SECTION FFD
FRONT FINAL DRIVE

CONTENTS

PRECAUTIONS

PFP:00001

Precautions

EDS001OA

CAUTION:

- **Before starting diagnosis of the vehicle, understand symptoms well. Perform correct and systematic operations.**
- **Check for the correct installation status prior removal or disassembly. When matching marks are required, be sure they do not interfere with the function of the parts they are applied to.**
- **Carry out an overhaul in a clean work place, Using a dust proof room is recommended.**
- **Before disassembly, using steam or white gasoline, completely remove sand and mud from the exterior the unit, preventing them from entering into the unit during disassembly or assembly.**
- **Check appearance of the disassembled parts for damage, deformation, and abnormal wear. If a malfunction is detected, replace it with a new one.**
- **Normally replace lock pins, oil seals, and bearings with new ones every times they are removed.**
- **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 them dry.**
- **Be careful not to damage the sliding surfaces and mating surface.**
- **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 a shop cloth to prevent entering of lint.**
- **During assembly, observe the specified tightening torque, and new differential gear oil, Vaseline, or multi-purpose grease, as specified for each vehicle, when necessary.**

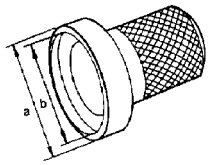
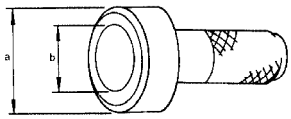
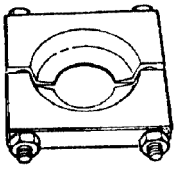
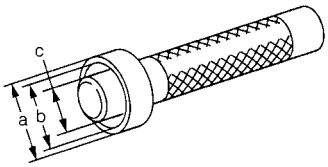
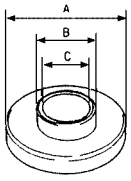
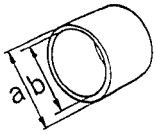
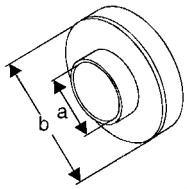
PREPARATION

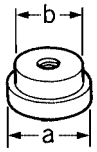
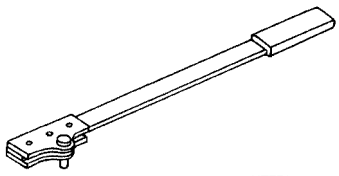
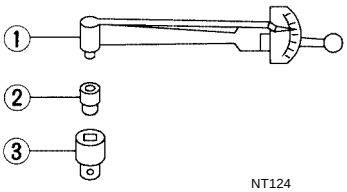
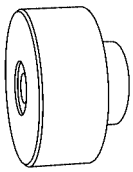
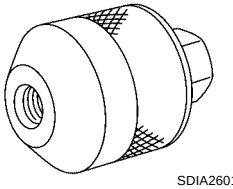
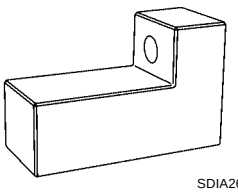
PFP:00002

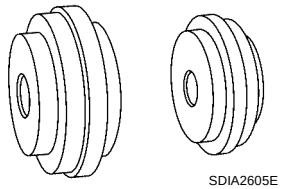
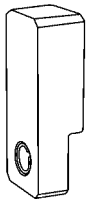
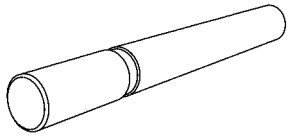
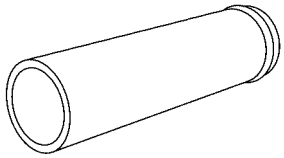
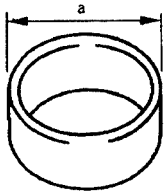
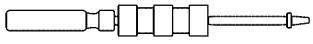
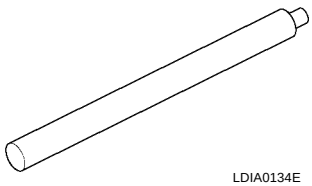
Special Service Tools

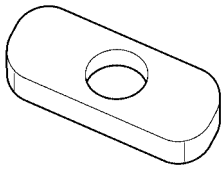
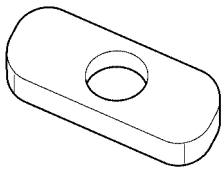
EDS002GR

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
ST35271000 (—) Drift	 ZZA0702D	Installing drive pinion front bearing outer race. a: 72 mm (2.83 in) dia. b: 36 mm (1.42 in) dia.
KV38100500 (J-25273) Drift	 ZZA0811D	Installing front oil seal. a: 80 mm (3.15 in) dia. b: 60 mm (2.36 in) dia.
ST30021000 (–) Puller	 ZZA0700D	● Removing side bearing inner race. ● Removing drive pinion rear bearing inner race.
KV38100300 (J-25523) Drift	 ZZA1046D	Installing side bearing inner race. a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32mm (1.26 in) dia.
ST30901000 (–) Drift	 SDIA0217J	Installing drive pinion rear bearing outer race. A: 79mm (3.11 in) dia. B: 45 mm (1.77 in) dia. C: 35.2 mm (1.39 in) dia.
KV40104810 (–) Drift	 ZZA1003D	Installing drive pinion front bearing outer race. a: 68 mm (2.68 in) dia. b: 55 mm (2.17 in) dia.
KV38102200 (—) Drift	 NT660	Installing front oil seal. a: 90 mm (3.54 in) dia. b: 55.3 mm (2.18 in) dia.

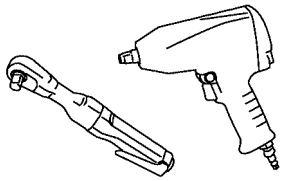
Tool number (Kent-Moore No.) Tool name		Description
ST33081000 (–) Adapter	 ZZA1000D	Removing and installing side bearing inner race. a: 43 mm (1.69 in) dia. b: 33.5 mm (1.32 in) dia.
KV38108300 (J-44195) Companion flange wrench	 NT771	Removing and installing drive pinion nut.
ST3127S000 (J-25765-A) Preload gauge 1. GG91030000 (J-25765) Torque wrench 2. HT62940000 (–) Socket adapter (1/2″) 3. HT62900000 (–) Socket adapter (3/8″)	 NT124	Inspecting drive pinion bearing preload and total preload
— (8144) Pinion block	 SDIA2599E	Adjusting pinion gear height
— (6740) Cone	 SDIA2601E	Adjusting pinion gear height
— (6741) Screw	 SDIA2602E	Adjusting pinion gear height
— (6739) Pinion height lock	 SDIA2603E	Adjusting pinion gear height

Tool number (Kent-Moore No.) Tool name	Description
— TBD Arbor disc  SDIA2605E	Adjusting pinion gear height
— (D-115-2) Scooter block  SDIA2604E	Adjusting pinion gear height
— (D-115-3) Arbor  SDIA2606E	Adjusting pinion gear height
— (C-4040) Installer  SDIA2607E	Installing drive pinion rear bearing inner race.
KV40105230 (–) Drift  ZZA0898D	Installing drive pinion rear bearing outer race. a: 92 mm(3.62 in) dia. b: 85.5 mm (3.37 in) dia.
— (SP8P) Slide hammer  LDIA0133E	● Removing front oil seal ● Removing side oil seal
— (C-4171) Handle  LDIA0134E	● Removing drive pinion front bearing outer race ● Removing drive pinion rear bearing outer race

Tool number (Kent-Moore No.) Tool name	Description
— (D-103) Remover  LDIA0135E	Removing drive pinion front bearing outer race
— (C-4307) Remover  LDIA0135E	Removing drive pinion rear bearing outer race

Commercial Service Tools

EDS002GS

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EDS001OD

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

Reference page			FFD-21	FFD-15	FFD-21	FFD-15	FFD-15	MA-26, "Checking Final Drive Oil"	PR-3, "NVH Troubleshooting Chart"	FAX-4, "NVH Troubleshooting Chart" and FSU-4, "NVH Troubleshooting Chart"	WT-3, "NVH Troubleshooting Chart"	WT-3, "NVH Troubleshooting Chart"	FAX-4, "NVH Troubleshooting Chart"	BR-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
Possible cause and suspected parts			Rough gear tooth	Improper gear contact	Tooth surfaces worn	Incorrect backlash	Companion flange excessive runout	Improper gear oil	Propeller shaft	Axle and suspension	Tires	Road wheel	Drive shaft	Brakes	Steering
Symptom	Differential	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×

×: Applicable

FRONT OIL SEAL

PFP:38189

Removal and Installation

EDS002GT

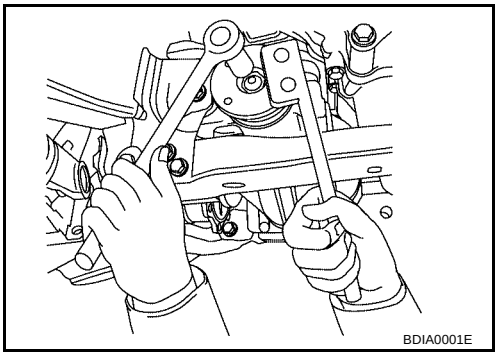
REMOVAL

1. Remove front propeller shaft. Refer to PR-5, "REMOVAL" .
2. Separate the RH and LH drive shafts from the front final drive. Refer to FAX-7, "REMOVAL" .
3. Measure the drive pinion bearing preload with front oil seal resistance using Tool.

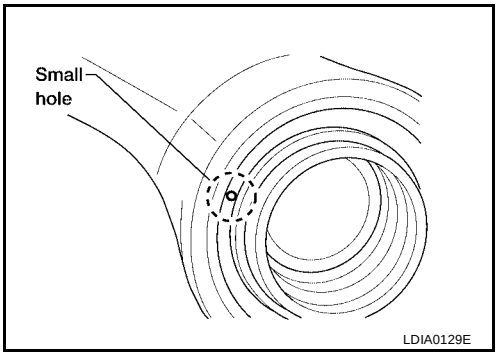
   Tool number : ST3127S000 (J25765-A)

   NOTE:
   Record the preload measurement.
4. Loosen drive pinion nut while holding the companion flange using Tool.

