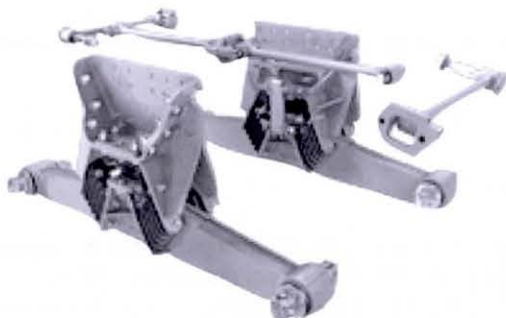




H TECHNICAL PROCEDURE

HAULMAAX® Rear Suspension

SUBJECT: Service Instructions

LIT NO: 17730-244

DATE: November 2014

REVISION: F

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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

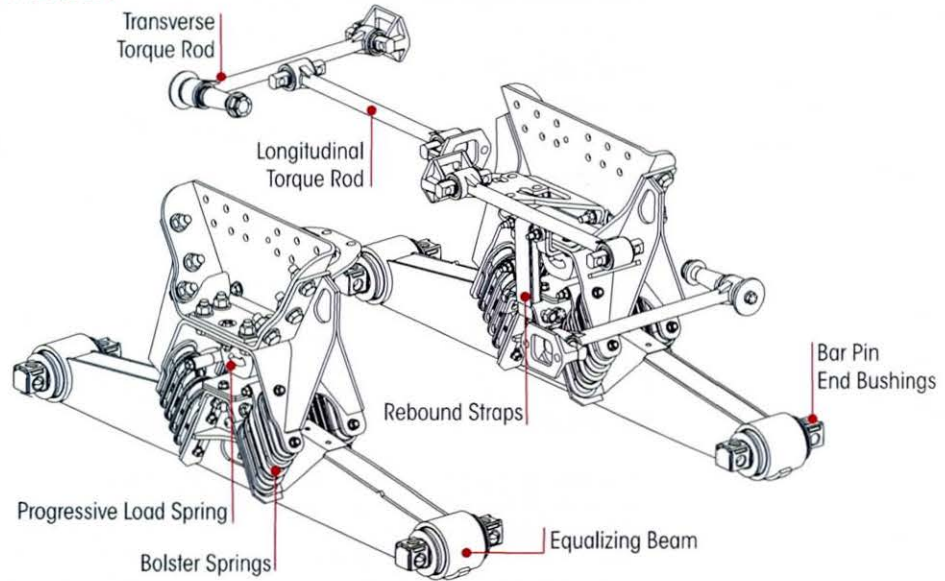
Advanced engineering design methods and experience gathered from millions of Hendrickson suspensions created HAULMAAX, a rugged, yet lightweight rubber vocational rear suspension that saves weight over competitive suspensions for greater payloads and route consolidation.

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 updated 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.

FIGURE 2-1



Major Components Include:

- **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.
- **ULTRA ROD® torque rods** — Improve cornering by controlling lateral forces. Transverse rods ensure maximum lateral axle control and straight line suspension stability. Longitudinal rods engineered to optimize resistance to wind up during acceleration and braking.
- **Progressive Load Spring** — 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 spring to deliver unparalleled empty ride quality and loaded stability.
- **Optional shock absorbers** — Provide additional driver comfort. Required for tractor and logging applications. Available as production or aftermarket options.



HAULMAAX SPECIFICATIONS

	HMX 400	HMX 460
Installed Weight ¹ (54" axle spacing)	855 lbs	861 lbs
Suspension Rating	40,000 lbs	46,000 lbs
GVW Approval ²	73,000 lbs	80,000 lbs
GCW Approval	160,000 lbs	190,000 lbs
Site Travel Rating ³	55,000 lbs	60,000 lbs
Diagonal Articulation ⁴	17 inch	17 inch
Lift Axles	Approved	Approved
Ride Heights (loaded) ⁵	9.5", 10.5", 11.5", 13.25", 15.5"	9.5", 10.5", 11.5", 13.25", 15.5", 18.5"
Axle Spacing ⁶	52", 54", 60", 72.5"	52", 54", 60", 72.5"
Shock Absorber Applications ⁷	Tractors, Logging	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. All such applications must comply with applicable Hendrickson specifications and must also be approved by the respective vehicle manufacturer with the vehicle in its original, as-built configuration. Contact Hendrickson and the respective vehicle manufacturer for approval of additional applications.

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. Site travel rating — operators using vehicles equipped with liftable pusher or tag axles must not exceed published ratings. Ratings are limited to no more than five percent of vehicle operation at speed not to exceed five mph. Liftable pusher or tag axles should only be raised (or unloaded) to improve vehicle maneuverability in off-road use or when vehicle is empty. Site travel ratings are consistent with published axle manufacturer's limitations. Axle and suspension 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.

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

**DANGER**

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

**WARNING**

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

**CAUTION**

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, LOSS OF VEHICLE CONTROL, PERSONAL INJURY, OR PROPERTY DAMAGE.

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



WARNING

LOAD CAPACITY

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



WARNING

MODIFYING COMPONENTS

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



WARNING

TORCH/WELDING

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

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



WARNING

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 LOSS OF VEHICLE CONTROL, 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

DO NOT AT ANY TIME WORK AROUND OR UNDER A VEHICLE SUPPORTED ONLY ON LIFTING DEVICES. THE VEHICLE MUST BE SECURELY CHOCKED AND SUPPORTED ON RIGID STANDS OF SUFFICIENT STRENGTH BEFORE WORK MAY COMMENCE, FAILURE TO DO SO CAN CAUSE PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

WARNING

LOAD SPRING SHIM

AT LEAST ONE 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, LOSS OF VEHICLE CONTROL 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

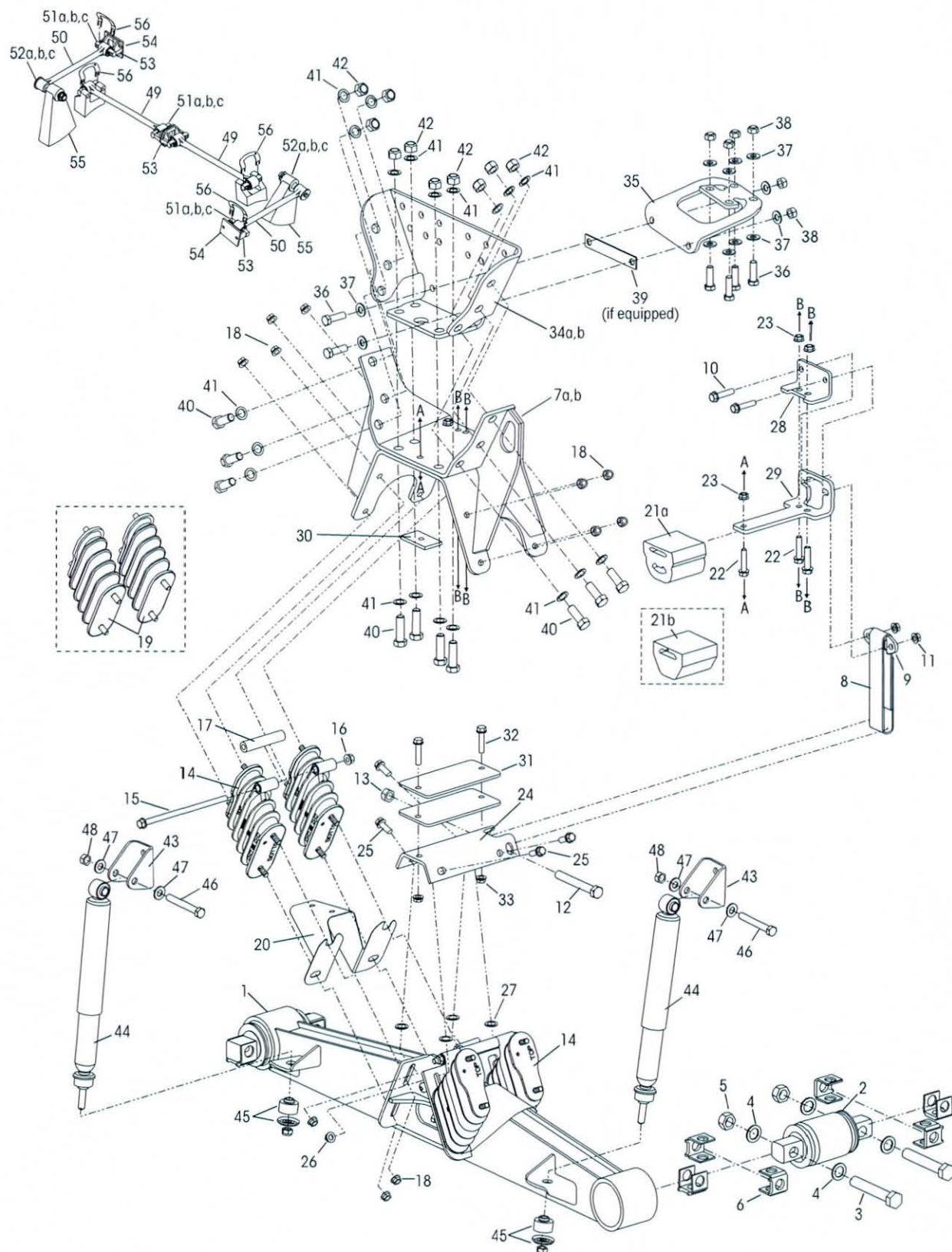
SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS, AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY, CAREFULLY FOLLOW THE MANUFACTURER'S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURES:

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 Lists





KEY NO.	PART NO.	DESCRIPTION	NO.REQ.	KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
1		***Equalizing Beam Assembly, 400/460	2	21 a		*Progressive Load Spring	2
	64846-003	52", with Shock Bracket		b		*Auxiliary Load Spring	2
	64847-003	52", w/o Shock Bracket		22		*½"-13 UNC 2.25" Flange Bolt	6
	64846-001	54", with Shock Bracket		23		*½"-13 UNC Flange Nut	6
	64847-001	54", w/o Shock Bracket			57974-046	Contact Plate Service Kit, One Side, Includes Key Nos. 24-26	
	64846-002	60", with Shock Bracket		24	59191-000	Load Spring Contact Plate	2
	64847-002	60", w/o Shock Bracket		25		*⅝"-11 UNC 1.5" Dacromet XL Flange Bolt for Vehicles built after 11/07 ***Replaces 60818-001	8
	34013-088L	Bar Pin Bushing Service Kit, One Wheel End, Includes Key Nos. 2-6a		26		*⅝"-11 UNC Dacromet XL Flange Nut for for Vehicles built after 11/07 ***Replaces 60819-000	8
	34013-188L	Rotating Bar Pin Bushing Service Kit, Optional, One Wheel End, Includes Key Nos. 2-6a		27		***Load Spring Contact Plate Spacer for Vehicles built prior to 11/07	8
2		*Bar Pin Bushing	4	28	60613-000	Rebound Support Angle	2
	56659-005	Equalizing Beam End Fastener Kit, Per Beam, Includes Key Nos. 3-5		29	59384-000	Load Spring Bracket	2
3		*1"-8 UNC Hex 6.0" Bolt	8	30	60874-000	Load Spring Spacer	2
4		*1" Hardened Washer	16	31	60791-000	Load Spring Shim - 0.25" Quantity may vary for vehicles built prior to 07/15/14 equipped with Auxiliary Load Spring	4
5		*1"-8 UNC Locknut	8	32	60818-002	½"-13 UNC 2.25" Flange Bolt	4
6		Bar Pin Shim	8	33	60819-000	½"-13 UNC Flange Nut	4
a	50130-000	0.19" / 0.19" Standard		34		Outboard Frame Bracket, <i>see page 11</i> Vehicles built after 01/12/03, Paccar vehicles built prior to 01/13/03	2
b	50131-000	0.25" / 0.12" Optional		a		Inboard Frame Bracket, <i>see page 10</i>	2
c	57026-000	0.375" Optional flat shim		b		32043-004 ⅝"-11 UNC 2.25" Hex Bolt *****M16 Hex Bolt	12
	57974-051	Saddle Assembly Service Kit, Tandem Set, HAULMAAX 400, Includes Key No. 7a and Kit No. 57974-048		37	22962-004	⅝" Hardened Washer *****M16 Hardened Washer	24
	57974-050	HAULMAAX 460, Includes Key No. 7b and Kit No. 57974-049		38	47764-000	⅝"-11 UNC Locknut *****M16 Locknut	12
	57974-048	Saddle Assembly Fastener Kit, Tandem Set, HAULMAAX 400, Includes Key Nos. 10-11, 18, 22-23, 25-26, 40-42		39		Inboard Spacer (<i>if equipped</i>) As Req. ⅛" (For Freightliner vehicles w/liner, and Paccar vehicles - ⅜" Frame Rail w/liner and ½" Frame Rail w/o liner)	
	57974-049	HAULMAAX 460, Includes Key Nos. 10-11, 15-16, 18, 22-23, 25-26, 40-42		60618-001		⅛" (For Freightliner vehicles w/liner, and Paccar vehicles - ⅜" Frame Rail w/liner and ½" Frame Rail w/o liner)	
7		Saddle Assembly, Vehicles built after 01/13/03	2	60618-002		⅜" (For Paccar vehicles - ⅜" Frame Rail with 2 liners)	
a	64642-000	HAULMAAX 400			64179-038	Outboard Frame Bracket to Saddle Assembly Fastener Kit, Includes Key Nos. 40-42	
b	64643-000	HAULMAAX 460		64179-039		Tandem Set One Side	
		• Vehicles built prior to 01/13/03 <i>require</i> <i>Conversion Service Kits, see page 11</i>		40		*M20 x 2.5-6G 65 mm Hex Bolt	20
	64179-028	Rebound Strap Service Kits One Side, Includes Key Nos. 8-13		41		*M20 Hardened Washer	40
	64179-045	Outrigger Tandem Set, <i>see page 12</i>		42		*M20 x 2.5-6H Locknut	20
	64179-046	Outrigger with Bolster Springs, Tandem Set, <i>see page 12</i>		43	60304-000	Upper Shock Bracket (<i>if equipped</i>) Single Shock Absorber Service Kit, (<i>if equipped</i>) Includes Key Nos. 44-48 16.5" Saddle Height 17.5"/18.5" Saddle Height	4
8		*Rebound Strap	2		64178-005	Aftermarket Shock Absorber Kit for vehicles built with equalizing beams without welded shock absorber mounts, <i>see page 12</i>	
9		*Rebound Clip	2		64178-006	Shock Absorber Assembly (<i>if equipped</i>) Includes Key No. 45 for 16.5" Saddle Height (see Figure 4-1) for 17.5"/18.5" Saddle Height (see Figure 4-1)	4
10	60818-002	½"-13 UNC 2.25" Flange Bolt	4	60680-004L		*Retaining Washer and Bushing	8
11	60819-000	½"-13 UNC Flange Nut	4	60680-005L		32043-005 ⅝"-11 UNC 4.25" Hex Bolt	4
12	21867-007	¾"-16 UNF 6.0" Hex Bolt	2	47	22962-004	⅝" Hardened Washer	8
13	30191-000	¾"-16 UNF Locknut	2	48	47764-000	⅝"-11 UNC Locknut	4
	64179-048	*Tie-bar Bolster Spring Service Kit, 2 Bolsters with 1 Wear Plate, Includes Key Nos. 14-18, 20					
	64179-049	*Bolster Spring Service Kit, 2 Bolsters with 1 Wear Plate, Includes Key Nos. 18-20					
14		*Tie-bar Bolster Spring	8				
15	60818-003	½"-13 UNC 10.0" Flange Bolt for Tie-bar	4				
16	60819-000	½"-13 UNC Flange Nut for Tie-bar	4				
17	65742-000	Tie-bar Bolster Spring Spacer	4				
18	60819-000	½"-13 UNC Flange Nut	32				
19		*Bolster Spring	8				
20	64890-000	Wear Plate <i>Replaces 60498-001 and 60498-002</i>	4				
		Progressive Load Spring Service Kits for Vehicles built after 07/15/14					
	60961-745	One Side, Includes Key Nos. 21a, 22-23					
	60961-747	Tandem Set, Includes Key Nos. 21a, 22-23 • Also a conversion kit for vehicles built prior to 07/15/14					
	60961-746	Weight Bias Kit with Shims, Includes Key Nos. 21a,b, 22-23, 31-33, <i>Replaces 65902-004</i>					
	64179-004	Auxiliary Load Spring Service Kit, One Side, for vehicles built prior to 07/15/14, Includes Key Nos. 21b, 22-23					



