

# SECTION DLN

## DRIVELINE

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## DIAGNOSIS AND REPAIR WORK FLOW

&lt; BASIC INSPECTION &gt;

[TRANSFER: TY20A]

## BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORK FLOW

## Work Flow

INFOID:000000006186884

## DETAILED FLOW

## 1. INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, reproduce symptoms, and understand them fully. Ask customer about his/her complaints carefully. Check symptoms by driving vehicle with customer, if necessary.

**CAUTION:**

Customers are not professional. Never guess easily like "maybe the customer means that..." or "maybe the customer mentions this symptom".

&gt;&gt; GO TO 2.

## 2. CHECK 4WD WARNING LAMP

Start the engine and drive at 30 km/h (19 MPH) or more for approximately 1 minute.

Does 4WD warning lamp turn ON?

YES &gt;&gt; GO TO 3.

NO &gt;&gt; GO TO 6.

## 3. PERFORM SELF-DIAGNOSIS

## ⓐ With CONSULT-III

1. Perform 4WD control unit self-diagnosis.
2. Check malfunction detected by self-diagnosis.
3. Erase 4WD control unit self-diagnostic results.

&gt;&gt; GO TO 4.

## 4. CHECK TERMINALS AND HARNESS CONNECTORS

Check pin terminals for damage or loose connection with harness connector.

&gt;&gt; GO TO 5.

## 5. CHECK SYMPTOM REPRODUCTION

## ⓐ With CONSULT-III

Perform DTC reproduction procedure for the error system.

Is any error detected?

YES &gt;&gt; GO TO 2.

NO &gt;&gt; GO TO 6.

## 6. PERFORM SYMPTOM DIAGNOSIS

Perform the symptom diagnosis for each system.

Is any malfunction present?

YES &gt;&gt; GO TO 2.

NO &gt;&gt; GO TO 7.

## 7. FINAL CHECK

## ⓐ With CONSULT-III

Check input/output signal standard of 4WD control unit.

Is the input/output the standard value?

YES &gt;&gt; INSPECTION END

NO &gt;&gt; GO TO 2.



4WD SYSTEM

< FUNCTION DIAGNOSIS >

[TRANSFER: TY20A]

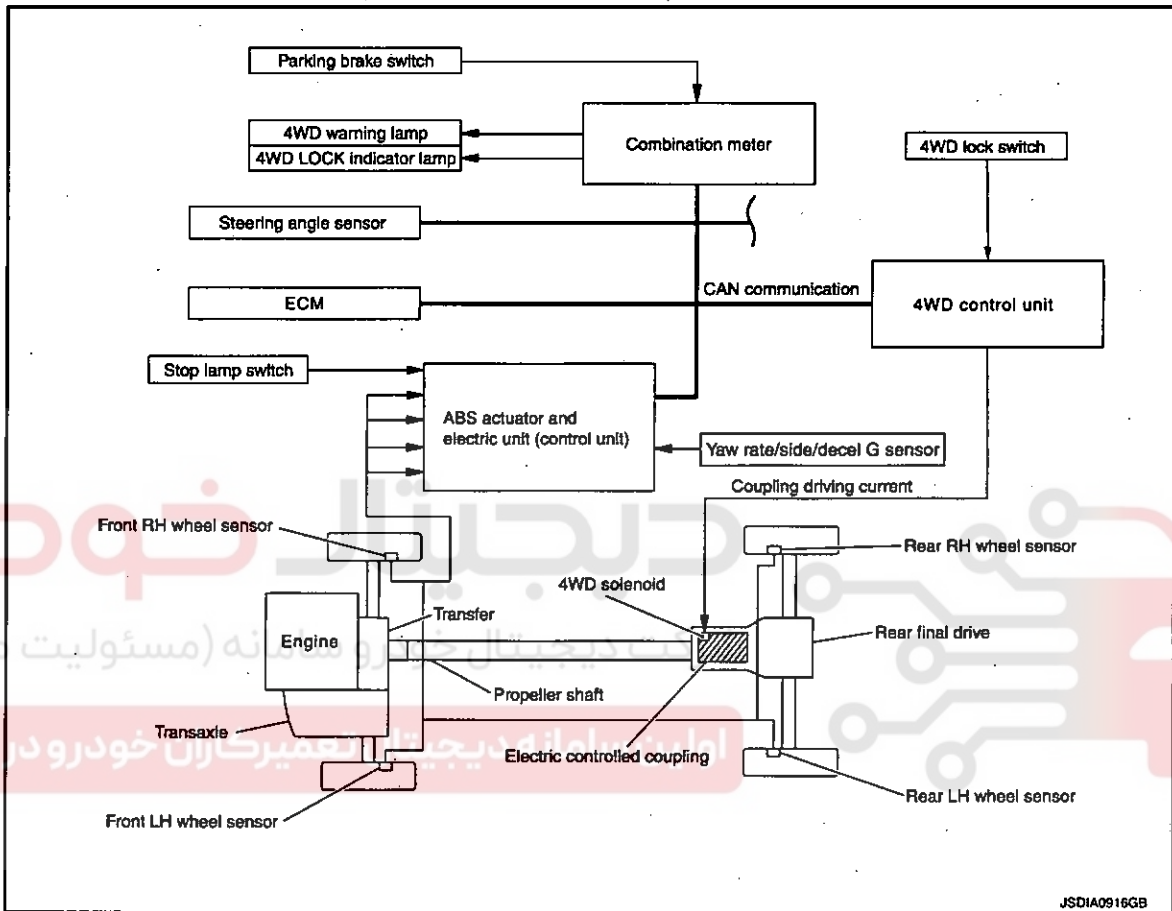
FUNCTION DIAGNOSIS

4WD SYSTEM

System Diagram

CONTROL DIAGRAM

INFOID:000000006186885



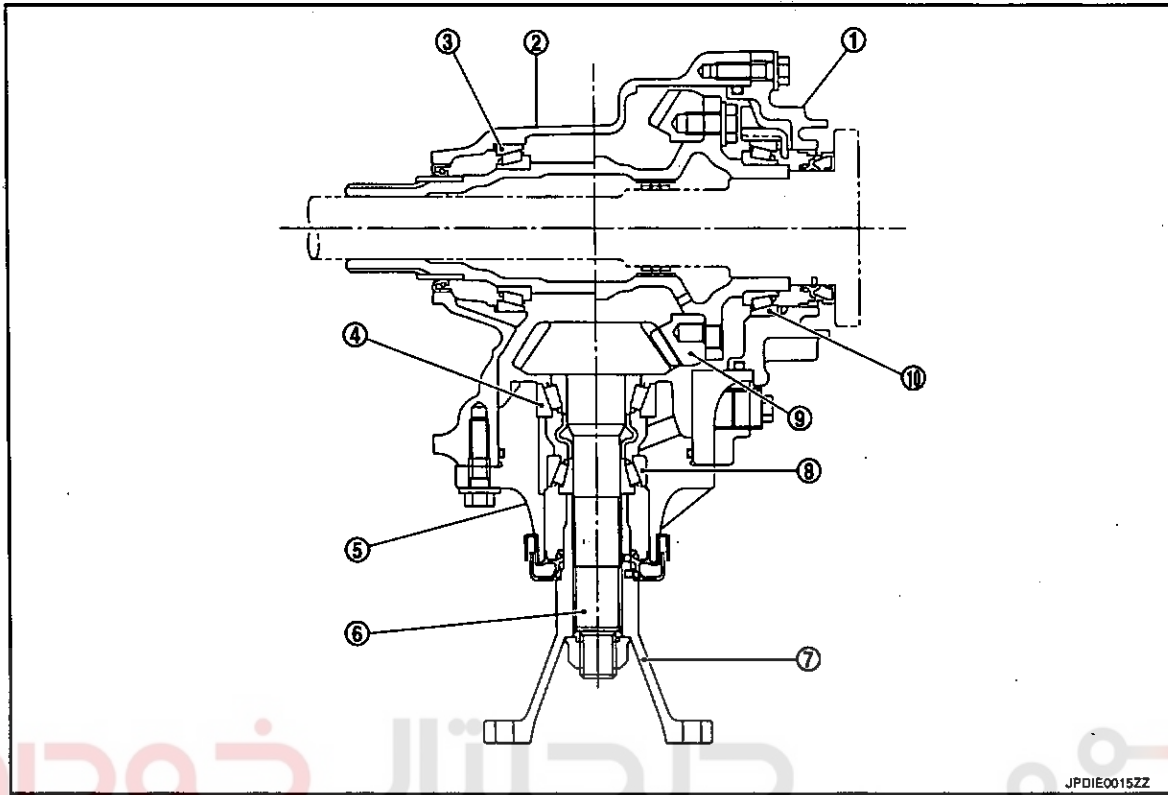
CROSS-SECTIONAL VIEW

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4WD SYSTEM

< FUNCTION DIAGNOSIS >

[TRANSFER: TY20A]



- |   |                        |   |
|---|------------------------|---|
| 1. Adapter case                           | 2. Transfer case       | 3. Gear ring bearing (Transfer case side) |
| 4. Pinion front bearing                   | 5. Pinion sleeve       | 6. Drive pinion                           |
| 7. Companion flange                       | 8. Pinion rear bearing | 9. Drive gear                             |
| 10. Gear ring bearing (Adapter case side) |                        |   |

System Description

DESCRIPTION

- 4WD controls distribution of drive power between front-wheel drive (100:0) and 4-wheel drive (50:50) conditions according to signals from sensors.
- By receiving the steering angle sensor signal, yaw rate sensor signal, side G sensor signal and decel G sensor signal, vehicle with ESP corrects a torque distribution for front and rear wheels according to a driving operation and a behavior of the vehicle during cornering and improves handle ability and safety and safety on a slippery road surface.
- It transmits/receives each signal from the following 4WD control unit via CAN communication line.

Component parts	Function
ABS actuator and electric unit (control unit)	Transmits the following signals via CAN communication to 4WD control unit. <ul style="list-style-type: none"> <li>• Vehicle speed signal</li> <li>• Stop lamp switch signal (brake signal)</li> <li>• Yaw rate sensor signal</li> <li>• Side G sensor signal</li> <li>• Decel G sensor signal</li> </ul>
ECM	Transmits the following signals via CAN communication to 4WD control unit. <ul style="list-style-type: none"> <li>• Accelerator pedal position signal</li> <li>• Engine speed signal</li> </ul>

4WD SYSTEM

< FUNCTION DIAGNOSIS >

[TRANSFER: TY20A]

Component parts	Function
Combination meter	Transmits conditions of parking brake switch signal via CAN communication to 4WD control unit.
	Receives the following signals via CAN communication from 4WD control unit. <ul style="list-style-type: none"> <li>• 4WD warning lamp signal</li> <li>• 4WD LOCK indicator lamp signal</li> </ul>
Steering angle sensor	Transmits conditions of steering angle sensor signal via CAN communication to 4WD control unit.

AUTO Mode

- Electronic control allows optimal distribution of torque to front/rear wheels to match road conditions.
- 4WD mode makes possible stable driving possible with no wheel spin, on snowy roads or other slippery surfaces.
- On roads which do not require 4-wheel drive, AUTO mode contributes to improved fuel economy by driving in conditions close to front-wheel drive.
- Sensor inputs determine the vehicle's turning condition, and tight cornering/braking are controlled by distributing optimum torque to rear wheels.

NOTE:

Light tight-corner braking symptom may occur depending on driving condition in AUTO mode. This is not malfunction.

LOCK Mode

- Front/rear wheel torque distribution is fixed, ensuring stable driving when climbing slopes.
- Vehicle will switch automatically to AUTO mode if vehicle speed increases. If vehicle speed then decreases, the vehicle automatically returns to direct 4-wheel driving conditions. The 4WD LOCK indicator lamp keeps illuminating.
- LOCK mode will change to AUTO mode automatically, when the vehicle has been driven at a high speed. The 4WD LOCK indicator lamp turns off.
- LOCK mode will change to AUTO mode automatically, when the ignition switch is turned "OFF".

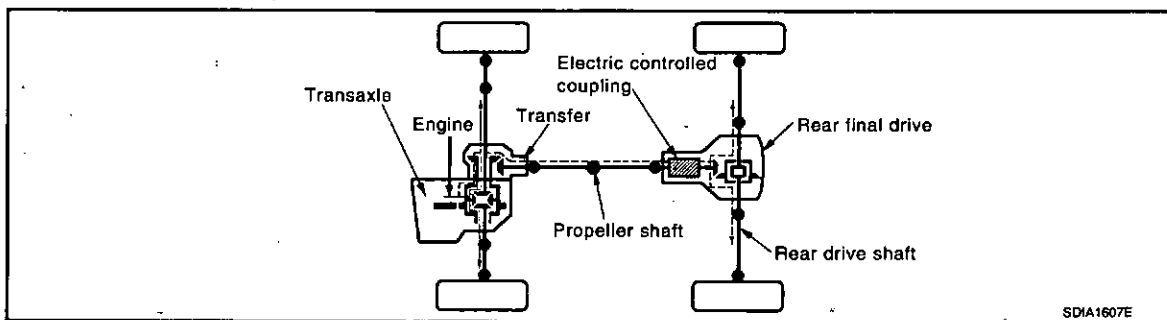
NOTE:

- Every time 4WD lock switch is pressed, AUTO mode and LOCK mode switch each other.
- If there is a significant difference in pressure or wear between tires, full vehicle performance is not available. Tire conditions are detected, and LOCK mode may be prohibited, or else speeds at which LOCK mode is enabled may be restricted.
- Heavy tight-corner braking symptom occurs when vehicle is driven in the following conditions: LOCK mode, steering wheel is turned fully to either sides, and accelerator pedal is depressed.

CAUTION:

Never switch to LOCK when rotation speed of front and rear wheel differs.

POWER TRANSFER DIAGRAM



OPERATION PRINCIPLE

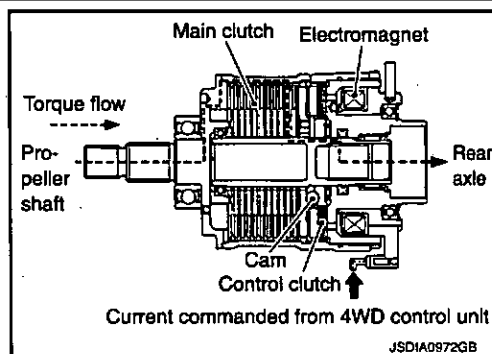
Electric Controlled Coupling

4WD SYSTEM

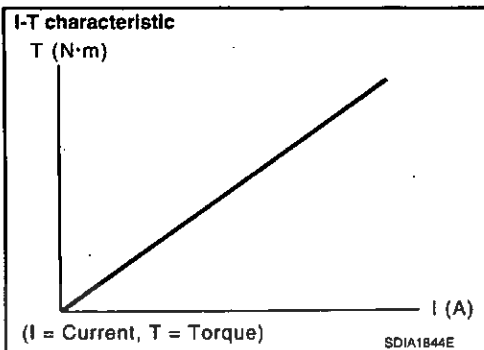
< FUNCTION DIAGNOSIS >

[TRANSFER: TY20A]

1. The 4WD control unit supplies command current to electric controlled coupling (4WD solenoid).
2. The control clutch is engaged by electromagnet and torque is detected in control clutch.
3. The cam operates in response to control clutch torque and applies pressure to main clutch.
4. The main clutch transmits torque to front wheels according to pressing power.

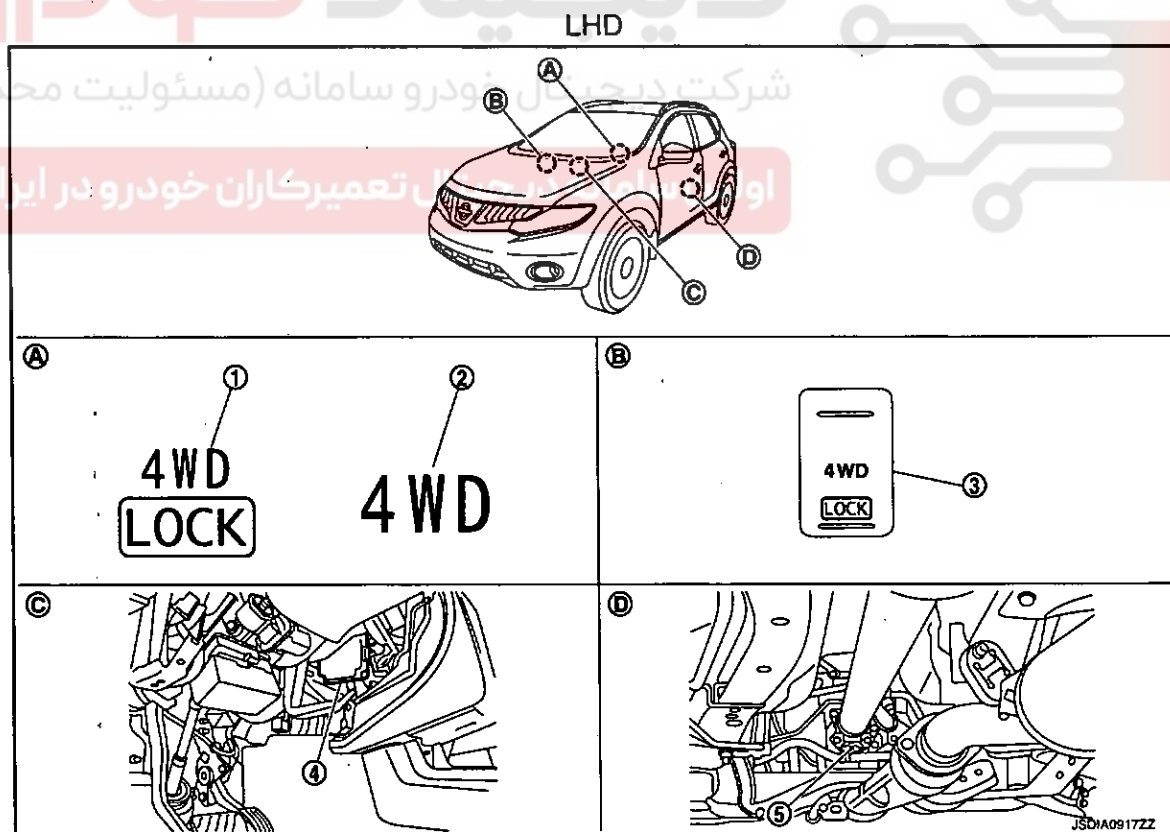


- Transmission torque to the rear wheels is determined according to command current.



Component Parts Location

INFOID:000000006186887



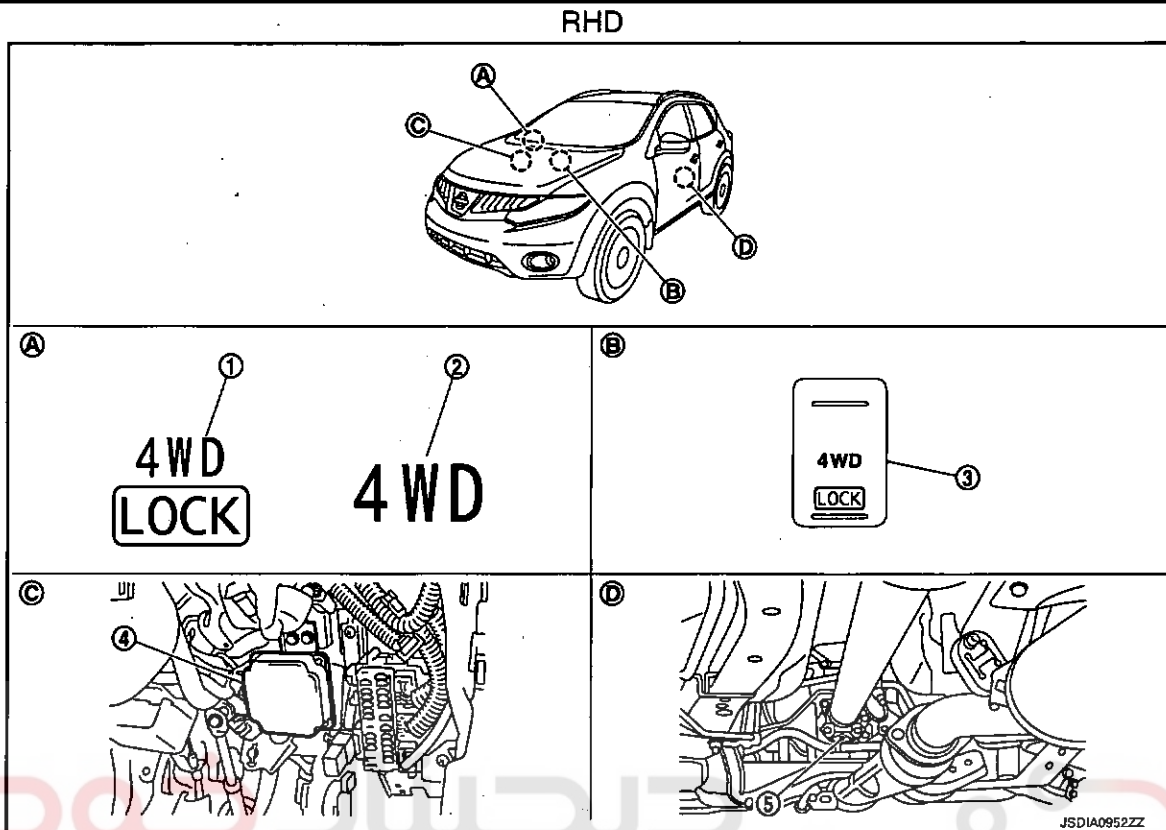
- |                              |                                       |  |
|------------------------------|---------------------------------------|--|
| 1. 4WD LOCK indicator lamp   | 2. 4WD warning lamp                   | 3. 4WD lock switch                       |
| 4. 4WD control unit          | 5. 4WD solenoid (in rear final drive) |  |
| A. Combination meter         | B. Center console (Front side)        | C. Instrument driver lower cover removed |
| D. Rear final drive assembly |                                       |  |



4WD SYSTEM

< FUNCTION DIAGNOSIS >

[TRANSFER: TY20A]



- 1. 4WD LOCK indicator lamp
- 2. 4WD warning lamp
- 3. 4WD lock switch
- 4. 4WD control unit
- 5. 4WD solenoid (in rear final drive)
- A. Combination meter
- B. Center console (Front side)
- C. Instrument driver lower cover removed
- D. Rear final drive assembly

Component Description

INFOID:000000006186888

Component parts	Reference/Function
4WD control unit	DLN-12. "Description"
Wheel sensors	BRC-33. "Description"
4WD solenoid	DLN-14. "Description"
Electric controlled coupling	Transmits driving force to rear final drive.
4WD warning lamp	DLN-24. "Description"
4WD LOCK indicator lamp	DLN-26. "Description"
4WD lock switch	DLN-22. "Description"
ABS actuator and electric unit (control unit)	DLN-13. "Description"
ECM	DLN-17. "Description"
Combination meter	DLN-26. "Description"
Steering angle sensor	BRC-61. "Description"

## DIAGNOSIS SYSTEM (4WD CONTROL UNIT)

&lt; FUNCTION DIAGNOSIS &gt;

[TRANSFER: TY20A]

## DIAGNOSIS SYSTEM (4WD CONTROL UNIT)

## CONSULT-III Function

INFOID:000000006186889

## FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes as follows.

Diagnostic test mode	Function
ECU Identification	4WD control unit part number can be read.
Self Diagnostic Result	Self-diagnostic results can be read and erased quickly.
Data Monitor	Input/Output data in the 4WD control unit can be read.
Active Test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the 4WD control unit and also shifts some parameters in a specified range.

## ECU IDENTIFICATION

4WD control unit part number can be read.

## SELF -DIAGNOSTIC RESULT

Before performing the self-diagnosis, start the engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

## Display Item List

Refer to DLN-33, "DTC Index".

## How to Erase Self-Diagnostic Results

Before erasing DTC memory, start the engine and drive at 30 km/h (19 MPH) or more for approximately 1 minute. Check that ABS warning lamp turns OFF.

**NOTE:**

When 4WD warning lamp is ON with system malfunction of DTC "C1203", run the vehicle at 30 km/h (19 MPH) or more for a minute and check that ABS warning lamp is turned OFF. Then turn ignition switch OFF, and start the engine again. Otherwise 4WD warning lamp may not turn OFF even if it is normal.

## DATA MONITOR اولین سامانه دیجیتال تعمیرکاران خود

## Display Item List

Monitor item (Unit)	Remarks
STOP LAMP SW [On/Off]	Stop lamp switch signal status via CAN communication line is displayed.
ENG SPEED SIG [Run/Stop]	Engine status is displayed.
ETS ACTUATOR [On/Off]	Operating condition of 4WD actuator relay (integrated in 4WD control unit) is displayed.
4WD WARN LAMP [On/Off]	Control status of 4WD warning lamp is displayed.
4WD MODE SW [AUTO/LOCK]	Mode switch is not equipped, but displayed.
4WD MODE MON [AUTO/LOCK]	Control status of 4WD is displayed.
DIS-TIRE MONI [mm]	Improper size tire installed condition is displayed.
P BRAKE SW [On/Off]	Parking switch signal status via CAN communication line is displayed.
BATTERY VOLT [V]	Power supply voltage for 4WD control unit
THRTL POS SEN [%]	Throttle opening status is displayed.
ETS SOLENOID [A]	Monitored value of current at 4WD solenoid
FR RH SENSOR [km/h] or [mph]	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR [km/h] or [mph]	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR [km/h] or [mph]	Wheel speed calculated by rear RH wheel sensor signal is displayed.
RR LH SENSOR [km/h] or [mph]	Wheel speed calculated by rear LH wheel sensor signal is displayed.

## ACTIVE TEST

## Description

## DIAGNOSIS SYSTEM (4WD CONTROL UNIT)

&lt; FUNCTION DIAGNOSIS &gt;

[TRANSFER: TY20A]

Use this mode to determine and identify the details of a malfunction based on self-diagnostic results or data monitor. 4WD control unit gives drive signal to actuator with receiving command from CONSULT-III to check operation of actuator.

Test Item

Test item	Condition	Description
ETS S/V (Detects 4WD solenoid)	<ul style="list-style-type: none"> <li>Vehicle stopped</li> <li>Engine running</li> <li>No DTC detected</li> </ul>	Change command current value to 4WD solenoid, and then change driving mode. (Monitor value is normal if it is within approx. $\pm 10\%$ of command value.) <ul style="list-style-type: none"> <li>Qu: Increase current value in increments of 0.2 A</li> <li>Qd: Decrease current value in increments of 0.2 A</li> <li>UP: Increase current value in increments of 0.02 A</li> <li>DOWN: Decrease current value in increments of 0.02 A</li> </ul>

## CAUTION:

Never energize continuously for a long time.

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## C1201 4WD CONTROL UNIT

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

## COMPONENT DIAGNOSIS

## C1201 4WD CONTROL UNIT

## Description

INFOID:000000006185890

- Controls driving force distribution by signals from each sensor from front wheel driving mode (100:0) to 4-wheel driving mode (50:50).
- Front wheel driving conditions is available by fail-safe function if malfunction is detected in 4WD system.

## DTC Logic

INFOID:000000006185891

## DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible cause
C1201	CONTROLLER FAILURE	Malfunction has occurred inside 4WD control unit.	Internal malfunction of 4WD control unit

## DTC CONFIRMATION PROCEDURE

## 1. DTC REPRODUCTION PROCEDURE

## Ⓜ With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

## Is DTC "C1201" detected?

- YES >> Proceed to diagnosis procedure. Refer to DLN-12, "Diagnosis Procedure".
- NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006185892

## 1. PERFORM SELF-DIAGNOSIS

## Ⓜ With CONSULT-III

1. Erase 4WD control unit self-diagnostic results.
2. Turn the ignition switch OFF, and then wait 10 seconds or more.
3. Perform 4WD control unit self-diagnosis.

## Is DTC "C1201" detected?

- YES >> Replace 4WD control unit. Refer to DLN-47, "LHD : Exploded View" (LHD), DLN-48, "RHD : Exploded View" (RHD).
- NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace the error-detected parts.



**C1203 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**

< COMPONENT DIAGNOSIS >

[TRANSFER: TY20A]

**C1203 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**

**Description**

INFOID:000000006186893

- Transmits the following signals via CAN communication to 4WD control unit.
- Vehicle speed signal
- Stop lamp switch signal (brake signal)
- Yaw rate sensor signal
- Side G sensor signal
- Decel G sensor signal

**DTC Logic**

INFOID:000000006186894

**DTC DETECTION LOGIC**

DTC	Display item	Malfunction detected condition	Possible cause
C1203	ABS SYSTEM	Malfunction related to wheel sensor has been detected by ABS actuator and electric unit (control unit).	ABS malfunction • Malfunction of ABS actuator and electric unit (control unit) • Vehicle speed signal error

**DTC CONFIRMATION PROCEDURE**

**1. DTC REPRODUCTION PROCEDURE**

**ⓑ With CONSULT-III**

1. Start the engine and drive at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform 4WD control unit self-diagnosis.

**Is DTC "C1203" detected?**

- YES >> Proceed to diagnosis procedure. Refer to DLN-13, "Diagnosis Procedure".
- NO >> INSPECTION END

**Diagnosis Procedure**

INFOID:000000006186895

**1. PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS**

**ⓑ With CONSULT-III**

Perform ABS actuator and electric unit (control unit) self-diagnosis.

**Is any DTC detected?**

- YES >> Check the DTC.
- NO >> GO TO 2.

**2. PERFORM SELF-DIAGNOSIS**

**ⓑ With CONSULT-III**

1. Erase 4WD control unit self-diagnostic results.
2. Start the engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
3. Make sure that ABS warning lamp turns OFF.
4. Perform 4WD control unit self-diagnosis.

**Is DTC "C1203" detected?**

- YES >> Replace 4WD control unit. Refer to DLN-47, "LHD : Exploded View" (LHD), DLN-48, "RHD : Exploded View" (RHD).
- NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace the error-detected parts.

C1204 4WD SOLENOID

< COMPONENT DIAGNOSIS >

[TRANSFER: TY20A]

C1204 4WD SOLENOID

Description

INFOID:000000006186898

Controls electric controlled coupling by command current from 4WD control unit.

DTC Logic

INFOID:000000006186897

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1204	4WD SOLENOID	Malfunction related to 4WD solenoid has been detected.	<ul style="list-style-type: none"> <li>Internal malfunction of electronic controlled coupling</li> <li>Malfunction of 4WD solenoid power supply circuit (open or short)</li> <li>Malfunction of 4WD solenoid command current.</li> </ul>

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

ⓐ With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

Is DTC "C1204" detected?

- YES >> Proceed to diagnosis procedure. Refer to DLN-14, "Diagnosis Procedure".  
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006186898

1. CHECK 4WD SOLENOID POWER SUPPLY

1. Turn the ignition switch OFF.
2. Disconnect 4WD control unit harness connector.
3. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		-	Voltage
Connector	Terminal		
M69	9	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 2.  
 NO >> Perform the trouble diagnosis for power supply circuit. Refer to DLN-20, "Diagnosis Procedure".

2. CHECK 4WD SOLENOID GROUND

Check the continuity between 4WD control unit harness connector and ground.

4WD control unit		-	Continuity
Connector	Terminal		
M69	10	Ground	Existed
	11		

Is the inspection result normal?

- YES >> GO TO 3.  
 NO >> Repair or replace the error-detected parts.

3. CHECK 4WD SOLENOID CIRCUIT

1. Check the continuity between 4WD control unit harness connector and 4WD solenoid harness connector.

C1204 4WD SOLENOID

< COMPONENT DIAGNOSIS >

[TRANSFER: TY20A]

4WD control unit		4WD solenoid		Continuity
Connector	Terminal	Connector	Terminal	
M69	1	C1	1	Existed
	2		2	

2. Check the continuity between 4WD control unit harness connector and the ground.

4WD control unit		-	Continuity
Connector	Terminal		
M69	1	Ground	Not existed
	2		

3. Check the continuity between 4WD solenoid harness connector and the ground.

4WD solenoid		-	Continuity
Connector	Terminal		
C1	1	Ground	Not existed
	2		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace the error-detected parts.

4. CHECK 4WD SOLENOID

Check 4WD solenoid. Refer to DLN-15, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> 4WD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-93, "Exploded View".

5. CHECK TERMINALS AND HARNESS CONNECTORS

1. Check 4WD control unit pin terminals for damage or loose connection with harness connector.

2. Check 4WD solenoid pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-47, "LHD : Exploded View" (LHD), DLN-48, "RHD : Exploded View" (RHD).

NO >> Repair or replace the error-detected parts.

Component Inspection

INFOID:000000006186899

1. CHECK 4WD SOLENOID

1. Turn the ignition switch OFF.

2. Disconnect 4WD solenoid harness connector.

3. Check the resistance between 4WD solenoid harness connector terminals.

4WD solenoid			Resistance (Approx.)
Connector	Terminal		
C1	1	2	2.45 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> 4WD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-93, "Exploded View".

## C1205 4WD ACTUATOR RELAY

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

## C1205 4WD ACTUATOR RELAY

## Description

INFOID:000000006186900

4WD solenoid is supplied with voltage by the internal circuit of 4WD control unit.

## DTC Logic

INFOID:000000006186901

## DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1205	4WD ACTUATOR RLY	Malfunction has been detected from 4WD actuator relay integrated with 4WD control unit, or malfunction related to 4WD solenoid has been detected.	Internal malfunction of 4WD control unit

## DTC CONFIRMATION PROCEDURE

## 1. DTC REPRODUCTION PROCEDURE

## ⓐ With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

## Is DTC "C1205" detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-16, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006186902

## 1. PERFORM SELF-DIAGNOSIS

## ⓐ With CONSULT-III

1. Erase 4WD control unit self-diagnostic results.
2. Turn ignition switch OFF, and wait 10 seconds or more.
3. Perform 4WD control unit self-diagnosis.

## Is DTC "C1205" detected?

YES >> Replace 4WD control unit. Refer to DLN-47, "LHD : Exploded View" (LHD), DLN-48, "RHD : Exploded View" (RHD).

NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace the error-detected parts.



## C1210 ECM

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

## C1210 ECM

## Description

INFOID:000000006186903

Transmits the following signals via CAN communication to 4WD control unit.

- Accelerator pedal position signal
- Engine speed signal

## DTC Logic

INFOID:000000006186904

## DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1210	ENGINE SIGNAL 1	Malfunction related to engine signal has been detected.	Malfunction of engine control system

## DTC CONFIRMATION PROCEDURE

## 1. DTC REPRODUCTION PROCEDURE

## Ⓜ With CONSULT-III

1. Start the engine. Drive the vehicle for a while.
2. Perform 4WD control unit self-diagnosis.

Is DTC "C1210" detected?

- YES >> Proceed to diagnosis procedure. Refer to DLN-17, "Diagnosis Procedure".  
 NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000006186905

## 1. PERFORM ECM SELF-DIAGNOSIS

## Ⓜ With CONSULT-III

Perform ECM self-diagnosis.

Is any DTC detected?

- YES >> Check the DTC.  
 NO >> GO TO 2.

## 2. PERFORM SELF-DIAGNOSIS

## Ⓜ With CONSULT-III

1. Erase 4WD control unit self-diagnostic results.
2. Turn the ignition switch OFF.
3. Start the engine. Drive the vehicle for a while.
4. Make sure that malfunction indicator (MIL) turns OFF.
5. Stop the vehicle. Perform 4WD control unit self-diagnosis.

Is DTC "C1210" detected?

- YES >> Replace 4WD control unit. Refer to DLN-47, "LHD : Exploded View" (LHD), DLN-48, "RHD : Exploded View" (RHD).  
 NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace the error-detected parts.

## U1000 CAN COMM CIRCUIT

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

## U1000 CAN COMM CIRCUIT

## Description

INFOID:000000006186906

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

## DTC Logic

INFOID:000000006186907

## DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	4WD control unit is not transmitting/receiving CAN communication signal for 2 seconds or more.	<ul style="list-style-type: none"> <li>• CAN communication error</li> <li>• Malfunction of 4WD control unit</li> </ul>

## DTC CONFIRMATION PROCEDURE

## 1. DTC REPRODUCTION PROCEDURE

## Ⓐ With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

## Is DTC "U1000" detected?

YES &gt;&gt; Proceed to diagnosis procedure. Refer to DLN-18, "Diagnosis Procedure".

NO &gt;&gt; INSPECTION END

## Diagnosis Procedure

INFOID:000000006186908

## 1. PERFORM SELF-DIAGNOSIS

## Ⓐ With CONSULT-III

Perform 4WD control unit self-diagnosis.

## Is DTC "U1000" detected?

YES &gt;&gt; CAN specification chart. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

NO &gt;&gt; INSPECTION END

## U1010 CONTROL UNIT (CAN)

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

## U1010 CONTROL UNIT (CAN)

## Description

INFOID:0000000006186909

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

## DTC Logic

INFOID:0000000006186910

## DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1010	CONTROL UNIT (CAN)	Detecting error during the initial diagnosis of CAN controller of 4WD control unit.	Malfunction of 4WD control unit

## DTC CONFIRMATION PROCEDURE

## 1. DTC REPRODUCTION PROCEDURE

## Ⓑ With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform 4WD control unit self-diagnosis.

## Is DTC "U1010" detected?

YES >> Proceed to diagnosis procedure. Refer to [DLN-19, "Diagnosis Procedure"](#).

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000006186911

## 1. CHECK 4WD CONTROL UNIT

Check 4WD control unit harness connector for disconnection and deformation.

## Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to [DLN-47, "LHD : Exploded View"](#) (LHD), [DLN-48, "RHD : Exploded View"](#) (RHD).

NO >> Repair or replace the error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

< COMPONENT DIAGNOSIS >

[TRANSFER: TY20A]

POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:000000006186912

Supplies power to 4WD control unit.

Diagnosis Procedure

INFOID:000000006186913

1.CHECK 4WD CONTROL UNIT POWER SUPPLY (1)

1. Turn the ignition switch OFF.
2. Disconnect 4WD control unit harness connector.
3. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
M69	7	Ground	0 V

4. Turn the ignition switch ON.  
**CAUTION:**  
**Never start the engine.**
5. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		—	Voltage
Connector	Terminal		
M69	7	Ground	Battery voltage

Is the inspection result normal?

