



86-95 Suzuki Samurai HD Front 4340 Chromoly Birfield Axle Set (SKU# SAX-4340LR)

Instructions also Include:

SAX-26SG Suzuki Samurai 26 Spline Side (Spider) Gears

Installation Instructions



To complete the installation of these axles you will need to disassemble the hubs and steering knuckle. For more information see the **Important** note on page 4.

CAUTION: Safety glasses should be worn at all times when working with vehicles and related tools and equipment.



For additional copies of these and other instructions go to:
www.lowrangeoffroad.com and click on the "Tech and Instructions" tab.

Suggested Tools:

- Twin Post Lift (or floor jack and jack stands)
- Brass Hammer
- Sockets: 10,12,14,17 & 27
- Ratchet
- Ball Peen Hammer - Medium
- Gasket Scraper
- Torque Wrench - Foot-Pound
- Torque Wrench - Inch-Pound (Needle or Gauge Type)
- Seal Puller (or Small Ladies Foot Pry Bar)
- Dial Indicator W/ Magnetic Mount
- Spanner Wrench
- Silicone Form-a-Gasket
- Blue Loctite
- Red Loctite
- Brake Cleaner - Aerosol Can
- 80W90 Gear Oil
- Wheel Bearing Grease



Tech Tip

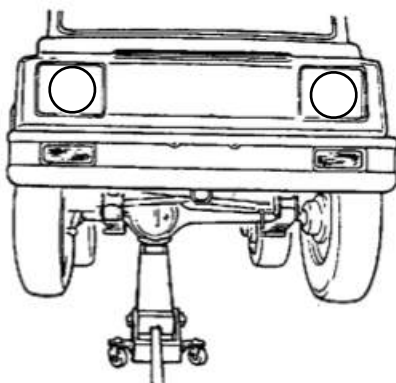
When working on suspension, brakes or drive train parts it is a good idea to spray all fasteners with penetrating oil a day ahead if possible. If not done a day ahead, an hour or even minutes before is helpful.



Step 1

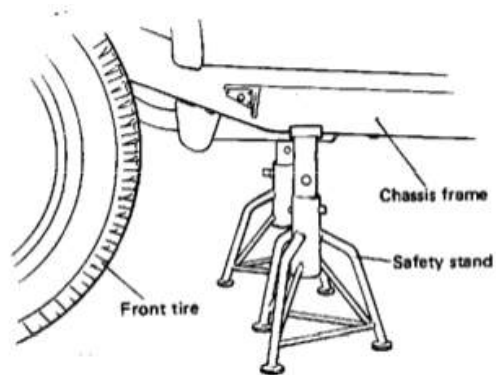
Lift and support the vehicle on a twin post lift.

Note: We used a twin post lift, but this job could easily be done with a floor jack and (2) safety stands.



Tech Tip

Proper positioning of floor jack.

