TECHNICAL PROCEDURE

HAULMAAX® EX Rear Suspension

SUBJECT: Service Instructions
LIT NO: 17730-328
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HENDRICKSON
The World Rides On Us®

SECTION 1
Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair and rebuild of the HAULMAAX® EX rear suspension system.

NOTE Use only Genuine Hendrickson parts for servicing this suspension system.

It is important to read and understand this 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 HAULMAAX EX Suspension.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson for information on the latest version of this manual.

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

SECTION 2
Product Description

Advanced engineering design methods and experience gathered from millions of Hendrickson suspensions contributed to the creation of HAULMAAX EX, a rugged, yet lightweight heavy-duty rubber vocational rear suspension that helps save weight over competitive suspensions for greater payloads and route consolidation.

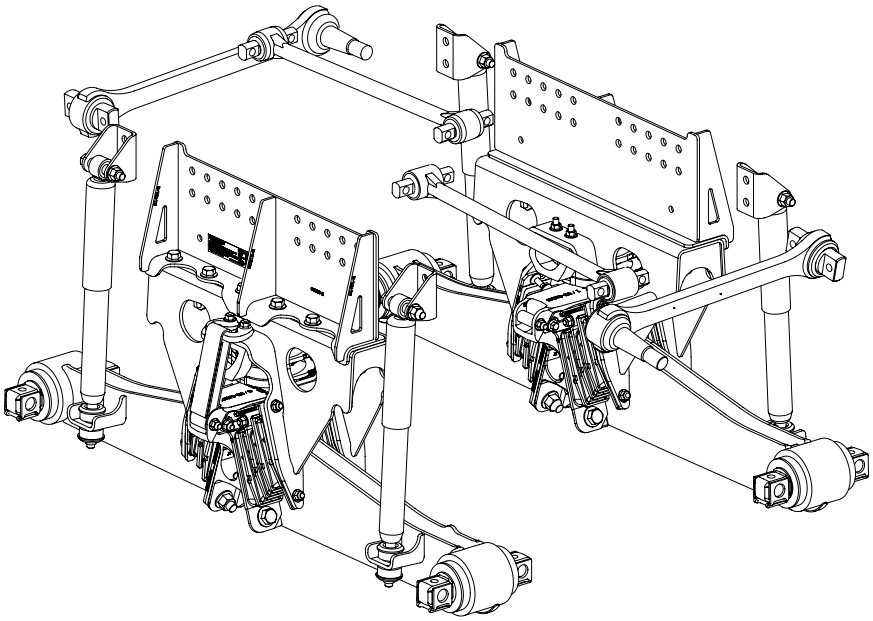
Suspension weight is reduced for greater payloads and improved durability through innovative design, higher strength materials, and advanced manufacturing methods. Proven with extensive vehicle durability and laboratory testing, HAULMAAX EX delivers the reliability and quality you've come to expect from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

The updated HAULMAAX EX 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.

- **Bar pin end connection** — Rugged axle connection extends bushing life and allows easy axle alignment and serviceability.
- **Rebound straps** — Provide additional bolster spring protection.

  Dual rebound straps for each equalizing beam are: (1) Required on vehicles equipped with outriggers, (2) standard equipment on HAULMAAX EX 52K capacity and (3) available as production or aftermarket options on HAULMAAX EX 40K and 46K capacities.
- **Equalizing beam** — Formed and robotically-welded equalizing beam provides a narrow profile for weight savings and distributes the load equally between both axles for improved maneuverability, stability, and handling. Lowers the center of gravity to increase stability. Narrow, offset beam allows for better packaging and increased tire clearance. The center bushing is eliminated for reduced maintenance.

FIGURE 2-1



- **Premium rubber bolster springs** — Extra wide bolster spring centers and a unique progressive load spring provide exceptional stability for demanding applications such as refuse, concrete mixers and dump. The unique design works with the progressive load springs to deliver enhanced empty ride quality and loaded stability. The optimized angle allows bolster springs to carry the majority of the payload and still react to braking and accelerating forces with minimal displacement.

  Tie-bar bolster design — Achieves greater column stiffness, improves suspension performance and remains consistent with the ride quality and stability of the original design. The tie-bar design is equipped on the HAULMAAX EX 46K and 52K capacities and offered as an aftermarket option for the HAULMAAX EX 40K capacity.

- **Progressive load springs** — Increase stiffness as the load increases, providing a unique balance of empty ride quality and loaded stability. Provide long service life and easy replacement for reduced downtime. Eliminate shim adjustments for lower maintenance.
- **Frame saddle and frame brackets** — Lightweight, modular design simplifies installation.
- **Shock absorbers** — Provide additional driver comfort. Required for tractor and logging applications. Available as a production or aftermarket option.
- **ULTRA ROD® longitudinal torque rods** — engineered to optimize resistance to wind up during acceleration and braking.
- **TRAAX ROD® transverse torque rods** — Fabricated heavy-duty torque rods provide greater durability over conventional rods and enhance handling during cornering by controlling lateral forces to maintain axle position.

HAULMAAX EX

	40K	46K	52K
Installed Weight[1]	855 lbs	861 lbs	958[8] lbs
Suspension Rating	40,000 lbs	46,000 lbs	52,000 lbs
Gross Vehicle Weight (GVW) Approval[2]	83,000 lbs	88,000 lbs	93,000 lbs
Gross Combination Weight (GCW) Approval	160,000 lbs	190,000 lbs	245,000 lbs
Job-Site Travel Rating[3]	60,000 lbs	70,000 lbs	75,000 lbs
Diagonal Articulation[4]	17 inch	17 inch	17 inch
Lift Axles	Approved	Approved	Approved
Ride Heights (loaded)[5]	9.5" – 13.25"	9.5" – 13.25"	9.5" – 13.25"
Axle Spacing[6]	52", 54"	52", 54", 60", 72.5"	52", 54", 60"
Shock Absorber Applications[7]	Tractors, Logging	Tractors, Logging	Tractors, Logging

Hendrickson approves the use of HAULMAAX EX 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. Job-Site Travel Rating — operators using vehicles equipped with liftable pusher or tag axles must not exceed published ratings. Ratings are limited to no more than five percent of vehicle operation at speed not to exceed five mph. Liftable pusher or tag axles should only be raised (or unloaded) to improve vehicle maneuverability in job-site applications or when vehicle is empty. Job-site travel ratings are consistent with published axle manufacturer's limitations. Axle and suspension job-site travel specifications must not be exceeded.
4. Suspension articulation may exceed vehicle's capability and may be limited by vehicle manufacturer; vehicle manufacturer installed axle stops may restrict suspension's articulation.
5. HAULMAAX EX 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.
8. 52K installed weight includes complete suspension, double rebound straps, longitudinal torque rods, Hendrickson TRAAX ROD® transverse torque rods, axle brackets and frame brackets; add 31 pounds for shock absorbers.

SECTION 3

Important Safety Notice

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

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

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

EXPLANATION OF SIGNAL WORDS

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

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

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

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 in this publication.

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

SAFETY PRECAUTIONS

WARNING

FASTENERS

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

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

WARNING

LOAD CAPACITY

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

WARNING

SUPPORT THE VEHICLE PRIOR TO SERVICING

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

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 ASSUME ALL RISKS OF POTENTIAL PERSONAL INJURY OR DAMAGE TO EQUIPMENT INVOLVED.

WARNING

PERSONAL PROTECTIVE EQUIPMENT

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

WARNING

MODIFYING COMPONENTS

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

WARNING

TORCH/WELDING

DO NOT USE A CUTTING TORCH TO REMOVE ANY FASTENERS. THE USE OF HEAT ON SUSPENSION COMPONENTS WILL ADVERSELY AFFECT THE STRENGTH OF THESE PARTS. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN ADVERSE VEHICLE HANDLING 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. DO NOT USE HEAT NEAR THE EQUALIZING BEAM. DO NOT NICK OR GOUGE THE EQUALIZING BEAM. SUCH IMPROPER ACTIONS CAN DAMAGE THE EQUALIZING BEAM AND CAUSE ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING

BAR PIN BUSHING END CONNECTION

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

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

A BAR PIN SHIM MUST BE INSTALLED AT EACH BOLT LOCATION. THE SAME PART NUMBER SHIM IN THE SAME ORIENTATION MUST BE USED AT BOTH BOLT LOCATIONS ON ANY ONE (1) END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE (1) SHIM AT EACH BOLT LOCATION. USE GENUINE HENDRICKSON BAR PIN SHIMS, DO NOT USE STANDARD WASHERS. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN IMPROPER VEHICLE ALIGNMENT, FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING

TORQUE RODS

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

CAUTION

IMPROPER VEHICLE LIFT OR SUPPORT METHOD

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

WARNING

PARTS CLEANING

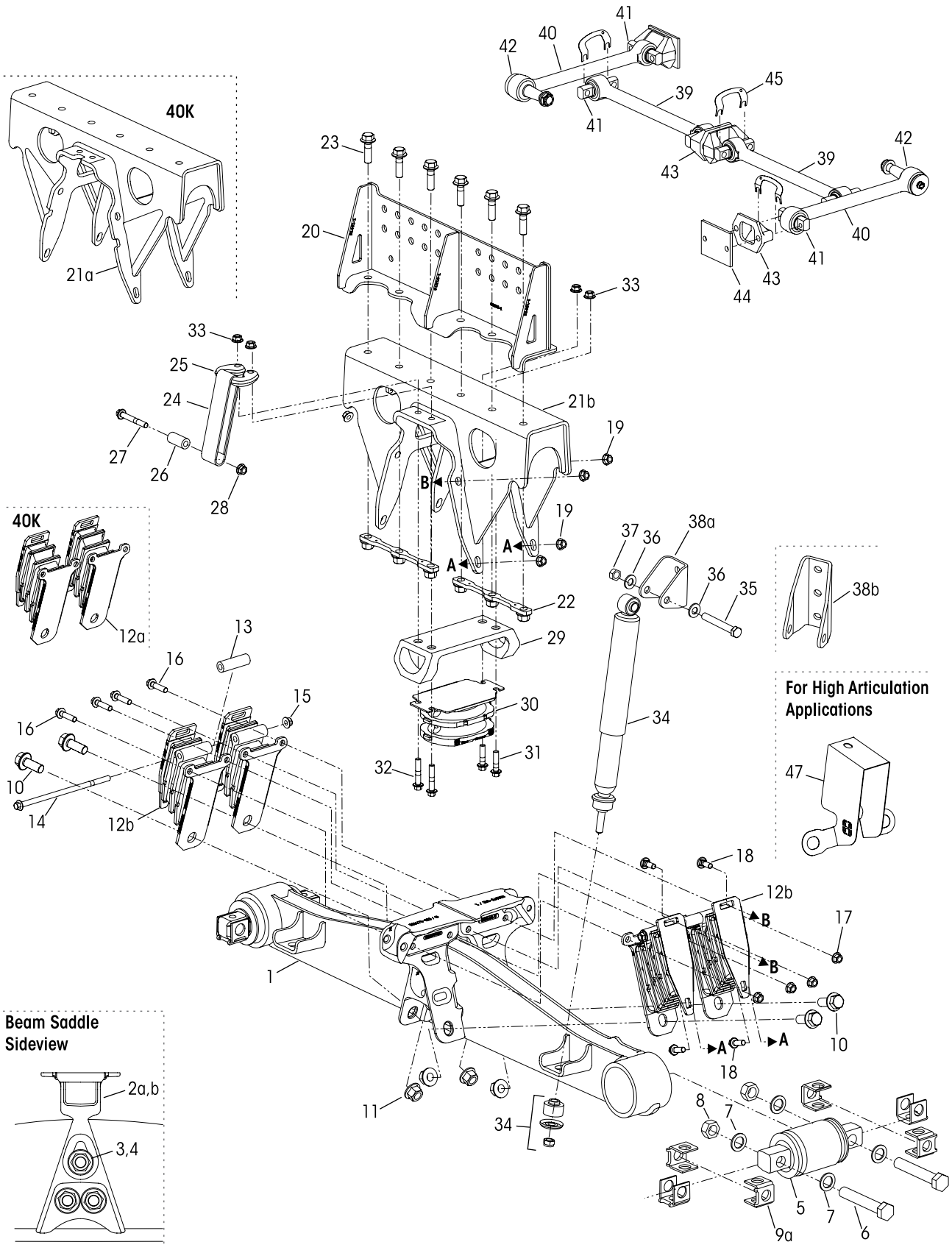
SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS, AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY, CAREFULLY FOLLOW THE MANUFACTURER'S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURES:

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 CAN NOT 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 ACCIDENTS 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	VEHICLE QTY.
1		Equalizing Beam Assembly with Beam Saddle, Includes Key No. 5, *See Aftermarket Equalizing Beam with Rotatable Bar Pin Selection Guide on Page 11*	2
	34013-417	**Single Equalizing Beam Saddle Service Kit,** Includes Key Nos. 2a, 2b, 3-4	
2		*Inboard & Outboard Equalizing Beam Saddle	2
a		Inboard	
b		Outboard	
3		*M20 x 1.5 x 110 mm Heavy Hex Flange Screw	6
4		*M20 x 1.5 Flange Nut	6
		Bar Pin End Bushing Service Kit, One Wheel End, Includes Key Nos. 5-9a	
	34013-088L	Shim Type	
	34013-188L	Rotating, Shim Type	
5		*Bar Pin End Bushing	4
	34013-104	**Bar Pin End Bushing Fastener Kit, One Wheel End,** Includes Key Nos. 6-8	
6		*1"-8 UNC x 6" Hex Bolt	8
7		*1" Hardened Washer	16
8		*1"-8 UNC Locknut	8
9		Bar Pin Shim	8
a	50131-000	0.25"/0.12" Standard	
b	50130-000	0.19"/0.19" Optional	
c	57026-000	0.375" Optional flat shim	
		Bolster Spring Service Kits	
	34013-356	Two Bolster Set, Includes Key Nos. 10-11, 12a, 16-19	
	34013-357	Tie-bar Bolsters Set, Includes Key Nos. 10-11, 12b, 13-19	
10	67749-050	M20 x 1.5-6G x 50 mm Flange Bolt	8
11	67745-000	M20 x 1.5 Flange Nut	8
12		*Bolster Springs	8
a		40K	
b		46K • 52K Tie-Bar	
13		*Tie-Bar Bolster Spring Spacer	4
14		*M12 x 1.75-6G x 270 mm Flange Bolt	4
15		*M12 x 1.75 Flange Nut	4
16	68973-050	M12 x 1.75-6G x 50 mm Flange Bolt	8
17	68974-000	M12 x 1.75 Flange Nut	8
18	78875-035	M12 x 1.75-6G x 35 mm Round Head Square Neck Bolt	16
19	68974-000	M12 x 1.75 Flange Nut	16
20		Frame Hanger, *See Selection Guide on Page 10* and *for Saddle Height see Figure 4-1 on Page 12*	2
		Frame Saddle Service Kits, One Side	
	34013-359	**40K** Includes Key Nos. 18, 19, 21a, 22-23, 31-33	
	34013-360	**46K•52K,** Includes Key Nos. 18, 19, 21b, 22-23, 31-33	
	34013-361	**52K,** Includes Key Nos. 18, 19, 21b, 22-23, 32-33	
21		*Frame Saddle	2
a		40K	
b		46K•52K	
	34013-362	**Frame Saddle to Hanger Fastener Service Kit, One Side,** Includes Key Nos. 22-23	
22		*Saddle Fastener Plate	4
23		*M16 x 1.5 -6G x 50 mm Flange Bolt	12
		****Rebound Strap Service Kits,** *See Page 12 & 13*	
	34013-354	One Side, 40K•46K Vehicles Originally equipped with One Strap	
	34013-355	One Side, 52K Vehicles Originally equipped with Dual Straps	
	34013-363	Aftermarket Dual Strap Enhancement	

