SECTION DLN
DRIVELINE

CONTENTS

TRANSFER: TY21C

TRANSFER: TY30A

HOW TO USE THIS MANUAL

HOW TO USE THIS SECTION

Information

INFOID:0000000011058854

Both “VDC” and “ESP” are used in this manual. These indicate the same system.

PRECAUTION

PRECAUTIONS

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

INFOID:0000000010992652

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

WARNING:

Always observe the following items for preventing accidental activation.

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 “SRS AIR BAG”.**
- **Never 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:

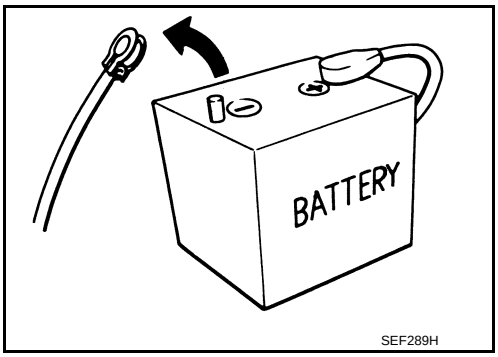
Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never 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.**

Precautions for Removing Battery Terminal

INFOID:0000000010992653

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
  NOTE:
  If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
  NOTE:
  The removal of 12V battery may cause a DTC detection error.



SEF289H

HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.

2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
NOTE:
At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Service Notice or Precautions for Transfer

INFOID:0000000010991949

- Use recommended transfer oil only, refer to MA-23, "Fluids and Lubricants".
- Never reuse transfer oil, once it has been drained.
- Check the oil level or replace the oil only with the vehicle parked on level ground.
- During removal or installation, keep inside of transfer clear of dust or dirt.
- Replace all tires at the same time. Always use tires of the proper size and the same brand and pattern. Fitting improper size and unusually worn tires applies excessive force to vehicle mechanism and can cause longitudinal vibration.
- 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 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.

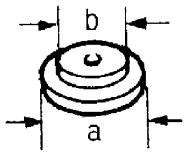
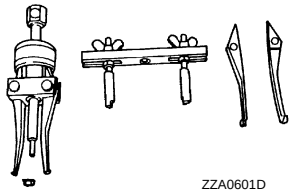
- Clean inner parts with lint-free cloth or towels. Do not use cotton work gloves and rags to prevent adhering fibers.

PREPARATION

PREPARATION

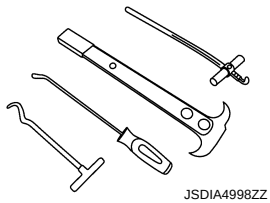
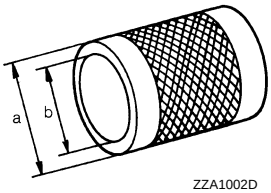
Special Service Tool

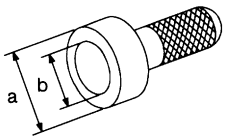
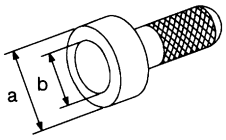
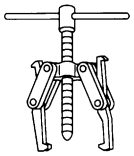
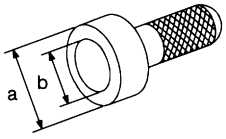
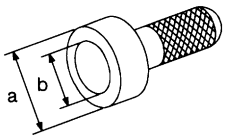
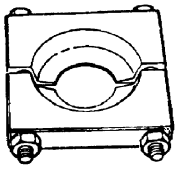
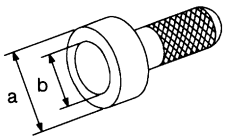
INFOID:0000000010991950

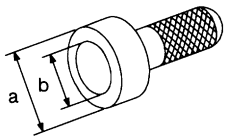
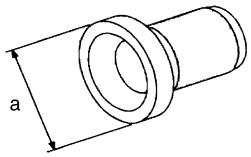
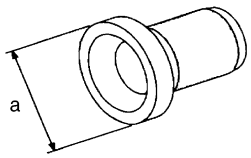
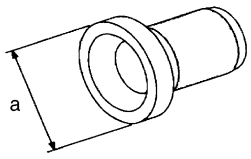
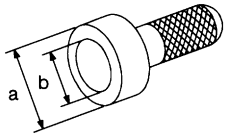
Tool number Tool name	Description
ST33061000 Drift a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia.  ZZA0810D	Removing gear ring bearing inner race (transfer case side)
KV381054S0 Puller  ZZA0601D	Removing ring gear shaft oil seal
ST3127S000 Preload gauge  ZZA0503D	Measuring preload torque

Commercial Service Tool

INFOID:0000000010991951

Tool name	Description
Oil seal remover  JSDIA4998ZZ	Removing transfer cover oil seal (outer/inner)
Drift a: 52 mm (2.05 in) dia. b: 44 mm (1.73 in) dia.  ZZA1002D	Removing ring gear bearing inner race (transfer cover side)

Tool name	Description
Drift a: 56.5 mm (2.224 in) dia. b: 48 mm (1.89 in) dia.  NT115	Installing side oil seal (installing transfer case oil seal)
Drift a: 44 mm (1.73 in) dia. b: 33 mm (1.3 in) dia.  NT115	Installing ring gear shaft oil seal
Puller  NT077	Removing ring gear bearing (left) inner race (transfer case side)
Drift a: 70 mm (2.76 in) dia. b: 60 mm (2.36 in) dia.  NT115	Installing oil seal (installing pinion bearing seal)
Drift a: 78 mm (3.07 in) dia. b: 68 mm (2.68 in) dia.  NT115	Installing side oil seal [installing transfer cover oil seal (outer inner)]
Replacer  ZZA0700D	• Removing drive pinion • Removing ring gear bearing (left) inner race (transfer cover side)
Drift a: 58 mm (2.28 in) dia. b: 55 mm (2.17 in) dia.  NT115	Installing ring gear bearing (left) inner race (transfer case side)

Tool name	Description
Drift a: 62 mm (2.44 in) dia. b: 58 mm (2.28 in) dia.  NT115	Installing ring gear bearing (right) inner race (transfer cover side)
Drift a: 73.5 mm (2.894 in) dia.  SCIA5338E	Installing ring gear bearing (left) outer race (transfer case side)
Drift a: 87 mm (3.43 in) dia.  SCIA5338E	Installing ring gear bearing (right) outer race (transfer cover side)
Drift a: 20 mm (0.79 in) dia.  SCIA5338E	Installing and removing drive pinion
Drift a: 40 mm (1.57 in) dia. b: 25 mm (0.98 in) dia.  NT115	Installing companion flange

Lubricant or/and Sealant

INFOID:0000000010991952

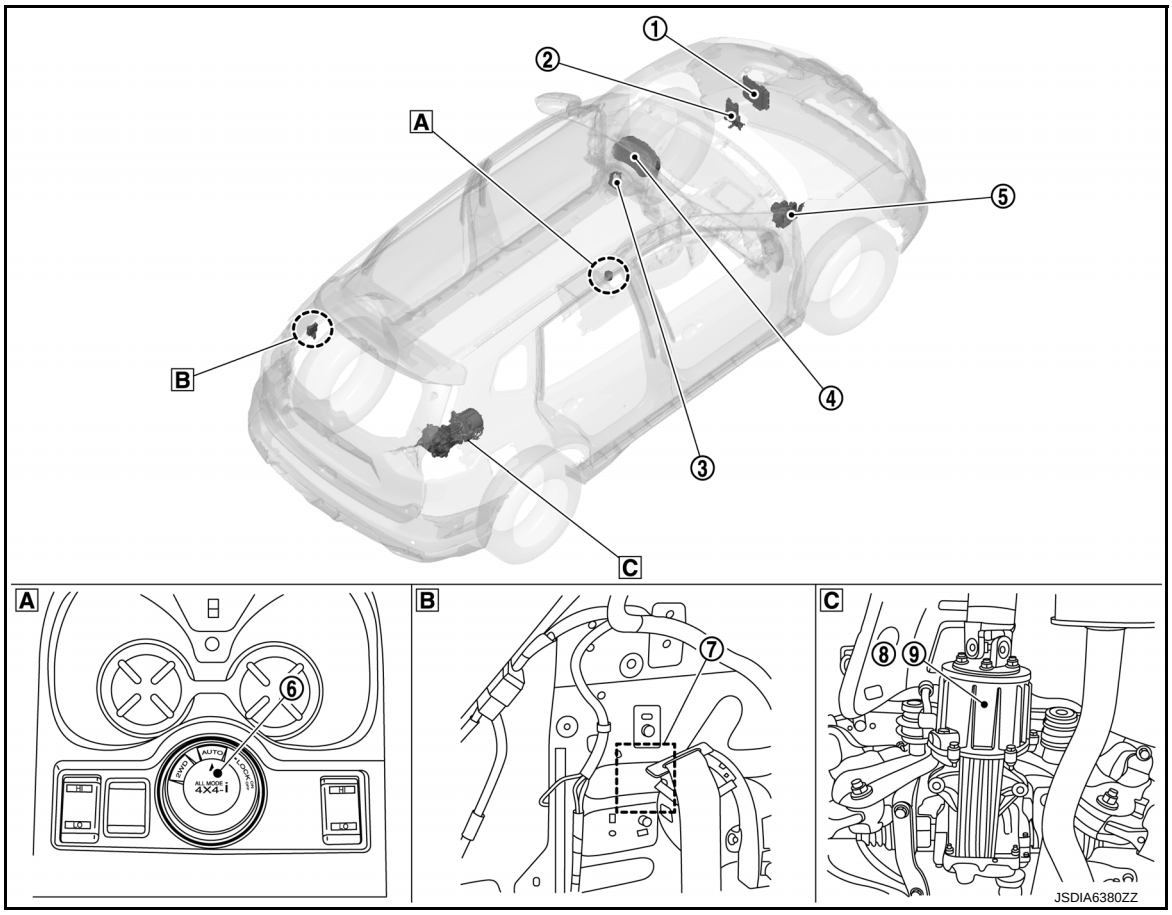
Item	Use
Red lead or equivalent	Checking tooth contact

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000010991953



A Console switch panel

B Rear wheel house outer panel in luggage room of left side

C Rear final drive

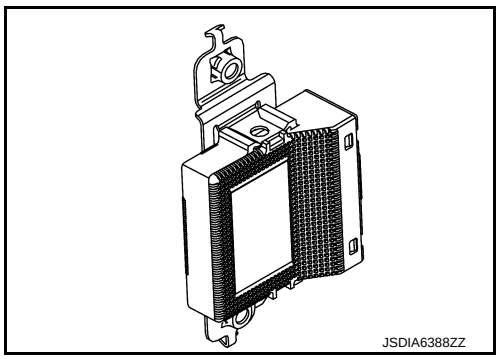
No.	Component	Function
①	ECM	Mainly transmits the following signals to 4WD control unit via CAN communication. • Accelerator pedal position signal • Engine speed signal • Engine status signal For detailed installation location, refer to EC-28, "ENGINE CONTROL SYSTEM : Component Parts Location" (MR20DD), EC-440, "Component Parts Location" (QR25DE).
②	TCM	Mainly transmits the following signals to 4WD control unit via CAN communication. • Input shaft revolutional signal • CVT ratio signal For detailed installation location, refer to TM-235, "CVT CONTROL SYSTEM : Component Parts Location".
③	Steering angle sensor	Mainly transmits the following signals to 4WD control unit via CAN communication. • Steering angle sensor signal For detailed installation location, refer to BRC-14, "Component Parts Location".

No.	Component	Function
④	Combination meter	Mainly transmits the following signals to 4WD control unit via CAN communication. • Parking brake switch signal Mainly receives the following signals from 4WD control unit via CAN communication. • 4WD warning lamp signal • 4WD mode indicator lamp signal • Torque distribution indicator signal For detailed installation location, refer to MWI-7, "METER SYSTEM : Component Parts Location".
⑤	ABS actuator and electric unit (control unit)	Mainly transmits the following signals to 4WD control unit via CAN communication. • Each wheel speed signal • Decel G sensor signal • Side G sensor signal • Yaw rate sensor signal For detailed installation location, refer to BRC-14, "Component Parts Location".
⑥	4WD mode switch	Refer to DLN-16, "4WD Mode Switch".
⑦	4WD control unit • 4WD actuator relay	Refer to DLN-15, "4WD Control Unit".
⑧	Electric controlled coupling	Refer to DLN-15, "Electric Controlled Coupling".
⑨	4WD solenoid	Refer to DLN-15, "4WD Solenoid".

4WD Control Unit

INFOID:0000000010991954

- Controls driving force distribution by signals from each sensor from front wheel driving mode (100:0) to 4-wheel driving mode (50:50).
- Fail-safe mode is available if malfunction is detected in 4WD system. For fail-safe, refer to DLN-21, "4WD SYSTEM : Fail-Safe".



4WD ACTUATOR RELAY

4WD actuator relay is integrated with 4WD control unit, and supplies 4WD solenoid with voltage.

Electric Controlled Coupling

INFOID:0000000010991955

Electric controlled coupling is integrated with rear final drive and transmits driving force to rear final drive. For operation, refer to DLN-17, "Operation Description".

4WD Solenoid

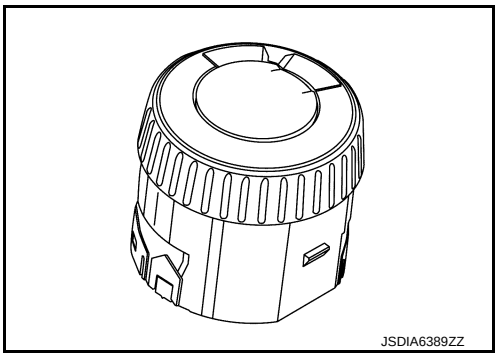
INFOID:0000000010991956

- 4WD solenoid is integrated with electric controlled coupling.
- Controls electric controlled coupling by command current from 4WD control unit.

4WD Mode Switch

INFOID:0000000010991957

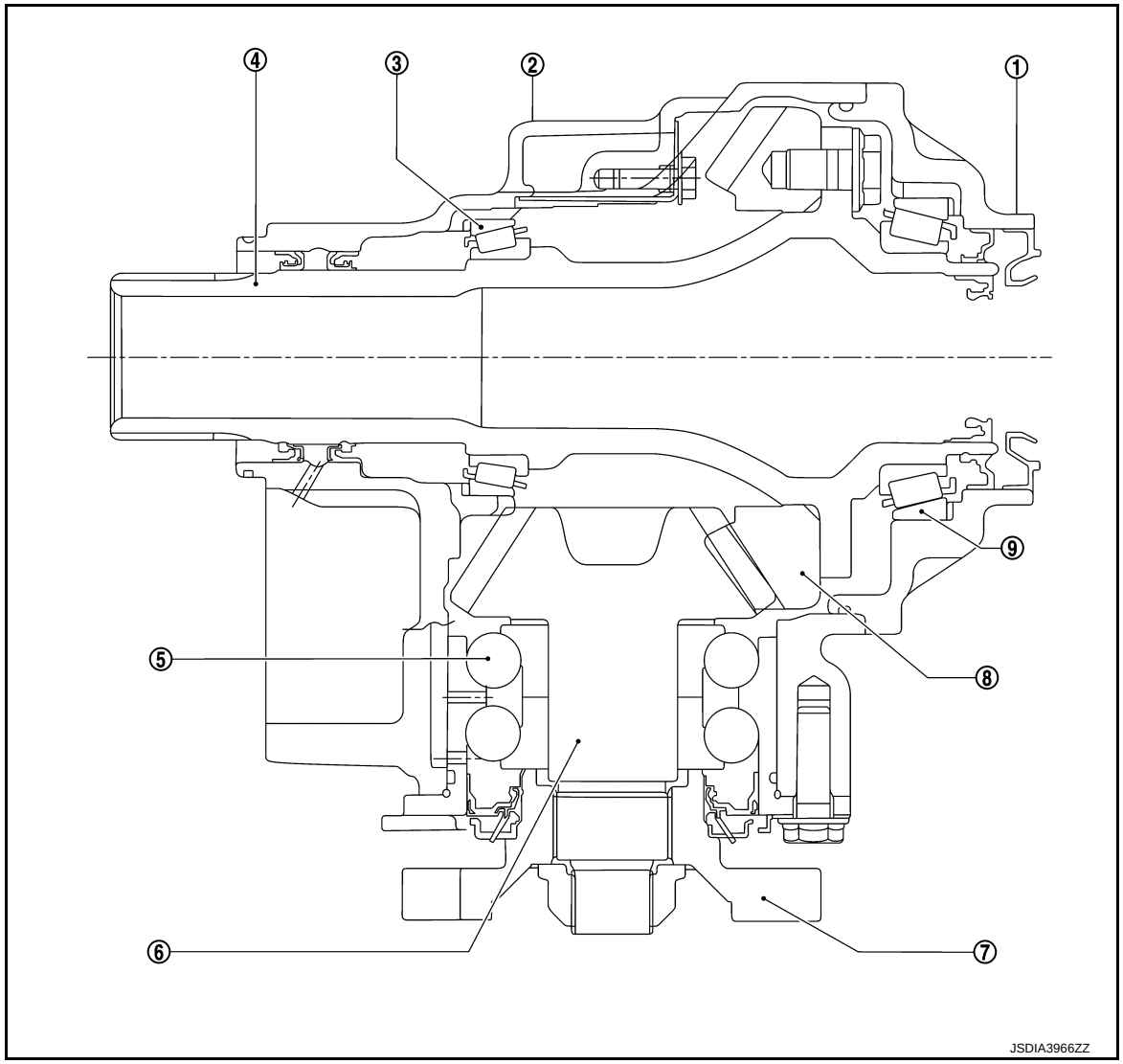
4WD mode is selectable among 2WD mode, AUTO mode, and LOCK mode by operating the 4WD mode switch while the engine is running.



STRUCTURE AND OPERATION

Sectional View

INFOID:0000000010991958

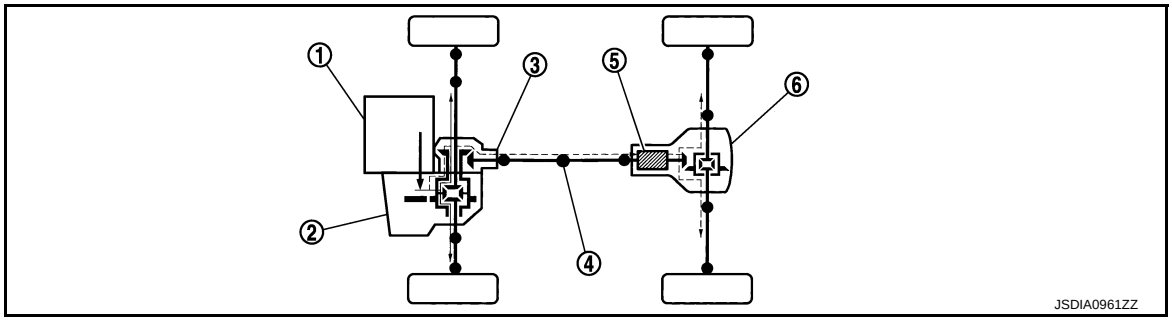


① Transfer cover	② Transfer case	③ Ring gear bearing (transfer case side)
④ Ring gear shaft	⑤ Pinion bearing	⑥ Drive pinion
⑦ Companion flange	⑧ Ring gear	⑨ Ring gear bearing (transfer cover side)

Operation Description

INFOID:0000000010991959

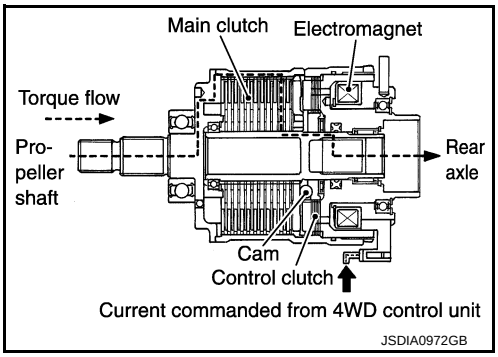
POWER TRANSFER DIAGRAM



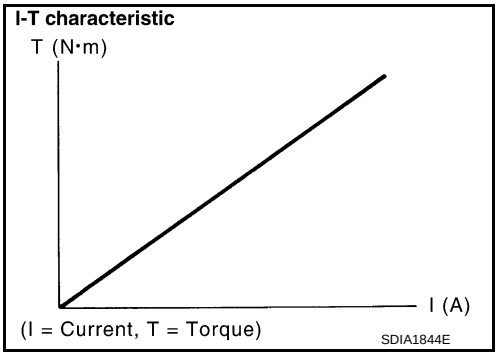
① Engine ② Transaxle ③ Transfer
④ Propeller shaft ⑤ Electric controlled coupling ⑥ Rear final drive

ELECTRIC CONTROLLED COUPLING

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



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

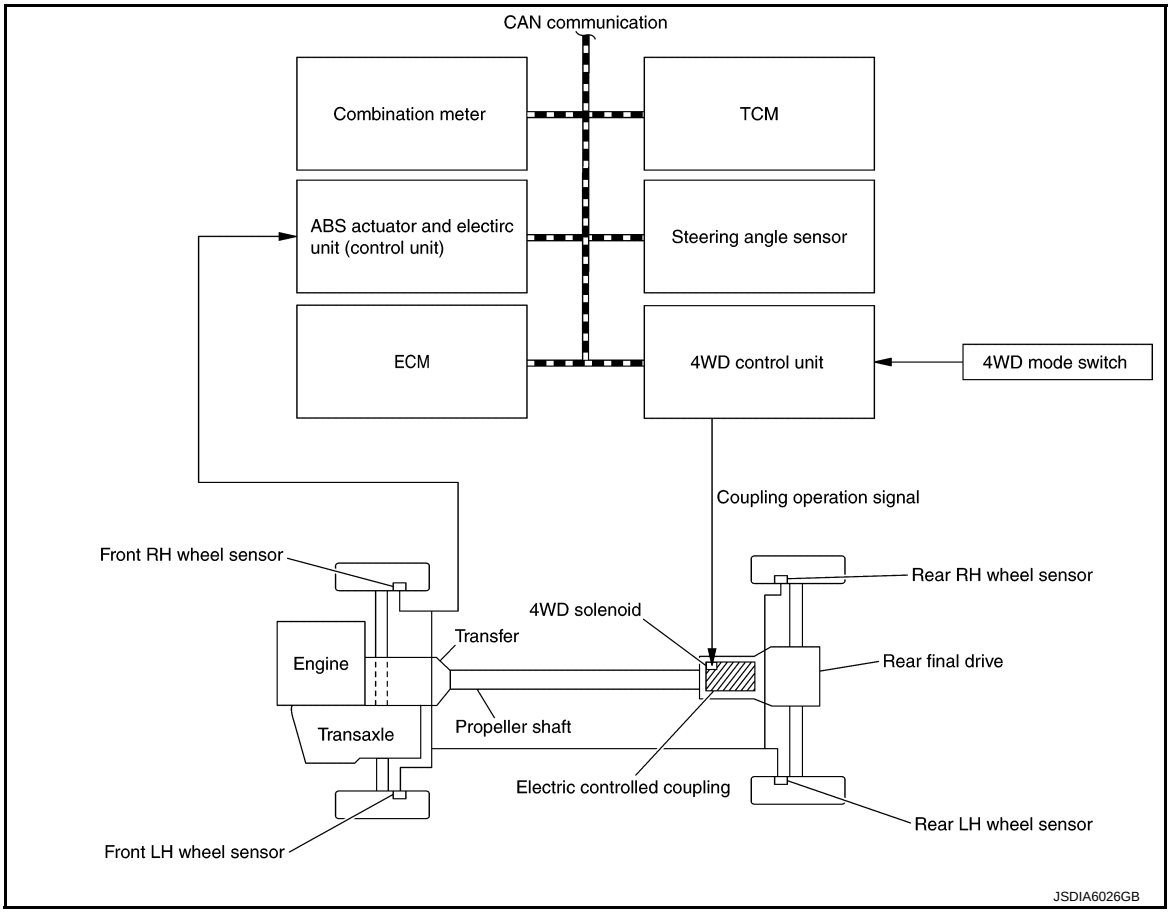


SYSTEM
4WD SYSTEM
4WD SYSTEM : System Description

INFOID:0000000010991960

- Pressing force of multiple disc clutch is controlled by electric control. Driving torque distribution of front and rear wheels changes automatically between approximately 100 : 0 (2WD) and 50 : 50 (4WD) to have an optimized torque distribution adapted to road condition change.
- Driving mode is selectable among 2WD mode, AUTO mode, and LOCK mode by operating the 4WD mode switch.
- In accordance with fail-safe function, when system is malfunctioning, 4WD control stops, and the system becomes 2WD or slight 4WD (rear-wheels still have some driving torque). Refer to DLN-21, "4WD SYSTEM : Fail-Safe".
- When a high load status continues for electric controlled coupling, 4WD control temporarily becomes front wheel drive, according to protection function. Refer to DLN-22, "4WD SYSTEM : Protection Function".

SYSTEM DIAGRAM



Signal with Communication Line

Major signal transmission between each unit via CAN communication lines are shown in the following table.

Component parts	Signal item
Combination meter	Mainly transmits the following signals to 4WD control unit via CAN communication. • Parking brake switch signal Mainly receives the following signals from 4WD control unit via CAN communication. • 4WD warning lamp signal • 4WD mode indicator lamp signal • Torque distribution indicator signal
Steering angle sensor	Mainly transmits the following signals to 4WD control unit via CAN communication. • Steering angle sensor signal

Component parts	Signal item
ABS actuator and electric unit (control unit)	Mainly transmits the following signals to 4WD control unit via CAN communication. • Each wheel speed signal • Decel G sensor signal • Side G sensor signal • Yaw rate sensor signal
ECM	Mainly transmits the following signals to 4WD control unit via CAN communication. • Accelerator pedal position signal • Engine speed signal • Engine status signal
TCM	Mainly transmits the following signals to 4WD control unit via CAN communication. • Input shaft revolutional signal • CVT ratio signal

4WD SYSTEM : Control in Each Mode

INFOID:0000000010991961

2WD MODE

- Vehicle is in front-wheel drive.

CAUTION:

If front wheels are slipping in 2WD mode, never switch to AUTO or LOCK. This can cause difficulties for the system.

NOTE:

The 4WD control unit may distribute the minimum necessary driving torque to rear wheels even when the 2WD mode is selected, depending on the driving condition. (However AUTO or LOCK indicator lamp does not illuminate.)

AUTO MODE

- Electronic control allows optimal distribution of torque to front/rear wheels to match road conditions.
- Pressing force of multiple disc clutch is controlled by electric control. Driving torque distribution of front and rear wheels changes automatically between approximately 100 : 0 (2WD) and 50 : 50 (4WD) to have an optimized torque distribution adapted to road condition change.
- Sensor inputs determine the vehicle's turning condition, and tight cornering/braking are controlled by distributing optimum torque to rear wheels.

Vehicle Starts Control

- At the start, torque distribution for front and rear wheels is fixed by electric control and stable start is achieved.
- Makes possible stable driving, with no wheel spin, on snowy roads or other slippery surfaces.

Normal Control

- On roads which do not require 4WD, it contributes to improved fuel economy by driving in conditions close to front-wheel drive and it results in better fuel efficiency.
- When spin occurs on front wheel, distribute optimum torque to rear wheel and keep stable driving.
- The vehicle cornering status is judged according to information from each sensor, and the optimum torque is distributed to rear wheels for preventing tight cornering/braking symptom.

LOCK MODE

- Front/rear wheel torque distribution is fixed, ensuring stable driving when climbing slopes.
- In LOCK mode, the pressing force to the multiple disc clutches is maximized by the electronic control and the driving torque distribution of front and rear wheels is fixed to obtain the 4WD status of approximately 50 : 50.

  NOTE:

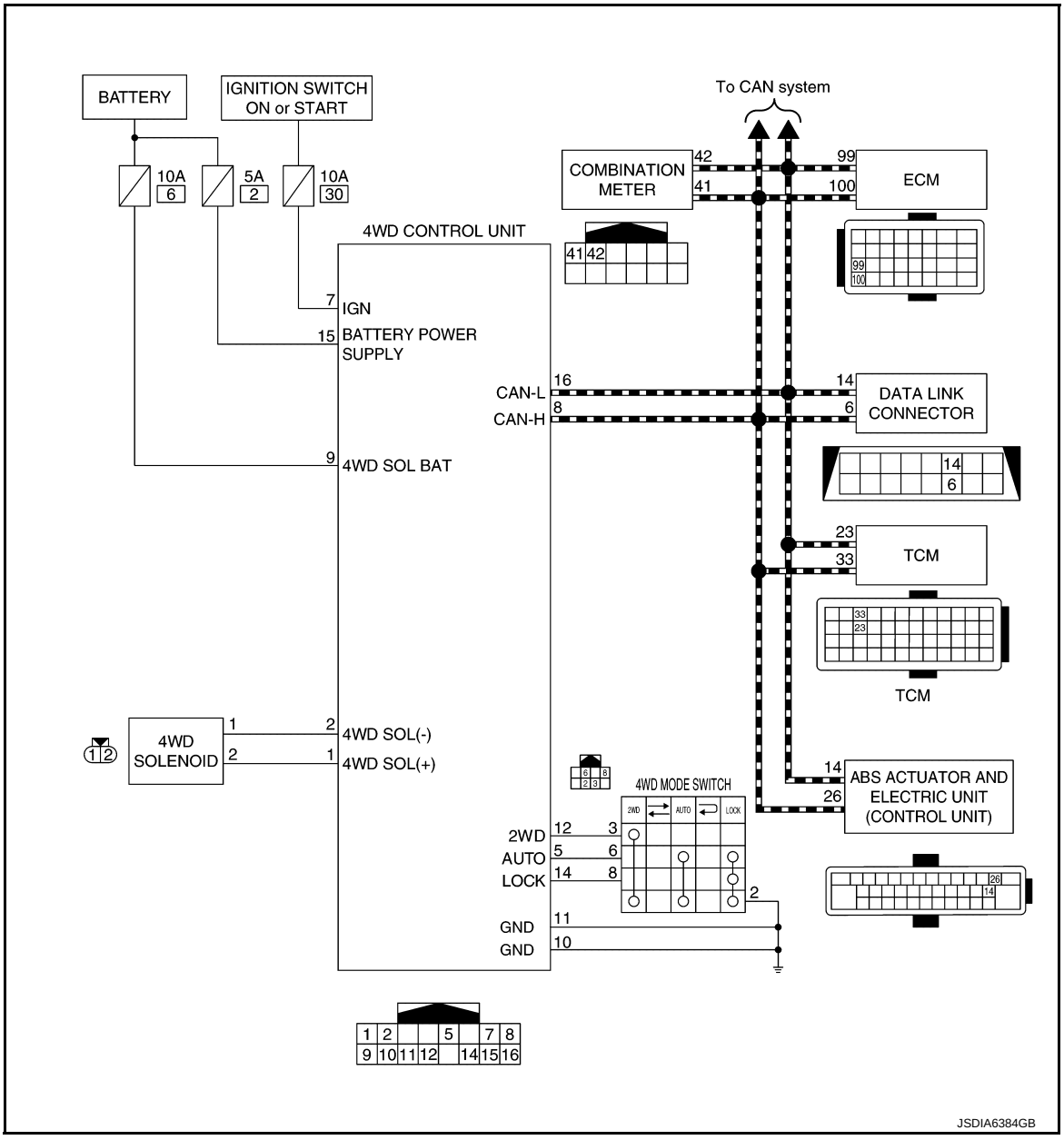
  Only torque distribution may be switched to the control same as the one in AUTO mode, depending on the driving condition.
- LOCK mode will change to AUTO mode automatically, when the vehicle has been driven at a high speed. Then LOCK mode control is canceled and the LOCK indicator lamp turns off.
- When vehicle speed exceeds the specified speed, the mode cannot be switched from AUTO mode to LOCK mode.
- LOCK mode will change to AUTO mode automatically, when the ignition switch is turned OFF in LOCK mode.

NOTE:

If there is a significant difference in pressure or wear between tires, full vehicle performance is not available. Tire conditions are detected, and LOCK mode may be prohibited, or else speeds at which LOCK mode is enabled may be restricted.

4WD SYSTEM : Circuit Diagram

INFOID:0000000010991962



4WD SYSTEM : Fail-Safe

INFOID:0000000010991963

If any malfunction occurs in 4WD electrical system, and control unit detects the malfunction, 4WD warning on information display (combination meter) is displayed to indicate system malfunction. And then 4WD control unit controls becomes the fail-safe mode depending on DTC.

DTC	Vehicle condition
•C1201 •C1204 •C1209 •P1804 •P1809 •P1811 •P181F	4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.
•C1203 •C1210 •P1808 •P181D •U1000 •U1010	4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.
•P181B	No impact to vehicle behavior.

4WD SYSTEM : Protection Function

INFOID:0000000010991964

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

DTC	4WD warning (on information display)	Error area and root cause	Contents of protection function
—	Refer to DLN-22, "INFORMATION DISPLAY (COMBINATION METER) : 4WD Warning".	Rear final drive assembly in protection mode. It is not malfunction. (Internal temperature rise of electronic controlled coupling)	Shuts down 4WD system temporarily (Front wheel drive)
—		Malfunction in each tire or different tire diameter	

NOTE:
- If the 4WD warning displays during driving but remains not displayed after the engine is restarted, the system is normal. If it again displays 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.

INFORMATION DISPLAY (COMBINATION METER)

INFORMATION DISPLAY (COMBINATION METER) : 4WD Warning

INFOID:0000000010991965

DESIGN/PURPOSE

4WD warning is displayed when the 4WD system has a malfunction. 4WD warning indicates that the vehicle is in fail-safe mode or protection function mode.

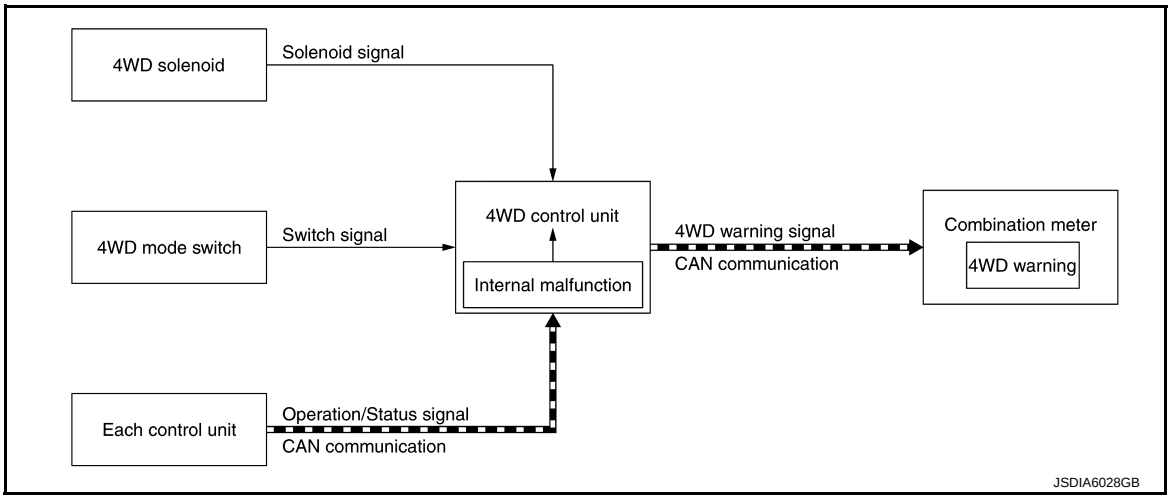
Symbol	Message	Condition
 JPNIA1896ZZ	4WD Error See Owner's Manual	4WD system malfunction.
	4WD High Temp. Stop vehicle	Protection function is activated due to heavy load to electric controlled coupling. (4WD system is not malfunctioning and 4WD system changes to front wheel drive.)
	Tire Size Incorrect See Owner's Manual	Large difference in diameter of front/rear tires.

SYNCHRONIZATION WITH MASTER WARNING LAMP

Applicable

For master warning lamp, refer to MWI-47, "WARNING LAMPS/INDICATOR LAMPS : Master Warning Lamp".

SYSTEM DIAGRAM



SIGNAL PATH

- The 4WD control unit judges and decides a mode from among normal mode, fail-safe mode, and protection function mode, according to signals received from each switch, sensor, and control unit.
- The 4WD control unit transmits 4WD warning signal to the combination meter via CAN communication when judging fail-safe mode or protection function mode.
- The combination meter displays 4WD warning on the information display when receiving 4WD warning signal transmitted from the 4WD control unit.

WARNING CONDITION

4WD warning is displayed when the 4WD system goes into fail-safe mode or protection function mode.

WARNING CANCEL CONDITION

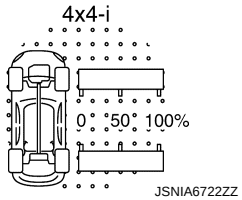
When any of the conditions listed below is satisfied:

- Ignition switch is in a position other than ON.
- 4WD warning becomes invisible when the 4WD system returns to normal.

INFORMATION DISPLAY (COMBINATION METER) : 4WD Torque Distribution Indicator

INFOID:0000000010991966

DESIGN/PURPOSE

Design	Purpose
 JSNIA6722ZZ	Displays the drive torque distribution to the front and rear wheels while driving and informs the driver of this. **NOTE:** The driving force distribution may not match actual one. This is not a system malfunction.

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp

INFOID:0000000010991967

Name	Design	Layout/Function
4WD indicator lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design". For function: Refer to MWI-23, "WARNING LAMPS/INDICATOR LAMPS : 4WD Indicator Lamp and LOCK Indicator Lamp".

Name	Design	Layout/Function
LOCK indicator lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design".
		For function: Refer to MWI-23, "WARNING LAMPS/INDICATOR LAMPS : 4WD Indicator Lamp and LOCK Indicator Lamp".

WARNING/INDICATOR/CHIME LIST : Warning/Indicator (On Information Display)

INFOID:0000000010991968

Name	Function
4WD warning	Refer to DLN-22, "INFORMATION DISPLAY (COMBINATION METER) : 4WD Warning".
4WD torque distribution indicator	Refer to DLN-23, "INFORMATION DISPLAY (COMBINATION METER) : 4WD Torque Distribution Indicator".

DIAGNOSIS SYSTEM (4WD CONTROL UNIT)

CONSULT Function

INFOID:0000000010991969

APPLICATION ITEMS

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

Diagnostic test mode	Function
ECU Identification	4WD control unit part number can be read.
Self Diagnostic Result	Self-diagnostic results and freeze frame data can be read and erased quickly.*
Data Monitor	Input/Output data in the 4WD control unit can be read.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the 4WD control unit and also shifts some parameters in a specified range.
Work support	This mode enable a technician to adjust some devices faster and more accurately by following the indication on the CONSULT.

*: The following diagnosis information is erased by erasing.
- DTC
- Freeze frame data (FFD)

ECU IDENTIFICATION

4WD control unit part number can be read.

SELF DIAGNOSTIC RESULT

Refer to DLN-30, "DTC Index".

When “PRSNT” is displayed on self-diagnosis result.
- The system is presently malfunctioning.

When “PAST” is displayed on self-diagnosis result.
- System malfunction in the past is detected, but the system is presently normal.

FREEZE FRAME DATA (FFD)

The following vehicle status is recorded when DTC is detected and is displayed.

