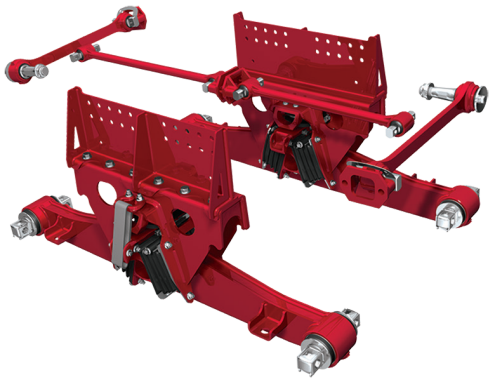


TECHNICAL PROCEDURE

HAULMAAX® EX Heavy-duty Rear Rubber Suspension System

SUBJECT: Service Instructions
LIT NO: 17730-328
DATE: March 2026 **REVISION:** G

TABLE OF CONTENTS

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 Heavy-duty Rear Rubber 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 and all work instructions and safety related information provided by the vehicle manufacturer prior to performing any maintenance, service, repair, or rebuild of this product. The information in this publication contains safety information, product specifications, features, proper maintenance, service, repair, and rebuild instructions for the HAULMAAX EX suspension system.

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

The latest revision of this publication is 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.

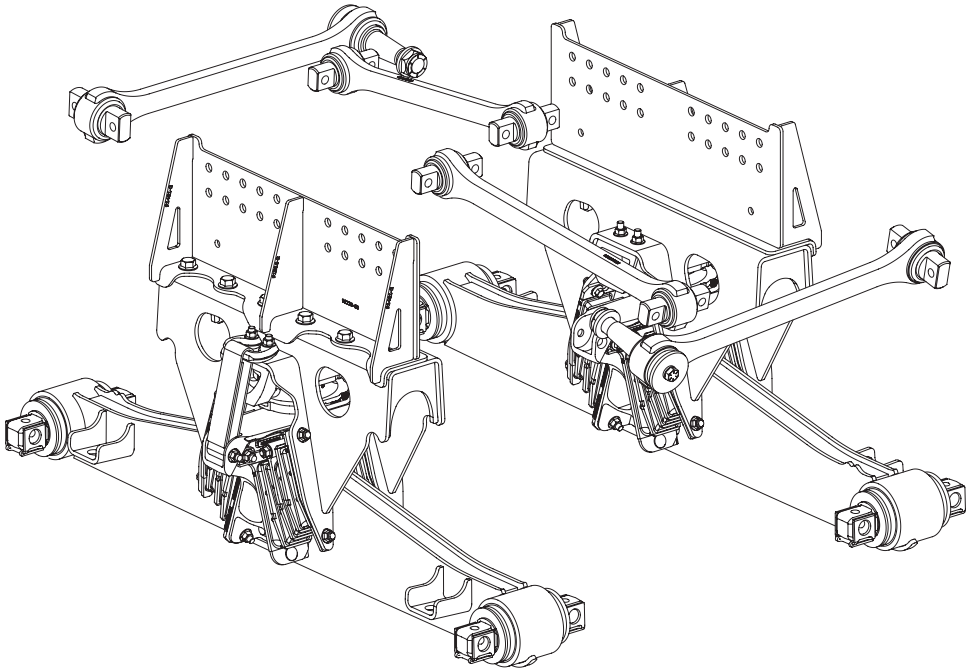
- **Bar pin end connections** — Rugged axle connection extends bushing life and allows easy axle alignment and serviceability.
- **Rebound straps** — Provide additional bolster spring protection. Dual rebound straps for each equalizing beam are:

  (1) Required on vehicles equipped with outriggers,

  (2) Standard equipment on HAULMAAX EX 52K pound capacity and

  (3) Available as production or aftermarket options on HAULMAAX EX 40K and 46K pound capacities.
- **Equalizing beams** — 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 pound capacities and offered as an aftermarket option for the HAULMAAX EX 40K pound 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
Suspension Rating (lb)	40,000	46,000	52,000
Installed Weight[1] (lb)	836	845	939[8]
Gross Vehicle Weight (GVW) Approval[2] (lb)	83,000	88,000	93,000
Gross Combination Weight (GCW) Approval (lb)	160,000	190,000	245,000
Job-Site Travel Rating[3] (lb)	60,000	70,000	75,000
Diagonal Articulation[4] (in)	17		
Lift Axles	Approved		
Ride Heights (loaded)[5] (in)	8 – 13.25		
Axle Spacing[6] (in)	52, 54	52, 54, 60, 72.5	52, 54, 60
Shock Absorber Applications[7]	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 pound installed weight includes complete suspension, double rebound straps, longitudinal torque rods, Hendrickson TRAAX ROD® transverse torque rods, axle brackets and frame brackets; add 31 pound 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 of this publication.

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

SAFETY PRECAUTIONS

WARNING

FASTENERS

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

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

WARNING

LOAD CAPACITY

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

WARNING

SUPPORT THE VEHICLE PRIOR TO SERVICING

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

WARNING

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

CAUTION

PROCEDURES AND TOOLS

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

WARNING

PERSONAL PROTECTIVE EQUIPMENT

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

WARNING

MODIFYING COMPONENTS

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

WARNING

TORCH/WELDING

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

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

⚠ WARNING

BAR PIN BUSHING END CONNECTION

BAR PIN END BUSHINGS ARE CRITICAL COMPONENTS OF THE 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.

⚠ WARNING

SHOCK ABSORBERS

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

⚠ CAUTION

IMPROPER VEHICLE LIFT OR SUPPORT METHOD

IMPROPER VEHICLE LIFT OR SUPPORT METHOD CAN CAUSE DAMAGE TO 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 PROCEDURE:

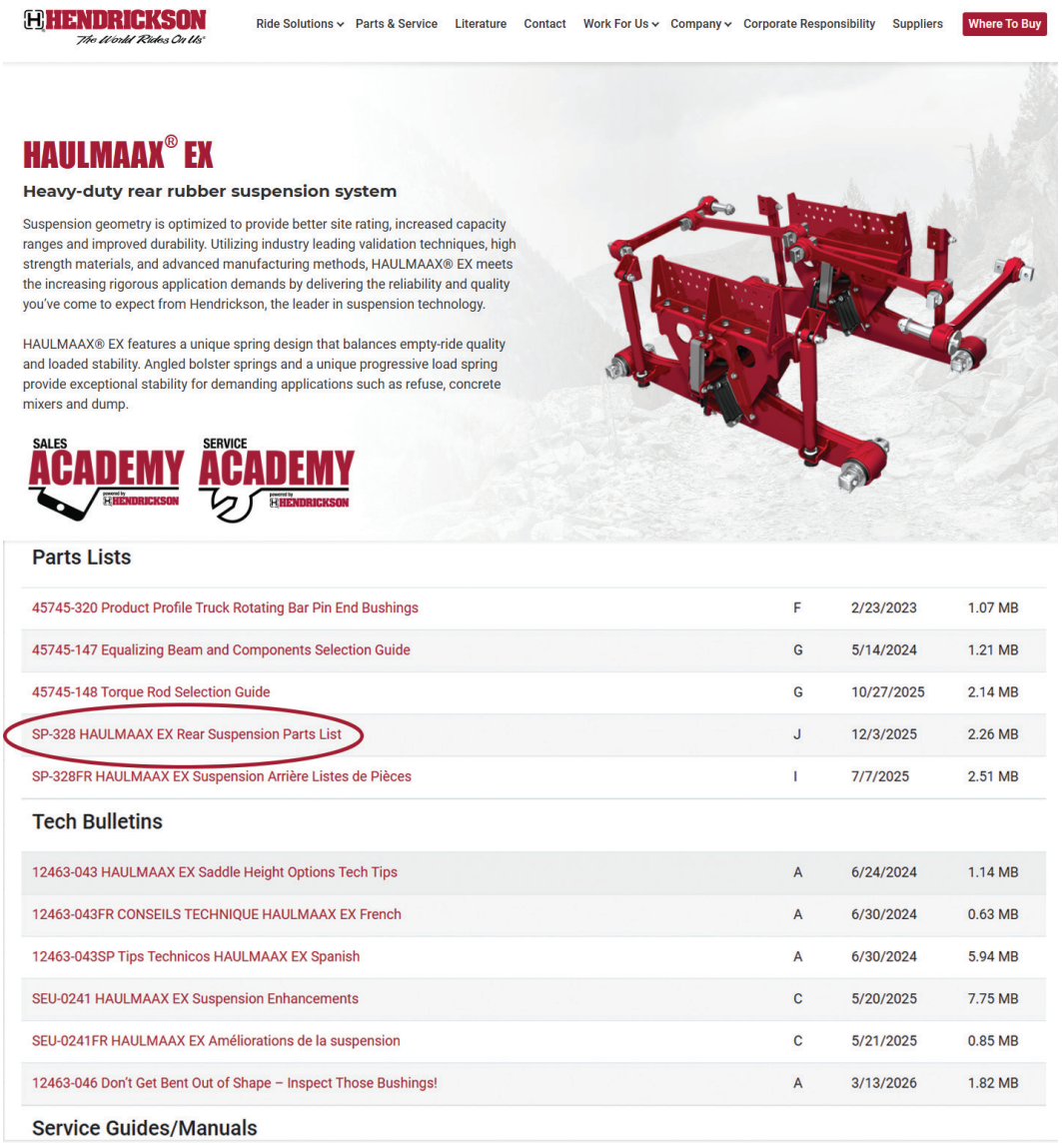
1. WEAR PROPER EYE PROTECTION
2. WEAR CLOTHING THAT PROTECTS YOUR SKIN
3. WORK IN A WELL VENTILATED AREA
4. DO NOT USE GASOLINE, OR SOLVENTS THAT CONTAIN GASOLINE. GASOLINE CAN EXPLODE
5. ACIDIC SOLUTIONS CANNOT BE USED ON ALUMINUM COMPONENTS.
6. HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED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

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

SECTION 4
Parts Lists

Refer to Hendrickson Literature Number SP-328, HAULMAAX EX Heavy-duty rear rubber suspension system, available online at www.hendrickson-intl.com