KEY NO.	PART NO.	DESCRIPTION	VEHICLE QTY.
24		*Rebound Strap	
25		*Rebound Bracket	
26		*Rebound Spacer	
27		*M12 x 1.75-6G x 90 mm Flange Bolt	
28		*M12 x 1.75 Flange Nut	2
29	77234-090	Jounce Stop	2
		Single Progressive Load Spring Service Kit	
	34013-358	Originally equipped with One Strap, Includes Key Nos. 30-33	
	34013-364	Originally equipped with Dual Straps, Includes Key Nos. 30, 32-33	
30	80329-070	Progressive Load Spring	2
31		*M12 x 1.75-6G x 50 mm Flange Bolt	
32		*M12 x 1.75-6G x 65 mm Flange Bolt	
33		*M12 x 1.75 Flange Nut	
		Single Shock Absorber Service Kit, (if equipped)	
	64178-005	14⅞"•15½"•16"•16½" Saddle Height, Includes Key Nos. 34a-37	
	64178-006	17¼"•17½" Saddle Height, Includes Key Nos. 34b-37	
	64178-035	18¼"•18½" addle Height, Includes Key Nos. 34c-37	
	64178-036	20¼"•20½"•21½"•22½" Saddle Height, Includes Key Nos. 34d-37	
		Aftermarket Shock Absorber Kit, for vehicles built with equalizing beams without shock absorber mounts, *see Page 11*	
34		*****Shock Absorber (if equipped) *For Saddle Height see Figure 4-1 on Page 12*	4
a	60680-004L	14⅞"•15½"•16"•16½" Saddle Height	
b	60680-005L	17¼"•17½" Saddle Height	
c	60680-009L	18¼"•18½" Saddle Height	
d	60680-010L	20¼"•20½"•21½"•22½" Saddle Height	
35		*⅝"-11 UNC x 4½" Hex Bolt (if equipped)	4
36		*⅝" Hardened Washer (if equipped)	8
37		*⅝"-11 UNC Locknut (if equipped)	4
38		Upper Shock Bracket	4
a	60304-000	For vehicles originally equipped with	
b	94351-001	Volvo Only	
39		One-piece Longitudinal Torque Rod Assembly, Straddle/Straddle, Specify Length in mm	2
	620XX-XXX	ULTRA ROD®, Includes Key No. 41	
	82XX-XXXX-XXX	****TRAAX ROD® (Optional)	
40		***One-piece Transverse Torque Rod Assembly, Straddle/Taper	2
	62350-XXX	40K Only, ULTRA ROD, Includes Key Nos. 41-42	
	82XX-XXXX-XXX	****46K • 52K - TRAAX ROD, Specify Length in mm	
41	47691-000L	Straddle Bushing	6
42	64697-000L	Taper Bushing	2
43	22186-000	Torque Rod Frame Bracket	4
44	45045-010	Backup Plate, *Replaces 45045-003*	4
45	49689-000L	Torque Rod Shim	As Req.
46	70867-001	P-80 Lubricant - 10 ml (Not Shown)	per Bushing 1
	34013-413	**Aftermarket Shield Plate Service Kit,** for High Articulation Applications, *see Page 12*	
47	75977-002	Shield Plate	4

■ Frame Hanger Selection Guide

Key No. 20 Saddle to Frame Hanger Fastener Service Kit 34013-362 is used for all configurations below.

Capacity	Frame Width	Ride Height	♦Saddle Height	Axle Drop	Frame Hanger Part Number
AUTOCAR					
40K•46K	34.37"	8.5"	15.5"	7"	91754-220
		9.5"	16.5"		91754-240
		10.5"	17.5"		91754-260
		11.5"	18.5"		91754-280
52K	34.37"	9.5"	16.5"	7"	93832-040
		8.5"	16.25"	7.75"	93833-020
		9.5"	17.25"		93833-040
INTERNATIONAL TRUCK					
40K•46K	34.25"	9.5"	16.5"	7"	91742-040
		13.25"	20.25"		91744-120
	34.50"	9.5"	16.5"		91742-240
		13.25"	20.25"		91744-320
	34.80"				91744-520
46K	34.80"	9.5"	16.5"	7"	91742-440
		18.6"	25.6"		94462-020
52K	34.25"	10.5"	17.5"	7"	91744-060
	34.50"				91744-260
	34.80"				91744-460
		13.25"	20.25"		91744-520
FREIGHTLINER					
40K	34.31"	9.5"	16.5"	7"	91816-205
		10.5"	17.5"		91816-206
		13.5"	20.5"		93889-209
	34.56"	8.5"	15.5"		91816-304
		9.5"	16.5"		91816-305
		10.5"	17.5"		91816-306
		13.5"	20.5"		93889-309
46K	34.31"	9.5"	16.5"	7"	93887-205
		10.5"	17.5"		93887-206
		11.5"	18.5"		93887-208
	34.56"	9.5"	16.5"		93887-305
		10.5"	17.5"		93887-306
		11.5"	18.5"		93887-308
52K	34.31"	10.5"	17.5"	7"	91818-206
				7.75"	91818-207
	34.56"			7"	91818-306
				7.75"	91818-307
HINO					
40K•46K	34.09"	9.6"	16.6"	7"	91758-040
	34.25"	9.4"	16.4"		
	34.59"	9.3"	16.3"		91758-240
		9.2"	16.2"		

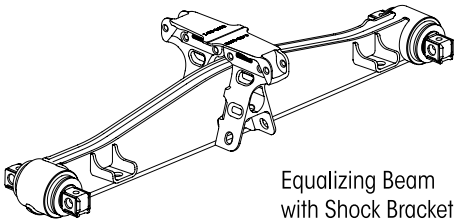
Capacity	Frame Width	Ride Height	♦Saddle Height	Axle Drop	Frame Hanger Part Number
KENWORTH • PETERBILT					
40K - 46K	34"	8.5"	15.5"	7"	91738-020
		9.5"	16.5"		91738-040
		10.5"	17.5"		91738-060
		11.5"	18.5"		91738-080
		13.25"	20.25"		91740-115
		15.5"	22.5"		91740-160
	34.75"	8.5"	15.5"		91740-220
		9.5"	16.5"		91740-240
		10.5"	17.5"		91740-260
		11.5"	18.5"		91740-280
52K	34"	9.5"	16.5"	7"	91740-040
		10.5"	17.5"		91740-060
		11.5"	18.5"		91740-080
	34.75"	9.5"	16.5"		91740-240
		10.5"	17.5"		91740-260
		11.5"	18.5"		91740-280
MACK					
40K	33.40"	7.875"	14.875"	7"	93788-101

Capacity	Frame Width	♦Saddle Height	Axle Drop		Frame Hanger Part Number
			Meritor	Mack	
VOLVO					
46K	33.5"	15.5"	7"	7.5"	91746-020
		16.5"			91746-040
		21.5"			93972-020
	33.4"	17.5"			93892-060
52K	33.5"	16.5"	7"	7.5"	94415-040
	33.4"	17.5"			91748-060

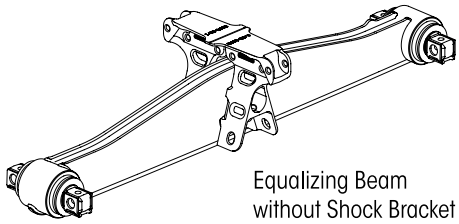
Capacity	♦♦♦Frame Width	♦♦GWH	♦Saddle Height	Axle Drop	Frame Hanger Part Number
WESTERN STAR					
40K	853 mm	460 mm	16.3"	7"	91750-001
		490 mm	17.5"		91750-002
	862 mm	460 mm	16.3"		91750-101
		490 mm	17.5"		91750-102
46K	853 mm	460 mm	16.3"	7"	93888-001
		490 mm	17.5"		93888-002
	862 mm	460 mm	16.3"		93888-101
		490 mm	17.5"		93888-102
52K	853 mm	490 mm	17.5"	7"	91752-002
			18.2"	7.75"	91752-003
	862 mm		17.5"	7"	91752-102
			18.2"	7.75"	91752-103

■ Aftermarket Equalizing Beam Assemblies with Rotatable Bar Pin End Bushings

Single Equalizing Beam
Saddle Service Kit
34013-417



Equalizing Beam
with Shock Bracket



Equalizing Beam
without Shock Bracket

Key No. 1

Capacity	Beam Length	Part Number with Rotatable Bar Pins	Part Number with Rotatable Bar Pins
40K • 46K	52"	91373-520R	91373-521R
	54"	91373-540R	91373-541R
	60"	91373-600R	91373-601R
46K	72.5"	91373-725R	91373-726R
52K	52"	91383-520R	91383-521R
	54"	91383-540R	91383-541R
	60"	91383-600R	91383-601R

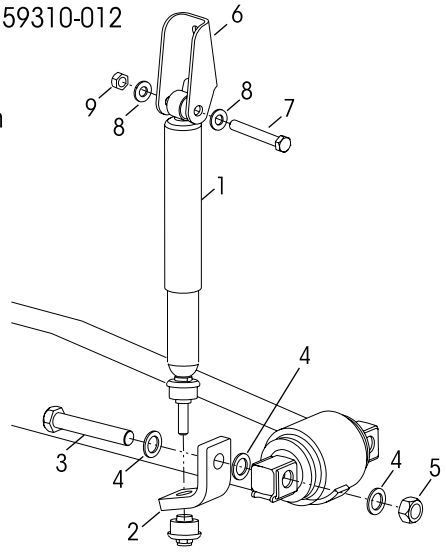
■ Aftermarket Service Kits

Aftermarket Shock Absorber Service Kits

Service Kit Nos.	Saddle Height	Tandem Set
64178-003	16½"	
64178-004	17½"•18¼"•18½"	For equalizing beams
64178-033	20¼"•20½"	not equipped with
64178-009	16½" Mack	lower shock mount

Reference Lit. No. 59310-012

NOTE:
Not available with
315 mm tires



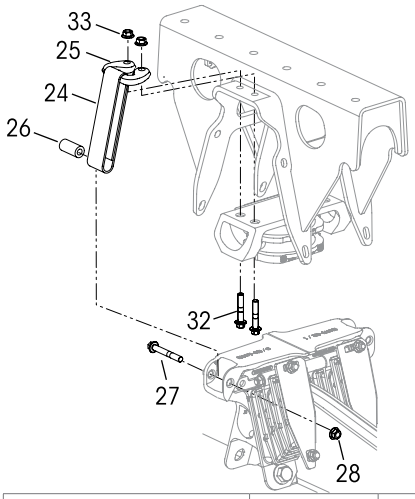
KEY NO.	PART NO.	DESCRIPTION	KIT QTY.
		Shock Absorber Service Kit, Tandem Set	
		For Saddle Height see Figure 1 on Page 12	
	64178-003	16½" Saddle Height, Includes Key Nos. 1a, 2a-b, 3-9	
	64178-004	17½"•18¼"•18½" Saddle Height, Includes Key Nos. 1b, 2a-b, 3-9	
	64178-009	16½" Saddle Height - Mack Only, Includes Key Nos. 1c, 2c, 3-9	
	64178-033	20¼"•20½" Saddle Height, Includes Key Nos. 1d, 2a-b, 3-9	
1		Shock Absorber Assembly	4
a	60680-004L	16½" Saddle Height	
b	60680-005L	17½"•18¼"•18½" Saddle Height	
c	60680-006L	16½" Saddle Height, Mack Only	
d	60680-010L	20¼"•20½" Saddle Height	
2		Lower Shock Bracket	
a	64148-001	Front	2
b	64148-002	Rear (Not Shown)	2
c	64835-000	Mack Only, Front and Rear (Not Shown)	4
3		*1"-8 UNC x 7" Hex Bolt,	4
4		*1" Hardened Washer	12
5		*1"-8 UNC Locknut	4
6	64146-000	Upper Shock Bracket	4
7		*⅝"-11 UNC x 4½" Hex Bolt	4
8		*⅝" Hardened Washer	8
9		*⅝"-11 UNC Locknut	4

NOTES ♦ To determine saddle height dimension, see Figure 1 on Page 12.
♦♦ GWH (Global Wheel Height) is used only by Western Star.
♦♦♦ Western Star frame width is dependent on the frame thickness (8 mm through 15 mm).

■ Single and Dual Rebound Straps

Service Kit No. 34013-354
Includes Key Nos. 24-28, 32-33

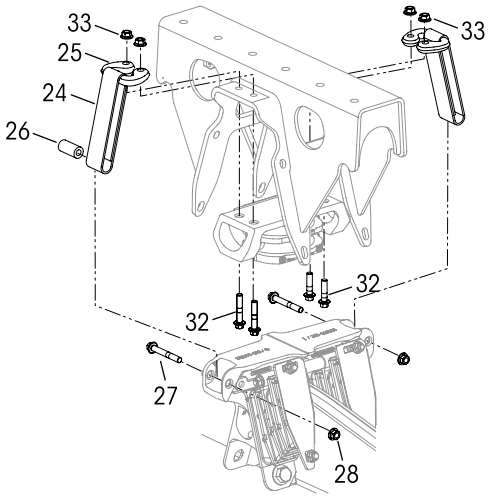
One Side, 40K•46K
Single Rebound Strap for vehicles originally equipped with one rebound strap



Key Nos.	24-28	32	33
Quantity Per Vehicle	2	4	4
Quantity Per Kit	1	2	2

Service Kit No. 34013-355
Includes Key Nos. 24-28, 31-33

One Side, 52K
Dual Rebound Straps for vehicles originally equipped with dual rebound straps

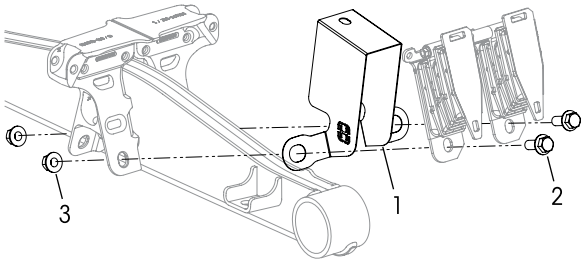


Key Nos.	24-28	32	33
Quantity Per Vehicle	4	8	8
Quantity Per Kit	2	4	4

Aftermarket Shield Plate Service Kit

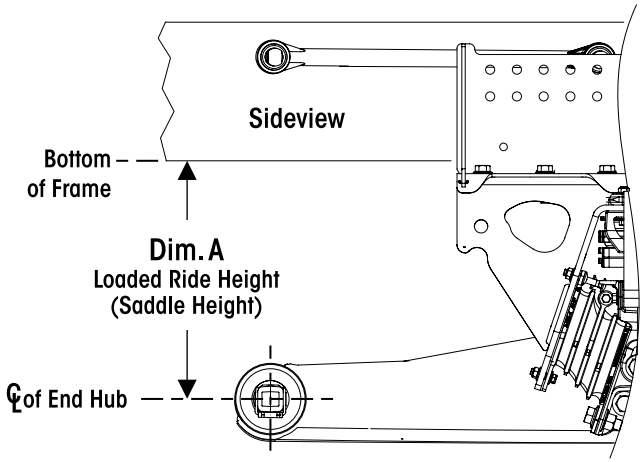
Service Kit No. 34013-413

Aftermarket Shield Plate for High Articulation Applications



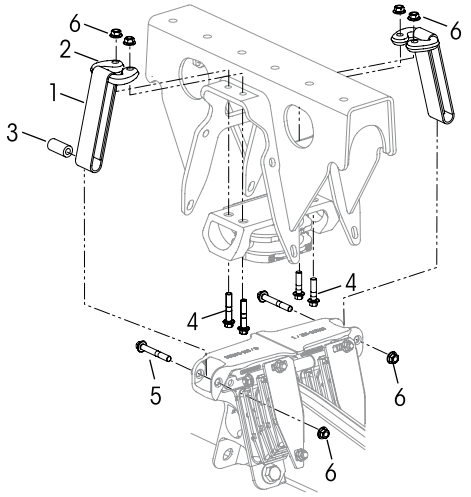
KEY NO.	PART NO.	DESCRIPTION	KIT QTY.
	34013-413	**Aftermarket Shield Plate Service Kit, Tandem Set,** for High Articulation Applications, Includes Key Nos. 1-3	
1		*Shield Plate	4
2		*M20 x 1.5-6G x 50 mm Flange Bolt	8
3		*M20 x 1.5 Flange Nut	8

FIGURE 4-1



Aftermarket Dual Rebound Strap Enhancement Kit

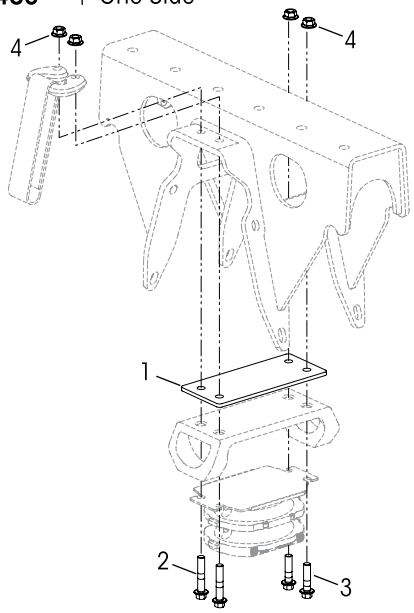
Service Kit No. 34013-363 | Aftermarket Dual Rebound Strap Conversion Vehicle Set



KEY NO.	PART NO.	DESCRIPTION	KIT QTY.
	34013-363	**Aftermarket Dual Rebound Strap Enhancement Kit, Tandem Set,** Includes Key Nos. 1-6	
1		*Rebound Strap	4
2		*Rebound Bracket	4
3		*Rebound Spacer	4
4		*M12 x 175-6G x 65 mm Flange Bolt	8
5		*M12 x 175-6G x 90 mm Flange Bolt	4
6		*M12 x 175 Flange Nut	12

Weight Bias Shim Service Kit

Service Kit No. 34013-430 | Weight Bias Shim Service Kit One Side



KEY NO.	PART NO.	DESCRIPTION	KIT QTY.
	34013-430	**Weight Bias Shim Service Kit, One Side,** Suitable for Single or Dual Rebound Strap, Includes Key Nos. 1-4	
1		*¼" Load Bias Shim	2
2		*M12 x 1.75-6G x 80 mm Flange Bolt	4
3		*M12 x 1.75-6G x 65 mm Flange Bolt for inner single strap use only	2
4		*M12 x 1.75 Flange Nut	4

Contains various sized fasteners to accommodate different suspension configurations. If necessary, one or two shims can be installed dependant on the vehicle weight bias. Refer to the table below for fastener selection.