   Tool number : KV38108300 (J44195)


BDIA0001E

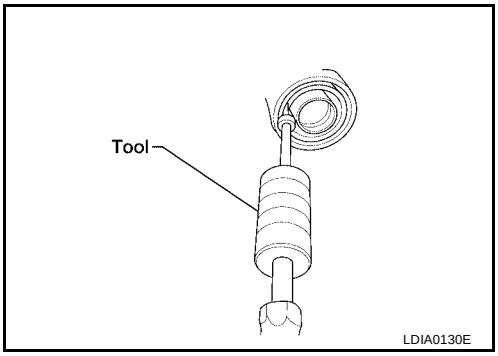
5. Remove companion flange using a suitable puller.
6. Place a small hole in seal case, using a suitable punch or drill.



LDIA0129E

7. Assemble Tool as shown and remove seal.

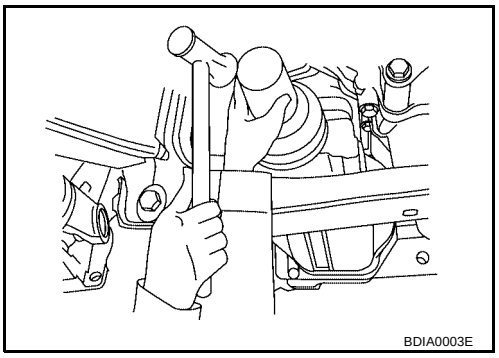
   Tool number : SP8P



LDIA0130E

INSTALLATION

1. Apply multi-purpose grease to cavity at sealing lips of front oil seal. Press front oil seal into gear carrier using suitable tool.

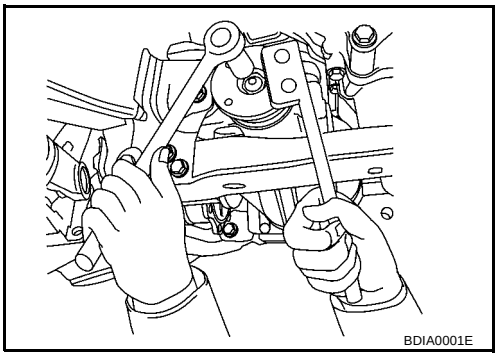


2. Install companion flange and a new drive pinion nut. Tighten drive pinion nut while holding the companion flange using Tool until there is no end play.

Tool number : KV38108300 (J44195)

3. Measure the drive pinion bearing preload with front oil seal resistance using Tool.

Tool number : ST3127S000 (J25765-A)



NOTE:

- Drive pinion bearing preload should equal the measurement taken during removal plus an additional 0.56 N·m (0.06 Kg-m, 5 in-lb).
- If drive pinion bearing preload is low, tighten drive pinion nut in 6.8 N·m (0.69 Kg-m, 5ft-lb) increments until drive pinion preload is met.

CAUTION:

Never loosen the drive pinion nut to decrease drive pinion bearing preload. Do not exceed specified preload. If preload torque is exceed a new collapsible spacer must be installed. If maximum torque is reached prior to reaching the required preload, the collapsible spacer may have been damaged. Replace the collapsible spacer.

Drive pinion nut : 298 - 678 N·m (31 - 69Kg-m, 220 - 500 ft-lb)

4. Attach the RH and LH drive shafts. Refer to FAX-8, "INSTALLATION" .
5. Install the front propeller shaft. Refer to PR-5, "INSTALLATION" .

SIDE OIL SEALS

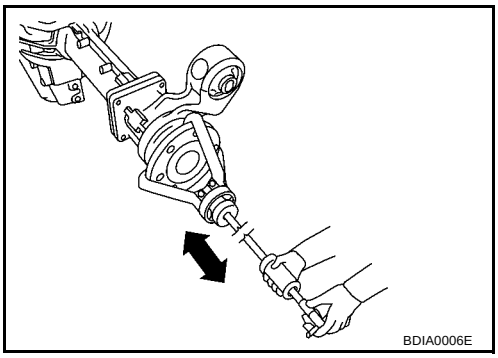
PFP:33142

Removal and Installation

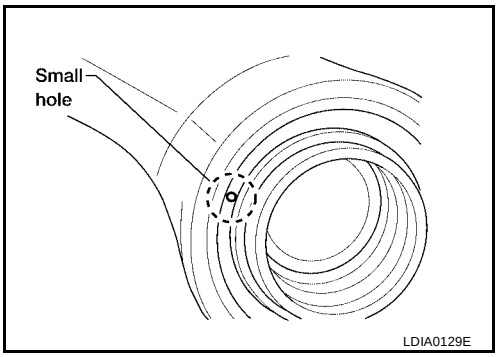
EDS002GU

REMOVAL

1. Remove front final drive. Refer to FFD-12, "REMOVAL" .
2. Remove differential side shaft and side flange using suitable tool.



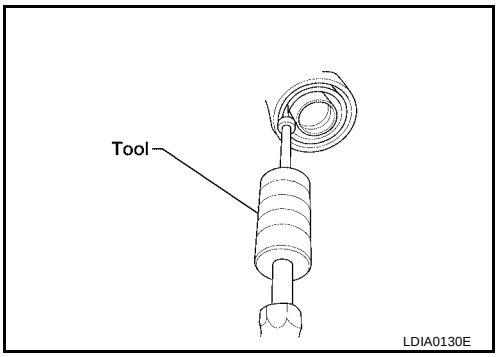
3. Place a small hole in seal case, using suitable punch or drill.



4. Assemble Tool as shown and remove seal.

Tool number : SP8P

5. Installation is in the reverse order of removal.



REAR COVER GASKET

PFP:38320

Removal and Installation

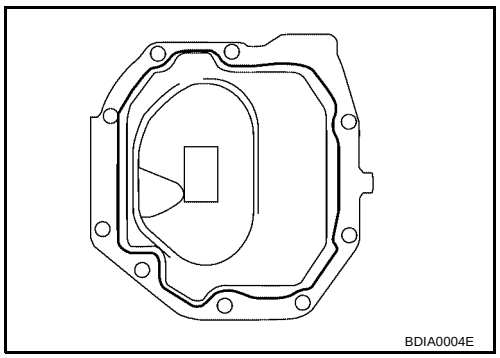
EDS002GV

REMOVAL

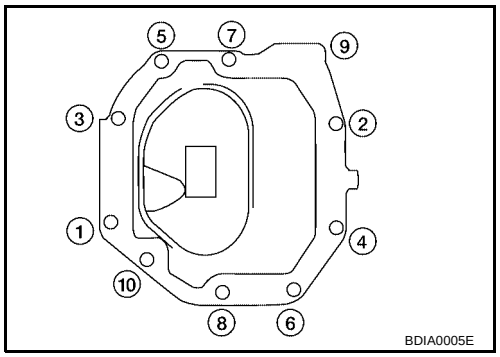
1. Remove front final drive. Refer to FFD-12, "REMOVAL" .
2. Drain gear oil. Refer to MA-27, "DRAINING" .
3. Remove rear cover.

INSTALLATION

1. Apply 3.2mm (0.126 in) bead of sealant to the rear cover.
   - Use Genuine Silicone RTV sealant or equivalent. Refer to. GI-45, "Recommended Chemical Products and Sealants" .



2. Install rear cover and tighten rear cover bolts in the order as shown FFD-14, "Components" .
3. Fill final drive with recommended gear oil. Refer to MA-11, "Fluids and Lubricants" .
4. Install front final drive. Refer to FFD-13, "INSTALLATION" .