KEY NO.	PART NO.	DESCRIPTION	NO.REQ.	KEY NO.	PART NO.	DESCRIPTION	NO.REQ.
49		One-piece Longitudinal Torque Rod Assembly, Straddle/Straddle		52		Taper Bushing	2
		ULTRA ROD™, Includes Key No. 51a		a	64697-000H	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	
50		****One-piece Transverse Torque Rod Assembly, Straddle/Taper, Specify Length in mm	2		65781-000	ULTRA ROD PLUS Straddle/Taper	
	62350-XXX	ULTRA ROD, Includes Key Nos. 51a-52a			65781-001	XTRB Straddle/Straddle	
	72350-XXX	ULTRA ROD PLUS, Includes Key Nos. 51b-52b			65781-002	XTRB Straddle/Taper	
	92350-XXX	XTRB, Includes Key Nos. 51c-52b		53	22186-000	Torque Rod Frame Bracket	2
51		Straddle Bushing	4	54	45045-003	Back-up Plate (for Torque Rod)	2
a	47691-000L	ULTRA ROD		55		*****Transverse Rod Axle Bracket	2
b	64400-002L	ULTRA ROD PLUS		56	49689-000	Torque Rod Shim	As req.
c	66649-002L	XTRB					

INBOARD FRAME BRACKET

KEY NO. 35	Beam Length	Frame Width	HAULMAAX Saddle Height					
Vehicle Manufacturer			16.5"	17.5"	18.5"	20.25"	22.5"	25.5"
Autocar	All	34"	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" 34.68" - 34.94"	60617-101		60617-104	60617-103		69681-000
Mack	54"	33.5"	64988-301					
	52", 60"		64988-311					
Oshkosh	All	34"			65078-003			
Paccar with liner		34.75"	67545-001 <i>replaces 65078-001</i>	67545-002 <i>replaces 65078-002</i>	67545-003 <i>replaces 65078-003</i>			
Paccar without liner		34"	65079-001	65079-002	65079-003			
		34.75"						
Volvo	54"	33.5"	64988-302					
	52", 60", 72.5"		64988-312					
Western Star	All	34"	60617-501	60617-502	60617-503			

NOTES

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

** HAULMAAX 460 suspensions must be serviced with the new tie-bar bolster spring Kit No. 64179-048. All HAULMAAX 400 suspensions can be serviced using the existing bolster springs Kit No. 64179-049 or if preferred, 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 November 2007, when replacing the load spring contact plate or equalizing beam, Kit No. 57974-046 is required. Kit includes instructions to address adjustments and the elimination of load spring spacers.

**** Transverse rods are mandatory for the HAULMAAX rear suspension regardless of axle spacing, refer to Literature No. 59310-004.

***** 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.

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



OUTBOARD FRAME BRACKET — VEHICLES BUILT AFTER 01/13/03

KEY NO. 34		HAULMAAX Saddle Height (Dim. "A" in Figure 4-1 below)					
Vehicle Manufacturer	Frame Width	16.5"	17.5"	18.5"	20.25"	22.5"	25.5"
Autocar	34"	64595-611	64595-612	64595-613			
CCC		64595-801 <i>replaces 64595-001</i>					
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			
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			

PACCAR ONLY — OUTBOARD FRAME BRACKET and SADDLE ASSEMBLY Conversion Kits
Vehicles Built PRIOR to 01/13/03

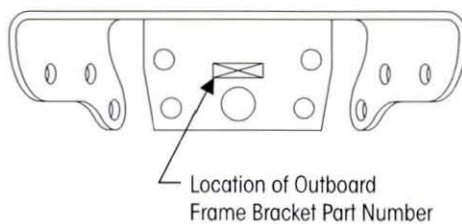
		Discontinued Part Nos.		*Conversion Kit Nos.					
Frame Width	Saddle Height (Dim. "A", see Figure 4-1)	**Outboard Frame Bracket	***Saddle Assembly	40K lbs. Capacity	46K lbs. Capacity	57974-XXX Conversion Kit Contents			
34"	16.5"	59399-001	64829-000 (40K CAPACITY)	57974-024	57974-030	Key No.	Description	Qty.	
	17.5"	59399-002		57974-025	57974-031	34a	Outboard Frame Bracket	1	
	18.5"	59399-003		57974-026	57974-032	7	Saddle Assembly	1	
34.75"	16.5"	59399-004	64828-000 (46K CAPACITY)	57974-027	57974-033	36	5/8"-11 UNC Hex Bolt 2.25"	14	
	17.5"	59399-005		57974-028	57974-034	37	5/8" Hardened Washer	28	
	18.5"	59399-006		57974-034	57974-035	38	5/8"-11 UNC Locknut	14	
						40	M20 x 2.5"- 6G Hex Bolt 65 mm	10	
						41	M20 Hardened Washer	20	
						42	M20 x 2.5"-6H Locknut	10	

NOTE:

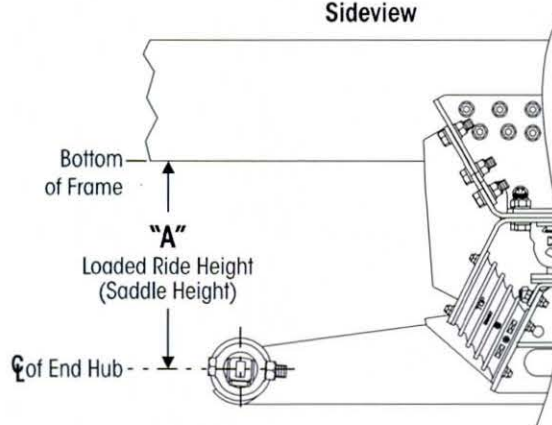
- * Refer to Hendrickson Assembly Instructions Literature No. 59310-020.
- ** Any customer replacing a 59399- series outboard frame brackets **MUST** also update the saddle assembly and hardware using a 57974 series Conversion Kit. Two Conversion Kits are necessary to convert one vehicle.
- *** Any customer replacing a 64829-000 or 64828-000 saddle assembly **MUST** also update the outboard frame bracket and hardware. Two kits needed per vehicle.

FIGURE 4-1

Outboard Frame Bracket Top View



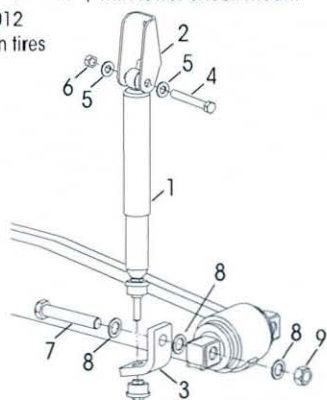
Sideview



■ Aftermarket Service Kits

Service Kit Nos.	Saddle Ht.	Aftermarket Shock Absorber Tandem Set
64178-003	16.5"	
64178-004	17.5"/18.5"	For equalizing beams not equipped with lower shock mount
64178-009	16.5" (Mack)	

Reference Lit. No. 59310-012
Not available with 315 mm tires

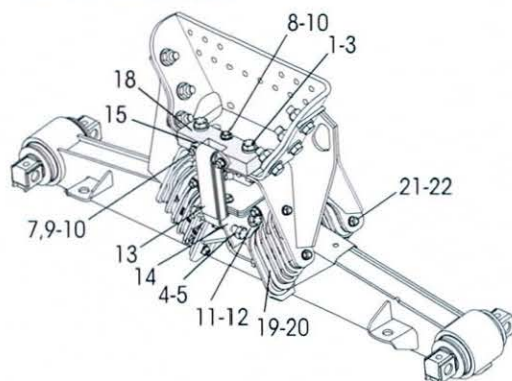


KEY NO.	PART NO.	DESCRIPTION	QTY.
1		Shock Absorber Assembly	4
	60680-004L	16.5" Saddle Ht.	
	60680-005L	17.5"/18.5" Saddle Ht.	
2	64146-000	Upper Shock Bracket	4
3	64148-001	Lower Shock Bracket Front	2
	64148-002	Lower Shock Bracket Rear (Not Shown)	2
4	32043-005	5/8"-11 UNC 4.5" Hex Bolt	4
5	22962-004	5/8" Hardened Washer	8
6	47764-000	5/8"-11 UNC Locknut	4
7	48941-001	1"-8 UNC 6.75" Hex Bolt	4
8	22962-008	1" Hardened Washer	12
9	48942-000	1"-8 UNC Locknut	4

Service Kit No.	Rebound Strap Enhancement with Bolster Springs Tandem Set
64179-046	For outrigger applications

Service Kit No.	Rebound Strap Enhancement Tandem Set
64179-045	For outrigger applications

Reference Lit. No. 59310-048



KEY NO.	PART NO.	DESCRIPTION	QTY.
	64179-046	Rebound Strap Enhancement with Bolster Springs Tandem Set, Includes Key Nos. 1-22	
	64179-045	Rebound Strap Enhancement Tandem Set, Includes Key Nos. 1-18	
1	21867-007	3/4"-16 UNF 6.0" 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 4.0" Bolt	4
5	66137-000	3/4"-10 UNC Flange Locknut	4
6	60818-001	1/2"-13 UNC 1.5" Flange Bolt (Not Shown)	4
7	24531-009	1/2"-13 UNC 4.0" Bolt	12
8	24531-014	1/2"-13 UNC 5.0" 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 1.5" 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 10.0" Flange Bolt	4
22	60819-000	1/2"-13 UNC Flange Nut	36

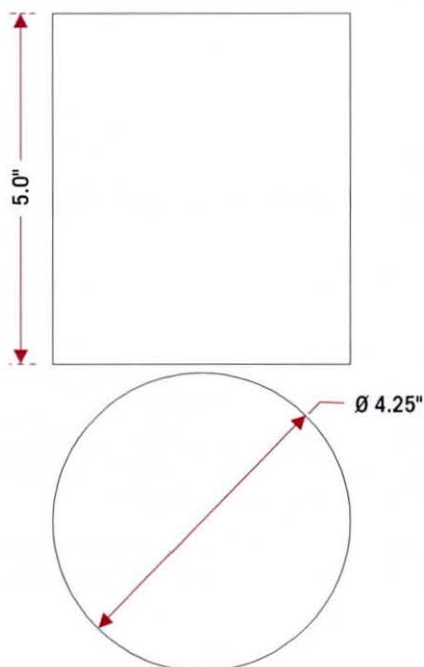
SECTION 5

Special Tools

These shop made tools are designed for servicing bushings. Bushing tools are made from cold rolled steel or equivalent. The drawings are for reference only, Hendrickson does not supply these tool.

BAR PIN END BUSHING TOOL

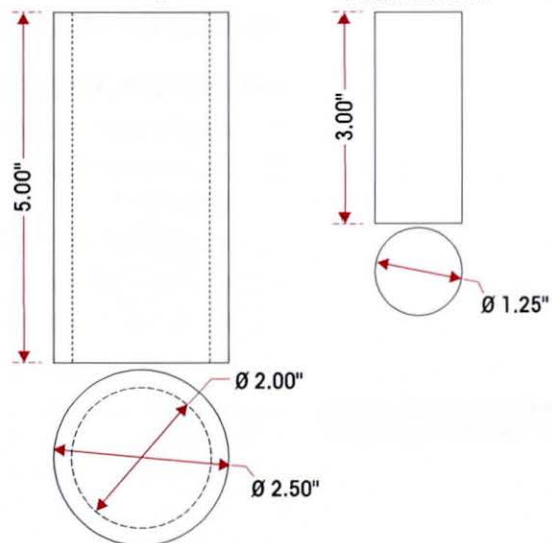
Push Out Tool



TORQUE ROD BUSHING TOOLS

Receiving Tool

Push Out Tool



BAR PIN ADAPTER SET TOOL

Hendrickson Part No. 66086-103

OTC Part No. 1757

Contact info: 800-533-6127 or visit otctools.com



BAR PIN REMOVAL TOOLS

Hendrickson Part No. 66086-104

OTC Part No. 206457

Contact info: 800-533-6127 or visit otctools.com



Hendrickson Part No. 66086-105

OTC Part No. 302030

Contact info: 800-533-6127 or visit otctools.com





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.

INSPECTION INTERVALS**PRE-DELIVERY INSPECTION**

1. Visually inspect suspension for proper assembly
2. Check all fasteners for proper torque with special attention to the following suspension connections:
 - Saddle to the outboard frame bracket fasteners
 - Equalizing beam end connections
 - Inboard frame bracket to the cross member fasteners
 - Load spring contact plate fasteners to the equalizing beam assembly

**WARNING**

AT LEAST ONE 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, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

3. Set load spring shims to required specifications, the number of shims (minimum of one shim and maximum of five shims, refer to Table 7-1) is dependent on the following criteria:
 - Vehicle empty weight
 - Vehicle application
4. Verify the lateral alignment of the axles are within the vehicle manufacturer's tolerances.

INSPECTION AT 1,000 MILES

1. Visually inspect suspension components. Check for:
 - Proper suspension function
 - Signs of unusual movement, loose or missing components
 - Signs of abrasive or adverse contact with other components
 - Damaged, bent or cracked parts
2. Check all fasteners for proper torque with special attention to the following suspension connections:
 - Saddle to the outboard frame bracket fasteners
 - Equalizing beam end connections
 - Inboard frame bracket to the cross member fasteners
 - Load spring contact plate fasteners to the equalizing beam assembly

PREVENTIVE MAINTENANCE

- **Every three months** inspect load springs, rebound straps, wear plates, and bolster springs / tie-bar bolster springs.
- **Every six months** inspect equalizing beam end connections.
- **Every twelve months:**



1. Visually inspect suspension for proper assembly
2. Check all fasteners for proper torque with special attention to the following suspension connections:
 - Saddle to the outboard frame bracket fasteners
 - Equalizing beam end connections
 - Inboard frame bracket to the cross member fasteners
 - Load spring contact plate fasteners to the equalizing beam assembly
3. Verify the lateral alignment of axles are within the vehicle manufacturer's tolerances.
4. Visually inspect suspension components. Check for all of the following and replace components as necessary:
 - Proper suspension function
 - Signs of unusual movement, loose or missing components
 - Signs of abrasive or adverse contact with other components
 - Damaged, bent or cracked parts

COMPONENT INSPECTION

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

- **Load spring, bolster spring / tie-bar bolster spring and rebound strap** — See Load spring, Bolster Spring and Rebound Strap inspection in this section.
- **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 inspection in this section.
- **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.
- **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. Misting is not considered a leak. See Shock Absorber Inspection in this section.
- **Torque rods** — All torque rods must be inspected every six 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 Plate** — Look for any signs of wear and damage. See Wear Plate inspection in this section.

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

LONGITUDINAL AND TRANSVERSE TORQUE RODS

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

- **Method 1** — **For Tractor applications only** with brakes applied, slowly rock the empty vehicle with power while a mechanic visually checks the action at both ends.
- **Method 2** — with the vehicle shut down, a lever check can be made with a long pry bar placed under each rod end and pressure applied.

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

The length of the torque rods is determined by the truck manufacturer for optimum drive line 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.

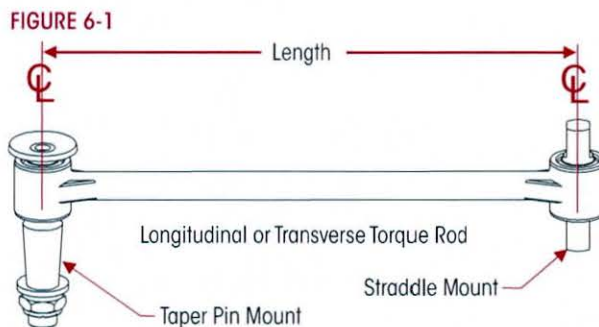
Straddle mount torque rod end attaching fasteners are furnished by the vehicle manufacturer. It is important that the tightening torque of the locknuts be checked during preventive maintenance service. Follow the vehicle manufacturer's specifications for torque values.