	¼" Shim Qty.	M12 Bolt Size	¼" Shim Qty.	M12 Bolt Size
No Rebound Strap	1	50 mm	2	65mm
Rebound Strap Installed		80 mm		80 mm

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

** The HAULMAAX EX 52K capacity suspensions are equipped with dual rebound straps per equalizing beam, while the 40K•46K capacity suspensions have a single outboard rebound strap.

*** Transverse torque rods are mandatory for HAULMAAX EX suspensions regardless of axle spacing, see Hendrickson Literature Nos. 59310-004 and 59310-058 for more information.

**** TRAAX ROD bushings are non-serviceable, the entire torque rod assembly requires replacement, visit www.traaxrods.com for more information.

***** Verify shock absorber part number prior to replacement.

Hendrickson Lit. No. 48422-624 – HAULMAAX EX Gauge Card can be obtained online at www.hendrickson-intl.com/Litform.

SECTION 5
Special Tools

BAR PIN END BUSHING TOOLS

INSTALLATION TOOLS

Hendrickson Part No. 66086-103

OTC Part No. 1757 Visit otctools.com

Special tooling is required to service the bar pin end bushings. Hendrickson part number 66086-103 tool is used with the equalizing beam removed from the truck, and in conjunction with OTC No. 51100 press plate and a 100-ton hydraulic shop press.

REMOVAL TOOLS

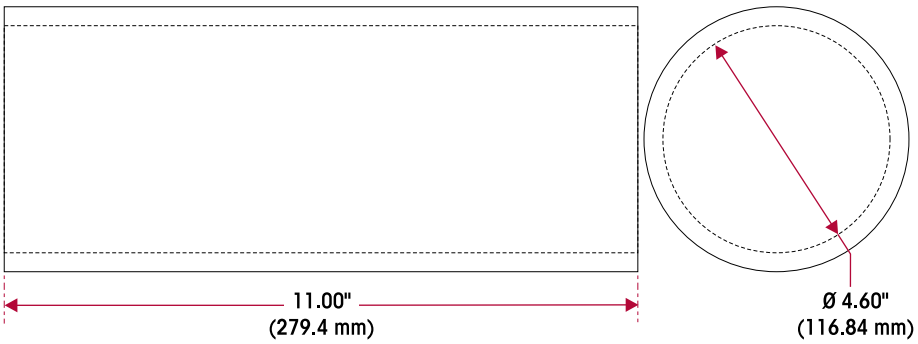
Hendrickson Part No. 66086-104

OTC Part No. 206457
Visit otctools.com

Hendrickson Part No. 66086-105

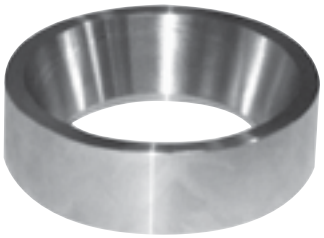
OTC Part No. 302030
Visit otctools.com

RECEIVING TOOL



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

ULTRA ROD TORQUE ROD BUSHING TOOLS



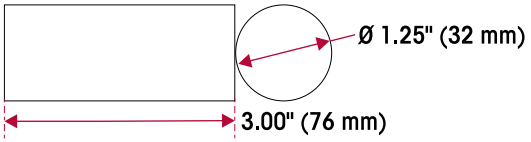
Hendrickson

Part No. 66086-001L

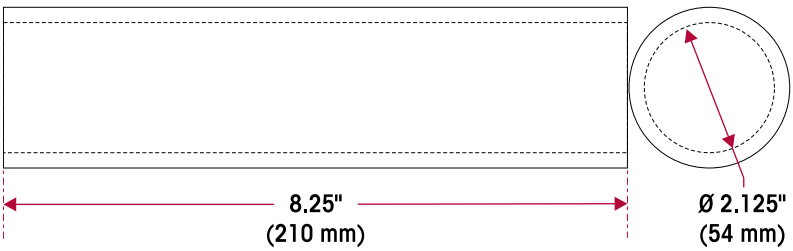
NOTE: TRAAX ROD assemblies equipped on HAULMAAX EX suspensions are not rebushable. The entire torque rod assembly must be replaced. This feature provides superior bushing retention in the torque rod end hub.

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

INSTALLATION / REMOVAL TOOL



RECEIVING TOOL



SECTION 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 EX 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 operations. Inspection must include the following items and other components referenced in this section.

HENDRICKSON RECOMMENDED INSPECTION INTERVALS	PRE-DELIVERY INSPECTION	FIRST IN-SERVICE INSPECTION	PREVENTIVE MAINTENANCE
Visually inspect progressive load springs, rebound straps, shield plates (if equipped) and bolster springs	Within the first **100 miles** (160 km)	Within the first **1,000 miles** (1,600 km) or 100 hours	Every 3 months / 600 hours
Visually inspect the equalizing beam end connections and torque rods			Every 6 Months / 1,200 Hours or **25,000 miles** (40,000 km)
Visually inspect for proper assembly and function. Check for all of the following and replace components as necessary. • Signs of unusual movement, loose or missing components • Signs of abrasive or adverse contact with other components • Damaged, bent or cracked parts			Every 12 Months / 2,400 Hours
Inspect fasteners for proper torque as recommended in the Torque Specifications section in this publication with special attention to the following suspension connections: • Frame hanger to frame saddle connection • Equalizing beam end connections • Bolster spring connections			
Verify the lateral alignment of axles are within the vehicle manufacturer's tolerances			

COMPONENT INSPECTION

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

- **Bolster springs, progressive load springs, and rebound straps** — See the Bolster Springs, Progressive Load Springs, and Rebound Strap Inspection in this section.
- **Equalizing beam assembly** — Check the overall condition of the equalizing beam for dents, cracks, or other overall damage and check equalizing beam ends, see Equalizing Beam End Connection Inspection section in this section.
- **Equalizing beam saddle** — Check the mounting bolts for signs of movement, if movement is visible, verify for proper torque.

- **Fasteners** — Look for any loose or damaged fasteners on the entire suspension. Ensure all fasteners are tightened to a torque value within the specified torque range. See recommended torque specifications for Hendrickson supplied fasteners in Torque Specifications section in 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 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.

- **Frame hanger** — Look for any signs of wear and damage, and replace as necessary.
- **Frame saddle assembly** — Check all attaching fasteners for proper torque. Visually inspect the saddle for signs of movement or damage. Inspect the area around the saddle gussets for cracks, and replace as necessary
- **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 (6) months.
- **Wear and damage** — Inspect all parts of the suspension for wear and damage. Look for bent or cracked parts and replace as necessary.
- **Shield plates** (if equipped) — Look for any signs of wear and damage and replace them as necessary.

See vehicle manufacturers' applicable publications for other preventive maintenance requirements.

EQUALIZING BEAM END CONNECTIONS

⚠ WARNING

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

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

NOTE

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

VISUAL INSPECTION

1. Chock the wheels.
2. Visually inspect suspension components for signs of movement or excessive wear.
   - Inspect equalizing beam end connection for signs of excessive wear or looseness.

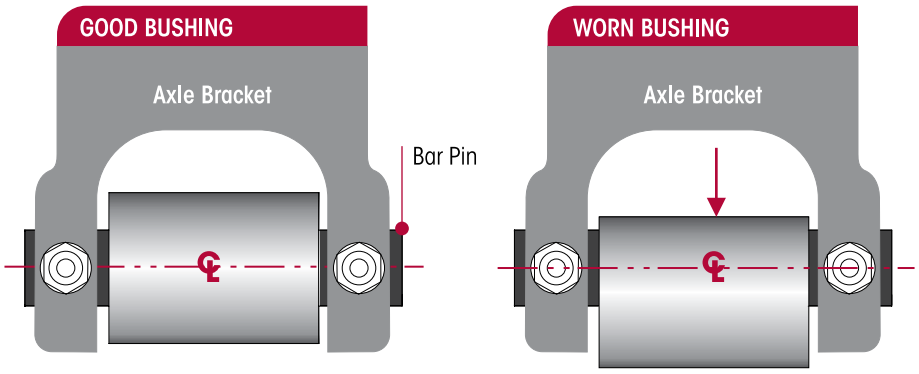
SERVICE HINT

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

- Look for the equalizing beam to be lower in the axle bracket, see Figure 6-1.
- If the bar pin beam end bushing is visually offset a floor jack test should be performed. See Physical Inspection.
- Inspect worn, frayed or distorted rubber in the bar pin beam end bushing.
- Inspect for a shift in the equalizing beam compared to the bar pin, see Figure 6-2.

- The equalizing beam and bar pin should appear to be square with an equal amount of rubber exposed on both sides, see Figure 6-3.

FIGURE 6-1



A **GOOD** bushing will appear centered the centerline of the bar pin in the axle bracket and equalizing beam end hub

A **WORN** bushing will appear offset/below the centerline of the bar pin in the axle bracket and equalizing beam end hub

FIGURE 6-2

UNACCEPTABLE

Bar Pin shifted in the end hub

FIGURE 6-3

ACCEPTABLE

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

PHYSICAL INSPECTION

NOTE

The gap at each side of the visible rubber on the lower part of the bar pin end bushing is normal, see Figure 6-3, it is not an indication to replace the bushing. All rubber end bushings are in compression with the load bearing on the top side, the lower side of the rubber is slightly relieved, allowing the rubber to move inward, and a gap appears.

⚠ WARNING

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

1. Place a floor jack under each equalizing beam end as shown. Raise the floor jack to check for movement in the connection or rubber components, see Figure 6-4.
2. If the bar pin end bushing movement or looseness is detected in the equalizing beam end hub, replace the end bushings and all connecting parts. Refer to the Bar Pin End Bushing Component Replacement section in this publication.
3. Check and record torque values, as received, for each 1" bar pin fastener, see Figure 6-5. Ensure all fasteners are tightened to the following:
   - At the locknuts tighten to 525 ± 75 foot pounds torque or
   - At the bolt head tighten to 575 ± 75 foot pounds torque
4. Recheck equalizing beam end connections for signs of looseness.

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

FIGURE 6-4

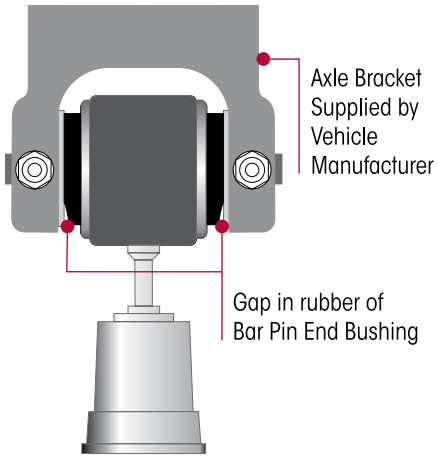
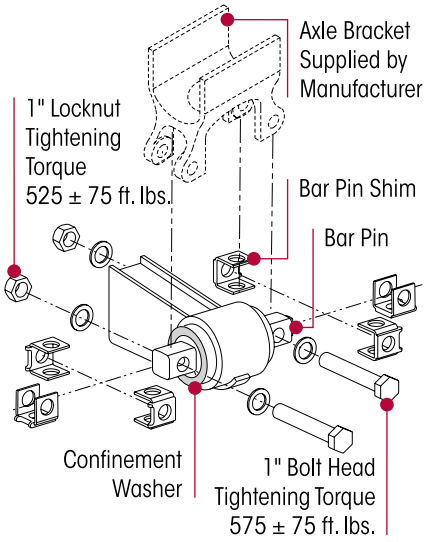


FIGURE 6-5



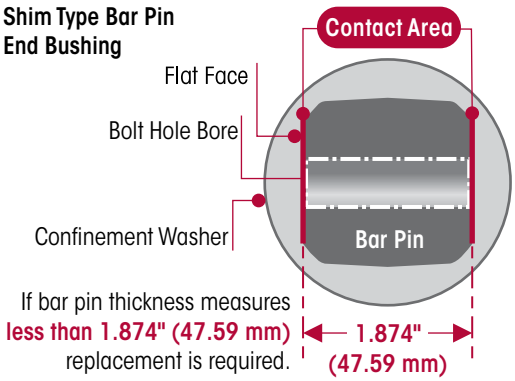
BAR PIN BUSHING

VISUAL INSPECTION

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

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

FIGURE 6-6
Shim Type Bar Pin End Bushing

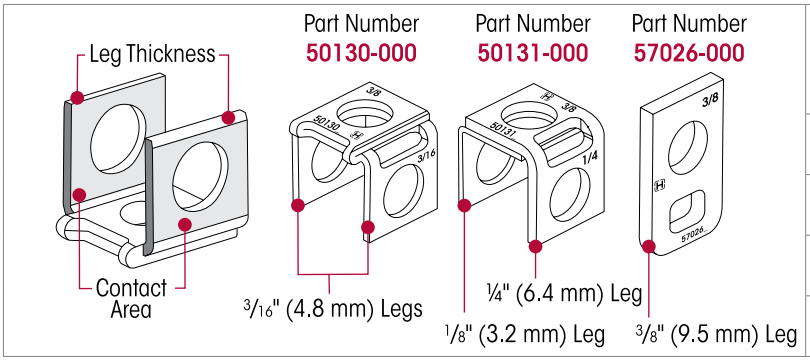


BAR PIN SHIMS

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

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

FIGURE 6-7



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

AXLE BRACKET

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

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

FIGURE 6-8

SIDEVIEW

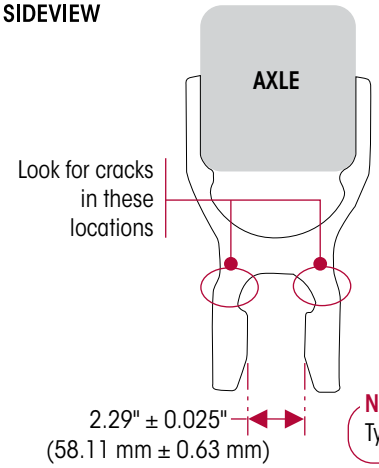
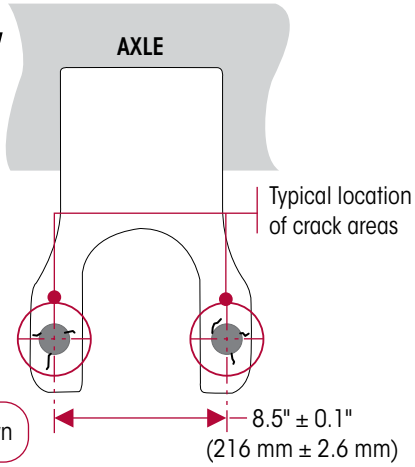


FIGURE 6-9

FRONT / REAR VIEW



NOTE
Typical axle bracket shown

LONGITUDINAL AND TRANSVERSE TORQUE RODS

⚠ WARNING

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

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

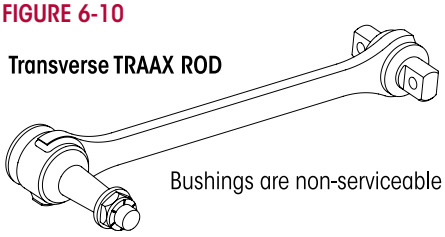
- **Method 1** — **For on-highway tractor applications ONLY** with brakes applied, slowly rock the empty vehicle with power while a mechanic visually checks the action at both ends.
- **Method 2** — with the vehicle shut down, a lever check can be made with a long pry bar placed under each torque rod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

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

Longitudinal Torque rod length is determined by the vehicle manufacturer for optimum drive line angles. The longitudinal torque rods control these angles and also absorb acceleration and braking forces. The mounting brackets at the axle ends of the torque rods are furnished and welded into position on the axle housings by the vehicle manufacturer or the axle manufacturer. A two-piece torque rod is also available to cut and weld to the desired length, see Hendrickson publication 45745-148. The longitudinal torque rod is equipped with straddle bushings, refer to the Torque Rod Bushing Component Replacement section in this publication.

