RSS 233/232 Auxiliary Axle Suspension KINGPIN/BUSHING – SERVICE PARTS GUIDE

RIDEWELL SUSPENSIONS
The Engineered Suspension Company

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.

www.ridewellcorp.com **(800) 641-4122**

Suspension Identification Tag

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

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 suspension number/part number and serial number when contacting the Ridewell Customer Service Department for replacement parts/warranty information.

Scan the QR-Code or double-click the image to view the Ridewell Installation and Service Manual support page.

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Auxiliary Axle – Self-Steering Option

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-steering mode during reverse travel to avoid damage.

Ridewell Suspensions strongly recommends the use of automated systems that raise/lock the liftable axle during reverse travel.

If an automated system is not installed, the installation of a visual/audible indicator to assist the driver in manual operation of the lift-in-reverse system is strongly recommended.

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

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

All work should be completed by a trained technician using the proper tools and safe work procedures.

This guide uses two types of service notes defined as:

"NOTE:" Provides instructions or procedures to complete tasks and ensure the suspension functions properly.

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

Kingpin Identification *(Shape of Kingpin Cap; Westport or Meritor Knuckle)*

Kingpin Cap Shape – 8K-10K-13K Suspension

Standard KP Cap

MERITOR Knuckle 232 (8K-10K-13K)

Kaiser KP Cap

MERITOR Knuckle 232 (8K-10K-13K)

Standard KP Cap *(Screw-In)* & Kaiser KP Cap *(Screw-In)*

WESTPORT Knuckle 232 (8K-10K-13K)

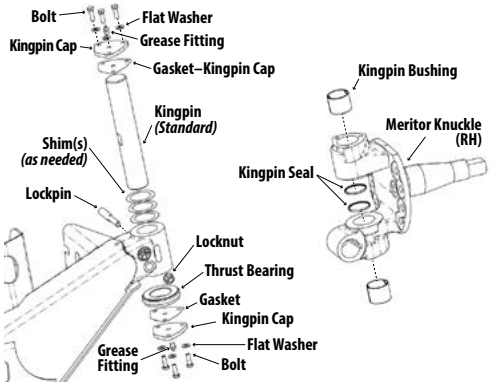
MERITOR Knuckle Not used–233 SUSP

Standard KP Cap *(Screw-In)*

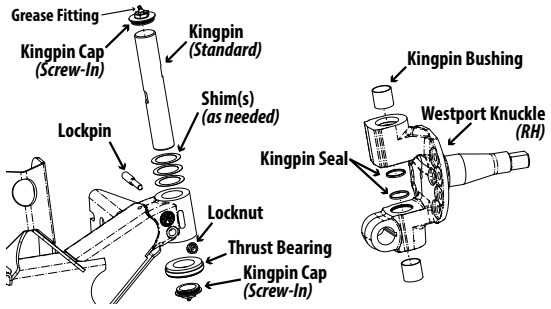
WESTPORT Knuckle 233 (8K-10K-13K)

Kaiser KP Cap *(Screw-In)*

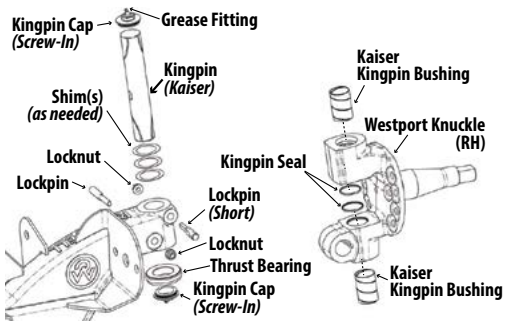
WESTPORT Knuckle 233 (8K-10K-13K)



(232) Standard kingpin (Meritor knuckle)



Standard kingpin (Westport knuckle)



Kaiser kingpin (Westport knuckle)

Kingpin Cap Shape – 20K Suspension

Standard KP Cap

MERITOR Knuckle 232 (20K)

Standard KP Cap

WESTPORT Knuckle 232 (20K)

Kaiser KP Cap

WESTPORT Knuckle 232 (20K)

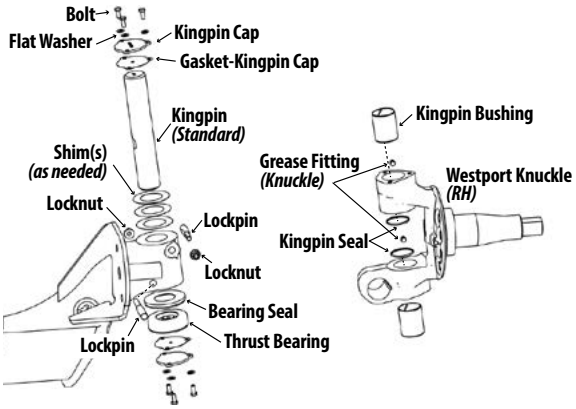
MERITOR Knuckle Not used–233 SUSP

Standard Kingpin Cap

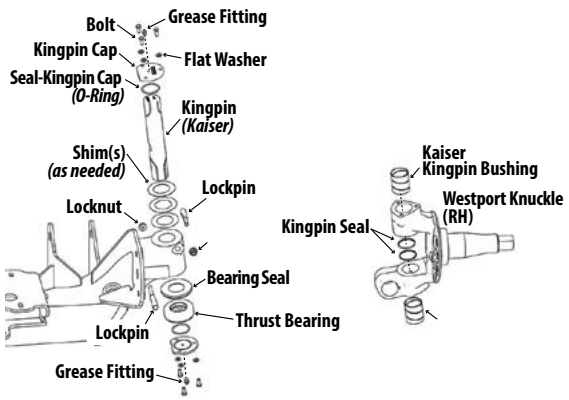
WESTPORT Knuckle 233 (20K)

Kaiser Kingpin Cap

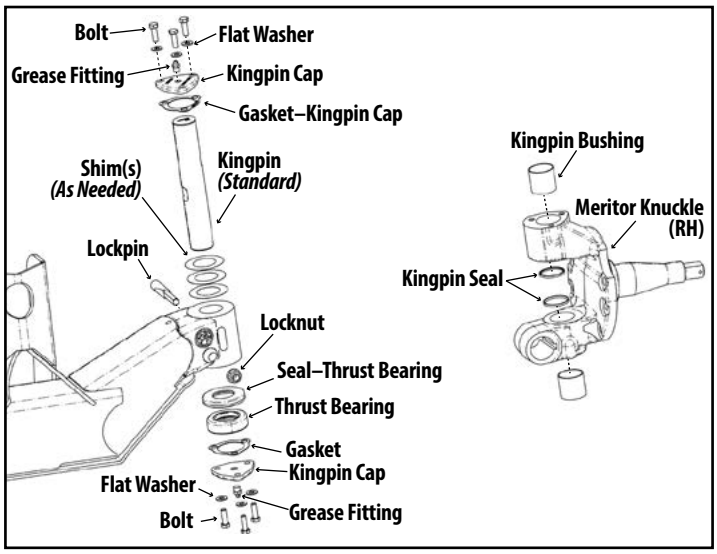
WESTPORT Knuckle 233 (20K)



Standard kingpin (Westport knuckle)



Kaiser kingpin (Westport knuckle)

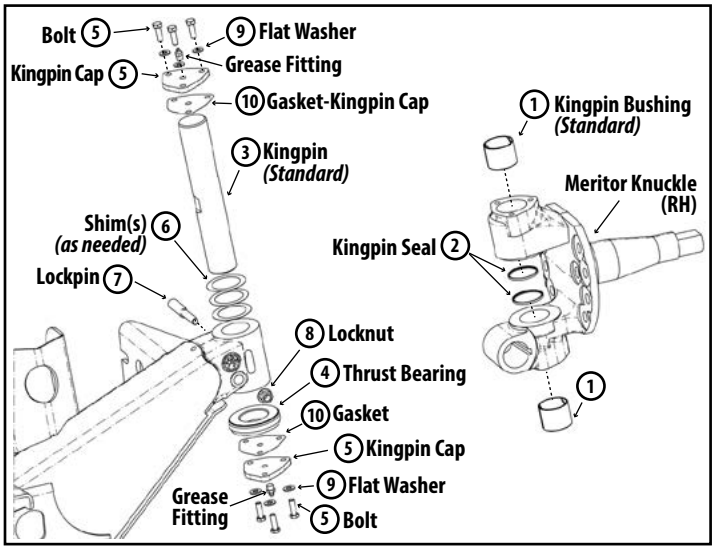


Standard Kingpin Cap

MERITOR Knuckle
232 (8K-10K-13K)

232-8K Truck (Meritor Knuckle; Standard Kingpin)

Diagram No.	QTY/Axle	Part Number	Item Description
	(1)	1660170	Kingpin Replacement Kit (FC-941)
—			Meritor #R201318 *(Pg 13 - Standard KP bushing - bore reaming required)*

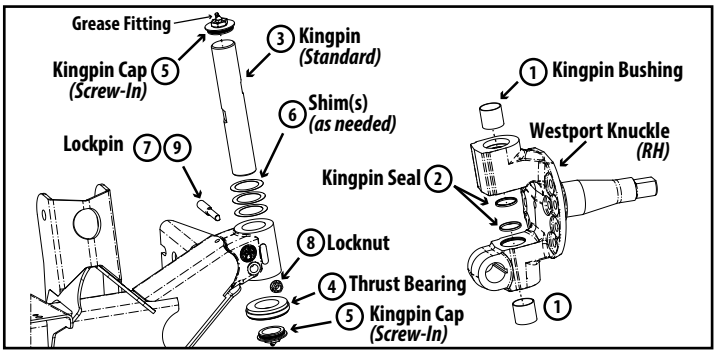


Standard Kingpin Cap

MERITOR Knuckle
232 (8K-10K-13K)

232-10K or 13K Truck/Trailer (Meritor Knuckle; Standard Kingpin)

DGM No.		QTY/Axle	Part Number	Item Description
		(1)	1660106	Kingpin Replacement Kit
Included in Replacement Kit	1	4	1660241	KINGPIN BUSH FF/FG R210088 *(Pg 13 - Standard KP bushing - bore reaming required)*
	2	4	1660131	SEAL ASY KINGPIN FG-941
	3	2	1660135	KINGPIN FF/FG STEMCO 105.21.03
	4	2	1660009	THRUST BRNG ASY T1822S 12/16K
	5	2	1660133	KINGPIN CAP KIT FG-941 MERITOR (2297T4752S; TWO CAPS; SIX HHCS)
	6	2	1660136	SHIM - KINGPIN .005" FF/FG
		2	1660137	SHIM - KINGPIN .010" FF/FG
		2	1660138	SHIM - KINGPIN .015" FF/FG
	7	2	1660139	LOCK PIN .44/20 3.88" 13.2
	8	2	1150001	L'NUT 7/16" 20NF FL T-L GR5 (B)
	9	12	1160004	FLAT WASHER - 5/16" SAE PLTD
	10	4	1660132	GSKT KINGPIN CAP FG-941

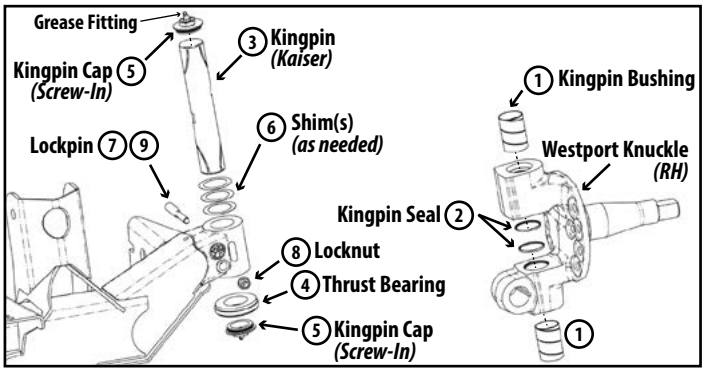


Standard KP *(Screw-In Cap)*
Kaiser KP *(Screw-In Cap)*

WESTPORT Knuckle
232 (8K-10K-13K)

232 10K or 13K Truck/Trailer (Westport Knuckle; Standard Kingpin)

Diagram No.		QTY/Axle	Part Number	Item Description
		(1)	1660317	**Kingpin Replacement Kit**
Included in Replacement Kit	1	4	1660241	KINGPIN BUSH FF/FG R210088 *(Pg 13 - Standard KP bushing - bore reaming required)*
	2	4	1660131	SEAL ASY KINGPIN FG-941
	3	2	1660135	KINGPIN FF/FG STEMCO 105.21.03
	4	2	1660009	BRNG ASY T1822S 12/16K THRUST
	5	4	1660014	KINGPIN CAP 12/16K SCREW IN
	6	2	1660136	SHIM - KINGPIN .005" FF/FG
		2	1660137	SHIM - KINGPIN .010" FF/FG
		2	1660138	SHIM - KINGPIN .015" FF/FG
	7	2	1660139	LOCK PIN .44/20 3.88" (13K)
	8	4	1150001	L'NUT 7/16" 20NF FL T-L GR5 (B)
	9	2	1660216	LOCK PIN .44/20 3.18″ (20K)



Standard KP *(Screw-In Cap)*
Kaiser KP *(Screw-In Cap)*

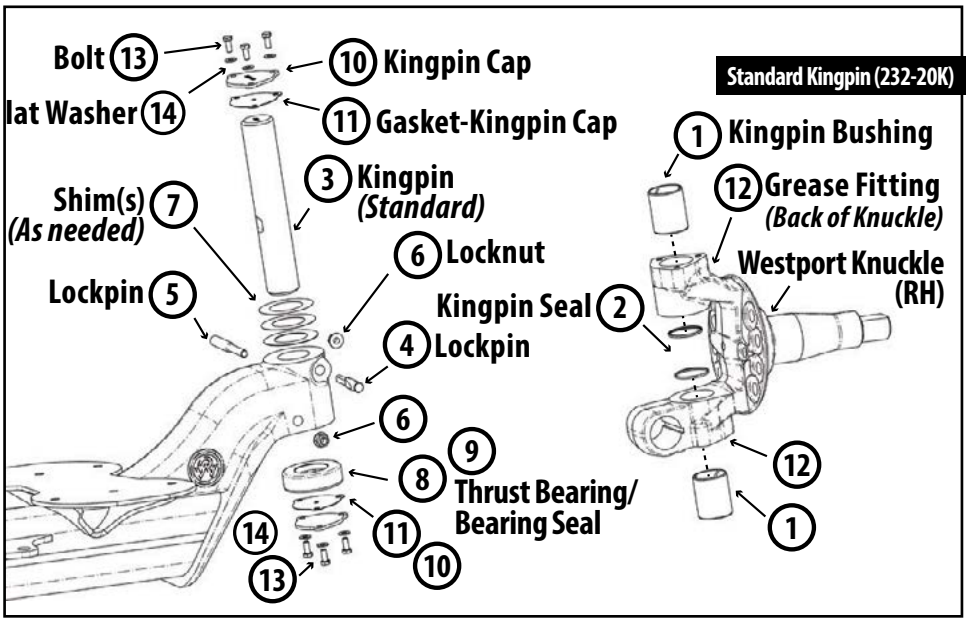
WESTPORT Knuckle
232 (8K-10K-13K)

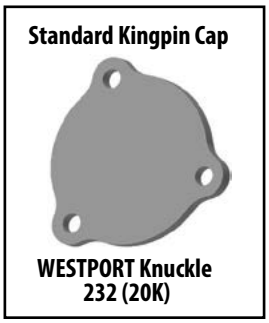
Kaiser Kingpin Cap

MERITOR Knuckle
232 (8K-10K-13K)

232 10K or 13K Truck/Trailer (Meritor or Westport Knuckle; Kaiser Kingpin)

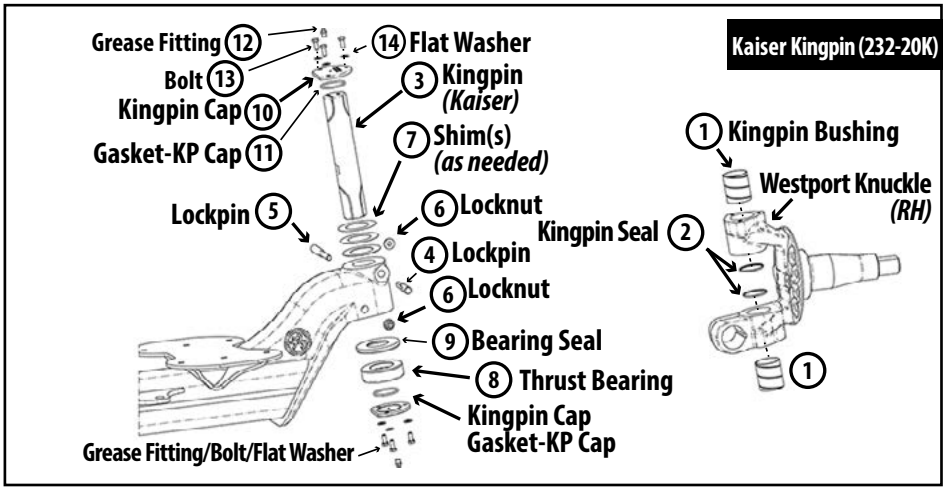
Diagram No.		QTY/Axle	Part Number	Item Description
		(1)	1660261	**Kingpin Replacement Kit FG-941 (Kaiser KP; Meritor Knuckle)**
—				#KG931-R *(Pg 15 - Kaiser KP bushing - No bore reaming needed)*
		(1)	1660319	**Kingpin Replacement Kit (Kaiser KP; Westport Knuckle)**
Included in Replacement Kit	1	4	1660322	KINGPIN BUSH KAI 13K *(Pg 14 - Kaiser KP bushing - No bore reaming needed)*
	2	4	1660131	SEAL ASY KINGPIN FG-941
	3	2	1660314	KINGPIN FF/FG KAI #10M21-3 *(1.8″ OD)*
	4	2	1660009	THRUST BRNG ASY T1822S 12/16K
	5	4	1660014	KINGPIN CAP 12/16K SCREW IN
	6	2	1660136	SHIM - KINGPIN .005" FF/FG
		2	1660137	SHIM - KINGPIN .010" FF/FG
		2	1660138	SHIM - KINGPIN .015" FF/FG
	7	2	1660139	LOCK PIN .44/20 3.88" 13.2
	8	4	1150001	L'NUT 7/16" 20NF FL T-L GR5(B)
	9	2	1660216	LOCK PIN .44/20 3.18″ 20K



