RTL-239

Liftable Tandem Auxiliary Axle Suspension

Installation and Service Manual

RIDEWELL SUSPENSIONS

Part No.: 9710124
Doc: 239-Trailer-ISM--RevB-05-01-19

SUSPENSION IDENTIFICATION

Introduction

The Ridewell Tandem Liftable RTL-239 suspension provides a lightweight auxiliary axle for state and federal bridge law opimization. The suspension can be purchased with or without integrated axles.

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

Suspension Identification Tag

A (**606-) Installation/Assembly Number** will be listed as the **Part Number** when other system components are factory installed with the suspension (Figure 1).

The **Suspension Number** and **Serial Number** on the Suspension ID Tag refer to the model and the date of manufacture of an individual suspension system.

Please refer to the suspension number/part number and serial number on the Suspension Identification Tag 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.

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

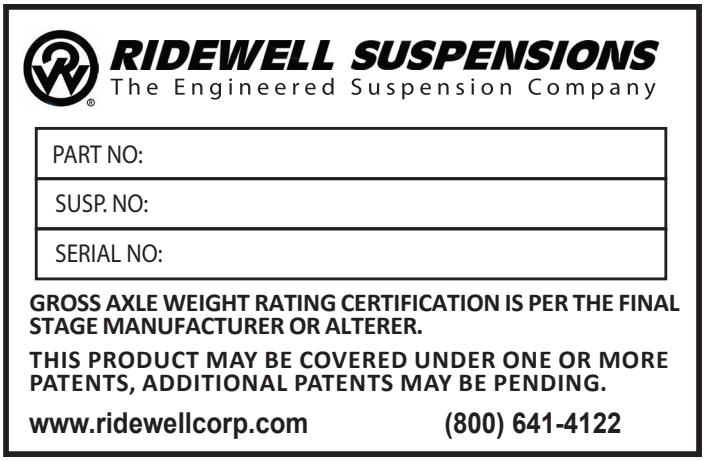


Figure 1.
The Suspension Model (Suspension Number) and the date of manufacture (Serial Number) are listed on the Suspension Identification Tag.

Prior to Installation

Refer to the engineering drawing to confirm dimensional requirements and the range of ride heights available.

Installations can vary and procedures should be adapted for different vehicles, as needed.

- The Gross Axle Weight Rating (GAWR) is determined by the system component with the lowest load rating. Please consult with tire, wheel, axle and brake manufacturers before installation to determine the GAWR.
- 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 that vehicle crossmembers are positioned to support the suspension at the installing location.
- It is the installer's responsibility to determine that axle spacing conforms to any applicable federal and local bridge laws.
- 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.
- The installer must verify there is sufficient clearance for proper functioning of the auxiliary suspension, air springs, axles and tires.

Axle Integration

Suspension systems are available with and without a factory integrated axle. Customer-supplied axle assemblies must be positioned correctly before welding the axle.

Use the top-center mark on the axle, if available, to identify the center of the axle.

Weld Preparation

The joint to be welded should be positioned in the flat or horizontal position. All grease, dirt, paint, slag or other contaminants must be removed from the weld joint.

The axle and suspension components should be at a minimum temperature of 60°F (15.5°C). Pre-heat the weld zone to the axle manufacturer's recommended pre-heat temperature, if required.

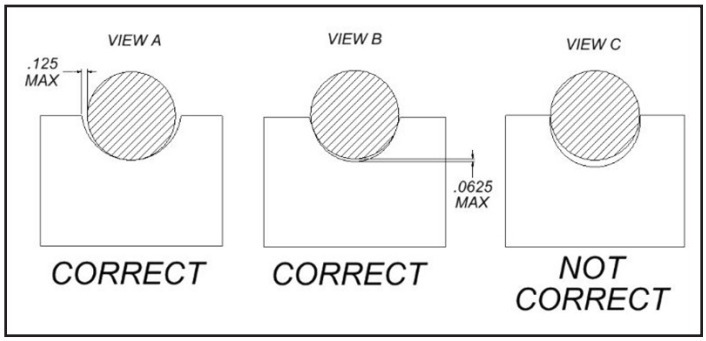
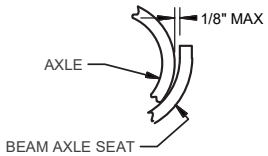


Figure 2. Correct axle seating for welding.