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

FIGURE 6-10



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

REBOUND STRAPS

NOTE If equipped with dual rebound straps, in the event only one rebound strap on an equalizing beam assembly shows signs of damage or excessive wear, Hendrickson recommends that both dual rebound straps installed on that equalizing beam assembly be replaced.

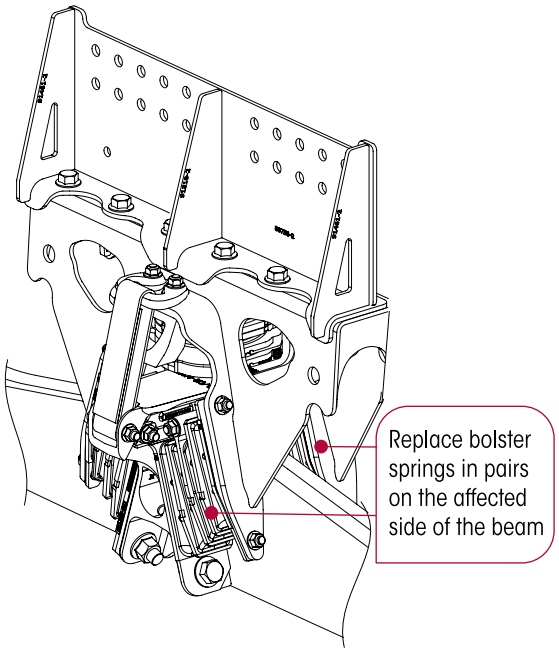
The rebound strap helps prevent the overextension of the bolster springs during normal vehicle operation. If a rebound strap is torn, frayed or not intact, replacement is necessary. See the Rebound Strap in the Component Replacement section in this publication.

BOLSTER SPRINGS

NOTE Actual bolster spring service condition and performance may vary depending on suspension and vehicle configuration, operation, service and other factors.

NOTE In the event only one (1) bolster spring on an equalizing beam assembly shows signs of damage or excessive wear, Hendrickson recommends that both bolster springs installed on that equalizing beam assembly be replaced, see Figure 6-11.

FIGURE 6-11



INSPECTION

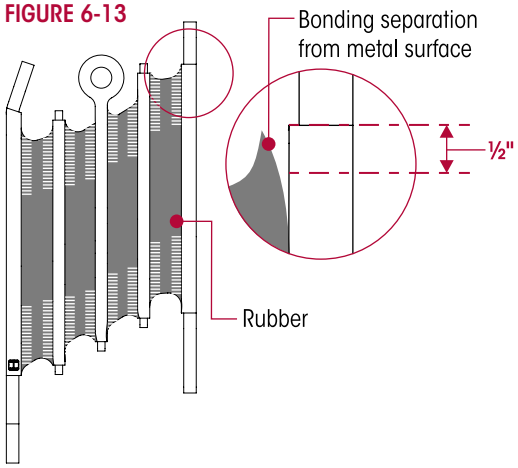
Inspect all four (4) bolster springs per the following procedure.

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

- Minor oil and grease contamination in the rubber due to vehicle operation is acceptable. A slight change in the shape of the rubber due to a 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 tie-bar bolster spring replacement. In the unloaded condition, if the tie-bar bolster spring rubber is swollen beyond the edge of the metal plates, then bolster spring replacement is necessary.
- A Hendrickson HAULMAAX EX gauge (Lit. No. 48422-624) is available to help measure the bolster spring for cut or splits and bonding separation, see Figure 6-12.
- **Cuts or Splits** in the rubber of over 1.0" in length and an average depth of ⅜" 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 6-13 as "/////// ".
- **Bonding separation** of the rubber from a bonded metal surface to a depth of up to **½"** is acceptable. If any bonding separation is more than ½" deep, both bolster springs should be replaced on the affected side of the vehicle (see Figure 6-11). An unloaded bolster spring may be inspected for any bonding separation by measuring at points indicated in Figure 6-13 as "/////// ". Any thin film or other residual rubber material on the metal plates resulting from the molding process may be ignored during an inspection.

FIGURE 6-12 Lit. No. 48422-624 Gauge

FIGURE 6-13



PROGRESSIVE LOAD SPRING (PLS)

A visual inspection of the progressive load spring is required every three months. Inspect the PLS for tearing. If the length of the tear is more than 1 inch (13 mm) then replacement is required.

SERVICE HINT

Use **HAULMAAX EX gauge Literature No. 48422-624** (Figure 6-14) in unloaded condition to help to determine the acceptable height of the progressive load spring (PLS).

In the unloaded condition, measure the PLS height from the outboard side from the top of the PLS mounting plate to the bottom of the PLS nub location, see Figures 6-15 and 6-16.

Progressive Load Spring (PLS)

- **Acceptable** — If the PLS height range is between 69 mm - 83 mm (2.72" - 3.27")
- **Replacement required** — If the PLS height is less than 69 mm (2.72")

FIGURE 6-14 Lit No. 48422-624 Gauge

FIGURE 6-15

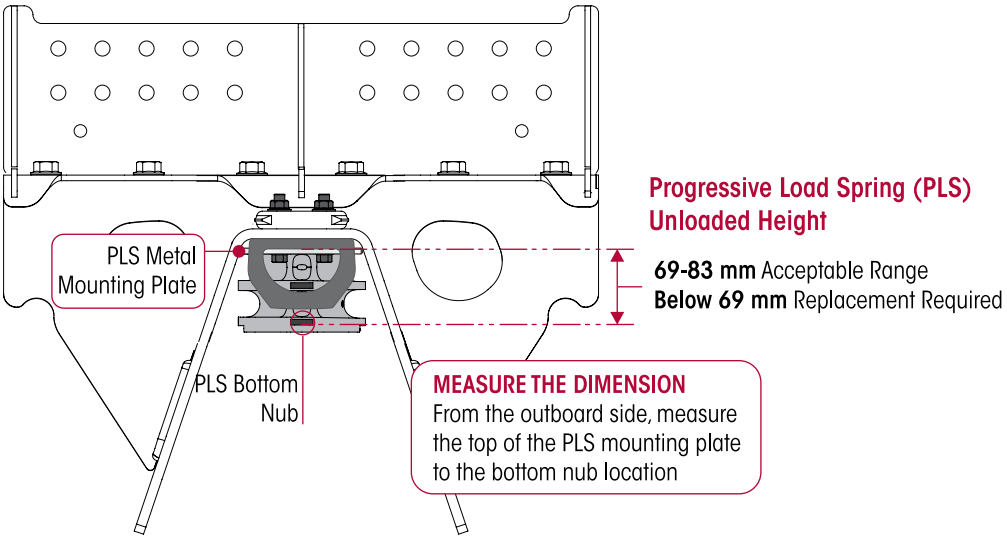


FIGURE 6-16

SHOCK ABSORBERS (if equipped)

FIGURE 6-17

NOTE

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

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

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

⚠ WARNING

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

HEAT TEST AND PHYSICAL INSPECTION

1. **Heat Test:** Drive the vehicle with the lift axle down at moderate speeds on a rough road for a minimum of fifteen minutes.
   a. Perform a heat test by carefully touching or placing a hand near the shock absorber body below the dust cover. Touch the frame to get an ambient reference, see Figure 6-17. A shock absorber that is warm to the touch is acceptable, a cold shock absorber should be replaced.
2. **Physical Inspection:** To inspect for an internal failure, remove and shake the suspected shock absorber. Listen for the sound of metal parts rattling inside. The rattling of metal parts can indicate that the shock absorber has an internal failure and the shock absorber should be replaced.

VISUAL INSPECTION

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

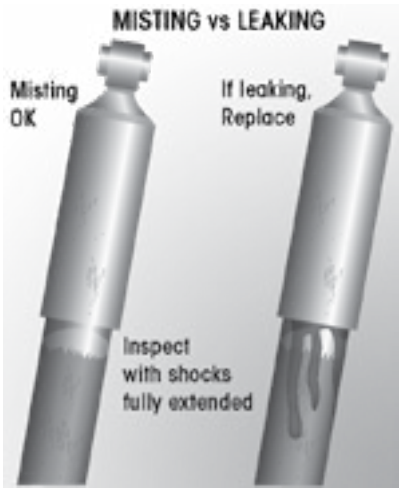
FIGURE 6-18

SHOCK ABSORBER VISUAL INSPECTION – UNACCEPTABLE CONDITIONS

Damaged upper or lower mount | Damaged upper or lower bushing | Damaged dust cover and / or shock body | Bent or dented shock absorber | Improper installation Example: washer (if equipped installed backwards

LEAKING VS. MISTING SHOCK ABSORBER VISUAL INSPECTION

FIGURE 6-19



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

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

NOTE

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

Inspect the shock absorber fully extended. **A shock absorber that is truly leaking** will show signs of fluid **leaking in streams from the upper seal**, see Figure 6-19. These streams can easily be seen, underneath the main body (dust cover) of the shock absorber. Replace as necessary.

SECTION 7
Alignment & Adjustments

DRIVE AXLE ALIGNMENT

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

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

NOTE

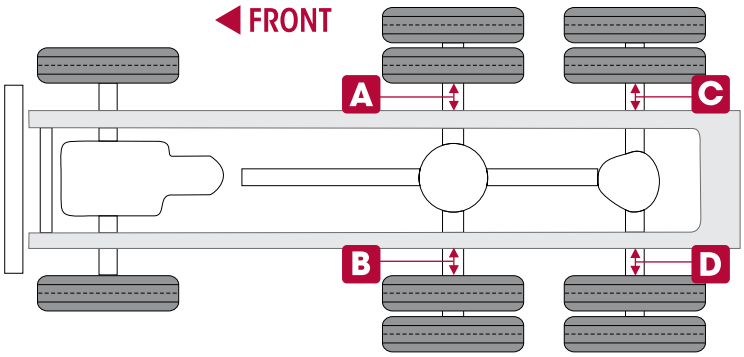
Depending on your alignment equipment, enter the vehicle year, make, model and design into the system's computer to determine the vehicle manufacturer's alignment specifications per the alignment equipment instructions. That data will be compared to the vehicle's actual alignment status to determine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

7. If the measurements are within the vehicle manufacturer's specifications, then the rear drive axle alignment is acceptable.
   a. If the alignment of the rear drive axle **IS NOT** within the vehicle manufacturer's specifications, then the alignment of this axle **MUST** be adjusted. Follow the alignment equipment procedure to adjust the alignment of this axle.
8. Recheck measurements to confirm adjustments until the correct alignment is achieved.
9. When all drive axle alignments are within the vehicle manufacturer's specifications then the alignment procedure is complete.

AXLE 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 measurements **A** and **B**, see Figure 7-1.
3. Measure the same distance on the opposite side of the same axle. Record the measurements **C** and **D**, see Figure 7-1.
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 axle lateral alignment.
   - A general rule of thumb is to use a shim with a thickness that is half of the difference between the two measurements.

FIGURE 7-1

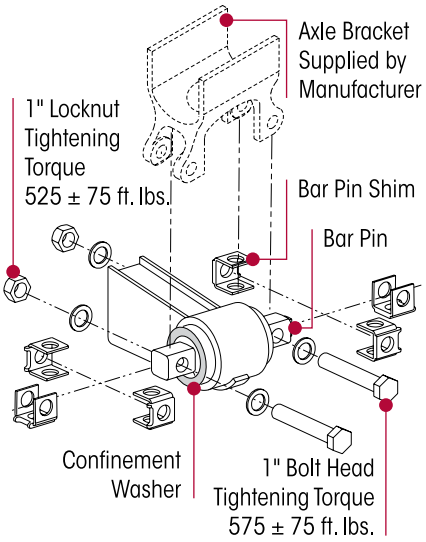


EXAMPLE If the axle lateral alignment is out of specification by ¼" (6 mm), remove or install a ⅛" (3 mm) shim between the transverse torque rod and frame rail as needed. Refer to the Longitudinal and Transverse Torque Rod section in the Preventive Maintenance section in this publication.

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

BAR PIN WITH SHIMS ALIGNMENT

FIGURE 7-2



The alignment feature consists of specially designed, tightly tolerant steel shims which fill the ⅜" total gap between the bushing's bar pin and the axle bracket legs. The gap must be filled by placing the shims on the bushing assembly in one of the positions shown in Figures 7-2 and 7-4.

Hendrickson has three (3) shim design options for alignment, part number 50130-000 (provided), 50131-000 and 57026-000, see Figure 7-5.

⚠ WARNING

A BAR PIN SHIM MUST BE INSTALLED AT EACH BOLT LOCATION. THE SAME PART NUMBER SHIM IN THE SAME ORIENTATION MUST BE USED AT BOTH BOLT LOCATIONS ON ANY ONE (1) END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE (1) SHIM AT EACH BOLT LOCATION. USE GENUINE HENDRICKSON BAR PIN SHIMS, DO NOT USE STANDARD WASHERS. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN IMPROPER VEHICLE ALIGNMENT, FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

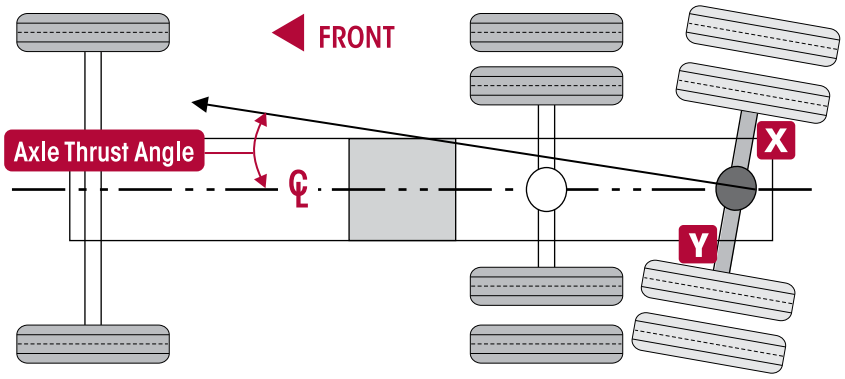
ALIGNMENT ADJUSTMENT PROCEDURE

NOTE Computerized alignment equipment is the preferred method of measuring alignment. Laser alignment equipment may be used, however, to calculate the shim thickness required the target offset must be converted to thrust angle, see alignment equipment manufacturer for procedures.

