SECTION DLN
DRIVELINE

CONTENTS

TRANSFER: TY20A

REAR FINAL DRIVE: R145

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000005514143

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".

>> GO TO 2.

2.CHECK AWD WARNING LAMP

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

Does AWD warning lamp turn ON?

YES >> GO TO 3.
NO >> GO TO 6.

3.PERFORM SELF-DIAGNOSIS

With CONSULT-III

1. Perform self-diagnosis for "ALL MODE AWD/4WD".
2. Check malfunction detected by self-diagnosis.
3. Erase self-diagnostic results for "ALL MODE AWD/4WD".

>> GO TO 4.

4.CHECK TERMINALS AND HARNESS CONNECTORS

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

>> GO TO 5.

5.CHECK SYMPTOM REPRODUCTION

With CONSULT-III

Perform DTC reproduction procedure for the error system.

Is any error detected?

YES >> GO TO 2.
NO >> GO TO 6.

6.PERFORM SYMPTOM DIAGNOSIS

Perform the symptom diagnosis for each system.

Is any malfunction present?

YES >> GO TO 2.
NO >> GO TO 7.

7.FINAL CHECK

With CONSULT-III

Check input/output signal standard of "ALL MODE AWD/4WD".

Is the input/output the standard value?

YES >> INSPECTION END
NO >> GO TO 2.

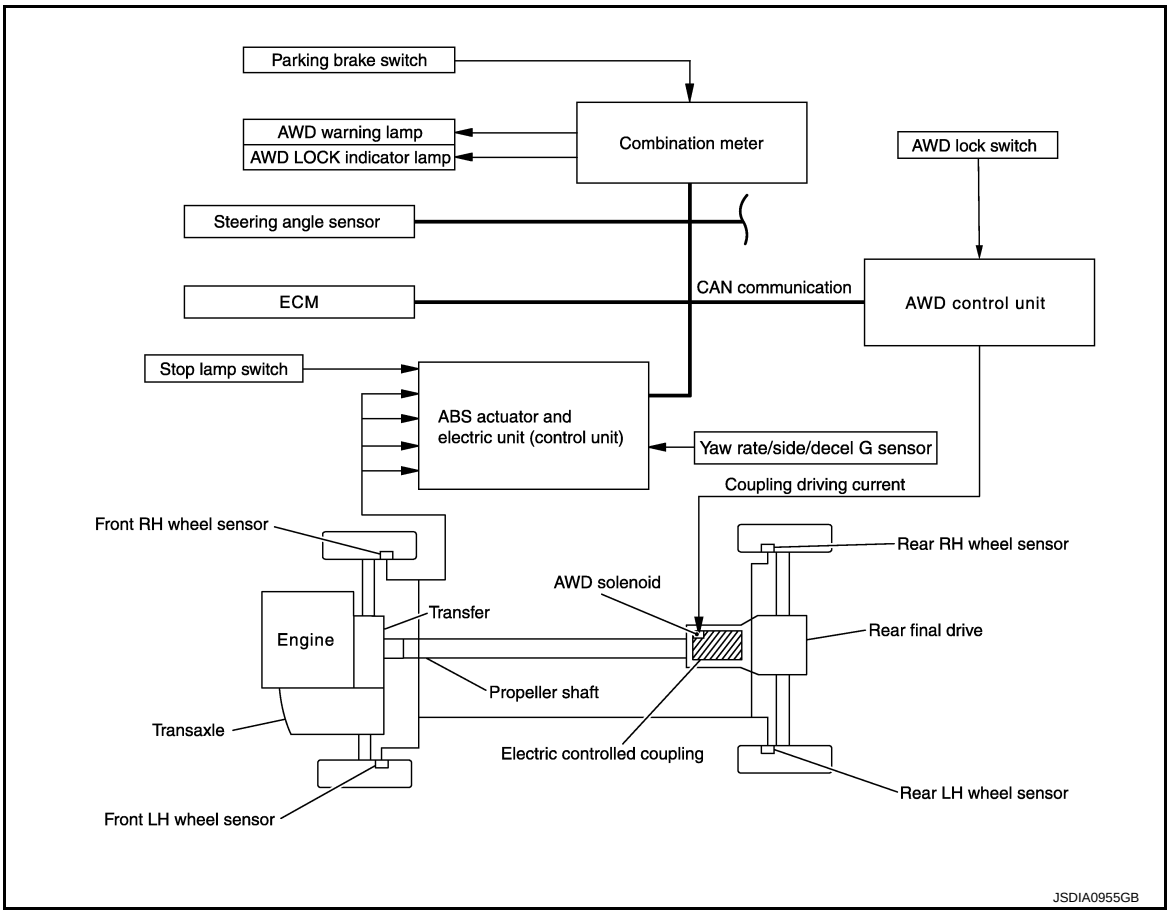
SYSTEM DESCRIPTION

AWD SYSTEM

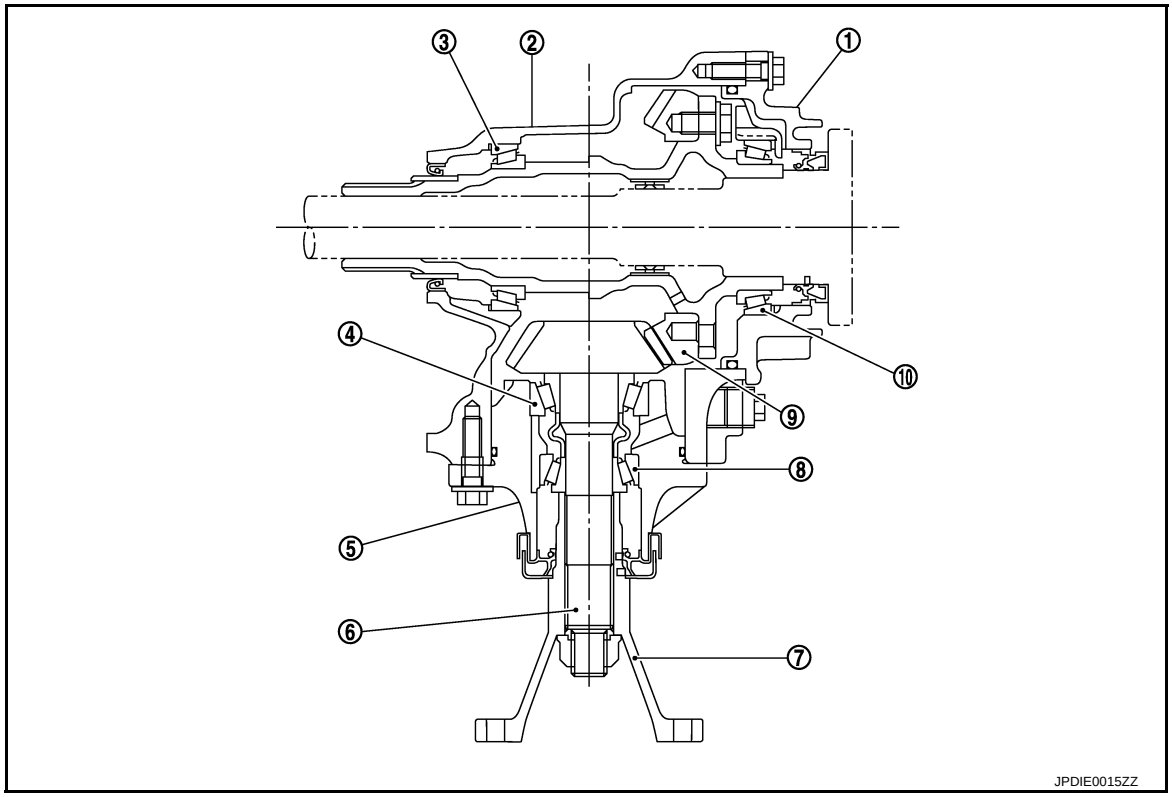
System Diagram

INFOID:0000000005514144

CONTROL DIAGRAM



CROSS-SECTIONAL VIEW



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

INFOID:0000000005514145

DESCRIPTION

- AWD 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 VDC corrects a torque distribution for front and rear wheels according to a driving operation and a behavior of the vehicle during cornering and improves drivability and safety on a slippery road surface.
- It transmits/receives each signal from the following AWD control unit via CAN communication line.

Component parts	Function
ABS actuator and electric unit (control unit)	Transmits the following signals via CAN communication to AWD control unit. • Vehicle speed signal • Stop lamp switch signal (brake signal) • Yaw rate sensor signal • Side G sensor signal • Decel G sensor signal
ECM	Transmits the following signals via CAN communication to AWD control unit. • Accelerator pedal position signal • Engine speed signal

Component parts	Function
Combination meter	Transmits conditions of parking brake switch signal via CAN communication to AWD control unit.
	Receives the following signals via CAN communication from AWD control unit. • AWD warning lamp signal • AWD LOCK indicator lamp signal
Steering angle sensor	Transmits conditions of steering angle sensor signal via CAN communication to AWD control unit.

AUTO Mode
- Electronic control allows optimal distribution of torque to front/rear wheels to match road conditions.
- AWD 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.

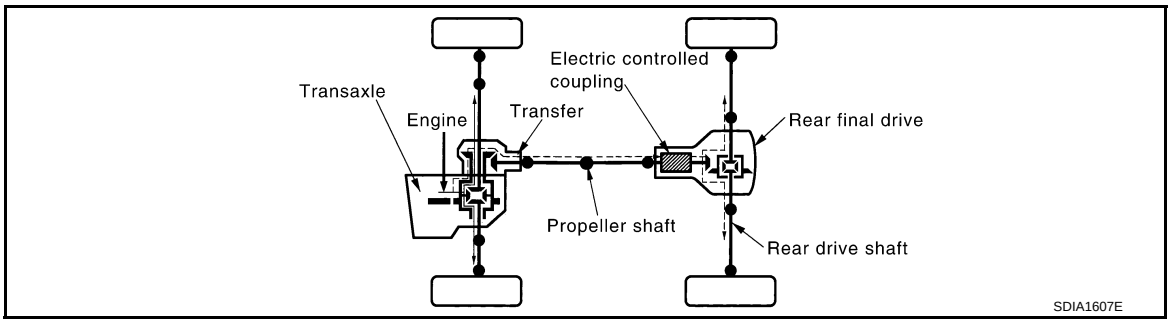
NOTE:
Light tight-corner braking symptom may occur depending on driving condition in AUTO mode. This is not malfunction.

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 AWD LOCK indicator lamp keeps illuminating.
- LOCK mode will change to AUTO mode automatically, when the vehicle has been driven at a high speed. The AWD LOCK indicator lamp turns off.
- LOCK mode will change to AUTO mode automatically, when the ignition switch is turned “OFF”.

NOTE:
- Every time AWD 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.

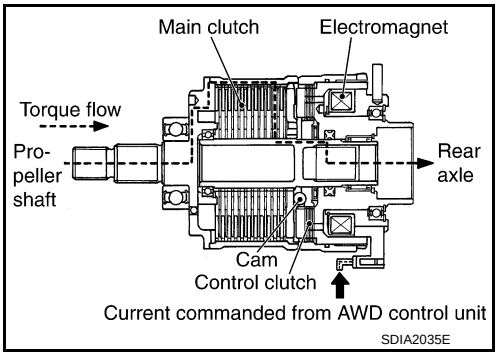
POWER TRANSFER DIAGRAM



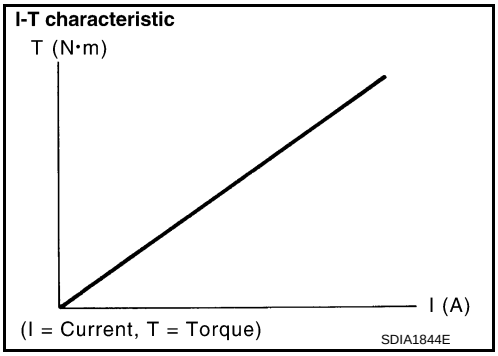
OPERATION PRINCIPLE

Electric Controlled Coupling

1. The AWD control unit supplies command current to electric controlled coupling (AWD 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.

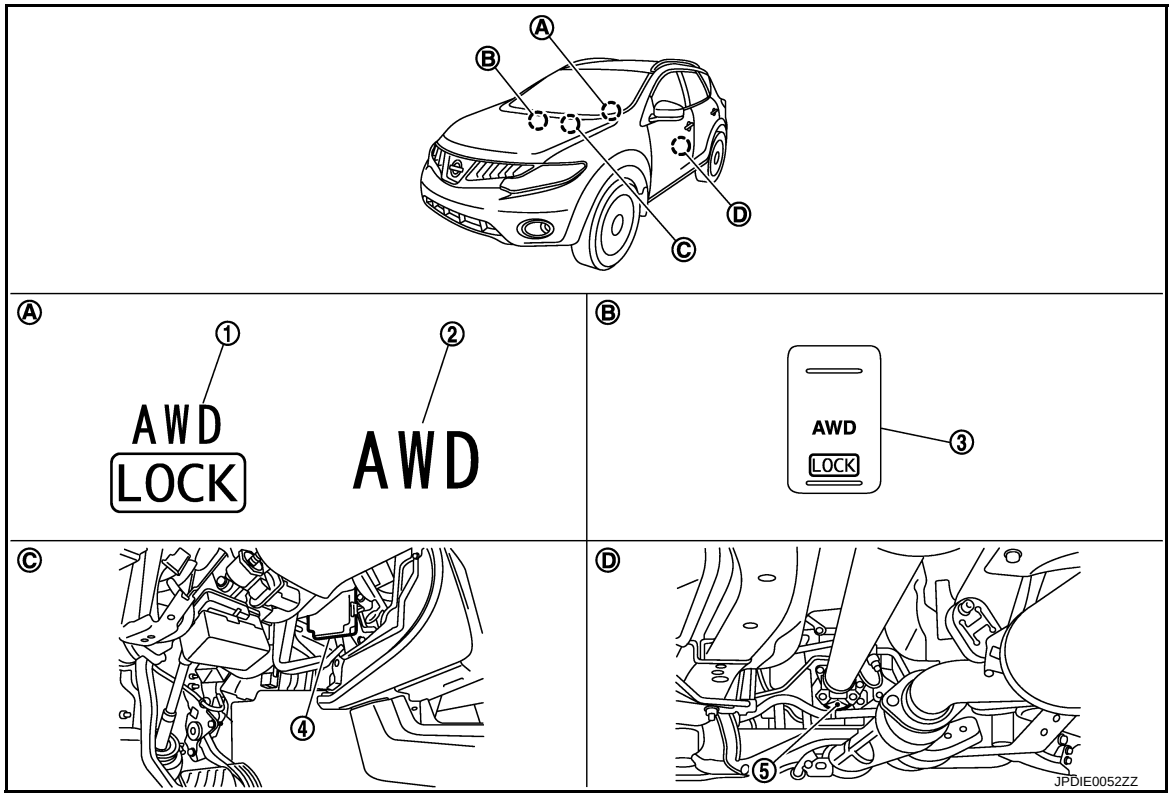


- Transmission torque to the rear wheels is determined according to command current.



Component Parts Location

INFOID:0000000005514146



1. AWD LOCK indicator lamp
2. AWD warning lamp
3. AWD lock switch
4. AWD control unit
5. AWD 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:0000000005514147

Component parts	Reference/Function
AWD control unit	DLN-12, "Description"
Wheel sensors	BRC-33, "Description"
AWD solenoid	DLN-14, "Description"
Electric controlled coupling	Transmits driving force to rear final drive.
AWD warning lamp	DLN-24, "Description"
AWD LOCK indicator lamp	DLN-26, "Description"
AWD 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-62, "Description"

DIAGNOSIS SYSTEM (AWD CONTROL UNIT)

CONSULT-III Function

INFOID:0000000005514148

FUNCTION

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

Diagnostic test mode	Function
ECU Identification	AWD 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 AWD control unit can be read.
Active Test	Diagnostic Test Mode in which CONSULT-III drives some actuators apart from the AWD control unit and also shifts some parameters in a specified range.

ECU IDENTIFICATION

AWD 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-34, "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 AWD 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 AWD warning lamp may not turned OFF even if it is normal.

DATA MONITOR

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 AWD actuator relay (integrated in AWD control unit) is displayed.
4WD WARN LAMP [On/Off]	Control status of AWD warning lamp is displayed.
4WD MODE SW [AUTO/LOCK]	Mode switch is not equipped, but displayed.
4WD MODE MON [AUTO/LOCK]	Control status of AWD 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 AWD control unit
THRTL POS SEN [%]	Throttle opening status is displayed.
ETS SOLENOID [A]	Monitored value of current at AWD 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

Use this mode to determine and identify the details of a malfunction based on self-diagnostic results or data monitor. AWD 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 AWD solenoid)	• Vehicle stopped • Engine running • No DTC detected	Change command current value to AWD solenoid, and then change driving mode. (Monitor value is normal if it is within approx. ±10% of command value.) • Qu: Increase current value in increments of 0.2 A • Qd: Decrease current value in increments of 0.2 A • UP: Increase current value in increments of 0.02 A • DOWN: Decrease current value in increments of 0.02 A

CAUTION:

Never energize continuously for a long time.

DTC/CIRCUIT DIAGNOSIS

C1201 AWD CONTROL UNIT

Description

INFOID:0000000005514149

- 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 AWD system.

DTC Logic

INFOID:0000000005514150

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1201	CONTROLLER FAILURE	Malfunction has occurred inside AWD control unit.	Internal malfunction of AWD control unit

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1201” detected?

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

Diagnosis Procedure

INFOID:0000000005514151

1. PERFORM SELF-DIAGNOSIS

With CONSULT-III

1. Erase self-diagnostic results for “ALL MODE AWD/4WD”.
2. Turn the ignition switch OFF, and then wait 10 seconds or more.
3. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1201” detected?

YES >> Replace AWD control unit. Refer to DLN-50, "Exploded View".
NO >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace error-detected parts.

C1203 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:0000000005514152

- Transmits the following signals via CAN communication to AWD 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:0000000005514153

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 • 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 self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1203” detected?

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

Diagnosis Procedure

INFOID:0000000005514154

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

With CONSULT-III

Perform self-diagnosis for “ABS”.

Is any DTC detected?

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

2.PERFORM SELF-DIAGNOSIS

With CONSULT-III

1. Erase self-diagnostic results for “ALL MODE AWD/4WD”.
2. Start the engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
3. Check that ABS warning lamp turns OFF.
4. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1203” detected?

YES >> Replace AWD control unit. Refer to DLN-50, "Exploded View".
NO >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace error-detected parts.

C1204 AWD SOLENOID

Description

INFOID:0000000005514155

Controls electric controlled coupling by command current from AWD control unit.

DTC Logic

INFOID:0000000005514156

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1204	4WD SOLENOID	Malfunction related to AWD solenoid has been detected.	• Internal malfunction of electronic controlled coupling • Malfunction of AWD solenoid power supply circuit (open or short) • Malfunction of AWD solenoid command current

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1204” detected?

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

Diagnosis Procedure

INFOID:0000000005514157

1.CHECK AWD SOLENOID POWER SUPPLY

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

AWD 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 AWD SOLENOID GROUND

Check the continuity between AWD control unit harness connector and ground.

AWD control unit		—	Continuity
Connector	Terminal		
M69	10	Ground	Existed
	11		

Is the inspection result normal?

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

3.CHECK AWD SOLENOID CIRCUIT

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

AWD control unit		AWD solenoid		Continuity
Connector	Terminal	Connector	Terminal	
M69	1	C1	1	Existed
	2		2	

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

AWD control unit		—	Continuity
Connector	Terminal		
M69	1	Ground	Not existed
	2		

3. Check the continuity between AWD solenoid harness connector and the ground.

AWD solenoid		—	Continuity
Connector	Terminal		
C1	1	Ground	Not existed
	2		

Is the inspection result normal?

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

4.CHECK AWD SOLENOID

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> AWD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-97, "Exploded View".

5.CHECK TERMINALS AND HARNESS CONNECTORS

1. Check AWD control unit pin terminals for damage or loose connection with harness connector.
2. Check AWD solenoid pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> Replace AWD control unit. Refer to DLN-50, "Exploded View".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000005514158

1.CHECK AWD SOLENOID

1. Turn the ignition switch OFF.
2. Disconnect AWD solenoid harness connector.
3. Check the resistance between AWD solenoid harness connector terminals.

AWD solenoid		Resistance (Approx.)
Terminal		
1	2	2.45 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> AWD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-97, "Exploded View".

C1205 AWD ACTUATOR RELAY

Description

INFOID:0000000005514159

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

DTC Logic

INFOID:0000000005514160

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1205” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-16, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000005514161

1.PERFORM SELF-DIAGNOSIS

With CONSULT-III

1. Erase self-diagnostic results for “ALL MODE AWD/4WD”.
2. Turn ignition switch OFF, and wait 10 seconds or more.
3. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1205” detected?

YES >> Replace AWD control unit. Refer to DLN-50, "Exploded View".
NO >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace error-detected parts.

C1210 ECM

Description

INFOID:0000000005514162

Transmits the following signals via CAN communication to AWD control unit.
- Accelerator pedal position signal
- Engine speed signal

DTC Logic

INFOID:0000000005514163

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 self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1210” detected?

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

Diagnosis Procedure

INFOID:0000000005514164

1.PERFORM ECM SELF-DIAGNOSIS

With CONSULT-III
Perform self-diagnosis for “ENGINE”.

Is any DTC detected?

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

2.PERFORM SELF-DIAGNOSIS

With CONSULT-III
1. Erase self-diagnostic results for “ALL MODE AWD/4WD”.
2. Turn the ignition switch OFF.
3. Start the engine. Drive the vehicle for a while.
4. Check that malfunction indicator lamp (MIL) turns OFF.
5. Stop the vehicle. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1210” detected?

YES >> Replace AWD control unit. Refer to DLN-50, "Exploded View".
NO >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace error-detected parts.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000005514165

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:0000000005514166

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	AWD control unit is not transmitting/receiving CAN communication signal for 2 seconds or more.	• CAN communication error • Malfunction of AWD control unit

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “U1000” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-18, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000005514167

1. PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-17, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

U1010 CONTROL UNIT (CAN)

Description

INFOID:0000000005514168

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:0000000005514169

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 AWD control unit.	Malfunction of AWD control unit

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

With CONSULT-III

1. Turn the ignition switch OFF to ON.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-19, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000005514170

1. CHECK AWD CONTROL UNIT

Check AWD control unit harness connector for disconnection and deformation.

Is the inspection result normal?

YES >> Replace AWD control unit. Refer to DLN-50, "Exploded View".
NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000005514171

Supplies power to AWD control unit.

Diagnosis Procedure

INFOID:0000000005514172

1.CHECK AWD CONTROL UNIT POWER SUPPLY (1)

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

AWD 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 AWD control unit harness connector and ground.

AWD control unit		—	Voltage
Connector	Terminal		
M69	7	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK AWD CONTROL UNIT POWER SUPPLY (2)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#45).
3. Disconnect IPDM E/R harness connector.
4. Check the continuity between AWD control unit harness connector and IPDM E/R harness connector.

AWD control unit		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
M69	7	E10	26	Existed

5. Check the continuity between AWD control unit harness connector and the ground.

AWD control unit		—	Continuity
Connector	Terminal		
M69	7	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-67, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3.CHECK AWD SOLENOID POWER SUPPLY (1)

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

AWD control unit		—	Voltage
Connector	Terminal		
M69	9	Ground	Battery voltage

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

AWD control unit		—	Voltage
Connector	Terminal		
M69	9	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> GO TO 4.

4. CHECK AWD SOLENOID POWER SUPPLY (2)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#36).

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-6, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK AWD CONTROL UNIT GROUND

1. Turn the ignition switch OFF.
2. Check the continuity between AWD control unit harness connector and ground.

AWD control unit		—	Continuity
Connector	Terminal		
M69	10	Ground	Existed
	11		

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

AWD LOCK SWITCH

Description

INFOID:0000000005514173

Able to select AUTO or LOCK mode.

Component Function Check

INFOID:0000000005514174

1.CHECK AWD LOCK SWITCH OPERATION

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

Condition	AWD LOCK indicator lamp
When the switch is pressed in AWD mode.	ON
When the switch is pressed in 2WD mode.	OFF

Is the inspection result normal?

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

Diagnosis Procedure

INFOID:0000000005514175

1.CHECK AWD LOCK SWITCH

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace AWD lock switch.

2.CHECK AWD LOCK SWITCH CIRCUIT (1)

Check the continuity between AWD lock switch harness connector and ground.

AWD lock switch		—	Continuity
Connector	Terminal		
M8	3	Ground	Existed

Is the inspection result normal?

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

3.CHECK AWD LOCK SWITCH CIRCUIT (2)

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

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

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

AWD control unit		—	Continuity
Connector	Terminal		
M69	14	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK AWD CONTROL UNIT OUTPUT SIGNAL

1. Connect AWD control unit harness connector.
2. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
3. Check the voltage between AWD lock switch harness connector and ground.

AWD 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 AWD control unit. Refer to DLN-50, "Exploded View".

Component Inspection

INFOID:0000000005514176

1. CHECK AWD LOCK SWITCH

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

AWD lock switch		Condition	Continuity
Terminal			
1	3	When releasing AWD lock switch.	Not existed
		When AWD lock switch is hold pressed.	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace AWD lock switch.

AWD WARNING LAMP

Description

INFOID:0000000005514177

- Turns ON when there is a malfunction in AWD system. AWD 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.

AWD WARNING LAMP INDICATION

Condition	AWD warning lamp
Lamp check	Turns ON when ignition switch is turned ON. Turns OFF after the engine start.
AWD system malfunction	ON
Protection function is activated due to heavy load to electric controlled coupling. (AWD system is not malfunctioning and AWD 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:

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

Component Function Check

INFOID:0000000005514178

1. CHECK AWD WARNING LAMP FUNCTION

1. Turn ignition switch ON.
2. Check that AWD 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:0000000005514179

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 self-diagnosis for “ALL MODE AWD/4WD”.

Is any detected?

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

3. CHECK AWD WARNING LAMP SIGNAL

With CONSULT-III

1. Turn the ignition switch ON.
   CAUTION:
   Never start the engine.
2. Check “4WD WARN LAMP” of CONSULT-III “DATA MONITOR” for “ALL MODE AWD/4WD”.

Does the item on “DATA MONITOR” indicate “On”?

YES >> GO TO 4.

NO >> Replace AWD control unit. Refer to DLN-50, "Exploded View".

4. CHECK COMBINATION METER POWER SUPPLY CIRCUIT

Perform the trouble diagnosis for combination meter power supply circuit. Refer to MWI-43, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace the error-detected parts.

AWD LOCK INDICATOR LAMP

Description

INFOID:0000000005514180

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

AWD LOCK INDICATOR LAMP

Condition	AWD 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:0000000005514181

1.AWD LOCK INDICATOR LAMP OPERATION CHECK 1

Check that AWD 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-22, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000005514182

1.CHECK AWD WARNING LAMP

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

Does AWD warning lamp turn ON?

YES >> Proceed to DLN-24, "Diagnosis Procedure".
NO >> GO TO 2.

2.CHECK AWD LOCK SWITCH

Perform the trouble diagnosis for AWD 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 AWD LOCK INDICATOR LAMP SIGNAL

With CONSULT-III

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Change AWD lock switch to “LOCK” from “AUTO”.
3. Check “4WD MODE MON” of CONSULT-III “DATA MONITOR” for “ALL MODE AWD/4WD”.

Does the item on “DATA MONITOR” indicate “LOCK”?

YES >> GO TO 4.
NO >> Replace AWD control unit. Refer to DLN-50, "Exploded View".

4.CHECK COMBINATION METER POWER SUPPLY CIRCUIT

Perform the trouble diagnosis for combination meter power supply circuit. Refer to MWI-43, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace the error-detected parts.

