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SECTION

DRIVELINE

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

[REAR PROPELLER SHAFT: 2S80A]

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000008194046

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

| Reference | | DLN-6, "Inspection" | — | — | — | — | DLN-6, "Inspection" | DLN-6, "Inspection" | NVH of REAR FINAL DRIVE in this section. | NVH in FAX, RAX, FSU and RSU section. | NVH in WT section. | NVH in WT section. | NVH in RAX section. | NVH in BR section. | NVH in ST section. |
|------------------------------------|-----------|------------------------|--------------------------------------|---|---|-----------------------|---------------------|---------------------|--|---------------------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|
| Possible cause and SUSPECTED PARTS | | Uneven rotating torque | Center bearing improper installation | Excessive center bearing axial end play | Center bearing mounting (insulator) cracks, damage or deterioration | Excessive joint angle | Rotation imbalance | Excessive runout | DIFFERENTIAL | AXLE AND SUSPENSION | TIRE | ROAD WHEEL | DRIVE SHAFT | BRAKE | STEERING |
| Symptom | Noise | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| | Shake | | × | | | × | | | | × | × | × | × | × | × |
| | Vibration | × | × | × | × | × | × | × | | × | × | | × | | × |

×: Applicable

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PRECAUTIONS

< PRECAUTION >

[REAR PROPELLER SHAFT: 2S80A]

PRECAUTION

PRECAUTIONS

Service notice or Precautions for Rear Propeller Shaft

INFOID:000000008194047

- If the propeller shaft is dropped, replace the propeller shaft assembly.
- Never tap the tube. Avoid impacts and scratching.
- Replace the propeller shaft assembly if there are cracks or deflection on the tube.
- Protect the propeller shaft tube from damage with a tube protector during repair service.

PREPARATION

< PREPARATION >

[REAR PROPELLER SHAFT: 2S80A]

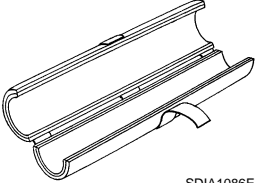
PREPARATION

PREPARATION

Special Service Tool

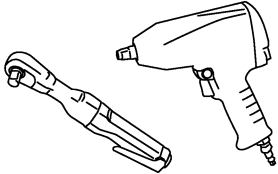
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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

| Tool number (Kent-Moore No.) Tool name | Description |
|--|---|
| — (J-46208) Propeller shaft protector | Removing and installing propeller shaft |
|  SDIA1086E | |

Commercial Service Tools

INFOID:000000008194049

| Tool name | Description |
|---|--------------------------|
| Power tool | Loosening bolts and nuts |
|  PBIC0190E | |

REAR PROPELLER SHAFT

< PERIODIC MAINTENANCE >

[REAR PROPELLER SHAFT: 2S80A]

PERIODIC MAINTENANCE

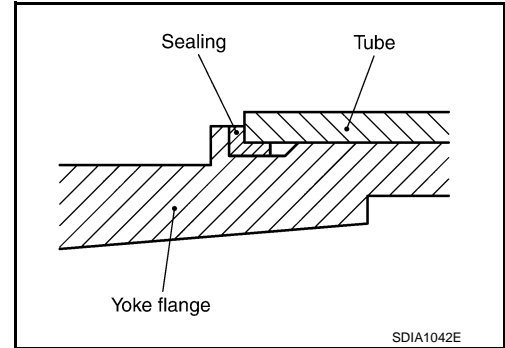
REAR PROPELLER SHAFT

Inspection

INFOID:000000008194050

NOISE

- Check the propeller shaft tube surface for dents or cracks. If damaged, replace propeller shaft assembly.
- Check that there is clearance between the tube end and yoke flange. If no clearance is found, replace the propeller shaft.
- If there are cracks, peeling, or any other breakage on the seal (yoke and tube joint) replace the propeller shaft assembly.

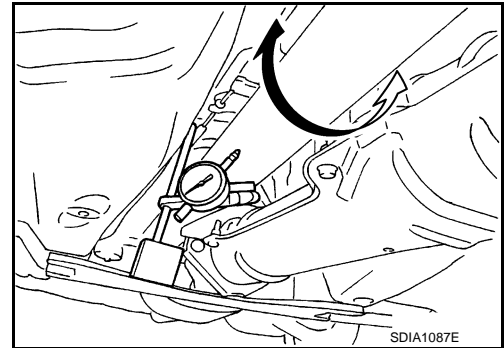


VIBRATION

If vibration is present at high speed, inspect propeller shaft runout first.

1. With a dial indicator, measure propeller shaft runout at runout measuring points by rotating final drive companion flange with hands.

Propeller shaft runout : Refer to [DLN-10, "Propeller Shaft Runout"](#).



- Propeller shaft runout measuring point (Point "△").

↶: Vehicle front

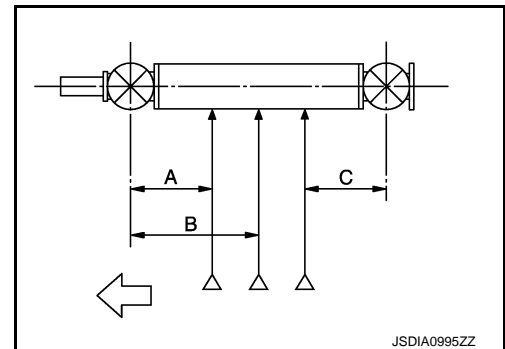
Standard

M/T

- A** : 340 mm (13.39 in)
B : 610 mm (24.02 in)
C : 340 mm (13.39 in)

A/T

- A** : 340 mm (13.39 in)
B : 580 mm (22.83 in)
C : 340 mm (13.39 in)



2. If runout still exceeds specifications, separate propeller shaft at final drive companion flange; then change the phase between companion flange and propeller shaft by the one bolt hole at a time and install propeller shaft.
3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
4. Check the vibration by driving vehicle.

REAR PROPELLER SHAFT

< REMOVAL AND INSTALLATION >

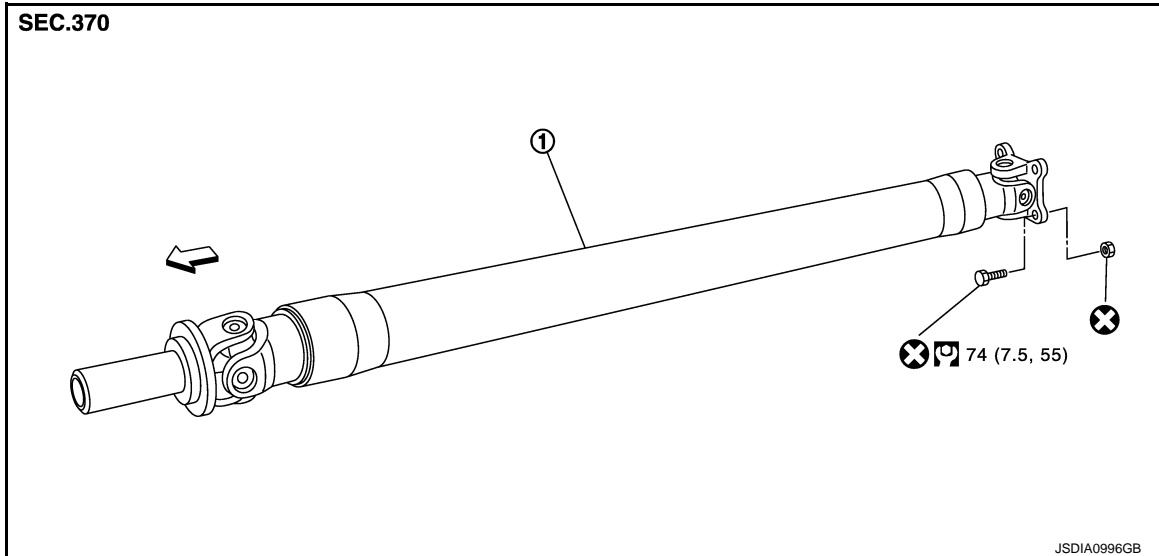
[REAR PROPELLER SHAFT: 2S80A]

REMOVAL AND INSTALLATION

REAR PROPELLER SHAFT

Exploded View

INFOID:000000008194051



1. Propeller shaft assembly

↩: Vehicle front

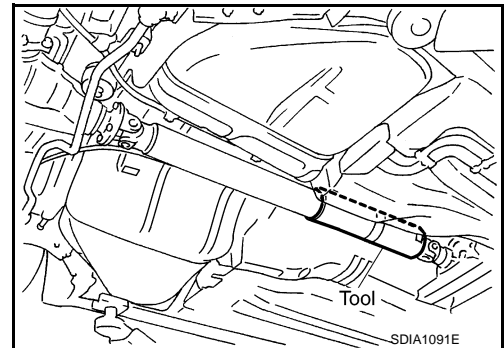
Refer to [GI-4, "Components"](#) for symbols in the figure.

Removal and Installation

INFOID:000000008194052

REMOVAL

1. Shift the transmission to the neutral position, and then release the parking brake.
2. Remove the center muffler and exhaust front tube with power tool. Refer to [EX-5, "Exploded View"](#).
3. Remove the heat insulator.
4. Attach propeller shaft protector [SST: — (J-46208)] to propeller shaft.



REAR PROPELLER SHAFT

< REMOVAL AND INSTALLATION >

[REAR PROPELLER SHAFT: 2S80A]

5. Put matching marks (A) on propeller shaft companion flange and final drive companion flange.

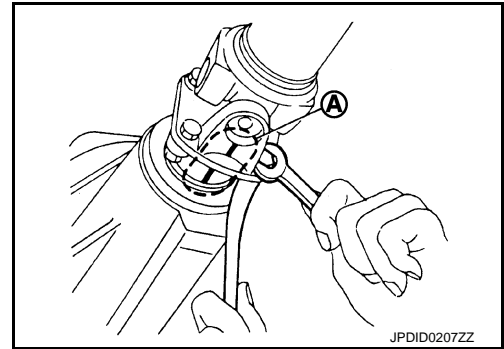
CAUTION:

For matching marks, use paint. Never damage propeller shaft companion flange and final drive companion flange.

6. Remove propeller shaft fixing bolts and nuts, and then remove propeller shaft from the vehicle.

CAUTION:

Never damage the rear oil seal of transmission.



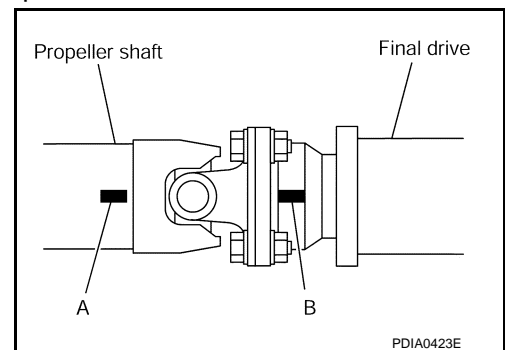
INSTALLATION

Note the following, and install in the reverse order of removal.

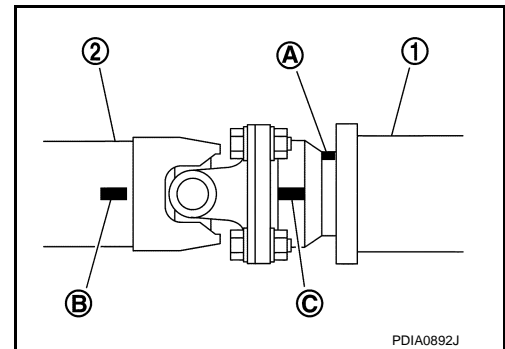
CAUTION:

After the installation, remove the propeller shaft protector from the propeller shaft.

- When installing propeller shaft, attach propeller shaft protector to propeller shaft.
- Aligning the matching of propeller shaft (A) companion flange with that of final drive companion flange (B).



- If propeller shaft assembly or final drive assembly has been replaced, connect them as follows:
 - Face the companion flange mark (A) of the final drive (1) upward. With the mark (A) faced upward, couple the propeller shaft and the final drive so that the matching mark (B) of propeller shaft (2) can be positioned as closest as possible with the matching mark (C) of the final drive companion flange.
- Tighten mounting bolts and nuts of propeller shaft and final drive to the specified torque.
- Perform inspection after installation. Refer to [DLN-8, "Inspection"](#).



INFOID:000000008194053

Inspection

INSPECTION AFTER REMOVAL

Appearance

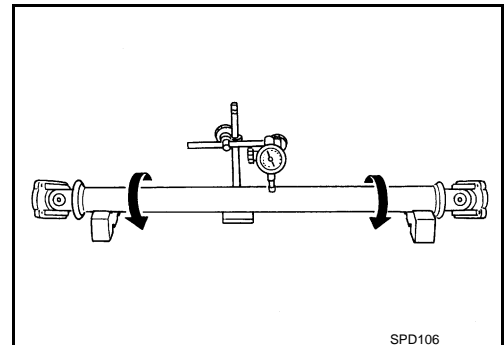
Check propeller shaft for bend and damage. If damage is detected, replace propeller shaft assembly.

Propeller Shaft Runout

Check propeller shaft runout at measuring points with a dial indicator. If runout exceeds specifications, replace propeller shaft assembly.

Propeller shaft runout

: Refer to [DLN-10, "Propeller Shaft Runout"](#).



REAR PROPELLER SHAFT

< REMOVAL AND INSTALLATION >

[REAR PROPELLER SHAFT: 2S80A]

- Propeller shaft runout measuring point (Point “△”).

↩: Vehicle front

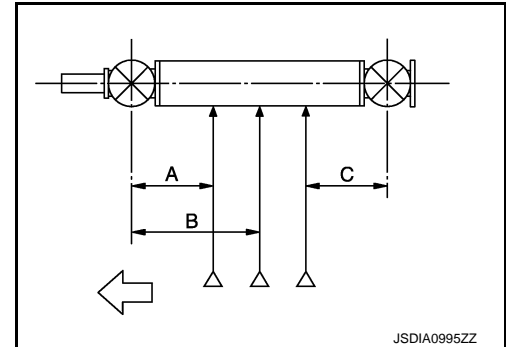
Standard

M/T

| | |
|---|---------------------|
| A | : 340 mm (13.39 in) |
| B | : 610 mm (24.02 in) |
| C | : 340 mm (13.39 in) |

A/T

| | |
|---|---------------------|
| A | : 340 mm (13.39 in) |
| B | : 580 mm (22.83 in) |
| C | : 340 mm (13.39 in) |



Journal Axial Play

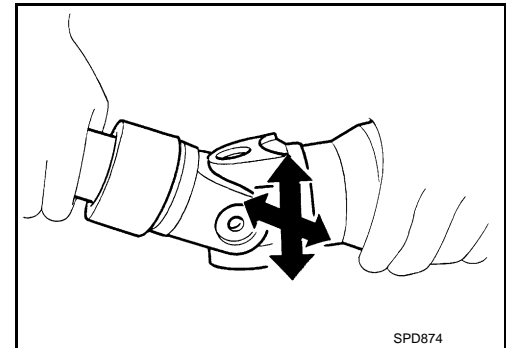
As shown in the figure, while fixing yoke on one side, check axial play of joint. If it is outside the standard, replace propeller shaft assembly.

Journal axial play

: Refer to [DLN-10, "Journal Axial Play"](#).

CAUTION:

Never disassemble joints.



INSPECTION AFTER INSTALLATION

After assembly, perform a driving test to check propeller shaft vibration. If vibration occurred, separate propeller shaft from final drive. Reinstall companion flange by changing the phase between companion flange and propeller shaft by the one bolt hole at a time. Then perform driving test and check propeller shaft vibration again at each point.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[REAR PROPELLER SHAFT: 2S80A]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000008194054

| | | |
|--|--------------------|--------------------|
| Applied model | 2WD | |
| | VQ37VHR | |
| | M/T | A/T |
| Propeller shaft model | 2S80A, CFRP | |
| Number of joints | 2 | |
| Type of journal bearings (Non-disassembly type) | 1st joint | Shell type |
| | 2nd joint | Shell type |
| Coupling method with transmission | Sleeve type | |
| Coupling method with rear final drive | Flange type | |
| Shaft length (Spider to spider) | 1221 mm (48.07 in) | 1160 mm (45.67 in) |
| Shaft outer diameter | 85 mm (3.35 in) | |

Propeller Shaft Runout

INFOID:0000000008194055

Unit: mm (in)

| Item | Limit |
|------------------------|-------------|
| Propeller shaft runout | 1.5 (0.059) |

Journal Axial Play

INFOID:0000000008194056

Unit: mm (in)

| Item | Standard |
|--------------------|----------|
| Journal axial play | 0 (0) |

REAR FINAL DRIVE ASSEMBLY

< SYSTEM DESCRIPTION >

[REAR FINAL DRIVE: R200]

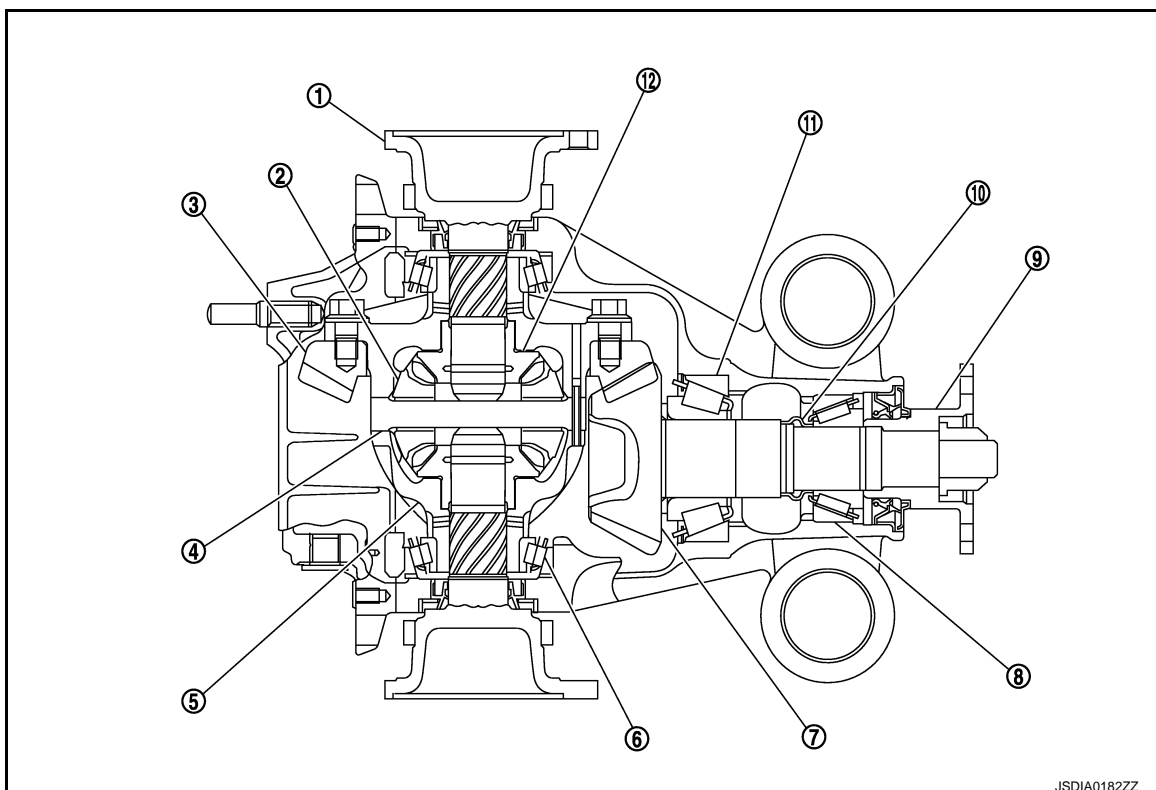
SYSTEM DESCRIPTION

REAR FINAL DRIVE ASSEMBLY

System Diagram

INFOID:000000008194057

CROSS-SECTIONAL VIEW



- | | | |
|------------------------|-------------------------|---------------------|
| 1. Side flange | 2. Pinion mate gear | 3. Drive gear |
| 4. Pinion mate shaft | 5. Differential case | 6. Side bearing |
| 7. Drive pinion | 8. Pinion front bearing | 9. Companion flange |
| 10. Collapsible spacer | 11. Pinion rear bearing | 12. Side gear |

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

[REAR FINAL DRIVE: R200]

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000008194058

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

| Reference | | DLN-40, "Inspection After Disassembly" | DLN-35, "Adjustment" | DLN-40, "Inspection After Disassembly" | DLN-35, "Adjustment" | DLN-47, "Adjustment" | DLN-18, "Inspection" | NVH of REAR PROPELLER SHAFT in this section. | NVH in FAX, RAX, FSU and RSU sections. | NVH in WT section. | NVH in WT section. | NVH in RAX section. | NVH in BR section. | NVH in ST section. |
|------------------------------------|-------|--|-----------------------|--|----------------------|-----------------------------------|----------------------|--|--|--------------------|--------------------|---------------------|--------------------|--------------------|
| Possible cause and SUSPECTED PARTS | | Gear tooth rough | Gear contact improper | Tooth surfaces worn | Backlash incorrect | Companion flange excessive runout | Gear oil improper | PROPELLER SHAFT | AXLE AND SUSPENSION | TIRE | ROAD WHEEL | DRIVE SHAFT | BRAKE | STEERING |
| Symptom | Noise | × | × | × | × | × | × | × | × | × | × | × | × | × |

×: Applicable

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Rear Final Drive

INFOID:000000008194059

- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they never interfere with the function of the parts when applied.
- Overhaul should be done in a clean work area, it is preferable to work in dustproof area.
- Before disassembly, using steam or white gasoline, completely remove sand and mud from the exterior of the unit, preventing them from entering into the unit during disassembly or assembly.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with 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.
- Never use cotton gloves or shop rags to prevent entering of lint.
- During assembly, observe the specified tightening torque, and apply new gear oil, petroleum jelly, or multi-purpose grease as specified for each vehicle, if necessary.

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PREPARATION

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[REAR FINAL DRIVE: R200]

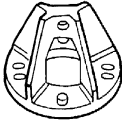
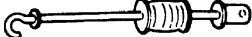
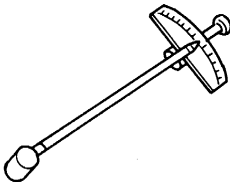
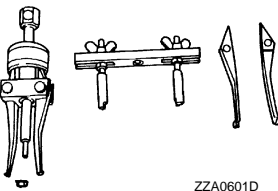
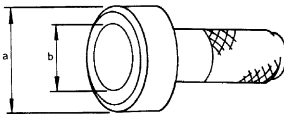
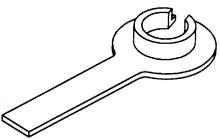
PREPARATION

PREPARATION

Special Service Tools

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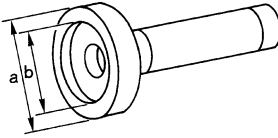
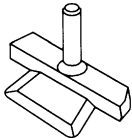
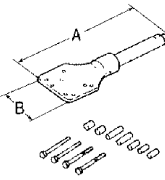
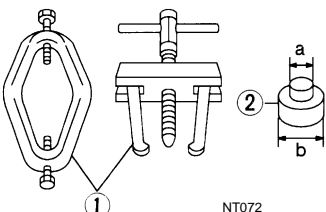
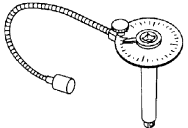
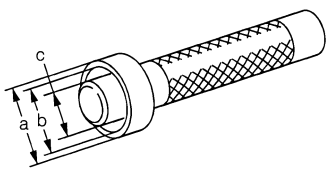
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

| Tool number (Kent-Moore No.) Tool name | | Description |
|---|---|--|
| KV40104100 (—) Attachment |  ZZA0804D | Removing side flange |
| ST36230000 (J-25840-A) Sliding hammer |  ZZA0803D | Removing side flange |
| ST3127S000 (J-25765-A) Preload gauge |  ZZA0806D | Measuring pinion bearing preload and total preload |
| KV381054S0 (J-34286) Puller |  ZZA0601D | Removing front oil seal |
| ST30720000 (J-25405) Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia. |  ZZA0811D | <ul style="list-style-type: none"> Installing front oil seal Installing pinion rear bearing outer race |
| KV38107900 (J-39352) Protector |  S-NT129 | Installing side flange |

PREPARATION

< PREPARATION >

[REAR FINAL DRIVE: R200]

| Tool number (Kent-Moore No.) Tool name | Description | |
|--|---|-----|
| KV38100200 (J-26233) Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia. | Installing side oil seal | A |
|  ZZA1143D | | B |
| KV10111100 (J-37228) Seal cutter | Removing rear cover | C |
|  S-NT046 | | DLN |
| KV38100800 (J-25604-01) Attachment A: 541 mm (21.30 in) B: 200 mm (7.87 in) | Fixing unit assembly | E |
|  SDIA0267E | | F |
| ST3306S001 (J-22888-D) Differential side bearing puller set 1: ST33051001 (J-22888-20) Puller 2: ST33061000 (J-8107-2) Base a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia. | Removing and installing side bearing inner race | G |
|  NT072 | | H |
| KV10112100 (BT-8653-A) Angle wrench | Tightening the drive gear mounting bolt | I |
|  ZZA0120D | | J |
| KV38100300 (J-25523) Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia. | Installing side bearing inner race | K |
|  ZZA1046D | | L |

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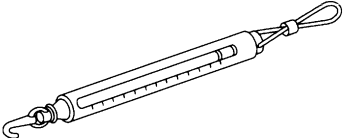
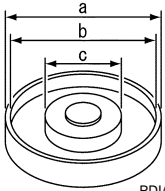
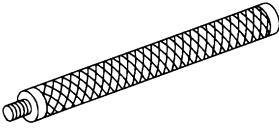
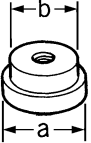
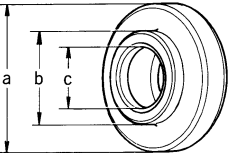
O

P

PREPARATION

< PREPARATION >

[REAR FINAL DRIVE: R200]

| Tool number (Kent-Moore No.) Tool name | Description |
|---|--|
| — (J-8129) Spring gauge | Measuring turning torque |
|  NT127 | |
| KV40105230 (—) Drift a: 92 mm (3.62 in) dia. b: 86 mm (3.39 in) dia. c: 45 mm (1.77 in) dia. | Installing pinion rear bearing outer race |
|  PDIA0591E | |
| ST30611000 (J-25742-1) Drift bar | Installing pinion front bearing outer race (Use with ST30613000) |
|  S-NT090 | |
| ST30613000 (J-25742-3) Drift a: 72 mm (2.83 in) dia. b: 48 mm (1.89 in) dia. | Installing pinion front bearing outer race |
|  ZZA1000D | |
| ST30901000 (J-26010-01) Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia. | Installing pinion rear bearing inner race |
|  ZZA0978D | |

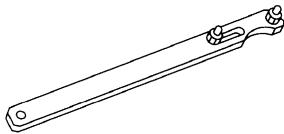
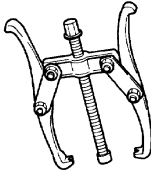

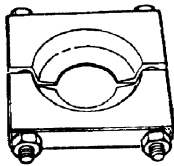
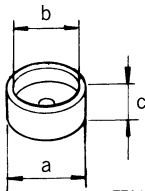
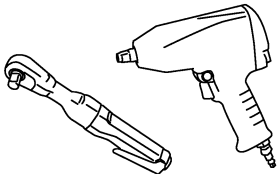
Commercial Service Tools

INFOID:000000008194061

PREPARATION

< PREPARATION >

[REAR FINAL DRIVE: R200]

| Tool name | Description |
|---|---|
| Flange wrench  NT035 | Removing and installing drive pinion lock nut |
| Puller  ZZA0119D | Removing companion flange |
| Sliding hammer  NT125 | Removing differential case assembly |
| Replacer  ZZA0700D | Removing pinion rear bearing inner race |
| Spacer a: 60 mm (2.36 in) dia. b: 36 mm (1.42 in) dia. c: 30 mm (1.18 in)  ZZA1133D | Installing pinion front bearing inner race |
| Power tool  PBIC0190E | Loosening bolts and nuts |

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PERIODIC MAINTENANCE

REAR DIFFERENTIAL GEAR OIL

Inspection

INFOID:000000008194062

OIL LEAKAGE

Make sure that oil is not leaking from final drive assembly or around it.

OIL LEVEL

- Remove filler plug (1) and check oil level from filler plug mounting hole as shown in the figure.

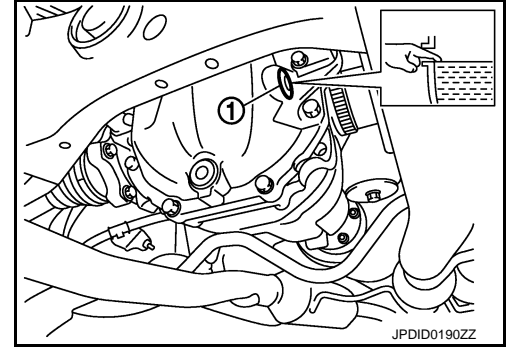
CAUTION:

Never start engine while checking oil level.

- Set a gasket on filler plug and install it on final drive assembly. Refer to [DLN-28, "Exploded View"](#).

CAUTION:

Never reuse gasket.