NOTE

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

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

Whether the bushings are straddle mount or taper pin mount, (see Figure 6-1) they can be replaced by pressing out the worn bushing and installing a new genuine Hendrickson bushing. Refer to the technical procedure for the proper replacement instructions for your specific suspension system.



BOLSTER SPRINGS

Inspect all four 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.

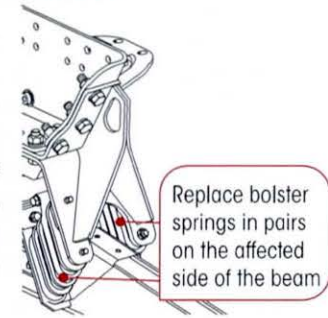
INSPECTION

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 bolster spring / tie-bar bolster spring on one equalizing beam assembly shows signs of damage or excessive wear, Hendrickson recommends that both bolster springs installed on that equalizing beam assembly be replaced. When the bolster springs are replaced on one side only, the vehicle may lean slightly, 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 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.

FIGURE 6-2



- **Bent, burred or overhanging edges** of the bolster spring metal plates may occur due to mishandling in service. If the rubber is not trapped, and there are no sharp metal edges in contact with the free surface of the rubber, this condition is acceptable.
- **Creases** formed by folding of the rubber surface under load are acceptable. These creases appear as stripes on the surface, polished by wear or covered with tacky rubber.
- **Minor oil and grease contamination** in the rubber due to vehicle operation is acceptable. A slight change in shape of the rubber due to permanent set should not be mistaken for oil and grease contamination. Certain softening of the rubber surface is acceptable. However, unacceptable swelling due to contamination will require bolster spring replacement. Measure bolster springs in the unloaded state. If the rubber diameter of the bolster spring exceeds 8 $\frac{3}{4}$ ", then bolster spring replacement is necessary.

FIGURE 6-3 HAULMAAX / HN Gauge - 48422-546

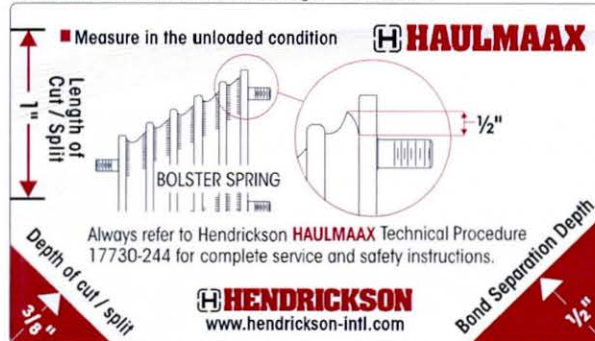
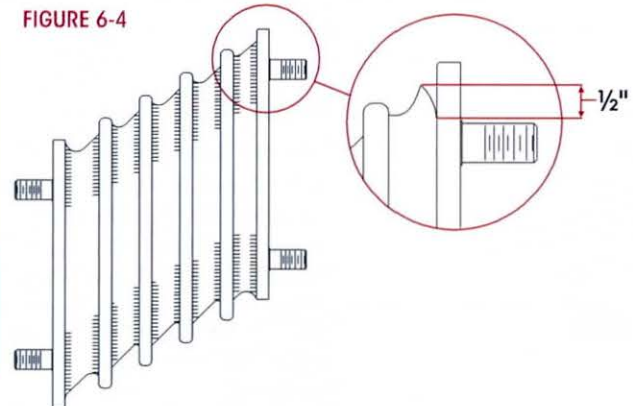


FIGURE 6-4



- 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.
- **Cuts or Splits** in the rubber of over 1.0" in length and an average depth of $\frac{3}{8}$ " 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 $\frac{1}{2}$ " is acceptable. If any bonding separation is more than $\frac{1}{2}$ " 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.

REBOUND STRAP

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 Component Replacement Section of this publication.

LOAD SPRING – 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 Component Replacement Section of this publication.

- **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 6-6.
- **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 6-7.

FIGURE 6-5

Progressive Load Spring

Auxiliary Load Spring



FIGURE 6-6

PROGRESSIVE LOAD SPRING

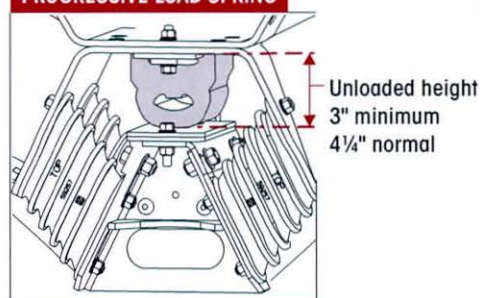
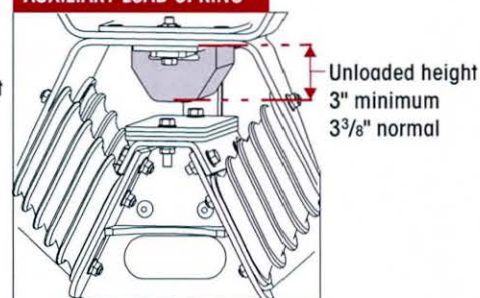


FIGURE 6-7

AUXILIARY LOAD SPRING



WEAR PLATE

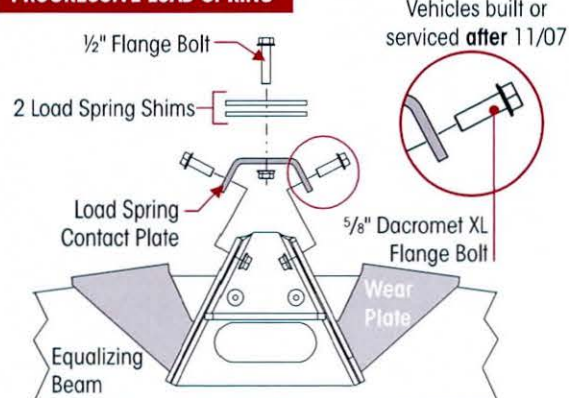
The wear plate is a formed stainless steel component located between the bolster springs / tie-bar bolster springs and the equalizing beam, see Figure 6-8. The function of the wear plate is to prevent chafing of the equalizing beam by the bolster springs / tie-bar bolster springs during certain operational maneuvers. If the wear plate is cracked or worn through, replace as outlined in the Component Replacement Section of this publication.

NOTE

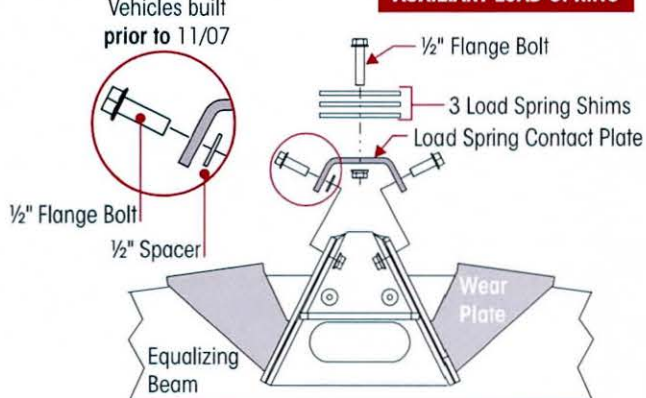
Vehicles manufactured from November 2003 through November 2007 require the installation of load spring contact plate spacers between the contact plate and the equalizing beam, see Figure 6-8.

FIGURE 6-8

PROGRESSIVE LOAD SPRING



AUXILIARY LOAD SPRING



EQUALIZING BEAM END CONNECTION

The equalizing beam end connection for the HAULMAAX is bar pin style with a rubber bushing and alignment shims as shown in Figure 6-9. An inspection of the equalizing beam end connection is necessary when a vehicle is in the shop for major repair work or every six months, whichever comes first.

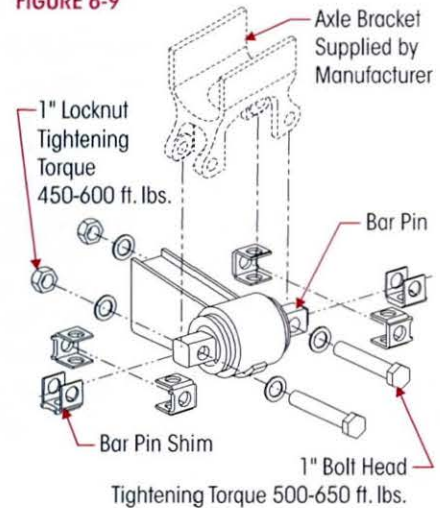
This equalizing beam end connection requires that the fasteners are kept tight to maintain the clamp load of the axle bracket legs to the bar pin. All bushing motion is accommodated by rubber deflection. Tighten the equalizing beam 1" end fasteners to:

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

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.
 - Inspect equalizing beam end connection for signs of excessive wear or looseness. An equalizing beam end connection, which is visibly cleaner than the other connections, may indicate a loose connection.
 - Look for worn, frayed, or distorted rubber in the equalizing beam end bushing.
 - Look for the equalizing beam to be lower in the beam hanger.
 - Place a jack under each equalizing beam end as shown. Raise the jack to check for movement in the connection or rubber components, see Figure 6-10.

FIGURE 6-9

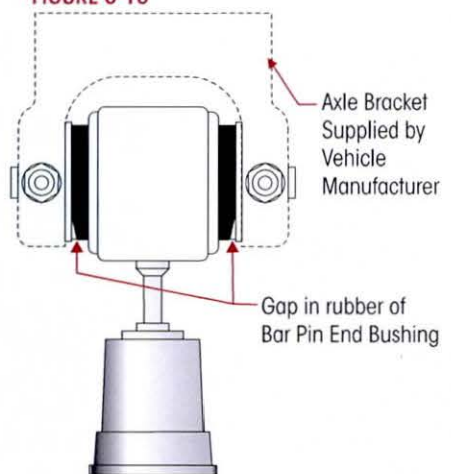


WARNING

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

3. If bar pin movement or looseness is detected in the equalizing beam end hub, **DO NOT** operate vehicle. Replace the equalizing beam end bushings and all connecting parts. Refer to the Component Replacement Section of this publication.
4. Check and record torque values, as received, for each 1" bar pin fastener. Correct torque values as required making sure all fasteners are tightened to:
 - At the **locknuts** to 450-600 foot pounds torque or
 - At the **bolt head** to 500-650 foot pounds

FIGURE 6-10



5. Recheck equalizing beam end connections for signs of looseness.
 - Inspect alignment shims in equalizing beam end for looseness. Lightly tap on the alignment shims to see if they can be moved.
 - Inspect equalizing beam end connection for signs of excessive wear or looseness.

NOTE

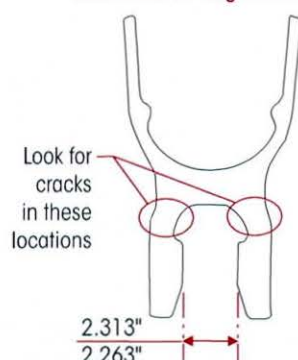
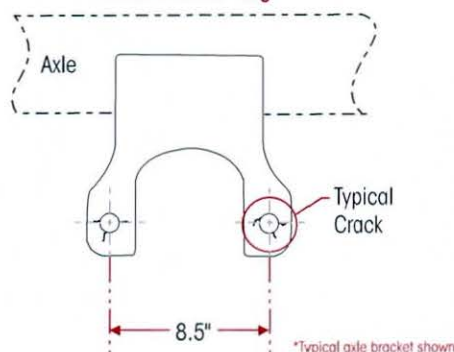
An equalizing beam end connection, which is visibly cleaner than the other connections, may indicate a loose connection.

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

AXLE BRACKET

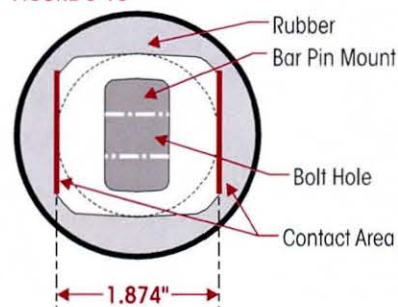
The axle brackets are furnished and welded into position by the vehicle or axle manufacturer.

- **When inspecting the equalizing beam end connection** also inspect the axle brackets for damage or cracks, see Figure 6-11. Measure the dimension as shown in Figure 6-11, any axle bracket that is found damaged or cracked must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.
- **When an equalizing beam is removed for repair, or an inspection of the equalizing beam end connection reveals movement,** measure the distance between the axle bracket legs for correct width. Refer to Figure 6-12 for measurement location and dimensions. An axle bracket outside of the measurement range must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.

FIGURE 6-11**Axle Bracket* Leg Dimensions****FIGURE 6-12****Axle Bracket* Leg****BAR PIN END BUSHING**

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

- Visual inspection of contact area (the flat face area where bar pin contacts the axle bracket) on the bar pin reveals signs of excessive wear. If the thickness of the bar pin in the contact area measures less than 1.874", bar pin end bushing requires replacement, see Figure 6-13.
- Visual inspection of the bolt holes in the bar pin reveals signs of elongation or wear, see Figure 6-13.

FIGURE 6-13

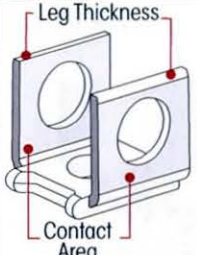
If bar pin measurement is **less than 1.874"**, component replacement is required.

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 6-14, replacement of bar pin shim is required.

FIGURE 6-14



Thickness of Shim Leg	Minimum Thickness Required
1/8"	0.123"
3/16"	0.186"
1/4"	0.248"
3/8"	0.371"

SHOCK ABSORBER INSPECTION (if equipped)

NOTE

Shock absorber 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.

Hendrickson uses a long service life, premium shock absorber on all HAULMAAX suspensions. If shock absorber replacement is necessary, Hendrickson recommends that the shock absorbers be replaced with identical Hendrickson Genuine parts for servicing. Failure to do so will affect the suspension performance, durability, and will void the warranty. 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. It is not necessary to replace shock absorbers in pairs if one shock absorber requires replacement.

FIGURE 6-15



HEAT TEST

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

WARNING

DO NOT GRAB THE SHOCK AS IT COULD POSSIBLY 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 body below the dust cover. Touch the frame to get an ambient reference, see Figure 6-15. 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. Listen for the sound of metal parts rattling inside. Rattling of metal parts can indicate that the shock has an internal failure.

VISUAL INSPECTION

Look for these potential problems when doing a visual inspection. Inspect the shock absorbers fully extended. Replace as necessary.

FIGURE 6-16



LEAKING VS. MISTING SHOCK VISUAL INSPECTION

The inspection must not be conducted after driving in wet weather or a vehicle wash. Shocks need to be free from water. Many shocks are often misdiagnosed as failures. Misting is the process whereby very small amounts of shock fluid evaporate at a high operating temperature through the upper seal of the shock, see Figure 6-17. When the "mist" reaches the cooler outside air, it condenses and forms a film on the outside of the shock body. Misting is perfectly normal and necessary function of the shock. The fluid, which evaporates through the seal area helps to lubricate and prolong the life of the seal.

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

FIGURE 6-17



NOTE

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

If the shock is damaged install new shock absorber and replace as detailed in the Component Replacement Section of this publication.

SECTION 7

Alignment & Adjustments

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.

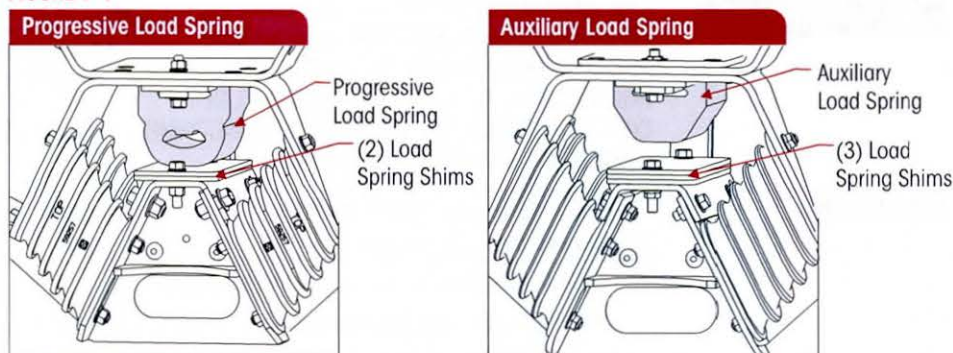
As shown in Figure 7-1, standard production vehicles specified with the HAULMAAX rear suspension are typically equipped with:

- **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 springs. Failure to do so will induce an undesirable vehicle lean.

