

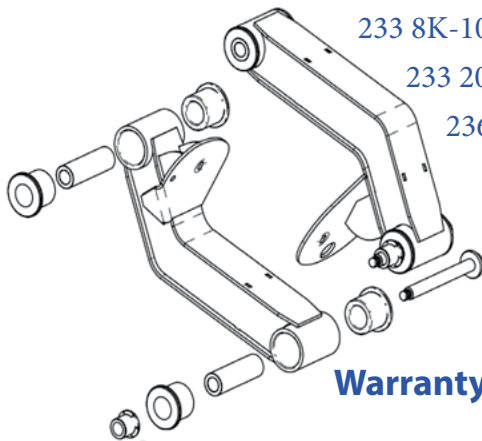
# RSS 233/232 AUXILIARY AXLE SUSPENSION SERVICE PARTS GUIDE – KINGPINS/BUSHINGS

## KINGPIN REPLACEMENT



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Installation/Service Manuals

## Suspension Identification

### Suspension Identification Tag

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

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

Please refer to the suspension number/part number and serial number on the Suspension Identification Tag when contacting Ridewell for customer service, replacement parts and warranty information.

### Self-Steering Option

Self-steering suspensions are designed to steer only in the forward direction. The suspension must be raised off the ground or locked into non-steering mode during reverse travel to avoid damage.

Ridewell Suspensions strongly recommends the use of automated systems that raise/lock the lift-axle during reverse travel. For manual operations, Ridewell recommends the installation of a visual/audible indicator to assist the driver. 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.



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

### Notes and Cautions

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

The guide uses two types of service notes to provide important guidelines for the suspension operating correctly. The service notes are defined as:

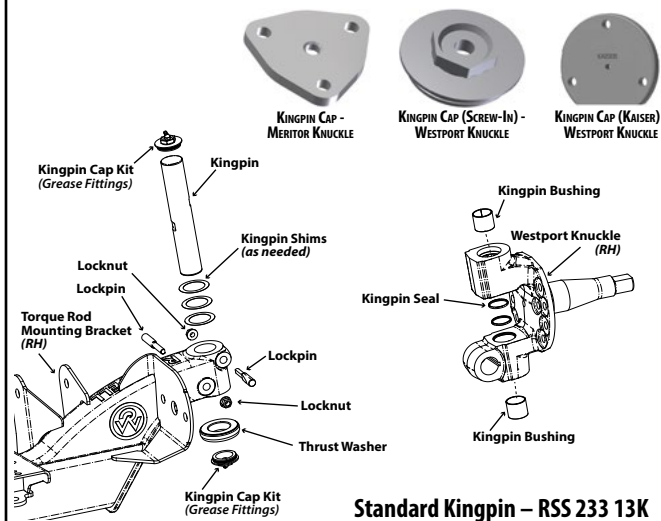
“NOTE:” Provides additional instructions or procedures to complete tasks and make sure that the suspension functions properly.

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

### Figure 2. Ridewell – Standard/Kaiser Kingpin Cap Profiles

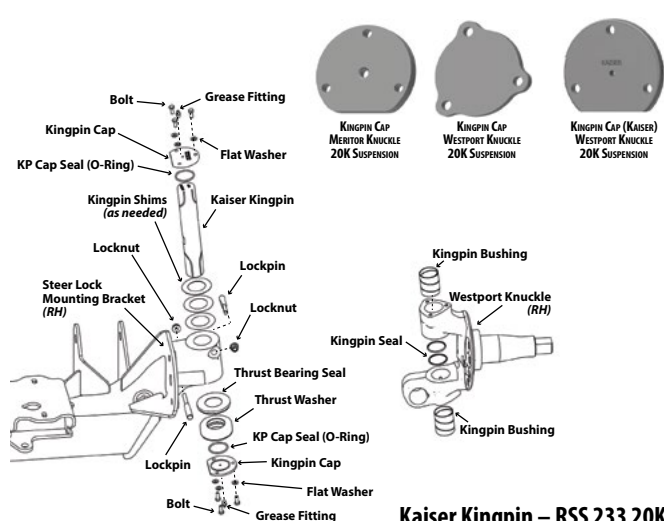
Various Standard Kingpin and Kaiser Kingpin configurations for RSS-232/RSS-233 suspensions with Meritor-/Westport-Axle Steering Knuckles are available. Kingpin replacement kits include components to replace two kingpin assemblies on each axle.

**232/233 8K-10K-13K – Meritor/Westport Axle Knuckle**  
The type of kingpin installed in the axle knuckle can be determined by the shape of the kingpin cap.



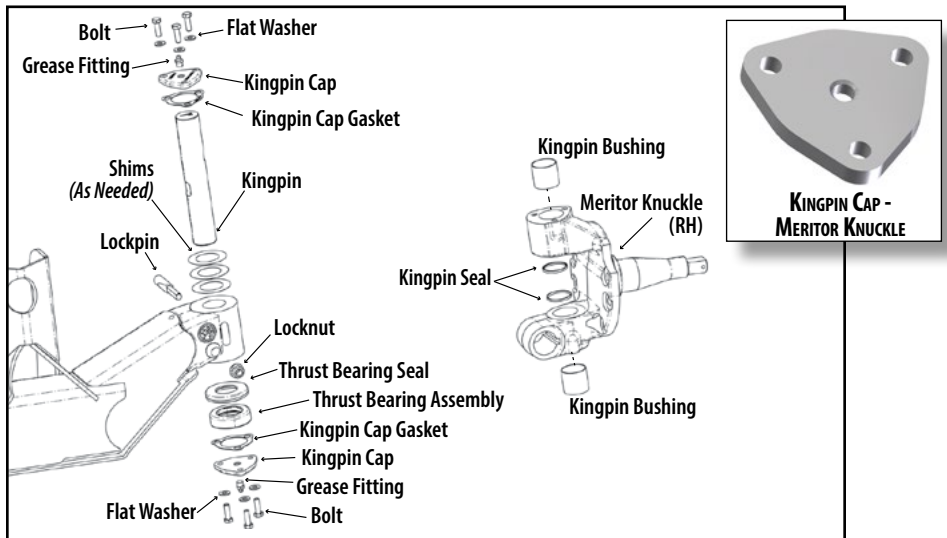
**Standard Kingpin – RSS 233 13K**

**232/233 20K – Meritor/Westport Axle Knuckle**  
The type of kingpin installed in the axle knuckle can be determined by the shape of the kingpin cap.

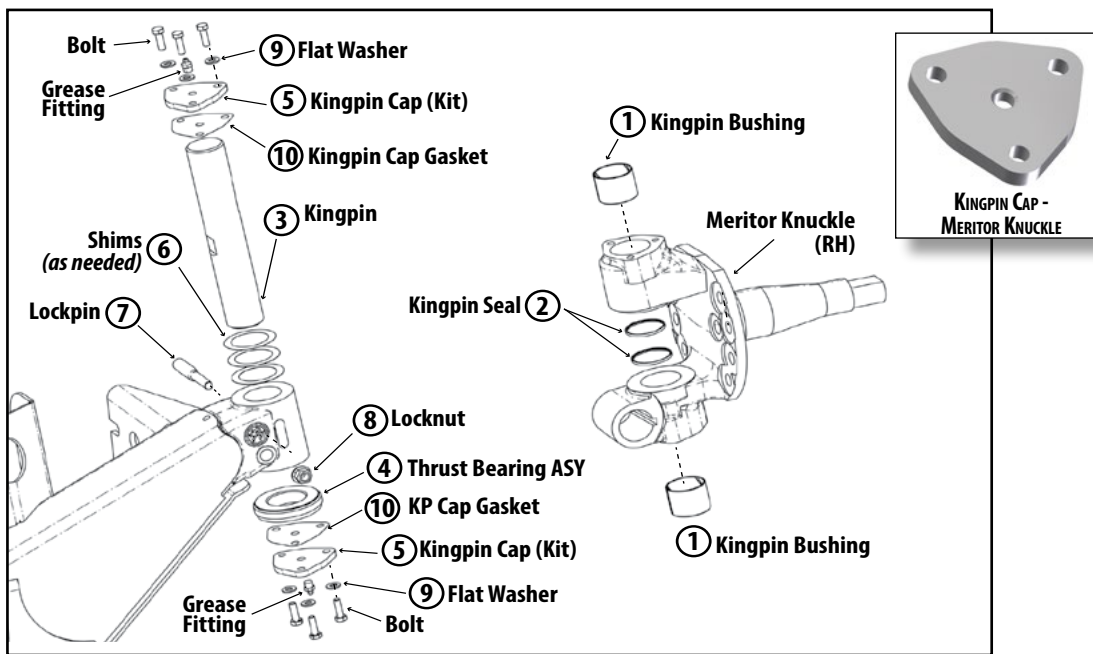


**Kaiser Kingpin – RSS 233 20K**

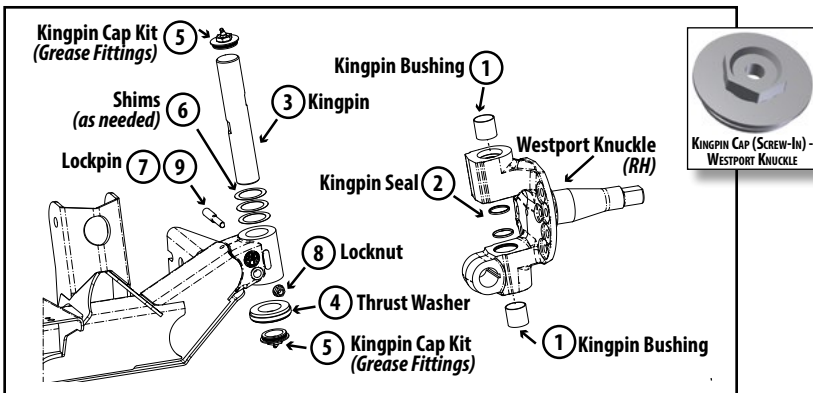
DWG No.	QTY/Axle	Part Number	232 8K TRUCK w/ MERITOR KNUCKLE – STANDARD KINGPIN
	<b>1</b>	<b>1660170</b>	<b>Kingpin Kit FC-941</b>
—	—	—	Meritor #R201318 ( <i>Kingpin bushing - bore reaming required</i> )