FIGURE 4-1



SECTION 5
Special Tools

BAR PIN END BUSHING TOOLS

INSTALLATION TOOLS

OTC Part No. 1757
Visit otctools.com

REMOVAL TOOLS

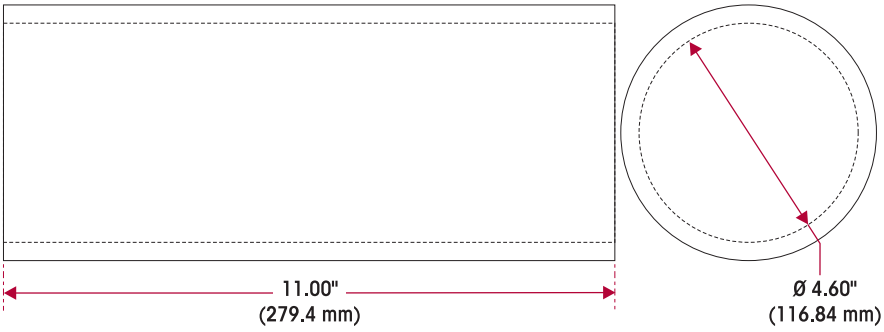
OTC Part No. 206457
Visit otctools.com

OTC Part No. 302030
Visit otctools.com

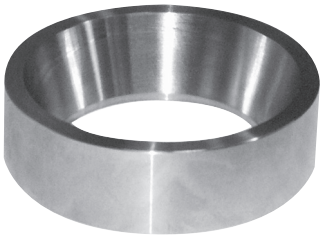
Tiger Tool Part No. 15044
Visit tigertool.com

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

RECEIVING TOOL



ULTRA ROD TORQUE ROD BUSHING TOOLS



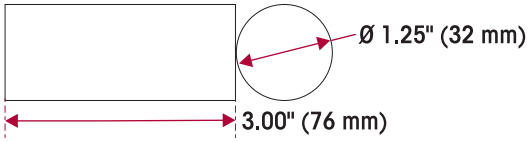
Hendrickson

Part No. 66086-001L

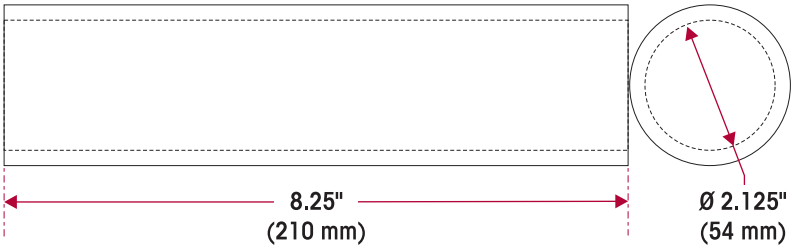
NOTE: TRAAX ROD assemblies equipped on HAULMAAX EX suspensions are not rebushable. The entire torque rod assembly must be replaced. This feature provides superior bushing retention in the torque rod end hub.

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 HAULMAAX EX heavy-duty rear suspension system and components function to their highest efficiency.

HENDRICKSON RECOMMENDED INSPECTION INTERVALS	PRE-DELIVERY/ VISUAL INSPECTION	FIRST IN-SERVICE	PREVENTIVE MAINTENANCE		
	within the first 100 miles (160 km)	1,000 miles (1,600 km), 100 hours or whichever comes first	12,500 miles (20,000 km), every 3 months, 600 hours or whichever comes first	25,000 miles (40,000 km), every 6 months 1,200 hours or whichever comes first	50,000 miles (80,000 km), every 12 months 2,400 hours or whichever comes first
Hendrickson recommends to visually inspect for proper assembly, function, overall condition, and any signs of damage. During the inspection intervals as shown, check for any unusual movement, loose or missing components, abrasive or adverse contact with other parts, damaged or cracked parts, and improper suspension function or alignment. Replace components as necessary.					
Alignment of Axles	■	■			■
Bolster Springs, Progressive Load Springs, Rebound Straps	■	■	■		
Equalizing Beam Assembly, Beam End Connection, Beam Saddle Assembly	■	■		■	
Fasteners	■	■			■
Frame Hanger and Saddle Assembly	■	■		■	
Shock Absorbers	■			■	
Torque Rods	■	■		■	
Wear and Damage			■		

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

COMPONENT INSPECTION

- **Alignment of axles** — Verify the alignment of axles are within the vehicle manufacturer's tolerances.
- **Bolster springs, progressive load springs, and rebound straps** — See the Bolster Springs, Progressive Load Springs, and Rebound Strap in this section.
- **Equalizing beam assembly, beam end connection and beam saddle assembly** — Inspect the overall condition of the equalizing beam for any dents, cracks, or other overall damage and check equalizing beam ends, see Equalizing Beam End Connection in this section. Check equalizing beam saddle mounting bolts for signs of movement, if movement is visible, verify for proper torque.
- **Fasteners** — Visually inspect for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to the specified torque. Refer to the Torque Specifications section of this publication. Use a calibrated torque wrench to check torque in a tightening direction. As soon as the fastener starts to move, record the torque. Correct the torque if necessary. Replace any worn or damaged fasteners.

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

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

- **Frame hanger and saddle assembly** — Look for any signs of wear and damage, and replace as necessary. 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 for looseness, torn or shredded rubber, and proper fastener torque. See Torque Rod in this section.
- **Wear and damage** — Inspect all parts of the suspension for wear and damage. Look for bent or cracked parts and replace as necessary.

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.

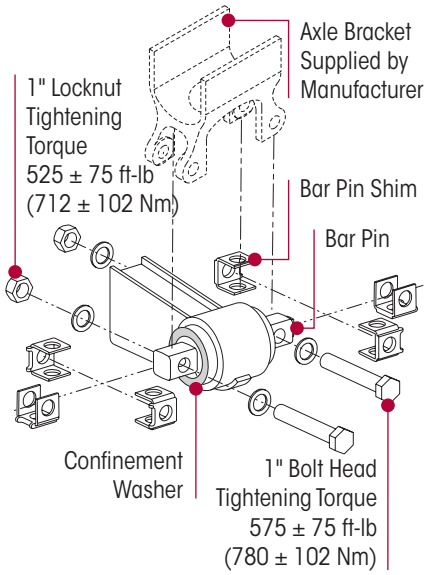
VISUAL INSPECTION

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

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

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

FIGURE 6-1



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

JACK TEST

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

NOTE

The gap at each side of the visible rubber on the lower part of the end bushing is normal and is not an indication to replace the bushing. Because all rubber end bushings are in compression, with the load bearing on the top side, the lower side of the rubber is slightly relieved, allowing the rubber to move inward, and a gap appears.

FIGURE 6-2

UNACCEPTABLE

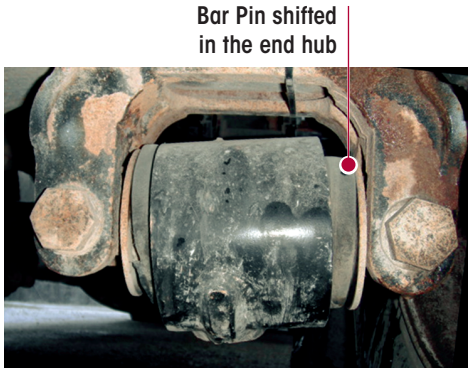


FIGURE 6-3

ACCEPTABLE

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

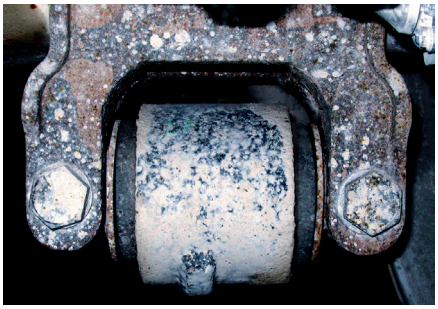
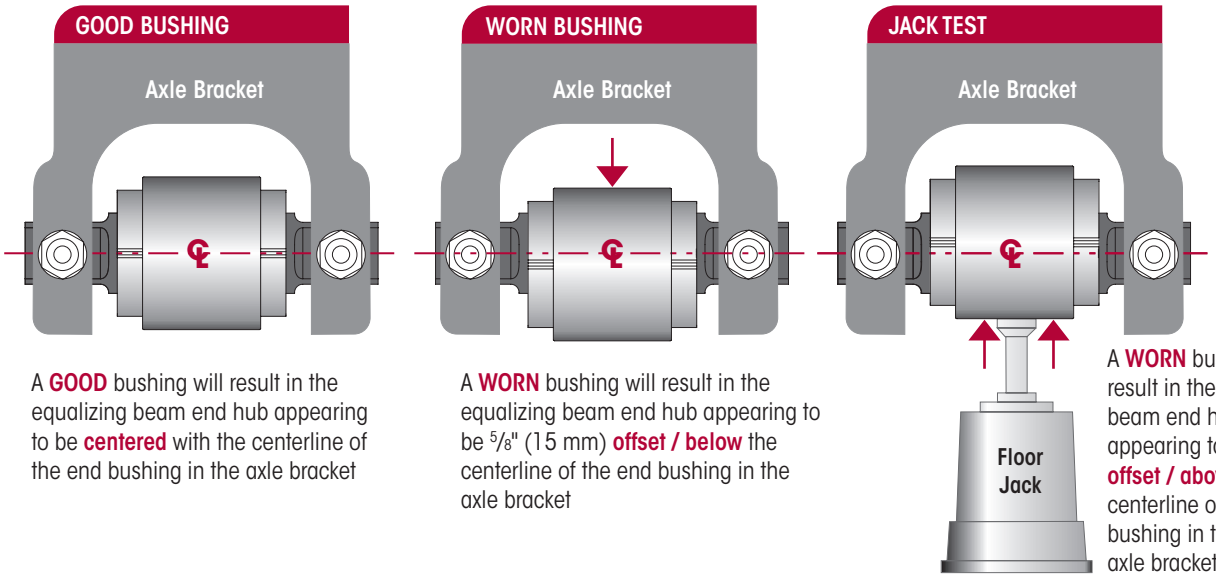


FIGURE 6-4



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

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

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

FIGURE 6-5

PHYSICAL INSPECTION

WARNING

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

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

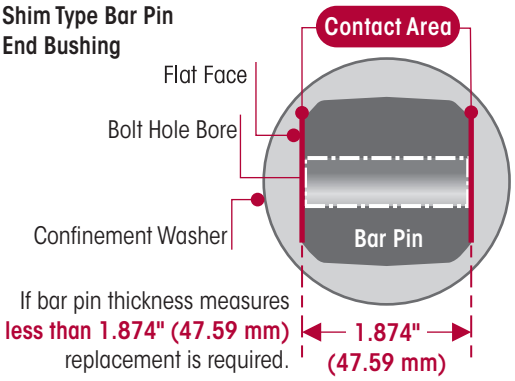
BAR PIN BUSHING

VISUAL INSPECTION

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

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

FIGURE 6-6
Shim Type Bar Pin End Bushing

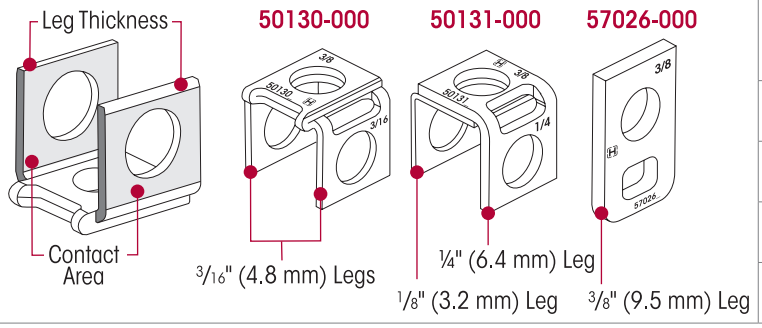


BAR PIN SHIMS

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

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

FIGURE 6-7



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

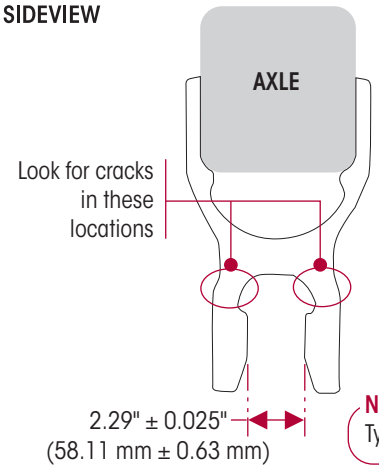
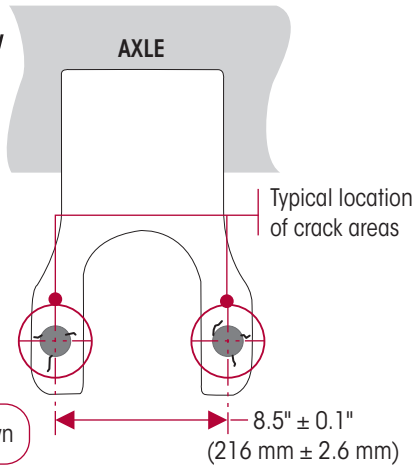


FIGURE 6-9
FRONT / REAR VIEW



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.