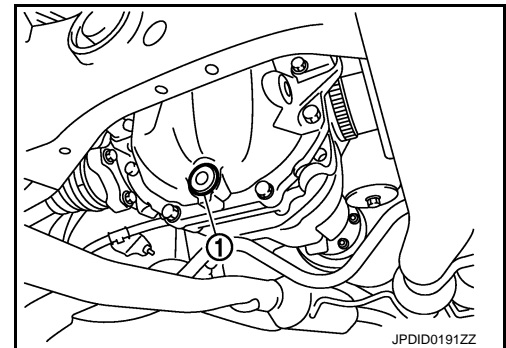
Draining

INFOID:000000008194063

- Stop the engine.
- Remove drain plug (1) and drain gear oil.
- Set a gasket on drain plug and install it to final drive assembly and tighten to the specified torque. Refer to [DLN-28, "Exploded View"](#).

CAUTION:

Never reuse gasket.



Refilling

INFOID:000000008194064

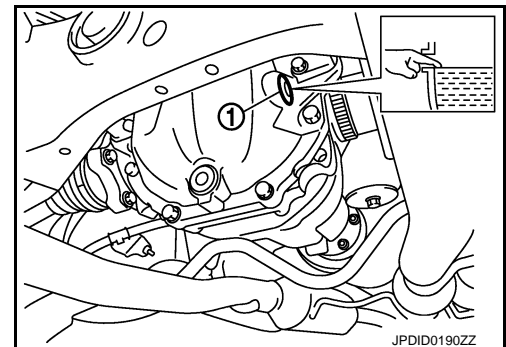
- Remove filler plug (1). Fill with new gear oil until oil level reaches the specified level near filler plug mounting hole.

Oil grade and viscosity

: Refer to [MA-16, "FOR NORTH AMERICA : Fluids and Lubricants"](#) (for NORTH AMERICA), [MA-17, "FOR MEXICO : Fluids and Lubricants"](#) (except for NORTH AMERICA).

Oil capacity

: Refer to [DLN-49, "General Specification"](#).



- After refilling oil, check oil level. Set a gasket to filler plug, then install it to final drive assembly. Refer to [DLN-28, "Exploded View"](#).

CAUTION:

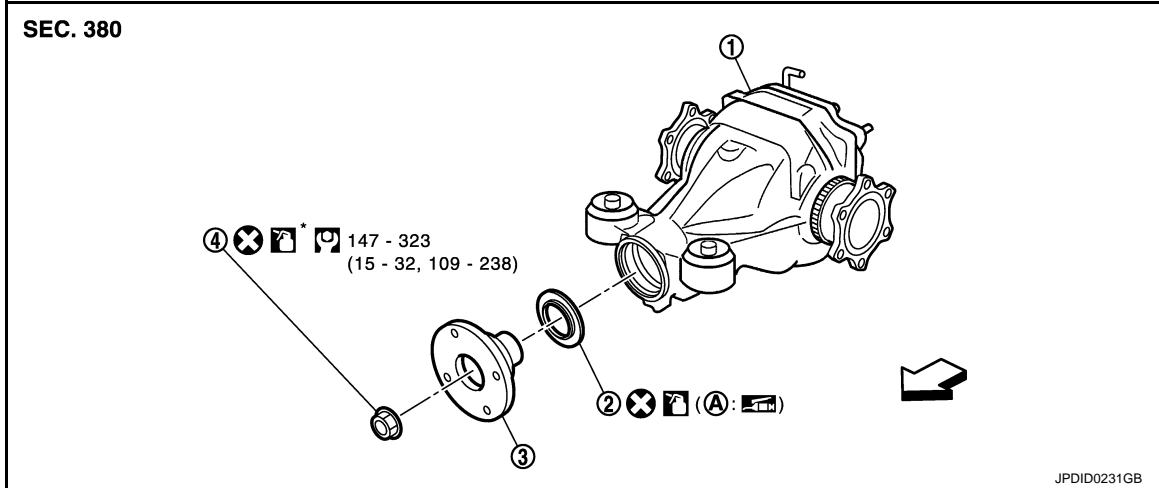
Never reuse gasket.

REMOVAL AND INSTALLATION

FRONT OIL SEAL

Exploded View

INFOID:000000008194065



1. Final drive assembly 2. Front oil seal 3. Companion flange

4. Drive pinion lock nut

- A. Oil seal lip

↔: Vehicle front

: Apply gear oil.

: Apply anti-corrosion oil.

Refer to [GL-4, "Components"](#) for symbols not described on the above.

Removal and Installation

INFOID:000000008194066

REMOVAL

CAUTION:

Verify identification stamp of replacement frequency put in the lower part of gear carrier to determine replacement for collapsible spacer when replacing front oil seal. Refer to "Identification stamp of replacement frequency of front oil seal". If collapsible spacer replacement is necessary, remove final drive assembly and disassemble it to replace front oil seal and collapsible spacer. Refer to [DLN-26, "Removal and Installation"](#) and [DLN-42, "Disassembly"](#).

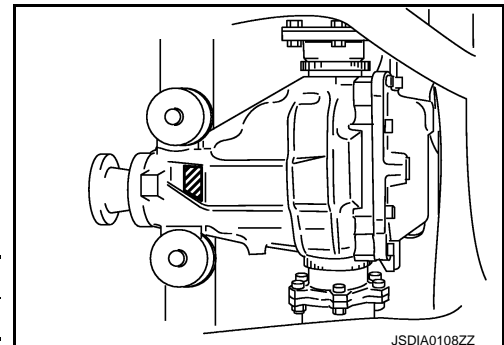
NOTE:

The reuse of collapsible spacer is prohibited in principle. However, it is reusable on a one-time basis only in cases when replacing front oil seal.

Identification stamp of replacement frequency of front oil seal

- The diagonally shaded area in the figure shows stamping point for replacement frequency of front oil seal.
 - The following table shows if collapsible spacer replacement is needed before replacing front oil seal.
- When collapsible spacer replacement is required, disassemble final drive assembly to replace collapsible spacer and front oil seal. Refer to [DLN-42, "Disassembly"](#).

| Stamp | collapsible spacer replacement |
|----------|--------------------------------|
| No stamp | Not required |



FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200]

| Stamp | collapsible spacer replacement |
|---------------------------------------|--------------------------------|
| "0" or "0" on the far right of stamp | Required |
| "01" or "1" on the far right of stamp | Not required |

CAUTION:

Make a stamping after replacing front oil seal.

- After replacing front oil seal, make a stamping on the stamping point in accordance with the table below in order to identify replacement frequency.

CAUTION:

Make a stamping from left to right.

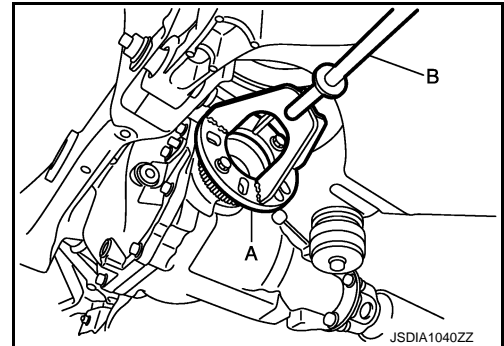
| Stamp before stamping | Stamping on the far right | Stamping |
|--|---------------------------|----------|
| No stamp | 0 | 0 |
| "0" (Front oil seal was replaced once.) | 1 | 01 |
| "01" (Collapsible spacer and front oil seal were replaced last time.) | 0 | 010 |
| "0" is on the far right. (Only front oil seal was replaced last time.) | 1 | ...01 |
| "1" is on the far right. (Collapsible spacer and front oil seal were replaced last time.) | 0 | ...010 |

- Drain gear oil. Refer to [DLN-18, "Draining"](#).
- Make a judgment if a collapsible spacer replacement is required.
- Remove center muffler with a power tool. Refer to [EX-5, "Exploded View"](#).
- Remove rear wheel sensors. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).
- Remove drive shafts from final drive. Refer to [RAX-10, "Exploded View"](#).
- Install attachment (A) to side flange, and then pull out the side flange with the sliding hammer (B).

A : Attachment [SST: KV40104100 (—)]

B : Sliding hammer [SST: ST36230000 (J-25840-A)]

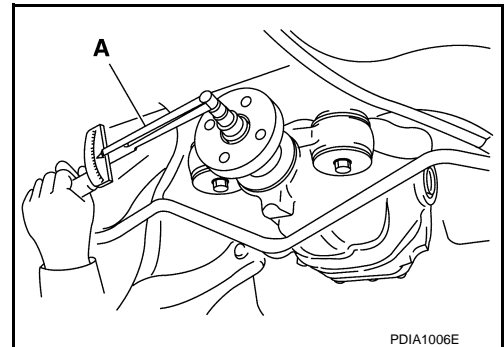
- Remove rear propeller shaft. Refer to [DLN-7, "Exploded View"](#).



- Measure the total preload with the preload gauge (A) [SST: ST3127S000 (J-25765-A)].

NOTE:

Record the preload measurement.



FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200]

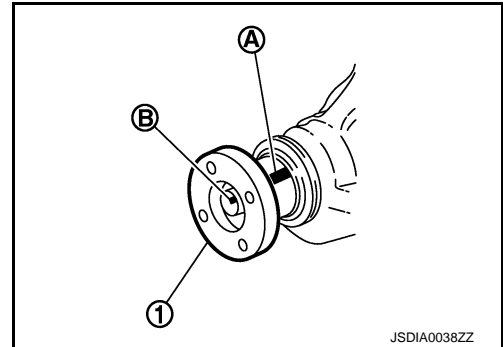
9. Put matching mark (B) on the end of the drive pinion. The matching mark should be in line with the matching mark (A) on companion flange (1).

CAUTION:

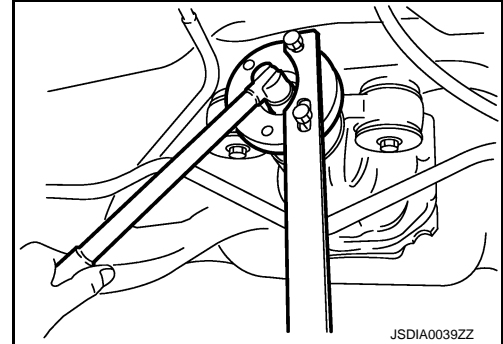
For matching mark, use paint. Never damage companion flange and drive pinion.

NOTE:

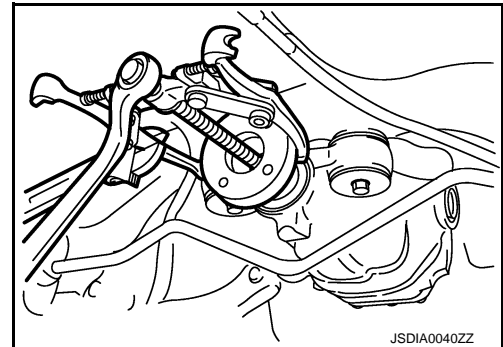
The matching mark on the final drive companion flange indicates the maximum vertical runout position.



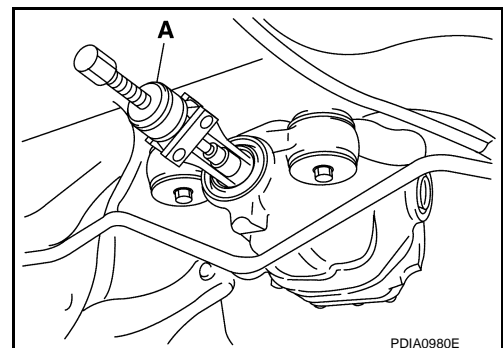
10. Remove drive pinion lock nut using the flange wrench (commercial service tool).



11. Remove companion flange using puller (commercial service tool).



12. Remove front oil seal using the puller (A) [SST: KV381054S0 (J-34286)].



INSTALLATION

1. Apply multi-purpose grease to front oil seal lip.

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FRONT OIL SEAL

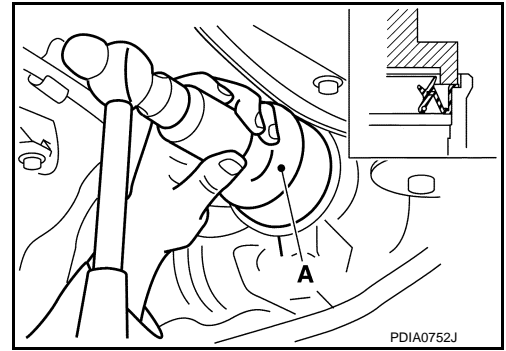
< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200]

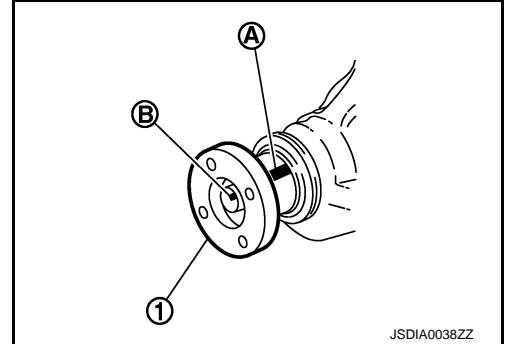
2. Install front oil seal using the drift (A) [SST: ST30720000 (J-25405)] as shown in figure.

CAUTION:

- Never reuse oil seal.
- Never incline oil seal when installing.



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



4. Apply anti-corrosion oil to the thread and seat of new drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion, using flange wrench (commercial service tool).

A : Preload gauge [SST: ST3127S000 (J-25765-A)]

CAUTION:

Never reuse drive pinion lock nut.

5. Tighten drive pinion lock nut within the limits of specified torque so as to keep the pinion bearing preload within a standard values, using preload gauge [SST: ST3127S000 (J-25765-A)].

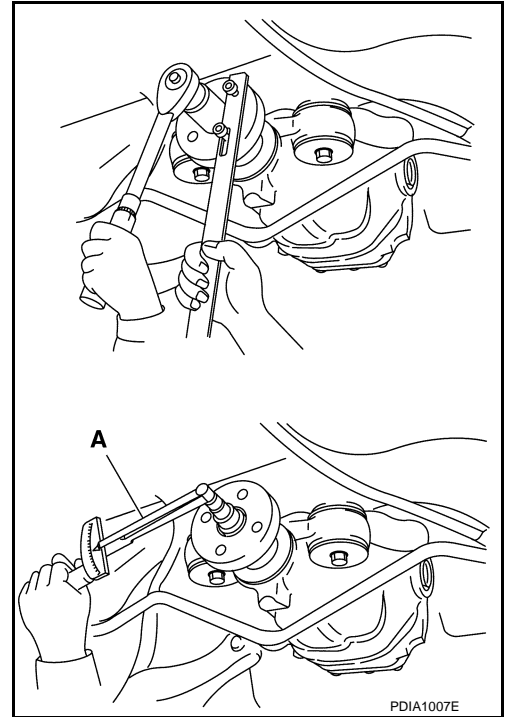
Standard

Total preload torque

: A value that add 0.1 – 0.4 N·m (0.01 – 0.04 kg·m, 0.9 – 3.5 in·lb) to the measured value before removing.

CAUTION:

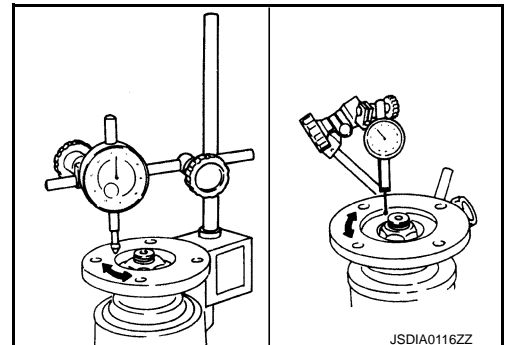
- Adjust to the lower limit of the drive pinion lock nut tightening torque first.
- If the preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Never loosen drive pinion lock nut to adjust the preload torque.



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

Companion flange runout : Refer to DLN-49, "Companion Flange Runout".

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



Companion flange runout : Refer to [DLN-49, "Companion Flange Runout"](#).

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

10. Make a stamping for identification of front oil seal replacement frequency. Refer to "Identification stamp of replacement frequency of front oil seal".

CAUTION:

Make a stamping after replacing front oil seal.

11. Install rear propeller shaft. Refer to [DLN-7, "Exploded View"](#).

12. Install side flanges with the following procedure.

- Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
- After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.
- Put a suitable drift on the center of side flange, then drive it until sound changes.

NOTE:

When installation is completed, driving sound of the side flange turns into a sound that seems to affect the whole final drive.

- Confirm that the dimension of the side flanges (1) installation measurement (A) in the figure comes into the following.

Standard

A : 326 – 328 mm (12.83 – 12.91 in)

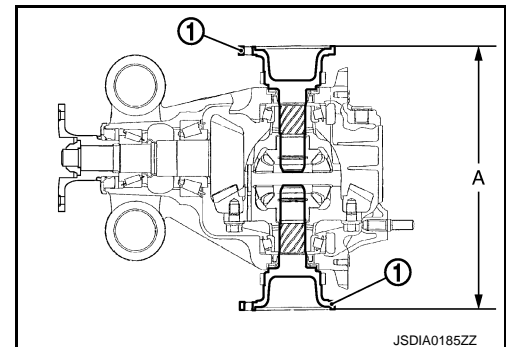
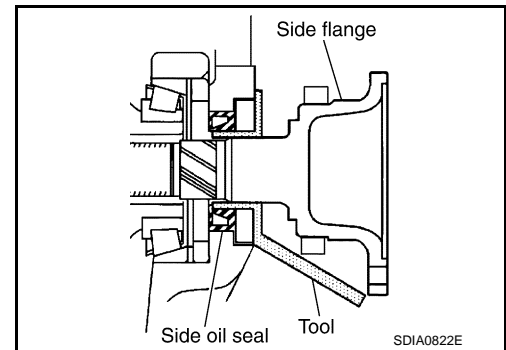
13. Install drive shafts. Refer to [RAX-10, "Exploded View"](#).

14. Install rear wheel sensors. Refer to [BRC-106, "REAR WHEEL SENSOR: Exploded View"](#).

15. Install center muffler. Refer to [EX-5, "Exploded View"](#).

16. Refill gear oil to the final drive and check oil level. Refer to [DLN-18, "Refilling"](#).

17. Check the final drive for oil leakage. Refer to [DLN-18, "Inspection"](#).



SIDE OIL SEAL

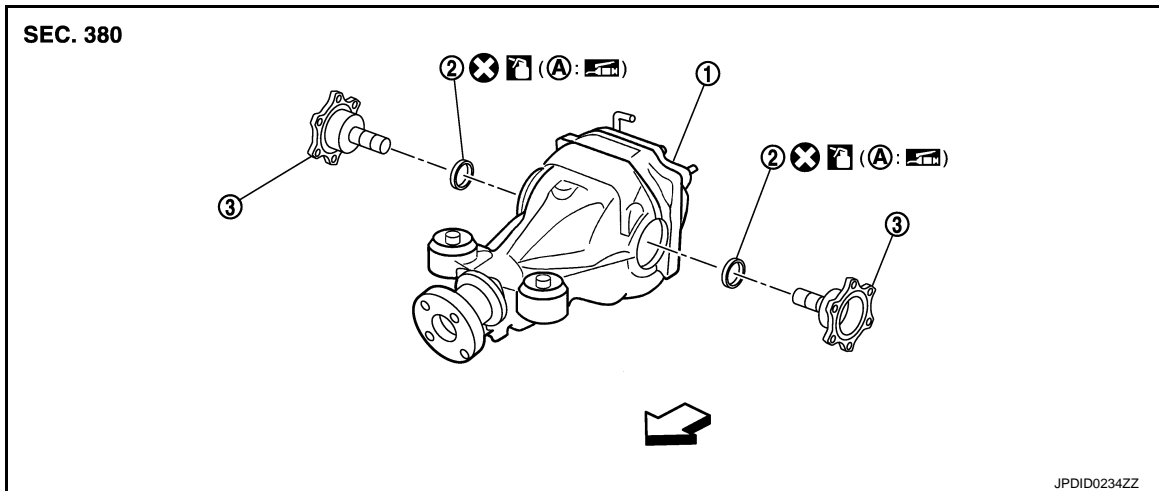
< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200]

SIDE OIL SEAL

Exploded View

INFOID:000000008194067



1. Final drive assembly

2. Side oil seal

3. Side flange

A. Oil seal lip

⇐: Vehicle front

: Apply gear oil.

Refer to [GI-4, "Components"](#) for symbols not described on the above.

Removal and Installation

INFOID:000000008194068

REMOVAL

1. Remove center muffler with a power tool. Refer to [EX-5, "Exploded View"](#).
2. Remove rear wheel sensor. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).
3. Remove drive shaft from final drive with a power tool. Refer to [RAX-10, "Exploded View"](#).
4. Install attachment (A) to side flange, and then pull out the side flange with the sliding hammer (B).

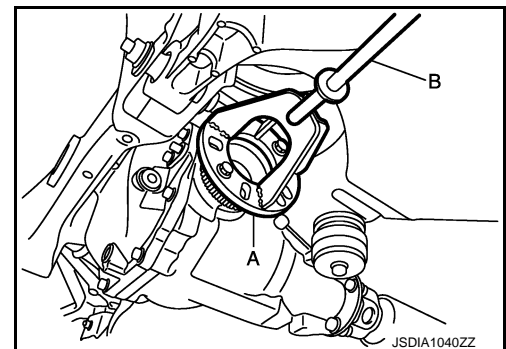
A : Attachment [SST: KV40104100 (—)]

B : Sliding hammer [SST: ST36230000 (J-25840-A)]

5. Remove side oil seal, using a suitable tool.

CAUTION:

Never damage gear carrier.



INSTALLATION

1. Apply multi-purpose grease to side oil seal lip.

SIDE OIL SEAL

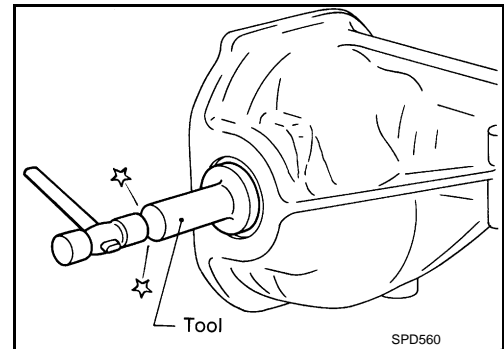
< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200]

2. Install side oil seal until it becomes flush with the case end, using the drift [SST: KV38100200 (J-26233)].

CAUTION:

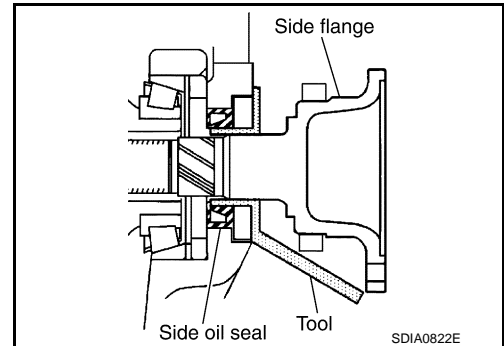
- **Never reuse oil seal.**
- **When installing, never incline oil seal.**



3. Install side flange with the following procedure.
 - a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
 - b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.
 - c. Put a suitable drift on the center of side flange, then drive it until sound changes.

NOTE:

When installation is completed, driving sound of the side flange turns into a sound that seems to affect the whole final drive.

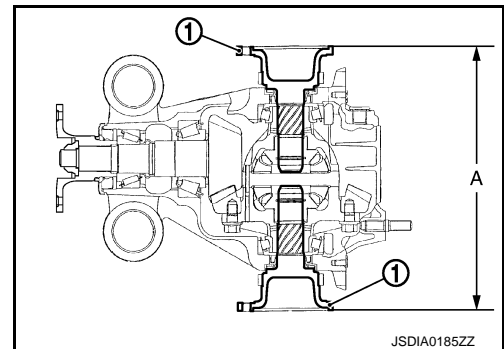


- d. Confirm that the dimension of the side flanges (1) installation measurement (A) in the figure comes into the following.

Standard

A : 326 – 328 mm (12.83 – 12.91 in)

4. Install drive shaft. Refer to [RAX-10, "Exploded View"](#).
5. Install rear wheel sensor. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).
6. Install center muffler. Refer to [EX-5, "Exploded View"](#).
7. When oil leaks while removing, check oil level after the installation. Refer to [DLN-18, "Inspection"](#).



REAR FINAL DRIVE ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

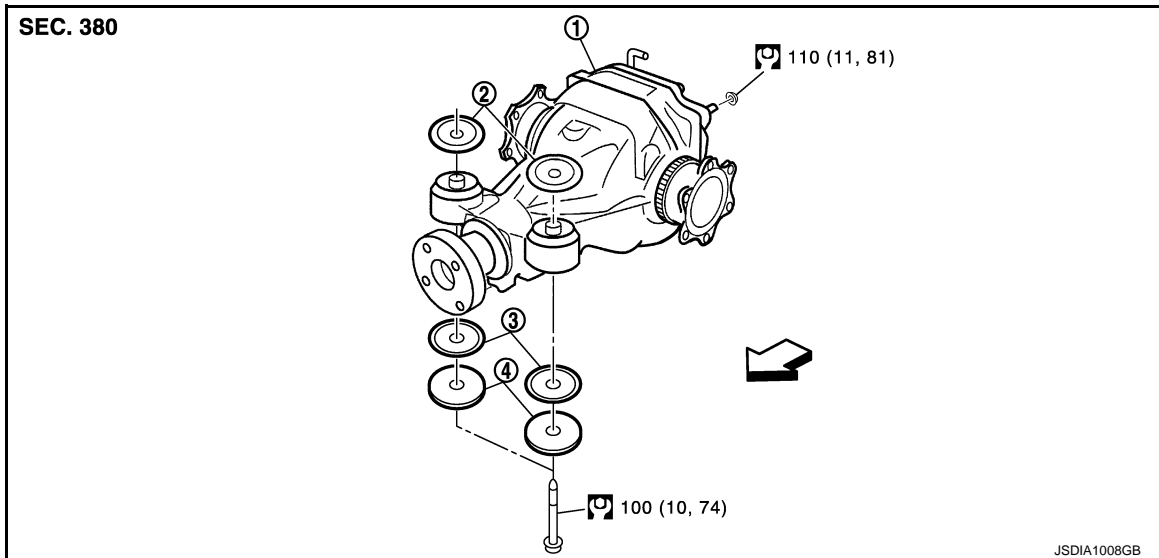
[REAR FINAL DRIVE: R200]

UNIT REMOVAL AND INSTALLATION

REAR FINAL DRIVE ASSEMBLY

Exploded View

INFOID:000000008194069



- | | | |
|------------------------------|------------------|------------------|
| 1. Rear final drive assembly | 2. Upper stopper | 3. Lower stopper |
| 4. Washer | | |

◀: Vehicle front

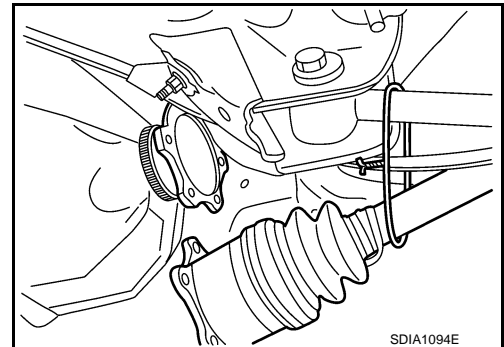
Refer to [GI-4, "Components"](#) for symbols in the figure.

Removal and Installation

INFOID:000000008194070

REMOVAL

1. Remove center muffler with a power tool. Refer to [EX-5, "Exploded View"](#).
2. Remove diag brace with power tool. Refer to [RSU-17, "Exploded View"](#).
3. Remove stabilizer bar with a power tool. Refer to [RSU-16, "Exploded View"](#).
4. Remove rear propeller shaft from the final drive. Refer to [DLN-7, "Exploded View"](#).
5. Remove drive shafts from final drive with a power tool. Then suspend it by wire, etc. Refer to [RAX-10, "Exploded View"](#).
6. Remove breather hose from the final drive.
7. Remove rear wheel sensors. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).



REAR FINAL DRIVE ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200]

8. Set a suitable jack to rear final drive assembly.

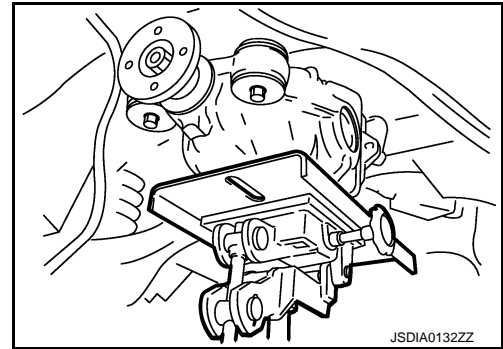
CAUTION:

Never place a jack on the rear cover (aluminum case).

9. Remove the mounting bolts and nuts connecting to the suspension member, and remove rear final drive assembly with a power tool.

CAUTION:

Secure rear final drive assembly to a suitable jack while removing it.



INSTALLATION

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

CAUTION:

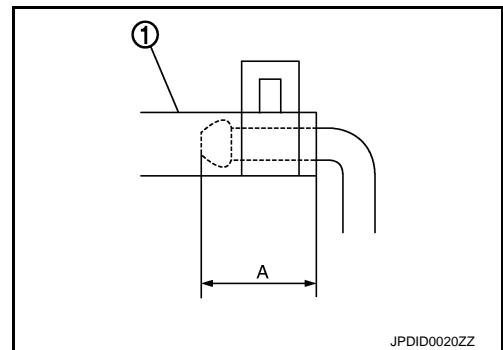
Make sure there are no pinched or restricted areas on the breather hose caused by bending or winding when installing it.

- Install the breather hose (1) to breather connector until dimension (A) shown as follows.

A:

Final drive side : 20 mm (0.79 in)

**Suspension member : 20.5 mm (0.807 in)
side**



CAUTION:

- **Never reuse hose clamp.**
- **Install the hose clamp at the final drive side, with the tab facing downward.**
- **Install the hose clamp at the suspension member side, with the tab facing downward.**

- If remove breather connector, install breather hose (1) as shown in the figure.

