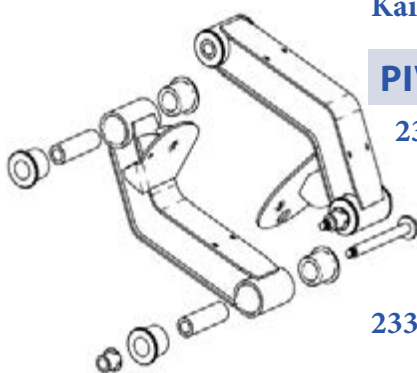


KINGPIN REPLACEMENT

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Suspension Identification Tag

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

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

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

Notes on Self-Steering Option

Self-steering suspensions are designed to steer only in the forward direction. The suspension should 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.

Notes and Cautions

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

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

The service notes are defined as:

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

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


 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	

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

Ridewell offers kingpin configurations that fit RSS-233/RSS-233 suspensions equipped with Meritor- and Westport- Axle steering knuckles. Replacement kits include components to replace two kingpin assemblies on each axle.

STANDARD/KAISER KINGPIN CONFIGURATIONS

Standard/Kaiser Kingpin Cap Profile – RSS 232/RSS 233 8K-10K-13K Suspension with Meritor/Westport Axle Knuckle

The type of kingpin installed in the axle knuckle can be determined by the shape of the kingpin cap.



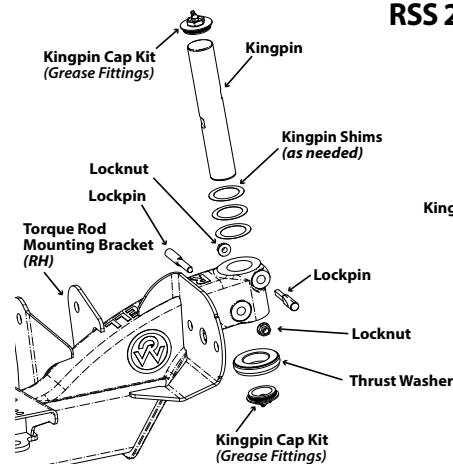
KINGPIN CAP -
MERITOR KNUCKLE



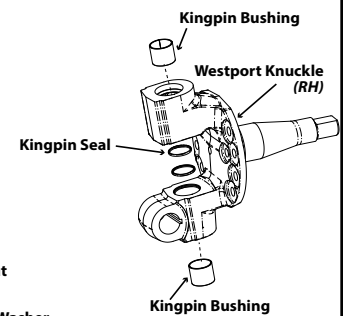
KINGPIN CAP (SCREW-IN) -
WESTPORT KNUCKLE



KINGPIN CAP (KAISER)
WESTPORT KNUCKLE



Standard Kingpin- RSS 233 13K



Standard/Kaiser Kingpin Cap Profile – RSS 232/RSS 233 20K Suspension with Meritor/Westport Axle Knuckle

The type of kingpin installed in the axle knuckle can be determined by the shape of the kingpin cap.



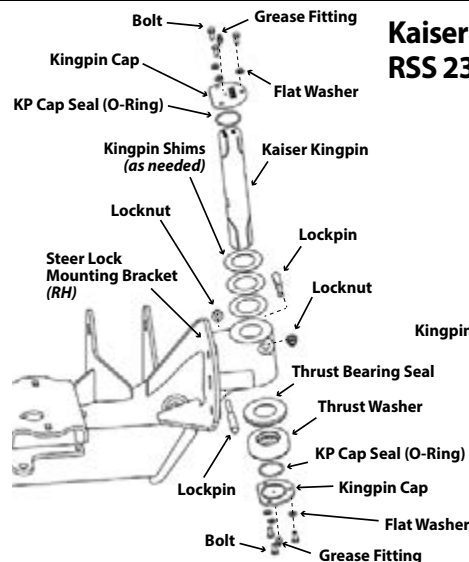
KINGPIN CAP
MERITOR KNUCKLE
20K SUSPENSION



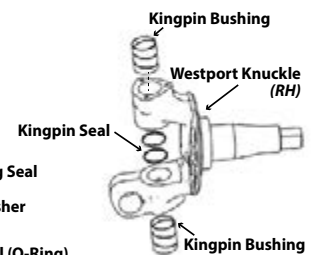
KINGPIN CAP
WESTPORT KNUCKLE
20K SUSPENSION



KINGPIN CAP (KAISER)
WESTPORT KNUCKLE
20K SUSPENSION

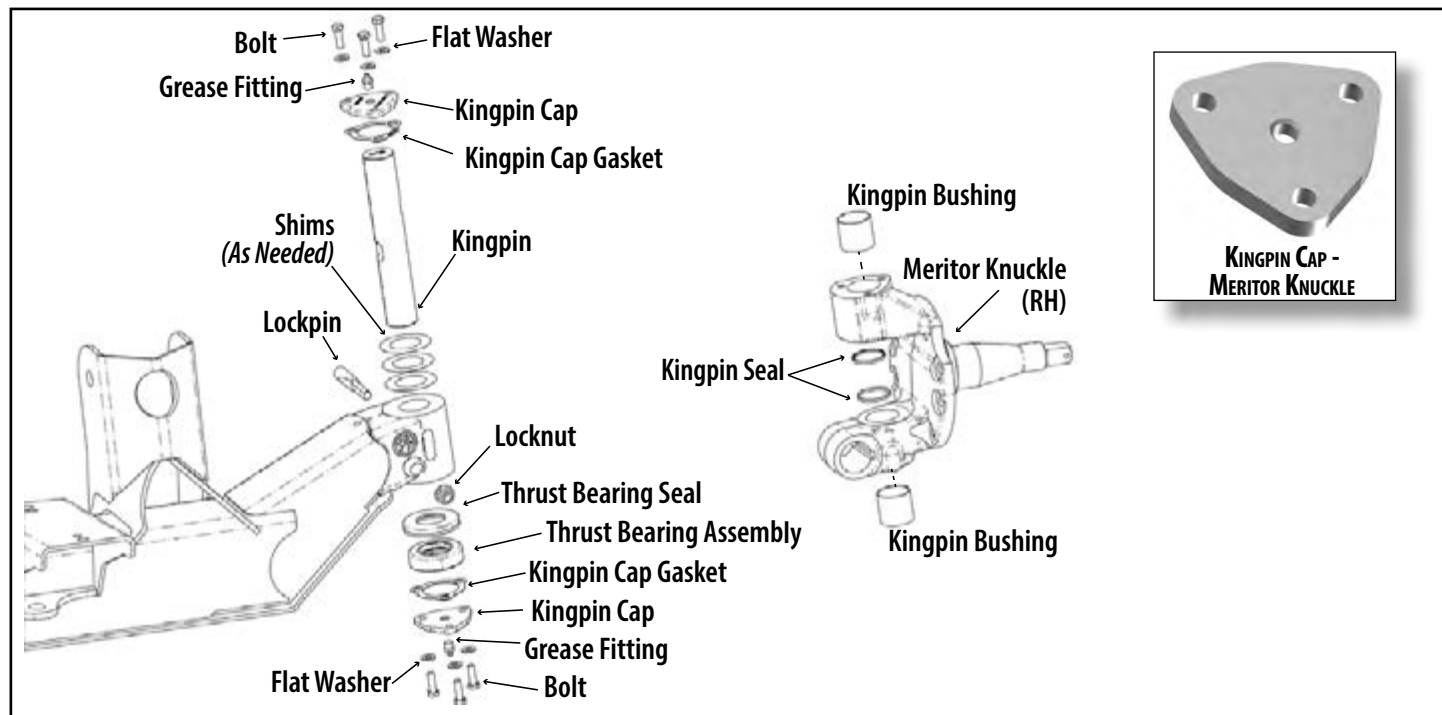


Kaiser Kingpin- RSS 233 20K

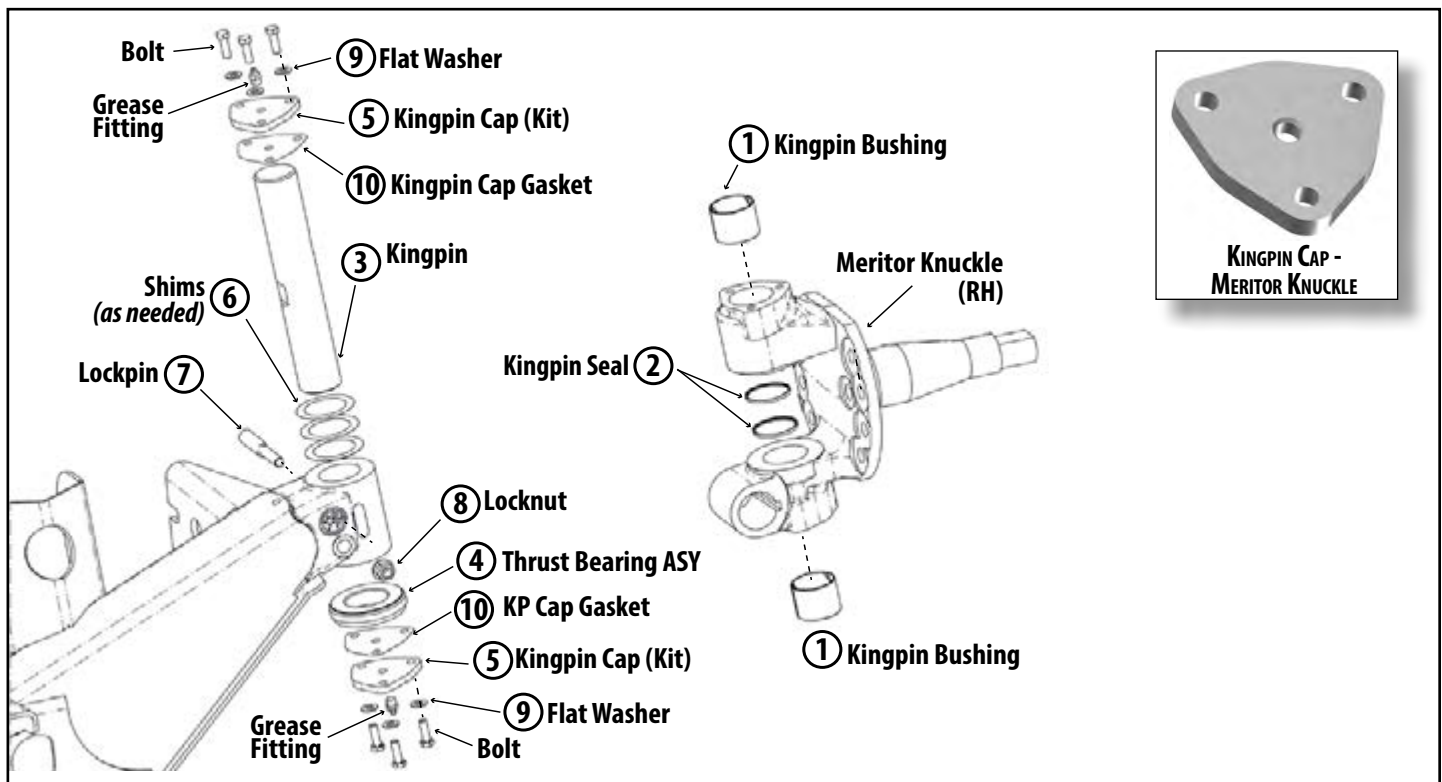


232 8K w/MERITOR KNUCKLE- STANDARD KINGPIN

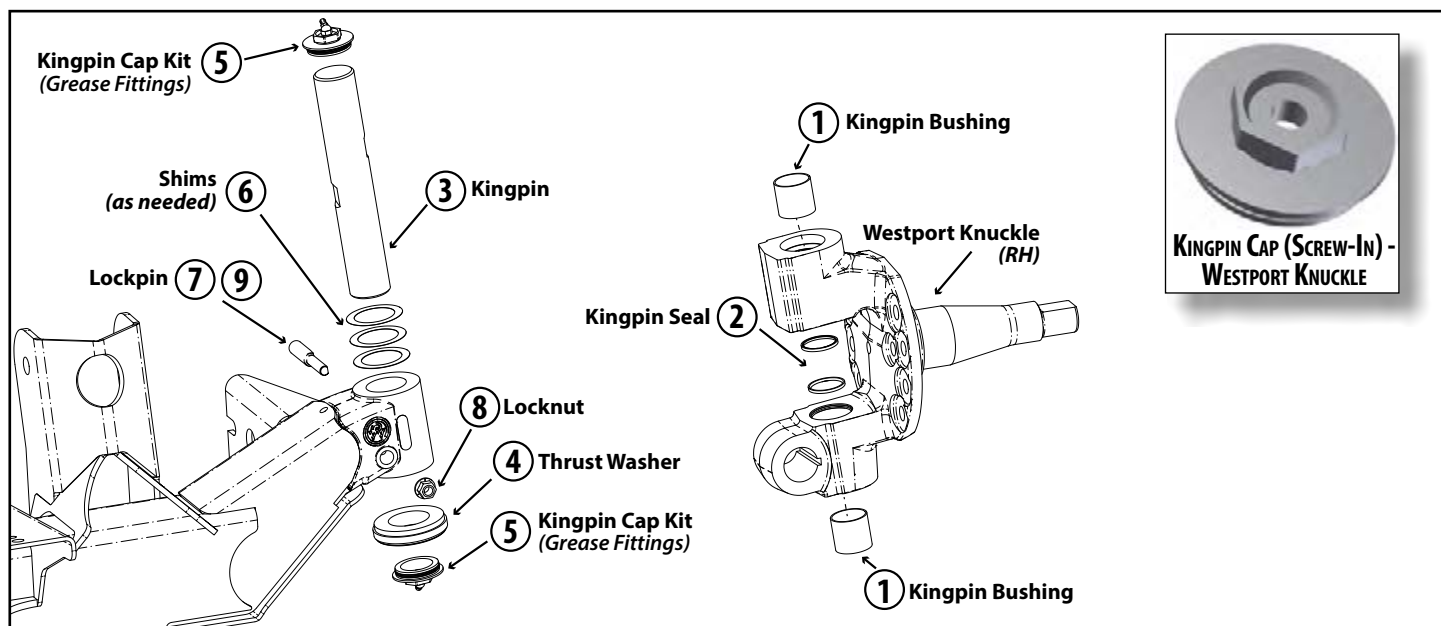
DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	1660170	Kingpin Kit FC-941 (232 8K with Meritor Knuckle)
—	—	—	Meritor #R201318 (<i>Kingpin bushing - bore reaming required</i>)