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

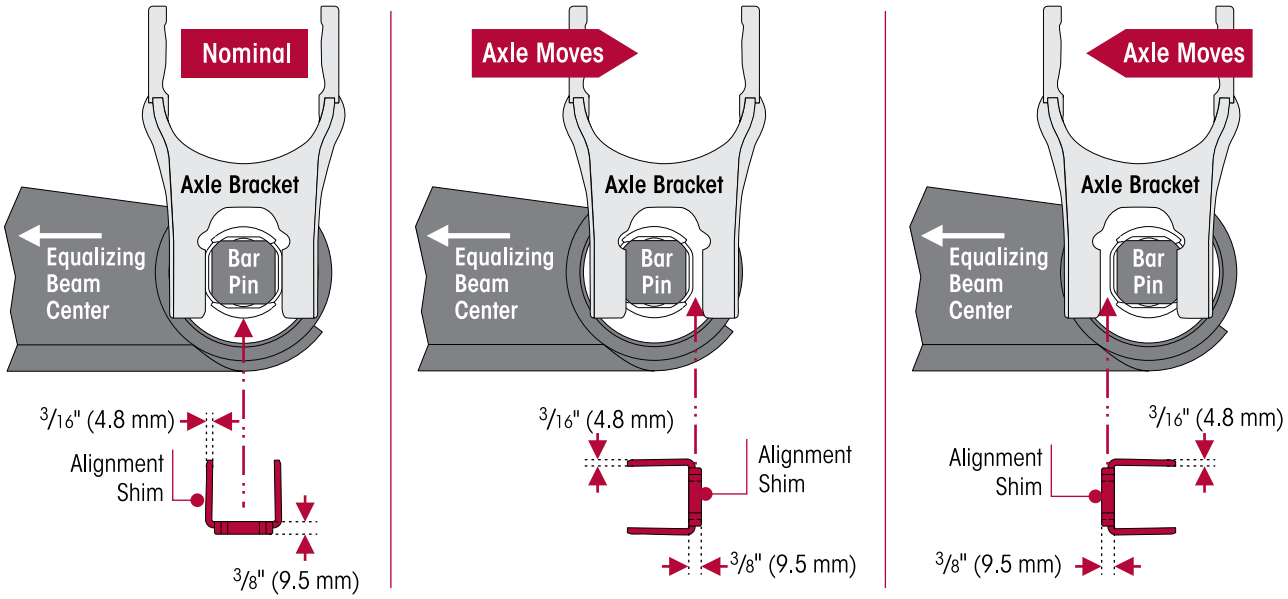
1. Determine the direction of the axle thrust angle. Figure 7-3 illustrates the forward drive axle with a thrust angle to the left (-negative thrust).

FIGURE 7-3



SERVICE HINT Axle movement is in the same direction as the increased shim thickness, see Figure 7-4.

FIGURE 7-4



2. To determine where to adjust shim thickness use measurements (**A** and **B**) for the front drive axle or (**C** and **D**) for the rear drive axle.

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 7-3, shim thickness will need to be increased at the **BACK** of the bar pin **(Location X)** and/or the **FRONT** of the bar pin **(Location Y)**.

NOTE Computerized alignment equipment is the preferred method of measuring alignment. Laser alignment equipment may be used, however, to calculate the shim thickness required the target offset must be converted to thrust angle, see alignment equipment manufacturer for procedures.

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.
5. Support the frame with safety stands.
6. Support the equalizing beam and remove the fasteners from the end bushing where the bar pin alignment shim adjustment is being made.
7. Adjust shim thickness to move the axle in the desired direction, see Figure 7-4.

WARNING

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

CAUTION

BAR PIN ALIGNMENT SHIM (PART NO. 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE BUSHING, SEE FIGURE 7-5. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE.

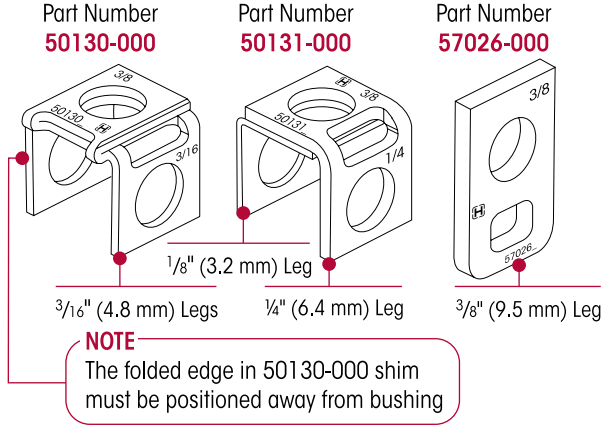
8. Install new end bushing fasteners and tighten to:
   - At the **locknut** to 525 ± 75 foot pounds torque, or
   - At the **bolt head** to 575 ± 75 foot pounds torque
9. Remove support and lower the vehicle.
10. Verify the axles' alignments are within the vehicle manufacturer's tolerance.
11. Set brakes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

FIGURE 7-5

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 3/16" (4.8 mm) legs and a 3/8" (9.5 mm) back. Rotating the shim pairs 90° will change the axle alignment in ± 3/16" (4.8 mm) increments.
- If a finer adjustment is required use alignment shim (P/N 50131-000). This alignment shim has one 1/8" (3.2 mm) leg, one 1/4" (6.4 mm) leg, and a 3/8" (9.5 mm) back. A total of 3/4" (19 mm) adjustment is achievable to the axle. A 3/8" (9.5 mm) flat shim is also available (P/N 57026-000).



- 1/16" (1.5 mm) shim thickness increases thrust angle by 0.10°.
- To accomplish a thrust angle adjustment rotate the alignment shims on the bar pin of the end bushing. Axle movement will be in the direction of the shim thickness increase.
- Axle thrust angle may be adjusted at either wheel end on an axle. If insufficient adjustment is available at one wheel end, the opposing wheel end will also need to be adjusted, but in the opposite direction.

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

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 in this publication. If non-Hendrickson fasteners are used, follow the torque specifications listed in the vehicle manufacturer's service manual.

NOTE

Hendrickson recommends the use of to use Class 10.9 bolts and locknuts and hardened washers or Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used, then hardened structural washers must be used under bolt heads and locknuts.

FRAME HANGER

DISASSEMBLY

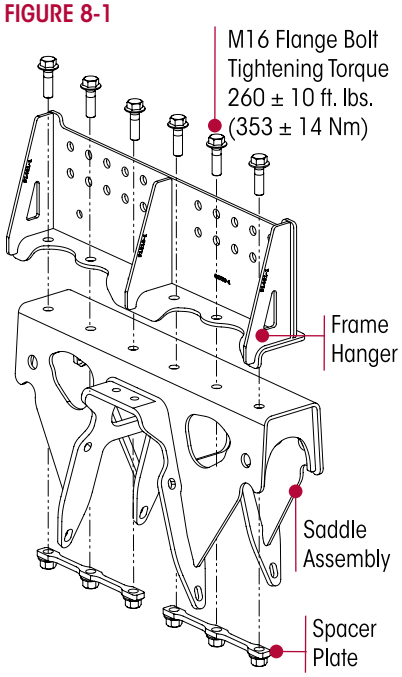
1. Chock the front wheels of the vehicle.
2. Lift and support the axles with safety stands.
3. Support the frame with safety stands.
4. Remove the wheel assemblies from the side being serviced.
5. Remove and discard the M16 fasteners that attach the frame hanger to the frame saddle and saddle fastener plate, see Figure 8-1.

SERVICE HINT

It may be necessary to remove the upper / lower shock absorber fasteners (if equipped) to ease in frame hanger removal.

6. Raise the frame enough to allow a gap between the frame saddle and the frame hanger.
7. Remove the frame fasteners per the vehicle manufacturer's guidelines.

FIGURE 8-1



⚠ WARNING

THE WEIGHT OF THE FRAME HANGER IS APPROXIMATELY 21 KILOGRAMS (46 POUNDS). CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

8. Remove the frame hanger from the frame rail.

ASSEMBLY

1. Mount the frame hanger to the frame rail, and ensure the frame rail is free of dirt or rust and the surface is flat. Tighten to the vehicle manufacturer's recommended torque specification.
2. Lower the frame until the frame hanger contacts the frame saddle.
3. Ensure the fastener holes are aligned.
4. Install the M16 fasteners to attach the saddle fastener plate to the frame saddle and frame hanger.
5. Tighten at the bolt heads to 260 ± 10 foot pounds torque, see Figure 8-1.

6. If removed, install the shock absorber studs (if equipped) into the lower shock mounting brackets. Install the rubber bushings, retainer washers, and nylon locknuts. Tighten to 80 ± 10 foot pounds torque.
7. Install wheel assemblies from the side being serviced.
8. Remove the frame safety stands.
9. Lift the axle and remove the safety stands.
10. Remove the wheel chocks.

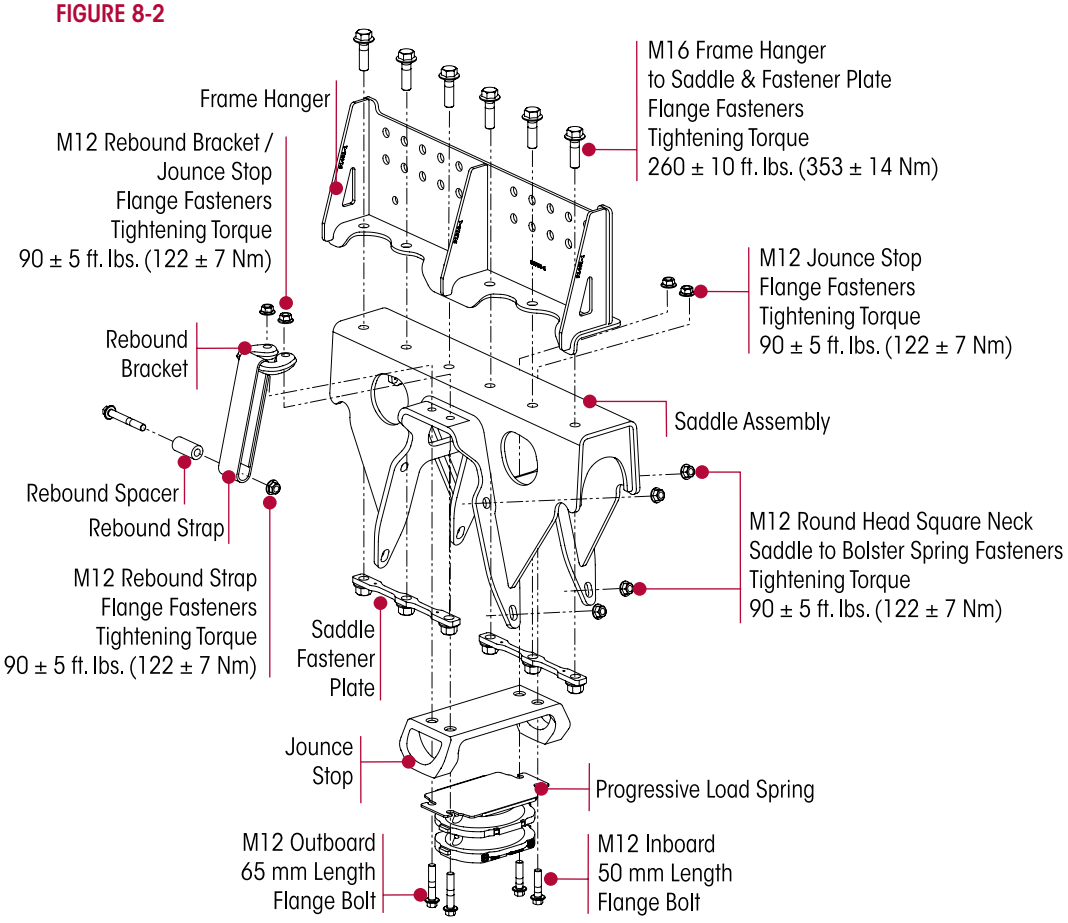
FRAME SADDLE

DISASSEMBLY

NOTE If both sides of the vehicle require frame saddle replacement, the procedure must be performed **one side at a time**.

1. Chock the front wheels of the vehicle.
2. Lift and support the axles with safety stands.
3. Support the frame with safety stands.
4. Remove the wheel assemblies from the side being serviced.
5. If equipped, remove and discard the lower shock absorber fasteners.
6. Remove and discard the inboard and outboard four (4) jounce stop M12 fasteners from the frame saddle, see Figure 8-2.
7. Remove and discard M12 fasteners connecting the bolster springs to the frame saddle, see Figure 8-2.

FIGURE 8-2



8.

9. Raise the frame slightly to allow for a gap between the bolster springs and the frame saddle.
10. Remove and discard the M16 fasteners and saddle fastener plates that connect the frame saddle to the frame hanger, see Figure 8-2.
11. Remove the frame saddle.

ASSEMBLY

1. Position the frame saddle over the bolster springs.
2. Install the M12 bolster spring to frame saddle fasteners and tighten to 90 ± 5 foot pounds torque, see Figure 8-2.
3. Lower the vehicle frame until the frame hanger contacts the frame saddle.
4. Install the M16 fasteners and saddle fastener plates and tighten to 260 ± 10 foot pounds.
5. Install the PLS and the jounce stop to the frame saddle.
6. Install the M12 fasteners into the frame saddle, rebound bracket, and tighten to 90 ± 5 foot pounds torque.
7. If equipped, install the lower shock absorber studs into the shock mounting brackets. Install the rubber bushings, retainer washers, and nylon locknuts. Tighten to 80 ± 10 foot pounds torque.
8. Install the wheel assemblies from the side being serviced.
9. Remove the safety stands supporting the frame.
10. Lift the axle and remove the safety stands.
11. Remove the wheel chocks.

PROGRESSIVE LOAD SPRING (PLS) & JOUNCE STOP

DISASSEMBLY

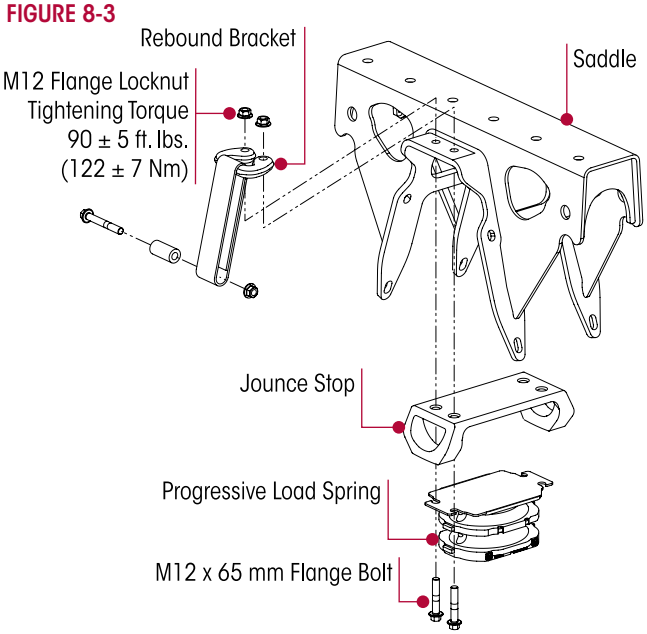
SERVICE HINT Wheel removal is not necessary for PLS replacement.

1. Chock the front wheels of the vehicle.

SERVICE HINT If the PLS is in contact with the equalizing beam saddle, the vehicle frame will need to be raised slightly to create a gap to facilitate PLS removal.

2. Remove and discard the inboard and outboard four (4) jounce stop / PLS rebound bracket M12 fasteners from the frame saddle, see Figure 8-3.
3. Remove the PLS and the jounce stop, see Figure 8-3.
4. Inspect the jounce stop for cracks or damage. Replace as necessary.