Monitor item (Unit)	Remarks
ODO/TRIP METER (km/h or mph)	Odometer value via CAN communication line is displayed.
ABS OPERATION SIG (On/Off)	ABS operation status via CAN communication line is displayed.
VDC OPERATION SIG (On/Off)	VDC operation status via CAN communication line is displayed.
TCS OPERATION SIG (On/Off)	TCS operation status via CAN communication line is displayed.
HI COEF FRIC FLG 1 (LOW/HIGH)	Measured friction of load is displayed when vehicle starts.
HI COEF FRIC FLG 2 (LOW/HIGH)	Measured friction of load is displayed when vehicle during deceleration.
IGN VOLT (V)	Ignition voltage supplied to 4WD control unit is displayed.
TARGET SOL CRNT (A)	4WD solenoid target current is displayed.
SOLENOID CRNT (A)	4WD solenoid control current is displayed.
QUASI VEHICLE SPEED (km/h or mph)	Vehicle speed calculated by 4WD control unit is displayed.
FRONT WHEEL SPEED (km/h or mph)	Front wheel speed average calculated by 4WD control unit is displayed.
REAR WHEEL SPEED (km/h or mph)	Rear wheel speed average calculated by 4WD control unit is displayed.
SLCT LVR POSI	Current transmission gear via CAN communication line is displayed.
OPERATION MODE	Control status of 4WD mode is displayed.
FRONT RH WHEEL SPEED (km/h or mph)	Wheel speed calculated by front RH wheel sensor signal is displayed.
FRONT LH WHEEL SPEED (km/h or mph)	Wheel speed calculated by front LH wheel sensor signal is displayed.
REAR RH WHEEL SPEED (km/h or mph)	Wheel speed calculated by rear RH wheel sensor signal is displayed.
REAR LH WHEEL SPEED (km/h or mph)	Wheel speed calculated by rear LH wheel sensor signal is displayed.

DATA MONITOR

NOTE:
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item (Unit)	Remarks
STOP LAMP SW (On/Off)	Stop lamp switch signal status via CAN communication line is displayed.
ENG SPEED SIG (Run/Stop)	Engine status is displayed.
ETS ACTUATOR (On/Off)	Operating condition of 4WD actuator relay (integrated in 4WD control unit) is displayed.
4WD WARN LAMP (On/Off)	Control status of 4WD warning (on information display) is displayed.
4WD MODE SW (AUTO/LOCK/2WD)	4WD mode switch status is displayed.
4WD MODE MON (AUTO/LOCK/2WD)	Control status of 4WD is displayed.
DIS-TIRE MONI (mm)	Improper size tire installed condition is displayed.
PARKING BRAKE SW SIG (On/Off)	Parking switch signal status via CAN communication line is displayed.
4WD MODE SW (2WD) (On/Off)	4WD mode switch (2WD position) signal is displayed.
4WD MODE SW (AUTO) (On/Off)	4WD mode switch (AUTO position) signal is displayed.
4WD MODE SW (LOCK) (On/Off)	4WD mode switch (LOCK position) signal is displayed.
READY (Off/Running)	This item is not equipped, but displayed.
BATTERY VOLT (V)	Power supply voltage value of 4WD control unit is displayed.
THRTL POS SEN (%)	Throttle opening status is displayed.
ETS SOLENOID (A)	Monitored value of current at 4WD solenoid is displayed.
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

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

Test item	Condition	Description
SOLENOID (Detects 4WD solenoid)	• Vehicle stopped • Engine running • No DTC detected	Change command current value to 4WD 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.

WORK SUPPORT

Item	Usage
UNIT CHARACTERISTICS DATA	Display the unit characteristics of electric controlled coupling written to 4WD control unit.
UNIT CHARACTERISTICS WRITE	Writes the unit characteristics of electric controlled coupling to 4WD control unit.

ECU DIAGNOSIS INFORMATION

4WD CONTROL UNIT

Reference Value

INFOID:0000000010991970

VALUES ON THE DIAGNOSIS TOOL

NOTE:

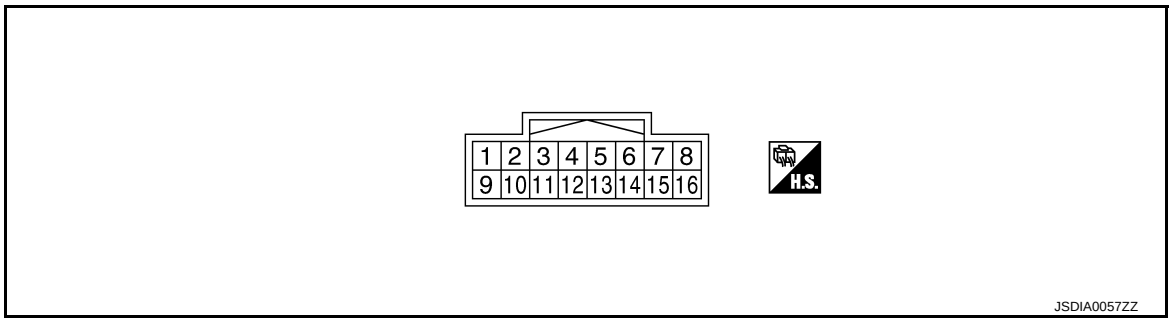
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item	Condition		Value/Status
STOP LAMP SW	Brake pedal: Depressed		On
	Brake pedal: Released		Off
ENG SPEED SIG	Engine stopped (Engine speed: Less than 400 rpm)		Stop
	Engine running (Engine speed: 400 rpm or more)		Run
ETS ACTUATOR	Engine stopped (Ignition switch: ON)		Off
	Engine running		On
4WD WARN LAMP	4WD warning (on information display): Displayed		On
	4WD warning (on information display): Not displayed		Off
4WD MODE SW	4WD mode switch: 2WD		2WD
	4WD mode switch: AUTO		AUTO
	4WD mode switch: LOCK (State of hold of LOCK position)		LOCK
4WD MODE MON	4WD mode switch: 2WD		2WD
	4WD mode switch: AUTO		AUTO
	4WD mode switch: AUTO ⇒ LOCK (When switching to LOCK mode)	Vehicle speed below 10 km/h (6 mph)	AUTO ⇒ LOCK
		Vehicle speed above 10 km/h (6 mph)	AUTO
	4WD mode switch: LOCK ⇒ AUTO (When switching to AUTO mode)	Vehicle speed below 10 km/h (6 mph)	LOCK ⇒ AUTO
DIS-TIRE MONI	Vehicle running with normal size tire installed		0 – 4 mm
	Vehicle running with improper size tire installed (Front/rear tire size difference, wear condition)		4 – 8 mm, 8 – mm
PARKING BRAKE SW SIG	Parking brake operated		On
	Parking brake not operated		Off
4WD MODE SW (2WD)	4WD mode switch: 2WD		On
	4WD mode switch: Except 2WD		Off
4WD MODE SW (AUTO)	4WD mode switch: AUTO		On
	4WD mode switch: Except AUTO		Off
4WD MODE SW (LOCK)	4WD mode switch: LOCK (State of hold of LOCK position)		On
	4WD mode switch: Except LOCK		Off
READY	Always		Off
BATTERY VOLT	Always		Battery voltage
THRTL POS SEN	When depressing accelerator pedal (Value rises gradually in response to throttle position.)		0 – 100%

Monitor item	Condition		Value/Status
ETS SOLENOID	Engine running • At idle speed	2WD mode	Approx. 0.000 A
		AUTO mode	Approx. 0.000 A
		LOCK mode	Approx. 0.000 A
	Engine running • 3,000 rpm or more constant	2WD mode	Approx. 0.000 A
		AUTO mode	Approx. 0.000 – 2.490 A*
		LOCK mode	Approx. 2.490 A
FR RH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display (±10% or less)
FR LH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display (±10% or less)
RR RH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display (±10% or less)
RR LH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display (±10%)

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

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
1 (SB)	Ground	4WD solenoid power supply	Output	Engine speed: At idle	2WD mode	0 V
					AUTO mode	0 V
					LOCK mode	0 V
				Engine speed: 3,000 rpm or more constant	2WD mode	0 V
					AUTO mode	2.5 V*
					LOCK mode	8 V
2 (Y)	Ground	4WD solenoid ground	Input	Engine speed: At idle		0 V
				Engine speed: 3,000 rpm or more constant		0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
5 (V)	Ground	4WD mode switch (AUTO)	Input	Ignition switch: ON	4WD mode switch: 2WD	Battery voltage
					4WD mode switch: AUTO	0 V
					4WD mode switch: LOCK (State of hold of LOCK position)	0 V
7 (LA/R)	Ground	Ignition switch	Input	Ignition switch: ON		Battery voltage
				Ignition switch: OFF		0 V
8 (L)	—	CAN-H	Input/ Output	—		—
9 (LA/G)	Ground	Power supply (4WD solenoid)	Input	Always		Battery voltage
10 (B)	Ground	Ground	—	Always		0 V
11 (B)	Ground	Ground	—	Always		0 V
12 (GR)	Ground	4WD mode switch (2WD)	Input	Ignition switch: ON	4WD mode switch: 2WD	0 V
					4WD mode switch: AUTO	Battery voltage
					4WD mode switch: LOCK (State of hold of LOCK position)	Battery voltage
14 (Y)	Ground	4WD mode switch (LOCK)	Input	Ignition switch: ON	4WD mode switch: 2WD	Battery voltage
					4WD mode switch: AUTO	Battery voltage
					4WD mode switch: LOCK (State of hold of LOCK position)	0 V
15 (LA/L)	Ground	Power supply (4WD control unit)	Input	Always		Battery voltage
16 (P)	—	CAN-L	Input/ Output	—		—

*: The values are changed by depressed accelerator pedal opening and engine speed.

CAUTION:

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

Fail-Safe

INFOID:0000000010991971

If any malfunction occurs in 4WD electrical system, and control unit detects the malfunction, 4WD warning on information display (combination meter) is displayed to indicate system malfunction. And then 4WD control unit controls becomes the fail-safe mode depending on DTC.

DTC	Vehicle condition
•C1201 •C1204 •C1209 •P1804 •P1809 •P1811 •P181F	4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC	Vehicle condition
•C1203 •C1210 •P1808 •P181D •U1000 •U1010	4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.
•P181B	No impact to vehicle behavior.

Protection Function

INFOID:0000000010991972

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

DTC	4WD warning (on information display)	Error area and root cause	Contents of protection function
—	Refer to DLN-22, "INFORMATION DISPLAY (COMBINATION METER) : 4WD Warning".	Rear final drive assembly in protection mode. It is not malfunction. (Internal temperature rise of electronic controlled coupling)	Shuts down 4WD system temporarily (Front wheel drive)
—		Malfunction in each tire or different tire diameter	

NOTE:
- If the 4WD warning displays during driving but remains not displayed after the engine is restarted, the system is normal. If it again displays 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.

DTC Inspection Priority Chart

INFOID:0000000010991973

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	• C1201 CONTROLLER FAILURE
2	• U1000 CAN COMM CIRCUIT • U1010 CONTROL UNIT (CAN)
3	• C1203 ABS SYSTEM • C1210 ENGINE SIGNAL 1 • P1808 VHCL SPEED SEN-ABS • P181D ENGINE SYSTEM
4	• P1809 CONTROL UNIT
5	• C1204 4WD SOLENOID • P1811 BATTERY VOLTAGE
6	• C1209 MODE SW
7	• P1804 CONTROL UNIT
8	• P181B INCOMP SELFSHUT • P181F INCOMP CALIBRATION

DTC Index

INFOID:0000000010991974

DTC	Display Item	Reference
C1201	CONTROLLER FAILURE	DLN-42, "DTC Description"
C1203	ABS SYSTEM	DLN-43, "DTC Description"
C1204	4WD SOLENOID	DLN-44, "DTC Description"

DTC	Display Item	Reference
C1209	MODE SW	DLN-47, "DTC Description"
C1210	ENGINE SIGNAL 1	DLN-50, "DTC Description"
P1804	CONTROL UNIT	DLN-51, "DTC Description"
P1808	VHCL SPEED SEN-ABS	DLN-52, "DTC Description"
P1809	CONTROL UNIT	DLN-53, "DTC Description"
P1811	BATTERY VOLTAGE	DLN-54, "DTC Description"
P181B	INCOMP SELF SHUT	DLN-57, "DTC Description"
P181D	ENGINE SYSTEM	DLN-60, "DTC Description"
P181F	INCOMP CALIBRATION	DLN-61, "DTC Description"
U1000	CAN COMM CIRCUIT	DLN-62, "DTC Description"
U1010	CONTROL UNIT (CAN)	DLN-63, "DTC Description"

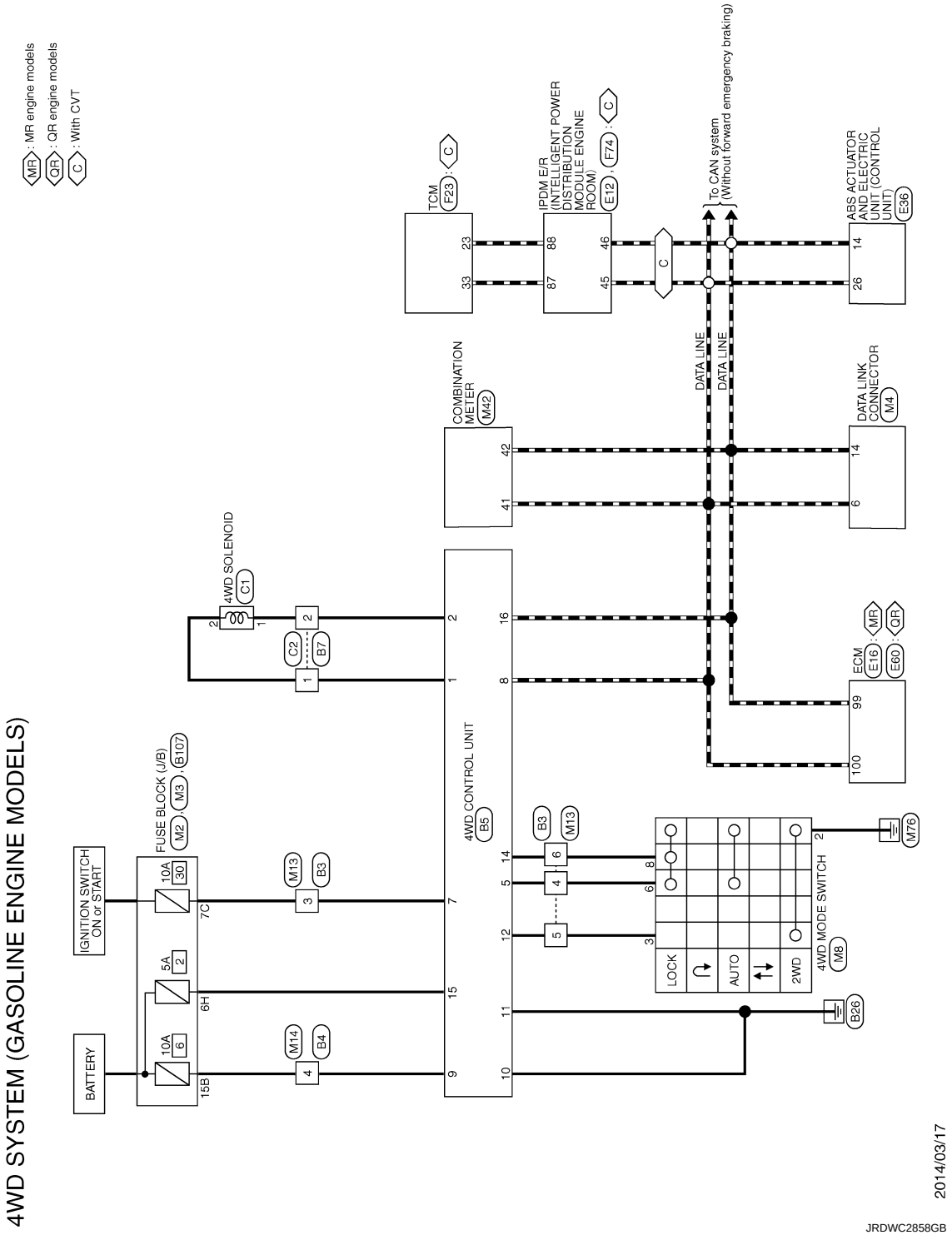
NOTE:
If some DTCs are displayed at the same time, refer to DLN-30, "DTC Inspection Priority Chart".

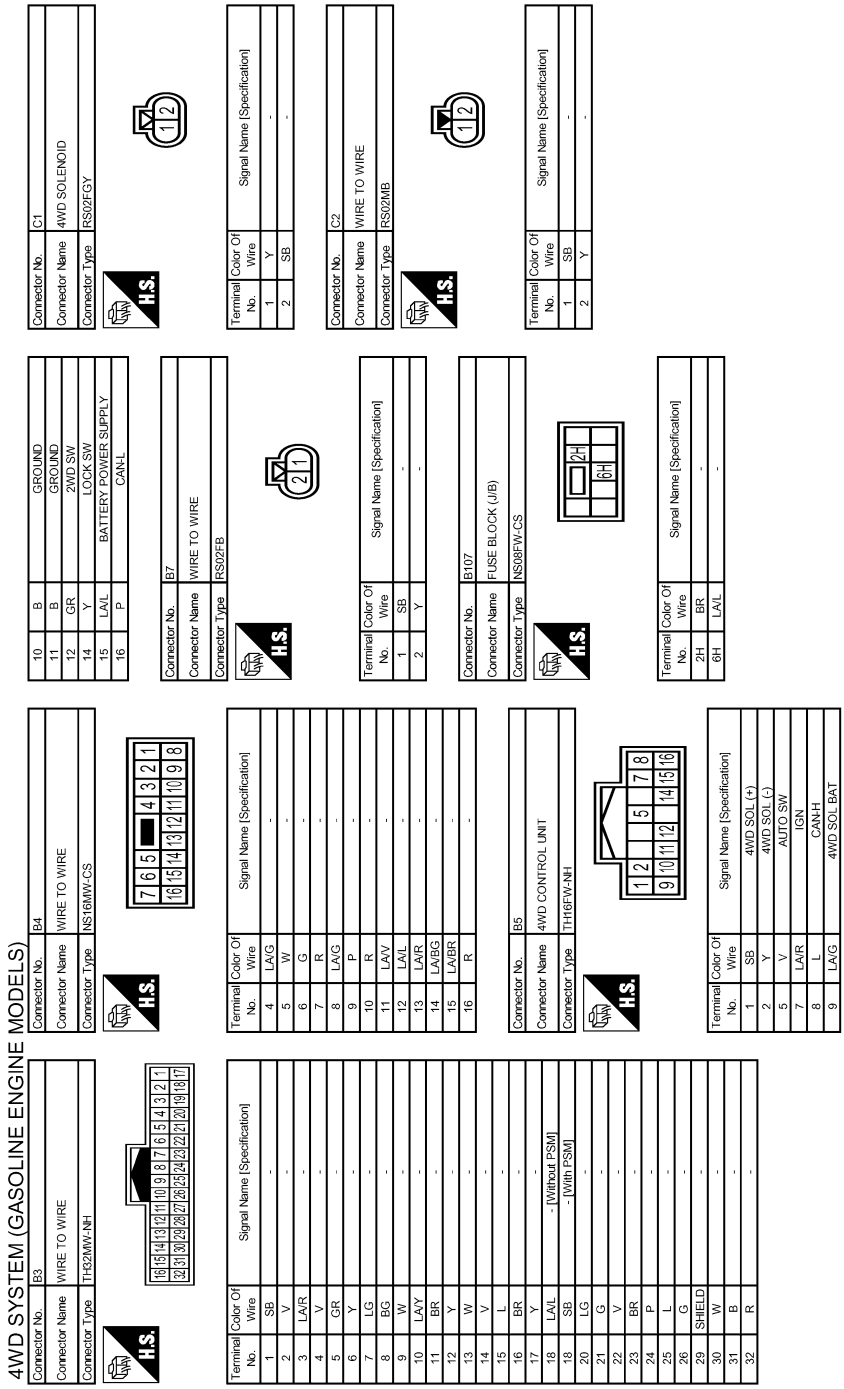
WIRING DIAGRAM

4WD SYSTEM

Wiring Diagram

INFOID:0000000010991975





JRDWC2859GB

4WD SYSTEM (GASOLINE ENGINE MODELS)

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH24FGY-NH

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
25	LG	-
26	W	-
27	SB	-
28	P	-
30	L	-
31	G	-
32	B	-
33	BG	-
34	LG	-
35	V	-
36	Y	-
37	B	-
38	GR	-
39	BR	-
45	L	-
46	P	-
47	W	-
48	R	-

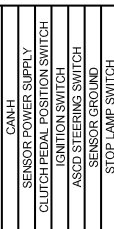
Connector No.	E16
Connector Name	ECM
Connector Type	RH24FB-RZ8-L-LH

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
97	W	BAROMETRIC PRESSURE SENSOR
99	P	CAN-L
100	L	CAN-H
101	Y	SENSOR POWER SUPPLY
108	R	CLUTCH PEDAL POSITION SWITCH
109	LG	IGNITION SWITCH
110	G	ASCD STEERING SWITCH
111	BR	SENSOR GROUND
115	V	STOP LAMP SWITCH
116	GR	BRAKE PEDAL POSITION SWITCH
118	SB	SENSOR POWER SUPPLY
119	Y	ACCELERATOR PEDAL POSITION SENSOR 2
120	LG	SENSOR GROUND
121	BR	POWER SUPPLY FOR ECM
122	V	SENSOR POWER SUPPLY
123	B	ECM GROUND
124	R	SENSOR GROUND
125	B	ECM GROUND
126	GR	ACCELERATOR PEDAL POSITION SENSOR 1
127	R	SENSOR GROUND
128	B	ECM GROUND

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BEZ34FB-BHY2-BJZ2-RH

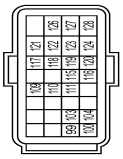
H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	MOTOR POWER SUPPLY
4	SB	FR RH WHEEL SENSOR SIGNAL
5	V	BRAKE VACUUM SENSOR POWER SUPPLY
8	P	FR LH WHEEL SENSOR SIGNAL
9	Y	hill decent control SWITCH SIGNAL
12	LG	BRAKE VACUUM SENSOR SIGNAL
13	B	GROUND (MOTOR)
14	P	CAN-L
15	BR	VDC OFF SWITCH SIGNAL
16	R	FR RH WHEEL SENSOR POWER SUPPLY
17	Y	RR RH WHEEL SENSOR POWER SUPPLY
18	G	RR LH WHEEL SENSOR SIGNAL
19	W	FR LH WHEEL SENSOR POWER SUPPLY
24	SHIELD	BRAKE VACUUM SENSOR GROUND
25	BR	VALVE POWER SUPPLY
26	L	CAN-H
28	GR	IGNITION POWER SUPPLY
29	LG	RR RH WHEEL SENSOR SIGNAL
31	BR	RR LH WHEEL SENSOR POWER SUPPLY
38	B	GROUND (VALVE)

Connector No.	E60
Connector Name	ECM
Connector Type	RH24FB-RZ8-L-LH

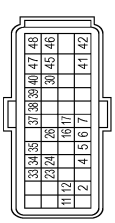
H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
99	P	CAN COMMUNICATION LINE (CAN-L)
100	L	CAN COMMUNICATION LINE (CAN-H)
103	Y	REFRIGERANT PRESSURE SENSOR
104	R	SENSOR POWER SUPPLY
109	LG	IGNITION SWITCH
110	G	ASCD STEERING SWITCH
111	BR	SENSOR GROUND
115	V	STOP LAMP SWITCH
116	GR	BRAKE PEDAL POSITION SWITCH
117	W	PNP SIGNAL
118	SB	SENSOR POWER SUPPLY
119	Y	ACCELERATOR PEDAL POSITION SENSOR 2
120	LG	SENSOR GROUND
121	BR	POWER SUPPLY FOR ECM
122	V	SENSOR POWER SUPPLY
123	BR	ECM GROUND
124	W	SENSOR GROUND
126	GR	ACCELERATOR PEDAL POSITION SENSOR 1
127	R	SENSOR GROUND
128	BR	ECM GROUND

Connector No.	F23
Connector Name	TCM
Connector Type	RH40FB-RZ8-L-RH

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
2	GR	-
4	Y	D RANGE SWITCH
5	BR	N RANGE SWITCH
6	G	R RANGE SWITCH
7	V	P RANGE SWITCH
11	LG	SENSOR GROUND
12	BR	CVT FLUID TEMPERATURE SENSOR
16	SB	SECONDARY PRESSURE SENSOR
17	R	PRIMARY PRESSURE SENSOR
23	P	CAN-L
24	LG	INPUT SPEED SENSOR
26	BG	SENSOR POWER SUPPLY
30	GR	LINE PRESSURE SOLENOID VALVE
33	L	CAN-H
34	W	OUTPUT SPEED SENSOR
35	GR	PRIMARY SPEED SENSOR
37	Y	SELECT SOLENOID VALVE
38	G	TORQUE CONVERTER CLUTCH SOLENOID VALVE
39	W	SECONDARY PRESSURE SOLENOID VALVE
40	V	PRIMARY PRESSURE SOLENOID VALVE
41	B	GROUND
42	B	GROUND
45	V	BATTERY POWER SUPPLY
46	V	BATTERY POWER SUPPLY
47	BG	IGNITION POWER SUPPLY
48	BG	IGNITION POWER SUPPLY

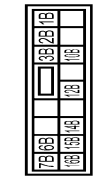
JRDWC2860GB

4WD SYSTEM (GASOLINE ENGINE MODELS)

Connector No.	F74
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH24FB-NH

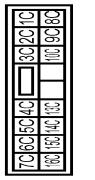
Terminal No.	Color Of Wire	Signal Name [Specification]
87	L	-
88	P	-
89	W	-
90	R	-
92	GR	-
93	G	- [With R9M Engine]
93	P	- [With MR20 or QR25 Engine]
94	SB	-
95	LG	-
96	W	-
97	P	-
98	Y	-
99	BG	-
100	LG	-
101	V	-
102	Y	-
105	W	-
106	BR	-
107	V	-
110	SB	-

Connector No.	M2
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FBR-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
10B	GR	- [With MR20 engine or R9M engine]
10B	LA/GR	- [With QR25 Engine]
12B	BR	-
14B	W	-
15B	W	-
16B	GR	-
1B	G	-
2B	R	-
3B	V	-
6B	LA/L	-
7B	LA/V	-

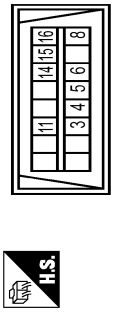
Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
10C	LG	-
13C	LA/G	-
14C	R	-
15C	L	-
16C	LA/W	-
1C	R	-
2C	G	-
3C	Y	-
4C	LG	-

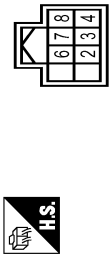
5C	GR	-
6C	LA/R	-
7C	Y	-
8C	BR	- [With ISS]
8C	LA/BR	- [Without ISS]
9C	L	-

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color Of Wire	Signal Name [Specification]
3	LG	-
4	B	-
5	B	-
6	L	-
8	Y	-
11	SB	-
14	P	-
15	BR	-
16	W	-

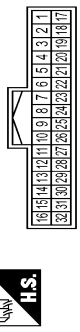
Connector No.	M8
Connector Name	4WD MODE SWITCH
Connector Type	TH08FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
2	B	-
3	L	-
4	B	-

6	BR	-
7	G	-
8	Y	-

Connector No.	M13
Connector Name	WIRE TO WIRE
Connector Type	TH32FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
1	SB	-
2	V	-
3	SB	-
4	BR	-
5	L	-
6	Y	-
7	LG	-
8	BG	-
9	W	-
10	Y	-
11	R	-
12	SB	-
13	LG	-
14	V	-
15	SB	-
16	Y	-
17	LA/BR	-
18	LA/L	-
20	BG	-
21	BG	-
22	GR	-
23	GR	-
24	P	-
25	L	-
26	BR	-
29	SHIELD	-
30	W	-
31	B	-
32	R	-

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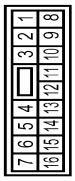
4WD SYSTEM (GASOLINE ENGINE MODELS)

Connector No.	M14
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS

H.S.

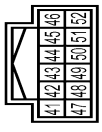


Terminal No.	Color Of Wire	Signal Name [Specification]
4	Y	-
5	W	-
6	LA/G	-
7	R	-
8	BR	-
9	G	-
10	R	-
11	LG	-
12	GR	-
13	BR	-
14	LA/L	-
15	LA/BR	-
16	GR	-

47	SB	AV COMMUNICATION SIGNAL (H)
48	LG	AV COMMUNICATION SIGNAL (L)
49	Y	OIL LEVEL SENSOR SIGNAL
50	B/G	OIL LEVEL SENSOR GROUND
51	LA/L	FUEL LEVEL SENSOR SIGNAL
52	B	GROUND

Connector No.	M42
Connector Name	COMBINATION METER
Connector Type	TH12FW-NH

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
41	L	CAN-H
42	P	CAN-L
43	W	ILLUMINATION CONTROL SIGNAL
44	LA/B	FUEL LEVEL SENSOR GROUND
45	LA/G	BATTERY POWER SUPPLY
46	LA/BR	IGNITION SIGNAL [Without ISS]
46	V	IGNITION SIGNAL [With ISS]

JRDWC2862GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000010991976

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing DLN-38, "Diagnostic Work Sheet" and reproduce symptoms as well as fully understand it. 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 SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained by interview. Also check that the symptom is not caused by protection function. Refer to DLN-30, "Protection Function".

CAUTION:

When the symptom is caused by normal operation, fully inspect each portion and obtain the understanding of customer that the symptom is not caused by a malfunction.

>> GO TO 3.

3.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is any DTC detected?

YES >> Record or print self-diagnosis results. GO TO 4.
NO >> GO TO 6.

4.RECHECK SYMPTOM

With CONSULT

1. Erase self-diagnostic results for “ALL MODE AWD/4WD”.
2. Perform DTC confirmation procedures for the error detected system.

NOTE:

If some DTCs are detected at the same time, determine the order for performing the diagnosis based on DLN-30, "DTC Inspection Priority Chart".

Is any DTC detected?

YES >> GO TO 5.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-44, "Intermittent Incident".

5.REPAIR OR REPLACE ERROR-DETECTED PARTS

- Repair or replace error-detected parts.
- Reconnect part or connector after repairing or replacing.
- When DTC is detected, erase self-diagnostic results for “ALL MODE AWD/4WD”.

>> GO TO 7.

6.IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

Estimate error-detected system based on symptom diagnosis and perform inspection.

Can the error-detected system be identified?

YES >> GO TO 7.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-44, "Intermittent Incident".

7. FINAL CHECK

With CONSULT
1. Check the reference value for 4WD control unit.
2. Recheck the symptom and check that symptom is not reproduced on the same conditions.

Is the symptom reproduced?

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

Diagnostic Work Sheet

INFOID:0000000010991977

Description

- In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about his/her concerns carefully. To systemize all the information for the diagnosis, prepare the interview sheet referring to the interview points.
- In some cases, multiple conditions that appear simultaneously may cause a DTC to be detected.

Interview sheet sample

Interview sheet					
Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine		Mileage	km (Mile)
Symptom		☐Vehicle does not enter 4WD mode.			
		☐4WD warning (4WD Error) is displayed.			
		☐Heavy tight-corner braking symptom occurs			
		☐Noise ☐Vibration			
		☐Others ( )			
First occurrence		☐Recently ☐Others ( )			
Frequency of occurrence		☐Always ☐Under a certain conditions of ☐Sometimes (time(s)/day)			
Climate conditions		☐Irrelevant			
	Weather	☐Fine ☐Cloud ☐Rain ☐Snow ☐Others ( )			
	Temperature	☐Hot ☐Warm ☐Cool ☐Cold ☐Temperature (Approx. °C)			
	Relative humidity	☐High ☐Moderate ☐Low			
Road conditions		☐Urban area ☐Suburb area ☐High way ☐Mounting road (uphill or down hill) ☐Rough road			
Operation conditions, etc.		☐Irrelevant ☐When engine starts ☐During idling ☐During driving ☐During acceleration ☐At constant speed driving ☐During deceleration ☐During cornering (right curve or left curve)			

Interview sheet

Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine		Mileage	km (Mile)
Other conditions					

Memo

ADDITIONAL SERVICE WHEN REPLACING 4WD CONTROL UNIT

Description

INFOID:0000000010991978

When replacing 4WD control unit, unit characteristics writing is required.

Work Procedure

INFOID:0000000010991979

1.PERFORM WRITING UNIT CHARACTERISTICS

Perform writing unit characteristics of electric controlled coupling.

>> Refer to DLN-41, "Work Procedure".

UNIT CHARACTERISTICS WRITING

Description

INFOID:0000000010991980

When replacing 4WD control unit, rear final drive assembly and/or electric controlled coupling, unit characteristics of electric controlled coupling writing is required.

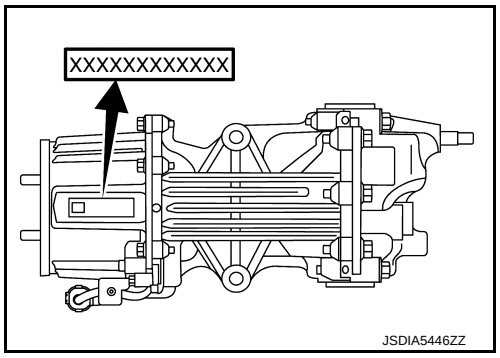
Work Procedure

INFOID:0000000010991981

1. UNIT CHARACTERISTICS WRITING

With CONSULT

1. Confirm the unit characteristics of electric controlled coupling.
   NOTE:
   Unit characteristics is 12-digit alphanumeric.
2. Turn the ignition switch OFF to ON.
3. Select “UNIT CHARACTERISTICS WRITE” in “WORK SUPPORT” for “ALL MODE AWD/4WD”.
4. Input unit characteristics.
5. Select “Start”.
6. Check that “UNIT CHARACTERISTICS WRITE COMPLETED” is displayed.



>> WORK END

DTC/CIRCUIT DIAGNOSIS

C1201 4WD CONTROL UNIT

DTC Description

INFOID:0000000010991982

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1201	CONTROLLER FAILURE (Control unit failure)	Malfunction has occurred inside 4WD control unit.

POSSIBLE CAUSE

Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “C1201” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-42, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010991983

1.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is DTC “C1201” detected?

YES >> Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Check 4WD 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 Description

INFOID:0000000010991984

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1203	ABS SYSTEM (ABS system)	Malfunction related to wheel sensor has been detected by ABS actuator and electric unit (control unit).

POSSIBLE CAUSE

ABS malfunction
- Vehicle speed signal error

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT
1. Drive at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1203” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-43, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010991985

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

With CONSULT
Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-84, "DTC Index".
NO >> GO TO 2.

2.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. If DTC “C1203” is detected, Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Repair or replace error-detected parts.

C1204 4WD SOLENOID

DTC Description

INFOID:0000000010991986

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1204	4WD SOLENOID (4WD solenoid)	Malfunction related to 4WD solenoid has been detected.

POSSIBLE CAUSE

- Internal malfunction of electronic controlled coupling
- Malfunction of 4WD solenoid power supply circuit (open or short)
- Malfunction of 4WD solenoid command current

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “C1204” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-44, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010991987

1.CHECK 4WD SOLENOID POWER SUPPLY (1)

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	9	Ground	Battery voltage

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	9	Ground	Battery voltage

Is the inspection result normal?

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

2. CHECK 4WD SOLENOID POWER SUPPLY (2)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#6).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	9	M2	15B	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	9	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3. CHECK 4WD SOLENOID GROUND

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	10	Ground	Existed
	11		

Is the inspection result normal?

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

4. CHECK 4WD SOLENOID CIRCUIT (1)

Check the resistance between 4WD control unit harness connector.

4WD control unit			Resistance (Approx.)
Connector	Terminal		
B5	1	2	2.5 Ω

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 5.

5. CHECK 4WD SOLENOID CIRCUIT (2)

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

4WD control unit		4WD solenoid		Continuity
Connector	Terminal	Connector	Terminal	
B5	1	C1	2	Existed
	2		1	

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	1	Ground	Not existed
	2		

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.CHECK 4WD SOLENOID

Check 4WD solenoid. Refer to DLN-46, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> 4WD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-231, "Removal and Installation".

7.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000010991988

1.CHECK 4WD SOLENOID

1. Turn the ignition switch OFF.
2. Disconnect 4WD solenoid harness connector.
3. Check the resistance between 4WD solenoid harness connector terminals.

4WD solenoid		Resistance (Approx.)
Terminal		
1	2	2.5 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> 4WD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-231, "Removal and Installation".

C1209 MODE SW

DTC Description

INFOID:0000000010991989

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1209	MODE SW (Mode switch)	More than two switch inputs are simultaneously detected due to short circuit of 4WD mode switch.

POSSIBLE CAUSE

- Malfunction of 4WD mode switch
- Malfunction of 4WD mode switch circuit
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Operate 4WD mode switch to each position.
3. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1209” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-47, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010991990

1.CHECK 4WD MODE SWITCH

Check 4WD mode switch. Refer to DLN-49, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace 4WD mode switch. Refer to DLN-77, "Removal and Installation".

2.CHECK 4WD MODE SWITCH SIGNAL CIRCUIT

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

4WD control unit		4WD mode switch		Continuity
Connector	Terminal	Connector	Terminal	
B5	5	M8	3	Not existed
			6	Existed
			8	Not existed
	12		3	Existed
			6	Not existed
			8	Not existed
	14		3	Not existed
			6	Not existed
			8	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	5	Ground	Not existed
	12		
	14		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK 4WD CONTROL SWITCH GROUND CIRCUIT

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

4WD mode switch		—	Continuity
Connector	Terminal		
M8	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4.CHECK 4WD CONTROL UNIT OUTPUT SIGNAL

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

CAUTION:
Never start the engine.

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

4WD mode switch		—	Voltage
Connector	Terminal		
M8	3	Ground	Battery voltage
	6		
	8		

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000010991991

1. CHECK 4WD MODE SWITCH

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

4WD mode switch		Condition	Continuity
Terminal			
3	2	4WD mode switch: 2WD	Existed
		4WD mode switch: AUTO	Not existed
		4WD mode switch: LOCK (State of hold of LOCK position)	
6	2	4WD mode switch: 2WD	Not existed
		4WD mode switch: AUTO	Existed
		4WD mode switch: LOCK (State of hold of LOCK position)	
8	2	4WD mode switch: 2WD	Not existed
		4WD mode switch: AUTO	
		4WD mode switch: LOCK (State of hold of LOCK position)	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace 4WD mode switch. Refer to DLN-77, "Removal and Installation".

C1210 ECM

DTC Description

INFOID:0000000010991992

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1210	ENGINE SIGNAL 1 (Engine signal 1)	Malfunction related to engine signal has been detected.

POSSIBLE CAUSE

Malfunction of engine control system

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Drive the vehicle for a while.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1210” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-50, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010991993

1.PERFORM ECM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for “ENGINE”.

Is any DTC detected?

YES >> Check the DTC. Refer to EC-109, "DTC Index" (MR20DD), EC-517, "DTC Index" (QR25DE).
NO >> GO TO 2.

2.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. If DTC “C1210” is detected, Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P1804 4WD CONTROL UNIT

DTC Description

INFOID:0000000010991994

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P1804	CONTROL UNIT (Control unit)	Malfunction is detected in the memory (EEPROM) system of 4WD control unit.

POSSIBLE CAUSE

Internal malfunction of 4WD control unit.

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P1804” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-51, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010991995

1.REPLACE 4WD CONTROL UNIT

CAUTION:
Replace 4WD control unit when DTC “P1804” is detected simultaneously with other items.

>> Replace 4WD control unit. Refer DLN-76, "Removal and Installation".

P1808 WHEEL SPEED SENSOR

DTC Description

INFOID:0000000010991996

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P1808	VHCL SPEED SEN-ABS (Vehicle speed sensor-ABS)	• Malfunction is detected in vehicle speed signal that is output from ABS actuator and electric unit (control unit) through CAN communication. • Improper signal is input while driving.

POSSIBLE CAUSE

- ABS malfunction
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P1808” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-52, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010991997

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

With CONSULT

Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-84, "DTC Index".
NO >> GO TO 2.