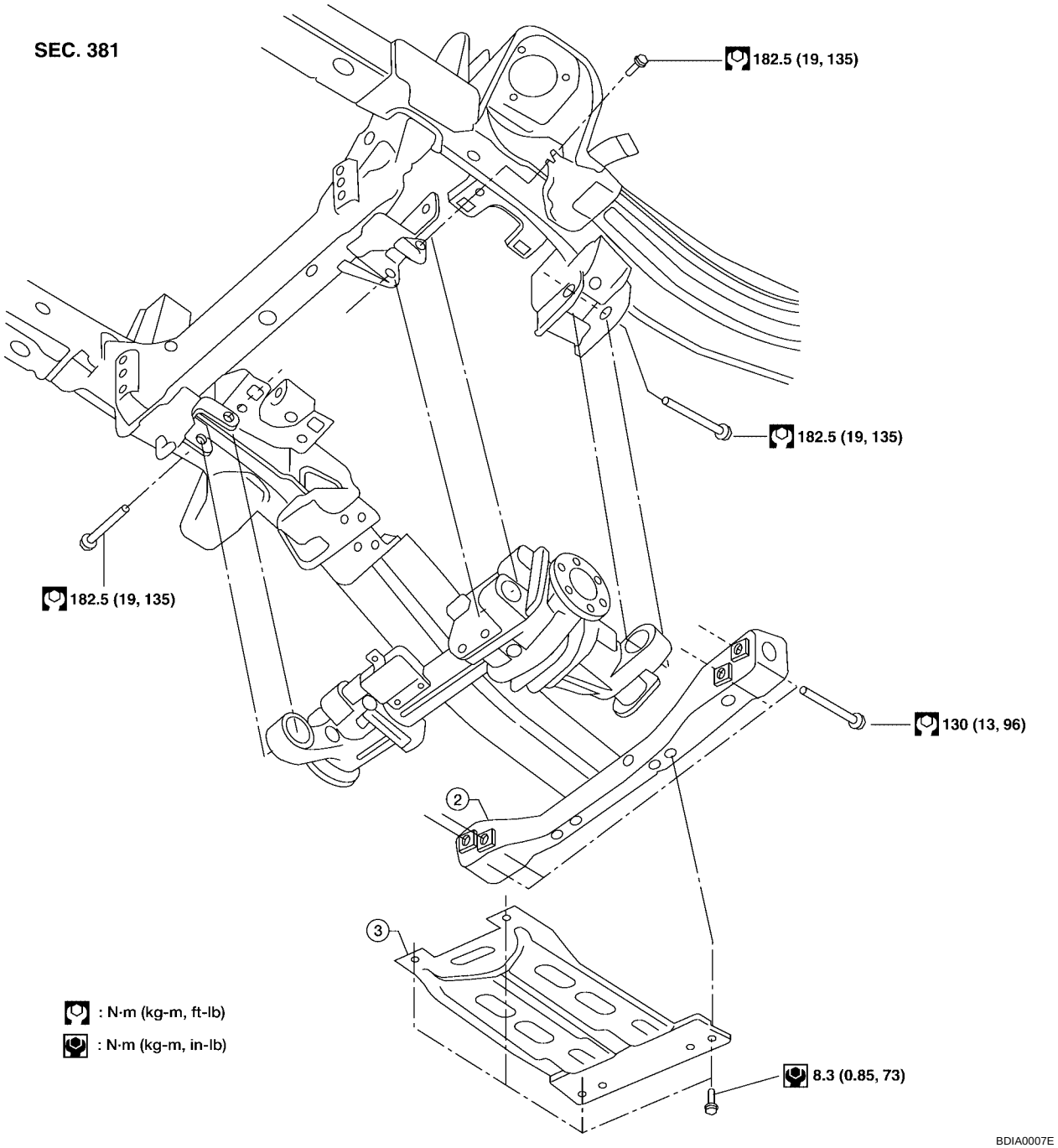


FRONT FINAL DRIVE ASSEMBLY

PFP:38500

Removal and Installation

EDS002GW



1. Gear carrier assembly
2. Front crosemember
3. Skid plate (if equipped)

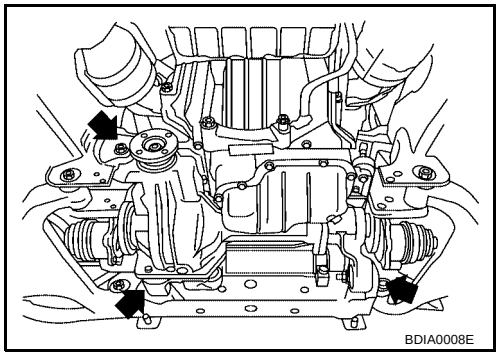
REMOVAL

1. Remove front propeller shaft. Refer to PR-5, "REMOVAL" .

   CAUTION:

   Be careful not to damage spline, sleeve yoke and front oil seal when removing propeller shaft.
2. Separate LH and RH drive shafts from front final drive. Refer to FAX-7, "REMOVAL" .
3. Remove front cross member.
4. Disconnect the vent hose.

5. Support the front final drive with suitable jack and remove the front final drive bolts. Carefully remove front final drive.

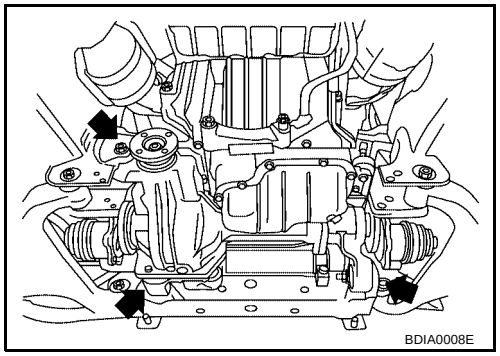


INSTALLATION

1. Install front final drive assembly.

Front final drive bolts : 182.5 N·m (19 Kg-m, 135 ft-lb)

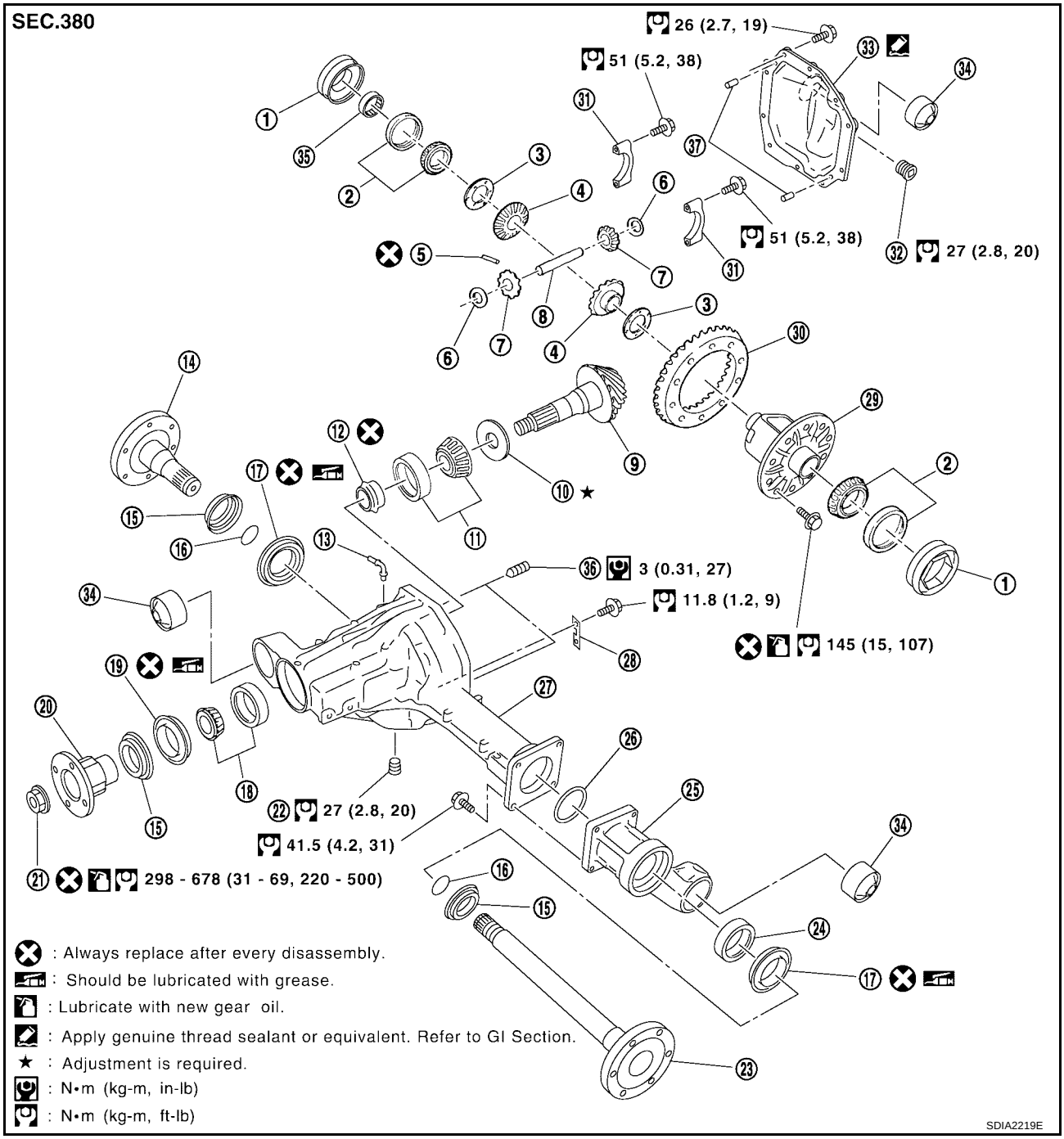
2. Connect the vent hose.
3. Install the front cross member.
4. Install LH and RH drive shaft. Refer to FAX-8, "INSTALLATION" .
5. Install front propeller shaft. Refer to PR-5, "INSTALLATION" .



Components

EDS002GX

M205 2-PINION



1. Side bearing adjust nut
2. Side bearing
3. Side gear thrust washer
4. Side gear
5. Lock pin
6. Pinion mate thrust washer
7. Pinion mate gear
8. Pinion mate shaft
9. Drive pinion
10. Drive pinion height adjusting washer
11. Drive pinion rear bearing
12. Collapsible spacer
13. Breather tube
14. Differential side flange
15. Dust shield
16. Circular clip
17. Side oil seal
18. Drive pinion front bearing
19. Front oil seal
20. Companion flange
21. Drive pinion nut
22. Drain plug
23. Differential side shaft
24. Axle shaft bearing
25. Extension tube
26. O-ring
27. Gear carrier
28. Plate
29. Differential case
30. Drive gear
31. Side bearing cap
32. Filler plug
33. Rear cover

34. Bushing
35. Bearing
36 Screw
37 Dowel pin

Pre-Inspection

EDS002GY

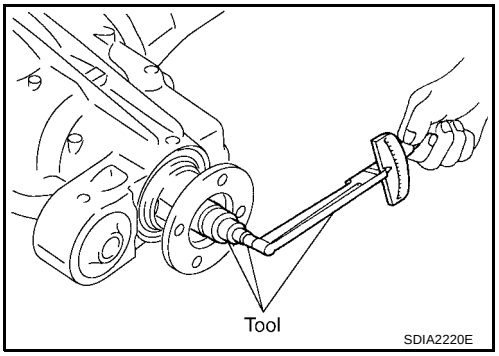
Before disassembling the front final drive, drain off oil from final drive assembly and remove the rear cover. Then perform the following inspection.

TOTAL PRELOAD

1. Turn drive pinion in both directions several times to set bearing rollers.
2. Check total preload using Tool.

Tool number : ST3127S000 (J-25765-A)

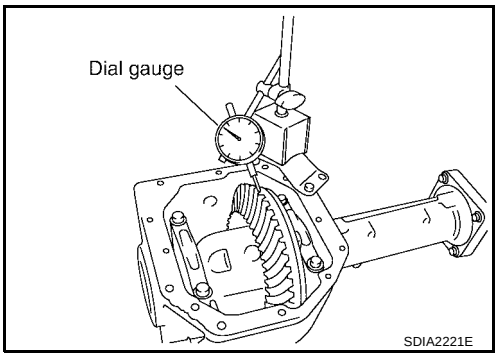
Total preload (with oil seal) : 2.98 - 4.76 N·m (0.31 - 0.48 Kg-m, 27 - 42 in-lb)



DRIVE GEAR TO DRIVE PINION BACKLASH

Check drive gear to drive pinion backlash using a dial gauge at several points.

Drive gear to drive pinion backlash:
0.13 - 0.18 mm(0.0051 - 0.0071 in)



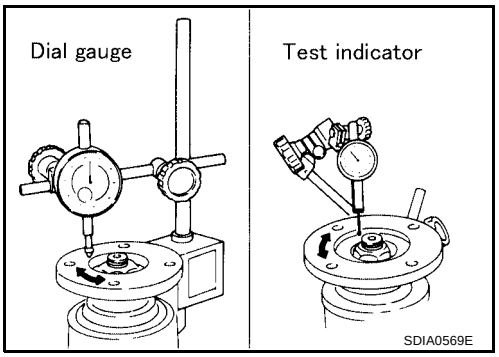
COMPANION FLANGE RUNOUT

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

Runout limit : 0.10 mm (0.0039 in)

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

Runout limit : 0.13 mm (0.0051 in)



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

a. Check for runout while changing the phase between companion flange and drive pinion gear by 90° step, and search for the point where the runout is the minimum.
b. If the runout value is still outside of the limit after the phase has been changed, replace the companion flange.
c. If the runout value still outside of the limit after the companion flange has been replaced, check pinion bearing and drive pinion assembly.