FIGURE 7-1



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 LOAD SPRING SHIM ON EACH SIDE OF THE SUSPENSION. FAILURE TO DO SO CAN CAUSE PREMATURE COMPONENT WEAR, EQUALIZING BEAM MISALIGNMENT, LOSS OF VEHICLE CONTROL 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.
 - Equipped with **progressive load spring** (maximum of four (4) load spring shims and a minimum of one).
 - Equipped with **auxiliary load spring** (maximum of five (5) load spring shims and a minimum of one).
5. After determining the proper amount of shims required, install or remove the shims as needed.

LOAD SPRING SHIMS 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 7-2.

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

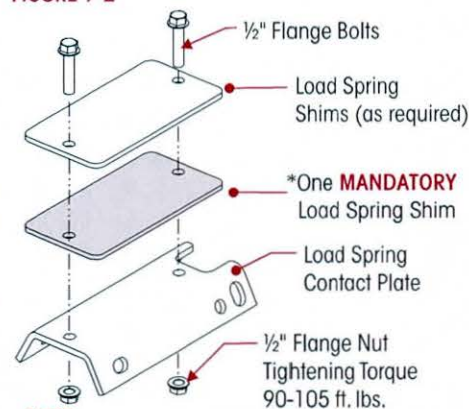
THE HAULMAAX SUSPENSION MUST BE EQUIPPED WITH AT LEAST ONE LOAD SPRING SHIM ON EACH SIDE OF THE SUSPENSION. FAILURE TO DO SO CAN CAUSE PREMATURE COMPONENT WEAR, EQUALIZING BEAM MISALIGNMENT, LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

SERVICE HINT

The bolt length 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:
 - Equipped with **progressive load spring** (maximum of four (4) load spring shims and a minimum of one).
 - Equipped with **auxiliary load spring** (maximum of five (5) load spring shims and a minimum of one).
2. Install the fasteners that attach the load spring shims to the load spring contact plate and tighten to 90-105 foot pounds torque, see Figure 7-2.
3. Lower the frame (If the vehicle was raised for disassembly).
4. Remove wheel chocks.

FIGURE 7-2



NOTE

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

DRIVE AXLE ALIGNMENT INSPECTION PROCEDURE

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

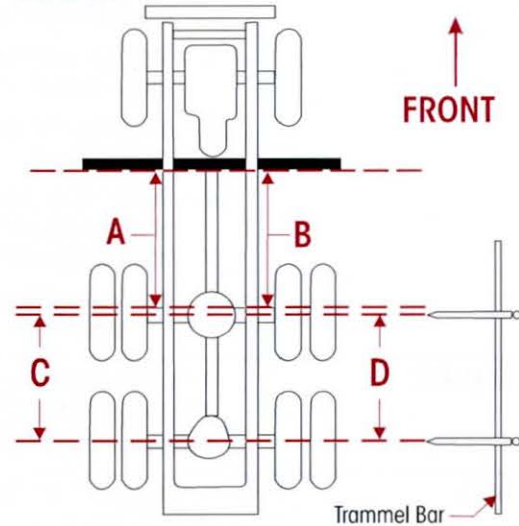
NOTE

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

1. Use a work bay with a level, flat surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead.
3. **DO NOT** set the parking brake. Chock the front wheels of the vehicle.
4. Verify and maintain the air system at full operating pressure.

5. Verify all suspension components are in good condition. Repair or replace any worn or damaged suspension components before proceeding with the alignment process.
6. Ensure all drive axle tires are the same size.

FIGURE 7-3



7. Securely clamp a six-foot piece of STRAIGHT bar stock or angle iron across the lower frame flange as shown in Figure 7-3. Select a location for the bar stock or angle iron as far forward of the drive axle as possible where components will not interfere.
8. Accurately square the bar stock or angle iron to the frame using a carpenter's square.
9. Using a measuring tape, measure from the straight edge to the forward face of the front drive axle arms on both sides of the vehicle as shown in Figure 7-3, **A** and **B**.
10. Calculate the difference between measurements **A** and **B**.
 - a. If the front drive axle is within vehicle manufacturer's specifications, proceed to check the rear drive axle (Step 11).
 - b. If alignment of the front drive axle **IS NOT** within the vehicle manufacturer's specifications, then the alignment of this axle **MUST** be corrected **BEFORE** measuring the rear drive axle alignment (Step 11). Correct the alignment of this axle by following the bar pin alignment instructions.

NOTE

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

11. Using a trammel bar, measure the distance from the spindle center of the front drive axle to the spindle center of the rear drive axle on both sides of the vehicle; see Figure 7-4, **C** and **D**.
12. Calculate the difference between measurements **C** and **D**.
 - a. If the measurements are within the vehicle manufacturer's specifications, then the rear drive axle alignment is acceptable.
 - b. If alignment of the rear drive axle **IS NOT** within the vehicle manufacturer's specifications, then the alignment of this axle **MUST** be corrected. Correct the alignment of this axle by following the bar pin alignment instructions.
13. Recheck measurements to confirm adjustments. Repeat Steps 9 through 12 until the correct alignment is achieved.
14. When all drive axle alignments are within the vehicle manufacturer's specifications then the alignment procedure is complete.

LATERAL ALIGNMENT

1. Use a work bay with a level floor. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used. **DO NOT** set the parking brake. Chock the front wheels of the vehicle.
2. Measure from the outside of the frame rail to the rim flange of the inner tire. Record the measurement.
3. Measure the same distance on the opposite side of the same axle. Record the measurement.
4. 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.

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.

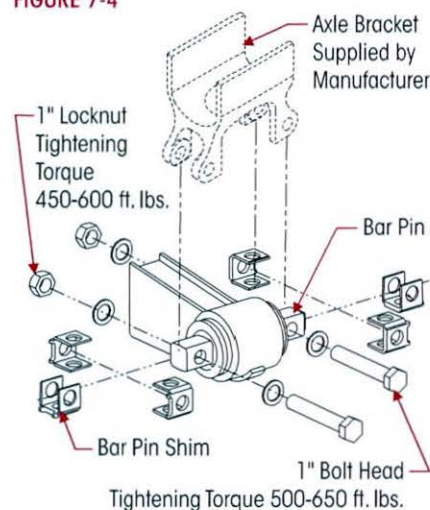
BAR PIN ALIGNMENT

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 Figure 7-4. Hendrickson has three shim designs options for alignment, part number 50130-000 (provided), 50131-000 and 507026-000, see Figure 7-7.

WARNING

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

FIGURE 7-4

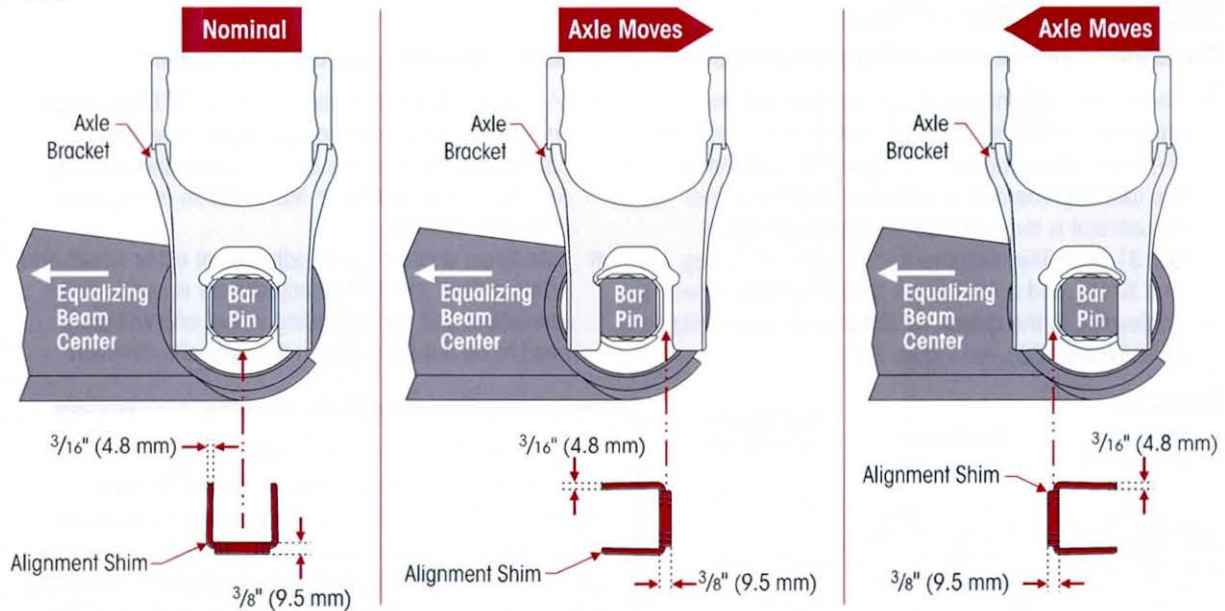


ALIGNMENT ADJUSTMENT

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

1. Determine direction of axle thrust angle. Figure 7-6 illustrates the forward drive axle with a thrust angle to the left (-negative thrust).

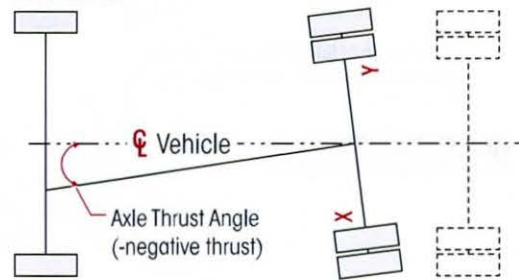
SERVICE HINT Axle movement is in the same direction as the increased shim thickness, see Figure 7-5.

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 7-3.

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 7-6, shim thickness will need to be increased at the front of the bar pin (Location **X**) and/or the rear of the bar pin (Location **Y**).

FIGURE 7-6

NOTE

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

3. Chock the wheels of the front axles to prevent vehicle movement during service.
4. Raise the frame of the vehicle to remove the load from the suspension. Support the frame at this height.
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.

WARNING

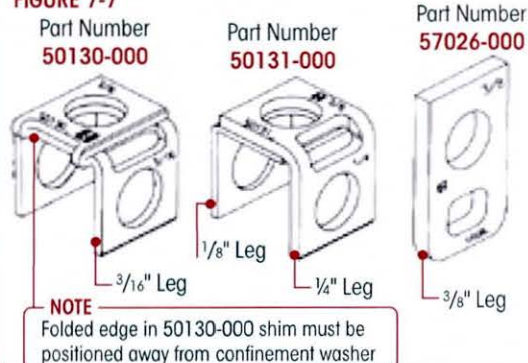
EACH EQUALIZING BEAM END BUSHING HAS ONE INBOARD AND ONE OUTBOARD ALIGNMENT SHIM, FOR A TOTAL OF FOUR SETS OF TWO ALIGNMENT SHIMS PER SUSPENSION. EACH SET OF ALIGNMENT SHIMS MUST BE INSTALLED IN THE SAME ORIENTATION ON ALL OF THE FOUR BAR PINS. EACH OF THE FOUR EQUALIZING BEAM END SHIM LOCATIONS CAN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

BAR PIN ALIGNMENT SHIMS

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

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

FIGURE 7-7



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

WARNING

THE BAR PIN ALIGNMENT SHIM (PART NO. 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE BUSHING, SEE FIGURE 7-7. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE, IMPROPER ALIGNMENT, DAMAGE OR FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

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

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

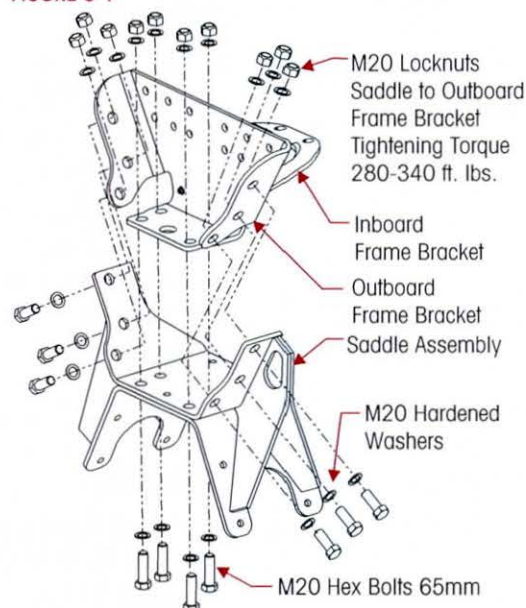
NOTE

The outboard frame bracket on vehicles built prior to January 13, 2003 are obsolete. 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.

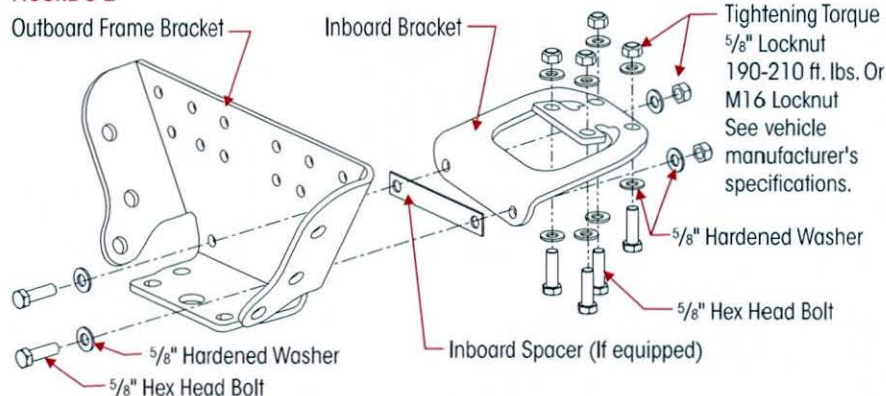
FIGURE 8-1



ASSEMBLY

1. Mount the new outboard frame bracket to the frame by installing the frame fasteners, (see vehicle manufacturer's recommended torque specification for proper torque values).
2. Install the fasteners into the outboard and inboard frame bracket assembly and spacer (if equipped).
3. Tighten to the required torque, see Figure 8-2.
 - M16 locknuts tighten to vehicle manufacturer's specifications.
 - 5/8" Locknuts tighten to 190-210 foot pounds torque.

FIGURE 8-2



4. Completely lower the vehicle.
5. Install the fasteners into the saddle assembly and outboard frame bracket. Tighten to  280-340 foot pounds torque, see Figure 8-1.
6. Remove wheel chocks.

INBOARD FRAME BRACKET

DISASSEMBLY

1. Chock the front wheels of the vehicle.

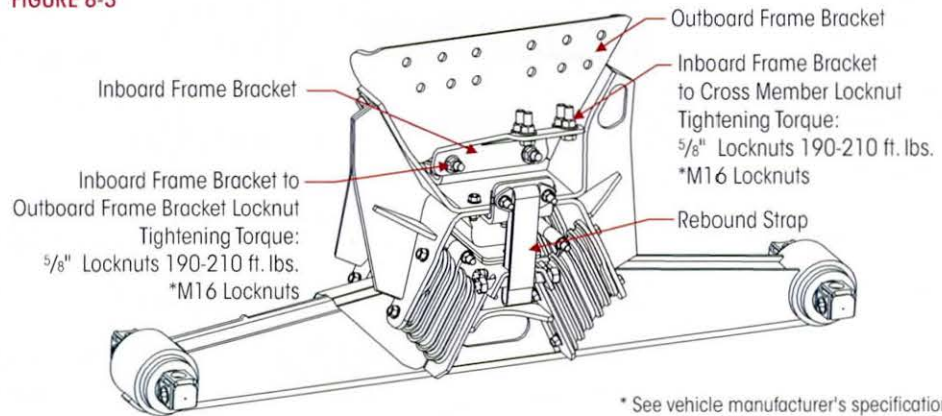
NOTE

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 vehicle until the suspension is fully extended with the tires completely off the ground. Support the frame at this height.
3. Remove the fasteners from the outboard frame bracket, inboard spacer (if equipped), and the inboard frame bracket, see Figure 8-2.
4. Remove the fasteners from the inboard frame bracket and the vehicle's cross member assembly.
5. Remove the inboard frame bracket and inboard spacer (if equipped).

