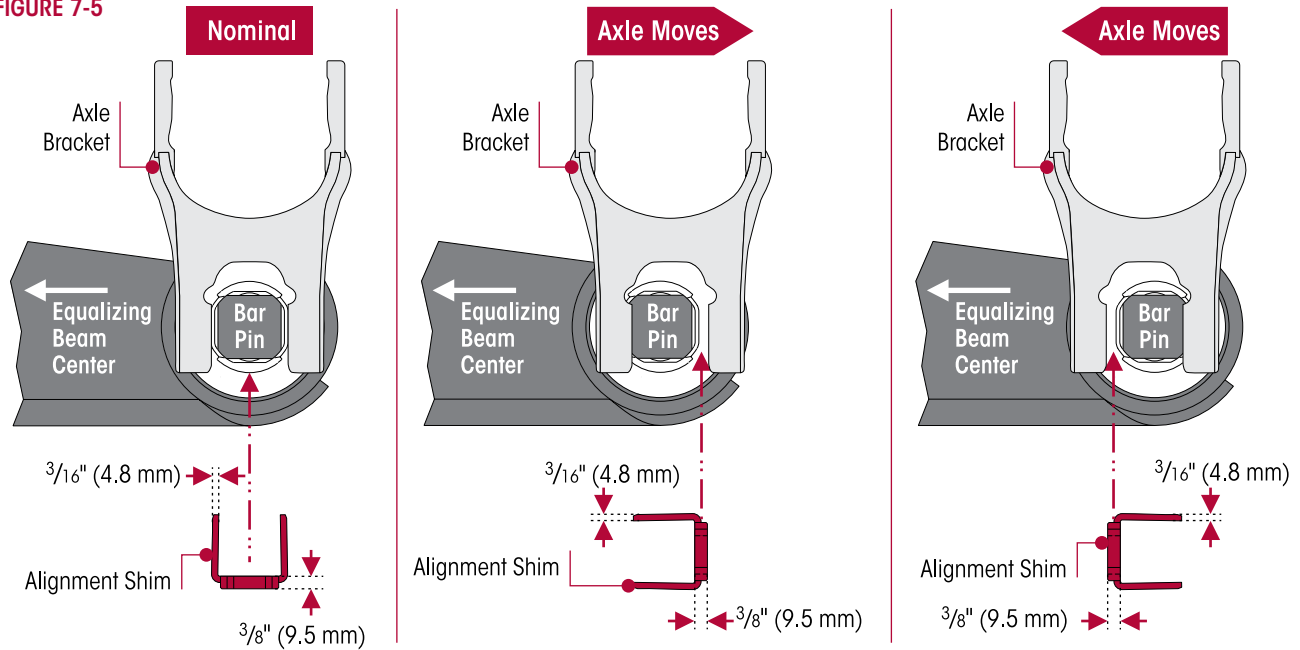


FIGURE 7-6

BAR PIN ALIGNMENT SHIMS

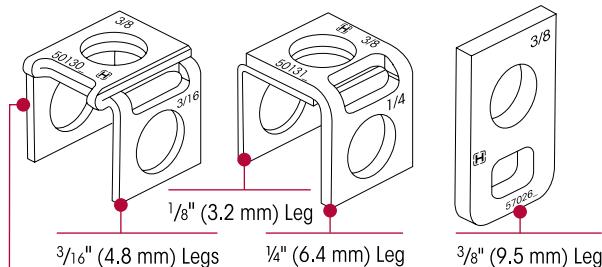
The following service notes will help when performing Hendrickson equalizing beam bar pin alignment

- The standard alignment shims supplied with each suspension (P/N 50130-000) have two $\frac{3}{16}$ " (4.8 mm) legs and a $\frac{3}{8}$ " (9.5 mm) back. Rotating the shim pairs 90° will change the axle alignment in $\pm \frac{3}{16}$ " (4.8 mm) increments.
- If a finer adjustment is required use alignment shim (P/N 50131-000). This alignment shim has one $\frac{1}{8}$ " (3.2 mm) leg, one $\frac{1}{4}$ " (6.4 mm) leg, and a $\frac{3}{8}$ " (9.5 mm) back. A total of $\frac{3}{4}$ " (19 mm) adjustment is achievable to the axle. A $\frac{3}{8}$ " (9.5 mm) flat shim is also available (P/N 57026-000).
- $\frac{1}{16}$ " (1.5 mm) shim thickness increases thrust angle by 0.10°.
- 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.

Part Number
50130-000

Part Number
50131-000

Part Number
57026-000



NOTE

The folded edge in 50130-000 shim must be positioned away from bushing

Example: The alignment equipment shows the front drive axle to have a 0.40° thrust angle to the left. This will require a $\frac{1}{4}$ " (6.4 mm) shim thickness increase to the front side of the left front equalizing beam end bushing. If there is less than $\frac{1}{4}$ " (6.4 mm) of adjustment available at this location then some of the adjustment will have to be made at the rear of the right front end bushing. In this case a $\frac{1}{8}$ " (3.2 mm) shim thickness increase at the front side of the left front bar pin **AND** a $\frac{1}{8}$ " (3.2 mm) shim thickness increase at the rear side of the right front bar pin will correct the 0.40° thrust angle.

3. Chock the wheels of the front axles to prevent vehicle movement during service.
4. Raise the frame of the vehicle to remove the load from the suspension. Support the frame at this height.
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.
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 manufactures tolerance.
10. Set brakes and remove wheel chocks.

LOAD SPRING SHIM EVALUATION

Ride quality is subject to many influences in heavy-duty applications. They include, but are not limited to, body equipment, vehicle suspensions, cab suspension, terrain, chassis/frame specifications, tires/wheels and wheelbase.

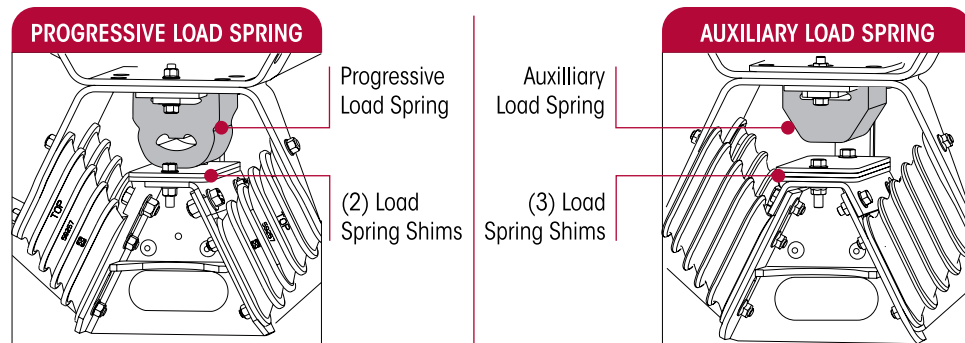
As shown in Figure 7-7, standard production vehicles specified with the HAULMAAX rear suspension are typically equipped with:

- **AFTER** July 2014 - progressive load spring equipped with two (2) load spring shims
- **PRIOR** to July 2014 - auxiliary load spring equipped with three (3) load spring shims

NOTE

With the exception of weight bias vehicles (refer to Hendrickson publication 59310-047), both sides of the vehicle must be equipped with the equal amount of load spring shims. Failure to do so will induce an undesirable vehicle lean.

FIGURE 7-7



ADJUSTMENT NOTES

1. Both sides of the HAULMAAX suspension **MUST** have an equal number of load spring shims, (shim part number 60791-000) in place.

WARNING

THE HAULMAAX SUSPENSION MUST BE EQUIPPED WITH AT LEAST ONE (1) LOAD SPRING SHIM ON EACH SIDE OF THE SUSPENSION. FAILURE TO DO SO CAN CAUSE PREMATURE COMPONENT WEAR, EQUALIZING BEAM MISALIGNMENT, ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

2. The HAULMAAX suspension **MUST** be equipped with at least one (1) load spring shim per side.
3. Some vehicles in the field may be equipped with more or less shims than the standard production assembly.

4. For applications where increasing stability is required, equally install additional shims per side. This may eliminate any gap between the load spring and the top load spring shim which is acceptable.
 - For suspensions equipped with **progressive load springs**, use a maximum of four (4) load spring shims and a minimum of one (1).
 - For suspensions equipped with **auxiliary load springs**, use a maximum of five (5) load spring shims and a minimum of one (1)
5. After determining the proper amount of shims required, install or remove the shims as needed.

LOAD SPRING SHIM ADJUSTMENT

The unladen tandem weight with the body and equipment installed will influence the number of load spring shims necessary to achieve optimal ride quality and stability.

DISASSEMBLY

1. Chock the **FRONT** wheels of the vehicle.
2. Remove the fasteners that attach the load spring shims to the load spring contact plate, see Figure 7-8.

SERVICE HINT

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

ASSEMBLY



WARNING

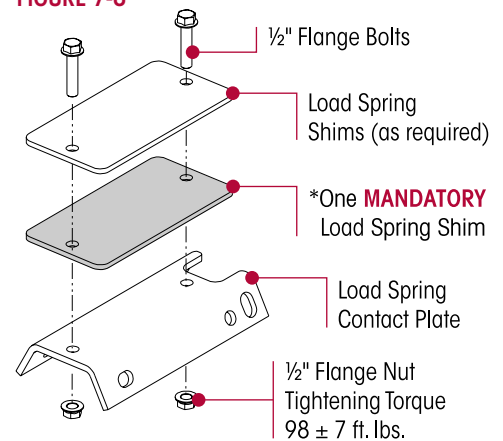
THE HAULMAAX SUSPENSION MUST BE EQUIPPED WITH AT LEAST ONE (1) LOAD SPRING SHIM ON EACH SIDE OF THE SUSPENSION. FAILURE TO DO SO CAN CAUSE PREMATURE COMPONENT WEAR, EQUALIZING BEAM MISALIGNMENT, ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

SERVICE HINT

The number of exposed threads on the flange bolts varies with the amount of shims installed. Ensure there is at least three (3) threads exposed past the locknut.

1. Install or remove load spring shims as needed:
 - For suspensions equipped with **progressive load springs**, use a maximum of four (4) load spring shims and a minimum of one (1)
 - For suspensions equipped with **auxiliary load springs**, use a maximum of five (5) load spring shims and a minimum of one (1)
2. Install the fasteners that attach the load spring shims to the load spring contact plate and tighten to 98 ± 7 foot pounds torque, see Figure 7-8.
3. Lower the frame (If the vehicle was raised for disassembly).
4. Remove wheel chocks.

FIGURE 7-8



NOTE

*One mandatory Load spring shim must be equipped on each side of the suspension.

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 torque specifications listed in the vehicle manufacturer's service manual.

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.

OUTBOARD FRAME BRACKET

NOTE

The outboard frame bracket on vehicles built prior to January 13, 2003 are no longer offered by Hendrickson. See outboard frame bracket and saddle assembly conversion kits in the Parts List Section of this publication.

DISASSEMBLY

1. Chock the **FRONT** wheels of the vehicle.
2. Remove the fasteners from the outboard frame bracket and saddle assembly, see Figure 8-1.
3. Raise the frame enough to allow a ½" gap between the saddle assembly and the outboard frame bracket.
4. Remove the frame fasteners, see manufacturer's guidelines.
5. Remove the fasteners and inboard spacer (if equipped) from the outboard frame bracket and inboard frame bracket, see Figure 8-2.
6. Remove the outboard frame bracket.

ASSEMBLY

1. Mount the new outboard frame bracket to the frame.
2. Install the frame fasteners per the vehicle manufacturer's.
3. Install the fasteners into the outboard and inboard frame bracket assembly and inboard spacer (if equipped) and tighten to torque specifications, see Figure 8-2.
 - 5/8" Locknuts, tighten to \mathbb{E} 200 ± 10 foot pounds torque
 - M16 locknuts, tighten to vehicle manufacturer's specifications
4. Completely lower the vehicle.
5. Install the M20 fasteners into the saddle assembly and outboard frame bracket.
6. Tighten the four (4) vertical fasteners first then the remaining six (6) M20 fasteners to \mathbb{E} 310 ± 30 foot pounds torque, see Figure 8-1.
7. Remove wheel chocks.

FIGURE 8-1

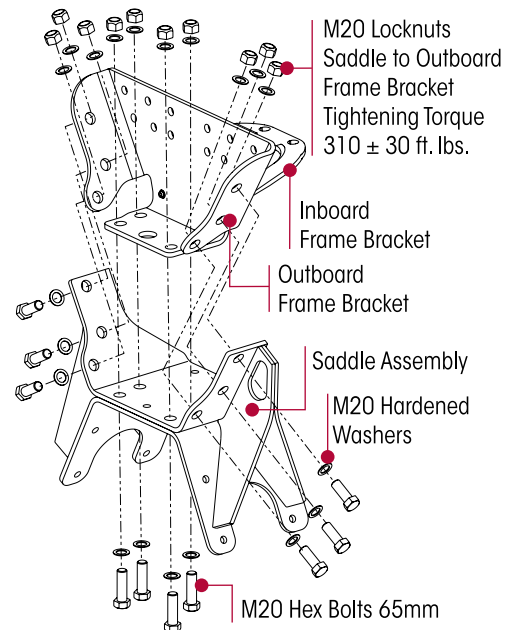
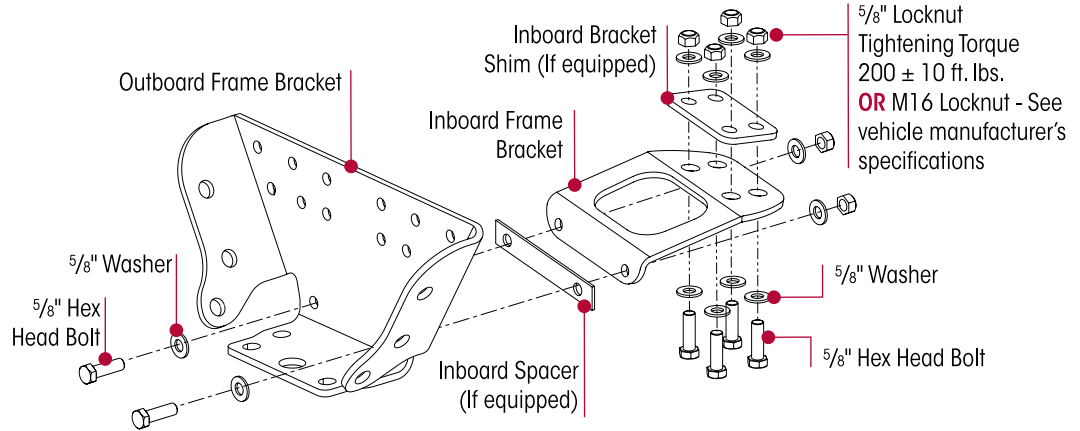




FIGURE 8-2



INBOARD FRAME BRACKET

DISASSEMBLY

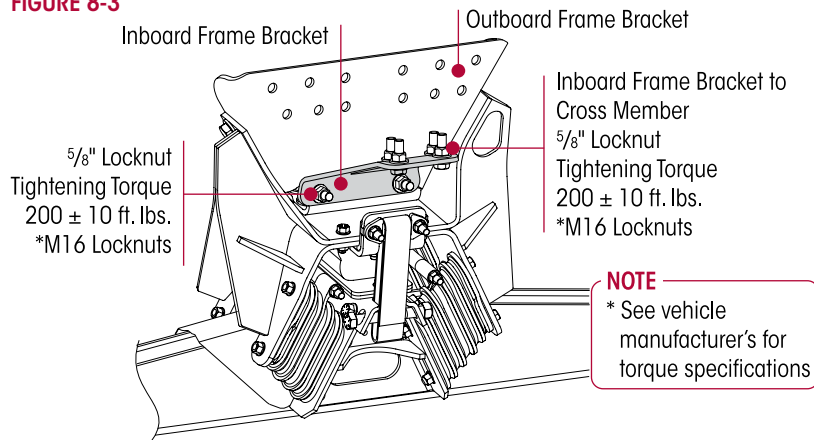
1. Chock the **FRONT** wheels of the vehicle.

NOTE

When servicing the inboard frame bracket to vehicle cross member connection, it is important to remove all weight from the suspension to maintain the frame rail's integrity and vertical position after service.