- YES - 1 (Except for Middle East)>>GO TO 3.  
 YES - 2 (For Middle East)>>GO TO 2.  
 NO >> Perform the trouble diagnosis for power supply circuit. Refer to PG-60, "Wiring Diagram - IGNITION POWER SUPPLY -".

2.CHECK 4WD CONTROL UNIT POWER SUPPLY (2)

1. Turn the ignition switch OFF.
2. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
M69	15	Ground	Battery voltage

3. Turn the ignition switch ON.  
**CAUTION:**  
**Never start the engine.**
4. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
M69	15	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.  
 NO >> Perform the trouble diagnosis for power supply circuit. Refer to PG-10, "Wiring Diagram - BATTERY POWER SUPPLY -".

3.CHECK 4WD SOLENOID POWER SUPPLY

1. Turn the ignition switch OFF.
2. Check the voltage between 4WD control unit harness connector and ground.



## POWER SUPPLY AND GROUND CIRCUIT

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

4WD control unit		-	Voltage
Connector	Terminal		
M69	9	Ground	Battery voltage

3. Turn the ignition switch ON.

**CAUTION:****Never start the engine.**

4. Check the voltage between 4WD control unit harness connector and ground.

4WD control unit		-	Voltage
Connector	Terminal		
M69	9	Ground	Battery voltage

Is the inspection result normal?

YES &gt;&gt; GO TO 4.

NO &gt;&gt; Perform the trouble diagnosis for power supply circuit. Refer to PG-10. "Wiring Diagram - BATTERY POWER SUPPLY -".

## 4.CHECK 4WD SOLENOID VALVE GROUND

1. Turn the ignition switch OFF.

2. Check the continuity between 4WD control unit harness connector and ground.

4WD control unit		-	Continuity
Connector	Terminal		
M69	10	Ground	Existed
	11		

Is the inspection result normal?

YES &gt;&gt; INSPECTION END

NO &gt;&gt; Repair or replace the error-detected parts.



4WD LOCK SWITCH

< COMPONENT DIAGNOSIS >

[TRANSFER: TY20A]

4WD LOCK SWITCH

Description

INFOID:000000006186914

Able to select AUTO or LOCK mode.

Component Function Check

INFOID:000000006186915

1. CHECK 4WD LOCK SWITCH OPERATION

Check that 4WD LOCK indicator lamp is in a condition as shown in the following table.

Condition	4WD LOCK indicator lamp
When the switch is pressed in LOCK mode.	ON
When the switch is pressed in AUTO mode.	OFF

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to diagnosis procedure. Refer to DLN-22, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:000000006186916

1. CHECK 4WD LOCK SWITCH

Check 4WD lock switch. Refer to DLN-23, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace 4WD lock switch.

2. CHECK 4WD LOCK SWITCH CIRCUIT (1)

Check the continuity between 4WD lock switch harness connector and ground.

4WD lock switch		—	Continuity
Connector	Terminal		
M8	3	Ground	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace the error-detected parts.

3. CHECK 4WD LOCK SWITCH CIRCUIT (2)

1. Disconnect 4WD control unit harness connector.
2. Check the continuity between 4WD control unit harness connector and 4WD lock switch harness connector.

4WD control unit		4WD lock switch		Continuity
Connector	Terminal	Connector	Terminal	
M69	14	M8	1	Existed

3. Check the continuity between 4WD control unit harness connector and ground.

4WD control unit		—	Continuity
Connector	Terminal		
M69	14	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.

4WD LOCK SWITCH

< COMPONENT DIAGNOSIS >

[TRANSFER: TY20A]

NO >> Repair or replace the error-detected parts.

4.CHECK 4WD CONTROL UNIT OUTPUT SIGNAL

1. Connect 4WD control unit harness connector.
2. Turn the ignition switch ON.

**CAUTION:**

**Never start the engine.**

3. Check the voltage between 4WD lock switch harness connector and ground.

4WD lock switch		-	Voltage
Connector	Terminal		
M8	1	Ground	Battery voltage

Is the inspection result normal?

YES >> Check each harness connector pin terminal for disconnection.

NO >> Replace 4WD control unit. Refer to DLN-47. "LHD : Exploded View" (LHD), DLN-48. "RHD : Exploded View" (RHD).

Component Inspection

INFOID:000000006186917

1.CHECK 4WD LOCK SWITCH

1. Turn the ignition switch OFF.
2. Remove 4WD lock switch.
3. Check the continuity between 4WD lock switch connector terminals.

4WD lock switch			Condition	Continuity
Connector	Terminal			
M8	1	3	When releasing 4WD lock switch.	Not existed
			When 4WD lock switch is hold pressed.	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace 4WD lock switch.

## 4WD WARNING LAMP

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

## 4WD WARNING LAMP

## Description

INFOID:000000006186918

- Turns ON when there is a malfunction in 4WD system. 4WD warning lamp indicates the vehicle is in fail-safe mode and shifting to front-wheel drive or 4-wheel drive (rear-wheels still have some driving torque).
- Also turns ON when ignition switch is turned ON, for the purpose of lamp check. Turns OFF after the engine starts if system is normal.

## 4WD WARNING LAMP INDICATION

Condition	4WD warning lamp
Lamp check	Turns ON when ignition switch is turned ON. Turns OFF after the engine start.
4WD system malfunction	ON
Protection function is activated due to heavy load to electric controlled coupling. (4WD system is not malfunctioning and 4WD system changes to front wheel drive.)	Quick blinking: 2 times/second (Blinking in approx. 1 minute and then turning OFF).
Large difference in diameter of front/rear tires	Slow blinking: 1 time/2 seconds (Continuing to blink until turning ignition switch OFF)
Other than above (system normal)	OFF

## CAUTION:

- 4WD warning lamp also turns ON due to data reception error, CAN communication error etc.

## Component Function Check

INFOID:000000006186919

## 1. CHECK 4WD WARNING LAMP FUNCTION

1. Turn ignition switch ON.
2. Make sure that 4WD warning lamp lights up.

## Is the inspection result normal?

- YES >> INSPECTION END  
NO >> Proceed to diagnosis procedure. Refer to DLN-24, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:000000006186920

## 1. CHECK POWER SUPPLY AND GROUND CIRCUIT

Perform the trouble diagnosis for power supply and ground circuit. Refer to DLN-20, "Diagnosis Procedure".

## Is the inspection result normal?

- YES >> GO TO 2.  
NO >> Repair or replace the error-detected parts.

## 2. PERFORM SELF-DIAGNOSIS

## ⓐ With CONSULT-III

Perform 4WD control unit self-diagnosis.

## Is any DTC detected?

- YES >> Check the DTC.  
NO >> GO TO 3.

## 3. CHECK 4WD WARNING LAMP SIGNAL

## ⓐ With CONSULT-III

1. Turn the ignition switch ON.

## CAUTION:

**Never start the engine.**

2. Check "4WD WARN LAMP" of 4WD control unit CONSULT-III "DATA MONITOR".

## Does the item on "DATA MONITOR" indicate "On"?

- YES >> GO TO 4.

## 4WD WARNING LAMP

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

NO >> Replace 4WD control unit. Refer to DLN-47. "LHD : Exploded View" (LHD), DLN-48. "RHD : Exploded View" (RHD).

## 4. CHECK COMBINATION METER POWER SUPPLY CIRCUIT

Perform the trouble diagnosis for combination meter power supply circuit. Refer to MWI-46. "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

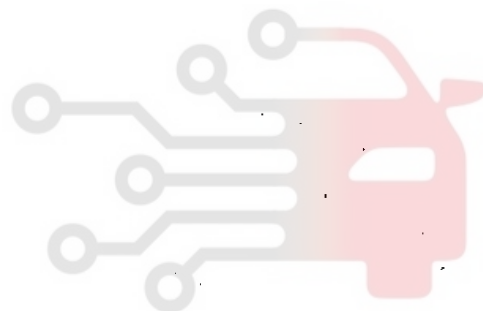
YES >> INSPECTION END

NO >> Repair or replace the error-detected parts.

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## 4WD LOCK INDICATOR LAMP

&lt; COMPONENT DIAGNOSIS &gt;

[TRANSFER: TY20A]

## 4WD LOCK INDICATOR LAMP

## Description

INFOID:000000006186921

The following is the indications of indicator lamp after the engine start.

## 4WD LOCK INDICATOR LAMP

Condition	4WD LOCK indicator lamp
Lamp check	Turns ON for approx. 1 second when ignition switch is turned ON.
AUTO mode	OFF
LOCK mode	ON

## Component Function Check

INFOID:000000006186922

## 1. 4WD LOCK INDICATOR LAMP OPERATION CHECK 1

Check that 4WD LOCK indicator lamp turns on for approximately 1 second after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to diagnosis procedure. Refer to DLN-26, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:000000006186923

## 1. CHECK 4WD WARNING LAMP

Start the engine and drive at 30 km/h (19 MPH) or more for approximately 1 minute.

Does 4WD warning lamp turn ON?

YES >> Proceed to DLN-24, "Diagnosis Procedure".

NO >> GO TO 2.

## 2. CHECK 4WD LOCK SWITCH

Perform the trouble diagnosis for 4WD lock switch. Refer to DLN-22, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace the error-detected parts.

## 3. CHECK 4WD LOCK INDICATOR LAMP SIGNAL

## ⓑ With CONSULT-III

1. Start the engine.

**CAUTION:**

**Stop the vehicle.**

2. Change 4WD lock switch to "LOCK" from "AUTO".

3. Check "4WD MODE MON" of 4WD control unit CONSULT-III "DATA MONITOR".

Does the item on "DATA MONITOR" indicate "LOCK"?

YES >> GO TO 4.

NO >> Replace 4WD control unit. Refer to DLN-47, "LHD : Exploded View" (LHD), DLN-48, "RHD : Exploded View" (RHD).

## 4. CHECK COMBINATION METER POWER SUPPLY CIRCUIT

Perform the trouble diagnosis for combination meter power supply circuit. Refer to MWI-46, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace the error-detected parts.



4WD CONTROL UNIT

< ECU DIAGNOSIS >

[TRANSFER: TY20A]

ECU DIAGNOSIS  
4WD CONTROL UNIT

Reference Value

INFOID:000000006186924

VALUES ON THE DIAGNOSIS TOOL

Monitor item	Condition	Value/Status	
STOP LAMP SW	Brake pedal: Depressed	On	
	Brake pedal: Released	Off	
ENG SPEED SIG	Engine stopped (Engine speed: Less than 400 rpm)	Stop	
	Engine running (Engine speed: 400 rpm or more)	Run	
ETS ACTUATOR	Engine stopped (Ignition switch: ON)	Off	
	Engine running	On	
4WD WARN LAMP	4WD warning lamp: ON	On	
	4WD warning lamp: OFF	Off	
4WD MODE SW	Releasing 4WD lock switch.	AUTO	
	4WD lock switch is hold pressed.	LOCK	
4WD MODE MON	4WD LOCK indicator lamp: OFF	AUTO	
	4WD LOCK indicator lamp: ON	Vehicle speed below 10 km/h (6 mph)	LOCK
		Vehicle speed above 10 km/h (6 mph)	AUTO
DIS-TIRE MONI	Vehicle running with normal size tire installed	0 – 4 mm	
	Vehicle running with improper size tire installed (Front/rear tire size difference, wear condition)	4 – 8 mm, 8 – mm	
P BRAKE SW	Parking brake operated	On	
	Parking brake not operated	Off	
BATTERY VOLT	Always	Battery voltage	
THRTL POS SEN	When depressing accelerator pedal (Value rises gradually in response to throttle position.)	0 – 100%	
ETS SOLENOID	Engine running • At idle speed	4WD LOCK indicator lamp: OFF	Approx. 0.000 A
		4WD LOCK indicator lamp: ON	Approx. 0.000 A
	Engine running • 3,000 rpm or more constant	4WD LOCK indicator lamp: OFF	Approx. 0.000 – 1.800 A*
		4WD LOCK indicator lamp: ON	Approx. 1.800 A
FR RH SENSOR	Vehicle stopped	0.00 km/h (0.00 mph)	
	Vehicle running <b>CAUTION:</b> Check air pressure of tire under standard condition.	Nearly matches the speed meter display (±10% or less)	
FR LH SENSOR	Vehicle stopped	0.00 km/h (0.00 mph)	
	Vehicle running <b>CAUTION:</b> Check air pressure of tire under standard condition.	Nearly matches the speed meter display(±10% or less)	
RR RH SENSOR	Vehicle stopped	0.00 km/h (0.00 mph)	
	Vehicle running <b>CAUTION:</b> Check air pressure of tire under standard condition.	Nearly matches the speed meter display(±10% or less)	

4WD CONTROL UNIT

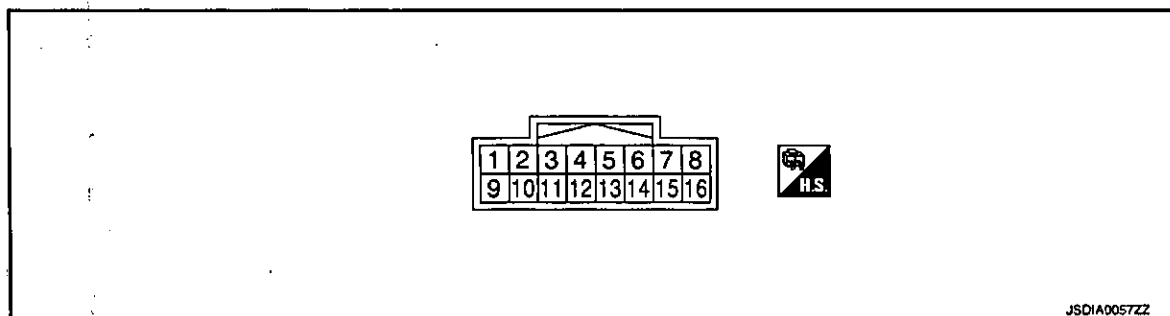
< ECU DIAGNOSIS >

[TRANSFER: TY20A]

Monitor item	Condition	Value/Status
RR LH SENSOR	Vehicle stopped	0.00 km/h (0.00 mph)
	Vehicle running <b>CAUTION:</b> Check air pressure of tire under standard condition.	Nearly matches the speed meter display(±10%)

\*: The values are changed by throttle opening and engine speed.

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)	Description		Input/ Out- put	Condition		Value (Approx.)
	+	-		Signal name		
1 (LG)	Ground	4WD solenoid power supply	Out- put	Engine speed: At idle	4WD LOCK indicator lamp: OFF	0 V
					4WD LOCK indicator lamp: ON	0 V
				Engine speed: 3,000 rpm or more constant	4WD LOCK indicator lamp: OFF	2.5 V <sup>*1</sup>
					4WD LOCK indicator lamp: ON	8 V
2 (L)	Ground	4WD solenoid ground	-	Engine speed: At idle		0 V
				Engine speed: 3,000 rpm or more constant		0 V
7 (R)	Ground	Ignition switch	Input	Ignition switch: ON		Battery voltage
				Ignition switch: OFF		0 V
8 (L)	-	CAN-H	Input/ Out- put	-	-	-
9 (G)	Ground	Power supply (4WD solenoid)	Input	Always		Battery voltage
10 (B)	Ground	Ground	-	Always		0 V
11 (B)	Ground	Ground	-	Always		0 V
14 (Y)	Ground	4WD lock switch	Out- put	Ignition switch: ON	Releasing 4WD lock switch	Battery voltage
					4WD lock switch is hold pressed.	0 V
15 <sup>*2</sup> (Y)	Ground	Power supply (4WD control unit)	Input	Always		Battery voltage
16 (P)	-	CAN-L	Input/ Out- put	-	-	-

\*1: The values are changed by throttle opening and engine speed.

\*2: For Middle East

4WD CONTROL UNIT

< ECU DIAGNOSIS >

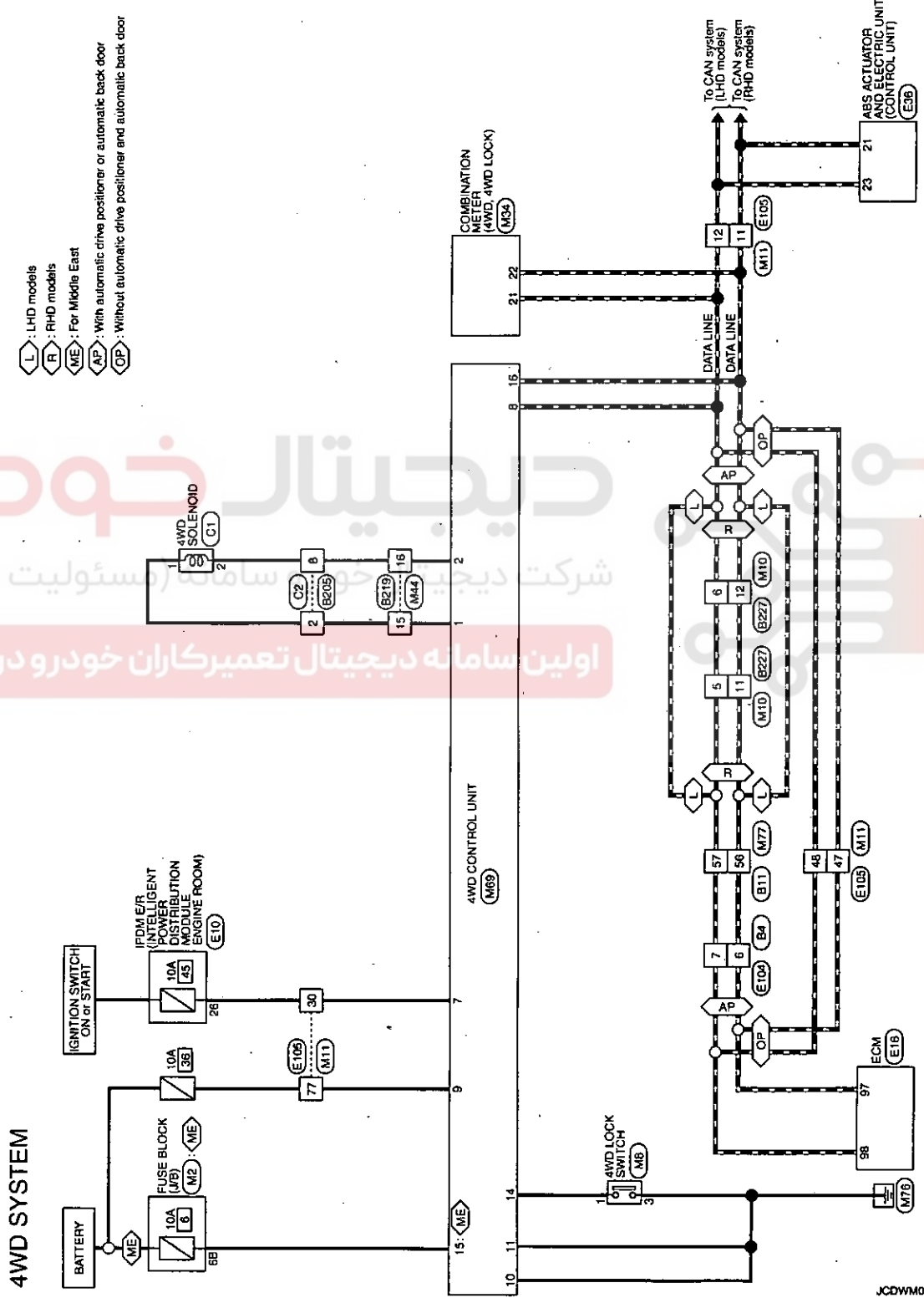
[TRANSFER: TY20A]

CAUTION:

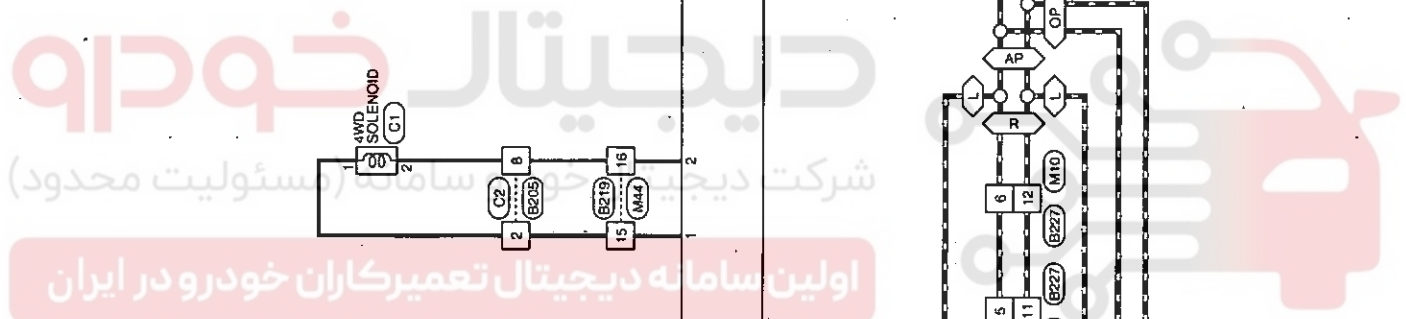
When using circuit tester to measure voltage for inspection, be sure not to extend forcibly any connector terminals.

Wiring Diagram - 4WD SYSTEM -

INFOID:000000006186925



- L: LHD models
- R: RHD models
- ME: For Middle East
- AP: With automatic drive positioner or automatic back door
- OP: Without automatic drive positioner and automatic back door



2008/09/30  
JCDWM0506GB

A  
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P

4WD CONTROL UNIT

< ECU DIAGNOSIS >

[TRANSFER: TY20A]

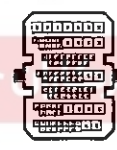
4WD SYSTEM

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	HS10MW-CS



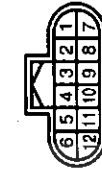
Terminal No.	Color of Wire	Signal Name (Specification)
6	P	-
7	L	-

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-GS19



Terminal No.	Color of Wire	Signal Name (Specification)
56	P	-
57	L	-

Connector No.	B205
Connector Name	WIRE TO WIRE
Connector Type	RH12CB



Terminal No.	Color of Wire	Signal Name (Specification)
2	SB	-
8	Y	-

Connector No.	B219
Connector Name	WIRE TO WIRE
Connector Type	TH52MW-RH



Terminal No.	Color of Wire	Signal Name (Specification)
15	SB	-
18	Y	-

Connector No.	B227
Connector Name	WIRE TO WIRE
Connector Type	TH12MW-RH



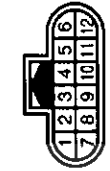
Terminal No.	Color of Wire	Signal Name (Specification)
5	L	-
8	L	-
11	P	-
12	P	-

Connector No.	C1
Connector Name	4WD SOLENOID
Connector Type	RSD2FBY



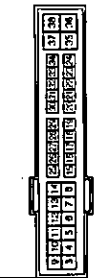
Terminal No.	Color of Wire	Signal Name (Specification)
1	SB	-
2	L	-

Connector No.	B2
Connector Name	WIRE TO WIRE
Connector Type	RH12MB



Terminal No.	Color of Wire	Signal Name (Specification)
2	L	-
8	L	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH20PW-GS12-IM-TV



Terminal No.	Color of Wire	Signal Name (Specification)
28	Y	-

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 رودر ایران



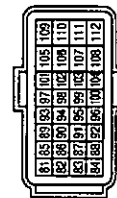
4WD CONTROL UNIT

< ECU DIAGNOSIS >

[TRANSFER: TY20A]

4WD SYSTEM

Connector No.	E1B
Connector Name	ECM
Connector Type	RH24FB-RZB-L-LH



Terminal No.	Color of Wire	Signal Name [Specification]
97	P	VEICAN-L
98	L	VEICAN-H

Connector No.	E3B
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	AE22ZFB-AJZ-LH



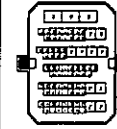
Terminal No.	Color of Wire	Signal Name [Specification]
21	P	GAKI L
23	L	GAKI H

Connector No.	E104
Connector Name	WIRE TO WIRE
Connector Type	NS18FW-GS



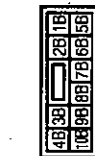
Terminal No.	Color of Wire	Signal Name [Specification]
6	P	-
7	L	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH10RW-CS10-M3



Terminal No.	Color of Wire	Signal Name [Specification]
11	P	-
12	L	-
30	Y	-
47	P	-
48	L	-
77	O	-

Connector No.	M2
Connector Name	FUSE BLOCK (L/R)
Connector Type	NS16FW-GS



Terminal No.	Color of Wire	Signal Name [Specification]
8B	Y	-

Connector No.	M5
Connector Name	4WD LOCK SWITCH
Connector Type	TH08FW-IV



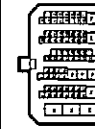
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
3	B	-

Connector No.	M10
Connector Name	WIRE TO WIRE
Connector Type	TH12FW-HH



Terminal No.	Color of Wire	Signal Name [Specification]
3	L	-
6	L	-
12	P	-

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH10RW-CS10-M3



Terminal No.	Color of Wire	Signal Name [Specification]
11	P	-
12	L	-
30	R	-
47	P	-
48	L	-
77	G	-

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

4WD CONTROL UNIT

< ECU DIAGNOSIS >

[TRANSFER: TY20A]

**4WD SYSTEM**

Connector No. M17  
 Connector Name WIRE TO WIRE  
 Connector Type T118DFW-CS19

Terminal No.	Color of Wire	Signal Name (Specification)
58	P	
57	L	

Connector No. M18  
 Connector Name 4WD CONTROL UNIT  
 Connector Type T118DFW-NH

Terminal No.	Color of Wire	Signal Name (Specification)
1	LG	4WD SOL+
2	L	4WD SOL-
7	R	IGN
8	L	CAN-H
9	G	SOL BATT
10	B	GND
11	B	GND
14	Y	LOCK SW
15	Y	VB
16	P	CAN-L

Connector No. M44  
 Connector Name WIRE TO WIRE  
 Connector Type T143DFW-NH

Terminal No.	Color of Wire	Signal Name (Specification)
15	LG	
16	L	

Connector No. M34  
 Connector Name COMBINATION METER  
 Connector Type T144DFW-NH

Terminal No.	Color of Wire	Signal Name (Specification)
21	L	CAN-H
22	P	CAN-L



دیجیتال خودرو دیجیتال خودروهایی با مسافتی محدود  
 اولین سامانه دیجیتال در ایران

Fail-Safe

4WD system

- If any malfunction occurs in 4WD electrical system, and control unit detects the malfunction, 4WD warning lamp on combination meter turns ON to indicate system malfunction.
- When 4WD warning lamp is ON, vehicle changes to front-wheel drive or shifts to 4-wheel drive (rear-wheels still have some driving torque).

JCDWM0509GB

INFOID:000000006186926



4WD CONTROL UNIT

< ECU DIAGNOSIS >

[TRANSFER: TY20A]

- 4WD system activates its protection function (shuts down 4WD-system temporarily) if 4WD system detects high load continuously or the front wheel tire size differs from the rear tire size. (4WD system is automatically restored if 4WD system no longer detects any overload or the tire size difference is eliminated.)

Mode	Warning lamp	DTC	Detected area (Error area)	Error area and root cause
Protection function	Blinking*1	—	4WD control unit	Transfer assembly in protection mode. It is not malfunction. (Internal temperature rise of electronic controlled coupling)
	Blinking*2	—	4WD control unit	Malfunction in each tire or different tire diameter
Fail-safe	ON	C1201	4WD control unit	Internal malfunction of 4WD control unit
		C1203	ABS actuator and electric unit (control unit)	<ul style="list-style-type: none"> <li>• Malfunction of ABS actuator and electric unit (control unit)</li> <li>• Vehicle speed signal error</li> </ul>
		C1204	4WD solenoid	<ul style="list-style-type: none"> <li>• Internal malfunction of electronic controlled coupling</li> <li>• Malfunction of 4WD solenoid power supply circuit. (open or short).</li> <li>• Malfunction of 4WD solenoid command current.</li> </ul>
		C1205	4WD control unit	Internal malfunction of 4WD control unit
		C1210	ECM	Malfunction of engine control system
		U1000	CAN communication line	<ul style="list-style-type: none"> <li>• CAN communication error</li> <li>• Malfunction of 4WD control unit</li> </ul>
		U1010	4WD control unit	Malfunction of 4WD control unit

\*1: Quick blinking: 2 times/second (blinking for approximately 1 minute and then turned OFF)

\*2: Slow blinking: 1 time/2 seconds (continuing to blink until ignition switch is turned OFF)

DTC Inspection Priority Chart

INFOID.000000006186927

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected Items (DTC)
1	<ul style="list-style-type: none"> <li>• U1000 CAN COMM CIRCUIT</li> <li>• U1010 CONTROL UNIT (CAN)</li> </ul>
2	<ul style="list-style-type: none"> <li>• C1201 CONTROLLER FAILURE</li> <li>• C1205 4WD ACTUATOR RLY</li> </ul>
3	<ul style="list-style-type: none"> <li>• C1204 4WD SOLENOID</li> </ul>
4	<ul style="list-style-type: none"> <li>• C1203 ABS SYSTEM</li> <li>• C1210 ENGINE SIGNAL 1</li> </ul>

DTC Index

INFOID.000000006186928

DTC	Display Item	Reference
C1201	CONTROLLER FAILURE	<a href="#">DLN-12. "DTC Logic"</a>
C1203	ABS SYSTEM	<a href="#">DLN-13. "DTC Logic"</a>
C1204	4WD SOLENOID	<a href="#">DLN-14. "DTC Logic"</a>
C1205	4WD ACTUATOR RLY	<a href="#">DLN-16. "DTC Logic"</a>
C1210	ENGINE SIGNAL 1	<a href="#">DLN-17. "DTC Logic"</a>
U1000	CAN COMM CIRCUIT	<a href="#">DLN-18. "DTC Logic"</a>
U1010	CONTROL UNIT (CAN)	<a href="#">DLN-19. "DTC Logic"</a>

## 4WD WARNING LAMP DOES NOT TURN ON

&lt; SYMPTOM.DIAGNOSIS &gt;

[TRANSFER: TY20A]

## SYMPTOM DIAGNOSIS

## 4WD WARNING LAMP DOES NOT TURN ON

## Description

INFOID:000000006186929

4WD warning lamp does not turn ON when the ignition switch is turned to ON.

## Diagnosis Procedure

INFOID:000000006186930

## 1.CHECK 4WD WARNING LAMP

Perform the trouble diagnosis for 4WD warning lamp. Refer to DLN-24, "Diagnosis Procedure".

Is the inspection result normal?

- YES >> Check each harness connector pin terminal for malfunction or disconnection.  
NO >> Repair or replace the error-detected parts.

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## 4WD WARNING LAMP DOES NOT TURN OFF

&lt; SYMPTOM DIAGNOSIS &gt;

[TRANSFER: TY20A]

## 4WD WARNING LAMP DOES NOT TURN OFF

## Description

INFOID:000000006186931

4WD warning lamp does not turn OFF several seconds after the engine started.

## Diagnosis Procedure

INFOID:000000006186932

## 1. PERFORM SELF-DIAGNOSIS

## Ⓐ With CONSULT-III

Perform 4WD control unit self-diagnosis.

Is any DTC detected?

YES >> Check the DTC.

NO >> GO TO 2.

## 2. CHECK 4WD WARNING LAMP

Perform the trouble diagnosis of the 4WD warning lamp. Refer to DLN-24, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace the error-detected parts.

## 3. CHECK 4WD CONTROL UNIT POWER SUPPLY AND GROUND CIRCUIT

Perform the trouble diagnosis of the power supply and ground circuit. Refer to DLN-20, "Diagnosis Procedure".

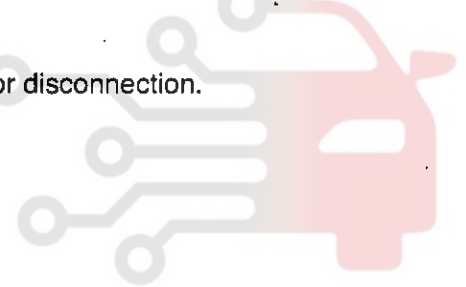
Is the inspection result normal?

YES >> Check each harness connector pin terminal for malfunction or disconnection.

NO >> Repair or replace the error-detected parts.

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**HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS**

&lt; SYMPTOM DIAGNOSIS &gt;

[TRANSFER: TY20A]

**HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS****Description**

INFOID:000000006186933

Heavy tight-corner braking symptom occurs when the vehicle is driven and the steering wheel is turned fully to either side after the engine is started.

**NOTE:**

Light tight-corner braking symptom may occur depending on driving conditions. This is not malfunction.

**Diagnosis Procedure**

INFOID:000000006186934

**1. PERFORM ECM SELF-DIAGNOSIS****Ⓜ With CONSULT-III**

Perform ECM self-diagnosis.

**Is any DTC detected?**

- YES >> Check the DTC.  
NO >> GO TO 2.

**2. PERFORM SELF-DIAGNOSIS****Ⓜ With CONSULT-III**

Perform 4WD control unit self-diagnosis.

**Is DTC "U1000" detected?**

- YES >> CAN specification chart. Refer to LAN-25, "CAN System Specification Chart".  
NO >> GO TO 3.

**3. CHECK 4WD SOLENOID**

Perform the trouble diagnosis of the 4WD solenoid. Refer to DLN-14, "Diagnosis Procedure".

**Is the inspection result normal?**

- YES >> GO TO 4.  
NO >> Repair or replace the error-detected parts.

**4. CHECK ELECTRIC CONTROLLED COUPLING**

1. Turn the ignition switch OFF.
2. Set the transaxle to neutral. Release the parking brake.
3. Lift up the vehicle.
4. Rotate the propeller shaft by hand.
5. Hold rear wheel of right and left lightly.

**Does rear wheel rotate?**

- YES >> Replace electric controlled coupling for mechanical malfunction (clutch sticking etc.). Refer to DLN-93, "Exploded View".  
NO >> Check each harness connector pin terminal for disconnection.

VEHICLE DOES NOT ENTER 4WD MODE

< SYMPTOM DIAGNOSIS >

[TRANSFER: TY20A]

VEHICLE DOES NOT ENTER 4WD MODE

Description

INFOID:000000006186935

Vehicle does not enter 4-wheel drive mode even though 4WD warning lamp turned to OFF.

Diagnosis Procedure

INFOID:000000006186936

1. CHECK 4WD WARNING LAMP

Turn the ignition switch ON.

Does 4WD warning lamp turn ON?

YES >> GO TO 2.

NO >> Proceed to diagnosis procedure. Refer to DLN-24, "Diagnosis Procedure".

2. CHECK PARKING BRAKE SWITCH SIGNAL

Ⓜ With CONSULT-III

Check "P BRAKE SW" of 4WD control unit CONSULT-III "DATA MONITOR".

Monitor Item	Condition	Status
P BRAKE SW	When the parking brake pedal is operation.	ON
	When the parking brake pedal is not operation.	OFF

Is the inspection result normal?

YES >> GO TO 3.

NO >> Proceed to diagnosis procedure. Refer to BRC-76, "Diagnosis Procedure".

3. CRUISE TEST

Drive the vehicle for a period of time.

Does any symptom occur?

YES >> Replace electric controlled coupling for mechanical malfunction (mechanical engagement of clutch is not possible). Refer to DLN-93, "Exploded View".

NO >> Check each harness connector pin terminal for disconnection.

## 4WD WARNING LAMP BLINKS QUICKLY

&lt; SYMPTOM DIAGNOSIS &gt;

[TRANSFER: TY20A]

## 4WD WARNING LAMP BLINKS QUICKLY

## Description

INFO.ID:000000006186937

While driving, 4WD warning lamp blinks 2 times in 1 second and it turns OFF after 1 minute.

- This symptom protects drivetrain parts when a heavy load is applied to the electric controlled coupling and multiple disc clutch temperature increases. Also, optional distribution of torque sometimes becomes rigid before lamp blinks quickly. Both cases are not malfunction.
- When this symptom occurs, stop vehicle and allow it to idle for some times. Blinking will stop and system will be restored.

# دیجیتال خودرو

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## 4WD WARNING LAMP FLASHES SLOWLY

&lt; SYMPTOM DIAGNOSIS &gt;

[TRANSFER: TY20A]

## 4WD WARNING LAMP FLASHES SLOWLY

## Description

INFOID.000000006186938

4WD warning lamp blinks at approximately 2 seconds intervals while driving.

## Diagnosis Procedure

INFOID.000000006186939

## 1. CHECK TIRE

Check the following.

- Tire pressure
- Wear condition
- Front and rear tire size (There is no difference between front and rear tires.)

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts. And then, drive the vehicle at speed of 20 km/h (12 MPH) or more for 5 seconds or more. Improper size information is initialized accordingly.

## 2. CHECK INPUT SIGNAL OF TIRE DIAMETER

ⓂWith CONSULT-III

1. Start the engine.
2. Drive at 20 km/h (12 MPH) or more for approximately 4 minutes.
3. Check "DIS-TIRE MONI" of 4WD control unit CONSULT-III "DATA MONITOR".

Does the item on "DATA MONITOR" indicate "0 - 4 mm"?

YES >> INSPECTION END

NO >> GO TO 3.

## 3. TERMINAL INSPECTION

Check 4WD control unit harness connector for disconnection.

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-47, "LHD : Exploded View" (LHD), DLN-48, "RHD : Exploded View" (RHD).

NO >> Repair or replace the error-detected parts.

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

[TRANSFER: TY20A]

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000006186940

Use the chart below to find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference		DLN-46, "Inspection"			DLN-53, "Exploded View"	DLN-53, "Exploded View"	DLN-53, "Exploded View"	DLN-60, "Inspection After Disassembly"	DLN-60, "Inspection After Disassembly"
		TRANSFER OIL (Level low)	TRANSFER OIL (Wrong)	TRANSFER OIL (Level too high)	LIQUID GASKET (Damaged)	O-RING (Worn or damaged)	OIL SEAL (Worn or damaged)	GEAR (Worn or damaged)	BEARING (Worn or damaged)
Symptom	Noise	1	2			3	3	3	
	Transfer oil leakage		3	1	2	2			

## PRECAUTIONS

&lt; PRECAUTION &gt;

[TRANSFER: TY20A]

## PRECAUTION

## PRECAUTIONS

## Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000006186941

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

## WARNING:

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

## PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

## WARNING:

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

## Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000006186942

## NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

## OPERATION PROCEDURE

1. Connect both battery cables.

## NOTE:

Supply power using jumper cables if battery is discharged.

