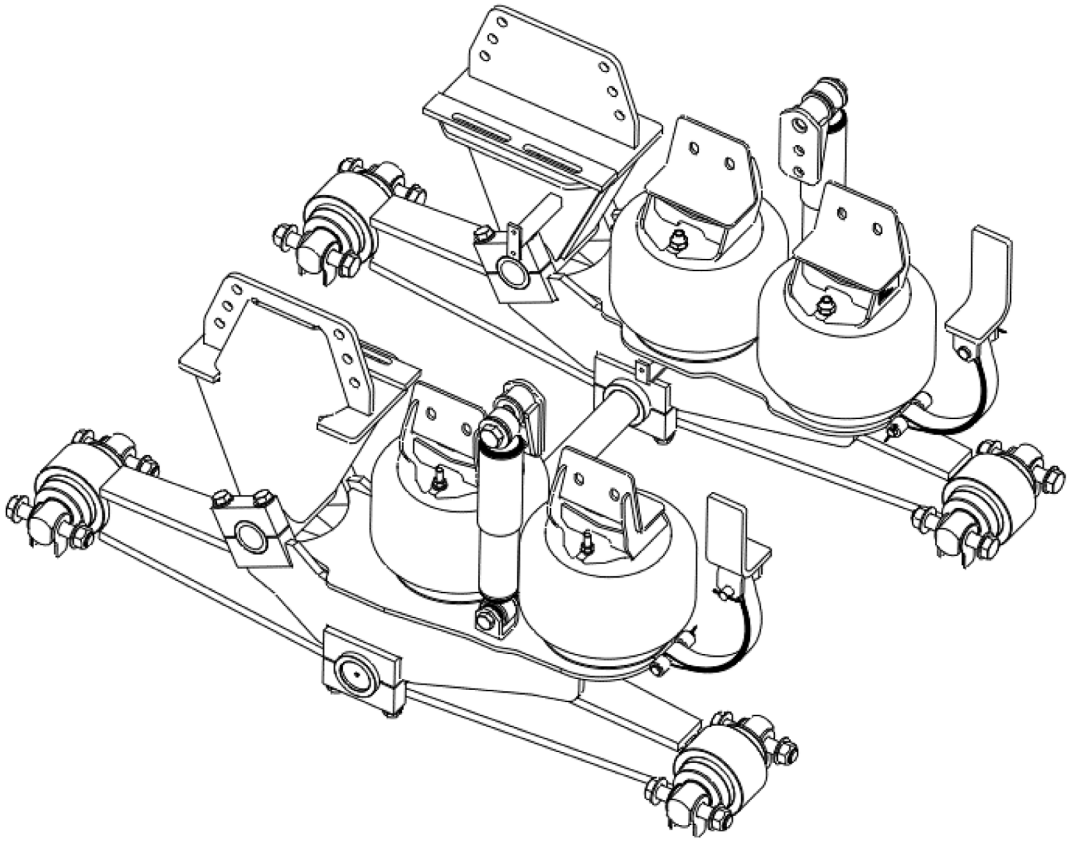
Chassis Suspensions

INSTALLATION INSTRUCTIONS

52K AIR LINK®
TANDEM DRIVE SUSPENSION



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QUESTIONS?
CALL CUSTOMER SERVICE
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52K AIR LINK Susp.
Jan 31, 2020

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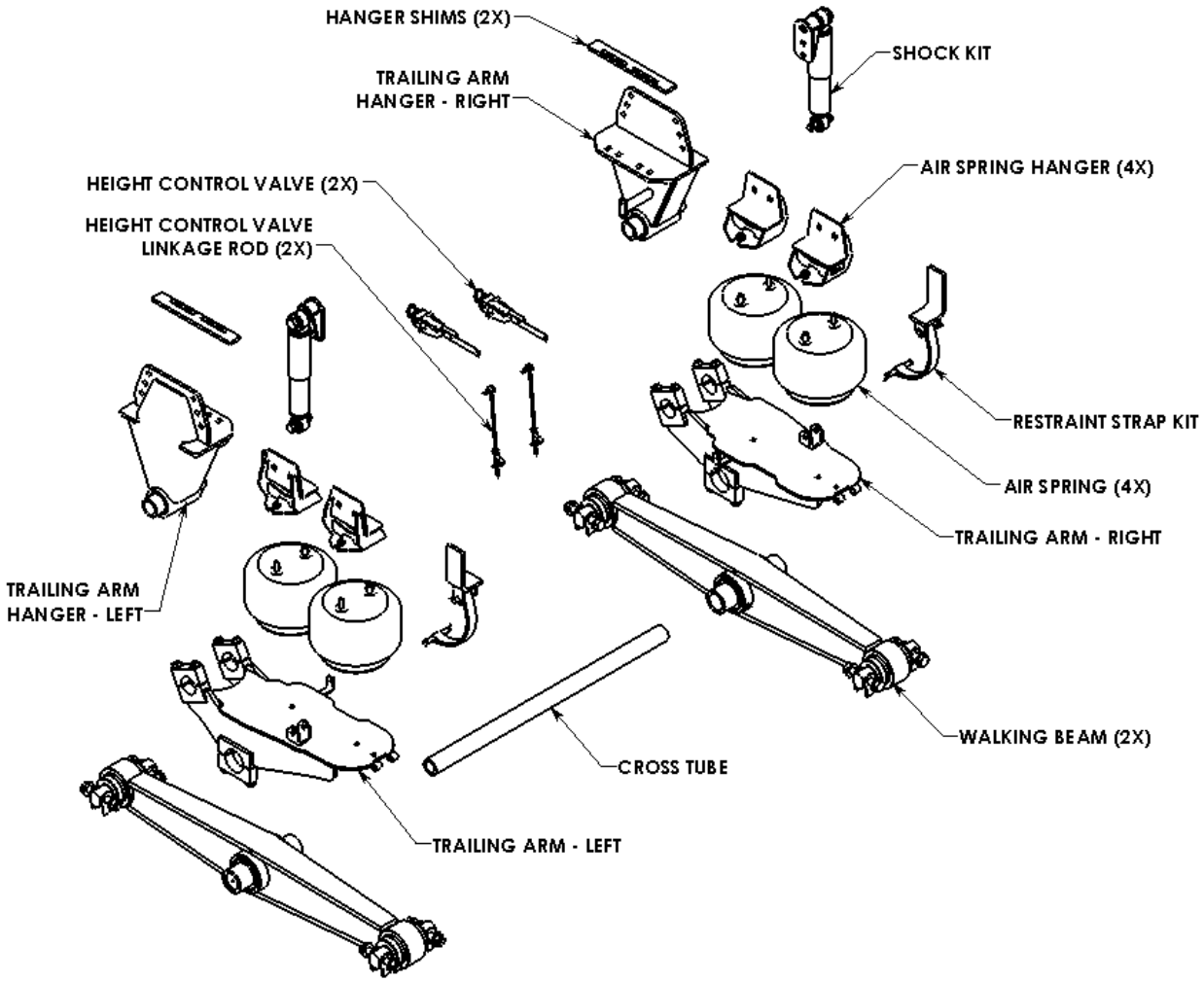


SECTION 2: INTRODUCTION

Description

This document is intended to provide general guidelines for the installation of the Air Link ™ system in a new chassis at the OEM level.
In this case, the design has been worked into the chassis based on requirements outlined by the OEM (capacity, ride height, spread, etc.).

This manual is to cover the general assembly of a 52,000 lbs capacity Air Link ™ suspension with bar pin end bushings. Each kit is specific to the requirements of each customer and therefore not all sections may specifically apply to each customer specific application. In such cases, refer to the OEM information for proper installation details.

Some part numbers have been supplied for generic parts, however, the suspension layout drawing should be used in conjunction with this manual to provide specific details of the suspension component part numbers and configuration.

The proper assembly and setup of the Air Link ™ suspension has been proven to provide customers with years of trouble free service, which is our goal for all our users.

Safety Notice

These processes are provided with the understanding that the work will be performed by qualified personnel, using appropriate industry safety standards. In all cases, safety and common sense must be at the forefront when working with heavy equipment. Carefully read and understand the work instructions prior to commencing work, and all appropriate safety precautions are the responsibility of the technicians performing this work.

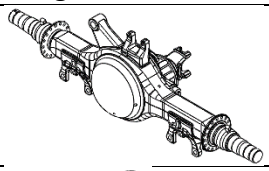
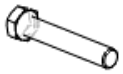
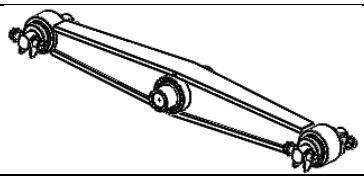
In this document, notes, cautions and warnings are placed at critical steps that should be read carefully.

- **Notes** will provide any tips and tricks to make the work as efficient as possible.
- **Cautions** are to warn of key features that need to be safeguarded or measurements that need to be maintained.
- **Warnings** are outlined where the danger of personal injury is most likely.

SECTION 3: ASSEMBLY

Assemble the Axle to the Walking Beams

Required Components

Description	Quantity	Image
Assembled rear axle (Customer Supplied)	2	
Bar Pin Bushing (Link P/N: 206-00-045)	4	
Bolt, Hex, Gr.8, 1”Ø-8UNC x 6” (Link P/N: 201-00-080)	8	
Washer, Flat, SAE, 1”Ø (Link P/N: 201-01-075)	8	
Nut, Hex Head, Gr.C, Stover, 1”Ø (Link P/N: 201-02-015)	8	
Alignment Shim 1/16” (Link P/N: 201-02-118)	8	
Alignment Shim 1/8” (Link P/N: 201-02-119)	8	
Alignment Shim 3/16” (Link P/N: 201-02-120)	8	
Walking beam [1][2] (Link Supplied)	2	

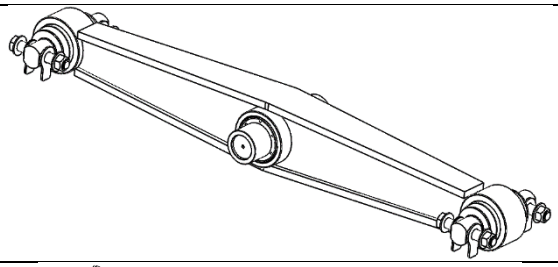
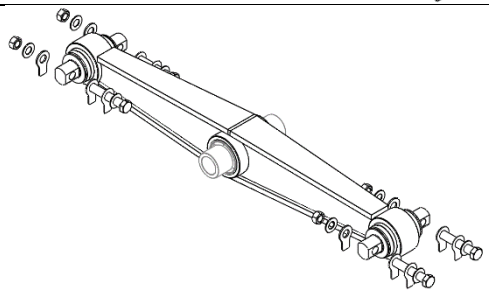
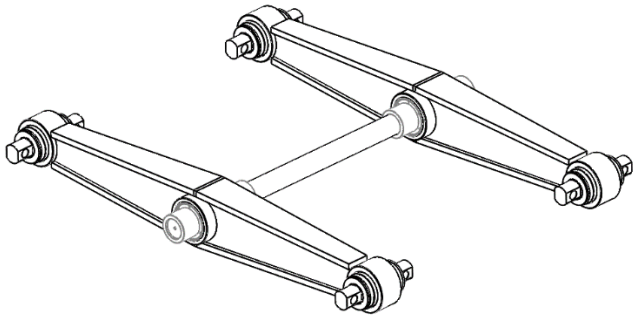
[1] The walking beam is not available without bushings.
[2] Walking beam supplied assembled with bushings in kit. Breakdown above provided for replacement detail.

