SECTION FFD
FRONT FINAL DRIVE

CONTENTS

PRECAUTIONS

PFP:00001

Precautions Necessary for Steering Wheel Rotation After Battery Disconnect

NDS000EK

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NVIS/IVIS (NISSAN/INFINITI VEHICLE IMMOBILIZER SYSTEM - NATS).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the ″LOCK″ position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NVIS/IVIS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.

   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the ″ACC″ position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the ″LOCK″ position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

Service Notice or Precautions

NDS000EL

- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts when applied.
- Overhaul should be done in a clean work area, it is preferable to work in dustproof area.
- Before disassembly, using steam or white gasoline, completely remove sand and mud from the exterior of the unit, preventing them from entering into the unit during disassembly or assembly.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new ones if necessary.
- Gaskets, seals and O-rings should be replaced any time when the unit is disassembled.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.
- Clean and flush the parts sufficiently and blow-dry them.
- Be careful not to damage sliding surfaces and mating surfaces.
- When applying sealant, remove the old sealant from the mounting surface; then remove any moisture, oil, and foreign materials from the application and mounting surfaces.
- Always use shop paper for cleaning the inside of components.
- Avoid using cotton gloves or shop rags to prevent entering of lint.
- During assembly, observe the specified tightening torque, and apply new gear oil, petroleum jelly, or multi-purpose grease as specified for each vehicle, if necessary.

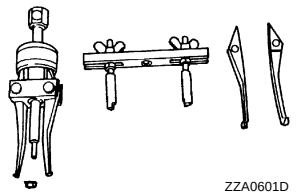
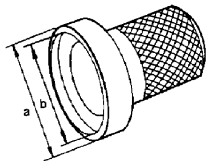
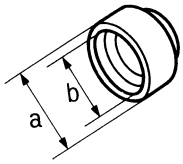
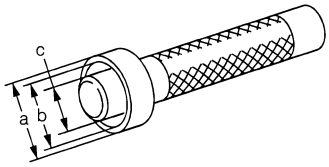
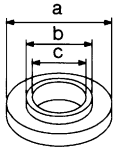
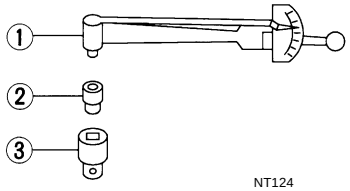
PREPARATION

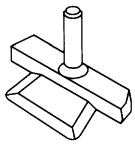
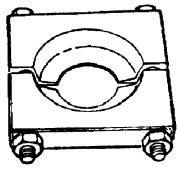
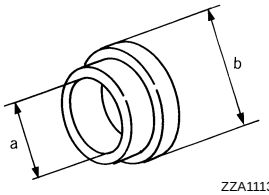
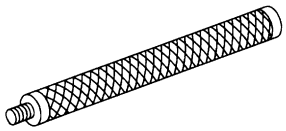
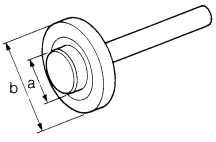
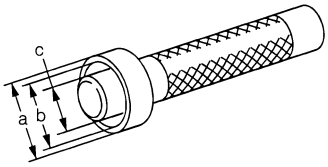
PFP:00002

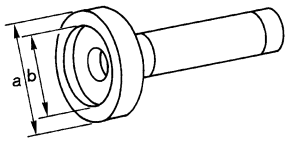
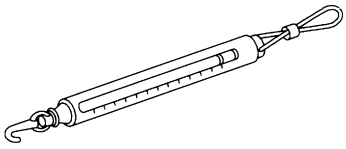
Special Service Tools

NDS000EM

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

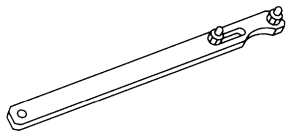
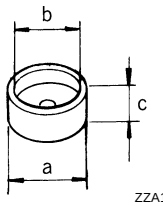
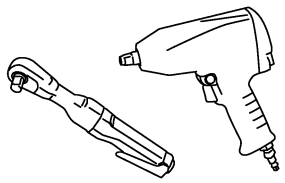
Tool number (Kent-Moore No.) Tool name	Description
KV381054S0 (J-34286) Puller  ZZA0601D	● Removing front oil seal ● Removing side oil seal(right side) ● Removing side bearing outer race
ST33400001 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0702D	● Installing front oil seal ● Installing side oil seal (right side)
KV38102510 (—) Drift a: 71 mm (2.80 in) dia. b: 65 mm (2.56 in) dia.  ZZA0838D	Installing front oil seal
KV38102100 (J-25803-01) Drift a: 44 mm (1.73 in) dia. b: 36 mm (1.42 in) dia. c: 24.5 mm (0.965 in) dia.  ZZA1046D	Installing side oil seal (left side)
ST30032000 (J-26010-01) Drift a: 80 mm (3.15 in) dia. b: 38 mm (1.50 in) dia. c: 31 mm (1.22 in) dia.  S-NT107	● Installing pinion rear bearing inner race ● Installing side shaft
ST3127S000 (J-25765-A) Preload gauge 1: GG91030000 (J-25765) Torque wrench 2: HT62940000 (—) Socket adapter (1/2″) 3: HT62900000 (—) Socket adapter (3/8″)  NT124	Measuring pinion bearing preload and total preload

Tool number (Kent-Moore No.) Tool name	Description
KV10111100 (J-37228) Seal cutter  S-NT046	Removing carrier cover
ST3306S001 (J-22888-D) Differential side bearing puller set 1: ST33051001 (J-22888-20) Puller 2: ST33061000 (J-8107-2) Base a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia.	Removing and installing side bearing inner race
ST30031000 (J-22912-01) Replacer  ZZA0700D	Removing pinion rear bearing inner race
KV31103000 (J-38982) Drift a: 49 mm (1.93 in) dia. b: 70 mm (2.76 in) dia.  ZZA1113D	Installing side bearing outer race
ST30611000 (J-25742-1) Drift bar  S-NT090	Installing side bearing outer race (Use with KV31103000)
ST37820000 (—) Drift a: 39 mm (1.54 in) dia. b: 72 mm (2.83 in) dia.  ZZA0836D	Installing pinion front and rear bearing outer race
ST33230000 (J-25805-01) Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.  ZZA1046D	Installing side bearing inner race

Tool number (Kent-Moore No.) Tool name	Description
KV38100200 (—) Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.  ZZA1143D	Installing side shaft oil seal
(J-8129) Spring gauge  NT127	Measuring turning torque

Commercial Service Tools

NDS000EN

Tool name	Description
Flange wrench  NT035	Removing and installing drive pinion lock nut
Spacer a: 60 mm (2.36 in) dia. b: 36 mm (1.42 in) dia. c: 30 mm (1.18 in)  ZZA1133D	Installing pinion front bearing inner race
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

NDS000EO

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page		Refer to FFD-24, "INSPECTION AFTER DISASSEMBLY".	Refer to FFD-17, "Tooth Contact".	Refer to FFD-24, "INSPECTION AFTER DISASSEMBLY".	Refer to FFD-19, "Backlash".	Refer to FFD-19, "Companion Flange Runout".	Refer to FFD-8, "Checking Differential Gear Oil".	NVH in PR section.	NVH in FAX, RAX, FSU and RSU sections.	NVH in WT section.	NVH in WT section.	NVH in FAX and RAX section.	NVH in BR section.	NVH in PS section.
Possible cause and SUSPECTED PARTS		Gear tooth rough	Gear contact improper	Tooth surfaces worn	Backlash incorrect	Companion flange excessive runout	Gear oil improper	PROPELLER SHAFT	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×

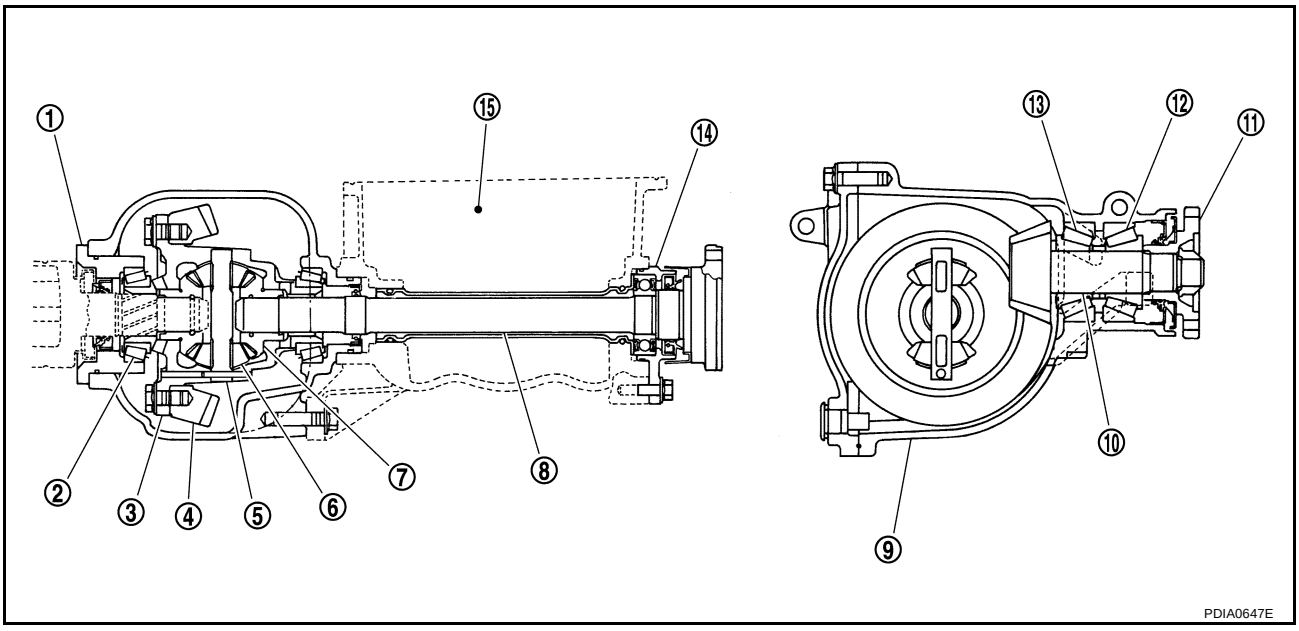
×: Applicable

DESCRIPTION

PFP:00000

Cross-Sectional View

NDS000EP



1. Side retainer
2. Side bearing
3. Differential case
4. Drive gear
5. Pinion mate shaft
6. Pinion mate gear
7. Side gear
8. Side shaft
9. Gear carrier
10. Drive pinion
11. Companion flange
12. Pinion front bearing
13. Pinion rear bearing
14. Extension tube retainer
15. Engine assembly

DIFFERENTIAL GEAR OIL

PFP:KLD30

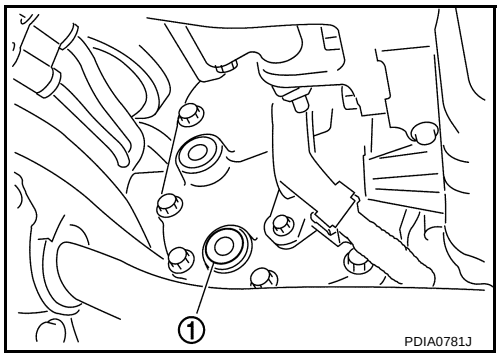
Changing Differential Gear Oil

NDS000EQ

DRAINING

1. Stop engine.
2. Remove drain plug (1) and drain gear oil.
3. Set a gasket on drain plug (1) and install it to final drive assembly and tighten to the specified torque. Refer to FFD-15, "COMPONENTS" .

CAUTION:
Do not reuse gasket.



FILLING

1. Remove filler plug (1). Fill with new gear oil until oil level reaches the specified level near filler plug mounting hole.

Oil grade and Viscosity:

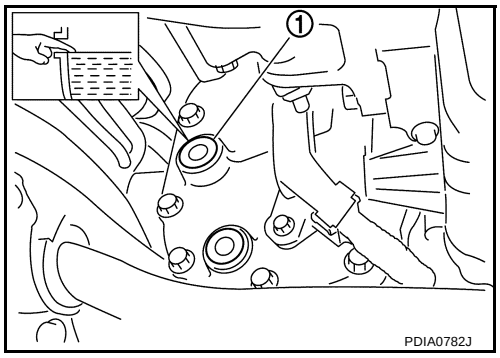
Refer to MA-12, "Fluids and Lubricants" .

Oil capacity:

Approx. 0.65 ℓ (1-3/8 US pt, 1-1/8 Imp pt)

2. After refilling oil, check oil level. Set a gasket to filler plug (1), then install it to final drive assembly. Refer to FFD-15, "COMPONENTS" .

CAUTION:
Do not reuse gasket.



Checking Differential Gear Oil

NDS000ER

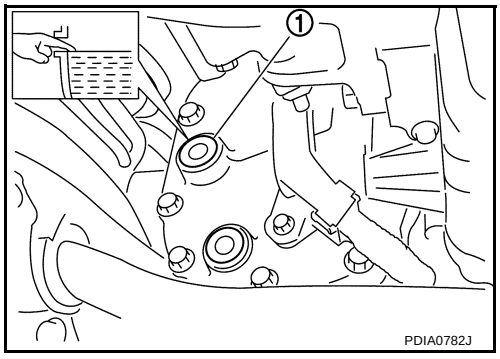
OIL LEAKAGE AND OIL LEVEL

- Make sure that oil is not leaking from final drive assembly or around it.
- Remove filler plug (1) and check oil level from filler plug mounting hole as shown in the figure.