2 : Suspension member

3 : Metal connector

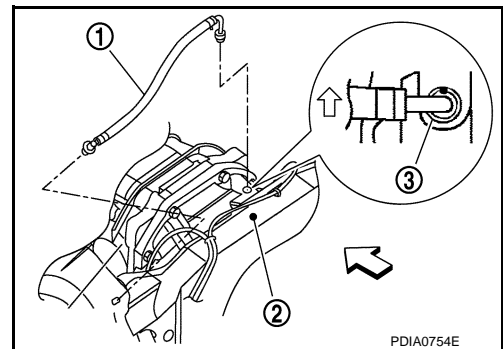
←: Vehicle front

- For installation, insert the breather connector to suspension member. Install metal connector to rear cover with aiming painted marking to the front of vehicle.

CAUTION:

Never reuse breather connector and metal connector.

- When oil leaks while removing final drive assembly, check oil level after the installation. Refer to [DLN-18, "Inspection"](#).



DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

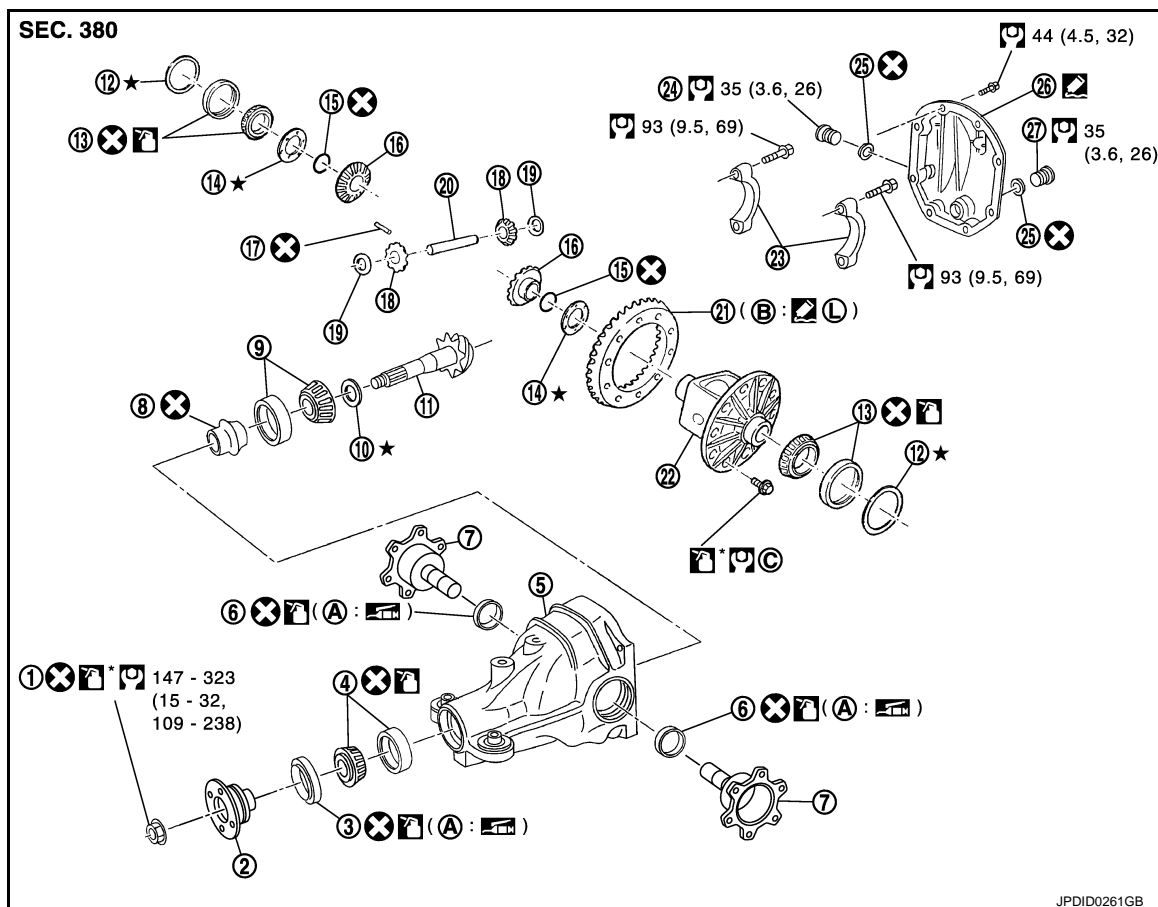
[REAR FINAL DRIVE: R200]

UNIT DISASSEMBLY AND ASSEMBLY

DIFFERENTIAL ASSEMBLY

Exploded View

INFOID:000000008778931



- | | | |
|------------------------------------|-----------------------------|--|
| 1. Drive pinion lock nut | 2. Companion flange | 3. Front oil seal |
| 4. Pinion front bearing | 5. Gear carrier | 6. Side oil seal |
| 7. Side flange | 8. Collapsible spacer | 9. Pinion rear bearing |
| 10. Pinion height adjusting washer | 11. Drive pinion | 12. Side bearing adjusting washer |
| 13. Side bearing | 14. Side gear thrust washer | 15. Circular clip |
| 16. Side gear | 17. Lock pin | 18. Pinion mate gear |
| 19. Pinion mate thrust washer | 20. Pinion mate shaft | 21. Drive gear |
| 22. Differential case | 23. Bearing cap | 24. Filler plug |
| 25. Gasket | 26. Rear cover | 27. Drain plug |
| A. Oil seal lip | B. Screw hole | C. Comply with the assembly procedure when tightening. Refer to DLN-31, "Assembly" . |

: Apply gear oil.

*: Apply anti-corrosion oil.

: Apply Genuine Silicone RTV or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

(L): Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

Refer to [GI-4, "Components"](#) for symbols not described on the above.

DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

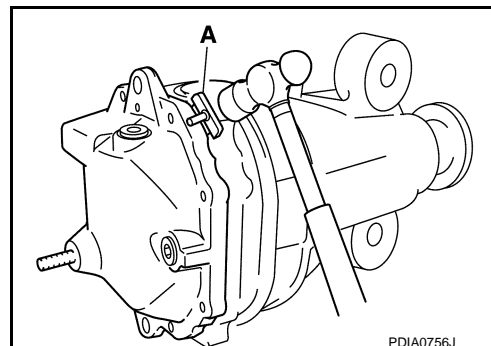
Disassembly

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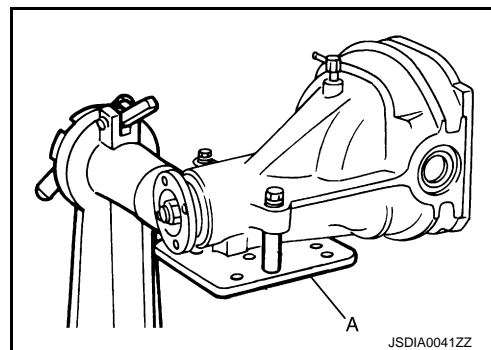
1. Drain gear oil, if necessary.
2. Remove side flanges.
3. Remove rear cover mounting bolts.
4. Remove rear cover to insert the seal cutter (A) [SST: KV10111100 (J-37228)] between gear carrier and rear cover.

CAUTION:

- Never damage the mating surface.
- Never insert flat-bladed screwdriver, this may damage the mating surface.



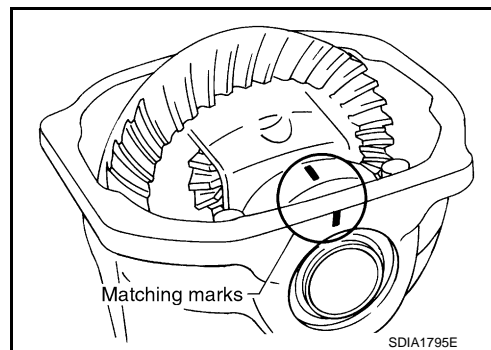
5. Using two spacers, mount carrier on the attachment (A) [SST: KV38100800 (J-25604-01)].



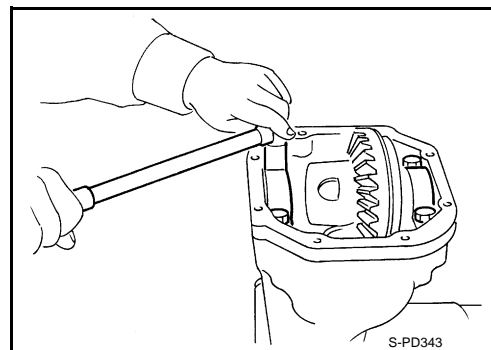
6. For proper reinstallation, paint matching marks on one side of the bearing cap.

CAUTION:

- For matching marks, use paint. Never damage bearing caps and gear carrier.
- Bearing caps are manufactured as integral molding. Use the matching marks to them in their original positions.



7. Remove bearing caps.



A

B

C

DLN

E

F

G

H

I

J

K

L

M

N

O

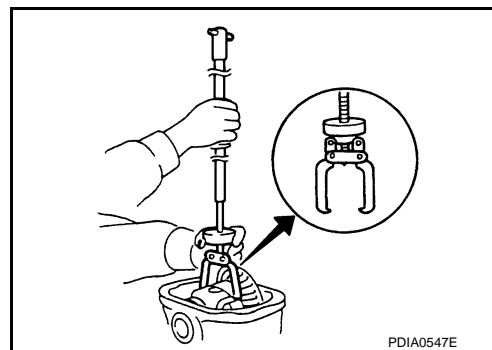
P

DIFFERENTIAL ASSEMBLY

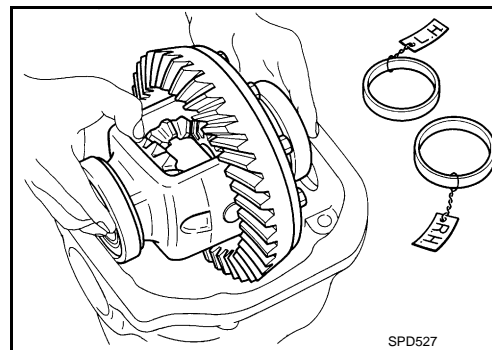
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

8. Lift differential case assembly out with a sliding hammer (commercial service tool).



- Keep side bearing outer races together with inner race. Never mix them up.
Also, keep side bearing adjusting washers together with bearings.



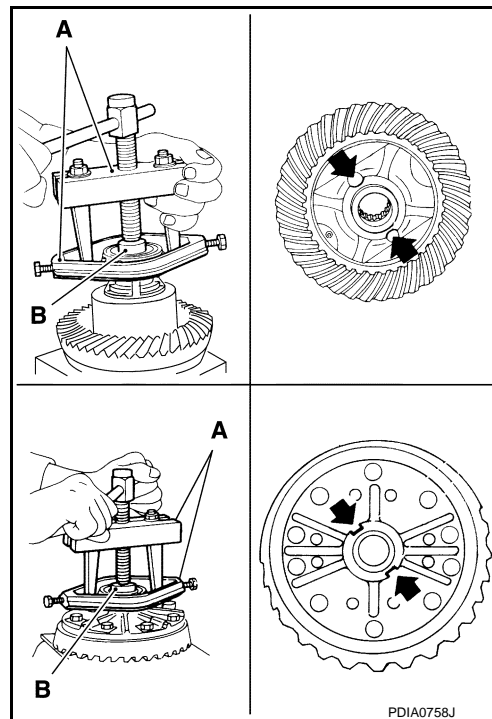
9. Remove side bearing inner race with puller (A) and base (B). To prevent damage to bearing, engage puller jaws in groove (←).

A : Puller [SST: ST33051001 (J-22888-20)]

B : Base [SST: ST33061000 (J-8107-2)]

CAUTION:

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



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

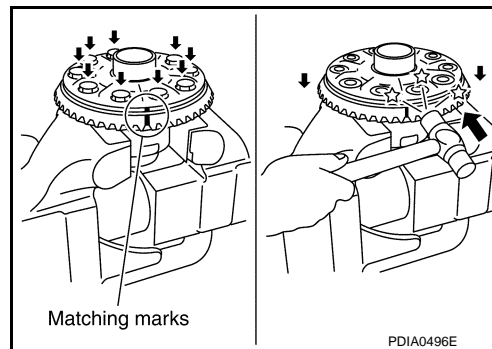
CAUTION:

For matching marks, use paint. Never damage differential case and drive gear.

11. Remove drive gear mounting bolts.
12. Tap drive gear off differential case assembly with a soft hammer.

CAUTION:

Tap evenly all around to keep drive gear from bending.

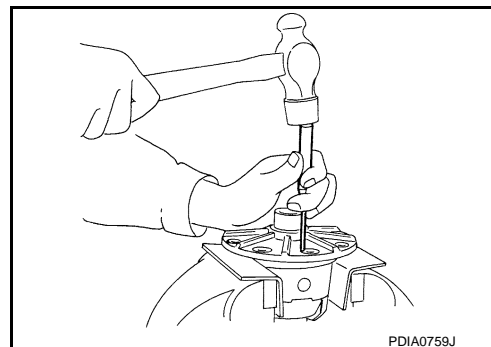


DIFFERENTIAL ASSEMBLY

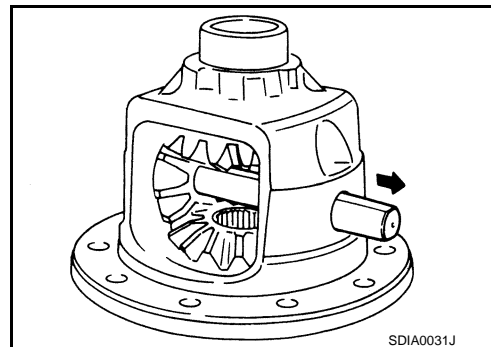
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

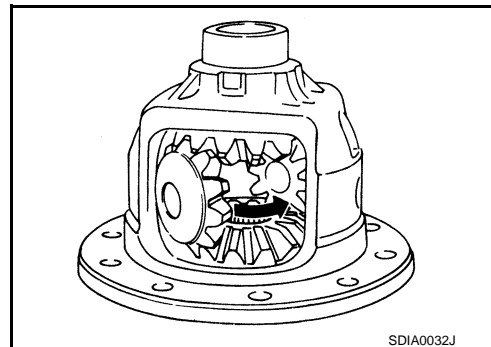
13. Remove lock pin of pinion mate shaft with a punch from drive gear side.



14. Remove pinion mate shaft.



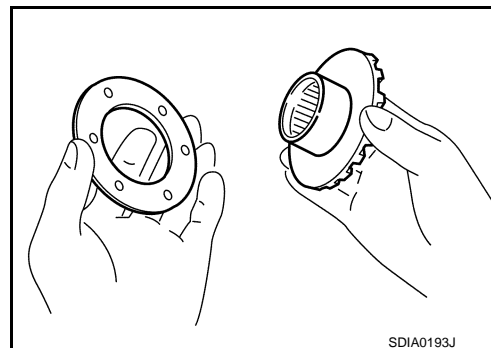
15. Turn pinion mate gear, then remove pinion mate gear, pinion mate thrust washer, side gear and side gear thrust washer from differential case.
16. Remove circular clip from side gear.
CAUTION:
Never damage side gear.
17. Remove side oil seal, using a suitable tool.
CAUTION:
Never damage gear carrier.



INFOID:000000008778933

Assembly

1. Install circular clip to side gear.
CAUTION:
Never damage side gear.
2. Install side gear thrust washers with the same thickness as the ones installed prior to disassembly or reinstall the old ones on the side gears.



DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

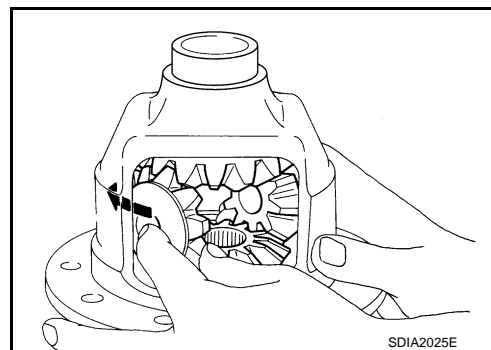
[REAR FINAL DRIVE: R200]

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

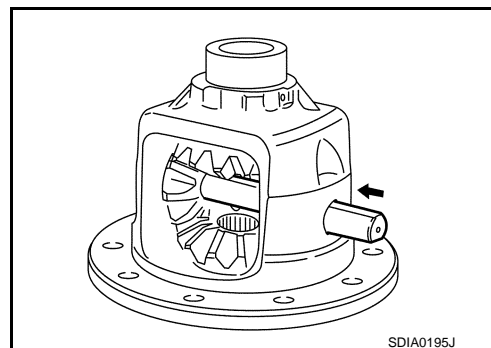
CAUTION:

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

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

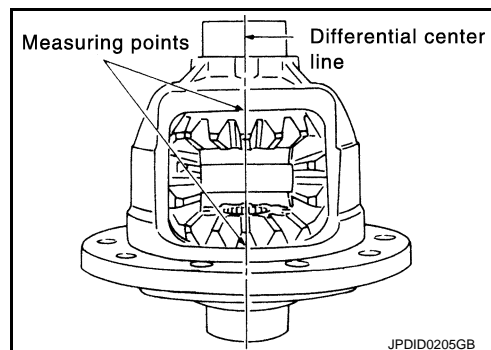


5. Align the lock pin holes on differential case with shaft, and install pinion mate shaft.



6. Measure side gear end play. If necessary, select the appropriate side gear thrust washers.

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



DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

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

Standard

Side gear back clearance : Refer to [DLN-49, "Differential Side Gear Clearance"](#).

CAUTION:

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

- c. If the back clearance is outside the specification, use a thicker/thinner side gear thrust washer to adjust. For selecting thrust washer, refer to the latest parts information.

When the back clearance is large: Use a thicker thrust washer.

When the back clearance is small: Use a thinner thrust washer.

CAUTION:

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

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

CAUTION:

Never reuse lock pin.

8. Apply thread locking sealant into the thread hole of drive gear. Use Genuine High Strength Thread Locking Sealant or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

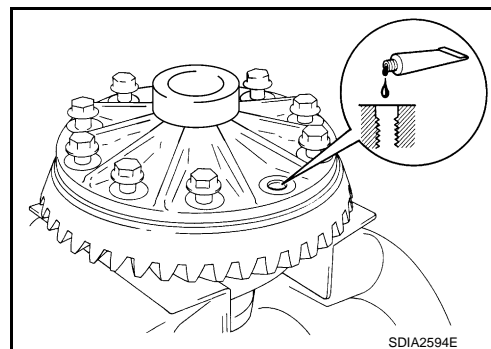
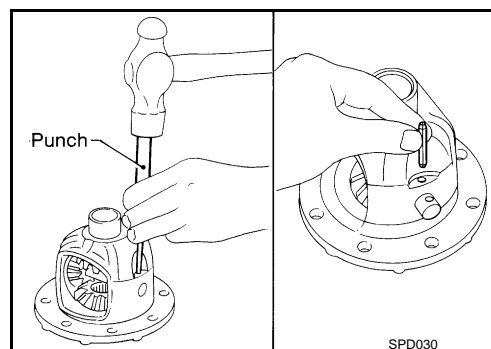
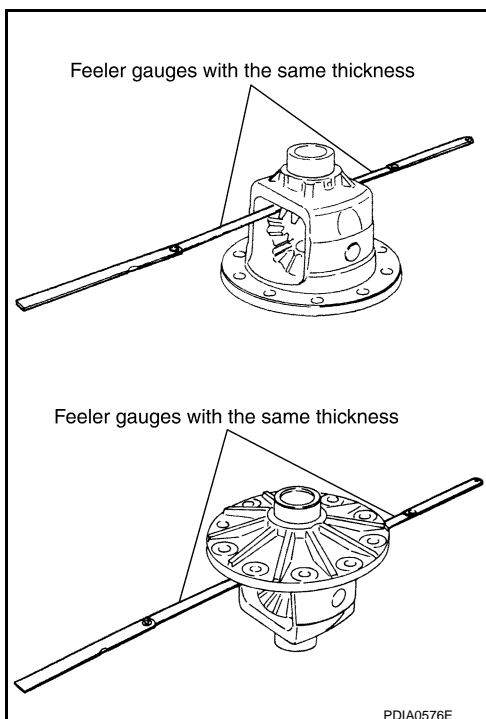
CAUTION:

Clean and degrease drive gear back and threaded holes sufficiently.

9. Install the drive gear to differential case.

CAUTION:

Align the matching marks of differential case and drive gear.



DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

10. Tighten the mounting bolts with the following procedure.

CAUTION:

Apply anti-corrosion oil to the thread and seat of mounting bolts.

- a. Tighten the bolts in a crisscross fashion to the specified torque.

Drive gear mounting bolts tightening torque : 78.5 N•m (8.0 kg-m, 58 ft-lb)

- b. Tighten the bolts additionally to the specified angle.

Drive gear mounting bolts tightening angle : 31 to 36 degree

CAUTION:

Check the tightening angle using the angle wrench [SST: KV10112100 (BT-8653-A)]. Never make judgment by visual inspection.

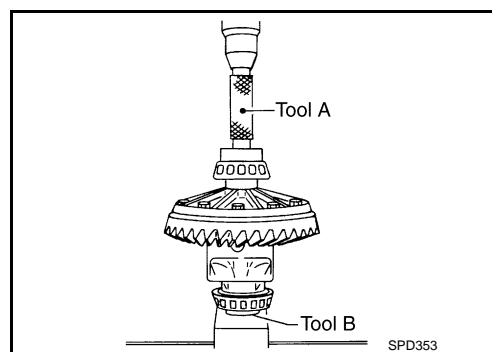
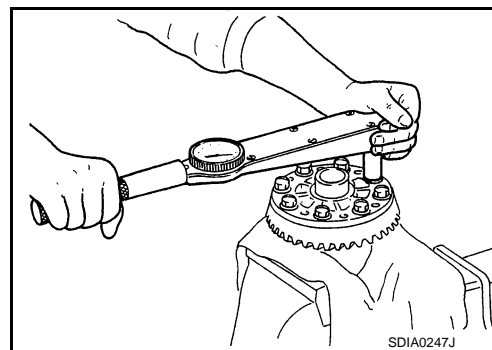
11. Press side bearing inner races to differential case, using the drift (A) and the base (B).

A : Drift [SST: KV38100300 (J-25523)]

B : Base [SST: ST33061000 (J-8107-2)]

CAUTION:

Never reuse side bearing inner race.

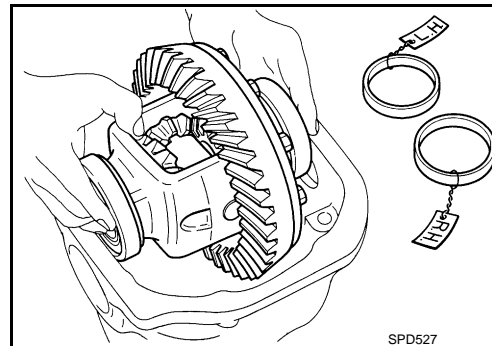


12. Set bearing outer races to differential case assembly, and install it with removed side bearing adjusting washer or same thickness washer into gear carrier.

CAUTION:

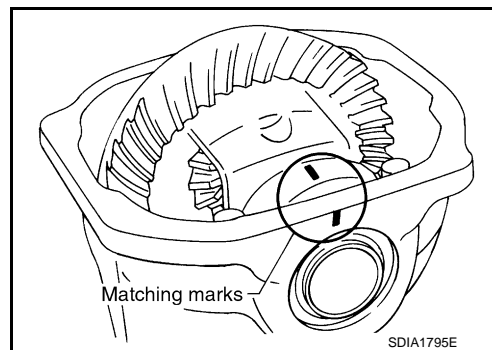
- Apply differential gear oil to the side bearings.
- Install side bearing and side bearing adjusting washer in correct location. (drive gear tooth side or drive gear back side)

13. Measure side bearing preload. If necessary, select the appropriate side bearing adjusting washers. Refer to [DLN-35, "Adjustment"](#).



14. Align matching marks on bearing cap with that on gear carrier.

15. Install bearing caps and tighten bearing cap mounting bolts.



DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

16. Using the drift [SST: KV38100200 (J-26233)], drive side oil seals until it becomes flush with the case end.

CAUTION:

- **Never reuse oil seal.**
- **When installing, never incline oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**

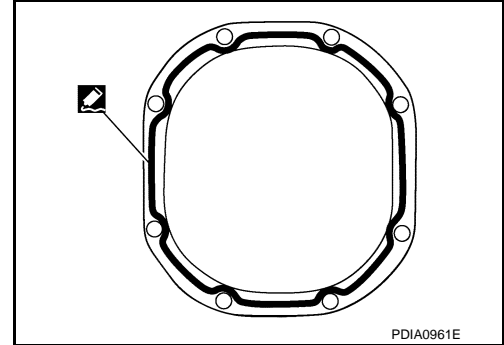
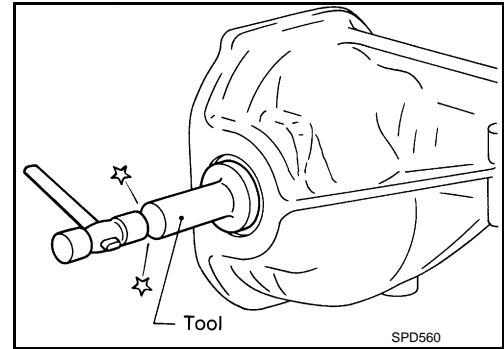
17. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and total preload torque. Refer to [DLN-35, "Adjustment"](#).
Recheck above items. Readjust the above description, if necessary.

18. Apply sealant to mating surface of rear cover.
Use Genuine Silicone RTV or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

CAUTION:

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

19. Install rear cover on gear carrier and tighten mounting bolts.

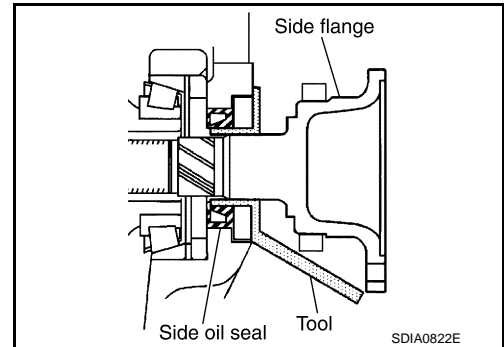


20. Install side flanges with the following procedure.

- a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
- b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.
- c. Put a suitable drift on the center of side flange, then drive it until sound changes.

NOTE:

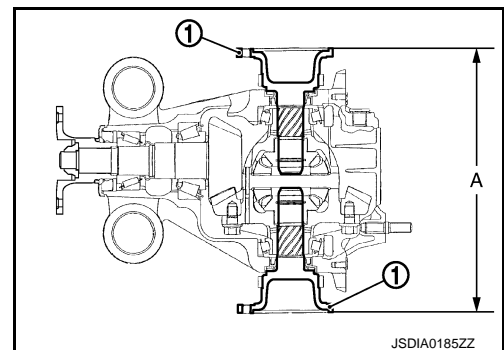
When installation is completed, driving sound of the side flange turns into a sound that seems to affect the whole final drive.



- d. Confirm that the dimension of the side flanges (1) installation measurement (A) in the figure comes into the following.

Standard

A : 326 – 328 mm (12.83 – 12.91 in)



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Adjustment

TOTAL PRELOAD TORQUE

Before inspection and adjustment, drain gear oil.

1. Secure final drive assembly onto an attachment [SST: KV38100800 (J-25604-01)].
2. Remove side flanges.
3. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
4. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.

DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

5. Measure total preload with the preload gauge (A) [SST: ST3127S000 (J-25765-A)].

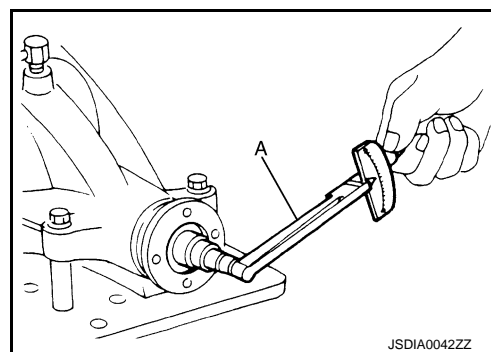
Total preload torque

: Refer to [DLN-49, "Preload Torque"](#).

NOTE:

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

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



When the preload torque is large

On pinion bearings: Replace the collapsible spacer.

On side bearings: Use thinner side bearing adjusting washers by the same amount to each side. For selecting adjusting washer, refer to the latest parts information.

When the preload is small

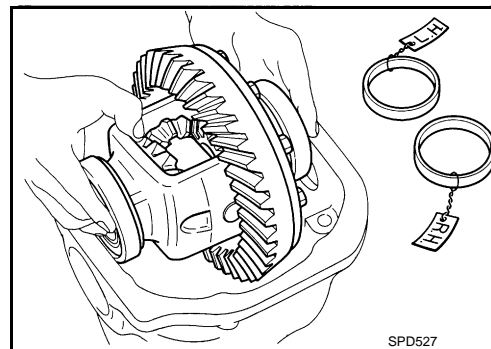
On pinion bearings: Tighten the drive pinion lock nut.

On side bearings: Use thicker side bearing adjusting washers by the same amount to each side. For selecting adjusting washer, refer to the latest parts information.