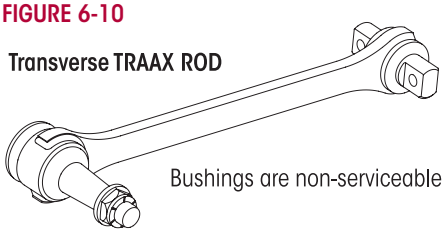
- **Method 1 — For on-highway tractor applications ONLY** with brakes applied, slowly rock the empty vehicle with power while a mechanic visually checks the action at both ends.
- **Method 2** — with the vehicle shut down, a lever check can be made with a long pry bar placed under each torque rod end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

BOLSTER SPRINGS

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

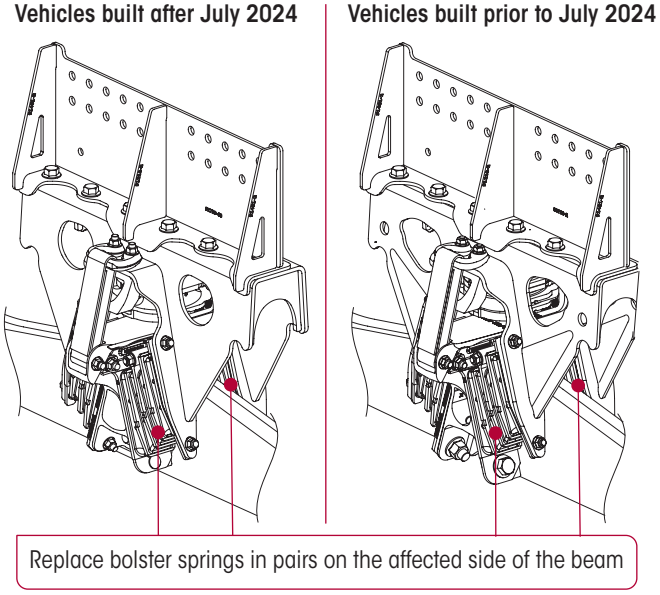
NOTE In the event only one (1) bolster spring on an equalizing beam assembly shows signs of damage or excessive wear, Hendrickson recommends that all bolster springs installed on that equalizing beam assembly be replaced, see Figure 6-11.

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.

FIGURE 6-11



- 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.

SERVICE HINT

Use **HAULMAAX EX gauge Lit. No. 48422-624** (Figure 6-12) to help measure the bolster spring for cut or splits and bonding separation.

- **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. 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

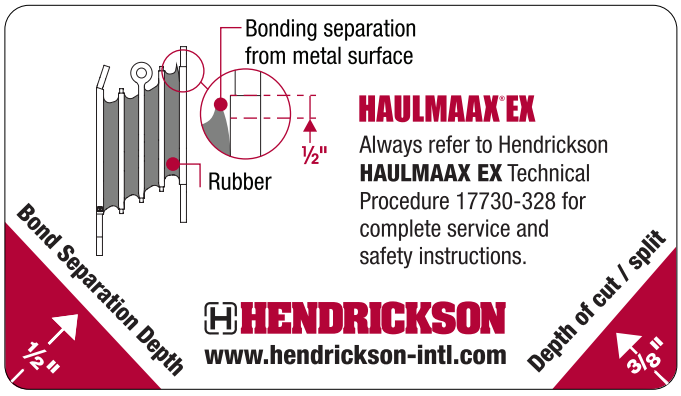
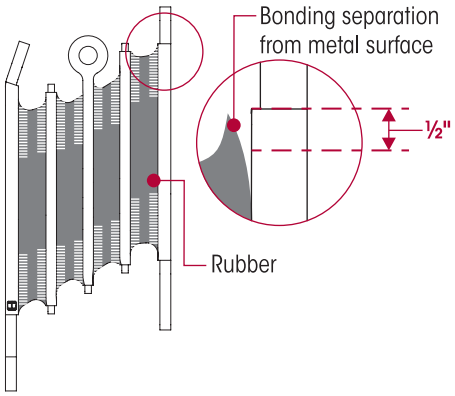


FIGURE 6-13



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

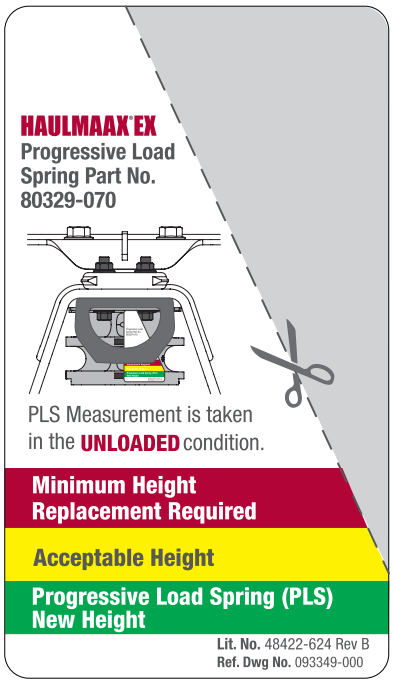


FIGURE 6-15

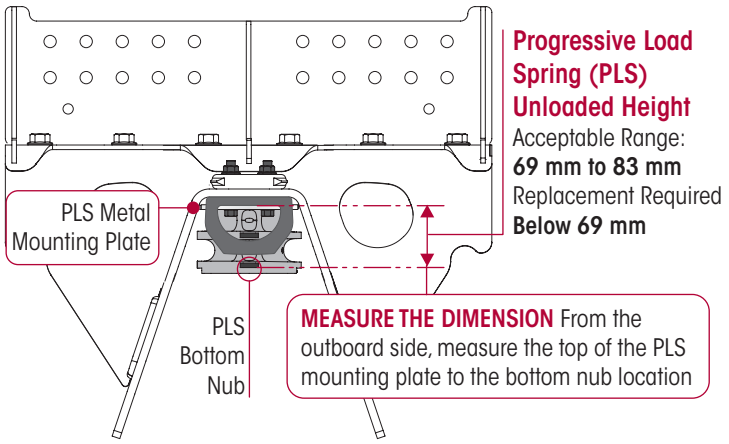
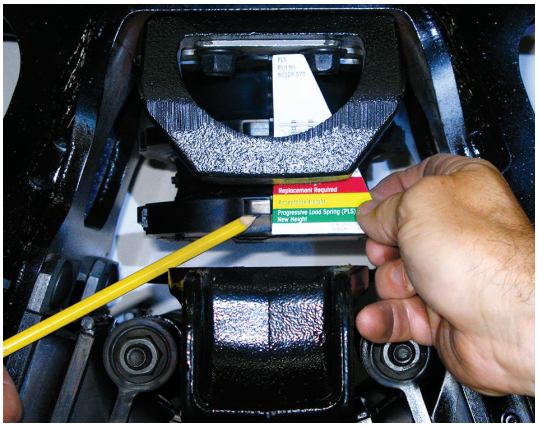


FIGURE 6-16



SHOCK ABSORBERS (if equipped)

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 of this publication.

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

FIGURE 6-17

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.

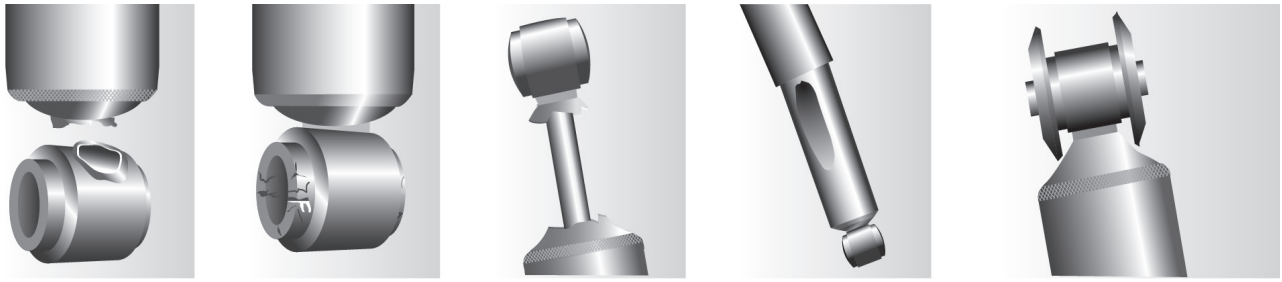
VISUAL INSPECTION

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

NOTE Figure 6-18 shows a general representation of an unacceptable shock absorber. Refer to your specific model's inspection guidelines for more details.

FIGURE 6-18

SHOCK ABSORBER VISUAL INSPECTION – UNACCEPTABLE CONDITIONS



Damaged upper or lower mount

Damaged upper or lower bushing

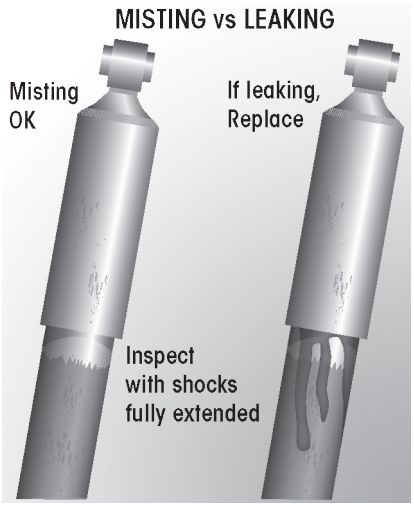
Damaged dust cover and / or shock body

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.

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.