FIGURE 8-3



ASSEMBLY

1. Install the PLS and the jounce stop.
2. Install the inboard and outboard four (4) jounce / PLS rebound bracket M12 fasteners to the frame saddle as shown in Figure 8-3.
3. Tighten fasteners to 90 ± 5 foot pounds torque,
4. Lower the frame (if raised).
5. Remove the wheel chocks.

REBOUND STRAP

NOTE Hendrickson HAULMAAX EX Rebound Strap service kits are available for single and dual rebound straps with hardware, refer to the Parts List section in this publication (Service Kit Nos. 34013-354 or 34013-355).

NOTE The HAULMAAX EX 52K capacity suspensions are equipped with dual rebound straps per equalizing beam, while the 40K•46K capacity suspensions have a single rebound strap. If equipped with dual rebound straps, in the event only one rebound strap requires replacement on an equalizing beam assembly, Hendrickson recommends that both dual rebound straps be replaced.

DISASSEMBLY

SERVICE HINT Wheel removal is not necessary for rebound strap replacement.

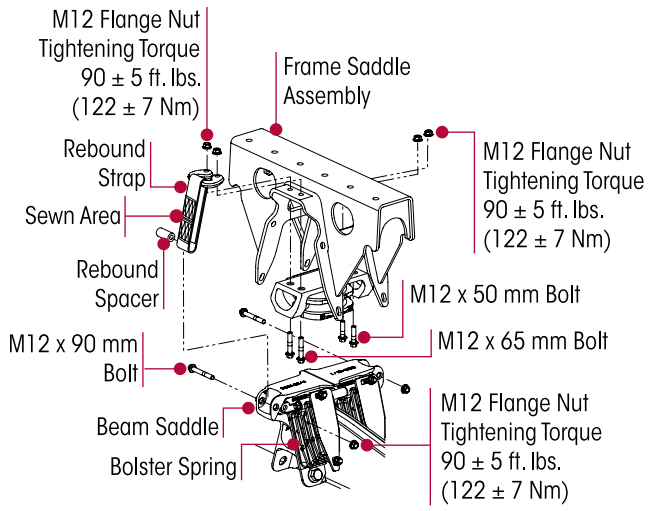
1. Chock the front wheels of the vehicle.

SERVICE HINT If the PLS is in contact with the equalizing beam saddle, the vehicle frame will need to be raised slightly to create a gap to facilitate rebound strap replacement.

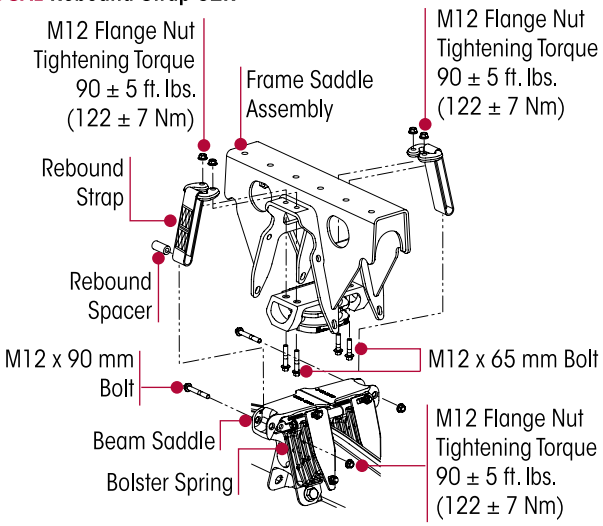
2. Remove and discard the M12 lower rebound strap fasteners and rebound spacer(s) from equalizing beam saddle, see Figure 8-4.
3. Remove and discard the M12 upper rebound strap fasteners from the frame saddle, see Figure 8-4.
4. Remove and discard rebound strap(s).

FIGURE 8-4

SINGLE Rebound Strap – 40K•46K



DUAL Rebound Strap 52K



ASSEMBLY

CAUTION

THE REBOUND STRAP MUST BE INSTALLED WITH THE SEWN AREA FACING OUTBOARD, FAILURE TO DO SO WILL RESULT IN THE PREMATURE WEAR OF THE REBOUND STRAP, SEE FIGURE 8-4.

1. Slide the upper rebound bracket through the upper rebound strap(s) loop with the sewn area facing outboard, and tighten the upper fastener to 90 ± 5 foot pounds torque, see Figure 8-4.
2. Install the rebound spacer into the lower rebound strap.
3. Install the M12 fasteners through the spacer(s) and equalizing beam saddle. Tighten the lower fasteners to 90 ± 5 foot pounds torque, see Figure 8-4.
4. Lower the vehicle frame (if raised).
5. Remove the wheel chocks.

AFTERMARKET DUAL REBOUND STRAP ENHANCEMENT KIT

NOTE HAULMAAX EX suspension dual rebound strap kit enhancement Kit Number 34013-363 is available to convert from single to dual rebound strap configuration, refer to the Parts List section in this publication. See the Rebound Component Replacement procedure in this section.

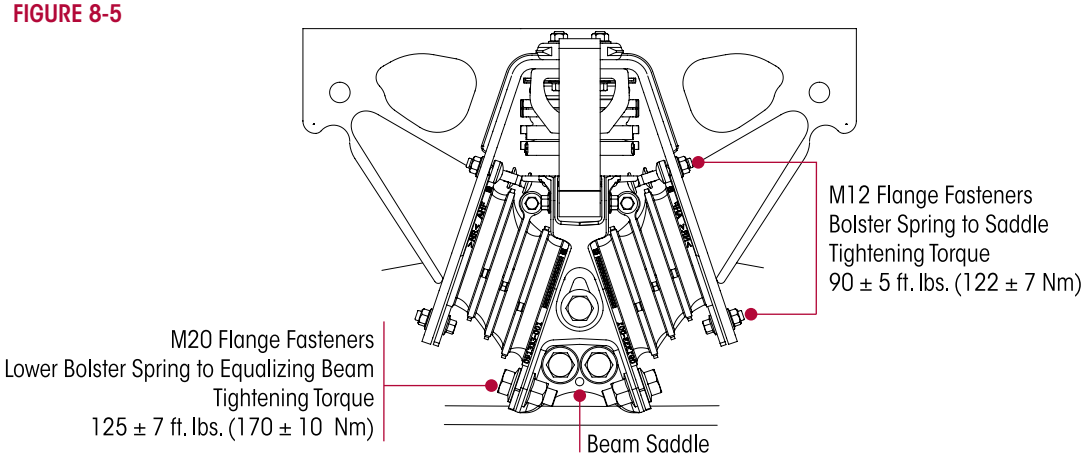
BOLSTER SPRINGS

DISASSEMBLY

NOTE If both sides of the vehicle require bolster spring replacement, the procedure must be performed **one side at a time**.

1. Chock the front wheels of the vehicle.
2. Lift and support the axles.
3. Remove the wheel assemblies from the side being serviced.
4. Support the frame with safety stands.
5. Remove the rebound strap as shown in this section.
6. Remove the lower shock absorber fasteners (if equipped).
7. Remove and discard the eight (8) M12 fasteners connecting the bolster springs to the frame hanger, see Figure 8-5.

FIGURE 8-5



8. Raise the frame slightly to allow for a gap between the bolster springs and the upper frame saddle.
9. Remove the tie-bar bolt and spacer (if equipped).

SERVICE HINT The **UPPER INNER** fasteners can be removed by going through the opening on the side of the frame saddle with a socket extension.

10. Remove and discard the four (4) M12 fasteners connecting the bolster springs to the beam saddle, see Figure 8-5.
11. Remove and discard the four (4) M20 fasteners connecting the bolster springs to the lower portion of the beam saddle.
12. Remove the bolster springs from the equalizing beam.
13. Remove the shield plate (if equipped).

⚠ CAUTION

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

INSPECTION

Inspect the shield plate (if equipped) for cracks and wear. Replace as necessary.

ASSEMBLY

1. Install the shield plate (if equipped).
2. Install the bolsters onto equalizing beam saddle.
3. Install and snug the four (4) M20 **LOWER** fasteners connecting the bolster springs to the lower portion of the beam saddle, see Figure 8-6. **DO NOT** tighten at this time to allow for movement.

FIGURE 8-6

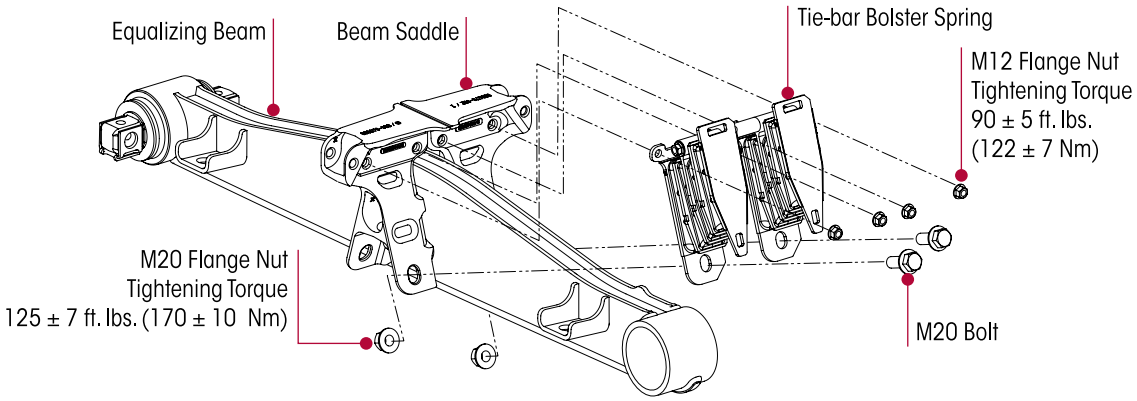
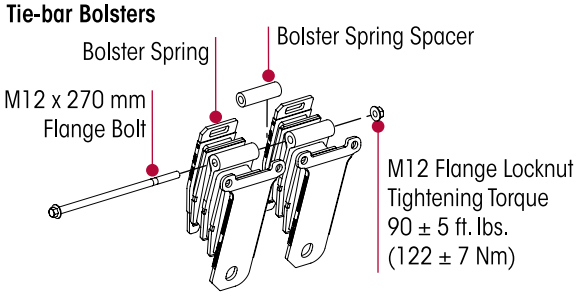


FIGURE 8-7
Tie-bar Bolsters



4. Loosely install the **UPPER** four (4) M12 fasteners, **DO NOT** tighten at this time.
5. If equipped with:
   - **Bolster springs**, proceed to Step 6.
   - **Tie-bar bolster springs**, temporarily install tie-bar bolt and spacer (no locknut) to space bolsters evenly on the beam saddle, see Figure 8-7
   a. Tighten **UPPER OUTER** two (2) M12 fasteners to 90 ± 5 foot pounds torque, see Figure 8-6.
   b. Remove the tie-bar bolt and spacer.

SERVICE HINT

The **UPPER INNER** fasteners can be tightened by going the opening on the side of the frame saddle with a socket extension.

   c. Tighten **UPPER INNER** two (2) M12 fasteners to 90 ± 5 foot pounds torque, see Figure 8-6.
   d. Install the tie-bar, spacer, and fasteners. Tighten the M12 fasteners to 90 ± 5 foot pounds torque.

6. Tighten the **LOWER** M20 fasteners to 125 ± 7 + 90° foot pounds torque, see Figure 8-6.
7. Lower the vehicle frame until the frame saddle contacts the bolsters.
8. Install and tighten the eight (8) M12 fasteners to 90 ± 5 foot pounds torque connecting the bolster to the frame saddle.
9. If equipped, locate the lower shock absorber stud in the lower shock bracket and install the rubber bushing, retainer washer, and nylon locknut. Tighten to 80 ± 10 foot pounds torque, see Figure 8-8.
10. Install the wheel assemblies from the side being serviced.
11. Remove the frame safety stands.
12. Remove the axle safety stands and lower the axle.
13. Remove the wheel chocks.

SHOCK ABSORBERS (if equipped)

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

NOTE The lower shock stud will be mounted either through a welded bracket on the outboard side of the equalizing beam. If equipped with an aftermarket shock absorber, the lower shock mount is location on the outboard side of the end bushing with a shock bracket. The component replacement procedure is the same for both configurations.

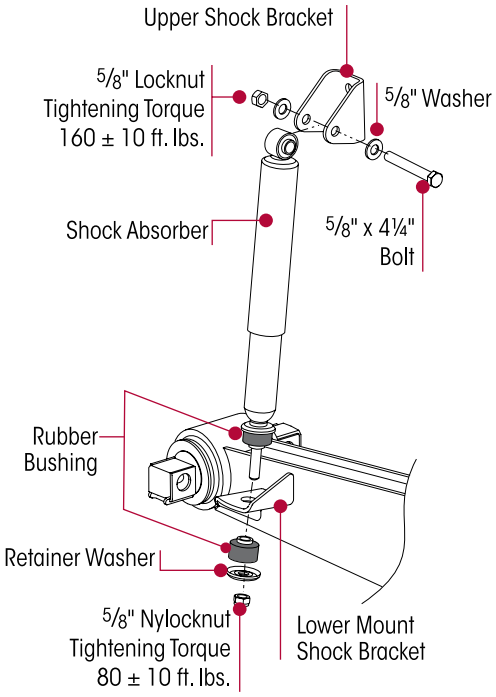
DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove the 5/8" lower shock absorber fasteners.
3. Remove the 5/8" upper shock absorber fasteners from the shock bracket and remove the shock absorber.

ASSEMBLY

1. Mount the shock absorber in the upper shock bracket and install the 5/8" fasteners. **DO NOT** tighten at this time.
2. Locate the lower shock absorber stud in the lower shock bracket with one rubber bushing above and below the shock bracket, see Figure 8-8.
3. Install the retainer washer, and nylon locknut. Tighten the lower fastener to 80 ± 10 foot pounds torque, see Figure 8-8.

FIGURE 8-8



4. Tighten the upper shock absorber 5/8" locknut to 160 ± 10 foot pounds torque, see Figure 8-8.
5. Remove the wheel chocks.

EQUALIZING BEAM AND BEAM SADDLE ASSEMBLY

NOTE Whenever an equalizing beam is removed for repair, inspect the axle bracket. Refer to the Axle Bracket Inspection in the Preventive Maintenance section of this publication.

NOTE Aftermarket Equalizing Beam Assemblies come equipped with rotatable bar pin end bushings with alignment shims (shim Part No. 50130-000), refer to the Parts List section in this publication.

DISASSEMBLY

CAUTION IF THE INBOARD OR OUTBOARD EQUALIZING BEAM SADDLE IS DAMAGED IT MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE DAMAGE TO THE BEAM SADDLE AND/OR MATING COMPONENTS.

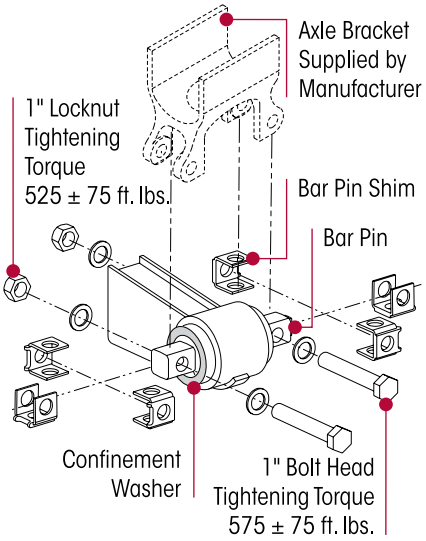
NOTE If both sides of the vehicle require equalizing beam/and or beam saddle assembly replacement, the **procedure MUST be performed one side at a time.**

1. Chock the front wheels of the vehicle.
2. Lift and support the axles.
3. Support the frame with safety stands.
4. Remove the wheel assemblies from the side being serviced per the vehicle manufacturer's instructions.
5. If equipped, remove the lower shock absorber fasteners.
6. Remove the lower rebound strap fasteners and spacer from the beam saddle to disconnect the lower strap connection.
7. Remove and discard the four (4) M12 fasteners securing the bolsters to the frame saddle.
8. Raise the frame slightly to provide a gap between the bolsters and the frame saddle.