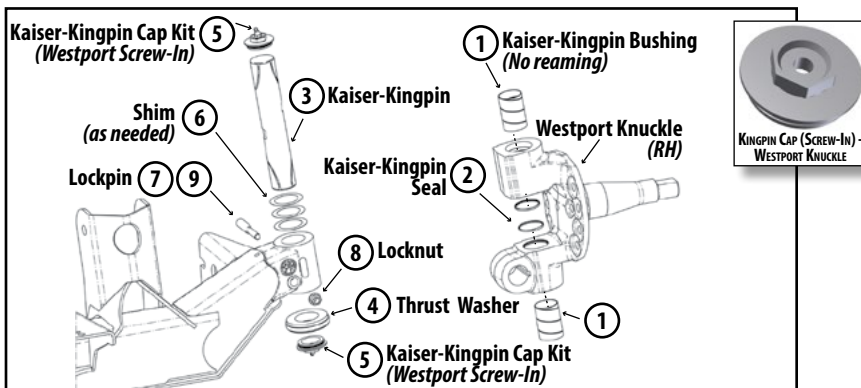
DWG No.	QTY/Axle	Part Number	232 10K-13K TRUCK AND TRAILER w/MERITOR KNUCKLE – STANDARD KINGPIN
	<b>1</b>	<b>1660106</b>	<b>Kingpin Kit (232 10K; 13K with Meritor Knuckle)</b>
<b>1</b>	<b>Included in Service Kit</b>	<b>4</b> 1660241	KINGPIN BUSH FF/FG R210088 ( <i>KP bushing - bore reaming required</i> )
<b>2</b>		<b>4</b> 1660131	SEAL ASY KINGPIN FG-941
<b>3</b>		<b>2</b> 1660135	KINGPIN FF/FG 13K (1.8" OD)
<b>4</b>		<b>2</b> 1660009	THRUST BRNG ASY T1822S 12/16K
<b>5</b>		<b>2</b> 1660133	KINGPIN CAP KIT FG-941 MRTR
<b>6</b>		<b>2</b> 1660136	SHIM - KINGPIN .005" FF/FG
		<b>2</b> 1660137	SHIM - KINGPIN .010" FF/FG
		<b>2</b> 1660138	SHIM - KINGPIN .015" FF/FG
<b>7</b>		<b>2</b> 1660139	LOCK PIN .44/20 3.88" 13.2
<b>8</b>		<b>2</b> 1150001	L'NUT 7/16" 20NF FL T-L GR5 (B)
<b>9</b>	<b>12</b> 1160004	FLAT WASHER - 5/16" SAE PLTD	
<b>10</b>	<b>4</b> 1660132	GSKT KINGPIN CAP FG-941	



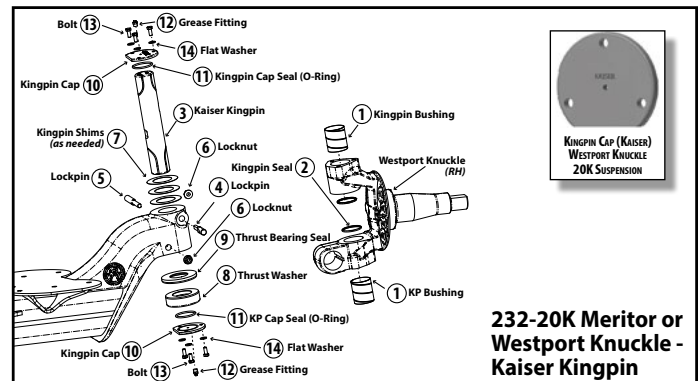
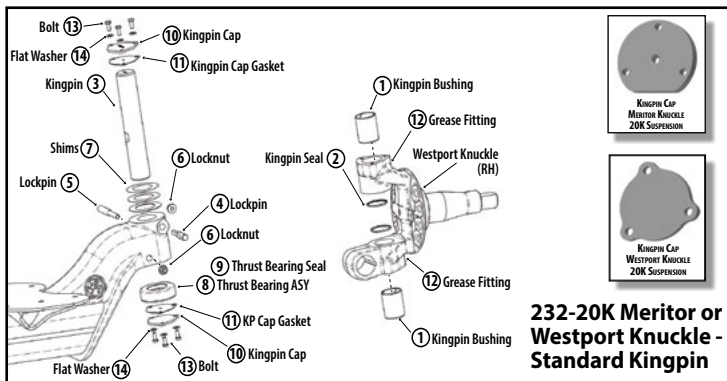
DWG No.	QTY/Axle	Part Number	232/232T 10K-13K TRUCK AND TRAILER w/WESTPORT KNUCKLE – STANDARD KINGPIN
	1	1660317	<b>Kingpin Replacement Kit</b>
1	Included in Service Kit	4 1660241	KINGPIN BUSH FF/FG ( <i>Kingpin bushing - bore reaming required</i> )
2		4 1660131	SEAL ASY KINGPIN FG-941
3		2 1660135	KINGPIN FF/FG (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	



DWG No.	QTY/Axle	Part Number	232-232T 10K-13K TRUCK AND TRAILER w/MERITOR OR WESTPORT KNUCKLE – KAISER KINGPIN
	1	1660261	<b>Kaiser-Kingpin Replacement Kit - Meritor Knuckle</b>
—		—	#KG931-R ( <i>Kingpin bushing - No bore reaming needed</i> )
	1	1660319	<b>Kaiser-Kingpin Replacement Kit - Westport Knuckle</b>
1	Included in Service Kit	4 1660322	KINGPIN BUSH KAI 13K ( <i>KP bushing - No bore reaming needed</i> )
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	



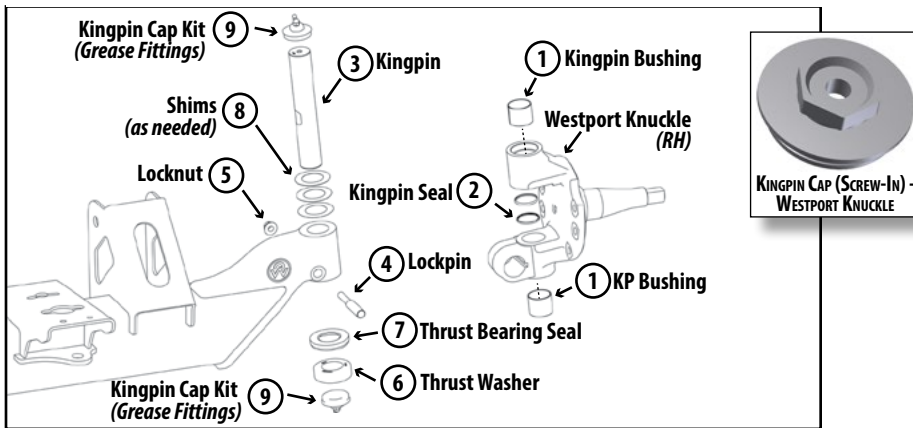
DWG No.	QTY/Axle	Part Number	232/232T-20K TRUCK AND TRAILER w/MERITOR OR WESTPORT KNUCKLE – STANDARD KINGPIN	
	1	1660326	<b>Kingpin Replacement Kit FC-941 - Meritor Knuckle</b>	
—		—	Meritor P/N R201312 ( <i>Kingpin bushing - bore reaming required</i> )	
	1	1660324	<b>Kingpin Replacement Kit - Westport Knuckle</b>	
1	<b>Included in Service Kit</b>	4	1660323	KINGPIN BUSH WSTPT 20K FL ( <i>Bushing bore reaming required</i> )
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	



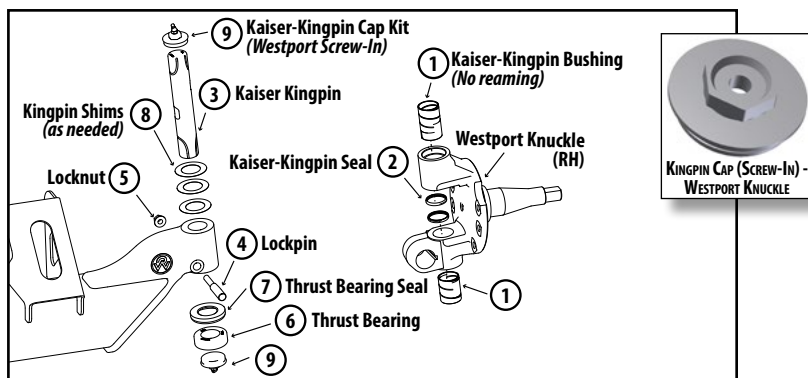
DWG No.	QTY/Axle	Part Number	232/232T-20K TRUCK AND TRAILER w/MERITOR OR WESTPORT KNUCKLE – KAISER KINGPIN	
	1	1660189	<b>Kaiser-Kingpin Replacement Kit FL-941 - Meritor Knuckle</b>	
—		—	Meritor P/N KH931-L ( <i>KP bushing - No bore reaming needed</i> )	
	1	1660325	<b>Kaiser-Kingpin Replacement Kit - Westport Knuckle</b>	
1	<b>Included in Service Kit</b>	4	1660315	KINGPIN BUSH KAI 20K FL ( <i>No bushing bore reaming needed</i> )
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	



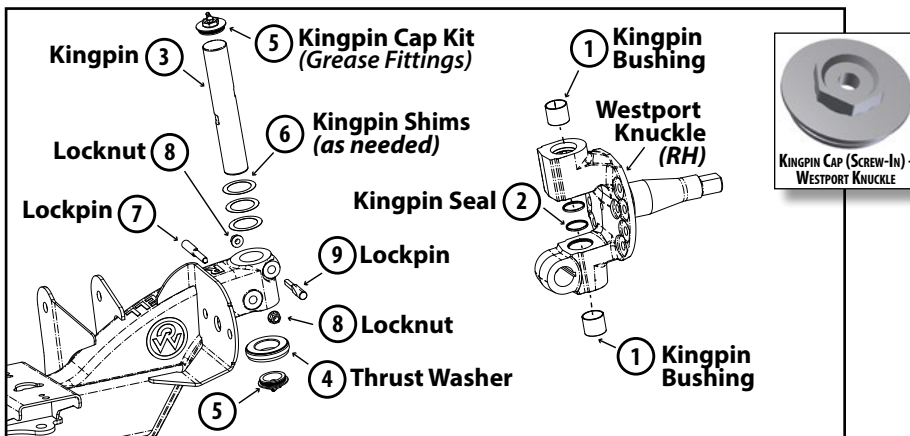
DWG No.	QTY/Axle	Part Number	233 8K TRUCK w/MERITOR/WESTPORT KNUCKLE – STANDARD KINGPIN
N/A	1	1660170	<b>Kingpin Kit FC-941 - Meritor Knuckle</b>
			Meritor #R201318 ( <i>Kingpin bushing - bore reaming required</i> )
	1	1660534	<b>Kingpin Replacement Kit - Westport Knuckle</b>
1	<b>Included in Service Kit</b>	4	1660545 KINGPIN BUSH WSTPT 8K ( <i>KP bushing - bore reaming required</i> )
2		4	1660544 SEAL KINGPIN WSTPT 8K
3		2	1660469 KINGPIN FC/8K WP #143660-0013 ( <i>1.5" OD</i> )
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	



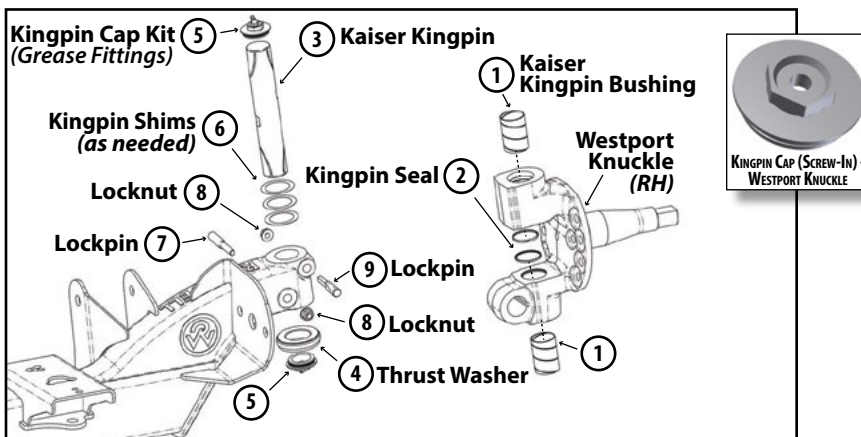
DWG No.	QTY/Axle	Part Number	233 8K TRUCK w/WESTPORT KNUCKLE – KAISER KINGPIN
	1	1660533	<b>Kaiser Kingpin Replacement Kit</b>
1	<b>Included in Service Kit</b>	4	1660483 KINGPIN BUSH KAI 8K FC ( <i>KP bushing - No bore reaming needed</i> )
2		4	1660484 SEAL KINGPIN KAI 8K FC
3		2	1660482 KINGPIN FC SER. KAI 8K ( <i>1.5" OD</i> )
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	