ECU DIAGNOSIS INFORMATION

AWD CONTROL UNIT

Reference Value

INFOID:0000000005514183

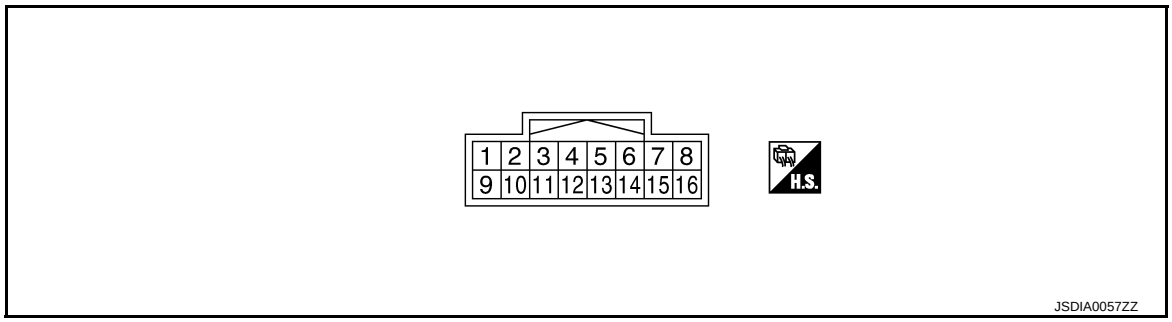
VALUES ON THE DIAGNOSIS TOOL

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	AWD warning lamp: ON		On
	AWD warning lamp: OFF		Off
4WD MODE SW	Releasing AWD lock switch.		AUTO
	AWD lock switch is hold pressed.		LOCK
4WD MODE MON	AWD LOCK indicator lamp: OFF		AUTO
	AWD 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	AWD LOCK indicator lamp: OFF	Approx. 0.000 A
		AWD LOCK indicator lamp: ON	Approx. 0.000 A
	Engine running • 3,000 rpm or more constant	AWD LOCK indicator lamp: OFF	Approx. 0.000 – 1.800 A*
		AWD LOCK indicator lamp: ON	Approx. 1.800 A
FR RH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **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 **CAUTION:** **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 **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display(±10% or less)

Monitor item	Condition	Value/Status
RR LH SENSOR	Vehicle stopped	0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **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		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
1 (LG)	Ground	AWD solenoid power supply	Output	Engine speed: At idle	AWD LOCK indicator lamp: OFF	0 V
					AWD LOCK indicator lamp: ON	0 V
				Engine speed: 3,000 rpm or more constant	AWD LOCK indicator lamp: OFF	2.5 V*
					AWD LOCK indicator lamp: ON	8 V
2 (L)	Ground	AWD 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/ Output	—		—
9 (G)	Ground	Power supply (AWD solenoid)	Input	Always		Battery voltage
10 (B)	Ground	Ground	—	Always		0 V
11 (B)	Ground	Ground	—	Always		0 V
14 (Y)	Ground	AWD lock switch	Output	Ignition switch: ON	Releasing AWD lock switch	Battery voltage
					AWD lock switch is hold pressed.	0 V
16 (P)	—	CAN-L	Input/ Output	—		—

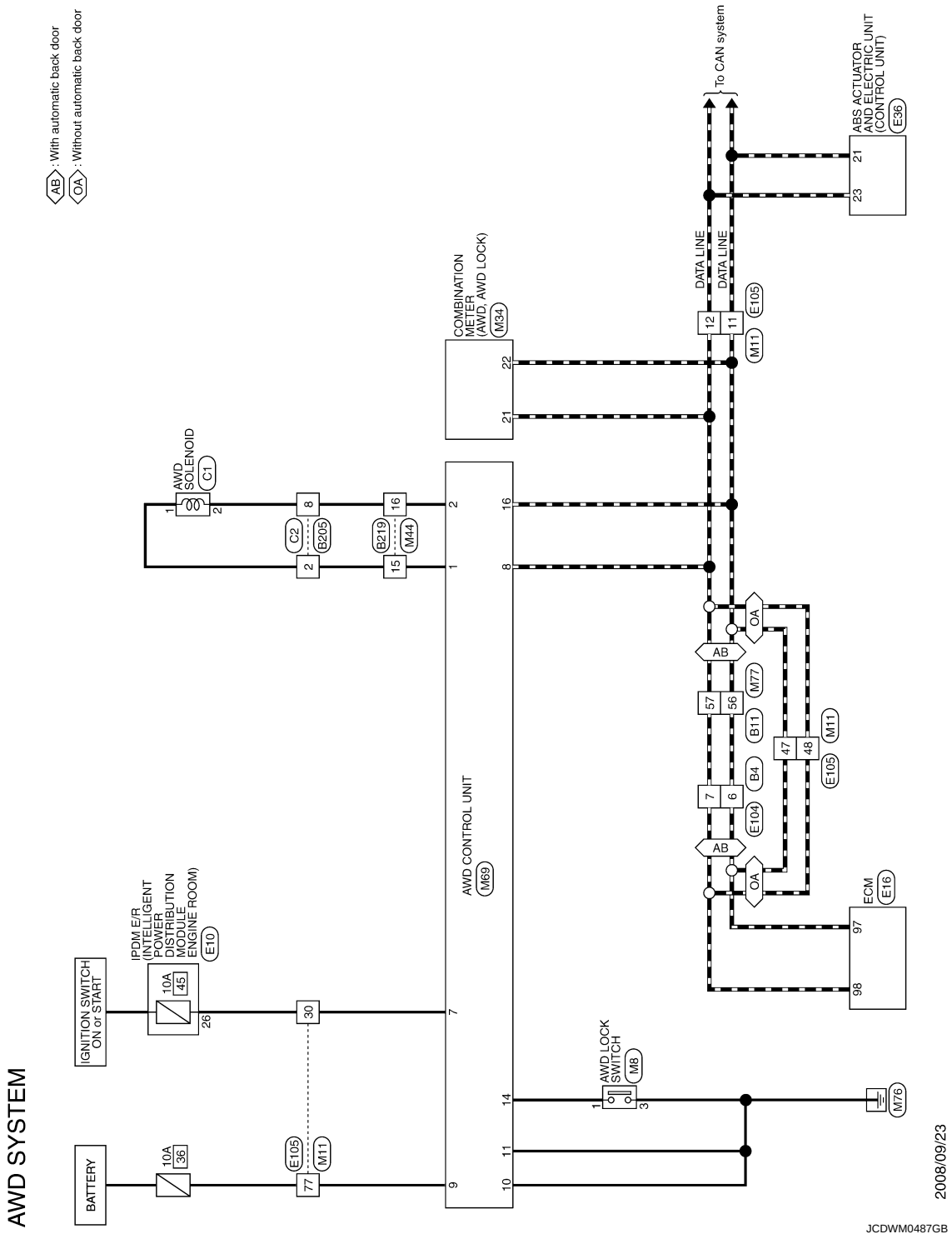
*: The values are changed by throttle opening and engine speed.

CAUTION:

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

Wiring Diagram - AWD SYSTEM -

INFOID:0000000005514184



AWD SYSTEM

Connector No.	B4
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS

H.S.

1	2	3		4	5	6	7
8	9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name [Specification]
1	SB	–
2	W	–
3	W	–
4	R	–
5	O	–
6	P	–
7	L	–
8	B	–
9	LG	–
10	V	–
11	L	–
12	BR	–
13	P	–
14	BR	–
15	O	–
16	G	–

Connector No.	B11
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS19

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	SHIELD	–
2	B	–
3	R/L	–
4	R/W	–
5	SB	–
6	P	–
7	V	–
8	SHIELD	–
9	BR/L	–
10	Y/G	–
11	Y/L	–
12	W/L	–
13	L	–
14	BR	–
15	SB	–
16	BR	–
17	V	–
18	SB	–
19	R	–
20	P	–
21	LG	–
22	W	–
23	Y	–
24	GR	–
25	Y	–
27	V	–
28	W/L	–
30	P	–
31	O	–
32	BR	–
34	SB	–
35	SHIELD	–
36	L/O	–
37	LG	–
40	Y	–
41	O	–
42	SB	–
43	G	–
44	BR	–
45	L	–
46	GR	–
47	V	–
48	GR	–[With rear view camera and telephone]
48	BR	–[With rear view camera without telephone]
49	Y	–
50	SHIELD	–
51	B	–
52	B	–
53	Y	–
54	LG	–
55	BR	–
56	P	–
57	L	–
58	R	–
59	SHIELD	–
60	B	–
61	R/L	–
62	R/W	–
63	LG	–
64	Y	–
66	GR	–
67	G	–
68	R	–
69	SHIELD	–
70	W/R	–
71	B/R	–
72	Y	–
73	LG	–
74	SB	–
75	L	–
76	G	–
77	R	–
78	SHIELD	–
79	B	–
80	W	–
81	R	–
82	L	–
83	BR	–
84	O	–
85	G	–
86	SB	–
87	R	–
88	G	–
89	GR	–
90	Y	–
91	G	–
92	BR	–
93	G	–
94	V	–
95	BR	–
96	GR	–
97	R	–
98	LG	–
99	O	–

Connector No.	B205
Connector Name	WIRE TO WIRE
Connector Type	RH12FB

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	SB	–
3	V	–
7	B	–
8	Y	–
9	P	–

Connector No.	B219
Connector Name	WIRE TO WIRE
Connector Type	TH32MW-NH

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/R	–
2	B/R	–
3	SHIELD	–
4	W/R	–
5	B/R	–
6	SHIELD	–
7	GR/V	–
8	W/L	–
9	SHIELD	–
10	GR/V	–
11	W/L	–
12	SHIELD	–
13	SB	–
15	SB	–
16	Y	–
17	R	–
18	W	–
29	G	–
30	P	–
31	V	–
32	BR	–

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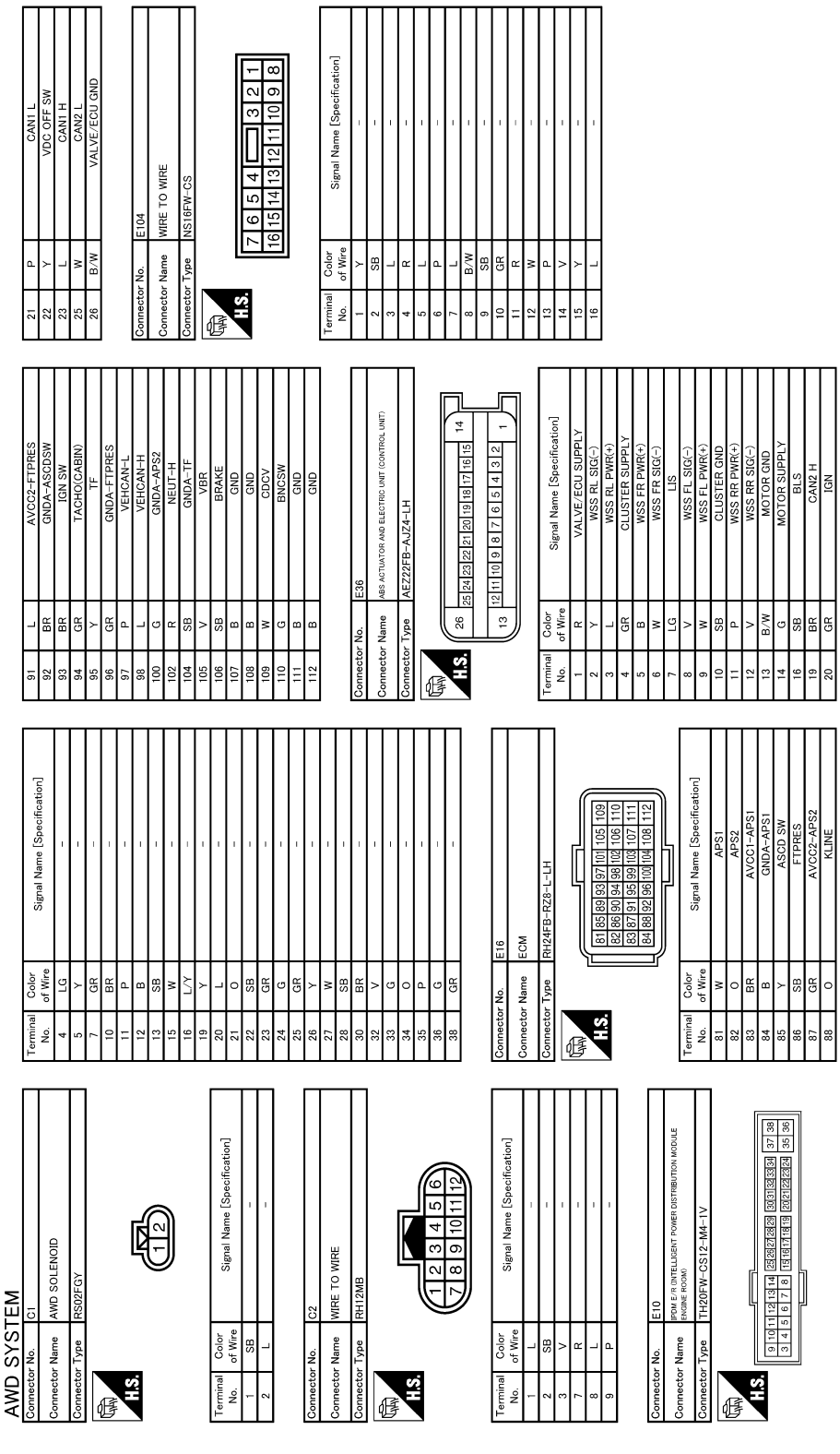
AWD SYSTEM
Connector No. C1
Connector Name AWD SOLENOID
Connector Type RS02FGY
H.S.
Terminal No. Color of Wire Signal Name [Specification]
1 SB –
2 L –
Connector No. C2
Connector Name WIRE TO WIRE
Connector Type RH12MB
H.S.
Terminal No. Color of Wire Signal Name [Specification]
1 L –
2 SB –
3 V –
7 R –
8 L –
9 P –
Connector No. E10
Connector Name IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type TH20FW-CS12-M4-1V
H.S.
Terminal No. Color of Wire Signal Name [Specification]
4 LG –
5 Y –
7 GR –
10 BR –
11 P –
12 B –
13 SB –
15 W –
16 L/Y –
19 Y –
20 L –
21 O –
22 SB –
23 GR –
24 G –
25 GR –
26 Y –
27 W –
28 SB –
30 BR –
32 V –
33 G –
34 O –
35 P –
36 G –
38 GR –
Connector No. E16
Connector Name ECM
Connector Type RH24FB-RZ8-L-LH
H.S.
Terminal No. Color of Wire Signal Name [Specification]
81 W APS1
82 O APS2
83 BR AVCC1-APS1
84 B GNDA-APS1
85 Y ASCD SW
86 SB FTPRES
87 GR AVCC2-APS2
88 O KLINE
91 L AVCC2-FTPRES
92 BR GNDA-ASCDSW
93 BR IGN SW
94 GR TACHO/CABIN
95 Y TF
96 GR GNDA-FTPRES
97 P VEHCAN-H
98 L VEHCAN-L
100 G GNDA-APS2
102 R NEUT-H
104 SB GNDA-TF
105 V VBR
106 SB BRAKE
107 B GND
108 B GND
109 W CDCV
110 G BNCSW
111 B GND
112 B GND
Connector No. E36
Connector Name ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type AEZ22FB-AJZ4-LH
H.S.
Terminal No. Color of Wire Signal Name [Specification]
1 R VALVE/ECU SUPPLY
2 Y WSS RL SIG(–)
3 L WSS RL PWR(+)
4 GR CLUSTER SUPPLY
5 B WSS FR PWR(+)
6 W WSS FR SIG(–)
7 LG LIS
8 V WSS FL SIG(–)
9 W WSS FL PWR(+)
10 SB CLUSTER GND
11 P WSS RR PWR(+)
12 V WSS RR SIG(–)
13 B/W MOTOR GND
14 G MOTOR SUPPLY
16 SB BLS
19 BR CAN2 H
20 GR IGN
21 P CAN1 L
22 Y VDC OFF SW
23 L CAN1 H
25 W CAN2 L
26 B/W VALVE/ECU GND
Connector No. E104
Connector Name WIRE TO WIRE
Connector Type NS16FW-CS
H.S.
Terminal No. Color of Wire Signal Name [Specification]
1 Y –
2 SB –
3 L –
4 R –
5 L –
6 P –
7 L –
8 B/W –
9 SB –
10 GR –
11 R –
12 W –
13 P –
14 V –
15 Y –
16 L –
JCDWM0723GB

AWD SYSTEM

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH70MW-CS10-M3

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	BR	–
3	Y	–
4	W	–
5	LG	–
6	GR	–
8	G	–
11	P	–
12	L	–
13	Y	–
14	O	–
15	BR	–
20	Y	–
21	BR	–
22	P	–
23	P	–
24	L	–
25	O	–
26	G	–
27	V	–
28	SB	–
29	W	–
30	Y	–
47	P	–
48	L	–
49	SB	–
50	GR	–
51	LG	–
52	V	–
53	GR	–
54	BR	–
55	Y	–
56	W/L	–
60	V	–
61	BR	–
62	O	–
63	L/O	–
64	SHIELD	–
66	W	–
67	BR	–
68	Y	–
69	SB	–
70	GR	–
71	SB	–
72	Y	–
73	L	–
74	W	–
75	BR	–
76	GR	–
77	O	–
78	V	–
79	Y	–
80	R	–
81	W	–
82	LG	–
83	O	–

Connector No.	M8
Connector Name	AWD LOCK SWITCH
Connector Type	TK06FW-1V

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	SB	–
3	B	–
4	R	–

Connector No.	M11
Connector Name	WIRE TO WIRE
Connector Type	TH70FW-CS10-M3

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
2	L	–
3	P	–
4	O	–
5	O	–
6	G	–
8	R	–
11	P	–
12	L	–
13	V	–
14	Y	–
15	R	–
20	Y	–
21	BR	–
22	G	–
23	P	–
24	Y	–
25	L	–
26	L	–
27	O	–
28	BR	–
29	L	–
30	R	–
47	P	–
48	L	–
49	W	–
50	GR	–
51	LG	–
52	Y	–
53	V	–
54	SB	–
55	P	–
56	SB	–
60	V	–
61	GR	–
62	O	–
63	V	–
64	SHIELD	–
66	W	–
67	R	–
68	W	–
69	P	–
70	G	–
71	G	–
72	BR	–
73	L	–
74	W	–
75	BR	–
76	R	–
77	G	–
78	Y	–
79	G	–
80	R	–
81	W	–
82	W	–
83	O	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	TH40FW-NH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BAT
2	O	IGN
3	B	GROUND
4	B	GROUND
5	SB	ILLUMINATION CONTROL
8	SB	TRIP RESET SWITCH
9	W	SW ILL POWER
10	O	METER CONTROL SW GND
11	L	ENTER SWITCH
12	R	SELECT SWITCH
13	V	ILLUMINATION CONTROL SWITCH (+)[With automatic drive positioner]
13	Y	ILLUMINATION CONTROL SWITCH (+)[Without automatic drive positioner]
14	GR	ILLUMINATION CONTROL SWITCH (–)
15	BR	AIR BAG
18	L	AMBIENT SENSOR
19	P	AMBIENT SENSOR POWER
20	Y	AMBIENT SENSOR GROUND
21	L	CAN-H
22	P	CAN-L
23	B	GROUND
24	W	FUEL LEVEL SENSOR GROUND
25	BR	CHG
26	G	PARKING BRAKE SWITCH
27	V	BRAKE FLUID LEVEL SWITCH
29	R	WASHER LEVEL SWITCH
30	P	VEHICLE SPEED (2–PULSE)
31	V	VEHICLE SPEED (8–PULSE)
32	LG	OD OFF/SPORTS
34	G	FUEL LEVEL SENSOR
35	SB	SEAT BELT BUCKLE SWITCH (DRIVER SIDE)
36	R	SEAT BELT BUCKLE SWITCH (PASSENGER SIDE)

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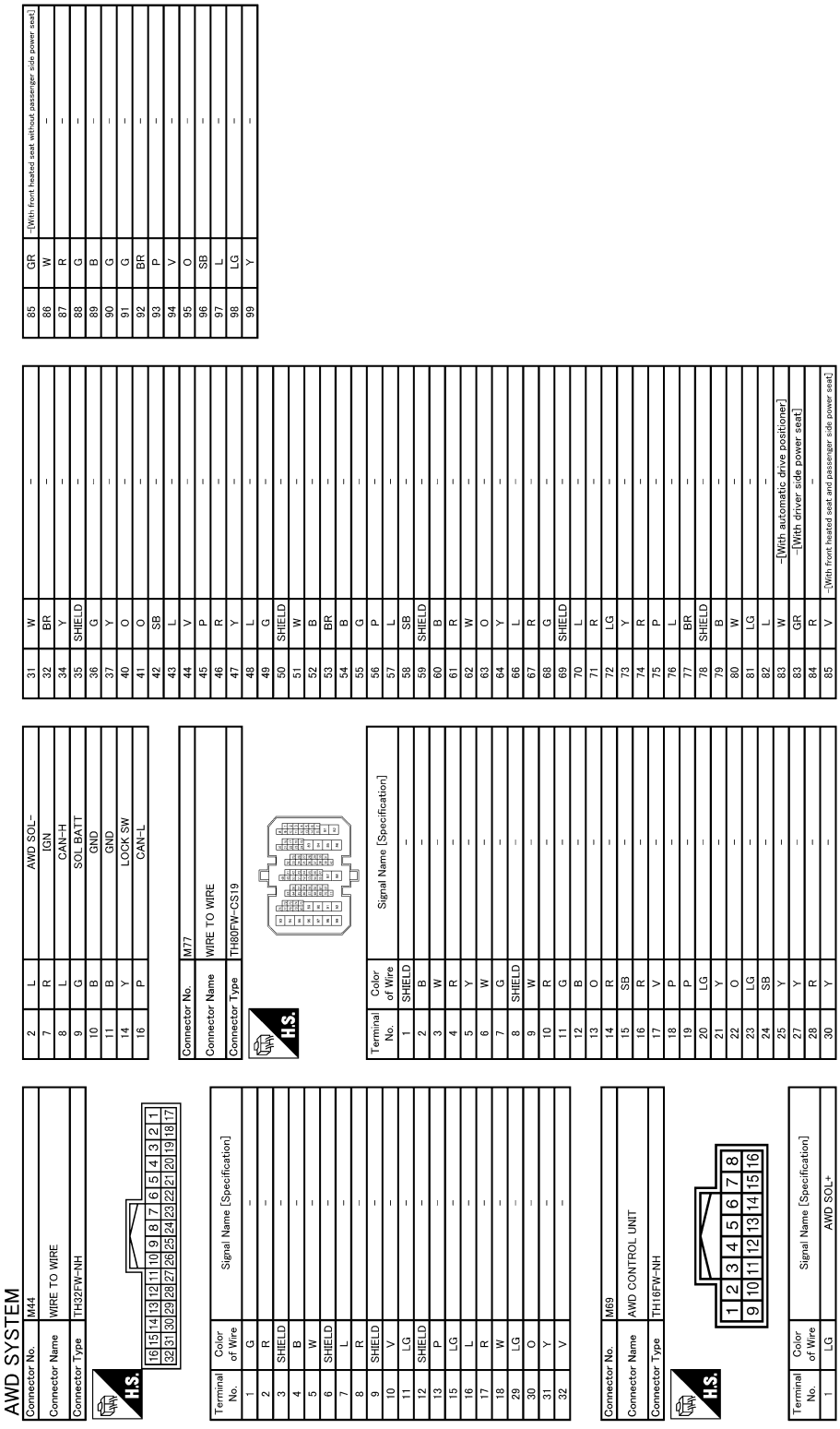


JCDWM0725GB

Fail-Safe

INFOID:0000000005514185

AWD system

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

- AWD system activates its protection function (shuts down AWD system temporarily) if AWD system detects high load continuously or the front wheel tire size differs from the rear tire size. (AWD system is automatically restored if AWD 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	—	AWD control unit	Transfer assembly in protection mode. It is not malfunction. (Internal temperature rise of electronic controlled coupling)
	Blinking*2	—	AWD control unit	Malfunction in each tire or different tire diameter
Fail-safe	ON	C1201	AWD control unit	Internal malfunction of AWD control unit
		C1203	ABS actuator and electric unit (control unit)	ABS malfunction • Vehicle speed signal error
		C1204	AWD solenoid	• Internal malfunction of electronic controlled coupling • Malfunction of AWD solenoid power supply circuit (open or short) • Malfunction of AWD solenoid command current
		C1205	AWD control unit	Internal malfunction of AWD control unit
		C1210	ECM	Malfunction of engine control system
		U1000	CAN communication line	• CAN communication error • Malfunction of AWD control unit
		U1010	AWD control unit	Malfunction of AWD 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:0000000005514186

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	• U1000 CAN COMM CIRCUIT • U1010 CONTROL UNIT (CAN)
2	• C1201 CONTROLLER FAILURE • C1205 4WD ACTUATOR RLY
3	• C1204 4WD SOLENOID
4	• C1203 ABS SYSTEM • C1210 ENGINE SIGNAL 1

DTC Index

INFOID:0000000005514187

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

SYMPTOM DIAGNOSIS

AWD WARNING LAMP DOES NOT TURN ON

Description

INFOID:0000000005514188

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

Diagnosis Procedure

INFOID:0000000005514189

1.CHECK AWD WARNING LAMP

Perform the trouble diagnosis for AWD 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.

AWD WARNING LAMP DOES NOT TURN OFF

Description

INFOID:0000000005514190

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

Diagnosis Procedure

INFOID:0000000005514191

1.PERFORM SELF-DIAGNOSIS

With CONSULT-III

Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is any DTC detected?

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

2.CHECK AWD WARNING LAMP

Perform the trouble diagnosis of the AWD 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 AWD 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.

HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS

Description

INFOID:0000000005514192

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:0000000005514193

1. PERFORM ECM SELF-DIAGNOSIS

With CONSULT-III
Perform self-diagnosis for “ENGINE”.

Is any DTC detected?

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

2. PERFORM SELF-DIAGNOSIS

With CONSULT-III
Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “U1000” detected?

YES >> CAN specification chart. Refer to LAN-17, "Trouble Diagnosis Flow Chart".
NO >> GO TO 3.

3. CHECK AWD SOLENOID

Perform the trouble diagnosis of the AWD 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-97, "Exploded View".
NO >> Check each harness connector pin terminal for disconnection.

VEHICLE DOES NOT ENTER AWD MODE

Description

INFOID:0000000005514194

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

Diagnosis Procedure

INFOID:0000000005514195

1.CHECK AWD WARNING LAMP

Turn the ignition switch ON.

Does AWD 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 CONSULT-III “DATA MONITOR” for “ALL MODE AWD/4WD”.

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-78, "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-97, "Exploded View".
NO >> Check each harness connector pin terminal for disconnection.

AWD WARNING LAMP BLINKS QUICKLY

Description

INFOID:0000000005514196

While driving, AWD 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.

AWD WARNING LAMP BLINKS SLOWLY

Description

INFOID:0000000005514197

AWD warning lamp blinks at approximately 2 seconds intervals while driving.

Diagnosis Procedure

INFOID:0000000005514198

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 error-detected 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 CONSULT-III “DATA MONITOR” for “ALL MODE AWD/4WD”.

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

YES >> INSPECTION END
NO >> GO TO 3.

3.TERMINAL INSPECTION

Check AWD control unit harness connector for disconnection.

Is the inspection result normal?

YES >> Replace AWD control unit. Refer to DLN-50, "Exploded View".
NO >> Repair or replace the error-detected parts.

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000005514199

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-48, "Inspection"			DLN-56, "Exploded View"	DLN-56, "Exploded View"	DLN-56, "Exploded View"	DLN-63, "Inspection After Disassembly"	DLN-63, "Inspection After Disassembly"
SUSPECTED PARTS (Possible cause)		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	2		

PRECAUTION

PRECAUTIONS

FOR USA AND CANADA

FOR USA AND CANADA : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000005514200

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

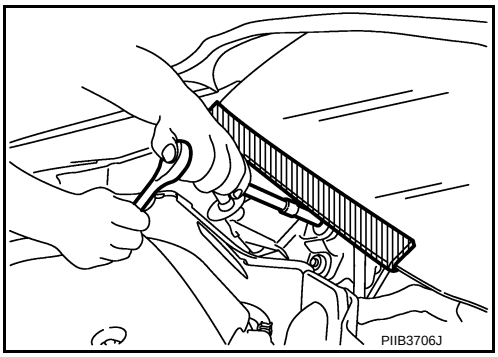
WARNING:

- **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.**

FOR USA AND CANADA : Precaution for Procedure without Cowl Top Cover

INFOID:0000000005514201

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



FOR USA AND CANADA : Service Notice or Precautions for Transfer

INFOID:0000000005514202

- 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.
- Be careful not to 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.

FOR MEXICO

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

INFOID:0000000005685094

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

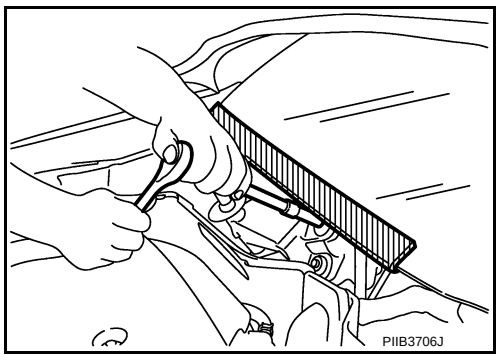
WARNING:

- **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.**

FOR MEXICO : Precaution for Procedure without Cowl Top Cover

INFOID:0000000005685092

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



FOR MEXICO : Service Notice or Precautions for Transfer

INFOID:0000000005685093

- 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.
- Be careful not to 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.

