SECTION DLN **DRIVELINE** c

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CONTENTS

TRANSFER: ETX13B

	Description	
BASIC INSPECTION		18
DIAGNOSIS AND REPAIR WORK FLOW	Diagnosis Procedure	18
Work Flow		
	Description	
SYSTEM DESCRIPTION	DTC Logic	
AWD SYSTEM	Diagnosis Procedure	
System Diagram		20
System Description		
Component Parts Location		
Component Description10	Diagnosis Procedure	
DIAGNOSIS SYSTEM (AWD CONTROL	POWER SUPPLY AND GROUND CIRCUI	Г 21
UNIT)11		
CONSULT-III Function1		
DTC/CIRCUIT DIAGNOSIS	-	
DIC/CIRCUIT DIAGNOSIS		
C1201 AWD CONTROL UNIT13	Description	
Description		
DTC Logic		23
Diagnosis Procedure13		25
C1203 ABS ACTUATOR AND ELECTRIC	AWD CONTROL UNIT	25
UNIT (CONTROL UNIT)14		
Description14		
DTC Logic14		
Diagnosis Procedure14		
	DTC Index	
C1204 AWD SOLENOID		
Description		33
DTC Logic		ON
Diagnosis Procedure		33
	Description	
C1205 AWD ACTUATOR RELAY17	Diagnosis Procedure	
Description17		
DTC Logic17		
Diagnosis Procedure17	7 OFF	34

C1210 ECM	•
U1000 CAN COMM CIRCUIT19 Description	Н
U1010 CONTROL UNIT (CAN)20 Description	
POWER SUPPLY AND GROUND CIRCUIT21 Description	
AWD WARNING LAMP23 Description	L
ECU DIAGNOSIS INFORMATION25	M
AWD CONTROL UNIT25Reference Value25Wiring Diagram - AWD SYSTEM -27Fail-Safe31DTC Inspection Priority Chart32DTC Index32	N
SYMPTOM DIAGNOSIS	;
AWD WARNING LAMP DOES NOT TURN ON	Ρ
33 Description	
AWD WARNING LAMP DOES NOT TURN	

Description Diagnosis Procedure	34 34
HEAVY TIGHT-CORNER BRAKING SYMP- TOM OCCURS	35
Description Diagnosis Procedure	35
VEHICLE DOES NOT ENTER AWD MODE Description Diagnosis Procedure	36
AWD WARNING LAMP BLINKS QUICKLY Description	
AWD WARNING LAMP BLINKS SLOWLY Description Diagnosis Procedure	38
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING NVH Troubleshooting Chart	
PRECAUTION	40
PRECAUTIONS Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- SIONER"	-
Precaution Necessary for Steering Wheel Rota- tion after Battery Disconnect Service Notice or Precautions for Transfer	40
PREPARATION	42
PREPARATION Special Service Tools Commercial Service Tools	42
PERIODIC MAINTENANCE	45
TRANSFER FLUID Inspection Draining Refilling	45 45
REMOVAL AND INSTALLATION	46
AWD CONTROL UNIT Exploded View Removal and Installation	46
FRONT OIL SEAL Exploded View Removal and Installation	47
REAR OIL SEAL Exploded View Removal and Installation	49
UNIT REMOVAL AND INSTALLATION	52

TRANSFER ASSEMBLY 52 Exploded View 52 Removal and Installation 52
UNIT DISASSEMBLY AND ASSEMBLY 55
FRONT CASE AND REAR CASE 55
Exploded View55
Disassembly
Assembly60 Inspection64
Inspection
MAINSHAFT 66
Exploded View66
Disassembly66
Assembly
Inspection67
FRONT DRIVE SHAFT AND DRIVE CHAIN 69
Exploded View69
Disassembly69
Assembly70
Inspection71
SERVICE DATA AND SPECIFICATIONS (SDS)
(000)
SERVICE DATA AND SPECIFICATIONS
(SDS)73
General Specifications
FRONT PROPELLER SHAFT: 2S56A
SYMPTOM DIAGNOSIS74
NOISE, VIBRATION AND HARSHNESS
(NVH) TROUBLESHOOTING74
NVH Troubleshooting Chart74
PREPARATION75
PREPARATION75
Commercial Service Tools
PERIODIC MAINTENANCE76
FRONT PROPELLER SHAFT
REMOVAL AND INSTALLATION77
FRONT PROPELLER SHAFT
Exploded View
Removal and Installation77
Inspection78
SERVICE DATA AND SPECIFICATIONS
(SDS)
SERVICE DATA AND SPECIFICATIONS

(SDS)	. 79
General Specifications	. 79

Propeller Shaft Runout79 Journal Axial Play
SYMPTOM DIAGNOSIS80
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING80 NVH Troubleshooting Chart80
PREPARATION81
PREPARATION
PERIODIC MAINTENANCE82
REAR PROPELLER SHAFT82 Inspection82
REMOVAL AND INSTALLATION83
REAR PROPELLER SHAFT83
Exploded View83 Removal and Installation83
Inspection86
SERVICE DATA AND SPECIFICATIONS (SDS)
SERVICE DATA AND SPECIFICATIONS (SDS)
SYMPTOM DIAGNOSIS88
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING
PREPARATION89
PREPARATION
PERIODIC MAINTENANCE90
REAR PROPELLER SHAFT90 Inspection90
REMOVAL AND INSTALLATION91
REAR PROPELLER SHAFT91Exploded View91Removal and Installation91Inspection94
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS	
(SDS)95	А
General Specifications95 Propeller Shaft Runout95	
Journal Axial Play95	В
FRONT FINAL DRIVE: F160A	
SYSTEM DESCRIPTION96	С
FRONT FINAL DRIVE ASSEMBLY96 System Diagram	
SYMPTOM DIAGNOSIS97	DLN
NOISE, VIBRATION AND HARSHNESS	
(NVH) TROUBLESHOOTING97	E
NVH Troubleshooting Chart97	
PRECAUTION98	F
PRECAUTIONS	
tion after Battery Disconnect	G
Service Notice or Precautions for Front Final Drive	
PREPARATION99	Η
PREPARATION	I
PERIODIC MAINTENANCE 102	
	J
FRONT DIFFERENTIAL GEAR OIL 102 Inspection	
Draining102	Κ
Refilling102	
REMOVAL AND INSTALLATION 103 SIDE OIL SEAL	L
RIGHT SIDE103 RIGHT SIDE : Exploded View103 RIGHT SIDE : Removal and Installation104	Μ
LEFT SIDE104	Ν
LEFT SIDE : Exploded View105 LEFT SIDE : Removal and Installation106	
UNIT REMOVAL AND INSTALLATION 107	0
FRONT FINAL DRIVE ASSEMBLY 107	
Exploded View107 Removal and Installation107	Ρ
UNIT DISASSEMBLY AND ASSEMBLY . 109	
SIDE SHAFT	
Disassembly110	

Assembly	110
Inspection After Disassembly	111

DIFFERENTIAL ASSEMBLY	112
Exploded View	
Disassembly	
Assembly	
Adjustment	
Inspection After Disassembly .	

DRIVE PINION	126
Exploded View	
Disassembly	127
Assembly	
Adjustment	130
Inspection After Disassembly	132

SERVICE DATA AND SPECIFICATIONS

SERVICE DATA AND SPECIFICATIONS

(SDS)	134
General Specifications	
Drive Gear Runout	
Differential Side Gear Clearance	134
Preload Torque	134
Backlash	134
Companion Flange Runout	134
READ FINIAL DRIVE - R200	

REAR FINAL DRIVE: R200

SYSTEM DESCRIPTION	135
REAR FINAL DRIVE ASSE	MBI Y 135

SYMPTOM DIAGNOSIS137

NOISE, VIBRATION AND HARSHNESS

(NVH) TROUBLESHOOTING NVH Troubleshooting Chart	
PRECAUTION	139
PRECAUTIONS Service Notice or Precautions for Rear Final D	
PREPARATION	140
PREPARATION Special Service Tools Commercial Service Tools	140
PERIODIC MAINTENANCE	144
	111

NEAN DITTENENTIAL GEAN OIL	
Inspection	144
Draining	144
Refilling	144
REMOVAL AND INSTALLATION .	145
FRONT OIL SEAL	145

2WD
AWD149AWD : Exploded View150AWD : Removal and Installation150
SIDE OIL SEAL155
2WD 155 2WD : Exploded View 155 2WD : Removal and Installation 155
AWD156AWD : Exploded View157AWD : Removal and Installation157
UNIT REMOVAL AND INSTALLATION 159
REAR FINAL DRIVE ASSEMBLY159
2WD 159 2WD : Exploded View 159 2WD : Removal and Installation 159
AWD
UNIT DISASSEMBLY AND ASSEMBLY 163
DIFFERENTIAL ASSEMBLY163
2WD 163 2WD : Exploded View 163 2WD : Disassembly 164 2WD : Assembly 166 2WD : Adjustment 171 2WD : Inspection After Disassembly 175
AWD 176 AWD : Exploded View 176 AWD : Disassembly 177 AWD : Assembly 179
AWD : Adjustment
AWD : Inspection After Disassembly 188 DRIVE PINION
AWD : Inspection After Disassembly 188

SERVICE DATA AND SPECIFICATIONS (SDS)	Drive G Differer Preload	
SERVICE DATA AND SPECIFICATIONS (SDS)		
General Specification	Compa	

Prive Gear Runout	.208	
Differential Side Gear Clearance		А
Preload Torque	.208	
acklash	.208	
Prive Pinion Runout (2WD)	.208	R
Companion Flange Runout (AWD)	.209	

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< BASIC INSPECTION >

BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000005171105

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 for "ALL MODE AWD/4WD".

Is the input/output the standard value?

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

< SYSTEM DESCRIPTION >

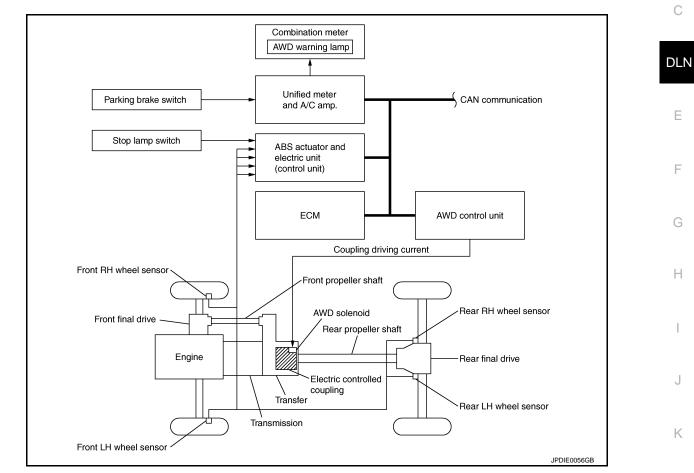
SYSTEM DESCRIPTION AWD SYSTEM

System Diagram

INFOID:000000005171106 B

[TRANSFER: ETX13B]

CONTROL DIAGRAM



CROSS-SECTIONAL VIEW

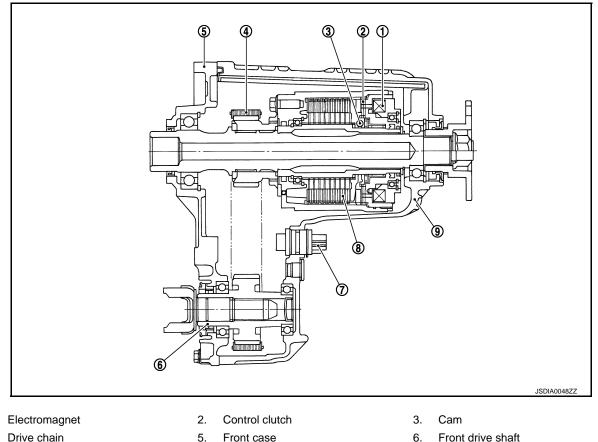
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- Drive chain 4.
- 8. Main clutch

- Front drive shaft 6.
- 9. Rear case

System Description

AWD solenoid connector

DESCRIPTION

1.

7.

- Electronic control allows optimal distribution of torque to front/rear wheels to match road conditions.
- Makes possible stable driving, with no wheel spin, on snowy roads or other slippery surfaces.
- On roads which do not require AWD, it contributes to improved fuel economy by driving in conditions close to rear-wheel drive.
- Sensor inputs determine the vehicle's turning condition, and in response tight cornering/braking are controlled by distributing optimum torque to front wheels.
- It transmits/receives each signal from the following 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 signalStop lamp switch signal (brake signal)	
ECM	Transmits the following signals via CAN communication to AWD control unit.Accelerator pedal position signalEngine speed signal	
Unified meter and A/C amp.	Transmits conditions of parking brake switch via CAN communication to AWD control unit.	

NOTE:

- When driving, if there is a large difference between front and rear wheel speed which continues for a long time, fluid temperature of drive system parts becomes too high and AWD warning lamp blinks quickly. (When AWD warning lamp blinks, vehicle changes to rear-wheel drive conditions.) Also, optional distribution of torque sometimes becomes rigid before lamp blinks quickly, but it is not a malfunction.
- If AWD warning lamp is blinking quickly, stop vehicle and allow it to idle for some time. Blinking will stop and AWD system will be restored.

< SYSTEM DESCRIPTION >

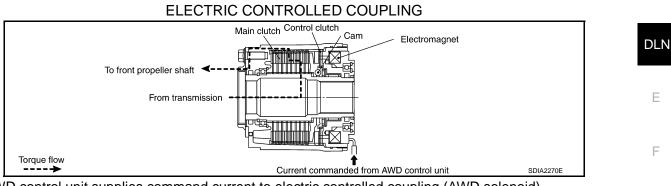
[TRANSFER: ETX13B]

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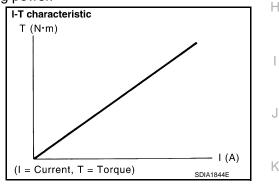
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- When driving, AWD warning lamp may blink slowly if there is a significant difference in diameter of the tires. At this time, vehicle performance is not fully available and cautious driving is required. (Continues until the engine is turned OFF.)
- If the warning lamp blinks slowly during driving but remains OFF after the engine is restarted, the system is normal. If it again blinks slowly after driving for some time, vehicle must be inspected.
- When there is a difference of revolution speed between the front and rear wheel the shift occasionally changes to direct 4-wheel driving conditions automatically. This is not a malfunction.

OPERATION PRINCIPLE

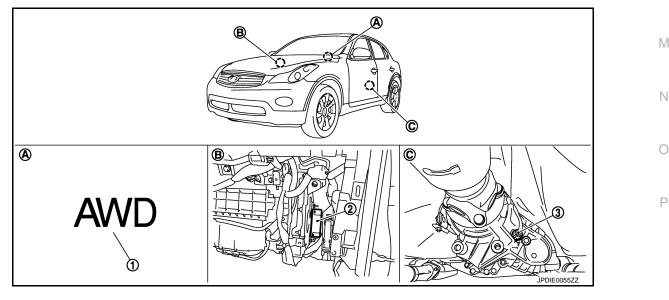


- 1. AWD control unit supplies command current to electric controlled coupling (AWD solenoid).
- 2. Control clutch is engaged by electromagnet and torque is detected in control clutch.
- 3. The cam operates in response to control clutch torque and applies pressure to main clutch.
- 4. Main clutch transmits torque to front wheels according to pressing power.
 - Transmission torque to front wheels is determined according
 I-T characteristic
 T (N·m)
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Component Parts Location

INFOID:000000005171108



1. AWD warning lamp

2. AWD control unit

3. AWD solenoid harness connector

< SYSTEM DESCRIPTION >

- A. Combination meter
- B. Glove box assembly removed

[TRANSFER: ETX13B]

C. Transfer assembly

INFOID:000000005171109

Component Description

Component parts	Reference/Function
AWD control unit	DLN-13, "Description"
Wheel sensors	BRC-37, "Description"
AWD solenoid	DLN-15, "Description"
Electric controlled coupling	Transmits driving force to rear final drive.
AWD warning lamp	DLN-23, "Description"
ABS actuator and electric unit (control unit)	DLN-14, "Description"
ECM	DLN-18, "Description"
Unified meter and A/C amp.	DLN-23, "Description"

DIAGNOSIS SYSTEM (AWD CONTROL UNIT)

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (AWD CONTROL UNIT)

CONSULT-III Function

INFOID:000000005171110

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[TRANSFER: ETX13B]

FUNCTION

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

Diagnostic test mode	Function	С
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.	DLN
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 <u>DLN-32, "DTC Index"</u>.

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 (19MPH) 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 [##]	Mode switch is not equipped, but displayed.	
4WD MODE MON [AUTO]	Control status of AWD is displayed.	
DIS-TIRE MONI [mm]	Improper size tire installed condition is displayed.	
P BRAKE SW [On/Off]	Parking brake 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

Revision: 2009 August

DLN-11

DIAGNOSIS SYSTEM (AWD CONTROL UNIT)

< SYSTEM DESCRIPTION >

[TRANSFER: ETX13B]

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 stoppedEngine runningNo 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 >

DTC/CIRCUIT DIAGNOSIS А C1201 AWD CONTROL UNIT Description INFOID:000000005493956 В Controls driving force distribution by signals from each sensor from rear wheel driving mode (0:100) to 4wheel driving mode (50:50). Rear wheel driving conditions is available by fail-safe function if malfunction is detected in AWD system. С DTC Logic INFOID:000000005171112 DLN DTC DETECTION LOGIC DTC Display item Malfunction detected condition Possible cause Е Malfunction has occurred inside AWD C1201 CONTROLLER FAILURE Internal malfunction of AWD control unit control unit. F DTC CONFIRMATION PROCEDURE 1.DTC REPRODUCTION PROCEDURE (P)With CONSULT-III 1. Turn the ignition switch OFF to ON. Perform self-diagnosis for "ALL MODE AWD/4WD". 2. Is DTC "C1201" detected? Н YES >> Proceed to diagnosis procedure. Refer to <u>DLN-13, "Diagnosis Procedure"</u>. >> INSPECTION END NO

Diagnosis Procedure

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. Κ 3. Perform self-diagnosis for "ALL MODE AWD/4WD".

Is DTC "C1201" detected?

- YES >> Replace AWD control unit. Refer to DLN-46, "Exploded View".
- L 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)

< DTC/CIRCUIT DIAGNOSIS >

C1203 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

INFOID:000000005171114

INFOID:000000005171115

[TRANSFER: ETX13B]

Transmits the following signals via CAN communication to AWD control unit.

- Vehicle speed signal
- Stop lamp switch signal (brake signal)

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

With CONSULT-III

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

2. Perform self-diagnosis for "ALL MODE AWD/4WD".

Is DTC "C1203" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>DLN-14, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000005171116

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. Make sure 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 <u>DLN-46, "Exploded View"</u>.
- 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

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

DTC Logic

INFOID:000000005171118

INFOID:000000005171117

DTC DETECTION LOGIC

DTC	Display i	tems	Malfunction detected condition	Possible cause	
C1204	4WD SOLENOID)	lalfunction related to AWD solenoid has een detected.	 Internal malfunction of electronic con- trolled coupling Malfunction of AWD sorenoid power supply circuit (open of short) Malfunction of AWD sorenoid com- mand current 	DLN
DTC CONFIR	MATION PRO	OCEDURE			F
1 .DTC REPR	ODUCTION PR	ROCEDURE			
2. Perform se I <u>s DTC "C1204</u> YES >> Pr	Inition switch O elf-diagnosis for <u>" detected?</u> oceed to diagno	· "ALL MODE	AWD/4WD". e. Refer to <u>DLN-15, "Diagnosis I</u>	Procedure".	G H
	SPECTION EN	D			
Diagnosis F	locedule			INFOID:000000005171119	I
CHECK AW	D SOLENOID	POWER SUP	PLY		
	nition switch O				J
	t AWD control u		onnector. ol unit harness connector and gi	round	
5. Oneok the	voltage betwee		or unit namess connector and g	ouna.	K
AWD cor	ntrol unit				
Connector	Terminal	_	Voltage		
F108	9	Ground	Battery voltage		L
s the inspection	on result normal	?			
	D TO 2.				M
~		0	or power supply circuit. Refer to	DLN-21, "Diagnosis Procedure".	
	D SOLENOID				
Check the con	tinuity between	AWD control	unit harness connector and grou	und.	Ν
	ontrol unit		Continuity		0
Connector	Terminal				
F108	10	Ground	Existed		
	11				Ρ
•	on result normal	<u> ?</u>			
	D TO 3. epair or replace	error-detected	d parts		
~	D SOI ENOID				

3.CHECK AWD SOLENOID CIRCUIT

1. Disconnect AWD solenoid harness connector.

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

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C1204 AWD SOLENOID

< DTC/CIRCUIT DIAGNOSIS >

AWD co	ntrol unit	AWD solenoid		Continuity
Connector	Terminal	Connector	Terminal	Continuity
F108	1	F57	1	Existed
1100	2	1.57	2	LXISIGU

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

AWD co	ontrol unit		Continuity	
Connector	Connector Terminal		Continuity	
F108	1	Ground	Not existed	
1100	2	Giouna	NOL EXISTEN	

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

AWD s	olenoid		Continuity	
Connector	Connector Terminal		Continuity	
F57	1	Ground	Not existed	
157	2	Glouid	NOT EXISTED	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK AWD SOLENOID

Check the resistance between AWD solenoid harness connector terminals. Refer to <u>DLN-16, "Component</u> <u>Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 5.

NO >> AWD solenoid is malfunctioning. Replace electric controlled coupling. Refer to <u>DLN-161</u>, "AWD : <u>Exploded View</u>".

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 <u>DLN-46, "Exploded View"</u>.
- NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:000000005171120

1.CHECK AWD SOLENOID

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

AWD s	olenoid	Resistance (Approx.)
Terr	ninal	Tresistance (Approx.)
1	2	2.45 Ω

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> AWD solenoid is malfunctioning. Replace electric controlled coupling. Refer to <u>DLN-161, "AWD :</u> <u>Exploded View"</u>.

DLN-16

C1205 AWD ACTUATOR RELAY

< DTC/CIRCUIT DIAGNOSIS >

C1205 AWD ACTUATOR RELAY

Description

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

DTC Logic

INFOID:000000005171122

INFOID:000000005171121

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
TC CONFIR	MATION PROCEDUR	RE	
1 .DTC REPR	ODUCTION PROCEDU	RE	
2. Perform se <u>s DTC "C1205</u> YES >> Pro	nition switch OFF to ON elf-diagnosis for "ALL MC <u>5" detected?</u>		Procedure".
Diagnosis F	Procedure		INFOID:000000005171123
1.perform	SELF-DIAGNOSIS		
2. Turn ignitic	ULT-III -diagnostic results for "A on switch OFF, and wait elf-diagnosis for "ALL MC	10 seconds or more.	
NO >> Ch	eplace AWD control unit. heck AWD control unit pi	Refer to <u>DLN-46, "Exploded View"</u> . n terminals for damage or loose com pair or replace error-detected parts.	nection with harness connector. If
	,	Ferre et	

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[TRANSFER: ETX13B]

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< DTC/CIRCUIT DIAGNOSIS >

C1210 ECM

Description

Transmits the following signals via CAN communication to AWD control unit.

- Accelerator pedal position signal
- Engine speed signal

DTC Logic

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 <u>DLN-18, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

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. Make sure 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 <u>DLN-46</u>, "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.

Revision: 2009 August

INFOID:0000000005171124

INFOID:000000005171125

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle mul-В tiplex 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

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
		AWD control unit is not transmitting/re-	
U1000	CAN COMM CIRCUIT	ceiving CAN communication signal for 2 seconds or more.	CAN communication error
DTC CONFIR	MATION PROCEDURE		
1.DTC REPRO	DUCTION PROCEDURI	Ξ	
With CONSL	JLT-III		
	nition switch OFF to ON. If-diagnosis for "ALL MOE		
2. Fendini se Is DTC "U1000'	•	JE AVVD/4VVD .	
	oceed to diagnosis proced	lure. Refer to <u>DLN-19, "Diagnosis I</u>	Procedure".
Diagnosis P	rocedure		INFOID:000000005171129
1.PERFORM	SELF-DIAGNOSIS		
With CONSU Perform self-dia	JLT-III agnosis for "ALL MODE A	WD/4WD".	
<u>ls DTC "U1000'</u>	•		
	N specification chart. Ref	er to <u>LAN-18, "Trouble Diagnosis F</u>	<u>low Chart"</u> .

INFOID:000000005171127

INFOID:000000005171128

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U1010 CONTROL UNIT (CAN)

Description

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:000000005171131

INFOID:000000005171130

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1010	CONTROL UNIT (CAN)	Detecting error during the initial diagno- sis of CAN controller of AWD control unit.	Malfunction of AWD control unit

DTC CONFIRMATION PROCEDURE

1.DTC REPRODUCTION PROCEDURE

(B) 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 <u>DLN-20, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

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 <u>DLN-46, "Exploded View"</u>.
- NO >> Repair or replace error-detected parts.

DOWED SUDDI V AND COOLIND CIDCUIT

	Р	OWER SU	PPLY AND GF	ROUND CIRCUIT	
< DTC/CIRCI	JIT DIAGNOS	SIS >		[TRANSFER: ETX13B]	
POWER S	SUPPLY A	ND GRO	UND CIRCUI	Т	А
Description	I			INFOID:000000005171133	A
Supplies powe	er to AWD con	trol unit.			В
Diagnosis I	Procedure			INFOID:000000005171134	
1. CHECK AV	VD CONTROL	UNIT POWE	R SUPPLY (1)		С
2. Disconne	gnition switch ct AWD contro e voltage betw	ol unit harness		nnector and ground.	DLN
AWD co	ontrol unit		Voltage (Approx.)		Е
Connector	Terminal			_	
F108	7	Ground	0 V		
CAUTION Never sta	art the engine		trol unit harness co	nnector and ground.	F
	atral				
	ontrol unit	· _	Voltage		
Connector F108	7	Ground	Battery voltage	-	Η
Is the inspecti			Ballery Vollage		
YES >> G	0 TO 3. 0 TO 2.	<u>iai :</u>			
2.CHECK AV	VD CONTROL	UNIT POWE	R SUPPLY (2)		
1. Turn the i	gnition switch e 10A fuse (#4	OFF.			J
 Disconne Check the 	ct IPDM E/R h	arness conne open or shor	t between AWD co	ontrol unit harness connector No.7 terminal and	K
Is the inspecti	on result norm	<u>al?</u>			
	erform the trou			supply circuit. Refer to <u>PG-69, "Wiring Diagram -</u>	
NO >> R	epair or replac	ce error-detect	ed parts.		5.4
3.CHECK AV	VD SOLENOII	D POWER SU	IPPLY (1)		M
2. Disconne	gnition switch ct AWD solend e voltage betw	oid harness co		nnector and ground.	Ν
	ntrol unit				
	ontrol unit	_	Voltage		0
Connector F108	Terminal 9	Ground	Battery voltage	-	
	gnition switch		Dattery Voltage		Ρ
	art the engine				

Never start the engine.
 Check the voltage between AWD control unit harness connector and ground.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

AWD co	ntrol unit		Voltage
Connector	Connector Terminal		voltage
F108	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. Check the 10A fuse (#33).

2. Check the harness for open or short between AWD control unit harness connector No.9 terminal and fuse box.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to <u>PG-6</u>, "Wiring Diagram - <u>BAT-</u> <u>TERY POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

5. CHECK AWD SOLENOID GROUND

1. Turn the ignition switch OFF.

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

AWD co	ntrol unit		Continuity	
Connector	Connector Terminal		Continuity	
F108	10	Ground	Existed	
1108	11	Ground	Existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

AWD WARNING LAMP

Description

INFOID:000000005171135

- Turns ON when there is a malfunction in AWD system. AWD warning lamp indicates the vehicle is in fail-safe mode and shifting to rear-wheel drive or 4-wheel drive (front-wheels still have some driving torque).
 Also turns ON when ignition switch is turned ON, for the purpose of lamp check. Turns OFF approximately
- for 1 second 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 approx. 1 second 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 rear wheel drive.)		
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:	ion one CAN communication once ato	
AWD warning lamp also turns ON due to data recept	ion error, CAN communication error etc.	
Component Function Check	INFOID:000000005171136	
1. CHECK AWD WARNING LAMP FUNCTION		
 Turn ignition switch ON. Make sure that AWD warning lamp lights up. 		
Is the inspection result normal? YES >> INSPECTION END		
NO >> Proceed to diagnosis procedure. Refer to <u>DLN</u>	<u>1-23, "Diagnosis Procedure"</u> .	
Diagnosis Procedure	INFOID:000000005171137	
1. CHECK POWER SUPPLY AND GROUND CIRCUIT		
Perform the trouble diagnosis for power supply and ground	d circuit. Refer to DLN-21, "Diagnosis Procedure".	
Is the inspection result normal?		
YES >> GO TO 2.		
NO >> Repair or replace the damaged parts.		
2.PERFORM SELF-DIAGNOSIS		
Perform self-diagnosis for "ALL MODE AWD/4WD".		
<u>Is any DTC detected?</u> YES >> Check the DTC.		
NO $>>$ GO TO 3.		
3. CHECK AWD WARNING LAMP SIGNAL		
With CONSULT-III		
Turn the ignition switch ON.		
CAUTION:		
Never start the engine. 2. Check "4WD WARN LAMP" of CONSULT-III "DATA M	IONITOR" for "ALL MODE AWD/4WD".	
Does the item on "DATA MONITOR" indicate "On"?		
YES >> GO TO 4.		

DLN-23

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< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace AWD control unit. Refer to <u>DLN-46, "Exploded View"</u>.

4. CHECK COMBINATION METER POWER SUPPLY CIRCUIT

Perform the trouble diagnosis for combination meter power supply circuit. Refer to <u>MWI-53, "COMBINATION</u> <u>METER : Diagnosis Procedure"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace the damaged parts.

< ECU DIAGNOSIS INFORMATION > ECU DIAGNOSIS INFORMATION AWD CONTROL UNIT

Reference Value

VALUES ON THE DIAGNOSIS TOOL

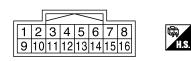
Monitor item	Condition	Value/Status	0
STOP LAMP SW	Brake pedal: Depressed	On	
STOP LAWF SW	Brake pedal: Released	Off	DLN
ENG SPEED SIG	Engine stopped (Engine speed: Less than 400 rpm)	Stop	
	Engine running (Engine speed: 400 rpm or more)	Run	E
ETS ACTUATOR	Engine stopped (Ignition switch: ON)	Off	
LIS ACTUATOR	Engine running	On	F
4WD WARN LAMP	AWD warning lamp: ON	On	
	AWD warning lamp: OFF	Off	G
4WD MODE SW	Always	##	0
4WD MODE MON	Engine running	AUTO	
	Vehicle running with normal size tire installed	0 – 4 mm	Н
DIS-TIRE MONI	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	
P DRAKE SW	Parking brake not operated	Off	
BATTERY VOLT	Always	Battery voltage	J
THRTL POS SEN	When depressing accelerator pedal (Value rises gradually in response to throttle position.)	0 – 100%	-
ETS SOLENOID	Engine running At idle speed 	Approx. 0.000 A	Κ
	Engine running • 3,000 rpm or more constant	Approx. 0.000 – 0.500 A*	I
	Vehicle stopped	0.00 km/h (0.00 mph)	
FR RH SENSOR	Vehicle running CAUTION: Check air pressure of tire under standard condition.	Approx. equal to the indication on speedometer (Inside of $\pm 10\%$)	M
	Vehicle stopped	0.00 km/h (0.00 mph)	
FR LH SENSOR	Vehicle running CAUTION: Check air pressure of tire under standard condition.	Approx. equal to the indication on speedometer (Inside of ±10%)	Ν
	Vehicle stopped	0.00 km/h (0.00 mph)	0
RR RH SENSOR	Vehicle running CAUTION: Check air pressure of tire under standard condition.	Approx. equal to the indication on speedometer (Inside of $\pm 10\%$)	
	Vehicle stopped	0.00 km/h (0.00 mph)	Ρ
RR LH SENSOR Vehicle running CAUTION: Check air pressure of tire under standard condition.		Approx. equal to the indication on speedometer (Inside of ±10%)	

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

TERMINAL LAYOUT

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< ECU DIAGNOSIS INFORMATION >



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PHYSICAL VALUES

	nal No. color)	Description		Condition		
+	-	Signal name	Input/ Output	Condition	Value (Approx.)	
1	Cround	AWD solenoid power sup-	/D solenoid power sup-	Engine speed: At idle	0 V	
(BR)	Ground	ply	Output	Engine speed: 3,000 rpm or more constant	2.5 V*	
2	Ground	AWD colonoid ground		Engine speed: At idle	0 V	
(Y)	Ground	AWD solenoid ground		Engine speed: 3,000 rpm or more constant	0 V	
7	Cround	lemitice curitele		Input	Ignition switch: ON	Battery voltage
(G)	Ground Ignition switch	Ignition Switch	Input	Ignition switch: OFF	0 V	
8 (L)		CAN-H	Input/ Output		_	
9 (O)	Ground	Power supply (AWD sole- noid)	Input	Always	Battery voltage	
10 (B)	Ground	Ground	_	Always	0 V	
11 (B)	Ground	Ground	_	Always	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.