2. Turn the push-button ignition switch to ACC position.  
(At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

## PRECAUTIONS

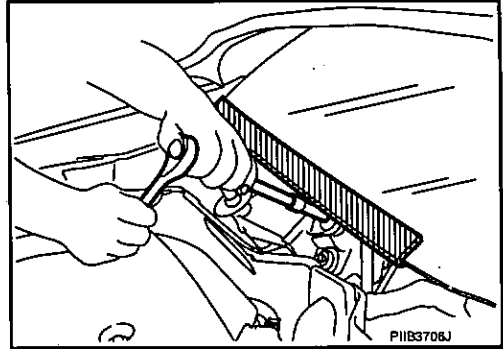
&lt; PRECAUTION &gt;

[TRANSFER: TY20A]

## Precaution for Procedure without Cowl Top Cover

INFOID:000000006186943

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



## Service Notice or Precautions for Transfer

INFOID:000000006186944

- After overhaul refill the transfer with new transfer oil.
- Check the oil level or replace the oil only with the vehicle parked on level surface.
- During removal or installation, keep inside of transfer clear of dust or dirt.
- Replace all tires at the same time. Always use tires of the proper size and the same brand and pattern. Fitting improper size and unusual wear tires applies excessive force to vehicle mechanism and can cause longitudinal vibration.
- Disassembly should be done in a clean work area.
- Before proceeding with disassembly, thoroughly clean the transfer. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts when applied.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new one if necessary.
- Gaskets, seals, O-rings and lock nuts should be replaced any time when the transfer is disassembled.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.
- Observe the specified torque when assembling.
- Clean and flush the parts sufficiently and blow-dry them.
- Never damage sliding surfaces and mating surfaces.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transfer.

PREPARATION

< PREPARATION >

[TRANSFER: TY20A]

PREPARATION

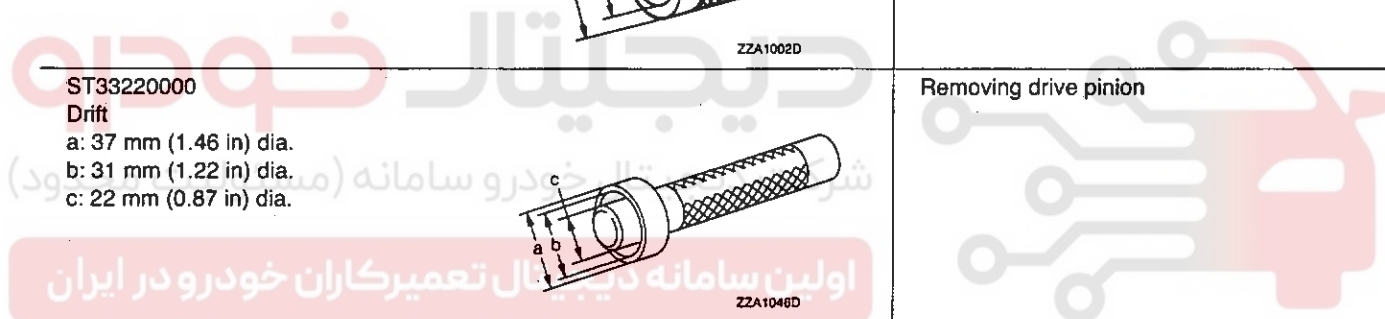
PREPARATION

Special Service Tool

INFOID:000000006186945

Tool number Tool name	Description
KV38101700 Drift a: 82 mm (3.23 in) dia. b: 78 mm (3.07 in) dia.	Installing side oil seal (installing adapter case oil seal)
ST33200000 Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.	<ul style="list-style-type: none"> <li>• Removing gear ring bearing inner race (adapter case side)</li> <li>• Installing companion flange</li> </ul>
ST33220000 Drift a: 37 mm (1.46 in) dia. b: 31 mm (1.22 in) dia. c: 22 mm (0.87 in) dia.	Removing drive pinion
ST33061000 Drift a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia.	Removing gear ring bearing inner race (transfer case side)
KV381054S0 Puller	<ul style="list-style-type: none"> <li>• Removing pinion rear bearing outer race</li> <li>• Removing pinion front bearing outer race</li> <li>• Removing gear ring oil seal</li> </ul>
ST33230000 Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.	Installing gear ring oil seal

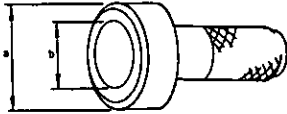
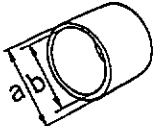
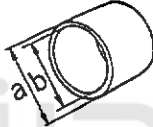

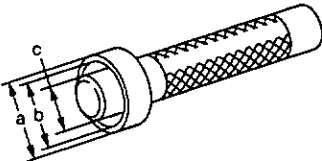
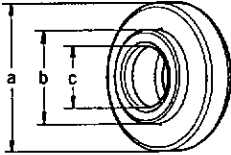
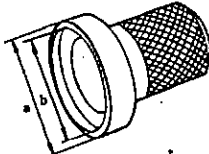
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PREPARATION

< PREPARATION >

[TRANSFER: TY20A]

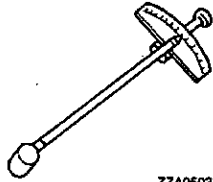
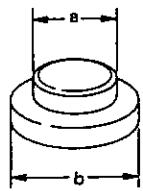
Tool number Tool name	Description
ST30720000 Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.  ZZA0811D	<ul style="list-style-type: none"> <li>• Installing gear ring bearing outer race (transfer case side)</li> <li>• Installing gear ring bearing inner race (transfer case side)</li> <li>• Installing gear ring bearing inner race (adapter case side)</li> <li>• Installing gear ring bearing outer race (adapter case side)</li> <li>• Installing transfer case oil seal</li> </ul>
ST27863000 Drift a: 74.5 mm (2.933 in) dia. b: 62.5 mm (2.461 in) dia.  ZZA1003D	Installing gear ring bearing inner race (transfer case side)
KV40101630 Drift a: 68 mm (2.68 in) dia. b: 60 mm (2.36 in) dia.  ZZA1003D	Installing gear ring bearing inner race (transfer case side)
KV38102510 Drift a: 71 mm (2.80 in) dia. b: 65 mm (2.56 in) dia.  ZZA1003D	Installing gear ring bearing inner race (adapter case side)
KV38100300 Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia.  ZZA1046D	Installing pinion rear bearing outer race
ST30901000 Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.  ZZA0978D	<ul style="list-style-type: none"> <li>• Installing pinion front bearing outer race</li> <li>• Installing pinion front bearing inner race</li> </ul>
ST33400001 Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0814D	<ul style="list-style-type: none"> <li>• Installing pinion front bearing outer race</li> <li>• Installing pinion sleeve oil seal</li> </ul>



PREPARATION

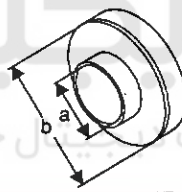
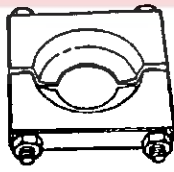
< PREPARATION >

[TRANSFER: TY20A]

Tool number Tool name	Description
ST3127S000 Preload gauge  ZZA0503D	Measuring preload torque
KV40101840 Drift a: 77 mm (3.03 in) dia. b: 85 mm (3.35 in) dia.  ZZA0881D	Installing gear ring bearing outer race (transfer case side)

Commercial Service Tool

INFOID:000000006186946

Tool name	Description
Drift a: 89 mm (3.50 in) dia. b: 72 mm (2.83 in) dia.  NT660	Installing gear ring bearing outer race (adapter case side)
Replacer  ZZA07000	Removing pinion front bearing inner race

TRANSFER OIL

< ON-VEHICLE MAINTENANCE >

[TRANSFER: TY20A]

ON-VEHICLE MAINTENANCE

TRANSFER OIL

Inspection

INFOID:000000006186947

OIL LEAKAGE

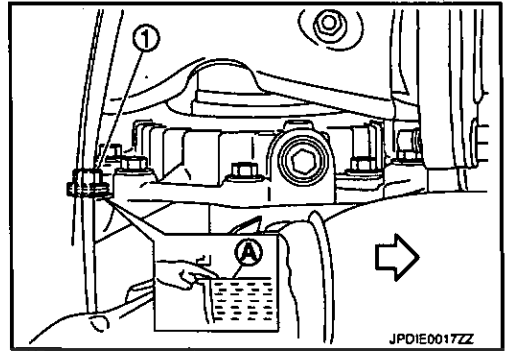
Check transfer surrounding area (oil seal, drain plug, filler plug, and transfer case, etc.) for oil leakage.

OIL LEVEL

1. Remove filler plug (1) and gasket. Then check that oil is filled up (A) from mounting hole for the filler plug.
2. Before installing filler plug, set a new gasket. Install filler plug on transfer and tighten to the specified torque. Refer to DLN-53, "Exploded View".

↶ : Vehicle front

**CAUTION:**  
Never reuse gaskets.



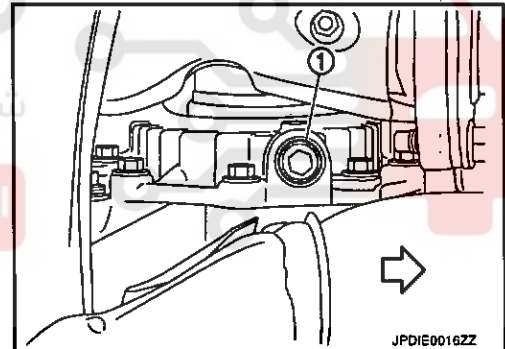
Draining

INFOID:000000006186948

1. Run the vehicle to warm up the transfer unit sufficiently.
2. Stop the engine and remove drain plug (1) and gaskets to drain the transfer oil.
3. Before installing drain plug, set a new gasket. Install drain plug on transfer and tighten to the specified torque. Refer to DLN-53, "Exploded View".

↶ : Vehicle front

**CAUTION:**  
Never reuse gaskets.



Refilling

INFOID:000000006186949

1. Remove filler plug (1) and gasket. Then fill oil up to mounting hole (A) for the filler plug.

↶ : Vehicle front

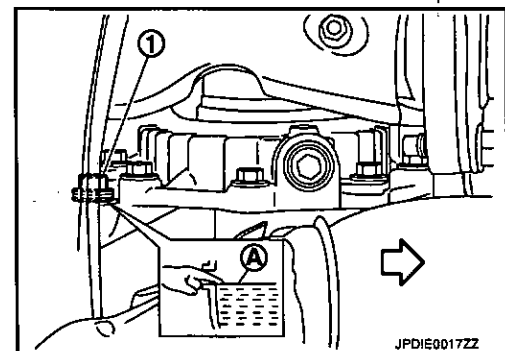
**Oil grade and viscosity** : Refer to MA-8, "Fluids and Lubricants".

**Oil capacity** : Refer to DLN-76, "General Specifications".

**CAUTION:**  
Carefully fill the oil. (Fill up for approximately 3 minutes.)

2. Leave the vehicle for 3 minutes. Then check oil level again.
3. Before installing filler plug, set a new gasket. Install filler plug on transfer and tighten to the specified torque. Refer to DLN-53, "Exploded View".

**CAUTION:**  
Never reuse gasket.



4WD CONTROL UNIT

< ON-VEHICLE REPAIR >

[TRANSFER: TY20A]

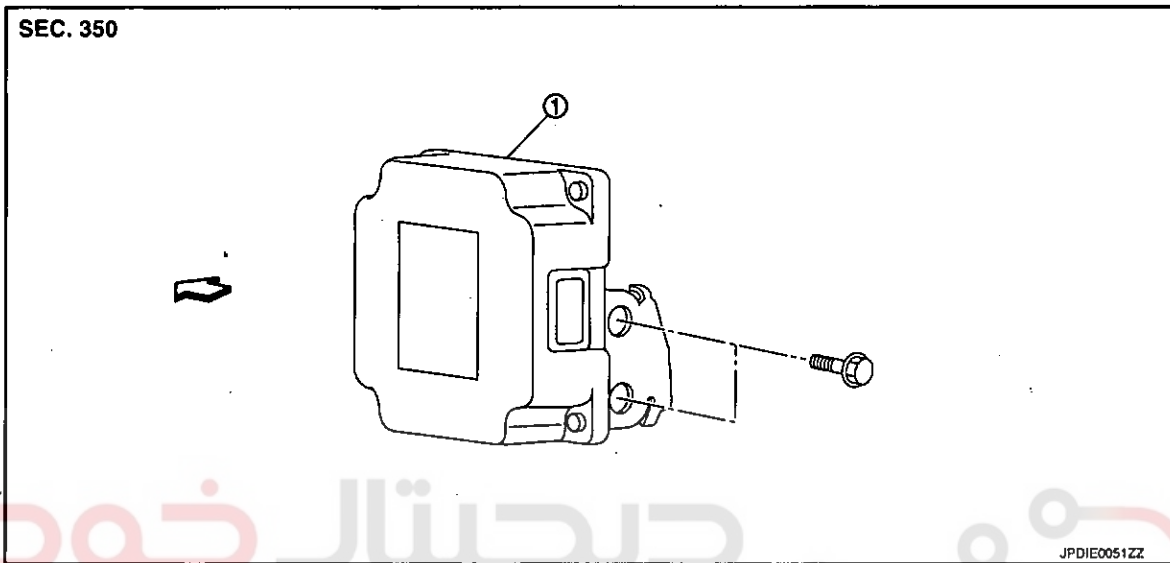
ON-VEHICLE REPAIR

4WD CONTROL UNIT

LHD

LHD : Exploded View

INFOID:000000006186950



1. 4WD control unit

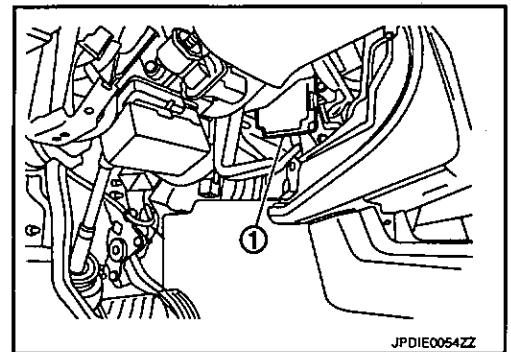
←: Vehicle front

LHD : Removal and Installation

INFOID:000000006186951

REMOVAL

1. Remove instrument lower panel LH. Refer to IP-11. "Exploded View".
2. Disconnect 4WD control unit harness connector.
3. Remove 4WD control unit mounting bolts.
4. Remove 4WD control unit (1).



INSTALLATION

Install in the reverse order of removal.

RHD

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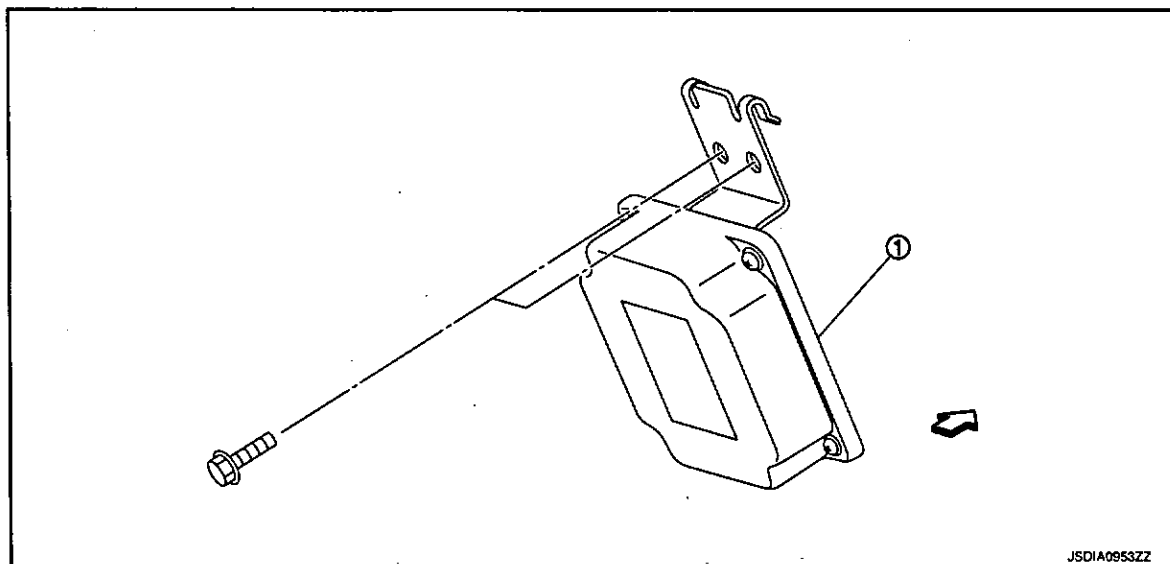
4WD CONTROL UNIT

< ON-VEHICLE REPAIR >

[TRANSFER: TY20A]

RHD : Exploded View

INFOID:000000006186952



1. 4WD control unit

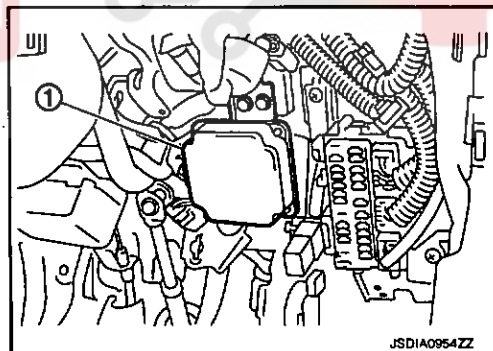
← Vehicle front

RHD : Removal and Installation

INFOID:000000006186953

REMOVAL

1. Remove instrument lower panel RH. Refer to IP-11, "Exploded View".
2. Disconnect 4WD control unit harness connector.
3. Remove 4WD control unit mounting bolts.
4. Remove 4WD control unit (1).



INSTALLATION

Install in the reverse order of removal.

SIDE OIL SEAL

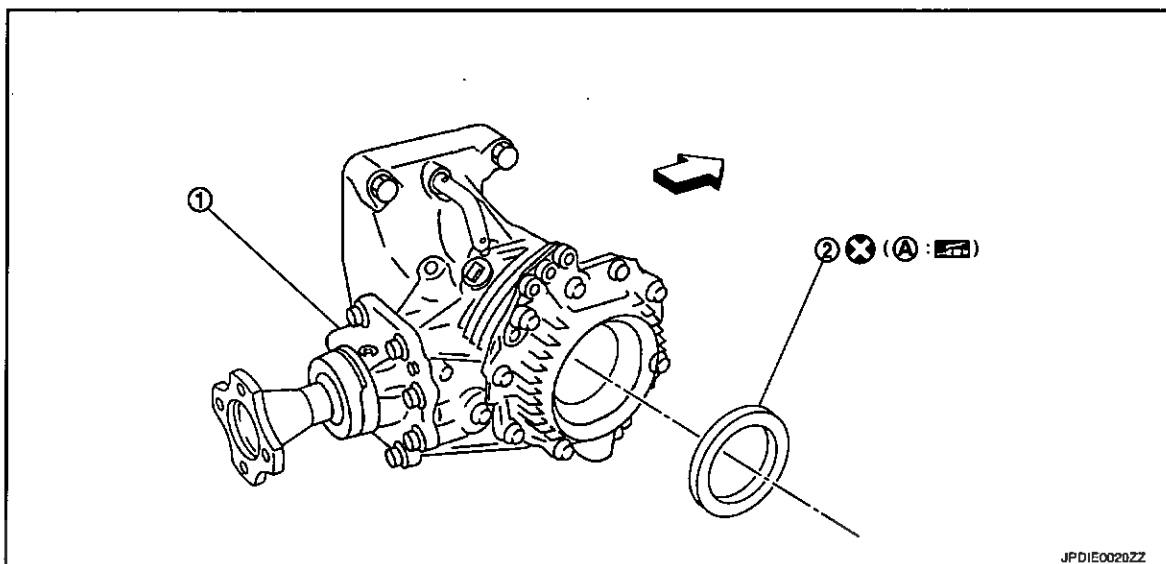
< ON-VEHICLE REPAIR >

[TRANSFER: TY20A]

SIDE OIL SEAL

Exploded View

INFOID:000000006186954



- 1. Transfer assembly
- 2. Side oil seal

A. Oil seal lip

← Vehicle front

Apply multi-purpose grease.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

INFOID:000000006186955

REMOVAL

NOTE:

Transaxle side oil seal is attached to transaxle assembly. Replace it when transfer assembly is removed from vehicle.

1. Remove front drive shaft (right side). Refer to FAX-15, "Exploded View".

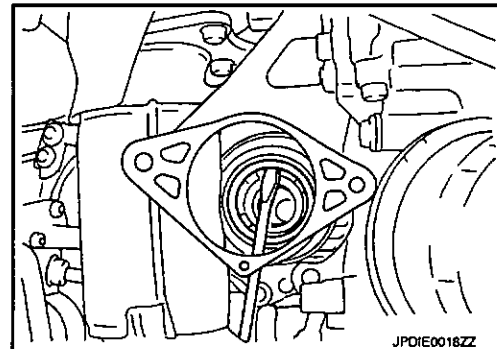
CAUTION:

Never damage gear oil seal inside of transfer.

2. Remove side oil seal with a suitable tool.

CAUTION:

Never damage adapter case.



INSTALLATION

## SIDE OIL SEAL

&lt; ON-VEHICLE REPAIR &gt;

[TRANSFER: TY20A]

1. Apply multi-purpose grease to side oil seal lips. As shown in the figure, install side oil seal so that it becomes flush with the case end surface, using the drift (A) (SST: KV38101700).

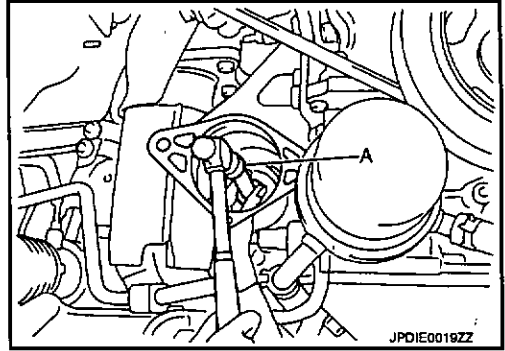
**CAUTION:**

- Never reuse side oil seal.
- Never incline side oil seal.

2. Install front drive shaft (right side). Refer to FAX-15, "Exploded View".

**CAUTION:****Never damage gear ring oil seal inside of transfer.**

3. Check oil level and leakage. Refer to DLN-46, "Inspection".



# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران





## TRANSFER ASSEMBLY

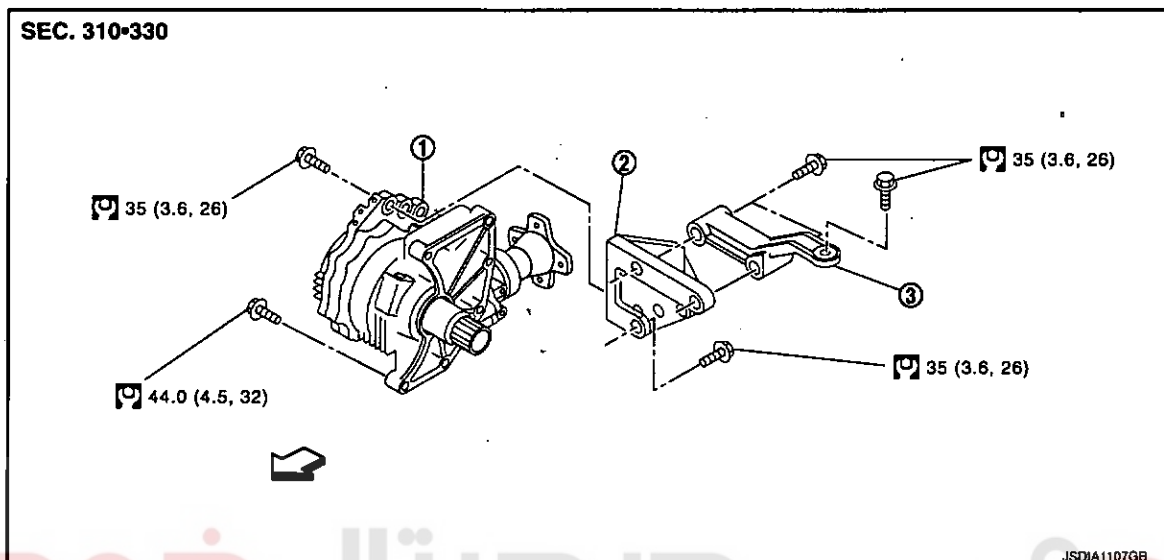
&lt; REMOVAL AND INSTALLATION &gt;

[TRANSFER: TY20A]

REMOVAL AND INSTALLATION  
TRANSFER ASSEMBLY

Exploded View

INFO/D:000000006186956



1. Transfer assembly

2. Transfer gusset

3. Rear gusset

Vehicle front

Refer to GI-4, "Components" for symbols not described on the above.

## Removal and Installation

INFO/D:000000006186957

## REMOVAL

1. Remove extension cowl top panel (lower and upper). Refer to EXT-22, "Exploded View".
2. Remove battery and battery tray.
3. Remove air duct (inlet), air cleaner case (upper and lower) with mass air flow sensor and air duct assembly. Refer to EM-27, "Exploded View".
4. Remove air fuel ratio sensor 1 (bank 1). Refer to EM-34, "Exploded View".
5. Remove front road wheel and tires.
6. Remove splash guards (RH and LH).
7. Remove engine under cover.
8. Remove air guide.
9. Remove front drive shaft (right side). Refer to FAX-15, "Exploded View".

**CAUTION:****Never damage gear ring oil seal inside of transfer.**

10. Remove exhaust front tube. Refer to EX-5, "Exploded View".
11. Separate the rear propeller shaft. Refer to DLN-79, "Exploded View".
12. Disconnect oxygen sensor 2 (bank 1) harness connector.
13. Remove heat insulator from front suspension member.
14. Remove three way catalyst (bank 1). Refer to EM-34, "Exploded View".

**CAUTION:****Handle carefully to avoid any shock to three way catalyst.**

15. Remove power steering tube brackets from front suspension member.
16. Remove high pressure piping and low pressure hose from power steering gear. Refer to ST-41, "Exploded View".

TRANSFER ASSEMBLY

< REMOVAL AND INSTALLATION >

[TRANSFER: TY20A]

**CAUTION:**

**Never let the power steering fluid into the suspension member.**

17. Remove rear engine mounting insulator mounting bolt (upper side). Refer to EM-68, "Exploded View".

18. Support transaxle assembly with a suitable jack.

**CAUTION:**

**When setting the transmission jack, Never allow it to collide against the drain plug.**

19. Support front suspension member with a suitable jack.

20. Remove rear gusset and transfer gusset.

21. Remove rear engine mounting insulator mounting bolt (lower side). Refer to EM-68, "Exploded View".

22. Disconnect front and rear engine mounting insulator harness connector and harness clip.

23. Move rear engine mounting insulator to remove rear engine mounting bracket.

**CAUTION:**

**Never damage power steering gear boot.**

24. Remove rear engine mounting bracket. Refer to EM-68, "Exploded View".

25. Remove LH and RH engine mounting bracket. Refer to EM-68, "Exploded View".

26. Remove member stay, front suspension member fixing bolts and nuts. Refer to FSU-16, "Exploded View".

27. Lower the jack for the front suspension member to the height where the transfer assembly can be removed.

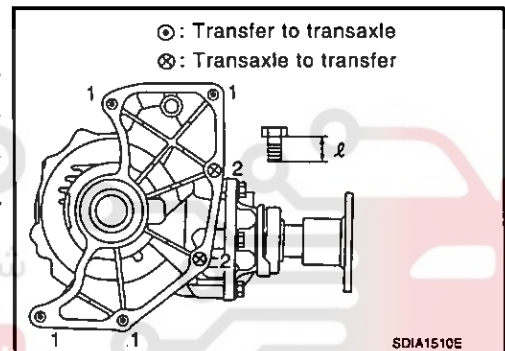
28. Remove bolts fitting transaxle assembly and transfer assembly.

Bolt No.	1	2
Quantity	4	2
Bolt length "ℓ" mm (in)	65 (2.56)	40 (1.57)

29. Remove transfer assembly from the vehicle.

**CAUTION:**

- Never damage air breather hose.
- After removing transfer from transaxle, be sure to replace differential side oil seal of the transaxle side with new one. Refer to TM-179, "Exploded View".



INSTALLATION

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

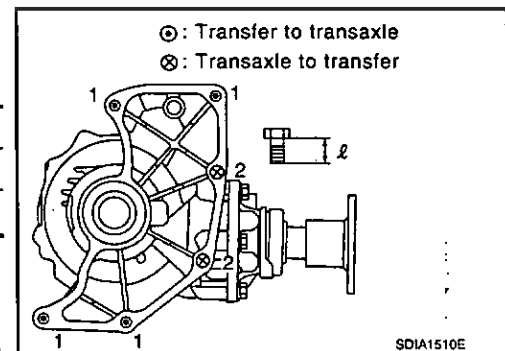
- When installing the transfer to the transaxle, install the mounting bolts following the standard below.

Bolt No.	1	2
Quantity	4	2
Bolt length "ℓ" mm (in)	65 (2.56)	40 (1.57)

**CAUTION:**

**When installing transfer to transaxle, never damage oil seal of transaxle.**

- Check oil level and check for oil leakage after installation. Refer to DLN-46, "Inspection".



ADAPTER CASE

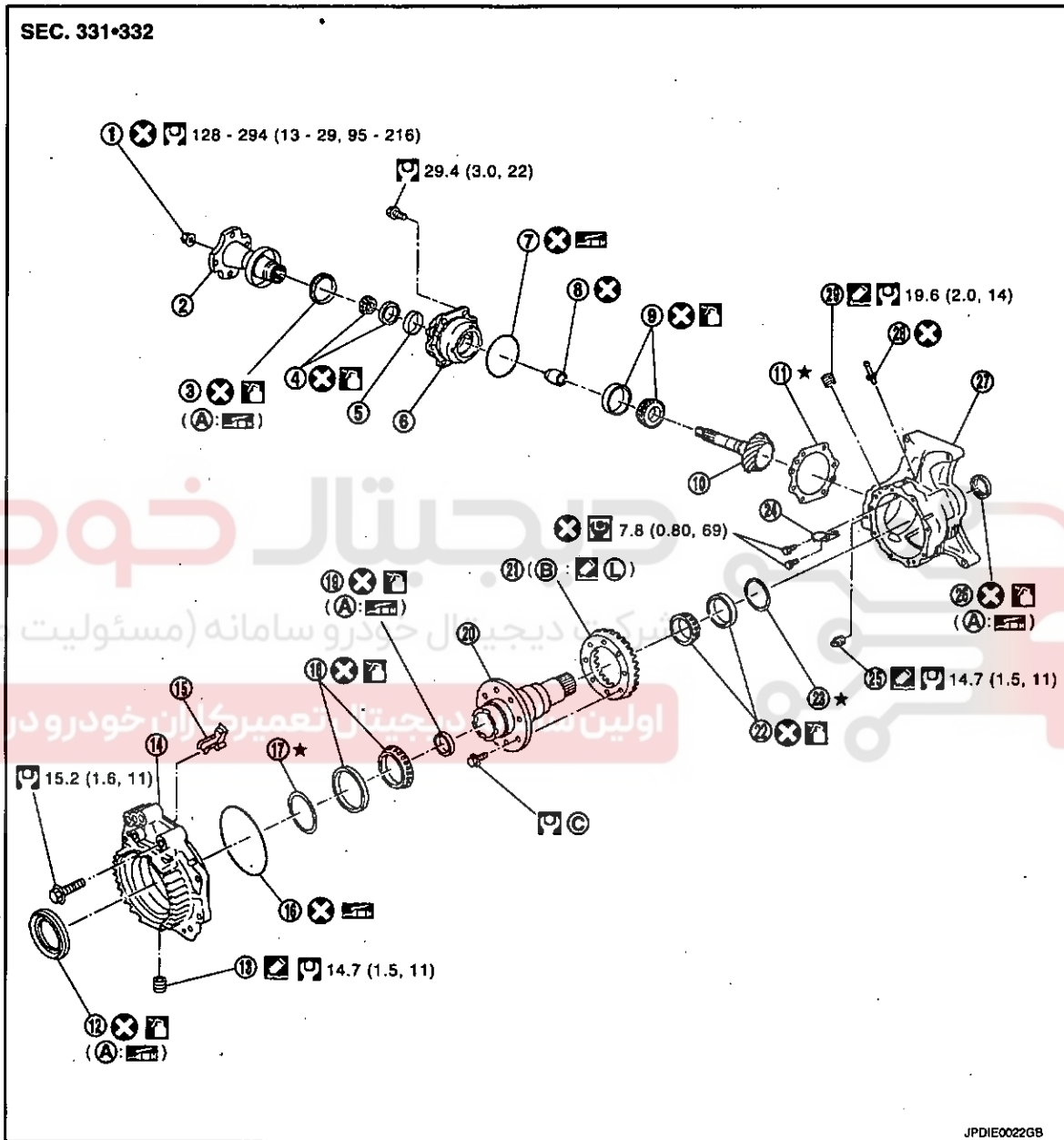
< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

DISASSEMBLY AND ASSEMBLY  
ADAPTER CASE

Exploded View

INFOID:000000006186958



- |  |   |   |
|--|---|---|
| 1. Pinion lock nut                         | 2. Companion flange                                       | 3. Pinion sleeve oil seal                 |
| 4. Pinion rear bearing                     | 5. Dust cover   | 6. Pinion sleeve                          |
| 7. O-ring                                  | 8. Collapsible spacer                                     | 9. Pinion front bearing                   |
| 10. Drive pinion                           | 11. Pinion sleeve shim                                    | 12. Adapter case oil seal                 |
| 13. Drain plug                             | 14. Adapter case  | 15. Oil gutter                            |
| 16. O-ring                                 | 17. Gear ring bearing adjusting shim (adapter case side)  | 18. Gear ring bearing (adapter case side) |
| 19. Gear ring oil seal                     | 20. Gear ring   | 21. Drive gear                            |
| 22. Gear ring bearing (transfer case side) | 23. Gear ring bearing adjusting shim (transfer case side) | 24. Oil defense                           |
| 25. Filter plug                            | 26. Transfer case oil seal                                | 27. Transfer case                         |

## ADAPTER CASE

## &lt; DISASSEMBLY AND ASSEMBLY &gt;



[TRANSFER: TY20A]

28. Breather tube

29. Plug

A. Oil seal lip

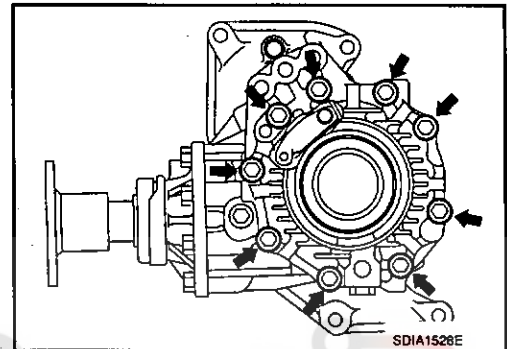
B. Screw hole

C. For the tightening torque, refer to DLN-59, "Assembly".: Apply gear oil.: Apply multi-purpose grease.: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.: Apply Genuine High Strength Thread Locking Sealant, Loctite 270 or equivalent.Refer to GI-4, "Components" for symbols not described above.

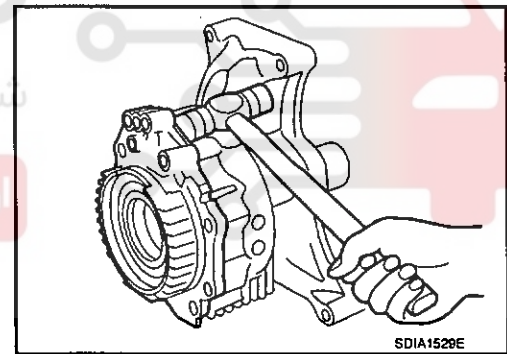
## Disassembly

INFO.ID:000000006186959

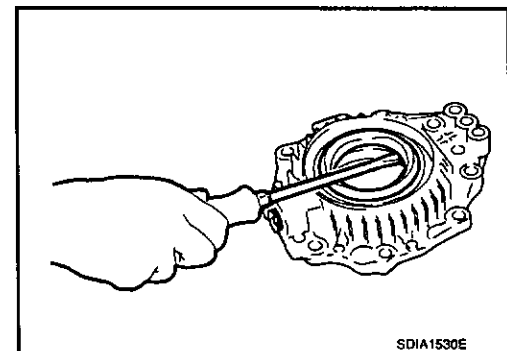
1. Remove adapter case mounting bolts (←).



2. Lightly tap adapter case with a plastic hammer to remove adapter case.
3. Remove O-ring from adapter case.



4. Remove adapter case oil seal with a suitable tool.  
**CAUTION:**  
Never damage adapter case.

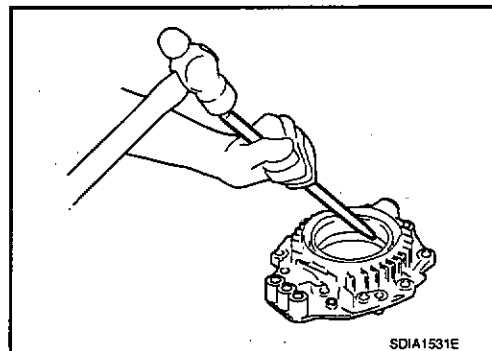


ADAPTER CASE

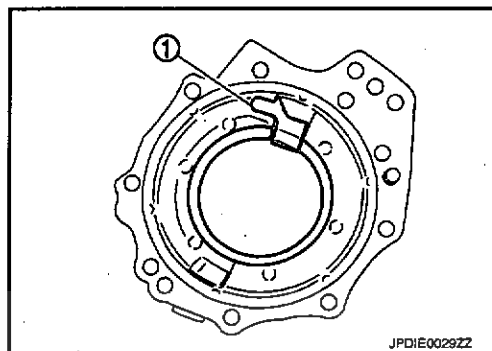
[TRANSFER: TY20A]

< DISASSEMBLY AND ASSEMBLY >

- Using a brass rod, tap the gear ring bearing adjusting shim at the cutout on the adapter case to remove the gear ring bearing adjusting shim (adapter case side) and gear ring bearing outer race (adapter case side).



