SECTION RFD
REAR FINAL DRIVE

CONTENTS

C200

M226 WITHOUT ELECTRONIC LOCKING DIFFERENTIAL

M226 WITH ELECTRONIC LOCKING DIFFERENTIAL

PRECAUTIONS

PFP:00001

Service Notice or Precautions

EDS0026E

- 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 dust proof area.
- Before disassembly 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.
- Do not damage sliding surfaces and mating surfaces.
- When applying sealant, remove the old sealant from the mating surface; then remove any moisture, oil, and foreign materials from the application and mating 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 differential gear oil, petroleum jelly, or multi-purpose grease as specified.

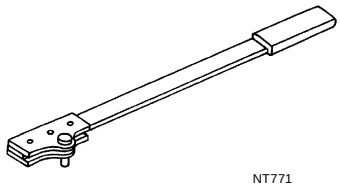
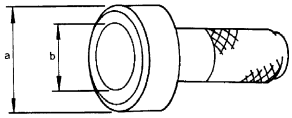
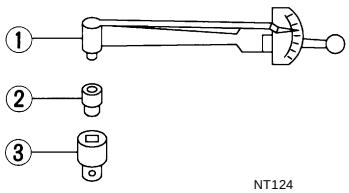
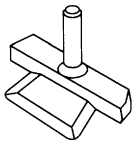
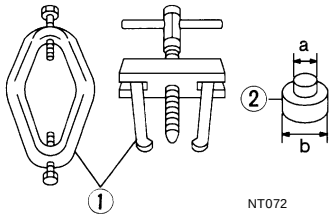
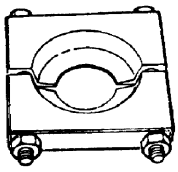
PREPARATION

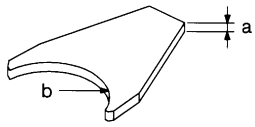
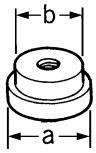
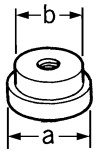
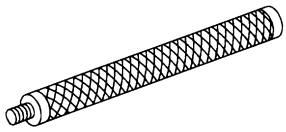
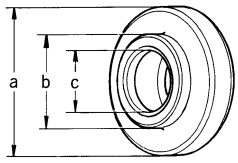
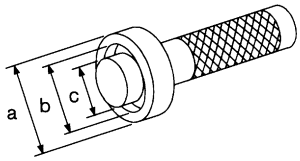
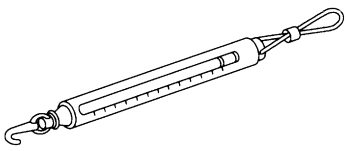
PFP:00002

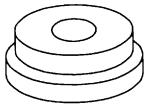
Special Service Tools

EDS0026F

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

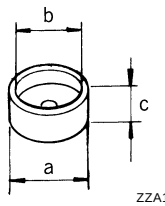
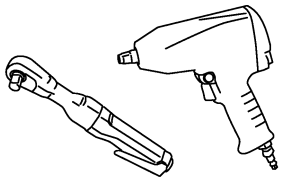
Tool number (Kent-Moore No.) Tool name	Description
KV38108300 (J-44195) Flange wrench  NT771	Removing and installing drive pinion lock nut
KV38100500 (J-25273) Drift  ZZA0811D	Installing front oil seal **a: 80 mm (3.15 in) dia.** **b: 60 mm (2.36 in) dia.**
ST3127S000 (J-25765-A) Preload gauge 1: GG91030000 (J-25765) Torque wrench 2: HT62940000 (—) Socket adapter (1/2″) 3: HT62900000 (—) Socket adapter (3/8″)  NT124	Measuring pinion bearing preload and total preload
KV10111100 (J-37228) Seal cutter  S-NT046	Removing rear cover
ST3306S001 (—) Differential side bearing puller set 1: ST33051001 (J-22888-20) Puller 2: ST33061000 (J-8107-2) Base  NT072	Removing and installing side bearing inner race **a: 28.5 mm (1.122 in) dia.** **b: 38 mm (1.50 in) dia.**
ST30031000 (J-22912-01) Puller  ZZA0700D	Removing pinion rear bearing inner race

Tool number (Kent-Moore No.) Tool name	Description
KV38100600 (J-25267) Drift  NT528	Installing side bearing adjusting washer **a: 8 mm (0.31 in)** **b: R42.5 mm (1.673 in)**
ST30621000 (J-25742-5) Drift  ZZA1000D	Installing pinion rear bearing outer race **a: 79 mm (3.11 in) dia.** **b: 59 mm (2.32 in) dia.**
ST30613000 (J-25742-3) Drift  ZZA1000D	Installing pinion front bearing outer race **a: 72 mm (2.83 in) dia.** **b: 48 mm (1.89 in) dia.**
ST30611000 (J-25742-1) Drift bar  S-NT090	Installing pinion front bearing outer race [Use with ST30613000 (J-25742-3) and ST30621000 (J-25742-5)]
ST30901000 (J-26010-01) Drift  ZZA0978D	Installing pinion rear bearing inner race **a: 79 mm (3.11 in) dia.** **b: 45 mm (1.77 in) dia.** **c: 35.2 mm (1.386 in) dia.**
ST3323 0000 (J-25805-01) Drift  NT085	Installing side bearing inner race **a: 51 mm (2.01 in) dia.** **b: 41 mm (1.61 in) dia.** **c: 28.5 mm (1.122 in) dia.**
— (J-8129) Spring gauge  NT127	Measuring turning torque

Tool number (Kent-Moore No.) Tool name	Description
— (J-34309) Differential shim selector tool  NT134	Adjusting bearing preload and pinion gear height
— (J-25269-4) Side bearing disc (2 Req'd)  NT136	Selecting pinion height adjusting washer

Commercial Service Tools

EDS0026G

Tool name	Description
Spacer  ZZA1133D	Installing pinion front bearing inner race **a: 60 mm (2.36 in) dia.** **b: 36 mm (1.42 in) dia.** **c: 30 mm (1.18 in)**
Power tool  PBIC0190E	Loosening nuts and bolts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EDS0026H

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

		Reference page	Refer to RFD-23, "INSPECTION AFTER DISASSEMBLY".	Refer to RFD-17, "Tooth Contact"	Refer to RFD-23, "INSPECTION AFTER DISASSEMBLY".	Refer to RFD-19, "Backlash".	Refer to RFD-19, "Companion Flange Runout".	Refer to RFD-10, "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		×	×	×	×	×	×	×	×	×	×	×	×	×

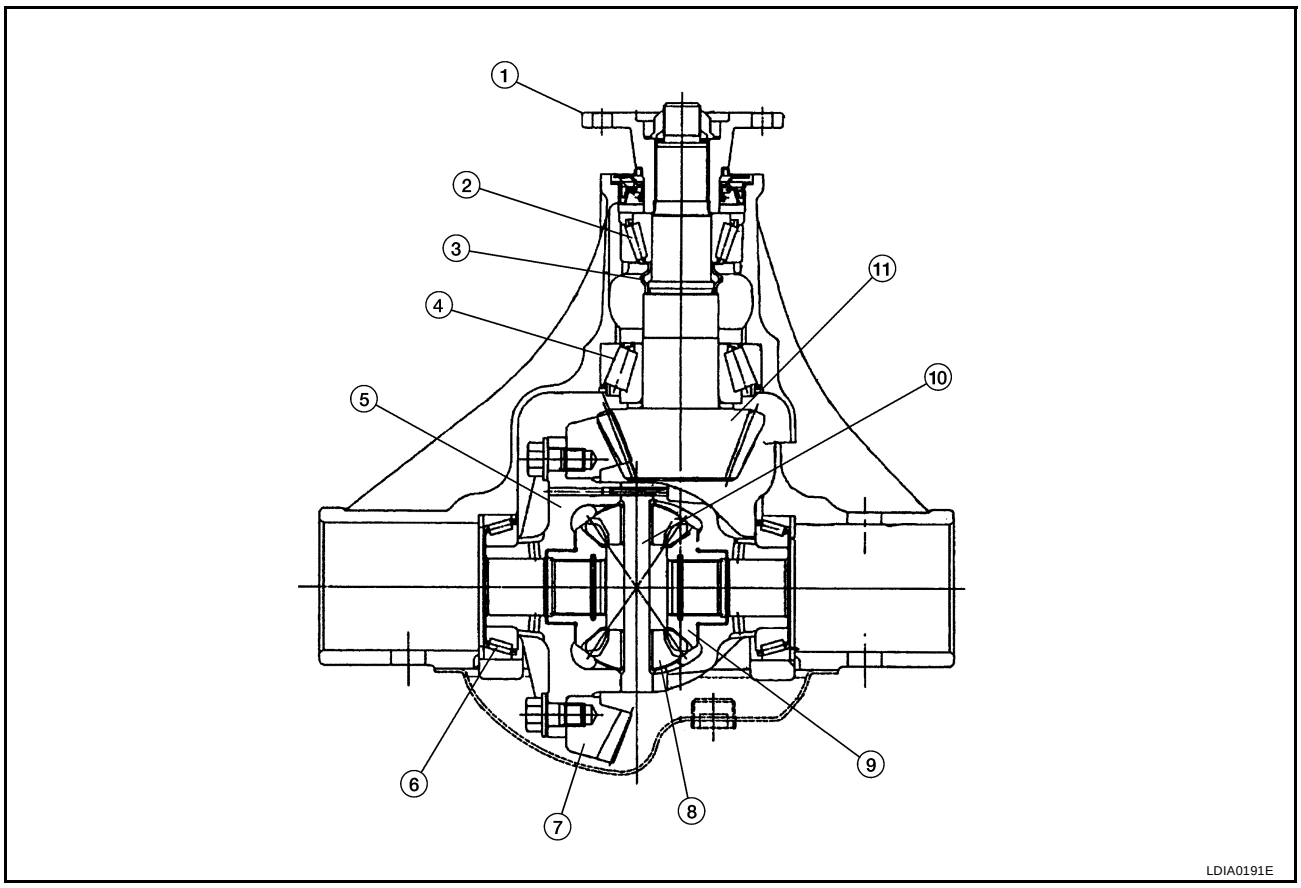
×: Applicable

DESCRIPTION

PFP:00000

Cross-Sectional View

EDS0026I



1. Companion flange	2. Pinion front bearing	3. Collapsible spacer
4. Pinion rear bearing	5. Differential case	6. Side bearing
7. Drive gear	8. Pinion mate gear	9. Side gear
10. Pinion mate shaft	11. Drive pinion	

DIFFERENTIAL GEAR OIL

PFP:KLD30

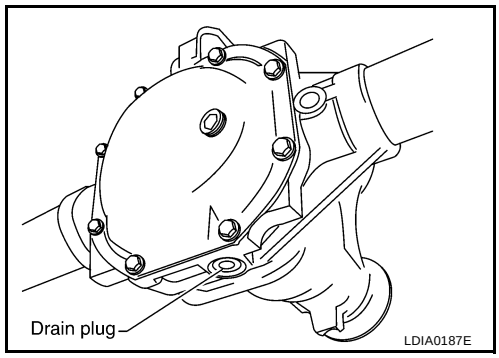
Changing Differential Gear Oil

EDS0026J

DRAINING

1. Stop engine.
2. Remove the drain plug from the rear final drive assembly to drain the differential gear oil.
3. Install the drain plug with a new gasket to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-15, "COMPONENTS" .

CAUTION:
Do not reuse gasket.

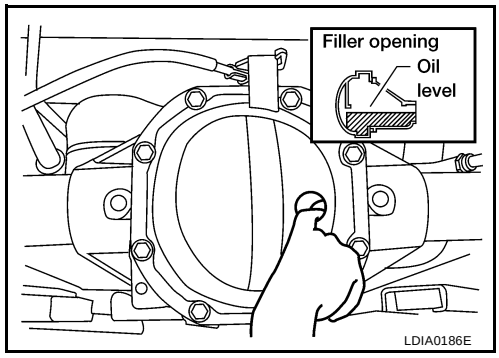


FILLING

1. Remove the filler plug from the rear final drive assembly.
2. Fill the rear final drive assembly with new differential gear oil until the level reaches the specified level near the filler plug hole.

Differential gear oil grade and capacity	**: Refer to MA-11, "Fluids and Lubricants" .**

3. Install the filler plug with sealant applied on the threads to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-15, "COMPONENTS" .
   - Use High Performance Thread Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .



Checking Differential Gear Oil

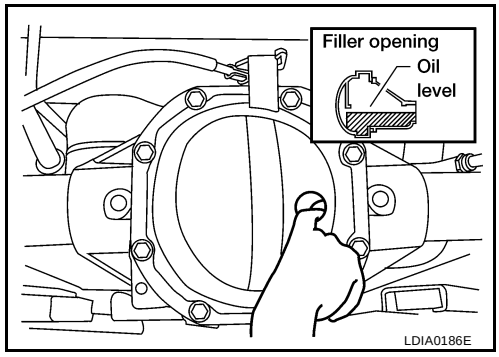
EDS0026K

OIL LEAKAGE AND OIL LEVEL

1. Make sure that differential gear oil is not leaking from the rear final drive assembly or around it.
2. Check the differential gear oil level from the filler plug hole as shown.

CAUTION:
Do not start engine while checking differential gear oil level.

3. Install the filler plug with sealant applied on the threads to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-15, "COMPONENTS" .
   - Use High Performance Thread Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .



FRONT OIL SEAL

PFP:38189

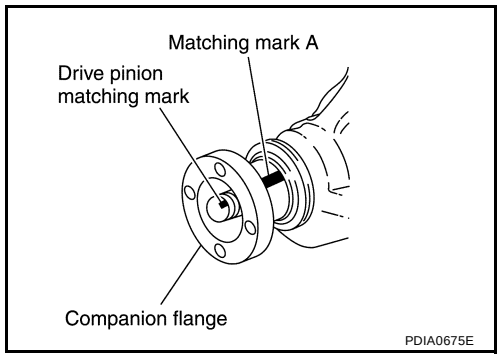
Removal and Installation

EDS0026L

REMOVAL

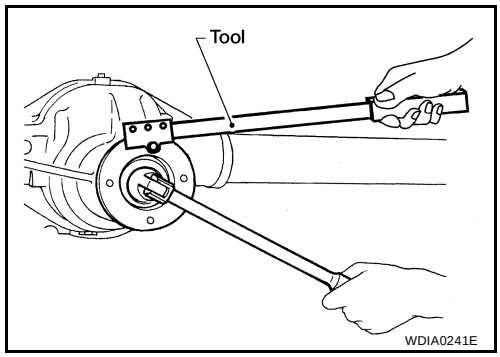
1. Remove the propeller shaft. Refer to PR-5, "Removal and Installation" .
2. Put matching mark on the end of the drive pinion. The matching mark should be in line with the matching mark A on companion flange.

   CAUTION:
   For matching mark, use paint. Do not damage drive pinion.
   NOTE:
   The matching mark A on the final drive companion flange indicates the maximum vertical runout position.

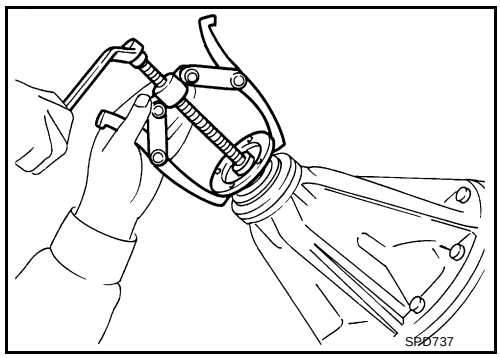


3. Remove the drive pinion lock nut using Tool.

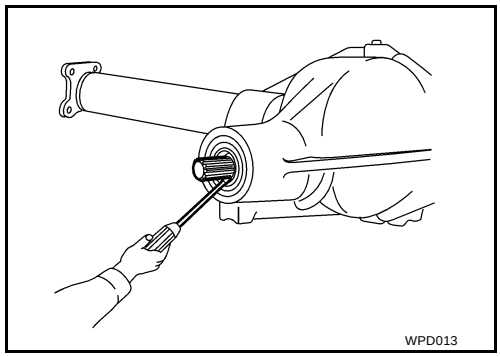
   Tool number : KV38108300 (J-44195)



4. Remove the companion flange using suitable tool.



5. Remove the front oil seal using suitable tool.

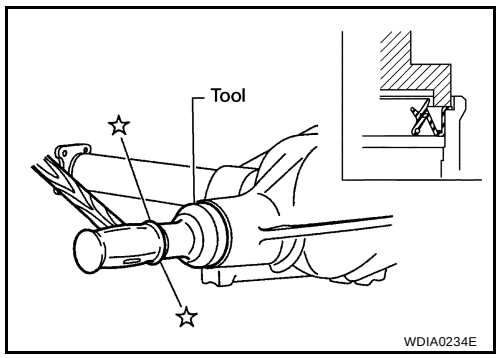


INSTALLATION

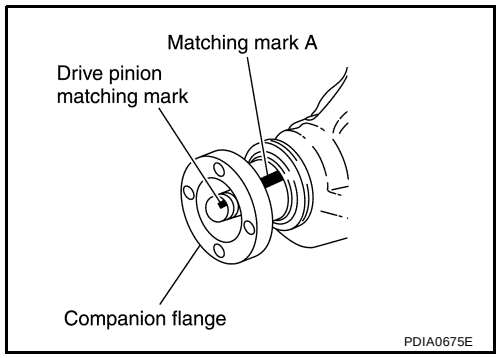
1. Apply multi-purpose grease to the front oil seal lips.
2. Install the front oil seal using Tool.

Tool number : KV38100500 (J-25273)

CAUTION:
- **Do not reuse oil seal.**
- **Do not incline oil seal when installing.**



3. Align the matching mark of drive pinion with the matching mark A of companion flange, then install the companion flange.

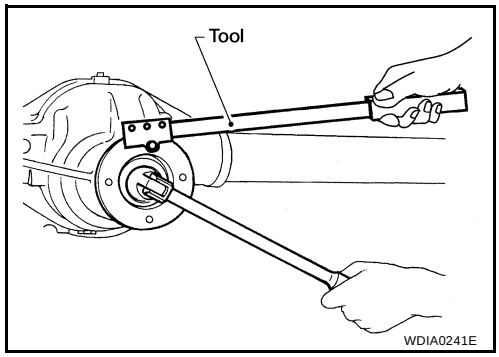


4. Apply gear oil on the screw part of drive pinion and the seating surface of drive pinion lock nut.
5. Install the drive pinion lock nut and tighten to the specified torque using Tool. Refer to RFD-15, "COMPONENTS" .

Tool number : KV38108300 (J-44195)

CAUTION:
Do not reuse drive pinion lock nut.

6. Install the propeller shaft. Refer to PR-5, "Removal and Installation" .



CARRIER COVER

PFP:38351

Removal and Installation

EDS0026M

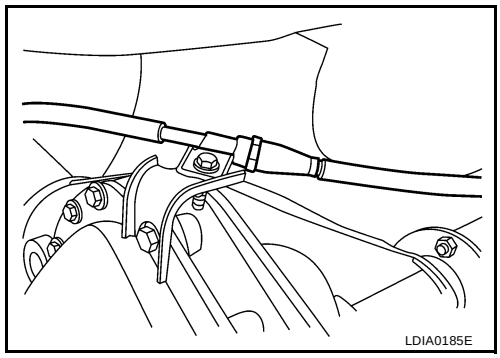
REMOVAL

1. Drain the differential gear oil. Refer to RFD-10, "DRAINING" .
2. Disconnect the parking brake cable from the carrier cover.
3. Remove the carrier cover bolts. Then separate the carrier cover from the gear carrier using Tool.

Tool number : KV10111100 (J-37228)

CAUTION:

- **Do not damage the mating surface.**
- **Do not insert flat-bladed screwdriver, this will damage the mating surface.**



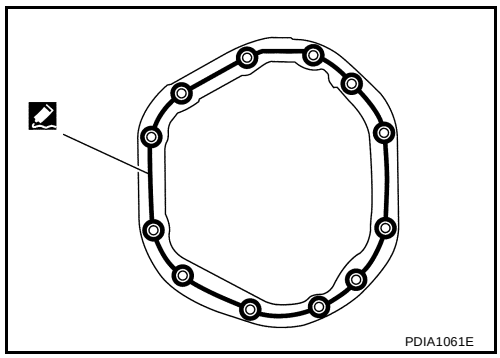
INSTALLATION

1. Apply a bead of sealant to the mating surface of the carrier cover as shown.
   - Use Genuine Silicone RTV or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

CAUTION:

Remove any old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to the application and mating surfaces.

2. Install the carrier cover to the gear carrier. Tighten the bolts to the specified torque. Refer to RFD-15, "COMPONENTS" .
3. Connect the parking brake cable to the carrier cover.
4. Fill the rear final drive assembly with recommended differential gear oil. Refer to RFD-10, "DIFFERENTIAL GEAR OIL" .



REAR FINAL DRIVE ASSEMBLY

PFP:38300

Removal and Installation

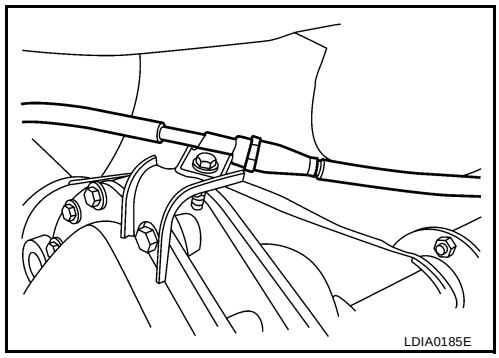
EDS0028E

REMOVAL

CAUTION:

- **Do not damage spline, companion flange and front oil seal when removing propeller shaft.**
- **Before removing final drive assembly or rear axle assembly, disconnect ABS sensor harness connector from the assembly and move it away from final drive/rear axle assembly area. Failure to do so may result in sensor wires being damaged and sensor becoming inoperative.**

1. Drain the differential gear oil. Refer to RFD-44, "DRAINING" .
2. Remove the rear propeller shaft. Refer to PR-10, "Removal and Installation" .
3. Remove the axle shaft. Refer to RAX-7, "Removal and Installation" .
4. Disconnect the following components from the rear final drive.
   - ABS sensor wire harness
   - Parking brake cable
   - Brake hoses



5. Support rear final drive assembly using a suitable jack.
6. Remove rear shock absorber lower bolts. Refer to RSU-7, "Removal and Installation" .
7. Remove leaf spring U-bolt nuts. Refer to RSU-8, "Removal and Installation" .
8. Remove rear final drive assembly.

   CAUTION:
   Secure rear final drive assembly to the jack while removing it.

INSTALLATION

Installation is in the reverse order of removal.

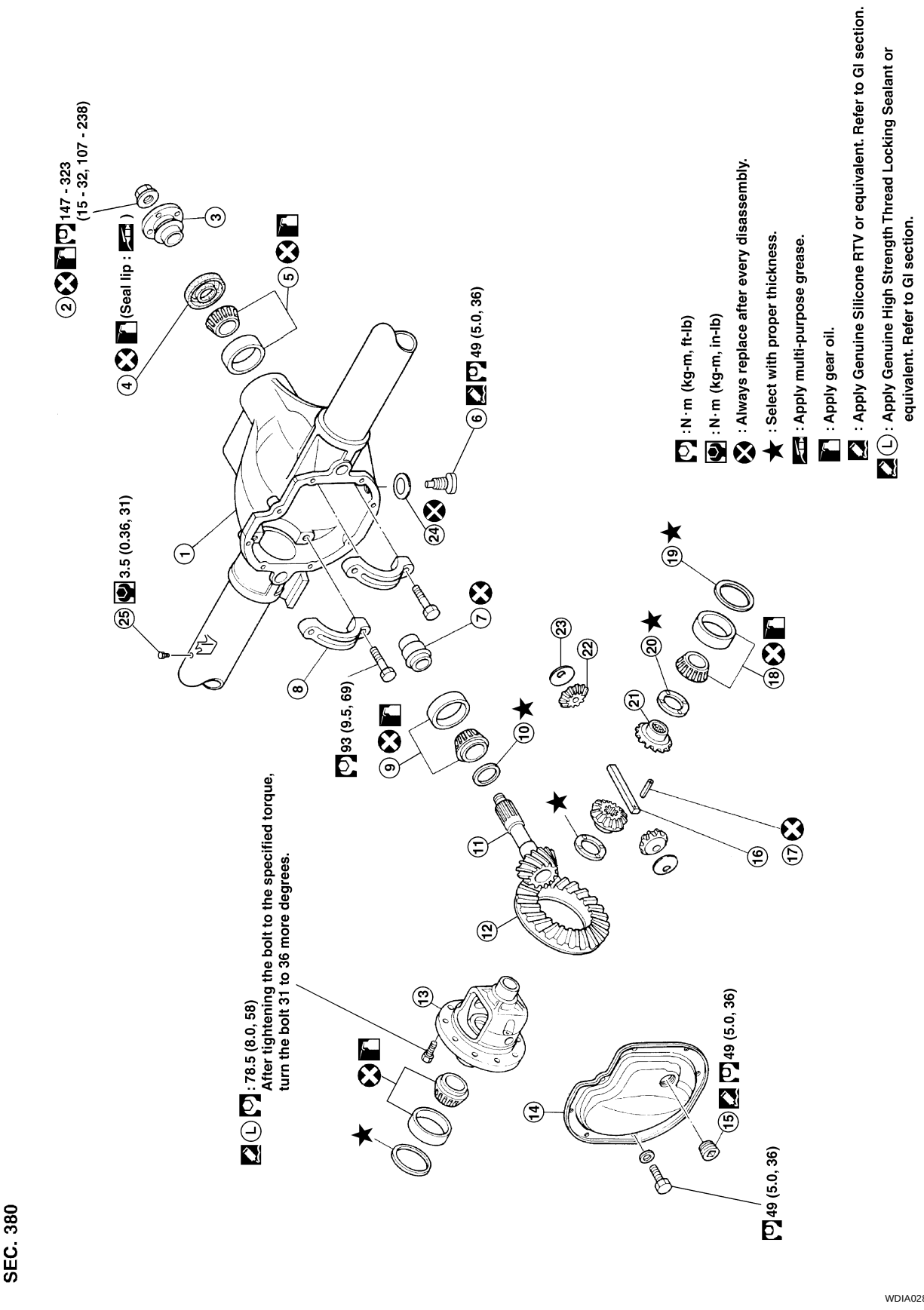
CAUTION:

- **Fill the rear final drive assembly with differential gear oil after installation. Refer to RFD-10, "DIFFERENTIAL GEAR OIL" .**
- **Bleed the air from brake system. Refer to BR-10, "Bleeding Brake System" .**

Disassembly and Assembly

COMPONENTS

EDS0026O



WDIA0281E

1. Gear carrier
2. Drive pinion lock nut
3. Companion flange
4. Front oil seal
5. Drive pinion front bearing
6. Drain plug
7. Collapsible spacer
8. Side bearing cap
9. Drive pinion rear bearing
10. Drive pinion height adjusting washer
11. Drive pinion
12. Drive gear
13. Differential case
14. Carrier cover
15. Filler plug
16. Pinion mate shaft
17. Lock pin
18. Side bearing
19. Side bearing adjusting washer
20. Side gear thrust washer
21. Side gear
22. Pinion mate gear
23. Pinion mate thrust washer
24. Gasket
25. Breather

ASSEMBLY INSPECTION AND ADJUSTMENT

- Drain the differential gear oil before inspection and adjustment. Refer to RFD-10, "DIFFERENTIAL GEAR OIL" .
- Remove and install the carrier cover as necessary for inspection and adjustment. Refer to RFD-13, "CARRIER COVER" .

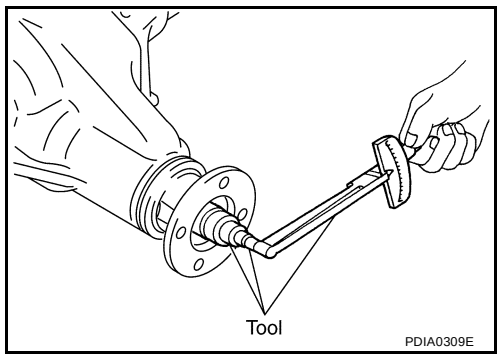
Total Preload Torque

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 torque using Tool.

Tool number : ST3127S000 (J-25765-A)

Total preload torque

: 1.4 - 2.9 N·m (0.15 - 0.29 kg-m, 13 - 25 in-lb)



NOTE:
Total preload torque = Drive pinion bearing preload torque + Side bearing preload torque

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

If the total preload torque is greater than specification

On drive pinion bearings: **Replace the collapsible spacer.**

On side bearings: **Use thinner side bearing adjusting washers by the same amount to each side. Refer to RFD-36, "Side Bearing Adjusting Washer" .**

If the total preload torque is less than specification

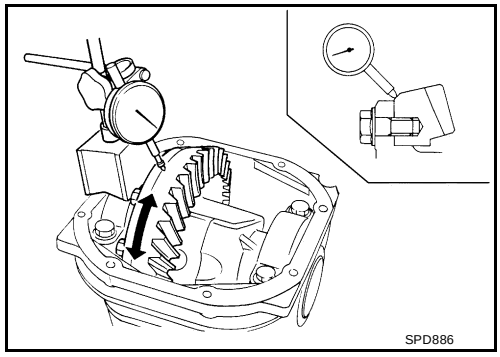
On drive pinion bearings: **Tighten the drive pinion nut.**

On side bearings: **Use thicker side bearing adjusting washers by the same amount to each side. Refer to RFD-36, "Side Bearing Adjusting Washer" .**

Drive Gear Runout

1. Fit a dial indicator to the drive gear back face.
2. Rotate the drive gear to measure runout.

Runout limit : 0.08 mm (0.0031 in) or less



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

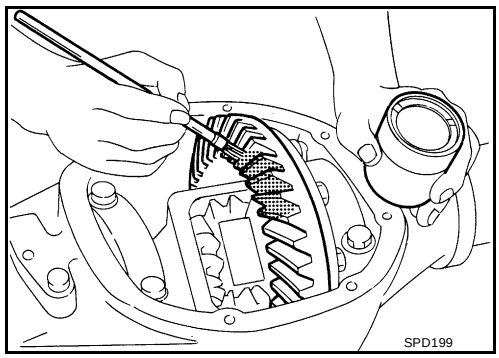
CAUTION:
Replace drive gear and drive pinion as a set.

Tooth Contact

Checking gear tooth contact pattern is necessary to verify correct relationship between drive gear and drive pinion. 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.

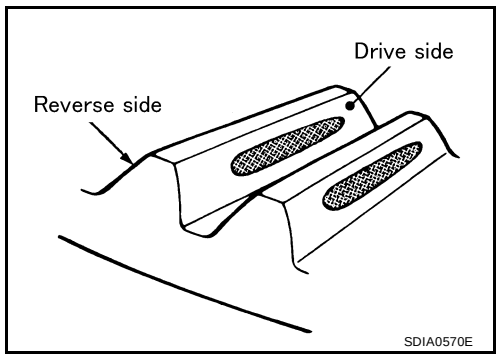
1. Apply red lead to drive gear.

   NOTE:
   Apply red lead to both faces of three to four gears, at four locations evenly spaced on the drive gear.

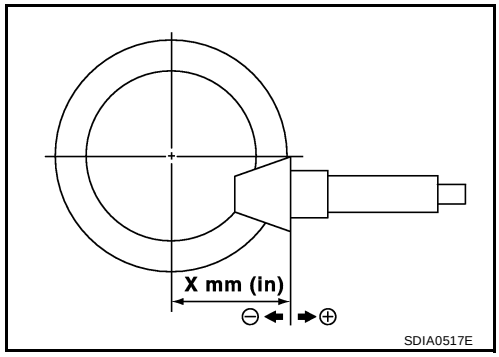


2. Rotate the drive gear back and forth several times. Then check for correct drive pinion to drive gear tooth contact as shown.

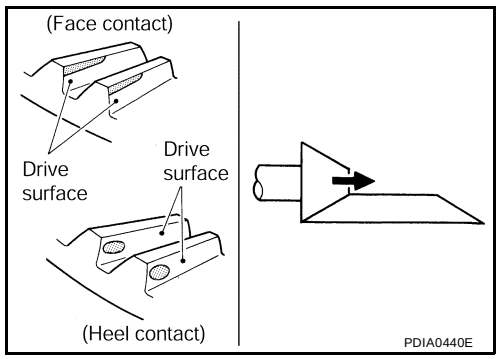
   CAUTION:
   Check tooth contact on drive side and reverse side.



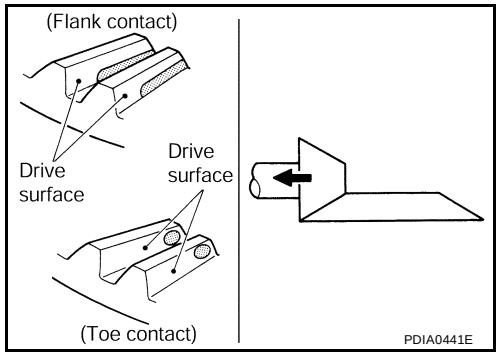
3. If the tooth contact is improperly adjusted, follow the procedure below to adjust the pinion height (dimension X).



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

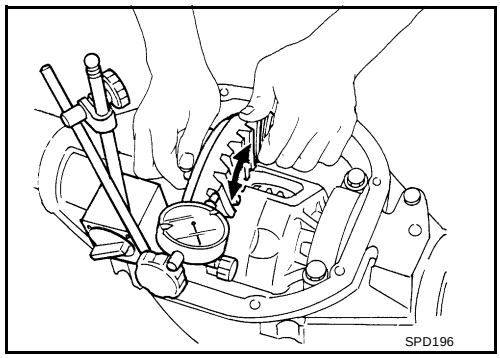


- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), use a thinner drive pinion height adjusting washers to move the drive pinion farther from the drive gear.
  Refer to RFD-36, "Drive Pinion Height Adjusting Washer" .



Backlash

1. 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 specification, change the thickness of each side bearing adjusting washer.

If the backlash is greater than specification:

Make drive gear back side adjusting washer thicker, and drive gear tooth side adjusting washer thinner by the same amount. Refer to RFD-36, "Side Bearing Adjusting Washer" .

If the backlash is less than specification:

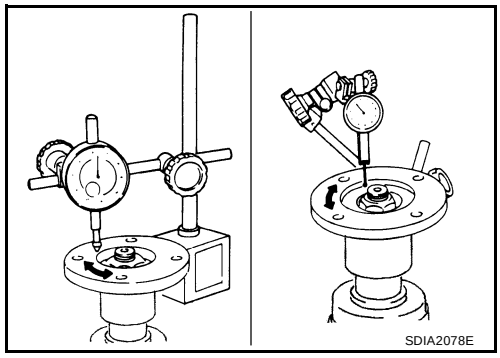
Make drive gear back side adjusting washer thinner, and drive gear tooth side adjusting washer thicker by the same amount. Refer to RFD-36, "Side Bearing Adjusting Washer" .

CAUTION:

Do not change the total thickness of side bearing adjusting washers as it will change the side bearing preload torque.

Companion Flange Runout

1. Rotate companion flange and check for runout on the companion flange face (inner side of the bolt holes) and companion flange inner side (socket diameter) using suitable tool.



Runout limit: 0.08 mm (0.0031 in) or less

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

a. Rotate the companion flange on the drive pinion by 90°, 180° and 270° while checking for the position where the runout is minimum.

b. If the runout is still outside of the runout limit after the companion flange has been rotated on the drive pinion, possible cause could be an assembly malfunction of drive pinion and drive pinion bearing or a malfunctioning drive pinion bearing.

c. If the runout is still outside of the runout limit after repair of the assembly of drive pinion and drive pinion bearing or drive pinion bearing, replace the companion flange.

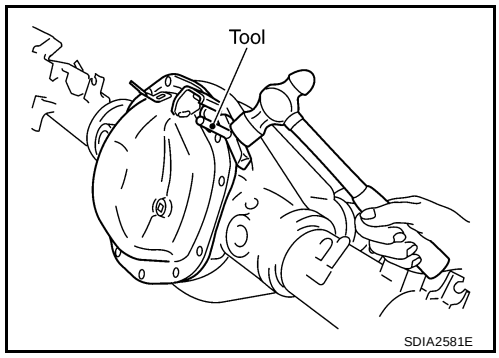
DISASSEMBLY

Differential Assembly

1. Remove carrier cover bolts.
2. Remove carrier cover using Tool.

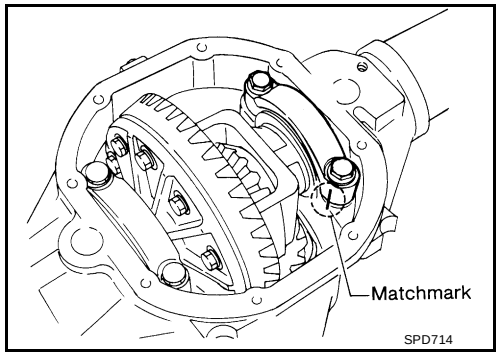
Tool number : KV10111100 (J-37228)

CAUTION:
- **Do not damage the mating surface.**
- **Do not insert flat-bladed screwdriver, this will damage the mating surface.**

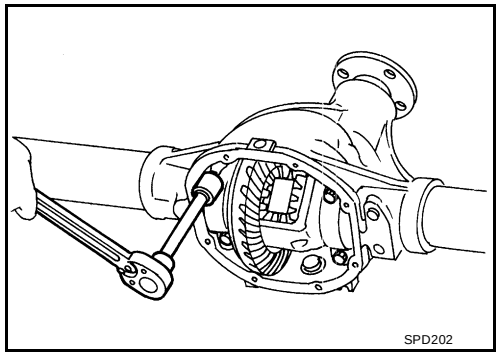


3. For proper reinstallation, paint matching marks on one side of side bearing cap.

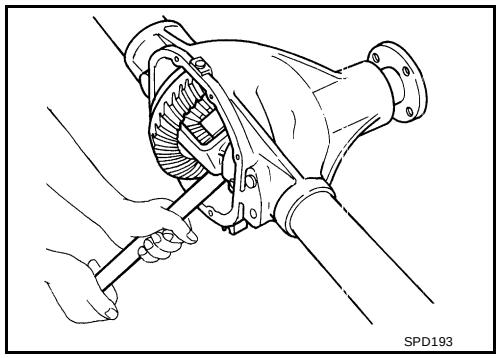
CAUTION:
- **Side bearing caps are line-board for initial assembly. The matching marks are used to reinstall them in their original positions.**
- **For matching mark, use paint. Do not damage side bearing cap.**



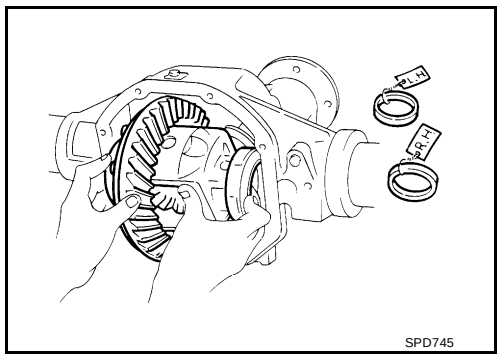
4. Remove side bearing caps.



5. Remove differential case assembly using suitable tool.



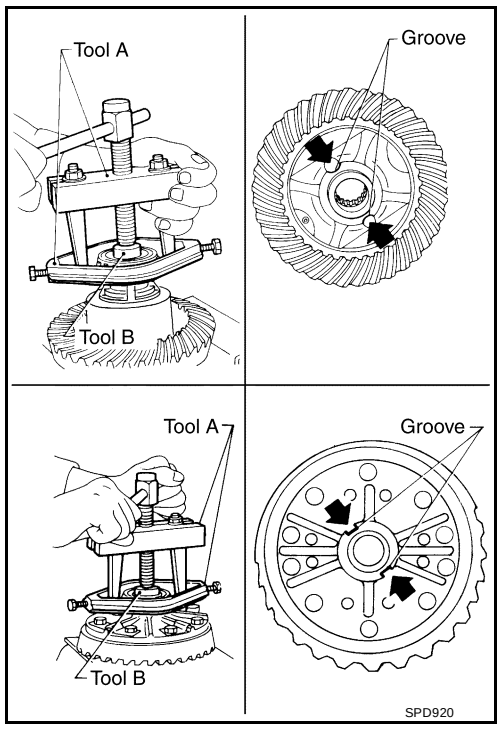
- Keep side bearing outer races together with inner races. Do not mix them up. Also, keep side bearing adjusting washers together with bearings.



6. Remove side bearing inner race using Tools.

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

CAUTION:
- **Engage puller jaws in groove to prevent damage.**
- **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 if it is replaced.**

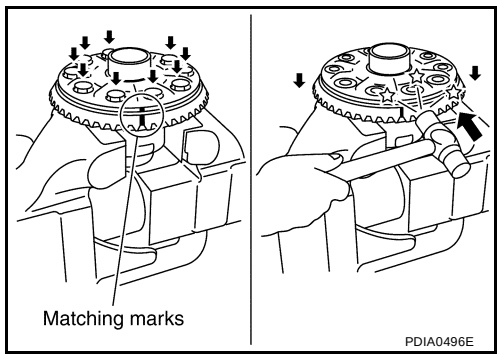


7. For proper reinstallation, paint matching mark on one differential case assembly.

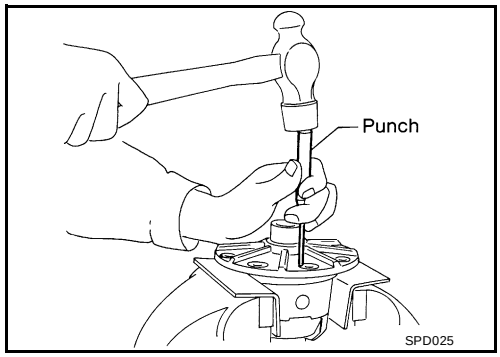
CAUTION:
Use paint for matching marks. Do not damage differential case or drive gear.