NOTE It is required that the bar pin alignment shims be installed in the same orientation and location as removed to preserve the existing vehicle alignment. Improper vehicle alignment can increase tire wear.

9. Prior to the removal of the equalizing beam, note the orientation and location of the bar pin shims on the equalizing beam, see Figure 8-9.

FIGURE 8-9



WARNING THE WEIGHT OF THE EQUALIZING BEAM ASSEMBLY WITH END BUSHINGS AND BEAM SADDLE IS APPROXIMATELY 106 KILOGRAMS (233 POUNDS). CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

10. Support the equalizing beam being serviced with a floor jack.
11. Remove and discard the bar pin connection fasteners that connect the end bushing bar pin to the axle bracket.
12. Lower the equalizing beam and remove the equalizing beam from the axle brackets.

ASSEMBLY

WARNING

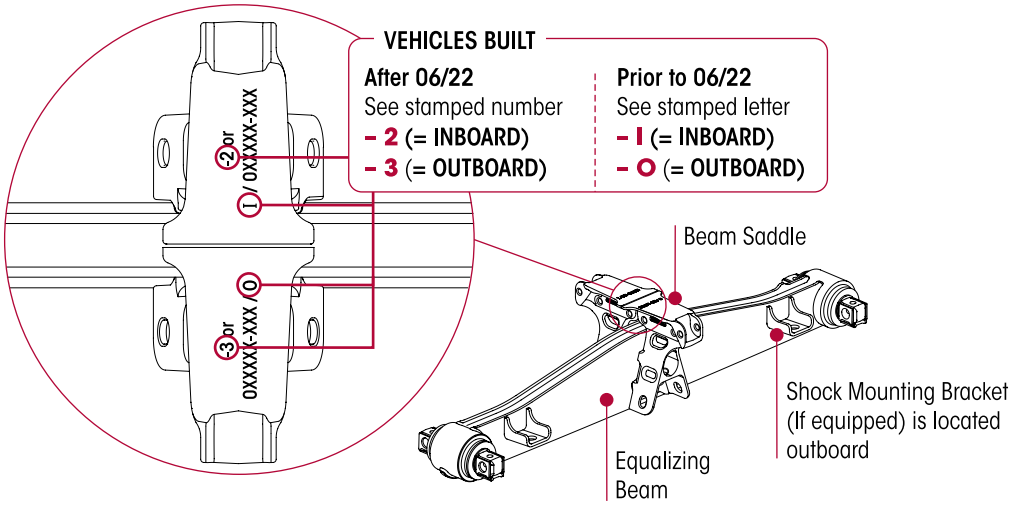
THE WEIGHT OF THE EQUALIZING BEAM ASSEMBLY WITH END BUSHINGS AND BEAM SADDLE IS APPROXIMATELY 106 KILOGRAMS (233 POUNDS). CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

NOTE

Aftermarket HAULMAAX EX equalizing beam assemblies come equipped with rotatable bar pin end bushings with alignment shims (shim Part No. 50130-000), refer to the Parts List section in this publication. The rotating bar pin is designed to lock into place once under load.

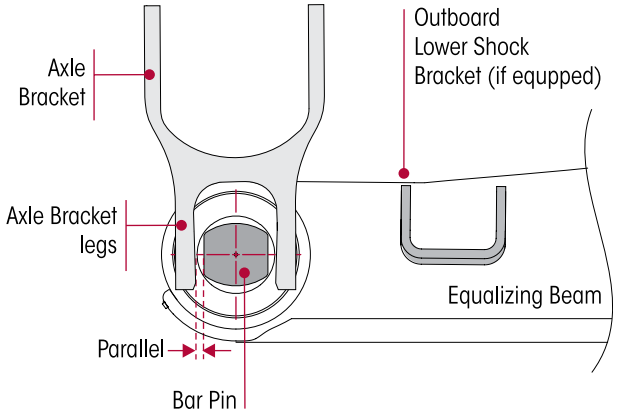
1. Remove the shims from the new equalizing beam to facilitate installation.
2. HAULMAAX EX equalizing beams are designed with an offset. Ensure the equalizing beam is installed in the proper orientation, see Figure 8-10.
3. Position the equalizing beam with the lower shock bracket **outboard**, see Figure 8-10. If the equalizing beam **is not equipped** with outboard shock mounting brackets, then:
   a. Locate on the beam saddle the stamped **(-3 or O for outboard)** and **(-2 or I for inboard)**, see Figure 8-10.

FIGURE 8-10



4. Install the bolsters on the **beam saddle** as detailed in the Bolster Spring Assembly in this section.
5. Use a suitable lifting device to raise the rear equalizing beam to engage the rear bar pin into the rear axle bracket legs.
6. Slide a ¾" bolt (or similar equivalent) in the holes of the **rear** bar pin/axle bracket connection to temporarily hold the position of the connection until the equalizing beam final bar pin fasteners are installed.

FIGURE 8-11



7. Continue to raise the equalizing beam into the front axle bracket legs, see Figure 8-11.
8. Slide a ¾" bolt (or similar equivalent) in the holes of the **front** bar pin/axle bracket connection to temporarily hold the position of the connection until the equalizing beam final bar pin fasteners are installed.

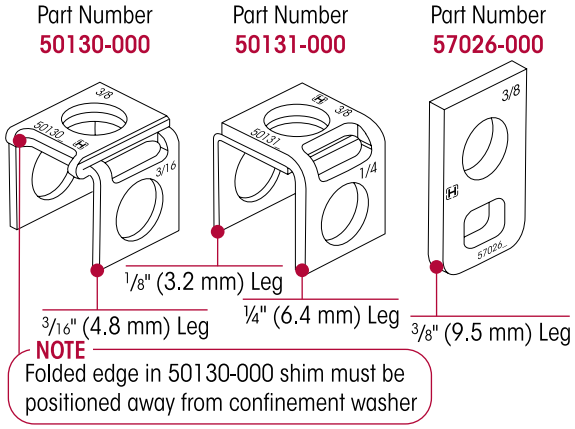
⚠ WARNING

A BAR PIN SHIM MUST BE INSTALLED AT EACH BOLT LOCATION. THE SAME PART NUMBER SHIM IN THE SAME ORIENTATION MUST BE USED AT BOTH BOLT LOCATIONS ON ANY ONE (1) END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE (1) SHIM AT EACH BOLT LOCATION. USE GENUINE HENDRICKSON BAR PIN SHIMS, DO NOT USE STANDARD WASHERS. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN IMPROPER VEHICLE ALIGNMENT, FRACTURE OF THE AXLE BRACKET OR BAR PIN, WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

⚠ CAUTION

BAR PIN ALIGNMENT SHIM (PART NO. 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE BUSHING, SEE FIGURE 8-12. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE.

FIGURE 8-12



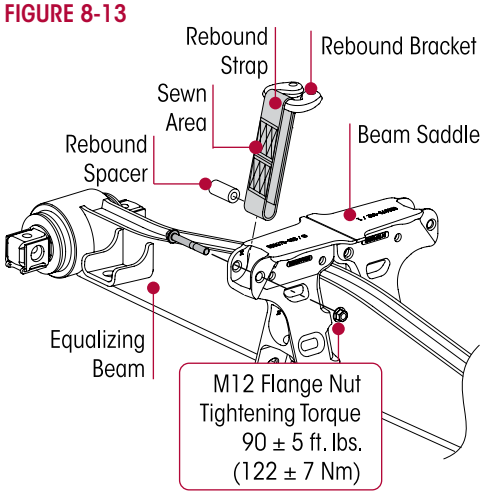
9. Install the alignment shims into the **front** bar pin connection in the same orientation and location as prior to removal and install the 1" fasteners while removing the temporary ¾" bolt.
10. Repeat the procedure for the **rear** bar pin connection.
11. Tighten the **FRONT** and **REAR** bar pin locknuts to 525 ± 75 foot pounds torque, or if tightening on the bolt head, tighten to 575 ± 75 foot pounds torque.
12. Lower the frame until the bolster springs contact the beam saddle.
13. Ensure the bolster springs and the beam saddle holes are aligned.
14. Install the **upper** bolster spring M12 fasteners to the beam saddle and tighten to 525 ± 75 foot pounds torque.

⚠ CAUTION

REBOUND STRAPS MUST BE INSTALLED WITH THE SEWN AREA FACING OUTBOARD, FAILURE TO DO SO WILL RESULT IN THE PREMATURE WEAR OF THE REBOUND STRAP.

15. Install the rebound spacer and M12 fasteners into the **lower** rebound strap loop with the sewn area facing away from the beam saddle, see Figure 8-13. Tighten fasteners to 90 ± 5 foot pounds torque, see Figure 8-13.

FIGURE 8-13



16. Install the lower shock absorber studs (if equipped) into the lower shock mounting brackets.
17. Install the shock absorber rubber bushings (one above and one below) the shock absorber bracket. Install the retainer washers and nylon locknuts. Tighten to 80 ± 10 foot pounds torque.
18. Install the wheel assemblies from the side being serviced.
19. Remove the frame safety stands.
20. Lift the axle and remove the axle safety stands.
21. Lower the wheel assemblies and tighten fasteners to the vehicle manufacturer's specifications.

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

22. Remove the wheel chocks.

BAR PIN END BUSHINGS

You will need:

- A shop press with a capacity of at least 100 tons
- Bar Pin Installation Tool Part No. 66086-103 (OTC Part No. 1757), Removal Tool Part Nos. 66086-104 and 66086-105 (OTC Part No. 206457 and 302030) – Refer to the Special Tools section in this publication.
- A shop made bar pin receiving tool, see the Special Tools section in this publication.
- See end bushing service kits in the Parts List section of this publication.

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

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

⚠ 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 BEAM BORES OR FASTENERS. 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.

NOTE Hendrickson recommends the use of Class 10.9 bolts, locknuts, and hardened washers or Grade C locknuts and Grade 8 bolts. If flange head bolts and locknuts are not used then hardened structural washers must be used under bolt heads and locknuts.

EQUALIZING BEAM REMOVAL

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

END BUSHING REMOVAL

FIGURE 8-14

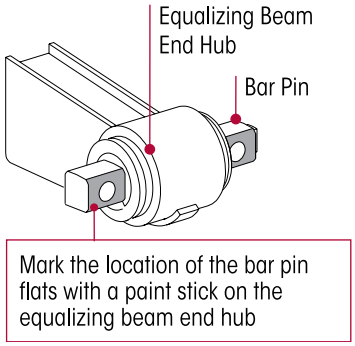
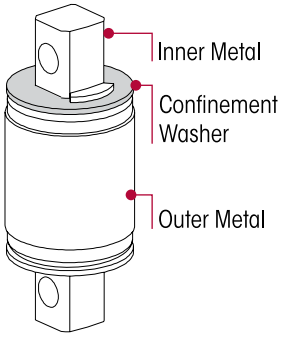


FIGURE 8-15

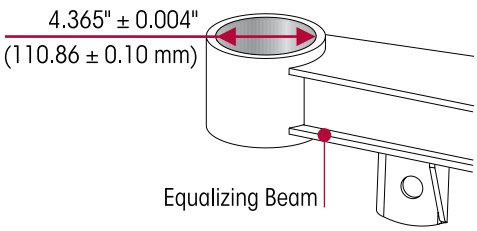


1. Place the equalizing beam in the shop press with the beam end hub squarely supported on the receiving tool.
2. Prior to removal, note the orientation of the bar pin flats, see Figure 8-14.
3. Mark the orientation on the equalizing beam with a paint stick.
4. Press on the end bushing inner metal, see Figure 8-15, of the end bushing until the inner metal is flush with the top of the beam end hub. This will dislodge the confinement washer and move the bushing rubber away from the outer metal of the bushing so the removal tool can be installed.
5. Center the end bushing removal tool directly on the bushing's outer metal (see Figure 8-15) and press the bushing out of the beam end hub.
6. After removing the equalizing beam end bushings, clean and inspect each beam end hub bore.

END HUB PREPARATION AND INSPECTION

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

FIGURE 8-16
Equalizing Beam End Hub Bore Diameter



WARNING

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

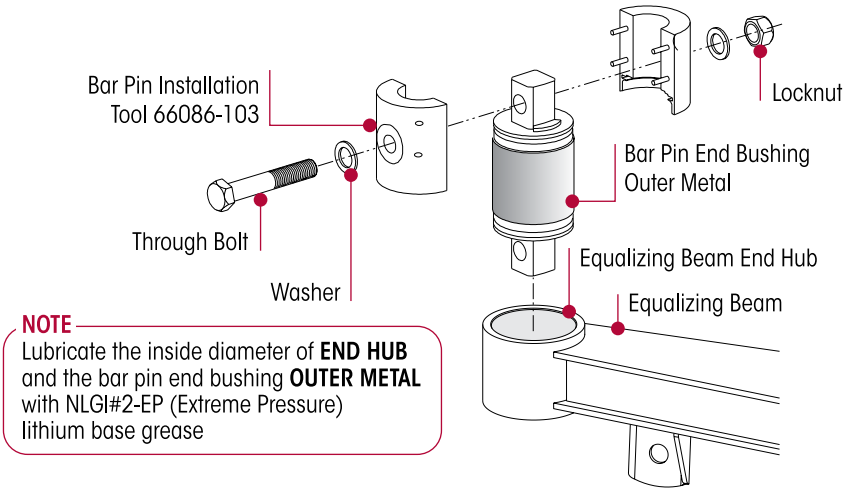
When installing the bar pin end bushings, the following steps will minimize the chance of damaging a new bar pin end bushing.

1. Clean the equalizing beam end hub bores with emery cloth or hone, removing any nicks or metal buildup from bushing removal.
2. Measure the equalizing beam end hub bore inner diameter. If the end hub bore is not within the specified range, equalizing beam replacement is required.
   - The equalizing beam end hub bore diameter is 4.365" ± 0.004" (110.86 ± 0.10 mm), see Figure 8-16.

END BUSHING INSTALLATION

1. Place the equalizing beam in a shop press with the end hub squarely supported on the press bed or receiving tool.
2. Install the end bushing installation tool (Part Number 66086-103) on the new end bushing as shown in Figure 8-17. Tighten the through bolt until the two halves of the tool touch.
3. Lubricate the inside diameter of the equalizing beam end hub **AND** the bar pin end bushing's outer metal with a heavy layer of NLGI #2 – EP (Extreme Pressure) lithium base grease, see Figure 8-17.

FIGURE 8-17



4. Position the end bushing and installation tool on the end hub. Verify the bar pin is aligned with the paint stick markings as prior to disassembly.

NOTE

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

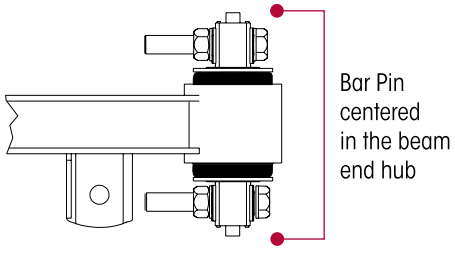
5. Verify the end bushing's outer metal is in alignment with the end hub. Equalizing beam and end bushing damage will result if the bushings are pressed in at an angle.

CAUTION

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

6. Install the end bushing into the end hub by pressing on the installation tool until the installation tool contacts the end hub.This will center the bushing in the end hub, see Figure 8-18.
7. Install the equalizing beam assembly onto the vehicle as detailed in Equalizing Beam assembly instructions in this section.

FIGURE 8-18



LONGITUDINAL TORQUE RODS

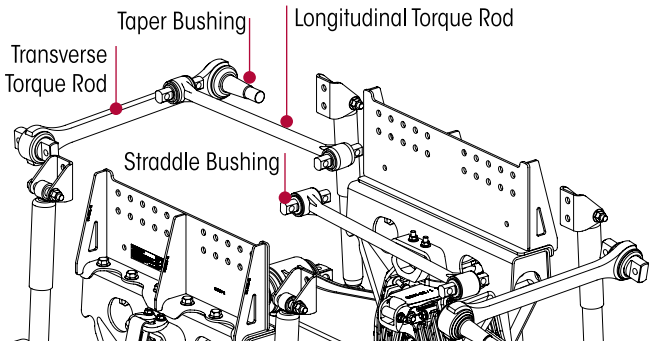
DISASSEMBLY

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.

