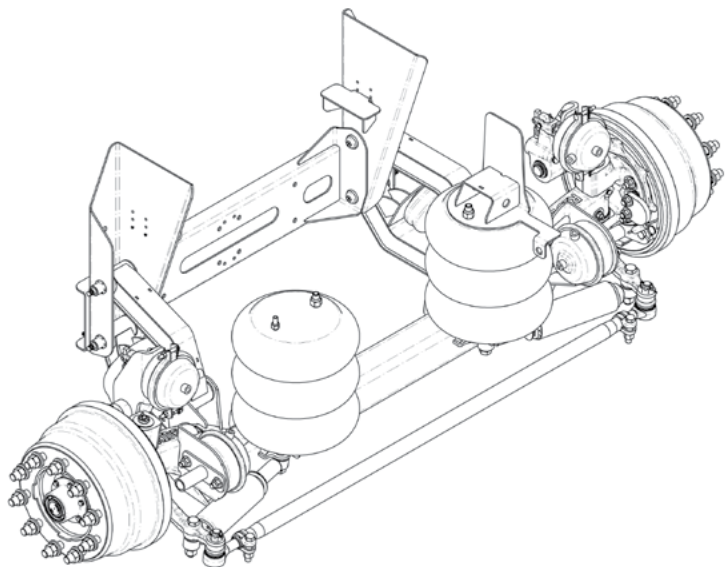

RSS-233 - 10K Truck

Self-Steering – Auxiliary Axle Suspension



Installation and Service Manual

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PART NO:

SUSP. 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.

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Suspension Identification Tag

The **Part Number** is listed as 606- Installation/Assembly Number when other components are factory installed onto the suspension.

The **Suspension Number** and **Serial Number** refer to the suspension model and date of manufacture.

Refer to the suspension number/part number and serial number when contacting Ridewell for customer service, replacement parts and warranty information.

Auxiliary Axle – Self-Steering Option

Self-steer auxiliary axle suspensions have wheels that can swivel and use the forces generated during turns to steer the wheels.

Steerable axles improve maneuverability, allow vehicles to turn sharper corners and reduce tire wear and tear by minimizing tire scrub.

Self-steering auxiliary axle suspensions are designed to steer only in the forward direction. The suspension **MUST** be raised off the ground or locked into a non-steerable configuration when driving in reverse.

Ridewell Suspensions strongly recommends using automated systems that raise/lock the wheels into a straightforward position during reverse travel.

A visual/audible indicator to assist with manual operation of the lift-in-reverse system is recommended if there are no automated systems installed.

The driver should maintain slow speeds and avoid extreme turns when maneuvering in reverse with the steering lock engaged.

CAUTION Failure to lift the suspension and-or engage the steering-lock during reverse travel can cause component damage and void the warranty.

Notes and Cautions

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

All work should be completed by a trained technician using any special tools and safe work procedures.

The ISM uses two service notes, defined as:

“NOTE”: Provides instructions/procedures to complete tasks to ensure components function properly.

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

Prior to Installation

The RSS-233 10K Truck Suspension provides a full range of tire sizes on 8-Stud or 10-Stud wheel-ends.

Refer to the suspension model engineering drawing for dimensional requirements; available ride height; and, the suspension system operating parameters.

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

- The Gross Axle Weight Rating is determined by the system component with the lowest load rating. 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 of suspension components is not permitted without the express written permission of Ridewell Suspensions.

Installer Responsibilities

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

- The installer is responsible for locating the suspension on the vehicle to provide load distribution. The installer must verify that vehicle crossmembers are positioned to support the suspension.
- The installer must verify there is sufficient clearance for proper functioning of the installed auxiliary suspension system including air springs; brake chambers; steering components; axle (including axle to driveline clearance); and, tires and wheels.
- 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 installation. Consult the vehicle manufacturer or the Federal Motor Vehicle Safety Standards (FMVSS) 121 for more information.

Suspension Mounting

Refer to the suspension model engineering drawing for the suspension travel table; torque specifications; and, the spacing and clearance requirements for mounting the suspension.

The hanger locator flanges for the suspension are factory installed to a preset ride height. The ride height is adjusted by installing a 1-inch or 2-inch air spring spacer kit and relocating the hanger locator flange (Figure 1)

Bolt-On Installation Procedure

RSS-233 10K Truck Suspensions are shipped fully assembled. The suspension system must be reassembled with the proper torque applied if any component is removed/taken apart for installation.

Grade-8 bolts, flanged locknuts or locknuts with hardened washers are supplied by the installer.