CAUTION:
Do not start engine while checking oil level.

- Set a gasket on filler plug (1) and install it on final drive assembly. Refer to FFD-15, "COMPONENTS" .

CAUTION:
Do not reuse gasket.



FRONT OIL SEAL

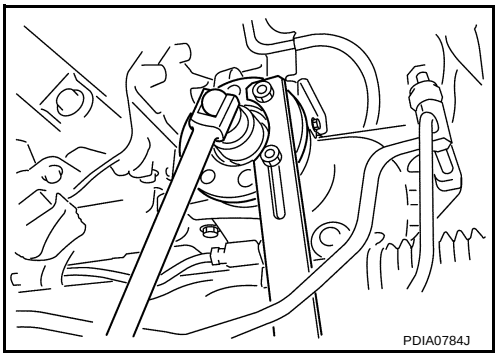
PFP:38189

Removal and Installation

NDS000ES

REMOVAL

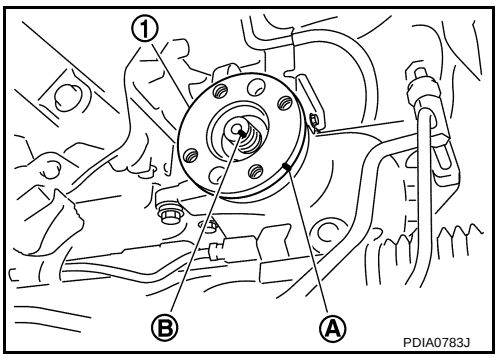
1. Drain gear oil. Refer to FFD-8, "DRAINING" .
2. Remove front propeller shaft. Refer to PR-5, "Removal and Installation" .
3. Remove front drive shaft both. Refer to FAX-11, "Removal and Installation" .
4. Remove side shaft assembly.
5. Remove drive pinion lock nut using a flange wrench.



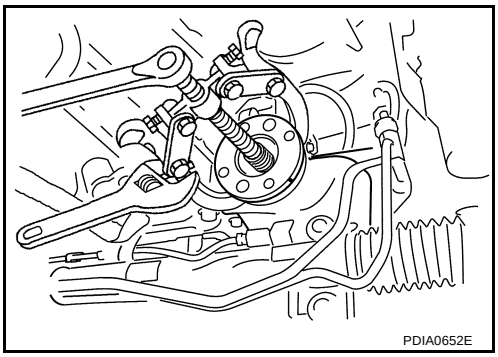
6. Put matching mark (B) on the end of the drive pinion. The matching mark (B) should be in line with the matching mark (A) on companion flange (1).

   CAUTION:
   For matching mark, use paint. Do not damage companion flange and drive pinion.

   NOTE:
   The matching mark (A) on the final drive companion flange (1) indicates the maximum vertical runout position.



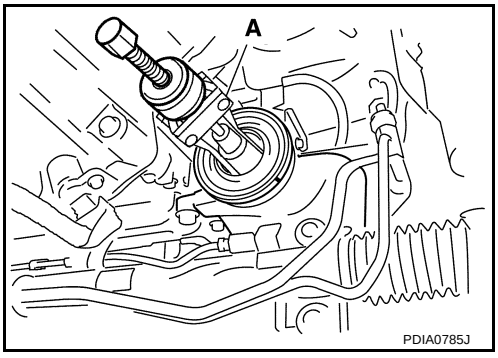
7. Remove companion flange using a puller.



8. Remove front oil seal using the puller.

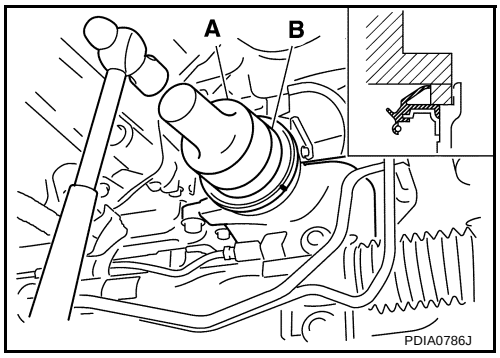
   Tool number **A: KV381054S0 (J-34286)**

   CAUTION:
   Be careful not to damage gear carrier.



INSTALLATION

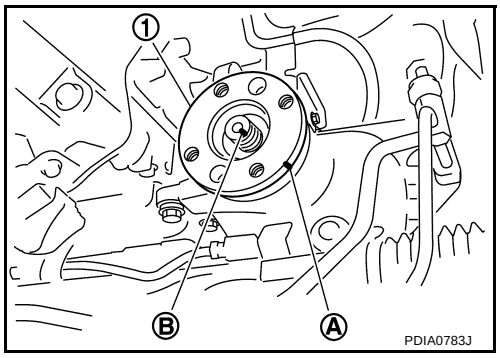
1. Apply multi-purpose grease to front oil seal lips.
2. Using the drifts, install front oil seal as shown in figure.



Tool number **A: ST33400001 (J-26082)**
B: KV38102510 (—)

CAUTION:
- **Do not reuse oil seal.**
- **When installing, do not incline oil seal.**

3. Align the matching mark (B) of drive pinion with the matching mark (A) of companion flange, and then install the companion flange (1).



4. Apply anti-corrosion oil to the thread and seat of new drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion.

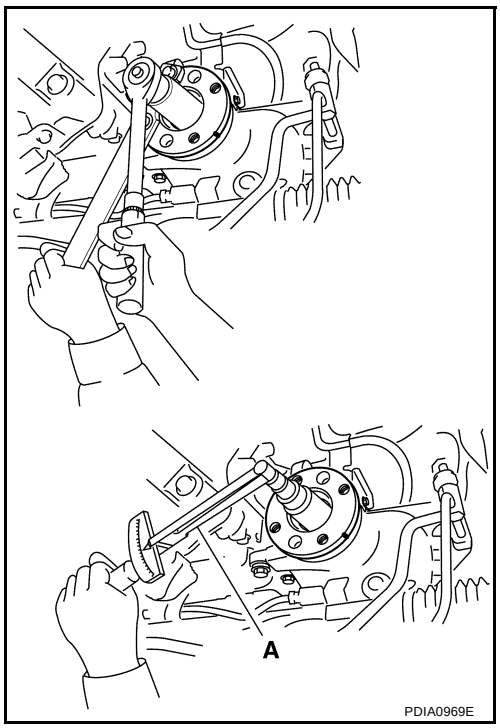
CAUTION:
Do not reuse drive pinion lock nut.

5. Tighten to drive pinion lock nut, while adjust total preload torque.

Tool number **A: ST3127S000 (J-25765-A)**

Drive pinion lock nut tightening torque:
127.4 - 245.0 N·m (13.0 - 25.0 kg-m, 94 - 181 ft-lb)

Total preload torque:
1.56 - 2.65 N·m (0.16 - 0.27 kg-m, 14 - 23 in-lb)



CAUTION:
- **Adjust to the lower limit of the drive pinion lock nut tightening torque first.**
- **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**
- If measured value is out of the specification, remove final drive assembly and disassemble drive pinion parts to check and adjust each part. Refer to FFD-13, "Removal and Installation" and FFD-15, "Disassembly and Assembly" .

6. Install front propeller shaft. Refer to PR-5, "Removal and Installation" .
7. Install side shaft assembly.
8. Install front drive shaft both. Refer to FAX-11, "Removal and Installation" .
9. Refill gear oil to the final drive and check oil level. Refer to FFD-8, "FILLING" .
10. Check the final drive for oil leakage. Refer to FFD-8, "OIL LEAKAGE AND OIL LEVEL" .

SIDE OIL SEAL

PFP:33142

Removal and Installation

NDS000ET

NOTE:
Left side oil seal is attached to engine assembly. Replace it after removing front final drive assembly from vehicle.

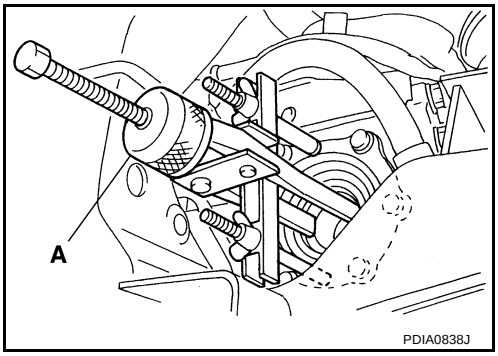
REMOVAL

Right Side:

1. Remove the front drive shaft. Refer to FAX-11, "Removal and Installation" .
2. Remove the side oil seal using a puller.

Tool number **A: KV381054S0 (J-34286)**

CAUTION:
Be careful not to damage gear carrier.



Left Side:

1. Remove the front final drive assembly from vehicle with power tool. Refer to FFD-13, "Removal and Installation" .
2. Remove the side oil seal using a flat-bladed screwdriver.

CAUTION:
Be careful not to damage gear carrier.

INSTALLATION

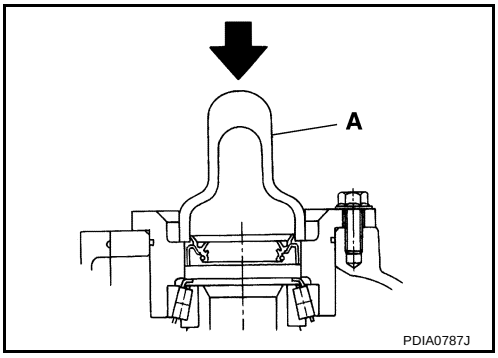
Right Side:

1. Apply multi-purpose grease to sealing lips of side oil seal.
2. Using the drift, press-fit side oil seal so that its surface comes face to face with the end surface of the side retainer.

Tool number **A: ST33400001 (J-26082)**

CAUTION:
- **Do not reuse oil seal.**
- **When installing, do not incline oil seal.**

3. Install the front drive shaft. Refer to FAX-11, "Removal and Installation" .
4. When oil leaks while removing, check oil level after the installation. Refer to FFD-8, "Checking Differential Gear Oil" .



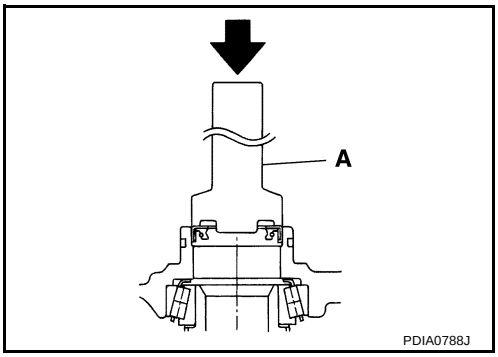
Left Side:

1. Apply multi-purpose grease to sealing lips of side oil seal.
2. Using the drift, press-fit side oil seal so that its surface comes face to face with the end surface of the gear carrier.

Tool number **A: KV38102100 (J-25803-01)**

CAUTION:
- **Do not reuse oil seal.**
- **When installing, do not incline oil seal.**

3. Install the front final drive assembly on vehicle. Refer toFFD-13, "Removal and Installation" .
4. Install the front drive shaft. Refer to FAX-11, "Removal and Installation" .



5. When oil leaks while removing, check oil level after the installation. Refer to FFD-8, "Checking Differential Gear Oil" .

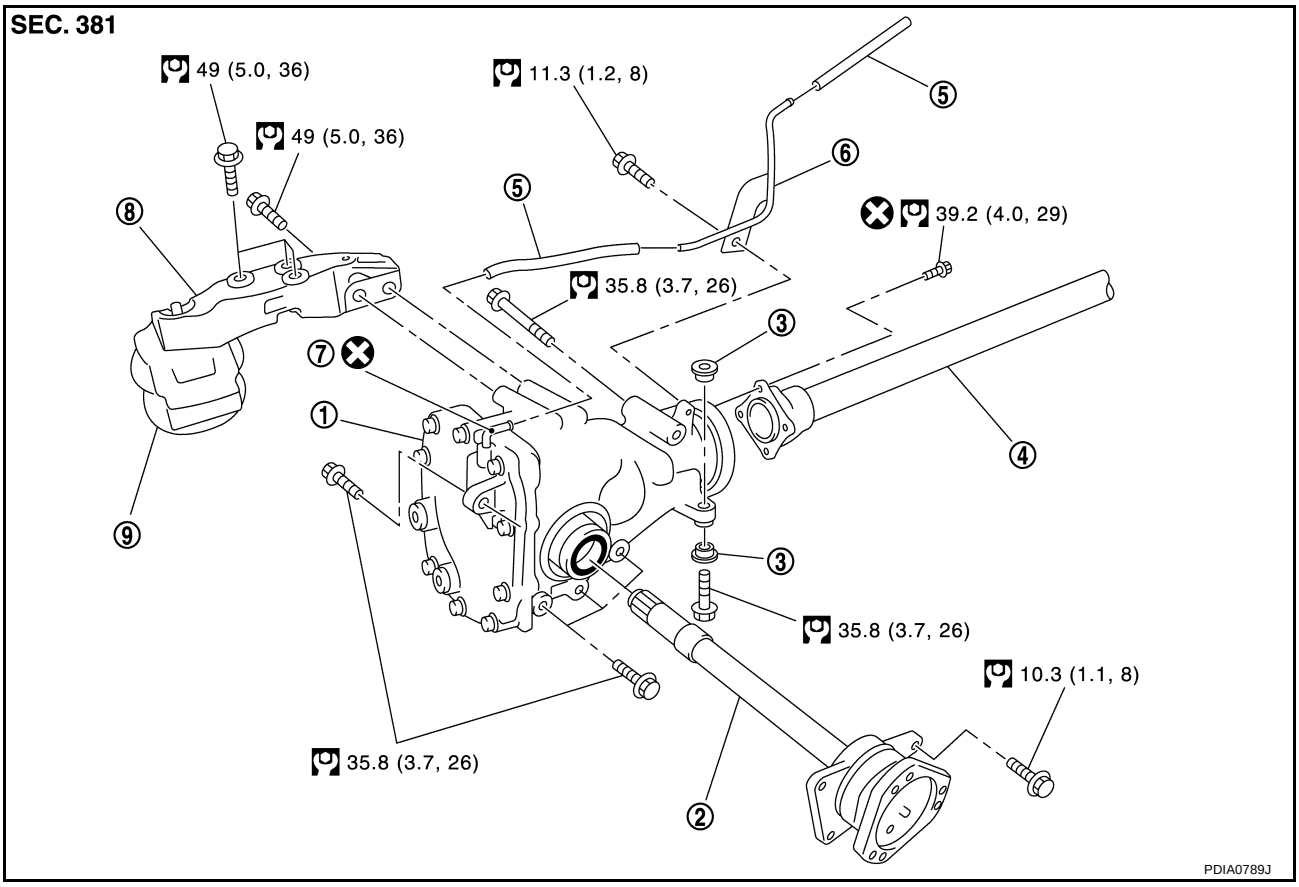
FRONT FINAL DRIVE ASSEMBLY

PFP:38500

Removal and Installation

NDS000EU

COMPONENTS



1.	Front final drive assembly	2.	Side shaft	3.	Bushing
4.	Front propeller shaft	5.	Breather hose	6.	Breather tube
7.	Breather connector	8.	Engine mounting bracket (RH) (Lower)	9.	Engine mounting insulator (RH)

Refer to GI-11, "Components" , for the symbols in the figure.