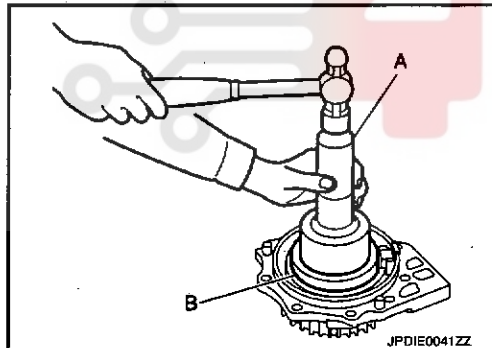
- Remove the oil gutter (1).
- Remove the drain plug.



Assembly

- Select the gear ring bearing adjusting shim (adapter case side). Refer to DLN-65, "Adjustment".
- Install the oil gutter.
- Using the drifts, install the selected gear ring bearing adjusting shim (adapter case side) and gear ring bearing outer race (adapter case side).

- A : Drift (SST: ST30720000)
- B : Drift (Commercial Service Tool)



- Using the drift (A) (SST: KV38101700), drive the adapter case oil seal until it becomes flush with the case end.

Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of the oil seal.

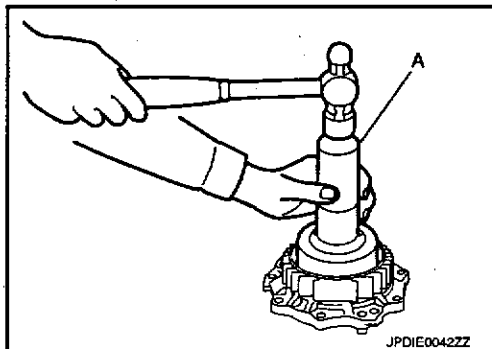
**CAUTION:**

- When checking the total preload torque, measure it without the oil seal, then install the oil seal.
- Never reuse the oil seal.

- Apply sealant on drain plug and install it to the adapter case.
- Apply multi-purpose grease lightly and evenly onto an O-ring, and install it to the adapter case.

**CAUTION:**

Never reuse the O-ring.



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ADAPTER CASE

< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

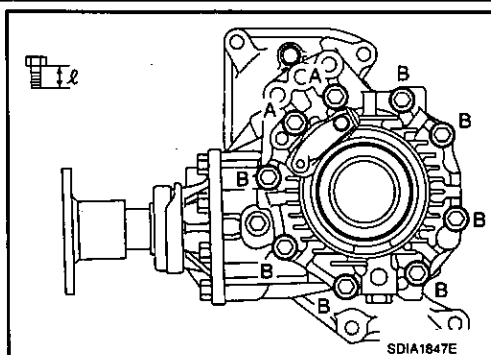
7. Install the adapter case to the transfer case, and apply anti-corrosive oil onto threads and seats on the mounting bolts. Tighten to the specified torque.

Bolt symbol	Bolt length "ℓ" mm (in)	Tightening torque N·m (kg·m, ft·lb)
A	45 (1.77)	15.2 (1.6, 11)
B	30 (1.18)	

8. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-65, "Adjustment".

**CAUTION:**

Measure the total preload without the adapter case oil seal.



Inspection After Disassembly

INFOID:0000000006186961

Check items below. If necessary, replace them with new ones.

CASE

Check the bearing mounting surface for wear, cracks and damages.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران





GEAR RING

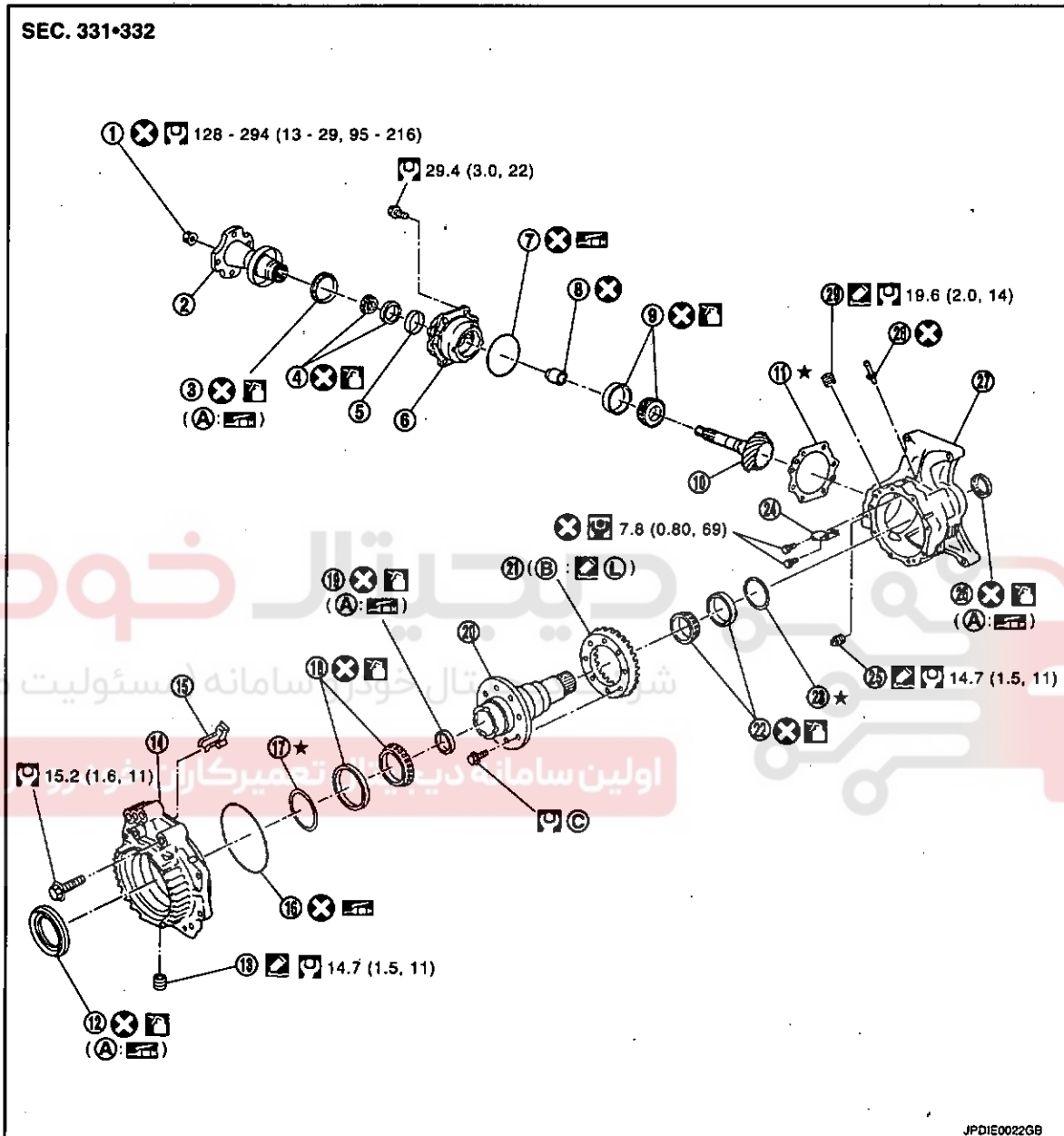
< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

GEAR RING

Exploded View

INFOID:000000006186962



- |  |   |   |
|--|---|---|
| 1. Pinion lock nut                         | 2. Companion flange                                       | 3. Pinion sleeve oil seal                 |
| 4. Pinion rear bearing                     | 5. Dust cover   | 6. Pinion sleeve                          |
| 7. O-ring                                  | 8. Collapsible spacer                                     | 9. Pinion front bearing                   |
| 10. Drive pinion                           | 11. Pinion sleeve shim                                    | 12. Adapter case oil seal                 |
| 13. Drain plug                             | 14. Adapter case  | 15. Oil gutter                            |
| 16. O-ring                                 | 17. Gear ring bearing adjusting shim (adapter case side)  | 18. Gear ring bearing (adapter case side) |
| 19. Gear ring oil seal                     | 20. Gear ring   | 21. Drive gear                            |
| 22. Gear ring bearing (transfer case side) | 23. Gear ring bearing adjusting shim (transfer case side) | 24. Oil defense                           |
| 25. Filler plug                            | 26. Transfer case oil seal                                | 27. Transfer case                         |

## GEAR RING

## &lt; DISASSEMBLY AND ASSEMBLY &gt;

[TRANSFER: TY20A]


28. Breather tube  
A. Oil seal lip

29. Plug  
B. Screw hole

C. For the tightening torque, refer to DLN-59, "Assembly".

: Apply gear oil.

: Apply multi-purpose grease.

: Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.

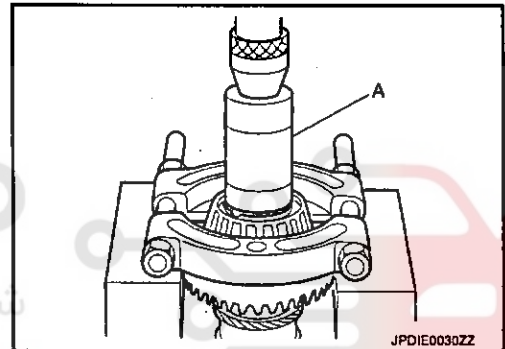
: Apply Genuine High Strength Thread Locking Sealant, Loctite 270 or equivalent.

Refer to GI-4, "Components" for symbols not described above.

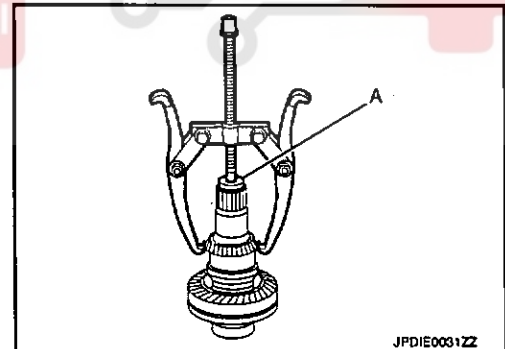
## Disassembly

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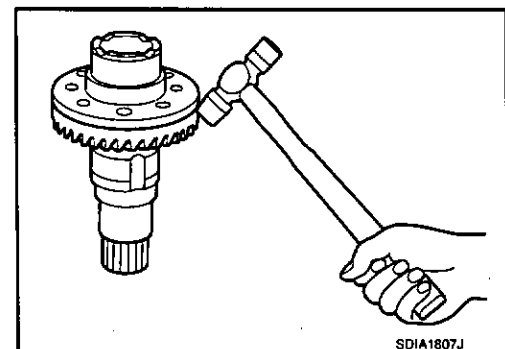
1. Remove adapter case. Refer to DLN-54, "Disassembly".
2. Remove drive gear assembly from the transfer case.
3. Remove gear ring bearing outer race (transfer case side) and gear ring bearing adjusting shim (transfer case side) from the transfer case. Refer to DLN-73, "Disassembly".
4. Remove gear ring bearing inner race (adapter case side) from ring gear shaft with the drift (A) (SST: ST33200000) and a replacer.



5. Remove gear ring bearing inner race (transfer case side) from gear ring with the drift (A) (SST: ST33061000) and a puller.
6. Remove the drive gear mounting bolts.



7. Lightly tap adapter case with a plastic hammer to remove drive gear from the gear ring.

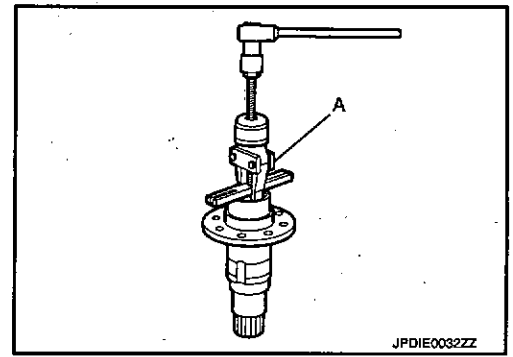


GEAR RING

< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

- 8. Remove gear ring oil seal from the gear ring with a puller (A) (SST: KV381054S0).



Assembly

- 1. Install gear ring oil seal to the gear ring with the drift (A) (SST: ST33230000). Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of the oil seal.

CAUTION:

- Never reuse the oil seal.
- The oil seal back position after the installation shall be 56.5 mm (2.224 in) from the gear ring end.

- 2. Select gear ring bearing adjusting shim (transfer case side). Refer to DLN-65, "Adjustment".

- 3. Assemble the selected gear ring adjusting shim (transfer case side) and gear ring bearing outer race (transfer case side) to the transfer case. Refer to DLN-73, "Assembly".

Apply gear oil to the gear ring bearing (transfer case side).

CAUTION:

Never reuse gear ring bearing (transfer case side).

- 4. Apply thread locking sealant into the thread hole for the drive gear (1).
  - a. Completely clean and degrease the drive gear back face, thread holes, and drive gear mounting bolts.
  - b. Apply thread locking sealant onto the first and second threads under the thread hole chamfering of the drive gear on 3 or more different points (A).

- 5. Install the drive gear to gear ring, and apply anti-corrosive oil onto threads and seats on the mounting bolts.

CAUTION:

If the thread locking sealant is applied aside, quickly wipe it off.

- 6. The drive gear mounting bolts are tightened according to the following torque.

1st step : 27 N·m (2.8 kg-m, 20 ft-lb)

2nd step : 98.5 N·m (10 kg-m, 73 ft-lb)

CAUTION:

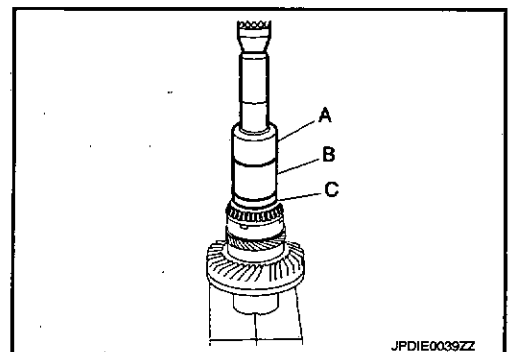
Temporary installation before tightening the bolts through to the completion of the tightening should be within 90 seconds.

- 7. Apply gear oil to gear ring bearing inner race (transfer case side). Install the gear ring bearing inner race (transfer case side) to gear ring with the drifts.

A : Drift (SST: ST30720000)

B : Drift (SST: ST27863000)

C : Drift (SST: KV40101630)



## GEAR RING

## &lt; DISASSEMBLY AND ASSEMBLY &gt;

[TRANSFER: TY20A]

8. Install gear ring bearing inner race (adaptor case side) with the drifts.

A : Drift (SST: ST30720000)

B : Drift (SST: KV38102510)

Apply gear oil to the gear ring bearing (adapter case side).

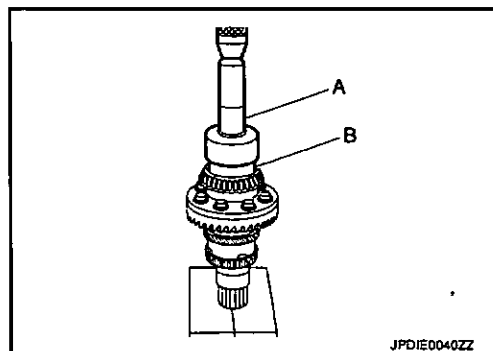
**CAUTION:**

**Never reuse gear ring bearing (adapter case side).**

9. Install the drive gear assembly to the transfer case.  
 10. Install adapter case. Refer to DLN-55, "Assembly".  
 11. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-65, "Adjustment".

**CAUTION:**

**Measure the total preload without the adapter case oil seal.**



## Inspection After Disassembly

INFOID:000000006185965

Check items below. If necessary, replace them with new ones.

## GEAR

Check gear face and shaft for wear, cracks, damage, and seizure.

**CAUTION:**

**If malfunction is detected on the drive gear or drive pinion, replace the drive gear and drive pinion as a set.**

## BEARING

Check for seizure, peeling, wear, corrosion, sticking, unusual noise, roughness in hand turning, and other damage.

**CAUTION:**

**When replacing the bearing, always replace the inner race and outer race as a pair.**

## SHIM

Check for seizure, damage, and unusual wear.

## CASE

Check the bearing mounting surface for wear, cracks and damages.

DRIVE PINION

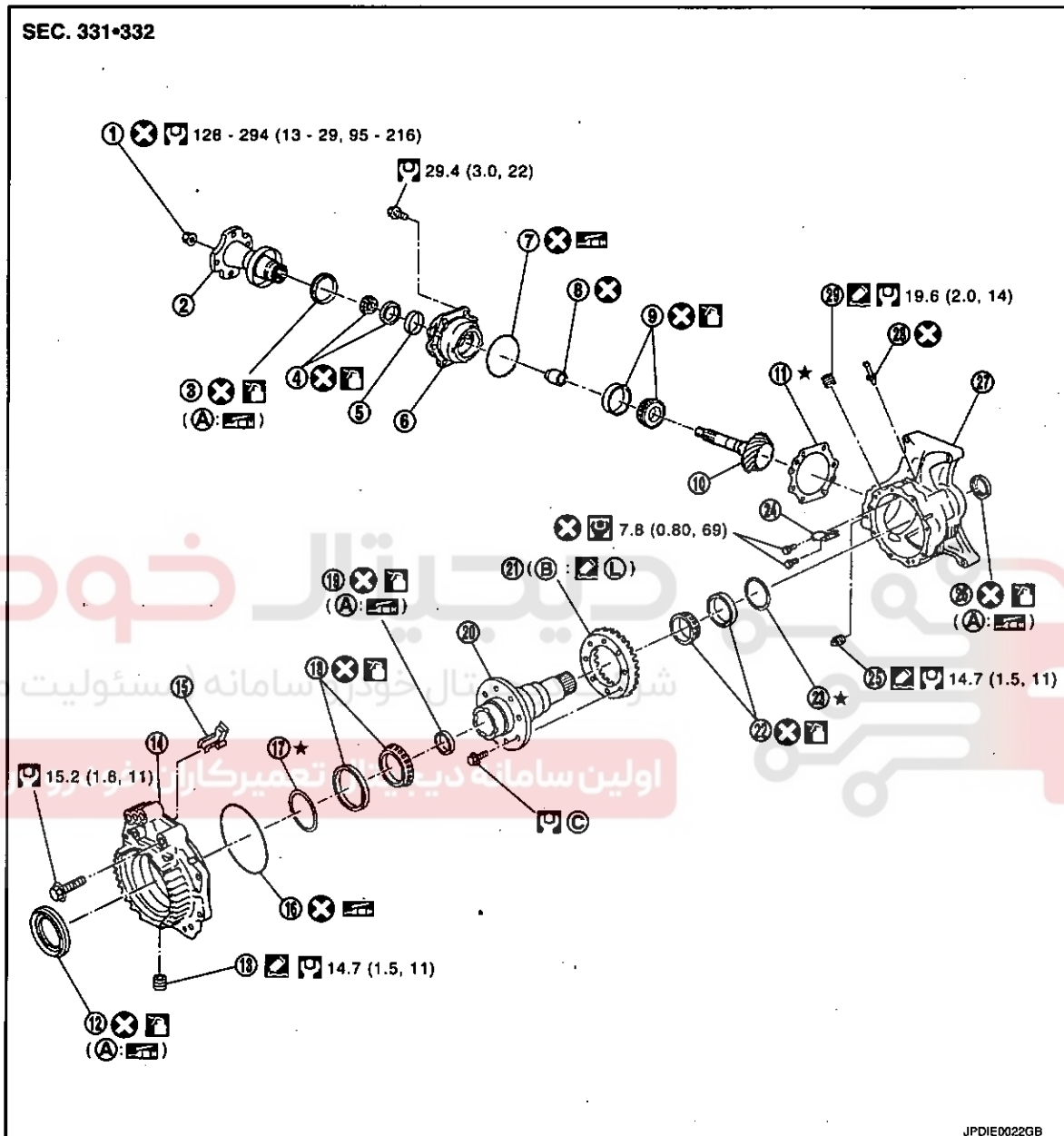
< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

DRIVE PINION

Exploded View

INFOID:000000006186966



- |  |   |   |
|--|---|---|
| 1. Pinion lock nut                         | 2. Companion flange                                       | 3. Pinion sleeve oil seal                 |
| 4. Pinion rear bearing                     | 5. Dust cover   | 6. Pinion sleeve                          |
| 7. O-ring                                  | 8. Collapsible spacer                                     | 9. Pinion front bearing                   |
| 10. Drive pinion                           | 11. Pinion sleeve shim                                    | 12. Adapter case oil seal                 |
| 13. Drain plug                             | 14. Adapter case  | 15. Oil gutter                            |
| 16. O-ring                                 | 17. Gear ring bearing adjusting shim (adapter case side)  | 18. Gear ring bearing (adapter case side) |
| 19. Gear ring oil seal                     | 20. Gear ring   | 21. Drive gear                            |
| 22. Gear ring bearing (transfer case side) | 23. Gear ring bearing adjusting shim (transfer case side) | 24. Oil defense                           |
| 25. Filler plug                            | 26. Transfer case oil seal                                | 27. Transfer case                         |

DRIVE PINION





< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

28. Breather tube  
A. Oil seal lip

29. Plug  
B. Screw hole

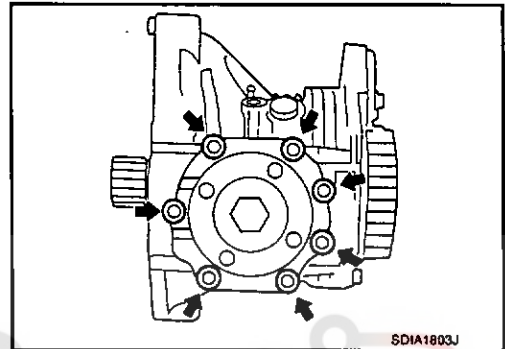
C. For the tightening torque, refer to DLN-59, "Assembly".

- : Apply gear oil.
  - : Apply multi-purpose grease.
  - : Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.
  - : Apply Genuine High Strength Thread Locking Sealant, Loctite 270 or equivalent.
- Refer to GI-4, "Components" for symbols not described above.

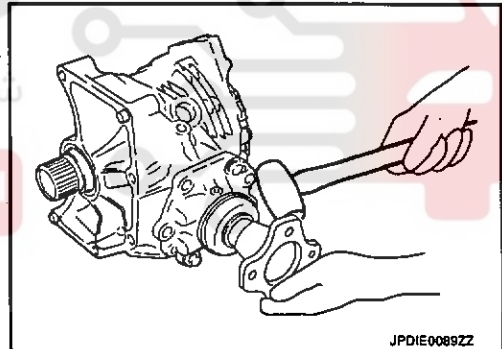
Disassembly

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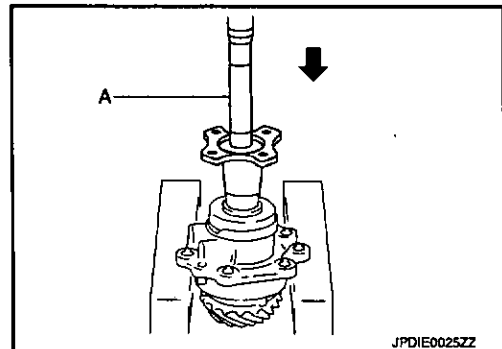
1. Remove pinion sleeve mounting bolts.



- 2. Lightly tap adapter case with a plastic hammer to remove pinion sleeve assembly.
- 3. Remove the pinion sleeve shim.
- 4. Remove the pinion lock nut.



- 5. Remove drive pinion assembly from pinion sleeve with the drift (A) (SST: ST33220000).
- 6. Remove companion flange.
- 7. Remove the O-ring from pinion sleeve.





DRIVE PINION

[TRANSFER: TY20A]

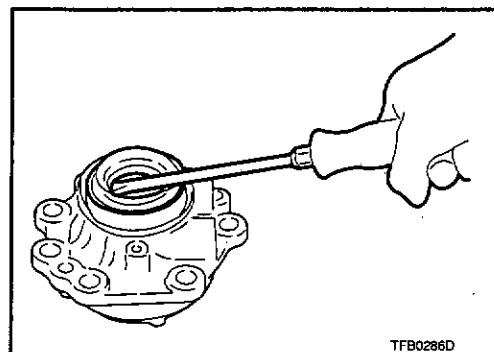
< DISASSEMBLY AND ASSEMBLY >

8. Remove pinion sleeve oil seal from the pinion sleeve with a suitable tool.

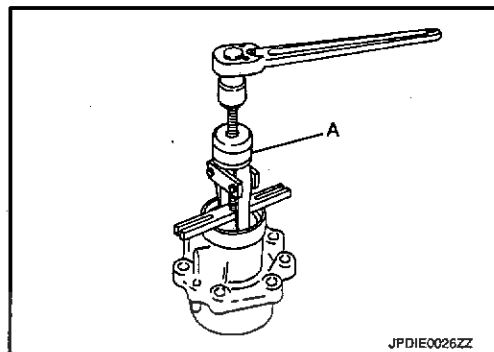
**CAUTION:**

**Never damage the pinion sleeve.**

9. Remove pinion rear bearing inner race.



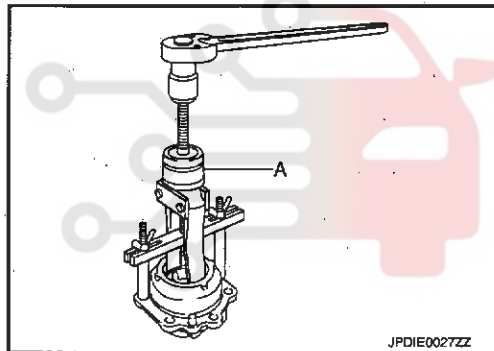
10. Remove the pinion rear bearing outer race with the puller (A) (SST: KV381054S0).



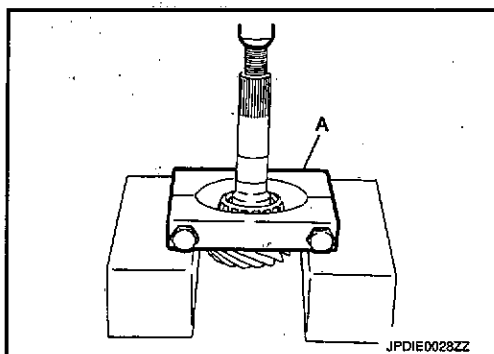
11. Remove the pinion front bearing outer race with the puller (A) (SST: KV381054S0).

12. Remove dust cover.

13. Remove the collapsible spacer from the drive pinion.



14. Using the replacer (A) (commercial service tool), press the pinion front bearing inner race out of the drive pinion.



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Assembly

1. Select the pinion sleeve shim. Refer to DLN-65, "Adjustment".
2. Install dust cover.

دیجیتال خودرو  
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)  
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

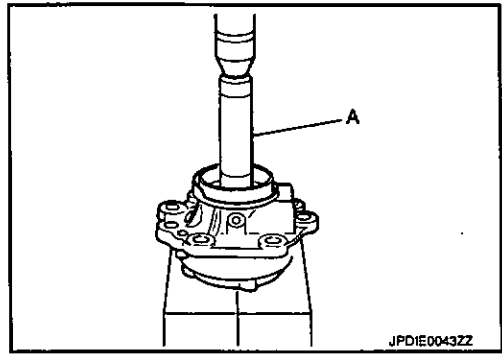
A  
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DRIVE PINION

< DISASSEMBLY AND ASSEMBLY >

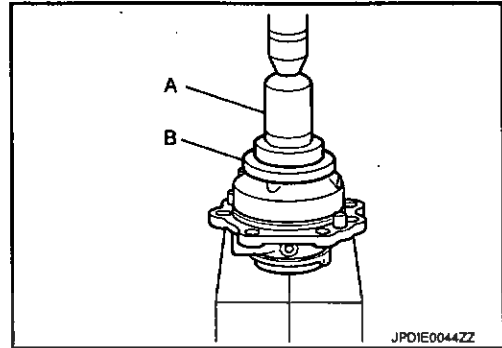
[TRANSFER: TY20A]

3. Install the pinion rear bearing outer race with the drift (A) (SST: KV38100300).



4. Install the pinion front bearing outer race with the drifts.

- A : Drift (SST: ST33400001)
- B : Drift (SST: ST30901000)



5. Install the pinion front bearing inner race to drive pinion with the drift (A) (SST: ST30901000).  
Apply gear oil to the drive pinion bearing (front side).

**CAUTION:**

- Never reuse drive pinion bearing (front side).

6. Install a collapsible spacer to the drive pinion.

**CAUTION:**

- Never reuse collapsible spacer.

7. Install the pinion rear bearing inner race to pinion sleeve.  
Apply gear oil to the drive pinion bearing (rear side).

**CAUTION:**

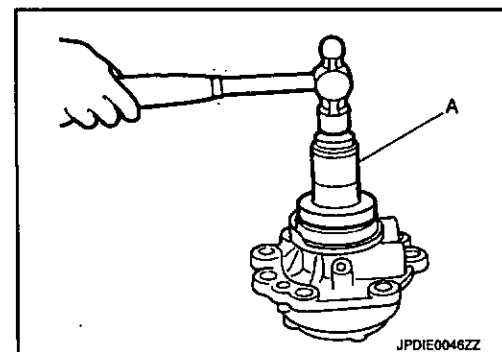
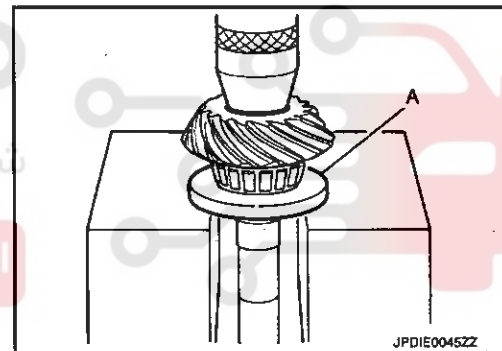
- Never reuse drive pinion bearing (rear side).

8. Install pinion sleeve oil seal to pinion sleeve with the drift (A) (SST: ST33400001).

Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.

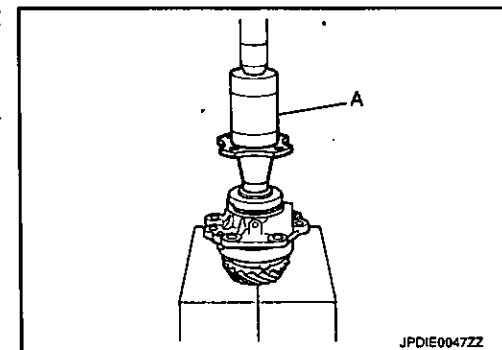
**CAUTION:**

- Never reuse oil seal.



9. Install companion flange to pinion sleeve assembly with the drift (A) (SST: ST33200000).

10. Apply anti-corrosive oil to the thread and seat of the lock nut, and adjust the pinion lock nut tightening torque and pinion bearing preload torque, using a preload gauge.



**Standard**

Drive pinion lock nut tighten torque : 128 – 294 N·m (13 – 29 kg-m, 95 – 216 ft-lb)

## DRIVE PINION

&lt; DISASSEMBLY AND ASSEMBLY &gt;

[TRANSFER: TY20A]

## Standard

Drive pinion bearing preload : Refer to DLN-76, "Pre-load Torque".

## CAUTION:

- Never reuse lock nut.
- If specified preload torque is exceeded, replace the collapsible spacer and tighten again. Never loosen the pinion lock nut for further preload torque adjustment.

11. Apply multi-purpose grease lightly and evenly onto an O-ring, and install it to the pinion sleeve.

## CAUTION:

**Never reuse O-ring.**

12. Assemble the selected pinion sleeve shim.
13. Install the pinion sleeve assembly, and apply anti-corrosive oil onto thread and seats on the mounting bolts. Tighten to the specified torque. Refer to DLN-61, "Exploded View".
14. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-65, "Adjustment".

## CAUTION:

**Measure the total preload without the adapter case oil seal.**

## Adjustment

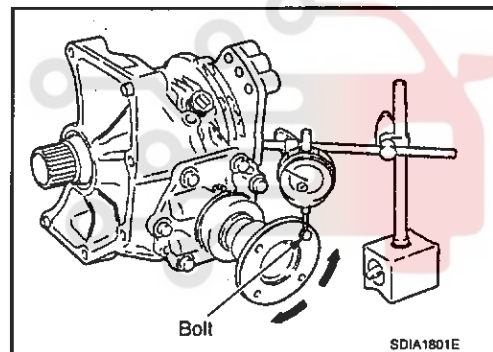
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## BACKLASH

1. Install a bolt to the companion flange.
2. Fit a dial indicator onto the bolt.
3. Measure the circumference backlash of the companion flange, and make sure it satisfies the standard below.

**Backlash** : Refer to DLN-76, "Backlash".

- If measured value is out of the specification, disassemble it to check and adjust each part.



## TOOTH CONTACT

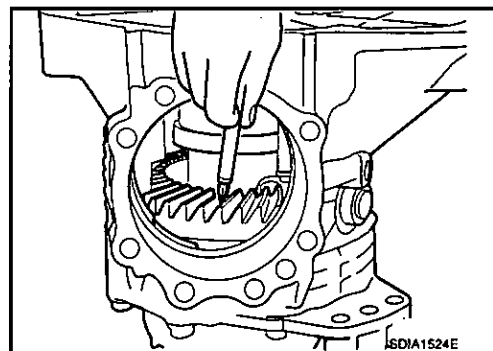
1. Remove the pinion sleeve assembly. Refer to DLN-62, "Disassembly".

2. Apply red lead to the drive gear.

## CAUTION:

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

3. Install the pinion sleeve shims and pinion sleeve assembly. Refer to DLN-63, "Assembly".
4. Remove the plug on the upper side of the transfer case. When installing plug, apply sealant on screw part, and tighten it at the specified torque. Refer to DLN-61, "Exploded View".

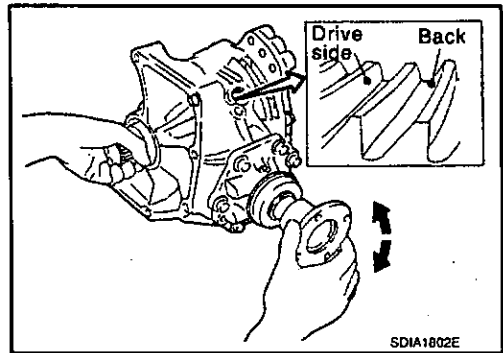


DRIVE PINION

< DISASSEMBLY AND ASSEMBLY >

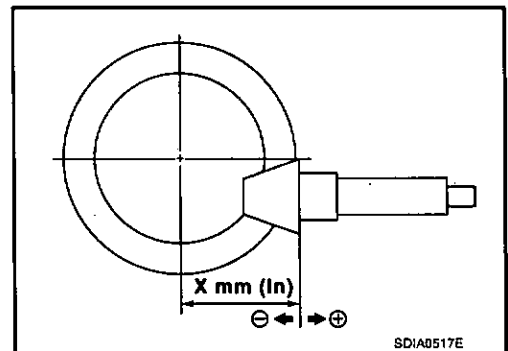
[TRANSFER: TY20A]

5. Rotate the companion flange back and forth several times, and check the drive pinion gear to drive gear tooth contact by viewing from the plug hole.



Pinion sleeve shim selection value mm (in)		Tooth contact condition			Need for adjustment	
		Heel side	Drive side	Toe side		Back
↑ Thicker	+0.12 (+0.0047)					Yes
	+0.09 (+0.0035)					
	+0.06 (+0.0024)					
	+0.03 (+0.0012)					
	0 (0.0)					No
↓ Thinner	-0.03 (-0.0012)					Yes
	-0.06 (-0.0024)					
	-0.09 (-0.0035)					
	-0.12 (-0.0047)					

6. If tooth contact is poorly adjusted, adjust pinion height (dimension X) in the following manner.

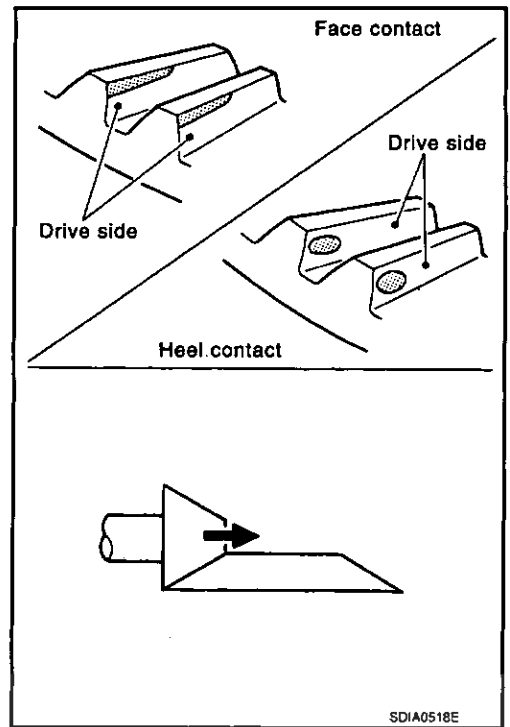


DRIVE PINION

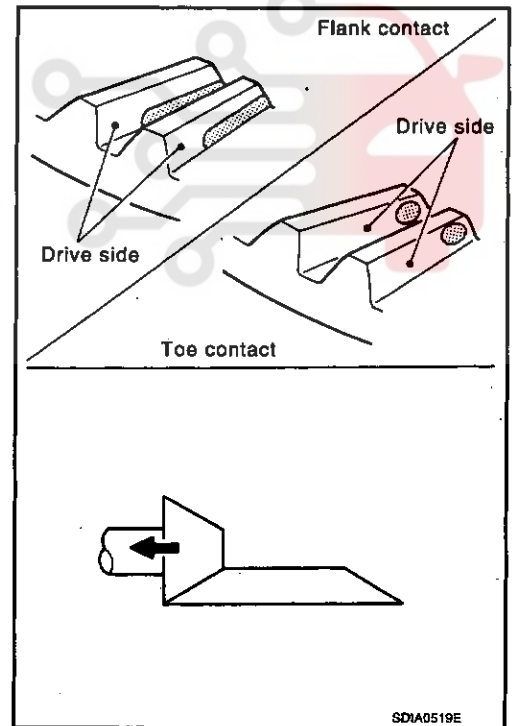
< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

- If the tooth contact is near the face (face contact), or near the heel (heel contact), thin the pinion sleeve shims to move the drive pinion closer to the drive gear.



- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thicken the pinion sleeve shims to move the drive pinion farther from the drive gear.



شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

PINION BEARING PRELOAD

1. Remove the pinion sleeve assembly. Refer to DLN-62. "Disassembly".
2. Rotate the companion flange back and forth 2 to 3 times. Check for unusual noise, rotation malfunction, and other malfunctions.
3. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.

## DRIVE PINION

## &lt; DISASSEMBLY AND ASSEMBLY &gt;

[TRANSFER: TY20A]

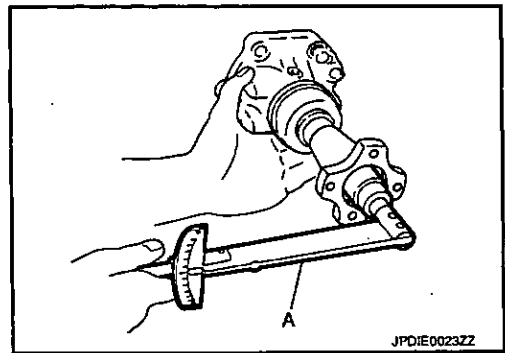
4. Measure the drive pinion bearing preload with the preload gauge (A) (SST: ST3127S000).

**Standard**

**Preload torque** : Refer to DLN-76. "Preload Torque".

**CAUTION:**

- Every rotational part shall rotate smoothly with the specified gear oil.
  - Preload torque differs before disassembly and after reassembly.
- If measured value is out of the specification, disassemble the pinion sleeve assembly to check and adjust each part.

**TOTAL PRELOAD**

1. Measure pinion bearing preload torque (P<sub>1</sub>). Refer to DLN-76. "Preload Torque".
2. Install the pinion sleeve shims and pinion sleeve assembly.
3. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
4. Measure the total preload with the preload gauge (A) (SST: ST3127S000).

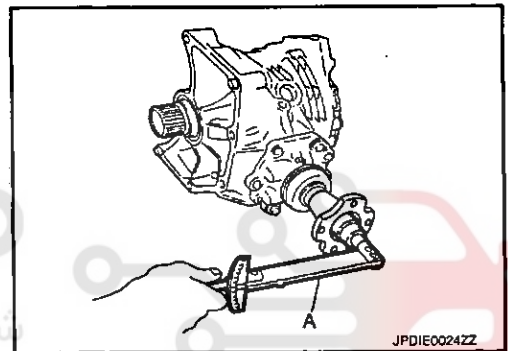
**Standard**

**Total Preload torque** : Refer to DLN-76. "Preload Torque".

**CAUTION:**

**Preload torque differs before disassembly and after reassembly.**

- If measured value is out of the specification, disassemble it to check and adjust each part. When measuring the total preload torque after the disassembly, measure it with the transfer case oil seals and gear ring oil seals removed, then install the oil seals.

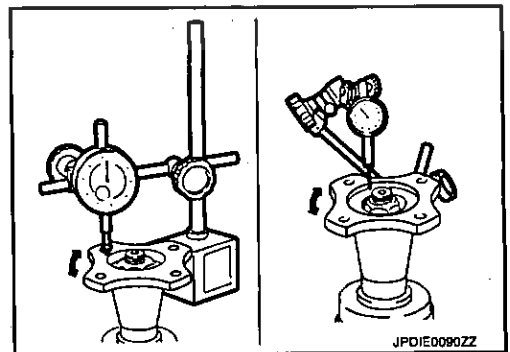
**COMPANION FLANGE RUNOUT**

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

**Limit**

**Companion flange runout** : Refer to DLN-76. "Companion Flange Runout".

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

**Limit**

**Companion flange runout** : Refer to DLN-76. "Companion Flange Runout".

5. If the runout value is outside the repair limit, follow the procedure below to adjust.
  - a. While changing the phase between companion flange and drive pinion gear by 90° at a time, check runout and determine which phase angle minimizes the runout.
  - b. If the runout value is still outside of the limit after the phase has been changed, replace the companion flange.
  - c. If the runout is out of the specification after replacement of companion flange, adjust the assembly status of the pinion bearings and drive pinion gear, or replace the pinion bearings.

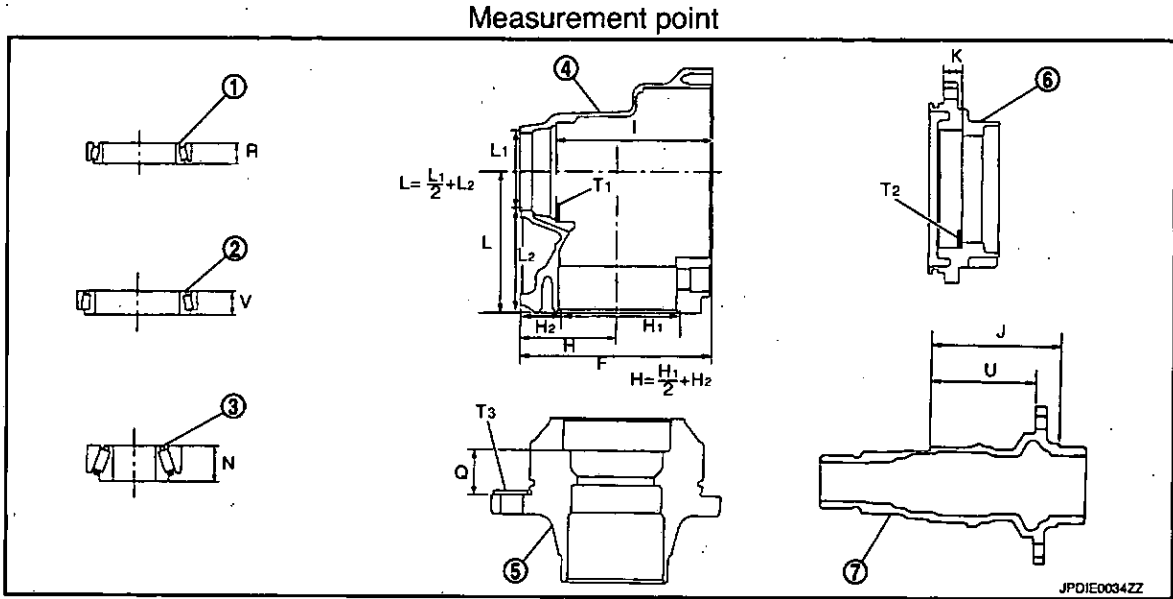


DRIVE PINION

< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

SELECTING ADJUSTING SHIM



- 1. Gear ring bearing (transfer case side)
- 2. Gear ring bearing (adapter case side)
- 3. Pinion front bearing
- 4. Transfer case
- 5. Pinion sleeve
- 6. Adapter case
- 7. Gear ring

Gear Ring Bearing Adjusting Shim (Transfer Case Side)

1. Measure F, H, I, R and U shown in the measurement points.
2. Convert the values F, H, I, R and U according to the standards below.

- F:** Value obtained by subtracting 163.00 mm (6.42 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- H:** Value obtained by subtracting 83.00 mm (3.268 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- I:** Value obtained by subtracting 131.90 mm (5.19 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- R:** Value obtained by subtracting 17.00 mm (0.6693 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- U:** Value obtained by subtracting 89.50 mm (3.5236 in) from the reading [in increments of 0.01 mm (0.0004 in)].

3. Check dimension Z on the drive gear side face.

**NOTE:**

Dimension Z indicates the difference between the optimum engagement and the standard dimensions in increments of 0.01mm (0.0004 in) written on the drive gear side face.

4. Use the formula below to calculate gear ring bearing adjusting shim (transfer case side) thickness T1.

$$T1 = (I - F + H + Z - U - R) \times 0.01 \text{ mm (0.0004 in)} + 1.49 \text{ mm (0.0587 in)}$$

5. Select the gear ring bearing adjusting shim (transfer case side).

**CAUTION:**

- Only one adjusting shim can be selected.
- If no adjusting shim with the calculated value is available, select the thicker and closest one.

Gear Ring Bearing Adjusting Shim (Adapter Case Side)

1. Measure F, H, J, K, U and V shown in the measurement points.
2. Convert the values F, H, J, K, U and V according to the standards below.

## DRIVE PINION

&lt; DISASSEMBLY AND ASSEMBLY &gt;

[TRANSFER: TY20A]

- F: Value obtained by subtracting 163.00 mm (6.42 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- H: Value obtained by subtracting 83.00 mm (3.268 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- J: Value obtained by subtracting 109.50 mm (4.31 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- K: Value obtained by subtracting 14.40 mm (0.5669 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- U: Value obtained by subtracting 89.50 mm (3.5236 in) from the reading [in increments of 0.01 mm (0.0004 in)].
- V: Value obtained by subtracting 17.00 mm (0.6693 in) from the reading [in increments of 0.01 mm (0.0004 in)].

3. Check dimension Z on the drive gear side face.

**NOTE:**

Dimension Z indicates the difference between the optimum engagement and the standard dimensions in increments of 0.01mm (0.0004 in) written on the drive gear side face.

4. Use the formula below to calculate gear ring bearing adjusting shim (adapter case side) thickness T<sub>2</sub>.

$$T_2 = (K + F - H - Z + U - J - V) \times 0.01 \text{ mm (0.0004 in)} + 1.49 \text{ mm (0.0587 in)}$$

5. Select the gear ring bearing adjusting shim (adapter case side).

**CAUTION:**

- Only one adjusting shim can be selected.
- If no adjusting shim with the calculated value is available, select the thicker and closest one.

## Pinion Sleeve Shim

1. Measure L, N and Q shown in the measurement points.
2. Check the dimension S written on the gear end of the drive pinion.

**NOTE:**

The dimension S indicates the difference between the optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the gear end of the drive pinion.

3. Use the formula below to calculate pinion sleeve shim thickness T<sub>3</sub>.

$$T_3 = [74.6 \text{ mm (2.937 in)} + S] + N + Q - L$$

4. Select the pinion sleeve shim.

**CAUTION:**

Only one pinion sleeve shim can be selected.

## Inspection After Disassembly

INFOID:000000006186970

Check items below. If necessary, replace them with new ones.

**GEAR**

Check gear face and shaft for wear, cracks, damage, and seizure.

**CAUTION:**

Replace ring gear and drive pinion as a set (hypoid gear set) if any malfunction is detected on the ring gear or drive pinion.

**BEARING**

Check for seizure, peeling, wear, corrosion, sticking, unusual noise, roughness in hand turning, and other damage.

**CAUTION:**

Always replace inner race and outer race as a pair when replacing the bearing.

**SHIM**

Check for seizure, damage, and unusual wear.

DRIVE PINION

< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

CASE

Check the bearing mounting surface for wear, cracks and damages.

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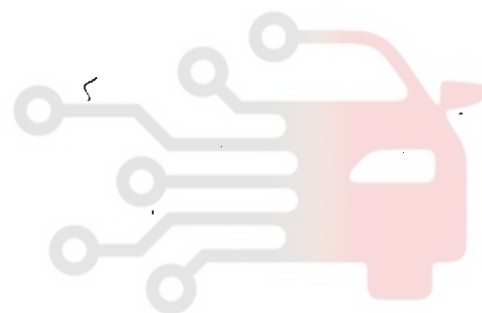
O

P

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



TRANSFER CASE

< DISASSEMBLY AND ASSEMBLY >

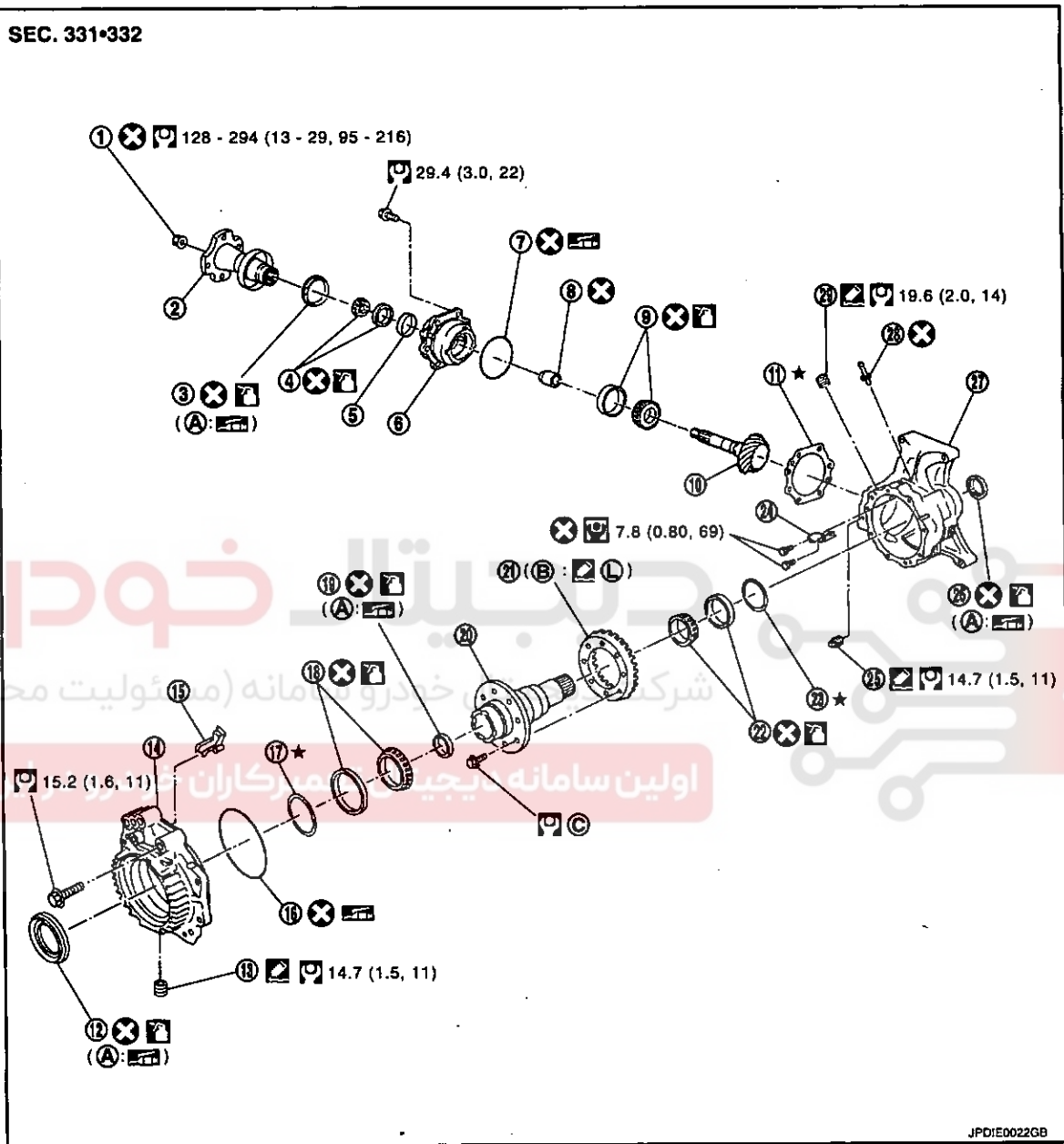
[TRANSFER: TY20A]

TRANSFER CASE

Exploded View

INFOID:000000006186971

SEC. 331•332



JPDIE0022GB

- |  |   |   |
|--|---|---|
| 1. Pinion lock nut                         | 2. Companion flange                                       | 3. Pinion sleeve oil seal                 |
| 4. Pinion rear bearing                     | 5. Dust cover   | 6. Pinion sleeve                          |
| 7. O-ring                                  | 8. Collapsible spacer                                     | 9. Pinion front bearing                   |
| 10. Drive pinion                           | 11. Pinion sleeve shim                                    | 12. Adapter case oil seal                 |
| 13. Drain plug                             | 14. Adapter case  | 15. Oil gutter                            |
| 16. O-ring                                 | 17. Gear ring bearing adjusting shim (adapter case side)  | 18. Gear ring bearing (adapter case side) |
| 19. Gear ring oil seal                     | 20. Gear ring   | 21. Drive gear                            |
| 22. Gear ring bearing (transfer case side) | 23. Gear ring bearing adjusting shim (transfer case side) | 24. Oil defense                           |
| 25. Filler plug                            | 26. Transfer case oil seal                                | 27. Transfer case                         |

TRANSFER CASE

[TRANSFER: TY20A]

< DISASSEMBLY AND ASSEMBLY >

- 28. Breather tube
- A. Oil seal lip
- 29. Plug
- B. Screw hole

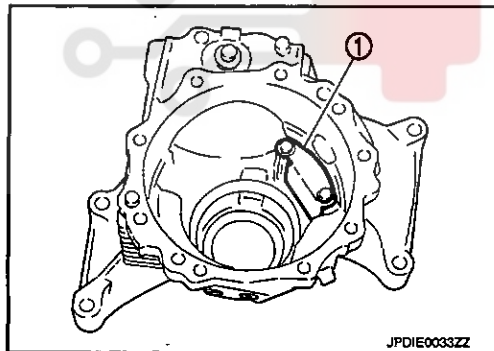
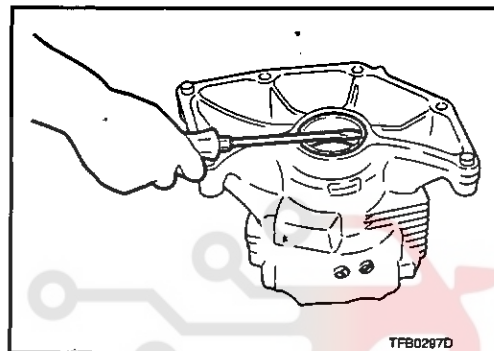
C. For the tightening torque, refer to DLN-59. "Assembly".

- : Apply gear oil.
  - : Apply multi-purpose grease.
  - : Apply Genuine Liquid Gasket, Three Bond TB1215 or equivalent.
  - : Apply Genuine High Strength Thread Locking Sealant, Loctite 270 or equivalent.
- Refer to GI-4. "Components" for symbols not described above.

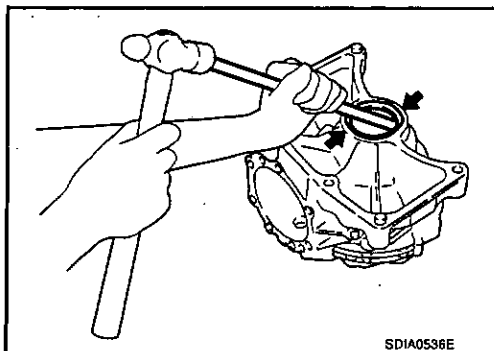
Disassembly

INFOID:000000006186972

1. Remove adapter case. Refer to DLN-54. "Disassembly".
  2. Remove gear ring assembly. Refer to DLN-58. "Disassembly".
  3. Remove drive pinion assembly. Refer to DLN-62. "Disassembly".
  4. Remove transfer case oil seal with a suitable tool.
- CAUTION:**  
Never damage transfer case.



5. Remove the oil defense.



6. Using a brass rod, tap the gear ring bearing adjusting shim (transfer case side) evenly from the 2 cutouts on the transfer case to remove the gear ring bearing adjusting shim (transfer case side) and gear ring bearing outer race (transfer case side).
  7. Remove air breather hose from transfer case.
- CAUTION:**  
Never damage air breather hose.
8. Remove air breather tube from transfer case.
  9. Remove the filler plug from the transfer case, and then remove each gasket.
  10. Remove plug from transfer case.

Assembly

INFOID:000000006186973

1. Select the gear ring bearing adjusting shim (transfer case side). Refer to DLN-65. "Adjustment".

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**TRANSFER CASE**

< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

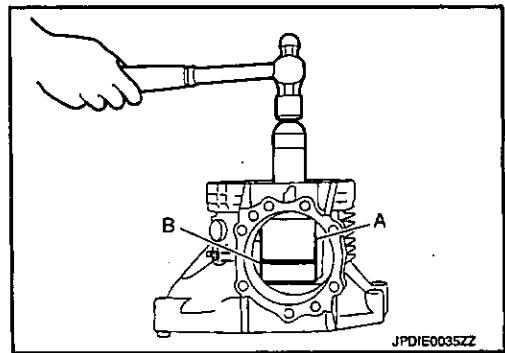
2. Install the selected gear ring bearing adjusting shim (transfer side) and gear ring bearing outer race (transfer side) to the transfer case with drifts.  
Apply gear oil to the drive pinion bearing (transfer side).

A : Drift (SST: ST30720000)

B : Drift (SST: KV40101840)

**CAUTION:**

- Never reuse drive pinion bearing (transfer side).



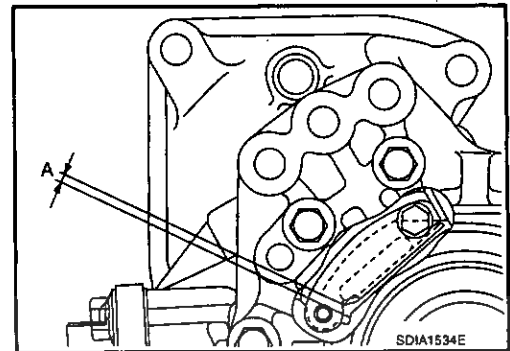
3. Install the oil defense, and tighten the mounting bolts to the specified torque. Refer to DLN-72, "Exploded View". The clearance (A) between the oil defense and transfer case should be the following.

Clearance between oil defense and transfer case

A : 1.0 - 3.5 mm (0.04 - 0.138 in)

**CAUTION:**

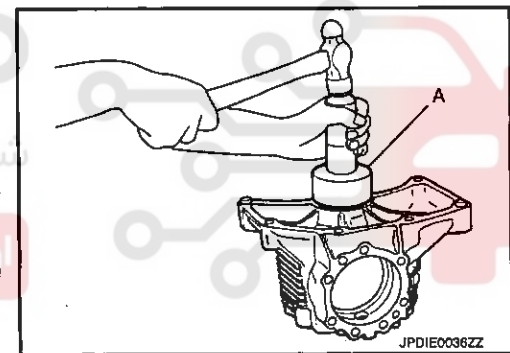
- Never reuse mounting bolts.



4. Install the transfer case oil seal until it becomes flush with the case end with drift (A) (SST: ST30720000).

**CAUTION:**

- When checking the total preload torque, measure it without the oil seal, then install the oil seal.
- Never reuse oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of the oil seal.



5. Apply sealant to filler plug and plug before installing them to the transfer case. Refer to DLN-61, "Exploded View".

6. Install breather tube to the transfer case.

**CAUTION:**

- Never reuse breather tube.

7. Install drive gear assembly. Refer to DLN-59, "Assembly".

8. Install adapter case. Refer to DLN-55, "Assembly".

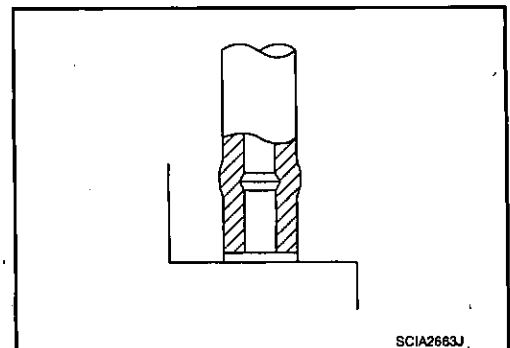
9. Install drive pinion assembly. Refer to DLN-63, "Assembly".

10. Install air breather hose.

**CAUTION:**

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

- Be sure to insert air breather hose into breather tube (metal connector) until hose end reaches the tube's base.



11. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-65, "Adjustment".

TRANSFER CASE

< DISASSEMBLY AND ASSEMBLY >

[TRANSFER: TY20A]

CAUTION:

Measure the total preload without the adapter case oil seals.

Inspection

INFOID:0000000006186974

Check items below. If necessary, replace them with new ones.

CASE

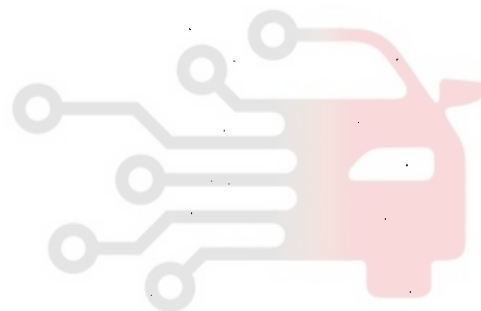
Check the bearing mounting surface for wear, cracks and damages.

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران





**SERVICE DATA AND SPECIFICATIONS (SDS)**

< SERVICE DATA AND SPECIFICATIONS (SDS)

[TRANSFER: TY20A]

**SERVICE DATA AND SPECIFICATIONS (SDS)**

**SERVICE DATA AND SPECIFICATIONS (SDS)**

**General Specifications**

INFOID:000000006186975

Applied model		4WD
		VQ35DE
		CVT
Transfer model		TY20A
Oil capacity (Approx.)	ℓ (Imp pt)	0.31 (1/2)
Gear ratio		0.404
Number of teeth	Ring gear	42
	Drive pinion	17

**Preload Torque**

INFOID:000000006186976

**BEFORE DISASSEMBLY**

Unit: N·m (kg·m, in·lb)

Item	Standard	
Drive pinion bearing preload (P1)	0.10 – 0.39 (0.01 – 0.03, 1.0 – 3.0)	
Total preload	With all oil seals	P1 + 0.16 – 0.22 (0.017 – 0.022, 1.5 – 1.9)
	Without adapter case oil seal	P1 + 0.06 – 0.12 (0.007 – 0.012, 0.6 – 1.0)

**AFTER DISASSEMBLY AND REASSEMBLY**

Unit: N·m (kg·m, in·lb)

Item	Standard	
Drive pinion bearing preload (P1)	0.55 – 0.99 (0.06 – 0.10, 5 – 8)	
Total preload	With all oil seals	P1 + 0.49 – 0.63 (0.05 – 0.06, 4.4 – 5.5)
	Without adapter case oil seal	P1 + 0.27 – 0.41 (0.03 – 0.04, 2.4 – 3.6)

**Backlash**

INFOID:000000006186977

Unit: mm (in)

Item	Standard
Ring gear to drive pinion	0.17 – 0.24 (0.0067 – 0.0094)

**Companion Flange Runout**

INFOID:000000006186978

Unit: mm (in)

Item	Limit
Companion flange face (inner side of the propeller shaft bolt holes)	0.15 (0.0059)
Inside of companion flange (socket diameter)	0.2 (0.008)

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

[REAR PROPELLER SHAFT: 3F63A-EDJ75]

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000006186979

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

Symptom	Noise	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
	Vibration	x	x	x	x	x	x	x	x		x	x		x	
Shake			x			x				x	x	x	x	x	x
Reference		DLN-78, "Inspection"	DLN-81, "Inspection"	-	DLN-81, "Inspection"	-	DLN-81, "Inspection"	DLN-78, "Inspection"	NVH in DLN section	NVH in FAX, RAX, FSU and RSU section	NVH in WT section	NVH in WT section	NVH in FAX and RAX section	NVH in BR section	NVH in ST section
Possible cause and SUSPECTED PARTS															

x: Applicable

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REAR PROPELLER SHAFT

< ON-VEHICLE MAINTENANCE >

[REAR PROPELLER SHAFT: 3F63A-EDJ75]

ON-VEHICLE MAINTENANCE

REAR PROPELLER SHAFT

Inspection

INFOID:000000006186980

NOISE

- Check the propeller shaft tube surface for dents or cracks. If damaged, replace propeller shaft assembly.
- If center bearing is noisy or damaged, replace 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.

Limit

Propeller shaft runout : Refer to DLN-82. "Propeller Shaft Runout".

2. If runout still exceeds specifications, separate propeller shaft at final drive companion flange or transfer companion flange; then rotate companion flange 90, 180, 270 degrees and install propeller shaft.
3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
4. Check the vibration by driving vehicle.



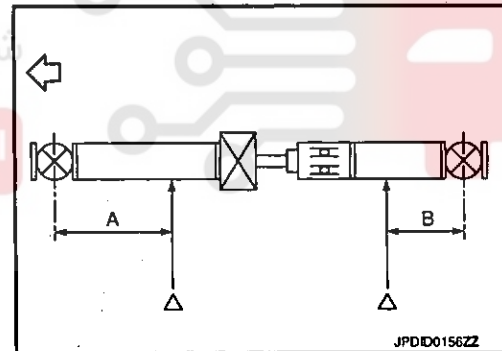
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RUNOUT MEASURING POINT

Propeller shaft runout measuring point (Point "Δ").

↔ : Vehicle front

Dimension A: 506.5 mm (19.94 in)  
B: 497.5 mm (19.59 in)



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REAR PROPELLER SHAFT

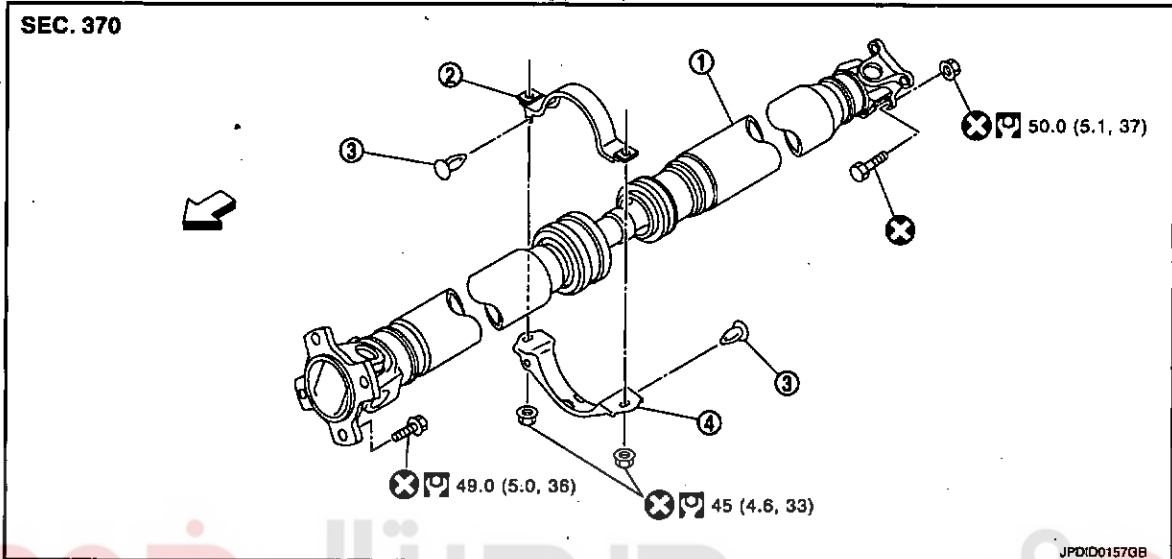
[REAR PROPELLER SHAFT: 3F63A-EDJ75]

< ON-VEHICLE REPAIR >

ON-VEHICLE REPAIR  
REAR PROPELLER SHAFT

Exploded View

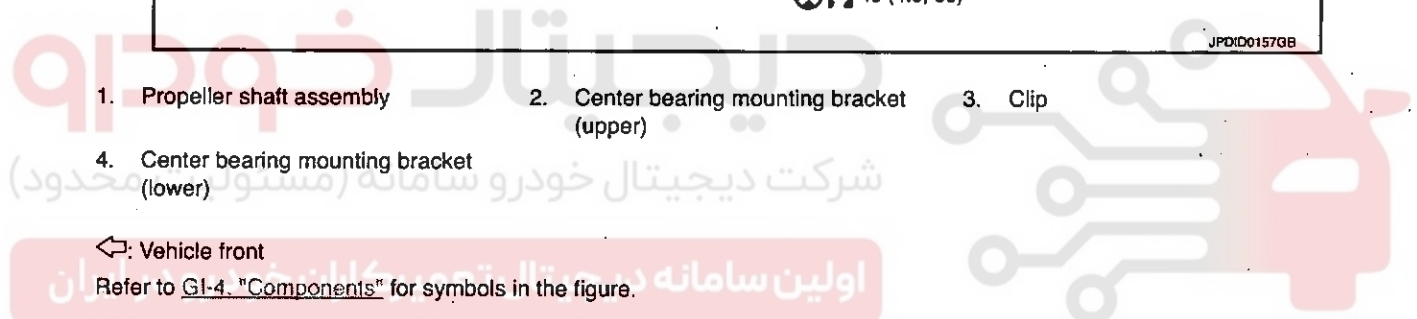
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- 1. Propeller shaft assembly
- 2. Center bearing mounting bracket (upper)
- 3. Clip
- 4. Center bearing mounting bracket (lower)

← Vehicle front

Refer to GI-4, "Components" for symbols in the figure.



Removal and Installation

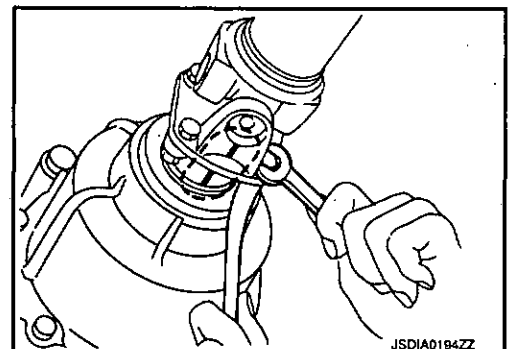
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REMOVAL

1. Shift the transaxle to the neutral position, and then release the parking brake.
2. Put matching marks onto propeller shaft flange yoke and final drive and transfer companion flanges.

**CAUTION:**

For matching marks, use paint. Never damage propeller shaft flange yoke and transfer companion flange.



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REAR PROPELLER SHAFT

[REAR PROPELLER SHAFT: 3F63A-EDJ75]

< ON-VEHICLE REPAIR >

- Loosen mounting nuts of center bearing mounting brackets (upper/lower).

↔ : Vehicle front

**CAUTION:**

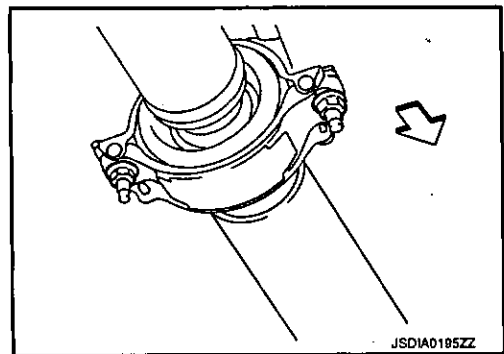
**Tighten mounting nuts temporarily.**

- Remove propeller shaft assembly fixing bolts and nuts.
- Remove center bearing mounting bracket fixing nuts.
- Remove propeller shaft assembly.

**CAUTION:**

**If constant velocity joint was bent during propeller shaft assembly removal, installation, or transportation, its boot may be damaged. Wrap boot interference area to metal part with shop cloth or rubber to protect boot from breakage.**

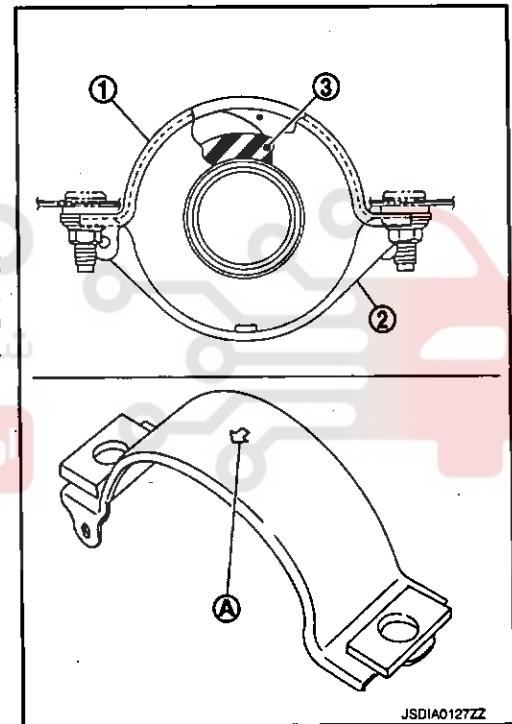
- Remove clips and center bearing mounting bracket (upper/lower).



INSTALLATION

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

- Install center bearing mounting bracket (upper) (1) with its arrow mark (A) facing forward.
- Adjust position of center bearing mounting bracket (upper), center bearing mounting bracket (lower) (2) sliding back and forth to prevent play in thrust direction of center bearing insulator (3). Install center bearing mounting bracket (upper/lower) to vehicle.
- Align matching marks to install propeller shaft assembly to final drive and transfer companion flanges.
- After assembly, perform a driving test to check propeller shaft vibration. If vibration occurred, separate propeller shaft from final drive. Reinstall companion flange after rotating it by 90, 180, 270 degrees. Then perform driving test and check propeller shaft vibration again at each point.

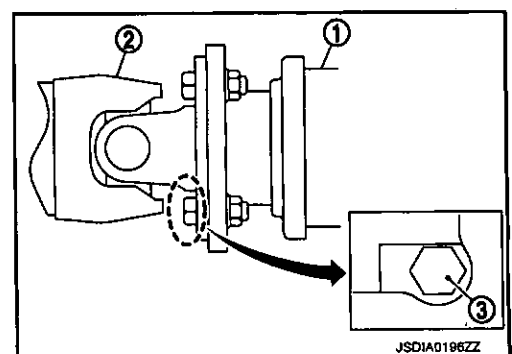


اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

- After tightening the bolts and nuts to the specified torque, make sure that the bolts (3) on the flange side is tightened as shown in the figure.

