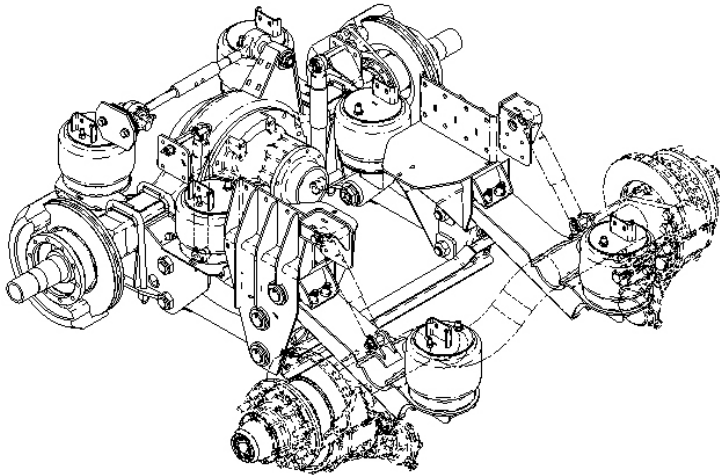


# RADT-246

## Bus/RV Air-Ride Suspension



## Installation and Service Manual

### Suspension Identification ..... 2

*Suspension System Serial Tag*

### Installation ..... 3

*Prior to Installation*

*Torque Specifications*

*Suspension Mounting*

*Axle Alignment – Drive Axle Assembly - Chassis-Mounted Air Spring*

*Axle Alignment – Drive Axle Assembly - Integrated Air Spring Mount*

*Axle Alignment – Tag Axle Configurations*

### Maintenance ..... 5

*Recommended Service Intervals*

*Parts Illustration*

*RADT-246 Suspension System*

*Bushing Replacement – Drive Axle Load Beam Assembly*

*Bushing Replacement – Independent Tag Axle Beam Assembly*

*Bushing Replacement – Tag Axle (Drop Axle Type)*

### Warranty ..... 12



Part No.: 9710117

Document: 246-Bus\_RV-ISM-03-20-17

## SUSPENSION IDENTIFICATION

Refer to the engineering drawing for detailed information on the suspension system components and operating parameters.

Read through the entire Installation and Service Manual (ISM) before performing any installation or maintenance procedures.

### Suspension Serial Tag

The Suspension Serial Tag provides information on the suspension model (Figure 1).

The **Part Number (246xxxx)** refers to the individual model of the suspension system.

Please refer to both the part number and serial number when contacting Ridewell for customer service, replacement parts and warranty information.

### Notes and Cautions

All work should be performed by a properly trained technician using the proper/special tools and safe work procedures.

The ISM uses two types of service notes to provide important safety guidelines, prevent equipment damage and make sure that the suspension system operates correctly. The service notes are defined as:

“NOTE”: Provides additional instructions or procedures to complete tasks and make sure that the suspension functions properly.

**CAUTION** Indicates a hazardous situation or unsafe practice that, if not avoided, could result in equipment damage and serious injury.

	<b>RIDEWELL SUSPENSIONS</b>
PART NO:	
SERIAL NO:	
GROSS AXLE WEIGHT RATING CERTIFICATION IS PER THE FINAL STAGE MANUFACTURER OR ALTERER.	
THIS PRODUCT MAY BE COVERED UNDER ONE OR MORE PATENTS. ADDITIONAL PATENTS MAY BE PENDING.	
FOR MORE INFORMATION ON PATENT OR SUSPENSION/AXLE CAPACITY RATING CONTACT RIDEWELL CORPORATION.	
<a href="http://www.ridewellcorp.com">www.ridewellcorp.com</a>	(800) 641-4122

**Figure 1. The Suspension Serial Tag is located on the left-hand (driver's side) suspension hanger.**

### **Prior to Installation**

Refer to the engineering drawing to confirm spacing and clearance requirements, torque values and ride heights. Installations can vary and procedures should be adapted for different vehicles, as needed.

- If vehicle chassis modifications are required, consult with the vehicle manufacturer to ensure that such changes are permitted.
- Welding or altering suspension components is not permitted without the express written permission of Ridewell Suspensions.

### **Installer Responsibilities**

The installer of the suspension has the sole responsibility for proper attachment of the suspension system to the vehicle chassis.