2. Raise the rear of the vehicle until the suspension is fully extended with the tires completely off the ground. Support the frame at this height.
3. Remove fasteners from the inboard frame bracket to the cross member. Remove inboard bracket shim if equipped.
4. Remove fasteners from the inboard frame bracket to the outboard bracket. Remove inboard spacer if equipped.
5. Remove the inboard frame bracket and inboard spacer (if equipped).


FIGURE 8-3



ASSEMBLY

1. Mount the inboard frame bracket to the vehicle's cross member and snug the fasteners. **DO NOT** tighten at this time.
2. Install the new inboard frame bracket to outboard frame bracket fasteners and inboard spacer (if equipped), and tighten to specifications, see Figure 8-2.
 - 5/8" locknuts tighten to 200 ± 10 foot pounds torque
 - M16 locknuts tighten to vehicle manufacturer's specifications



3. Tighten the fasteners securing the inboard frame bracket to the vehicle manufacturer's cross member, see Figure 8-3.
 - 5/8" locknuts tighten to  200 ± 10 foot pounds torque
 - M16 locknuts tighten to vehicle manufacturer's specifications
4. Remove the frame supports.
5. Remove the wheel chocks.

SADDLE

NOTE

When changing both saddle assemblies, simultaneously perform the following replacement steps on both sides of the vehicle. See Parts List Section of this publication for service kits available for saddle assembly replacement.

DISASSEMBLY

SERVICE HINT

Replacement may be facilitated by servicing both sides of the suspension.

1. Chock the **FRONT** wheels of the vehicle.
2. From the inboard side of the saddles, remove and discard 1/2" upper fasteners from the rebound clip and load spring bracket, see Figure 8-4. Remove the rebound clips.
3. Loosen, **DO NOT** remove, the upper 1/2" flange head locknuts connecting the bolster springs / tie-bar bolster springs to the saddle assembly.
4. Remove the lower 1/2" flange head locknuts that connects the bolster springs / tie-bar bolster springs to the equalizing beam.
5. Remove and discard the upper shock absorber fasteners (if equipped), from the upper shock brackets. Push the shock absorbers down and clear of the upper shock brackets.
6. Remove and discard the 5/8" or 1/2" fasteners from the load spring contact plate and equalizing beam, see Figure 8-4.

SERVICE HINT

Disconnecting the transverse torque rods will help with bolster spring alignment during disassembly and assembly.

7. Disconnect the transverse torque rods from the frame, and take note of any shims that may be removed.
8. Raise the rear of the vehicle frame just high enough to remove any contact between the load spring and the top of the load spring contact plate.
9. Remove the load spring contact plates.
10. Remove the three (3) 1/2" fasteners that attach the rebound support angle to the saddle. Remove the rebound support angle and load spring, see Figure 8-4.
11. Continue to raise the rear of the vehicle frame until the bolster springs just clear the equalizer beams. **DO NOT** over raise the frame.
12. Support the rear of the vehicle frame at this height.
13. Remove and discard the upper 1/2" flange head locknuts connecting the bolster springs to the saddle assembly, see Figure 8-5, and lower the bolster springs and wear plates back into the beam slots.



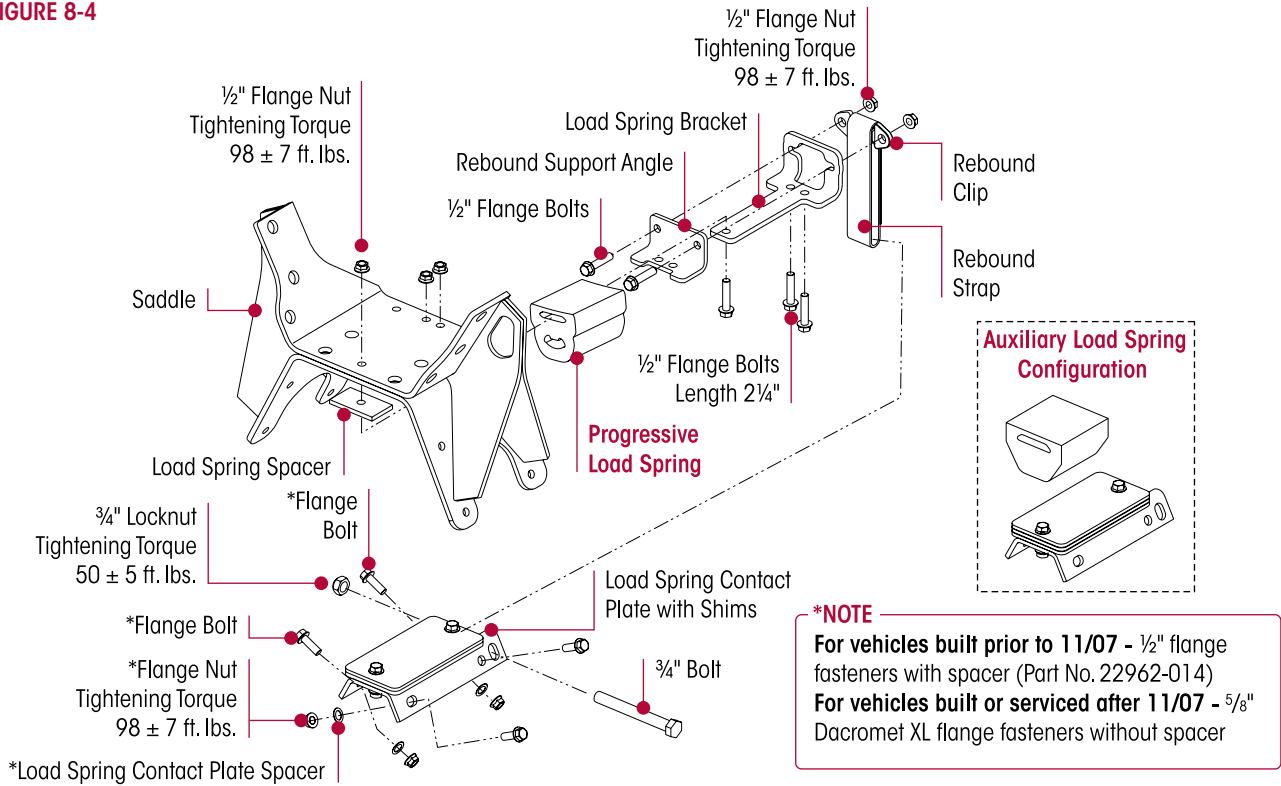
WARNING

THE WEIGHT OF THE SADDLE IS APPROXIMATELY 70 POUNDS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

14. Remove and discard the M20 fasteners that attach the saddle to the outboard frame bracket, see Figure 8-6.
15. Remove the saddle from the vehicle.



FIGURE 8-4



ASSEMBLY

SERVICE HINT

Replacement may be facilitated by servicing both sides of the suspension.

1. Mount the new saddle against the outboard frame bracket.
2. Install the M20 fasteners into the saddle assembly and outboard frame bracket.
3. Tighten the four (4) vertical fasteners first then the remaining six (6) M20 fasteners to \mathbb{R} 310 \pm 30 foot pounds torque, see Figure 8-6.
4. Mount the load spring group: progressive / auxiliary load spring, load spring bracket, rebound support angle, and load spring spacer to the saddle by installing the 1/2" flange head bolts, see Figure 8-4. Tighten to \mathbb{R} 98 \pm 7 foot pounds torque.
5. Mount the bolster springs / tie-bar bolster springs to the saddle and loosely install the 1/2" flange head locknuts on the bolster spring studs. **DO NOT** tighten at this time.
6. If equipped with a tie-bar bolster spring, install the tie-bar bolt from the outboard side. Install the bolt through the outboard bolster mount, the tie-bar sleeve and the inboard bolster mount. Install the tie-bar locknut and tighten to \mathbb{R} 98 \pm 7 foot pounds torque.



IF THE WEAR PLATES LOCATED BETWEEN THE EQUALIZING BEAM AND THE BOLSTER SPRINGS/TIE-BAR BOLSTER SPRINGS ARE DAMAGED, THEY MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE DAMAGE TO MATING COMPONENTS.

7. Verify the wear plates are on the lower bolster spring studs.
8. Remove the frame supports and lower the vehicle, guiding the lower bolster spring studs into the wear plates and equalizing beam mounting slots. Ensure bolster spring studs sit at the bottom of the mounting slots on the equalizing beam, see Figure 8-5.
9. Install the lower 1/2" flange head locknuts on the bolster spring studs and tighten both upper and lower bolster spring fasteners to \mathbb{R} 98 \pm 7 foot pounds torque.
10. Mount the load spring contact plate on the equalizing beam by installing the fasteners. Tighten to \mathbb{R} 98 \pm 7 foot pounds torque, see Figure 8-7.



FIGURE 8-5

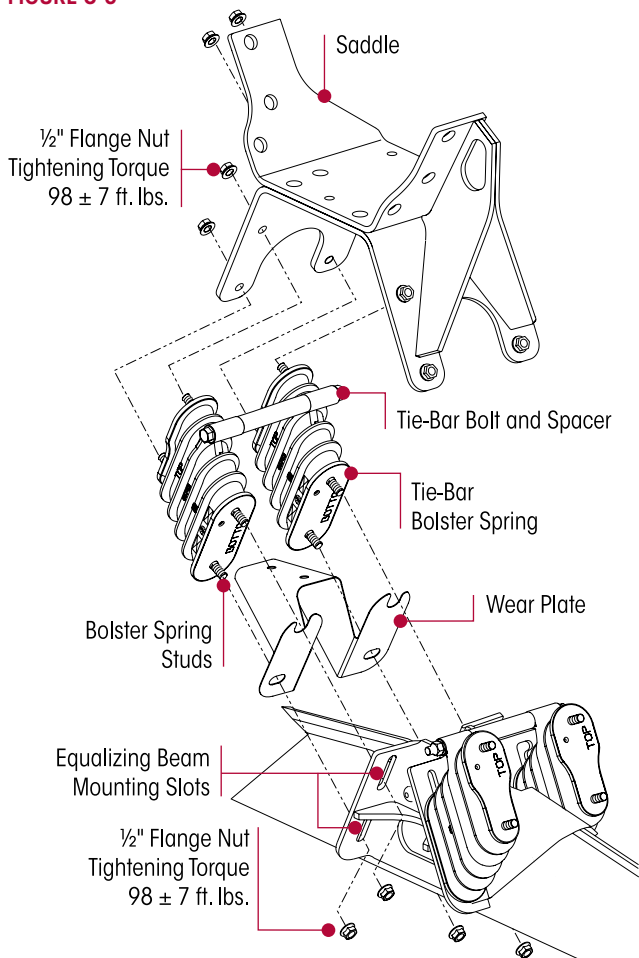


FIGURE 8-6

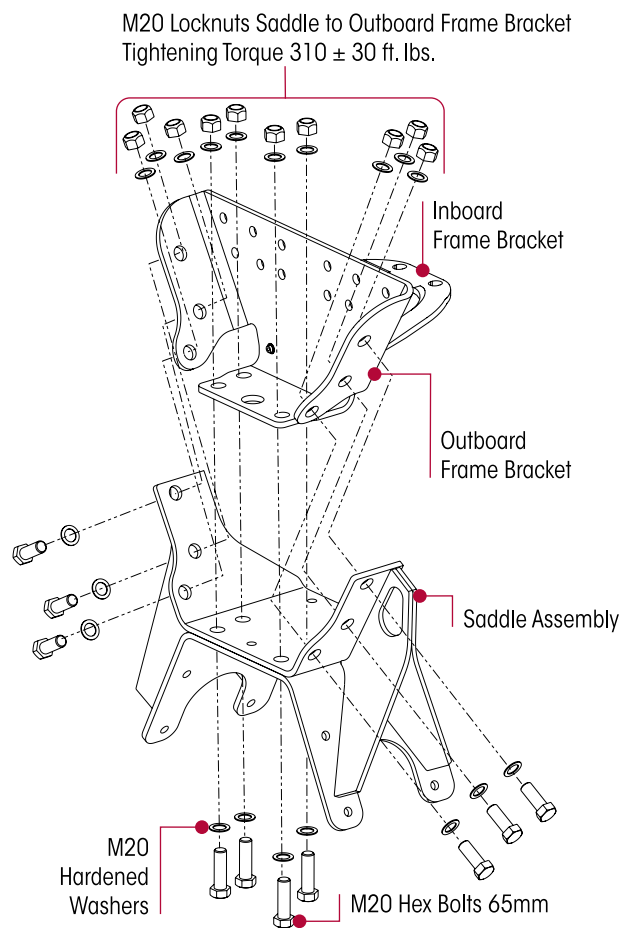
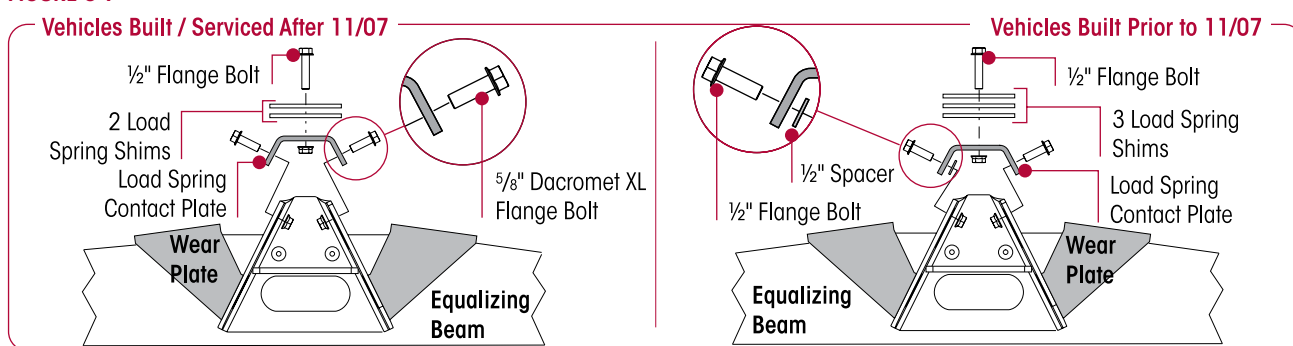


FIGURE 8-7



11. Lower the vehicle.
12. Install the shock absorbers (if equipped) into the upper shock bracket and install the fasteners, tighten to 160 ± 10 foot pounds torque.
13. Reattach the transverse torque rods to the frame, ensuring the shims are properly installed. Tighten to vehicle manufacturer's specification.
14. Mount the rebound clip and upper rebound strap to load spring bracket by installing the 1/2" flange fasteners and tighten to 98 ± 7 foot pounds torque, see Figure 8-4.
15. Remove the wheel chocks.

LOAD SPRINGS – PROGRESSIVE OR AUXILIARY

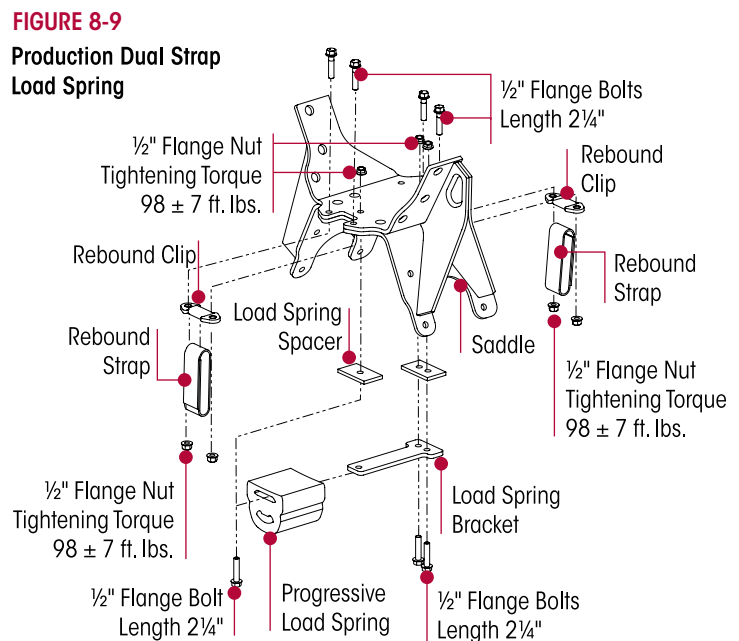
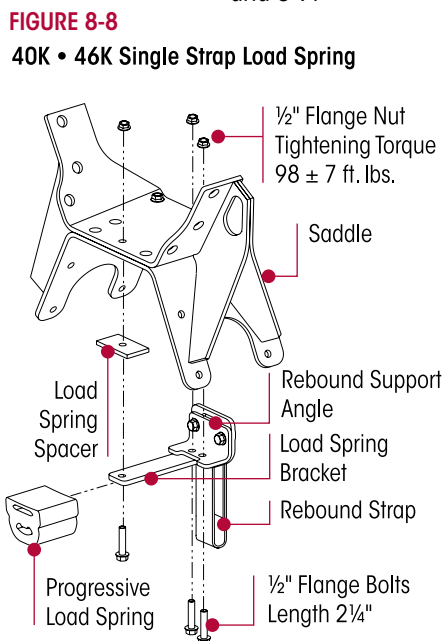
NOTE Hendrickson load spring service kits are available for the HAULMAAX suspension, refer to the Parts List Section of this publication. There is also a service kit available to help adjust for vehicle side-to-side vehicle weight bias found with particular types of vehicle bodies or vehicle-mounted equipment used in certain applications (including, but not limited to, side-loading refuse and well driller). Refer to Hendrickson Assembly Instructions 59310-047 for more information.