8. Remove drive gear bolts.
9. Tap the drive gear off the differential case assembly using suitable tool.

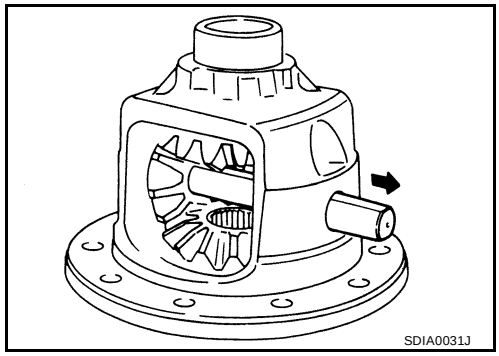
CAUTION:
Tap evenly all around to keep drive gear from binding.



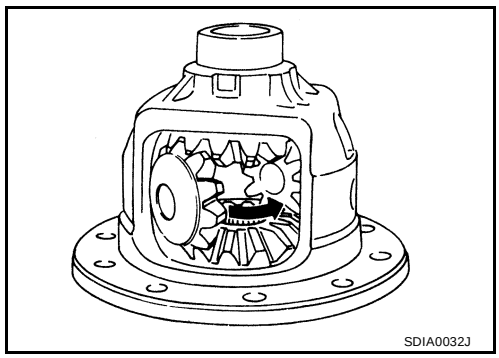
10. Remove the lock pin of pinion mate shaft from the drive gear side using suitable tool.



11. Remove pinion mate shaft.



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



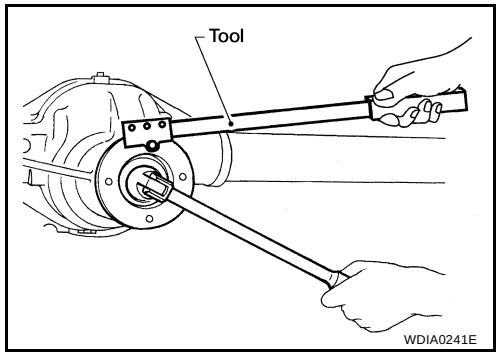
Drive Pinion Assembly

1. Remove differential case assembly. Refer to RFD-20, "Differential Assembly" .
2. Remove drive pinion lock nut using Tool.

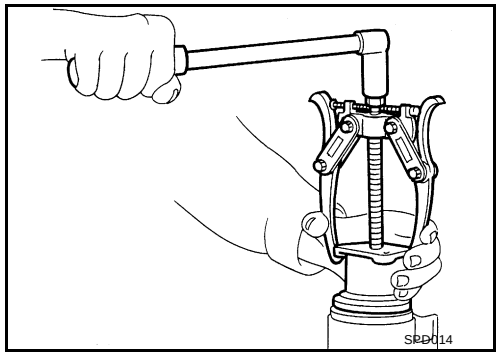
Tool number : KV38108300 (—)

3. Put matching marks on the companion flange and drive pinion using paint.

CAUTION:
Use paint to make the matching marks. Do not damage the companion flange or drive pinion.



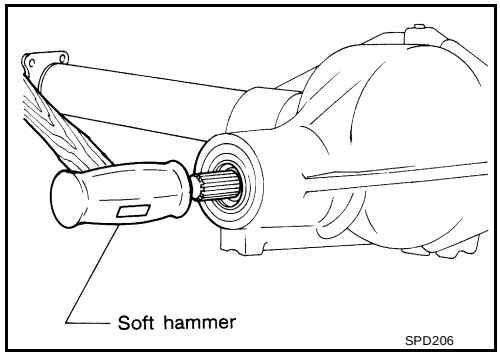
4. Remove companion flange using suitable Tool.



5. Remove drive pinion assembly from gear carrier using suitable tool.

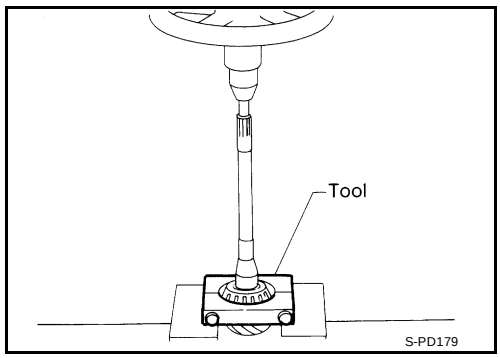
CAUTION:
Do not drop drive pinion assembly.

6. Remove front oil seal.
7. Remove drive pinion front bearing inner race.
8. Remove collapsible spacer.



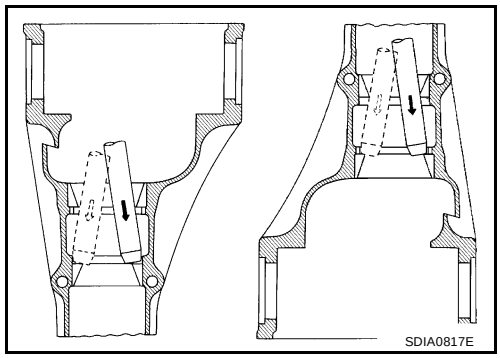
9. Remove drive pinion rear bearing inner race and drive pinion height adjusting washer using Tool.

Tool number : ST30031000 (J-22912-01)



10. Tap drive pinion front and rear bearing outer races uniformly with a brass bar or equivalent to remove.

CAUTION:
Do not 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.

Drive Pinion and Drive Gear

- If the drive pinion and drive gear teeth do not mesh or line-up correctly, determine the cause and adjust, repair, or replace as necessary.
- If the drive pinion or drive gear are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive pinion and drive gear.
- Drive pinion and drive gear are supplied in matched sets only. Matching numbers on both drive pinion and drive gear are etched for verification. If a new drive pinion and drive gear set are being used, verify the numbers of each drive pinion and drive gear before proceeding with assembly.

Bearing

- If bearings are chipped (by friction), pitted, worn, rusted, scratched, or unusual noise is coming from bearing, replace with new bearing assembly (as a new set).
- Bearing must be replaced with a new one whenever disassembled.

Side Gear and Pinion Mate Gear

- If any cracks or damage are found on the surface of the teeth, replace with new one.
- If any worn or chipped marks are found on the side of the side gear and pinion mate gear which contact the thrust washer, replace with new one.
- Replace both side gear and pinion mate gear as a set when replacing side gear or pinion mate gear.

Side Gear Thrust Washer and Pinion Mate Thrust Washer

- If any chips (by friction), damage, or unusual wear are found, replace with new one.

Gear Carrier

- If any wear or cracks are found on the contact sides of gear carrier, replace with new one.

Companion Flange

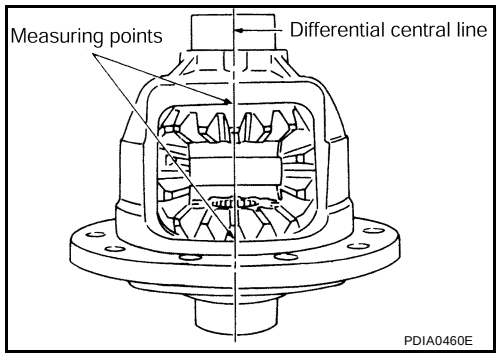
- If any chips (about 0.1mm, 0.004 in) or other damage on the companion flange surface which contacts the front oil seal lips are found, replace with new one.

ADJUSTING AND SELECTING WASHERS

Side Gear Back Clearance

- Assemble the differential parts if they are disassembled. Refer to RFD-31, "Differential Assembly" .

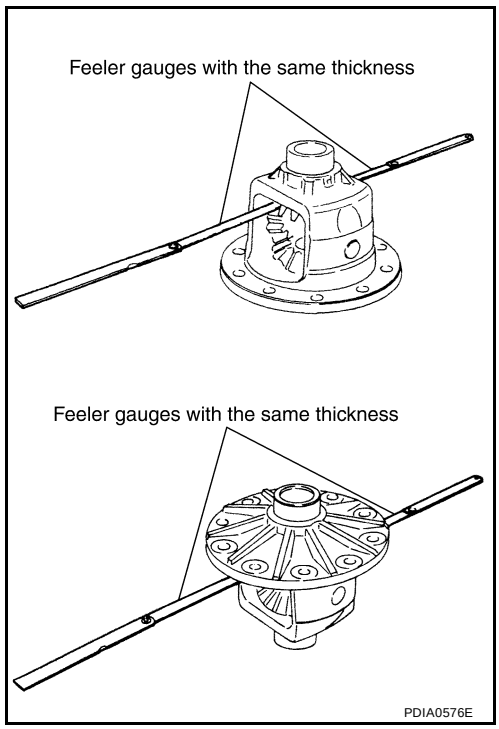
1. Place the differential case straight up so that the side gear to be measured is upward.



2. Using feeler gauges, measure the clearance between the side gear back and differential case at three different points, while rotating the side gear. Average the three readings to calculate the clearance. (Measure the clearance of the other side as well.)

   Side gear back clearance: 0.1 - 0.2 mm (0.004 - 0.008 in) or less.

   - If the side gear back clearance is outside of the specification, use a thicker or thinner side gear thrust washer to adjust. Refer to RFD-36, "Side Gear Thrust Washer" .



   If the side gear back clearance is greater than specification:

   Use a thicker side gear thrust washer.

   If the side gear back clearance is less than specification:

   Use a thinner side gear thrust washer.

CAUTION:

- **Insert feeler gauges with the same thickness on both sides to prevent side gear from tilting.**
- **Each gear should rotate smoothly without excessive resistance during differential motion.**
- **Select a side gear thrust washer for right and left individually.**

NOTE:

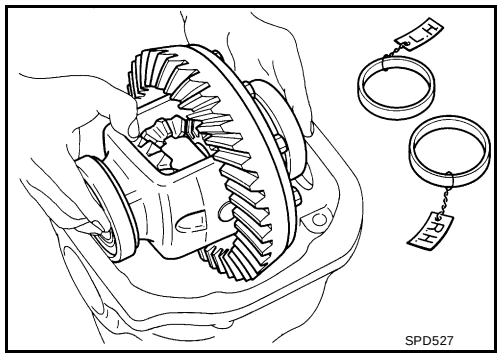
Side gear back clearance is clearance between side gear and differential case for adjusting side gear backlash.

Side Bearing Preload Torque

- A selection of side bearing adjusting washers is required for successful completion of this procedure.

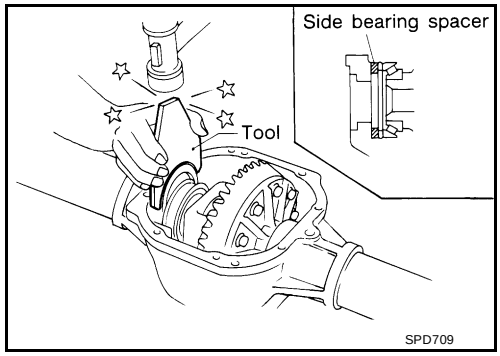
1. Apply differential gear oil to the side bearings, and install the differential case assembly with the side bearing outer races into the gear carrier.

CAUTION:
Do not reuse side bearing outer race when replacing side bearing inner race (replace as a set).

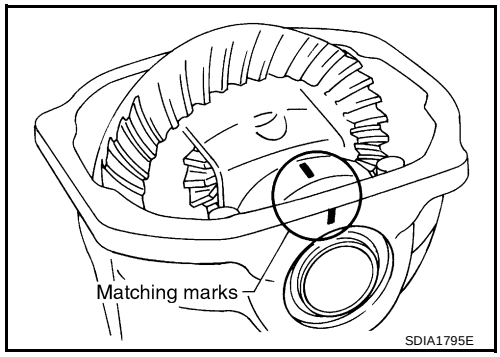


2. Insert the left and right original side bearing adjusting washers in place between side bearings and gear carrier using Tool.

Tool number : KV38100600 (J-25267)



3. Align the matching mark on the side bearing cap with the matching mark on the gear carrier.
4. Install the side bearing caps and tighten the side bearing cap bolts to the specified torque. Refer to RFD-15, "COMPONENTS" .
5. Turn the differential assembly several times to seat the side bearings.

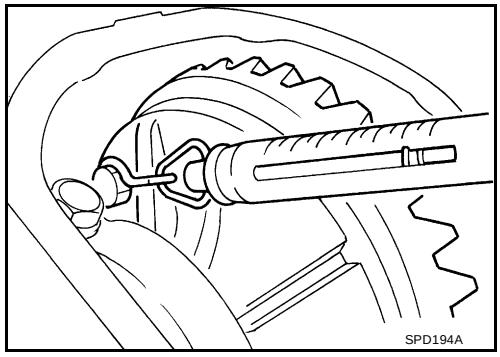


6. To determine side bearing preload torque, measure the pulling force of the differential assembly at the drive gear bolt using Tool.

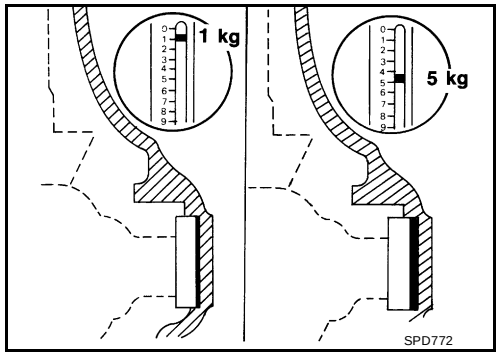
Tool number : — (J-8129)

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

NOTE:
If pulling force of the differential assembly at the drive gear bolt is within specification, side bearing preload torque will also be within specification. Refer to RFD-17, "Total Preload Torque" .



7. If the pulling force is outside the specification, use a thicker or thinner side bearing adjusting washer to adjust. Refer to RFD-36, "Side Bearing Adjusting Washer" .



If the pulling force is less than the specification:

Use a thicker side bearing adjusting washer.

If the pulling force is greater than the specification:

Use a thinner side bearing adjusting washer.

CAUTION:

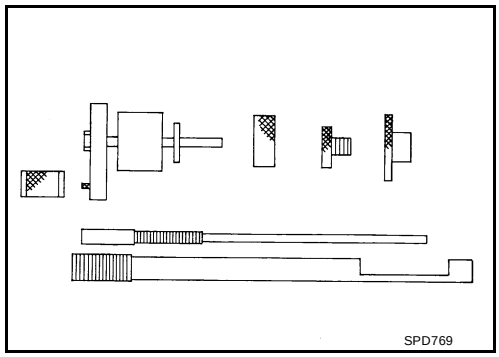
Select a side bearing adjusting washer for right and left individually.

8. Record the total amount of washer thickness required for the correct side bearing preload torque.

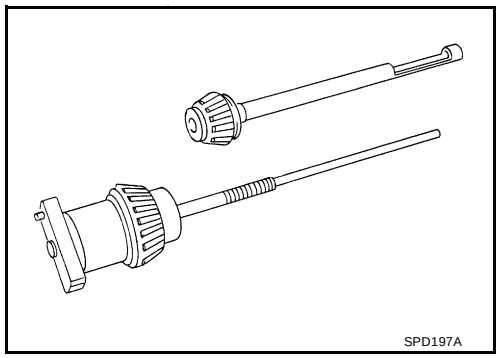
Drive Pinion Height

1. Make sure all parts are clean and that the bearings are well lubricated.
2. Assemble the drive pinion bearings onto the Tool.

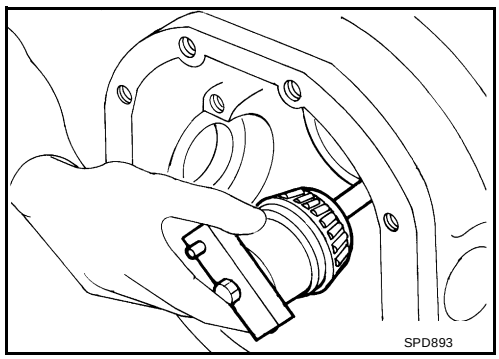
Tool number : — (J-34309)



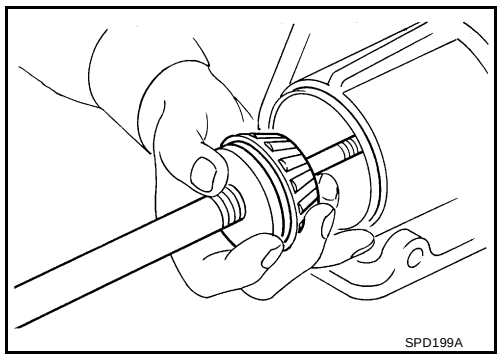
- **Drive pinion front bearing;** make sure the J-34309-3 drive pinion front bearing seat is secured tightly against the J-34309-2 gauge anvil. Then turn the J-34309-5 drive pinion front bearing pilot to secure the drive pinion bearing in its proper position.
- **Drive pinion rear bearing;** the J-34309-8 drive pinion rear bearing pilot is used to center the drive pinion rear bearing only. The J-34309-4 drive pinion rear bearing locking seat is used to lock the drive pinion rear bearing to the assembly.
- **Installation of J-34309-9 and J-34309-16;** place a suitable 2.5 mm (0.098 in) thick plain washer between J-34309-9 and J-34309-16. Both surfaces of J-34309-9 and J-34309-16 must be parallel with a clearance of 2.5 mm (0.098 in).



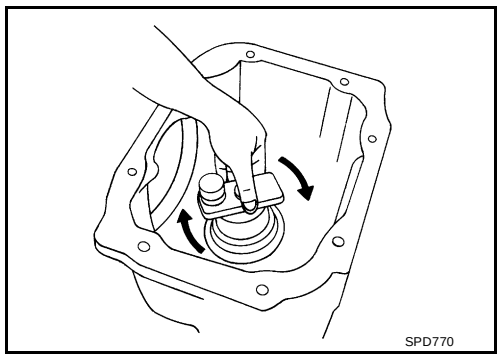
3. Install the drive pinion rear bearing inner race into the gear carrier. Then insert the drive pinion height adjusting washer selector tool, J-34309-1, gauge screw assembly.



4. Assemble the drive pinion front bearing inner race and the J-34309-2 gauge anvil. Assemble them together with the J-34309-1 gauge screw in the gear carrier. Make sure that the drive pinion height gauge plate, J-34309-16, will turn a full 360°. Tighten the two sections together by hand.



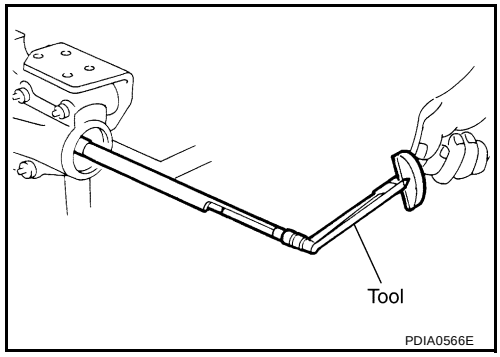
5. Turn the assembly several times to seat the drive pinion bearings.



6. Measure the turning torque at the end of the J-34309-2 gauge anvil using Tool.

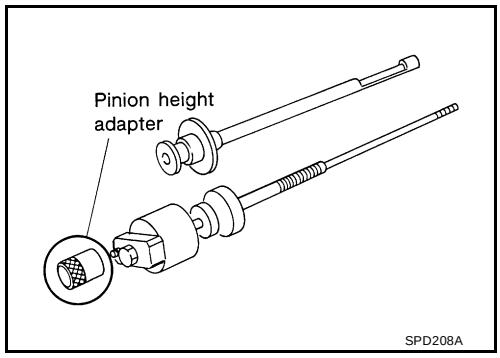
Tool number : ST3127S000 (J-25765- A)

Turning torque: 1.0 - 1.3 N·m (0.11 - 0.13 kg-m, 9 - 11 in-lb)



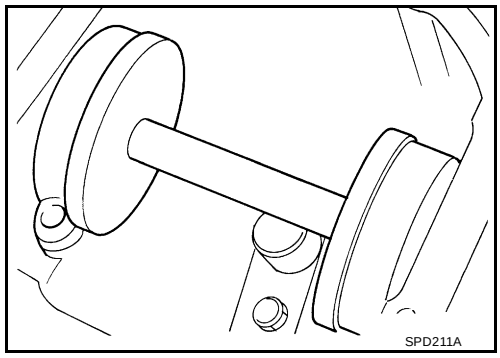
7. Place the J-34309-11 drive pinion height adapter onto the gauge plate and tighten it by hand.

CAUTION:
Make sure all machined surfaces are clean.

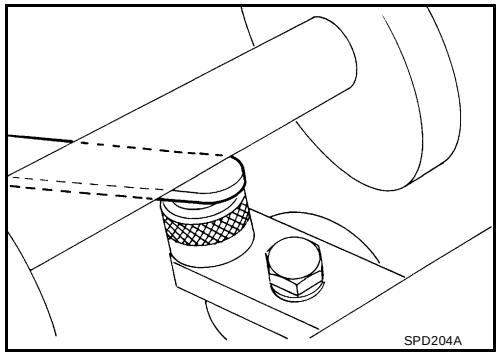


8. Position the side bearing discs, Tool, and arbor firmly into the side bearing bores. Install the side bearing caps and tighten the side bearing cap bolts to the specified torque. Refer to RFD-15, "COMPONENTS" .

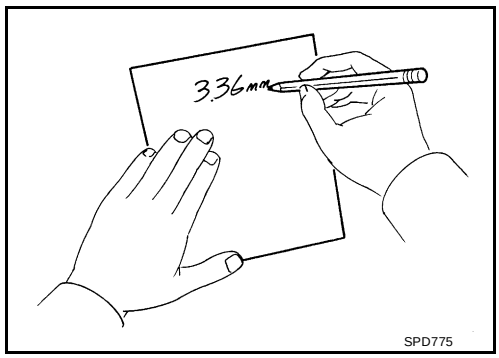
Tool number : — (J-25269-4)



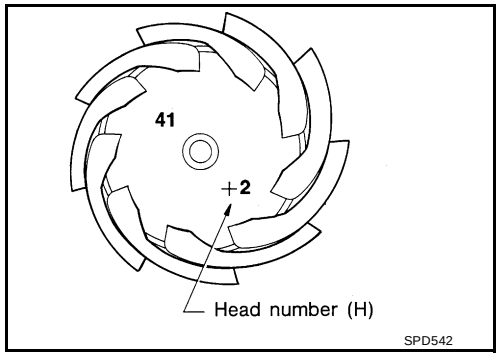
9. Select the correct standard drive pinion height adjusting washer thickness. Select by using a standard gauge of 3 mm (0.12 in) and your J-34309-101 feeler gauge. Measure the distance between the J-34309-11 drive pinion height adapter, including the standard gauge and the arbor.



10. Write down the exact measurement (the value of feeler gauge).



11. Correct the drive pinion height adjusting washer size by referring to the drive pinion “head number”.
There are two numbers painted on the drive pinion. The first one refers to the drive pinion and drive gear as a matched set. This number should be the same as the number on the drive gear. The second number is the drive pinion “head number”. It refers to the ideal drive pinion height from standard for quietest operation. Use the following chart to determine the correct drive pinion height adjusting washer.

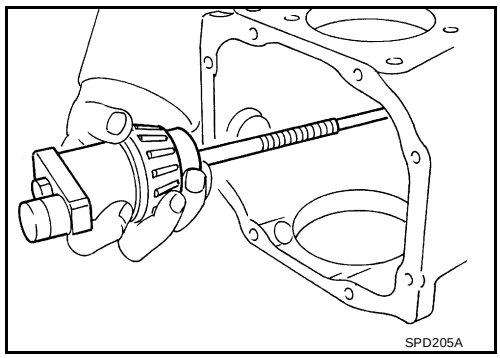


Head number	Add or remove from the standard drive pinion height adjusting washer thickness measurement
- 6	Add 0.06 mm (0.0024 in)
- 5	Add 0.05 mm (0.0020 in)
- 4	Add 0.04 mm (0.0016 in)
- 3	Add 0.03 mm (0.0012 in)
- 2	Add 0.02 mm (0.0008 in)
- 1	Add 0.01 mm (0.0004 in)
0	Use the selected washer thickness
+1	Subtract 0.01 mm (0.0004 in)
+2	Subtract 0.02 mm (0.0008 in)
+3	Subtract 0.03 mm (0.0012 in)
+4	Subtract 0.04 mm (0.0016 in)
+5	Subtract 0.05 mm (0.0020 in)
+6	Subtract 0.06 mm (0.0024 in)

12. Select the correct drive pinion height adjusting washer. Refer to RFD-36, "Drive Pinion Height Adjusting Washer" .

13. Remove the Tool from the gear carrier and disassemble to retrieve the drive pinion bearings.

Tool number : — (J-34309)



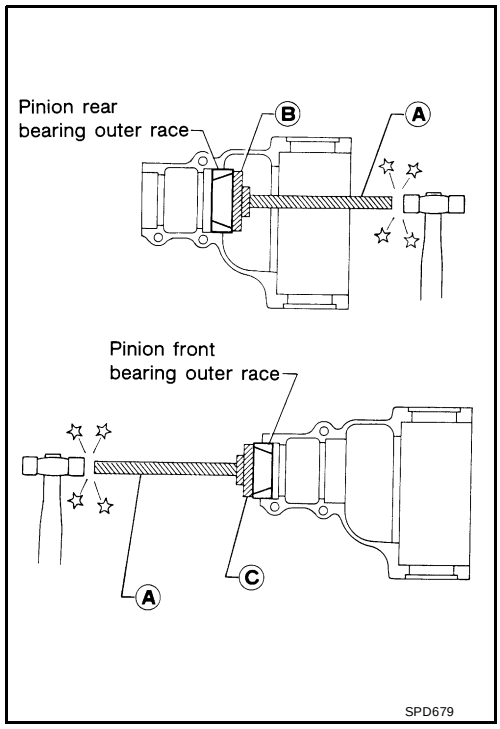
ASSEMBLY

Drive Pinion Assembly

1. Install the new drive pinion front and rear bearing outer races using Tools.

Tool number A: ST30611000 (J-25742-1)
B: ST30621000 (J-25742-5)
C: ST30613000 (J-25742-3)

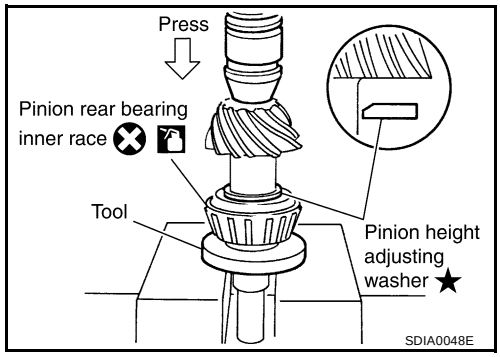
CAUTION:
- **First tap the drive pinion bearing outer race until it becomes flush with the gear carrier.**
- **Do not reuse drive pinion front and rear bearing outer race.**



2. Select a drive pinion height adjusting washer. Refer to RFD-26, "Drive Pinion Height" .
3. Install the selected drive pinion height adjusting washer to the drive pinion. Press the new drive pinion rear bearing inner race to it using Tool.

Tool number : ST30901000 (J-26010-01)

CAUTION:
- **Install the drive pinion height adjusting washer in the proper direction as shown.**
- **Do not reuse drive pinion rear bearing inner race.**

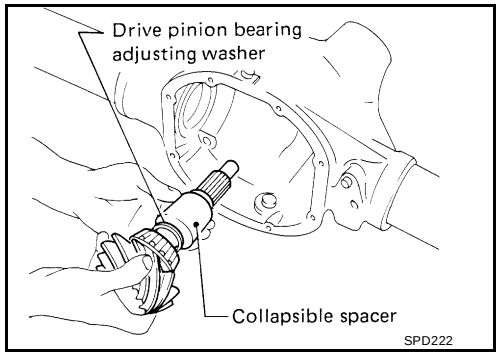


4. Assemble the new collapsible spacer to the drive pinion.

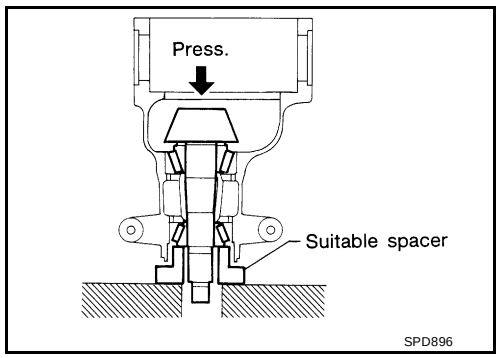
CAUTION:
Do not reuse collapsible spacer.

5. Apply differential gear oil to the drive pinion rear bearing, and install the drive pinion assembly to the gear carrier.
6. Apply differential gear oil to the drive pinion front bearing, and install the new drive pinion front bearing inner race to the drive pinion assembly.

CAUTION:
Do not reuse drive pinion front bearing inner race.



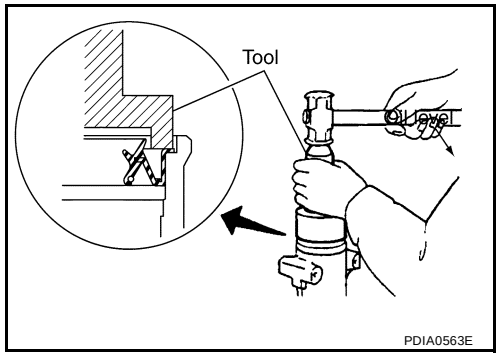
7. Press the drive pinion front bearing inner race to the drive pinion as far as drive pinion lock nut can be tightened using suitable spacer.



8. Apply multi-purpose grease to the lips and differential gear oil to the circumference of the new front oil seal. Then drive the new front oil seal in evenly until it becomes flush with the gear carrier using Tool.

Tool number : KV38100500 (J-25273)

CAUTION:
- **Do not reuse front oil seal.**
- **Do not incline the new front oil seal when installing.**
- **Apply multi-purpose grease to the lips and differential gear oil to the circumference of the new front oil seal.**

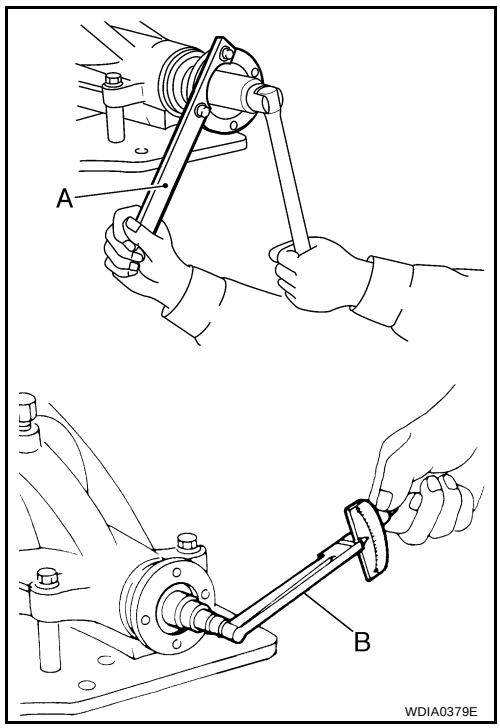


9. Install the companion flange to the drive pinion while aligning the matching marks.

10. Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut. Then adjust the drive pinion lock nut tightening torque using Tool A, and check the drive pinion bearing preload torque using Tool B.

Tool number **A: KV38108300 (—)**
B: ST3127S000 (J-25765-A)

Drive pinion bearing preload torque:
1.1 - 1.4 N·m (0.12 - 0.14 kg-m, 10 - 12 in-lb)

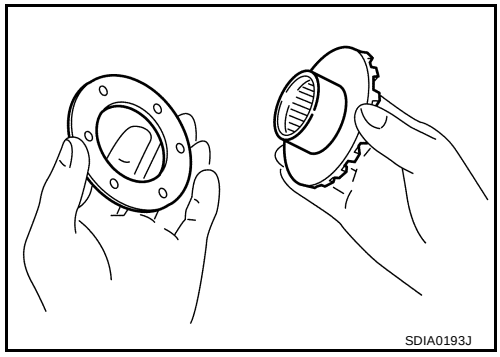


CAUTION:
- **Do not reuse drive pinion lock nut.**
- **Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut.**
- **Adjust the drive pinion lock nut tightening torque to the lower limit first. Do not exceed the drive pinion lock nut specified torque. Refer to RFD-15, "COMPONENTS" .**
- **If the drive pinion bearing preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Do not loosen drive pinion lock nut to adjust the drive pinion bearing preload torque.**
- **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**

11. Check companion flange runout. Refer to RFD-19, "Companion Flange Runout" .
12. Install differential case assembly. Refer to RFD-31, "Differential Assembly" .

Differential Assembly

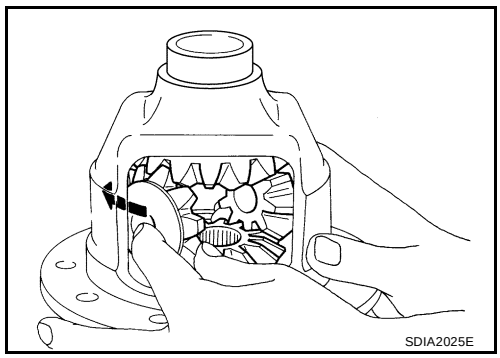
1. Install side gear thrust washers with the same thickness as the ones installed prior to disassembly, or reinstall the old ones on the side gears.



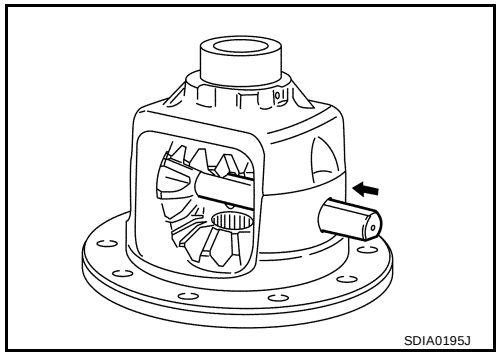
2. Install the side gears and side gear thrust washers into the differential case.

CAUTION:
Make sure that the circular clip is installed to side gears.

3. Install the pinion mate thrust washers to the two pinion mate gears. Then install the pinion mate gears with the pinion mate thrust washers by aligning them in diagonally opposite positions and rotating them into the differential case.

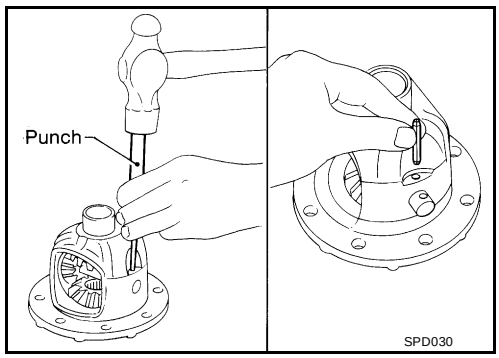


4. Align the lock pin hole on the differential case with the lock pin hole on the pinion mate shaft, and install the pinion mate shaft.
5. Measure the side gear end play. If necessary, select the appropriate side gear thrust washers. Refer to RFD-24, "Side Gear Back Clearance" .


SDIA0195J

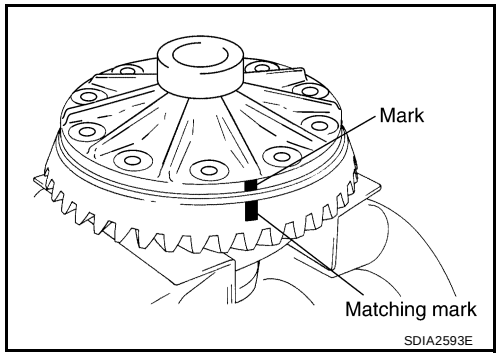
6. Drive a new lock pin into the pinion mate shaft until it is flush with the differential case using suitable tool.

CAUTION:
Do not reuse lock pin.



SPD030

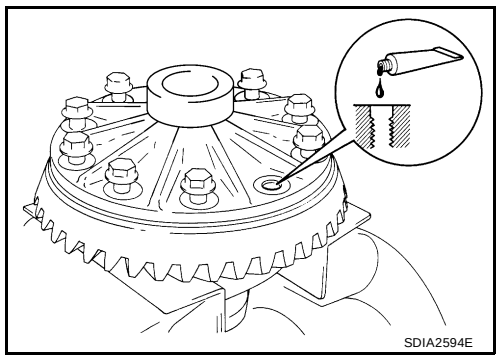
7. Align the matching mark of the differential case with the mark of the drive gear, then place the drive gear onto the differential case.



SDIA2593E

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

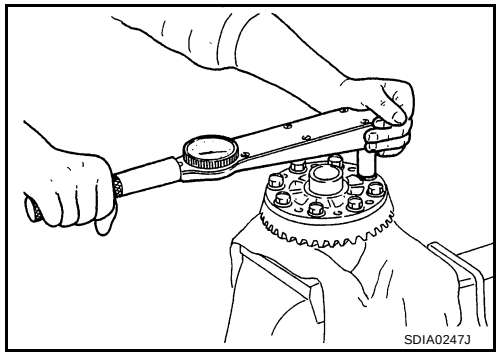
CAUTION:
Make sure the drive gear back and threaded holes are clean.


SDIA2594E

9. Tighten the drive gear bolts to the specified torque. Refer to RFD-15, "COMPONENTS" . After tightening the drive gear bolts to the specified torque, tighten an additional 31° to 36° using Tool.

Tool number : KV10112100-A (BT-8653-A)

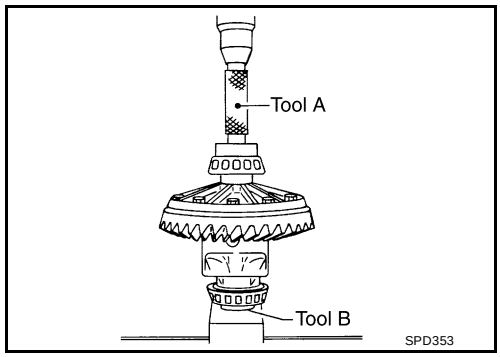
CAUTION:
- **Always use Tool. Avoid tightening based on visual check alone.**
- **Tighten drive gear bolts in a crisscross pattern.**


SDIA0247J

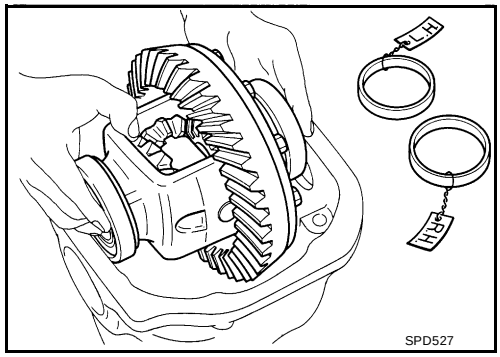
10. Press the new side bearing inner races to the differential case using Tools.

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

CAUTION:
Do not reuse side bearing inner race.

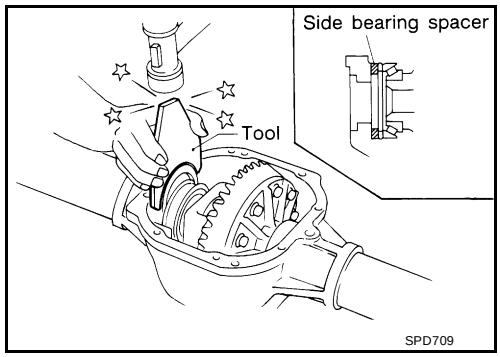


11. Install the differential case assembly with the side bearing outer races into gear carrier.
12. Measure the side bearing preload torque. If necessary, select the appropriate side bearing adjusting washers. Refer to RFD-25, "Side Bearing Preload Torque" .

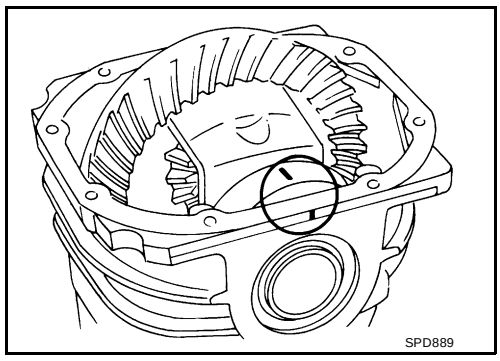


13. Insert the selected left and right side bearing adjusting washers in place between the side bearings and gear carrier using Tool.

Tool number **: KV38100600 (J-25267)**



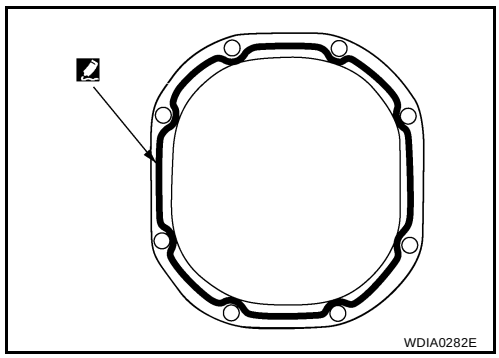
14. Install the side bearing caps with the matching marks aligned and tighten the side bearing cap bolts to the specified torque. Refer to RFD-15, "COMPONENTS" .



