

LSZ13/20 Repair Manual

Tie Rod and Steering Damper



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Introduction

This manual provides the necessary information for the maintenance, inspection, and safe operation of the NEWAY® LSZ Series Auxiliary Air Suspension.

NOTE: To assist with installation, customer inspection drawing LSZ13_TAB_CI or LSZ20_TAB_CI is required and is included in the literature kit.

Read this manual before using or servicing this product and keep it in a safe location for future reference. Updates to this manual, which are published as necessary, are available on the internet at www.safholland.us.

When replacement parts are required, SAF-HOLLAND® highly recommends the use of only SAF-HOLLAND® Original Parts. A list of technical support locations that supply SAF-HOLLAND® Original Parts and an Aftermarket Parts Catalog are available on the internet at www.safholland.us or contact Customer Service at 888-396-6501.

Warranty

Refer to the complete warranty for the country in which the product will be used. A copy of the written warranty is included with the product or available on the internet at www.safholland.com.

Notes, Cautions, and Warnings

Before starting any work on the unit, read and understand all the safety procedures presented in this manual. This manual contains the terms “NOTE”, “IMPORTANT”, “CAUTION”, and “WARNING” followed by important product information. These terms are defined as follows:

NOTE: Includes additional information to enable accurate and easy performance of procedures.

IMPORTANT: Includes additional information that if NOT followed could lead to hindered product performance.

CAUTION Used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, could result in property damage.

CAUTION Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

1. Safety Instructions

General and Servicing Safety Instructions

- Read and observe all Warning and Caution hazard alert messages. The alerts provide information that can help prevent serious personal injury, damage to components, or both.

⚠ WARNING Failure to follow the instructions and safety precautions in this manual could result in improper servicing or operation leading to component failure which if not avoided could result in death or serious injury.

- All installations should be performed by a properly trained technician using proper/special tools, and safe procedures.

NOTE: In the United States, workshop safety requirements are defined by federal and/or state Occupational Safety and Health Act (OSHA). Equivalent laws could exist in other countries. This manual is written based on the assumption that OSHA or other applicable employee safety regulations are followed by the location where work is performed.

- Properly support and secure the vehicle from unexpected movement when servicing the unit.

⚠ WARNING Failure to properly support and secure the vehicle and axles prior to commencing work could create a crush hazard which, if not avoided, could result in death or serious injury.

- Service both roadside and curbside of an axle. Worn parts should be replaced in sets. Key components on each axle's braking system, such as friction material, rotors and drums will normally wear over time.
- Follow all manufacturer's instructions on spring pressure and air pressure controls.

⚠ WARNING Failure to follow manufacturer's instructions regarding spring pressure or air pressure control could allow unexpected release of energy which, if not avoided, could result in death or serious injury.

- The wheel contact surfaces between the wheel and hub/drum MUST NOT be additionally painted.

IMPORTANT: The wheel contact surfaces MUST be clean, smooth and free from grease.

⚠ WARNING Failure to keep wheel and hub contact surfaces clean and clear of foreign material could allow wheel/hub separations which, if not avoided, could result in death or serious injury.

- Only the wheel and tire sizes approved by SAF-HOLLAND® can be used.
- Tire clearance between tires and the suspension MUST be regularly monitored and maintained.

⚠ WARNING Failure to maintain tire clearance between tires and the nearest point of contact on the suspension or vehicle could cause fire or loss of vehicle control which, if not avoided, could result in death or serious injury.

Operational and Road Safety Instructions

- Before operating vehicle, ensure that the maximum permissible axle load is NOT exceeded and that the load is distributed equally and uniformly and in accordance with state and federal bridge laws.

- Make sure that the brakes are NOT overheated from continuous operation.

⚠ WARNING Failure to minimize the use of brakes during overheating conditions could result in deterioration of brake efficiency which, if not avoided could result in death or serious injury.

- Observe the operating recommendation of the truck manufacturer for off-road operation of the installed axles.

IMPORTANT: The definition of OFF-ROAD means driving on non-asphalt/non-concrete routes, e.g. gravel roads, agricultural and forestry tracks, on construction sites and in gravel pits.

IMPORTANT: Off-road operation of axles beyond the approved application design could result in damage and impair suspension system performance.