NOTE Use Kit No. 60961-747 when converting from the auxiliary load springs to the progressive load springs. The instructions are the same as below with the exception that it is necessary to remove one (1) load spring shim from each side of the suspension. The conversion requires both sides of the tandem to be replaced with the progressive load springs.

DISASSEMBLY

SERVICE HINT Tire removal is not necessary for the replacement of the load spring.

1. Chock the **FRONT** wheels of the vehicle.
2. **Production Dual Strap only** — Remove the **OUTBOARD** and **INBOARD** rebound clips, and fasteners. Lower rebound straps out of the way.
3. Remove the three (3) ½" flange head fasteners from the saddle, progressive / auxiliary load spring, load spring bracket, and load spring spacer(s).
4. Raise the frame slightly to create a gap between the load spring and load spring shims, see Figure 8-7.
5. Remove the progressive / auxiliary load spring from the load spring bracket, see Figures 8-8 and 8-9.



INSPECTION

1. Inspect load spring shims and any mating components for damage. Replace as necessary.
2. Inspect the load spring bracket, rebound support angle (if equipped), rebound clip(s), and rebound strap(s) for damage. Replace as necessary.

ASSEMBLY

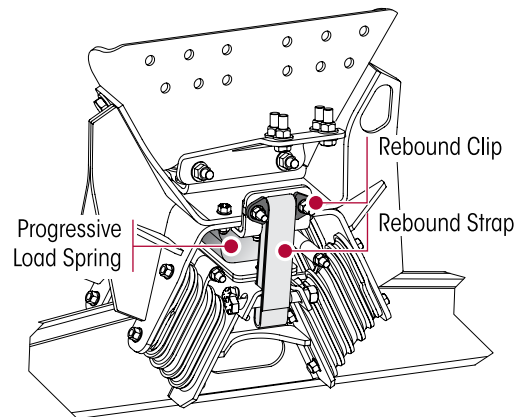
1. Install the new progressive / auxiliary load spring onto the load spring bracket.
2. Mount the new load spring group (progressive / auxiliary load spring, load spring bracket, rebound support angle and load spring spacer) to the saddle by installing the ½" flange bolts to the through the load spring bracket to the saddle, see Figures 8-8 and 8-9.
3. Locate the locknuts on top of the saddle to prevent interference with equalizing beam assembly and tighten to 98 ± 7 foot pounds torque.
4. Lower the frame.
5. **For Production Dual Strap only** — Install the **OUTBOARD** and **INBOARD** rebound clips, fasteners, and rebound straps. Tighten fasteners to 98 ± 7 foot pounds torque.
6. Remove the wheel chocks.

STANDARD REBOUND STRAPS

NOTE Hendrickson recommends replacement of all rebound straps if only one requires replacement.

NOTE Hendrickson Rebound Strap Enhancement Kit No. 64179-045 is available for outrigger applications for HAULMAAX 40K•46K rear suspensions, to be used on as needed basis in applications that utilize outriggers in severe environments with uneven terrain. Typical applications benefiting from this kit may include but are not limited to; concrete pumers, digger derricks, and well diggers, see Aftermarket Dual Rebound Strap Kit in this publication.

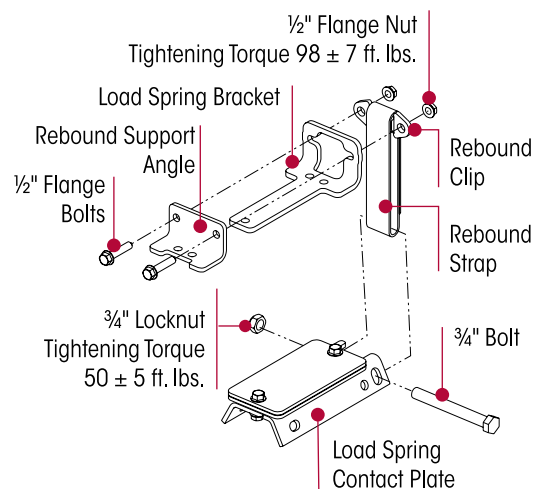
FIGURE 8-10



DISASSEMBLY

1. Chock the **FRONT** wheels of the vehicle.
2. Remove the ¾" fastener that attaches the rebound strap to the load spring contact plate.
3. From the inboard side of the saddle remove the ½" fasteners that attach the rebound clip to the load spring bracket.
4. Slide the rebound clip out of the upper rebound strap loop, see Figure 8-10.
5. Remove and discard rebound strap.

FIGURE 8-11



ASSEMBLY



THE REBOUND STRAP MUST BE INSTALLED WITH THE SEWN AREA FACING AWAY FROM THE SADDLE AND THE EQUALIZING BEAM. FAILURE TO DO SO WILL RESULT IN PREMATURE WEAR OF THE REBOUND STRAP.

1. Locate the rebound strap into position, and ensure the sewn area of the loop is facing away from the saddle and equalizing beam.
2. Slide the rebound clip through the upper rebound strap loop.

3. From the inboard side of the saddle, mount the rebound clip by installing $\frac{1}{2}$ " fasteners. Tighten locknuts to $\mathbb{N} 98 \pm 7$ foot pounds torque, see Figure 8-11.
4. Install the $\frac{3}{4}$ " fasteners into the load spring contact plate and lower rebound strap loop, with the sewn area facing away from the saddle and equalizing beam. Tighten locknut to $\mathbb{N} 50 \pm 5$ foot pounds torque, see Figure 8-11.
5. Remove the wheel chocks.

PRODUCTION DUAL REBOUND STRAPS – OUTRIGGER APPLICATIONS

NOTE

Prior to installation of the production dual rebound straps service kit, inspect all components of the HAULMAAX suspension for proper assembly and function, with special attention to the bolster springs. If any damage to the bolster springs is noted, replace prior to installation.

DISASSEMBLY

NOTE

Hendrickson recommends replacement of all rebound straps if only one requires replacement.

1. Chock the **FRONT** wheels of the vehicle.
2. Remove and discard the inboard and outboard $\frac{3}{4}$ " lower rebound strap to load spring contact plate fasteners, see Figure 8-13.
3. Remove and discard the inboard and outboard $\frac{1}{2}$ " rebound clip fasteners from the saddle assembly, see Figure 8-13.
4. Remove the rebound clips from the saddle assembly.
5. Remove both rebound straps.

FIGURE 8-12

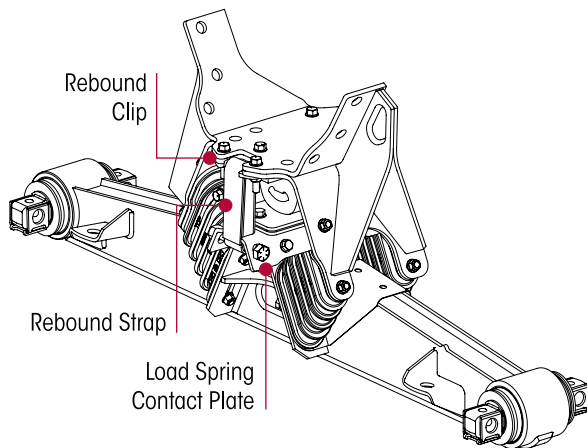
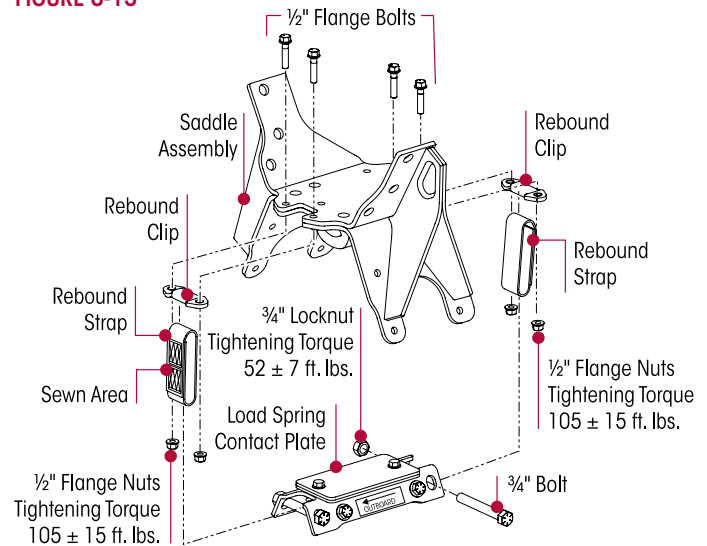


FIGURE 8-13



ASSEMBLY



THE REBOUND STRAP MUST BE INSTALLED WITH THE SEWN AREA FACING AWAY FROM THE SADDLE AND THE EQUALIZING BEAM. FAILURE TO DO SO WILL RESULT IN PREMATURE WEAR OF THE REBOUND STRAP.

1. Slide the rebound clip through the upper rebound strap loop and ensure the sewn area of the loop is facing away from the saddle and equalizing beam.
2. Locate the rebound clip into position under the saddle assembly, see Figure 8-13.
3. Install the upper $\frac{1}{2}$ " rebound clip fasteners onto the saddle assembly with the locknuts located under the saddle, see Figure 8-13.
4. Tighten upper rebound strap $\frac{1}{2}$ " fasteners to $\mathbb{N} 105 \pm 15$ foot pounds torque, see Figure 8-13.

5. Slide the lower rebound strap $\frac{3}{4}$ " bolt through the load spring contact plate and rebound strap.
6. Install the inboard and outboard $\frac{3}{4}$ " lower rebound strap fasteners and tighten to $\boxed{52 \pm 7}$ foot pounds torque, see Figure 8-13.
7. Repeat procedure for the other side of the suspension.
8. Remove the wheel chocks from the vehicle.

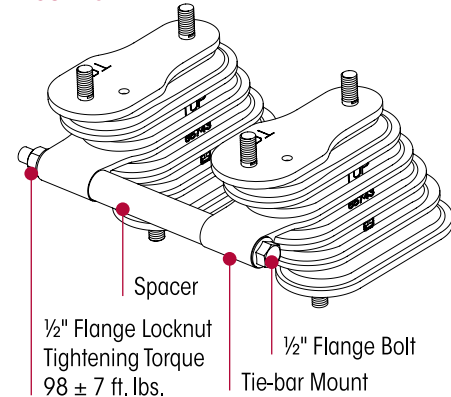
BOLSTER SPRINGS

In June 2006, an improved bolster spring package was phased into production for the HAULMAAX 46K suspension system. The design enhancement features a tie-bar (see Figure 8-14), which connects the bolster springs using a bolt, spacer, and nut. This enhanced bolster spring package applies to the HAULMAAX 46K suspension only. The bolster spring design for the HAULMAAX 40K system remains the same, although a tie-bar kit is available in the after-market for component replacement.

HAULMAAX 46K suspensions must be serviced using the tie-bar bolster spring with wear plate Service Kit No. 64179-048. Installation of the tie-bar bolster spring is similar to existing bolster springs, with the addition of the tie-bar spacer, bolt and locknut, see Figure 8-14.

All HAULMAAX 40K suspensions can continue to be serviced using the existing bolster spring Service Kits Nos. 64179-002 and 64179-049 (with wear plate), or can be replaced with the tie-bar bolster spring Service Kit Nos. 64179-037 and 64179-048.

FIGURE 8-14



IF THE WEAR PLATES LOCATED BETWEEN THE EQUALIZING BEAM AND THE BOLSTER SPRINGS / TIE-BAR BOLSTER SPRINGS ARE DAMAGED, THEY MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE DAMAGE TO MATING COMPONENTS.

DISASSEMBLY

SERVICE HINT

Replacement may be facilitated by servicing both sides of the suspension.

1. Chock the **FRONT** wheels of the vehicle.
2. From the inboard side of the saddle remove the two (2) $\frac{1}{2}$ " fasteners from the rebound clip and remove, see Figure 8-15.
3. Loosen, **DO NOT** remove, the upper eight (8) $\frac{1}{2}$ " flange head locknuts connecting the bolster springs / tie-bar bolster springs to the saddle assembly.

FIGURE 8-15

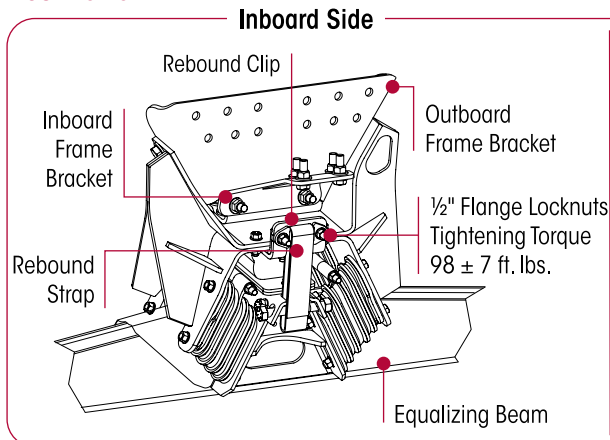
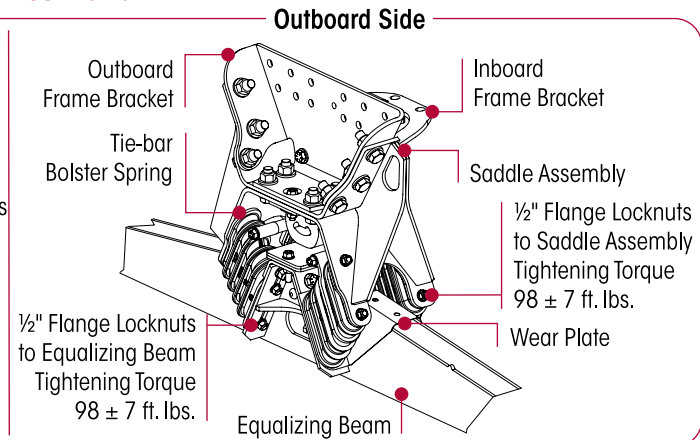


FIGURE 8-16





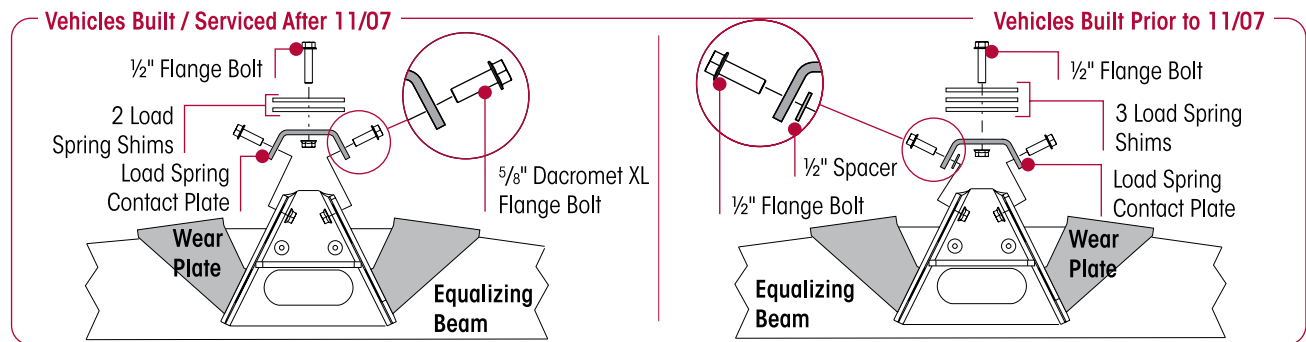
4. Remove the lower eight (8) ½" flange head locknuts connecting the bolster springs / tie-bar bolster springs to the equalizing beam, see Figure 8-16.
5. Remove tie-bar bolt and spacer (if equipped).
6. Remove the shock absorber (if equipped) fasteners from the upper shock bracket.
7. Push shock absorber down and clear of the upper shock bracket.