15. Check and adjust the drive gear runout, tooth contact, drive gear to drive pinion backlash, and total preload torque. Refer to RFD-17, "Drive Gear Runout" , RFD-17, "Tooth Contact" , RFD-19, "Backlash" and RFD-17, "Total Preload Torque" .
Recheck above items.

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

    CAUTION:
    Remove any old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to the application and mating surfaces.
17. Install the carrier cover to the gear carrier. Tighten the bolts to the specified torque. Refer to RFD-15, "COMPONENTS" .



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EDS0026P

2WD MODELS

Applied model	QR25DE		VQ40DE	
	King cab		King cab	Crew cab
	M/T	A/T	A/T	
Final drive model	C200			
Gear ratio	4.083	3.692	2.937	3.133
Number of teeth (Drive gear/Drive pinion)	49/12	48/13	47/16	47/15
Oil capacity (Approx.)	1.6 ℓ (3-3/8 US pt, 2-7/8 Imp pt)			
Number of pinion gears	2			
Drive pinion adjustment spacer type	Collapsible			

4WD MODELS

Applied model	VQ40DE	
	King cab	Crew cab
	A/T	
Final drive model	C200	
Gear ratio	3.133	3.357
Number of teeth (Drive gear/Drive pinion)	47/15	47/14
Oil capacity (Approx.)	1.6 ℓ (3-3/8 US pt, 2-7/8 Imp pt)	
Number of pinion gears	2	
Drive pinion adjustment spacer type	Collapsible	

Inspection and Adjustment

EDS0026Q

DRIVE GEAR RUNOUT

Unit: mm (in)

Item	Runout limit
Drive gear back face	0.08 (0.0031) or less

DIFFERENTIAL SIDE GEAR CLEARANCE

Unit: mm (in)

Item	Specification
Side gear back clearance (Clearance between side gear and differential case for adjusting side gear backlash)	0.1 - 0.2 (0.004 - 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
Drive pinion bearing preload torque	1.1 - 1.4 (0.12 - 0.14, 10 - 12)
Side bearing preload torque (reference value determined by drive gear bolt pulling force)	0.3 - 1.5 (0.03 - 0.15, 3 - 13)
Drive gear bolt pulling force (by spring gauge)	34.2 – 39.2 N (3.5 – 4 kg, 7.7 – 8.8 lb)
Total preload torque (Total preload torque = drive pinion bearing preload torque + Side bearing preload torque)	1.4 - 2.9 (0.15 - 0.29, 13 - 25)

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	0.08 (0.0031) or less
Companion flange inner side	0.08 (0.0031) or less

SELECTIVE PARTS

Side Gear Thrust Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
0.75 (0.0295)	38424 EC000	0.87 (0.0343)	38424 EC004
0.78 (0.0307)	38424 EC001	0.90 (0.0350)	38424 EC005
0.81 (0.0319)	38424 EC002	0.93 (0.0366)	38424 EC006
0.84 (0.0331)	38424 EC003		

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

Drive Pinion Height Adjusting Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
3.05 (0.1201)	38154 0C000	3.29 (0.1295)	38154 0C008
3.08 (0.1213)	38154 0C001	3.32 (0.1307)	38154 0C009
3.11 (0.1224)	38154 0C002	3.35 (0.1319)	38154 0C010
3.14 (0.1236)	38154 0C003	3.38 (0.1331)	38154 0C011
3.17 (0.1248)	38154 0C004	3.41 (0.1343)	38154 0C012
3.20 (0.1260)	38154 0C005	3.44 (0.1354)	38154 0C013
3.23 (0.1272)	38154 0C006	3.47 (0.1366)	38154 0C014
3.26 (0.1283)	38154 0C007	3.50 (0.1378)	38154 0C015

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

Side Bearing Adjusting Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
2.00 (0.0787)	38453 N3100	2.35 (0.0925)	38453 N3107
2.05 (0.0807)	38453 N3101	2.40 (0.0945)	38453 N3108
2.10 (0.0827)	38453 N3102	2.45 (0.0965)	38453 N3109
2.15 (0.0846)	38453 N3103	2.50 (0.0984)	38453 N3110
2.20 (0.0866)	38453 N3104	2.55 (0.1004)	38453 N3111
2.25 (0.0886)	38453 N3105	2.60 (0.1024)	38453 N3112
2.30 (0.0906)	38453 N3106	2.65 (0.1043)	38453 N3113

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

PRECAUTIONS

PFP:00001

Precautions for Servicing Rear Final Drive

EDS0046Q

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

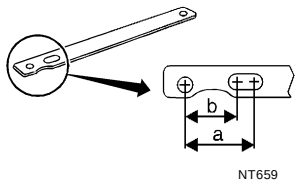
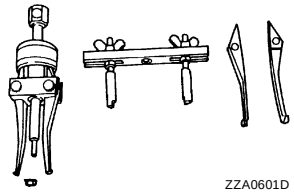
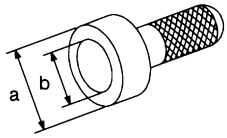
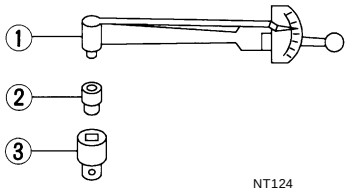
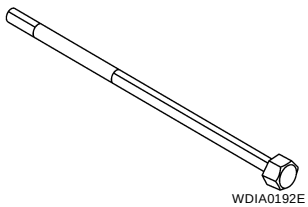
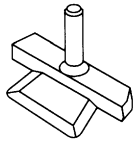
PREPARATION

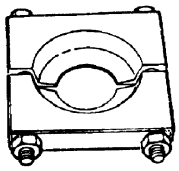
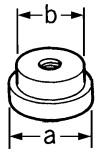
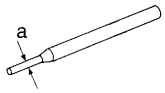
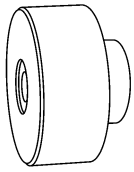
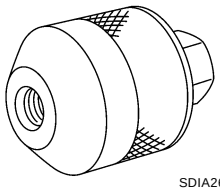
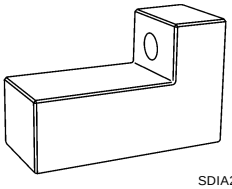
PFP:00002

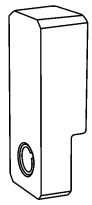
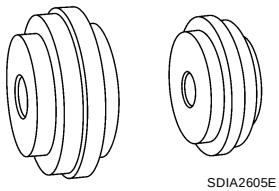
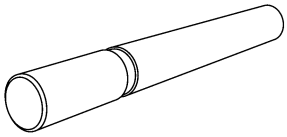
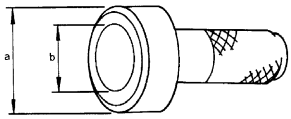
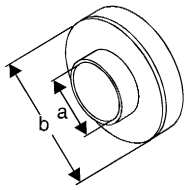
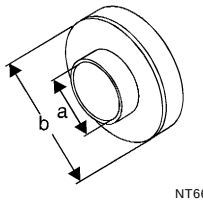
Special Service Tools

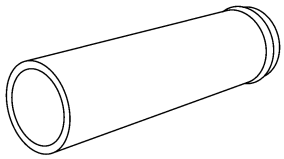
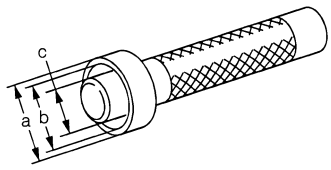
EDS0026S

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
KV40104000 (—) Flange wrench  NT659	Removing and installing drive pinion nut **a: 85 mm (3.35 in) dia.** **b: 65 mm (2.56 in) dia.**
ST33290001 (J-34286) Puller  ZZA0601D	Removing front oil seal
ST15310000 (—) Drift  NT115	Installing front oil seal **a: 96mm (3.77 in) dia.** **b: 84 mm (3.30 in) dia.**
ST3127S000 (J-25765-A) Preload gauge set 1. GG91030000 (J-25765) Torque wrench 2. HT62940000 (1/2″) (—) Socket adapter 3. HT62900000 (3/8″) (—) Socket adapter  NT124	Inspecting drive pinion bearing preload and total preload
— (C - 4164) Adjuster tool  WDIA0192E	Removing and installing side bearing adjuster
KV10111100 (J-37228) Seal cutter  S-NT046	Removing carrier cover

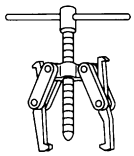
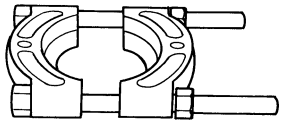
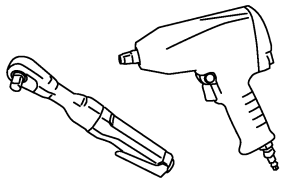
Tool number (Kent-Moore No.) Tool name		Description
ST30021000 (J-22912-01) Puller	 ZZA0700D	Removing drive pinion rear bearing inner race
ST33081000 (—) Adapter	 ZZA1000D	Removing and installing side bearing inner race **a: 43 mm (1.69 in) dia.** **b: 33.5 mm (1.32 in) dia.**
ST23550000 (—) Pin punch	 NT410	Removing and installing lock pin **a: 4.5 mm (0.177 in) dia.**
— (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
— (D-115-2) Scooter block	 SDIA2604E	Adjusting pinion gear height
— (8541A-1) Arbor disc	 SDIA2605E	Adjusting pinion gear height
— (D-115-3) Arbor	 SDIA2606E	Adjusting pinion gear height
ST01500001 (—) Drift	 ZZA0811D	Installing drive pinion rear bearing outer race **a: 89mm (3.50 in) dia.** **b: 79 mm (3.11 in) dia.**
ST30022000 (—) Drift	 NT660	Installing drive pinion rear bearing outer race **a: 46 mm (1.81 in) dia.** **b: 110 mm (4.33 in) dia.**
ST33022000 (—) Drift	 NT660	Installing drive pinion front bearing outer race **a: 49 mm (1.92 in) dia.** **b: 67 mm (2.63 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
— (C-4040) Installer  SDIA2607E	Installing 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.**

Commercial Service Tools

EDS0026T

Tool name	Description
Puller  NT077	Removing companion flange and side bearing inner race
Puller  ZZB0823D	Removing side bearing inner race
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EDS0026U

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

Reference page		—	RFD-50, "Tooth Contact"	—	RFD-51, "Backlash"	RFD-52, "Companion Flange Runout"	RFD-44, "Checking Differential Gear Oil"	PR-3, "NVH Troubleshooting Chart"	RAX-5, "NVH Troubleshooting Chart", RSU-4, "NVH Troubleshooting Chart"	WT-4, "NVH Troubleshooting Chart"		RAX-5, "NVH Troubleshooting Chart"	BR-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
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	AXLE SHAFT	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×

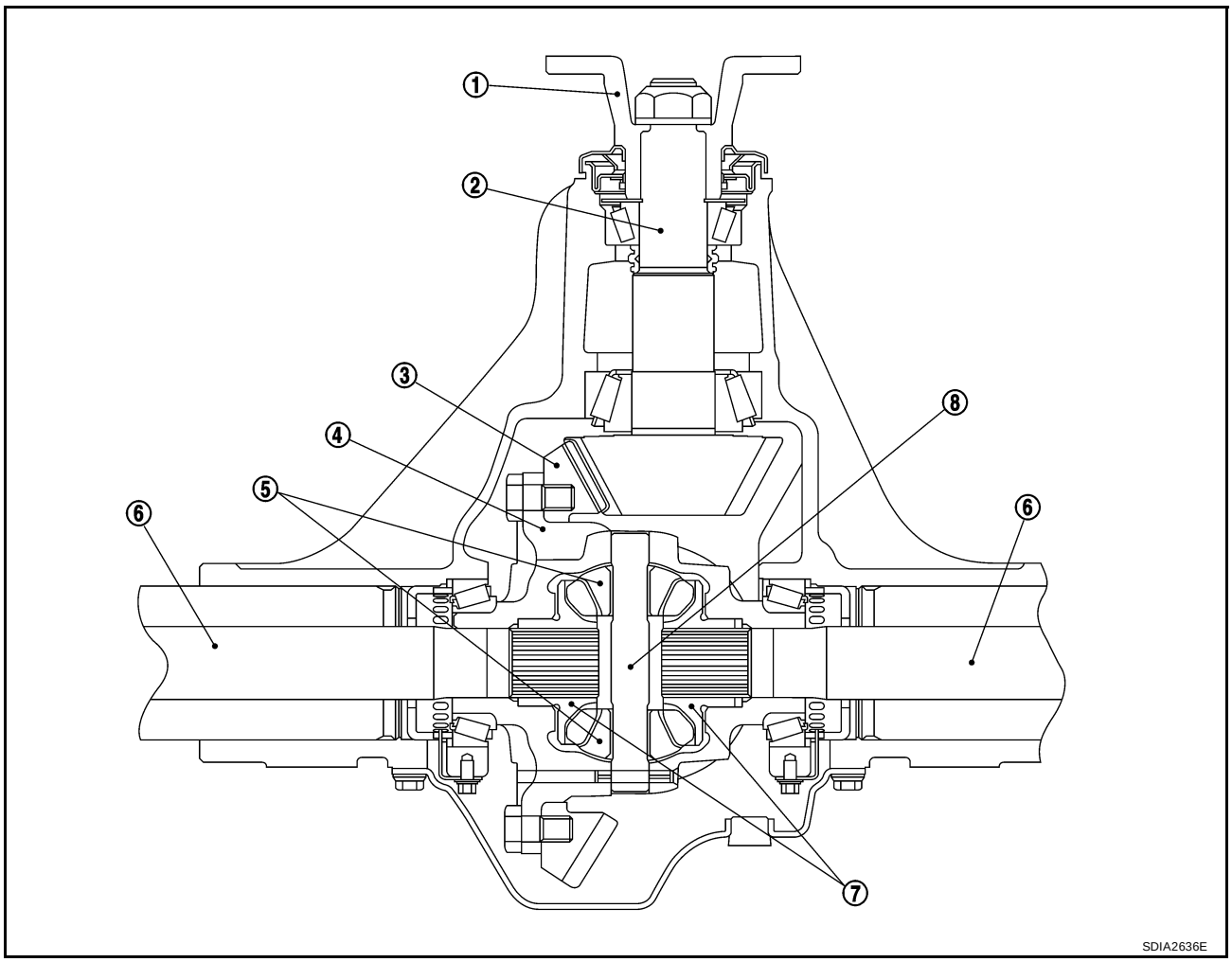
×: Applicable

DESCRIPTION

PFP:00000

Cross-Sectional View

EDS0026V



1. Companion flange
2. Drive pinion
3. Drive gear
4. Differential case
5. Pinion mate gear
6. Axle shaft
7. Side gear
8. Pinion mate shaft

DIFFERENTIAL GEAR OIL

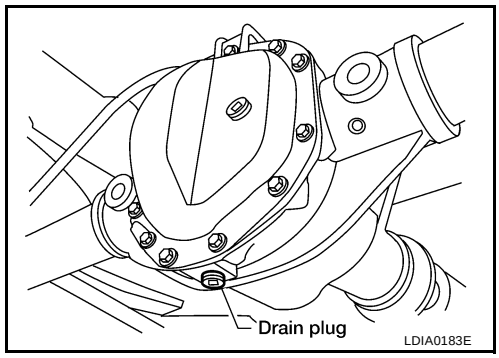
PFP:KLD30

Changing Differential Gear Oil

EDS0026W

DRAINING

1. Stop engine.
2. Remove the drain plug from the rear final drive assembly to drain the differential gear oil.
3. Install the drain plug with sealant applied on the threads to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-49, "COMPONENTS" .
   - Use High Performance Thread Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

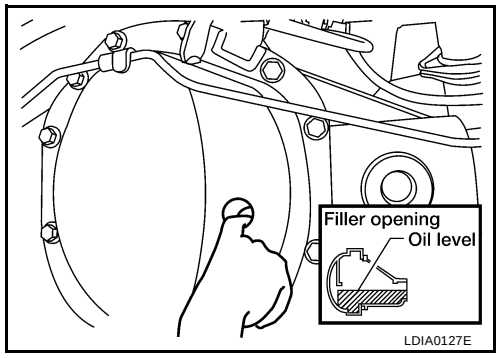


FILLING

1. Remove the filler plug from the rear final drive assembly.
2. Fill the rear final drive assembly with new differential gear oil until the level reaches the specified level near the filler plug hole.

   Differential gear oil grade and capacity : Refer to MA-11, "Fluids and Lubricants" .

3. Install the filler plug with sealant applied on the threads to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-49, "COMPONENTS" .
   - Use High Performance Thread Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .



Checking Differential Gear Oil

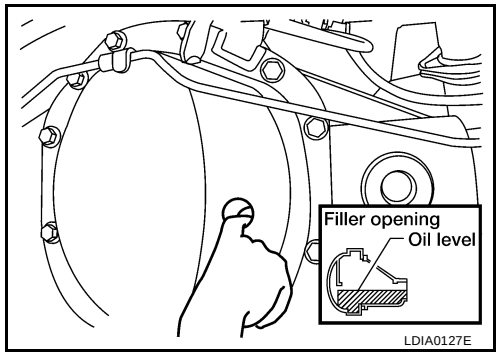
EDS0026X

OIL LEAKAGE AND OIL LEVEL

1. Make sure that differential gear oil is not leaking from the rear final drive assembly or around it.
2. Check the differential gear oil level from the filler plug hole as shown.

   CAUTION:
   Do not start engine while checking differential gear oil level.

3. Install the filler plug with sealant applied on the threads to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-49, "COMPONENTS" .
   - Use High Performance Thread Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .



FRONT OIL SEAL

PFP:38189

Removal and Installation

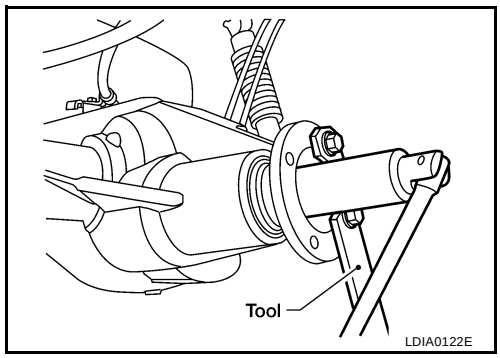
EDS0026Y

REMOVAL

1. Remove rear propeller shaft. Refer to PR-10, "Removal and Installation" .
2. Remove brake calipers and rotors. Refer to BR-29, "Removal and Installation of Brake Caliper and Disc Rotor" .
3. Measure the total preload torque. Refer to RFD-50, "Total Preload Torque" .

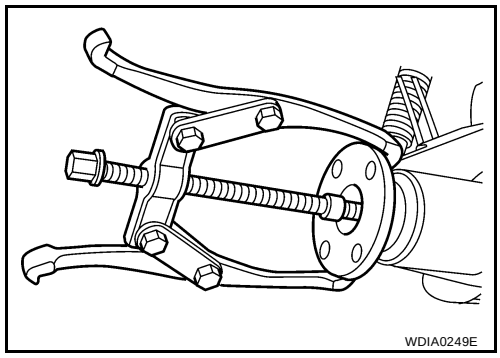
   NOTE:
   Record the total preload torque measurement.
4. Remove the drive pinion lock nut using Tool.

   Tool number : KV40104000 (—)



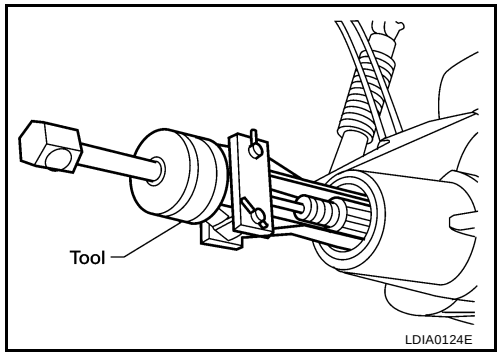
5. Put matching marks on the companion flange and drive pinion using paint.

   CAUTION:
   Use paint to make the matching marks. Do not damage the companion flange or drive pinion.
6. Remove the companion flange using suitable tool.



7. Remove the front oil seal using Tool.

   Tool number : ST33290001 (J-34286)

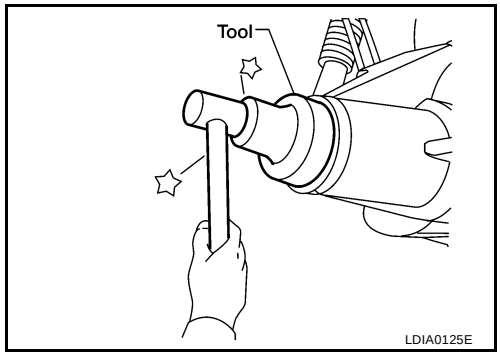


INSTALLATION

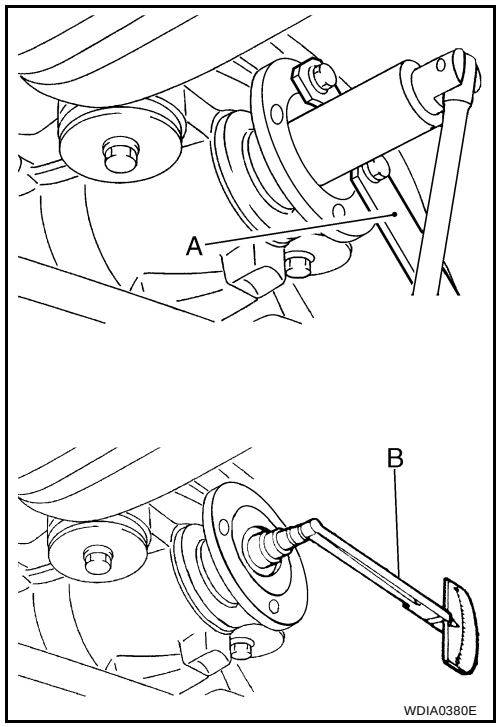
1. Apply multi-purpose grease to the lips of the new front oil seal. Then drive the new front oil seal in evenly until it becomes flush with the gear carrier using Tool.

   Tool number : ST15310000 (—)

   CAUTION:
   - **Do not reuse front oil seal.**
   - **Do not incline the new front oil seal when installing.**
   - **Apply multi-purpose grease to the lips and differential gear oil to the circumference of the new front oil seal.**



2. Install the companion flange to the drive pinion while aligning the matching marks.
3. Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut and new drive pinion lock nut washer. Then adjust the drive pinion lock nut tightening torque using Tool A, and check the total preload torque using Tool B.



Tool number **A: KV40104000 (—)**
B: ST3127S000 (J-25765-A)

Total preload torque: **Refer to RFD-50, "Total Preload Torque" .**

- The total preload torque should be within the total preload torque specification. When not replacing the collapsible spacer, it should also be equal to the measurement taken during removal plus an additional 0.56 N·m (0.06 Kg-m, 5 in-lb).
- If the total preload torque is low, tighten the drive pinion lock nut in 6.8 N·m (0.69 Kg-m, 5ft-lb) increments until the total preload torque is met.

CAUTION:
- **Do not reuse drive pinion lock nut or drive pinion lock nut washer.**
- **Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut.**
- **Adjust the drive pinion lock nut tightening torque to the lower limit first. Do not exceed the drive pinion lock nut specified torque. Refer to RFD-49, "COMPONENTS" .**
- **Do not loosen drive pinion lock nut to adjust the total preload torque. If the total preload torque exceeds the specifications, replace the collapsible spacer and tighten it again to adjust. Refer to RFD-49, "Disassembly and Assembly" .**
- **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**

4. Installation of the remaining components is in the reverse order of removal.

CAUTION:
Check the differential gear oil level after installation. Refer to RFD-44, "DIFFERENTIAL GEAR OIL" .

CARRIER COVER

PFP:38351

Removal and Installation

EDS0026Z

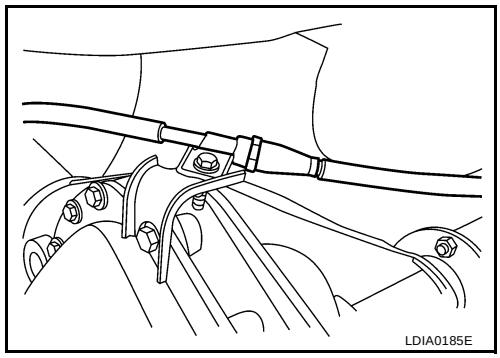
REMOVAL

1. Drain the differential gear oil. Refer to RFD-44, "DRAINING" .
2. Disconnect the parking brake cable from the carrier cover.
3. Remove the carrier cover bolts and separate the carrier cover from the gear carrier using Tool.

Tool number : KV10111100 (J-37228)

CAUTION:

- **Do not damage the mating surface.**
- **Do not insert flat-bladed screwdriver, this will damage the mating surface.**



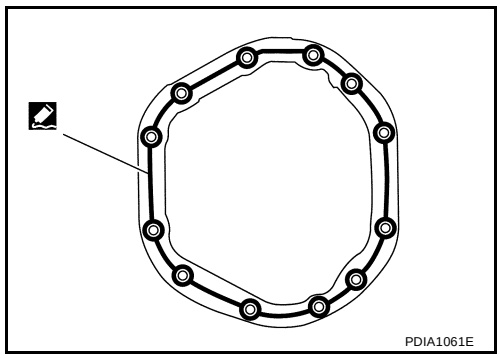
INSTALLATION

1. Apply a bead of sealant to the mating surface of the carrier cover as shown.
   - Use Genuine Silicone RTV or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

CAUTION:

Remove any old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to the application and mating surfaces.

2. Install the carrier cover to the gear carrier. Tighten the bolts to the specified torque. Refer to RFD-49, "COMPONENTS" .
3. Connect the parking brake cable and brake tube to the carrier cover.



4. Fill the rear final drive assembly with recommended differential gear oil. Refer to RFD-44, "Checking Differential Gear Oil" .

REAR FINAL DRIVE ASSEMBLY

PFP:38300

Removal and Installation

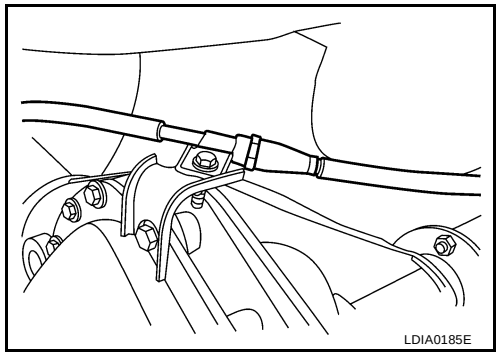
EDS00270

REMOVAL

CAUTION:

- **Do not damage spline, companion flange and front oil seal when removing propeller shaft.**
- **Before removing final drive assembly or rear axle assembly, disconnect ABS sensor harness connector from the assembly and move it away from final drive/rear axle assembly area. Failure to do so may result in sensor wires being damaged and sensor becoming inoperative.**

1. Drain the differential gear oil. Refer to RFD-44, "DRAINING" .
2. Remove the rear propeller shaft. Refer to PR-10, "Removal and Installation" .
3. Remove the axle shaft. Refer to RAX-7, "Removal and Installation" .
4. Disconnect the following components from the rear final drive assembly.
   - ABS sensor wire harness. Refer to BRC-36, "Removal and Installation" (ABS), BRC-80, "Removal and Installation" (ABLS/ABS) or BRC-147, "Removal and Installation" (HDC/HSA/VDC/TCS/ABS).
   - Parking brake cable
   - Brake hoses



5. Support rear final drive assembly using a suitable jack.
6. Remove rear shock absorber lower bolts. Refer to RSU-7, "Removal and Installation" .
7. Remove leaf spring U-bolt nuts. Refer to RSU-8, "Removal and Installation" .
8. Remove rear final drive assembly.

   CAUTION:
   Secure rear final drive assembly to the jack while removing it.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

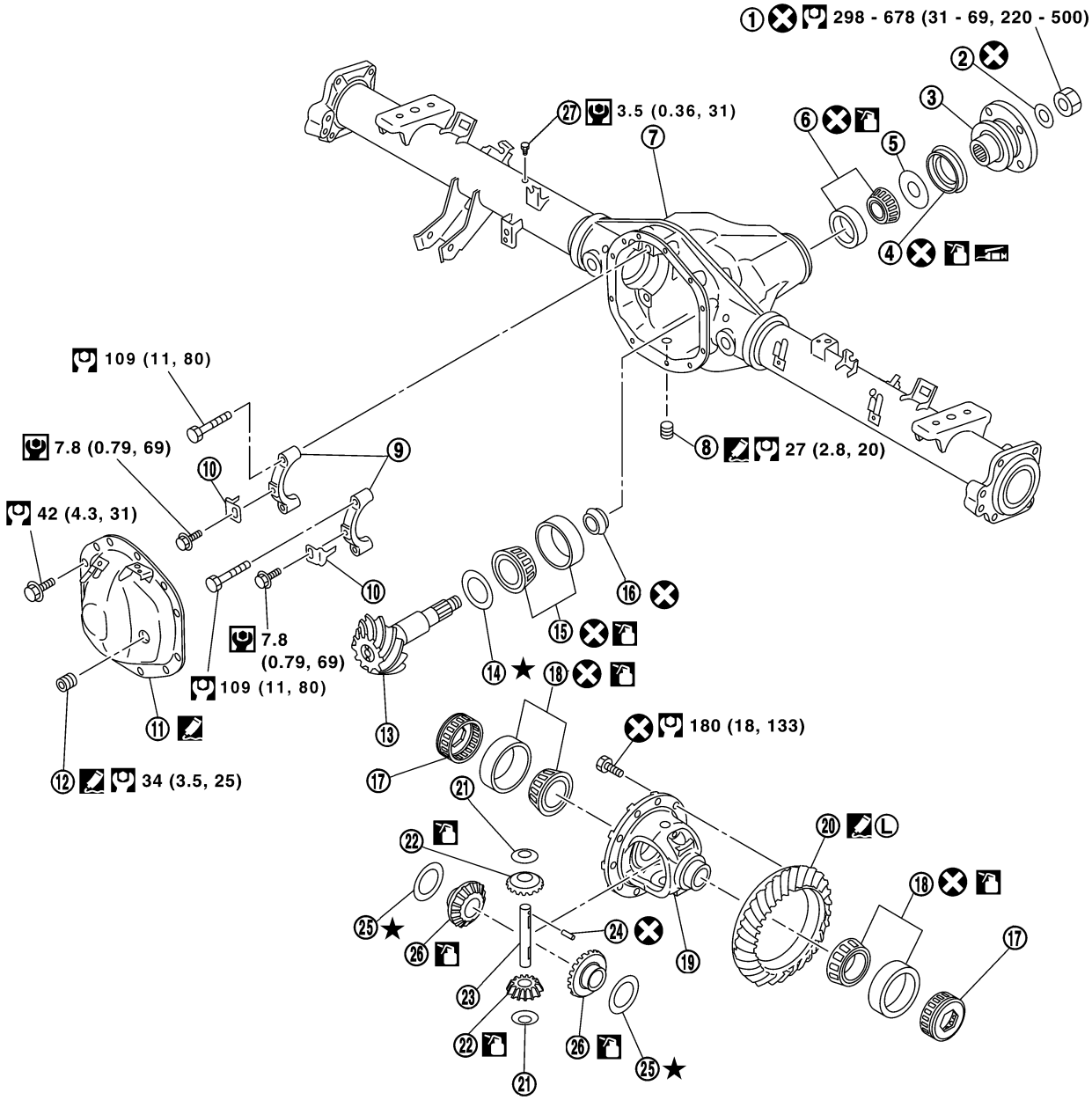
- **Fill the rear final drive assembly with differential gear oil after installation. Refer to RFD-44, "Checking Differential Gear Oil" .**
- **Bleed the air from brake system. Refer to BR-10, "Bleeding Brake System" .**

Disassembly and Assembly

EDS00271

COMPONENTS

SEC.380



WDIA0347E

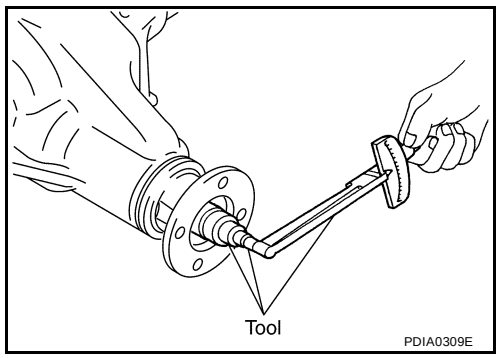
1. Drive pinion lock nut
2. Drive pinion nut washer
3. Companion flange
4. Front oil seal
5. Drive pinion front bearing thrust washer
6. Drive pinion front bearing
7. Gear carrier
8. Drain plug
9. Side bearing cap
10. Adjuster lock plate
11. Carrier cover
12. Filler plug
13. Drive pinion
14. Drive pinion height adjusting washer
15. Drive pinion rear bearing
16. Collapsible spacer
17. Side bearing adjuster
18. Side bearing
19. Differential case
20. Drive gear
21. Pinion mate thrust washer
22. Pinion mate gear
23. Pinion mate shaft
24. Lock pin
25. Side gear thrust washer
26. Side gear
27. Breather

ASSEMBLY INSPECTION AND ADJUSTMENT

- Drain the differential gear oil before inspection and adjustment. Refer to RFD-44, "DIFFERENTIAL GEAR OIL" .
- Remove and install the carrier cover as necessary for inspection and adjustment. Refer to RFD-47, "CARRIER COVER" .

Total Preload Torque

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



Tool number : ST3127S000 (J-25765-A)

Total preload torque

Gear ratio 3.538 Type:

2.49 - 4.57 N·m (0.26 - 0.46 kg-m, 22- 40 in-lb)

Gear ratio 3.692 Type:

2.38 - 4.46 N·m (0.25 - 0.45 kg-m, 21 - 39 in-lb)

NOTE:
Total preload torque = Drive pinion bearing preload torque + Side bearing preload torque

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

If the total preload torque is greater than specification

On drive pinion bearings: Replace collapsible spacer.

On side bearings: Loosen side bearing adjuster.

If the total preload torque is less than specification

On drive pinion bearings: Tighten drive pinion lock nut.

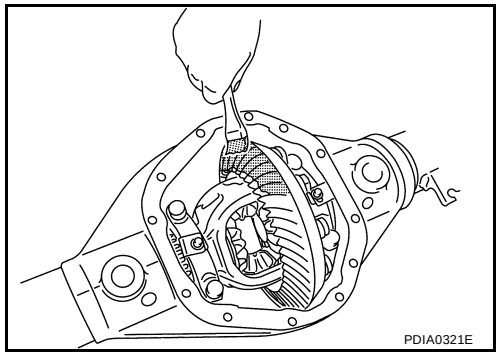
On side bearings: Tighten side bearing adjuster.

Tooth Contact

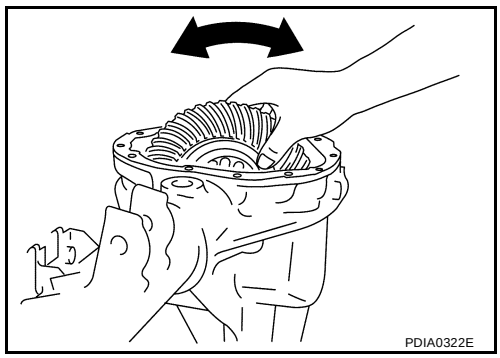
Checking gear tooth contact pattern is necessary to verify correct relationship between drive gear and drive pinion. Gears which are not positioned in proper arrangement may be noisy and/or have a short life. Check gear tooth contact pattern to obtain the best contact for low noise and long life.

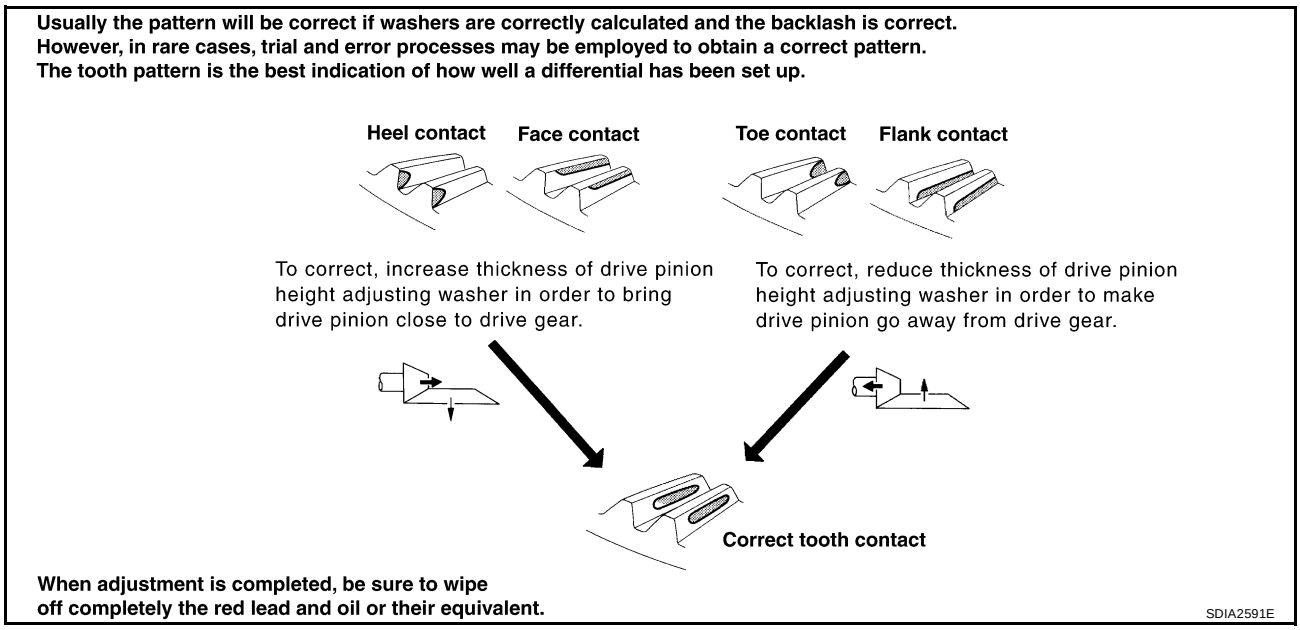
1. Thoroughly clean drive gear and drive pinion teeth.
2. Apply red lead to drive gear.

NOTE:
Apply red lead to both faces of three to four gears, at four locations evenly spaced on the drive gear.



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



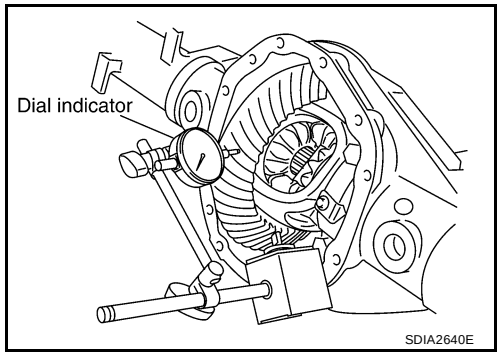


4. If outside the standard, adjust drive pinion height adjusting washer and backlash. Refer to RFD-59, "Drive Pinion Height Adjusting Washer" and RFD-51, "Backlash" .

Backlash

1. Fit a dial indicator to the drive gear face to measure the backlash.

Backlash: 0.08 - 0.13 mm (0.0031 - 0.0051 in)



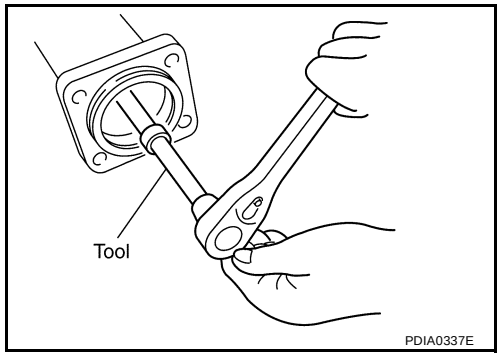
2. If the backlash is outside of the specification, adjust each side bearing side bearing adjuster.

a. Remove adjuster lock plate.

b. Loosen side bearing cap bolts.

c. Tighten or loosen each side bearing adjuster using Tool.

Tool number : — (C - 4164)

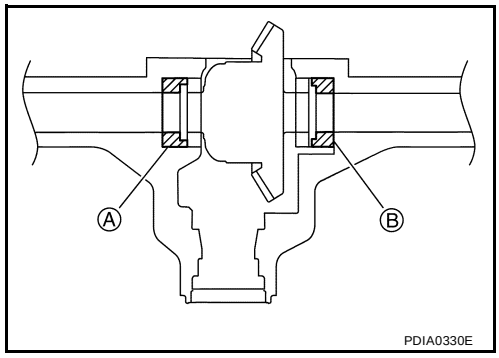


If the backlash is greater than specification:

Loosen side bearing adjuster A and tighten side bearing adjuster B by the same amount.

If the backlash is less than specification:

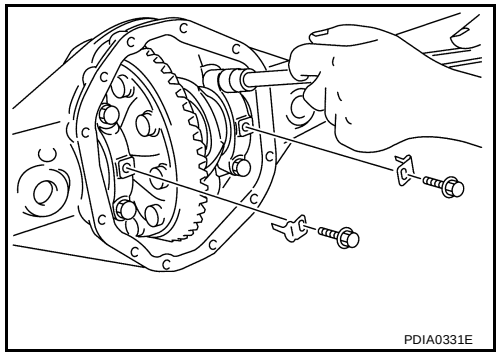
Loosen side bearing adjuster B and tighten side bearing adjuster A by the same amount.