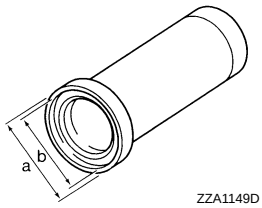
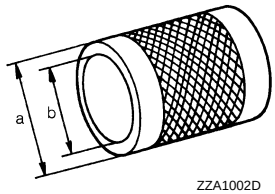
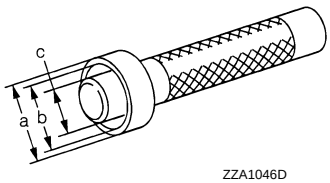
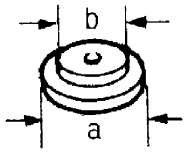
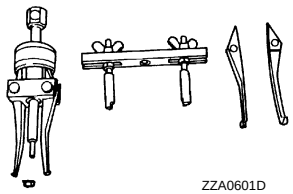
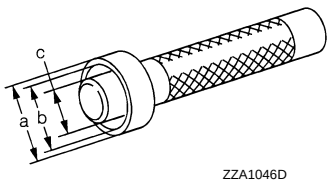
PREPARATION

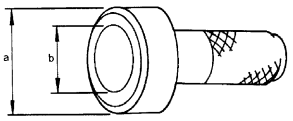
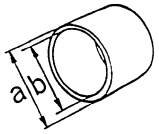
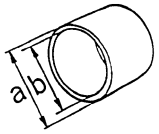
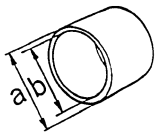
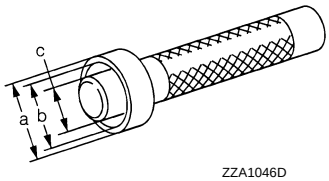
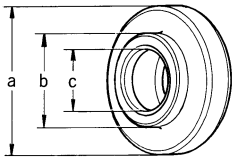
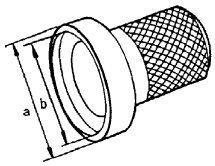
PREPARATION

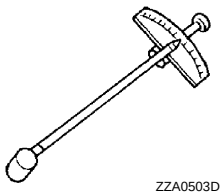
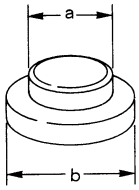
Special Service Tool

INFOID:0000000005514203

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

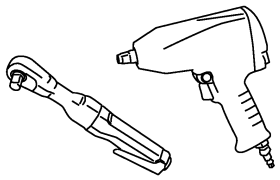
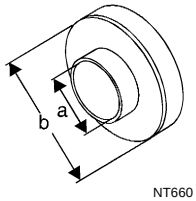
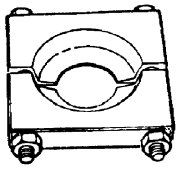
Tool number (Kent-Moore No.) Tool name		Description
KV38101700 (—) Drift a: 82 mm (3.23 in) dia. b: 78 mm (3.07 in) dia.	 ZZA1149D	Installing side oil seal (installing adapter case oil seal)
ST33200000 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.	 ZZA1002D	• Removing gear ring bearing inner race (adapter case side) • Installing companion flange
ST33220000 (J-25804-01) Drift a: 37 mm (1.46 in) dia. b: 31 mm (1.22 in) dia. c: 22 mm (0.87 in) dia.	 ZZA1046D	Removing drive pinion
ST33061000 (J-8107-2) Drift a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia.	 ZZA0810D	Removing gear ring bearing inner race (transfer case side)
KV381054S0 (J-34286) Puller	 ZZA0601D	• Removing pinion rear bearing outer race • Removing pinion front bearing outer race • Removing gear ring oil seal
ST33230000 (J-25805-01) Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.	 ZZA1046D	Installing gear ring oil seal

Tool number (Kent-Moore No.) Tool name	Description
ST30720000 (J-25405) Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.  ZZA0811D	• Installing gear ring bearing outer race (transfer case side) • Installing gear ring bearing inner race (transfer case side) • Installing gear ring bearing inner race (adapter case side) • Installing gear ring bearing outer race (adapter case side) • Installing transfer case oil seal
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 (J-35870) 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 (J-25523) Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia.  ZZA1046D	Installing pinion rear bearing outer race
ST30901000 (J-26010-01) Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.  ZZA0978D	• Installing pinion front bearing outer race • Installing pinion front bearing inner race
ST33400001 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0814D	• Installing pinion front bearing outer race • Installing pinion sleeve oil seal

Tool number (Kent-Moore No.) Tool name	Description
ST3127S000 (J-25765-A) 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:0000000005514204

Tool name	Description
Power tool  PBIC0190E	Loosening nuts and bolts and nuts
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  ZZA0700D	Removing pinion front bearing inner race

PERIODIC MAINTENANCE

TRANSFER OIL

Inspection

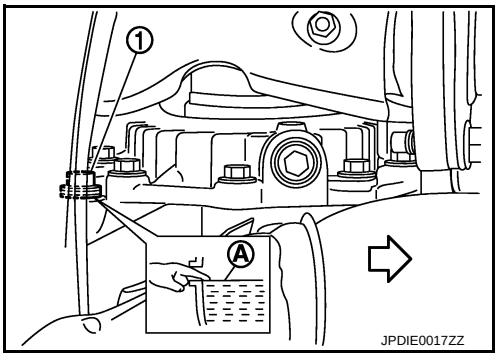
INFOID:0000000005514205

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-56, "Exploded View".



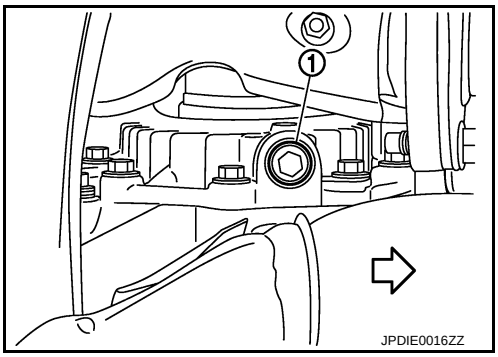
⇦ : Vehicle front

CAUTION:
Never reuse gaskets.

Draining

INFOID:0000000005514206

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-56, "Exploded View".



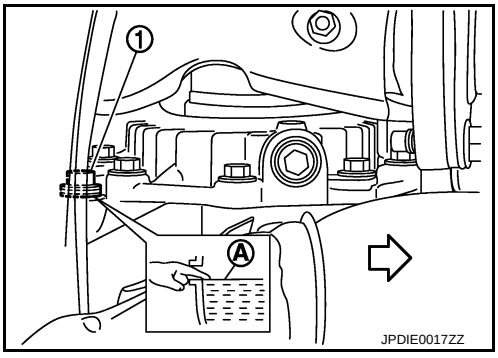
⇦ : Vehicle front

CAUTION:
Never reuse gaskets.

Refilling

INFOID:0000000005514207

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-15, "FOR NORTH AMERICA : Fluids and Lubricants" (for NORTH AMERICA), MA-16, "FOR MEXICO : Fluids and Lubricants" (for MEXICO).**
Oil capacity	**: Refer to DLN-79, "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-56, "Exploded View".

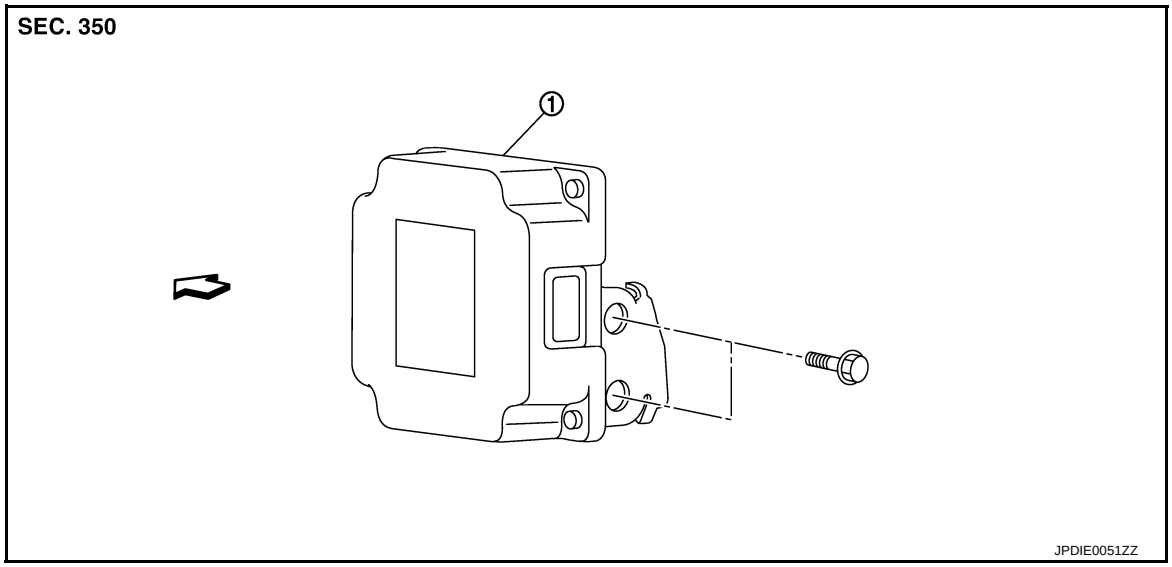
CAUTION:
Never reuse gasket.

REMOVAL AND INSTALLATION

AWD CONTROL UNIT

Exploded View

INFOID:0000000005514208



1. AWD control unit

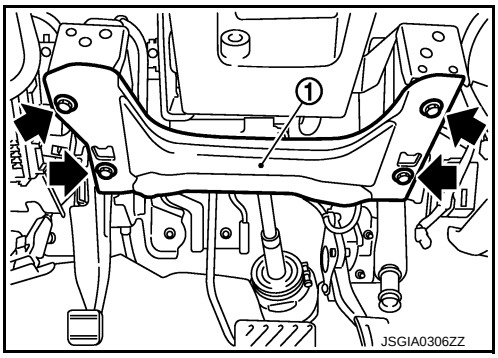
⇦: Vehicle front

Removal and Installation

INFOID:0000000005514209

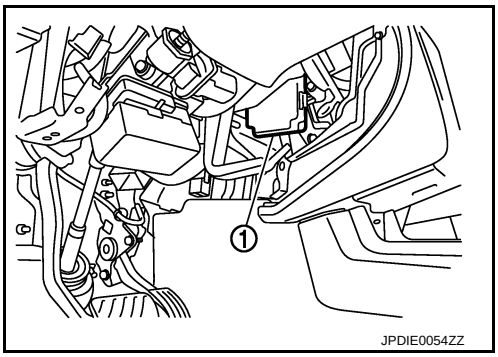
REMOVAL

1. Remove instrument lower panel LH. Refer to IP-12, "Exploded View".
2. Remove Knee protector (1).



⬅ : Bolt

3. Disconnect AWD control unit harness connector.
4. Remove AWD control unit mounting bolts.
5. Remove AWD control unit (1).



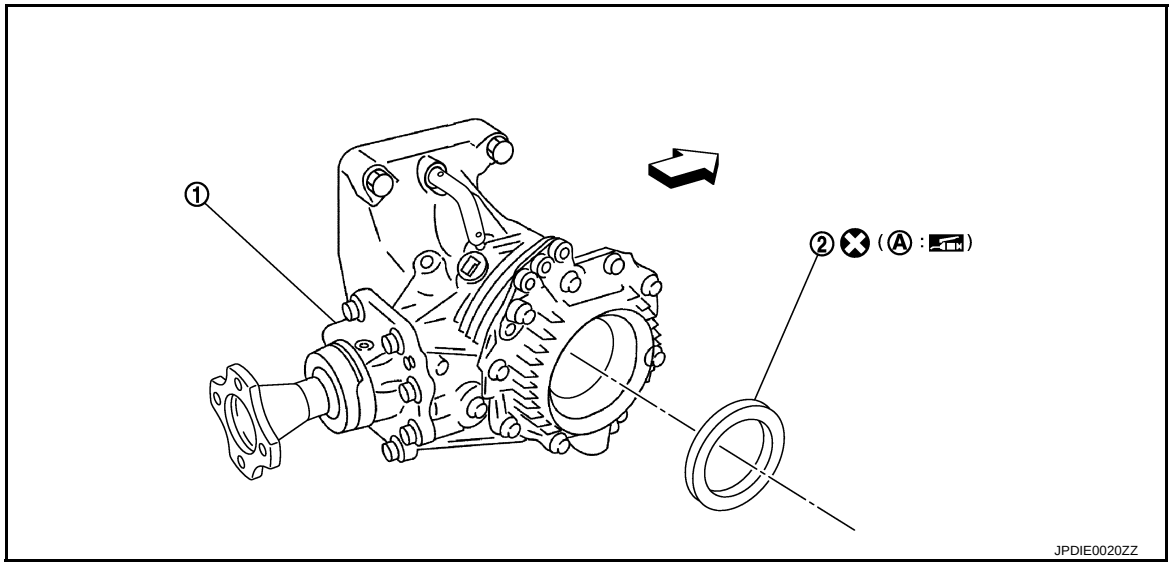
INSTALLATION

Install in the reverse order of removal.

SIDE OIL SEAL

Exploded View

INFOID:0000000005514210



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

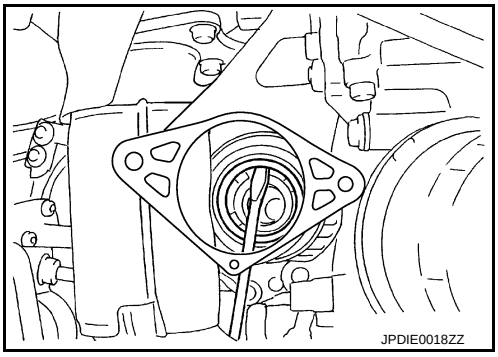
INFOID:0000000005514211

REMOVAL

NOTE:

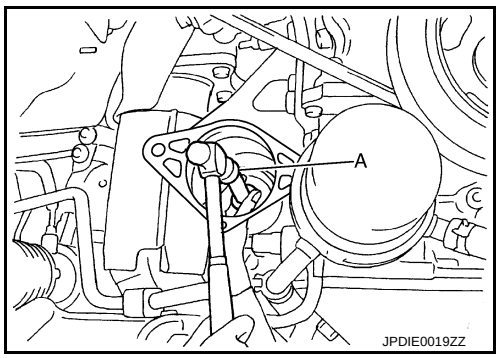
Transaxle side oil seal is attached to transaxle assembly. Replace it when transfer assembly is removed from vehicle.

1. Remove front drive shaft (right side). Refer to FAX-44, "Exploded View".
   CAUTION:
   Be careful not to damage gear oil seal inside of transfer.
2. Remove side oil seal with a suitable tool.
   CAUTION:
   Be careful not to damage adapter case.



INSTALLATION

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.**
- **Be careful not to incline side oil seal.**
2. Install front drive shaft (right side). Refer to FAX-44, "Exploded View".
CAUTION:
Be careful not to damage gear ring oil seal inside of transfer.
3. Check oil level and leakage. Refer to DLN-48, "Inspection".

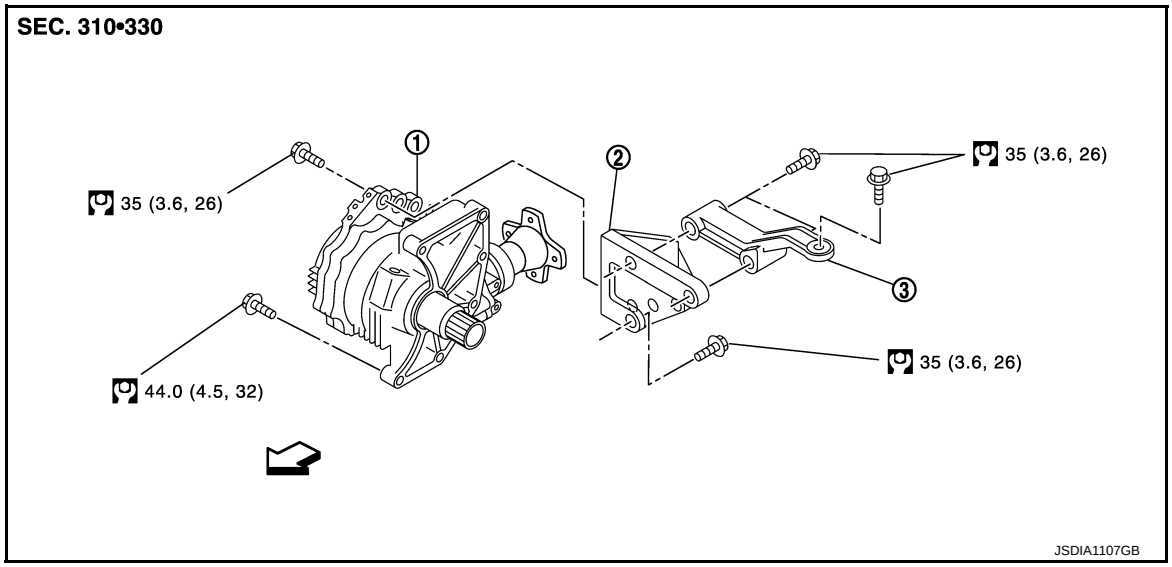


UNIT REMOVAL AND INSTALLATION

TRANSFER ASSEMBLY

Exploded View

INFOID:0000000005514212



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

INFOID:0000000005514213

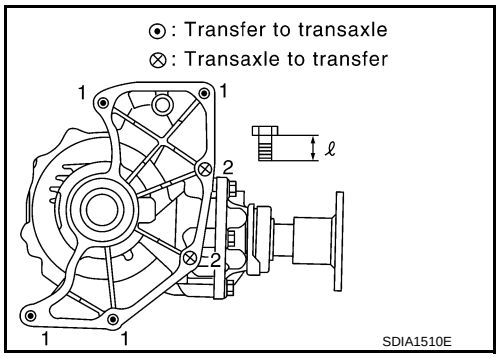
REMOVAL

1. Remove extension cowl top panel (lower and upper). Refer to EXT-21, "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-31, "Exploded View".
4. Remove air fuel ratio sensor 1 (bank 1). Refer to EM-38, "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-44, "Exploded View".
   CAUTION:
   Be careful not to 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-83, "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-38, "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-44, "Exploded View".

CAUTION:
Never let the power steering fluid into the suspension member.

17. Remove rear engine mounting insulator mounting bolt (upper side). Refer to EM-81, "AWD : Exploded View".
18. Support transaxle assembly with a suitable jack.
    CAUTION:
    When setting the transmission jack, be careful not to 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-81, "AWD : 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-81, "AWD : Exploded View".
25. Remove LH and RH engine mounting bracket. Refer to EM-81, "AWD : 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)



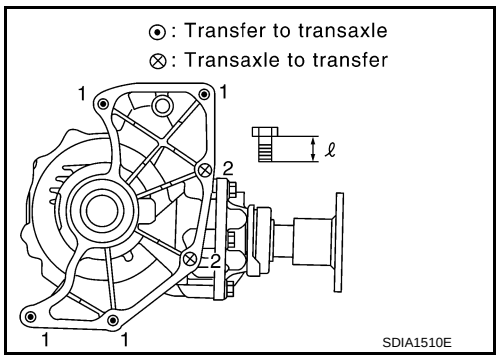
29. Remove transfer assembly from the vehicle.
    CAUTION:
    - **Never damage air breather hose.**
    - **After removing transfer from transaxle, be sure to replace differential side oil seal of the transaxle side with new one. Refer to TM-170, "AWD : Exploded View".**

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, be careful not to damage oil seal of transaxle.

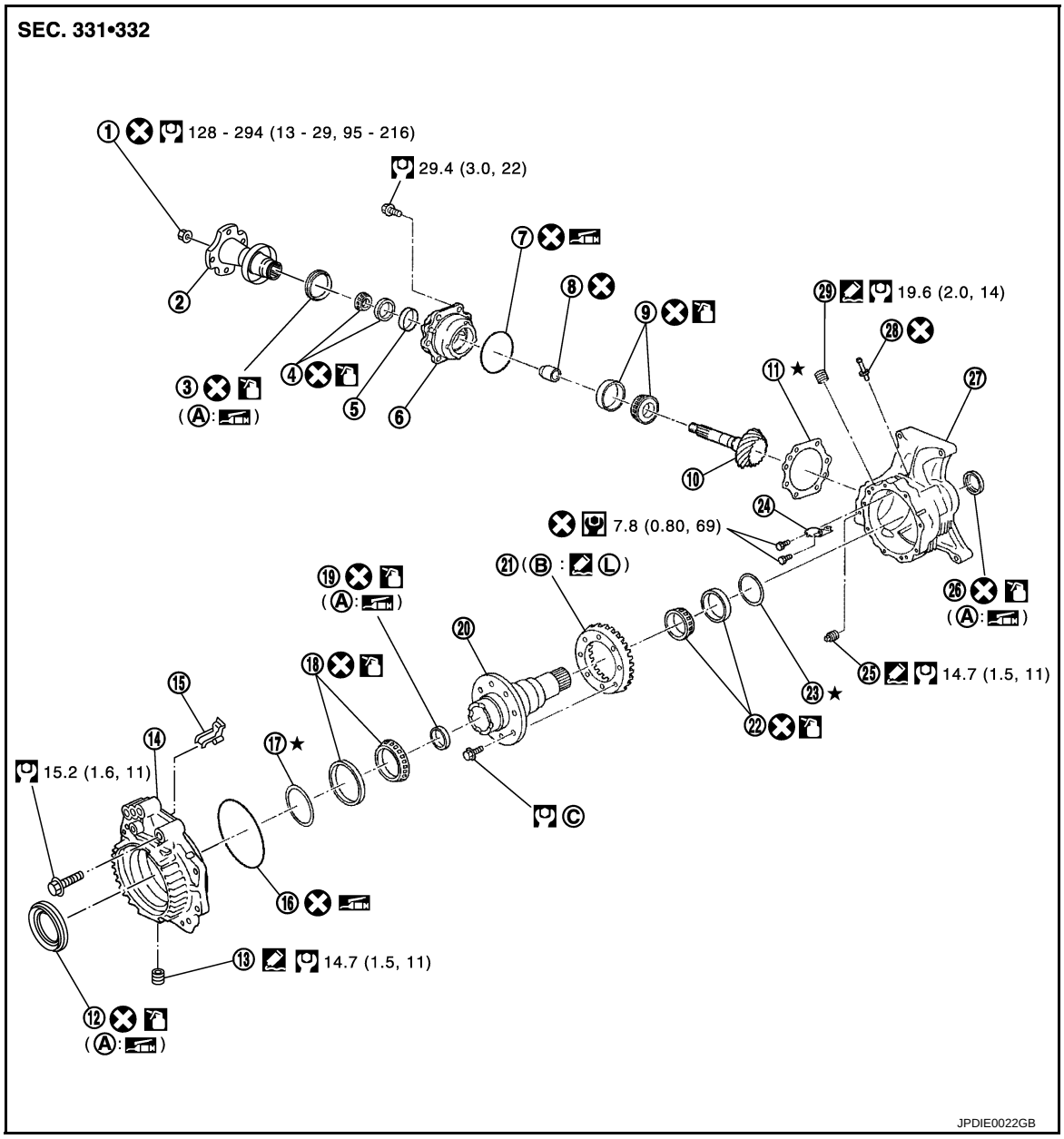
- Check oil level and check for oil leakage after installation. Refer to DLN-48, "Inspection".

UNIT DISASSEMBLY AND ASSEMBLY

ADAPTER CASE

Exploded View

INFOID:0000000005514214



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

28. Breather tube
29. Plug
A. Oil seal lip
B. Screw hole
C. For the tightening torque, refer to DLN-62, "Assembly".

: Apply gear oil.

: Apply multi-purpose grease.

: Apply Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

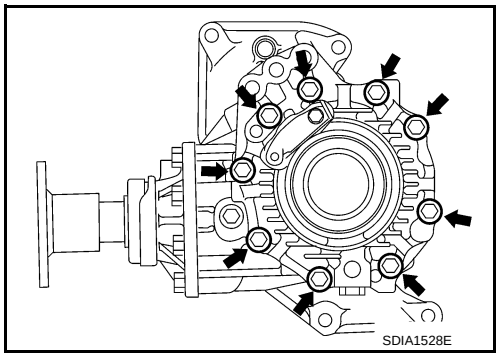
Ⓛ: Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

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

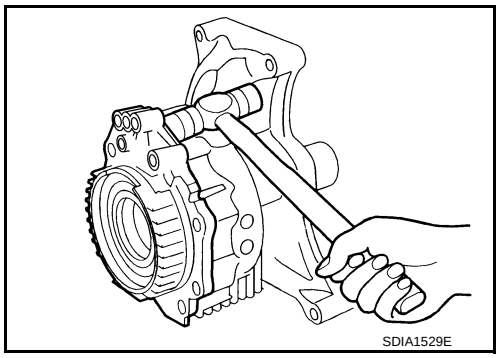
Disassembly

INFOID:0000000005514215

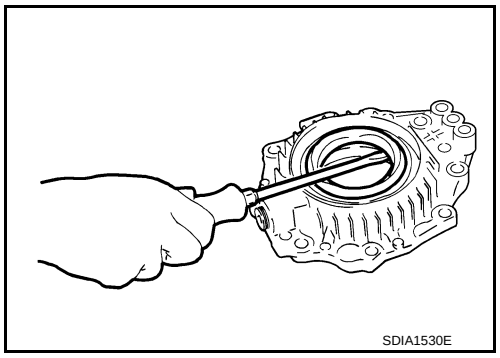
1. Remove adapter case mounting bolts (⬅).


SDIA1528E

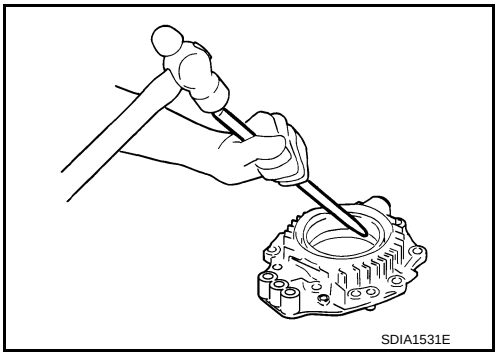
2. Lightly tap adapter case with a plastic hammer to remove adapter case.
3. Remove O-ring from adapter case.


SDIA1529E

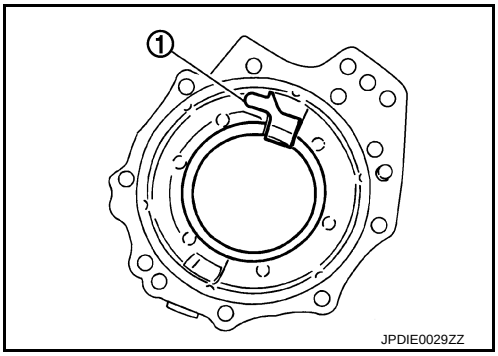
4. Remove adapter case oil seal with a suitable tool.
CAUTION:
Be careful not to damage adapter case.


SDIA1530E

5. 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).


SDIA1531E

6. Remove the oil gutter (1).
7. Remove the drain plug.



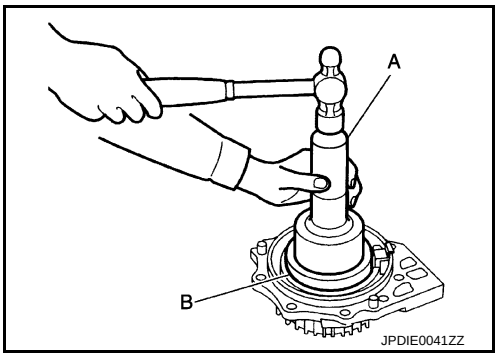
JPDIE0029ZZ

Assembly

INFOID:0000000005514216

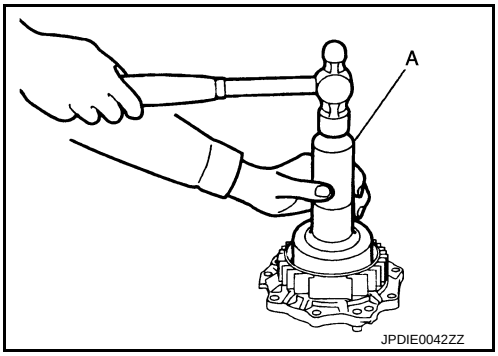
1. Select the gear ring bearing adjusting shim (adapter case side). Refer to DLN-68, "Adjustment".
2. Install the oil gutter.
3. Using the drifts, install the selected gear ring bearing adjusting shim (adapter case side) and gear ring bearing outer race (adapter case side).

   A : Drift [SST: ST30720000 (J-25405)]
   B : Drift (Commercial Service Tool)



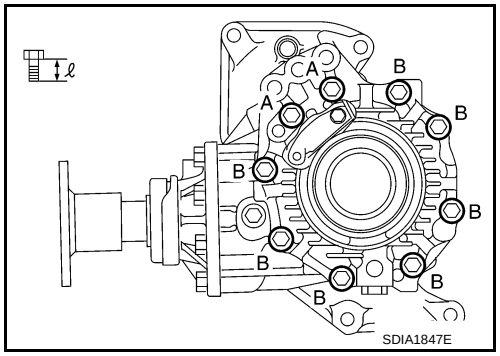
JPDIE0041ZZ

4. 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.**
5. Apply sealant on drain plug and install it to the adapter case.
   Use Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".
6. Apply multi-purpose grease lightly and evenly onto an O-ring, and install it to the adapter case.
   CAUTION:
   Never reuse the O-ring.



JPDIE0042ZZ

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-68, "Adjustment".
CAUTION:
Measure the total preload without the adapter case oil seal.