ASSEMBLY

1. Mount the inboard frame bracket to the vehicle's cross member. Install the fasteners until snug. **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.
 - M16 locknuts tighten to vehicle manufacturer's specifications.
 - 5/8" Locknuts tighten to  190-210 foot pounds torque.
3. Tighten the fasteners securing the inboard frame bracket to the vehicle manufacturer's cross member, see Figure 8-3.
 - M16 locknuts tighten to vehicle manufacturer's specifications.
 - 5/8" locknuts tighten to  190-210 foot pounds torque.
4. Remove the frame supports.
5. Remove the wheel chocks.

FIGURE 8-3


* See vehicle manufacturer's specifications

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

1. Chock the front wheels of the vehicle.
2. Raise the vehicle and remove the rear tires.
3. Support both rear axles with jack stands.
4. Remove and discard the upper fasteners from the rebound clip and load spring bracket, see Figure 8-4.
5. Remove and discard the fasteners connecting the load spring to the saddle and the load spring spacer, see Figure 8-4. Remove the load spring.
6. Loosen, **DO NOT** remove, the $\frac{1}{2}$ " flange head locknuts connecting the bolster springs / tie-bar bolster springs to the saddle assembly.
7. Remove and discard the $\frac{1}{2}$ " fasteners connecting the bolster springs / tie-bar bolster springs to the equalizing beam.
8. Remove and discard the tie-bar bolt and spacer (if equipped).
9. Remove and discard the $\frac{5}{8}$ " or $\frac{1}{2}$ " fasteners from the load spring contact plate and equalizing beam, see Figure 8-4.
10. Remove the load spring contact plate with the load spring shims as an assembly.
11. 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.
12. Raise the rear of the vehicle to clear the bolster springs/ tie-bar bolster springs from the equalizing beam. Support the vehicle at this height.
13. Remove and discard the $\frac{1}{2}$ " fasteners that connect the bolster springs / tie-bar bolster springs to the saddle, and remove the bolster springs, see Figure 8-5.

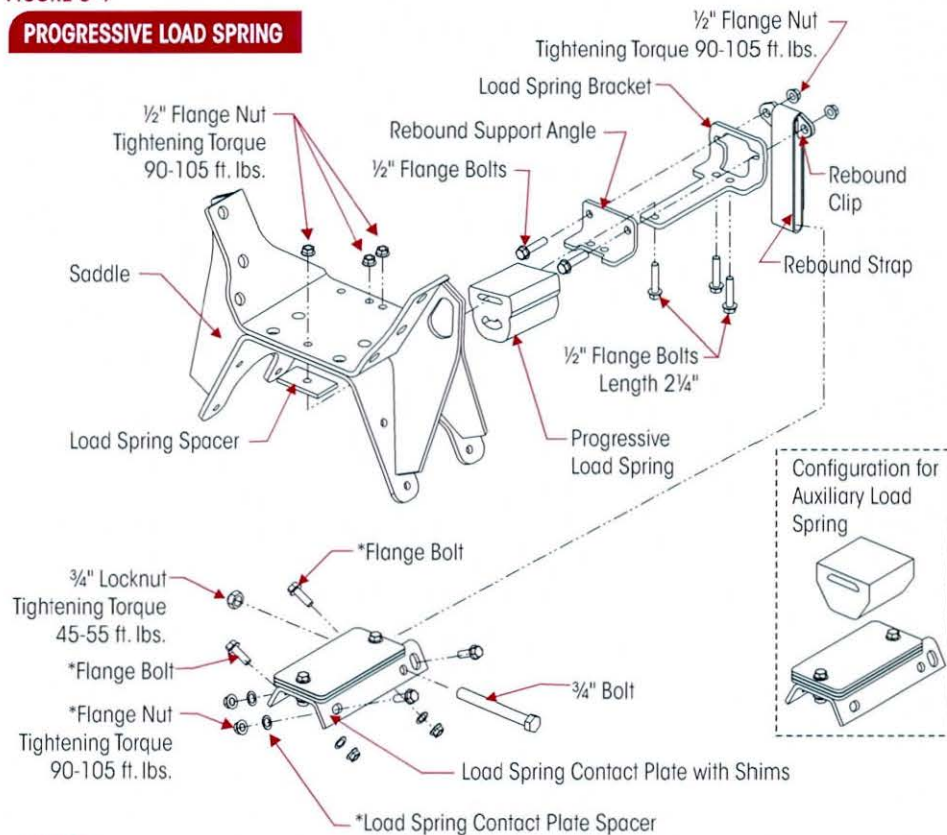


WARNING

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 from the saddle and outboard frame bracket, see Figure 8-6.
15. Remove the saddle.

FIGURE 8-4

PROGRESSIVE LOAD SPRING***NOTE**

For vehicles built prior to 11/07 - 1/2" flange fasteners with spacer (Part No. 22962-014)
 For vehicles built or serviced after 11/07 - 5/8" Dacromet XL flange fasteners without spacer

ASSEMBLY

1. Mount the new saddle to the outboard frame bracket by installing the M20 fasteners and tighten to 280-340 foot pounds torque, see Figure 8-6.
2. 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.
3. 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 90-105 foot pounds torque.

CAUTION

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.

4. 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.
5. Install the lower 1/2" flange head locknuts on the bolster spring studs and tighten both upper and lower bolster spring fasteners to 90-105 foot pounds torque.

FIGURE 8-5

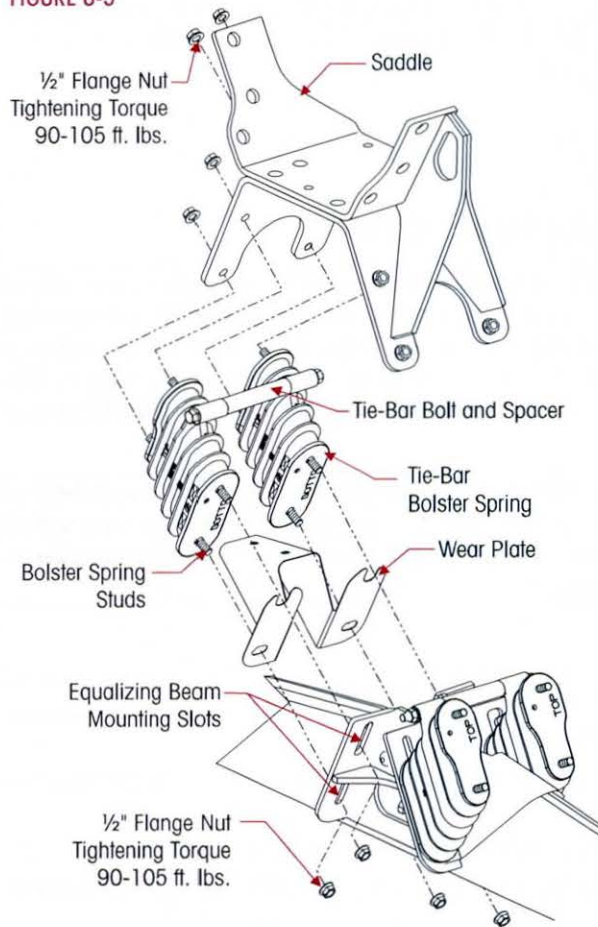


FIGURE 8-6

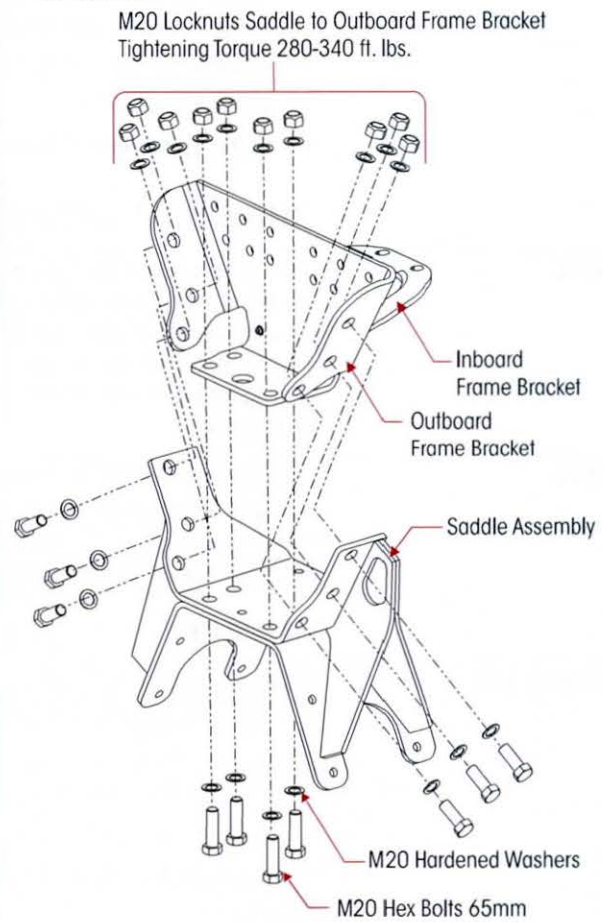
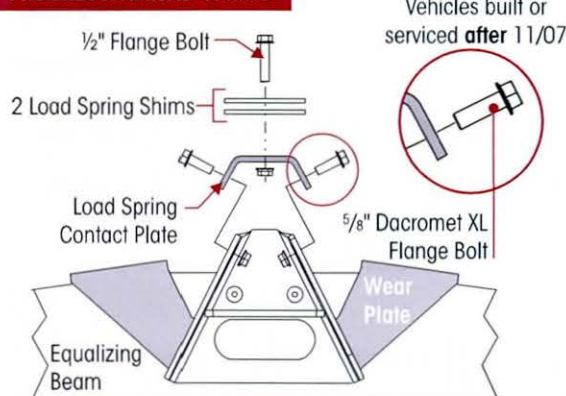
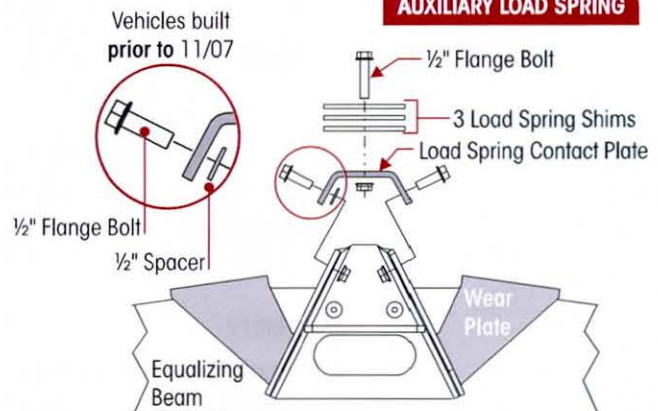


FIGURE 8-7

PROGRESSIVE LOAD SPRING



AUXILIARY LOAD SPRING



6. Mount the load spring contact plate on the equalizing beam by installing the fasteners. Tighten to 90-105 foot pounds torque, see Figure 8-7.
7. Locate the shock absorbers (if equipped) into the upper shock bracket and install the fasteners, tighten to 150-170 foot pounds torque.
8. 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 90-105 foot pounds torque.

9. Mount the rebound clip and upper rebound strap to load spring bracket by installing the ½" flange fasteners and tighten to  90-105 foot pounds torque, see Figure 8-4.
10. Remove the jack stands and install tires.
11. Lower the vehicle.
12. Remove the wheel chocks.

LOAD SPRING – 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 spring to the progressive load spring. The instructions are the same as below with the exception that it is necessary to remove one load spring shim from each side of the suspension. The conversion requires both sides of the tandem to be replaced with the progressive load spring.

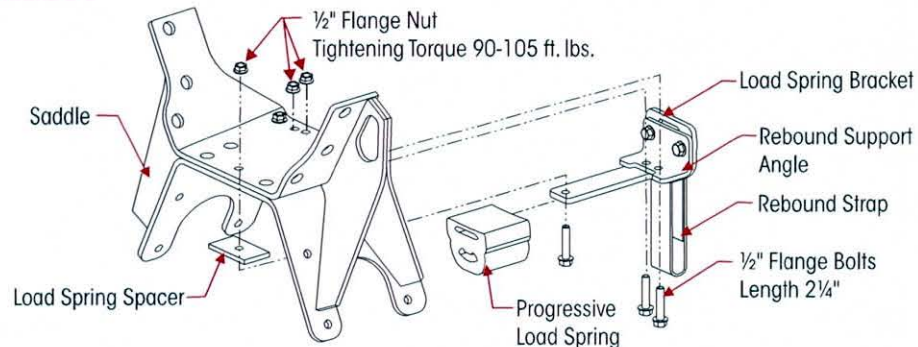
DISASSEMBLY

SERVICE HINT

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

1. Chock the front wheels of the vehicle.
2. Remove the three ½" flange head fasteners from the saddle, progressive / auxiliary load spring and load spring spacer.
3. Raise the frame slightly to create a gap between the load spring and shim.
4. Remove the progressive / auxiliary load spring from the load spring bracket, see Figure 8-8.

FIGURE 8-8



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 head bolts, see Figure 8-8. Tighten to  90-105 foot pounds torque.
3. Locate the locknuts on top of the saddle to prevent interference with equalizing beam assembly and tighten to  90-105 foot pounds torque.
4. Lower the frame.
5. Remove the wheel chocks.

REBOUND STRAP

NOTE

Hendrickson Rebound Strap Enhancement Kit No. 64179-045 is available for outrigger applications for HAULMAAX 400/460 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 pumps, digger derricks, and well diggers. Refer to Hendrickson Publication Nos. SEU-0232 and 59310-048 for more information.

FIGURE 8-9

DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. From the inboard side of the saddle remove the $\frac{1}{2}$ " fasteners that attach the rebound clip to the load spring bracket.
3. Slide the rebound clip out of the upper rebound strap loop, see Figure 8-9.
4. Remove the $\frac{3}{4}$ " fastener that attaches the rebound strap to the load spring contact plate.
5. Remove and discard rebound strap.

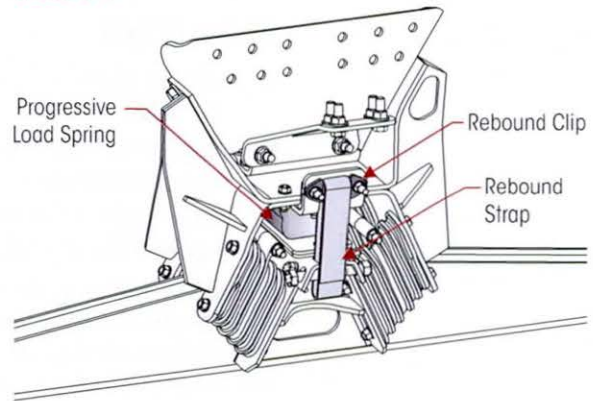
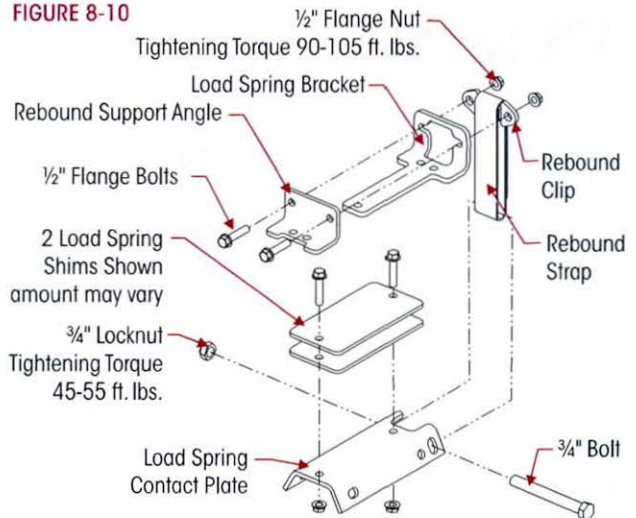


FIGURE 8-10

ASSEMBLY

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.

