

SECTION RFD

REAR FINAL DRIVE

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PRECAUTIONS

[WITH LIMITED SLIP DIFFERENTIAL]

PRECAUTIONS

PPF:00001

Limited Slip Differential (LSD) Performance Judgement

EDS0031G

- Inspection is required when detecting any noise or malfunction while driving or turning. Improper condition of oil or differential case assembly is suspected. Refer to [RFD-3, "METHOD FOR TROUBLESHOOTING"](#)

METHOD FOR TROUBLESHOOTING

1. Check differential gear oil level and differential gear oil leakage. Refer to [RFD-9, "Checking Differential Gear Oil"](#) .
2. Changing differential gear oil. Refer to [RFD-9, "Changing Differential Gear Oil"](#) .
3. Start engine. Drive for 10 min.
4. Again changing differential gear oil. Refer to [RFD-9, "Changing Differential Gear Oil"](#) .
5. Start engine. Drive for 10 min. Check if any noise or improper oil condition is detected.
 - If OK, check differential gear oil level and differential gear oil leakage. Refer to [RFD-9, "Checking Differential Gear Oil"](#) .
 - If NG, replace differential case assembly after checking each part of final drive. Refer to [RFD-15, "Dis-assembly and Assembly"](#) .

Service Notice or Precautions

EDS0038Z

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

PREPARATION

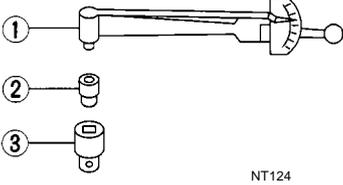
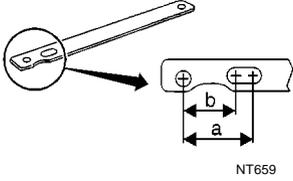
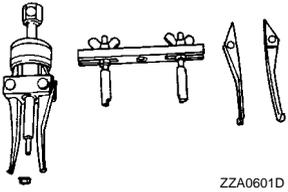
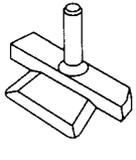
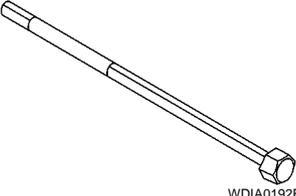
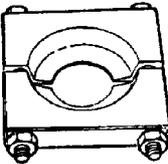
[WITH LIMITED SLIP DIFFERENTIAL]

PREPARATION

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Special Service Tools

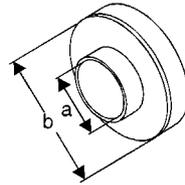
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Tool number Tool name	Description
ST3127S000 Preload gauge set 1. GG91030000 Torque wrench 2. HT62940000 (1/2") Socket adapter 3. HT62900000 (3/8") Socket adapter	Inspecting pinion bearing preload and total preload 
KV40104000 Flange wrench a: 85 mm (3.35 in) dia. b: 65 mm (2.56 in) dia.	Removing and installing drive pinion lock nut 
KV381054S0 Puller	Removing front oil seal 
KV10111100 Seal cutter	Removing carrier cover 
KV38108800 Adjuster tool	Removing and installing side bearing adjuster 
ST30021000 Puller	Removing drive pinion rear bearing inner race 

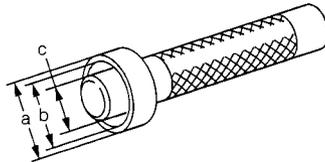
PREPARATION

[WITH LIMITED SLIP DIFFERENTIAL]

Tool number Tool name	Description
ST30022000 Drift a: 46 mm (1.81 in) dia. b: 110 mm (4.33 in) dia.	Installing drive pinion rear bearing outer race
KV38100300 Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32mm (1.26 in) dia.	Installing side bearing inner race



NT660



ZZA1046D

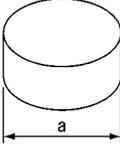
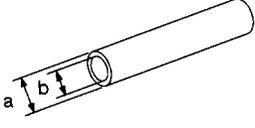
Commercial Service Tools

EDS003H8

Tool name	Description
Puller	<ul style="list-style-type: none"> ● Removing companion flange ● Removing side bearing inner race
Drift a: 96mm (3.77 in) dia. b: 84 mm (3.30 in) dia.	Installing front oil seal
Adapter a: 43 mm (1.69 in) dia.	Removing and installing side bearing inner race
Puller	Removing side bearing inner race
Drift a: 89 mm (3.50 in) dia. b: 79 mm (3.11 in) dia.	Installing drive pinion rear bearing outer race

PREPARATION

[WITH LIMITED SLIP DIFFERENTIAL]

Tool name	Description
<p>Drift a: 67 mm (2.63 in) dia.</p>  <p>PDIA0893E</p>	<p>Installing drive pinion front bearing outer race</p>
<p>Installer a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia.</p>  <p>NT065</p>	<p>Installing drive pinion rear bearing inner race</p>

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING [WITH LIMITED SLIP DIFFERENTIAL]

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PPF:00003

NVH Troubleshooting Chart

EDS00392

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

Symptom	Noise	Possible cause and SUSPECTED PARTS	Reference page
×	×	Gear tooth rough	RFD-22, "INSPECTION AFTER DISASSEMBLY"
×	×	Gear contact improper	RFD-16, "Tooth Contact"
×	×	Tooth surfaces worn	RFD-22, "INSPECTION AFTER DISASSEMBLY"
×	×	Backlash incorrect	RFD-17, "Backlash"
×	×	Companion flange excessive runout	RFD-18, "Companion Flange Runout"
×	×	Gear oil improper	RFD-9, "Checking Differential Gear Oil"
×	×	PROPELLER SHAFT	PR-2, "NVH Troubleshooting Chart"
×	×	AXLE AND SUSPENSION	RAX-5, "NVH Troubleshooting Chart", RSU-3, "NVH Troubleshooting Chart"
×	×	TIRES	WT-2, "NVH Troubleshooting Chart"
×	×	ROAD WHEEL	RAX-5, "NVH Troubleshooting Chart"
×	×	AXLE SHAFT	BR-5, "NVH Troubleshooting Chart"
×	×	BRAKES	PS-5, "NVH Troubleshooting Chart"
×	×	STEERING	PS-5, "NVH Troubleshooting Chart"

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DESCRIPTION

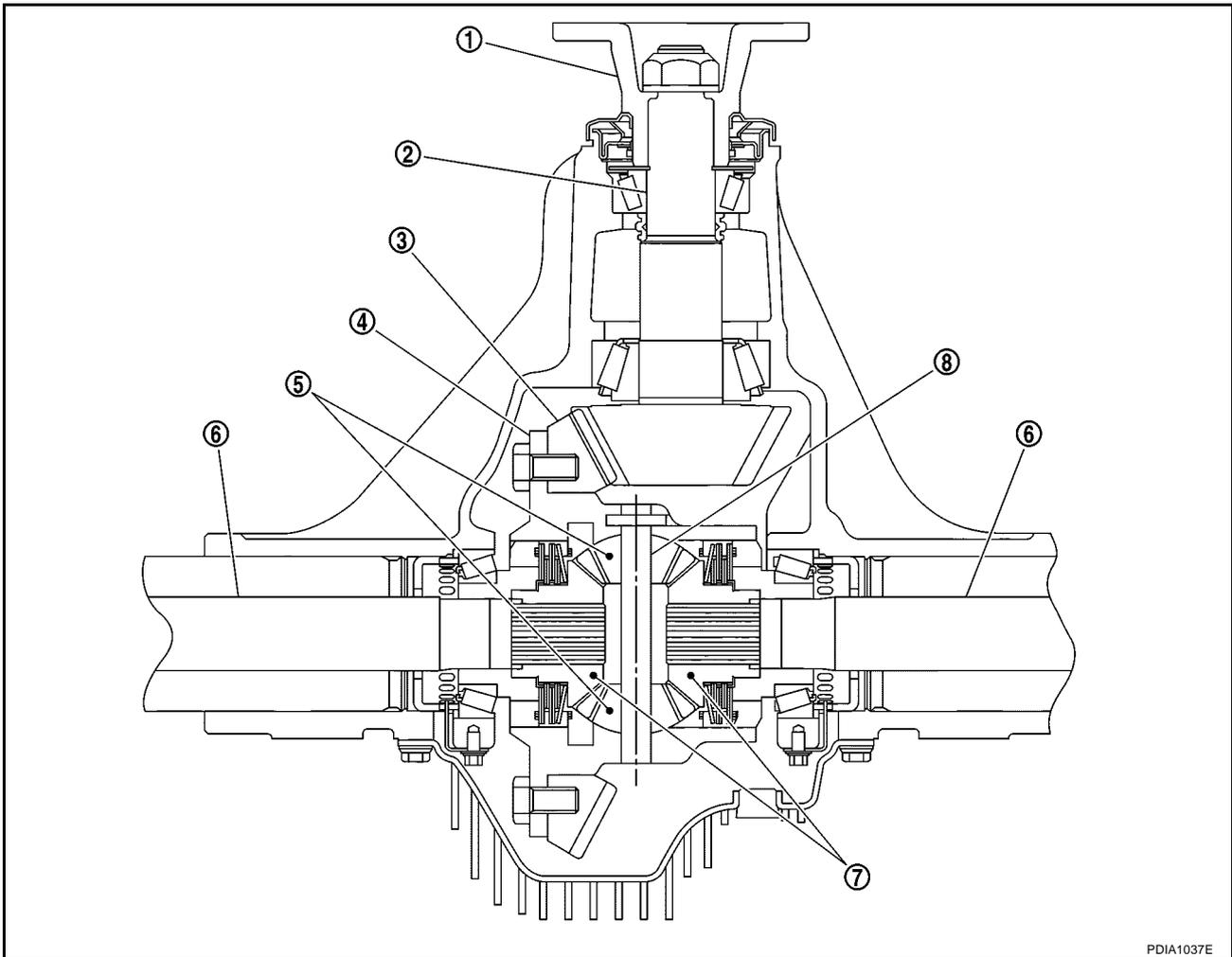
[WITH LIMITED SLIP DIFFERENTIAL]

DESCRIPTION

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Cross-Sectional View

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PDIA1037E

- | | | |
|----------------------|----------------------|---------------|
| 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 [WITH LIMITED SLIP DIFFERENTIAL]

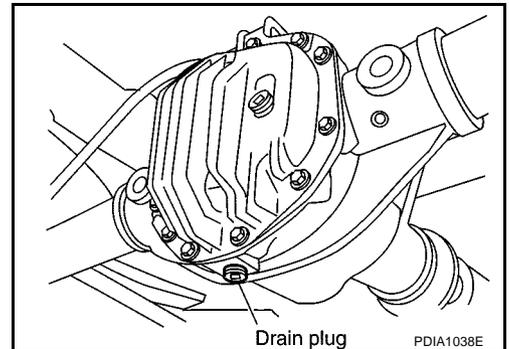
DIFFERENTIAL GEAR OIL

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Changing Differential Gear Oil DRAINING

EDS00394

1. Stop engine.
2. Remove drain plug and drain gear oil.
3. Apply sealant to drain plug. Install drain plug to final drive assembly and tighten to the specified torque. Refer to [RFD-15, "COMPONENTS"](#).



FILLING

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

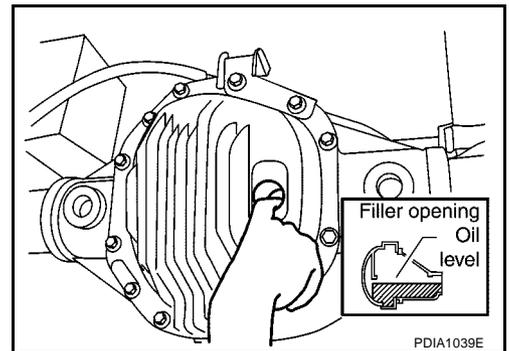
Oil grade and Viscosity:

Refer to [MA-14, "Fluids and Lubricants"](#).

Oil capacity:

Approx. 2.01 ℓ (3-1/2pt)

2. After refilling oil, check oil level. Apply sealant to filler plug. Install filler plug to final drive assembly and tighten to the specified torque. Refer to [RFD-15, "COMPONENTS"](#).



Checking Differential Gear Oil OIL LEAKAGE AND OIL LEVEL

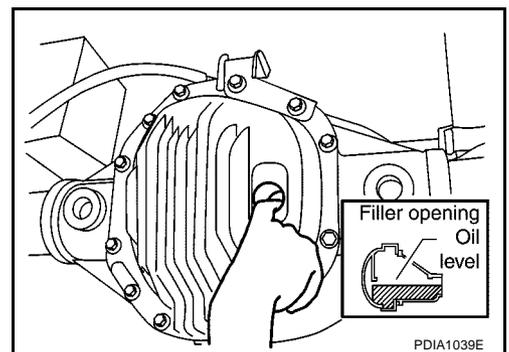
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1. Make sure that gear oil is not leaking from final drive assembly or around it.
2. Check oil level from filler plug hole as shown.

CAUTION:

Do not start engine while checking oil level.

3. Apply sealant to filler plug. Install filler plug to final drive assembly and tighten to the specified torque. Refer to [RFD-15, "COMPONENTS"](#).



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FRONT OIL SEAL

[WITH LIMITED SLIP DIFFERENTIAL]

FRONT OIL SEAL

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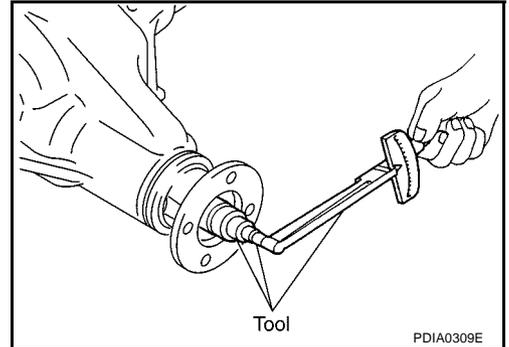
Removal and Installation

REMOVAL

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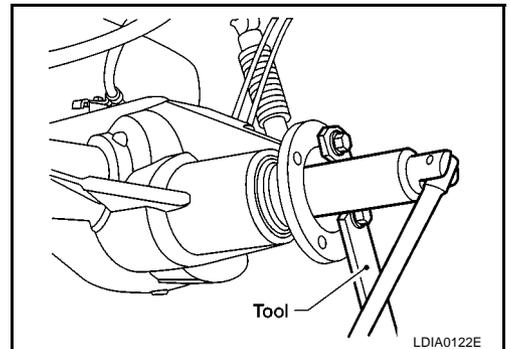
1. Remove the rear propeller shaft. Refer to [PR-8, "Removal and Installation"](#) .
2. Remove the rear tires.
3. Remove rear drum brake. Refer to [BR-31, "Removal and Installation of Drum Brake Assembly"](#) .
4. Rotate the drive pinion back and forth 2 to 3 times using Tool and record the rotating torque.

Tool number : ST3127S000



5. Remove the drive pinion lock nut and washer using Tool.

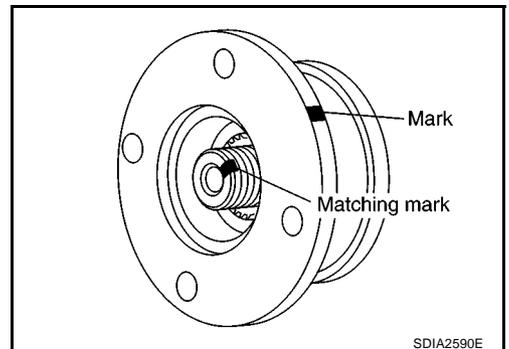
Tool number : KV40104000



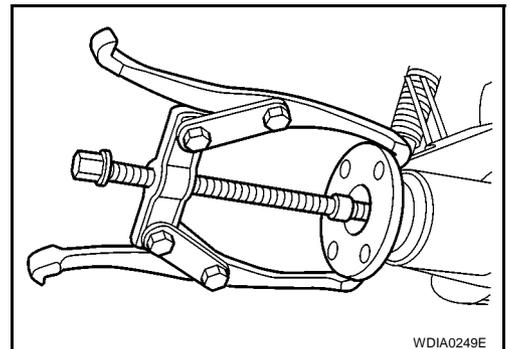
6. Put a matching mark on the thread edge of drive pinion. The mark should be in line with the mark on companion flange.

CAUTION:

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



7. Remove the companion flange using suitable tool.



FRONT OIL SEAL

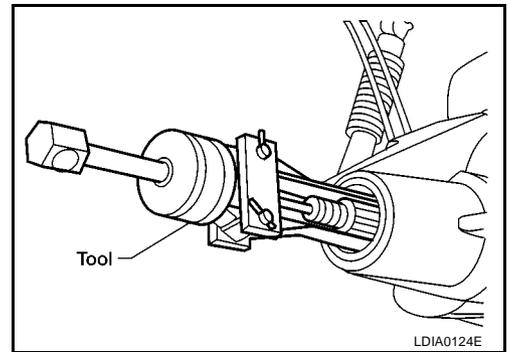
[WITH LIMITED SLIP DIFFERENTIAL]

8. Remove the front oil seal using Tool.

Tool number : KV381054S0

CAUTION:

Do not damage axle housing.



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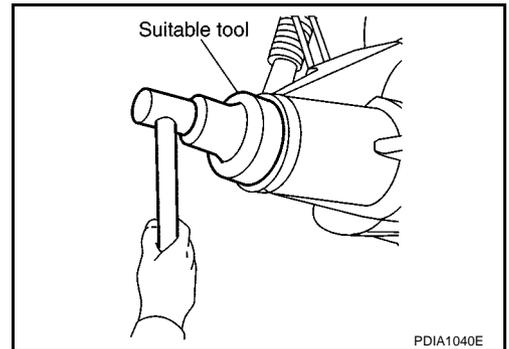
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INSTALLATION

1. Install the front oil seal into the axle housing using a suitable tool.

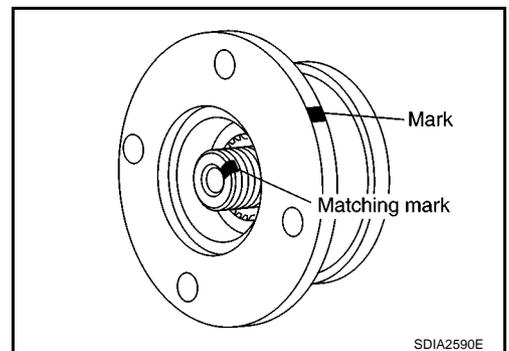
CAUTION:

- Do not reuse oil seal.
- Do not incline oil seal when installing.
- Apply multi-purpose grease onto oil seal lip, and gear oil onto the circumference of oil seal.



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



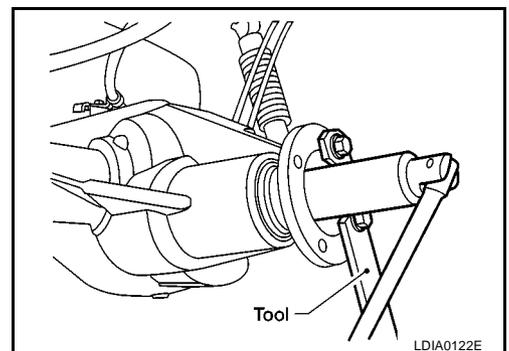
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3. Install the washer and drive pinion lock nut. Tighten the nut until there is zero bearing end play using Tool.

Tool number : KV40104000

CAUTION:

Do not reuse drive pinion lock nut and washer.



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FRONT OIL SEAL

[WITH LIMITED SLIP DIFFERENTIAL]

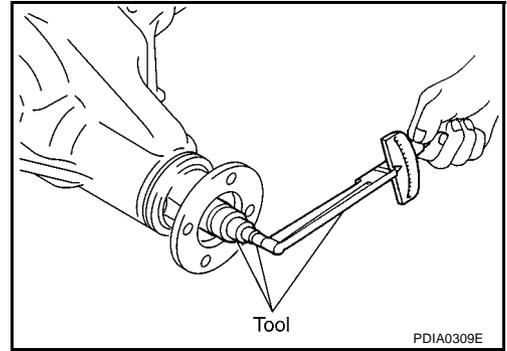
- Rotate the drive pinion using Tool. Rotating torque should be equal to the reading recorded in step 4 above during removal plus an additional 0.56 N·m (5 in-lb).

Tool number : ST3127S000

- If the rotating torque is low, continue to tighten the drive pinion lock nut in 6.8 N·m (5 ft-lb) increments without overtightening. Refer to [RFD-15, "COMPONENTS"](#) . Tighten until proper rotating torque is achieved.

CAUTION:

- Do not loosen the drive pinion lock nut to decrease drive pinion rear bearing rotating torque.
 - Do not exceed specified rotating preload torque. If preload torque or rotating torque is exceeded a new collapsible spacer must be installed.
 - Do not exceed maximum tightening torque. If maximum tightening torque is reached prior to reaching the required rotating torque, the collapsible spacer may have been damaged. Replace the collapsible spacer.
- Check the gear oil level. Refer to [RFD-9, "Checking Differential Gear Oil"](#) .
 - Install the remaining components in the reverse order of removal.



CARRIER COVER

[WITH LIMITED SLIP DIFFERENTIAL]

CARRIER COVER

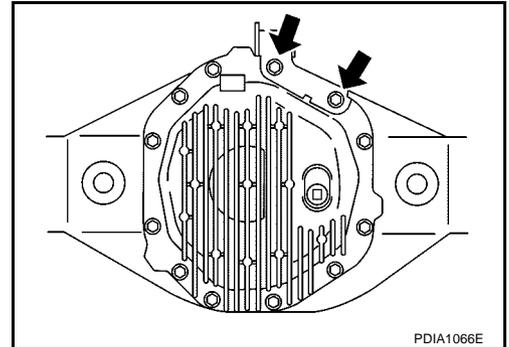
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Removal and Installation

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REMOVAL

1. Remove the drain plug and drain the gear oil. Refer to [RFD-9, "DRAINING"](#) .
2. Disconnect the rear cable (LH) from the carrier cover. Refer to [PB-3, "Components"](#) .
3. Remove bracket from the axle housing.

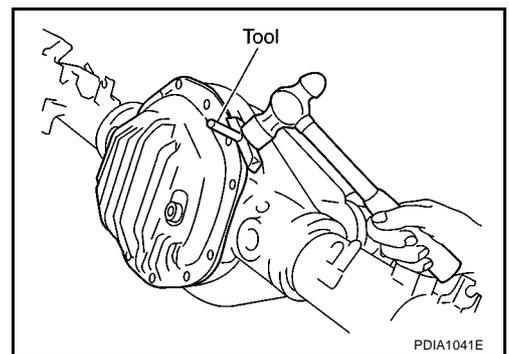


4. Remove the carrier cover bolts. Then separate carrier cover from the axle housing using Tool.

Tool number : KV10111100

CAUTION:

- Be careful not to damage the mating surface.
- Do not insert flat-bladed screwdriver, this will damage the mating surface.

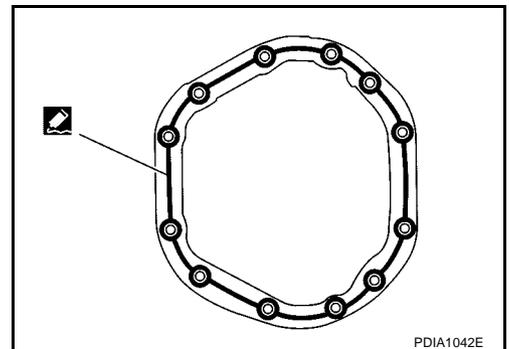


INSTALLATION

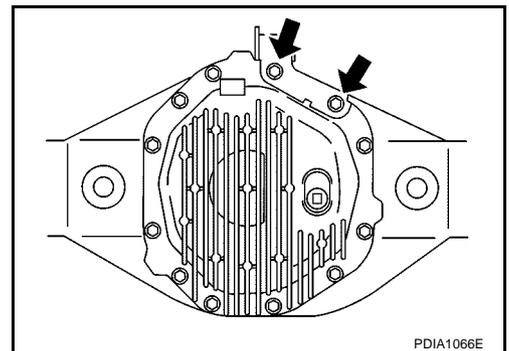
1. Apply sealant to mating surface of carrier cover. Refer to [RFD-15, "COMPONENTS"](#) .

CAUTION:

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



2. Install carrier cover and bracket on axle housing. Then tighten carrier cover bolts to the specified torque. Refer to [RFD-15, "COMPONENTS"](#) .
3. Connect the rear cable (LH) to the carrier cover and tighten to the specified torque. Refer to [PB-3, "Components"](#) .
4. Fill with new gear oil until oil level reaches the specified limit near filler plug hole. Refer to [RFD-9, "Checking Differential Gear Oil"](#) .



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REAR FINAL DRIVE ASSEMBLY

[WITH LIMITED SLIP DIFFERENTIAL]

REAR FINAL DRIVE ASSEMBLY

PFP:38300

Removal and Installation

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REMOVAL

1. Remove the rear propeller shaft. Refer to [PR-8, "Removal and Installation"](#) .
 - Plug rear end of transmission or transfer.
2. Remove the axle shafts and back plate and torque members. Refer to [RAX-7, "Removal and Installation"](#) .
3. Disconnect the following components from the rear final drive.
 - ABS sensor wire harness
 - Rear cable (LH) and rear cable (RH)
 - Brake hoses and brake tube

CAUTION:

Position the wire harness, cable and hoses away from the final drive assembly. Failure to do so may result in components being damaged during rear axle assembly removal.

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

WARNING:

Support the rear final drive assembly using suitable jack before removing leaf spring U-bolt nuts.

7. Remove rear final drive assembly using suitable jack.

INSTALLATION

Installation is the reverse order of removal.

- When oil leaks while removing rear final drive assembly, check oil level after the installation. Refer to [RFD-9, "Checking Differential Gear Oil"](#) .
- Refill brake fluid and bleed the air from the brake system. Refer to [BR-11, "Bleeding Brake System"](#) .