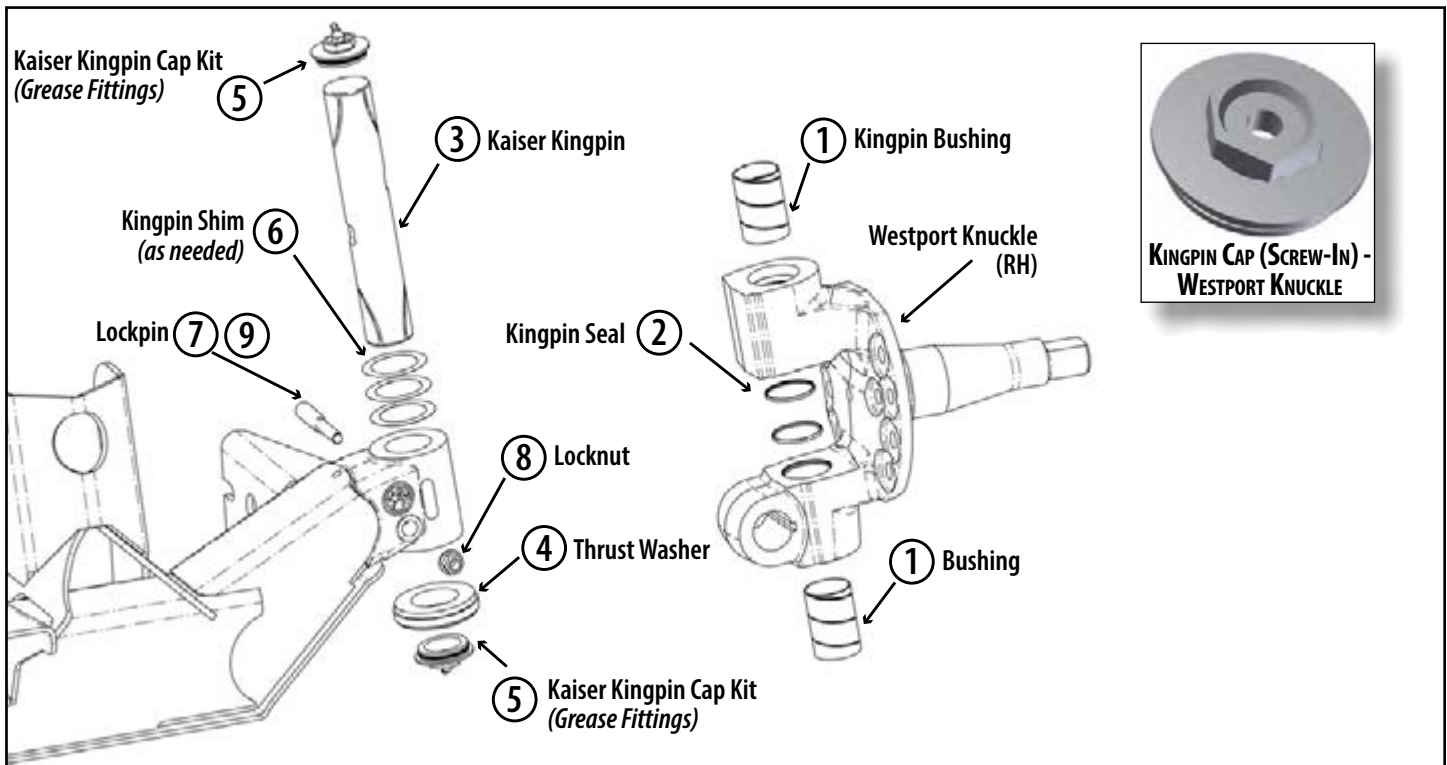
DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	1660106	Kingpin Kit (232 10K; 13K with Meritor Knuckle)
1	Included in Service Kit	4 1660241	KINGPIN BUSH FF/FG R210088 (<i>KP bushing - bore reaming required</i>)
2		4 1660131	SEAL ASY KINGPIN FG-941
3		2 1660135	KINGPIN FF/FG 13K (1.8" OD)
4		2 1660009	THRUST BRNG ASY T1822S 12/16K
5		2 1660133	KINGPIN CAP KIT FG-941 MRTR
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



DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	1660317	Kingpin Kit (232 10K-13K with Westport Knuckle)
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

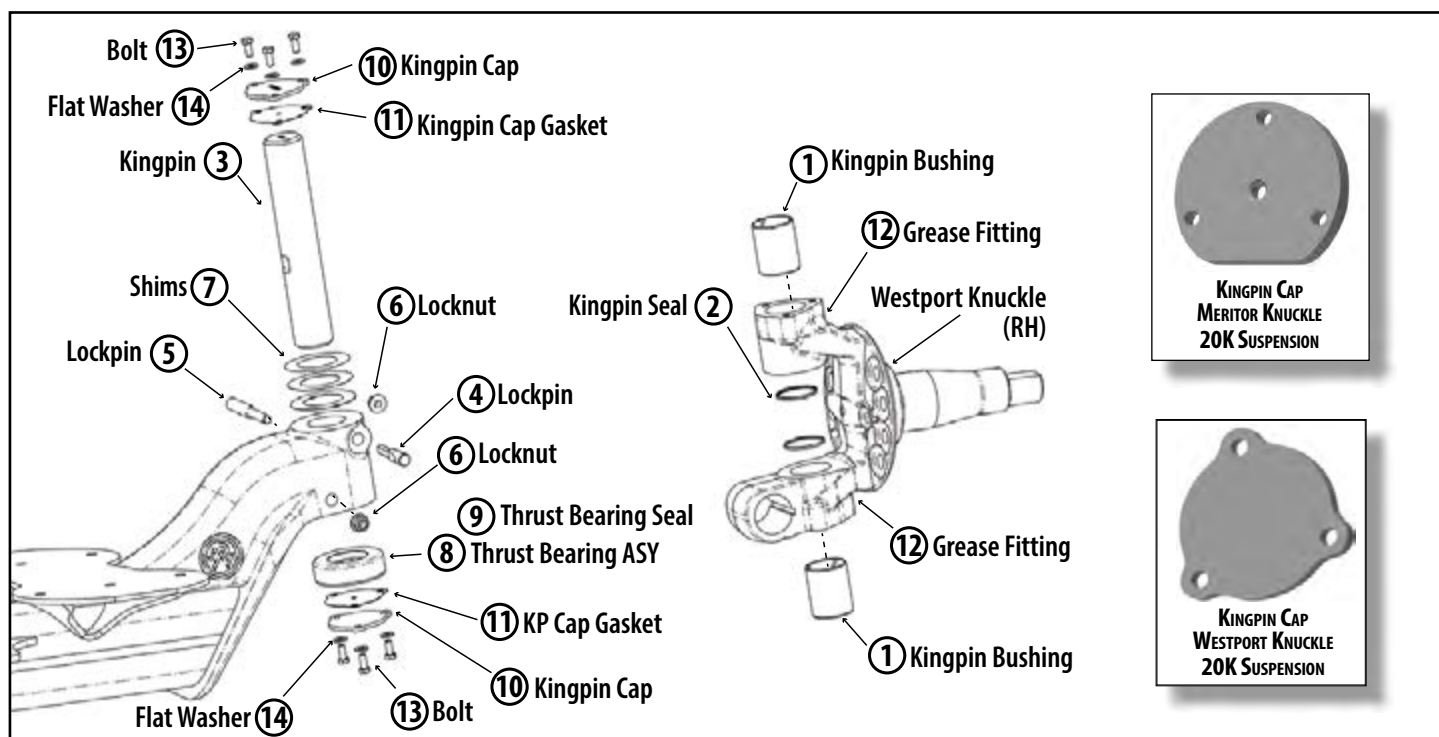


DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	1660261	Kaiser-Kingpin Kit (232 10K-13K with Meritor Knuckle)
—		—	#KG931-R (Kingpin bushing - No bore reaming needed)
	1	1660319	Kaiser-Kingpin Kit (232 10K-13K with Westport Knuckle)
1	Included in Service Kit	4 1660322	KINGPIN BUSH KAI 13K (KP bushing - 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

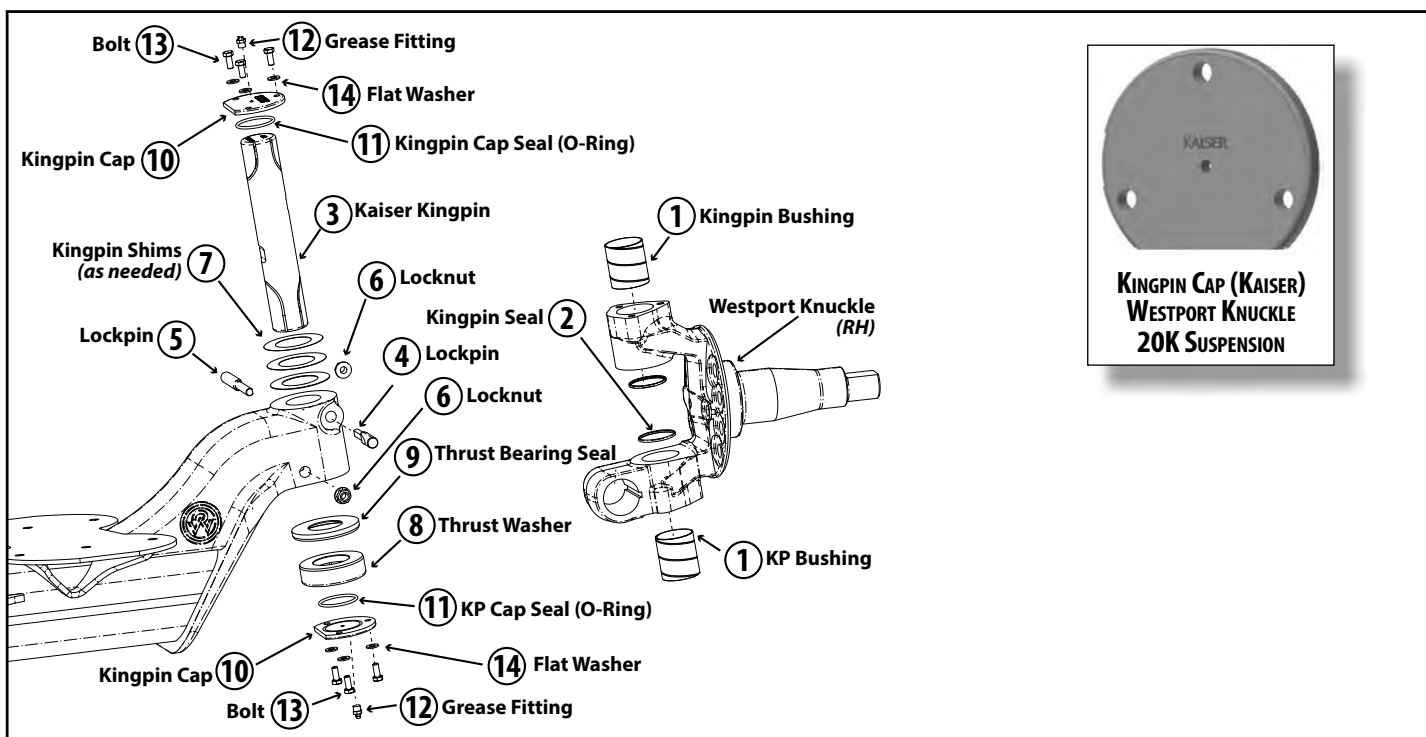


**232-20K MERITOR/WESTPORT
KNUCKLE - STANDARD KINGPIN**

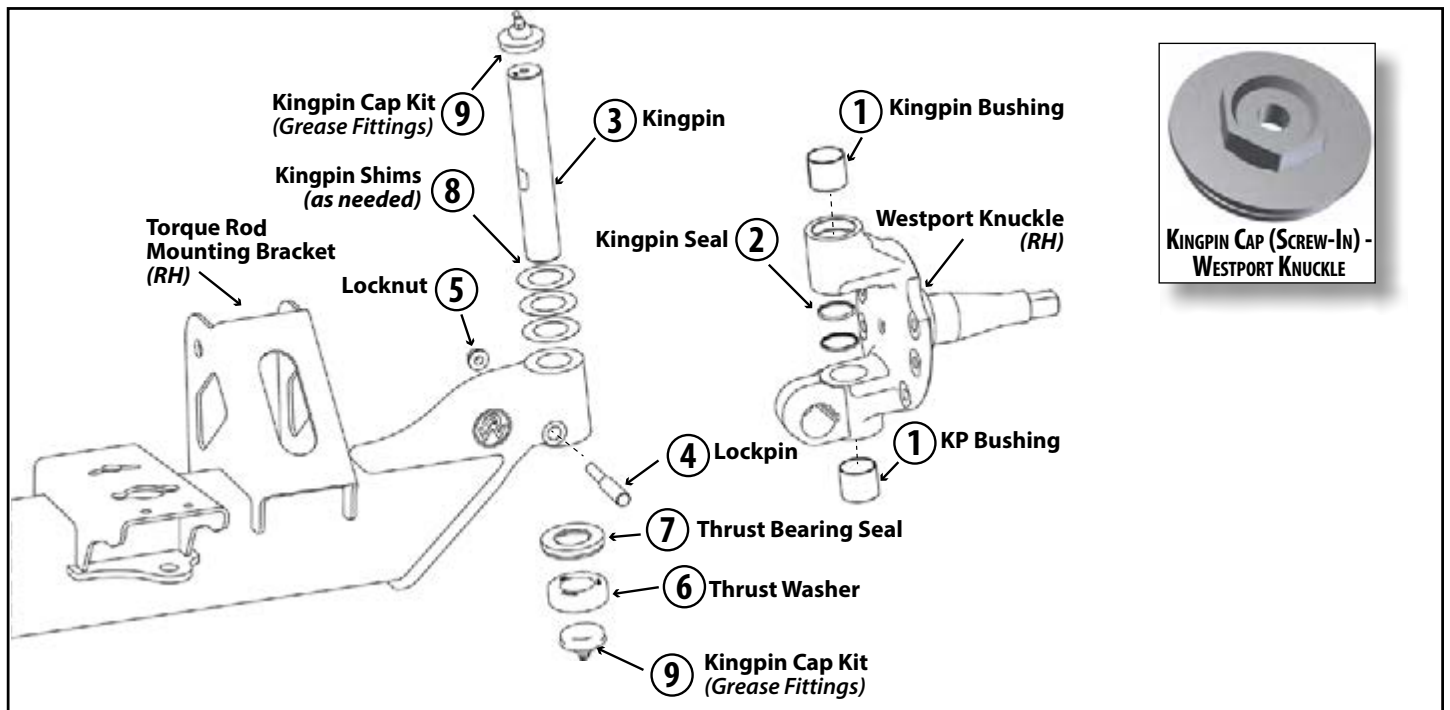
DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	1660326	Kingpin Kit FC-941 (232 20K with Meritor Knuckle)
—		—	Meritor P/N R201312 (<i>Kingpin bushing - bore reaming required</i>)
	1	1660324	Kingpin Kit (232 20K with Westport Knuckle)
1	Included in Service Kit	4 1660323	KINGPIN BUSH WSTPT 20K FL (<i>Bushing 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