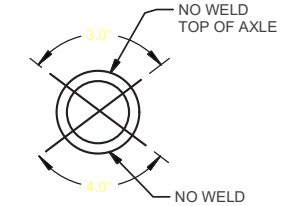
Weld Procedure

1. Center the axle assembly on the beams.
2. Check the gap between the axle and the axle seats before welding (Figure 2). Side gaps should be no greater than 1/8". The gap at the bottom of the axle seat should be no greater than 1/16".
3. Weld the axle to the seat according to Ridewell Weld Process #2 (Page 5).
   NOTE: Mounted air springs should be covered to protect them from welding spatter.

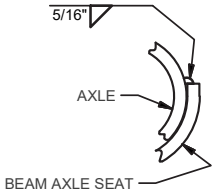
⚠CAUTION Failure to follow procedures and design specifications could result in injury, damage to the axle or suspension and void the warranty.



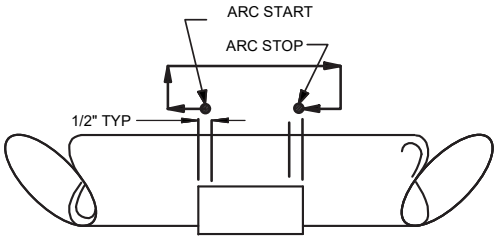
WELD JOINT PREPARATION



NO WELDING ZONE



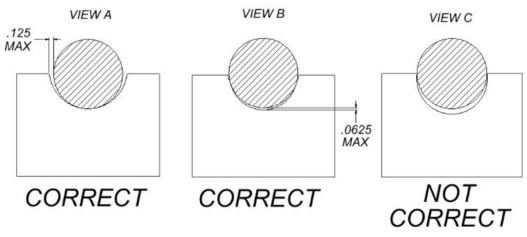
SINGLE PASS



SMAW / GMAW / FCAW

REPRESENTATIVE AXLE SEAT (PROFILE DEPENDENT ON SUSPENSION PRODUCT)

1 - CAUTION: All welds must be kept away from the top and bottom of the axle where maximum stresses occur (see “NO WELDING ZONE” illustration above). Do not test-weld the arc on any part of the axle tube.
2 - All welders and welding operators should be certified as per the requirements of the American Welding Society (AWS) or equivalent. All electrodes used should meet the AWS specifications and classifications for welding carbon and low-alloy steels.
3 - Recommended Welding Methods: Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW) or Flux Cored Arc Welding (FCAW). The welding method used and the electrode selected must develop a minimum weld tensile strength of 70,000 psi per AWS specifications. The best fusion and mechanical properties will be obtained by using the voltage, current, and shielding medium recommended by the electrode manufacturer. If the SMAW method is used, the stick electrodes must be new, dry, free of contaminants and stored per AWS specifications.
4 - Weld Joint Preparation: The joint to be welded should be positioned in the flat or horizontal position. All grease, dirt, paint, slag or other contaminants must be removed from the weld joint without gouging the axle tube. CAUTION: Never weld when the axle is cold. The axle and beam assemblies to be welded should be at a temperature of at least 60°F (15°C). Pre-heat the weld zone to the axle manufacturer's recommended pre-heat temperature, if required. This will reduce the chance of an area of brittle material forming adjacent to the weld.
5 - The axle should fit into the beam assembly with a maximum root gap of 1/8-inch between the axle and the beam axle seat (see “WELD JOINT PREPARATION” illustration above).
6 - NOTE: Clamp the axle to the beam axle seat with a C-clamp prior to welding to make sure that proper contact occurs (see “CORRECT” illustration below).
7 - Ground the axle to one of the attached axle parts such as the brake chamber brackets, cam brackets or brake spider. Never ground the axle to a wheel or a hub as the spindle bearing may sustain damage.
8 - Single-pass welding on the beam/axle connection uses the following guidelines: 8.1-Total fillet weld size should be 5/16-inch. 8.2-Weld pass start and stop performed as illustrated above. 8.3-Never start or stop weld at the end of the weld joint. 8.4-Start weld at least 1/2 inch from the end and backweld over the start. Backstep fill all craters. 8.5-Weld must go to within 1/8-inch +/- 1/16-inch of the ends of the axle seat. Weld must not go beyond or around the ends of the axle seat. 8.8-Post-weld peening is recommended, but not required. Hold the needles perpendicular to the axle. A uniform dimpled pattern will appear when properly peened.