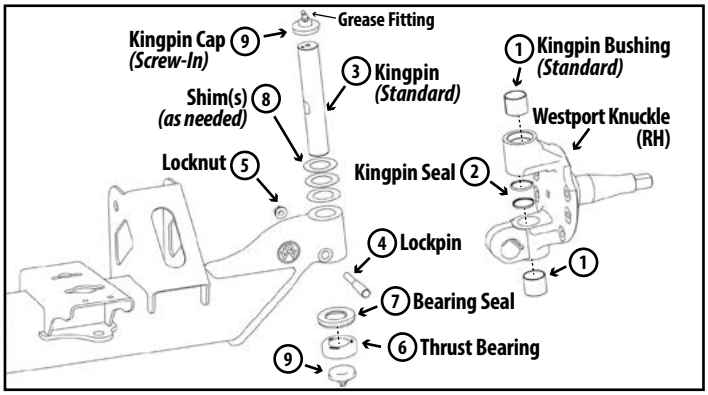


232 20K Truck/Trailer (Meritor or Westport Knuckle; Standard Kingpin)

Diagram No.		QTY/Axle	Part Number	Item Description
		(1)	1660326	**Kingpin Replacement Kit FL-941 (Meritor Knuckle; Standard KP)**
—				Meritor #R201312 *(Pg 13 - Standard KP bushing - bore reaming required)*
		(1)	1660324	**Kingpin Replacement Kit (Westport Knuckle; Standard KP)**
Included in Replacement Kit	1	4	1660323	KINGPIN BUSH WSTPT 20K FL *(Pg 12 - Standard KP bushing - bore reaming required)*
	2	4	1660316	SEAL ASY KINGPIN FL-941
	3	2	1660221	KINGPIN FL943 WP #143660-0006 *(2″ OD)*
	4	2	1660216	LOCK PIN .44/20 3.18" 20K
	5	2	1660217	LOCK PIN .44/20 4.75" 20K
	6	4	1150001	L'NUT 7/16" 20NF FL T-L GR5(B)
	7	2	1660218	SHIM KINGPIN-.005"THK FL-943
		2	1660219	SHIM KINGPIN-.015"THK FL-943
		2	1660220	SHIM KINGPIN-.030"THK FL-943
	8	2	1660224	BRNG ASY T-208 FL-943 (THRUST)
	9	2	1660225	KINGPIN BRNG SEAL T-208 FL
	10	4	1660222	KINGPIN CAP WP 20K
	11	4	1660223	KINGPIN CAP GSKT WP 20K
	12	4	1660134	GREASE FITTING 1/8"(FF/FG)
	13	12	1140064	HEX HEAD CAP SCREW 5/16" 18NC GR8 3/4" LGTH
	14	12	1160004	FLAT WASHER 5/16″ SAE PLTD



232 20K Truck/Trailer (Meritor or Westport Knuckle; Kaiser Kingpin)				
Diagram No.		**QTY/Axle**	**Part Number**	**Item Description**
		(1)	**1660189**	**Kingpin Replacement Kit (Meritor Knuckle; Kaiser KP)**
—				Meritor #KH931-L *(Pg 15 - Kaiser KP bushing - No bore reaming needed)*
		(1)	**1660325**	**Kingpin Replacement Kit (Westport Knuckle; Kaiser KP)**
Included in Replacement Kit	**1**	**4**	**1660315**	KINGPIN BUSH KAI 20K FL *(Pg 15 - Kaiser KP bushing - No bore reaming needed)*
	2	**4**	**1660316**	SEAL ASY KINGPIN FL-941
	3	**2**	**1660231**	KINGPIN FL SER. KAI 20K (2″ OD)
	4	**2**	**1660216**	LOCK PIN .44/20 3.18" 20K
	5	**2**	**1660217**	LOCK PIN .44/20 4.75" 20K
	6	**4**	**1150001**	L'NUT 7/16" 20NF FL T-L GR5 (B)
	7	**2**	**1660218**	SHIM KINGPIN-.005"THK FL-943
		2	**1660219**	SHIM KINGPIN-.015"THK FL-943
		2	**1660220**	SHIM KINGPIN-.030"THK FL-943
	8	**2**	**1660224**	BRNG ASY T-208 FL-943 (THRUST)
	9	**2**	**1660225**	KINGPIN BRNG SEAL T-208 FL
	10	**4**	**1660232**	KINGPIN CAP FL SER KAI 20K
	11	**4**	**1660233**	O-RING CAP SEAL FL SER. KAI
	12	**4**	**1660134**	Grease Fitting 1/8"(FF/FG)
	13	**12**	**1140064**	Hex Head Cap Screw 5/16" 18NC GR8 3/4" Lgth
	14	**12**	**1160004**	Flat Washer 5/16″ SAE PLTD

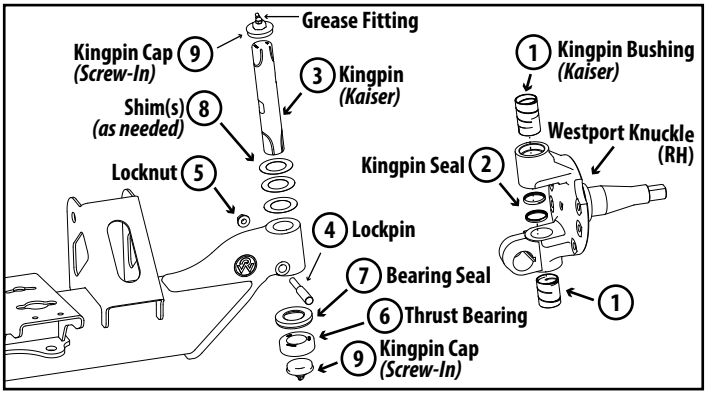


Standard KP *(Screw-In Cap)*

WESTPORT Knuckle 233 (8K-10K-13K)

233 8K Truck (Westport Knuckle; Standard Kingpin)

Diagram No.		QTY/Axle	Part Number	
		(1)	1660534	**Kingpin Replacement Kit (Standard KP; Westport Knuckle)**
Included in Replacement Kit	1	4	1660545	KINGPIN BUSH WSTPT 8K *(Pg 13 - Standard KP bushing - bore reaming required)*
	2	4	1660544	SEAL KINGPIN WSTPT 8K
	3	2	1660469	KINGPIN FC/8K WP #143660-0013 *(1.5" OD)*
	4	2	1660139	LOCK PIN .44/20 3.88" 13.2
	5	2	1150001	L'NUT 7/16" 20NF FL T-L GR5(B)
	6	2	1660473	BRNG ASY T-149 FC/8K (THRUST)
	7	2	1660474	KINGPIN BRNG SEAL T-149 FC
	8	2	1660475	SHIM KINGPIN-.005"THK "FC"
		2	1660476	SHIM KINGPIN-.010"THK "FC"
		2	1660477	SHIM KINGPIN-.015"THK "FC"
	9	4	1660472	KINGPIN CAP FC/8K SCREW IN

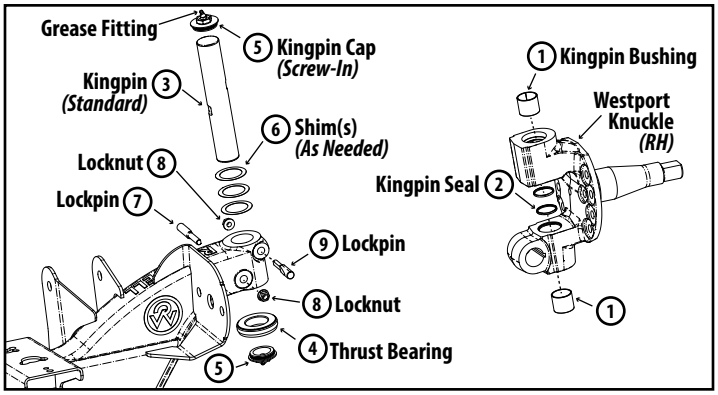


Kaiser KP *(Screw-In Cap)*

WESTPORT Knuckle 233 (8K-10K-13K)

233 8K Truck (Westport Knuckle; Kaiser Kingpin)

Diagram No.		QTY/Axle	Part Number	Item Description
		(1)	1660533	**Kingpin Replacement Kit (Kaiser KP; Westport Knuckle)**
Included in Replacement Kit	1	4	1660483	KINGPIN BUSH KAI 8K FC *(Pg 15 - Kaiser KP bushing - No bore reaming needed)*
	2	4	1660484	SEAL KINGPIN KAI 8K FC
	3	2	1660482	KINGPIN FC SER. KAI 8K *(1.5" OD)*
	4	2	1660139	LOCK PIN .44/20 3.88" 13.2 (Draw Key)
	5	2	1150001	L'NUT 7/16" 20NF FL T-L GR5(B)
	6	2	1660473	BRNG ASY T-149 FC/8K (THRUST)
	7	2	1660474	KINGPIN BRNG SEAL T-149 FC
	8	2	1660475	SHIM KINGPIN-.005"THK "FC"
		2	1660476	SHIM KINGPIN-.010"THK "FC"
		2	1660477	SHIM KINGPIN-.015"THK "FC"
	9	4	1660472	KINGPIN CAP FC/8K SCREW IN

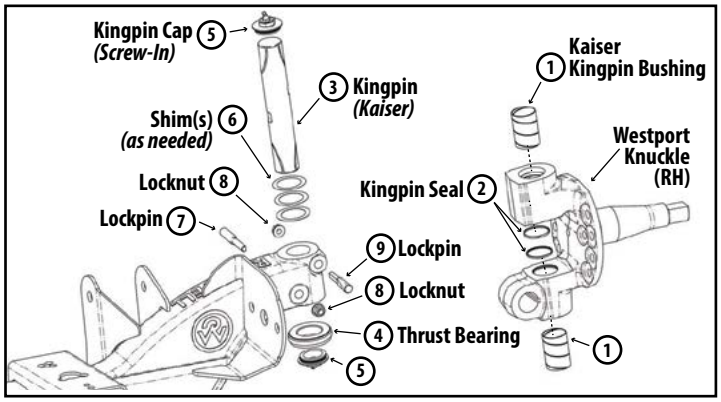


Standard KP *(Screw-In Cap)*

WESTPORT Knuckle 233 (8K-10K-13K)

233 10K or 13K Truck/Trailer (Westport Knuckle; Standard Kingpin)

Diagram No.		QTY/Axle	Part Number	Item Description
		(1)	1660317	Kingpin Replacement Kit (Westport Knuckle; Standard KP)
Included in Replacement Kit	1	4	1660241	KINGPIN BUSH FF/FG *(Pg 13 - Standard KP bushing - bore reaming required)*
	2	4	1660131	SEAL ASY KINGPIN FG-941
	3	2	1660135	KINGPIN FF/FG 13K (1.8″ OD)
	4	2	1660009	BRNG ASY T1822S 12/16K THRUST
	5	4	1660014	KINGPIN CAP 12/16K SCREW IN
	6	2	1660136	SHIM - KINGPIN .005" FF/FG
		2	1660137	SHIM - KINGPIN .010" FF/FG
		2	1660138	SHIM - KINGPIN .015" FF/FG
	7	2	1660139	LOCK PIN .44/20 3.88" 13.2
	8	4	1150001	L'NUT 7/16" 20NF FL T-L GR5 (B)
	9	2	1660216	LOCK PIN .44/20 3.18″ 20K

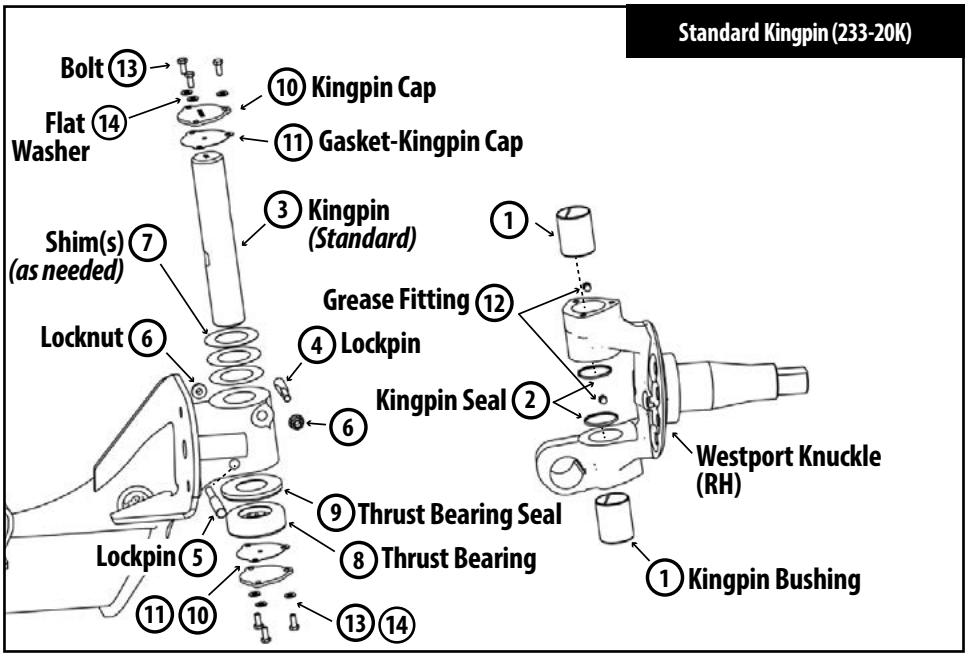


Kaiser KP *(Screw-In Cap)*

WESTPORT Knuckle 233 (8K-10K-13K)

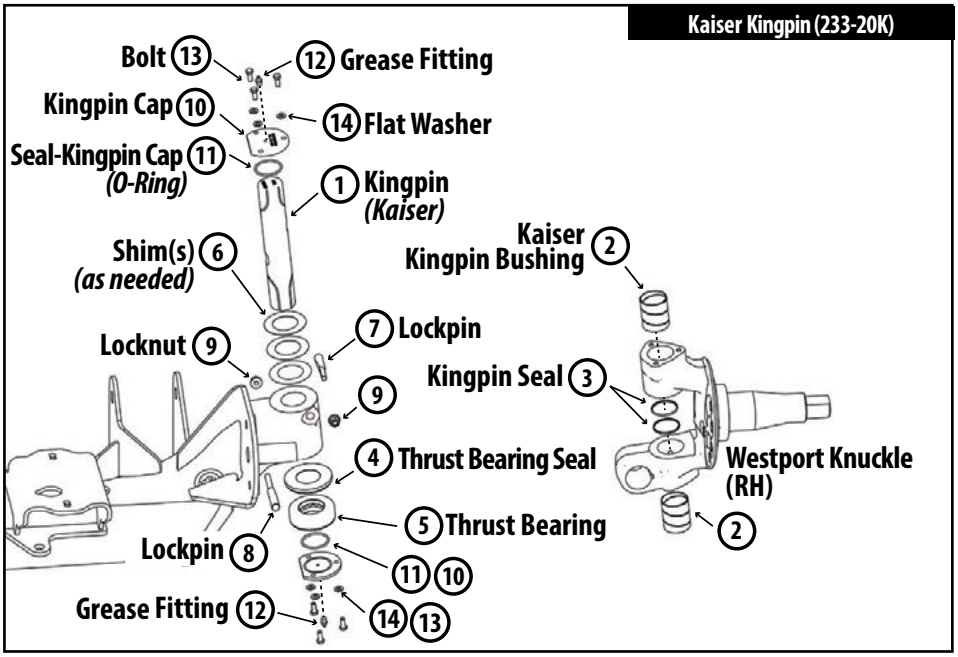
233 10K-13K Truck/Trailer (Westport Knuckle; Kaiser Kingpin)

Diagram No.		QTY/Axle	Part Number	Item Description
		(1)	1660319	Kingpin Replacement Kit (Westport Knuckle; Kaiser KP)
Included in Replacement Kit	1	4	1660322	KINGPIN BUSH KAI 13K *(Pg 15 - Kaiser KP bushing - No bore reaming needed)*
	2	4	1660131	SEAL ASY KINGPIN FG-941
	3	2	1660314	KINGPIN FF/FG KAI #10M21-3 (1.8″ OD)
	4	2	1660009	BRNG ASY T1822S 12/16K THRUST
	5	4	1660014	KINGPIN CAP 12/16K SCREW IN
	6	2	1660136	SHIM - KINGPIN .005" FF/FG
		2	1660137	SHIM - KINGPIN .010" FF/FG
		2	1660138	SHIM - KINGPIN .015" FF/FG
	7	2	1660139	LOCK PIN .44/20 3.88" 13.2
	8	4	1150001	L'NUT 7/16" 20NF FL T-L GR5 (B)
	9	2	1660216	LOCK PIN .44/20 3.18″ 20K