DWG No.	QTY/Axle	Part Number	233/233T 10K-13K TRUCK AND TRAILER w/WESTPORT KNUCKLE — STANDARD KINGPIN
	<b>1</b>	<b>1660317</b>	<b>Kingpin Kit (233 10K-13K Truck with Westport Knuckle)</b>
<b>1</b>	<b>Included in Service Kit</b>	<b>4</b> 1660241	KINGPIN BUSH FF/FG ( <i>Kingpin bushing - bore reaming required</i> )
<b>2</b>		<b>4</b> 1660131	SEAL ASY KINGPIN FG-941
<b>3</b>		<b>2</b> 1660135	KINGPIN FF/FG 13K ( <i>1.8" OD</i> )
<b>4</b>		<b>2</b> 1660009	BRNG ASY T1822S 12/16K THRUST
<b>5</b>		<b>4</b> 1660014	KINGPIN CAP 12/16K SCREW IN
<b>6</b>		<b>2</b> 1660136	SHIM - KINGPIN .005" FF/FG
		<b>2</b> 1660137	SHIM - KINGPIN .010" FF/FG
		<b>2</b> 1660138	SHIM - KINGPIN .015" FF/FG
<b>7</b>		<b>2</b> 1660139	LOCK PIN .44/20 3.88" 13.2
<b>8</b>	<b>4</b> 1150001	L'NUT 7/16" 20NF FL T-L GR5 (B)	
<b>9</b>	<b>2</b> 1660216	LOCK PIN .44/20 3.18" 20K	

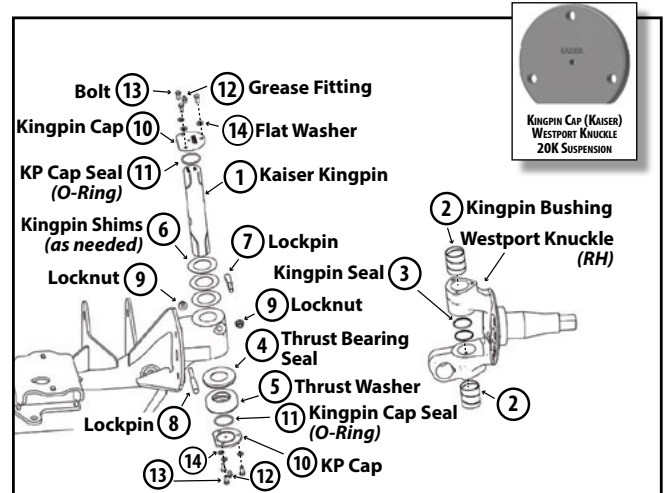
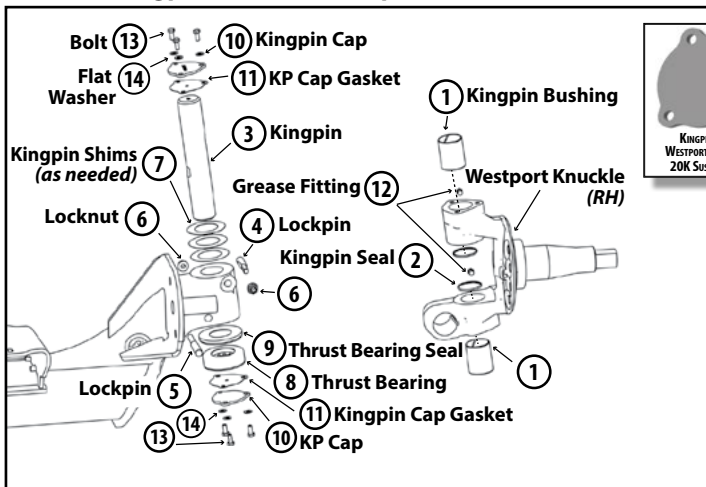


DWG No.	QTY/Axle	Part Number	233/233T 10K-13K TRUCK AND TRAILER w/WESTPORT KNUCKLE — KAISER KINGPIN
	<b>1</b>	<b>1660319</b>	<b>Kaiser Kingpin Kit (233 10K-13K with Westport Knuckle)</b>
<b>1</b>	<b>Included in Service Kit</b>	<b>4</b> 1660322	KINGPIN BUSH KAI 13K ( <i>KP bushing - No bore reaming needed</i> )
<b>2</b>		<b>4</b> 1660131	SEAL ASY KINGPIN FG-941
<b>3</b>		<b>2</b> 1660314	KINGPIN FF/FG KAI #10M21-3 ( <i>1.8" OD</i> )
<b>4</b>		<b>2</b> 1660009	BRNG ASY T1822S 12/16K THRUST
<b>5</b>		<b>4</b> 1660014	KINGPIN CAP 12/16K SCREW IN
<b>6</b>		<b>2</b> 1660136	SHIM - KINGPIN .005" FF/FG
		<b>2</b> 1660137	SHIM - KINGPIN .010" FF/FG
		<b>2</b> 1660138	SHIM - KINGPIN .015" FF/FG
<b>7</b>		<b>2</b> 1660139	LOCK PIN .44/20 3.88" 13.2
<b>8</b>	<b>4</b> 1150001	L'NUT 7/16" 20NF FL T-L GR5 (B)	
<b>9</b>	<b>2</b> 1660216	LOCK PIN .44/20 3.18" 20K	



DWG No.	QTY/Axle	Part Number	233/233T 20K TRUCK AND TRAILER w/WESTPORT KNUCKLE – STANDARD KINGPIN
	<b>1</b>	<b>1660324</b>	<b>Kingpin Kit (233 20K with Westport Knuckle)</b>
1	<b>Included in Service Kit</b>	4 1660323	KINGPIN BUSH WSTPT 20K (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	

**Standard Kingpin (233 20K - Westport Knuckle)**



**Kaiser Kingpin (233 20K - Westport Knuckle)**

DWG No.	QTY/Axle	Part Number	233 20K w/WESTPORT KNUCKLE – KAISER KINGPIN
	<b>1</b>	<b>1660325</b>	<b>Kaiser Kingpin Kit (233 20K with Westport Knuckle)</b>
1	<b>Included in Service Kit</b>	2 1660231	KINGPIN FL SER. KAI 20K
2		4 1660315	KINGPIN BUSH KAI 20K (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"	



## Maintenance

### Recommended Service Intervals

Ridewell Suspensions recommends these minimum service intervals for standard duty, on-highway usage applications. More frequent intervals are recommended for 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 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 suspension components to specifications (Engineering Drawing).

#### Every 12,000 miles of use

- \_\_\_ Lubricate Brake Cam and Slack Adjuster.
- \_\_\_ Inspect kingpins and upper/lower kingpin bushings for wear. Grease thrust bearings.
- \_\_\_ Inspect steering damper for damage/wear.
- \_\_\_ Inspect air springs for any damage/excessive wear.  
Torque air spring bolts/nuts to specifications (Engineering Drawing).
- \_\_\_ Check air system for leaks.

#### First 50,000 miles of use

- \_\_\_ Torque all suspension bolts/nuts to specifications (Engineering Drawing).
- \_\_\_ Check wheel ends for excessive play.
- \_\_\_ Check pivot bushings for wear.
- \_\_\_ Check operation of (reverse) steering lock (if equipped).
- \_\_\_ Verify operation of manual/automatic lift-in-reverse control (if equipped).
- \_\_\_ Inspect tie-rod and the tie-rod ends for excessive damage/wear. Lubricate tie-rod ends.  
Check that tie-rod boot is in place and completely over the end of the tie-rod.  
Replace entire tie-rod end if boot is damaged.

#### Annual/100,000 Miles Inspection

- \_\_\_ Inspect pivot connections for worn bushings/wear washers. Replace if necessary. Torque all hardware to spec. (Engineering Drawing).
- \_\_\_ Check hanger and air spring mounting plate connections to frame.

#### Check lubrication level in wheel ends:

- \_\_\_ Oil-Filled Wheel Ends:  
Refill/Replace lubricant as needed (See TMC RP 631-“100K/Annual Inspection”).
- \_\_\_ Check air system for leaks.
- \_\_\_ Test air tank pressure protection valve (PPV) if equipped.
- \_\_\_ Check brake chambers/brakes for damage and proper function.

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

**CAUTION** Failure to torque bolts/nuts of 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:

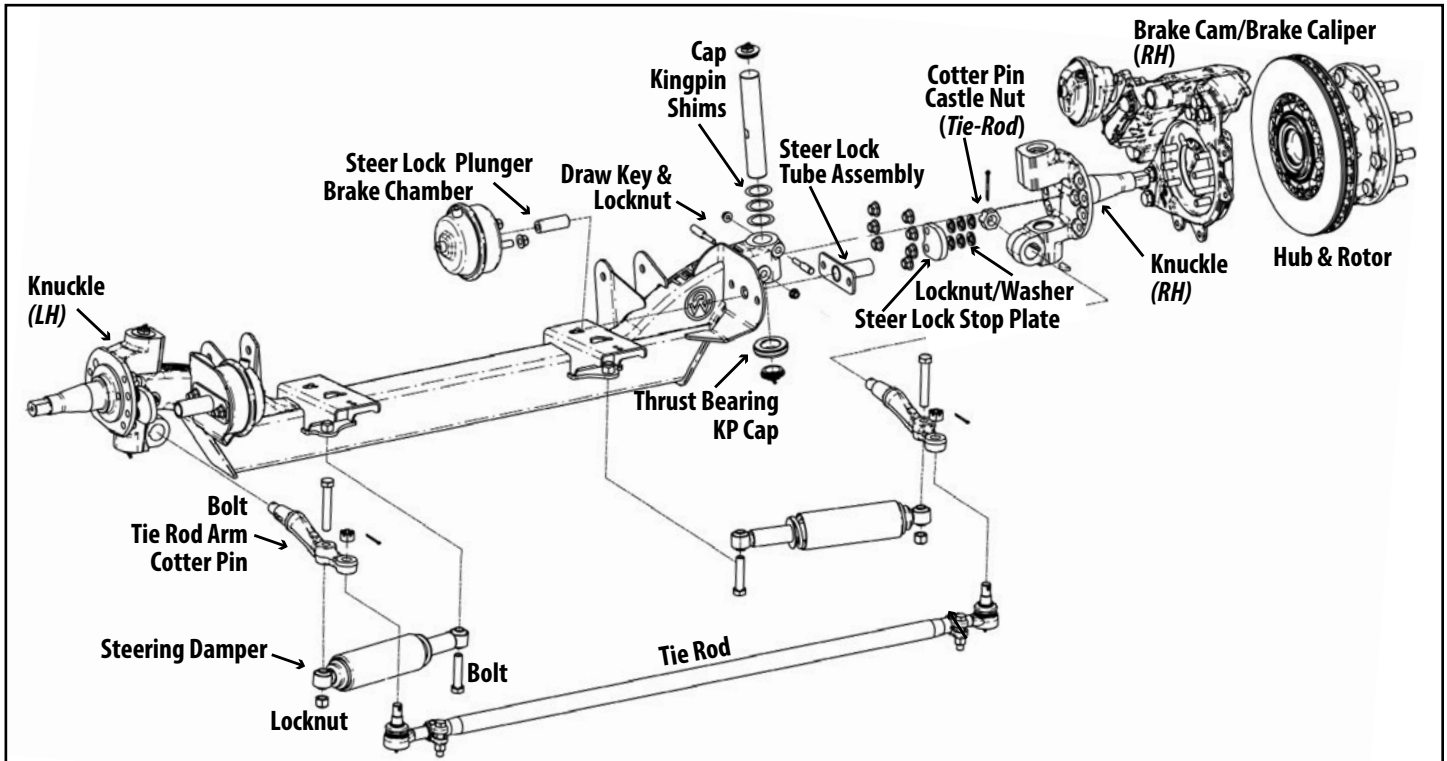
RP 609	Self-Adjusting/Manual Brake Adjuster Removal, Installation and Maintenance
RP 618	Wheel Bearing Adjustment Procedure
RP 619	Air System Inspection Procedure
RP 622	Wheel Seal and Bearing Maintenance
RP 631	Wheel End Lubrication Procedures
RP 643	Air Ride Suspension Maintenance Guidelines
RP 645	Tie-Rod End Inspection/Maintenance
RP 651	Steer Axle Maintenance Guidelines