2.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. If DTC “P1808” is detected, Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P1809 4WD CONTROL UNIT

DTC Description

INFOID:0000000010991998

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P1809	CONTROL UNIT (Control unit)	AD converter system of 4WD control unit is malfunctioning.

POSSIBLE CAUSE

Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P1809” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-53, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010991999

1.REPLACE 4WD CONTROL UNIT

CAUTION:
Replace 4WD control unit when DTC “P1809” is detected simultaneously with other items.

>> Replace 4WD control unit. Refer DLN-76, "Removal and Installation".

P1811 BATTERY VOLTAGE

DTC Description

INFOID:0000000010992000

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P1811	BATTERY VOLTAGE (Battery voltage)	When engine is running and 4WD control unit power supply is less than 9 V or higher than 16 V.

POSSIBLE CAUSE

- Malfunction of 4WD control unit power supply circuit (open or short)
- Battery power supply
- Ignition power supply
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P1811” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-54, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010992001

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

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	7	Ground	0 V

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	7	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#30).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	7	M3	7C	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	7	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-52, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3. CHECK 4WD CONTROL UNIT POWER SUPPLY (3)

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	15	Ground	Battery voltage

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	15	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 5A fuse (#2).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	15	B107	6H	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	15	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".

NO >> Repair or replace error-detected parts.

5. CHECK 4WD CONTROL UNIT GROUND

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	10	Ground	Existed
	11		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6. CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. When DTC “P1811” is detected, Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P181B INCOMPLETE SELFSHUT

DTC Description

INFOID:0000000010992002

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P181B	INCOMP SELF SHUT (Incomplete self shut)	When ignition switch is ON, self-shut of 4WD control unit was incomplete.

POSSIBLE CAUSE

- Malfunction of 4WD control unit power supply circuit (open or short)
- Battery power supply
- Ignition power supply
- Internal malfunction of 4WD control unit

FAIL-SAFE

No impact to vehicle behavior.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P181B” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-57, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010992003

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

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	7	Ground	0 V

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	7	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#30).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	7	M3	7C	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	7	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-52, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3. CHECK 4WD CONTROL UNIT POWER SUPPLY (3)

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	15	Ground	Battery voltage

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	15	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 5A fuse (#2).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	15	B107	6H	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	15	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".

NO >> Repair or replace error-detected parts.

5. CHECK 4WD CONTROL UNIT GROUND

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	10	Ground	Existed
	11		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6. CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. When DTC “P181B” is detected, Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P181D ENGINE TORQUE SIGNAL

DTC Description

INFOID:0000000010992004

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P181D	ENGINE SYSTEM (Engine system)	Malfunction related to engine signal has been detected.

POSSIBLE CAUSE

- Malfunction of engine control system
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Drive the vehicle for a while.
2. Stop the vehicle.
3. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “P181D” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-60, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010992005

1.PERFORM ECM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for “ENGINE”.

Is any DTC detected?

YES >> Check the DTC. Refer to EC-109, "DTC Index" (MR20DD), EC-517, "DTC Index" (QR25DE).
NO >> GO TO 2.

2.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. If DTC “P181D” is detected, Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P181F INCOMPLETE CALIBRATION

DTC Description

INFOID:0000000010992006

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P181F	INCOMP CALIBRATION (Incomplete calibration)	When incomplete writing unit characteristics of electric controlled coupling are detected.

POSSIBLE CAUSE

Writing unit characteristics are incomplete.

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P181F” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-61, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010992007

1.PERFORM WRITING UNIT CHARACTERISTICS

1. Erase self-diagnostic result for “ALL MODE AWD/4WD”.
2. Perform writing unit characteristics. Refer to DLN-41, "Work Procedure".
3. Turn the ignition switch OFF to ON.
4. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is any DTC except “P181F” detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to DLN-30, "DTC Index".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS AGAIN

With CONSULT

Perform “DTC CONFIRMATION PROCEDURE” (self-diagnosis) again. Refer to DLN-61, "DTC Description".

Is DTC “P181F” detected?

YES >> Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace error-detected parts.

U1000 CAN COMM CIRCUIT

DTC Description

INFOID:0000000010992008

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 DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
U1000	CAN COMM CIRCUIT (CAN communication circuit)	4WD control unit is not transmitting/receiving CAN communication signal for 2 seconds or more.

POSSIBLE CAUSE

- CAN communication error
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “U1000” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-62, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010992009

Proceed to LAN-17, "Trouble Diagnosis Flow Chart".

U1010 CONTROL UNIT (CAN)

DTC Description

INFOID:0000000010992010

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 DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
U1010	CONTROL UNIT (CAN) [Control unit (CAN)]	Detecting error during the initial diagnosis of CAN controller of 4WD control unit.

POSSIBLE CAUSE

Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-63, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000010992011

1.CHECK 4WD CONTROL UNIT

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

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000010992012

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

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	7	Ground	0 V

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	7	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#30).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	7	M3	7C	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	7	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-52, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3.CHECK 4WD CONTROL UNIT POWER SUPPLY (3)

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	15	Ground	Battery voltage

3. Turn the ignition switch ON.

CAUTION:
Never start the engine.

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	15	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 5A fuse (#2).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	15	B107	6H	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	15	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK 4WD SOLENOID POWER SUPPLY (1)

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	9	Ground	Battery voltage

3. Turn the ignition switch ON.

CAUTION:
Never start the engine.

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	9	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK 4WD SOLENOID POWER SUPPLY (2)

1. Turn the ignition switch OFF.

2. Check the 10A fuse (#6).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	9	M2	15B	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	9	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

7. CHECK 4WD CONTROL UNIT GROUND

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	10	Ground	Existed
	11		

Is the inspection result normal?

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

4WD INDICATOR LAMP

Component Function Check

INFOID:0000000010992013

1.4WD INDICATOR LAMP OPERATION CHECK

Check that 4WD indicator lamp turns ON for several seconds after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to DLN-67, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000010992014

1.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to DLN-30, "DTC Index".
NO >> GO TO 2.

2.CHECK 4WD MODE SWITCH

Perform the trouble diagnosis for 4WD mode switch. Refer to DLN-47, "Diagnosis Procedure".

Is the inspection results normal?

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

3.CHECK 4WD INDICATOR LAMP SIGNAL

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Change 4WD mode switch from "2WD” to “AUTO”.
3. Check “4WD MODE MON” in “DATA MONITOR” for “ALL MODE AWD/4WD”.

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

YES >> Perform the trouble diagnosis for combination meter. Refer to MWI-84, "On Board Diagnosis Function".
NO >> Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".

LOCK INDICATOR LAMP

Component Function Check

INFOID:0000000010992015

1.LOCK INDICATR LMAP OPERATION CHECK

Check that LOCK indicator lamp turns ON for several seconds after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to DLN-68, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000010992016

1.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to DLN-30, "DTC Index".
NO >> GO TO 2.

2.CHECK 4WD MODE SWITCH

Perform the trouble diagnosis for 4WD mode switch. Refer to DLN-47, "Diagnosis Procedure".

Is the inspection results normal?

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

3.CHECK LOCK INDICATOR LAMP SIGNAL

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Change 4WD mode switch from "AUTO” to “LOCK”.
3. Check “4WD MODE MON” in “DATA MONITOR” for “ALL MODE AWD/4WD”.

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

YES >> Perform the trouble diagnosis for combination meter. Refer to MWI-84, "On Board Diagnosis Function".
NO >> Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".

SYMPTOM DIAGNOSIS

HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS

Description

INFOID:0000000010992017

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

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

Diagnosis Procedure

INFOID:0000000010992018

1. PERFORM ECM SELF-DIAGNOSIS

With CONSULT
Perform self-diagnosis for “ENGINE”.

Is any DTC detected?

YES >> Check the DTC. Refer to EC-109, "DTC Index" (MR20DD), EC-517, "DTC Index" (QR25DE).
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

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

Is DTC “U1000” detected?

YES >> Proceed to DLN-62, "Diagnosis Procedure".
NO >> GO TO 3.

3. CHECK 4WD SOLENOID

Perform the trouble diagnosis of the 4WD solenoid. Refer to DLN-44, "Diagnosis Procedure".

Is the inspection result normal?

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

4. CHECK ELECTRIC CONTROLLED COUPLING

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

Does rear wheel rotate?

YES >> Replace electric controlled coupling for mechanical malfunction (clutch sticking etc.). Refer to DLN-231, "Removal and Installation".
NO >> Check each harness connector pin terminal for disconnection.

VEHICLE DOES NOT ENTER 4WD MODE

Description

INFOID:0000000010992019

Vehicle does not enter 4-wheel drive mode even though 4WD warning is not displayed.

Diagnosis Procedure

INFOID:0000000010992020

1.CHECK INFORMATION DISPLAY (COMBINATION METER)

Perform the trouble diagnosis of combination meter. Refer to MWI-84, "On Board Diagnosis Function".

Is the inspection result normal?

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

2.CHECK PARKING BRAKE SWITCH SIGNAL

With CONSULT

Check “PARKING BRAKE SW SIG” of CONSULT “DATA MONITOR” for “ALL MODE AWD/4WD”.

Monitor Item	Condition	Status
PARKING BRAKE SW SIG	When the parking brake is operation.	On
	When the parking brake is not operation.	Off

Is the inspection result normal?

YES >> GO TO 3.
NO >> Proceed to BRC-107, "Diagnosis Procedure".

3.CRUISE TEST

Drive the vehicle for a period of time.

Does any symptom occur?

YES >> Replace electric controlled coupling for mechanical malfunction (mechanical engagement of clutch is not possible). Refer to DLN-231, "Removal and Installation".
NO >> Check each harness connector pin terminal for disconnection.

4WD HIGH TEMP IS DISPLAYED ON INFORMATION DISPLAY

Description

INFOID:0000000010992021

While driving, 4WD warning (4WD High Temp. Stop vehicle) is displayed on information display (combination meter).

- 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 4WD warning (4WD High Temp. Stop vehicle) is displayed. Both cases are not malfunction. Refer to DLN-30, "Protection Function".
- When this symptom occurs, stop vehicle and allow it to idle for some times. Displays will stop and system will be restored.

TIRE SIZE INCORRECT IS DISPLAYED ON INFORMATION DISPLAY

Description

INFOID:0000000010992022

While driving, 4WD warning (Tire Size Incorrect: See Owner's Manual) is displayed on information display (combination meter).

Diagnosis Procedure

INFOID:0000000010992023

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

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-76, "Removal and Installation".
NO >> Repair or replace the error-detected parts.

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000010992024

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

Reference			DLN-74, "MR20DD : Inspection" (MR20DD) DLN-75, "QR25DE : Inspection" (QR25DE)		—	DLN-83, "Exploded View"	DLN-83, "Exploded View"	DLN-92, "Inspection", DLN-102, "Inspection"	DLN-92, "Inspection", DLN-102, "Inspection"
SUSPECTED PARTS (Possible cause)		TRANSFER OIL (Level low)	TRANSFER OIL (Wrong)	TRANSFER OIL (Level too high)	LIQUID GASKET (Damaged)	O-RING (Worn or damaged)	OIL SEAL (Worn or damaged)	GEAR (Worn or damaged)	BEARING (Worn or damaged)
Symptom	Noise	1	2				3	3	3
	Transfer oil leakage		3	1	2	2	2		

PERIODIC MAINTENANCE

TRANSFER OIL

MR20DD

MR20DD : Inspection

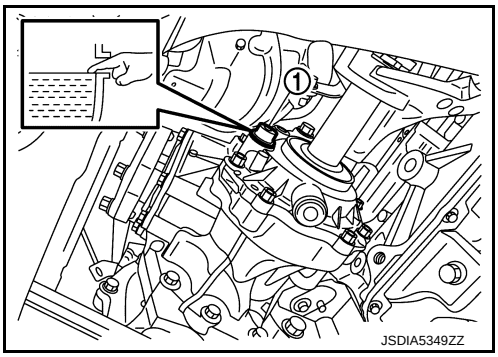
INFOID:0000000011001968

OIL LEAKAGE

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

OIL LEVEL

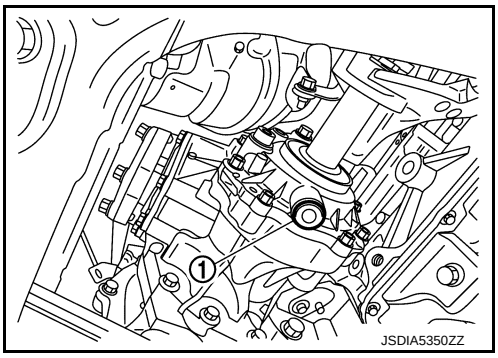
1. Remove filler plug ① and gasket. Then check that oil is filled up from mounting hole for filler plug.
   CAUTION:
   Turn the ignition switch OFF while checking oil level.
   - Oil level should be level with bottom of filler plug mounting hole. Add transfer oil if necessary. Refer to DLN-74, "MR20DD : Refilling".
2. Set a new gasket on filler plug and install it on transfer assembly. Refer to DLN-83, "Exploded View".
   CAUTION:
   Never reuse gasket.



MR20DD : Draining

INFOID:0000000011001969

1. Run the vehicle to warm up the transfer unit sufficiently.
2. Turn the ignition switch OFF.
3. Remove drain plug ① and gasket.
4. Drain transfer oil.
5. Before installing drain plug, set a new gasket. Install drain plug to transfer assembly and tighten to the specified torque. Refer to DLN-83, "Exploded View".
   CAUTION:
   Never reuse gasket.



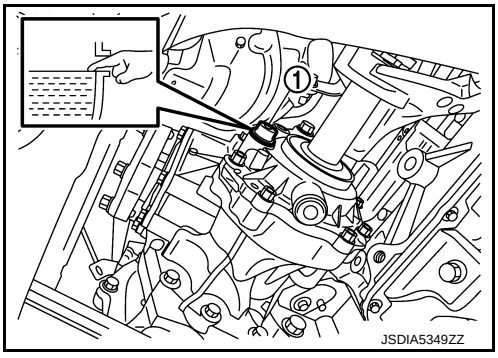
MR20DD : Refilling

INFOID:0000000011001970

1. Remove filler plug ① and gasket. Then fill with new transfer oil until oil level reaches the specified level near filler plug mounting hole.

   Recommended oil and capacity : Refer to MA-23, "Fluids and Lubricants".

2. Leave the vehicle for 3 minutes, and check the oil level again.
3. Before installing filler plug, set a new gasket. Install filler plug to transfer assembly and tighten to the specified torque. Refer to DLN-83, "Exploded View".
   CAUTION:
   Never reuse gasket.



QR25DE

QR25DE : Inspection

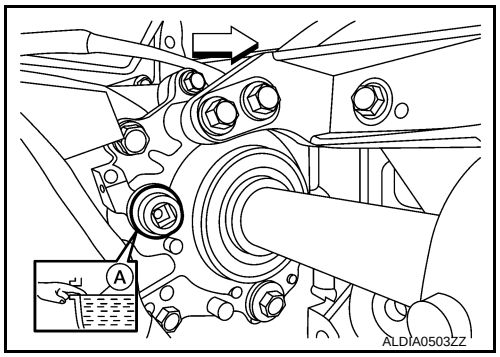
INFOID:0000000011001971

OIL LEAKAGE

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

OIL LEVEL

1. Remove filler plug ① and gasket. Then check that oil is filled up from mounting hole for filler plug.



Ⓐ : Oil level

⇦ : Vehicle front

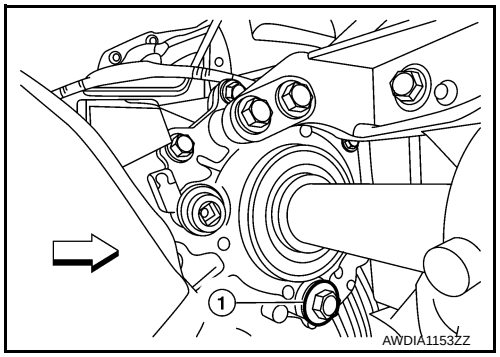
CAUTION:
Turn the ignition switch OFF while checking oil level.
- Oil level should be level with bottom of filler plug mounting hole. Add transfer oil if necessary. Refer to DLN-75, "QR25DE : Refilling".

2. Set a new gasket on filler plug and install it on transfer assembly. Refer to DLN-83, "Exploded View".
CAUTION:
Never reuse gasket.

QR25DE : Draining

INFOID:0000000011001972

1. Run the vehicle to warm up the transfer unit sufficiently.
2. Turn the ignition switch OFF.
3. Remove drain plug ① and gasket.



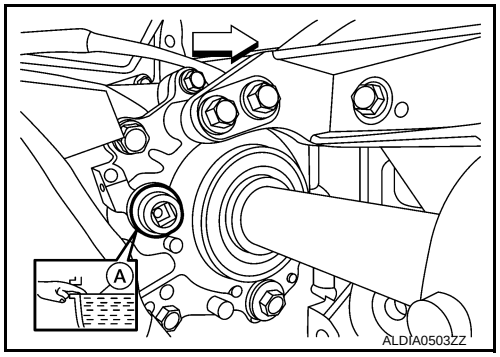
⇦ : Vehicle front

4. Drain transfer oil.
5. Before installing drain plug, set a new gasket. Install drain plug to transfer assembly and tighten to the specified torque. Refer to DLN-83, "Exploded View".
CAUTION:
Never reuse gasket.

QR25DE : Refilling

INFOID:0000000011001973

1. Remove filler plug ① and gasket. Then fill with new transfer oil until oil level reaches the specified level near filler plug mounting hole.



Ⓐ : Oil level

⇦ : Vehicle front

Recommended oil and capacity	**: Refer to MA-23, "Fluids and Lubricants".**

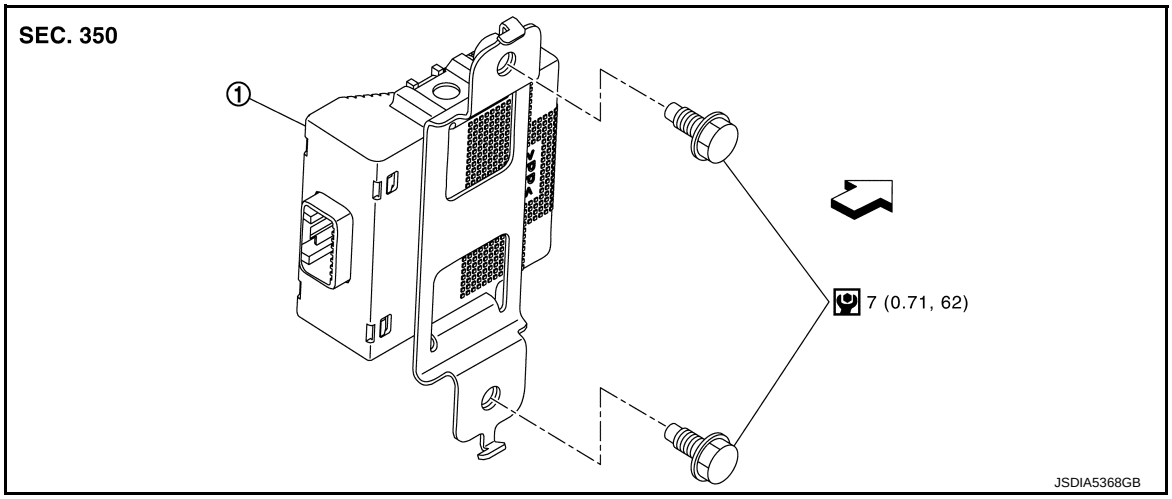
2. Leave the vehicle for 3 minutes, and check the oil level again.
3. Before installing filler plug, set a new gasket. Install filler plug to transfer assembly and tighten to the specified torque. Refer to DLN-83, "Exploded View".
CAUTION:
Never reuse gasket.

REMOVAL AND INSTALLATION

4WD CONTROL UNIT

Exploded View

INFOID:0000000010992028



① 4WD control unit

⇦: Vehicle front

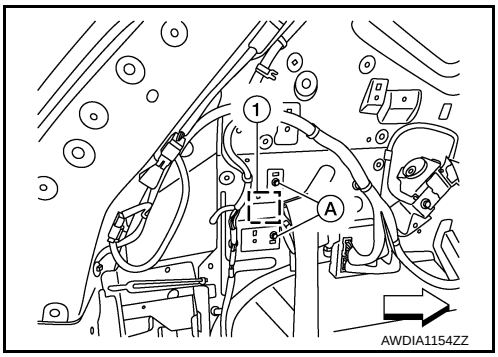
: N·m (kg-m, in-lb)

Removal and Installation

INFOID:0000000010992029

REMOVAL

1. Turn the ignition switch OFF.
2. Remove luggage side lower finisher LH. Refer to INT-43, "LUGGAGE SIDE LOWER FINISHER : Removal and Installation".
3. Disconnect 4WD control unit harness connector.
4. Remove 4WD control unit mounting nuts Ⓐ and remove 4WD control unit ①.



⇦ : Vehicle front

NOTE:
4WD control unit is located on the back side of the rear wheel house outer panel LH.

INSTALLATION

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

- Perform adjustment after installation. Refer to DLN-76, "Adjustment".

Adjustment

INFOID:0000000010992030

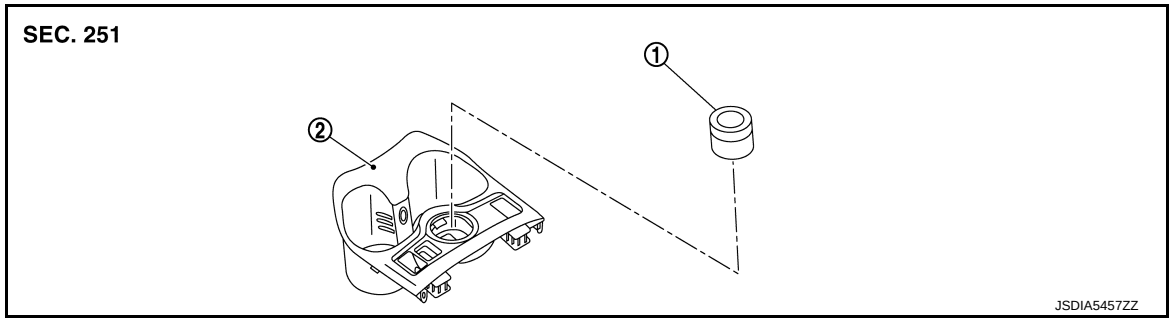
ADJUSTMENT AFTER INSTALLATION

When replaced 4WD control unit, perform writing unit characteristics. Refer to DLN-41, "Work Procedure".

4WD MODE SWITCH

Exploded View

INFOID:0000000010992031



① 4WD mode switch ② Console switch panel

Removal and Installation

INFOID:0000000010992032

REMOVAL

1. Remove console switch panel from center console assembly. Refer to IP-25, "Removal and Installation" (LHD models), IP-52, "Removal and Installation" (RHD models).
2. Disconnect 4WD mode switch harness connector.
3. Remove 4WD mode switch from console switch panel.

INSTALLATION

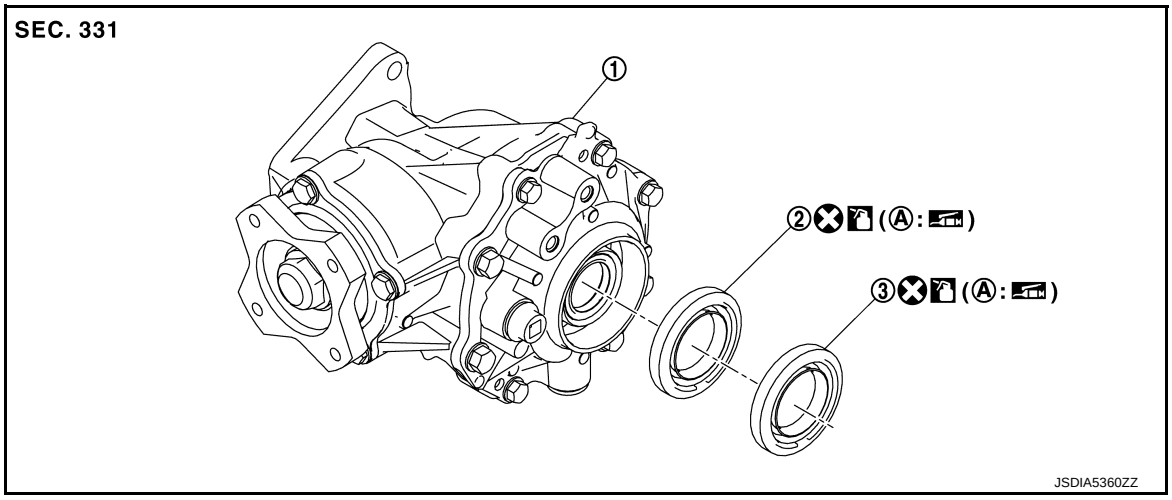
Install in the reverse order of removal.

TRANSFER COVER OIL SEAL

MR20DD

MR20DD : Exploded View

INFOID:0000000010992033



① Transfer assembly ② Transfer cover oil seal (inner) ③ Transfer cover oil seal (outer)

Ⓐ Oil seal lip

: Always replace after every disassembly.

: Apply transfer oil.

: Apply multi-purpose grease.

MR20DD : Removal and Installation

INFOID:0000000010992034

REMOVAL

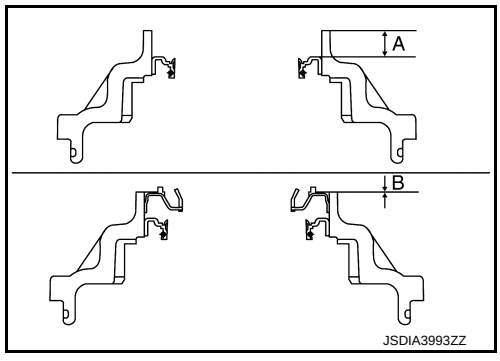
1. Drain the transfer oil. Refer to DLN-74, "MR20DD : Draining".
2. Remove front drive shaft (right side). Refer to FAX-101, "MR20DD : Removal and Installation".
   CAUTION:
   Oil may leak from the opening. Use cap and/or plug to prevent leakage.
3. Remove transfer cover oil seal (outer/inner), using oil seal remover (commercial service tool).
   CAUTION:
   Never damage transfer cover.

INSTALLATION

1. Using drift (commercial service tool), install transfer cover oil seal (outer/inner) with the directions below.

   A : Installation dimension for transfer cover oil seal (inner)
   B : Installation dimension for transfer cover oil seal (outer)

   A : 10.3 +0.6/-0 mm (0.406 +0.024/-0 in)
   B : 0 +0.6/-0 mm (0 +0.024/-0 in)



   CAUTION:
   - **Never reuse oil seal.**
   - **When installing, never incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and transfer oil onto the circumference of oil seal.**
2. Install front drive shaft (right side). Refer to FAX-101, "MR20DD : Removal and Installation".
3. Refill the transfer oil to transfer assembly. Refer to DLN-74, "MR20DD : Refilling".

4. Perform inspection after installation. Refer to DLN-79, "MR20DD : Inspection".

MR20DD : Inspection

INFOID:0000000010992035

INSPECTION AFTER INSTALLATION

Check oil level and transfer for oil leakage. Refer to DLN-74, "MR20DD : Inspection".

QR25DE

QR25DE : Removal and Installation

INFOID:0000000011001966

NOTE:

- Replacement on vehicle may cause damage to transfer cover, and may cause a transfer oil leak.
- If transfer cover oil seal requires replacement, remove transfer assembly from the vehicle before replacing transfer cover oil seal. Refer to DLN-85, "Disassembly and Assembly".

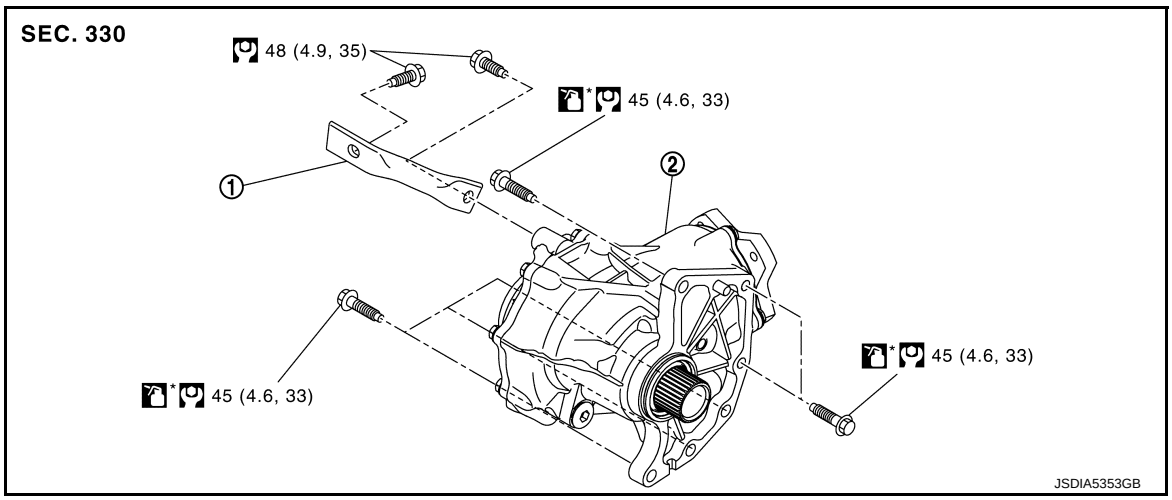
UNIT REMOVAL AND INSTALLATION

TRANSFER ASSEMBLY

MR20DD

MR20DD : Exploded View

INFOID:0000000011002856



① Transfer gusset ② Transfer assembly

: N·m (kg-m, ft-lb)

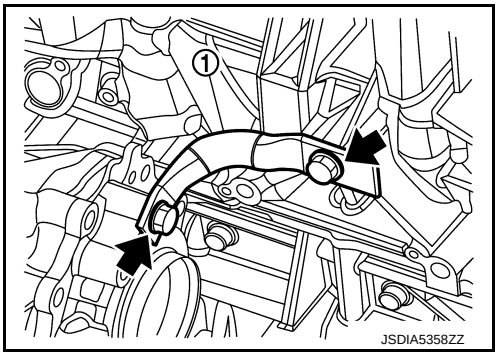
*: Apply anti-corrosion oil.

MR20DD : Removal and Installation

INFOID:0000000011002857

REMOVAL

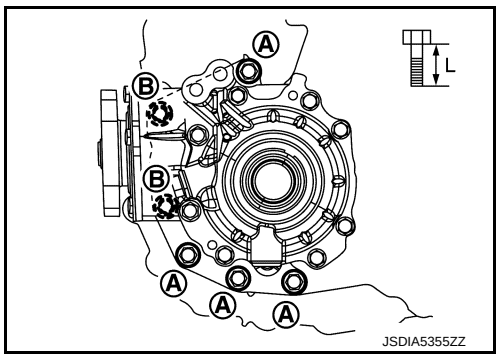
1. Remove exhaust front tube. Refer to EX-6, "Removal and Installation".
2. Remove front drive shaft (RH). Refer to FAX-101, "MR20DD : Removal and Installation".
   CAUTION:
   Oil may leak from the opening. Use cap and/or plug to prevent leakage.
3. Remove propeller shaft from transfer assembly. Refer to DLN-214, "Removal and Installation".
   CAUTION:
   The joint of propeller shaft must be handled with care.
4. Remove transfer gusset ①.
5. Remove transfer assembly from transaxle assembly.
   CAUTION:
   - **Never damage ring gear shaft.**
   - **Be careful when removing transfer assembly form the vehicle because it is heavy.**



INSTALLATION

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

- When installing the transfer to the transaxle, install the mounting bolts following the standard below, tighten bolts to the specified torque. For each tightening torque, refer to DLN-81, "QR25DE : Exploded View".



Bolt symbol	Ⓐ	Ⓑ
Quantity	4	2
Bolt length “L” mm (in)	40 (1.57)	40 (1.57)
Insertion direction	Transfer to transaxle	Transaxle to transfer

CAUTION:
- **Apply anti-corrosion oil to the thread and seat of mounting bolts.**
- **Never damage O-ring of transfer.**

- For mounting bolts of transfer gusset, temporarily tightening the engine side bolt first. After this, tighten bolts to the specified torque in the order from transfer side bolt to engine side bolt. For tightening torque, refer to DLN-81, "QR25DE : Exploded View".
- Perform inspection after installation. Refer to DLN-82, "QR25DE : Inspection".

MR20DD : Inspection

INFOID:0000000011002858

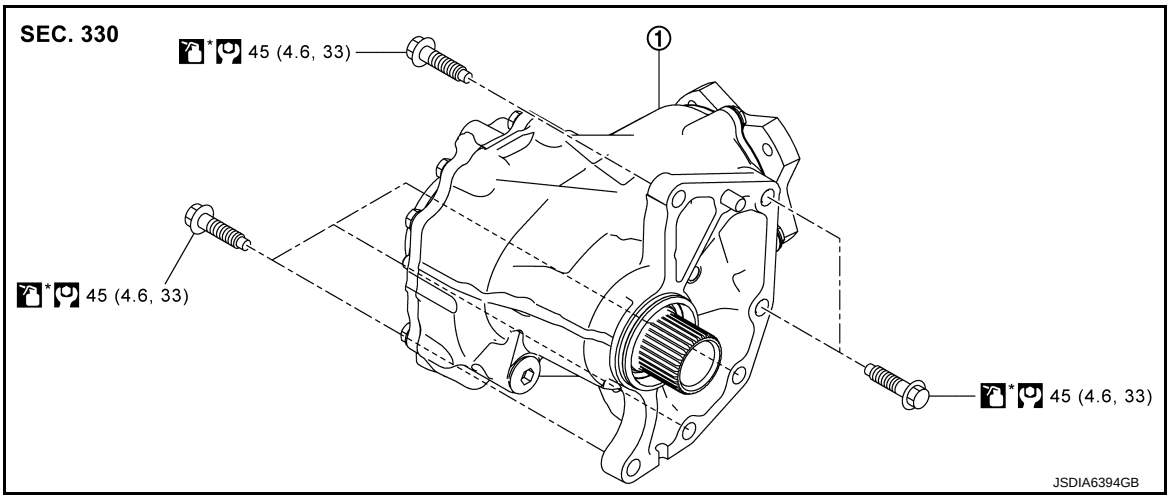
INSPECTION AFTER INSTALLATION

When oil leaks while removing/installing transfer assembly, check oil level after the installation. Refer to DLN-74, "MR20DD : Inspection".

QR25DE

QR25DE : Exploded View

INFOID:0000000011002859



① Transfer assembly

: N·m (kg-m, ft-lb)

*: Apply anti-corrosion oil.

QR25DE : Removal and Installation

INFOID:0000000011002860

REMOVAL

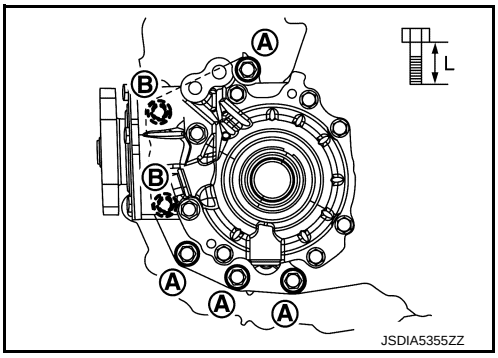
1. Remove front drive shaft (RH). Refer to FAX-113, "QR25DE : Removal and Installation".
   CAUTION:
   Oil may leak from the opening. Use cap and/or plug to prevent leakage.
2. Remove front suspension member. Refer to FSU-22, "Removal and Installation".
3. Remove exhaust front tube. Refer to EX-12, "Removal and Installation".

4. Remove propeller shaft. Refer to DLN-214, "Removal and Installation".
5. Remove transfer assembly mounting bolts.
6. Remove transfer assembly from the vehicle.

INSTALLATION

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

- When installing the transfer to the transaxle, install the mounting bolts following the standard below, tighten bolts to the specified torque. For each tightening torque, refer to DLN-81, "QR25DE : Exploded View".



Bolt symbol	Ⓐ	Ⓑ
Quantity	4	2
Bolt length “L” mm (in)	40 (1.57)	40 (1.57)
Insertion direction	Transfer to transaxle	Transaxle to transfer

CAUTION:

- **Apply anti-corrosion oil to the thread and seat of mounting bolts.**
- **Never damage O-ring of transfer.**

- Perform inspection after installation. Refer to DLN-82, "QR25DE : Inspection".

QR25DE : Inspection

INFOID:0000000011002861

INSPECTION AFTER INSTALLATION

When oil leaks while removing/installing transfer assembly, check oil level after the installation. Refer to DLN-75, "QR25DE : Inspection".