- Follow the recommended routine maintenance and inspections described in this manual. These procedures are designed so that optimum performance and operational safety are achieved.
- The suspension springs should ALWAYS be operated with a static operating pressure between 20 psi (1.38 bar) and 107 psi (7.38 bar).

⚠ WARNING Failure to operate the air springs with a proper static operating pressure could cause premature component failure and loss of vehicle control which, if not avoided, could result in death or serious injury.

- In the event of suspension air pressure loss, quickly reduce speed as safely as possible and remove the vehicle from traffic. If unable to remove vehicle from traffic, follow DOT safety requirements regarding emergency situations.
- Contact a qualified towing and/or service company to assist in repairing the vehicle or to move it to a qualified repair facility. DO NOT operate the vehicle in the absence of suspension air pressure; however in the event of an air system failure while in service, an internal rubber bumper built into the air spring will make it possible to temporarily operate the vehicle at reduced speed determined by road conditions.

⚠ WARNING Operating the vehicle without proper air pressure can cause tire failure, fire, or loss of vehicle control which, if not avoided could result in death or serious injury.

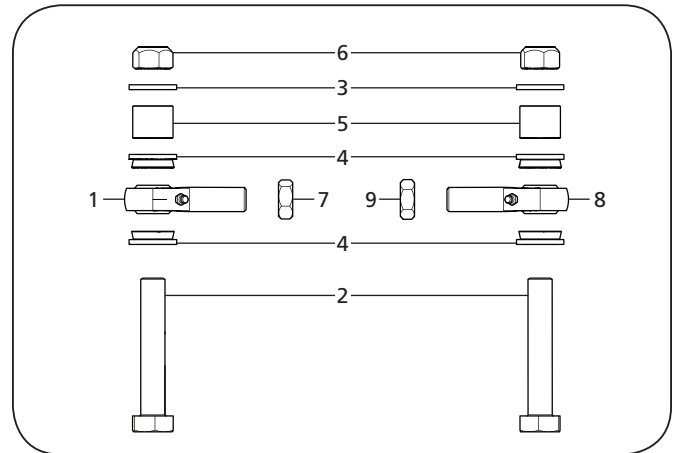
- The suspension MUST be lifted when the vehicle is moving in reverse.

CAUTION Failure to lift axle when in reverse could result in tire or axle damage.

2. Service Repair Kit

SRK 48100556: ROD ENDS KIT LSZ (Figure 1)			
ITEM	DESCRIPTION	PART NUMBER	QTY
1	Rod End, 3/4" -16, Left-Hand	90045696	1
2	Cap Screw, Hex, 3/4" -10 x 4 1/4", GR 8	93003617	2
3	Washer, Flat Narrow 3/4"	93600156	2
4	Rod Seal	90045756	4
5	Spacer, Rod End	90036293	2
6	Nut, Hex, Lock 3/4" -10 GR C	93400494	2
7	Jam Nut, 3/4" -16, Left-Hand	93400631	1
8	Rod End, 3/4" -16, Right-Hand	90045695	1
9	Jam Nut, 3/4" -16 GR C	93400271	1
10	Never-Seez® (not shown)	XB-02967	1

Figure 1



SRK 48100555: TIE ROD KIT LSZ13 (Figure 1)			
ITEM	DESCRIPTION	PART NUMBER	QTY
1	Rod End, 3/4" -16, Left-Hand	90045696	1
2	Cap Screw, Hex, 3/4" -10 x 4 3/4", GR 8	93003617	2
3	Washer, Flat Narrow 3/4"	93600156	2
4	Rod Seal	90045756	4
5	Spacer, Rod End	90036293	2
6	Nut, Hex, Lock 3/4" -10 GR C	93400494	2
7	Jam Nut, 3/4" -16, Left-Hand	93400631	1
8	Rod End, 3/4" -16, Right-Hand	90045695	1
9	Jam Nut, 3/4" -16 GR C	93400271	1
10	Tie Rod (not shown)	90549910	1