1 : Final drive assembly

2 : Propeller shaft assembly



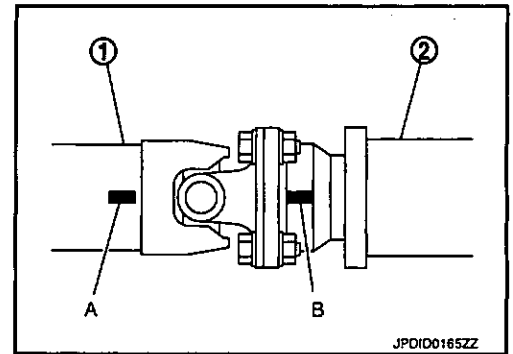
- If propeller shaft assembly or final drive assembly has been replaced, connect them as follows:

**REAR PROPELLER SHAFT**

[REAR PROPELLER SHAFT: 3F63A-EDJ75]

< ON-VEHICLE REPAIR >

- Install propeller shaft (1) while aligning its matching mark (A) with the matching mark (B) of the final drive (2) on the joint as close as possible.
- Tighten mounting bolts and nuts of propeller shaft and final drive to the specified torque.



INFOID:000000006186983

**Inspection**

**APPEARANCE**

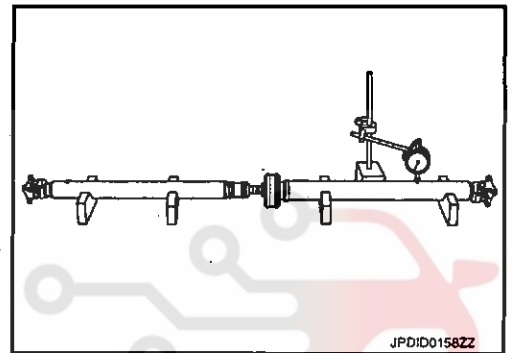
Check propeller shaft for bend and damage. If damage is detected, replace propeller shaft assembly.

**PROPELLER SHAFT RUNOUT**

Check propeller shaft runout at measuring points with a dial indicator. If runout exceeds specifications, replace propeller shaft assembly. For measuring point, refer to DLN-78, "Inspection".

**Limit**

**Propeller shaft runout** : Refer to DLN-82, "Propeller Shaft Runout".

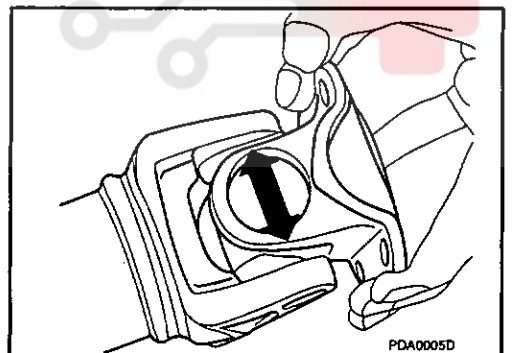


**JOURNAL AXIAL PLAY**

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.

**Standard**

**Journal axial play** : Refer to DLN-82, "Journal Axial Play".



**CAUTION:**

**Never disassemble joints.**

**CENTER BEARING**

Check center bearing for noise and damage. If noise or damage is detected, replace propeller shaft assembly.

**CAUTION:**

**Never disassemble center bearing.**

**SERVICE DATA AND SPECIFICATIONS (SDS)**

< SERVICE DATA AND SPECIFICATIONS (SDS)

[REAR PROPELLER SHAFT: 3F63A-EDJ75]

**SERVICE DATA AND SPECIFICATIONS (SDS)**

**SERVICE DATA AND SPECIFICATIONS (SDS)**

**General Specifications**

INFOID:000000006186984

Applied model		4WD
		VQ35DE
		CVT
Propeller shaft model		3F63A-EDJ75
Number of joints		3
Type of journal bearings (Non-disassembly type)	1st joint	Shell type
	2nd joint	EDJ type
	3rd joint	Shell type
Coupling method with transfer		Flange type
Coupling method with rear final drive		Flange type
Shaft length	1st (Spider to EDJ joint center)	1142 mm (44.96 in)
	2nd (EDJ joint center to spider)	987 mm (38.86 in)
Shaft outer diameter	1st	63.5 mm (2.500 in)
	2nd	75 mm (2.95 in)

**Propeller Shaft Runout**

INFOID:000000006186985

Unit: mm (in)

Item	Limit
Propeller shaft runout	0.8 (0.031)

**Journal Axial Play**

INFOID:000000006186986

Unit: mm (in)

Item	Standard
Journal axial play	.0 (0)





## PRECAUTIONS

&lt; PRECAUTION &gt;

[REAR FINAL DRIVE: R145]

## PRECAUTION

## PRECAUTIONS

## Service Notice or Precautions for Rear Final Drive

INFOID:0000000005186988

- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts when applied.
- Overhaul should be done in a clean work area, it is preferable to work in dustproof area.
- Before disassembly, using steam or white gasoline, completely remove sand and mud from the exterior of the unit, preventing them from entering into the unit during disassembly or assembly.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new one 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.
- Never damage sliding surfaces and mating surfaces.
- When applying sealant, remove the old sealant from the mounting surface; then remove any moisture, oil, and foreign materials from the application and mounting surfaces.
- Always use shop paper for cleaning the inside of components.
- Avoid using cotton gloves or shop rags to prevent entering of lint.
- During assembly, observe the specified tightening torque, and apply new gear oil, petroleum jelly, or multi-purpose grease as specified for each vehicle, if necessary.

دیجیتال خودرو

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PREPARATION

< PREPARATION >

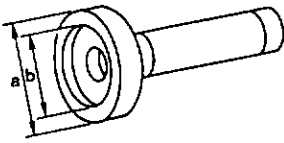
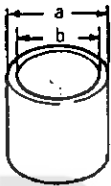

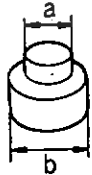
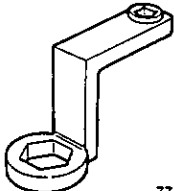
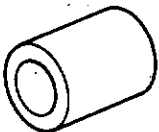
[REAR FINAL DRIVE: R145]

PREPARATION

PREPARATION

Special Service Tools

INFOID:000000006186989

Tool number Tool name	Description
KV38100200 Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.	 ZZA1143D <ul style="list-style-type: none"> <li>Installing front oil seal</li> <li>Installing side oil seal</li> </ul>
ST27861000 Drift a: 62 mm (2.44 in) dia. b: 52 mm (2.05 in) dia.	 ZZA0632D Installing front oil seal
ST35271000 Drift a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.	 ZZA0814D Installing center oil seal
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.	 ZZA1023D Removing side bearing inner race
KV38108400 Pinion nut wrench	 ZZA1206D Removing and installing drive pinion nut
KV38108500 Drive pinion socket	 ZZA1205D <ul style="list-style-type: none"> <li>Removing and installing drive pinion nut</li> <li>Measuring preload torque</li> </ul>

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PREPARATION

< PREPARATION >

[REAR FINAL DRIVE: R145]

Tool number Tool name	Description
ST17130000 Drift a: 31.8 mm (1.252 in) dia. b: 58 mm (2.28 in) dia.	Installing pinion rear bearing outer race
ST33230000 Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.	Installing pinion front bearing outer race
ST23860000 Drift a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.	<ul style="list-style-type: none"> <li>Installing pinion rear bearing inner race</li> <li>Installing pinion front bearing inner race</li> </ul>
ST3127S000 Preload gauge	Measuring preload torque
KV381086S1 Dummy cover set 1. KV38108610 Dummy cover 2. KV38108621 Dummy cover spacer 3. KV38108630 Dummy cover shim	<ul style="list-style-type: none"> <li>Checking backlash</li> <li>Checking drive gear runout</li> <li>Checking tooth contact</li> </ul>

Commercial Service Tools

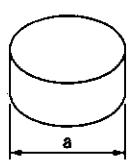
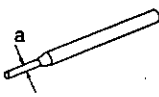
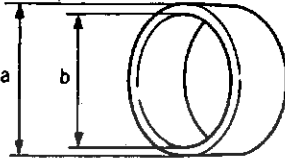
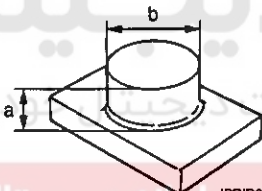
INFOID:000000006186990

Tool name	Description
Flange wrench	Removing and installing companion flange lock nut

PREPARATION

< PREPARATION >

[REAR FINAL DRIVE: R145]

<p>Drift a: 54.5 mm (2.146 in) dia.</p>  <p>PDA0893E</p>	<p>Removing and installing gear carrier and rear cover (2 pieces are used)</p>	<p>A B C</p>
<p>Pin punch a: 4.5 mm (0.177 in) dia.</p>  <p>NT410</p>	<p>Removing and installing lock pin</p>	<p>DLN E</p>
<p>Drift a: 39.7 mm (1.563 in) dia. b: 35 mm (1.38 in) dia.</p>  <p>ZZA0896D</p>	<p>Installing side bearing inner race</p>	<p>F G</p>
<p>Stand a: Approx. 60 mm (2.36 in) b: Approx. 90 mm (3.54 in) dia</p>  <p>JPDID0011ZZ</p>	<p>Installing pinion front bearing inner race</p>	<p>H I J K L M N O P</p>

REAR FINAL DRIVE ASSEMBLY

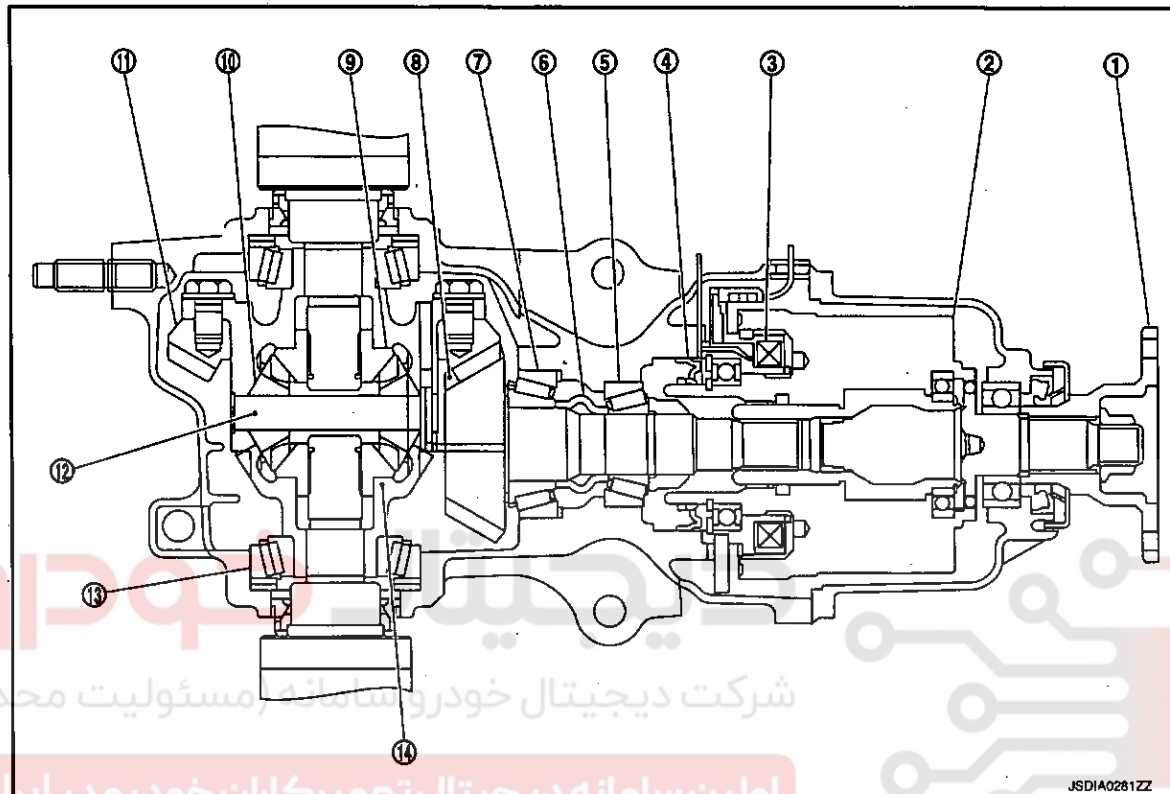
< FUNCTION DIAGNOSIS >

[REAR FINAL DRIVE: R145]

FUNCTION DIAGNOSIS  
REAR FINAL DRIVE ASSEMBLY

System Diagram

INFOID:000000008166991



JSDIA0281ZZ

- |                        |                                 |                       |
|------------------------|---------------------------------|-----------------------|
| 1. Companion flange    | 2. Electric controlled coupling | 3. 4WD solenoid       |
| 4. Center oil seal     | 5. Pinion front bearing         | 6. Collapsible spacer |
| 7. Pinion rear bearing | 8. Drive pinion                 | 9. Side gear          |
| 10. Pinion mate gear   | 11. Drive gear                  | 12. Pinion mate shaft |
| 13. Side bearing       | 14. Differential case           |                       |

REAR DIFFERENTIAL GEAR OIL

< ON-VEHICLE MAINTENANCE >

[REAR FINAL DRIVE: R145]

ON-VEHICLE MAINTENANCE  
REAR DIFFERENTIAL GEAR OIL

Inspection

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.

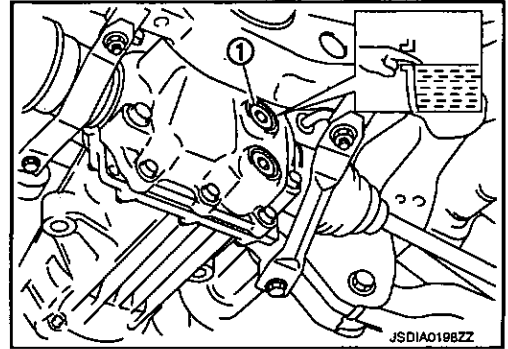
**CAUTION:**

**Never start engine while checking oil level.**

- Set a new gasket on filler plug and install it on final drive assembly. Refer to DLN-100, "Exploded View".

**CAUTION:**

**Never reuse gasket.**



INFOID:000000006186992

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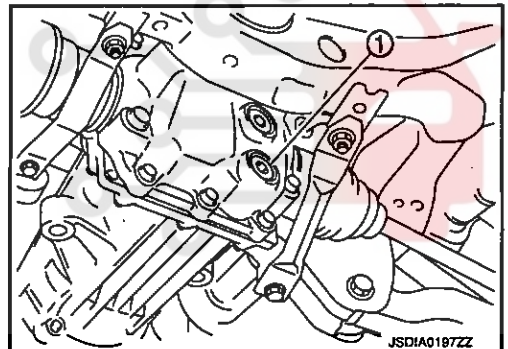
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Draining

1. Stop engine.
2. Remove drain plug (1) and drain gear oil.
3. Set a new gasket on drain plug and install it to final drive assembly and tighten to the specified torque. Refer to DLN-100, "Exploded View".

**CAUTION:**

**Never reuse gasket.**



Refilling

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

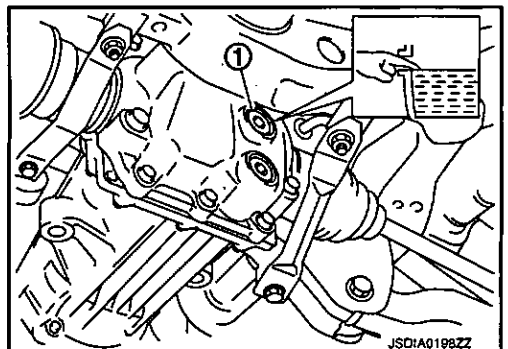
**Oil grade and viscosity** : Refer to MA-8, "Fluids and Lubricants".

**Oil capacity** : Refer to DLN-122, "General Specification".

2. After refilling oil, check oil level. Set a new gasket to filler plug, then install it to final drive assembly. Refer to DLN-100, "Exploded View".

**CAUTION:**

**Never reuse gasket.**



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FRONT OIL SEAL

< ON-VEHICLE REPAIR >

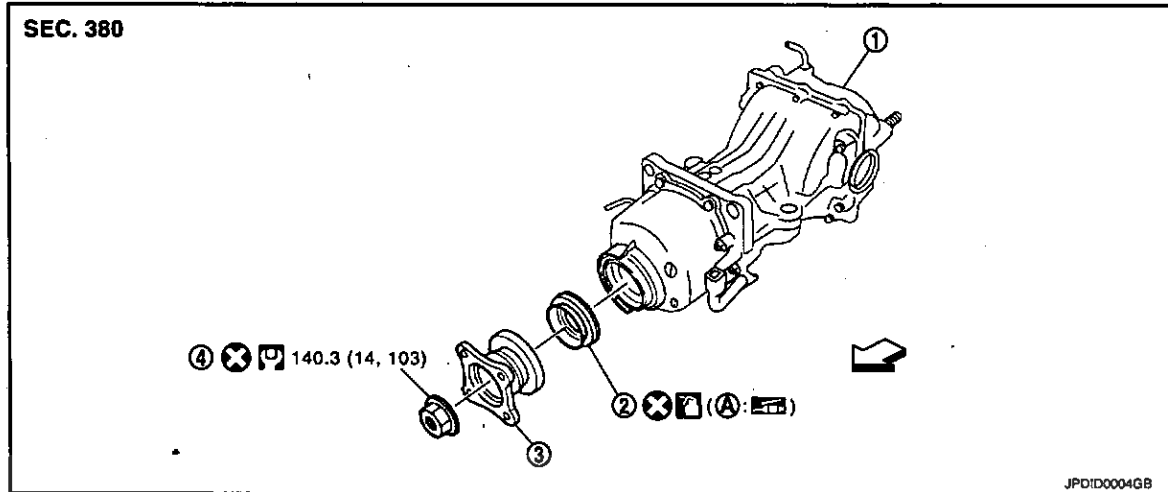
[REAR FINAL DRIVE: R145]

ON-VEHICLE REPAIR

FRONT OIL SEAL

Exploded View

INFOID:000000006186995



- 1. Final drive assembly
- 2. Front oil seal
- 3. Companion flange
- 4. Companion flange lock nut
- A: Oil seal lip

↔: Vehicle front

☑: Apply gear oil.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

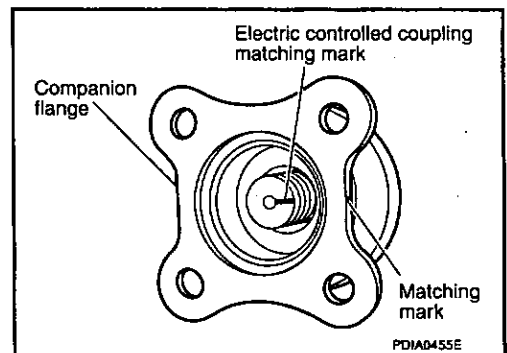
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REMOVAL

1. Remove rear propeller shaft. Refer to DLN-79, "Exploded View".
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on companion flange.

**CAUTION:**

**For matching mark, use paint. Never damage electric controlled coupling.**

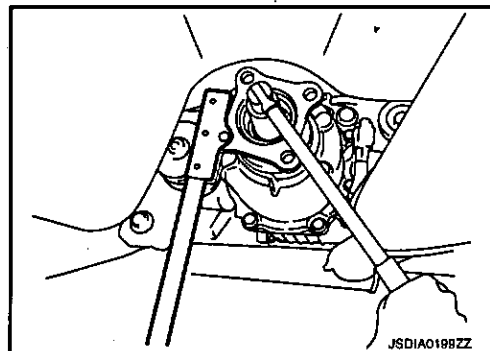


FRONT OIL SEAL

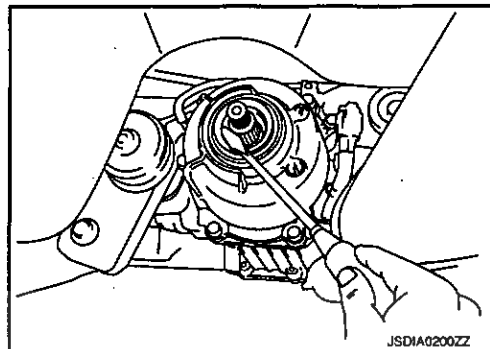
< ON-VEHICLE REPAIR >

[REAR FINAL DRIVE: R145]

- Remove companion flange lock nut, using a flange wrench (commercial service tool). Then remove companion flange.



- Remove front oil seal from coupling cover with a suitable tool.  
**CAUTION:**  
Never damage coupling cover.



INSTALLATION

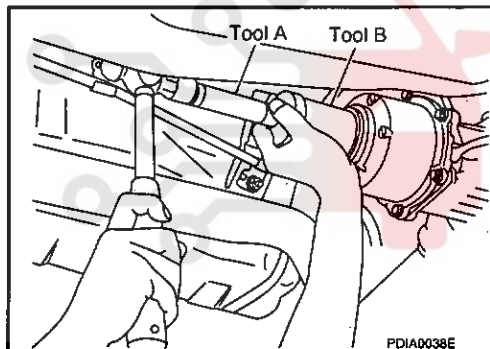
- Install front oil seal until it becomes flush with the coupling cover end, using the drifts.

A : Drift (SST: KV38100200)

B : Drift (SST: ST27861000)

**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.

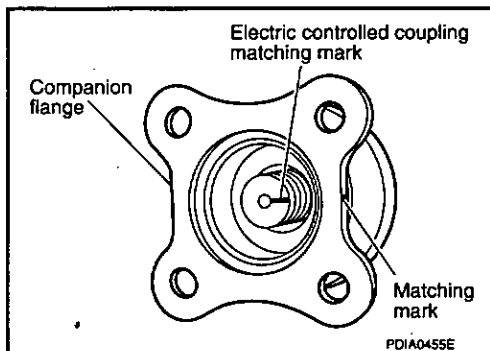


- Align the matching mark of electric controlled coupling with the matching mark of companion flange, then install the companion flange.
- Install companion flange lock nut with a flange wrench (commercial service tool), tighten to the specified torque.

**CAUTION:**

Never reuse companion flange lock nut.

- Install rear propeller shaft. Refer to DLN-79. "Exploded View".
- When oil leaks while removing, check oil level after the installation. Refer to DLN-89. "Inspection".



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SIDE OIL SEAL

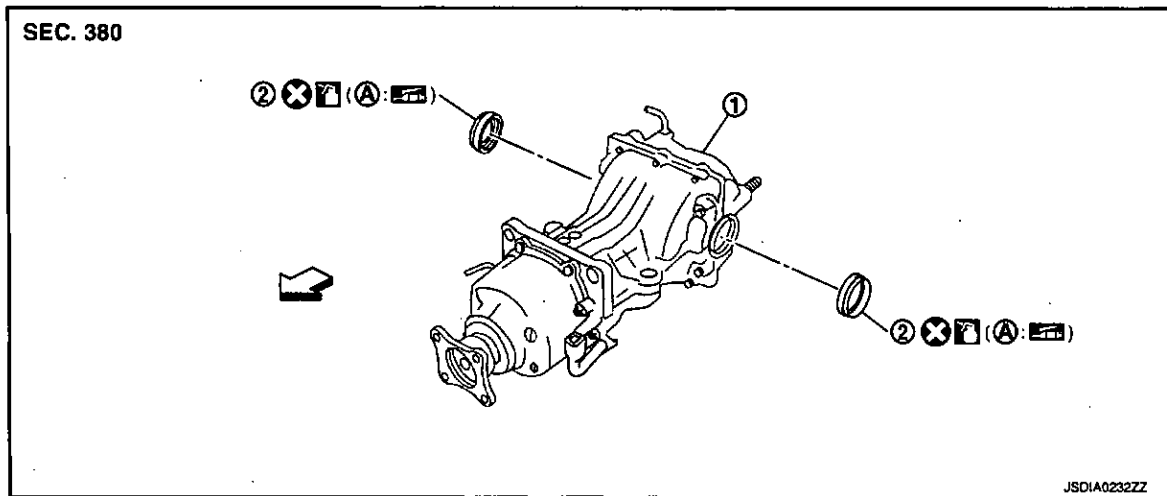
< ON-VEHICLE REPAIR >

[REAR FINAL DRIVE: R145]

SIDE OIL SEAL

Exploded View

INFOID:000000006186997



- 1. Final drive assembly
- 2. Side oil seal
- A: Oil seal lip

←: Vehicle front

☐: Apply gear oil.

Refer to GI-4, "Components" for symbols not described on the above.

Removal and Installation

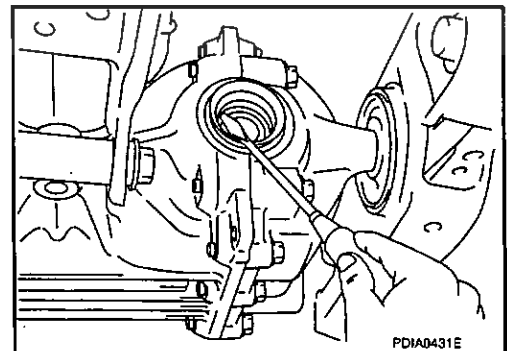
INFOID:000000006186998

REMOVAL اولین سامانه دیجیتال تعمیرکاران خودرو

1. Remove rear drive shafts. Refer to RAX-8, "Exploded View".
2. Remove side oil seals with a suitable tool.

**CAUTION:**

**Never damage gear carrier and rear cover.**



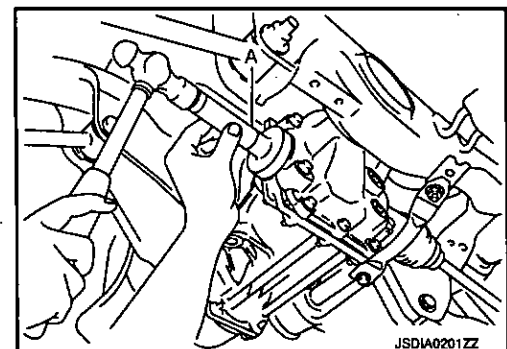
INSTALLATION

1. Install side oil seals until it becomes flush with the carrier end, using the drift (A) (SST: KV38100200).

**CAUTION:**

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

2. Install rear drive shafts. Refer to RAX-8, "Exploded View".
3. When oil leaks while removing, check oil level after the installation. Refer to DLN-89, "Inspection".



ELECTRIC CONTROLLED COUPLING

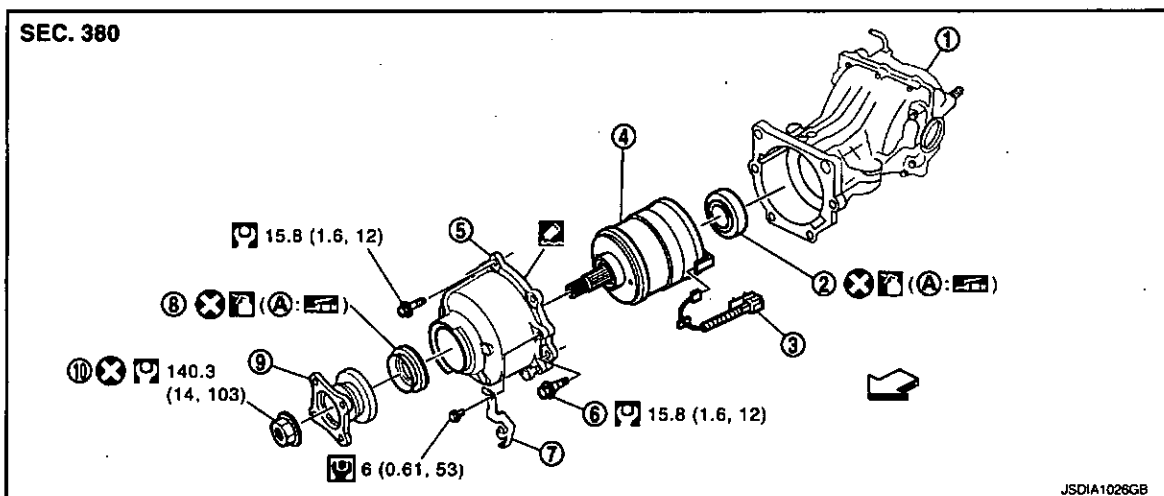
< ON-VEHICLE REPAIR >

[REAR FINAL DRIVE: R145]

ELECTRIC CONTROLLED COUPLING

Exploded View

INFOID:000000006186999



- |                                 |                    |                         |
|---------------------------------|--------------------|-------------------------|
| 1. Final drive assembly         | 2. Center oil seal | 3. 4WD solenoid harness |
| 4. Electric controlled coupling | 5. Coupling cover  | 6. Reamer bolt          |
| 7. Connector bracket            | 8. Front oil seal  | 9. Companion flange     |
| 10. Companion flange lock nut   |                    |                         |
- A: Oil seal lip

←: Vehicle front

: Apply gear oil.

: Apply Genuine Liquid Gasket, Three Bond 1217 or equivalent.

Refer to GI-4 "Components" for symbols not described on the above.

Removal and Installation

INFOID:000000006187000

REMOVAL

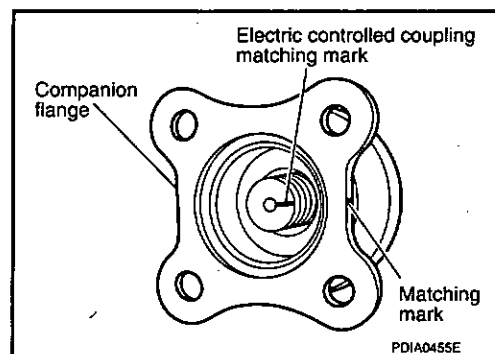
1. Remove rear propeller shaft. Refer to DLN-79, "Exploded View".
2. Disconnect 4WD solenoid harness connector.
3. Remove connector bracket.
4. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on the companion flange.

**CAUTION:**

**For matching mark, use paint. Never damage electric controlled coupling.**

**NOTE:**

When replacing electric controlled coupling, matching mark is not necessary.

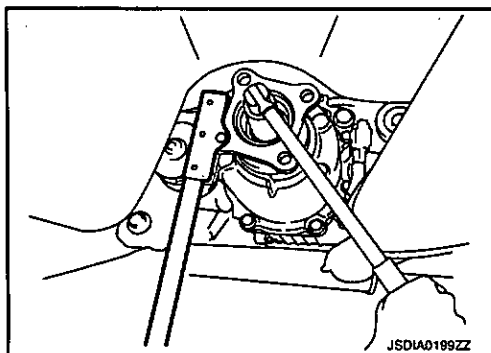


## ELECTRIC CONTROLLED COUPLING

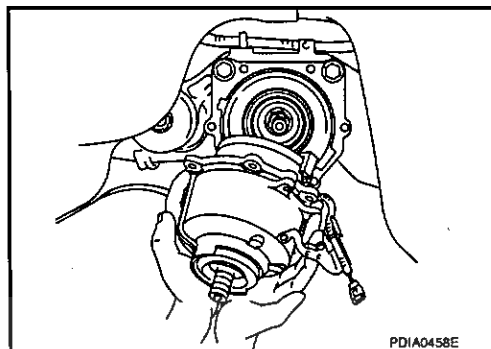
&lt; ON-VEHICLE REPAIR &gt;

[REAR FINAL DRIVE: R145]

5. Remove companion flange lock nut, using a flange wrench (commercial service tool).
6. Remove companion flange.
7. Remove electric controlled coupling breather hose from coupling cover.



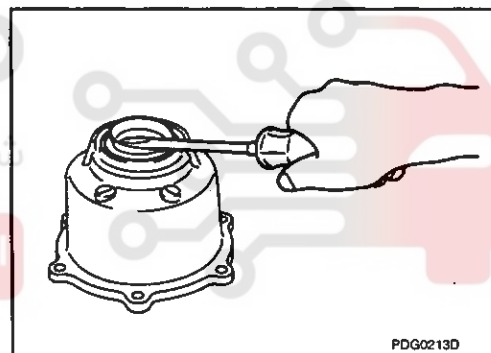
8. Remove coupling cover with electric controlled coupling from final drive assembly.
9. Remove electric controlled coupling from coupling cover.
10. Remove 4WD solenoid harness.



11. Remove front oil seal from coupling cover, using a flat-bladed screwdriver.

**CAUTION:****Never damage coupling cover.**

12. Remove center oil seal from final drive assembly.



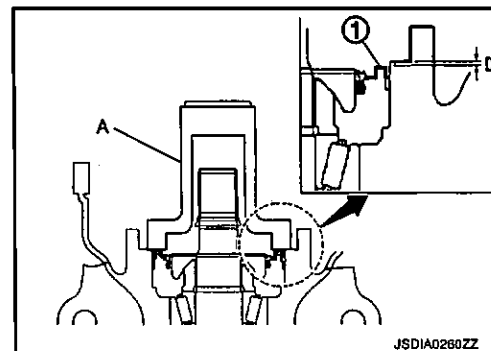
## INSTALLATION

1. Using the drift (A) (SST: ST35271000), install center oil seal (1) as shown in the figure.

Dimension "D" : 0.8 – 1.2 mm (0.031 – 0.047 in)

**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.



2. Connect 4WD solenoid harness to electric controlled coupling.

**ELECTRIC CONTROLLED COUPLING**

[REAR FINAL DRIVE: R145]

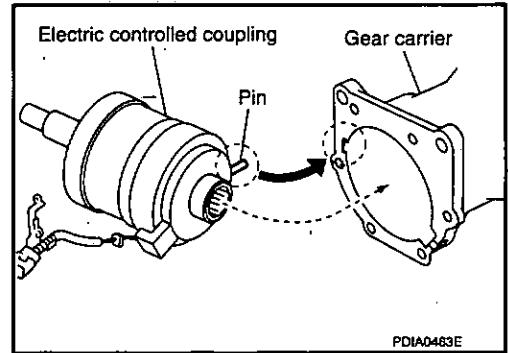
< ON-VEHICLE REPAIR >

3. Install electric controlled coupling to spline of drive pinion inside gear carrier.

**CAUTION:**

- Align the pin on electric controlled coupling with the groove of gear carrier.
- Never damage center oil seal.

4. Set 4WD solenoid harness guide to gear carrier.



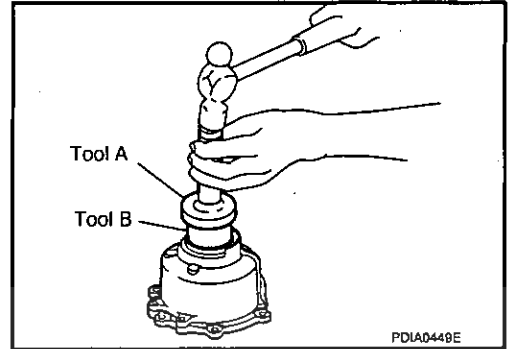
5. Using the drifts, drive front oil seal until it becomes flush with the coupling cover end.

A : Drift (SST: KV38100200)

B : Drift (SST: ST27861000)

**CAUTION:**

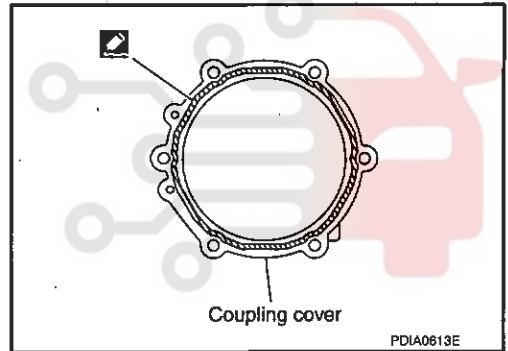
- Never reuse oil seal.
- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.



6. Apply liquid gasket to mating surface of coupling cover. Overlap both ends of the bead for at least 3 mm (0.12 in).

**CAUTION:**

- Remove old gasket adhering to the mounting surfaces.
- Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.



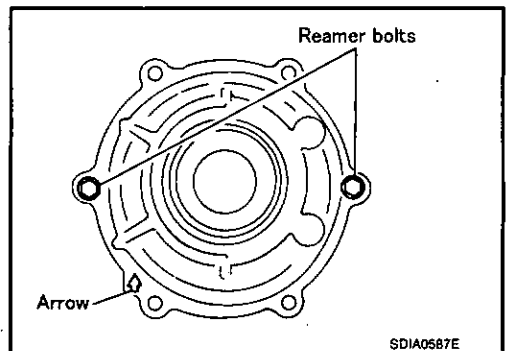
7. Install coupling cover to final drive assembly with arrow facing upward, temporarily tighten reamer bolts to the positions shown in the figure.

8. Tighten reamer bolts and coupling cover mounting bolts to the specified torque.

9. Install electric controlled coupling breather hose to coupling cover.

10. Install connector bracket, and tighten bolts to the specified torque.

11. Connect 4WD solenoid harness connector.



12. Install companion flange.

**NOTE:**

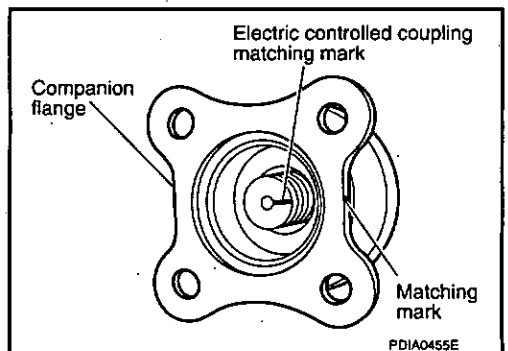
When reusing electric controlled coupling, align the matching mark of electric controlled coupling with the matching mark of companion flange, then install companion flange.

13. Install companion flange lock nut with flange wrench (commercial service tool), tighten to the specified torque.

**CAUTION:**

Never reuse companion flange lock nut.

14. Check companion flange runout. Refer to DLN-103, "Adjustment".



اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



ELECTRIC CONTROLLED COUPLING

< ON-VEHICLE REPAIR >

[REAR FINAL DRIVE: R145]

15. Install rear propeller shaft. Refer to DLN-79. "Exploded View".
16. When oil leaks while removing, check oil level after the installation. Refer to DLN-89. "Inspection".

