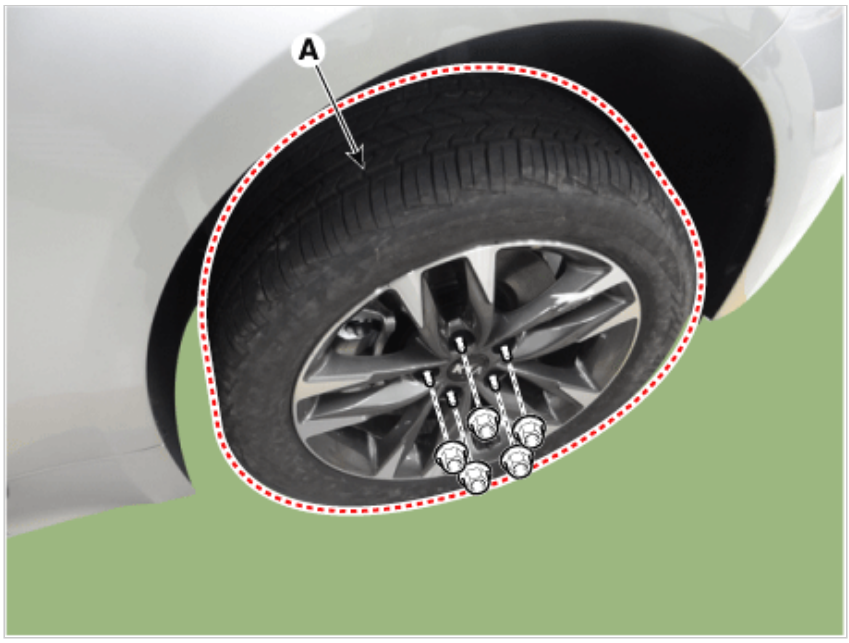
Removal

NOTICE

Must inject LSD exclusive oil when the rear differential oil of LSD specification is replaced.

1. Remove wheel nuts, wheel and tire (A) from hub.

   Tightening torque:
   107.9 - 127.5 N·m (11.0 - 13.0 kgf·m, 79.6 - 94.0 lb·ft)



NOTICE

Be careful not to damage the wheel nuts when removing the wheel and tire (A).

2. Remove the propeller shaft.
   (Refer to Driveshaft and axle - "Propeller shaft")
3. Remove the rear driveshaft.
   (Refer to Driveshaft and axle - "Rear drive shaft")
4. Remove the rear muffler.
   G 2.0 T-GDI THETA II (Refer to Engine Mechanical System - "Muffler")
   G 3.3 T-GDI LAMBDA II (Refer to Engine Mechanical System - "Muffler")
5. Loosen the bolts and then remove the rear differential carrier.

   Tightening torque :
   49.0 - 63.7 N·m (5.0 - 6.5 kgf·m, 36.2.0 - 47.0 lb·ft)

6. Install in the reverse order of removal.

Disassembly

NOTICE

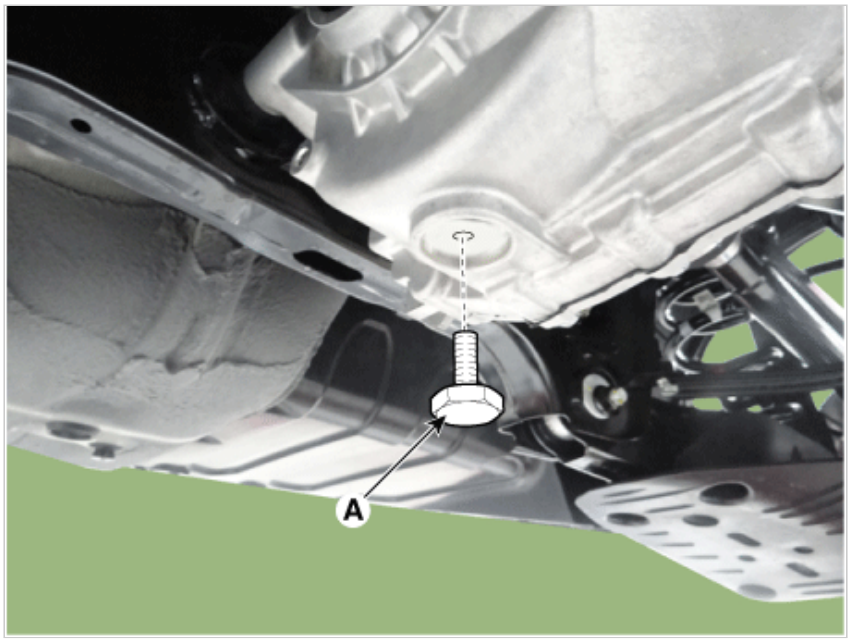
Must inject LSD exclusive oil when the rear differential oil of LSD specification is replaced.

Rear differential carrier

1. Drain oil by removing the drain plug (A).

Tightening torque :

49.0 - 68.6 N·m (5.0 - 7.0 kgf·m, 36.1 - 50.1 lb·ft)



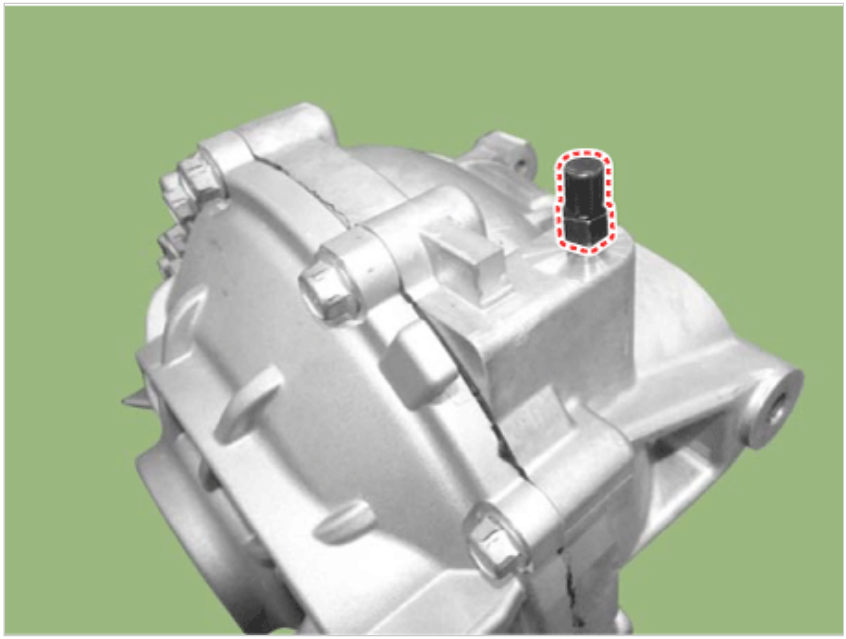
NOTICE

Do not reuse the drain plug bolt and washer when installing.

2. Remove the air breather plug.

Tightening torque :

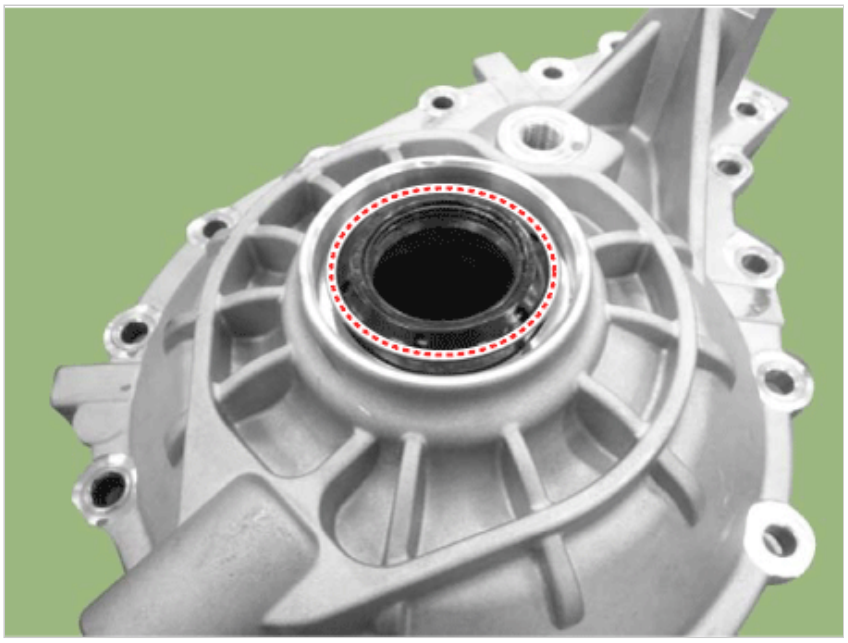
9.8 - 19.6 N·m (1.0 - 2.0 kgf·m, 7.2 - 14.5 lb·ft)



NOTICE

Do not reuse the air breather when installing.

3. Using (-) driver, remove the differential case oil seal. (LH,RH)



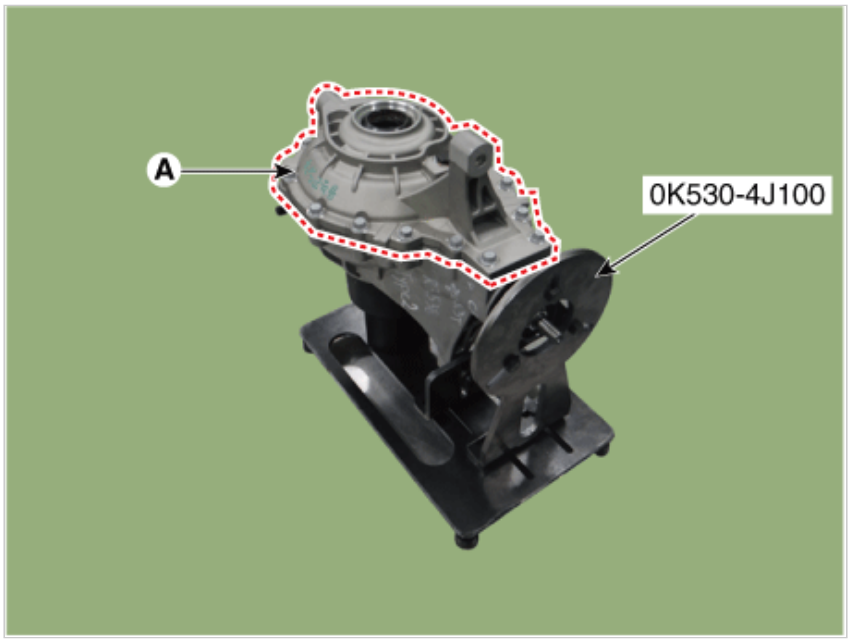
NOTICE

Use a new oil seal when reinstalling the rear differential carrier.