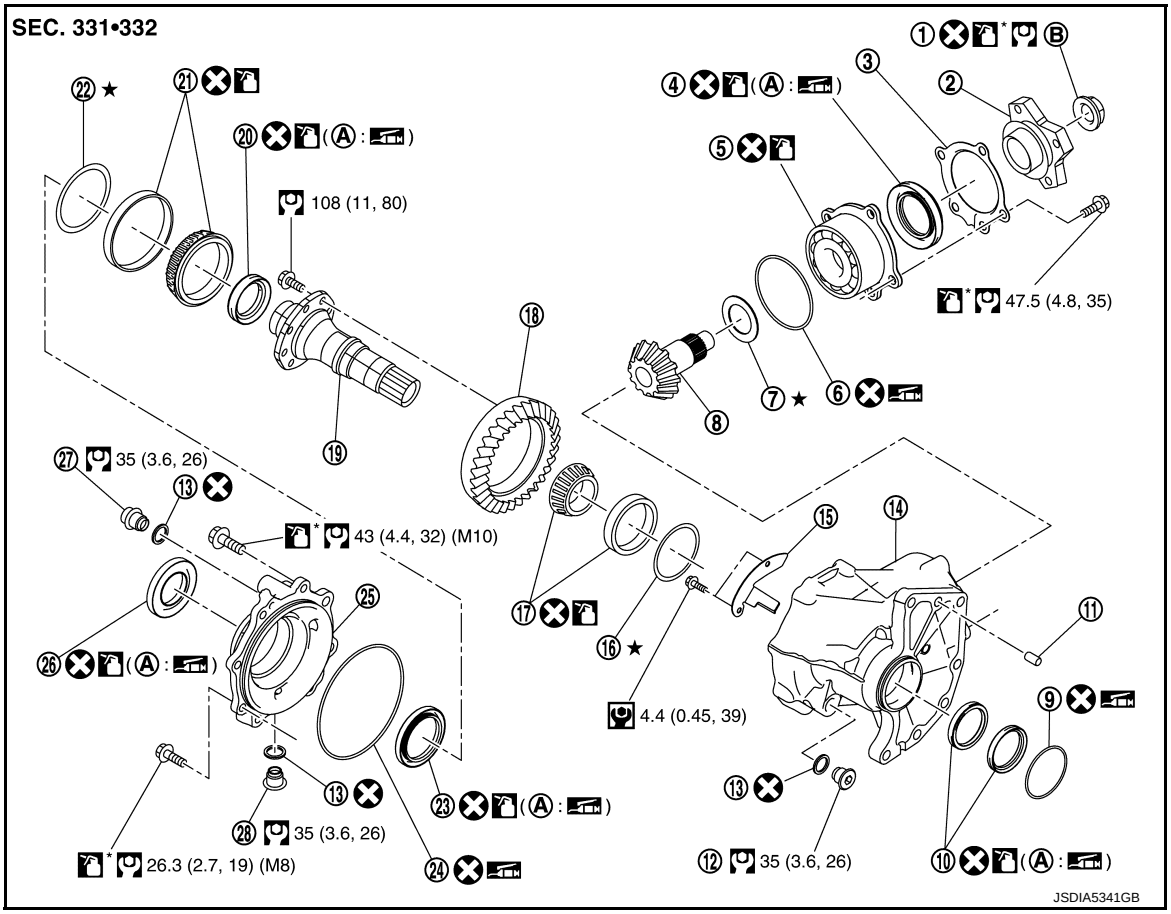
UNIT DISASSEMBLY AND ASSEMBLY

TRANSFER COVER

Exploded View

INFOID:0000000010992039

MR20DD models



① Pinion lock nut	② Companion flange	③ Dust cover
④ Oil seal	⑤ Pinion bearing assembly	⑥ O-ring
⑦ Drive pinion adjusting shim	⑧ Drive pinion	⑨ O-ring
⑩ Oil seal	⑪ Dowel pin	⑫ Plug
⑬ Gasket	⑭ Transfer case	⑮ Baffle plate
⑯ Ring gear bearing adjusting shim (transfer case side)	⑰ Ring gear bearing (transfer case side)	⑱ Ring gear
⑲ Ring gear shaft	⑳ Ring gear shaft oil seal	㉑ Ring gear bearing (transfer cover side)
㉒ Ring gear bearing adjusting shim (transfer cover side)	㉓ Oil seal	㉔ O-ring
㉕ Transfer cover	㉖ Oil seal	㉗ Filler plug
㉘ Drain plug		
Ⓐ Oil seal lip	Ⓑ Comply with the assembly procedure when tightening. Refer to DLN-96, "Disassembly and Assembly".	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

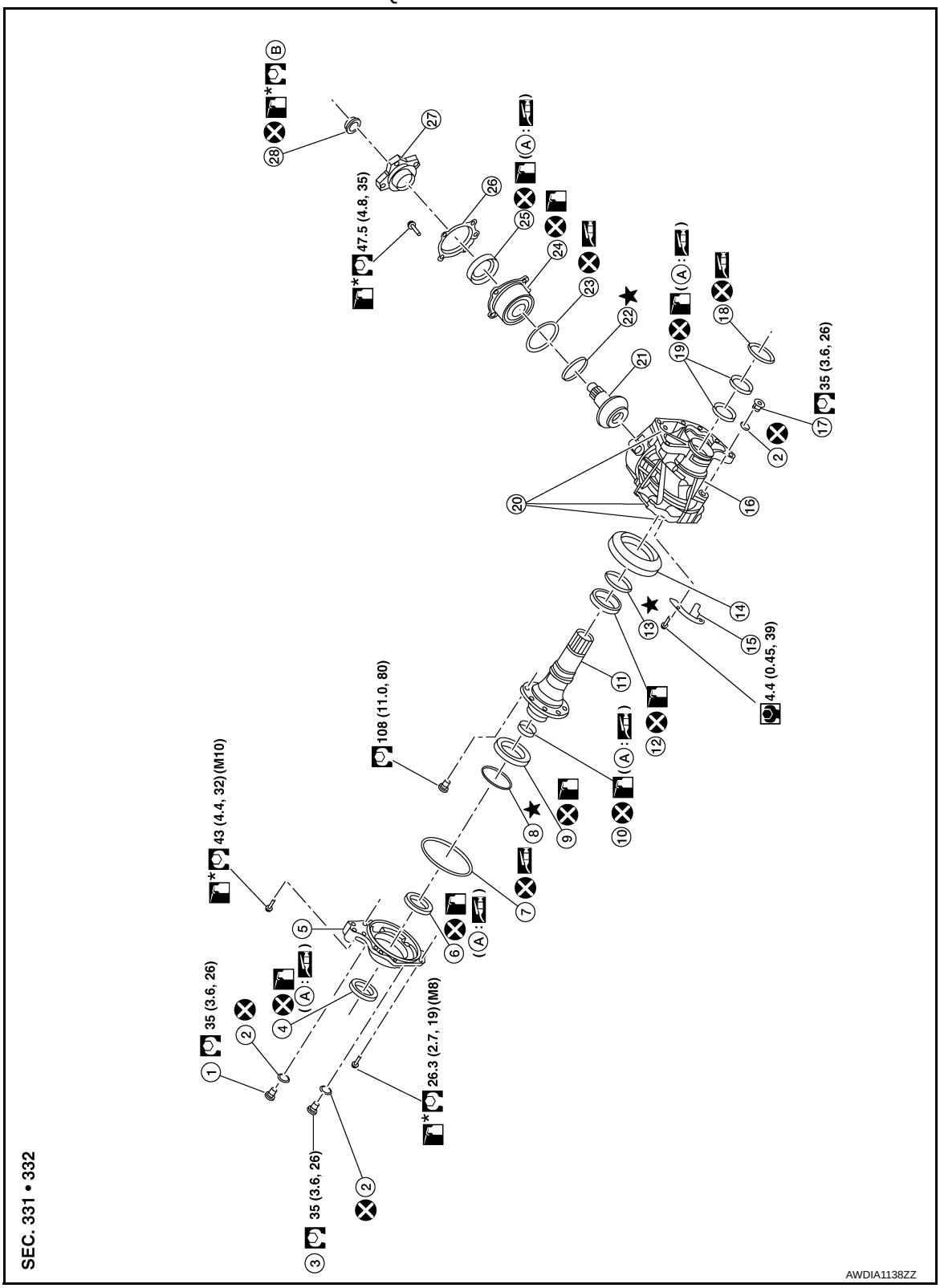
★: Select with proper thickness.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

QR25DE models



① Filler plug	② Gasket	③ Drain plug
④ Oil seal	⑤ Transfer cover	⑥ Oil seal
⑦ O-ring	⑧ Ring gear bearing adjusting shim (transfer cover side)	⑨ Ring gear bearing (transfer cover side)
⑩ Ring gear shaft oil seal	⑪ Ring gear shaft	⑫ Ring gear bearing (transfer case side)
⑬ Ring gear bearing adjusting shim (transfer case side)	⑭ Ring gear	⑮ Baffle plate
⑯ Transfer case	⑰ Plug	⑱ O-ring
⑲ Oil seal	⑳ Dowel pin	㉑ Drive pinion
㉒ Drive pinion adjusting shim	㉓ O-ring	㉔ Pinion bearing assembly
㉕ Oil seal	㉖ Dust cover	㉗ Companion flange
㉘ Pinion lock nut		
Ⓐ Oil seal lip	Ⓑ Comply with the assembly procedure when tightening. Refer to DLN-96, "Disassembly and Assembly".	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

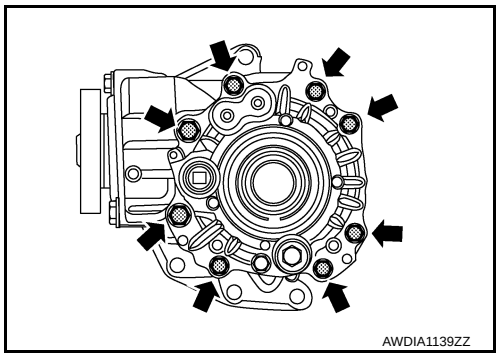
★: Select with proper thickness.

Disassembly and Assembly

INFOID:0000000010992040

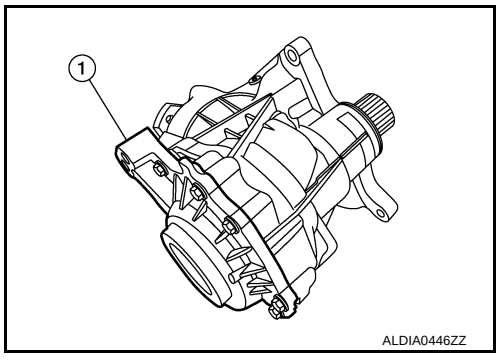
DISASSEMBLY

1. Remove transfer cover mounting bolts (⬅).


AWDIA1139ZZ

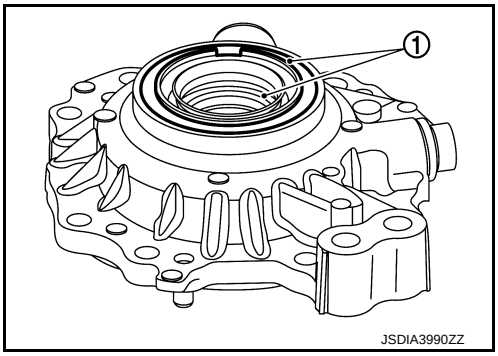
2. Lightly tap transfer cover ① with a plastic hammer to remove transfer cover.
3. Remove O-ring from transfer cover.

CAUTION:
- **Never use a suitable tool.**
- **Never damage transfer cover.**

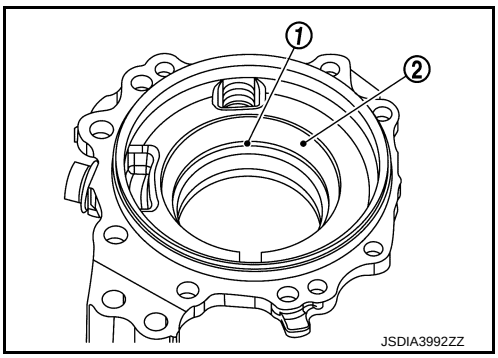


ALDIA0446ZZ

4. Lightly tap the metal part of oil seals ① with punch from back side of transfer cover to remove oil seals.
CAUTION:
When removing, never damage the transfer cover by scooping it out with a suitable tool.

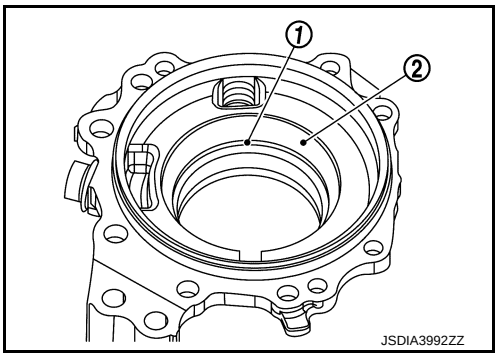


5. Remove the ring gear bearing adjusting shim (transfer cover side) ① and ring gear bearing outer race (transfer cover side) ② using suitable tool.
6. Remove drain plug and gasket.
7. Remove filler plug and gasket.
8. Perform inspection after disassembly. Refer to DLN-87, "Inspection".



ASSEMBLY

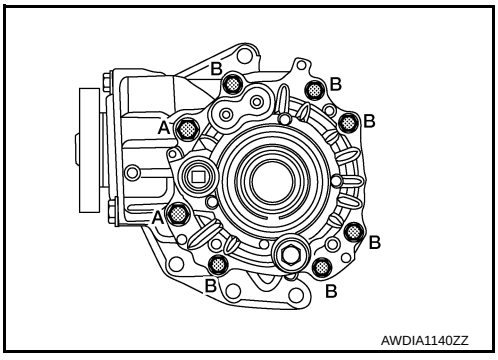
1. Select the ring gear bearing adjusting shim (transfer cover side). Refer to DLN-98, "Adjustment".
2. Install the selected ring gear bearing adjusting shim (transfer cover side) ① and ring gear bearing outer race (transfer cover side) ② using suitable tool.
CAUTION:
- **Never reuse ring gear bearing.**
- **Apply transfer oil to the ring gear bearing.**
3. Install gasket onto drain plug and install them to transfer cover.
CAUTION:
Never reuse gasket.



4. Install the transfer cover to the transfer case, and apply anti-corrosive oil onto thread and seats on the mounting bolts. Then tighten mounting bolts to the specified torque.

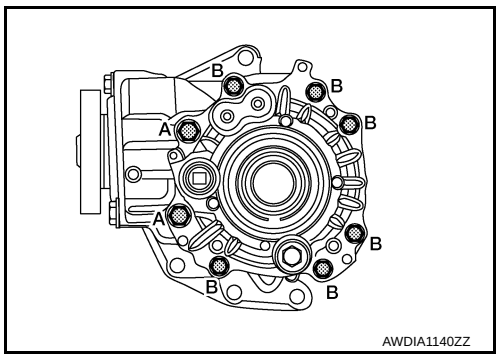
A	: M10 bolt
B	: M8 bolt

NOTE:
At this timing, O-ring installing to transfer cover is not necessary. Install O-ring after tooth contact is checked.
5. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-98, "Adjustment".
CAUTION:
Measure the total preload without oil seals of transfer cover and transfer case.



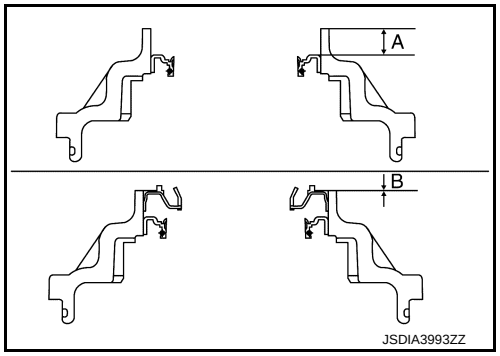
6. Remove transfer cover to install O-ring.
7. Apply multi-purpose grease lightly and evenly onto an O-ring, and install it to the transfer cover.
CAUTION:
- **Never reuse O-ring.**
- **When installing O-ring, never use a suitable tool.**
- **Never damage O-ring.**

8. Install the transfer cover to the transfer case, and apply anti-corrosive oil onto thread and seats on the mounting bolts. Then tighten mounting bolts to the specified torque.



A : M10 bolt
B : M8 bolt

9. Using drift (commercial service tool), install transfer cover oil seal (outer/inner) with the directions below.



A : Installation dimension for transfer cover oil seal (inner)
B : Installation dimension for transfer cover oil seal (outer)

A : 10.3 +0.6/-0 mm (0.406 +0.024/-0 in)
B : 0 +0.6/-0 mm (0 +0.024/-0 in)

CAUTION:
- **When checking the total preload torque, measure it without the oil seal, then install the oil seal.**
- **Never reuse the oil seal.**
- **When installing, never incline oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and transfer oil onto the circumference of the oil seal.**

10. Install gasket onto filler plug and install them to transfer cover.

CAUTION:
- **Never reuse gasket.**
- **Install filler plug after oil is filled.**

Inspection

INFOID:0000000010992042

INSPECTION AFTER DISASSEMBLY

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

Transfer cover

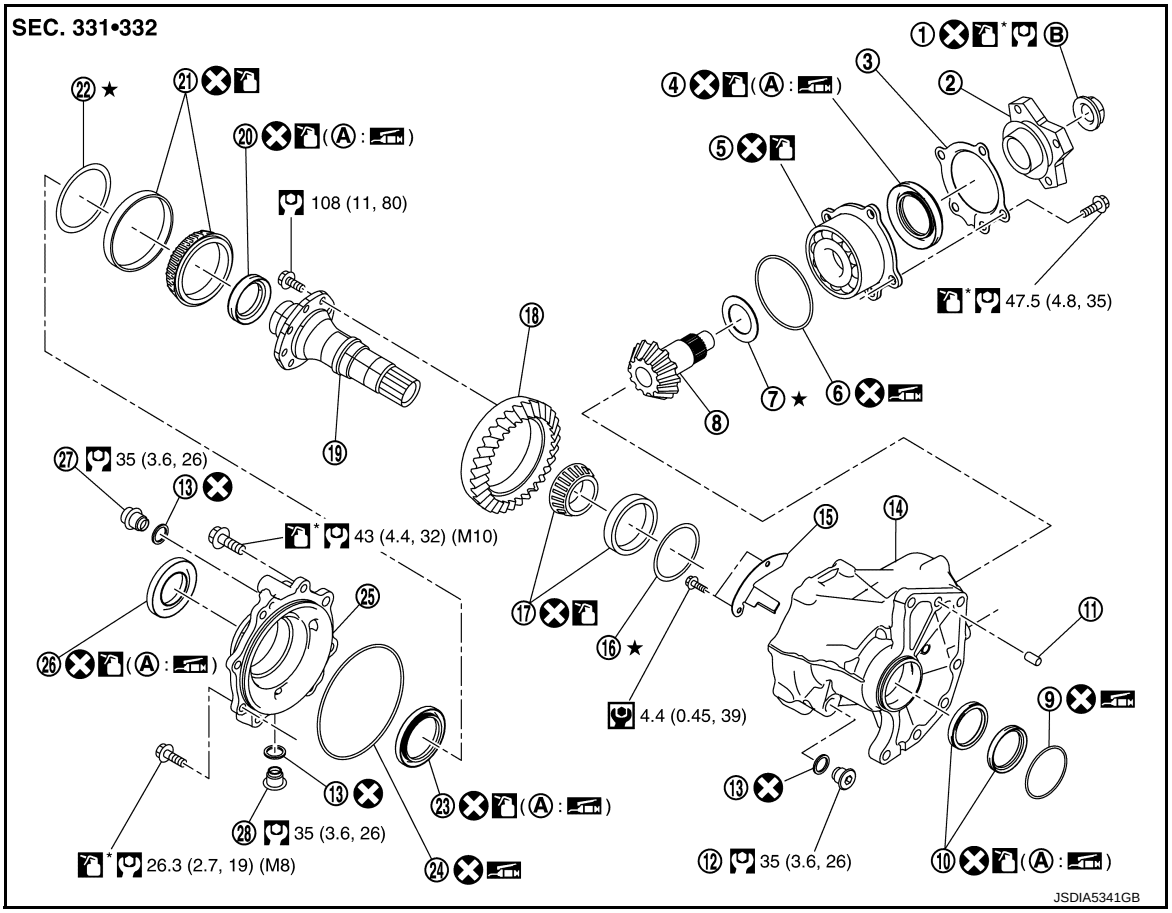
Check the bearing mounting surface for wear, cracks and damages.

RING GEAR SHAFT

Exploded View

INFOID:0000000010992043

MR20DD models



① Pinion lock nut	② Companion flange	③ Dust cover
④ Oil seal	⑤ Pinion bearing assembly	⑥ O-ring
⑦ Drive pinion adjusting shim	⑧ Drive pinion	⑨ O-ring
⑩ Oil seal	⑪ Dowel pin	⑫ Plug
⑬ Gasket	⑭ Transfer case	⑮ Baffle plate
⑯ Ring gear bearing adjusting shim (transfer case side)	⑰ Ring gear bearing (transfer case side)	⑱ Ring gear
⑲ Ring gear shaft	⑳ Ring gear shaft oil seal	㉑ Ring gear bearing (transfer cover side)
㉒ Ring gear bearing adjusting shim (transfer cover side)	㉓ Oil seal	㉔ O-ring
㉕ Transfer cover	㉖ Oil seal	㉗ Filler plug
㉘ Drain plug		
Ⓐ Oil seal lip	Ⓑ Comply with the assembly procedure when tightening. Refer to DLN-96, "Disassembly and Assembly".	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

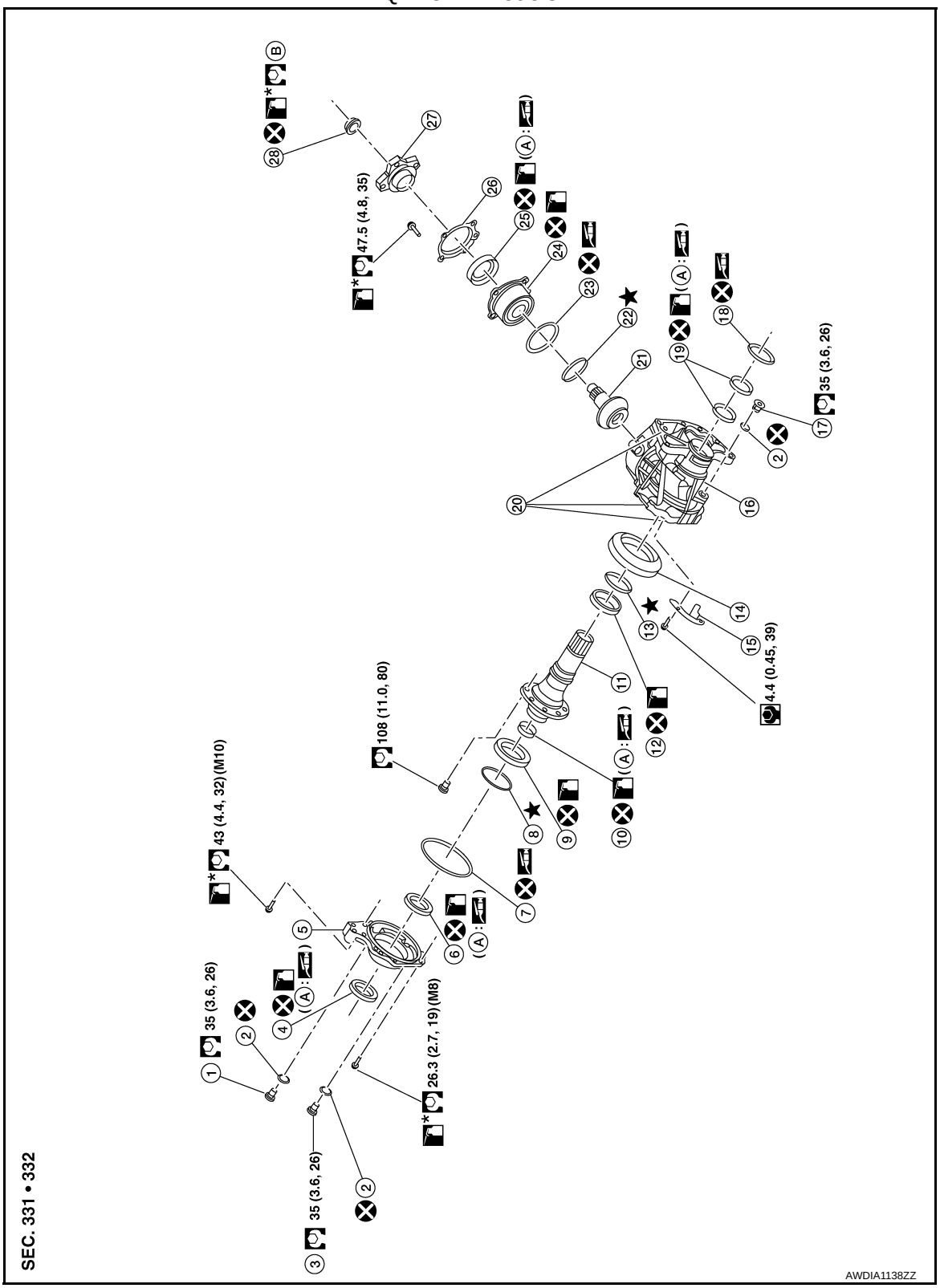
★: Select with proper thickness.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

QR25DE models



① Filler plug	② Gasket	③ Drain plug
④ Oil seal	⑤ Transfer cover	⑥ Oil seal
⑦ O-ring	⑧ Ring gear bearing adjusting shim (transfer cover side)	⑨ Ring gear bearing (transfer cover side)
⑩ Ring gear shaft oil seal	⑪ Ring gear shaft	⑫ Ring gear bearing (transfer case side)
⑬ Ring gear bearing adjusting shim (transfer case side)	⑭ Ring gear	⑮ Baffle plate
⑯ Transfer case	⑰ Plug	⑱ O-ring
⑲ Oil seal	⑳ Dowel pin	㉑ Drive pinion
㉒ Drive pinion adjusting shim	㉓ O-ring	㉔ Pinion bearing assembly
㉕ Oil seal	㉖ Dust cover	㉗ Companion flange
㉘ Pinion lock nut		
Ⓐ Oil seal lip	Ⓑ Comply with the assembly procedure when tightening. Refer to DLN-96, "Disassembly and Assembly".	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

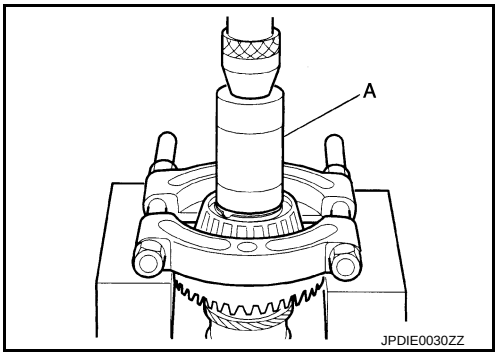
★: Select with proper thickness.

Disassembly and Assembly

INFOID:0000000010992044

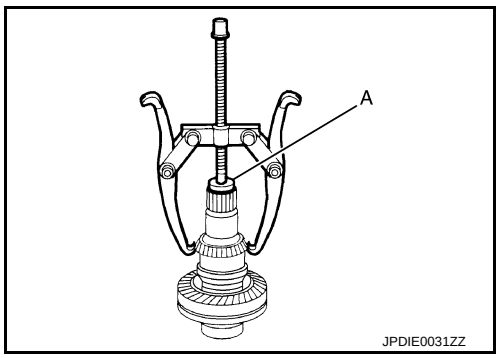
DISASSEMBLY

1. Remove transfer cover assembly. Refer to DLN-85, "Disassembly and Assembly".
2. Remove ring gear bearing outer race (transfer cover side) and ring gear bearing adjusting shim (transfer cover side) from the transfer cover. Refer to DLN-85, "Disassembly and Assembly".
3. Remove ring gear shaft assembly from the transfer case.
4. Remove ring gear bearing outer race (transfer case side) and ring gear bearing adjusting shim (transfer case side) from the transfer case. Refer to DLN-105, "Disassembly and Assembly".
5. Remove ring gear bearing inner race (transfer cover side) from ring gear shaft using suitable tool (A) and suitable tool.



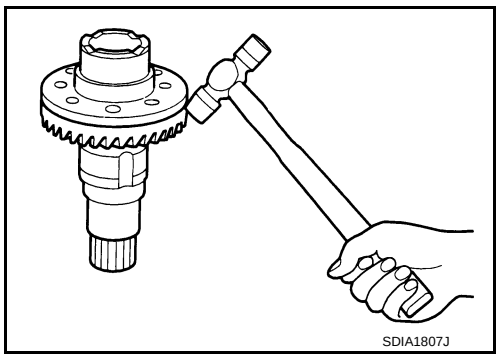
6. Remove ring gear bearing inner race (transfer case side) from ring gear shaft with suitable tool (A) and Tool.

Tool number : ST33061000



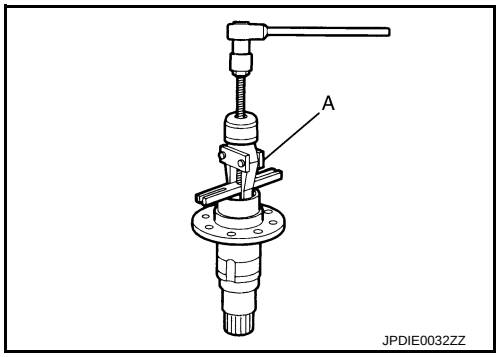
7. Remove the ring gear mounting bolts.

8. Lightly tap ring gear with a plastic hammer to remove ring gear from the ring gear shaft.



9. Remove ring gear shaft oil seal from the ring gear shaft with the Tool (A).

Tool number : KV381054S0

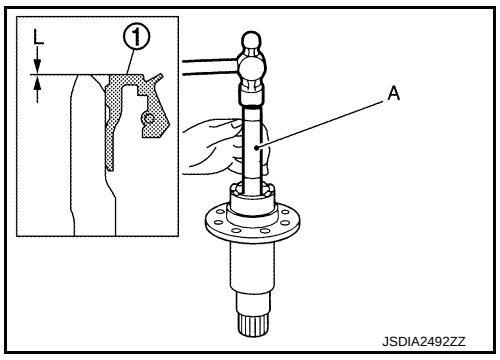


10. Perform inspection after disassembly. Refer to DLN-92, "Inspection".

ASSEMBLY

1. Using suitable tool (A), install ring gear shaft oil seal ① within the dimension (L) shown as follows.

L : 2.0 +0.6/–0 mm (0.079 +0.024/–0 in)



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

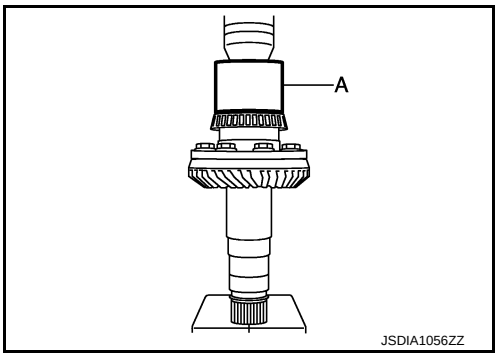
2. Select ring gear bearing adjusting shim (transfer case side) and ring gear bearing adjusting shim (transfer cover side). Refer to DLN-98, "Adjustment".
3. Assemble the selected ring gear bearing adjusting shim (transfer case side) and ring gear bearing outer race (transfer case side) to transfer case. Refer to DLN-105, "Disassembly and Assembly".

CAUTION:
- **Never reuse ring gear bearing.**
- **Apply transfer oil to the ring gear bearing.**

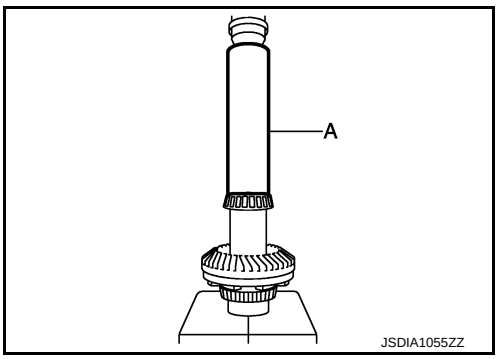
4. Assemble the selected ring gear bearing adjusting shim (transfer cover side) and ring gear bearing outer race (transfer cover side) to transfer cover. Refer to DLN-85, "Disassembly and Assembly".

CAUTION:
- **Never reuse ring gear bearing.**
- **Apply transfer oil to the ring gear bearing.**

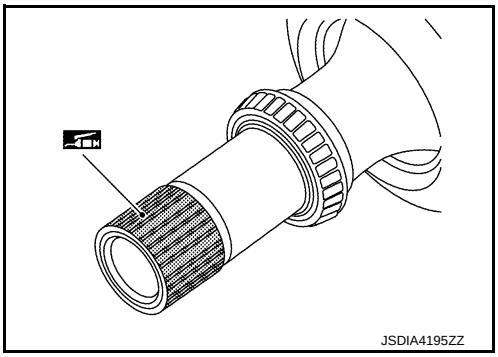
5. Install the ring gear to ring gear shaft, and tighten mounting bolts to the specified torque.
6. Install ring gear bearing inner race (transfer cover side) with drift (A) (commercial service tool).
   CAUTION:
   - **Never reuse ring gear bearing.**
   - **Apply transfer oil to the ring gear bearing.**



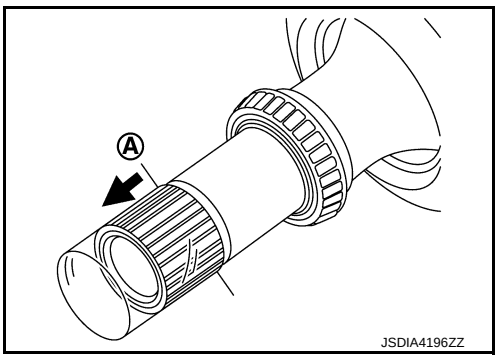
7. Install the ring gear bearing inner race (transfer case side) to ring gear shaft with suitable tool (A).
   CAUTION:
   - **Never reuse ring gear bearing.**
   - **Apply transfer oil to the ring gear bearing.**
8. Install the ring gear shaft assembly to the transfer case.
   CAUTION:
   Protect transfer case oil seals beforehand from being damaged by the spline of ring gear shaft below method following.



a. Apply multi-purpose grease to spline part indicated in the figure.



b. Wrap piece of vinyl to spline part only indicated in the figure. [(A): limit line]
   CAUTION:
   Never wrap sliding surfaces on oil seal.
9. Install transfer cover to check and adjust each part. Refer to DLN-85, "Disassembly and Assembly".
   NOTE:
   At this timing, O-ring installing to transfer cover is not necessary. Install O-ring after backlash and tooth contact are checked.
10. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-98, "Adjustment".
    CAUTION:
    Measure the total preload without oil seals of transfer cover and transfer case.



11. Reinstall transfer cover to install O-ring. Refer to DLN-85, "Disassembly and Assembly".
12. After installing transfer case oil seals, remove wrapped vinyl from the spline of ring gear shaft.

Inspection

INFOID:0000000010992046

INSPECTION AFTER DISASSEMBLY

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

Gear and Shaft

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

CAUTION:

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

Bearing

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

CAUTION:

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

Shim

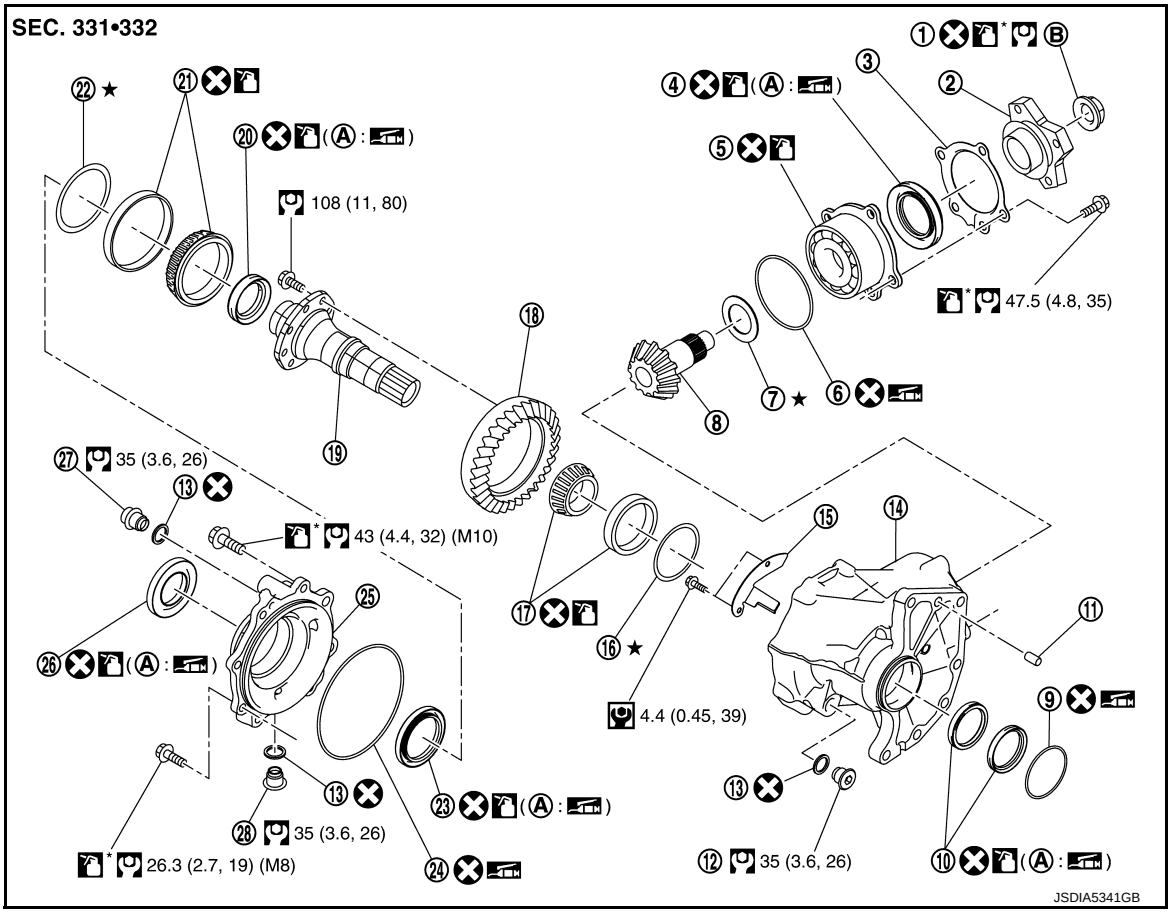
Check for seizure, damage, and unusual wear.

DRIVE PINION

Exploded View

INFOID:0000000010992047

MR20DD models



① Pinion lock nut	② Companion flange	③ Dust cover
④ Oil seal	⑤ Pinion bearing assembly	⑥ O-ring
⑦ Drive pinion adjusting shim	⑧ Drive pinion	⑨ O-ring
⑩ Oil seal	⑪ Dowel pin	⑫ Plug
⑬ Gasket	⑭ Transfer case	⑮ Baffle plate
⑯ Ring gear bearing adjusting shim (transfer case side)	⑰ Ring gear bearing (transfer case side)	⑱ Ring gear
⑲ Ring gear shaft	⑳ Ring gear shaft oil seal	㉑ Ring gear bearing (transfer cover side)
㉒ Ring gear bearing adjusting shim (transfer cover side)	㉓ Oil seal	㉔ O-ring
㉕ Transfer cover	㉖ Oil seal	㉗ Filler plug
㉘ Drain plug		
Ⓐ Oil seal lip	Ⓑ Comply with the assembly procedure when tightening. Refer to DLN-96, "Disassembly and Assembly".	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

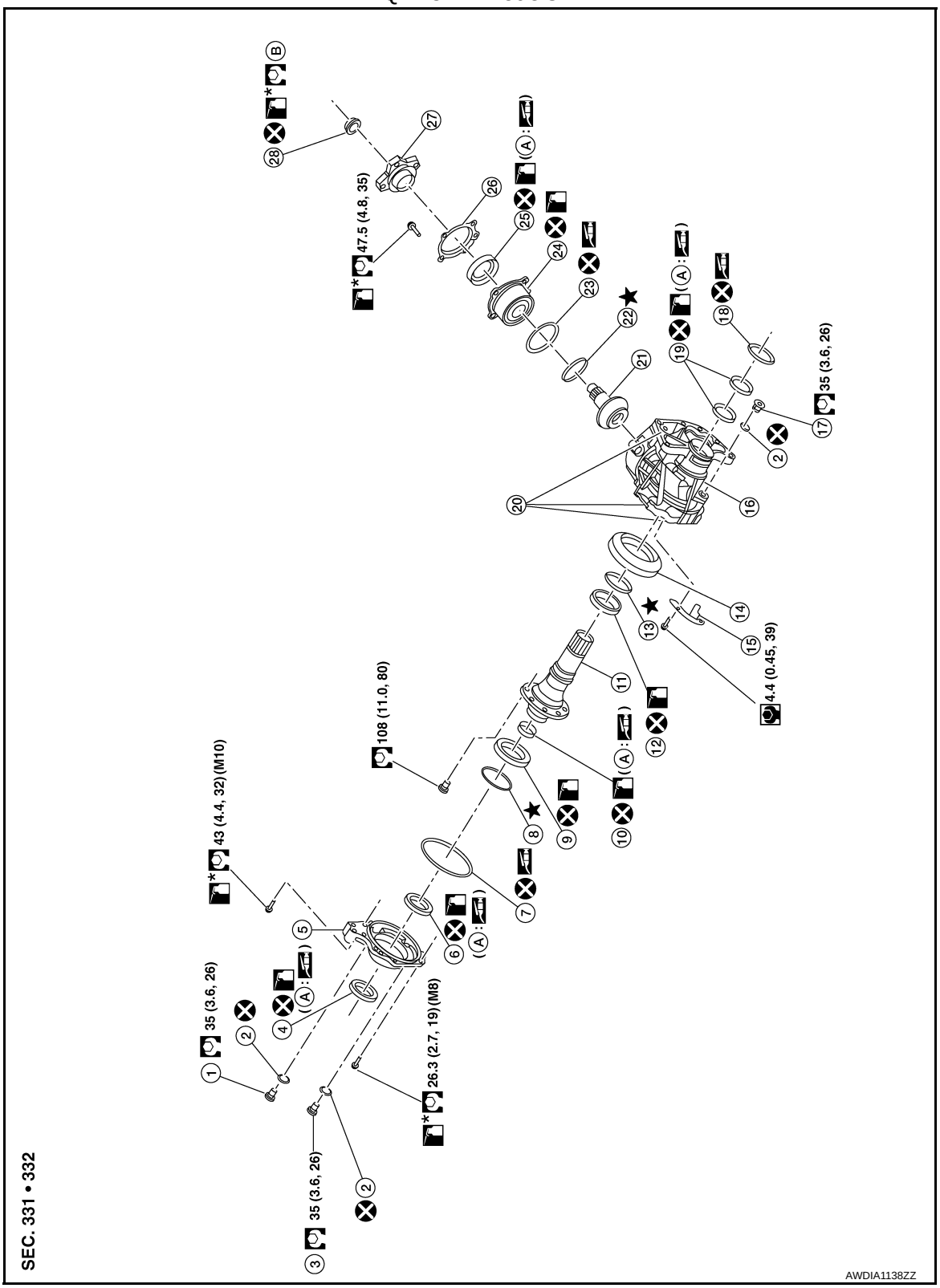
★: Select with proper thickness.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

QR25DE models



① Filler plug	② Gasket	③ Drain plug
④ Oil seal	⑤ Transfer cover	⑥ Oil seal
⑦ O-ring	⑧ Ring gear bearing adjusting shim (transfer cover side)	⑨ Ring gear bearing (transfer cover side)
⑩ Ring gear shaft oil seal	⑪ Ring gear shaft	⑫ Ring gear bearing (transfer case side)
⑬ Ring gear bearing adjusting shim (transfer case side)	⑭ Ring gear	⑮ Baffle plate
⑯ Transfer case	⑰ Plug	⑱ O-ring
⑲ Oil seal	⑳ Dowel pin	㉑ Drive pinion
㉒ Drive pinion adjusting shim	㉓ O-ring	㉔ Pinion bearing assembly
㉕ Oil seal	㉖ Dust cover	㉗ Companion flange
㉘ Pinion lock nut		
Ⓐ Oil seal lip	Ⓑ Comply with the assembly procedure when tightening. Refer to DLN-96, "Disassembly and Assembly".	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

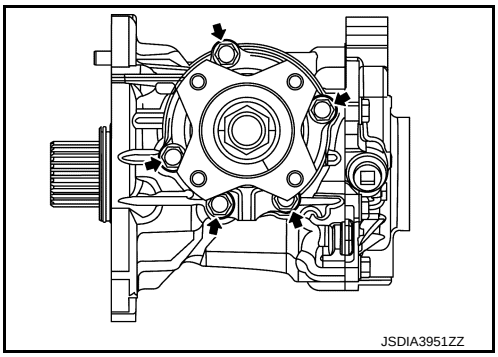
★: Select with proper thickness.