REMOVAL

1. Remove front drive shaft both. Refer to FAX-11, "Removal and Installation" .
2. Remove front crossbar with power tool.
3. Separate steering outer socket and steering knuckle. Refer to PS-19, "POWER STEERING GEAR AND LINKAGE" .
4. Remove side shaft.
5. Remove three way catalyst (right bank) with power tool. Refer to EX-3, "EXHAUST SYSTEM" .
6. Remove front propeller shaft. Refer to PR-5, "Removal and Installation" .
7. Separate EPS solenoid valve connector.
8. Separate power steering hydraulic line.
9. Remove stabilizer assembly with power tool. Refer to FSU-36, "Removal and Installation" .
10. Separate steering lower joint and steering gear assembly. Refer to PS-19, "POWER STEERING GEAR AND LINKAGE" .
11. Set a suitable jack to engine.
12. Remove front suspension member with power tool. Refer to FSU-27, "Removal and Installation" .
13. Remove breather hose and tube.
14. Remove engine mounting bracket (RH) (Lower) and engine mounting insulator (RH) with power tool. Refer to EM-119, "Removal and Installation (AWD Models)" .

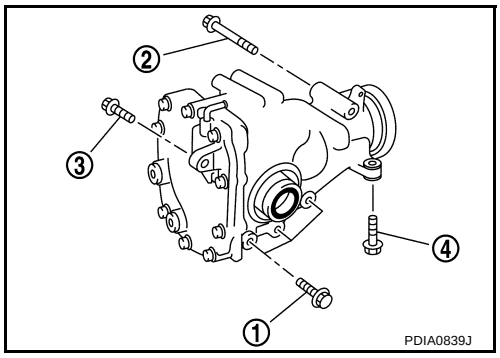
15. Remove front final drive assembly with power tool.

INSTALLATION

Note the following, and installation is in the reverse order of removal.

- Refer to FFD-13, "COMPONENTS" about each tightening torque.
- When installing the side shaft, apply multi-purpose grease to contact surface of side shaft and side shaft oil seal.
- Tighten mounting bolts in the order as described below when installing front final drive assembly: side of gear carrier (1), upper side of gear carrier (2), part of carrier cover (3), lower part of gear carrier (4).

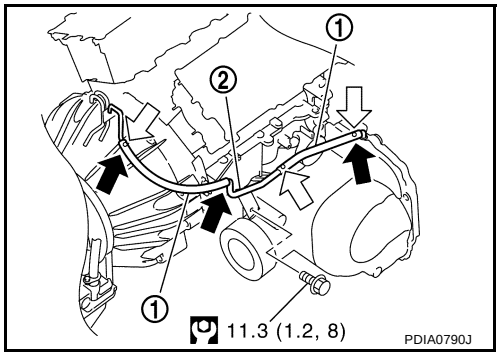
  CAUTION:
  Align the mating faces of gear carrier and oil pan for installation.



- When installing breather hoses (1) and tube (2), refer to the figure.

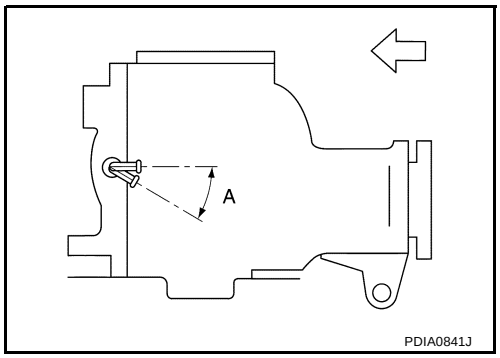
  CAUTION:
  Make sure there are no pinched or restricted areas on the breather hose caused by bending or winding when installing it.

  – Make sure the paint mark facing up (⇦).
  – Securely install the hose until it seats the rounded portion of the tube (⬅).

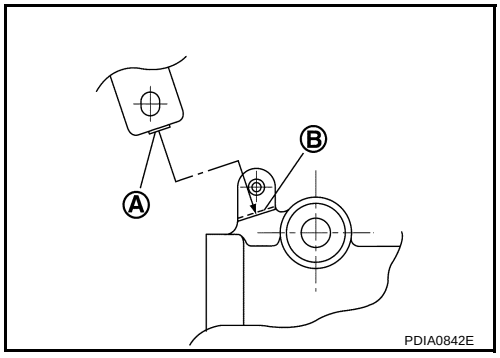


  – Install breather connector as shown in the figure.

    Angle "A": 0 - 30°



  – Seat the breather tube bracket end (A) to the machined face (B) of gear carrier boss.
- When oil leaks while removing final drive assembly, check oil level after the installation. Refer to FFD-8, "Checking Differential Gear Oil" .



Disassembly and Assembly

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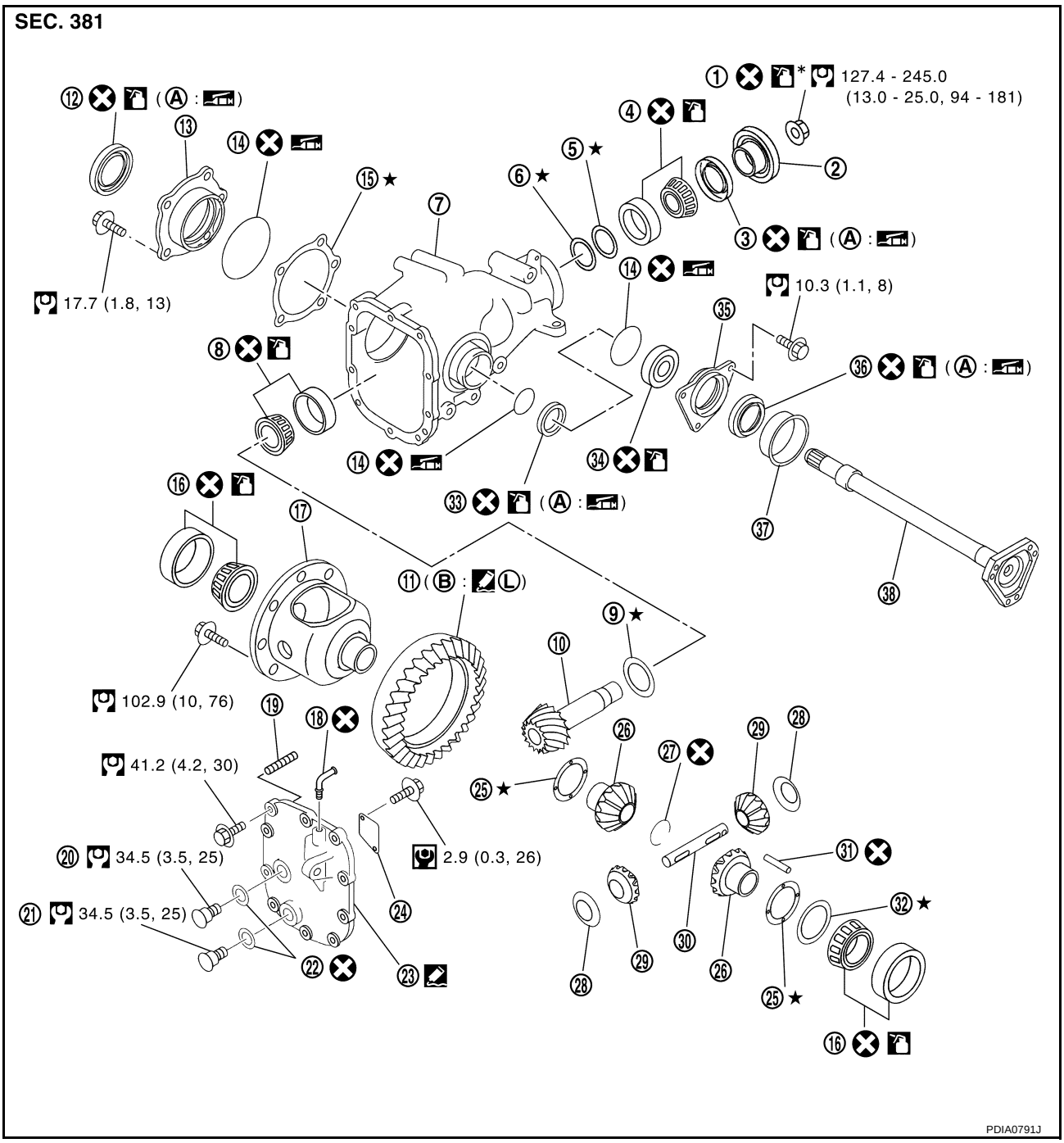
COMPONENTS

SEC. 381



1. Drive pinion lock nut
2. Companion flange
3. Front oil seal
4. Pinion front bearing
5. Drive pinion bearing adjusting washer
6. Drive pinion adjusting washer
7. Gear carrier
8. Pinion rear bearing
9. Pinion height adjusting washer
10. Drive pinion
11. Drive gear
12. Side oil seal (right side)
13. Side retainer
14. O-ring
15. Side bearing adjusting shim
16. Side bearing
17. Differential case
18. Breather connector
19. Dowel pin
20. Filler plug
21. Drain plug
22. Gasket
23. Carrier cover
24. Gear oil defence
25. Side gear thrust washer
26. Side gear
27. Circular clip
28. Pinion mate thrust washer
29. Pinion mate gear
30. Pinion mate shaft
31. Lock pin
32. Side bearing adjusting washer
33. Side oil seal (left side)

34. Side shaft bearing
35. Extension tube retainer
36. Side shaft oil seal
37. Dust sealed
38. Side shaft

A: Oil seal lip

B: Screw hole

Refer to GI-11, "Components" and the followings for the symbols in the figure.

: Apply gear oil.

: Apply anti-corrosion oil.

: Apply Genuine Silicone RTV or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

: Apply Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

ASSEMBLY INSPECTION AND ADJUSTMENT

- Before inspection and adjustment, drain gear oil.

Total Preload Torque

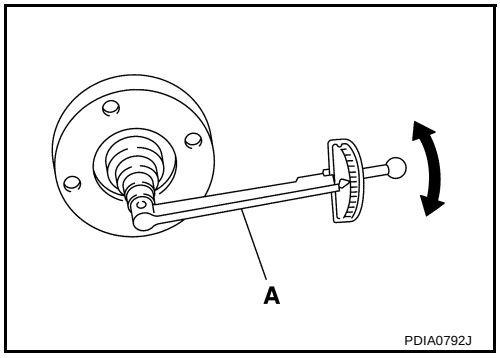
1. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
2. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
3. Measure total preload with preload gauge.

Tool number A: ST3127S000 (J-25765-A)

Total preload torque:

1.56 - 2.65 N·m (0.16 - 0.27 kg-m, 14 - 23 in-lb)

NOTE:
Total preload torque = Pinion bearing preload torque + Side bearing preload torque



- If measured value is out of the specification, disassemble it to check and adjust each part. Adjust the pinion bearing preload and side bearing preload. Adjust the pinion bearing preload first, then adjust the side bearing preload.