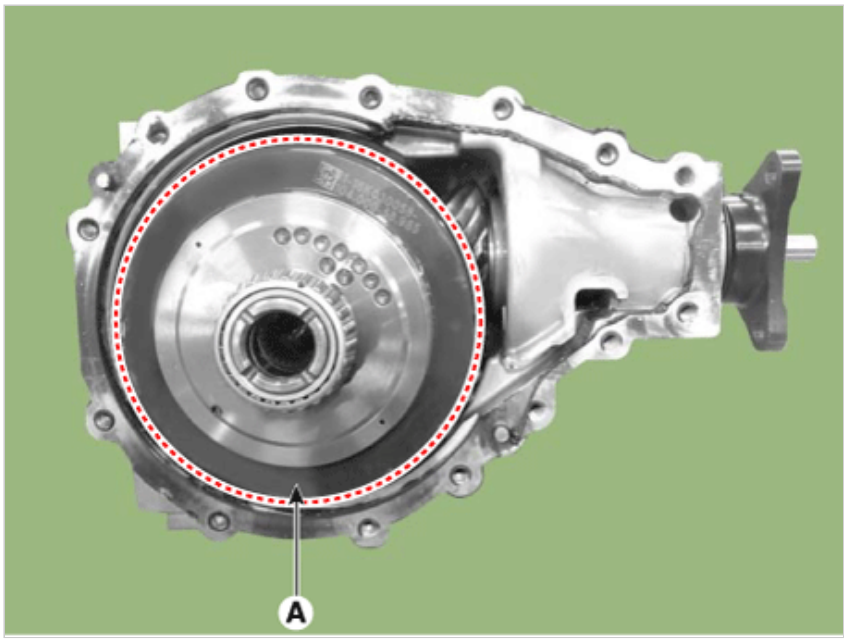
4. Using SST (0K530-4J100), loosen the differential side cover bolt and then remove the differential side cover (A).

Tightening torque :

39.2 - 49.0 N·m (4.0 - 5.0 kgf·m, 28.9 - 36.1 lb·ft)

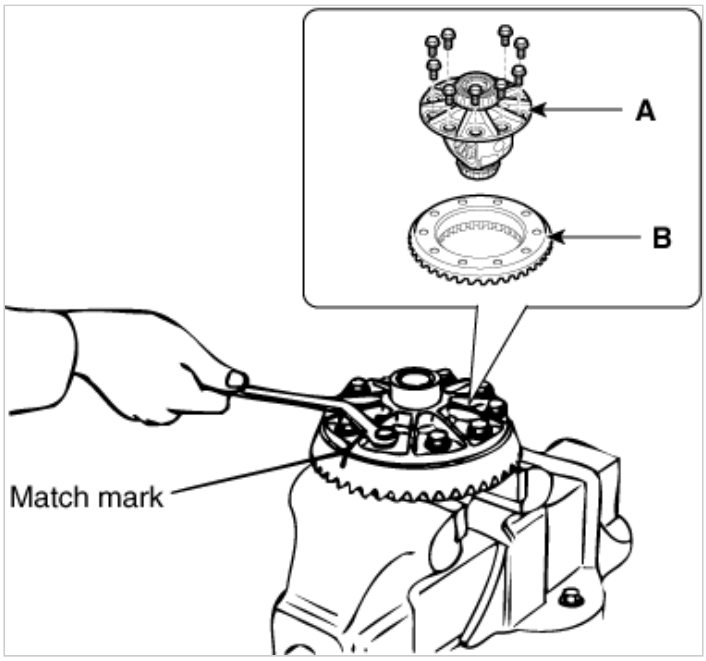


5. Remove the differential case assembly (A).

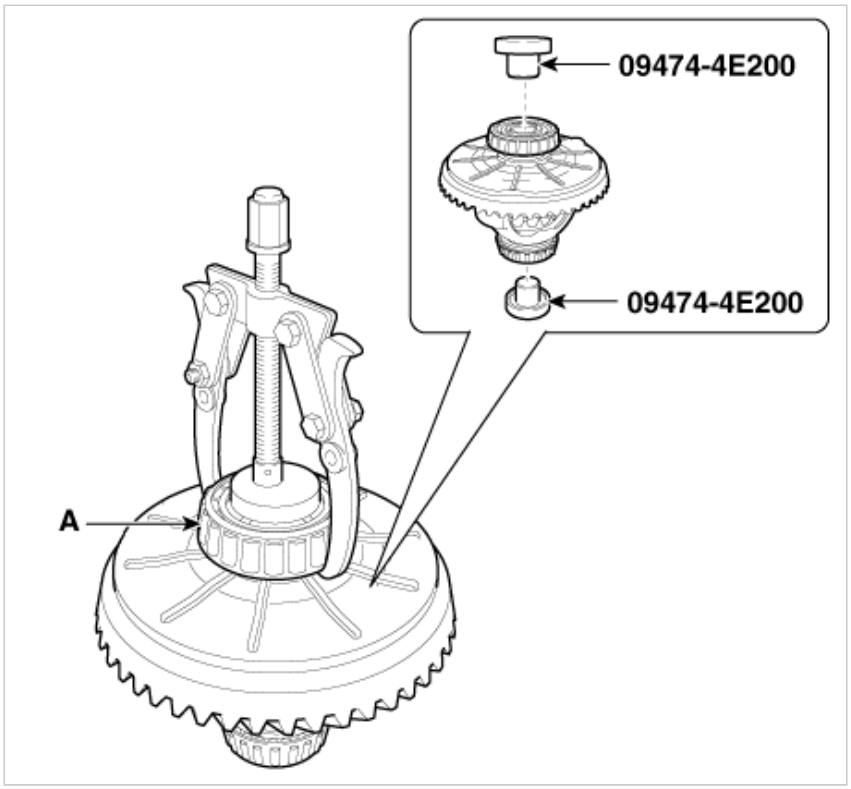


Gear carrier assembly

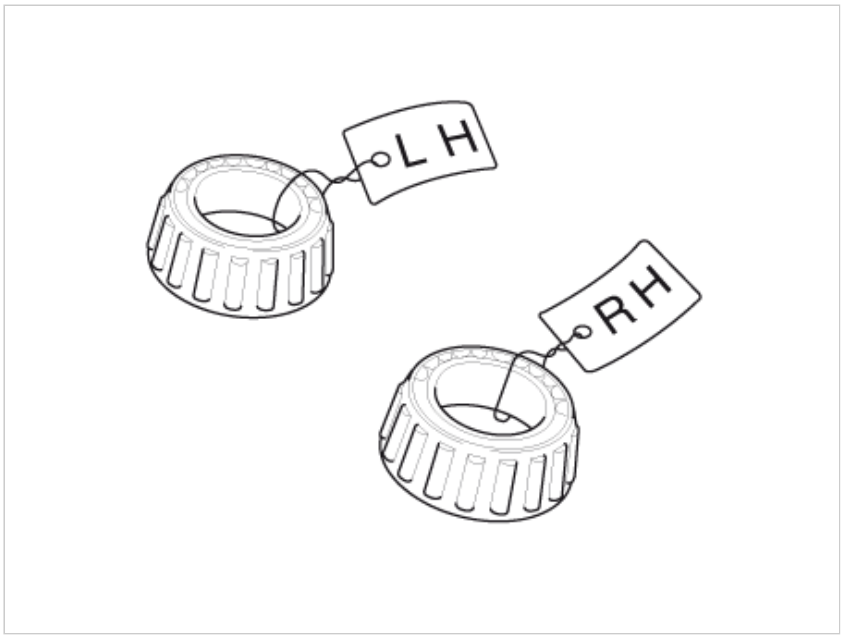
1. Loosen the seal bolts and then remove the LSD (A) and ring gear (B).**[LSD]**



2. Using the SST (09474-4E200), remove the gear carrier bearing (A).

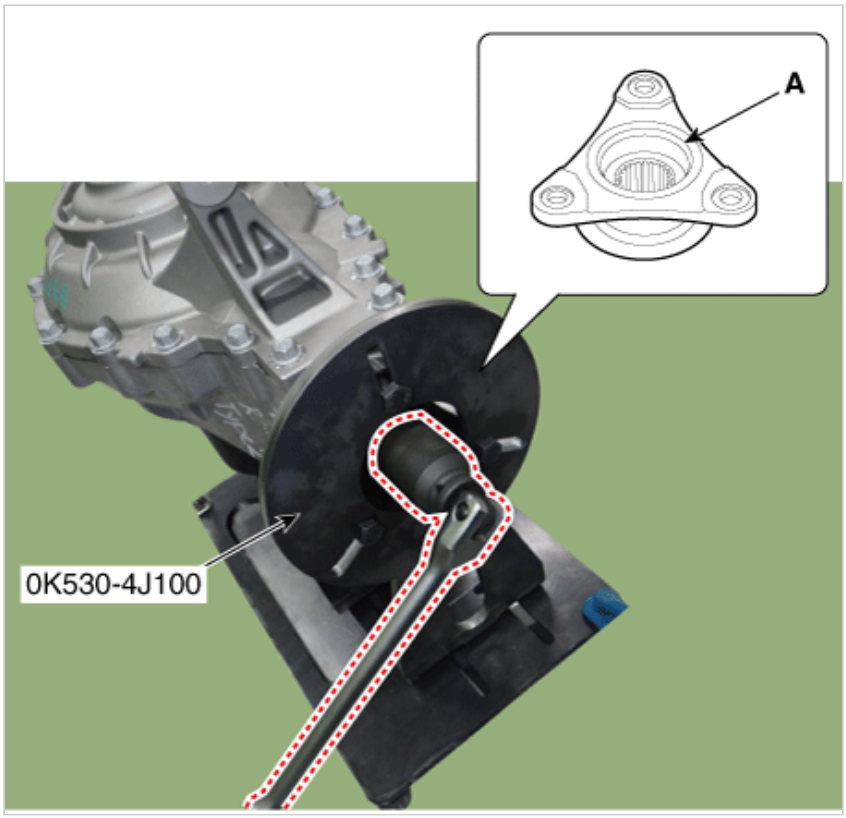


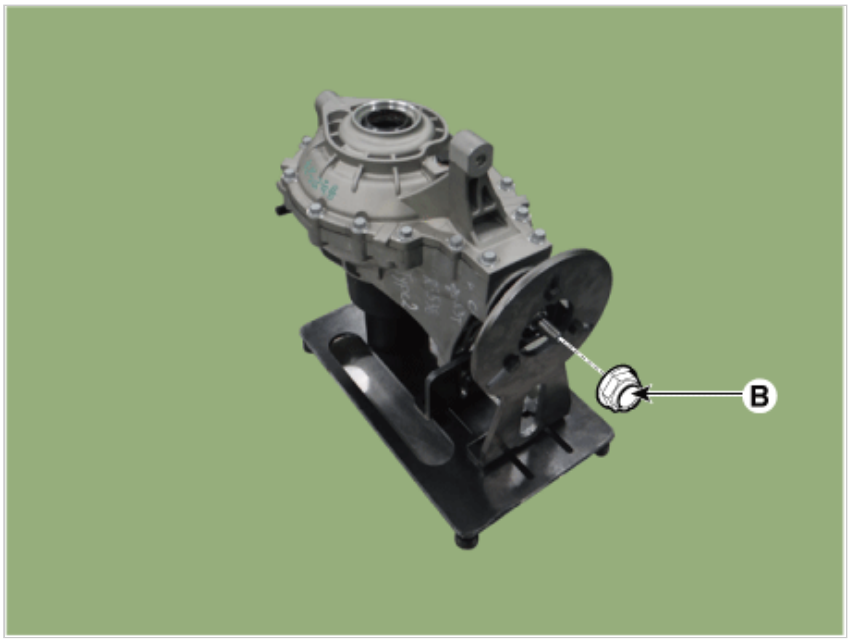
3. Remove the bearings and then attach "Left" or "Right" tags to each bearing.