#### AVAILABLE WHEEL-END LUBRICANTS

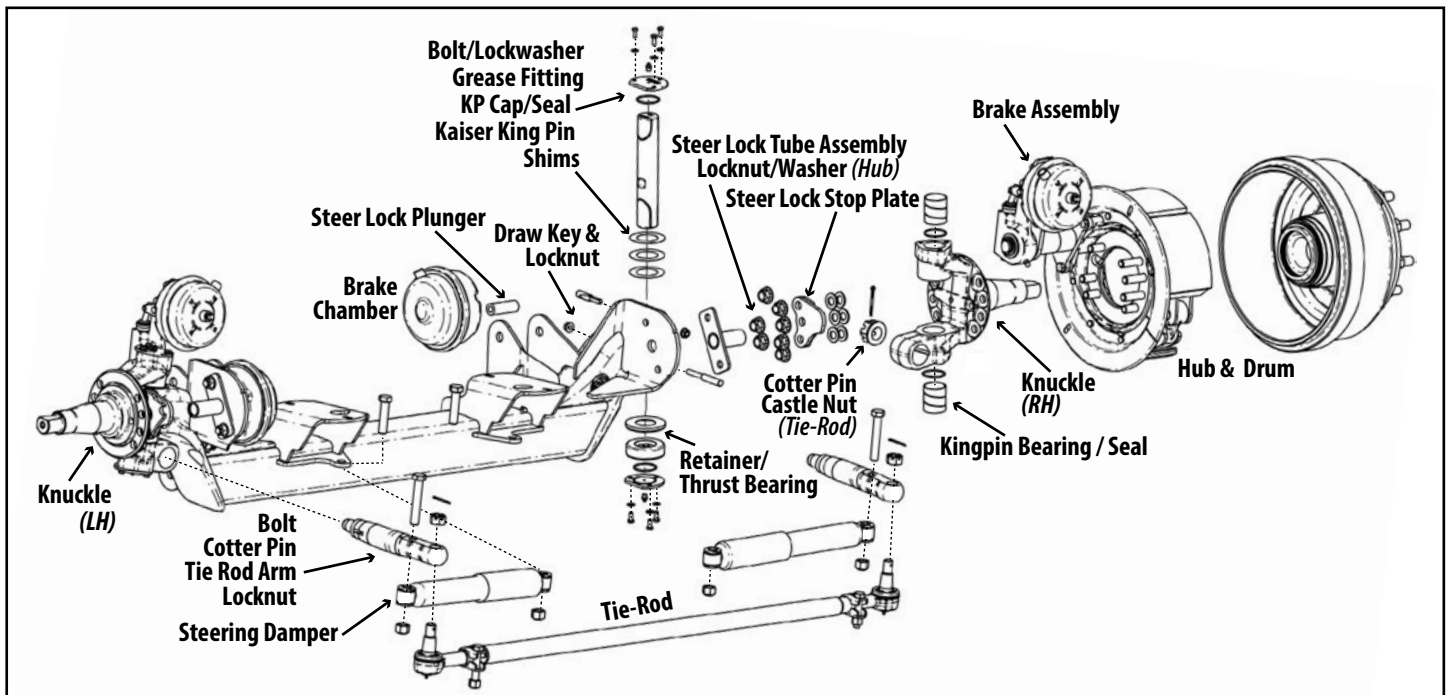
Lubricant Type	P/N	Item Description
Mineral Oil	<b>380008G</b>	(CITGO) MP GearOil 631310001-80W-90
Synthetic Oil	<b>1980006</b>	(SHELL) Synthetic API GI-5 75W-90 Oil
Synthetic Hard-Pack Grease	<b>1980007</b>	(CITGO) Synthetic Grease

## RSS 233/232 Fabricated Axle – Kingpin /Knuckle/Tie-Rod Components

Kingpin replacement kits for RSS-233/RSS-233 suspensions with Meritor- and Westport-Axle steering knuckles include kingpin bushings/seals, shims, and locknut components to replace two kingpins for each axle..



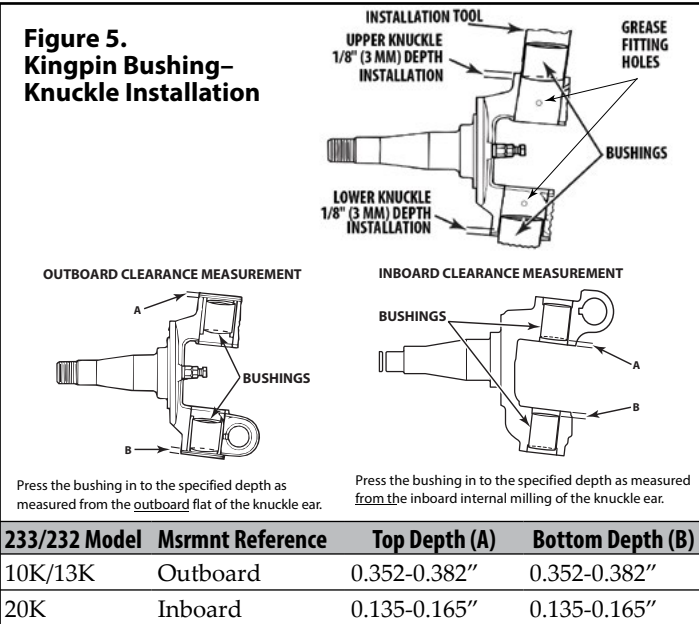
**Figure 3.**  
ADB fabricated axle for RSS 233T-13K Suspension with Westport Knuckle - Kingpin (Reference only).



**Figure 4.**  
Drum brake fabricated axle for RSS 233 20K with Westport Knuckle - Kaiser Kingpin (Reference only).

## RSS 233/232 Suspensions – Standard Kingpin Replacement Procedure

**Figure 5. Kingpin Bushing–Knuckle Installation**



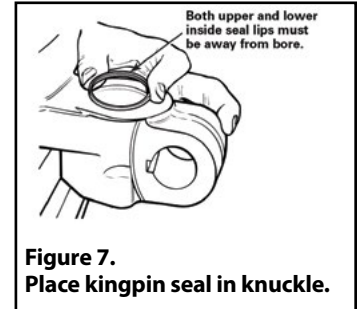
Guide the pilot of the reamer into the bottom bushing until the reamer blades touch the bushing. Rotate the reamer with a light **DOWNWARD** pressure until the bottom bushing is reamed out (Fig. 5).

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 (Fig 6).

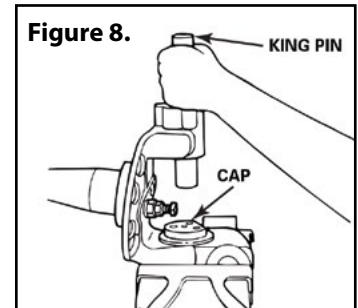


**Figure 7. Place kingpin seal in knuckle.**

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 6).

Place endcap for the knuckle on top of the seal. Slide kingpin through the opposite knuckle bore. Use kingpin to install the seal (Figure 7).



**Figure 8.**

### 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 8).

- 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*

**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 4).

### 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 4).

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

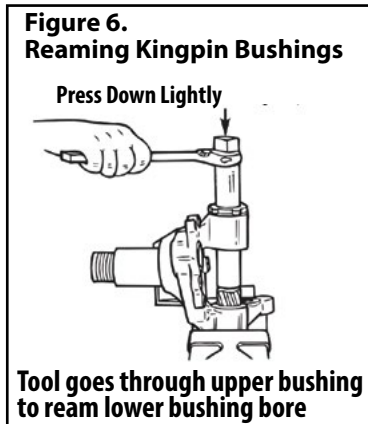
### Ream the bushings:

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

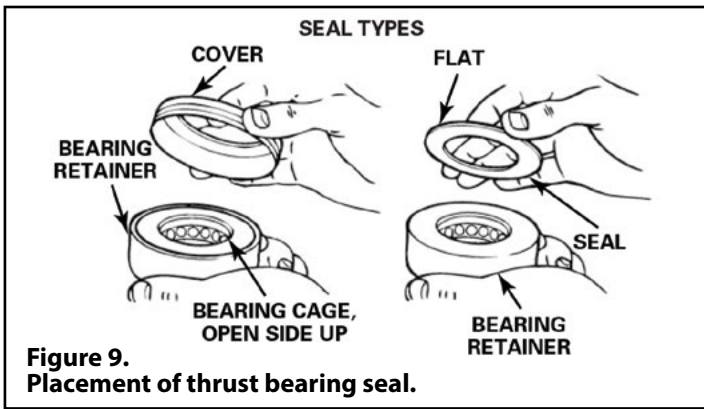
Place the knuckle into a vise with brass jaws. Slide the pilot of the reamer through the top bushing until the reamer blades touch the bushing.

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 6. Reaming Kingpin Bushings**







**Figure 9.**  
**Placement of thrust bearing seal.**

### Install Shims

Inspect the shims for damage before installation.

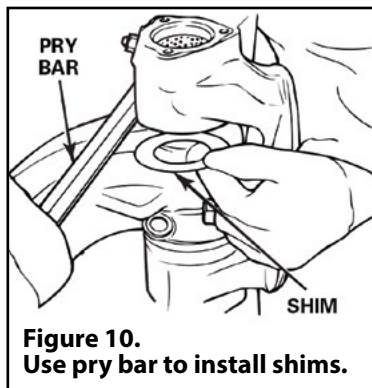
- Replace damaged shims with the same size shims or a combination of sizes that allow the least amount of knuckle-end play.
- If a new shim pack is required, select the number of shims for installation that provide the least amount of knuckle-end play.
- Place the shims on top of the axle beam bore machined 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 9).