TOOTH CONTACT

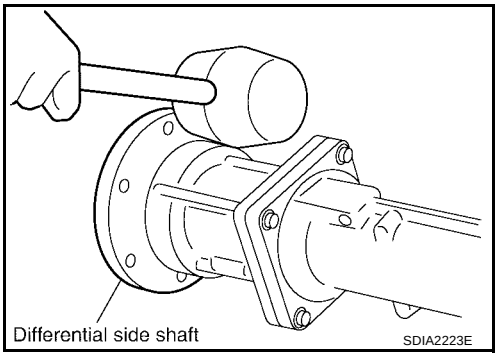
Check tooth contact. Refer to FFD-15, "TOOTH CONTACT" .

Disassembly and Assembly

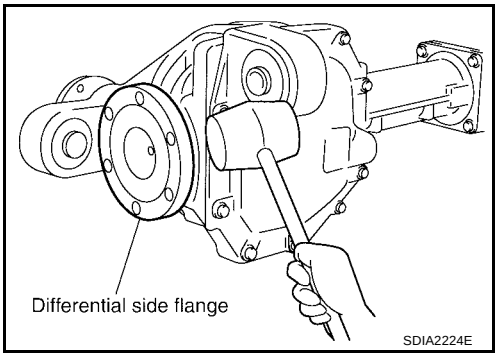
EDS002GZ

REMOVAL OF DRIVE GEAR AND DIFFERENTIAL CASE ASSEMBLY

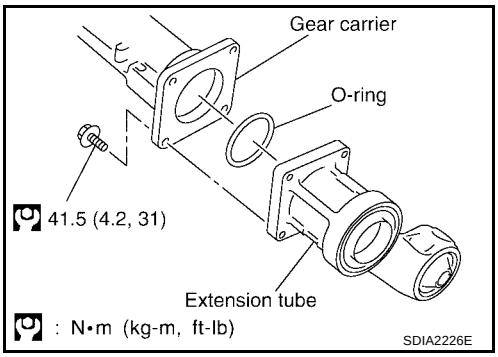
1. Remove differential side shaft with a soft hammer.



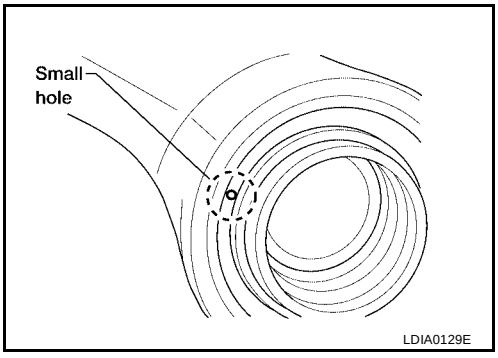
2. Remove differential side flange with a soft hammer.



3. Remove extension tube and O-ring.

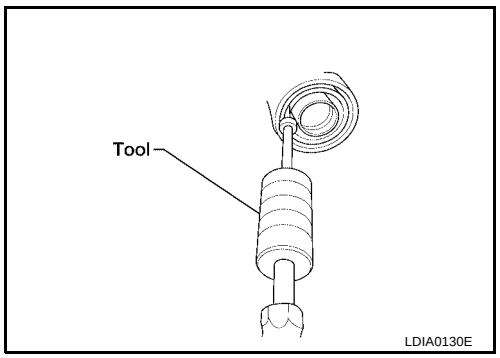


4. Place a small hole in seal case, using suitable punch or drill.

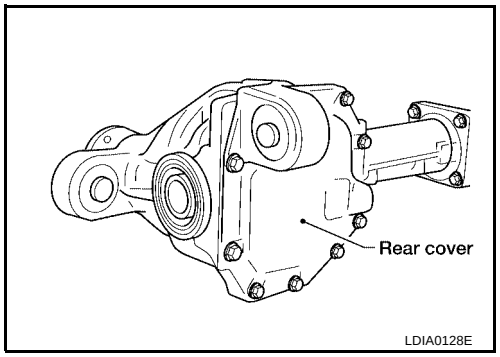


5. Assemble Tool as shown and remove seal.

Tool number : — (SP8P)

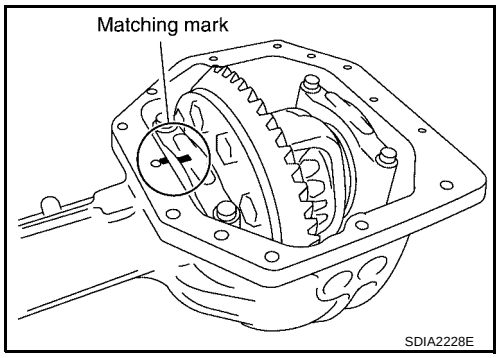


6. Remove rear cover from gear carrier.

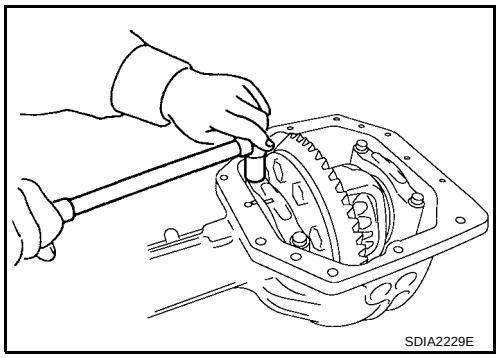


7. For proper reinstallation, paint matching mark on one side bearing cap.

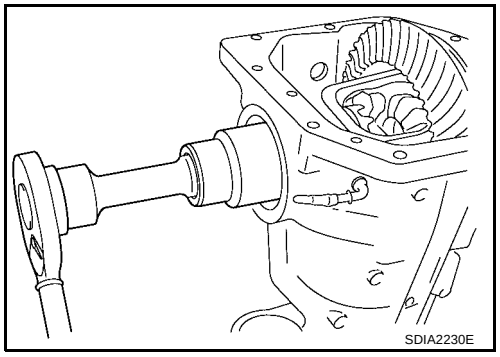
NOTE:
Bearing caps are line-board for initial assembly. The matching marks are used to replace them in their original positions.



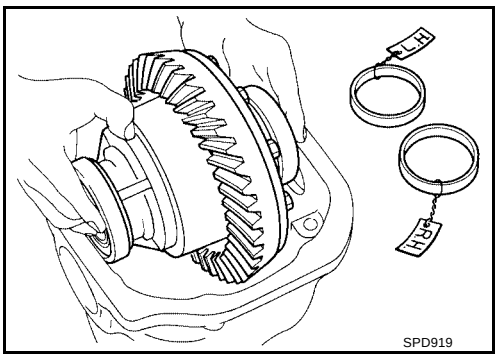
8. Remove side bearing caps.



9. Remove side bearing adjust nuts.



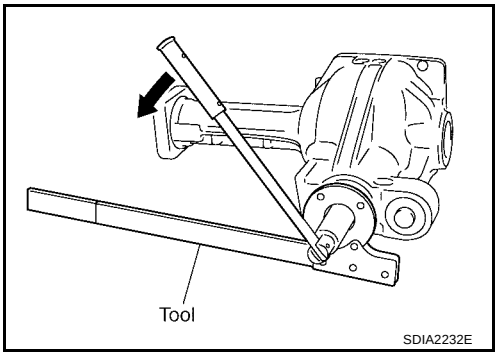
10. Keep the side bearing outer races together with inner race. Do not mix them up.



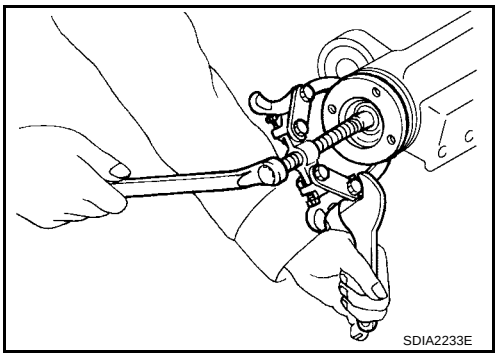
REMOVAL OF DRIVE PINION ASSEMBLY

1. Put matching marks on companion flange and drive pinion with paint.
2. Loosen drive pinion nut using Tool.

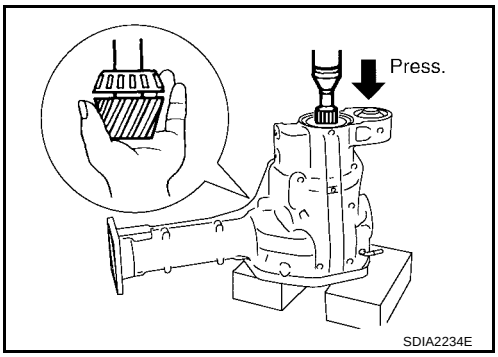
Tool number : KV38108300 (J-44195)



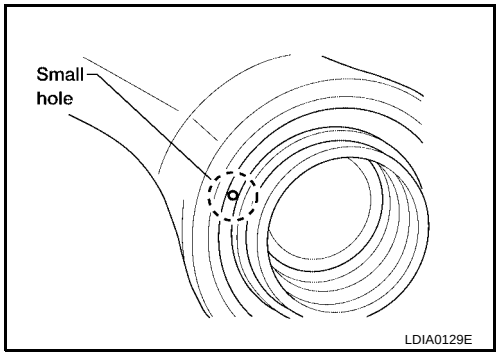
3. Remove companion flange using a suitable puller.



4. Remove drive pinion (together with rear bearing inner race, collapsible spacer.)
5. Remove pinion front bearing inner race.