When the preload torque is large

On pinion bearings: **Decrease the drive pinion bearing adjusting washer and drive pinion adjusting washer thickness. Refer to FFD-36, "Drive Pinion Bearing Adjusting Washer" and FFD-36, "Drive Pinion Adjusting Washer" .**

On side bearings: **Increase the side bearing adjusting shim thickness. Refer to FFD-36, "Side Bearing Adjusting Shim" .**

When the preload torque is small

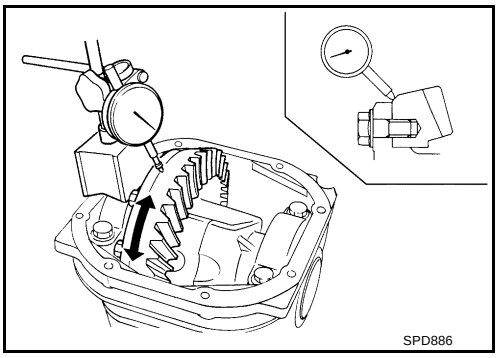
On pinion bearings: **Increase the drive pinion bearing adjusting washer and drive pinion adjusting washer thickness. Refer to FFD-36, "Drive Pinion Bearing Adjusting Washer" and FFD-36, "Drive Pinion Adjusting Washer" .**

On side bearings: **Decrease the side bearing adjusting shim thickness. Refer to FFD-36, "Side Bearing Adjusting Shim" .**

Drive Gear Runout

1. Remove carrier cover. Refer to FFD-20, "Differential Assembly" .
2. Fit a dial indicator to the drive gear back face.
3. Rotate the drive gear to measure runout.

Runout limit: 0.05 mm (0.0020 in)



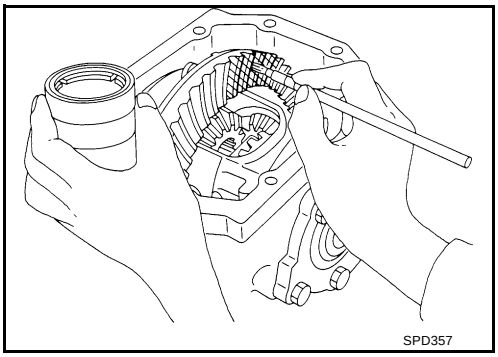
- If the runout is outside of the repair limit, check drive gear assembly condition; foreign material may be caught between drive gear and differential case, or differential case or drive gear may be deformed, etc.

CAUTION:
Replace drive gear and drive pinion gear as a set.

Tooth Contact

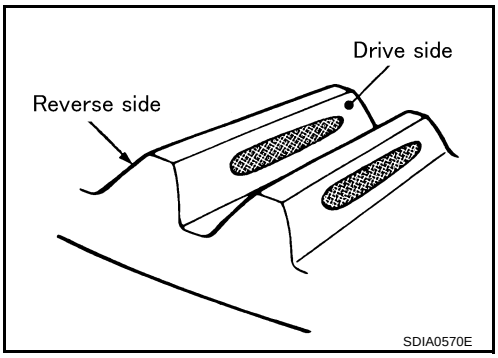
1. Remove carrier cover. Refer to FFD-20, "Differential Assembly" .
2. Apply red lead to drive gear.

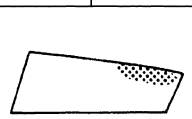
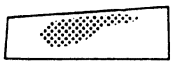
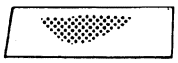
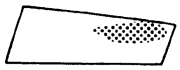
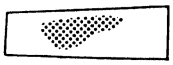
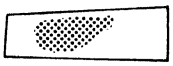
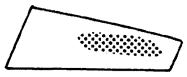
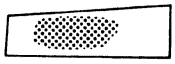
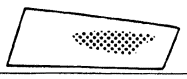
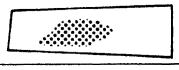
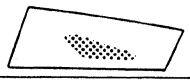
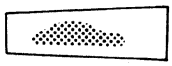
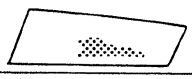
CAUTION:
Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on drive gear.



3. Rotate drive gear back and forth several times, check drive pinion gear to drive gear tooth contact.

CAUTION:
Check tooth contact on drive side and reverse side.



Tooth contact pattern				Pinion height adjusting washer selection value [mm(in)]	Adjustment requirement (Yes/No)
Back side		Drive side			
Heel side	Toe side	Toe side	Heel side		
				+0.15 (+0.0059)	Yes
				+0.12 (+0.0047)	
				+0.09 (+0.0035)	
				+0.06 (+0.0024)	No
				+0.03 (+0.0012)	
				0	
				−0.03 (−0.0012)	
				−0.06 (−0.0024)	
				−0.09 (−0.0035)	Yes
				−0.12 (−0.0047)	
				−0.15 (−0.0059)	

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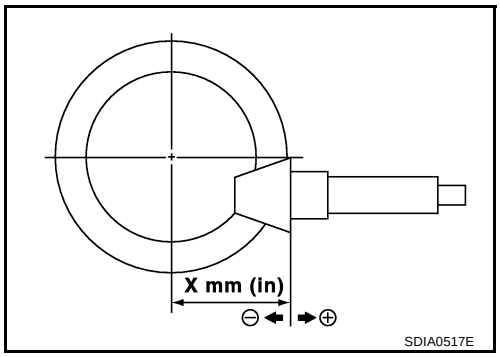
4. If tooth contact is improperly adjusted, follow the procedure below to adjust the pinion height (dimension X).



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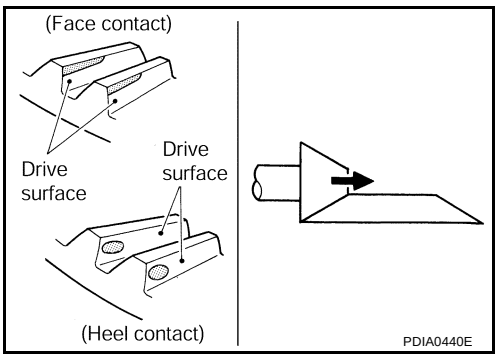
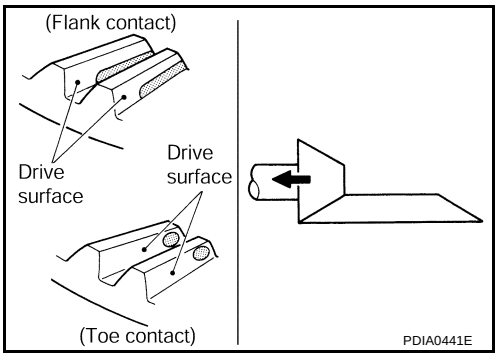
- If the tooth contact is near the face (face contact), or near the heel (heel contact), thicken pinion height adjusting washers to move drive pinion closer to drive gear.
  Refer to FFD-36, "Pinion Height Adjusting Washer" .



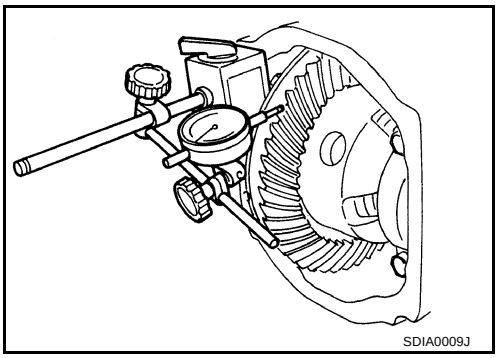
- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thin pinion height adjusting washers to move drive pinion farther from drive gear.
  Refer to FFD-36, "Pinion Height Adjusting Washer" .



Backlash

1. Remove carrier cover. Refer to FFD-20, "Differential Assembly" .
2. Fit a dial indicator to the drive gear face to measure the backlash.

Backlash: 0.10 - 0.15 mm (0.0039 - 0.0059 in)



- If the backlash is outside of the specified value, change the thickness of side bearing adjusting washer.

When the backlash is large:

Decrease side bearing adjusting washer thickness.
Refer to FFD-36, "Side Bearing Adjusting Washer" .

When the backlash is small:

Increase side bearing adjusting washer thickness.
Refer to FFD-36, "Side Bearing Adjusting Washer" .

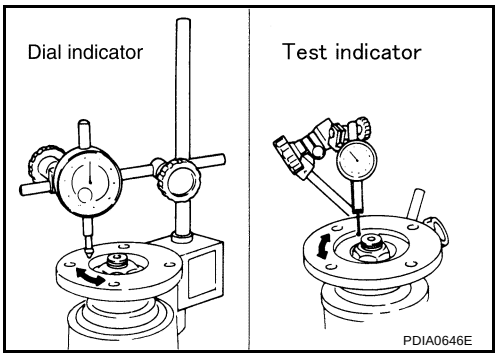
Companion Flange Runout

1. Fit a dial indicator onto the companion flange face (inner side of the propeller shaft mounting bolt holes).
2. Rotate companion flange to check for runout.

Runout limit: 0.18 mm (0.0070 in)

3. Fit a test indicator to the inner side of companion flange (socket diameter).
4. Rotate companion flange to check for runout.

Runout limit: 0.13 mm (0.0051 in)



5. If the runout value is outside the runout limit, follow the procedure below to adjust.

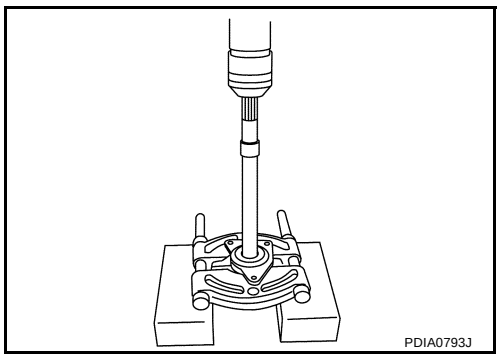
a. Check for runout while changing the phase between companion flange and drive pinion by 90° step, and search for the position where the runout is the minimum.
b. If the runout value is still outside of the limit after the phase has been changed, possible cause will be an assembly malfunction of drive pinion and pinion bearing and malfunction of pinion bearing. Check for these items and repair if necessary.

c. If the runout value is still outside of the limit after the check and repair, replace companion flange.

DISASSEMBLY

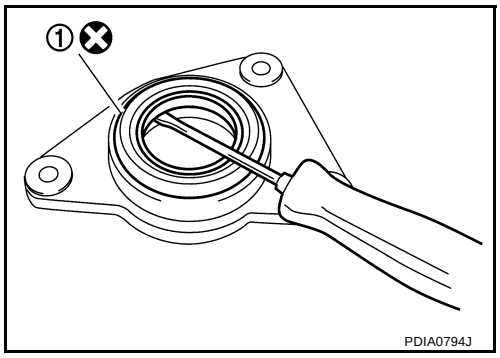
Side Shaft Assembly

1. Hold extension tube retainer with puller, then press out side shaft using a press.



2. Remove side shaft oil seal (1) from extension tube retainer with a flat- blade screwdriver.

   CAUTION:
   Be careful not to damage extension tube retainer.
3. Remove side shaft bearing from extension tube retainer.
4. Remove O-ring from extension tube retainer.
5. Remove dust sealed from side shaft.

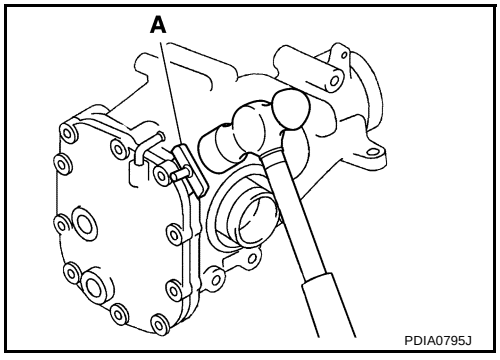


Differential Assembly

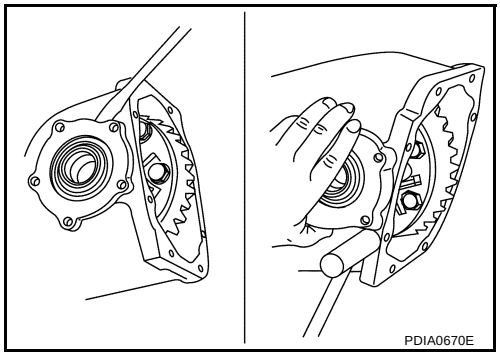
1. Drain gear oil, if necessary.
2. Remove carrier cover mounting bolts.
3. Remove carrier cover to insert the seal cutter between gear carrier and carrier cover.

   Tool number A: KV10111100 (J-37228)

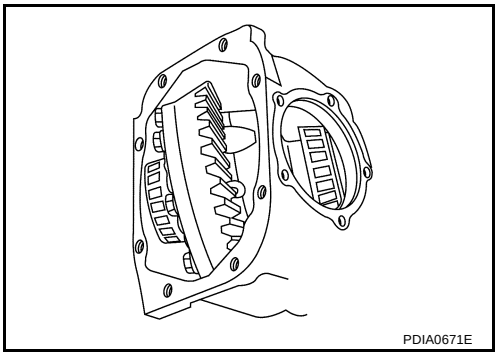
   CAUTION:
   - **Be careful not to damage the mating surface.**
   - **Do not insert flat-bladed screwdriver, this way damage the mating surface.**



4. Remove side retainer.
5. Remove side bearing adjusting shim.
6. Remove O-ring from side retainer.



7. Remove differential case assembly from gear carrier.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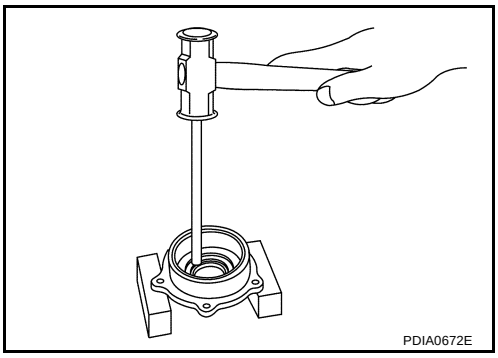
8. Remove side oil seal (right side) from side retainer.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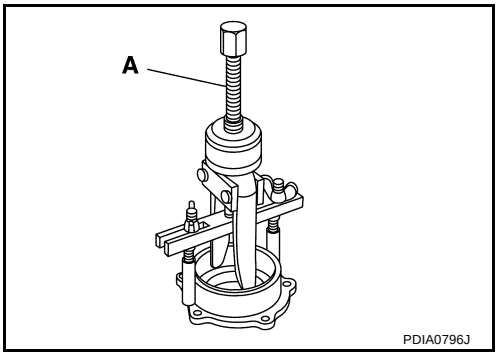
9. Remove side bearing outer race with puller.