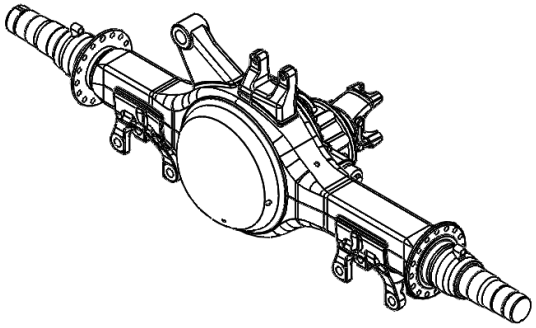
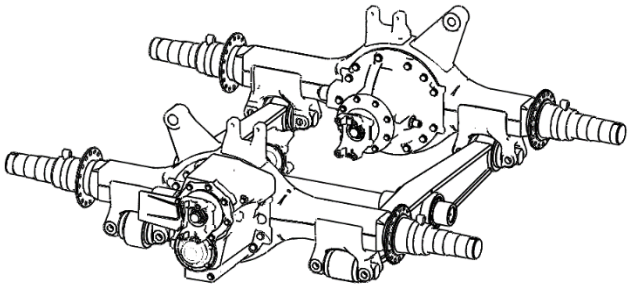
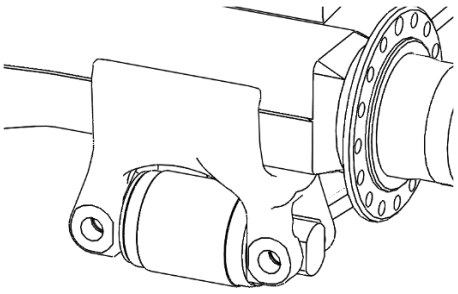
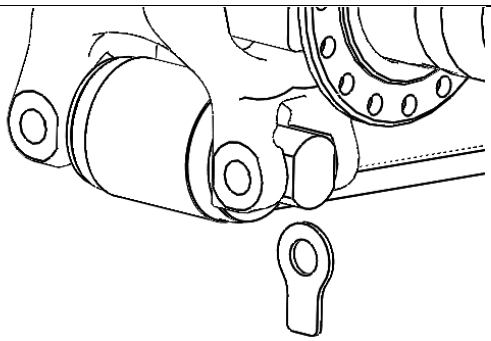
Required Tools

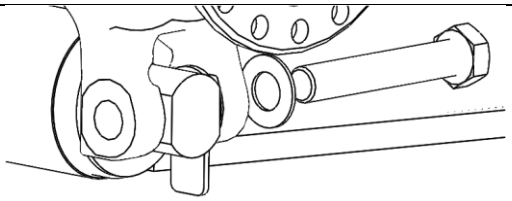
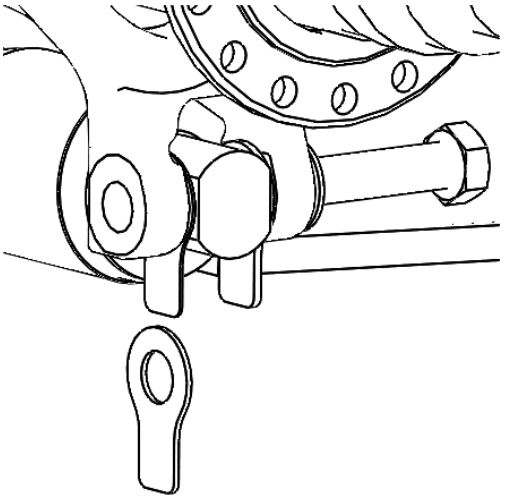
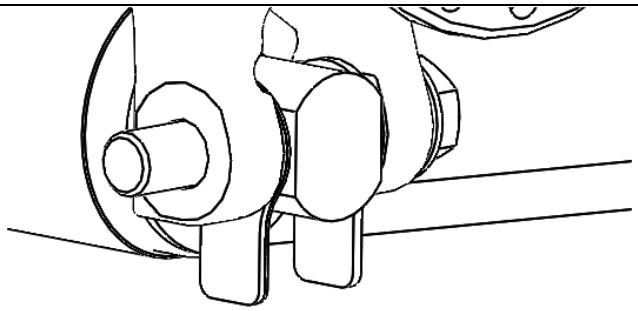
- Hammer (Mallet)
- Wrench (1 ½”)
- Socket (1 ½”)
- Torque wrench 500lb-ft minimum

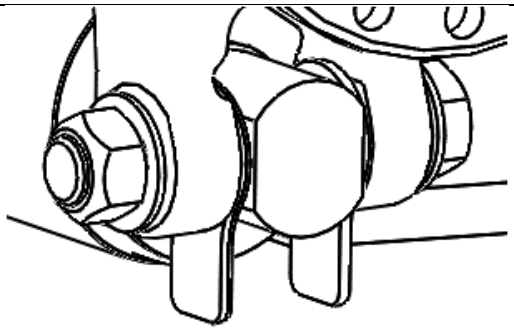
- Digital Level
- Pliers
- Alignment punch

Procedure

1. Each walking beam has a center bushing and a bar pin bushing in each end.	
2. Remove the alignment shims, bolts, washer and nuts from each end bushing and keep them at hand for assembly.	
3. Insert the cross tube into the center bushing of each walking beam. **Note:** Trunnion tube must be installed before the walking beams are installed to the axles. **Note:** Trunnion tube is intended to be loose in the center bushing. (Freely rotate and some end to end play).	

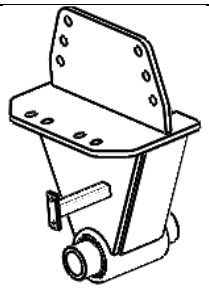
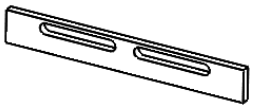
4. Position both drive axles to allow access to the axle connectors to install the walking beams. **Note:** The orientation of the axles is dependent on each OEM assembly process. **Caution:** Some walking beams are orientation dependant. Be sure to position beams correctly.	
Move the walking beam end bushing into the axle connectors. **Note:** One axle can be done at a time if the process requires it. **Warning:** Axles and suspension components are heavy. Avoid pinch points during assembly.	
5. Align the holes in the walking beam end bushings to the axle connector bolt holes. **Note:** If the walking beam bushing come pre-clocked for the desired pinion angles, ensure axles are set to that angle to get the holes to line up.	
6. Slide the 3/16” alignment shim in between the bar pin bushing and axle connector on one side.	

7. Install the bolt and washer through the axle connector, through the shim and part way into the bar pin bushing to hold the first shim in place.	
8. Next slide the 1/16” and 1/8” alignment shims in between the bar pin bushing and the axle connector on the opposite side to the 3/16” shim. **Note:** The shims should be configured neutral (3/16” of shim per side) to provide the greatest flexibility for final alignment. **Note:** Depending on the dimensions for the axle connector, it could be a tight fit for the two small shims. Position the 1/16” shim first and do the 1/8” shim last. It can better handle being tapped into place with a mallet.	
9. Slide the bolt and washer through the shims until the head and washer are fully seated. **Note:** An alignment punch can help move the shims into place.	

10. Install the washer and Stover nut on this side. **Note:** Tighten the hardware to secure the connection with no play. Final torque done at alignment stage.	
11. Repeat steps 6-11 for assembling bolts and shims into each of the two bolts per end bushing (8 total for the suspension). **Note:** Ensure that all hardware has the same orientation to facilitate future service.	

Install Frame Mounted Components

Required Components

Description	Quantity	
Trailing Arm Hanger – Left [1] Trailing Arm Hanger – Right [1] (Link Supplied)	2	
Air Spring Hanger [2] (Link Supplied)	4	
Shock Bracket – Upper (Link Supplied)	2	
Spacer – Trailing Arm Hanger (Link P/N: Variable)	2	

[1] Trailing Arm Hangers will be directional (left/right) if a Height Control Valve mounting bracket is present. Otherwise they are universal. For reference, consult the suspension layout drawing to confirm orientation on the frame.
[2] Air Spring Hangers, for the capacity, are typically all the same. In case of pairs with the different height, refer to layout drawing to ensure correct orientation.

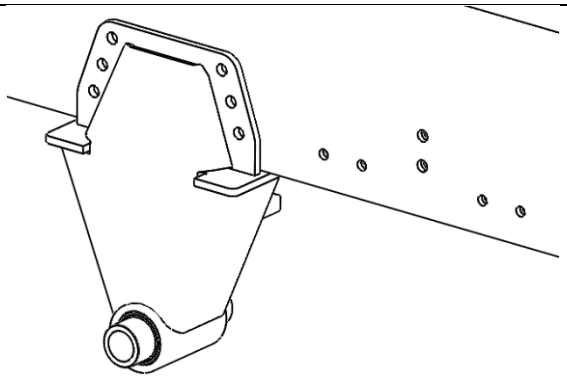
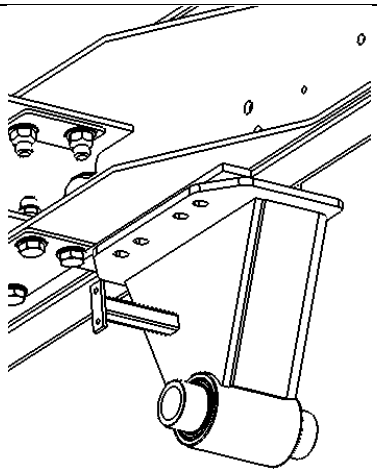
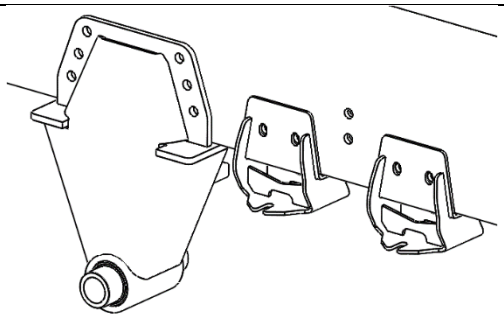
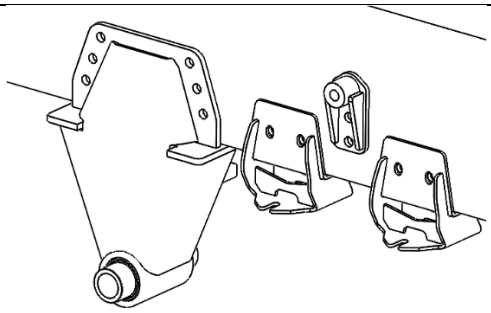
Required Tools

- Socket
- Wrench
- Ratchet wrench or Air impact tool.

Procedure

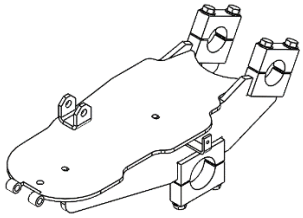
In this application where the Air Link ™ has been designed into the chassis. It is expected that the frame is pierced appropriately to allow for the direct connection of the Air Link ™ components.

> **Note:** The suspension is designed to use axle stops at each wheel end to control jounce travel of the walking beam. Link is willing to work with each OEM to ensure that this component is implemented with the Air Link suspension system.

1. Mount the trailing arm hanger to the frame. **Note:** Use 6 - ¾”Ø bolts – Gr.8 (or equivalent) to secure the hanger to the web of the frame rail (Hardware not supplied). **Caution:** Press hanger tight to the bottom flange of the frame rail to ensure it is fully seated before the bolts are tightened.	
2. Position the spacer(s) between the hanger and the cross-member to create a proper clamping joint without pulling the plates. Attach the hanger using 4 - 5/8”Ø bolts Gr.8 (or equivalent) vertically through the spacer to the cross member. **Note:** Use the correct spacer(s) to fill the gap without wedging it open.	
3. Mount the air spring hangers to the frame rail using 2 - 5/8”Ø bolts Gr.8 (or equivalent). **Note:** Ensure air spring hangers are pressed tight to bottom flange of the frame rail before tightening.	
4. Install the upper shock bracket to the frame rail using 2 – ¾”Ø bolts Gr.8 (or equivalent) **Note:** The design of the bracket may vary; refer to suspension kit drawing for clarifying details.	