SECTION 7
Alignment & Adjustments

AXLE ALIGNMENT

- **The primary control for axle alignment** is the location of the frame hanger assemblies on the frame rail as installed by the vehicle manufacturer, and the location of the axle brackets on the axles as installed by the axle or vehicle manufacturer.
- **Axle centering and pinion angles** are controlled by the longitudinal and transverse torque rods.
- **Ride height** is controlled by the design of the suspension frame hanger. No adjustment is possible.

DRIVE AXLE ALIGNMENT

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

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

NOTE

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

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

12. When all drive axle alignments and pinion angles are within the vehicle manufacturer's specifications then the alignment procedure is complete.
13. Remove the wheel chocks.

DRIVE AXLE PINION ANGLE

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

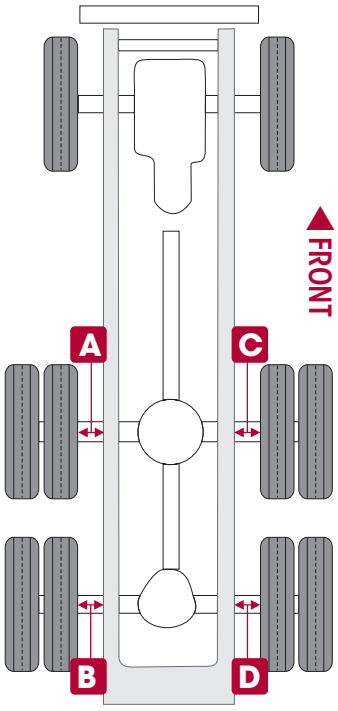
FIGURE 7-1

To Check the Pinion Angle

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

AXLE LATERAL ALIGNMENT

FIGURE 7-2



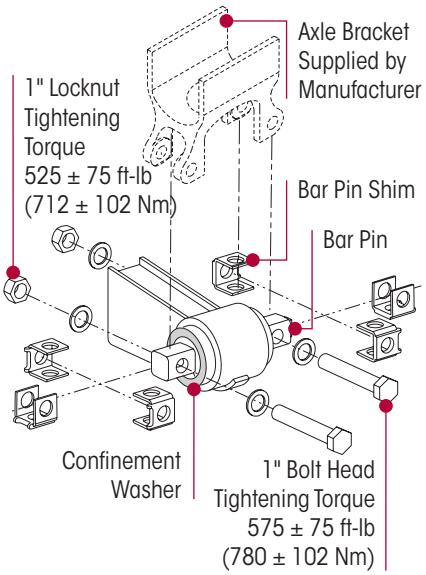
1. Use a work bay with a level surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to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

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 of this publication.

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

BAR PIN WITH SHIMS ALIGNMENT

FIGURE 7-3



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 7-3 and 7-5.

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

⚠ WARNING

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

ALIGNMENT ADJUSTMENT PROCEDURE

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

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

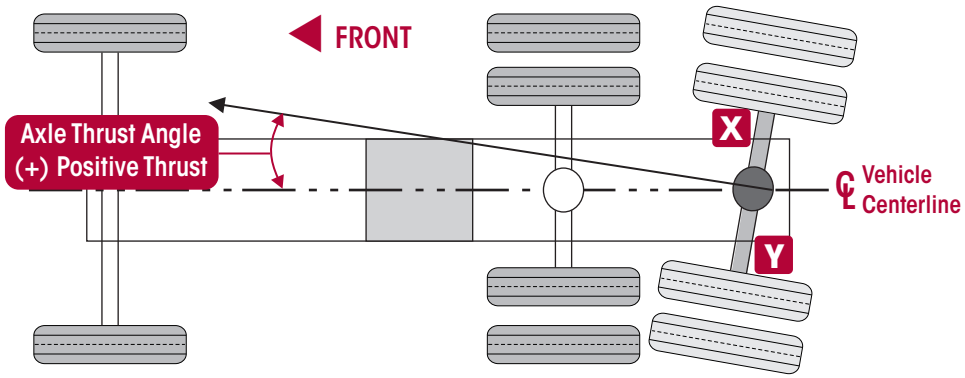
1. Determine the direction of the axle thrust angle. Figure 7-4 illustrates the rear drive axle with a positive thrust angle.

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

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

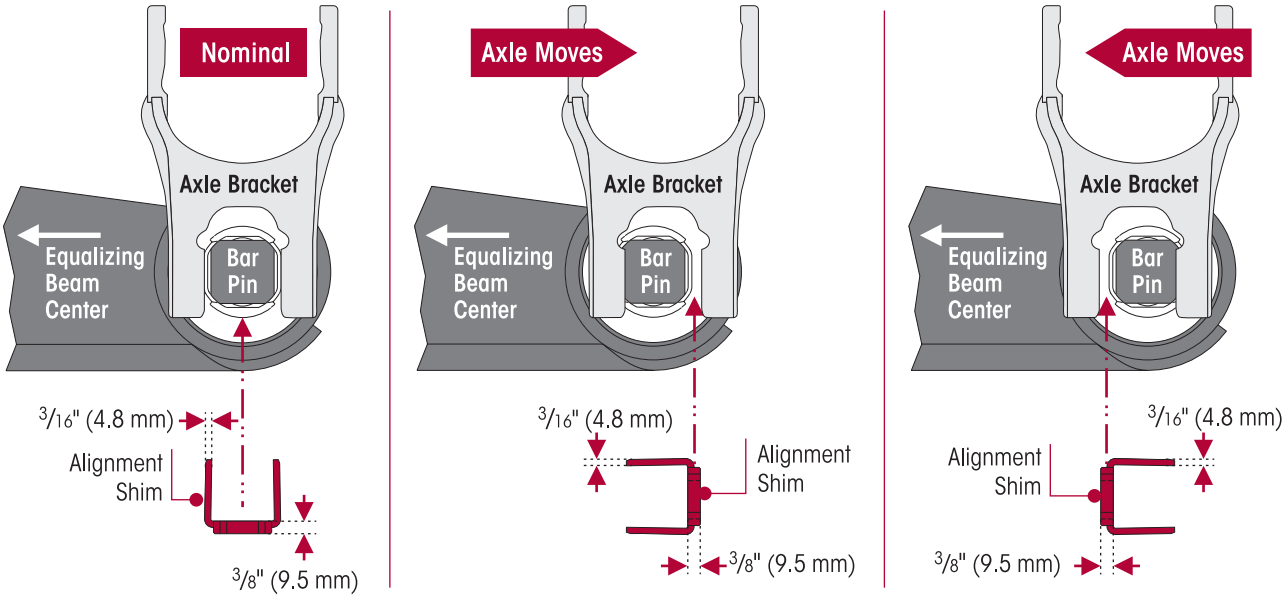
2. Chock the wheels of the front axles to prevent vehicle movement during service.
3. Raise the frame of the vehicle to remove the load from the suspension.
4. Support the frame with safety stands.

FIGURE 7-4



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

FIGURE 7-5



WARNING

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

CAUTION

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

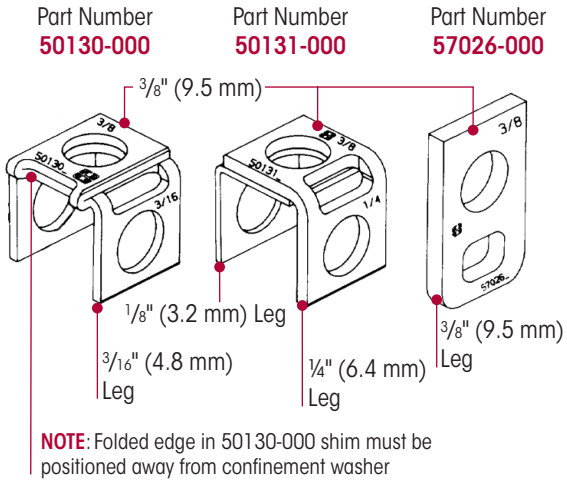
7. Install new end bushing fasteners and tighten to:
   - At the **locknut** to 525 ± 75 foot pounds torque, or
   - At the **bolt head** to 575 ± 75 foot pounds torque
8. Remove support and lower the vehicle.
9. Verify the axles' alignments are within the vehicle manufacturer's tolerance.
10. Set brakes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

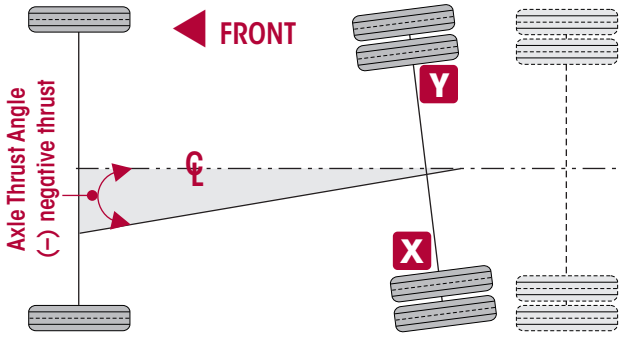
FIGURE 7-6

BAR PIN ALIGNMENT SHIMS

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

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





Example: The alignment equipment shows the front drive axle to have a **0.40° Negative thrust angle** to the left. This will require a 1/4" shim thickness increase to the **FRONT SIDE** of the left front equalizing beam end bushing bar pin. If there is less than 1/4" of adjustment available at this location then some of the adjustment will have to be made at the **REAR SIDE** of the right front end bushing bar pin. In this case a 1/8" shim thickness increase at the **FRONT SIDE** of the left front bar pin AND a 1/8" shim thickness increase at the **REAR SIDE** of the right front bar pin will correct the 0.40° negative 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 of this publication. If non-Hendrickson fasteners are used, follow the torque specifications listed in the vehicle manufacturer's service manual.

NOTE

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

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.

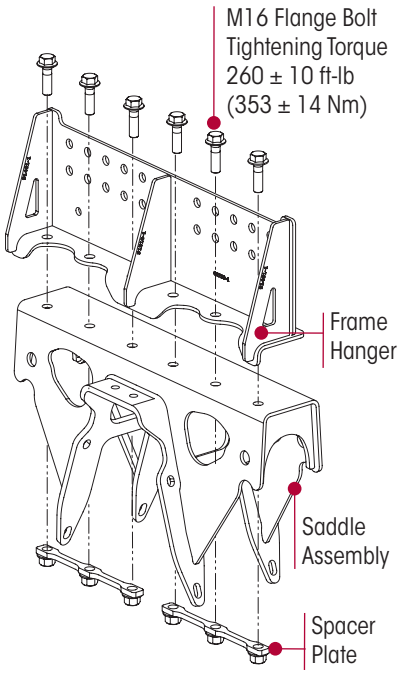
6. Raise the frame enough to allow a gap between the frame saddle and the frame hanger.
7. Remove the frame fasteners per the vehicle manufacturer's guidelines.

⚠ CAUTION

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.

FIGURE 8-1



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.