FIGURE 8-19



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.

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 the longitudinal torque rod from the vehicle, see Figure 8-19.

ASSEMBLY

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

NOTE Hendrickson recommends the use of to use Class 10.9 bolts and locknuts and hardened washers or Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used, then hardened structural washers must be used under bolt heads and locknuts.

2. Install the longitudinal torque rod into position.
3. Install the fasteners and any shims that were removed to the cross member and axle brackets. Snug the fasteners, **DO NOT** tighten at this time.
4. Remove the pinion angle safety supports.
5. Verify the proper pinion angle per the vehicle manufacturer's specifications. Correct the pinion angle if necessary with drop in shims between the torque rod bar pin and the cross member or the axle bracket depending on the direction of adjustment needed.
6. Tighten all fasteners to the vehicle manufacturer's torque specifications.
7. Remove the wheel chocks.

TRANSVERSE TORQUE RODS

WARNING

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

NOTE

Transverse **TRAAX ROD** rod assemblies equipped on HAULMAAX EX suspensions are non-rebushable. The entire torque rod assembly must be replaced. This feature provides superior bushing retention in the torque rod end hub.

DISASSEMBLY

1. Chock the **FRONT** wheels of the vehicle.
2. Support the frame of the vehicle with safety stands.

SERVICE HINT

Note the quantity and location of shims removed to maintain the lateral alignment of the axle during assembly.

3. Remove and discard the transverse torque rod fasteners from the frame and the axle brackets.
4. Use a large hammer to strike the top of the axle tower to loosen the taper pin end of the torque rod in the bracket bore.
5. Remove the transverse torque rod from the vehicle, see Figure 8-19.
6. Inspect the mounting surfaces for any wear or damage. Repair or replace as necessary.

ASSEMBLY

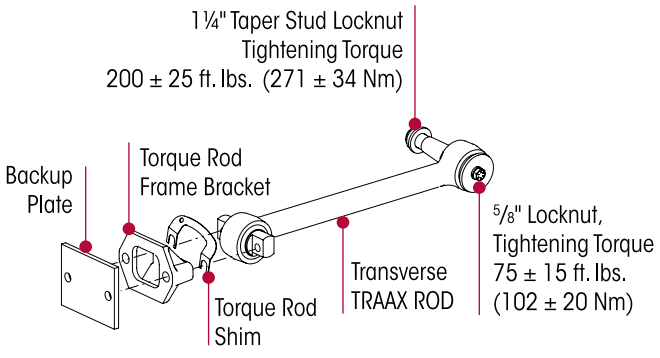
1. Ensure the length and configuration of the replacement torque rod is identical to the torque rod removed.

NOTE

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

2. Position the taper pin into the axle tower and loosely install the taper pin locknut. **DO NOT** tighten to torque at this time.
3. Loosely install the frame mounting fasteners and any shims that were removed into the frame bracket and outboard support plate. **DO NOT** tighten to torque at this time.
4. Tighten taper pin locknut to 200 ± 25 foot pounds torque, see Figure 8-20.

FIGURE 8-20



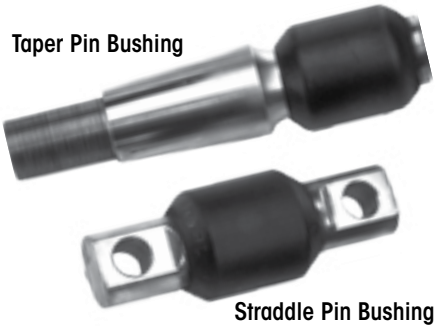
5. Tighten all frame mounting fasteners to the required torque specification. Refer to the original equipment manufacturer for specifications.
6. Remove the vehicle frame safety stands.
7. Check the lateral alignment. If not within the vehicle manufacturer's specified range, a lateral alignment is necessary. Refer to Lateral Alignment in the Alignment & Adjustments section in this publication.
8. Remove the wheel chocks.

ULTRA ROD TORQUE ROD BUSHINGS

You will need:

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

FIGURE 8-21



BUSHING REMOVAL

WARNING

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

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

FIGURE 8-22

BUSHING INSTALLATION

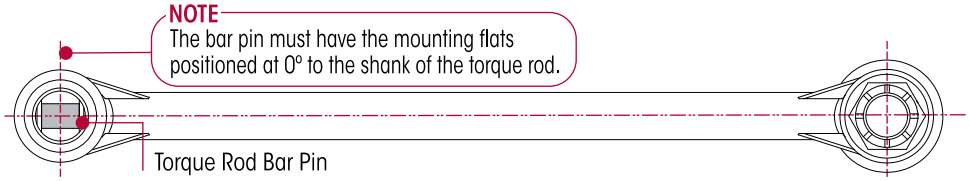
1. Clean and inspect the inner diameter of the torque rod end tubes.

SERVICE HINT

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

2. Lubricate the inner diameter of the torque rod end hub and the new rubber bushing (see Figure 8-22) with P-80 Lubricant (refer to Parts List section in this publication) or light Naphthenic Base Oil, such as 60 SUS at 100°F.
3. Support the torque rod end tube centered on the receiving tool. Ensure the torque rod is squarely supported on the press bed for safety. The straddle mount bar pin bushings must have the mounting flats positioned at zero degrees to the shank of the torque rod, see Figure 8-23.

FIGURE 8-23



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 3⁄16", see Figure 8-24.
   - Push the bushing again from the opposite side to center the bar pin, or tapered stud within the end tube, see Figure 8-25.

FIGURE 8-24

FIGURE 8-25

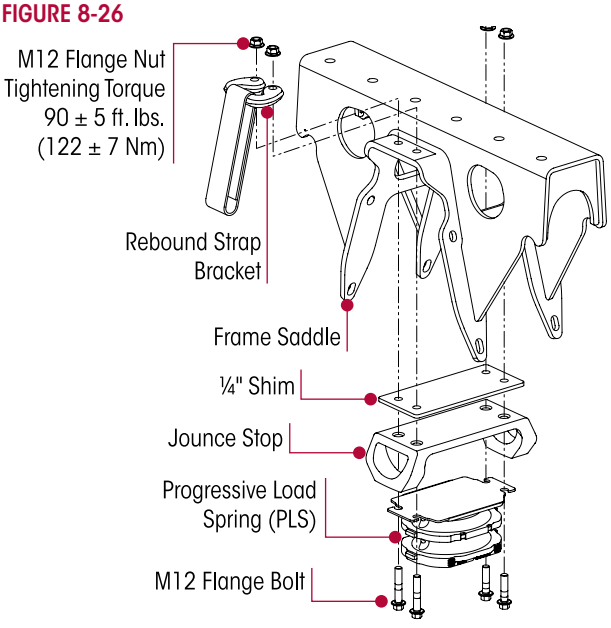
CAUTION

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

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

AFTERMARKET WEIGHT BIAS PLS KIT

FIGURE 8-26



Service Kit No. 34013-430

1. Set parking brake and chock wheels.
2. It may be necessary to remove at least one of the wheel assemblies for access to the PLS / jounce stop.
3. Lift and support the axle and remove wheel assemblies.

SERVICE HINT Supporting the axles at an even height will make the installation easier.

4. Raise and support the vehicle frame until there is at least a ¾" gap between the PLS and beam saddle. Support the frame with safety stands.
5. Remove the upper fasteners that secure the upper rebound strap bracket, PLS and jounce stop. Repeat the same process on the inside of the suspension half.
6. Slide the shim(s) between the jounce stop and frame saddle. The maximum amount of shims is two (2) per side.

NOTE There are various sized fasteners depending on the suspension configuration and the number of shims that will be installed. See Table 8-1 for the fastener selection.

TABLE 8-1	¼" Shim Quantity	M12 Bolt Size	¼" Shim Quantity	M12 Bolt Size
Single Rebound Strap	1	50 mm	2	65 mm
Dual Rebound Strap		80 mm		80 mm

7. Install the fasteners and tighten to 90 ± 5 foot pounds torque, see Figure 8-26.
8. Lower the vehicle frame and remove the safety stands.
9. Install the wheel assemblies.
10. Remove the chocks.

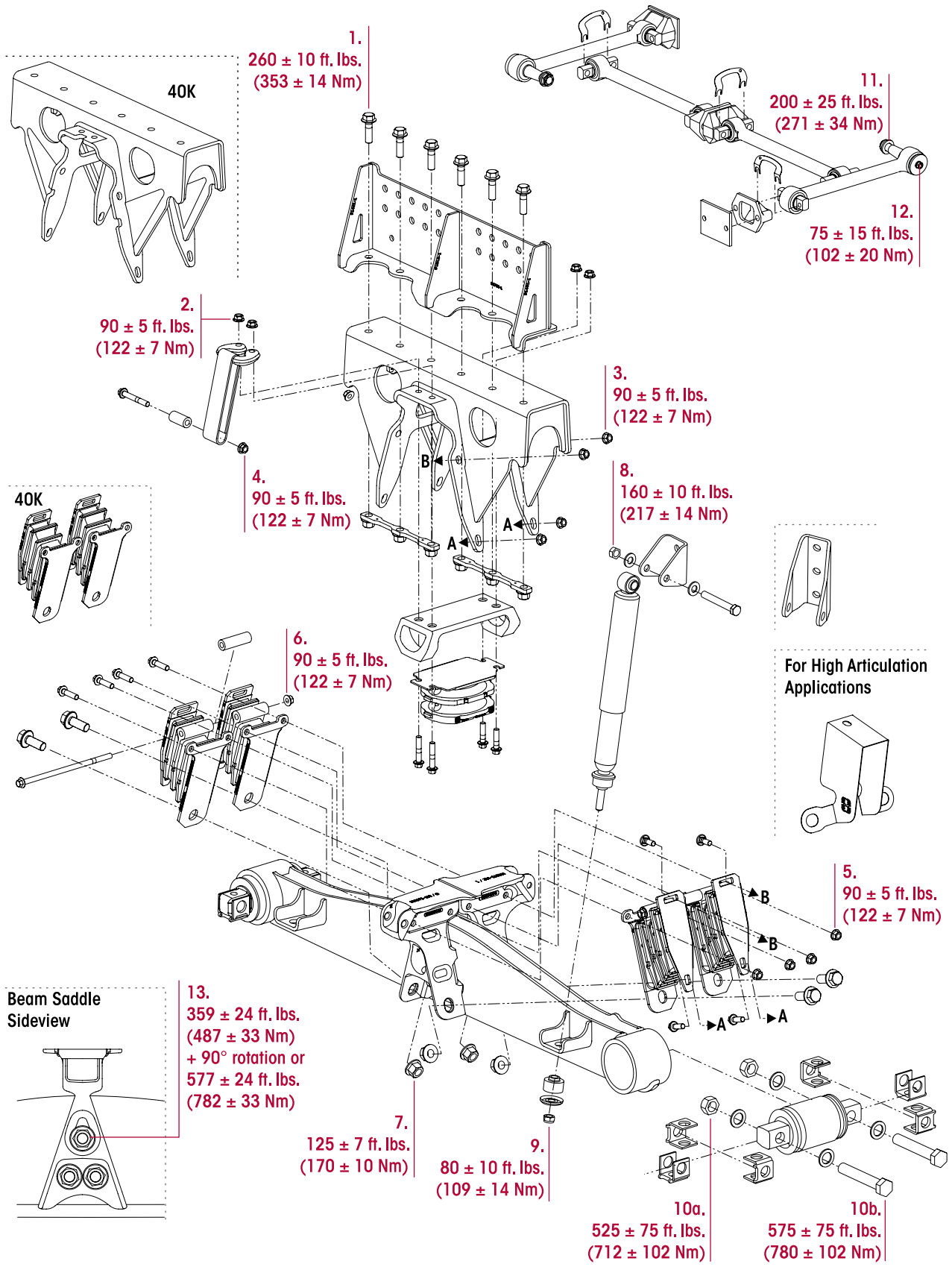
SECTION 9
Troubleshooting Guide

HAULMAAX EX

TROUBLESHOOTING GUIDE		
CONDITION	**POSSIBLE CAUSE**	**CORRECTION**
Vehicle bouncing excessively	Vehicle not equipped with shock absorbers	Install an aftermarket shock kit, see the Parts List section in this publication.
	Leaking or damaged shock absorber	Replace the shock absorber.
Suspension has harsh or bumpy ride	Damaged progressive load spring (PLS)	Replace the PLS.
	Damaged bolster springs	Replace the bolster springs.
Vehicle leans	Damaged progressive load spring (PLS)	Replace the PLS.
	Damaged bolster springs	Replace the bolster springs.
Irregular tire wear	Incorrect axle alignment	Align the axles. Refer to the vehicle manufacturer's specifications.
Bulged bolster springs	Suspension is overloaded	Redistribute the load to correct weight and replace the bolster springs.
	Worn progressive load spring (PLS)	Replace the PLS and replace bolster springs.
	Axles not centered	Check the lateral alignment, refer to the Alignment and Adjustment section and/or replace the bolster springs.
Loose saddle assembly fasteners	Suspension is overloaded	Redistribute the load to correct weight.
	Frequent hard stop/start	Increase fastener inspection intervals.
		Review driving habits to reduce frequency of hard stop / start.
Outboard frame bracket cracked	Suspension is overloaded	Redistribute load to correct weight.
	Loose saddle assembly fasteners	Increase fastener inspection intervals.
Loose frame saddle to frame hanger fasteners	Suspension is overloaded	Redistribute the load to correct weight.
	Frequent hard stop/start	Verify the torque is to specification and increase the fastener inspection interval.
		Review the driving habits to reduce frequency of hard stop/start.
Saddle leg to equalizing beam contact	Axles not centered	Check the lateral alignment, refer to the Alignment and Adjustment section in this publication.
		Inspect the transverse torque rod fasteners and bushing conditions, refer to the Preventive Maintenance section in this publication. Replace the torque rod assembly or replace the bushings if necessary.

SECTION 10
Torque Specifications

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



HAULMAAX EX

HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS						
NO.	COMPONENT		FASTENER		TORQUE VALUE	
			SIZE	QUANTITY	IN FOOT POUNDS	IN NEWTON METERS
Frame fasteners are furnished and installed by the truck manufacturer.						
1	Frame Hanger to Frame Saddle Assembly		M16 Flange	12	260 ± 10	353 ± 14
2	Frame Saddle Assembly to Rebound Strap Bracket		M12 Flange	8	90 ± 5	122 ± 7
3	Frame Saddle Assembly to Upper Bolster Spring			16		
4	Rebound Strap to Beam Saddle					
5	Bolster Spring to Beam Saddle			8		
6	Tie-bar Bolster Spring			4		
7	Lower Bolster Spring to Equalizing Beam		M20 Flange	8	125 ± 7	170 ± 10
8	Upper Shock Absorber to Upper Shock Bracket		⅝"-11 UNC	4	160 ± 10	217 ± 14
9	Lower Shock Absorber to Beam		⅝"-11 UNC	4	80 ± 10	109 ± 14
10a	Bar Pin Bushing	at the Locknut	1"-8 UNC	8	525 ± 75	712 ± 102
10b		at the Bolt Head			575 ± 75	780 ± 102
11	Torque Rod Taper End to Axle	at the Locknut	1¼"-12 UNF	2	200 ± 25	271 ± 34
12	Torque Rod to Taper Pin Bolt	at the Bolt Head	⅝"-11 UNC	2	75 ± 15	102 ± 20
13	Equalizing Beam to Beam Saddle		M20	6	359 ± 24 plus 90° Rotation or 577 ± 24	487 ± 33 plus 90° Rotation or 782 ± 33
NOTE: Torque values listed above apply only if Hendrickson supplied fasteners are used. If non-Hendrickson fasteners are used, follow the torque specification listed in vehicle manufacturer's service manual.						

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

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