Inspection After Disassembly

INFOID:0000000005514217

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

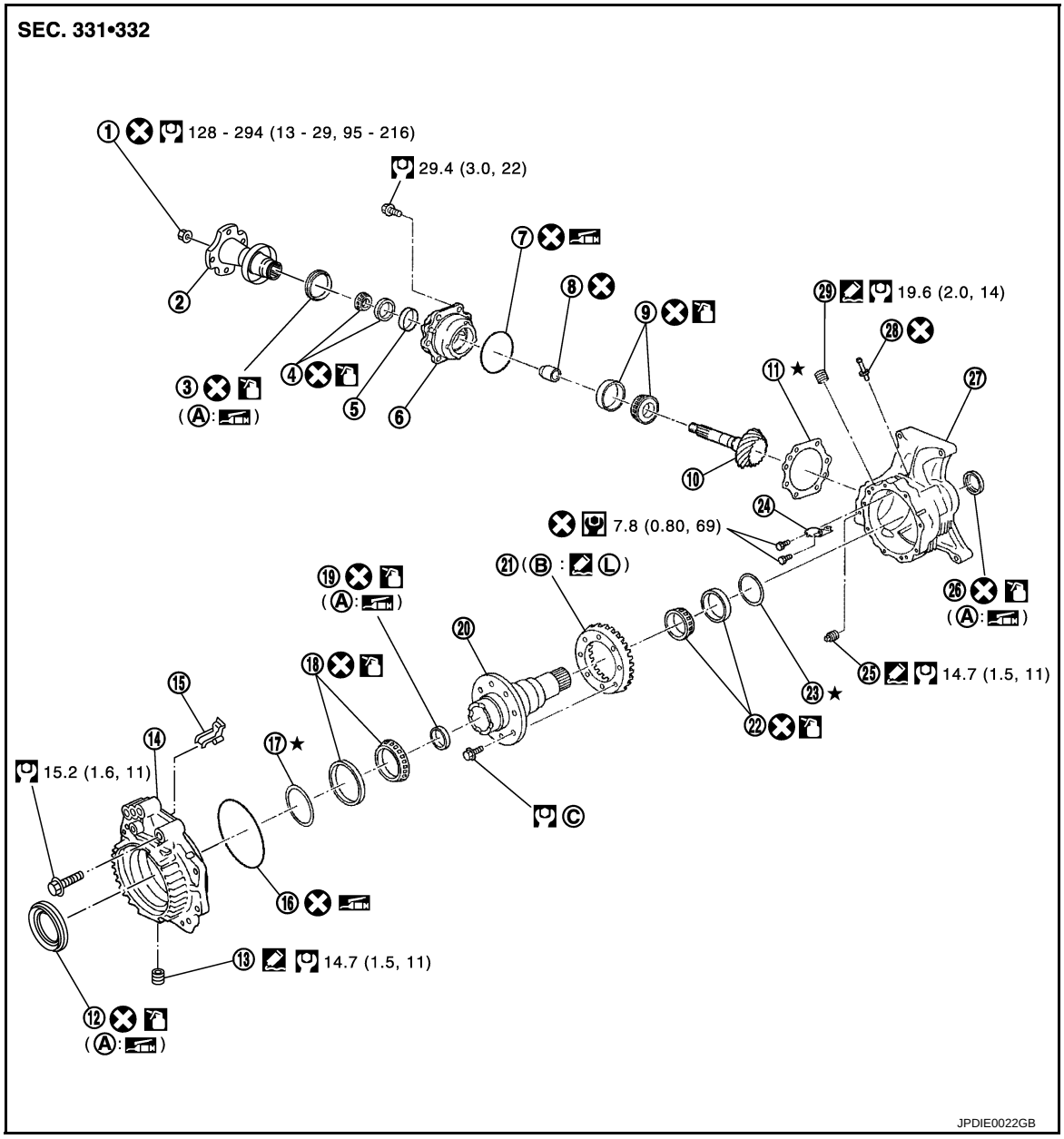
CASE

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

GEAR RING

Exploded View

INFOID:0000000005514218



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

28. Breather tube
29. Plug
A. Oil seal lip
B. Screw hole
C. For the tightening torque, refer to DLN-62, "Assembly".

: Apply gear oil.

: Apply multi-purpose grease.

: Apply Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

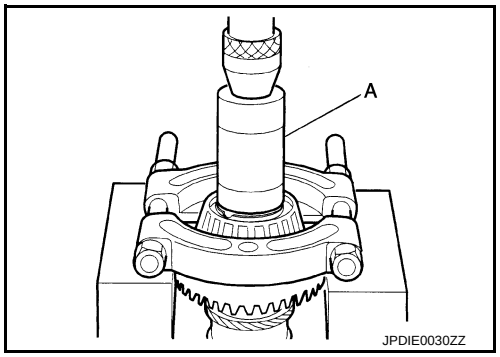
: Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

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

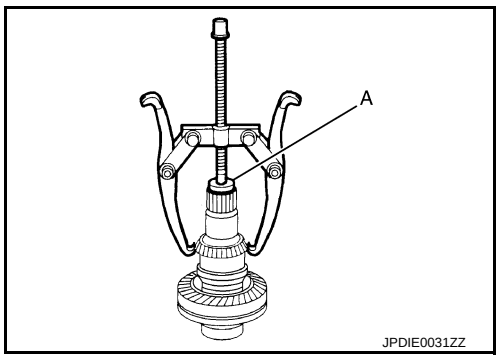
Disassembly

INFOID:0000000005514219

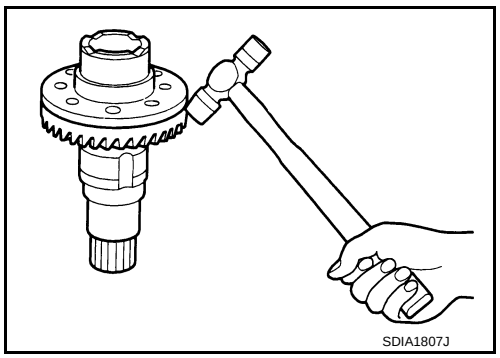
1. Remove adapter case. Refer to DLN-57, "Disassembly".
2. Remove drive gear assembly from the transfer case.
3. Remove gear ring bearing outer race (transfer case side) and gear ring bearing adjusting shim (transfer case side) from the transfer case. Refer to DLN-76, "Disassembly".
4. Remove gear ring bearing inner race (adapter case side) from ring gear shaft with the drift (A) [SST: ST33200000 (J-26082)] and a replacer.



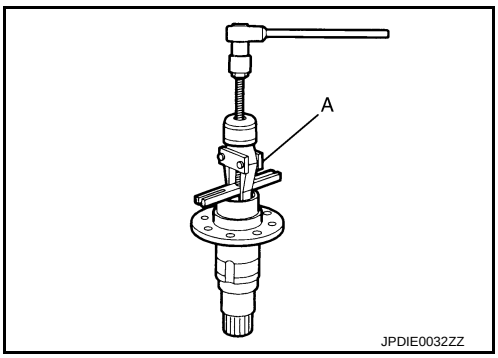
5. Remove gear ring bearing inner race (transfer case side) from gear ring with the drift (A) [SST: ST33061000 (J-8107-2)] and a puller.
6. Remove the drive gear mounting bolts.



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



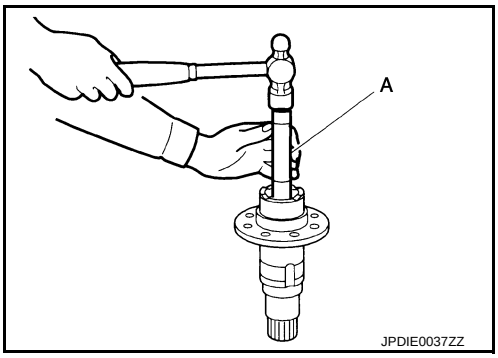
8. Remove gear ring oil seal from the gear ring with a puller (A) [SST: KV381054S0 (J-34286)].



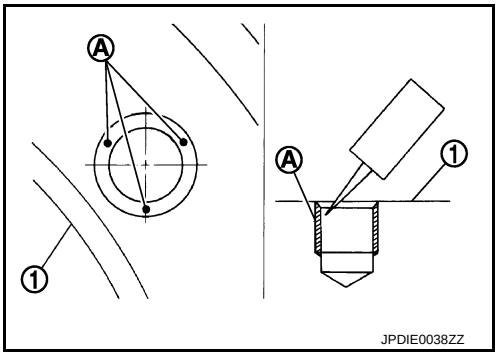
Assembly

INFOID:0000000005514220

1. Install gear ring oil seal to the gear ring with the drift (A) [SST: ST33230000 (J-25805-01)].
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-68, "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-76, "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).
Use Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".



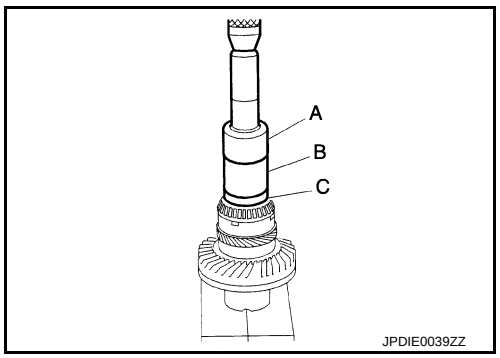
a. Completely clean and degrease the drive gear back face, thread holes, and drive gear mounting bolts.
b. Apply thread locking sealant onto the first and second threads under the thread hole chamfering of the drive gear on 3 or more different points (A).
Use Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".
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.

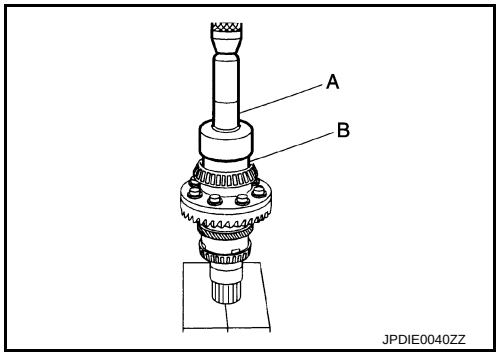
   A : Drift [SST: ST30720000 (J-25405)]
   B : Drift [SST: ST27863000 (—)]
   C : Drift [SST: KV40101630 (J-35870)]



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

   A : Drift [SST: ST30720000 (J-25405)]
   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-58, "Assembly".
11. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-68, "Adjustment".
    CAUTION:
    Measure the total preload without the adapter case oil seal.



Inspection After Disassembly

INFOID:0000000005514221

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.

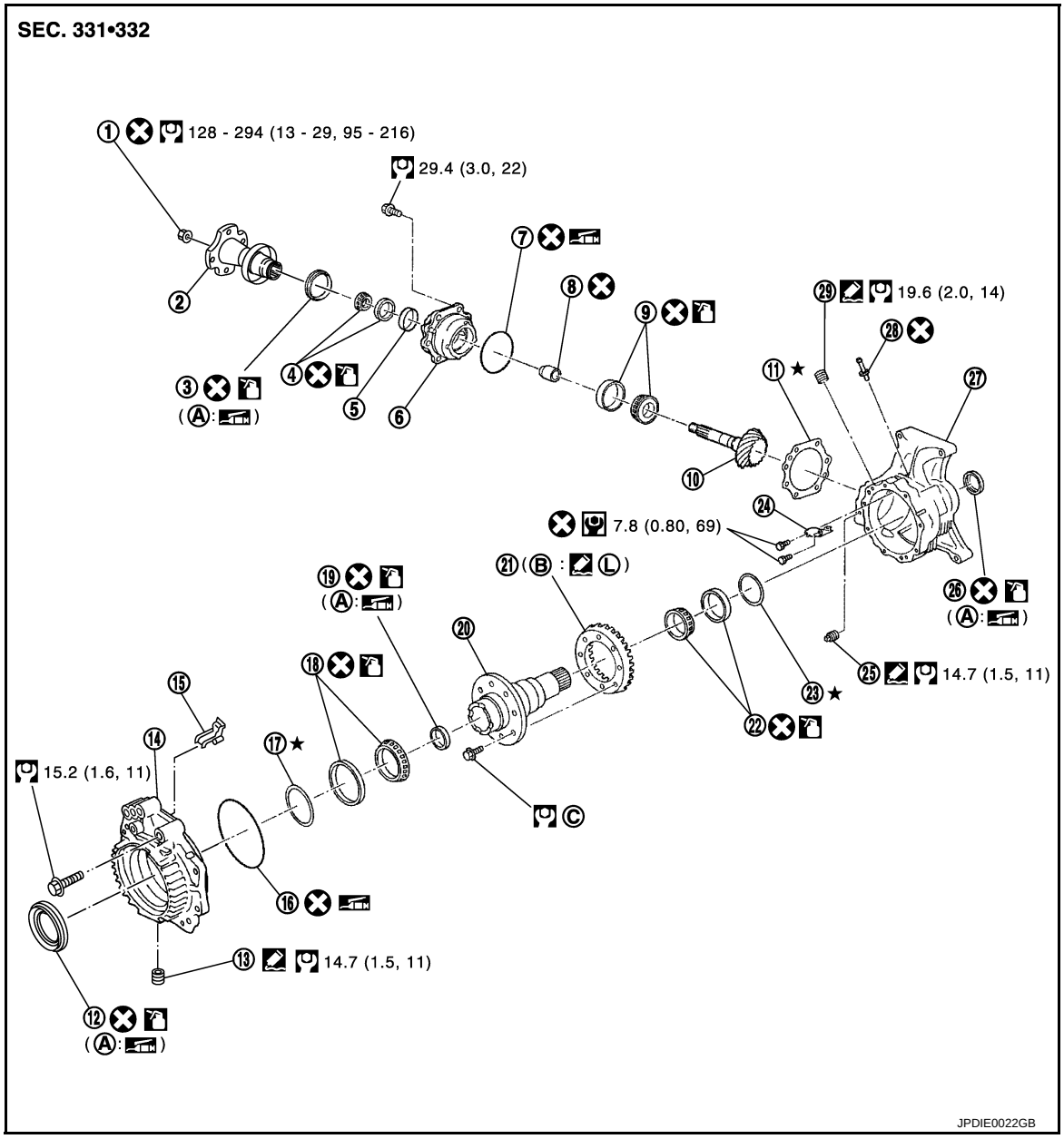
CASE

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

DRIVE PINION

Exploded View

INFOID:0000000005514222



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

28. Breather tube
29. Plug
A. Oil seal lip
B. Screw hole
C. For the tightening torque, refer to DLN-62, "Assembly".

: Apply gear oil.

: Apply multi-purpose grease.

: Apply Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

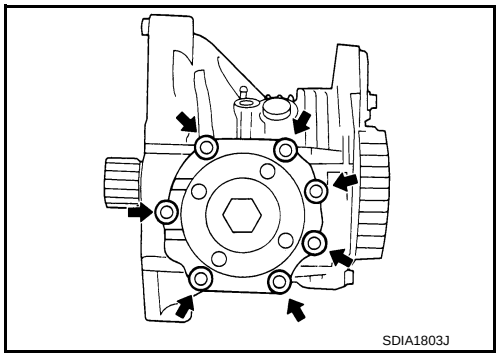
Ⓛ: Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

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

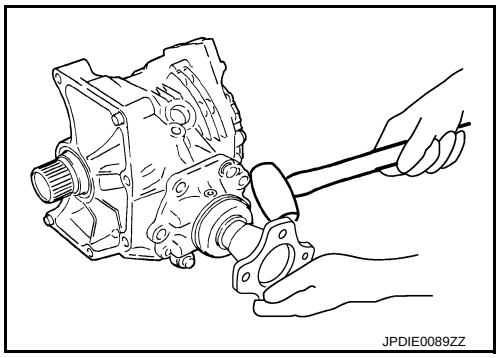
Disassembly

INFOID:0000000005514223

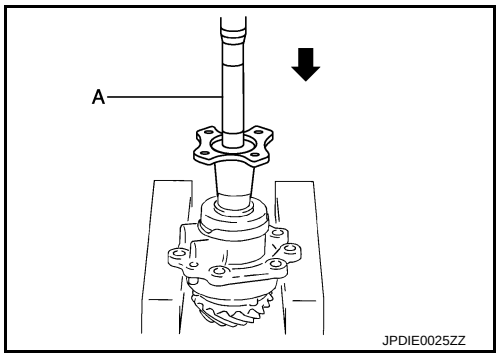
1. Remove pinion sleeve mounting bolts.


SDIA1803J

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.


JPDIE0089ZZ

5. Remove drive pinion assembly from pinion sleeve with the drift (A) [SST: ST33220000 (J-25804-01)].
6. Remove companion flange.
7. Remove the O-ring from pinion sleeve.



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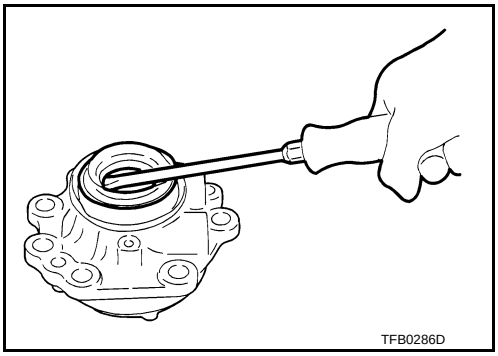
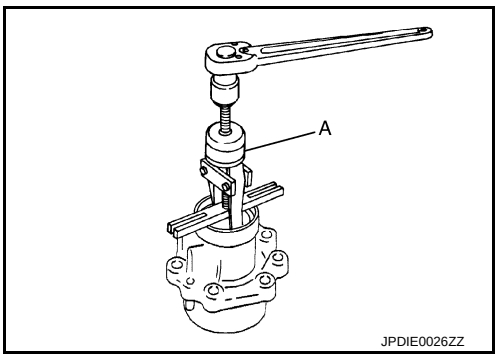
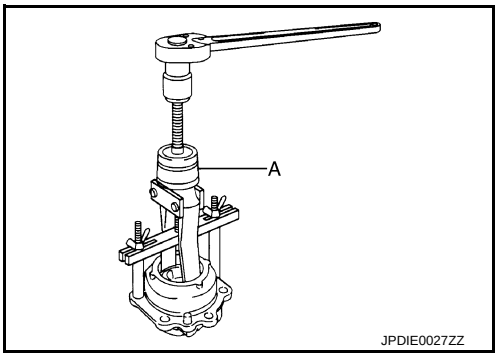
8. Remove pinion sleeve oil seal from the pinion sleeve with a suitable tool.
CAUTION:
Be careful not to damage the pinion sleeve.
9. Remove pinion rear bearing inner race.



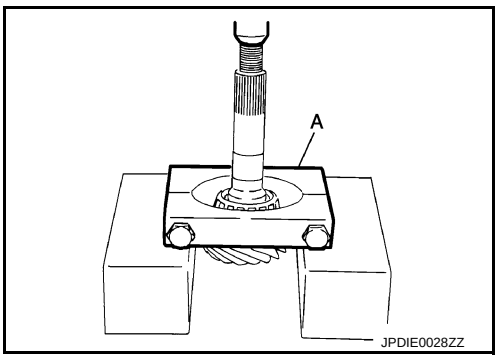
10. Remove the pinion rear bearing outer race with the puller (A) [SST: KV381054S0 (J-34286)].



11. Remove the pinion front bearing outer race with the puller (A) [SST: KV381054S0 (J-34286)].
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.

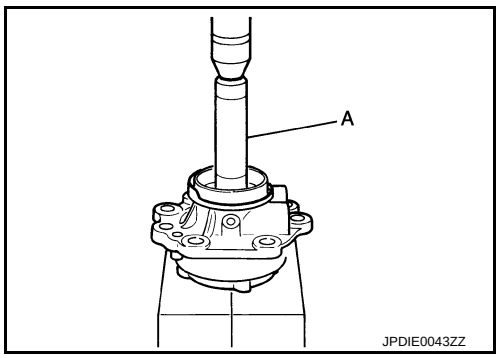


Assembly

INFOID:0000000005514224

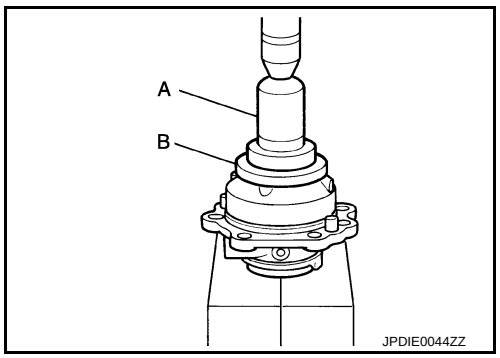
1. Select the pinion sleeve shim. Refer to DLN-68, "Adjustment".
2. Install dust cover.

3. Install the pinion rear bearing outer race with the drift (A) [SST: KV38100300 (J-25523)].



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

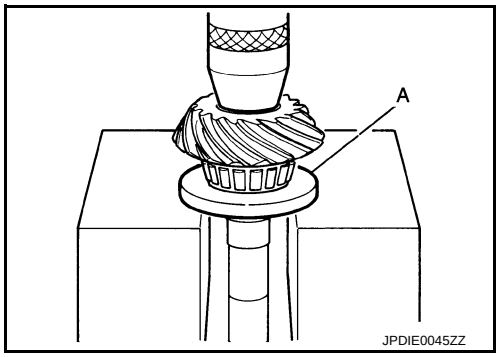
A : Drift [SST: ST33400001 (J-26082)]
B : Drift [SST: ST30901000 (J–26010-01)]



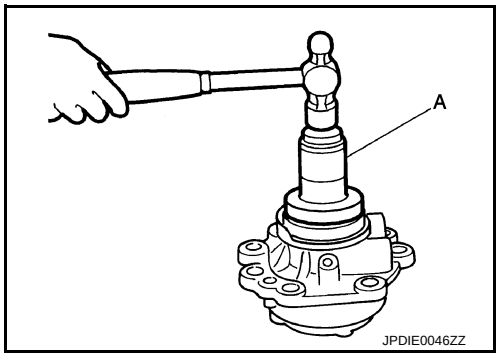
5. Install the pinion front bearing inner race to drive pinion with the drift (A) [SST: ST30901000 (J-26010-01)].
Apply gear oil to the pinion front bearing.
CAUTION:
- **Never reuse pinion front bearing.**

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 pinion rear bearing.
CAUTION:
- **Never reuse pinion rear bearing.**



8. Install pinion sleeve oil seal to pinion sleeve with the drift (A) [SST: ST33400001 (J-26082)].
Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.
CAUTION:
- **Never reuse oil seal.**

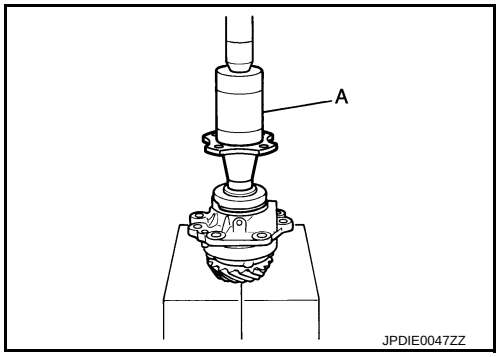


9. Install companion flange to pinion sleeve assembly with the drift (A) [SST: ST33200000 (J-26082)].

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)**



Standard

Drive pinion bearing preload **: Refer to DLN-79, "Preload 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-64, "Exploded View".
14. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-68, "Adjustment".
CAUTION:
Measure the total preload without the adapter case oil seal.

Adjustment

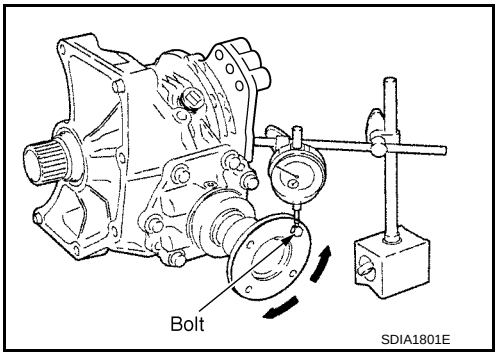
INFOID:0000000005514225

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 Check that it satisfies the standard below.

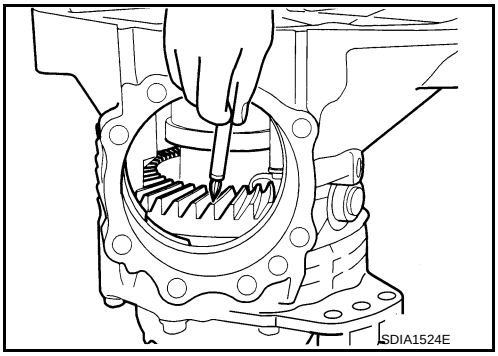
Backlash **: Refer to DLN-79, "Backlash".**

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

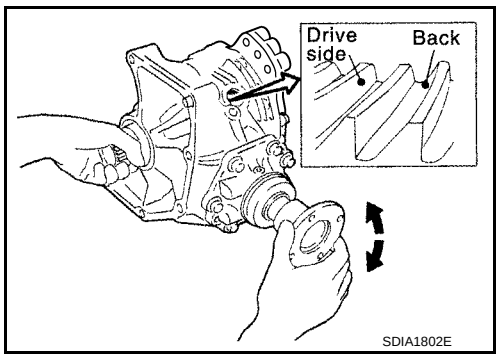


TOOTH CONTACT

1. Remove the pinion sleeve assembly. Refer to DLN-65, "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-66, "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-64, "Exploded View".
Use Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".



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
		Drive side	Back	
↑ Thicker	+0.12 (+0.0047)	Heel side / Toe side		Yes
	+0.09 (+0.0035)			
	+0.06 (+0.0024)			
	+0.03 (+0.0012)			No
	0 (0.0)			
Thinner ↓	−0.03 (−0.0012)			
	−0.06 (−0.0024)			Yes
	−0.09 (−0.0035)			
	−0.12 (−0.0047)			

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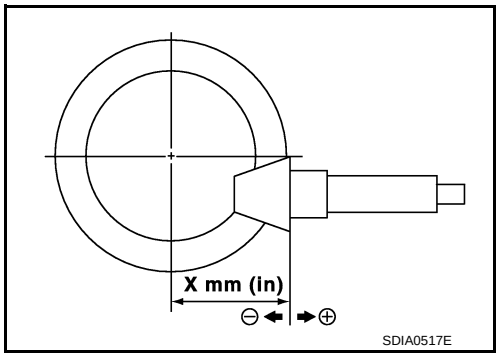
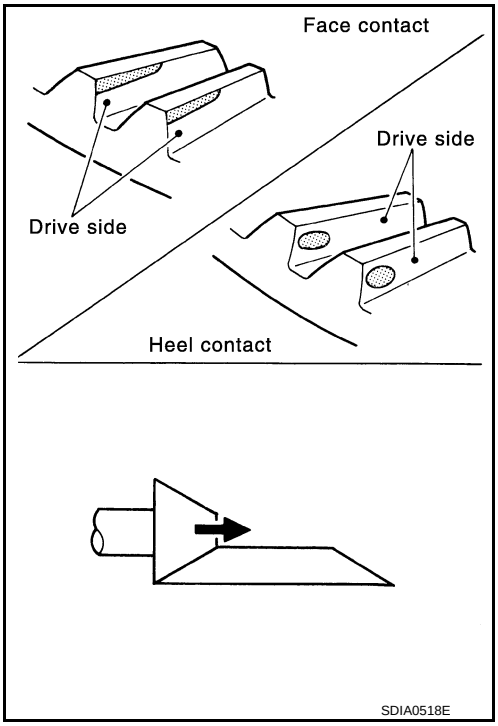
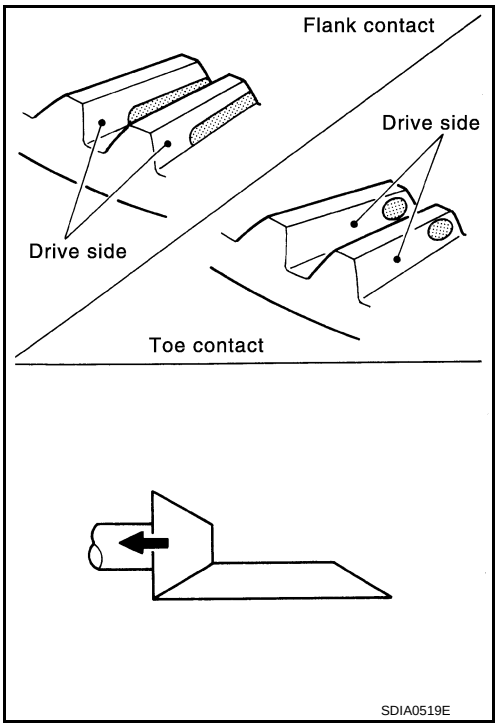
6. If tooth contact is poorly adjusted, adjust pinion height (dimension X) in the following manner.



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



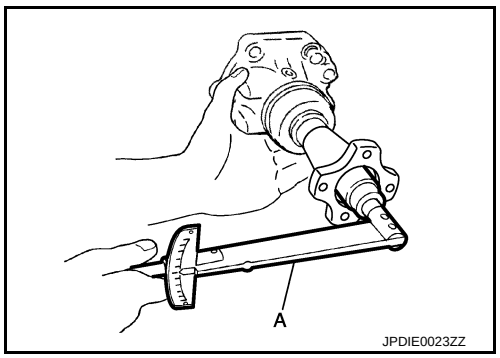
- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thicken the pinion sleeve shims to move the drive pinion farther from the drive gear.



PINION BEARING PRELOAD

1. Remove the pinion sleeve assembly. Refer to DLN-65, "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.

4. Measure the drive pinion bearing preload with the preload gauge (A) [SST: ST3127S000 (J-25765-A)].



Standard

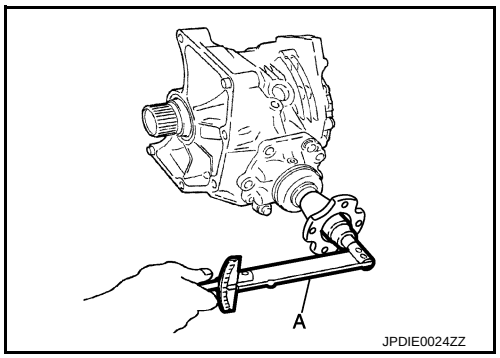
Preload torque : Refer to DLN-79, "Preload Torque".