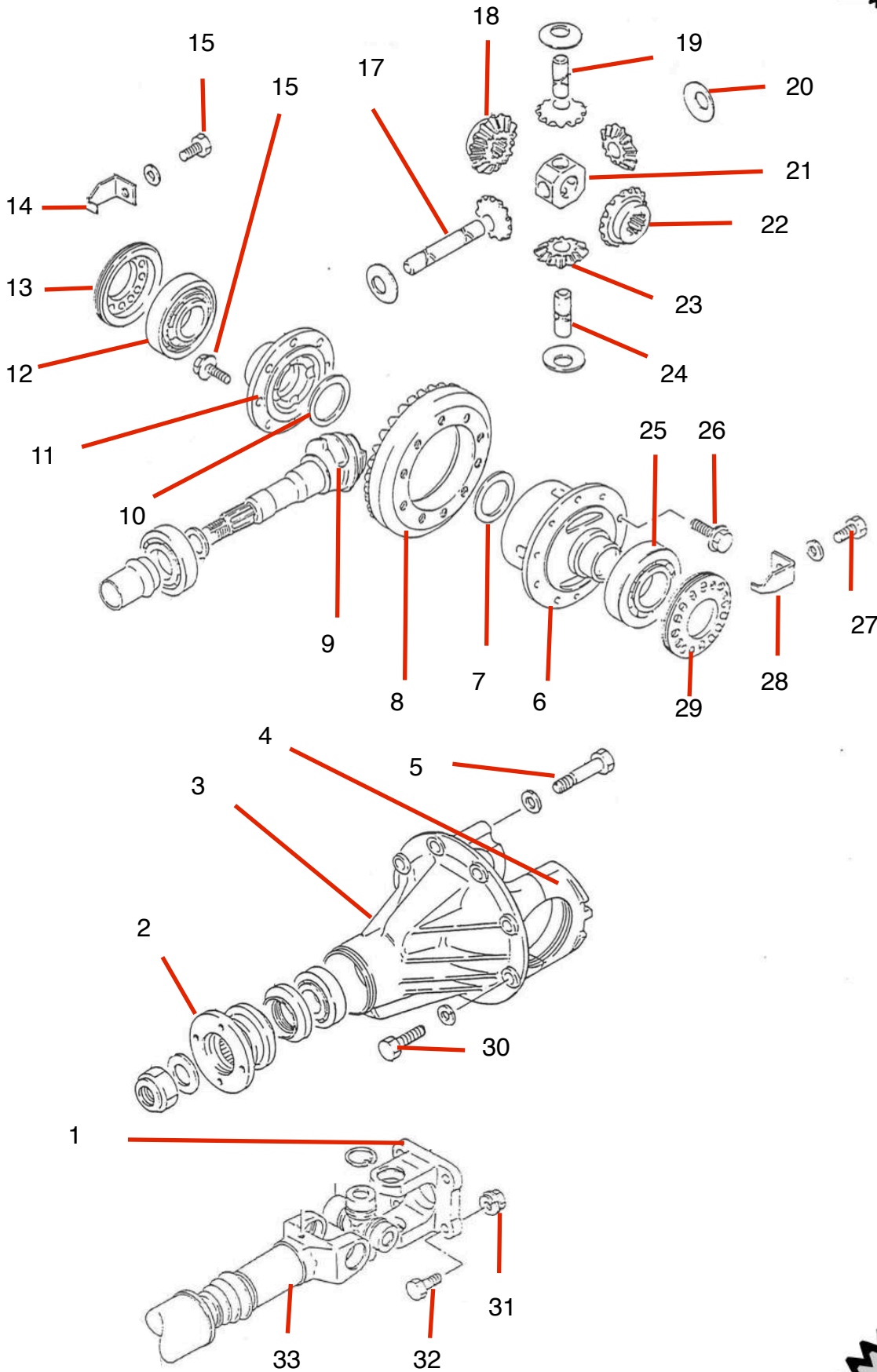


Tech Tip

Proper positioning of safety stands.