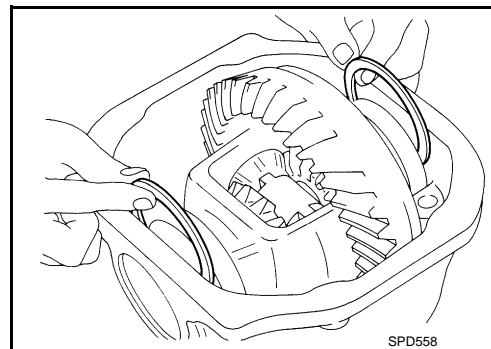
SIDE BEARING PRELOAD

Before inspection and adjustment, drain gear oil.

1. Remove rear cover. Refer to [DLN-29, "Disassembly"](#).
2. Make sure all parts are clean. Also, make sure the bearings are well lubricated with gear oil.
3. Place the differential case, with side bearings and bearing races installed, into gear carrier.



4. Insert left and right original side bearing adjusting washers in place between side bearings and gear carrier.

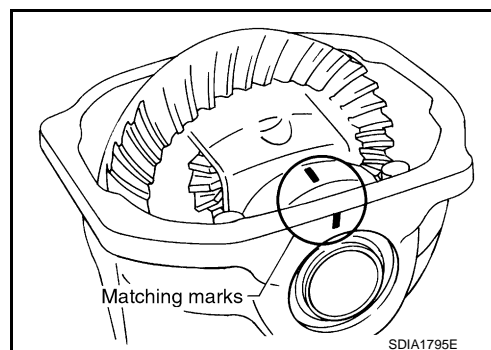


DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

5. Install bearing caps in their correct locations and tighten bearing cap mounting bolts.
6. Turn the carrier several times to seat the bearings.

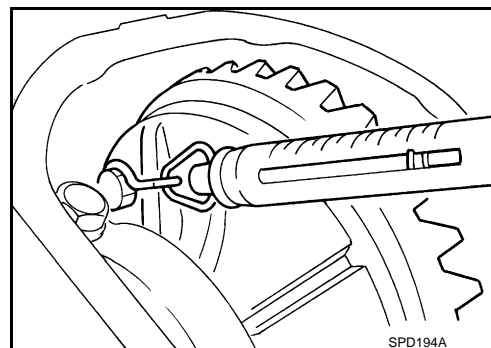


7. Measure the turning torque of the carrier at the drive gear mounting bolts with a spring gauge [SST: — (J-8129)].

Standard

Specification

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



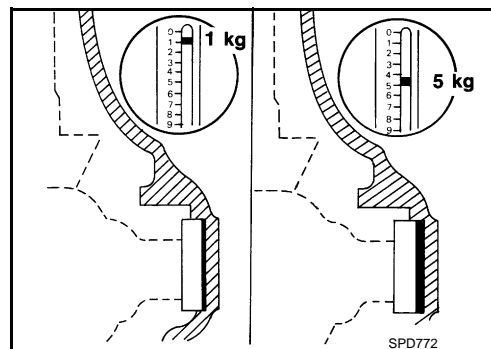
8. If the turning torque is outside the specification, use a thicker/thinner side bearing adjusting washer to adjust. For selecting adjusting washer, refer to the latest parts information.

If the turning torque is less than the specified range:

Use a thicker adjusting washer.

If the turning torque is greater than the specification:

Use a thinner adjusting washer.



CAUTION:

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

9. Record the total amount of washer thickness required for the correct carrier side bearing preload.

DRIVE GEAR RUNOUT

1. Remove rear cover. Refer to [DLN-29, "Disassembly"](#).
2. Fit a dial indicator to the drive gear back face.
3. Rotate the drive gear to measure runout.

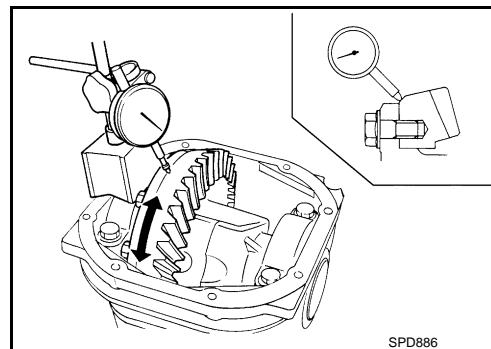
Drive gear runout

: Refer to [DLN-49, "Drive Gear Runout"](#).

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

CAUTION:

Replace drive gear and drive pinion gear as a set.



TOOTH CONTACT

Before inspection and adjustment, drain gear oil.

1. Remove rear cover. Refer to [DLN-29, "Disassembly"](#).

DIFFERENTIAL ASSEMBLY

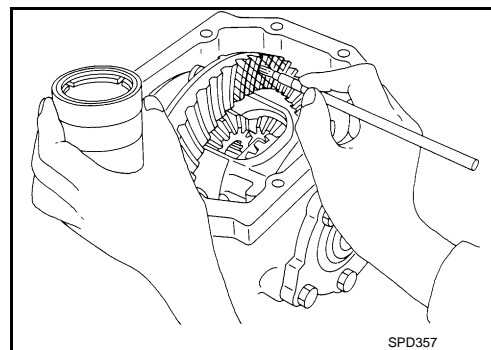
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

2. Apply red lead to drive gear.

CAUTION:

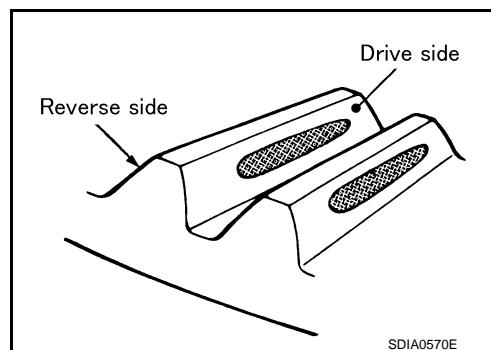
Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on drive gear.



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

CAUTION:

Check tooth contact on drive side and reverse side.



| Tooth contact condition | | | | Pinion height adjusting washer selection valve [mm (in)] | | Adjustment (Yes/No) | Possible cause |
|-------------------------|----------|-----------|-----------|---|--------------------|------------------------|---|
| Drive side | | Back side | | | | | |
| Heel side | Toe side | Toe side | Heel side | ↑ Thicker | +0.09 (+0.0035) | Yes | Occurrence of noise and scoring sound in all speed ranges. |
| | | | | | +0.06 (+0.0024) | | Occurrence of noise when accelerating. |
| | | | | | +0.03 (+0.0012) | No | — |
| | | | | | 0 | | |
| | | | | -0.03 (-0.0012) | | | |
| | | | | ↓ Thinner | -0.06 (-0.0024) | Yes | Occurrence of noise at constant speed and decreasing speed. |
| | | | | | -0.09 (-0.0035) | | Occurrence of noise and scoring sound in all speed ranges. |

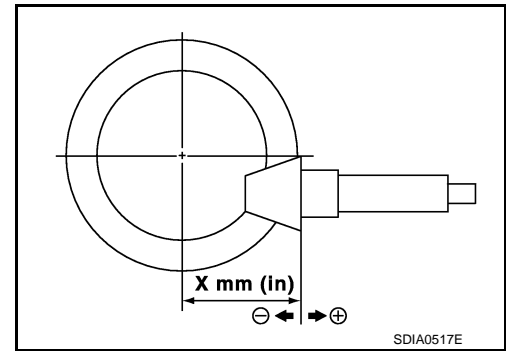
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DIFFERENTIAL ASSEMBLY

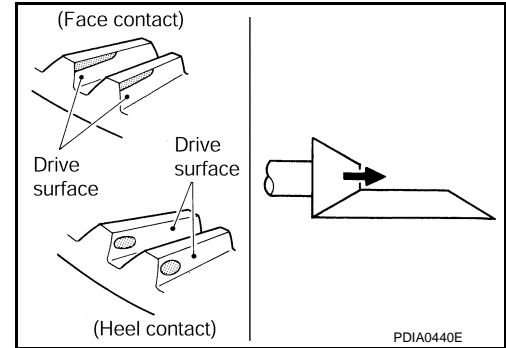
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

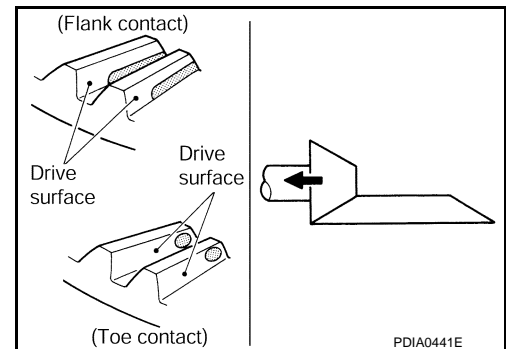
4. If tooth contact is improperly adjusted, follow the procedure below to adjust the pinion height [dimension (X)].



- If the tooth contact is near the face (face contact), or near the heel (heel contact), thicken pinion height adjusting washers to move drive pinion closer to drive gear. For selecting adjusting washer, refer to the latest parts information.



- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thin pinion height adjusting washers to move drive pinion farther from drive gear. For selecting adjusting washer, refer to the latest parts information.



BACKLASH

Before inspection and adjustment, drain gear oil.

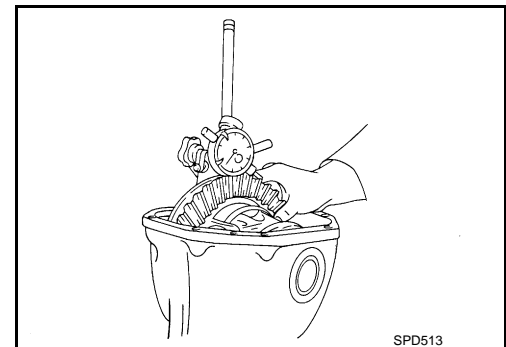
1. Remove rear cover. Refer to [DLN-29, "Disassembly"](#).
2. Fit a dial indicator to the drive gear face to measure the backlash.

Backlash : Refer to [DLN-49, "Backlash"](#).

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

When the backlash is large:

Make drive gear back side adjusting washer thicker, and drive gear tooth side adjusting washer thinner by the same amount. For selecting adjusting washer, refer to the latest parts information.



DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

When the backlash is small:

Make drive gear back side adjusting washer thinner, and drive gear tooth side adjusting washer thicker by the same amount. For selecting adjusting washer, refer to the latest parts information.

CAUTION:

Never change the total amount of washers as it changes the bearing preload.

Inspection After Disassembly

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DRIVE GEAR AND DRIVE PINION

- Clean up the disassembled parts.
- If the gear teeth never mesh or line-up correctly, determine the cause and adjust or replace as necessary.
- If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.

BEARING

- Clean up the disassembled parts.
- If any chipped (by friction), pitted, worn, rusted or scratched marks, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).

SIDE GEAR AND PINION MATE GEAR

- Clean up the disassembled parts.
- If any cracks or damage on the surface of the tooth is found, replace.
- If any worn or chipped mark on the contact sides of the thrust washer is found, replace.

SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

- Clean up the disassembled parts.
- If it is chipped (by friction), damaged, or unusually worn, replace.

OIL SEAL

- Whenever disassembled, replace.
- If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips, replace them.

DIFFERENTIAL CASE

- Clean up the disassembled parts.
- If any wear or crack on the contact sides of the differential case is found, replace.

COMPANION FLANGE

- Clean up the disassembled parts.
- If any chipped mark [about 0.1 mm, (0.004 in)] or other damage on the contact sides of the lips of the companion flange is found, replace.

DRIVE PINION

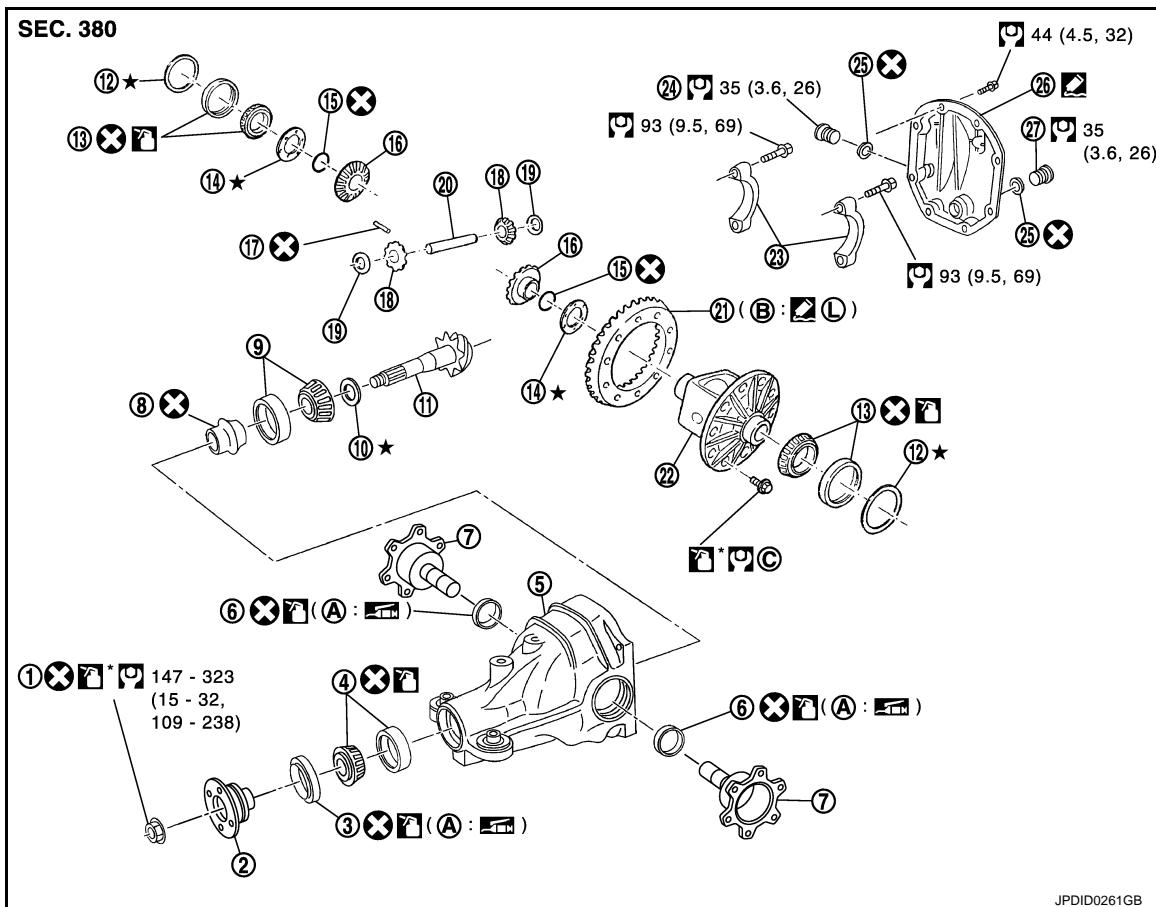
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

DRIVE PINION

Exploded View

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- | | | |
|------------------------------------|-----------------------------|--|
| 1. Drive pinion lock nut | 2. Companion flange | 3. Front oil seal |
| 4. Pinion front bearing | 5. Gear carrier | 6. Side oil seal |
| 7. Side flange | 8. Collapsible spacer | 9. Pinion rear bearing |
| 10. Pinion height adjusting washer | 11. Drive pinion | 12. Side bearing adjusting washer |
| 13. Side bearing | 14. Side gear thrust washer | 15. Circular clip |
| 16. Side gear | 17. Lock pin | 18. Pinion mate gear |
| 19. Pinion mate thrust washer | 20. Pinion mate shaft | 21. Drive gear |
| 22. Differential case | 23. Bearing cap | 24. Filler plug |
| 25. Gasket | 26. Rear cover | 27. Drain plug |
| A. Oil seal lip | B. Screw hole | C. Comply with the assembly procedure when tightening. Refer to DLN-31, "Assembly" . |

: Apply gear oil.

: Apply anti-corrosion oil.

: Apply Genuine Silicone RTV or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

: Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

Refer to [GI-4, "Components"](#) for symbols not described on the above.

DRIVE PINION

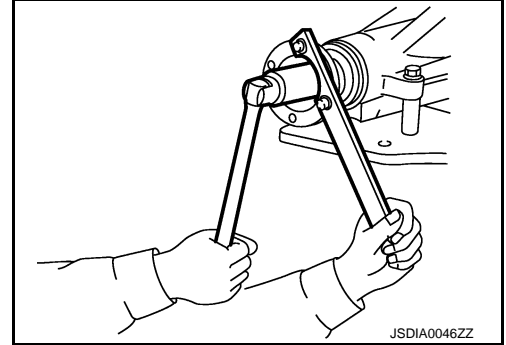
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

INFOID:000000008778937

Disassembly

1. Remove differential case assembly. Refer to [DLN-29. "Disassembly"](#).
2. Remove drive pinion lock nut with the flange wrench (commercial service tool).



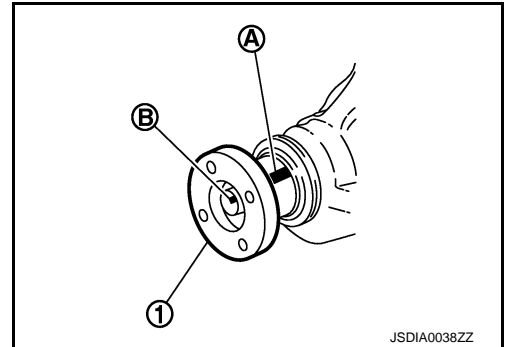
3. Put matching mark (B) on the end of drive pinion. The matching mark should be in line with the matching mark (A) on companion flange (1).

CAUTION:

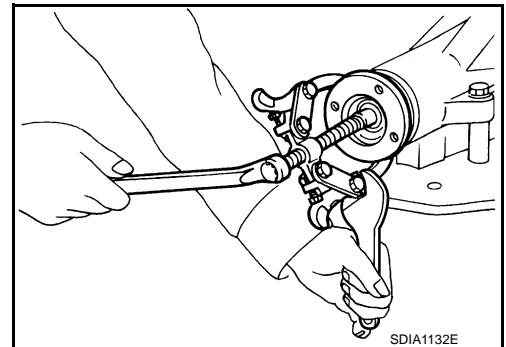
For matching mark, use paint. Never damage companion flange and drive pinion.

NOTE:

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



4. Remove companion flange using the suitable puller (commercial service tool).

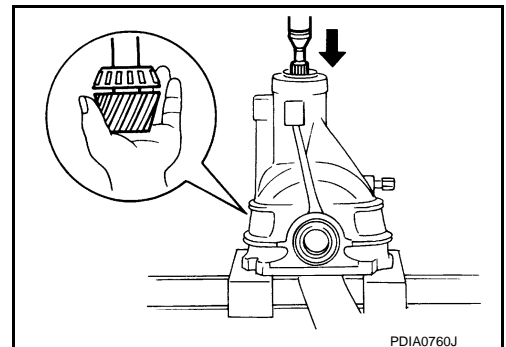


5. Press drive pinion assembly out of gear carrier.

CAUTION:

Never drop drive pinion assembly.

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

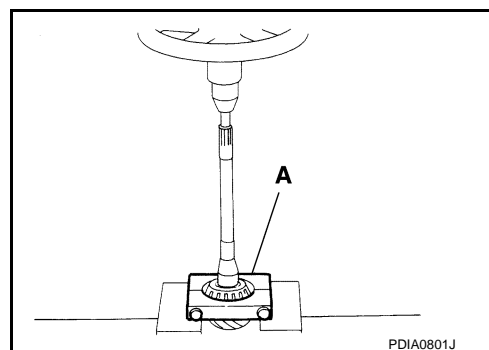


DRIVE PINION

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

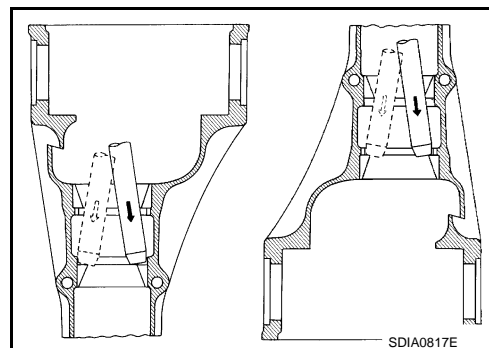
10. Remove pinion rear bearing inner race and pinion height adjusting washer with the replacer (A) (commercial service tool).



11. Tap pinion front/rear bearing outer races uniformly using a brass rod or equivalent to remove them.

CAUTION:

Never damage gear carrier.



Assembly

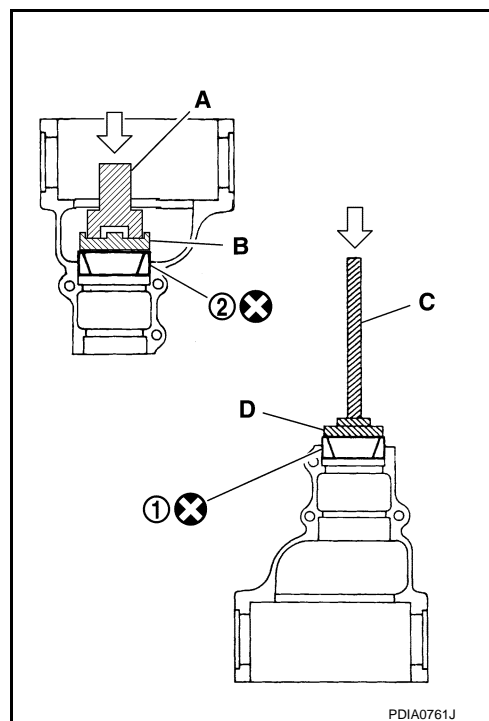
INFOID:000000008778938

1. Install front bearing outer race (1) and rear bearing outer race (2) using drifts (A, B and D) and drift bar (C).

- A : Drift [SST: ST30720000 (J-25405)]
- B : Drift [SST: KV40105230 (—)]
- C : Drift bar [SST: ST30611000 (J-25742-1)]
- D : Drift [SST: ST30613000 (J-25742-3)]

CAUTION:

- At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.
- Never reuse pinion front and rear bearing outer race.



DRIVE PINION

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

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

When hypoid gear set has been replaced

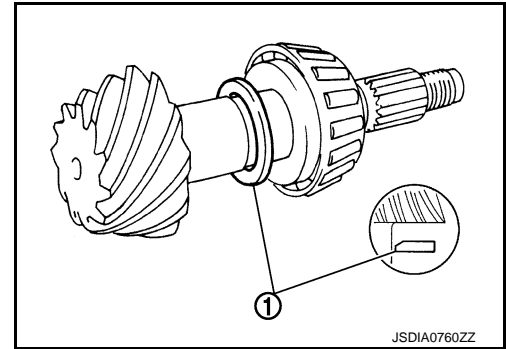
- Select pinion height adjusting washer. Refer to [DLN-47](#), "Adjustment".

When hypoid gear set has been reused

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

CAUTION:

Pay attention to the direction of pinion height adjusting washer. (Assemble as shown in the figure.)



3. Install pinion rear bearing inner race (1) to drive pinion with the drift (A) [SST: ST30901000 (J-26010-01)].

CAUTION:

Never reuse pinion rear bearing inner race.

4. Check and adjust the tooth contact and back lash of drive gear and drive pinion following the procedure below.

- a. Assemble drive pinion into gear carrier.

CAUTION:

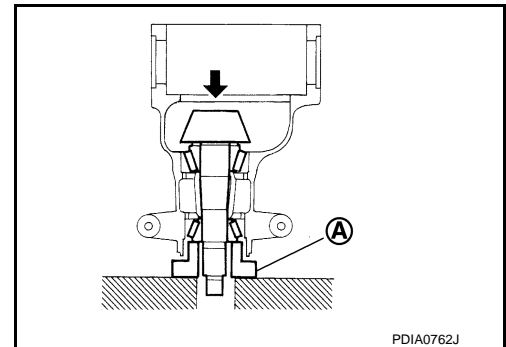
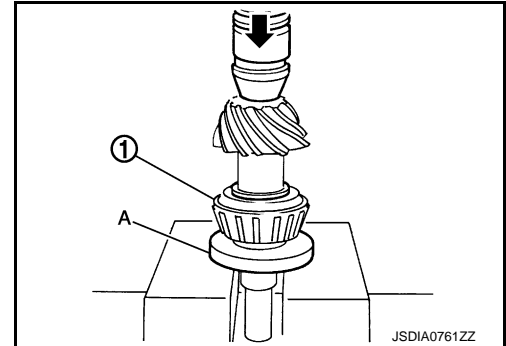
- **Never assemble collapsible spacer at this time.**
- **Apply gear oil to pinion rear bearing.**

- b. Assemble pinion front bearing inner race to drive pinion assembly.

CAUTION:

- **Never reuse pinion front bearing inner race.**
- **Apply gear oil to pinion front bearing.**

- c. Using suitable spacer (A) (commercial service tool), press the pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.



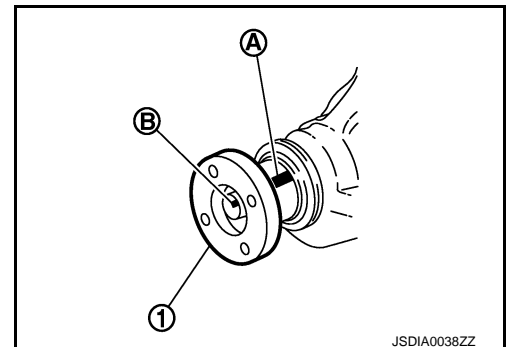
- d. Install companion flange.

CAUTION:

Never install front oil seal at this time.

NOTE:

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



DRIVE PINION

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

- e. Temporarily tighten removed drive pinion nut to drive pinion, using flange wrench (commercial service tool).

A : Preload gauge [SST: ST3127S000 (J-25765-A)]

NOTE:

Use removed drive pinion nut only for the preload measurement.

- f. Rotate drive pinion more than 20 times to adjust bearing.
- g. Tighten to drive pinion lock nut using flange wrench (commercial service tool), while adjusting pinion bearing preload torque using preload gauge [SST: ST3127S000 (J-25765-A)].

Pinion bearing preload (without oil seal) : 1.0 - 1.3 N·m (0.11 – 0.13 kg-m, 9 – 11 in-lb)

CAUTION:

Drive pinion nut is tightened with no collapsible spacer. Be careful not to overtighten it. While measuring the preload, tighten drive pinion nut in 5° to 10° increments.

- h. Assemble removed drive side bearing adjusting washer or same thickness of it and install differential case assembly. Refer to [DLN-31. "Assembly"](#).

CAUTION:

- Apply differential gear oil to the side bearings.
- Install side bearing and side bearing adjusting washer in correct location. (drive gear tooth side or drive gear back side)

- i. Install bearing caps.
- j. Check and adjust tooth contact and drive gear to drive pinion backlash. Refer to [DLN-35. "Adjustment"](#).
- k. Remove bearing caps and differential case assembly.
- l. Remove companion flange.
- m. Remove drive pinion assembly from gear carrier.

CAUTION:

Never drop the drive pinion assembly.

- n. Remove pinion front bearing inner race.
5. Assemble collapsible spacer.

CAUTION:

Never reuse collapsible spacer.

6. Assemble drive pinion into gear carrier.

CAUTION:

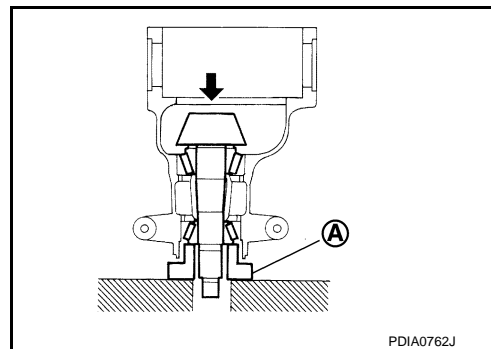
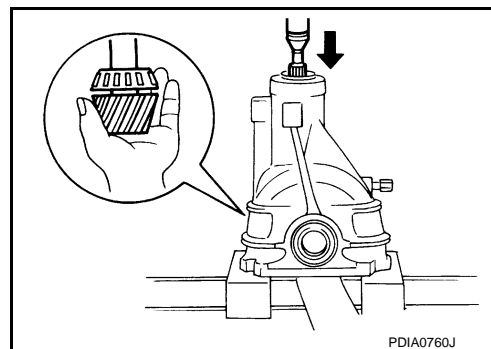
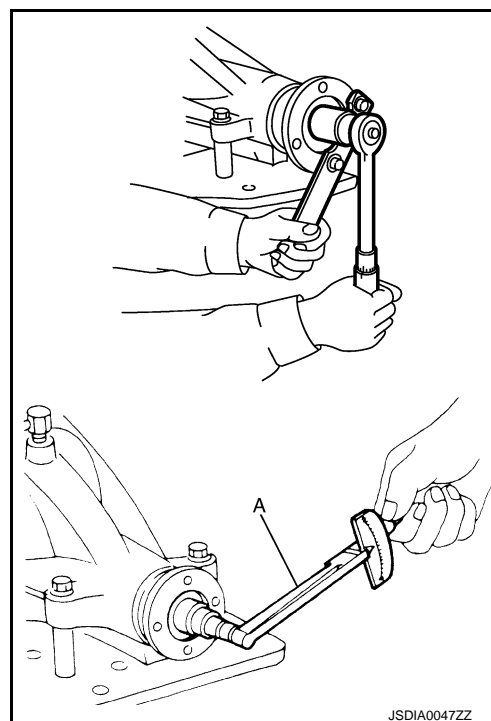
Apply gear oil to pinion rear bearing.

7. Assemble pinion front bearing inner race to drive pinion assembly.

CAUTION:

- Never reuse pinion front bearing inner race.
- Apply gear oil to pinion front bearing.

8. Using suitable spacer (A) (commercial service tool), press the pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.