SRK 48100617: TIE ROD KIT LSZ20 (Figure 1)			
ITEM	DESCRIPTION	PART NUMBER	QTY
1	Rod End, 3/4" -16, Left-Hand	90045696	1
2	Cap Screw, Hex, 3/4" -10 x 4 3/4", GR 8	93003617	2
3	Washer, Flat Narrow 3/4"	93600156	2
4	Rod Seal	90045756	4
5	Spacer, Rod End	90036293	2
6	Nut, Hex, Lock 3/4" -10 GR C	93400494	2
7	Jam Nut, 3/4" -16, Left-Hand	93400631	1
8	Rod End, 3/4" -16, Right-Hand	90045695	1
9	Jam Nut, 3/4" -16 GR C	93400271	1
10	Tie Rod (not shown)	90550288	1

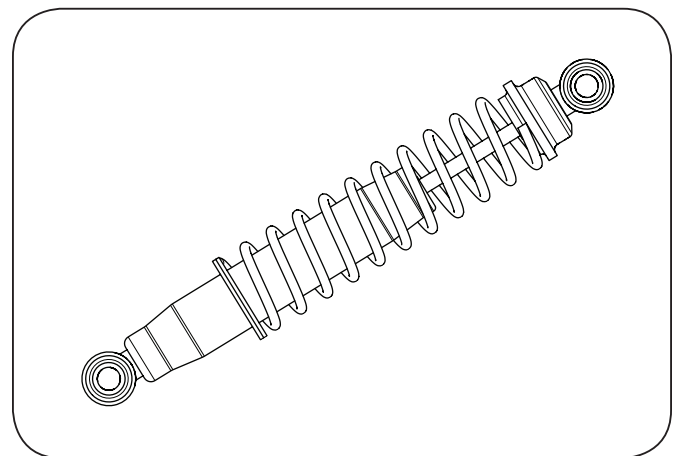
3. Rod Ends/Tie Rod Replacement

- Required Tools:
- 1-1/8" open end wrench
 - 1-1/8" socket
 - Torque wrench capable of 250 ft.-lbs.
 - Two (2) cam or ratchet straps

1. With the vehicle unloaded and/or trailer disconnected on a level surface, set parking brakes and chock drive tires to prevent the vehicle from rolling forward or backward.

⚠ WARNING Failure to properly secure the vehicle prior to commencing work could create a crush hazard which, if not avoided, could result in death or serious injury.

Steering Damper 90045662



2. Put suspension in the stowed position.
3. Put a jack stand under the axle at each end.
4. Measure the distance between the centers of the steering damper to steer arms bolts. Record this dimension.
5. Install straps on both steering dampers (**Figure 2**).

NOTE: One end of the tie rod assembly has left handed threads. This end can be identified with a groove around the tapered section close to the 3/4" jam nut. (**Figure 3**).

6. Loosen the jam nuts at both ends on the tie rod assembly.
7. Remove and discard both 3/4" nuts and 3/4" washers on each end of the tie rod assembly.
8. Remove and discard the 3/4" bolt, 3/4" washers, spacer and the 3/4" seal washers from each end of the tie rod.
9. If changing the tie rod assembly skip to Step 12.
10. Remove and discard both rod ends.

NOTE: When installing rod ends measure the exposed threads to insure both ends are equally inserted into the tie rod.

NOTE: When adjusting the length of the tie rod assembly, make sure the grease zerk fittings are clocked in the same direction.