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران





REAR FINAL DRIVE ASSEMBLY

< REMOVAL AND INSTALLATION >

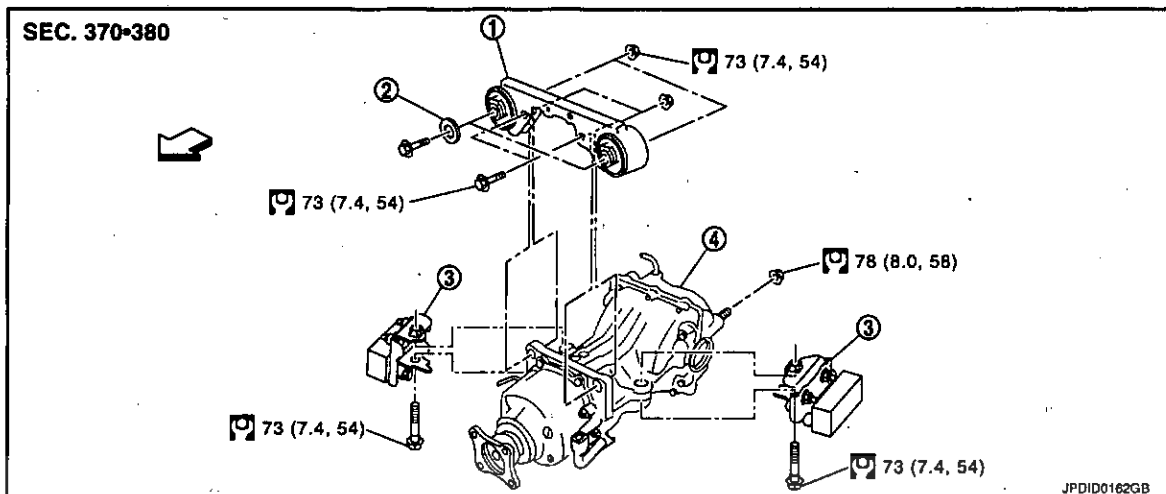
[REAR FINAL DRIVE: R145]

REMOVAL AND INSTALLATION

REAR FINAL DRIVE ASSEMBLY

Exploded View

INFOID:000000006187001



- 1. Final drive mounting bracket
- 2. Washer
- 3. Dynamic damper assembly
- 4. Final drive assembly

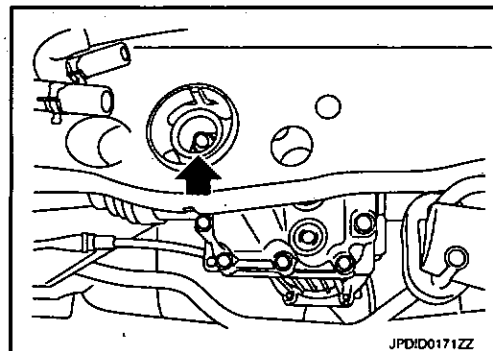
←: Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

REMOVAL

1. Remove rear propeller shaft. Refer to DLN-79, "Exploded View".
2. Remove stabilizer bar. Refer to RSU-14, "Exploded View".
3. Remove EVAP canister.
4. Disconnect rear drive shafts (final drive side). Refer to RAX-8, "Exploded View".
5. Disconnect 4WD solenoid harness connector.
6. Remove rear final drive breather hose and electric controlled coupling breather hose.
7. Support final drive assembly with a suitable jack.
8. Remove rear final drive mounting nut (←) at rear suspension member.

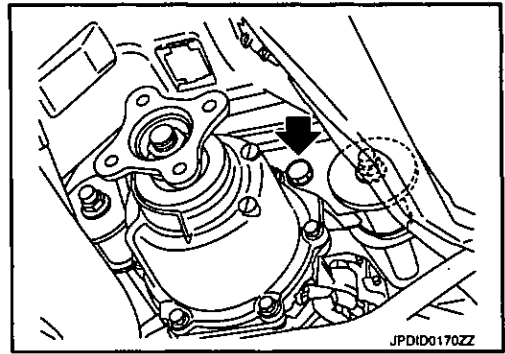


REAR FINAL DRIVE ASSEMBLY

[REAR FINAL DRIVE: R145]

< REMOVAL AND INSTALLATION >

9. Remove final drive mounting nuts and final drive mounting bolts. If necessary, remove final drive mounting bracket and washer.  
**CAUTION:**  
Secure final drive assembly to a suitable jack while removing it.
10. Remove dynamic damper assembly.

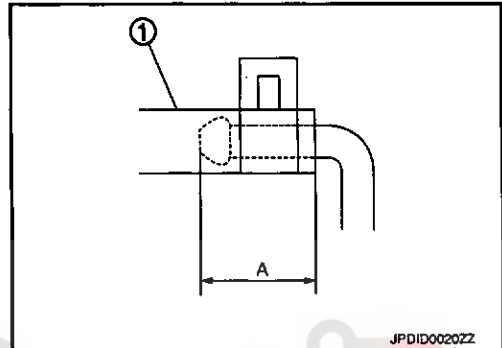


INSTALLATION

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

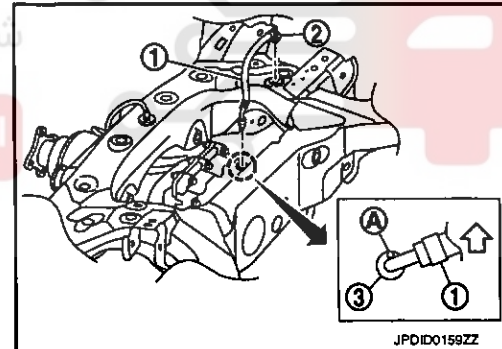
- Install the breather hose (1) to breather connector until dimension (A) shown as follows.

- A:**
- Final drive side : 20 mm (0.79 in)
  - Suspension member side : 20.7 mm (0.815 in)



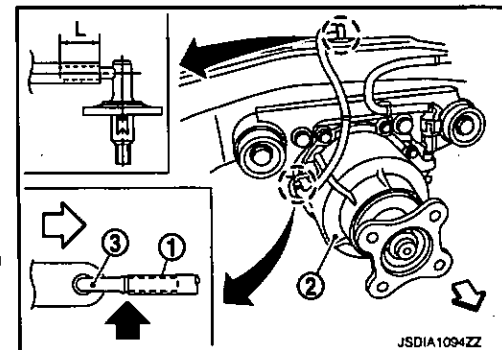
**CAUTION:**

- Never reuse hose clamp.
- Make sure there are no pinched or restricted areas on the breather hose caused by bending or winding when installing it.
- Install the hose clamp at the final drive side, with the tab facing to the vehicle front.
- Install the hose clamp at the suspension member side, with the tab facing down ward.
- If remove breather connector (2) and metal connector (3), install breather hose (1), breather connector and metal connector as shown in the figure.
- For installation, insert breather connector into the square hole of rear suspension. Install metal connector to rear cover with aiming painted marking to the front of vehicle.



← : Vehicle front

- Install the electric controlled coupling breather hose (1) as shown in the figure.
- Install electric controlled coupling breather hose at the coupling side to the metal tube (3) of the coupling cover (2) all the way to the point shown by the solid arrow (←).



← : Vehicle front

- Install electric controlled coupling breather hose at the suspension member side until dimension (L) shown as follows.

**L** : 15 mm

- Install the hose clip at the position 152 mm from breather hose end on the breather connector side.

**CAUTION:**

- Make sure there are no pinched or restricted areas on the breather hose caused by bending or winding when installing it.
- Make sure that insert hose clip into the hole of final drive mounting bracket.

## REAR FINAL DRIVE ASSEMBLY

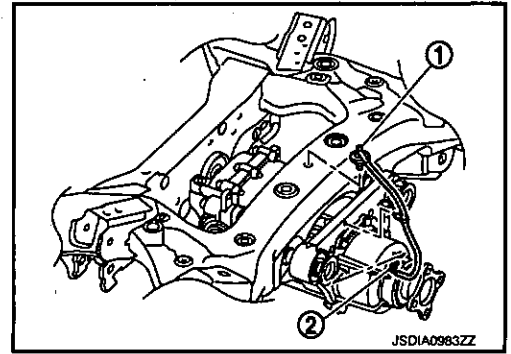
## &lt; REMOVAL AND INSTALLATION &gt;

[REAR FINAL DRIVE: R145]

- If remove breather connector of the electric controlled coupling (1) and metal tube (2), install them as shown in the figure.
- Install the breather connector at the insertion side to the suspension member, facing to the vehicle front.
- Install the metal tube to the coupling cover, facing to the vehicle front.

**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-89, "Inspection".



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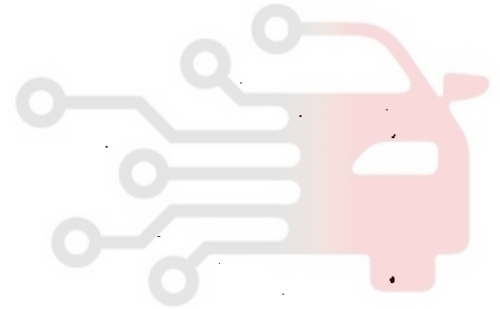
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P

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



ELECTRIC CONTROLLED COUPLING

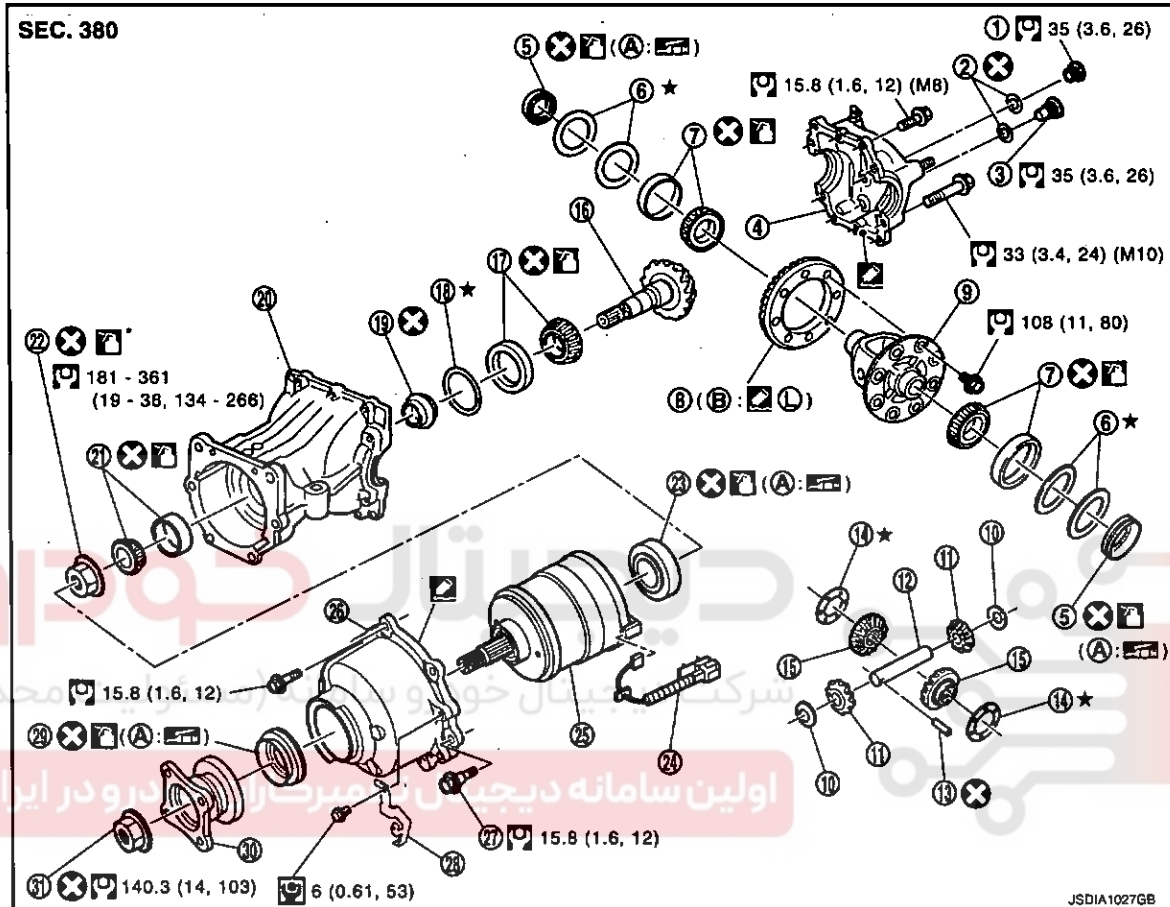
< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

DISASSEMBLY AND ASSEMBLY  
ELECTRIC CONTROLLED COUPLING

Exploded View

INFOID:000000006187003



- |                                  |                             |                                 |
|----------------------------------|-----------------------------|---------------------------------|
| 1. Filler plug                   | 2. Gasket                   | 3. Drain plug                   |
| 4. Rear cover                    | 5. Side oil seal            | 6. Side bearing adjusting shim  |
| 7. Side bearing                  | 8. Drive gear               | 9. Differential case            |
| 10. Pinion mate thrust washer    | 11. Pinion mate gear        | 12. Pinion mate shaft           |
| 13. Lock pin                     | 14. Side gear thrust washer | 15. Side gear                   |
| 16. Drive pinion                 | 17. Pinion rear bearing     | 18. Drive pinion adjusting shim |
| 19. Collapsible spacer           | 20. Gear carrier            | 21. Pinion front bearing        |
| 22. Drive pinion nut             | 23. Center oil seal         | 24. 4WD solenoid harness        |
| 25. Electric controlled coupling | 26. Coupling cover          | 27. Reamer bolt                 |
| 28. Connector bracket            | 29. Front oil seal          | 30. Companion flange            |
| 31. Companion flange lock nut    |                             |                                 |

A: Oil seal lip  
B: Screw hole

: Apply gear oil.

: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond 1217 or equivalent.

: Apply Genuine Medium Strength Thread Locking Sealant, Three Bond 1322B or equivalent.

Refer to GI-4. "Components" for symbols not described on the above.

**ELECTRIC CONTROLLED COUPLING**

[REAR FINAL DRIVE: R145]

< DISASSEMBLY AND ASSEMBLY >

**Disassembly**

INFOID:000000006187004

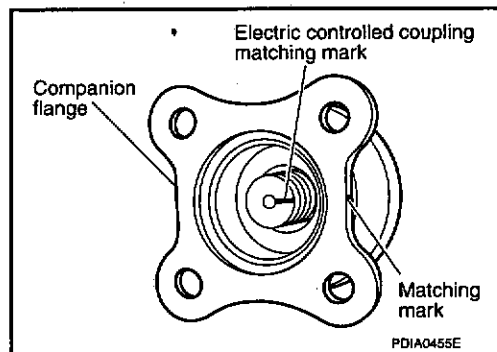
1. Remove connector bracket.
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on companion flange.

**CAUTION:**

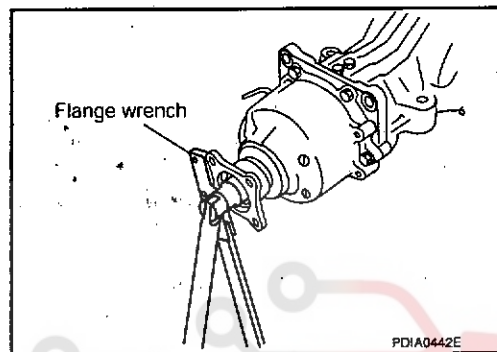
**For matching mark, use paint. Never damage electric controlled coupling.**

**NOTE:**

When replacing electric controlled coupling, matching mark is not necessary.



3. Remove companion flange lock nut, using a flange wrench (commercial service tool).
4. Remove companion flange.
5. Remove coupling cover.

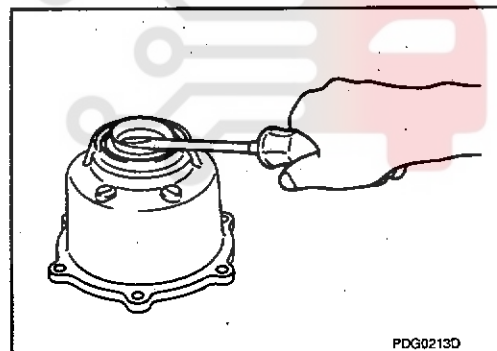


6. Remove front oil seal from coupling cover with a suitable tool.

**CAUTION:**

**Never damage coupling cover.**

7. Remove electric controlled coupling.
8. Remove 4WD solenoid harness.
9. Remove center oil seal from gear carrier.



**Assembly**

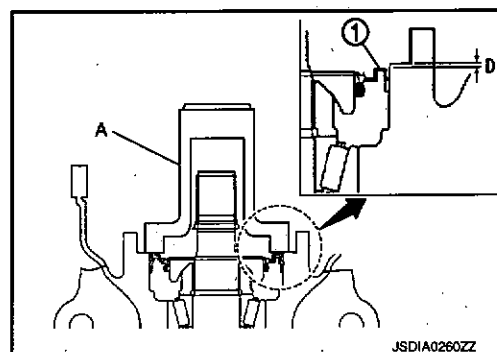
INFOID:000000006187005

1. Using the drift (A) (SST: ST35271000), install center oil seal (1) as shown in the figure.

Dimension "D" : 0.8 – 1.2 mm (0.031 – 0.047 in)

**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.



2. Connect 4WD solenoid harness to electric controlled coupling.



**ELECTRIC CONTROLLED COUPLING**

< DISASSEMBLY AND ASSEMBLY >

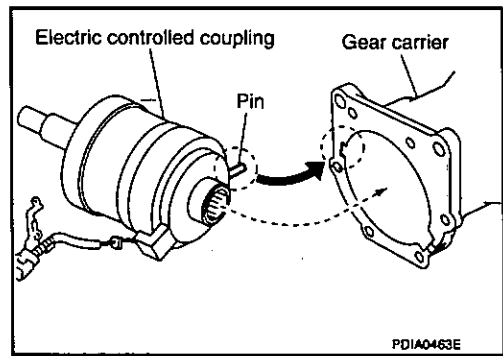
[REAR FINAL DRIVE: R145]

3. Install electric controlled coupling to spline of drive pinion inside gear carrier.

**CAUTION:**

- Align the pin on electric controlled coupling with the groove of gear carrier.
- Never damage center oil seal.

4. Set 4WD solenoid harness guide to gear carrier.



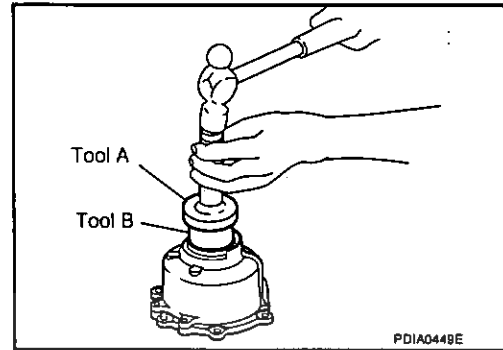
5. Using the drifts, drive front oil seal until it becomes flush with the coupling cover end.

A : Drift (SST: KV38100200)

B : Drift (SST: ST27861000)

**CAUTION:**

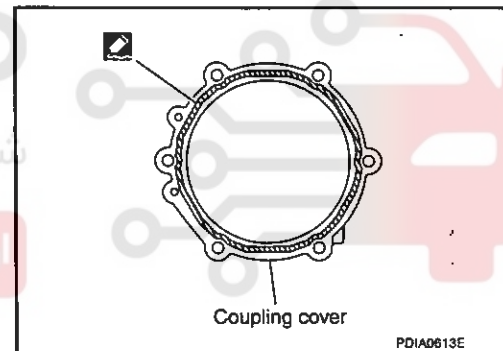
- Never reuse oil seal.
- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.



6. Apply liquid gasket to mating surface of coupling cover. Overlap both ends of the bead for at least 3 mm (0.12 in).

**CAUTION:**

- Remove old gasket adhering to the mounting surfaces.
- Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.

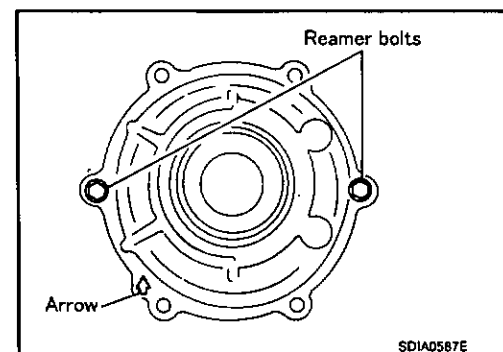


اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

7. Install coupling cover to gear carrier with arrow facing upward, temporarily tighten reamer bolts to the positions shown in the figure.

8. Tighten reamer bolts and coupling cover mounting bolts to the specified torque.

9. Install connector bracket, and tighten bolts to the specified torque.



10. Install companion flange.

**NOTE:**

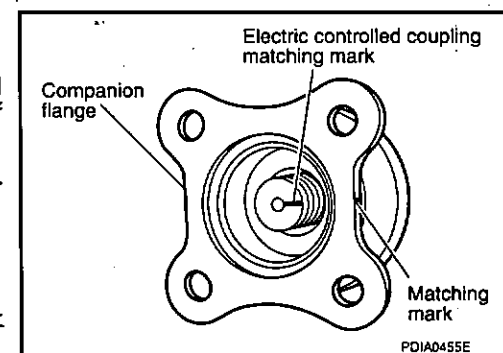
When reusing electric controlled coupling, align the matching mark of electric controlled coupling with the matching mark of companion flange, then install companion flange.

11. Install companion flange lock nut with flange wrench (commercial service tool), tighten to the specified torque.

**CAUTION:**

Never reuse companion flange lock nut.

12. Check companion flange runout. Refer to DLN-103. "Adjustment".



## ELECTRIC CONTROLLED COUPLING

&lt; DISASSEMBLY AND ASSEMBLY &gt;

[REAR FINAL DRIVE: R145]

## Adjustment

INFO/D:000000006187006

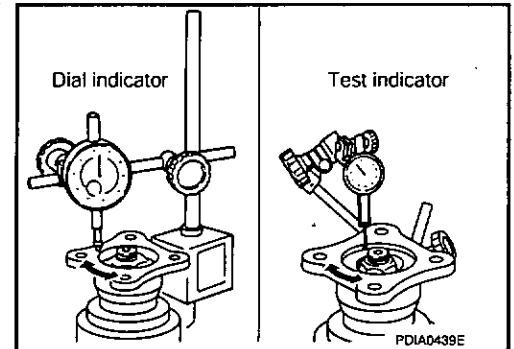
## COMPANION FLANGE RUNOUT

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

## Limit

Companion flange runout : Refer to DLN-122, "Companion Flange Runout".

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



## Limit

Companion flange runout : Refer to DLN-122, "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, replace companion flange.
  - c. If the runout value is still outside of the limit after companion flange has been replaced, possible cause will be an assembly malfunction of drive pinion and electric controlled coupling, malfunctioning coupling bearing, or malfunctioning of electric controlled coupling.

## Inspection After Disassembly

INFO/D:000000006187007

## 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.



**ELECTRIC CONTROLLED COUPLING**

< DISASSEMBLY AND ASSEMBLY >

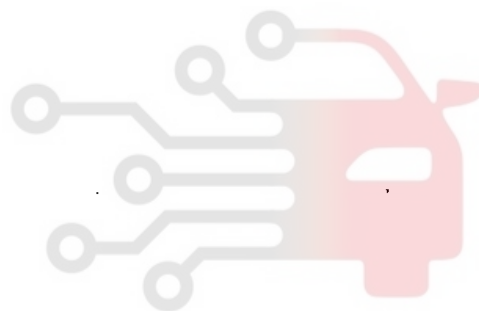
[REAR FINAL DRIVE: R145]

- 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.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



DIFFERENTIAL ASSEMBLY

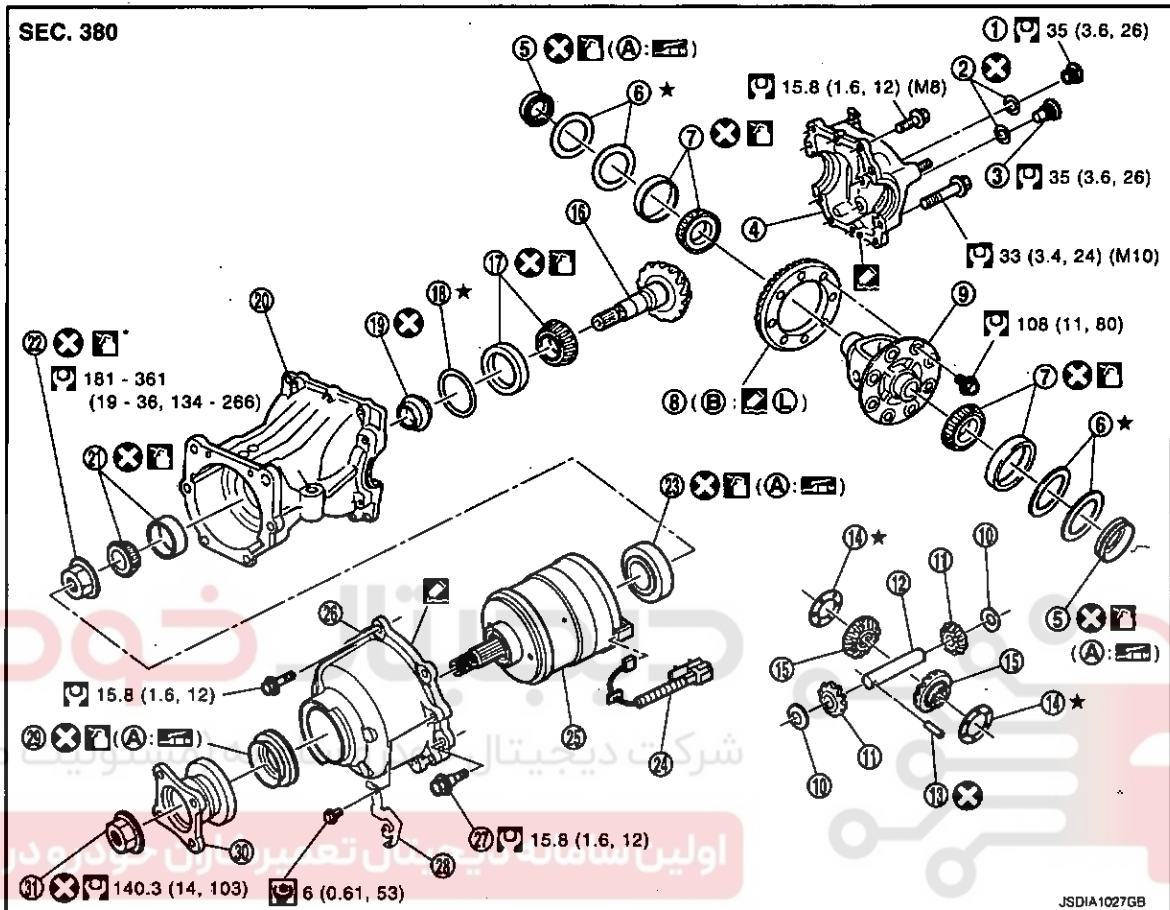
< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

DIFFERENTIAL ASSEMBLY

Exploded View

INFO/D.000000006187008



- |                                  |                             |                                 |
|----------------------------------|-----------------------------|---------------------------------|
| 1. Filler plug                   | 2. Gasket                   | 3. Drain plug                   |
| 4. Rear cover                    | 5. Side oil seal            | 6. Side bearing adjusting shim  |
| 7. Side bearing                  | 8. Drive gear               | 9. Differential case            |
| 10. Pinion mate thrust washer    | 11. Pinion mate gear        | 12. Pinion mate shaft           |
| 13. Lock pin                     | 14. Side gear thrust washer | 15. Side gear                   |
| 16. Drive pinion                 | 17. Pinion rear bearing     | 18. Drive pinion adjusting shim |
| 19. Collapsible spacer           | 20. Gear carrier            | 21. Pinion front bearing        |
| 22. Drive pinion nut             | 23. Center oil seal         | 24. 4WD solenoid harness        |
| 25. Electric controlled coupling | 26. Coupling cover          | 27. Reamer bolt                 |
| 28. Connector bracket            | 29. Front oil seal          | 30. Companion flange            |
| 31. Companion flange lock nut    |                             |                                 |

A: Oil seal lip  
B: Screw hole

: Apply gear oil.

\*: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond 1217 or equivalent.

: Apply Genuine Medium Strength Thread Locking Sealant, Three Bond 1322B or equivalent.

Refer to GI-4: "Components" for symbols not described on the above.

**DIFFERENTIAL ASSEMBLY**

< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

**Disassembly**

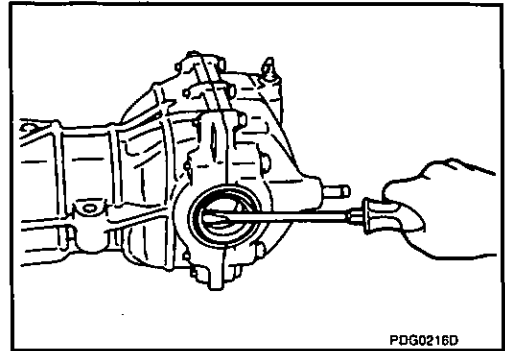
INFOID:000000006187009

1. Remove side oil seals, using flat-bladed screwdriver.

**CAUTION:**

**Never damage gear carrier and rear cover.**

2. Remove rear cover mounting bolts.



3. Set drifts (commercial service tool) to the right and left side bearing adjusting shims individually. Press differential case assembly with side bearing to remove gear carrier assembly and rear cover assembly.

**CAUTION:**

**The pressure shall be as low as possible to remove gear carrier assembly and rear cover assembly. The maximum pressure shall be 10 kN (1 ton, 1.0 Imp ton).**

**NOTE:**

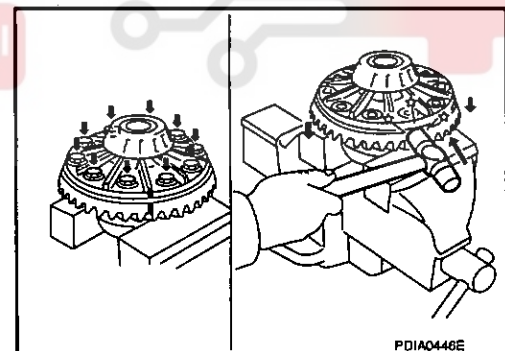
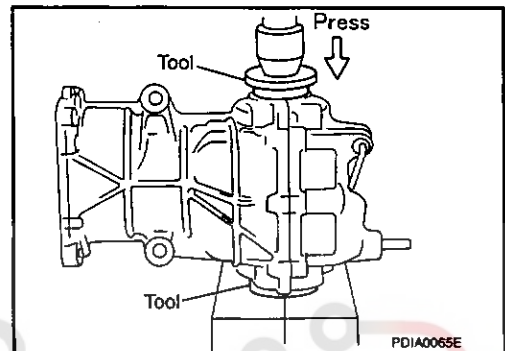
Differential case assembly, side bearings, and adjusting shims are compressed and integrated in gear carrier and rear cover.

4. Remove drain plug and filler plug.
5. Remove side bearing adjusting shims and side bearing outer races.

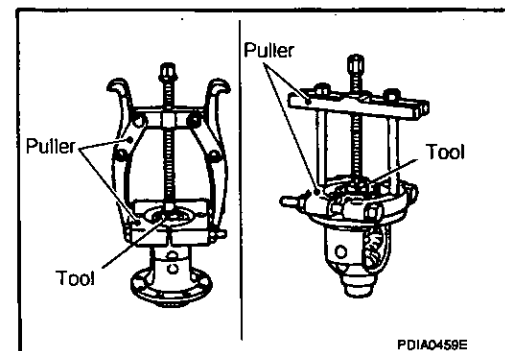
**CAUTION:**

**Mark the side bearing adjusting shims so that the original mounting positions (right/left) can be identified later.**

6. Remove drive gear mounting bolts and then remove drive gear from differential case.



7. Remove side bearing inner races, using pullers and the drift (SST: ST33052000).

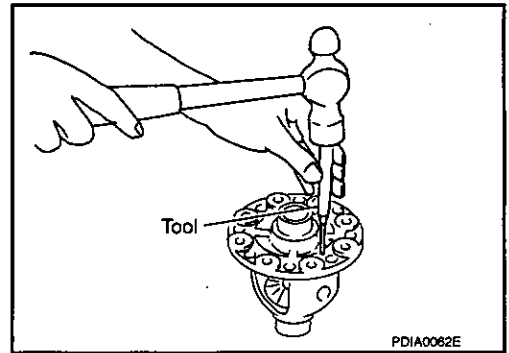


**DIFFERENTIAL ASSEMBLY**

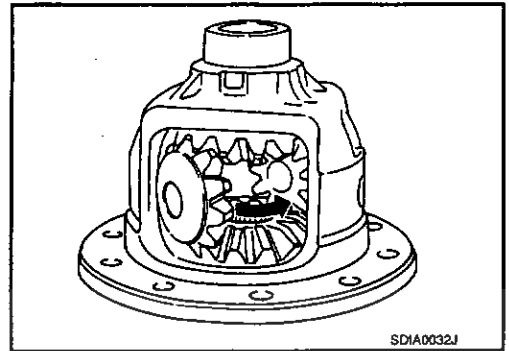
< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

8. Pull the lock pin out of pinion mate shaft, using the pin punch (commercial service tool).

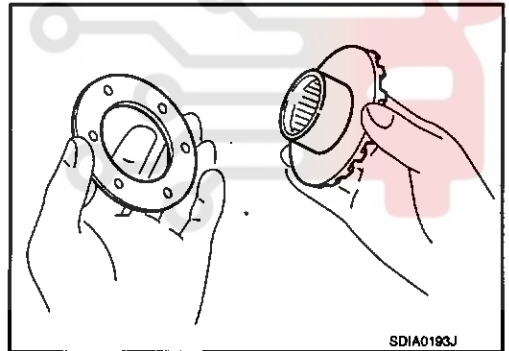


9. Remove pinion mate shaft, pinion mate gears, pinion mate thrust washers, side gears, side gear thrust washers from differential case.

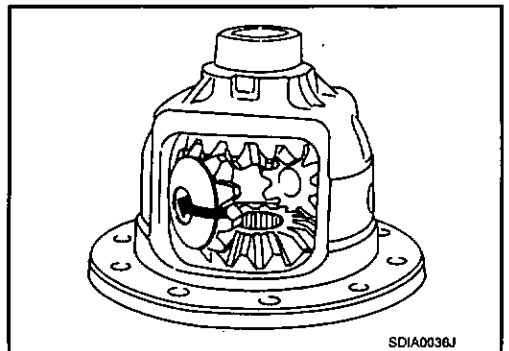


**Assembly**

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



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



دیجیتال خودرو  
 شرکت دیجیتال خودرو سامانه (مستعد خود)  
 اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

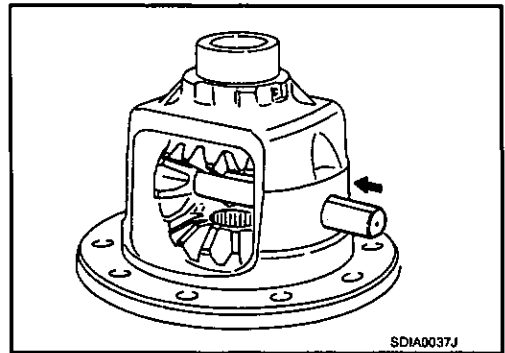
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P

**DIFFERENTIAL ASSEMBLY**

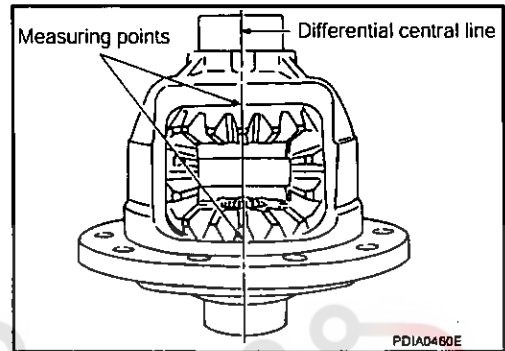
< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

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



5. Measure side gear end play following the procedure below, and select the appropriate side gear thrust washers.
  - a. Place differential case straight up so that side gear to be measured comes upward.



- b. Using thickness gauges, measure the clearance between side gear back and differential case at 3 different positions, while rotating side gear. Average the 3 readings, and then measure the clearance. (Measure the clearance of the other side as well.)

اولین سامانه دیجیتال خودروهان  
 Standard  
 Side gear back clearance : Refer to DLN-122. "Differential Side Gear Clearance".

**CAUTION:**

To prevent side gear from tilting, insert thickness 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.

When the back clearance is large:

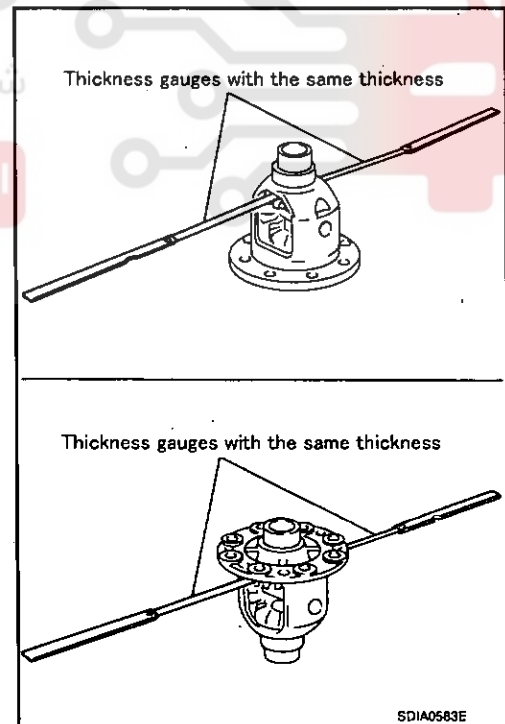
Use a thicker thrust washer.

When the back clearance is small:

Use a thinner thrust washer.