SERVICE HINT

It may be necessary to raise the frame of the vehicle to remove the load spring contact plate.

8. Remove the four (4) fasteners and load spring contact plate spacer (if equipped) that connect the load spring contact plate to the equalizing beam. Remove the load spring contact plate, see Figure 8-17.

FIGURE 8-17



NOTE

Disconnecting the transverse torque rods will help with bolster spring removal and installation.

9. Disconnect the transverse torque rods from the frame, and take note of any shims that may be removed.
10. Raise the rear of the vehicle frame just high enough to remove any contact between the load spring and the top of the load spring contact plate.
11. Remove the load spring contact plates.
12. Continue to raise the rear of the vehicle frame to clear the bolster springs / tie-bar bolster springs from the equalizing beam.
13. Support the vehicle frame at this height.
14. Remove ½" flange head locknuts that connect the bolster springs / tie-bar bolster springs to the saddle.
15. Remove the bolster springs / tie-bar bolster springs and wear plates, see Figure 8-18.

INSPECTION

1. Inspect wear plates for crack damage or if worn through. Replace as necessary.

ASSEMBLY

SERVICE HINT

Replacement may be facilitated by servicing both sides of the suspension.

1. Mount the bolster springs/ tie-bar bolster springs to the saddle and loosely install ½" flange head locknuts. **DO NOT** tighten at this time.
2. By hand, slightly spread the legs of the wear plates to ensure they remain on the bolster while lowering the vehicle. Position the wear plates onto the eight (8) lower bolster spring studs.



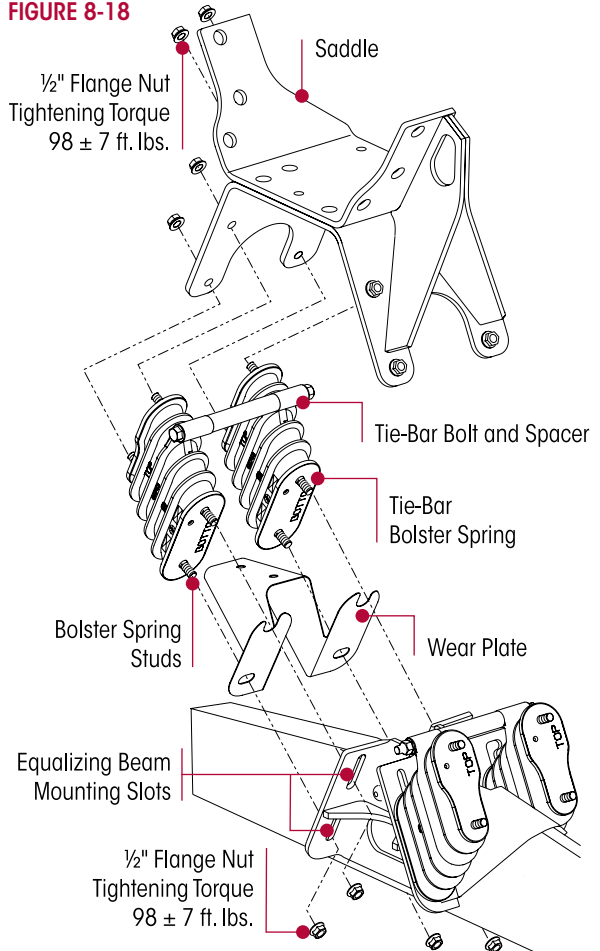
IF THE WEAR PLATES LOCATED BETWEEN THE EQUALIZING BEAM AND THE BOLSTER SPRINGS / TIE-BAR BOLSTER SPRINGS ARE DAMAGED, THEY MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE DAMAGE TO MATING COMPONENTS.



3. Raise the vehicle and remove the frame support. Lower the vehicle and guide the eight (8) lower bolster spring studs into the equalizing beam mounting slots, see Figure 8-18.

4. Slide the spring contact plates into position. Continue to lower the vehicle and allow the full weight of the vehicle to rest on the bolster springs.
5. Ensure bolster spring studs sit at the bottom of the mounting slots on the equalizing beam.
6. If equipped with a tie-bar bolster spring (see Figure 8-19) install:
 - a. The tie-bar bolt from the outboard side.
 - b. Install the bolt through the outboard bolster mount, the tie-bar sleeve and the inboard bolster mount.
 - c. Install the tie-bar locknut and tighten to 98 ± 7 foot pounds torque.
7. Install the eight (8) lower $\frac{1}{2}$ " flange head locknuts and tighten to 98 ± 7 foot pounds torque.

FIGURE 8-18



NOTE

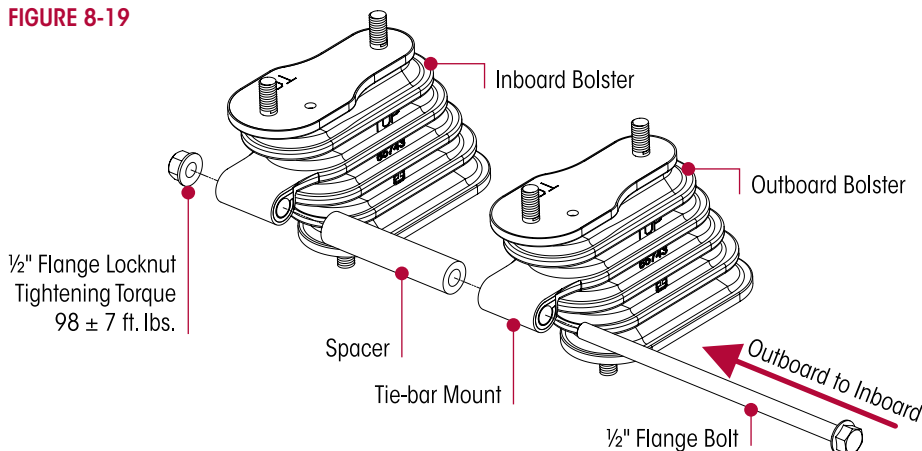
Vehicles manufactured from November 2003 through November 2007 require the installation of load spring contact plate spacers between the contact plate and the equalizing beam, see Figure 8-17. Refer to the Parts List Section of this publication.

SERVICE HINT

It may be necessary to raise the frame of the vehicle to install the load spring contact plate.

8. Mount the load spring contact plate on the equalizing beam by installing the four (4) fasteners, and load spring contact plate spacers (if equipped). Tighten to 98 ± 7 foot pounds torque.
9. Lower the vehicle.
10. Locate the shock absorbers (if equipped) into the upper shock bracket and install the fasteners, tighten to 160 ± 10 foot pounds torque.

FIGURE 8-19



11. Reattach the transverse torque rods to the frame, ensuring the shims are properly installed. Tighten the frame fasteners to vehicle manufacturer's specifications.
12. Slide the rebound clip through the upper rebound strap loop.
13. From the inboard side of the saddle, mount the rebound clip by installing fasteners. Tighten locknuts to 98 ± 7 foot pounds torque.
14. Remove wheel chocks.

SHOCK ABSORBERS (if equipped)

NOTE It is not necessary to replace shock absorbers in pairs if one shock absorber requires replacement.

NOTE The lower shock stud will be mounted either through a welded bracket on the side of the beam, or a bolt on bracket mounted to the outboard beam hanger leg. The shock absorber is the same for both applications, and the replacement procedure is the same for both.

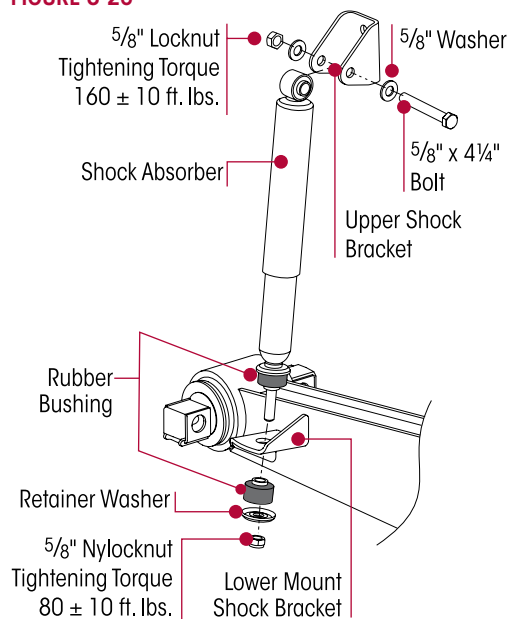
DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove the $\frac{5}{8}$ " lower shock absorber nylon locknut, retainer washer and lower rubber bushing from the shock absorber stud.
3. Remove the $\frac{5}{8}$ " fasteners from the upper shock bracket and remove shock absorber.

ASSEMBLY

1. Mount the shock absorber in the upper shock bracket and install $\frac{5}{8}$ " fasteners. **DO NOT** tighten at this time.
2. Locate the lower shock absorber stud in the lower shock bracket and install the rubber bushing, retainer washer and nylon locknut. Tighten to 80 ± 10 foot pounds torque.
3. Tighten the upper shock absorber $\frac{5}{8}$ " locknut to 160 ± 10 foot pounds torque.
4. Remove the wheel chocks.

FIGURE 8-20



EQUALIZING BEAM

NOTE For vehicles built prior to November 2007, when replacing the load spring contact plate or equalizing beam, Kit No. 57974-046 is required. The kit will include the larger diameter fasteners, instructions to address adjustments necessary, and will eliminate the need for load spring contact plate spacers.

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 the 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.

DISASSEMBLY

SERVICE HINT

Replacement may be facilitated by servicing both sides of the suspension.



IF THE WEAR PLATES LOCATED BETWEEN THE EQUALIZING BEAM AND THE BOLSTER SPRINGS / TIE-BAR BOLSTER SPRINGS ARE DAMAGED, THEY MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE DAMAGE TO MATING COMPONENTS.

1. Chock the **FRONT** wheels of the vehicle.

NOTE

If both equalizing beams need replacement repeat Steps 2 through 14 for removal of the opposing equalizing beam **AFTER** the first equalizing beam is reassembled.

2. From the inboard side of the saddle remove the two (2) fasteners from the rebound clip and remove, see Figure 8-21.

FIGURE 8-21

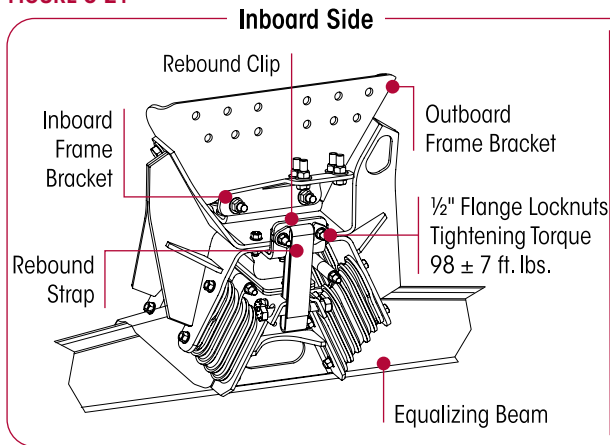


FIGURE 8-22

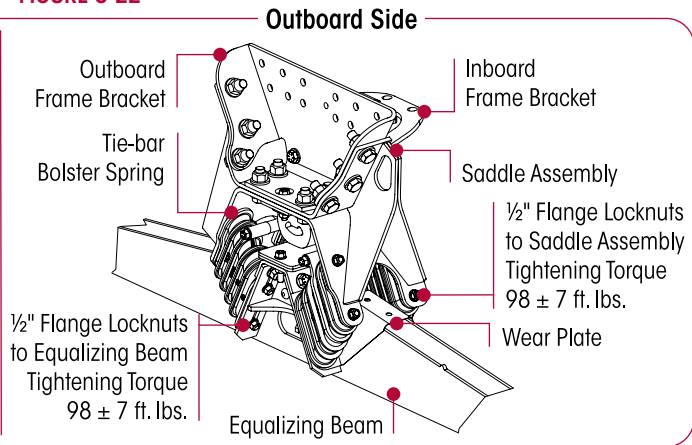
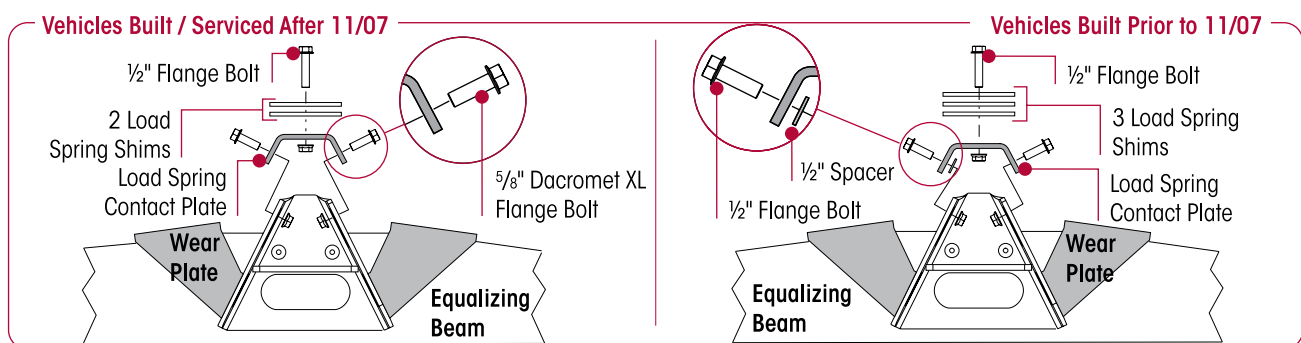


FIGURE 8-23



3. Loosen, **DO NOT** remove, the eight (8) 1/2" flange head locknuts connecting the bolster springs / tie-bar bolster springs to the saddle assembly.
4. Remove the eight (8) 1/2" flange head locknuts connecting the bolster springs / tie-bar bolster springs to the equalizing beam, see Figure 8-22.
5. Remove tie-bar bolt and spacer (if equipped). Remove the shock absorber fasteners (if equipped) from the lower shock bracket.
6. Remove the load spring contact plate fasteners and spacer (if equipped, see Figure 8-23) that connect the to the equalizing beam.
7. Raise the rear of the vehicle frame just enough to remove any contact between the load spring and the top of the load spring contact plate.
8. Remove the load spring contact plate, see Figure 8-23.



9. Continue to raise the rear of the vehicle frame to clear the bolster springs / tie-bar bolster springs from the equalizing beam.
10. Support the vehicle frame at this height.

NOTE

Prior to disassembly of the equalizing beam bar pin fasteners, note the orientation of the bar pin alignment shims, see Figure 8-24. 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.

11. Note the orientation and location of the bar pin shims, see Figure 8-24.

**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.

12. Support the equalizing beam being serviced.
13. Remove and discard bar pin fasteners that connect the end bushing bar pin to the axle bracket.
14. Lower the support and remove the equalizing beam from the axle brackets.

ASSEMBLY**SERVICE HINT**

Replacement may be facilitated by servicing both sides of the suspension.

NOTE

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

SERVICE HINT

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

**WARNING**

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

NOTE

Ensure equalizing beams equipped with shock absorber mounting brackets are installed with the shock brackets on outboard side.

1. Mount the equalizing beam into the **FRONT** drive axle bracket with the shock mounting brackets (if equipped) on the outboard side. **DO NOT** install the alignment shims at this time.
2. Slide a 3/4" bolt through the front axle bracket and the bar pin holes to temporarily support the equalizing beam.
3. Lift the **REAR** of the equalizing beam until the front bar pin flats are parallel to the front drive axle bracket legs, see Figure 8-25.