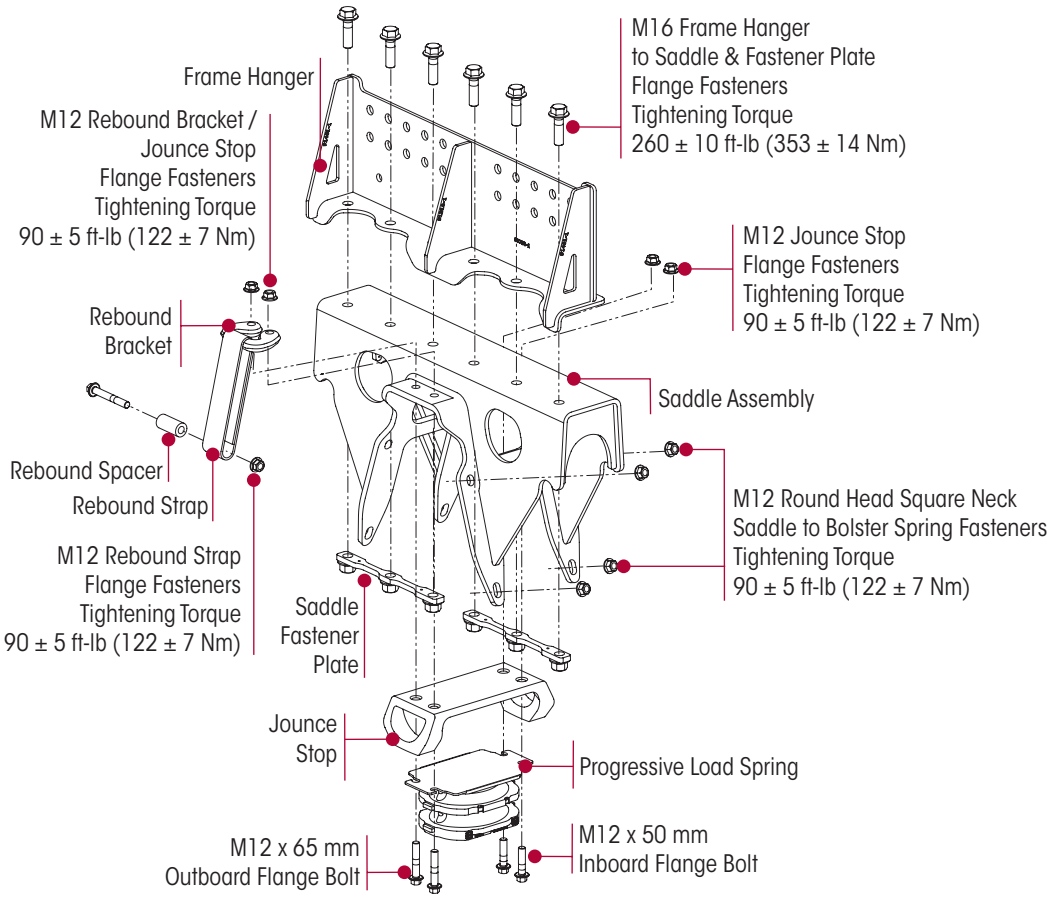
FRAME SADDLE

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

FIGURE 8-2



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

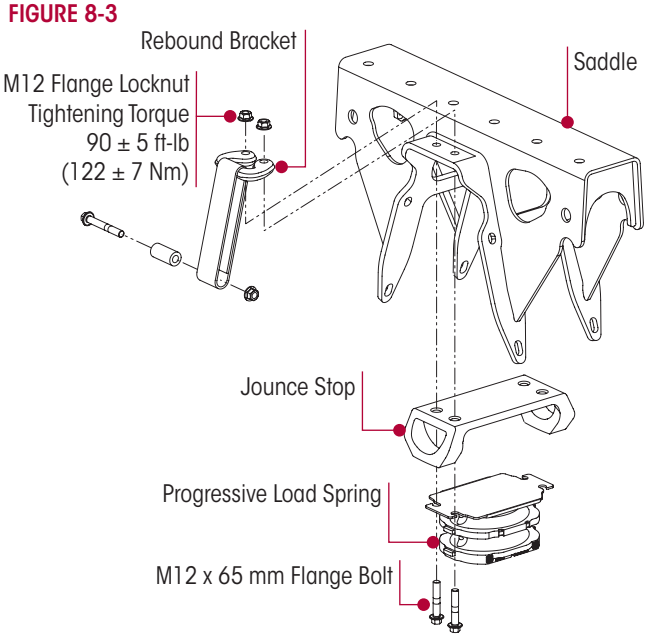
SERVICE HINT Wheel removal is not necessary for PLS replacement.

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

The following Hendrickson HAULMAAX EX Rebound Strap service kits are available for single and dual rebound straps with hardware, refer to the Parts List section of this publication

- **Service Kit No. 34013-354** – for 40K, 46K lb capacity, Single rebound strap kit for vehicles originally equipped with one rebound strap.
- **Service Kit No. 34013-355** – for 52K lb capacity, Dual rebound straps kit for vehicles originally equipped with dual rebound straps.
- **Service Kit No. 34013-363** – Aftermarket dual rebound strap enhancement kit to convert from single to dual rebound strap configuration.

NOTE The HAULMAAX EX 52K lb capacity suspensions are equipped with dual rebound straps per equalizing beam, while the 40K•46K lb 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.

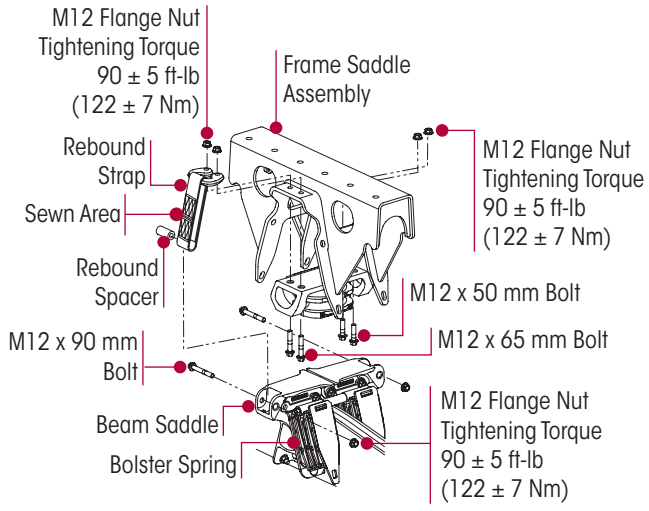
1. Chock the front wheels of the vehicle.

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.

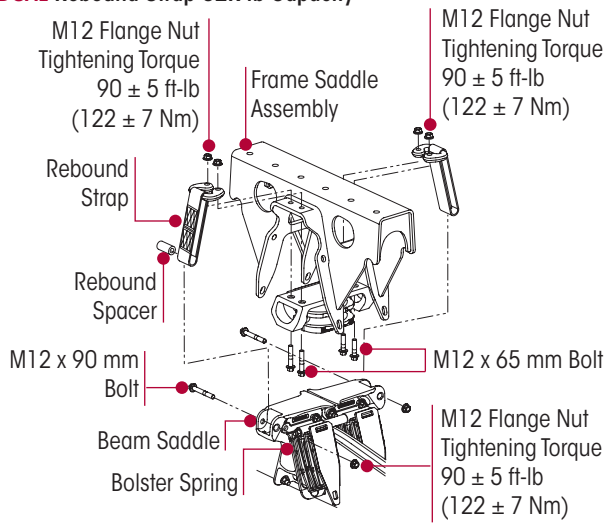
2. Remove and discard the M12 lower rebound strap fasteners and rebound spacer(s) from equalizing beam saddle, see Figure 8-4.
3. Remove and discard the M12 upper rebound strap fasteners from the frame saddle, see Figure 8-4.
4. Remove and discard rebound strap(s).

FIGURE 8-4

SINGLE Rebound Strap – 40K•46K lb Capacity



DUAL Rebound Strap 52K lb Capacity



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.

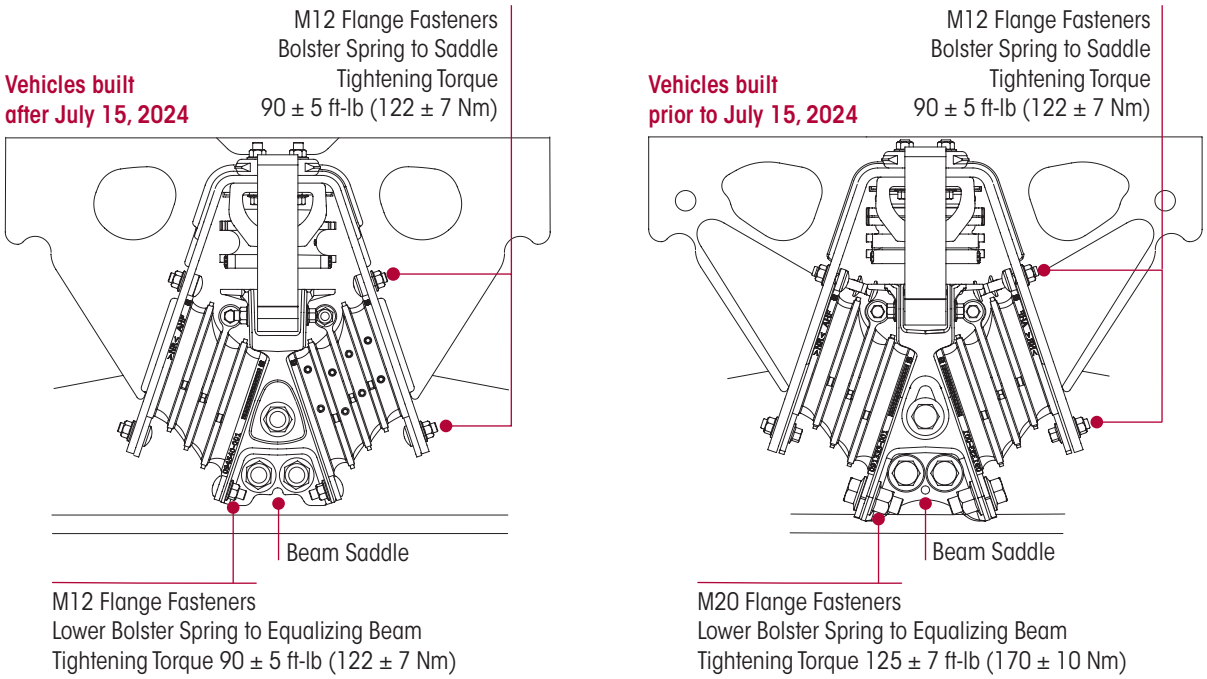
BOLSTER SPRINGS

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.