Install the Trailing Arm

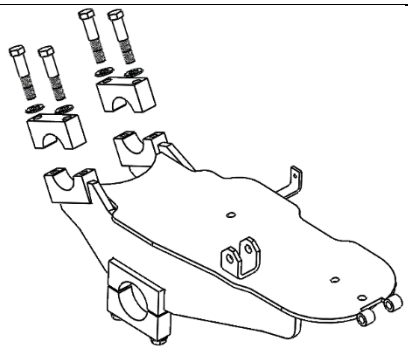
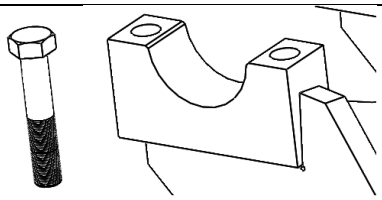
Required Components

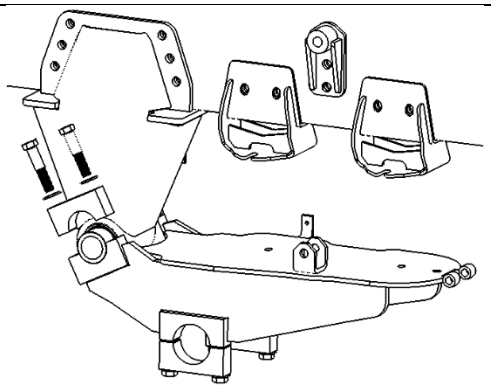
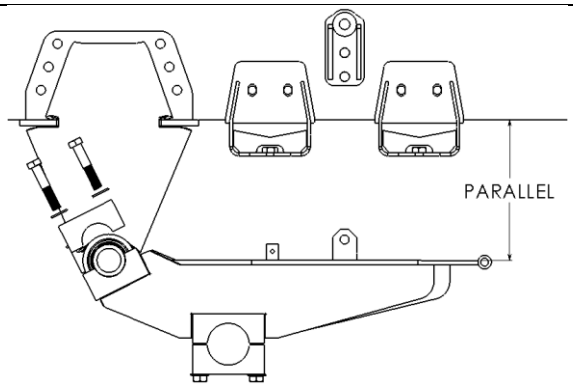
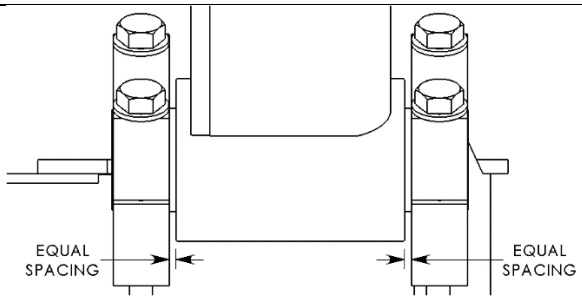
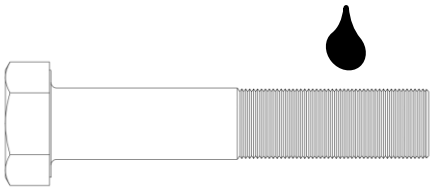
Description	Quantity	Image
Trailing Arm – Left Trailing Arm - Right (Link Supplied)	2	

Required Tools

- Torque wrench 250lb-ft minimum
- Socket (1-1/8")
- Wrench (1-1/8”)
- Tape measure
- Loctite 242 (Blue)

Procedure

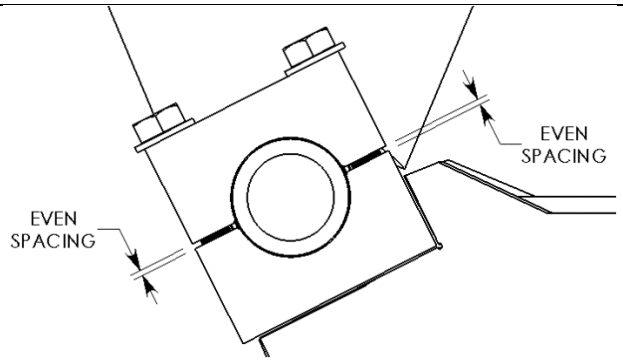
1. Dis-assemble the upper block set on each trailing arm.	
2. Use solvent to flush the threaded holes and bolts to remove any remaining anti-seize compound from the manufacturing process.	

3. Position each trailing arm by seating the upper block set onto the trailing arm hanger bushing. **Note:** Shock U-bracket on trailing arm should be to the outside of the frame rail.	
4. Set the top surface of the trailing arm to be parallel with the bottom flange of the frame. **Note:** This can be verified by measuring to the frame in two places or simply using a spacer to set the trailing arm to parallel (place between air spring hangers).	
5. Ensure the trailing arm spacing is centered on the hanger bushing. The bushing should be flush on the outside of each trailing arm block.	
6. Apply thread locking compound (Loctite 242) on bolts.	

7. Reinstall cap and bolt hardware to secure the trailing arm to the hanger.

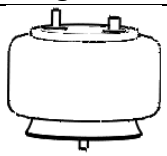
Caution: Ensure caps are tightened square so that the gaps are even across the bushing.

Torque specification: 250 ft-lb [271 Nm]



Install Air Spring

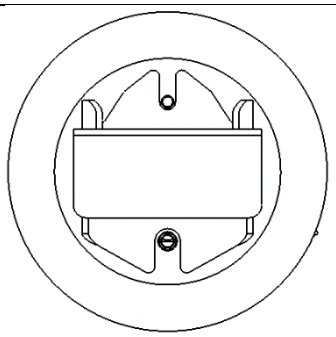
Required Components

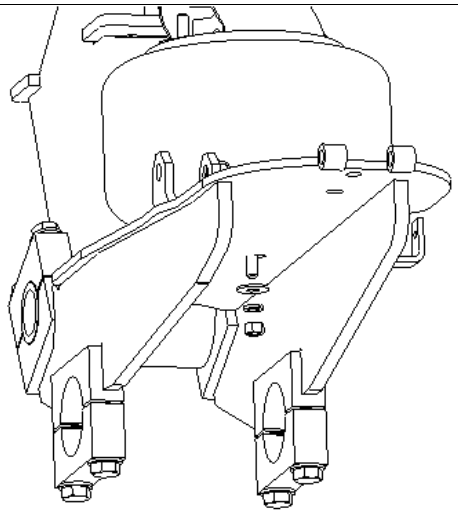
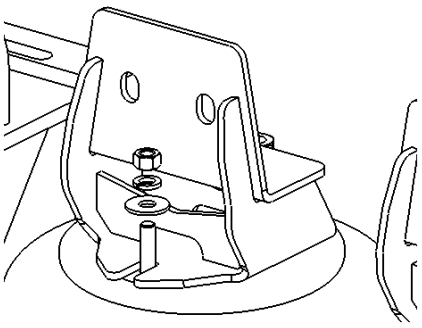
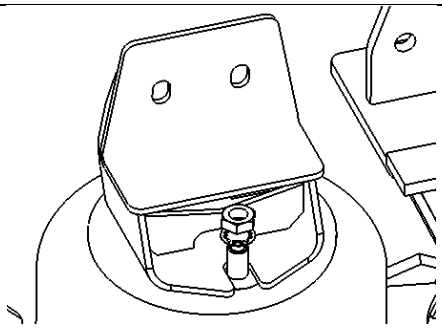
Description	Quantity	Image
Air Spring (Link Supplied)	4	
Lock Washer Ø1/2” (Link P/N: 201-01-100)	8	
Internal Tooth Washer Ø3/4" (Link P/N: 201-01-160)	4	
Jam Nut Ø3/4" UNF (Link P/N: 201-02-185)	4	
Flat Washer Ø1/2" SAE (Link P/N: 201-01-020)	8	
Hex Nut Ø1/2" UNC (Link P/N: 201-02-110)	8	

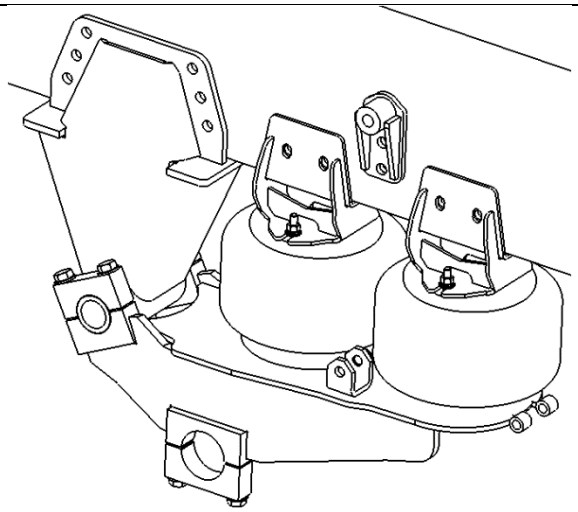
Required Tools

- Torque wrench 30lb-ft minimum
- Socket (3/4")
- Wrench (1 1/8")
- Wrench (3/4”)
- Ratchet wrench

Procedure

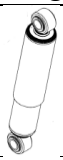
1. Place an air spring into the air spring hanger. Line up the air spring studs with the openings on the air hanger. Compress the air spring to fit between the trailing arm and air spring hanger. **Note:** Ensure alignment of the stud and combo air/stud to the appropriate slot in the air spring hanger. Refer to suspension drawing for details.	

2. Line up the stud on the base of the air bag with the corresponding opening on the trailing arm. Secure the bottom of the air spring to the trailing arm using the ½"Ø flat washer, lock washer and standard hex nut. ***Torque specification: 30 lb-ft [41 Nm]***	
3. Secure the air spring top stud to the air spring hangers, using the ½"Ø flat washer, lock washer and a standard hex nut. ***Torque specification: 30 lb-ft [41 Nm]***	
4. Secure the combo fitting to the air spring hangers with the internal tooth washer and the Ø3/4" jam nut. ***Torque specification: 30 lb-ft [41 Nm]***	

5. Repeat steps 1 through 4 to each of the four air springs. Secure into the suspension. **Note:** It is easiest to install the forward air springs first, then the rear based on the room in the suspension.	

Install the Shock

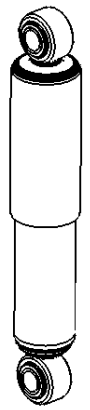
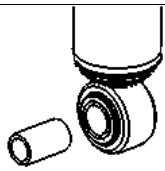
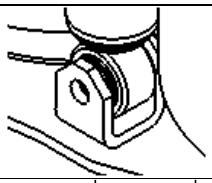
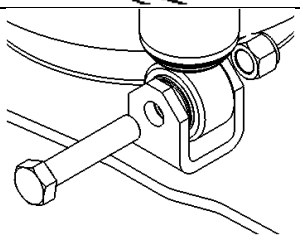
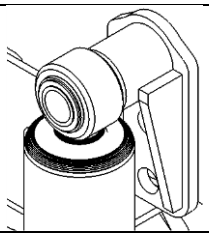
Required Components

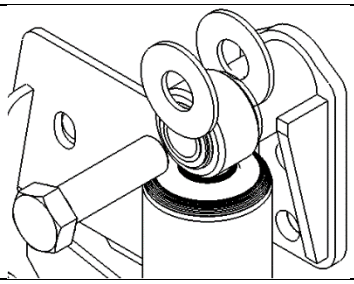
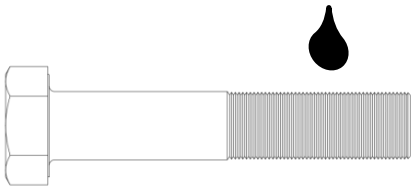
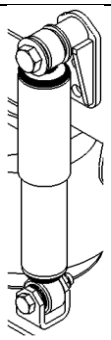
Description	Quantity	Image
Shock (Link P/N: 446-51-211)	2	
Shock Mount Bolt, Ø1" UNC X 3 ½" (Link P/N: 201-00-095)	2	
Shock Mount Washer, Ø1" USS flat (Link P/N: 201-01-015)	4	
Shock Mount Nut, Ø3/4" UNF Nylock (Link P/N: 201-02-250)	2	
Shock Mount Bolt, Ø3/4" UNF X 3 ½" (Link P/N: 201-00-230)	2	
Shock Spacer (Link P/N:311-80-136R00)	2	

Required Tools

- Torque wrench 250lb-ft minimum
- Socket (1 ½")
- Socket (1 1/8")
- Wrench (1 1/8")
- Ratchet wrench or Air impact gun
- Loctite 242 (Blue)

Procedure

1. Orient the shock so that the dust cover is on the top and open downwards.	
2. Press in the shock spacer into the lower shock eye. **Note:** This allows the lower eye to adapt to ¾" hardware.	
3. Install the lower shock eye in between the plates of the trailing arm shock mount bracket and line up the bores.	
4. Insert the ¾"Ø bolt through the shock bracket and install the ¾"Ø Nylock nut. **Caution:** Make sure bolt head is orientated to the outside of the suspension.	
5. Align the upper shock eye until the bolt lines up with the threaded hole in the frame mounted shock bracket.	