**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.

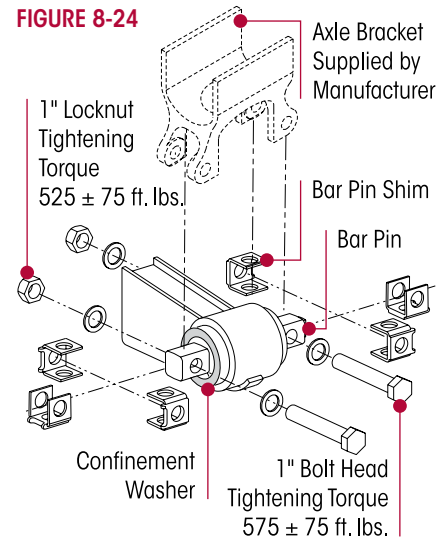
FIGURE 8-24



FIGURE 8-25

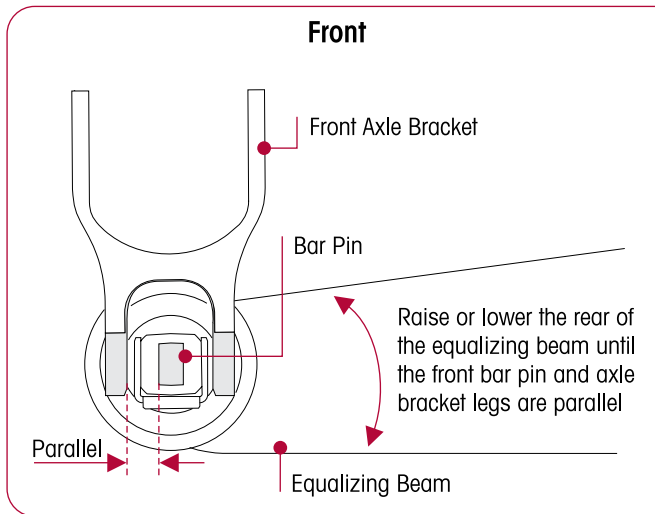
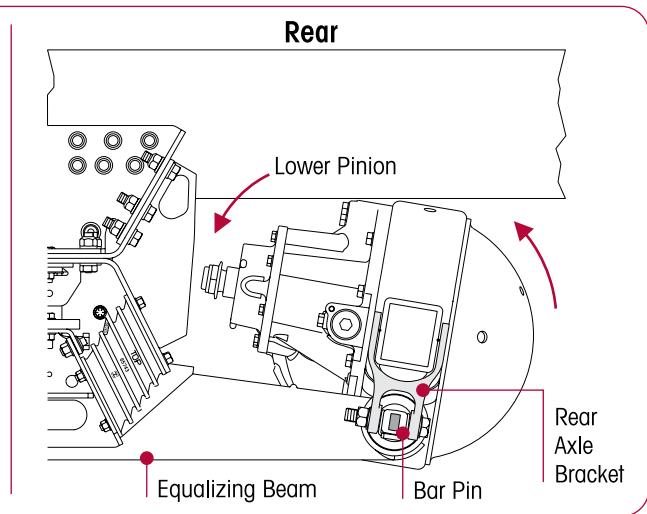


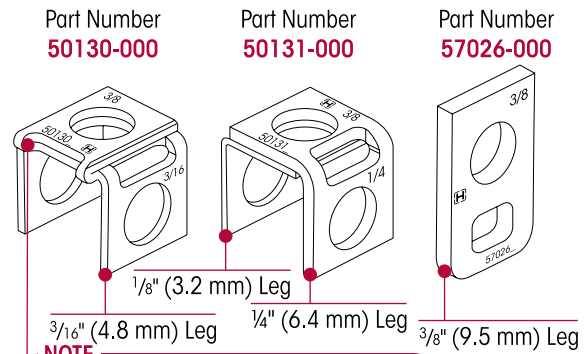
FIGURE 8-26



WARNING

THE BAR PIN ALIGNMENT SHIM (PART NO. 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE BUSHING, SEE FIGURE 8-27. 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 ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

FIGURE 8-27



NOTE
Folded edge in 50130-000 shim must be positioned away from confinement washer

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 8-24.
5. 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.
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** bar pin 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 rear longitudinal torque rod from the torque rod axle bracket.
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 axle bracket legs are parallel to the rear bar pin flats, see Figure 8-26.
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 the rear axle bracket and the bar pin holes to temporarily support the equalizing beam.
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 8-24.
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** alignment shim.

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.

19. Raise the rear drive pinion angle to 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.
20. Re-apply rear parking brake.

NOTE

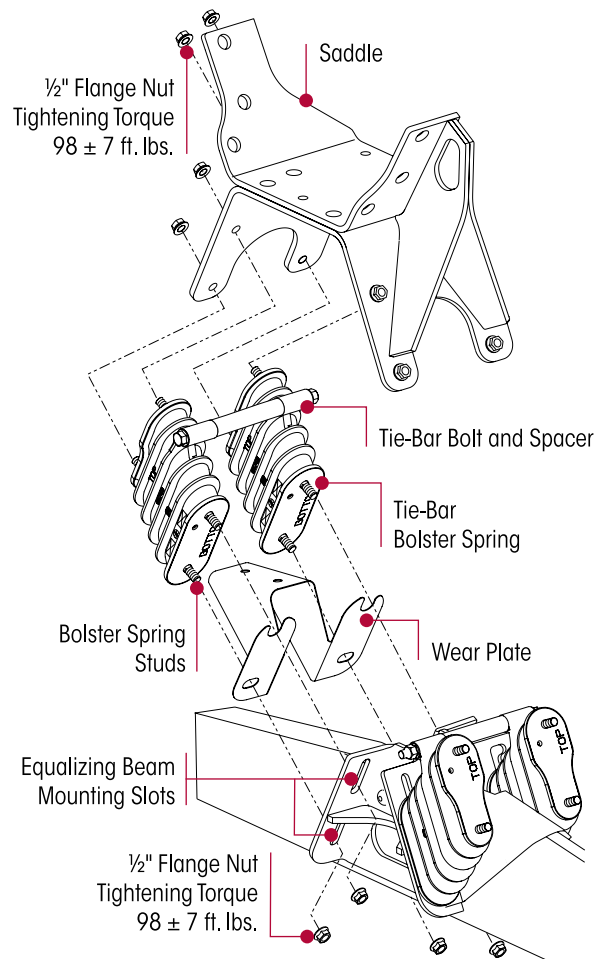
Prior to assembly of the rear fasteners, ensure that all the bar pin shims are installed in the same orientation as prior to disassembly.

21. Tighten the bar pin locknuts to 525 ± 75 foot pounds torque, or if tightening on the bolt head, tighten to 575 ± 75 foot pounds torque.

NOTE

If required, repeat the preceding steps to replace the second equalizing beam.

22. By hand, slightly spread the wear plates to ensure they remain on the bolster spring while lowering the vehicle. Position the wear plates onto the eight (8) lower bolster spring studs.
23. Lower the vehicle and guide the lower bolster spring studs into the equalizing beam mounting slots until the wear plates and the bolster springs / tie-bar bolster springs are seated against the lower end of the equalizing beam mounting bracket.
24. Position the load spring contact plates on the equalizing beams.
25. Ensure bolster studs sit at the bottom of the mounting slots on the equalizing beams.
26. If equipped with a tie-bar bolster spring, install the tie-bar bolt from the outboard side. Install the bolt through the outboard bolster mount, the tie-bar sleeve and the inboard bolster mount. Install the tie-bar locknut and tighten to 98 ± 7 foot pounds torque.

FIGURE 8-28


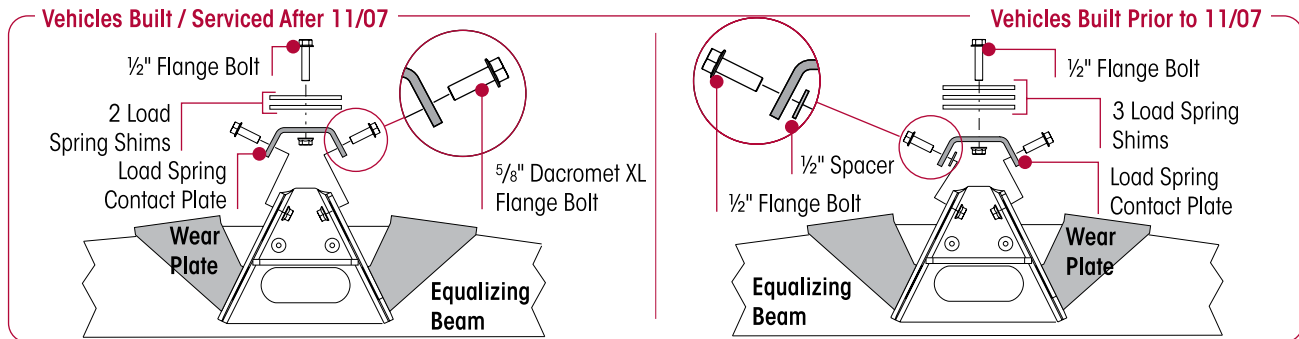
27. Install the eight (8) lower 1/2" flange head locknuts and tighten all sixteen (16) bolster fasteners to 98 ± 7 foot pounds torque, see Figure 8-28.

NOTE

Vehicles manufactured from November 2003 through November 2007 require the installation of load spring contact plate spacers between the contact plate and the equalizing beam, see Figure 8-29. Refer to Parts List Section of this publication.

28. Mount the load spring contact plate to the equalizing beam by installing the four (4) flange head bolts through the load spring contact plate, contact plate spacers (if equipped) and equalizing beam assembly, see Figure 8-29. Install flange head locknuts and tighten to 98 ± 7 foot pounds torque.

FIGURE 8-29



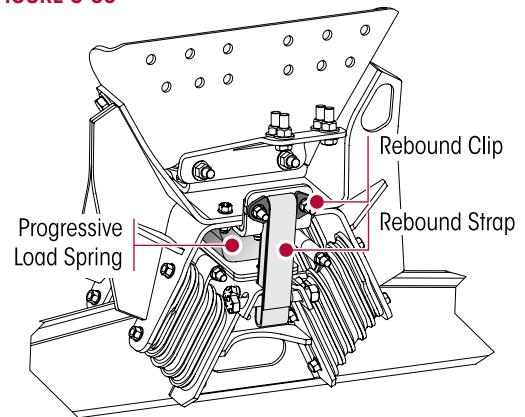
29. Install the shock absorber studs (if equipped) into the lower shock mounting brackets. Install the rubber bushings, retainer washers and nylon locknuts. Tighten to 80 ± 10 foot pounds torque.

CAUTION

THE REBOUND STRAP MUST BE INSTALLED WITH THE SEWN AREA FACING AWAY FROM THE SADDLE AND EQUALIZING BEAM. FAILURE TO DO SO WILL RESULT IN PREMATURE WEAR OF THE REBOUND STRAP.

30. Slide the rebound clip through the upper rebound strap loop, see Figure 8-30.
31. From the inboard side of the saddle, mount the rebound clip by installing fasteners. Tighten locknuts to 98 ± 7 foot pounds torque.
32. Remove the wheel chocks.

FIGURE 8-30



BAR PIN END BUSHINGS

You will need:

- A shop press with a capacity of at least 100 tons
- Bar Pin Installation Tool Part No. 66086-103 (OTC Part No. 1757), Removal Tool Part Nos. 66086-104 and 66086-105 (OTC Part No. 206457 and 302030) – Refer to Special Tools Section of this publication
- A shop made receiving tool, see Special Tools 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 (1) equalizing beam end, see 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, ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

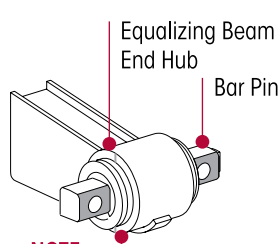
NOTE

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.

DISASSEMBLY

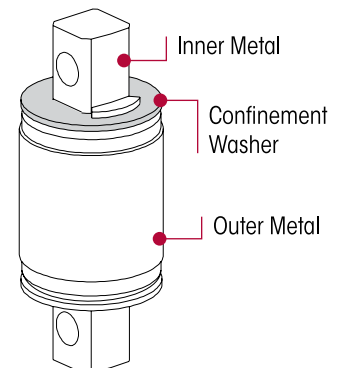
1. Remove the equalizing beam from the vehicle as detailed in the Equalizing Beam Disassembly instructions in this section.
2. Place the equalizing beam in the shop press with the equalizing beam end hub squarely supported on the press bed or receiving tool.

FIGURE 8-31



NOTE
Mark the location of the bar pin flats with a paint stick on the equalizing beam end hub

FIGURE 8-32



3. Prior to removal, note the orientation of the bar pin flats, see Figure 8-31. Mark orientation on the equalizing beam with a paint stick.
4. Press on the end bushing inner metal, see Figure 8-32, of the end bushing until the inner metal is flush with the top of the equalizing beam end hub. This will dislodge the confinement washer and move the bushing rubber away from the outer metal of the bushing so the removal tool can be installed.
5. Center the bushing removal tool directly on the bushing's outer metal and press the bushing out of the equalizing beam end hub.
6. After removing the equalizing beam end bushings, thoroughly inspect each equalizing beam end hub bore.

INSPECTION

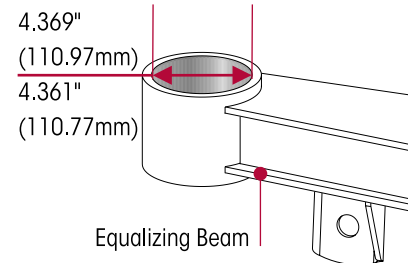
After removing the bar pin end bushings, thoroughly inspect the equalizing beam bores. If the equalizing beam is damaged from end bushing removal, replacement of the equalizing beam is required. **DO NOT** re-bush or otherwise use an equalizing beam that has been damaged.

WARNING

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

When replacing bar pin end bushings, the following steps will help minimize the chance of damage during the procedure.

1. Clean the end hub bores with emery cloth or hone, removing any nicks or metal buildup from bushing removal.
2. Measure the equalizing beam end hub bore inner diameter and the bushing outer diameter. The Hendrickson specification for the equalizing beam end hub bore diameter of equalizing beam is 4.369" / 4.361" (110.97 mm / 110.77 mm), see Figure 8-33. If components are not within the specified range, replacement is required.

FIGURE 8-33
Equalizing Beam End Hub Bore Diameter

SERVICE HINT

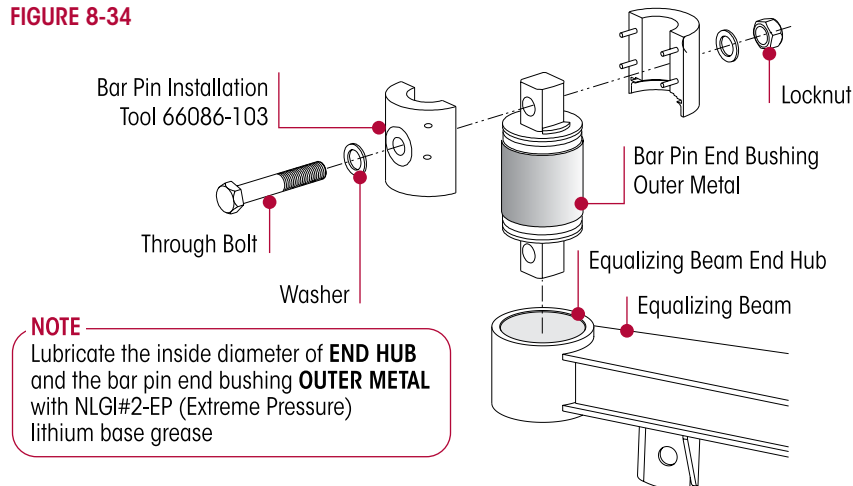
The end hub bore may have a more substantial leading chamfer at one end of the bore than the other. Take advantage of the larger chamfer by pressing in the new end bushing from this end.

CAUTION

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.

ASSEMBLY

1. Place the equalizing beam in a shop press with the end hub (see Figure 8-34) squarely supported on the press bed or receiving tool, see Special Tools Section of this publication.

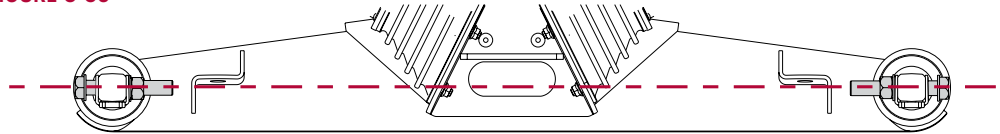
FIGURE 8-34


2. Install Hendrickson part number 66086-103 (OTC 1757) end bushing installation tool (refer to Special Tools Section of this publication) on the new end bushing as shown in Figure 8-34. Tighten the through bolt until the two (2) halves of the tool touch. The installation tool compresses the rubber between the inner and outer metal of the bushing to allow press force to be transmitted only to the outer metal of the bushing.
3. Lubricate the equalizing beam end hub inside diameter AND the bar pin end bushing's outer metal with a heavy layer of NLGI #2 – EP (Extreme Pressure) lithium base grease, see Figure 8-34.
4. Position the equalizing beam end bushing and installation tool on the end hub. Verify the bolt holes in the end bushing are in line with the equalizing beam axis, see Figure 8-35.