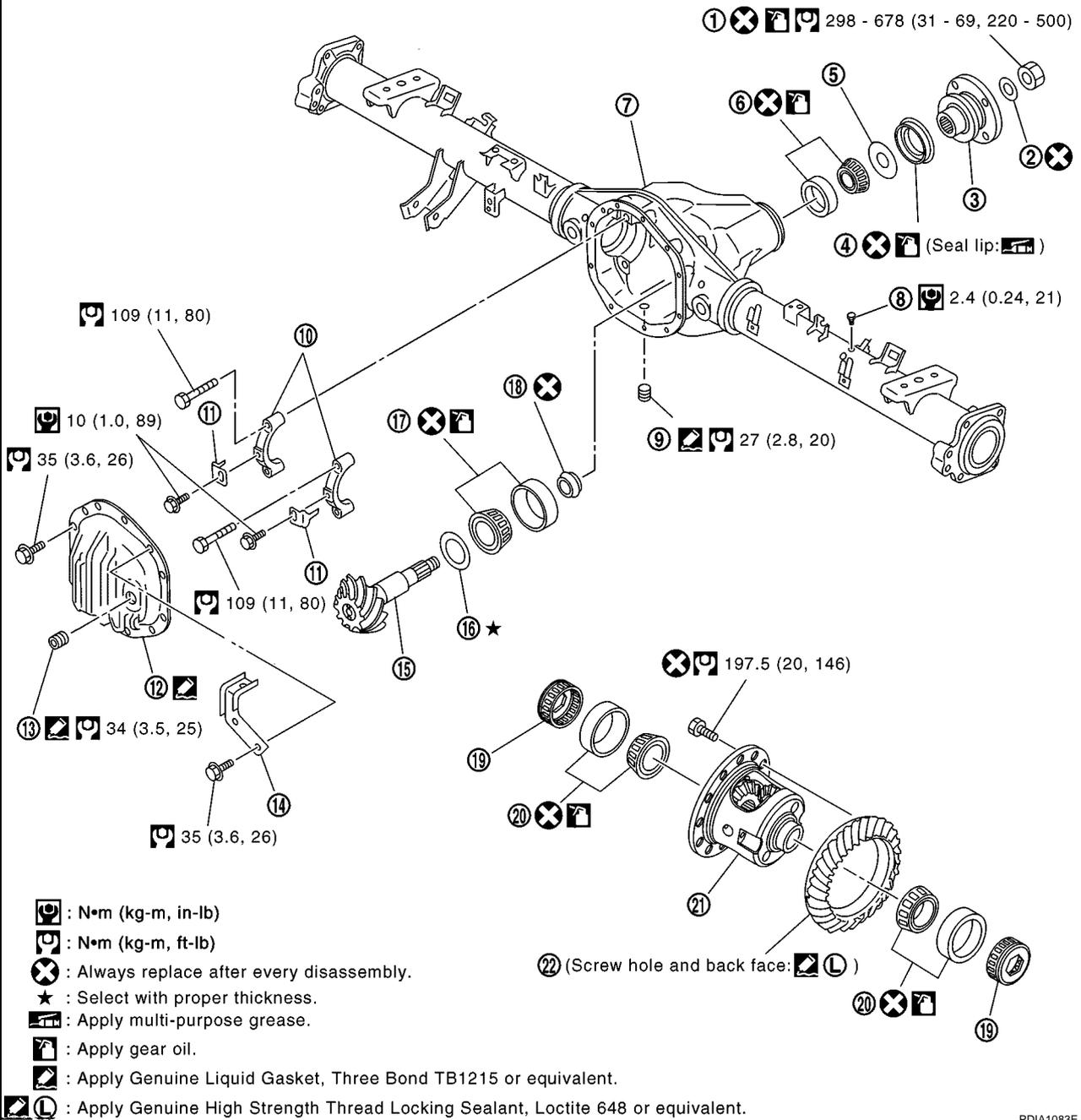
REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

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Disassembly and Assembly COMPONENTS

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|--|--------------------------------|--------------------------------|
| 1. Drive pinion lock nut | 2. Washer | 3. Companion flange |
| 4. Front oil seal | 5. Front bearing thrust washer | 6. Drive pinion front bearing |
| 7. Axle housing | 8. Breather | 9. Drain plug |
| 10. Side bearing cap | 11. Adjuster lock plate | 12. Carrier cover |
| 13. Filler plug | 14. Bracket | 15. Drive pinion |
| 16. Drive pinion height adjusting washer | 17. Drive pinion rear bearing | 18. Collapsible spacer |
| 19. Side bearing adjuster | 20. Side bearing | 21. Differential case assembly |
| 22. Drive gear | | |

REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

ASSEMBLY INSPECTION AND ADJUSTMENT

- Before inspection and adjustment, drain gear oil.

Total Preload Torque

1. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
2. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
3. Turn drive pinion in both directions several times to set bearing rollers.
4. Measure total preload with preload gauge.

Tool number : ST3127S000

Total preload

Gear ratio 3.357 Type:

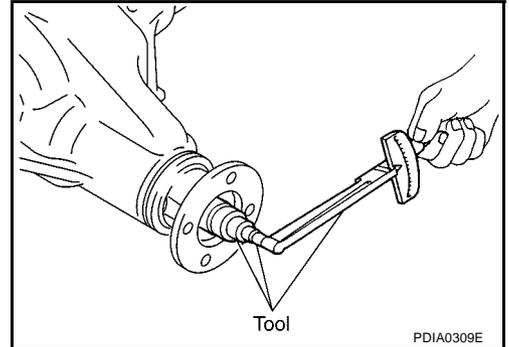
2.38 - 4.46 N·m (0.25 - 0.45 kg·m, 21- 39 in-lb)

Gear ratio 3.538 Type:

2.34 - 4.34 N·m (0.24 - 0.44 kg·m, 21- 38 in-lb)

Gear ratio 3.692 Type:

2.32 - 4.34 N·m (0.24 - 0.44 kg·m, 21 - 38 in-lb)



NOTE:

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

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

When the preload torque is greater than specification

On pinion bearings: Replace collapsible spacer.

On side bearings: Loosen side bearing adjuster.

When the preload torque is less than specification

On pinion bearings: Tighten drive pinion lock nut.

On side bearings: Tighten side bearing adjuster.

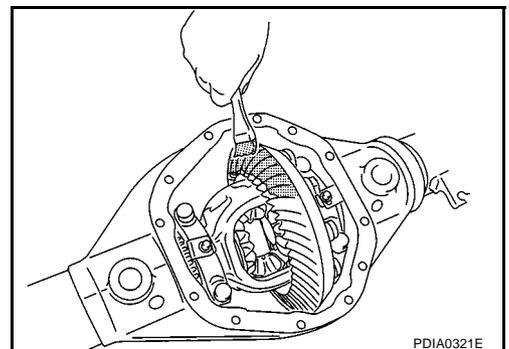
Tooth Contact

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. Remove carrier cover. Refer to [RFD-13, "Removal and Installation"](#).
2. Thoroughly clean drive gear and drive pinion teeth.
3. Apply red lead to drive gear.

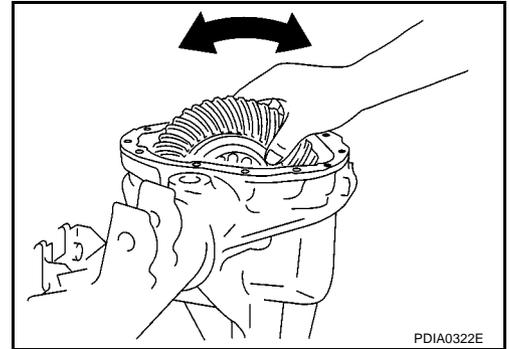
CAUTION:

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



REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

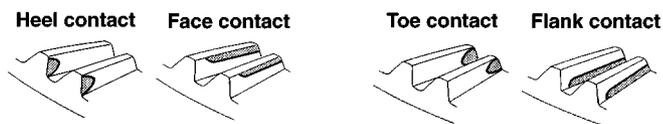
4. Hold companion flange steady by hand and rotate drive gear in both directions.



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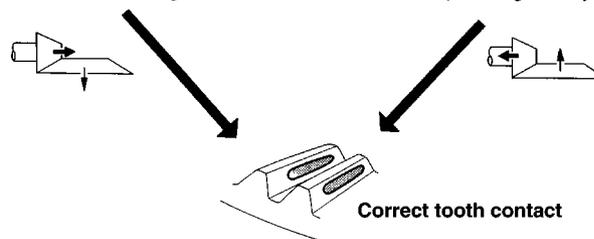
RFD

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



To correct, increase thickness of drive pinion height adjusting washer in order to bring drive pinion close to drive gear.

To correct, reduce thickness of drive pinion height adjusting washer in order to make drive pinion go away from drive gear.



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

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5. If outside the standard, adjust drive pinion height adjusting washer and backlash. Refer to [RFD-23, "Drive Pinion Height Adjusting Washer"](#) and [RFD-17, "Backlash"](#).

Backlash

1. Remove carrier cover. Refer to [RFD-19, "Differential Assembly"](#).
2. Check drive gear to drive pinion backlash using a dial indicator at several points.

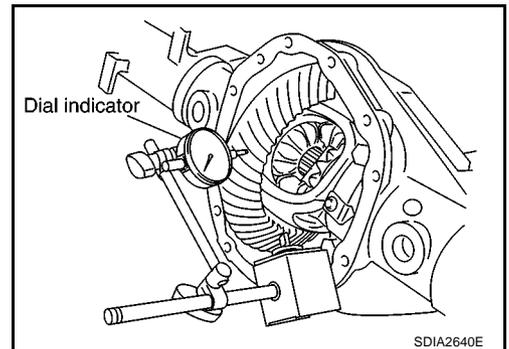
Drive gear to drive pinion backlash:
0.08 - 0.13 mm (0.0031 - 0.0051 in)

3. If outside the standard, adjust side bearing adjusters.

CAUTION:

Check tooth contact and total preload after adjusting side bearing adjusters. Refer to [RFD-16, "Total Preload Torque"](#), [RFD-16, "Tooth Contact"](#).

- a. Remove adjuster lock plates.
- b. Loosen side bearing cap bolts.



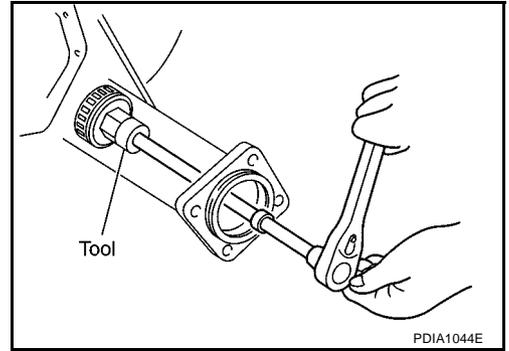
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REAR FINAL DRIVE ASSEMBLY

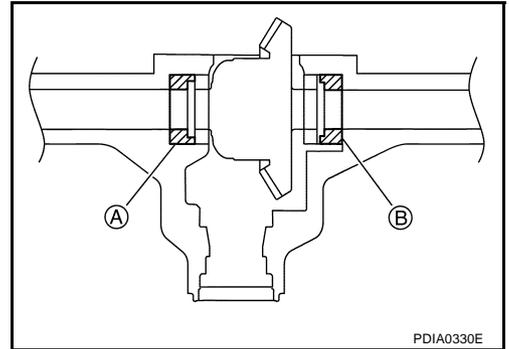
[WITH LIMITED SLIP DIFFERENTIAL]

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

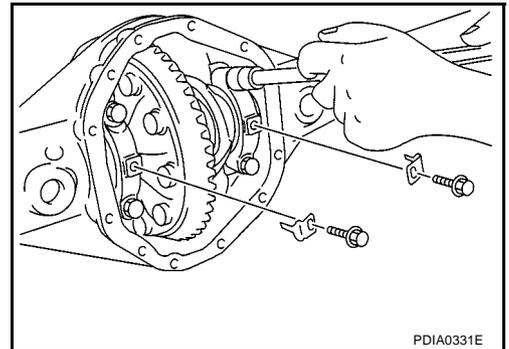
Tool number : KV38108800



- d. In case of excessive backlash, loosen side bearing adjuster A and tighten side bearing adjuster B. In case of insufficient backlash, loosen side bearing adjuster B and tighten side bearing adjuster A.



- e. After adjusting backlash, tighten side bearing cap bolts to the specified torque. Refer to [RFD-15, "COMPONENTS"](#) .
f. Install adjuster lock plates and tighten to the specified torque. Refer to [RFD-15, "COMPONENTS"](#) .



Companion Flange Runout

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

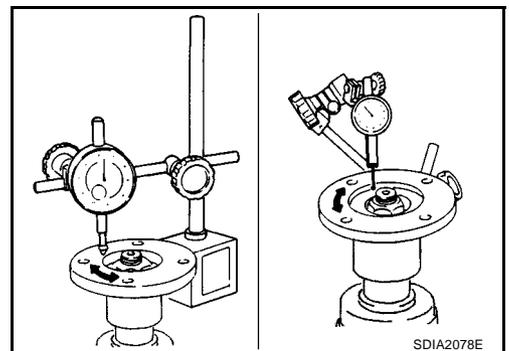
Runout limit : 0.10 mm (0.0039 in) or less

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

Runout limit : 0.13 mm (0.0051 in) or less

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

- a. Check for runout while changing the phase between companion flange and drive pinion by 90°, 180° and 270° and search for the point where the runout is the minimum.
- b. If the runout value is still outside of the limit after the phase has been changed, replace companion flange.
- c. If the runout value is still outside of the limit after companion flange has been replaced, check drive pinion front bearing, drive pinion rear bearing and drive pinion assembly.

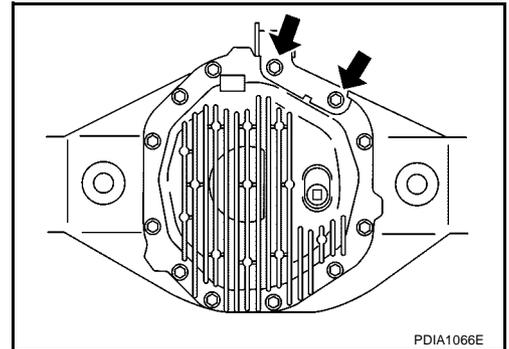


REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

DISASSEMBLY

Differential Assembly

1. Remove carrier cover bolts and bracket.

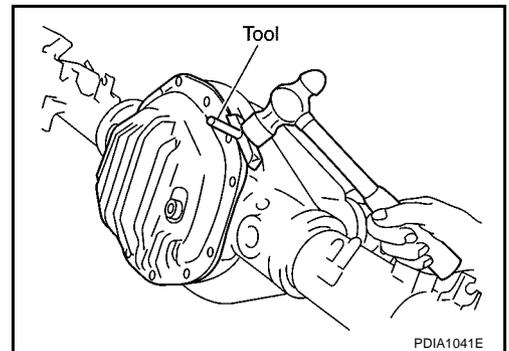


2. Separate carrier cover from axle housing using Tool.

Tool number : KV10111100

CAUTION:

- Be careful not to damage the mating surface.
- Do not insert flat-bladed screwdriver, this will damage the mating surface.

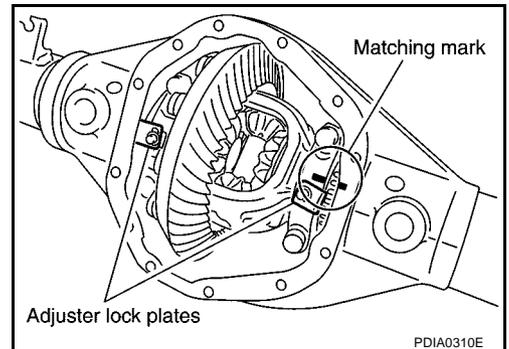


3. For proper reinstallation, paint matching mark on one side of side bearing cap and axle housing.

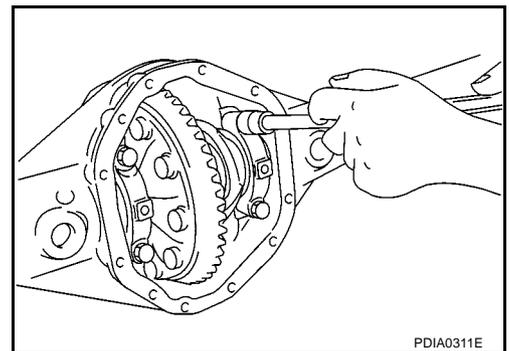
CAUTION:

- 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 and axle housing.

4. Remove adjuster lock plates.



5. Remove side bearing caps.



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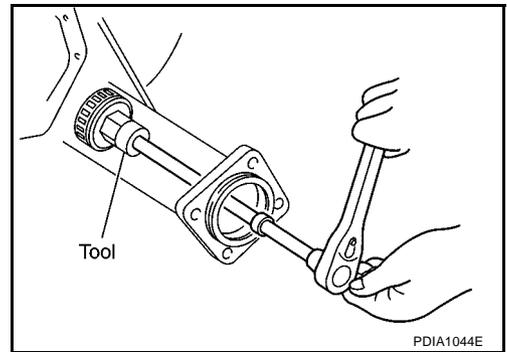
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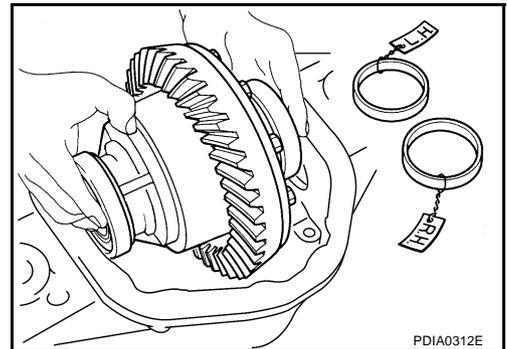
REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

6. Loosen side bearing adjusters using Tool.

Tool number : KV38108800

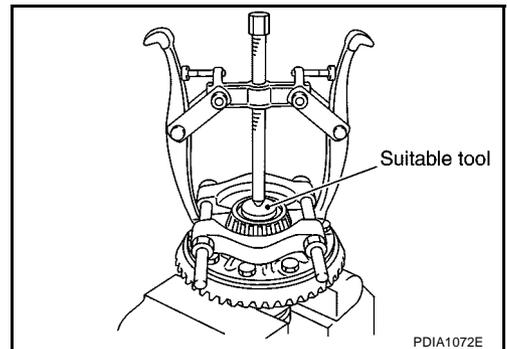


7. Keep side bearing outer races together with inner races. Do not mix them up. Also, keep side bearing adjusters together with bearing.
8. Remove side bearing adjusters from axle housing.



9. Remove side bearing inner races using suitable tools.

CAUTION:
Be careful not to damage differential case assembly.

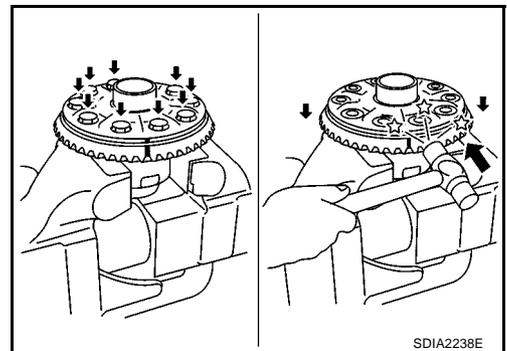


10. For proper reinstallation, paint matching mark on differential case assembly and drive gear.

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

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

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

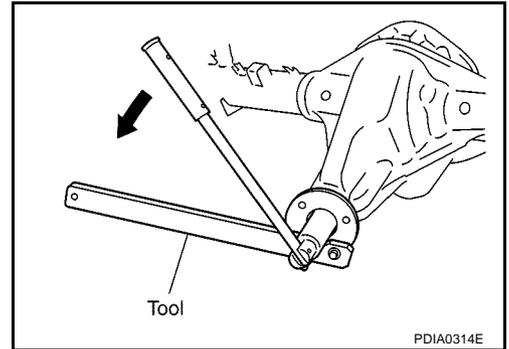


REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

Drive Pinion Assembly

1. Remove differential case assembly. Refer to [RFD-19, "Differential Assembly"](#).
2. Remove drive pinion lock nut and washer using Tool.

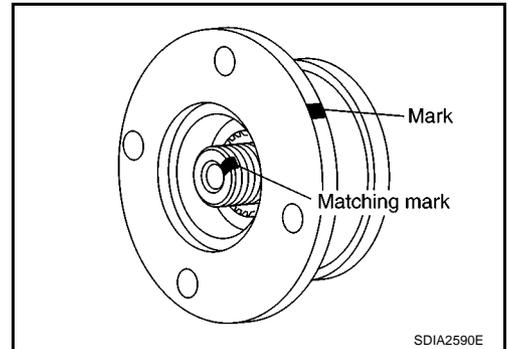
Tool number : KV40104000



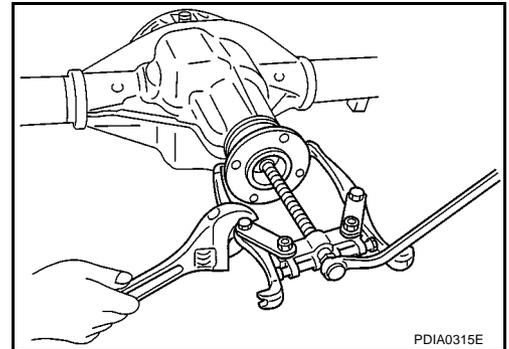
3. Put a matching mark on the thread edge of drive pinion. The mark should be in line with the mark on companion flange.

CAUTION:

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



4. Remove companion flange using suitable tool.



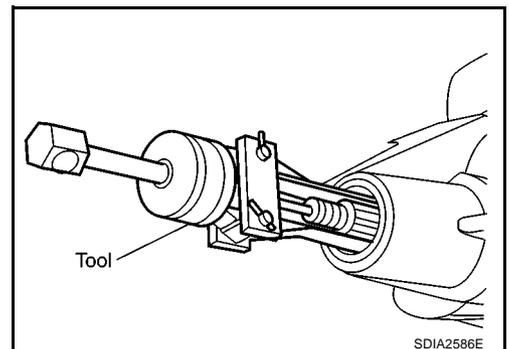
5. Remove front oil seal using Tool.

Tool number : KV381054S0

CAUTION:

Be careful not to damage axle housing.

6. Remove front bearing thrust washer.



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REAR FINAL DRIVE ASSEMBLY

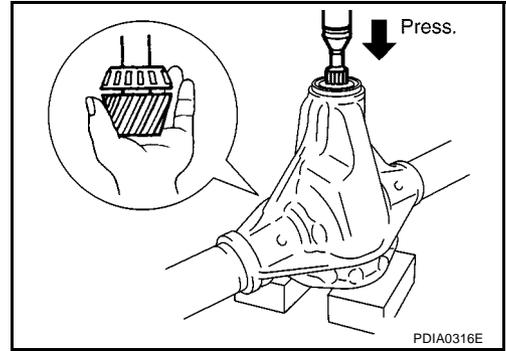
[WITH LIMITED SLIP DIFFERENTIAL]

7. Press the drive pinion assembly and collapsible spacer from axle housing.

CAUTION:

Do not drop drive pinion assembly.

8. Remove drive pinion front bearing inner race from axle housing.



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

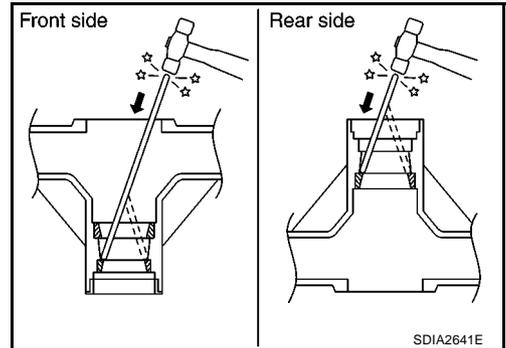
CAUTION:

Be careful not to damage axle housing.

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

CAUTION:

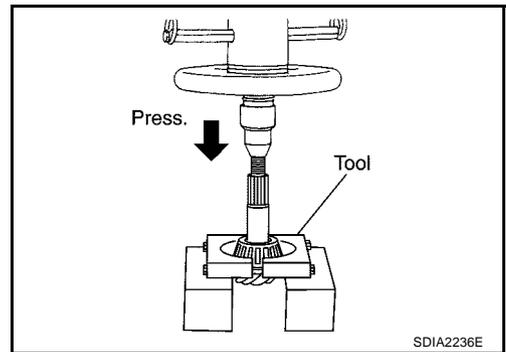
Be careful not to damage axle housing.



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

Tool number : ST30021000

12. Remove the breather.



INSPECTION AFTER DISASSEMBLY

Drive Gear and Drive Pinion

- If the gear teeth do not mesh or line-up correctly, determine the cause and adjust, repair, or replace as necessary.
- If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new gears.
- 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.

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.

Differential Case Assembly

- If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new differential case assembly.

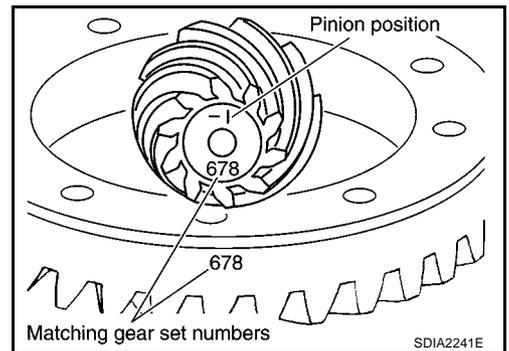
REAR FINAL DRIVE ASSEMBLY

[WITH LIMITED SLIP DIFFERENTIAL]

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 hypoid 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 M226 final drive 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 hypoid gear set. This dimension is controlled by a selective drive pinion height adjusting washer between drive pinion rear bearing inner 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 a m-8 (-3) etching indicated.
- To change drive pinion adjustment, use different drive pinion height adjusting washer 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.

Unit: mm (in)

OLD DRIVE PINION MARKING	NEW DRIVE PINION MARKING								
	-10 (-4)	-8 (-3)	-5 (-2)	-3 (-1)	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	+0.10 (+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)

REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

ASSEMBLY

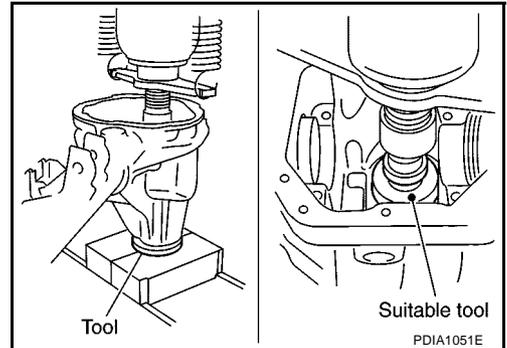
Drive Pinion Assembly

1. Install the breather and then tighten to the specified torque. Refer to [RFD-15, "COMPONENTS"](#).
2. Press a drive pinion rear bearing outer race into axle housing using suitable tool and Tool.

Tool number : ST30022000

CAUTION:

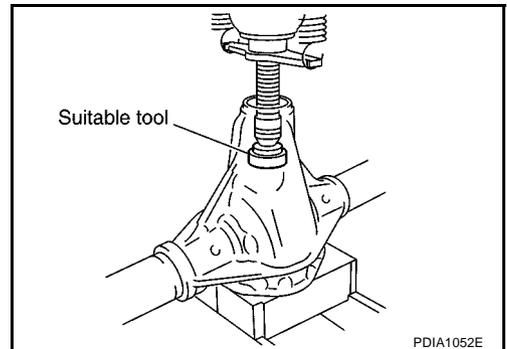
Do not reuse drive pinion rear bearing.



3. Press drive pinion front bearing outer race into axle housing using suitable tool.

CAUTION:

Do not reuse drive pinion front bearing.



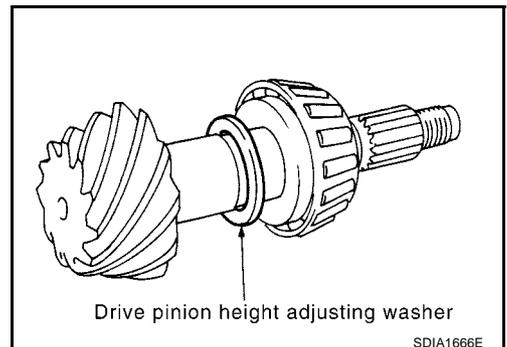
4. Temporarily install drive pinion height adjusting washer.

When hypoid gear set has been replaced

- Select drive pinion height adjusting washer. Refer to [RFD-23, "Drive Pinion Height Adjusting Washer"](#).

When hypoid gear set has been reused

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



5. Install selected drive pinion height adjusting washer to drive pinion, and press-fit drive pinion rear bearing inner race in it, using a press and suitable tool.

CAUTION:

Do not reuse drive pinion rear bearing.

6. Apply gear oil to drive pinion rear bearing and drive pinion front bearing.
7. Install drive pinion front bearing inner race in axle housing.

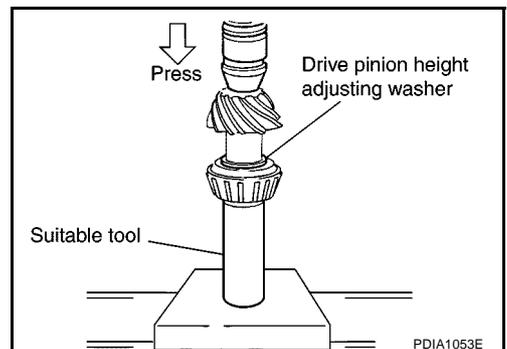
CAUTION:

Do not reuse drive pinion front bearing.

8. Install front bearing thrust washer to axle housing.
9. Perform checking and adjusting the tooth contact and backlash of the hypoid gear following the procedure below.
- a. Assemble the drive pinion assembly to the axle housing.

CAUTION:

Do not assemble a collapsible spacer.

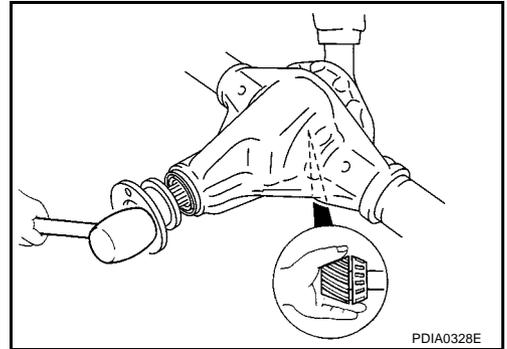


REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

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

CAUTION:

Do not assemble a front oil seal.