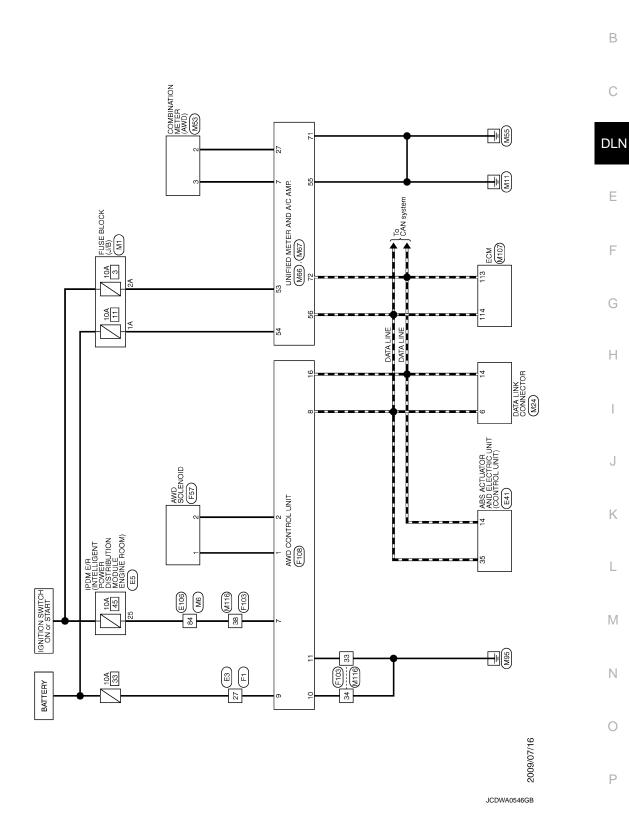
AWD CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

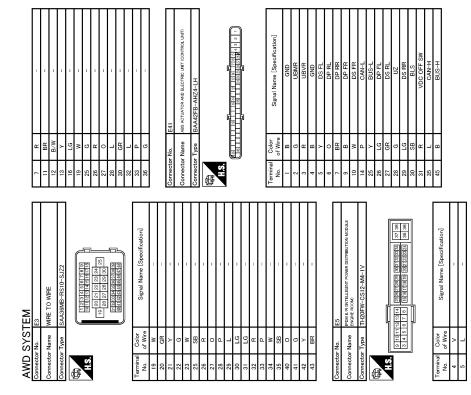
Wiring Diagram - AWD SYSTEM -

INFOID:000000005171139

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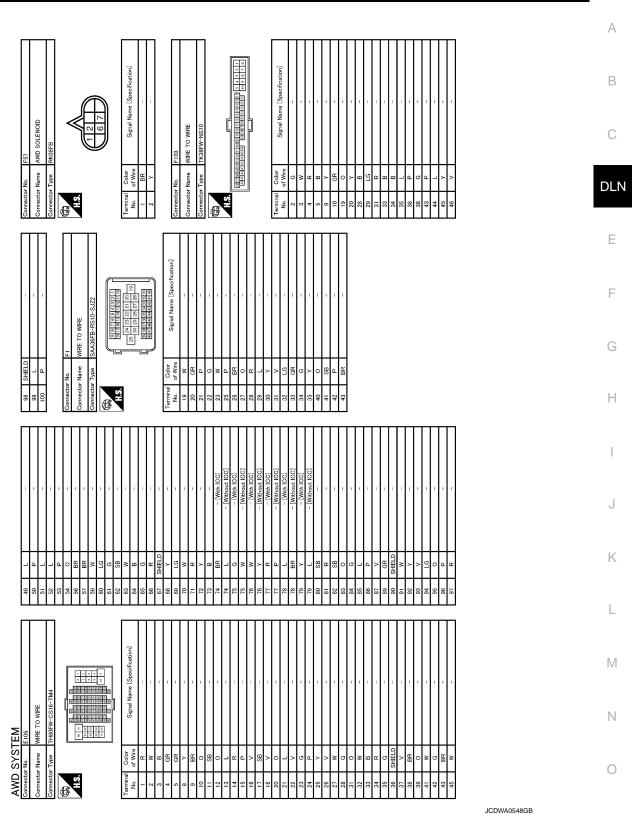
AWD SYSTEM



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AWD CONTROL UNIT

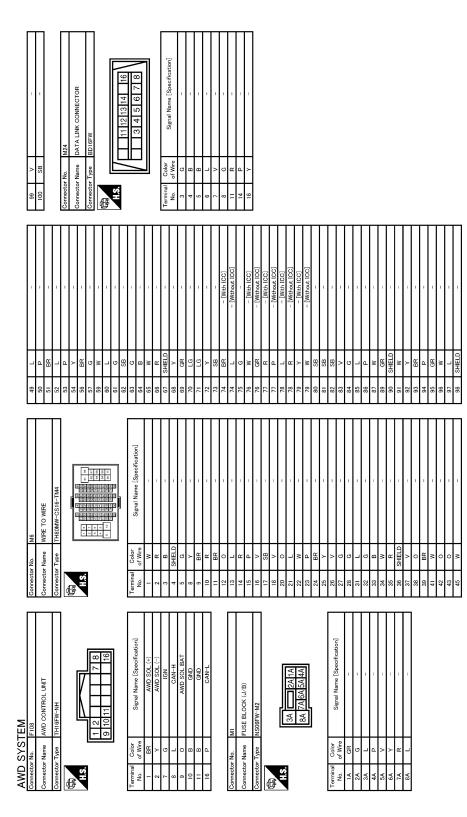
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AWD CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >



[TRANSFER: ETX13B]

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INFOID:000000005171140

AWD system

Fail-Safe

- 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 rear-wheel drive or shifts to 4-wheel drive (front-wheels still have some driving torque).

AWD CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

Revision: 2009 August

DLN-31

AWD CONTROL UNIT

< ECU DIAGNOSIS INFORMATION >

• 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 Iamp	DTC	Detected area (Error area)	Error area and root cause	
Protection Blinking ^{*1} —		—	AWD control unit	Transfer assembly in protection mode. It is not malfunction. (Internal temperature rise of electronic controlled coupling)	
function	Blinking ^{*2}		Outer diameters of front and rear wheel tires	Malfunction in each tire or different tire diameter	
	C1		AWD control unit	Internal malfunction of AWD control unit	
Fail-safe ON		C1203	ABS actuator and electric unit (control unit)	ABS malfunctionMalfunction of ABS actuator and electric unit (control unit)Vehicle speed signal error	
	ON	C1204	AWD solenoid	 Internal malfunction of electronic controlled coupling Malfunction of AWD sorenoid power supply circuit (open of short) Malfunction of AWD sorenoid 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	
	· · · · · · · · · · · · · · · · · · ·	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:000000005171141

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

DTC	Display Items	Reference
C1201	CONTROLLER FAILURE	DLN-13, "DTC Logic"
C1203	ABS SYSTEM	DLN-14, "DTC Logic"
C1204	4WD SOLENOID	DLN-15, "DTC Logic"
C1205	4WD ACTUATOR RLY	DLN-17, "DTC Logic"
C1210	ENGINE SIGNAL 1	DLN-18, "DTC Logic"
U1000	CAN COMM CIRCUIT	DLN-19, "DTC Logic"
U1010	CONTROL UNIT (CAN)	DLN-20, "DTC Logic"

AWD WARNING LAMP DOES NOT TURN ON < SYMPTOM DIAGNOSIS > [TRANS	FER: ETX13B]
SYMPTOM DIAGNOSIS	
AWD WARNING LAMP DOES NOT TURN ON	
Description	INFOID:000000005171143
AWD warning lamp does not turn ON when the ignition switch is turned to ON.	
Diagnosis Procedure	INFOID:0000000005171144
1. CHECK AWD WARNING LAMP Perform the trouble diagnosis for AWD warning lamp. Refer to <u>DLN-23. "Diagnosis Procedure</u>	<u>ے</u> "
Is the inspection result normal? YES >> Check each harness connector pin terminal for malfunction or disconnection. NO >> Repair or replace the error-detected parts.	<u>~</u> .

AWD WARNING LAMP DOES NOT TURN OFF

< SYMPTOM DIAGNOSIS >

AWD WARNING LAMP DOES NOT TURN OFF

Description

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

Diagnosis Procedure

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-23, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.

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

 ${f 3.}$ CHECK AWD CONTROL UNIT POWER SUPPLY AND GROUND CIRCUIT

Perform the trouble diagnosis of the power supply and ground circuit. Refer to <u>DLN-21</u>, "<u>Diagnosis Proce-dure</u>".

Is the inspection result normal?

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

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

INFOID:000000005171146

INFOID:000000005171145

[TRANSFER: ETX13B]

HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS < SYMPTOM DIAGNOSIS > [TRANSFER: ETX13B] HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS A Description NFOID:0000005171147 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. B NOTE: Light tight-corner braking symptom may occur depending on driving conditions. This is not malfunction. C

Diagnosis Procedure	INFOID:000000005171148	0
1.PERFORM ECM SELF-DIAGNOSIS		DLN
With CONSULT-III Perform self-diagnosis for "ENGINE". Is any DTC detected? YES >> Check the DTC.		E
NO >> GO TO 2. 2.PERFORM SELF-DIAGNOSIS		F
With CONSULT-III Perform self-diagnosis for "ALL MODE AWD/4WD". Is DTC "U1000" detected?		G
YES >> CAN specification chart. Refer to <u>LAN-18, "Trouble Diagnosis Flow Chart"</u> . NO >> GO TO 3. 3. CHECK AWD SOLENOID		Н
Perform the trouble diagnosis of the AWD solenoid. Refer to <u>DLN-15, "Diagnosis Procedure"</u> . <u>Is the inspection result normal?</u> YES >> GO TO 4.		
NO >> Repair or replace the error-detected parts. 4.CHECK ELECTRIC CONTROLLED COUPLING		J
 Turn the ignition switch OFF. Set the transmission to neutral. Release the parking brake. Lift up the vehicle. Rotate the rear propeller shaft. 		K
 Hold the front propeller shaft lightly. Does the front propeller shaft rotate? 		L
 YES >> Replace electric controlled coupling for mechanical malfunction (clutch sticking <u>DLN-66, "Exploded View"</u>. NO >> Check each harness connector pin terminal for disconnection. 	etc.). Refer to	Μ
		Ν

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VEHICLE DOES NOT ENTER AWD MODE

< SYMPTOM DIAGNOSIS >

VEHICLE DOES NOT ENTER AWD MODE

Description

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

Diagnosis Procedure

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 <u>DLN-23, "Diagnosis Procedure"</u>.

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
F BRARE SW	When the parking brake pedal is not operation.	Off

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform the trouble diagnosis for parking brake switch circuit. Refer to <u>BRC-76</u>, "<u>Diagnosis Proce</u><u>dure</u>" (with VDC), <u>BRC-76</u>, "<u>Diagnosis Procedure</u>" (without VDC).

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 <u>DLN-66, "Exploded View"</u>.
- NO >> Check each harness connector pin terminal for disconnection.

INFOID:000000005171149

AWD WARNING LAMP BLINKS QUICKLY

< SYMPTOM DIAGNOSIS >

AWD WARNING LAMP BLINKS QUICKLY

Description

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.
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INFOID:000000005171151

AWD WARNING LAMP BLINKS SLOWLY

< SYMPTOM DIAGNOSIS >

AWD WARNING LAMP BLINKS SLOWLY

Description

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

Diagnosis Procedure

INFOID:000000005171153

INFOID:000000005171152

[TRANSFER: ETX13B]

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 <u>DLN-46, "Exploded View"</u>.
- NO >> Repair or replace the error-detected parts.

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING < SYMPTOM DIAGNOSIS > [TRANSFER: ETX13B]

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000005171154

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

Reference			DLN-45. "Inspection"		DLN-55, "Exploded View"	DLN-55. "Exploded View"	DLN-67, "Inspection"	DLN-67, "Inspection"	DLN-64. "Inspection"	C
SUSPECTED (Possible caus		TRANSFER FLUID (Level Iow)	TRANSFER FLUID (Wrong)	TRANSFER FLUID (Level too high)	LIQUID GASKET (Damaged)	OIL SEAL (Worn or damaged)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	TRANSFER CASE (Damaged)	F G H
Symptom	Noise	1	2				3	3	3	-
Cymptolin	Transfer fluid leakage		4	1	2	2			3	

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< PRECAUTION > PRECAUTION PRECAUTIONS

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

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.

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000005171156

NOTE:

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

This vehicle is equipped with a push-button ignition switch and a steering lock unit.

If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

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

OPERATION PROCEDURE

1. Connect both battery cables. **NOTE:**

Supply power using jumper cables if battery is discharged.

- 2. Turn the push-button ignition switch to ACC position. (At this time, the steering lock will be released.)
- 3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
- 4. Perform the necessary repair operation.

Service Notice or Precautions for Transfer

< PRECAUTION >

CAUTION:

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- Never reuse transfer fluid, once it has been drained.
- Check the fluid level or replace the fluid only with the vehicle parked on level ground.

wheel will lock when the push-button ignition switch is turned to LOCK position.)

• During removal or installation, keep inside of transfer clear of dust or dirt.

Perform self-diagnosis check of all control units using CONSULT-III.

• Replace all tires at the same time. Always use tires of the proper size and the same brand and pattern. Fitting improper size and unusually worn tires applies excessive force to vehicle mechanism and can cause longitudinal vibration.

When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn

the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering

- Disassembly should be done in a clean work area, it is preferable to work in dustproof area.
- Before proceeding with disassembly, thoroughly clean the transfer. It is important to prevent the E internal parts from becoming contaminated by dirt or other foreign matter.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- 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.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new ones if necessary.
- Gaskets, seals and O-rings should be replaced any time 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.
- Clean inner parts with lint-free cloth or towels. Do not use cotton work gloves and rags to prevent adhering fibers.

PRECAUTIONS

[TRANSFER: ETX13B]

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< PREPARATION > PREPARATION PREPARATION

Special Service Tools

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	nay differ from those of special service tools illust	rated here.
Tool number (Kent-Moore No.)		Description
Tool name		
ST27862000 (—) Drift a: 62.5 mm (2.461 in) dia. b: 42 mm (1.65 in) dia.	ab	Installing front oil seal
KV381054S0	ZZA0194D	Removing rear oil seal
(J-34286) Puller		
ST30720000 (J-25405)		Installing rear oil sealInstalling mainshaft oil seal
Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.		
KV40104830	ZZA0811D	Installing rear oil seal
(—) Drift a: 70 mm (2.76 in) dia. b: 63.5 mm (2.500 in) dia.	abl	
KV38100300	ZZA1003D	Removing mainshaft bearing
(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	
ST33052000		Removing mainshaft assembly
(—) Drift a: 28 mm (1.10 in) dia. b: 22 mm (0.87 in) dia.		
	ZZA1000D	

PREPARATION

[TRANSFER: ETX13B]

Tool number (Kent-Moore No.) Tool name		Description
ST30611000 (J-25742-1) Drift bar a: 350 mm (13.78 in) b: 25 mm (0.98 in) dia. b: M12 × 1.5P	a m c b NIE63	Removing rear bearing
ST35321000 —) Drift a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.		 Removing rear bearing Installing mainshaft assembly
KV38104010 —) Drift 1: 67 mm (2.64 in) dia. 1: 49 mm (1.93 in) dia.	ZZA1000D	 Installing front drive shaft rear bearing Installing rear bearing
T30621000 J-25742-5) prift : 80 mm (3.15 in) dia. : 59 mm (2.32 in) dia.	ZZA1000D	Installing mainshaft bearing
8T31214000 J-25269-B) Drift I: 34 mm (1.34 in) dia. I: 25.5 mm (1.004 in) dia.	al bl	 Removing front drive shaft front bearing Removing front drive shaft rear bearing
GT33200000 J-26082) Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.		Installing front drive shaft front bearing

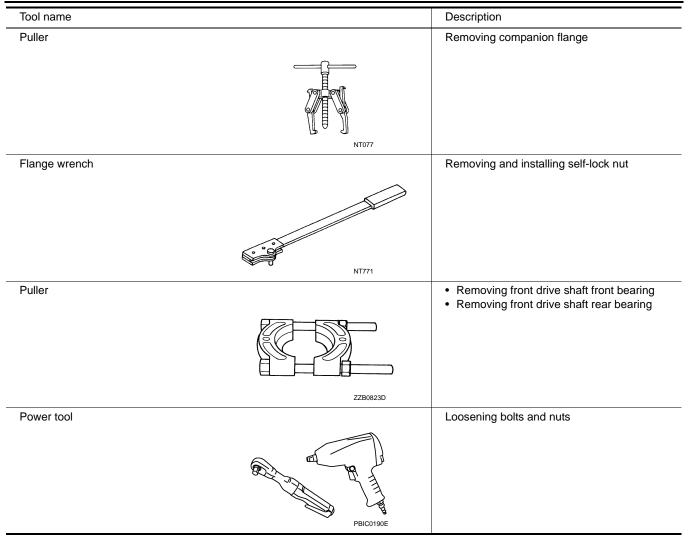
Commercial Service Tools

INFOID:000000005171159

< PREPARATION >

PREPARATION

< PREPARATION >



< PERIODIC MAINTENANCE > PERIODIC MAINTENANCE

TRANSFER FLUID

Inspection

FLUID LEAKAGE

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

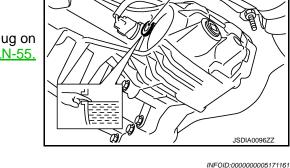
FLUID LEVEL

1. Remove filler plug (1) and gasket. Then check that fluid is filled up from mounting hole for the filler plug. CAUTION:

Never start engine while checking fluid level.

2. Before installing filler plug, set a new gasket. Install filler plug on transfer and tighten to the specified torque. Refer to DLN-55. "Exploded View". **CAUTION:**

Never reuse gasket.



Draining

- 1. Run the vehicle to warm up the transfer unit sufficiently.
- 2. Stop the engine, and remove the drain plug (1) to drain the transfer fluid. **CAUTION:**

When draining fluid, protect exhaust tube flange with cover.

3. Apply sealant to drain plug. Install drain plug on transfer and tighten to the specified torque. Refer to DLN-55, "Exploded View".

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

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

Refilling

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

Fluid and viscosity

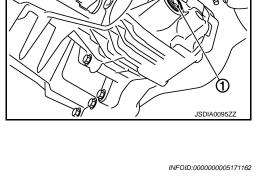
Fluid capacity

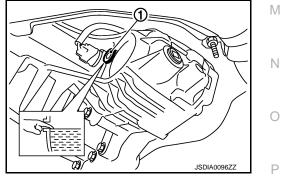
: Refer to MA-10, "Fluids and Lubricants". : Refer to DLN-73, "General Specifications".

CAUTION:

Carefully fill the fluid. (Fill up for approximately 3 minutes.)

- 2. Leave the vehicle for 3 minutes, and check the fluid level again.
- 3. Set a new gasket onto filler plug and install it on transfer and tighten to the specified torque. Refer to DLN-55, "Exploded View". **CAUTION:** Never reuse gasket.





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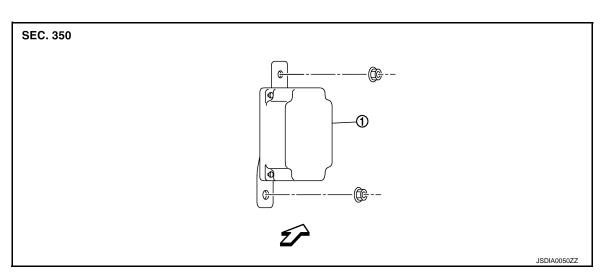
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REMOVAL AND INSTALLATION AWD CONTROL UNIT

Exploded View

INFOID:000000005171163

[TRANSFER: ETX13B]



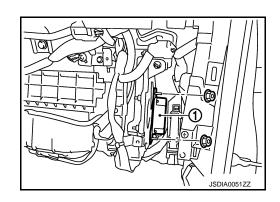
- 1. AWD control unit
- C: Vehicle front

Removal and Installation

INFOID:000000005171164

REMOVAL

- 1. Remove the glove box assembly. Refer to IP-12, "Removal and Installation".
- 2. Disconnect AWD control unit harness connector.
- 3. Remove AWD control unit (1) mounting nuts.
- 4. Remove AWD control unit.



INSTALLATION Install in the reverse order of removal.

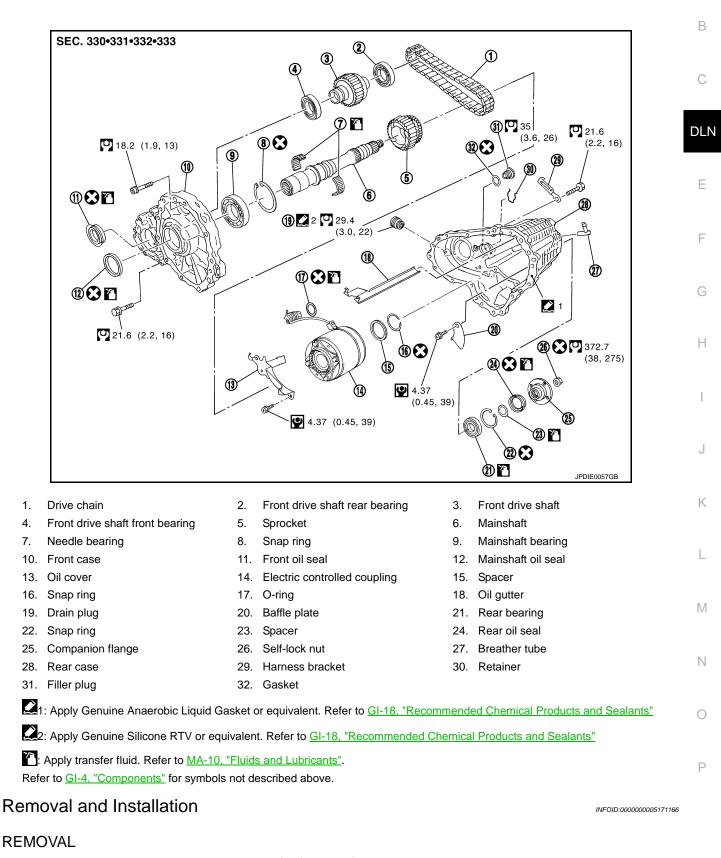
< REMOVAL AND INSTALLATION >

FRONT OIL SEAL

Exploded View

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- 1. Remove the drain plug to drain the transfer fluid. Refer to <u>DLN-45, "Draining"</u>.
- 2. Remove the front propeller shaft. Refer to DLN-77, "Removal and Installation".

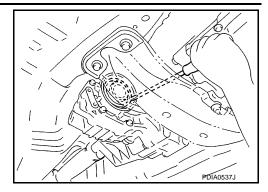
DLN-47

FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

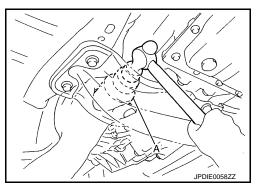
 Remove front oil seal with a suitable tool.
 CAUTION: Never damage the front case and front drive shaft.

[TRANSFER: ETX13B]



INSTALLATION

- Apply transfer fluid to front oil seal, install it with a drift (A) [SST: ST27862000 (—)] until the end face of front case. CAUTION:
 - Never reuse front oil seal.
 - When installing, never incline front oil seal.
- 2. Install front propeller shaft. Refer to <u>DLN-77</u>, "Removal and <u>Installation</u>".
- 3. Install transfer fluid, check fluid level and for fluid leakage. Refer to <u>DLN-45, "Inspection"</u>.



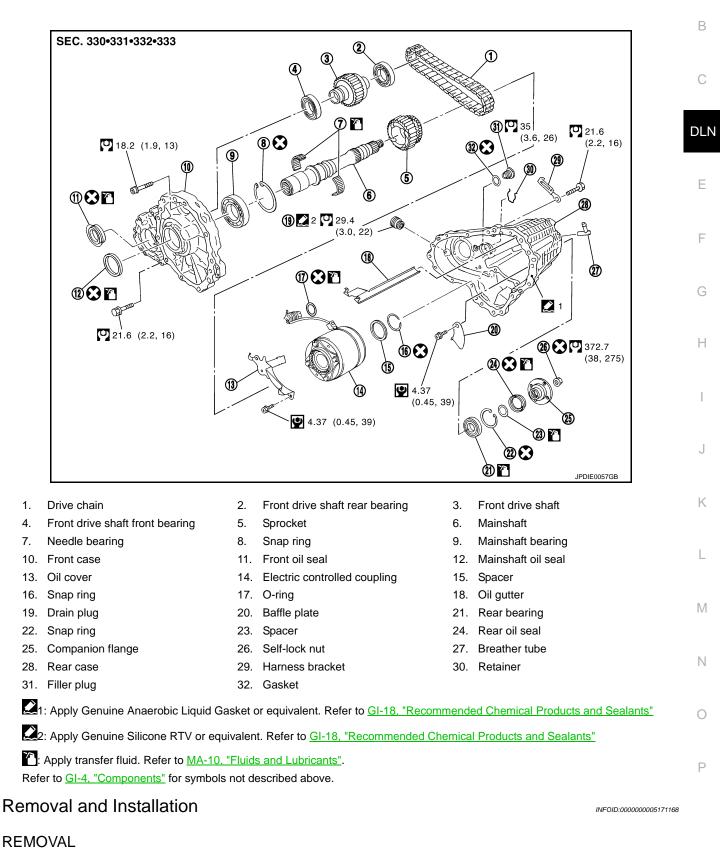
< REMOVAL AND INSTALLATION >

REAR OIL SEAL

Exploded View

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1. Remove the rear propeller shaft. Refer to <u>DLN-91, "Removal and Installation"</u>.

DLN-49

REAR OIL SEAL

< REMOVAL AND INSTALLATION >

3.

 Remove self-lock nut of companion flange with a flange wrench (A) (commercial service tool).

should be in line with the mark (B) on the companion flange. CAUTION: For matching mark, use paint. Never damage mainshaft.

Put matching mark (A) on the end of the mainshaft. The mark

Remove the companion flange with a puller (A) (commercial service tool).
 CAUTION:

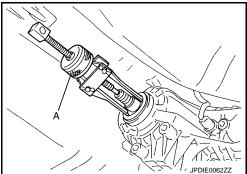
Never damage the companion flange.

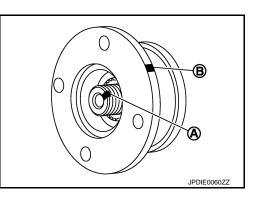
Remove the rear oil seal with the puller (A) [SST: KV381054S0 (J-34286)].
 CAUTION:

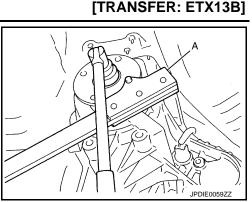
Never damage the rear case.

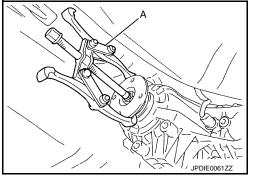
INSTALLATION











REAR OIL SEAL

< REMOVAL AND INSTALLATION >

- 1. Apply transfer fluid to rear oil seal, install it with the drifts within the dimension (L) shown as follows.
 - A : Drift [SST: ST30720000 (J-25405)]
 - B : Drift [SST: KV40104830 ()]

L : 6.7 – 7.3 mm (0.264 – 0.287 in)

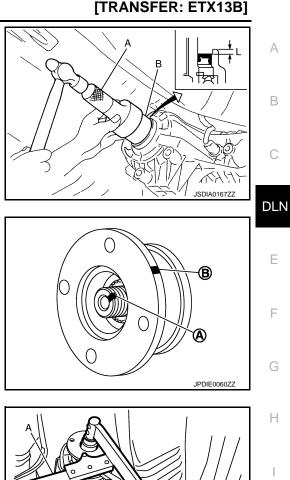
CAUTION:

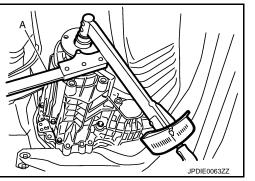
- Never reuse rear oil seal.
- When installing, never incline rear oil seal.
- 2. Align the matching mark (A) of mainshaft with the mark (B) of companion flange, then install the companion flange.

 Using a flange wrench (A) (commercial service tool), install the self-lock nut of companion flange and tighten to the specified torque.
 CAUTION:

Never reuse self-lock nut.

- 4. Install the rear propeller shaft. Refer to <u>DLN-91, "Removal and</u> <u>Installation"</u>.
- 5. Check fluid level. Refer to <u>DLN-45. "Inspection"</u>.





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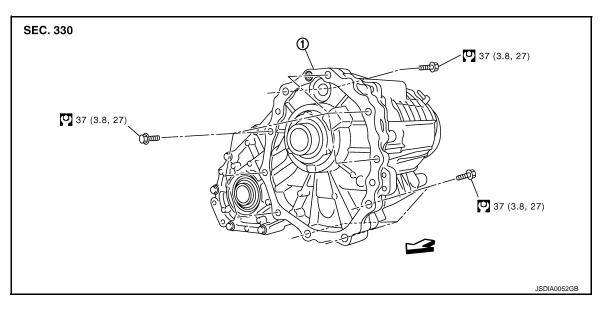
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UNIT REMOVAL AND INSTALLATION TRANSFER ASSEMBLY

Exploded View

INFOID:000000005171169



1. Transfer assembly

CP: Vehicle front
Refer to <u>GI-4, "Components"</u> for symbols in the figure.

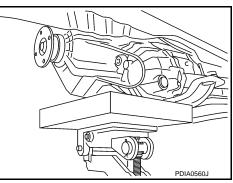
Removal and Installation

INFOID:000000005171170

REMOVAL

- 1. Remove exhaust front tube with power tool. Refer to EX-6, "Removal and Installation".
- 2. Remove front propeller shaft. Refer to <u>DLN-77, "Removal and Installation"</u>.
- 3. Remove rear propeller shaft. Refer to DLN-91, "Removal and Installation".
- 4. Disconnect AWD solenoid harness connector and separate harness from transfer assembly.
- 5. Remove transfer air breather hose.
- 6. Remove control rod. Refer to TM-166, "Removal and Installation".
- 7. Support transfer assembly and transmission assembly with a jack.
- 8. Remove rear engine mounting member and engine mounting insulator with power tool. Refer to <u>EM-84</u>, <u>"AWD : Removal and Installation"</u>.
- 9. Lower jack to the position where the top transfer mounting bolts can be removed.
- 10. Remove transfer mounting bolts with power tool and separate transfer from transmission.

Secure transfer assembly and transmission assembly to a jack.



INSTALLATION

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

TRANSFER ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

· When installing the transfer to the transmission, install the mounting bolts following the standard below, tighten bolts to the specified torque.

Bolt No.	1	2	3	4
Quantity	4	3	2	1
Bolt length " ℓ " mm (in)	75 (2.95)	45 (1.77)	40 (1.57)	30 (1.18)

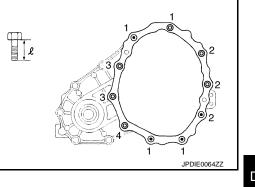
• Transfer to transmission.

():Transmission to transfer.

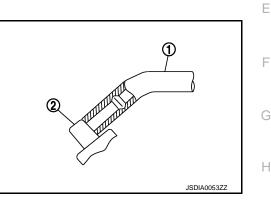
- · When installing transfer air breather hose, make sure there are no pinched or restricted areas on the transfer air breather hose caused by bending or winding.
- Set transfer air breather hose with paint mark facing upward.
- Be sure to insert transfer air breather hose (1) into breather tube (2) until hose end reaches the tube's base.

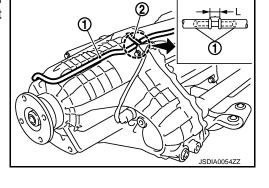
- Do not deviate from the range (L) of the transfer air breather when installing the transfer air breather hose (1) to the harness bracket (2) of the transfer.

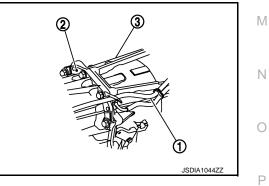
- Install transfer air breather hose (1) with bracket between the adapter case (2) and the transmission case (3) as shown in the figure.



[TRANSFER: ETX13B]







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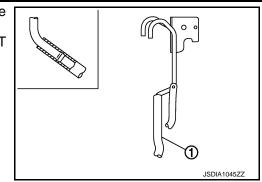
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TRANSFER ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

- Be sure to insert air breather hose (1) to transfer tube until hose end reaches the tube bend R portion.
- After the installation, check the fluid level, fluid leakage and the A/T positions. Refer to <u>DLN-45</u>, "Inspection".



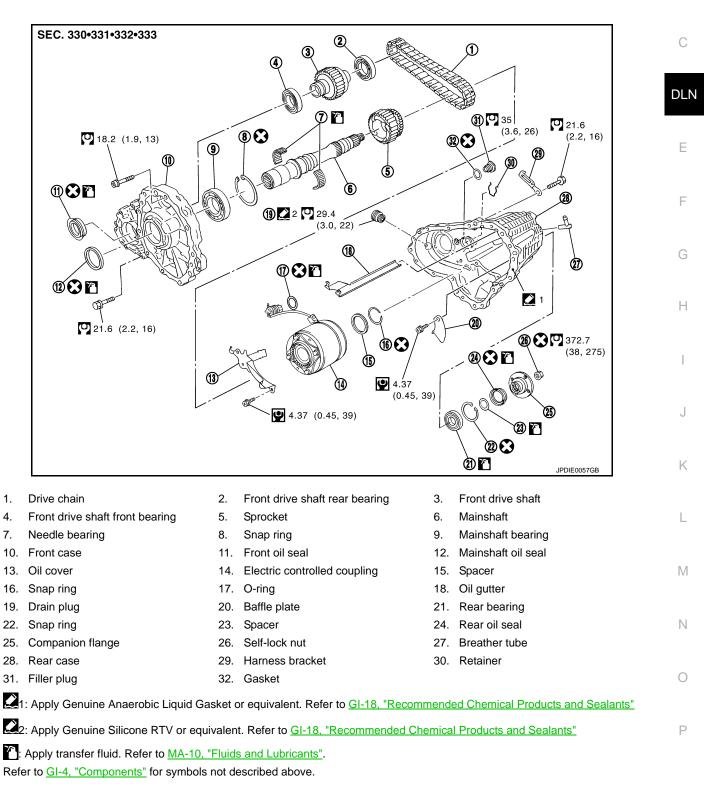
[TRANSFER: ETX13B]

[TRANSFER: ETX13B]

UNIT DISASSEMBLY AND ASSEMBLY FRONT CASE AND REAR CASE

Exploded View

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Disassembly

1. Remove drain plug and filler plug.

Revision: 2009 August

< UNIT DISASSEMBLY AND ASSEMBLY >

3.

CAUTION:

CAUTION:

4. Remove self-lock nut.

2. Remove mainshaft oil seal from front case with a suitable tool. **CAUTION:**

Remove front oil seal from front case with a suitable tool.

Never damage the front case and front drive shaft.

Never damage the front case and mainshaft.

Revision: 2009 August

CAUTION:

KV381054S0 (J-34286)].

Never damage the rear case.

7. Remove rear oil seal from rear case with the puller (A) [SST:

should be in line with the mark (B) on the companion flange.

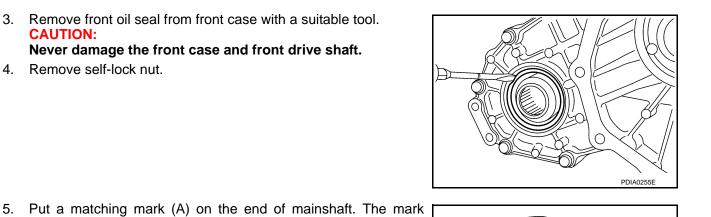
For matching mark, use paint. Never damage mainshaft.

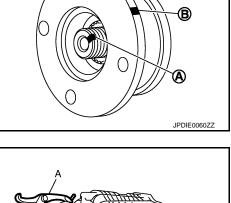
Remove companion flange with a puller (A) (commercial service 6. tool). **CAUTION:**

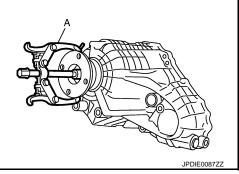
Never damage the companion flange.

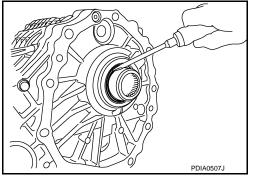
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[TRANSFER: ETX13B]

< UNIT DISASSEMBLY AND ASSEMBLY >

8. Remove spacer (1) from mainshaft.

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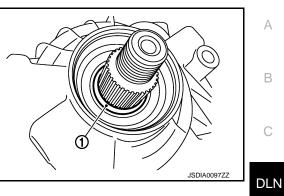
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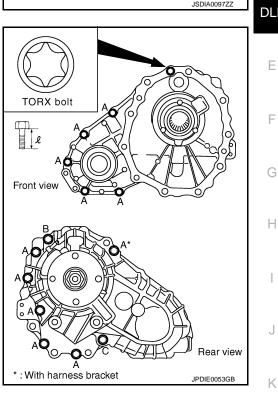
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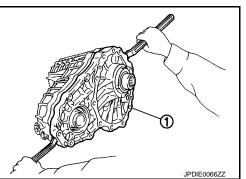
9. Remove front case and rear case fixing bolts, then remove harness bracket.

Bolts symbol	Quantity	Bolt length " ℓ " mm (in)		
A	11	42 (1.65)		
В	1	162 (6.38)		
С	1	97 (3.82)		
TORX bolt	1	40 (1.57)		



10. Remove front case (1) from rear case by levering it up with a suitable tool. **CAUTION:**

Never damage the mating surface.



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11. Remove snap ring (1) from front case.

< UNIT DISASSEMBLY AND ASSEMBLY >

12. Remove mainshaft bearing from front case with the drift (A) [SST: KV38100300 (J-25523)].

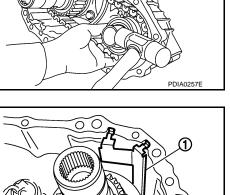
Revision: 2009 August

13. Remove drive chain and front drive shaft while tapping front drive shaft with plastic hammer. **CAUTION:** Never tap drive chain.