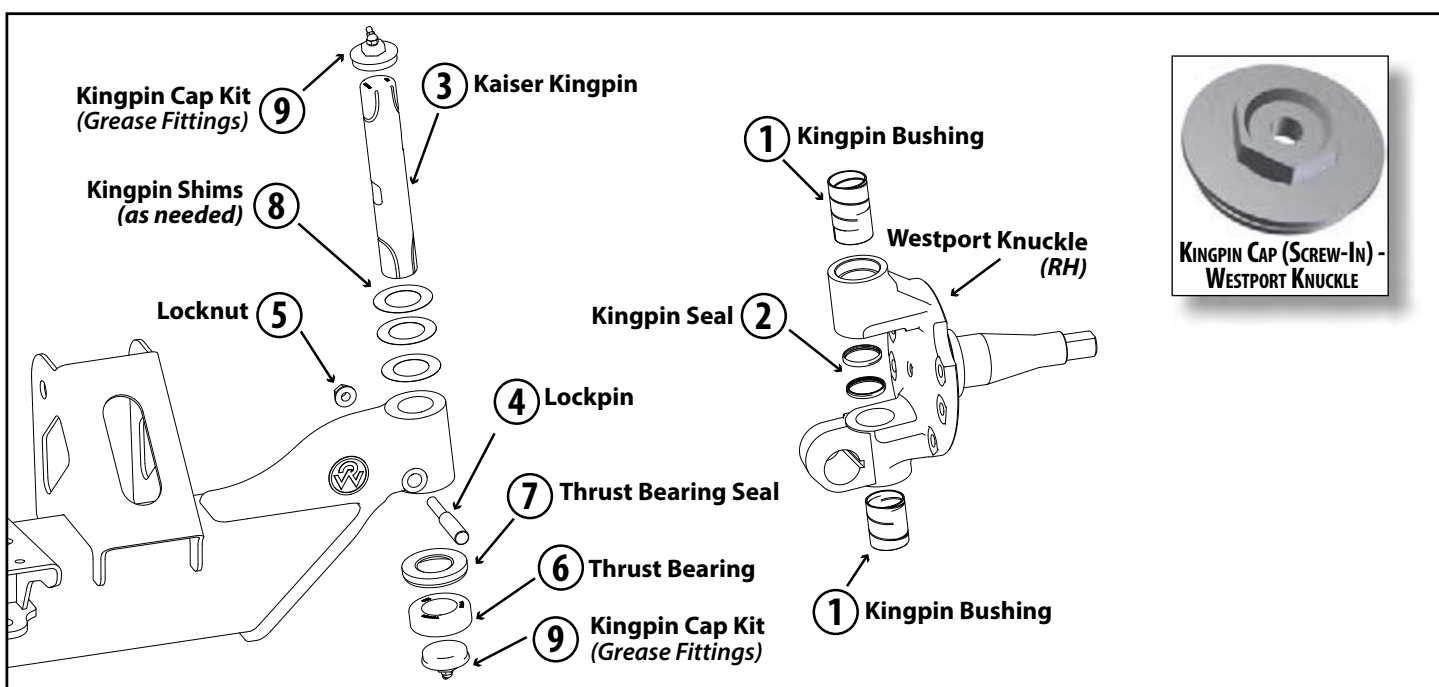
DWG NO.	QTY/AXLE	PART NUMBER		ITEM DESCRIPTION
	1	1660189		Kaiser Kingpin Kit FL-941 (232 20K with Meritor Knuckle)
—		—		Meritor P/N KH931-L (KP bushing - No bore reaming needed)
	1	1660325		Kaiser Kingpin Kit (232 20K with Westport Knuckle)
1	Included in Service Kit	4	1660315	KINGPIN BUSH KAI 20K FL (No bushing 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



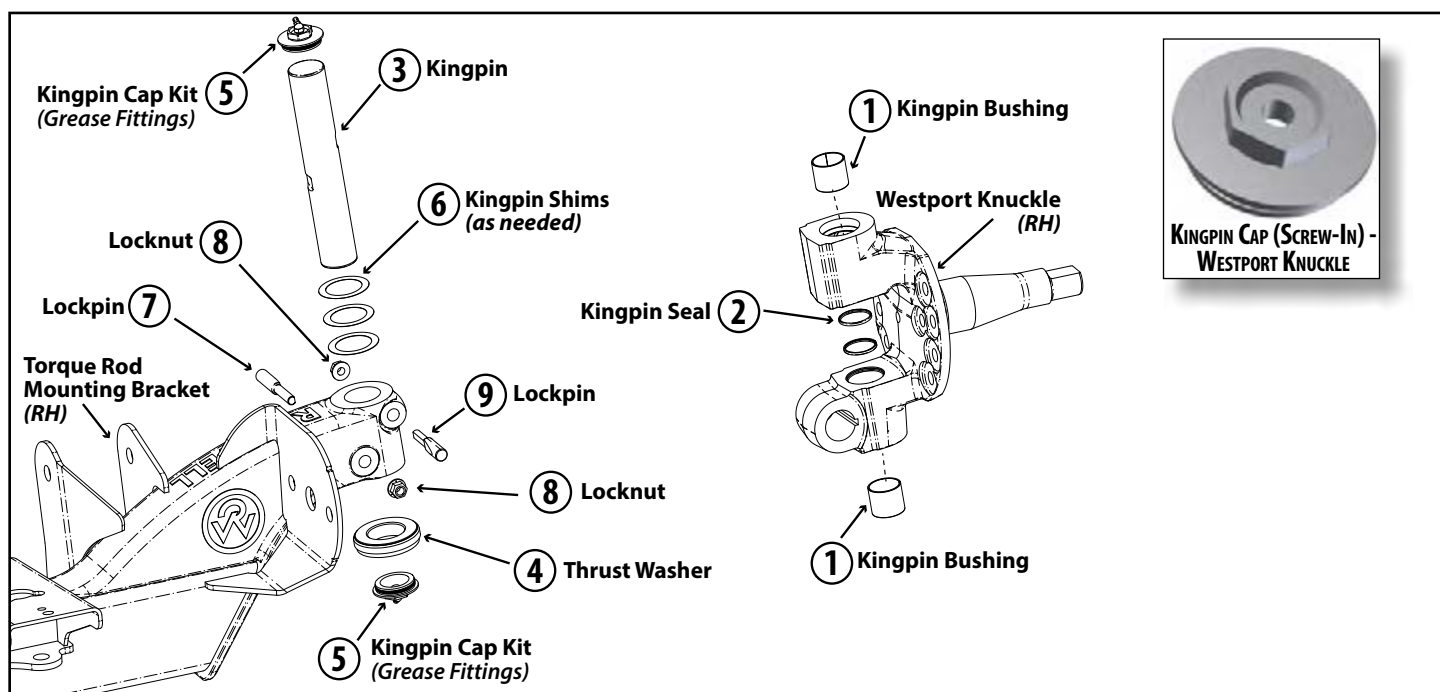
DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
N/A	1	1660170	Kingpin Kit FC-941 (233 8K Truck with Meritor Knuckle)
			Meritor #R201318 (<i>Kingpin bushing - bore reaming required</i>)
	1	1660534	Kingpin Kit (233 8K Truck with Westport Knuckle)
1	Included in Service Kit	4 1660545	KINGPIN BUSH WSTPT 8K (<i>KP bushing - bore reaming required</i>)
2		4 1660544	SEAL KINGPIN WSTPT 8K
3		2 1660469	KINGPIN FC/8K WP #143660-0013 (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



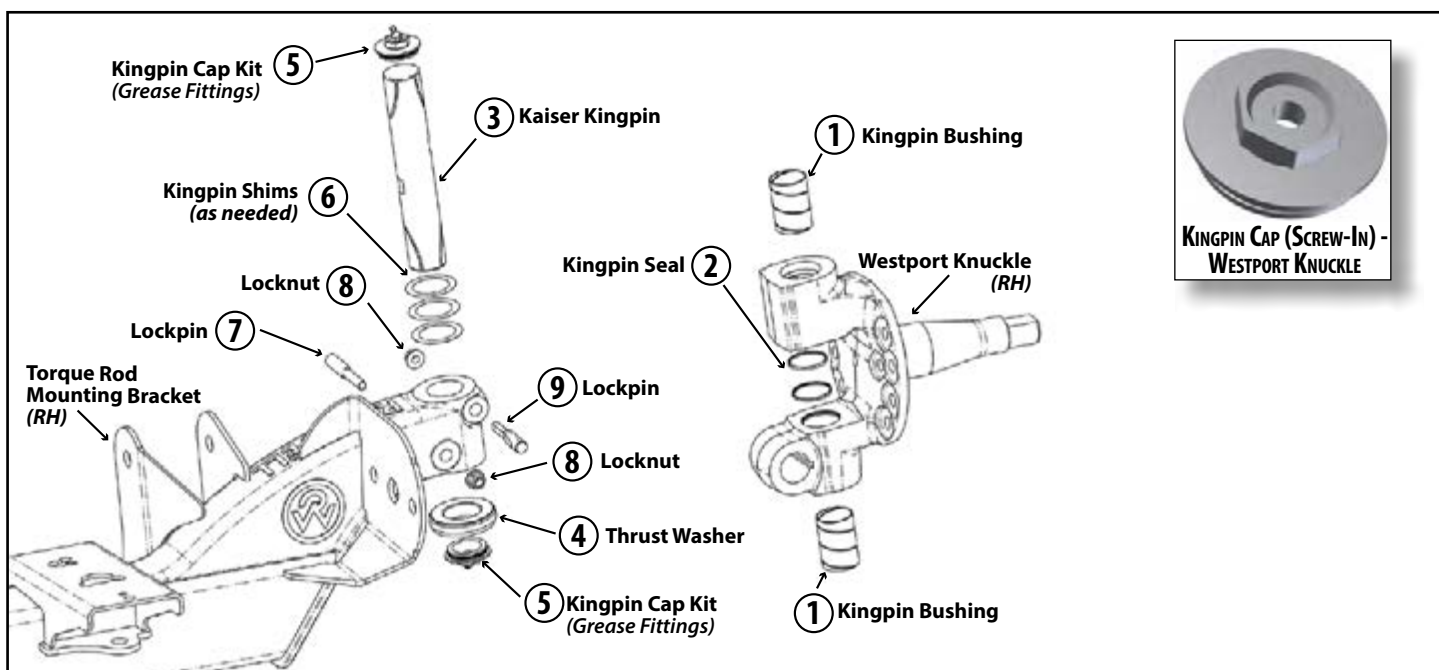
DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	1660533	Kaiser Kingpin Kit (233 8K Truck with Westport Knuckle)
1	Included in Service Kit	4 1660483	KINGPIN BUSH KAI 8K FC (KP bushing - bore reaming needed)
2		4 1660484	SEAL KINGPIN KAI 8K FC
3		2 1660482	KINGPIN FC SER. KAI 8K (1.5" OD)
4		2 1660139	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