Front Differential Parts

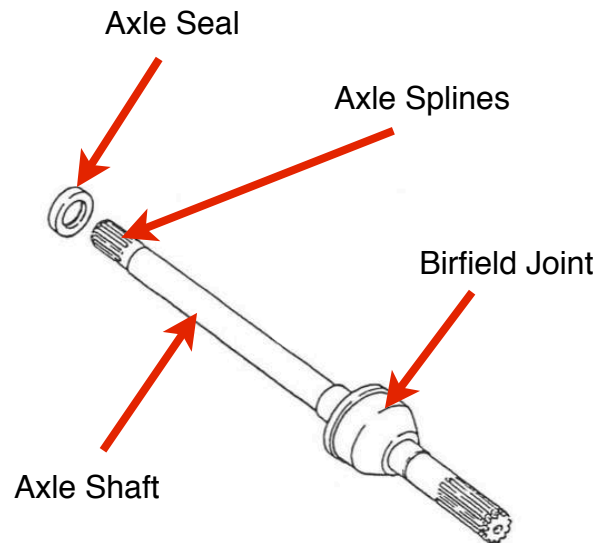


1. Yoke Flange
2. Pinion Flange
3. Differential Carrier Housing
4. Bearing Cap -Right Side
5. Bearing Cap Bolt and Washer
6. Differential Case
7. Side Pinion Thrust Washer
8. Ring Gear
9. Pinion Driver Gear
10. Side Pinion Thrust Washer
11. Differential Case Cover
12. Carrier Bearing & Race - Left Side
13. Bearing Adjuster - Left
14. Adjuster Lock
15. Adjuster Lock Bolt & Washer
16. Case Bolt
17. Pinion Shaft - Long
18. Side Gear - Left
19. Pinion Shaft -Short
20. Thrust Washer
21. Pinion Joint
22. Side Gear - Right
23. Pinion Gear (4)
24. Pinion Shaft - Short
25. Carrier Bearing & Race - Right Side
26. Ring Gear Bolt
27. Adjuster Bolt & Washer
28. Adjuster Lock
29. Bearing Adjuster - Right
30. Carrier Bolt & Washer
31. Pinion Flange Nut
32. Pinion Flange Bolt
33. Front Drive Shaft



Important: These chromoly axles have 26 splines on the end that fits into the differential side (spider) gears. The OEM side gears are 23 spline. In order to accommodate these axles you will need to either install new 26 spline side gears (included in these instructions) or upgrade to an after market “locker” such as a [Spartan](#), [LockRight](#), or [Mini Spool](#). Click on any of these above options to get more information.

To install any of these options the differential must be removed. In order to remove the differential you must first remove both front axle shafts. For instructions on how to access the front axle shafts, click [HERE](#) and then go to “Samurai Front Axle Knuckle Rebuild Kit” instructions. After completing **Steps 2 through 45** of those instructions come back to these instructions, beginning at **Step 4**.



Step 2

Remove the passenger side axle shaft and set it aside.



Step 3

Remove the driver side axle shaft and set it aside.

Removing the Differential (3rd Member)



Step 4

Position a drain container under the front axle assembly and remove the drain plug using a 19 mm socket.



Step 5

Mark the orientation of the front drive shaft flange and differential pinion flange using a punch or a permanent marker.

Note: This is done so the drive shaft can be reinstalled in the same position, reducing the risk of vibration.



Step 6

Remove the (4) front drive shaft bolts using two 12 mm box end wrenches.



Step 7

It may be necessary to tap the U-Joint with a hammer if it does not disconnect easily.





Step 8

Tie the drive shaft out of the way with a bungee cord or something similar.



Step 9

Reinstall the drain plug just a couple of threads and move the drain pan out of the way.



Step 10

Remove the (8) differential carrier bolts and washers using a 12 mm socket.



Step 11

Jar the differential carrier housing loose by striking it alternately, top and bottom, as shown in this and the next step.





Step 12

Striking the top of the carrier housing to jar it loose.



Step 13

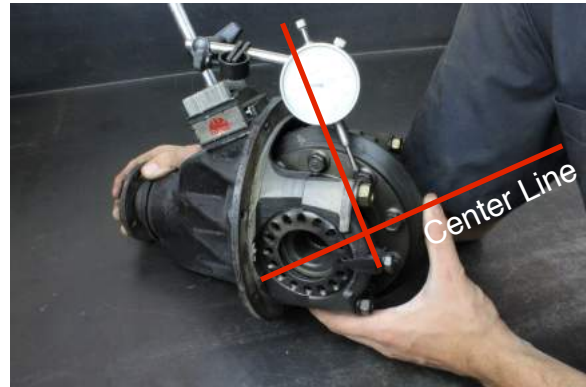
Remove the carrier housing from the front axle housing.

Installing New 26 spline Side Gears



Step 14

Clean off any gasket material or sealer from the differential carrier and place the carrier on a clean work surface.



Step 15

Measure backlash by setting up a dial indicator as shown. To see a video on measuring backlash click [HERE](#).