1. 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 45-55 foot pounds torque, see Figure 8-10.
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 90-105 foot pounds torque, see Figure 8-10.
4. Remove the wheel chocks.

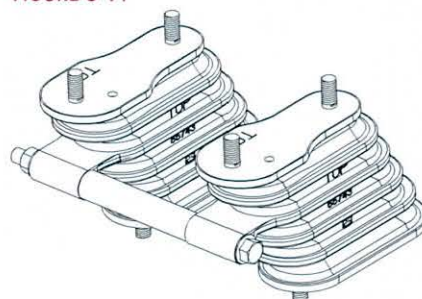


CAUTION

BOLSTER SPRINGS

Effective in June of 2006, an improved bolster spring package was phased into production for the HAULMAAX 460 suspension system. The design enhancement features a tie-bar (see Figure 8-11), which connects the bolster springs using a bolt, spacer, and nut. This newly enhanced bolster spring package applies to the HAULMAAX 460 suspension only. The bolster spring design for the HAULMAAX 400 system will remain the same, although a tie-bar kit will be available in the aftermarket for component replacement.

FIGURE 8-11



TIE-BAR DESIGN

- Achieves greater column stiffness with the use of a tie-bar
- Improves suspension performance even when axles are misaligned
- Remains consistent with the ride quality and stability of the original design

HAULMAAX 460 suspensions must be serviced using the new 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 8-11.

All HAULMAAX 400 suspensions can continue to be serviced using the existing bolster spring service kits, No. 64179-002 and No. 64179-049 (with wear plate), or can be replaced with the Tie-bar Bolster Spring Service Kit Nos. 64179-037 and 64179-048.

CAUTION

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

1. Chock the front wheels of the vehicle.
2. From the inboard side of the saddle remove the two ½" fasteners from the rebound clip and remove, see Figure 8-12.
3. Loosen, **DO NOT** remove, the upper eight (8) ½" flange head locknuts connecting the bolster springs / tie-bar bolster springs to the saddle assembly.
4. Remove the lower eight (8) ½" flange head locknuts connecting the bolster springs / tie-bar bolster springs to the equalizing beam, see Figure 8-13.
5. Remove tie-bar bolt and spacer (if equipped).

FIGURE 8-12

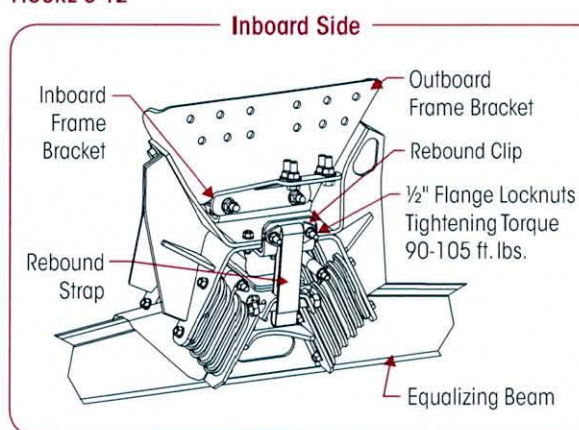
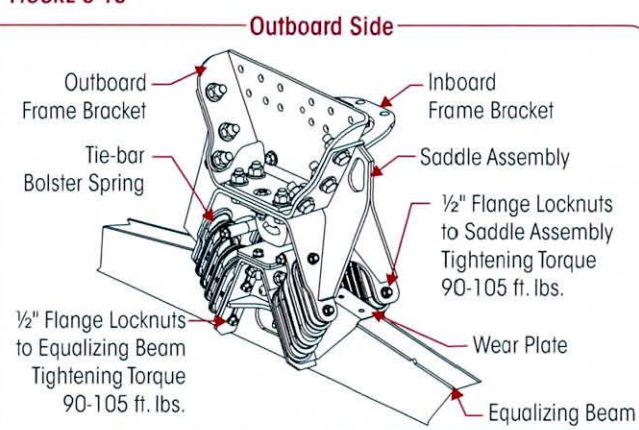


FIGURE 8-13



6. Remove the shock absorber (if equipped) fasteners from the upper shock bracket.
7. Push shock absorber down, 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 8-14.

FIGURE 8-14

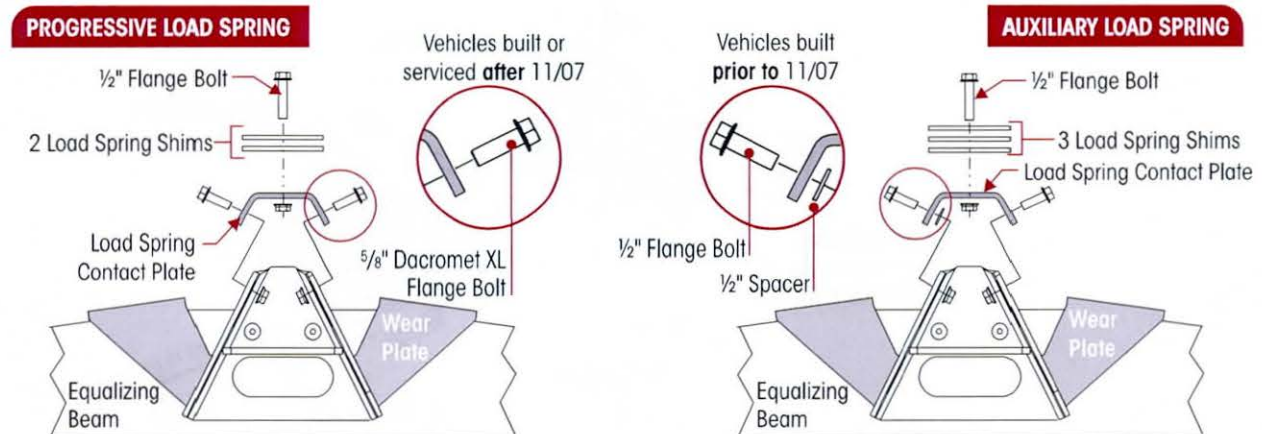
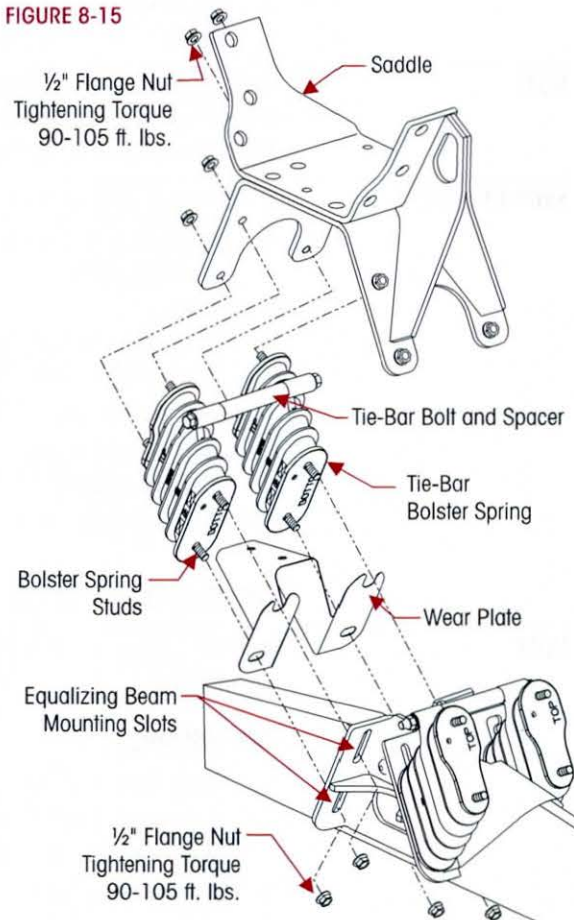


FIGURE 8-15

9. Raise the rear of the vehicle frame to clear the bolster springs / tie-bar bolster springs from the equalizing beam. Support the vehicle frame at this height.
10. Remove 1/2" flange head locknuts that connect the bolster springs / tie-bar bolster springs to the saddle. Remove the bolster springs / tie-bar bolster springs, see Figure 8-15.



ASSEMBLY

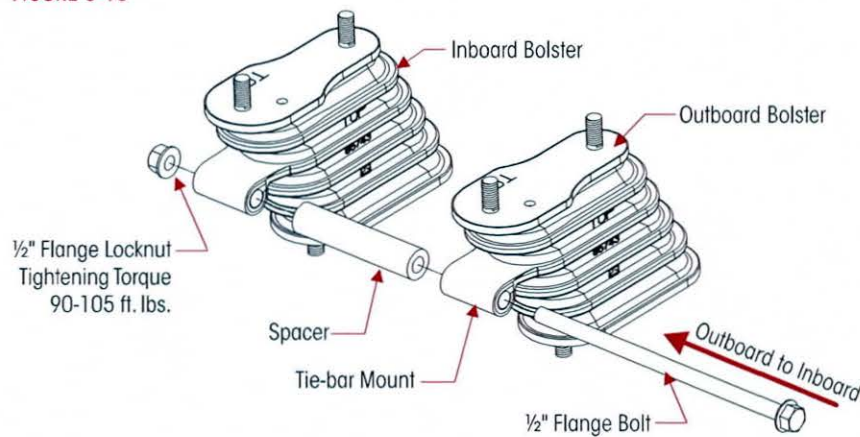
1. Mount the bolster springs / tie-bar bolster springs to the saddle and loosely install 1/2" flange head locknuts. **DO NOT** tighten at this time.

CAUTION

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.

2. Position the wear plates onto the eight (8) lower bolster spring studs. By hand, slightly spread the legs of the wear plates to ensure they remain on the bolster while lowering the vehicle.

3. Lower the vehicle and guide the eight (8) lower bolster spring studs into the equalizing beam mounting slots, see Figure 8-15. Ensure bolster spring studs sit at the bottom of the mounting slots on the equalizing beam.
4. 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 90-105 foot pounds torque, see Figure 8-16.

FIGURE 8-16

5. Install the eight (8) lower 1/2" flange head locknuts and tighten all sixteen (16) locknuts to 90-105 foot pounds torque.

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 8-14. Refer to 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.

6. Mount the load spring contact plate on the equalizing beam by installing the four fasteners, and load spring contact plate spacers (if equipped). Tighten to 90-105 foot pounds torque.
7. Locate the shock absorbers (if equipped) into the upper shock bracket and install the fasteners, tighten to 150-170 foot pounds torque.
8. Slide the rebound clip through the upper rebound strap loop.
9. From the inboard side of the saddle, mount the rebound clip by installing fasteners. Tighten locknuts to 90-105 foot pounds torque.
10. Remove wheel chocks.

SHOCK ABSORBERS (if equipped)**NOTE**

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

DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove the lower shock absorber nylon locknut, retainer washer and rubber bushing from the shock absorber stud.
3. Remove the fasteners from the upper shock bracket and remove shock absorber.



ASSEMBLY

1. Mount the shock absorber in the upper shock bracket and install fasteners, tighten to 150-170 foot pounds torque.
2. Locate the shock absorber stud in the lower shock bracket and install the rubber bushing, retainer washer and nylon locknut. Tighten to 70-90 foot pounds torque.
3. Remove the wheel chocks.

AFTERMARKET SHOCK ABSORBER KIT

This procedure is intended to assist maintenance personnel with the installation of the Aftermarket Shock Absorber Kits option, see Table 8-1, for vehicles not originally equipped with shock absorbers from the vehicle manufacturer.

TABLE 8-1

Kit Number	Saddle Height
64178-003	16.5"
64178-004	17.5" / 18.5"
64178-009	16.5" (Mack Vehicles Only)

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 LOSS OF VEHICLE CONTROL, PERSONAL INJURY OR PROPERTY DAMAGE.

INSTALLATION

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 in both directions along both vehicle frame rails and draw a vertical line, see Figure 8-17. See Table 8-2 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 8-17.
5. Drill only for the **LOWER HOLES** of the shock brackets to accommodate the ⅝" bolts, see Figure 8-17.

TABLE 8-2

Rear Axle Spacing	Vertical Hole Location
	Measure in both directions from the centerline of the outboard frame bracket
52"	18½"
54"	19½"
60"	22½"
72"	28¾"

NOTE

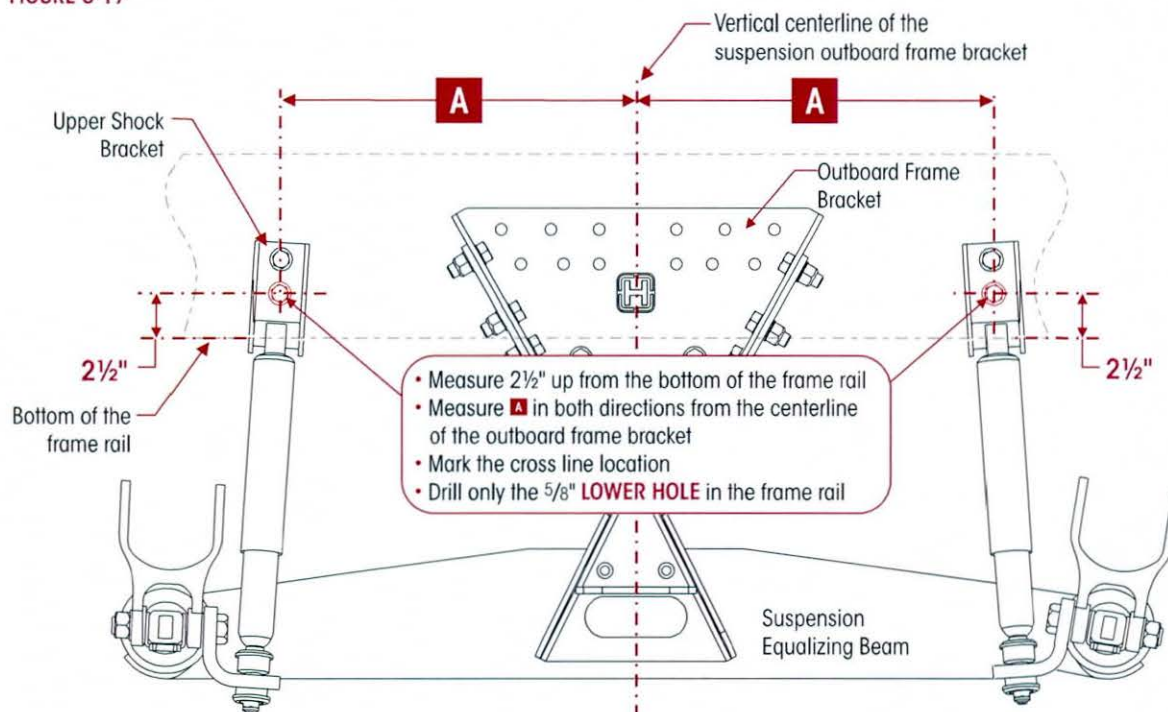
If an existing hole is already in the frame rail close to this location, move the location fore or aft by (± ⅜") to use the existing hole. **DO NOT** change the elevation (maintain the 2½" distance from the bottom of the frame rail) of the hole to accommodate an existing hole.

6. Install the upper shock brackets to frame. Install only the **LOWER HOLE** shock bracket frame fasteners, see Figure 8-17. 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 Kit contains longer replacement bar pin bolts needed to accommodate the lower shock bracket.