REV	PROJECT	DESCRIPTION	DATE	BY	CHK	APPD

DRAWN BY: GWH — 3/27/2018
CHECKED:
APPROVED:
PROJECT NO: -
SCALE: A-SIZE: NTS
MATERIAL: -
WEIGHT: -

RIDEWELL CORPORATION
PO BOX 4586 SPRINGFIELD, MISSOURI 65808

TITLE:
RIDEWELL WELD PROCESS #2
3" DIA. AXLE SINGLE PASS WELD

SHEET 1 OF 1
PART NO: WELD PROCESS #2
REV: -

Mounting the suspension to the frame

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

Bolt-On Installation

Refer to the suspension engineering drawing for hanger and air spring mounting plate bolt hole locations. Clamp hangers, air spring mounting plates and filler plates, if used, in place and drill bolt holes into frame for installation.

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

⚠CAUTION Before installation, check to make sure that wires, hoses or other components will not be affected by drilling into the frame rail.

Final Assembly and Inspection

1. Inspect for any loose or missing fasteners on the suspension assembly. Verify that all suspension component bolts/nuts are torqued to proper values (Appendix).
2. Lift the axle to the raised position. Check the air system tubing and connections for leaks.
3. Check that wheels can rotate freely and that brakes are properly adjusted.
4. Raise and lower the suspension assembly through the entire range of travel. Make sure sufficient clearances for all components has been provided.

⚠CAUTION When lowering an auxiliary axle on an unloaded vehicle, pressure to the load air springs must be reduced to below 10 psi.

Failure to keep air pressure below stated pressure could result in damage to the air springs or axle assembly.

Shock Absorber Kit (Optional)

The shock absorber can be installed after the suspension has been assembled and mounted on the vehicle.

Installation Procedure

Refer to the shock kit engineering drawing (6030115) for the correct mounting location.Customer-supplied fasteners are required for bolting upper bracket to vehicle frame.

1. Bolt uppper mounting brackets to frame crossmember with Grade 8 bolts and flanged locknuts (customer furnished).
2. Attach the shock absorbers to upper mounting bracket with supplied bolt and locknut. Do not apply final torque.
3. Attach shock absorber to beam assembly with supplied bolt and locknut. Torque shock absorber connection bolts to 200 ft-lb (270 N-m).
4. Raise and lower suspension to make sure that shock absorbers clear all vehicle components and that shock absorbers do not overextend.

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

Regulate load with air spring pressure

The load capacity of the auxiliary axle is adjusted by increasing or decreasing the pressure to the air springs. By applying more air, the lift axle takes on a greater percentage of the load's weight. The load capacity is decreased as the air pressure decreases.

Accurate readings of the load capacity can be obtained by parking a loaded vehicle over a calibrated scale and lowering the axle onto the scale. The air pressure to the air springs is manually adjusted up or down to obtain the axle load weight at various air pressures.

⚠CAUTION Do not exceed the rated load capacity of the suspension system or other components.

- Do not exceed 45 psi pressure to the load springs of the RTL-239 6K Tandem Axle.
- Do not exceed 19 psi pressure to the load springs of the RTL-239 3K Single Axle .
- Exceeding the capacity can cause component failure and void the warranty.

Install air system components

Connect the load and lift air springs and an air control kit to the air system (Figure 3).

The air control kit (ACK) consists of a pressure regulator with a gauge connected to an air valve controlled by an electric switch or manual knob. The ACK allows the operator to control the air spring pressure so that the auxiliary axle can support different loads.

Ridewell has a number of manual/electric ACK configurations available. Installation will vary by the type of configuration.

⚠CAUTION The installer is responsible for making sure that air system requirements comply with the appropriate Federal Motor Vehicle Safety Standards.