Align all the bores.

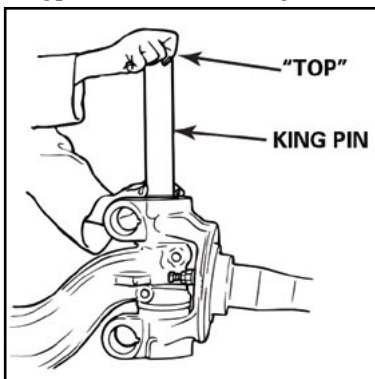
**NOTE:** If the bores are not aligned, the parts will be damaged when kingpin is installed. Remove pry bar.



**Figure 10.**  
**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 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 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". Torque clamp bolts at tie-rod end to 40-60 ft-lbs.

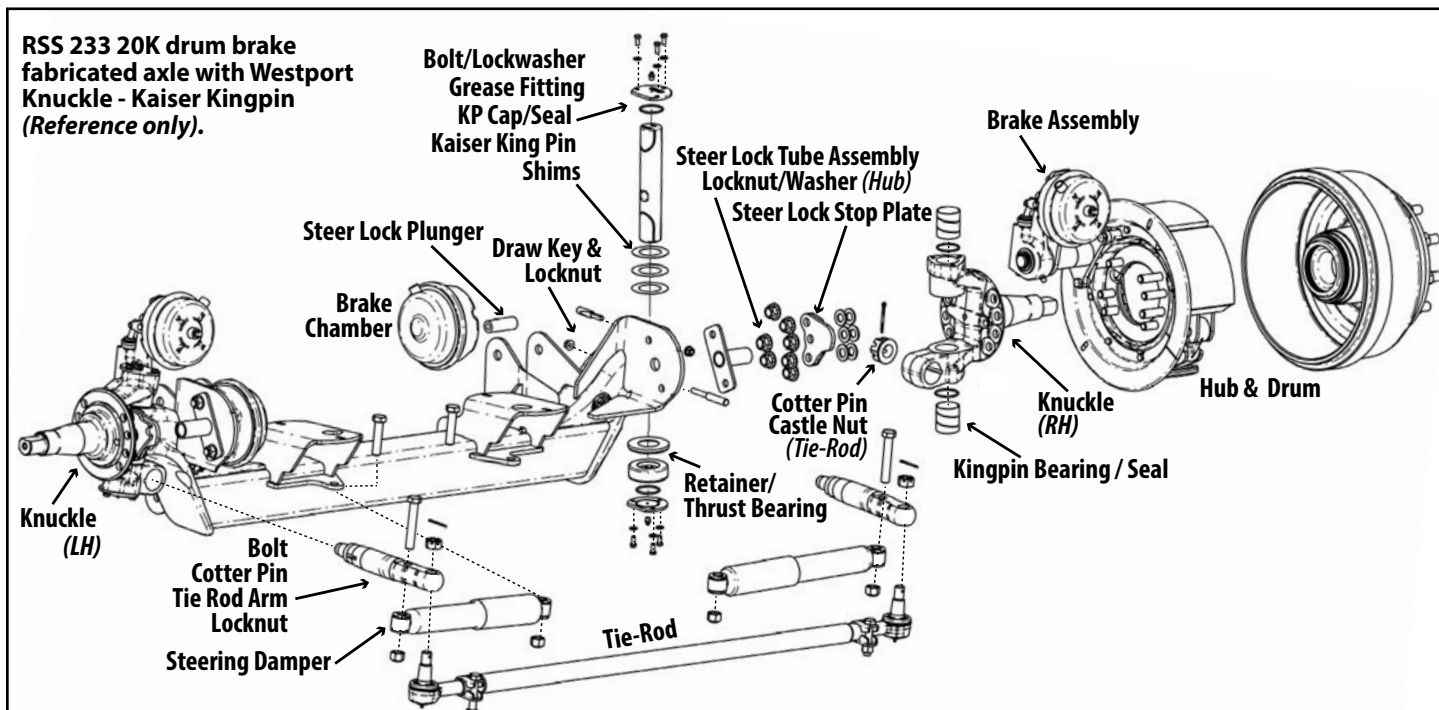
**NOTE:** Toe-in is the negative difference in measurement across the inside of each hub, at the leading edge compared to the trailing edge.

### 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 Maintenance Manual 2 "Front Non-Drive Steer Axles" for additional information.

## RSS 233/232 Suspensions – Kaiser Kingpin Replacement Procedure



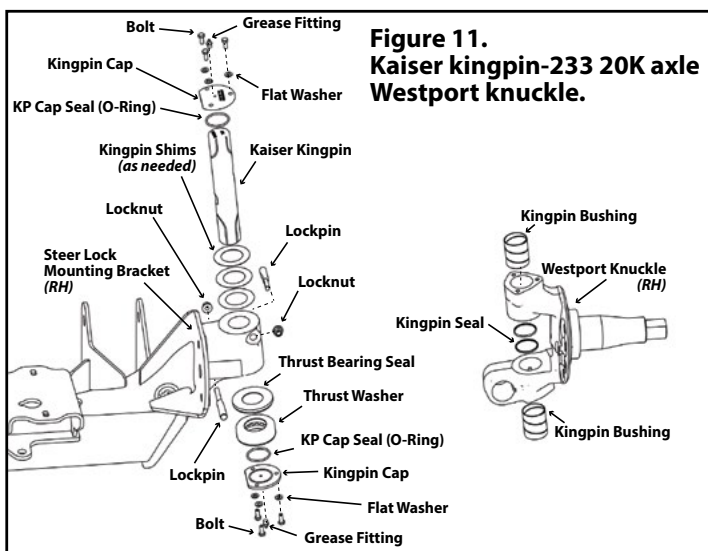
### Kaiser Kingpin Bushing Installation Procedure

Kaiser kingpin bushings do not need the bushing bores reamed after installation (Figure 10).

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 rubber seal should face axle eye.

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.

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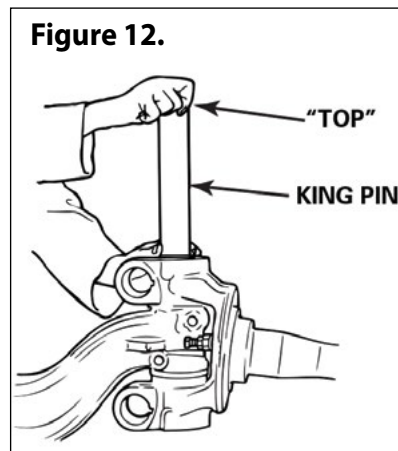
**Figure 11.**  
Kaiser kingpin-233 20K axle  
Westport knuckle.



## RSS 233/232 Suspensions – Kaiser Kingpin Replacement Procedure (Continued)

### Kingpin/Knuckle Installation

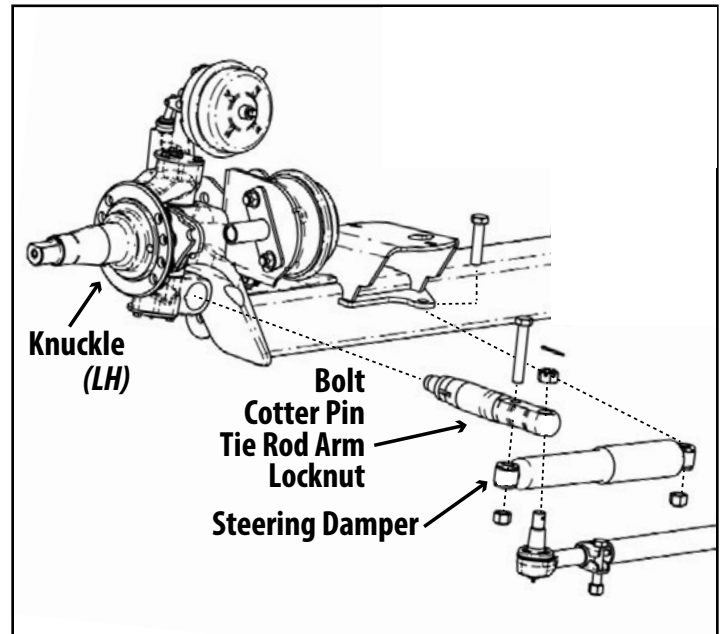
1. Check the kingpin fit in both the top and bottom bore of the knuckle. Slide the kingpin through both knuckle bores to test the spindle alignment (Figure 12).
2. The spindle should be replaced if the kingpin will not go into and through both spindle eyes.
3. Pack thrust bearing with grease before installation.
4. Select the number of shims that will give the least amount of endplay in the knuckle. Shim thicknesses are .005", .010" and .015" (.030" - 20K axles).
5. Verify the word "TOP" on the top of the kingpin is facing toward the end of the spindle. Place kingpin into top spindle eye and slide through until ½-inch of kingpin comes out the bottom.



- Place shims onto the bottom of the kingpin.
6. Carefully place knuckle with kingpin and shims 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.
  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 nut to 30-45 ft.lb.
  9. Install top and bottom plates (caps) 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 washer (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

1. Place a Woodruff key into the tie-rod arm. Attach arm to the knuckle with nuts.
2. Torque 233 8K/13.2K (1" nuts) to 550-1025 ft-lbs.
3. Torque 233 20K (1 1/4" nuts) to 775-1450 ft-lbs.
4. Tighten nut slightly, if necessary, to align the holes. Install a 3/16" x 2-1/4" cotter pin.
5. If removed, install the cross tube into the tie-rod ends to the position marked during removal. Thread the ends into the cross tube to the required length and secure with clamp and bolts.  
NOTE: The cross tube has right-hand threads on one end and left-hand threads on the other end.
6. 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.
7. Adjust tie-rod length to attain wheel toe-in between 1/32" and 3/32". Torque 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 the wheels and other components to complete the fabricated axle assembly.

DWG No.	QTY/Axle	Part Number	233 8K-10K-13K TRUCK – BUSHING REPLACEMENT/TORQUE SPECIFICATIONS		Torque (foot-pound/Newton-meter)	
	1	<b>6040134</b>	<b>Bushing Kit-Traditional Hardware</b>		310 ft-lb	420 N-m
1	Included in Service Kit	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 SRVC LUBE FORMULA 5		
	1	<b>6040133</b>	<b>Bushing Kit-No Hardware</b>		310 ft-lb	420 N-m
1	Included in Kit	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 SRVC LUBE FORMULA 5		
	1	<b>6040215</b>	<b>Bushing Kit-W/ Huck® Hardware</b>		NA	
1	Included in Service Kit	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		
<b>Fasteners</b>			Flanged Lock Screw - (Air Spring)		3/8"-16NC	25 ft-lb 35 N-m
			Locknut - (Air Spring)		3/4"-16NF	50 ft-lb 68 N-m
			Locknut - (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 vehicle from moving. Exhaust all air from the air controls system. Disassemble suspension, if necessary.