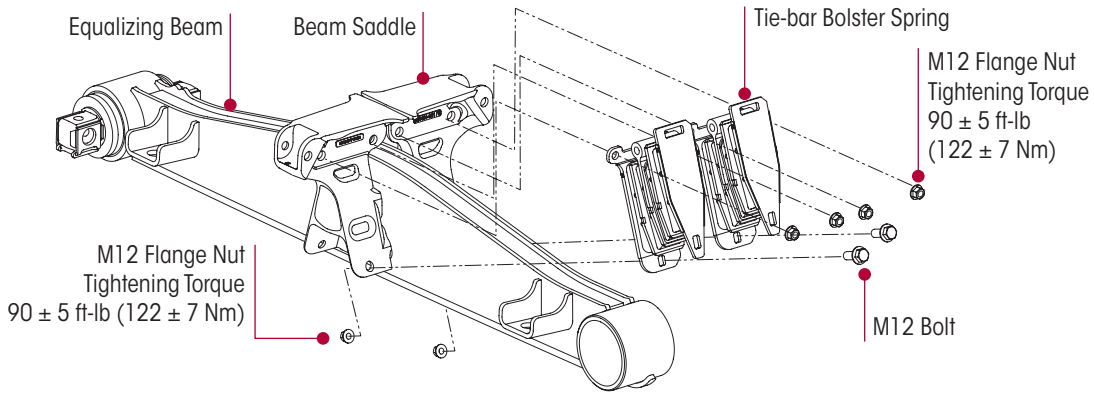
⚠ CAUTION IF THE BEAM SADDLE LOCATED BETWEEN THE EQUALIZING BEAM AND THE TIE-BAR BOLSTER SPRINGS IS DAMAGED, THEY MUST BE REPLACED. FAILURE TO DO SO CAN CAUSE DAMAGE TO MATING COMPONENTS.

ASSEMBLY

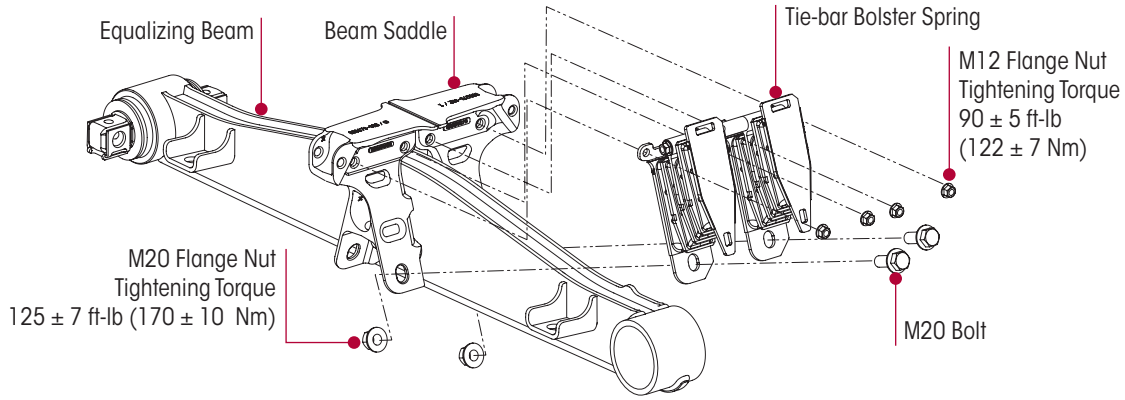
1. Install the bolsters onto equalizing beam saddle.
2. Install and snug the four (4) M20 **LOWER** fasteners connecting the bolster springs to the lower portion of the beam saddle, see Figure 8-6. **DO NOT** tighten at this time to allow for movement.

FIGURE 8-6

Vehicles built after July 15, 2024

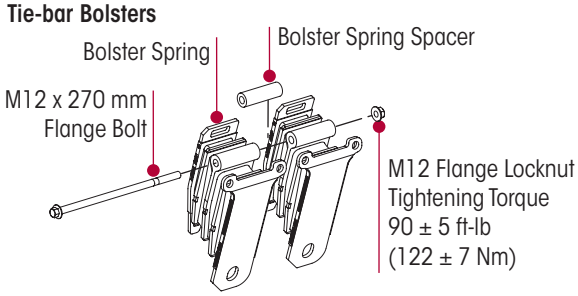


Vehicles built prior to July 15, 2024



3. Loosely install the **UPPER** four (4) M12 fasteners, **DO NOT** tighten at this time.
4. 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

FIGURE 8-7
Tie-bar Bolsters



   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.

5. Tighten the **LOWER** M20 fasteners to 125 ± 7 + 90° foot pounds torque, see Figure 8-6.
6. Lower the vehicle frame until the frame saddle contacts the bolsters.
7. Install and tighten the eight (8) fasteners connecting the bolster to the frame saddle, see Figure 8-6.
   - **Vehicles built after July 2025** – M12 fasteners to 90 ± 5 foot pounds torque
   - **Vehicles built prior to July 2025** – M20 fasteners 125 ± 7 foot pounds torque
8. 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.
9. Install the wheel assemblies from the side being serviced.
10. Remove the frame safety stands.
11. Remove the axle safety stands and lower the axle.
12. 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.

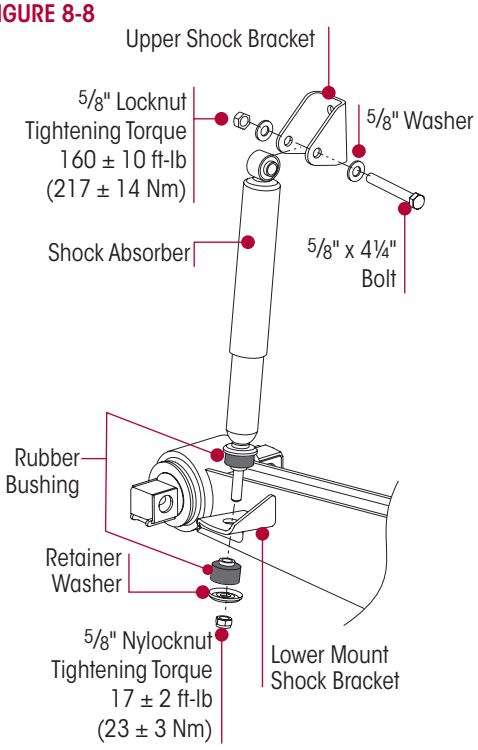
DISASSEMBLY

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 17 ± 2 foot pounds torque, see 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.

FIGURE 8-8



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 of 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.

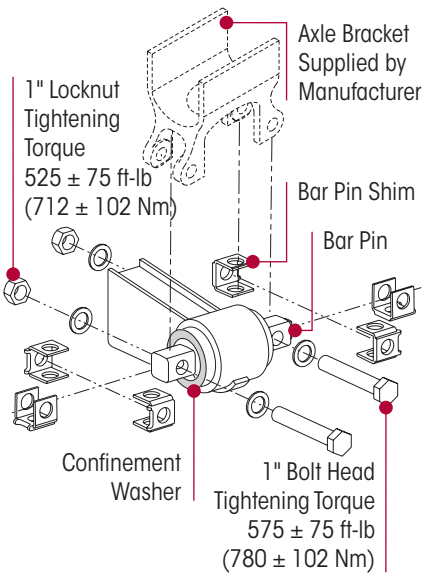
NOTE If both sides of the vehicle require equalizing beam/and or beam saddle assembly replacement, the **procedure MUST be performed one side at a time.**

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 of 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 Figures 8-10 and 8-11.
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:
   - **Vehicles built prior to July 2024 –** Locate the stamped markings on the beam saddle: **-3 or O for outboard** and **-2 or I for inboard**, see Figure 8-10.
   - **Vehicles built after July 2024 –** Locate the square cut-out with a notch **for outboard** or square cut-out **for inboard** on the beam saddle side view, see Figure 8-11.

FIGURE 8-10

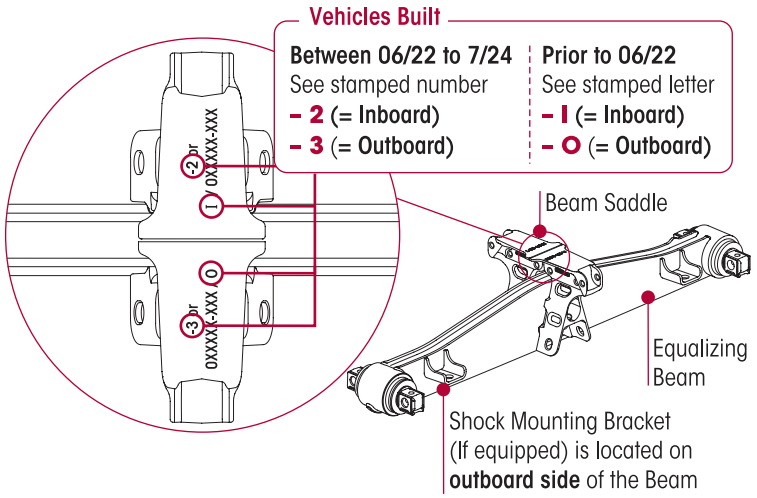


FIGURE 8-11

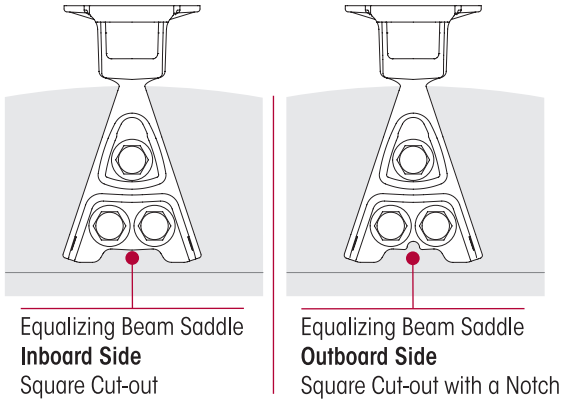
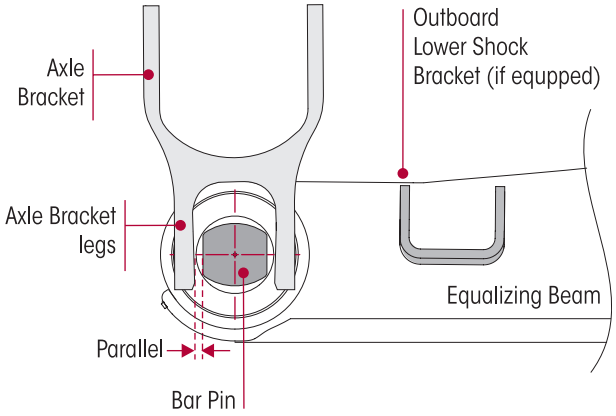


FIGURE 8-12



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.
7. Continue to raise the equalizing beam into the front axle bracket legs, see Figure 8-12.
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.