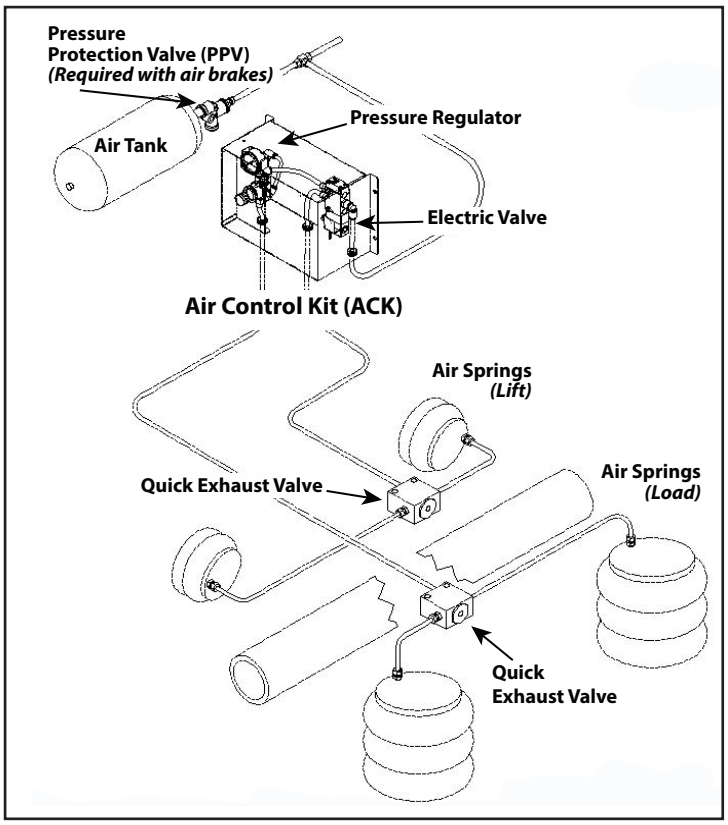


Figure 3.
Example of Air Control Kit (ACK) installation

Troubleshooting – Air System Installation

Problem	Possible Cause	Solution
Air springs fill but do not exhaust.	— Obstructed air line. — Faulty controls wiring. — Manual override pushed in	— Check for pinched/blocked lines. — Check wiring with voltmeter and correct wiring/installation. — Release manual override.
Air system leaks down after a short period of time.	— Leak in air system beyond accepted standards.	— Pressurize system and spray soap water solution onto the tubing, valves and fittings. Check for bubbles (leaks). Note: Some valves will leak at an acceptable rate. — Check that tubing cuts are straight and smooth. Re-cut and reassemble fitting joints, if necessary.
Auxiliary unit will not stay up	— Loose Air Fittings. — Damaged Air Lines. — Air lines to lift and load air springs are reversed. — Damaged or Worn Air Springs.	— Check and retighten fittings. Repair or replace component, as necessary. — Check installation. Air line from regulator goes to (load) air springs. — Replace if worn or damaged.
Auxiliary unit not getting the correct lift	— Air lines to lift and load air springs are reversed. — Lift air springs do not have proper air pressure. — Interference with driveline or other chassis components. — Air control system not installed correctly.	— Check installation. Air line from regulator goes to (load) air springs. — Check for loose fittings or worn/ damaged lines. Verify air tank pressure with gauge. — Visually inspect unit operation for proper clearance. Check for loose fasteners and retighten. — Check installation; refer to OEM installation procedures.

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.

Refer to the following Technology & Maintenance Council (TMC) publications for additional maintenance information

TMC RP 619	Air System Inspection Procedure
TMC RP 643	Air Ride Suspension Maintenance Guidelines
TMC RP 728	Trailer Axle Maintenance

Daily/Pre-Trip Inspections

__ Check tires for proper inflation, damage or excessive wear.

__ Check axle assemblies for damage/ loose 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 bolts/nuts to specifications (Chart/Engineering Drawing).

__ Verify suspension is operating at ride height.

Every 12,000 miles of use

__ Inspect air springs for any damage or excessive wear. Torque air spring bolts/nuts to specifications (Chart/Engineering Drawing).

__ Check air lines and connections for leaks.

First 50,000 miles of use

__ Torque all suspension component bolts/nuts to specifications (see Appendix).

Annually/100,000 miles of use

__ Inspect pivot connections for worn pivot bushings and replace, if necessary. Torque pivot hardware and component bolts/ nuts to specifications (Appendix).