1. Measure vehicle frame width and the hanger-to-hanger inside dimensions of the suspension.
NOTE: Customer-supplied filler plates are required for the hangers and air spring mounting plates if the vehicle frame width is narrower than the suspension pre-set frame width.
2. Place the suspension, with any hanger/air spring filler plates or hanger/air spring spacer, in the desired installation location.
NOTE: A crossmember must be located on the frame within six inches of the leading or trailing edge of the hanger.
3. Check the location for adequate clearance of suspension components. The top of the hangers and air spring mounting plates must be parallel to the chassis frame to maintain the proper caster angle.

4. The frame hangers and air spring mounting plates should be perpendicular to the chassis frame and in alignment with each other.

Clamp the hangers, the mounting plates, and any required spacer and filler plates firmly in place.

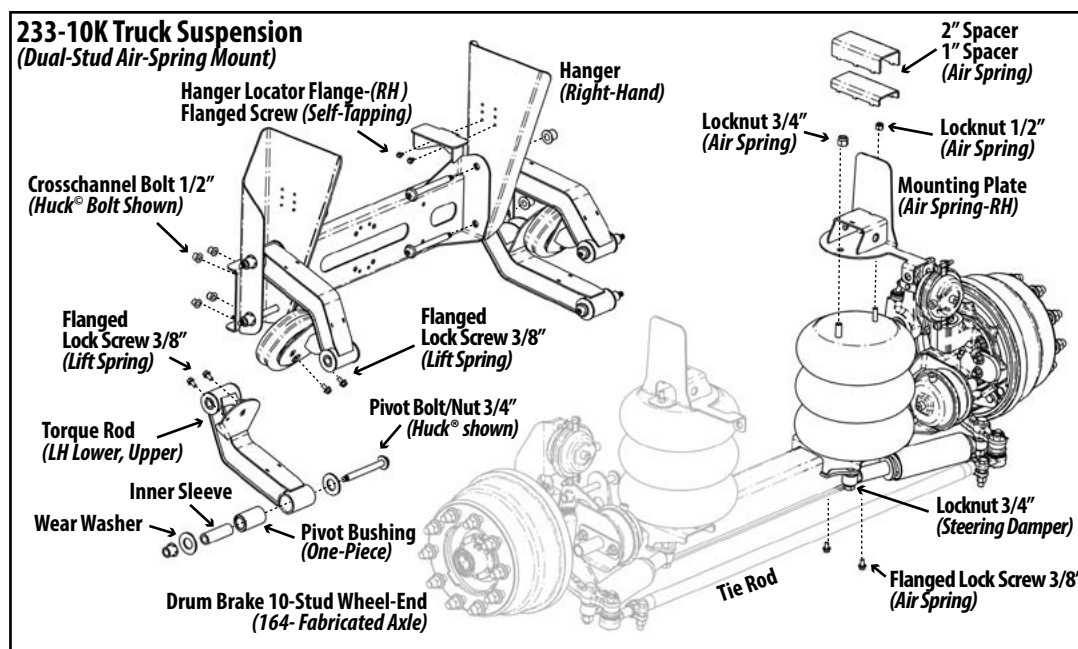
5. Refer to the engineering drawing for the recommended hanger/air spring mounting plate bolt-hole locations.

CAUTION If the recommended bolt-hole locations are not available, locate and drill the bolt-holes as far apart as possible to provide the most support for the assembled suspension.

Check to make sure that wires, hoses or other components located within the frame rail are not affected by drilling.

6. Center-punch and drill six bolt-holes in each hanger. Bolt each hanger to the frame with 5/8-inch Grade 8 bolts and locknuts.
7. Center-punch and drill two bolt-holes in each air spring mounting bracket. Bolt each air spring bracket to the frame with two 5/8-inch Grade 8 bolts and locknuts.
8. Install/connect the air control kit (ACK) to the suspension (Page 5). Check the air system after installation for leaks and proper operation of controls.
9. Perform final assembly and inspection and check the wheel toe setting (Page 4)

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



233-10K Truck Components Dual-Stud Air Spring Mount

Refer to the Steer Lock (S) version of the engineering drawing for the individual component part number.