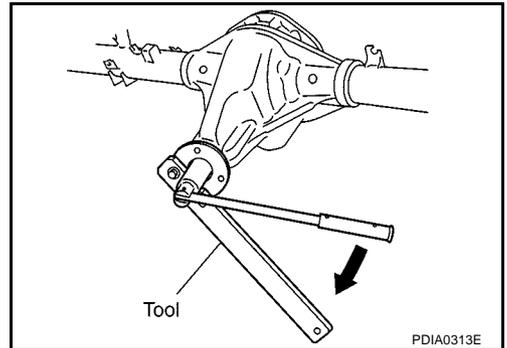
- c. Temporarily tighten removed drive pinion lock nut and washer to drive pinion.

Tool number : KV40104000

NOTE:

Use removed drive pinion lock nut and washer only for the pre-load measurement.

- d. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.



- e. Tighten to drive pinion lock nut, while adjust pinion bearing pre-load torque.

Tool number : ST3127S000

Drive pinion lock nut tightening torque:

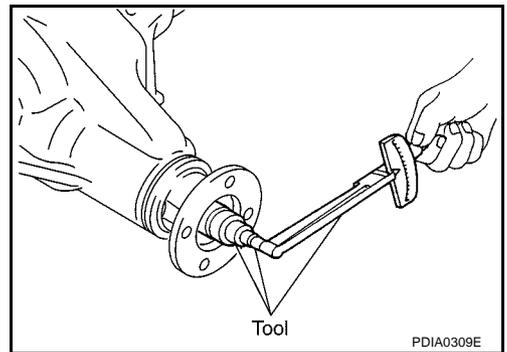
298 - 678 N-m (31 - 69 kg-m, 220 - 500 ft-lb)

Pinion bearing preload:

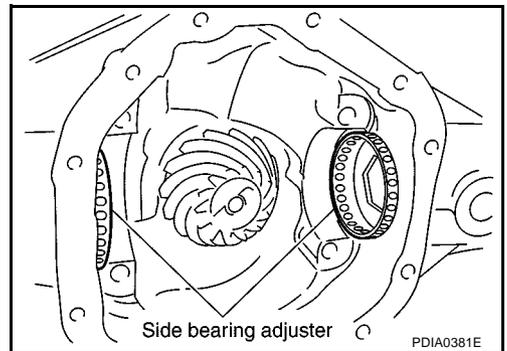
1.7 - 3.1 N-m (0.18 - 0.31 kg-m, 15 - 27 in-lb)

CAUTION:

- Adjust to the lower limit of the drive pinion lock nut tightening torque first.
- Drive pinion lock nut is tightened with no collapsible spacer. Be careful not to overtighten it. While measuring the preload, tighten it by 5° to 10°.
- After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction and other malfunctions.



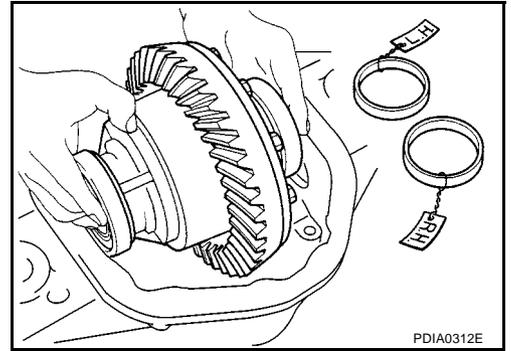
- f. Install side bearing adjusters into axle housing.



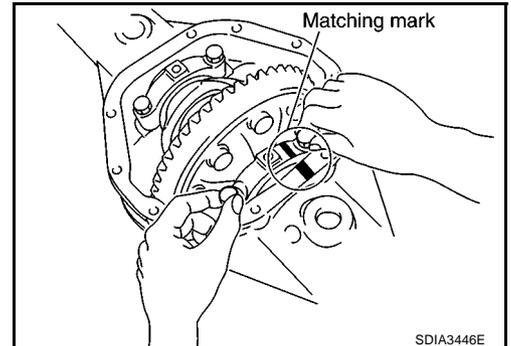
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REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

- g. Apply gear oil to side bearings. Install differential case assembly with side bearing outer races into axle housing.

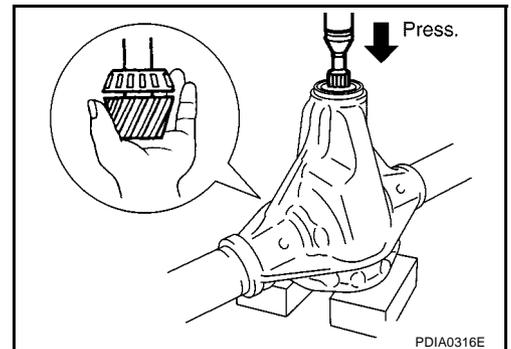


- h. Align paint matching mark on side bearing cap with that on axle housing and install side bearing caps on axle housing.
- Do not tighten at this point. This allows further tightening of side bearing adjusters.
- i. Check and adjust the backlash and tooth contact. Refer to [RFD-17, "Backlash"](#) and [RFD-16, "Tooth Contact"](#).
- j. Remove side bearing caps.
- k. Remove differential case assembly.
- l. Remove companion flange.



- m. Press the drive pinion assembly from axle housing.

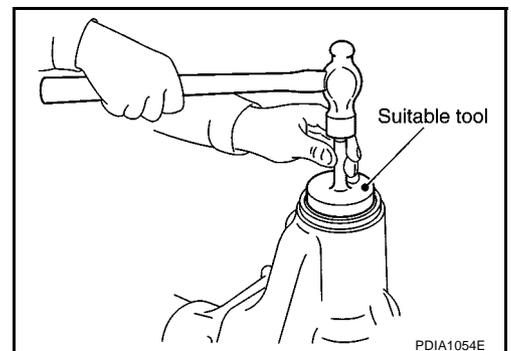
CAUTION:
Do not drop drive pinion assembly.



10. Install front oil seal into axle housing using suitable tool.

CAUTION:

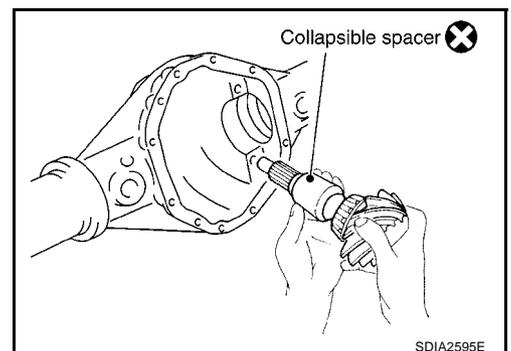
- Do not reuse oil seal.
- Do not incline oil seal when installing.
- Apply multi-purpose grease onto oil seal lip, and gear oil onto the circumference of oil seal.



11. Install collapsible spacer to drive pinion. And then install drive pinion assembly in axle housing.

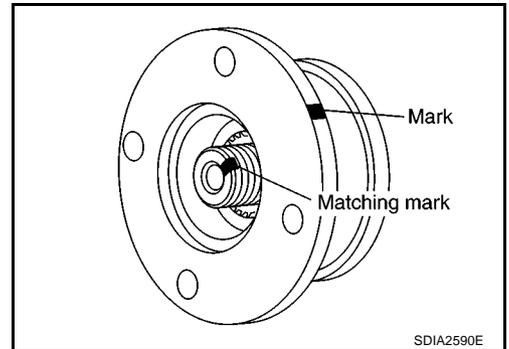
CAUTION:

- Do not reuse collapsible spacer.
- Be careful not to damage front oil seal.



REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

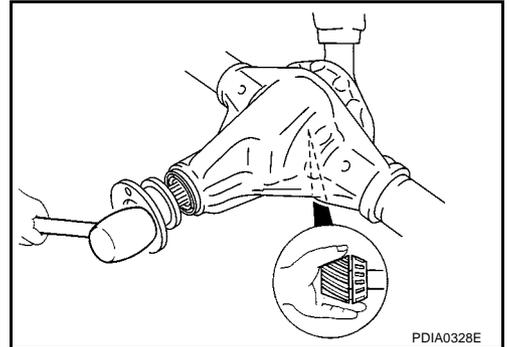
12. Align the matching mark of the drive pinion with the mark of the companion flange, then install the companion flange.



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

CAUTION:

Be careful not to damage companion flange and front oil seal.



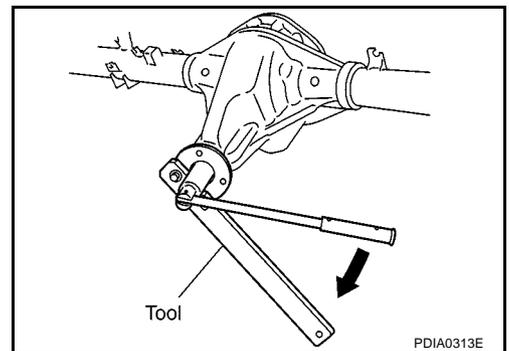
14. Apply anti-corrosive oil to the thread and seat of drive pinion lock nut, and temporarily tighten drive pinion lock nut and washer to drive pinion.

Tool number : KV40104000

CAUTION:

Do not reuse drive pinion lock nut and washer.

15. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.



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

Tool number : ST3127S000

Drive pinion lock nut tightening torque:

298 - 678 N-m (31 - 69 kg-m, 220 - 500 ft-lb)

Pinion bearing preload:

1.7 - 3.1 N-m (0.18 - 0.31 kg-m, 15 - 27 in-lb)

CAUTION:

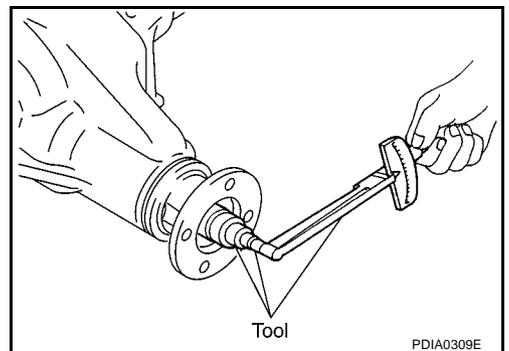
- Adjust the lower limit of the drive pinion lock nut tightening torque first.
- If the preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Never loosen drive pinion lock nut to adjust the preload torque.
- After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.

17. Install differential case assembly. Refer to [RFD-28, "Differential Assembly"](#) .

CAUTION:

Do not install carrier cover yet.

18. Check and adjust backlash, tooth contact and companion flange runout. Refer to [RFD-17, "Backlash"](#) , [RFD-16, "Tooth Contact"](#) and [RFD-18, "Companion Flange Runout"](#) . Recheck above items. Readjust the above description, if necessary.

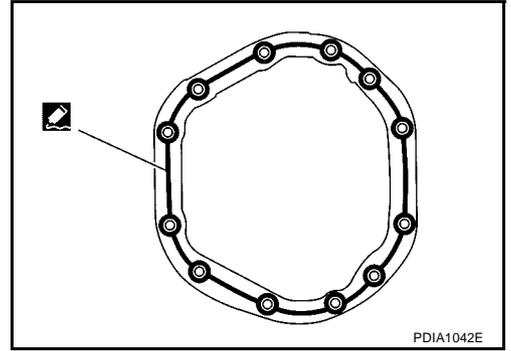


REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

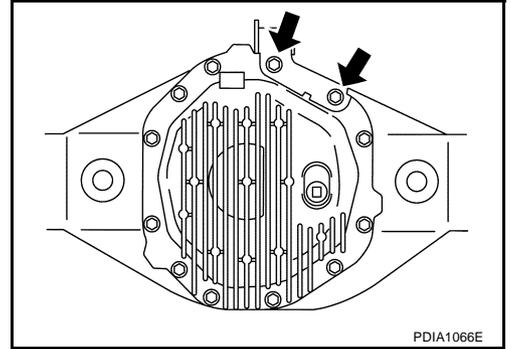
19. Check total preload torque. Refer to [RFD-16, "Total Preload Torque"](#) .
20. Apply sealant to mating surface of carrier cover. Refer to [RFD-15, "COMPONENTS"](#) .

CAUTION:

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



21. Install carrier cover and bracket on axle housing. Then tighten carrier cover bolts to the specified torque. Refer to [RFD-15, "COMPONENTS"](#) .

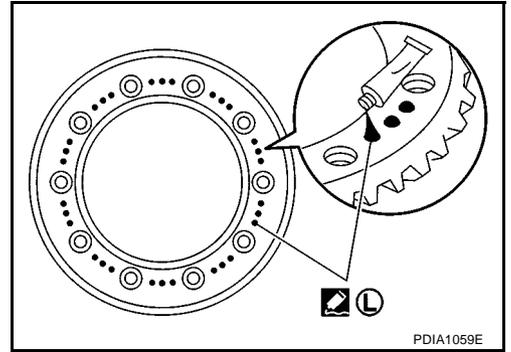


Differential Assembly

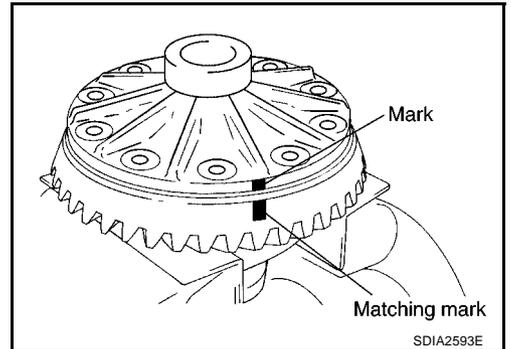
1. Apply sealant to back face of drive gear. Refer to [RFD-15, "COMPONENTS"](#) .

CAUTION:

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



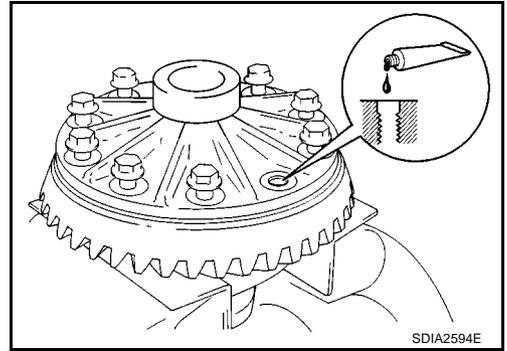
2. Align the matching mark of differential case assembly with the mark of drive gear, then install drive gear.



REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

3. Apply thread locking sealant into the thread hole of drive gear. Refer to [RFD-15, "COMPONENTS"](#).

CAUTION:
Make sure threaded holes are clean.

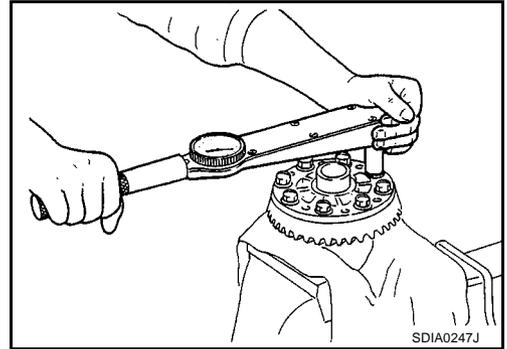


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4. Install the drive gear bolts, and then tighten to the specified torque. Refer to [RFD-15, "COMPONENTS"](#).

CAUTION:

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



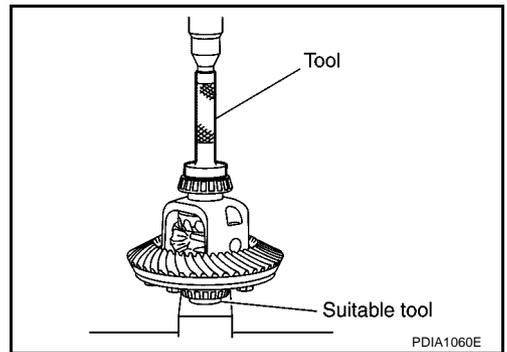
RFD

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

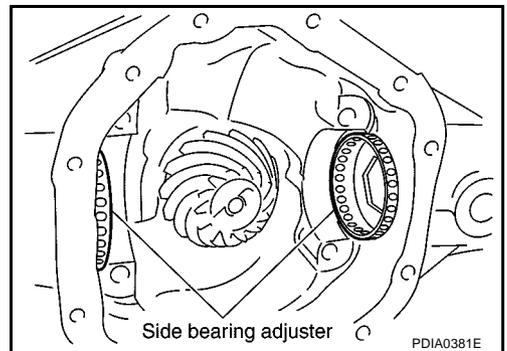
Tool number : KV38100300

CAUTION:
Do not reuse side bearings.



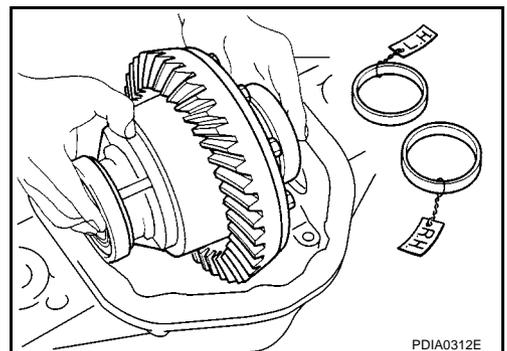
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6. Install side bearing adjusters into axle housing.



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7. Apply gear oil to side bearings. Install differential case assembly with side bearing outer races into axle housing.

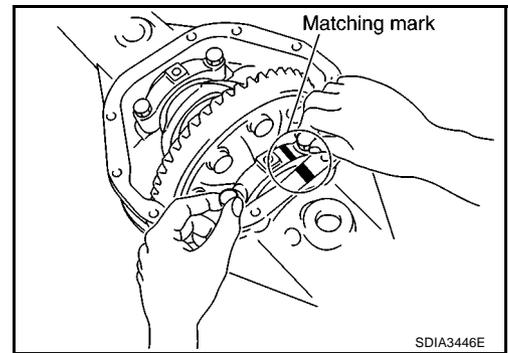


REAR FINAL DRIVE ASSEMBLY [WITH LIMITED SLIP DIFFERENTIAL]

8. Align paint matching mark on side bearing cap with that on axle housing and install side bearing caps on axle housing.

CAUTION:

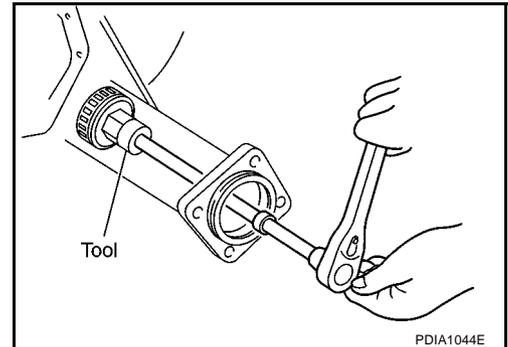
Do not tighten at this point. This allows further tightening of side bearing adjusters.



9. Tighten each side bearing adjusters using Tool.

Tool number : KV38108800

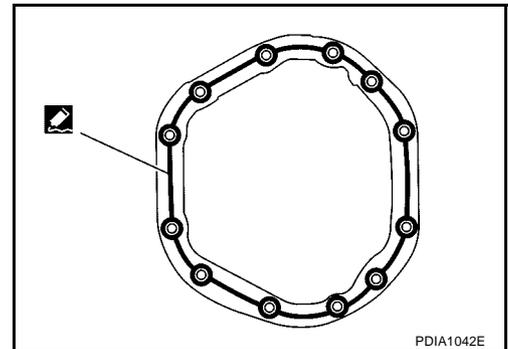
10. Adjust backlash of drive gear and drive pinion. Refer to [RFD-17, "Backlash"](#) .
11. Check tooth contact. Refer to [RFD-16, "Tooth Contact"](#) .
12. Check total preload. Refer to [RFD-16, "Total Preload Torque"](#) .



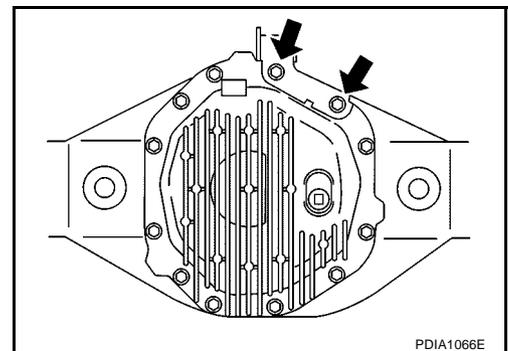
13. Apply sealant to mating surface of carrier cover. Refer to [RFD-15, "COMPONENTS"](#) .

CAUTION:

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



14. Install carrier cover and bracket on axle housing. Then tighten carrier cover bolts to the specified torque. Refer to [RFD-15, "COMPONENTS"](#) .



SERVICE DATA AND SPECIFICATIONS (SDS) [WITH LIMITED SLIP DIFFERENTIAL]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EDS0039A

Applied model	YD25DDTi				
	2WD		4WD		
	6M/T	5A/T	6M/T		5A/T
Grade	SE, XE	SE	SE, XE*	XE	SE
Final drive model	M226				
Gear ratio	3.538	3.357	3.692	3.538	
Number of pinion gears	2				
Number of teeth (Drive gear / drive pinion)	46/13	47/14	48/13	46/13	
Oil capacity (Approx.) ℓ (Imp pt)	2.01 (3-1/2)				
Drive pinion adjustment spacer type	Collapsible				

*: Option

Inspection and Adjustment PRELOAD TORQUE

EDS0039B

Unit: N·m (kg·m, in·lb)

Item	Specification		
	Gear ratio 3.357 type	Gear ratio 3.538 type	Gear ratio 3.692 type
Total preload	2.38 - 4.46 (0.25 - 0.45, 21 - 39)	2.34 - 4.34 (0.24 - 0.44, 21 - 38)	2.32 - 4.34 (0.24 - 0.44, 21 - 38)
Pinion bearing preload	1.7 - 3.1 (0.18 - 0.31, 15 - 27)		

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
Inner side of companion flange	0.13 (0.0051) or less

SERVICE DATA AND SPECIFICATIONS (SDS)
[WITH LIMITED SLIP DIFFERENTIAL]

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.

PRECAUTIONS

[WITH ELECTRONIC LOCKING DIFFERENTIAL]

PRECAUTIONS

PFP:00001

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

EDS0031E

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. 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

EDS003AG

- 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 (4 MPH) 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	7 km/h (4 MPH) < VSS	Disengage	Flash
		VSS ≤ 7 km/h (4 MPH)		
	ON	7 km/h (4 MPH) < VSS	Disengage → Engage	Flash → ON
		VSS ≤ 7 km/h (4 MPH)		
OFF	OFF	7 km/h (4 MPH) < VSS	Disengage	OFF
		VSS ≤ 7 km/h (4 MPH)		
	ON	7 km/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-34, "METHOD FOR ADJUSTMENT"](#) .

PRECAUTIONS

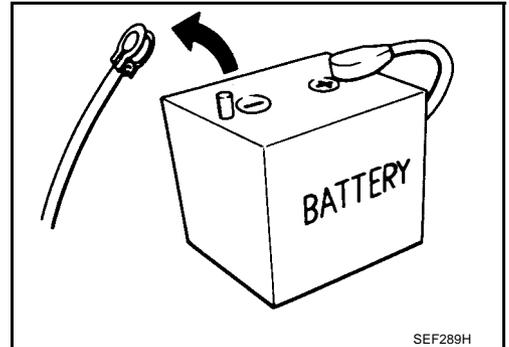
[WITH ELECTRONIC LOCKING DIFFERENTIAL]

METHOD FOR ADJUSTMENT

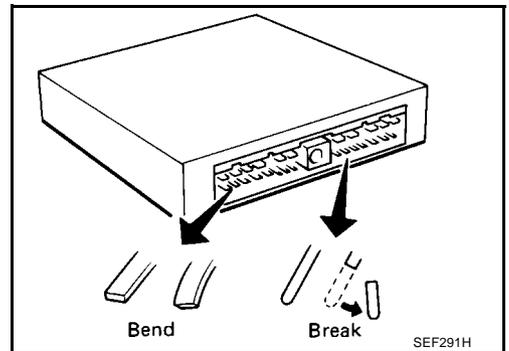
1. Perform erase self-diagnosis with differential lock control unit. Refer to [RFD-52, "How to Erase Self-diagnostic Results"](#) .
2. Check differential lock control unit input/output signal. Refer to [RFD-48, "Differential Lock Control Unit Input/Output Signal Reference Values"](#) .
3. Check DIFF LOCK indicator lamp. Refer to [RFD-33, "CHECK 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

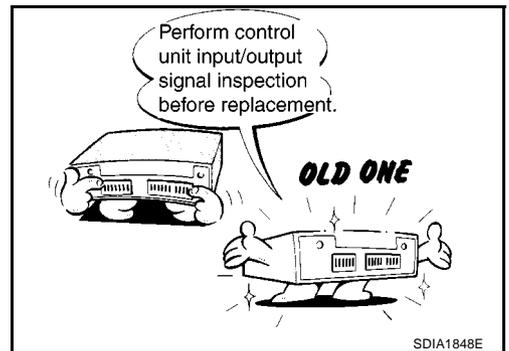
- Before connecting or disconnecting differential lock control unit harness connector, turn ignition switch "OFF" and disconnect the battery cables. Because battery voltage is applied to differential lock control unit even if ignition switch is turned "OFF".



- 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.



- 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-48, "Differential Lock Control Unit Input/Output Signal Reference Values"](#) .



PRECAUTIONS

[WITH ELECTRONIC LOCKING DIFFERENTIAL]

Service Notice or Precaution

EDS003AI

- 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.
- Be careful not to damage sliding surfaces and mating surfaces.
- When applying sealant, remove the old sealant from the mounting surface; then remove any moisture, oil, and foreign materials from the application and mounting surfaces.
- Always use shop paper for cleaning the inside of components.
- Avoid using cotton gloves or shop rags to prevent entering of lint.
- During assembly, observe the specified tightening torque, and apply new differential gear oil, petroleum jelly, or multi-purpose grease as specified for each vehicle, if necessary.

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Wiring Diagrams and Trouble Diagnosis

EDS003AJ

When reading wiring diagrams, refer to the following:

- [GI-15, "How to Read Wiring Diagrams"](#).
- [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#).

When performing trouble diagnosis, refer to the following:

- [GI-11, "How to Follow Trouble Diagnoses"](#).
- [GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident"](#).