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_1). Refer to DLN-79, "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 (J-25765-A)].



Standard

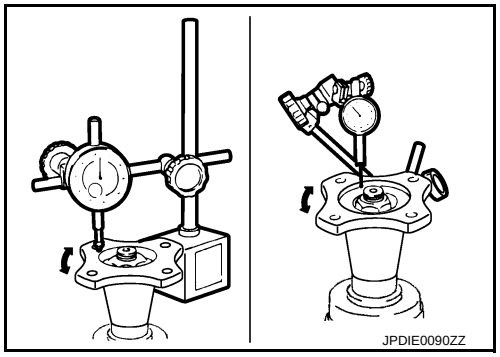
Total Preload torque : Refer to DLN-79, "Preload Torque".

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-79, "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-79, "Companion Flange Runout".

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

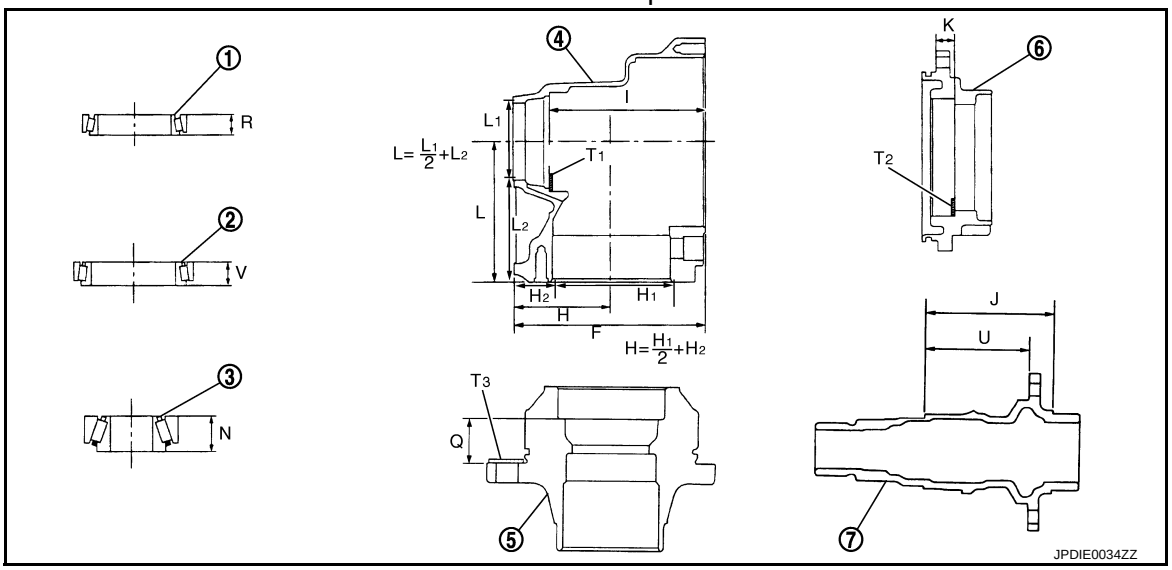
a. While changing the phase between companion flange and drive pinion gear by 90° at a time, check runout and determine which phase angle minimizes the runout.

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.

SELECTING ADJUSTING SHIM

Measurement point



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 T_1.

$$T_1 = (I - F + H + Z - U - R) \times 0.01 \text{ mm } (0.0004 \text{ in}) + 1.49 \text{ mm } (0.0587 \text{ in})$$

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.

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_2.

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

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_3.

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

4. Select the pinion sleeve shim.
   CAUTION:
   Only one pinion sleeve shim can be selected.

Inspection After Disassembly

INFOID:0000000005514226

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.

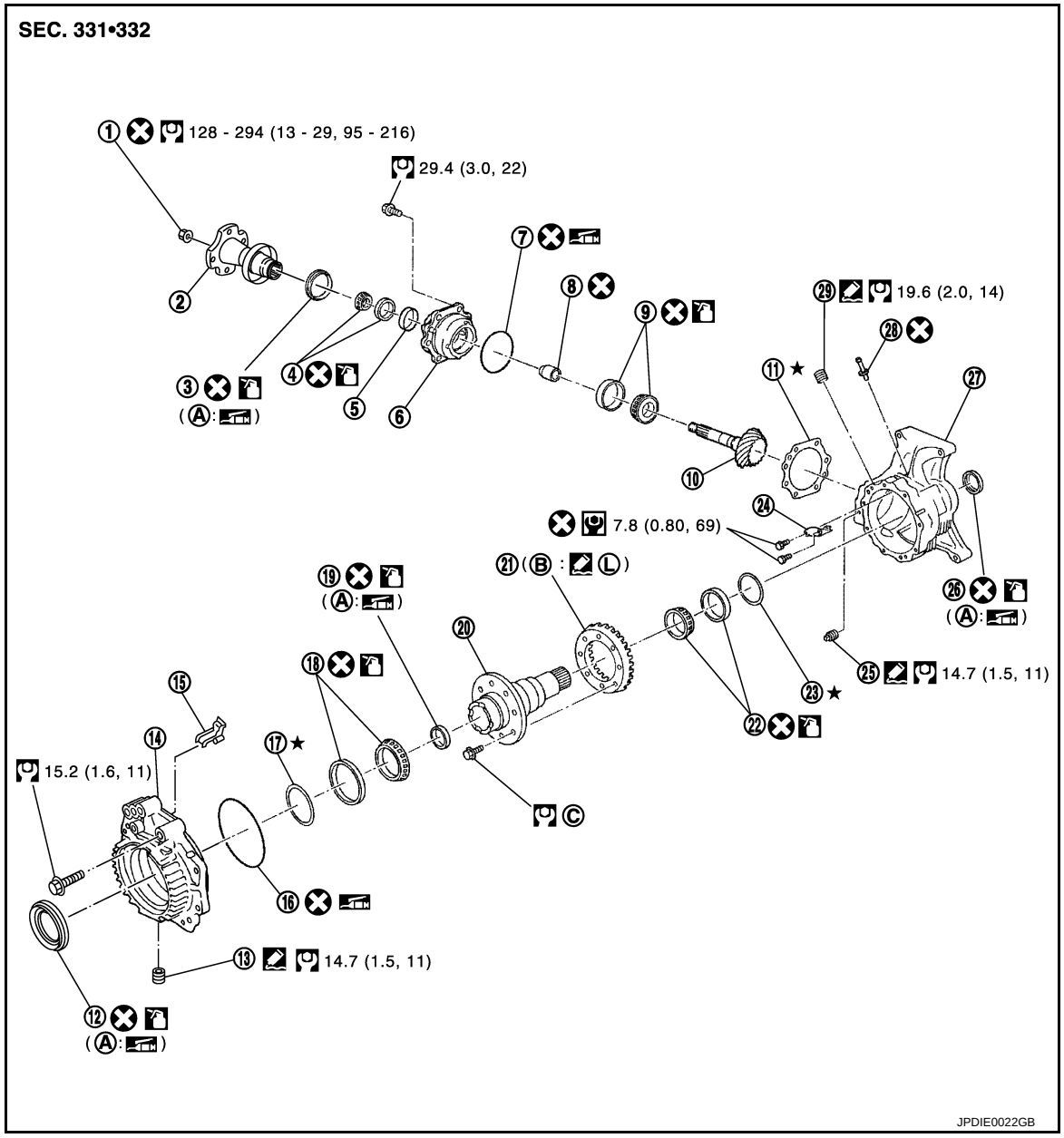
CASE

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

TRANSFER CASE

Exploded View

INFOID:0000000005514227



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

28. Breather tube
29. Plug
A. Oil seal lip
B. Screw hole
C. For the tightening torque, refer to DLN-62, "Assembly".

: Apply gear oil.

: Apply multi-purpose grease.

: Apply Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

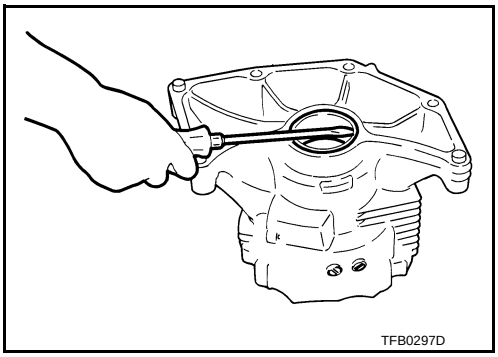
Ⓛ: Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

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

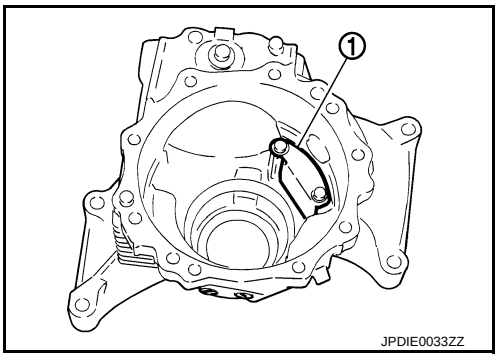
Disassembly

INFOID:0000000005514228

1. Remove adapter case. Refer to DLN-57, "Disassembly".
2. Remove gear ring assembly. Refer to DLN-61, "Disassembly".
3. Remove drive pinion assembly. Refer to DLN-65, "Disassembly".
4. Remove transfer case oil seal with a suitable tool.
   CAUTION:
   Never damage transfer case.

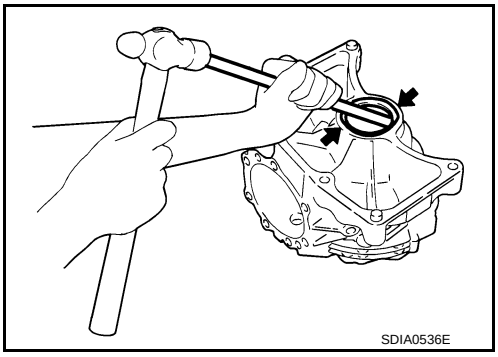

TFB0297D

5. Remove the oil defense.



JPDIE0033ZZ

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.


SDIA0536E

Assembly

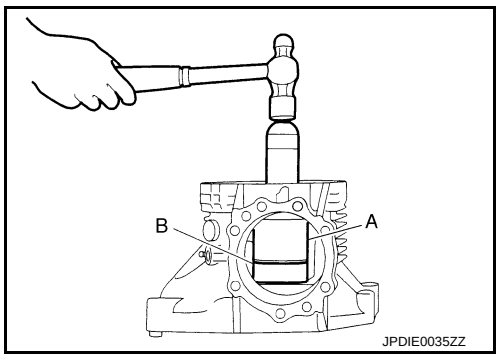
INFOID:0000000005514229

1. Select the gear ring bearing adjusting shim (transfer case side). Refer to DLN-68, "Adjustment".

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 (J-25405)]
B : Drift [SST: KV40101840 (—)]

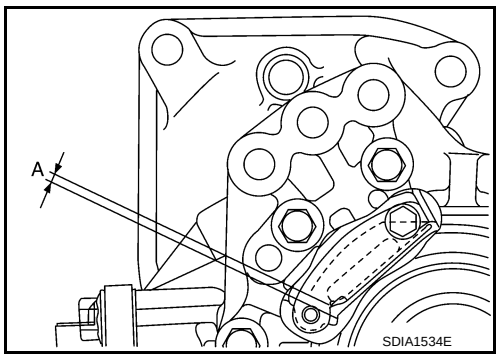
CAUTION:
- **Never reuse drive pinion bearing (transfer side).**



3. Install the oil defense, and tighten the mounting bolts to the specified torque. Refer to DLN-75, "Exploded View". The clearance (A) between the oil defense and transfer case should be the following.

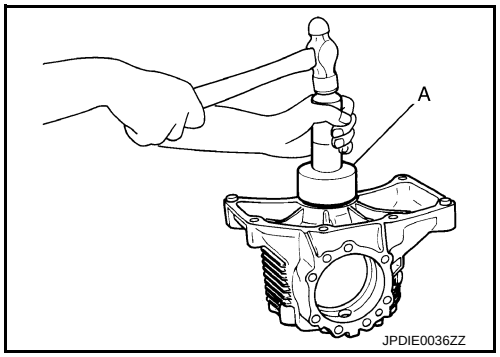
Clearance between oil defense and transfer case
A : 1.0 - 3.5 mm (0.04 - 0.138 in)

CAUTION:
Never reuse mounting bolts.

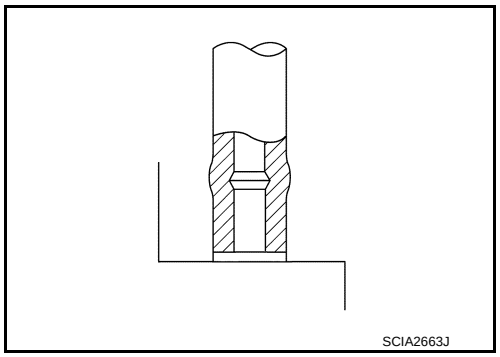


4. Install the transfer case oil seal until it becomes flush with the case end with drift (A) [SST: ST30720000 (J-25405)].
CAUTION:
- **When checking the total preload torque, measure it without the oil seal, then install the oil seal.**
- **Never reuse oil seal.**
- **Apply multi-purpose grease onto 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-64, "Exploded View".
Use Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".



6. Install breather tube to the transfer case.
CAUTION:
Never reuse breather tube.
7. Install drive gear assembly. Refer to DLN-62, "Assembly".
8. Install adapter case. Refer to DLN-58, "Assembly".
9. Install drive pinion assembly. Refer to DLN-66, "Assembly".
10. Install air breather hose.
CAUTION:
Check that 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.**
- **Be sure to insert air breather hose in the hole of the transfer case.**



11. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-68, "Adjustment".
CAUTION:
Measure the total preload without the adapter case oil seals.

Inspection

INFOID:0000000005514230

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

CASE

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

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000005514231

Applied model		AWD
		VQ35DE
		CVT
Transfer model		TY20A
Oil capacity (Approx.) ℓ (US pt, Imp pt)		0.31 (5/8, 1/2)
Gear ratio		0.404
Number of teeth	Ring gear	42
	Drive pinion	17

Preload Torque

INFOID:0000000005514232

BEFORE DISASSEMBLY

Unit: N·m (kg-m, in-lb)

Item		Standard
Drive pinion bearing preload (P_1)		0.10 – 0.39 (0.01 – 0.03, 1.0 – 3.0)
Total preload	With all oil seals	P_1 + 0.16 – 0.22 (0.017 – 0.022, 1.5 – 1.9)
	Without transfer oil seal and adapter case oil seal	P_1 + 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 (P_1)		0.50 – 0.99 (0.06 – 0.10, 5 – 8)
Total preload	With all oil seals	P_1 + 0.49 – 0.63 (0.05 – 0.06, 4.4 – 5.5)
	Without transfer oil seal and adapter case oil seal	P_1 + 0.27 – 0.41 (0.03 – 0.04, 2.4 – 3.6)

Backlash

INFOID:0000000005514233

Unit: mm (in)

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

Companion Flange Runout

INFOID:0000000005514234

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)

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000005514235

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

Reference		DLN-82, "Inspection"	DLN-85, "Inspection"	—	DLN-85, "Inspection"	—	DLN-85, "Inspection"	DLN-82, "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		Uneven rotating torque	Center bearing improper installation	Excessive center bearing axial end play	Center bearing mounting (insulator) cracks, damage or deterioration	Excessive joint angle	Rotation imbalance	Excessive runout	DIFFERENTIAL	AXLE AND SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	BRAKE	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	Shake		×			×				×	×	×	×	×	×
	Vibration	×	×	×	×	×	×	×		×	×		×		×

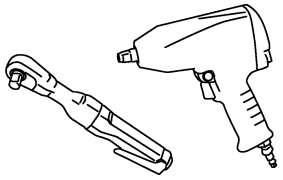
×: Applicable

PREPARATION

PREPARATION

Commercial Service Tool

INFOID:0000000005514236

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts

PERIODIC MAINTENANCE

REAR PROPELLER SHAFT

Inspection

INFOID:0000000005514237

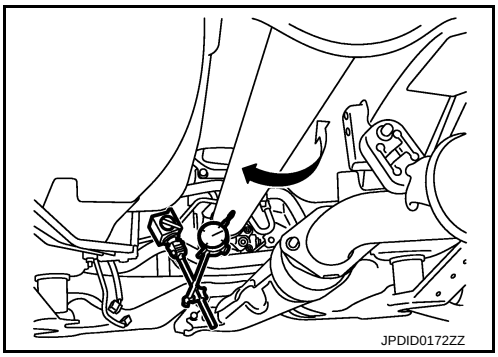
NOISE

- 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

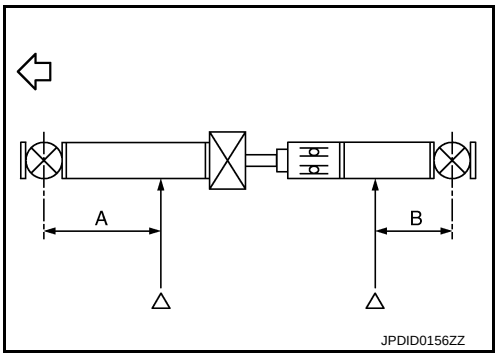
Propeller shaft runout **: Refer to DLN-86, "Propeller Shaft Runout".**

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.

RUNOUT MEASURING POINT

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

⇦ : Vehicle front



Dimension **A: 506.5 mm (19.94 in)**

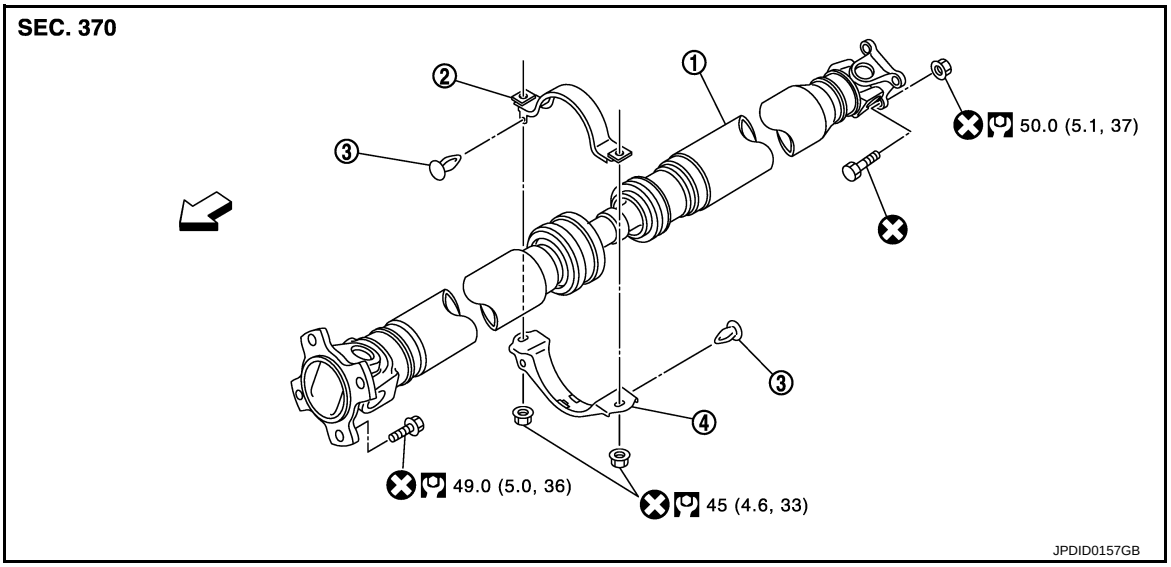
B: 497.5 mm (19.59 in)

REMOVAL AND INSTALLATION

REAR PROPELLER SHAFT

Exploded View

INFOID:0000000005514238



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

⇦: Vehicle front

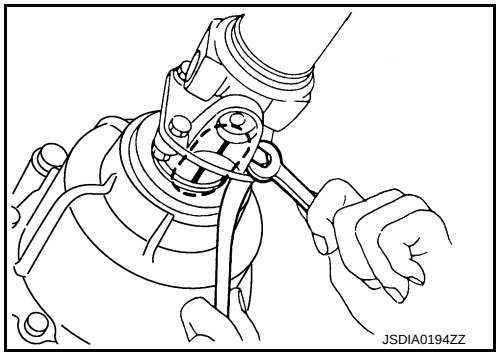
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

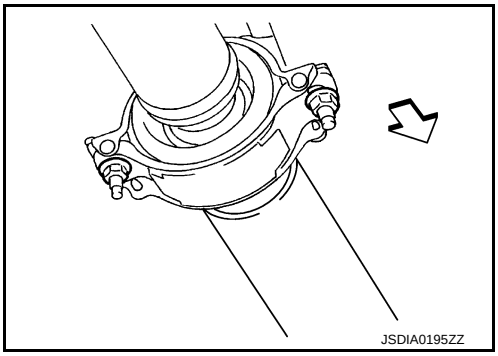
INFOID:0000000005514239

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.



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



⇦ : Vehicle front

CAUTION:
Tighten mounting nuts temporarily.

4. Remove propeller shaft assembly fixing bolts and nuts.
5. Remove center bearing mounting bracket fixing nuts.
6. Remove propeller shaft assembly.

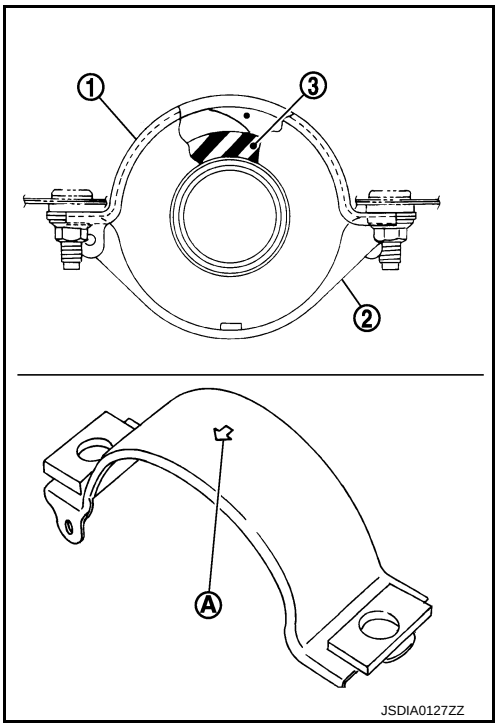
CAUTION:
If constant velocity joint was bent during propeller shaft assembly removal, installation, or transportation, its boot may be damaged. Wrap boot interference area to metal part with shop cloth or rubber to protect boot from breakage.

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

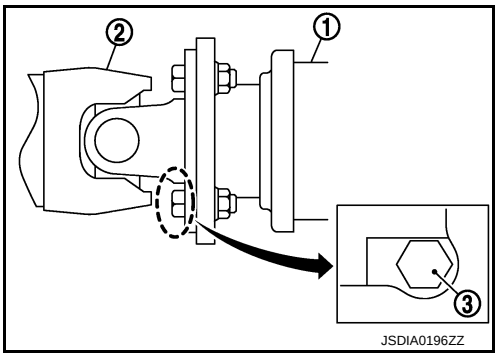
INSTALLATION

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.



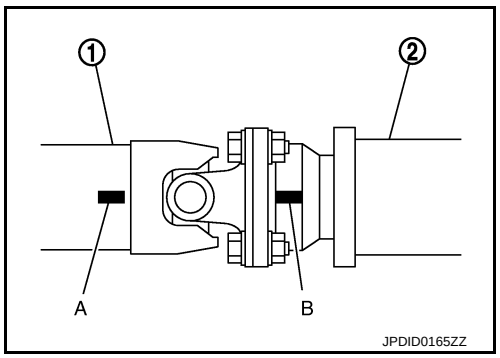
- After tightening the bolts and nuts to the specified torque, check that the bolts (3) on the flange side is tightened as shown in the figure.



1 : Final drive assembly
2 : Propeller shaft assembly

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

- 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.



Inspection

INFOID:0000000005514240

APPEARANCE

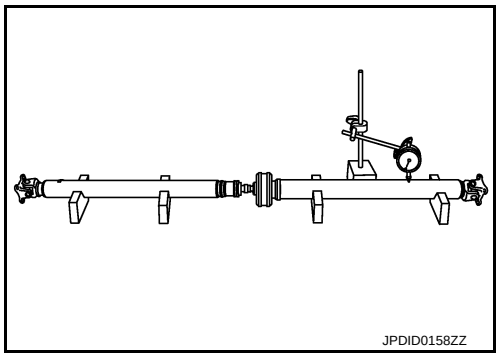
Check propeller shaft for bend and damage. If damage is detected, replace propeller shaft assembly.

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-82, "Inspection".

Limit

Propeller shaft runout	**: Refer to DLN-86, "Propeller Shaft Runout".**

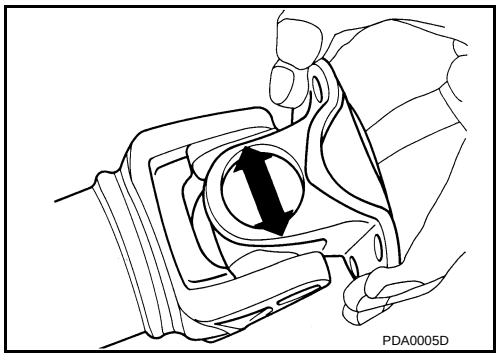


JOURNAL AXIAL PLAY

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-86, "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)

General Specifications

INFOID:0000000005514241

Applied model		AWD
		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:0000000005514242

Unit: mm (in)

Item	Limit
Propeller shaft runout	0.8 (0.031)

Journal Axial Play

INFOID:0000000005514243

Unit: mm (in)

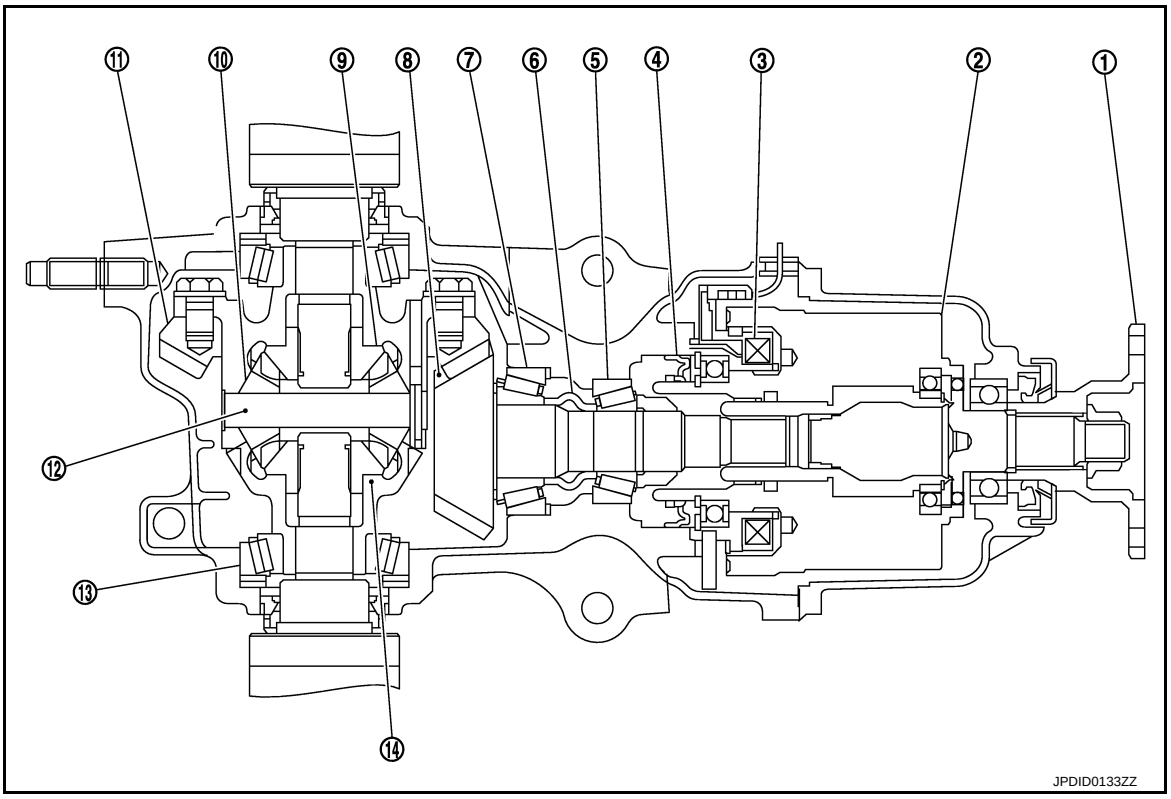
Item	Standard
Journal axial play	0 (0)

SYSTEM DESCRIPTION

REAR FINAL DRIVE ASSEMBLY

System Diagram

INFOID:0000000005514244



1. Companion flange
2. Electric controlled coupling
3. AWD 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

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000005514245

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

Reference		DLN-124, "Inspection After Disassembly"	DLN-121, "Adjustment"	DLN-124, "Inspection After Disassembly"	DLN-121, "Adjustment"	DLN-121, "Adjustment"	DLN-93, "Inspection"	NVH in DLN section	NVH in FAX, RAX, FSU and RSU sections	NVH in WT section	NVH in WT section	NVH in FAX and RAX section	NVH in BR section	NVH in ST section
Possible cause and SUSPECTED PARTS		Gear tooth rough	Gear contact improper	Tooth surfaces worn	Backlash incorrect	Companion flange excessive runout	Gear oil improper	PROPELLER SHAFT	AXLE AND SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	BRAKE	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×