Final Assembly and Inspection

1. Verify that all suspension component bolts/nuts are torqued to specifications.
2. Install wheels and tires.
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 reduce the air pressure could cause the vehicle's drive axles to rise from the ground and the vehicle could roll in an unsafe manner.
Do not lower the auxiliary axle while the vehicle is moving above 10 mph.
3. Check that tires are inflated to recommended pressure. Check wheel hubs for proper level of lubricant recommended by the manufacturer.
4. Lift the axle to the raised position. Check the air system tubing and connections for leaks.
5. Check that wheels can rotate freely and that brakes and slack adjusters are properly adjusted.
6. Raise and lower the suspension assembly (wheels and tires installed) through the entire range of travel. Make sure that sufficient clearance for air springs, brake chambers and other components has been provided.
7. Check the vehicle's reverse travel operations:
 - 7.1. Check steer-lock operation.
 - 7.2. Check automated system (if installed) to make sure that suspension raises/locks wheels during reverse travel.
8. Check wheel toe-in setting and adjust if necessary (between 1/32" and 3/32").

CAUTION Failure to check the reverse travel operation can result in vehicle/component damage and void the suspension warranty.

Regulate load with air spring pressure

The auxiliary axle load capacity 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 decreases as 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. Exceeding the capacity can cause component failure and void the warranty.

Wheel Toe Setting

Wheel toe is the relationship of the distance between the front of the tires and the distance between the rear of the tires on the same axle.

When the front distance is less than the rear distance, the wheels are in a "toe-in" (positive toe) condition.

Check Wheel Toe Setting

The correct setting for the RSS-233 suspension should be a positive toe-in between 1/32" and 3/32".

1. Deflate the air springs.
2. Lift the axle enough for tires to rotate freely. Support with jack stands to ensure axle is level.
3. Position tires to point straight ahead. Spin each tire. Use a piece of chalk to mark a line on the center tread all the way around each tire.
4. Use a tape measure to measure the distance between the center mark at the front and the rear of the tires.
5. Subtract the distance measured at the front of the tires from the distance measured at the rear of the tires to obtain the wheel toe setting (between 1/32" and 3/32").

Adjust Wheel Toe

1. Loosen the clamps on both ends of the tie rod. Twist the tie rod forward/backward to move the front of the tires towards or away from each other (increase/decrease toe-in setting).
2. Continue rotating the tie rod until the proper toe-in setting is achieved.
3. Torque tie-rod clamps to 60-80 ft-lb (81-108 N-m).

Figure 3.
Plumbing Example - 1200039
(Quick Exhaust (QE) Valves)
Panel-Mount ACK w/ Electric
Controls for Lift-In-Reverse