- The installer is responsible for locating the suspension system on the vehicle to provide the proper load distribution.
- The installer must verify there is sufficient clearance for proper functioning of the suspension, air springs, brake chambers, axle and tires.
- The installer must verify that air reservoir volume requirements are met after suspension installation. Consult the vehicle manufacturer or Federal Motor Vehicle Safety Standards (FMVSS) 121 for more information.

## RADT-246 Suspension – Torque Specifications

Fastener Type	Size	Torque Specifications	
		foot-pound	Newton-meter
Pivot Bolt/ Nut (HHCS) (Torque Beam-Axle End)	1 1/2"-6NC	1,100 ft-lb	1,490 N-m
Pivot Bolt (Eccentric Bolt/Lock Wshr) (Torque Beam-Hanger End)	1 1/4"-7NC	1,000 ft-lb	1,350 N-m
Fastener Kit (Panhard Rod)	1 1/4"	300 ft-lb	405 N-m
Bolt/Lock Nut (Shock Absorber)	5/8"-11NC	160 ft-lb	220 N-m
Bolt/Lock Nut (Air Spring)	3/4"- 10NC (Grade 2)	50 ft-lb	70 N-m
Bolt/Lock Nut (Air Spring)	1/2"-13NC	25 ft-lb	35 N-m

**⚠CAUTION** Suspension is shipped with minimal torque applied to fasteners. It is the installer's responsibility to apply the proper torque values. All fasteners must be re-torqued after the first 6,000 miles of operation. Failure to install and maintain suspension component fasteners at torque specifications could result in suspension failure and void the warranty.

### Mounting the suspension to the frame

Refer to the engineering drawing for the range of available ride heights, torque values, spacing and clearance requirements of the suspension. The suspension installer has the final responsibility of attaching the suspension to the vehicle frame.

#### Bolt-On Installation

Bolts/nuts for attaching the suspension to the vehicle are supplied by the installer. Grade 8 bolts and flanged lock nuts or lock nuts with hardened washers are recommended.

1. Check that location provides adequate clearance for suspension components.
2. Locate hangers and air spring mounting plates on the chassis. Make sure that hangers and air spring mounting plates are evenly located and square to the frame and clamp firmly into place.
3. Refer to the engineering drawing for recommended bolt hole locations on hangers and air spring mounting plates. Center punch and drill bolt holes (minimum 5/8") in each hanger and plate.  
**⚠CAUTION** Check to make sure that wires, hoses or other components located within the chassis are not affected by drilling.
4. Bolt the hangers and air spring mounting plates to the vehicle chassis with customer-supplied Grade 8 bolts and lock nuts.
5. Install suspension. Do not apply final torque until axle alignment procedure is completed (Page 5). Alignment should be performed with suspension at installed ride height.

6. Follow procedure below to install drive axle with U-bolt Assembly. After final torque is applied, weld drive axle to beam assemblies per the engineering drawing.

U-bolt Torque Procedure:

- Tighten all nuts securely.
- Torque all nuts to 150 ft lb.
- Increase final torque to 415 ft-lb.

**⚠CAUTION** The four nuts on the two U-bolts must be tightened in a crisscross-pattern sequence to provide even torque.

7. Perform final assembly and inspection of suspension and vehicle components. Verify that all suspension component bolts/nuts are torqued to specifications (Page 4).
8. The pressure in the tag axle air springs must be adjusted after final assembly. The pressure must be set at 70-to-75 PSIG with the spindle set at installed ride height.  
NOTE: Optimum set-up requires verification of the ground load weight with a certified scale.

**⚠CAUTION** Failure to torque bolts/nuts of suspension components to specifications can result in failure of the suspension and void the warranty.