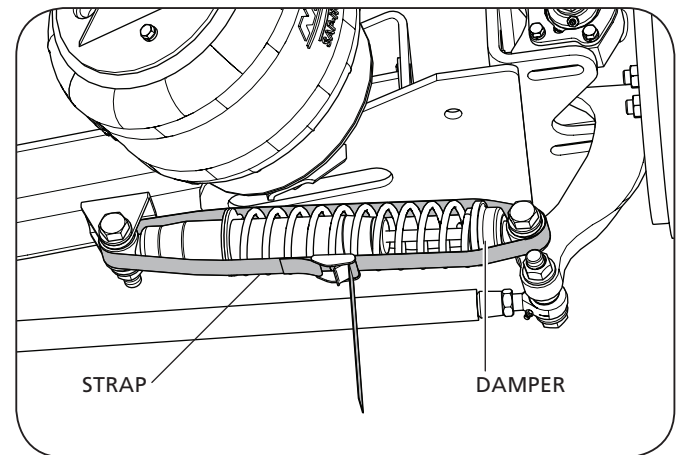
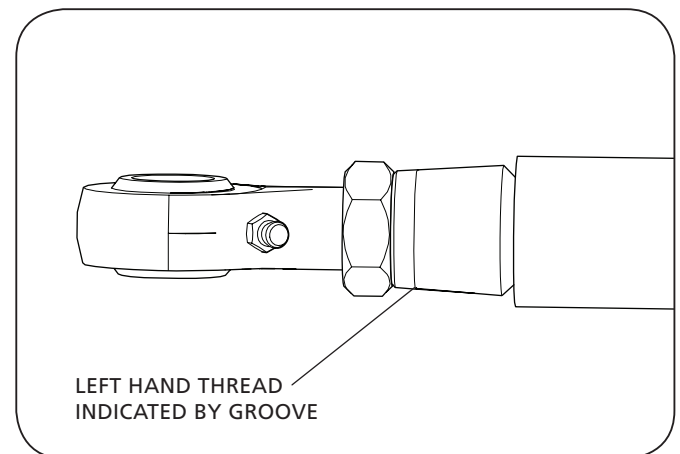
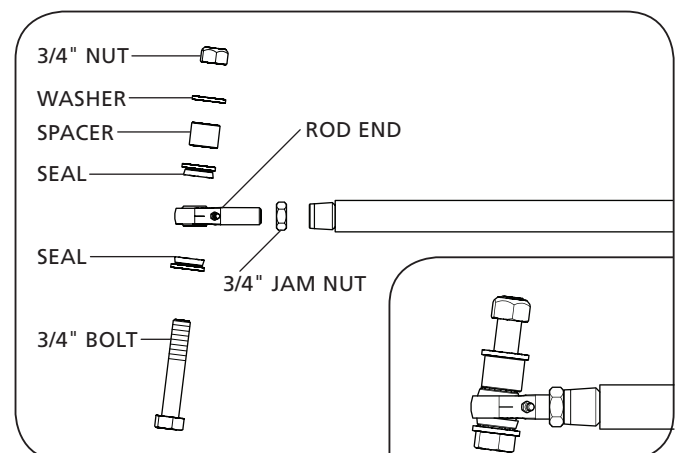
11. Apply a small amount of provided Never-Seez® onto the new 3/4" rod end at the end of the threads. Install the new 3/4" jam nuts onto the new rod ends before installing the rod ends into the tie rod assembly.
12. Install the tie rod assembly using a new 3/4" bolt, new 3/4" washer, the new spacer and new seal washers (**Figure 4**).

NOTE: When installing rods end at the steer arm make sure the grease zerk fitting is pointing towards the rear of the vehicle.

13. Using a new 3/4" nut and new 3/4" washer, install rod end into steer arm.
14. Repeat on Step 13 and Step 14 opposite end.
15. Torque both 3/4" nuts according to specifications in Section 16.
16. Adjust length between rod ends to the dimension recorded earlier. Position the 3/4" jam nuts preventing the rod end from rotating.

NOTE: When installing the tie rod make sure both grease zerk fittings are pointed towards the rear of the vehicle.

17. Remove straps from steering dampers.

Figure 2

Figure 3

Figure 4


18. Refer to Service Procedures in Section 5 Alignment, check toe in.
19. Tighten the 3/4" jam nut on both ends of the tie rod assembly.
20. Insure axle is still in the stowed position.
21. Remove the jack stands and chocks from drive tires.

4. Steering Damper Replacement

Required Tools:

- 1-1/8" Wrench
- 1-1/8" Socket
- Torque wrench capable of 250 ft.-lbs.
- Cam or ratchet straps

IMPORTANT: Replacing both steering dampers is highly recommended.

1. With the vehicle unloaded and/or trailer disconnected on a level surface, set parking brakes and chock drive tires to prevent the vehicle from rolling forward or backward.

WARNING Failure to properly secure the vehicle prior to commencing work could create a crush hazard which, if not avoided, could result in death or serious injury.