233 20K Truck/Trailer (Westport Knuckle; Standard Kingpin)

Diagram No.		Qty/Axle	Part Number	Item Description
		(1)	1660324 – Kingpin Replacement Kit (Westport Knuckle; Standard KP)	
Included in Replacement Kit	1	4	1660323	KINGPIN BUSH WSTPT 20K *(Pg 13 - Standard KP bushing - bore reaming required)*
	2	4	1660316	SEAL ASY KINGPIN FL-941
	3	2	1660221	KINGPIN FL943 WP #143660-0006
	4	2	1660216	LOCK PIN .44/20 3.18" 20K
	5	2	1660217	LOCK PIN .44/20 4.75" 20K
	6	4	1150001	L'NUT 7/16" 20NF FL T-L GR5(B)
	7	2	1660218	SHIM KINGPIN-.005"THK FL-943
		2	1660219	SHIM KINGPIN-.015"THK FL-943
		2	1660220	SHIM KINGPIN-.030"THK FL-943
	8	2	1660224	BRNG ASY T-208 FL-943 (THRUST)
	9	2	1660225	KINGPIN BRNG SEAL T-208 FL
	10	4	1660222	KINGPIN CAP WP 20K
	11	4	1660223	KINGPIN CAP GSKT WP 20K
	12	4	1660134	GREASE FITTING 1/8"(FF/FG)
	13	12	1140064	HEX HEAD CAP SCREW 5/16" 18NC GR8 3/4" LGTH
	14	12	1160004	FLAT WASHER 5/16″ SAE PLTD



233 20K Truck/Trailer (Westport Knuckle; Kaiser Kingpin)				
Diagram No.		Qty/Axle	Part Number	Item Description
		(1)	1660325 - Kingpin Replacement Kit (Westport Knuckle; Kaiser KP)	
Included in Replacement Kit	1	2	1660231	KINGPIN FL SER. KAI 20K
	2	4	1660315	KINGPIN BUSH KAI 20K *(Pg 15 - Kaiser KP bushing - No bore reaming needed)*
	3	4	1660316	SEAL ASY KINGPIN FL-941
	4	2	1660225	KINGPIN BRNG SEAL T-208 FL
	5	2	1660224	BRNG ASY T-208 FL-943 (THRUST)
	6	2	1660218	SHIM KINGPIN-.005"THK FL-943
		2	1660219	SHIM KINGPIN-.015"THK FL-943
		2	1660220	SHIM KINGPIN-.030"THK FL-943
	7	2	1660216	LOCK PIN .44/20 3.18" 20K
	8	2	1660217	LOCK PIN .44/20 4.75" 20K
	9	4	1150001	L'NUT 7/16" 20NF FL T-L GR5(B)
	10	4	1660232	KINGPIN CAP FL SER KAI 20K
	11	4	1660233	O-RING CAP SEAL FL SER. KAI
	12	4	1660134	GREASE FITTING 1/8"(FF/FG)
	13	12	1140064	HEX HEAD CAP SCREW 5/16" 18NC GR8 3/4" L
	14	12	1160004	FLAT WASHER 5/16"

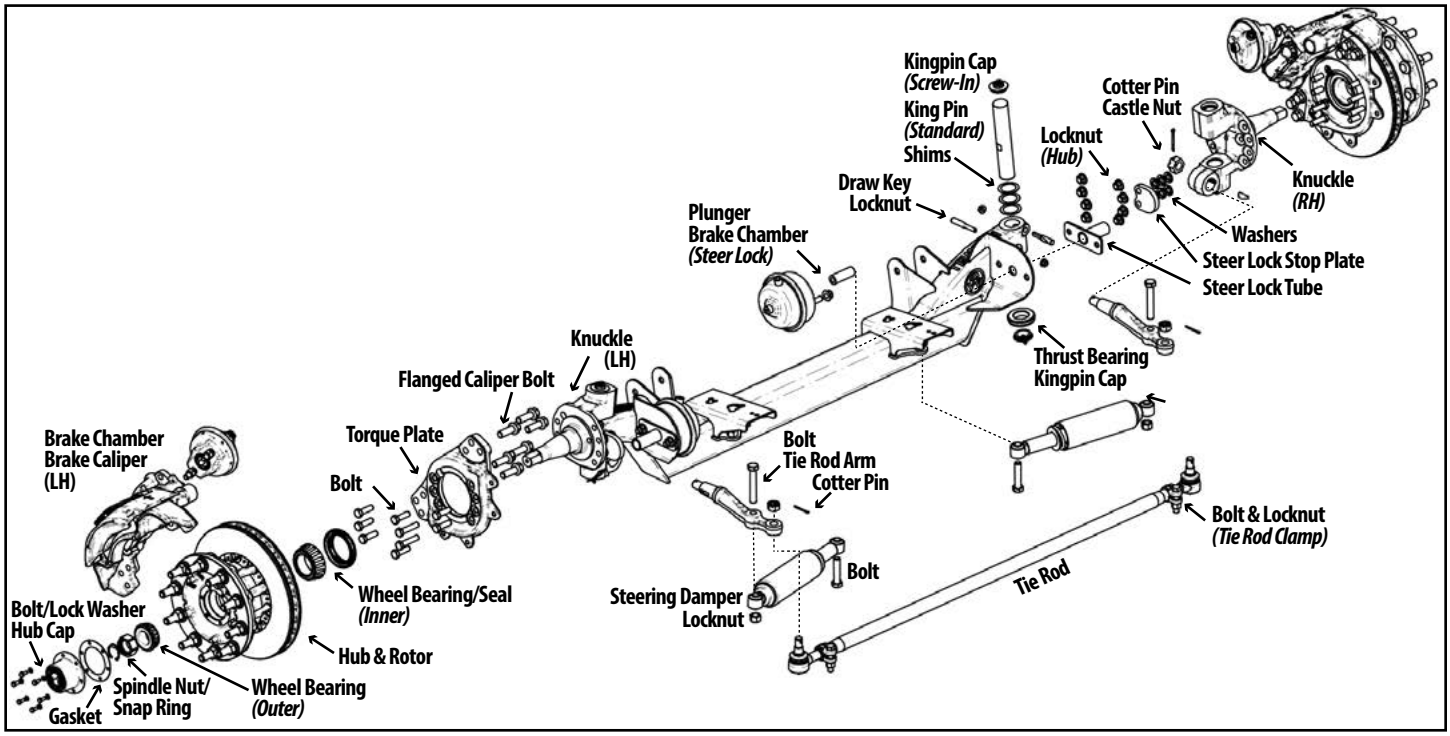


Figure 1.
ADB Axle Components *(Reference only)* 233T-13K Suspension – Westport Knuckle; Standard Kingpin.

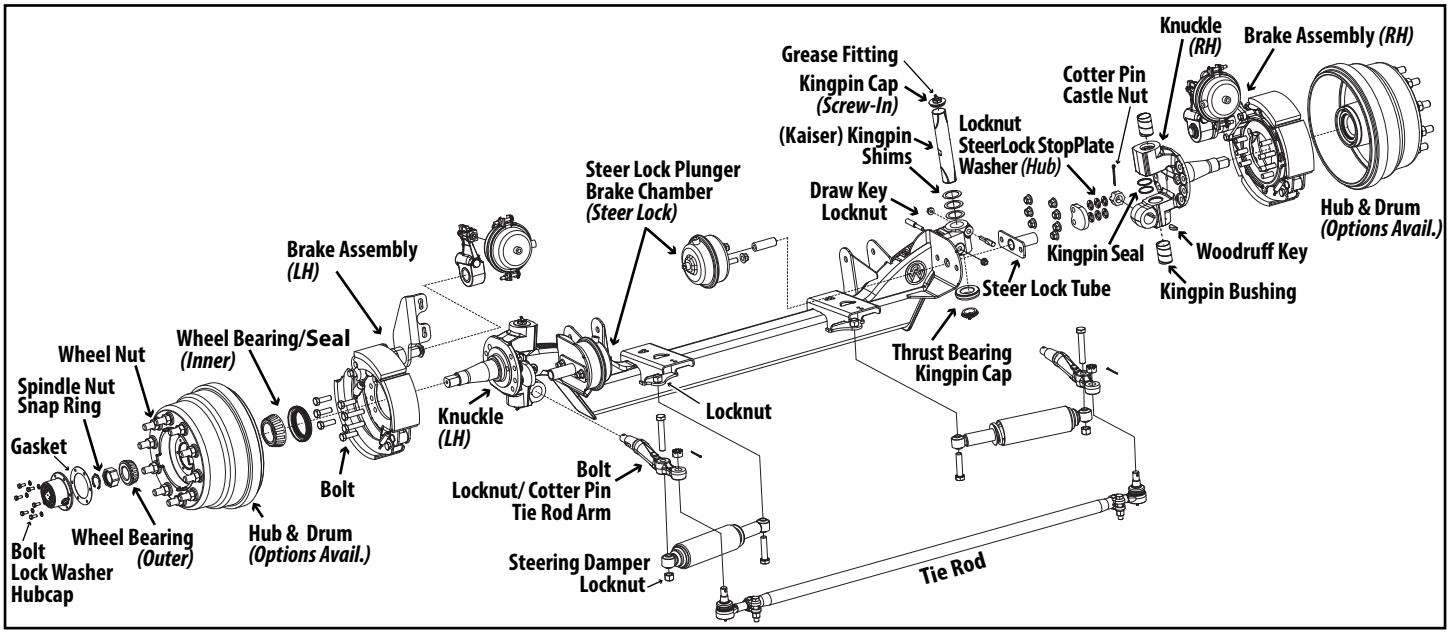
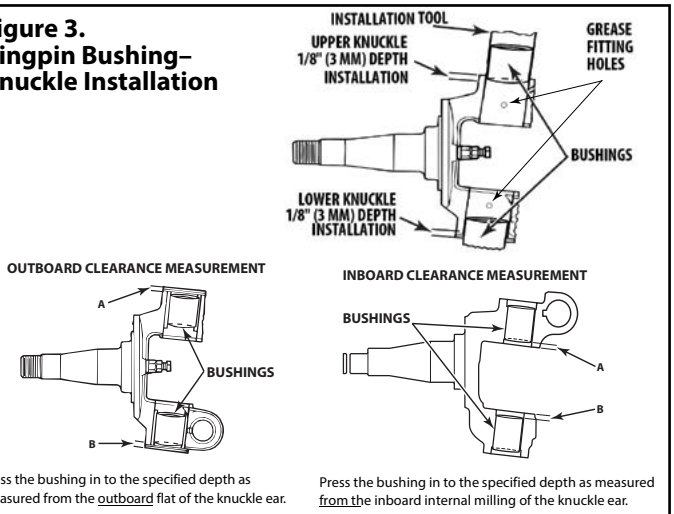


Figure 2.
Drum Brake Axle Components *(Reference only)* 233-13K Suspension – Westport Knuckle; Kaiser Kingpin.

Standard Kingpin Replacement Procedure – 233/232 Suspension

Figure 3.
Kingpin Bushing–Knuckle Installation



Press the bushing in to the specified depth as measured from the outboard flat of the knuckle ear.

Press the bushing in to the specified depth as measured from the inboard internal milling of the knuckle ear.

233/232 Model	Msrmnt Reference	Top Depth (A)	Bottom Depth (B)
10K/13K	Outboard	0.352-0.382"	0.352-0.382"
20K	Inboard	0.135-0.165"	0.135-0.165"

Kingpin bushings should be replaced on both sides of the axle at the same time.

Top Bushing

Place the new bushing into the upper knuckle bore. Use a bushing installation tool, if needed, to start the bushing straight into the upper bore. Press top bushing to the depth indicated for the suspension.
NOTE: Bushing hole for grease must be aligned with grease fitting hole in knuckle side (Figure 3).

Bottom Bushing

Turn the knuckle over so that the bottom of the knuckle is UP. Place the new bushing into the lower knuckle bore. Use a bushing installation tool, if needed, to start the bushing straight into the lower bore. Press bottom bushing to the depth indicated for the suspension.
NOTE: Bushing hole for grease must be aligned with grease fitting hole in knuckle side (Figure 3).

Both the top and bottom bushing must be reamed before installing kingpin seals.

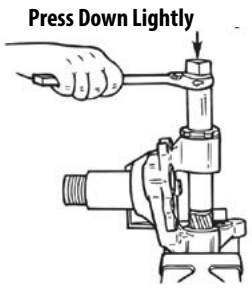
Ream the bushings:

Do not hone or burnish bushings before reaming. Use a fixed-size reamer tool to ream kingpin bushings.

Place the knuckle into a vise with brass jaws. Slide the pilot of the reamer through the top bushing until the reamer blades touch the bushing.

Rotate the reamer tool with a light DOWNWARD pressure. Continue rotating the tool until the top bushing is reamed out. Do not allow the reamer tool to drop through onto the bottom bushing.

Figure 4.
Reaming Kingpin Bushings



Tool goes through upper bushing to ream lower bushing bore

Guide the pilot of the reamer into the bottom bushing until the reamer blades touch the bushing. Rotate the reamer with a light DOWNWARD pressure until the bottom bushing is reamed out (Figure 4).

Slide the reamer out of the bottom bushing.
NOTE: Rotate the reamer tool in the opposite cutting direction if the tool must be removed through the top bushing.

Clean all material from inside of the bushings.

Steering Knuckle - Kingpin Seal Installation

Place the top of the knuckle into a vise with brass jaws. The bottom of the knuckle must be TOWARD you. Place the kingpin seal into the bottom of the top knuckle bore. The lip of the seal must be AWAY from the bore (Figure 5).

Place the knuckle end cap on top of the seal. Slide the kingpin through the opposite knuckle bore. Use the kingpin to install the seal. The bottom of the seal must touch the bushing.

Turn the knuckle over in the vise. The jaws of the vise must hold the bottom of the knuckle, and the top of the knuckle must be towards the installer. Place the seal into the top of the bottom knuckle bore.
The seal lip must be AWAY from the bore (Figure 5).

Place endcap for the knuckle on top of the seal. Slide kingpin through the opposite knuckle bore. Use kingpin to install the seal (Figure 6).

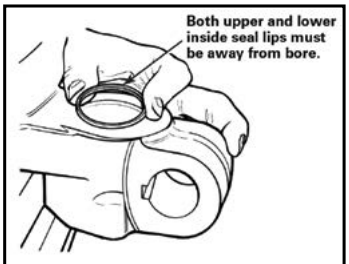
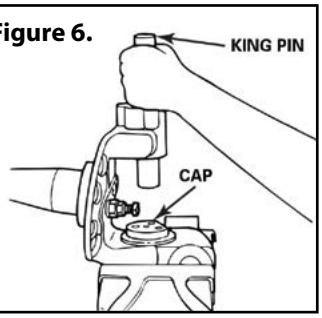


Figure 5.
Place kingpin seal in knuckle.

Figure 6.



Steering knuckle installation

Clean the bores of the knuckle and the axle beam.

CAUTION Use a brass or leather mallet for assembly/disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of the steel part can break off.

Install the seal onto thrust bearing. The surface with the inner diameter seal must be on top. The surface with outer diameter seal must be on bottom (Figure 7).

- Cover-type seals:
  Install seal over the open end of the bearing.
- Flat-type seals:
  Install seal over the closed part of the bearing.

Install the seal and thrust bearing assembly on the inner knuckle. The seal faces upward towards beam; top inner diameter contacts the bottom of the beam.
NOTE: One-piece thrust bearing with an integrated grease seal is completely interchangeable with two-piece design. It has a specified top and bottom orientation.

continued on next page

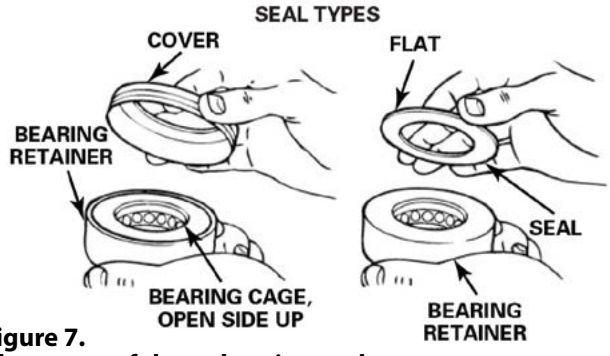


Figure 7.
Placement of thrust bearing seal.

Install Shims

Inspect the shims for damage before installation.

- Replace damaged shims with the same size shims or a combination of sizes that allow the least amount of knuckle-end play.
- If a new shim pack is required, select the number of shims for installation that provide the least amount of knuckle-end play.
- Place the shims on top of the axle beam bore machined surface. Align the shims for kingpin installation.

CAUTION Shims have sharp edges. Wear gloves to install.

Place the knuckle onto the axle beam. Place a pry bar between the steering arm boss and the axle beam. Lift the knuckle and slide the shim pack between the top of the beam and the knuckle (Figure 8).
Align all the bores.
NOTE: If the bores are not aligned, the parts will be damaged when kingpin is installed. Remove pry bar.