__ Check suspension hanger and air spring mounting plate connections to frame.

___Check beam-to-axle connection welds.

__ Check air system for leaks.

__ Test air system pressure protection valve (if equipped).

__ Refer to Axle Manufacturer's Guidelines for axle/ wheel end maintenance procedures.

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

RTL-239 Auxilary Axle Trailer Suspension – Torque Specifications

Fastener Type	Size	Torque Values foot-pound	Newton-meter
Hex Head Cap Screw (HHCS) - Cross Channel Flanged Locknut	1/2″-13NC	80 ft-lb	108 N-m
Flanged Lock Screw (Air Spring)	3/8″-16NC	25 ft-lb	35 N-m
Locknut (Air Spring)	3/4″-16NF	50 ft-lb	68 N-m
Locknut (Air Spring)	1/2″- 13NC	25 ft-lb	35 N-m
Bolt (HHCS) Locknut - (Shock Absorber)	3/4″- 10NC	200 ft-lb	270 N-m
Pivot Bolt - (Hex Head Cap Screw (HHCS)) Pivot Nut - (Flanged Locknut)	3/4″-16NF	310 ft-lb	420 N-m

Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque.

⚠CAUTION *Suspension is shipped with minimal torque applied to fasteners. It is the installer's responsibility to apply the proper torque values.Failure to install and maintain suspension component fasteners at torque specifications could result in suspension failure and void the warranty.*