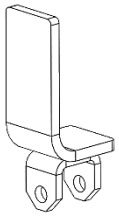
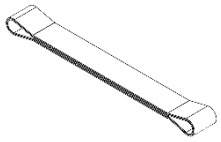
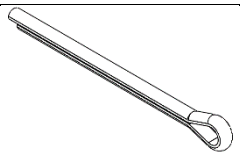
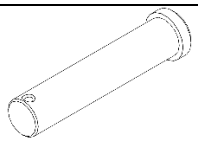
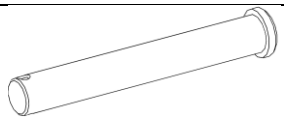
6. Install a 1”Ø flat washer on outside of the upper shock eye (or both side: See suspension layout).	
7. Apply thread locking compound (Loctite 242) on the bolt threads. Install the 1”Ø bolt through the flat washers and shock eye into the upper shock mount bracket on the frame.	
8. Install bolt until it is fully seated. Torque all hardware. ***1”Ø Torque specification: 200 lb-ft [271 Nm]*** ***¾”Ø Torque specification: 180 lb-ft [244 Nm]***	
9. Repeat steps 1 thru 8 on the opposite side of the suspension.	

Install Restraint Strap

Introduction

Restraint strap kits are offered for customers who are operating units which can raise the chassis off the ground using outriggers. In these cases, Link offers these straps to provide additional control of the jounce travel of the suspension. For all Air Link ™ suspensions, the shock is designed specifically to control the jounce travel. Refer to the suspension layout drawing and if a restraint strap is expected, please install as follows, otherwise proceed to the next section.

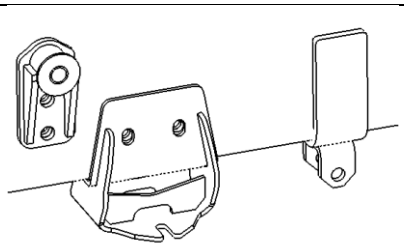
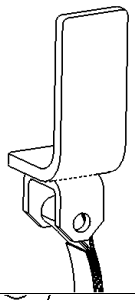
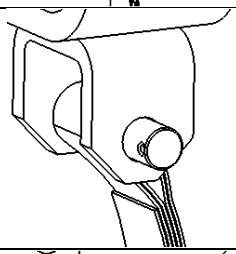
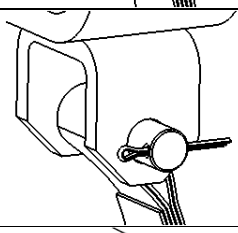
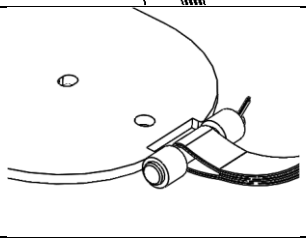
Required Components

Description	Quantity	
Restraint Strap Frame Bracket (Link Supplied)	2	
Restraint Strap (Link Supplied)	2	
Pin, Cotter (Ø1/8" X 1 3/4") (Link P/N: 201-04-020)	4	
Pin, Clevis, (Ø3/4" X 3 1/2") (Link P/N: 201-04-010)	2	
Pin, Clevis, (Ø5/8" X 4 1/2") (Link P/N: 201-04-012)	2	

Required Tools

- Pliers

Procedure

1. Mount the upper bracket to the frame in its designated hole position **Note:** The hole pattern varies depending on the customer.	
2. Position one eye of the restraint strap in between the “U” portion of the frame bracket. Line up the eye with the holes in the plate.	
3. Slide the Ø3/4” x 3-1/2” clevis pin through the bracket and restraint strap.	
4. Insert the cotter through the hole in the clevis pin. Then using the pliers, bend the longer end of the cotter pin 90°. Ensure the cotter pin will not back out of the hole.	
5. Position the other eye of the restraint strap in between the bosses on the trailing arm. Line up the eye with the holes in the bosses.	
6. Slide the Ø5/8” x 4-1/2” clevis pin through the bore and restraint strap.	
7. Secure the lower cotter pin as in Step 4.	
8. Repeat steps 1 – 7 for the restraint strap on the other side of the chassis.	

Install the Height Control Valve Linkage Rod

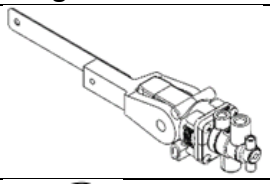
Introduction

The Air Link ™ suspension is a height control system. It uses dual height control valves to manage the suspension height for the left and right sides of the vehicle. Depending on the configuration of the chassis, the valves may be mounted from customer supplied brackets in the frame or mounted to integrated brackets on the Trailing Arm Hangers.

The installation below is for Link's standard valve kit. There are two options for securement hardware (pin connection or bolt connection). Both are shown below for reference. Both are acceptable methods and it will be customer preference and based on the suspension layout.

If the Air Link ™ suspension kit is not provided with a height control valve kit, then please refer to OEM literature for assembly and connection details.

Required Components (Height Control Valve)

Description	Quantity	Image
Height Control Valve (Link P/N: 203-02-025)	2	
Washer, Flat, SAE, Narrow, GR8 (Ø1/4") (Link P/N: 201-01-030)	8	
Nut, Hex, UNC, Nylock (Ø1/4") (Link P/N: 201-02-195)	4	
Bolt, Hex Head, GR5, UNC (Ø1/4" X 3") (Link P/N: 201-00-040)	4	

Required Tools

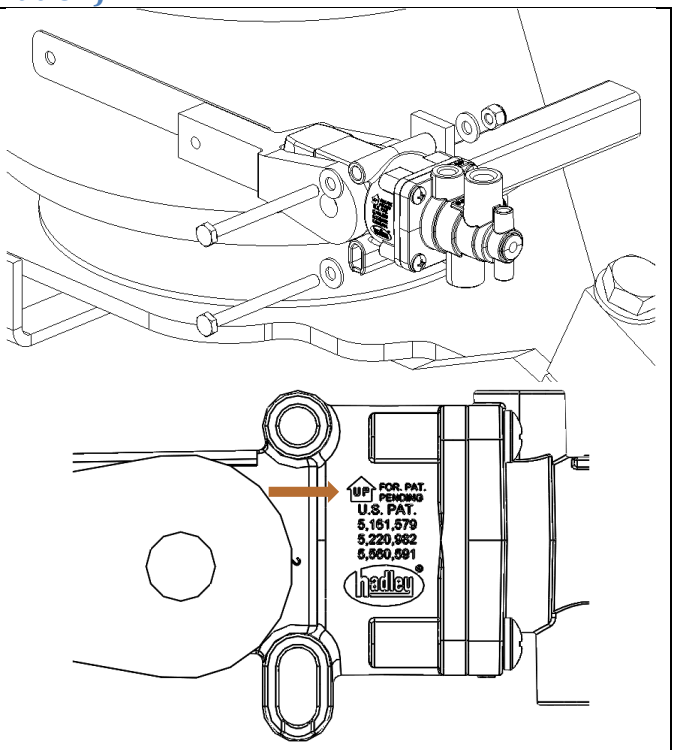
- Torque wrench 10in-lb minimum
- Socket (7/16")
- Wrench (7/16")
- Ratchet wrench
- Screwdriver - Flathead

Procedure (Height Control Valve Installation)

1. Install the height control valve (HCV) onto each trailing arm hanger using the ¼”Ø bolt, flat washer (2X) and the Nylock nut.

Torque specification: 5-6 ft-lb [7-8 Nm]

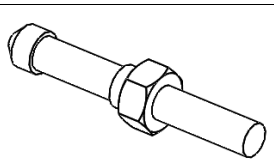
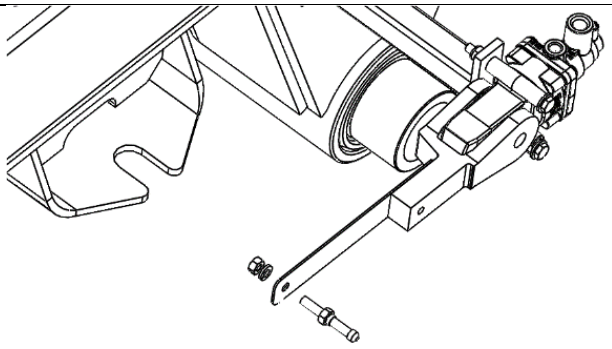
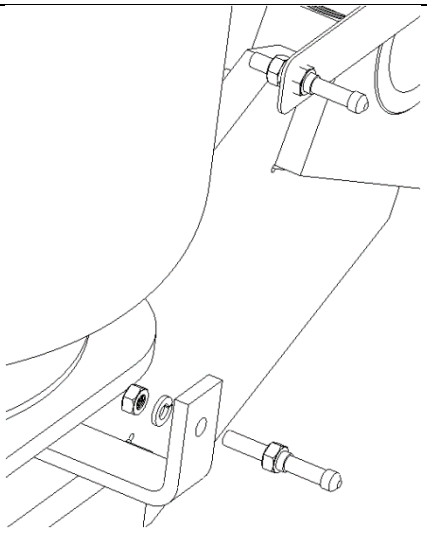
Caution: Pay attention to the “UP” direction on the HCV and the orientation to the suspension.

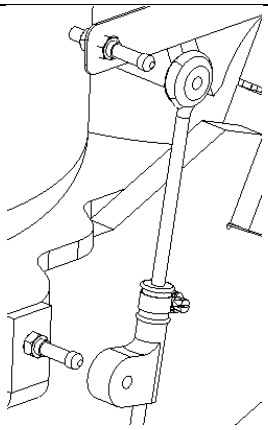
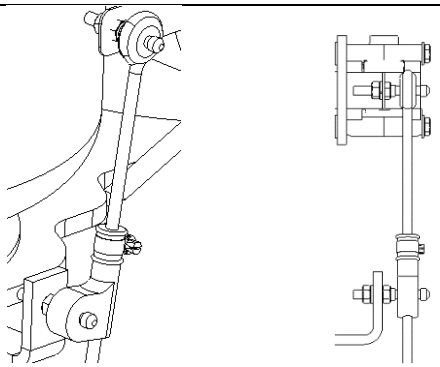
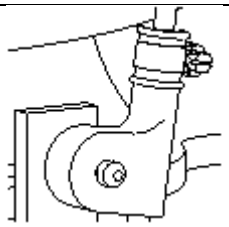


Required Components (Pin Connection)

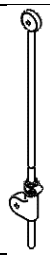
Description	Quantity	Image
HCV Linkage Rod	2	
Stud, Straight (1/4-20 UNC-2A)	4	
Nut, Hex, Gr8 (1/4-20 UNC-2A)	8	
Washer, Lock, SAE (Ø1/4")	4	

Procedure (Pin Connection)

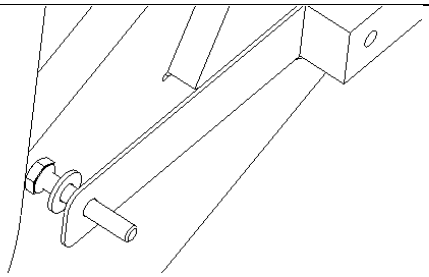
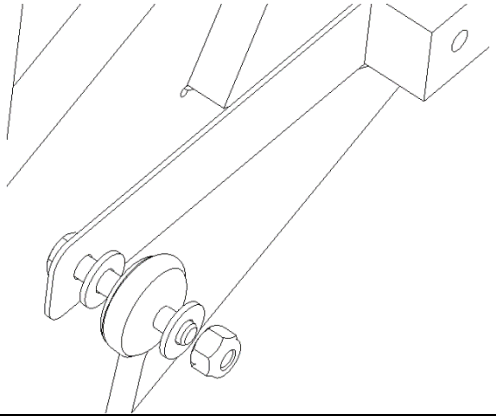
1. Install a ¼" nut onto the pin. Fully seat the nut against the shoulder of the pin.	
2. Install the pin through the HCV arm. Install a lock washer and nut to retain the pin on the HCV arm. **Note:** Orientation of the pin may vary. Check the suspension layout drawing to verify orientation. The pin orientation should allow the linkage rod to be vertical. ***Torque specification: 60-72 in-lb [7-8 Nm]***	
3. Install the pin through the trailing arm bracket. Install a lock washer and nut to retain the pin on the trailing beam. **Note:** Orientation of the pin may vary. Check the suspension layout drawing to verify orientation. The pin orientation should allow the linkage rod to be vertical. ***Torque specification: 60-72 in-lb [7-8 Nm]***	
4. Loosen the clamp on the p-boot which secures it to the HCV linkage rod.	