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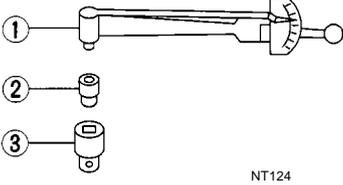
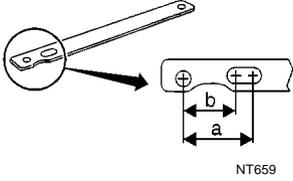
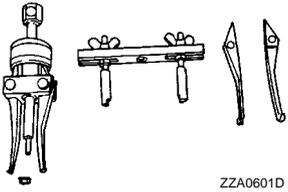
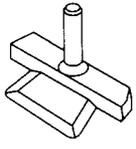
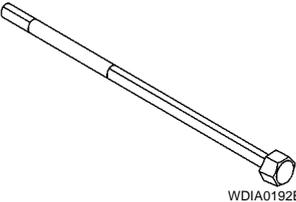
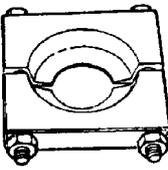
PREPARATION [WITH ELECTRONIC LOCKING DIFFERENTIAL]

PREPARATION

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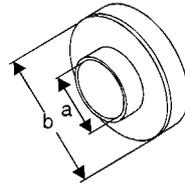
Special Service Tools

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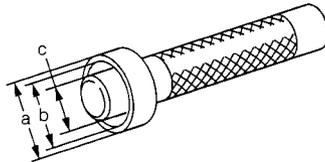
Tool number Tool name	Description
ST3127S000 Preload gauge set 1. GG91030000 Torque wrench 2. HT62940000 (1/2") Socket adapter 3. HT62900000 (3/8") Socket adapter	 Inspecting pinion bearing preload and total preload
KV40104000 Flange wrench a: 85 mm (3.35 in) dia. b: 65 mm (2.56 in) dia.	 Removing and installing drive pinion lock nut
KV381054S0 Puller	 Removing front oil seal
KV10111100 Seal cutter	 Removing carrier cover
KV38108800 Adjuster tool	 Removing and installing side bearing adjuster
ST30021000 Puller	 Removing drive pinion rear bearing inner race

PREPARATION [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Tool number Tool name	Description
ST30022000 Drift a: 46 mm (1.81 in) dia. b: 110 mm (4.33 in) dia.	Installing drive pinion rear bearing outer race
KV38100300 Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32mm (1.26 in) dia.	Installing side bearing inner race



NT660



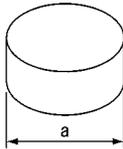
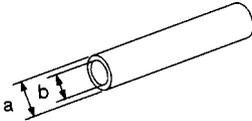
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Commercial Service Tools

EDS003AL

Tool name	Description
Puller	<ul style="list-style-type: none"> ● Removing companion flange ● Removing side bearing inner race
Drift a: 96mm (3.77 in) dia. b: 84 mm (3.30 in) dia.	Installing front oil seal
Adapter a: 43 mm (1.69 in) dia.	Removing and installing side bearing inner race
Puller	Removing side bearing inner race
Drift a: 89mm (3.50 in) dia. b: 79 mm (3.11 in) dia.	Installing drive pinion rear bearing outer race

PREPARATION [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Tool name	Description
<p>Drift a: 67 mm (2.63 in) dia.</p>  <p>PDIA0893E</p>	Installing drive pinion front bearing outer race
<p>Installer a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia.</p>  <p>NT065</p>	Installing drive pinion rear bearing inner race

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING [WITH ELECTRONIC LOCKING DIFFERENTIAL]

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

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NVH Troubleshooting Chart

EDS003AM

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

Symptom	Noise	Possible cause and SUSPECTED PARTS	Reference page
	×	Gear tooth rough	RFD-90, "INSPECTION AFTER DISASSEMBLY"
	×	Gear contact improper	RFD-83, "Tooth Contact"
	×	Tooth surfaces worn	RFD-90, "INSPECTION AFTER DISASSEMBLY"
	×	Backlash incorrect	RFD-84, "Backlash"
	×	Companion flange excessive runout	RFD-85, "Companion Flange Runout"
	×	Gear oil improper	RFD-40, "Checking Differential Gear Oil"
	×	PROPELLER SHAFT	PR-2, "NVH Troubleshooting Chart"
	×	AXLE AND SUSPENSION	RAX-5, "NVH Troubleshooting Chart", RSU-3, "NVH Troubleshooting Chart"
	×	TIRES	WT-2, "NVH Troubleshooting Chart"
	×	ROAD WHEEL	
	×	AXLE SHAFT	RAX-5, "NVH Troubleshooting Chart"
	×	BRAKES	BR-5, "NVH Troubleshooting Chart"
	×	STEERING	PS-5, "NVH Troubleshooting Chart"

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DIFFERENTIAL GEAR OIL [WITH ELECTRONIC LOCKING DIFFERENTIAL]

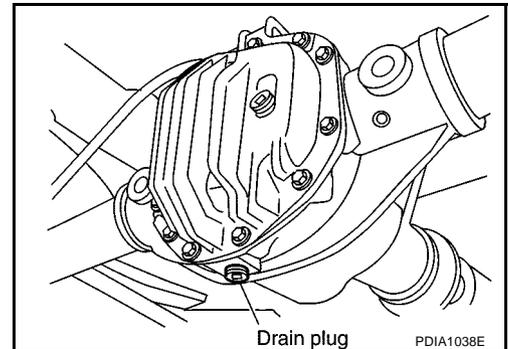
DIFFERENTIAL GEAR OIL

PFPP:KLD30

Changing Differential Gear Oil DRAINING

EDS003AN

1. Stop engine.
2. Remove drain plug and drain gear oil.
3. Apply sealant to drain plug. Install drain plug to final drive assembly and tighten to the specified torque. Refer to [RFD-82, "COMPONENTS"](#).



FILLING

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

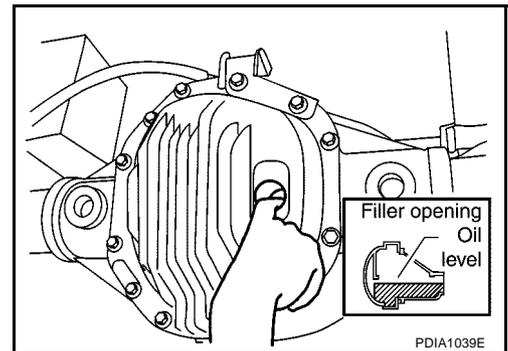
Oil grade and Viscosity:

Refer to [MA-14, "Fluids and Lubricants"](#).

Oil capacity:

Approx. 2.01 l (3-1/2pt)

2. After refilling oil, check oil level. Apply sealant to filler plug. Install filler plug to final drive assembly and tighten to the specified torque. Refer to [RFD-82, "COMPONENTS"](#).



Checking Differential Gear Oil OIL LEAKAGE AND OIL LEVEL

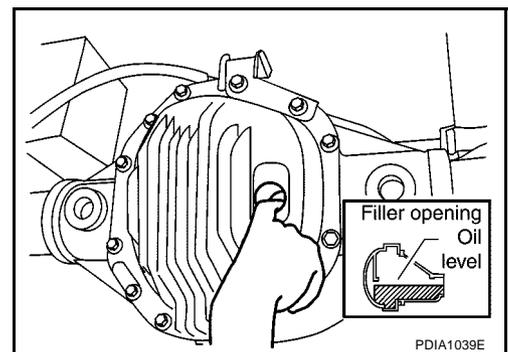
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1. Make sure that gear oil is not leaking from final drive assembly or around it.
2. Check oil level from filler plug hole as shown.

CAUTION:

Do not start engine while checking oil level.

3. Apply sealant to filler plug. Install filler plug to final drive assembly and tighten to the specified torque. Refer to [RFD-82, "COMPONENTS"](#).



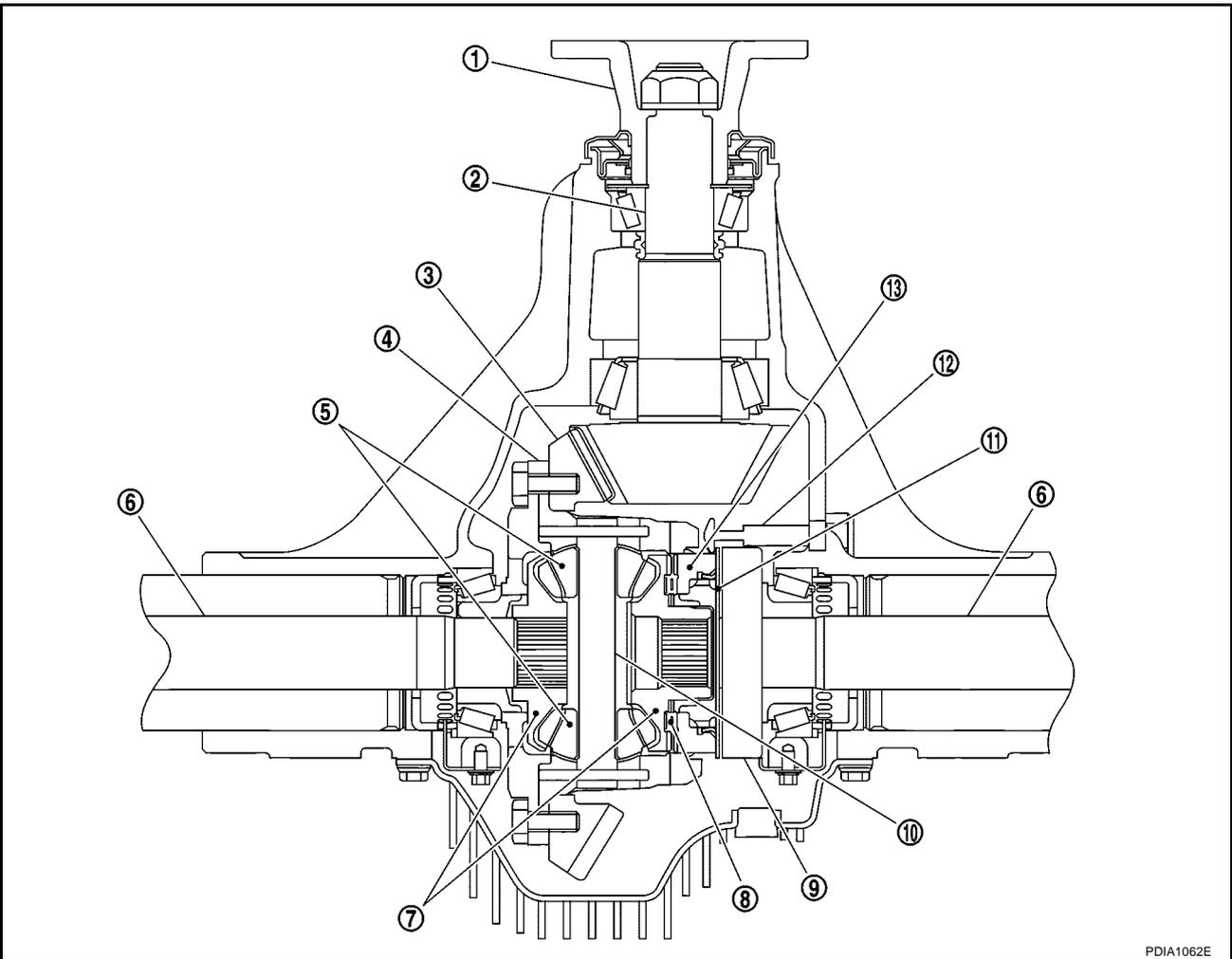
DIFFERENTIAL LOCK SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

DIFFERENTIAL LOCK SYSTEM

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Cross-sectional View

EDS003AP



PDIA1062E

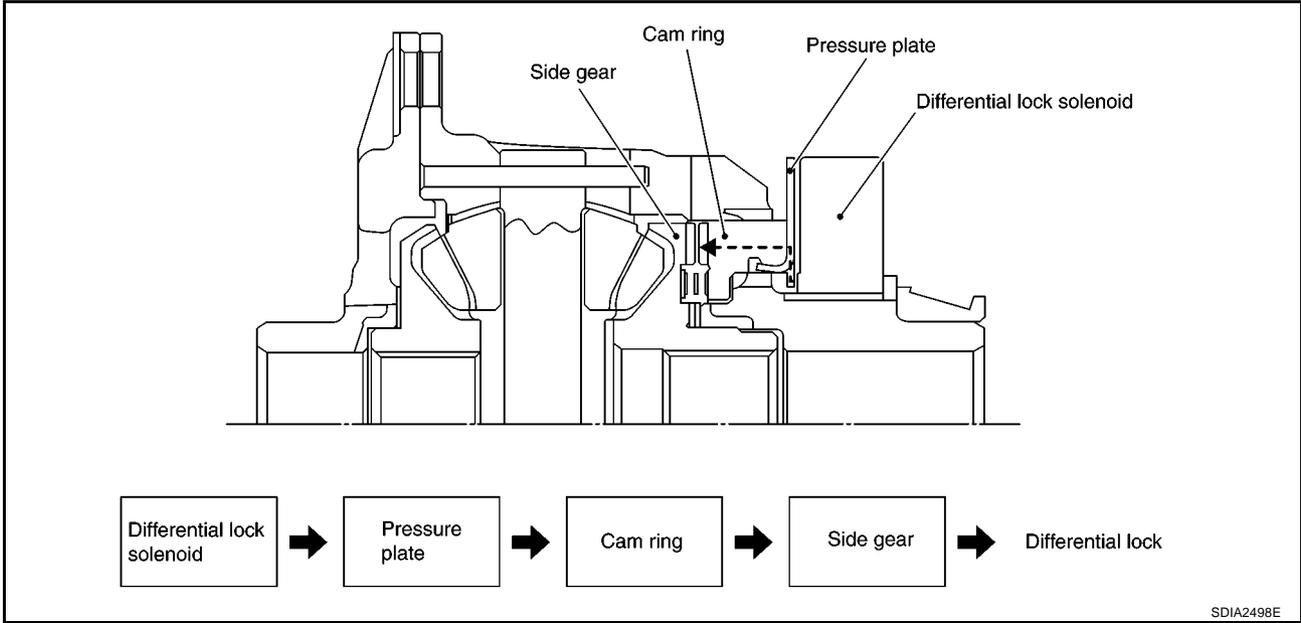
- | | | |
|-----------------------|---------------------|---------------------------------------|
| 1. Companion flange | 2. Drive pinion | 3. Drive gear |
| 4. Differential case | 5. Pinion mate gear | 6. Axle shaft |
| 7. Side gear | 8. Spring | 9. Differential lock solenoid |
| 10. Pinion mate shaft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

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DIFFERENTIAL LOCK SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Differential Lock Operation

EDS003AQ



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 DIFFERENTIAL LOCK SOLENOID

EDS003AR

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.

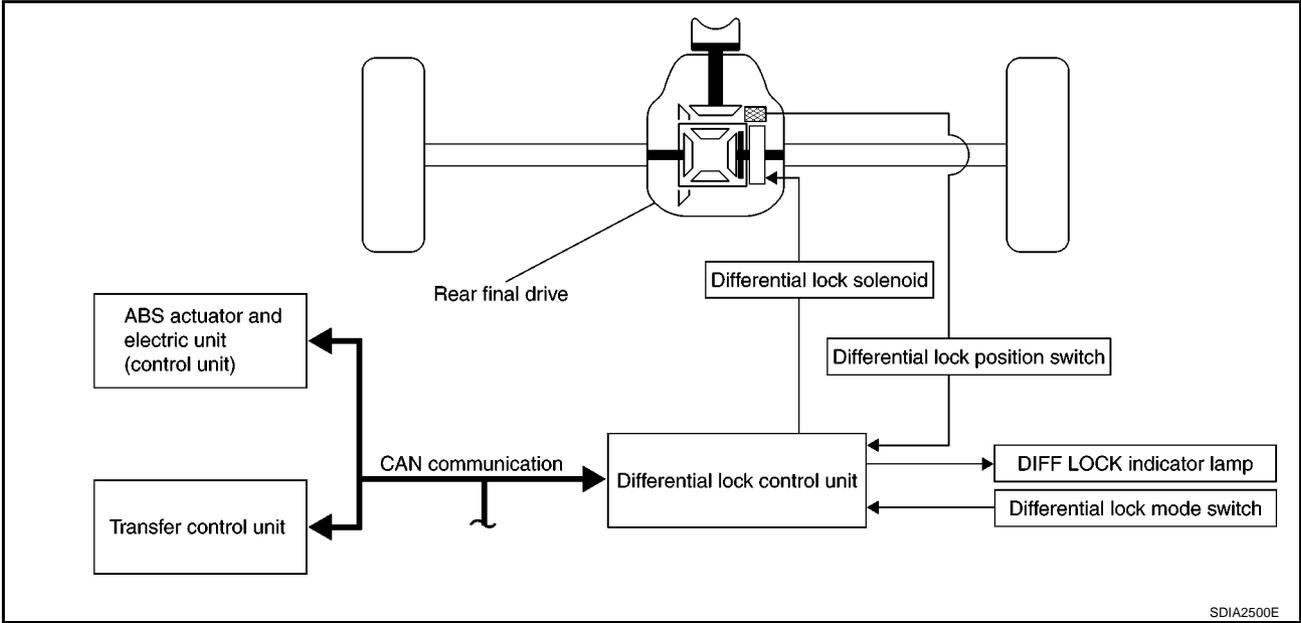
NOTE:

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

DIFFERENTIAL LOCK SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

System Diagram

EDS003AS



COMPONENTS FUNCTION DESCRIPTION

Component parts	Function
Differential lock control unit	<ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> Vehicle speed signal
Transfer control unit	Transmits the following signal via CAN communication to differential lock control unit. <ul style="list-style-type: none"> 4WD shift switch signal

CAN Communication SYSTEM DESCRIPTION

EDS003AT

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

For details, refer to [DI-65, "CAN Communication Unit"](#).

TROUBLE DIAGNOSIS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

TROUBLE DIAGNOSIS

PFP:00004

Fail-safe Function

EDS003AU

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

How to Perform Trouble Diagnosis

EDS003AV

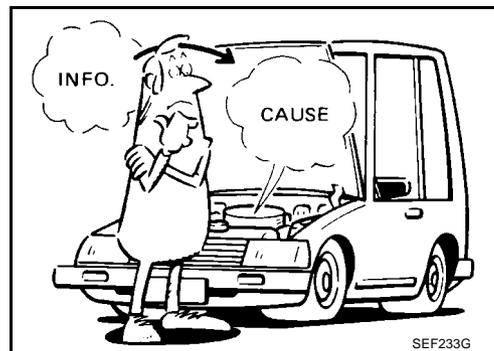
BASIC CONCEPT

- To perform trouble diagnosis, it is the most important to have understanding about vehicle systems (control and mechanism) thoroughly.
- It is also important to clarify customer complaints before inspection.

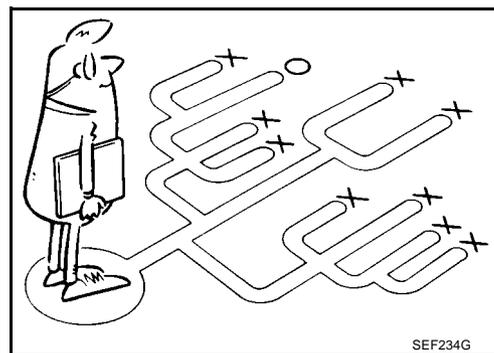
First of all, reproduce symptoms, and understand them fully. Ask customer about his/her complaints carefully. In some cases, it will be necessary to check symptoms by driving vehicle with customer.

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".



- 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-52. "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.

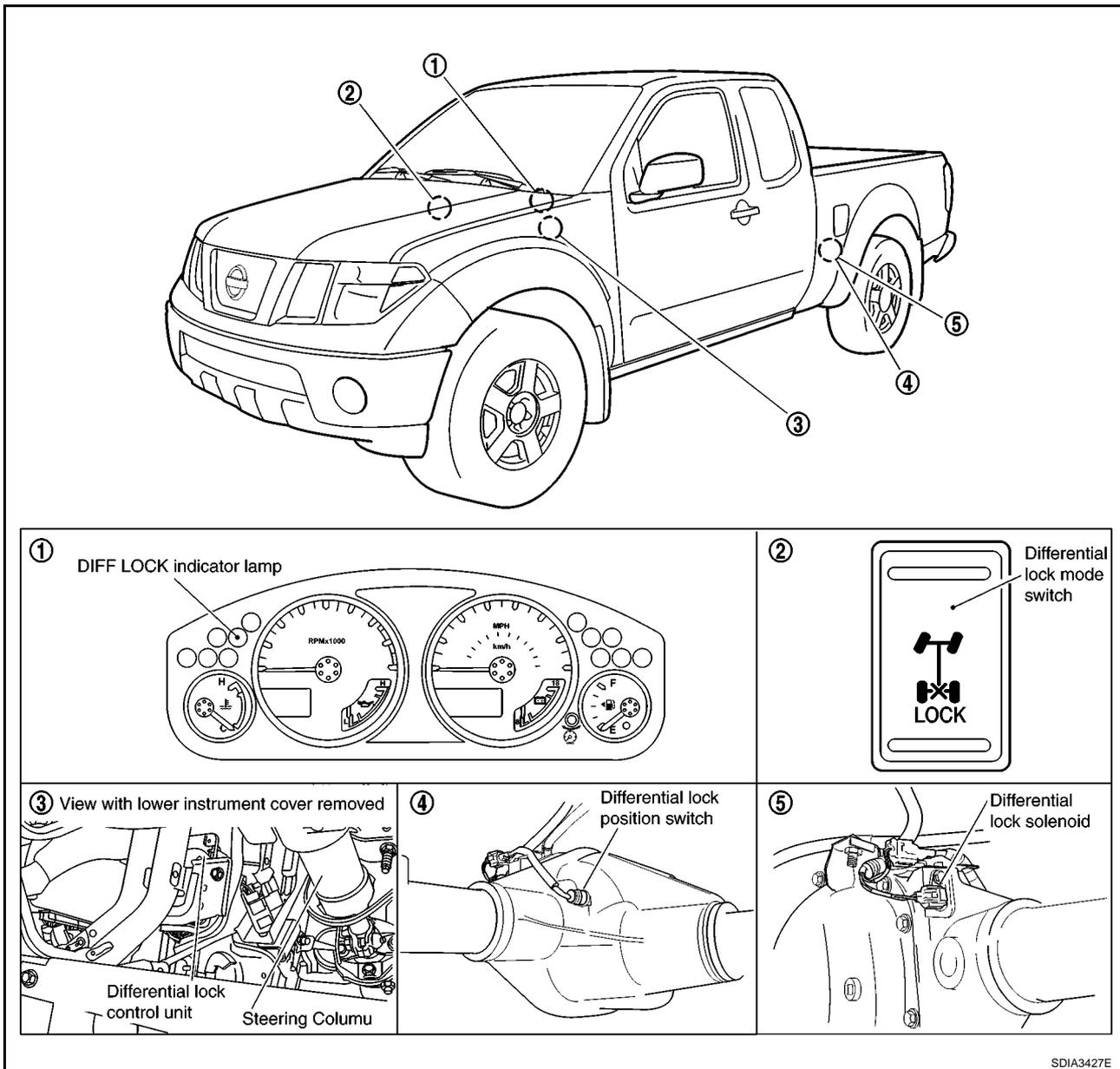


TROUBLE DIAGNOSIS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Location of Electrical Parts

EDS003AW

A
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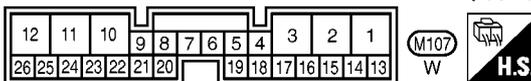
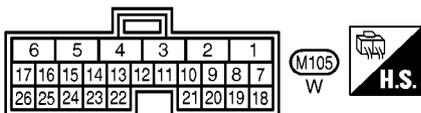
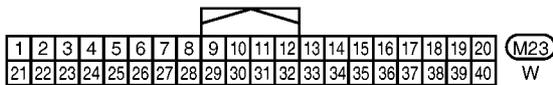
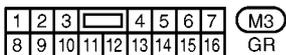
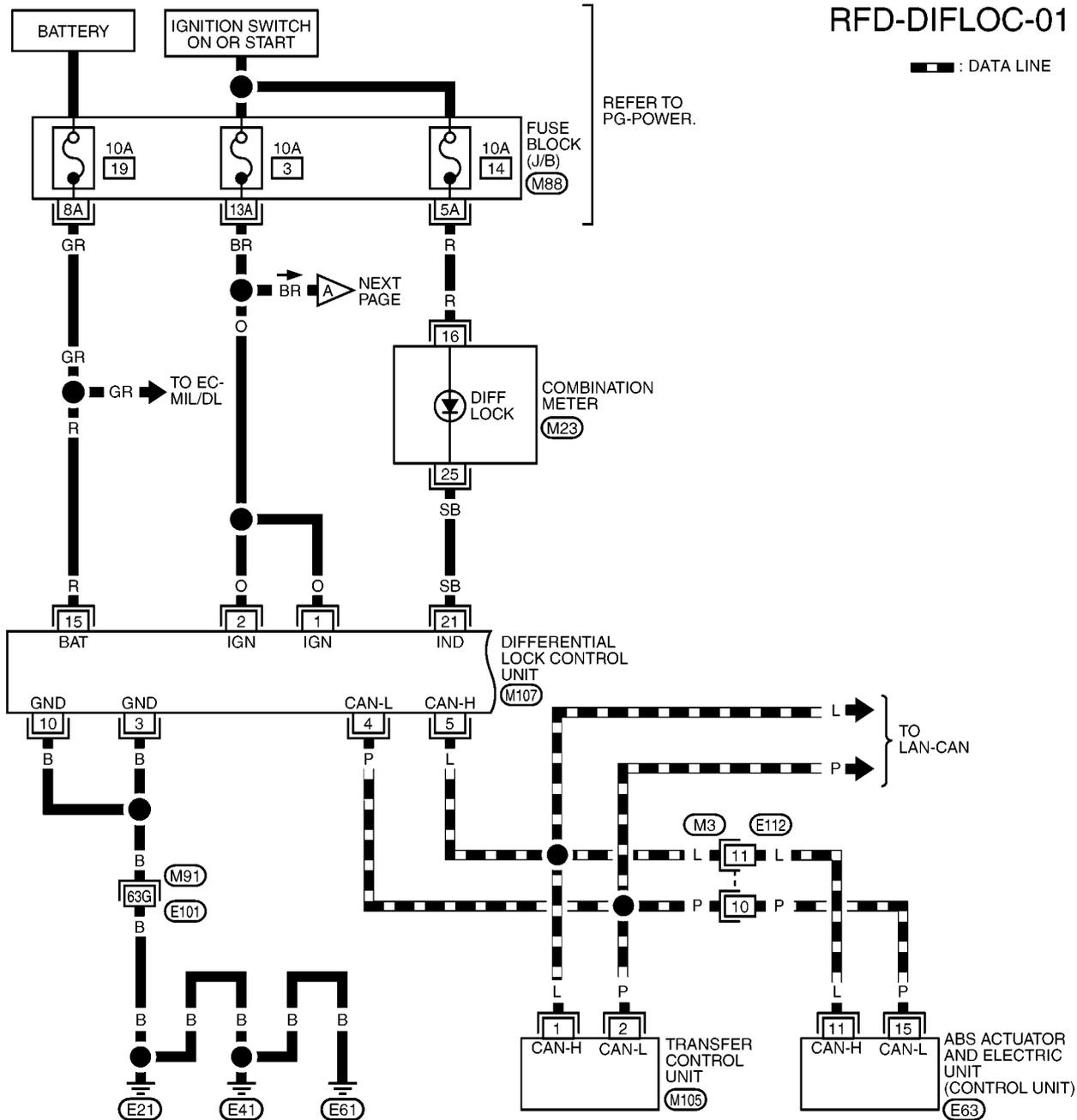
TROUBLE DIAGNOSIS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Wiring Diagram — DIFLOC —

EDS003AX

RFD-DIFLOC-01

▬ : DATA LINE



REFER TO THE FOLLOWING.