Tool number **A: KV381054S0 (J-34286)**

10. Remove O-ring from gear carrier.
11. Remove side oil seal (left side) from gear carrier.



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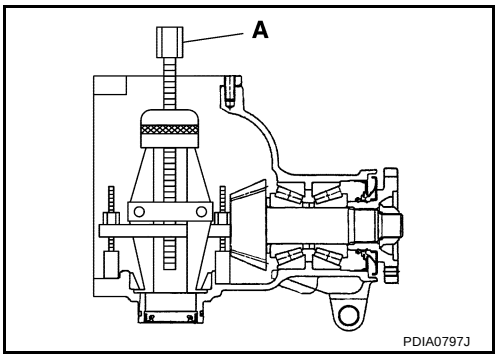
12. Remove side bearing outer race with puller.

Tool number **A: KV381054S0 (J-34286)**

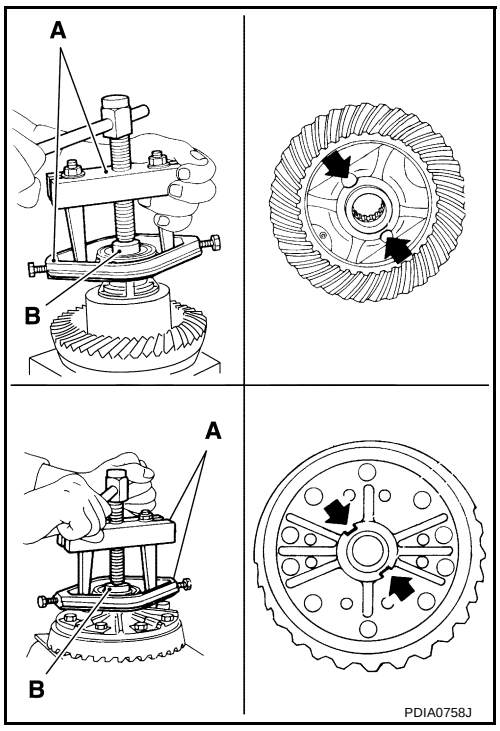


PDIA0797J

13. Remove side bearing inner race.
To prevent damage to bearing, engage puller jaws in groove (⬅).

Tool number **A: ST33051001 (J-22888-20)**
B: ST33061000 (J-8107-2)

CAUTION:
- **To prevent damage to the side bearing and drive gear, place copper plates between these parts and vise.**
- **It is not necessary to remove side bearing inner race except it is replaced.**

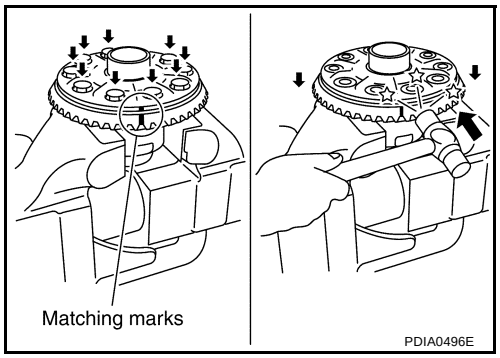


14. For proper reinstallation, paint matching marks on one differential case assembly.

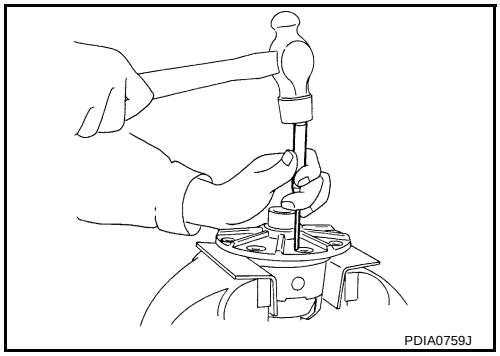
CAUTION:
For matching marks, use paint. Do not damage differential case and drive gear.

15. Remove drive gear mounting bolts.
16. Tap drive gear off differential case assembly with a soft hammer.

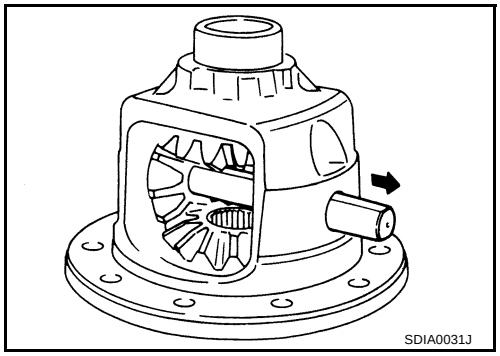
CAUTION:
Tap evenly all around to keep drive gear from bending.



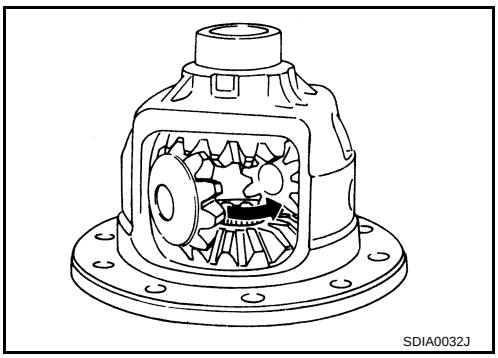
17. Remove lock pin of pinion mate shaft with a punch from drive gear side.



18. Remove pinion mate shaft.

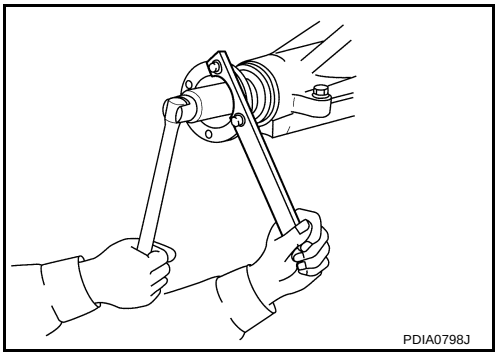


19. Turn pinion mate gear, then remove pinion mate gears, pinion mate thrust washers, side gears and side gear thrust washers from differential case.


SDIA0032J

Drive Pinion Assembly

1. Remove differential assembly. Refer to FFD-20, "Differential Assembly" .
2. Remove drive pinion lock nut with a flange wrench.


PDIA0798J

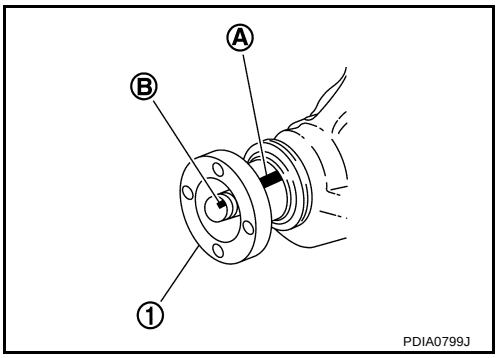
3. Put matching mark (B) on the end of drive pinion. The matching mark should be in line with the matching mark (A) on companion flange (1).

   CAUTION:

   For matching mark, use paint. Do not damage companion flange and drive pinion.

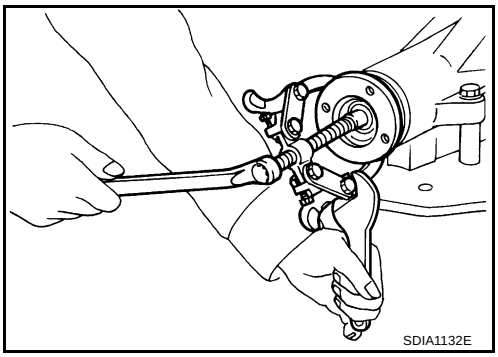
   NOTE:

   The matching mark (A) on the final drive companion flange (1) indicates the maximum vertical runout position.
   When replacing companion flange, matching mark is not necessary.



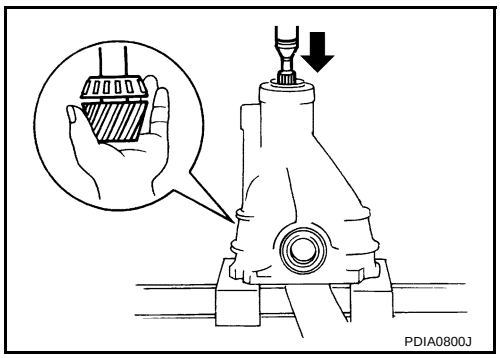
PDIA0799J

4. Remove companion flange using the suitable puller.


SDIA1132E

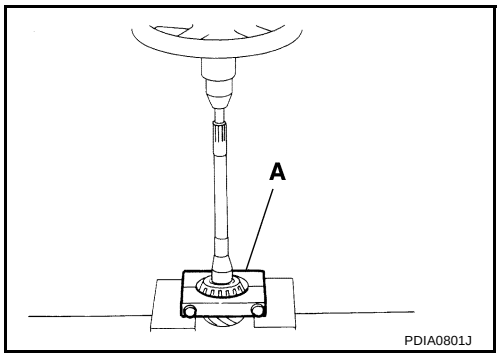
5. Press drive pinion assembly out of gear carrier.

   CAUTION:
   Do not drop drive pinion assembly.
6. Remove front oil seal.
7. Remove pinion front bearing inner race.
8. Remove drive pinion bearing adjusting washer and drive pinion adjusting washer.



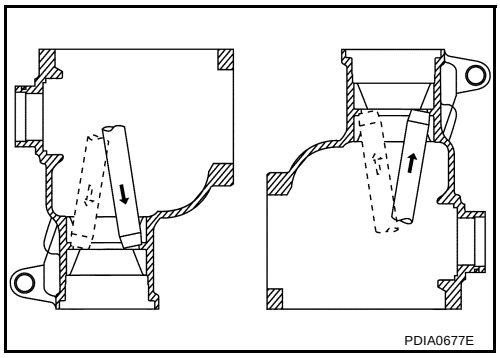
9. Remove pinion rear bearing inner race and pinion height adjusting washer with replacer.

   Tool number A: ST30031000 (J-22912-01)



10. Tap pinion front/rear bearing outer races uniformly a brass rod or equivalent to removed.

    CAUTION:
    Be careful not to damage gear carrier.



INSPECTION AFTER DISASSEMBLY

Clean up the disassembled parts. Then, inspect if the parts are worn or damaged. If so, follow the measures below.

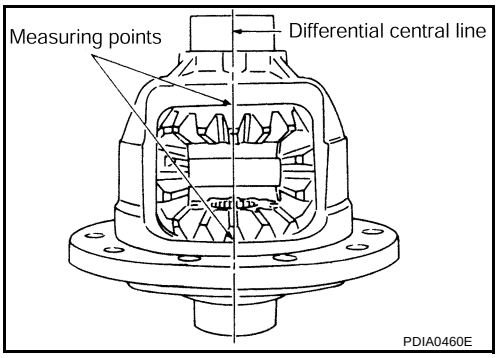
Content	Conditions and Measures
Hypoid gear	● If the gear teeth do not mesh or line-up correctly, determine the cause and adjust or replace as necessary. ● If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.
Bearing	● If any chipped (by friction), pitted, worn, rusted or scratched mark, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).
Side gear and Pinion mate gear	● If any cracks or damage on the surface of the tooth is found, replace. ● If any worn or chipped mark on the contact sides of the thrust washer is found, replace.
Side gear thrust washer and pinion mate thrust washer	● If it is chipped (by friction), damaged, or unusually worn, replace.
Oil seal	● Whenever disassembled, replace. ● If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips, replace them.
Differential case	● If any wear or crack on the contact sides of the differential case is found, replace.
Companion flange	● If any chipped mark (about 0.1 mm, 0.004 in) or other damage on the contact sides of the lips of the companion flange is found, replace.

ADJUSTMENT AND SELECTION OF ADJUSTING WASHERS (SHIMS)

Differential Side Gear Clearance

- Assemble the differential parts if they are disassembled. Refer to FFD-30, "Differential Assembly" .

1. Place differential case straight up so that side gear to be measured comes upward.



2. Using feeler gauge, measure the clearance between side gear back and differential case at 3 different points, while rotating side gear. Average the 3 readings, and then measure the clearance of the other side as well.

   Side gear back clearance specification:

   0.2 mm (0.008 in) or less.
   (Each gear should rotate smoothly without excessive resistance during differential motion.)

   CAUTION:
   To prevent side gear from tilting, insert feeler gauges with the same thickness from both sides.

3. If the back clearance is outside the specification, use a thicker/thinner side gear thrust washer to adjust. Refer to FFD-35, "Side Gear Thrust Washer" .