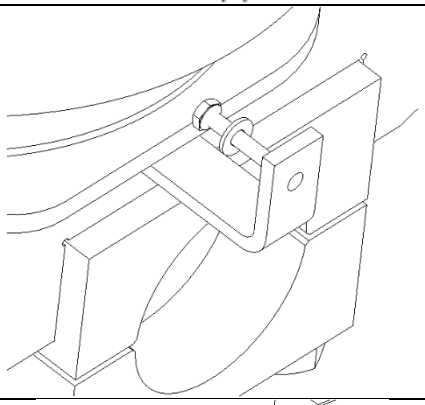
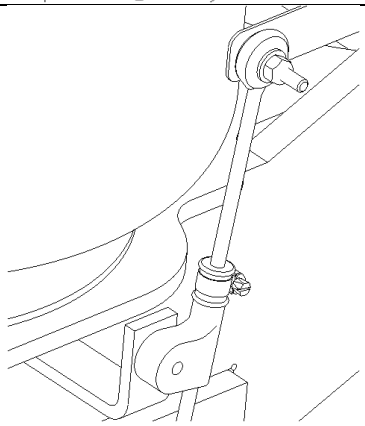
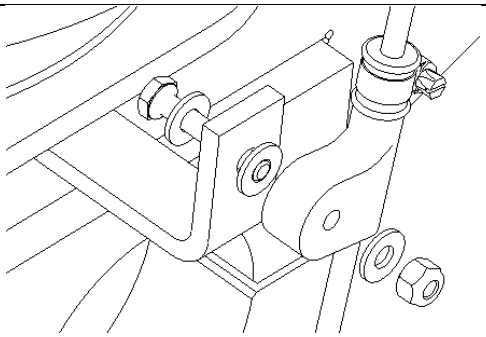
5. Set height of rod so upper and lower holes align with the pins. **Note:** The linkage rod length should be set when the trailing arm and the HCV arm are parallel to the frame rail bottom flange. This will be a close initial setting for the HCV to maintain the design ride height.	
6. Press the linkage grommets onto the pins until fully seated past the end knob.	
7. Tighten the clamp on the p-boot at this length until final ride height is set.	
8. Repeat step 1-7 for the opposite side of the suspension.	

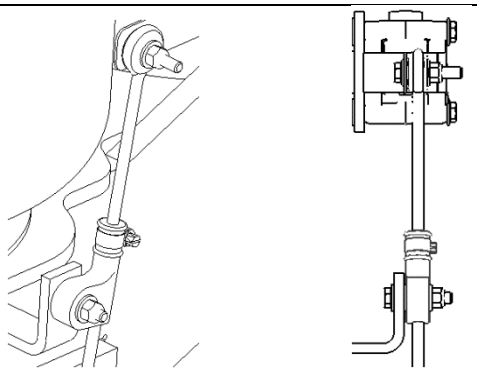
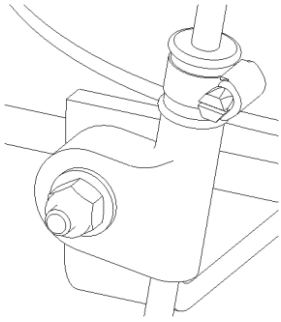
Required Components (Bolt Connection)

Description	Quantity	Image
HCV Linkage Rod	2	
Bolt 1/4Ø UNC X 1-1/2”	4	
Nut, Hex, Nylock, 1/4Ø UNC	4	
Washer, Flat, SAE, Narrow, GR8 (Ø1/4") (Link P/N: 201-01-030)	8	

Procedure (Bolt Connection)

1. Install a ¼”Ø bolt and washer through the HCV arm. **Note:** Orientation of the bolt may vary. Check the suspension layout drawing to verify orientation. The connection should make the rod vertical.	
2. Install one washer on the opposite side of the HCV arm onto the bolt. Slide the rubber eyelet end of the linkage rod onto the bolt. Install a washer and the Nylock nut. ***Torque specification: 5-10 in-lb [1 Nm]*** **Caution:** The bolt should only be tightened to remove the play in the connection while still allowing the grommet to rotate on the bolt.	

3. Loosen the clamp on the P-boot on the HCV linkage rod.	
4. Install a ¼”Ø bolt and washer through the trailing arm bracket. **Note:** Orientation of the bolt may vary. Check the suspension layout drawing to verify orientation.	
5. Align the P-boot up or down the linkage rod until it lines up with the bolt in the trailing arm bracket. **Note:** The linkage rod length should be set when the trailing arm and the HCV arm are parallel to the frame rail bottom flange. This will be a close initial setting for the HCV to maintain the design ride height.	
6. Install the bolt with one washer, then the bracket, a second washer, the P-boot, a third washer and finally the nylok nut to secure this connection. ***Torque specification: 5-10 in-lb [1 Nm]*** **Caution:** The bolt should only be tightened to remove the play in the connection while still allowing the grommet to rotate on the bolt.	

7. Ensure linkage rod, rubber grommet and the rubber boot are free to rotate and move. **Warning:** Over tightening of this hardware will cause the HCV grommets and P-boots to wear prematurely.	
8. Tighten the clamp on the P-boot until final ride height is set.	
9. Repeat steps 1-8 for the opposite side of the suspension.	

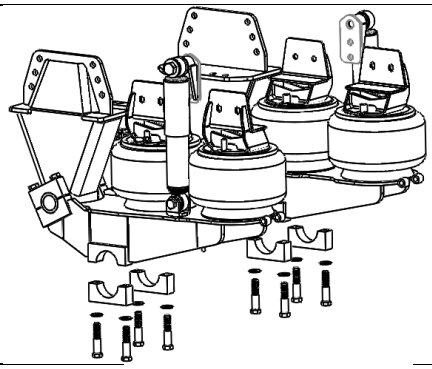
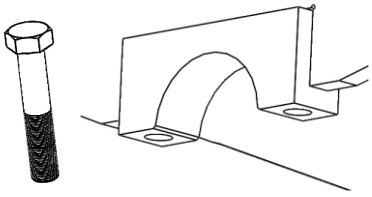
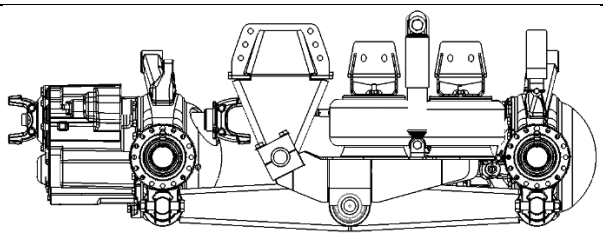
Install the Walking Beam/Axle Assembly to the Trailing Arms

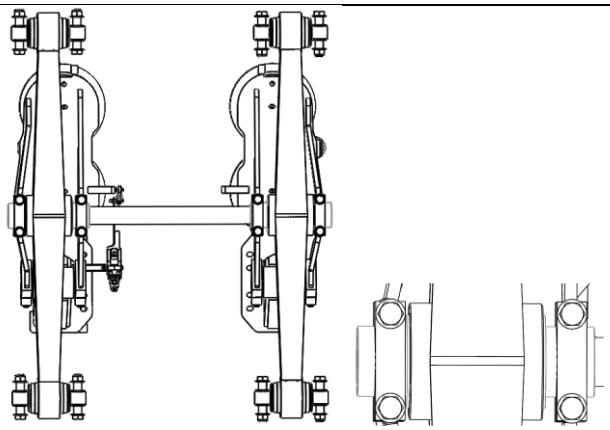
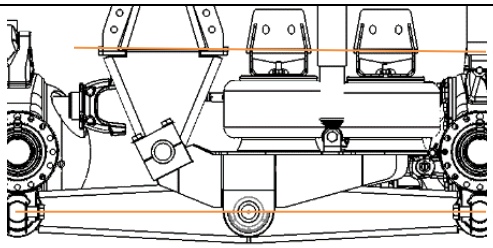
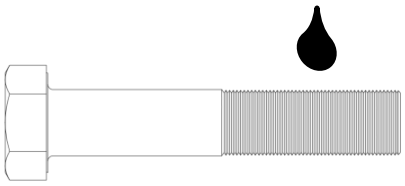
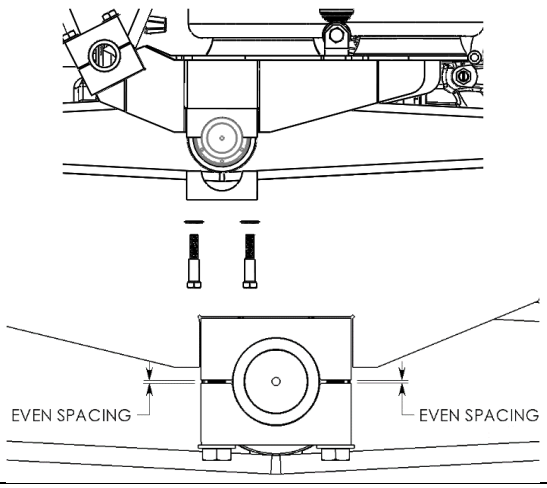
The overall assembly of the suspension to the chassis will be OEM dependent based on systems used at each facility. We have found that the walking beam and axles are an convenient sub-assembly module that needs to be mated properly to the upper portion of the suspension assembly and these details are outlined below.

Required Tools

- Torque wrench 250lb-ft minimum
- Socket (15/16")
- Wrench (15/16”)
- Tape measure
- Hammer (Mallet)
- Loctite 242 (Blue)

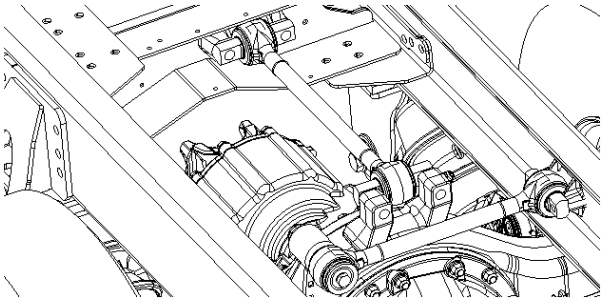
Procedure

1. Remove the lower block set caps and hardware on each trailing arm (4 caps and 8 bolts total).	
2. Use solvent to flush the threaded holes and bolts to remove any remaining anti-seize compound from the component manufacturing process.	
3. Position the walking beam/axle assembly underneath the trailing arms. Line up the walking beam center bushings into the lower block set of the trailing arms. **Warning:** Be careful of pinch/crush points that can damage components and injure technicians.	

4. Verify that the axles are centered to the frame. **Caution:** The walking beams should have gaps that are symmetrical about the centerline of the chassis to center the axles. (Gap on outside of right trailing arm should equal gap on outside of left trailing arm and gap for inside left will equal gap on inside right) **Note:** The walking beam center bushings will not be centered between the trailing arm lower blocks, which is anticipated and acceptable.	
5. Ensure the walking beams are parallel to the frame (with the trailing arms parallel) before securing the caps on the center bushing.	
6. Apply thread locking compound (Loctite 242 blue) on cap bolt threads.	
7. Reinstall the lower block set cap and hardware on each trailing arm. Torque the hardware. (4 caps, 8 bolts) **Note:** Ensure caps are tightened square so that the gaps are even across the bushing. Tighten the bolts back and forth until full torque to keep the gap even. ***Torque specification: 250 ft-lb [271 Nm]***	

Install Control Rod Components

The Air Link™ suspension system requires control rods to secure the axles in position to the frame. Each axle must have a lateral and longitudinal control rod. The longitudinal control rods will control the pinion angle of each axle. Both longitudinal control rods are mounted to the center cross member of the suspension (part of the OEM frame).



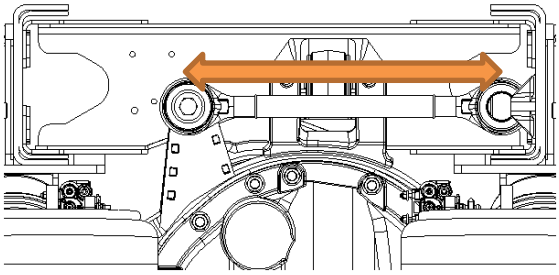
The lateral control rods maintain the position of the axle in the frame and contribute to the roll stability of the Air Link™ suspension system. The control rods from the axles extend from the tower on the axle to the frame rail and will be the same size for both axles.