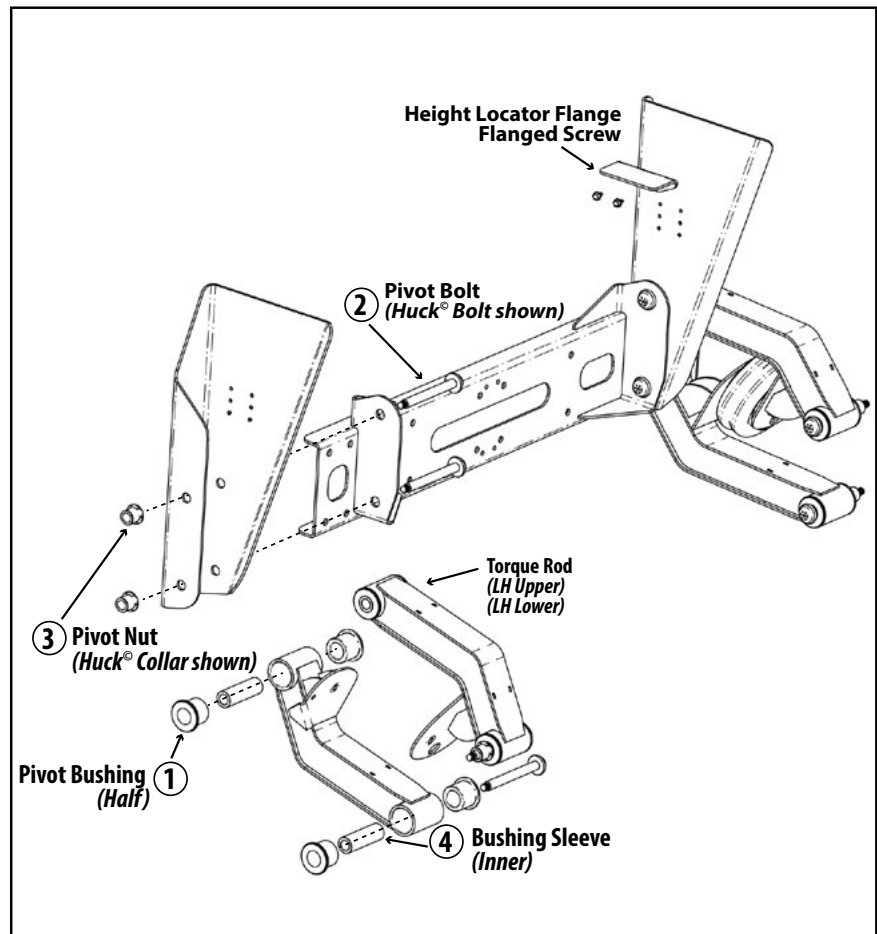
**CAUTION** Failure to chock wheels and exhaust the air system could allow vehicle/suspension movement that could result in serious injury.

### Bushing Replacement Procedure

1. Replace all bushings at the same time. Cut away Huck® Collar. Discard the pivot hardware (Fig 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. NOTE: Do not substitute lubricant. Urethane lubricant included with bushing kit. Rubber mallet may be needed.
4. Press the bushing sleeve into the center opening of the installed bushing. NOTE: Rubber mallet may be needed.
5. Check that internal sleeve is flush with both sides of replacement bushing.
6. Install new pivot hardware. Torque to specifications. Reassemble suspension, if necessary.

Check that wheel toe-in setting is between 1/32" and 3/32".

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



**Figure 13.** 233 13K Truck Suspension. Bushing kits include traditional hardware, wear washers and other components for eight pivot connections.

DWG No.	QTY/Axle	Part Number	233 13K ROLL-OFF TRUCK – BUSHING REPLACEMENT/TORQUE SPECIFICATIONS	Torque (foot-pound/Newton-meter)		
	1	6040218	<b>Bushing Kit-Traditional Hardware</b>	310 ft-lb	420 N-m	
1	Included in Service Kit	8	1120047 BUSH 2.020X1.314X3.325L 88D			
2		4	1140049 HHCS 3/4" 16NF 6"L GR8 P&O			
3		4	1140050 HHCS 3/4" 16NF 6.5"L GR8 P&O			
4		8	1150016 L'NUT 3/4" 16NF FL-TL GR8 ZN			
—		4	9090079 SLV 1.31"ODX.813"ID X 4.111"LG			
1		4	9090103 SLV 1.31"ODX.813"ID X 4.861" (AXLE-END)			
4		28	1160033 WASH 215X2.625X1.35 233 13K			
—		—	1980013 URETHANE BUSHING SRVC LUBE FORMULA 5			
		1	6040217	<b>Bushing Kit-No Hardware</b>	310 ft-lb	420 N-m
1		Included in Service Kit	8	1120047 BUSH 2.020X1.314X3.325L 88D		
2	4		9090079 SLV 1.31"ODX.813"ID X 4.111"LG			
3	4		9090103 SLV 1.31"ODX.813"ID X 4.861" (AXLE-END)			
4	28		1160033 WASH 215X2.625X1.35 233 13K			
—	—		1980013 URETHANE BUSHING SRVC LUBE FORMULA 5			
<b>Fasteners</b>			Flanged Lock Screw - (Air Spring)	3/8"-16NC	25 ft-lb 35 N-m	
			Locknut - (Air Spring)	3/4"-16NF	50 ft-lb 68 N-m	
			Locknut - (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.

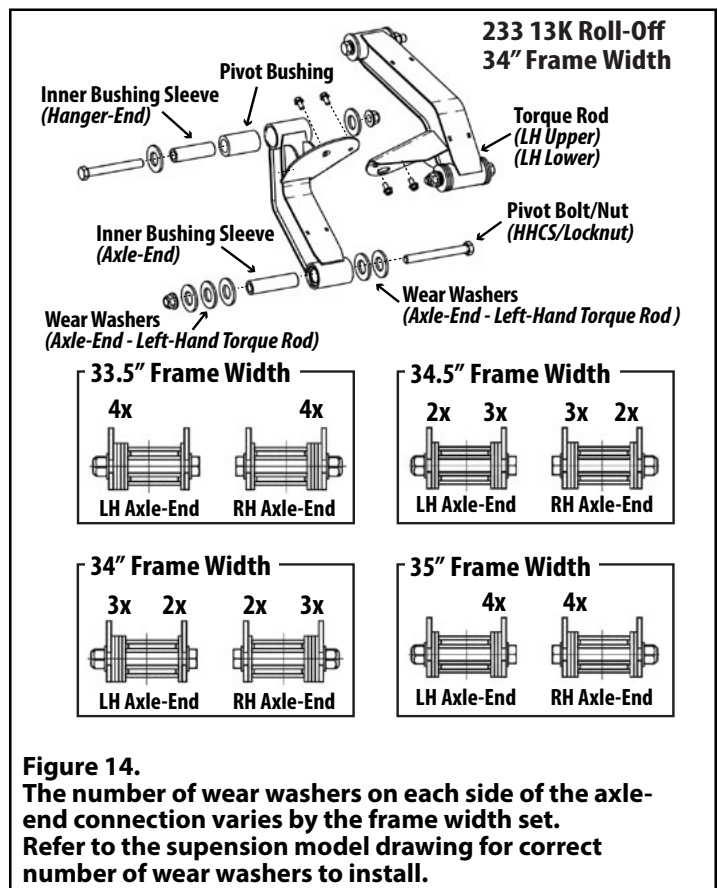
## Vehicle Preparation

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

- Replace all bushings at same time. Count wear washers on each side of Axle-End Torque Rod Assembly (Fig 14).
- Remove pivot hardware and discard. Remove bushing and discard. Inspect wear washers for wear/damage. Replace if necessary.  
NOTE: Hardware/wear washers included with bushing kit.
- Clean rod eye. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of new bushings.  
NOTE: Urethane lubricant included with bushing kit.
- Install new bushing into the eye of the torque rod.  
NOTE: Mallet /press needed to install bushing.
- 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.
- 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.



- Torque pivot nut to spec (500 ft-lb - 678 N-m).
- Reassemble suspension. Torque to specifications.
- Check wheel toe-in setting (between 1/32" and 3/32"). Adjust, if necessary.

DWG No.	QTY/Axle	Part Number	233 20K TRUCK - BUSHING REPLACEMENT/TORQUE SPECIFICATIONS	Torque (foot-pound/Newton-meter)
	1	6040145	<b>Bushing Kit-Traditional Hardware</b>	500 ft-lb 678 N-m
1	Included in Service Kit	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	<b>Bushing Kit-No Hardware</b>	500 ft-lb 678 N-m
1	Included in Service Kit	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	
<b>Fasteners</b>			Locknut - (Air Spring)	1/2"-13NC 25 ft-lb 35 N-m
			Locknut - (Air Spring)	1/2"-20NF 25 ft-lb 35 N-m
			Locknut - (Air Spring)	3/4"-16NF 50 ft-lb 68 N-m
			Flanged Lock Screw - (Air Spring)	3/8"-16NC 25 ft-lb 35 N-m
			HHCS/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.

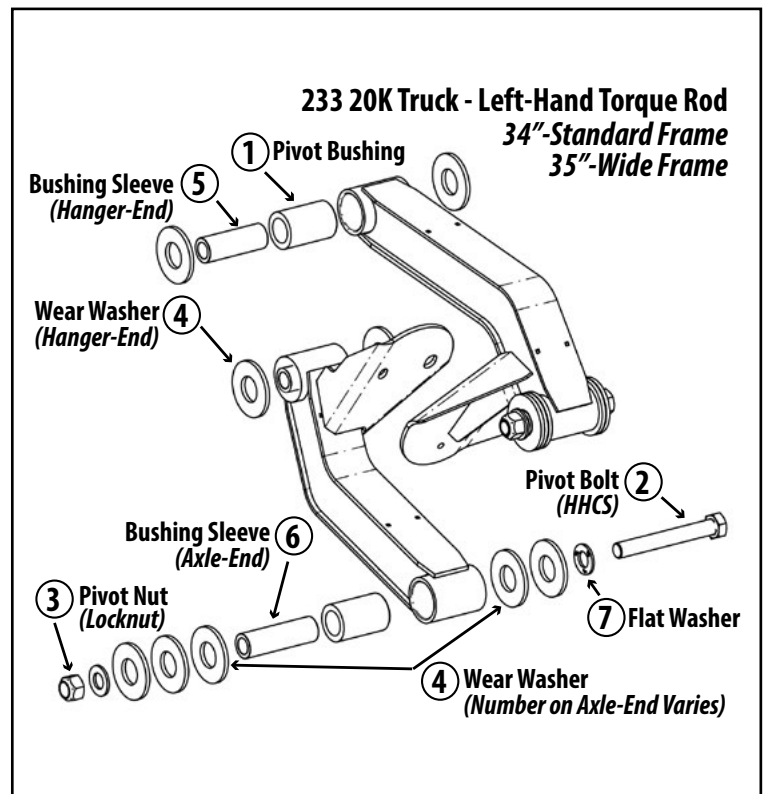
### Bushing Replacement-Standard/Wide Frame Width

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

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

1. Replace all bushings at the same time. Disassemble suspension to reach the pivot connections (Fig. 15).
2. Count the number of wear washers on each side of the Torque Rod(s) on the Axle-End. The number of wear washers varies according to the frame width set by the distance between the frame hangers (Fig. 16).
3. Remove pivot hardware and discard. Inspect wear washers for excessive wear/damage. Replace if necessary.  
NOTE: Pivot hardware and wear washers are included with bushing replacement kit.
4. Remove bushing assembly from the torque rod and discard. Clean the rod eye of any debris/corrosion.
5. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of replacement bushings.  
NOTE: Do not substitute - special urethane bushing lubricant included with all bushing kits.. Install new bushing into the eye of the torque rod.  
NOTE: Mallet /press may be needed to install the urethane bushing into the torque rod.