Note: Dial indicator pintle should be at a right angle to the ring gear center line.





Step 16

Backlash is the amount of ring gear movement with the drive pinion held steady. Backlash is measured by holding the pinion shaft so it does not move with one hand. Then, with the other hand, move the ring gear back and forth and observe the dial indicator. Count the number of spaces the needle sweeps from one extreme to the other. Each space equals .001 inches. Remember to record your reading. It will be needed after reassembly.



Step 18

Bearing preload is the amount of effort required to turn the differential pinion shaft measured in inch-pounds. To measure preload, place an inch pound torque wrench on the drive pinion nut and rotate the pinion shaft. (See picture in **Step 17**) While rotating the shaft, note the reading on the torque wrench. Be sure to record the reading because you will need to check and adjust the preload near the end of this procedure.



Step 17

Check bearing preload with an inch-pound torque wrench and record your readings. To see a video on measuring preload click [HERE](#).

Note: We used a dial type torque wrench, but a less expensive needle type (or flexible beam) would do just fine.

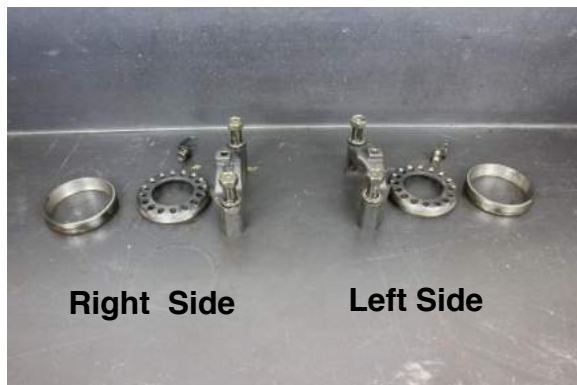


Step 19

Mark the right bearing cap so it can be easily distinguish from the left.

Note: Bearing caps must be reinstalled in their original position. We used yellow paint for marking, but any stamp, file or engraver would work.



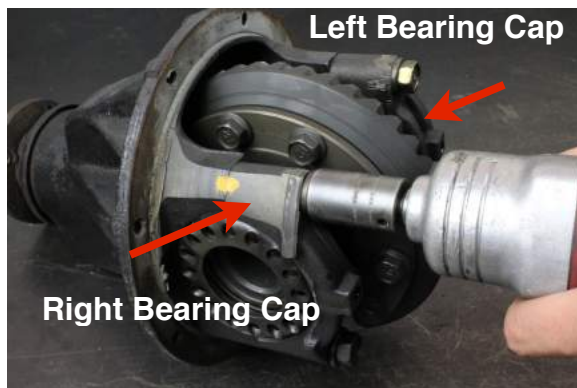


Tech Tip

As mentioned, it is critical that you reassemble the differential carrier parts in the same location from which they were removed. Setting them on the workbench as shown works well.

Step 20

Remove both (left and right) bearing adjuster lock plates by removing the (2) bolts using a 12 mm socket.



Step 21

Remove both side bearing caps by removing (4) bolts using a 17 mm socket.

Step 22

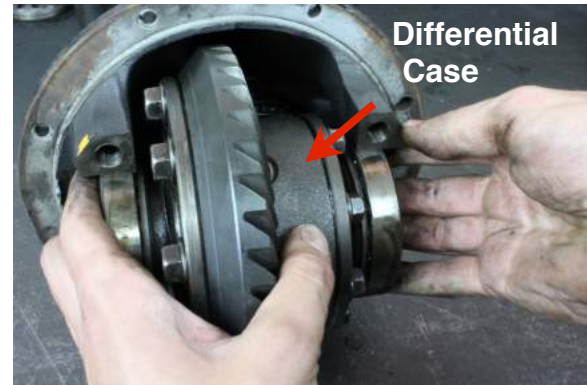
It may be necessary to tap on the caps with a brass hammer to assist in removal.





Step 23

Remove both (left and right) bearing adjusters.



Step 24

Remove the differential case.