CAUTION:
Do not change the side bearing side bearing adjusters by different amounts as it will change the side bearing preload torque.

d. Tighten side bearing cap bolts to the specified torque. Refer to RFD-49, "COMPONENTS" .

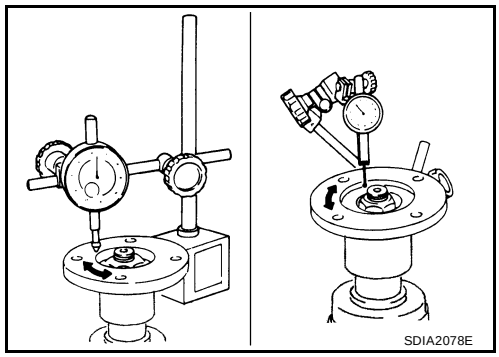
e. Install adjuster lock plate and tighten to the specified torque. Refer to RFD-49, "COMPONENTS" .



CAUTION:
Check tooth contact and total preload torque after adjusting side bearing adjuster. Refer to RFD-50, "Tooth Contact" and RFD-50, "Total Preload Torque" .

Companion Flange Runout

1. Rotate companion flange and check for runout on the companion flange face (inner side of the bolt holes) and companion flange inner side (socket diameter) using suitable tool.



Runout limit

Companion flange face:	**0.10 mm (0.0039 in)**
Companion flange inner side:	**0.13 mm (0.0051 in)**

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

a. Rotate the companion flange on the drive pinion by 90°, 180° and 270° while checking for the position where the runout is minimum.

b. If the runout is still outside of the runout limit after the companion flange has been rotated on the drive pinion, possible cause could be an assembly malfunction of drive pinion and drive pinion bearing or a malfunctioning drive pinion bearing.

c. If the runout is still outside of the runout limit after repair of the assembly of drive pinion and drive pinion bearing or drive pinion bearing, replace the companion flange.

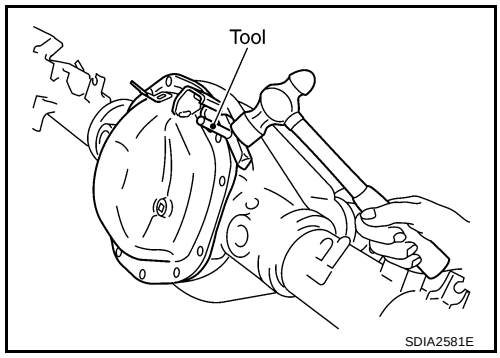
DISASSEMBLY

Differential Assembly

1. Remove carrier cover bolts.
2. Separate carrier cover using Tool.

Tool number : KV10111100 (J-37228)

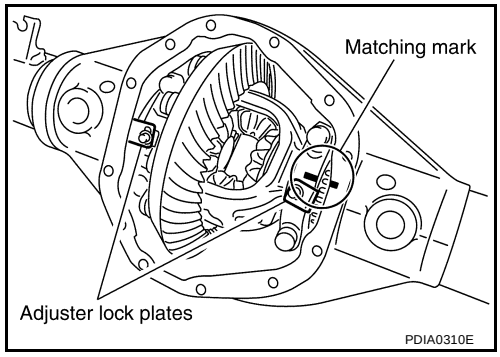
CAUTION:
- **Do not damage the mating surface.**
- **Do not insert flat-bladed screwdriver, this will damage the mating surface.**



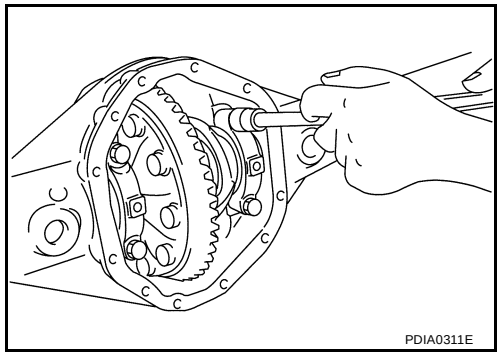
3. For proper reinstallation, paint matching mark on one side of side bearing cap.

CAUTION:
- **Side bearing caps are line-board for initial assembly. The matching marks are used to reinstall them in their original positions.**
- **For matching mark, use paint. Do not damage side bearing cap.**

4. Remove adjuster lock plates.

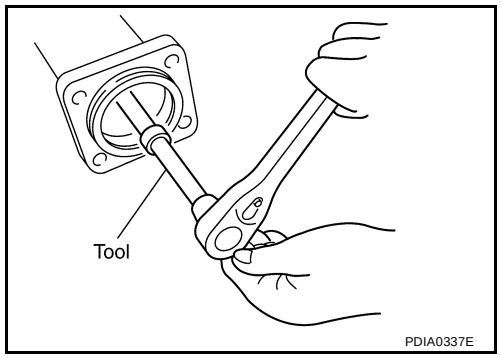


5. Remove side bearing caps.

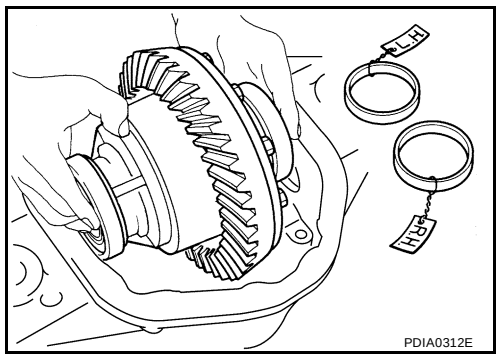


6. Remove side bearing adjusters using Tool.

Tool number : — (C-4164)



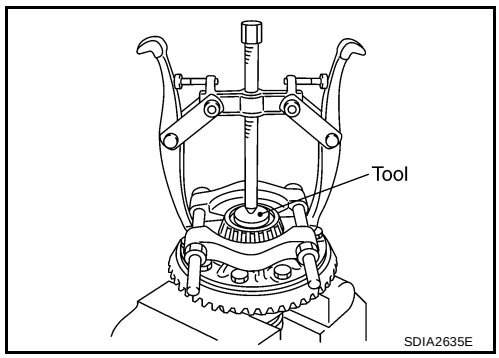
7. Keep side bearing outer races together with inner races. Do not mix them up. Also, keep side bearing adjusters together with bearing.
8. Remove side bearing adjusters from gear carrier.



9. Remove side bearing inner races using Tool.

Tool number : ST33081000 (—)

CAUTION:
Do not damage differential case.

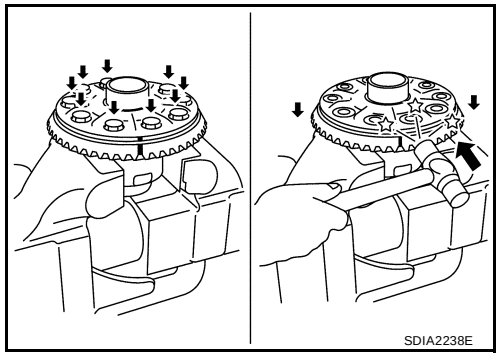


10. For proper reinstallation, paint matching mark on differential case and drive gear.

CAUTION:
Use paint for matching marks. Do not damage differential case or drive gear.

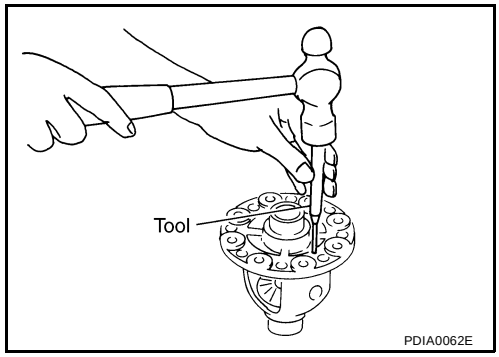
11. Remove drive gear bolts.
12. Tap the drive gear off the differential case using suitable tool.

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

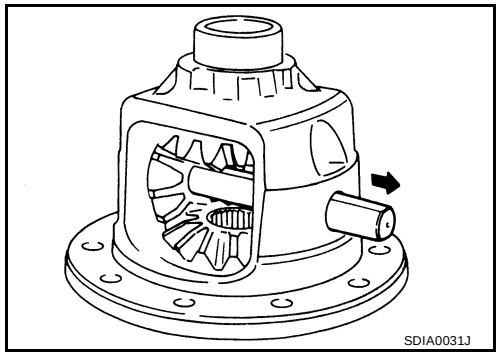


13. Remove the lock pin of the pinion mate shaft from the drive gear side using Tool.

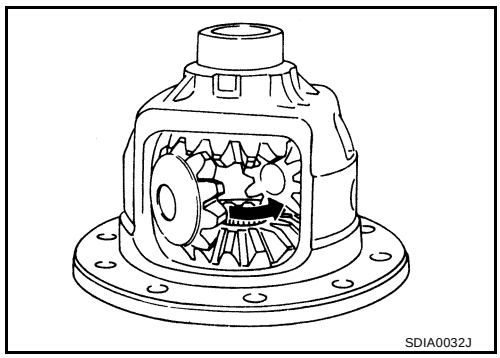
Tool number : ST23550000 (—)



14. Remove pinion mate shaft.



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


SDIA0032J

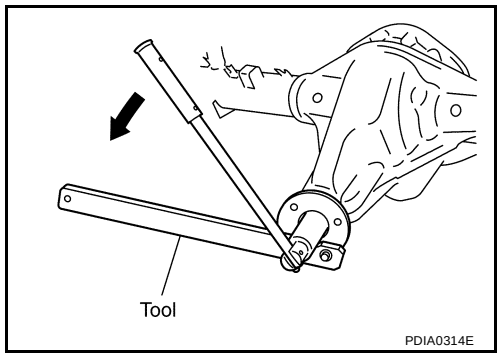
Drive Pinion Assembly

1. Remove differential case assembly. Refer to RFD-53, "Differential Assembly" .
2. Remove drive pinion lock nut and washer using Tool.

Tool number : KV40104000 (—)

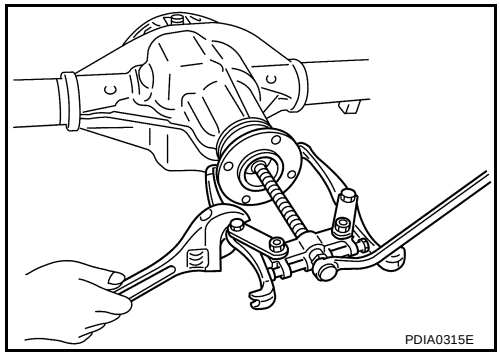
3. Put matching marks on the companion flange and drive pinion using paint.

CAUTION:
Use paint to make the matching marks. Do not damage the companion flange or drive pinion.



PDIA0314E

4. Remove companion flange using suitable tool.

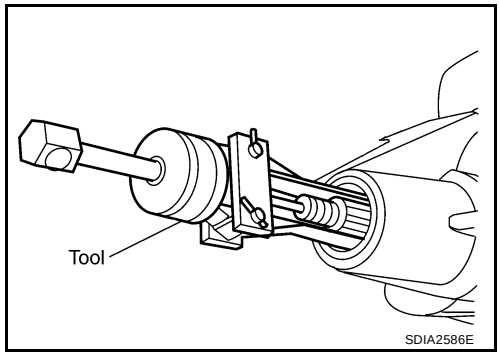

PDIA0315E

5. Remove front oil seal using Tool.

Tool number : ST33290001 (J-34286)

CAUTION:
Do not damage gear carrier.

6. Remove drive pinion front bearing thrust washer.

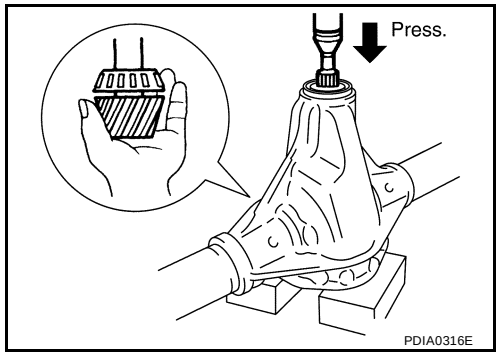


SDIA2586E

7. Remove drive pinion assembly (with rear inner bearing race and collapsible spacer) out of gear carrier.

   CAUTION:
   Do not drop drive pinion assembly.

8. Remove drive pinion front bearing inner race from gear carrier.

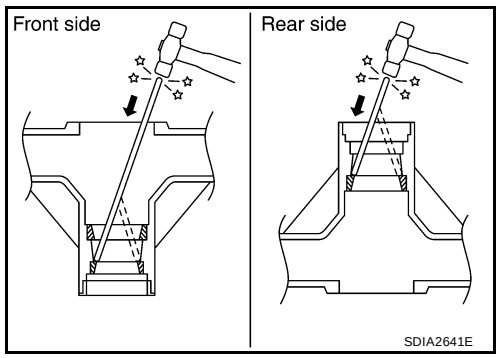


9. Tap drive pinion front bearing outer race uniformly with a brass bar or equivalent to remove.

   CAUTION:
   Do not damage gear carrier.

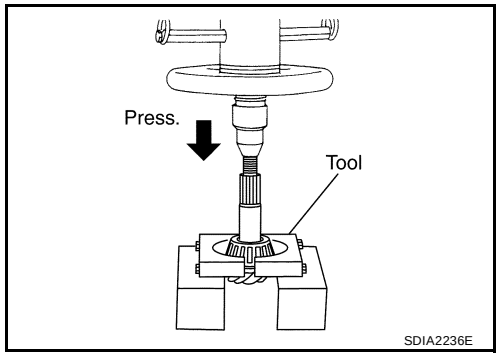
10. Tap drive pinion rear bearing outer race uniformly with a brass bar or equivalent for removal.

    CAUTION:
    Do not damage gear carrier.



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

    Tool number : ST30021000 (J-22912-01)



INSPECTION AFTER DISASSEMBLY

Drive Pinion and Drive Gear

- If the drive pinion and drive gear teeth do not mesh or line-up correctly, determine the cause and adjust, repair, or replace as necessary.
- If the drive pinion or drive gear are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive pinion and drive gear.
- Drive pinion and drive gear are supplied in matched sets only. Matching numbers on both drive pinion and drive gear are etched for verification. If a new drive pinion and drive gear set are being used, verify the numbers of each drive pinion and drive gear before proceeding with assembly.

Bearing

- If bearings are chipped (by friction), pitted, worn, rusted, scratched, or unusual noise is coming from bearing, replace with new bearing assembly (as a new set).
- Bearing must be replaced with a new one whenever disassembled.

Side Gear and Pinion Mate Gear

- If any cracks or damage are found on the surface of the teeth, replace with new one.
- If any worn or chipped marks are found on the side of the side gear and pinion mate gear which contact the thrust washer, replace with new one.
- Replace both side gear and pinion mate gear as a set when replacing side gear or pinion mate gear.

Side Gear Thrust Washer and Pinion Mate Thrust Washer

- If any chips (by friction), damage, or unusual wear are found, replace with new one.

Gear Carrier

- If any wear or cracks are found on the contact sides of gear carrier, replace with new one.

Companion Flange

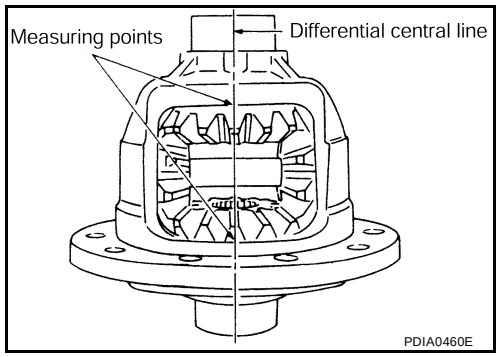
- If any chips (about 0.1mm, 0.004 in) or other damage on the companion flange surface which contacts the front oil seal lips are found, replace with new one.

SELECTION ADJUSTING WASHERS

Side Gear Back Clearance

- Assemble the differential parts if they are disassembled. Refer to RFD-63, "Differential Assembly" .

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



2. Using feeler gauges, measure the clearance between the side gear back and differential case at three different points, while rotating the side gear. Average the three readings to calculate the clearance. (Measure the clearance of the other side as well.)

Side gear back clearance: 0.305 mm (0.0120 in) or less.

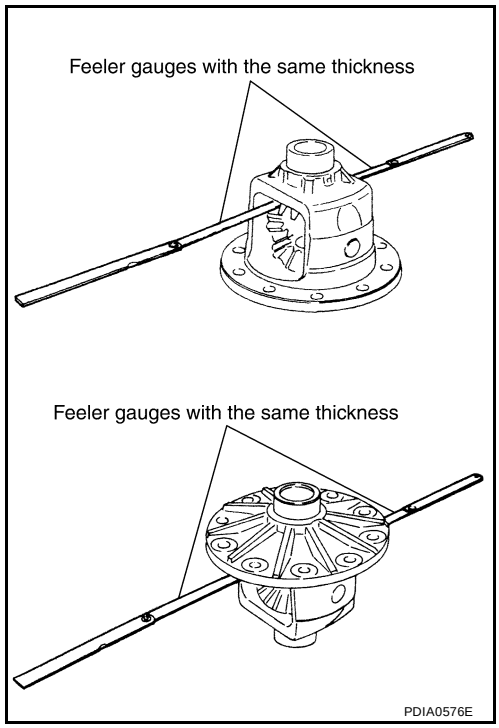
- If the side gear back clearance is outside of the specification, use a thicker or thinner side gear thrust washer to adjust. Refer to RFD-58, "Side Gear Back Clearance" .

If the side gear back clearance is greater than specification:

Use a thicker side gear thrust washer.

If the side gear back clearance is less than specification:

Use a thinner side gear thrust washer.



CAUTION:

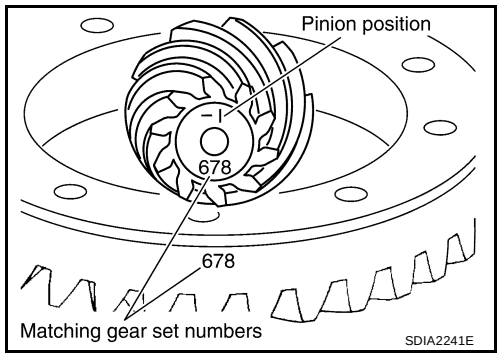
- **Insert feeler gauges with the same thickness on both sides to prevent side gear from tilting.**
- **Each gear should rotate smoothly without excessive resistance during differential motion.**
- **Select a side gear thrust washer for right and left individually.**

NOTE:

Side gear back clearance is clearance between side gear and differential case for adjusting side gear backlash.

Drive Pinion Height Adjusting Washer

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

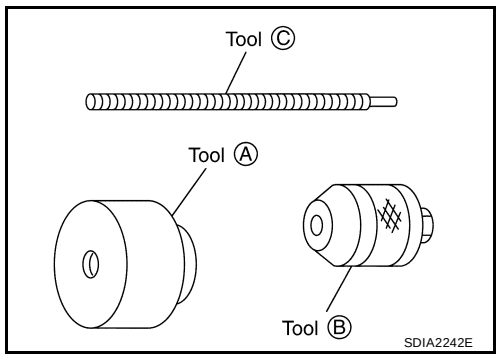


- The mounting distance from the center line of drive gear to the back face of drive pinion for the Model 226 final drive assembly is 109.5 mm (4.312 in).
  On the button end of each drive pinion, there is etched a plus (+) number, a minus (-) number, or a zero (0), which indicates the best running position for each particular gear set. This dimension is controlled by a selective drive pinion height adjusting washer between drive pinion inner bearing race and drive pinion.
  For example: If a drive pinion is etched m+8 (+3), it would require 0.08 mm (0.003 in) less drive pinion height adjusting washer than a drive pinion etched “0”. This means decreasing drive pinion height adjusting washer thickness; increases the mounting distance of drive pinion to 109.6 mm (4.315 in). If a drive pinion is etched m-8 (-3), it would require adding 0.08 mm (0.003 in) more to drive pinion height adjusting washer than would be required if drive pinion were etched “0”. By adding 0.08 mm (0.003 in), the mounting distance of drive pinion was decreased to 109.4 mm (4.309 in) which is just what m-8 (a-3) etching indicated.
- To change drive pinion adjustment, use different drive pinion height adjusting washers which come in different thickness.
- Use the following tables as a guide for selecting the correct drive pinion height adjusting washer thickness to add or subtract from the old drive pinion height adjusting washer.

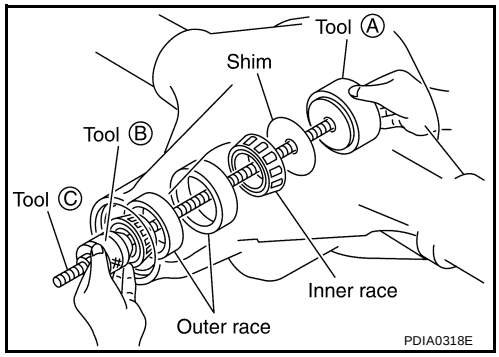
OLD DRIVE PINION MARKING	NEW DRIVE PINION MARKING mm (in)								
	-10 (-4)	-8 (-3)	-5 (-2)	-3 (-1)	0 (0)	+3 (+1)	+5 (+2)	+8 (+3)	+10 (+4)
+10 (+4)	+0.20 (+0.008)	+0.18 (+0.007)	+0.15 (+0.006)	+0.13 (+0.005)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)
+8 (+3)	+0.18 (+0.007)	+0.15 (+0.006)	+0.13 (+0.005)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)
+5 (+2)	+0.15 (+0.006)	+0.13 (+0.005)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)
+3 (+1)	+0.13 (+0.005)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)
0 (0)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)
-3 (-1)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)	-0.13 (-0.005)
-5 (-2)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)	-0.13 (-0.005)	-0.15 (-0.006)
-8 (-3)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)	-0.13 (-0.005)	-0.15 (-0.006)	-0.18 (-0.007)
-10 (-4)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)	-0.13 (-0.005)	-0.15 (-0.006)	-0.18 (-0.007)	-0.20 (-0.008)

1. Make sure all parts are clean and that drive pinion bearings are well lubricated.
2. Assemble drive pinion bearings into Tools.

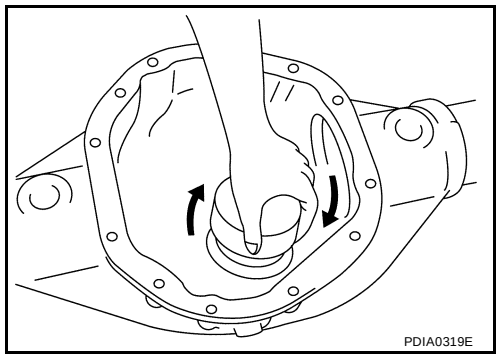
Tool number **A: — (8144)**
B: — (6740)
C: — (6741)



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



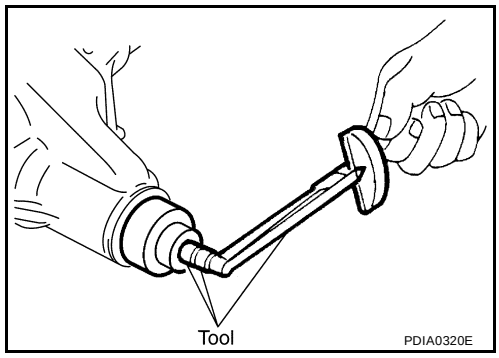
4. Turn the assembly several times to seat drive pinion bearings.



5. Measure the turning torque using Tool.

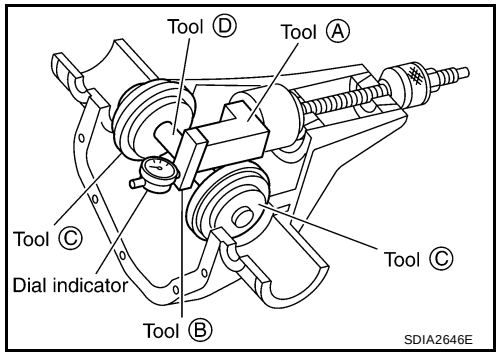
Tool number : ST3127S000 (J-25765-A)

Turning torque specification:
1.2 - 2.8 N-m (0.13 - 0.28 kg-m, 11 - 24 in-lb)

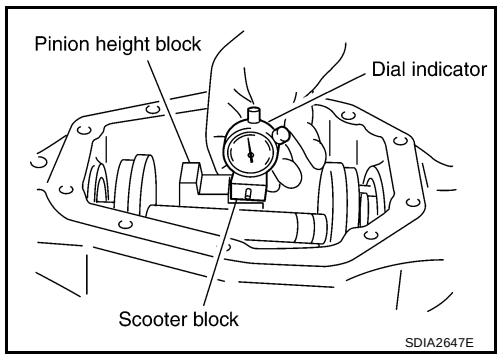


6. Tighten side bearing caps to the specified torque installing Tools as shown.

Tool number **A: — (6739)**
B: — (D-115-2)
C: — (8541A-1)
D: — (D-115-3)



7. Put scooter block on pinion height block. Make sure that dial indicator is level adjusting pressure with a hand. Dial indicator indicates “0”.
8. Slide dial indicator along arbor. Record the maximum.
9. Adjust drive pinion height adjusting washer so that the maximum will be “0”.



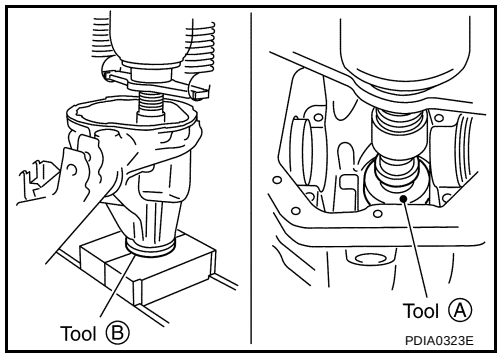
ASSEMBLY

Drive Pinion Assembly

1. Press a new drive pinion rear bearing outer race into gear carrier using Tools.

Tool number A: ST01500001 (—)
B: ST30022000 (—)

CAUTION:
Do not reuse drive pinion rear bearing.

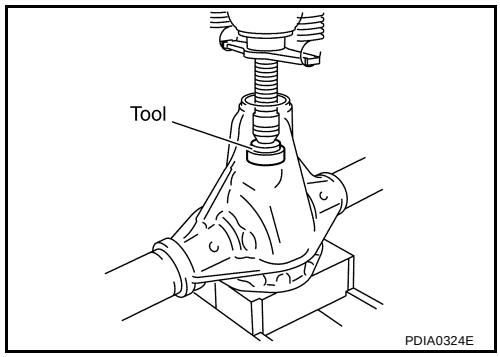


2. Press a new drive pinion front bearing outer race into gear carrier using Tool.

Tool number : ST33022000 (—)

CAUTION:
Do not reuse drive pinion front bearing.

3. Select drive pinion height adjusting washer. Refer to RFD-59, "Drive Pinion Height Adjusting Washer" .

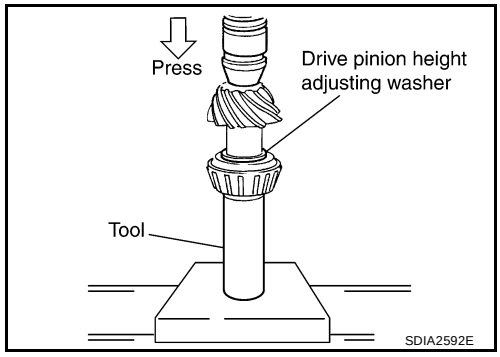


4. Press a new drive pinion rear bearing inner race and drive pinion height adjusting washer to drive pinion using Tool.

Tool number : — (C - 4040)

CAUTION:
Do not reuse drive pinion rear bearing.

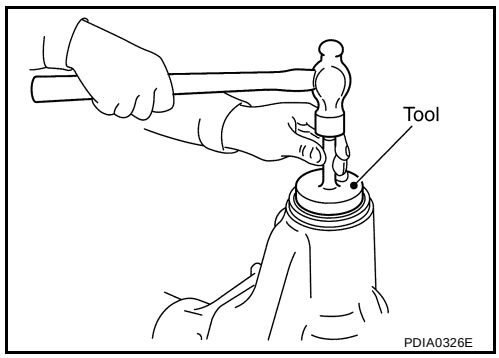
5. Apply gear oil to drive pinon rear bearing and drive pinon front bearing.
6. Install drive pinion front bearing inner race in gear carrier.
7. Install drive pinion front bearing thrust washer to gear carrier.



8. Apply multi-purpose grease to new front oil seal lip. Install front oil seal into gear carrier using Tool.

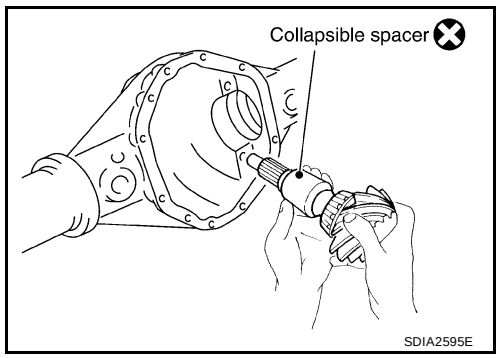
Tool number : ST15310000 (—)

CAUTION:
- **Do not reuse front oil seal.**
- **Do not incline the new front oil seal when installing.**
- **Apply multi-purpose grease to the lip of the new front oil seal.**



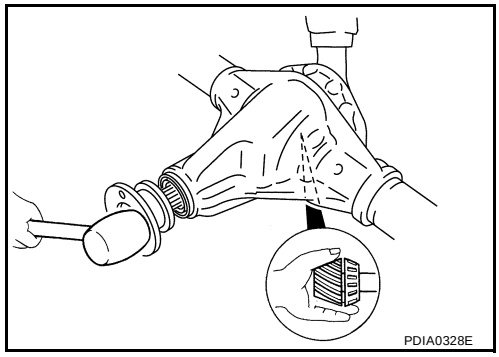
9. Install new collapsible spacer to drive pinion. And then install drive pinion assembly in gear carrier.

CAUTION:
- **Do not reuse collapsible spacer.**
- **Do not damage front oil seal.**



10. Install the companion flange onto the drive pinion while aligning the matching marks. Then tap the companion flange using suitable tool.

CAUTION:
Do not damage companion flange or front oil seal.

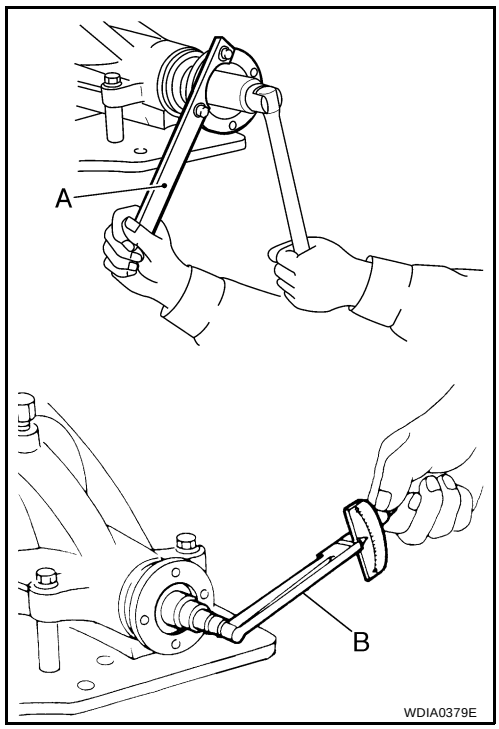


11. Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut and new drive pinion lock nut washer. Then adjust the drive pinion lock nut tightening torque using Tool A, and check the drive pinion bearing preload torque using Tool B.

Tool number A: KV40104000 (—)
B: ST3127S000 (J-25765-A)

Drive pinion bearing preload torque:
1.7 - 3.1 N·m (0.18 - 0.31 kg-m, 15 - 27 in-lb)

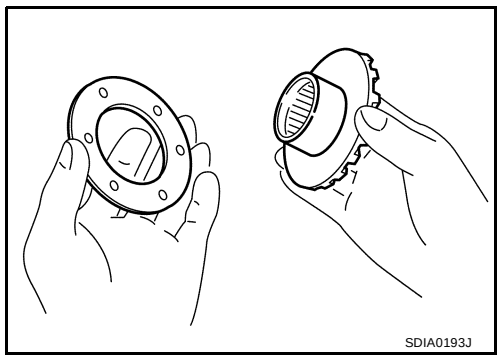
CAUTION:
- **Do not reuse drive pinion lock nut or drive pinion lock nut washer.**
- **Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut.**
- **Adjust the drive pinion lock nut tightening torque to the lower limit first. Do not exceed the drive pinion lock nut specified torque. Refer to RFD-49, "COMPONENTS" .**
- **If the drive pinion bearing preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Do not loosen drive pinion lock nut to adjust the drive pinion bearing preload torque.**



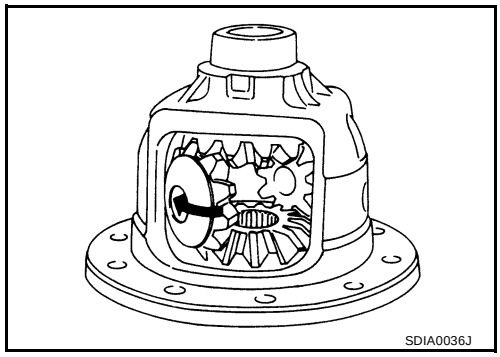
- **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**

Differential Assembly

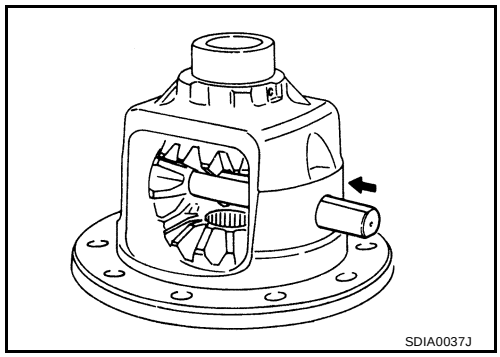
1. Assemble side gear thrust washers with the same thickness as the ones installed prior to disassembly or reinstall the old ones on side gears.
2. Assemble side gear and side gear thrust washer into differential case.



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



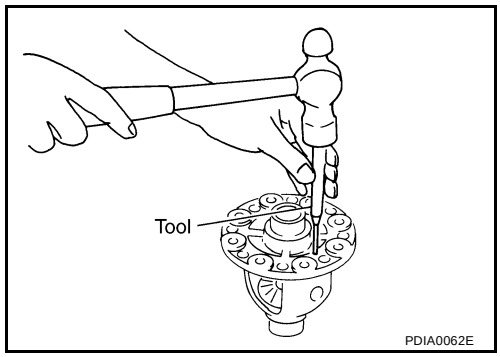
4. Align lock pin holes on differential case and shaft, and assemble pinion mate shaft.
5. Measure side gear end play. If necessary, select the appropriate side gear thrust washers. Refer to RFD-58, "Side Gear Back Clearance" .



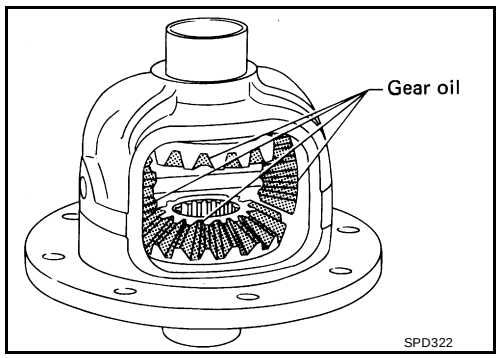
6. Drive a new lock pin into pinion mate shaft, using Tool.

Tool number : ST23550000 (—)

CAUTION:
Do not reuse lock pin.

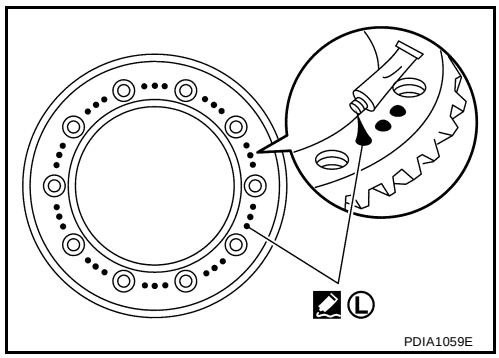


7. Apply gear oil to gear tooth surfaces and thrust surfaces and check to see they turn properly.

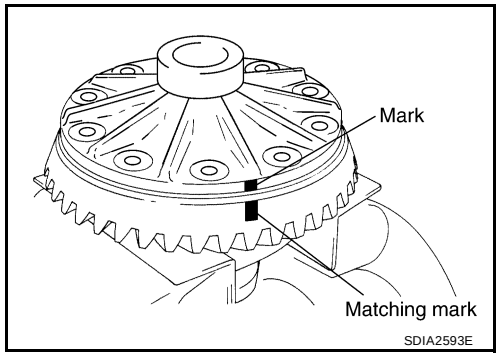


8. Apply thread locking sealant to the back face of drive gear as shown.
   - Use Genuine High Strength Thread Locking Sealant, Loctite 648 or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

   CAUTION:
   Make sure the drive gear back and threaded holes are clean.

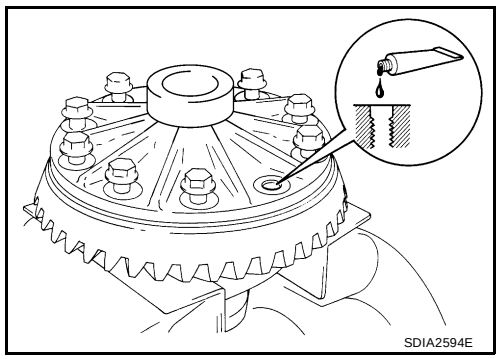


9. Align the matching mark of differential case with the mark of drive gear, then install drive gear.



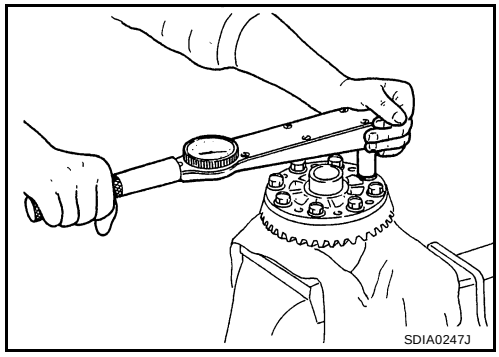
10. Apply thread locking sealant into the threaded holes of the drive gear and install the bolts.
    - Use Genuine High Strength Thread Locking Sealant, Loctite 648 or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

    CAUTION:
    Make sure the drive gear back and threaded holes are clean.



11. Install new drive gear bolts, and then tighten to the specified torque. Refer to RFD-49, "COMPONENTS" .

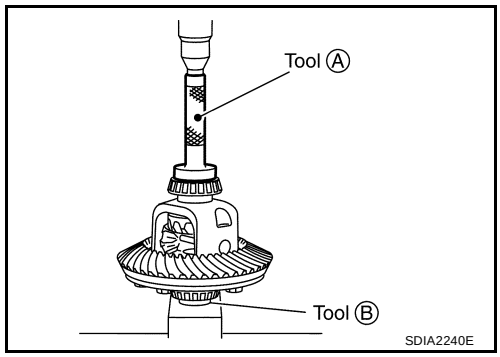
    CAUTION:
    - **Do not reuse the bolts.**
    - **Tighten bolts in a crisscross fashion.**



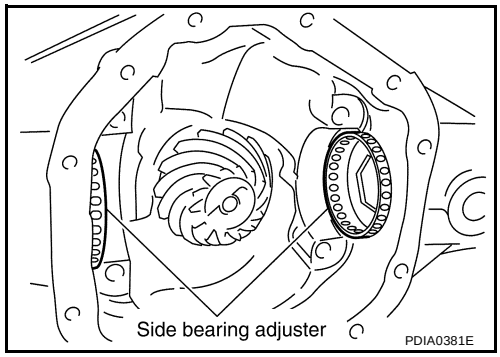
12. Press new side bearing inner races to differential case using Tools.

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

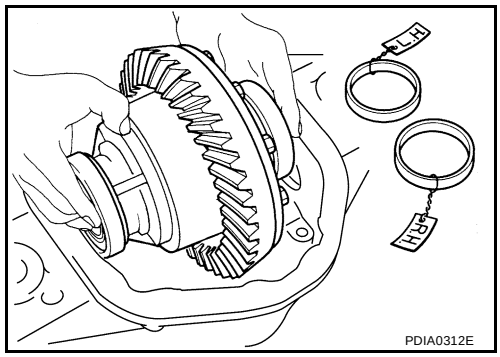
CAUTION:
Do not reuse side bearing.



13. Install side bearing adjusters into gear carrier.

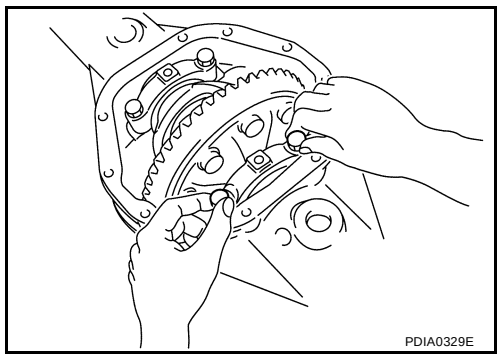


14. Apply gear oil to side bearings. Install differential case assembly with side bearing outer races into gear carrier.



15. Align paint matching mark on side bearing caps with that on gear carrier and install side bearing caps on gear carrier.