14. Remove oil gutter (1) from rear case.

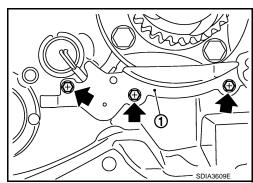
15. Remove oil cover bolts from rear case. And then, remove oil cover (1).

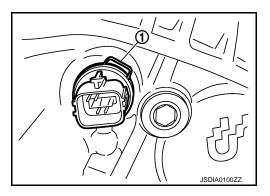
- 16. Remove retainer (1) from AWD solenoid harness connector.
- 17. Remove AWD solenoid harness connector from rear case.
- 18. Remove O-ring from AWD solenoid harness connector.

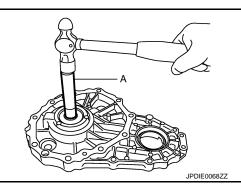


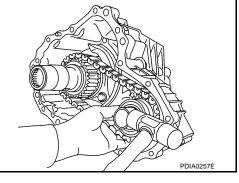
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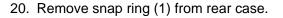
[TRANSFER: ETX13B]

< UNIT DISASSEMBLY AND ASSEMBLY >

- 19. Remove mainshaft assembly from rear case with the drift (A) [SST: ST33052000 (--)].
- [TRANSFER: ETX13B]

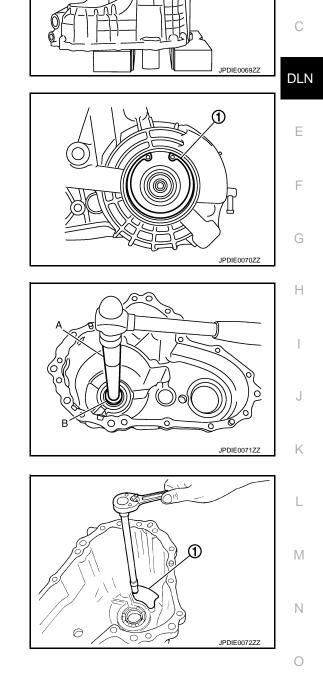
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- 21. Remove rear bearing from rear case with the drifts.
 - A : Drift bar [SST: ST30611000 (J-25742-1)]
 - B : Drift [SST: ST35321000 ()]

- 22. Remove baffle plate (1) from rear case.
- 23. Remove breather tube from rear case.



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< UNIT DISASSEMBLY AND ASSEMBLY >

Assembly

- Install breather tube with plastic hammer.
 CAUTION: Pay attention to the direction of breather tube.
- 2. Install baffle plate to rear case.

Install rear bearing to rear case with the drift (A) [SST: KV38104010 (—)].
 CAUTION:

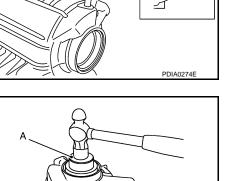
Apply transfer fluid to inside of rear bearing.

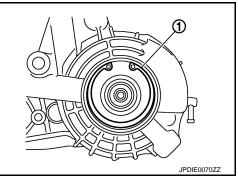
 Install snap ring (1) to rear case.
 CAUTION: Never reuse snap ring.

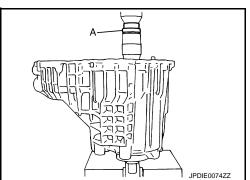
Install mainshaft assembly to rear case with the drift (A) [SST: ST35321000 (—)].
 CAUTION:

Transfer fluid should be applied to contact surface of mainshaft and rear bearing.

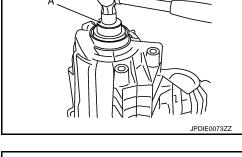
- 6. Install O-ring to AWD solenoid harness connector. CAUTION:
 - Never reuse O-ring.
 - Apply transfer fluid to O-ring.
- 7. Install AWD solenoid harness connector into rear case.





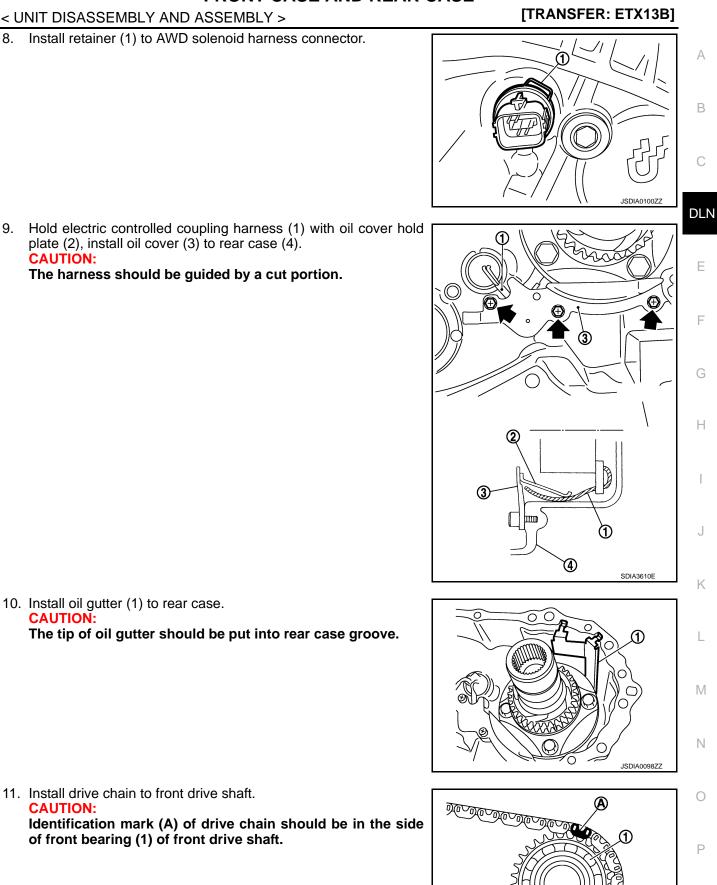






< UNIT DISASSEMBLY AND ASSEMBLY >

8. Install retainer (1) to AWD solenoid harness connector.



The harness should be guided by a cut portion.

plate (2), install oil cover (3) to rear case (4).

CAUTION:

10. Install oil gutter (1) to rear case. **CAUTION:**

The tip of oil gutter should be put into rear case groove.

11. Install drive chain to front drive shaft. **CAUTION:** Identification mark (A) of drive chain should be in the side of front bearing (1) of front drive shaft.

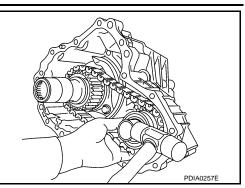
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< UNIT DISASSEMBLY AND ASSEMBLY >

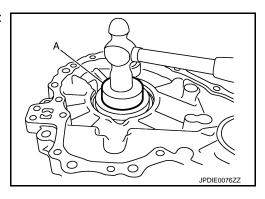
 Install drive chain to mainshaft, and then install tap front drive shaft with plastic hammer. Press-fit rear bearing of front drive shaft to rear case.
 CAUTION:

Never tap drive chain.

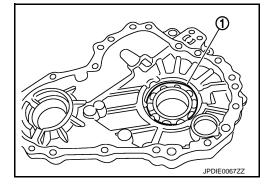
[TRANSFER: ETX13B]



13. Install mainshaft bearing to front case with the drift (A) [SST: ST30621000 (J-25742-5)].



14. Install snap ring (1) to front case. CAUTION: Never reuse snap ring.



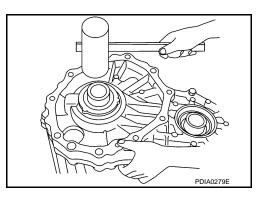
 15. Apply liquid gasket to mating surface of rear case. Use Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants".
 CAUTION: Remove old sealant adhering to mounting surfaces. Also remove any moisture, oil, or foreign material adhering to

so to

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16. Set front case to rear case. **CAUTION: Never damage the mating surface transmission side.**

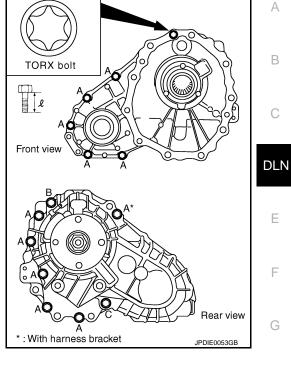
application and mounting surfaces.



< UNIT DISASSEMBLY AND ASSEMBLY >

17. Tighten front case and rear case fixing bolts.

Bolts symbol	Quantity	Bolt length " ℓ " mm (in)
A	11	42 (1.65)
В	1	162 (6.38)
С	1	97 (3.82)
TORX bolt	1	40 (1.57)



[TRANSFER: ETX13B]

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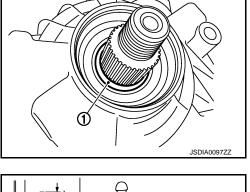
18. Install spacer (1) to mainshaft. **CAUTION:** Apply transfer fluid to spacer.

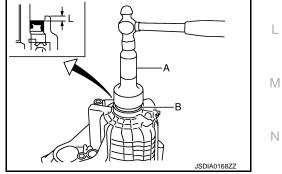
- 19. Install rear oil seal to rear case with the drifts within the dimension (L) shown as follows.
 - : Drift [SST: ST30720000 (J-25405)] А
 - : Drift [SST: KV40104830 ()] В

: 6.7 – 7.3 mm (0.264 – 0.287 in) L

CAUTION:

- Never reuse rear oil seal.
- Apply transfer fluid to rear oil seal.
- When installing, never incline rear oil seal.





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< UNIT DISASSEMBLY AND ASSEMBLY >

(A) (commercial service tool).

Never reuse self-lock nut.

CAUTION:

CAUTION:

20. Install companion flange while aligning the matching mark (A) of mainshaft with the mark (B) of companion flange.

- - Revision: 2009 August

• When installing, never incline mainshaft oil seal.

23. Install front oil seal until it is flush with end face of front case with the drift (A) [SST: ST27862000 ()]. **CAUTION:**

22. Install mainshaft oil seal until it is flush with end face of front

case with the drift (A) [SST: ST30720000 (J-25405)].

• Apply transfer fluid to mainshaft oil seal.

• Never reuse front oil seal.

• Never reuse mainshaft oil seal.

- Apply transfer fluid to front oil seal.
- When installing, never incline front oil seal.
- 24. Apply sealant to threads of drain plug. Then, install it to rear case.

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

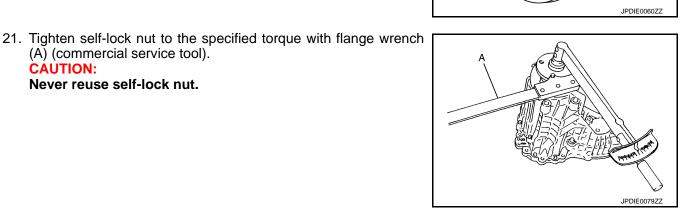
Remove old sealant and oil adhering to threads.

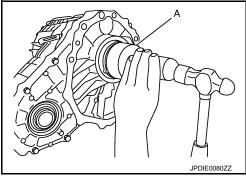
- 25. Set gasket to filler plug. Install it to rear case.
 - **CAUTION:**
 - Never reuse gasket.
 - After oil is filled, tighten filler plug to specified torque.

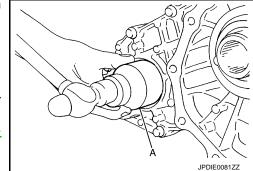
Inspection

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

CASES











DLN-64

< UNIT DISASSEMBLY AND ASSEMBLY >

- Contact surfaces of bearing for wear, damage, etc.
- Damage and cracks of case.

[TRANSFER: ETX13B]

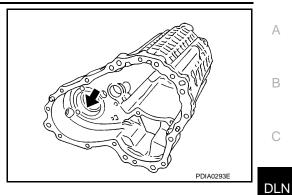
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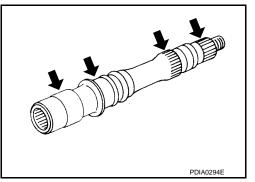
BEARING

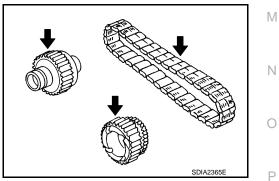
• Damage and rough rotation of bearing.

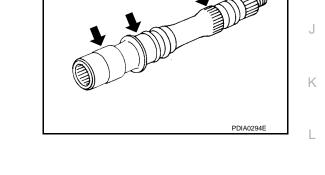
SHAFT

• Damage, peeling, dent, uneven wear, bending, etc. of shaft.

• Excessive wear, damage, peeling, etc. of gear and chain.







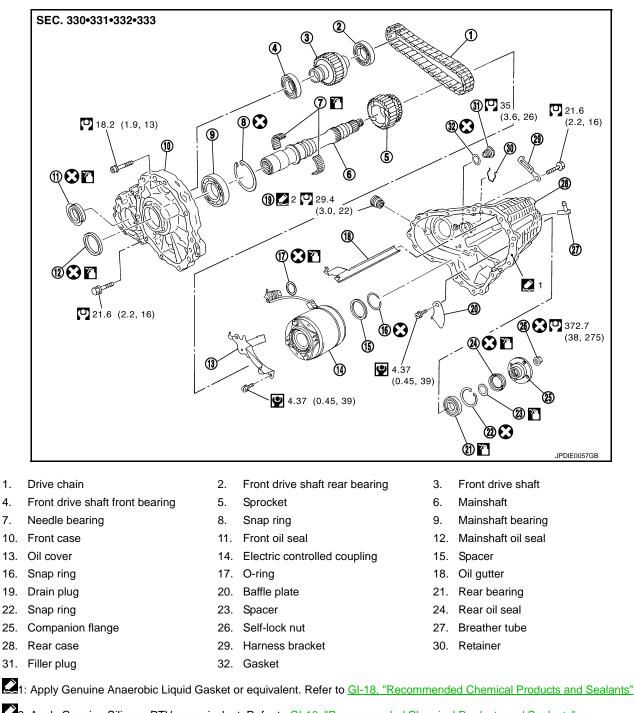
GEARS AND CHAIN

MAINSHAFT

Exploded View

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[TRANSFER: ETX13B]



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

2: Apply transfer fluid. Refer to MA-10, "Fluids and Lubricants".

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

Disassembly

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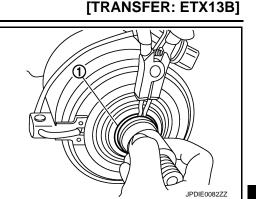
1. Separate front case and rear case, then remove mainshaft assembly. Refer to DLN-55, "Disassembly".

MAINSHAFT

< UNIT DISASSEMBLY AND ASSEMBLY >

2. Remove snap ring (1) from mainshaft.

- 3. Remove spacer from mainshaft.
- 4. Remove electric controlled coupling and sprocket from mainshaft.
- 5. Remove needle bearing from mainshaft.



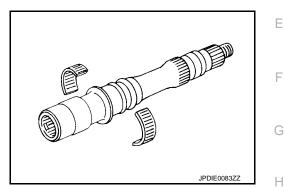
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А

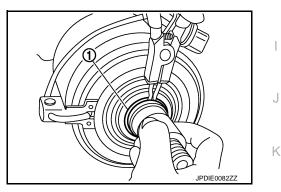
В

Assembly

- Install needle bearing to mainshaft.
 CAUTION:
 Apply transfer fluid to periphery of needle bearing.
- 2. Install sprocket and electric controlled coupling to mainshaft.
- 3. Install spacer to main shaft.



- Install snap ring (1) to mainshaft.
 CAUTION: Never reuse snap ring.
- 5. Install mainshaft assembly to rear case, then install front case and rear case. Refer to <u>DLN-60, "Assembly"</u>.

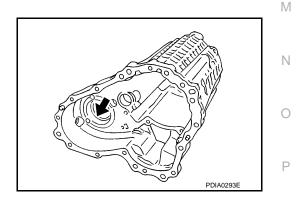


Inspection

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

CASES

- Contact surfaces of bearing for wear, damage, etc.
- Damage and cracks of case.



BEARING

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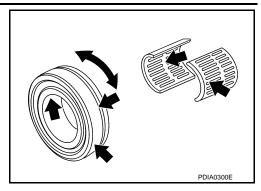
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MAINSHAFT

< UNIT DISASSEMBLY AND ASSEMBLY >

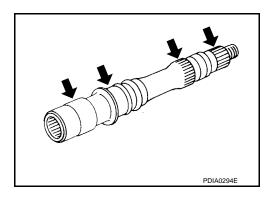
• Damage and rough rotation of bearing.

[TRANSFER: ETX13B]



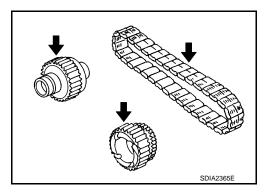
SHAFT

• Damage, peeling, dent, uneven wear, bending, etc. of shaft.



GEARS AND CHAIN

• Excessive wear, damage, peeling, etc. of gear and chain.



< UNIT DISASSEMBLY AND ASSEMBLY >

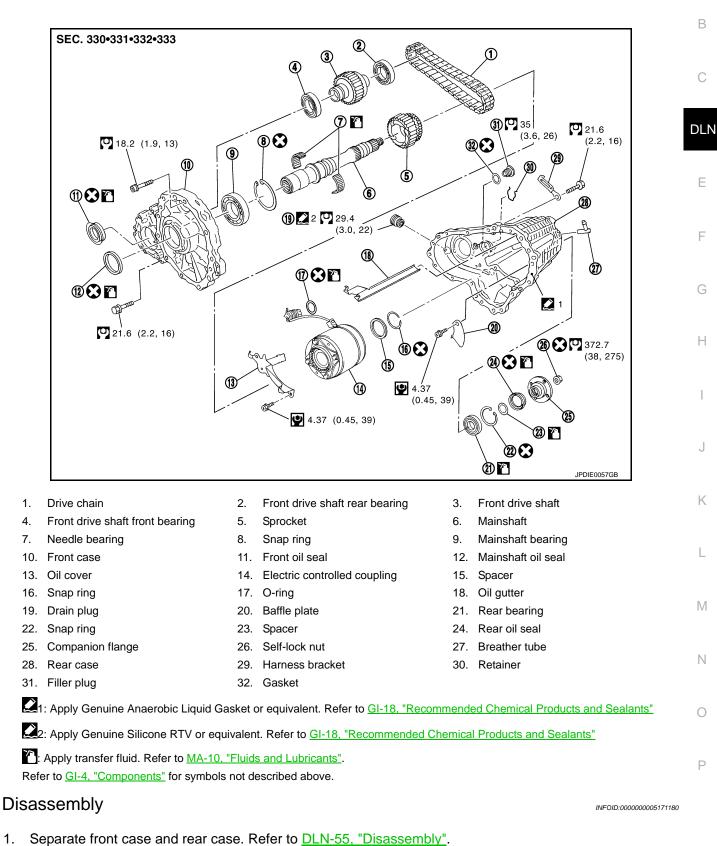
FRONT DRIVE SHAFT AND DRIVE CHAIN

Exploded View

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[TRANSFER: ETX13B]

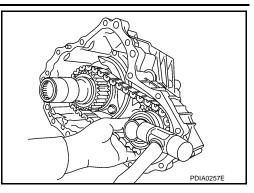


FRONT DRIVE SHAFT AND DRIVE CHAIN

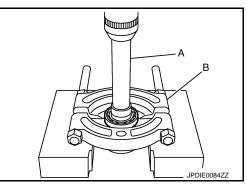
< UNIT DISASSEMBLY AND ASSEMBLY >

 Remove drive chain and front drive shaft while tapping front drive shaft with plastic hammer.
 CAUTION: Never tap drive chain.

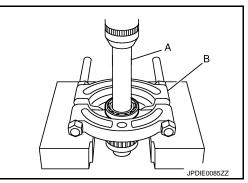
[TRANSFER: ETX13B]



- 3. Remove front drive shaft front bearing with the drift (A) and puller (B).
 - A: Drift [SST: ST31214000 (J-25269-B)]
 - B: Puller (commercial service tool)

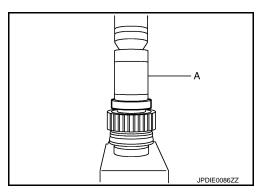


- 4. Remove front drive shaft rear bearing with the drift (A) and puller (B).
 - A: Drift [SST: ST31214000 (J-25269-B)]
 - B: Puller (commercial service tool)



Assembly

1. Install front drive shaft front bearing with the drift (A) [SST: ST33200000 (J-26082)].



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FRONT DRIVE SHAFT AND DRIVE CHAIN

< UNIT DISASSEMBLY AND ASSEMBLY >

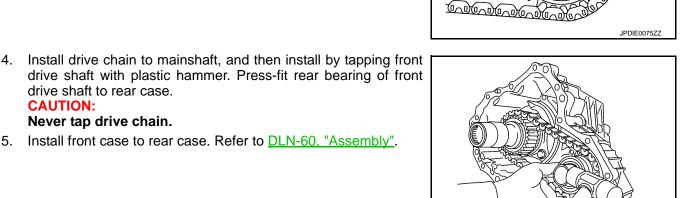
3. Install drive chain to front drive shaft.

of front bearing (1) of front drive shaft.

CAUTION:

2. Install front drive shaft rear bearing with the drift (A) [SST: KV38104010 (—)].

Identification mark (A) of drive chain should be in the side



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Inspection

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

5. Install front case to rear case. Refer to DLN-60, "Assembly".

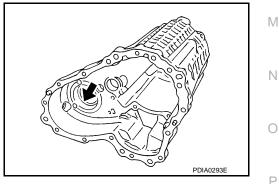
CASES

- Contact surfaces of bearing for wear, damage, etc.
- Damage and cracks of case.

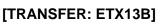
drive shaft to rear case.

Never tap drive chain.

CAUTION:



BEARING



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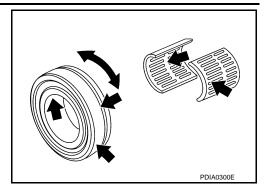
INFOID:000000005171182

FRONT DRIVE SHAFT AND DRIVE CHAIN

< UNIT DISASSEMBLY AND ASSEMBLY >

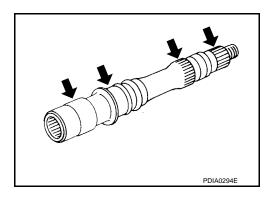
• Damage and rough rotation of bearing.

[TRANSFER: ETX13B]



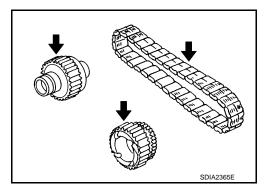
SHAFT

• Damage, peeling, dent, uneven wear, bending, etc. of shaft.



GEARS AND CHAIN

• Excessive wear, damage, peeling, etc. of gear and chain.



SERVICE DATA AND SPECIFICATIONS (SDS) < SERVICE DATA AND SPECIFICATIONS (SDS)</td> [TRANSFER: ETX13B] SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:000000005171183

		AWD	0
Applied model		VQ35HR	
		A/T	
Transfer model		ETX13B	DLN
Fluid capacity (Approx.)	ℓ (US pt, Imp pt)	1.25 (2-5/8, 2-1/4)	

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING < SYMPTOM DIAGNOSIS > [FRONT PROPELLER SHAFT: 2S56A]

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000005171184

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

Reference		DLN-76, "Inspection"	I	I	I	Ι	DLN-78, "Inspection"	DLN-78, "Inspection"	NVH in DLN section.	NVH in FAX, RAX, FSU and RSU section.	NVH in WT section.	NVH in WT section.	NVH in RAX section.	NVH in BR section.	NVH in ST section.
Possible cause and SUSPEC		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
Cumpton	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Symptom	Shake Vibration	×	×	×	×	×	×	×		×	×	×	×	×	×
	VIDIALION	^	^	^	^	^	^	^		^	^		^		^

 \times : Applicable

[FRONT PROPELLER SHAFT: 2S56A]

< PREPARATION >

PREPARATION

PREPARATION

Commercial Service Tools

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Tool name		Description	
Power tool		Loosening bolts and nuts	C
			DLN
	PBIC0190E		E

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PERIODIC MAINTENANCE FRONT PROPELLER SHAFT

Inspection

INFOID:000000005171186

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NOISE

Check the propeller shaft tube surface for dents or cracks. If 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.

C: Vehicle front

Limit

Propeller shaft runout

: Refer to <u>DLN-79, "Propel-</u> ler Shaft Runout".

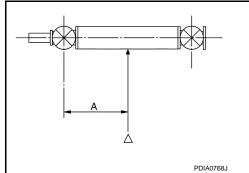
- If runout still exceeds specifications, separate propeller shaft at final drive companion flange; then rotate companion flange 90, 180, 270 degrees and install propeller shaft.
- 3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
- 4. Check the vibration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

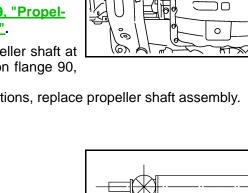
RUNOUT MEASURING POINT

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

Standard

A : 381.5 mm (15.02 in)





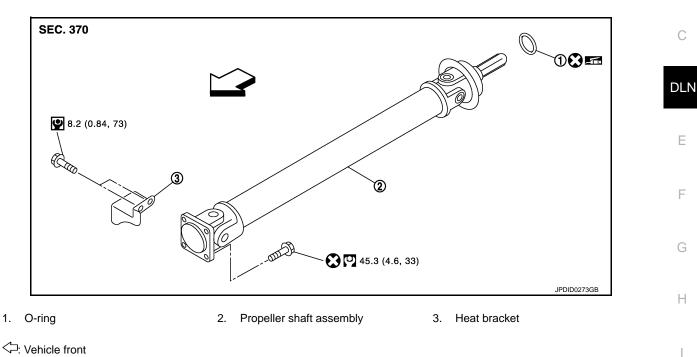
FRONT PROPELLER SHAFT

Exploded View

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INFOID:000000005171188

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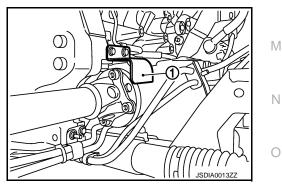


Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

REMOVAL

- 1. Shift the transaxle to the neutral position, and then release the parking brake.
- 2. Remove engine undercover with a power tool.
- 3. Remove front cross bar.
- 4. Remove the three-way catalyst (right bank) with a power tool. Refer to EM-34, "Exploded View".
- 5. Remove heat bracket (1).



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FRONT PROPELLER SHAFT

< REMOVAL AND INSTALLATION >

 Put matching mark onto propeller shaft flange yoke and final drive companion flange.
 CAUTION:

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

- 7. Remove the propeller shaft assembly fixing bolts.
- 8. Remove propeller shaft assembly from the front final drive and transfer.

CAUTION:

Never damage the transfer front oil seal.

- 9. Hang steering hydraulic line not to interfere with work. Refer to <u>ST-51, "AWD : Exploded View"</u>.
- 10. Remove propeller shaft assembly from O-ring.

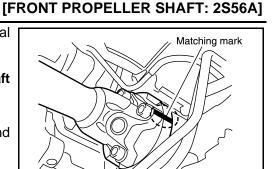
INSTALLATION

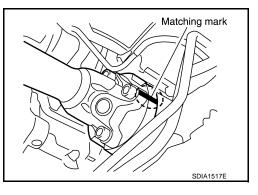
Note the following, and install in the reverse order of removal.

- Align matching mark to install propeller shaft assembly to final drive companion flange.
- 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.

CAUTION:

- Never damage the transfer front oil seal.
- Never reuse O-ring.
- Apply multi-purpose grease onto O-ring.





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Inspection

APPEARANCE

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

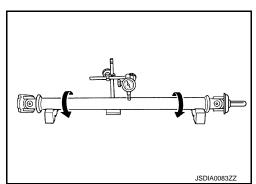
PROPELLER SHAFT RUNOUT

Check propeller shaft runout at measuring point with a dial indicator. If runout exceeds specifications, replace propeller shaft assembly. For measuring point, refer to <u>DLN-76</u>, "Inspection".

Limit

Propeller shaft runout

: Refer to <u>DLN-79, "Propel-</u> ler Shaft Runout".



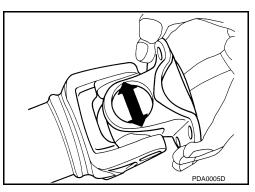
JOURNAL AXIAL PLAY

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

CAUTION: Never disassemble joints. : Refer to <u>DLN-79, "Journal</u> <u>Axial Play"</u>.



SERVICE DATA AND SPECIFICATIONS (SDS) D SPECIFICATIONS (SDS) [FRONT PROPELLER SHAFT: 2S56A]

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:000000005171190

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	AWD
Applied model	VQ35HR
	A/T
Propeller shaft model	2S56A
Number of joints	2
Type of journal bearings (Non-disassembly type)	Shell type
Coupling method with transfer	Sleeve type
Coupling method with front final drive	Flange type
Shaft length (Spider to spider)	763 mm (30.04 in)
Shaft outer diameter	42.7 mm (1.681 in)
Propeller Shaft Runout	INFOID:000000005171191
	Unit: mm (in)
ltem	Limit
Propeller shaft runout	0.8 (0.031)
lournal Axial Play	INFOID:000000005171192
	Unit: mm (in)
Item	Unit: mm (in) Standard

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING < SYMPTOM DIAGNOSIS > [REAR PROPELLER SHAFT: 3S80A-R]

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000005171193

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

Reference		DLN-82, "Inspection"	DLN-86, "Inspection"	I	DLN-86, "Inspection"	Ι	DLN-86, "Inspection"	DLN-86, "Inspection"	NVH in DLN section.	NVH in FAX, RAX, FSU and RSU section.	NVH in WT section.	NVH in WT section.	NVH in RAX section.	NVH in BR section.	NVH in ST section.
Possible cause and SUSPECT		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
0	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Symptom	Shake Vibration		×	~	~	×	~	~		×	×	×	×	×	×
	VIDIALION	×	×	×	×	×	×	×		×	×		×		×

 \times : Applicable

[REAR PROPELLER SHAFT: 3S80A-R]

< PREPARATION >

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:000000005171194 B

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Tool name		Description	C
Power tool		Loosening bolts and nuts	
			DLN
	PBIC0190E		E

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PERIODIC MAINTENANCE REAR PROPELLER SHAFT

Inspection

INFOID:000000005171195

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.

 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 <u>DLN-87, "Propel-</u> ler Shaft Runout".

- If runout still exceeds specifications, separate propeller shaft at final drive companion flange; then rotate companion flange 120, 240 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.

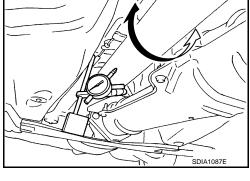
RUNOUT MEASURING POINT

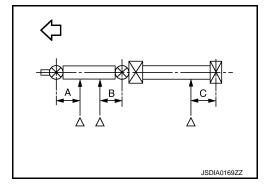
Propeller shaft runout measuring point (Point "△").

C: Vehicle front

Standard

Α	: 192 mm (7.56 in)
В	: 172 mm (6.77 in)
С	: 172 mm (6.77 in)





[REAR PROPELLER SHAFT: 3S80A-R]

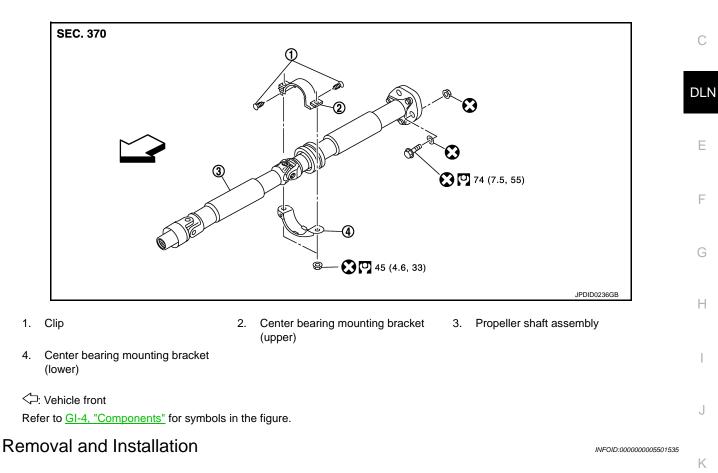
REMOVAL AND INSTALLATION REAR PROPELLER SHAFT

Exploded View

INFOID:000000005171196

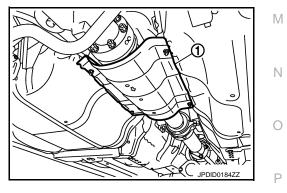
А

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REMOVAL

- 1. Shift the transaxle to the neutral position, and then release the parking brake.
- 2. Remove the floor reinforcement.
- 3. Remove the center muffler with power tool. Refer to EX-5. "Exploded View".
- 4. Remove the heat plate (1).

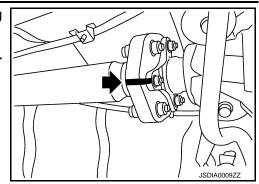


< REMOVAL AND INSTALLATION >

[REAR PROPELLER SHAFT: 3S80A-R]

 Put matching marks (
 onto propeller shaft rubber coupling and final drive companion flange. CAUTION:

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



6. Loosen mounting nuts (1) of center bearing mounting brackets (upper/lower).

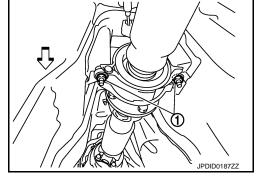
CAUTION: Tighten mounting nuts temporarily.

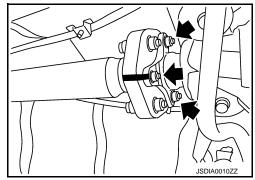
Remove propeller shaft assembly fixing bolts and nuts (
 CAUTION:

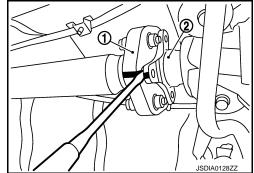
Never remove the rubber coupling from the propeller shaft assembly.

Slightly separate the rubber coupling (1) from the final drive companion flange (2).
 CAUTION:

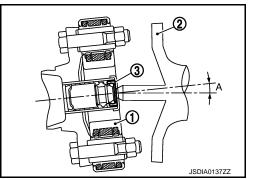
Never damage the final drive companion flange and rubber coupling.







- 9. Remove center bearing mounting bracket fixing nuts. **CAUTION:**
 - The angle (A), which the third axis rubber coupling (1) forms with the final drive companion flange (2), must be 5° or less.
 - Never damage the grease seal (3).
 - Never damage the rubber coupling.
- Slide the propeller shaft in the vehicle forward direction slightly. Separate the propeller shaft from the final drive companion flange.
 CAUTION:



< REMOVAL AND INSTALLATION >

[REAR PROPELLER SHAFT: 3S80A-R]

- The angle, which the third axis rubber coupling forms with the final drive companion flange, must be 5° or less.
- Never damage the grease seal.
- Never damage the rubber coupling.
- 11. Remove the propeller shaft assembly from the vehicle. CAUTION:

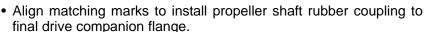
Never damage the rear oil seal of transmission.

12. Remove clip and center bearing mounting bracket (upper/lower).

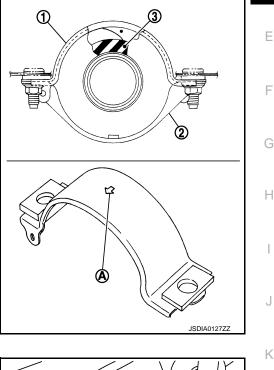
INSTALLATION

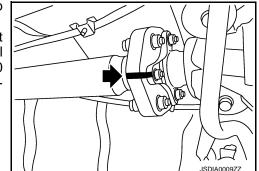
Note the following, and install in the reverse order of removal.