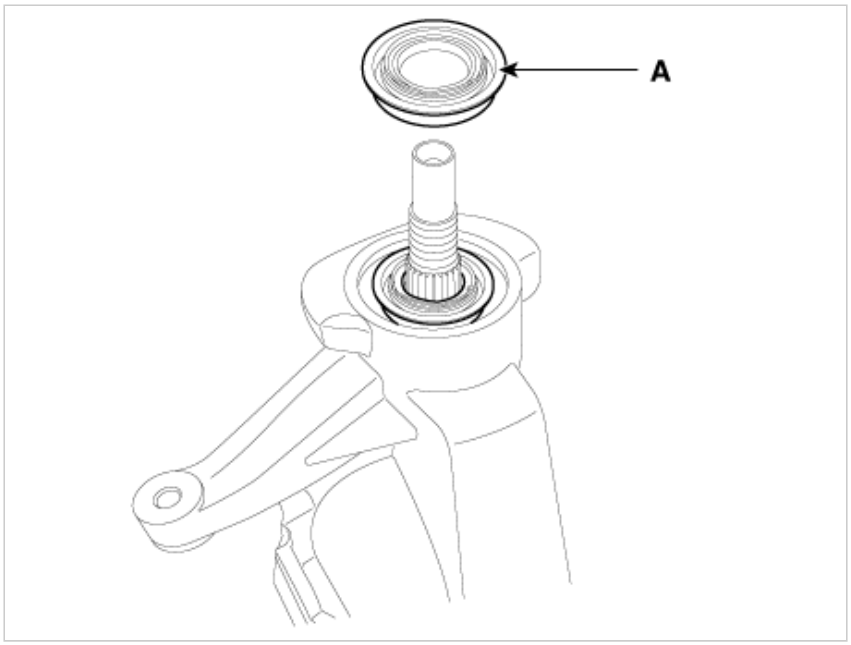
Pinion assembly

1. Remove the companion flange (A).
   (1) Using the SST (0K530-4J100), place the rear differential carrier.
   (2) Loosen the lock nut (B) and remove the companion flange (A).

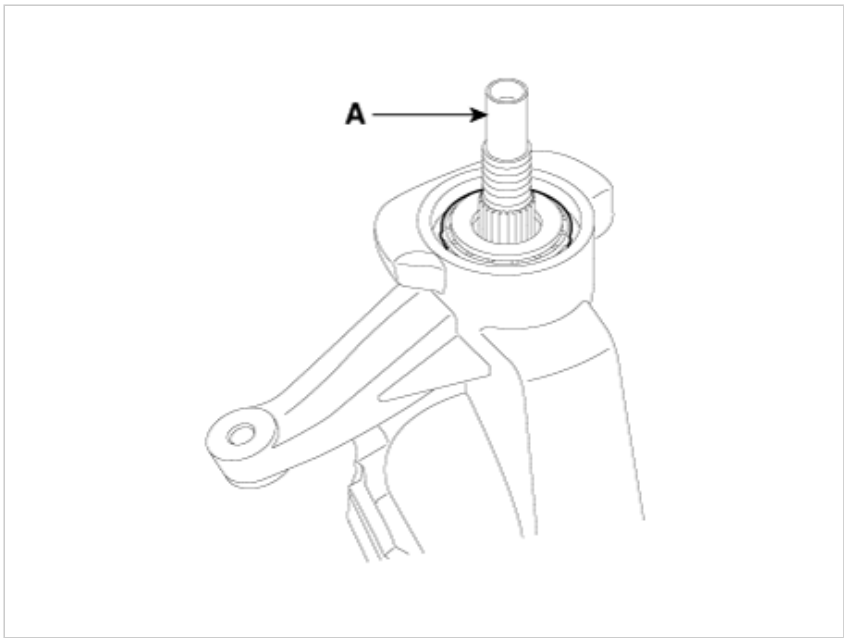




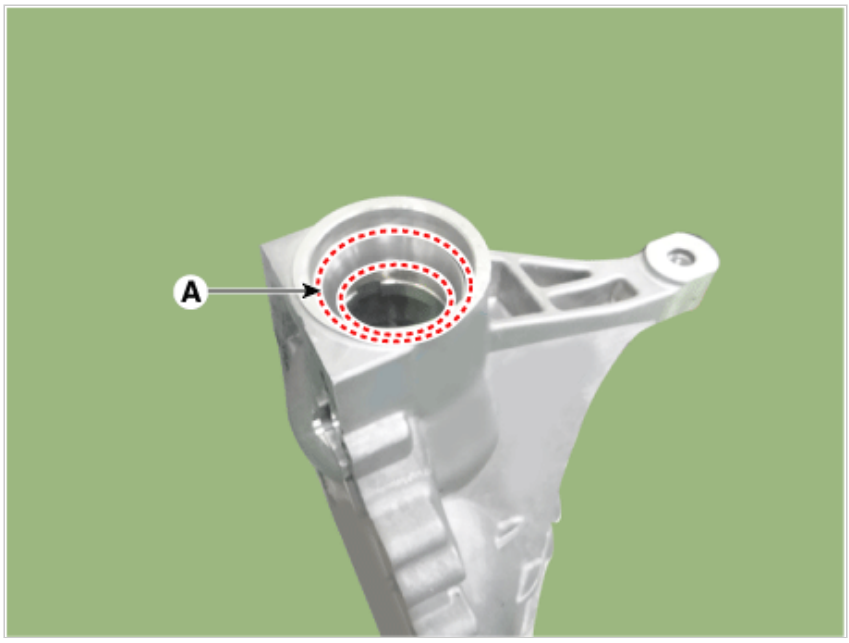
2. Using the driver, remove the pinion oil seal (A).

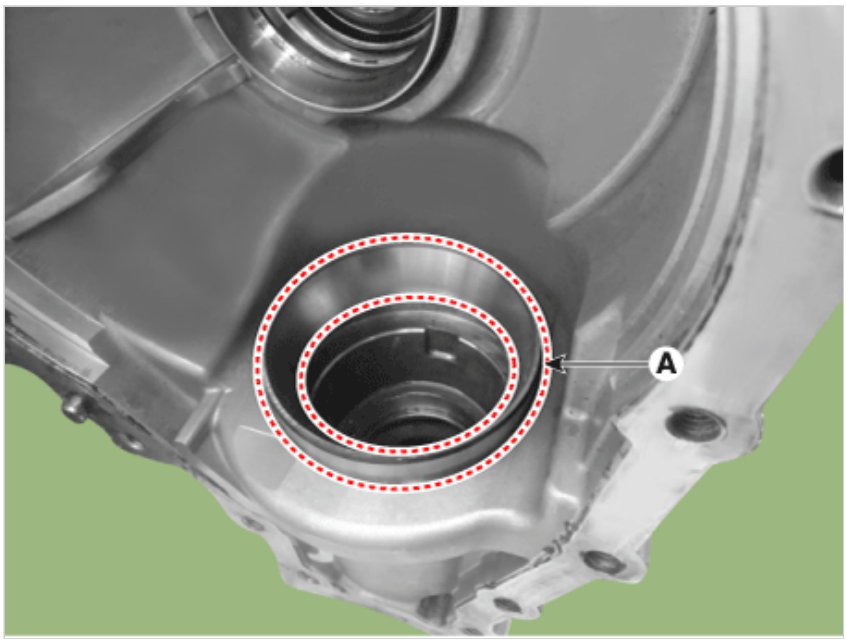


3. Using the press, remove the pinion drive gear (A).

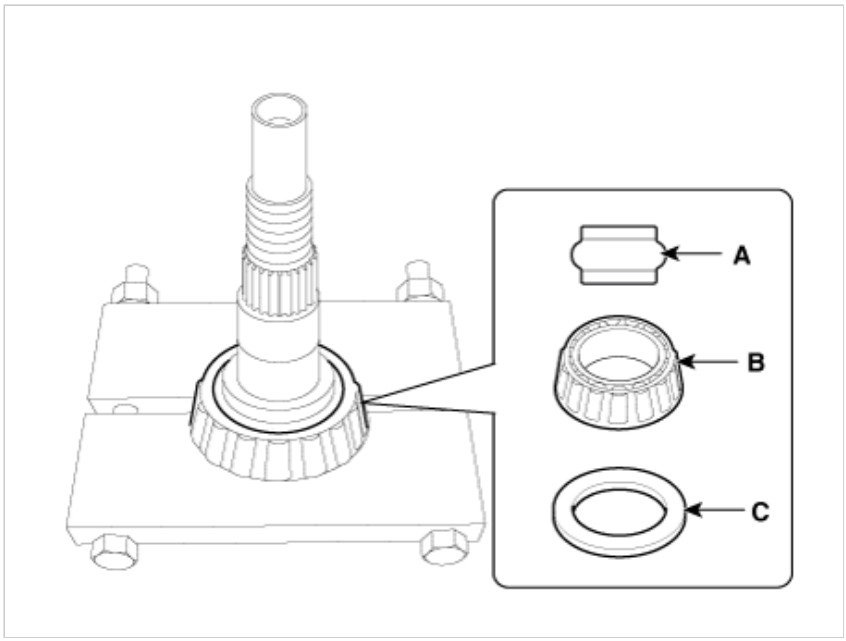


4. Using the chisel and hammer, remove the pinion bearing outer race (A).





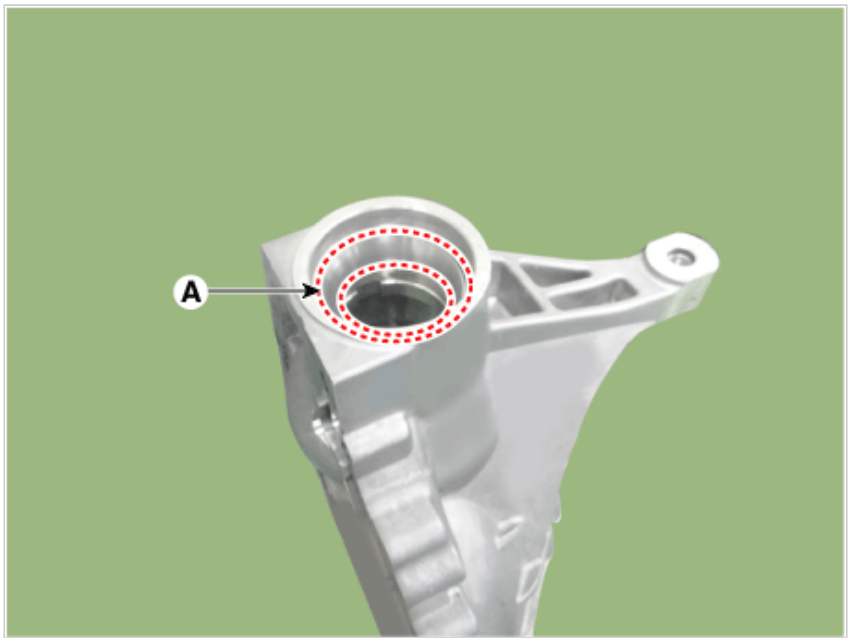
5. Using the press, remove the pinion rear bearing (A), the pinion gear adjustment shim (B) and the inner bearing adjustment shim (C) from the pinion drive gear in order.