(M91) -SUPER MULTIPLE JUNCTION (SMJ)

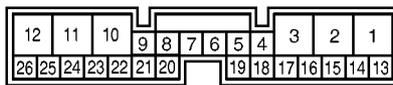
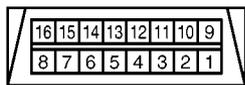
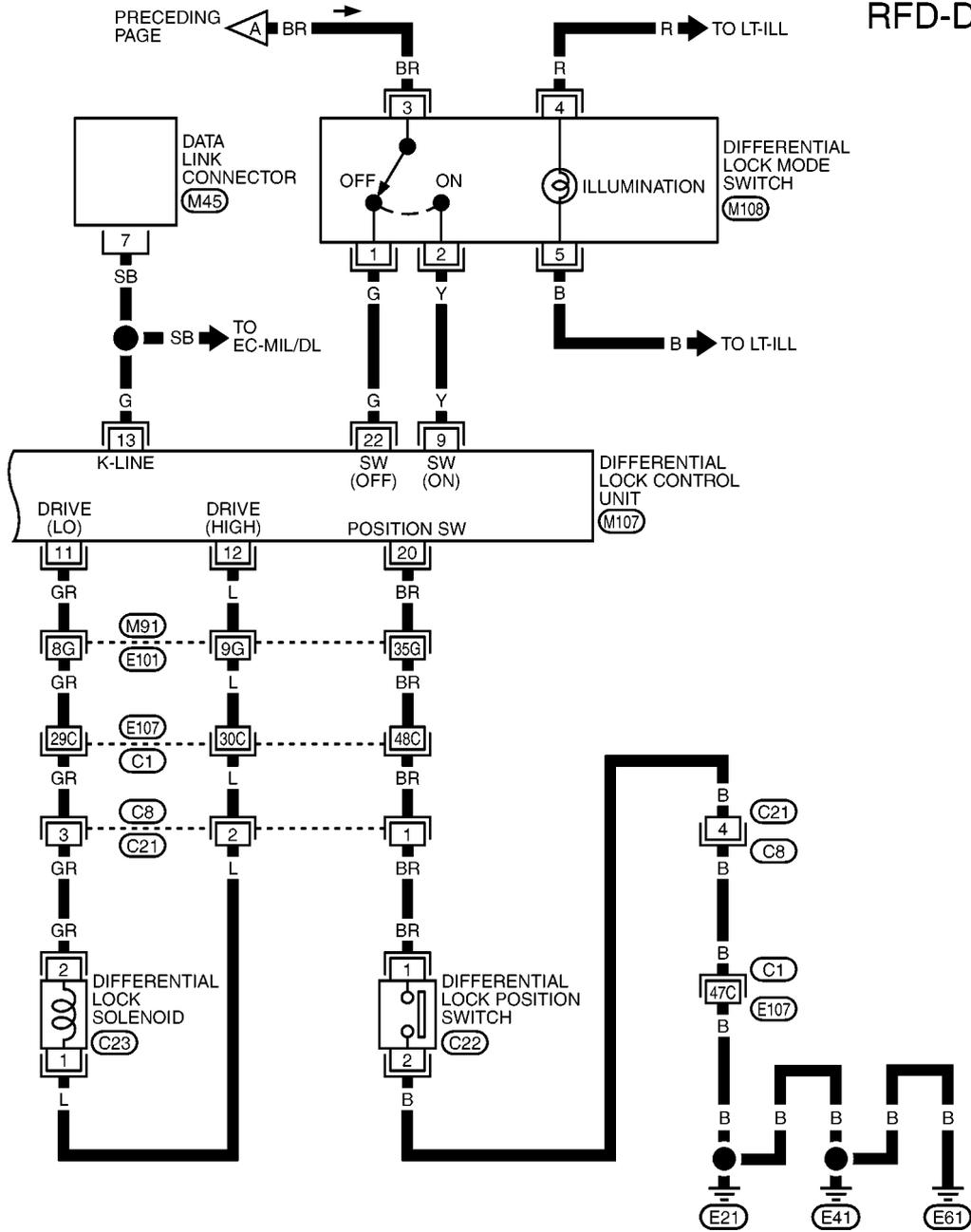
(E63) -ELECTRICAL UNIT

(M88) -FUSE BLOCK-JUNCTION BOX (J/B)

MDWA0065E

TROUBLE DIAGNOSIS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

RFD-DIFLOC-02



REFER TO THE FOLLOWING.
 (M91), (C1) -SUPER
 MULTIPLE JUNCTION (SMJ)



TROUBLE DIAGNOSIS

[WITH ELECTRONIC LOCKING DIFFERENTIAL]

Trouble Diagnosis Chart for Symptoms

EDS003AY

If DIFF LOCK indicator lamp does not turn ON after engine start, perform self-diagnosis. Refer to [RFD-51, "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-70
		Power supply and ground for differential lock control unit	
		Combination meter	
DIFF LOCK indicator lamp does not change.	<ul style="list-style-type: none"> ● Engine running ● Differential lock mode switch: ON 	Combination meter	RFD-73
		Differential lock mode switch	
		CAN communication line	
DIFF LOCK indicator lamp sometimes flashes.	<ul style="list-style-type: none"> ● Engine running ● Differential lock mode switch: ON 	Combination meter	RFD-74
		Differential lock mode switch	
		Differential lock position switch	
		Differential inner parts	

Differential Lock Control Unit Input/Output Signal Reference Values

DIFFERENTIAL LOCK CONTROL UNIT INSPECTION TABLE

EDS003AZ

Specifications with CONSULT-II

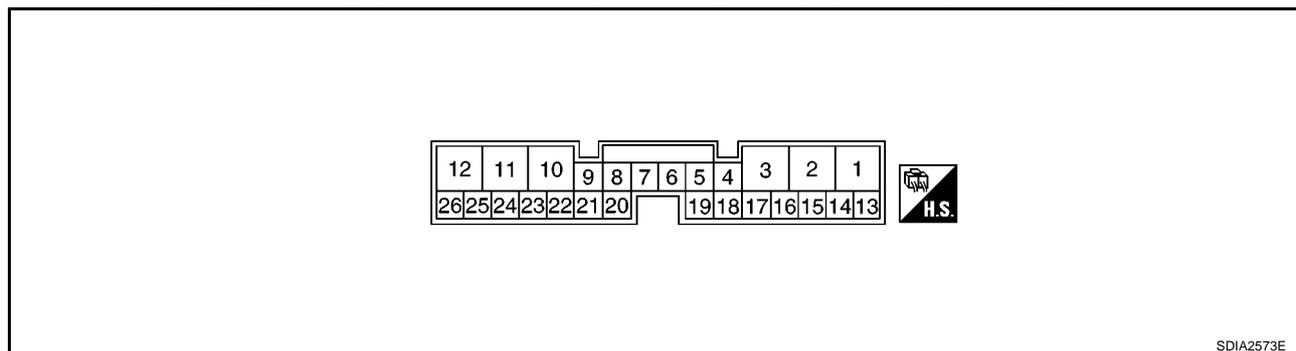
Monitor item [Unit]	Content	Condition	Display value
BATTERY VOLT [V]	Power supply voltage for differential lock control unit	Ignition switch: ON	Battery voltage
4WD MODE [2H/4H/4Lo]	Condition of 4WD shift switch	4WD shift switch (Engine running)	2WD 4H 4Lo
			2H
			4H
VHCL S/SEN-R [km/h] or [mph]	Wheel 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	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON ON
			Differential lock mode switch: OFF OFF

TROUBLE DIAGNOSIS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Monitor item [Unit]	Content	Condition		Display value
RELAY ON [ON/OFF]	Operating condition of differential lock solenoid relay (integrated in differential lock control unit)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 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)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 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	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 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	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 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



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

Terminal	Wire color	Item	Condition		Data (Approx.)
1	O	Power supply	Ignition switch: ON		Battery voltage
			Ignition switch: OFF		0V
2	O	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
10	B	Ground	Always		0V

TROUBLE DIAGNOSIS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Terminal	Wire color	Item	Condition	Data (Approx.)	
11	GR	Differential lock solenoid (-)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON	0V
				Differential lock mode switch: OFF	Battery voltage
12	L	Differential lock solenoid (+)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON	0V
				Differential lock mode switch: OFF	Battery voltage
13	G	K-LINE (CONSULT-II signal)	-	-	
15	R	Power supply (Memory back-up)	Ignition switch: ON		Battery voltage
			Ignition switch: OFF		Battery voltage
20	BR	Differential lock position switch	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 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) FUNCTION

EDS003B0

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

Diagnostic test mode	Function	Reference page
Self-diagnostic results	<ul style="list-style-type: none"> ● Self-diagnostic results can be read and erased quickly. 	RFD-51
Data monitor	<ul style="list-style-type: none"> ● Input/Output data in the differential lock control unit can be read. 	RFD-53
CAN diagnostic support monitor	<ul style="list-style-type: none"> ● The results of transmit/receive diagnosis of CAN communication can be read. 	LAN-15

CONSULT-II SETTING PROCEDURE

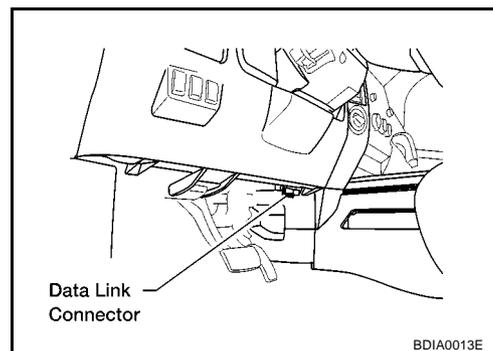
CAUTION:

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.

NOTE:

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

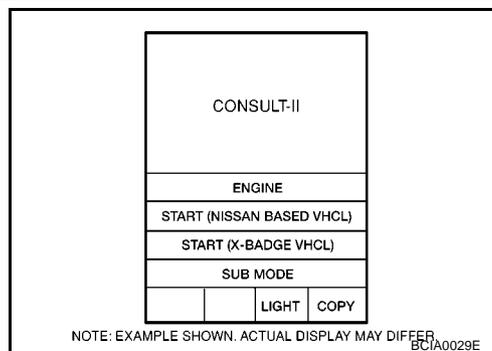
1. Turn ignition switch "OFF".
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector on vehicle.
3. Turn ignition switch "ON".



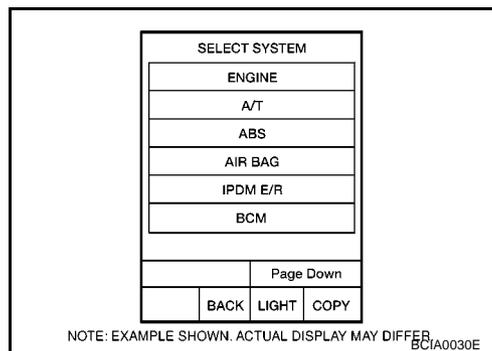
BDIA0013E

TROUBLE DIAGNOSIS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

4. Touch "START (NISSAN BASED VHCL)".



5. Touch "DIFF LOCK".
If "DIFF LOCK" is not indicated, go to [GI-50, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#) .
6. Perform each diagnostic test mode according to each service procedure.



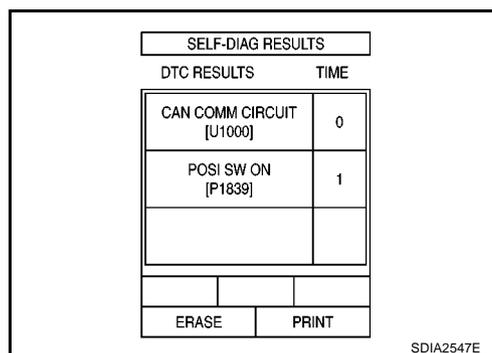
SELF-DIAG RESULTS MODE

Operation Procedure

- Perform "CONSULT-II SETTING PROCEDURE". Refer to [RFD-50, "CONSULT-II SETTING PROCEDURE"](#) .
- 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-54, "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-56, "Differential Lock Control Unit"
CONTROL UNIT 2 [P1835]	Malfunction is detected in the memory (ROM) system of differential lock control unit.	RFD-56, "Differential Lock Control Unit"
CONTROL UNIT 3 [P1836]	Malfunction is detected in the memory (EEPROM) system of differential lock control unit.	RFD-56, "Differential Lock Control Unit"
CONTROL UNIT 4 [P1837]	AD converter system of differential lock control unit is malfunctioning.	RFD-56, "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-56, "Differential Lock Mode Switch"

TROUBLE DIAGNOSIS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

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-60, "Differential Lock Position Switch"
RELAY [P1844]	Differential lock control unit detects as irregular by comparing target value with monitor value.	RFD-63, "Differential Lock Solenoid Relay" , RFD-64, "Differential Lock Solenoid"
SOL CIRCUIT [P1847]	Malfunction is detected in differential lock control unit internal circuit.	RFD-64, "Differential Lock Solenoid"
SOL DISCONNECT [P1848]	<ul style="list-style-type: none"> ● Differential lock solenoid internal circuit or harness is open. ● Differential lock solenoid relay does not switch to ON position. 	RFD-64, "Differential Lock Solenoid"
SOL SHORT [P1849]	Differential lock solenoid internal circuit or harness is shorted.	RFD-64, "Differential Lock Solenoid"
SOL CURRENT [P1850]	Differential lock solenoid relay does not switch to OFF position.	RFD-64, "Differential Lock Solenoid"
ABS SYSTEM [C1203]	Malfunction related to wheel sensor has been detected by ABS actuator and electric unit (control unit).	RFD-68, "ABS System"
CAN COMM CIRCUIT [U1000]	Malfunction has been detected from CAN communication line.	RFD-69, "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 applicable 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.

TROUBLE DIAGNOSIS

[WITH ELECTRONIC LOCKING DIFFERENTIAL]

DATA MONITOR MODE

Operation Procedure

1. Perform "CONSULT-II SETTING PROCEDURE". Refer to [RFD-50, "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 [WITH ELECTRONIC LOCKING DIFFERENTIAL]

TROUBLE DIAGNOSIS FOR SYSTEM

PFP:00000

Power Supply Circuit For Differential Lock Control Unit CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

EDS003B1

Data are reference value.

Monitor item [Unit]	Content	Condition	Display value
BATTERY VOLT [V]	Power supply voltage for differential lock control unit	Ignition switch: ON	Battery voltage

DIFFERENTIAL LOCK CONTROL UNIT TERMINALS AND REFERENCE VALUE

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

Terminal	Wire color	Item	Condition	Data (Approx.)
1	O	Power supply	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	0V
2	O	Power supply	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	0V
3	B	Ground	Always	0V
10	B	Ground	Always	0V
15	R	Power supply (Memory back-up)	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Battery voltage

CAUTION:

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

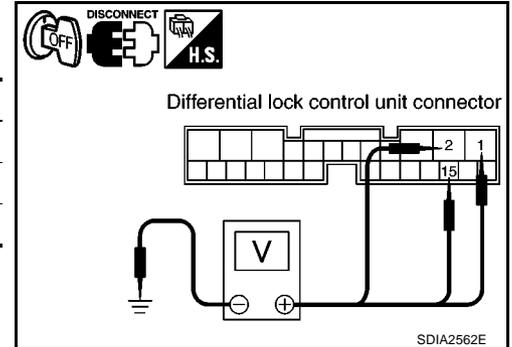
TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

DIAGNOSTIC PROCEDURE

1. CHECK POWER SUPPLY

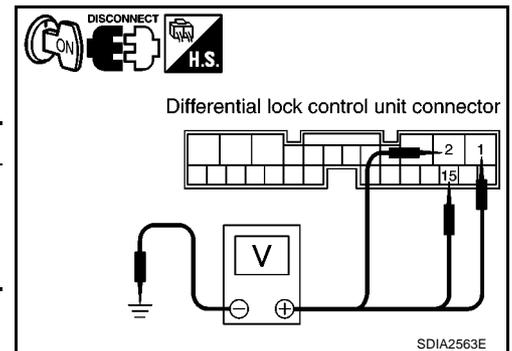
1. Turn ignition switch "OFF".
2. Disconnect differential lock control unit harness connector.
3. Check voltage between differential lock control unit harness connector terminals and ground.

Connector	Terminal	Voltage (Approx.)
M107	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.)
M107	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. Disconnect differential lock control unit harness connector.
3. Check continuity between differential lock control unit harness connector M107 terminals 3, 10 and ground.

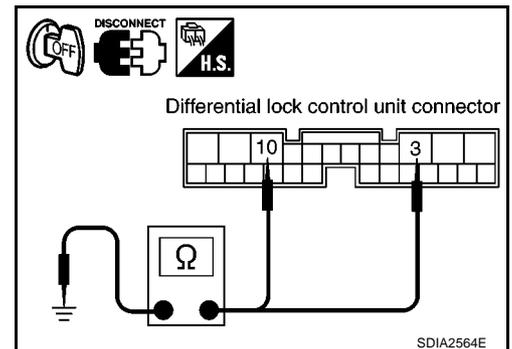
Continuity should exist.

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.



TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

3. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to [RFD-48, "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-76, "Removal and Installation"](#).

Differential Lock Control Unit DIAGNOSTIC PROCEDURE

EDS003B2

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-76, "Removal and Installation"](#).

NO >> **INSPECTION END**

Differential Lock Mode Switch CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

EDS003B3

Data are reference value.

Monitor item [Unit]	Content	Condition	Display value
D-LOCK SW SIG [ON/OFF]	Condition of differential lock mode switch	Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF

DIFFERENTIAL LOCK CONTROL UNIT TERMINALS AND REFERENCE VALUE

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

Terminal	Wire color	Item	Condition	Data (Approx.)	
9	Y	Differential lock mode switch (ON)	Ignition switch: ON	Differential lock mode switch: ON	Battery voltage
				Differential lock mode switch: OFF	0V
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.

TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

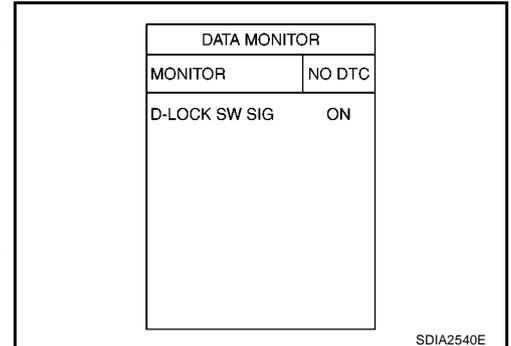
DIAGNOSTIC PROCEDURE

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".

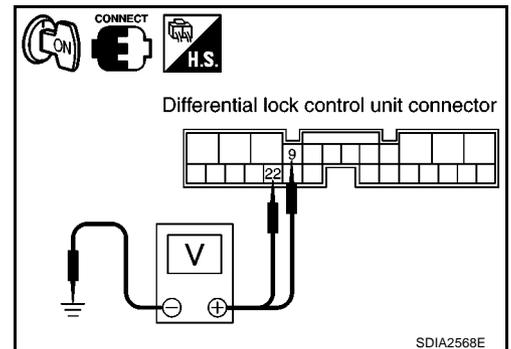
Monitor item	Condition		Display value
D-LOCK SW SIG	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running 	Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF



ⓧ 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.)
M107	9 - Ground	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

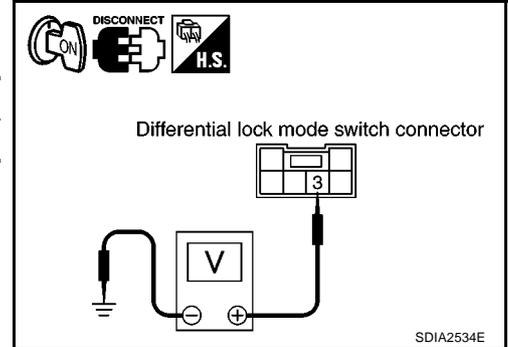
- OK >> GO TO 5.
 NG >> GO TO 2.

TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

2. CHECK DIFFERENTIAL LOCK MODE SWITCH SUPPLY CIRCUIT

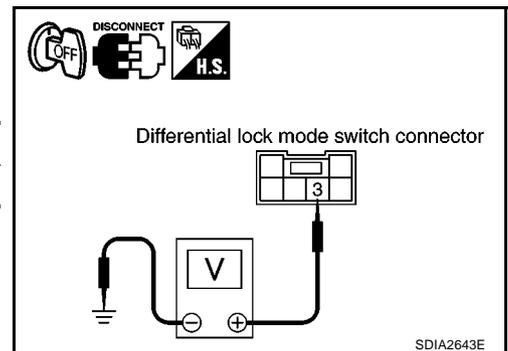
1. Turn ignition switch "ON".
2. Disconnect differential lock mode switch harness connector.
3. Check voltage between differential lock mode switch harness connector terminal 3 and ground.

Connector	Terminal	Voltage (Approx.)
M108	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.)
M108	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

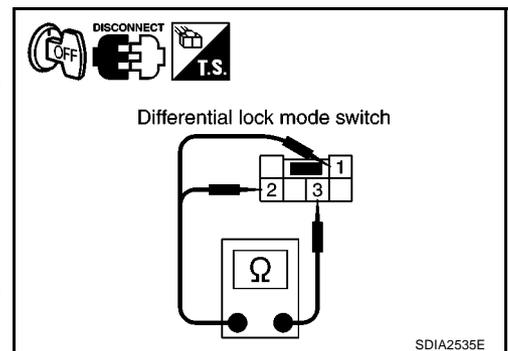
1. Turn ignition switch "OFF".
2. Disconnect differential lock mode switch harness connector.
3. Operate differential lock mode switch and check continuity between differential lock mode switch terminals.

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.



TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

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

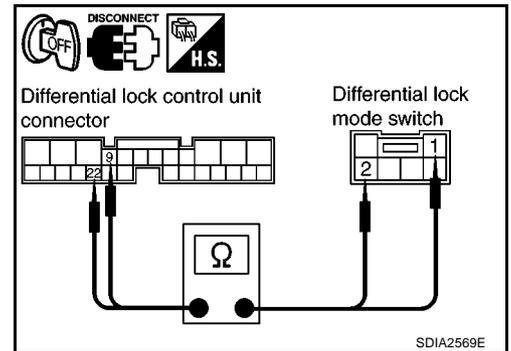
1. Turn ignition switch "OFF".
2. Disconnect differential lock control unit harness connector and differential lock mode switch harness connector.
3. Check continuity between the following terminals.
 - Differential lock control unit harness connector M107 terminal 9 and differential lock mode switch harness connector M108 terminal 2.
 - Differential lock control unit harness connector M107 terminal 22 and differential lock mode switch harness connector M108 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-48, "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

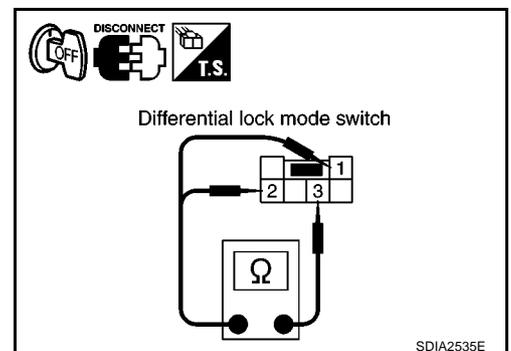
- OK >> **INSPECTION END**
- NG >> Replace differential lock control unit. Refer to [RFD-76, "Removal and Installation"](#) .

COMPONENT INSPECTION

1. Turn ignition switch "OFF".
2. Disconnect differential lock mode switch harness connector.
3. 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

4. If NG, replace differential lock mode switch.



TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Differential Lock Position Switch CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

EDS003B4

Data are reference value.

Monitor item [Unit]	Content	Condition	Display value
D-LOCK POS SW [ON/OFF]	Condition of differential lock position switch	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON (DIFF LOCK indicator lamp: ON)
			Differential lock mode switch: OFF (DIFF LOCK indicator lamp: OFF)

DIFFERENTIAL CONTROL UNIT TERMINALS AND REFERENCE VALUE

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

Terminal	Wire color	Item	Condition	Data (Approx.)
20	BR	Differential lock position switch	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON (DIFF LOCK indicator lamp: ON)
				Differential lock mode switch: OFF (DIFF LOCK indicator lamp: OFF)

CAUTION:

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

TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

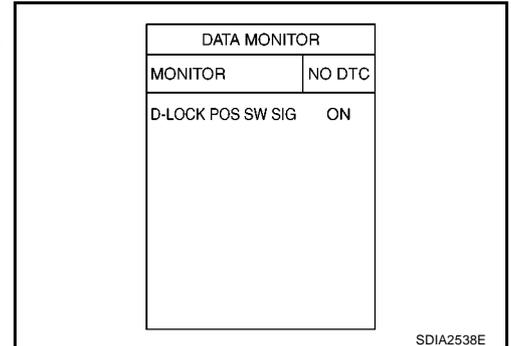
DIAGNOSTIC PROCEDURE

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".

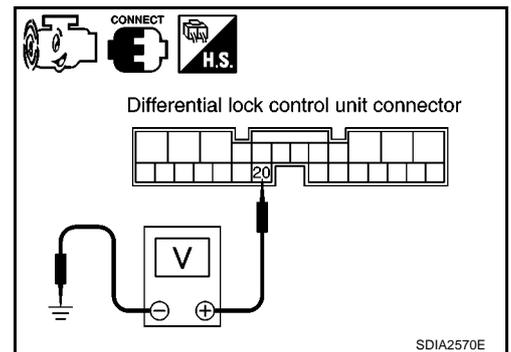
Monitor item	Condition		Display value
D-LOCK POS SW SIG	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON (DIFF LOCK indicator lamp: ON)	ON
		Differential lock mode switch: OFF (DIFF LOCK indicator lamp: OFF)	OFF



⊗ Without CONSULT-II

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

Connector	Terminal	Condition		Voltage (Approx.)
M107	20 - Ground	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 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

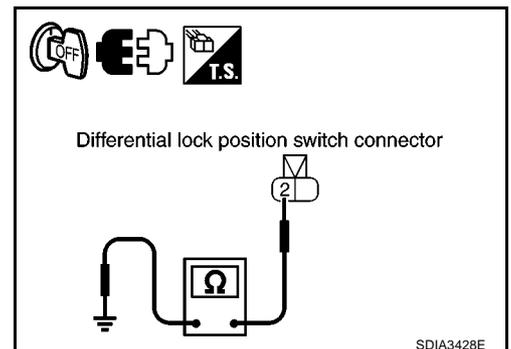
1. Turn ignition switch "OFF".
2. Disconnect differential lock position switch harness connector.
3. Check continuity between differential lock position switch harness connector C22 terminal 2 and ground.

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.



TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

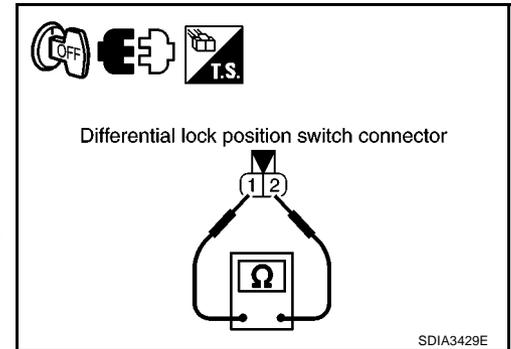
3. CHECK DIFFERENTIAL LOCK POSITION SWITCH

1. Turn ignition switch "OFF".
2. Disconnect differential lock position switch harness connector.
3. Remove differential lock position switch. Refer to [RFD-45, "Location of Electrical Parts"](#) .
4. Pull differential lock position switch and check continuity between differential lock position switch harness connector terminals.

Terminal	Condition	Continuity
1 - 2	Pull differential position switch	Yes
	Release Differential position switch	No

OK or NG

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



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

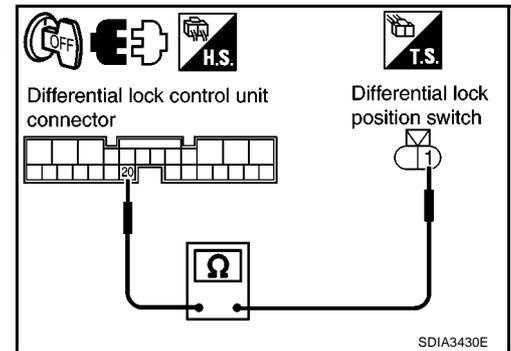
1. Turn ignition switch "OFF".
2. Disconnect differential lock control unit harness connector and differential lock position switch harness connector.
3. Check continuity between differential lock control unit harness connector M107 terminal 20 and differential lock position switch harness connector C22 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-48, "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-76, "Removal and Installation"](#) .

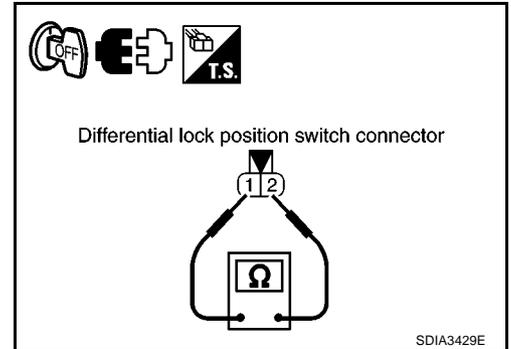
TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

COMPONENT INSPECTION

1. Turn ignition switch "OFF".
2. Disconnect differential lock position switch harness connector.
3. Remove differential lock position switch. Refer to [RFD-45, "Location of Electrical Parts"](#) .
4. Pull differential lock position switch and check continuity between differential lock position switch harness connector terminals.

Terminal	Condition	Continuity
1 - 2	Pull differential position switch	Yes
	Release Differential position switch	No

5. If NG, replace differential lock position switch.



Differential Lock Solenoid Relay CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Data are reference value.

Monitor item [Unit]	Content	Condition	Display value
RELAY ON [ON/OFF]	Operating condition of differential lock solenoid relay (integrated in differential lock control unit)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON
			Differential lock mode switch: OFF

DIAGNOSTIC PROCEDURE

1. CHECK DIFFERENTIAL LOCK SOLENOID SYSTEM

Perform self-diagnosis. Refer to [RFD-51, "SELF-DIAG RESULTS MODE"](#) .

Is "RELAY [P1844]" displayed?

- YES >> Perform trouble diagnosis for differential lock solenoid. Refer to [RFD-64, "Differential Lock Solenoid"](#) .
- NO >> GO TO 2.