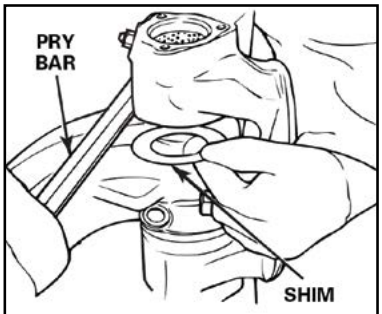
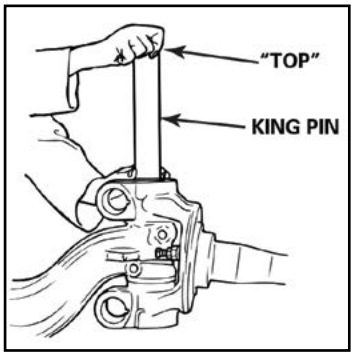


Figure 8.
Use pry bar to install shims.

Install kingpin

Apply multi-purpose grease onto the bottom half of the kingpin before installing.



Verify "TOP" is stamped on the top of kingpin.
Rotate the kingpin so that the two draw key slots of the pin correctly align with the draw key slots in the knuckle.

Install the kingpin into the TOP of the knuckle and through the area where the shims are located.
Do not force the pin through the top bushing. If required, use a hammer and a brass drift to apply direct force to the kingpin for seating it into the lower knuckle bore.

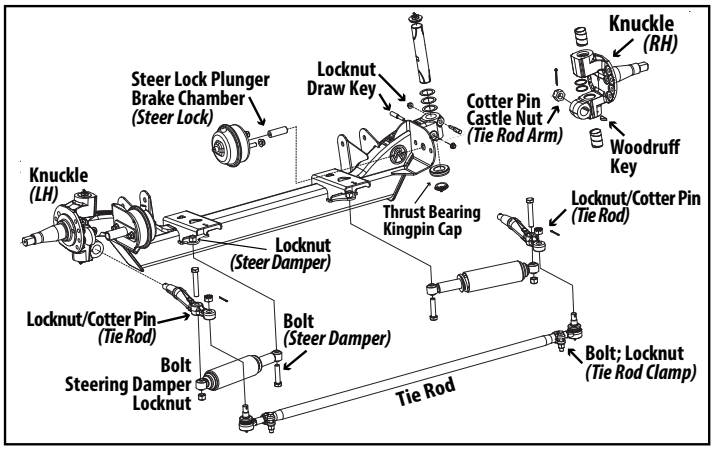
Seat the top draw key into the front of the beam. Seat the bottom draw key into the back of the beam by striking it with a hammer and drift.

The keys must align with the slots of the kingpin. Check the knuckle end play before installing or tightening locknuts.

Install the draw key locknut(s). Torque draw key locknut(s) to 30-45 ft-lbs.

Install new gaskets and caps on the top and bottom of the kingpin.

- Meritor kingpin caps:
  Install bolts and washers. Torque to 20-30 ft-lbs.
- Westport caps:
  Install threaded cap and gaskets. Torque to 70-90 ft-lbs.
- Install kingpin cap grease fittings. Torque to 10 ft-lbs.



Assemble the Tie-Rod

Place a Woodruff key into the tie-rod arm. Attach arm to the axle knuckle with nuts.

- Torque 233 8K/13K (1" nuts) to 550-1025 ft-lbs.
- Torque 233 20K (1 1/4" nuts) to 775-1450 ft-lbs.

Tighten nut slightly, if necessary, to align the holes. Install a 3/16" x 2-1/4" cotter pin.

If removed, install the cross tube into the tie-rod ends to the position marked during removal. Thread the ends equally into the cross tube to the required length and secure with clamp and bolts.
NOTE: The tie-rod cross tube has right-hand threads on one end and left-hand threads on the other end.

Attach tie-rod ends through the tapered holes of tie-rod arms with 7/8" nuts. Torque nuts to 160-300 ft-lbs.
Tighten nut slightly, if necessary, to align the holes. Install a 9/64" x 1-3/4" cotter pin.

Adjust tie-rod length to attain wheel toe-in between 1/32" and 3/32"(See page 17). Torque clamp bolts at tie-rod end to 40-60 ft-lbs.
NOTE: Toe-in is the negative difference in measurement across the inside of each hub, at the leading edge compared to the trailing edge.

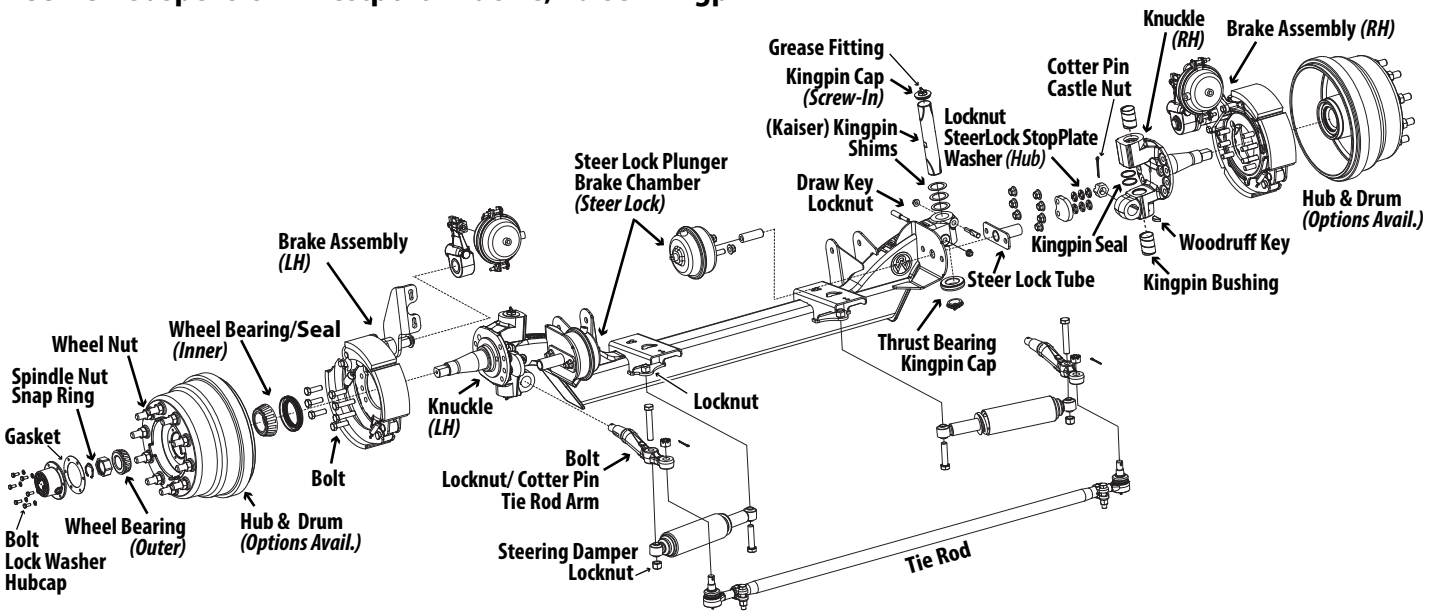
Lubrication

Grease top and bottom of knuckles until grease appears near axle to knuckle interface. Grease camshaft support tube until grease appears at slack adjuster.

Refer to Meritor, Inc. Publication "Maintenance Manual 2-Front Non-Drive Steer Axles" for additional information.

Kaiser Kingpin Replacement Procedure – 233/232 Suspension

Drum brake axle w/ optional Steer Lock
233-13K Suspension - Westport Knuckle; Kaiser Kingpin



Kaiser Kingpin - Bushing Installation Procedure

Kaiser kingpin bushings do not need the bushing bores reamed after installation (Figure 9).

1. Drive out existing bushings and seals from the knuckle(s) with a bushing driver and a brass hammer or dead blow hammer.
   NOTE: Do not use a punch or chisel, this could result in damaging the spindle eyes.
2. Use a brake hone attached to a hand drill to lightly hone the axle spindle eye until smooth. Install two (2) lip seals in each kingpin assembly:
   - One lip seal is placed at the bottom of the top spindle bore (near axle).
   - One lip seal is placed at the top of the bottom spindle bore (near axle).

   Lip opening of the rubber seal should face the axle eye.

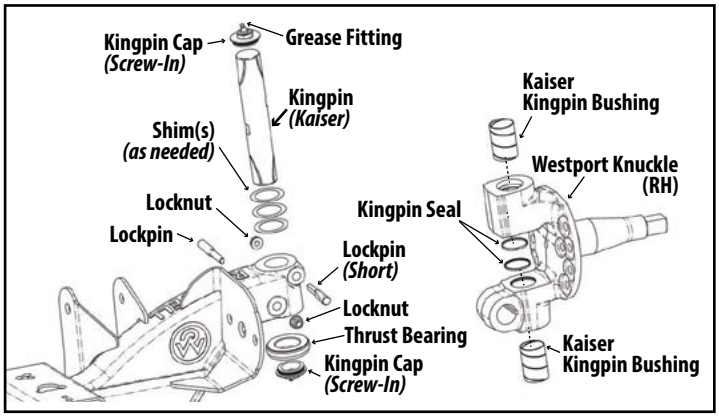


Figure 9.
233-13K Drum brake axle (Westport knuckle; Kaiser KP)

3. Place kingpin seal on the end of bushing driver with beveled edge of seal facing out.
   NOTE: Metal portion of the lip seal should be placed against the metal of the lip seal installation tool (bushing driver).
4. Use a brass hammer or dead-blow hammer to drive the seal into spindle eye until the driver and seal are flush with the bottom of the spindle eye.
   Seal should be positioned far enough into the spindle bore to accommodate the bushing, but should not extend out of the bore.
   The lip seal is properly installed when it is in the correct position with the seal lip opening facing the appropriate direction. This will allow grease to pass through the seal during greasing, but will prevent dirt, grit, and water from entering the bushing area.
5. Wipe a small amount of grease into each spindle bore. Hold the spiral steel bushing in one hand, tilted slightly, and insert into the bore.
   Turn the bushing in a clockwise direction to twist the spiral bushing into the spindle eye. Install the bushing as far into the spindle bore as you can by hand.
6. Grip bushing wall with a "T" wrench (recommended) or narrow-nose pliers about 1" away from the tip. Continue the clockwise rotation, using the wrench or pliers, until the bushing is within 1/8" of the bushing bore surface.
7. Tap bushing down flush to surface with a brass mallet, starting at heaviest part of the wrap and tapping clockwise around the bushing until bushing is in position.

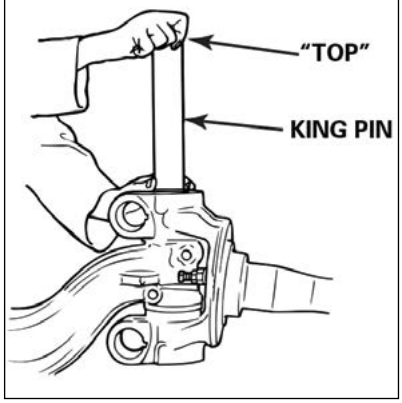
continued on next page

Kaiser Kingpin Replacement Procedure (Continued from previous page)

Kaiser Kingpin - Axle Knuckle Installation

1. Check kingpin fit in both the top and bottom bore of the knuckle. Slide the kingpin through both knuckle bores to test spindle alignment (Figure 10).
2. The spindle should be replaced if the kingpin will not go into and through both spindle eyes.
3. Pack thrust bearing with grease before installation.
4. Select number of shims to give the least amount of endplay in the knuckle. Shim thicknesses are .005", .010" and .015" (.030"thickness for 20K axles).
5. Verify the word "TOP" on top of kingpin is facing towards the end of the spindle. Place kingpin into top spindle eye and slide through until ½-inch of kingpin comes out the bottom.
   Place shim(s) onto the bottom of the kingpin.
6. Carefully place knuckle with kingpin and shim(s) on the axle. Let the kingpin drop into the bottom hole. Push kingpin down through knuckle until it is flush with bottom of the axle.

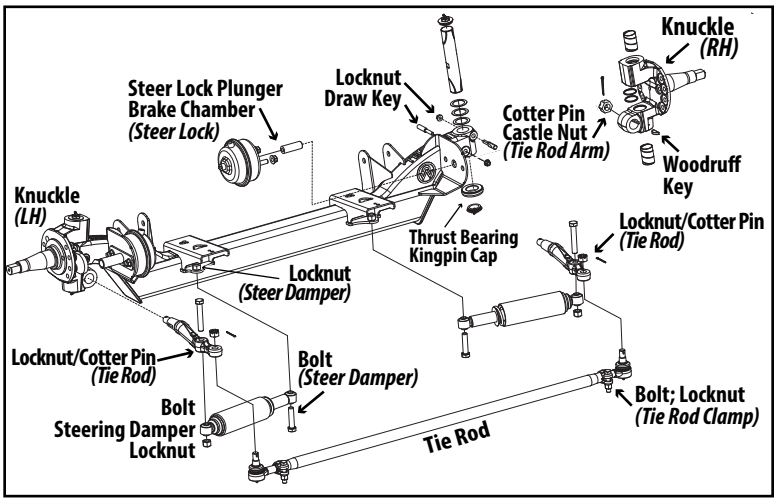
Figure 10.



7. Using the palm of the hand, install the thrust bearing with the open side down. If bearing cannot be installed, take knuckle assembly apart and remove the 0.005" shim(s) from the kingpin bottom.
   If bearing can easily be installed with fingers, take the assembly apart and add a 0.005" shim to the stack.
8. Install lockpin(s). Make sure the flat side of the lock pin is facing the kingpin. Install nuts and washers. Torque the lockpin locknut to 30-45 ft.lb.
9. Install top and bottom kingpin cap and tighten.

Lubrication

1. Attach grease gun to the top grease fitting (top of cap). Move the spindle from side-to-side while pumping grease into the fitting until grease comes out between spindle and axle.
   If the spindle does not move smoothly, there may be too many shims installed or the thrust bearing may have been damaged.
2. Attach grease gun to the bottom cap grease fitting. Move the spindle from side-to-side while pumping grease into the fitting until grease comes out the top of the bearing.



Assemble the Tie-Rod

Place a Woodruff key into the tie-rod arm. Attach arm to the knuckle with nuts.

- Torque 233 8K/13K (1" nuts) to 550-1025 ft-lbs.
- Torque 233 20K (1 1/4" nuts) to 775-1450 ft-lbs.

Tighten nut slightly, if necessary, to align the holes. Install a 3/16" x 2-1/4" cotter pin.

If removed, install the cross tube into the tie-rod ends to the position marked during removal. Thread the tie-rod ends into the cross tube to the required length and secure with clamp and bolts.
NOTE: Tie-Rod cross tube has right-hand threads on one end and left-hand threads on the other end.

Attach tie-rod ends through the tapered holes of tie-rod arms with 7/8" nuts. Torque nuts to 160-300 ft-lbs. Tighten nut slightly, if necessary, to align the holes. Install a 9/64" x 1-3/4" cotter pin.

Adjust the tie-rod length to attain wheel toe-in between 1/32" and 3/32"(See page 17). Torque the clamp bolts at each tie-rod end to 40-60 ft-lbs.
NOTE: Toe-in is the negative difference in measurement across the inside of each hub, at the leading edge compared to the trailing edge.

Complete the axle assembly

Install wheels and other components to complete the fabricated axle re-assembly.

Recommended Service Intervals

Ridewell Suspensions recommends 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 for damage/excessive wear.
___ Check for loose/missing fasteners. Check for irregular movement in suspension system components.
___ Check tires for proper inflation, 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 fasteners to specifications (ENG Drawing).

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 excess grease from purge areas.
___ Inspect steering damper for damage/wear.
___ Inspect air springs for damage/excessive wear. Torque bolts/nuts to specifications. (ENG Drawing).
___ 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 end of tie-rod. Replace entire tie-rod end if boot is damaged.
___ Check pivot bushings for wear.
___ Torque all suspension bolts/nuts to spec. (ENG Drawing).
___ 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 specifications (ENG Drawing).
___ Check lubrication level in wheel-ends. Refill/Replace as needed. *(TMC RP 631-Wheel End Lubrication Procedure)*
___ Check hanger and A/SPG mounting plate connections.
___ Check air system for leaks.
___ Test air tank pressure protection valve if equipped.
___ Check brakes/brake chambers for damage/function.

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

⚠CAUTION Failure to torque suspension components to specifications can result in suspension 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 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 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).