# Axle Alignment – Drive Axle Assembly

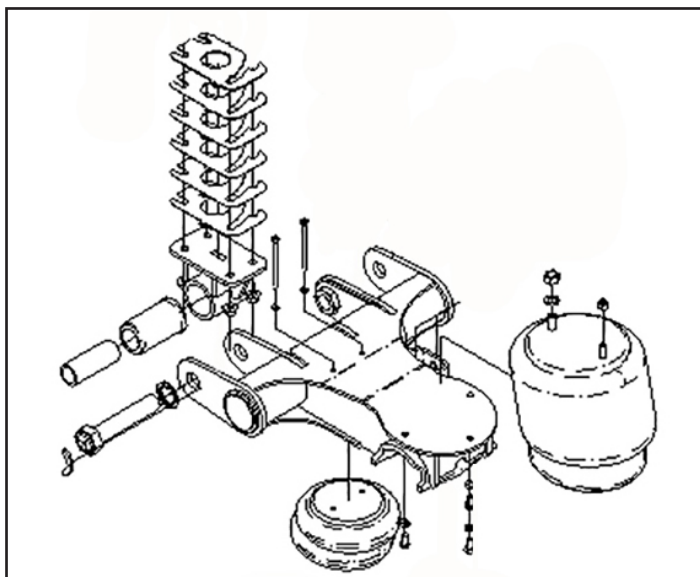
Align the suspension per TMC or SAE recommended standards. Alignment should be performed on a level surface with the suspension at the desired ride height. On a multiple-axle vehicle, the forward axle is moved into the proper alignment, then the remaining axles are positioned so that they are parallel to the forward axle. A maximum tolerance of 1/8-inch difference from side-to-side of the forward axle and 1/16-inch difference from side-to-side for the aft axles is acceptable.

## Chassis-Mounted Air Spring

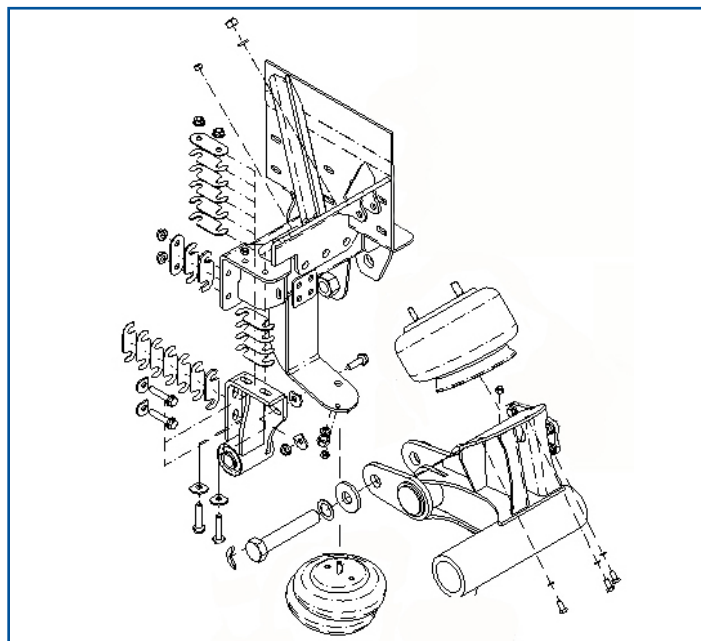
Refer to the engineering drawing for number and location of camber adjustment shims, camber angle, toe adjustment bolt locations and torque values.

### Camber/Toe Adjustment procedure:

1. Loosen bolster hanger assembly nuts at bushing supports connection.
2. Insert camber adjustment shims on each side of the hanger/bushing supports. Different sizes and number of shims may be needed to set the appropriate camber angle (Right and left side camber must be 0.8 degrees; +/- 0.25 degrees).
3. Snug bolster hanger bushing support nuts. Adjust toe by turning toe adjustment bolts located on bolster hanger assembly to desired toe (Toe for both sides must be positive 0.04 inches; +/- 0.02 inches).
4. Torque toe adjustment bolts to specifications and jam "toe" with lock nut. Torque bushing support bolts to specifications.
5. Torque pivot bolt to specifications. Weld locking plate over head of bolt as shown on drawing.
6. The air spring pressure must be set at 70-to-75 PSIG with the spindle set at installed ride height. NOTE: Optimum set-up requires verification of the ground load weight with a certified scale.



**Figure 2.**  
**Adjustment shims and pivot bushing parts Illustration for Chassis-Mounted Air Spring Assembly.**



**Figure 3.**  
**Adjustment shims and pivot bushing parts Illustration for Integrated Air Spring Mount Configuration.**

## Integrated Air Spring

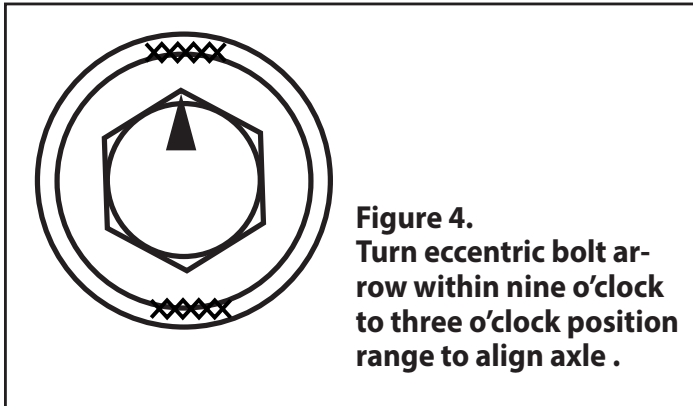
Refer to the engineering drawing for location of camber adjustment shim kit and locations, camber angle, toe adjustment bolt locations and torque values.