2. CHECK DIFFERENTIAL LOCK SOLENOID RELAY SIGNAL

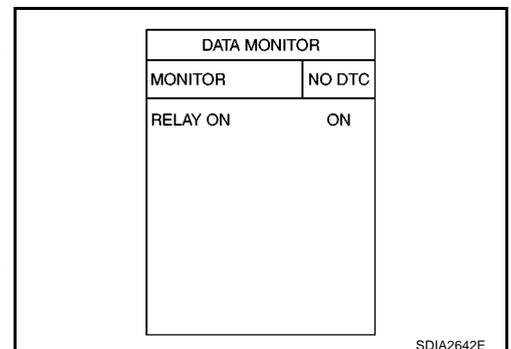
With CONSULT-II

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	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON
		Differential lock mode switch: OFF

OK or NG

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



TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

3. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to [RFD-48, "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-76, "Removal and Installation"](#).

Differential Lock Solenoid CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

EDS003B6

Data are reference value.

Monitor item [Unit]	Content	Condition	Display value
RELAY ON [ON/OFF]	Operating condition of differential lock solenoid relay (integrated in differential lock control unit)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 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)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 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	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON ON
			Differential lock mode switch: OFF OFF

DIFFERENTIAL LOCK CONTROL UNIT TERMINALS AND REFERENCE VALUE

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

Terminal	Wire color	Item	Condition	Data (Approx.)
11	GR	Differential lock solenoid (-)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON 0V
				Differential lock mode switch: OFF Battery voltage
12	L	Differential lock solenoid (+)	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	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.

TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

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		Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF
RELAY MTR	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON	ON
		Differential lock mode switch: OFF	OFF
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

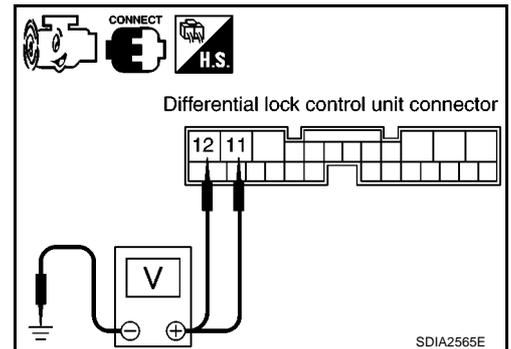
DATA MONITOR	
MONITOR	NO DTC
RELAY ON	OFF
RELAY MTR	OFF
SOL MTR	OFF

SDIA2539E

ⓧ Without CONSULT-II

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

Connector	Terminal	Condition		Data (Approx.)
M107	11 - Ground	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● 4WD shift switch: 4LO 	Differential lock mode switch: ON	0V
			Differential lock mode switch: OFF	Battery voltage
	12 - Ground		Differential lock mode switch: ON	0V
			Differential lock mode switch: OFF	Battery voltage



OK or NG

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

TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

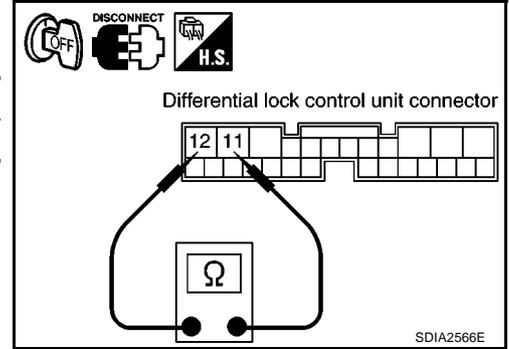
2. CHECK DIFFERENTIAL LOCK SOLENOID CIRCUIT

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.)
M107	11 - 12	3.4 Ω

OK or NG

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



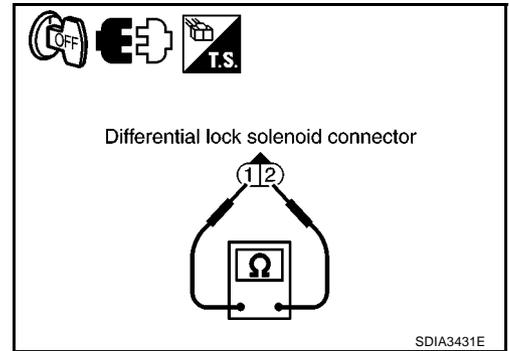
3. CHECK DIFFERENTIAL LOCK SOLENOID RESISTANCE

1. Turn ignition switch "OFF".
2. Disconnect differential lock solenoid harness connector.
3. Check resistance between differential lock solenoid harness connector C23 terminals 1 and 2.

1 - 2 : Approx. 3.4Ω

OK or NG

- OK >> GO TO 4.
 NG >> Replace differential lock solenoid. Refer to [RFD-86, "Differential Assembly"](#).



4. CHECK DIFFERENTIAL LOCK SOLENOID OPERATION

1. Turn ignition switch "OFF".
2. Disconnect differential lock solenoid harness connector.
3. Check operation of differential lock solenoid by applying battery voltage to differential lock solenoid harness connector terminals.

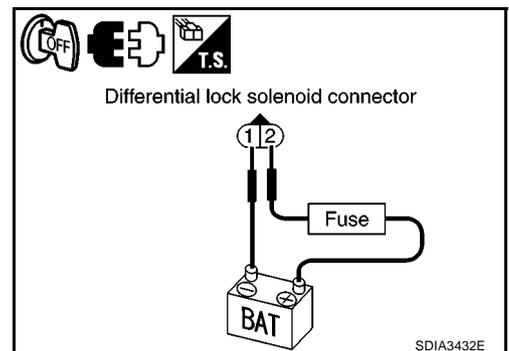
CAUTION:

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

Connector	Terminal
C23	1 (Battery voltage) - 2 (Ground)

Does solenoid operate?

- YES >> GO TO 5.
 NO >> Replace differential lock solenoid. Refer to [RFD-86, "Differential Assembly"](#).



TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

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

1. Turn ignition switch "OFF".
2. Disconnect differential lock control unit harness connector and differential lock solenoid harness connector.
3. Check continuity between the following terminals.
 - Differential lock control unit harness connector M107 terminal 11 and differential lock solenoid harness connector C23 terminal 2.
 - Differential lock control unit harness connector M107 terminal 12 and differential lock solenoid harness connector C23 terminal 1.

11 - 2 : Continuity should exist.

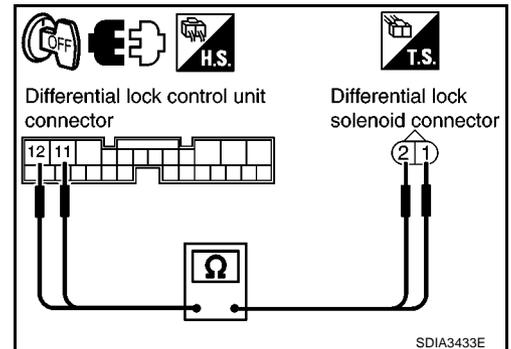
12 - 1 : Continuity should exist.

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-48, "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-76, "Removal and Installation"](#).

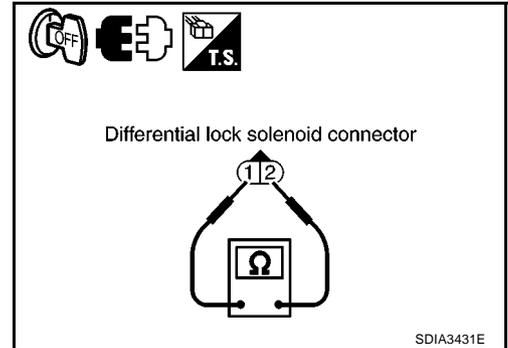
TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

COMPONENT INSPECTION

1. Turn ignition switch "OFF".
2. Disconnect differential lock solenoid harness connector.
3. Check resistance between differential lock solenoid harness connector C23 terminals 1 and 2.

1 - 2 : Approx. 3.4Ω

4. If NG, replace differential lock solenoid. Refer to [RFD-86, "Differential Assembly"](#).



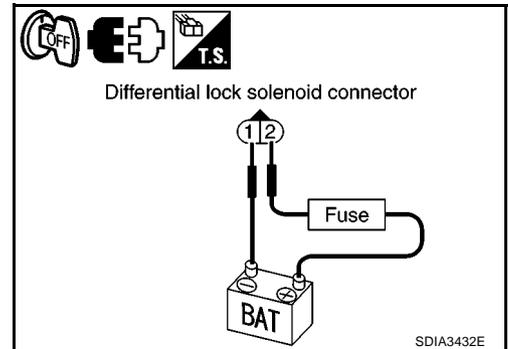
5. Check operation by applying battery voltage to differential lock solenoid harness connector terminals.

CAUTION:

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

Connector	Terminal
C23	1 (Battery voltage) - 2 (Ground)

6. If NG, replace differential lock solenoid.



EDS003B7

ABS System 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-18, "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-48, "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-18, "Self-Diagnosis"](#).

TROUBLE DIAGNOSIS FOR SYSTEM [WITH ELECTRONIC LOCKING DIFFERENTIAL]

EDS003B8

CAN Communication Line DIAGNOSTIC PROCEDURE

1. CHECK CAN COMMUNICATION CIRCUIT

④ With CONSULT-II

1. Turn ignition switch "ON" and start engine.
2. Select "SELF-DIAG RESULTS" mode for "DIFF LOCK" with in 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**

SELF-DIAG RESULTS	
DTC RESULTS	TIME
CAN COMM CIRCUIT [U1000]	0
ERASE	PRINT

SDIA1850E

A

B

C

RFD

E

F

G

H

I

J

K

L

M

TROUBLE DIAGNOSIS FOR SYMPTOMS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

TROUBLE DIAGNOSIS FOR SYMPTOMS

PFP:00007

DIFF LOCK Indicator Lamp Does Not Turn ON

EDS003B9

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-51, "SELF-DIAG RESULTS MODE"](#).

Is "CAN COMM CIRCUIT" displayed?

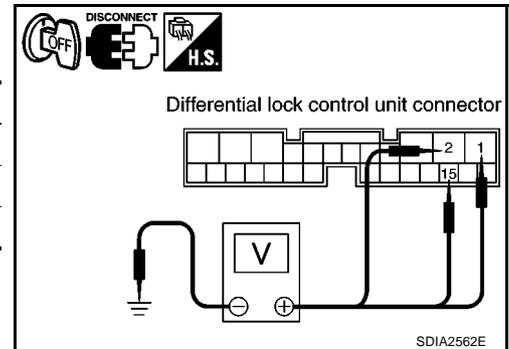
YES >> Perform trouble diagnosis for CAN communication line. Refer to [RFD-69, "CAN Communication Line"](#).

NO >> GO TO 2.

2. CHECK DIFFERENTIAL LOCK CONTROL UNIT POWER SUPPLY

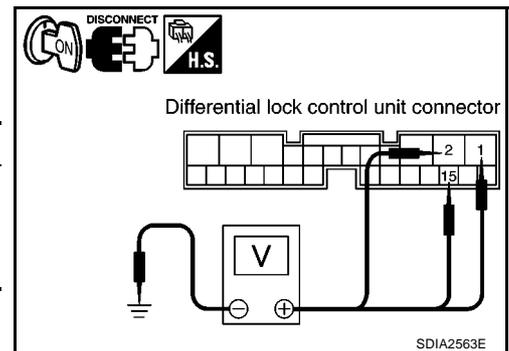
1. Turn ignition switch "OFF".
2. Disconnect differential lock control unit harness connector.
3. Check voltage between differential lock control unit harness connector terminals and ground.

Connector	Terminal	Voltage (Approx.)
M107	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.)
M107	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"](#).

TROUBLE DIAGNOSIS FOR SYMPTOMS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

3. CHECK DIFFERENTIAL LOCK CONTROL UNIT GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect differential lock control unit harness connector.
3. Check continuity between differential lock control unit harness connector M107 terminals 3, 10 and ground.

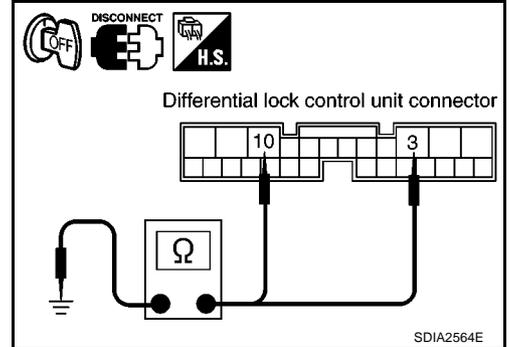
Continuity should exist.

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

OK or NG

OK >> GO TO 4.

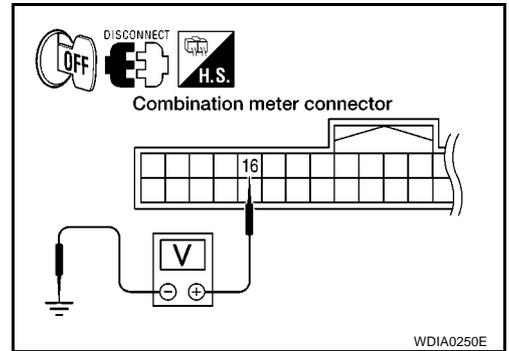
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK COMBINATION METER POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect combination meter harness connector.
3. Check voltage between combination meter harness connector terminal and ground.

Connector	Terminal	Voltage (Approx.)
M23	16 - Ground	0V



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

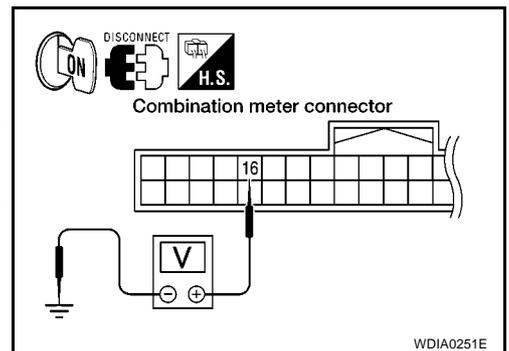
Connector	Terminal	Voltage (Approx.)
M23	16 - Ground	0V

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"](#).



TROUBLE DIAGNOSIS FOR SYMPTOMS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

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

1. Turn ignition switch "OFF".
2. Disconnect differential lock control unit harness connector and combination meter harness connector.
3. Check continuity between differential lock control unit harness connector M107 terminal 21 and combination meter harness connector M23 terminal 25.

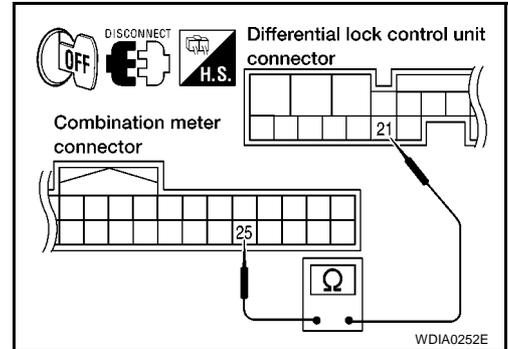
Continuity should exist.

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

OK or NG

OK >> GO TO 6.

NG >> Repair or replace damaged parts.



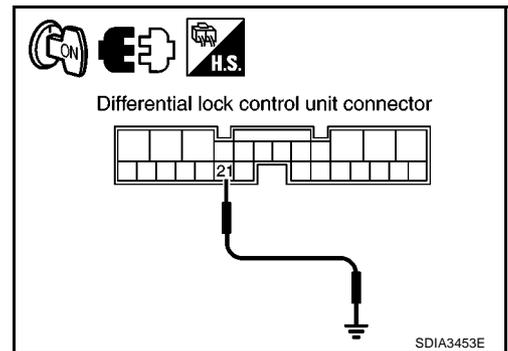
6. CHECK INDICATOR LAMP CIRCUIT

1. Turn ignition switch "OFF". (Stay for at least 5 seconds.)
2. Connect combination meter harness connector.
3. Disconnect differential lock control unit harness connector.
4. Turn ignition switch "ON". (Do not start engine.)
5. Ground the following terminals using suitable wiring.
 - Differential lock control unit harness connector M107 terminal 21 and ground.

Do indicator lamps turn on?

OK >> GO TO 7.

NG >> Replace combination meter. Refer to [DI-27, "Removal and Installation of Combination Meter"](#) .



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-48, "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.

TROUBLE DIAGNOSIS FOR SYMPTOMS

[WITH ELECTRONIC LOCKING DIFFERENTIAL]

EDS003BA

DIFF LOCK Indicator Lamp Does Not Change

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-70, "DIFF LOCK Indicator Lamp Does Not Turn ON"](#) .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [RFD-51, "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-56, "Differential Lock Mode Switch"](#) .

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 5.

5. CHECK DIFFERENTIAL LOCK CONTROL UNIT

Check differential lock control unit input/output signal. Refer to [RFD-48, "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.

TROUBLE DIAGNOSIS FOR SYMPTOMS [WITH ELECTRONIC LOCKING DIFFERENTIAL]

EDS003BB

DIFF LOCK Indicator Lamp Sometimes Flashes

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-70, "DIFF LOCK Indicator Lamp Does Not Turn ON"](#) .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [RFD-51, "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-56, "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-60, "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-48, "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.

TROUBLE DIAGNOSIS FOR SYMPTOMS

[WITH ELECTRONIC LOCKING DIFFERENTIAL]

7. CHECK DIFFERENTIAL INNER PARTS

1. Disassemble rear final drive assembly. Refer to [RFD-82, "Disassembly and Assembly"](#) .
2. Check differential inner parts.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

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DIFFERENTIAL LOCK CONTROL UNIT [WITH ELECTRONIC LOCKING DIFFERENTIAL]

DIFFERENTIAL LOCK CONTROL UNIT

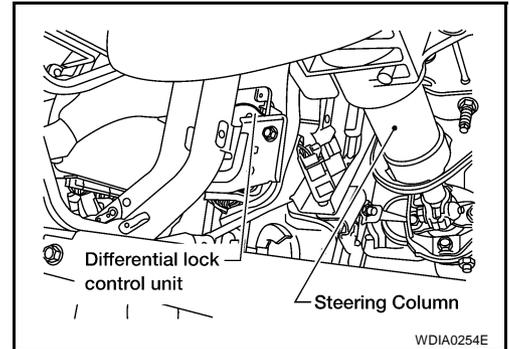
PFP:28496

Removal and Installation

EDS003BC

REMOVAL

1. Turn the ignition switch OFF and disconnect the battery cables.
2. Remove the lower instrument panel LH (LHD models) or lower instrument panel RH (RHD models). Refer to [IP-13, "LOWER INSTRUMENT PANEL LH"](#) (LHD models) or [IP-13, "LOWER INSTRUMENT PANEL LH"](#) (RHD models).
3. Disconnect the differential lock control unit connector.
4. 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 the installation, check DIFF LOCK indicator lamp. Refer to [RFD-33, "Precautions for Differential Case Assembly and Differential Lock Control Unit Replacement"](#).

FRONT OIL SEAL [WITH ELECTRONIC LOCKING DIFFERENTIAL]

FRONT OIL SEAL

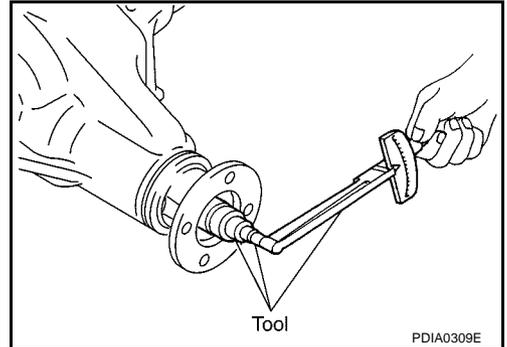
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Removal and Installation REMOVAL

EDS003BD

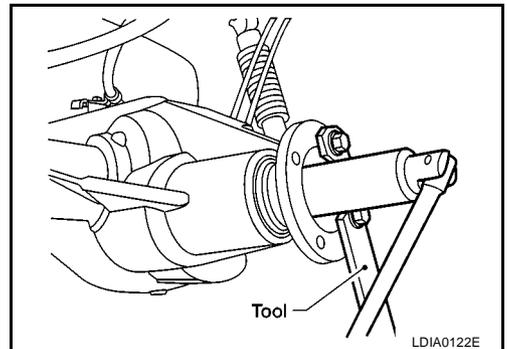
1. Remove the rear propeller shaft. Refer to [PR-8, "Removal and Installation"](#) .
2. Remove the rear tires.
3. Remove rear drum brake. Refer to [BR-31, "Removal and Installation of Drum Brake Assembly"](#) .
4. Rotate the drive pinion back and forth 2 to 3 times using Tool and record the rotating torque.

Tool number : ST3127S000



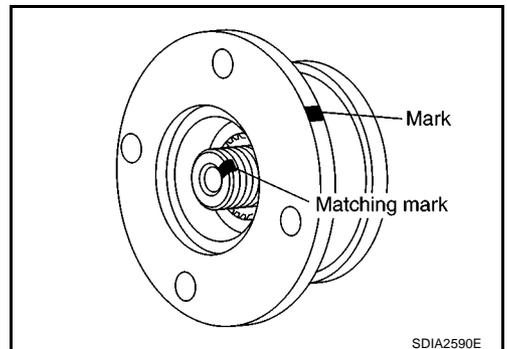
5. Remove the drive pinion lock nut and washer using Tool.

Tool number : KV40104000

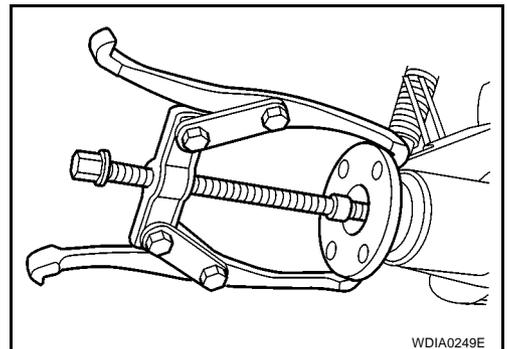


6. Put a matching mark on the thread edge of drive pinion. The mark should be in line with the mark on companion flange.

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



7. Remove the companion flange using suitable tool.



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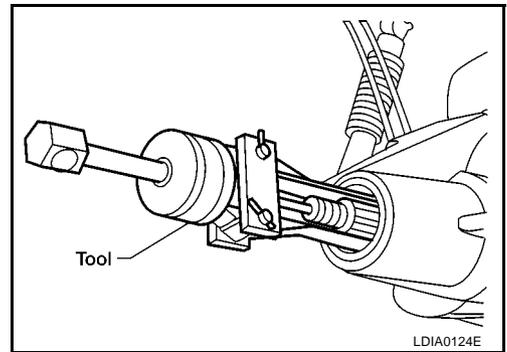
FRONT OIL SEAL [WITH ELECTRONIC LOCKING DIFFERENTIAL]

8. Remove the front oil seal using Tool.

Tool number : KV381054S0

CAUTION:

Do not damage axle housing.

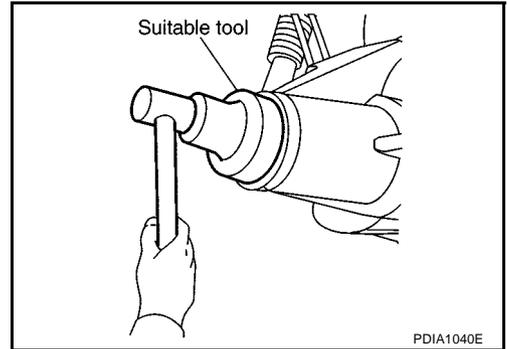


INSTALLATION

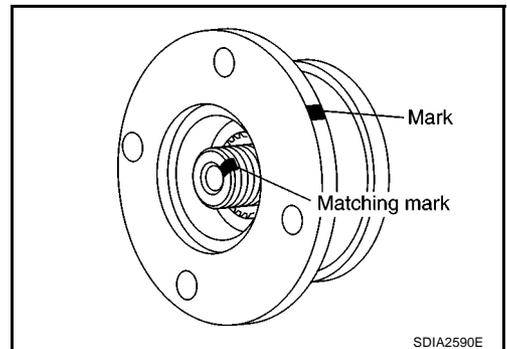
1. Install the front oil seal into the axle housing using a suitable tool.

CAUTION:

- Do not reuse oil seal.
- Do not incline oil seal when installing.
- Apply multi-purpose grease onto oil seal lip, and gear oil onto the circumference of oil seal.



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

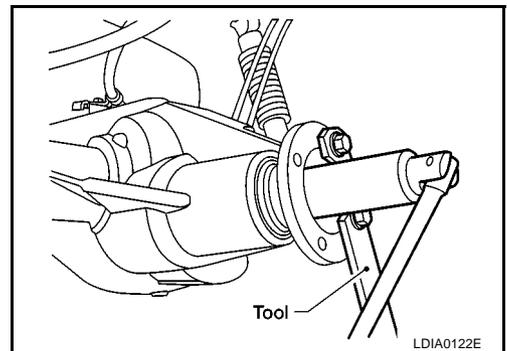


3. Install the washer and drive pinion lock nut. Tighten the nut until there is zero bearing end play using Tool.

Tool number : KV40104000

CAUTION:

Do not reuse drive pinion lock nut and washer.



FRONT OIL SEAL [WITH ELECTRONIC LOCKING DIFFERENTIAL]

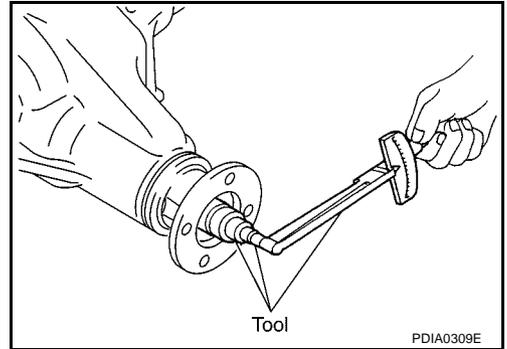
4. Rotate the drive pinion using Tool. Rotating torque should be equal to the reading recorded in step 4 above during removal plus an additional 0.56 N·m (5 in-lb).

Tool number : ST3127S000

5. If the rotating torque is low, continue to tighten the drive pinion lock nut in 6.8 N·m (5 ft-lb) increments without overtightening. Refer to [RFD-82, "COMPONENTS"](#). Tighten until proper rotating torque is achieved.

CAUTION:

- Do not loosen the drive pinion lock nut to decrease drive pinion rear bearing rotating torque.
 - Do not exceed specified rotating preload torque. If preload torque or rotating torque is exceeded a new collapsible spacer must be installed.
 - Do not exceed maximum tightening torque. If maximum tightening torque is reached prior to reaching the required rotating torque, the collapsible spacer may have been damaged. Replace the collapsible spacer.
6. Check the gear oil level. Refer to [RFD-40, "Checking Differential Gear Oil"](#).
7. Install the remaining components in the reverse order of removal.



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CARRIER COVER [WITH ELECTRONIC LOCKING DIFFERENTIAL]

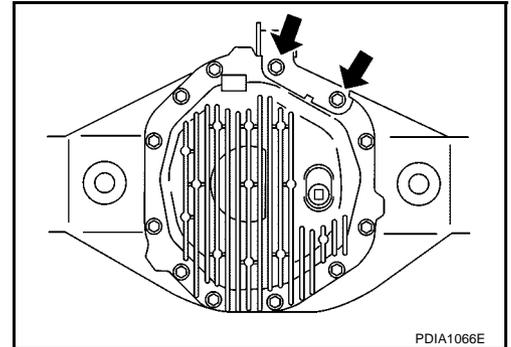
PFP:38351

EDS003BE

CARRIER COVER

Removal and Installation REMOVAL

1. Remove the drain plug and drain the gear oil. Refer to [RFD-40, "DRAINING"](#).
2. Disconnect the rear cable (LH) from the carrier cover. Refer to [PB-3, "Components"](#).
3. Remove bracket from the axle housing.

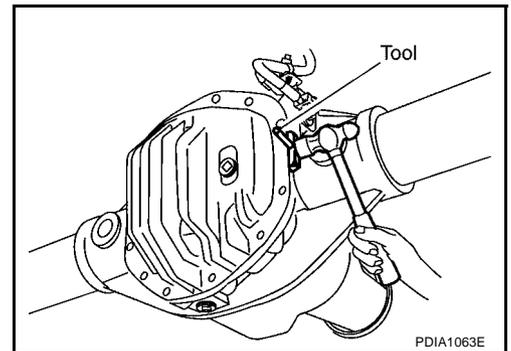


4. Remove the carrier cover bolts. Then separate carrier cover from the axle housing using Tool.

Tool number : KV10111100

CAUTION:

- Be careful not to damage the mating surface.
- Do not insert flat-bladed screwdriver, this will damage the mating surface.