**CAUTION:**

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



**DIFFERENTIAL ASSEMBLY**

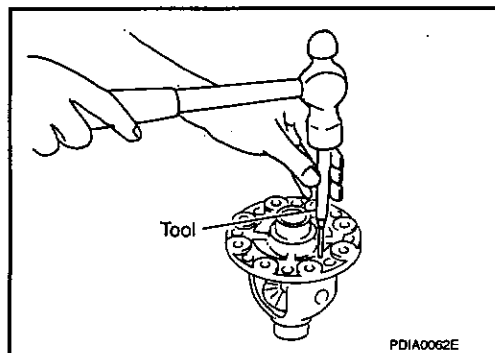
**< DISASSEMBLY AND ASSEMBLY >**

**[REAR FINAL DRIVE: R145]**

6. Drive a lock pin into pinion mate shaft, using the pin punch (commercial service tool).

**CAUTION:**

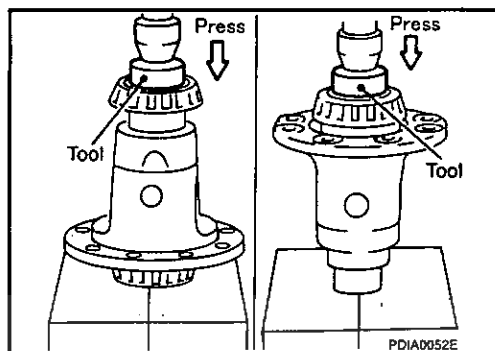
**Never reuse lock pin.**



7. Press side bearing inner races to differential case, using the drift (commercial service tool).

**CAUTION:**

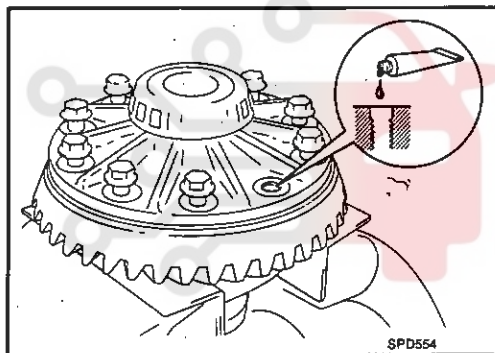
**Never reuse side bearing inner races.**



8. Apply locking sealant into the thread hole of drive gear.

**CAUTION:**

**The drive gear back and threaded holes shall be cleaned and decreased sufficiently.**



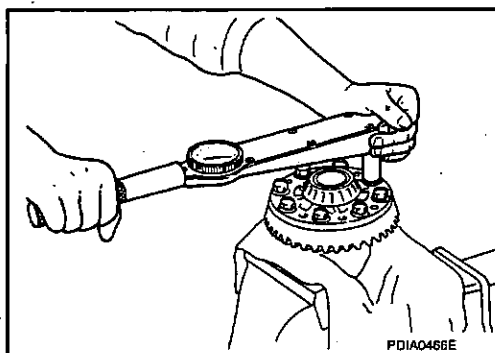
9. Install drive gear to the differential case, and then tighten to the specified torque.

10. Apply gear oil to side bearings, and install new side bearing adjusting shims (2 pieces for one side) with the same thickness as the ones installed prior to disassembly or re-install the old ones, with side bearing outer race to differential case.

If side bearing adjusting shims have been already selected, use them.

**CAUTION:**

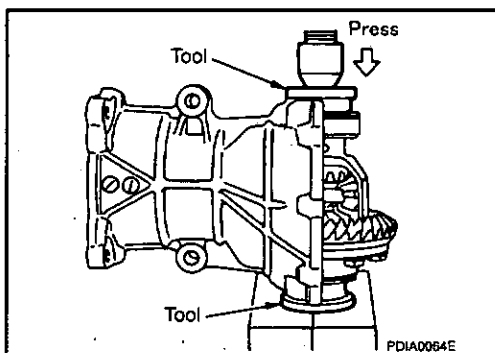
**Never reuse side bearing outer race.**



11. Set the drifts (commercial service tool) to the right and left side bearing adjusting shims individually. Compress differential case assembly and side bearing to install gear carrier assembly to differential case assembly.

**CAUTION:**

- The drift shall be placed on the center of the adjusting shims.
- The pressure shall be as low as possible to install differential assembly into gear carrier assembly. The maximum pressure shall be 10 kN (1 ton, 1.0 Imp ton).
- If the adjusting shims are installed by tapping, the gear carrier may be damaged. Avoid tapping.



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دیجیتال خودرو سامانه (مستولیت محدود)  
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## DIFFERENTIAL ASSEMBLY

## &lt; DISASSEMBLY AND ASSEMBLY &gt;

[REAR FINAL DRIVE: R145]

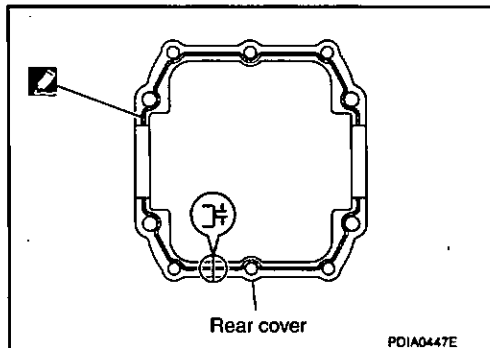
12. Install dummy cover set, check and adjust drive gear runout, tooth contact, backlash, and total preload torque. Refer to DLN-117, "Adjustment".

13. Remove dummy cover set.

14. Apply liquid gasket to mating surface of rear cover. Overlap both ends of the bead for at least 3 mm (0.12 in).

**CAUTION:**

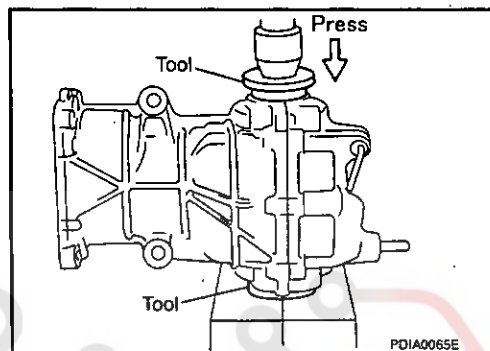
**Remove old gasket adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.**



15. Set the drifts (commercial service tool) to the right and left side bearing adjusting shims individually. Compress differential case assembly and side bearing to install rear cover.

**CAUTION:**

- The drift shall be placed on the center of the adjusting shims.
- The pressure shall be as low as possible to install the rear cover. The maximum pressure shall be 10 kN (1 ton, 1.0 lmp ton).
- If rear cover is forced in by tapping, rear cover may be damaged by adjusting shims. Avoid tapping.



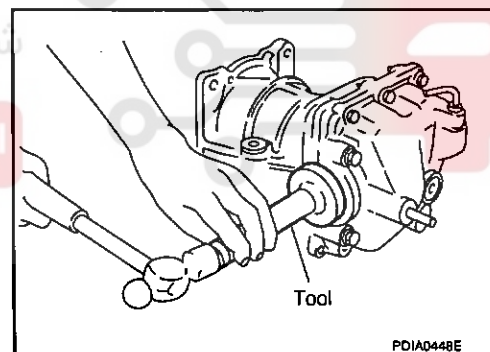
16. Tighten rear cover mounting bolts to the specified torque.

17. Using the drift (SST: KV38100200), drive side oil seals until it becomes flush with the carrier end.

**CAUTION:**

- Never reuse oil seals.
- When installing, do not incline oil seals.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.

18. Check total preload torque. Refer to DLN-117, "Adjustment".



## Inspection After Disassembly

INFOID.000000006187011

## 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.



## DIFFERENTIAL ASSEMBLY

&lt; DISASSEMBLY AND ASSEMBLY &gt;

[REAR FINAL DRIVE: R145]

## 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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DLN

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



DRIVE PINION

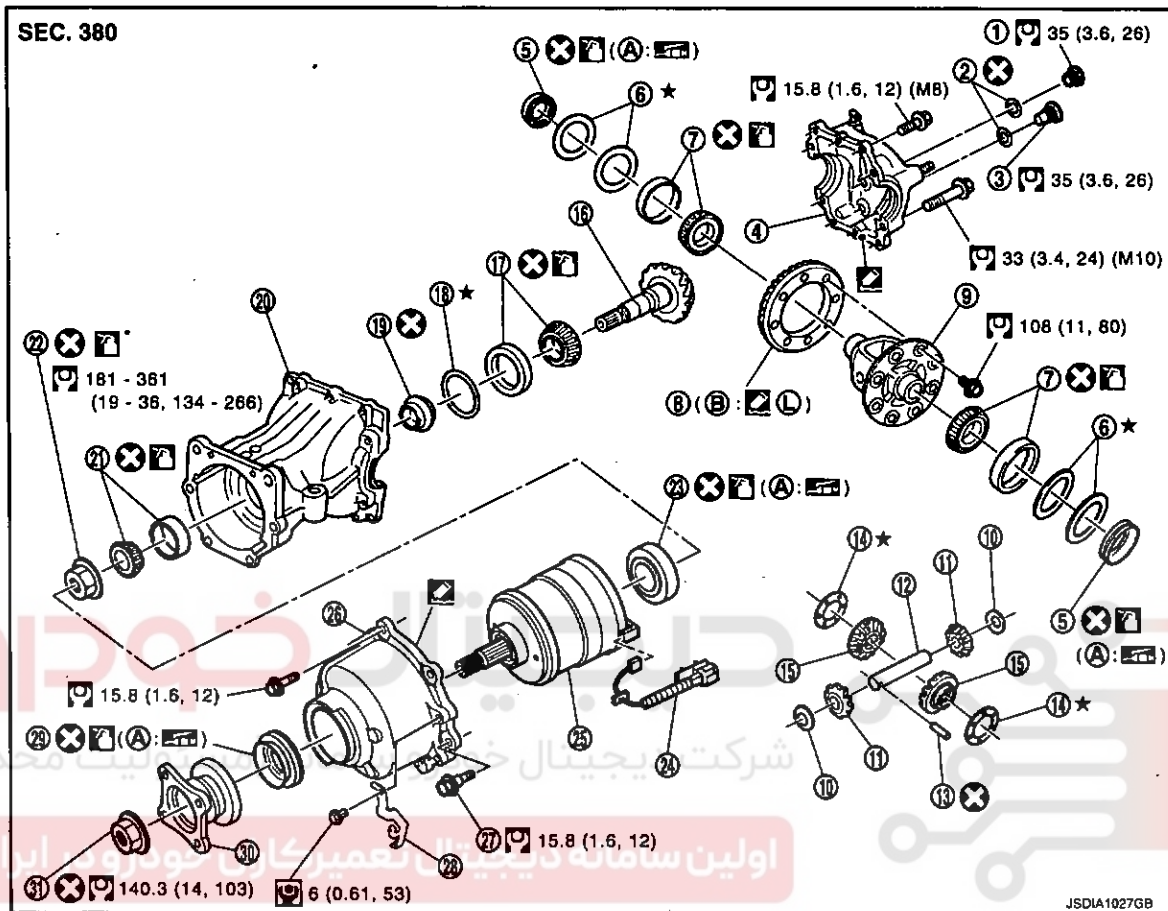
< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

DRIVE PINION

Exploded View

INFOID:000000006187012



- |                                  |                             |                                 |
|----------------------------------|-----------------------------|---------------------------------|
| 1. Filler plug                   | 2. Gasket                   | 3. Drain plug                   |
| 4. Rear cover                    | 5. Side oil seal            | 6. Side bearing adjusting shim  |
| 7. Side bearing                  | 8. Drive gear               | 9. Differential case            |
| 10. Pinion mate thrust washer    | 11. Pinion mate gear        | 12. Pinion mate shaft           |
| 13. Lock pin                     | 14. Side gear thrust washer | 15. Side gear                   |
| 16. Drive pinion                 | 17. Pinion rear bearing     | 18. Drive pinion adjusting shim |
| 19. Collapsible spacer           | 20. Gear carrier            | 21. Pinion front bearing        |
| 22. Drive pinion nut             | 23. Center oil seal         | 24. 4WD solenoid harness        |
| 25. Electric controlled coupling | 26. Coupling cover          | 27. Reamer bolt                 |
| 28. Connector bracket            | 29. Front oil seal          | 30. Companion flange            |
| 31. Companion flange lock nut    |                             |                                 |

A: Oil seal lip  
B: Screw hole

: Apply gear oil.

: Apply anti-corrosive oil.

: Apply Genuine Liquid Gasket, Three Bond 1217 or equivalent.

: Apply Genuine Medium Strength Thread Locking Sealant, Three Bond 1322B or equivalent.

Refer to GI-4, "Components" for symbols not described on the above.

DRIVE PINION

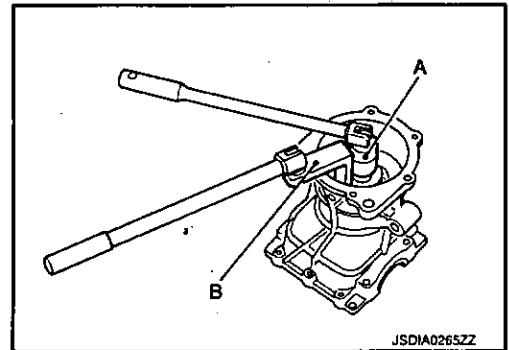
< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

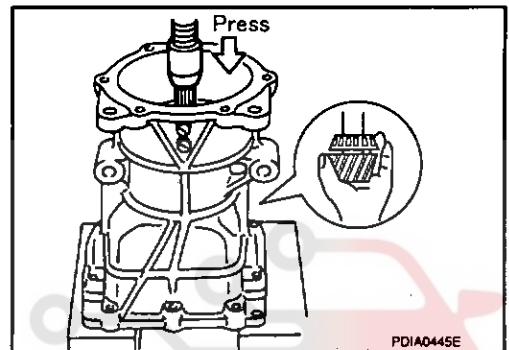
INFO/D.000000006187013

Disassembly

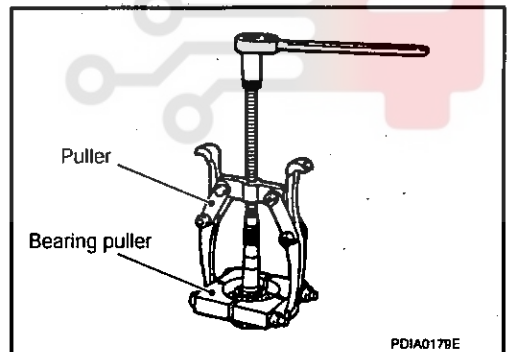
1. Remove electric controlled coupling assembly. Refer to DLN-101. "Disassembly".
2. Remove differential case assembly. Refer to DLN-106. "Disassembly".
3. Fit drive pinion socket (A) (SST: KV38108500) onto drive pinion spline. Remove drive pinion nut, using the pinion nut wrench (B) (SST: KV38108400).



4. Press drive pinion assembly out of gear carrier.  
**CAUTION:**  
**Never drop drive pinion assembly.**
5. Remove pinion front bearing inner race.
6. Remove collapsible spacer.



7. Remove pinion rear bearing inner race from drive pinion, using puller and bearing puller.

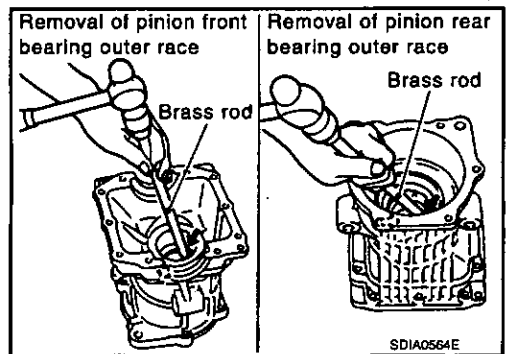


8. Using a brass rod, tap pinion front bearing outer race evenly from the 2 cutouts on gear carrier and remove pinion front bearing outer race.

**CAUTION:**  
**Never damage gear carrier.**

9. Using a brass rod, tap drive pinion adjusting shim evenly from the 2 cutouts on gear carrier and remove drive pinion adjusting shim and pinion rear bearing outer race.

**CAUTION:**  
**Never damage the gear carrier.**



دیجیتال خودرو  
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

## DRIVE PINION

&lt; DISASSEMBLY AND ASSEMBLY &gt;

[REAR FINAL DRIVE: R145]

## Assembly

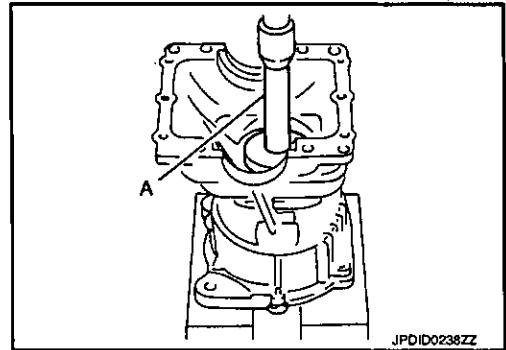
INFOID:000000006187014

1. Install a drive pinion adjusting shim of the same thickness as was installed prior to disassembly. Press pinion rear bearing outer race into gear carrier, using the drift.

A : Drift (SST: ST17130000)

**CAUTION:**

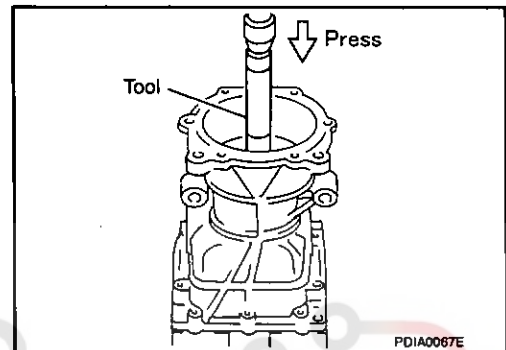
- At first, using a hammer, tap bearing outer race until it becomes flush to gear carrier.
- Never reuse pinion rear bearing outer race.



2. Press pinion front bearing outer race into gear carrier, using the drift (SST: 33230000).

**CAUTION:**

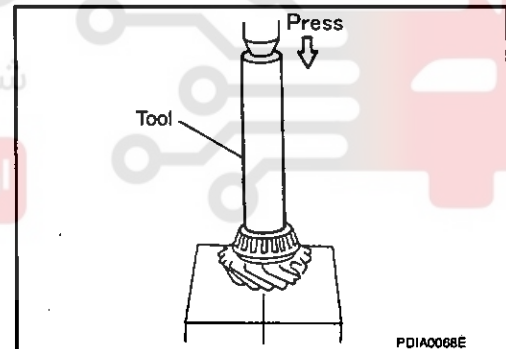
- At first, using a hammer, tap bearing outer race until it becomes flush to gear carrier.
- Never reuse pinion front bearing outer race.



3. Press pinion rear bearing inner race to drive pinion, using the drift (SST: ST23860000).

**CAUTION:**

- Never reuse pinion rear bearing inner race.



4. After checking and adjusting the tooth contact and backlash of the hypoid gear following the procedure below.

- a. Apply gear oil to the pinion rear bearing, and assemble the drive pinion to the gear carrier.

**CAUTION:**

- Never assemble a collapsible spacer.

- b. Apply gear oil to pinion front bearing, and assemble pinion front bearing inner race to drive pinion. Using the drifts and stand, press pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.

A : Drift (SST: ST23860000)

B : Drift (commercial service tool)

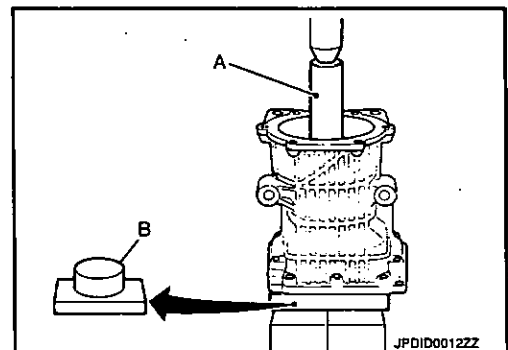
**CAUTION:**

- Never reuse pinion front bearing inner race.

- c. Temporarily tighten removed drive pinion nut to drive pinion.

**NOTE:**

- Use removed drive pinion nut only for the preload measurement.



DRIVE PINION

[REAR FINAL DRIVE: R145]

< DISASSEMBLY AND ASSEMBLY >

d. Fit the drive pinion socket onto the drive pinion spline. Using the pinion nut wrench, tighten drive pinion nut to the specified preload torque.

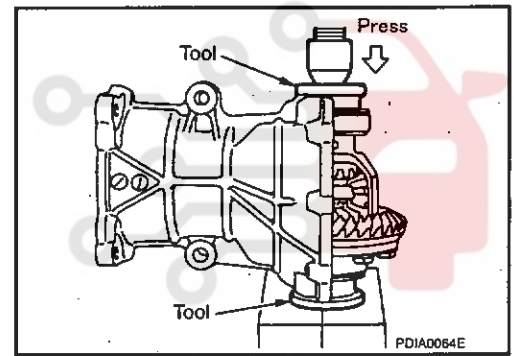
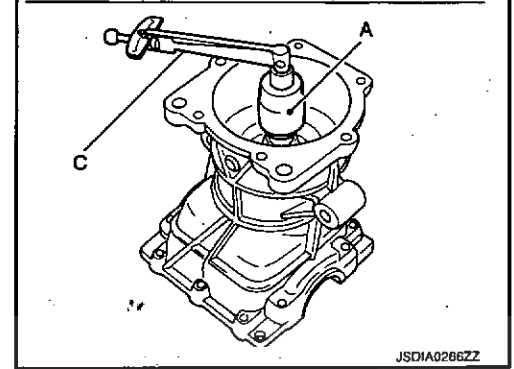
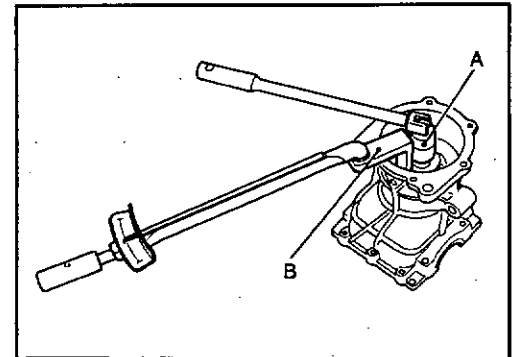
- A : Drive pinion socket (SST: KV38108500)
- B : Pinion nut wrench (SST: KV38108400)
- C : Preload gauge (SST: ST3127S000)

**Standard**

**Pinion bearing preload** : Refer to DLN-122. "Preload Torque".

**CAUTION:**

Drive pinion nut is tightened with no collapsible spacer. Never over tighten it. While measuring the preload, tighten it by 5° to 10°.



e. Apply gear oil to side bearings, and install new side bearing adjusting shims with the same thickness or re-install the old ones to the same mounting position they were in prior to disassembly. Set the drifts (commercial service tool) to the right and left. Install differential case assembly to gear carrier.

**CAUTION:**

- The drifts shall be placed on the center of the adjusting shims.
- The pressure shall be as low as possible to install gear carrier assembly to differential assembly. The maximum pressure shall be 10 kN (1 ton, 1.0 Imp ton).
- If adjusting shims are installed by tapping, gear carrier may be damaged. Avoid tapping.

f. Check and adjust the tooth contact. Refer to DLN-117. "Adjustment".

g. Check and adjust the backlash. Refer to DLN-117. "Adjustment".

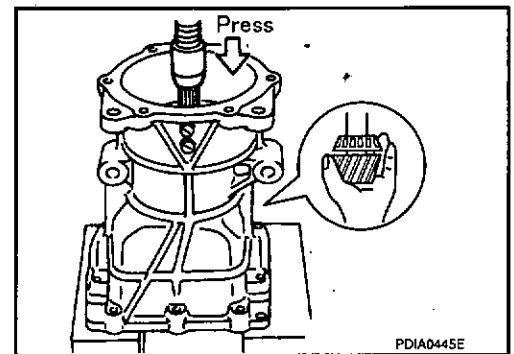
h. Remove dummy cover set, and remove differential case assembly.

i. Remove drive pinion nut and press drive pinion assembly out of gear carrier.

**CAUTION:**

Never drop drive pinion assembly.

j. Remove pinion front bearing inner race.



DRIVE PINION

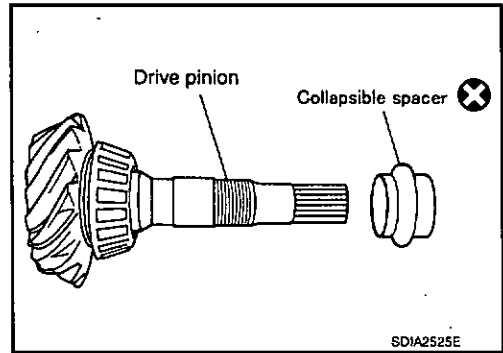
[REAR FINAL DRIVE: R145]

< DISASSEMBLY AND ASSEMBLY >

5. Assemble collapsible spacer to drive pinion.

**CAUTION:**

- Be careful of the mounting direction of collapsible spacer.
- Never reuse collapsible spacer.



6. Apply gear oil to pinion front bearing, and assemble pinion front bearing inner race to drive pinion. Using the drifts and stand, press pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.

- A : Drift (SST: ST23860000)
- B : Drift (commercial service tool)

**CAUTION:**

**Never reuse pinion front bearing inner race.**

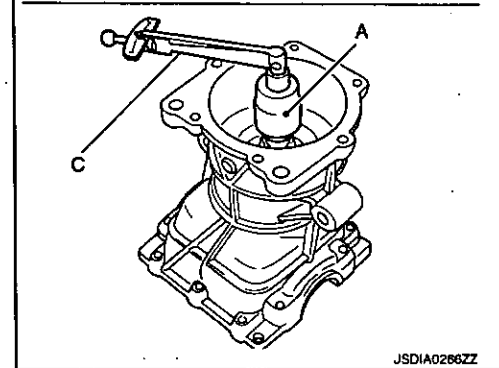
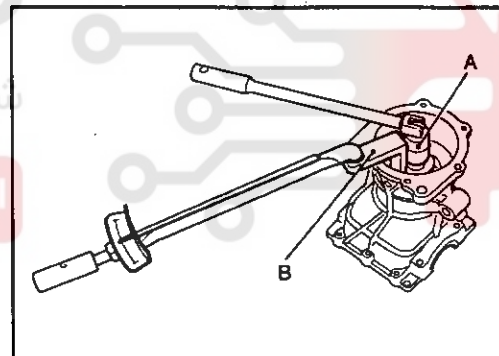
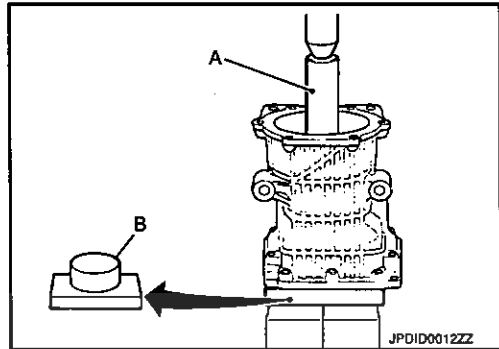
7. Apply anti-corrosive oil to the thread and seat of drive pinion nut, and temporarily tighten drive pinion nut to drive pinion.

**CAUTION:**

**Never reuse drive pinion nut.**

8. Fit the drive pinion socket onto the drive pinion spline. Using the pinion nut wrench, tighten drive pinion nut to the specified preload torque.

- A : Drive pinion socket (SST: KV38108500)
- B : Pinion nut wrench (SST: KV38108400)
- C : Preload gauge (SST: ST3127S000)



Drive pinion tightening torque : Refer to DLN-112, "Exploded View"

Standard

Pinion bearing preload : Refer to DLN-122, "Preload Torque".

**CAUTION:**

- Adjust the lower limit of the drive pinion 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 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.

9. Install differential case assembly. Refer to DLN-107, "Assembly".

**CAUTION:**

**Never install rear cover.**

10. Install dummy cover set, and check drive gear runout, tooth contact, and backlash. Refer to DLN-117, "Adjustment".

11. Remove dummy cover set, then install rear cover, and side oil seal. Refer to DLN-107, "Assembly".

12. Check total preload torque. Refer to DLN-117, "Adjustment".

13. Install electric controlled coupling assembly. Refer to DLN-101, "Assembly".

14. Check companion flange runout. Refer to DLN-103, "Adjustment".



**DRIVE PINION**

< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

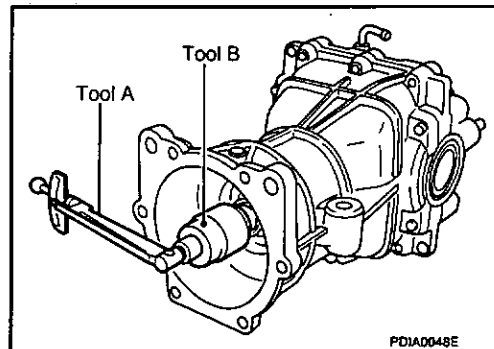
**Adjustment**

INFOID:000000006187015

**TOTAL PRELOAD TORQUE**

1. Remove electric controlled coupling assembly. Refer to DLN-101, "Disassembly".
2. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
3. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
4. Fit drive pinion socket onto drive pinion spline. Measure the total preload, using the preload gauge and drive pinion socket.

- A : Preload gauge (SST: 3127S000)
- B : Drive pinion socket (SST: KV38108500)



**Standard**

**Total preload torque** : Refer to DLN-122, "Preload Torque".

**NOTE:**

**Total preload torque = Pinion bearing torque + Side bearing 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 shims.

**When the preload is small**

- On pinion bearings:** Tighten the drive pinion nut.
- On side bearings:** Use thicker side bearing adjusting shims.

**DRIVE GEAR RUNOUT**

1. Remove rear cover. Refer to DLN-106, "Disassembly".
2. Following the procedure below, install a dummy cover set (SST: KV389L0010) to gear carrier.
  - a. Set dummy cover shims to the right and left side bearing adjusting shims.
  - b. Temporarily tighten dummy cover to gear carrier.
  - c. Position dummy cover spacers to dummy cover.
  - d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-112, "Exploded View".
  - e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

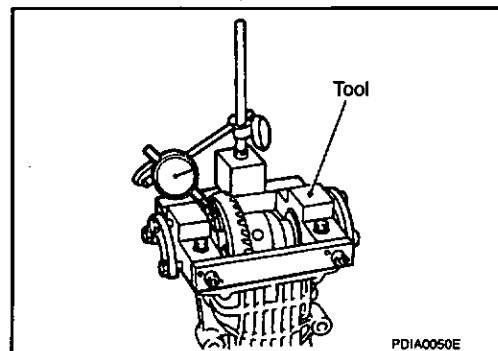
3. Fit a dial indicator to the drive gear back face.
4. Rotate the drive gear to measure runout.

**Limit**

**Drive gear back face runout** : Refer to DLN-122, "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:**





## DRIVE PINION


&lt; DISASSEMBLY AND ASSEMBLY &gt;

[REAR FINAL DRIVE: R145]

Replace drive gear and drive pinion as a set.

## TOOTH CONTACT

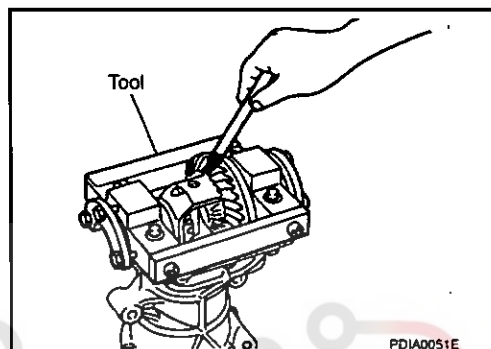
1. Remove rear cover. Refer to DLN-106, "Disassembly".
2. Following the procedure below, install a dummy cover set (SST: KV389L0010) to gear carrier.
  - a. Set dummy cover shims to the right and left side bearing adjusting shims.
  - b. Temporarily tighten dummy cover to gear carrier.
  - c. Position dummy cover spacers to dummy cover.
  - d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-112, "Exploded View".
  - e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

 : 5.9 N·m (0.6 kg-m, 52 in-lb)

3. Apply red lead to drive gear.

**CAUTION:**

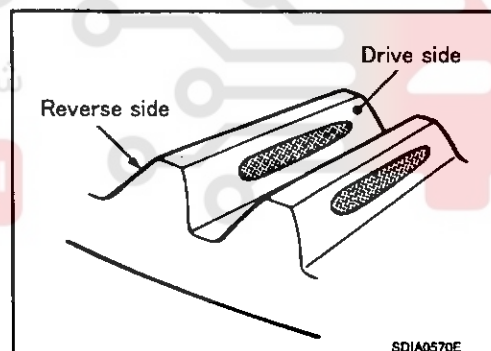
Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on drive gear.



4. 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.



DRIVE PINION

< DISASSEMBLY AND ASSEMBLY >

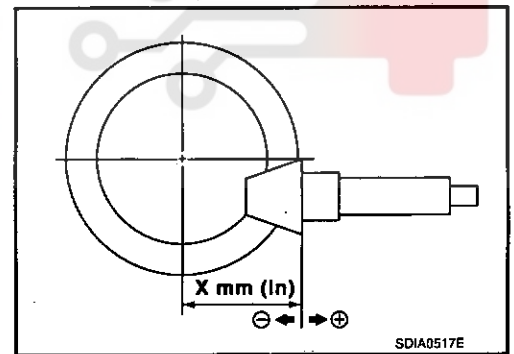
[REAR FINAL DRIVE: R145]

Tooth Contact Judgment Guide

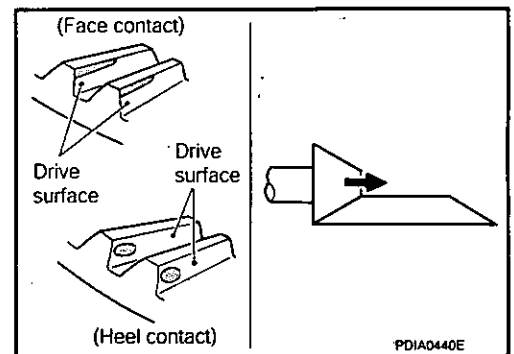
Tooth contact condition				Drive pinion adjusting shim selection value [mm (in)]	Adjustment (Yes/No)	Possible cause
Drive side		Back side				
Heel side 	Toe side 	Toe side 	Heel side 	↑ Thicker	Yes	Occurrence of noise and scoring sound in all speed ranges.
				↓ Thinner	No	-
				-0.03 (-0.0012)	Yes	Occurrence of noise at constant speed and decreasing speed.
				0		
				-0.06 (-0.0024)	Yes	Occurrence of noise and scoring sound in all speed ranges.
				-0.09 (-0.0035)		

SDIA2549E

5. 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 drive pinion gear adjusting shim to move drive pinion closer to drive gear.

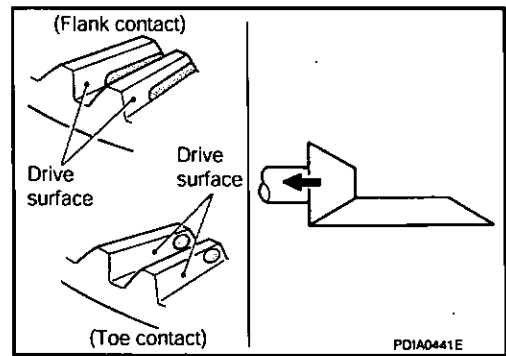


**DRIVE PINION**

< DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R145]

- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thin drive pinion gear adjusting shim to move drive pinion farther from drive gear.



**BACKLASH**

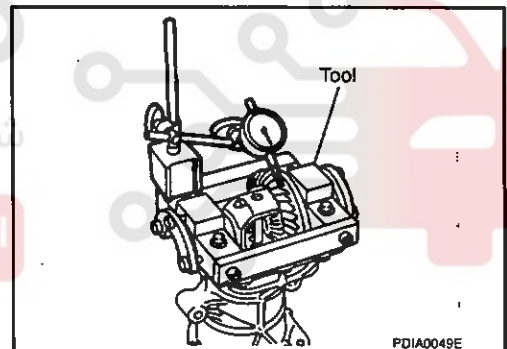
1. Remove rear cover. Refer to DLN-106, "Disassembly".
2. Following the procedure below, install a dummy cover set (SST: KV389L0010) to gear carrier.
  - a. Set dummy cover shims to the right and left side bearing adjusting shims.
  - b. Temporarily tighten dummy cover to gear carrier.
  - c. Position dummy cover spacers to dummy cover.
  - d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-112, "Exploded View".
  - e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

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

**Standard Backlash** : Refer to DLN-122, "Backlash".

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



**When the backlash is large:**

**Make drive gear back adjusting shims thicker, and drive gear front adjusting shims thinner.**

**When the backlash is small:**

**Make drive gear back adjusting shims thinner, and drive gear front adjusting shims thicker.**

**Inspection After Disassembly**

INFOID:000000006187016

**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.

## DRIVE PINION

&lt; DISASSEMBLY AND ASSEMBLY &gt;

[REAR FINAL DRIVE: R145]

## 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.

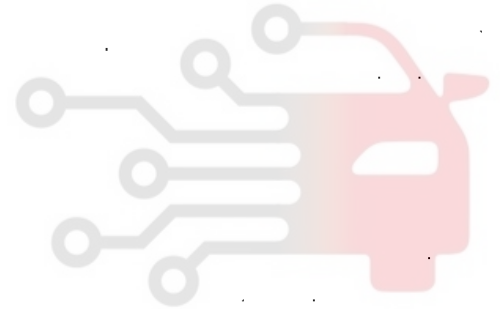
## COMPANION FLANGE

- 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.

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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**SERVICE DATA AND SPECIFICATIONS (SDS)**

< SERVICE DATA AND SPECIFICATIONS (SDS)

[REAR FINAL DRIVE: R145]

**SERVICE DATA AND SPECIFICATIONS (SDS)**

**SERVICE DATA AND SPECIFICATIONS (SDS)**

**General Specification**

INFOID:000000006187017

Applied model	4WD
	VQ35DE
	CVT
Final drive model	R145
Gear ratio	2.466
Number of teeth (Drive gear/Drive pinion)	37/15
Oil capacity (Approx.) ℓ (Imp pt)	0.55 (1)
Number of pinion gears	2
Drive pinion adjustment spacer type	Collapsible

**Drive Gear Runout**

INFOID:000000006187018

Unit: mm (in)

Item	Limit
Drive gear back face runout	0.05 (0.0020)

**Differential Side Gear Clearance**

INFOID:000000006187019

Unit: mm (in)

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

**Preload Torque**

INFOID:000000006187020

Unit: N·m (kg·m, in·lb)

Item	Standard
Pinion bearing (P1)	0.69 – 1.18 (0.07 – 0.12, 7 – 10)
Side bearing (P2)	0.64 – 0.98 (0.07 – 0.09, 6 – 8)
Side bearing to pinion bearing (Total preload) (Total preload = P1 + P2)	1.33 – 2.16 (0.14 – 0.22, 12 – 19)

**Backlash**

INFOID:000000006187021

Unit: mm (in)

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

**Companion Flange Runout**

INFOID:000000006187022

Unit: mm (in)

Item	Limit
Companion flange face	0.13 (0.0051)
Inner side of the companion flange	0.19 (0.0075)