Refer to these Technology & Maintenance Council (TMC) Recommended Procedures for additional information:	
RP 609	Self-Adjusting/Manual Brake Adjuster Removal, Installation and Maintenance
RP 618	Wheel Bearing Adjustment Procedure
RP 619	Air System Inspection Procedure
RP 622	Wheel Seal and Bearing Maintenance
RP 631	Wheel End Lubrication Procedures
RP 643	Air Ride Suspension Maintenance Guidelines
RP 645	Tie-Rod End Inspection/Maintenance
RP 651	Steer Axle Maintenance Guidelines

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

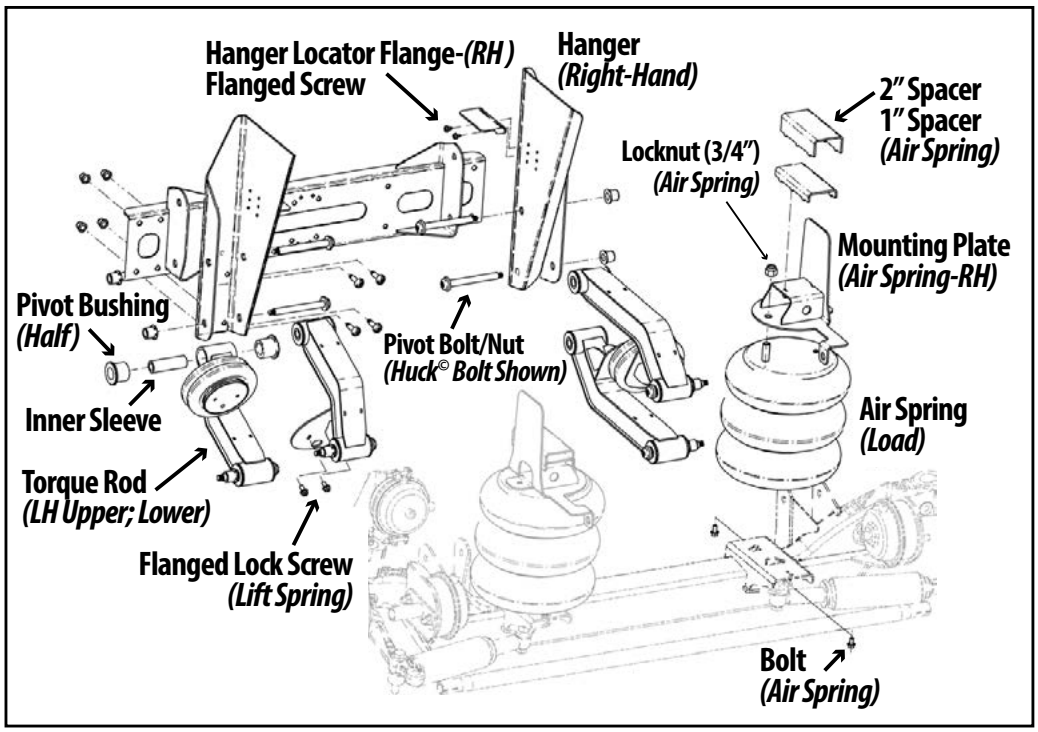


Figure 11.
233-13K Truck Components–
Single stud-mounted air spring

NOTE: Suspension manufactured before April 2022

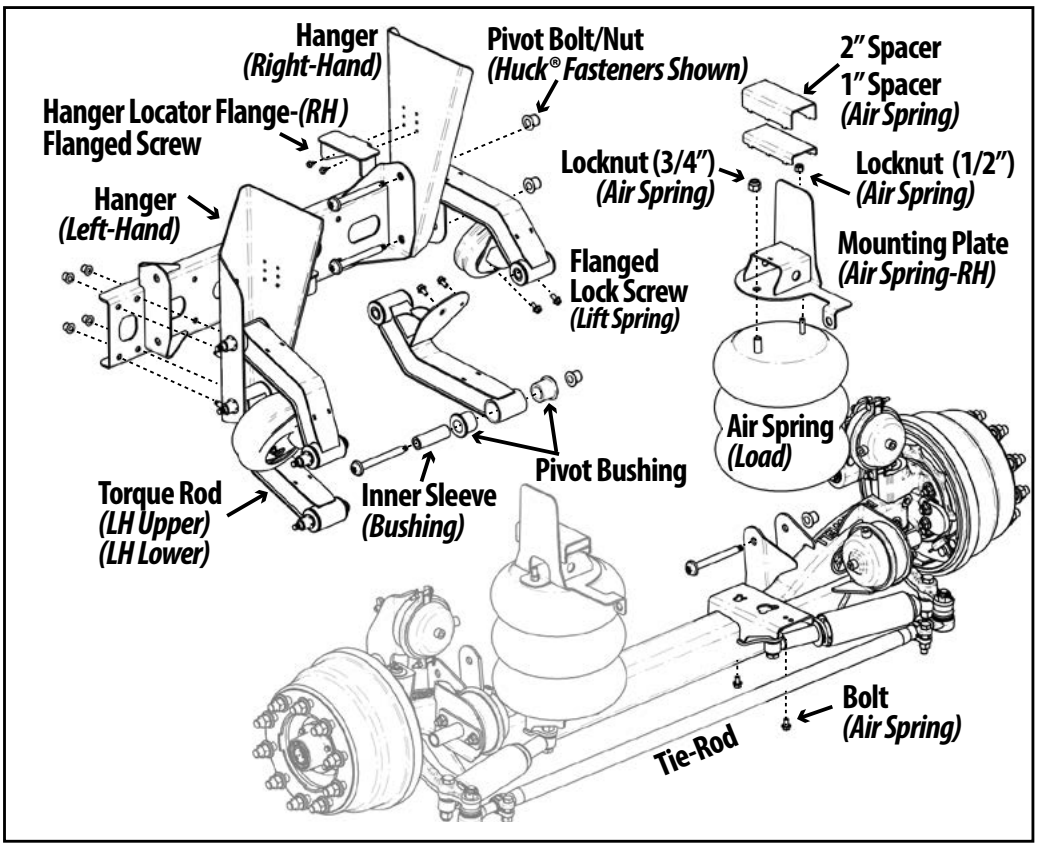


Figure 12.
233-13K Truck Components –
Dual stud-mounted air spring

NOTE: Suspension manufactured after May 1 2022

233 8K-10K-13K Truck Suspension (Bushing Replacement Kits)							
Diagram No.		QTY/Axle	Part Number	Item Description		Torque (foot-pound/Newton-meter)	
		(1)	6040134	**Bushing Replacement Kit (Traditional Hardware)**		310 ft-lb	420 N-m
Included in Kit	1	16	1120023	BUSH URE 2X1.31X1.80L 95 DURO			
	2	8	1140049	HHCS 3/4" 16NF 6"L GR8 P&O			
	3	8	1150016	L'NUT 3/4" 16NF FL-TL GR8 ZN			
	4	8	9090079	BUSHING SLEEVE 1.31"ODX.813"ID X 4.111"LG			
	—	—	1980013	URETHANE BUSHING SERVICE LUBE FORMULA 5			
—		(1)	6040133	**Bushing Replacement Kit (No Hardware)**		310 ft-lb	420 N-m
Included in Kit	1	16	1120023	BUSH URE 2X1.31X1.80L 95 DURO			
	4	8	9090079	BUSHING SLEEVE 1.31"ODX.813"ID X 4.111"LG			
	—	—	1980013	URETHANE BUSHING SERVICE LUBE FORMULA 5			
—		(1)	6040215	**Bushing Replacement Kit (Huck® Hardware)**		N/A	
Included in Kit	1	16	1120023	BUSH URE 2X1.31X1.80L 95 DURO			
	2	8	1130053	HUCK BOLT 3/4" 4.5x4.87 GL GR8 (BOBTAIL)			
	3	8	1150059	HUCK COLLAR 3/4" (BOBTAIL)			
	4	8	9090079	BUSHING SLEEVE 1.31"ODX.813"ID X 4.111"LG			
	—	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
Fasteners				Locknut - (Air Spring)	3/4"-16NF	50 ft-lb	68 N-m
				Locknut - (Air Spring)	1/2"-13NC	25 ft-lb	35 N-m
				Flanged Lock Screw - (Lift Spring; Air Spring, Lower)	3/8"-16NC	25 ft-lb	35 N-m
				Locknut - (Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m

CAUTION *Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque.*
Failure to install and maintain fasteners at torque specifications could result in suspension failure and void the warranty.

Vehicle Preparation

Park vehicle on a level surface. Chock wheels to keep the vehicle from moving.

Exhaust all air from the air controls system. Disassemble suspension, if necessary.

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

Bushing Replacement Procedure

1. Replace all bushings at the same time. Grind/Cut away Huck® Collar. Discard pivot hardware (Figure 13).
2. Remove bushing assembly from rod eye. Clean rod eye of foreign debris/corrosion.
3. Apply Energy Suspensions® Formula 5 Prelube to bore (inside) of each bushing half. Press bushing into pivot connection.
   NOTE: Do not substitute lubricant. Urethane lubricant included with all bushing replacement kits.
   Rubber mallet may be needed to install bushing.
4. Press the bushing sleeve into the center opening of the installed bushing.
   NOTE: Rubber mallet may be needed.
5. Verify internal sleeve is flush with both sides of the replacement bushing.
6. Install new pivot hardware. Torque to specifications. Reassemble suspension if necessary.

Check wheel toe-in setting is between 1/32" and 3/32" (Pg 17).

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

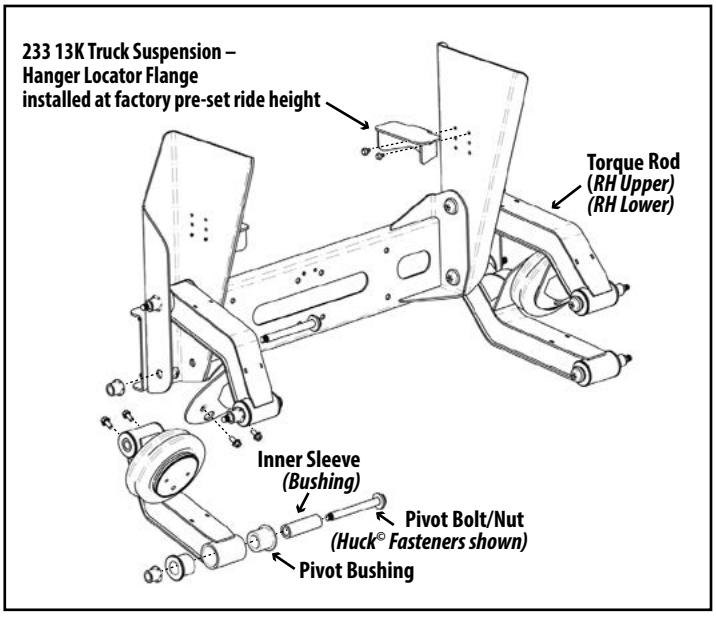
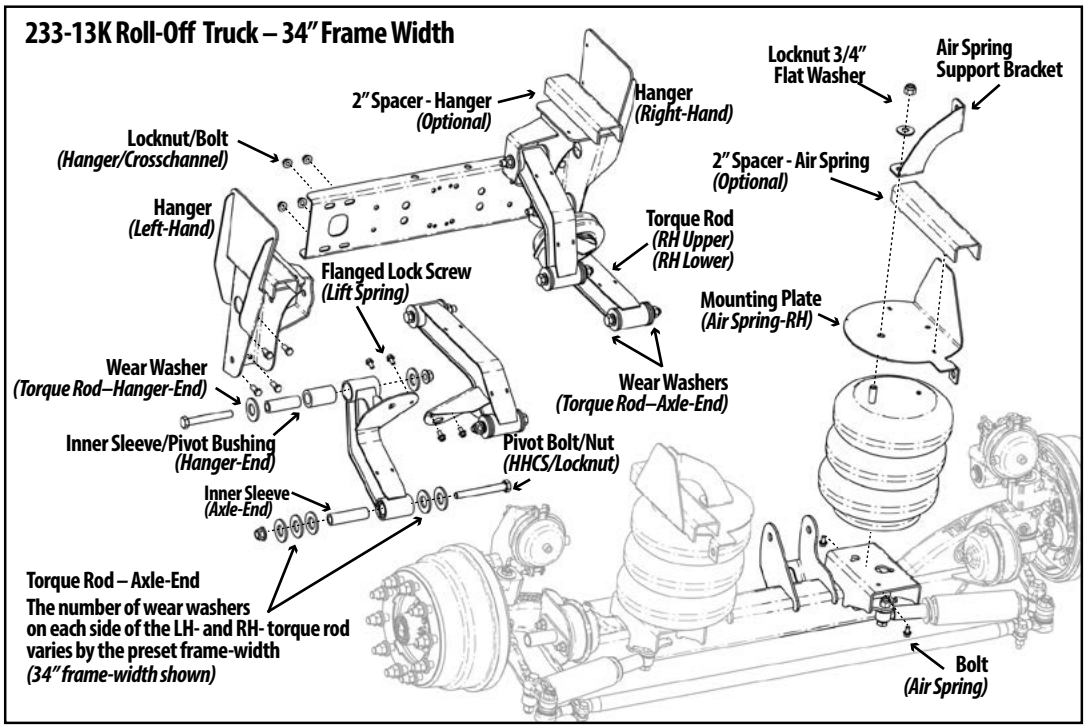


Figure 13.
Bushing replacement kit includes wear washers and traditional hardware components to replace Huck™ fasteners at the eight pivot connections.



233-13K Roll-Off Truck Components

233-13K Roll-Off Truck bushing kit includes wear washers and traditional hardware components to replace the eight pivot connections.
Refer to the engineering drawing to install the correct number of wear washers on the axle-end of both the LH- and RH-torque rod.

233 13K Roll-Off Truck Suspension (Bushing Replacement Kits)						
Diagram No.	**QTY/Axle**	**Part Number**	**Item Description**		**Torque (foot-pound/Newton-meter)**	
—	1	6040218	**Bushing Replacement Kit-Traditional Hardware**		310 ft-lb	420 N-m
Included in Kit	8	1120047	BUSH 2.020x1.314x3.325L 88D			
	4	1140049	HHCS 3/4″ 16NF 6″L GR8 P&O			
	4	1140050	HHCS 3/4″ 16NF 6.5″L GR8 P&O			
	8	1150016	L'NUT 3/4″ 16NF FL-TL GR8 ZN			
	4	9090079	SLV 1.31″ODX.813″ID X 4.111″LG			
	4	9090103	SLV 1.31″ODx.813″IDx4.861″ (Axle-End)			
	28	1160033	WASH 215x2.625x1.35 233 13K			
	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
—	(1)	6040217	**Bushing Replacement Kit-No Hardware**		310 ft-lb	420 N-m
Included in Kit	8	1120047	BUSH 2.020x1.314x3.325L 88D			
	4	9090079	SLV 1.31″ODX.813″ID X 4.111″LG			
	4	9090103	SLV 1.31″ODx.813″IDx4.861″ (Axle-End)			
	28	1160033	WASH 215x2.625x1.35 233 13K			
	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
Fasteners			Flanged Lock Screw - (Lift Spring; Lower Air Spring)	3/8″-16NC	25 ft-lb	35 N-m
			Locknut - (Air Spring)	3/4″-16NF	50 ft-lb	68 N-m
			Locknut - (Crosschannel)	1/2″-13NC	25 ft-lb	35 N-m
			Locknut - (Steering Damper)	3/4″-10NC	160 ft-lb	217 N-m

CAUTION *Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. 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 to reach pivot connections.

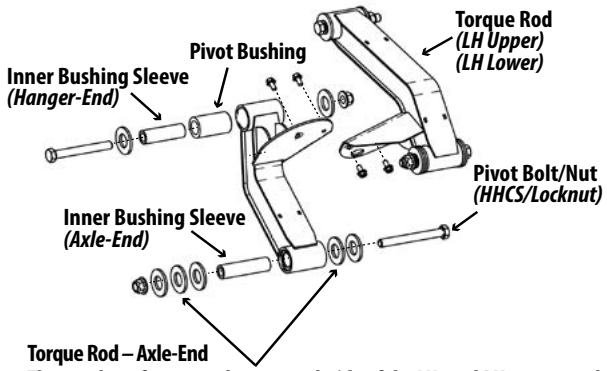
CAUTION Failure to properly chock wheels and exhaust air system could allow movement resulting in serious injury.

Bushing Replacement Procedure

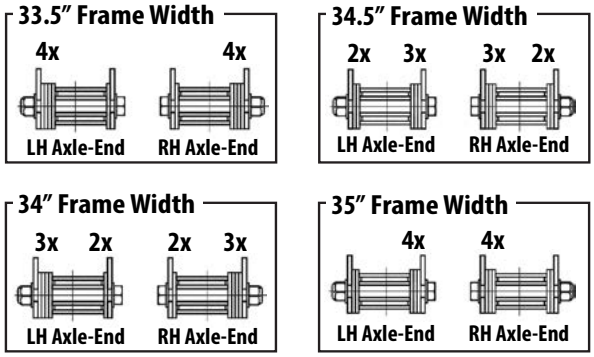
1. Count the number of wear washers installed on the Axle-End of the Left- and Right-Hand Torque Rods (Fig 14).
2. Remove pivot hardware and discard. Remove bushing and wear washers and discard. NOTE: Pivot hardware/ wear washers included with the Bushing Replacement Kit.
3. Clean rod eye. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of new bushings. NOTE: Do not substitute. Urethane lubricant included with Bushing Replacement Kit.
4. Install new bushing into the eye of the torque rod. NOTE: Mallet /press needed to install bushing.
5. Torque Rod Hanger-End (Bushing Sleeve - 4.1″) Press inner sleeve into installed bushing. Center sleeve so that both ends extend slightly past bushing sides. Assemble pivot connection with one wear washer on each side of the bushing. Sleeve must be flush with or extend past outside of wear washers on both ends.
6. Torque Rod Axle-End (Bushing Sleeve - 4.8″) Press inner sleeve into the installed bushing. Position inner sleeve - one end extends further past bushing on appropriate side as set by the frame width. Assemble pivot connection with appropriate number of wear washers on either end of the inner sleeve on the axle-end of the torque rod (Figure 14). NOTE: Inner sleeve must be flush with or slightly past the outside of installed wear washers on both sides of torque rods. Adjust sleeve if necessary.