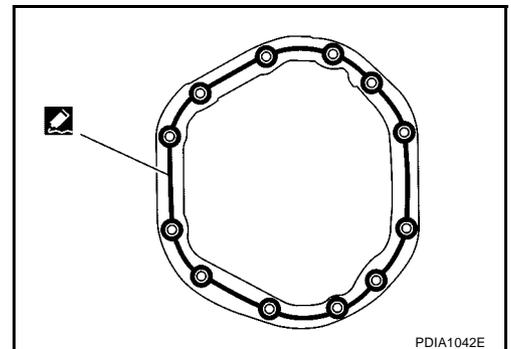


INSTALLATION

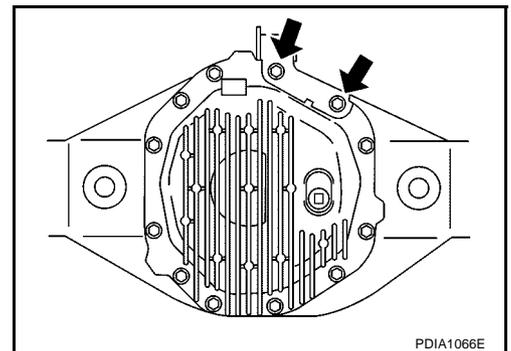
1. Apply sealant to mating surface of carrier cover. Refer to [RFD-82, "COMPONENTS"](#).

CAUTION:

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



2. Install carrier cover and bracket on axle housing. Then tighten carrier cover bolts to the specified torque. Refer to [RFD-82, "COMPONENTS"](#).
3. Connect the rear cable (LH) to the carrier cover and tighten to the specified torque. Refer to [PB-3, "Components"](#).
4. Fill with new gear oil until oil level reaches the specified limit near filler plug hole. Refer to [RFD-40, "Checking Differential Gear Oil"](#).



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

REAR FINAL DRIVE ASSEMBLY

PFP:38300

Removal and Installation

EDS003BF

REMOVAL

1. Remove the rear propeller shaft. Refer to [PR-8, "Removal and Installation"](#) .
 - Plug rear end of transmission or transfer.
2. Remove the axle shafts and back plate and torque members. Refer to [RAX-7, "Removal and Installation"](#) .
3. Disconnect the following components from the rear final drive.
 - ABS sensor wire harness
 - Rear cable (LH) and rear cable (RH)
 - Brake hoses and brake tube
 - Differential lock position switch harness connector
 - Differential lock solenoid harness connector

CAUTION:

Position the wire harness, cable and hoses away from the final drive assembly. Failure to do so may result in components being damaged during rear axle assembly removal.

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

WARNING:

Support the rear final drive assembly using suitable jack before removing leaf spring U-bolt nuts.

7. Remove rear final drive assembly using suitable jack.

INSTALLATION

Installation is the reverse order of removal.

- When oil leaks while removing rear final drive assembly, check oil level after the installation. Refer to [RFD-40, "Checking Differential Gear Oil"](#) .
- Refill brake fluid and bleed the air from the brake system. Refer to [BR-11, "Bleeding Brake System"](#) .
- After the installation, check DIFF LOCK indicator lamp. Refer to [RFD-33, "Precautions for Differential Case Assembly and Differential Lock Control Unit Replacement"](#) .

REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

ASSEMBLY INSPECTION AND ADJUSTMENT

- Before inspection and adjustment, drain gear oil.

Total Preload Torque

1. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
2. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
3. Turn drive pinion in both directions several times to set bearing rollers.
4. Measure total preload with preload gauge.

Tool number : ST3127S000

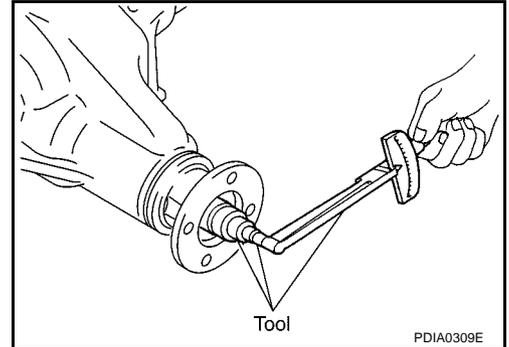
Total preload

Gear ratio 3.538 Type:

2.34 - 4.34 N·m (0.24 - 0.44 kg·m, 21 - 38 in·lb)

Gear ratio 3.692 Type:

2.32 - 4.34 N·m (0.24 - 0.44 kg·m, 21 - 38 in·lb)



NOTE:

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

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

When the preload torque is greater than specification

On pinion bearings: Replace collapsible spacer.

On side bearings: Loosen side bearing adjuster.

When the preload torque is less than specification

On pinion bearings: Tighten drive pinion lock nut.

On side bearings: Tighten side bearing adjuster.

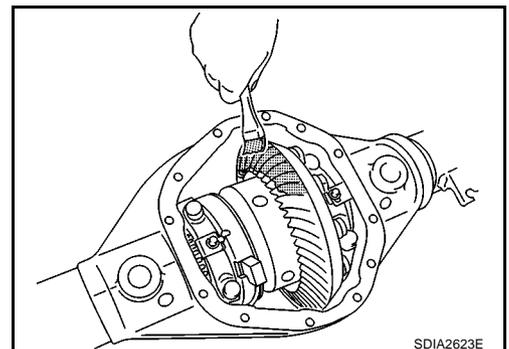
Tooth Contact

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. Remove carrier cover. Refer to [RFD-86, "Differential Assembly"](#).
2. Thoroughly clean drive gear and drive pinion teeth.
3. Apply red lead to drive gear.

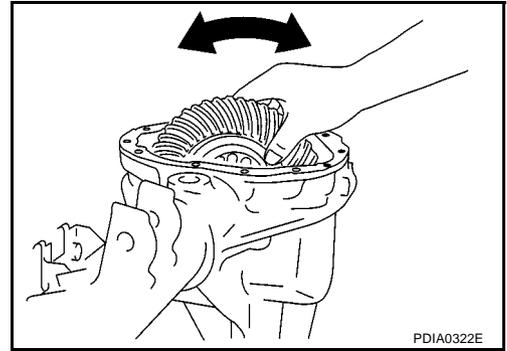
CAUTION:

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

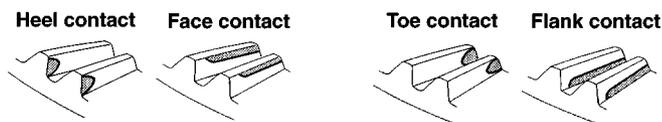


REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

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

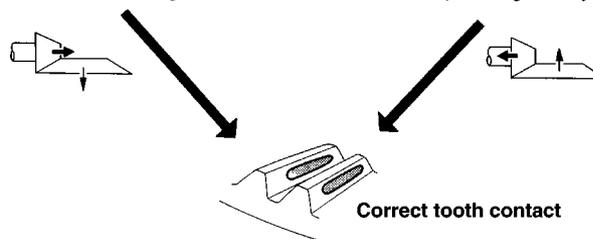


Usually the pattern will be correct if washers are correctly calculated and the backlash is correct. However, in rare cases, trial and error processes may be employed to obtain a correct pattern. The tooth pattern is the best indication of how well a differential has been set up.



To correct, increase thickness of drive pinion height adjusting washer in order to bring drive pinion close to drive gear.

To correct, reduce thickness of drive pinion height adjusting washer in order to make drive pinion go away from drive gear.



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

5. If outside the standard, adjust drive pinion height adjusting washer and backlash. Refer to [RFD-90, "Drive Pinion Height Adjusting Washer"](#) and [RFD-84, "Backlash"](#).

Backlash

1. Remove carrier cover. Refer to [RFD-86, "Differential Assembly"](#).
2. Check drive gear to drive pinion backlash using a dial indicator at several points.

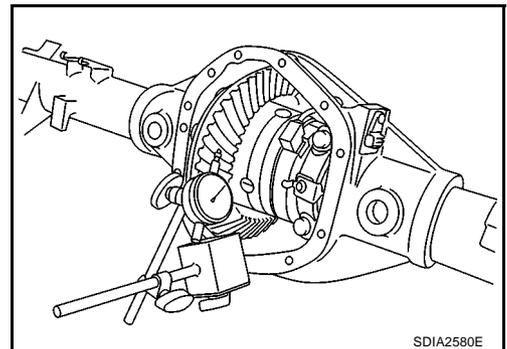
Drive gear to drive pinion backlash:
0.08 - 0.13 mm (0.0031 - 0.0051 in)

3. If outside the standard, adjust side bearing adjusters.

CAUTION:

Check tooth contact and total preload after adjusting side bearing adjusters. Refer to [RFD-83, "Total Preload Torque"](#), [RFD-83, "Tooth Contact"](#).

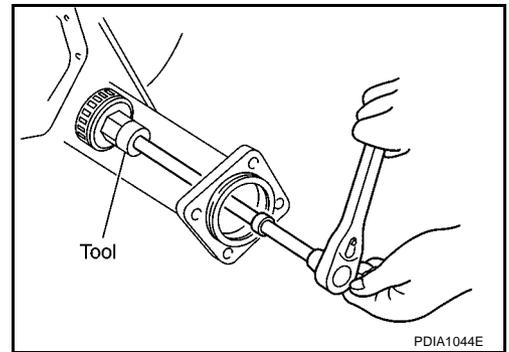
- a. Remove adjuster lock plates.
- b. Loosen side bearing cap bolts.



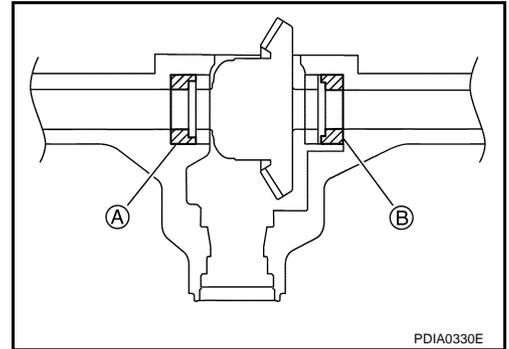
REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

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

Tool number : KV38108800

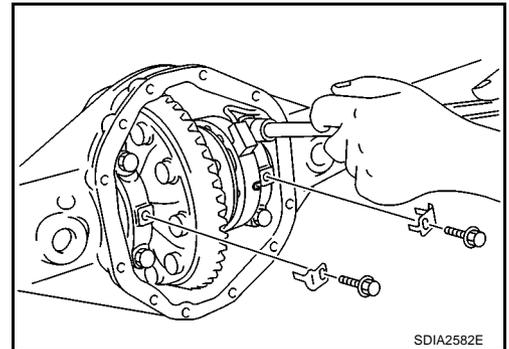


d. In case of excessive backlash, loosen side bearing adjuster A and tighten side bearing adjuster B. In case of insufficient backlash, loosen side bearing adjuster B and tighten side bearing adjuster A.



e. After adjusting backlash, tighten side bearing cap bolts to the specified torque. Refer to [RFD-82, "COMPONENTS"](#).

f. Install adjuster lock plates and tighten to the specified torque. Refer to [RFD-82, "COMPONENTS"](#).



Companion Flange Runout

1. Fit a dial indicator onto companion flange face (inner side of propeller shaft bolt holes).

2. Rotate companion flange to check for runout.

Runout limit : 0.10 mm (0.0039 in) or less

3. Fit a test indicator to the inner side of companion flange (socket diameter).

4. Rotate companion flange to check for runout.

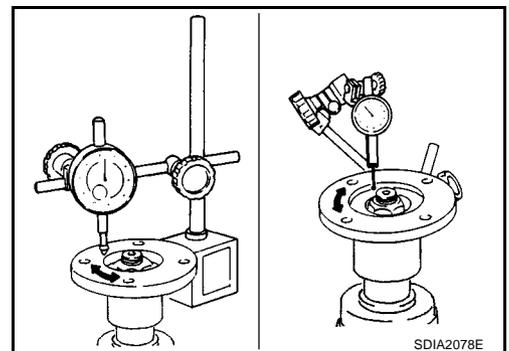
Runout limit : 0.13 mm (0.0051 in) or less

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

a. Check for runout while changing the phase between companion flange and drive pinion by 90°, 180° and 270° and search for the point where the runout is the minimum.

b. If the runout value is still outside of the limit after the phase has been changed, replace companion flange.

c. If the runout value is still outside of the limit after companion flange has been replaced, check drive pinion front bearing, drive pinion rear bearing and drive pinion assembly.

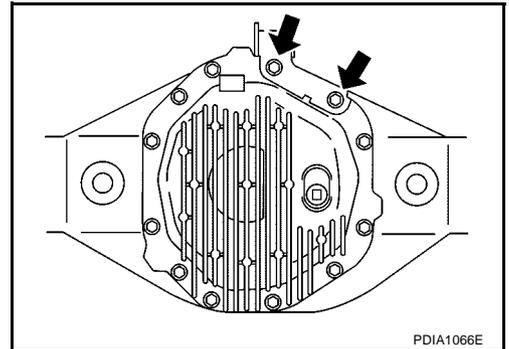


REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

DISASSEMBLY

Differential Assembly

1. Remove carrier cover bolts and bracket.

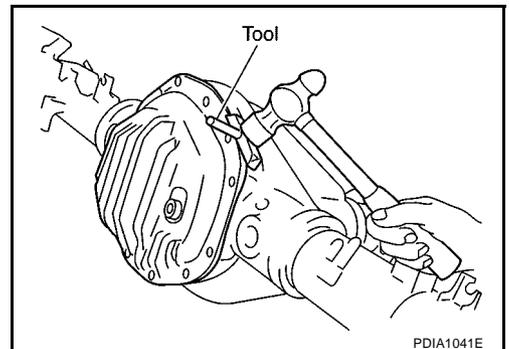


2. Separate carrier cover from axle housing using Tool.

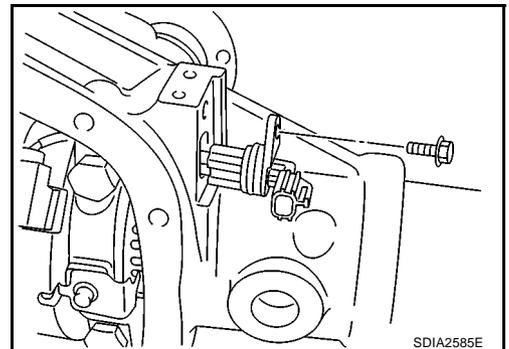
Tool number : KV10111100

CAUTION:

- Be careful not to damage the mating surface.
- Do not insert flat-bladed screwdriver, this will damage the mating surface.



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

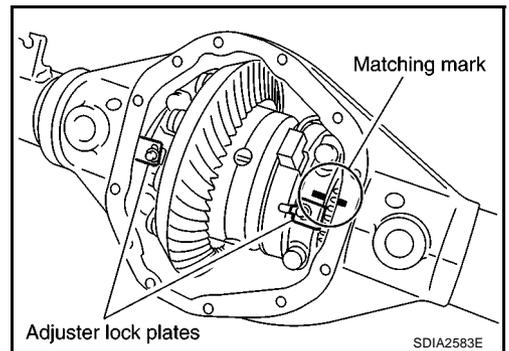


4. For proper reinstallation, paint matching mark on one side of side bearing cap and axle housing.

CAUTION:

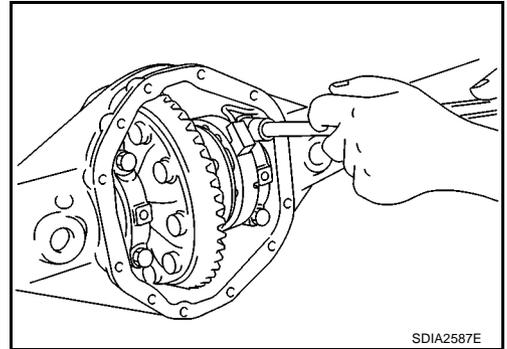
- Side bearing caps are line-board for initial assembly. The matching marks are used to reinstall them in their original positions.
- For matching mark, use paint. Do not damage side bearing cap and axle housing.

5. Remove adjuster lock plates.



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

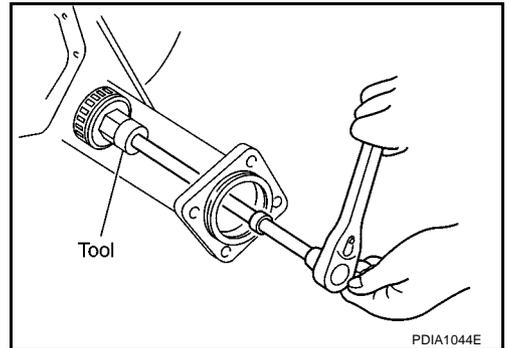
6. Remove side bearing caps.



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7. Loosen side bearing adjusters using Tool.

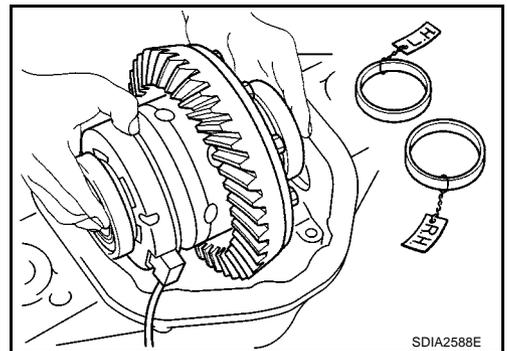
Tool number : KV38108800



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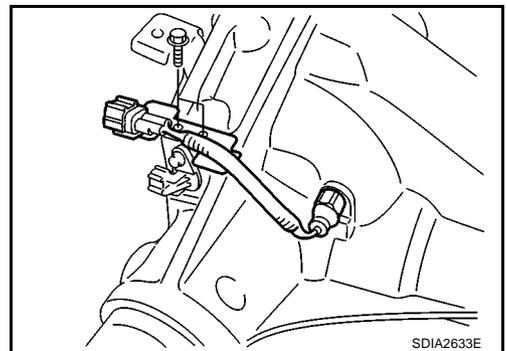
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8. Keep side bearing outer races together with inner races. Do not mix them up. Also, keep side bearing adjusters together with bearing.
9. Remove side bearing adjusters from axle housing.



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10. Remove bracket of differential lock position switch connector and bolts.
11. Remove differential lock position switch.



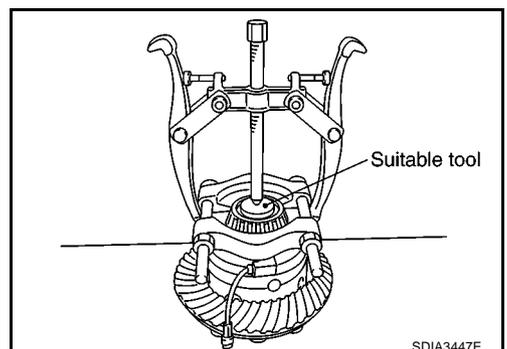
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12. Remove side bearing inner race using suitable tools.

CAUTION:

Be careful not to damage differential case assembly and differential lock solenoid.

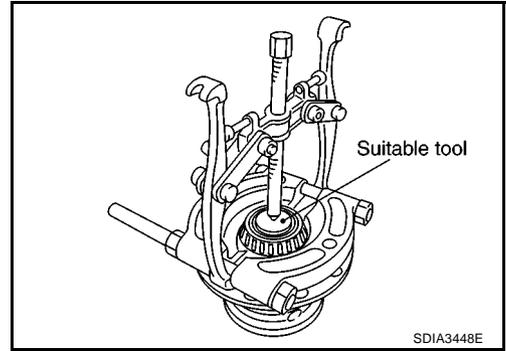
13. Remove differential lock solenoid and solenoid washer.



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

14. Remove side bearing inner race using suitable tools.

CAUTION:
Be careful not to damage differential case assembly.



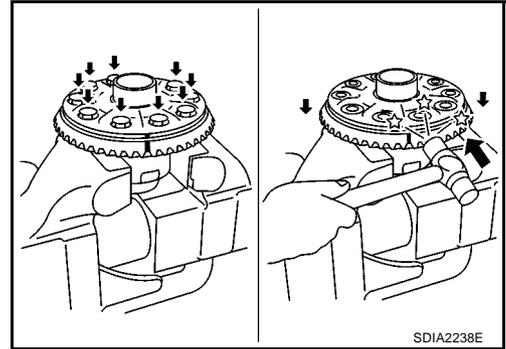
15. For proper reinstallation, paint matching mark on differential case assembly and drive gear.

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

16. Remove drive gear bolts.

17. Tap drive gear off differential case assembly using suitable tool.

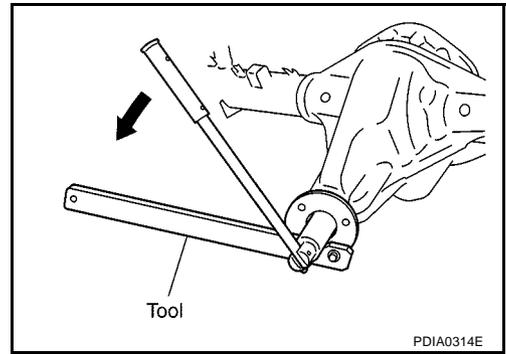
CAUTION:
Tap evenly all around to keep drive gear from binding.



Drive Pinion Assembly

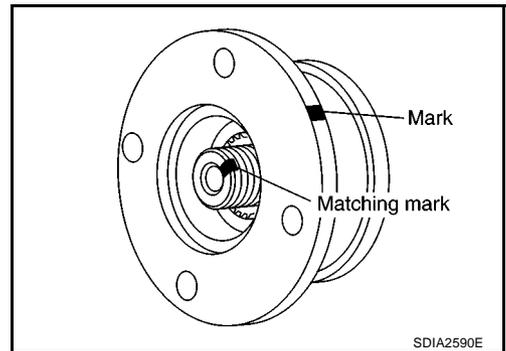
1. Remove differential case assembly. Refer to [RFD-86, "Differential Assembly"](#).
2. Remove drive pinion lock nut and washer using Tool.

Tool number : KV40104000



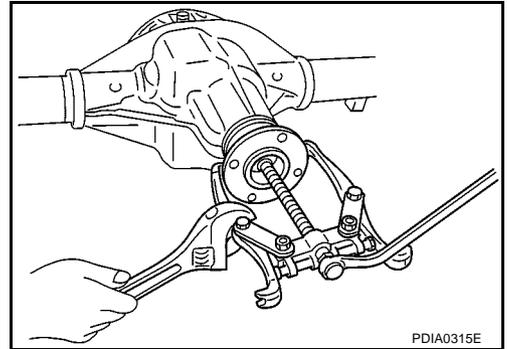
3. Put a matching mark on the thread edge of drive pinion. The mark should be in line with the mark on companion flange.

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



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

4. Remove companion flange using suitable tool.

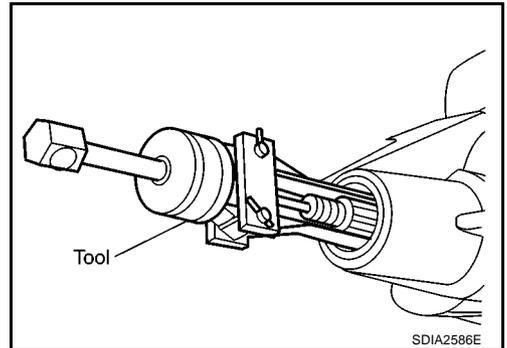


5. Remove front oil seal using Tool.

Tool number : KV381054S0

CAUTION:
Be careful not to damage axle housing.

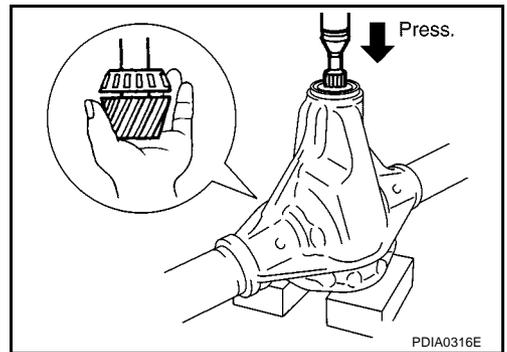
6. Remove front bearing thrust washer.



7. Press the drive pinion assembly and collapsible spacer from axle housing.

CAUTION:
Do not drop drive pinion assembly.

8. Remove drive pinion front bearing inner race from axle housing.

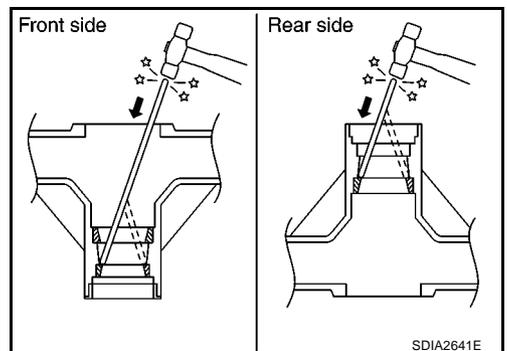


9. Tap drive pinion front bearing outer race uniformly with a brass bar or equivalent to remove.

CAUTION:
Be careful not to damage axle housing.

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

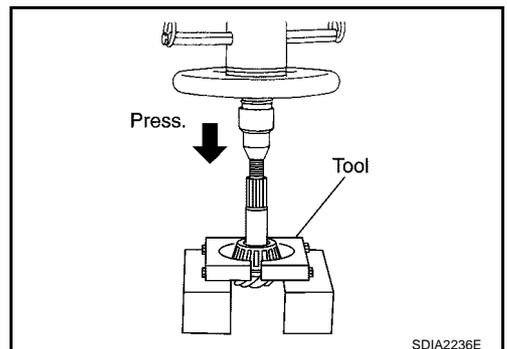
CAUTION:
Be careful not to damage axle housing.



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

Tool number : ST30021000

12. Remove the breather.



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REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

INSPECTION AFTER DISASSEMBLY

Drive Gear and Drive Pinion

- If the gear teeth do not mesh or line-up correctly, determine the cause and adjust, repair, or replace as necessary.
- If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new gears.
- 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.

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.

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 by hand, repair or replace as necessary.

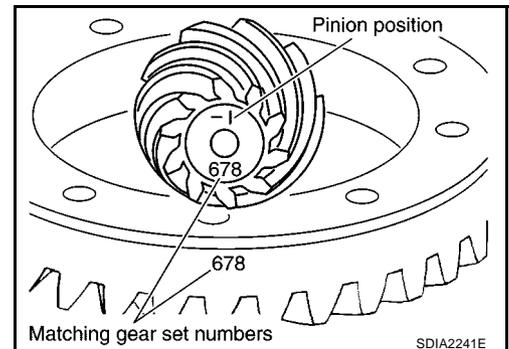
Differential Lock Solenoid

- If the operating part of differential lock solenoid is not smooth, perform component inspection. Refer to [RFD-68, "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 hypoid 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 M226 final drive 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 hypoid gear set. This dimension is controlled by a selective drive pinion height adjusting washer between drive pinion rear bearing inner 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 a m-8 (-3) etching indicated.
- To change drive pinion adjustment, use different drive pinion height adjusting washer 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.

REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

Unit: mm (in)

OLD DRIVE PINION MARKING	NEW DRIVE PINION MARKING								
	-10 (-4)	-8 (-3)	-5 (-2)	-3 (-1)	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	+0.10 (+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)

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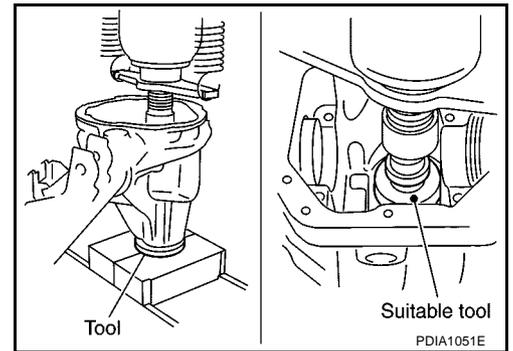
ASSEMBLY

Drive Pinion Assembly

1. Install the breather and then tighten to the specified torque. Refer to [RFD-82, "COMPONENTS"](#).
2. Press a drive pinion rear bearing outer race into axle housing using suitable tool and Tool.