1. Loosen bolster hanger assembly nuts and bushing support nuts at bushing support connection.
2. Insert camber adjustment shims between hanger/bushing supports as needed to set the appropriate camber angle (Right and left side must be positive 0.75 degrees +/- 0.25 degrees. ).
  - 2a. To increase camber, add (horizontal) shims between the outer bushing bracket and tag frame.
  - 2b. To increase toe, remove (vertical) shims from between the outer bushing bracket and tag frame . Stack the removed shims on the outside.
3. Torque toe adjustment bolts to specifications and jam "toe" with lock nut. Torque bushing support bolts to specifications.
4. Torque pivot bolt to specifications. Weld locking plate over head of bolt as shown on drawing.
5. The air spring pressure must be set at 70-to-75 PSIG with the spindle set at installed ride height. NOTE: Optimum set-up requires verification of the ground load weight with a certified scale.

# Axle Alignment – Tag Axle Assembly

Align the suspension per TMC or SAE recommended standards. Alignment should be performed on a level surface with the suspension at the desired ride height.

On a multiple-axle vehicle, the forward axle is moved into the proper alignment, then the remaining axles are positioned so that they are parallel to the forward axle. A maximum tolerance of 1/8-inch difference from side-to-side of the forward axle and 1/16-inch difference from side-to-side for the aft axles is acceptable



## Alignment Procedure- Suspension with Eccentric Bolts

1. Loosen the lock nuts enough for the beam to move. NOTE: If installed, remove the anti-turn washer by grinding away the welds.
2. Turn bolt head until arrow on bolt head points straight up (12 o'clock position).
3. Turn eccentric bolt on lower torque arm forward or backward until axle reaches alignment.  
**⚠CAUTION** Do not turn arrow past the 9 o'clock or 3 o'clock position (horizontal).
4. Turn eccentric bolt on upper torque arm forward or backward until axle reaches alignment. NOTE: Arrow on upper eccentric bolt should be in same position as lower torque arm bolt.
5. Check alignment; repeat procedure as needed.
6. Weld anti-turn washers over bolt heads with 1/4" fillet welds at top and bottom (Figure 4).
7. Torque lock nuts to 1,000 ft-lb (1,350 N-m).

## Alignment Procedure- Suspension with threaded-rod-adjustable torque arms

1. Loosen the bolts on both the upper and lower torque arm clamps.
2. Turn the threaded rod of the lower torque arm clockwise to lengthen or counter-clockwise to shorten the torque arm, as needed.

3. Measure the length of the lower torque arm from the center of the torque arm mounting bolts.
4. Adjust the length of the upper torque arm to match the lower arm by turning threaded rod, as needed.
5. Check alignment. Repeat torque rod length adjustment as necessary.
6. Torque the clamp bolts on torque arms to 100 ft-lb (135 N-m).

## Alignment Procedure- Suspension - Lower torque beam eccentric bolt and upper threaded rod-adjustable torque arm

1. Loosen the lock nuts on eccentric bolts enough for the beam to move. NOTE: If installed, remove the anti-turn washer by grinding away the welds.
2. Turn bolt head until arrow on bolt head points straight up (12 o'clock position).
3. Turn eccentric bolt on lower torque arm forward or backward until axle reaches alignment.  
**⚠CAUTION** Do not turn arrow past the 9 o'clock or 3 o'clock position (horizontal).
4. Loosen the bolts on upper torque arm clamps.
5. Turn the threaded rod clockwise to lengthen or counter-clockwise to shorten the torque arm approximately the same distance that the axle has moved.
6. Check alignment. Repeat the eccentric bolt adjustment and threaded rod adjustment procedures, as necessary.
7. Weld anti-turn washers over bolt heads with 1/4" fillet welds at top and bottom (Figure 4).
8. Torque lock nut to 1,000 ft-lb (1,350 N-m).
9. Torque bolts on adjustable torque arm to 100 ft-lb (136 N-m).