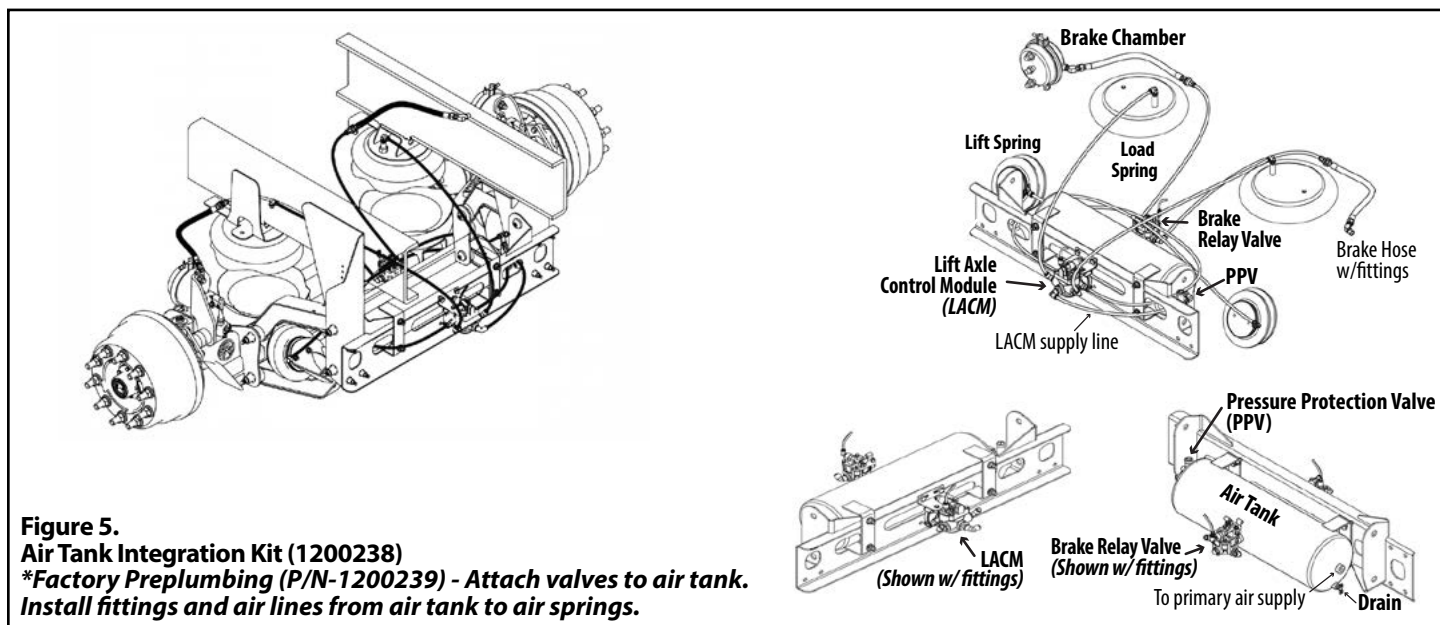


Figure 4.
Plumbing Example 1200115
(Air Control Kit Panel)
Lift Axle Control Module
(LACM) with Lift-In-Reverse



Air Tank Integration Kit (*Factory Preplumbing Available)

Part Number	Part Number- *Preplumbing	Item Description	Air Tank- 1300 - Cu In	Pressure Protection Valve (PPV)	Lift Axle Control Module (LACM)	Brake Relay Valve	Quick Exhaust Valve (QE)
1200238	1200239	233-10K Truck with Drum Brakes Lift Axle Control Module (LACM) Kit <i>(inc Brake Relay & PPV)</i> <i>*Install valves; fittings and air lines from air tank to air springs.</i>	1230204	1230060	1230195	1230081	
1200262	1200263	233-10K Truck with Drum Brakes LACM Only (No Brake Relay Valve); includes PPV <i>*Install valves; fittings and air lines from air tank to air springs.</i>					
1200260	1200261	233-10K Truck with Drum Brakes Quick Exhaust (QE) Valve Kit <i>(inc Brake Relay & PPV)</i> <i>*Install valves; fittings and air lines from air tank to air springs.</i>					1230078 (2) valves needed



Recommended Service Intervals

Ridewell Suspensions recommends these minimum service intervals for standard duty, on-highway usage suspension applications.

More frequent service intervals are recommended for off-highway/heavier duty applications.

Daily/Pre-Trip Inspections

- ___ Visually inspect suspension structure for signs of damage or excessive wear.
- ___ Check for loose or missing bolts/nuts.
Check for irregular movement in suspension system components.
- ___ Check tires for proper inflation, road damage or excessive wear.
- ___ Check wheel-ends for obvious signs of lubricant leakage. Check for missing 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 (Page 9/ENG DWG).

Every 12,000 miles of use

- ___ Lubricate Brake Cam and Slack Adjuster.
- ___ Grease kingpin thrust bearings. Apply grease in upper and lower grease fittings until new grease is visible at the purge location. Wipe the excess grease from purge areas and grease fittings.
- ___ Inspect steering damper for damage/wear.
- ___ Inspect air springs for damage/excessive wear.
Torque bolts/nuts to spec (Page 9/ENG DWG).
- ___ Check air system for leaks.

First 50,000 miles of use

- ___ Check wheel-end/knuckle for excessive play.
- ___ Inspect tie-rod and tie-rod ends for excessive damage/wear. Lubricate tie-rod ends. Verify tie-rod boot is in place and completely over the end of tie-rod. Replace entire tie-rod end if boot is damaged.
- ___ Check pivot bushings for wear.
- ___ Torque all suspension system component bolts/nuts to specifications (Page 9/ENG DWG).
- ___ Check (reverse) steer lock operation (if equipped).
- ___ Verify operation of manual/automatic lift-in-reverse control system (if equipped).

Annual/100,000 Miles Inspection

- ___ Inspect pivot connections for worn bushings/wear washers. Replace if necessary. Torque pivot hardware to spec. (Pg 9/ENG DWG).
- ___ Check lubrication level in wheel-ends. Refill/Replace lubricant as needed.
(TMC RP 631-Wheel End Lubrication Procedure)
- ___ Check frame hanger and air spring mounting plate connections to frame.
- ___ Check air system for leaks.
- ___ Test air tank pressure protection valve (PPV) if equipped.
- ___ Check brakes/brake chambers for damage/function.

⚠ CAUTION Failure to exhaust all pressure from the air system before working on vehicle can cause serious injury.