- 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.

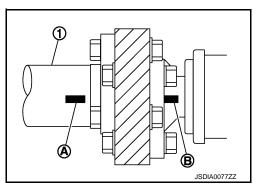


• After assembly, perform a driving test to check propeller shaft vibration. If vibration occurred, separate propeller shaft from final drive. Reinstall companion flange after rotating it by 120, 240 degrees. Then perform driving test and check propeller shaft vibration again at each point.





- If propeller shaft or final drive has been replaced, connect them as follows:
- Install the propeller shaft (1) while aligning its matching mark (A) with the matching mark (B) on the joint as close as possible.



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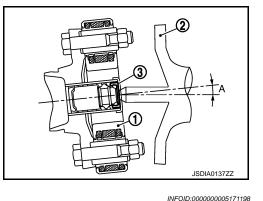
Ρ

< REMOVAL AND INSTALLATION >

[REAR PROPELLER SHAFT: 3S80A-R]

CAUTION:

- The angle (A), which the third axis rubber coupling (1) forms with the final drive companion flange (2), must be 5° or less.
- Never damage the grease seal (3).
- Never damage the rubber coupling.
- Never damage the rear oil seal of transmission.
- Never damage the rubber coupling, protect it with a shop towel or equivalent.



Inspection

APPEARANCE

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

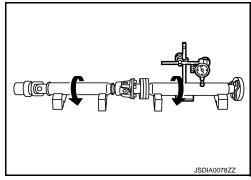
PROPELLER SHAFT RUNOUT

Check propeller shaft runout at measuring points with a dial indicator. If runout exceeds specifications, replace propeller shaft assembly. For measuring point, refer to <u>DLN-82, "Inspection"</u>

Limit

Propeller shaft runout

: Refer to <u>DLN-87, "Propel-</u> ler 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

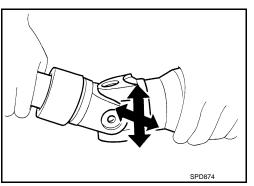
: Refer to <u>DLN-87, "Journal</u> <u>Axial Play"</u>.

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) D SPECIFICATIONS (SDS) [REAR PROPELLER SHAFT: 3S80A-R]

< SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:000000005171199 B

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		2WD						
Applied model		VQ35HR						
		A/T						
Propeller shaft model		3S80A-R						
Number of joints		3						
	1st joint	Shell type						
Type of journal bearings (Non-disassembly type)	2nd joint	Shell type						
	3rd joint	Rubber coupling type						
Coupling method with tran	smission	Sleeve type						
Coupling method with rear final drive		Rubber coupling type						
Chaft langth	1st (Spider to spider)	720 mm (28.35 in)						
Shaft length	2nd (Spider to rubber coupling center)	722 mm (28.43 in)						
Shaft outer diameter	1st	82.6 mm (3.252 in)						
Shan outer diameter	2nd	75.0 mm (2.953 in)						
Propeller Shaft R	unout	INFOID:00000005171200						
		Unit: mm (in)						
	Item	Limit						
Propeller shaft runout		0.8 (0.031)						
lournal Axial Pla	y	INFOID:00000005171201						
		Unit: mm (in)						
	Item	Standard						
Journal axial play		0 (0)						

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING < SYMPTOM DIAGNOSIS > [REAR PROPELLER SHAFT: 3F80A-1VL107]

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000005171202

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

Reference		DLN-90, "Inspection"	DLN-94, "Inspection"	I	DLN-94, "Inspection"	I	DLN-94, "Inspection"	DLN-94, "Inspection"	NVH in DLN section.	NVH in FAX, RAX, FSU and RSU section.	NVH in WT section.	NVH in WT section.	NVH in RAX section.	NVH in BR section.	NVH in ST section.
Possible cause and SUSPEC		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
	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Symptom	Shake		×			×				×	×	×	×	×	×
	Vibration	×	×	×	×	×	×	×		×	×		×		×

 \times : Applicable

[REAR PROPELLER SHAFT: 3F80A-1VL107]

< PREPARATION >

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:000000005171203

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Tool name		Description	
Power tool		Loosening bolts and nuts	
			DLN
	PBIC0190E		E

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PERIODIC MAINTENANCE REAR PROPELLER SHAFT

Inspection

INFOID:000000005171204

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.

 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 <u>DLN-95, "Propel-</u> ler Shaft Runout".

- 2. If runout still exceeds specifications, separate propeller shaft at final drive companion flange, then rotate companion flange 60, 120, 180, 240, 300 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.

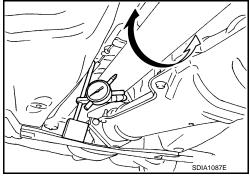
RUNOUT MEASURING POINT

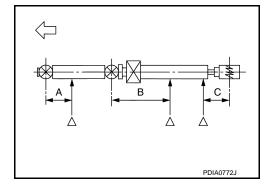
Propeller shaft runout measuring point (Point " Δ ").

C: Vehicle front

Standard

Α	: 162 mm (6.38 in)
В	: 245 mm (9.65 in)
С	: 185 mm (7.28 in)





REMOVAL AND INSTALLAT REAR PROPELLER SHAFT

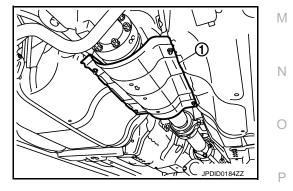
А

SEC. 370 2 С ി DLN Е 56.9 (5.8, 42) F 4 45 (4.6, 33) 74 (7.5, 55) JPDID0228GB Н 1. Propeller shaft assembly 2. Clip 3. Center bearing mounting bracket (upper) Center bearing mounting bracket 4. (lower) C: Vehicle front Refer to <u>GI-4, "Components"</u> for symbols in the figure.

Removal and Installation

REMOVAL

- 1. Shift the transaxle to the neutral position, and release the parking brake.
- 2. Remove the floor reinforcement.
- 3. Remove the center muffler with power tool. Refer to EX-5, "Exploded View".
- 4. Remove the heat plate (1).



INFOID:000000005171206

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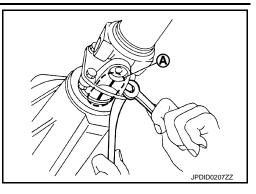
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< REMOVAL AND INSTALLATION >

[REAR PROPELLER SHAFT: 3F80A-1VL107]

 Put matching marks (A) on propeller shaft flange yoke and transfer companion flange.
 CAUTION:

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



 Put matching marks (A) on propeller shaft rebro joint and final drive companion flange.
 CAUTION:

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

 Loosen mounting nuts (1) of center bearing mounting brackets (upper/lower).
 CAUTION:

Tighten mounting nuts temporarily.

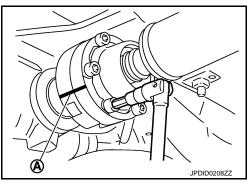
- 8. Remove propeller shaft assembly fixing bolts and nuts.
- 9. Remove center bearing mounting bracket fixing nuts.
- 10. Remove propeller shaft assembly. CAUTION:

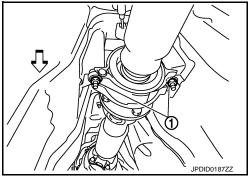
If constant velocity joint was bent during propeller shaft

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.

INSTALLATION

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

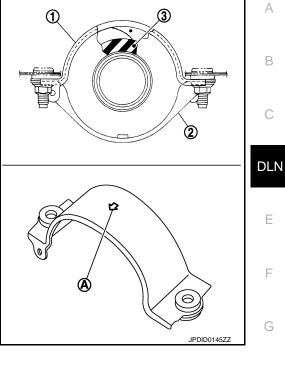




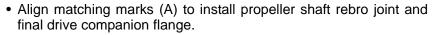
< REMOVAL AND INSTALLATION >

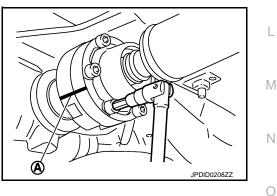
[REAR PROPELLER SHAFT: 3F80A-1VL107]

- 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 (A) to install propeller shaft flange yoke and transfer companion flange.





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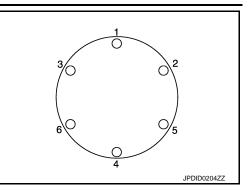
JPDID0207ZZ

< REMOVAL AND INSTALLATION >

[REAR PROPELLER SHAFT: 3F80A-1VL107]

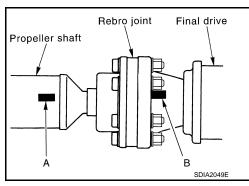
Tighten mounting bolt and nut in the order shown in the figure.

 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 60, 120, 180, 240, 300 degrees. Then perform driving test and check propeller shaft vibration again at each point.



- If propeller shaft or final drive has been replaced, connect them as follows:
- Install the propeller shaft while aligning its matching mark (A) with the matching mark (B) on the joint as close as possible. **CAUTION:**

Avoid damaging the rebro joint boot, protect it with a shop towel or equivalent.



Inspection

INFOID:000000005171207

APPEARANCE

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

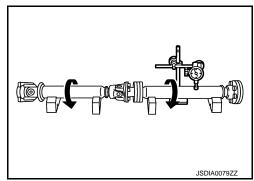
PROPELLER SHAFT RUNOUT

Check propeller shaft runout at measuring points with a dial indicator. If runout exceeds specifications, replace propeller shaft assembly. For measuring point, refer to <u>DLN-90, "Inspection"</u>.

Limit

Propeller shaft runout

: Refer to DLN-95, "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 <u>DLN-95, "Journal</u> <u>Axial Play"</u>.

CAUTION: Never disassemble joints.

CENTER BEARING

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

Never disassemble center bearing.

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SERVICE DATA AND SPECIFICATIONS (SDS)

[REAR PROPELLER SHAFT: 3F80A-1VL107] < SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:000000005171208 В

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		AWD	
Applied model		VQ35HR	
		VQ35HR A/T 3F80A-1VL107 3 Shell type Shell type Rebro joint type Flange type Rebro joint type Note type Rebro joint type Intervention NFOLD-00000000517 Unit: mm Unit: mm Introduction Standard	
Propeller shaft model	VQ35HR A/T A/T ar shaft model 3F80A-1VL107 ar shaft model 3F80A-1VL107 ar shaft model Shell type 2nd joint Shell type ar shaft runout Flange type g method with transmission Flange type g method with rear final drive Rebro joint type arg (Spider to spider) 395 mm (15.55 in) arg (Spider to spider) 706 mm (2.80 in) arg (Spider to spider) 2.26 mm (3.252 in) arg (Spider to spider) 2.26 mm (3.252 in) Inter Shaft Runout		

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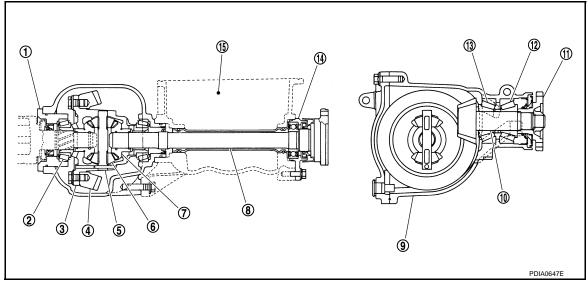
< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION FRONT FINAL DRIVE ASSEMBLY

System Diagram

INFOID:000000005171211

CROSS-SECTIONAL VIEW



- 1. Side retainer
- 4. Drive gear
- 7. Side gear
- 10. Drive pinion
- 13. Pinion rear bearing

- 2. Side bearing
- 5. Pinion mate shaft
- 8. Side shaft
- 11. Companion flange
- 14. Extension tube retainer
- 3. Differential case
- 6. Pinion mate gear
- 9. Gear carrier
- 12. Pinion front bearing
- 15. Engine assembly

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING < SYMPTOM DIAGNOSIS > [FRONT FINAL DRIVE: F160A]

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000005171212

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Use the chart below to find the cause of the symptom. If necess Reference		<u> \</u>							ions.						С
		er Disassembly"		er Disassembly"					and RSU sections			section.			DL
		DLN-124, "Inspection After	DLN-120, "Adjustment"	DLN-124, "Inspection After	DLN-120, "Adjustment"	DLN-120, "Adjustment"	DLN-102, "Inspection"	NVH in DLN section.	NVH in FAX, RAX, FSU	NVH in WT section.	NVH in WT section.	NVH in FAX and RAX se	NVH in BR section.	NVH in ST section.	F
Possible cause and SUSPECTE	ED 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	- F J
		0	0		-	-	-								

×: Applicable

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< PRECAUTION > PRECAUTION PRECAUTIONS

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:000000005171213

NOTE:

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

If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

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

OPERATION PROCEDURE

1. Connect both battery cables. NOTE:

Supply power using jumper cables if battery is discharged.

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

Service Notice or Precautions for Front Final Drive

INFOID:000000005171214

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

NOTE:

Front oil seal cannot be replaced on vehicle, because there is not enough room.

< PREPARATION > PREPARATION

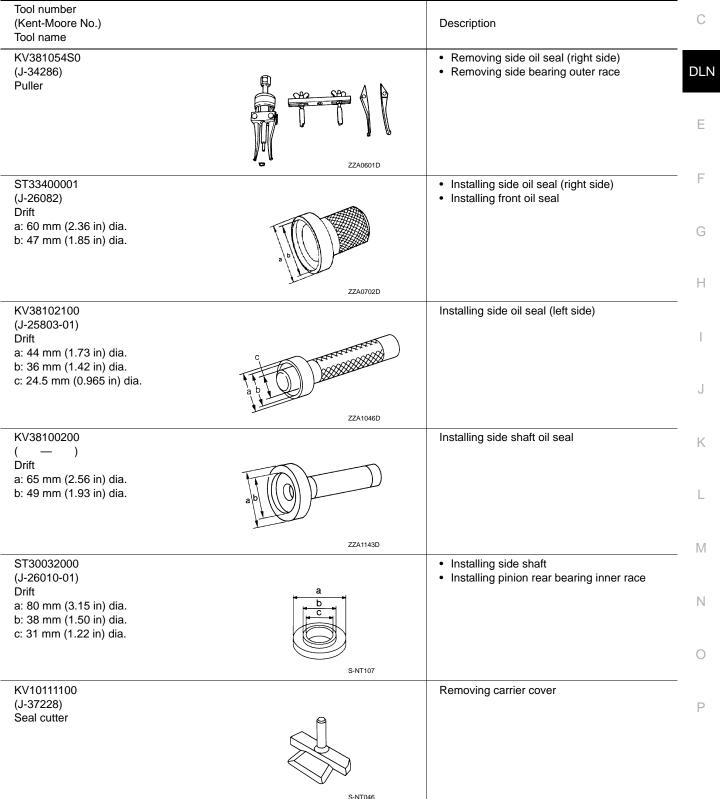
PREPARATION

Special Service Tools

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



PREPARATION

< PREPARATION >

[FRONT FINAL DRIVE: F160A]

Tool number		
(Kent-Moore No.) Tool name		Description
ST3306S001 (J-22888-D) Differential side bearing puller set 1: ST33051001 (J-22888-20) Puller 2: ST33061000 (J-8107-2) Base a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia.		Removing and installing side bearing inner race
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 side bearing inner race
ST30611000 (J-25742-1) Drift bar	S-NT090	Installing side bearing outer race (Use with KV31103000)
KV31103000 (J-38982) Drift a: 49 mm (1.93 in) dia. b: 70 mm (2.76 in) dia.	a ZZA1113D	Installing side bearing outer race
ST3127S000 (J-25765-A) Preload gauge	ZZAOBOGD	Measuring pinion bearing preload and total preload
(J-8129) Spring gauge	NT127	Measuring turning torque

PREPARATION

[FRONT FINAL DRIVE: F160A]

Tool number (Kent-Moore No.) Tool name		Description	A
ST37820000 (—) Drift a: 39 mm (1.54 in) dia. b: 72 mm (2.83 in) dia.		Installing pinion front and rear bearing outer race	В
	b a ZZA0836D		С
KV38102510		Installing front oil seal	DL
(—) Drift a: 71 mm (2.80 in) dia. b: 65 mm (2.56 in) dia.	ab		E
Commercial Service Tools	ZZA0838D	INFOID:000000005171216	F
Tool name		Description	
Flange wrench		Removing and installing drive pinion lock nut	Н
	ONT035		J
Replacer	ZZA0700D	Removing pinion rear bearing inner race	K
Spacer a: 60 mm (2.36 in) dia. b: 36 mm (1.42 in) dia. c: 30 mm (1.18 in)	b c a ZZA1133D	Installing pinion front bearing inner race	M
Power tool	PBIC0190E	Loosening bolts and nuts	O

< PREPARATION >

< PERIODIC MAINTENANCE >

PERIODIC MAINTENANCE FRONT DIFFERENTIAL GEAR OIL

Inspection

OIL LEAKAGE

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

OIL LEVEL

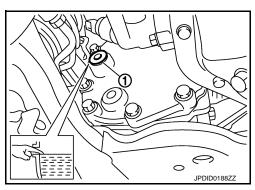
• Remove filler plug (1) and check oil level from filler plug mounting hole as shown in the figure.

CAUTION:

Never start engine while checking oil level.

• Set a gasket on filler plug (1) and install it on final drive assembly. Refer to <u>DLN-109, "Exploded View"</u>.

CAUTION: Never reuse gasket.



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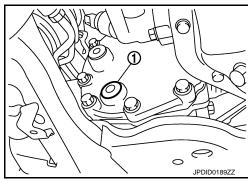
INFOID:000000005171219

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- 1. Stop engine.
- 2. Remove drain plug (1) and drain gear oil.
- Set a gasket on drain plug (1) and install it to final drive assembly and tighten to the specified torque. Refer to <u>DLN-109</u>, <u>"Exploded View"</u>.
 CAUTION:

Never reuse gasket.



Refilling

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

Oil grade and Viscosity

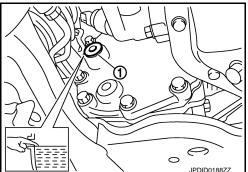
Oil capacity

: Refer to <u>MA-10, "Fluids</u> and Lubricants".

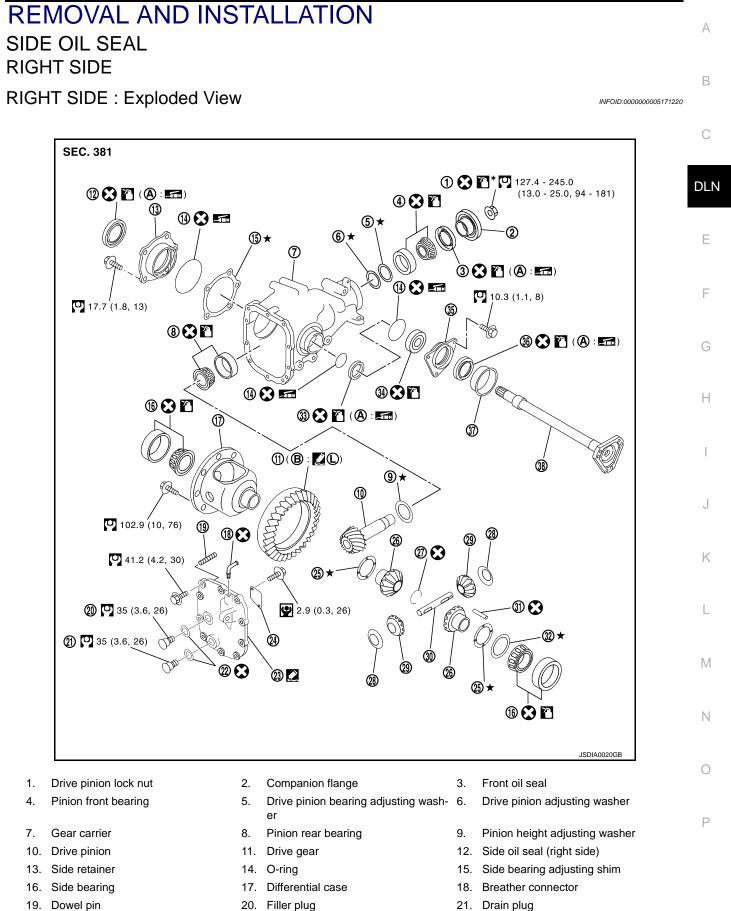
: Refer to <u>DLN-134, "Gen-</u> eral Specifications".

 After refilling oil, check oil level. Set a gasket to filler plug (1), then install it to final drive assembly. Refer to <u>DLN-109</u>, <u>"Exploded View"</u>. CAUTION:

Never reuse gasket.



[FRONT FINAL DRIVE: F160A]



22. Gasket

Revision: 2009 August

Side gear thrust washer 25.

< REMOVAL AND INSTALLATION >

23.

26.

Carrier cover

Side gear

- **DLN-103**
- 21. Drain plug
- 24. Gear oil defense
- 27. Circular clip

SIDE OIL SEAL

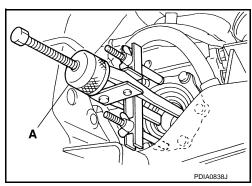
< REMOVAL AND INSTALLATION >

28. Pinion mate thrust washer 30. Pinion mate shaft 29. Pinion mate gear 33. Side oil seal (left side) 31. Lock pin 32. Side bearing adjusting washer 34. Side shaft bearing 35. Extension tube retainer 36. Side shaft oil seal 38. Side shaft 37. Dust seal A: Oil seal lip B: Screw hole γ. Apply gear oil. ۲***** Apply anti-corrosion 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 Prod-ucts and Sealants". Refer to GI-4, "Components" for symbols not described above. **RIGHT SIDE : Removal and Installation** INFOID:000000005171221

REMOVAL

- 1. Remove the front drive shaft. Refer to FAX-24, "Exploded View".
- Remove the side oil seal using a puller (A) [SST: KV381054S0 (J-34286)].
 CAUTION:

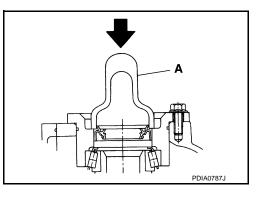
Never damage gear carrier.



[FRONT FINAL DRIVE: F160A]

INSTALLATION

- 1. Apply multi-purpose grease to sealing lips of side oil seal.
- Using the drift (A) [SST: ST33400001 (J-26082)], press-fit side oil seal so that its surface comes face-to-face with the end surface of the side retainer. CAUTION:
 - Never reuse oil seal.
 - When installing, never incline oil seal.
- 3. Install the front drive shaft. Refer to FAX-24, "Exploded View".
- 4. When oil leaks while removing, check oil level after the installation. Refer to <u>DLN-102</u>, "Inspection".



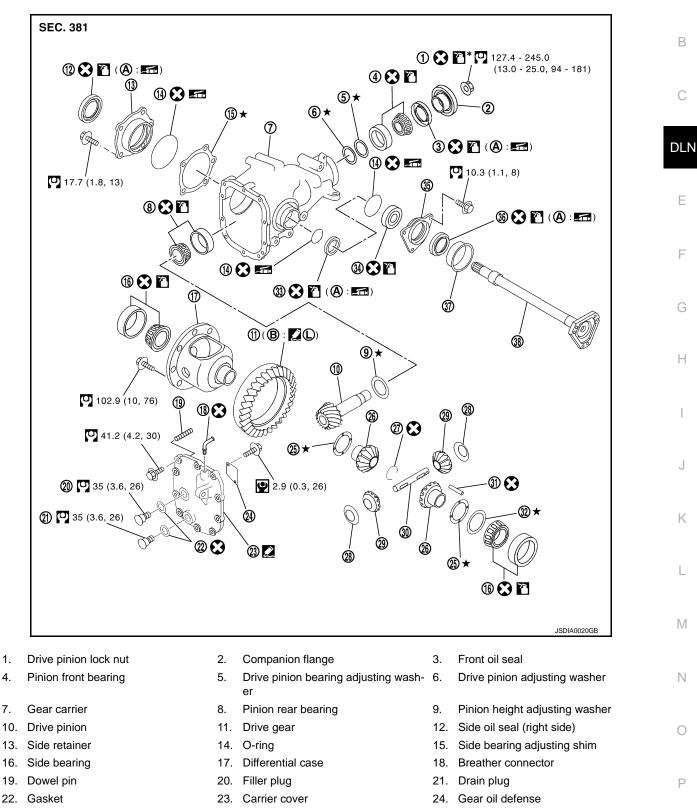
LEFT SIDE

[FRONT FINAL DRIVE: F160A]

< REMOVAL AND INSTALLATION > LEFT SIDE : Exploded View

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А



- Side gear thrust washer 25.
- 28. Pinion mate thrust washer
- 31. Lock pin

1.

4.

7.

- 34. Side shaft bearing
- Side gear 26.
- 29. Pinion mate gear
- 32. Side bearing adjusting washer
- 35. Extension tube retainer
- 27. Circular clip
- 30. Pinion mate shaft
- 33. Side oil seal (left side)
- 36. Side shaft oil seal

< REMOVAL AND INSTALLATION >

37. Dust seal

38. Side shaftB: Screw hole

A: Oil seal lip

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Apply gear oil.

Apply anti-corrosion 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 <u>GI-18. "Recommended Chemical Products and Sealants"</u>.

Refer to <u>GI-4, "Components"</u> for symbols not described above.

LEFT SIDE : Removal and Installation

INFOID:000000005171223

REMOVAL

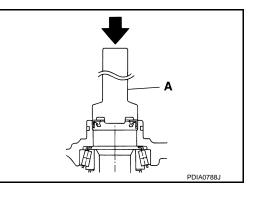
 Remove the front final drive assembly from vehicle with power tool. Refer to <u>DLN-107, "Exploded View"</u>. NOTE:

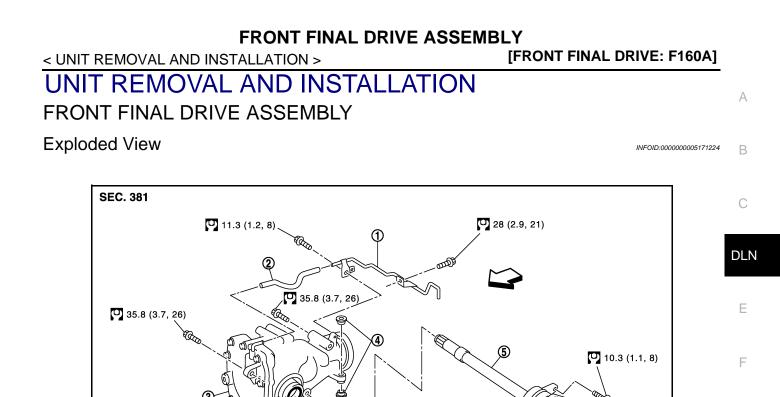
Left side oil seal is attached to engine assembly. Replace it after removing front final drive assembly from vehicle.

 Remove the side oil seal using a flat-bladed screwdriver.
 CAUTION: Never damage gear carrier.

INSTALLATION

- 1. Apply multi-purpose grease to sealing lips of side oil seal.
- Using the drift (A) [SST: KV38102100 (J-25803-01)], press-fit side oil seal so that its surface comes face-to-face with the end surface of the gear carrier.
 CAUTION:
 - Never reuse oil seal.
 - When installing, never incline oil seal.
- 3. Install the front final drive assembly on vehicle. Refer to <u>DLN-107, "Exploded View"</u>.
- 4. Install the front drive shaft. Refer to FAX-24, "Exploded View".
- 5. When oil leaks while removing, check oil level after the installation. Refer to <u>DLN-102, "Inspection"</u>.





35.8 (3.7, 26)

Removal and Installation

Breather tube

Bushing

C: Vehicle front

REMOVAL

1. 4.

1. Remove both front drive shaft. Refer to FAX-24, "Exploded View".

2.

5.

2. Remove front crossbar with power tool.

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

- 3. Separate steering outer socket and steering knuckle. Refer to <u>ST-33, "AWD : Exploded View"</u>.
- 4. Remove side shaft.
- 5. Remove three way catalyst (right bank) with power tool. Refer to EM-34, "Exploded View".

Breather hose

Side shaft

- 6. Remove front propeller shaft. Refer to <u>DLN-77, "Exploded View"</u>.
- 7. Separate power steering solenoid valve connector.
- 8. Separate power steering hydraulic line. Refer to <u>ST-51, "AWD : Exploded View"</u>.
- 9. Remove stabilizer assembly with power tool. Refer to FSU-36. "Exploded View".
- 10. Separate steering lower joint and steering gear assembly. Refer to ST-33, "AWD : Exploded View".
- 11. Set a suitable jack to engine.
- 12. Remove front suspension member with power tool. Refer to <u>FSU-37, "Exploded View"</u>.
- 13. Remove breather hose and tube.
- 14. Remove engine mounting bracket (RH) (Lower) and engine mounting insulator (RH) with power tool. P Refer to <u>EM-83, "AWD : Exploded View"</u>.
- 15. Remove final drive assembly mounting bolts with power tool and separate front final drive assembly from engine.

INSTALLATION

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

DLN-107

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3. Front final drive assembly

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FRONT FINAL DRIVE ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[FRONT FINAL DRIVE: F160A]

- When installing the side shaft, apply multi-purpose grease to contact surface of side shaft and side shaft oil seal.
- Tighten mounting bolts in the order described below when installing front final drive assembly: side of gear carrier (1), upper side of gear carrier (2), part of carrier cover (3), lower part of gear carrier (4).

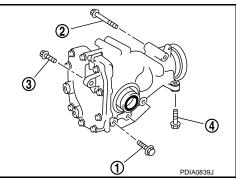
CAUTION:

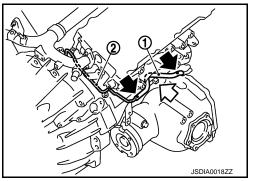
Align the mating faces of gear carrier and oil pan for installation.

• When installing breather hose (1) and tube (2), refer to the figure. **CAUTION:**

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

- Make sure the paint mark facing up (+).
- Securely install the hose until it seats the rounded portion of the tube. (+) (front final drive side).
- Securely install the hose until it to paint mark of the tube. (+) (vehicle rear side).
- Face the bend of the breather hose (\triangleleft) to the engine.
- When oil leaks while removing final drive assembly, check oil level after the installation. Refer to <u>DLN-102</u>, "Inspection".





< UNIT DISASSEMBLY AND ASSEMBLY > UNIT DISASSEMBLY AND ASSEMBLY SIDE SHAFT

Exploded View

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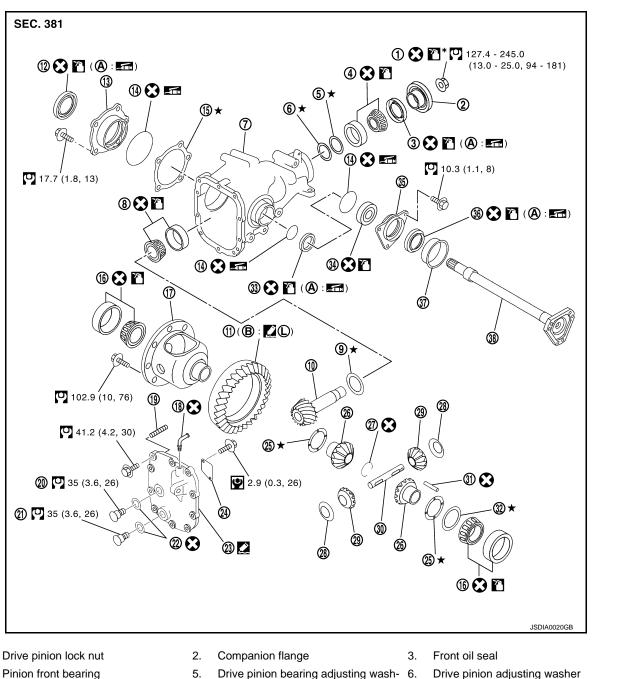
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- 7. Gear carrier
- Drive pinion 10.

1.

4.

- Side retainer 13.
- 16. Side bearing
- Dowel pin 19.
- 22. Gasket
- 25. Side gear thrust washer
- 28. Pinion mate thrust washer

- Drive pinion bearing adjusting wash- 6. 5. er
- 8. Pinion rear bearing
- Drive gear 11.
- 14. O-ring
- 17. Differential case
- 20. Filler plug
- 23. Carrier cover
- 26. Side gear
- 29. Pinion mate gear

- Drive pinion adjusting washer
- 9. Pinion height adjusting washer
- 12. Side oil seal (right side)
- Side bearing adjusting shim 15.
- 18. Breather connector
- 21. Drain plug
- 24. Gear oil defense
- 27. Circular clip
- 30. Pinion mate shaft

DLN-109

SIDE SHAFT

< UNIT DISASSEMBLY AND ASSEMBLY >

31. Lock pin

37. Dust seal

A: Oil seal lip

34. Side shaft bearing

- 32. Side bearing adjusting washer35. Extension tube retainer
- 38. Side shaft
 - B: Screw hole

- [FRONT FINAL DRIVE: F160A]
- 33. Side oil seal (left side)
- 36. Side shaft oil seal

Apply gear oil.

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

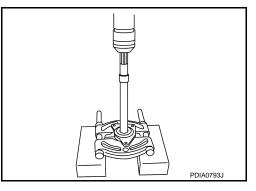
Apply Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to <u>GI-18. "Recommended Chemical Prod</u>ucts and Sealants".

Refer to <u>GI-4, "Components"</u> for symbols not described above.

Disassembly

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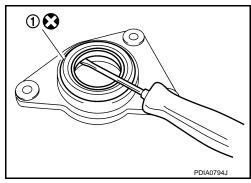
1. Hold extension tube retainer with puller, then press out side shaft using a press.



 Remove side shaft oil seal (1) from extension tube retainer with a suitable tool. CAUTION:

Never damage extension tube retainer.

- 3. Remove side shaft bearing from extension tube retainer.
- 4. Remove O-ring from extension tube retainer.
- 5. Remove dust seal from side shaft.



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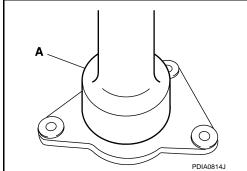
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Assembly

 Using the drift (A) [SST: KV38100200 (—)], install side shaft oil seal.

CAUTION:

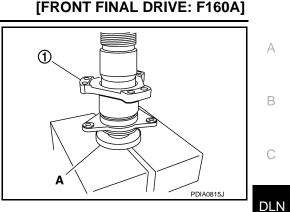
- Never reuse oil seal.
- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.
- 2. Install dust seal.



SIDE SHAFT

< UNIT DISASSEMBLY AND ASSEMBLY >

- Support side shaft bearing with the drift (A) [SST: ST30032000 (J-26010-01)], then press side shaft (1) into the side shaft bearing using a press.
- Apply multi-purpose grease to O-ring, and install it to extension tube retainer. CAUTION:
 - Never reuse O-ring.