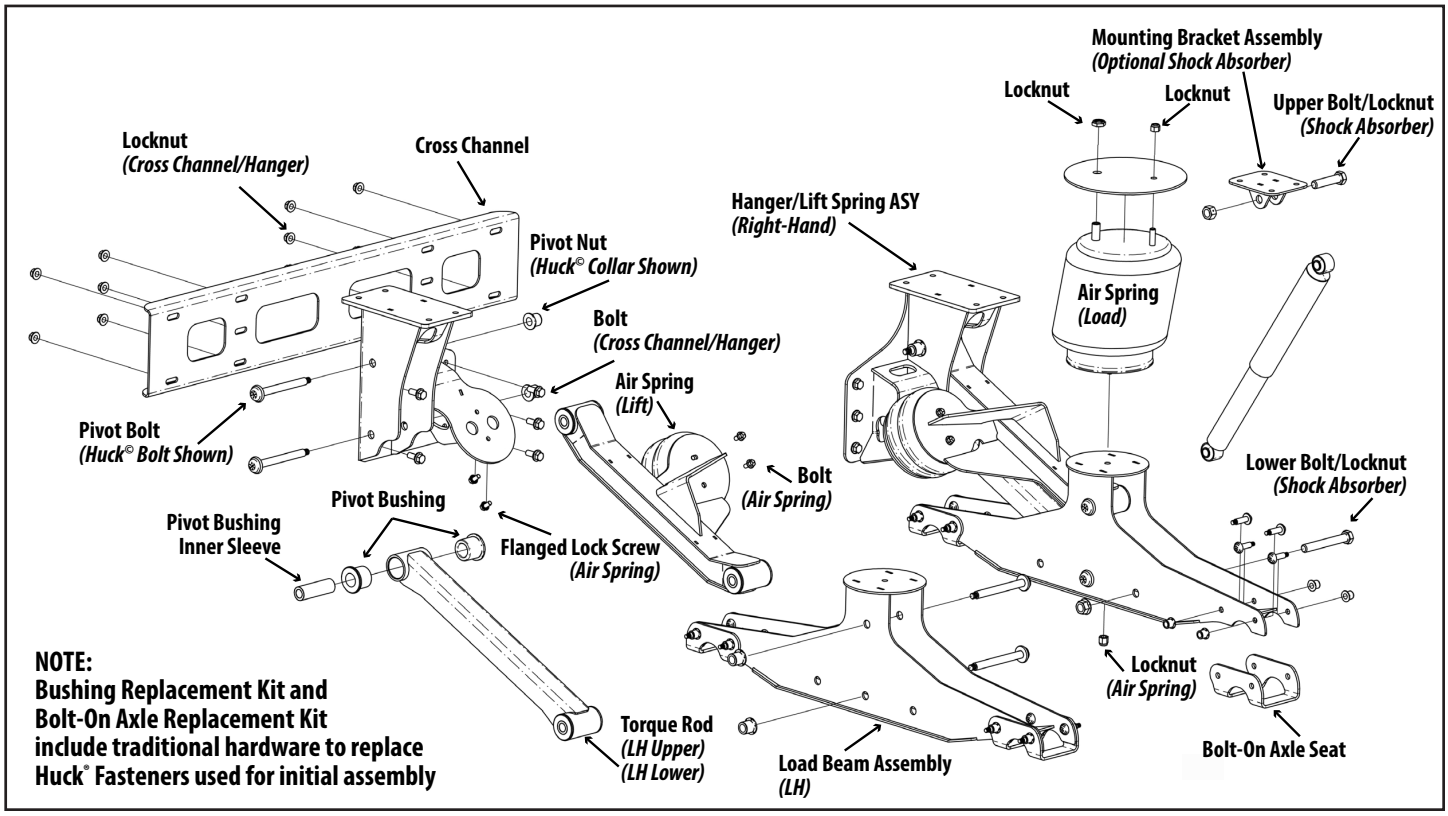


Figure 4.
RTL-239 - 6K Tandem Bolt-On Axle Suspension. Refer to the engineering drawing for the individual component part number.

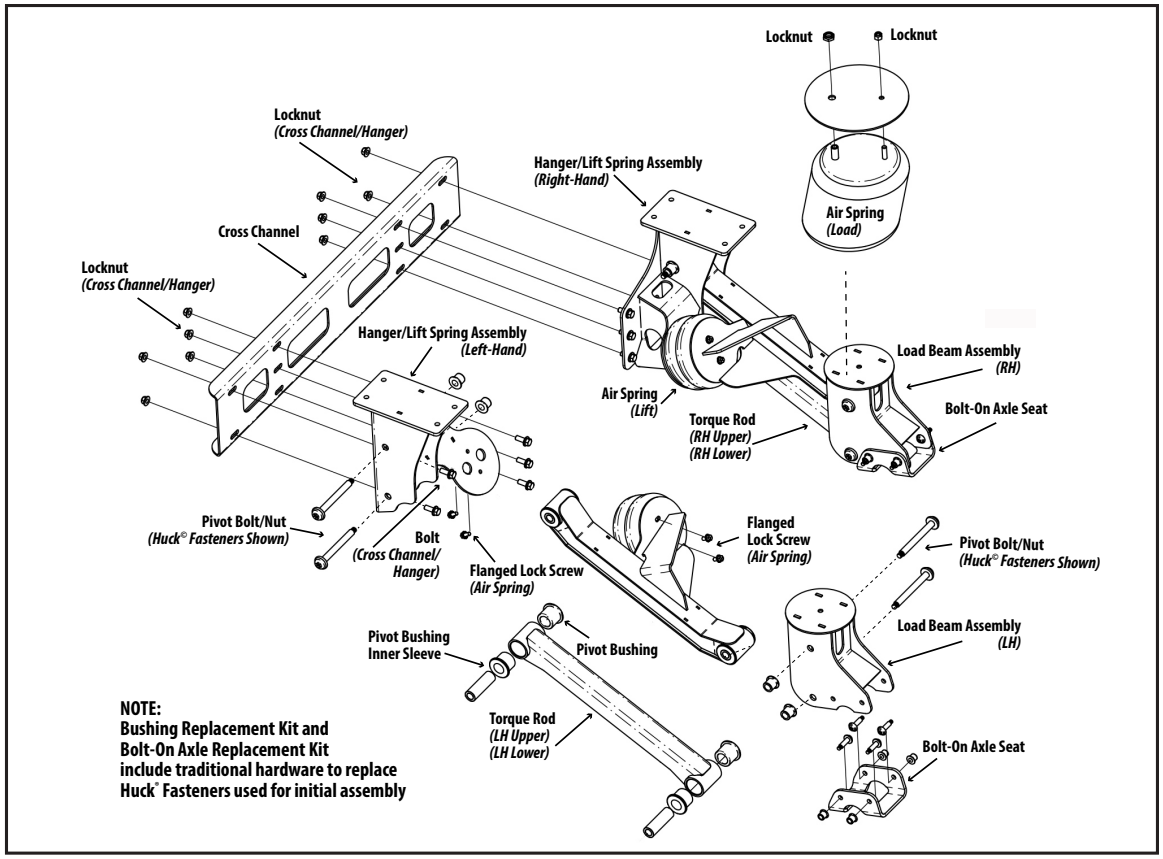


Figure 5.
RTL-239 - 3K Single Bolt-On Axle Suspension.

Refer to the engineering drawing for the component part number.