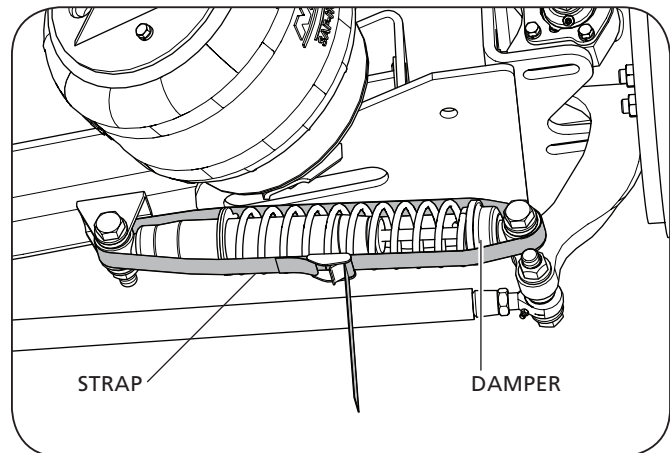
2. Put suspension in the in-service position. Exhaust air pressure in the suspension air springs. Remove the air pressure using the air pressure regulator or control valve.

WARNING Failure to exhaust the suspension air and chock the tires prior to beginning maintenance could allow vehicle movement which, if not avoided, could result in death or serious injury.

3. Install straps on both steering dampers. This maintains the length of the steering dampers to allow removal of damper(s) (**Figure 5**).
4. Remove and retain the following from both ends of the steering damper:
 - Two (2) 3/4" lock nuts
 - Four (4) 3/4" flat washers
 - Two (2) 3/4" bolts
5. Remove steering damper, release strap and discard steering damper.
6. Install the following:
 - a. New steering damper.

IMPORTANT: The steering damper **MUST** be installed with coil spring toward tire.

Figure 5



- b. The two (2) 3/4" bolts and two (2) 3/4" flat washers attaching the steering damper to the steer arm and axle
- c. Two (2) 3/4" lock nuts and two (2) 3/4" flat washers onto the steering dampers 3/4" bolts. Torque both 3/4" lock nuts according to specifications in Section 16.
7. Repeat steps 4 through 6 for opposite side.
8. Remove the band(s) around newly installed steering dampers.
9. Remove the strap if only changing one steering damper.
10. Remove the chocks from drive tires.

5. Alignment

IMPORTANT: Proper axle toe-in is essential to prevent excessive tire wear.

- Required Tools:
- 1-1/8" open end wrench
 - 10' tape measure (minimum length),
 - Three (3) jack stands
 - Standard screwdriver

1. With the vehicle on a level surface, set parking brakes and chock drive tires to prevent the vehicle from rolling forward or backward.

WARNING Failure to properly secure the vehicle prior to commencing work could create a crush hazard which, if not avoided, could result in death or serious injury.

2. Place the axle in the stowed position.
3. Position a jack stands under the axle at both ends.
4. This procedure requires two (2) people. Utilizing a jack stand, place a standard head screwdriver on top of the stand to scribe a line onto the tire tread. One person secures the position of the screwdriver while the other person slowly rotates the tire one full rotation. The resulting scribe line **MUST** overlap at both ends. If not, scribe in another position (**Figure 6**).
5. Repeat Step 4 on the opposite side.
6. Using a measuring tape, measure the cross-body distance at the front and rear of the tires from the scribe lines.
7. The rear dimension should be $1/8" \pm 1/16"$ larger than the front dimension. If not, loosen both $3/4"$ jam nuts on the tie rod assembly (**Figure 7**).

NOTE: One end of the tie rod assembly has left handed threads. This end can be identified with a groove around the tapered section close to the $3/4"$ jam nut (**Figure 5**).

8. Rotate tie rod until the rear dimension is $1/8" \pm 1/16"$ ($3 \text{ mm} \pm 1 \text{ mm}$) larger than the front dimension.

CAUTION NEVER rotate the center section of the tie rod to expose more than $5/8"$ of the rod end threads. If more than $5/8"$ of rod end thread is exposed in operation or during service the steering damper forces could cause the rod to fail prematurely which, if not avoided, could result in minor or moderate injury.