Disassembly and Assembly

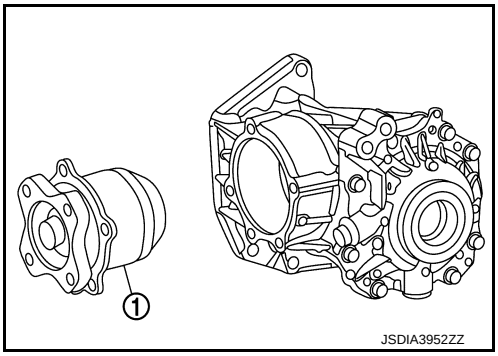
INFOID:0000000010992048

DISASSEMBLY

1. Remove pinion bearing assembly mounting bolts.

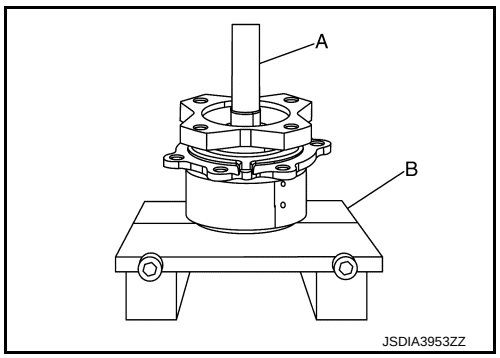

JSDIA3951ZZ

2. Lightly tap companion flange with a plastic hammer to remove drive pinion assembly ①.
3. Remove the O-ring from pinion bearing.
4. Remove the pinion lock nut.



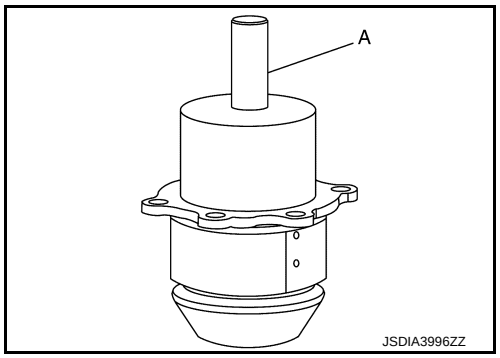
JSDIA3952ZZ

5. Remove drive pinion from pinion bearing assembly using suitable tool (A) and suitable tool (B).
6. Remove adjusting shim.
7. Remove companion flange.
8. Remove the dust cover.
9. Remove the oil seal.
10. Perform inspection after disassembly. Refer to DLN-102, "Inspection".



ASSEMBLY

1. Select drive pinion adjusting shim. Refer to DLN-98, "Adjustment".
2. Assemble the selected drive pinion adjusting shim to drive pinion.
3. Install the drive pinion to pinion bearing assembly using suitable tool.
   CAUTION:
   - **Never reuse pinion bearing assembly.**
   - **Apply transfer oil to pinion bearing part.**
4. Install oil seal to pinion bearing assembly using suitable tool (A).
   CAUTION:
   - **Never reuse the oil seal.**
   - **When installing, never incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and transfer oil onto the circumference of the oil seal.**
5. Install dust cover.
   NOTE:
   Tighten dust cover together with pinion bearing assembly.

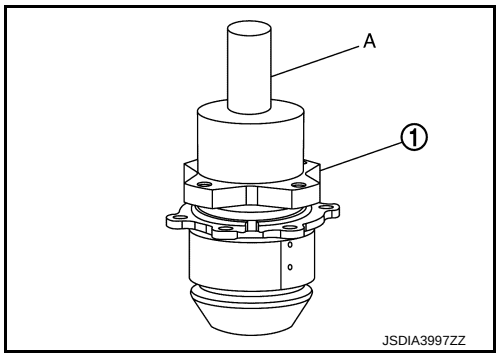


6. Install companion flange ① to pinion bearing using suitable tool (A).
7. Apply anti-corrosive oil to the thread and seat of the lock nut, and adjust the pinion lock nut tightening torque and pinion bearing preload torque, using a preload gauge.

a. Install pinion lock nut, and then tighten to the specified torque.

Pinion lock nut tightening torque : 90±9 N·m (9.2±0.92kg-m, 66±7 ft-lb)

CAUTION:
- **Never reuse pinion lock nut.**
- **Check that pinion lock nut is seated on the companion flange.**

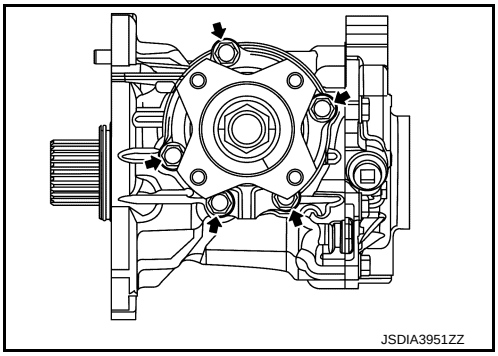


b. After tightening pinion lock nut to the specified torque, retighten the pinion lock nut by 25 degrees.
c. Measure the pinion bearing preload.

Pinion bearing preload : Refer to DLN-108, "Preload Torque".

8. Apply multi-purpose grease lightly and evenly onto an O-ring, and install it to the pinion bearing assembly.
   CAUTION:
   - **Never reuse O-ring.**
   - **When installing O-ring, never use a suitable tool.**
   - **Never damage O-ring.**

9. Install drive pinion assembly, and apply anti-corrosive oil onto thread and seats on the mounting bolts. Tighten to the specified torque.
   NOTE:
   Tighten dust cover together with pinion bearing assembly.
10. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-98, "Adjustment".
    CAUTION:
    Measure the total preload without oil seals of transfer cover and transfer case.

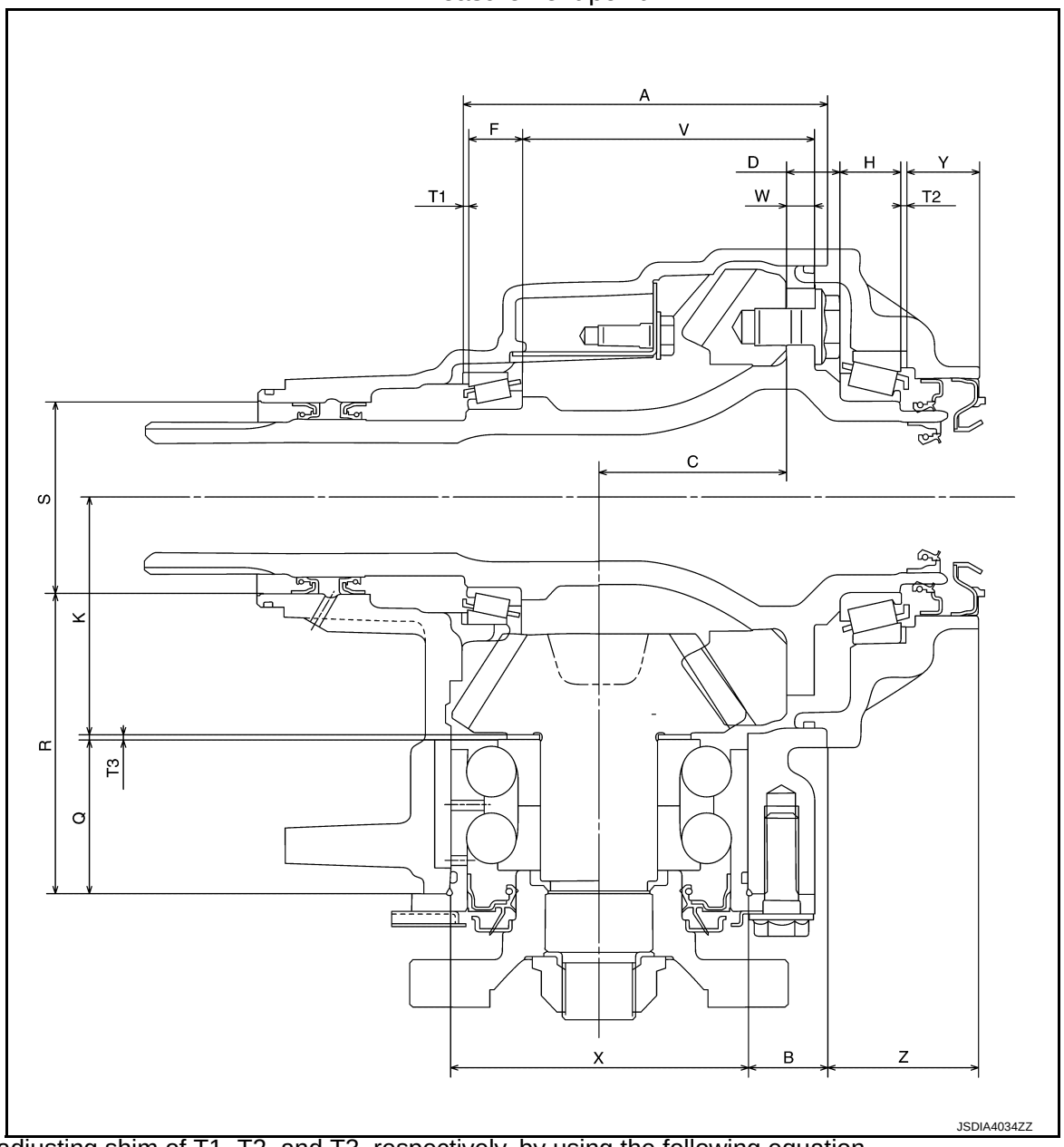


Adjustment

INFOID:0000000010992050

ADJUSTING SHIM SELECTION

Measurement point



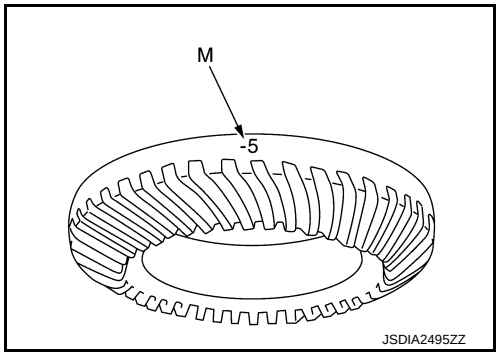
Select adjusting shim of T1, T2, and T3, respectively, by using the following equation.

T1 [Ring gear bearing adjusting shim (transfer case side)]
- T1 = A –(B +X/2) +C +W –V –F –(M/100) +0.071 mm (0.0028 in)

T2 [Ring gear bearing adjusting shim (transfer cover side)]
- T2 = –Y +Z +(B +X/2) –C –D –H +(M/100) +0.071 mm (0.0028 in)

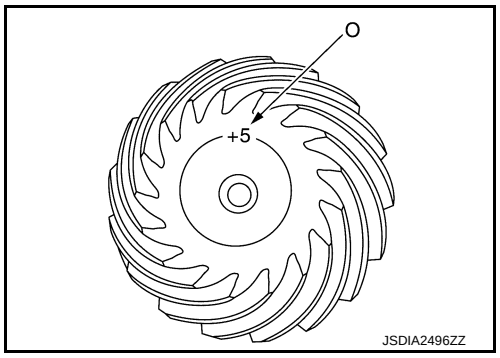
T3 (Drive pinion adjusting shim)
- T3 = –Q +(R +S/2) –K +(O/100)
- Check dimension (M) on the ring gear side face.

NOTE:
Dimension “M” indicates the difference between the optimum engagement and standard dimensions in increments of 0.01 mm (0.0004 in) written on the ring gear side face.



- Check dimension (O) on the gear end of drive pinion.

NOTE:
Dimension “O” indicates the difference between the optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the gear end of drive pinion.



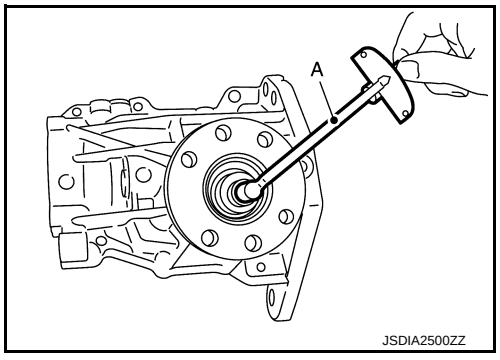
PINION BEARING PRELOAD

CAUTION:
When measuring preload, the rotating speed must be set to 30 rpm.

1. Remove ring gear shaft assembly from the transfer case. Refer to DLN-90, "Disassembly and Assembly".
2. Rotate the companion flange back and forth from 2 to 3 times to check for unusual noise, binding, sticking, and so on.
3. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
4. Measure the pinion bearing preload using Tool (A).

Pinion bearing preload	**: Refer to DLN-108, "Preload Torque".**
Tool number	**: ST3127S000**

CAUTION:
Each rotational part should rotate smoothly with the specified transfer oil.
- If outside the standard, disassemble the drive pinion assembly to check and adjust each part.

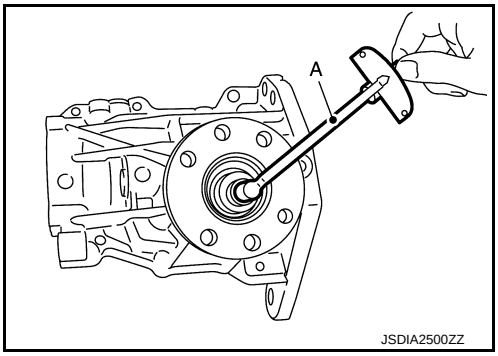


TOTAL PRELOAD

CAUTION:
When measuring preload, the rotating speed must be set to 30 rpm.

1. Measure pinion bearing preload.
   CAUTION:
   Check that the pinion bearing preload is within the standard.
2. Assemble the ring gear shaft assembly to the transfer case. Refer to DLN-90, "Disassembly and Assembly"
3. Install transfer cover to check and adjust each part. Refer to DLN-85, "Disassembly and Assembly".
4. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.

5. Measure the total preload using Tool (A).



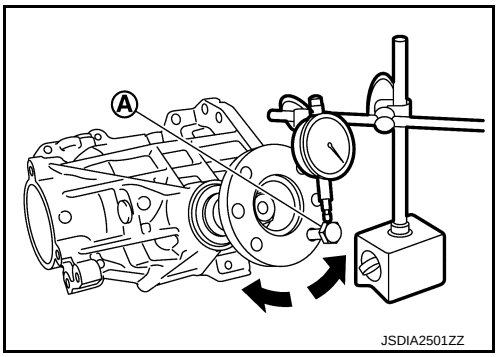
Total preload : **Refer to DLN-108, "Preload Torque".**

Tool number : **ST3127S000**

CAUTION:
Each rotational part should rotate smoothly with the specified transfer oil.
- If outside the standard, disassemble the transfer assembly to check and adjust each part. Measure it with the transfer case oil seal and transfer cover oil seal removed when measuring total preload after disassembly. Then install transfer case oil seals and transfer cover oil seal.

BACKLASH

1. Install the bolt to the companion flange.
2. Fit a dial indicator onto the bolt Ⓐ.
3. Measure the circumference backlash of the companion flange.

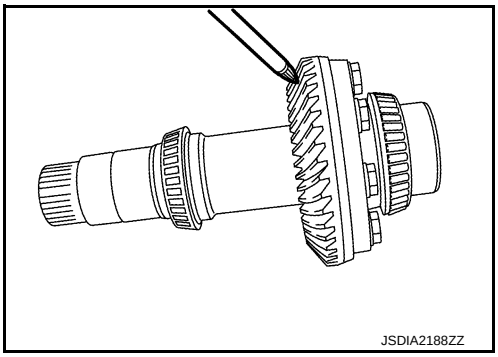


Backlash : **Refer to DLN-108, "Backlash".**

- If outside the standard, disassemble the transfer assembly to check and adjust each part.

TOOTH CONTACT

1. Remove transfer cover. Refer to DLN-85, "Disassembly and Assembly".
2. Remove ring gear shaft assembly from transfer case. Refer to DLN-90, "Disassembly and Assembly".
3. Apply red lead or equivalent onto the ring gear.
   CAUTION:
   Apply red lead or equivalent to both faces of 3 to 4 gears at 4 locations evenly spaced on the ring gear.



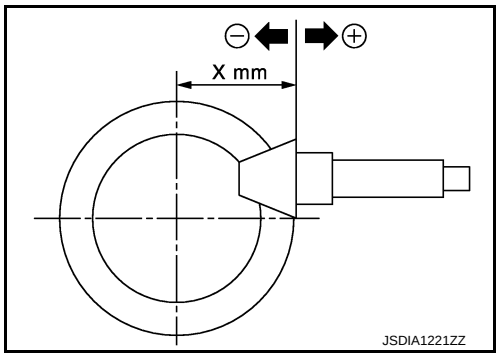
4. Assemble the ring gear shaft assembly to the transfer case. Refer to DLN-90, "Disassembly and Assembly".
5. Install transfer cover to check and adjust each part. Refer to DLN-85, "Disassembly and Assembly".
   NOTE:
   At this timing, O-ring installing to transfer cover is not necessary. Install O-ring after backlash and tooth contact are checked.
6. Remove the plug from the transfer case.
7. Rotate the companion flange back and forth several times, and check the drive pinion gear to ring gear tooth contact by viewing from the plug hole.

Tooth Contact Judgment Guide

Drive pinion adjusting shim selection value mm(in)		Tooth contact condition		Need for adjustment
		Drive side	Back side	
Thinner ↑	-0.09 (-0.0035)	Heel side / Toe side	Toe side / Heel side	YES
	-0.06 (-0.0024)			
	-0.03 (-0.0012)			NO
	0			
Thicker ↓	+0.03 (+0.0012)			
	+0.06 (+0.0024)			YES
	+0.09 (+0.0035)			

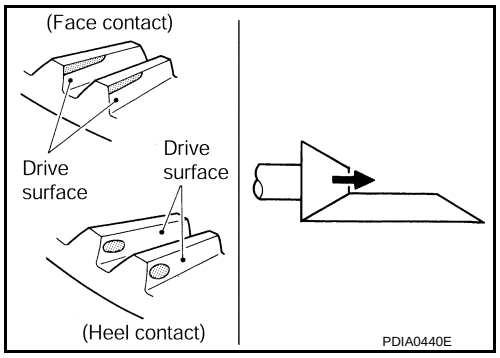
JSDIA4035GB

8. Follow the procedure below to adjust pinion height (dimension X) if tooth contact is improper. For selecting adjusting shim, refer to the latest parts information.
CAUTION:
If no adjusting shim with the calculated value is available, select the thicker and closest one.



JSDIA1221ZZ

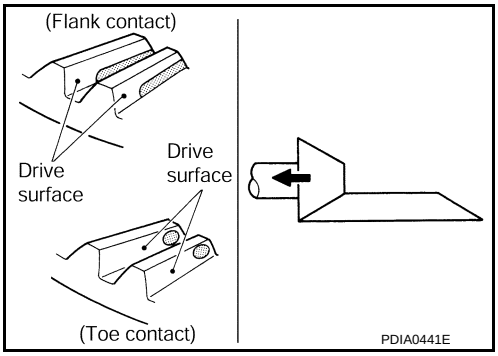
- Thicken the drive pinion adjusting shim to move the drive pinion closer to the ring gear in case of face contact or heel contact.
CAUTION:
Only one adjusting shim can be selected.



PDIA0440E

- Thin the drive pinion adjusting shim to move the drive pinion farther from the ring gear in case of flank contact or toe contact.

CAUTION:
Only one adjusting shim can be selected.



COMPANION FLANGE RUNOUT

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

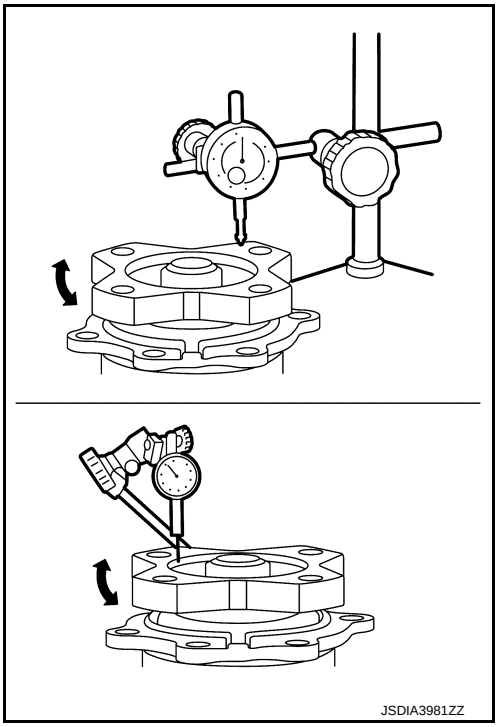
Companion flange runout : Refer to DLN-108, "Companion Flange Runout".

3. Fit suitable tool to the inner side of the companion flange (socket diameter).
4. Rotate the companion flange to check for runout.

Companion flange runout : Refer to DLN-108, "Companion Flange Runout".

5. Follow the procedure below to adjust if runout value is outside the repair limit.

a. Check for runout while changing the phase between companion flange and drive pinion in 90° steps. Then search for the minimum point.
b. Replace companion flange if runout value is still outside the limit after the phase has been changed.
c. Adjust assembly status of the pinion bearing and drive pinion, or replace pinion bearing assembly if runout is outside the standard after the companion flange is replaced.



Inspection

INFOID:0000000010992051

INSPECTION AFTER DISASSEMBLY

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

Gear and Shaft

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

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

Bearing

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

Shim

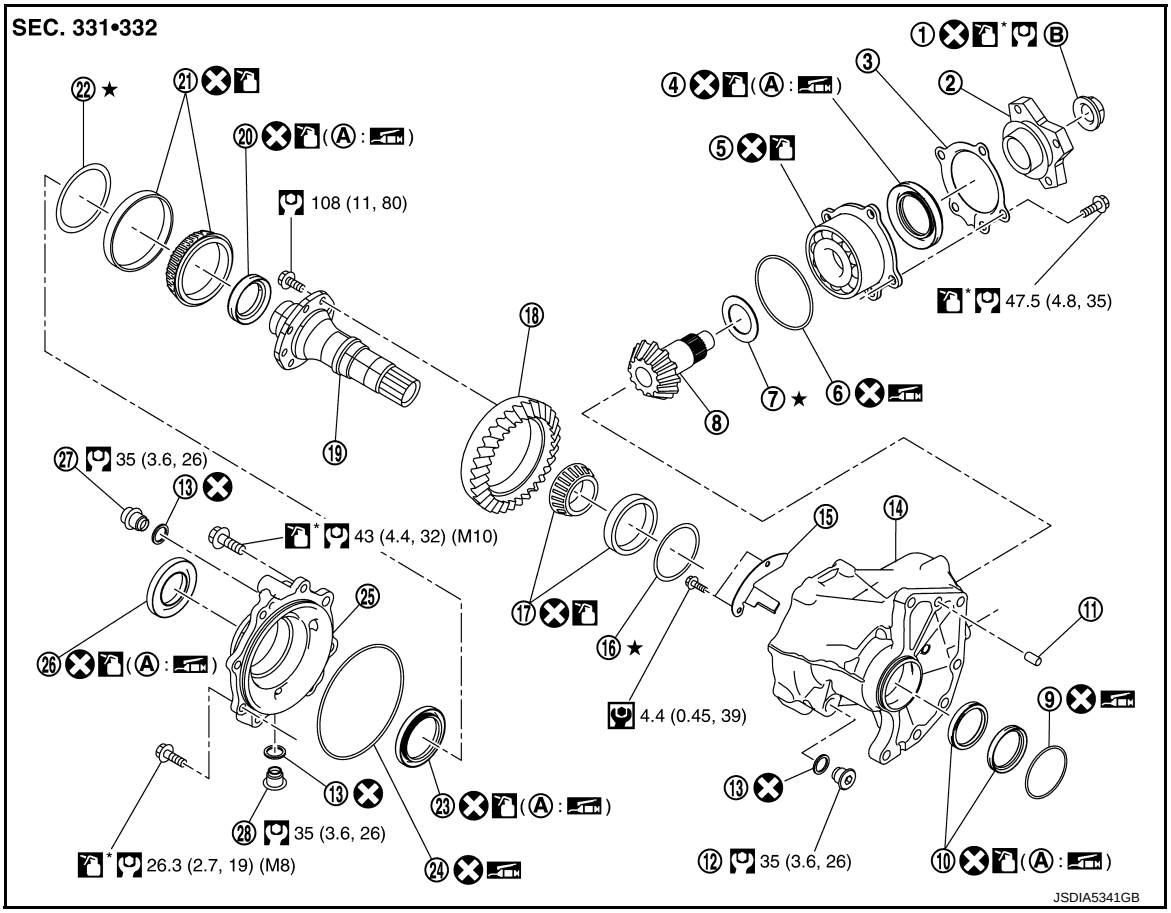
Check for seizure, damage, and unusual wear.

TRANSFER CASE

Exploded View

INFOID:0000000010992052

MR20DD models



① Pinion lock nut	② Companion flange	③ Dust cover
④ Oil seal	⑤ Pinion bearing assembly	⑥ O-ring
⑦ Drive pinion adjusting shim	⑧ Drive pinion	⑨ O-ring
⑩ Oil seal	⑪ Dowel pin	⑫ Plug
⑬ Gasket	⑭ Transfer case	⑮ Baffle plate
⑯ Ring gear bearing adjusting shim (transfer case side)	⑰ Ring gear bearing (transfer case side)	⑱ Ring gear
⑲ Ring gear shaft	⑳ Ring gear shaft oil seal	㉑ Ring gear bearing (transfer cover side)
㉒ Ring gear bearing adjusting shim (transfer cover side)	㉓ Oil seal	㉔ O-ring
㉕ Transfer cover	㉖ Oil seal	㉗ Filler plug
㉘ Drain plug		
Ⓐ Oil seal lip	Ⓑ Comply with the assembly procedure when tightening. Refer to DLN-96, "Disassembly and Assembly".	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

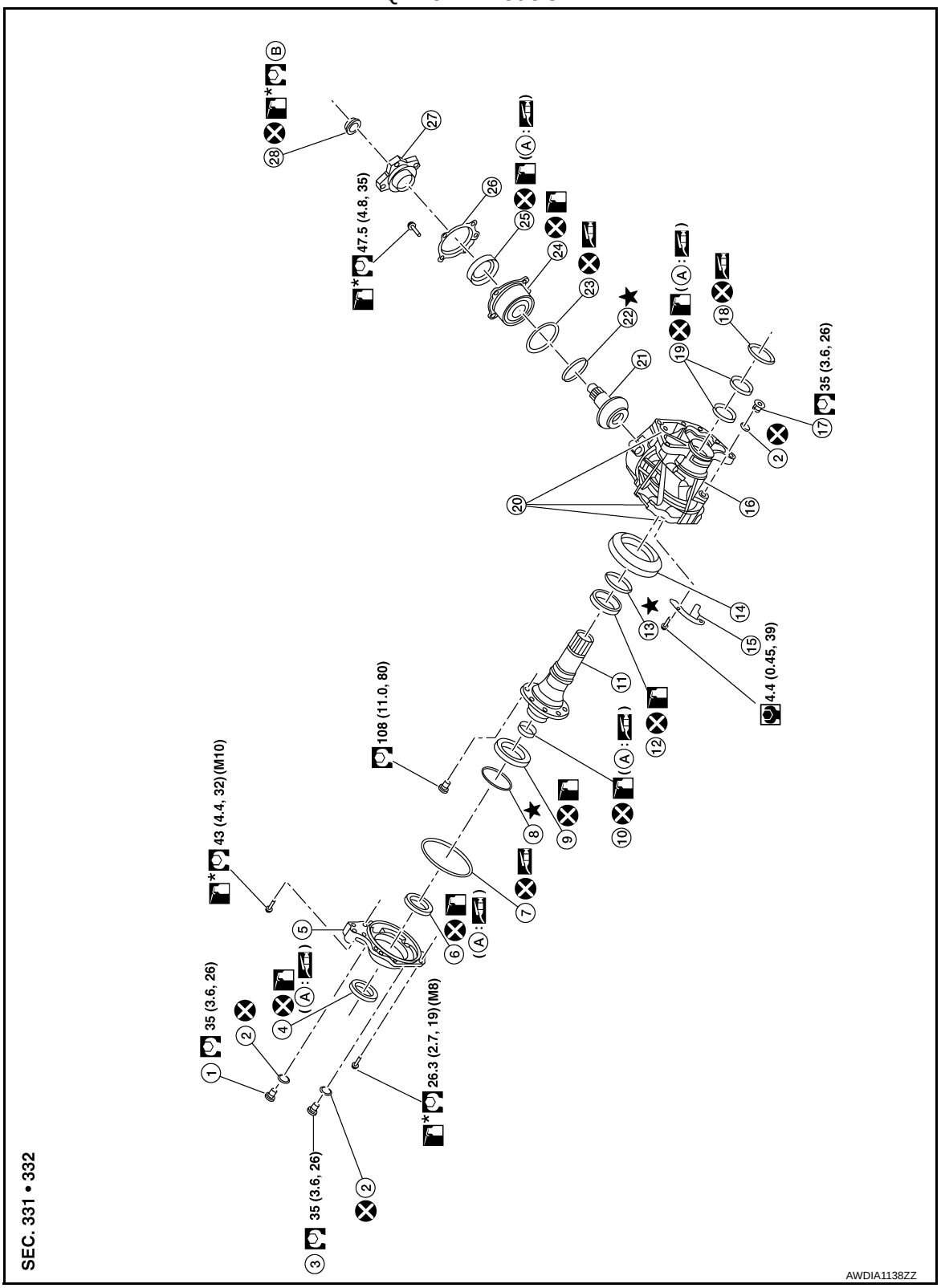
★: Select with proper thickness.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

QR25DE models



① Filler plug	② Gasket	③ Drain plug
④ Oil seal	⑤ Transfer cover	⑥ Oil seal
⑦ O-ring	⑧ Ring gear bearing adjusting shim (transfer cover side)	⑨ Ring gear bearing (transfer cover side)
⑩ Ring gear shaft oil seal	⑪ Ring gear shaft	⑫ Ring gear bearing (transfer case side)
⑬ Ring gear bearing adjusting shim (transfer case side)	⑭ Ring gear	⑮ Baffle plate
⑯ Transfer case	⑰ Plug	⑱ O-ring
⑲ Oil seal	⑳ Dowel pin	㉑ Drive pinion
㉒ Drive pinion adjusting shim	㉓ O-ring	㉔ Pinion bearing assembly
㉕ Oil seal	㉖ Dust cover	㉗ Companion flange
㉘ Pinion lock nut		
Ⓐ Oil seal lip	Ⓑ Comply with the assembly procedure when tightening. Refer to DLN-96, "Disassembly and Assembly".	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

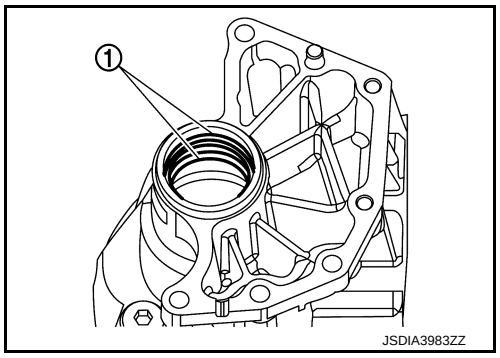
★: Select with proper thickness.

Disassembly and Assembly

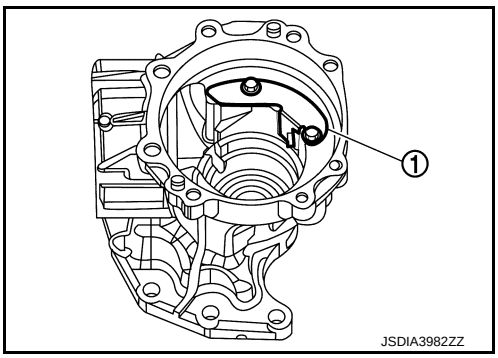
INFOID:0000000010992053

DISASSEMBLY

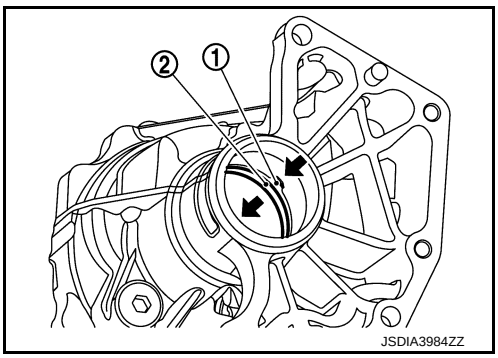
1. Remove transfer cover. Refer to DLN-85, "Disassembly and Assembly".
2. Remove ring gear shaft assembly. Refer to DLN-90, "Disassembly and Assembly".
3. Remove drive pinion assembly. Refer to DLN-96, "Disassembly and Assembly".
4. Remove O-ring from transfer case.
   CAUTION:
   - **Never use a suitable tool.**
   - **Never damage transfer case.**
5. Remove oil seals ①.
   CAUTION:
   Never damage transfer case.



6. Remove baffle plate ①.

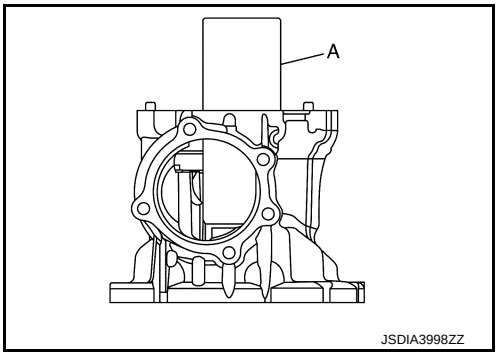


7. Remove the ring gear bearing adjusting shim (transfer case side) ① and ring gear bearing outer race (transfer case side) ② by tapping from the 2 cutouts (⬅) on the transfer case.
CAUTION:
Never damage transfer case.
8. Remove plug and gasket.
9. Perform inspection after disassembly. Refer to DLN-107, "Inspection".

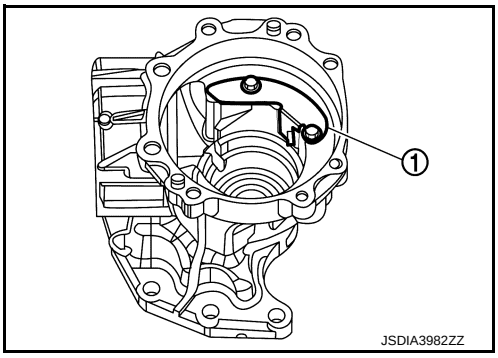


ASSEMBLY

1. Select the ring gear bearing adjusting shim (transfer case side). Refer to DLN-98, "Adjustment".
2. Install the selected ring gear bearing adjusting shim (transfer case side) and ring gear bearing outer race (transfer case side) using suitable tool (A).
CAUTION:
- **Never reuse ring gear bearing.**
- **Apply transfer oil to the ring gear bearing.**

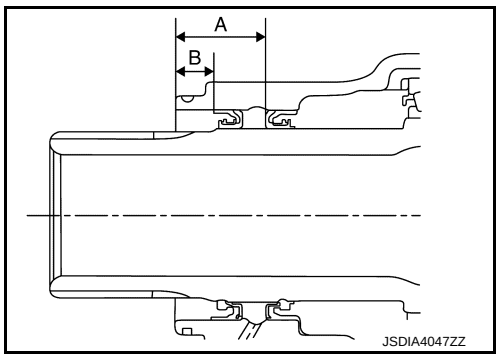


3. Install baffle plate ①.
4. Install ring gear shaft assembly. Refer to DLN-90, "Disassembly and Assembly".
CAUTION:
Protect transfer case oil seals beforehand from being damaged by the spline of ring gear shaft.
5. Install drive pinion assembly. Refer to DLN-96, "Disassembly and Assembly".
6. Install transfer cover to check and adjust each part. Refer to DLN-85, "Disassembly and Assembly".
NOTE:
At this timing, O-ring installing to transfer cover is not necessary. Install O-ring after backlash and tooth contact are checked.



7. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-98, "Adjustment".
CAUTION:
Measure the total preload without oil seals of transfer cover and transfer case.
8. Reinstall transfer cover to install O-ring. Refer to DLN-85, "Disassembly and Assembly".

9. Install oil seals using suitable tool.



A : 24.8 mm (0.976 in)
B : 10.3 mm (0.406 in)

CAUTION:
- **When checking the total preload torque, measure it without the oil seal, then install the oil seal.**
- **Never reuse the oil seal.**
- **When installing, never incline oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and transfer oil onto the circumference of the oil seal.**
- **Never damage oil seals by spline of ring gear shaft.**

10. After installing oil seals to transfer case, remove wrapped vinyl from the spline of ring gear shaft.
11. Apply multi-purpose grease lightly and evenly onto an O-ring, and install it to the transfer case.

CAUTION:
- **Never reuse O-ring.**
- **When installing O-ring, never use a suitable tool.**
- **Never damage O-ring.**

Inspection

INFOID:0000000010992055

INSPECTION AFTER DISASSEMBLY

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

Case

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

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000010992056

Applied model	Axle	4WD	
	Engine	MR20DD	QR25DE
	Transaxle	CVT	
Transfer model		TY21C	
Gear ratio		0.404	
Number of teeth	Ring gear	42	
	Drive pinion	17	
Oil capacity		Refer to MA-23, "Fluids and Lubricants".	