×: Applicable

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Rear Final Drive

INFOID:0000000005514246

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

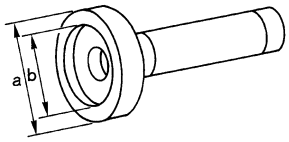
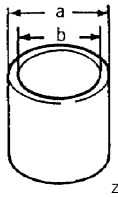
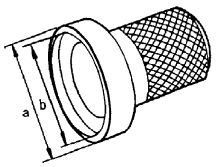
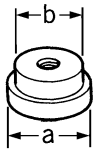
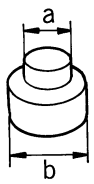
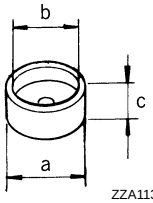
PREPARATION

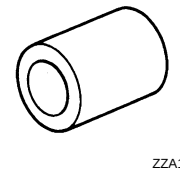
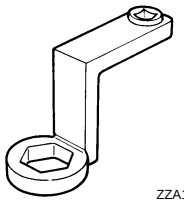
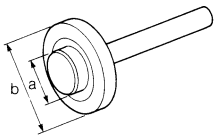
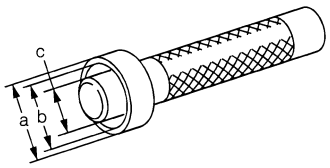
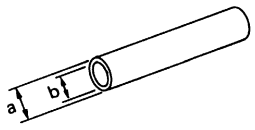
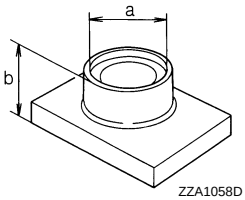
PREPARATION

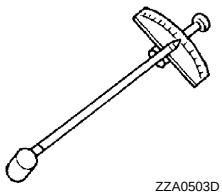
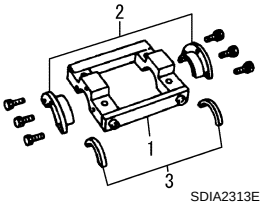
Special Service Tools

INFOID:0000000005514247

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

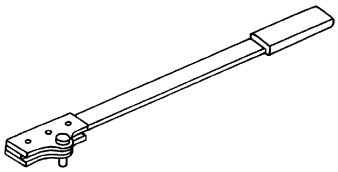
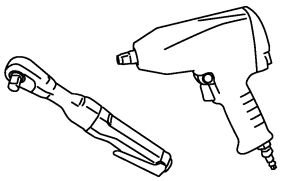
Tool number (Kent-More No.) Tool name	Description
KV38100200 (J-26233) Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.  ZZA1143D	• Installing front oil seal • Installing side oil seal
ST27861000 (—) Drift a: 62 mm (2.44 in) dia. b: 52 mm (2.05 in) dia.  ZZA0832D	Installing front oil seal
ST35271000 (J-26091) Drift a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.  ZZA0814D	Installing center oil seal
KV40100610 (J-26089) Drift a: 63 mm (2.48 in) dia. b: 54.3 mm (2.138 in) dia.  ZZA1000D	Removing and installing gear carrier and rear cover (2 pieces are used)
ST33052000 (—) Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.  ZZA1023D	Removing side bearing inner race
KV4010520 (—) Drift a: 39.7 mm (1.563 in) dia. b: 35 mm (1.38 in) dia. c: 15 mm (0.59 in) dia.  ZZA1133D	Installing side bearing inner race

Tool number (Kent-More No.) Tool name	Description
KV38108500 (—) Drive pinion socket  ZZA1205D	• Removing and installing drive pinion nut • Measuring preload torque
KV38108400 (—) Pinion nut wrench  ZZA1206D	Removing and installing drive pinion nut
ST17130000 (—) Drift a: 31.8 mm (1.252 in) dia. b: 58 mm (2.28 in) dia.  ZZA0836D	Installing pinion rear bearing outer race
ST33230000 (J-25805-01) Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.  ZZA1046D	Installing pinion front bearing outer race
ST23860000 (—) Drift a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.  ZZA0534D	• Installing pinion rear bearing inner race • Installing pinion front bearing inner race
ST38220000 (—) Press stand a: 63 mm (2.48 in) dia. b: 65 mm (2.56 in) dia.  ZZA1058D	Installing pinion front bearing inner race

Tool number (Kent-More No.) Tool name	Description
ST3127S000 (J-25765-A) Preload gauge  ZZA0503D	Measuring preload torque
KV381086S1 (—) Dummy cover set 1. KV38108610 (—) Dummy cover 2. KV38108621 (—) Dummy cover spacer 3. KV38108630 (—) Dummy cover shim  SDIA2313E	• Checking backlash • Checking drive gear runout • Checking tooth contact

Commercial Service Tools

INFOID:0000000005514248

Tool name	Description
Flange wrench  NT771	Removing and installing companion flange lock nut
Power tool  PBIC0190E	Loosening bolts and nuts

PERIODIC MAINTENANCE

REAR DIFFERENTIAL GEAR OIL

Inspection

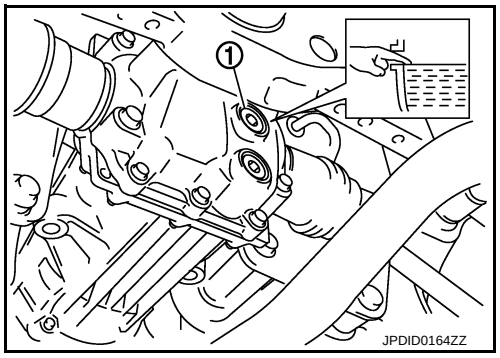
INFOID:0000000005514249

OIL LEAKAGE

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

OIL LEVEL

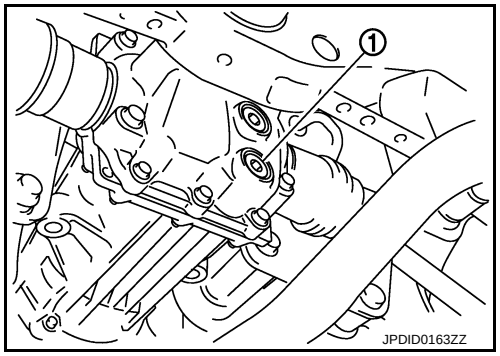
- Remove filler plug (1) and check oil level from filler plug mounting hole as shown in the figure.
  CAUTION:
  Never start engine while checking oil level.
- Set a new gasket on filler plug and install it on final drive assembly. Refer to DLN-104, "Exploded View".
  CAUTION:
  Never reuse gasket.



Draining

INFOID:0000000005514250

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-104, "Exploded View".
   CAUTION:
   Never reuse gasket.

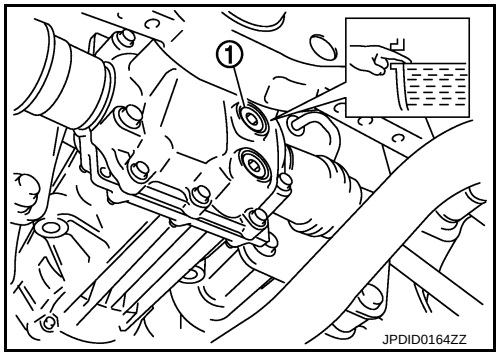


Refilling

INFOID:0000000005514251

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-15, "FOR NORTH AMERICA : Fluids and Lubricants" (for NORTH AMERICA), MA-16, "FOR MEXICO : Fluids and Lubricants" (for MEXICO).**
Oil capacity	**: Refer to DLN-126, "General Specification".**



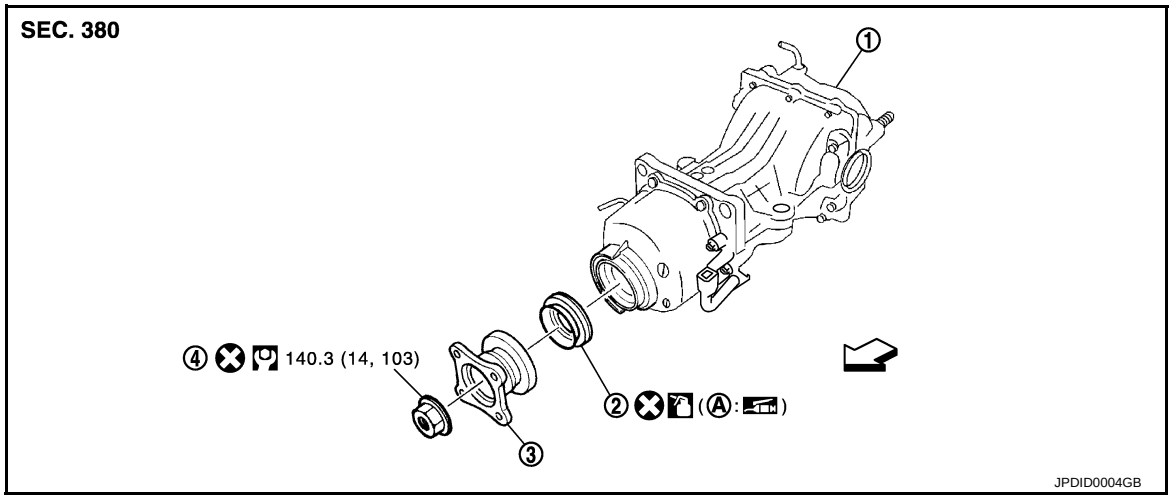
2. After refilling oil, check oil level. Set a new gasket to filler plug, then install it to final drive assembly. Refer to DLN-104, "Exploded View".
   CAUTION:
   Never reuse gasket.

REMOVAL AND INSTALLATION

FRONT OIL SEAL

Exploded View

INFOID:0000000005514252



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.

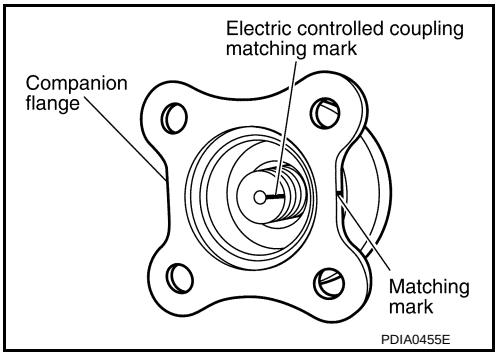
Refer to GI-4, "Components" for symbols not described above.

Removal and Installation

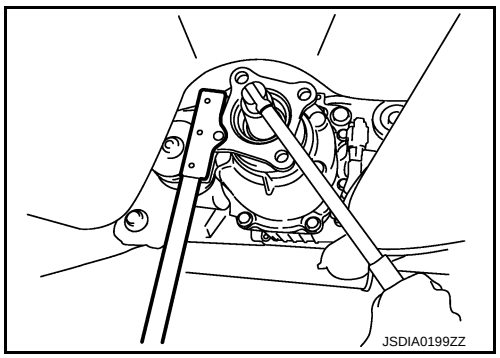
INFOID:0000000005514253

REMOVAL

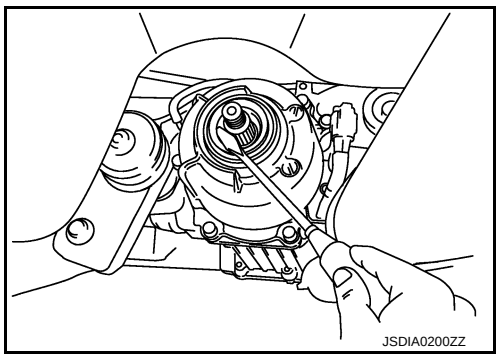
1. Remove rear propeller shaft. Refer to DLN-83, "Exploded View".
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on companion flange.
   CAUTION:
   For matching mark, use paint. Never damage electric controlled coupling.



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



4. Remove front oil seal from coupling cover, using a suitable tool.
CAUTION:
Be careful not to damage coupling cover.

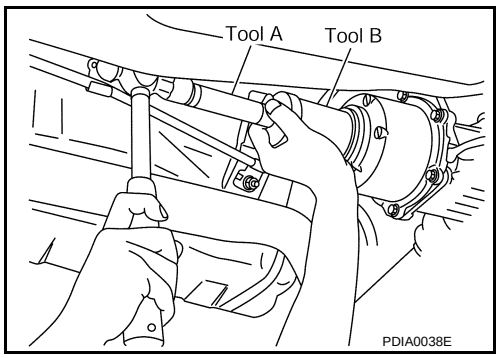


INSTALLATION

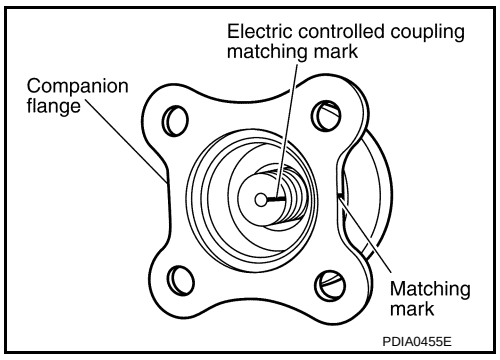
1. Install front oil seal until it becomes flush with the coupling cover end, using the drifts.

A : Drift [SST: KV38100200 (J-26233)]
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.**



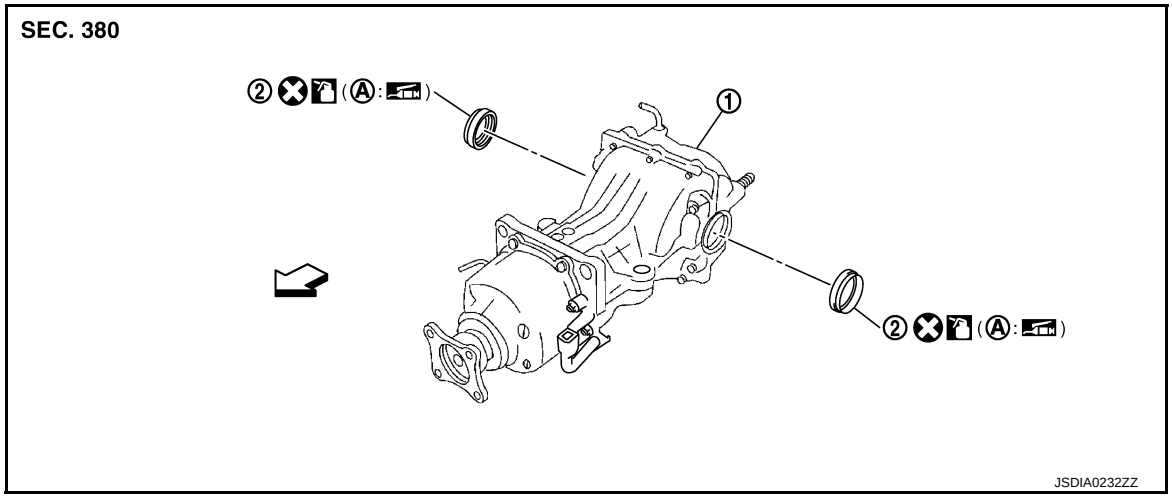
2. Align the matching mark of electric controlled coupling with the matching mark of companion flange, then install the companion flange.
3. Install companion flange lock nut with a flange wrench (commercial service tool), tighten to the specified torque.
CAUTION:
Never reuse companion flange lock nut.
4. Install rear propeller shaft. Refer to DLN-83, "Exploded View".
5. When oil leaks while removing, check oil level after the installation. Refer to DLN-93, "Inspection".



SIDE OIL SEAL

Exploded View

INFOID:0000000005514254



1. Final drive assembly
2. Side oil seal

A. Oil seal lip

⇦: Vehicle front

: Apply gear oil.

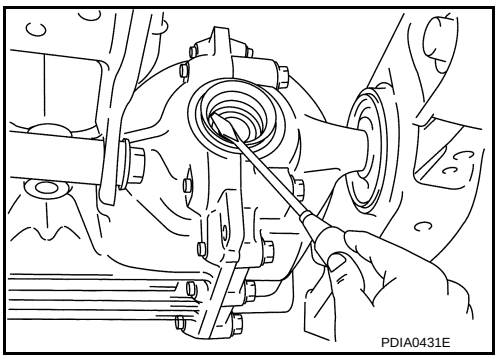
Refer to GI-4, "Components" for symbols not described above.

Removal and Installation

INFOID:0000000005514255

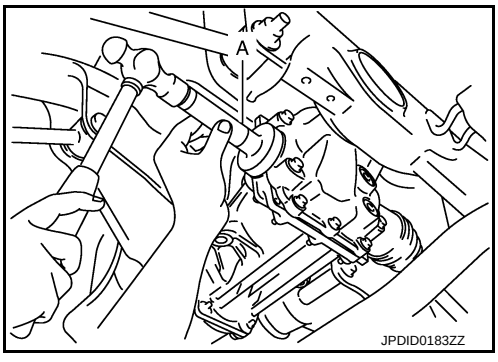
REMOVAL

1. Remove rear drive shafts with power tool. Refer to RAX-15, "Exploded View".
2. Remove side oil seals, using a suitable tool.
   CAUTION:
   Be careful not to damage gear carrier and rear cover.



INSTALLATION

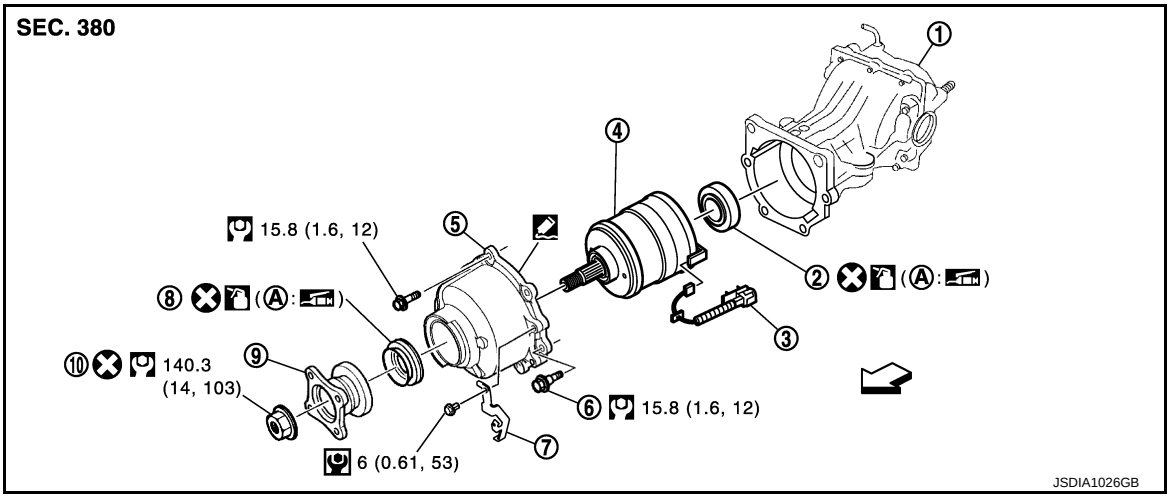
1. Install side oil seals until it becomes flush with the carrier end, using the drift (A) [SST: KV38100200 (J-26233)].
   CAUTION:
   - **Never reuse oil seals.**
   - **When installing, never incline oil seals.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**
2. Install rear drive shafts. Refer to RAX-15, "Exploded View".
3. When oil leaks while removing, check oil level after the installation. Refer to DLN-93, "Inspection".



ELECTRIC CONTROLLED COUPLING

Exploded View

INFOID:0000000005514256



1. Final drive assembly
2. Center oil seal
3. AWD 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 Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

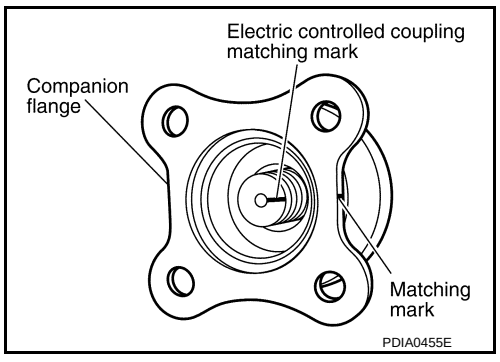
Refer to GI-4, "Components" for symbols not described above.

Removal and Installation

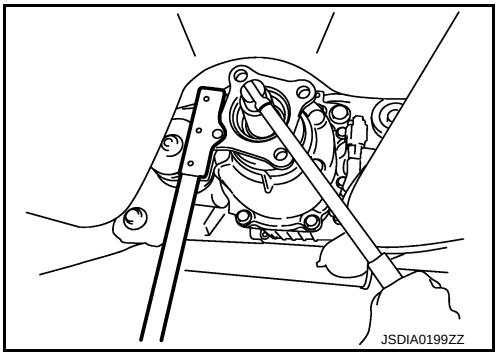
INFOID:0000000005514257

REMOVAL

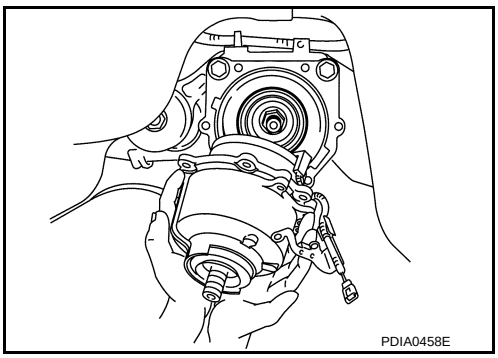
1. Remove rear propeller shaft. Refer to DLN-83, "Exploded View".
2. Disconnect AWD solenoid harness connector.
3. Remove connector bracket.
4. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on the companion flange.
   CAUTION:
   For matching mark, use paint. Never damage electric controlled coupling.
   NOTE:
   When replacing electric controlled coupling, matching mark is not necessary.



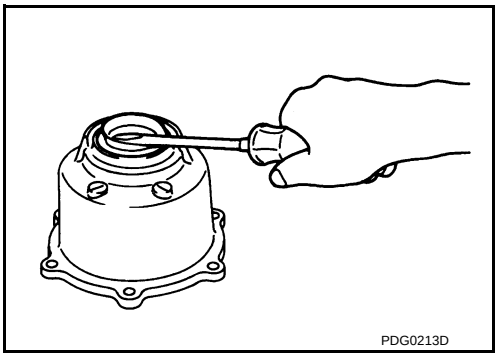
5. Remove companion flange lock nut, using a flange wrench (commercial service tool).
6. Remove companion flange.
7. Remove electric controlled coupling breather hose from coupling cover.



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



11. Remove front oil seal from coupling cover, using a suitable tool.
CAUTION:
Be careful not to damage coupling cover.
12. Remove center oil seal from final drive assembly.

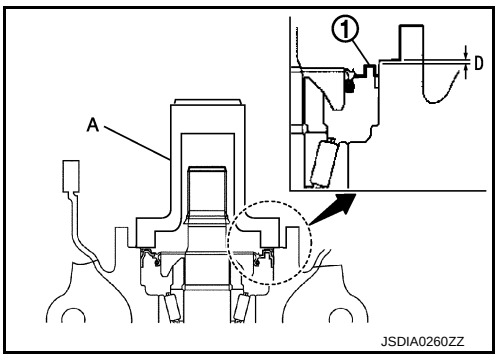


INSTALLATION

1. Using the drift (A) [SST: ST35271000 (J-26091)], install center oil seal (1) as shown in the figure.

D : 0.8 – 1.2 mm (0.031 – 0.047 in)

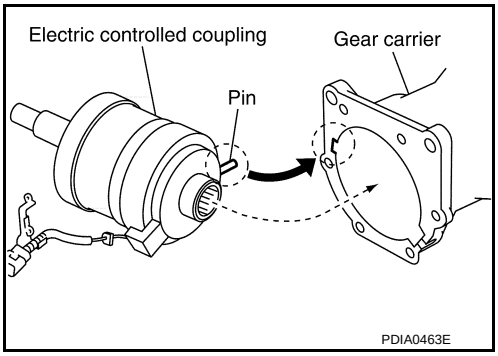
CAUTION:
- **Never reuse oil seal.**
- **When installing, never incline oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



2. Connect AWD solenoid harness to electric controlled coupling.

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.**
- **Be careful not to damage center oil seal.**

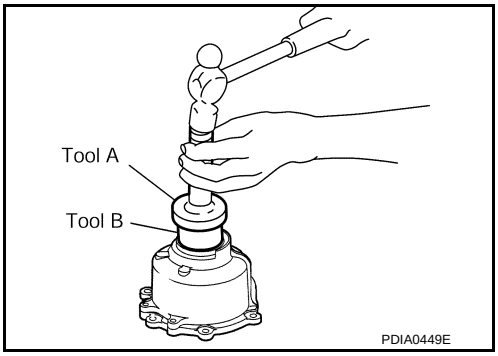
4. Set AWD solenoid harness guide to gear carrier.



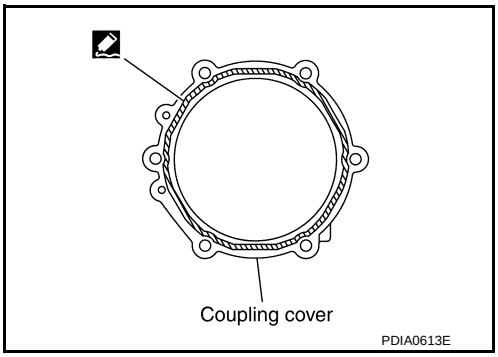
5. Using the drifts, drive front oil seal until it becomes flush with the coupling cover end.

A : Drift [SST: KV38100200 (J-26233)]
B : Drift [SST: ST27861000 (—)]

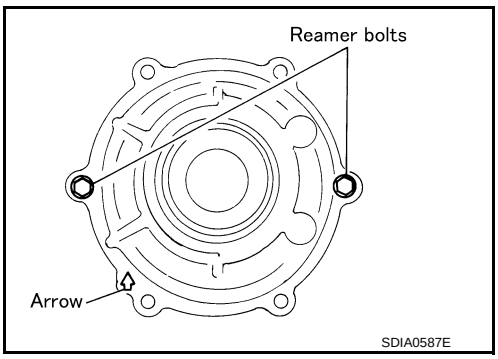
CAUTION:
- **Never reuse oil seal.**
- **When installing, never incline oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



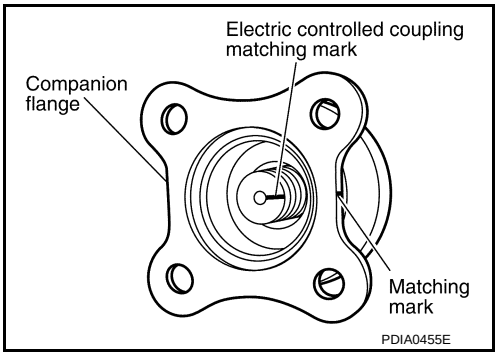
6. Apply liquid gasket to mating surface of coupling cover. Overlap both ends of the bead for at least 3 mm (0.12 in).
Use Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".
CAUTION:
Remove old gasket adhering to the mounting surfaces. Also remove any moisture, 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 AWD 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-107, "Adjustment".



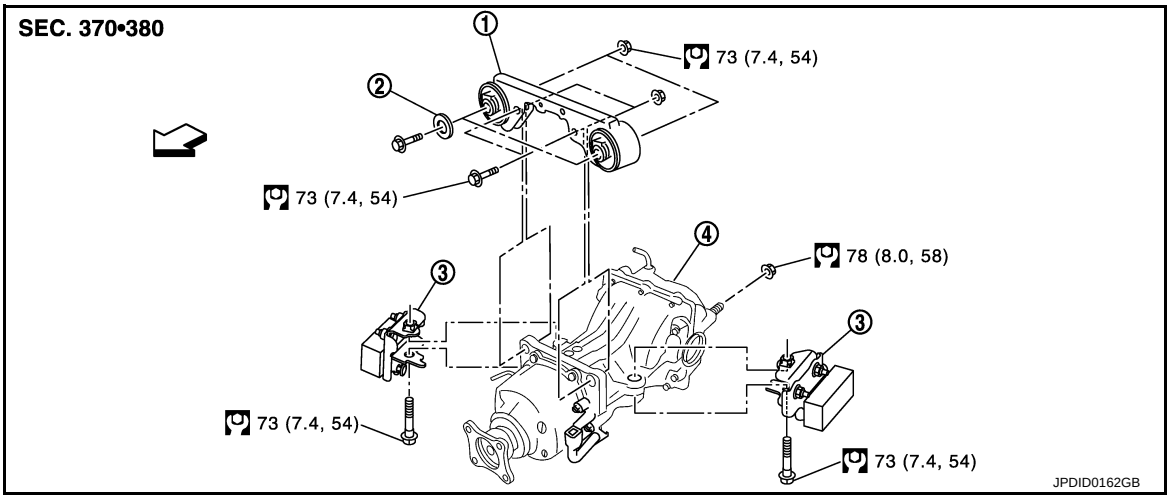
15. Install rear propeller shaft. Refer to DLN-83, "Exploded View".
16. When oil leaks while removing, check oil level after the installation. Refer to DLN-93, "Inspection".