Figure 14.

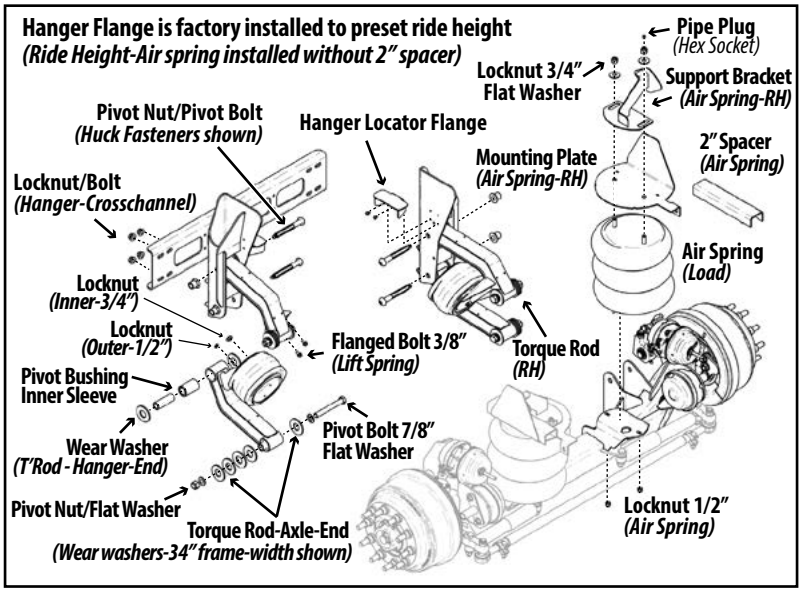
233 13K Roll-Off Truck – Bushing Replacement

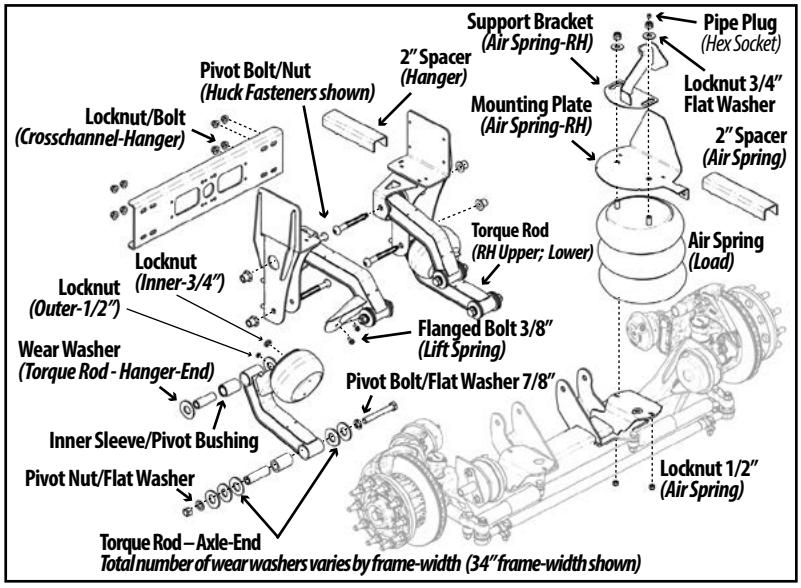


The number of wear washers on each side of the LH- and RH- torque rod varies by the preset frame-width *(34″ frame-width shown)*



7. Torque pivot nut to specification (500 ft-lb - 678 N-m).
8. Reassemble suspension. Torque to specifications.
9. Check wheel toe-in setting (between 1/32″ and 3/32″). Adjust if necessary (See page 17).



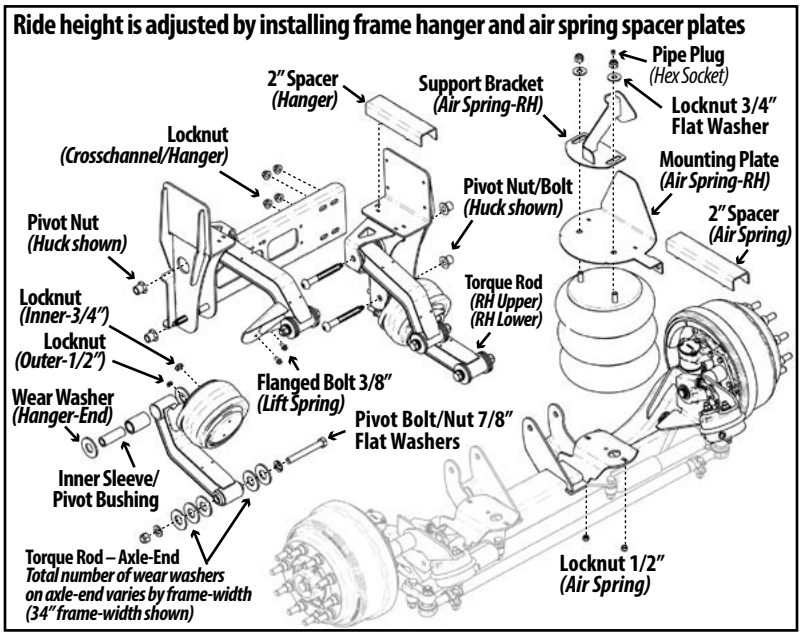


233-20K Truck Components

Drum/Disc Brake Fabricated Axle
Bushing replacement kit includes wear washers and traditional hardware components to replace eight pivot connections.

Replace Huck™ fasteners at the suspension's hanger-end pivot connection with traditional hardware.

The number of wear washers installed on each side of the axle-end pivot connection varies by the factory preset frame width. Refer to the engineering drawing to install the correct number of wear washers.



233 20K Roll-Off Truck Components

Bushing replacement kit includes wear washers and traditional hardware to replace eight pivot connections.

The number of wear washers installed on each side of the axle-end pivot connection varies by the factory preset frame width. Refer to the engineering drawing to install the correct number of wear washers.

233 20K Truck/Roll-Off Truck (Bushing Replacement Kits)							
Diagram No.		QTY/Axle	Part Number	Item Description		Torque (foot-pound/Newton-meter)	
—		(1)	6040145	**Bushing Replacement Kit-Traditional Hardware**		500 ft-lb	678 N-m
Included in Kit	1	8	1120043	BUSH 2.140X1.428X3.300L 90A			
	2	8	1140088	HHCS 7/8″ 14NF 6-3/4″LG GR8			
	3	8	1150052	L'NUT 7/8″ 14NF TP-LK GR C PO			
	4	28	1160026	WEAR WASHER .25X3.25X1.50			
	5	4	9090082	BUSHING SLEEVE 1.44″ODX.938″IDX4.111″LG			
	6	4	9090083	Sleeve 1.44″OD x .938″ID x 4.861″ LG (Axle-End)			
	7	16	1160868B100	FLAT WASHER 7/8″ A-325			
	—	—	1980013	Urethane Bushing SRVC Lube Formula 5			
—		(1)	6040142	**Bushing Replacement Kit-No Hardware**		500 ft-lb	678 N-m
Included in Kit	1	8	1120043	BUSH 2.140X1.428X3.300L 90A			
	4	28	1160026	WEAR WASHER .25X3.25X1.50 233			
	5	4	9090082	BUSHING SLEEVE 1.44″ODX.938″IDX4.111″LG			
	6	4	9090083	Sleeve 1.44″OD x .938″ID x 4.861″ LG (Axle-End)			
	—	—	1980013	Urethane Bushing SRVC Lube Formula 5			
Fasteners				Locknut - (Air Spring; Upper)	3/4″-16NF	50 ft-lb	68 N-m
				Locknut - (Air Spring; Lower)	1/2″-13NC	25 ft-lb	35 N-m
				Locknut - (Lift Spring; Outer)	1/2″-20NF	25 ft-lb	35 N-m
				Locknut - (Lift Spring; Inner)	3/4″-16NF	50 ft-lb	68 N-m
				Flanged Lock Screw - (Lift Spring)	3/8″-16NC	25 ft-lb	35 N-m
				Bolt/Locknut - (Crosschannel)	5/8″-11NC	160 ft-lb	217 N-m
				Locknut - (Tie-Rod/Steering Damper)	3/4″-10NC	160 ft-lb	217 N-m

CAUTION *Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. Failure to install/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.

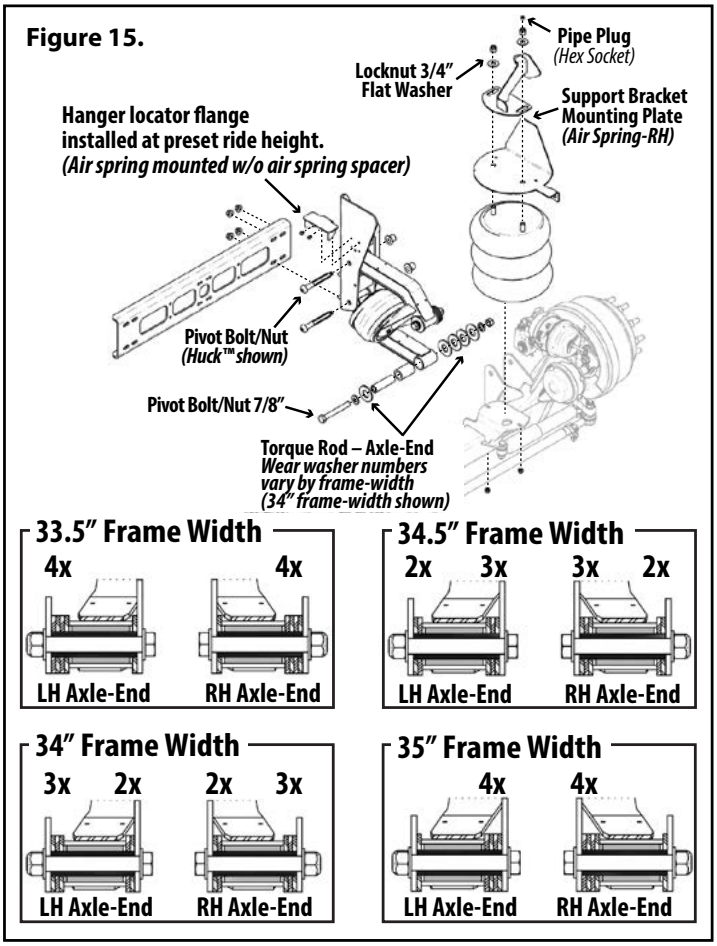
CAUTION Failure to properly chock wheels and completely exhaust the air system could allow vehicle movement that could result in serious injury.

Bushing Replacement Procedure

1. Count the number of wear washers on each side of the bushing on the Axle-End Torque Rod Assembly. The wear washer number varies according to the frame-width set by the hangers (Figures 15, 16).
2. Cut/grind away Huck® Collars at the hanger-end pivot connection. Take pivot connection apart. Discard pivot hardware. Discard wear washers.
3. Remove bushing assembly from torque rod and discard. Clean rod eye of debris/corrosion.
4. Remove traditional hardware at the axle-end pivot connection. Take pivot connection apart. Discard pivot hardware. Discard wear washers.
5. Remove bushing assembly from torque rod and discard. Clean rod eye of debris/corrosion.
6. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of replacement bushings. NOTE: Do not substitute - special urethane bushing lubricant included with bushing kit.

continued on next page

Figure 15.



7. Install new bushing into the eye of the torque rod.
   NOTE: Mallet /press needed to install bushing.

Hanger-End–Wear Washer Installation –
(Bushing Sleeve - 4.1″)
Press the inner sleeve into the installed bushing. Center sleeve so that both ends extend slightly past the sides of the bushing.
Assemble the pivot connection with one wear washer on each side of bushing (Figures 15, 16).
Inner sleeve must be flush with or extend slightly past the outside of wear washers on both sides.

Axle-End–Wear Washer Installation –
(Bushing Sleeve - 4.8″)
Press the inner sleeve into the installed bushing. Position inner sleeve so that one end extends further past the bushing than the other end.
Assemble pivot connection with the appropriate number of wear washers installed on both sides of the inner sleeve (Figures 15, 16).
Inner sleeve must be flush with or slightly past the outside of the wear washers on both sides.

8. Torque pivot nut to spec. (500 ft-lb - 678 N-m).
9. Reassemble suspension, if necessary. Torque components to specifications.
10. Verify wheel toe-in setting between 1/32″ and 3/32″ Adjust if necessary (See page 17).

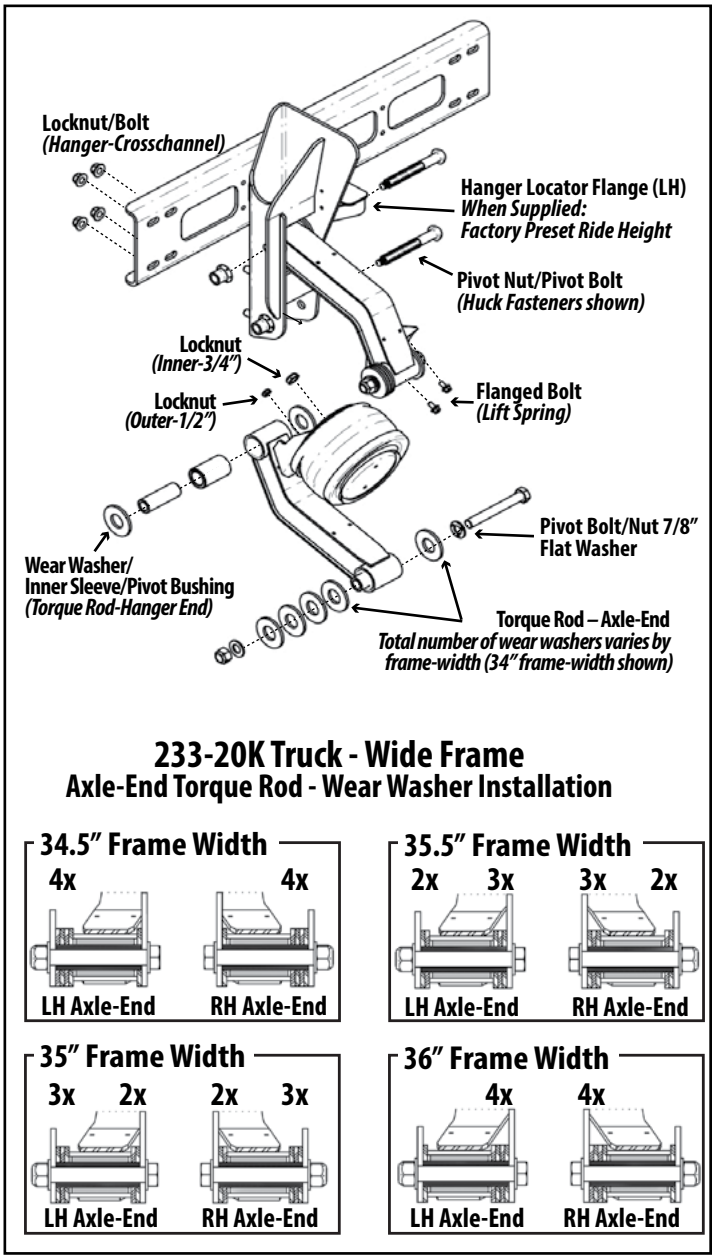


Figure 16.
Bushing replacement kits include wear washers and traditional hardware components to replace eight pivot connections.

Replace Huck™ fasteners at the hanger-end pivot connection with traditional hardware.

Refer to the engineering drawing to install the correct number of wear washers on the axle-end pivot connection of left-hand and right-hand torque rods.