Preload Torque

INFOID:0000000010992057

Unit: N·m (kg-m, in-lb)

Item		Standard
Pinion bearing preload (P_1)		0.25 – 1.15 (0.03 – 0.11, 3.0 – 10.0)
Total preload	With all oil seals	P_1 + 0.7 – 1.0 (0.08 – 0.1, 7.0 – 8.0)
	Without oil seals (for transfer cover and transfer case)	P_1 + 0.5 – 0.8 (0.06 – 0.08, 5.0 – 7.0)

Backlash

INFOID:0000000010992058

Unit: mm (in)

Item	Standard
Ring gear to drive pinion	0.16 – 0.21 (0.0063 – 0.0083)

Companion Flange Runout

INFOID:0000000010992059

Unit: mm (in)

Item	Standard
Companion flange face runout	0.15 (0.0059) or less
Inner side of the companion flange runout	0.1 (0.004) or less

HOW TO USE THIS MANUAL

HOW TO USE THIS SECTION

Information

INFOID:0000000011058862

Both “VDC” and “ESP” are used in this manual. These indicate the same system.

PRECAUTION

PRECAUTIONS

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

INFOID:0000000011003962

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

WARNING:

Always observe the following items for preventing accidental activation.

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 “SRS AIR BAG”.**
- **Never 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:

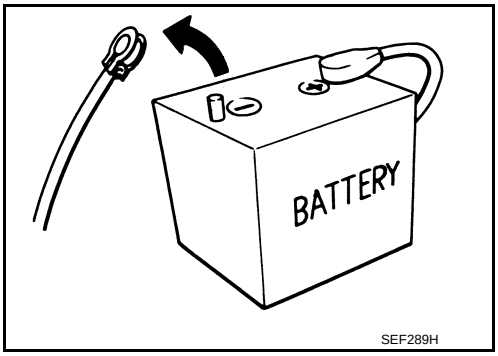
Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never 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.**

Precautions for Removing Battery Terminal

INFOID:0000000011003963

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
  NOTE:
  If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
  NOTE:
  The removal of 12V battery may cause a DTC detection error.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.

2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
NOTE:
At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.
CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.
6. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precaution for Stop/Start System Service

INFOID:0000000011046001

CAUTION:
When performing an inspection and its related work with the engine at idle, always turn the stop/start OFF switch ON or open the hood to release the stop/start system.

Service Notice or Precautions for Transfer

INFOID:0000000011003964

- Use recommended transfer oil only, refer to MA-23, "Fluids and Lubricants".
- Never reuse transfer oil, once it has been drained.
- Check the oil level or replace the oil only with the vehicle parked on level ground.
- During removal or installation, keep inside of transfer clear of dust or dirt.
- Replace all tires at the same time. Always use tires of the proper size and the same brand and pattern. Fitting improper size and unusually worn tires applies excessive force to vehicle mechanism and can cause longitudinal vibration.
- 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 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.

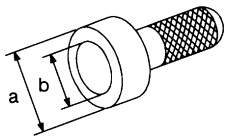
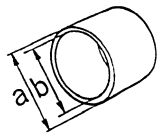
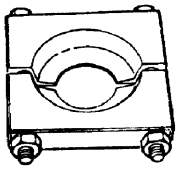
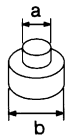
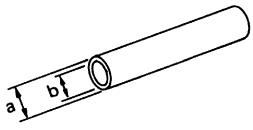
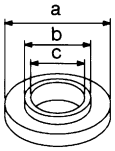
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.
- Observe the specified torque when assembling.
- Clean and flush the parts sufficiently and blow-dry them.
- Be careful not to damage sliding surfaces and mating surfaces.
- Clean inner parts with lint-free cloth or towels. Do not use cotton work gloves and rags to prevent adhering fibers.

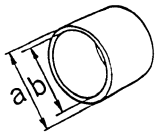
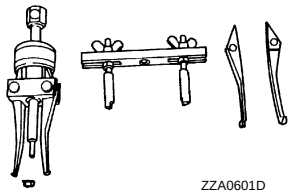
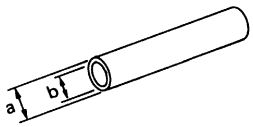
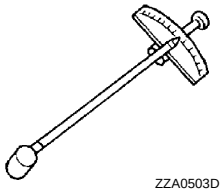
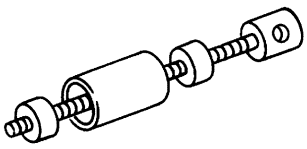
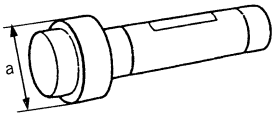
PREPARATION

PREPARATION

Special Service Tool

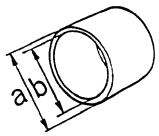
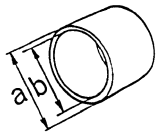
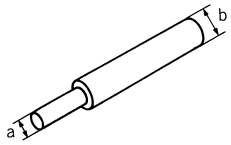
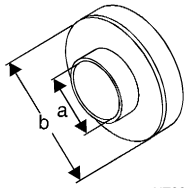
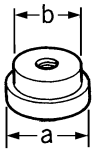
INFOID:0000000011003965

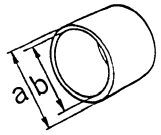
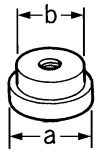
Tool number Tool name	Description
ST30720000 Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.  NT115	• Installing adapter case oil seal (inner/outer) • Installing drive pinion oil seal
ST27861000 Drift a: 62 mm (2.44 in) dia. b: 52 mm (2.05 in) dia.  ZZA1003D	• Installing adapter case oil seal (inner/outer) • Installing drive pinion oil seal
ST22730000 Replacer  ZZA0700D	• Removing inner race of ring gear shaft bearing (transfer case side) • Removing inner race of drive pinion bearing (front side)
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.  NT116	• Removing ring gear • Removing inner race of drive pinion bearing (front side)
ST01530000 Drift a: 48 mm (1.89 in) dia. b: 41 mm (1.61 in) dia.  ZZA0534D	Installing ring gear
ST35272000 Drift a: 72 mm (2.83 in) dia. b: 40 mm (1.57 in) dia. c: 35.5 mm (1.398 in) dia.  NT107	• Installing ring gear • Installing outer race of drive pinion bearing (front side)

Tool number Tool name	Description
KV10111400 Drift a: 25 mm (0.98 in) dia. b: 20.8 mm (0.819 in) dia.  ZZA1003D	Installing inner race of ring gear shaft bearing (transfer case side)
KV381054S0 Puller  ZZA0601D	Removing drive pinion oil seal
ST23860000 Drift a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.  ZZA0534D	Installing inner race of drive pinion bearing (front side)
ST3127S000 Preload gauge  ZZA0503D	Measuring preload torque
ST38280000 Bushing remover  NT685	Installing outer race of drive pinion bearing (front side)
ST33230000 Drift a: 51 mm (2.01 in) dia.  ZZA0938D	Installing outer race of drive pinion bearing (rear side)

Commercial Service Tool

INFOID:0000000011003966

Tool name	Description
Drift a: 63 mm (2.48 in) dia. b: 58 mm (2.28 in) dia.  ZZA1003D	Installing adapter case oil seal (inner)
Drift a: 90 mm (3.54 in) dia. b: 88 mm (3.46 in) dia.  ZZA1003D	Installing adapter case oil seal (outer)
Drift a: 12 mm (0.47 in) dia. b: 18 mm (0.71 in) dia.  ZZA1178D	Removing inner race of ring gear shaft bearing (transfer case side)
Drift a: 49 mm (1.93 in) dia. b: 67 mm (2.64 in) dia.  NT660	Removing inner race of ring gear shaft bearing (adapter case side)
Drift a: 80 mm (3.15 in) dia. b: 50 mm (1.97 in) dia.  ZZA1000D	Installing outer race of ring gear shaft bearing (adapter case side)

Tool name	Description
Drift a: 57 mm (2.24 in) dia. b: 47 mm (1.85 in) dia.  ZZA1003D	Installing inner race of ring gear shaft bearing (adapter case side)
Drift a: 61 mm (2.40 in) dia. b: 48 mm (1.89 in) dia.  ZZA1000D	Installing outer race of drive pinion bearing (front side)

Lubricant or/and Sealant

INFOID:0000000011003967

Item	Use
Genuine Liquid Gasket (Three Bond 1217 or equivalent)	Application to threads of plug
Red lead or equivalent	Checking tooth contact

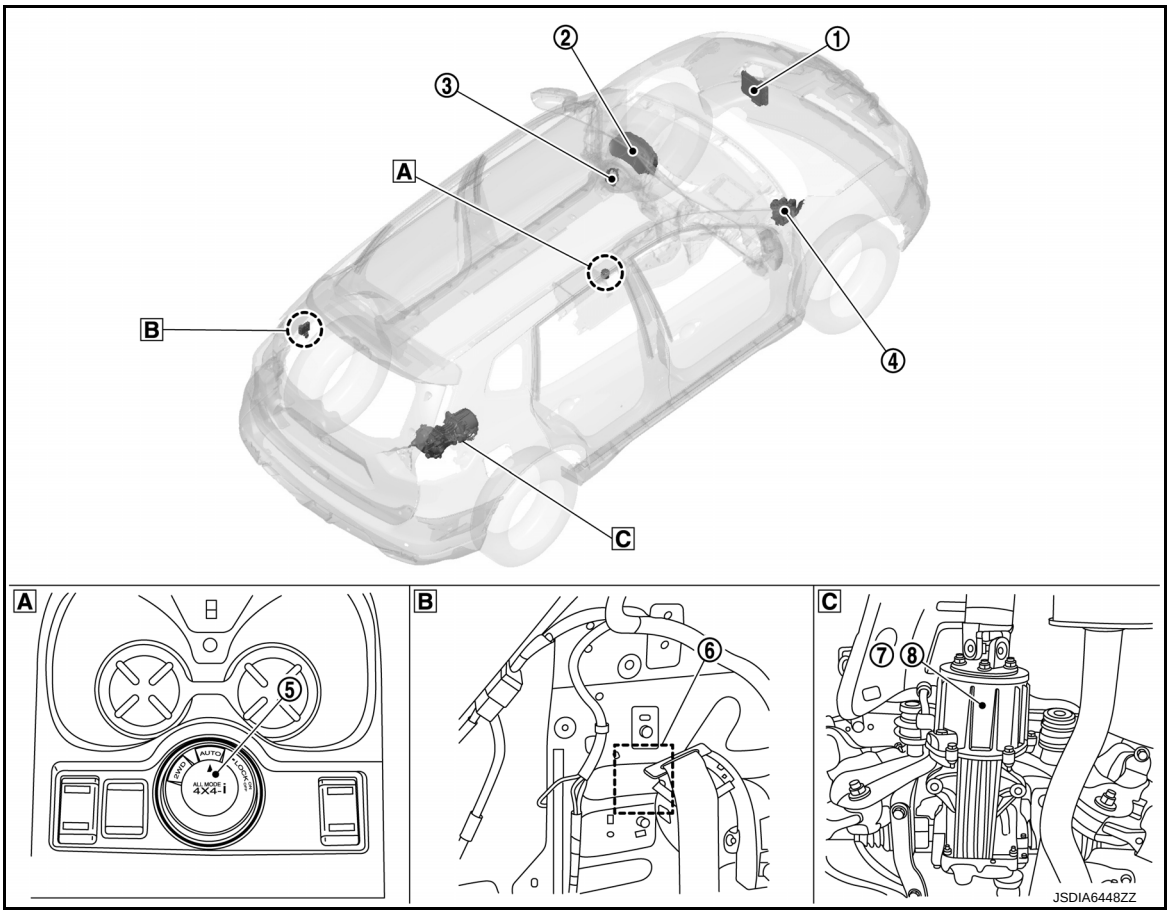
SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000011003968

LHD MODELS



A Console switch panel

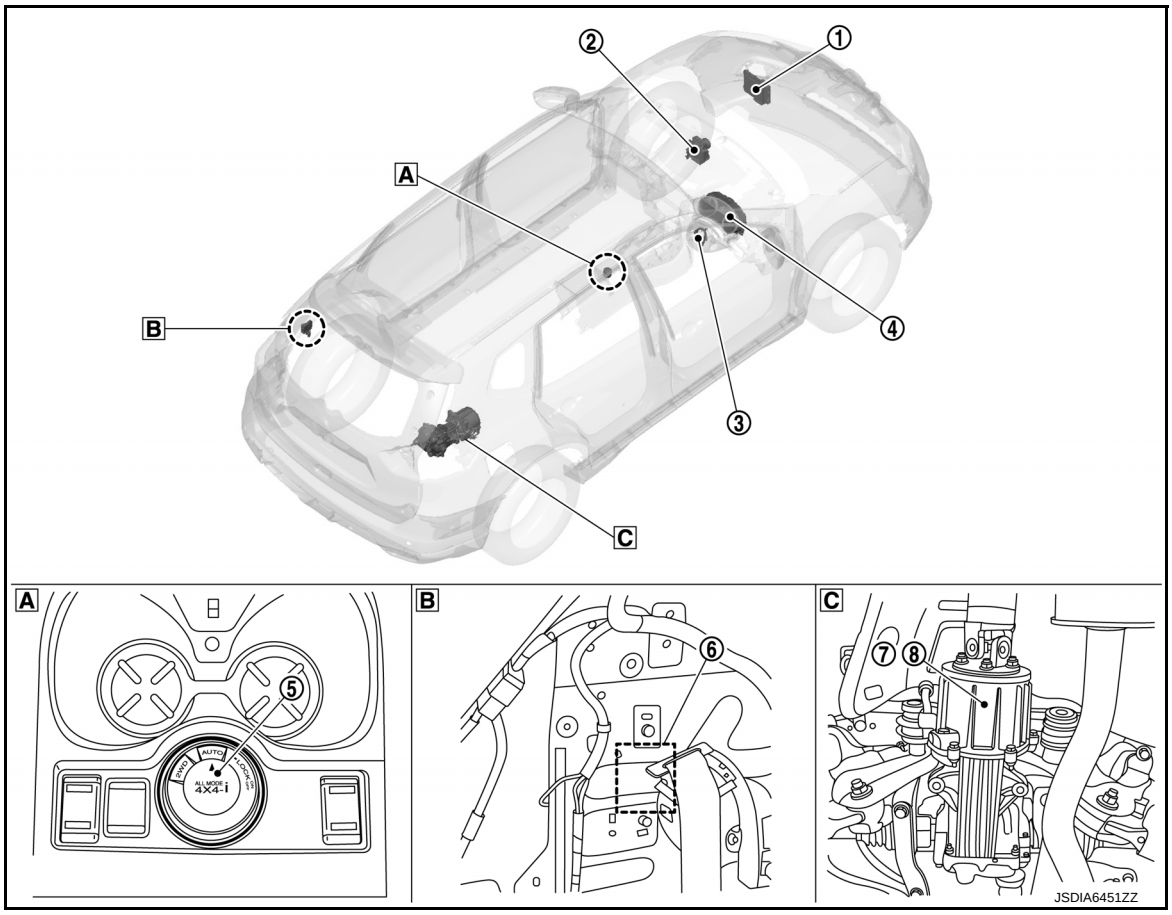
B Rear wheel house outer panel in luggage room of left side

C Rear final drive

No.	Component	Function
①	ECM	Mainly transmits the following signals to 4WD control unit via CAN communication. • Accelerator pedal position signal • Engine speed signal • Engine status signal For detailed installation location, refer to EC-812, "Component Parts Location".
②	Combination meter	Mainly transmits the following signals to 4WD control unit via CAN communication. • Parking brake switch signal Mainly receives the following signals from 4WD control unit via CAN communication. • 4WD warning lamp signal • 4WD mode indicator lamp signal • Torque distribution indicator signal For detailed installation location, refer to MWI-7, "METER SYSTEM : Component Parts Location".
③	Steering angle sensor	Mainly transmits the following signals to 4WD control unit via CAN communication. • Steering angle sensor signal For detailed installation location, refer to BRC-14, "Component Parts Location".

No.	Component	Function
④	ABS actuator and electric unit (control unit)	Mainly transmits the following signals to 4WD control unit via CAN communication. • Each wheel speed signal • Decel G sensor signal • Side G sensor signal • Yaw rate sensor signal For detailed installation location, refer to BRC-14, "Component Parts Location".
⑤	4WD mode switch	Refer to DLN-120, "4WD Mode Switch".
⑥	4WD control unit • 4WD actuator relay	Refer to DLN-119, "4WD Control Unit".
⑦	Electric controlled coupling	Refer to DLN-119, "Electric Controlled Coupling".
⑧	4WD solenoid	Refer to DLN-119, "4WD Solenoid".

RHD MODELS



A Console switch panel

B Rear wheel house outer panel in luggage room of left side

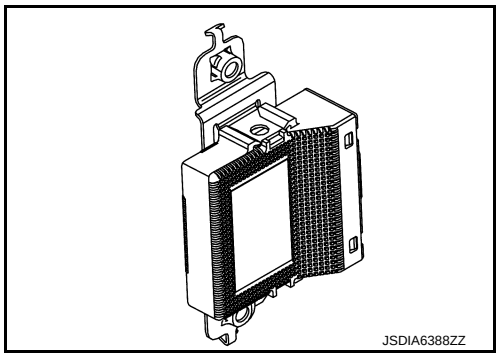
C Rear final drive

No.	Component	Function
①	ECM	Mainly transmits the following signals to 4WD control unit via CAN communication. • Accelerator pedal position signal • Engine speed signal • Engine status signal For detailed installation location, refer to EC-812, "Component Parts Location".
②	ABS actuator and electric unit (control unit)	Mainly transmits the following signals to 4WD control unit via CAN communication. • Each wheel speed signal • Decel G sensor signal • Side G sensor signal • Yaw rate sensor signal For detailed installation location, refer to BRC-14, "Component Parts Location".
③	Steering angle sensor	Mainly transmits the following signals to 4WD control unit via CAN communication. • Steering angle sensor signal For detailed installation location, refer to BRC-14, "Component Parts Location".
④	Combination meter	Mainly transmits the following signals to 4WD control unit via CAN communication. • Parking brake switch signal Mainly receives the following signals from 4WD control unit via CAN communication. • 4WD warning lamp signal • 4WD mode indicator lamp signal • Torque distribution indicator signal For detailed installation location, refer to MWI-7, "METER SYSTEM : Component Parts Location".
⑤	4WD mode switch	Refer to DLN-120, "4WD Mode Switch".
⑥	4WD control unit • 4WD actuator relay	Refer to DLN-119, "4WD Control Unit".
⑦	Electric controlled coupling	Refer to DLN-119, "Electric Controlled Coupling".
⑧	4WD solenoid	Refer to DLN-119, "4WD Solenoid".

4WD Control Unit

INFOID:0000000011003969

- Controls driving force distribution by signals from each sensor from front wheel driving mode (100:0) to 4-wheel driving mode (50:50).
- Fail-safe mode is available if malfunction is detected in 4WD system. For fail-safe, refer to DLN-125, "4WD SYSTEM : Fail-Safe".


JSDIA6388ZZ

4WD ACTUATOR RELAY

4WD actuator relay is integrated with 4WD control unit, and supplies 4WD solenoid with voltage.

Electric Controlled Coupling

INFOID:0000000011003970

Electric controlled coupling is integrated with rear final drive and transmits driving force to rear final drive. For operation, refer to DLN-121, "Operation Description".

4WD Solenoid

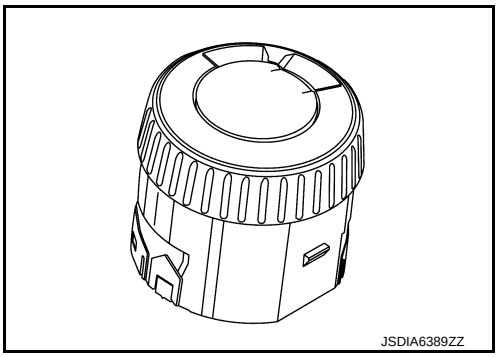
INFOID:0000000011003971

- 4WD solenoid is integrated with electric controlled coupling.
- Controls electric controlled coupling by command current from 4WD control unit.

4WD Mode Switch

INFOID:0000000011003972

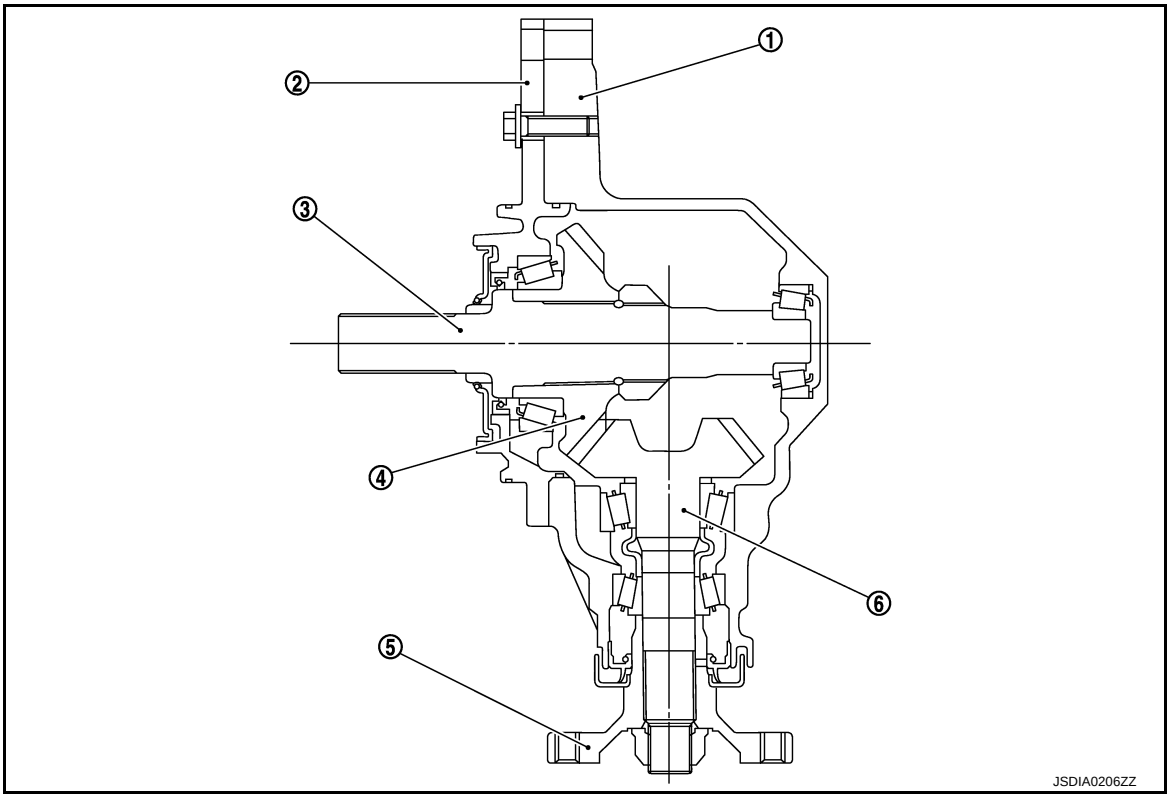
4WD mode is selectable among 2WD mode, AUTO mode, and LOCK mode by operating the 4WD mode switch while the engine is running.



STRUCTURE AND OPERATION

Sectional View

INFOID:0000000011003973

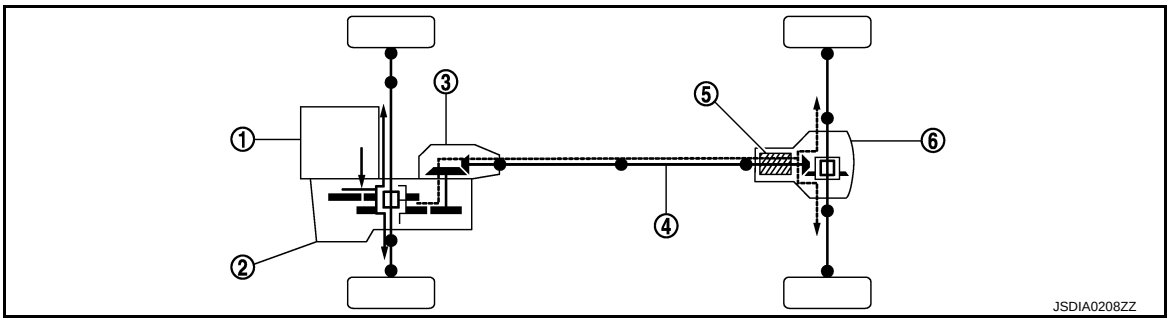


① Transfer case ② Adapter case ③ Ring gear shaft
④ Ring gear ⑤ Companion flange ⑥ Drive pinion

Operation Description

INFOID:0000000011003974

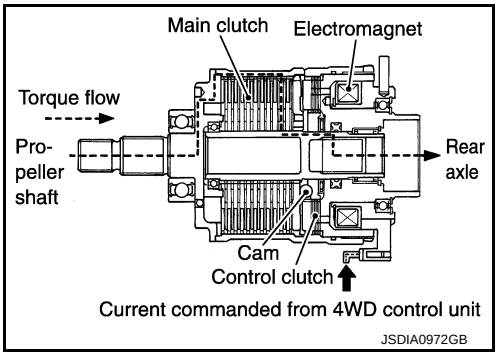
POWER TRANSFER DIAGRAM



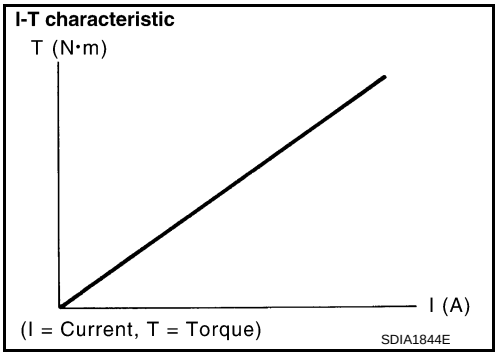
① Engine ② Transaxle ③ Transfer
④ Propeller shaft ⑤ Electric controlled coupling ⑥ Rear final drive

ELECTRIC CONTROLLED COUPLING

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



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

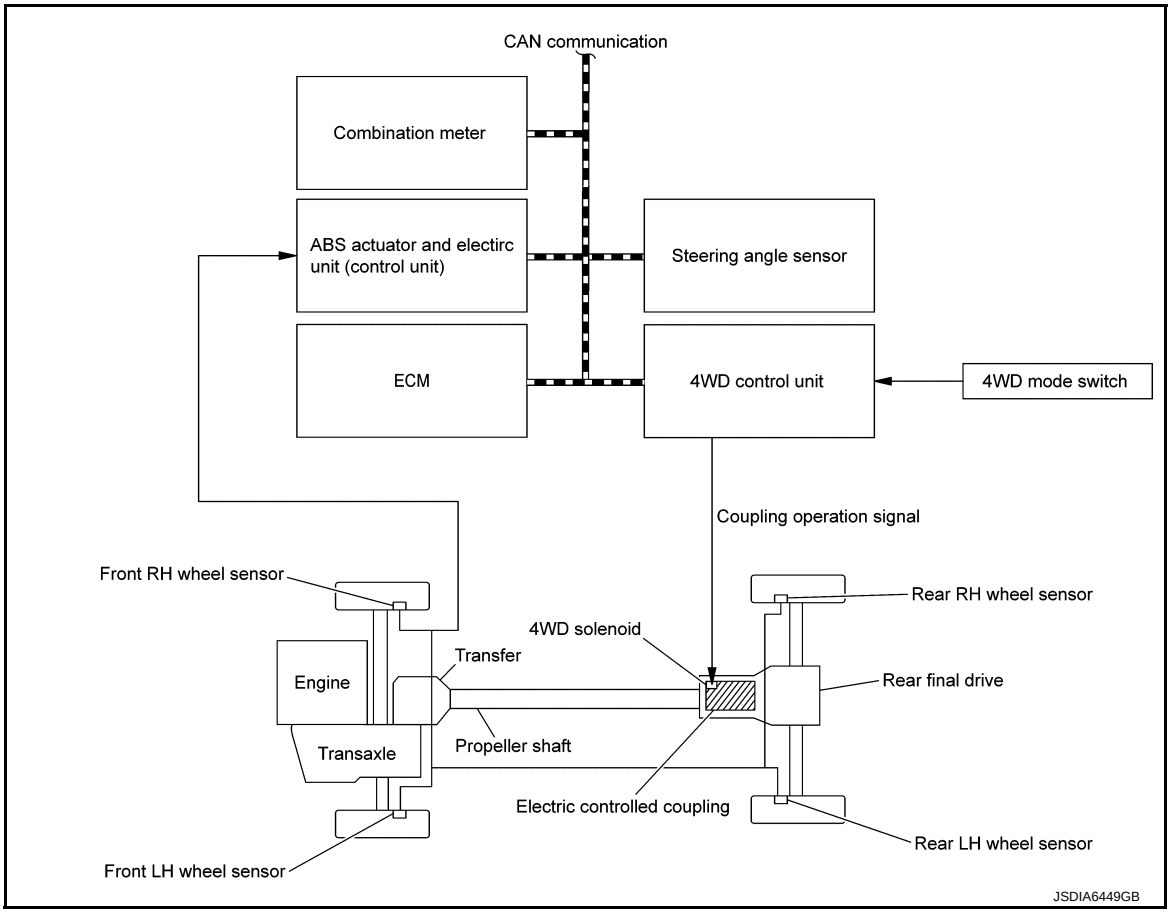


SYSTEM
4WD SYSTEM
4WD SYSTEM : System Description

INFOID:0000000011003975

- Pressing force of multiple disc clutch is controlled by electric control. Driving torque distribution of front and rear wheels changes automatically between approximately 100 : 0 (2WD) and 50 : 50 (4WD) to have an optimized torque distribution adapted to road condition change.
- Driving mode is selectable among 2WD mode, AUTO mode, and LOCK mode by operating the 4WD mode switch.
- In accordance with fail-safe function, when system is malfunctioning, 4WD control stops, and the system becomes 2WD or slight 4WD (rear-wheels still have some driving torque). Refer to DLN-125, "4WD SYSTEM : Fail-Safe".
- When a high load status continues for electric controlled coupling, 4WD control temporarily becomes front wheel drive, according to protection function. Refer to DLN-126, "4WD SYSTEM : Protection Function".

SYSTEM DIAGRAM



Signal with Communication Line

Major signal transmission between each unit via CAN communication lines are shown in the following table.

Component parts	Signal item
Combination meter	Mainly transmits the following signals to 4WD control unit via CAN communication. • Parking brake switch signal Mainly receives the following signals from 4WD control unit via CAN communication. • 4WD warning lamp signal • 4WD mode indicator lamp signal • Torque distribution indicator signal
Steering angle sensor	Mainly transmits the following signals to 4WD control unit via CAN communication. • Steering angle sensor signal

Component parts	Signal item
ABS actuator and electric unit (control unit)	Mainly transmits the following signals to 4WD control unit via CAN communication. • Each wheel speed signal • Decel G sensor signal • Side G sensor signal • Yaw rate sensor signal
ECM	Mainly transmits the following signals to 4WD control unit via CAN communication. • Accelerator pedal position signal • Engine speed signal • Engine status signal

4WD SYSTEM : Control in Each Mode

INFOID:0000000011003976

2WD MODE

- Vehicle is in front-wheel drive.

CAUTION:

If front wheels are slipping in 2WD mode, never switch to AUTO or LOCK. This can cause difficulties for the system.

NOTE:

The 4WD control unit may distribute the minimum necessary driving torque to rear wheels even when the 2WD mode is selected, depending on the driving condition. (However AUTO or LOCK indicator lamp does not illuminate.)

AUTO MODE

- Electronic control allows optimal distribution of torque to front/rear wheels to match road conditions.
- Pressing force of multiple disc clutch is controlled by electric control. Driving torque distribution of front and rear wheels changes automatically between approximately 100 : 0 (2WD) and 50 : 50 (4WD) to have an optimized torque distribution adapted to road condition change.
- Sensor inputs determine the vehicle's turning condition, and tight cornering/braking are controlled by distributing optimum torque to rear wheels.

Vehicle Starts Control

- At the start, torque distribution for front and rear wheels is fixed by electric control and stable start is achieved.
- Makes possible stable driving, with no wheel spin, on snowy roads or other slippery surfaces.

Normal Control

- On roads which do not require 4WD, it contributes to improved fuel economy by driving in conditions close to front-wheel drive and it results in better fuel efficiency.
- When spin occurs on front wheel, distribute optimum torque to rear wheel and keep stable driving.
- The vehicle cornering status is judged according to information from each sensor, and the optimum torque is distributed to rear wheels for preventing tight cornering/braking symptom.

LOCK MODE

- Front/rear wheel torque distribution is fixed, ensuring stable driving when climbing slopes.
- In LOCK mode, the pressing force to the multiple disc clutches is maximized by the electronic control and the driving torque distribution of front and rear wheels is fixed to obtain the 4WD status of approximately 50 : 50.

  NOTE:

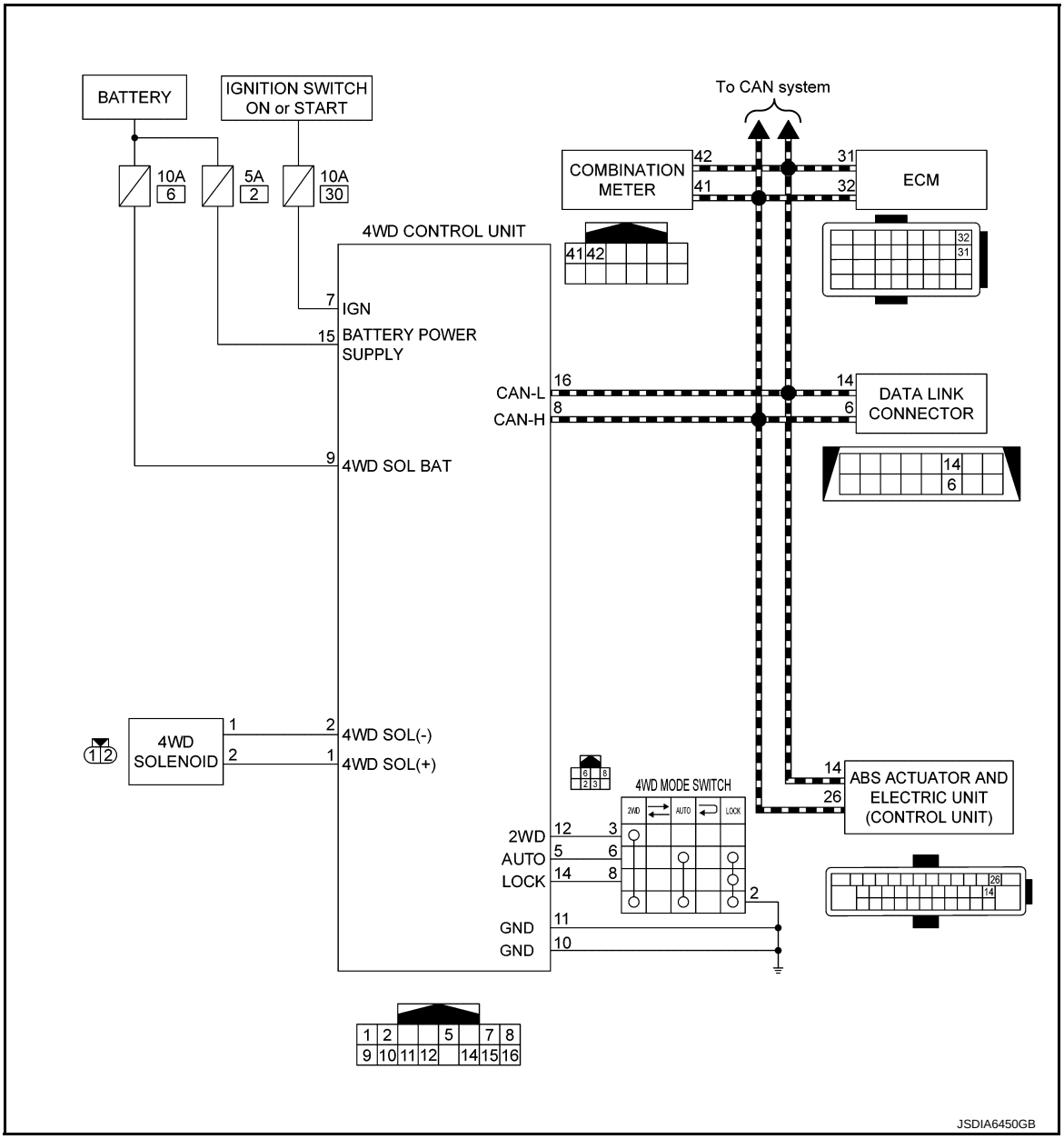
  Only torque distribution may be switched to the control same as the one in AUTO mode, depending on the driving condition.
- LOCK mode will change to AUTO mode automatically, when the vehicle has been driven at a high speed. Then LOCK mode control is canceled and the LOCK indicator lamp turns off.
- When vehicle speed exceeds the specified speed, the mode cannot be switched from AUTO mode to LOCK mode.
- LOCK mode will change to AUTO mode automatically, when the ignition switch is turned OFF in LOCK mode.

NOTE:

If there is a significant difference in pressure or wear between tires, full vehicle performance is not available. Tire conditions are detected, and LOCK mode may be prohibited, or else speeds at which LOCK mode is enabled may be restricted.

4WD SYSTEM : Circuit Diagram

INFOID:0000000011003977



4WD SYSTEM : Fail-Safe

INFOID:0000000011003978

If any malfunction occurs in 4WD electrical system, and control unit detects the malfunction, 4WD warning on information display (combination meter) is displayed to indicate system malfunction. And then 4WD control unit controls becomes the fail-safe mode depending on DTC.

DTC	Vehicle condition
•C1201 •C1204 •C1209 •P1804 •P1809 •P1811 •P181F	4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.
•C1203 •C1210 •P1808 •P181D •U1000 •U1010	4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.
•P181B	No impact to vehicle behavior.

4WD SYSTEM : Protection Function

INFOID:0000000011003979

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

DTC	4WD warning (on information display)	Error area and root cause	Contents of protection function
—	Refer to DLN-126, "INFORMATION DISPLAY (COMBINATION METER) : 4WD Warning".	Rear final drive assembly in protection mode. It is not malfunction. (Internal temperature rise of electronic controlled coupling)	Shuts down 4WD system temporarily (Front wheel drive)
—		Malfunction in each tire or different tire diameter	

NOTE:
- If the 4WD warning displays during driving but remains not displayed after the engine is restarted, the system is normal. If it again displays 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.

INFORMATION DISPLAY (COMBINATION METER)

INFORMATION DISPLAY (COMBINATION METER) : 4WD Warning

INFOID:0000000011003980

DESIGN/PURPOSE

4WD warning is displayed when the 4WD system has a malfunction. 4WD warning indicates that the vehicle is in fail-safe mode or protection function mode.

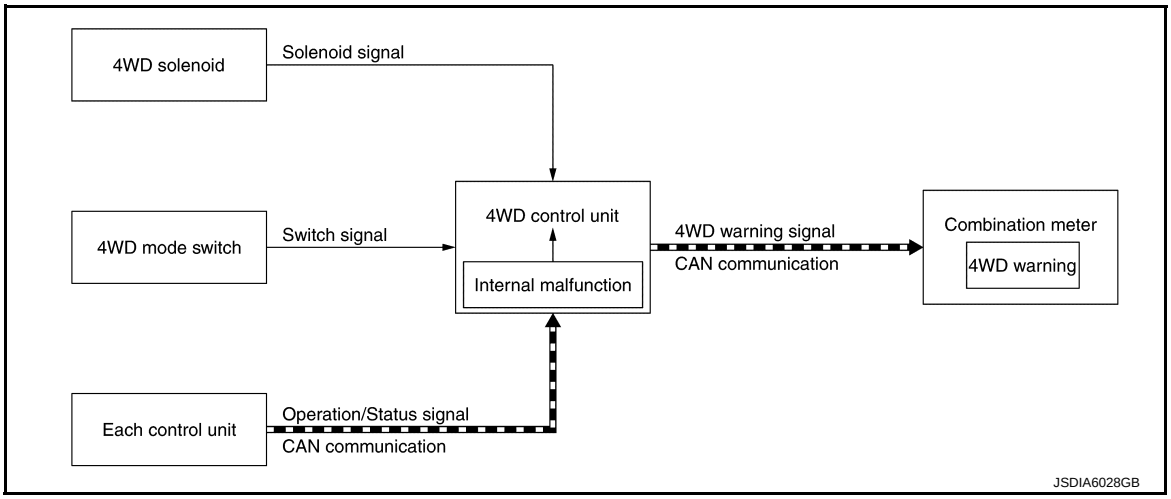
Symbol	Message	Condition
4WD JPNIA1896ZZ	4WD Error See Owner's Manual	4WD system malfunction.
	4WD High Temp. Stop vehicle	Protection function is activated due to heavy load to electric controlled coupling. (4WD system is not malfunctioning and 4WD system changes to front wheel drive.)
	Tire Size Incorrect See Owner's Manual	Large difference in diameter of front/rear tires.