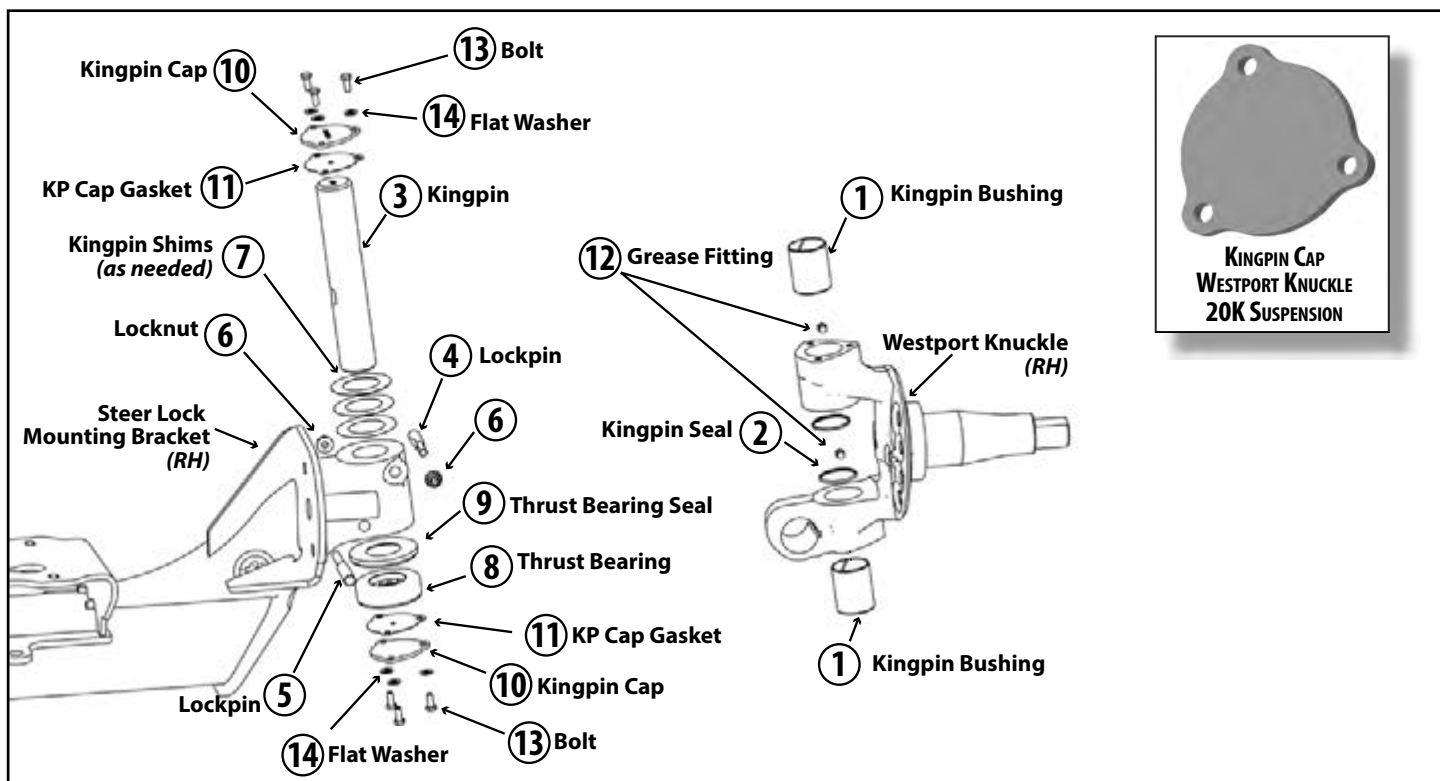
DWG NO.	QTY/AXLE	PART NUMBER		ITEM DESCRIPTION
	1	1660317		Kingpin Kit (233 10K-13K with Westport Knuckle)
1	Included in Service Kit	4	1660241	KINGPIN BUSH FF/FG (Kingpin bushing - bore reaming required)
2		4	1660131	SEAL ASY KINGPIN FG-941
3		2	1660135	KINGPIN FF/FG 13K (1.8" OD)
4		2	1660009	BRNG ASY 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	



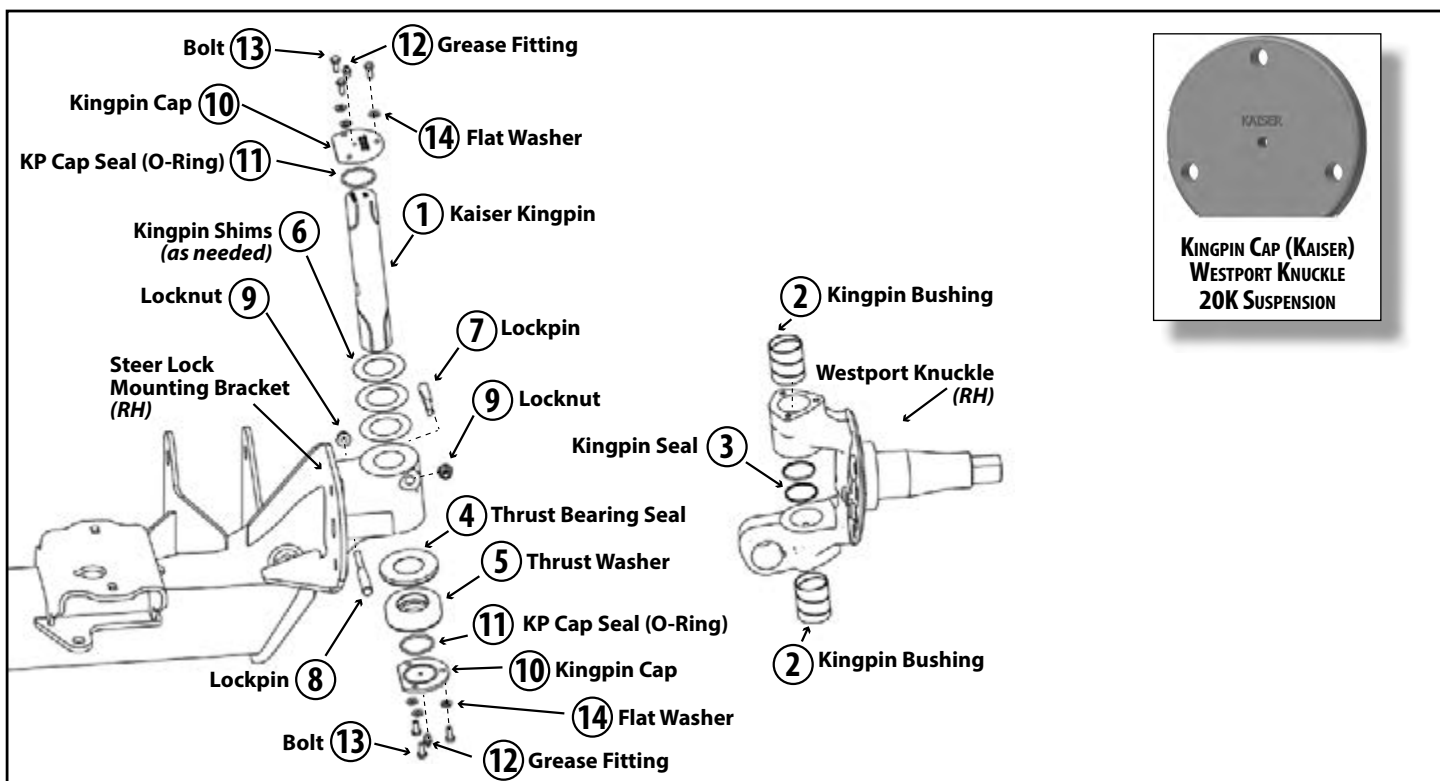
DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	1660319	Kaiser Kingpin Kit (233 10K-13K with Westport Knuckle)
1	Included in Service Kit	4 1660322	KINGPIN BUSH KAI 13K (KP bushing - No bore reaming needed)
2		4 1660131	SEAL ASY KINGPIN FG-941
3		2 1660314	KINGPIN FF/FG KAI #10M21-3 (1.8" OD)
4		2 1660009	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



DWG NO.	QTY/AXLE	PART NUMBER		ITEM DESCRIPTION
	1	1660324		Kingpin Kit (233 20K with Westport Knuckle)
1	Included in Service Kit	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	



DWG NO.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	1660325	Kaiser Kingpin Kit (233 20K with Westport Knuckle)
1	Included in Service Kit	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"



Ridewell suggests the following Technology & Maintenance Council (TMC) publications for additional information.

RP 609	Self-Adjusting and Manual Brake Adjuster Removal, Installation and Maintenance
RP 618	Wheel Bearing Adjustment Procedure
RP 619	Air System Inspection Procedure
RP 622	Wheel Seal/Bearing Installation-Maintenance.
RP 631	Recommendations for Wheel End Lubrication
RP 643	Air Ride Suspension Maintenance Guidelines
RP 645	Tie-Rod End Inspection and Maint. Procedure
RP 651	Steer Axle Maintenance Guidelines
RP 652	Service and Inspection of Air Disc Brakes

Ridewell Suspensions recommends these minimum service intervals for standard duty, on-highway usage suspension applications. More frequent intervals are recommended for heavier duty applications.

Daily/Pre-Trip Inspections

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

First 6,000 miles of use

- ___ Torque all component bolts/nuts to specifications (Refer to Manufacturer's Specifications).

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 damage/excessive wear.
- ___ Torque air spring bolts/nuts to specifications (Refer to Manufacturer's Specifications).
- ___ Check air lines and connections for leaks.

Every 50,000 miles of use

- ___ Torque all suspension bolts/nuts to specifications (Refer to Manufacturer's Specifications).
- ___ 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 tie-rod ends for damage and wear. Lubricate tie-rod ends. Check that the tie-rod boot is in place and completely over the end of the tie-rod. Replace entire tie-rod end if boot is damaged.

Annually/100,000 miles of use

- ___ Inspect pivot connections for worn pivot bushings and replace, if necessary. Torque pivot hardware and component bolts/nuts to specifications (Refer to Manufacturer's Specifications).
- ___ Check suspension hanger and air spring mounting plate connections to frame.
- ___ Check lubrication level in wheel ends:
 - 1) Oil-Filled Wheel Ends:
Refill/Replace lubricant as needed (Refer to TMC RP 631 "100K/Annual Inspection").
 - 2) Semi-Fluid Grease:
Pull the outer wheel bearing and visually inspect lubrication level. Refill/Replace as needed (Refer to TMC RP631 "Level 3 Lubrication Level Inspection" and TMC RP618 "Wheel Bearing Adjustment Procedure").
- ___ Check air system for leaks.
- ___ Test air system pressure protection valve (if equipped).
- ___ Check brake chambers and brakes for damage and proper function.

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

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

Available Wheel-End Lubricants

Lubricant Type	Part Number	Item Description
Mineral Oil	380008G	(CITGO) MP Gear Oils 631310001 - 80W-90
Synthetic Oil	1980006	(SHELL) Synthetic API GI-5 75W-90 Oil
Synthetic Semi-Fluid Grease	1980011	(CHEVRON) DELO® SYN-GREASE™ SFE EP
Synthetic Hard-Pack Grease	1980007	(CITGO) Synthetic Grease

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..

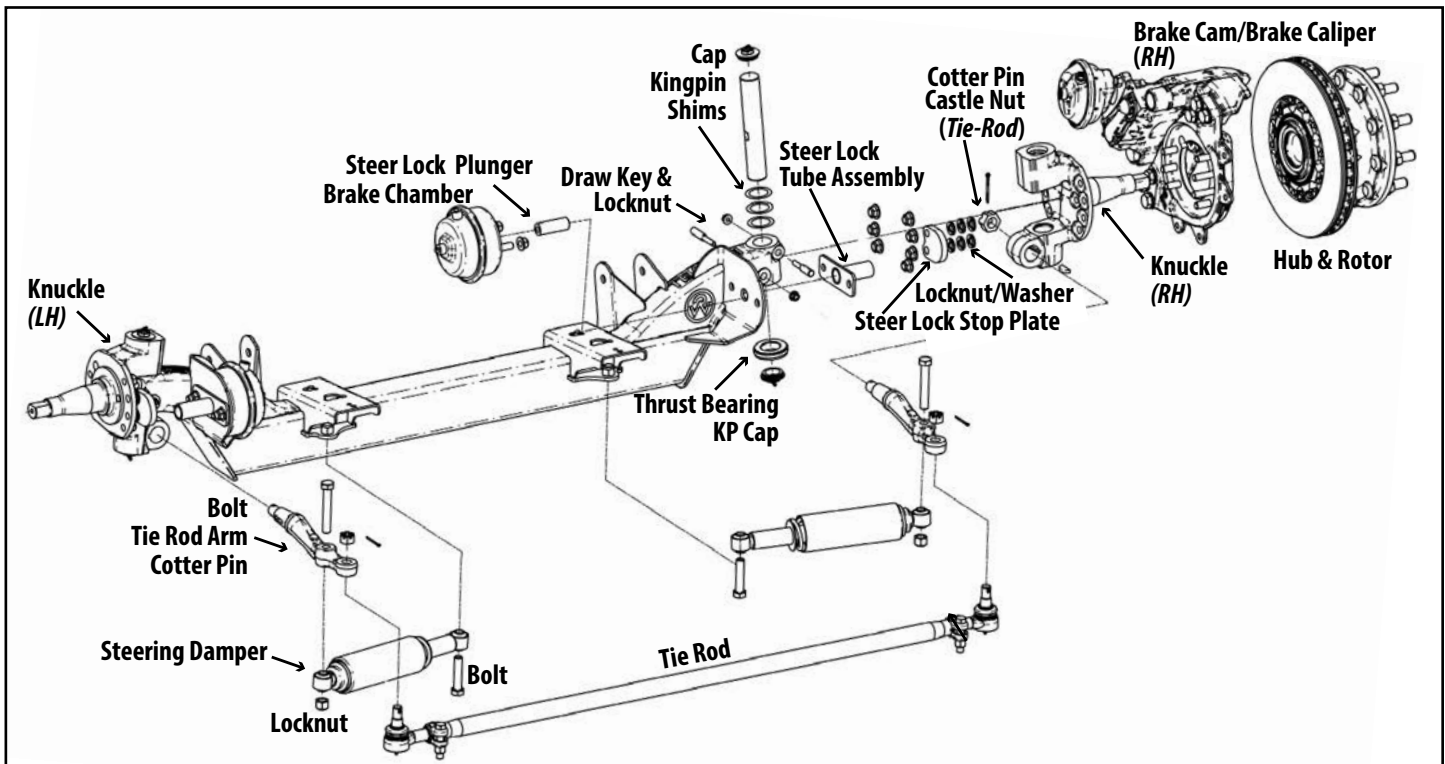


Figure 2.
ADB fabricated axle for RSS 233T-13K Suspension with Westport Knuckle - Kingpin (Reference only).