UNIT REMOVAL AND INSTALLATION

REAR FINAL DRIVE ASSEMBLY

Exploded View

INFOID:0000000005514258



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

⇦: Vehicle front

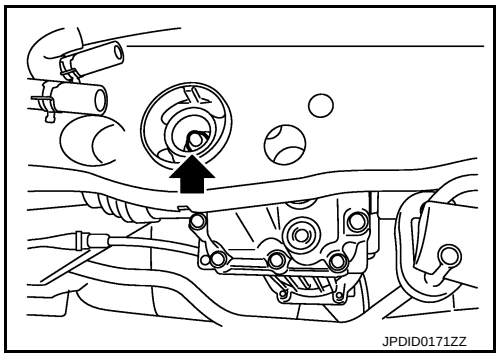
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

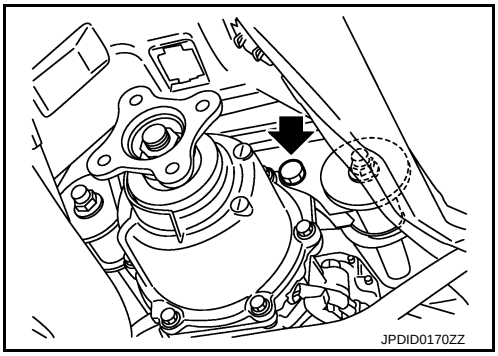
INFOID:0000000005514259

REMOVAL

1. Remove rear propeller shaft. Refer to DLN-83, "Exploded View".
2. Remove stabilizer bar. Refer to RSU-15, "Exploded View".
3. Remove EVAP canister. Refer to EC-534, "Exploded View".
4. Disconnect rear drive shafts (final drive side). Refer to RAX-15, "Exploded View".
5. Disconnect AWD 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.



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

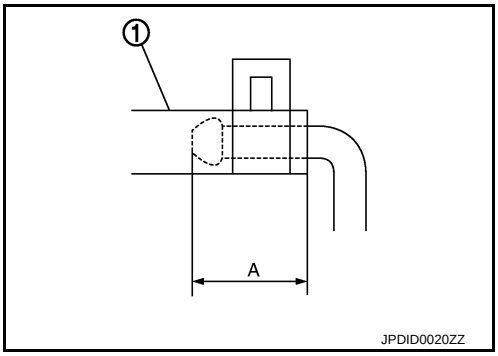

JPDID0170ZZ

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)



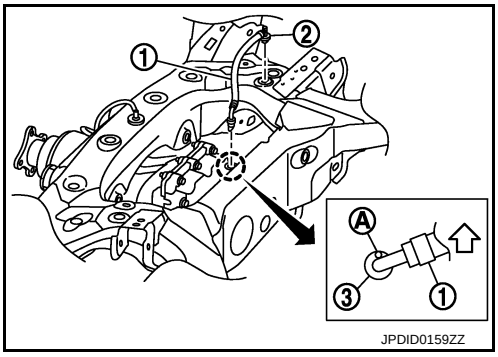
JPDID0020ZZ

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



JPDID0159ZZ

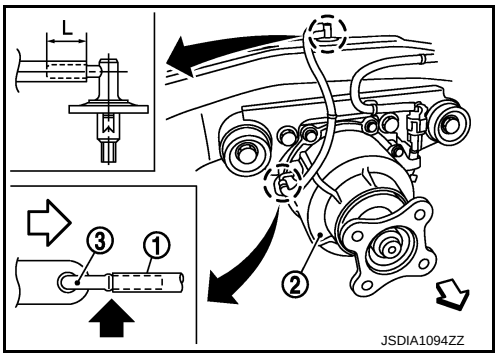
- Install the electric controlled coupling breather hose (1) as shown in the figure.

- 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



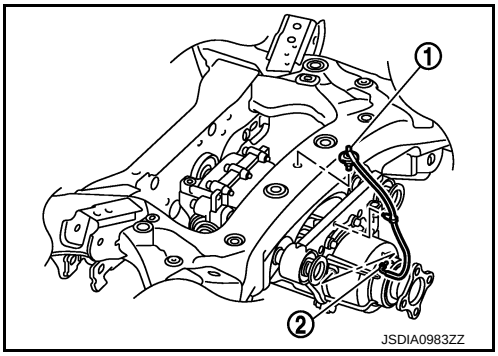
JSDIA1094ZZ

- 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.**

- 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-93, "Inspection".

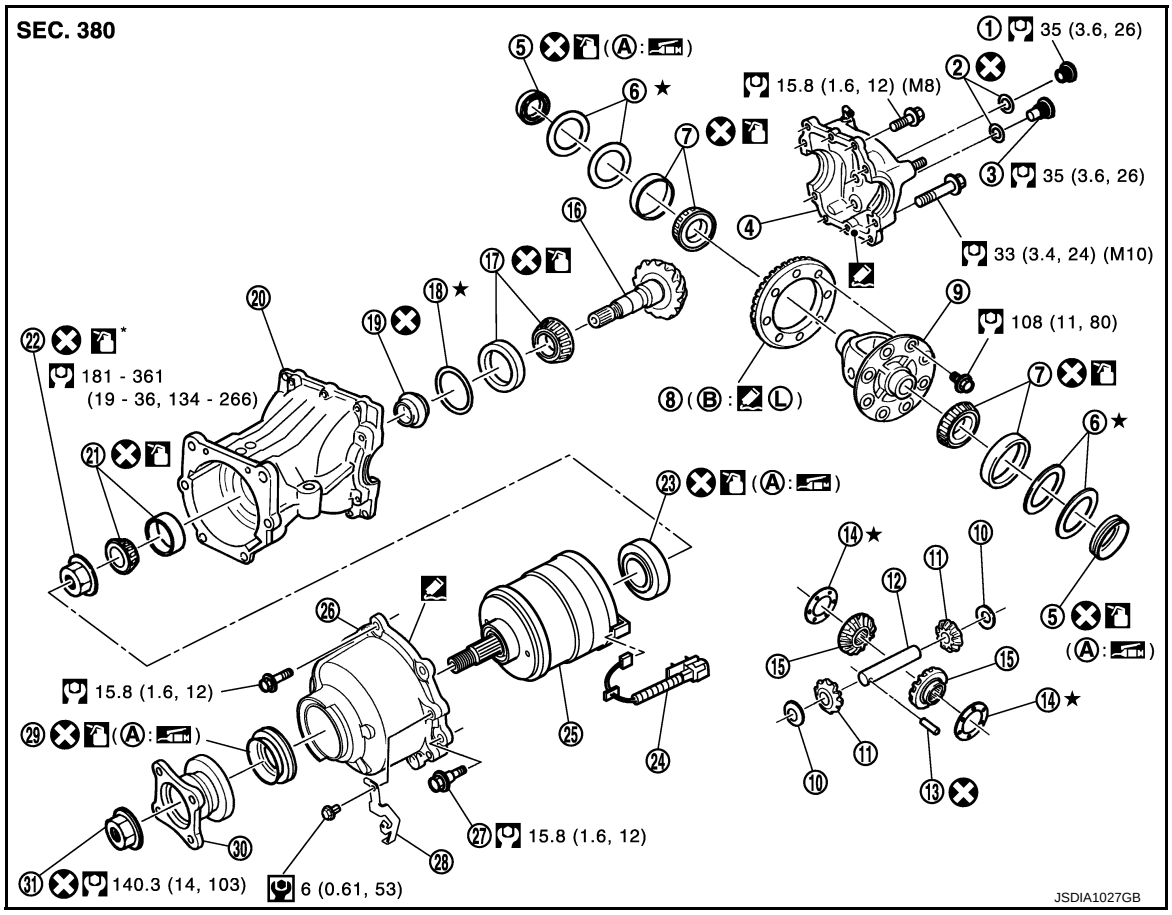


UNIT DISASSEMBLY AND ASSEMBLY

ELECTRIC CONTROLLED COUPLING

Exploded View

INFOID:0000000005514260



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.	AWD 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 Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

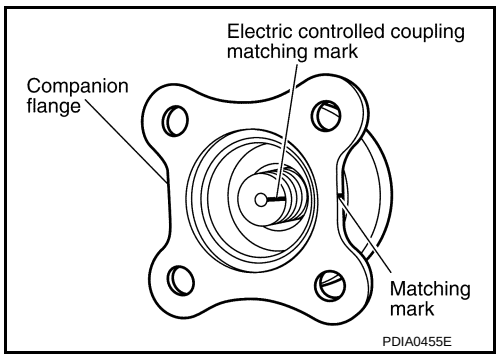
Ⓛ: Apply Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

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

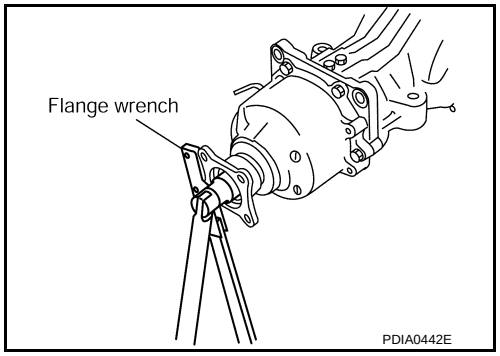
Disassembly

INFOID:0000000005514261

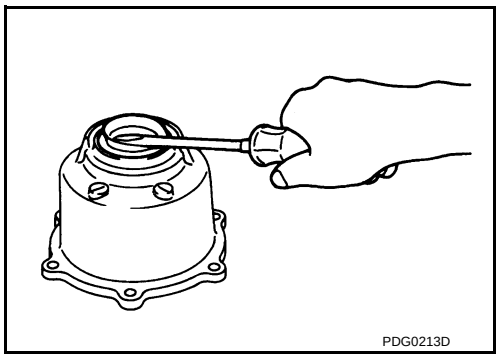
1. Remove connector bracket.
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on companion flange.
   CAUTION:
   For matching mark, use paint. Never damage electric controlled coupling.
   NOTE:
   When replacing electric 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, using a suitable tool.
   CAUTION:
   Be careful not to damage coupling cover.
7. Remove electric controlled coupling.
8. Remove AWD solenoid harness.
9. Remove center oil seal from gear carrier.



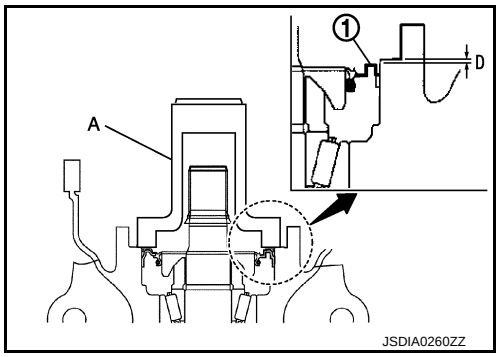
Assembly

INFOID:0000000005514262

1. Using the drift (A) [SST: ST35271000 (J-26091)], install center oil seal (1) as shown in the figure.

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

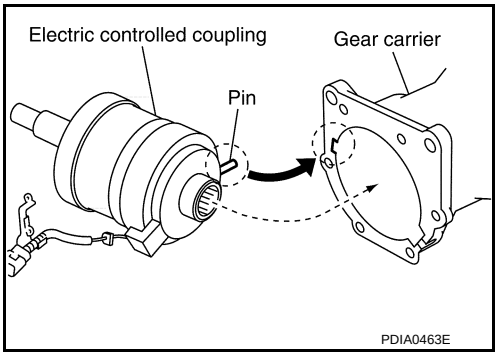
   CAUTION:
   - **Never reuse oil seal.**
   - **When installing, never incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



2. Connect AWD solenoid harness to electric controlled coupling.

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.**
- **Be careful not to damage center oil seal.**

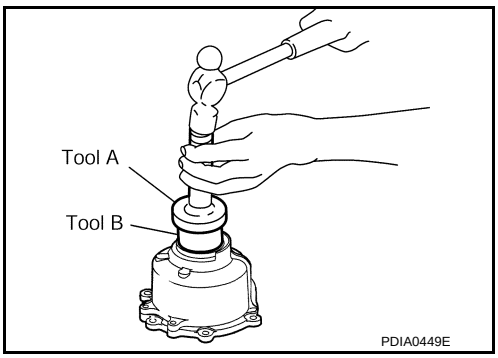
4. Set AWD solenoid harness guide to gear carrier.



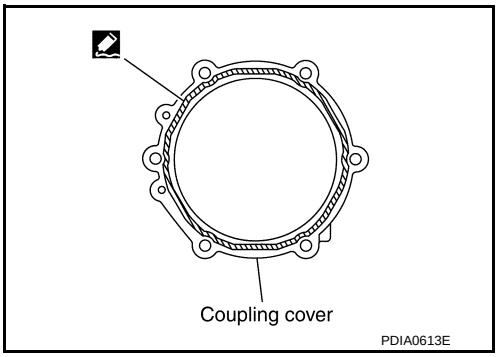
5. Using the drifts, drive front oil seal until it becomes flush with the coupling cover end.

A : Drift [SST: KV38100200 (J-26233)]
B : Drift [SST: ST27861000 (—)]

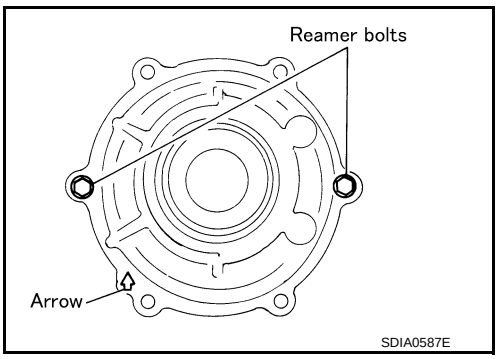
CAUTION:
- **Never reuse oil seal.**
- **When installing, never incline oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



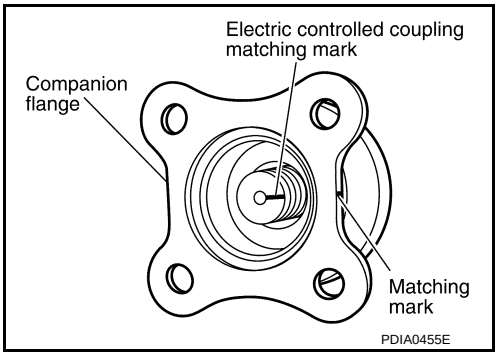
6. Apply liquid gasket to mating surface of coupling cover. Overlap both ends of the bead for at least 3 mm (0.12 in).
Use Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".
CAUTION:
Remove old gasket adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.



7. Install coupling cover to 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-107, "Adjustment".



Adjustment

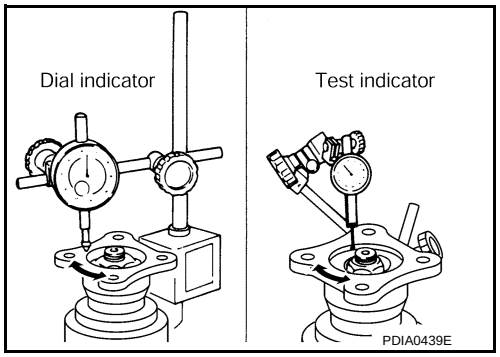
INFOID:0000000005514263

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-126, "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-126, "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

INFOID:0000000005514264

DRIVE GEAR AND DRIVE PINION

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

BEARING

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

SIDE GEAR AND PINION MATE GEAR

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

SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

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

OIL SEAL

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

DIFFERENTIAL CASE

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

COMPANION FLANGE

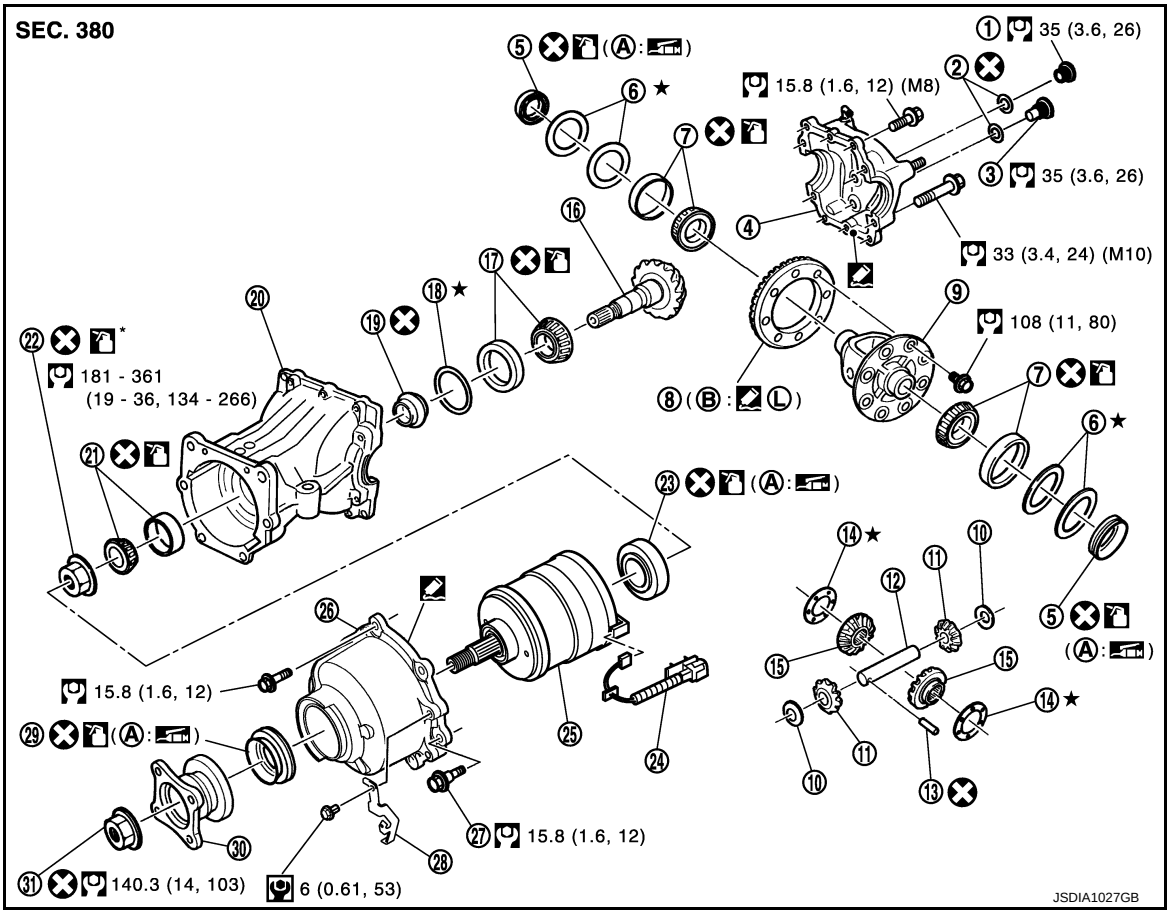
- Clean up the disassembled parts.

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

DIFFERENTIAL ASSEMBLY

Exploded View

INFOID:0000000005514265



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.	AWD 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 Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

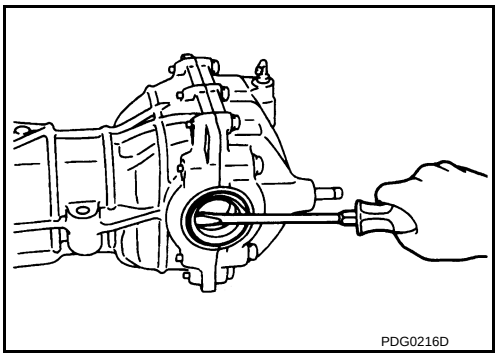
Ⓛ: Apply Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

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

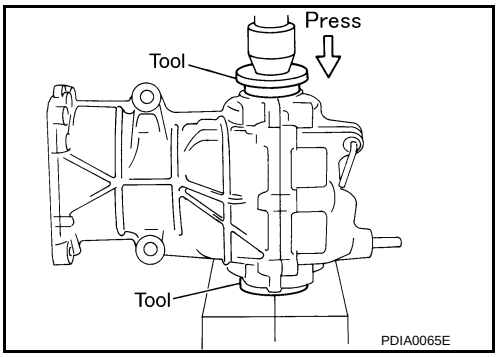
Disassembly

INFOID:0000000005514266

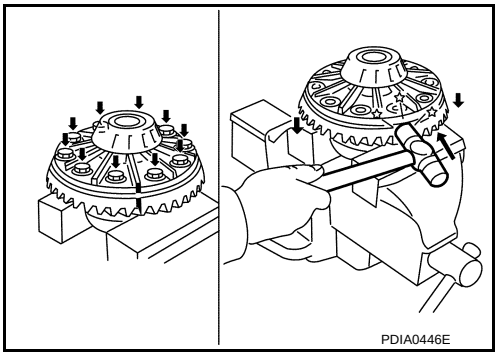
1. Remove side oil seals, using a suitable tool.
   CAUTION:
   Be careful not to damage gear carrier and rear cover.
2. Remove rear cover mounting bolts.



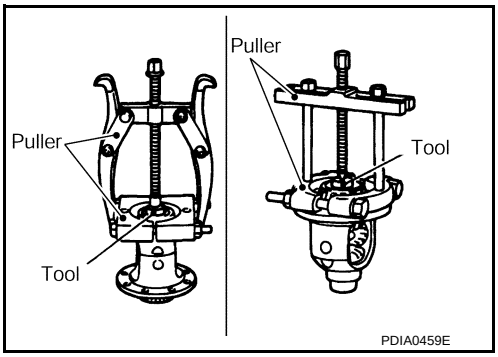
3. Set drifts [SST: KV40100610 (J-26089)] to the right and left side bearing adjusting shims individually. Press differential case assembly with side bearing to remove gear carrier assembly and rear cover assembly.
   CAUTION:
   The pressure shall be as low as possible to remove gear carrier assembly and rear cover assembly. The maximum pressure shall be 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
   NOTE:
   Differential case assembly, side bearings, and adjusting shims are compressed and integrated in gear carrier and rear cover.



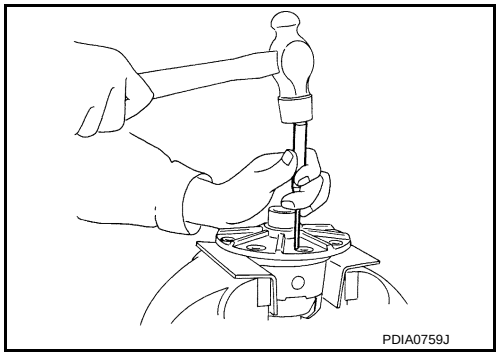
4. Remove drain plug and filler plug.
5. Remove side bearing adjusting shims and side bearing outer races.
   CAUTION:
   Mark the side bearing adjusting shims so that the original mounting positions (right/left) can be identified later.
6. Remove drive gear mounting bolts and then remove drive gear from differential case.



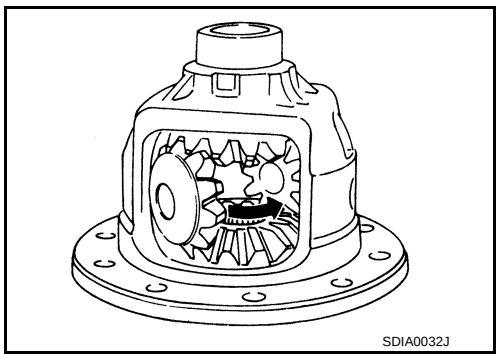
7. Remove side bearing inner races, using pullers and the drift [SST: ST33052000 (—)].



8. Pull the lock pin out of pinion mate shaft, using the pin punch.


PDIA0759J

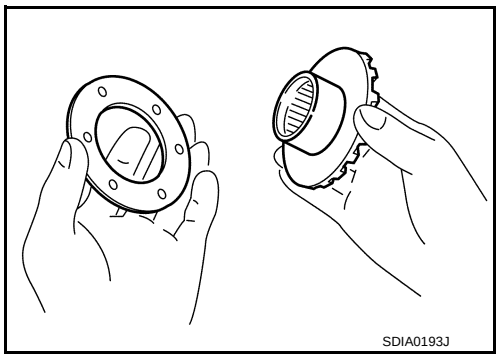
9. Remove pinion mate shaft, pinion mate gears, pinion mate thrust washers, side gears, side gear thrust washers from differential case.


SDIA0032J

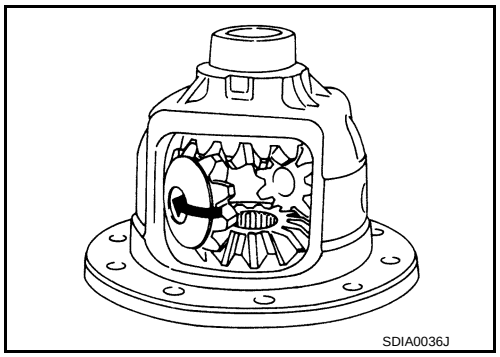
Assembly

INFOID:0000000005514267

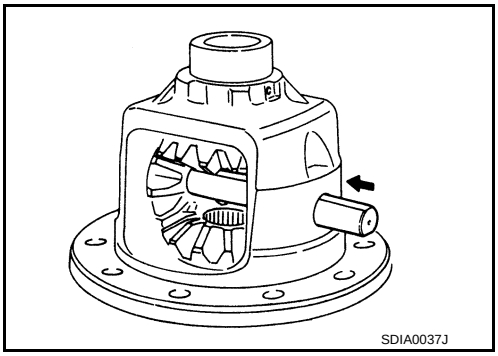
1. Install new side gear thrust washers with the same thickness as the ones installed prior to disassembly or reinstall the old ones on the side gears.
2. Install side gears and side gear thrust washers into differential case.


SDIA0193J

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

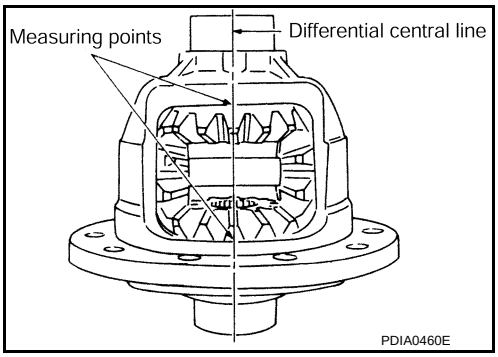

SDIA0036J

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.

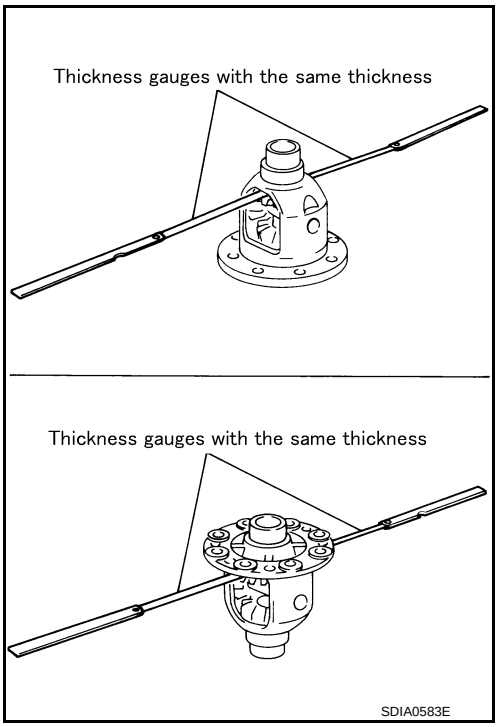


b. Using thickness gauges, measure the clearance between side gear back and differential case at 3 different positions, while rotating side gear. Average the 3 readings, and then decide the clearance. (Measure the clearance of the other side as well.)

Standard

Side gear back clearance **: Refer to DLN-126, "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:

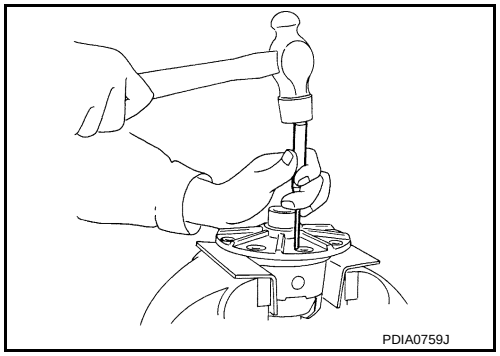
Use a thicker thrust washer.

When the back clearance is small:

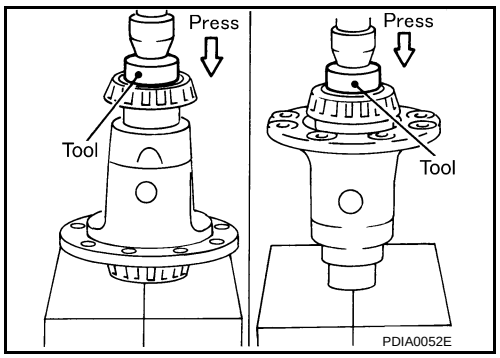
Use a thinner thrust washer.

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

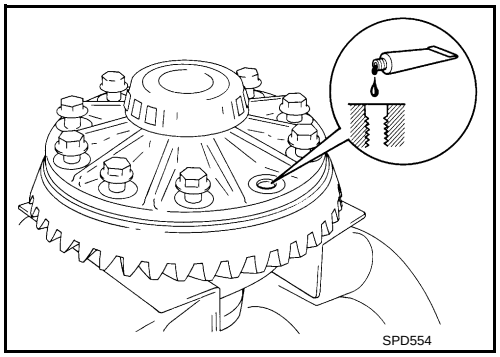
6. Drive a lock pin into pinion mate shaft, using the pin punch.
CAUTION:
Never reuse lock pin.