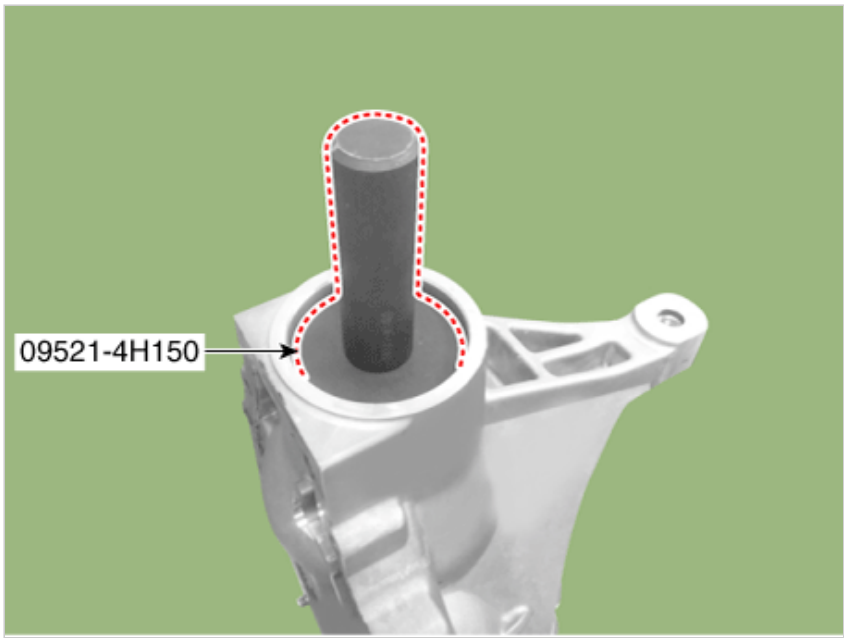


Reassembly

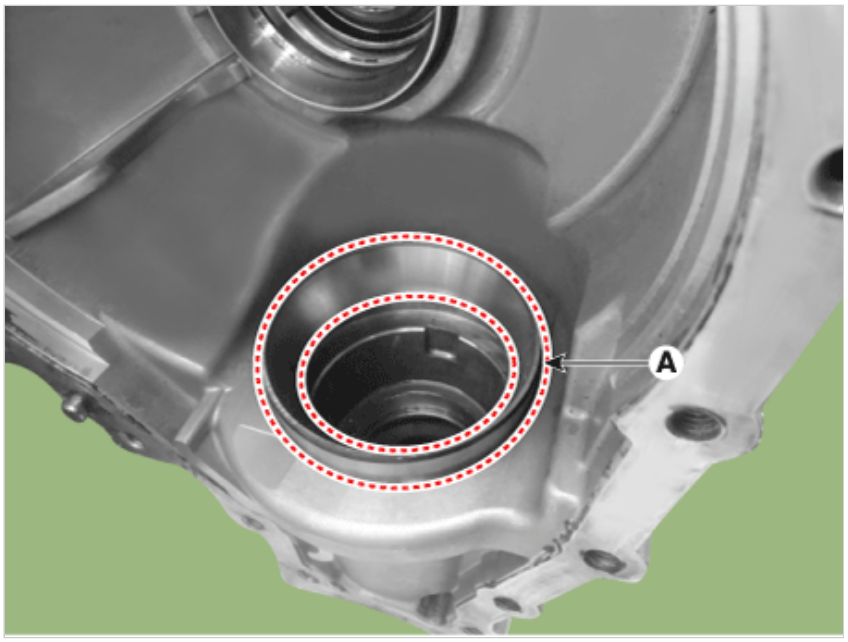
Rear differential carrier

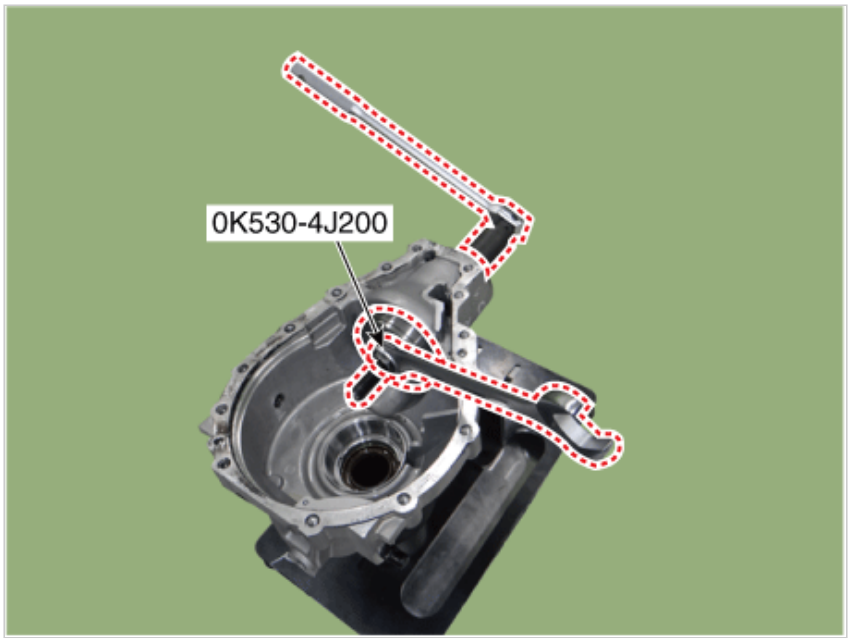
1. Using the SST (09521-4H150), install the front pinion bearing outer race (A).



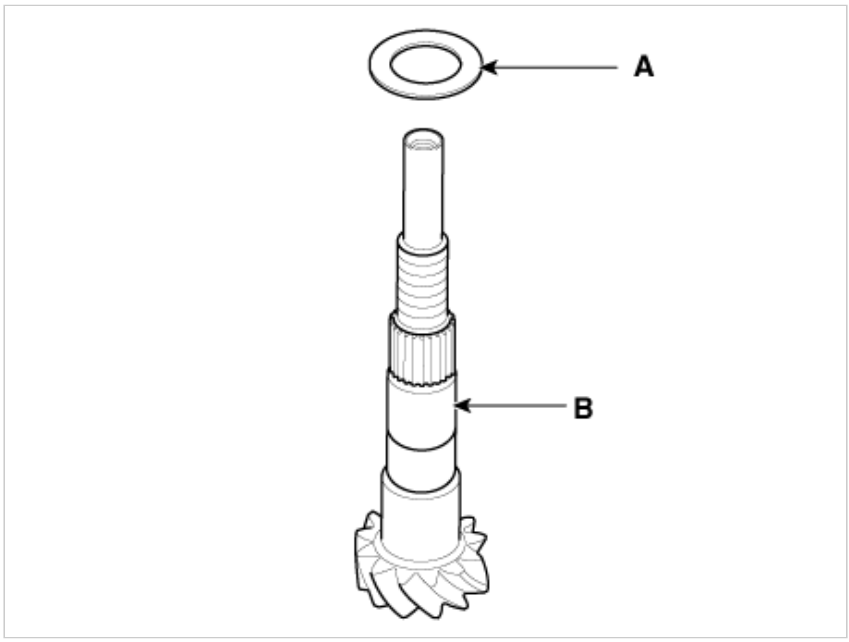


2. Using the SST (0K530-4J200), install the rear pinion bearing outer race (A).





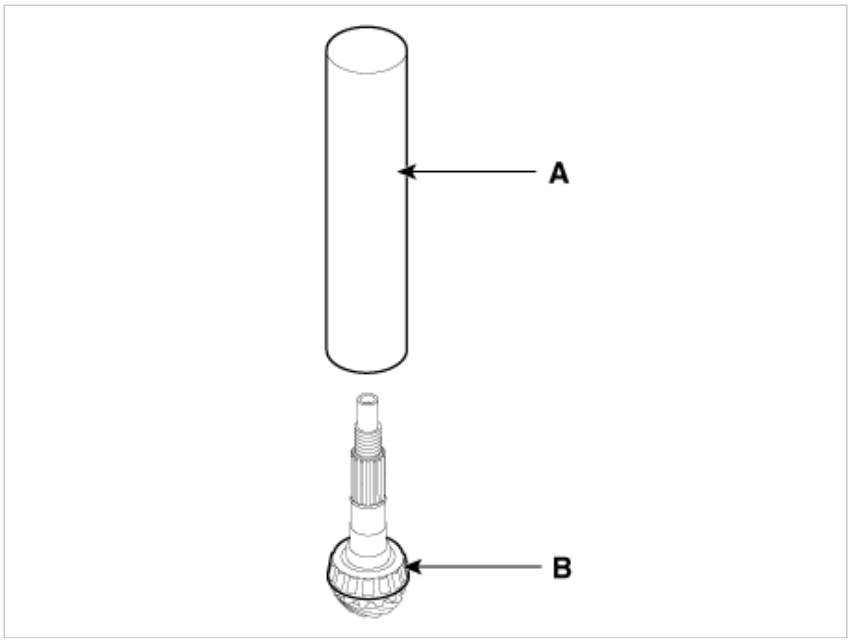
3. Install the pinion gear adjustment shim (A) to the pinion drive gear (B).



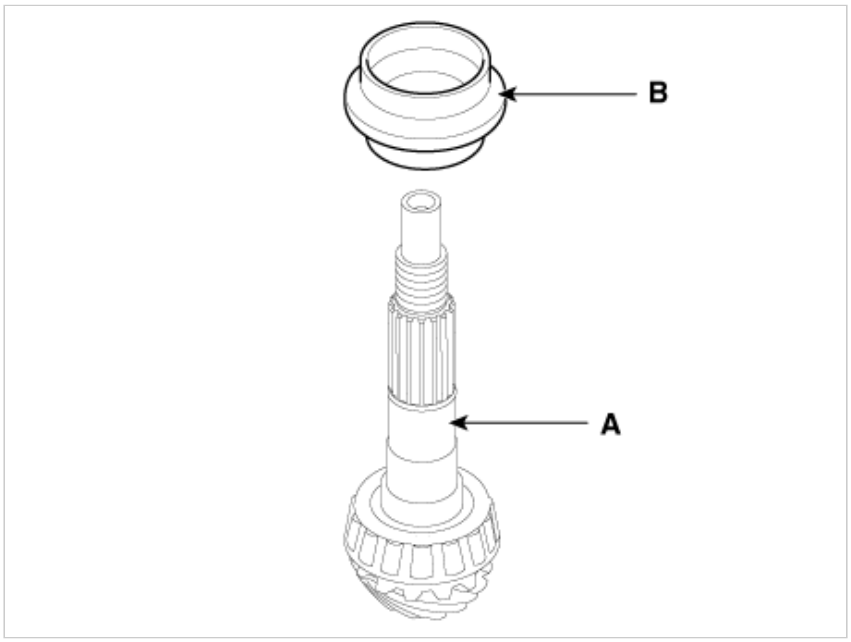
NOTICE

- The already adopted seam for controlling the pinion gear adjustment shim on the front differential assembly is used. (Use the same thickness controlling seam in case of destruction)
- The rear differential assembly shall be replaced with new one when the differential carrier or differential case assembly is failed.The noise or vibration can be made due to the no matching of current pinion gear adjustment shim and gear control seam when the carrier or differential case assembly is exchanged as a unit.

4. Using the round pipe (A), press in the pinion rear bearing (B).



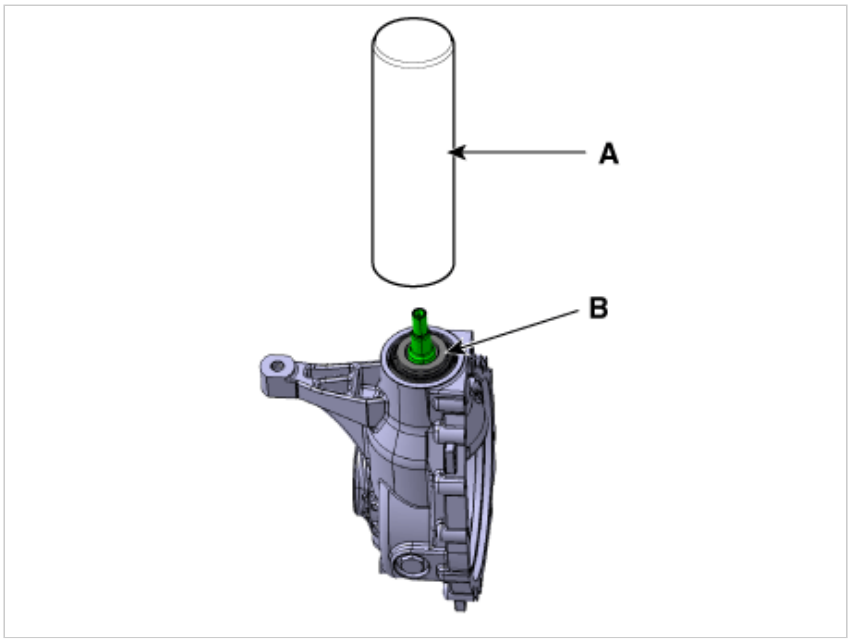
5. Install the Inner bearing adjustment shim (A) to the pinion drive gear (B).