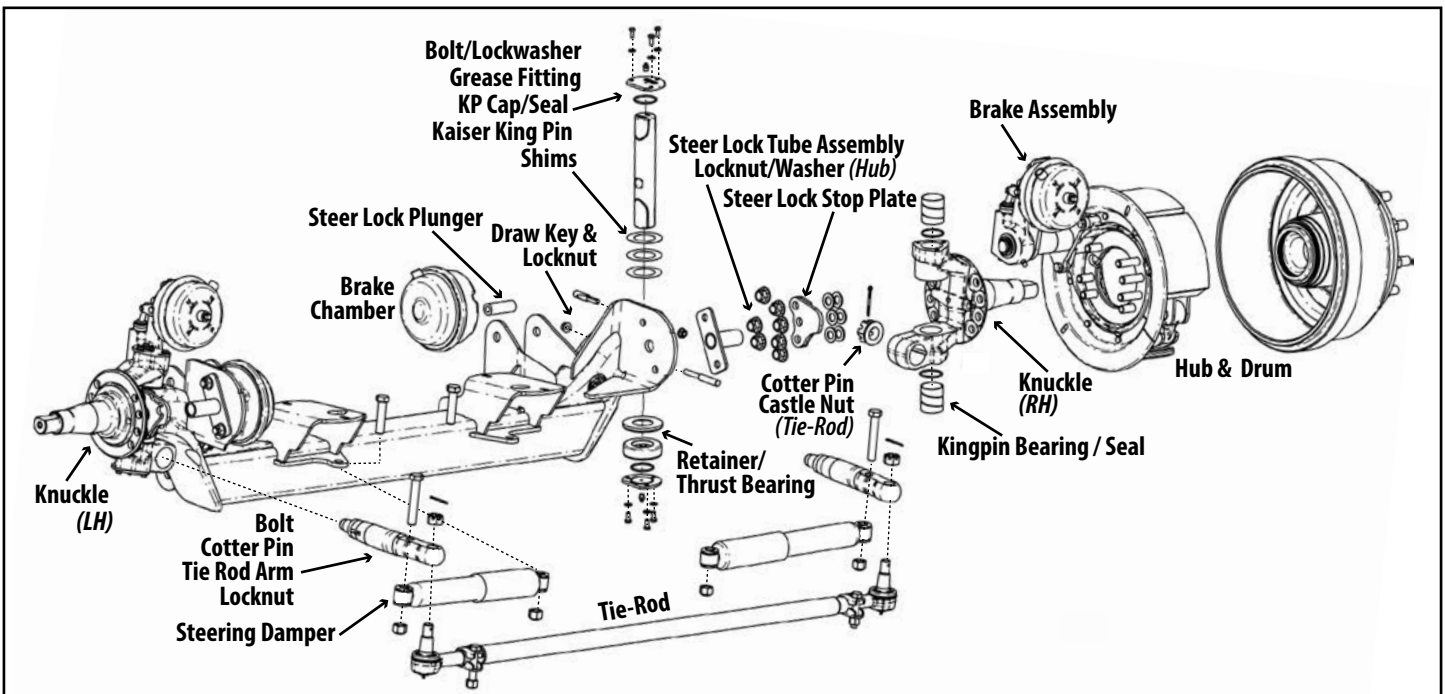
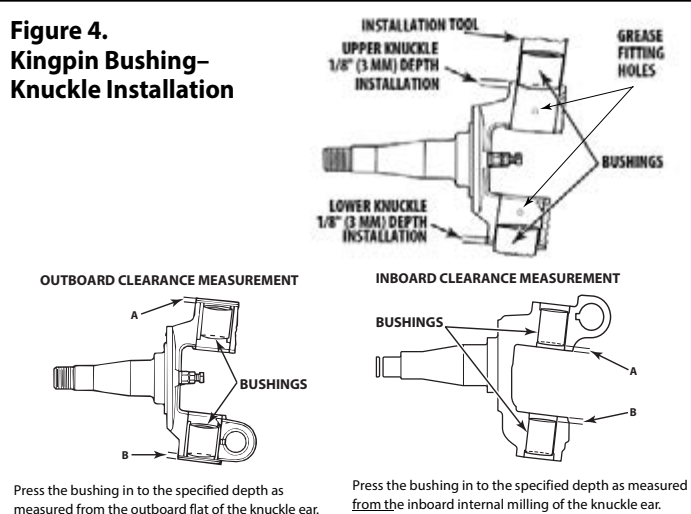


Figure 3.
Drum brake fabricated axle for RSS 233 20K with Westport Knuckle - Kaiser Kingpin (Reference only).

Kingpin Bushing and Axle Knuckle-to-Tie-Rod Installation

**Figure 4.
Kingpin Bushing–
Knuckle Installation**



233/232 Model	Msrmt 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"

NOTE: 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 (Fig. 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 (Fig. 16).

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 the 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 tool to drop onto the bottom bushing.

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. 17).

Slide the reamer out of the bottom bushing. NOTE: Rotate the reamer tool in the opposite cutting direction if the reamer 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 18).

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 toward you.

Place the seal into the top of the bottom knuckle bore. The seal lip must be AWAY from the bore (Fig 18).

Place the end cap for the knuckle on top of the seal. Slide the kingpin through the opposite knuckle bore. Use the kingpin to install the seal (Fig. 19).

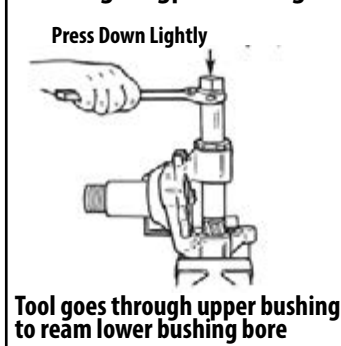
Steering knuckle installation

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 the thrust bearing. The surface with the inner diameter seal must be on the top. The surface with the outer diameter seal must be on the bottom (Fig. 20).

**Figure 5.
Reaming Kingpin 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 18).

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 toward you.

Place the seal into the top of the bottom knuckle bore. The seal lip must be AWAY from the bore (Fig 18).

Place the end cap for the knuckle on top of the seal. Slide the kingpin through the opposite knuckle bore. Use the kingpin to install the seal (Fig. 19).

Steering knuckle installation

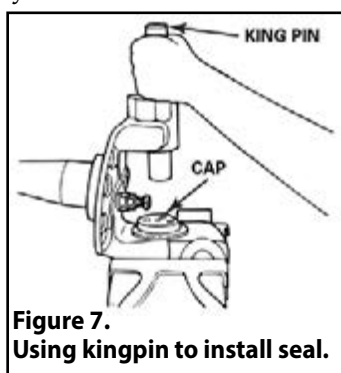
Clean the bores of the knuckle and the axle beam.

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 the thrust bearing. The surface with the inner diameter seal must be on the top. The surface with the outer diameter seal must be on the bottom (Fig. 20).



**Figure 6.
Place kingpin seal in knuckle.**



**Figure 7.
Using kingpin to install seal.**

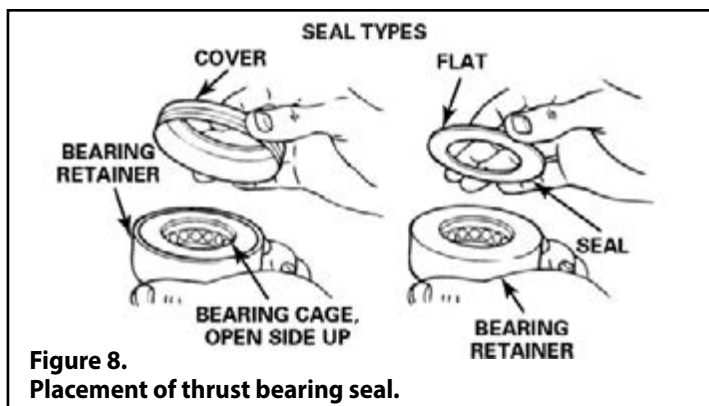


Figure 8.
Placement of thrust bearing seal.

- Cover-type seals: Install the seal over the open end of the bearing.
- Flat-type seals: Install the 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: The one-piece thrust bearing with an integrated grease seal is completely interchangeable with the two-piece design. It has a specified top and bottom orientation.

Install Shims

CAUTION Shims have sharp edges. Wear gloves to install.

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 end play.

After inspection, place the shims on top of the axle beam bore machined surface. Align the shims for kingpin installation.

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 (Fig. 21).

Align all the bores. If the bores are not aligned, the parts will be damaged when the king pin is installed. Remove the pry bar.

Install kingpin

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

Verify that you can see the word "TOP" stamped on the kingpin. Rotate the kingpin so that the two draw



Figure 9.
Use pry bar to install shims.

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 the 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 and torque to 20-30 ft-lbs.
- Westport caps - install threaded cap and gaskets and torque to 70-90 ft-lbs.

Install kingpin cap grease fittings. Torque to 10 ft-lbs.

Tie-rod assembly

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 lengths to achieve 1/16" toe-in on axle. *NOTE: Toe-in is the negative difference in measurement across the inside of each hub, at the leading edge compared to the trailing edge.* Torque clamp bolts at each end to 40-60 ft-lbs.

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.

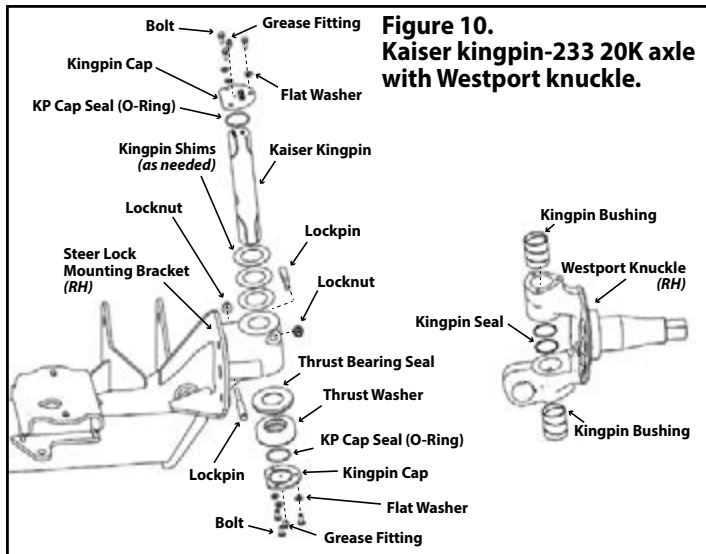


Figure 10.
Kaiser kingpin-233 20K axle
with Westport knuckle.

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 the 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 the bushing down flush to the surface with a brass mallet, starting at the heaviest part of the wrap and tapping clockwise around the bushing until bushing is in position.

Kingpin/Knuckle Installation

1. Check kingpin fit in both top and bottom bore of knuckle. Slide kingpin through both bores to test spindle alignment. If the kingpin will not go into both spindle eyes, spindle should be replaced. Pack thrust bearing with grease before installation.
2. 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).
3. 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 1/2-inch of kingpin comes out the bottom. Place shims onto the bottom of the kingpin (Fig. 11).
4. Carefully place knuckle with kingpin and shims on the axle. Let the kingpin drop into the bottom hole. Push kingpin down until it is flush with the bottom of the axle.
5. Using the palm of your hand, install the thrust bearing with the open side down. If bearing cannot be installed, take knuckle assembly apart and remove 0.005" of the shims. If bearing can easily be installed with fingers, take assembly apart and add a 0.005" shim to the stack.
6. 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.
7. Install top and bottom plates (caps) and tighten.

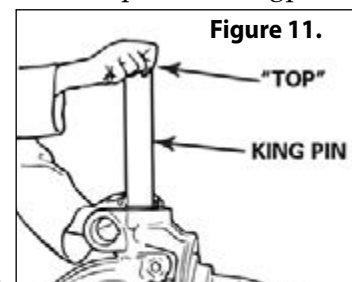


Figure 11.

Lubrication

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.

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.

Tie-rod assembly

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

- Torque 233 8K/13.2K (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 (cross tube) length to achieve 1/16" toe-in. NOTE: Toe-in is the negative difference in measurement across the inside of each hub, at the leading edge compared to the trailing edge. Torque clamp bolts at each end to 40-60 ft-lbs.

Complete axle assembly

Install wheels and other components to complete fabricated axle assembly.

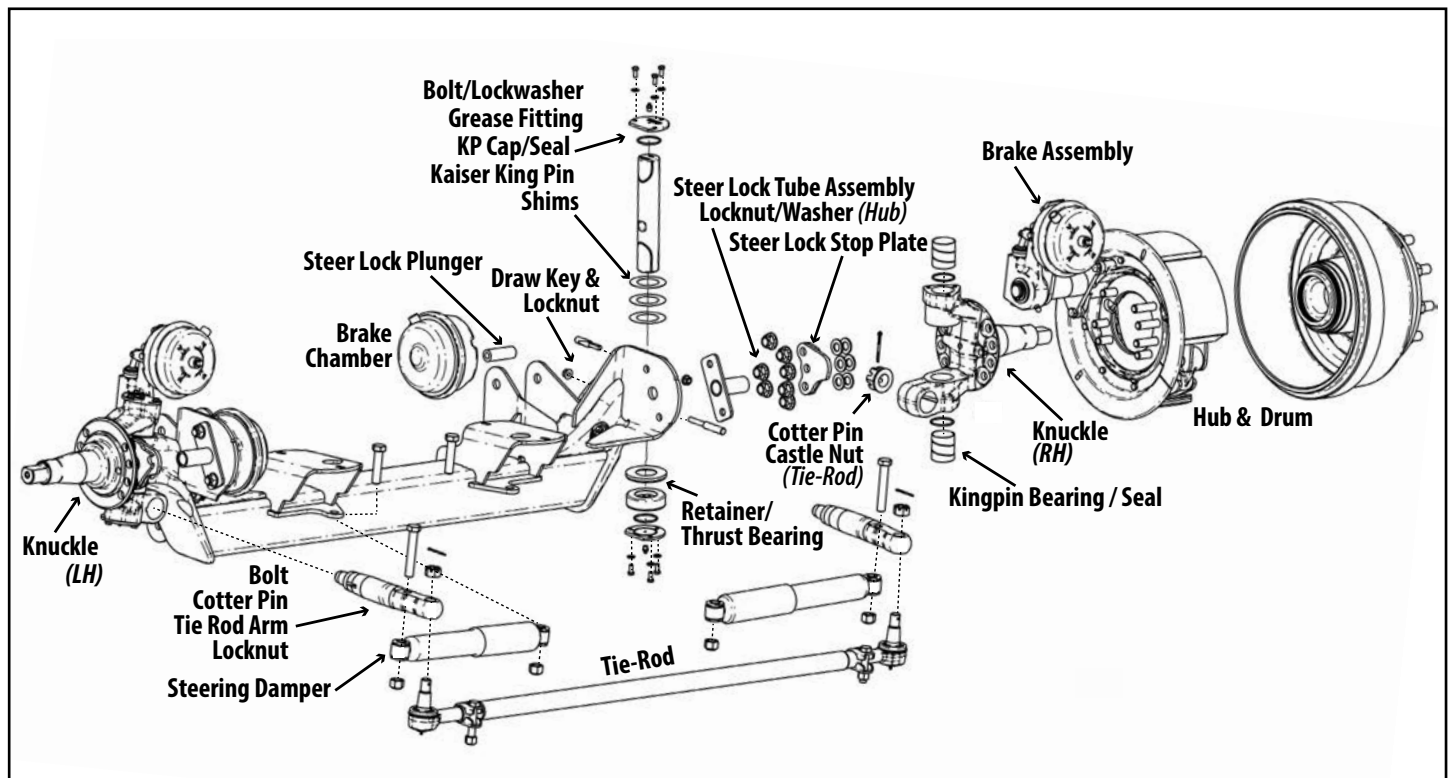


Figure 12.
RSS 233 20K drum brake fabricated axle with Westport Knuckle - Kaiser Kingpin (Reference only).