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

Refer to these Technology & Maintenance Council (TMC) Recommended Procedures for additional information:

RP 607	Maintenance - S-Cam Brakes
RP 618	Wheel Bearing Adjustment Procedure
RP 619	Air System Inspection Procedure
RP 631	Wheel End Lubrication Procedures
RP 643	Air Ride Suspension MAINT Guidelines
RP 645	Tie-Rod End Maintenance
RP 652	Inspection/Service - Air Disc Brakes
RP 1515	Maintenance Guide - Auxiliary Axle

Available Wheel-End Lubricants

Lubricant Type	Part No.	Item Description
Mineral Oil	380008G	(CITGO) MP GearOil 631310001-80W-90
Synthetic Oil	1980006	(SHELL) Synthetic API GL-5 75W-90 Oil
Synthetic Hard-Pack Grease	1980007	(CITGO) Synthetic Grease



Scan/double-click the QR-Code or visit online support page for more info at www.ridewellcorp.com

233 10K TRUCK – BUSHING REPLACEMENT KIT

Part Number	Item Description	Size	Torque Values	
			foot-pound	Newton-meter
6040188	Traditional Hardware (HHCS/Locknut/Wear Washers)	3/4" -16NF	310 ft-lb	420 N-m
6040187	(No Pivot Hardware)			
Fasteners	Locknut - (Air Spring; Upper)	3/4" -16NF	50 ft-lb	68 N-m
	Locknut - (Air Spring; Upper)	1/2" -13NC	25 ft-lb	35 N-m
	Flanged Lock Screw - (Air Spring; Lower)	3/8" -16NC	25 ft-lb	35 N-m
	Flanged Lock Screw - (Lift Spring)	3/8" -16NC	25 ft-lb	35 N-m
	HHCS/Locknut - (Crosschannel)	1/2" -13NC	50 ft-lb	68 N-m
	Locknut - (Steering Damper)	3/4" -10NC	160 ft-lb	217 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. All fasteners must be re-torqued after first 6,000 miles of operation. Failure to install and maintain fasteners at torque specifications could result in suspension failure and void the warranty.

Vehicle Preparation

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 the air system could allow vehicle/suspension movement resulting in serious injury.

Bushing Replacement Procedure

Replace the eight pivot connection bushings and hardware at the same time (Figure 6).

1. Remove Huck® Collar by cutting/grinding. Take pivot connection apart. Discard pivot hardware. Discard wear washers.
2. Remove bushing assembly and discard.
3. Clean torque rod eye of debris/corrosion with a wire brush before installing bushing assembly.
4. Apply Energy Suspensions® Formula 5 Prelube to bore (inside) of the replacement bushing.
NOTE: Do not substitute - urethane bushing lubricant included with all replacement kits.
5. Install (press) bushing into the torque rod eye.
NOTE: Mallet/press needed to install bushing.
6. Press inner sleeve into the installed bushing. Center the sleeve inside the bushing so that the sleeve ends extend slightly past the bushing sides.
7. Assemble pivot connection with one wear washer on each side of the bushing.
The inner sleeve of the bushing must be flush with or extend slightly past the outside of the wear washers after assembly.
8. Torque pivot hardware to specifications (chart/engineering drawing).
9. Reassemble suspension, if necessary. Torque to specifications (chart/engineering drawing).
10. Check wheel toe-in setting (between 1/32" and 3/32") and adjust, if necessary (Page 5).