Link does offer control rods for customers and some OEMs have organized their own solution. In all cases, Link is willing to work with each OEM to ensure that these control rods are configured to provide an optimum configuration for the Air Link™ suspension. When these rods are OEM designed and supplied, Link strongly recommends following the design guidelines below:

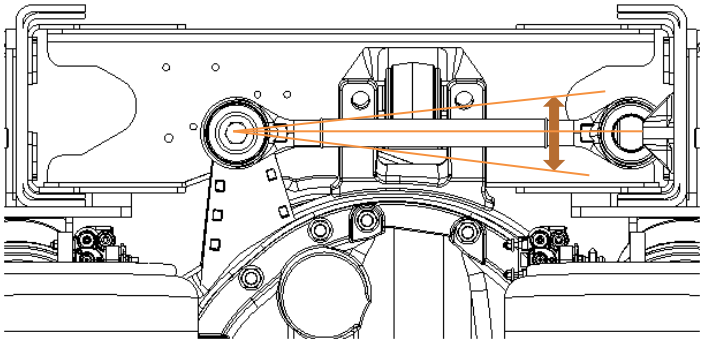
1. The length of the control rods must allow for some adjustment shims in order to fine tune the position of the axle in the frame (lateral) and the pinion angle (longitudinal).

2. The lateral control rod should be made as long as possible within the constraints of the frame and axle tower but should be a minimum of 20” from center to center.

   Note: The longer that the lateral control rod can be made, the less lateral forces will be exerted on the suspension during the articulation of the axles.



3. The lateral control rod must be configured to be horizontal when the suspension is at ride height (±5°). This will also minimize the lateral forces induced into the suspension by the lateral control rod during full articulation.



4. In the case of rubber bushed control rods, the installation of the rods should be done to avoid any preload on those end bushings. The hole pattern for mounting the straddle end to the frame should match the expected pinion angle on the axle.

5. The lateral control rods are expected to mount from the axles to opposite frame rails from the tandem group. (eg, the forward drive axle lateral control rod will mount to the driver side frame rail, and the rear drive axle lateral control rod will mount to the passenger side frame rail). The configuration of the drive axles will typically force this design setup with the mounting of the towers and this is the preferred configuration of the towers.

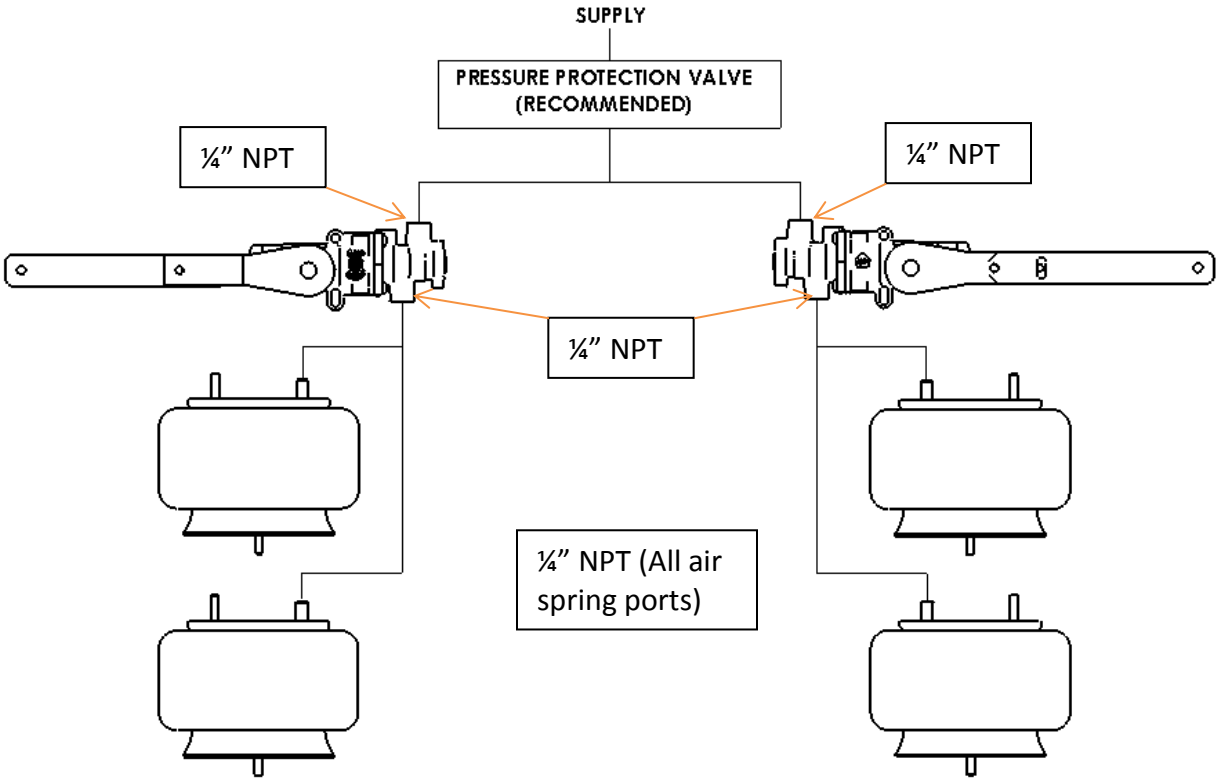
The Air Link™ suspension system can also be configured with V-Rod control rod designs. Please contact Link to review and provide design feedback for any special OEM configuration request.

Plumbing the Air System

The Suspension air system is relatively simple in application. The Air Link™ suspension system is a height controlled suspension and will adjust the air pressure in the air springs to maintain the design ride height based on the load applied.

The Air Link™ suspension must be plumbed with DUAL height control valves and each valve controls one side of the suspension (the side on which the valve is mounted). Therefore, the valve on the one side of the chassis will only control the air springs on that side.

The fittings and air line selection will depend on the preferred plumbing technologies used by each OEM. The general schematic with port sizing is below:



SECTION 4: SUSPENSION FINAL SETUP

With the suspension fully assembled to the chassis, the vehicle will need to be completed with a body to then finalize the suspension setup prior to being released into the field.

For optimum performance, the suspension needs to operate at the design ride height that was requested and approved.

Warning: Changes to the ride height of the suspension cannot be done through simply adjusting the air spring ride height. This will put the Air Link™ outside of its optimum parameters and may result in a poor handling or premature wear of components. Please contact Link if a ride height change is needed on any chassis after the suspension is installed so that we can assist in finding the best resolution.

The suspension ride height sets the position for the control rods and the alignment therefore it must be set first before any other adjustments are made. See Appendix B for a work instruction to complete a ride height adjustment for the Air Link™ suspension system.

Once the ride height has been properly set, the alignment will need to be checked and if found that it needs to be adjusted, Appendix C includes a work instruction for completing this final step of the suspension setup.

With the suspension correctly installed using the steps above and then properly setup as the vehicle is put into service by following the two additional work instructions provided in the appendices, the Air Link™ will be configured in a way to offer the customer the best possible experience.

If there are any questions with any of these instructions, Link is prepared to assist in answering questions and offering additional training to further support our product. Please reach out to us for any help if needed.

APPENDIX A: TORQUE SUMMARY TABLE

Location Description	Size	Torque, lb.ft. [Nm] DRY
Trailing arm blocks*	Ø3/4" UNF Socket head cap screw	250 [339]
Walking beam bar pin bushing	Ø 1" UNC bolt	450 [610]
Shock upper bolt	Ø 1" UNC x 3 ½" Hex head bolt (Loctite coated)	200-250 [271-389]
Shock lower mount	Ø3/4" UNC X 3 ½" Hex head bolt	180-200 [244-271]
Air spring lower bolts	Ø1/2" UNC X 1 ½" Hex head bolt	25-30 [34-41]
Air spring top stud mount nut	Ø1/2" UNC Hex nut	25-30 [34-41]
Air spring top combo stud jam nut	Ø3/4" UNF Jam nut	25-30 [34-41]

Location Description	Size	Torque, in-ft. [Nm]
HCV mounting bolts	Ø1/4" UNC bolt	80-100 [9-11]
HCV arm to linkage rod	Ø1/4" UNC bolt	5-10 [1-2]
Linkage rod boot to L-bracket	Ø1/4" UNC bolt	5-10 [1-2]

APPENDIX B:

AIR LINK RIDE HEIGHT ADJUSTEMENT WORK INSTRUCTION

I. PURPOSE

The purpose of this document is to provide a detailed work instruction on setting or adjusting the ride height of the Air Link rear suspension.

II. SCOPE

This work instruction is provided for information only. It is expected that all work will be performed by qualified technicians, using appropriate industry safety standards. In all cases, safety must be at the fore front when working through this installation process.

The information hereon in, refers to Link supplied height control valves. Set-up and adjustment will vary from different height control valve manufacturers. Please refer to the instructions specific to your height control valve.

The Technician is responsible for all necessary safety precautions:

- Always wear proper personal protective equipment.
- Never work alone.
- Carefully read and understand the work instructions prior to commencing work.

III. TOOLS REQUIRED

The following tools are required:

- Flathead screwdriver socket
- 7/16” socket
- 7/16” open end wrench
- Torque wrench 5 in-lbs. minimum

IV. ADJUSTMENT/SETTING RIDE HEIGHT INSTRUCTIONS

1. Park the vehicle on a flat and level ground.

   Note: Chassis needs to be brought in to the measuring area with a soft stop to avoid winding up the suspension and changing the ride height.

   Note: Place additional weight on the chassis to overcome the torsional resistance in the bushing. (Especially when new).

2. Ensure the suspension air system will dump and inflate the air bags.

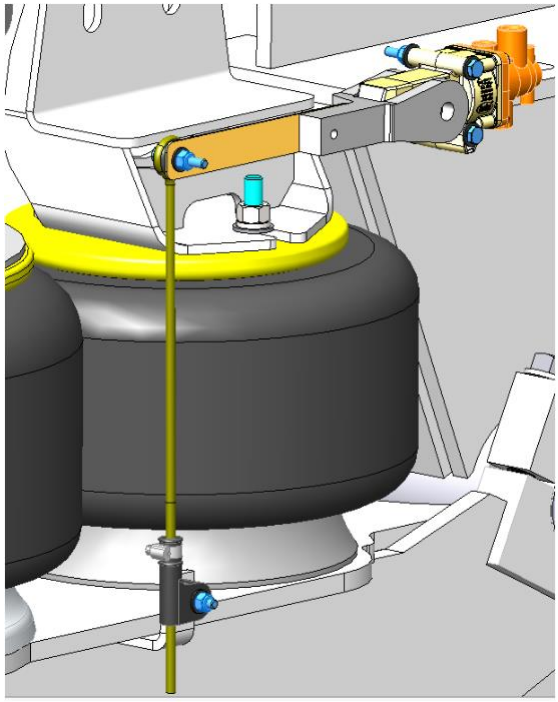
3. Ensure all ¼" hardware for the height control valves mounting and rod linkages are torqued to specification before starting.

   Torque specification: 5-10 in-lb [1 Nm] – Rod linkage hardware. (Bolt style).

   Torque specification: 5-10 in-lb [1 Nm] – Rod linkage hardware. (Stud style).

   Torque specification: 80-100 in-lb [9-11 Nm] – HCV mounting hardware.

   Note: Initial HCV setting is typically done during assembly while putting a block of correct length to square the trailing arm to the frame and give an initial length to the rod based on the position of the HCV.



4. Measure both trailing arms to determine the current ride height setting for both sides of the suspension.

   Note: The trailing arms should be parallel to the bottom flange of the frame rail. This is the ideal position and defines the design ride height of the suspension. There are two typical methods for measuring this setting.

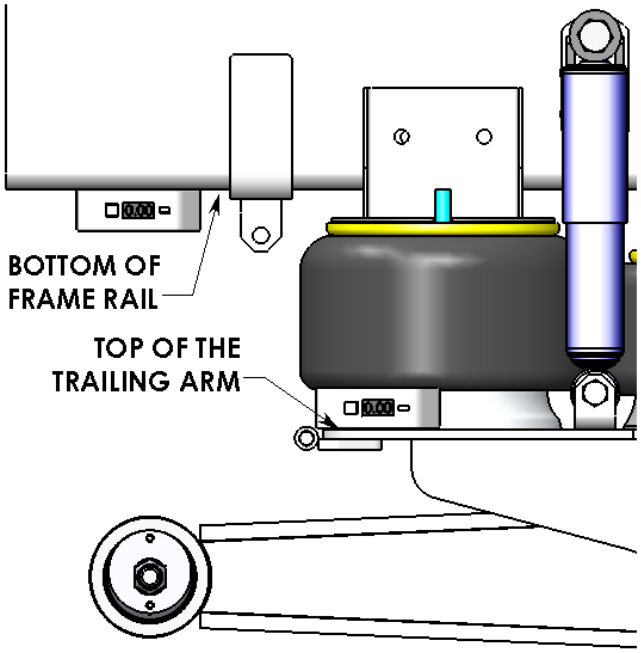
Option 1 - Digital Level

(a) Place a digital level on a clean section of the bottom flange of the chassis frame rail near the suspension.