233 8K-10K-13K Truck

BUSHING REPLACEMENT

DWG No.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	6040134	Bushing Kit-Traditional Hardware
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 SERVICE LUBE
	1	6040215	Bushing Kit-Huck® Replacement Hardware
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 SERVICE LUBE
	1	6040133	Bushing Kit-No Hardware
1	Included in Service 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 SERVICE LUBE

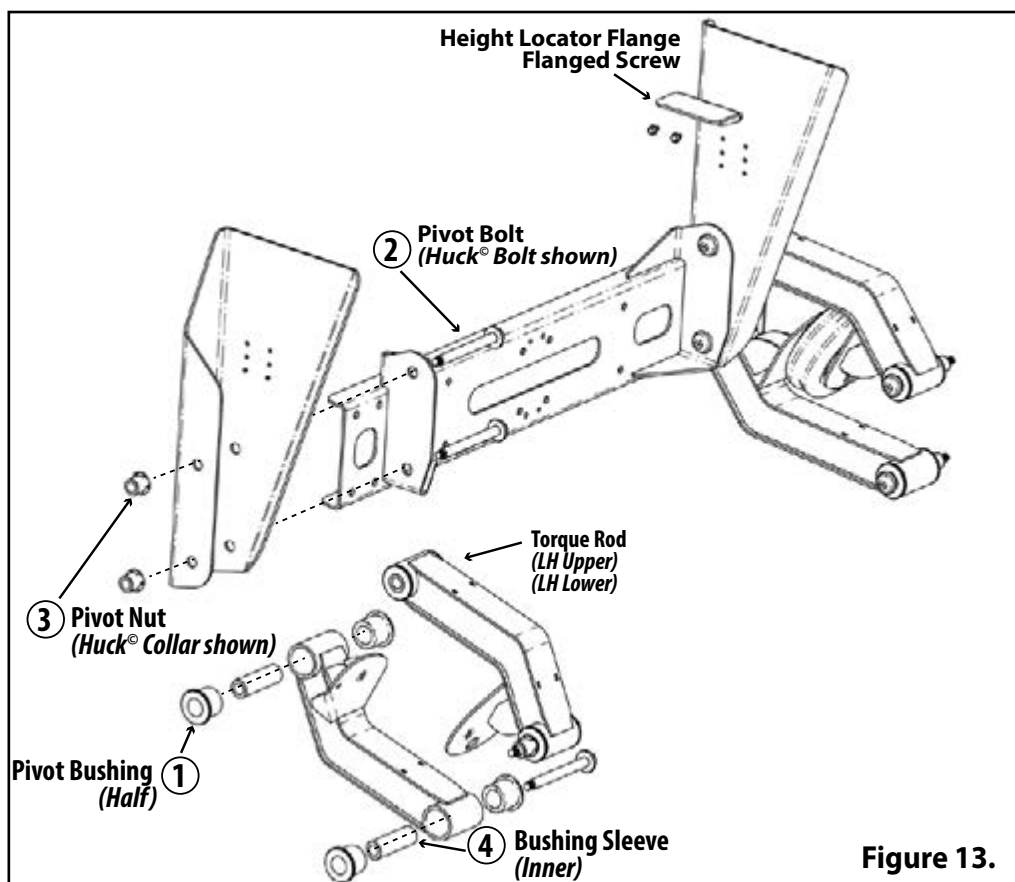


Figure 13.

Bushing Replacement Procedure

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, to reach pivot connections. Bushings should be replaced in the eight pivot connections at the same time.

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

1. Remove pivot bolt by cutting away Huck® Collar. Discard pivot bolt (Fig 13).
2. Remove the bushing assembly from the rod eye. Clean the rod eye of any foreign debris/corrosion.

Continued on next page

233 8K-10K-13K TRUCK – TORQUE SPECIFICATIONS

Fastener Type	Size	Torque Values	
Flanged Lock Screw (Air Spring)	3/8"-16NC	25 ft-lb	34 N-m
Locknut - (Air Spring)	3/4"-16NF	50 ft-lb	68 N-m
Locknut - (Tie Rod/Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m
Locknut - (Cross Channel)	5/8"-11NC	160 ft-lb	217 N-m
Pivot Bolt/Nut - (Hex Head Cap Screw (HHCS))/ Locknut)	3/4"-16NF	310 ft-lb	420 N-m

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

CAUTION All fasteners **MUST** be re-torqued after the first 6,000 miles of operation. Failure to install and maintain fasteners at torque specifications could result in suspension failure and voiding of the warranty.

3. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of each bushing half.
NOTE: Do not substitute - lubricant included with bushing replacement kit.
4. Press bushing halves into the pivot connection.
NOTE: Rubber mallet may be needed.
5. Press the bushing sleeve into the center opening of the installed bushing.
NOTE: Rubber mallet may be needed.
6. Check that internal sleeve is flush with both sides of replacement bushing.

Install pivot hardware. Torque to specifications.

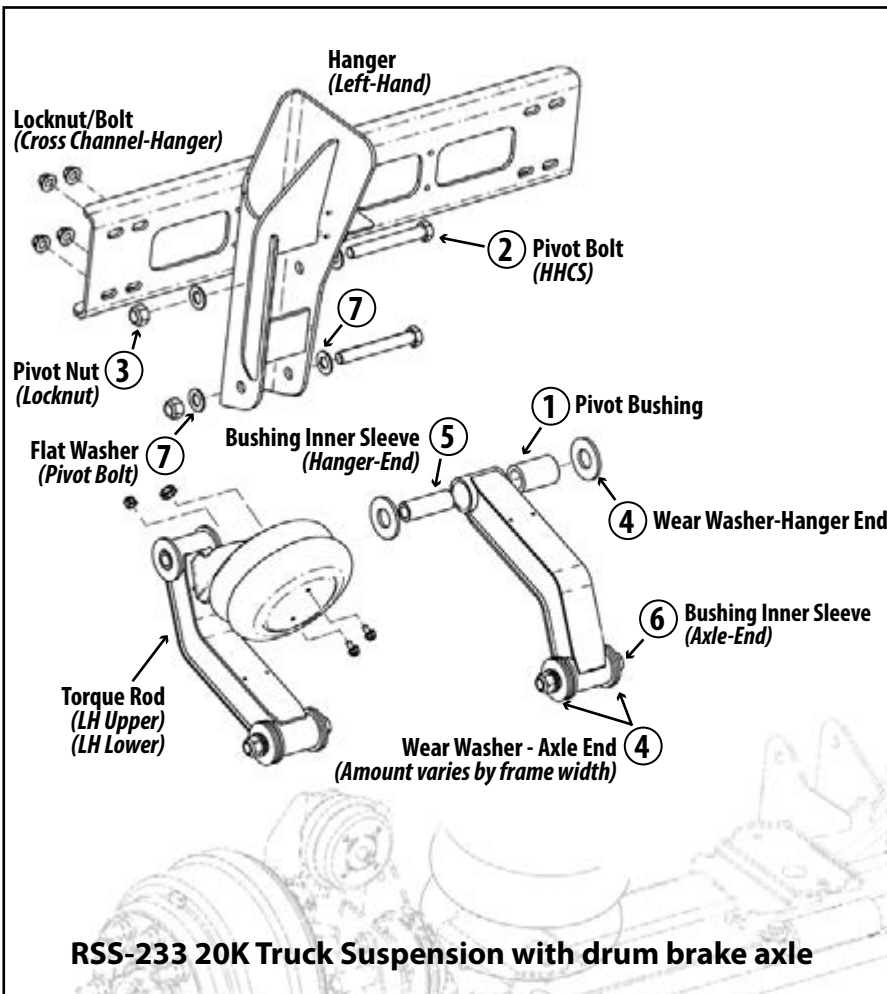
Reassemble suspension, if necessary.

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

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

233 20K TRUCK BUSHING REPLACEMENT

DWG No.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	6040145	Bushing Kit-with Hardware
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 .25X3.25X1.50 233
5		4 9090082	BUSHING SLEEVE 1.44"OD x .938"ID x 4.111"LG
6		4 9090083	BUSHING 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 SERVICE LUBE
	1	6040142	Bushing Kit-No Hardware
1	Included in Service Kit	8 1120043	BUSH 2.140x1.428x3.300L 90A
4		28 1160026	WEAR WASHER .25x3.25x1.50
5		4 9090082	BUSHING SLEEVE 1.44"OD x .938"ID x 4.111" LG
6		4 9090083	BUSHING SLEEVE 1.44"OD x .938"ID x 4.861" LG
—		— 1980013	URETHANE BUSHING SERVICE LUBE



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

1. Disassemble suspension, if necessary, to reach pivot connections.
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 (Figure 11).
3. Remove pivot hardware and discard. Inspect wear washers for excessive wear/damage. Replace if necessary.
NOTE: Pivot hardware included with bushing replacement kit.
4. Remove bushing assembly from the torque rod and discard. Clean the rod eye of any debris/corrosion.

Continued on next page

233 20K TRUCK – TORQUE SPECIFICATIONS

Fastener Type	Size	Torque Values	
Locknut - (Air Spring)	1/2"-13NC	25 ft-lb	34 N-m
Locknut - (Air Spring)	1/2"-20NF	25 ft-lb	34 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	34 N-m
Locknut - (Tie Rod/Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m
Locknut - (Cross Channel)	5/8"-11NC	160 ft-lb	217 N-m
Pivot Bolt/Nut - (Hex Head Cap Screw (HHCS)/ Locknut)	7/8"-14NF	500 ft-lb	678 N-m

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

CAUTION All fasteners MUST be re-torqued after the first 6,000 miles of operation. Failure to install and maintain fasteners at torque specifications could result in suspension failure and voiding of the warranty.

- 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.
- 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.
- 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 appropriate number of wear washers on either end of the inner sleeve. Inner sleeve must be flush with or slightly past the outside of the wear washers on both ends.
- Torque pivot nut to spec (500 ft-lb - 678 N-m).

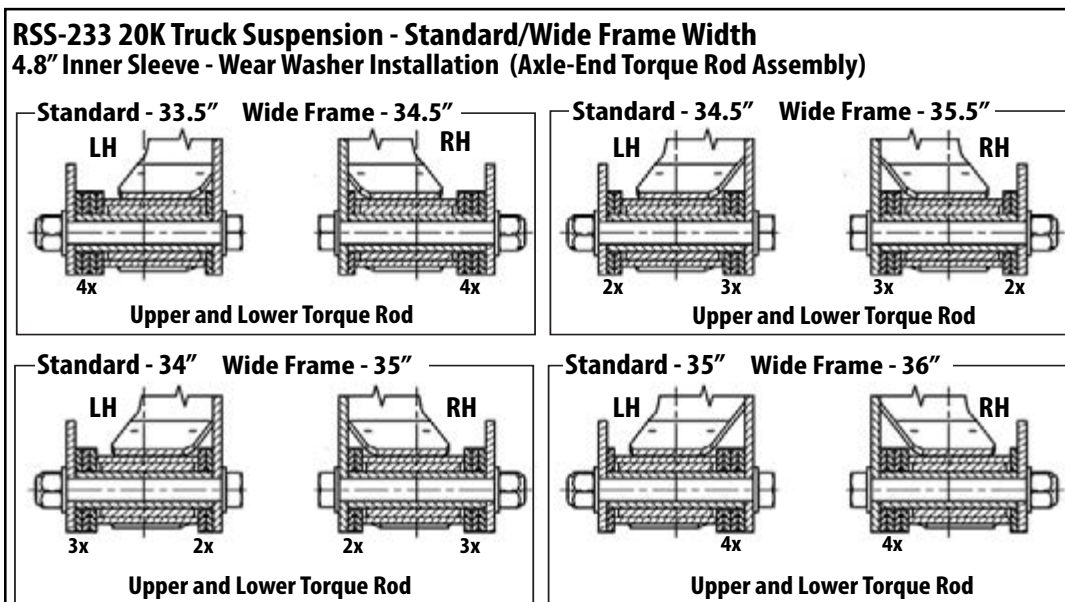


Figure 14.

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.

Reassemble the suspension if necessary. Torque components to specifications. Check the wheel toe-in setting (between 1/32" and 3/32") and adjust if necessary.

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

2361000 TRUCK (CSTMRAxLE) BUSHING REPLACEMENT

DWG No.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	6040161	Bushing Kit-with Hardware
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 SERVICE LUBE
	1	6040160	Bushing Kit-No Hardware
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 SERVICE LUBE

2361000 TRUCK (CUSTOMER-SUPPLIED AXLE) - TORQUE SPECIFICATIONS

Fastener Type	Size	Torque Values	
Pivot Bolt/Nut - (Hex Head Cap Screw (HHCS/ Locknut))	7/8"-14NF	500 ft-lb	678 N-m
HHCS/Locknut - (Cross Channel)	5/8"-11NC	160 ft-lb	217 N-m
Locknut - (Load Beam Axle Assembly)	3/4"-16NF	310 ft-lb	420 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	34 N-m
HHCS/ Locknut (Steer Damper)	3/4"-10NC	160 ft-lb	217 N-m
Locknut - (U-Bolt-Steer Damper Mount)	3/8"-16NC	30 ft-lb	41 N-m

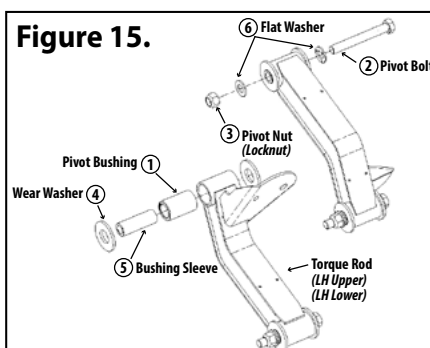
Bushing Replacement Procedure

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

Take apart suspension to reach the pivot connections, if needed (Fig. 15).