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Inspection After Disassembly

DRIVE GEAR AND DRIVE PINION

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

BEARING

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

SIDE GEAR AND PINION MATE GEAR

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

SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

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

OIL SEAL

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

DIFFERENTIAL CASE

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

COMPANION FLANGE

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

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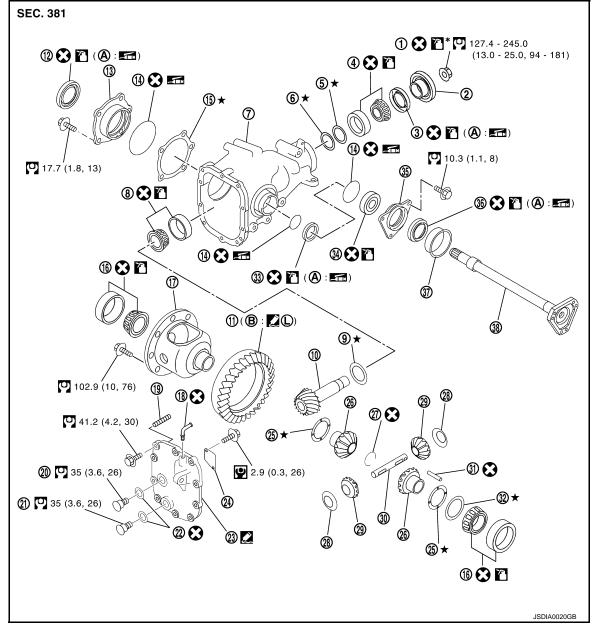
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< UNIT DISASSEMBLY AND ASSEMBLY >

DIFFERENTIAL ASSEMBLY

Exploded View

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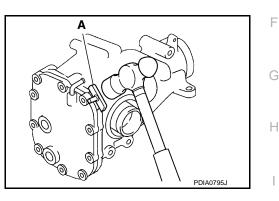
- 1. Drive pinion lock nut
- 4. Pinion front bearing
- 7. Gear carrier
- 10. Drive pinion
- 13. Side retainer
- 16. Side bearing
- 19. Dowel pin
- 22. Gasket
- 25. Side gear thrust washer
- 28. Pinion mate thrust washer
- 31. Lock pin

- 2. Companion flange
- 5. Drive pinion bearing adjusting wash- 6. er
- 8. Pinion rear bearing
- 11. Drive gear
- 14. O-ring
- 17. Differential case
- 20. Filler plug
- 23. Carrier cover
- 26. Side gear
- 29. Pinion mate gear
- 32. Side bearing adjusting washer

- 3. Front oil seal
 - Drive pinion adjusting washer
- 9. Pinion height adjusting washer
- 12. Side oil seal (right side)
- 15. Side bearing adjusting shim
- 18. Breather connector
- 21. Drain plug
- 24. Gear oil defense
- 27. Circular clip
- 30. Pinion mate shaft
- 33. Side oil seal (left side)

< UNI	F DISASSEMBLY AND ASS	EME	BLY >	[FRONT FINAL DRIVE: F160A]	
34.	Side shaft bearing	35.	Extension tube retainer	36.	Side shaft oil seal	
37.	Dust seal	38.	Side shaft			А
A:	Oil seal lip	B:	Screw hole			
~ :	Apply gear oil.					В
۲ <u>۲</u>	<: Apply anti-corrosion oil.					
Ĺ	Apply Genuine Silicone RTV or	equiv	alent. Refer to <u>GI-18, "Recommende</u>	ed Chem	nical Products and Sealants".	С
	Apply Genuine Medium Strengt ucts and Sealants".	h Thre	ead Locking Sealant or equivalent. Re	efer to <u>G</u>	II-18, "Recommended Chemical Prod-	
Refe	er to <u>GI-4, "Components"</u> for symbols	s not c	lescribed above.			DLN
Disas	sembly				INFOID:000000005171231	

- 1. Drain gear oil, if necessary.
- 2. Remove carrier cover mounting bolts.
- Remove carrier cover to insert the seal cutter (A) [SST: KV10111100 (J-37228)] between gear carrier and carrier cover. CAUTION:
 - Never damage the mating surface.
 - Never insert flat-bladed screwdriver, this may damage the mating surface.



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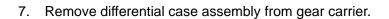
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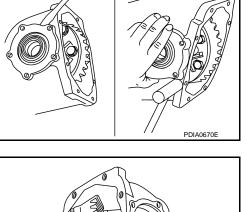
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- 4. Remove side retainer.
- 5. Remove side bearing adjusting shim.
- 6. Remove O-ring from side retainer.



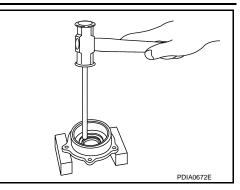




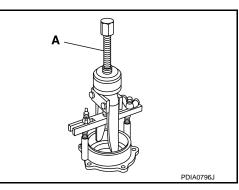
< UNIT DISASSEMBLY AND ASSEMBLY >

8. Remove side oil seal (right side) from side retainer.

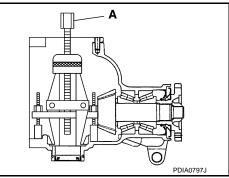
[FRONT FINAL DRIVE: F160A]



- 9. Remove side bearing outer race with puller (A) [SST: KV381054S0 (J-34286)].
- 10. Remove O-ring from gear carrier.
- 11. Remove side oil seal (left side) from gear carrier.



12. Remove side bearing outer race with puller (A) [SST: KV381054S0 (J-34286)].



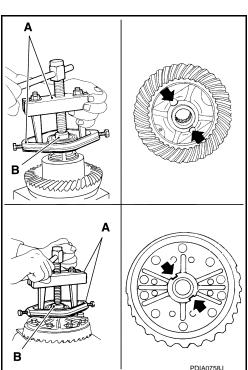
13. Remove side bearing inner race.

To prevent damage to bearing, engage puller jaws in groove (\Leftarrow) .

A: Puller [SST: ST33051001 (J-22888-20)] B: Base [SST: ST33061000 (J-8107-2)]

CAUTION:

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



< UNIT DISASSEMBLY AND ASSEMBLY >

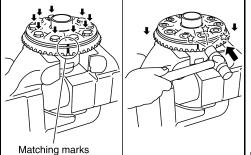
14. For proper reinstallation, paint matching marks on one differential case assembly. **CAUTION:** For matching marks, use paint. Never damage differential

case and drive gear.

- 15. Remove drive gear mounting bolts.
- 16. Tap drive gear off differential case assembly with a soft hammer. **CAUTION:**

Tap evenly all around to keep drive gear from bending.

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



[FRONT FINAL DRIVE: F160A]

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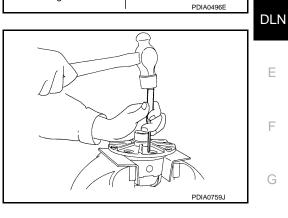
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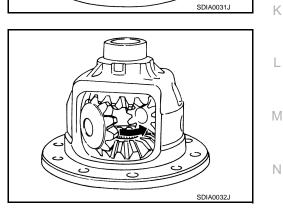
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18. Remove pinion mate shaft.

19. Turn pinion mate gear, then remove pinion mate gears, pinion mate thrust washers, side gears and side gear thrust washers from differential case.



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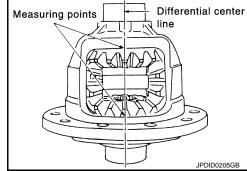
< UNIT DISASSEMBLY AND ASSEMBLY >

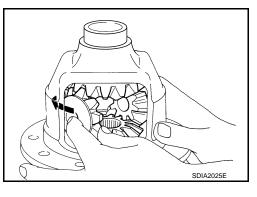
Assembly

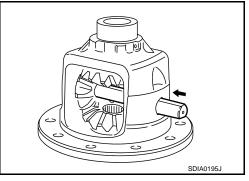
Install side gear thrust washers with the same thickness as the 1. ones installed prior to disassembly or reinstall the old ones on the side gears.

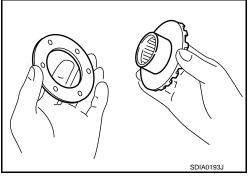
- Install side gears and thrust washers into differential case. 2. **CAUTION:**
 - Never reuse circular clip.
 - Make sure that the circular clip is installed to side gear (side retainer side).
- 3. Align 2 pinion mate gears in diagonally opposite positions, then rotate and install them into differential case after installing thrust washer to pinion mate gear.
- 4. Align the lock pin holes on differential case with shaft, and install pinion mate shaft.

- Measure side gear end play. If necessary, select the appropriate side gear thrust washers. 5.
- Place differential case straight up so that side gear to be meaa. sured comes upward.









[FRONT FINAL DRIVE: F160A]

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< UNIT DISASSEMBLY AND ASSEMBLY >

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

Standard

Side gear back clearance

: Refer to DLN-134, "Differential Side Gear Clearance".

CAUTION:

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

If the back clearance is outside the specification, use a thicker/ c. thinner side gear thrust washer to adjust.

When the back clearance	Use a thicker thrust wash-
is large:	er.
When the back clearance	Use a thinner thrust wash-
is small:	er.



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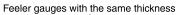
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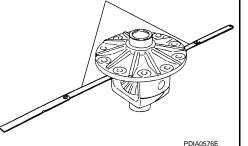
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[FRONT FINAL DRIVE: F160A]





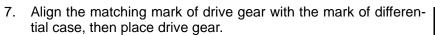
Punch

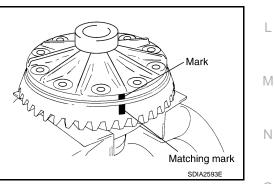


CAUTION:

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

6. Drive a lock pin into pinion mate shaft, using a punch. Make sure lock pin is flush with differential case. **CAUTION:** Never reuse lock pin.



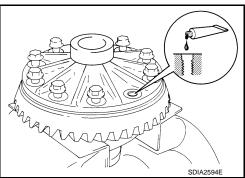


< UNIT DISASSEMBLY AND ASSEMBLY >

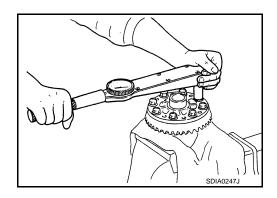
 Apply thread locking sealant into the thread hole of drive gear.
 Use Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to <u>GI-18</u>, <u>"Recommended Chemical</u> <u>Products and Sealants"</u>. CAUTION:

Drive gear back and threaded holes must be cleaned and degreased sufficiently.

[FRONT FINAL DRIVE: F160A]



 Install drive gear on the mounting bolts.
 CAUTION: Tighten bolts in a crisscross fashion.



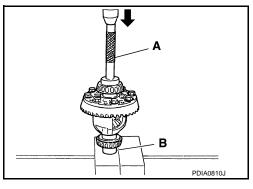
10. Press side bearing inner races to differential case, using the drift and the base.

A: Drift [SST: ST33230000 (J-25805-01)]

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

CAUTION:

Never reuse side bearing inner race.



11. Press-fit side bearing outer race into side retainer with the drift and the drift bar.

A: Drift bar [SST: ST30611000 (J-25742-1)] B: Drift [SST: KV31103000 (J-38982)]

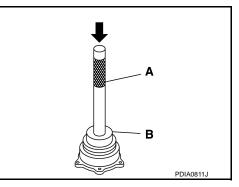
CAUTION:

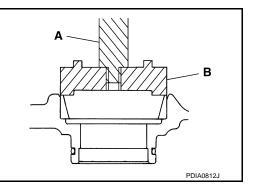
- At first, using a hammer, tap bearing outer race until it becomes flat to side retainer.
- Never reuse side bearing outer race.
- 12. Press-fit side bearing outer race into gear carrier with the drift and the drift bar.

A: Drift bar [SST: ST30611000 (J-25742-1)] B: Drift [SST: KV31103000 (J-38982)]

CAUTION:

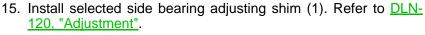
- At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.
- Never reuse side bearing outer race.





< UNIT DISASSEMBLY AND ASSEMBLY >

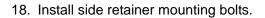
- [FRONT FINAL DRIVE: F160A] 13. Place the differential case assembly into gear carrier.
- 14. Measure side bearing preload. If necessary, select the appropriate side bearing adjusting shim. Refer to DLN-120, "Adjustment".



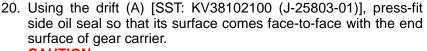
16. Apply multi-purpose grease to O-ring (2), and install it to side retainer. **CAUTION:**

Never reuse O-ring.

17. Install side retainer assembly to gear carrier.



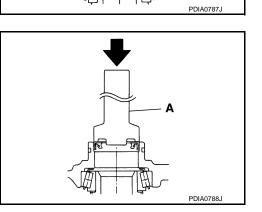
- 19. Using the drift (A) [SST: ST33400001 (J-26082)], press-fit side oil seal so that its surface comes face-to-face with the end surface of the side retainer. **CAUTION:**
 - Never reuse oil seal.
 - When installing, never incline oil seal.
 - Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.

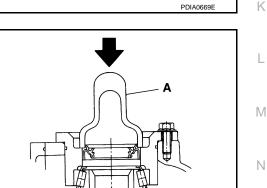


CAUTION:

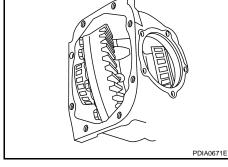
- Never reuse oil seal.
- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.
- 21. Apply multi-purpose grease to O-ring, and install it to gear carrier.

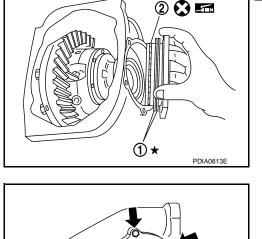
CAUTION:





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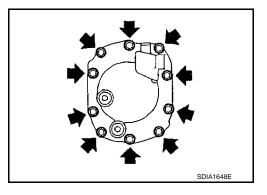
Never reuse O-ring.

- 22. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and total preload torque. Refer to <u>DLN-120, "Adjustment"</u>.
- Recheck above items. Readjust as described above, if necessary.
- 23. Apply sealant (A) to mating surface of carrier cover.
 - Use Genuine Silicone RTV or equivalent. Refer to <u>GI-18</u>, <u>"Recommended Chemical Products and Sealants"</u>. CAUTION:

24. Install carrier cover on gear carrier and tighten mounting bolts.

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

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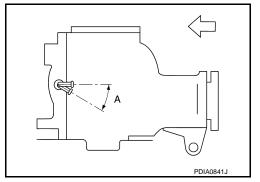


25. Set breather connector angle (A) as shown in the figure.

C: Vehicle front

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Adjustment

TOTAL PRELOAD TORQUE

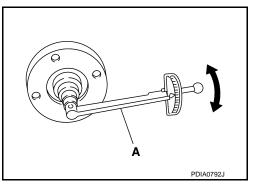
• Before inspection and adjustment, drain gear oil.

- 1. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
- 2. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
- 3. Measure total preload with preload gauge (A) [SST: ST3127S000 (J-25765-A)].

Standard

Total preload torque

: Refer to <u>DLN-134, "Pre-</u> load Torque".



NOTE:

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

Revision: 2009 August

DLN-120

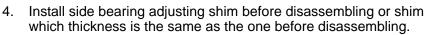
< UNIT DISASSEMBLY AND A	ASSEMBLY > [FRONT FINAL D	RIVE: F160A]
pinion bearing preload and	of the specification, disassemble it to check and adjust each p d side bearing preload. preload first, then adjust the side bearing preload.	part. Adjust the A
When the preload torqu	ie is large	В
On pinion bearings:	Decrease the drive pinion bearing adjusting washer and adjusting washer thickness.	_
On side bearings:	Increase the side bearing adjusting shim thickness. For s refer to parts information.	select parts C
When the preload torqu	ie is small	DLN
On pinion bearings:	Increase the drive pinion bearing adjusting washer and d adjusting washer thickness.	
On side bearings:	Decrease the side bearing adjusting shim thickness. For	select parts

SIDE BEARING PRELOAD

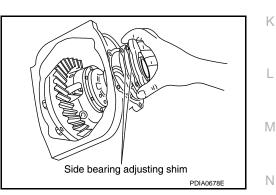
- Before inspection and adjustment, drain gear oil.
- 1. Remove carrier cover and side retainer. Refer to <u>DLN-113, "Disassembly"</u>.
- 2. Make sure all parts are clean. Also, make sure the bearings are well lubricated with gear oil.

refer to parts information.

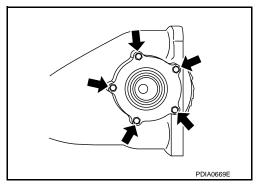
3. Place the differential case assembly into gear carrier.



 Install side retainer assembly to gear carrier. CAUTION: Never install O-ring.



6. Install side retainer mounting bolts to the specified torque.



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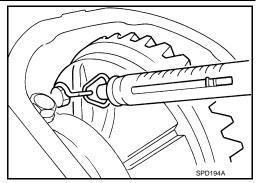
< UNIT DISASSEMBLY AND ASSEMBLY >

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

Specification

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

[FRONT FINAL DRIVE: F160A]



5 kg

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8. If the turning torque is outside the specification, use a thicker/ thinner side bearing adjusting shim to adjust.

> If the turning torque is less than the specified range: Decrease the side bearing adjusting shim thickness. If the turning torque is greater than the specification: Increase the side bearing adjusting shim thickness.

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

DRIVE GEAR RUNOUT

- 1. Remove carrier cover. Refer to <u>DLN-113, "Disassembly"</u>.
- 2. Fit a dial indicator to the drive gear back face.
- 3. Rotate the drive gear to measure runout.

Limit

Drive gear runout

: Refer to <u>DLN-134, "Drive</u> <u>Gear Runout"</u>.

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

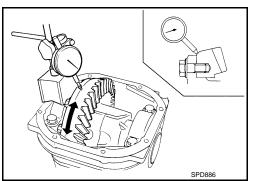
Replace drive gear and drive pinion gear as a set.

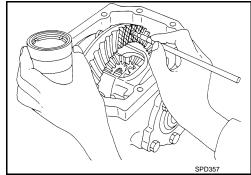
TOOTH CONTACT

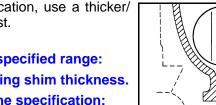
Before inspection and adjustment, drain gear oil.

- 1. Remove carrier cover. Refer to <u>DLN-113, "Disassembly"</u>.
- 2. Apply red lead to drive gear.

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



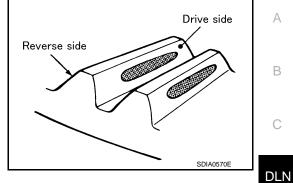




< UNIT DISASSEMBLY AND ASSEMBLY >

Rotate drive gear back and forth several times, check drive pin-ion gear to drive gear tooth contact. 3. **CAUTION:**

Check tooth contact on drive side and reverse side.

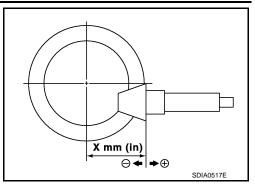


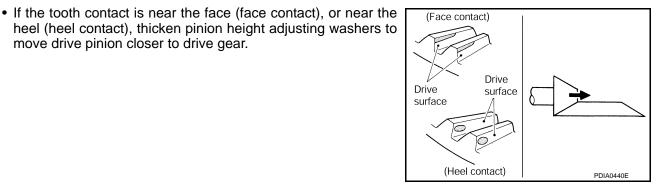
	Tooth cont	act pattern				E
Back side Drive side		Pinion height adjusting washer	Adjustment requirement			
Heel side	Toe side	Toe side	Heel side	selection value (mm(in))	(Yes/No)	
				+0.15 (+0.0059)		F
				+0.12 (+0.0047)	Yes	G
				+0.09 (+0.0035)		Н
				+0.06 (+0.0024)		I
				+0. 03 (+0. 0012)		J
				0	No	K
			»	-0. 03 (-0. 0012)		L
				-0. 06 (-0. 0024)		Μ
				-0. 09 (-0. 0035)		Ν
			»	-0. 12 (-0. 0047)	Yes	0
				-0.15 (-0.0059)		Р
					PDIA0667E	

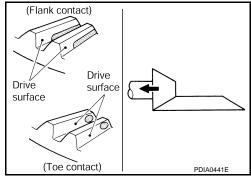
< UNIT DISASSEMBLY AND ASSEMBLY >

move drive pinion closer to drive gear.

- 4. If tooth contact is improperly adjusted, follow the procedure below to adjust the pinion height [dimension (X)].
- [FRONT FINAL DRIVE: F160A]







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

BACKLASH

Before inspection and adjustment, drain gear oil.

- 1. Remove carrier cover. Refer to <u>DLN-113</u>, "Disassembly".
- 2. Fit a dial indicator to the drive gear face to measure the backlash.

Standard **Backlash**

: Refer to DLN-134, "Backlash".

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

When the backlash is large:

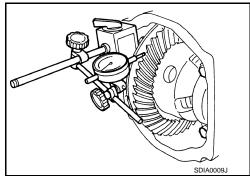
Decrease side bearing adjusting washer thickness.

When the backlash is small:

Increase side bearing adjusting washer thickness.

Inspection After Disassembly

DRIVE GEAR AND DRIVE PINION



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< UNIT DISASSEMBLY AND ASSEMBLY >

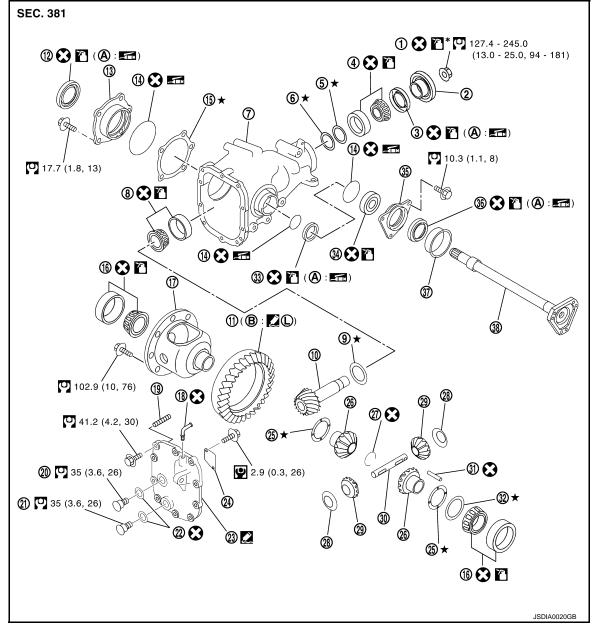
[FRONT FINAL DRIVE: F160A]

 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. 	А
BEARING	В
 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). 	С
 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. 	DLN
 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. 	Е
OIL SEALWhenever disassembled, replace.If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips, replace them.	F
DIFFERENTIAL CASEClean up the disassembled parts.If any wear or crack on the contact sides of the differential case is found, replace.	G
 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 com- 	Η
panion flange is found, replace.	Ι
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DRIVE PINION

Exploded View

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- 1. Drive pinion lock nut
- 4. Pinion front bearing
- 7. Gear carrier
- 10. Drive pinion
- 13. Side retainer
- 16. Side bearing
- 19. Dowel pin
- 22. Gasket
- 25. Side gear thrust washer
- 28. Pinion mate thrust washer
- 31. Lock pin

- 2. Companion flange
- 5. Drive pinion bearing adjusting wash- 6. er
- 8. Pinion rear bearing
- 11. Drive gear
- 14. O-ring
- 17. Differential case
- 20. Filler plug
- 23. Carrier cover
- 26. Side gear
- 29. Pinion mate gear
- 32. Side bearing adjusting washer

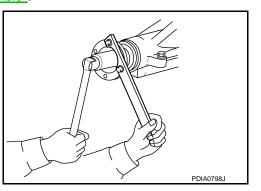
- 3. Front oil seal
 - Drive pinion adjusting washer
- 9. Pinion height adjusting washer
- 12. Side oil seal (right side)
- 15. Side bearing adjusting shim
- 18. Breather connector
- 21. Drain plug
- 24. Gear oil defense
- 27. Circular clip
- 30. Pinion mate shaft
- 33. Side oil seal (left side)

[FRONT FINAL DRIVE: F160A]

< UNIT DISASSEMBLY AND ASS	EMBLY >	[FRONT FINAL DRIVE: F160A]	
34. Side shaft bearing	35. Extension tube retainer	36. Side shaft oil seal	
37. Dust seal	38. Side shaft		А
A: Oil seal lip	B: Screw hole		
Apply gear oil.			В
▲ Apply anti-corrosion oil.			
Apply Genuine Silicone RTV or	equivalent. Refer to <u>GI-18, "Recomme</u>	ended Chemical Products and Sealants".	С
Apply Genuine Medium Strength ucts and Sealants".	n Thread Locking Sealant or equivalent	t. Refer to GI-18, "Recommended Chemical Prod-	
Refer to GI-4, "Components" for symbols	not described above.		DLN

Disassembly

- 1. Remove differential case assembly. Refer to <u>DLN-113, "Disassembly"</u>.
- 2. Remove drive pinion lock nut with a flange wrench.



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

CAUTION:

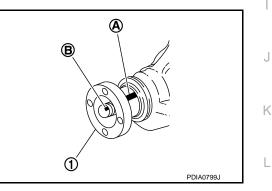
For matching mark, use paint. Never damage companion flange and drive pinion.

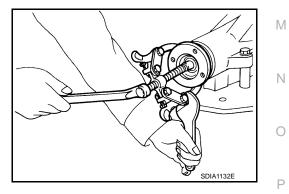
NOTE:

The matching mark (A) on the final drive companion flange (1) indicates the maximum vertical runout position. When replacing companion flange, matching mark is not neces-

sary.

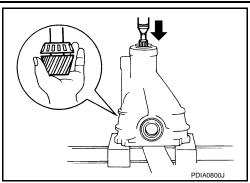
4. Remove companion flange using the suitable puller.





< UNIT DISASSEMBLY AND ASSEMBLY >

- Press drive pinion assembly out of gear carrier.
 CAUTION: Never drop drive pinion assembly.
- 6. Remove front oil seal.
- 7. Remove pinion front bearing inner race.
- 8. Remove drive pinion bearing adjusting washer and drive pinion adjusting washer.

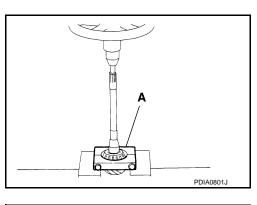


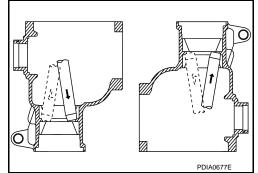
[FRONT FINAL DRIVE: F160A]

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

 Tap pinion front/rear bearing outer races uniformly a brass rod or equivalent to removed. CAUTION:

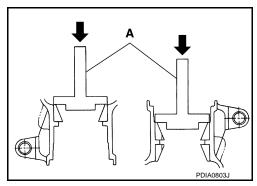
Never damage gear carrier.





Assembly

- Install pinion front and rear bearing outer races using drift (A) [SST: ST37820000 (—)].
 CAUTION:
 - At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.
 - Never reuse pinion front and rear bearing outer race.



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< UNIT DISASSEMBLY AND ASSEMBLY >

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

- When hypoid gear set has been replaced
- Select pinion height adjusting washer. Refer to <u>DLN-130</u>, "Adjustment".

When hypoid gear set has been reused

- Temporarily install the removed pinion height adjusting washer or same thickness washer to drive pinion.
- 3. Install selected pinion height adjusting washer (2) to drive pinion. Press pinion rear bearing inner race (1) to it, using drift (A) [SST: ST30032000 (J-26010-01)]. **CAUTION:**
 - Pay attention to the direction of pinion height adjusting washer. (Assemble as shown in the figure.)
 - Never reuse pinion rear bearing inner race.
- Temporarily assemble removed drive pinion adjusting washer 4 and drive pinion bearing adjusting washer or same thickness of them to drive pinion.
- 5. Apply gear oil to pinion rear bearing, and assemble drive pinion into gear carrier.
- 6. Apply gear oil to pinion front bearing, and assemble pinion front bearing inner race to drive pinion assembly. CAUTION:

Never reuse pinion front bearing inner race.

- 7. Using suitable spacer (A), press the pinion front bearing inner race to drive pinion as far as drive pinion nut can be tightened.
- 8. Adjust pinion bearing preload. If necessary, select the appropriate drive pinion adjusting washer and drive pinion bearing adjusting washer. Refer to DLN-130, "Adjustment".
- Using the drifts, install front oil seal as shown in figure. 9.

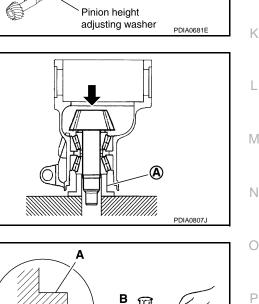
A: Drift [SST: ST33400001 (J-26082)]

B: Drift [SST: KV38102510 ()]

CAUTION:

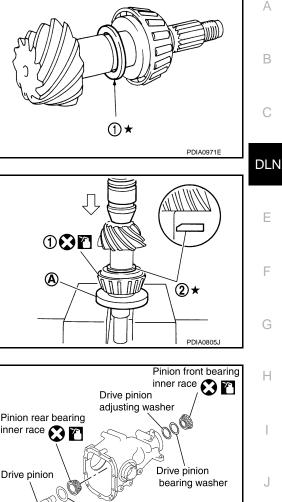
- Never reuse oil seal.
- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.

DLN-129



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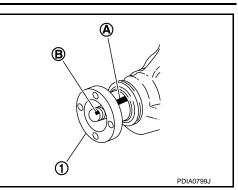


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< UNIT DISASSEMBLY AND ASSEMBLY >

10. Install companion flange (1). **NOTE:**

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



11. Apply anti-corrosion oil to the thread and seat of new drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion.

CAUTION:

Never reuse drive pinion lock nut.

12. Tighten to drive pinion lock nut, while adjusting pinion bearing preload torque.

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

Standard

Pinion bearing preload

: Refer to <u>DLN-134, "Pre-</u>load Torque".

CAUTION:

- Adjust to the lower limit of the drive pinion lock nut tightening torque first.
- After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.
- Install differential case assembly. Refer to <u>DLN-116, "Assembly"</u>. CAUTION:

Never install carrier cover yet.

- 14. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and companion flange runout. Refer to <u>DLN-120</u>, "Adjustment" and <u>DLN-130</u>, "Adjustment". Recheck above items. Readjust the above description, if necessary.
- 15. Check total preload torque. Refer to DLN-120, "Adjustment".
- 16. Install carrier cover. Refer to DLN-116, "Assembly".

Adjustment

PINION GEAR HEIGHT

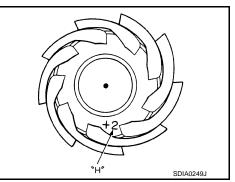
If the hypoid gear set has been replaced, select the pinion height adjusting washer.

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

Washer selection equation:

T = T0 + (t1 - t2)

- T: Correct washer thickness
- To: Removed washer thickness
- t1: Old drive pinion head letter "H \times 0.01" ("H": machined tolerance 1/100 mm \times 100)
- t2: New drive pinion head letter " $H \times 0.01$ " ("H": machined tolerance 1/100 mm \times 100)



INFOID:000000005171238

PDIA0802

А Example: $T = 3.21 + [(2 \times 0.01) - (-1 \times 0.01)] = 3.24$ 3.21 To: В +2 t1: -1 t2: 2. Select the proper pinion height adjusting washer. If unable to find a washer of desired thickness, use a washer with thickness closest to the calculated value. DLN **Example:** Calculated value... T = 3.22 mm Е Used washer... T = 3.21 mm PINION BEARING PRELOAD Assemble the drive pinion parts if they are disassembled. Refer to <u>DLN-128, "Assembly"</u>. F Make sure all parts are clean. Also, make sure the bearings are well lubricated with gear oil. 1. 2. Install companion flange (1). NOTE: When reusing drive pinion, align the matching mark (B) of drive B pinion with the matching mark (A) of companion flange, and then install companion flange (1). Н በ PDIA0799J Temporarily tighten removed drive pinion lock nut to drive pinion. 3. NOTE: Use removed drive pinion lock nut only for the preload measure-Κ ment. 4. Rotate drive pinion at least 20 times to check for smooth operation of the bearing. L Tighten to drive pinion lock nut, while adjust pinion bearing pre-5. load torque. Μ A: Preload gauge [SST: ST3127S000 (J-25765-A)] Standard Ν **Pinion bearing preload** : Refer to DLN-134, "Preload Torque". CAUTION: · Adjust to the lower limit of the drive pinion lock nut tightening torgue first. After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions. 6. If the pinion bearing preload torque is outside the specification, PDIA0802J use a thicker/thinner drive pinion bearing adjusting washer and drive pinion adjusting washer to adjust.

When the preload torque is large:

Decrease the drive pinion bearing adjusting washer and drive pinion adjusting washer thickness.For select parts refer to parts information.

When the preload is small:

Increase the drive pinion bearing adjusting washer and drive pinion adjusting washer thickness.For select parts refer to parts information.

7. Remove companion flange, after adjustment.

COMPANION FLANGE RUNOUT

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

Limit

Companion flange runout

: Refer to <u>DLN-134, "Com-</u> panion 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 <u>DLN-134, "Com-</u> panion Flange Runout".

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

Inspection After Disassembly

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

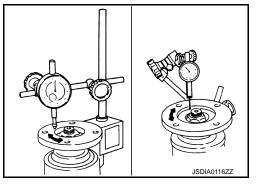
- Clean up the disassembled parts.
- If it is chipped (by friction), damaged, or unusually worn, replace.

OIL SEAL

• Whenever disassembled, replace.