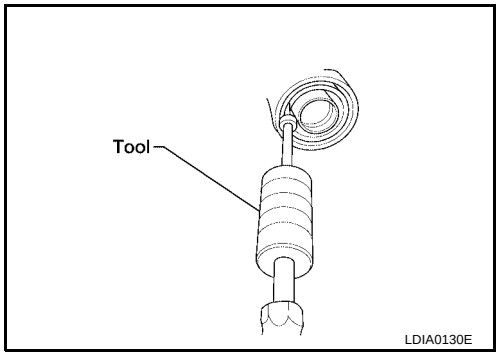


6. Place a small hole in case, using suitable punch or drill.



7. Assemble Tool as shown and remove seal.

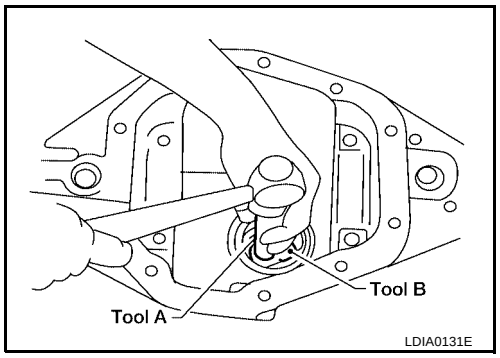
Tool number : — (SP8P)



8. Turn nose of gear carrier down. Remove drive pinion front bearing outer race using Tool. Locate driver on back edge of outer race, then drive outer race out.

CAUTION:
Do not nick gear carrier.

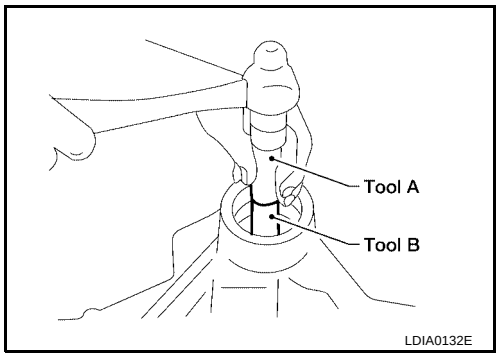
Tool number A: — (C-4171)
B: — (D-103)



9. Turn nose of gear carrier up. Remove drive pinion rear bearing outer race using Tool. Locate driver on back edge of outer race, then drive outer race out.

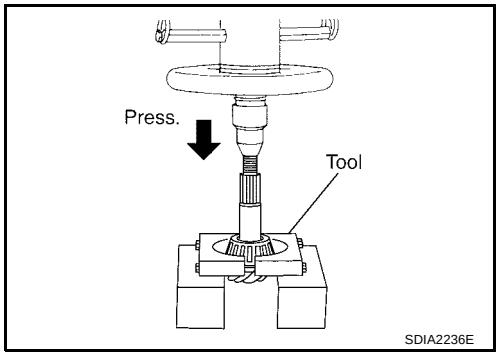
CAUTION:
Do not nick gear carrier.

Tool number A: — (C-4171)
B: — (C-4307)



10. Remove drive pinion rear bearing inner race and drive pinion height adjusting washer using Tool.

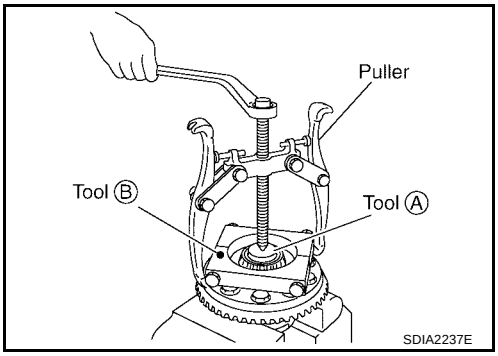
Tool number : ST30021000 (—)



DIFFERENTIAL CASE DISASSEMBLY

1. Remove side bearing inner race.
   To prevent damage to bearing, engage puller jaws in groove.

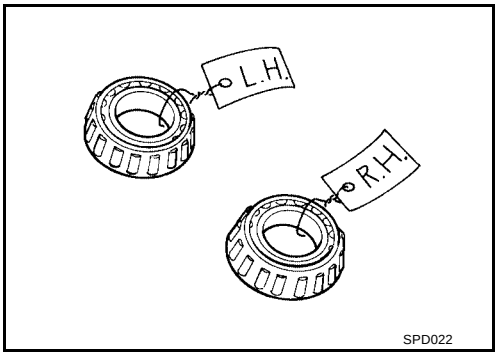
   Tool number A : ST33081000 (—)
   Tool number B : ST30021000 (—)



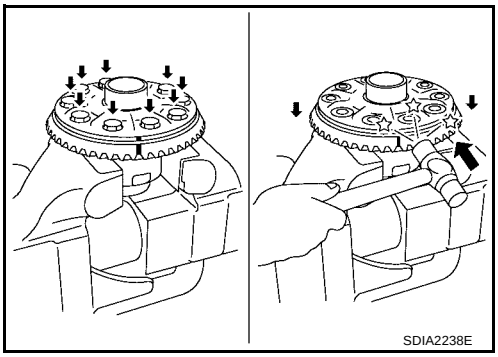
CAUTION:

- **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 except it is replaced.**

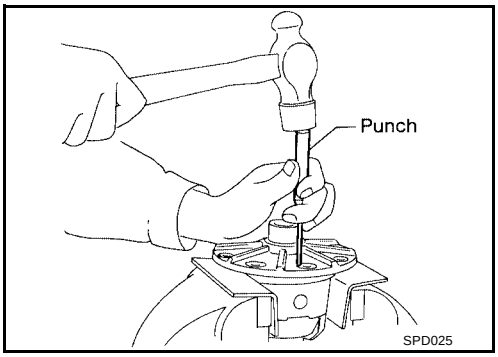
- **Be careful not to confuse left-hand and right-hand parts. Keep bearing and bearing race for each side together.**



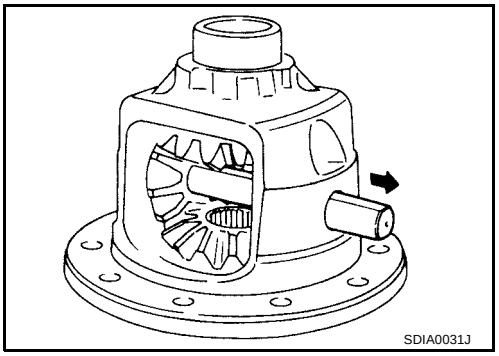
2. Loosen drive gear bolts in a crisscross fashion.
3. Tap drive gear off the differential case with a soft hammer.
   - Tap evenly all around to keep the drive gear from bending.



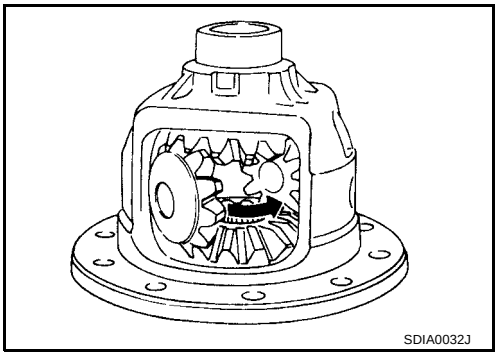
4. Drive out pinion mate shaft lock pin using suitable punch from drive gear side.



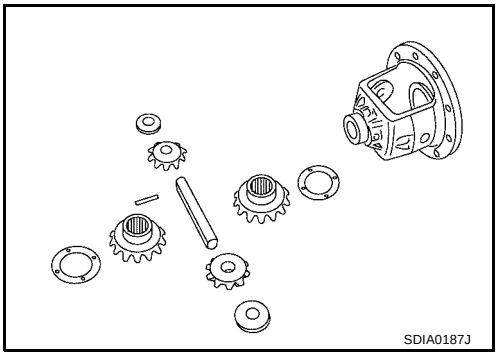
5. Remove the pinion mate shaft.



6. Turn the pinion mate gear, then remove the pinion mate gear, pinion mate thrust washer, side gear and side gear thrust washer from the differential case.



7. Check mating surfaces of differential case, side gears, pinion mate gears, pinion mate shaft and thrust washers.



INSPECTION

- Clean up the disassemble parts. Then, inspect if the parts are wear or damaged. If so, follow the measures below.

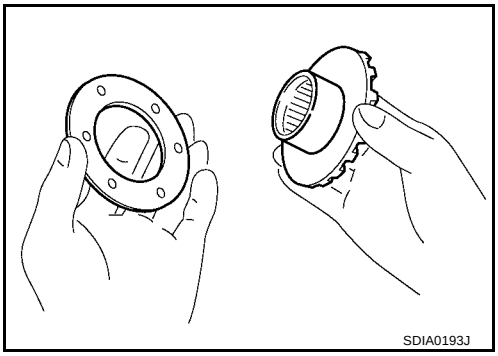
Content	Measures
Drive gear and drive pinion	● If the gear teeth do not mesh or line-up correctly, determine the cause and adjust, repair, or replace as necessary. ● If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new gears.
Bearing	● If found any chipped (by friction), pitted, worn, rusted, scratched mark, or unusual noise from the bearing, replace with new bearing assembly (as a new set).
Side gear thrust washer and pinion mate thrust washer	● Replace with a new one if found any cracks or damage on the surface of the tooth. ● Replace with a new one if found any worn or chipped mark on the contact sides of the thrust washer.
Side gear and pinion mate thrust washer	● Replace with a new one if found that it is chipped (by friction), damaged, or unusual worn.
Oil seal	● Oil seals must be replaced with a new one whenever disassembled.

Content	Measures
Differential case	● Replace with a new one if found any wear or cracks on the contact sides of the differential case.
Companion flange	● Replace with a new one if found any chipped marks (about 0.10 mm, 0.0039 in) or other damage on the contact sides of the lips of the companion flange.

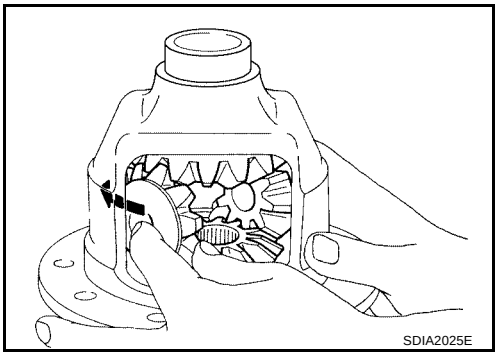
ADJUSTMENT OF DIFFERENTIAL CASE

Thrust Washer Selection

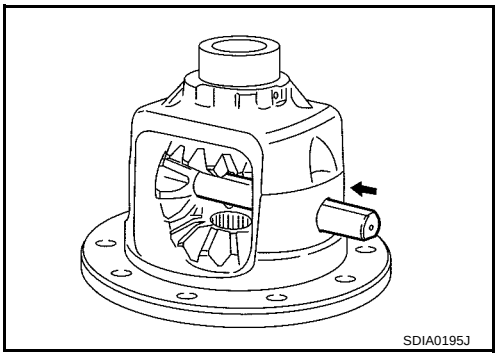
1. Apply gear oil to contact surfaces of each gear, thrust washers and differential case.
2. Install the removed thrust washer or same thickness washer to side gear.