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

1. Remove pivot hardware and discard.
NOTE: New hardware included in the bushing replacement kit (6040161).
2. Inspect wear washers for excessive wear/damage. Replace if necessary.

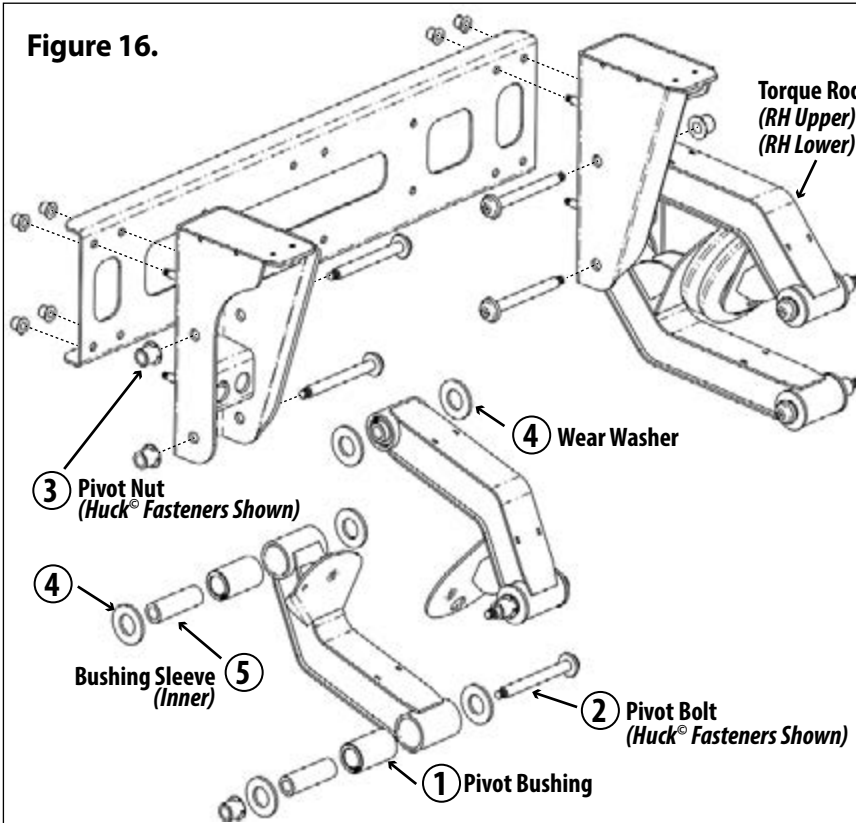


3. Remove bushing assembly from the torque rod and discard. Clean the rod eye of debris/corrosion.
4. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of new bushings. NOTE: Do not substitute - special lubricant included in kit.
5. Install bushing in the eye of the torque rod. NOTE: Mallet/press may be needed.
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 equally on both sides.
7. Assemble pivot connection with one wear washer on each side of the bushing. The inner sleeve of the bushing must be flush with or extend slightly past the outside of the wear washers.
8. Torque pivot nut to specs (500 ft-lb - 678 N-m).

Reassemble suspension, if necessary. Torque components to specifications (see chart).

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

DWG No.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	6040188	HD Bushing Replacement Kit - Traditional hardware
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 SERVICE LUBE
	1	6040216	Bushing Kit-Huck® Pivot Connection Hardware
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 SERVICE LUBE
	1	6040187	Bushing Kit-No Hardware
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 SERVICE LUBE

Figure 16.


Bushing Replacement Procedure

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

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

Wear washers included in all bushing kits.

1. Remove the Huck® Collar by cutting/grinding. Take the pivot connection apart. Discard the pivot hardware. Discard the wear washers (Figure 16).
NOTE: Suspensions purchased before October 2018 do not use wear washers at the pivot connection.
2. Remove the bushing assembly from the rod eye(s) and discard.
NOTE: Bushing assembly before October 2018 consists of two bushing halves and inner sleeve.

continued on next page

233T 10K-13K TRAILER – TORQUE SPECIFICATIONS

Fastener Type	Size	Torque Values	
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
Pivot Bolt/Nut - (Hex Head Cap Screw (HHCS/ Locknut))	3/8"-16NC	310 ft-lb	420 N-m

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

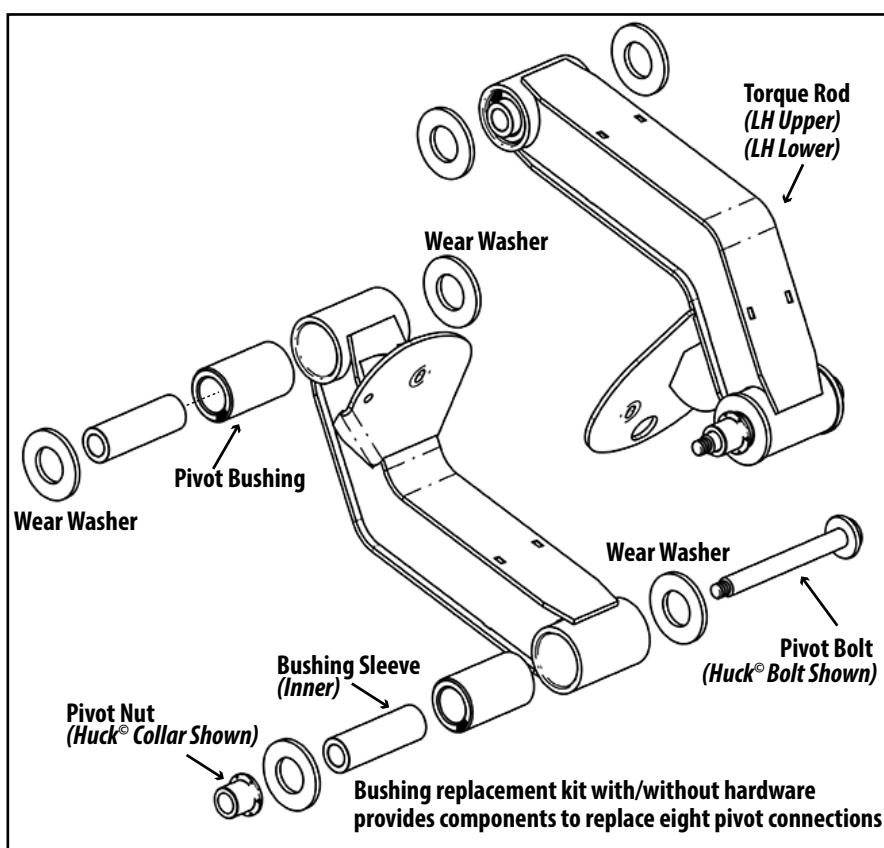
CAUTION All fasteners **MUST** be re-torqued after the first 6,000 miles of operation. Failure to install and maintain fasteners at torque specifications could result in suspension failure and voiding of the warranty.

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- Clean torque rod eye of foreign debris/corrosion with wire brush before installing new bushing.
- 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.
- Install (press) bushing into the torque rod eye.
NOTE: Mallet/press needed to install bushing.
- Press inner sleeve into the installed bushing. Center the sleeve inside the bushing so that sleeve ends extend slightly past the bushing sides.
- 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.
- Torque pivot hardware (see chart).
Reassemble suspension, if necessary.
Torque 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 suspension failure and void the warranty.



DWG No.	QTY/AXLE	PART NUMBER	ITEM DESCRIPTION
	1	6040161	Bushing Replacement Kit w/hardware
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"OD X .938"ID X 4.111"LG
—		16 1160868B100	FLAT WASHER 7/8" A-325
—		— 1980013	URETHANE BUSHING SERVICE LUBE
	1	6040160	Bushing Kit-No Hardware
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 SERVICE LUBE

Bushing Replacement Procedure

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

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

Replacement kit includes traditional hardware to replace the Huck® fasteners used in factory assembly. Wear washers are included in all bushing replacement kits.

1. Disassemble the suspension, if necessary, to reach the pivot connections.
 2. Remove the Huck® Collars by cutting/grinding away from the Huckbolts.
 3. Take the pivot connection apart (Figure 28). Discard the pivot hardware and wear washers.
 4. Remove bushing assembly from the torque rod and discard. Clean rod eye of any foreign debris or corrosion.
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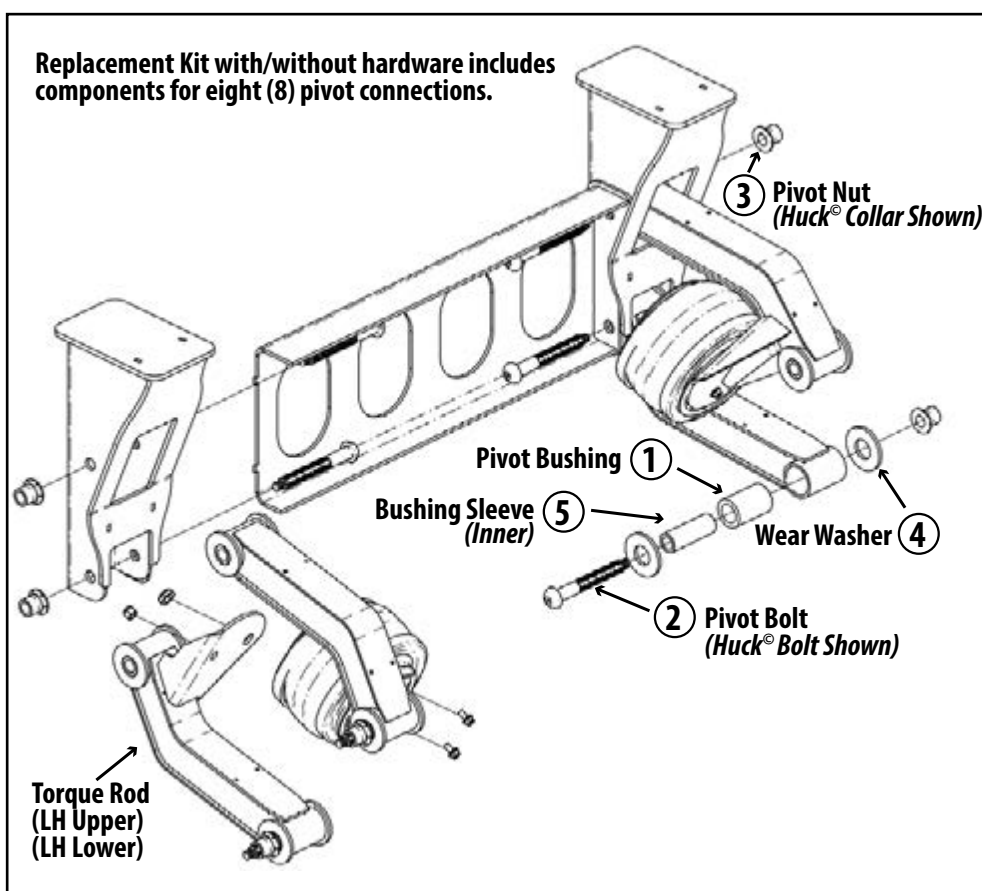


Figure 17.
233T 20K Trailer - Mid-Mount suspension for drum brake axle shown.

233T 20K TRAILER – TORQUE SPECIFICATIONS

Fastener Type	Size	Torque Values	
Bolt (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 (Tie Rod/Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m
Locknut (Cross Channel)	5/8"-11NC	160 ft-lb	217 N-m
Pivot Bolt/Nut - (Hex Head Cap Screw (HHCS)/ Locknut))	3/8"-16NC	500 ft-lb	678 N-m

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

CAUTION All fasteners **MUST** be re-torqued after the first 6,000 miles of operation. Failure to install and maintain fasteners at torque specifications could result in suspension failure and voiding of the warranty.

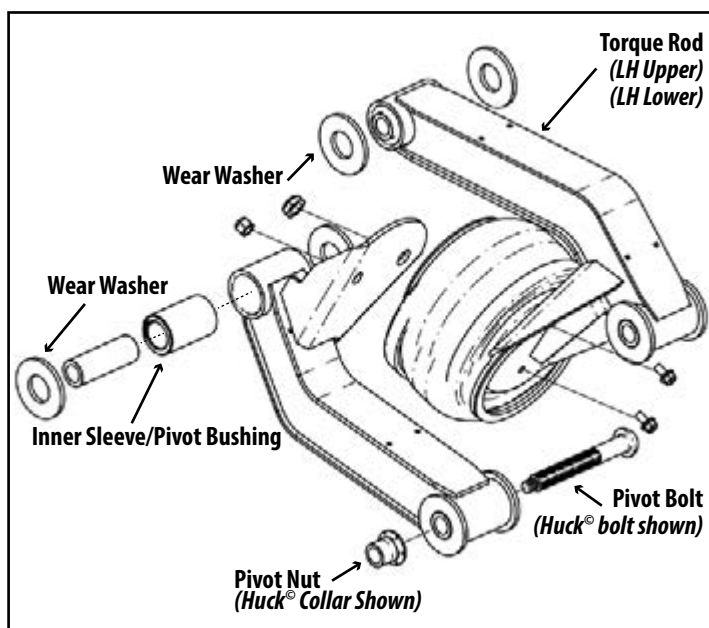
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5. Apply Energy Suspensions® Formula 5 Prelube to the bore (inside) of new bushings.
NOTE: Do not substitute - urethane bushing lubricant included with all kits.
6. Install bushing in the eye of the torque rod.
NOTE: Mallet/press is needed to install the replacement bushings.
7. 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.
8. Assemble pivot connection with one wear washer on each side of the bushing. The inner sleeve of the bushing should be flush with or extend slightly past the outside of the wear washers.
9. Torque pivot nut to specifications (500 ft-lb).