FIGURE 8-17



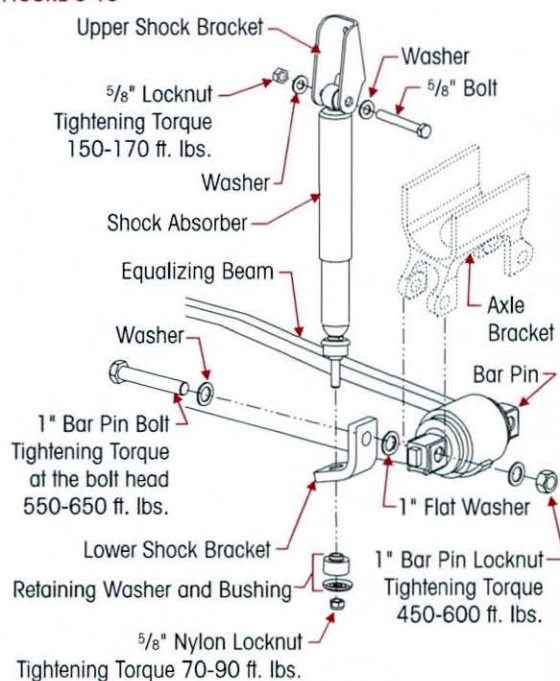
- Support the end of the equalizing beam then remove the existing bar pin fasteners from the outboard side of the equalizing beam and discard.

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.

FIGURE 8-18

- 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 8-18.
- 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.
- Attach the **lower** shock absorber fasteners.
- Attach the **upper** shock absorber fasteners.





14. Tighten the **lower** shock absorber fasteners first to 70-90 foot pounds torque, see Figure 8-18.
15. Rotate the upper shock mounting bracket to align with the angle of the shock absorbers.
16. Tighten the **upper** shock absorbers fasteners to 150-170 foot pounds torque, see Figure 8-18.
17. 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** 550-650 foot pounds torque
 - At the **locknut** 450-600 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 rear tires.
24. Remove wheel chocks.

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.

DISASSEMBLY



CAUTION

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.
2. If both equalizing beams need replacement repeat Steps 3 through 13 for removal of the opposing equalizing beam **AFTER** the first equalizing beam is reassembled.
3. From the inboard side of the saddle remove the two fasteners from the rebound clip and remove, see Figure 8-19.
4. Loosen, **DO NOT** remove, the eight (8) ½" flange head locknuts connecting the bolster springs / tie-bar bolster springs to the saddle assembly.
5. Remove the eight (8) ½" flange head locknuts connecting the bolster springs / tie-bar bolster springs to the equalizing beam, see Figure 8-20.
6. Remove tie-bar bolt and spacer (if equipped).

FIGURE 8-19

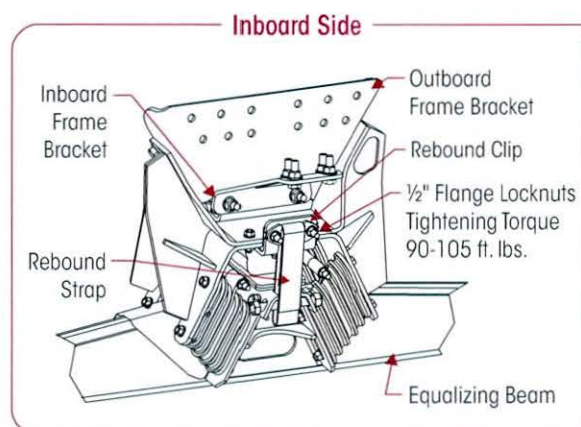
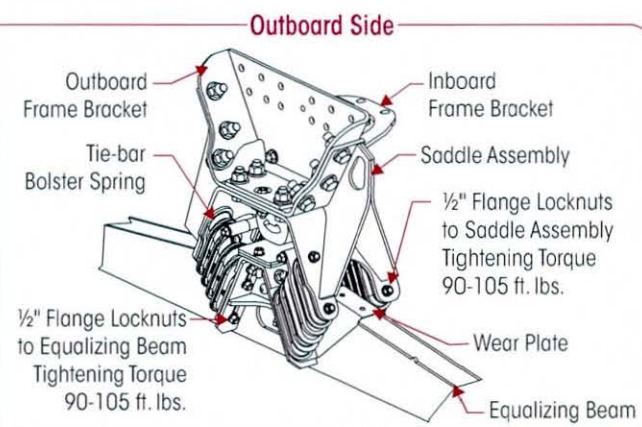
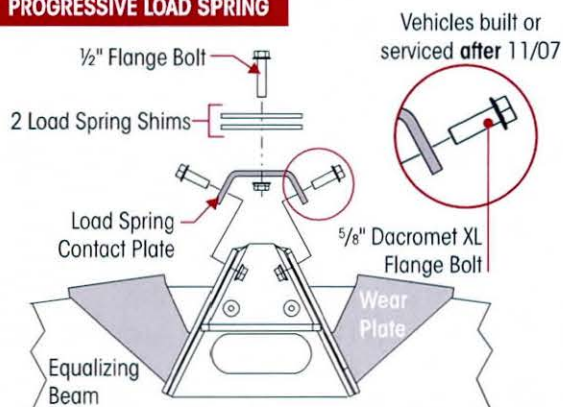
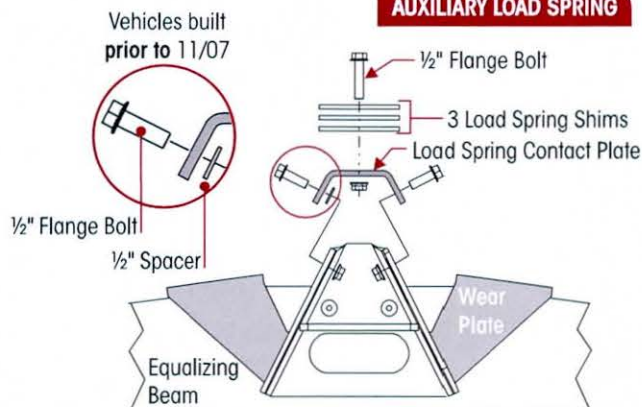


FIGURE 8-20



7. Remove the shock absorber fasteners (if equipped) from the lower shock bracket.
8. Remove the load spring contact plate fasteners and spacer (if equipped, see Figure 8-21) that connect the to the equalizing beam.
9. Raise the rear of the vehicle frame to clear the bolster springs / tie-bar bolster springs from the equalizing beam. Support the vehicle frame at this height.
10. Remove the load spring contact plate, see Figure 8-21.

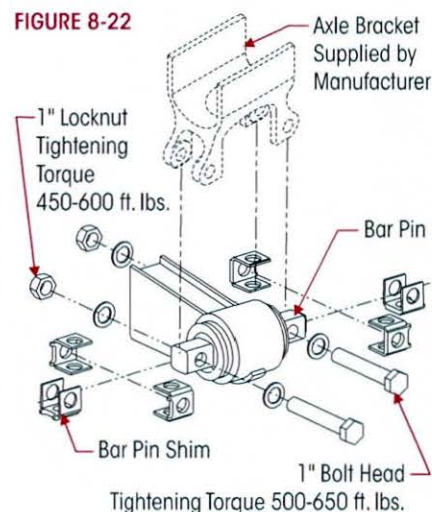
FIGURE 8-21

PROGRESSIVE LOAD SPRING**AUXILIARY LOAD SPRING****NOTE**

Prior to disassembly of the equalizing beam bar pin fasteners, note the orientation of the bar pin alignment shims, see Figure 8-22. 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 8-22.

FIGURE 8-22



⚠ 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

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 $\frac{3}{4}$ " 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 8-23.

FIGURE 8-23

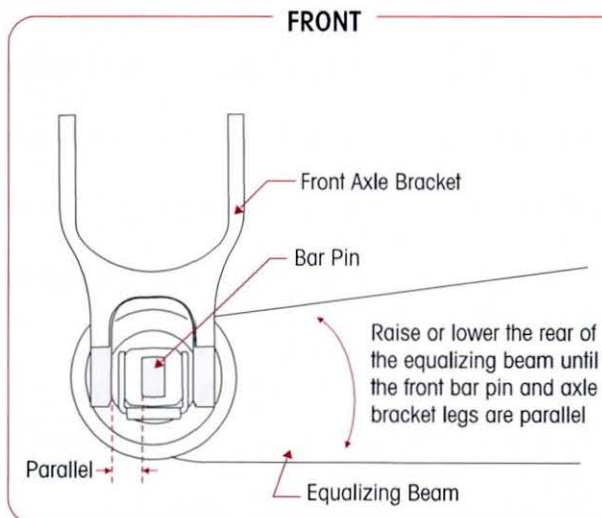
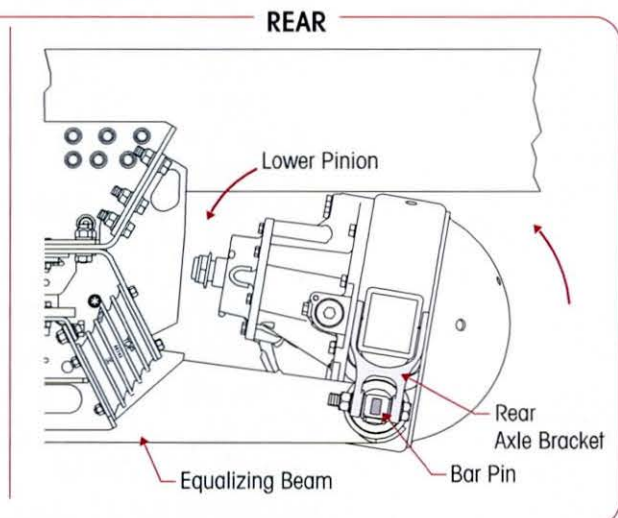


FIGURE 8-24



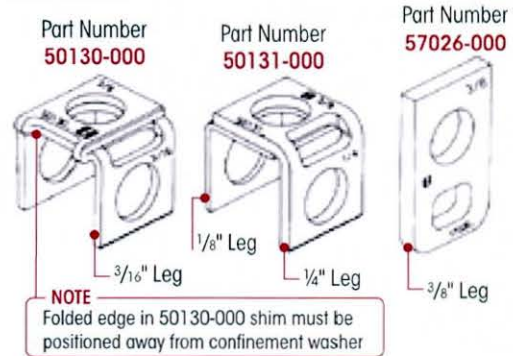
⚠ WARNING

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

 WARNING

THE BAR PIN ALIGNMENT SHIM (PART NO. 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE BUSHING, SEE FIGURE 8-25. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE, IMPROPER ALIGNMENT, DAMAGE OR FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN THE LOSS OF VEHICLE CONTROL AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

FIGURE 8-25



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 8-22.
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 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 pinion until the axle bracket legs are parallel to the rear bar pin flats, see Figure 8-24.
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 8-22.
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.

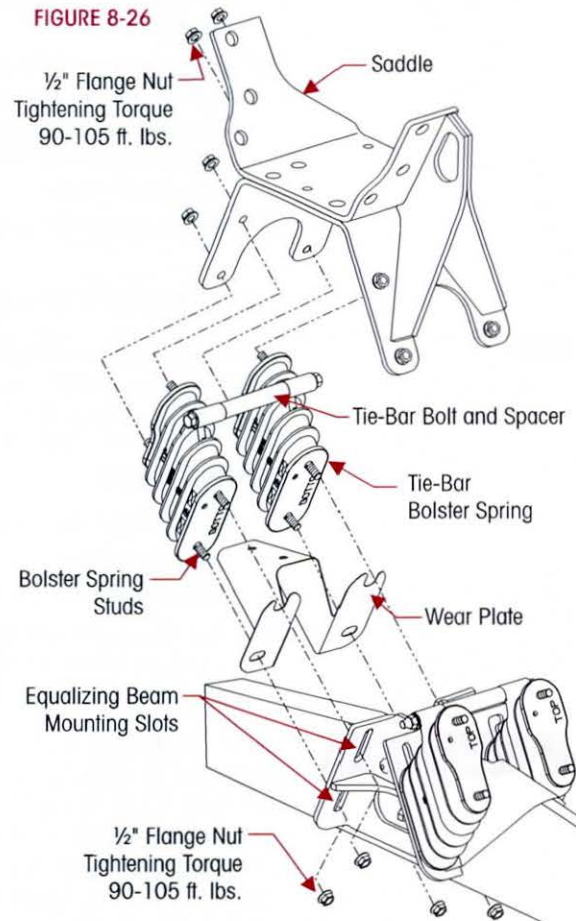
19. Install the longitudinal torque rod and any longitudinal torque rod shims in the same orientation as prior to disassembly. Tighten the fasteners to the vehicle manufacturer's specifications.
20. Re-apply rear parking brake.

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 450-600 foot pounds torque, or if tightening on the bolt head, tighten to 500-650 foot pounds torque.
22. Install the wear plates onto the eight (8) lower bolster spring studs.
23. 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 90-105 foot pounds torque.

FIGURE 8-26



24. 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.
25. Install the eight (8) lower 1/2" flange head locknuts and tighten all sixteen (16) bolster fasteners to 90-105 foot pounds torque, see Figure 8-26.

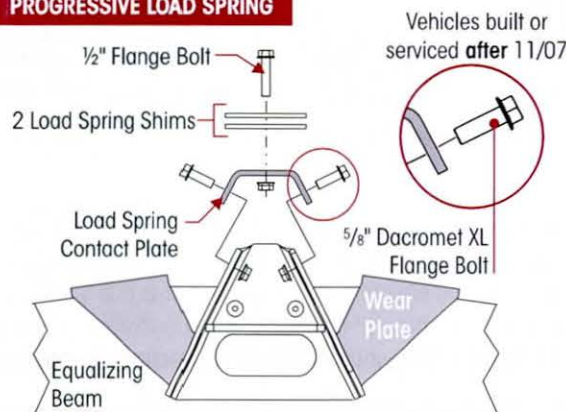
NOTE

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 8-27. Refer to Parts List Section of this publication.

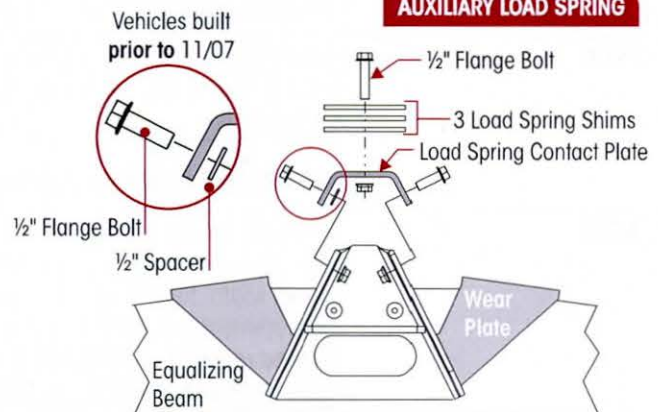
26. Mount the load spring contact plate to the equalizing beam by installing the four (4) flange head bolts through the load spring contact plate, contact plate spacers (if equipped) and equalizing beam assembly, see Figure 8-27. Install flange head locknuts and tighten to 90-105 foot pounds torque.

FIGURE 8-27

PROGRESSIVE LOAD SPRING



AUXILIARY LOAD SPRING



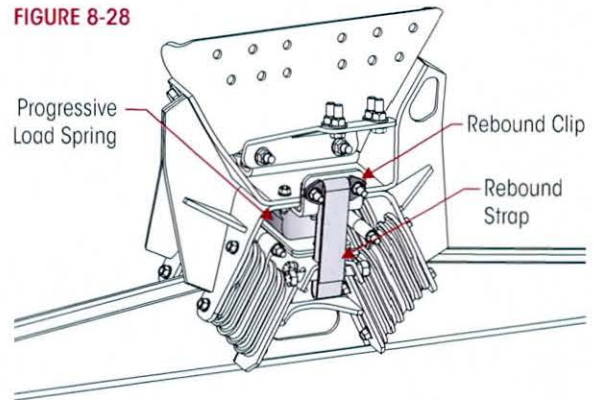
27. Locate the shock absorber studs (if equipped) into the lower shock mounting brackets. Install the rubber bushings, retainer washers and nylon locknuts. Tighten to  70-90 foot pounds torque.

 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.

28. Slide the rebound clip through the upper rebound strap loop, see Figure 8-28.
29. From the inboard side of the saddle, mount the rebound clip by installing fasteners. Tighten locknuts to  90-105 foot pounds torque.
30. Remove the wheel chocks.