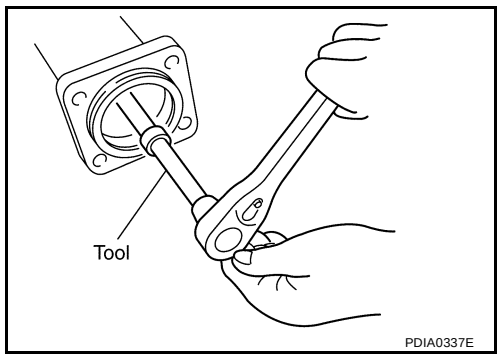
CAUTION:
Do not tighten at this point. This allows further tightening of side bearing adjusters.



16. Tighten each side bearing adjusters using Tool.

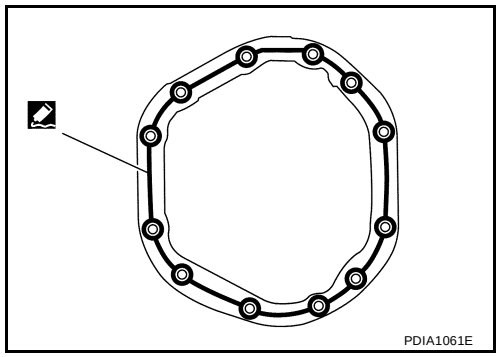
Tool number : — (C - 4164)

17. Adjusting backlash of drive gear and drive pinion. Refer to RFD-51, "Backlash" .
18. Check total preload. Refer to RFD-50, "Total Preload Torque" .
19. Check tooth contact. Refer to RFD-50, "Tooth Contact" .



20. Apply a bead of sealant to the mating surface of the carrier cover as shown.
    - Use Genuine Silicone RTV or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

    CAUTION:
    Remove any old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to the application and mating surfaces.
21. Install the carrier cover to the gear carrier. Tighten the bolts to the specified torque. Refer to RFD-49, "COMPONENTS" .



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EDS00272

Applied model	VQ40DE		
	2WD	4WD	
		King cab	Double cab
	6M/T		
Final drive model	M226		
Gear ratio	3.538		3.692
Number of pinion gears	2		
Number of teeth (Drive gear / drive pinion)	46/13	48/13	
Oil capacity (Approx.)	2.01 ℓ (4-1/4 US pt, 3-1/2 lmp pt)		
Drive pinion adjustment spacer type	Collapsible		

Inspection and Adjustment

EDS00273

DIFFERENTIAL SIDE GEAR CLEARANCE

Unit: mm (in)

Item	Standard
Side gear back clearance (Clearance between side gear and differential case for adjusting side gear backlash)	0.305 (0.0120) or less. (Each gear should rotate smoothly without excessive resistance during differential motion.)

PRELOAD TORQUE

Unit: N·m (kg-m, in-lb)

Item	Specification	
	Gear ratio 3.538 type	Gear ratio 3.692 type
Drive pinion bearing preload torque	1.7 - 3.1 (0.18 - 0.31, 15 - 27)	
Total preload torque (Total preload torque = drive pinion bearing preload torque + Side bearing preload torque)	2.49 - 4.57 (0.26 - 0.46, 22 - 40)	2.38 - 4.46 (0.25 - 0.45, 21 - 39)

BACKLASH

Unit: mm (in)

Item	Standard
Drive gear to drive pinion gear	0.08 - 0.13 (0.0031 - 0.0051)

COMPANION FLANGE RUNOUT

Unit: mm (in)

Item	Runout limit
Companion flange face	0.10 (0.0039) or less
Companion flange inner side	0.13 (0.0051) or less

SELECTIVE PARTS

Drive Pinion Height Adjusting Washer

Unit: mm (in)

Thickness	Package part number*
0.076 (0.030) 0.079 (0.031) 0.081 (0.032) 0.084 (0.033) 0.086 (0.034)	38151 8S101
0.089 (0.035) 0.091 (0.036) 0.094 (0.037) 0.097 (0.038) 0.099 (0.039)	38151 8S102
0.102 (0.040) 0.104 (0.041) 0.107 (0.042) 0.109 (0.043) 0.112 (0.044)	38151 8S103
0.114 (0.045) 0.117 (0.046) 0.119 (0.047) 0.122 (0.048) 0.124 (0.049)	38151 8S104
0.127 (0.050) 0.130 (0.051) 0.132 (0.052) 0.135 (0.053) 0.137 (0.054)	38151 8S105

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

Side Gear Thrust Washer

Unit: mm (in)

Thickness	Package part number*
0.76 (0.030) 0.79 (0.031) 0.81 (0.032) 0.84 (0.033) 0.86 (0.034)	38424 8S101
0.89 (0.035) 0.91 (0.036) 0.94 (0.037) 0.97 (0.038) 0.99 (0.039)	38424 8S102

*Always check with the parts department for the latest parts information.

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EDS00274

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Differential Case Assembly and Differential Lock Control Unit Replacement.

EDS003LG

- When replacing differential case assembly or differential lock control unit, check the DIFF LOCK indicator pattern and adjustment of the position between differential case assembly and differential lock control unit if necessary.

CHECK DIFF LOCK INDICATOR LAMP

1. Start engine. Run engine for at least 10 seconds.
2. Turn 4WD shift switch to "4LO' and confirm 4LO indicator lamp is turned on. Refer to TF-16, "4WD SHIFT SWITCH AND INDICATOR LAMP" .
3. Stop vehicle and turn differential lock mode switch to "ON".
4. Drive vehicle at 7 km/h (4MPH) or less.

   NOTE:
   Differential case assembly must be given a rotation from rear left wheel and rear right wheel.
5. Check if DIFF LOCK indicator lamp flashes to turn on.
6. Check if DIFF LOCK indicator lamp and 4LO indicator lamp are changed properly as follows.

Differential lock mode switch	4LO indicator lamp	Vehicle speed (VSS)	Differential case assembly state	DIFF LOCK indicator lamp
ON	OFF	7km/h (4 MPH) < VSS	Disengage	Flash
		VSS ≤ 7 km/h (4 MPH)		
	ON	7km/h (4 MPH) < VSS		
		VSS ≤ 7 km/h (4 MPH)	Disengage → Engage	Flash → ON
OFF	OFF	7km/h (4 MPH) < VSS	Disengage	OFF
		VSS ≤ 7 km/h (4 MPH)		
	ON	7km/h (4 MPH) < VSS		
		VSS ≤ 7 km/h (4 MPH)		

- If each indication and state is OK, rear final drive assembly and differential lock control unit is working correctly.
- If each indication and state is NG, rear final drive assembly and differential lock control unit is not working correctly. Refer to RFD-70, "METHOD FOR ADJUSTMENT" .

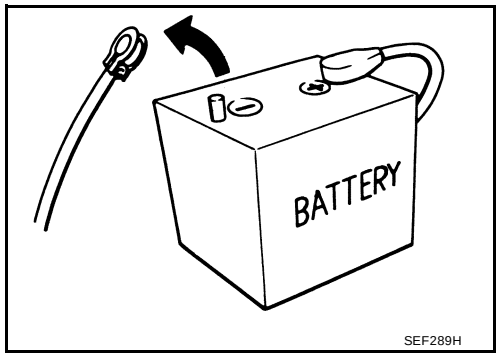
METHOD FOR ADJUSTMENT

1. Perform erase self-diagnosis with differential lock control unit. Refer to RFD-89, "How to Erase Self-diagnostic Results" .
2. Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .
3. Check DIFF LOCK indicator lamp. Refer to RFD-79, "DIFF LOCK INDICATOR LAMP" .
   - If DIFF LOCK indicator lamp is not proper according to the above patterns.
     Install new differential lock control unit or check for mechanical malfunction of rear final drive assembly and retry the above (DIFF LOCK indicator lamp) check.
     (If differential lock control unit or rear final drive assembly is replaced from another vehicle, the new differential control unit must be replaced first.)

Precautions

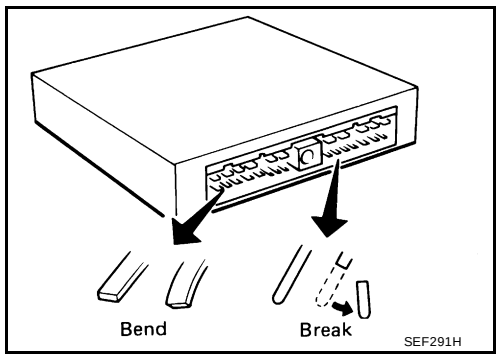
EDS00275

- **Before connecting or disconnecting differential lock control unit harness connector, turn ignition switch “OFF” and disconnect the battery cable from the negative terminal. Because battery voltage is applied to differential lock control unit even if ignition switch is turned “OFF”.**



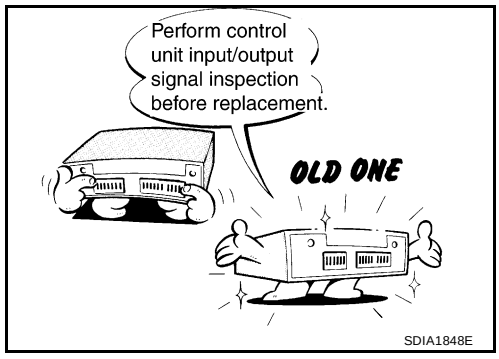
SEF289H

- **When connecting or disconnecting pin connectors into or from differential lock control unit, take care not to damage pin terminals (bend or break).**
  When connecting pin connectors make sure that there are not any bends or breaks on differential lock control unit pin terminal.



SEF291H

- **Before replacing differential lock control unit, perform differential lock control unit input/output signal inspection and make sure whether differential lock control unit functions properly or not. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .**



SDIA1848E

Precautions for Servicing Rear Final Drive

EDS0046R

- Before starting diagnosis of the vehicle, understand the symptoms well. Perform correct and systematic operations.
- Check for the correct installation status prior to removal or disassembly. When matching marks are required, be certain they do not interfere with the function of the parts they are applied to.
- Overhaul should be done in a clean work area, a dust proof area is recommended.
- Before disassembly, completely remove sand and mud from the exterior of the unit, preventing them from entering into the unit during disassembly or assembly.
- Always use shop paper for cleaning the inside of components.

- Avoid using cotton gloves or a shop cloth to prevent the entering of lint.
- Check appearance of the disassembled parts for damage, deformation, and abnormal wear. Replace them with new ones if necessary.
- Gaskets, seals and O-rings should be replaced any time the unit is disassembled.
- Clean and flush the parts sufficiently and blow them dry.
- Be careful not to damage sliding surfaces and mating surfaces.
- When applying sealant, remove the old sealant from the mating surface; then remove any moisture, oil, and foreign materials from the application and mating surfaces.
- In principle, tighten nuts or bolts gradually in several steps working diagonally from inside to outside. If a tightening sequence is specified, observe it.
- During assembly, observe the specified tightening torque.
- Add new differential gear oil, petroleum jelly, or multi-purpose grease, as specified.

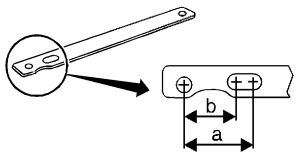
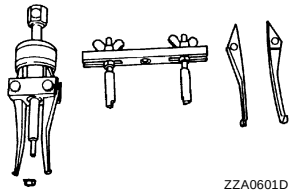
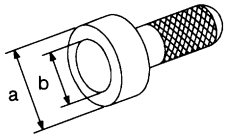
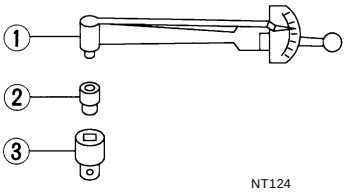
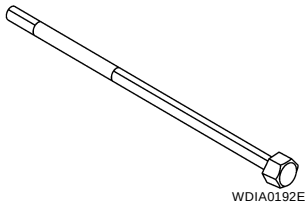
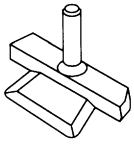
PREPARATION

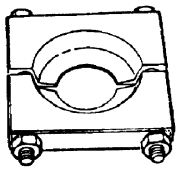
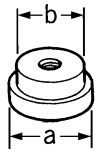
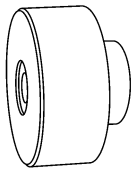
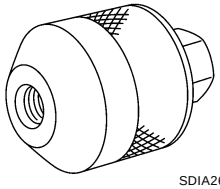
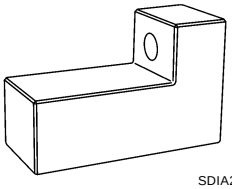
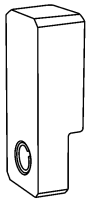
PFP:00002

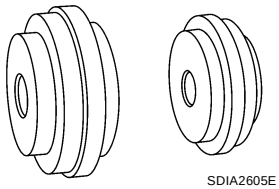
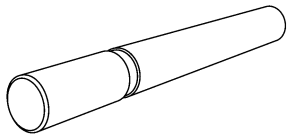
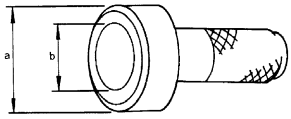
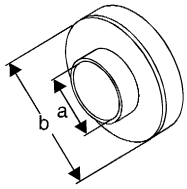
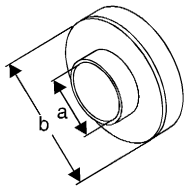
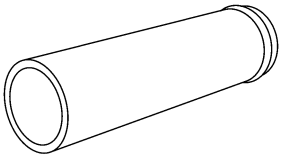
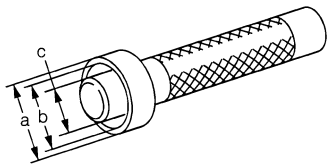
Special Service Tools

EDS00278

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

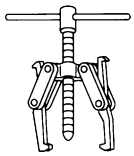
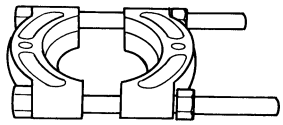
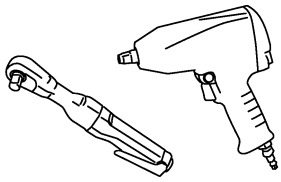
Tool number (Kent-Moore No.) Tool name		Description
KV40104000 (—) Flange wrench	 NT659	Removing and installing drive pinion nut **a: 85 mm (3.35 in) dia.** **b: 65 mm (2.56 in) dia.**
ST33290001 (J-34286) Puller	 ZZA0601D	Removing front oil seal
ST15310000 (—) Drift	 NT115	Installing front oil seal **a: 96mm (3.77 in) dia.** **b: 84 mm (3.30 in) dia.**
ST3127S000 (J-25765-A) Preload gauge set 1. GG91030000 (J-25765) Torque wrench 2. HT62940000 (1/2″) (—) Socket adapter 3. HT62900000 (3/8″) (—) Socket adapter	 NT124	Inspecting drive pinion bearing preload and total preload
— (C - 4164) Adjuster tool	 WDIA0192E	Removing and installing side bearing adjuster
KV10111100 (J-37228) Seal cutter	 S-NT046	Removing carrier cover

Tool number (Kent-Moore No.) Tool name		Description
ST30021000 (J-22912-01) Puller	 ZZA0700D	Removing drive pinion rear bearing inner race
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.**
— (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
— (D-115-2) Scooter block	 SDIA2604E	Adjusting pinion gear height

Tool number (Kent-Moore No.) Tool name		Description
— (8541A-1) Arbor disc	 SDIA2605E	Adjusting pinion gear height
— (D-115-3) Arbor	 SDIA2606E	Adjusting pinion gear height
ST01500001 (—) Drift	 ZZA0811D	Installing drive pinion rear bearing outer race **a: 89mm (3.50 in) dia.** **b: 79 mm (3.11 in) dia.**
ST30022000 (—) Drift	 NT660	Installing drive pinion rear bearing outer race **a: 46 mm (1.81 in) dia.** **b: 110 mm (4.33 in) dia.**
ST33022000 (—) Drift	 NT660	Installing drive pinion front bearing outer race **a: 49 mm (1.92 in) dia.** **b: 67 mm (2.63 in) dia.**
— (C-4040) Installer	 SDIA2607E	Installing 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.**

Commercial Service Tools

EDS00279

Tool name	Description
Puller  NT077	Removing companion flange and side bearing inner race
Puller  ZZB0823D	Removing side bearing inner race
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EDS0027A

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

Reference page		—	RFD-116, "Tooth Contact"	—	RFD-117, "Backlash"	RFD-118, "Companion Flange Runout"	RFD-77, "Checking Differential Gear Oil"	PR-3, "NVH Troubleshooting Chart"	RAX-5, "NVH Troubleshooting Chart", RSU-4, "NVH Troubleshooting Chart"	WT-4, "NVH Troubleshooting Chart"		RAX-5, "NVH Troubleshooting Chart"	BR-5, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
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	AXLE SHAFT	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×

×: Applicable

DIFFERENTIAL GEAR OIL

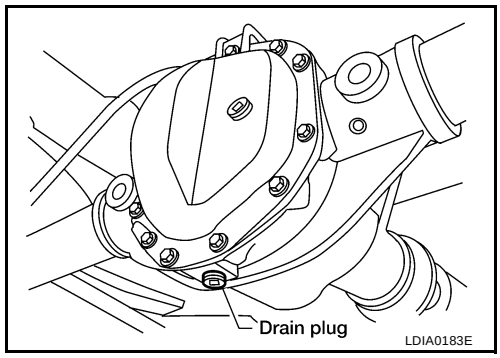
PFP:KLD30

Changing Differential Gear Oil

EDS0027B

DRAINING

1. Stop engine.
2. Remove the drain plug from the rear final drive assembly to drain the differential gear oil.
3. Install the drain plug with sealant applied on the threads to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-115, "COMPONENTS" .
   - Use High Performance Thread Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

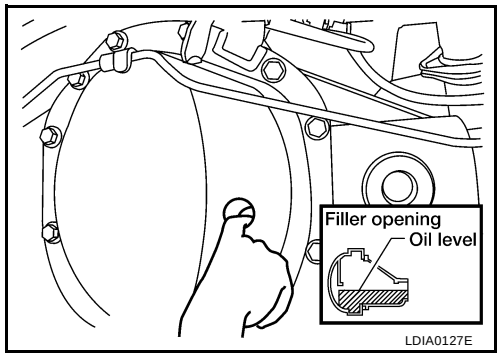


FILLING

1. Remove the filler plug from the rear final drive assembly.
2. Fill the rear final drive assembly with new differential gear oil until the level reaches the specified level near the filler plug hole.

   Differential gear oil grade and capacity : **Refer to MA-11, "Fluids and Lubricants" .**

3. Install the filler plug with sealant applied on the threads to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-115, "COMPONENTS" .
   - Use High Performance Thread Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .



Checking Differential Gear Oil

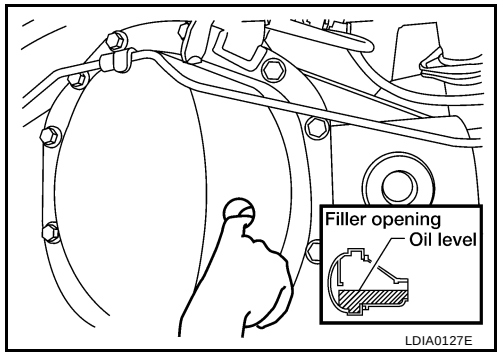
EDS0027C

DIFFERENTIAL GEAR OIL LEAKAGE AND LEVEL

1. Make sure that differential gear oil is not leaking from the rear final drive assembly or around it.
2. Check the differential gear oil level from the filler plug hole as shown.

   CAUTION:
   Do not start engine while checking differential gear oil level.

3. Install the filler plug with sealant applied on the threads to the rear final drive assembly. Tighten to the specified torque. Refer to RFD-115, "COMPONENTS" .
   - Use High Performance Thread Sealant or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

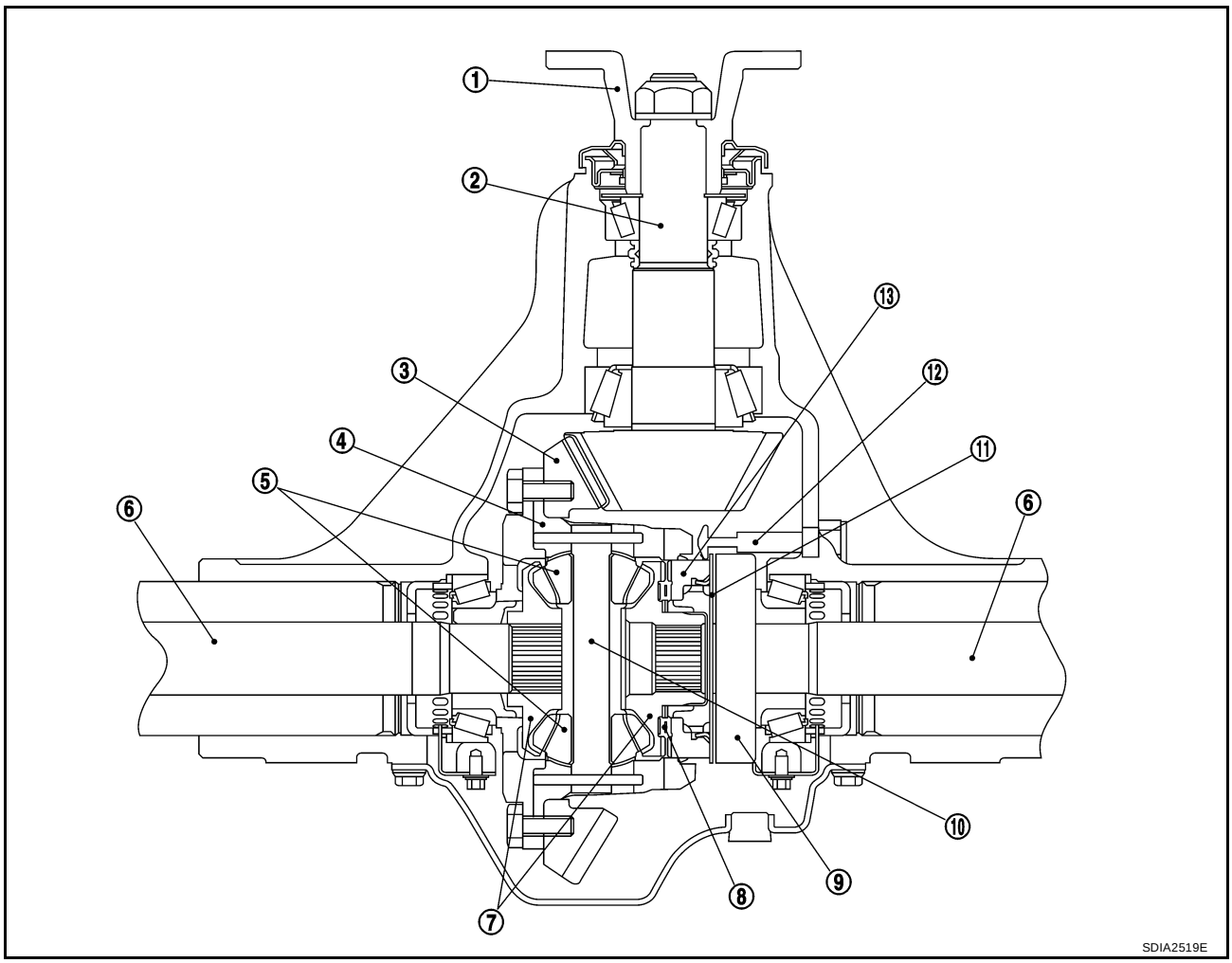


DIFFERENTIAL LOCK SYSTEM

PFP:28496

Cross-sectional View

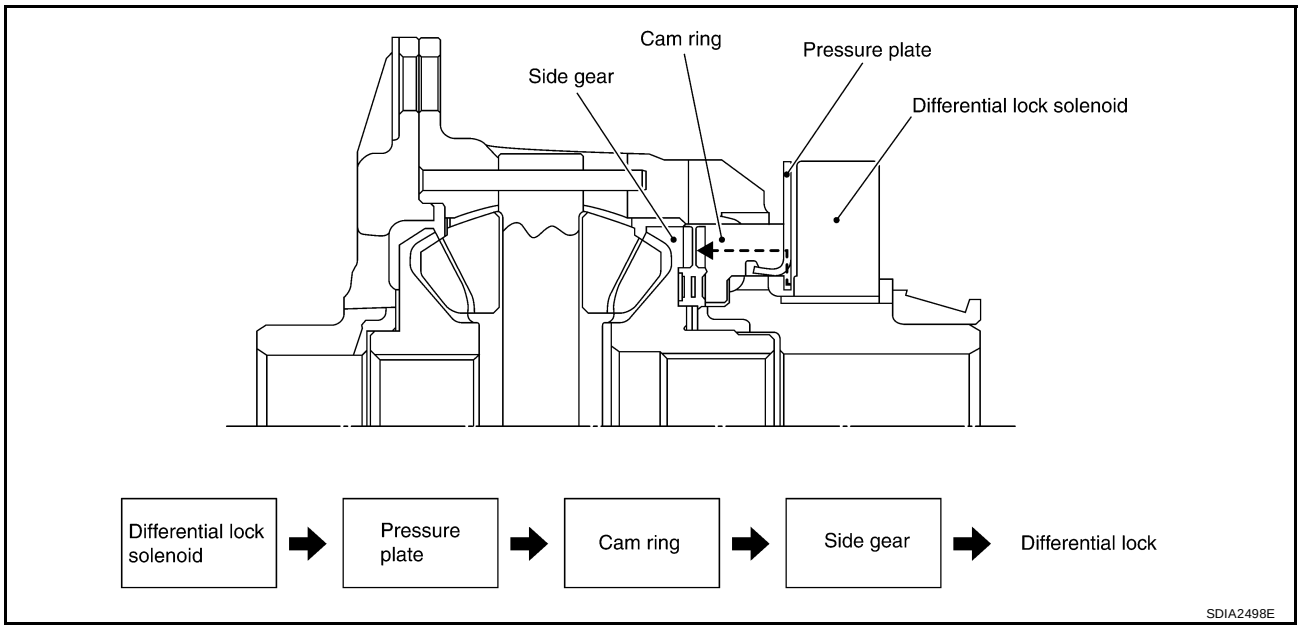
EDS0027D



1. Companion flange
2. Drive pinion
3. Drive gear
4. Differential case
5. Pinion mate gear
6. Axle shaft
7. Side gear
8. Spring
9. Differential lock solenoid
10. Pinion mate shaft
11. Pressure plate
12. Differential lock position switch
13. Cam ring

Differential Lock Operation

EDS0027E



1. Differential lock solenoid operates pressure plate.
2. Pressure plate presses cam ring.
3. Engage cam ring and side gear, and then differential is locked.

System Description

EDS0027F

DIFFERENTIAL LOCK SOLENOID

It is operated by signal from differential lock control unit, and it operates pressure plate so as to switch lock/unlock.

DIFFERENTIAL LOCK POSITION SWITCH

It detects that differential is in lock or unlock by pressure plate position, and sends it to differential lock control unit.

DIFFERENTIAL LOCK CONTROL UNIT

- Differential lock control unit controls differential lock solenoid by input signals of each sensor and each switch.
- As a fail-safe function, differential lock disengages, if malfunction is detected in differential lock system.
- Self-diagnosis can be done with CONSULT-II.

DIFFERENTIAL LOCK MODE SWITCH

Able to select differential lock and unlock.

DIFF LOCK INDICATOR LAMP

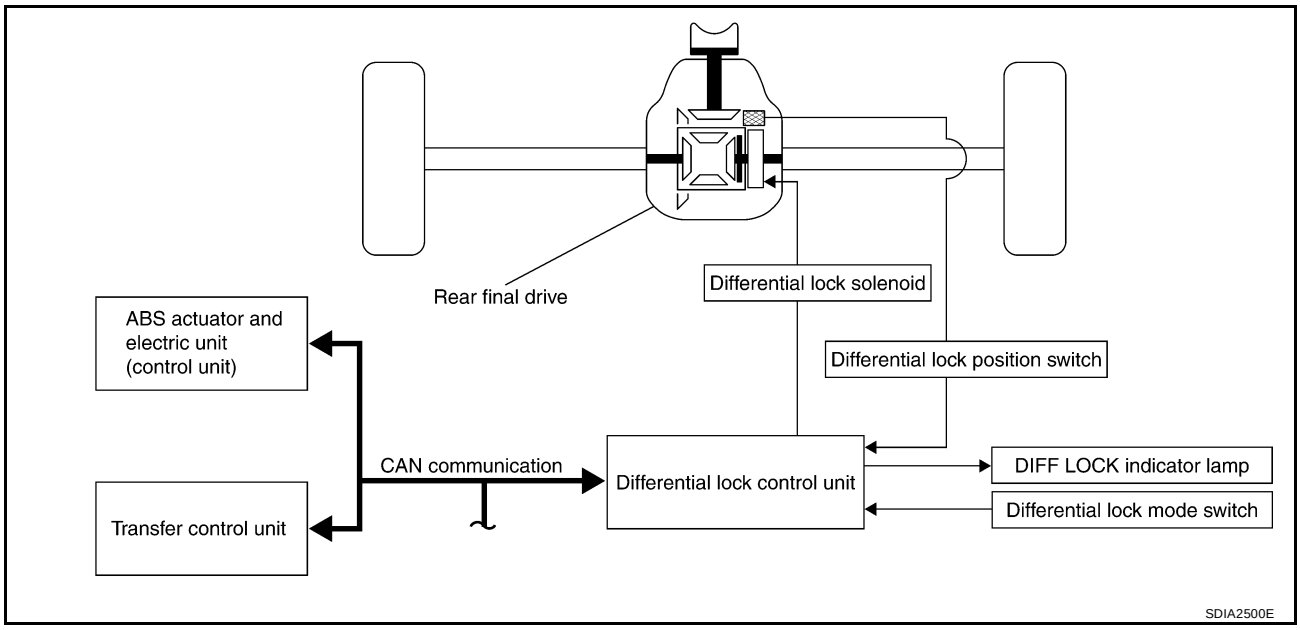
The following is the indications of indicator lamp.

Condition	DIFF LOCK indicator lamp
Differential lock/unlock	ON/OFF
Differential lock standby condition	Flashing: 1 time/2 seconds
Differential lock system malfunction	OFF (Even if differential lock mode switch is turned ON)
Lamp check	Turns ON when ignition switch is turned ON. Turns OFF after engine start.

NOTE:
Differential lock standby condition is the condition that differential lock mode switch is ON and differential is unlocked.

System Diagram

EDS0027G



COMPONENTS FUNCTION DESCRIPTION

Component parts	Function
Differential lock control unit	● Controls differential lock solenoid and switches differential lock/unlock. ● As a fail-safe function, differential lock disengages, if malfunction is detected in differential lock system.
Differential lock solenoid	Controls pressure plate by current from differential lock control unit.
Differential lock position switch	Detects that differential is lock or unlock condition.
Differential lock mode switch	Able to select differential lock or unlock.
DIFF LOCK indicator lamp	Illuminates that differential is in lock or lock standby condition.
ABS actuator and electric unit (control unit)	Transmits the following signals via CAN communication to differential lock control unit. ● Vehicle speed signal ● VDC operation signal
Transfer control unit	Transmits the following signal via CAN communication to differential lock control unit. ● 4WD shift switch signal

CAN Communication

EDS0027H

SYSTEM DESCRIPTION

Refer to LAN-4, "SYSTEM DESCRIPTION" .

TROUBLE DIAGNOSIS

PFP:00004

Fail-safe Function

EDS0027I

If any malfunction occurs in the differential lock system, and the control unit detects the malfunction, the DIFF LOCK indicator lamp on the combination meter does not turn ON to indicate system malfunction. The differential lock control unit turns the differential lock solenoid OFF.

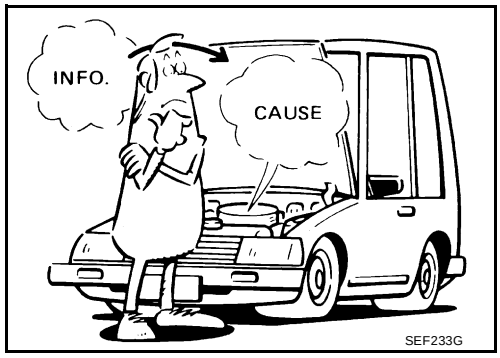
How to Perform Trouble Diagnosis

EDS0027J

BASIC CONCEPT

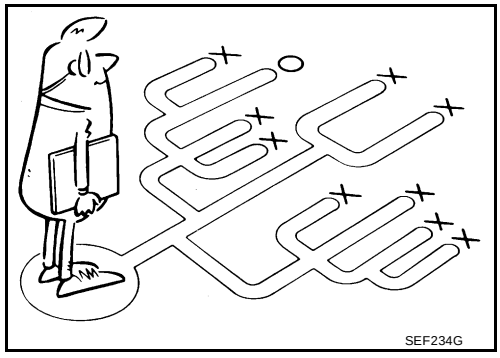
- To perform trouble diagnosis, it is most important to have understanding about the vehicle systems (control and mechanism) thoroughly.
- It is also important to clarify customer complaints before inspection.
  First of all, reproduce symptoms, and understand them fully.
  Ask customer about his/her complaints carefully. In some cases, it will be necessary to check symptoms by driving vehicle with customer.

  CAUTION:
  Customers are not professional. It is dangerous to make an easy guess like "maybe the customer means that...," or "maybe the customer mentions this symptom".



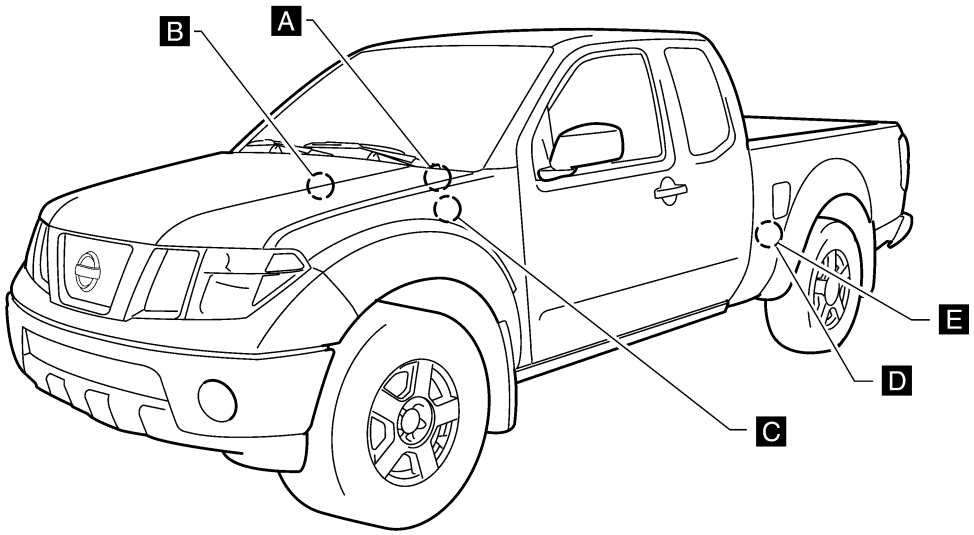
SEF233G

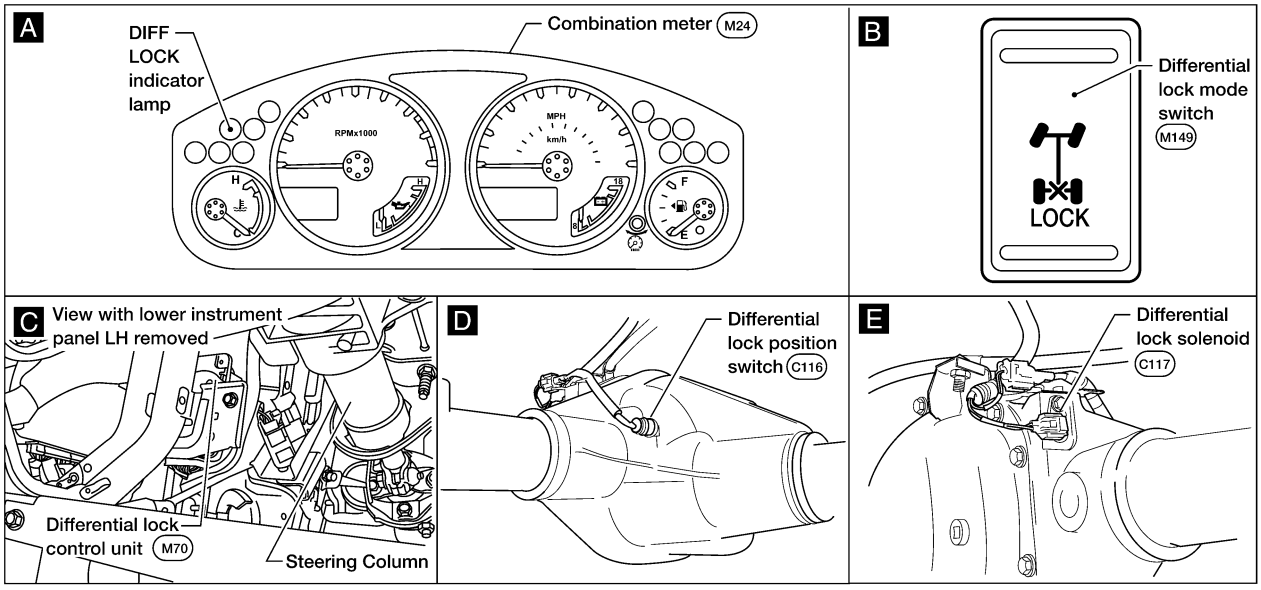
- It is essential to check symptoms right from the beginning in order to repair malfunctions completely.
  For intermittent malfunctions, reproduce symptoms based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairing without any symptom diagnosis, you cannot judge if malfunctions have actually been eliminated.
- After completing diagnosis, always erase diagnostic memory. Refer to RFD-89, "How to Erase Self-diagnostic Results" .
- For intermittent malfunctions, move harness or harness connector by hand. Then check for poor contact or reproduced open circuit.