Step 25

Place the differential case on the bench as shown and remove the right side bearing race.



Step 26

Remove the (10) ring gear bolts using a 14 mm socket.

Caution: Be sure to catch the ring gear with your hand and set it on the bench as shown in the next picture.





Step 27

Lift the differential case off the ring gear and set the ring gear aside.



Step 28

Turn the case over and remove the case cover by removing the (8) bolts using a 12 mm socket.



Step 29

Remove long pinion shaft.



Step 30

Remove the (2) short pinion shafts.



Step 31

Remove the left side gear and thrust washer.



Step 32

Remove the pinion joint.



Step 33

Remove the (4) pinion gears and thrust washers.



Step 34

Remove the right side gear and thrust washer.



Important Message!

If installing a **26 Spline Mini Spool Locker** click [HERE](#) for instructions and Information.

If installing a **LockRight Locker** (with or W/O Couplers) click [HERE](#) for instructions and information.

If installing a **Spartan Locker** click [HERE](#) for Instructions and information.

If installing new **26 Spline Side Gears**, continue on to the next step.



Step 35

Remove the thrust washer from the original side gear.



Step 36

Install the original thrust washer on the new 26 spline side gear.





Step 37

Place the new side gear and thrust washer inside the differential case.

Note: The side gear must be installed straight in and it must spin freely once in place.



Step 38

Prepare the first pinion for installation by placing a thrust washer as shown.



Step 39

Install the pinion gear and thrust washer in the case and insert a short pinion shaft.

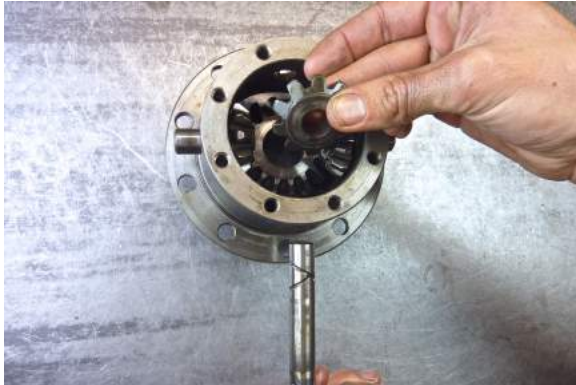
Note: Only insert the short shaft far enough to hold the washer and pinion gear in place. Not all the way yet.



Step 40

Repeat that same procedure on the second pinion gear, thrust washer and short shaft. Again do not install the short shaft all the way yet.





Step 41

Install the 3rd pinion gear, thrust washer and long shaft as shown.



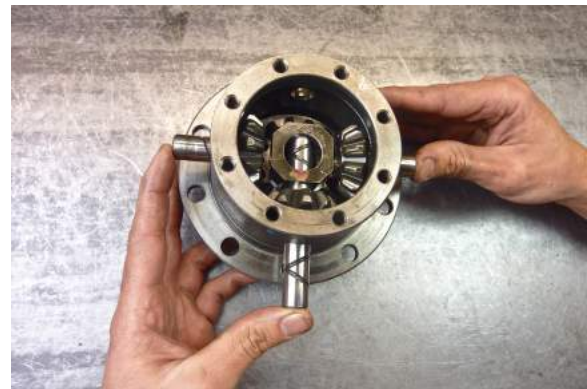
Step 41 Continued

Only install the long pinion shaft far enough to hold the thrust washer and pinion gear in place for now.



Step 42

Position the pinion joint in the center as shown and slide the long pinion shaft through the joint. Stop sliding it just before it goes all the way through the joint to leave room for the 4th pinion gear and thrust washer.



Step 43

Slide the two short pinion shafts through the pinion joint as well. The short shafts should not be visible outside the differential case at this time.



Step 44

Install the 4th and last pinion gear and thrust washer and slide the long pinion shaft all the way into the differential case.



Step 44 Continued

It may be necessary to align the pinion gear and thrust washer with the long shaft using your little finger.