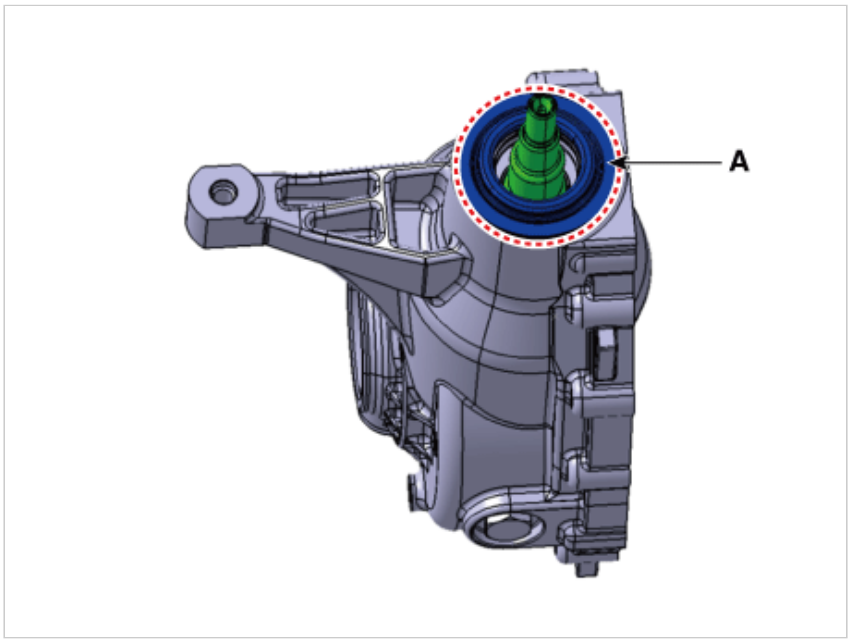
NOTICE

Do not reuse the space. Be sure to install a new one.

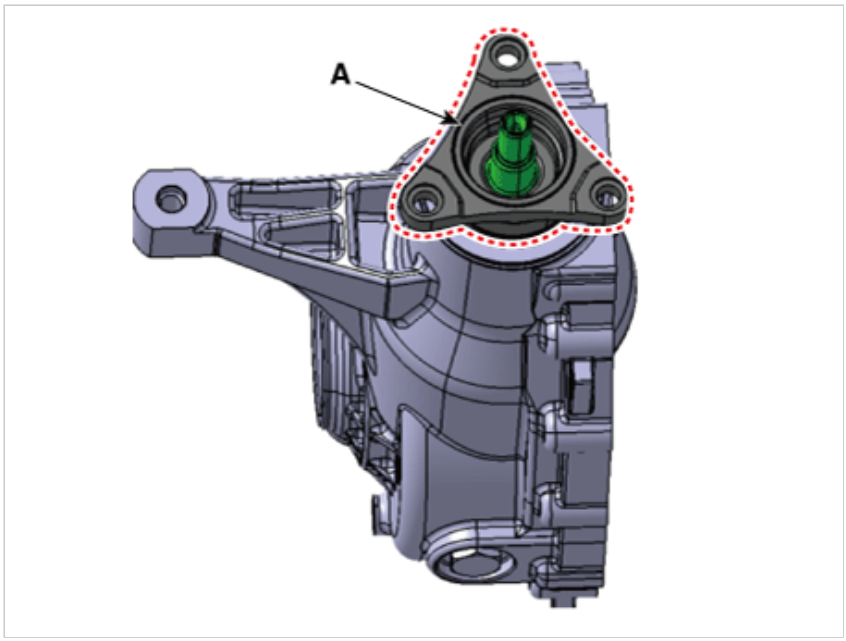
6. Using the round pipe (A), install the front bearing (B).



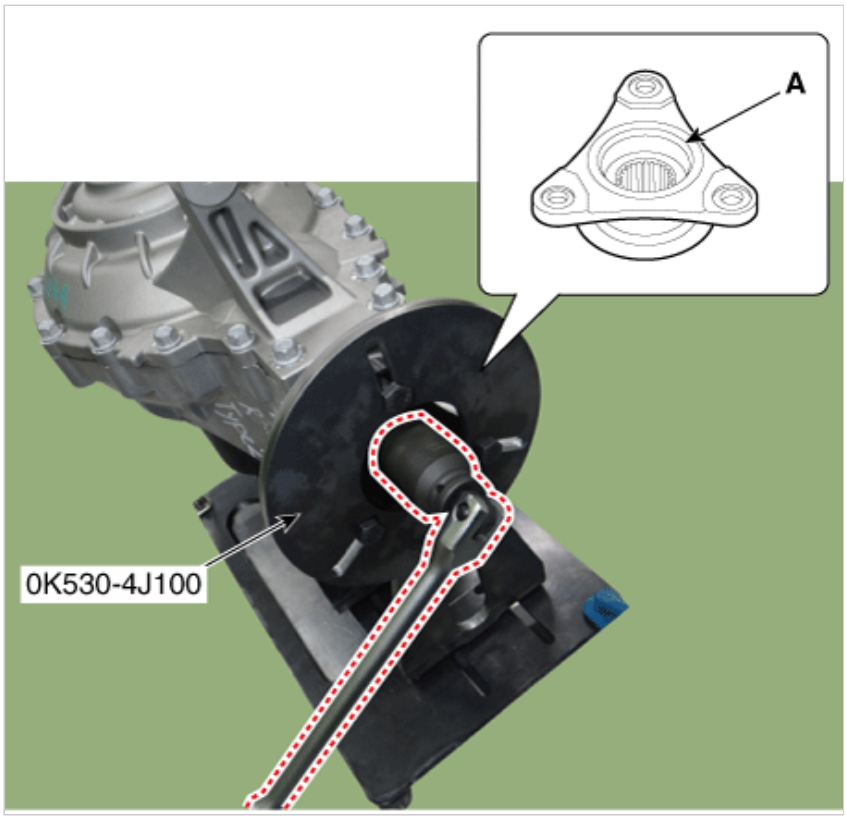
7. Using the SST (09530-3T600), install the pinion oil seal (A).

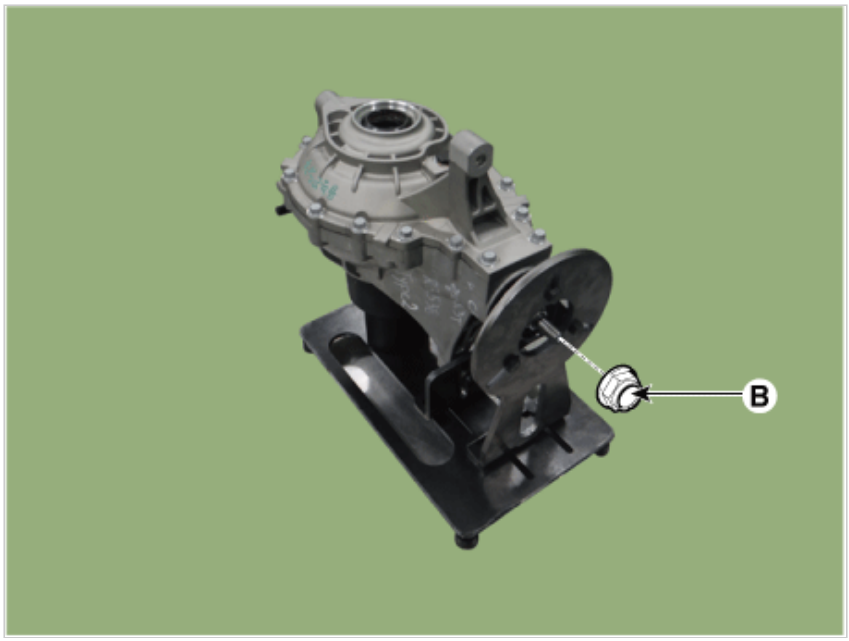


8. Using the round pipe and press, install the companion flange (A).

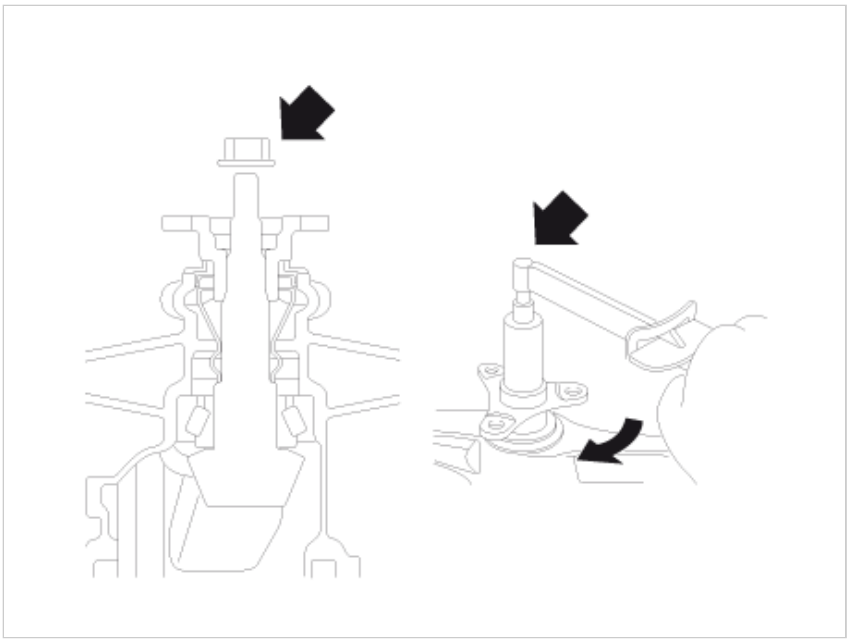


9. Using the SST (0K530-4J100), fix the companion flange (A) and then install the nut (B).





10. Install the pinion lock nut.



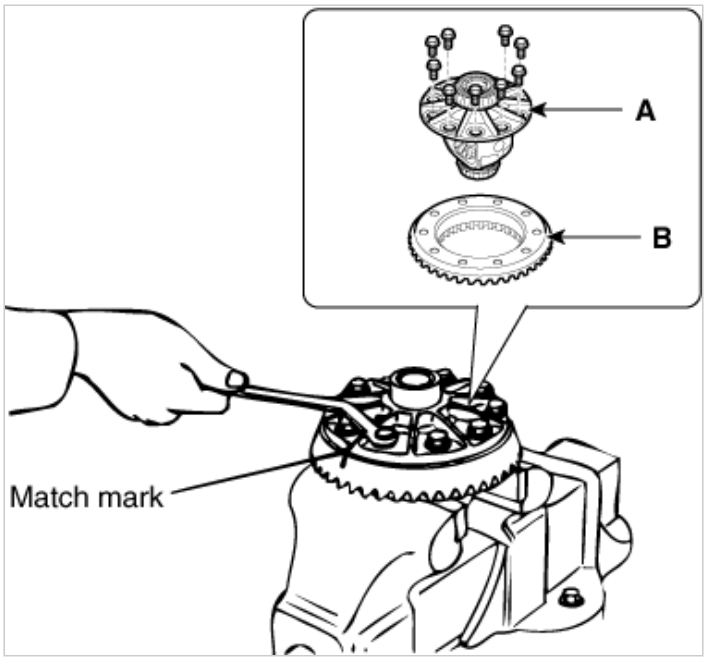
NOTICE

- The preload must be 11.5 - 16.5 kgf.cm and the SST lock nut must be tightened with the torque.
- Preload measurements maintain the constant speed rotation (60rpm).