SEF234G

Location of Electrical Parts

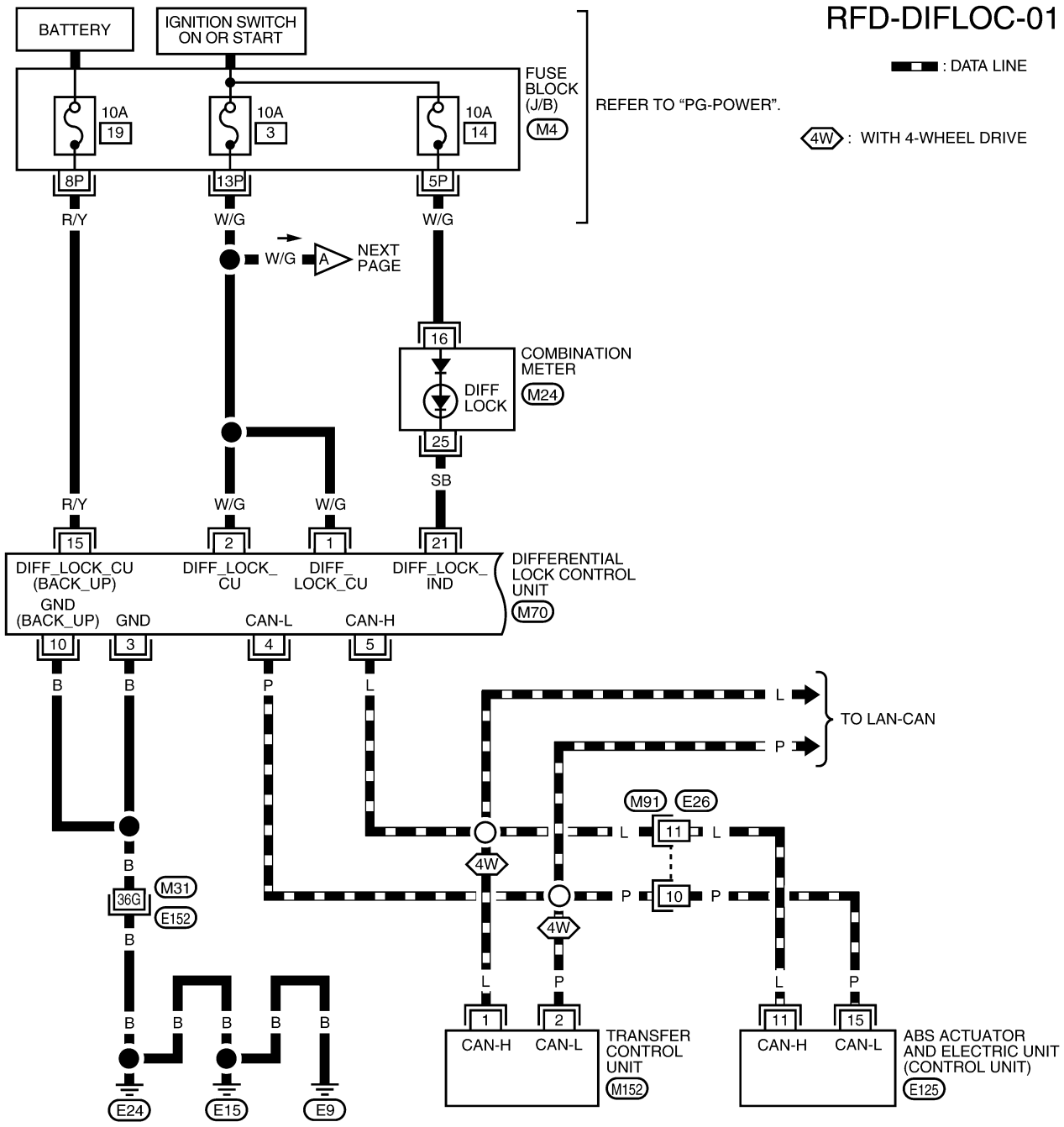
EDS0027K

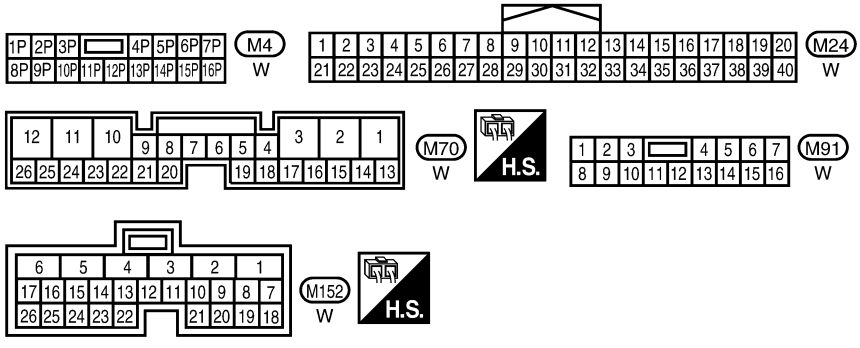




Wiring Diagram — DIFLOC —

EDS0027L

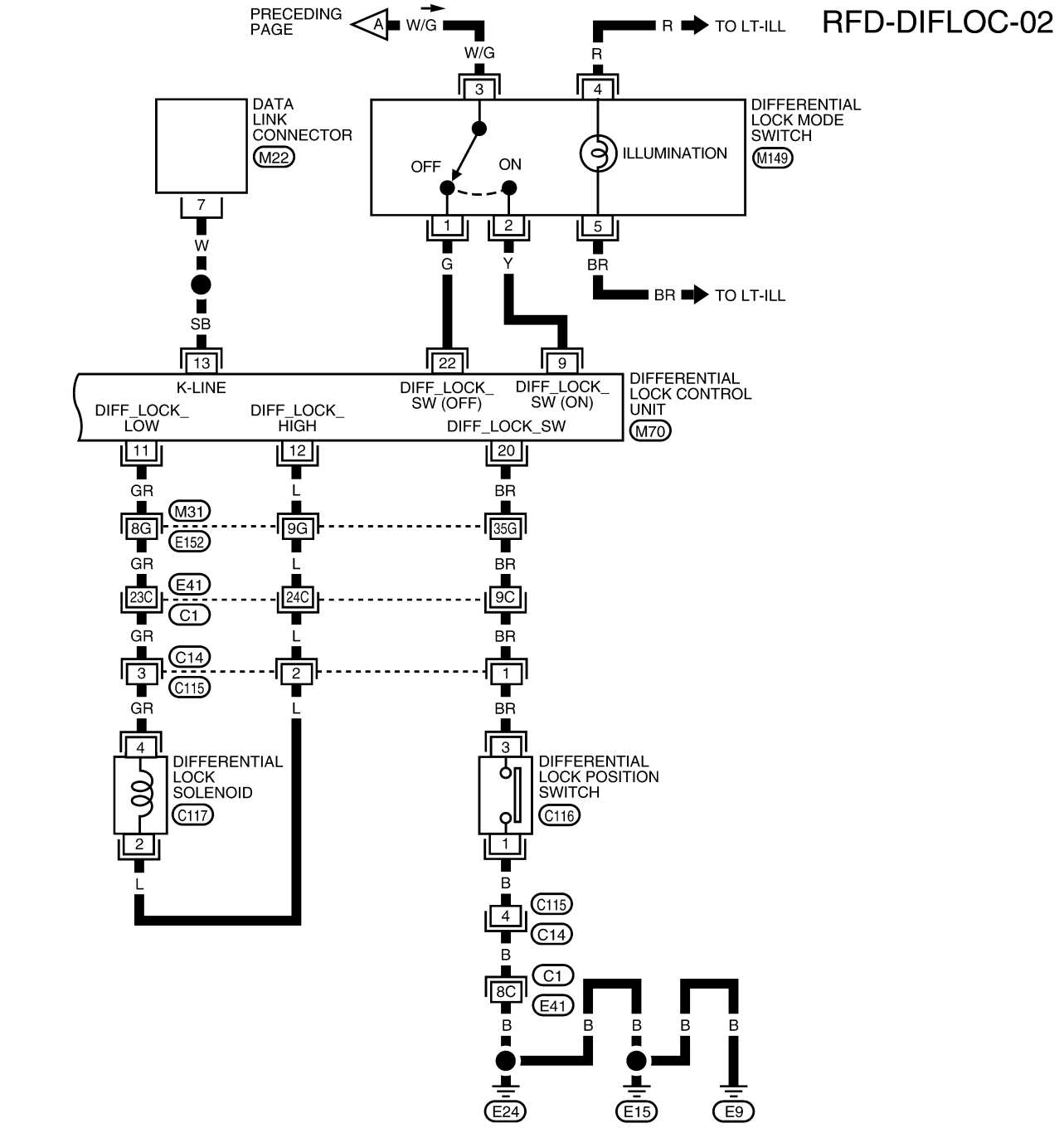


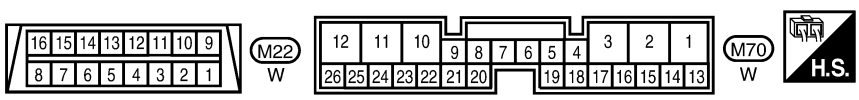


REFER TO THE FOLLOWING.
M31 - SUPER MULTIPLE JUNCTION (SMJ)
E125 - ELECTRICAL UNITS

BDWA0078E

RFD-DIFLOC-02





REFER TO THE FOLLOWING.
M31 , C1 - SUPER MULTIPLE JUNCTION (SMJ)

BDWA0054E

Trouble Diagnosis Chart for Symptoms

EDS0027M

With the Differential Mode Switch in the ON position, if the DIFF LOCK indicator lamp does not turn ON after the engine starts, perform self-diagnosis. Refer to RFD-88, "SELF-DIAG RESULTS MODE" .

Symptom	Condition	Check item	Reference page
DIFF LOCK indicator lamp does not turn ON. (DIFF LOCK indicator lamp check)	Ignition switch: ON	CAN communication line	RFD-104
		Power supply and ground for differential lock control unit	
		Combination meter	
DIFF LOCK indicator lamp does not change.	● Engine running ● Differential lock mode switch: ON	Combination meter	RFD-107
		Differential lock mode switch	
		CAN communication line	
DIFF LOCK indicator lamp sometimes flashes.	● Engine running ● Differential lock mode switch: ON	Combination meter	RFD-108
		Differential lock mode switch	
		Differential lock position switch	
		Differential inner parts	

Differential Lock Control Unit Input/Output Signal Reference Values

EDS0027N

DIFFERENTIAL LOCK CONTROL UNIT INSPECTION TABLE

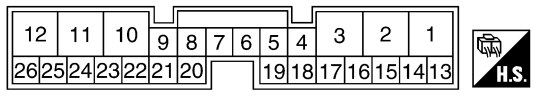
Specifications with CONSULT-II

Monitor item [Unit]	Content	Condition		Display value
BATTERY VOLT [V]	Power supply voltage for differential lock control unit	Ignition switch: ON		Battery voltage
4WD MODE [2H/4H/4Lo]	Condition of 4WD shift switch	4WD shift switch (Engine running)	2WD	2H
			4H	4H
			4LO	4Lo
VHCL S/SEN-R [km/h] or [mph]	Wheel speed (Rear wheel right)	Vehicle stopped		0 km/h (0 mph)
		Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
VHCL S/SEN-L [km/h] or [mph]	Wheel speed (Rear wheel left)	Vehicle stopped		0 km/h (0 mph)
		Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
VHCL S/SEN-RL [km/h] or [mph]	Wheel speed (Average value of rear wheel right and left)	Vehicle stopped		0 km/h (0 mph)
		Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
D-LOCK SW SIG [ON/OFF]	Condition of differential lock mode switch	Differential lock mode switch: ON		ON
		Differential lock mode switch: OFF		OFF
D-LOCK SIG [ON/OFF]	Control status of differential lock	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	ON
			Differential lock mode switch: OFF	OFF

Monitor item [Unit]	Content	Condition		Display value
RELAY ON [ON/OFF]	Operating condition of differential lock solenoid relay (integrated in differential lock control unit)	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	ON
			Differential lock mode switch: OFF	OFF
RELAY MTR [ON/OFF]	Control status of differential lock solenoid relay (integrated in differential lock control unit)	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	ON
			Differential lock mode switch: OFF	OFF
SOL MTR [ON/OFF]	Control status of differential lock solenoid	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	ON
			Differential lock mode switch: OFF	OFF
IND MTR [ON/OFF]	Control status of DIFF LOCK indicator lamp	DIFF LOCK indicator lamp: ON		ON
		DIFF LOCK indicator lamp: OFF		OFF
D-LOCK POS SW [ON/OFF]	Condition of differential lock position switch	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON (DIFF LOCK indicator lamp: ON)	ON
			Differential lock mode switch: OFF (DIFF LOCK indicator lamp: OFF)	OFF

Specifications Between Differential Lock Control Unit Terminals

DIFFERENTIAL LOCK CONTROL UNIT TERMINAL CONNECTOR LAYOUT



SDIA2573E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
1	W/G	Power supply	Ignition switch: ON		Battery voltage
			Ignition switch: OFF		0V
2	W/G	Power supply	Ignition switch: ON		Battery voltage
			Ignition switch: OFF		0V
3	B	Ground	Always		0V
4	P	CAN-L	–		–
5	L	CAN-H	–		–
9	Y	Differential lock mode switch (ON)	Ignition switch: ON	Differential lock mode switch: ON	Battery voltage
				Differential lock mode switch: OFF	0V

Terminal	Wire color	Item	Condition		Data (Approx.)
10	B	Ground	Always		0V
11	GR	Differential lock solenoid (-)	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	0V
				Differential lock mode switch: OFF	Battery voltage
12	L	Differential lock solenoid (+)	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	Battery voltage
				Differential lock mode switch: OFF	0V
13	SB	K-LINE (CONSULT-II signal)	–		–
15	R/Y	Power supply (Memory back-up)	Ignition switch: ON		Battery voltage
			Ignition switch: OFF		Battery voltage
20	BR	Differential lock position switch	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON (DIFF LOCK indicator lamp: ON)	0V
				Differential lock mode switch: OFF (DIFF LOCK indicator lamp: OFF)	Battery voltage
21	SB	DIFF LOCK indicator lamp	Ignition switch: ON	DIFF LOCK indicator lamp: ON	0V
				DIFF LOCK indicator lamp: OFF	Battery voltage
22	G	Differential lock mode switch (OFF)	Ignition switch: ON	Differential lock mode switch: ON	0V
				Differential lock mode switch: OFF	Battery voltage

CAUTION:
When using a circuit tester to measure voltage for inspection, be sure not to extend forcibly any connector terminals.

CONSULT-II Function (DIFF LOCK)

EDS0027O

FUNCTION

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

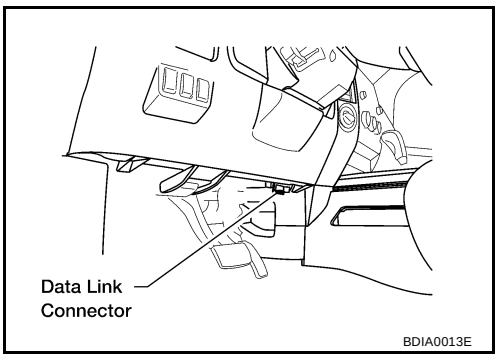
DIFF LOCK diagnostic mode	Description
SELF-DIAG RESULTS	Displays differential lock control unit self-diagnosis results.
DATA MONITOR	Displays differential lock control unit input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.

CONSULT-II SETTING PROCEDURE

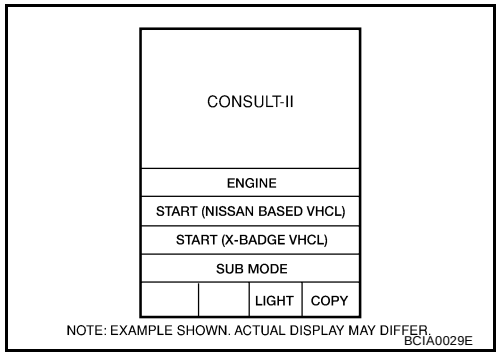
CAUTION:
If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carries out CAN communication.

- For details, refer to the separate “CONSULT-II Operations Manual”.

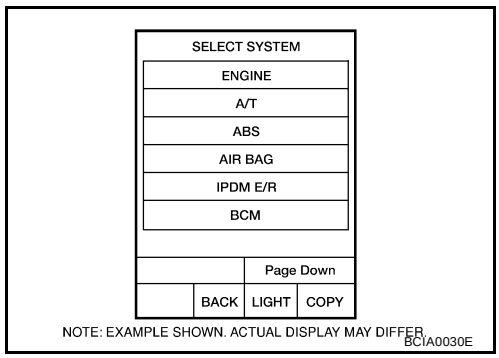
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector on vehicle.
3. Turn ignition switch ON.



4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “DIFF LOCK”.
   If “DIFF LOCK” is not indicated, go to GI-40, "CONSULT-II Data Link Connector (DLC) Circuit" .
6. Perform each diagnostic test mode according to each service procedure.

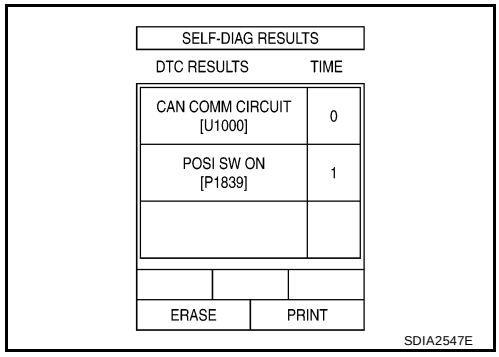


SELF-DIAG RESULTS MODE

Operation Procedure

1. Perform “CONSULT-II SETTING PROCEDURE”. Refer to RFD-87, "CONSULT-II SETTING PROCEDURE" .
2. With engine at idle, touch “SELF-DIAG RESULTS”.
   Display shows malfunction experienced since the last erasing operation.

   NOTE:
   - **The details for “TIME” are as follow:**
     - **“0”: Error currently detected with differential lock control unit.**
     - **Except for “0”: Error detected in the past and memorized with differential lock control unit.**
       Detects frequency of driving after DTC occurs (frequency of turning ignition switch “ON/OFF”).



Display Item List

Items (CONSULT-II screen terms)	Diagnostic item is detected when...	Check item
INITIAL START [P1833]	● Due to removal of battery which cuts off power supply to differential control unit, self-diagnosis memory function is suspended.	RFD-91, "Power Supply Circuit For Differential Lock Control Unit"
CONTROL UNIT 1 [P1834]	● Malfunction is detected in the memory (RAM) system of differential lock control unit.	RFD-92, "Differential Lock Control Unit"
CONTROL UNIT 2 [P1835]	● Malfunction is detected in the memory (ROM) system of differential lock control unit.	RFD-92, "Differential Lock Control Unit"
CONTROL UNIT 3 [P1836]	● Malfunction is detected in the memory (EEPROM) system of differential lock control unit.	RFD-92, "Differential Lock Control Unit"
CONTROL UNIT 4 [P1837]	● AD converter system of differential lock control unit is malfunctioning.	RFD-92, "Differential Lock Control Unit"
ON SW [P1838]	● More than two switch inputs are simultaneously detected due to short circuit of differential lock mode switch.	RFD-93, "Differential Lock Mode Switch"

Items (CONSULT-II screen terms)	Diagnostic item is detected when...	Check item
POSI SW ON [P1839]	● When differential lock position switch is ON, rotation difference occurs in wheel speed (rear wheel right and left).	RFD-96, "Differential Lock Position Switch"
RELAY [P1844]	● Differential lock control unit detects as irregular by comparing target value with monitor value.	RFD-98, "Differential Lock Solenoid Relay", RFD-99, "Differential Lock Solenoid"
SOL CIRCUIT [P1847]	● Malfunction is detected in differential lock control unit internal circuit.	RFD-99, "Differential Lock Solenoid"
SOL DISCONNECT [P1848]	● Differential lock solenoid internal circuit or harness is open. ● Differential lock solenoid relay does not switch to ON position.	RFD-99, "Differential Lock Solenoid"
SOL SHORT [P1849]	● Differential lock solenoid internal circuit or harness is shorted.	RFD-99, "Differential Lock Solenoid"
SOL CURRENT [P1850]	● Differential lock solenoid relay does not switch to OFF position.	RFD-99, "Differential Lock Solenoid"
ABS SYSTEM [C1203]	● Malfunction related to wheel sensor has been detected by ABS actuator and electric unit (control unit).	RFD-102, "ABS System"
CAN COMM CIRCUIT [U1000]	● Malfunction has been detected from CAN communication line.	RFD-103, "CAN Communication Line"
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	● No NG item has been detected.	—

CAUTION:
If “CAN COMM CIRCUIT [U1000]” is displayed with other DTCs, first perform the trouble diagnosis for CAN communication line.

How to Erase Self-diagnostic Results

1. Perform inspection of malfunctioning item and then repair or replace.
2. Start engine and select “SELF-DIAG RESULTS” mode for “DIFF LOCK” with CONSULT-II.
3. Touch “ERASE” on CONSULT-II screen to erase DTC memory.

CAUTION:
If memory cannot be erased, perform diagnosis.

DATA MONITOR MODE

Operation Procedure

1. Perform “CONSULT-II SETTING PROCEDURE”. Refer to RFD-87, "CONSULT-II SETTING PROCEDURE" .
2. Touch “DATA MONITOR”.
3. Select from “SELECT MONITOR ITEM”, screen of data monitor mode is displayed.

NOTE:
When malfunction is detected, CONSULT-II performs REAL-TIME DIAGNOSIS.
Also, any malfunction detected while in this mode will be displayed at real time.

Display Item List

×: Standard –: Not applicable

Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
BATTERY VOLT [V]	×	×	×	Power supply voltage for differential lock control unit.
4WD MODE [2H/4H/4Lo]	×	×	×	4WD shift switch signal status via CAN communication line is displayed.
VHCL S/SEN-R [km/h] or [mph]	×	–	×	Wheel speed calculated by rear wheel sensor right signal is displayed.
VHCL S/SEN-L [km/h] or [mph]	×	–	×	Wheel speed calculated by rear wheel sensor left signal is displayed.
VHCL S/SEN-RL [km/h] or [mph]	×	×	×	Average value between wheel speed calculated by rear wheel sensor right signal and rear wheel sensor left signal is displayed.
D-LOCK SW SIG [ON/OFF]	×	×	×	Condition of differential lock mode switch is displayed.
D-LOCK SIG [ON/OFF]	×	×	×	Control status of differential lock is displayed.
RELAY ON [ON/OFF]	×	×	×	Operating condition of differential lock solenoid relay is displayed (integrated in differential lock control unit).
RELAY MTR [ON/OFF]	×	×	×	Control status of differential lock solenoid relay is displayed (integrated in differential lock control unit).
SOL MTR [ON/OFF]	×	×	×	Control status of differential lock solenoid is displayed.
IND MTR [ON/OFF]	×	×	×	Control status of DIFF LOCK indicator lamp is displayed.
D-LOCK POS SW [ON/OFF]	×	×	×	Condition of differential lock position switch is displayed.
Voltage [V]	–	–	×	The value measured by the voltage probe is displayed.
Frequency [Hz]	–	–	×	The value measured by the pulse probe is displayed.
DUTY-HI (high) [%]	–	–	×	
DUTY-LOW (low) [%]	–	–	×	
PLS WIDTH-HI [msec]	–	–	×	
PLS WIDTH-LOW [msec]	–	–	×	

TROUBLE DIAGNOSIS FOR SYSTEM

PFP:00000

Power Supply Circuit For Differential Lock Control Unit

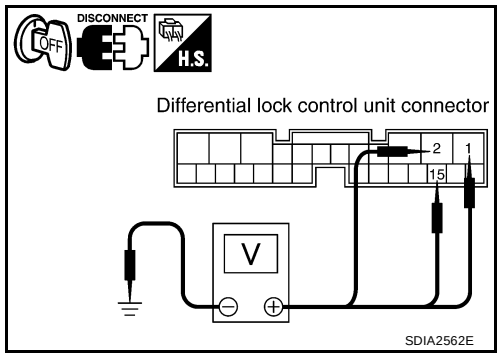
EDS0027P

DIAGNOSTIC PROCEDURE

1. CHECK POWER SUPPLY

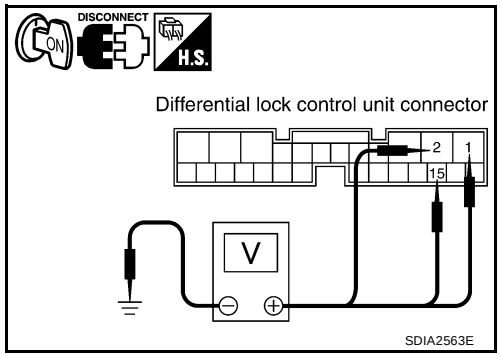
1. Turn ignition switch OFF.
2. Disconnect differential lock control unit harness connector.
3. Check voltage between differential lock control unit harness connector terminals and ground.

Connector	Terminal	Voltage (Approx.)
M70	1 - Ground	0V
	2 - Ground	0V
	15 - Ground	Battery voltage



4. Turn ignition switch ON. (Do not start engine.)
5. Check voltage between differential lock control unit harness connector terminals and ground.

Connector	Terminal	Voltage (Approx.)
M70	1 - Ground	Battery voltage
	2 - Ground	
	15 - Ground	



OK or NG

OK >> GO TO 2.

NG >> Check the following. If any items are damaged, repair or replace damaged parts.

- 10A fuse [No. 3 or 19, located in fuse block (J/B)]
- Harness for short or open between battery and differential lock control unit harness connector terminal 15
- Harness for short or open between ignition switch and differential lock control unit harness connector terminals 1 and 2
- Battery and ignition switch. Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

2. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between differential lock control unit harness connector M70 terminals 3, 10 and ground.

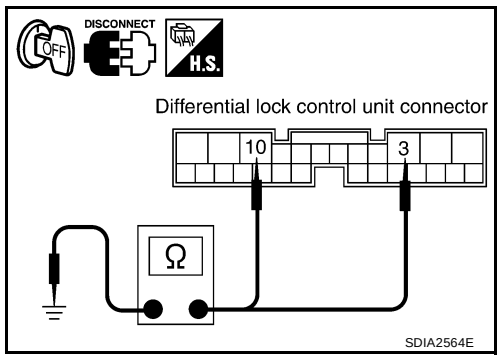
Continuity should exist.

Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 4.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

4. CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

OK >> Inspection End.
NG >> Replace differential lock control unit. Refer to RFD-110, "DIFFERENTIAL LOCK CONTROL UNIT" .

Differential Lock Control Unit

EDS0027Q

DIAGNOSTIC PROCEDURE

1. PERFORM SELF-DIAGNOSIS

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “DIFF LOCK” with CONSULT-II.
3. Touch “ERASE”.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Perform the self-diagnosis again.

Is the “CONTROL UNIT 1 [P1834]”, “CONTROL UNIT 2 [P1835]”, “CONTROL UNIT 3 [P1836]” or “CONTROL UNIT 4 [P1837]” displayed?

YES >> Replace differential lock control unit. Refer to RFD-110, "DIFFERENTIAL LOCK CONTROL UNIT" .
NO >> Inspection End.

Differential Lock Mode Switch

EDS0027R

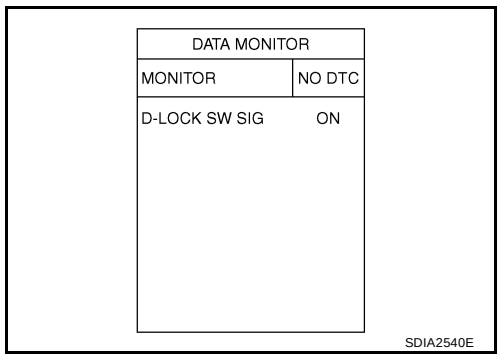
DIAGNOSTIC PROCEDURE

1. CHECK DIFFERENTIAL LOCK MODE SWITCH SIGNAL

With CONSULT-II

1. Start engine.
2. Select “DATA MONITOR” mode for “DIFF LOCK” with CONSULT-II.
3. Read out ON/OFF switching action of “D-LOCK SW SIG”.

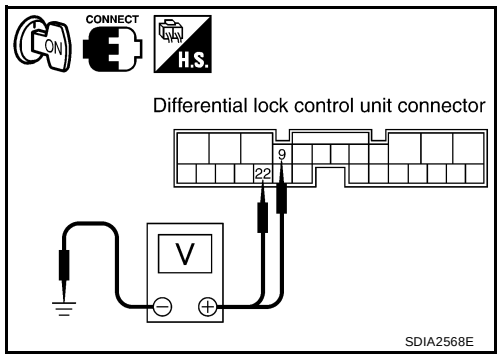
Monitor item	Condition		Display value
D-LOCK SW SIG	● Vehicle stopped ● Engine running	Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between differential lock control unit harness connector terminals and ground.

Connector	Terminal	Condition		Voltage (Approx.)
M70	9 - Ground	Ignition switch: ON	Differential lock mode switch: ON	Battery voltage
			Differential lock mode switch: OFF	0V
	22 - Ground		Differential lock mode switch: ON	0V
			Differential lock mode switch: OFF	Battery voltage



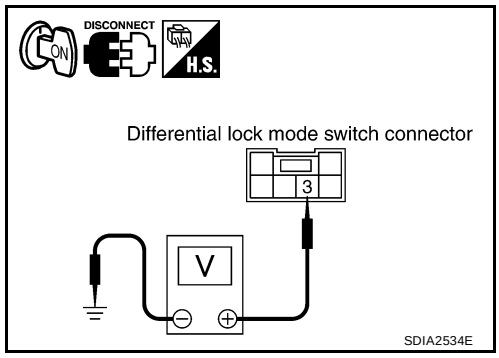
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK DIFFERENTIAL LOCK MODE SWITCH SUPPLY CIRCUIT

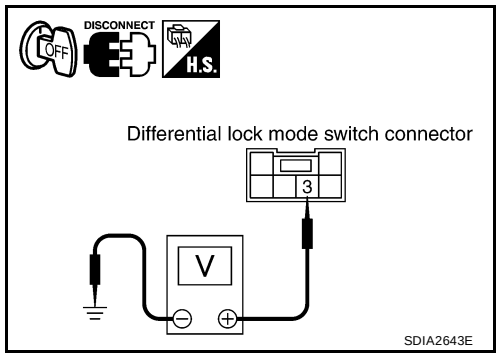
1. Turn ignition switch ON.
2. Disconnect differential lock mode switch harness connector.
3. Check voltage between differential lock mode switch harness connector terminal 3 and ground.

Connector	Terminal	Voltage (Approx.)
M149	3 - Ground	Battery voltage



4. Turn ignition switch OFF.
5. Check voltage between differential lock mode switch harness connector terminal 3 and ground.

Connector	Terminal	Voltage (Approx.)
M149	3 - Ground	0V



OK or NG

OK >> GO TO 3.

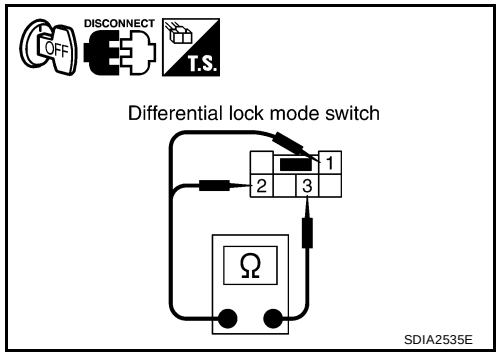
NG >> Check the following. If any items are damaged, repair or replace damaged parts.

- 10A fuse [No. 3, located in fuse block (J/B)]
- Harness for short or open between ignition switch and differential lock mode switch harness connector terminal 3
- Ignition switch. Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

3. CHECK DIFFERENTIAL LOCK MODE SWITCH

1. Turn ignition switch OFF.
2. Operate differential lock mode switch and check continuity between differential lock mode switch terminals.

Terminal	Condition	Continuity
1 - 3	Differential lock mode switch: ON	No
	Differential lock mode switch: OFF	Yes
2 - 3	Differential lock mode switch: ON	Yes
	Differential lock mode switch: OFF	No



OK or NG

OK >> GO TO 4.

NG >> Replace differential lock mode switch.

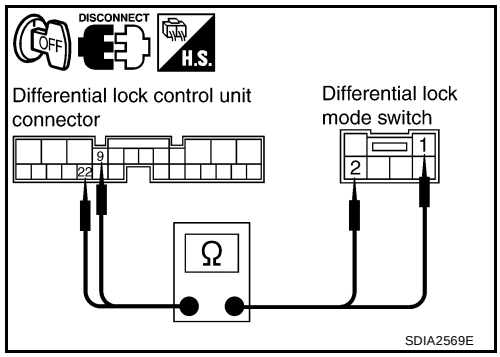
4. CHECK HARNESS BETWEEN DIFFERENTIAL LOCK CONTROL UNIT AND DIFFERENTIAL LOCK MODE SWITCH

1. Disconnect differential lock control unit harness connector.
2. Check continuity between the following terminals.

- Differential lock control unit harness connector M70 terminal 9 and differential lock mode switch harness connector M149 terminal 2.
- Differential lock control unit harness connector M70 terminal 22 and differential lock mode switch harness connector M149 terminal 1.

Continuity should exist.

Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 6.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

6. CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

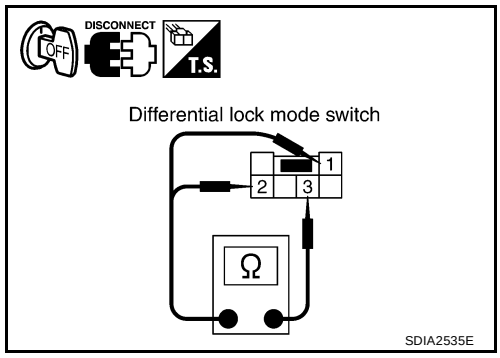
OK >> Inspection End.
NG >> Replace differential lock control unit. Refer to RFD-110, "DIFFERENTIAL LOCK CONTROL UNIT" .

COMPONENT INSPECTION

1. Turn ignition switch OFF.
2. Operate differential lock mode switch and check continuity between differential lock mode switch terminals.

Terminal	Condition	Continuity
1 - 3	Differential lock mode switch: ON	No
	Differential lock mode switch: OFF	Yes
2 - 3	Differential lock mode switch: ON	Yes
	Differential lock mode switch: OFF	No

3. If NG, replace differential lock mode switch.



Differential Lock Position Switch

EDS0027S

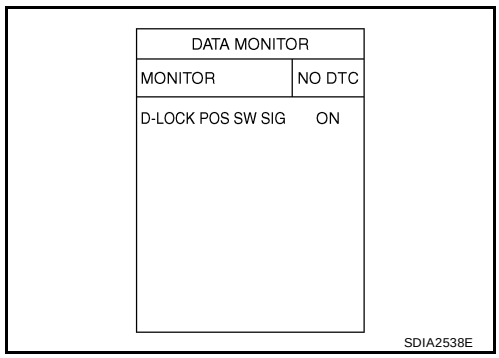
DIAGNOSTIC PROCEDURE

1. CHECK DIFFERENTIAL LOCK POSITION SWITCH SIGNAL

With CONSULT-II

1. Start engine.
2. Select “DATA MONITOR” mode for “DIFF LOCK” with CONSULT-II.
3. Read out ON/OFF switching action of “D-LOCK POS SW SIG”.

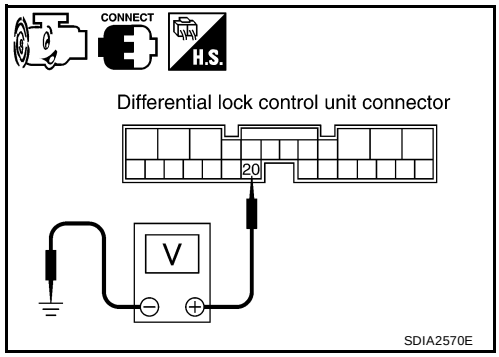
Monitor item	Condition		Display value
D-LOCK POS SW SIG	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON (DIFF LOCK indicator lamp: ON)	ON
		Differential lock mode switch: OFF (DIFF LOCK indicator lamp: OFF)	OFF



Without CONSULT-II

1. Start engine.
2. Check voltage between differential lock control unit harness connector terminal and ground.

Connector	Terminal	Condition		Voltage (Approx.)
M70	20 - Ground	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON (DIFF LOCK indicator lamp: ON)	0V
			Differential lock mode switch: OFF (DIFF LOCK indicator lamp: OFF)	Battery voltage



OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK GROUND CIRCUIT

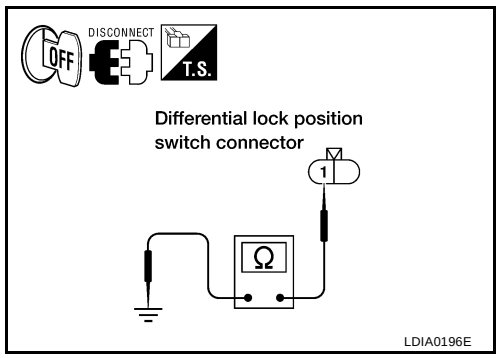
1. Turn ignition switch OFF.
2. Disconnect differential lock position switch harness connector.
3. Check continuity between differential lock position switch harness connector C116 terminal 1 and ground.

Continuity should exist.

Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

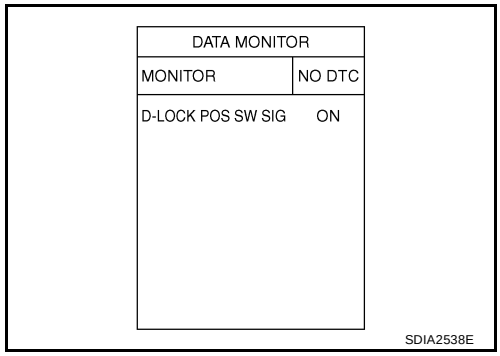


3. CHECK DIFFERENTIAL LOCK POSITION SWITCH

With CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode for “DIFF LOCK” with CONSULT-II.
3. Read out ON/OFF switching action of “D-LOCK POS SW SIG” while connecting and disconnecting jumper wire between differential lock position switch harness connector C116 terminals 1 and 3.

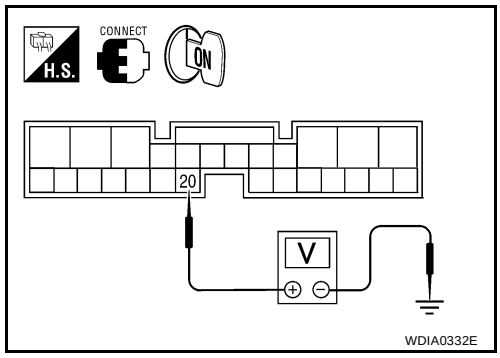
Monitor item	Condition	Display value
D-LOCK POS SW SIG	Jumper wire connected	ON
	Jumper wire disconnected	OFF



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between differential lock control unit harness connector terminal and ground while connecting and disconnecting jumper wire between differential lock position switch harness connector C116 terminals 1 and 3.

Connector	Terminal	Condition	Voltage (Approx.)
M70	20 - Ground	Jumper wire connected	0V
		Jumper wire disconnected	Battery voltage



OK or NG

OK >> Replace differential lock position switch.
NG >> GO TO 4.

4. CHECK HARNESS BETWEEN DIFFERENTIAL LOCK CONTROL UNIT AND DIFFERENTIAL LOCK POSITION SWITCH

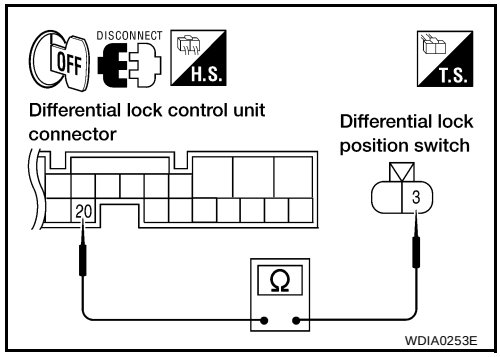
1. Turn ignition switch OFF.
2. Disconnect differential lock control unit harness connector.
3. Check continuity between differential lock control unit harness connector M70 terminal 20 and differential lock position switch harness connector C116 terminal 3.

Continuity should exist.

Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.



5. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 6.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

6. CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

OK >> Inspection End.
NG >> Replace differential lock control unit. Refer to RFD-110, "DIFFERENTIAL LOCK CONTROL UNIT" .

Differential Lock Solenoid Relay

EDS0027T

DIAGNOSTIC PROCEDURE

1. CHECK DIFFERENTIAL LOCK SOLENOID SYSTEM

Perform self-diagnosis. Refer to RFD-88, "SELF-DIAG RESULTS MODE" .

Is “RELAY [P1844]” displayed?

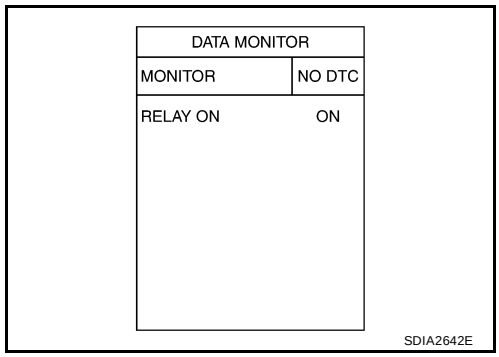
YES >> Perform trouble diagnosis for differential lock solenoid. Refer to RFD-99, "Differential Lock Solenoid" .
NO >> GO TO 2.

2. CHECK DIFFERENTIAL LOCK SOLENOID RELAY SIGNAL

With CONSULT-II

1. Start engine.
2. Select “DATA MONITOR” mode for “DIFF LOCK” with CONSULT-II.
3. Read out ON/OFF switching action of “RELAY ON”.

Monitor item	Condition		Display value
RELAY ON	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 4.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

4. CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

OK >> Inspection End.
NG >> Replace differential lock control unit. Refer to RFD-110, "DIFFERENTIAL LOCK CONTROL UNIT" .

Differential Lock Solenoid

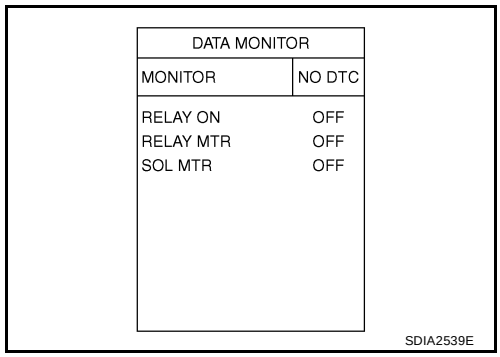
EDS0027U

DIAGNOSTIC PROCEDURE

1. CHECK DIFFERENTIAL SOLENOID SIGNAL

With CONSULT-II

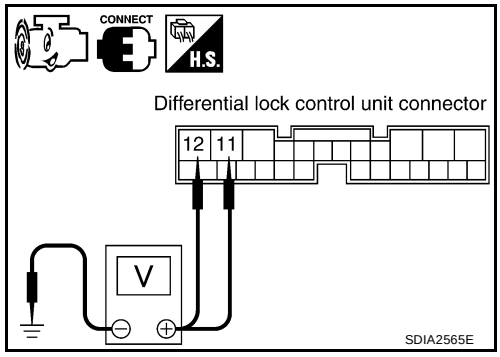
1. Start engine.
2. Select “DATA MONITOR” mode for “DIFF LOCK” with CONSULT-II.
3. Read out ON/OFF switching action of “RELAY ON”, “RELAY MTR”, “SOL MTR”.



Monitor item	Condition		Display value
RELAY ON	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF
RELAY MTR		Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF
SOL MTR		Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF

Without CONSULT-II

1. Start engine.
2. Check voltage between differential lock control unit harness connector terminal and ground.



Connector	Terminal	Condition		Data (Approx.)
M70	11 - Ground	● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON ● 4WD shift switch: 4LO	Differential lock mode switch: ON	0V
			Differential lock mode switch: OFF	Battery voltage
	12 - Ground		Differential lock mode switch: ON	Battery voltage
			Differential lock mode switch: OFF	0V

OK or NG

OK >> GO TO 6.
NG >> GO TO 2.