Step 45

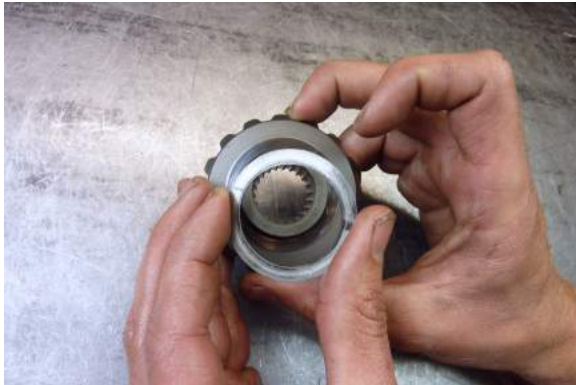
All the pinion gears, thrust washers and pinion shafts should be installed now. None of the pinion shafts should be visible outside the differential case.



Step 46

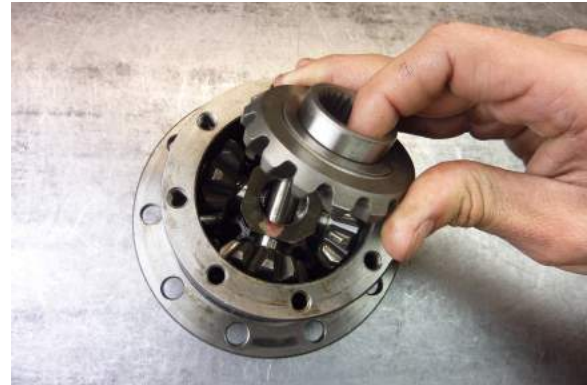
Remove the original thrust washer from the original side gear.





Step 47

Install the original thrust washer on the new 26 spline side gear.



Step 48

Install the new 26 spline side gear and thrust washer inside the differential case.



Step 49

Install the differential case cover.



Step 50

Apply Blue Loctite® to the threads of the (8) differential case bolts and install.





Step 51

Torque the differential case bolts 27 to 32.5 ft. lbs.



Step 52

Position the ring gear over the differential case.



Step 53

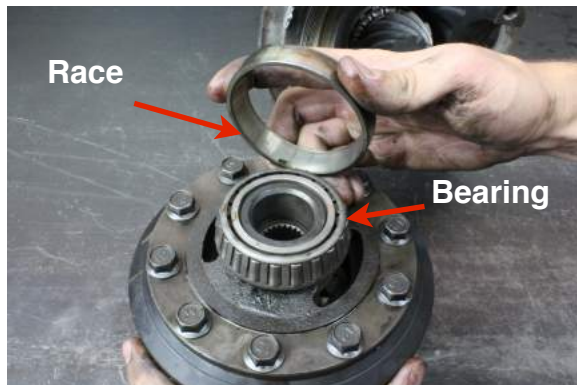
Turn the case over, hold the ring gear in place, apply Red Loctite® to the threads and install the bolts.



Step 54

Torque the ring gear bolts 58 to 66 ft. lbs.





Step 55

Place the (2) side bearing races on the side bearings.

Note: Be sure the left race goes on the left bearing and the right race goes on the right bearing.



Step 56

Place the differential case in the carrier as shown.



Step 57

Install the left side bearing cap and bolts. Then tighten the bolts 7.5 to 14 ft. lbs. Be sure that this is the LEFT side bearing cap.

Note: We are only snugging these bolts at this point. We will do the final torque later.



Step 58

Install the RIGHT side bearing cap and bolts and tighten 7.5 to 14 ft. lbs.

Note: Notice the mark indicating it is the right side bearing cap.





Step 59

Install both left and right bearing adjusters.

Note: Again, be sure the adjusters are placed on the correct sides.