DRIVE PINION

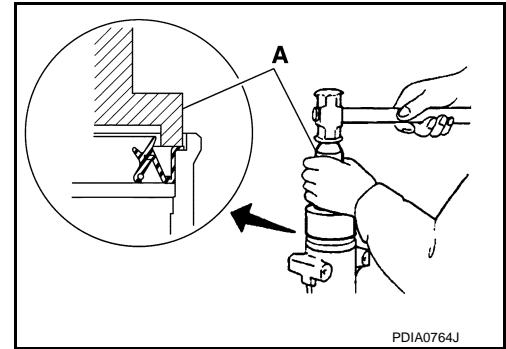
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

9. Using the drift (A) [SST: ST30720000 (J-25405)], install front oil seal as shown in figure.

CAUTION:

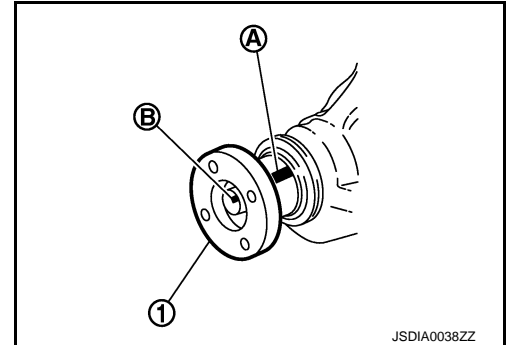
- Never reuse oil seal.
- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.



10. Install companion flange.

NOTE:

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



11. Apply anti-corrosion oil to the thread and seat of drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion, using flange wrench (commercial service tool).

A : Preload gauge [SST: ST3127S000 (J-25765-A)]

CAUTION:

Never reuse drive pinion lock nut.

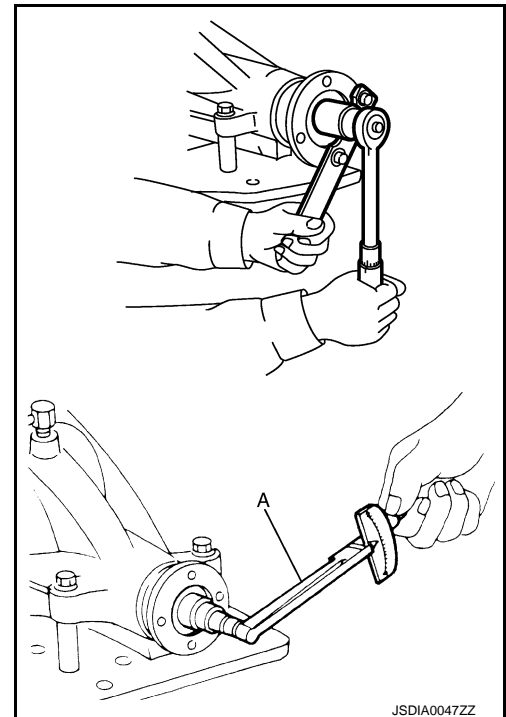
12. Adjust to the drive pinion lock nut tightening torque and pinion bearing preload torque, using preload gauge [SST: ST3127S000 (J-25765-A)].

Pinion bearing preload

: Refer to [DLN-49, "Preload Torque"](#).

CAUTION:

- Adjust to 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.



13. Install differential case assembly. Refer to [DLN-31, "Assembly"](#).

CAUTION:

Never install rear cover at this timing.

14. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and companion flange runout. Refer to [DLN-35, "Adjustment"](#) and [DLN-47, "Adjustment"](#).
Recheck above items. Readjust the above description, if necessary.
15. Check total preload torque. Refer to [DLN-35, "Adjustment"](#).
16. Install rear cover. Refer to [DLN-31, "Assembly"](#).

Adjustment

PINION GEAR HEIGHT

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

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

Washer selection equation:

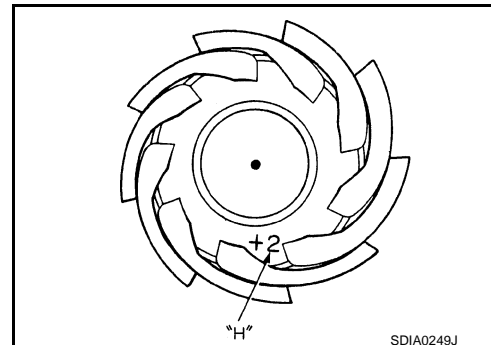
$$T = T_0 + (t_1 - t_2)$$

T: Correct washer thickness

T₀: Removed washer thickness

t₁: Old drive pinion head letter "H × 0.01"
("H": machined tolerance 1/100 mm × 100)

t₂: New drive pinion head letter "H × 0.01"
("H": machined tolerance 1/100 mm × 100)



Example:

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

T₀: 3.21

t₁: +2

t₂: -1

2. Select the proper pinion height adjusting washer. For selecting adjusting washer, refer to the latest parts information.

CAUTION:

If unable to find a washer of desired thickness, use a washer with thickness closest to the calculated value.

Example:

Calculated value... T = 3.22 mm

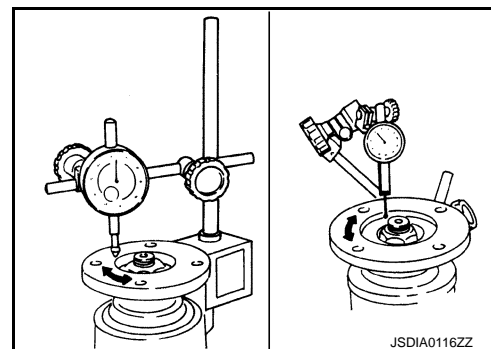
Used washer... T = 3.21 mm

COMPANION FLANGE RUNOUT

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

Companion flange runout : Refer to [DLN-49, "Companion Flange Runout"](#).

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



Inner side of companion flange runout : Refer to [DLN-49, "Companion Flange Runout"](#).

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

Inspection After Disassembly

INFOID:000000008778940

DRIVE GEAR AND DRIVE PINION

- Clean up the disassembled parts.
- If the gear teeth never mesh or line-up correctly, determine the cause and adjust or replace as necessary.
- If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.

BEARING

- Clean up the disassembled parts.
- If any chipped (by friction), pitted, worn, rusted or scratched marks, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).

SIDE GEAR AND PINION MATE GEAR

- Clean up the disassembled parts.
- If any cracks or damage on the surface of the tooth is found, replace.
- If any worn or chipped mark on the contact sides of the thrust washer is found, replace.

SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

- Clean up the disassembled parts.
- If it is chipped (by friction), damaged, or unusually worn, replace.

OIL SEAL

- Whenever disassembled, replace.
- If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips, replace them.

DIFFERENTIAL CASE

- Clean up the disassembled parts.
- If any wear or crack on the contact sides of the differential case is found, replace.

COMPANION FLANGE

- Clean up the disassembled parts.
- If any chipped mark [about 0.1 mm, (0.004 in)] or other damage on the contact sides of the lips of the companion flange is found, replace.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[REAR FINAL DRIVE: R200]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:000000008194081

| | | |
|---|----------------|-------|
| Applied model | 2WD | |
| | VQ37VHR | |
| | M/T | A/T |
| Final drive model | R200 | |
| Gear ratio | 3.692 | 3.357 |
| Number of teeth (Drive gear/Drive pinion) | 48/13 | 47/14 |
| Oil capacity (Approx.) ℓ (US pt, Imp pt) | 1.4 (3, 2-1/2) | |
| Number of pinion gears | 2 | |
| Drive pinion adjustment spacer type | Collapsible | |

Drive Gear Runout

INFOID:000000008194082

Unit: mm (in)

| Item | Limit |
|-----------------------------|---------------|
| Drive gear back face runout | 0.05 (0.0020) |

Differential Side Gear Clearance

INFOID:000000008194083

Unit: mm (in)

| Item | Standard |
|--|--|
| Side gear backlash (Clearance between side gear and differential case) | 0.20 (0.0079) or less (Each gear should rotate smoothly without excessive resistance during differential motion.) |

Preload Torque

INFOID:000000008194084

Unit: N·m (kg·m, in·lb)

| Item | Standard |
|---|------------------------------------|
| Pinion bearing (P1) | 2.65 – 3.23 (0.27 – 0.32, 24 – 28) |
| Side bearing (P2) | 0.20 – 0.52 (0.02 – 0.05, 2 – 4) |
| Side bearing to pinion bearing (Total preload) (Total preload = P1 + P2) | 2.85 – 3.75 (0.29 – 0.38, 26 – 33) |

Backlash

INFOID:000000008194085

Unit: mm (in)

| Item | Standard |
|---------------------------------|-------------------------------|
| Drive gear to drive pinion gear | 0.10 – 0.15 (0.0039 – 0.0059) |

Companion Flange Runout

INFOID:000000008194086

Unit: mm (in)

| Item | Limit |
|---|---------------|
| Companion flange face runout | 0.08 (0.0031) |
| Inner side of the companion flange runout | 0.08 (0.0031) |

REAR FINAL DRIVE ASSEMBLY

< SYSTEM DESCRIPTION >

[REAR FINAL DRIVE: R200V]

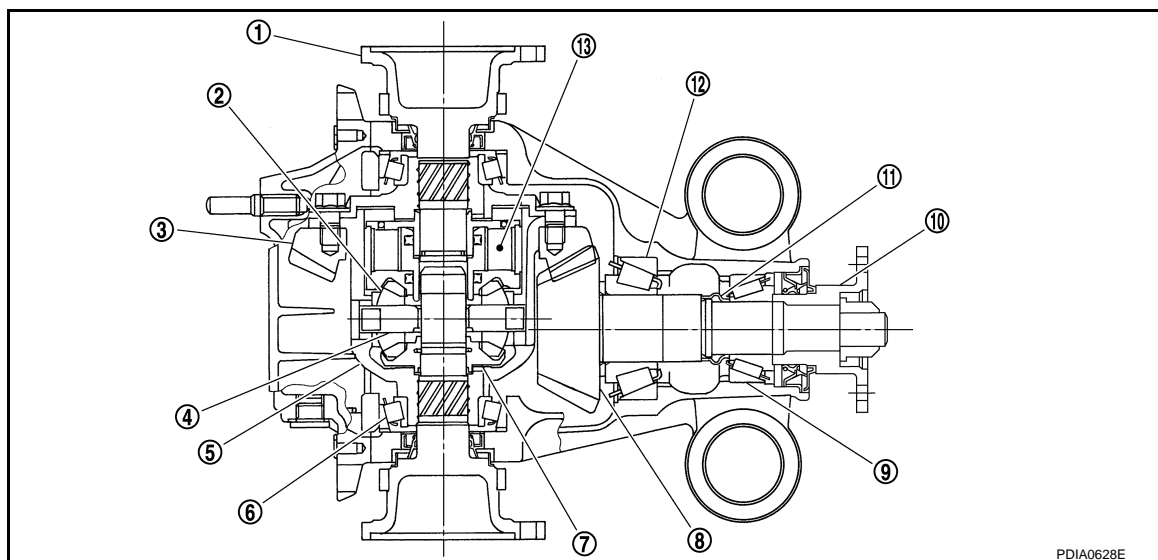
SYSTEM DESCRIPTION

REAR FINAL DRIVE ASSEMBLY

System Diagram

INFOID:000000008194087

CROSS-SECTIONAL VIEW



- | | | |
|----------------------|------------------------|-------------------------|
| 1. Side flange | 2. Pinion mate gear | 3. Drive gear |
| 4. Pinion mate shaft | 5. Differential case | 6. Side bearing |
| 7. Side gear | 8. Drive pinion | 9. Pinion front bearing |
| 10. Companion flange | 11. Collapsible spacer | 12. Pinion rear bearing |
| 13. Viscous coupling | | |

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

[REAR FINAL DRIVE: R200V]

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000008194088

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

| Reference | | DLN-78, "Inspection After Disassembly" | DLN-74, "Adjustment" | DLN-78, "Inspection After Disassembly" | DLN-74, "Adjustment" | DLN-86, "Adjustment" | DLN-57, "Inspection" | NVH of REAR PROPELLER SHAFT in this section. | NVH in FAX, RAX, FSU and RSU sections. | NVH in WT section. | NVH in WT section. | NVH RAX section. | NVH in BR section. | NVH in ST section. |
|------------------------------------|-------|--|-----------------------|--|----------------------|-----------------------------------|----------------------|--|--|--------------------|--------------------|------------------|--------------------|--------------------|
| Possible cause and SUSPECTED PARTS | | Gear tooth rough | Gear contact improper | Tooth surfaces worn | Backlash incorrect | Companion flange excessive runout | Gear oil improper | PROPELLER SHAFT | AXLE AND SUSPENSION | TIRE | ROAD WHEEL | DRIVE SHAFT | BRAKE | STEERING |
| Symptom | Noise | x | x | x | x | x | x | x | x | x | x | x | x | x |

x: Applicable

A
B
C
DLN
E
F
G
H
I
J
K
L
M
N
O
P

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Rear Final Drive

INFOID:000000008194089

- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they never interfere with the function of the parts when applied.
- Overhaul should be done in a clean work area, it is preferable to work in dustproof area.
- Before disassembly, using steam or white gasoline, completely remove sand and mud from the exterior of the unit, preventing them from entering into the unit during disassembly or assembly.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new ones if necessary.
- Gaskets, seals and O-rings should be replaced any time when the unit is disassembled.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.
- Clean and flush the parts sufficiently and blow-dry them.
- Be careful not to damage sliding surfaces and mating surfaces.
- Always use shop paper for cleaning the inside of components.
- 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.
- Never use cotton gloves or shop rags to prevent entering of lint.
- During assembly, observe the specified tightening torque, and apply new gear oil, petroleum jelly, or multi-purpose grease as specified for each vehicle, if necessary.

PREPARATION

< PREPARATION >

[REAR FINAL DRIVE: R200V]

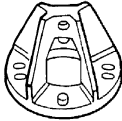
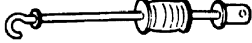
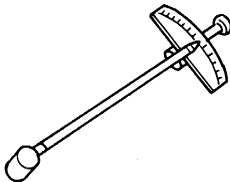
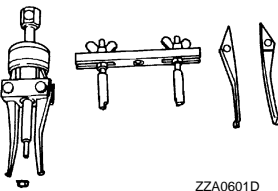
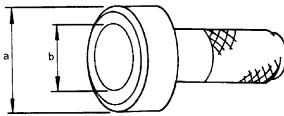
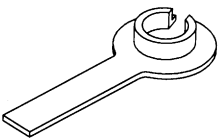
PREPARATION

PREPARATION

Special Service Tools

INFOID:000000008194090

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

| Tool number (Kent-Moore No.) Tool name | Description |
|---|--|
| KV40104100 (—) Attachment  ZZA0804D | Removing side flange |
| ST36230000 (J-25840-A) Sliding hammer  ZZA0803D | Removing side flange |
| ST3127S000 (J-25765-A) Preload gauge  ZZA0806D | Measuring pinion bearing preload and total preload |
| KV381054S0 (J-34286) Puller  ZZA0601D | Removing front oil seal |
| ST30720000 (J-25405) Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.  ZZA0811D | <ul style="list-style-type: none"> Installing front oil seal Installing pinion rear bearing outer race |
| KV38107900 (J-39352) Protector  S-NT129 | Installing side flange |

A

B

C

DLN

E

F

G

H

I

J

K

L

M

N

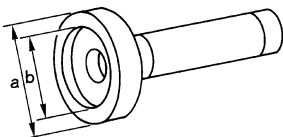
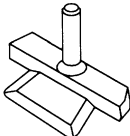
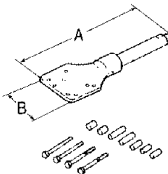
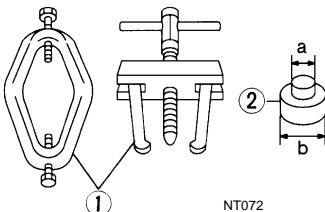
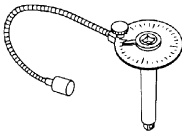
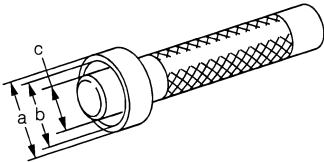
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P

PREPARATION

< PREPARATION >

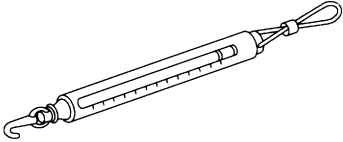
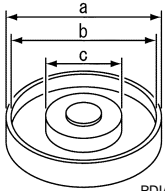
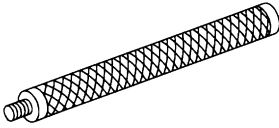
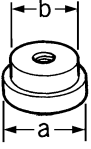
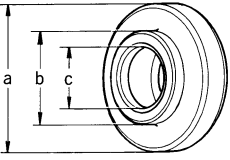
[REAR FINAL DRIVE: R200V]

| Tool number (Kent-Moore No.) Tool name | | Description |
|--|---|---|
| KV38100200 (J-26233) Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia. |  ZZA1143D | Installing side oil seal |
| KV10111100 (J-37228) Seal cutter |  S-NT046 | Removing rear cover |
| KV38100800 (J-25604-01) Attachment A: 541 mm (21.30 in) B: 200 mm (7.87 in) |  SDIA0267E | Fixing unit assembly |
| ST3306S001 (J-22888-D) Differential side bearing puller set 1: ST33051001 (J-22888-20) Puller 2: ST33061000 (J-8107-2) Base a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia. |  NT072 | Removing and installing side bearing inner race |
| KV10112100 (BT-8653-A) Angle wrench |  ZZA0120D | Tightening the drive gear mounting bolt |
| KV38100300 (J-25523) Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia. |  ZZA1046D | Installing side bearing inner race |

PREPARATION

< PREPARATION >

[REAR FINAL DRIVE: R200V]

| Tool number (Kent-Moore No.) Tool name | Description |
|---|--|
| — (J-8129) Spring gauge | Measuring turning torque |
|  NT127 | |
| KV40105230 (—) Drift a: 92 mm (3.62 in) dia. b: 86 mm (3.39 in) dia. c: 45 mm (1.77 in) dia. | Installing pinion rear bearing outer race |
|  PDIA0591E | |
| ST30611000 (J-25742-1) Drift bar | Installing pinion front bearing outer race (Use with ST30613000) |
|  S-NT090 | |
| ST30613000 (J-25742-3) Drift a: 72 mm (2.83 in) dia. b: 48 mm (1.89 in) dia. | Installing pinion front bearing outer race |
|  ZZA1000D | |
| ST30901000 (J-26010-01) Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia. | Installing pinion rear bearing inner race |
|  ZZA0978D | |

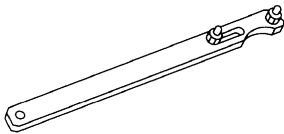
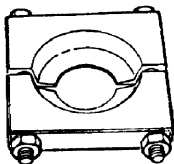
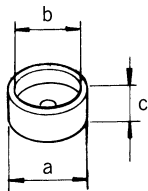
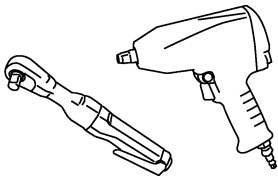
Commercial Service Tools

INFOID:000000008194091

PREPARATION

< PREPARATION >

[REAR FINAL DRIVE: R200V]

| Tool name | Description |
|---|--|
| <p>Flange wrench</p>  <p>NT035</p> | <p>Removing and installing drive pinion lock nut</p> |
| <p>Replacer</p>  <p>ZZA0700D</p> | <p>Removing pinion rear bearing inner race</p> |
| <p>Spacer</p> <p>a: 60 mm (2.36 in) dia. b: 36 mm (1.42 in) dia. c: 30 mm (1.18 in)</p>  <p>ZZA1133D</p> | <p>Installing pinion front bearing inner race</p> |
| <p>Power tool</p>  <p>PBIC0190E</p> | <p>Loosening bolts and nuts</p> |

PERIODIC MAINTENANCE

REAR DIFFERENTIAL GEAR OIL

Inspection

INFOID:000000008194092

OIL LEAKAGE

Make sure that oil is not leaking from final drive assembly or around it.

OIL LEVEL

- Remove filler plug (1) and check oil level from filler plug mounting hole as shown in the figure.

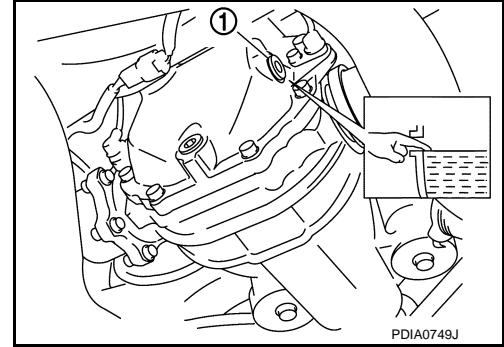
CAUTION:

Never start engine while checking oil level.

- Set a gasket on filler plug and install it on final drive assembly. Refer to [DLN-67, "Exploded View"](#).

CAUTION:

Never reuse gasket.



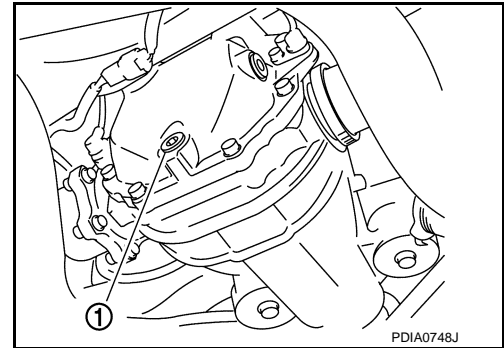
Draining

INFOID:000000008194093

- Stop the engine.
- Remove drain plug (1) and drain gear oil.
- Set a gasket on drain plug and install it to final drive assembly and tighten to the specified torque. Refer to [DLN-67, "Exploded View"](#).

CAUTION:

Never reuse gasket.



Refilling

INFOID:000000008194094

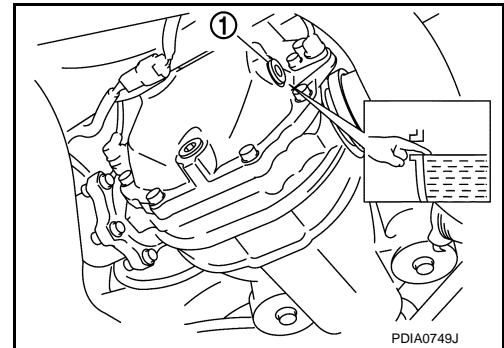
- Remove filler plug (1). Fill with new gear oil until oil level reaches the specified level near filler plug mounting hole.

Oil grade and viscosity

: Refer to [MA-16, "FOR NORTH AMERICA : Fluids and Lubricants"](#) (for NORTH AMERICA), [MA-17, "FOR MEXICO : Fluids and Lubricants"](#) (except for NORTH AMERICA).

Oil capacity

: Refer to [DLN-88, "General Specification"](#).



- After refilling oil, check oil level. Set a gasket to filler plug, then install it to final drive assembly. Refer to [DLN-67, "Exploded View"](#).

CAUTION:

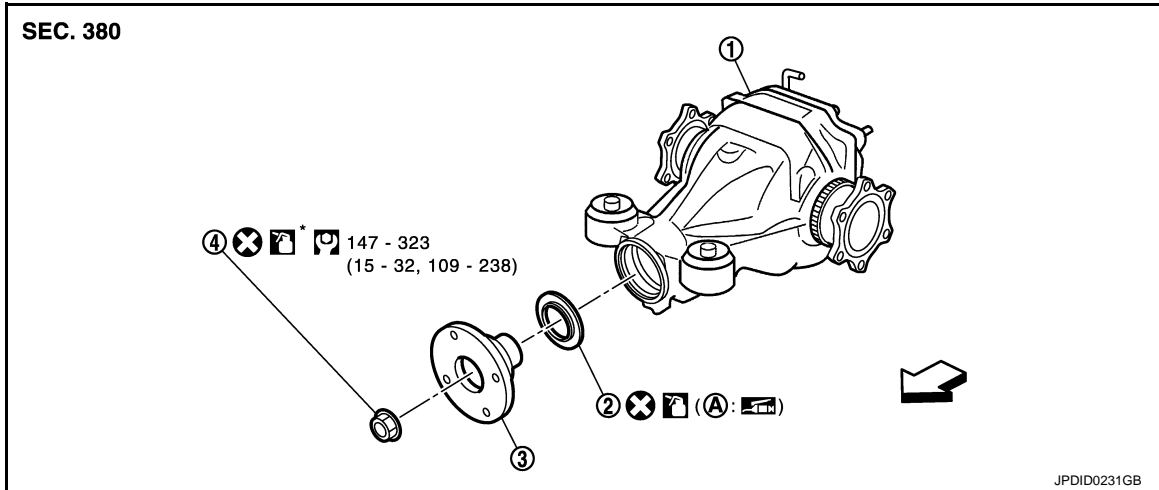
Never reuse gasket.

REMOVAL AND INSTALLATION

FRONT OIL SEAL

Exploded View

INFOID:000000008194095



1. Final drive assembly 2. Front oil seal 3. Companion flange

4. Drive pinion lock nut

- A. Oil seal lip

↔: Vehicle front

: Apply gear oil.

*: Apply anti-corrosion oil.

Refer to [GI-4, "Components"](#) for symbols not described on the above.

Removal and Installation

INFOID:000000008194096

REMOVAL

CAUTION:

Verify identification stamp of replacement frequency put in the lower part of gear carrier to determine replacement for collapsible spacer when replacing front oil seal. Refer to "Identification stamp of replacement frequency of front oil seal". If collapsible spacer replacement is necessary, remove final drive assembly and disassemble it to replace front oil seal and collapsible spacer. Refer to [DLN-65, "Removal and Installation"](#) and [DLN-81, "Disassembly"](#).

NOTE:

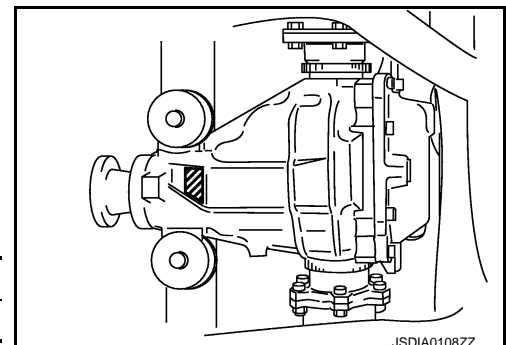
The reuse of collapsible spacer is prohibited in principle. However, it is reusable on a one-time basis only in cases when replacing front oil seal.

Identification stamp of replacement frequency of front oil seal.

- The diagonally shaded area in the figure shows stamping point for replacement frequency of front oil seal.
- The following table shows if collapsible spacer replacement is needed before replacing front oil seal.

When collapsible spacer replacement is required, disassemble final drive assembly to replace collapsible spacer and front oil seal. Refer to [DLN-81, "Disassembly"](#).

| Stamp | collapsible spacer replacement |
|----------|--------------------------------|
| No stamp | Not required |



FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200V]

| Stamp | collapsible spacer replacement |
|---------------------------------------|--------------------------------|
| "0" or "0" on the far right of stamp | Required |
| "01" or "1" on the far right of stamp | Not required |

CAUTION:

Make a stamping after replacing front oil seal.

- After replacing front oil seal, make a stamping on the stamping point in accordance with the table below in order to identify replacement frequency.

CAUTION:

Make a stamping made from left to right.

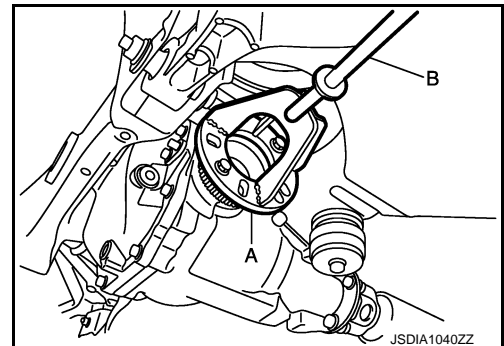
| Stamp before stamping | Stamping on the far right | Stamping |
|--|---------------------------|----------|
| No stamp | 0 | 0 |
| "0" (Front oil seal was replaced once.) | 1 | 01 |
| "01" (Collapsible spacer and front oil seal were replaced last time.) | 0 | 010 |
| "0" is on the far right. (Only front oil seal was replaced last time.) | 1 | ...01 |
| "1" is on the far right. (Collapsible spacer and front oil seal were replaced last time.) | 0 | ...010 |

- Drain gear oil. Refer to [DLN-57, "Draining"](#).
- Make a judgment if a collapsible spacer replacement is required.
- Remove center muffler with a power tool. Refer to [EX-5, "Exploded View"](#).
- Remove rear wheel sensors. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).
- Remove drive shafts from final drive. Refer to [RAX-10, "Exploded View"](#).
- Install attachment (A) to side flange, and then pull out the side flange with the sliding hammer (B).

A : Attachment [SST: KV40104100 (—)]

B : Sliding hammer [SST: ST36230000 (J-25840-A)]

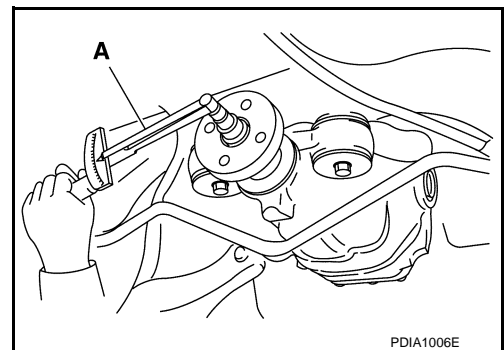
- Remove propeller shaft. Refer to [DLN-7, "Exploded View"](#).