DLN-132

INFOID:000000005171239



[FRONT FINAL DRIVE: F160A]

< UNIT DISASSEMBLY AND ASSEMBLY > [FRONT FINA	AL DRIVE: F160A]	
• If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips	, replace them.	
DIFFERENTIAL CASEClean up the disassembled parts.If any wear or crack on the contact sides of the differential case is found, replace.	A	1
 COMPANION FLANGE Clean up the disassembled parts. 	В	3
 If any chipped mark [about 0.1 mm, (0.004 in)] or other damage on the contact sides of panion flange is found, replace. 	the lips of the com-)
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General Specifications

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[FRONT FINAL DRIVE: F160A]

	AWD
Applied model	VQ35HR
	A/T
Final drive model	F160A
Gear ratio	3.133
Number of teeth (Drive gear/Drive pinion)	47/15
Oil capacity (Approx.) ℓ (US pt, Imp pt)	0.65 (1-3/8, 1-1/8)
Number of pinion gears	2
Drive pinion adjustment spacer type	Solid

Drive Gear Runout

INFOID:000000005171241

	Unit: mm (in)
Item	Limit
Drive gear back face runout	0.05 (0.0020)

Differential Side Gear Clearance

INFOID:000000005171242

	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:000000005171243

Unit: N·m (kg-m, in-lb)

Item	Standard
Pinion bearing (P1)	0.78 – 1.57 (0.08 – 0.16, 7 – 13)
Side bearing (P2)	0.78 - 1.08 (0.08 - 0.11, 7 - 9)
Side bearing to pinion bearing (Total preload) (Total preload = P1 + P2)	1.56 – 2.65 (0.16 – 0.27, 14 – 23)

Backlash

INFOID:000000005171244

Unit: mm (in)

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

Companion Flange Runout

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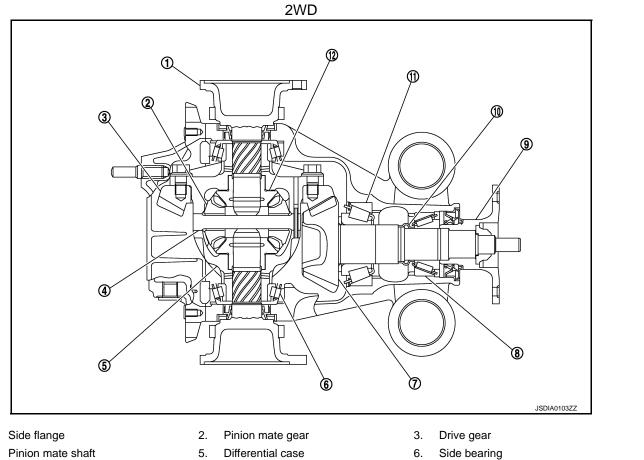
Unit: mm (in)

Item	Limit
Companion flange face runout	0.18 (0.0071)
Inner side of the companion flange runout	0.13 (0.0051)

SYSTEM DESCRIPTION REAR FINAL DRIVE ASSEMBLY

System Diagram

CROSS-SECTIONAL VIEW



- 1.
- 4.
- 7. Drive pinion
- 10. Collapsible spacer
- 5.
- 8. Pinion front bearing
- 11. Pinion rear bearing
- 9. Companion flange
- 12. Side gear

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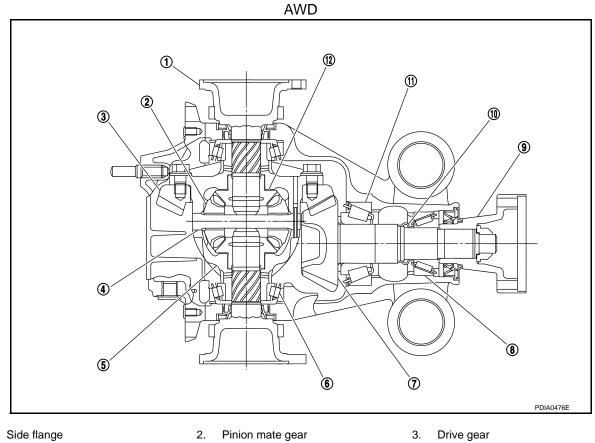
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REAR FINAL DRIVE ASSEMBLY

< SYSTEM DESCRIPTION >



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

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING [REAR FINAL DRIVE: R200] < SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:000000005171247 В

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2WD

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

Reference		sembly		sembly					ons.						
Reference		75, "2WD : Inspection After Disassembly"	71, "2WD : Adjustment"	75. "2WD : Inspection After Disassembly"	71, "2WD : Adjustment"	71, "2WD : Adjustment"	DLN-144, "Inspection"	NVH in DLN section.	NVH in FAX, RAX, FSU and RSU sections.	n WT section.	n WT section.	NVH in RAX section.	n BR section.	NVH in ST section.	DL F G
		DLN-175.	DLN-171.	DLN-175,	DLN-171	DLN-171.	DLN-1	NVH i	NVH ii	NVH in WT	NVH in WT	NVH i	NVH in BR	NVH ii	
Possible cause and SUSPECTE	-	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	H I K
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

< SYMPTOM DIAGNOSIS >

[REAR FINAL DRIVE: R200] Use the chart below to find the cause of the symptom. If necessary, repair or replace these parts. DLN-188, "AWD : Inspection After Disassembly" "AWD : Inspection After Disassembly NVH in FAX, RAX, FSU and RSU sections. "AWD : Adjustment" "AWD : Adjustment' DLN-184, "AWD : Adjustment" NVH in FAX and RAX section Reference DLN-144, "Inspection" NVH in DLN section. NVH in WT section. NVH in WT section. NVH in BR section. NVH in ST section. DLN-184, DLN-184, DLN-188. Companion flange excessive runout AXLE AND SUSPENSION Gear contact improper **PROPELLER SHAFT** Tooth surfaces worn Possible cause and SUSPECTED PARTS Backlash incorrect Gear oil improper Gear tooth rough DRIVE SHAFT ROAD WHEEL STEERING BRAKE TIRE Symptom Noise × × × × × × × × × × × × × ×: Applicable

PRECAUTIONS

< PRECAUTION > PRECAUTION PRECAUTIONS

Service Notice or Precautions for Rear Final Drive

- 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 **DLN** with new ones, if necessary.
- Gaskets, seals and O-rings should be replaced any time when the unit is disassembled.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.
- Clean and flush the parts sufficiently and blow-dry them.
- Be careful not to damage sliding surfaces and mating surfaces.
- When applying sealant, remove the old sealant from the mounting surface; then remove any moisture, oil, and foreign materials from the application and mounting surfaces.
- Always use shop paper for cleaning the inside of components.
- Never use cotton gloves or shop rags to prevent entering of lint.
- During assembly, observe the specified tightening torque, and apply new gear oil, petroleum jelly, or multipurpose grease as specified for each vehicle, if necessary.
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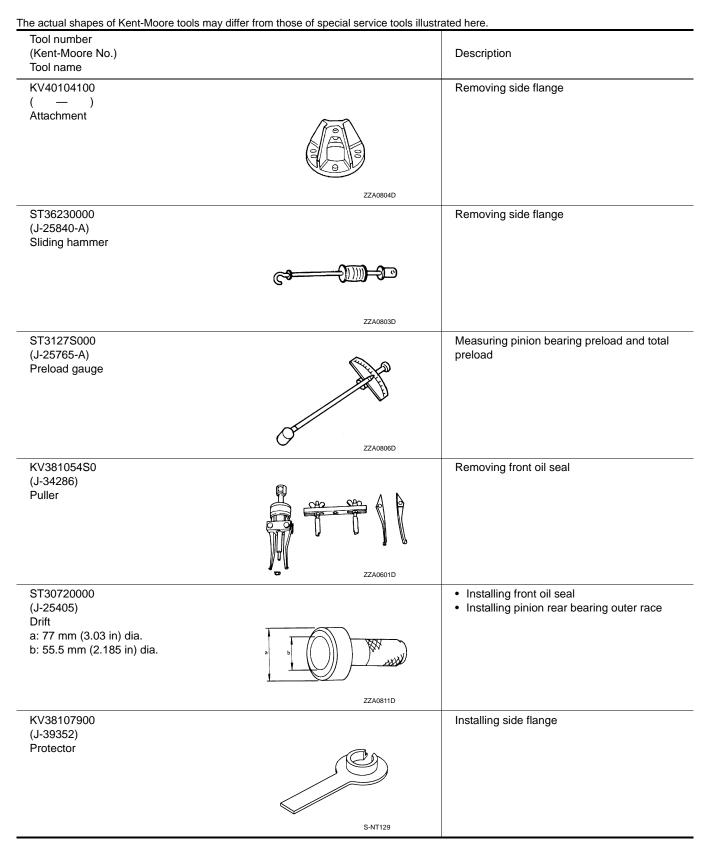
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PREPARATION

Special Service Tools

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PREPARATION

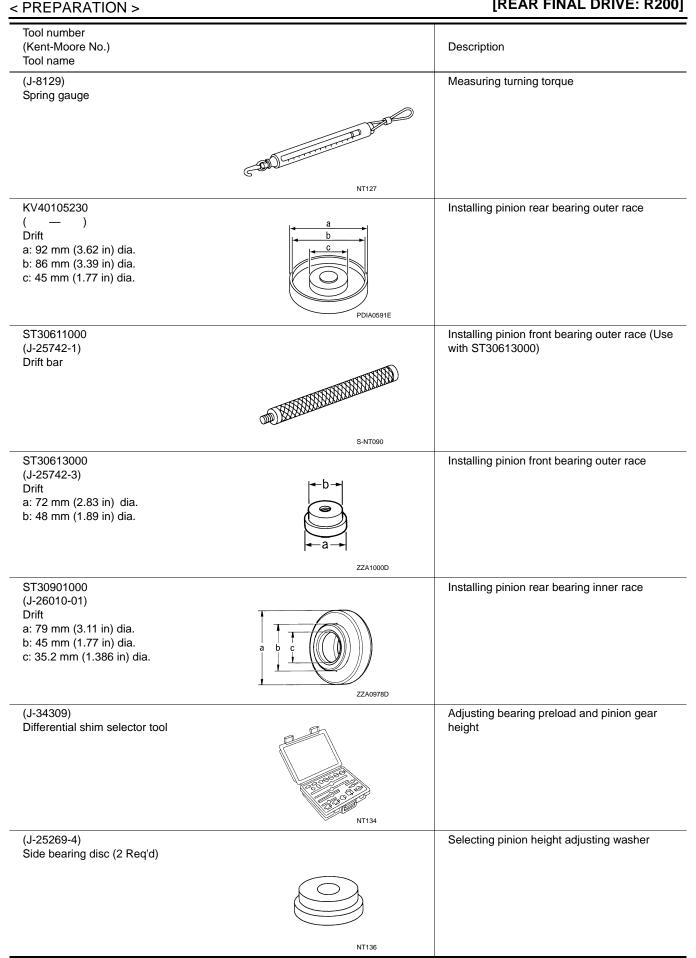
< PREPARATION >

[REAR FINAL DRIVE: R200]

Tool number (Kent-Moore No.) Tool name		Description	A
KV38100200 (J-26233) Drift a: 65 mm (2.56 in) dia.		Installing side oil seal	В
b: 49 mm (1.93 in) dia.			С
KV10111100 (J-37228) Seal cutter	ZZA1143D	Removing rear cover	DLN
			E
KV38100800	S-NT046	Fixing unit assembly	F
(J-25604-01) Attachment A: 541 mm (21.30 in) B: 200 mm (7.87 in)	A		G
	B		Н
ST3306S001 (J-22888-D) Differential side bearing puller set 1: ST33051001		Removing and installing side bearing inner race	
(J-22888-20) Puller 2: ST33061000 (J-8107-2)			J
Base a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia.	1 NT072		K
KV10112100 (BT-8653-A) Angle wrench	And the second sec	Tightening the drive gear mounting bolt	L
			Μ
KV38100300	ZZA0120D	Installing side bearing inner race	N
(J-25523) Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia.			0
	ZZA1046D		Ρ

PREPARATION

[REAR FINAL DRIVE: R200]



< PREPARATION >

[REAR FINAL DRIVE: R200]

Commercial Service Tools

INFOID:000000005171250

А

Tool name		Description	
Flange wrench		Removing and installing drive pinion lock nut	
	0		
	NT035		
Replacer		Removing pinion rear bearing inner race	
	ZZA0700D		
Spacer a: 60 mm (2.36 in) dia. b: 36 mm (1.42 in) dia. c: 30 mm (1.18 in)	b	Installing pinion front bearing inner race	
c. 30 mm (1.18 m)			
	ZZA1133D		
Power tool		Loosening bolts and nuts	
	PBIC0190E		

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< PERIODIC MAINTENANCE >

PERIODIC MAINTENANCE REAR DIFFERENTIAL GEAR OIL

Inspection

OIL LEAKAGE

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

OIL LEVEL

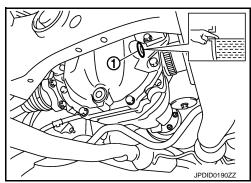
• Remove filler plug (1) and check oil level from filler plug mounting hole as shown in the figure.

CAUTION:

Never start engine while checking oil level.

 Set a gasket on filler plug (1) and install it on final drive assembly. Refer to <u>DLN-163</u>, "<u>2WD</u> : <u>Exploded View</u>" (2WD), <u>DLN-176</u>, "<u>AWD</u> : <u>Exploded View</u>" (AWD).
 CAUTION:

Never reuse gasket.



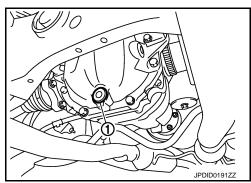
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Draining

- 1. Stop engine.
- 2. Remove drain plug (1) and drain gear oil.
- Set a gasket on drain plug (1) and install it to final drive assembly and tighten to the specified torque. Refer to <u>DLN-163, "2WD</u>: <u>Exploded View"</u> (2WD), <u>DLN-176, "AWD : Exploded View"</u> (AWD).
 CAUTION: Never reuse gasket.



Refilling

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

Oil grade and viscosity

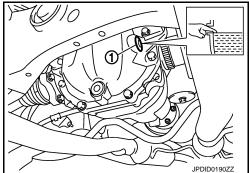
: Refer to MA-10, "Fluids and Lubricants".

: Refer to <u>DLN-208, "Gen-</u> eral Specification".

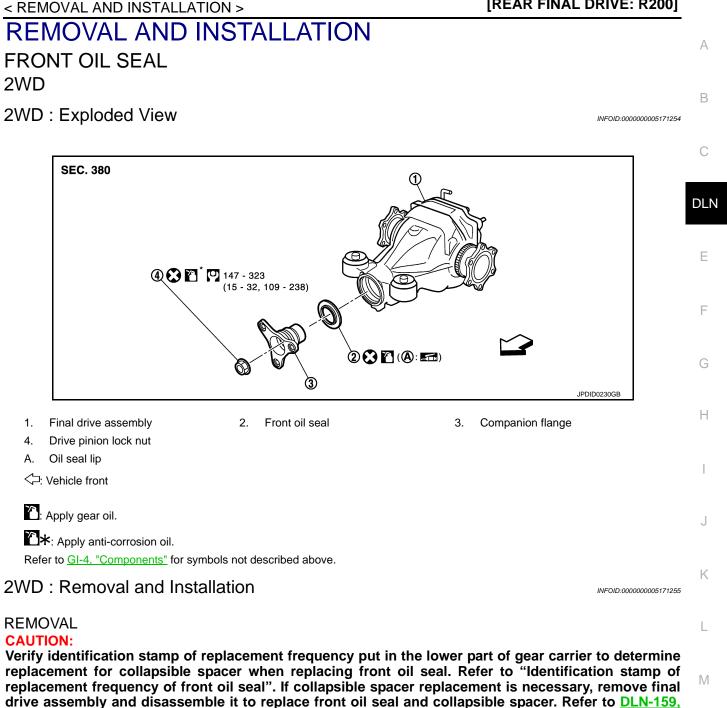
 After refilling oil, check oil level. Set a gasket to filler plug (1), then install it to final drive assembly. Refer to <u>DLN-163, "2WD :</u> <u>Exploded View"</u> (2WD), <u>DLN-176, "AWD : Exploded View"</u> (AWD). CAUTION:

Never reuse gasket.

Oil capacity







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

Identification stamp of replacement frequency of front oil seal

"2WD : Removal and Installation" and DLN-164, "2WD : Disassembly".

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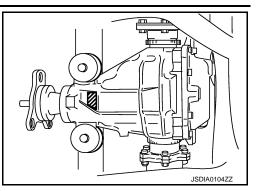
FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

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

When collapsible spacer replacement is required, disassemble final drive assembly to replace collapsible spacer and front oil seal. Refer to <u>DLN-164</u>, "2WD : Disassembly".

Stamp	collapsible spacer replacement		
No stamp	Not required		
"0" or "0" on the far right of stamp	Required		
"01" or "1" on the far right of stamp	Not required		



[REAR FINAL DRIVE: R200]

CAUTION:

Make a stamping after replacing front oil seal.

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

CAUTION:

Make a stamping from left to right.

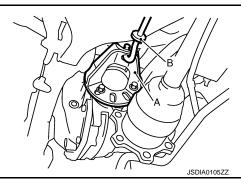
Stamp before stamping	Stamping on the far right	Stamping 0	
No stamp	0		
"0" (Front oil seal was replaced once.)	1	01	
"01" (Collapsible spacer and front oil seal were replaced last time.)	0	010	
"0" is on the far right. (Only front oil seal was replaced last time.)	1	01	
"1" is on the far right. (Collapsible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

1. Drain gear oil. Refer to DLN-144, "Draining".

- 2. Make a judgment if a collapsible spacer replacement is required.
- 3. Remove center muffler with a power tool. Refer to EX-5, "Exploded View".
- 4. Remove rear wheel sensor. Refer to <u>BRC-107, "REAR WHEEL SENSOR : Exploded View"</u>.
- 5. Remove drive shaft from final drive. Then suspend it by wire, etc. Refer to RAX-10, "Exploded View".
- Install attachment (A) [SST: KV40104100 ()] to side flange, and then pull out the side flange with the sliding hammer (B) [SST: ST36230000 (J-25840-A)].
 NOTE:

Circular clip installation position: Final drive side

7. Remove rear propeller shaft. Refer to DLN-83, "Exploded View".



on companion flange (1).

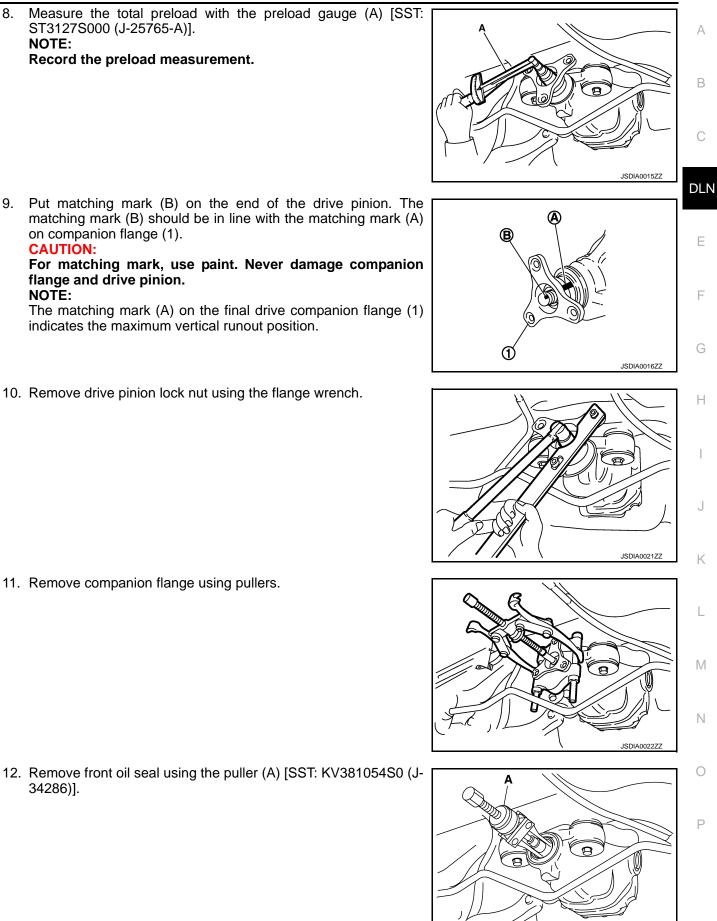
flange and drive pinion.

CAUTION:

NOTE:

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

Record the preload measurement.



11. Remove companion flange using pullers.

indicates the maximum vertical runout position.

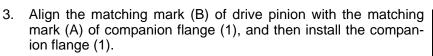
10. Remove drive pinion lock nut using the flange wrench.

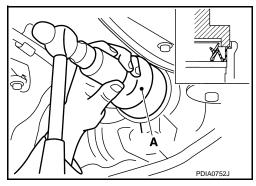
12. Remove front oil seal using the puller (A) [SST: KV381054S0 (J-34286)].

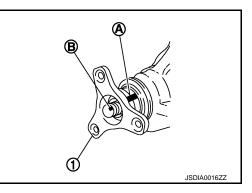
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INSTALLATION

- 1. Apply multi-purpose grease to front oil seal lips.
- Install front oil seal using the drift (A) [SST: ST30720000 (J-25405)] as shown in figure. CAUTION:
 - Never reuse oil seal.
 - Never incline oil seal when installing.







4. Apply anti-corrosion oil to the thread and seat of new drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion.

CAUTION:

Never reuse drive pinion lock nut.

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

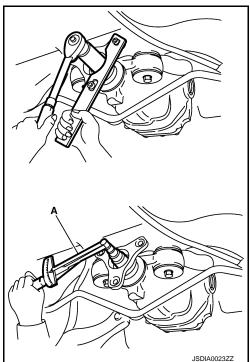
Standard

Total preload torque

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

CAUTION:

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



- 6. Set a dial indicator (A) vertically to the tip of the drive pinion.
- 7. Rotate drive pinion to check for runout.

Limit Drive pinion runout

: Refer to <u>DLN-208, "Drive</u> <u>Pinion Runout (2WD)"</u>.

- If the runout value is still outside of the limit after the phase has been changed, possible causes are an assembly malfunction of drive pinion and pinion bearing and malfunction of pinion bearing. Check for these items and repair if necessary.
- Make a stamping for identification of front oil seal replacement frequency. Refer to "Identification stamp of replacement frequency of front oil seal". CAUTION:

Make a stamping after replacing front oil seal.

- 9. Install rear propeller shaft. Refer to <u>DLN-83, "Exploded View"</u>.
- 10. Install side flange with the following procedure.
- a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
- b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.
- c. Put a suitable drift on the center of side flange, then drive it until sound changes.

NOTE:

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

: 326 – 328 mm (12.83 – 12.91 in)

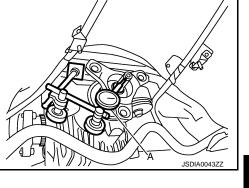
d. Confirm that the dimension of the side flange (1) installation measurement (A) in the figure comes into the following.

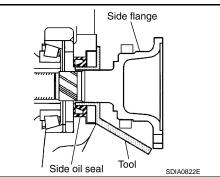
Standard

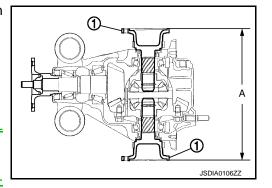
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- 11. Install drive shaft. Refer to RAX-10, "Exploded View".
- 12. Install rear wheel sensor. Refer to <u>BRC-107</u>, "REAR WHEEL <u>SENSOR : Exploded View"</u>.
- 13. Install center muffler. Refer to EX-5, "Exploded View".
- Refill gear oil to the final drive and check oil level. Refer to <u>DLN-144, "Refilling"</u>.
- 15. Check the final drive for oil leakage. Refer to DLN-144, "Inspection".

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[REAR FINAL DRIVE: R200]

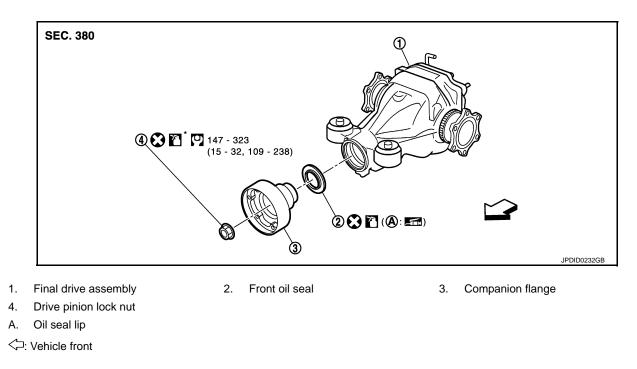
FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

AWD : Exploded View

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[REAR FINAL DRIVE: R200]



: Apply gear oil.

Apply anti-corrosion oil.

Refer to <u>GI-4, "Components"</u> for symbols not described above.

AWD : Removal and Installation

INFOID:000000005171257

REMOVAL

CAUTION:

Verify identification stamp of replacement frequency put in the lower part of gear carrier to determine replacement for collapsible spacer when replacing front oil seal. Refer to "Identification stamp of replacement frequency of front oil seal". If collapsible spacer replacement is necessary, remove final drive assembly and disassemble it to replace front oil seal and collapsible spacer. Refer to <u>DLN-161</u>, <u>"AWD : Removal and Installation"</u> and <u>DLN-177, "AWD : Disassembly"</u>.

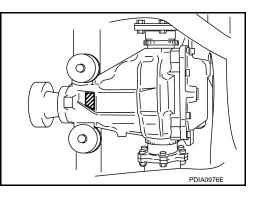
NOTE:

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

Identification stamp of replacement frequency of front oil seal

- The diagonally shaded area in the figure shows stamping point for replacement frequency of front oil seal.
- The following table shows if collapsible spacer replacement is needed before replacing front oil seal.
 When collapsible spacer replacement is required, disassemble final drive assembly to replace collapsible spacer and front oil seal.
 Refer to DLN-177, "AWD : Disassembly".

Stamp	collapsible spacer replacement		
No stamp	Not required		
"0" or "0" on the far right of stamp	Required		
"01" or "1" on the far right of stamp	Not required		



CAUTION:

Make a stamping after replacing front oil seal.

FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

- [REAR FINAL DRIVE: R200]
- After replacing front oil seal, make a stamping on the stamping point in accordance with the table below in order to identify replacement frequency.
 CAUTION:

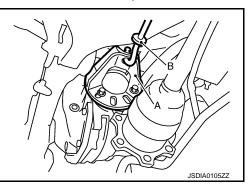
Make a stamping from left to right.

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

- 1. Drain gear oil. Refer to <u>DLN-144, "Draining"</u>.
- 2. Make a judgment if a collapsible spacer replacement is required.
- 3. Remove center muffler with a power tool. Refer to EX-5. "Exploded View".
- 4. Remove rear wheel sensor. Refer to <u>BRC-107, "REAR WHEEL SENSOR : Exploded View"</u>.
- 5. Remove drive shaft from final drive. Then suspend it by wire, etc. Refer to RAX-10, "Exploded View".
- Install attachment (A) [SST: KV40104100 ()] to side flange, and then pull out the side flange with the sliding hammer (B) [SST: ST36230000 (J-25840-A)].
 NOTE:

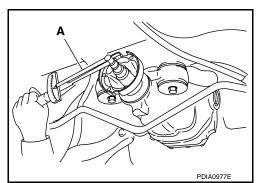
Circular clip installation position: Final drive side

7. Remove rear propeller shaft. Refer to <u>DLN-91, "Exploded View"</u>.



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

Record the preload measurement.

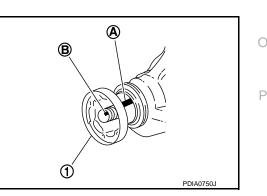


9. Put matching mark (B) on the end of the drive pinion. The matching mark should be in line with the matching mark (A) on companion flange (1).

CAUTION:

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

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



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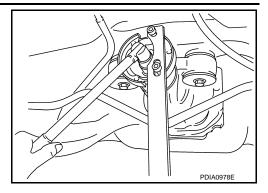
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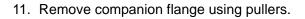
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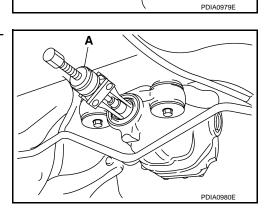
10. Remove drive pinion lock nut using the flange wrench.

[REAR FINAL DRIVE: R200]



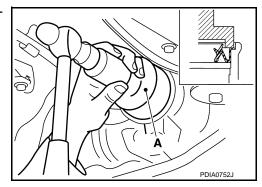


12. Remove front oil seal using the puller (A) [SST: KV381054S0 (J-34286)].



INSTALLATION

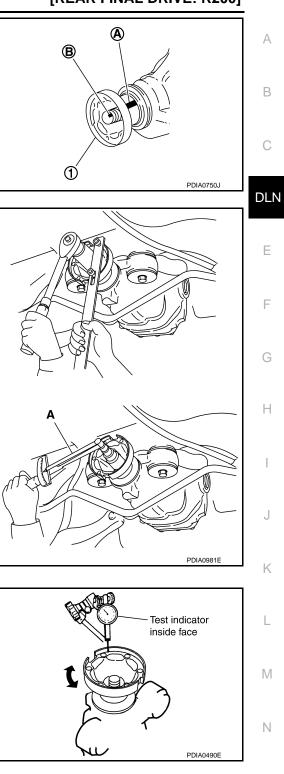
- 1. Apply multi-purpose grease to front oil seal lips.
- Install front oil seal using the drift (A) [SST: ST30720000 (J-25405)] as shown in figure.
 - CAUTION:
 - Never reuse oil seal.
 - Never incline oil seal when installing.



FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

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



4. Apply anti-corrosion oil to the thread and seat of new drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion.

CAUTION:

Never reuse drive pinion lock nut.

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

Standard

Total preload torque

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

CAUTION:

- Adjust to the lower limit of the drive pinion lock nut tightening torque first.
- If the preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Never loosen drive pinion lock nut to adjust the preload torque.
- 6. Fit a test indicator to the inner side of companion flange (socket diameter).
- 7. Rotate companion flange to check for runout.

Limit

Companion flange runout

: Refer to <u>DLN-209, "Com-</u> panion Flange Runout (AWD)".

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

Make a stamping after replacing front oil seal.

9. Install rear propeller shaft. Refer to <u>DLN-91, "Exploded View"</u>.

Ρ

FRONT OIL SEAL

< REMOVAL AND INSTALLATION >

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

NOTE:

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

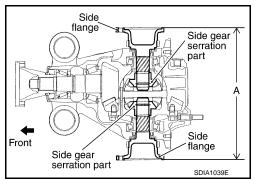
d. Confirm that the dimension of the side flange installation measurement (A) in the figure comes into the following.

Standard

: 326 – 328 mm (12.83 – 12.91 in)

- 11. Install drive shaft. Refer to RAX-10, "Exploded View".
- 12. Install rear wheel sensor. Refer to <u>BRC-107</u>, "<u>REAR WHEEL</u> <u>SENSOR : Exploded View</u>".
- 13. Install center muffler. Refer to EX-5, "Exploded View".
- 14. Refill gear oil to the final drive and check oil level. Refer to <u>DLN-144, "Refilling"</u>.
- 15. Check the final drive for oil leakage. Refer to <u>DLN-144, "Inspection"</u>.

Side flange



[REAR FINAL DRIVE: R200]

[REAR FINAL DRIVE: R200] < REMOVAL AND INSTALLATION > SIDE OIL SEAL 2WD 2WD : Exploded View INFOID:000000005171258 SEC. 380 2 🔀 🎦 (A: 🚮) 2 🕄 🎦 (A): 🚮) 3 JPDID0233ZZ 1. Final drive assembly 2. Side oil seal 3. Side flange Oil seal lip Α. C: Vehicle front : Apply gear oil. Refer to GI-4, "Components" for symbols not described above. 2WD : Removal and Installation INFOID:000000005171259 REMOVAL Remove center muffler with a power tool. Refer to EX-5, "Exploded View". 1. Remove rear wheel sensor. Refer to <u>BRC-107, "REAR WHEEL SENSOR : Exploded View"</u>. 3. Remove drive shaft from final drive with a power tool. Then suspend it by wire, etc. Refer to RAX-10, "Exploded View". 4. Install attachment (A) [SST: KV40104100 (---)] to side flange, and then pull out the side flange with the sliding hammer (B) [SST: ST36230000 (J-25840-A)]. NOTE: Circular clip installation position: Final drive side JSDIA0105ZZ

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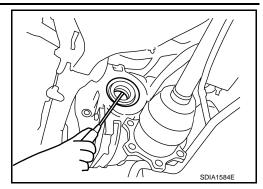
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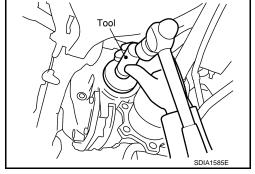
Ρ

 Remove side oil seal, using a suitable tool.
 CAUTION: Never damage gear carrier.

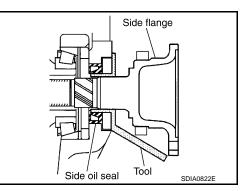


INSTALLATION

- 1. Apply multi-purpose grease to side oil seal lips.
- Install side oil seal until it becomes flush with the case end, using the drift [SST: KV38100200 (J-26233)].
 CAUTION:
 - Never reuse oil seal.
 - When installing, never incline oil seal.



- 3. Install side flange with the following procedure.
- a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
- b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.



c. Put a suitable drift on the center of side flange, then drive it until sound changes. **NOTE:**

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

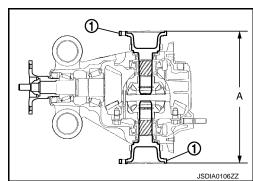
d. Confirm that the dimension of the side flange (1) installation measurement (A) in the figure comes into the following.

Standard

A : 326 – 328 mm (12.83 – 12.91 in)

- 4. Install drive shaft. Refer to RAX-10, "Exploded View".
- Install rear wheel sensor. Refer to <u>BRC-107. "REAR WHEEL</u> <u>SENSOR : Exploded View"</u>.
- 6. Install center muffler. Refer to EX-5, "Exploded View".
- When oil leaks while removing, check oil level after the installation. Refer to <u>DLN-144</u>, "Inspection".

AWD



SIDE OIL SEAL

< REMOVAL AND INSTALLATION >

AWD : Exploded View

INFOID:000000005171260 А **SEC. 380** В 2 😧 🎦 (A: 🚮) ന 2 🔀 🎦 (A: 🖬) 3 DLN Е JPDID0235ZZ F Final drive assembly 2. Side oil seal Side flange 1. 3. Oil seal lip Α. C: Vehicle front : Apply gear oil. Н Refer to GI-4, "Components" for symbols not described above. AWD : Removal and Installation INFOID:000000005171261 REMOVAL 1. Remove center muffler with a power tool. Refer to EX-5, "Exploded View". 2. Remove rear wheel sensor. Refer to <u>BRC-107, "REAR WHEEL SENSOR : Exploded View"</u>. 3. Remove drive shaft from final drive with a power tool. Then suspend it by wire, etc. Refer to RAX-10. "Exploded View". Κ 4. Install attachment (A) [SST: KV40104100 (---)] to side flange, and then pull out the side flange with the sliding hammer (B) [SST: ST36230000 (J-25840-A)]. L NOTE: Circular clip installation position: Final drive side Μ Ν JSDIA0105ZZ 5. Remove side oil seal, using a suitable tool. **CAUTION:** Never damage gear carrier. Ρ

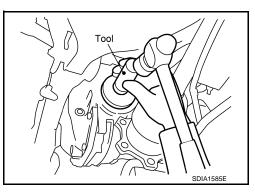
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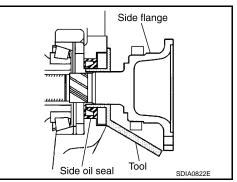
T

INSTALLATION

- 1. Apply multi-purpose grease to side oil seal lips.
- Install side oil seal until it becomes flush with the case end, using the drift [SST: KV38100200 (J-26233)].
 CAUTION:
 - Never reuse oil seal.
 - When installing, never incline oil seal.

- 3. Install side flange with the following procedure.
- a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
- b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.





c. Put a suitable drift on the center of side flange, then drive it until sound changes. **NOTE:**

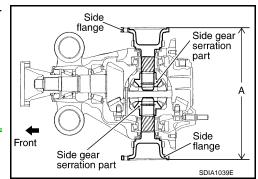
: 326 - 328 mm (12.83 - 12.91 in)

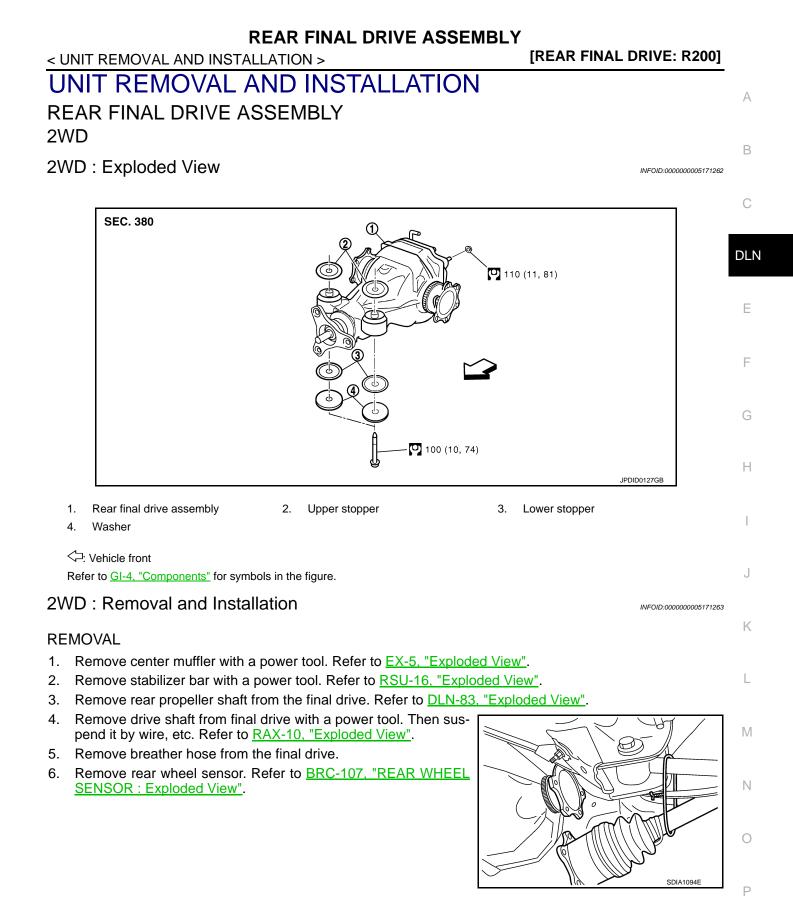
When installation is completed, driving sound of the side flange turns into a sound that seems to affect the whole final drive.