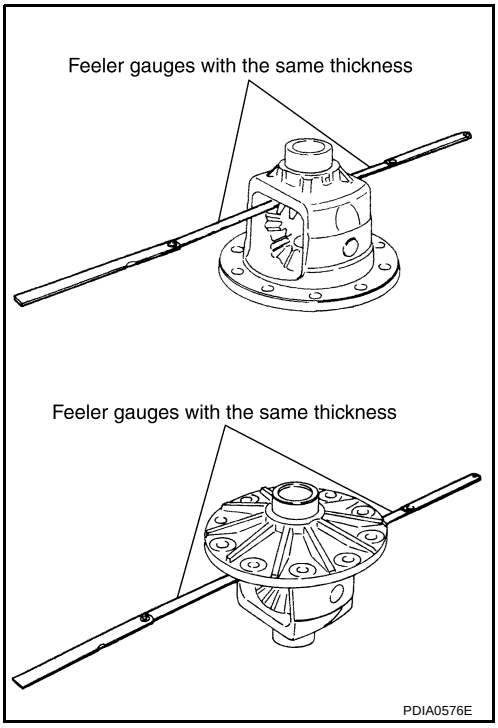
   When the back clearance is large:

   Use a thicker thrust washer.

   When the back clearance is small:

   Use a thinner thrust washer.

   CAUTION:
   Select a side gear thrust washer for right and left individually.

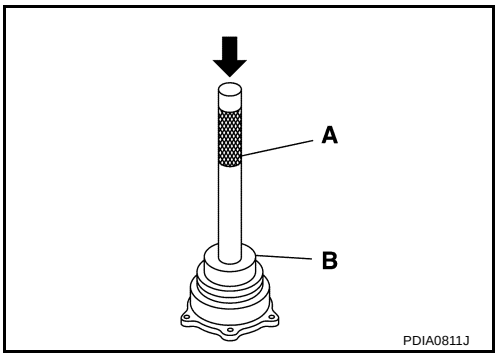


Side Bearing Preload

1. Make sure all parts are clean. Also, make sure the bearings are well lubricated with gear oil.
2. Press-fit side bearing outer race into side retainer with tool.

   Tool number **A: ST30611000 (J-25742-1)**
   B: KV31103000 (J-38982)

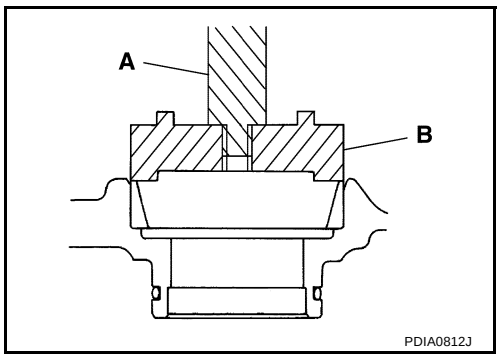
   CAUTION:
   - **At first, using a hammer, tap bearing outer race until it becomes flat to side retainer.**
   - **Do not reuse side bearing outer race.**



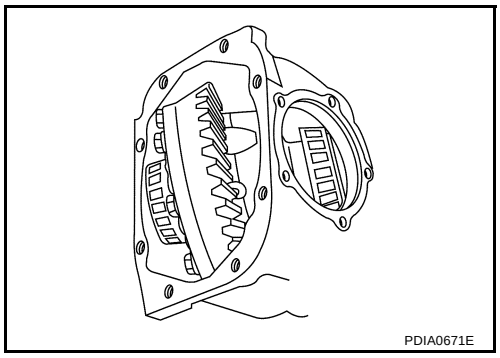
3. Press-fit side bearing outer race into gear carrier with tool.

   Tool number **A: ST30611000 (J-25742-1)**
   B: KV31103000 (J-38982)

   CAUTION:
   - **At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.**
   - **Do not reuse side bearing outer race.**

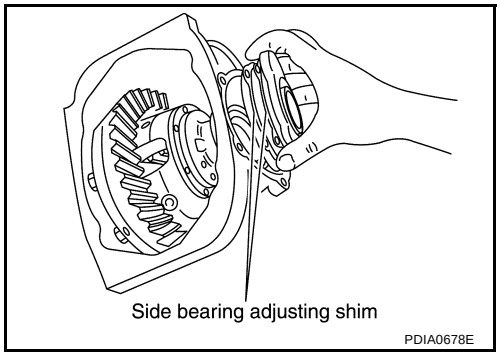


4. Place the differential case assembly into gear carrier.

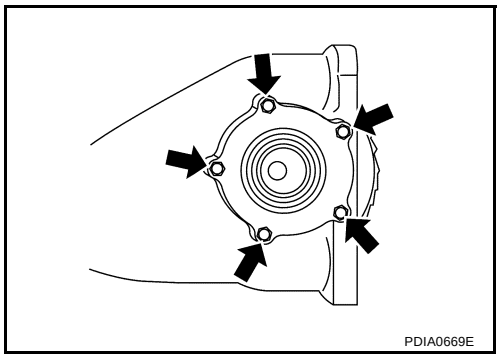


5. Install side bearing adjusting shim before disassembling or shim which thickness is the same as the one before disassembling.
6. Install side retainer assembly to gear carrier.

   CAUTION:
   Do not install O-ring.



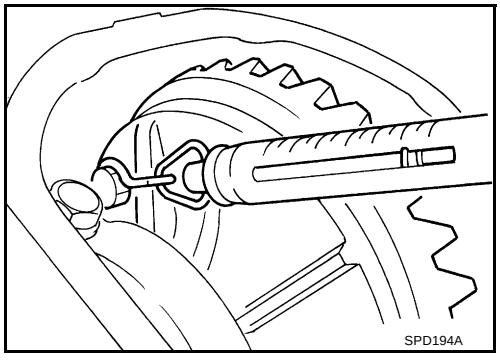
7. Install side retainer mounting bolts to the specified torque. Refer to FFD-15, "COMPONENTS" .



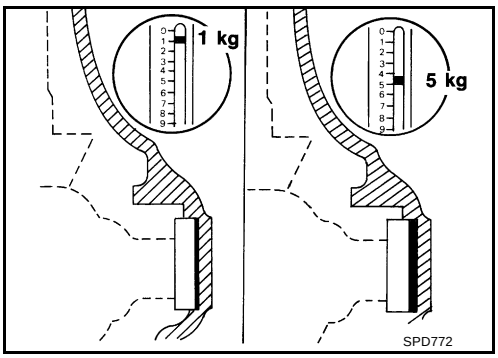
8. Measure the turning torque of the gear carrier at the drive gear mounting bolts with a spring gauge.

   Tool number : — (J-8129)

   Specification:
   34.2 - 39.2 N (3.5 - 4.0 kg, 7.7 - 8.8 lb) of pulling force at the drive gear bolt



9. If the turning torque is outside the specification, use a thicker/thinner side bearing adjusting shim to adjust. Refer to FFD-36, "Side Bearing Adjusting Shim" .



If the turning torque is less than the specified range:

Decrease the side bearing adjusting shim thickness.

If the turning torque is greater than the specification:

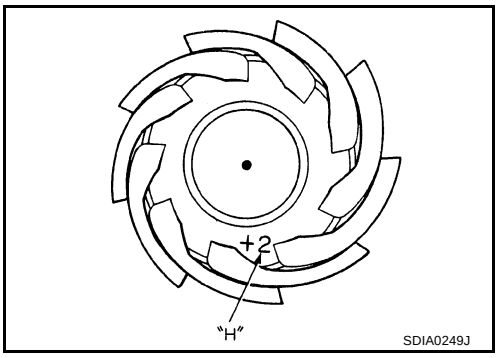
Increase the side bearing adjusting shim thickness.

10. Record the total amount of shim thickness required for the correct carrier side bearing preload.

Pinion Gear Height

If the hypoid gear set has been replaced, select the pinion height adjusting washer.

1. Use the formula below to calculate pinion height adjusting washer thickness.



Washer selection equation:

$T = T_0 + (t_1 - t_2)$

T: Correct washer thickness

T_0 : Removed washer thickness

t_1 : Old drive pinion head letter "H $\times$ 0.01"
("H": machined tolerance 1/100 mm $\times$ 100)

t_2 : New drive pinion head letter "H $\times$ 0.01"
("H": machined tolerance 1/100 mm $\times$ 100)

Example:

$T = 3.21 + [(2 \times 0.01) - (-1 \times 0.01)] = 3.24$

T_0 : 3.21

t_1 : +2

t_2 : -1

2. Select the proper pinion height adjusting washer. Refer to FFD-36, "Pinion Height Adjusting Washer" .
If impossible find the desired thickness of washer, use washer with thickness closest to the calculated value.

Example:

Calculated value... T = 3.22 mm

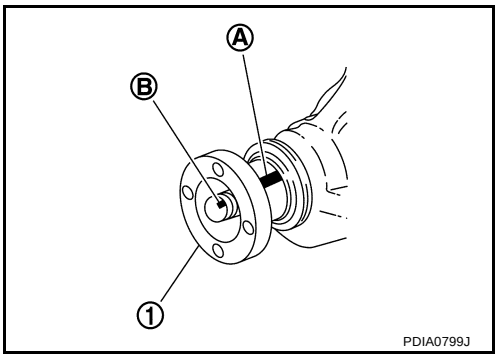
Used washer... T = 3.21 mm

Pinion Bearing Preload

- Assemble the drive pinion parts if they are disassembled. Refer to FFD-28, "Drive Pinion Assembly" .

1. Make sure all parts are clean. Also, make sure the bearings are well lubricated with gear oil.
2. Install companion flange (1).

NOTE:
When reusing drive pinion, align the matching mark (B) of drive pinion with the matching mark (A) of companion flange, and then install companion flange (1).



3. Temporarily tighten removed drive pinion lock nut to drive pinion.

   NOTE:
   Use removed drive pinion lock nut only for the preload measurement.

4. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
5. Tighten to drive pinion lock nut, while adjust pinion bearing preload torque.

   Tool number A: ST3127S000 (J-25765-A)

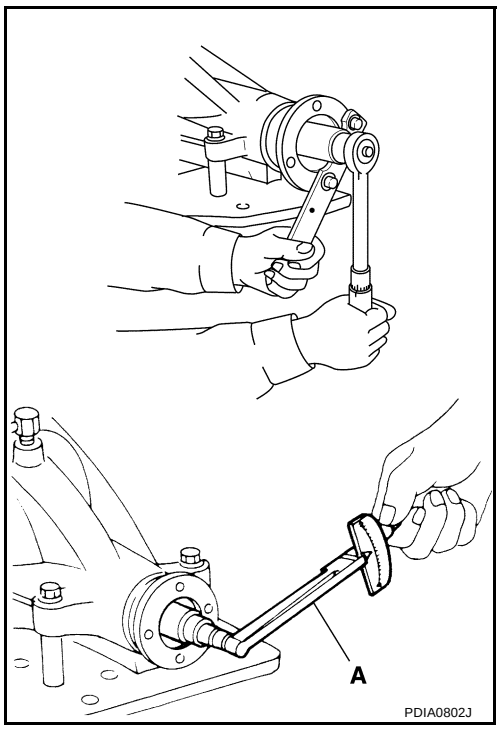
   Drive pinion lock nut tightening torque:

   127.4 - 245.0 N·m (13.0 - 25.0 kg-m, 94 - 181 ft-lb)

   Pinion bearing preload:

   0.78 - 1.57 N·m (0.08 - 0.16 kg-m, 7 - 13 in-lb)

   CAUTION:
   - **Adjust to the lower limit of the drive pinion lock nut tightening torque first.**
   - **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**



6. If the pinion bearing preload torque is outside the specification, use a thicker/thinner drive pinion bearing adjusting washer and drive pinion adjusting washer to adjust. Refer to FFD-36, "Drive Pinion Bearing Adjusting Washer" and FFD-36, "Drive Pinion Adjusting Washer" .

   When the preload torque is large:

   Decrease the drive pinion bearing adjusting washer and drive pinion adjusting washer thickness.

   When the preload is small:

   Increase the drive pinion bearing adjusting washer and drive pinion adjusting washer thickness.

7. Remove companion flange, after adjustment.

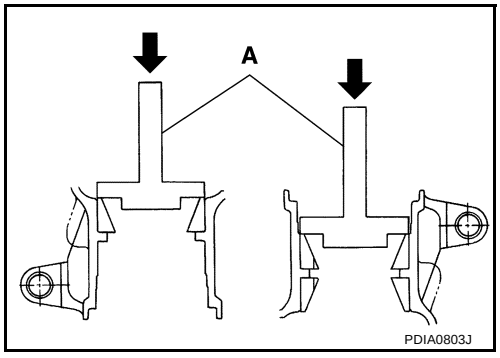
ASSEMBLY

Drive Pinion Assembly

1. Install pinion front and rear bearing outer races using drifts.

   Tool number A: ST37820000 (—)

   CAUTION:
   - **At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.**
   - **Do not reuse pinion front and rear bearing outer race.**



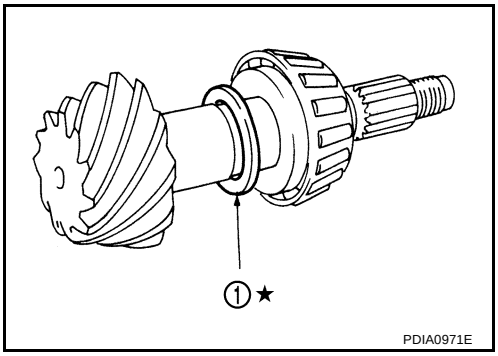
2. Temporarily install pinion height adjusting washer (1).

When hypoid gear set has been replaced

- Select pinion height adjusting washer. Refer to FFD-27, "Pinion Gear Height" .

When hypoid gear set has been reused

- Temporarily install the removed pinion height adjusting washer or same thickness washer to drive pinion.