**⚠CAUTION** Failure to properly torque pivot hardware could result in catastrophic suspension failure and void the warranty

A visual inspection of the suspension structure should be performed during each pre-trip/safety inspection. Ridewell Suspensions recommends the following minimum service intervals for standard duty, on-highway usage applications. More frequent intervals are recommended for heavier duty applications.

Ridewell suggests the following Technology & Maintenance Council (TMC) publications for additional maintenance information.	
TMC RP 607	Preventive Maintenance and Inspection of S-Cam Foundation Brakes
TMC RP 609	Self-Adjusting and Manual Brake Adjuster Removal, Installation and Maintenance
TMC RP 618	Wheel Bearing Adjustment Proced.
TMC RP 619	Air System Inspection Procedure
TMC RP 631	Recommendations for Wheel End Lubrication
TMC RP 643	Air Ride Suspension Maintenance Guidelines
TMC RP 652	Service and Inspection of Air Disc Brakes
TMC RP 728	Trailer Axle Maintenance
TMC RP 1509	Drive Axle Suspension Maintenance and Inspection Guidelines for Vocational Vehicles

## Daily/Pre-Trip Inspections

- \_\_\_ Check tires for proper inflation, damage or excessive wear.
- \_\_\_ Check wheel-ends for obvious signs of lubricant leakage. Check for missing components.
- \_\_\_ Visually inspect suspension structure for signs of damage or excessive wear.
- \_\_\_ Check for loose or missing bolts/nuts. Check for irregular movement in suspension components.
- \_\_\_ Make sure air controls are operating properly. Drain all moisture from air reservoirs.

## First 6,000 miles of use

- \_\_\_ Torque all suspension component bolts/nuts to specifications (Pg 4/Engineering drawing).
- \_\_\_ Check air lines and connections for leaks.
- \_\_\_ Verify that the suspension is operating at the installed ride height.

## Every 50,000 miles of use

- \_\_\_ Inspect pivot connection for wear/damage.
- \_\_\_ Torque all suspension component bolts/nuts to specifications (Pg 4/Engineering drawing).
- \_\_\_ Check air lines and connections for leaks.
- \_\_\_ Inspect air spring for signs of chafing or component damage. Check for proper fastener torque.

## Annually/100,000 miles of use

- \_\_\_ Inspect pivot connection for worn bushing. Replace components, if necessary. Torque all component bolts/nuts to specifications (Pg 4/Engineering drawing).
- \_\_\_ Check air lines and connections for leaks.
- \_\_\_ Check height control valve (HCV) adjustment.
- \_\_\_ Verify that the suspension is operating at the installed ride height.

**⚠ CAUTION** Failure to torque suspension component bolts/nuts to specifications can result in failure of the suspension and voiding of the warranty.

## 246-Series Bus/RV Suspension – Drive Axle LBA Bushing Replacement

Suspension Location	Bushing Rplcmnt Part No.	Pivot Hardware	Torque Values		
			foot-pound	Newton-meter	
	1110512B000	Bonded Rubber Bushing			
Torque Beam (Hanger End)	1130003	7" Pivot Bolt (Eccentric) F/ 4-7/16 Bshng			
	9003092B000	Anti-Turn Washer			
	1160519B903	Washer/Shim 12GA			
	OPTIONS	1155648B108	(Waxed) Lock Nut 1-1/4"-7NC	1000 ft-lb	1356 N-m
		1152880B102	(Std) Lock Nut 1-1/4"-7NC	1000 ft-lb	1356 N-m
	9003092B000	Anti-Turn Washer			
Torque Beam (Axle End)	1130670B105	Pivot Bolt (HHCS) 1-1/2"-6NC (Grade 5)	1100 ft-lb	1491 N-m	
	9004565B000	Locking Plate			

**⚠CAUTION** Failure to install and maintain fasteners at torque specifications could result in suspension failure and voiding of the warranty. Refer to the engineering drawing for torque specifications.

Park the vehicle on a level surface. Chock wheels to keep vehicle from moving. Exhaust all air from the air system. Disassemble suspension, if necessary, to reach pivot connections. **⚠CAUTION** Failure to properly chock wheels and exhaust air system could allow vehicle/suspension movement that could result in serious injury.