NOTE

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

FIGURE 8-35



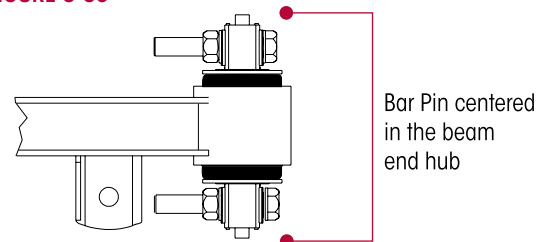
5. Verify the end bushing's outer metal is square with the end hub. Equalizing beam and end bushing damage will result if the bushings are pressed in at an angle.

CAUTION

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

FIGURE 8-36

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 8-36.
7. Install the equalizing beam assembly into vehicle as detailed in Equalizing Beam Assembly in this section.

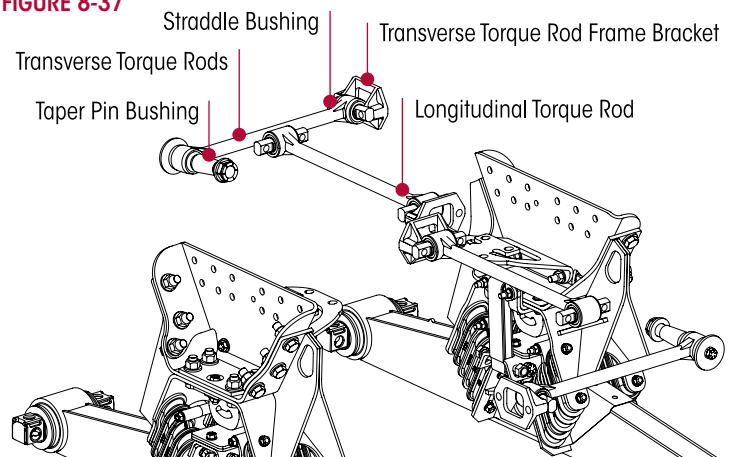


LONGITUDINAL TORQUE RODS

DISASSEMBLY

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

FIGURE 8-37



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.

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.

3. Remove the torque rod mounting fasteners and shims (if equipped).
4. Remove the fasteners that connect the longitudinal torque rod to the cross member and axle brackets.
5. Remove longitudinal torque rod from the vehicle, see Figure 8-37.

ASSEMBLY

1. Verify the length and configuration of the replacement torque rod with the torque rod that has been removed.

**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.

2. Install longitudinal torque rod into position and install the fasteners and any shims that were removed to the cross member and axle brackets. Snug the fasteners.
3. Verify proper pinion angle, and correct with drop in shims between the torque rod bar pin and the cross member or axle bracket depending on the direction of adjustment needed. Contact the vehicle manufacturer for proper pinion angle specifications.
4. Tighten all fasteners to vehicle manufacturer's torque specifications.
5. Remove wheel chocks.

TRANSVERSE TORQUE RODS**DISASSEMBLY**

1. Chock the **FRONT** wheels of the vehicle.

SERVICE HINT

Note the quantity and location of shims removed to maintain the lateral alignment of the axle during assembly. See Alignment & Adjustments Section of this publication.


2. Remove the fasteners that connect the transverse torque rod to the frame and axle brackets.
3. Using a large hammer, strike the top of axle tower to loosen the taper pin end of the torque rod in the bracket bore.
4. Remove the transverse torque rod from the vehicle, see Figure 8-37.
5. Inspect the mounting surfaces for any wear or damage. Repair or replace as necessary.

ASSEMBLY

1. Verify the length and configuration of the replacement torque rod with the torque rod that has been removed.

NOTE

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

2. Position the transverse torque rod taper pin into the axle tower, and install the frame mounting fasteners and any shims that were removed into the frame bracket and outboard support plate. Snug the fasteners.
3. Prior to tightening, ensure that the vehicle is at the proper ride height.
4. Install the taper pin locknut, and tighten to  200 ± 25 foot pounds torque.
5. Tighten all fasteners to the required torque specification. Refer to original equipment manufacturer for specifications.
6. Check the lateral alignment. If not within vehicle manufacturer's specified range, a lateral alignment is necessary. See Lateral Alignment in the Alignment & Adjustments Section of this publication.
7. Remove the wheel chocks.

TORQUE ROD BUSHINGS

■ ULTRA ROD • ULTRA ROD PLUS BUSHINGS

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 Tools Part No. 66086-001 (ULTRA ROD) / 66086-000 (ULTRA ROD PLUS)
1. Remove torque rods as detailed in Torque Rod Disassembly instructions in this section.



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.

BUSHING REMOVAL

1. Support the torque rod end tube centered on the receiving tool. Be sure the torque rod is squarely supported on the press bed for safety.
2. Push directly on the straddle mount bar pin, see Figure 8-38, until the top of the pin is level with the top of torque rod end tube. Place the push out tool directly on top of the bar pin and press until the bushing clears the torque rod end tube.
3. Remove the fasteners from the tapered bar pin bushing, and support the torque rod end on the receiving tool with the tapered stud pointing up and the end tube centered on the tool. Be sure the torque rod is squarely supported on the press bed for safety.
4. Push directly on the tapered stud until the bushing clears the torque rod end tube.

FIGURE 8-38

Taper Pin Bushing



Straddle Pin Bushing

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 with P-80 Lubricant or light Naphthenic Base Oil, such as 60 SUS at 100°F, see Figure 8-39.
3. Support the torque rod end tube centered on the receiving tool. Be sure 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 8-40.

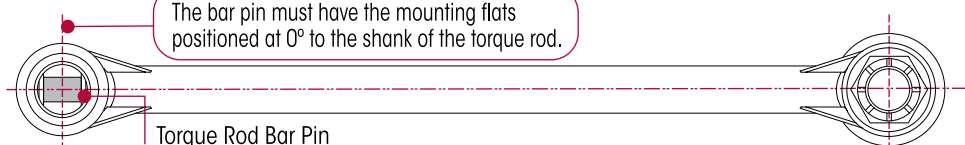
FIGURE 8-39



FIGURE 8-40

NOTE

The bar pin must have the mounting flats positioned at 0° to the shank of the torque rod.



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 8-41 .
 - Push the torque rod bushing again from the opposite side to center the bar pin, or tapered stud within the end tube, see Figure 8-42.

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.

FIGURE 8-41

FIGURE 8-42


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

■ XTRB BUSHING

You will need:

- A vertical press with a capacity of at least 10 tons
 - Shop made receiving tool and installation / removal tools, see the Special Tools Section of this publication for more information.
1. Remove torque rod as detailed in Torque Rod Disassembly instructions in this section.

FIGURE 8-43

WARNING

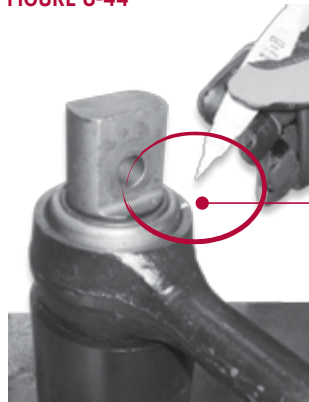
DO NOT USE HEAT OR USE A CUTTING TORCH TO REMOVE THE BUSHINGS FROM THE TORQUE ROD. THE USE OF HEAT WILL ADVERSELY AFFECT THE STRENGTH OF THE TORQUE ROD, HEAT CAN CHANGE THE MATERIAL PROPERTIES. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY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

BUSHING REMOVAL

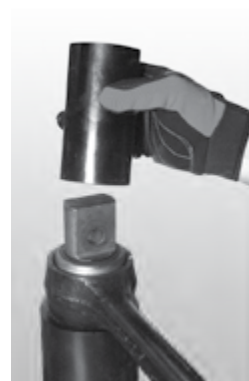
SERVICE HINT

When servicing a straddle mount bar pin bushing assembly, mark the clocking position of the straddle mount bar pin flats with a paint stick on the torque rod end hub prior to disassembly, see Figure 8-44. This marking will serve as a guide when installing the new bushing assembly so the original clocking position can be retained.

2. Mark the clocking position of the straddle mount bar pin flats with a paint stick on the torque rod end hub prior to disassembly, see Figure 8-44.

FIGURE 8-44


Mark the clocking position of the bar pin flats with a paint stick on the torque rod end hub

FIGURE 8-45

FIGURE 8-46


3. Support the torque rod end tube centered on the receiving tool. Be sure the torque rod is squarely supported on the press bed for safety.
4. Push directly on the straddle mount bar pin, until the top of the bar pin is level with the top of torque rod end hub, see Figure 8-45.
5. Place the shop made removal tool on the bar pin and press until the bushing clears the torque rod hub, see Figure 8-46.
6. Remove the fastener from the tapered bar pin bushing, and support the torque rod hub on the receiving tool with the tapered stud pointing down and the end hub centered on the tool. Be sure the torque rod is squarely supported on the press bed for safety.

BUSHING INSTALLATION

1. Clean and inspect the inner diameter of the torque rod end hubs, see Figure 8-47.

SERVICE HINT

DO NOT use a paraffinic oil, or soap base lubricant. Such lubricants can cause adverse reactions with the bushing, causing premature failure.

2. Lubricate the inner diameter of the torque rod end hubs and the new bushings with NLGI #2 EP grease, see Figure 8-48.

FIGURE 8-47

Inspect and clean the inner diameter of torque rod end hubs


FIGURE 8-48


Apply NLGI #2-EP (Extreme Pressure) lubricant to the inner diameter of torque rod end hub and bushings

3. Support the torque rod end hub centered on the receiving tool. Be sure the torque rod is squarely supported on the press bed for safety.
4. Re-align the bar pin bushings to the mark made before removal as shown in Figure 8-44.
5. Using the shop made tool, place the installer tool on the bushing and press in. The bushing must be centered within the hub of the torque rod.
6. Wipe off excess lubricant.
7. Replace torque rod assembly as detailed in the Transverse or Longitudinal Torque Rod Component Replacement Section of this publication.

AFTERMARKET SHOCK ABSORBER KITS

Service Kit Nos.

- 64178-003 16½" Saddle Height
- 64178-004 17½" / 18½" Saddle Height
- 64178-009 16½" (Mack) Saddle Height

This procedure is intended to assist maintenance personnel with the installation of the Aftermarket Shock Absorber Kit option for vehicles not originally equipped with shock absorbers by the vehicle manufacturer.

NOTE

Due to component interference, the HAULMAAX aftermarket shock absorber kits are not compatible with vehicles using dual 315 mm wide tires.

CAUTION

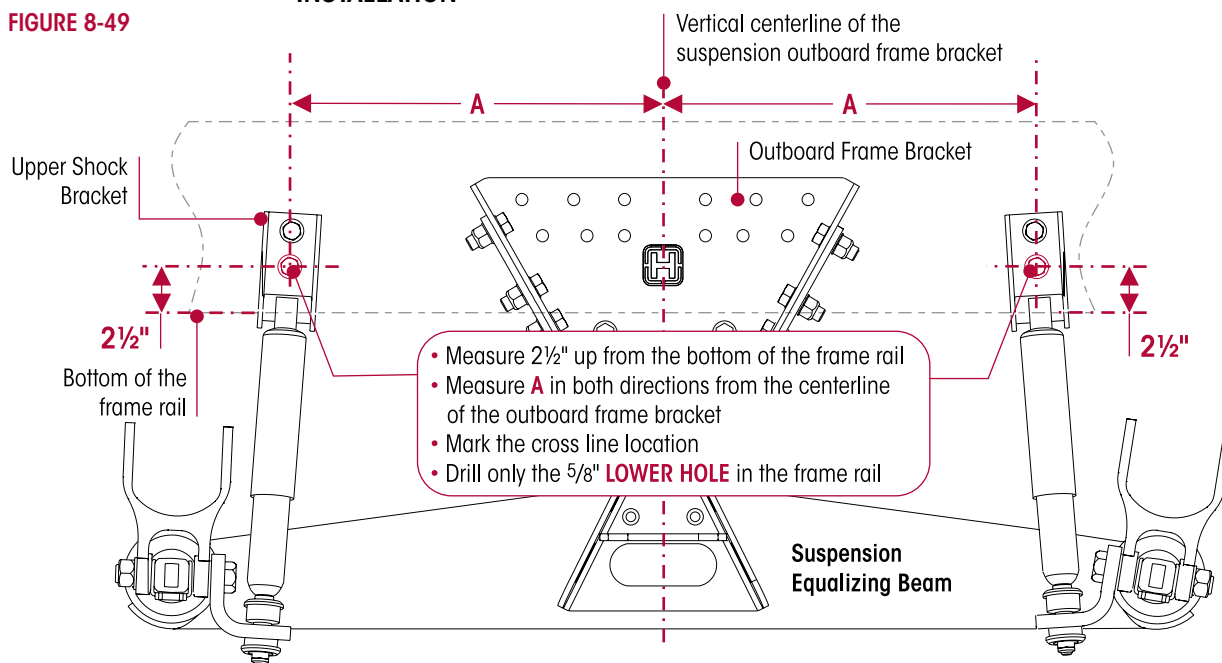
A TECHNICIAN USING A SERVICE PROCEDURE OR TOOL WHICH HAS NOT BEEN RECOMMENDED BY HENDRICKSON MUST FIRST SATISFY HIMSELF THAT NEITHER HIS SAFETY NOR THE VEHICLE'S SAFETY WILL BE JEOPARDIZED BY THE METHOD OR TOOL SELECTED. INDIVIDUALS DEVIATING IN ANY MANNER FROM THE INSTRUCTIONS PROVIDED WILL ASSUME ALL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

WARNING

DO NOT USE THESE KITS IN CONJUNCTION WITH DUAL 315 MM WIDE TIRES. INSTALLING THESE KITS ON VEHICLES USING DUAL 315 MM TIRES WILL CAUSE CONTACT BETWEEN THE TIRE AND THE LOWER SHOCK MOUNTING BRACKET RESULTING IN TIRE DAMAGE AND POSSIBLE ADVERSE VEHICLE HANDLING, PERSONAL INJURY OR PROPERTY DAMAGE.

INSTALLATION

FIGURE 8-49



1. Chock the front wheels of vehicle to prevent movement during installation.
2. Support axles and frame on stands and remove rear tires.
3. Starting at the vertical centerline of the suspension outboard frame bracket, measure A in both directions along both vehicle frame rails and draw a vertical line, see Figure 8-49. Refer to Table 8-1 to determine the correct vertical hole location measurement for the vehicle's rear axle spacing.
4. Measure up from the bottom of the frame rail 2½" and draw a horizontal cross line for the lower hole position of the shock frame bracket, see Figure 8-49.

- Drill only for the **LOWER HOLES** of the shock brackets to accommodate the $\frac{5}{8}$ " bolts, see Figure 8-49.

TABLE 8-1

Rear Axle Spacing	Vertical Hole Location
52"	18½"
54"	19½"
60"	22½"
72"	28¾"

NOTE

If an existing hole is already in the frame rail close to this location, move the location fore or aft by ($\pm \frac{3}{8}$ ") to use the existing hole. **DO NOT** change the elevation (maintain the 2½" distance from the bottom of the frame rail) of the hole to accommodate an existing hole.

- Install the upper shock brackets to frame. Install only the **LOWER HOLE** shock bracket frame fasteners, see Figure 8-49. Snug the fasteners, **DO NOT** tighten at this time. Note the upper hole of the shock mounting bracket will be installed in Step 18.