Gear carrier assembly

1. Tighten the seal bolts and then install the LSD (A) and ring gear (B).**[LSD]**

Tightening torque :
137.3 - 156.9 N·m (14.0 - 16.0 kgf·m, 101.3 - 115.7 lb·ft)



NOTICE

Tighten the seal bolts in the diagonal sequence.

2. Install the differential case assembly side bearing by using the press and SST (09530-3C200, 0K530-4J300).

2.0 T-GDI THETA II :0K530-4J300
LAMBDA II 3.3 T-GDI :09530-3C200

Click to see large image...

3. Install the oil guide spacer (A).**[LSD]**
4. Install the differential side bearing spacer (B).
[Differential Case]

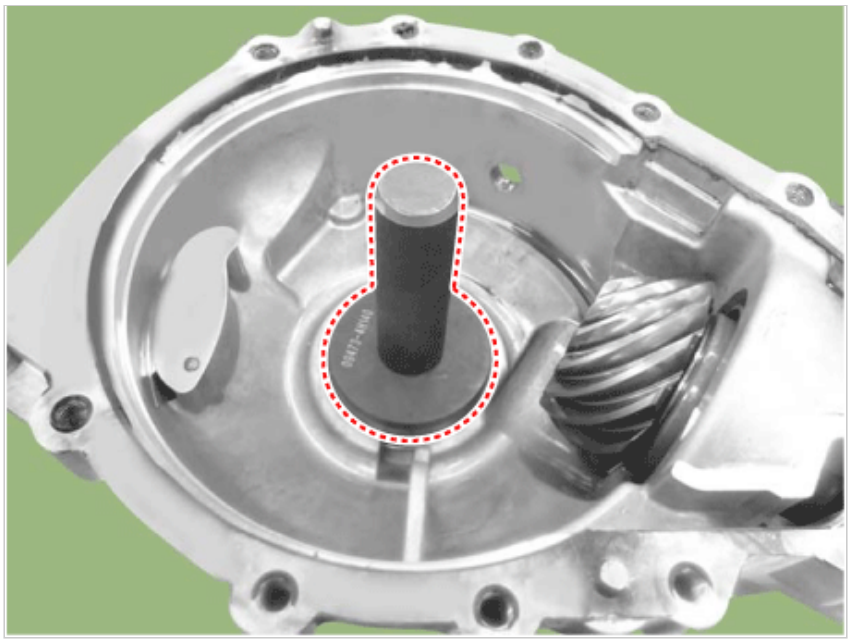
Click to see large image...

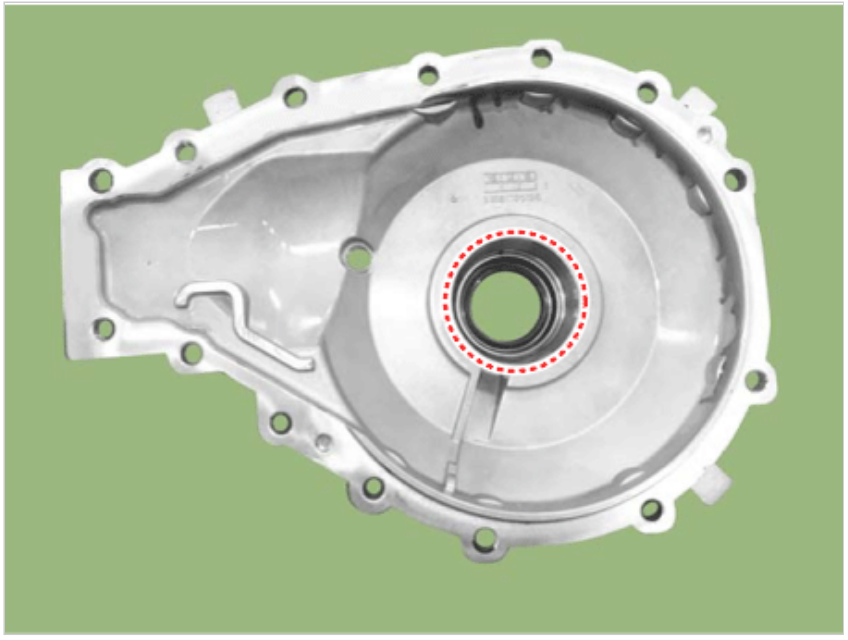
[Differential Case Side Cover]

Click to see large image...

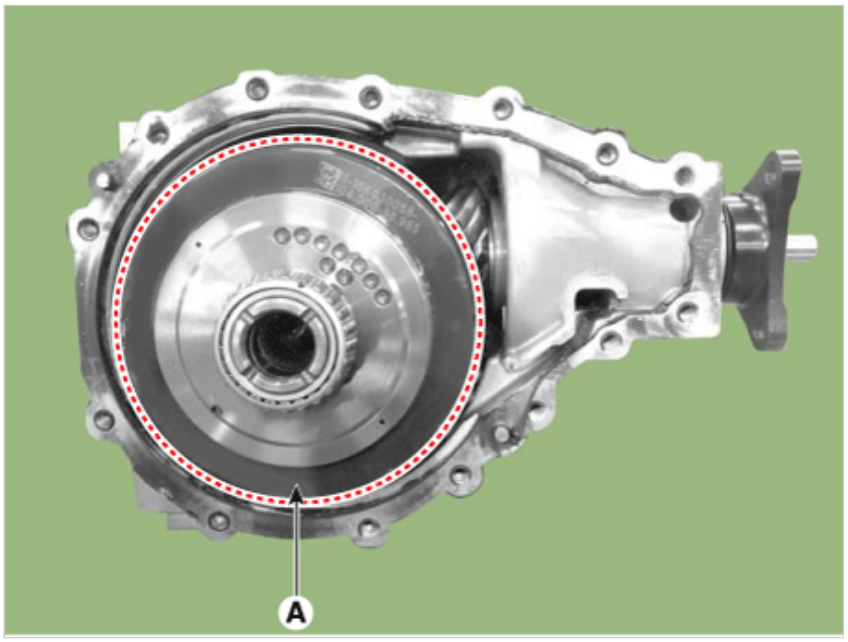
5. Using the SST (09432-33700, 09453-3B500), install the race to the differential case.

2.0 T-GDI THETA II :09432-33700
LAMBDA II 3.3 T-GDI :09453-3B500





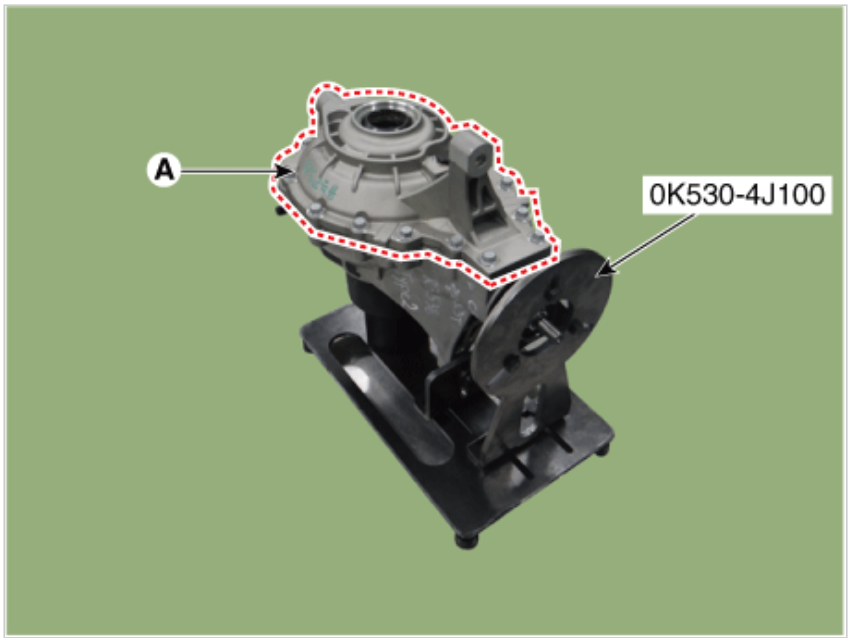
6. Install the gear carrier assembly (A).



7. Using the SST (0K530-4J100), install the differential side cover (A).

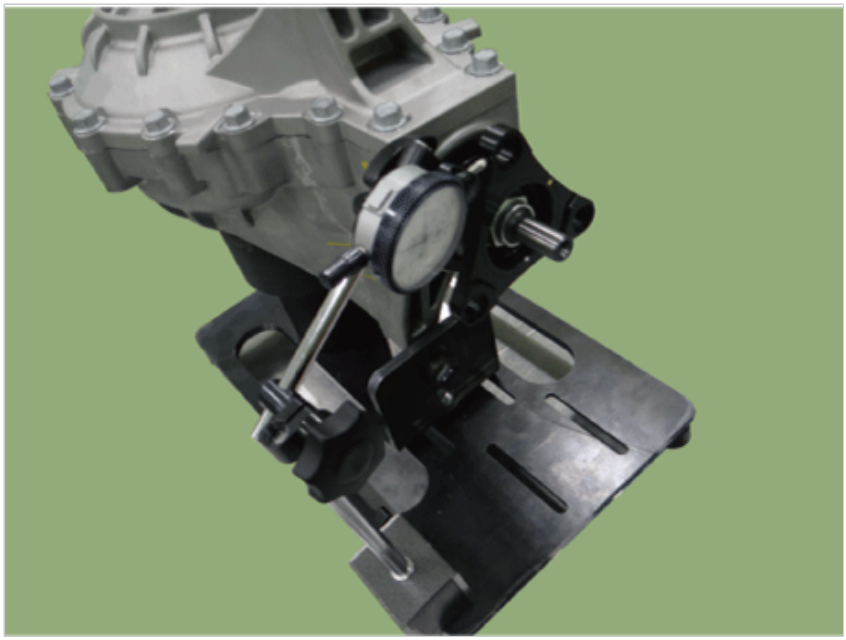
Tightening torque :
39.2 - 58.8 N·m (4.0 - 6.0 kgf·m, 28.9 - 43.3 lb·ft)

NOTICE
Assemble with sealant is not applied to measure gear backlash and total preload.