Continued on next page



**Figure 15.** The number of wear washers on each side of the axle-end connection varies by the frame width set. Refer to the suspension model drawing for correct number of wear washers to install.



## 233 20K Truck Re-Bushing Procedure (continued from previous page)

### 6. Hanger-End Torque Rod - Bushing Inner Sleeve - 4.1"

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 one wear washer on each side of the bushing. Inner sleeve must be flush with or extend slightly past the outside of the wear washers on both ends.

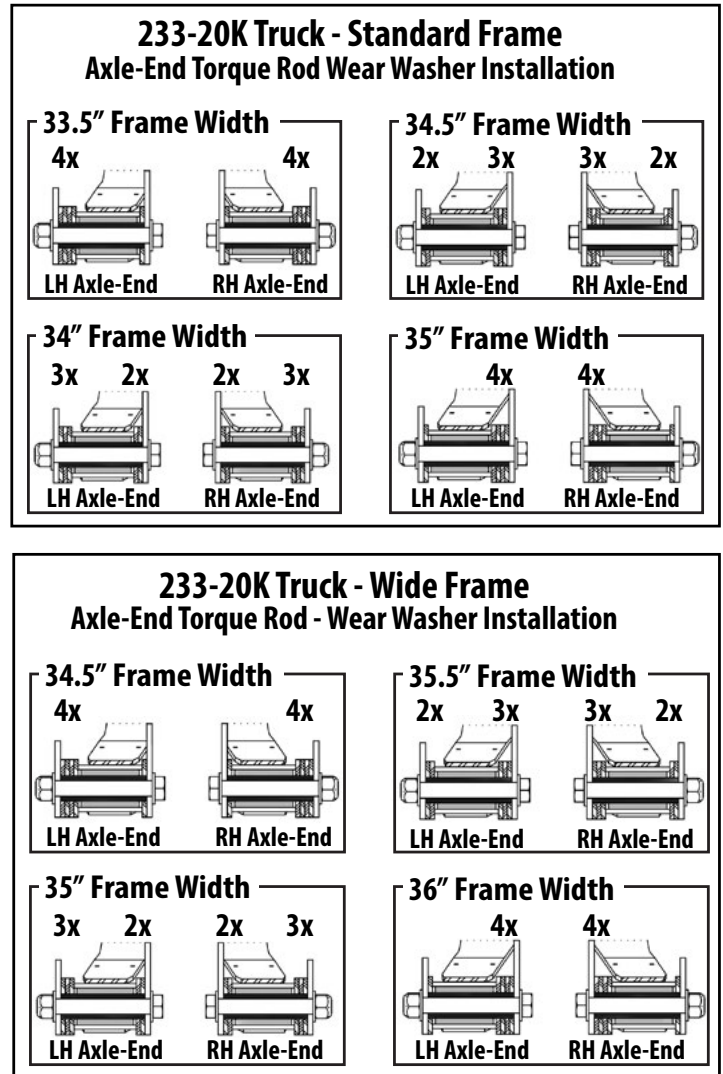
### 7. Axle-End Torque Rod-Bushing Inner Sleeve - 4.8"

Press inner sleeve into the installed bushing. Position the inner sleeve so that one end extends further past the bushing than the other end.

Assemble pivot connection with the number of wear washers on either end of the inner sleeve (Figure 16). Inner sleeve must be flush with or slightly past the outside of the wear washers on both ends.

8. Torque pivot nut to spec (500 ft-lb - 678 N-m).
9. Reassemble the suspension if necessary. Torque components to specifications.
10. Check the wheel toe-in setting (between 1/32" and 3/32") and adjust if necessary.

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



**Figure 16.** Refer to the suspension model engineering drawing for the number of wear washers on the axle-end of the left-hand and right-hand torque rod. Number varies by the pre-set frame width.



DWG No.	QTY/Axle	Part Number	2361000 TRUCK (CUSTOMER AXLE) - BUSHING REPLACEMENT	Torque (foot-pound/Newton-meter)
	1	6040161	<b>Bushing Kit-Traditional Hardware</b>	500 ft-lb 678 N-m
1	Included in Service Kit	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		16	1160026 WEAR WASHER .25X3.25X1.50	
5		8	9090082 BUSHING SLEEVE 1.44"ODX.938"IDX4.111"LG	
6		16	1160868B100 FLAT WASHER 7/8" A-325	
—		—	1980013 URETHANE BUSHING SRVC LUBE FORMULA 5	
	1	6040160	<b>Bushing Kit-No Hardware</b>	500 ft-lb 678 N-m
1	Included in Service Kit	8	1120043 BUSH 2.140X1.428X3.300L 90A	
4		16	1160026 WEAR WASHER .25X3.25X1.50 233	
5		8	9090082 BUSHING SLEEVE 1.44"ODX.938"IDX4.111"LG	
—		—	1980013 URETHANE BUSHING SRVC LUBE FORMULA 5	
<b>Fasteners</b>			FLANGED LOCK SCREW - (AIR SPRING)	3/8"-16NC 25 ft-lb 35 N-m
			LOCKNUT - (AIR SPRING)	3/4"-16NF 50 ft-lb 68 N-m
			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 - (Steering Damper)	3/4"-10NC 160 ft-lb 217 N-m
			LOCKNUT - (U-Bolt Steering Damper Mt)	3/8"-16NC 30 ft-lb 41 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.

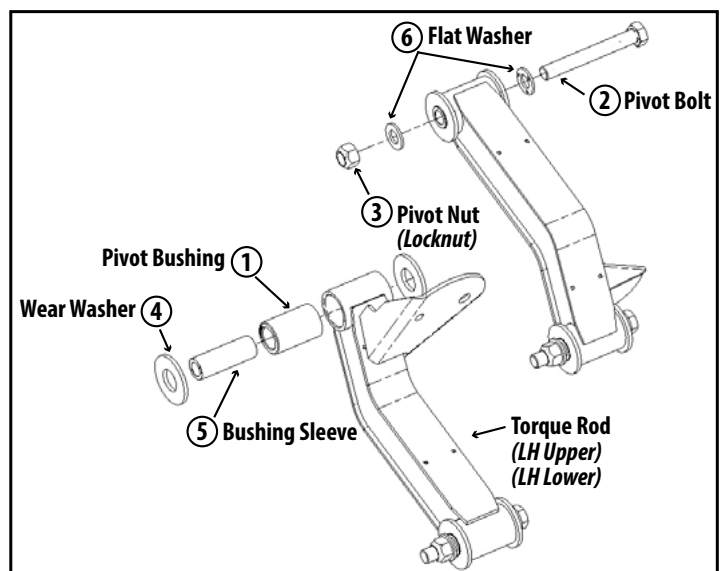
### Vehicle Preparation

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 the air system could allow vehicle movement that could result in serious injury.

### Bushing Replacement Procedure

1. Replace all bushings at the same time. Remove pivot hardware and discard. Remove bushing assembly from the torque rod and discard (Figure 17).  
NOTE: Pivot hardware and wear washers included in the bushing replacement kit (6040161).
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") and adjust, if necessary.



**Figure 17.** Bushing kits include traditional hardware, wear washers and other components for eight pivot connections.

DWG No.	QTY/Axle	Part Number	233T 10K-13K HD TRAILER - BUSHING REPLACEMENT/TORQUE SPECIFICATIONS		TORQUE - foot-pound Newton-	
	1	<b>6040188</b>	<b>Bushing Kit-Traditional Hardware</b>		310 ft-lb	420 N-m
1	Included in Service Kit	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	<b>6040187</b>	<b>Bushing Kit-No Hardware</b>		310 ft-lb	420 N-m
1	Included in Kit	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	<b>6040216</b>	<b>Bushing Kit-Huck® Replacement Hardware</b>		NA	
1	Included in Service Kit	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		
<b>Fasteners</b>			Hex Head Cap Screw (Air Spring)	1/2"-13NC	50 ft-lb	68 N-m
			Flanged Lock Screw	3/8"-16NC	25 ft-lb	35 N-m
			Locknut - (Air Spring)	3/4"-16NF	50 ft-lb	68 N-m
			Locknut - (Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m

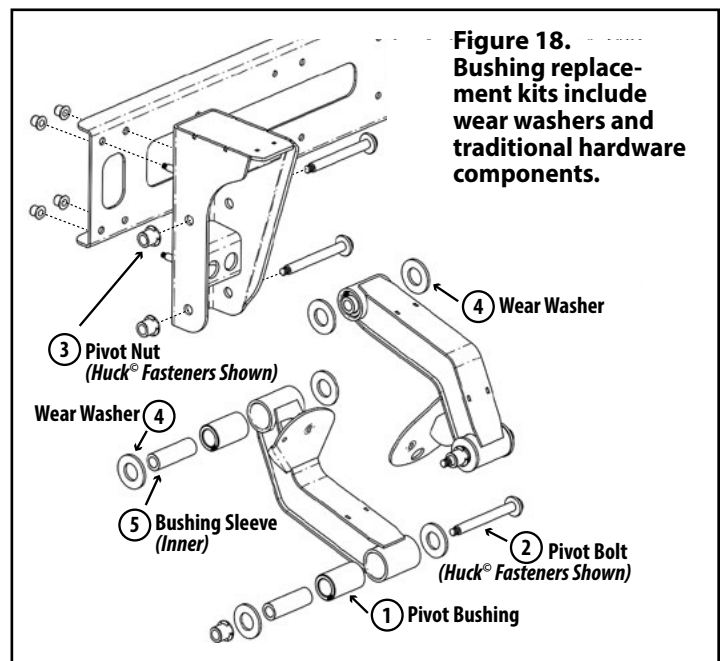
**CAUTION** Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. Failure to install and maintain fasteners at torque specifications could result in suspension failure and void the warranty.

### Bushing Replacement Procedure

Park 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 18).
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 included in all bushing kits.



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.