(b) Record this angle or zero out the angle finder.

(c) Place the digital level on the trailing arm in a location while keeping the level in line with the rail.

Compare bottom flange of frame to trailing arm surfaces.
The **maximum** difference between the two surfaces should be ±0.75°.



Option 2 – Tape Measure

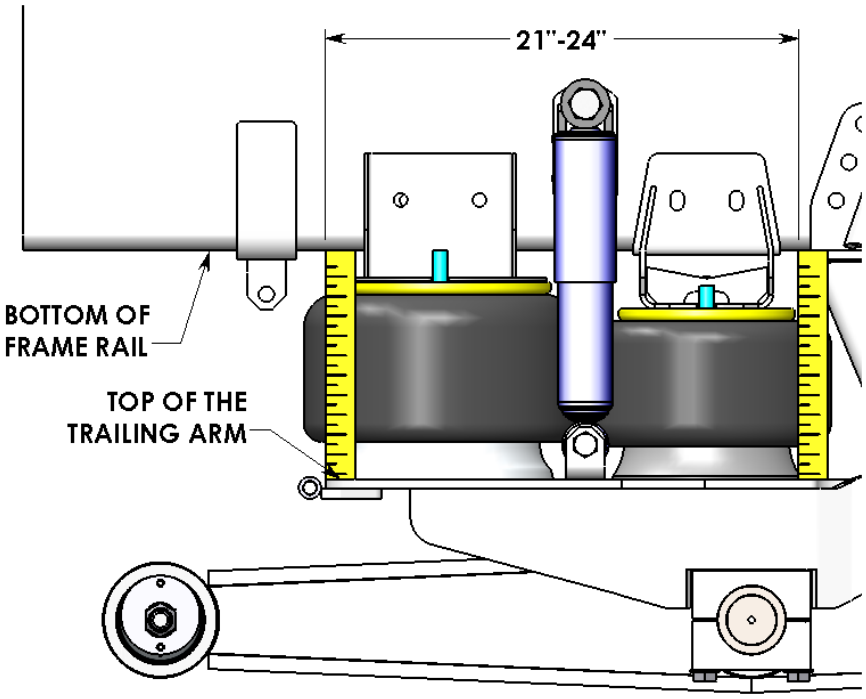
(a) Use a straight edge (if needed) and a tape measure to measure the height from the bottom flange of the frame rail to the top surface of the trailing arm near the front hanger (ahead of the air springs).

(b) Record this measurement.

(c) Measure from the frame of the top surface of the trailing arm at the back, behind the second air spring.

(d) Subtract the two measurements from one another.

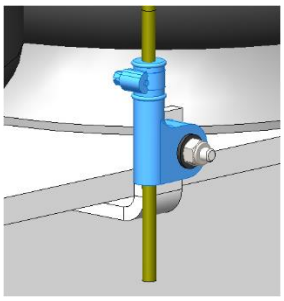
Measure ahead of air springs and behind air springs.
The distance between measurements should be 21-24” apart.
The **maximum** difference between the two measurements should be ±5/32”.



5. Start on the side with the largest variance that is out of specification. if the angle or measurement if greater than the tolerance in step 4. If within tolerance, proceed to step 10.

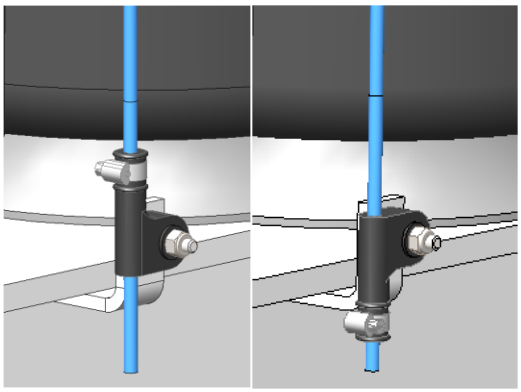
   Note: If the measurements are within the allowable tolerance the ride height is correctly set.

6. Use screwdriver to loosen clamp on P-bolt.

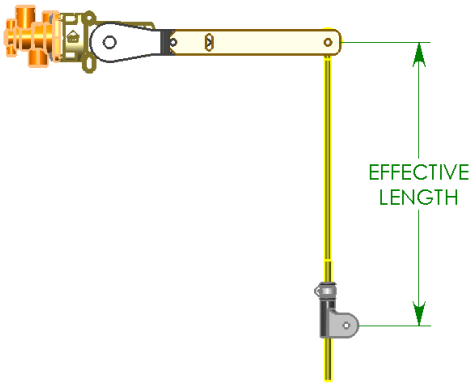


7. Adjust the rod through the P-boot.

   Note: Orientation of the P-boot is not critical (can be upside down). The key is to ensure that there is rod sticking through the entire length.



Note: Shorten the effective length to lower the ride height.
Increase the effective length to raise the ride height.



8. Retighten clamp.

   Torque specification: 5-10 in-lb [1 Nm]

   Note: Only minor adjustments are needed, no air has to hiss out (or in) to make a change.

9. Dump the suspension air system, then re-inflate to have the suspension reset to the new HCV rod length setting.

   Note: Alternatively drive the chassis over some bumps to articulate the HCV and suspension to reset it to the new setting.

10. Remeasure and confirm this side is within tolerance.
    - If within tolerance, proceed to step 11.
    - If out of tolerance, readjust using step 6 – 10 adjusting and resetting the suspension to achieve the correct ride height.

11. Measure the second side of the Air Link® suspension.

12. Repeat steps 6 - 10 for the second side of the Air Link® suspension, then proceed to step 13.

13. Recheck the first side of the Air Link suspension.
    - The HCV's are affecting two halves of the same system, so will be affected by one another.

14. Adjust the first side again as necessary.

V. REVISION HISTORY

Revision	Date	Details
0	10/05/2017	Initial release.
1	11/26/2018	Revise entire document

APPENDIX C:

AIR LINK ALIGNMENT WORK INSTRUCTION

I. PURPOSE

This publication is intended for vehicles equipped with Air Link® suspension that have walking beams with a bar pin end connection. Proper axle and wheel alignment will provide prolonged tire life, decreased maintenance on the suspension and driveline components and improved fuel economy. This document is to be used in conjunction with OEM guidelines for preferred thrust angles.

II. SCOPE

This work instruction is provided for information only. It is expected that all work will be performed by qualified technicians, using appropriate industry safety standards. In all cases, safety must be at the fore front when working through this installation process.

The assembler is responsible for all necessary safety precautions:

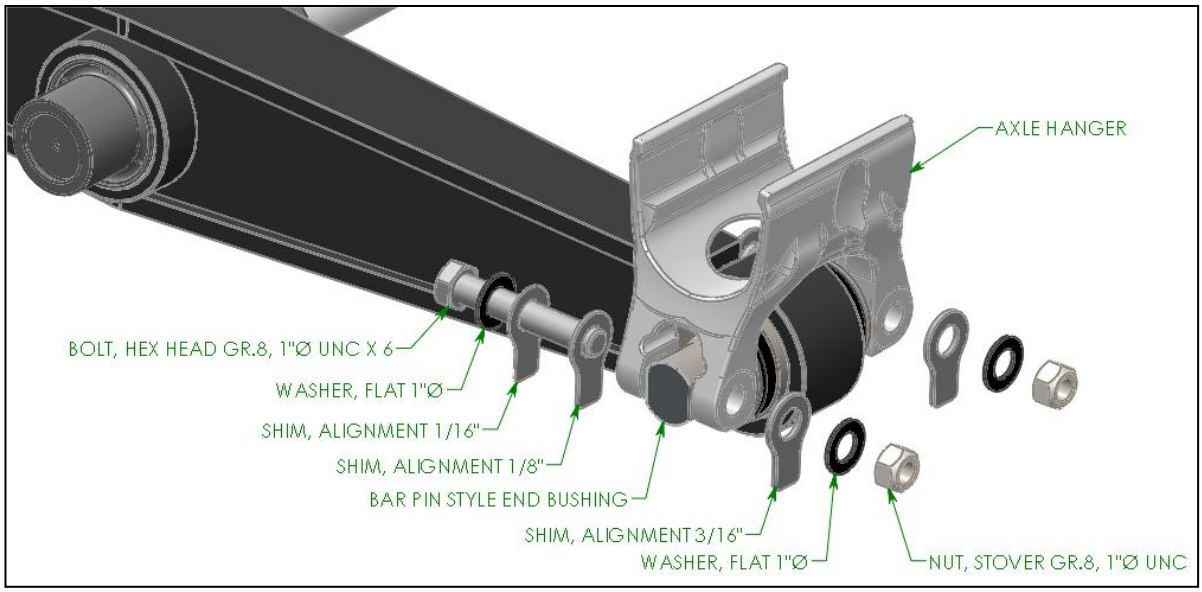
- Always wear proper personal protective equipment
- Never work alone
- Carefully read and understand the work instructions prior to commencing work
- Do not modify or substitute components. Failure may occur and cause personal injury and/or property damage

III. TOOLS REQUIRED

The following tools are required:

- Measuring tape
- 1-5/8” Open end box wrench
- 1-5/8” Socket
- Ratchet
- Torque wrench 450 ft-lbs. minimum
- Pliers
- Mallet
- Centering punch

IV. BAR PIN ASSEMBLY OVERVIEW



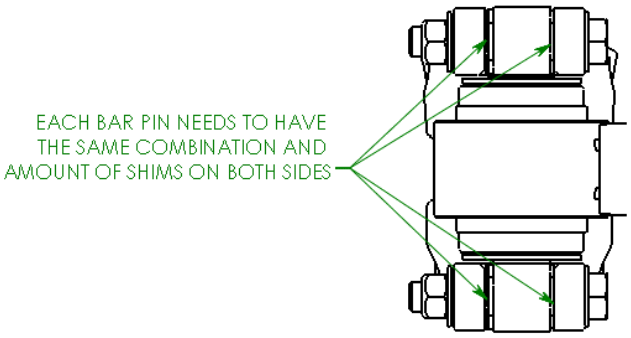
Link's walking beam bar pin end bushings are supplied with the following hardware:

- 201-05-118 - Shim, Alignment, 1/16" (1.5mm)
- 201-05-119 - Shim, Alignment, 1/8" (3.5mm)
- 201-05-120 - Shim, Alignment, 3/16" (5mm)
- 201-00-080 – Bolt, Hex Head, Gr.8, 1" Ø-UNC x 6"
- 201-02-015 – Nut, Hex, Stover, Gr.C, 1" Ø-UNC
- 201-01-075 – Washer, Flat, SAE, 1" Ø

Alignment shims fill the 3/8" gap between the bar pin and axle hanger and permit the axles/wheels to be aligned relative to the centerline of the vehicle.

CAUTION: All shims must be installed at each bolt location between the hanger and the bushing to ensure a tight clamp connection.

CAUTION: The same orientation of shims must be used on both the inside and outside of each bushing to prevent abnormal loading of the bushing.