RTL-239 – Bushing Replacement Kit

Pivot Component	Bushing Kit Part Number	Pivot Hardware	Torque Values foot-pound	Torque Values Newton-meter
Torque Rod Assemblies	6040133	Bushing kit - No pivot bolt	310 ft-lb	420 N-m
	6040134	Pivot Bolt (HHCS)/Pivot Nut (Locknut)	310 ft-lb	420 N-m

⚠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 the suspension to reach the pivot connections.

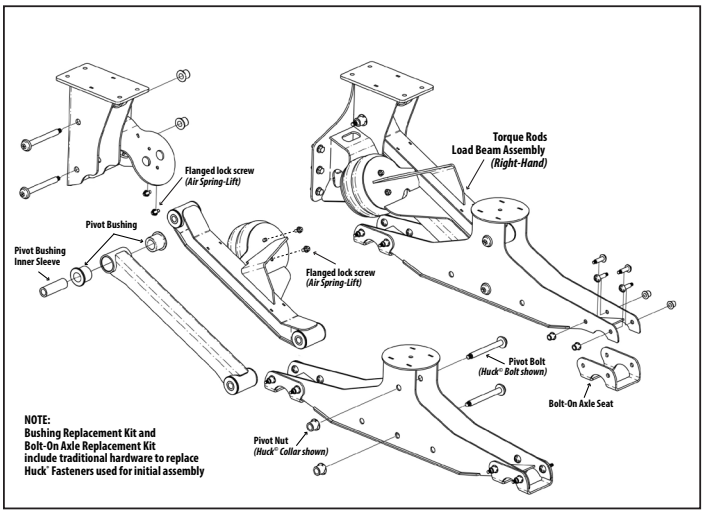
⚠CAUTION Failure to properly chock wheels and exhaust the air system could allow vehicle/suspension movement that could result in serious injury.

Bushing Replacement Procedure

Bushings should be replaced in the eight (8) pivot connections at the same time (Figure 6). The bushing replacement kit with pivot hardware includes traditional hardware to replace the Huck® Fasteners used for initial assembly.

1. Remove the pivot bolt by cutting/grinding away the Huck® Collar. Discard pivot bolt.
2. Remove the bushing and sleeve assembly from the rod eye. Clean the rod eye of any foreign debris/corrosion.
3. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of each bushing half.
   NOTE: Do not substitute - lubricant included with bushing replacement kit.
4. Press bushing halves into the pivot connection.
   NOTE: Rubber mallet may be needed.
5. Press the bushing sleeve into the center opening of the installed bushing.
   NOTE: Rubber mallet may be needed.
6. Check that internal sleeve is flush with both sides of replacement bushing.
7. Reassemble suspension. Torque to specifications.
8. Install pivot hardware and torque to specs.

⚠CAUTION Failure to torque pivot hardware can result in suspension failure and void the warranty.



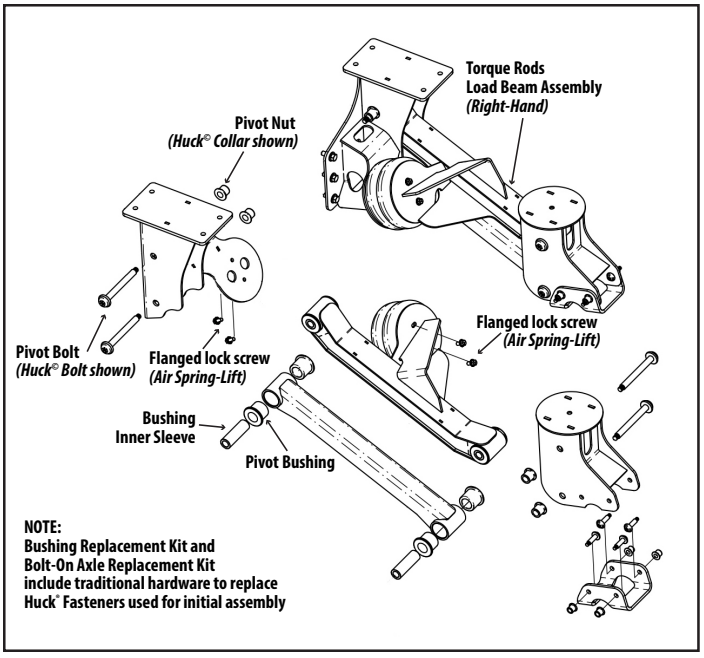


Figure 6.
Bushing replacement kit with hardware includes pivot bolt, pivot nut and replacement components for eight (8) pivot connections.