8. Measure the back rash from the companion flange.

Backlash : Below 0.6°



NOTICE

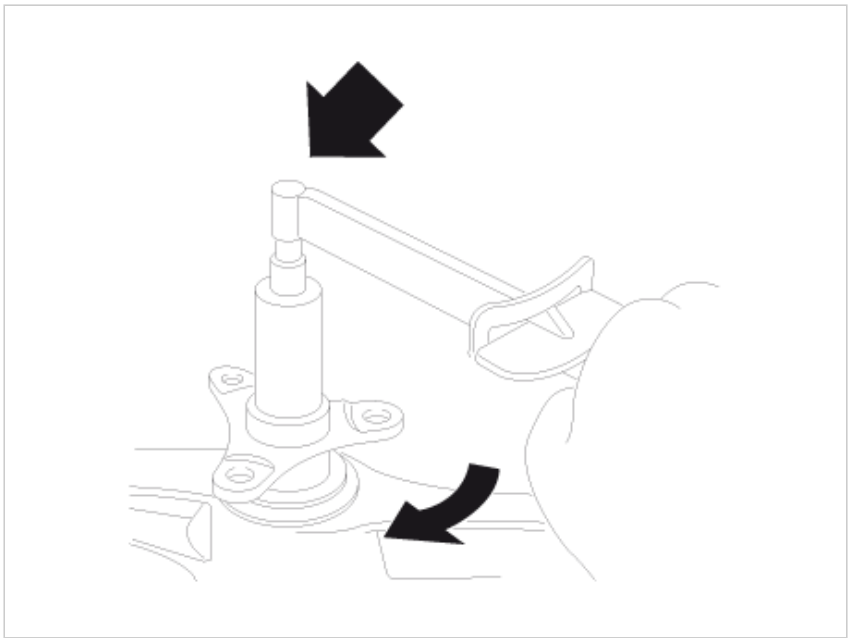
- Measure the backlash by applying the torque of 30kgf.cm to the companion flange in both directions.
- The thickness of both spacers shall be adjusted by disassembling again when the backlash is bigger or smaller than the tolerance.
- Increase the spacer thickness on the cover side by one unit and reduce the spacer thickness on the carrier side by one unit when backlash is bigger than the tolerance.
- Increase the spacer thickness on the carrier side by one unit and reduce the spacer thickness on the cover side by one unit when backlash is smaller than the tolerance.
- The adjusting unit of the spacer is 0.02mm.

9. Measure the total preload.

Total preload

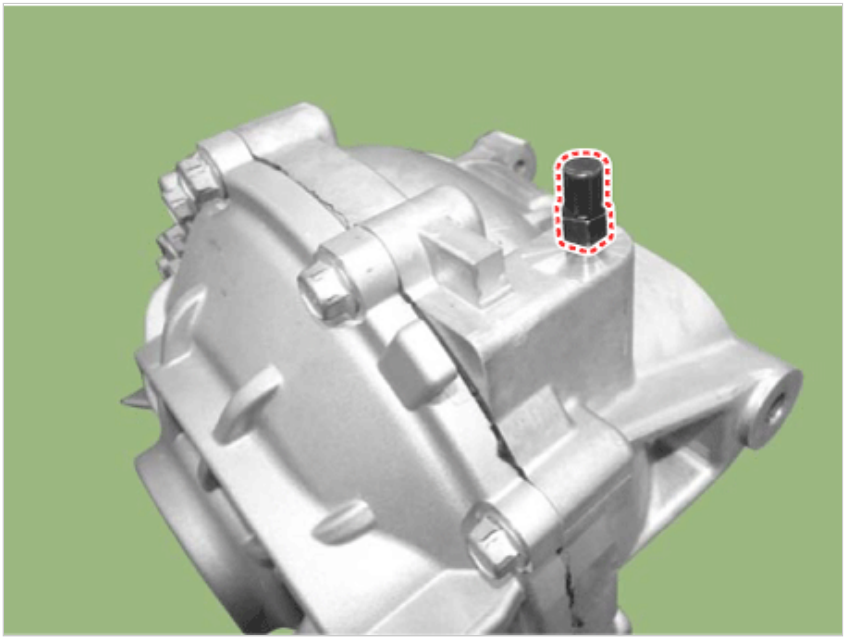
2.0 T-GDI THETA II : Pinion bearing preload +11.5 - 35.0 kgf.cm / Reduction gear ratio

LAMBDA II 3.3 T-GDI : Pinion bearing preload +15.5 - 40.0 kgf.cm / Reduction gear ratio



10. Install the air breather plug.

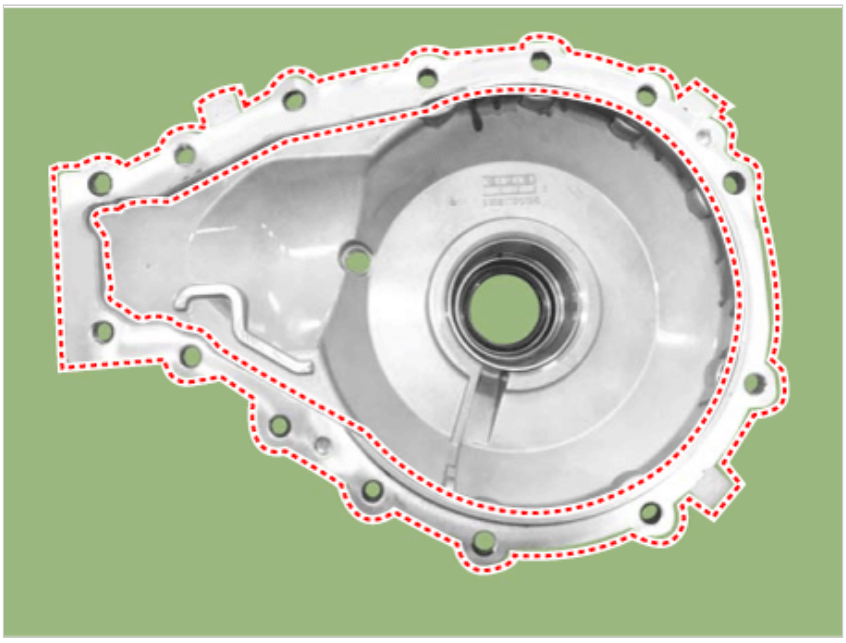
Tightening torque :
9.8 - 19.6 N·m (1.0 - 2.0 kgf·m, 7.2 - 14.5 lb·ft)



NOTICE
Do not reuse the air breather when installing.

11. Apply the sealant on the rear cover surface.

Sealant :LT5060

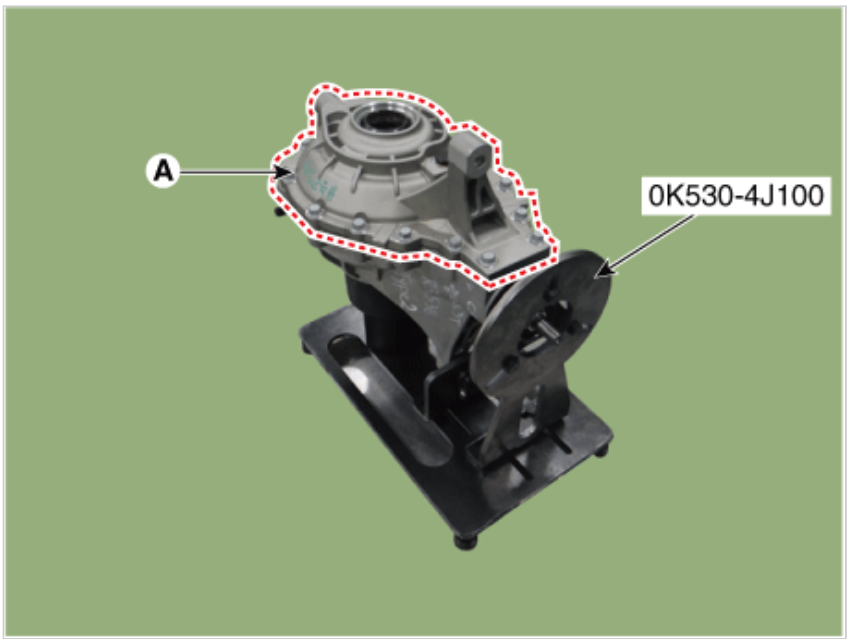


NOTICE

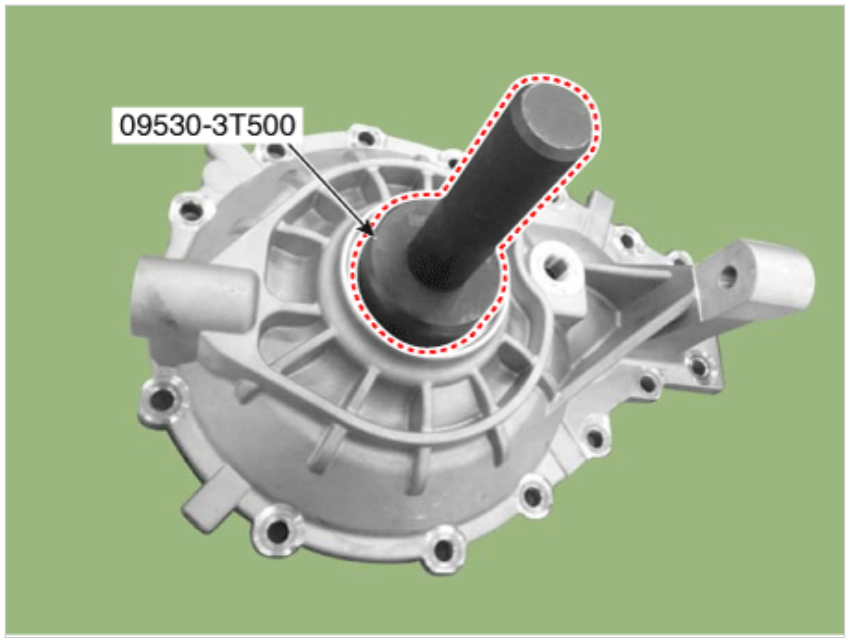
- Remove the remaining sealant before coating.
- Apply along the rear cover surface to the 2-3 mm of thickness evenly .

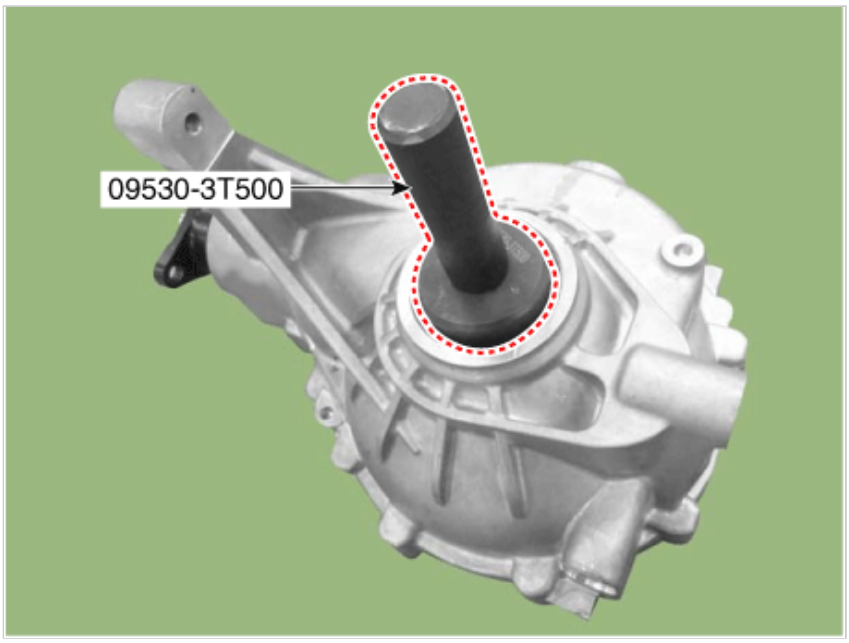
12. Using the SST (0K530-4J100), install the differential side cover (A).