- Measure the total preload with the preload gauge (A) [SST: ST3127S000 (J-25765-A)].

NOTE:

Record the preload measurement.



FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200V]

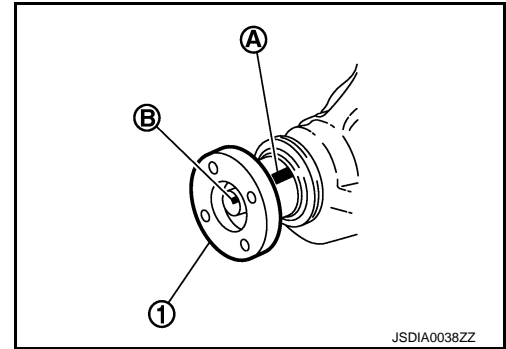
9. Put matching mark (B) on the end of the drive pinion. The matching mark should be in line with the matching mark (A) on companion flange (1).

CAUTION:

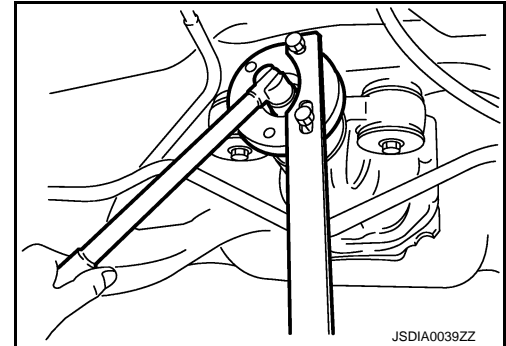
For matching mark, use paint. Never damage companion flange and drive pinion.

NOTE:

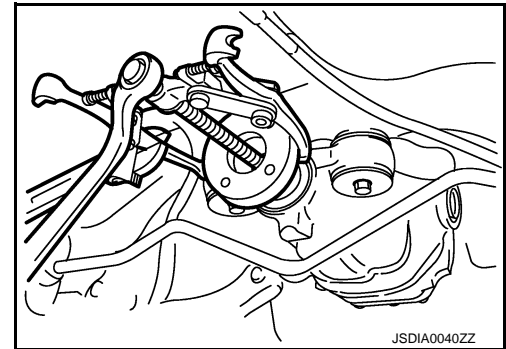
The matching mark on the final drive companion flange indicates the maximum vertical runout position.



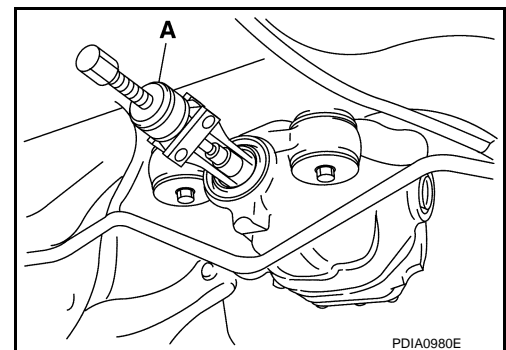
10. Remove drive pinion lock nut using the flange wrench (commercial service tool).



11. Remove companion flange using a puller (commercial service tool).



12. Remove front oil seal using the puller (A) [SST: KV381054S0 (J-34286)].



INSTALLATION

1. Apply multi-purpose grease to front oil seal lip.

FRONT OIL SEAL

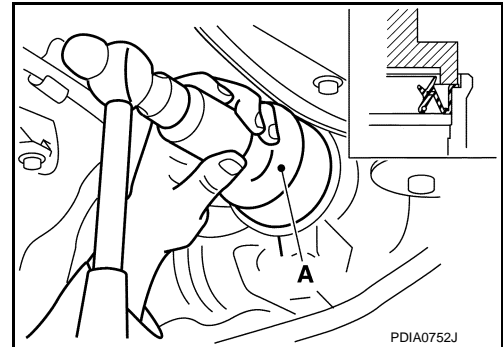
< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200V]

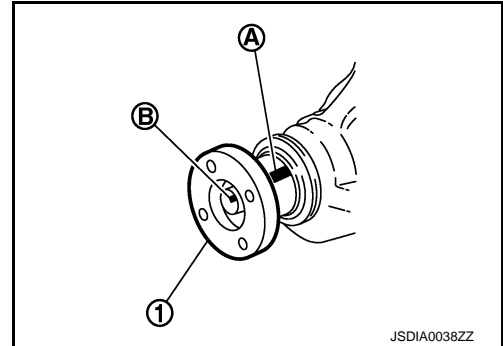
2. Install front oil seal using the drift (A) [SST: ST30720000 (J-25405)] as shown in figure.

CAUTION:

- Never reuse oil seal.
- Never incline oil seal when installing.



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



4. Apply anti-corrosion oil to the thread and seat of new drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion, using flange wrench (commercial service tool).

A: Preload gauge [SST: ST3127S000 (J-25765-A)]

CAUTION:

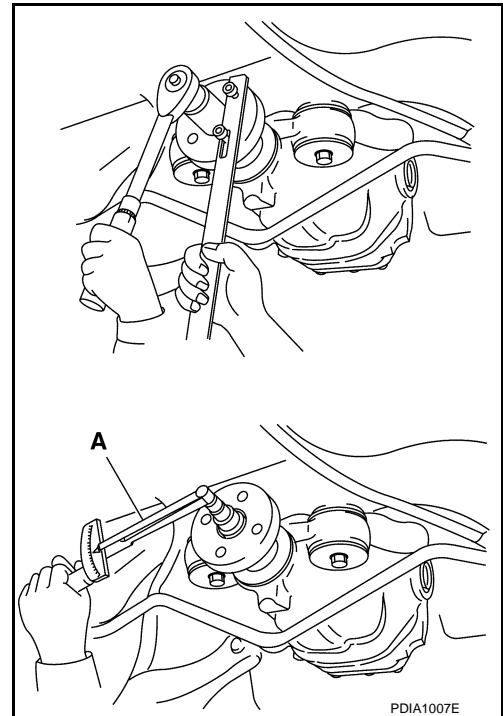
Never reuse drive pinion lock nut.

5. Tighten drive pinion lock nut within the limits of specified torque so as to keep the pinion bearing preload within a standard values, using [SST: ST3127S000 (J-25765-A)].

Total preload torque : A value that add 0.1– 0.4 N·m (0.01 – 0.04 kg-m) to the measured value when removing.

CAUTION:

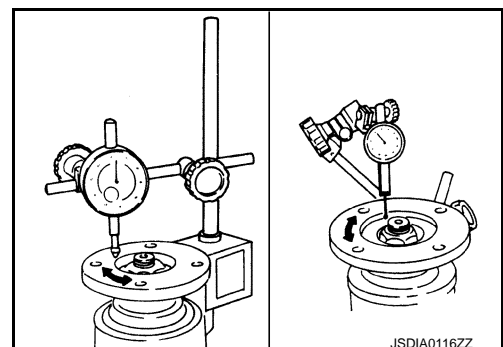
- Adjust to the lower limit of the drive pinion lock nut tightening torque first.
- If the preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Never loosen drive pinion lock nut to adjust the preload torque.



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

Companion flange runout : Refer to [DLN-88, "Companion flange Runout"](#).

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



Companion flange runout : Refer to [DLN-88, "Companion flange Runout"](#).

10. If the runout value is outside the repair limit, follow the procedure below to adjust.
 - a. Check for runout while changing the phase between companion flange and drive pinion gear by 90° step, and search for the position where the runout is the minimum.
 - b. If the runout value is still outside of the limit after the phase has been changed, possible causes are be an assembly malfunction of drive pinion and pinion bearing and malfunction of pinion bearing. Check for these items and repair if necessary.
 - c. If the runout value is still outside of the limit after the check and repair, replace companion flange.
11. Make a stamping for identification of front oil seal replacement frequency. Refer to "Identification stamp of replacement frequency of front oil seal".

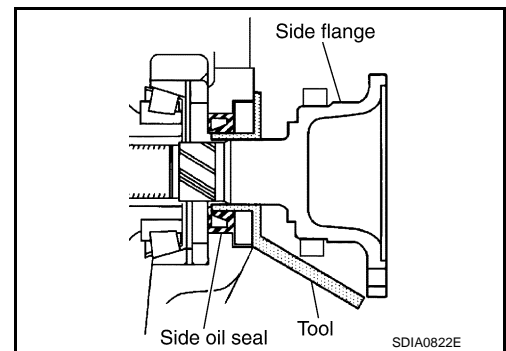
CAUTION:

Make a stamping after replacing front oil seal.

12. Install propeller shaft. Refer to [DLN-7, "Exploded View"](#).
13. Install side flanges with the following procedure.
 - a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
 - b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.
 - c. Put a suitable drift on the center of side flange, then drive it until sound changes.

NOTE:

When installation is completed, driving sound of the side flange turns into a sound that seems to affect the whole final drive.

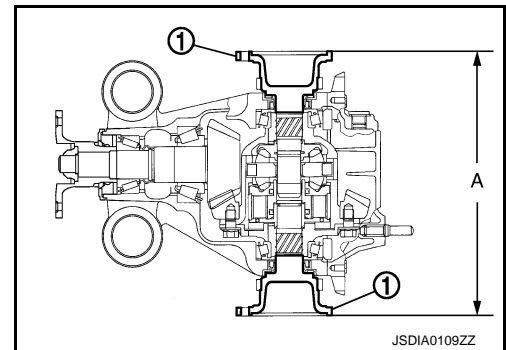


- d. Confirm that the dimension of the side flanges (1) installation measurement (A) in the figure comes into the following.

Standard

A : 326 – 328 mm (12.83 – 12.91 in)

14. Install drive shafts. Refer to [RAX-10, "Exploded View"](#).
15. Install rear wheel sensors. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).
16. Install center muffler. Refer to [EX-5, "Exploded View"](#).
17. Refill gear oil to the final drive and check oil level. Refer to [DLN-57, "Refilling"](#).
18. Check the final drive for oil leakage. Refer to [DLN-57, "Inspection"](#).



SIDE OIL SEAL

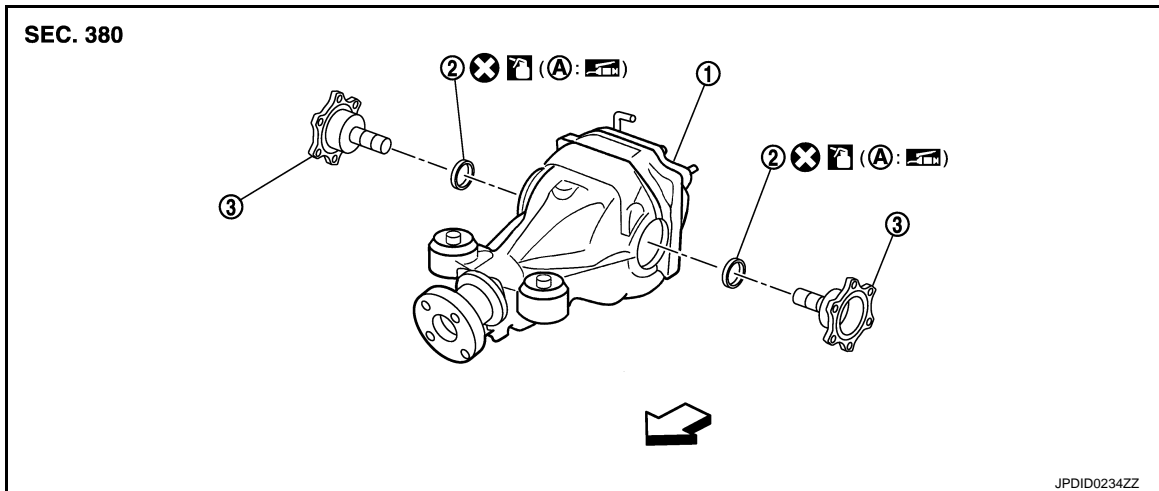
< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200V]

SIDE OIL SEAL

Exploded View

INFOID:000000008194097



1. Final drive assembly

2. Side oil seal

3. Side flange

A. Oil seal lip

⇐: Vehicle front

: Apply gear oil.

Refer to [GI-4, "Components"](#) for symbols not described on the above.

Removal and Installation

INFOID:000000008194098

REMOVAL

1. Remove center muffler with a power tool. Refer to [EX-5, "Exploded View"](#).
2. Remove rear wheel sensor. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).
3. Remove drive shaft from final drive with a power tool. Refer to [RAX-10, "Exploded View"](#).
4. Install attachment (A) to side flange, and then pull out the side flange with the sliding hammer (B).

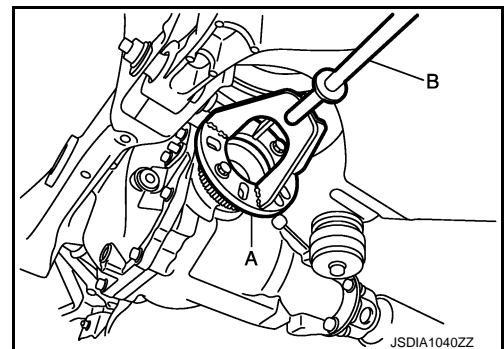
A : Attachment [SST: KV40104100 (—)]

B : Sliding hammer [SST: ST36230000 (J-25840-A)]

5. Remove side oil seal, using a suitable tool.

CAUTION:

Never damage gear carrier.



INSTALLATION

1. Apply multi-purpose grease to side oil seal lip.

SIDE OIL SEAL

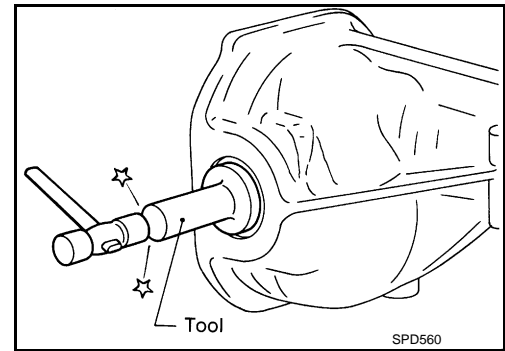
< REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200V]

2. Install side oil seal until it becomes flush with the case end, using the drift [SST: KV38100200 (J-26233)].

CAUTION:

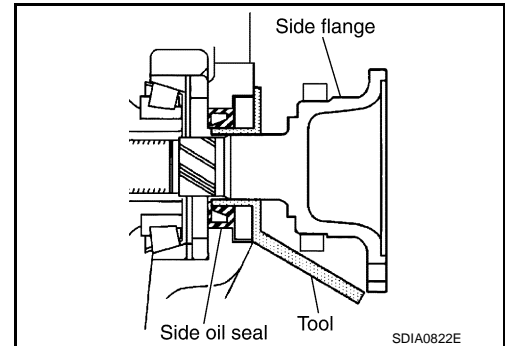
- Never reuse oil seal.
- When installing, never incline oil seal.



3. Install side flange with the following procedure.
 - a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
 - b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.
 - c. Put a suitable drift on the center of side flange, then drive it until sound changes.

NOTE:

When installation is completed, driving sound of the side flange turns into a sound that seems to affect the whole final drive.

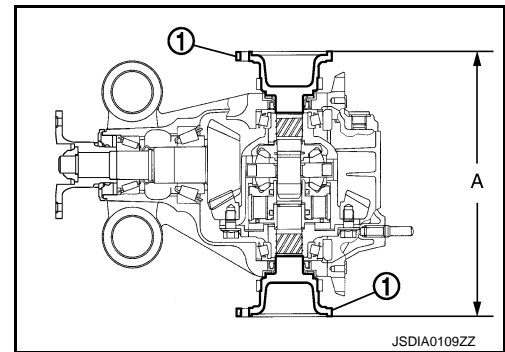


- d. Confirm that the dimension of the side flanges (1) installation measurement (A) in the figure comes into the following.

Standard

A : 326 – 328 mm (12.83 – 12.91 in)

4. Install drive shaft. Refer to [RAX-10, "Exploded View"](#).
5. Install rear wheel sensor. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).
6. Install center muffler. Refer to [EX-5, "Exploded View"](#).
7. When oil leaks while removing, check oil level after the installation. Refer to [DLN-57, "Inspection"](#).



REAR FINAL DRIVE ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

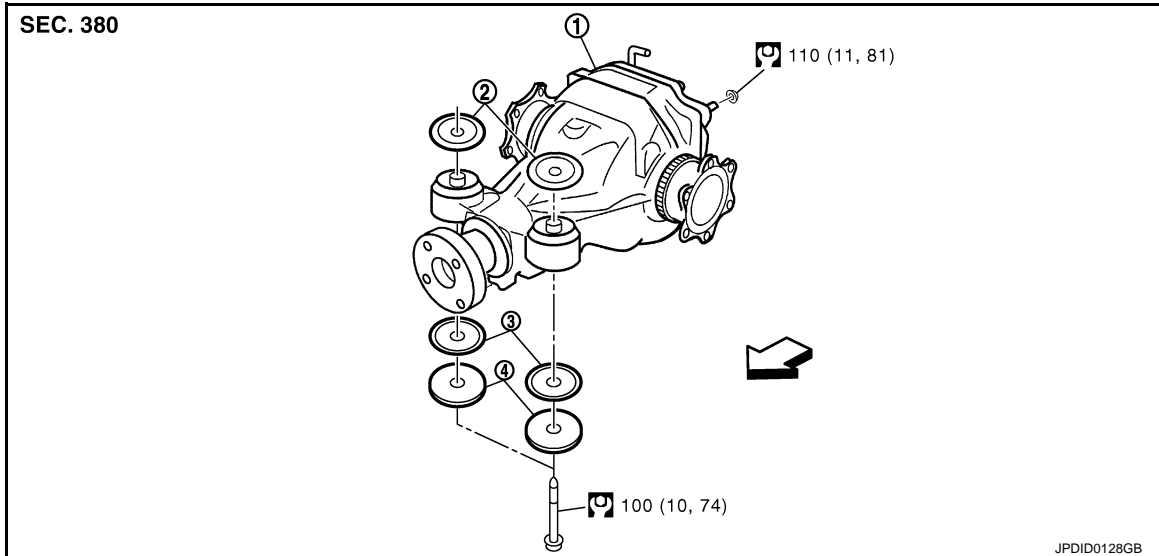
[REAR FINAL DRIVE: R200V]

UNIT REMOVAL AND INSTALLATION

REAR FINAL DRIVE ASSEMBLY

Exploded View

INFOID:000000008194099



1. Rear final drive assembly
2. Upper stopper
3. Lower stopper
4. Washer

⇐: Vehicle front

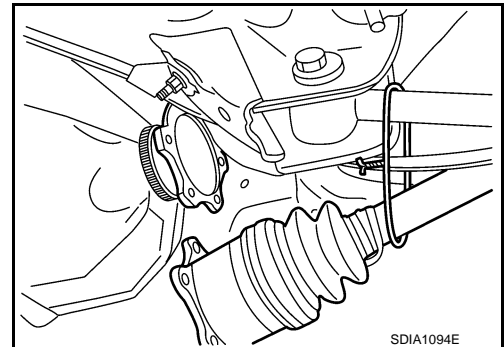
Refer to [GI-4, "Components"](#) for symbols in the figure.

Removal and Installation

INFOID:000000008194100

REMOVAL

1. Remove center muffler with a power tool. Refer to [EX-5, "Exploded View"](#).
2. Remove diag brace with power tool. Refer to [RSU-17, "Exploded View"](#).
3. Remove rear stabilizer bar with a power tool. Refer to [RSU-16, "Exploded View"](#).
4. Remove propeller shaft from the final drive. Refer to [DLN-7, "Exploded View"](#).
5. Remove drive shafts from final drive with a power tool. Then suspend it by wire, etc. Refer to [RAX-10, "Exploded View"](#).
6. Remove breather hose from the final drive.
7. Remove rear wheel sensors. Refer to [BRC-106, "REAR WHEEL SENSOR : Exploded View"](#).



REAR FINAL DRIVE ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[REAR FINAL DRIVE: R200V]

8. Set a suitable jack to rear final drive assembly.

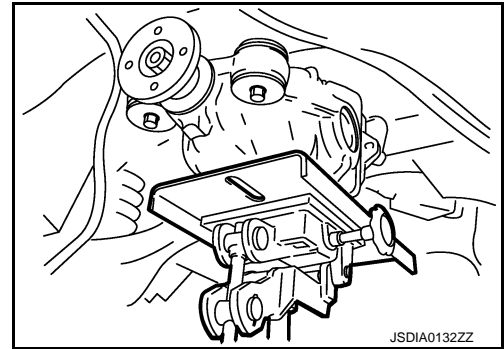
CAUTION:

Never place a jack on the rear cover (aluminum case).

9. Remove the mounting bolts and nuts connecting to the suspension member, and remove rear final drive assembly with a power tool.

CAUTION:

Secure rear final drive assembly to a suitable jack while removing it.



INSTALLATION

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

CAUTION:

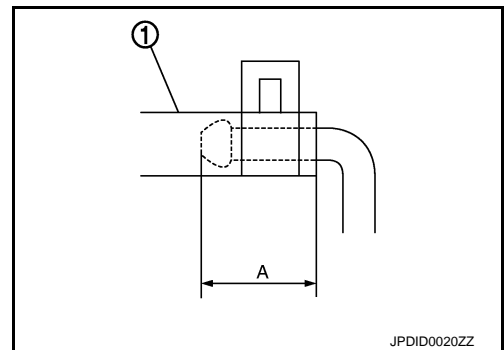
Make sure there are no pinched or restricted areas on the breather hose caused by bending or winding when installing it.

- Install the breather hose (1) to breather connector until dimension (A) shown as follows.

A:

Final drive side : 20 mm (0.79 in)

Suspension member side : 20.5 mm (0.807 in)



CAUTION:

- **Never reuse hose clamp.**
- **Install the hose clamp at the final drive side, with the tab facing downward.**
- **Install the hose clamp at the suspension member side, with the tab facing downward.**

- If remove breather connector, install breather hose (1) as shown in the figure.

2 : Suspension member

3 : Metal connector

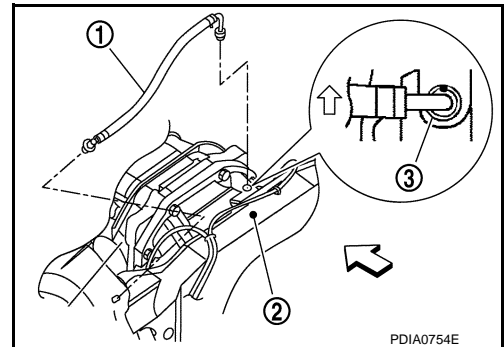
⇐: Vehicle front

- For installation, insert the breather connector to suspension member. Install metal connector to rear cover with aiming painted marking to the front of vehicle.

CAUTION:

Never reuse breather connector and metal connector.

- When oil leaks while removing final drive assembly, check oil level after the installation. Refer to [DLN-57, "Inspection"](#).



DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

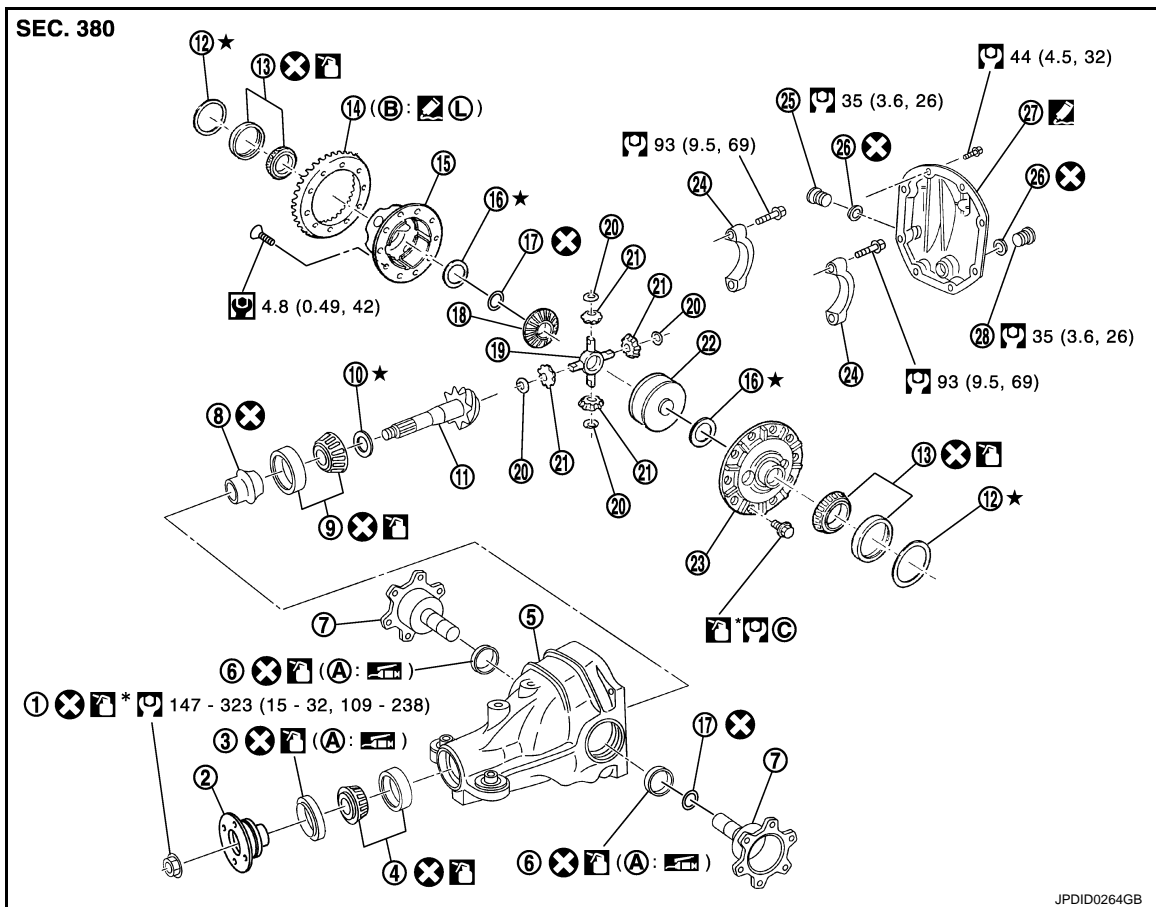
[REAR FINAL DRIVE: R200V]

UNIT DISASSEMBLY AND ASSEMBLY

DIFFERENTIAL ASSEMBLY

Exploded View

INFOID:000000008778945



- | | | |
|------------------------------------|-------------------------------|-----------------------------------|
| 1. Drive pinion lock nut | 2. Companion flange | 3. Front oil seal |
| 4. Pinion front bearing | 5. Gear carrier | 6. Side oil seal |
| 7. Side flange | 8. Collapsible spacer | 9. Pinion rear bearing |
| 10. Pinion height adjusting washer | 11. Drive pinion | 12. Side bearing adjusting washer |
| 13. Side bearing | 14. Drive gear | 15. Differential case B |
| 16. Side gear thrust washer | 17. Circular clip | 18. Side gear |
| 19. Pinion mate shaft | 20. Pinion mate thrust washer | 21. Pinion mate gear |
| 22. Viscous coupling | 23. Differential case A | 24. Bearing cap |
| 25. Filler plug | 26. Gasket | 27. Rear cover |
- A. Oil seal lip B. Screw hole C. Comply with the assembly procedure when tightening. Refer to [DLN-70, "Assembly"](#).



Apply gear oil.



Apply anti-corrosion oil.



Apply Genuine Silicone RTV or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).



Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

Refer to [GI-4, "Components"](#) for symbols not described on the above.

DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

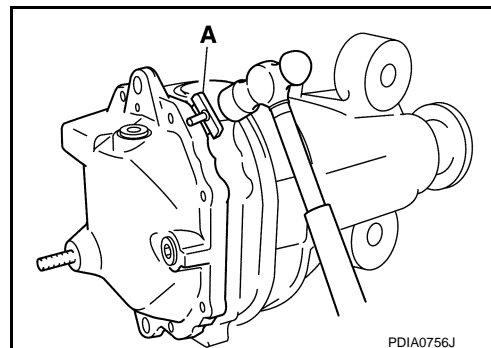
Disassembly

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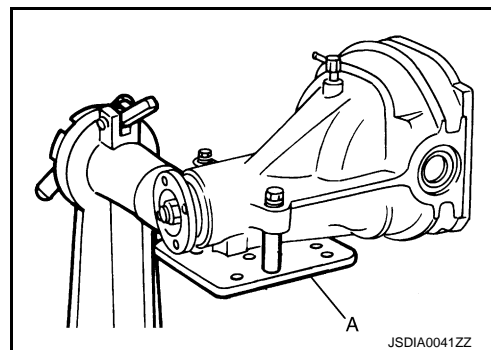
1. Drain gear oil, if necessary.
2. Remove side flanges.
3. Remove rear cover mounting bolts.
4. Remove rear cover to insert the seal cutter (A) [SST: KV10111100 (J-37228)] between gear carrier and rear cover.

CAUTION:

- Never damage the mating surface.
- Never insert flat-bladed screwdriver, this may damage the mating surface.



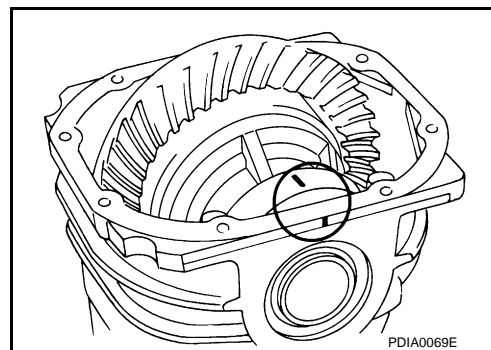
5. Using two spacers, mount carrier on the attachment (A) [SST: KV38100800 (J-25604-01)].