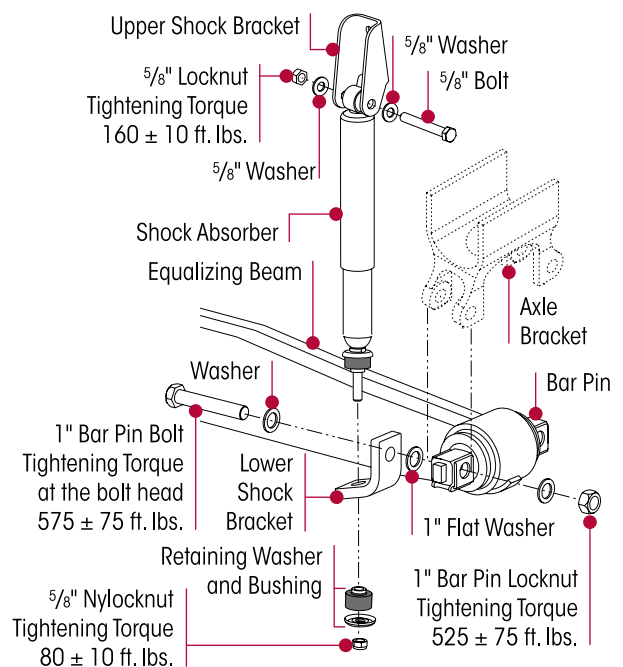
NOTE

The Aftermarket Shock Kits contain longer replacement bar pin bolts needed to accommodate the lower shock bracket.

NOTE

The front and rear lower shock brackets are different for Aftermarket Shock Kits 64178-003 and 64178-004. Only Kit No. 64178-009 (Mack Vehicles) uses the same lower shock bracket for both front and rear. Ensure the proper part is used prior to installation of the lower shock bracket, part numbers are stamped on the bracket.

- Support the end of the equalizing beam then remove the existing bar pin fasteners from the outboard side of the equalizing beam and discard.
- Install the **FRONT** lower shock bracket (Part No. 64148-001) and new fasteners. A 1" flat washer must be located between the lower shock bracket and the axle bracket, as shown in Figure 8-50.
- Snug the bar pin fastener, **DO NOT** tighten at this time.
- Repeat Steps 8 and 9 for the **REAR** lower shock bracket (Part No. 64148-002).
- Install the shock absorber into the lower shock bracket first and then the upper shock absorber bracket.

FIGURE 8-50


- Attach the **lower** shock absorber fasteners.
- Attach the **upper** shock absorber fasteners.
- Tighten the **lower** shock absorber fasteners first to \mathbb{N} 80 ± 10 foot pounds torque, see Figure 8-50.
- Rotate the upper shock mounting bracket to align with the angle of the shock absorbers.
- Tighten the **upper** shock absorbers fasteners to \mathbb{N} 160 ± 10 foot pounds torque, see Figure 8-50.
- Use the upper shock bracket as a guide to drill the **top mounting hole** in the frame rail.



18. Install the top mounting hole fasteners.
19. Tighten the shock bracket to frame fasteners per the vehicle manufacturer's specifications.
20. Tighten the 1" bar pin fasteners:
 - At the **bolt head** 575 ± 75 foot pounds torque
 - At the **locknut** 525 ± 75 foot pounds torque
21. Repeat Steps 3 to 20 for the other side of the vehicle.
22. Paint as required to prevent corrosion to components.
23. Install the rear tires.
24. Remove wheel chocks.

AFTERMARKET DUAL REBOUND STRAP ENHANCEMENT KIT – for Outrigger Applications

- 64179-045 Tandem Set
- 64179-046 Tandem Set with Bolster Springs

Service Kit Nos.

NOTE

Prior to installation of the Aftermarket Dual Rebound Straps Enhancement Kit, inspect all components of the HAULMAAX suspension for proper assembly and function, with special attention to the bolster springs. If any damage to the bolster springs is noted, replace prior to kit installation.

INSTALLATION

This procedure is intended to assist maintenance personnel with the installation, on an as-needed basis, of the Aftermarket Dual Rebound Straps Enhancement Kit for Outrigger Applications Kit No. 64179-045 for HAULMAAX 40K•46K rear suspensions.

Installation of this aftermarket service kit will involve replacement of the standard inboard mounted rebound strap and load spring contact plate with a special load spring contact plate, inboard and outboard rebound support blocks (see Figure 8-51) and multiple rebound straps on both sides of the suspension.

All components must be installed per the following instructions.

FIGURE 8-51

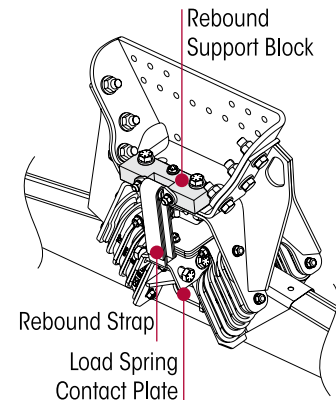
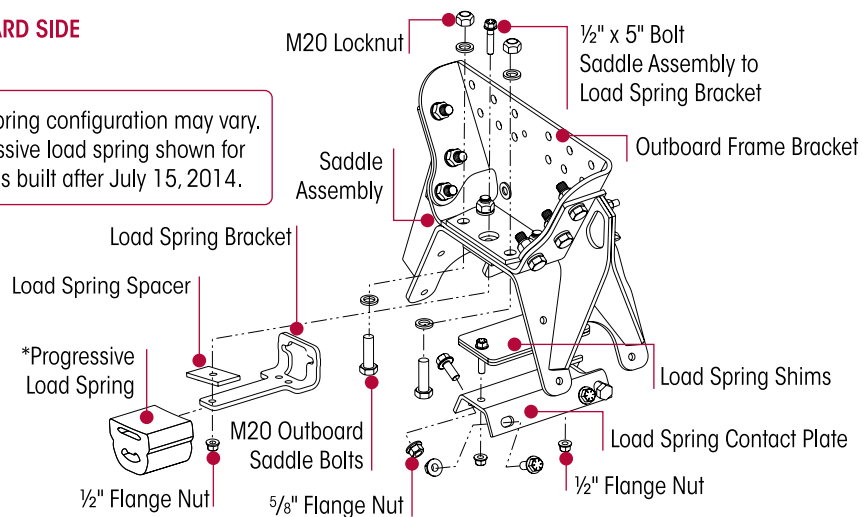


FIGURE 8-52

OUTBOARD SIDE

NOTE

*Load spring configuration may vary. Progressive load spring shown for vehicles built after July 15, 2014.





DISASSEMBLY

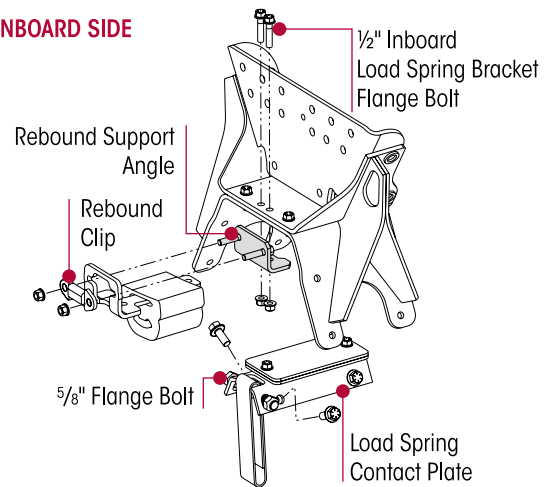
1. Chock the front wheels of the vehicle.
2. From the **INBOARD SIDE** of the suspension remove the following components on both sides of the vehicle, see Figure 8-53.
 - a. Remove the rebound clip.
 - b. Remove the $\frac{5}{8}$ " inboard load spring bracket fasteners.
 - c. Remove the inboard load spring contact plate fasteners.



WHEN RAISING OR LOWERING A VEHICLE ENSURE ALL PERSONNEL ARE CLEAR OF THE VEHICLE. NEVER WORK ON A VEHICLE THAT IS NOT PROPERLY SUPPORTED.

3. Raise the vehicle frame to create a sufficient gap between the progressive / auxiliary load spring and the shim(s), see Figure 8-52. Support the vehicle frame at this height.
4. From the **OUTBOARD SIDE** of the suspension remove the following components on both sides of the vehicle, see Figure 8-52.
 - a. Remove the two (2) M20 outboard saddle fasteners.
 - b. Remove the outboard bracket fastener. Remove the bracket, rebound support angle, and outboard spacer.
 - c. Remove the $\frac{5}{8}$ " outboard contact plate fasteners.
 - d. Lift and remove the contact plate and rebound strap.

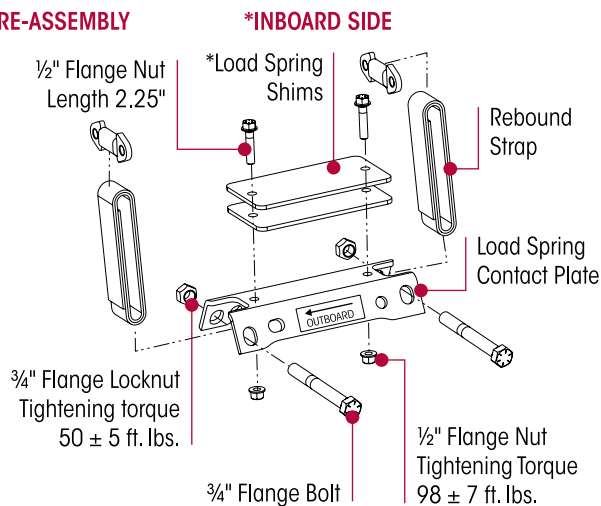
FIGURE 8-53
INBOARD SIDE



PRE-ASSEMBLY

1. Remove the shims from the current contact plate. Remove contact plate and discard.
2. Transfer the load spring shims to the new load spring contact plate. Install the bolts through the shims, then through the contact plate. Install locknuts and tighten to \mathbb{R} 98 ± 7 foot pounds torque, see Figure 8-54.

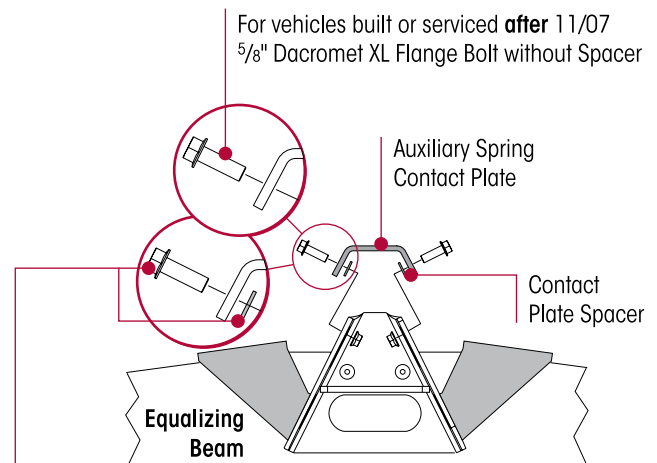
FIGURE 8-54
PRE-ASSEMBLY



NOTE

* Number of load spring shims may vary. Progressive load spring configuration shown.

FIGURE 8-55
CONTACT PLATE SPACER



For vehicles built **prior** to 11/07
 $\frac{1}{2}$ " Flange Bolt with Spacer (Part no. 22962-014)

ASSEMBLY

NOTE The Dual Rebound Straps Enhancement Kit for Outrigger Applications uses $\frac{5}{8}$ " fasteners to attach the load spring contact plate to the **A** bracket on the equalizing beam, see Figure 8-56. Vehicles built prior to November 2007 were manufactured with $\frac{1}{2}$ " fasteners and spacers between the contact plate and the **A** bracket, see Figure 8-55. On these vehicles, the equalizing beam **A** bracket may require slight modification.

1. On vehicles built prior to 11/2007 — verify the **A** bracket will accept a $\frac{5}{8}$ " bolt in the contact plate mounting slot. If a $\frac{5}{8}$ " bolt will not pass through the **A** bracket then enlarge the slot slightly using a die grinder or file.

NOTE **DO NOT** install spacers between the contact plate and the equalizing beam **A** bracket.

2. Position the contact plate on top of the equalizing beam **A** bracket. **Ensure the arrow** on the contact plate points to the outboard side of the suspension as indicated on the contact plate, see Figure 8-56.
3. Align the holes in the contact plate with the slots in the top of the equalizing beam and install the $\frac{5}{8}$ " bolts through the contact plate then through the equalizing beam **A** bracket. Install the locknuts on the bolts and tighten to 98 ± 7 foot pounds torque, see Figure 8-56.
4. Assemble the new rebound straps and lower mounting fasteners to the new contact plate. Tighten fasteners to 50 ± 5 foot pounds torque, see Figure 8-54.

FIGURE 8-56

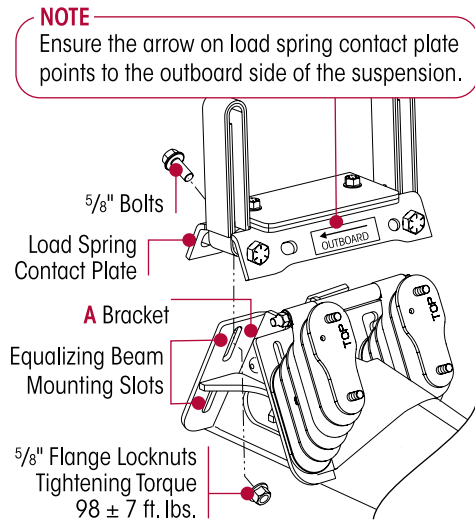
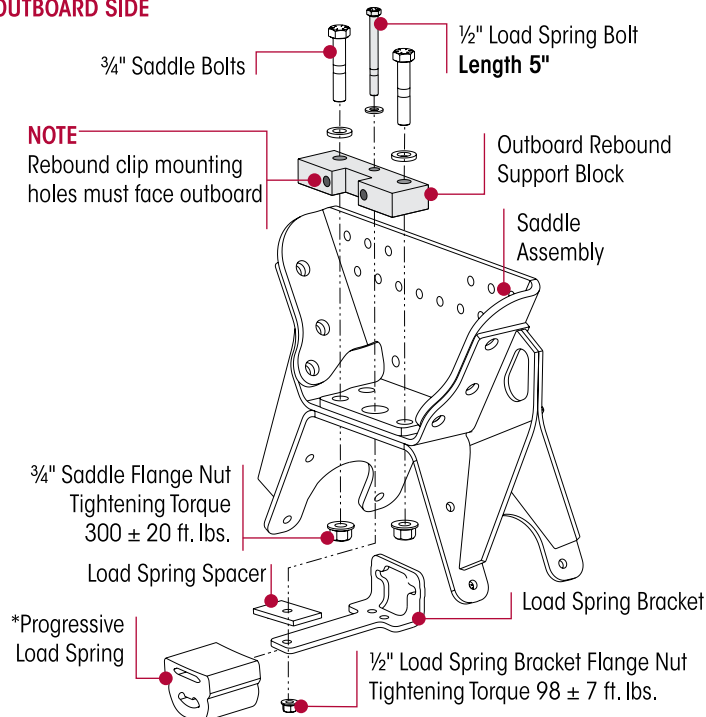
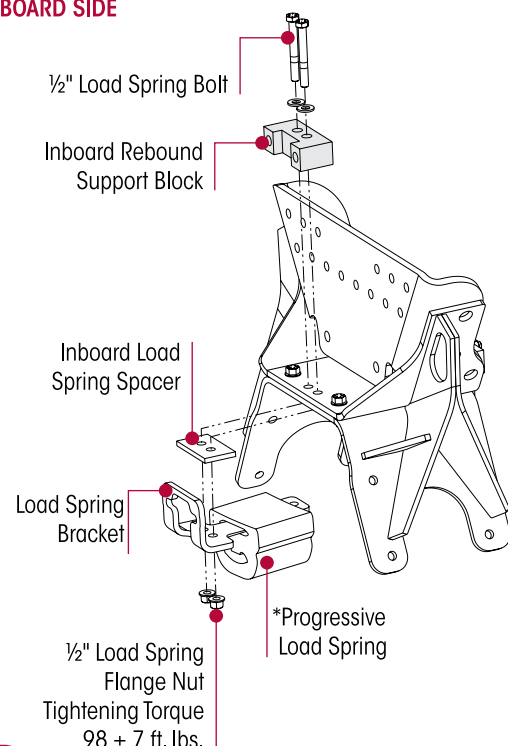


FIGURE 8-57
OUTBOARD SIDE



NOTE:
*Shown progressive load spring configuration, vehicles built after July 15, 2014.