SYNCHRONIZATION WITH MASTER WARNING LAMP

Applicable

For master warning lamp, refer to MWI-47, "WARNING LAMPS/INDICATOR LAMPS : Master Warning Lamp".

SYSTEM DIAGRAM



SIGNAL PATH

- The 4WD control unit judges and decides a mode from among normal mode, fail-safe mode, and protection function mode, according to signals received from each switch, sensor, and control unit.
- The 4WD control unit transmits 4WD warning signal to the combination meter via CAN communication when judging fail-safe mode or protection function mode.
- The combination meter displays 4WD warning on the information display when receiving 4WD warning signal transmitted from the 4WD control unit.

WARNING CONDITION

4WD warning is displayed when the 4WD system goes into fail-safe mode or protection function mode.

WARNING CANCEL CONDITION

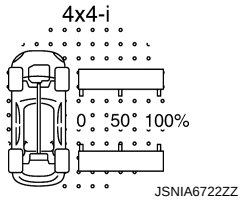
When any of the conditions listed below is satisfied:

- Ignition switch is in a position other than ON.
- 4WD warning becomes invisible when the 4WD system returns to normal.

INFORMATION DISPLAY (COMBINATION METER) : 4WD Torque Distribution Indicator

INFOID:0000000011003981

DESIGN/PURPOSE

Design	Purpose
 JSNIA6722ZZ	Displays the drive torque distribution to the front and rear wheels while driving and informs the driver of this. **NOTE:** The driving force distribution may not match actual one. This is not a system malfunction.

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning Lamp/Indicator Lamp

INFOID:0000000011003982

Name	Design	Layout/Function
4WD indicator lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design". For function: Refer to MWI-23, "WARNING LAMPS/INDICATOR LAMPS : 4WD Indicator Lamp and LOCK Indicator Lamp".

Name	Design	Layout/Function
LOCK indicator lamp		For layout: Refer to MWI-10, "METER SYSTEM : Design". For function: Refer to MWI-23, "WARNING LAMPS/INDICATOR LAMPS : 4WD Indicator Lamp and LOCK Indicator Lamp".

WARNING/INDICATOR/CHIME LIST : Warning/Indicator (On Information Display)

INFOID:0000000011003983

Name	Function
4WD warning	Refer to DLN-126, "INFORMATION DISPLAY (COMBINATION METER) : 4WD Warning".
4WD torque distribution indicator	Refer to DLN-127, "INFORMATION DISPLAY (COMBINATION METER) : 4WD Torque Distribution Indicator".

DIAGNOSIS SYSTEM (4WD CONTROL UNIT)

CONSULT Function

INFOID:0000000011003984

APPLICATION ITEMS

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

Diagnostic test mode	Function
ECU Identification	4WD control unit part number can be read.
Self Diagnostic Result	Self-diagnostic results and freeze frame data can be read and erased quickly.*
Data Monitor	Input/Output data in the 4WD control unit can be read.
Active Test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the 4WD control unit and also shifts some parameters in a specified range.
Work support	This mode enable a technician to adjust some devices faster and more accurately by following the indication on the CONSULT.

*: The following diagnosis information is erased by erasing.
- DTC
- Freeze frame data (FFD)

ECU IDENTIFICATION

4WD control unit part number can be read.

SELF DIAGNOSTIC RESULT

Refer to DLN-134, "DTC Index".

When “PRSNT” is displayed on self-diagnosis result.
- The system is presently malfunctioning.

When “PAST” is displayed on self-diagnosis result.
- System malfunction in the past is detected, but the system is presently normal.

FREEZE FRAME DATA (FFD)

The following vehicle status is recorded when DTC is detected and is displayed.

Monitor item (Unit)	Remarks
ODO/TRIP METER (km/h or mph)	Odometer value via CAN communication line is displayed.
ABS OPERATION SIG (On/Off)	ABS operation status via CAN communication line is displayed.
VDC OPERATION SIG (On/Off)	VDC operation status via CAN communication line is displayed.
TCS OPERATION SIG (On/Off)	TCS operation status via CAN communication line is displayed.
HI COEF FRIC FLG 1 (LOW/HIGH)	Measured friction of load is displayed when vehicle starts.
HI COEF FRIC FLG 2 (LOW/HIGH)	Measured friction of load is displayed when vehicle during deceleration.
IGN VOLT (V)	Ignition voltage supplied to 4WD control unit is displayed.
TARGET SOL CRNT (A)	4WD solenoid target current is displayed.
SOLENOID CRNT (A)	4WD solenoid control current is displayed.
QUASI VEHICLE SPEED (km/h or mph)	Vehicle speed calculated by 4WD control unit is displayed.
FRONT WHEEL SPEED (km/h or mph)	Front wheel speed average calculated by 4WD control unit is displayed.
REAR WHEEL SPEED (km/h or mph)	Rear wheel speed average calculated by 4WD control unit is displayed.
SLCT LVR POSI	This item is not equipped, but displayed.
OPERATION MODE	Control status of 4WD mode is displayed.
FRONT RH WHEEL SPEED (km/h or mph)	Wheel speed calculated by front RH wheel sensor signal is displayed.
FRONT LH WHEEL SPEED (km/h or mph)	Wheel speed calculated by front LH wheel sensor signal is displayed.
REAR RH WHEEL SPEED (km/h or mph)	Wheel speed calculated by rear RH wheel sensor signal is displayed.
REAR LH WHEEL SPEED (km/h or mph)	Wheel speed calculated by rear LH wheel sensor signal is displayed.

DATA MONITOR

NOTE:
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item (Unit)	Remarks
STOP LAMP SW (On/Off)	Stop lamp switch signal status via CAN communication line is displayed.
ENG SPEED SIG (Run/Stop)	Engine status is displayed.
ETS ACTUATOR (On/Off)	Operating condition of 4WD actuator relay (integrated in 4WD control unit) is displayed.
4WD WARN LAMP (On/Off)	Control status of 4WD warning (on information display) is displayed.
4WD MODE SW (AUTO/LOCK/2WD)	4WD mode switch status is displayed.
4WD MODE MON (AUTO/LOCK/2WD)	Control status of 4WD is displayed.
DIS-TIRE MONI (mm)	Improper size tire installed condition is displayed.
PARKING BRAKE SW SIG (On/Off)	Parking switch signal status via CAN communication line is displayed.
4WD MODE SW (2WD) (On/Off)	4WD mode switch (2WD position) signal is displayed.
4WD MODE SW (AUTO) (On/Off)	4WD mode switch (AUTO position) signal is displayed.
4WD MODE SW (LOCK) (On/Off)	4WD mode switch (LOCK position) signal is displayed.
READY (Off/Running)	This item is not equipped, but displayed.
BATTERY VOLT (V)	Power supply voltage value of 4WD control unit is displayed.
THRTL POS SEN (%)	Throttle opening status is displayed.
ETS SOLENOID (A)	Monitored value of current at 4WD solenoid is displayed.
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

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

Test item	Condition	Description
SOLENOID (Detects 4WD solenoid)	• Vehicle stopped • Engine running • No DTC detected	Change command current value to 4WD 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.

WORK SUPPORT

Item	Usage
UNIT CHARACTERISTICS DATA	Display the unit characteristics of electric controlled coupling written to 4WD control unit.
UNIT CHARACTERISTICS WRITE	Writes the unit characteristics of electric controlled coupling to 4WD control unit.

ECU DIAGNOSIS INFORMATION

4WD CONTROL UNIT

Reference Value

INFOID:0000000011003985

VALUES ON THE DIAGNOSIS TOOL

NOTE:

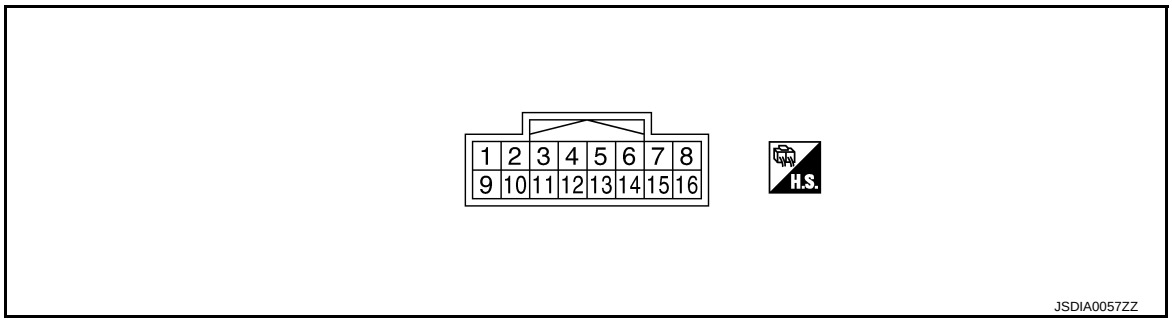
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item	Condition		Value/Status
STOP LAMP SW	Brake pedal: Depressed		On
	Brake pedal: Released		Off
ENG SPEED SIG	Engine stopped (Engine speed: Less than 400 rpm)		Stop
	Engine running (Engine speed: 400 rpm or more)		Run
ETS ACTUATOR	Engine stopped (Ignition switch: ON)		Off
	Engine running		On
4WD WARN LAMP	4WD warning (on information display): Displayed		On
	4WD warning (on information display): Not displayed		Off
4WD MODE SW	4WD mode switch: 2WD		2WD
	4WD mode switch: AUTO		AUTO
	4WD mode switch: LOCK (State of hold of LOCK position)		LOCK
4WD MODE MON	4WD mode switch: 2WD		2WD
	4WD mode switch: AUTO		AUTO
	4WD mode switch: AUTO ⇒ LOCK (When switching to LOCK mode)	Vehicle speed below 10 km/h (6 mph)	AUTO ⇒ LOCK
		Vehicle speed above 10 km/h (6 mph)	AUTO
	4WD mode switch: LOCK ⇒ AUTO (When switching to AUTO mode)	Vehicle speed below 10 km/h (6 mph)	LOCK ⇒ AUTO
DIS-TIRE MONI	Vehicle running with normal size tire installed		0 – 4 mm
	Vehicle running with improper size tire installed (Front/rear tire size difference, wear condition)		4 – 8 mm, 8 – mm
PARKING BRAKE SW SIG	Parking brake operated		On
	Parking brake not operated		Off
4WD MODE SW (2WD)	4WD mode switch: 2WD		On
	4WD mode switch: Except 2WD		Off
4WD MODE SW (AUTO)	4WD mode switch: AUTO		On
	4WD mode switch: Except AUTO		Off
4WD MODE SW (LOCK)	4WD mode switch: LOCK (State of hold of LOCK position)		On
	4WD mode switch: Except LOCK		Off
READY	Always		Off
BATTERY VOLT	Always		Battery voltage
THRTL POS SEN	When depressing accelerator pedal (Value rises gradually in response to throttle position.)		0 – 100%

Monitor item	Condition		Value/Status
ETS SOLENOID	Engine running • At idle speed	2WD mode	Approx. 0.000 A
		AUTO mode	Approx. 0.000 A
		LOCK mode	Approx. 0.000 A
	Engine running • 3,000 rpm or more constant	2WD mode	Approx. 0.000 A
		AUTO mode	Approx. 0.000 – 2.490 A*
		LOCK mode	Approx. 2.490 A
FR RH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display (±10% or less)
FR LH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display (±10% or less)
RR RH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display (±10% or less)
RR LH SENSOR	Vehicle stopped		0.00 km/h (0.00 mph)
	Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Nearly matches the speed meter display (±10%)

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

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
1 (SB)	Ground	4WD solenoid power supply	Output	Engine speed: At idle	2WD mode	0 V
					AUTO mode	0 V
					LOCK mode	0 V
				Engine speed: 3,000 rpm or more constant	2WD mode	0 V
					AUTO mode	2.5 V*
					LOCK mode	8 V
2 (Y)	Ground	4WD solenoid ground	Input	Engine speed: At idle		0 V
				Engine speed: 3,000 rpm or more constant		0 V

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
5 (V)	Ground	4WD mode switch (AUTO)	Input	Ignition switch: ON	4WD mode switch: 2WD	Battery voltage
					4WD mode switch: AUTO	0 V
					4WD mode switch: LOCK (State of hold of LOCK position)	0 V
7 (LA/R)	Ground	Ignition switch	Input	Ignition switch: ON		Battery voltage
				Ignition switch: OFF		0 V
8 (L)	—	CAN-H	Input/ Output	—		—
9 (LA/G)	Ground	Power supply (4WD solenoid)	Input	Always		Battery voltage
10 (B)	Ground	Ground	—	Always		0 V
11 (B)	Ground	Ground	—	Always		0 V
12 (GR)	Ground	4WD mode switch (2WD)	Input	Ignition switch: ON	4WD mode switch: 2WD	0 V
					4WD mode switch: AUTO	Battery voltage
					4WD mode switch: LOCK (State of hold of LOCK position)	Battery voltage
14 (Y)	Ground	4WD mode switch (LOCK)	Input	Ignition switch: ON	4WD mode switch: 2WD	Battery voltage
					4WD mode switch: AUTO	Battery voltage
					4WD mode switch: LOCK (State of hold of LOCK position)	0 V
15 (LA/L)	Ground	Power supply (4WD control unit)	Input	Always		Battery voltage
16 (P)	—	CAN-L	Input/ Output	—		—

*: The values are changed by depressed accelerator pedal opening and engine speed.

CAUTION:

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

Fail-Safe

INFOID:0000000011003986

If any malfunction occurs in 4WD electrical system, and control unit detects the malfunction, 4WD warning on information display (combination meter) is displayed to indicate system malfunction. And then 4WD control unit controls becomes the fail-safe mode depending on DTC.

DTC	Vehicle condition
•C1201 •C1204 •C1209 •P1804 •P1809 •P1811 •P181F	4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC	Vehicle condition
•C1203 •C1210 •P1808 •P181D •U1000 •U1010	4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.
•P181B	No impact to vehicle behavior.

Protection Function

INFOID:0000000011003987

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

DTC	4WD warning (on information display)	Error area and root cause	Contents of protection function
—	Refer to DLN-126, "INFORMATION DISPLAY (COMBINATION METER) : 4WD Warning".	Rear final drive assembly in protection mode. It is not malfunction. (Internal temperature rise of electronic controlled coupling)	Shuts down 4WD system temporarily (Front wheel drive)
—		Malfunction in each tire or different tire diameter	

NOTE:
- If the 4WD warning displays during driving but remains not displayed after the engine is restarted, the system is normal. If it again displays 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.

DTC Inspection Priority Chart

INFOID:0000000011003988

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	• C1201 CONTROLLER FAILURE
2	• U1000 CAN COMM CIRCUIT • U1010 CONTROL UNIT (CAN)
3	• C1203 ABS SYSTEM • C1210 ENGINE SIGNAL 1 • P1808 VHCL SPEED SEN-ABS • P181D ENGINE SYSTEM
4	• P1809 CONTROL UNIT
5	• C1204 4WD SOLENOID • P1811 BATTERY VOLTAGE
6	• C1209 MODE SW
7	• P1804 CONTROL UNIT
8	• P181B INCOMP SELFSHUT • P181F INCOMP CALIBRATION

DTC Index

INFOID:0000000011003989

DTC	Display Item	Reference
C1201	CONTROLLER FAILURE	DLN-146, "DTC Description"
C1203	ABS SYSTEM	DLN-147, "DTC Description"
C1204	4WD SOLENOID	DLN-148, "DTC Description"

DTC	Display Item	Reference
C1209	MODE SW	DLN-151, "DTC Description"
C1210	ENGINE SIGNAL 1	DLN-154, "DTC Description"
P1804	CONTROL UNIT	DLN-155, "DTC Description"
P1808	VHCL SPEED SEN-ABS	DLN-156, "DTC Description"
P1809	CONTROL UNIT	DLN-157, "DTC Description"
P1811	BATTERY VOLTAGE	DLN-158, "DTC Description"
P181B	INCOMP SELF SHUT	DLN-161, "DTC Description"
P181D	ENGINE SYSTEM	DLN-164, "DTC Description"
P181F	INCOMP CALIBRATION	DLN-165, "DTC Description"
U1000	CAN COMM CIRCUIT	DLN-166, "DTC Description"
U1010	CONTROL UNIT (CAN)	DLN-167, "DTC Description"

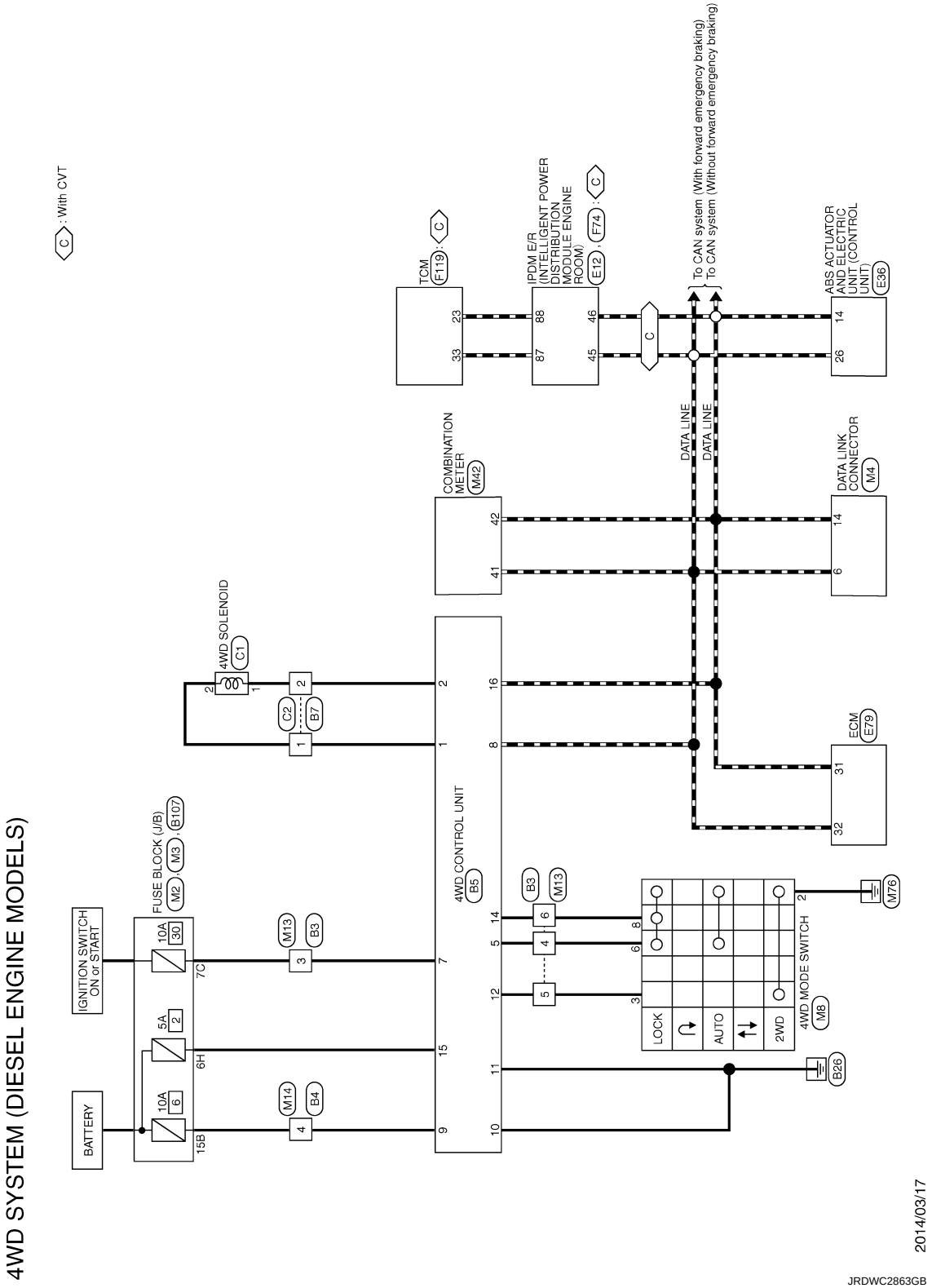
NOTE:
If some DTCs are displayed at the same time, refer to DLN-134, "DTC Inspection Priority Chart".

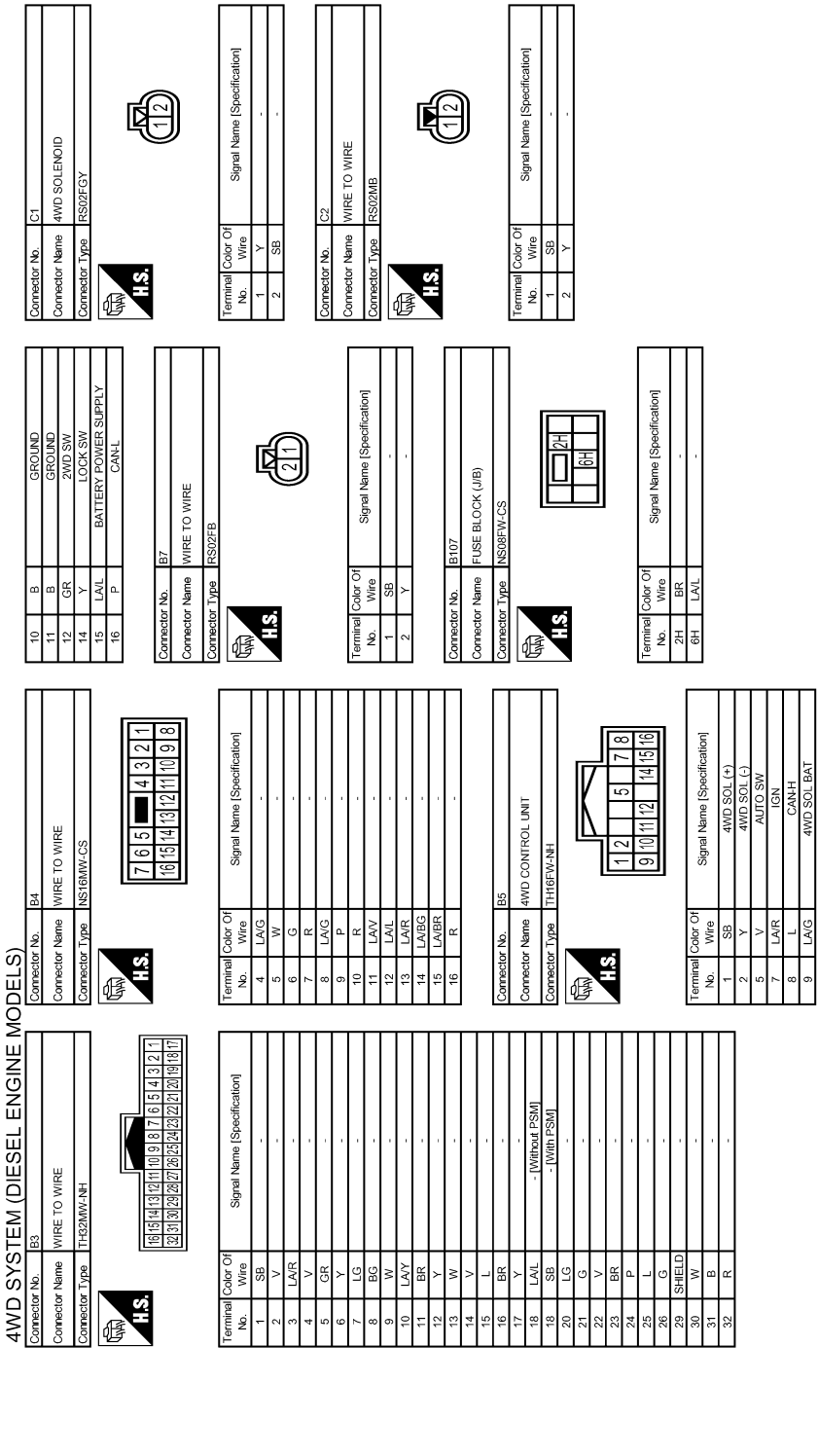
WIRING DIAGRAM

4WD SYSTEM

Wiring Diagram

INFOID:0000000011003990





JRDWC2864GB

4WD SYSTEM (DIESEL ENGINE MODELS)

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH24FGY-NH

H.S.

36	35	34	33	32	31	30			28	27	26	25
48	47	46	45								39	38	37

Terminal No.	Color Of Wire	Signal Name [Specification]
25	LG	-
26	W	-
27	SB	-
28	P	-
30	L	-
31	G	-
32	B	-
33	BG	-
34	LG	-
35	V	-
36	Y	-
37	B	-
38	GR	-
39	BR	-
45	L	-
46	P	-
47	W	-
48	R	-

Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	MOTOR POWER SUPPLY
4	SB	FR RH WHEEL SENSOR SIGNAL
5	V	BRAKE VACUUM SENSOR POWER SUPPLY
8	P	FR LH WHEEL SENSOR SIGNAL
9	Y	hill decent control SWITCH SIGNAL
12	LG	BRAKE VACUUM SENSOR SIGNAL
13	B	GROUND (MOTOR)
14	P	CAN-L
15	BR	VDC OFF SWITCH SIGNAL
16	R	FR RH WHEEL SENSOR POWER SUPPLY
17	Y	RR RH WHEEL SENSOR POWER SUPPLY
18	G	RR LH WHEEL SENSOR SIGNAL
19	W	FR LH WHEEL SENSOR POWER SUPPLY
24	SHIELD	BRAKE VACUUM SENSOR GROUND
25	BR	VALVE POWER SUPPLY
26	L	CAN-H
28	GR	IGNITION POWER SUPPLY
29	LG	RR RH WHEEL SENSOR SIGNAL
31	BR	RR LH WHEEL SENSOR POWER SUPPLY
38	B	GROUND (VALVE)

Connector No.	E79
Connector Name	ECM
Connector Type	RH24FB-RZ8-R-RH

H.S.

4	8	12	16	20	24	32
3		11		19	23	31
2	6	10		18	22	30
1	5	9		17		

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	BEZ34FB-BHY2-BJZ2-RH

H.S.

38					31		29	28	26	25
	24			19	18	17	16	15	14	1
13	12		9	8		5	4			

Terminal No.	Color Of Wire	Signal Name [Specification]
1	B	ECM GROUND
2	W	ACCELERATOR PEDAL POSITION SENSOR 1
3	Y	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 1)
4	B	ECM GROUND
5	L	POWER SUPPLY FOR ECM
6	G	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
8	B	ECM GROUND
9	L	FUEL HEATER AND WATER IN FUEL LEVEL SENSOR
10	L	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)
11	V	ACCELERATOR PEDAL POSITION SENSOR 2
12	P	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
16	BG	STOP LAMP SWITCH [With M/T]
16	R	BRAKE PEDAL POSITION SWITCH [With CVT]
17	LG	IGNITION SWITCH
18	G	ASCD STEERING SWITCH
19	BR	SENSOR GROUND (ASCD STEERING SWITCH)
20	BR	FUEL PUMP CONTROL MODULE (COMMAND)
22	G	FUEL PUMP CONTROL MODULE (DIAGNOSIS)
23	V	SPEED LIMITER MAIN SWITCH
24	R	CLUTCH PEDAL POSITION SWITCH
27	V	CLUTCH INTERLOCK SWITCH
30	BR	ASCD MAIN SWITCH
31	P	CAN-L
32	L	CAN-H

Connector No.	F74
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH24FB-NH

H.S.

98	97	96	95	94	93	92			90	89	88	87
111			107	106	105				102		101	100	99

Terminal No.	Color Of Wire	Signal Name [Specification]
87	L	-
88	P	-
89	W	-
90	R	-
92	GR	-
93	G	- [With R9M Engine]
93	P	- [With MR20 or QR25 Engine]
94	SB	-
95	LG	-
96	W	-
97	P	-
98	Y	-
99	BG	-
100	LG	-
101	V	-
102	Y	-
105	W	-
106	BR	-
107	V	-
110	SB	-

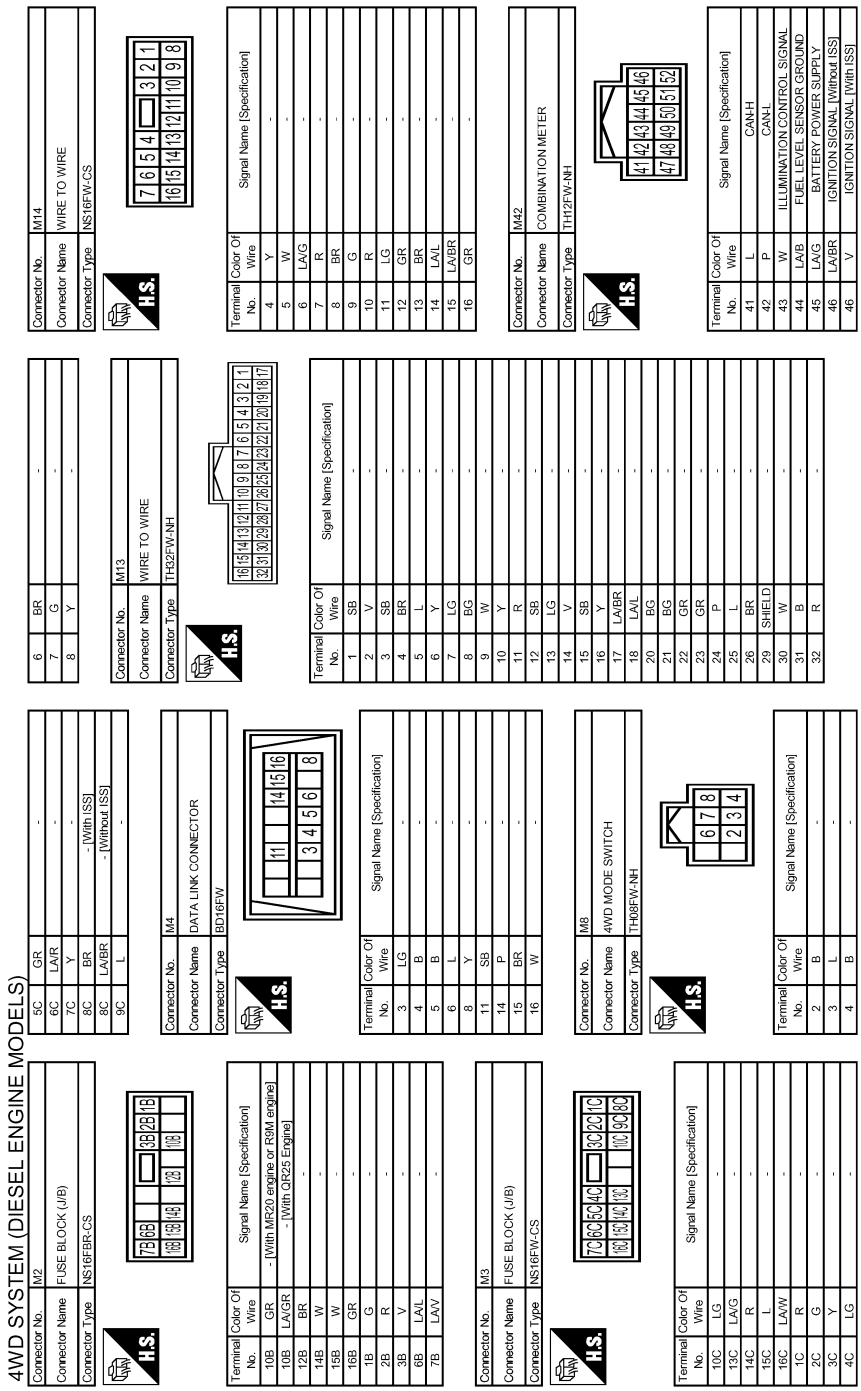
Connector No.	F119
Connector Name	TCM
Connector Type	RH40FB-RZ8-L-LH

H.S.

12	33	34	35		37	38	39	40	47	48
	23	24	25	26			30	45	46	
11	12		14		16	17				
1	2		4	5	6	7			41	42

Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	ELECTRIC OIL PUMP RELAY
2	GR	-
4	Y	D RANGE SWITCH
5	BR	N RANGE SWITCH
6	G	R RANGE SWITCH
7	V	P RANGE SWITCH
11	LG	SENSOR GROUND
12	BR	CVT FLUID TEMPERATURE SENSOR
14	V	G SENSOR
16	SB	SECONDARY PRESSURE SENSOR
17	R	PRIMARY PRESSURE SENSOR
23	P	CAN-L
24	LG	INPUT SPEED SENSOR
25	R	ELECTRIC OIL PUMP COMMAND SIGNAL
26	BG	SENSOR POWER SUPPLY
30	GR	LINE PRESSURE SOLENOID VALVE
32	SB	ELECTRIC OIL PUMP STATUS SIGNAL
33	L	CAN-H
34	W	OUTPUT SPEED SENSOR
35	GR	PRIMARY SPEED SENSOR
37	Y	SELECT SOLENOID VALVE
38	G	TORQUE CONVERTER CLUTCH SOLENOID VALVE
39	W	SECONDARY PRESSURE SOLENOID VALVE
40	V	PRIMARY PRESSURE SOLENOID VALVE
41	B	GROUND
42	B	GROUND
45	V	BATTERY POWER SUPPLY
46	V	BATTERY POWER SUPPLY
47	BG	IGNITION POWER SUPPLY
48	BG	IGNITION POWER SUPPLY

JRDWC2865GB



JRDWC2866GB

4WD SYSTEM (DIESEL ENGINE MODELS)

47	SB	AV COMMUNICATION SIGNAL (H)
48	LG	AV COMMUNICATION SIGNAL (L)
49	Y	OIL LEVEL SENSOR SIGNAL
50	BG	OIL LEVEL SENSOR GROUND
51	LA/L	FUEL LEVEL SENSOR SIGNAL
52	B	GROUND

JRDWC2867GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000011003991

DETAILED FLOW

1.INTERVIEW FROM THE CUSTOMER

Clarify customer complaints before inspection. First of all, perform an interview utilizing DLN-142, "Diagnostic Work Sheet" and reproduce symptoms as well as fully understand it. 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 SYMPTOM

Reproduce the symptom that is indicated by the customer, based on the information from the customer obtained by interview. Also check that the symptom is not caused by protection function. Refer to DLN-134, "Protection Function".

CAUTION:

When the symptom is caused by normal operation, fully inspect each portion and obtain the understanding of customer that the symptom is not caused by a malfunction.

>> GO TO 3.

3.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is any DTC detected?

YES >> Record or print self-diagnosis results. GO TO 4.
NO >> GO TO 6.

4.RECHECK SYMPTOM

With CONSULT

1. Erase self-diagnostic results for “ALL MODE AWD/4WD”.
2. Perform DTC confirmation procedures for the error detected system.

NOTE:

If some DTCs are detected at the same time, determine the order for performing the diagnosis based on DLN-134, "DTC Inspection Priority Chart".

Is any DTC detected?

YES >> GO TO 5.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-44, "Intermittent Incident".

5.REPAIR OR REPLACE ERROR-DETECTED PARTS

- Repair or replace error-detected parts.
- Reconnect part or connector after repairing or replacing.
- When DTC is detected, erase self-diagnostic results for “ALL MODE AWD/4WD”.

>> GO TO 7.

6.IDENTIFY ERROR-DETECTED SYSTEM BY SYMPTOM DIAGNOSIS

Estimate error-detected system based on symptom diagnosis and perform inspection.

Can the error-detected system be identified?

YES >> GO TO 7.
NO >> Check harness and connectors based on the information obtained by interview. Refer to GI-44, "Intermittent Incident".

7. FINAL CHECK

With CONSULT

1. Check the reference value for 4WD control unit.
2. Recheck the symptom and check that symptom is not reproduced on the same conditions.

Is the symptom reproduced?

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

Diagnostic Work Sheet

INFOID:0000000011003992

Description

- In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about his/her concerns carefully. To systemize all the information for the diagnosis, prepare the interview sheet referring to the interview points.
- In some cases, multiple conditions that appear simultaneously may cause a DTC to be detected.

Interview sheet sample

Interview sheet					
Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine		Mileage	km (Mile)
Symptom		☐Vehicle does not enter 4WD mode.			
		☐4WD warning (4WD Error) is displayed.			
		☐Heavy tight-corner braking symptom occurs			
		☐Noise ☐Vibration			
		☐Others ( )			
First occurrence		☐Recently ☐Others ( )			
Frequency of occurrence		☐Always ☐Under a certain conditions of ☐Sometimes (time(s)/day)			
Climate conditions		☐Irrelevant			
	Weather	☐Fine ☐Cloud ☐Rain ☐Snow ☐Others ( )			
	Temperature	☐Hot ☐Warm ☐Cool ☐Cold ☐Temperature (Approx. °C)			
	Relative humidity	☐High ☐Moderate ☐Low			
Road conditions		☐Urban area ☐Suburb area ☐High way ☐Mounting road (uphill or down hill) ☐Rough road			
Operation conditions, etc.		☐Irrelevant ☐When engine starts ☐During idling ☐During driving ☐During acceleration ☐At constant speed driving ☐During deceleration ☐During cornering (right curve or left curve)			

Interview sheet

Customer name	MR/MS	Registration number		Initial year registration	
		Vehicle type		VIN	
Storage date		Engine		Mileage	km (Mile)
Other conditions					

Memo

ADDITIONAL SERVICE WHEN REPLACING 4WD CONTROL UNIT

Description

INFOID:0000000011003993

When replacing 4WD control unit, unit characteristics writing is required.

Work Procedure

INFOID:0000000011003994

1. PERFORM WRITING UNIT CHARACTERISTICS

Perform writing unit characteristics of electric controlled coupling.

>> Refer to DLN-145, "Work Procedure".

UNIT CHARACTERISTICS WRITING

Description

INFOID:0000000011003995

When replacing 4WD control unit, rear final drive assembly and/or electric controlled coupling, unit characteristics of electric controlled coupling writing is required.

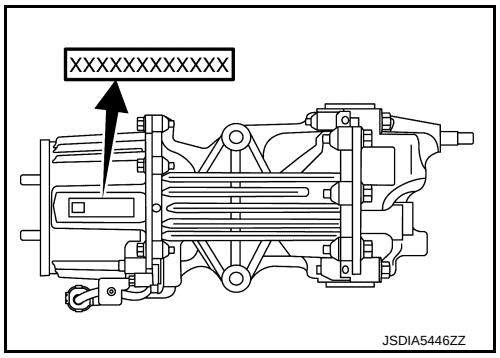
Work Procedure

INFOID:0000000011003996

1. UNIT CHARACTERISTICS WRITING

With CONSULT

1. Confirm the unit characteristics of electric controlled coupling.
   NOTE:
   Unit characteristics is 12-digit alphanumeric.
2. Turn the ignition switch OFF to ON.
3. Select “UNIT CHARACTERISTICS WRITE” in “WORK SUPPORT” for “ALL MODE AWD/4WD”.
4. Input unit characteristics.
5. Select “Start”.
6. Check that “UNIT CHARACTERISTICS WRITE COMPLETED” is displayed.



>> WORK END

DTC/CIRCUIT DIAGNOSIS

C1201 4WD CONTROL UNIT

DTC Description

INFOID:0000000011003997

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1201	CONTROLLER FAILURE (Control unit failure)	Malfunction has occurred inside 4WD control unit.