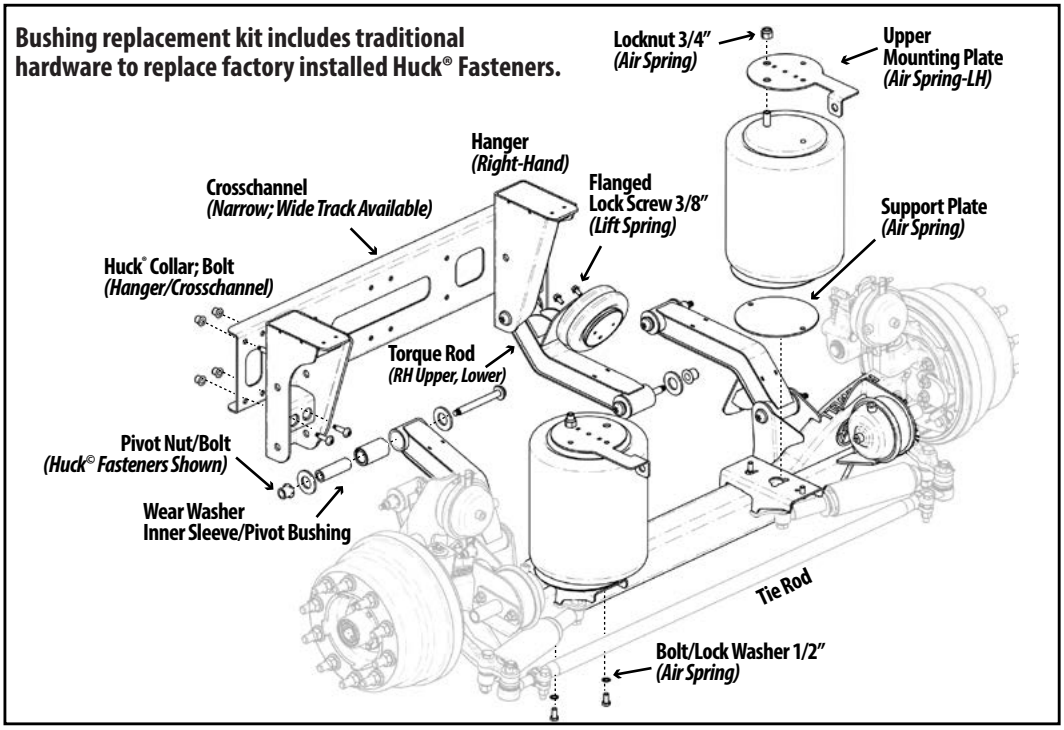


Figure 17.
13K Trailer Suspension-Drum Brake FAXL Components – Single-fastener-mounted air spring

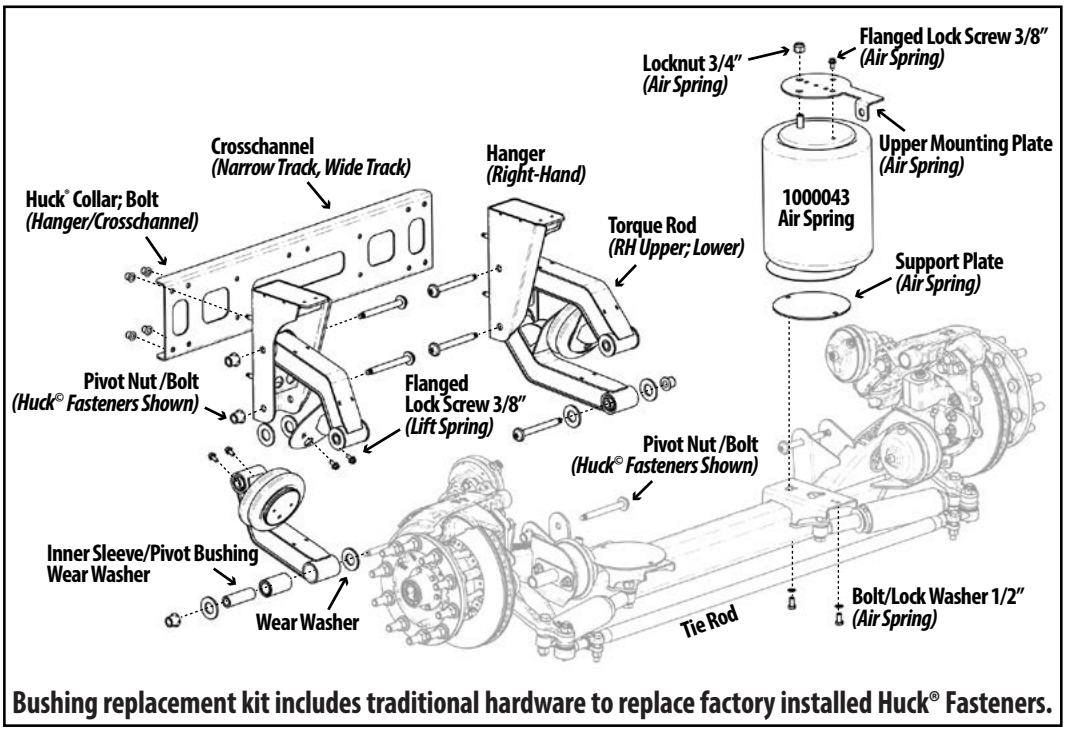


Figure 18.
13K Trailer Suspension-Disc Brake FAXL Components – Dual-fastener-mounted air spring

Requires dual-fastener air spring (P/N 1000043)

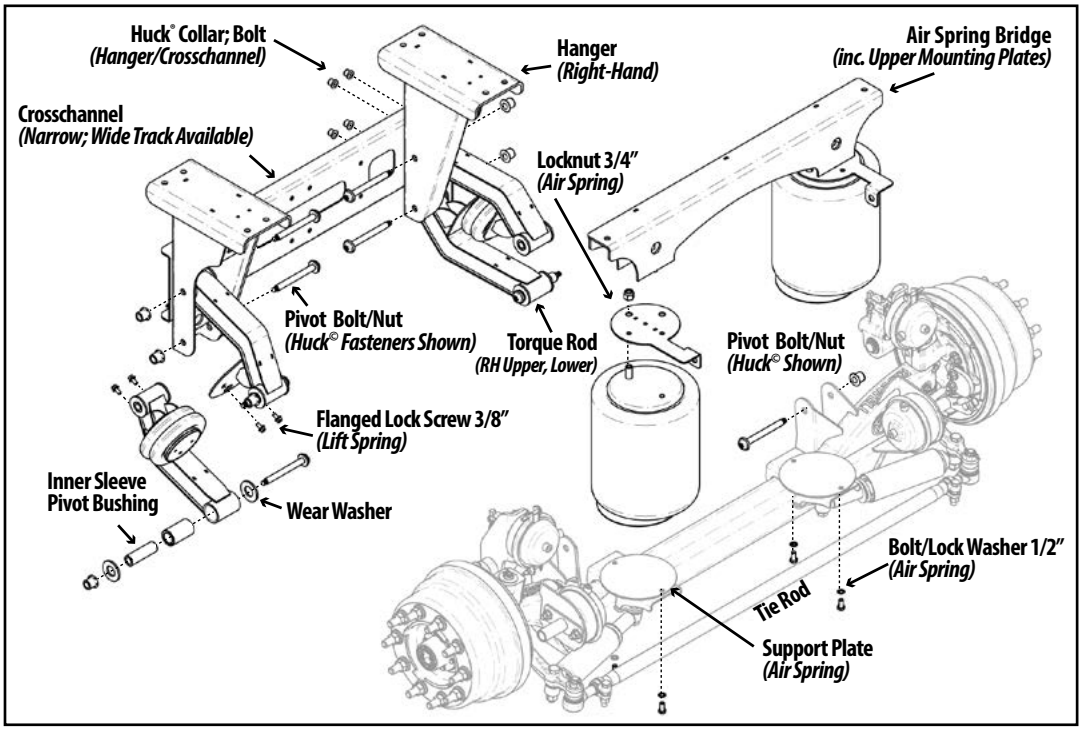


Figure 19.
233-13K Trailer Suspension Drum Brake FAXL Components with Air Spring Bridge Single-fastener-mounted air spring

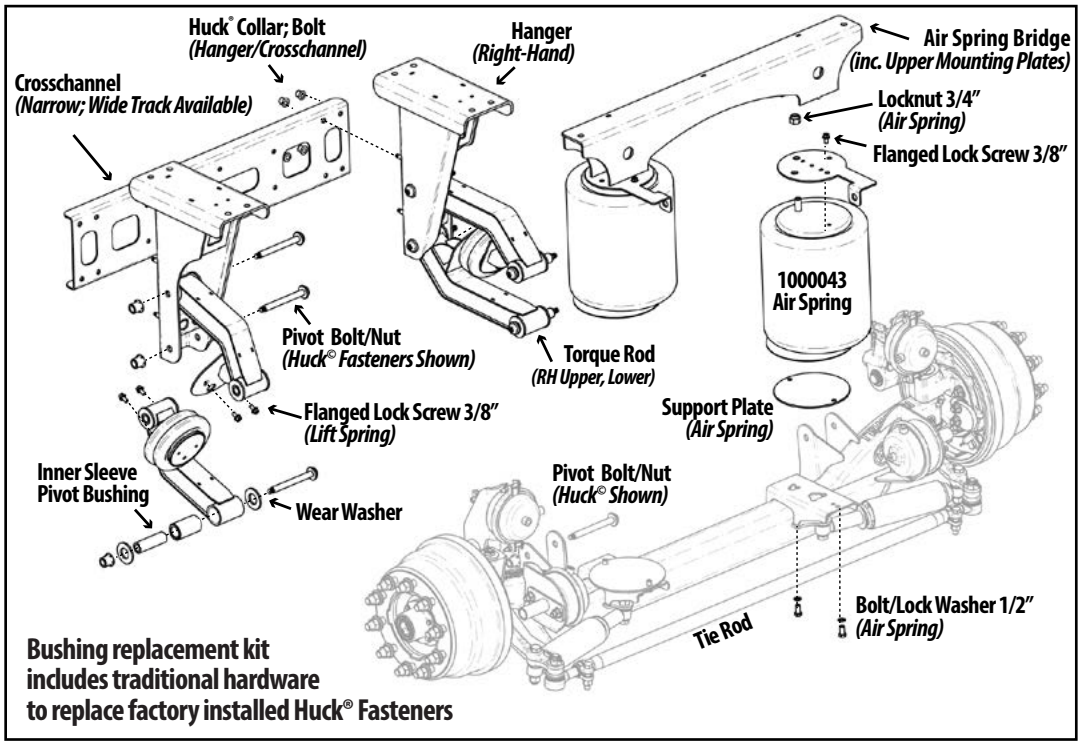


Figure 20.
233-13K Trailer Suspension Drum Brake FAXL Components with Air Spring Bridge – Dual-fastener-mounted air spring

Requires dual-fastener air spring (P/N 1000043)

233T 8K-10K-13K HD Trailer (Bushing Replacement Kits)							
Diagram No.		QTY/Axle	Part Number	Item Description		Torque (foot-pound/Newton-meter)	
		(1)	6040188	**Bushing Replacement Kit-Traditional Hardware**		310 ft-lb	420 N-m
Included inKit	1	8	1120047	BUSH 2.020 x 1.314 x 3.325 L 88D (H-D RED)			
	2	8	1140049	HHCS 3/4" 16NF 6"L GR8 P&O			
	3	8	1150016	L'NUT 3/4" 16NF FL-TL GR8 ZN			
	4	16	1160033	WASH 215X2.625X1.35 233 13K			
	5	8	9090079	BUSHING SLEEVE 1.31"ODX.813"ID X 4.111"LG			
	—	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
—		(1)	6040187	**Bushing Replacement Kit-No Hardware**		310 ft-lb	420 N-m
Included inKit	1	8	1120047	BUSH 2.020 x 1.314 x 3.325 L 88D (H-D RED)			
	4	16	1160033	WASH 215x2.625x1.35 233 13K			
	5	8	9090079	BUSHING SLEEVE 1.31"ODX.813"ID X 4.111"LG			
	—	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
—		(1)	6040216	**Bushing Replacement Kit-Huck® Replacement Hardware**		NA	
Included inKit	1	8	1120047	BUSH 2.020 x 1.314 x 3.325 L 88D (H-D RED)			
	2	8	1130053	HUCK BOLT 3/4" 4.5X4.87 GL GR8 (BOBTAIL)			
	3	8	1150059	HUCK COLLAR 3/4" (BOBTAIL)			
	4	16	1160033	WASH 215 X 2.625 X 1.35 233 13K			
	5	8	9090079	BUSHING SLEEVE 1.31"ODX.813"ID X 4.111"LG			
	—	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
Fasteners				Locknut (Single-Fastener-Mounted Air Spring)	3/4"-16NF	50 ft-lb	68 N-m
				FLG Lock Screw (Dual-Fastener-Mounted A/SPG)	3/8"-16NC	25 ft-lb	35 N-m
				Hex Head Cap Screw (Air Spring; Lower)	1/2"-13NC	50 ft-lb	68 N-m
				Flanged Lock Screw (Lift Spring; Upper, Lower)	3/8"-16NC	25 ft-lb	35 N-m
				Locknut - (Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m

CAUTION *Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. Failure to install and maintain fasteners at torque specifications could result in suspension failure and void the warranty.*

Bushing Replacement Procedure

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

CAUTION Failure to properly chock wheels and exhaust air system could allow movement resulting in serious injury.

1. Replace all bushings at the same time. Cut/Grind away Huck® Collar. Take pivot connection apart. Discard pivot hardware and wear washers (Fig 21).
2. Remove bushing assembly and discard.
   NOTE: Bushing assembly before October 2018 consists of two bushing halves and inner sleeve.
3. Clean torque rod eye of foreign debris/corrosion with wire brush before installing new bushing.
4. Apply Energy Suspensions® Formula 5 PreLube to the bore (inside) of the replacement bushing.
   NOTE: Do not substitute - urethane bushing lubricant is included with all bushing replacement kits.
5. Install (press) bushing into the torque rod eye.
   NOTE: Mallet/press needed to install bushing.
6. Press inner sleeve into bushing. Center sleeve inside bushing so that ends extend slightly past bushing sides.
7. Assemble pivot connection with one wear washer on each side of torque rod.
   Inner sleeve must be flush with or extend slightly past the outside of wear washers after assembly.
   NOTE: Wear washers are included in all RSS-233 Bushing Replacement Kits.

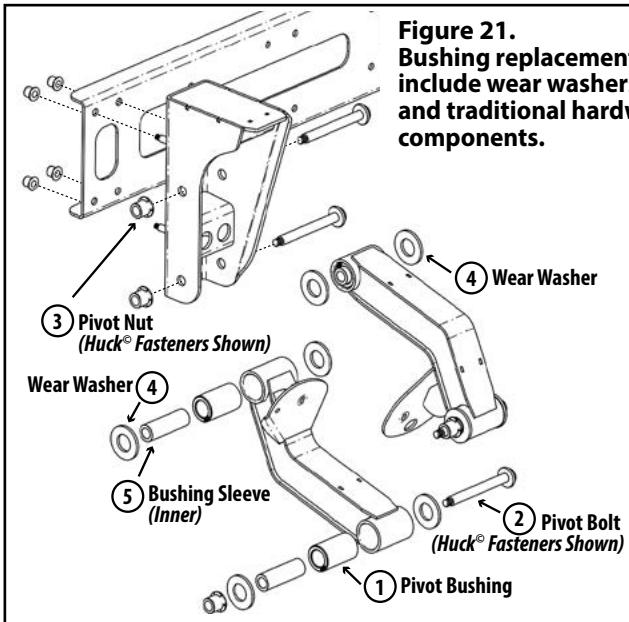


Figure 21. Bushing replacement kits include wear washers and traditional hardware components.

8. Torque pivot hardware (See chart).
9. Reassemble suspension. Torque to specifications.
10. Check wheel toe-in setting (between 1/32" and 3/32") and adjust if necessary (See page 17).

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

233T – 20K Trailer (Bushing Replacement Kits)							
Diagram No.		QTY/Axle	Part Number	Item Description		TORQUE (foot-pound Newton-meter)	
		(1)	6040161	**Bushing Replacement Kit-Traditional Hardware**		310 ft-lb	420 N-m
Included in Kit	1	8	1120043	BUSH 2.140 x 1.428 x 3.300L 90A			
	2	8	1140088	HHCS 7/8″ 14NF 6-3/4″LG GR8			
	3	8	1150052	L'NUT 7/8″ 14NF TP-LK Gr C PO			
	4	16	1160026	WEAR WASHER .25 X 3.25 X 1.50			
	5	8	9090082	BUSHING SLEEVE 1.44″ODX.938″IDX4.111″LG			
	—	16	1160868B100	FLAT WASHER 7/8″ A-325			
	—	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
—		(1)	6040160	**Bushing Replacement Kit-No Hardware**		310 ft-lb	420 N-m
Included in Kit	1	8	1120043	BUSH 2.140 x 1.428 x 3.300L 90A			
	4	16	1160026	WEAR WASHER .25 x 3.25 x 1.50			
	5	8	9090082	BUSHING SLEEVE 1.44″ODX.938″IDX4.111″LG			
	—	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
Fasteners				Locknut - (Air Spring, Upper)	3/4″-16NF	50 ft-lb	68 N-m
				Bolt/Lock Washer (Air Spring, Lower)	1/2″-13NC	50 ft-lb	68 N-m
				Locknut - (Lift Spring, Inner)	3/4″-16NF	50 ft-lb	68 N-m
				Locknut - (Lift Spring, Outer)	1/2″-20NF	25 ft-lb	35 N-m
				Flanged Lock Screw (Lift Spring)	3/8″-16NC	25 ft-lb	35 N-m
				Locknut - (Tie-Rod; Steering Damper)	3/4″-10NC	160 ft-lb	217 N-m
				Locknut - (Crosschannel)	5/8″-11NC	160 ft-lb	217 N-m

CAUTION *Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. Failure to install and maintain fasteners at torque specifications could result in suspension failure and void the warranty.*

Bushing Replacement Procedure

Park the vehicle on a level surface. Chock wheels to keep vehicle from moving.

Exhaust all air from the air system. Disassemble suspension to reach pivot connections.

CAUTION Failure to properly chock wheels and exhaust air system could allow movement resulting in serious injury.

1. Cut/Grind away Huck® Collars. Take pivot connection apart. Discard pivot hardware and wear washers (Fig 22).
2. Remove bushing assembly from the torque rod and discard. Clean rod eye of any foreign debris or corrosion.
3. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of new bushings.
   NOTE: Do not substitute - urethane bushing lubricant included with all kits.
4. Install bushing into the eye of the torque rod.
   NOTE: Mallet/press needed to install bushing.
5. Press inner sleeve into the installed bushing.
   Center the sleeve inside the bushing so that both ends extend slightly past the sides of the bushing.
6. Assemble pivot connection with one wear washer on each side of the bushing.
   Bushing inner sleeve should be flush with or extend slightly past the outside of the wear washers.
7. Torque pivot nut to specifications (500 ft-lb).
8. Reassemble suspension. Torque to specifications
9. Check wheel toe-in setting (between 1/32″ and 3/32″). Adjust if necessary (See page 17).