### Drive Axle Load Beam Assembly - Bushing Replacement Procedure

#### Torque Beam Bushing Removal

1. Remove anti-turn washers from eccentric bolt heads by grinding away welds. Remove weld from clamping plate (if applicable).
2. Remove 1¼" nuts on eccentric bolts. Turn arrow on eccentric bolt head to the 12 o'clock position and gently tap the bolt out of the sleeve.  
**⚠CAUTION** Replace eccentric bolt if threads are damaged during removal.
3. Remove 1½" Hex Head Cap Screw (HHCS) from lower torque beam on the Drive Axle Assembly.
4. Remove torque beams from suspension. Press bushings out using hydraulic press.
5. Liberally apply P80® lubricant or soap solution and press in new bushings. Make sure bushings are centered in torque beam sleeve.
6. Install torque beams into suspension.
7. Move axle up or down to proper ride height and torque 1½" HHCS on drive axle end of lower torque beam to 1,100 ft-lb (1,491 N-m).
8. Turn arrow on eccentric bolt head to the 12 o'clock position and insert bolt into sleeve. Attach 1¼" lock nuts. Do not apply final torque until axle alignment is completed (Pgs 4-5).
9. Install anti-turn washers after alignment.
10. Torque 1¼" nuts to 1,000 ft-lb (1356 N-m).

#### Replacement of adjustable torque arms/ Panhard rod bushings:

Refer to the engineering drawing for torque values, bushing and fastener options.

1. Remove torque arms/Panhard rod.
2. Liberally apply P80® lubricant or soap solution and press in new bushings. Make sure bushings are centered in torque arm/Panhard rod sleeve.  
Install torque arm/Panhard rod. Torque hex head cap screw (HHCS) options to specifications:  
3a) 5/8" HHCS - torque to 160 ft-lb (220 N-m).  
3b) 1" HHCS - torque to 460 ft-lb (625 N-m).  
3c) 1 1/4" HHCS - torque to 300 ft-lb (405 N-m).
3. Perform axle alignment procedure, if required (Pgs 4-5).





## 246-Series Bus/RV Suspension – Tag Axle Bushing Replacement Torque Specification

Fastener Type	Size	Torque Specifications	
		foot-pound	Newton-meter
Pivot Bolt (HHCS)	1 1/2"-(Grade 5)	1,100 ft-lb	1,490 N-m
Bolt (HHCS)	3/4"-(Grade 5)	160 ft-lb	220 N-m
Bolt (HHCS)	5/8"-(Grade 8)	160 ft-lb	217 N-m

**⚠CAUTION** Suspension is shipped with minimal torque applied to fasteners. It is the installer's responsibility to apply the proper torque values. All fasteners must be re-torqued after the first 6,000 miles of operation. Failure to install and maintain suspension component fasteners at torque specifications could result in suspension failure and void the warranty.

### Bushing Replacement Procedure - Independent Tag Axle Beam

Park the vehicle on a level surface. Chock wheels to keep vehicle from moving. Exhaust all air from the air system. Disassemble suspension, if necessary, to reach pivot connections.

**⚠CAUTION** Failure to properly chock wheels and exhaust air system could allow vehicle/suspension movement that could result in serious injury.

#### Service Parts Needed

**1987625B000** Adhesive EpoxyFusor-320 50ML

**BUSHING OPTIONS** **1116176B001** Bushing-(5.25"X1.5")

**1117427B000** Bushing (4.44"X1.5")

1. Remove old bushing from sleeve. Apply heat to the outside of the sleeve with an oxyacetylene torch to destroy any remaining bonding element and make bushing removal easier.

2. Use a wire brush to remove any remaining bonding residue, rubber, dirt, rust, etc, from the sleeve bore.

3. Wash bore of bushing sleeve with paint thinner. Wash replacement bushing surface with paint thinner.

**⚠CAUTION** Epoxy adhesive and paint thinner are flammable materials that are irritating to the eyes, respiratory system and skin. Read label instructions before use.

4. Remove cap from Epoxy Adhesive 50ml tube kit. Squeeze out entire contents of adhesive. Thoroughly mix the two-parts of the adhesive. NOTE: Adhesive must be used within 20 minutes after mixing.

5. Spread mixed adhesive on the entire surface of the replacement bushing. Apply adhesive to the inside of the sleeve bore.

6. Press bushing into sleeve bore until bushing is centered.

7. Wipe the excess adhesive from the ends of installed bushing with paint thinner.

8. Adhesive can be handled after four hours and will totally cure after 24 hours.

**⚠CAUTION** Adhesive must be totally cured before returning vehicle to service.

9. Perform axle alignment feature (Pg 6) and re-assemble the suspension, if necessary. Torque to specifications.

Refer to the engineering drawing for additional component part numbers and torque values.