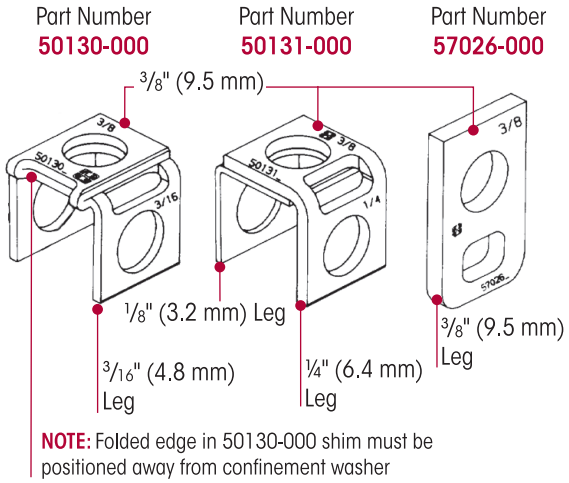
⚠ WARNING

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 8-13. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE.

FIGURE 8-13

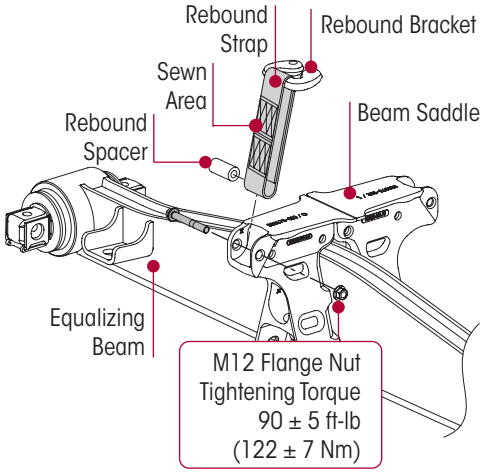


9. Install the alignment shims into the **front** bar pin connection in the same orientation and location as prior to removal and install the 1" fasteners while removing the temporary ¾" bolt.
10. Repeat the procedure for the **rear** bar pin connection.
11. Tighten the **FRONT** and **REAR** bar pin 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.

FIGURE 8-14



15. Install the rebound spacer and M12 fasteners into the **lower** rebound strap loop with the sewn area facing away from the beam saddle and tighten fasteners to 90 ± 5 foot pounds torque, see Figure 8-14.
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
- A shop made bar pin receiving tool, see the Special Tools section of this publication.
- See end bushing service kits in the Parts List section of this publication.

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

⚠ WARNING 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 in this section.

END BUSHING REMOVAL

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 8-15.
3. Mark the orientation on the equalizing beam with a paint stick.

FIGURE 8-15

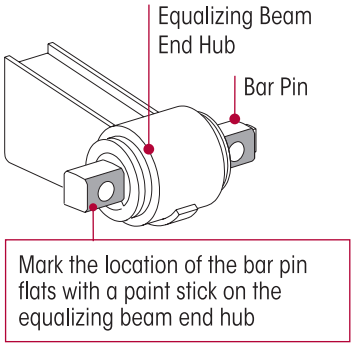
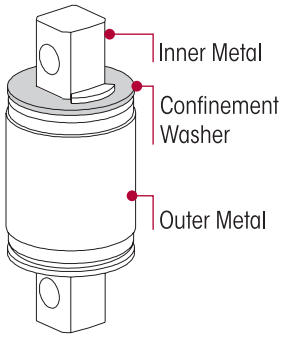


FIGURE 8-16



4. Press on the end bushing inner metal, see Figure 8-16, 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 8-16) 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

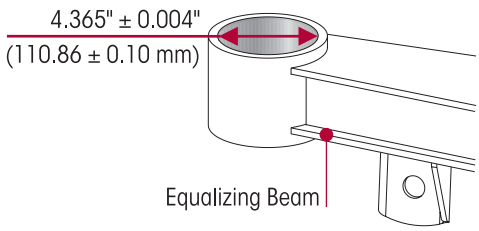
After removing the bar pin end bushings, inspect the equalizing beam bores for damage. If the equalizing beam is damaged from end bushing removal, replacement of the equalizing beam is required. **DO NOT** re-bush or otherwise use an equalizing beam that has been damaged.

⚠ 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 8-17.

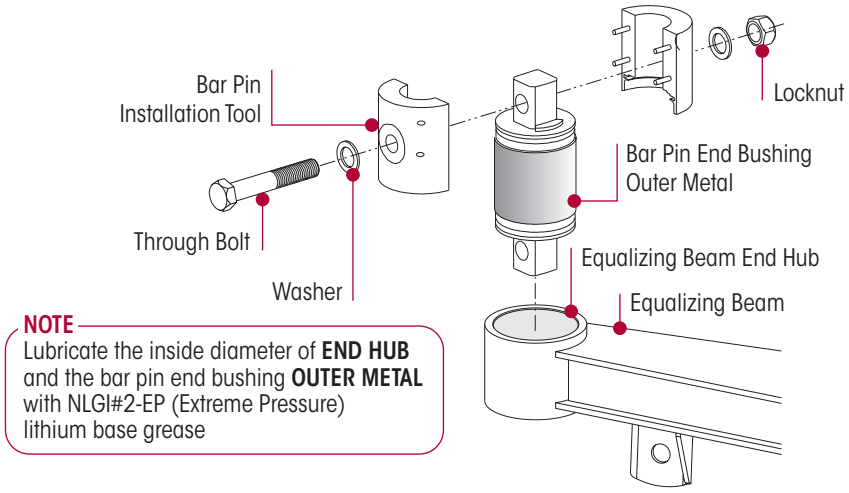
FIGURE 8-17
Equalizing Beam End Hub Bore Diameter



END BUSHING INSTALLATION

1. Place the equalizing beam in a shop press with the end hub squarely supported on the press bed or receiving tool.
2. Install the end bushing installation tool (see Special Tools section of this publication) on the new end bushing as shown in Figure 8-18. 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 8-18.

FIGURE 8-18



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

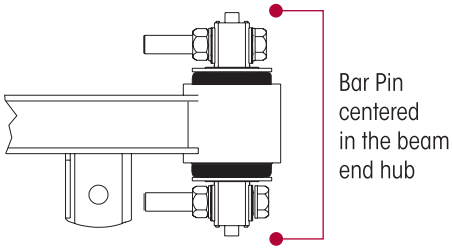
The end bushing must be square with the equalizing beam end hub before pressing the end bushing into the beam. End bushings pressed in at an angle will damage the end bushing and the equalizing beam.

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.

FIGURE 8-19



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 8-19.
7. Install the equalizing beam assembly onto the vehicle as detailed in Equalizing Beam in this section.

LONGITUDINAL TORQUE RODS

DISASSEMBLY

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

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

2. Support the pinion on the axle being serviced.

NOTE Prior to disassembly of the longitudinal torque rod, note the quantity and orientation of the longitudinal torque rod shims. It is required that the longitudinal torque rod shims are installed in the same orientation and location as removed to preserve the existing 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 8-20.

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

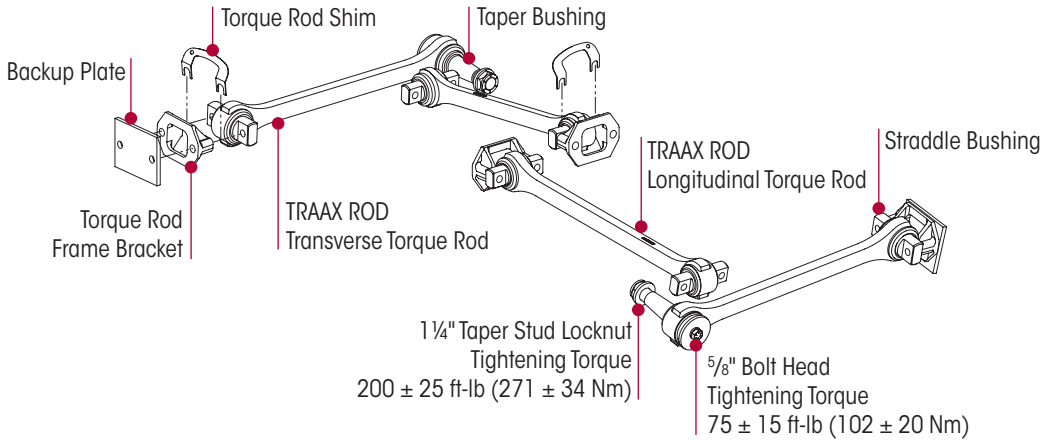
1. Chock the **FRONT** wheels of the vehicle.

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 8-20.
6. Inspect the mounting surfaces for any wear or damage. Repair or replace as necessary.

FIGURE 8-20



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.
5. Tighten all frame mounting fasteners to the vehicle manufacturer's torque 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 of this publication.
8. Remove the wheel chocks.

ULTRA ROD TORQUE ROD BUSHINGS

FIGURE 8-21

You will need:

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

BUSHING REMOVAL

WARNING

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

1. Remove the torque rod as detailed in the Torque Rod Disassembly instructions in this section.
2. Support the torque rod end tube centered on the receiving tool.
3. Ensure the torque rod is squarely supported on the press bed for safety.
4. Push directly on the straddle mount bar pin until the top of the bar pin is level with the top of torque rod end tube.
5. Place the push out tool directly on top of the bar pin and press until the bushing clears the torque rod end tube.

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.

FIGURE 8-22

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 of this publication) or light Naphthionic Base Oil, such as 60 SUS at 100°F.
3. Support the torque rod end tube centered on the receiving tool. Ensure the torque rod is squarely supported on the press bed for safety. The straddle mount bar pin bushings must have the mounting flats positioned at zero degrees to the shank of the torque rod, see Figure 8-23.

FIGURE 8-23

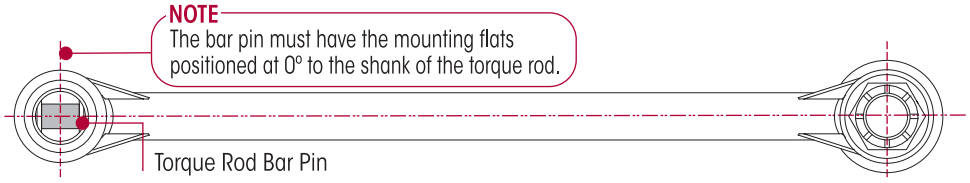


FIGURE 8-24

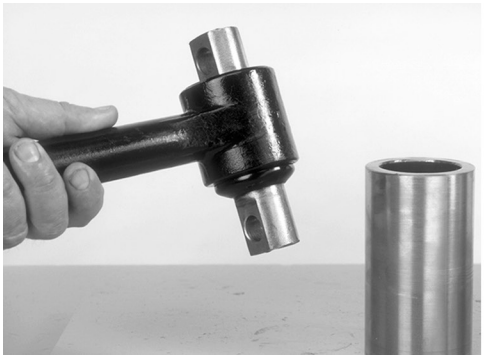
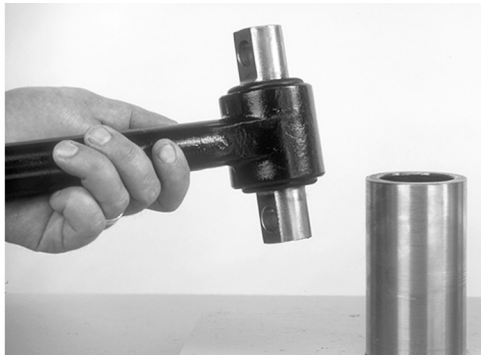


FIGURE 8-25



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.