FIGURE 8-28



BAR PIN END BUSHING

NOTE

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

YOU WILL NEED

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

 WARNING

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

 WARNING

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

NOTE

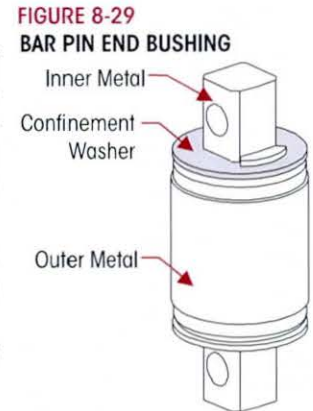
Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used then hardened structural washers must be used under bolt heads and locknuts.

BAR PIN END BUSHING REMOVAL

NOTE

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

1. Remove equalizing beam assembly from vehicle as detailed in the equalizing beam disassembly instructions in this section.
2. Place the equalizing beam in the shop press with the equalizing beam end hub squarely supported on the press bed or receiving tool.
3. Press on the end bushing inner metal, see Figure 8-29, of the end bushing until the inner metal is flush with the top of the equalizing beam end hub. This will dislodge the confinement washer and move the bushing rubber away from the outer metal of the bushing so the push out tool can be installed, see Special Tools Section of this publication.
4. Center the bushing push out tool directly on the bushing's outer metal and press the bushing out of the equalizing beam end hub.
5. After removing the bar pin end bushings, thoroughly inspect each end hub bore.



INSPECTION

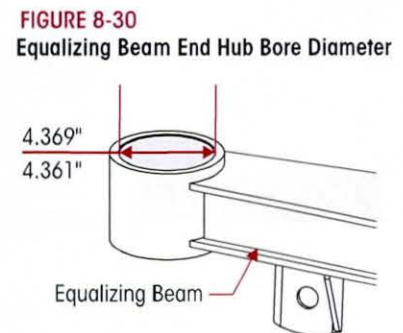
After removing the bar pin end bushings, thoroughly inspect the equalizing beam bores. If the equalizing beam is damaged from end bushing removal, replacement of the equalizing beam is required, replace with a new equalizing beam. **DO NOT** re-bush or otherwise use an equalizing beam that has been damaged.

WARNING

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

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

1. Clean the end hub bores with emery cloth or hone, removing any nicks or metal buildup from bushing removal.
2. Measure the equalizing beam end hub bore inner diameter and the bushing outer diameter. The Hendrickson specification for the equalizing beam end hub bore diameter of equalizing beam is 4.369" / 4.361", see Figure 8-30. If components are not within the specified range, replacement is required.
3. The end hub bore may have a more substantial leading chamfer at one end of the bore than the other. Take advantage of the larger chamfer by pressing in the new bushing from this end.



NOTE

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

BAR PIN END BUSHING INSTALLATION

1. Place the equalizing beam in a shop press with the end hub (see Figure 8-31) squarely supported on the press bed or receiving tool, see Special Tools Section of this publication.

2. Install OTC 1757 end bushing installation tool (refer to Special Tools Section of this publication) on the new end bushing as shown in Figure 8-31. Tighten the through bolt until the two halves of the tool touch. The installation tool compresses the rubber between the inner and outer metal of the bushing to allow press force to be transmitted only to the outer metal of the bushing.

FIGURE 8-31

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 8-31.
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 8-32.

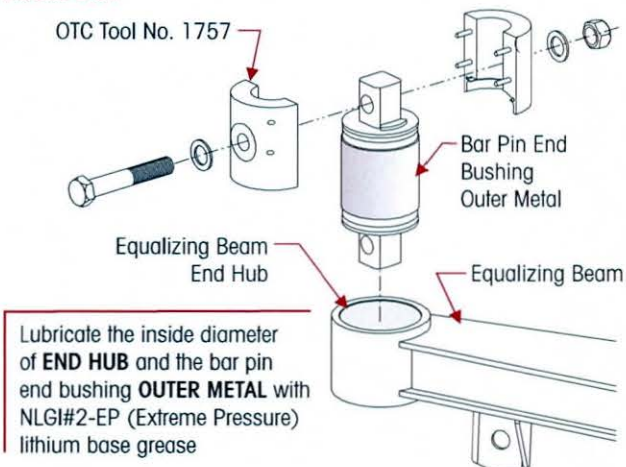
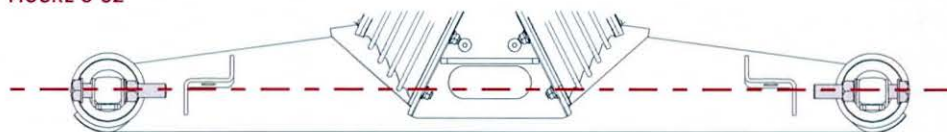


FIGURE 8-32

**NOTE**

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

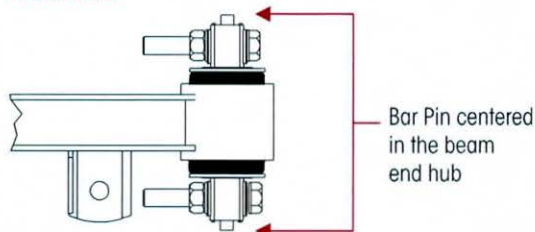
5. Verify the end bushing's outer metal is square with the end hub. Equalizing beam and end bushing damage will result if the bushings are pressed in at an angle.

**CAUTION**

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

FIGURE 8-33

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 8-33.
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.

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.

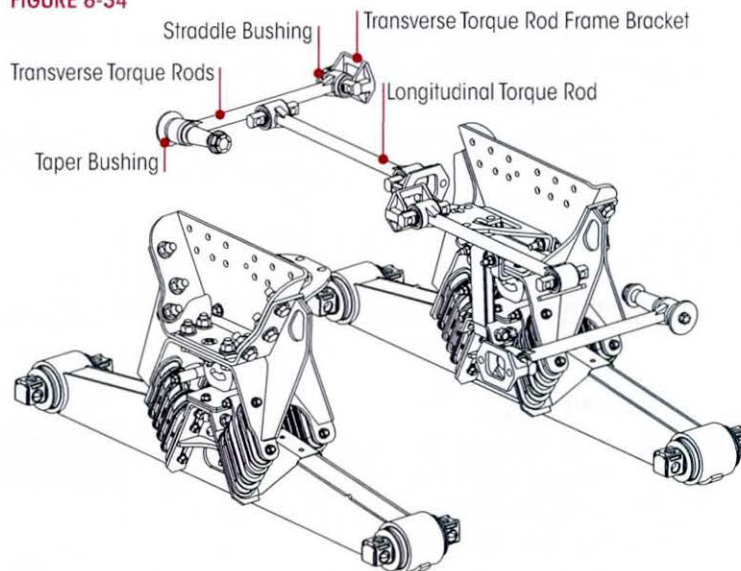
2. Support the pinion on the axle being serviced.

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, see Figure 8-34.

FIGURE 8-34



ASSEMBLY

1. Install longitudinal torque rod.
2. Install the fasteners and any shims that were removed to the cross member and axle brackets.

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.

3. Tighten all fasteners to vehicle manufacturer's torque specifications.
4. 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.
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 torque rod mounting fasteners.
3. Remove the transverse torque rod.
4. Inspect the mounting surfaces for any wear or damage. Repair or replace as necessary.

ASSEMBLY

1. Install the transverse torque rod.
2. Install the mounting fasteners and any shims that were removed.

NOTE

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

3. Prior to tightening, ensure that the vehicle is at the proper ride height. Tighten all fasteners to the required torque specification. Refer to original equipment manufacturer for specifications.
4. 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.
5. Remove the wheel chocks.

TAPERED AND STRADDLE MOUNT TORQUE ROD BUSHINGS

YOU WILL NEED

- A vertical press with a capacity of at least 10 tons, a receiving tool, and a push out tool, see the Special Tools Section of this publication for more information.
1. Remove torque rods as detailed in Torque Rod Disassembly instructions in this section.

FIGURE 8-35

Taper Pin Bushing



Straddle Pin Bushing



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 THE LOSS OF VEHICLE CONTROL 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 8-35, 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.

BUSHING INSTALLATION

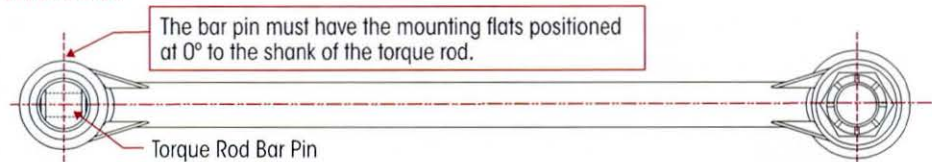
1. Clean and inspect the inner diameter of the torque rod end tubes.

NOTE

DO NOT use a paraffinic oil, or soap base lubricant. Such lubricants can cause adverse reactions with the bushing, such as deterioration of the rubber, causing premature failure. Use **ONLY** a light **Naphthenic base oil**, such as 60 SUS at 100°F.

2. Lubricate the inner diameter of the torque rod end tubes and the new rubber bushings with a light Naphthenic base oil, such as 60 SUS at 100° F, see Figure 8-36.
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 8-37.

FIGURE 8-37



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 8-38.
 - Push the bushing again from the opposite side to center the bar pin, or tapered stud within the end tube, see Figure 8-39.

FIGURE 8-38

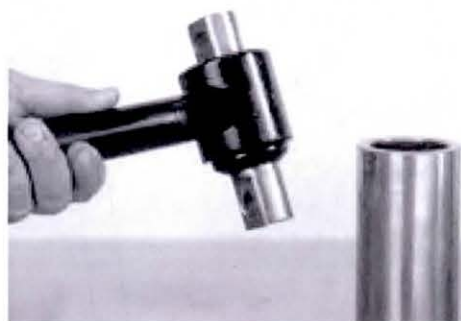


FIGURE 8-39



CAUTION

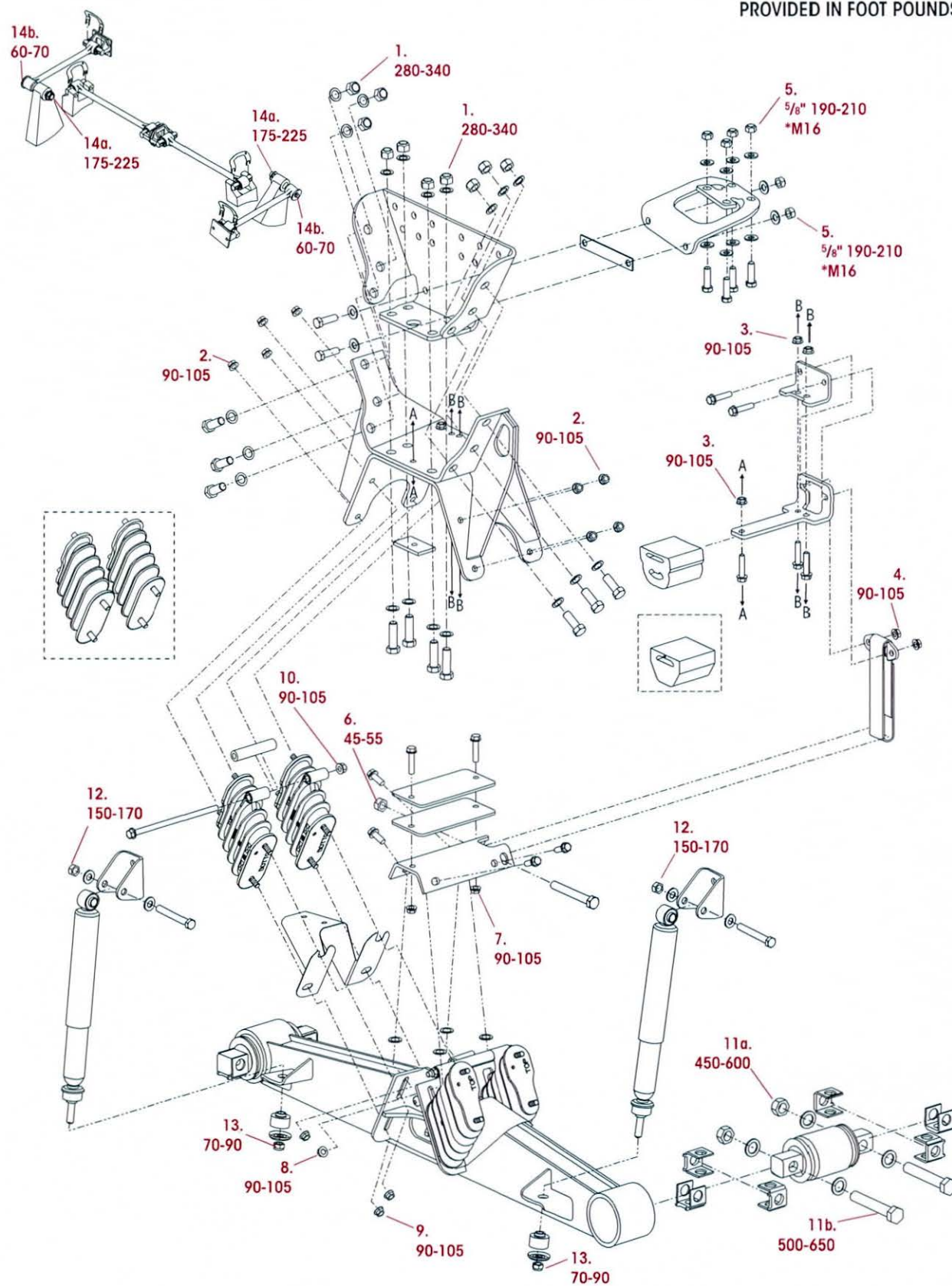
IF THE TORQUE ROD ASSEMBLY IS NOT ALLOWED THE ALLOTTED TIME FOR THE LUBRICANT TO DISSIPATE, THE BUSHING MAY SLIDE FROM THE TORQUE ROD END TUBE CAUSING THE BUSHING TO BE REMOVED AND A NEW BUSHING RE-INSTALLED.

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

SECTION 9

Torque Specifications

HENDRICKSON RECOMMENDED TORQUE VALUES
PROVIDED IN FOOT POUNDS





HAULMAAX

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS

NO.	COMPONENT	QTY.	SIZE	TORQUE VALUE (in foot pounds)	
Frame Fasteners furnished and installed by Truck Manufacturer					
1	Saddle to Outboard Frame Bracket	20	M20 x 2.5" 6H Locknut	280-340	
2	Saddle to Bolster Spring	16	½"-13 UNC Flange Locknut	90-105	
3	Saddle to Load Spring Bracket	6	½"-13 UNC Flange Locknut	90-105	
4	Load Spring Bracket to Rebound Clip	4	½"-13 UNC Flange Locknut	90-105	
5	Inboard Frame Bracket to Outboard Frame Bracket and Cross Member	12	⅝"-11 UNC Locknut	190-210	
			*M16 Locknut	*	
6	Load Spring Contact Plate to Rebound Strap	2	¾"-16 UNF Locknut	45-55	
7	Load Spring Contact Plate to Load Spring Shim	4	½"-13 UNC Flange Locknut	90-105	
8	Load Spring Contact Plate to Beam Assembly	8	**⅝"-Dacromet XL Flange Locknut	90-105	
			***½"-13 UNC Flange Locknut	90-105	
9	Beam Assembly to Bolster Spring	16	½"-13 UNC Flange Locknut	90-105	
10	Bolster Spring Tie-Bar	4	½"-13 UNC Flange Locknut	90-105	
11a	Bar Pin Bushing	at the Locknut	8	1"-8 UNC Locknut	450-600
11b		at the Bolt Head	8	1"-8 UNC Hex Bolt	500-650
12	Upper Shock Absorber to Upper Shock Bracket	4	⅝"-11 UNC Locknut	150-170	
13	Lower Shock Absorber to Beam - Nylocknut	4	⅝"-11 UNC Locknut	70-90	
14a	Transverse Torque Rod to Axle	at the Locknut	2	1¼"-12 UNF Locknuts	175-225
14b		at the Bolt Head	2	⅝"-11 UNC 1.25" Bolt	60-70
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.					
* Not supplied by Hendrickson. For torque requirements see vehicle manufacturer.					
** Applies to vehicles built or serviced after 11/07.					
*** Applies to vehicles built prior to 11/07.					



SECTION 10

Troubleshooting Guide

HAULMAAX		
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 Spring 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 Spring 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 spring 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 fasteners 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 fasteners 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 fasteners 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



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