SDIA0193J

3. Install the side gears, thrust washers, pinion mate gears and thrust washers into differential case.


SDIA2025E

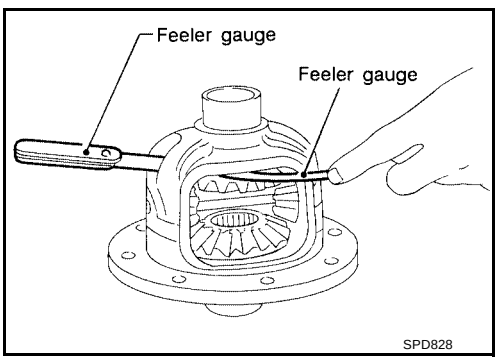
4. Install pinion mate shaft to differential case so that it meets lock pin holes.


SDIA0195J

5. Adjust clearance between rear face of side gear and thrust washer by selecting side gear thrust washer. Refer to FFD-32, "Side Gear Adjustment" .
   Use two feeler gauges to prevent leaning of side gear as showing figure.

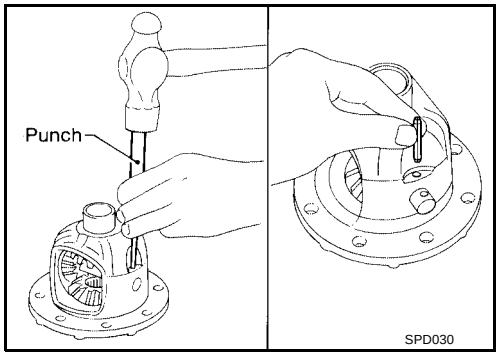
   Clearance between side gear thrust washer and differential case

   : 0.20 mm (0.0079 in) or less

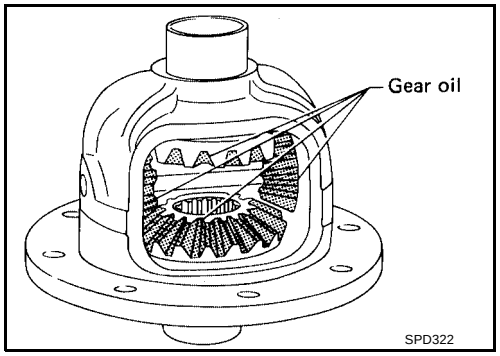


SPD828

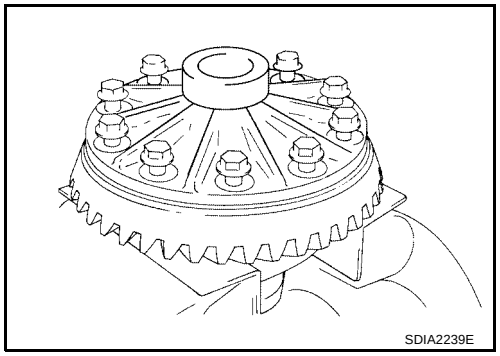
6. Make sure lock pin is flush with case, using a suitable punch.



7. Apply gear oil to gear tooth surfaces and thrust surfaces and check to see they turn properly.
8. Install differential case assembly on drive gear.
   - Tighten bolts in a crisscross pattern, lightly tapping bolt head with a hammer.

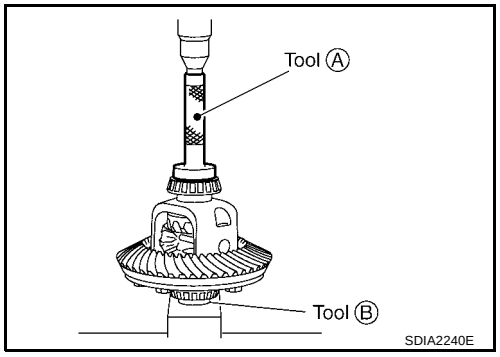


9. Place differential case on drive gear. Tighten bolts in a criss-cross fashion.



10. Press-fit side bearing inner race on differential case using Tools.

Tool number A : KV38100300 (J-25523)
Tool number B : ST33081000 (—)

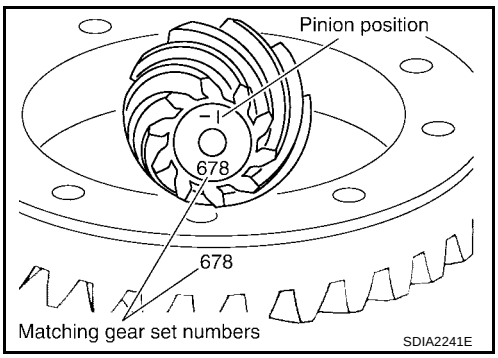


Adjustment of Drive Gear and Drive Pinion Assembly

EDS002H0

DRIVE PINION HEIGHT ADJUSTING WASHER SELECTION

- Drive gear and pinions are supplied in matched sets only. Matching numbers on both pinion and drive gear are etched for verification. If a new gear set is being used, verify the numbers of each pinion gear and drive gear before proceeding with assembly.



- The mounting distance from the centerline of the drive gear to the back face of the pinion gear for the Model 205 axle assembly is 103.5 mm (4.0748 inches).
  On the button end of each pinion, there is etched a plus (+) number, a minus (-) number, or a zero (0), which indicates the best running position for each particular gear set. This dimension is controlled by a selective shim between the inner pinion bearing race and pinion gear.
  For example: If a pinion is etched m+8 (+3), it would require 0.08 mm (0.003 inch) less shim than a pinion etched “0”. This means decreasing shim thickness; increases the mounting distance of the pinion to 103.6 mm (4.0778 inches). If a pinion is etched m+8 (-3), it would require adding 0.08mm (0.003 inch) more to the shim than would be required if the pinion were etched “0”. By adding 0.08 mm (0.003 inch), the mounting distance of the pinion was decreased to 103.4 mm (4.0718 inches) which is just what m-8 (a-3) etching indicated.
- To change the pinion adjustment, use different shims which come in different thickness.
- Use the following tables as a guide for selecting the correct shim thickness to add or subtract from the old shim.

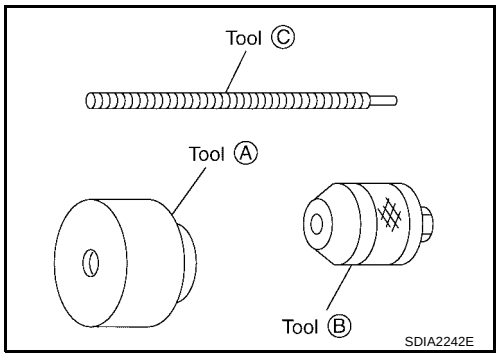
OLD PINION MARKING	NEW PINION MARKING (ENGLISH 0.000)								
	-4	-3	-2	-1	0	+1	+2	+3	+4
+4	+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001
+2	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002
+1	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003
0	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004
-1	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005
-2	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006
-3	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007
-4	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007	-0.008

OLD PINION MARKING	NEW PINION MARKING (METRIC 0.00)								
	-10	-8	-5	-3	0	+3	+5	+8	+10
+10	+0.20	+0.18	+0.15	+0.13	+0.10	+0.08	+0.05	+0.02	0
+8	+0.18	+0.15	+0.13	+0.10	+0.08	+0.05	+0.02	0	-0.02
+5	+0.15	+0.13	+0.10	+0.08	+0.05	+0.02	0	-0.02	-0.05
+3	+0.13	+0.10	+0.08	+0.05	+0.02	0	-0.02	-0.05	-0.08
0	+0.10	+0.08	+0.05	+0.02	0	-0.02	-0.05	-0.08	-0.10
-3	+0.08	+0.05	+0.02	0	-0.02	-0.05	-0.08	-0.10	-0.13
-5	+0.05	+0.02	0	-0.02	-0.05	-0.08	-0.10	-0.13	-0.15
-8	+0.02	0	-0.02	-0.05	-0.08	-0.10	-0.13	-0.15	-0.18
-10	0	-0.02	-0.05	-0.08	-0.10	-0.13	-0.15	-0.18	-0.20

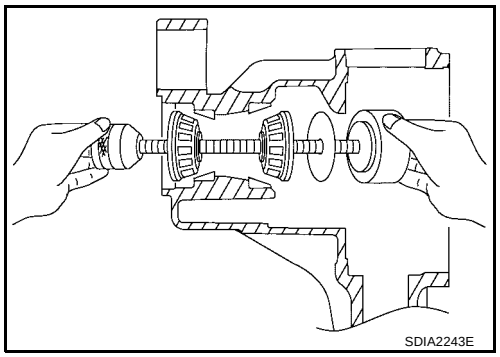
PINION GEAR HEIGHT

1. Make sure all parts are clean and that the bearings are well lubricated.
2. Assemble the pinion gear bearings into the differential shim selector tool.

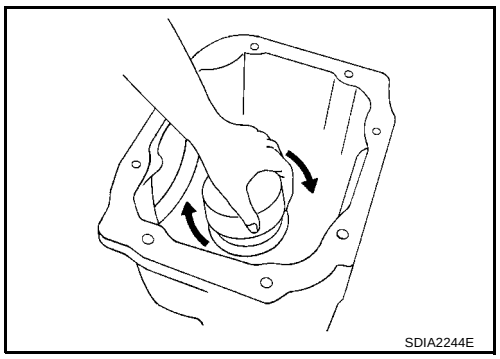
Tool number A : — (8144)
Tool number B : — (6740)
Tool number C : — (6741)



3. Install pinion bearing inner race and pinion height adjusting washer to gear carrier using Tool as shown.



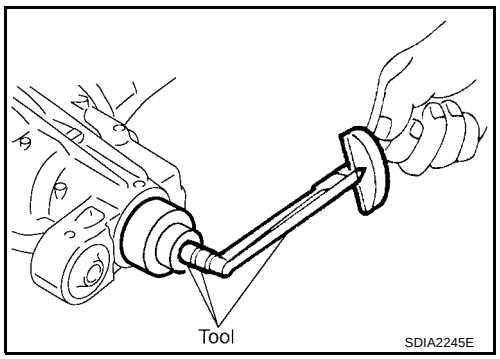
4. Turn the assembly several times to seat the bearings.