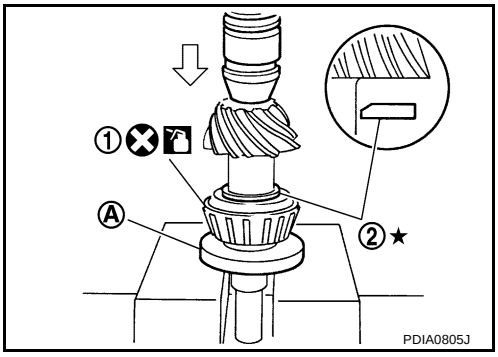


3. Install selected pinion height adjusting washer (2) to drive pinion. Press pinion rear bearing inner race (1) to it, using drift.

Tool number A: ST30032000 (J-26010-01)

CAUTION:

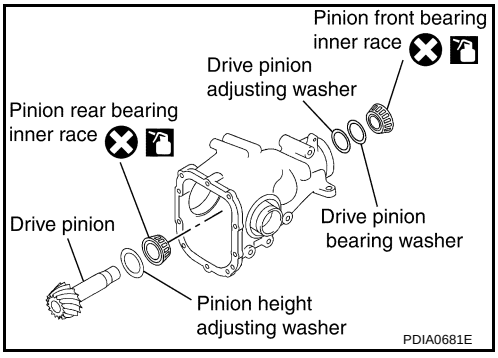
- **Pay attention to the direction of pinion height adjusting washer. (Assemble as shown in the figure.)**
- **Do not reuse pinion rear bearing inner race.**



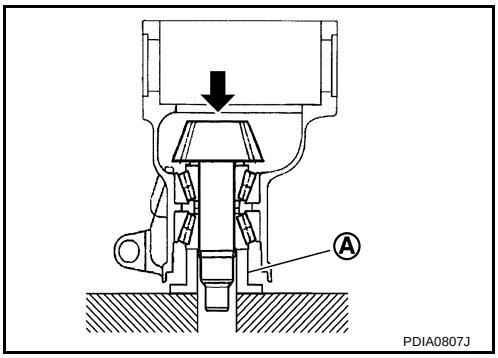
4. Temporarily assemble removed drive pinion adjusting washer and drive pinion bearing adjusting washer or same thickness them to drive pinion.
5. Apply gear oil to pinion rear bearing, and assemble drive pinion into gear carrier.
6. Apply gear oil to pinion front bearing, and assemble pinion front bearing inner race to drive pinion assembly.

CAUTION:

Do not reuse pinion front bearing inner race.



7. Using suitable spacer (A), press the pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.
8. Adjust pinion bearing preload. If necessary, select the appropriate drive pinion adjusting washer and drive pinion bearing adjusting washer. Refer to FFD-27, "Pinion Bearing Preload" .



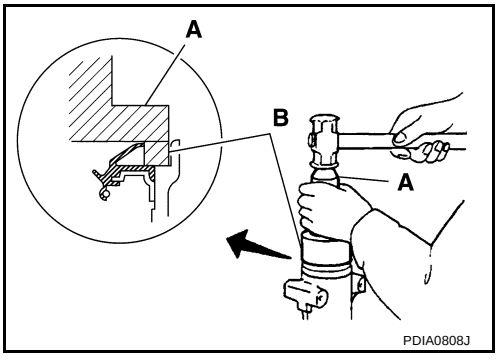
9. Using the drifts, install front oil seal as shown in figure.

Tool number A: ST33400001 (J-26082)

B: KV38102510 (—)

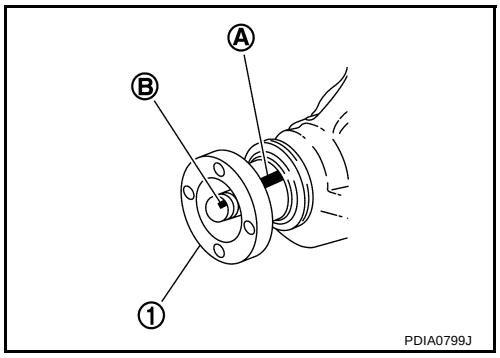
CAUTION:

- **Do not reuse oil seal.**
- **When installing, do not incline oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



10. Install companion flange (1).

NOTE:
When reusing drive pinion, align the matching mark (B) of drive pinion with the matching mark (A) of companion flange, and then install companion flange (1).



11. Apply anti-corrosion oil to the thread and seat of new drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion.

CAUTION:
Do not reuse drive pinion lock nut.

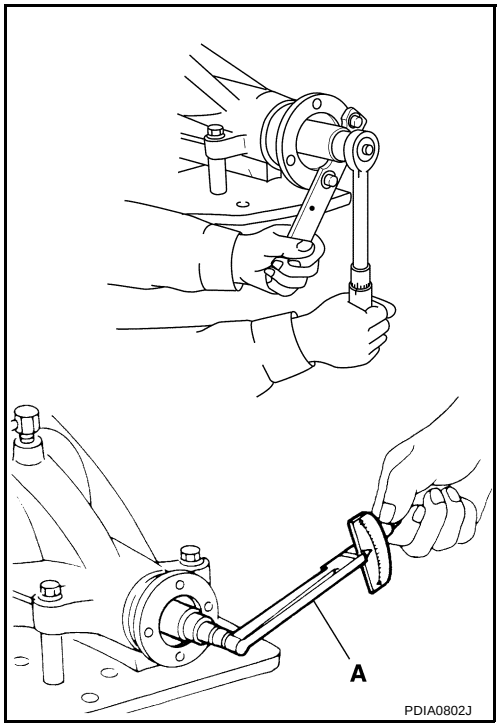
12. Tighten to drive pinion lock nut, while adjust pinion bearing preload torque.

Tool number A: ST3127S000 (J-25765-A)

Drive pinion lock nut tightening torque:
127.4 - 245.0 N·m (13.0 - 25.0 kg-m, 94 - 181 ft-lb)

Pinion bearing preload:
0.78 - 1.57 N·m (0.08 - 0.16 kg-m, 7 - 13 in-lb)

CAUTION:
- **Adjust to the lower limit of the drive pinion lock nut tightening torque first.**
- **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**



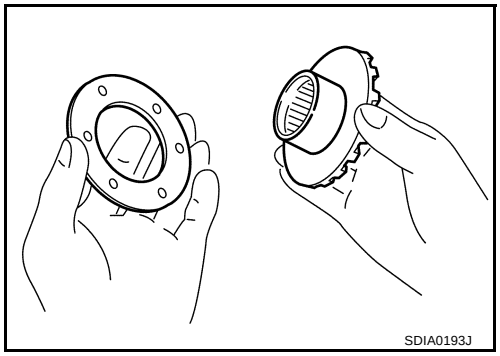
13. Install differential case assembly. Refer to FFD-30, "Differential Assembly" .

CAUTION:
Do not install carrier cover yet.

14. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and companion flange runout. Refer to FFD-17, "Drive Gear Runout" , FFD-17, "Tooth Contact" , FFD-19, "Backlash" , FFD-19, "Companion Flange Runout" .
Recheck above items. Readjust the above description, if necessary.
15. Check total preload torque. Refer to FFD-16, "Total Preload Torque" .
16. Install carrier cover. Refer to FFD-30, "Differential Assembly" .

Differential Assembly

1. Install side gear thrust washers with the same thickness as the ones installed prior to disassembly or reinstall the old ones on the side gears.

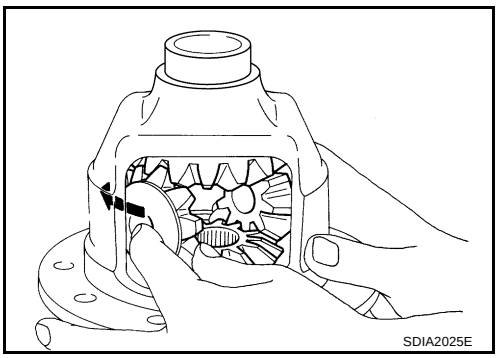


2. Install side gears and thrust washers into differential case.

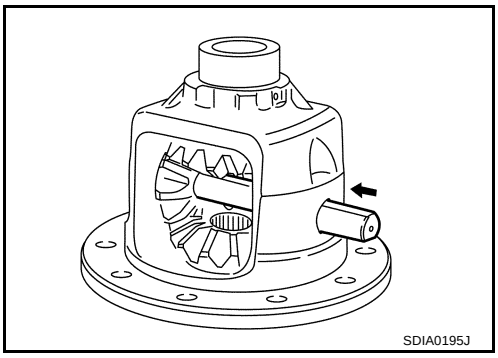
CAUTION:

- **Do not reuse circular clip.**
- **Make sure that the circular clip is installed to side gear (side retainer side).**

3. Align 2 pinion mate gears in diagonally opposite positions, then rotate and install them into differential case after installing thrust washer to pinion mate gear.



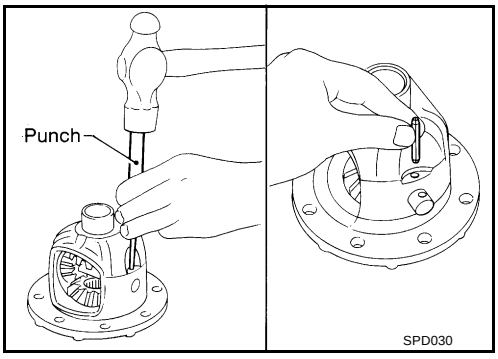
4. Align the lock pin holes on differential case with shaft, and install pinion mate shaft.
5. Measure side gear end play. If necessary, select the appropriate side gear thrust washers. Refer to FFD-25, "Differential Side Gear Clearance" .



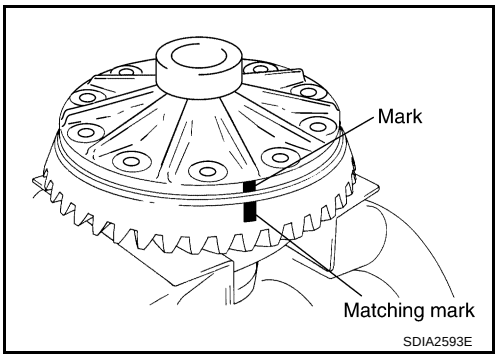
6. Drive a lock pin into pinion mate shaft, using a punch. Make sure lock pin is flush with differential case.

CAUTION:

Do not reuse lock pin.



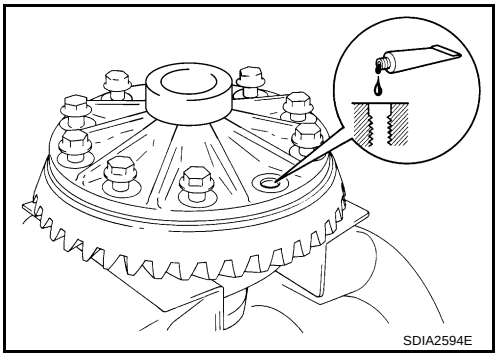
7. Align the matching mark of drive gear with the mark of differential case, then place drive gear.



8. Apply thread locking sealant into the thread hole of drive gear.
   - **Use Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .**

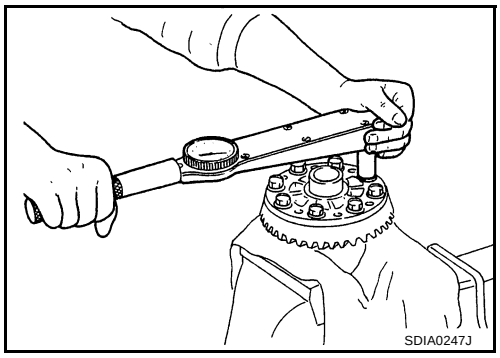
CAUTION:

Drive gear back and threaded holes shall be cleaned and degreased sufficiently.



9. Install drive gear on the mounting bolts, and then tighten to the specified torque. Refer to FFD-15, "COMPONENTS" .

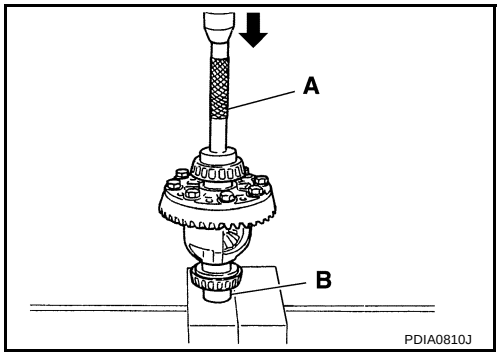
CAUTION:
Tighten bolts in a crisscross fashion.



10. Press side bearing inner races to differential case, using the drift and the base.

Tool number **A: ST33230000 (J-25805-01)**
B: ST33061000 (J-8107-2)

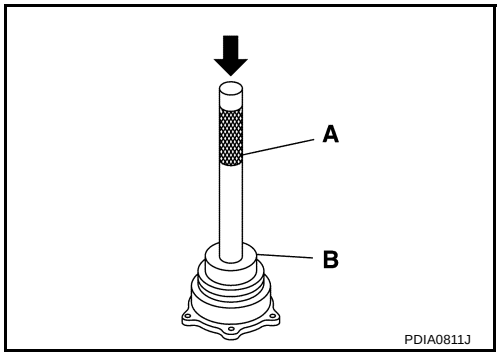
CAUTION:
Do not reuse side bearing inner race.