## Bushing Replacement Procedure - Tag Axle (Drop Axle Type)

Park the vehicle on a level surface. Chock wheels to keep vehicle from moving. Exhaust all air from the air system. Disassemble suspension, if necessary, to reach pivot connections.

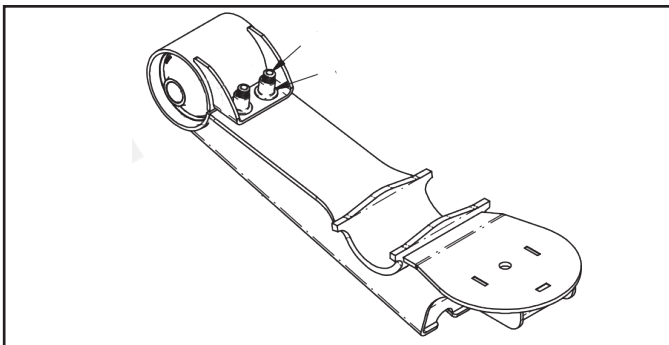
**CAUTION** Failure to properly chock wheels and exhaust air system could allow vehicle/suspension movement that could result in serious injury.

1. Remove pivot nut. Remove the anti-turn washer from the eccentric bolt head by grinding away the welds. Turn bolt head until the arrow on the head points straight up. Remove pivot bolt.
2. Rotate arm beams down and out of hanger. Inspect the pivot bolt hole and hanger surfaces for wear or damage. Repair or replace components, if needed.
3. Remove Huck® fasteners from the bushing clamp and discard (Figure 6). Open the bushing clamp, remove the pivot bushing assembly and discard.
4. Insert new bushing assembly (1110079) into bushing clamp. Install replacement bolts, washers and nuts (1800038) or replace Huck® fasteners. Do not apply final torque.
5. Center bushing assembly on bushing clamp. Torque clamp nuts to 190 ft-lb. Make sure bushing clamp surfaces are closed "metal-to-metal" and torque nuts to 280 ft-lb (380 N-m).
8. Install shock absorbers, wheels and tires (if removed). Raise vehicle and remove support stands. Lower vehicle to the ground.
9. Connect HCV linkage, if necessary, and adjust the ride height.

**CAUTION** Failure to properly torque pivot hardware could result in catastrophic suspension failure and void the warranty

### Reassemble Suspension

6. Coat the large diameter shank of eccentric bolt with anti-seize compound, install bolt with arrow pointing straight up.
7. Align the axle, if necessary. Weld anti-turn washers over the eccentric bolt head with 1/4" fillet welds at the top and bottom of bolt head. With suspension at ride height, torque pivot nut to 1,000 ft-lb (1,350 N-m).



**Figure 6.**  
**RADT-246 Bush/Beam Assembly pivot connection.**  
**Refer to the engineering drawing for the individual component part number.**

## WARRANTY

### **Terms and coverage in this warranty apply only to the United States and Canada.**

Ridewell Suspensions warrants the suspension systems manufactured by it to be free of defects in material and workmanship. Warranty coverage applies only to suspensions that have been properly installed, maintained and operated within the rated capacity and recommended application of the suspension. The responsibility for warranty coverage is limited to the repair/replacement of suspension parts. The liability for coverage of purchased components is limited to the original warranty coverage extended by the manufacturer of the purchased part.

All work under warranty must have prior written approval from the Ridewell warranty department. Ridewell has the sole discretion and authority to approve or deny a claim and authorize the repair or replacement of suspension parts. All parts must be held until the warranty claim is closed.

Parts that need to be returned for warranty evaluation will be issued a Returned Materials Authorization (RMA). Parts must be returned to Ridewell with the transportation charges prepaid. The transportation charges will be reimbursed if the warranty claim is approved.

This non-transferable warranty is in lieu of all other expressed or implied warranties or representations, including any implied warranties of merchantability or fitness or any obligations on the part of Ridewell. Ridewell will not be liable for any business interruptions, loss of profits, personal injury, any costs of travel delays or for any other special, indirect, incidental or consequential losses, costs or damages caused by Ridewell.

**Contact the Ridewell Warranty Dept. at 417.833.4565 - Ext. 135, for complete warranty information.**