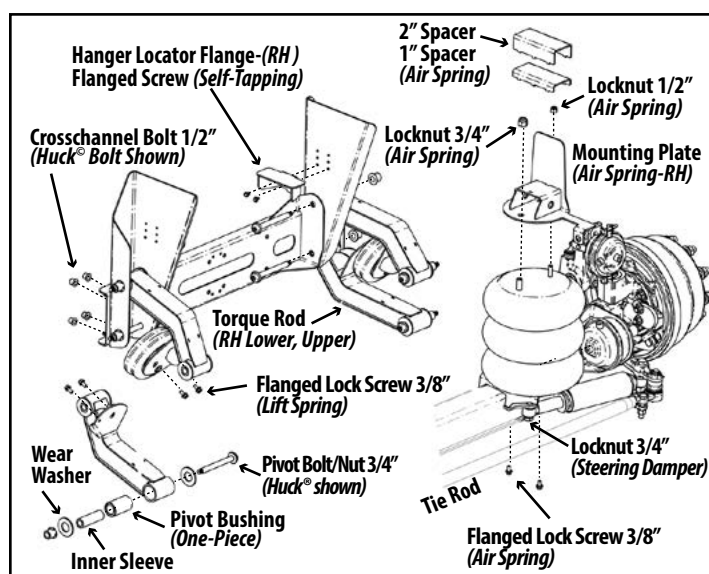
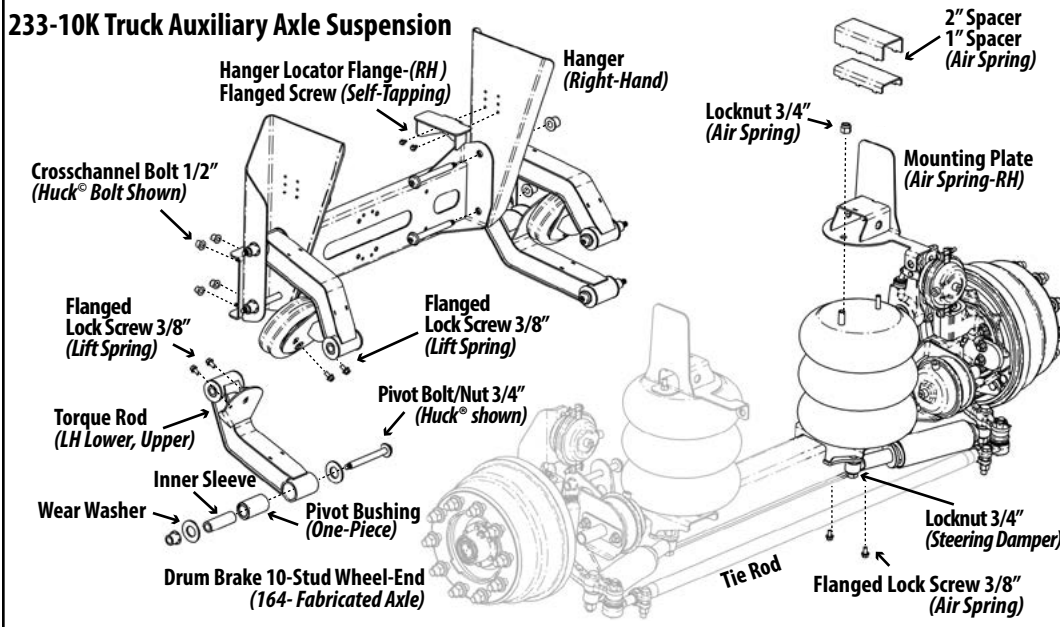


Figure 6.
Bushing replacement kits include one-piece bushings, wear washers and hardware components for eight pivot connections.

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

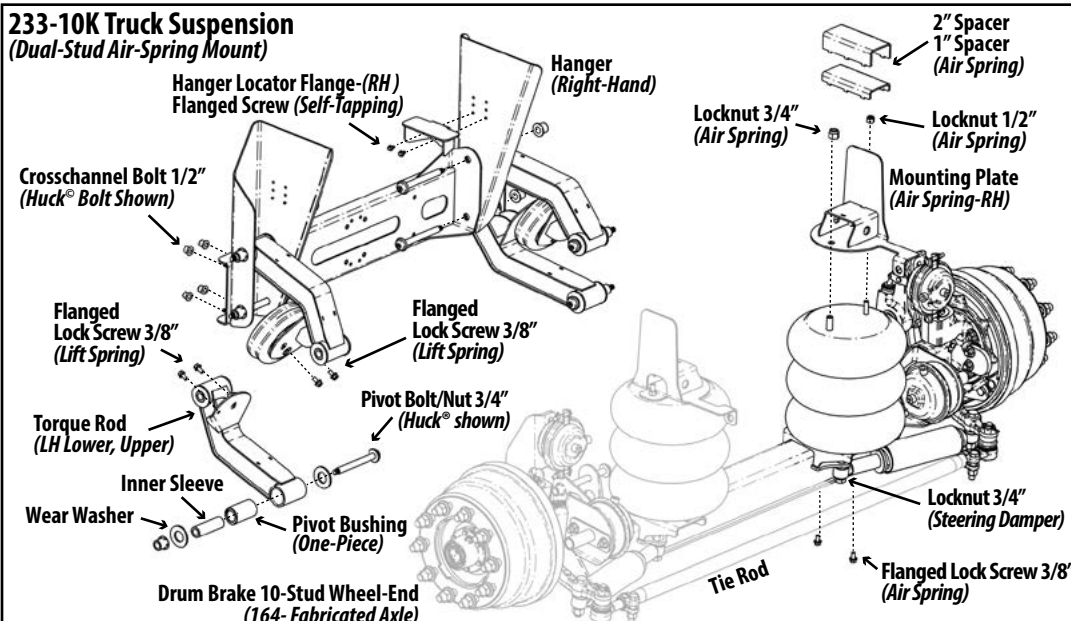
233-10K Truck Auxiliary Axle Suspension



233-10K Truck Components – Single Locknut - Upper Air Spring

Refer to the Steer Lock (S) version of the engineering drawing for the individual component part number.