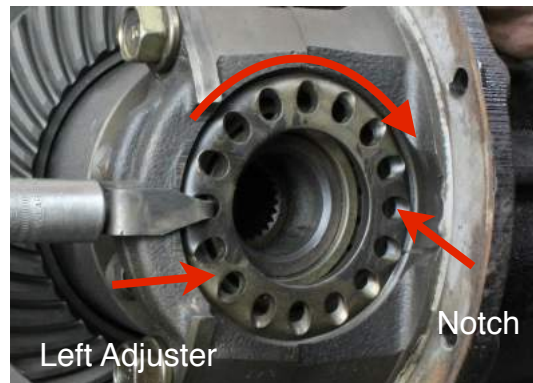


Step 60

Snug the bearing adjusters such that the case and ring gear turns easily but does not move side to side.

Note: There is no spec for this but we estimate 15 to 20 ft. lbs. of torque on the adjuster.

Backlash Adjustment Procedure



Step 61

Check backlash with a dial indicator as shown. (Click [HERE](#) to see Backlash video) Backlash should be set to what it was before disassembly in **Step 15**. If you need to increase backlash, turn the right adjuster counter-clockwise and the left adjuster clockwise an equal amount. To decrease backlash, turn the left adjuster counter-clockwise and the right adjuster clockwise and equal amount.

Note: One adjuster notch changes the backlash about .002 in.



Preload Adjustment Procedure



Step 62

Check bearing preload as shown. (Click [HERE](#) to see Preload video) The preload should be what it was before disassembly. If preload is what it was at the beginning, the preload adjustment is complete. You may skip to **Step 65**. If preload is not correct continue to the next step.



Step 64

Recheck preload. If preload is within specification, recheck backlash to insure it is still within specification. If backlash is NOT within specification you will need to repeat the backlash procedure, as well as repeat the preload procedure, until both are as close as possible to the original settings.



Step 63

To increase preload, turn the right adjuster clockwise and turn the left adjuster an equal amount clockwise.

To decrease preload, turn the right adjuster counter-clockwise and turn the left adjuster an equal amount counter-clockwise.



Step 65

Install the the bearing lock plates and tighten bolts 7 to 10 ft. lbs.

Note: It may be necessary to rotate the adjuster slightly to align the holes in the adjuster with the pin in the lock plate.



Step 66

Finish tightening the (4) bearing cap bolts 51 to 72 ft. lbs.

Installing the Differential (3rd Member)



Step 67

Clean any of the old gasket or gasket sealer from the front axle housing.



Step 68

Clean the inside of the axle housing using a cloth.

Note: Some have found it helpful to remove the drain plug, place a pan underneath and flush the housing with brake cleaner.





Step 69

Clean the gasket surface of oil and debris using brake cleaner.



Step 70

Apply a thin layer (about 1/16" thick) of silicone gasket sealer to the gasket surface of the axle housing.

Note: We recommend using Permatex® Ultra Gray Gasket Maker. Click [HERE](#) to see what is available through Low Range Off-Road.



Tech Tip

Do not put any gasket sealer inside the bolt holes.



Step 71

While the gasket sealer is still wet, install the differential carrier in the axle housing.





Step 72

Install and snug all the differential carrier bolts. Then torque them, in a criss-cross patten, 13.5 to 20 ft. lbs.



Step 73

Install and tighten the drain plug if not done previously. 13.5 to 18 ft. lbs.



Step 74

Position the front drive shaft in place. Be sure to align the marks made during disassembly.



Step 75

Install and tighten the (4) bolts, nuts and lock washer. Torque 17 to 21.5 ft. lbs.



Installing the Axle Seal



Step 76

Wipe the knuckle ball area clean.



Step 77

Using a seal puller, remove the inner axle seal.



Step 78

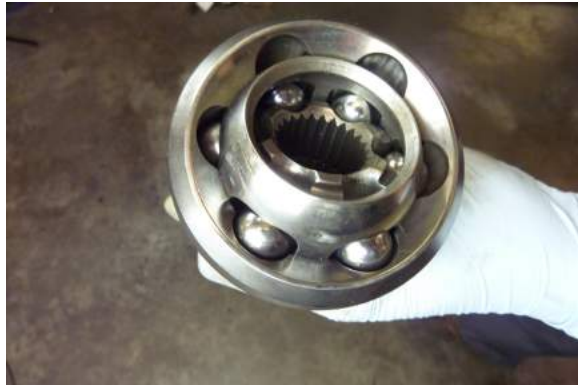
Position the new seal with the garter spring facing away from you.