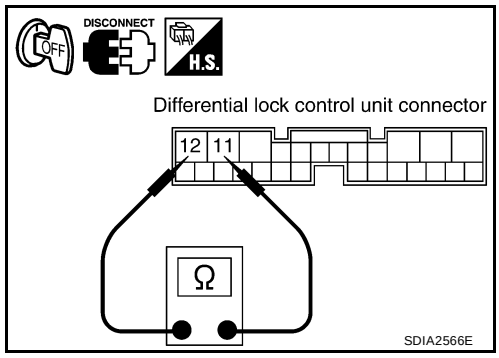
2. CHECK DIFFERENTIAL LOCK SOLENOID CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect differential lock control unit harness connector.
3. Check resistance between differential lock control unit harness connector terminals 11 and 12.

Connector	Terminal	Resistance (Approx.)
M70	11 - 12	3.4 Ω

OK or NG

OK >> GO TO 6.
NG >> GO TO 3.



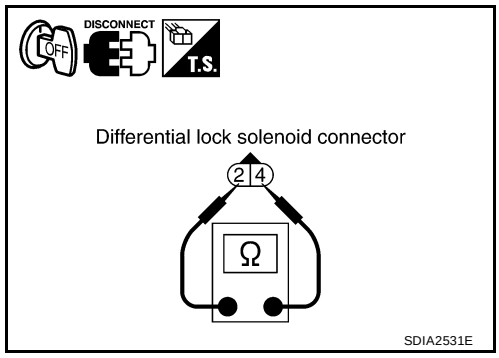
3. CHECK DIFFERENTIAL LOCK SOLENOID RESISTANCE

1. Disconnect differential lock solenoid harness connector.
2. Check resistance between differential lock solenoid terminals 2 and 4.

2 - 4 : Approx. 3.4Ω

OK or NG

OK >> GO TO 4.
NG >> Replace differential lock solenoid. Refer to RFD-119, "Differential Assembly" .



4. CHECK DIFFERENTIAL LOCK SOLENOID OPERATION

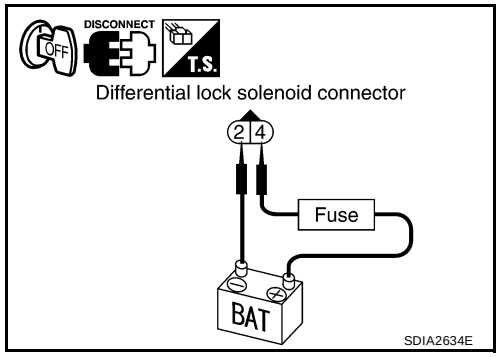
1. Check operation of differential lock solenoid by applying battery voltage to differential lock solenoid terminals.

CAUTION:
Be sure to apply the voltage of the correct polarity to the respective terminals. Otherwise, the part may be damaged.

Terminal
4 (Battery voltage) - 2 (Ground)

Does solenoid operate?

YES >> GO TO 5.
NO >> Replace differential lock solenoid. Refer to RFD-119, "Differential Assembly" .



5. CHECK HARNESS BETWEEN DIFFERENTIAL LOCK CONTROL UNIT AND DIFFERENTIAL LOCK SOLENOID

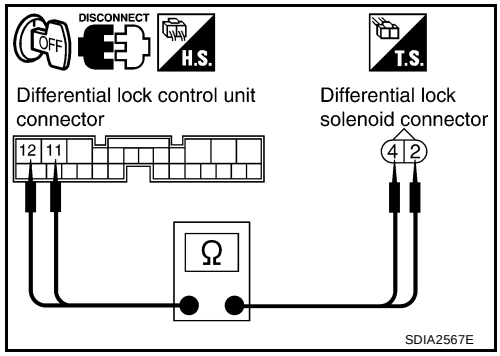
1. Check continuity between the following terminals.

- Differential lock control unit harness connector M70 terminal 11 and differential lock solenoid harness connector C117 terminal 4.
- Differential lock control unit harness connector M70 terminal 12 and differential lock solenoid harness connector C17 terminal 2.

11 - 4 : Continuity should exist.

12 - 2 : Continuity should exist.

Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 7.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

7. CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

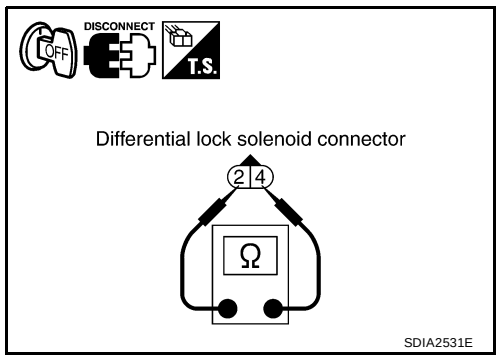
OK >> Inspection End.
NG >> Replace differential lock control unit. Refer to RFD-110, "DIFFERENTIAL LOCK CONTROL UNIT" .

COMPONENT INSPECTION

1. Turn ignition switch OFF.
2. Disconnect differential lock solenoid harness connector.
3. Check resistance between differential lock solenoid terminals 2 and 4.

   2 - 4 : Approx. 3.4Ω

4. If NG, replace differential lock solenoid. Refer to RFD-119, "Differential Assembly" .

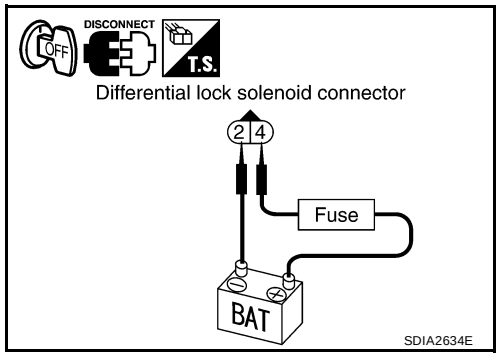


5. Check operation by applying battery voltage to differential lock solenoid terminals.

   CAUTION:
   Be sure to apply the voltage of the correct polarity to the respective terminals. Otherwise, the part may be damaged.

Terminal
4 (Battery voltage) - 2 (Ground)

6. If NG, replace differential lock solenoid.



ABS System

EDS0027V

DIAGNOSTIC PROCEDURE

1. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Perform self-diagnosis with ABS actuator and electric unit (control unit). Refer to BRC-22, "SELF-DIAGNOSIS" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 2.

2. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 3.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

3. CHECK DTC

Perform the self-diagnosis, after driving the vehicle for a while.

OK or NG

OK >> Inspection End.
NG >> Perform self-diagnosis with ABS actuator and electric unit (control unit) again. Refer to BRC-60, "SELF-DIAGNOSIS" (with ABLS) or BRC-111, "SELF-DIAGNOSIS" (with VDC).

CAN Communication Line

EDS0027W

DIAGNOSTIC PROCEDURE

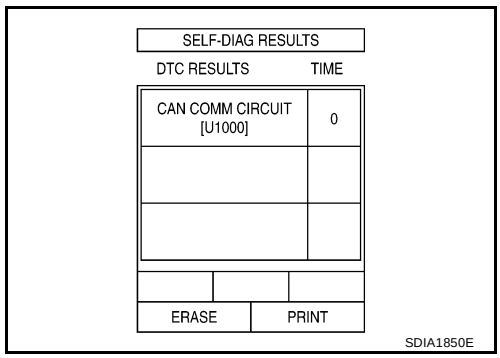
1. CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-II

1. Turn ignition switch ON and start engine.
2. Select “SELF-DIAG RESULTS” mode for “DIFF LOCK” with CONSULT-II.
3. Perform the self-diagnosis.

Is the “CAN COMM CIRCUIT [U1000]” displayed?

YES >> Go to LAN-3, "Precautions When Using CONSULT-II" .
NO >> Inspection End.



TROUBLE DIAGNOSIS FOR SYMPTOMS

PFP:00007

DIFF LOCK Indicator Lamp Does Not Turn ON

EDS0027X

SYMPTOM:
DIFF LOCK indicator lamp does not turn ON for approx. 1 second when turning ignition switch to "ON".

DIAGNOSTIC PROCEDURE

1. CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to RFD-88, "SELF-DIAG RESULTS MODE" .

Is "CAN COMM CIRCUIT" displayed?

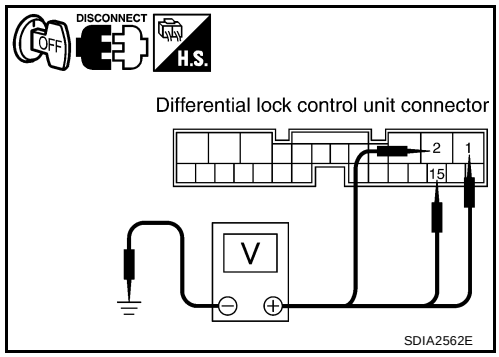
YES >> Perform trouble diagnosis for CAN communication line. Refer to RFD-103, "CAN Communication Line"

NO >> GO TO 2.

2. CHECK DIFFERENTIAL LOCK CONTROL UNIT POWER SUPPLY

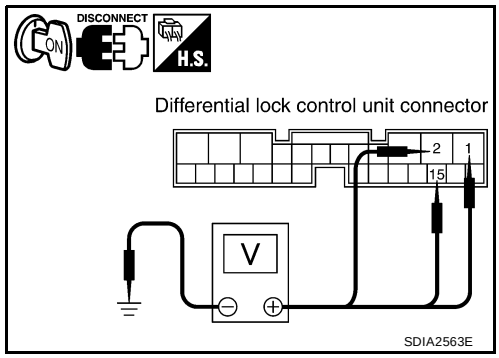
1. Turn ignition switch OFF.
2. Disconnect differential lock control unit harness connector.
3. Check voltage between differential lock control unit harness connector terminals and ground.

Connector	Terminal	Voltage (Approx.)
M70	1 - Ground	0V
	2 - Ground	0V
	15 - Ground	Battery voltage



4. Turn ignition switch ON. (Do not start engine.)
5. Check voltage between differential lock control unit harness connector terminals and ground.

Connector	Terminal	Voltage (Approx.)
M70	1 - Ground	Battery voltage
	2 - Ground	
	15 - Ground	



OK or NG

OK >> GO TO 3.

NG >> Check the following. If any items are damaged, repair or replace damaged parts.

- 10A fuse [No. 3 or 19, located in fuse block (J/B)]
- Harness for short or open between battery and differential lock control unit harness connector terminal 15
- Harness for short or open between ignition switch and differential lock control unit harness connector terminals 1 and 2
- Battery and ignition switch. Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

3. CHECK DIFFERENTIAL LOCK CONTROL UNIT GROUND CIRCUIT

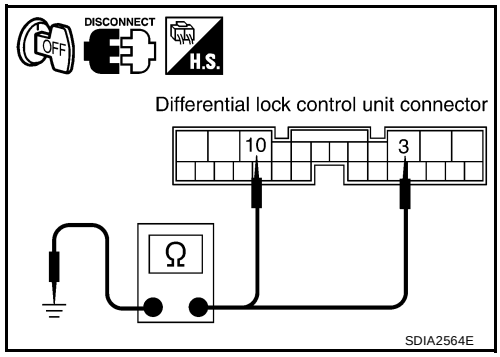
1. Turn ignition switch OFF.
2. Check continuity between differential lock control unit harness connector M70 terminals 3, 10 and ground.

Continuity should exist.

Also check harness for short to ground and short to power.

OK or NG

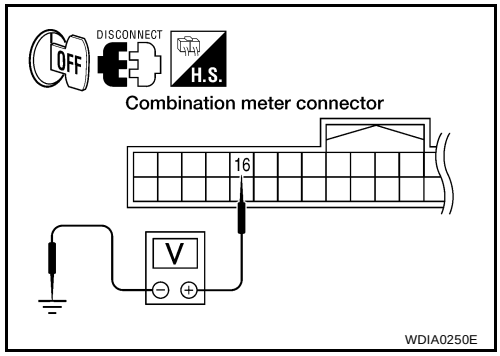
OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK COMBINATION METER POWER SUPPLY CIRCUIT

1. Disconnect combination meter harness connector.
2. Check voltage between combination meter harness connector terminal 16 and ground

Connector	Terminal	Voltage (Approx.)
M24	16 - Ground	0V



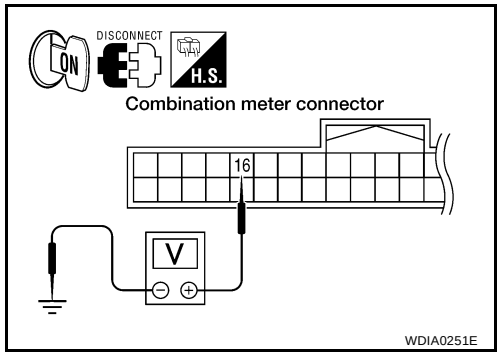
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between combination meter harness connector terminal and ground.

Connector	Terminal	Voltage (Approx.)
M24	16 - Ground	Battery voltage

OK or NG

OK >> GO TO 5.
NG >> Check the following. If any items are damaged, repair or replace damaged parts.

- 10A fuse [No.14, located in the fuse block (J/B)]
- Harness for short or open between ignition switch and combination meter harness connector terminal 16.
- Ignition switch. Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

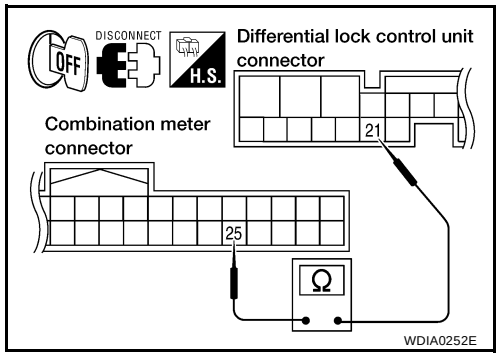


5. CHECK HARNESS BETWEEN DIFFERENTIAL LOCK CONTROL UNIT AND COMBINATION METER

1. Turn ignition switch OFF.
2. Check continuity between differential lock control unit harness connector M70 terminal 21 and combination meter harness connector M24 terminal 25.

Continuity should exist.

Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK DIFF LOCK INDICATOR LAMP CIRCUIT

1. Turn ignition switch OFF.
2. Check combination meter. Refer to DI-7, "Arrangement of Combination Meter" .

OK or NG

OK >> GO TO 7.
NG >> Replace combination meter. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> Inspection End.
NG >> GO TO 8.

8. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> Inspection End.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

DIFF LOCK Indicator Lamp Does Not Change

EDS0027Y

SYMPTOM:
DIFF LOCK indicator lamp does not change when turning differential lock mode switch to “ON” after engine start.

DIAGNOSTIC PROCEDURE

1. CHECK DIFF LOCK INDICATOR LAMP

Confirm DIFF LOCK indicator lamp when ignition switch is turned to ON.

Does DIFF LOCK indicator lamp turn on?

YES >> GO TO 2.
NO >> Go to RFD-104, "DIFF LOCK Indicator Lamp Does Not Turn ON" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to RFD-88, "SELF-DIAG RESULTS MODE" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3. CHECK SYSTEM FOR DIFFERENTIAL LOCK MODE SWITCH

Perform trouble diagnosis for differential lock mode switch system. Refer to RFD-93, "Differential Lock Mode Switch" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK DIFF LOCK INDICATOR LAMP CIRCUIT

1. Turn ignition switch OFF.
2. Check combination meter. Refer to DI-7, "Arrangement of Combination Meter" .

OK or NG

OK >> GO TO 5.
NG >> Replace combination meter. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .

5. CHECK SYMPTOM

Check again.

OK or NG

OK >> Inspection End.
NG >> GO TO 6.

6. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> Inspection End.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

DIFF LOCK Indicator Lamp Sometimes Flashes

EDS0027Z

SYMPTOM:
DIFF LOCK indicator lamp sometimes flashes when it turns ON or OFF during driving.

DIAGNOSTIC PROCEDURE

1. CHECK DIFF LOCK INDICATOR LAMP

Confirm DIFF LOCK indicator lamp when ignition switch is turned to ON.

Does DIFF LOCK indicator lamp turn on?

YES >> GO TO 2.
NO >> Go to RFD-104, "DIFF LOCK Indicator Lamp Does Not Turn ON" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to RFD-88, "SELF-DIAG RESULTS MODE" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3. CHECK SYSTEM FOR DIFFERENTIAL LOCK MODE SWITCH

Perform trouble diagnosis for differential lock mode switch system. Refer to RFD-93, "Differential Lock Mode Switch" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK SYSTEM FOR DIFFERENTIAL POSITION SWITCH

Perform trouble diagnosis for differential lock position switch system. Refer to RFD-96, "Differential Lock Position Switch" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK SYMPTOM

Check again.

OK or NG

OK >> Inspection End.
NG >> GO TO 6.

6. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to RFD-85, "Differential Lock Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 7.
NG >> Check differential lock control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace damaged parts.

7. CHECK DIFFERENTIAL INNER PARTS

1. Disassemble rear final drive assembly. Refer to RFD-115, "Disassembly and Assembly" .
2. Check differential inner parts.

OK or NG

OK >> Inspection End.
NG >> Repair or replace damaged parts.

DIFFERENTIAL LOCK CONTROL UNIT

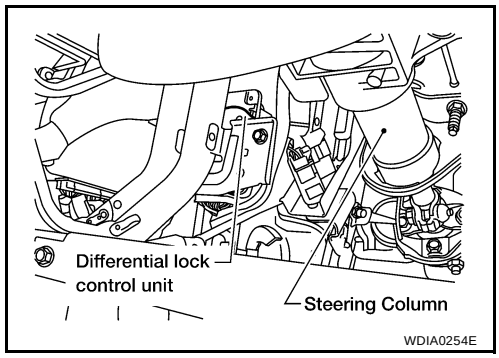
PFP:28496

Removal and Installation

EDS00280

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Disconnect the differential lock control unit connector.
3. Remove the two bolts and remove the differential lock control unit.



INSTALLATION

Installation is in the reverse order of removal.

- When installing differential lock control unit, tighten bolts to the specified torque.

Differential lock control unit bolts : 5.1 N·m (0.52 kg-m, 45 in-lb)

- After installation, check DIFF LOCK indicator lamp. Refer to RFD-69, "Precautions for Differential Case Assembly and Differential Lock Control Unit Replacement." .

FRONT OIL SEAL

PFP:38189

Removal and Installation

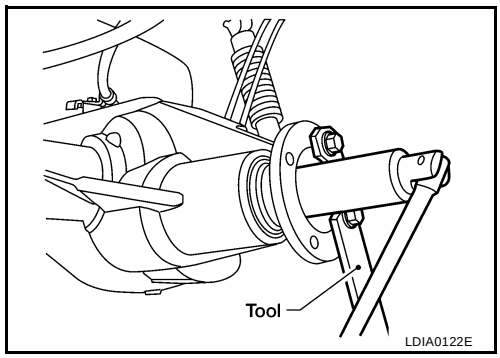
EDS0028B

REMOVAL

1. Remove the rear propeller shaft. Refer to PR-10, "Removal and Installation" .
2. Remove the brake calipers and rotors. Refer to BR-29, "Removal and Installation of Brake Caliper and Disc Rotor" .
3. Measure the total preload torque. Refer to RFD-116, "Total Preload Torque" .

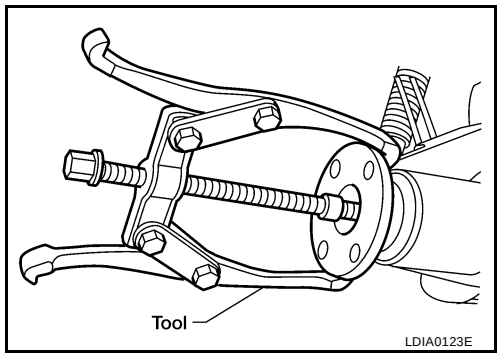
   NOTE:
   Record the total preload torque measurement.
4. Remove the drive pinion nut using Tool.

   Tool number : KV40104000 (—)



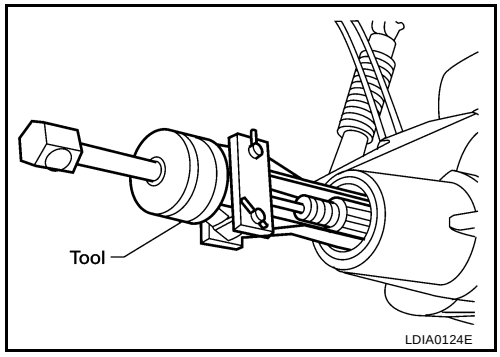
5. Put matching marks on the companion flange and drive pinion using paint.

   CAUTION:
   Use paint to make the matching marks. Do not damage the companion flange or drive pinion.
6. Remove the companion flange using suitable tool.



7. Remove the front oil seal using Tool.

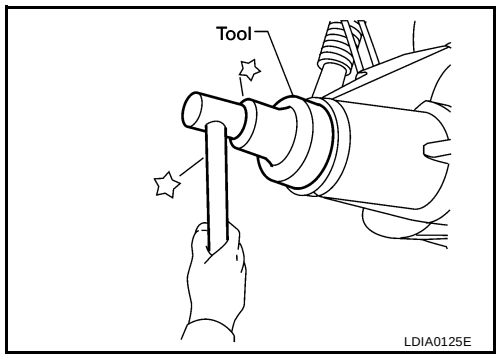
   Tool number : ST33290001 (J-34286)



INSTALLATION

1. Apply multi-purpose grease to the lips of the new front oil seal. Then drive the new front oil seal in evenly until it becomes flush with the gear carrier using Tool.

   Tool number : ST15310000 (—)

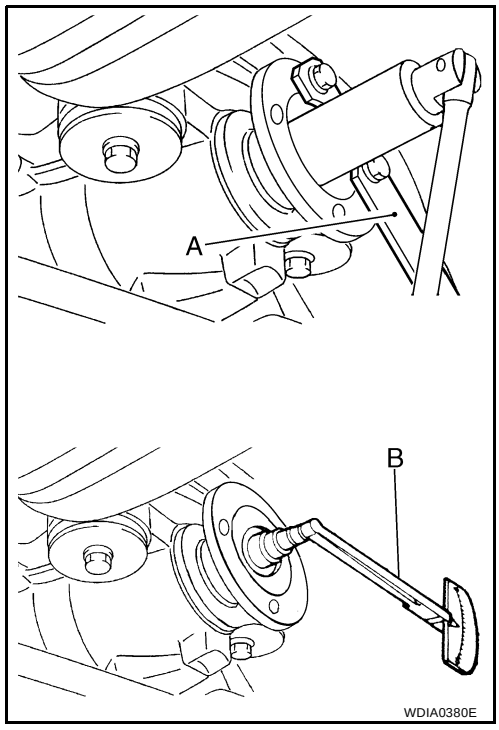


   CAUTION:
   - **Do not reuse front oil seal.**
   - **Do not incline the new front oil seal when installing.**
   - **Apply multi-purpose grease to the lips and differential gear oil to the circumference of the new front oil seal.**

2. Install the companion flange to the drive pinion while aligning the matching marks.
3. Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut and new drive pinion lock nut washer. Then adjust the drive pinion lock nut tightening torque using Tool A, and check the total preload torque using Tool B.

   Tool number A: KV40104000 (—)
   B: ST3127S000 (J-25765-A)

   Total preload torque: Refer to RFD-116, "Total Preload Torque" .



   - The total preload torque should be within the total preload torque specification. When not replacing the collapsible spacer, it should also be equal to the measurement taken during removal plus an additional 0.56 N·m (0.06 Kg-m, 5 in-lb).
   - If the total preload torque is low, tighten the drive pinion lock nut in 6.8 N·m (0.69 Kg-m, 5ft-lb) increments until the total preload torque is met.

   CAUTION:
   - **Do not reuse drive pinion lock nut or drive pinion lock nut washer.**
   - **Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut.**
   - **Adjust the drive pinion lock nut tightening torque to the lower limit first. Do not exceed the drive pinion lock nut specified torque. Refer to RFD-115, "COMPONENTS" .**
   - **Do not loosen drive pinion lock nut to adjust the total preload torque. If the total preload torque exceeds the specifications, replace the collapsible spacer and tighten it again to adjust. Refer to RFD-115, "Disassembly and Assembly" .**
   - **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**

4. Installation of the remaining components is in the reverse order of removal.

   CAUTION:
   Check the differential gear oil level after installation. Refer to RFD-77, "DIFFERENTIAL GEAR OIL" .

CARRIER COVER

PFP:38351

Removal and Installation

EDS0028C

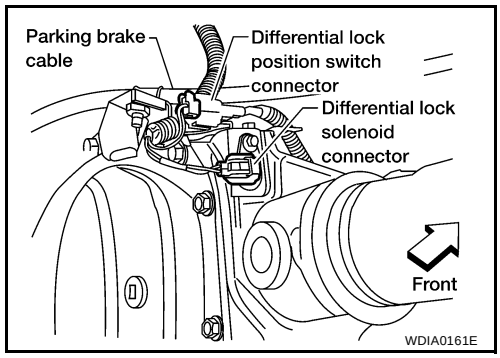
REMOVAL

1. Remove the drain plug and drain the gear oil. Refer to RFD-77, "DRAINING" .
2. Disconnect the parking brake cable from the carrier cover.
3. Remove the carrier cover bolts and separate the carrier cover from the gear carrier using Tool.

Tool number : KV10111100 (J-37228)

CAUTION:

- **Do not damage the mating surface.**
- **Do not insert flat-bladed screwdriver, this will damage the mating surface.**



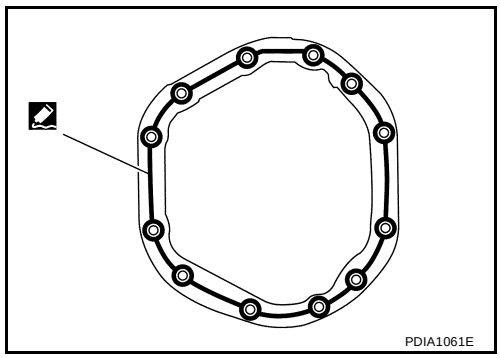
INSTALLATION

1. Apply a bead of sealant to the mating surface of the carrier cover as shown.
   - Use Genuine Silicone RTV or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

CAUTION:

Remove any old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to the application and mating surfaces.

2. Install the carrier cover to the gear carrier. Tighten the bolts to the specified torque. Refer to RFD-49, "COMPONENTS" .
3. Connect the parking brake cable to the carrier cover.
4. Fill the rear final drive assembly with recommended differential gear oil. Refer to RFD-44, "Checking Differential Gear Oil" .



REAR FINAL DRIVE ASSEMBLY

PFP:38300

Removal and Installation

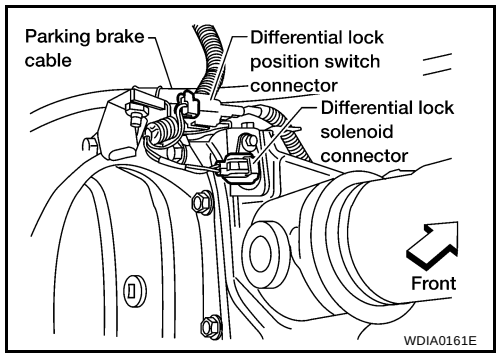
EDS0028D

REMOVAL

CAUTION:

- **Do not damage spline, companion flange and front oil seal when removing propeller shaft.**
- **Before removing final drive assembly or rear axle assembly, disconnect ABS sensor harness connector from the assembly and move it away from final drive/rear axle assembly area. Failure to do so may result in sensor wires being damaged and sensor becoming inoperative.**

1. Drain the differential gear oil. Refer to RFD-77, "DRAINING" .
2. Remove the rear propeller shaft. Refer to PR-10, "Removal and Installation" .
3. Remove the axle shaft. Refer to RAX-19, "Removal and Installation" .
4. Disconnect the following components from the rear final drive assembly.
   - ABS sensor wire harness
   - Brake hoses
   - Parking brake cable
   - Differential lock solenoid connector
   - Differential lock position switch connector



5. Support the rear final drive assembly using a suitable jack.
6. Remove rear shock absorber lower bolts. Refer to RSU-7, "Removal and Installation" .
7. Remove leaf spring U-bolt nuts. Refer to RSU-8, "Removal and Installation" .
8. Remove rear final drive assembly.

   CAUTION:
   Secure rear final drive assembly to the jack while removing it.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

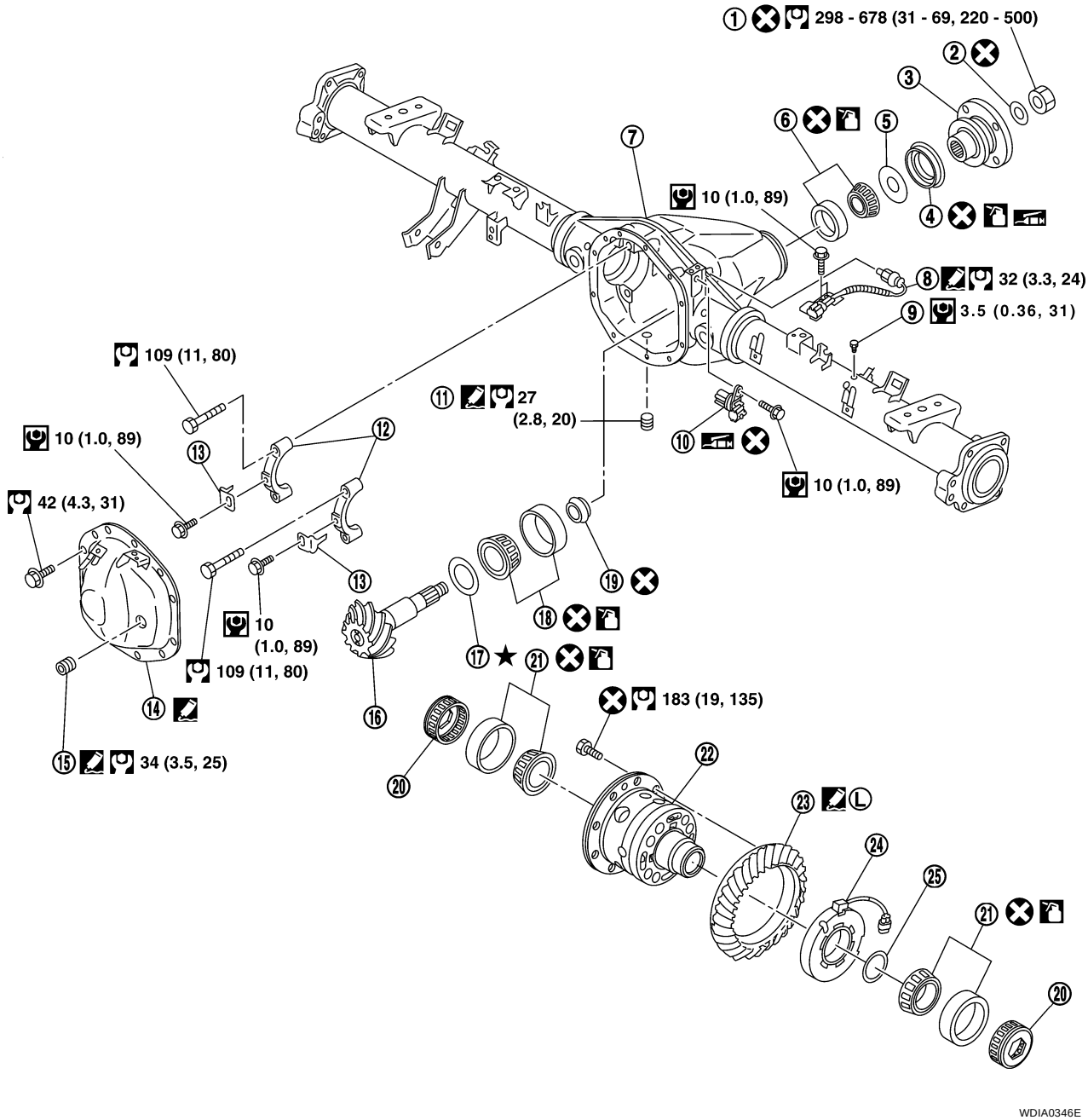
- **Fill the rear final drive assembly with differential gear oil after installation. Refer to RFD-77, "DIFFERENTIAL GEAR OIL" .**
- **Bleed the air from brake system. Refer to BR-10, "Bleeding Brake System" .**
- **After the installation, check DIFF LOCK indicator lamp. Refer to RFD-69, "Precautions for Differential Case Assembly and Differential Lock Control Unit Replacement." .**

Disassembly and Assembly

EDS00284

COMPONENTS

SEC.380



WDIA0346E

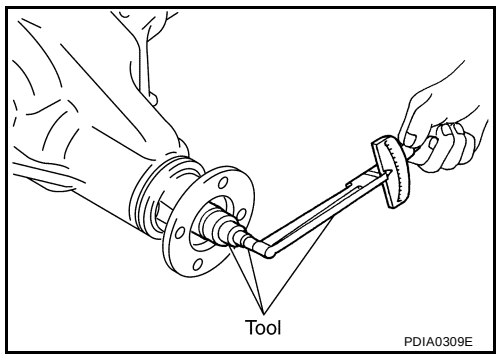
1. Drive pinion lock nut
2. Drive pinion lock nut washer
3. Companion flange
4. Front oil seal
5. Drive pinion front bearing thrust washer
6. Drive pinion front bearing
7. Gear carrier
8. Differential lock position switch
9. Breather
10. Sensor connector
11. Drain plug
12. Side bearing cap
13. Adjuster lock plate
14. Carrier cover
15. Filler plug
16. Drive pinion
17. Drive pinion height adjusting washer
18. Drive pinion rear bearing
19. Collapsible spacer
20. Side bearing adjuster
21. Side bearing
22. Differential case assembly
23. Drive gear
24. Differential lock solenoid
25. Solenoid washer

ASSEMBLY INSPECTION AND ADJUSTMENT

- Drain the differential gear oil before inspection and adjustment. Refer to RFD-77, "DIFFERENTIAL GEAR OIL" .
- Remove and install the carrier cover as necessary for inspection and adjustment. Refer to RFD-113, "CARRIER COVER" .

Total Preload Torque

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



Tool number : ST3127S000 (J-25765-A)

Total preload torque:

2.38 - 4.46 N·m (0.25 - 0.45 kg-m, 21 - 39 in-lb)

NOTE:
Total preload torque = Drive pinion bearing preload torque + Side bearing preload torque

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

If the total preload torque is greater than specification

On drive pinion bearings: Replace collapsible spacer.
On side bearings: Loosen side bearing adjuster.

If the total preload torque is less than specification

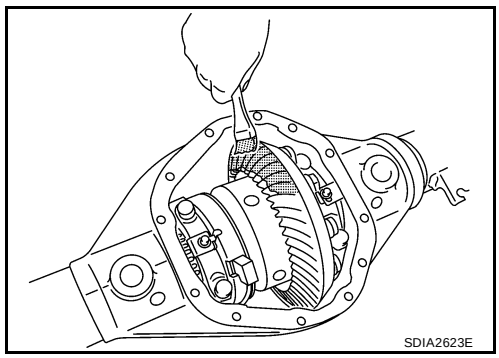
On drive pinion bearings: Tighten drive pinion lock nut.
On side bearings: Tighten side bearing adjuster.

Tooth Contact

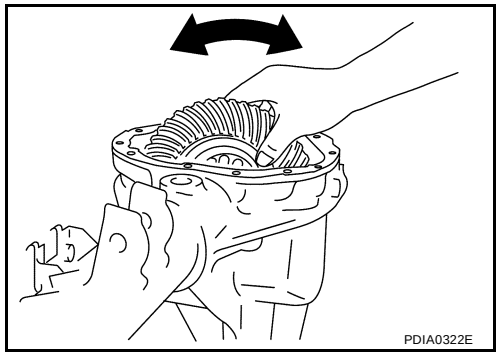
Checking gear tooth contact pattern is necessary to verify correct relationship between drive gear and drive pinion. Gears which are not positioned in proper arrangement may be noisy and/or have a short life. Check gear tooth contact pattern to obtain the best contact for low noise and long life.

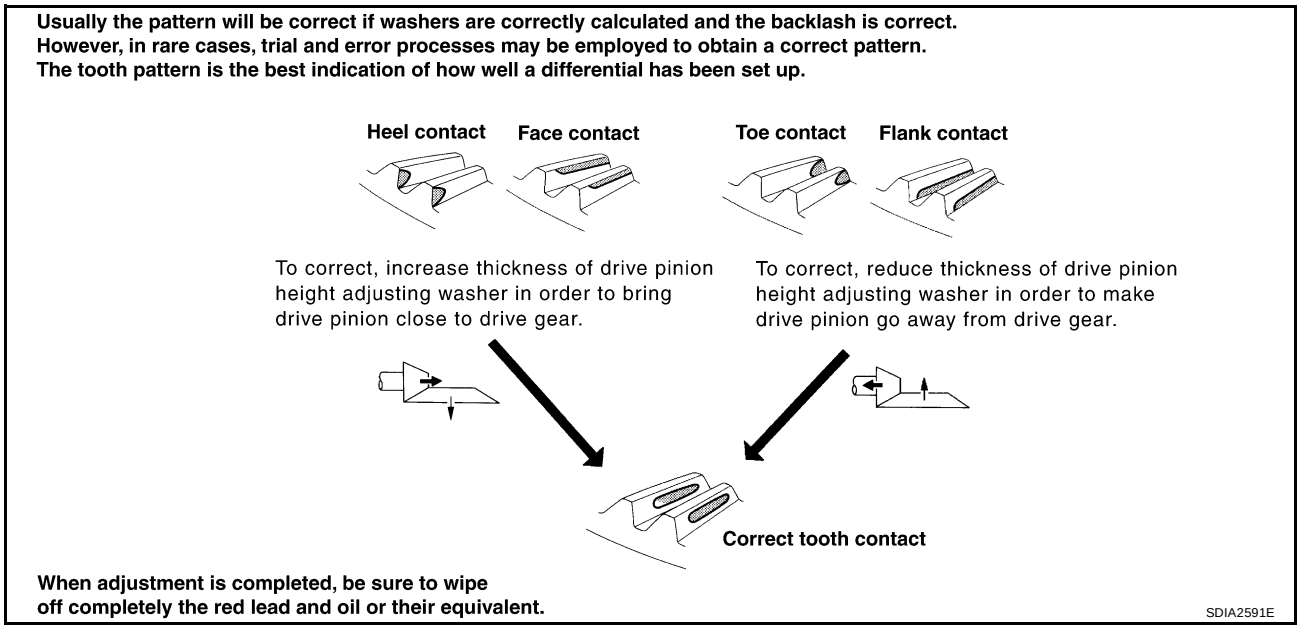
1. Thoroughly clean drive gear and drive pinion teeth.
2. Apply red lead to the drive gear.

NOTE:
Apply red lead to both faces of three to four gears, at four locations evenly spaced on the drive gear.



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



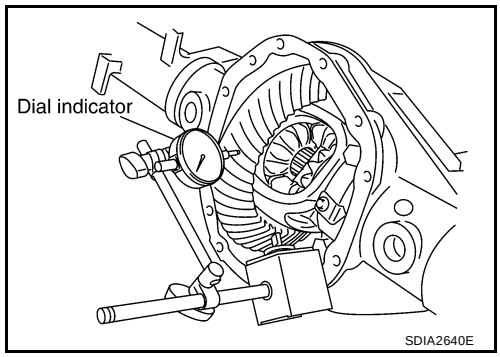


4. If outside the standard, adjust drive pinion height adjusting washer and backlash. Refer to RFD-124, "Drive Pinion Height Adjusting Washer" and RFD-117, "Backlash" .

Backlash

1. Fit a dial indicator to the drive gear face to measure the backlash.

Backlash: 0.08 - 0.13 mm (0.0031 - 0.0051 in)



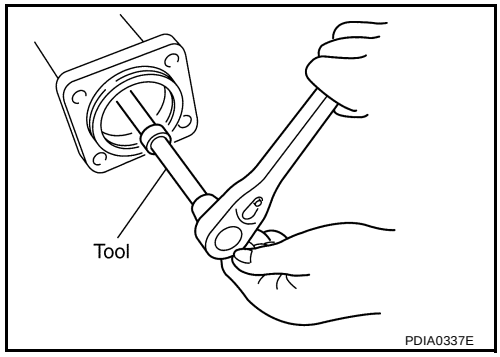
2. If the backlash is outside of the specification, adjust each side bearing side bearing adjuster.

a. Remove adjuster lock plate.

b. Loosen side bearing cap bolts.

c. Tighten or loosen each side bearing adjusters using Tool.

Tool number : — (C - 4164)

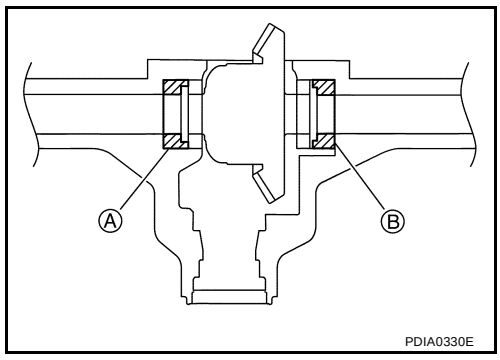


If the backlash is greater than specification:

Loosen side bearing adjuster A and tighten side bearing adjuster B by the same amount.