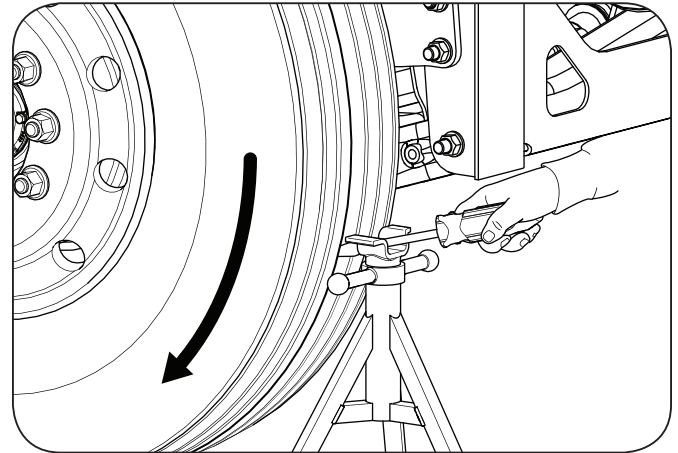
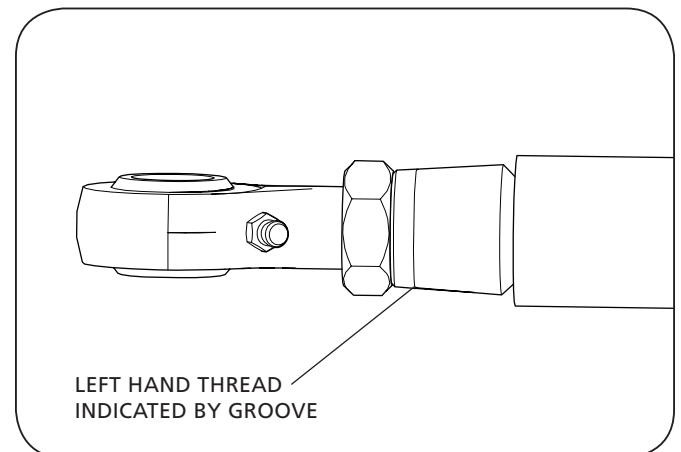
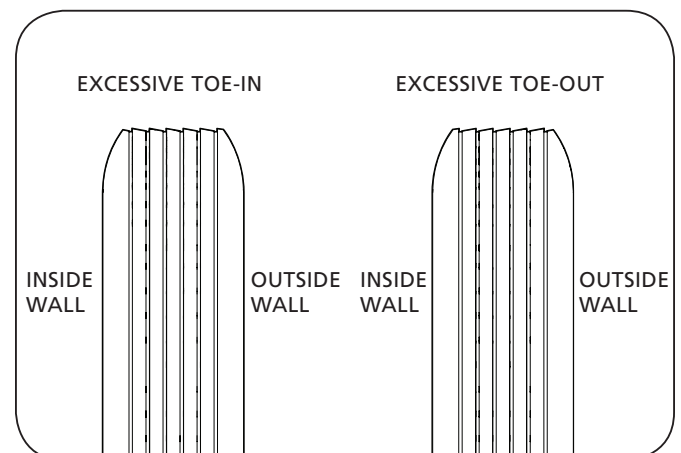
9. Tighten both $3/4"$ jam nuts on the tie rod assembly.

NOTE: One end of the tie rod assembly has left handed threads. This end can be identified with a groove around the tapered section close to the $3/4"$ jam nut (**Figure 7**).

10. Verify the front and rear dimensions. If rear dimension is larger than the front by $1/8" \pm 1/16"$ the axle is ready for service. If rear dimension is **NOT** larger by $1/8" \pm 1/16"$ repeat procedures starting with Step 7.

IMPORTANT: Proper toe-in is essential for normal tire wear (**Figure 8**).

11. Build truck air pressure to 100 psi (6.89 bar) and make sure axle is in the stowed position. Remove jack stands.

Figure 6

Figure 7

Figure 8


6. Torque Specifications

NOTE: Torque specifications listed in this section are with clean lubricated/coated threads, supplied by SAF-HOLLAND®.

IMPORTANT: The use of special lubricants with friction modifiers, such as Anti-Seize or Never-Seez®, without written approval from SAF-HOLLAND® Engineering, will void warranty and could lead to over torquing of fasteners or other component issues.