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

DWG No.	QTY/Axle	Part Number	233T – 20K TRAILER-BUSHING REPLACEMENT/TORQUE SPECIFICATIONS		TORQUE - foot-pound Newton-meter	
	1	6040161	<b>Bushing Kit-Traditional Hardware</b>		310 ft-lb	420 N-m
1	Included in Service Kit	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	<b>Bushing Kit-No Hardware</b>		310 ft-lb
1	Included in Kit	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		
<b>Fasteners</b>			Hex Head Cap Screw (Air Spring)	1/2"-13NC	50 ft-lb	68 N-m
			Locknut - (Air Spring)	1/2"-20NF	25 ft-lb	35 N-m
			Locknut - (Air Spring)	3/4"-16NF	50 ft-lb	68 N-m
			Locknut - (Crosschannel)	5/8"-11NC	160 ft-lb	217 N-m
			Locknut - (Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m

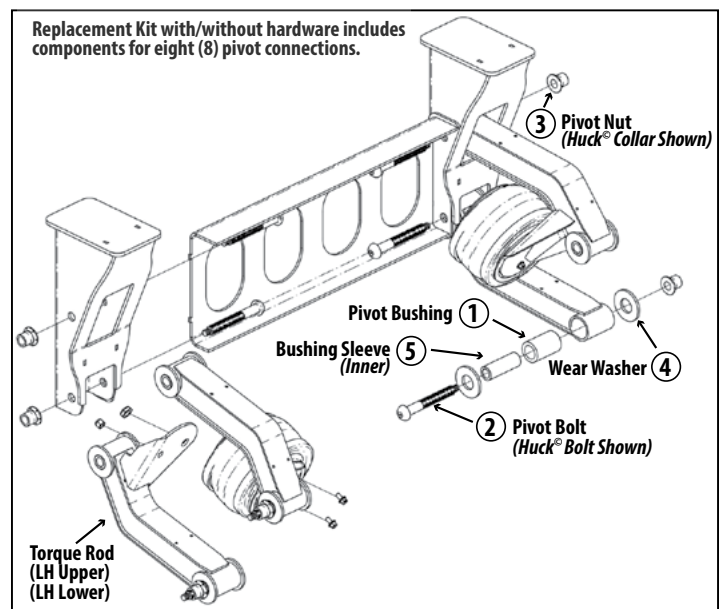
**CAUTION** Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. Failure to install and maintain fasteners at torque specifications could result in suspension failure and void the warranty.

### Bushing Replacement Procedure

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

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

1. Remove Huck® Collars by cutting/grinding away.
2. Take the pivot connection apart (Figure 19). Discard the pivot hardware and wear washers.
3. Remove bushing assembly from the torque rod and discard. Clean rod eye of any foreign debris or corrosion.
4. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of new bushings.  
NOTE: Do not substitute - urethane bushing lubricant included with all kits.
5. Install bushing into the eye of the torque rod.  
NOTE: Mallet/press needed to install bushing.
6. 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.
7. 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.
8. Torque pivot nut to specifications (500 ft-lb).
9. Reassemble suspension. Torque to specifications
10. Check the wheel toe-in setting (between 1/32" and 3/32") and adjust, if necessary.



**Figure 19.** Bushing replacement kits include traditional hardware, wear washers and other components to replace eight pivot connections.

QTY/Axle	Part Number	232/232T 8K-10K-13K – BUSHING REPLACEMENT/TORQUE VALUES	TORQUE (foot-pound Newton-meter)	
1	6040132	232 8/10/13K Truck-Bushing Kit with Hardware	350 ft-lb	475 N-m
1	6040084	232 8/10/13K Truck-Bushing Kit w/o Hardware (includes Wear Washers)	350 ft-lb	475 N-m
1	6040152	232T 8/10/13K Trailer-Bushing Kit with Hardware	350 ft-lb	475 N-m
1	6040151	232T 8/10/13K Trailer-Bushing Kit w/o Hardware (includes Wear Washers)	350 ft-lb	475 N-m
<b>Fasteners</b>		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

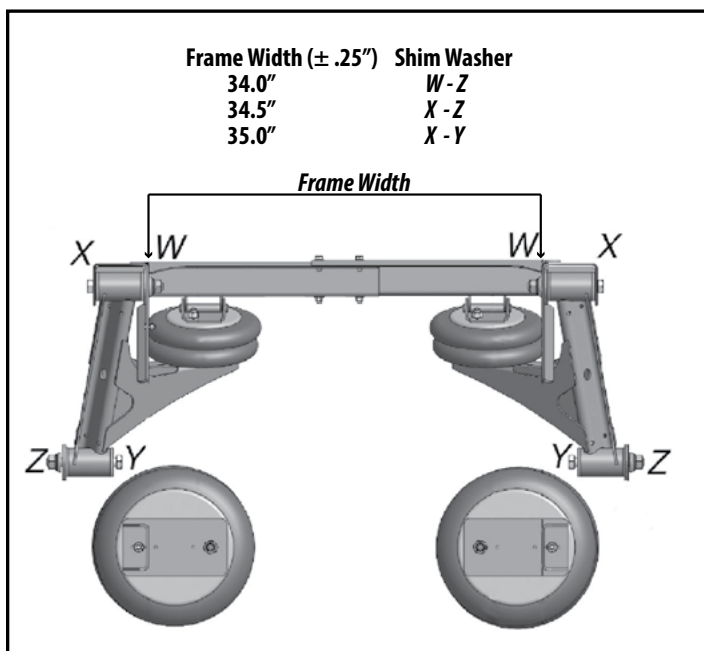
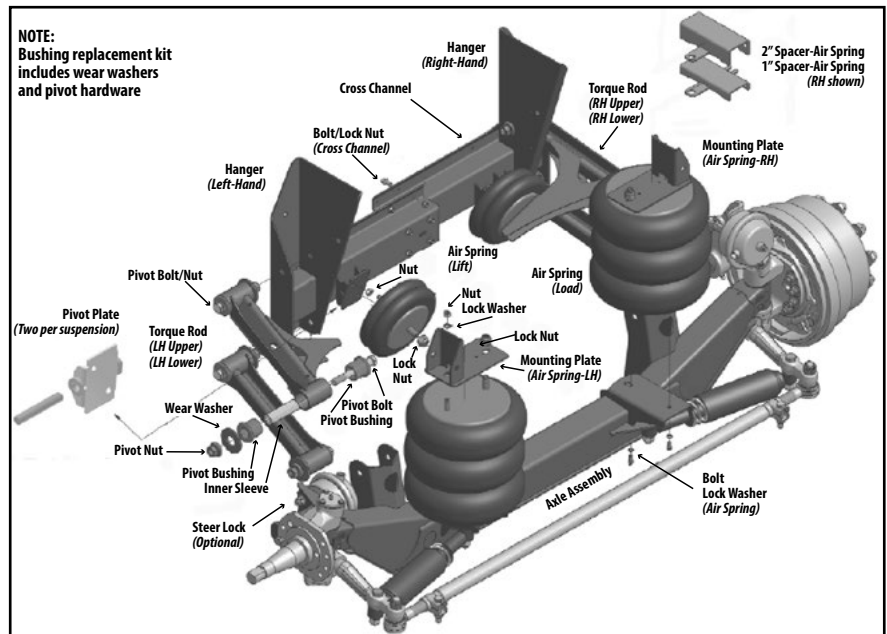
**CAUTION** Torque values reflect a lubricated thread condition (Nuts are pre-lubed). Do not overtorque. Failure to install and maintain fasteners at torque specifications could result in suspension failure and void the warranty.

### 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. Replace all bushings at the same time. Take suspension apart to reach pivot connections.
2. The number of wear washers on each side of the Torque Rod Assembly will vary according to the frame-width set by the suspension crosschannel (Figure 20).
3. Remove the pivot hardware and discard. Inspect the wear washers for excessive wear/damage. Replace, if necessary  
NOTE: New pivot hardware must be ordered with bushing replacement kit.
4. Remove bushing assembly from rod and discard. Clean the rod eye of any foreign debris or corrosion.



**Figure 20.** Adjust frame width by securing crosschannel at the desired width. Install washers at marked locations for correct alignment.

5. Apply Energy Suspensions® Formula 5 Prelube to bore (inside) of new bushings.  
NOTE: Do not substitute - special urethane bushing lubricant is part of all bushing kits.
6. Install the new bushing into the eye of the torque rod.  
NOTE: Mallet /press needed to install.
7. **Hanger-End Torque Rod Assembly -** 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. **Axle-End Torque Rod Assembly -** 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 components to specifications.
11. Check wheel toe-in setting (between 1/32" and 3/32") and adjust if necessary.

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



QTY/Axle	Part No.	232/232T – 20K BUSHING REPLACEMENT/TORQUE VALUES	Torque (foot-pound Newton-meter)	
1	6040112	232 20K Truck-Bushing Kit with Hardware	500 ft-lb	678 N-m
1	6040086	232 20K Truck-Bushing Kit w/o Hardware (includes Wear Washers)	500 ft-lb	678 N-m
1	6040111	232T 20K Trailer-Bushing Kit with Hardware	500 ft-lb	678 N-m
1	6040085	232T 20K Trailer-Bushing Kit w/o Hardware (includes Wear Washers)	500 ft-lb	678 N-m
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

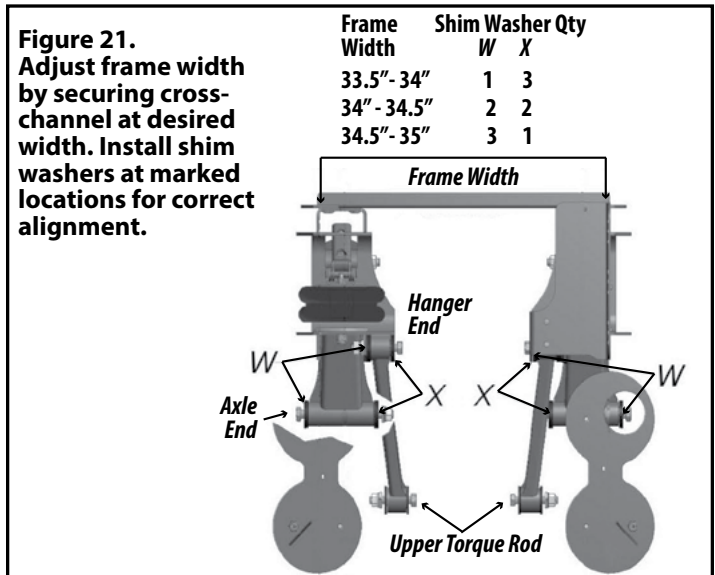
Park the vehicle on a level surface. Chock wheels to keep vehicle from moving. Exhaust all air from the air system. Disassemble suspension to reach pivot connections.

**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 kits.

- 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 21).
- Remove and discard pivot hardware; bushing assemblies; wear washers. Clean the torque rod eye of foreign debris/corrosion.
- Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of new bushings.  
NOTE: Do not substitute - special lubricant included with bushing kits.
- Lower Torque Rod (Axle-End):**
  - Press the replacement hard and soft bushings into axle end of the lower torque rod.
  - Press inner sleeve into the installed bushings. Check to make sure that bushing ends are flush with the eye of the torque rod.
  - 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.
  - Assemble pivot connection with the number of wear washers on either side of the torque rod. Torque pivot hardware to specifications.
- Lower Torque Rod (Hanger-End) -**
  - 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.
  - 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.



## 6. Upper Torque Rod (Hanger-End)

- Install soft bushing into the upper torque rod eye.
- 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 T-Rod eye.

- Assemble pivot connection with correct number of wear washers. Torque pivot hardware to specs.

## 7. Upper Torque Rod (Axle-End)

- 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.
- 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.

- Reassemble suspension, if necessary. Torque components to specifications.

- Check wheel toe-in setting (between 1/32" and 3/32") and adjust if necessary.

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



## WARRANTY

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

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

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

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

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

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