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

Standard

- Α
- 4. Install drive shaft. Refer to RAX-10, "Exploded View".
- 5. Install rear wheel sensor. Refer to <u>BRC-107</u>, "REAR WHEEL <u>SENSOR : Exploded View"</u>.
- 6. Install center muffler. Refer to EX-5, "Exploded View".
- 7. When oil leaks while removing, check oil level after the installation. Refer to <u>DLN-144</u>, "Inspection".





REAR FINAL DRIVE ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

7. Set a suitable jack to rear final drive assembly. CAUTION:

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

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

CAUTION:

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

INSTALLATION

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

CAUTION:

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

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

A:

Final drive side: 20 mm (0.79 in)Suspension member: 20.5 mm (0.807 in)side

CAUTION:

- Never reuse hose clamp.
- Install the hose clamp at the final drive side, with the tab facing downward.
- Install the hose clamp at the suspension member side, with the tab facing downward.
- If remove breather connector, install breather hose (1) as shown in the figure.
- For installation, insert the resin connector into rear suspension member (2). Install the metal connector (3) in rear cover so that a paint mark becomes forward of the vehicle as shown in the figure. Arrange the breather hose then to pass by over wheel sensor harness.

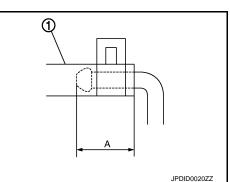
: Vehicle front

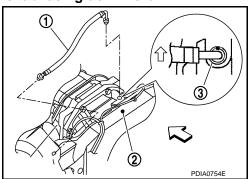
CAUTION:

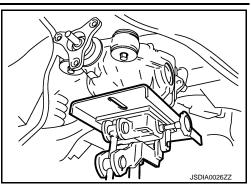
Never reuse breather connector.

 When oil leaks while removing final drive assembly, check oil level after the installation. Refer to <u>DLN-144, "Inspection"</u>.

AWD







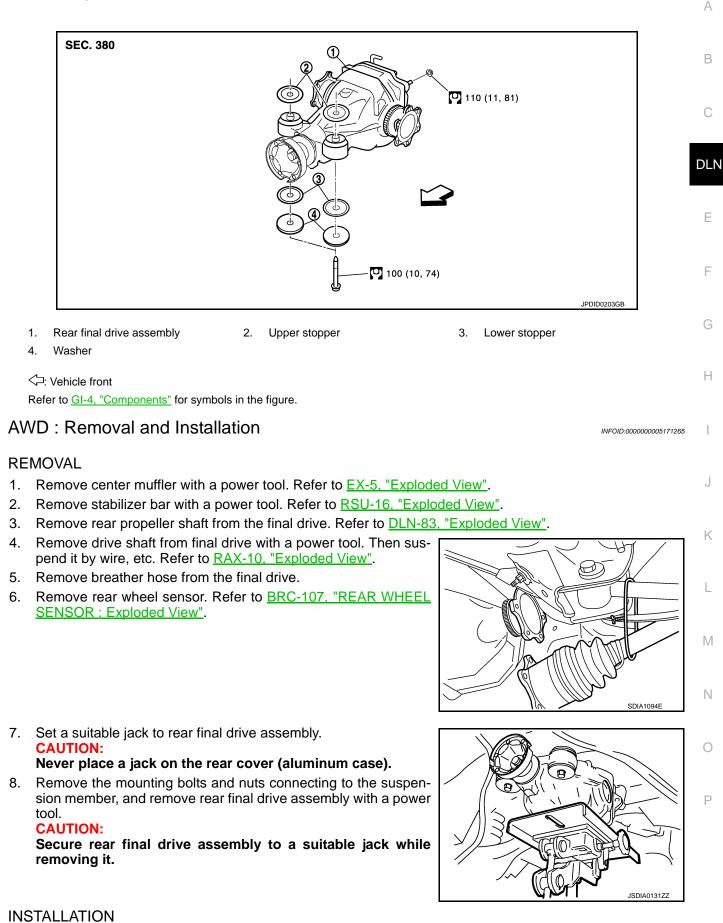
[REAR FINAL DRIVE: R200]

REAR FINAL DRIVE ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

AWD : Exploded View

INFOID:000000005171264



Revision: 2009 August

REAR FINAL DRIVE ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

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

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

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

A:

Final drive side : 20 mm (0.79 in) Suspension member : 20.5 mm (0.807 in) side

CAUTION:

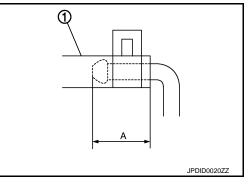
- Never reuse hose clamp.
- Install the hose clamp at the final drive side, with the tab facing downward.
- Install the hose clamp at the suspension member side, with the tab facing downward.
- If remove breather connector, install breather hose (1) as shown in the figure.
- For installation, insert the resin connector into rear suspension member (2). Install the metal connector (3) in rear cover so that a paint mark becomes forward of the vehicle as shown in the figure. Arrange the breather hose then to pass by over wheel sensor harness.

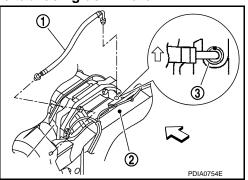
✓: Vehicle front

CAUTION:

Never reuse breather connector.

• When oil leaks while removing final drive assembly, check oil level after the installation. Refer to DLN-144, "Inspection".





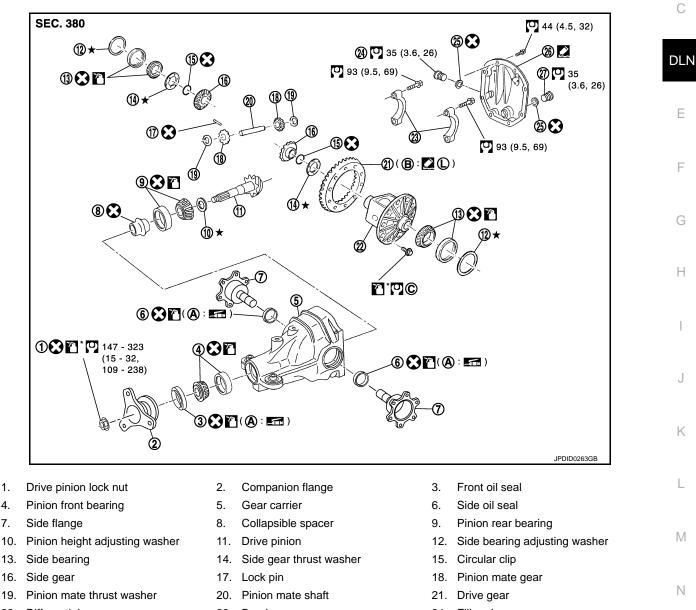
UNIT DISASSEMBLY AND ASSEMBLY DIFFERENTIAL ASSEMBLY 2WD

2WD : Exploded View

INFOID:000000005171266

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- Differential case 22.
- 25. Gasket

1.

4.

7.

Α. Oil seal lip

- 23. Bearing cap
- 26. Rear cover
 - В. Screw hole

- 24. Filler plug
- 27. Drain plug
- C. Comply with the assembly procedure when tightening. Refer to DLN-166, "2WD : Assembly".

Ρ

: Apply gear oil.

Apply anti-corrosion oil.

Section 2012 Contemporal Contemporal Products and Sealants. Refer to GI-18, "Recommended Chemical Products and Sealants".

DLN-163

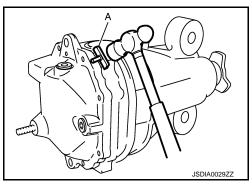
< UNIT DISASSEMBLY AND ASSEMBLY >

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

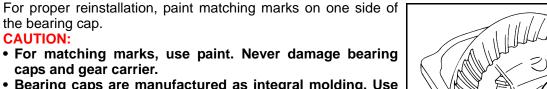
Refer to GI-4, "Components" for symbols not described above.

2WD : Disassembly

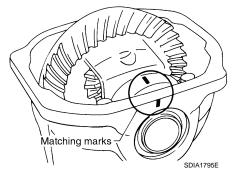
- Drain gear oil, if necessary. 1.
- 2. Remove side flange.
- 3. Remove rear cover mounting bolts.
- 4. Remove rear cover to insert the seal cutter (A) [SST: KV10111100 (J-37228)] between gear carrier and rear cover. **CAUTION:**
 - Never damage the mating surface.
 - Never insert flat-bladed screwdriver, this may damage the mating surface.



Using two 45 mm (1.77 in) spacers, mount carrier on the attach-5. ment (A) [SST: KV38100800 (J-25604-01)].



· Bearing caps are manufactured as integral molding. Use the matching marks to them in their original positions.



S-PD343

Remove bearing caps. 7.

the bearing cap. **CAUTION:**

caps and gear carrier.

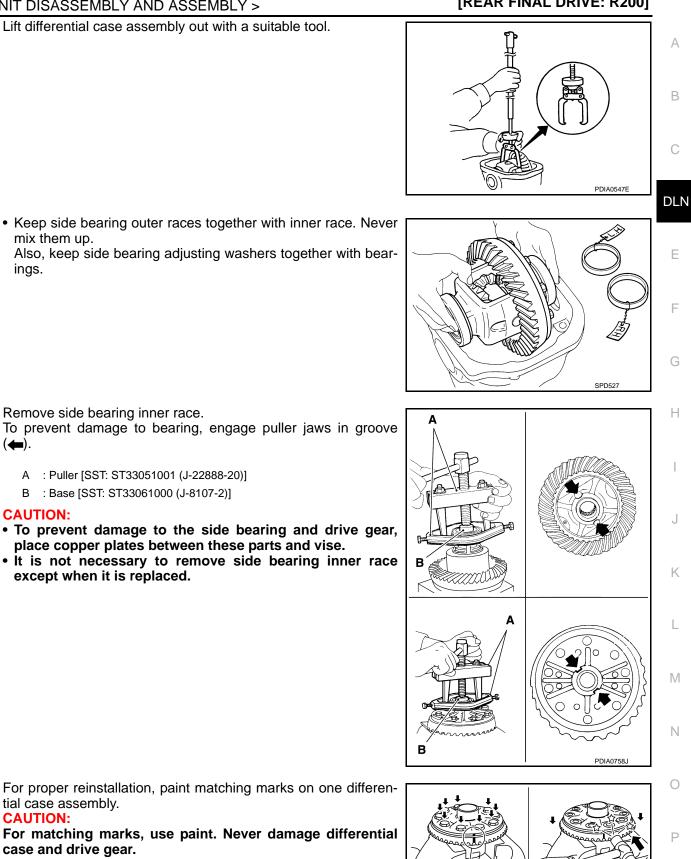
6.

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< UNIT DISASSEMBLY AND ASSEMBLY >

8. Lift differential case assembly out with a suitable tool.

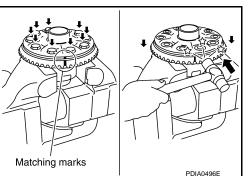


mix them up. Also, keep side bearing adjusting washers together with bearings.

- Remove side bearing inner race. 9. To prevent damage to bearing, engage puller jaws in groove (🛑).
 - A : Puller [SST: ST33051001 (J-22888-20)]
 - B : Base [SST: ST33061000 (J-8107-2)]
 - **CAUTION:**
 - To prevent damage to the side bearing and drive gear, place copper plates between these parts and vise.
 - It is not necessary to remove side bearing inner race except when it is replaced.

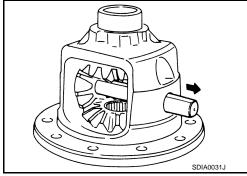
- 10. For proper reinstallation, paint matching marks on one differential case assembly. **CAUTION:** For matching marks, use paint. Never damage differential case and drive gear.
- 11. Remove drive gear mounting bolts.
- 12. Tap drive gear off differential case assembly with a soft hammer. CAUTION:

Tap evenly all around to keep drive gear from bending.



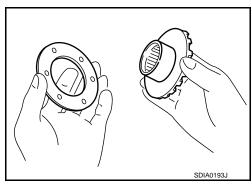
< UNIT DISASSEMBLY AND ASSEMBLY >

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



2WD : Assembly

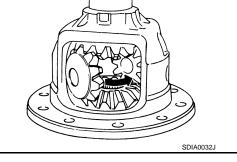
- 1. Install circular clip to side gear. **CAUTION:** Never damage side gear.
- 2. Install side gear thrust washers with the same thickness as the ones installed prior to disassembly or reinstall the old ones on the side gears.

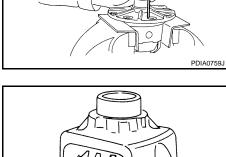


14. Remove pinion mate shaft.

- 15. Turn pinion mate gear, then remove pinion mate gear, pinion mate thrust washer, side gear and side gear thrust washer from differential case.
- 16. Remove circular clip from side gear. **CAUTION:** Never damage side gear.

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[REAR FINAL DRIVE: R200]

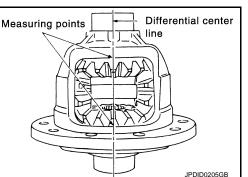
< UNIT DISASSEMBLY AND ASSEMBLY >

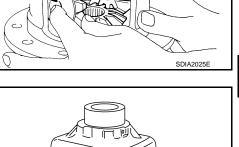
3. Install side gears and thrust washers into differential case.

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

- 4. Align 2 pinion mate gears in diagonally opposite positions, then rotate and install them into differential case after installing thrust washer to pinion mate gear.
- 5. Align the lock pin holes on differential case with shaft, and install pinion mate shaft.

- 6. Measure side gear end play. If necessary, select the appropriate side gear thrust washers.
- a. Place differential case straight up so that side gear to be measured comes upward.





[REAR FINAL DRIVE: R200]

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< UNIT DISASSEMBLY AND ASSEMBLY >

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

Standard

Side gear back clearance

: Refer to <u>DLN-208, "Differ-</u> ential Side Gear Clearance".

CAUTION:

CAUTION:

CAUTION:

Never reuse lock pin.

ally.

7.

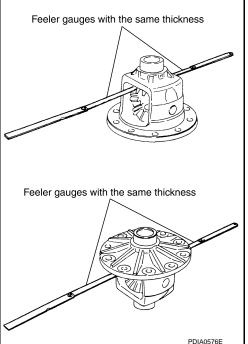
To prevent side gear from tilting, insert feeler gauges with the same thickness from both sides.

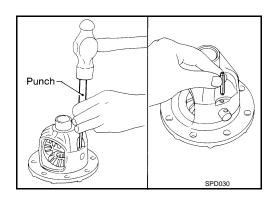
c. If the back clearance is outside the specification, use a thicker/ thinner side gear thrust washer to adjust.

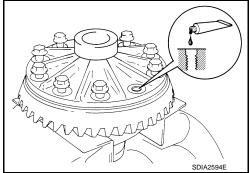
When the back clearance	Use a thicker thrust wash-
is large:	er.
When the back clearance	Use a thinner thrust wash-
is small:	er.

Select a side gear thrust washer for right and left individu-

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







 Apply thread locking sealant into the thread hole of drive gear. Use Genuine High Strength Thread Locking Sealant or equivalent. Refer to <u>GI-18</u>, "Recommended Chemical Products and <u>Sealants"</u>. CAUTION:

Clean and degrease drive gear back and threaded holes sufficiently.

Install the drive gear to differential case.
 CAUTION:
 Align the matching marks of differential case and a

Align the matching marks of differential case and drive gear.

[REAR FINAL DRIVE: R200]

< UNIT DISASSEMBLY AND ASSEMBLY >

Tighten the mounting bolts with the following procedure.
 CAUTION:
 Apply anti-corrosin oil to the thread and seat of mounting

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

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

b. Tighten the bolts additionally to the specified angle.

Drive gear mounting : 31 to 36 degree bolts tightening angle

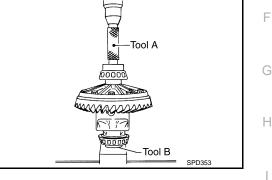
CAUTION:

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

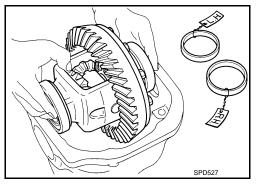
Press side bearing inner races to differential case, using the drift

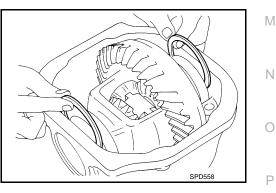
 (A) [SST: KV38100300 (J-25523)] and the base (B) [SST: ST33061000 (J-8107-2)].
 CAUTION:

Never reuse side bearing inner race.



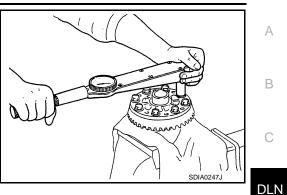
- 12. Install differential case assembly with side bearing outer races into gear carrier.
- 13. Measure side bearing preload. If necessary, select the appropriate side bearing adjusting washers. Refer to <u>DLN-171, "2WD :</u> <u>Adjustment"</u>.





14. Insert selected left and right side bearing adjusting washers in place between side bearings and gear carrier. Refer to <u>DLN-171, "2WD : Adjustment"</u>.





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< UNIT DISASSEMBLY AND ASSEMBLY >

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

Revision: 2009 August

- Using the drift [SST: KV38100200 (J-26233)], drive side oil seals until it becomes flush with the case end. CAUTION:
 - Never reuse oil seal.
 - When installing, never incline oil seal.
 - Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.
- Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and total preload torque. Refer to <u>DLN-</u> <u>171, "2WD : Adjustment"</u>.

Recheck above items. Readjust the above description, if necessary.

19. Apply sealant (A) to mating surface of rear cover.

• Use Genuine Silicone RTV or equivalent. Refer to <u>GI-18,</u> <u>"Recommended Chemical Products and Sealants"</u>. CAUTION:

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

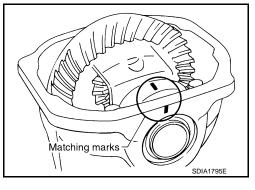
- 20. Install rear cover on gear carrier and tighten mounting bolts.
- 21. Install side flange with the following procedure.
- a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
- b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part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

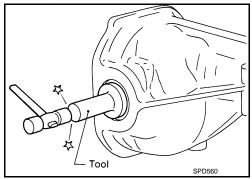
When installation is completed, driving sound of the side flange turns into a sound that seems to affect the whole final drive.

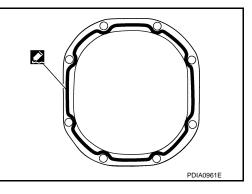
DLN-170

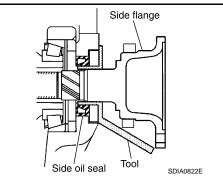


[REAR FINAL DRIVE: R200]







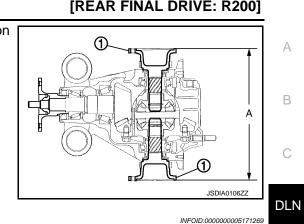


< UNIT DISASSEMBLY AND ASSEMBLY >

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

Standard

A : 326 – 328 mm (12.83 – 12.91 in)



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2WD : Adjustment

TOTAL PRELOAD TORQUE

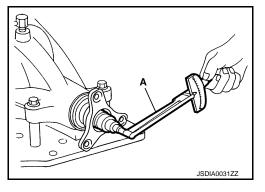
Before inspection and adjustment, drain gear oil.

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

Standard

Total preload torque

: Refer to <u>DLN-208, "Pre-</u> load Torque".



NOTE:

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

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

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.	I
On side bearings:	Use thinner side bearing adjusting washers by the same amount to each side.	

When the preload is smallOn pinion bearings:Tighten the drive pinion lock nut.On side bearings:Use thicker side bearing adjusting washers by the same amount toN

SIDE BEARING PRELOAD

Before inspection and adjustment, drain gear oil.

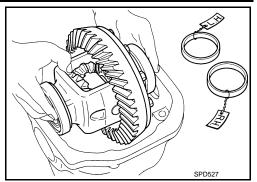
1. Remove rear cover. Refer to <u>DLN-164, "2WD : Disassembly"</u>.

< UNIT DISASSEMBLY AND ASSEMBLY >

- 2. Make sure all parts are clean. Also, make sure the bearings are well lubricated with gear oil.
- 3. Place the differential case, with side bearings and bearing races installed, into gear carrier.

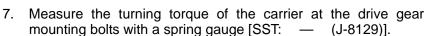
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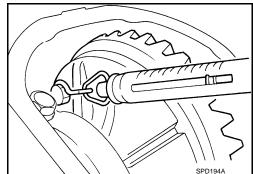
4. Insert left and right original side bearing adjusting washers in place between side bearings and gear carrier.

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



Standard Specification

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



Matching marks

8. If the turning torque is outside the specification, use a thicker/ thinner side bearing adjusting washer to adjust.

If the turning torque is lessUse a thicker thrust wash-
er.than the specified range:er.If the turning torque is
greater than the specifica-
tion:Use a thinner thrust wash-
er.

CAUTION:

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

SPD772

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< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200]

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

DRIVE GEAR RUNOUT

- 1. Remove rear cover. Refer to <u>DLN-164, "2WD : Disassembly"</u>.
- 2. Fit a dial indicator to the drive gear back face.
- 3. Rotate the drive gear to measure runout.

Limit

Drive gear runout

: Refer to <u>DLN-208, "Drive</u> <u>Gear Runout"</u>.

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

Replace drive gear and drive pinion gear as a set.

TOOTH CONTACT

Before inspection and adjustment, drain gear oil.

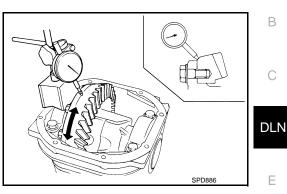
- 1. Remove rear cover. Refer to <u>DLN-164, "2WD : Disassembly"</u>.
- 2. Apply red lead to drive gear. CAUTION:

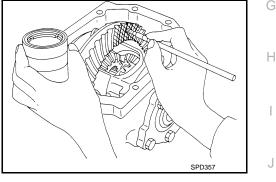
Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on drive gear.

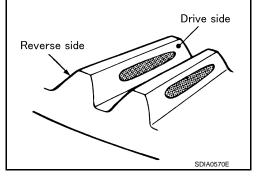
 Rotate drive gear back and forth several times, check drive pinion gear to drive gear tooth contact.
 CAUTION:

Check tooth contact on drive side and reverse side.









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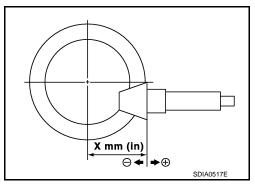
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< UNIT DISASSEMBLY AND ASSEMBLY >

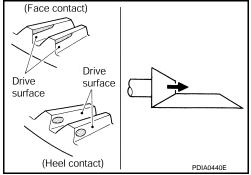
Tooth contact condition		Pinion height adjusting washer selection valve		Adjustment	Possible cause		
Drive side		Back side		[mm (in)]		(Yes/No)	
Heel side	Toe side	Toe side	Heel side		+0.09 (+0.0035)	Yes	Occurrence of noise and scoring sound in all speed ranges.
		(\neg	Thicker	+0.06 (+0.0024)	Yes	Occurrence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



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



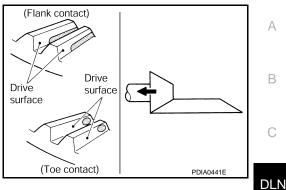
• If the tooth contact is near the face (face contact), or near the heel (heel contact), thicken pinion height adjusting washers to move drive pinion closer to drive gear.



< UNIT DISASSEMBLY AND ASSEMBLY >

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

[REAR FINAL DRIVE: R200]



BACKLASH

Before inspection and adjustment, drain gear oil.

- 1. Remove rear cover. Refer to <u>DLN-164, "2WD : Disassembly"</u>.
- 2. Fit a dial indicator to the drive gear face to measure the backlash.

Standard

Backlash

: Refer to <u>DLN-208, "Back-</u> lash".

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

When the backlash is large:

Make drive gear back side adjusting washer thicker, and drive gear tooth side adjusting washer thinner by the same amount.

When the backlash is small:

Make drive gear back side adjusting washer thinner, and drive gear tooth side adjusting washer thicker by the same amount.

CAUTION:

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

2WD : Inspection After Disassembly

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.

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< UNIT DISASSEMBLY AND ASSEMBLY >

• 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.

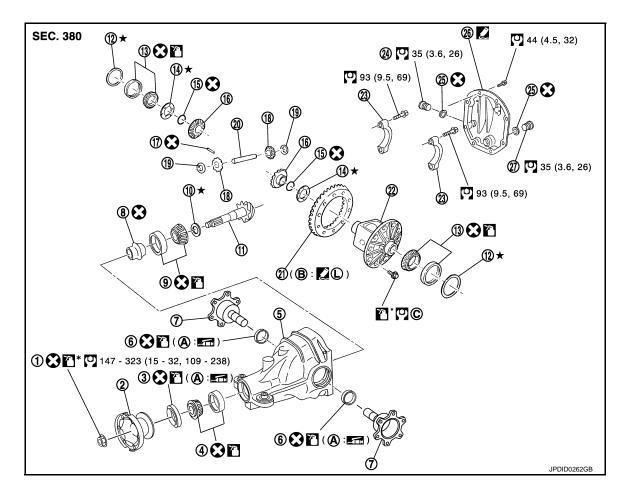
COMPANION FLANGE

- 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.

AWD

AWD : Exploded View

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- Drive pinion lock nut 1.
- 4. Pinion front bearing
- 7. Side flange
- 10. Pinion height adjusting washer
- 13. Side bearing
- 16. Side gear
- Pinion mate thrust washer 19.
- 22. Differential case
- 25. Gasket
- Α. Oil seal lip

- 2. Companion flange Gear carrier
- 8. Collapsible spacer

5.

- 11. Drive pinion
- 14. Side gear thrust washer
- 17. Lock pin
- 20. Pinion mate shaft
- 23. Bearing cap
- 26. Rear cover
- Β. Screw hole

- 3. Front oil seal
- 6. Side oil seal
- 9. Pinion rear bearing
- Side bearing adjusting washer 12.
- 15. Circular clip
- 18. Pinion mate gear
- 21. Drive gear
- 24. Filler plug
- 27. Drain plug
- C. Comply with the assembly procedure when tightening. Refer to DLN-179, "AWD : Assembly".

< UNIT DISASSEMBLY AND ASSEMBLY >

: Apply gear oil.

Apply anti-corrosion oil.

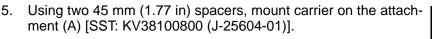
Apply Genuine Silicone RTV or equivalent. Refer to <u>GI-18, "Recommended Chemical Products and Sealants"</u>.

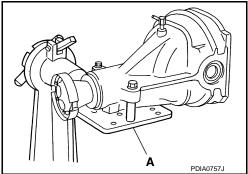
Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18. "Recommended Chemical Products and Sealants".

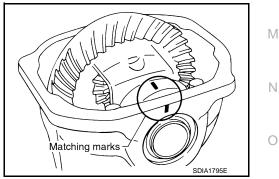
Refer to <u>GI-4, "Components"</u> for symbols not described above.

AWD : Disassembly

- 1. Drain gear oil, if necessary.
- 2. Remove side flange.
- 3. Remove rear cover mounting bolts.
- Remove rear cover to insert the seal cutter (A) [SST: KV10111100 (J-37228)] between gear carrier and rear cover. CAUTION:
 - Never damage the mating surface.
 - Never insert flat-bladed screwdriver, this may damage the mating surface.







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- For proper reinstallation, paint matching marks on one side of the bearing cap.
 CAUTION:
 - For matching marks, use paint. Never damage bearing caps and gear carrier.
 - Bearing caps are manufactured as integral molding. Use the matching marks to them in their original positions.

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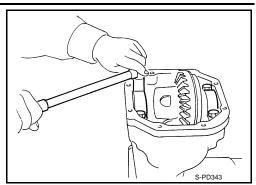
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< UNIT DISASSEMBLY AND ASSEMBLY >

7. Remove bearing caps.

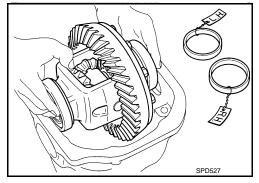
[REAR FINAL DRIVE: R200]



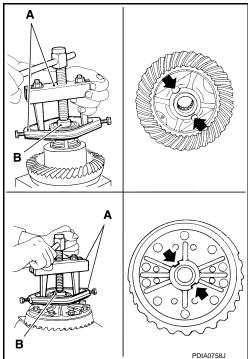
8. Lift differential case assembly out with a suitable tool.

• Keep side bearing outer races together with inner race. Never mix them up.

Also, keep side bearing adjusting washers together with bearings.



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9. Remove side bearing inner race.

To prevent damage to bearing, engage puller jaws in groove (\Leftarrow) .

- A : Puller [SST: ST33051001 (J-22888-20)]
- B : Base [SST: ST33061000 (J-8107-2)]

CAUTION:

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

< UNIT DISASSEMBLY AND ASSEMBLY >

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

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

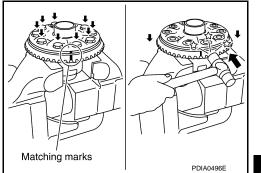
- 11. Remove drive gear mounting bolts.
- 12. Tap drive gear off differential case assembly with a soft hammer. **CAUTION:**

Tap evenly all around to keep drive gear from bending.

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

- 15. Turn pinion mate gear, then remove pinion mate gear, pinion mate thrust washer, side gear and side gear thrust washer from differential case.
- 16. Remove circular clip from side gear. **CAUTION:** Never damage side gear.

14. Remove pinion mate shaft.



[REAR FINAL DRIVE: R200]

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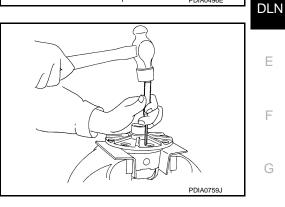
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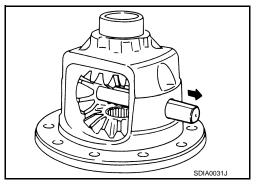
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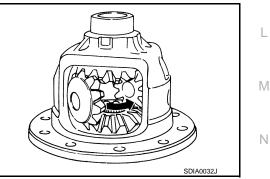
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AWD : Assembly

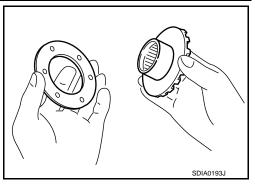
Install circular clip to side gear. 1. **CAUTION:** Never damage side gear.

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< UNIT DISASSEMBLY AND ASSEMBLY >

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

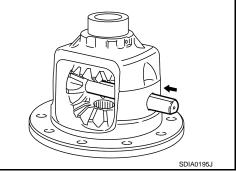
[REAR FINAL DRIVE: R200]



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

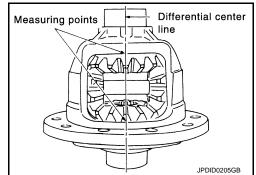
Make sure that the circular clip is installed to side gears.

- 4. Align 2 pinion mate gears in diagonally opposite positions, then rotate and install them into differential case after installing thrust washer to pinion mate gear.
 - Align the lock pin holes on differential case with shaft, and install pinion mate shaft.

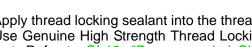


pinion mate shaft.

- 6. Measure side gear end play. If necessary, select the appropriate side gear thrust washers.
- a. Place differential case straight up so that side gear to be measured comes upward.



5.



Install the drive gear to differential case. **CAUTION:**

Align the matching marks of differential case and drive gear.

DIFFERENTIAL ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

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

Standard

Side gear back clearance

: Refer to DLN-208, "Differential Side Gear Clearance".

CAUTION:

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

If the back clearance is outside the specification, use a thicker/ c. thinner side gear thrust washer to adjust.

When the back clearance	Use a thicker thrust wash-
is large:	er.
When the back clearance is small:	Use a thinner thrust wash- er.

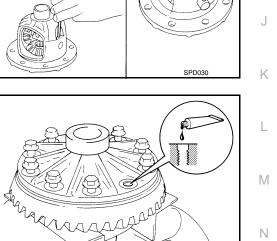
CAUTION:

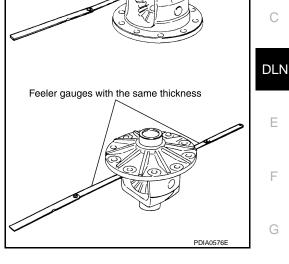
Select a side gear thrust washer for right and left individually.

7. Drive a lock pin into pinion mate shaft, using a punch. Make sure lock pin is flush with differential case. **CAUTION:** Never reuse lock pin.

8. Apply thread locking sealant into the thread hole of drive gear. Use Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants". **CAUTION:**

Clean and degrease drive gear back and threaded holes sufficiently.





Punch



Feeler gauges with the same thickness

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< UNIT DISASSEMBLY AND ASSEMBLY >

10. Tighten the mounting bolts with the following procedure. CAUTION: Apply anti-corrosin oil to the thread and seat of mounting

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

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

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

b. Tighten the bolts additionally to the specified angle.

Drive gear mounting : 31 to 36 degree bolts tightening angle

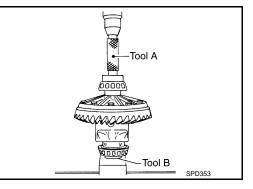
CAUTION:

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

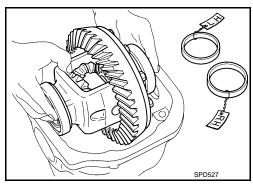
Press side bearing inner races to differential case, using the drift

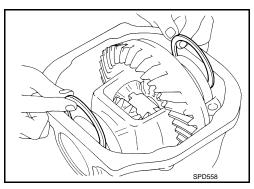
 (A) [SST: KV38100300 (J-25523)] and the base (B) [SST: ST33061000 (J-8107-2)].
 CAUTION:

Never reuse side bearing inner race.



- 12. Install differential case assembly with side bearing outer races into gear carrier.
- 13. Measure side bearing preload. If necessary, select the appropriate side bearing adjusting washers. Refer to <u>DLN-184, "AWD :</u> <u>Adjustment"</u>.





14. Insert selected left and right side bearing adjusting washers in place between side bearings and gear carrier. Refer to <u>DLN-184</u>, "AWD : Adjustment".

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[REAR FINAL DRIVE: R200]

< UNIT DISASSEMBLY AND ASSEMBLY >

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

- 17. Using the drift (A) [SST: KV38100200 (J-26233)], drive side oil seals until it becomes flush with the case end.
 - Never reuse oil seal.

CAUTION:

- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.
- 18. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and total preload torque. Refer to DLN-184, "AWD : Adjustment".

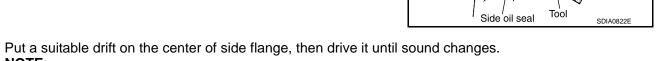
Recheck above items. Readjust the above description, if necessary.

19. Apply sealant (A) to mating surface of rear cover.

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

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

- 20. Install rear cover on gear carrier and tighten mounting bolts.
- 21. Install side flange with the following procedure.
- a. Attach the protector [SST: KV38107900 (J-39352)] to side oil seal.
- b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.