5. Measure the turning torque.

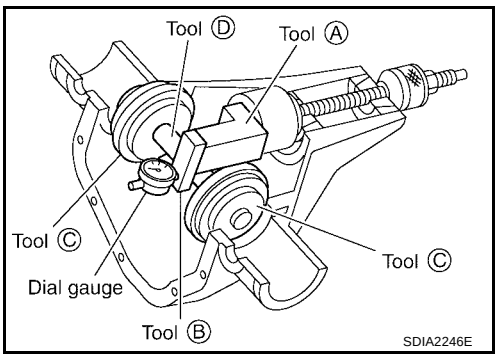
Tool number : ST3127S000 (J-25765-A)

Turning torque specification : 2.98 - 4.76 N·m (0.31 - 0.48 Kg-m, 27 - 42 in-lb)

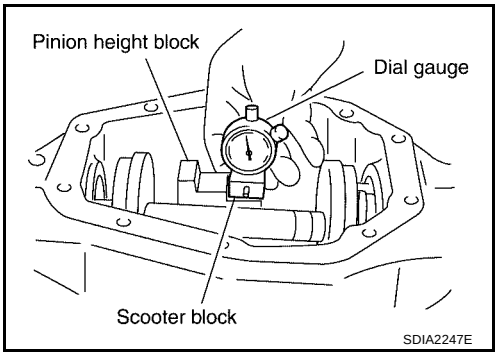


6. Tighten side-bearing cap to the specified torque installing Tools as shown in the figure.

Tool number A : — (6739)
Tool number B : — (D-115-2)
Tool number C : — TBD
Tool number D : — (D-115-3)



7. Put scooter block on pinion height block. Make sure that dial gauge is level adjusting pressure with a hand. Dial gauge indicates “0”.

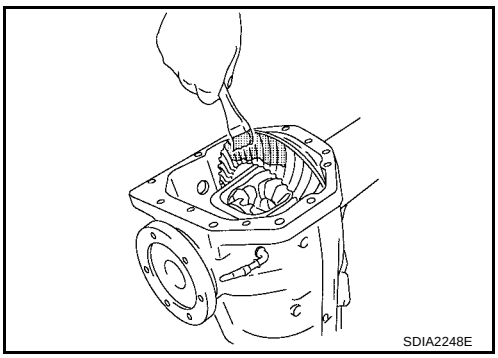


8. Slide dial gauge along arbor. Record the maximum.
9. Adjust pinion height adjusting washer so that the maximum will be “0”.

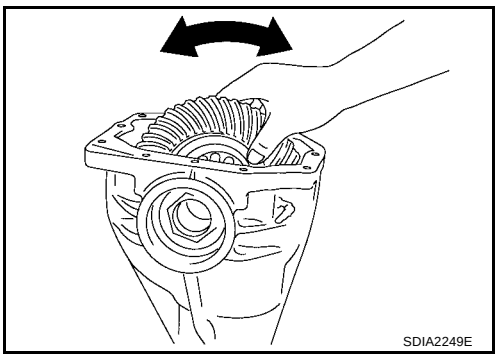
TOOTH CONTACT

Checking gear tooth contact pattern is necessary to verify correct relationship between drive gear and drive pinion.
Hypoid gears which are not positioned in proper arrangement may be noisy and/or have a short life. Check gear tooth contact pattern to obtain the best contact for low noise and long life.

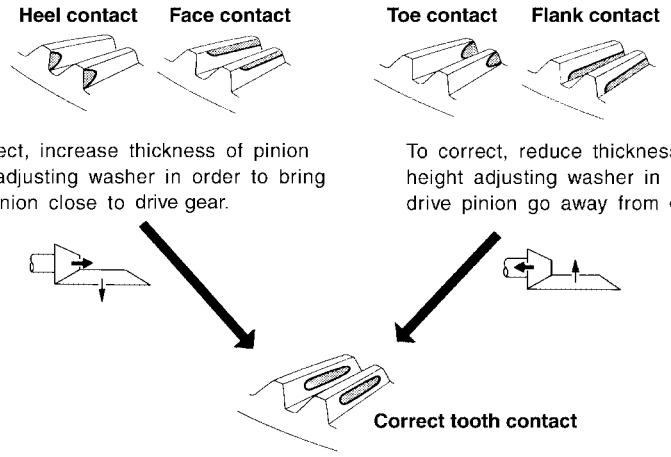
1. Thoroughly clean drive gear and drive pinion teeth.
2. Lightly apply a mixture of powdered ferric oxide and oil or the equivalent. Apply it to 3 or 4 teeth of drive gear drive side.



3. Hold companion flange steady by hand and rotate the drive gear in both directions.



Usually the pattern will be correct if washers are correctly calculated and the backlash is correct.
However, in rare cases, trial and error processes may be employed to obtain a correct pattern.
The tooth pattern is the best indication of how well a differential has been set up.



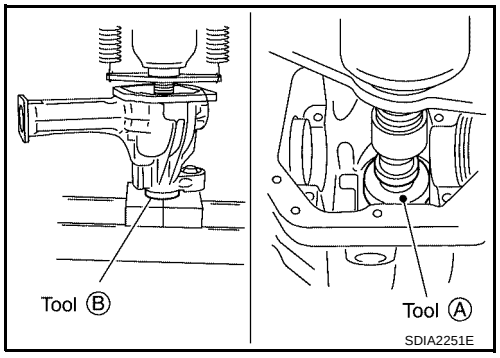
When adjustment is completed, be sure to wipe off completely the ferric oxide and oil or their equivalent.

SDIA1796E

INSTALLATION OF DRIVE PINION ASSEMBLY

1. Press-fit rear bearing outer race with Tools.

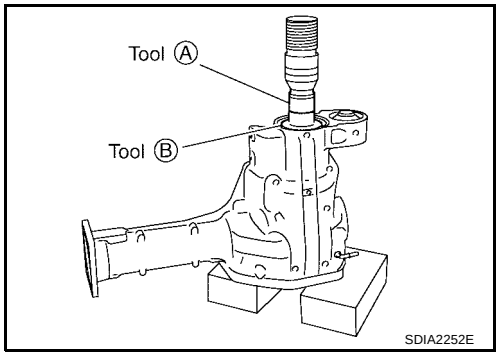
Tool number A : ST30901000 (—)
Tool number B : KV40105230 (—)



SDIA2251E

2. Press-fit front bearing outer race with Tools.

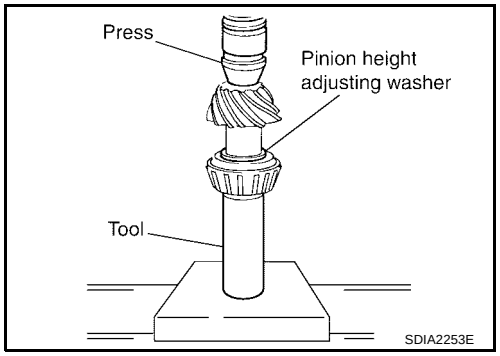
Tool number A : ST35271000 (—)
Tool number B : KV40104810 (—)



SDIA2252E

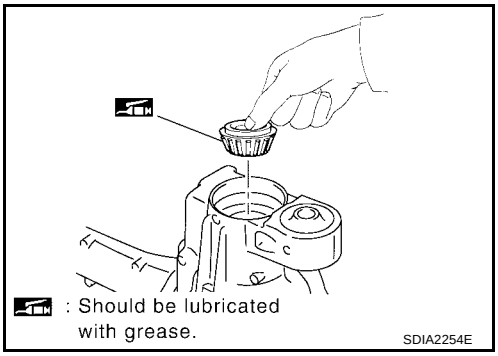
3. Select drive pinion height adjusting washer. Refer to FFD-33, "Drive Pinion Height Adjustment" .
4. Install drive pinion adjusting washer in drive pinion, and press-fit pinion rear bearing inner race in it, using a press and Tool.

Tool number : — (C - 4040)



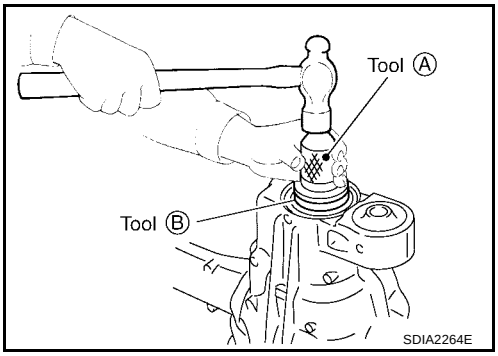
SDIA2253E

5. Place pinion front bearing inner race in gear carrier.

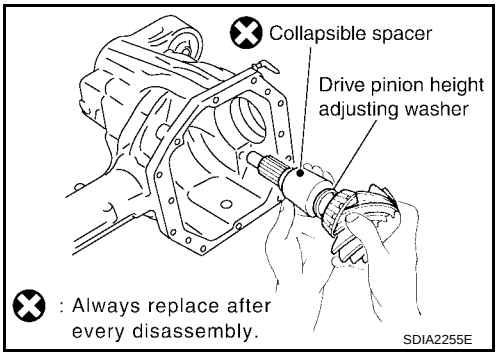


6. Apply multi-purpose grease to cavity at sealing lips of oil seal. Install front oil seal, using Tools.

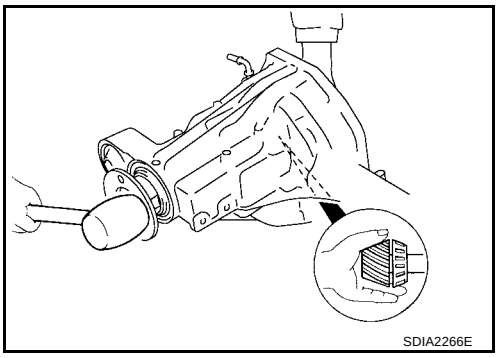
Tool number A : KV38100500 (J-25273)
Tool number B : KV38102200 (—)



7. Place collapsible spacer, drive pinion height adjusting washer and drive pinion in gear carrier.

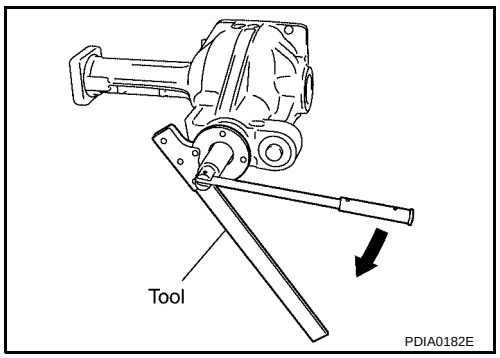


8. Insert companion flange onto drive pinion. Tap the companion flange with a soft hammer until fully seated.



9. Tighten pinion nut until total preload is within specification.
   - The threaded portion of drive pinion and pinion nut should be free from oil or grease.