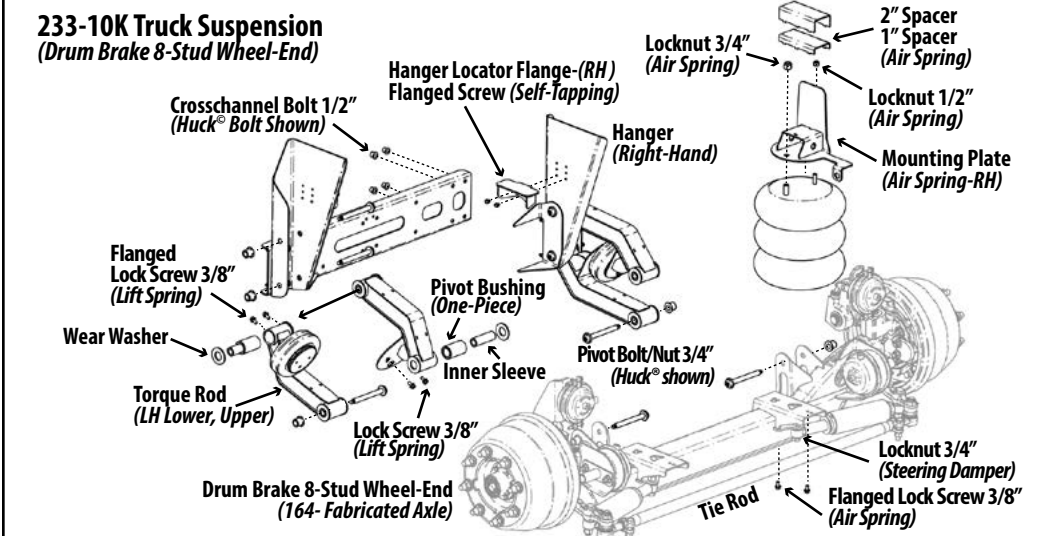
233-10K Truck Suspension (Dual-Stud Air-Spring Mount)



233-10K Truck Components Dual-Stud Air Spring Mount

Refer to the Steer Lock (S) version of the engineering drawing for the individual component part number.

233-10K Truck Suspension (Drum Brake 8-Stud Wheel-End)



233-10K Truck Components (Drum Brake 8-Stud Wheel-End)

Refer to the Steer Lock (S) version of the engineering drawing for the individual component part number.