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

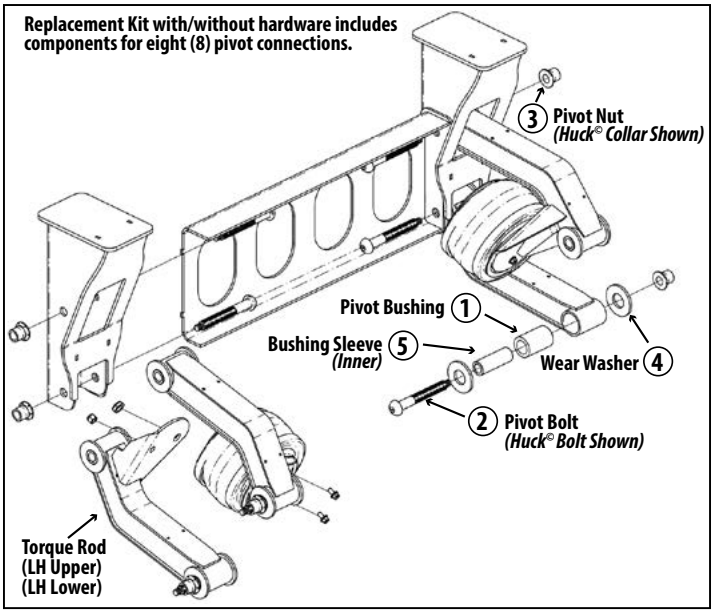


Figure 22.
Bushing Replacement Kits include wear washers and traditional hardware components for eight pivot connections.

2361000 Truck Suspension (Customer-Supplied Axle) – Bushing Replacement Kits						
QTY/Axle		Part Number	Item Description		Torque (foot-pound/Newton-meter)	
(1)		6040161	**Bushing Replacement Kit-Traditional Hardware**		500 ft-lb	678 N-m
Included in Kit	8	1120043	BUSH 2.140X1.428X3.300L 90A			
	8	1140088	HHCS 7/8″ 14NF 6-3/4″LG GR8			
	8	1150052	L'NUT 7/8″ 14NF TP-LK GR C PO			
	16	1160026	WEAR WASHER .25 X 3.25 X 1.50			
	8	9090082	BUSHING SLEEVE 1.44″ODX.938″IDX4.111″LG			
	16	1160868B100	FLAT WASHER 7/8″ A-325			
	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
(1)		6040160	**Bushing Replacement Kit-No Hardware**		500 ft-lb	678 N-m
Included in Kit	8	1120043	BUSH 2.140 X 1.428 X 3.300L 90A			
	16	1160026	WEAR WASHER .25 X 3.25 X 1.50			
	8	9090082	BUSHING SLEEVE 1.44″ODX.938″IDX4.111″LG			
	—	1980013	URETHANE BUSHING SRVC LUBE FORMULA 5			
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
			Locknut - (Lift Spring, Inner)	3/4″-16NF	50 ft-lb	68 N-m
			Locknut - (Lift Spring, Outer)	1/2″-20NF	25 ft-lb	35 N-m
			HHCS/Locknut - (Crosschannel)	5/8″-11NC	160 ft-lb	217 N-m
			Locknut - (Load Beam Axle Assembly)	3/4″-16NF	310 ft-lb	420 N-m
			Locknut - (Tie-Rod; Steering Damper)	3/4″-10NC	160 ft-lb	217 N-m
			Locknut - (U-Bolt Steering Damper Mount)	3/8″-16NC	30 ft-lb	41 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 to reach pivot connections.

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

Bushing Replacement Procedure

1. Remove pivot hardware by cutting/grinding away the Huck® Collar. Discard pivot hardware (Figure 23).
2. Inspect wear washers for damage. Replace if necessary.
3. Clean the rod eye of debris/corrosion. Apply Energy Suspensions® Formula 5 Prelube to inside of new bushings. NOTE: Do not substitute - special urethane lubricant included in bushing replacement kit.
4. Install bushing in the eye of the torque rod. NOTE: Mallet/press may be needed for install.
5. Press inner sleeve into the installed bushing. Center sleeve inside the bushing so that both ends of bushing extend slightly past the sides of the bushing equally.
6. 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 (Figure 17).
7. Torque pivot nut to specs (500 ft-lb - 678 N-m).
8. Reassemble suspension, if necessary. Torque components to specifications (see chart).
9. Check wheel toe-in setting (between 1/32″ and 3/32″). Adjust, if necessary (See page 17).

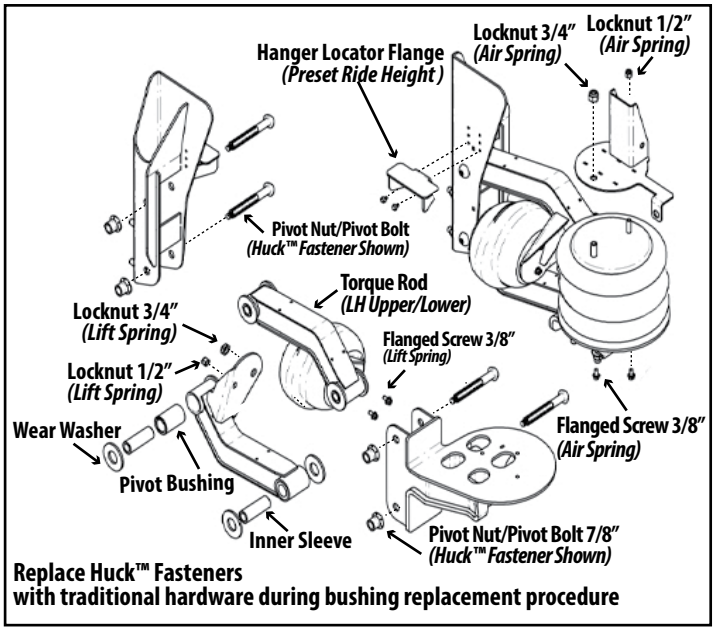


Figure 23.
Bushing replacement kit includes enough wear washers and traditional hardware to replace the Huck™ fasteners at eight pivot connections.

232/232T 8K-10K-13K (Bushing Replacements)					
QTY/Axle	Part No.	Item Description		TORQUE (foot-pound Newton-meter)	
1	6040132	232 8/10/13K Truck (Bushing Replacement Kit w/ Hardware)		350 ft-lb	475 N-m
1	6040084	232 8/10/13K Truck (Bushing Replacement Kit w/o Hardware-*includes Wear Washers)*			
1	6040152	232T 8/10/13K Trailer (Bushing Replacement Kit w/ Hardware)		350 ft-lb	475 N-m
1	6040151	232T 8/10/13K Trailer (Bushing Replacement Kit w/o Hardware -*includes Wear Washers)*			
Fasteners		Bolt/Lock Washer/Nut (Air Spring)	1/2″-13NC	25 ft-lb	35 N-m
		Locknut - (Air Spring)	3/8″-16NC	25 ft-lb	35 N-m
		Locknut - (Air Spring)	3/4″-16NF	50 ft-lb	68 N-m
		Bolt/Locknut - (Crosschannel)	5/8″-11NC	50 ft-lb	68 N-m
		Locknut - (Steering Damper)	3/4″-10NC	160 ft-lb	217 N-m

CAUTION *Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. Failure to install and maintain fasteners at torque specifications could result in suspension failure and void the warranty.*

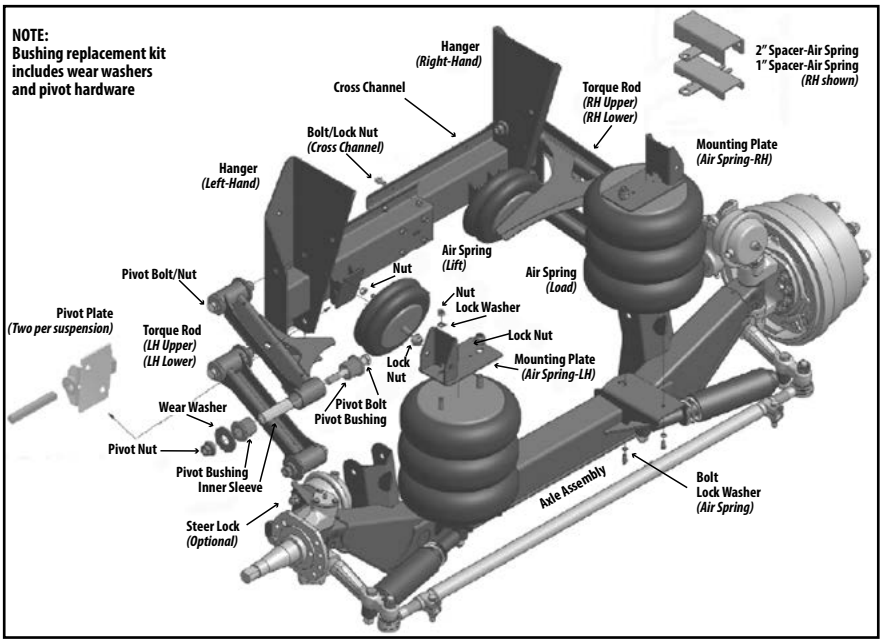
Bushing Replacement Procedure

Park vehicle on level surface. Chock wheels to keep vehicle from moving. Exhaust all air from the air system.

CAUTION Failure to chock wheels and exhaust the air system could allow movement resulting in serious injury.

1. Disassemble suspension to reach the pivot connections.
2. The number of wear washers on each side of the Torque Rod Assembly will vary according to preset frame-width (Figure 24).
3. Remove the pivot hardware and discard. Remove bushing assembly and wear washers and discard.
   NOTE: Wear washers included with bushing replacement kits.
4. Clean the rod eye with wire brush to remove foreign debris/corrosion.
5. Apply Energy Suspensions® Formula 5 Prelube to bore (inside) of new bushings.
   NOTE: Do not substitute lubricant - special urethane bushing lubricant included with all Bushing Replacement Kits.
6. Install new bushing into the eye of the torque rod.
   NOTE: Mallet/bushng press needed to install.
7. Torque Rod - Hanger-End
   Press inner sleeve into the installed bushing. Center the sleeve so that both ends extend slightly past the sides of the bushing/wear washer.
   Assemble the pivot connection with wear washer on appropriate side of the bushing.
8. Torque Rod - Axle-End
   Press inner sleeve into the installed bushing. Center the sleeve so that both ends extend slightly past the sides of the bushing. Assemble the pivot connection with wear washer on appropriate side of the bushing.
9. Tighten pivot hardware to torque (350 ft-lb - 475 N-m).
10. Reassemble suspension, if necessary. Torque all components to specifications.
11. Check wheel toe-in setting (between 1/32″ and 3/32″). Adjust if necessary (See page 17).

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



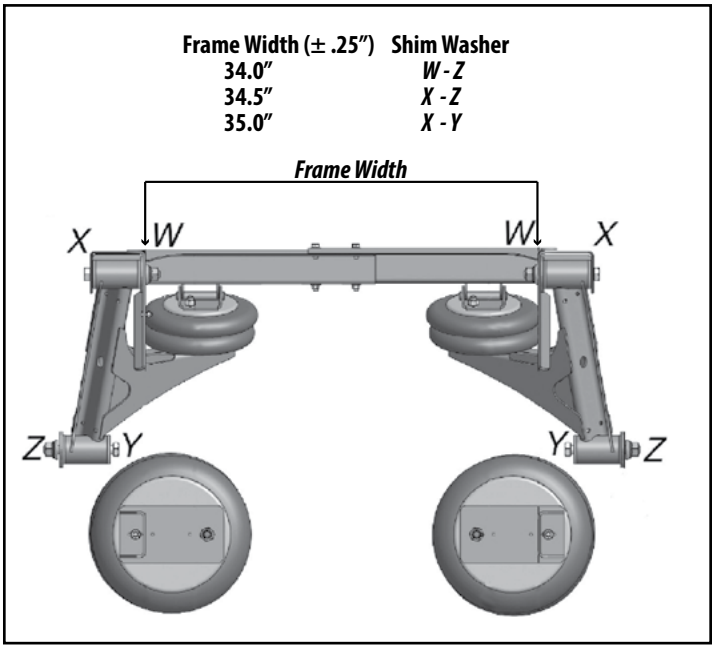


Figure 24.
Adjust frame width by securing crosschannel at the desired width. Install washers at marked locations for correct alignment.

232/232T – 20K (Bushing Replacements)					
QTY/Axle	Part No.	Item Description		Torque (foot-pound Newton-meter)	
1	6040112	232 20K Truck (Bushing Replacement Kit w/ Hardware)		500 ft-lb	678 N-m
1	6040086	232 20K Truck (Bushing Replacement Kit w/o Hardware-*includes Wear Washers)*			
1	6040111	232T 20K Trailer (Bushing Replacement Kit w/ Hardware)		500 ft-lb	678 N-m
1	6040085	232T 20K Trailer (Bushing Replacement Kit w/o Hardware-*includes Wear Washers)*			
Fasteners		Bolt/Lock Washer/Nut (Air Spring)	1/2″-13NC	25 ft-lb	35 N-m
		Locknut - (Air Spring)	3/4″-16NF	50 ft-lb	68 N-m
		Bolt/Locknut - (Crosschannel)	1/2″-13NC	50 ft-lb	68 N-m
		Locknut - (Steering Damper)	3/4″-10NC	160 ft-lb	217 N-m

CAUTION *Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. 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 to reach pivot connections.

CAUTION Failure to properly chock wheels and exhaust air system could allow movement resulting in serious injury.

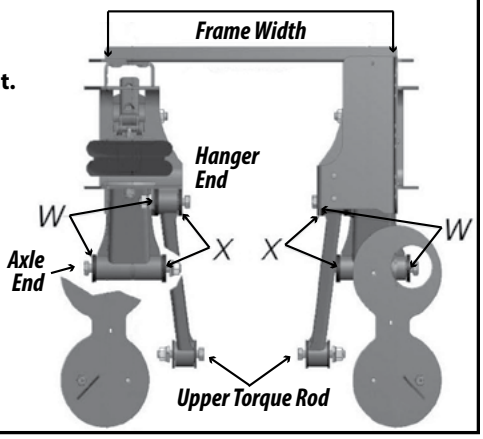
Bushing Replacement Procedure

Bushing replacement kits include both soft and hard urethane bushings for hanger end of lower torque rods. Wear washers included in all Bushing Replacement Kits.

1. Count and note the number of wear washers on each side of the upper torque rod (Hanger-End) and the lower torque rod (Axle-End). The number of wear washers will vary with the frame width (Figure 25).
2. Remove and discard pivot hardware; bushing assemblies; wear washers. Clean the torque rod eye of foreign debris/corrosion.
3. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of new bushings.
   NOTE: Do not substitute - special lubricant included with Bushing Replacement Kits.
4. Lower Torque Rod (Axle-End)
   4.1-Press the replacement hard and soft bushings into axle end of the lower torque rod.
   4.2-Press inner sleeve into the installed bushings. Check to make sure that bushing ends are flush with the eye of the torque rod.
   4.3-Position inner sleeve to extend slightly past the right or left side of the torque rod eye, depending on the number of wear washers needed.
   NOTE: Trim bushing ends flush to torque rod eye.
   4.4-Assemble pivot connection with the number of wear washers on either side of the torque rod. Torque pivot hardware to specifications.
5. Lower Torque Rod (Hanger-End)
   5.1-Install soft bushings into the hanger end of the lower torque rod. Check to make sure that bushing ends are flush with torque rod eye.
   5.2-Press inner sleeve into the installed bushing. Center the inner sleeve so that both ends extend past the sides of the torque rod eye. Assemble the pivot connection with one wear washer on either side of the bushing. Torque pivot hardware to specifications.
   NOTE: Trim the ends of the bushing flush to the rod eye, if necessary.

Figure 25. 232/232T-20K Suspension. Adjust frame width by securing crosschannel at desired width. Install shim washers at marked locations for correct alignment.

Frame Width	Shim Washer Qty W	X
33.5″- 34″	1	3
34″ - 34.5″	2	2
34.5″- 35″	3	1



6. Upper Torque Rod (Hanger-End)
   6.1-Install soft bushing into the upper torque rod eye.
   6.2-Press inner sleeve into installed bushing. Position sleeve to extend past the right or left side of the torque rod eye, depending on the number of wear washers needed.
   NOTE: Check that bushing ends are flush with the torque-rod eye.
   6.3-Assemble pivot connection with correct number of wear washers. Torque pivot hardware to specs.
7. Upper Torque Rod (Axle-End)
   7.1-Install soft bushing into the hanger end of the lower torque rod. Check that bushing ends are flush with torque rod eye. Trim bushing ends flush to eye.
   7.2-Press inner sleeve into the installed bushing. Center inner sleeve so that both ends extend slightly past sides of torque rod eye. Assemble pivot connection with one wear washer on either side of the bushing. Torque pivot hardware to specifications.
8. Reassemble suspension, if necessary. Torque components to specifications.
9. Check wheel toe-in setting (between 1/32″ and 3/32″). Adjust if necessary (See page 17).

CAUTION Failure to torque pivot hardware can result in parts failure and void the 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 for suspensions is limited to the original warranty coverage extended by the manufacturer of the purchased part.

All work performed 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 charges for parts transportation 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.