   Tool number : KV38108300 (J-44195)

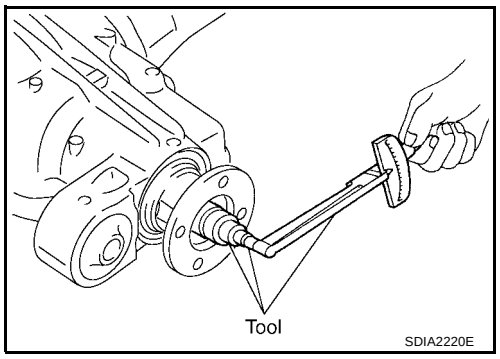


10. Tighten the pinion nut by very small degrees until the specified preload is achieved. When checking the preload, turn the drive pinion in both directions several times to set the bearing rollers.

    Tool number : ST3127S000 (J-25765-A)

    Pinion bearing preload:

    2.3 - 3.4 N·m (24 - 34 Kg-cm, 21 - 30 in-lb)

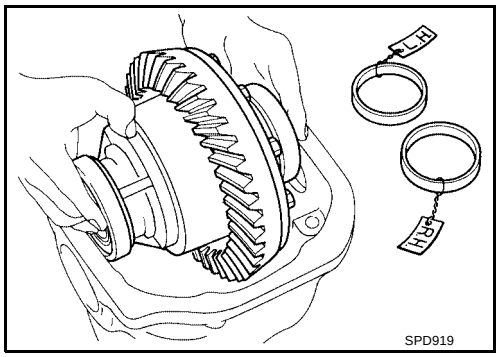


This procedure will have to be repeated if:

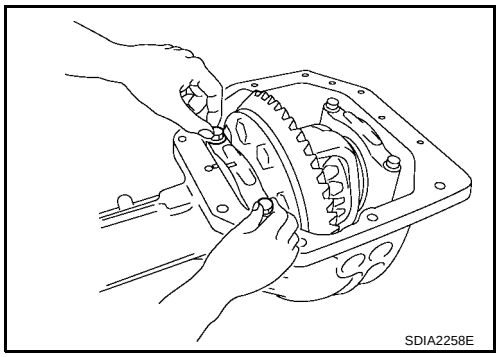
- Maximum preload is achieved before the minimum pinion nut torque is reached.
- Minimum preload is not achieved before maximum pinion nut torque is reached.

INSTALLATION OF DIFFERENTIAL CASE ASSEMBLY

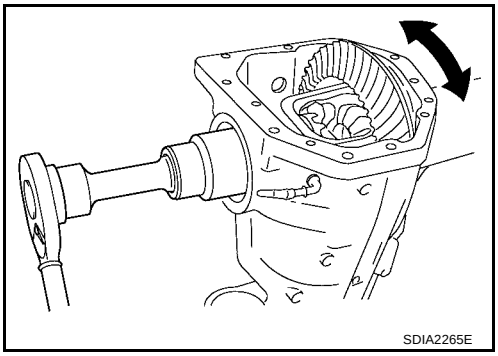
1. Install side bearing adjust nut into gear carrier.
2. Install differential case assembly with side bearing outer races into gear carrier.



3. Align mark on bearing cap with that on gear carrier and install bearing cap on gear carrier.
   - Do not tighten at this point. This allows further tightening of side bearing adjusters.



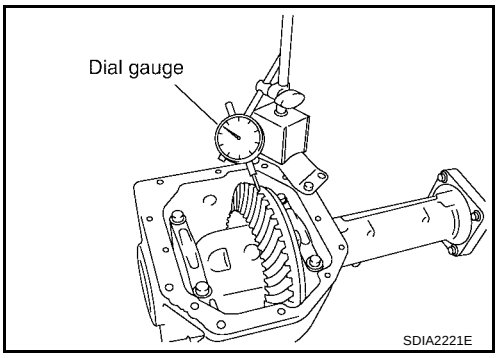
4. Tighten each side bearing adjust nuts alternately turning drive gear.



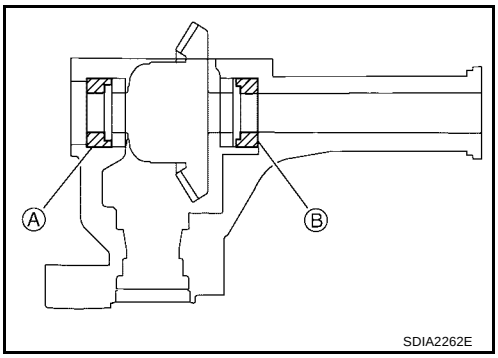
5. Measure backlash of drive gear and drive pinion using a dial gauge.

Drive gear to drive pinion back lash

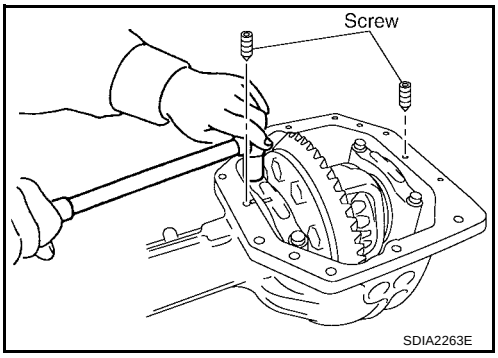
:0.13 - 0.18mm (0.0051 - 0.0071 in)



6. Use each adjust nut to adjust backlash.
7. In case of lots of backlash, loosen adjust nut A and tighten adjust nut B. In case of less backlash, loosen adjust nut B and tighten adjust nut A.



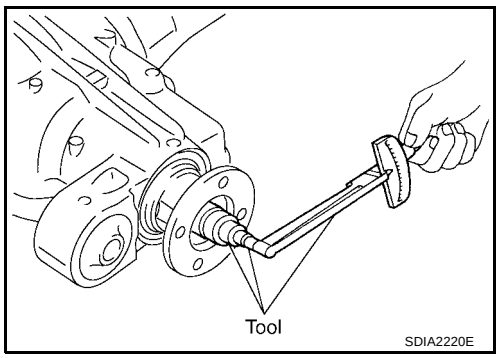
8. After adjusting backlash, fix adjuster with screws and tighten cap bolt to the specified torque. Refer to FFD-14, "Components" .



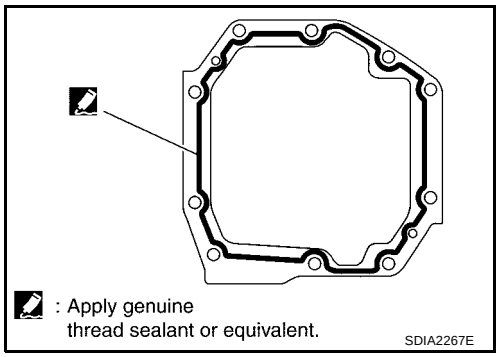
9. Check total preload with tool.

Tool number : ST3127S000 (J-25765-A)

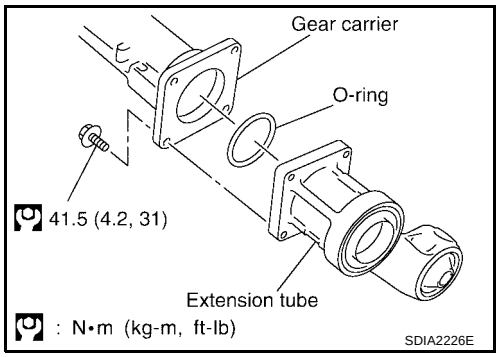
Total preload (With oil seal) : 2.98 - 4.76 N·m (0.31 - 0.48 Kg-m, 27 - 42 in-lb)



10. Check tooth contact. Refer to FFD-26, "TOOTH CONTACT" .
11. Install rear cover. Apply liquid sealant to rear cover side and install gear carrier.
12. Apply multi-purpose grease to cavity at sealing lips of oil seal.Install side oil seal.



13. Install O-ring and extension tube.
14. Install sides haft and side flange.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EDS001OM

Engine	VK56E	
Vehicle grade	All	
Front final drive	M205	
	2-pinion	
Gear ratio	2.937	3.357
Number of teeth (Drive gear/drive pinion)	47/16	47/14
Oil capacity (Approx.) ℓ (US pt, lmp pt)	1.6 (3-3/8 , 2-7/8)	

Side Gear Adjustment

EDS001ON

Side gear to pinion mate gear backlash (Clearance between side gear thrust washer and differential case) mm (in)		less than 0.20 (0.0079) or less
Available side gear thrust washers	Thickness mm (in)	Package part number*
	0.76 (0.030) 0.79 (0.031) 0.81 (0.032) 0.84 (0.033) 0.87 (0.034)	38424 8S111
	0.89 (0.035) 0.91 (0.036) 0.94 (0.037) 0.97 (0.038) 0.99 (0.039)	38424 8S112

Total Preload Adjustment

EDS001OO

Total preload N·m (Kg-m, in-lb)	Gear ratio 2.937 Type	Gear ratio 3.357 type
	3.09 - 4.87 (0.32 - 0.49, 28 - 43)	2.98 - 4.76 (0.31 - 0.48, 27 - 42)
Drive gear to drive pinion backlash mm (in)	0.13 - 0.18 (0.0051 - 0.0071)	

Drive Pinion Height Adjustment

EDS001OP

	Thickness mm (in)	Package part number*
Available drive pinion height adjusting washers	1.22 (0.048) 1.24 (0.049) 1.27 (0.050) 1.30 (0.051) 1.32 (0.052)	38154 8S111
	1.35 (0.053) 1.37 (0.054) 1.40 (0.055) 1.42 (0.056) 1.45 (0.057)	38154 8S112
	1.47 (0.058) 1.50 (0.059) 1.52 (0.060) 1.55 (0.061) 1.57 (0.062)	38154 8S113
	1.60 (0.063) 1.63 (0.064) 1.65 (0.065) 1.68 (0.066) 1.70 (0.067)	38154 8S114
	1.73 (0.068) 1.75 (0.069) 1.78 (0.070) 1.80 (0.071) 1.83 (0.072)	38154 8S115

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