Reassemble suspension components, if necessary.
Tighten 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 suspension failure and void the warranty.



232/232T 8K-10K-13K TRUCK/TRAILER BUSHING REPLACEMENT KIT

Suspension Type	Bushing Rplcmnt Kit Part Number	Pivot Hardware	Torque Values	
			foot-pound	Newton-meter
Truck Suspension	6040132	Bushing kit with hardware	350 ft-lb	475 N-m
Trailer Suspension	6040152	Bushing kit with hardware	350 ft-lb	475 N-m
Truck Suspension	6040084	Bushing kit - No hardware	350 ft-lb	475 N-m
Trailer Suspension	6040151	Bushing kit - No hardware	350 ft-lb	475 N-m

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

1. Take apart suspension to reach pivot connections.
2. The wear washer on each side of the Torque Rod Assembly will vary according to the frame width set by the crosschannel (Figure 18).
3. Remove the pivot hardware and discard.
NOTE: New pivot hardware must be ordered with bushing replacement kit.
4. Inspect the wear washers for excessive wear/damage. Replace, if necessary.
5. Remove bushing assembly from rod and discard. Clean the rod eye of foreign debris or corrosion.
6. Apply Energy Suspensions® Formula 5 Prelube to bore (inside) of new bushings.
NOTE: Do not substitute - the special urethane bushing lubricant is part of all bushing kits.
7. Install the new bushing into the eye of the torque rod. NOTE: Mallet /press needed to install.
8. 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.
9. 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.

10. Tighten pivot hardware to torque specifications (350 ft-lb - 475 N-m).
11. Reassemble suspension, if necessary. Torque components to specifications.
12. 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.

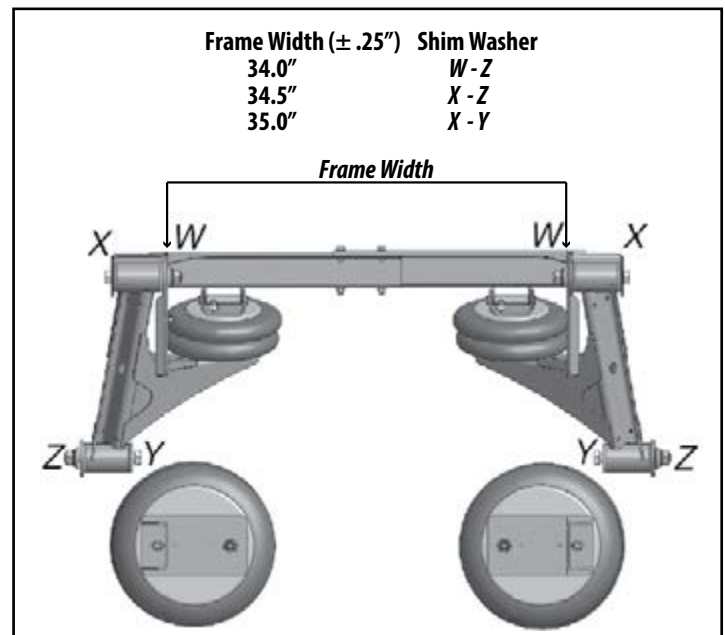


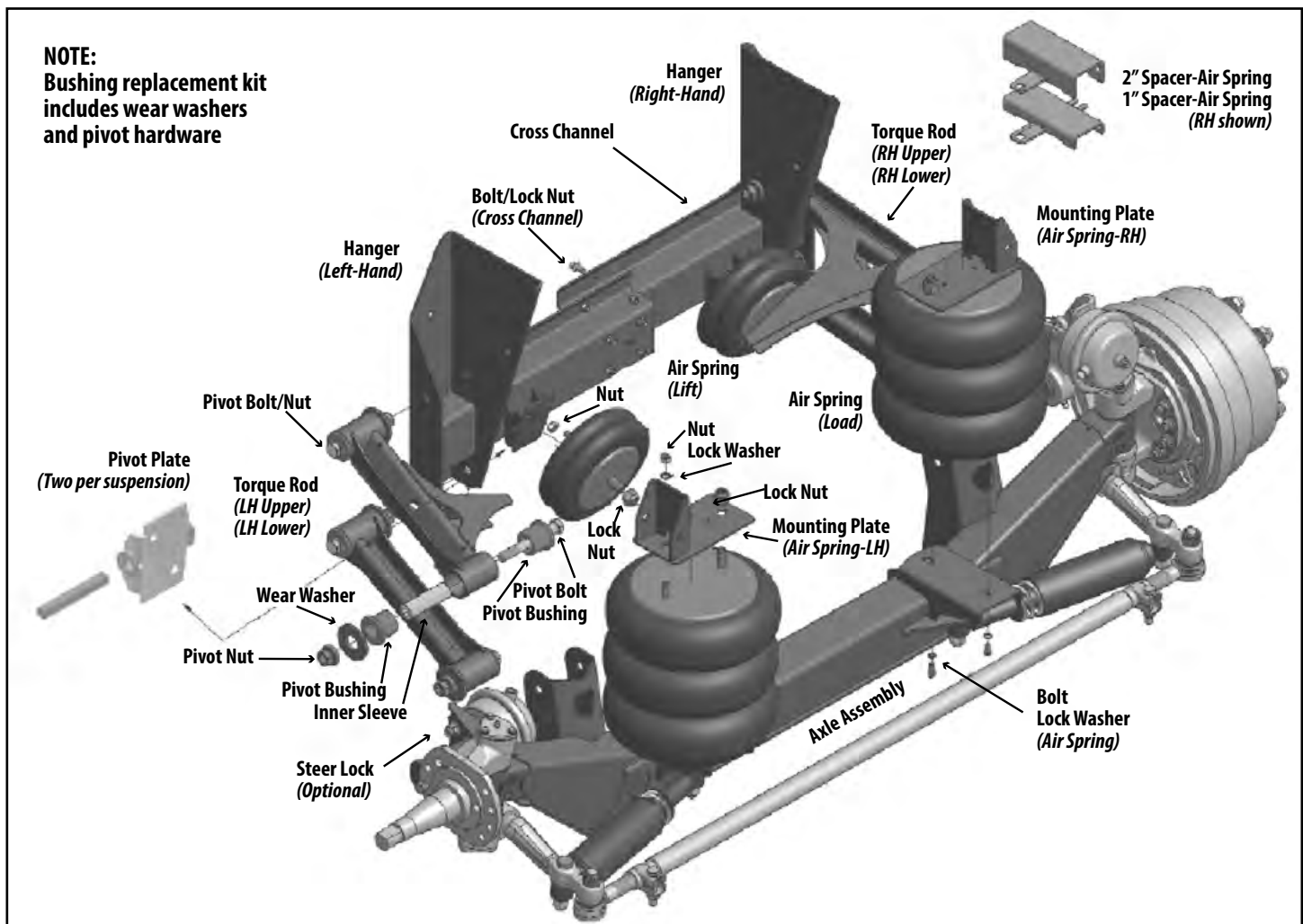
Figure 18.
Adjust the frame width by securing crosschannel at the desired width. Install shim washers at the marked locations for the correct alignment.

232/232T 8K-10K-13K TRUCK/TRAILER - TORQUE SPECIFICATIONS

Fastener Type	Size	Torque Values	
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 (Cross Channel)	1/2"-13NC	50 ft-lb	68 N-m
Bolt/Locknut (Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m
Pivot Bolt - (Hex Head Cap Screw (HHCS)) Pivot Nut - (Locknut)	3/4"-16NF	350 ft-lb	475 N-m

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

CAUTION All fasteners **MUST** be re-torqued after the first 6,000 miles of operation. Failure to install and maintain component fasteners at torque specifications could result in suspension failure and void the warranty.



232/232T 20K TRUCK/TRAILER - BUSHING REPLACEMENT

Suspension Type	Bushing Rplcmnt Kit Part No.	Pivot Hardware	Torque Values	
			foot-pound	Newton-meter
Trailer Suspension	6040111	Bushing kit w/hardware	500 ft-lb	678 N-m
Truck Suspension	6040112	Bushing kit w/hardware	500 ft-lb	678 N-m
Trailer Suspension	6040085	Bushing kit - No hardware	500 ft-lb	678 N-m
Truck Suspension	6040086	Bushing kit - No hardware	500 ft-lb	678 N-m

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, if necessary, 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 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 19).
- Remove and discard pivot hardware; wear washers.
- Remove bushing assemblies and discard. 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 the torque rod eye, if necessary.
 - 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.

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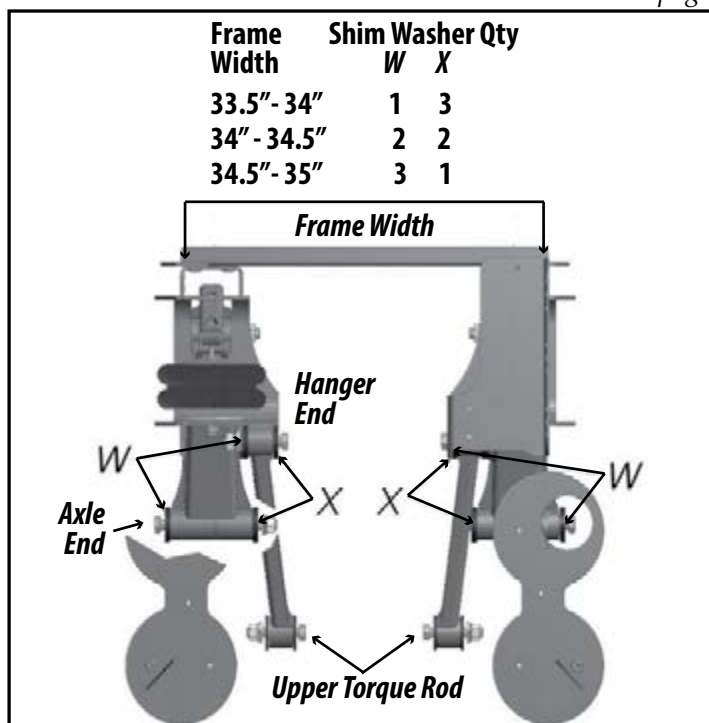


Figure 19. Adjust the frame width by securing crosschannel at the desired width. Install shim (wear) washers at the marked locations for the correct alignment.

232/232T 20K TRUCK/TRAILER TORQUE SPECIFICATIONS

Fastener Type	Size	Torque Values	
Bolt/Locknut (Cross Channel)	1/2"-13NC	50 ft-lb	68 N-m
Locknut (Air Spring)	3/4"-16NF	50 ft-lb	68 N-m
Bolt/Lock Washer/Nut (Air Spring)	1/2"-13NC	25 ft-lb	34 N-m
Bolt/Locknut (Steering Damper)	3/4"-10NC	160 ft-lb	217 N-m
Pivot Bolt - (Hex Head Cap Screw (HHCS)) Pivot Nut - (Locknut)	7/8"-14NF	500 ft-lb	678 N-m

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

CAUTION All fasteners **MUST** be re-torqued after the first 6,000 miles of operation. Failure to install and maintain component fasteners at torque specifications could result in suspension failure and void the warranty.

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7. Upper Torque Rod (Hanger-End)

7.1-Install soft bushing into the upper torque rod eye.

7.2-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 T-Rod eye.

7.3-Assemble the pivot connection with the appropriate number of wear washers. Torque pivot hardware to specs.

8. Upper Torque Rod (Axle-End)

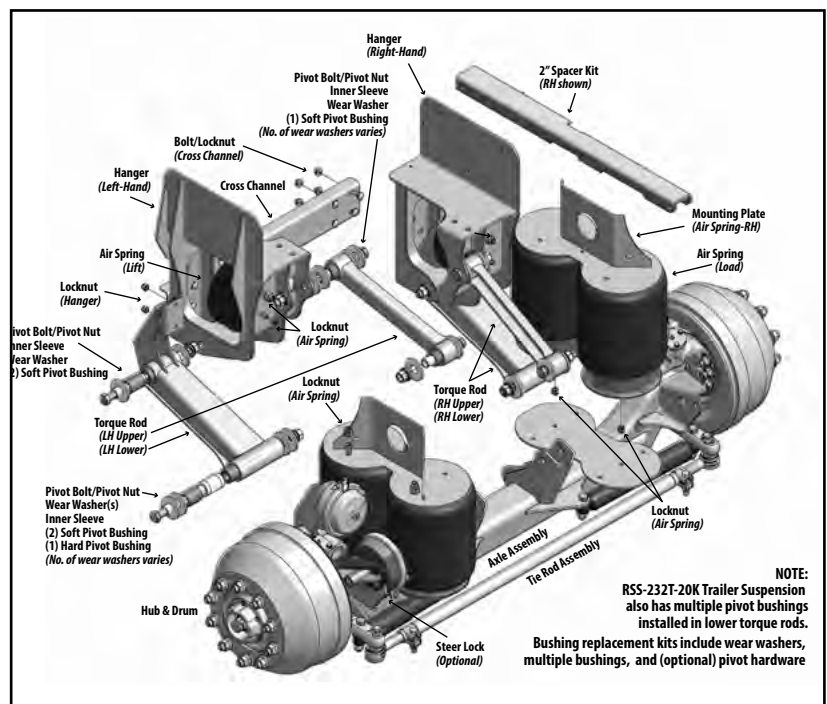
8.1-Install soft bushing into the hanger end of the lower torque rod. Check that bushing ends are flush with torque rod eye. Trim bushing ends flush to eye.

8.2-Press inner sleeve into the installed bushing. Center the inner sleeve so that both ends extend slightly 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.

9. Reassemble suspension, if necessary. Torque components 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 parts failure and void the warranty.



NOTE:
R55-232T-20K Trailer Suspension also has multiple pivot bushings installed in lower torque rods. Bushing replacement kits include wear washers, multiple bushings, and (optional) pivot hardware

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.