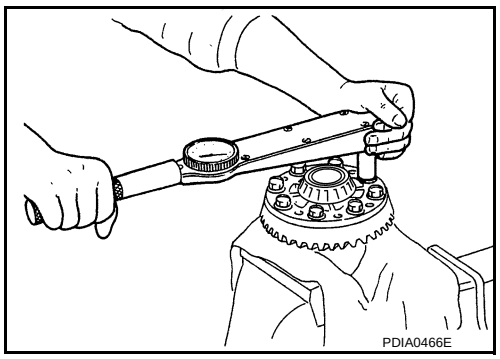
7. Press side bearing inner races to differential case, using the drift [SST: KV40105020 (—)].
CAUTION:
Never reuse side bearing inner races.



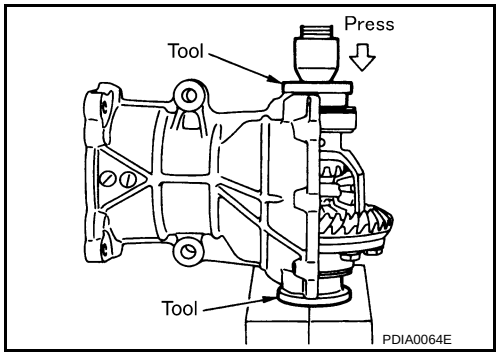
8. Apply locking sealant into the thread hole of drive gear.
Use Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".
CAUTION:
The drive gear back and threaded holes shall be cleaned and decreased sufficiently.



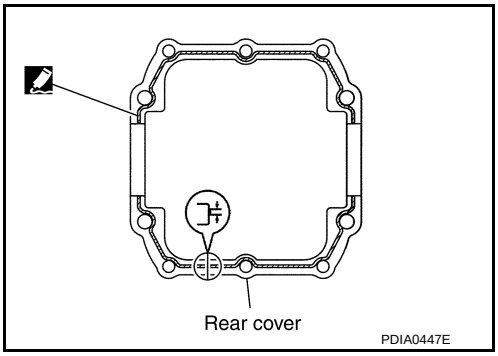
9. Install drive gear to the differential case, and then tighten to the specified torque.
10. Apply gear oil to side bearings, and install new side bearing adjusting shims (2 pieces for one side) with the same thickness as the ones installed prior to disassembly or re-install the old ones, with side bearing outer race to differential case.
If side bearing adjusting shims have been already selected, use them.
CAUTION:
Never reuse side bearing outer race.



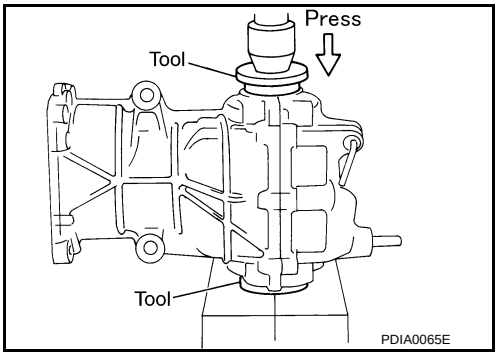
11. Set the drifts [SST: KV40100610 (J-26089)] to the right and left side bearing adjusting shims individually. Compress differential case assembly and side bearing to install gear carrier assembly to differential case assembly.
CAUTION:
- **The drift shall be placed on the center of the adjusting shims.**
- **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, 1.1 US ton, 1.0 Imp ton).**
- **If the adjusting shims are installed by tapping, the gear carrier may be damaged. Avoid tapping.**



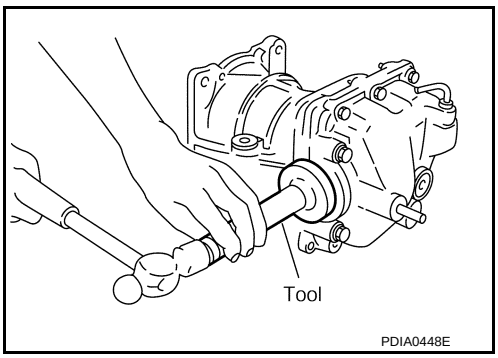
12. Install dummy cover set, check and adjust drive gear runout, tooth contact, backlash, and total preload torque. Refer to DLN-121, "Adjustment".
13. Remove dummy cover set.
14. Apply liquid gasket to mating surface of rear cover. Overlap both ends of the bead for at least 3 mm (0.12 in).
    Use Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".
    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 [SST: KV40100610 (J-26089)] 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 Imp 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 (J-26233)], 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-121, "Adjustment".



Inspection After Disassembly

INFOID:0000000005514268

DRIVE GEAR AND DRIVE PINION

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

BEARING

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

SIDE GEAR AND PINION MATE GEAR

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

SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

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

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

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

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

DRIVE PINION

Exploded View

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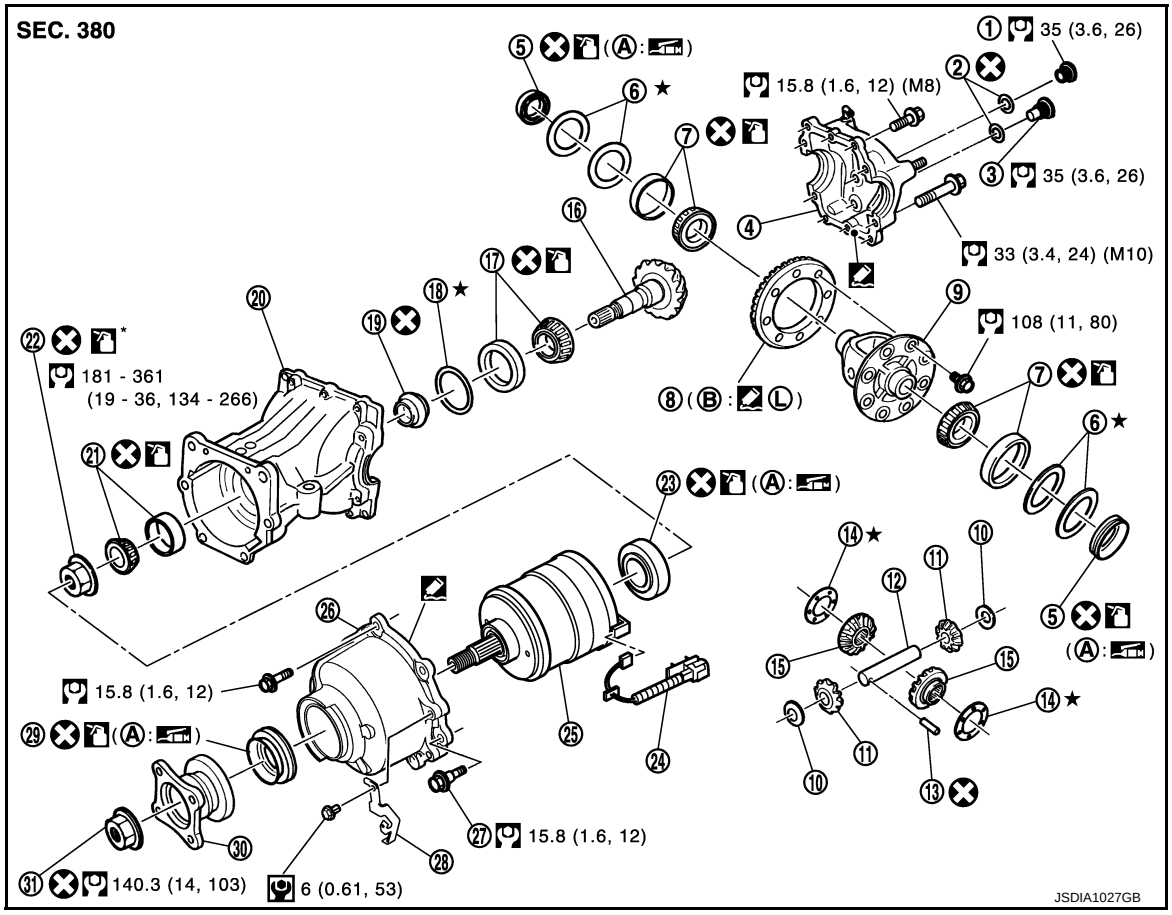


1.	Filler plug	2.	Gasket	3.	Drain plug
4.	Rear cover	5.	Side oil seal	6.	Side bearing adjusting shim
7.	Side bearing	8.	Drive gear	9.	Differential case
10.	Pinion mate thrust washer	11.	Pinion mate gear	12.	Pinion mate shaft
13.	Lock pin	14.	Side gear thrust washer	15.	Side gear
16.	Drive pinion	17.	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.	AWD 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 Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

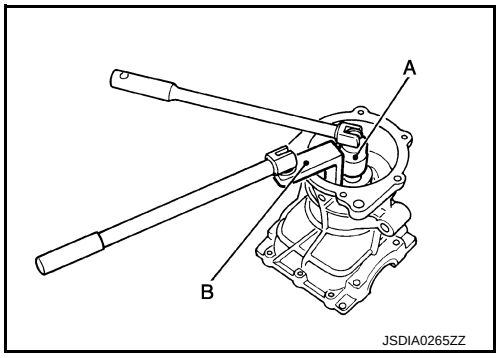
Ⓛ: Apply Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".

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

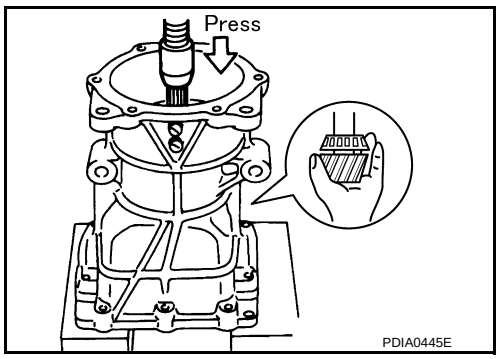
Disassembly

INFOID:0000000005514270

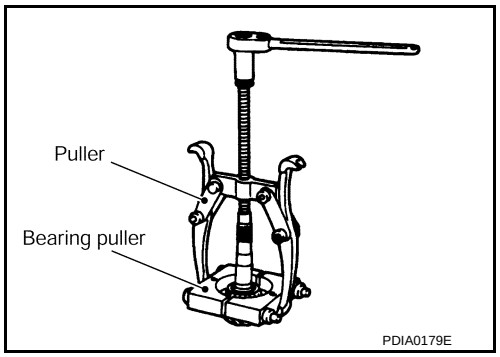
1. Remove electric controlled coupling assembly. Refer to DLN-105, "Disassembly".
2. Remove differential case assembly. Refer to DLN-110, "Disassembly".
3. Fit drive pinion socket (A) [SST: KV38108500 (—)] onto drive pinion spline. Remove drive pinion nut, using the pinion nut wrench (B) [SST: KV38108400 (—)].



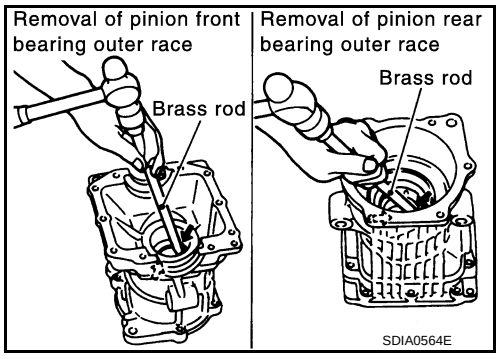
4. Press drive pinion assembly out of gear carrier.
   CAUTION:
   Never drop drive pinion assembly.
5. Remove pinion front bearing inner race.
6. Remove collapsible spacer.



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:
   Be careful not to 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:
   Be careful not to damage the gear carrier.

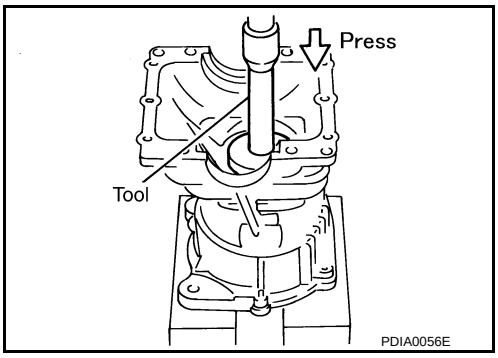


Assembly

INFOID:0000000005514271

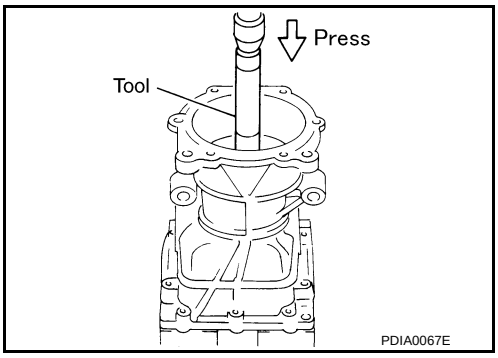
1. Install a drive pinion adjusting shim of the same thickness as was installed prior to disassembly. Press pinion rear bearing outer race into gear carrier, using the drift [SST: ST1713000 (—).

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



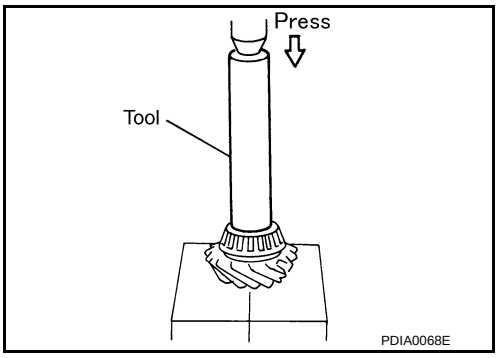
2. Press pinion front bearing outer race into gear carrier, using the drift [SST: 33230000 (J-25805-01)].

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.



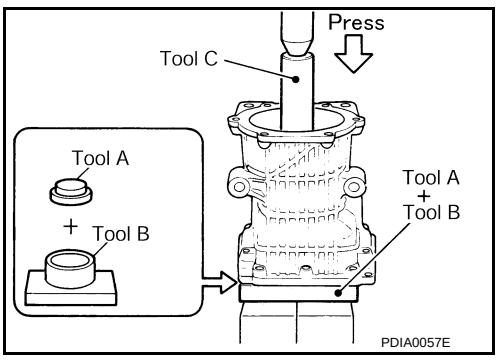
4. After checking and adjusting the tooth contact and backlash of the drive gear and drive pinion following the procedure below.

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: KV40100610 (J-26089)]
B : Drift [SST: ST38220000 (—)]
C : Drift [SST: ST23860000 (—)]



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.

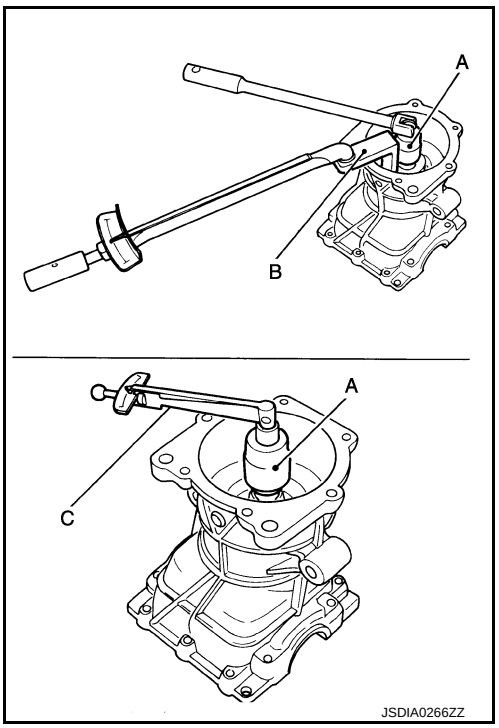
d. Fit the drive pinion socket (A) [SST: KV38108500 (—)] onto the drive pinion spline. Using the pinion nut wrench (B) [SST: KV38108400 (—)], tighten drive pinion nut to the specified preload torque.

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

Standard

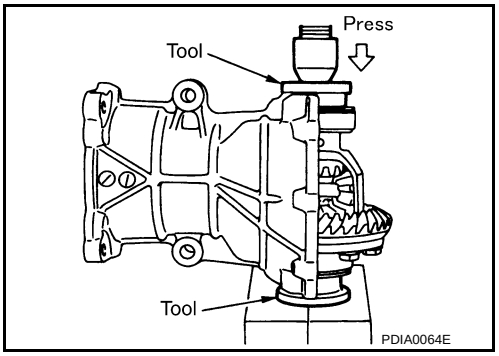
Pinion bearing preload **: Refer to DLN-126, "Preload Torque".**

CAUTION:
Drive pinion nut is tightened with no collapsible spacer. Be careful not to overtighten 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 [SST: KV40100610 (J-26089)] 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, 1.1 US 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-121, "Adjustment".

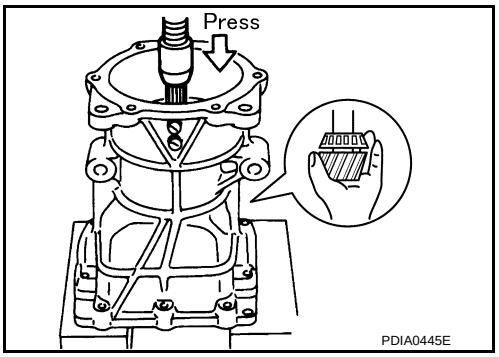
g. Check and adjust the backlash. Refer to DLN-121, "Adjustment".

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

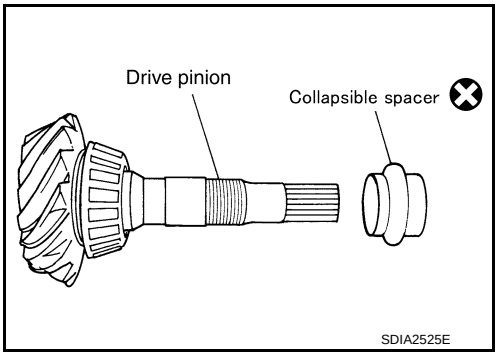
i. Remove drive pinion nut and press drive pinion assembly out of gear carrier.

CAUTION:
Never drop drive pinion assembly.

j. Remove pinion front bearing inner race.



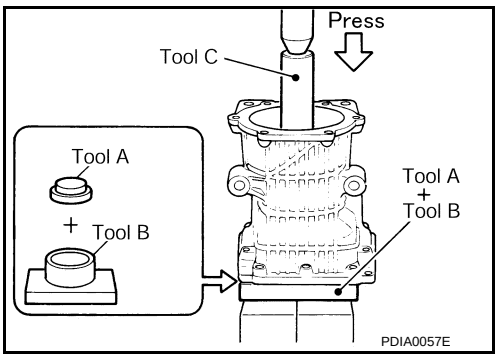
5. Assemble collapsible spacer to drive pinion.
CAUTION:
- **Be careful of the mounting direction of collapsible spacer.**
- **Never reuse collapsible spacer.**



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: KV40100610 (J-26089)]
B : Drift [SST: ST38220000 (—)]
C : Drift [SST: ST23860000 (—)]

CAUTION:
Never reuse pinion front bearing inner race.



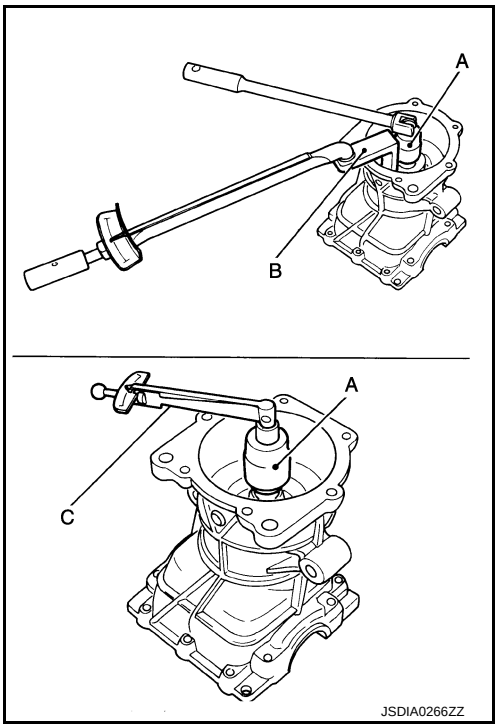
7. Apply anti-corrosive oil to the thread and seat of drive pinion nut, and temporarily tighten drive pinion nut to drive pinion.
CAUTION:
Never reuse drive pinion nut.

8. Fit the drive pinion socket (A) [SST: KV38108500 (—)] onto the drive pinion spline. Using the pinion nut wrench (B) [SST: KV38108400 (—)], adjust the drive pinion nut tightening torque and pinion bearing preload torque.

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

Drive pinion tightening torque	**: Refer to DLN-116, "Exploded View".**
Standard	
Pinion bearing preload	**: Refer to DLN-126, "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-111, "Assembly".
CAUTION:
Never install rear cover.

10. Install dummy cover set [SST: KV381086S1 (—)], and check drive gear runout, tooth contact, and backlash. Refer to DLN-121, "Adjustment".
11. Remove dummy cover set [SST: KV381086S1 (—)], then install rear cover, and side oil seal. Refer to DLN-111, "Assembly".
12. Check total preload torque. Refer to DLN-121, "Adjustment".
13. Install electric controlled coupling assembly. Refer to DLN-105, "Assembly".

14. Check companion flange runout. Refer to DLN-107, "Adjustment".

Adjustment

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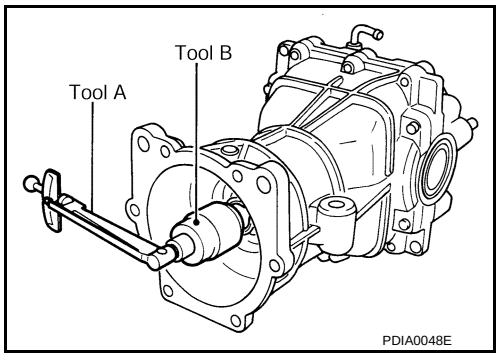
TOTAL PRELOAD TORQUE

1. Remove electric controlled coupling assembly. Refer to DLN-105, "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 (A) [SST: 3127S000 (J-27565-A)] and drive pinion socket (B) [SST: KV38108500 —)].



Standard

Total preload torque **: Refer to DLN-126, "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.**

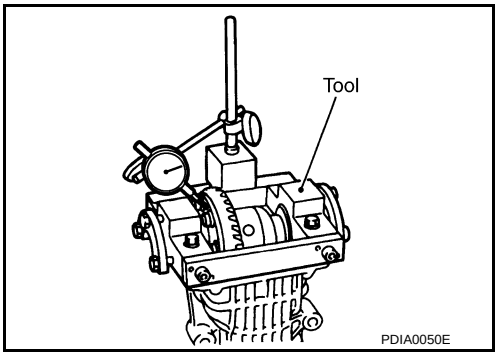
DRIVE GEAR RUNOUT

1. Remove rear cover. Refer to DLN-110, "Disassembly".
2. Following the procedure below, install a dummy cover set [SST: KV381086S1 (—)] to gear carrier.

a. Set dummy cover shims [SST: KV38108630 (—)] to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover [SST: KV38108610 (—)] to gear carrier.
c. Position dummy cover spacers [SST: KY38108621 (—)] to dummy cover [SST: 38108610 (—)].
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-116, "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-126, "Drive Gear Runout".**

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

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

TOOTH CONTACT

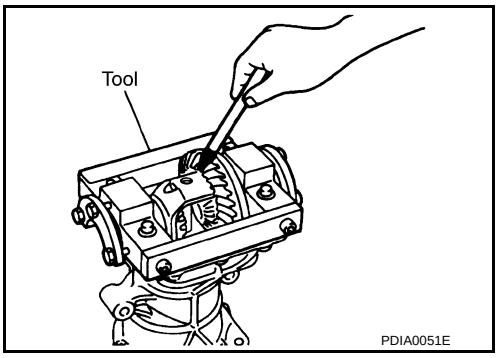
1. Remove rear cover. Refer to DLN-110, "Disassembly".
2. Following the procedure below, install a dummy cover set [SST: KV381086S1 (—)] to gear carrier.

a. Set dummy cover shims [SST: KV38108630 (—)] to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover [SST: 38108620 (—)] to gear carrier.
c. Position dummy cover spacers [SST: 38108621 (—)] to dummy cover [SST: 38108620 (—)].
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-116, "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)

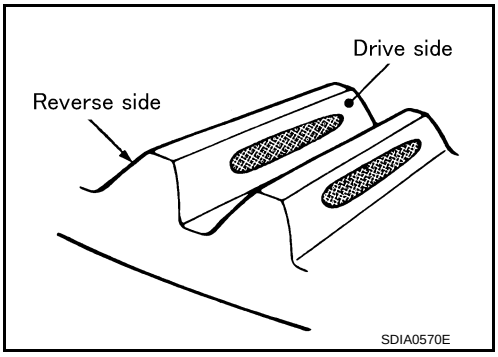
3. Apply red lead to drive gear.

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

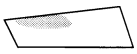
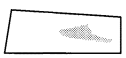
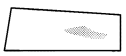


4. Rotate drive gear back and forth several times, check drive pinion gear to drive gear tooth contact.

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

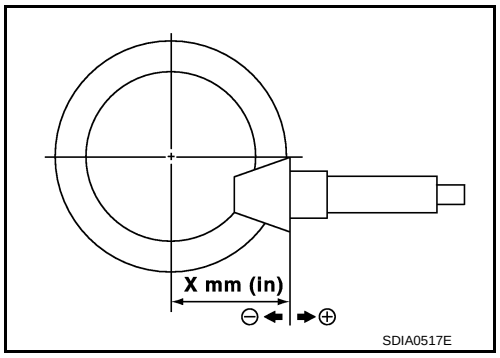


Tooth Contact Judgment Guide

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 ↑	+0.09 (+0.0035)	Yes	Occurrence of noise and scoring sound in all speed ranges.
			+0.06 (+0.0024)		Occurrence of noise when accelerating.
			+0.03 (+0.0012)	No	–
			0		
		Thinner ↓	−0.03 (−0.0012)		
			−0.06 (−0.0024)	Yes	Occurrence of noise at constant speed and decreasing speed.
			−0.09 (−0.0035)		Occurrence of noise and scoring sound in all speed ranges.

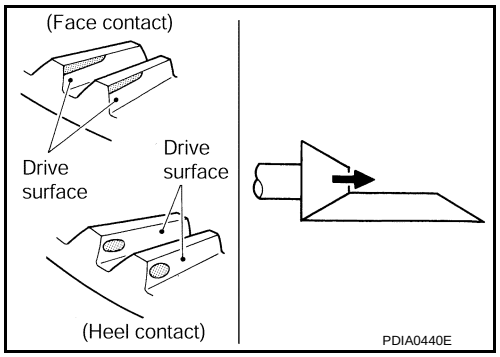
SDIA2549E

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



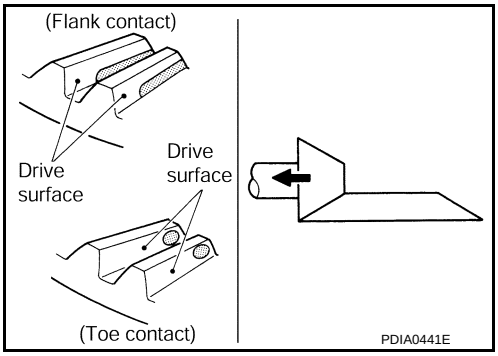
SDIA0517E

- 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.



PDIA0440E

- 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.



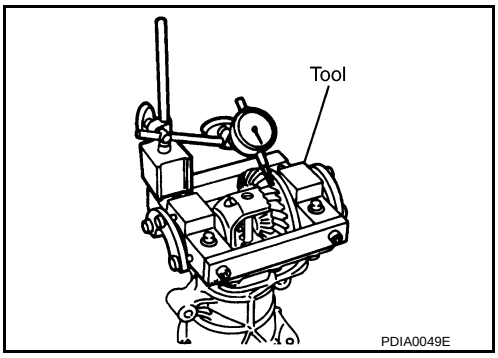
BACKLASH

1. Remove rear cover. Refer to DLN-110, "Disassembly".
2. Following the procedure below, install a dummy cover set [SST: KV381086S1 (—)] to gear carrier.

a. Set dummy cover shims [SST: KV38108630 (—)] to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover [SST: KV38108610 (—)] to gear carrier.
c. Position dummy cover spacers [SST: KV38108621 (—)] to dummy cover [SST: KV38108610 (—)].
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-116, "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-126, "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

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DRIVE GEAR AND DRIVE PINION

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

BEARING

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

SIDE GEAR AND PINION MATE GEAR

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

SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

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

OIL SEAL

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

DIFFERENTIAL CASE

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

COMPANION FLANGE

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

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000005514274

Applied model	AWD
	VQ35DE
	CVT
Final drive model	R145
Gear ratio	2.466
Number of teeth (Drive gear/Drive pinion)	37/15
Oil capacity (Approx.) ℓ (US pt, Imp pt)	0.55 (1-1/8, 1)
Number of pinion gears	2
Drive pinion adjustment spacer type	Collapsible

Drive Gear Runout

INFOID:0000000005514275

Unit: mm (in)

Item	Limit
Drive gear back face runout	0.05 (0.0020)

Differential Side Gear Clearance

INFOID:0000000005514276

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:0000000005514277

Unit: N·m (kg-m, in-lb)

Item	Standard
Pinion bearing (P_1)	0.69 – 1.18 (0.07 – 0.12, 7 – 10)
Side bearing (P_2)	0.64 – 0.98 (0.07 – 0.09, 6 – 8)
Side bearing to pinion bearing (Total preload) (Total preload = P_1 + P_2)	1.33 – 2.16 (0.14 – 0.22, 12 – 19)

Backlash

INFOID:0000000005514278

Unit: mm (in)

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

Companion Flange Runout

INFOID:0000000005514279

Unit: mm (in)

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