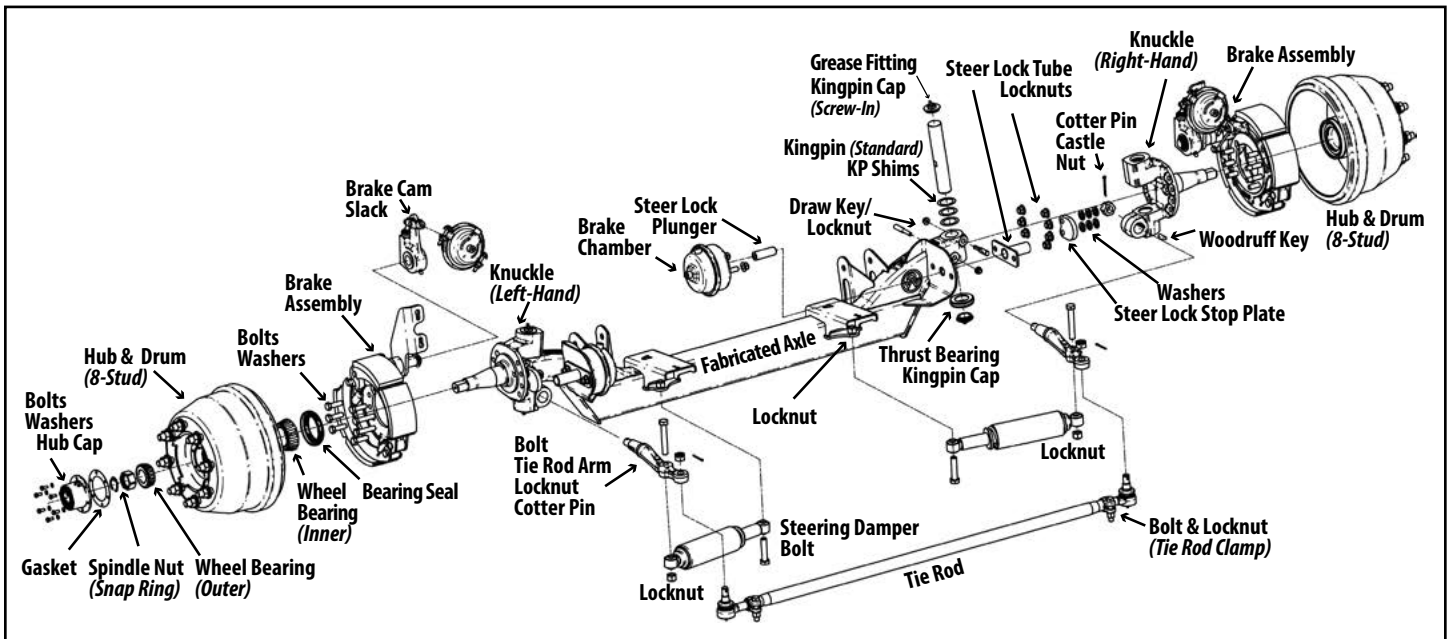


Figure 7.
8-Stud-Drum Brake FAXL-Steer Lock; Standard Kingpin shown; Kaiser Kingpin available (1640028_(S) Chartist Drawing Shown)
 Refer to the Steer Lock (S) version of the engineering drawing for the component part number.

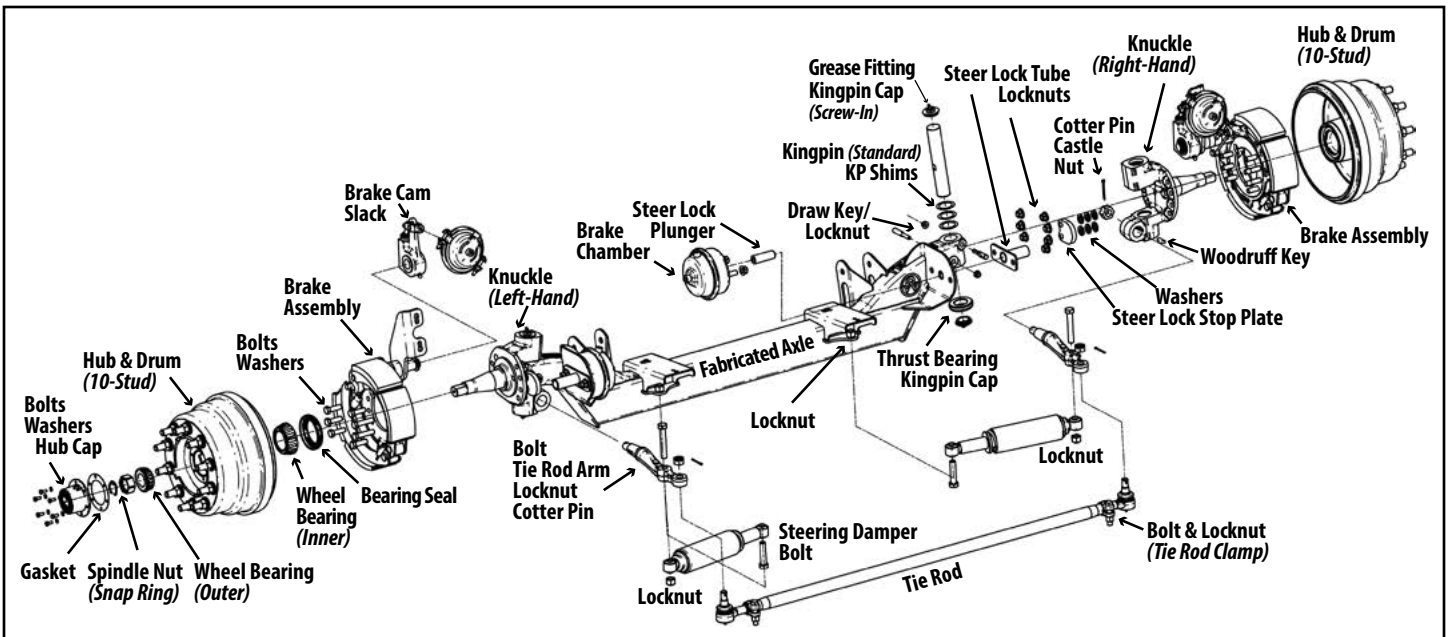


Figure 8.
10-Stud-Drum Brake FAXL-Steer Lock; Standard Kingpin shown; Kaiser Kingpin available (1640028_(S) Chartist Drawing Shown)
 Refer to the Steer Lock (S) version of the engineering drawing for the individual component part number.

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.