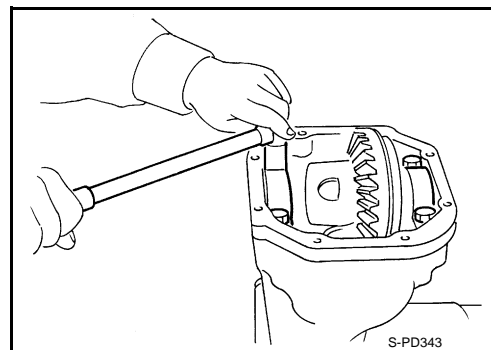
6. For proper reinstallation, paint matching marks on one side of the bearing cap.

CAUTION:

- For matching marks, use paint. Never damage bearing caps and gear carrier.
- Bearing caps are manufactured as integral molding. Use the matching marks to them in their original positions.



7. Remove bearing caps.

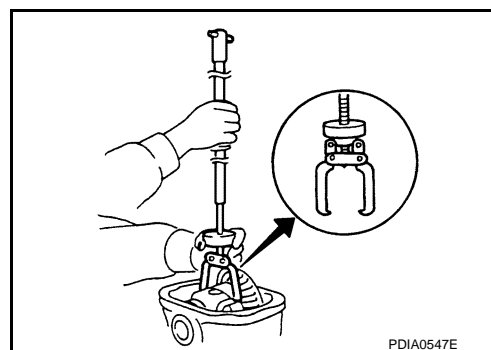


DIFFERENTIAL ASSEMBLY

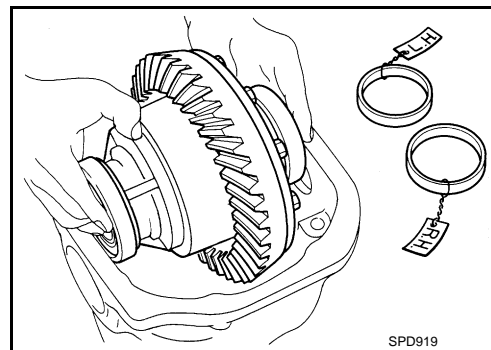
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

8. Lift differential case assembly out with a sliding hammer (commercial service tool).



- Keep side bearing outer races together with inner race. Never mix them up.
Also, keep side bearing adjusting washers together with bearings.



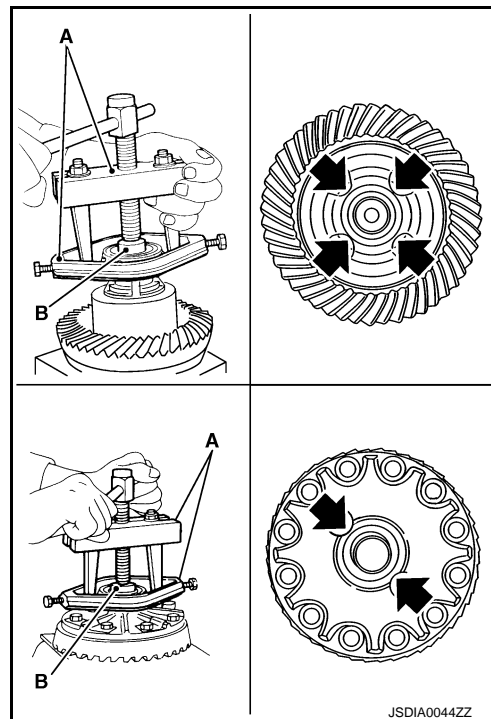
9. Remove side bearing inner race with puller (A) and base (B). To prevent damage to bearing, engage puller jaws in groove (←→).

A: Puller [SST: ST33051001 (J-22888-20)]

B: Base [SST: ST33061000 (J-8107-2)]

CAUTION:

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



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

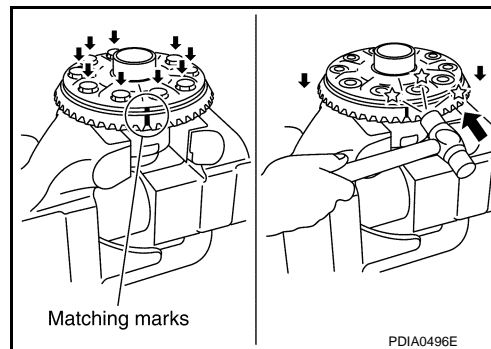
CAUTION:

For matching marks, use paint. Never damage differential case and drive gear.

11. Remove drive gear mounting bolts.
12. Tap drive gear off differential case assembly with a soft hammer.

CAUTION:

Tap evenly all around to keep drive gear from bending.

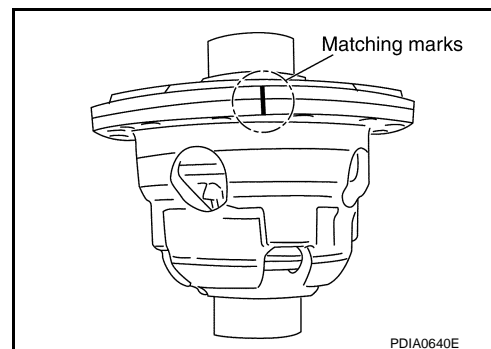


DIFFERENTIAL ASSEMBLY

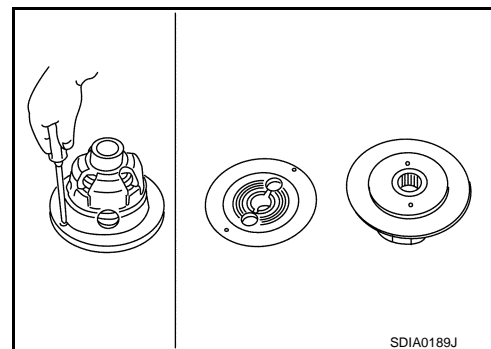
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

13. Put matching marks with paint.



14. Loosen screws on differential cases A and B.

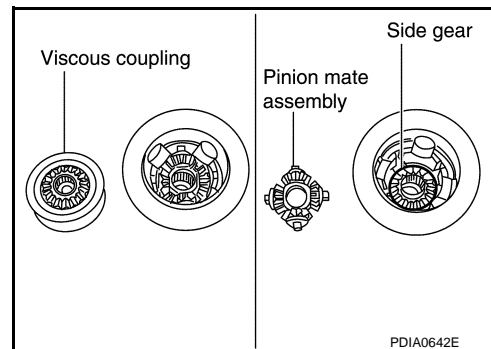


15. Separate differential case A and B, then remove viscous coupling, pinion mate gear, pinion mate thrust washer, side gear, pinion mate shaft, circular clip and side gear thrust washer from differential cases.

16. Remove side oil seal, using a suitable tool.

CAUTION:

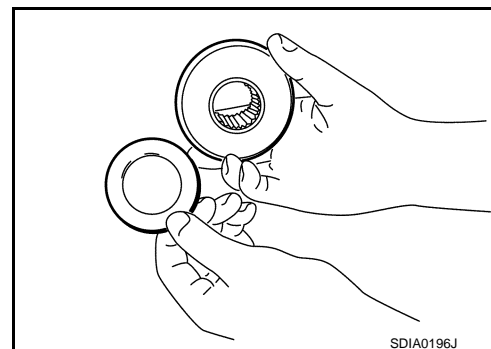
Never damage gear carrier.



Assembly

INFOID:000000008778947

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

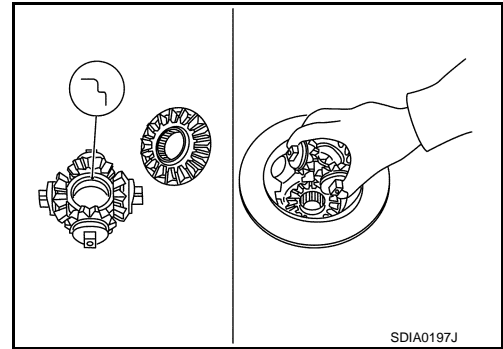


DIFFERENTIAL ASSEMBLY

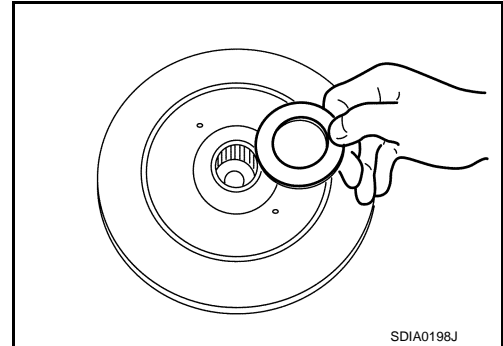
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

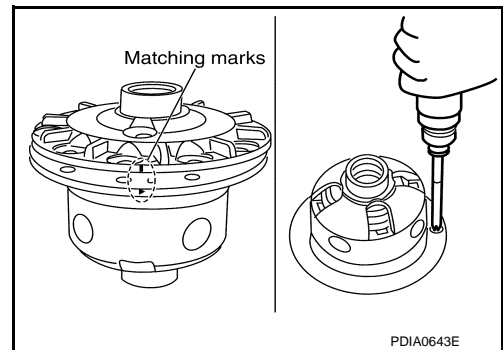
2. Install side gear and thrust washer into differential case B.
CAUTION:
Make sure that the circular clip is installed to side gear.
3. Install pinion mate assembly (pinion mate shaft, pinion mate gears and pinion mate thrust washers) into differential case B.
CAUTION:
Install the pinion mate shaft groove side to side gear.



4. Install viscous coupling into differential case B.
5. Install side gear thrust washer with the same thickness as the ones installed prior to disassembly or reinstall the old ones on the viscous coupling.



6. Align the matching marks and install differential case A into differential case B.

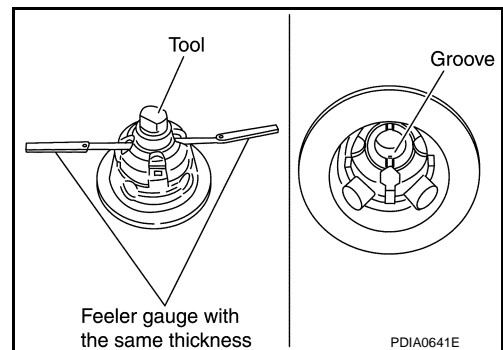


7. Measure side gear end play. If necessary, select the appropriate side gear thrust washer.
 - a. Place differential assembly so that right side gear is on the upper side.
 - b. Measure the clearance between right side gear back and differential case using feeler gauge, while rotating right side gear with a suitable tool attached to splines.

Side gear back clearance : Refer to [DLN-88, "Differential Side Gear Clearance"](#).

CAUTION:

- **Never place feeler gauge at groove side of differential case.**
- **To prevent side gear from tilting, insert feeler gauges with the same thickness from both sides.**



- c. If the back clearance is outside the specification, use a thicker/thinner side gear thrust washer to adjust. For selecting adjusting washer, refer to the latest parts information. For selecting thrust washer, refer to the latest parts information.

When the back clearance is large: Use a thicker thrust washer.

When the back clearance is small: Use a thinner thrust washer.

DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

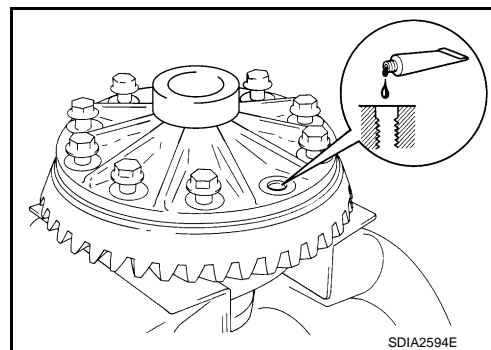
CAUTION:

- Adjust the clearance with the left side gear thrust washer only.
- Only one side gear thrust washer can be selected.

8. Apply thread locking sealant into the thread hole of drive gear. Use Genuine High Strength Thread Locking Sealant or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

CAUTION:

Clean and degrease drive gear back and threaded holes sufficiently.



9. Install the drive gear to differential case.

CAUTION:

Align the matching marks of differential case and drive gear.

10. Tighten the mounting bolts with the following procedure.

CAUTION:

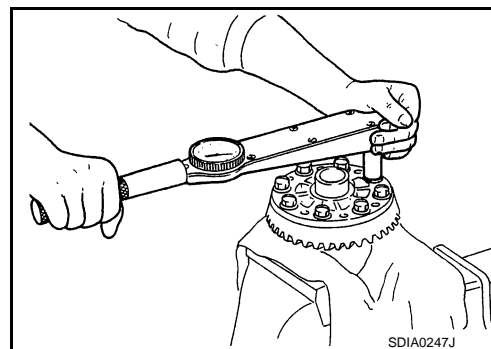
Apply anti-corrosion oil to the thread and seat of mounting bolts.

- a. Tighten the bolts in a crisscross fashion to the specified torque.

Drive gear mounting bolts tightening torque : 78.5 N•m (8.0 kg-m, 58 ft-lb)

- b. Tighten the bolts additionally to the specified angle.

Drive gear mounting bolts tightening angle : 31 to 36 degree



CAUTION:

Check the tightening angle using the angle wrench [SST: KV10112100 (BT-8653-A)]. Never make judgment by visual inspection.

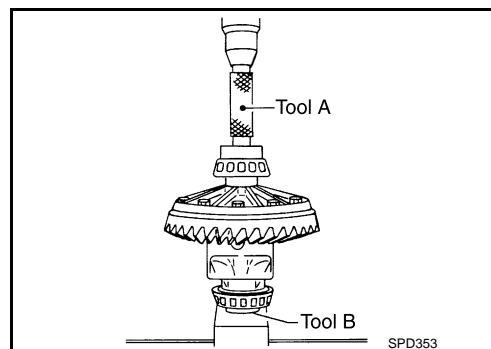
11. Press side bearing inner races to differential case, using the drift (A) and the base (B) [SST: ST33061000 (J-8107-2)].

A : Drift [SST: KV38100300 (J-25523)]

B : Base [SST: ST33061000 (J-8107-2)]

CAUTION:

Never reuse side bearing inner race.

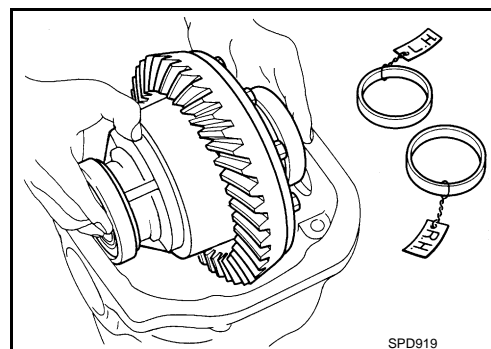


12. Set bearing outer races to differential case assembly, and install it with removed side bearing adjusting washer or same thickness washer into gear carrier.

CAUTION:

- Apply differential gear oil to the side bearings.
- Install side bearing and side bearing adjusting washer in correct location. (drive gear tooth side or drive gear back side)

13. Measure side bearing preload. If necessary, select the appropriate side bearing adjusting washers. Refer to [DLN-74, "Adjustment"](#).

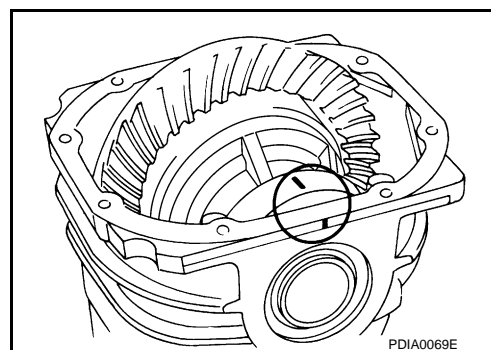


DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

14. Align matching marks on bearing cap with that on gear carrier.
15. Install bearing caps and tighten bearing cap mounting bolts.

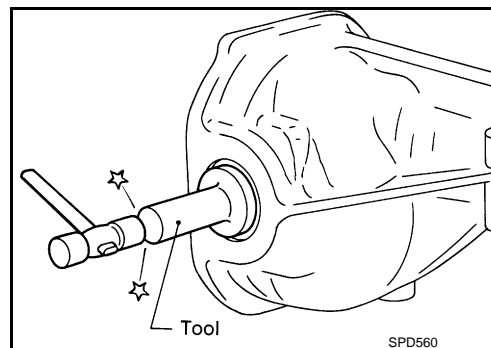


16. Using the drift [SST: KV38100200 (J-26233)], drive side oil seals until it becomes flush with the case end.

CAUTION:

- **Never reuse oil seal.**
- **When installing, never incline oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**

17. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and total preload torque. Refer to [DLN-74, "Adjustment"](#).
Recheck above items. Readjust the above description, if necessary.

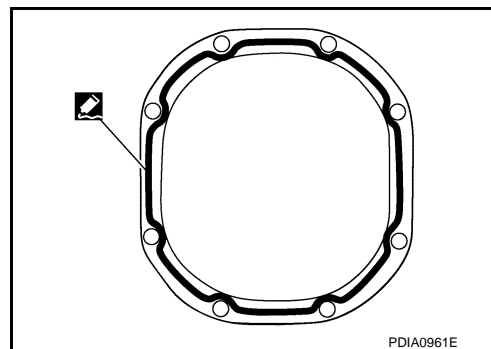


18. Apply sealant to mating surface of rear cover. Use Genuine Silicone RTV or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

CAUTION:

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

19. Install rear cover on gear carrier and tighten mounting bolts.

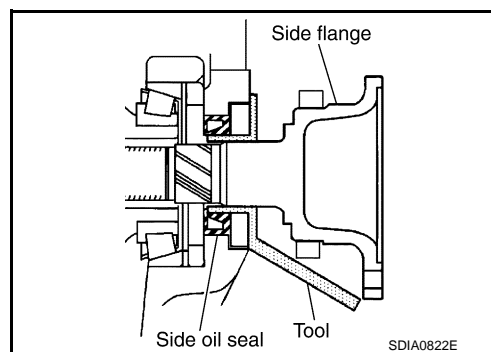


20. Install side flanges with the following procedure.

- a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
- b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.
- c. Put a suitable drift on the center of side flange, then drive it until sound changes.

NOTE:

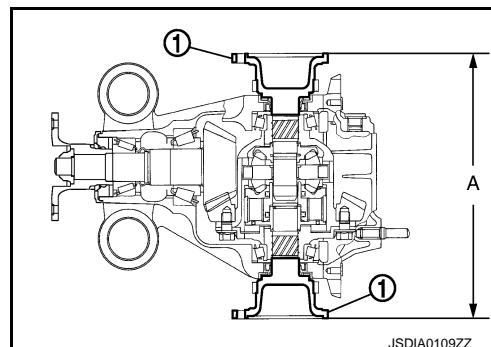
When installation is completed, driving sound of the side flange turns into a sound that seems to affect the whole final drive.



- d. Confirm that the dimension of the side flanges (1) installation measurement (A) in the figure comes into the following.

Standard

A : 326 – 328 mm (12.83 – 12.91 in)



DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

Adjustment

INFOID:000000008778948

TOTAL PRELOAD TORQUE

- Before inspection and adjustment, drain gear oil.
- 1. Secure final drive assembly onto an attachment [SST: KV38100800 (J-25604-01)].
- 2. Remove side flanges.
- 3. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
- 4. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
- 5. Measure total preload with the preload gauge (A) [SST: ST3127S000 (J-25765-A)].

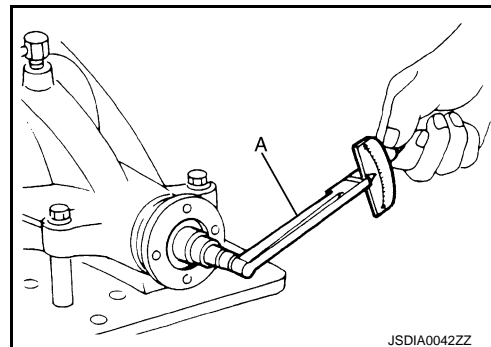
Total preload torque

: Refer to [DLN-88, "Preload Torque"](#).

NOTE:

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

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



When the preload torque is large

On pinion bearings: Replace the collapsible spacer.

On side bearings: Use thinner side bearing adjusting washers by the same amount to each side. For selecting adjusting washer, refer to the latest parts information.

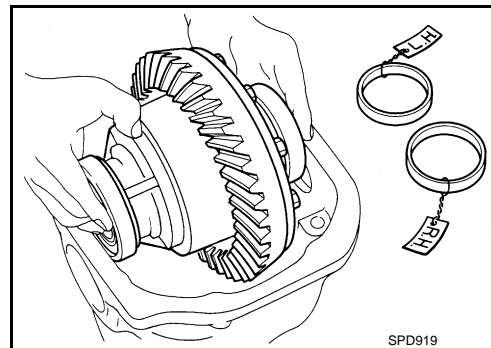
When the preload is small

On pinion bearings: Tighten the drive pinion lock nut.

On side bearings: Use thicker side bearing adjusting washers by the same amount to each side. For selecting adjusting washer, refer to the latest parts information.

SIDE BEARING PRELOAD

- Before inspection and adjustment, drain gear oil.
- 1. Remove rear cover. Refer to [DLN-68, "Disassembly"](#).
- 2. Make sure all parts are clean. Also, make sure the bearings are well lubricated with gear oil.
- 3. Place the differential case, with side bearings and bearing races installed, into gear carrier.

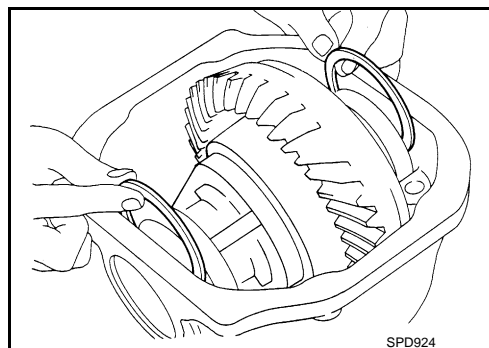


DIFFERENTIAL ASSEMBLY

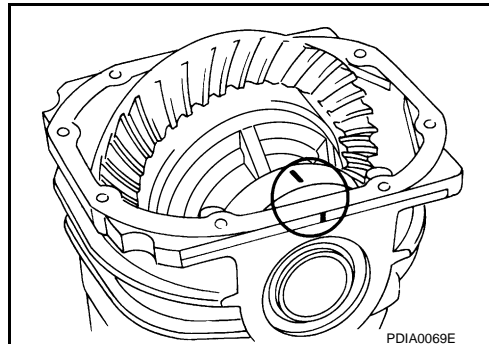
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

4. Insert left and right original side bearing adjusting washers in place between side bearings and gear carrier.



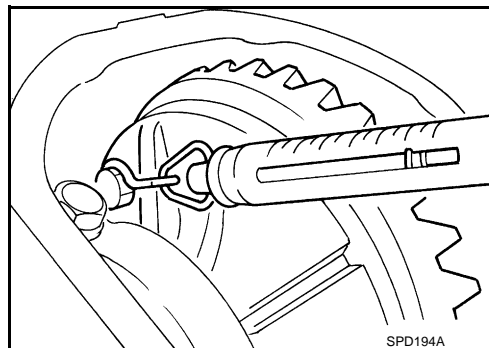
5. Install bearing caps in their correct locations and tighten bearing cap mounting bolts.
6. Turn the carrier several times to seat the bearings.



7. Measure the turning torque of the carrier at the drive gear mounting bolts with a spring gauge [SST: — (J-8129)].

Specification

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



8. If the turning torque is outside the specification, use a thicker/thinner side bearing adjusting washer to adjust. For selecting adjusting washer, refer to the latest parts information.

If the turning torque is less than the specified range:

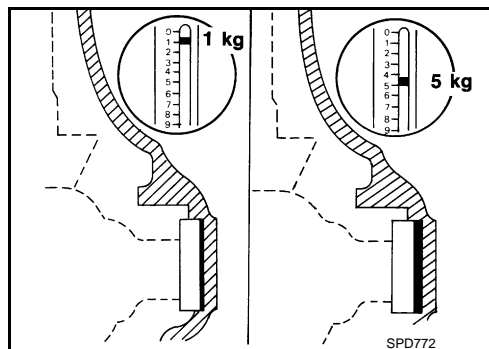
Use a thicker adjusting washer.

If the turning torque is greater than the specification:

Use a thinner adjusting washer.

CAUTION:

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



9. Record the total amount of washer thickness required for the correct carrier side bearing preload.

DRIVE GEAR RUNOUT

1. Remove rear cover. Refer to [DLN-68, "Disassembly"](#).

DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

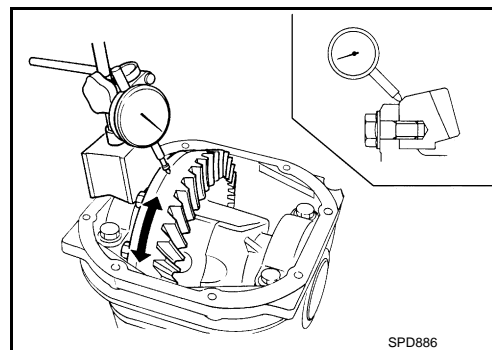
2. Fit a dial indicator to the drive gear back face.
3. Rotate the drive gear to measure runout.

Drive gear runout : Refer to [DLN-88, "Drive Gear Runout"](#).

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

CAUTION:

Replace drive gear and drive pinion gear as a set.

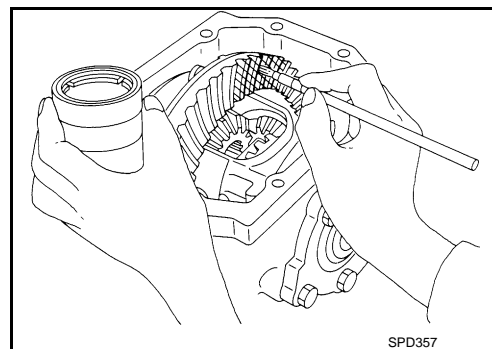


TOOTH CONTACT

- Before inspection and adjustment, drain gear oil.
1. Remove rear cover. Refer to [DLN-68, "Disassembly"](#).
 2. Apply red lead to drive gear.

CAUTION:

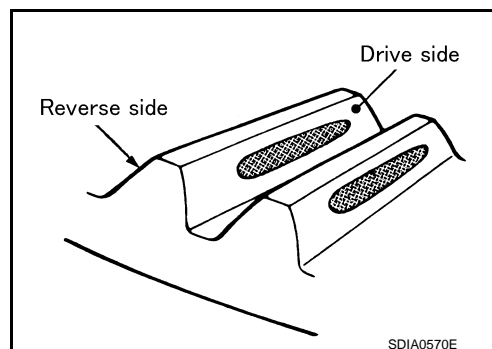
Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on drive gear.



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

CAUTION:

Check tooth contact on drive side and reverse side.



DIFFERENTIAL ASSEMBLY

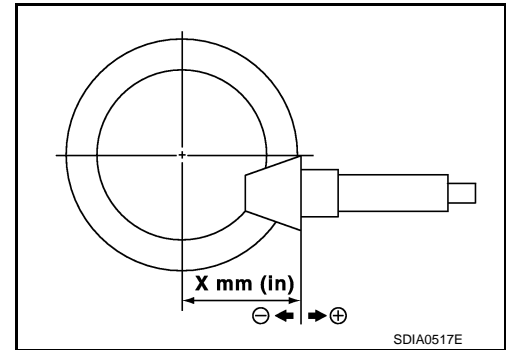
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

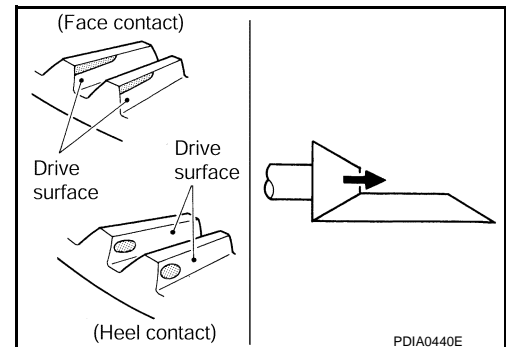
| Tooth contact condition | | Pinion height adjusting washer selection valve [mm (in)] | Adjustment (Yes/No) | Possible cause |
|-------------------------|--------------|---|------------------------|---|
| Drive side | Back side | | | |
| Heel side | Toe side | Thicker ↑ | Yes | Occurrence of noise and scoring sound in all speed ranges. |
| | | | | Occurrence of noise when accelerating. |
| | | | | |
| | | Thinner ↓ | No | - |
| | | | | |
| | | | | |
| | | | | |
| | | Thinner ↓ | Yes | Occurrence of noise at constant speed and decreasing speed. |
| | | | | Occurrence of noise and scoring sound in all speed ranges. |

SDIA0207E

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



- If the tooth contact is near the face (face contact), or near the heel (heel contact), thicken pinion height adjusting washers to move drive pinion closer to drive gear. For selecting adjusting washer, refer to the latest parts information.

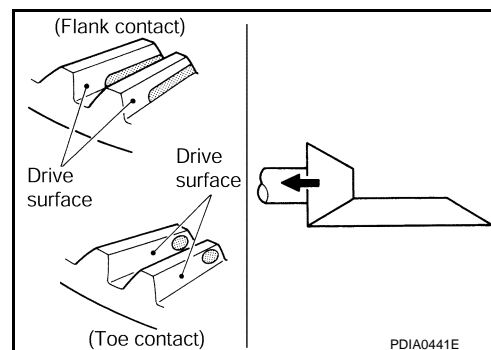


DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thin pinion height adjusting washers to move drive pinion farther from drive gear.
For selecting adjusting washer, refer to the latest parts information.