FIGURE 8-58
INBOARD SIDE



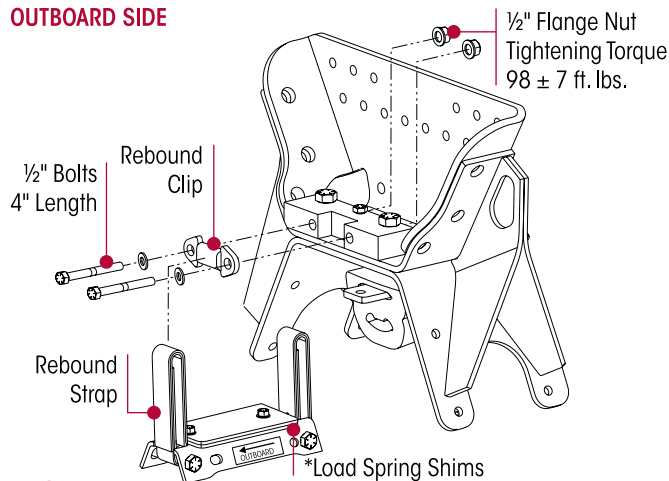
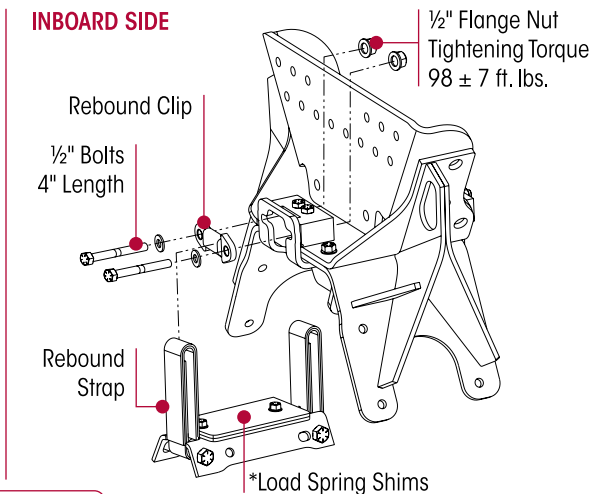


5. Repeat Steps 1 through 4 for the contact plate on the opposite side of the vehicle.
6. From the **OUTBOARD SIDE** of the suspension install the following components on both sides of the vehicle, see Figure 8-57.
 - a. Position the outboard rebound support block on the saddle and install the two (2) new $\frac{3}{4}$ " saddle fasteners. Ensure the outboard rebound support block is positioned with the rebound clip mounting holes to the outboard side of the suspension, see Figure 8-57. **DO NOT** tighten the fasteners at this time.
 - b. Install the load spring, the load spring bracket, outboard load spring spacer, and the new bracket fastener. **DO NOT** tighten the fastener at this time.
 - c. Repeat Steps 6a and 6b on the opposite side of the vehicle.
7. From the inboard side of the suspension install the following components on both sides of the vehicle, see Figure 8-58.

NOTE

This kit uses an inboard load spring spacer, see Figure 8-58, and **DOES NOT** use the rebound support angle, shown in Figure 8-52.

- a. Install the inboard rebound support block, load spring bracket, load spring spacer and bracket fasteners. Tighten fasteners to \mathbb{R} 98 \pm 7 foot pounds torque.
- b. Repeat Step 9a for the suspension on the opposite side of the vehicle.
8. Tighten the **OUTBOARD SIDE** rebound support block fasteners on both sides of the vehicle to the following torque values, see Figure 8-57.
 - $\frac{3}{4}$ " fasteners – \mathbb{R} 300 \pm 20 foot pounds
 - $\frac{1}{2}$ " fasteners – \mathbb{R} 98 \pm 7 foot pounds

**FIGURE 8-59
OUTBOARD SIDE****FIGURE 8-60
INBOARD SIDE****NOTE**

*Two load spring shim configuration shown for vehicles built after July 15, 2014.



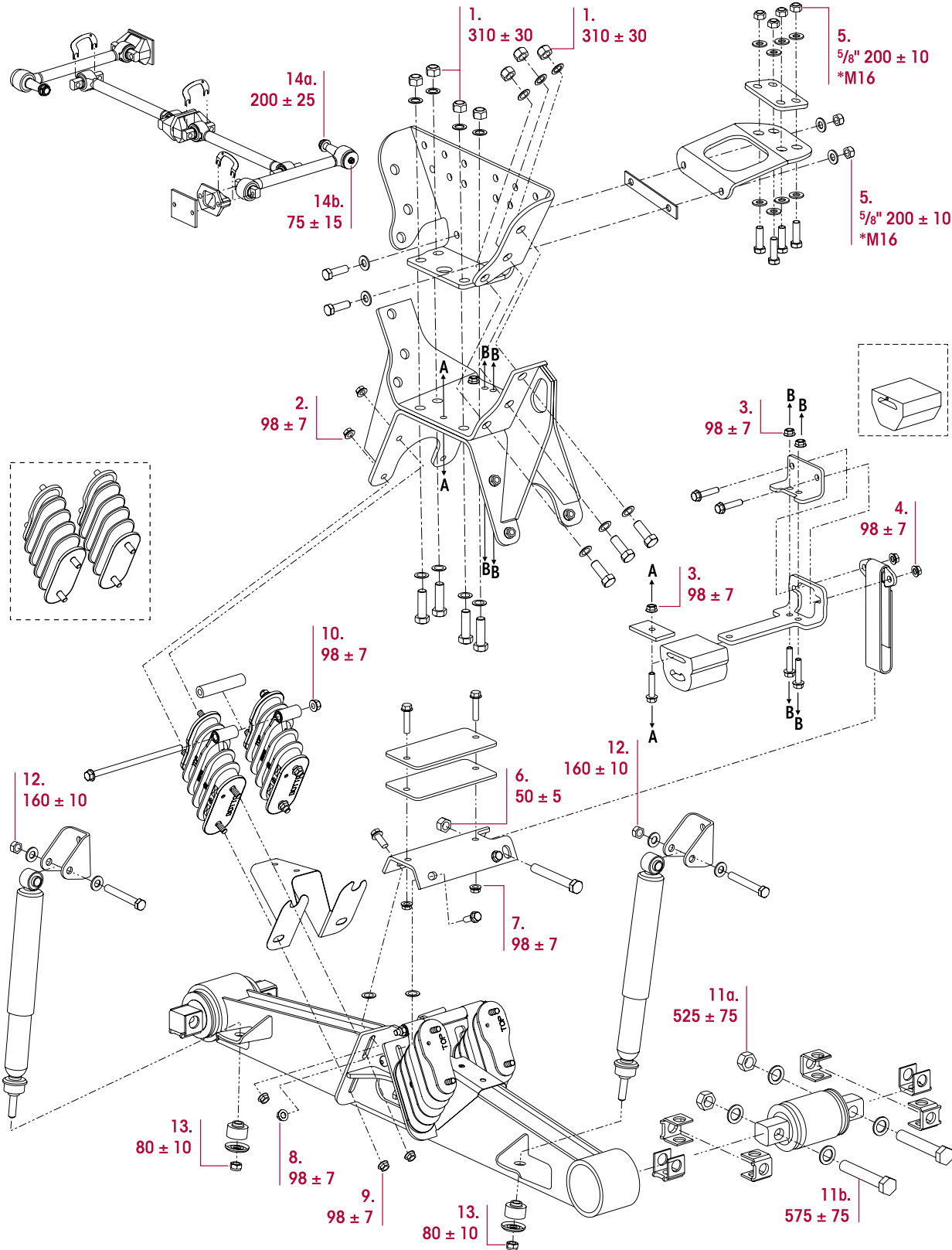
WHEN RAISING OR LOWERING A VEHICLE ENSURE ALL PERSONNEL ARE CLEAR OF THE VEHICLE. NEVER WORK ON A VEHICLE THAT IS NOT PROPERLY SUPPORTED.

9. Remove the frame supports and lower the vehicle onto the ground.
10. Install the **INBOARD** rebound clip through the rebound strap and install the fasteners. Tighten fasteners to \mathbb{R} 98 \pm 7 foot pounds torque. Repeat for the inboard rebound clip and rebound strap on the opposite side of the vehicle, see Figure 8-60.
11. Install the **OUTBOARD** rebound clip through the rebound strap and install fasteners. Tighten fasteners to \mathbb{R} 98 \pm 7 foot pounds torque. Repeat for the outboard rebound clip and rebound strap on the opposite side of the vehicle, see Figure 8-59.
12. Remove the wheel chocks from the vehicle.

SECTION 9 Torque Specifications

Hendrickson recommended torque values provided in Foot Pounds

40K•46K





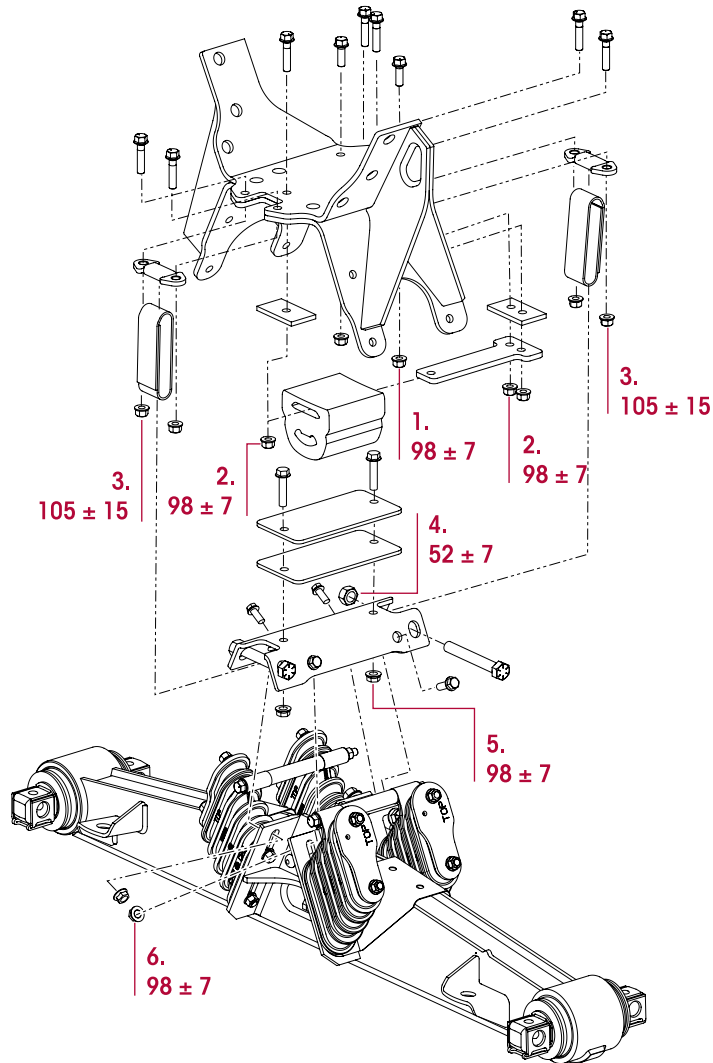
HAULMAAX 40K•46K

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	FASTENER		TORQUE VALUE in foot pounds	
		Quantity	Size		
Frame Fasteners furnished and installed by Truck Manufacturer					
1	Saddle to Outboard Frame Bracket	20	M20	310 ± 30	
2	Saddle to Bolster Spring	16	½"-13 UNC Flange	98 ± 7	
3	Saddle to Load Spring Bracket	6	½"-13 UNC Flange	98 ± 7	
4	Load Spring Bracket to Rebound Clip	4	½"-13 UNC Flange	98 ± 7	
5	Inboard Frame Bracket to Outboard Frame Bracket and Cross Member	12	⅝"-11 UNC	200 ± 10	
			M16	*	
6	Load Spring Contact Plate to Rebound Strap	2	¾"-16 UNF	50 ± 5	
7	Load Spring Contact Plate to Load Spring Shim	4	½"-13 UNC Flange	98 ± 7	
8	Load Spring Contact Plate to Beam Assembly	8	⅝"-11 UNC Flange	**98 ± 7	
			½"-13 UNC Flange	***98 ± 7	
9	Beam Assembly to Bolster Spring	16	½"-13 UNC Flange	98 ± 7	
10	Bolster Spring Tie-Bar	4	½"-13 UNC Flange	98 ± 7	
11a	Bar Pin Bushing	at the Locknut	8	1"-8 UNC	525 ± 75
11b		at the Bolt Head	8	1"-8 UNC	575 ± 75
12	Upper Shock Absorber to Upper Shock Bracket	4	⅝"-11 UNC	160 ± 10	
13	Lower Shock Absorber to Beam - Nylocknut	4	⅝"-11 UNC	80 ± 10	
14a	Transverse Torque Rod to Axle	at the Locknut	2	1¼"-12 UNF	200 ± 25
14b		at the Bolt Head	2	⅝"-11 UNC	75 ± 15
<p>NOTE: Torque values listed above apply only if Hendrickson supplied fasteners are used. If non-Hendrickson fasteners are used, follow torque specification listed in vehicle manufacturer's service manual.</p> <p>* Not supplied by Hendrickson, for torque requirements see vehicle manufacturer.</p> <p>** Applies to vehicles built or serviced after 11/07.</p> <p>*** Applies to vehicles built prior to 11/07.</p>					

Production Dual Rebound Straps – Outrigger Applications

Hendrickson recommended torque values provided in Foot Pounds



**PRODUCTION DUAL REBOUND STRAPS – Outrigger Applications****HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS**

NO.	COMPONENT	FASTENER		TORQUE VALUE in foot pounds
		Quantity	Size	
Frame Fasteners furnished and installed by Truck Manufacturer				
1	Upper Saddle to Lower Saddle	4	½"-13 UNC Flange	98 ± 7
2	Saddle to Load Spring Bracket	6	½"-13 UNC Flange	98 ± 7
3	Saddle to Rebound Clip	8	½"-13 UNC Flange	105 ± 15
4	Load Spring Contact Plate to Rebound Strap	4	¾"-16 UNF	52 ± 7
5	Load Spring Contact Plate to Load Spring Shim	4	½"-13 UNC Flange	98 ± 7
6	Load Spring Contact Plate to Beam Assembly	8	⅝"-11 UNC	98 ± 7

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



SECTION 10

Troubleshooting Guide

HAULMAAX

TROUBLESHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTION
Vehicle bouncing excessively	Vehicle not equipped with shock absorbers	Install an aftermarket shock kit, see Parts List Section
	Leaking shock absorber	Replace shock absorber
	Damaged or missing shock absorber	Replace shock absorber
Suspension has harsh or bumpy ride	Incorrect progressive / auxiliary load spring adjustment	Adjust progressive / auxiliary load spring to proper setting, see Load Springs Adjustment in the Alignment & Adjustments Section
	Damaged progressive / auxiliary load spring	Replace progressive / auxiliary load spring
	Damaged bolster springs / tie-bar bolster springs assembly	Replace bolster springs / tie-bar bolster springs assembly
Vehicle leans	Incorrect progressive / auxiliary load spring adjustment	Adjust progressive / auxiliary load spring to proper setting, see Load Springs Adjustment in the Alignment & Adjustments Section
	Damaged progressive / auxiliary load spring	Replace progressive / auxiliary load spring
	Damaged bolster springs / tie-bar bolster springs assembly	Replace bolster springs / tie-bar bolster springs assembly
Irregular tire wear	Incorrect axle alignment	Align axles. Refer to vehicle manufacturer's specifications
Bulged bolster springs / tie-bar bolster springs	Suspension is overloaded	Redistribute load to correct weight and replace bolster springs
	Worn progressive / auxiliary load spring	Replace progressive / auxiliary load springs and/or shims and replace bolster springs
	Axles not centered	Center axles under frame rails and replace bolster springs
Loose saddle assembly fasteners	Suspension is overloaded	Redistribute load to correct weight
	Frequent hard stop/start	Increase fastener inspection intervals
		Review driving habits to reduce frequency of hard stop/start
Outboard frame bracket cracked	Suspension is overloaded	Redistribute load to correct weight
	Loose saddle assembly fasteners	Increase fastener inspection intervals
	Loose/broken inboard frame bracket	Correct inboard frame bracket condition
Loose auxiliary contact plate fasteners	Suspension is overloaded	Redistribute load to correct weight
	Frequent hard stop/start	Increase fastener inspection interval
		Review driving habits to reduce frequency of hard stop/start
Saddle leg to equalizing beam contact	Slipped/loose/broken inboard frame bracket	Correct inboard frame bracket condition
	Axles not centered	Center axles under frame rails



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 **1.866.755.5968** (toll-free) or **1.630.910.2800** for additional information.*



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