11. Press-fit side bearing outer race into side retainer with the drift and the drift bar.

Tool number **A: ST30611000 (J-25742-1)**
B: KV31103000 (J-38982)

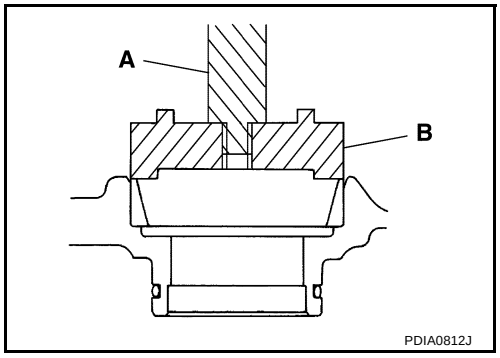
CAUTION:
- **At first, using a hammer, tap bearing outer race until it becomes flat to side retainer.**
- **Do not reuse side bearing outer race.**



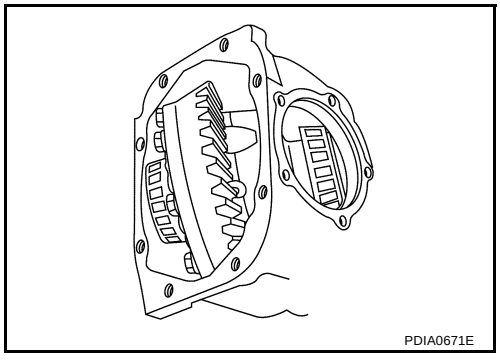
12. Press-fit side bearing outer race into gear carrier with the drift and the drift bar.

Tool number **A: ST30611000 (J-25742-1)**
B: KV31103000 (J-38982)

CAUTION:
- **At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.**
- **Do not reuse side bearing outer race.**

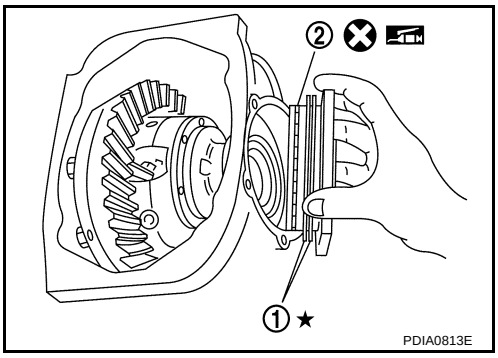


13. Place the differential case assembly into gear carrier.
14. Measure side bearing preload. If necessary, select the appropriate side bearing adjusting shim. Refer to FFD-25, "Side Bearing Preload" .



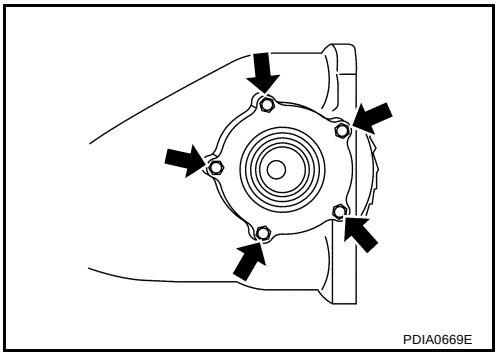
15. Install selected side bearing adjusting shim (1).
16. Apply multi-purpose grease to O-ring (2), and install it to side retainer.

    CAUTION:
    Do not reuse O-ring.
17. Install side retainer assembly to gear carrier.



PDIA0813E

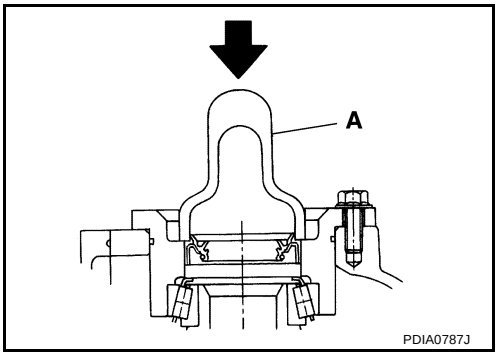
18. Install side retainer mounting bolts to the specified torque. Refer to FFD-15, "COMPONENTS" .


PDIA0669E

19. Using the drift, press-fit side oil seal so that its surface comes face to face with the end surface of the side retainer.

    Tool number **A: ST33400001 (J-26082)**

    CAUTION:
    - **Do not reuse oil seal.**
    - **When installing, do not incline oil seal.**
    - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



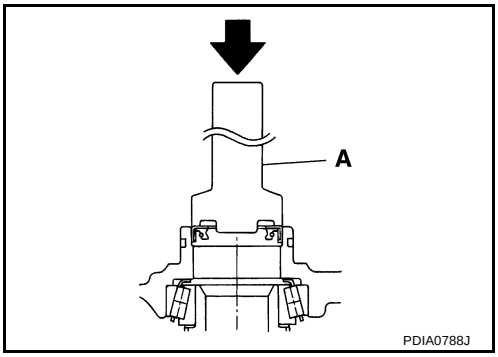
PDIA0787J

20. Using the drift, press-fit side oil seal so that its surface comes face to face with the end surface of gear carrier.

    Tool number **A: KV38102100 (J-25803-01)**

    CAUTION:
    - **Do not reuse oil seal.**
    - **When installing, do not incline oil seal.**
    - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**
21. Apply multi-purpose grease to O-ring, and install it to gear carrier.

    CAUTION:
    Do not reuse O-ring.

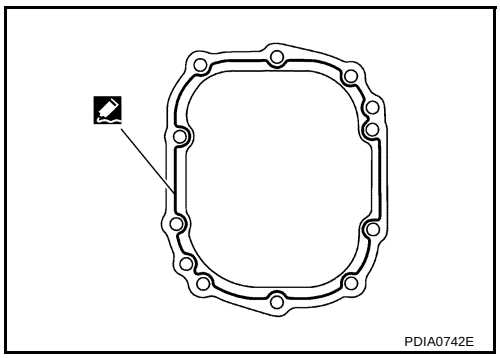


PDIA0788J

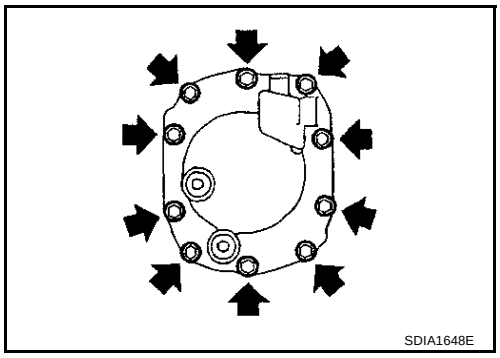
22. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and total preload torque. Refer to FFD-17, "Drive Gear Runout" , FFD-17, "Tooth Contact" , FFD-19, "Backlash" , FFD-16, "Total Preload Torque" .
    Recheck above items. Readjust the above description, if necessary.

23. Apply sealant to mating surface of carrier cover.
    - **Use Genuine Silicone RTV or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .**

    CAUTION:
    Remove old sealant adhering to mounting surfaces. Also remove any moisture, oil, or foreign material adhering to application and mounting surfaces.



24. Install carrier cover on gear carrier and tighten mounting bolts with the specified torque. Refer to FFD-15, "COMPONENTS" .



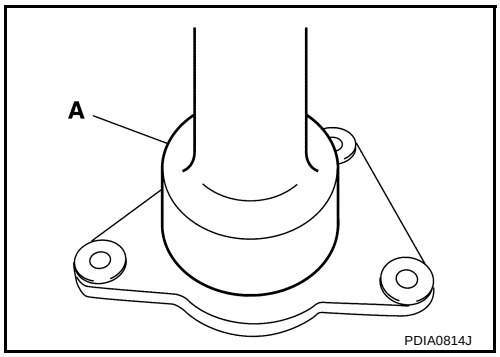
Side Shaft Assembly

1. Using the drift, install side shaft oil seal.

    Tool number **A: KV38100200 (—)**

    CAUTION:
    - **Do not reuse oil seal.**
    - **When installing, do not incline oil seal.**
    - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**

2. Install dust sealed.

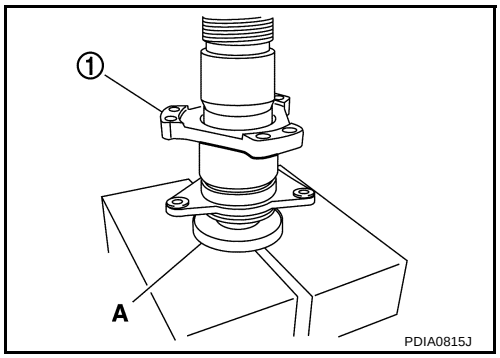


3. Support side shaft bearing with the drift, then press side shaft (1) into the side shaft bearing using a press.

    Tool number **A: ST30032000 (J-26010-01)**

4. Apply multi-purpose grease to O-ring, and install it to extension tube retainer.

    CAUTION:
    Do not reuse O-ring.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

NDS000EW

Applied model	VQ35DE
Final drive model	F160A
Gear ratio	3.692
Number of teeth (Drive gear/Drive pinion)	48/13
Oil capacity (Approx.) ℓ (US pt, Imp pt)	0.65 (1-3/8, 1-1/8)
Number of pinion gears	2
Drive pinion adjustment spacer type	Solid

Inspection and Adjustment

NDS000EX

DRIVE GEAR RUNOUT

Unit: mm (in)

Item	Runout limit
Drive gear back face	0.05 (0.0020)

DIFFERENTIAL SIDE GEAR CLEARANCE

Unit: mm (in)

Item	Specification
Side gear backlash (Clearance between side gear and differential case)	0.2 (0.008) or less (Each gear should rotate smoothly without excessive resistance during differential motion.)

PRELOAD TORQUE

Unit: N·m (kg-m, in-lb)

Item	Specification
Pinion bearing (P_1)	0.78 - 1.57 (0.08 - 0.16, 7 - 13)
Side bearing (P_2)	0.78 - 1.08 (0.08 - 0.11, 7 - 9)
Side bearing to pinion bearing (Total preload) (Total preload = P_1 + P_2)	1.56 - 2.65 (0.16 - 0.27, 14 - 23)

BACKLASH

Unit: mm (in)

Item	Specification
Drive gear to drive pinion gear	0.10 - 0.15 (0.0039 - 0.0059)

COMPANION FLANGE RUNOUT

Unit: mm (in)

Item	Runout limit
Companion flange face	0.18 (0.0070)
Inner side of the companion flange	0.13 (0.0051)

SELECTIVE PARTS

Side Gear Thrust Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
0.68 (0.0268)	38424 W1010	0.86 (0.0339)	38424 W1016
0.71 (0.0280)	38424 W1011	0.89 (0.0350)	38424 W1017
0.74 (0.0291)	38424 W1012	0.92 (0.0362)	38424 W1018
0.77 (0.0303)	38424 W1013	0.95 (0.0374)	38424 W1019
0.80 (0.0315)	38424 W1014	0.98 (0.0386)	38424 W1020
0.83 (0.0327)	38424 W1015	1.01 (0.0398)	38424 W1021

*: Always check with the Parts Department for the latest parts information.

Pinion Height Adjusting Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
3.09 (0.1217)	38154 U1500	3.39 (0.1335)	38154 U1510
3.12 (0.1228)	38154 U1501	3.42 (0.1346)	38154 U1511
3.15 (0.1240)	38154 U1502	3.45 (0.1358)	38154U1512
3.18 (0.1252)	38154 U1503	3.48 (0.1370)	38154 U1513
3.21 (0.1264)	38154 U1504	3.51 (0.1382)	38154 U1514
3.24 (0.1276)	38154 U1505	3.54 (0.1394)	38154 U1515
3.27 (0.1287)	38154 U1506	3.57 (0.1406)	38154 U1516
3.30 (0.1299)	38154 U1507	3.60 (0.1429)	38154 U1517
3.33 (0.1323)	38154 U1508	3.63 (0.1429)	38154 U1518
3.36 (0.1323)	38154 U1509	3.66 (0.1441)	38154 U1519

*: Always check with the Parts Department for the latest parts information.

Drive Pinion Bearing Adjusting Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
3.81 (0.1500)	38125 61001	3.97 (0.1563)	38133 61001
3.83 (0.1508)	38126 61001	3.99 (0.1571)	38134 61001
3.85 (0.1516)	38127 61001	4.01 (0.1579)	38135 61001
3.87 (0.1524)	38128 61001	4.03 (0.1587)	38136 61001
3.89 (0.1531)	39129 61001	4.05 (0.1594)	38137 61001
3.91 (0.1539)	38130 61001	4.07 (0.1602)	38138 61001
3.93 (0.1547)	38131 61001	4.09 (0.1610)	38139 61001
3.95 (0.1555)	38132 61001		

*: Always check with the Parts Department for the latest parts information.

Drive Pinion Adjusting Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
5.19 (0.2043)	38151 AR000	6.09 (0.2398)	38151 AR003
5.49 (0.2161)	38151 AR001	6.39 (0.2516)	38151 AR004
5.79 (0.2280)	38151 AR002		

*: Always check with the Parts Department for the latest parts information.

Side Bearing Adjusting Shim

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
0.20 (0.0079)	38453 AR000	0.40 (0.0157)	38453 AR003
0.25 (0.0098)	38453 AR001	0.50 (0.0197)	38453 AR004
0.30 (0.0118)	38453 AR002		

*: Always check with the Parts Department for the latest parts information.

Side Bearing Adjusting Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
0.10 (0.0040)	38453 AR010	0.25 (0.0098)	38453 AR015
0.12 (0.0047)	38453 AR011	0.30 (0.0118)	38453 AR016
0.15 (0.0059)	38453 AR012	0.40 (0.0157)	38453 AR017
0.17 (0.0067)	38453 AR013	0.50 (0.0197)	38453 AR018
0.20 (0.0079)	38453 AR014		

*: Always check with the Parts Department for the latest parts information.