BACKLASH

- Before inspection and adjustment, drain gear oil.
- 1. Remove rear cover. Refer to [DLN-68, "Disassembly"](#).
- 2. Fit a dial indicator to the drive gear face to measure the backlash.

Backlash : Refer to [DLN-88, "Backlash"](#).

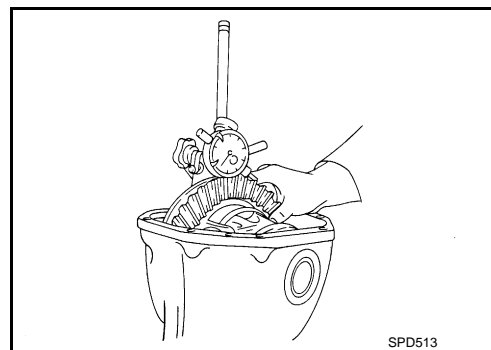
- If the backlash is outside of the specified value, change the thickness of side bearing adjusting washer.

When the backlash is large:

Make drive gear back side adjusting washer thicker, and drive gear tooth side adjusting washer thinner by the same amount. For selecting adjusting washer, refer to the latest parts information.

When the backlash is small:

Make drive gear back side adjusting washer thinner, and drive gear tooth side adjusting washer thicker by the same amount. For selecting adjusting washer, refer to the latest parts information.



CAUTION:

Never change the total amount of washers as it changes the bearing preload.

Inspection After Disassembly

INFOID:000000008778949

DRIVE GEAR AND DRIVE PINION

- Clean up the disassembled parts.
- If the gear teeth never mesh or line-up correctly, determine the cause and adjust or replace as necessary.
- If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.

BEARING

- Clean up the disassembled parts.
- If any chipped (by friction), pitted, worn, rusted or scratched marks, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).

SIDE GEAR AND PINION MATE GEAR

- Clean up the disassembled parts.
- If any cracks or damage on the surface of the tooth is found, replace.
- If any worn or chipped mark on the contact sides of the thrust washer is found, replace.

SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

- Clean up the disassembled parts.
- If it is chipped (by friction), damaged, or unusually worn, replace.

OIL SEAL

DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

- Whenever disassembled, replace.
- If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips, replace them.

DIFFERENTIAL CASE

- Clean up the disassembled parts.
- If any wear or crack on the contact sides of the differential case is found, replace.

COMPANION FLANGE

- Clean up the disassembled parts.
- If any chipped mark [about 0.1 mm, (0.004 in)] or other damage on the contact sides of the lips of the companion flange is found, replace.

A

B

C

DLN

E

F

G

H

I

J

K

L

M

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O

P

DRIVE PINION

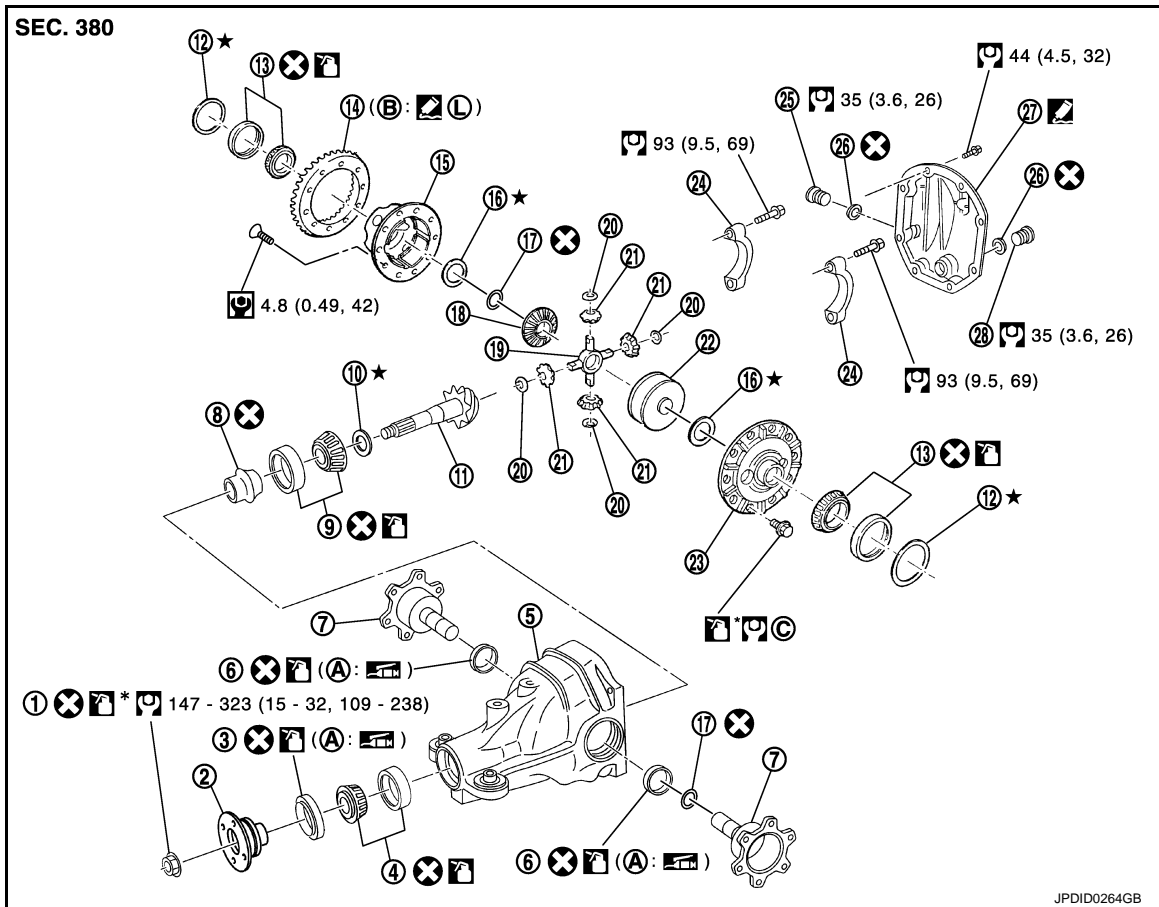
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

DRIVE PINION

Exploded View

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- | | | |
|------------------------------------|-------------------------------|--|
| 1. Drive pinion lock nut | 2. Companion flange | 3. Front oil seal |
| 4. Pinion front bearing | 5. Gear carrier | 6. Side oil seal |
| 7. Side flange | 8. Collapsible spacer | 9. Pinion rear bearing |
| 10. Pinion height adjusting washer | 11. Drive pinion | 12. Side bearing adjusting washer |
| 13. Side bearing | 14. Drive gear | 15. Differential case B |
| 16. Side gear thrust washer | 17. Circular clip | 18. Side gear |
| 19. Pinion mate shaft | 20. Pinion mate thrust washer | 21. Pinion mate gear |
| 22. Viscous coupling | 23. Differential case A | 24. Bearing cap |
| 25. Filler plug | 26. Gasket | 27. Rear cover |
| 28. Drain plug | | |
| A. Oil seal lip | B. Screw hole | C. Comply with the assembly procedure when tightening. Refer to DLN-70, "Assembly" . |



Apply gear oil.



Apply anti-corrosion oil.



Apply Genuine Silicone RTV or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).



Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).

Refer to [GI-4, "Components"](#) for symbols not described on the above.

DRIVE PINION

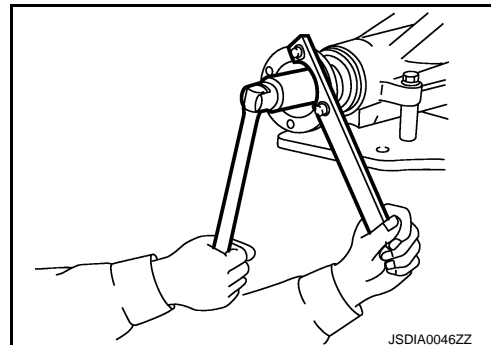
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

INFOID:000000008778951

Disassembly

1. Remove differential case assembly. Refer to [DLN-68. "Disassembly"](#).
2. Remove drive pinion lock nut with the flange wrench (commercial service tool).



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

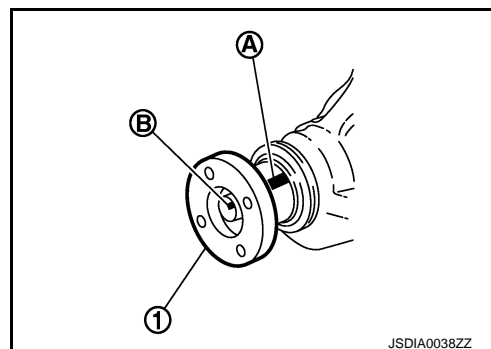
CAUTION:

For matching mark, use paint. Never damage companion flange and drive pinion.

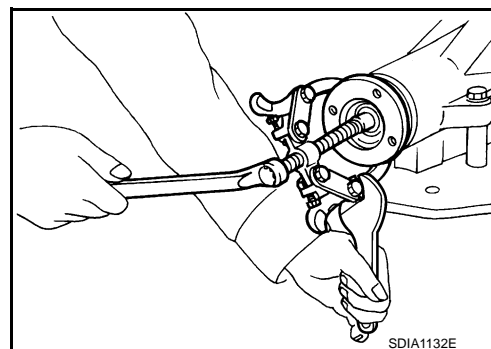
NOTE:

The matching mark on the final drive companion flange indicates the maximum vertical runout position.

When replacing companion flange, matching mark is not necessary.



4. Remove companion flange using the suitable puller (commercial service tool).

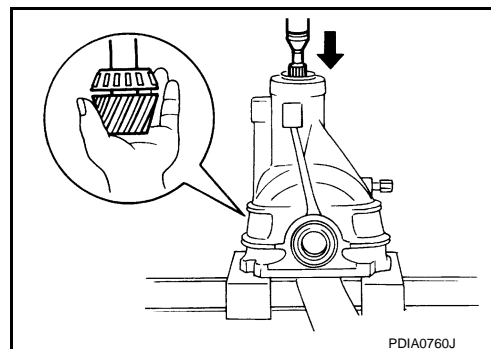


5. Press drive pinion assembly out of gear carrier.

CAUTION:

Never drop drive pinion assembly.

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

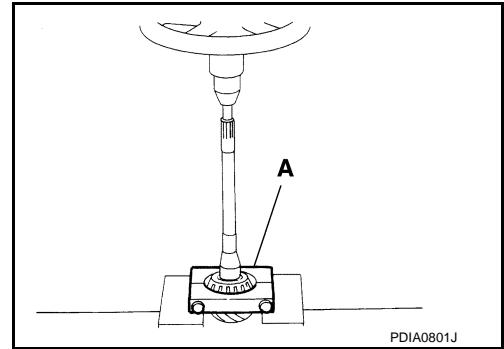


DRIVE PINION

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

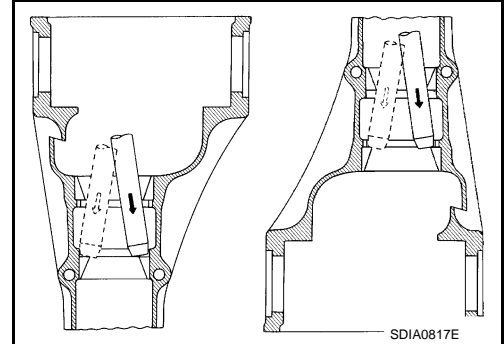
10. Remove pinion rear bearing inner race and pinion height adjusting washer with the replacer (A) (commercial service tool).



11. Tap pinion front/rear bearing outer races uniformly using a brass rod or equivalent to remove them.

CAUTION:

Never damage gear carrier.



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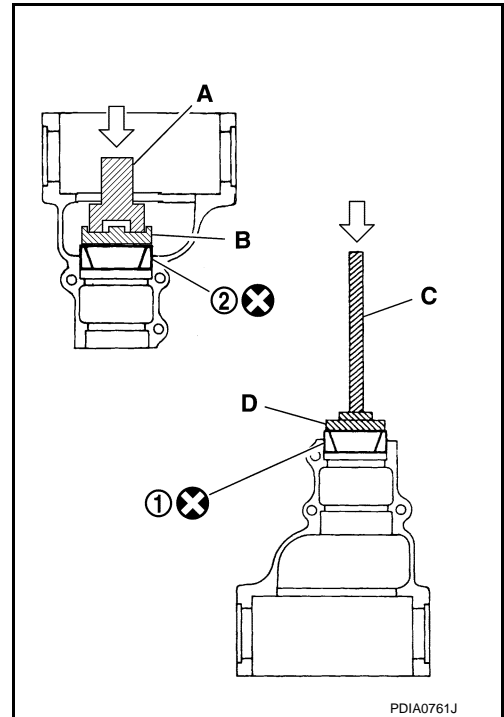
Assembly

1. Install front bearing outer race (1) and rear bearing outer race (2) using drifts (A, B and D) and drift bar (C).

- A : Drift [SST: ST30720000 (J-25405)]
- B : Drift [SST: KV40105230 (—)]
- C : Drift bar [SST: ST30611000 (J-25742-1)]
- D : Drift [SST: ST30613000 (J-25742-3)]

CAUTION:

- At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.
- Never reuse pinion front and rear bearing outer race.



DRIVE PINION

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

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

When hypoid gear set has been replaced

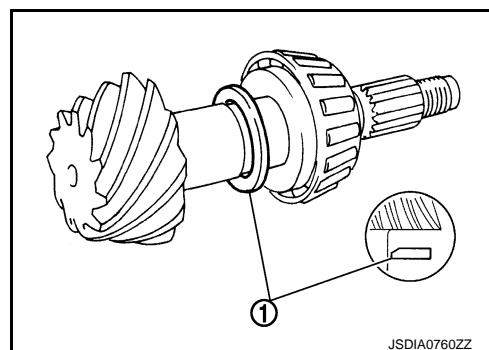
- Select pinion height adjusting washer. Refer to [DLN-86](#), "Adjustment".

When hypoid gear set has been reused

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

CAUTION:

Pay attention to the direction of pinion height adjusting washer. (Assemble as shown in the figure.)



3. Install pinion rear bearing inner race (1) to drive pinion with the drift (A) [SST: ST30901000 (J-26010-01)].

CAUTION:

Never reuse pinion rear bearing inner race.

4. Check and adjust the tooth contact and back lash of drive gear and drive pinion following the procedure below.

- a. Assemble drive pinion into gear carrier.

CAUTION:

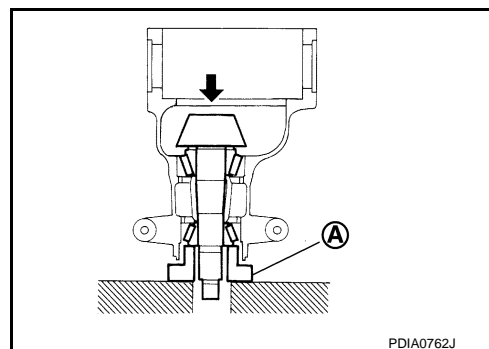
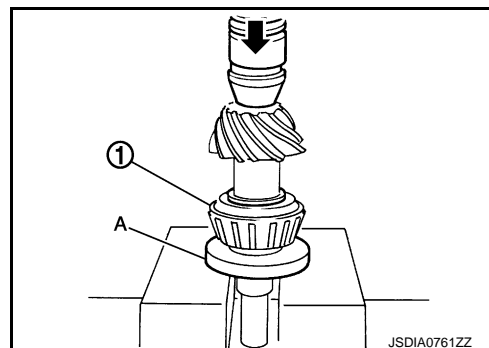
- **Never assemble collapsible spacer at this time.**
- **Apply gear oil to pinion rear bearing.**

- b. Assemble pinion front bearing inner race to drive pinion assembly.

CAUTION:

- **Never reuse pinion front bearing inner race.**
- **Apply gear oil to pinion front bearing.**

- c. Using suitable spacer (A) (commercial service tool), press the pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.



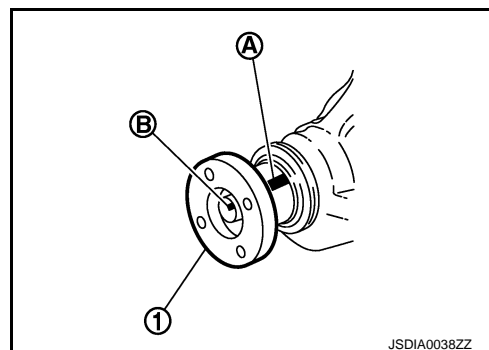
- d. Install companion flange.

CAUTION:

Never install front oil seal at this time.

NOTE:

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



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DRIVE PINION

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

- e. Temporarily tighten removed drive pinion nut to drive pinion, using flange wrench (commercial service tool).

A : Preload gauge [SST: ST3127S000 (J-25765-A)]

NOTE:

Use removed drive pinion nut only for the preload measurement.

- f. Rotate drive pinion more than 20 times to adjust bearing.
- g. Tighten to drive pinion lock nut using flange wrench (commercial service tool), while adjusting pinion bearing preload torque using preload gauge [SST: ST3127S000 (J-25765-A)].

Pinion bearing preload (without oil seal) : 1.0 - 1.3 N·m (0.11 – 0.13 kg-m, 9 – 11 in-lb)

CAUTION:

Drive pinion nut is tightened with no collapsible spacer. Be careful not to overtighten it. While measuring the preload, tighten drive pinion nut in 5° to 10° increments.

- h. Assemble removed drive side bearing adjusting washer or same thickness of it and install differential case assembly. Refer to [DLN-70. "Assembly"](#).

CAUTION:

- Apply differential gear oil to the side bearings.
- Install side bearing and side bearing adjusting washer in correct location. (drive gear tooth side or drive gear back side)

- i. Install bearing caps.
- j. Check and adjust tooth contact and drive gear to drive pinion backlash. Refer to [DLN-74. "Adjustment"](#).
- k. Remove bearing caps and differential case assembly.
- l. Remove companion flange.
- m. Remove drive pinion assembly from gear carrier.

CAUTION:

Never drop the drive pinion assembly.

- n. Remove pinion front bearing inner race.
5. Assemble collapsible spacer.

CAUTION:

Never reuse collapsible spacer.

6. Assemble drive pinion into gear carrier.

CAUTION:

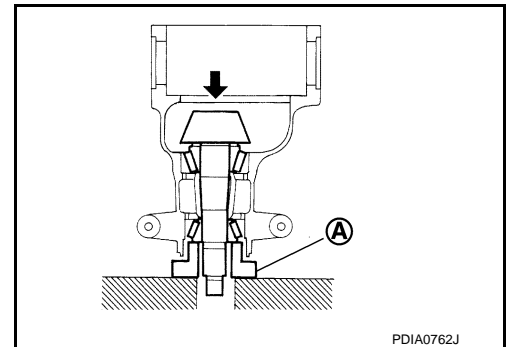
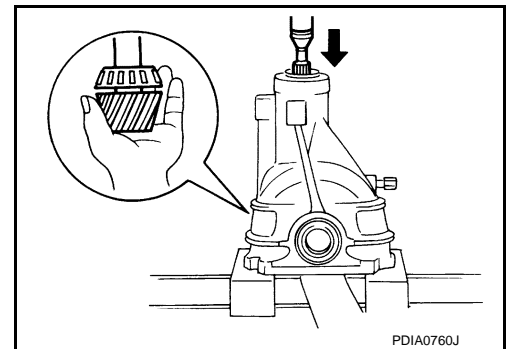
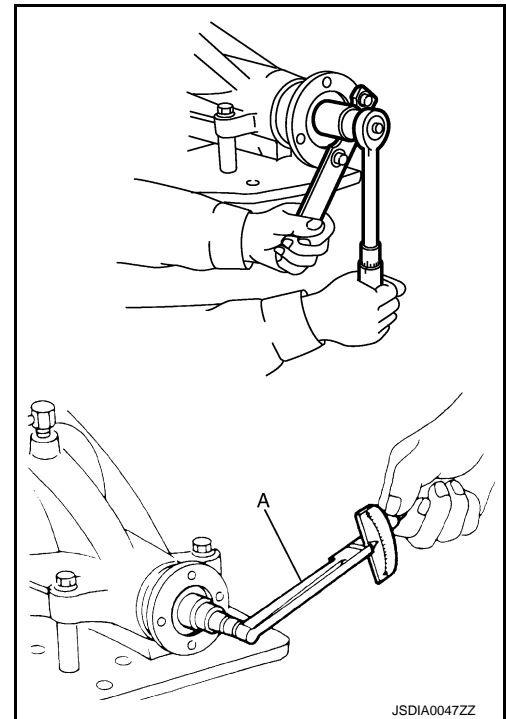
Apply gear oil to pinion rear bearing.

7. Assemble pinion front bearing inner race to drive pinion assembly.

CAUTION:

- Never reuse pinion front bearing inner race.
- Apply gear oil to pinion front bearing.

8. Using suitable spacer (A) (commercial service tool), press the pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.



DRIVE PINION

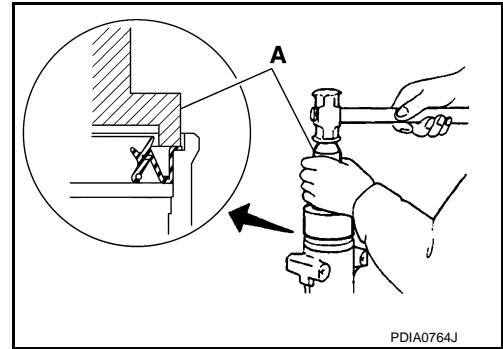
< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

9. Using the drift (A) [SST: ST30720000 (J-25405)], install front oil seal as shown in figure.

CAUTION:

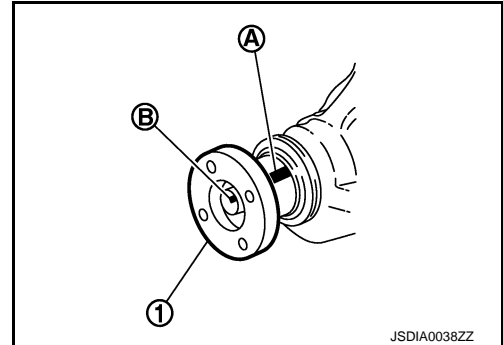
- Never reuse oil seal.
- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.



10. Install companion flange.

NOTE:

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



11. Apply anti-corrosion oil to the thread and seat of drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion, using flange wrench (commercial service tool).

A : Preload gauge [SST: ST3127S000 (J-25765-A)]

CAUTION:

Never reuse drive pinion lock nut.

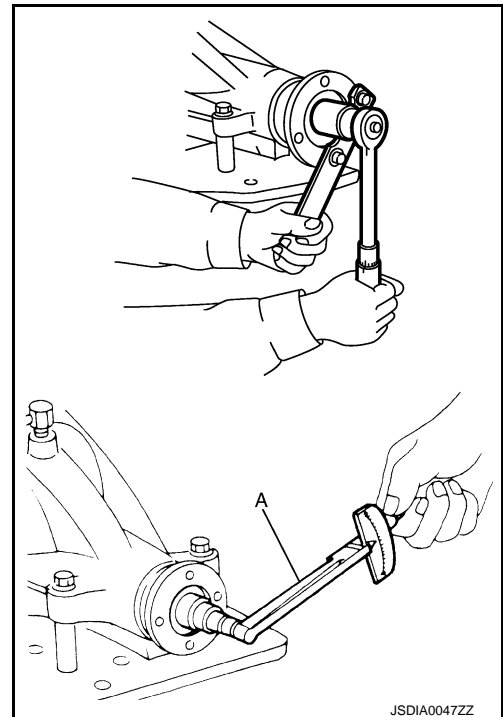
12. Adjust to the drive pinion lock nut tightening torque and pinion bearing preload torque, using preload gauge [SST: ST3127S000 (J-25765-A)].

Pinion bearing preload

: Refer to [DLN-88, "Preload Torque"](#).

CAUTION:

- Adjust to 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.



13. Install differential case assembly. Refer to [DLN-70, "Assembly"](#).

CAUTION:

Never install rear cover at this timing.

14. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and companion flange runout. Refer to [DLN-74, "Adjustment"](#) and [DLN-86, "Adjustment"](#).
Recheck above items. Readjust the above description, if necessary.
15. Check total preload torque. Refer to [DLN-74, "Adjustment"](#).
16. Install rear cover. Refer to [DLN-70, "Assembly"](#).

Adjustment

PINION GEAR HEIGHT

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

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

Washer selection equation:

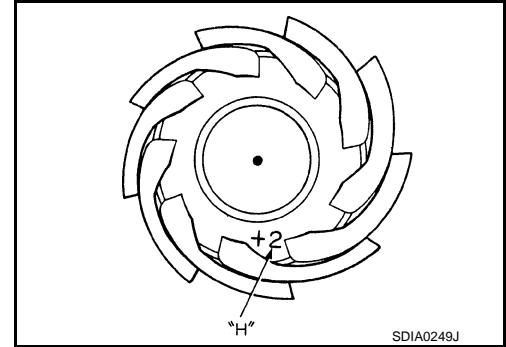
$$T = T_0 + (t_1 - t_2)$$

T: Correct washer thickness

T₀: Removed washer thickness

t₁: Old drive pinion head letter "H × 0.01"
("H": machined tolerance 1/100 mm × 100)

t₂: New drive pinion head letter "H × 0.01"
("H": machined tolerance 1/100 mm × 100)



Example:

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

T₀: 3.21

t₁: +2

t₂: -1

2. Select the proper pinion height adjusting washer. For selecting adjusting washer, refer to the latest parts information.

CAUTION:

If unable to find a washer of desired thickness, use a washer with thickness closest to the calculated value.

Example:

Calculated value... T = 3.22 mm

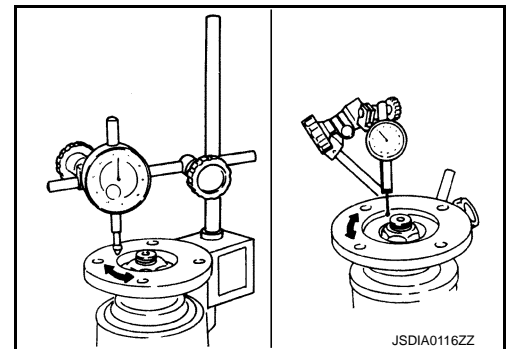
Used washer... T = 3.21 mm

COMPANION FLANGE RUNOUT

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

Companion flange runout : Refer to [DLN-88, "Companion flange Runout"](#).

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



Inner side of companion flange runout : Refer to [DLN-88, "Companion flange Runout"](#).

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

DRIVE PINION

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200V]

Inspection After Disassembly

INFOID:000000008778954

DRIVE GEAR AND DRIVE PINION

- Clean up the disassembled parts.
- If the gear teeth never mesh or line-up correctly, determine the cause and adjust or replace as necessary.
- If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.

BEARING

- Clean up the disassembled parts.
- If any chipped (by friction), pitted, worn, rusted or scratched marks, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).

SIDE GEAR AND PINION MATE GEAR

- Clean up the disassembled parts.
- If any cracks or damage on the surface of the tooth is found, replace.
- If any worn or chipped mark on the contact sides of the thrust washer is found, replace.

SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

- Clean up the disassembled parts.
- If it is chipped (by friction), damaged, or unusually worn, replace.

OIL SEAL

- Whenever disassembled, replace.
- If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips, replace them.

DIFFERENTIAL CASE

- Clean up the disassembled parts.
- If any wear or crack on the contact sides of the differential case is found, replace.

COMPANION FLANGE

- Clean up the disassembled parts.
- If any chipped mark [about 0.1 mm, (0.004 in)] or other damage on the contact sides of the lips of the companion flange is found, replace.

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SERVICE DATA AND SPECIFICATIONS (SDS)

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[REAR FINAL DRIVE: R200V]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:000000008194111

| | | |
|--|------------------|-------|
| Applied model | 2WD | |
| | VQ37VHR | |
| | M/T | A/T |
| Final drive model | R200V (With LSD) | |
| Gear ratio | 3.692 | 3.357 |
| Number of teeth (Drive gear/Drive pinion) | 48/13 | 47/14 |
| Oil capacity (Approx.) ℓ (US pt, Imp pt) | 1.4 (3, 2-1/2) | |
| Number of pinion gears | 4 | |
| Drive pinion adjustment spacer type | Collapsible | |

Drive Gear Runout

INFOID:000000008194112

Unit: mm (in)

| Item | limit |
|-----------------------------|---------------|
| Drive gear back face runout | 0.05 (0.0020) |

Differential Side Gear Clearance

INFOID:000000008194113

Unit: mm (in)

| Item | Standard |
|--|---|
| Side gear backlash (Clearance between side gear and differential case) | 0.15 (0.0059 in) or less (Each gear should rotate smoothly without excessive resistance during differential motion.) |

Preload Torque

INFOID:000000008194114

Unit: N·m (kg·m, in·lb)

| Item | Standard |
|---|------------------------------------|
| Pinion bearing (P1) | 2.65 – 3.23 (0.27 – 0.32, 24 – 28) |
| Side bearing (P2) | 0.20 – 0.52 (0.02 – 0.05, 2 – 4) |
| Side bearing to pinion bearing (Total preload) (Total preload = P1 + P2) | 2.85 – 3.75 (0.29 – 0.38, 26 – 33) |

Backlash

INFOID:000000008194115

Unit: mm (in)

| Item | Standard |
|---------------------------------|-------------------------------|
| Drive gear to drive pinion gear | 0.10 – 0.15 (0.0039 – 0.0059) |

Companion flange Runout

INFOID:000000008194116

Unit: mm (in)

| Item | Limit |
|---|---------------|
| Companion flange face runout | 0.08 (0.0031) |
| Inner side of the companion flange runout | 0.08 (0.0031) |