If the backlash is less than specification:

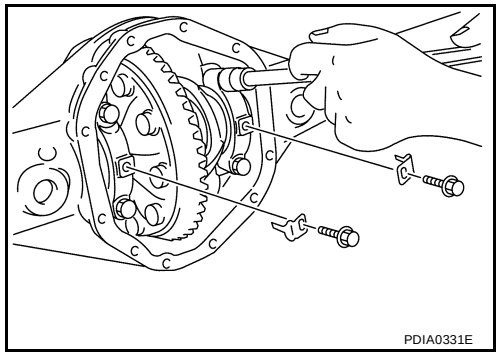
Loosen side bearing adjuster B and tighten side bearing adjuster A by the same amount.



CAUTION:
Do not change the side bearing side bearing adjusters by different amounts as it will change the side bearing preload torque.

d. Tighten side bearing cap bolts to the specified torque. Refer to RFD-115, "COMPONENTS" .

e. Install adjuster lock plate and tighten to the specified torque. Refer to RFD-115, "COMPONENTS" .



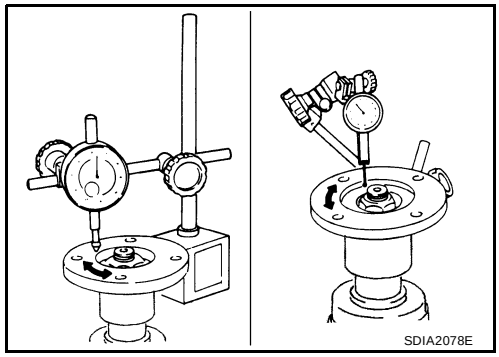
CAUTION:
Check tooth contact and total preload torque after adjusting side bearing adjuster. Refer to RFD-116, "Tooth Contact" and RFD-116, "Total Preload Torque" .

Companion Flange Runout

1. Rotate companion flange and check for runout on the companion flange face (inner side of the bolt holes) and companion flange inner side (socket diameter) using suitable tool.

Runout limit

Companion flange face:	**0.10 mm (0.0039 in)**
Companion flange inner side:	**0.13 mm (0.0051 in)**



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

a. Rotate the companion flange on the drive pinion by 90°, 180° and 270° while checking for the position where the runout is minimum.

b. If the runout is still outside of the runout limit after the companion flange has been rotated on the drive pinion, possible cause could be an assembly malfunction of drive pinion and drive pinion bearing or a malfunctioning drive pinion bearing.

c. If the runout is still outside of the runout limit after repair of the assembly of drive pinion and drive pinion bearing or drive pinion bearing, replace the companion flange.

DISASSEMBLY

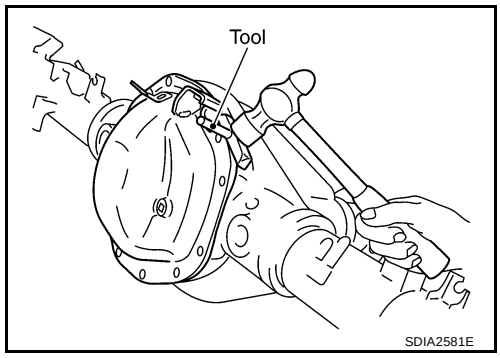
Differential Assembly

1. Remove carrier cover bolts.
2. Remove carrier cover using Tool.

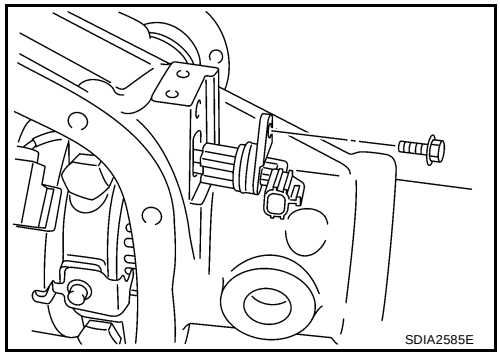
Tool number : KV10111100 (J-37228)

CAUTION:

- **Do not damage the mating surface.**
- **Do not insert flat-bladed screwdriver, this will damage the mating surface.**



3. Remove differential sensor connector bolt and differential lock solenoid connector.

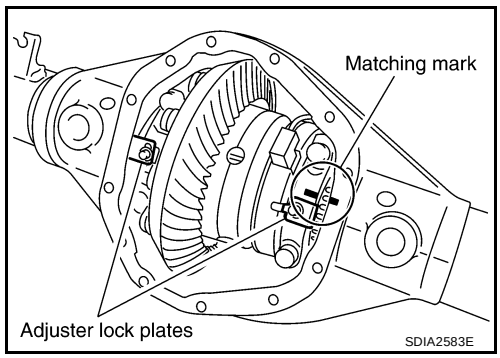


4. For proper reinstallation, paint matching mark on one side of side bearing cap.

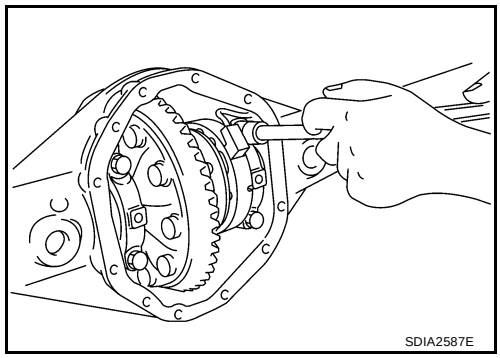
CAUTION:

- **Side bearing caps are line-board for initial assembly. The matching marks are used to reinstall them in their original positions.**
- **For matching mark, use paint. Do not damage side bearing cap.**

5. Remove adjuster lock plates.

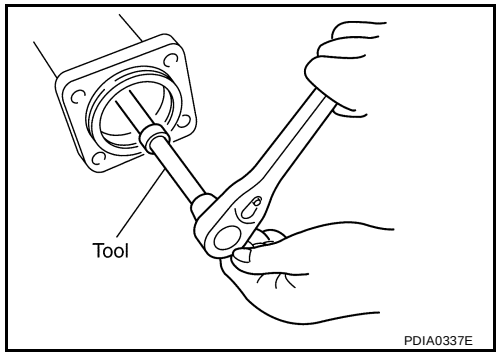


6. Remove side bearing caps.

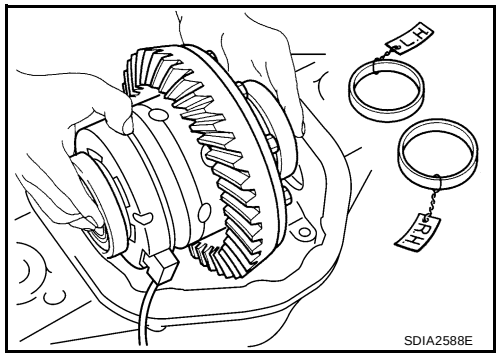


7. Remove side bearing adjusters using Tool.

Tool number : — (C - 4164)



8. Keep side bearing outer races together with inner races. Do not mix them up. Also, keep side bearing adjusters together with bearing.
9. Remove side bearing adjusters from gear carrier.

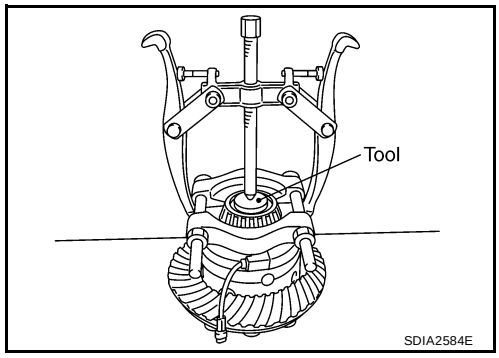


10. Remove bracket of differential lock position switch connector and bolts.
11. Remove differential lock position switch.
12. Remove side bearing inner race and washer using Tool.

Tool number : ST33081000 (—)

CAUTION:
Do not damage differential case assembly and differential lock solenoid.

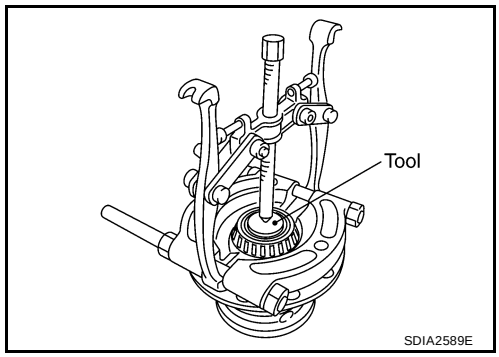
13. Remove differential lock solenoid and solenoid washer.



14. Remove side bearing inner race using Tool.

Tool number : ST33081000 (—)

CAUTION:
Do not damage differential case assembly.

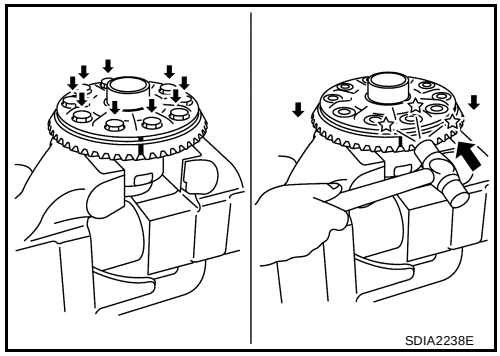


15. For proper reinstallation, paint matching mark on differential case and drive gear.

CAUTION:
Use paint for matching marks. Do not damage differential case or drive gear.

16. Remove drive gear bolts.
17. Tap the drive gear off the differential case using suitable tool.

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


SDIA2238E

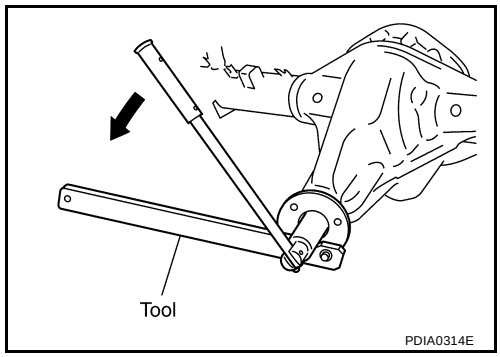
Drive Pinion Assembly

1. Remove differential case assembly. Refer to RFD-119, "Differential Assembly" .
2. Remove drive pinion lock nut and washer using Tool.

Tool number : KV40104000 (—)

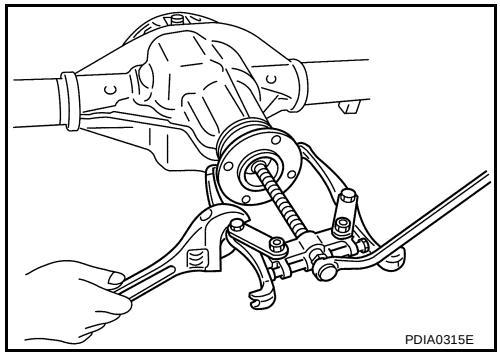
3. Put matching marks on the companion flange and drive pinion using paint.

CAUTION:
Use paint to make the matching marks. Do not damage the companion flange or drive pinion.



PDIA0314E

4. Remove companion flange using suitable tool.

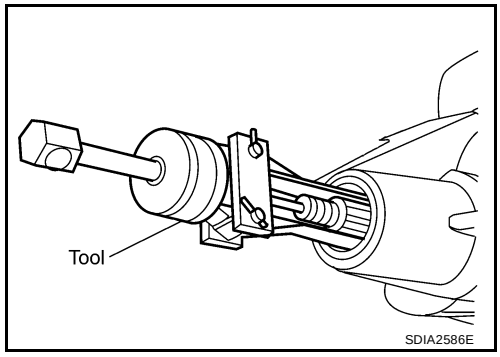

PDIA0315E

5. Remove front oil seal using Tool.

Tool number : ST33290001 (J-34286)

CAUTION:
Do not damage gear carrier.

6. Remove drive pinion front bearing thrust washer.

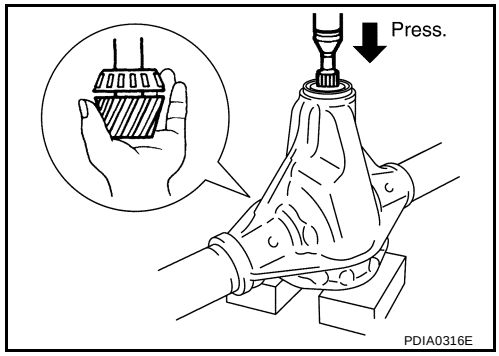


SDIA2586E

7. Remove drive pinion assembly (with rear inner bearing race and collapsible spacer) out of gear carrier.

   CAUTION:
   Do not drop drive pinion assembly.

8. Remove drive pinion front bearing inner race from gear carrier.

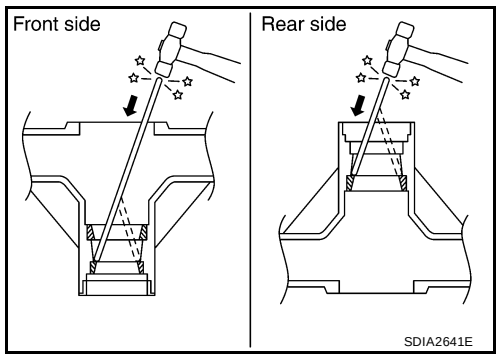


9. Tap drive pinion front bearing outer race uniformly with a brass bar or equivalent to remove.

   CAUTION:
   Do not damage gear carrier.

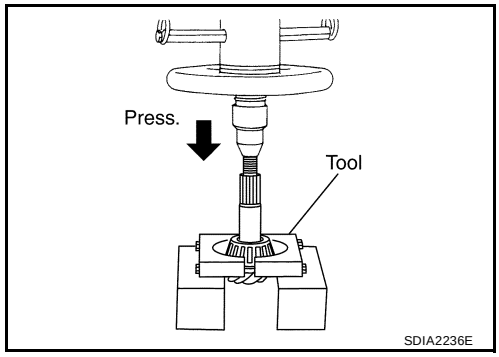
10. Tap drive pinion rear bearing outer race uniformly with a brass bar or equivalent for removal.

    CAUTION:
    Do not damage gear carrier.



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

    Tool number : ST30021000 (J-22912-01)



INSPECTION AFTER DISASSEMBLY

Drive Pinion and Drive Gear

- 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.
- Drive gear and drive pinion are supplied in matched sets only. Matching numbers on both drive 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.

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).
- Bearing must be replaced with a new one whenever disassembled.

Differential Case Assembly

- If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new differential case assembly.
- If the movement is not smooth when pushing cam ring of differential case assembly with a hand.

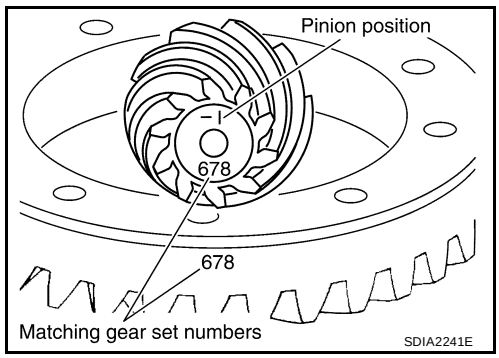
Differential Lock Solenoid

- If the operating part of differential lock solenoid is not smooth, perform component inspection. Refer to RFD-95, "COMPONENT INSPECTION" .

SELECTION ADJUSTING WASHERS

Drive Pinion Height Adjusting Washer

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

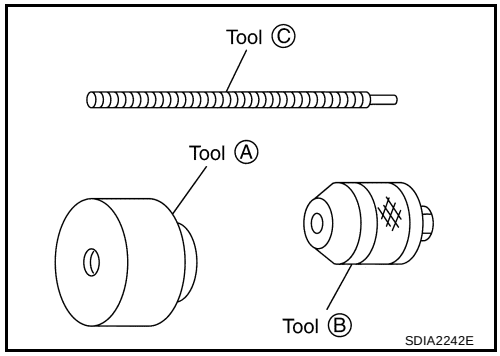


- The mounting distance from the center line of drive gear to the back face of drive pinion for the Model 226 final drive assembly is 109.5 mm (4.312 in).
  On the button end of each drive pinion, there is etched a plus (+) number, a minus (-) number, or a zero (0), which indicates the best running position for each particular gear set. This dimension is controlled by a selective drive pinion height adjusting washer between drive pinion inner bearing race and drive pinion.
  For example: If a drive pinion is etched m+8 (+3), it would require 0.08 mm (0.003 in) less drive pinion height adjusting washer than a drive pinion etched “0”. This means decreasing drive pinion height adjusting washer thickness; increases the mounting distance of drive pinion to 109.6 mm (4.315 in). If a drive pinion is etched m-8 (-3), it would require adding 0.08 mm (0.003 in) more to drive pinion height adjusting washer than would be required if drive pinion were etched “0”. By adding 0.08 mm (0.003 in), the mounting distance of drive pinion was decreased to 109.4 mm (4.309 in) which is just what m-8 (a-3) etching indicated.
- To change drive pinion adjustment, use different drive pinion height adjusting washers which come in different thickness.
- Use the following tables as a guide for selecting the correct drive pinion height adjusting washer thickness to add or subtract from the old drive pinion height adjusting washer.

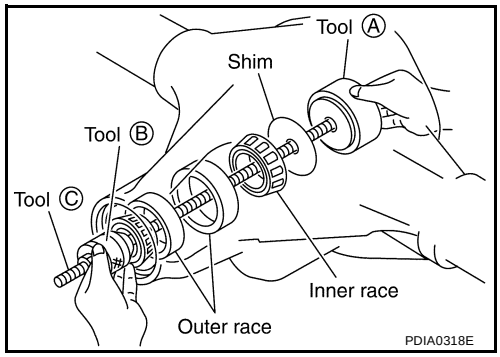
OLD DRIVE PINION MARKING	NEW DRIVE PINION MARKING mm (in)								
	-10 (-4)	-8 (-3)	-5 (-2)	-3 (-1)	0 (0)	+3 (+1)	+5 (+2)	+8 (+3)	+10 (+4)
+10 (+4)	+0.20 (+0.008)	+0.18 (+0.007)	+0.15 (+0.006)	+0.13 (+0.005)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)
+8 (+3)	+0.18 (+0.007)	+0.15 (+0.006)	+0.13 (+0.005)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)
+5 (+2)	+0.15 (+0.006)	+0.13 (+0.005)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)
+3 (+1)	+0.13 (+0.005)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)
0 (0)	+0.10 (+0.004)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)
-3 (-1)	+0.08 (+0.003)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)	-0.13 (-0.005)
-5 (-2)	+0.05 (+0.002)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)	-0.13 (-0.005)	-0.15 (-0.006)
-8 (-3)	+0.02 (+0.001)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)	-0.13 (-0.005)	-0.15 (-0.006)	-0.18 (-0.007)
-10 (-4)	0 (0)	-0.02 (-0.001)	-0.05 (-0.002)	-0.08 (-0.003)	-0.10 (-0.004)	-0.13 (-0.005)	-0.15 (-0.006)	-0.18 (-0.007)	-0.20 (-0.008)

1. Make sure all parts are clean and that drive pinion bearings are well lubricated.
2. Assemble drive pinion bearings into the tools.

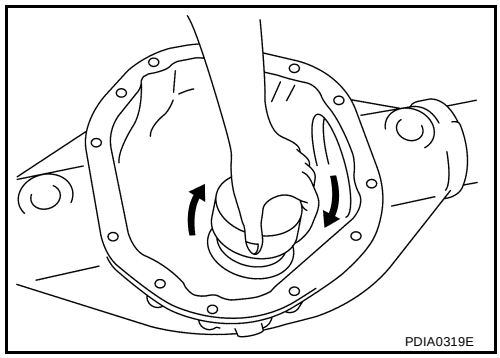
Tool number **A: — (8144)**
B: — (6740)
C: — (6741)



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



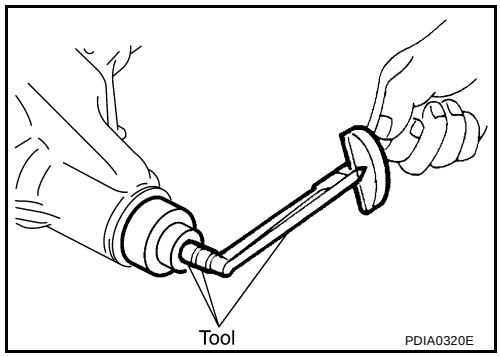
4. Turn the assembly several times to seat drive pinion bearings.



5. Measure the turning torque, using Tool.

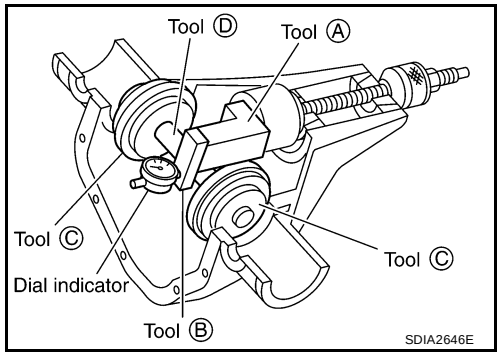
Tool number : ST3127S000 (J-25765-A)

Turning torque specification:
1.2 - 2.8 N-m (0.13 - 0.28 kg-m, 11 - 24 in-lb)

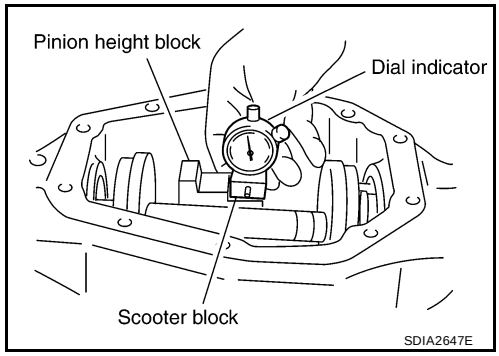


6. Tighten side bearing caps to the specified torque installing Tools as shown.

Tool number **A: — (6739)**
B: — (D-115-2)
C: — (8541A-1)
D: — (D-115-3)



7. Put scooter block on pinion height block. Make sure that dial indicator is level adjusting pressure with a hand. Dial indicator indicates “0”.
8. Slide dial indicator along arbor. Record the maximum.
9. Adjust drive pinion height adjusting washer so that the maximum will be “0”.



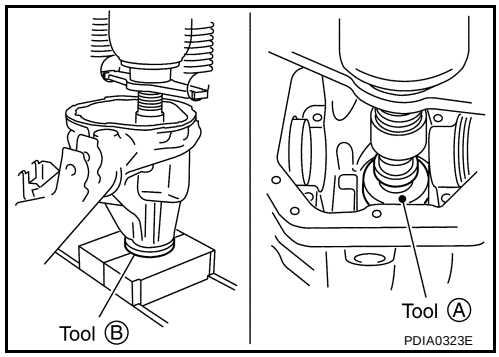
ASSEMBLY

Drive Pinion Assembly

1. Press a drive pinion rear bearing outer race into gear carrier using Tool.

Tool number A: ST01500001 (—)
B: ST30022000 (—)

CAUTION:
Do not reuse drive pinion rear bearing.

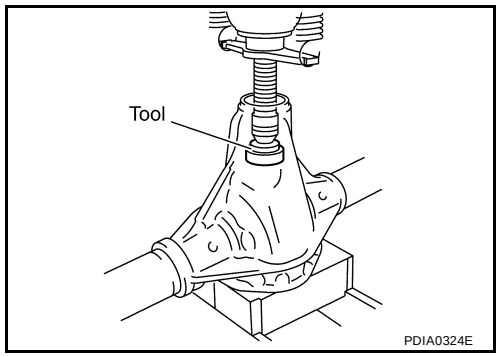


2. Press a drive pinion front bearing outer race into gear carrier using Tool.

Tool number : ST33022000 (—)

CAUTION:
Do not reuse drive pinion front bearing.

3. Select drive pinion height adjusting washer. Refer to RFD-131, "Drive Pinion Height Adjusting Washer" .

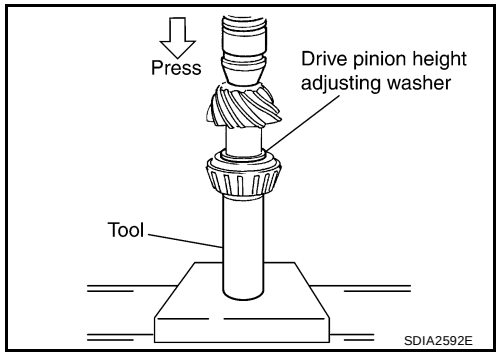


4. Press a drive pinion rear bearing inner race and drive pinion height adjusting washer to drive pinion, using Tool.

Tool number : — (C - 4040)

CAUTION:
Do not reuse drive pinion rear bearing.

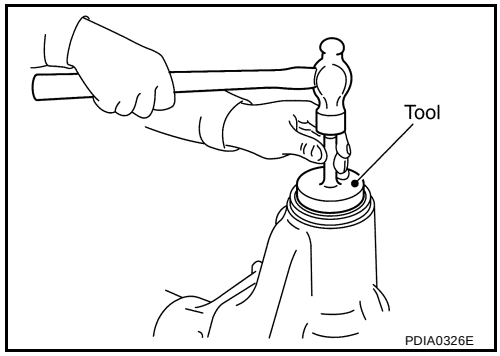
5. Apply gear oil to the drive pinon rear bearing and drive pinon front bearing.
6. Install drive pinion front bearing inner race in gear carrier.
7. Install drive pinion front bearing thrust washer to gear carrier.



8. Apply multi-purpose grease to new front oil seal lip. Install new front oil seal into gear carrier using Tool.

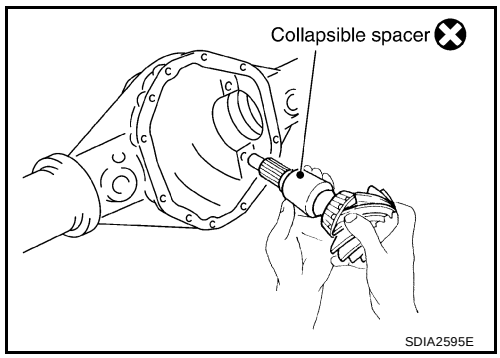
Tool number : ST15310000 (—)

CAUTION:
- **Do not reuse front oil seal.**
- **Do not incline the new front oil seal when installing.**
- **Apply multi-purpose grease to the lip of the new front oil seal.**



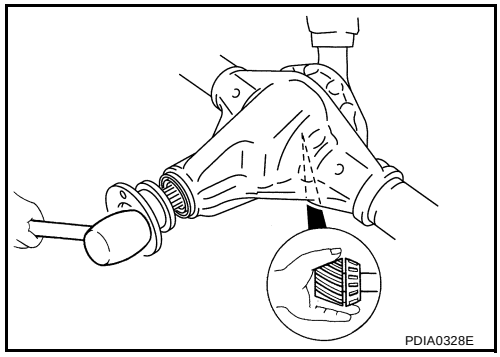
9. Install new collapsible spacer to drive pinion. And then install drive pinion assembly in gear carrier.

CAUTION:
- **Do not reuse collapsible spacer.**
- **Do not damage front oil seal.**



10. Install the companion flange onto the drive pinion while aligning the matching marks. Then tap the companion flange using suitable tool.

CAUTION:
Do not damage companion flange or front oil seal.

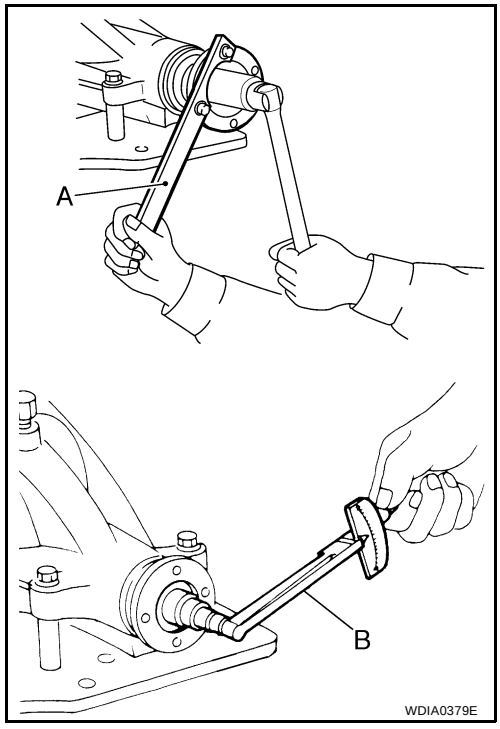


11. Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut and new drive pinion lock nut washer. Then adjust the drive pinion lock nut tightening torque using Tool A, and check the drive pinion bearing preload torque using Tool B.

Tool number A: KV40104000 (—)
B: ST3127S000 (J-25765-A)

Drive pinion bearing preload torque:
1.7 - 3.1 N·m (0.18 - 0.31 kg-m, 15 - 27 in-lb)

CAUTION:
- **Do not reuse drive pinion lock nut or drive pinion lock nut washer.**
- **Apply anti-corrosive oil to the threads of the drive pinion and the seating surface of the new drive pinion lock nut.**
- **Adjust the drive pinion lock nut tightening torque to the lower limit first. Do not exceed the drive pinion lock nut specified torque. Refer to RFD-115, "COMPONENTS" .**
- **If the drive pinion bearing preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Do not loosen drive pinion lock nut to adjust the drive pinion bearing preload torque.**

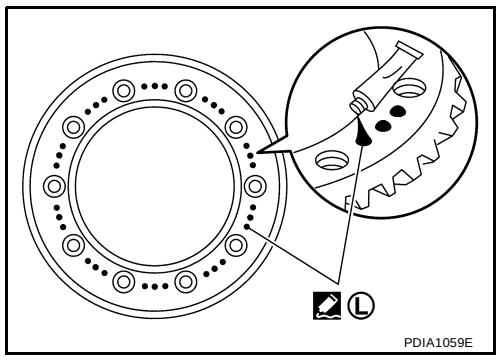


- **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**

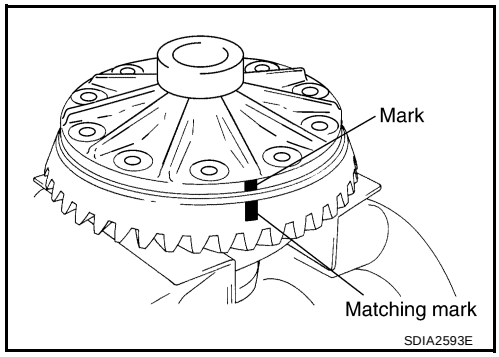
Differential Assembly

1. Apply thread locking sealant to back face of drive gear.
   - Use Genuine High Strength Thread Locking Sealant, Loctite 648 or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

   CAUTION:
   Make sure the drive gear back and threaded holes are clean.

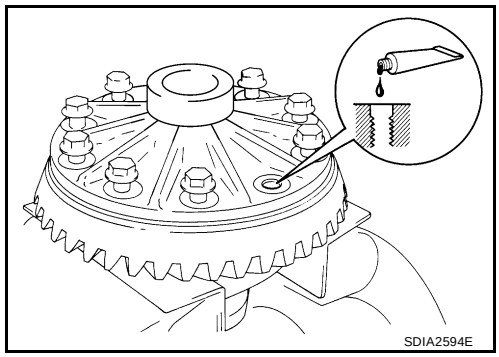


2. Align the matching mark of differential case assembly with the mark of drive gear, then install drive gear.



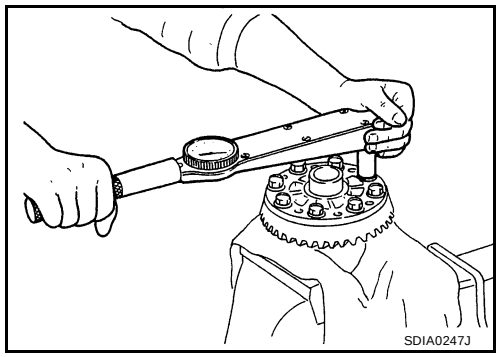
3. Apply thread locking sealant into the threaded holes of the drive gear and install the bolts.
   - Use Genuine High Strength Thread Locking Sealant, Loctite 648 or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

   CAUTION:
   Make sure the drive gear back and threaded holes are clean.



4. Install new drive gear bolts, and then tighten to the specified torque. Refer to RFD-115, "COMPONENTS" .

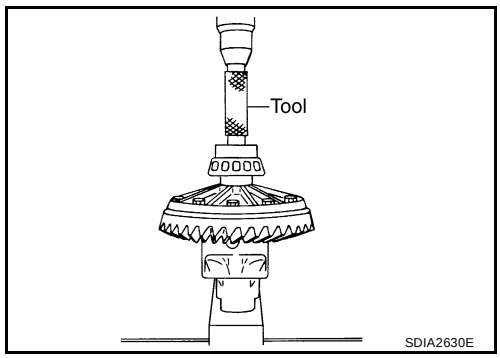
   CAUTION:
   - **Do not reuse the bolts.**
   - **Tighten bolts in a crisscross fashion.**



5. Press side bearing inner races to differential case assembly using Tool.

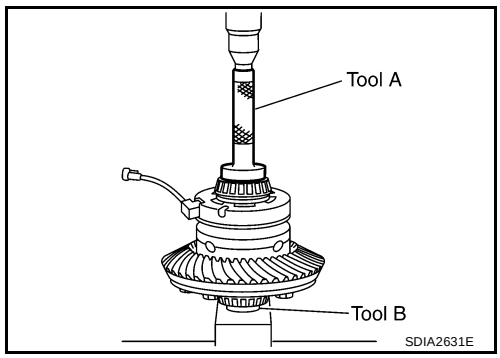
Tool number : ST33081000 (—)

CAUTION:
Do not reuse side bearing.



6. Install differential lock solenoid and washer.
7. Press side bearing inner races to differential case assembly using Tool.

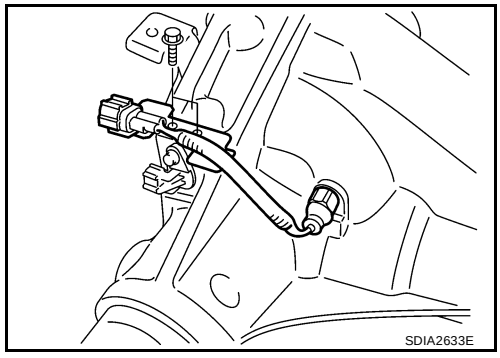
Tool number A: KV38100300 (J-25523)
B: ST33081000 (—)



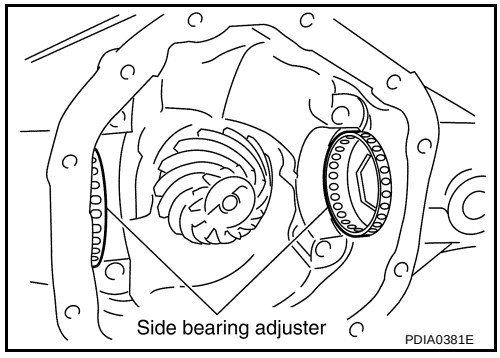
8. Apply sealant to threads of differential lock position switch.
   - Use Genuine Silicone RTV or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

CAUTION:
Remove old sealant adhering to gear carrier and differential lock position switch. Also remove any moisture, oil, or foreign material adhering to application and gear carrier and differential lock position switch.

9. Install differential lock position switch on gear carrier and tighten differential lock position switch bolts with the specified torque. Refer to RFD-115, "COMPONENTS" .

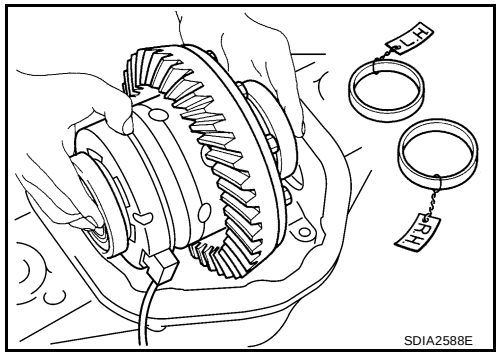


10. Install side bearing adjusters into gear carrier.



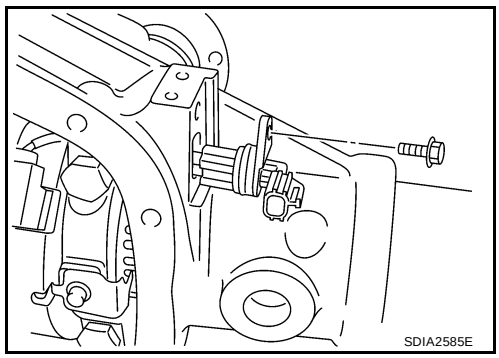
11. Apply gear oil to side bearings. Install differential case assembly with side bearing outer races into gear carrier.
12. Apply multi-purpose grease to sensor connector.

CAUTION:
Do not reuse sensor connector.



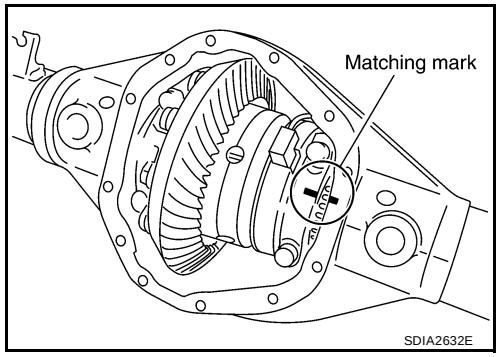
SDIA2588E

13. Connect differential lock solenoid harness and sensor connector. Then install it to gear carrier, tighten to the specified torque. Refer to RFD-115, "COMPONENTS" .


SDIA2585E

14. Align paint matching mark on side bearing caps with that on gear carrier and install side bearing caps on gear carrier.

CAUTION:
Do not tighten at this point. This allows further tightening of side bearing adjusters.

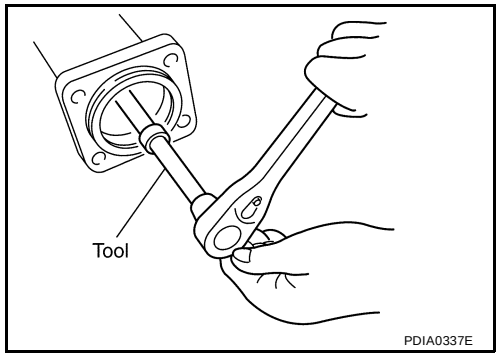


SDIA2632E

15. Tighten each side bearing adjusters using adjuster tool.

Tool number : — (C - 4164)

16. Adjusting backlash of drive gear and drive pinion. Refer to RFD-117, "Backlash" .
17. Check total preload. Refer to RFD-116, "Total Preload Torque" .
18. Check tooth contact. Refer to RFD-116, "Tooth Contact" .

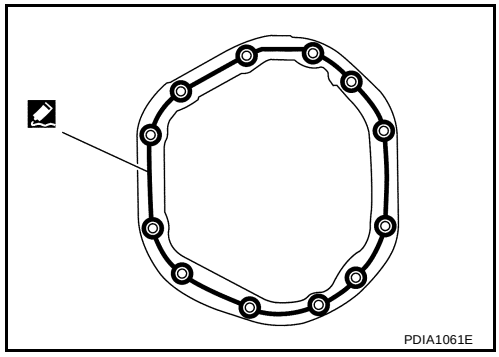


PDIA0337E

19. Apply a bead of sealant to the mating surface of the carrier cover as shown.
    - Use Genuine Silicone RTV or equivalent. Refer to GI-47, "Recommended Chemical Products and Sealants" .

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

20. Install the carrier cover to the gear carrier. Tighten the bolts to the specified torque. Refer to RFD-115, "COMPONENTS" .


PDIA1061E

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EDS00285

Applied model	VQ40DE		
	2WD	4WD	
	5A/T		6M/T
Final drive model	M226		
Gear ratio	3.133	3.357	3.692
Number of pinion gears	2		
Number of teeth (Drive gear / drive pinion)	47/15	47/14	48/13
Oil capacity (Approx.)	2.01 ℓ (4-1/4 US pt, 3-1/2 Imp pt)		
Drive pinion adjustment spacer type	Collapsible		

Inspection and Adjustment

EDS00286

PRELOAD TORQUE

Unit: N·m (kg-m, in-lb)

Item	Specification
Drive pinion bearing preload torque	1.7 - 3.1 (0.18 - 0.31, 15 - 27)
Total preload torque (Total preload torque = drive pinion bearing preload torque + Side bearing preload torque)	2.38 - 4.46 (0.25 - 0.45, 21 - 39)

BACKLASH

Unit: mm (in)

Item	Standard
Drive gear to drive pinion gear	0.08 - 0.13 (0.0031 - 0.0051)

COMPANION FLANGE RUNOUT

Unit: mm (in)

Item	Runout limit
Companion flange face	0.10 (0.0039) or less
Companion flange inner side	0.13 (0.0051) or less

SELECTIVE PARTS

Drive Pinion Height Adjusting Washer

Unit: mm (in)

Thickness	Package part number*
0.076 (0.030) 0.079 (0.031) 0.081 (0.032) 0.084 (0.033) 0.086 (0.034)	38151 8S101
0.089 (0.035) 0.091 (0.036) 0.094 (0.037) 0.097 (0.038) 0.099 (0.039)	38151 8S102
0.102 (0.040) 0.104 (0.041) 0.107 (0.042) 0.109 (0.043) 0.112 (0.044)	38151 8S103

Thickness	Package part number*
0.114 (0.045) 0.117 (0.046) 0.119 (0.047) 0.122 (0.048) 0.124 (0.049)	38151 8S104
0.127 (0.050) 0.130 (0.051) 0.132 (0.052) 0.135 (0.053) 0.137 (0.054)	38151 8S105

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