Step 79

Position the seal in the axle and drive it into place using a socket that is a little smaller than the seal.

Installing the Axle Shaft



Step 80

Prepare the birfield joint for installation by filling it with wheel bearing grease.

Step 80 Continued

Fill the supplied plastic bag with about 8 oz. of wheel bearing grease.



Step 80 Continued

Press the bag flat eliminating as much air as possible and forcing the grease to the corner of the bag.

Step 80 Continued

Roll the top of the bag, placing the grease under a slight pressure.





Step 80 Continued

Cut off the corner closest to the grease as shown.



Step 80 Continued

Place the cut corner inside the birfield. Simultaneously press down and squeeze the bag until grease escapes from around the steel balls. The grease should escape from the areas indicated by the arrows.



Step 80 Continued

Birfield full of grease.



Step 81

Select the shorter of the two axles if you are installing the passenger side axle. Place the "snap ring" end of the axle in the birfield joint as shown.



Step 82

While holding the axle in one hand and the birfield joint in the other, pound them against a block of wood until the axle snaps into place.



Step 83

After the axle snaps into place, give it a solid tug to insure it is locked inside the birfield.



Step 84

Apply a small amount of grease to the axle seal to protect it when installing the axle shaft.



Step 85

Install the axle in the axle housing until it stops. It will stop when it hits the differential. To install the inner end of the axle, you will need to push down on the birfield end of the axle, which will lift up on the differential end of the axle, aligning it with the differential side gear. You may also need to rotate the axle slightly, while pushing it in, to align the splines.

Note: Be patient. This may take a few tries.





Step 85 Continued

This shows the axle properly installed



Step 86

Repeat **Steps 76 through 85** on the driver side axle.



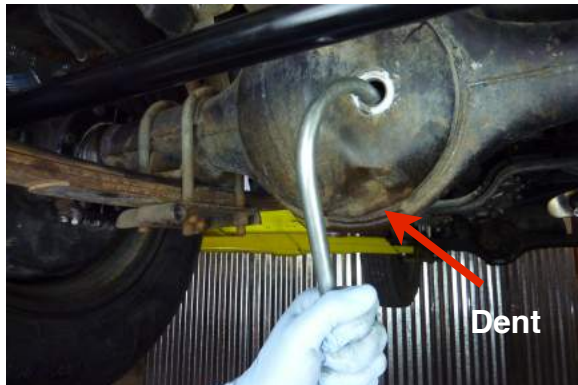
Step 87

Insure the differential drain plug is installed and tight. Torque spec is 13.5 to 18 ft. lbs.



Step 88

Remove the fill plug using a 17 mm box end wrench.



Step 89

Add SAE 80W90 Gear Oil until it runs out of the fill hole.

Note: Notice the large dent in the axle housing. To avoid this problem we recommend installing some protection. Click [HERE](#) to see what is available through Low Range Off-Road.



Step 90

Install the fill plug, torque it 25.5 to 36 ft. lbs. and wipe the axle housing clean.

Step 91

It is now time to refer you back to the Knuckle Rebuild instructions Beginning at **Step 46**.





As always, If you experience any difficulty during the installation of this product please contact Low Range Off-Road Technical Support at 801-805-6644 M-F 8am-5pm MST. Thank you for purchasing from Low Range Off-Road.



These instructions are designed as a general installation guide. Installation of many Low Range Off-Road products require specialized skills such as metal fabrication, welding and mechanical trouble shooting. If you have any questions or are unsure about how to proceed, please contact our shop at 801-805-6644 or seek help from a competent fabricator. Using fabrication tools such as welders, torches and grinders can cause serious bodily harm and death. Please operate equipment carefully and observe proper safety procedures.

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