⚠ 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 PLS WEIGHT BIAS SHIM SERVICE KIT

Service Kit No. 34013-430, *see Table 8-1 for included parts*

INSPECTION

Prior to installing the PLS Weight Bias Shim Service Kit, visually inspect the vehicle for any worn or damaged components. Repair or replace as necessary.

VEHICLE LEAN EVALUATION

1. Place the vehicle on a level floor.
2. Set parking brake and chock the wheels.
3. Measure the distance from the bottom of the vehicle frame to the ground on both sides of the vehicle just ahead of the HAULMAAX EX suspension.
4. If frame to ground measurements:
   a. **are within** the vehicle manufacturer's level chassis specification, do not install the PLS Weight Bias Shim Service Kit.
   b. **are not within** the vehicle manufacturer's level chassis specification, then the PLS Weight Bias Shim Service Kit can be installed on the vehicle. Proceed to the Installation procedure.

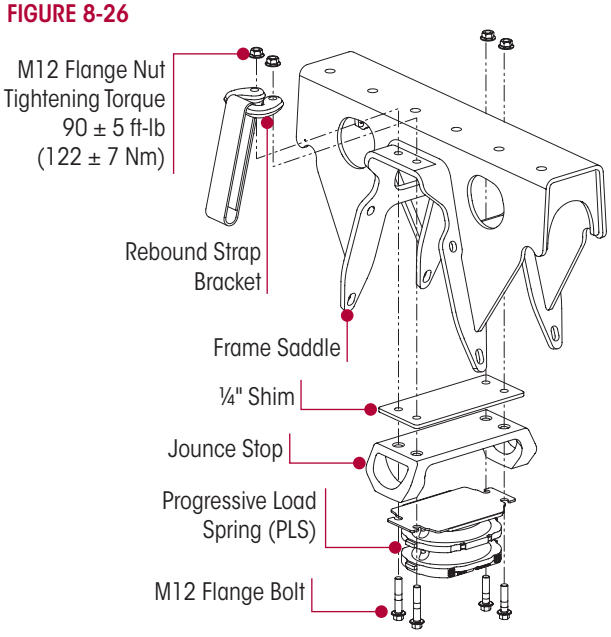
INSTALLATION

NOTE It may be necessary to remove at least one of the wheel assemblies for greater access to the progressive load spring / jounce stop.

TABLE 8-1

KIT NUMBER 34013-430 WEIGHT BIAS SHIM SERVICE KIT		
One Side, Suitable for Single or Dual Rebound Strap, Includes (2) ¼" Load Bias Shim (4) M12 x 80 mm Flange Bolt (2) M12 x 65 mm Flange Bolt, *for inner single strap use only* (2) M12 x 50 mm Flange Bolt, *for inner single strap use only* (4) M12 x 1.75 Flange Nut		
Contains various sized fasteners to accommodate different suspension configurations. One or two shims can be installed dependant on the vehicle weight bias. Refer to the table below for fastener selection.		
Rebound Strap	**¼" Shim Qty**	**M12 Bolt Size**
Single	1	50 mm
Dual		80 mm
Single	2	65 mm
Dual		80 mm

FIGURE 8-26



1. Lift and support the rear axles.

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

2. Remove the wheel assemblies.
3. Raise and support the vehicle frame until there is at least a ¾" gap between the progressive load spring (PLS) and frame saddle.
4. Support the vehicle frame with safety stands.
5. Remove and discard the upper fasteners that secure the upper rebound strap bracket, PLS and jounce stop, see Figure 8-26. Repeat the same process on the inside of the suspension half.
6. Slide the shim(s) between the jounce stop and frame saddle, see Figure 8-26. The maximum amount of shims is two (2) per side.

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

7. Install the fasteners and tighten to 90 ± 5 foot pounds torque, see Figure 8-26.

RE-EVALUATE VEHICLE LEAN

1. Install the wheel assemblies, lower the vehicle frame and remove the safety stands.
2. Measure the distance from the bottom of the vehicle frame to ground on both sides of the vehicle just ahead of the HAULMAAX EX suspension.
3. If the frame to ground measurements:
   a. **are within** the vehicle manufacturer's level chassis specifications, then no further adjustment is needed. Remove the wheel chocks.
   b. **are not within** the vehicle manufacturer's level chassis specifications, then the PLS shims may be adjusted. Proceed to the Shim Count Adjustment procedure.

SHIM COUNT ADJUSTMENT

1. Lift and support the rear axles.
2. Remove the wheel assemblies.
3. Raise and support the vehicle frame until there is at least a ¾" gap between the progressive load spring (PLS) and frame saddle.
4. Support the vehicle frame with safety stands.
5. Remove the shim fasteners.
6. Remove a shim from the light (high) side of the vehicle, or install an additional shim to the heavy (low) side as needed, refer to the Installation procedure. The maximum amount of shims is two (2) per side.

NOTE Before re-installation, ensure that bolt length is appropriate according to the suspension configuration and number of shims that will be installed. Refer to Table 8-1 for the fastener selection.

7. Install the fasteners and tighten to 90 ± 5 foot pounds torque, see Figure 8-26.
8. Re-evaluate vehicle lean, see Re-evaluate Vehicle Lean section of this publication.
9. If necessary, repeat Steps 1-8 until measurements are within vehicle manufacturer specifications.
10. Install the wheel assemblies.
11. Lower the vehicle frame and remove safety stands.
12. Remove the wheel chocks.

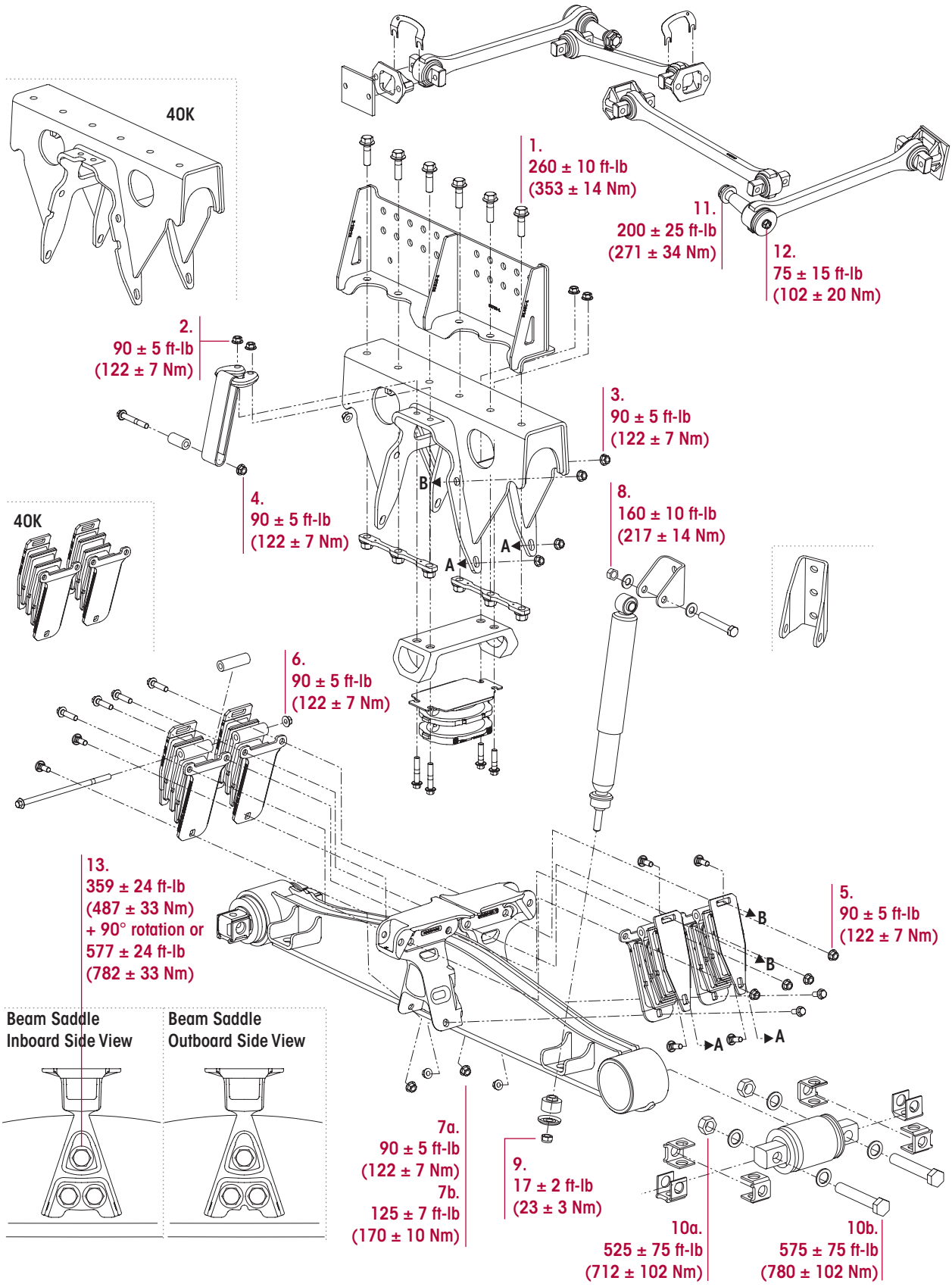
SECTION 9
Troubleshooting Guide

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 of 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. Install aftermarket weight bias kit, see Hendrickson Literature No. 59310-078.
	Damaged bolster springs	Replace the bolster springs.
Irregular tire wear	Incorrect axle alignment	Align the axles. Refer to the vehicle manufacturer's specifications.
	Damaged, bent, cracked suspension component	Replace damaged component
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 & Adjustment section and/or replace the bolster springs.
Loose or missing suspension fasteners	Suspension is overloaded	Redistribute the load to correct weight.
	Frequent hard stop/start	Verify the torque is to specification and increase the fastener inspection interval.
		Review driving habits to reduce frequency of hard stop / start.
Frame hanger cracked	Suspension is overloaded	Redistribute load to correct weight.
	Loose saddle assembly fasteners	Increase fastener inspection intervals.
Saddle leg to equalizing beam contact	Axles not centered	Check the lateral alignment, refer to the Alignment & Adjustment section of this publication.
		Inspect the transverse torque rod fasteners and bushing conditions, refer to the Preventive Maintenance section of 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		
7a 7b	Lower Bolster Spring to Equalizing Beam Vehicles built after July 15, 2024 Vehicles built prior to July 15, 2024		M12 Flange M20 Flange	8	90 ± 5 125 ± 7	122 ± 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				17 ± 2	23 ± 3
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.

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

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

HENDRICKSON

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