Tightening torque :
39.2 - 49.0 N·m (4.0 - 5.0 kgf·m, 28.9 - 36.1 lb·ft)

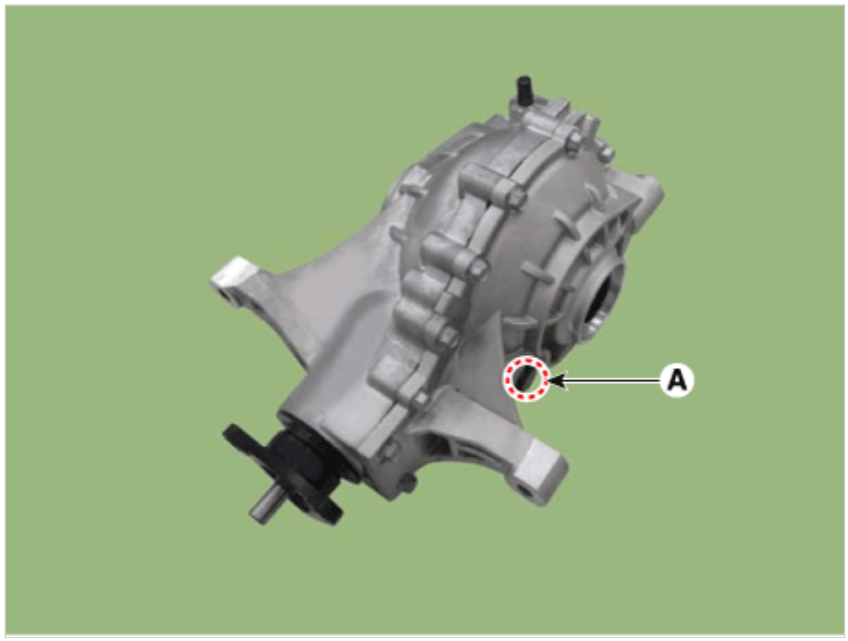


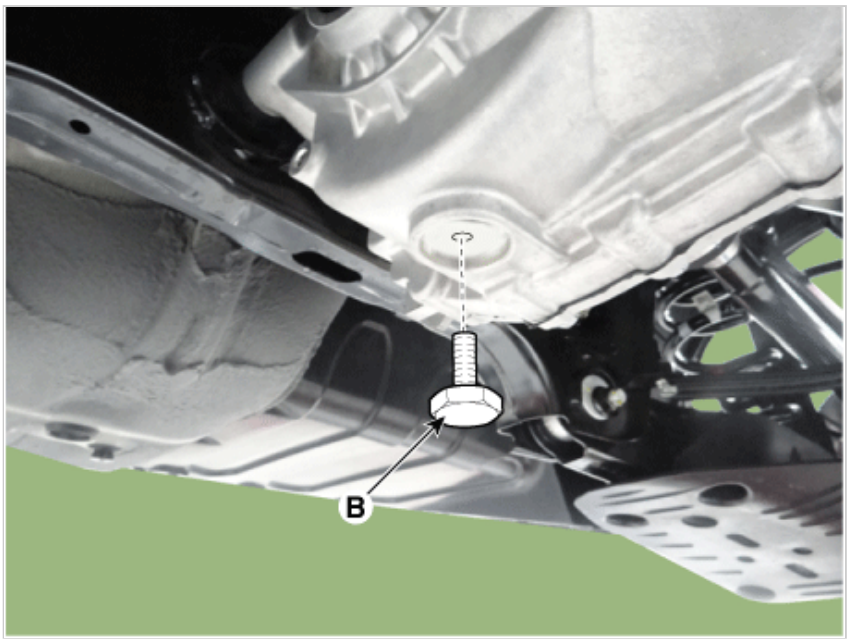
13. Using the SST (09530-3T500), install the LH,RH side oil seal.





14. Install the filer plug (A) and drain plug (B).





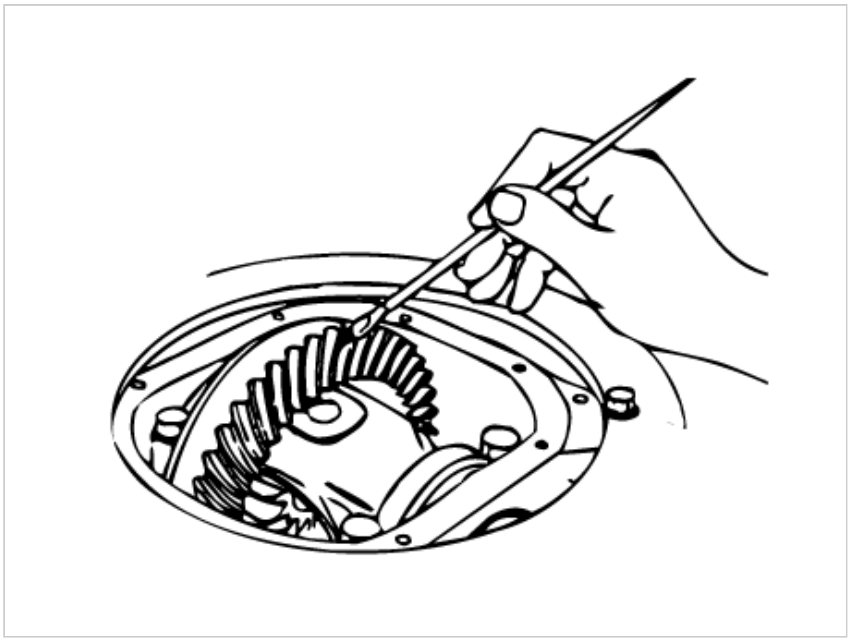
Inspection

1. After clearing, check for damage parts or abrasion. Follow the below method, if any are noticed.

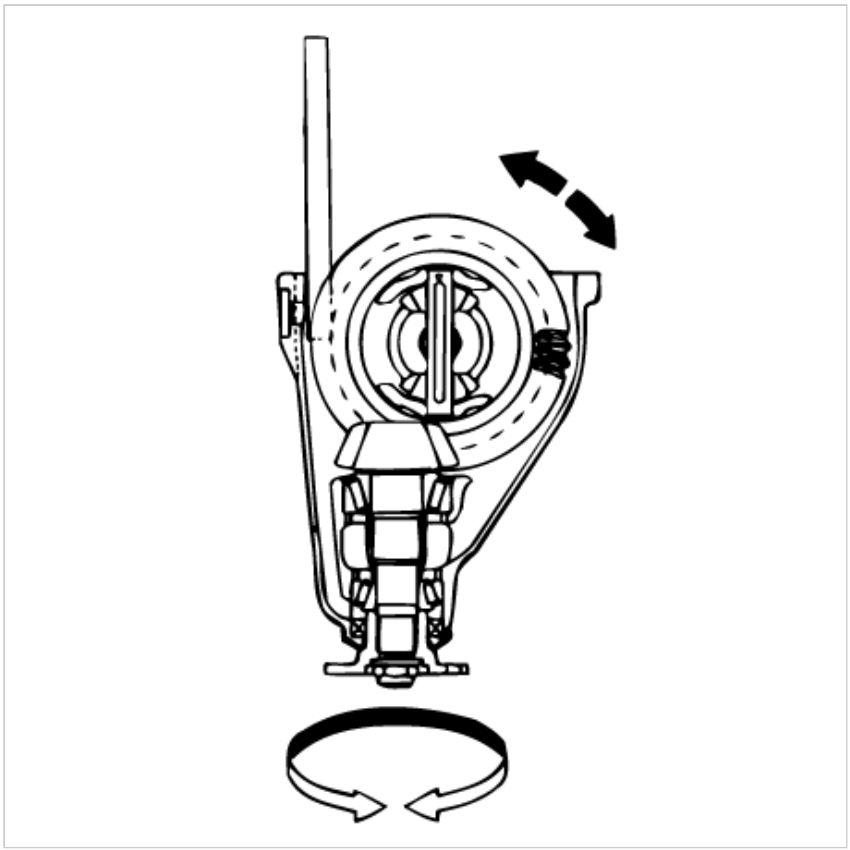
Item		Identify
Gear set (drive pinion gear & drive gear)		The gear set must be replaced with a new one if the gear tooth is damaged (crack/pits/dents). (It needs to be replaced pinion gear and drive gear at the same time for pairing gear set)
Bearing		The bearing must be replaced with a new one if the bearing roller or race is damaged (crack/pits/dents).
Oil seal		The oil seal must be replaced with a new one if disassembled.
Differential carrier		The carrier must be replaced with a new one if the inside of the carrier bearing is damaged (crack/pits/dents) or a crack is found inside/outside.
Companion flange		The pinion oil seal must be replaced with a new one if the contact surface is damaged (crack/pits/dents).
LSD type	Limited slip differential assembly	The limited slip differential assembly must be replaced with a new one if a crack is found outside.

2. Check the drive gear contact.

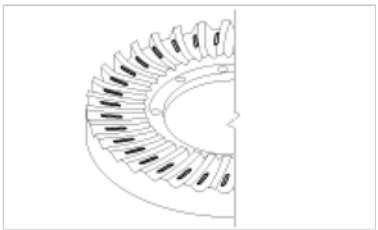
(1) Paint the ring gear teeth with a thin coating of marking compound uniformly.

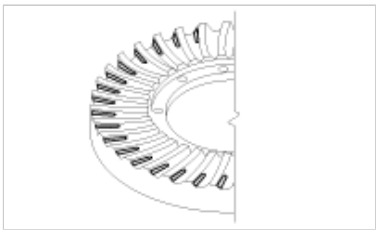
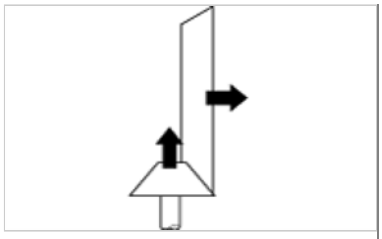
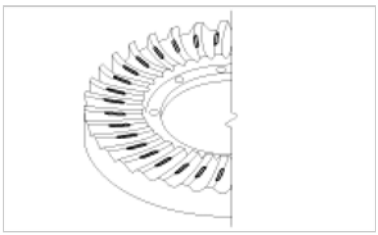
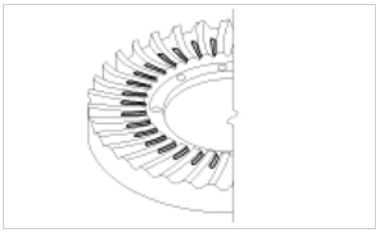
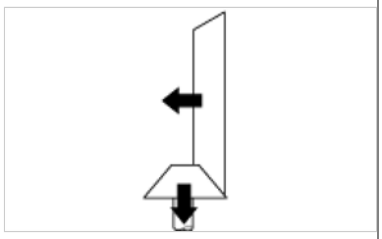
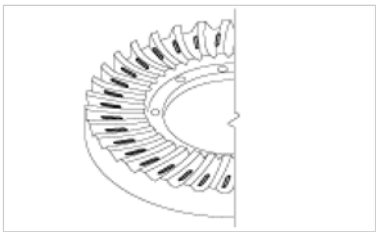


(2) Put the ring gear into the pinion drive gear while making each painted marks aligned, and repeatedly turn the ring gear or flange clockwise and counterclockwise to check if the gear teeth are engaged properly.



(3) Check the ring gear tooth contact pattern.

Tooth contact	Contact state	Solution	
Standard contact			

1. Wheel contact		Increase the thickness of the pinion height adjusting shim, and position the drive pinion closer to the center of the drive gear. Also, for backlash adjustment, reposition the drive gear farther from the drive pinion.	
2. Face contact			
3. Toe contact		Decrease the thickness of the pinion height adjusting shim, and position the drive pinion farther from the center of the drive gear. Also, for backlash adjustment, reposition the drive gear closer to the drive pinion.	
4. Flank contact			

NOTICE

1) Tooth contact pattern is a method for judging the result of the adjustment of drive pinion height and final drive gear backlash. The adjustment of drive pinion height and final drive gear backlash should be repeated until the tooth contact patterns are similar to the standard tooth contact pattern.
2) If the tooth contact pattern is not correct, the drive gear and drive pinion exceed their limits. Both gears should be replaced as a set.