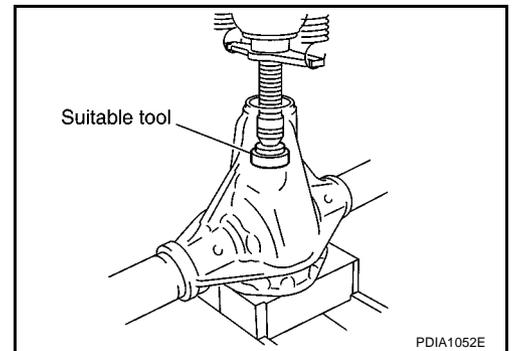
Tool number : ST30022000

CAUTION:
Do not reuse drive pinion rear bearing.



3. Press drive pinion front bearing outer race into axle housing using suitable tool.

CAUTION:
Do not reuse drive pinion front bearing.



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

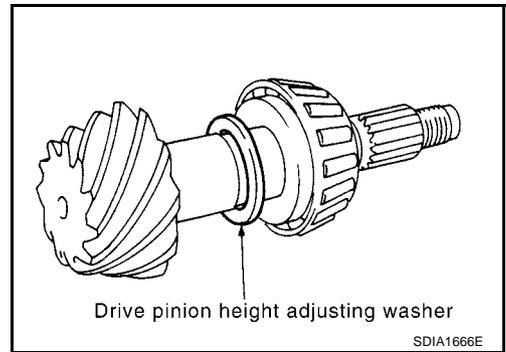
4. Temporarily install drive pinion height adjusting washer.

When hypoid gear set has been replaced

- Select drive pinion height adjusting washer. Refer to [RFD-90, "Drive Pinion Height Adjusting Washer"](#).

When hypoid gear set has been reused

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



5. Install selected drive pinion height adjusting washer to drive pinion, and press-fit drive pinion rear bearing inner race in it, using a press and suitable tool.

CAUTION:

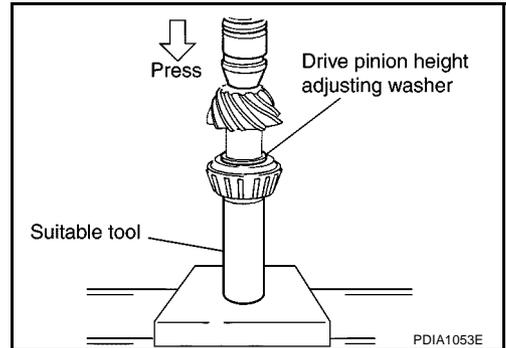
Do not reuse drive pinion rear bearing.

6. Apply gear oil to drive pinion rear bearing and drive pinion front bearing.
7. Install drive pinion front bearing inner race in axle housing.

CAUTION:

Do not reuse drive pinion front bearing.

8. Install front bearing thrust washer to axle housing.
9. Perform checking and adjusting the tooth contact and backlash of the hypoid gear following the procedure below.
- a. Assemble the drive pinion assembly to the axle housing.



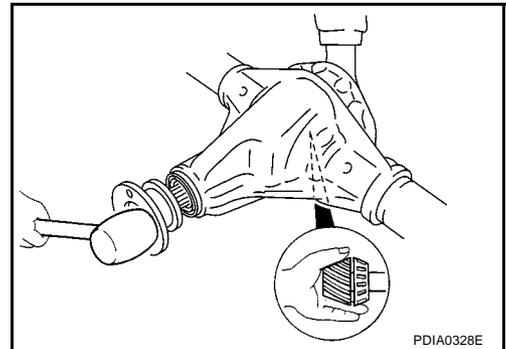
CAUTION:

Do not assemble a collapsible spacer.

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

CAUTION:

Do not assemble a front oil seal.



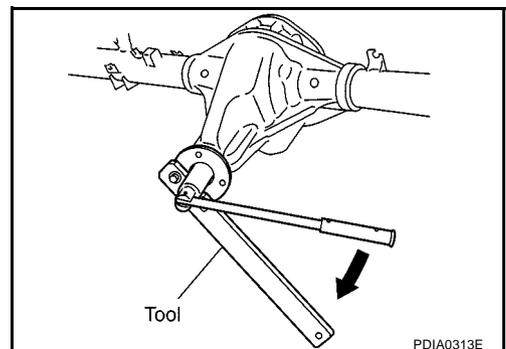
- c. Temporarily tighten removed drive pinion lock nut and washer to drive pinion.

Tool number : KV40104000

NOTE:

Use removed drive pinion lock nut and washer only for the pre-load measurement.

- d. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

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

Tool number : ST3127S000

Drive pinion lock nut tightening torque:

298 - 678 N·m (31 - 69 kg·m, 220 - 500 ft·lb)

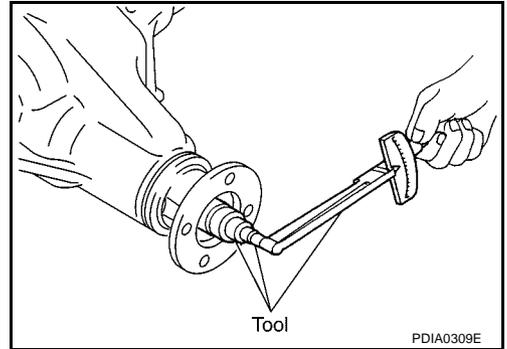
Pinion bearing preload:

1.7 - 3.1 N·m (0.18 - 0.31 kg·m, 15 - 27 in·lb)

CAUTION:

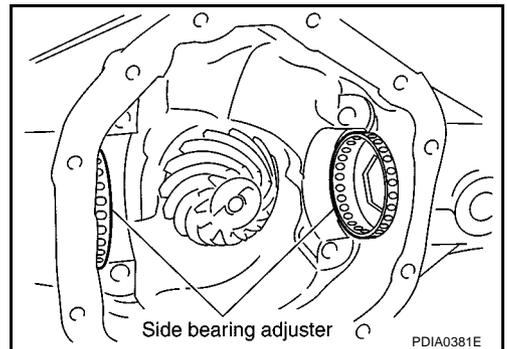
- Adjust to the lower limit of the drive pinion lock nut tightening torque first.
- Drive pinion lock nut is tightened with no collapsible spacer. Be careful not to overtighten it. While measuring the preload, tighten it by 5° to 10°.
- After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction and other malfunctions.

- f. Install side bearing adjusters into axle housing.



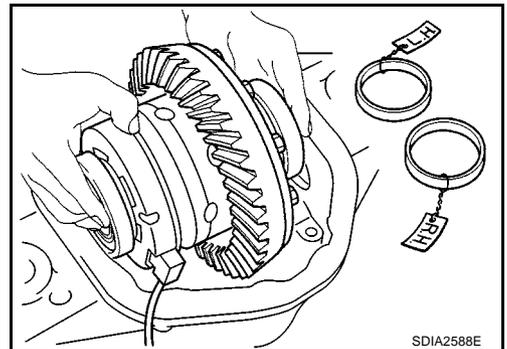
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- g. Apply gear oil to side bearings. Install differential case assembly with side bearing outer races into axle housing.



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- h. Align paint matching mark on side bearing cap with that on axle housing and install side bearing caps on axle housing.

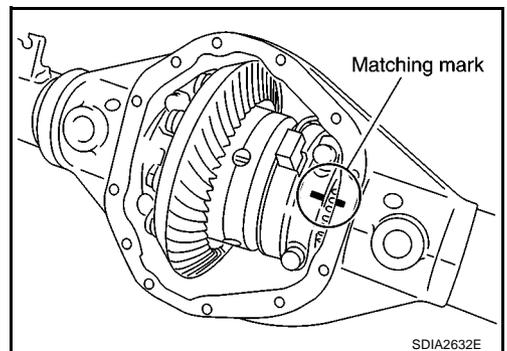
- Do not tighten at this point. This allows further tightening of side bearing adjusters.

- i. Check and adjust the backlash and tooth contact. Refer to [RFD-84, "Backlash"](#) and [RFD-83, "Tooth Contact"](#).

- j. Remove side bearing caps.

- k. Remove differential case assembly.

- l. Remove companion flange.

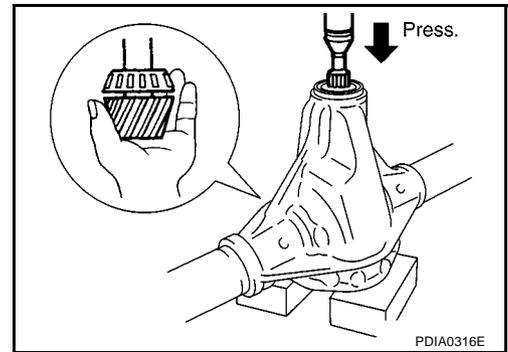


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REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

- m. Press the drive pinion assembly from axle housing.

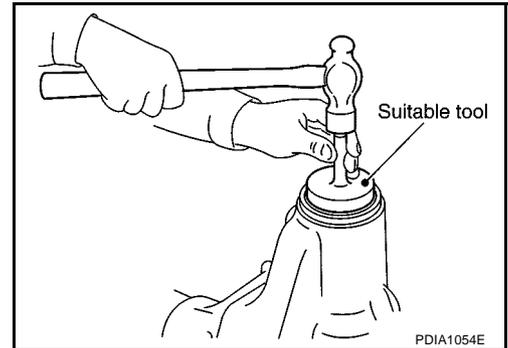
CAUTION:
Do not drop drive pinion assembly.



10. Install front oil seal into axle housing using suitable tool.

CAUTION:

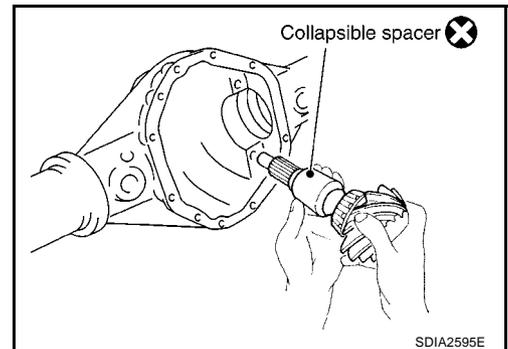
- Do not reuse oil seal.
- Do not incline oil seal when installing.
- Apply multi-purpose grease onto oil seal lip, and gear oil onto the circumference of oil seal.



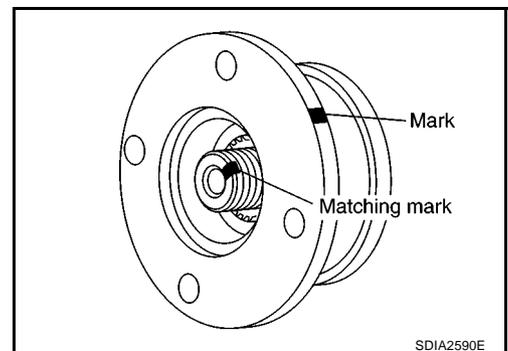
11. Install collapsible spacer to drive pinion. And then install drive pinion assembly in axle housing.

CAUTION:

- Do not reuse collapsible spacer.
- Be careful not to damage front oil seal.

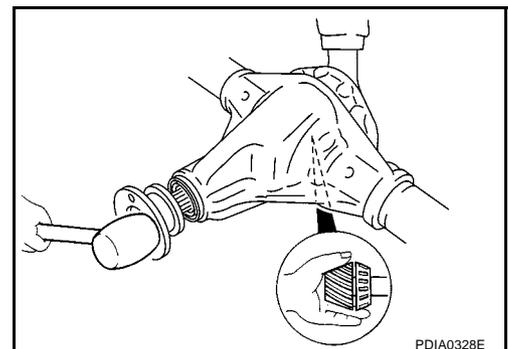


12. Align the matching mark of the drive pinion with the mark of the companion flange, then install the companion flange.



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

CAUTION:
Be careful not to damage companion flange and front oil seal.



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

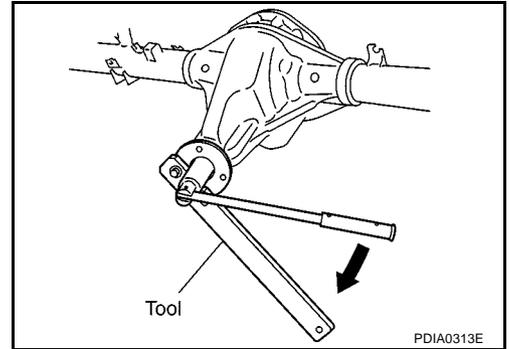
14. Apply anti-corrosive oil to the thread and seat of drive pinion lock nut, and temporarily tighten drive pinion lock nut and washer to drive pinion.

Tool number : KV40104000

CAUTION:

Do not reuse drive pinion lock nut and washer.

15. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.



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

Tool number : ST3127S000

Drive pinion lock nut tightening torque:

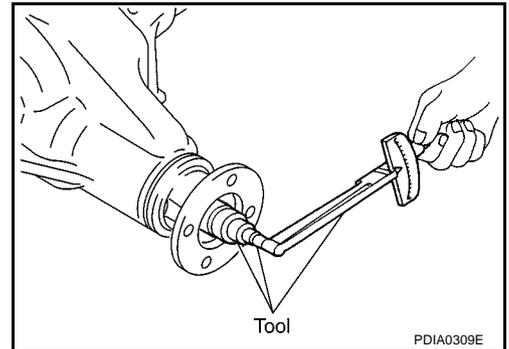
298 - 678 N·m (31 - 69 kg·m, 220 - 500 ft·lb)

Pinion bearing preload:

1.7 - 3.1 N·m (0.18 - 0.31 kg·m, 15 - 27 in·lb)

CAUTION:

- Adjust the lower limit of the drive pinion lock nut tightening torque first.
- If the preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Never loosen drive pinion lock nut to adjust the preload torque.
- After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.



17. Install differential case assembly. Refer to [RFD-96, "Differential Assembly"](#).

CAUTION:

Do not install carrier cover yet.

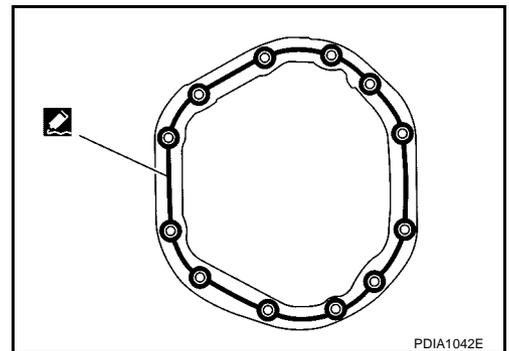
18. Check and adjust backlash, tooth contact and companion flange runout. Refer to [RFD-84, "Backlash"](#), [RFD-83, "Tooth Contact"](#) and [RFD-85, "Companion Flange Runout"](#). Recheck above items. Readjust the above description, if necessary.

19. Check total preload torque. Refer to [RFD-83, "Total Preload Torque"](#).

20. Apply sealant to mating surface of carrier cover. Refer to [RFD-82, "COMPONENTS"](#).

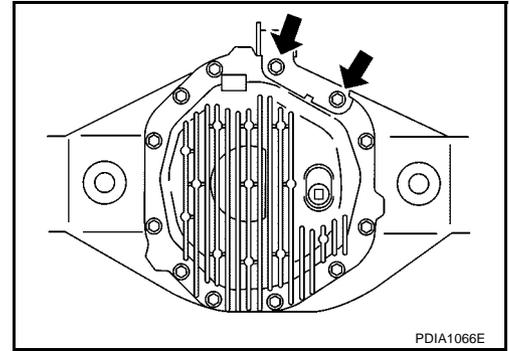
CAUTION:

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



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

21. Install carrier cover and bracket on axle housing. Then tighten carrier cover bolts to the specified torque. Refer to [RFD-82. "COMPONENTS"](#).

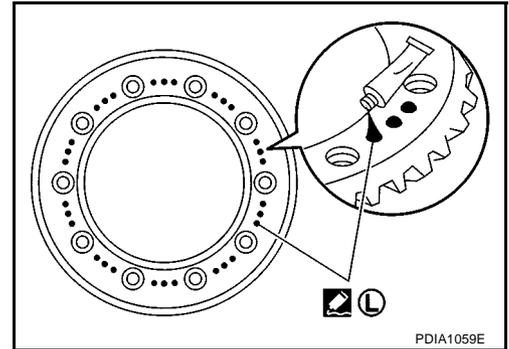


Differential Assembly

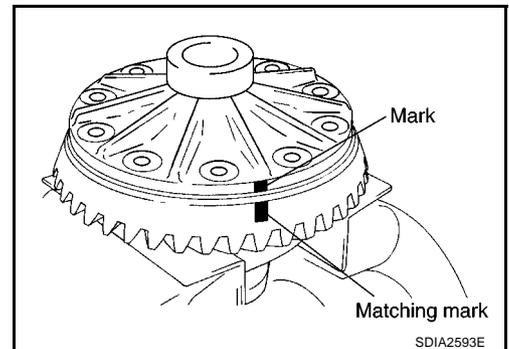
1. Apply sealant to back face of drive gear. Refer to [RFD-82. "COMPONENTS"](#).

CAUTION:

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



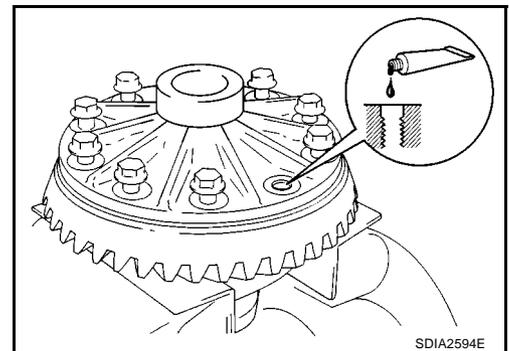
2. Align the matching mark of differential case assembly with the mark of drive gear, then install drive gear.



3. Apply thread locking sealant into the thread hole of drive gear. Refer to [RFD-82. "COMPONENTS"](#).

CAUTION:

Make sure threaded holes are clean.

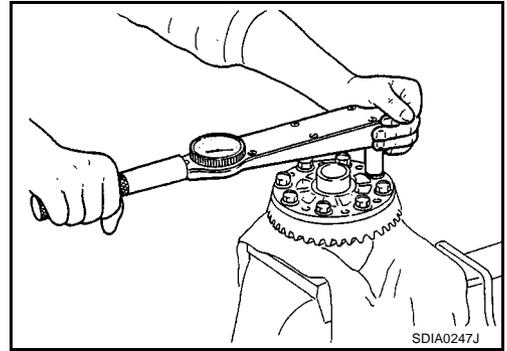


REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

4. Install the drive gear bolts, and then tighten to the specified torque. Refer to [RFD-82, "COMPONENTS"](#) .

CAUTION:

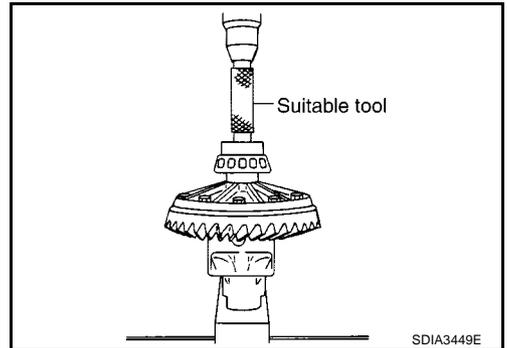
- Do not reuse the bolts.
- Tighten bolts in a crisscross fashion.



5. Press side bearing inner race to differential case assembly using suitable tool.

CAUTION:

Do not reuse side bearing.

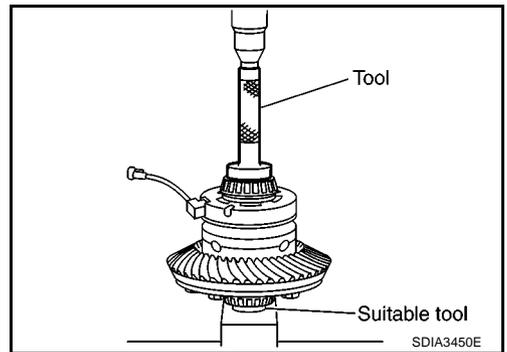


6. Install differential lock solenoid and solenoid washer.
7. Press side bearing inner race to differential case assembly using suitable tool and Tool.

Tool number : KV38100300

CAUTION:

Do not reuse side bearing.

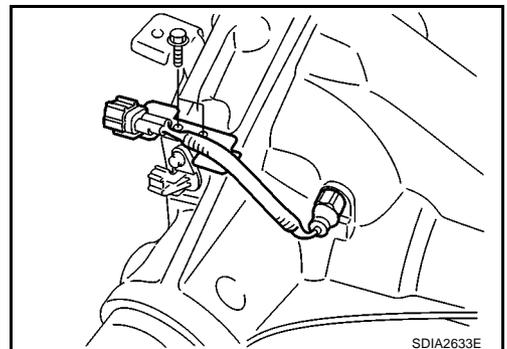


8. Apply sealant to threads of differential lock position switch. Refer to [RFD-82, "COMPONENTS"](#) .

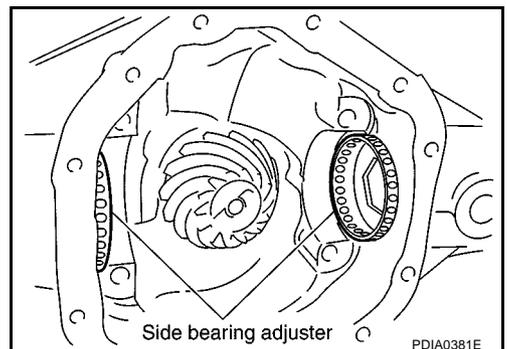
CAUTION:

Remove old sealant adhering to axle housing and differential lock position switch. Also remove any moisture, oil, or foreign material adhering to application and axle housing and differential lock position switch.

9. Install differential lock position switch on axle housing and tighten differential lock position switch bolts with the specified torque. Refer to [RFD-82, "COMPONENTS"](#) .



10. Install side bearing adjusters into axle housing.



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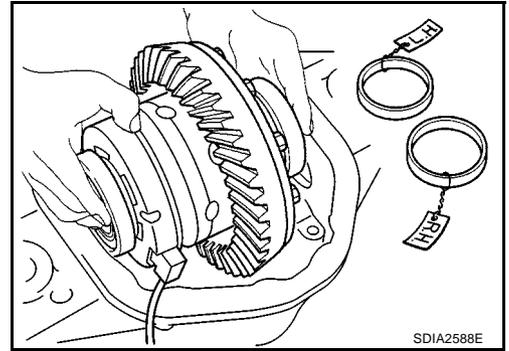
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REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

11. Apply gear oil to side bearings. Install differential case assembly with side bearing outer races into axle housing.

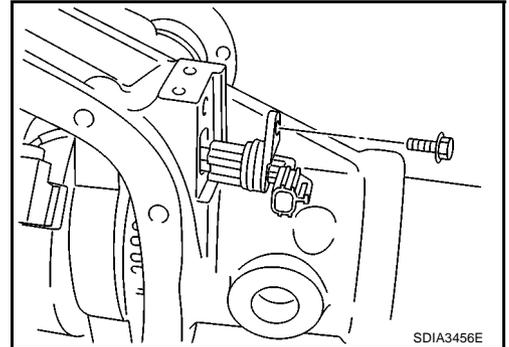


12. Apply multi-purpose grease to sensor connector.

CAUTION:

Do not reuse sensor connector.

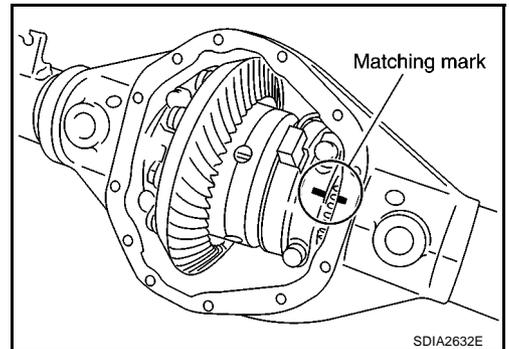
13. Connect differential lock solenoid harness and sensor connector. Then install it to axle housing, tighten to the specified torque. Refer to [RFD-82, "COMPONENTS"](#).



14. Align paint matching mark on side bearing cap with that on axle housing and install side bearing caps on axle housing.

CAUTION:

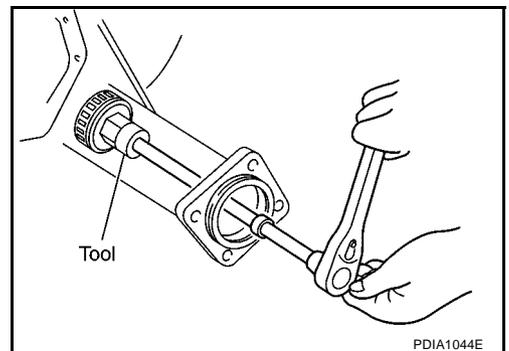
Do not tighten at this point. This allows further tightening of side bearing adjusters.



15. Tighten each side bearing adjusters using Tool.

Tool number : KV38108800

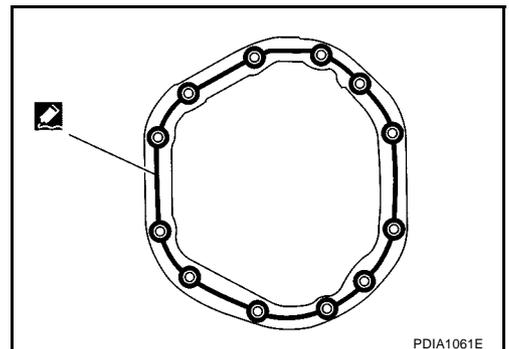
16. Adjust backlash of drive gear and drive pinion. Refer to [RFD-84, "Backlash"](#).
17. Check tooth contact. Refer to [RFD-83, "Tooth Contact"](#).
18. Check total preload. Refer to [RFD-83, "Total Preload Torque"](#).



19. Apply sealant to mating surface of carrier cover. Refer to [RFD-82, "COMPONENTS"](#).

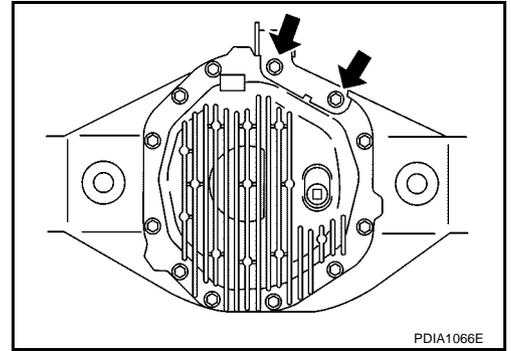
CAUTION:

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



REAR FINAL DRIVE ASSEMBLY [WITH ELECTRONIC LOCKING DIFFERENTIAL]

20. Install carrier cover and bracket on axle housing. Then tighten carrier cover bolts to the specified torque. Refer to [RFD-82](#), "[COMPONENTS](#)".



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SERVICE DATA AND SPECIFICATIONS (SDS)
[WITH ELECTRONIC LOCKING DIFFERENTIAL]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EDS003BH

Applied model	YD25DDTi	
	4WD	
	5A/T	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.) ℓ (Imp pt)	2.01 (3-1/2)	
Drive pinion adjustment spacer type	Collapsible	

Inspection and Adjustment
PRELOAD TORQUE

EDS003BI

Unit: N·m (kg·m, in·lb)

Item	Standard	
	Gear ratio: 3.538 type	Gear ratio: 3.692 type
Total preload	2.34 - 4.34 (0.24 - 0.44, 21 - 38)	2.32 - 4.34 (0.24 - 0.44, 21 - 38)
Pinion bearing preload	1.7 - 3.1 (0.18 - 0.31, 15 - 27)	

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
Inner side of companion flange	0.13 (0.0051) or less

SERVICE DATA AND SPECIFICATIONS (SDS)
[WITH ELECTRONIC LOCKING DIFFERENTIAL]

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

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

SERVICE DATA AND SPECIFICATIONS (SDS)
[WITH ELECTRONIC LOCKING DIFFERENTIAL]