RTL-239 Bolt-On Axle Seat – Replacement Kit			
Axle Kit Part Number	**Replacement Components for One Axle**	**Quantity**	**Part No.**
6030116	(Bolt-On) Seat for 3-inch Diameter Axle	2	8004622
(2390003-6K Tandem Axle)	HHCS 1/2″ 13NC (Length - 1.25″)	8	1140084
	Flanged Locknut 1/2" 13NC (Grade 8)	8	1150012
6030117	(Bolt-On) Seat for 3-inch Diameter Axle	2	8001589
(2390101-3K Single Axle)	HHCS 1/2″ 13NC (Length - 1.25″)	8	1140084
	Flanged Locknut 1/2″ 13NC (Grade 8)	8	1150012

⚠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. Raise vehicle to height that removes load from suspension and support with jack stands. Disconnect the linkage from the height control valve(s), if equipped. Exhaust all air from the air system.

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

Axle Replacement Procedure

The bolt-on axle seat replacement kit includes traditional hardware to replace the Huck® Fasteners used for initial assembly.

1. Remove wheels and tires from axle. Provide vehicle support for axle removal and replacement.
2. Cut/grind away Huck® Fasteners from the right- and left-hand load beam assembly and discard. Remove axle from the load beams.
3. Refer to the engineering drawing for correct axle seat orientation. Attach axle seat with replacement hardware. Torque to 80 ft-lb (108 N-m).
4. Center replacement axle between the load beam assemblies. Make sure that the electric brake wiring is positioned correctly and place axle on axle seats. Weld axle to each axle seat according to Ridewell Weld Process #2 (Page 5).

Remove axle support. Install wheels and tires. Connect height control valve linkage, if necessary. Inflate air springs. Raise vehicle and remove support stands. Lower vehicle to ground.

⚠CAUTION Failure to follow procedures and design specifications could result in injury, damage to the axle or suspension, and void the warranty.

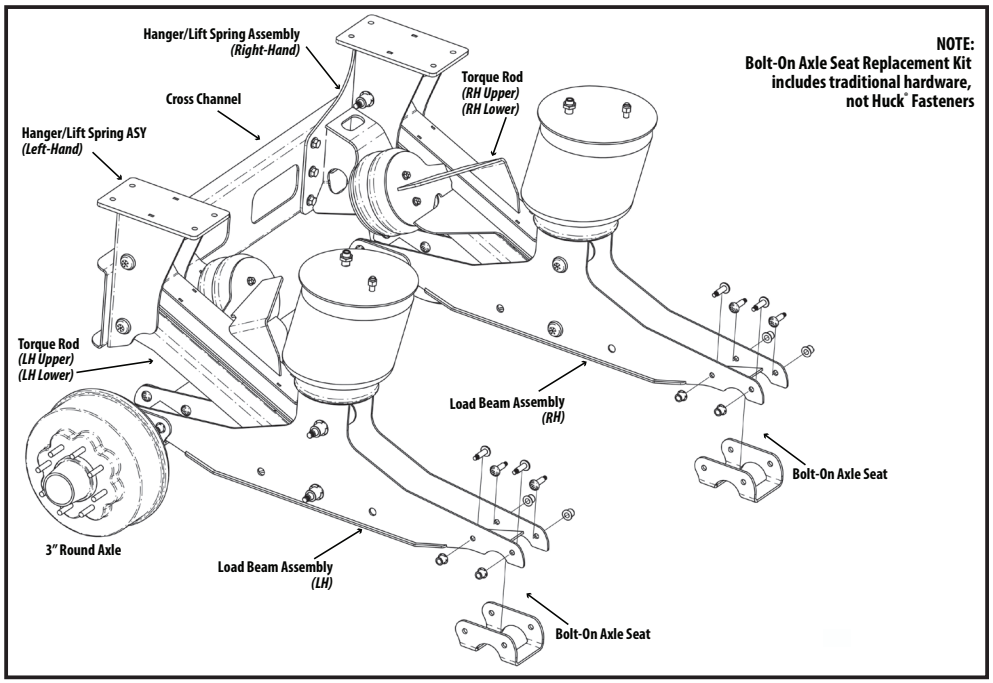


Figure 7.
Bolt-On Axle Replacement Kit includes two axle seats and traditional hardware to replace one axle.

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.

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