General Information

- The torque specifications listed throughout the manual are applied to the lock nut and NOT the bolt.

IMPORTANT: Most of the fasteners used in this suspension are Grade 8 bolts and Grade C lock nuts. These fasteners have the strength and hardness properties required for their particular function. They **MUST** be replaced with fasteners of the same grade, size and form as the original in order to prevent failure (**Figure 9**).

WARNING Failure to use the proper fasteners when servicing the suspension could cause component failure which, if NOT avoided, could result in death or serious injury.

WARNING Failure to properly torque all fasteners will result in component failure which, if NOT avoided, could result in death or serious injury.

- All fasteners **MUST** be re-torqued after the first 100 hours of service or 5,000 miles (8,000 km).
- Refer to vehicle OEM for torque specifications for vehicle frame fastener hardware.

7. Lubrication Specifications

Lubricate the suspension in accordance with the approved lubricants (**Table 2**).

IMPORTANT: Replacement of SAF-HOLLAND® supplied fasteners with non-SAF-HOLLAND® could result in unpredictable performance.

WARNING Failure to maintain the LSZ suspension with SAF-HOLLAND® original parts can result in unpredictable performance which, if NOT avoided, could result in death or serious injury.

Table 1

COMPONENT	TORQUE RANGE	SIZE
Hub Cap,	12-16 ft.-lbs. 16-22 N•m	5/16"-18
Clevis Pin Assembly	18-24 ft.-lbs. 24-33 N•m	5/16"-18
Retainer	25-35 ft.-lbs. 34-47 N•m	3/8"-16
Lower Air Spring	25-35 ft.-lbs. 34-47 N•m	1/2"-13
Chamber Bracket	47-63 ft.-lbs. 64-85 N•m	1/2"-13
Bolt-on Brake Assembly	150-180 ft.-lbs. 203-244 N•m	5/8"-11
SuperChamber™ and Service Brake Chamber	133-155 ft.-lbs. 180-210 N•m	5/8"-11
Pivot Connections, Lift Bracket, King Pin Bolt, Crossmember, and Tie Rod	200-250 ft.-lbs. 271-339 N•m	3/4"-10
Steering Damper	133-155 ft.-lbs. 180-210 N•m	3/4"-10

Figure 9

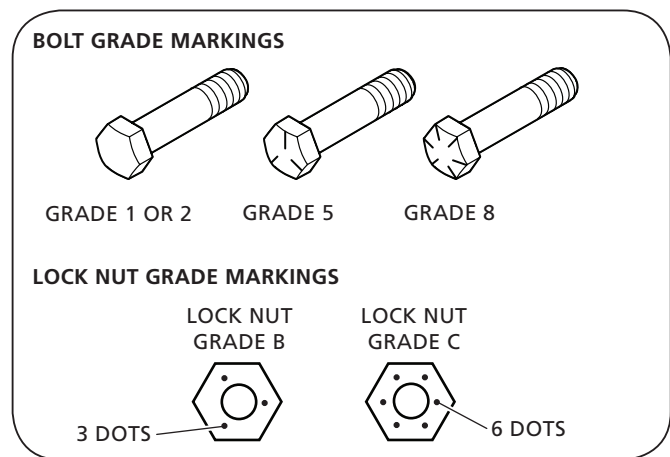


Table 2

GREASE	HUB OIL
CITGO SynDurance Premium Synthetic 460	Exxon Mobil Mobilube HD Plus 80W-90
Mystik JT-6 Hi Temp with Moly	Shell Spirax S 75W-90
Valvoline Palladium Grease	Shell Spirax ASX 75W-90
Chevron Delo Heavy Duty Moly 5% EP	Exxon Mobil Mobilube 1 SHC 75W-90
	Exxon Mobil Delvac 75W-90



From fifth wheel rebuild kits to suspension bushing repair kits, SAF-HOLLAND Original Parts are the same quality components used in the original component assembly.

SAF-HOLLAND Original Parts are tested and designed to provide maximum performance and durability. Will-fits, look-alikes or, worse yet, counterfeit parts will only limit the performance potential and could possibly void SAF-HOLLAND's warranty. Always be sure to spec SAF-HOLLAND Original Parts when servicing your SAF-HOLLAND product.

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