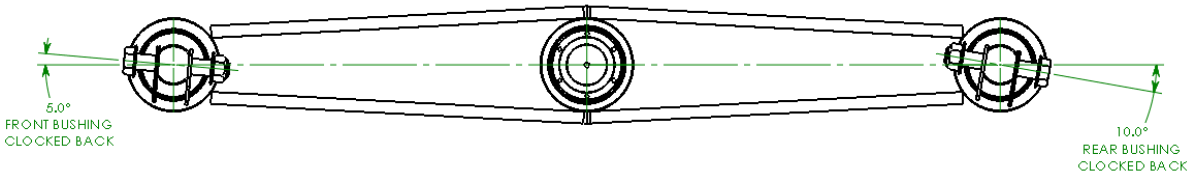


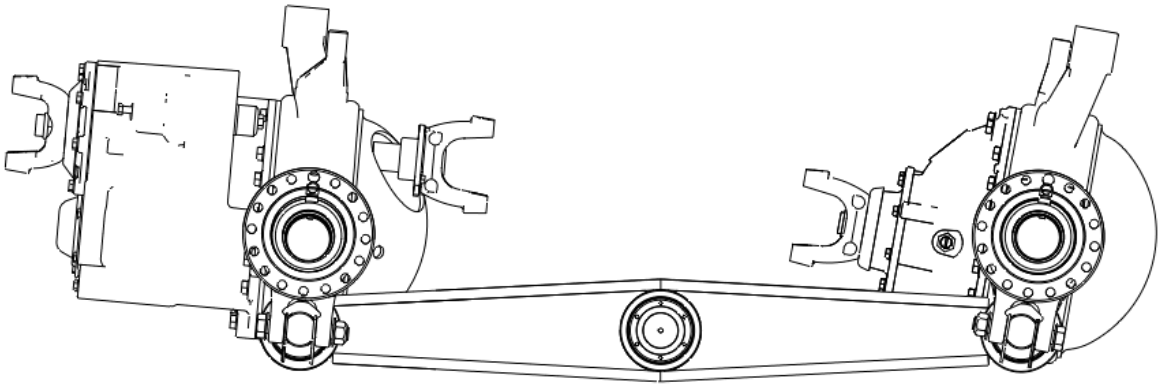
V. INITIAL ASSEMBLY

1. Remove hardware from bushing, including shims.

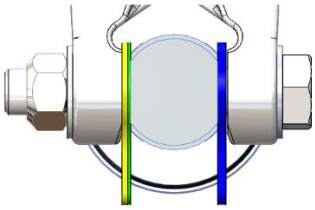
2. Align bushing with axle hanger on drive axles and square bar pin mounting holes to hanger holes.

   Note: Some walking beam bushings will come preset at an angle to match the final pinion angle of the axle for driveline purposes. The squaring of the hanger helps ensure that all the shims will fit into place.



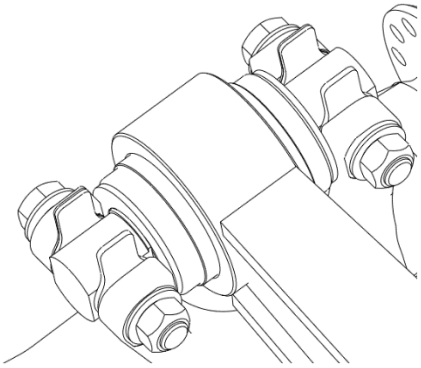


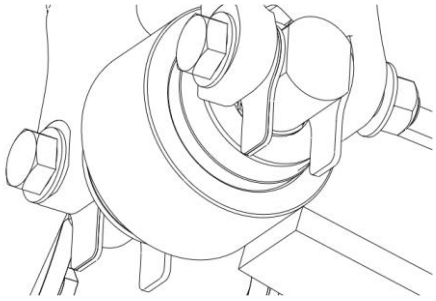
3. Set all axle hangers to the walking beam with neutral shim set-up (3/16” thick shim on one side, 1/8” & 1/16” shims on the other).



Note: When getting the shims in place it is useful to save the 1/8” shim till last. The tendancy would be to work down in size but the tight fit may make it difficult to get the last shim in and the 1/16” thick shim will tend to bend when some force is needed to get it into place.

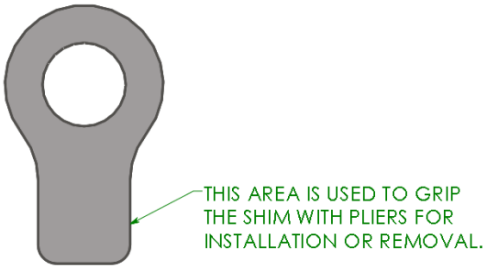
4. Place bolt through hanger and bushing using washers and nut. Make sure to orient bolts in the same direction.





5. Tighten bolts to eliminate any play, but do not torque until wheel alignment.

6. Finish initial set-up with all 4 corners of the suspension.



VI. ALIGNMENT PROCEDURE

1. Ensure vehicle is on a level floor and ride height is correctly set. (*Refer to Link Work Instruction LWI-053: Rear Suspension Ride Height Adjustment).*

2. Measure the thrust angle of each axle relative to the vehicle's centerline.

3. Record measurements.

   Note: How this is done will depend on each machine used.

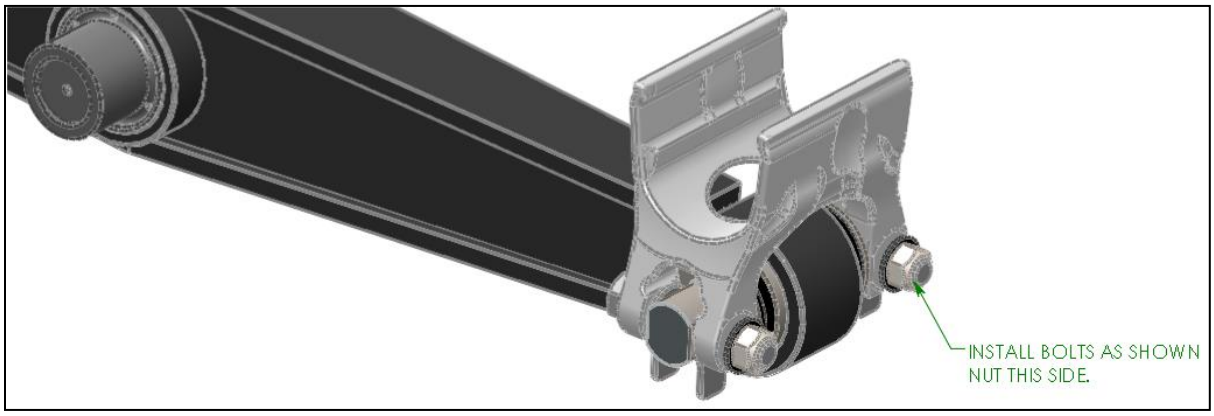
4. Compare readings to accepted OEM guidelines for proper wheel alignment.

5. Adjust shims as needed to achieve desired results.

   Note: The shims can be adjusted in various configurations to achieve 1/16" minimum variances between 3/8" fully forward to 3/8" fully rearward. See table on page 7 & 8 for shim placement and resultant thrust angle change.

   CAUTION: Shims must be set the same for the bolt on the inside and outside of the same bushing, but they can be different for each bushing in the suspension (4 total).

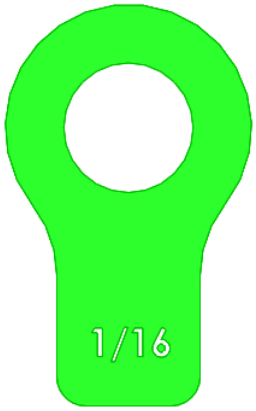
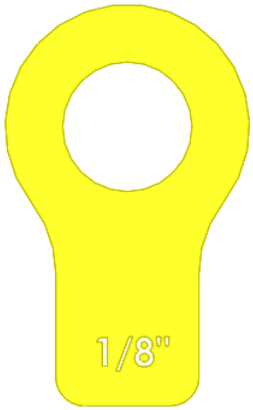
6. Tighten clamping hardware.



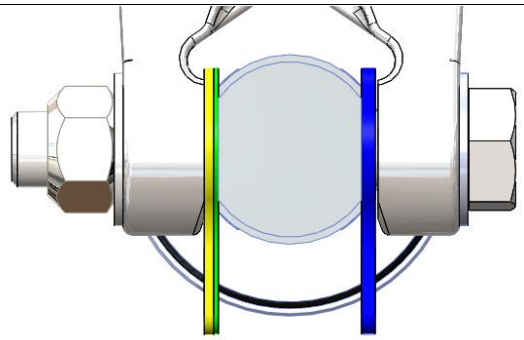
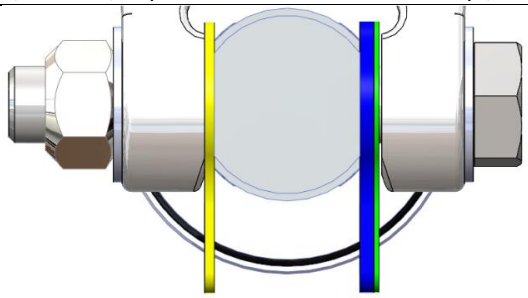
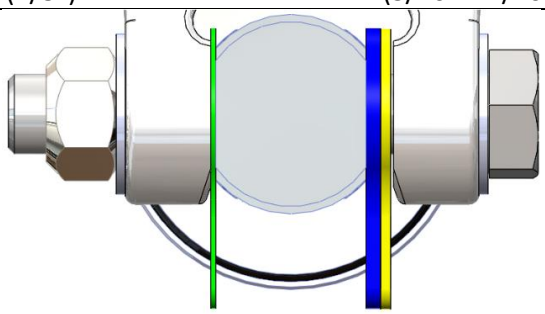
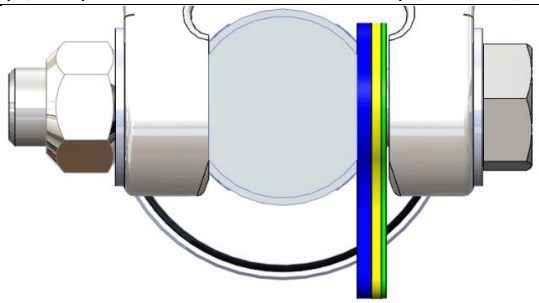
7. Torque bar pin bolts to 450 ft-lbs.(615Nm) with no lubrication.

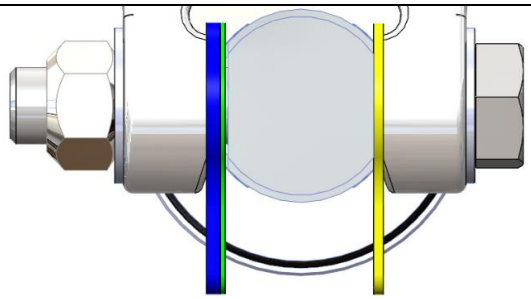
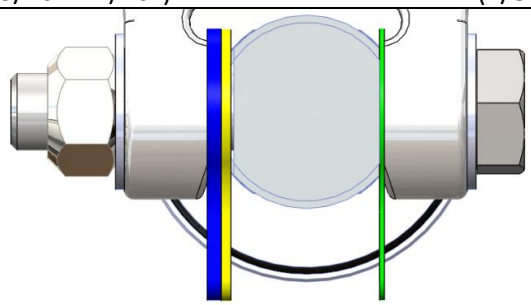
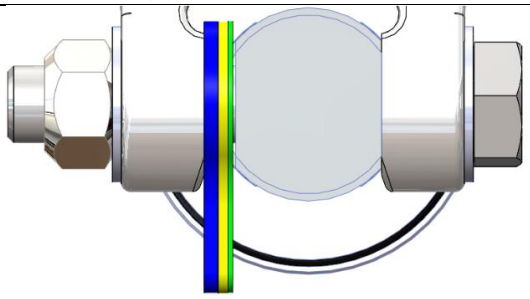
VII. ALIGNMENT TABLE

The following table is to be used as a reference during the alignment process to enable effective adjustment to the final thrust angle with the minimum number of tries. The front of the vehicle is to the left in the diagrams.

THIN (1/16”)	MED (1/8”)	THICK (3/16”)
		

Note: The shims are colored in this document for illustrative purposes. Actual shims are all galvanized and look the same to each other.

SHIM PLACEMENT	CORNER MOVEMENT	THRUST ANGLE X (DEG)	THRUST ANGLE X (IN)*
 (1/16” + 1/8”) (3/16”)	0 NEUTRAL	0°	0”
 (1/8”) (3/16” + 1/16”)	1/16 REARWARD	0.1°	0.436”
 (1/16”) (3/16” + 1/8”)	1/8 REARWARD	0.2°	0.873”
 (NO SHIMS) (ALL THREE)	3/16 REARWARD	0.3°	1.309”

 (3/16” + 1/16”) (1/8”)	1/16 FORWARD	0.1°	0.436”
 (3/16” + 1/8”) (1/16”)	1/8 FORWARD	0.2°	0.873”
 (ALL THREE) (NO SHIMS)	3/16 FORWARD	0.3°	1.309”

*The thrust angle measurement is based on a wheel base of 250”.

VII. REVISION HISTORY

Revision	Date	Details
0	07/12/2017	Initial release.
1	11/26/2018	Revise entire document.