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

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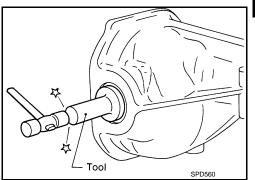
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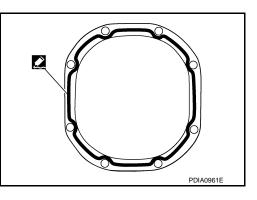
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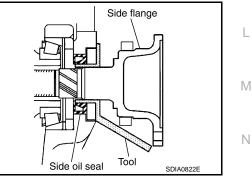
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Matching marks



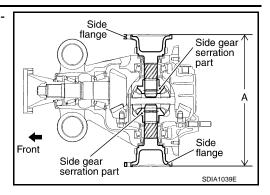


< UNIT DISASSEMBLY AND ASSEMBLY >

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

Standard

A : 326 – 328 mm (12.83 – 12.91 in)



[REAR FINAL DRIVE: R200]

AWD : Adjustment

TOTAL PRELOAD TORQUE

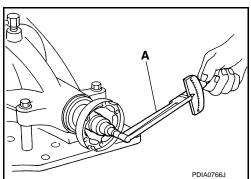
Before inspection and adjustment, drain gear oil.

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

Standard

Total preload torque

: Refer to <u>DLN-208, "Pre-</u> load Torque".



NOTE:

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

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

Adjust the pinion bearing preload first, then adjust the side bearing preload.

When the preload torque is large

On pinion bearings:	Replace the collapsible spacer.
On side bearings:	Use thinner side bearing adjusting washers by the same amount to each side.

When the preload is small

On pinion bearings:	Tighten the drive pinion lock nut.
On side bearings:	Use thicker side bearing adjusting washers by the same amount to each side.

SIDE BEARING PRELOAD

Before inspection and adjustment, drain gear oil.

1. Remove rear cover. Refer to <u>DLN-177, "AWD : Disassembly"</u>.

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< UNIT DISASSEMBLY AND ASSEMBLY >

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cap mounting bolts.

- 2. Make sure all parts are clean. Also, make sure the bearings are well lubricated with gear oil.
- 3. Place the differential case, with side bearings and bearing races installed, into gear carrier.

Insert left and right original side bearing adjusting washers in

Install bearing caps in their correct locations and tighten bearing

Turn the carrier several times to seat the bearings.

place between side bearings and gear carrier.

DLN-185

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 Standard
 : 34.2 – 39.2 N (3.5 – 4.0 kg,

 7.7 – 8.8 lb) of pulling force
 : 34.2 – 39.2 N (3.5 – 4.0 kg,

Measure the turning torque of the carrier at the drive gear

mounting bolts with a spring gauge [SST: — (J-8129)].

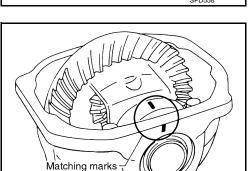
at the drive gear bolt

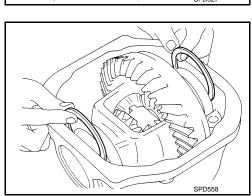
If the turning torque is outside the specification, use a thicker/

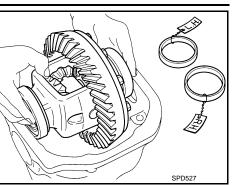
If the turning torque is lessUse a thicker thrust wash-
er.than the specified range:er.If the turning torque is
greater than the specifica-
tion:Use a thinner thrust wash-
er.

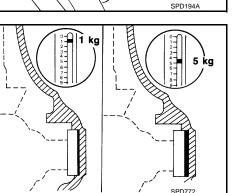
tion: CAUTION:

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











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VIBLY [REAR FINAL DRIVE: R200]

< UNIT DISASSEMBLY AND ASSEMBLY >

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

DRIVE GEAR RUNOUT

- 1. Remove rear cover. Refer to <u>DLN-177, "AWD : Disassembly"</u>.
- 2. Fit a dial indicator to the drive gear back face.
- 3. Rotate the drive gear to measure runout.

Limit

Drive gear runout

: Refer to <u>DLN-208, "Drive</u> <u>Gear Runout"</u>.

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

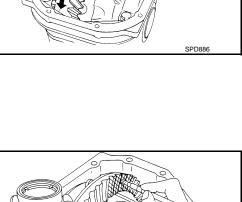
Replace drive gear and drive pinion gear as a set.

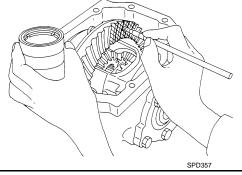
TOOTH CONTACT

Before inspection and adjustment, drain gear oil.

- 1. Remove rear cover. Refer to <u>DLN-177, "AWD : Disassembly"</u>.
- 2. Apply red lead to drive gear. CAUTION:

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





- Drive side Reverse side SDIA0570E
- Rotate drive gear back and forth several times, check drive pinion gear to drive gear tooth contact.
 CAUTION:

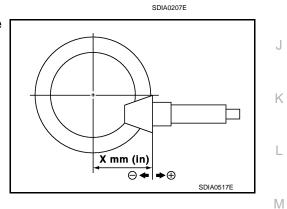
Check tooth contact on drive side and reverse side.

< UNIT DISASSEMBLY AND ASSEMBLY >

[REAR FINAL DRIVE: R200] А Pinion height adjusting Adjustment В

Tooth contact condition		Pinion height adjusting washer selection valve		Adjustment	Possible cause	
Drive si	de	Back side		[mm (in)]	(Yes/No)	
Heel side	Toe side	Toe side Heel side		+0.09 (+0.0035)	Yes	Occurrence of noise and scoring sound in all speed ranges.
			Thicker	+0.06 (+0.0024)	163	Occurrence of noise when accelerating.
				+0.03 (+0.0012)		
	»)			0	No	-
	<u>)</u>			-0.03 (-0.0012)		
)		Thinner	-0.06 (-0.0024)	~	Occurrence of noise at constant speed and decreasing speed.
)			-0.09 (-0.0035)	Yes	Occurrence of noise and scoring sound in all speed ranges.

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



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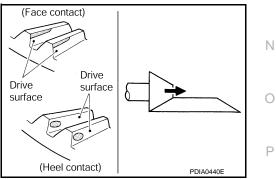
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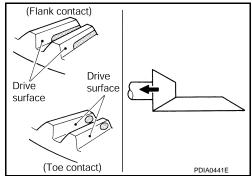
• If the tooth contact is near the face (face contact), or near the heel (heel contact), thicken pinion height adjusting washers to move drive pinion closer to drive gear.



< UNIT DISASSEMBLY AND ASSEMBLY >

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

[REAR FINAL DRIVE: R200]



BACKLASH

Before inspection and adjustment, drain gear oil.

- 1. Remove rear cover. Refer to <u>DLN-177, "AWD : Disassembly"</u>.
- 2. Fit a dial indicator to the drive gear face to measure the backlash.

Standard

Backlash

: Refer to <u>DLN-208, "Back-</u> lash".

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

When the backlash is large:

Make drive gear back side adjusting washer thicker, and drive gear tooth side adjusting washer thinner by the same amount.

When the backlash is small:

Make drive gear back side adjusting washer thinner, and drive gear tooth side adjusting washer thicker by the same amount.

CAUTION:

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

AWD : Inspection After Disassembly

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.

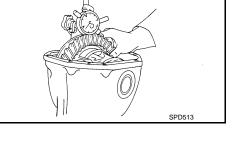
SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

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

OIL SEAL

• Whenever disassembled, replace.

DLN-188



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< UNIT DISASSEMBLY AND ASSEMBLY >

If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips, replace them. DIFFERENTIAL CASE Clean up the disassembled parts. If any wear or crack on the contact sides of the differential case is found, replace. COMPANION FLANGE Clean up the disassembled parts. If any chipped mark [about 0.1 mm, (0.004 in)] or other damage on the contact sides of the lips of the companion flange is found, replace.

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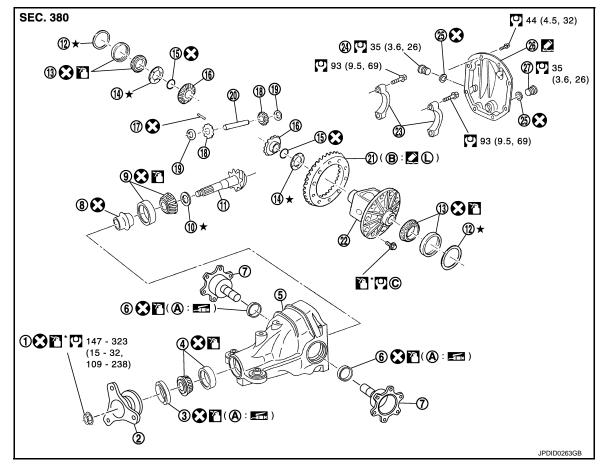
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[REAR FINAL DRIVE: R200]

DRIVE PINION 2WD

2WD : Exploded View

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- 1. Drive pinion lock nut
- 4. Pinion front bearing
- 7. Side flange
- 10. Pinion height adjusting washer
- 13. Side bearing
- 16. Side gear
- 19. Pinion mate thrust washer
- 22. Differential case
- 25. Gasket
- A. Oil seal lip

- 2. Companion flange
- 5. Gear carrier
- 8. Collapsible spacer
- 11. Drive pinion
- 14. Side gear thrust washer
- 17. Lock pin
- 20. Pinion mate shaft
- 23. Bearing cap
- 26. Rear cover
- B. Screw hole

- 3. Front oil seal
- 6. Side oil seal
- 9. Pinion rear bearing
- 12. Side bearing adjusting washer
- 15. Circular clip
- 18. Pinion mate gear
- 21. Drive gear
- 24. Filler plug
- 27. Drain plug
- C. Comply with the assembly procedure when tightening. Refer to <u>DLN-</u> <u>166, "2WD : Assembly"</u>.

: Apply gear oil.

Apply anti-corrosion oil.

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

C: Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to <u>GI-18. "Recommended Chemical Products</u> and Sealants".

Refer to <u>GI-4, "Components"</u> for symbols not described above.

DLN-190

< UNIT DISASSEMBLY AND ASSEMBLY >

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2WD : Disassembly

- 1. Remove differential case assembly. Refer to <u>DLN-164, "2WD : Disassembly"</u>.
- 2. Remove drive pinion lock nut with the flange wrench.

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

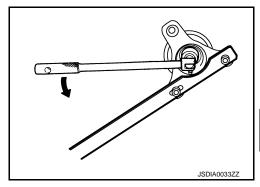
For matching mark, use paint. Never damage companion flange and drive pinion.

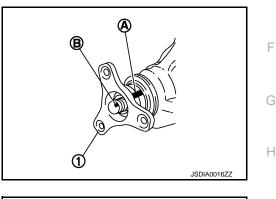
NOTE:

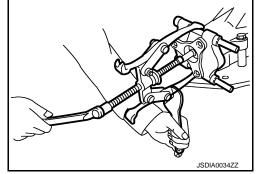
The matching mark on the final drive companion flange indicates the maximum vertical runout position.

When replacing companion flange, matching mark is not necessary.

4. Remove companion flange using the suitable pullers.







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 Press drive pinion assembly out of gear carrier.
 CAUTION: Never drop drive pinion assembly.

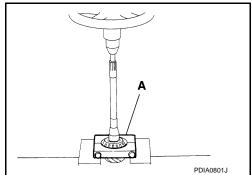
- 6. Remove front oil seal.
- 7. Remove side oil seal.
- 8. Remove pinion front bearing inner race.
- 9. Remove collapsible spacer.

< UNIT DISASSEMBLY AND ASSEMBLY >

rod or equivalent to remove them.

Never damage gear carrier.

- 10. Remove pinion rear bearing inner race and pinion height adjusting washer with the replacer (A) (commercial service tool).
- [REAR FINAL DRIVE: R200]



11. Tap pinion front/rear bearing outer races uniformly using a brass SDIA0817E

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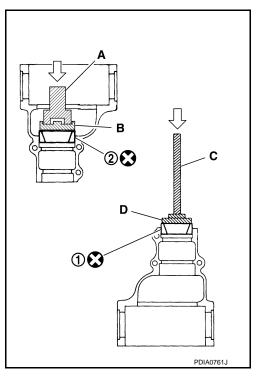
2WD : Assembly

CAUTION:

- 1. Install front bearing outer race (1) and rear bearing outer race (2) using drifts.
 - A : Drift [SST: ST30720000 (J-25405)]
 - B : Drift [SST: KV40105230 ()]
 - C : Drift bar [SST: ST30611000 (J-25742-1)]
 - D : Drift [SST: ST30613000 (J-25742-3)]

CAUTION:

- At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.
- Never reuse pinion front and rear bearing outer race.
- 2. Select drive pinion height adjusting washer. Refer to DLN-194, "2WD : Adjustment".



< UNIT DISASSEMBLY AND ASSEMBLY >

- 3. Install selected drive pinion height adjusting washer (2) to drive pinion. Press pinion rear bearing inner race (1) to it, using drift (A) [SST: ST30901000 (J-26010-01)]. **CAUTION:**
 - Be careful of the direction of pinion height adjusting washer. (Assemble as shown in the figure.)
 - Never reuse pinion rear bearing inner race.
- Assemble collapsible spacer to drive pinion. 4. CAUTION:

Never reuse collapsible spacer.

- 5. Apply gear oil to pinion rear bearing, and assemble drive pinion into gear carrier.
- 6. Apply gear oil to pinion front bearing, and assemble pinion front bearing inner race to drive pinion assembly. CAUTION:

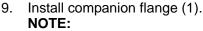
Never reuse pinion front bearing inner race.

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

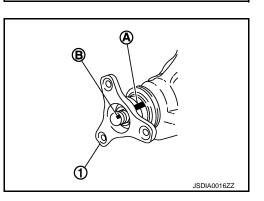
8. Using the drift (A) [SST: ST30720000 (J-25405)], install front oil seal as shown in figure.

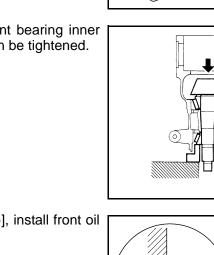
CAUTION:

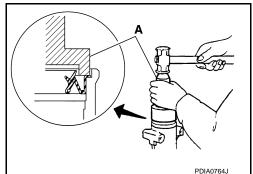
- Never reuse oil seal.
- When installing, never incline oil seal.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.

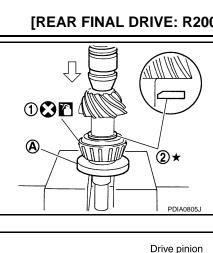


When reusing drive pinion, align the matching mark (B) of drive pinion with the matching mark (A) of companion flange, and then install companion flange (1).









Collapsible spacer

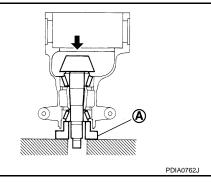
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Pinion rear bearing

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[REAR FINAL DRIVE: R200]

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< UNIT DISASSEMBLY AND ASSEMBLY >

 Apply anti-corrosion oil to the thread and seat of drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion.
 CAUTION:

Never reuse drive pinion lock nut.

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

Standard

Pinion bearing preload

: Refer to <u>DLN-208, "Pre-</u> load Torque".

CAUTION:

- Adjust to the lower limit of the drive pinion lock nut tightening torque first.
- If the preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Never loosen drive pinion lock nut to adjust the preload torque.
- After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.
- 12. Install differential case assembly. Refer to <u>DLN-166, "2WD :</u> <u>Assembly"</u>. CAUTION:

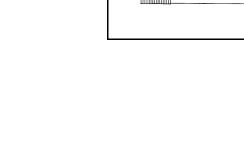
Never install rear cover at this timing.

- Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and companion flange runout. Refer to <u>DLN-171, "2WD : Adjustment"</u> and <u>DLN-194, "2WD : Adjustment"</u>. Recheck above items. Readjust the above description, if necessary.
- 14. Check total preload torque. Refer to <u>DLN-171, "2WD : Adjustment"</u>.
- 15. Install rear cover. Refer to <u>DLN-166, "2WD : Assembly"</u>.

2WD : Adjustment

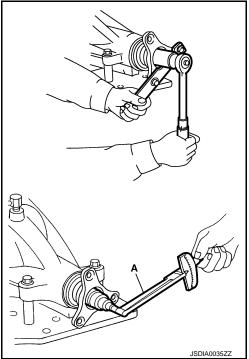
PINION GEAR HEIGHT

- 1. Make sure all parts are clean and that the bearings are well lubricated.
- Assemble the pinion gear bearings into the differential shim selector tool [SST: — (J-34309)].



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< UNIT DISASSEMBLY AND ASSEMBLY >

- **Pinion front bearing;** make sure the J-34309-3 pinion front bearing seat is secured tightly against the J-34309-2 gauge anvil. Then turn the pinion front bearing pilot, J-34309-5, to secure the bearing in its proper position.
- **Pinion rear bearing;** the pinion rear bearing pilot, J-34309-8, is used to center the pinion rear bearing only. The pinion rear bearing locking seat, J-34309-4, is used to lock the bearing to the assembly.
- Installation of J-34309-9 and J-34309-16; place a suitable 2.5 mm (0.098 in) thick plain washer between J-34309-9 and J-34309-16. Both surfaces of J-34309-9 and J-34309-16 must be parallel with a clearance of 2.5 mm (0.098 in).
- 3. Install the pinion rear bearing inner race into gear carrier. Then place the pinion preload shim selector tool, J-34309-1, gauge screw assembly.

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

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

 Measure the turning torque at the end of the J-34309-2 gauge anvil using preload gauge [SST: ST3127S000 (J-25765-A)].

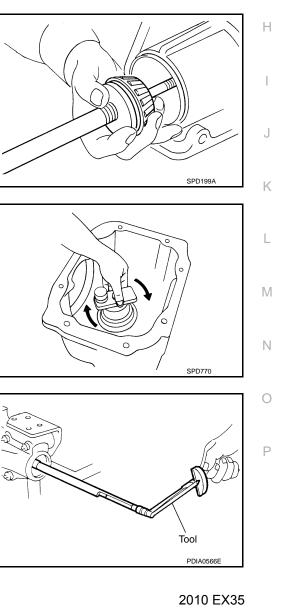
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Turning torque specifica-

DLN-195

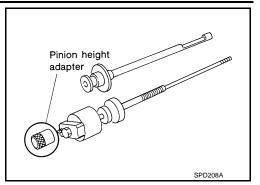
[REAR FINAL DRIVE: R200] А В SPD197A DLN Q F SPD893 Н Ć SPD199A Κ



< UNIT DISASSEMBLY AND ASSEMBLY >

 Place the J-34309-11 "R200A" pinion height adapter onto the gauge plate and tighten it by hand. CAUTION:

Make sure all machined surfaces are clean.



 Position the side bearing discs, J-25269-4, and arbor firmly into the side bearing bores. Install the bearing caps and tighten bearing cap mounting bolts to the specified torque. Refer to <u>DLN-190, "2WD : Exploded View"</u>.

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

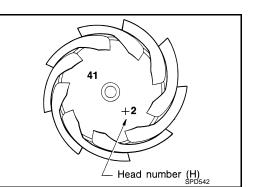
10. Write down exact measurement (the value of feeler gauge).

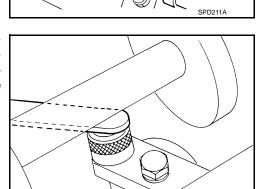
11. Correct the pinion height washer size by referring to the "pinion

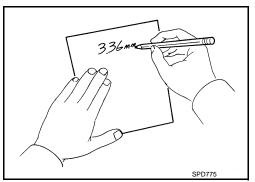
There are two numbers painted on the drive pinion. The first one refers to the drive pinion and drive gear as a matched set. This number should be the same as the number on the drive gear. The second number is the "pinion head height number". It refers to the ideal pinion height from standard for quietest operation. Use the following chart to determine



the correct pinion height washer.







SPD204A

Revision: 2009 August

head number".

< UNIT DISASSEMBLY AND ASSEMBLY >

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

- 12. Select the correct pinion height adjusting washer.
- 13. Remove the J-34309 differential shim selector tool from the final drive housing. Then disassemble to retrieve the pinion bearings.



- 1. Set a dial indicator (A) vertically to the tip of the drive pinion.
- 2. Rotate drive pinion to check for runout.

Limit

Drive pinion runout

: Refer to <u>DLN-208, "Drive</u> <u>Pinion Runout (2WD)"</u>.

3. If the runout value is outside of the limit, possible causes are an assembly malfunction of drive pinion and pinion bearing and malfunction of pinion bearing. Check for these items and repair if necessary.

2WD : Inspection After Disassembly

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.

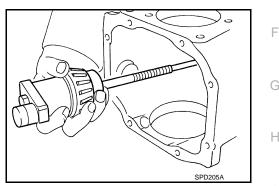
SIDE GEAR THRUST WASHER AND PINION MATE THRUST WASHER

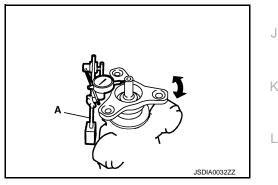
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< UNIT DISASSEMBLY AND ASSEMBLY >

• 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.

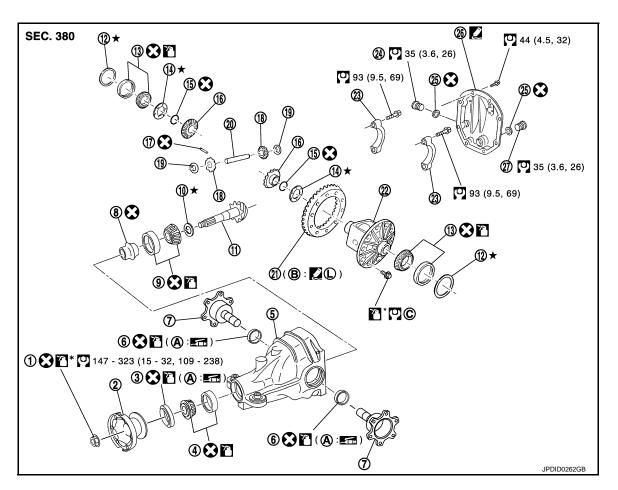
COMPANION FLANGE

- 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.

AWD

AWD : Exploded View

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- 1. Drive pinion lock nut
- 4. Pinion front bearing
- 7. Side flange
- 10. Pinion height adjusting washer
- 13. Side bearing
- 16. Side gear
- 19. Pinion mate thrust washer
- 22. Differential case

- 2. Companion flange
- 5. Gear carrier
- 8. Collapsible spacer
- 11. Drive pinion
- 14. Side gear thrust washer
- 17. Lock pin
- 20. Pinion mate shaft
- 23. Bearing cap

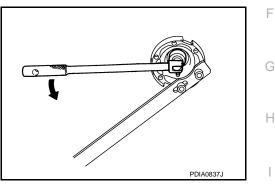
- 3. Front oil seal
- 6. Side oil seal
- 9. Pinion rear bearing
- 12. Side bearing adjusting washer
- 15. Circular clip
- 18. Pinion mate gear
- 21. Drive gear
- 24. Filler plug

< UNIT DISASSEMBLY AND ASSEMBLY >

25. Gasket 26. Rear cover 27. Drain plug А A. Oil seal lip В. Screw hole C. Comply with the assembly procedure when tightening. Refer to DLN-179, "AWD : Assembly". В : Apply gear oil. Apply anti-corrosion oil. Apply Genuine Silicone RTV or equivalent. Refer to GI-18, "Recommended Chemical Products and Sealants". C: Apply Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-18. "Recommended Chemical Products DLN and Sealants". Refer to GI-4, "Components" for symbols not described above.

AWD : Disassembly

- 1. Remove differential case assembly. Refer to <u>DLN-177, "AWD : Disassembly"</u>.
- 2. Remove drive pinion lock nut with the flange wrench.



[REAR FINAL DRIVE: R200]

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

CAUTION:

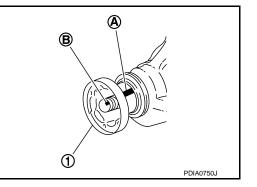
For matching mark, use paint. Never damage companion flange and drive pinion.

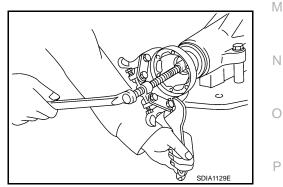
NOTE:

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

When replacing companion flange, matching mark is not necessary.

4. Remove companion flange using the suitable pullers.





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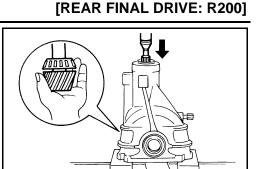
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< UNIT DISASSEMBLY AND ASSEMBLY >

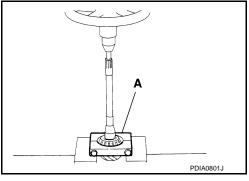
- Press drive pinion assembly out of gear carrier. CAUTION: Never drop drive pinion assembly.
- 6. Remove front oil seal.
- 7. Remove side oil seal.
- 8. Remove pinion front bearing inner race.
- 9. Remove collapsible spacer.

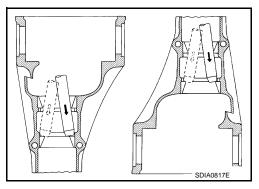


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10. Remove pinion rear bearing inner race and pinion height adjusting washer with the replacer (A) (commercial service tool).

 Tap pinion front/rear bearing outer races uniformly using a brass rod or equivalent to remove them.
 CAUTION: Never damage gear carrier.





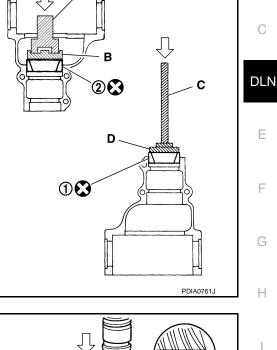
AWD : Assembly

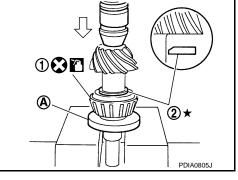
- 1. Install front bearing outer race (1) and rear bearing outer race (2) using drifts.
 - A : Drift [SST: ST30720000 (J-25405)]
 - В : Drift [SST: KV40105230 (—)]
 - С : Drift bar [SST: ST30611000 (J-25742-1)]
 - : Drift [SST: ST30613000 (J-25742-3)] D

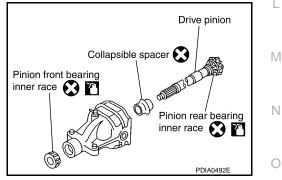
CAUTION:

- At first, using a hammer, tap bearing outer race until it becomes flat to gear carrier.
- Never reuse pinion front and rear bearing outer race.
- 2. Select drive pinion height adjusting washer. Refer to DLN-203. "AWD : Adjustment".

- Install selected drive pinion height adjusting washer (2) to drive 3. pinion. Press pinion rear bearing inner race (1) to it, using drift (A) [SST: ST30901000 (J-26010-01)]. CAUTION:
 - · Be careful of the direction of pinion height adjusting washer. (Assemble as shown in the figure.)
 - Never reuse pinion rear bearing inner race.







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4. Assemble collapsible spacer to drive pinion. CAUTION: Never reuse collapsible spacer.

- 5. Apply gear oil to pinion rear bearing, and assemble drive pinion into gear carrier.
- 6. Apply gear oil to pinion front bearing, and assemble pinion front bearing inner race to drive pinion assembly. **CAUTION:**

Never reuse pinion front bearing inner race.

[REAR FINAL DRIVE: R200]

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< UNIT DISASSEMBLY AND ASSEMBLY >

seal as shown in figure.

• Never reuse oil seal.

Install companion flange (1).

install companion flange.

• When installing, never incline oil seal.

onto the circumference of oil seal.

CAUTION:

9.

NOTE:

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

Revision: 2009 August

10. Apply anti-corrosion oil to the thread and seat of drive pinion lock nut, and temporarily tighten drive pinion lock nut to drive pinion.

When reusing drive pinion, align the matching mark (B) of drive

pinion with the matching mark (A) of companion flange, and then

CAUTION:

Never reuse drive pinion lock nut.

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

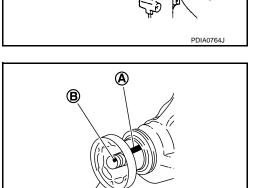
Standard

Pinion bearing preload

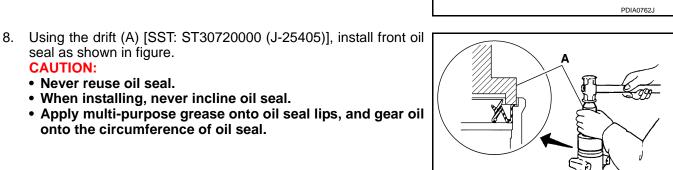
: Refer to DLN-208, "Preload Torque".

CAUTION:

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



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< UNIT DISASSEMBLY AND ASSEMBLY >

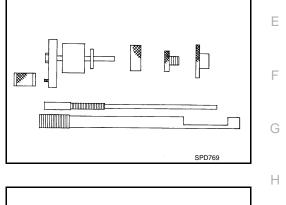
- Install differential case assembly. Refer to <u>DLN-179, "AWD : Assembly"</u>. CAUTION: Never install rear cover at this timing.
- 13. Check and adjust drive gear runout, tooth contact, drive gear to drive pinion backlash, and companion flange runout. Refer to <u>DLN-184</u>, "<u>AWD</u> : <u>Adjustment</u>" and <u>DLN-203</u>, "<u>AWD</u> : <u>Adjustment</u>". Recheck above items. Readjust the above description, if necessary.
- 14. Check total preload torque. Refer to DLN-184, "AWD : Adjustment".
- 15. Install rear cover. Refer to <u>DLN-179, "AWD : Assembly"</u>.

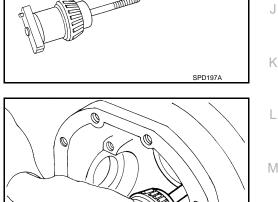
AWD : Adjustment

PINION GEAR HEIGHT

- 1. Make sure all parts are clean and that the bearings are well lubricated.
- Assemble the pinion gear bearings into the differential shim selector tool [SST: — (J-34309)].

- **Pinion front bearing;** make sure the J-34309-3 pinion front bearing seat is secured tightly against the J-34309-2 gauge anvil. Then turn the pinion front bearing pilot, J-34309-5, to secure the bearing in its proper position.
- **Pinion rear bearing;** the pinion rear bearing pilot, J-34309-8, is used to center the pinion rear bearing only. The pinion rear bearing locking seat, J-34309-4, is used to lock the bearing to the assembly.
- Installation of J-34309-9 and J-34309-16; place a suitable 2.5 mm (0.098 in) thick plain washer between J-34309-9 and J-34309-16. Both surfaces of J-34309-9 and J-34309-16 must be parallel with a clearance of 2.5 mm (0.098 in).
- 3. Install the pinion rear bearing inner race into gear carrier. Then place the pinion preload shim selector tool, J-34309-1, gauge screw assembly.









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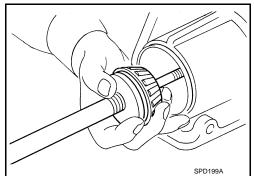
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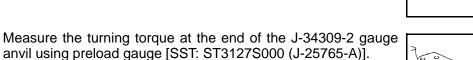
< UNIT DISASSEMBLY AND ASSEMBLY >

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

[REAR FINAL DRIVE: R200]



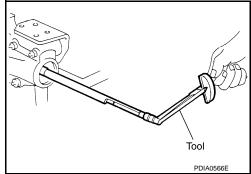
5. Turn the assembly several times to seat the bearings.



Standard

6.

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

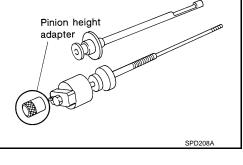


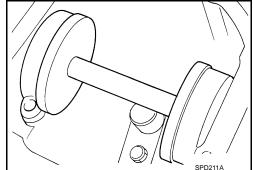
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 Place the J-34309-11 "R200A" pinion height adapter onto the gauge plate and tighten it by hand. CAUTION:
 Make sure all machined surfaces are clean.

Make sure all machined surfaces are clean.

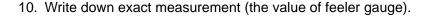
 Position the side bearing discs, J-25269-4, and arbor firmly into the side bearing bores. Install the bearing caps and tighten bearing cap mounting bolts to the specified torque. Refer to <u>DLN-198, "AWD : Exploded View"</u>.





< UNIT DISASSEMBLY AND ASSEMBLY >

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



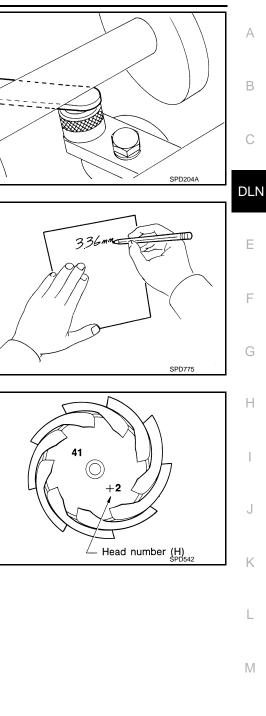
11. Correct the pinion height washer size by referring to the "pinion head number".

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

			l
Pinion head height number	Add or remove from the standard pinion height ad- justing washer thickness measurement	← Head number (H) SPD542	
- 6	Add 0.06 mm (0.0024 in)		
– 5	Add 0.05 mm (0.0020 in)		
- 4	Add 0.04 mm (0.0016 in)		
- 3	Add 0.03 mm (0.0012 in)		
- 2	Add 0.02 mm (0.0008 in)		
– 1	Add 0.01 mm (0.0004 in)		
0	Use the selected washer thickness		
+1	Subtract 0.01 mm (0.0004 in)		
+2	Subtract 0.02 mm (0.0008 in)		
+3	Subtract 0.03 mm (0.0012 in)		
+4	Subtract 0.04 mm (0.0016 in)		
+5	Subtract 0.05 mm (0.0020 in)		
+6	Subtract 0.06 mm (0.0024 in)		

12. Select the correct pinion height adjusting washer.

[REAR FINAL DRIVE: R200]

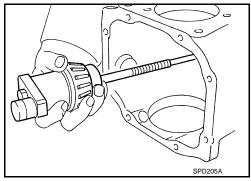


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< UNIT DISASSEMBLY AND ASSEMBLY >

13. Remove the J-34309 differential shim selector tool from the final drive housing. Then disassemble to retrieve the pinion bearings.

[REAR FINAL DRIVE: R200]



COMPANION FLANGE RUNOUT

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

Limit

Companion flange runout

: Refer to <u>DLN-209, "Com-</u> panion Flange Runout (AWD)".

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

AWD : Inspection After Disassembly

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Test indicator

inside face

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.

DLN-206

< UNIT DISASSEMBLY AND ASSEMBLY >

COMPANION FLANGE

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

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SERVICE DATA AND SPECIFICATIONS (SDS)

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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

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[REAR FINAL DRIVE: R200]

		2WD	AWD
Applied model		VQ3	5HR
		A	Л
Final drive model		R2	200
Gear ratio		3.4	33
Number of teeth (Drive gear/Drive pinion)	47	/15
Oil capacity (Approx.)	ℓ (US pt, Imp pt)	1.4 (3,	2-1/2)
Number of pinion gears		:	2
Drive pinion adjustment spacer type		Colla	psible

Drive Gear Runout

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Unit: mm (in)

Item	Limit
Drive gear back face runout	0.05 (0.0020)

Differential Side Gear Clearance

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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

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Unit: N·m (kg-m, in-lb)

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

Backlash

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Unit: mm (in)

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

Drive Pinion Runout (2WD)

Unit: mm (in)

Item	Limit
Tip of drive pinion runout	0.8 (0.031)

SERVICE DATA AND SPECIFICATIONS (SDS) D SPECIFICATIONS (SDS) [REAR FINAL DRIVE: R200]

< SERVICE DATA AND SPECIFICATIONS (SDS)

Companion Flange Runout (AWD)

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Unit: mm (in)

Item	Limit	
Inner side of the companion flange runout	0.08 (0.0031)	В

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