POSSIBLE CAUSE

Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “C1201” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-146, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011003998

1.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is DTC “C1201” detected?

YES >> Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Check 4WD 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 Description

INFOID:0000000011003999

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1203	ABS SYSTEM (ABS system)	Malfunction related to wheel sensor has been detected by ABS actuator and electric unit (control unit).

POSSIBLE CAUSE

ABS malfunction
- Vehicle speed signal error

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT
1. Drive at 30 km/h (19 MPH) or more for approximately 1 minute.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1203” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-147, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004000

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

With CONSULT
Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-84, "DTC Index".
NO >> GO TO 2.

2.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. If DTC “C1203” is detected, Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Repair or replace error-detected parts.

C1204 4WD SOLENOID

DTC Description

INFOID:0000000011004001

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1204	4WD SOLENOID (4WD solenoid)	Malfunction related to 4WD solenoid has been detected.

POSSIBLE CAUSE

- Internal malfunction of electronic controlled coupling
- Malfunction of 4WD solenoid power supply circuit (open or short)
- Malfunction of 4WD solenoid command current

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “C1204” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-148, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004002

1.CHECK 4WD SOLENOID POWER SUPPLY (1)

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	9	Ground	Battery voltage

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	9	Ground	Battery voltage

Is the inspection result normal?

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

2.CHECK 4WD SOLENOID POWER SUPPLY (2)

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#6).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	9	M2	15B	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	9	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3.CHECK 4WD SOLENOID GROUND

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	10	Ground	Existed
	11		

Is the inspection result normal?

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

4.CHECK 4WD SOLENOID CIRCUIT (1)

Check the resistance between 4WD control unit harness connector.

4WD control unit			Resistance (Approx.)
Connector	Terminal		
B5	1	2	2.5 Ω

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 5.

5.CHECK 4WD SOLENOID CIRCUIT (2)

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

4WD control unit		4WD solenoid		Continuity
Connector	Terminal	Connector	Terminal	
B5	1	C1	2	Existed
	2		1	

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	1	Ground	Not existed
	2		

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.CHECK 4WD SOLENOID

Check 4WD solenoid. Refer to DLN-150, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> 4WD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-231, "Removal and Installation".

7.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000011004003

1.CHECK 4WD SOLENOID

1. Turn the ignition switch OFF.
2. Disconnect 4WD solenoid harness connector.
3. Check the resistance between 4WD solenoid harness connector terminals.

4WD solenoid		Resistance (Approx.)
Terminal		
1	2	2.5 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> 4WD solenoid is malfunctioning. Replace electric controlled coupling. Refer to DLN-231, "Removal and Installation".

C1209 MODE SW

DTC Description

INFOID:0000000011004004

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1209	MODE SW (Mode switch)	More than two switch inputs are simultaneously detected due to short circuit of 4WD mode switch.

POSSIBLE CAUSE

- Malfunction of 4WD mode switch
- Malfunction of 4WD mode switch circuit
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Operate 4WD mode switch to each position.
3. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1209” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-151, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004005

1.CHECK 4WD MODE SWITCH

Check 4WD mode switch. Refer to DLN-153, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace 4WD mode switch. Refer to DLN-180, "Removal and Installation".

2.CHECK 4WD MODE SWITCH SIGNAL CIRCUIT

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

4WD control unit		4WD mode switch		Continuity
Connector	Terminal	Connector	Terminal	
B5	5	M8	3	Not existed
			6	Existed
			8	Not existed
	12		3	Existed
			6	Not existed
			8	Not existed
	14		3	Not existed
			6	Not existed
			8	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	5	Ground	Not existed
	12		
	14		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace damaged parts.

3.CHECK 4WD CONTROL SWITCH GROUND CIRCUIT

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

4WD mode switch		—	Continuity
Connector	Terminal		
M8	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4.CHECK 4WD CONTROL UNIT OUTPUT SIGNAL

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

CAUTION:
Never start the engine.

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

4WD mode switch		—	Voltage
Connector	Terminal		
M8	3	Ground	Battery voltage
	6		
	8		

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace damaged parts.

5.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Repair or replace damaged parts.

Component Inspection

INFOID:0000000011004006

1. CHECK 4WD MODE SWITCH

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

4WD mode switch		Condition	Continuity
Terminal			
3	2	4WD mode switch: 2WD	Existed
		4WD mode switch: AUTO	Not existed
		4WD mode switch: LOCK (State of hold of LOCK position)	
6	2	4WD mode switch: 2WD	Not existed
		4WD mode switch: AUTO	Existed
		4WD mode switch: LOCK (State of hold of LOCK position)	
8	2	4WD mode switch: 2WD	Not existed
		4WD mode switch: AUTO	
		4WD mode switch: LOCK (State of hold of LOCK position)	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace 4WD mode switch. Refer to DLN-180, "Removal and Installation".

C1210 ECM

DTC Description

INFOID:0000000011004007

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
C1210	ENGINE SIGNAL 1 (Engine signal 1)	Malfunction related to engine signal has been detected.

POSSIBLE CAUSE

Malfunction of engine control system

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Drive the vehicle for a while.
2. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “C1210” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-154, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004008

1.PERFORM ECM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for “ENGINE”.

Is any DTC detected?

YES >> Check the DTC. Refer to EC-908, "DTC Index".
NO >> GO TO 2.

2.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. If DTC “C1210” is detected, Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P1804 4WD CONTROL UNIT

DTC Description

INFOID:0000000011004009

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P1804	CONTROL UNIT (Control unit)	Malfunction is detected in the memory (EEPROM) system of 4WD control unit.

POSSIBLE CAUSE

Internal malfunction of 4WD control unit.

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P1804” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-155, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004010

1.REPLACE 4WD CONTROL UNIT

CAUTION:
Replace 4WD control unit when DTC “P1804” is detected simultaneously with other items.

>> Replace 4WD control unit. Refer DLN-179, "Removal and Installation".

P1808 WHEEL SPEED SENSOR

DTC Description

INFOID:0000000011004011

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P1808	VHCL SPEED SEN-ABS (Vehicle speed sensor-ABS)	• Malfunction is detected in vehicle speed signal that is output from ABS actuator and electric unit (control unit) through CAN communication. • Improper signal is input while driving.

POSSIBLE CAUSE

- ABS malfunction
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P1808” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-156, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004012

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

With CONSULT

Perform self-diagnosis for “ABS”.

Is any DTC detected?

YES >> Check the DTC. Refer to BRC-84, "DTC Index".
NO >> GO TO 2.

2.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. If DTC “P1808” is detected, Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P1809 4WD CONTROL UNIT

DTC Description

INFOID:0000000011004013

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P1809	CONTROL UNIT (Control unit)	AD converter system of 4WD control unit is malfunctioning.

POSSIBLE CAUSE

Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P1809” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-157, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004014

1.REPLACE 4WD CONTROL UNIT

CAUTION:
Replace 4WD control unit when DTC “P1809” is detected simultaneously with other items.

>> Replace 4WD control unit. Refer DLN-179, "Removal and Installation".

P1811 BATTERY VOLTAGE

DTC Description

INFOID:0000000011004015

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P1811	BATTERY VOLTAGE (Battery voltage)	When engine is running and 4WD control unit power supply is less than 9 V or higher than 16 V.

POSSIBLE CAUSE

- Malfunction of 4WD control unit power supply circuit (open or short)
- Battery power supply
- Ignition power supply
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P1811” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-158, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004016

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

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	7	Ground	0 V

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	7	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#30).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	7	M3	7C	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	7	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-52, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3. CHECK 4WD CONTROL UNIT POWER SUPPLY (3)

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	15	Ground	Battery voltage

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	15	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 5A fuse (#2).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	15	B107	6H	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	15	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".

NO >> Repair or replace error-detected parts.

5. CHECK 4WD CONTROL UNIT GROUND

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	10	Ground	Existed
	11		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6. CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. When DTC “P1811” is detected, Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P181B INCOMPLETE SELFSHUT

DTC Description

INFOID:0000000011004017

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P181B	INCOMP SELF SHUT (Incomplete self shut)	When ignition switch is ON, self-shut of 4WD control unit was incomplete.

POSSIBLE CAUSE

- Malfunction of 4WD control unit power supply circuit (open or short)
- Battery power supply
- Ignition power supply
- Internal malfunction of 4WD control unit

FAIL-SAFE

No impact to vehicle behavior.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P181B” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-161, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004018

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

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	7	Ground	0 V

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	7	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#30).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	7	M3	7C	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	7	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-52, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3. CHECK 4WD CONTROL UNIT POWER SUPPLY (3)

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	15	Ground	Battery voltage

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	15	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 5A fuse (#2).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	15	B107	6H	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	15	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".

NO >> Repair or replace error-detected parts.

5. CHECK 4WD CONTROL UNIT GROUND

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	10	Ground	Existed
	11		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6. CHECK TERMINALS AND HARNESS CONNECTORS

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

Is the inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. When DTC “P181B” is detected, Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P181D ENGINE TORQUE SIGNAL

DTC Description

INFOID:0000000011004019

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P181D	ENGINE SYSTEM (Engine system)	Malfunction related to engine signal has been detected.

POSSIBLE CAUSE

- Malfunction of engine control system
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

1. Drive the vehicle for a while.
2. Stop the vehicle.
3. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is DTC “P181D” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-164, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004020

1.PERFORM ECM SELF-DIAGNOSIS

With CONSULT

Perform self-diagnosis for “ENGINE”.

Is any DTC detected?

YES >> Check the DTC. Refer to EC-908, "DTC Index".
NO >> GO TO 2.

2.CHECK TERMINALS AND HARNESS CONNECTORS

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

Is inspection result normal?

YES >> After turning the ignition switch OFF, perform DTC confirmation procedure again. If DTC “P181D” is detected, Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P181F INCOMPLETE CALIBRATION

DTC Description

INFOID:0000000011004021

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
P181F	INCOMP CALIBRATION (Incomplete calibration)	When incomplete writing unit characteristics of electric controlled coupling are detected.

POSSIBLE CAUSE

Writing unit characteristics are incomplete.

FAIL-SAFE

4WD control changes to front-wheel drive immediately, then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “P181F” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-165, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004022

1.PERFORM WRITING UNIT CHARACTERISTICS

1. Erase self-diagnostic result for “ALL MODE AWD/4WD”.
2. Perform writing unit characteristics. Refer to DLN-145, "Work Procedure".
3. Turn the ignition switch OFF to ON.
4. Perform self-diagnosis for “ALL MODE AWD/4WD”.

Is any DTC except “P181F” detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to DLN-134, "DTC Index".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS AGAIN

With CONSULT

Perform “DTC CONFIRMATION PROCEDURE” (self-diagnosis) again. Refer to DLN-165, "DTC Description".

Is DTC “P181F” detected?

YES >> Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Check 4WD control unit pin terminals for damage or loose connection with harness connector. If any items are damaged, repair or replace error-detected parts.

U1000 CAN COMM CIRCUIT

DTC Description

INFOID:0000000011004023

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 DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
U1000	CAN COMM CIRCUIT (CAN communication circuit)	4WD control unit is not transmitting/receiving CAN communication signal for 2 seconds or more.

POSSIBLE CAUSE

- CAN communication error
- Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “U1000” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-166, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004024

Proceed to LAN-17, "Trouble Diagnosis Flow Chart".

U1010 CONTROL UNIT (CAN)

DTC Description

INFOID:0000000011004025

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 DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition
U1010	CONTROL UNIT (CAN) [Control unit (CAN)]	Detecting error during the initial diagnosis of CAN controller of 4WD control unit.

POSSIBLE CAUSE

Internal malfunction of 4WD control unit

FAIL-SAFE

4WD control changes to front-wheel drive gradually (rear-wheels still have some driving torque), then 4WD control stops, and the vehicle becomes front-wheel drive.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If “DTC CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC “U1010” detected?

YES >> Proceed to diagnosis procedure. Refer to DLN-167, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-44, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000011004026

1.CHECK 4WD CONTROL UNIT

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

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

Diagnosis Procedure

INFOID:0000000011004027

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

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	7	Ground	0 V

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	7	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 10A fuse (#30).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	7	M3	7C	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	7	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for ignition power supply circuit. Refer to PG-52, "Wiring Diagram - IGNITION POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

3.CHECK 4WD CONTROL UNIT POWER SUPPLY (3)

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

4WD control unit		—	Voltage (Approx.)
Connector	Terminal		
B5	15	Ground	Battery voltage

3. Turn the ignition switch ON.

CAUTION:
Never start the engine.

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	15	Ground	Battery voltage

Is the inspection result normal?

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

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

1. Turn the ignition switch OFF.
2. Check the 5A fuse (#2).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	15	B107	6H	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	15	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".
NO >> Repair or replace error-detected parts.

5. CHECK 4WD SOLENOID POWER SUPPLY (1)

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	9	Ground	Battery voltage

3. Turn the ignition switch ON.

CAUTION:
Never start the engine.

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

4WD control unit		—	Voltage
Connector	Terminal		
B5	9	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK 4WD SOLENOID POWER SUPPLY (2)

1. Turn the ignition switch OFF.

2. Check the 10A fuse (#6).
3. Disconnect fuse block (J/B) harness connector.
4. Check the continuity between 4WD control unit harness connector and fuse block (J/B) harness connector.

4WD control unit		Fuse block (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
B5	9	M2	15B	Existed

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	9	Ground	Not existed

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to PG-12, "Wiring Diagram - BATTERY POWER SUPPLY -".

NO >> Repair or replace error-detected parts.

7. CHECK 4WD CONTROL UNIT GROUND

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

4WD control unit		—	Continuity
Connector	Terminal		
B5	10	Ground	Existed
	11		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

4WD INDICATOR LAMP

Component Function Check

INFOID:0000000011004028

1.4WD INDICATOR LAMP OPERATION CHECK

Check that 4WD indicator lamp turns ON for several seconds after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to DLN-171, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011004029

1.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to DLN-134, "DTC Index".
NO >> GO TO 2.

2.CHECK 4WD MODE SWITCH

Perform the trouble diagnosis for 4WD mode switch. Refer to DLN-151, "Diagnosis Procedure".

Is the inspection results normal?

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

3.CHECK 4WD INDICATOR LAMP SIGNAL

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Change 4WD mode switch from "2WD” to “AUTO”.
3. Check “4WD MODE MON” in “DATA MONITOR” for “ALL MODE AWD/4WD”.

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

YES >> Perform the trouble diagnosis for combination meter. Refer to MWI-84, "On Board Diagnosis Function".
NO >> Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".

LOCK INDICATOR LAMP

Component Function Check

INFOID:0000000011004030

1.LOCK INDICATR LMAP OPERATION CHECK

Check that LOCK indicator lamp turns ON for several seconds after the ignition switch is turned ON.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to DLN-172, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000011004031

1.PERFORM SELF-DIAGNOSIS

With CONSULT

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

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to DLN-134, "DTC Index".
NO >> GO TO 2.

2.CHECK 4WD MODE SWITCH

Perform the trouble diagnosis for 4WD mode switch. Refer to DLN-151, "Diagnosis Procedure".

Is the inspection results normal?

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

3.CHECK LOCK INDICATOR LAMP SIGNAL

With CONSULT

1. Start the engine.
   CAUTION:
   Stop the vehicle.
2. Change 4WD mode switch from "AUTO” to “LOCK”.
3. Check “4WD MODE MON” in “DATA MONITOR” for “ALL MODE AWD/4WD”.

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

YES >> Perform the trouble diagnosis for combination meter. Refer to MWI-84, "On Board Diagnosis Function".
NO >> Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".

SYMPTOM DIAGNOSIS

HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS

Description

INFOID:0000000011004032

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

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

Diagnosis Procedure

INFOID:0000000011004033

1. PERFORM ECM SELF-DIAGNOSIS

With CONSULT
Perform self-diagnosis for “ENGINE”.

Is any DTC detected?

YES >> Check the DTC. Refer to EC-908, "DTC Index".
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS

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

Is DTC “U1000” detected?

YES >> Proceed to DLN-166, "Diagnosis Procedure".
NO >> GO TO 3.

3. CHECK 4WD SOLENOID

Perform the trouble diagnosis of the 4WD solenoid. Refer to DLN-148, "Diagnosis Procedure".

Is the inspection result normal?

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

4. CHECK ELECTRIC CONTROLLED COUPLING

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

Does rear wheel rotate?

YES >> Replace electric controlled coupling for mechanical malfunction (clutch sticking etc.). Refer to DLN-231, "Removal and Installation".
NO >> Check each harness connector pin terminal for disconnection.

VEHICLE DOES NOT ENTER 4WD MODE

Description

INFOID:0000000011004034

Vehicle does not enter 4-wheel drive mode even though 4WD warning is not displayed.

Diagnosis Procedure

INFOID:0000000011004035

1.CHECK INFORMATION DISPLAY (COMBINATION METER)

Perform the trouble diagnosis of combination meter. Refer to MWI-84, "On Board Diagnosis Function".

Is the inspection result normal?

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

2.CHECK PARKING BRAKE SWITCH SIGNAL

With CONSULT

Check “PARKING BRAKE SW SIG” of CONSULT “DATA MONITOR” for “ALL MODE AWD/4WD”.

Monitor Item	Condition	Status
PARKING BRAKE SW SIG	When the parking brake is operation.	On
	When the parking brake is not operation.	Off

Is the inspection result normal?

YES >> GO TO 3.
NO >> Proceed to BRC-107, "Diagnosis Procedure".

3.CRUISE TEST

Drive the vehicle for a period of time.

Does any symptom occur?

YES >> Replace electric controlled coupling for mechanical malfunction (mechanical engagement of clutch is not possible). Refer to DLN-231, "Removal and Installation".
NO >> Check each harness connector pin terminal for disconnection.

4WD HIGH TEMP IS DISPLAYED ON INFORMATION DISPLAY

Description

INFOID:0000000011004036

While driving, 4WD warning (4WD High Temp. Stop vehicle) is displayed on information display (combination meter).

- 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 4WD warning (4WD High Temp. Stop vehicle) is displayed. Both cases are not malfunction. Refer to DLN-134, "Protection Function".
- When this symptom occurs, stop vehicle and allow it to idle for some times. Displays will stop and system will be restored.

TIRE SIZE INCORRECT IS DISPLAYED ON INFORMATION DISPLAY

Description

INFOID:0000000011004037

While driving, 4WD warning (Tire Size Incorrect: See Owner's Manual) is displayed on information display (combination meter).

Diagnosis Procedure

INFOID:0000000011004038

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

Is the inspection result normal?

YES >> Replace 4WD control unit. Refer to DLN-179, "Removal and Installation".
NO >> Repair or replace the error-detected parts.

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000011004039

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

Reference		DLN-178, "Inspection"			DLN-205, "Exploded View"	DLN-184, "Exploded View"	DLN-184, "Exploded View"	DLN-190, "Inspection", DLN-204, "Inspection"	DLN-190, "Inspection", DLN-204, "Inspection"
SUSPECTED PARTS (Possible cause)		TRANSFER OIL (Level low)	TRANSFER OIL (Wrong)	TRANSFER OIL (Level too high)	LIQUID GASKET (Damaged)	O-RING (Worn or damaged)	OIL SEAL (Worn or damaged)	GEAR (Worn or damaged)	BEARING (Worn or damaged)
Symptom	Noise	1	2				3	3	3
	Transfer oil leakage		3	1	2	2	2		

PERIODIC MAINTENANCE

TRANSFER OIL

Inspection

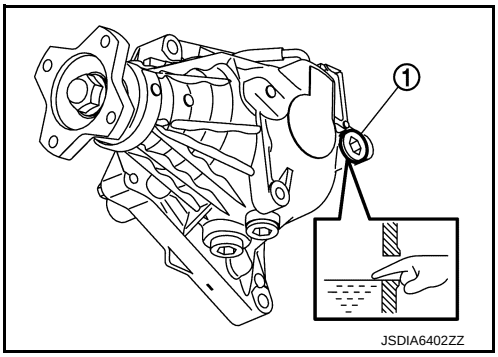
INFOID:0000000011004040

OIL LEAKAGE

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

OIL LEVEL

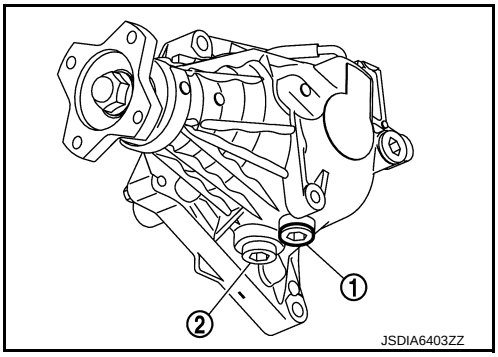
1. Check oil level from filler plug mounting hole as shown in the figure, after removing filler plug ① and gasket from transfer assembly.
   CAUTION:
   Turn the ignition switch OFF while checking oil level.
   - Oil level should be level with bottom of filler plug mounting hole. Add transfer oil if necessary. Refer to DLN-178, "Refilling".
2. Set a gasket on filler plug and install it on transfer assembly.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque. Refer to DLN-205, "Exploded View".



Draining

INFOID:0000000011004041

1. Run the vehicle to warm up the transfer unit sufficiently.
2. Stop the vehicle and turn the ignition switch OFF.
3. Remove drain plug ① and gasket.
   CAUTION:
   Never remove plug ② for tooth contact test.
4. Drain transfer oil.
5. Set a gasket on drain plug and install it to transfer assembly.
   CAUTION:
   Never reuse gasket.
6. Tighten drain plug to the specified torque. Refer to DLN-205, "Exploded View".



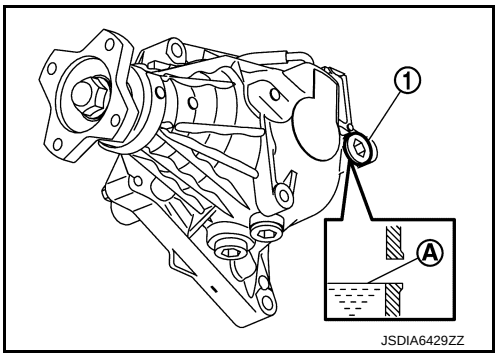
Refilling

INFOID:0000000011004042

1. Fill with new transfer oil until oil level reaches the specified level Ⓐ near filler plug mounting hole, after removing filler plug ① and gasket from transfer assembly.

   Recommended oil and capacity : **Refer to MA-23, "Fluids and Lubricants".**

2. Leave the vehicle for 3 minutes, and check the oil level again.
3. Set a gasket on filler plug, and install it to transfer assembly.
   CAUTION:
   Never reuse gasket.
4. Tighten filler plug to the specified torque. Refer to DLN-205, "Exploded View".

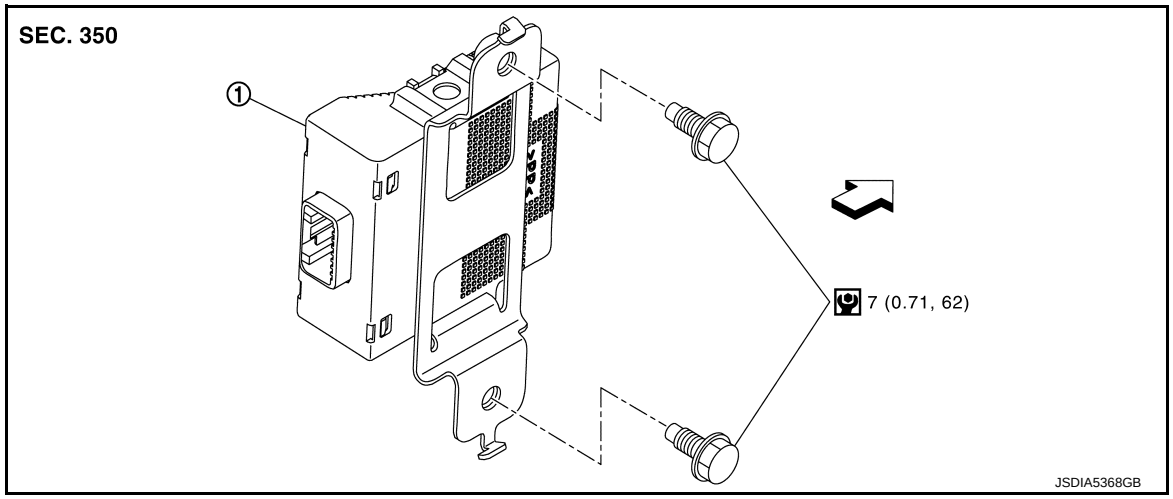


REMOVAL AND INSTALLATION

4WD CONTROL UNIT

Exploded View

INFOID:0000000011004046



① 4WD control unit

⇦: Vehicle front

: N·m (kg-m, in-lb)

Removal and Installation

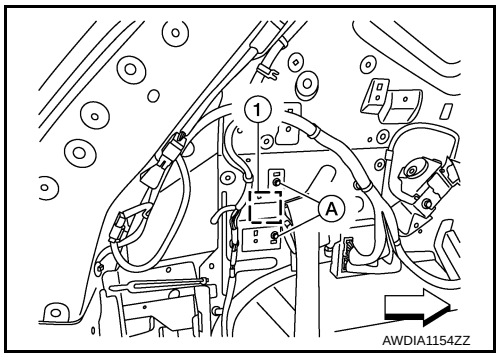
INFOID:0000000011004047

REMOVAL

1. Turn the ignition switch OFF.
2. Remove luggage side lower finisher LH. Refer to INT-43, "LUGGAGE SIDE LOWER FINISHER : Removal and Installation".
3. Disconnect 4WD control unit harness connector.
4. Remove 4WD control unit mounting nuts Ⓐ and remove 4WD control unit ①.

⇦ : Vehicle front

NOTE:
4WD control unit is located on the back side of the rear wheel house outer panel LH.



INSTALLATION

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

- Perform adjustment after installation. Refer to DLN-179, "Adjustment".

Adjustment

INFOID:0000000011004048

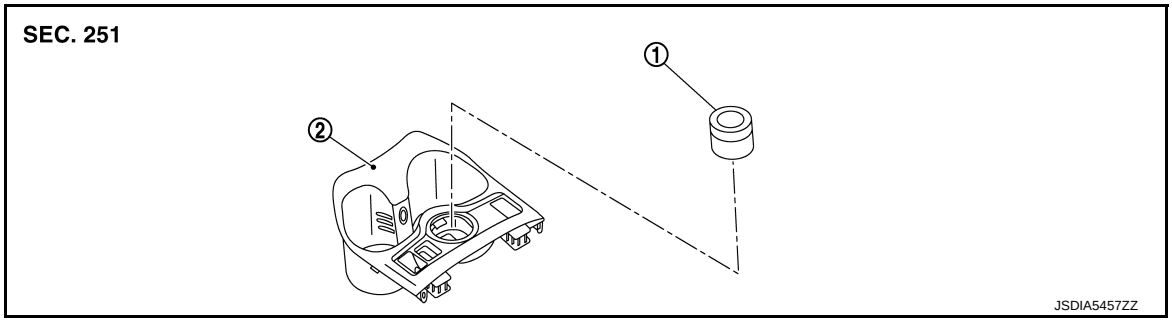
ADJUSTMENT AFTER INSTALLATION

When replaced 4WD control unit, perform writing unit characteristics. Refer to DLN-145, "Work Procedure".

4WD MODE SWITCH

Exploded View

INFOID:0000000011004049



① 4WD mode switch ② Console switch panel

Removal and Installation

INFOID:0000000011004050

REMOVAL

1. Remove console switch panel from center console assembly. Refer to IP-25, "Removal and Installation" (LHD models), IP-52, "Removal and Installation" (RHD models).
2. Disconnect 4WD mode switch harness connector.
3. Remove 4WD mode switch from console switch panel.

INSTALLATION

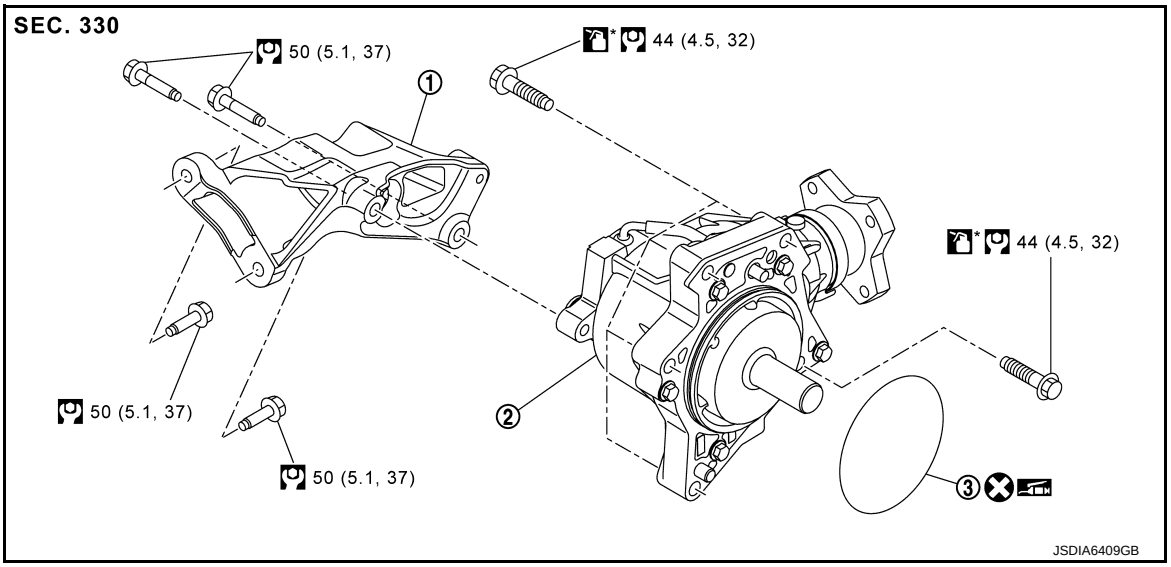
Install in the reverse order of removal.

UNIT REMOVAL AND INSTALLATION

TRANSFER ASSEMBLY

Exploded View

INFOID:0000000011004055



① Transfer gusset ② Transfer assembly ③ O-ring

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

*: Apply anti-corrosion oil.

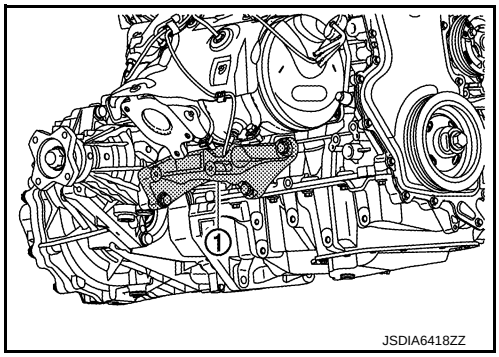
: Apply multi purpose grease.

Removal and Installation

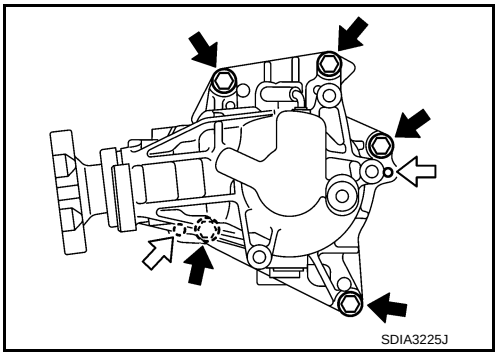
INFOID:0000000011004056

REMOVAL

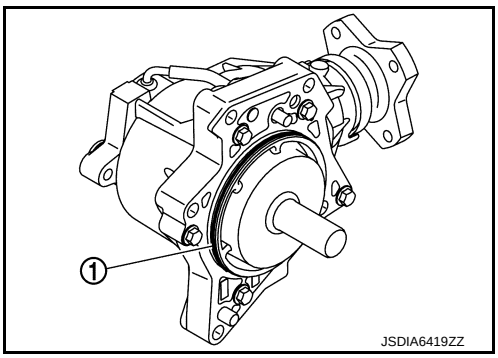
1. Remove engine assembly together with transaxle assembly and transfer assembly from vehicle. Refer to EM-366, "Removal and Installation".
2. Remove transfer gusset ①.
3. Remove transaxle assembly together with transfer assembly from engine assembly. Refer to TM-122, "Removal and Installation".



4. Remove transfer assembly from transaxle assembly.
CAUTION:
- **Be careful not to remove wrong fixing bolts (⇦). Never remove the mounting bolts of adapter case.**
- **Never damage ring gear shaft.**
- **Never damage air breather hose.**
- **Never damage oil seal.**


SDIA3225J

5. Remove O-ring ① from transfer assembly.
CAUTION:
- **Never use a tool.**
- **Never damage adapter case.**

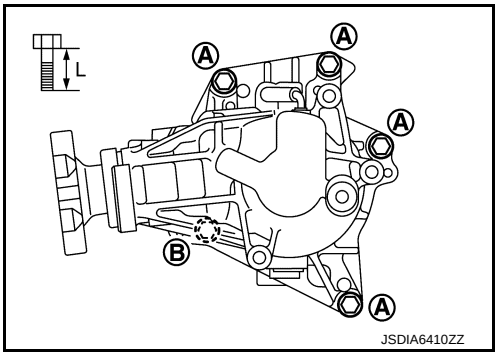


JSDIA6419ZZ

INSTALLATION

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

- Apply multi-purpose grease lightly and evenly onto an O-ring, and install it to transfer assembly.
CAUTION:
  - **Never reuse O-ring.**
  - **When installing O-ring, never use a tool.**
  - **Never damage adapter case and O-ring.**
- When installing the transfer to the transaxle, install the mounting bolts following the standard below, tighten bolts to the specified torque. For each tightening torque, refer to DLN-181, "Exploded View".

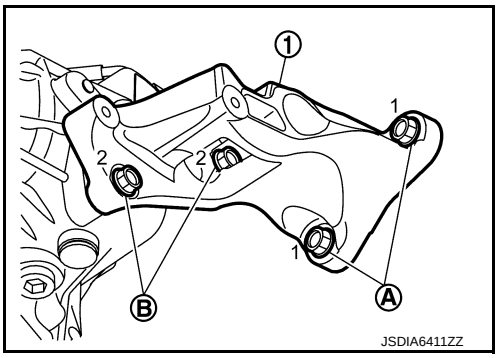


JSDIA6410ZZ

Bolt symbol	Ⓐ	Ⓑ
Quantity	4	1
Bolt length “L” mm (in)	55 (2.17)	55 (2.17)
Insertion direction	Transfer to transaxle	Transaxle to transfer

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

- For mounting bolts of transfer gusset ①, temporarily tightening them first. After this, tighten bolts to the specified torque in the order from engine side bolts Ⓐ to transfer side bolts Ⓑ. For tightening torque, refer to DLN-181, "Exploded View".



JSDIA6411ZZ

Bolt symbol	Ⓐ	Ⓑ
Quantity	2	2
Bolt length “L” mm (in)	35 (1.38)	45 (1.77)
Mounting position	Engine cylinder block side	Transfer side

- Perform inspection after installation. Refer to DLN-183, "Inspection".

Inspection

INFOID:0000000011004057

INSPECTION AFTER INSTALLATION

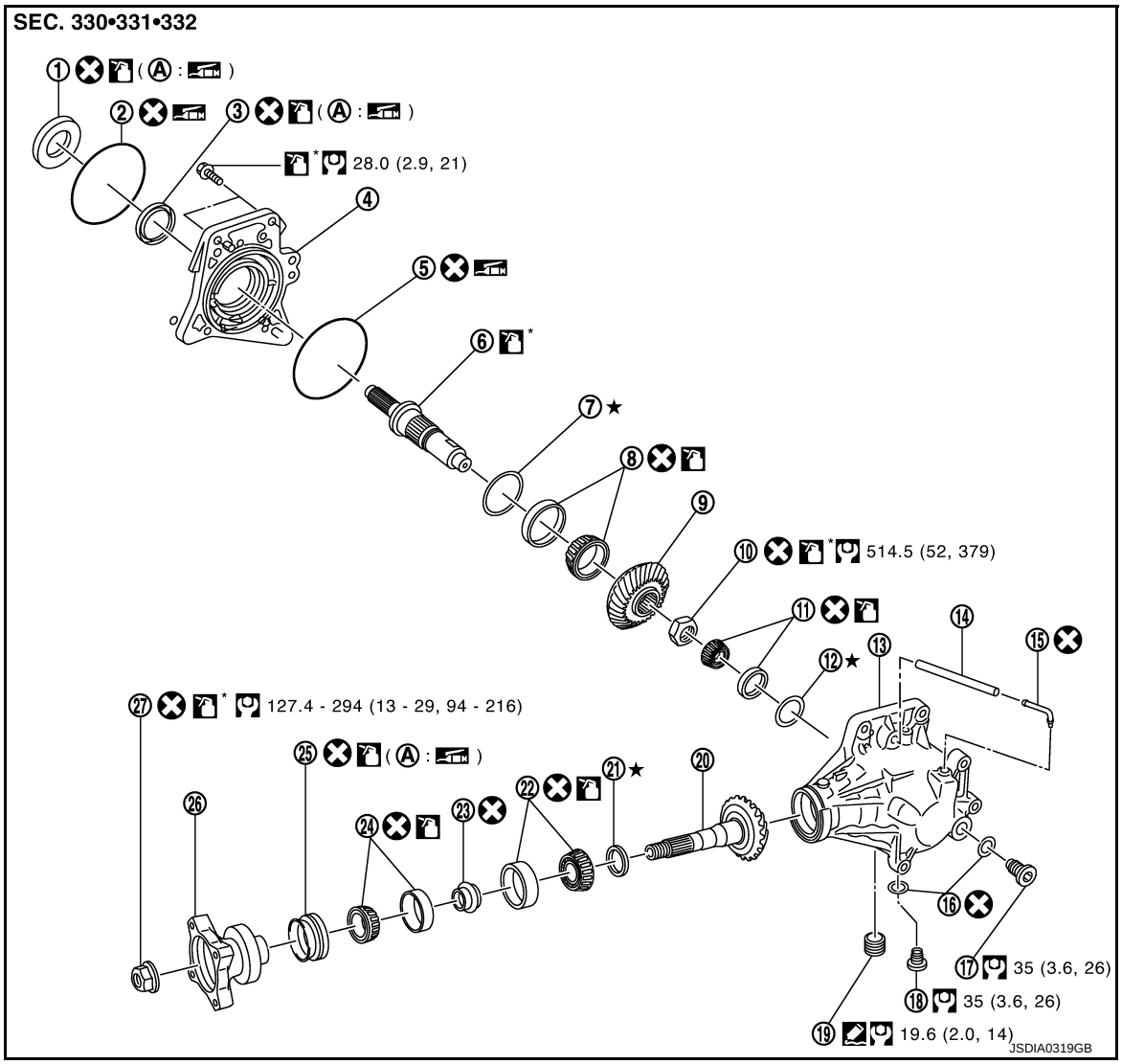
When oil leaks while removing/installing transfer assembly, check oil level after the installation. Refer to DLN-178, "Inspection".

UNIT DISASSEMBLY AND ASSEMBLY

ADAPTER CASE

Exploded View

INFOID:0000000011005043



① Adapter case oil seal (outer)
② O-ring (outer)
③ Adapter case oil seal (inner)
④ Adapter case
⑤ O-ring (inner)
⑥ Ring gear shaft
⑦ Ring gear adjusting shim (adapter case side)
⑧ Ring gear shaft bearing (adapter case side)
⑨ Ring gear
⑩ Ring gear nut
⑪ Ring gear shaft bearing (transfer case side)
⑫ Ring gear adjusting shim (transfer case side)
⑬ Transfer case
⑭ Air breather hose
⑮ Air breather tube
⑯ Gasket
⑰ Filler plug
⑱ Drain plug
⑲ Plug
⑳ Drive pinion
㉑ Drive pinion adjusting shim
㉒ Drive pinion bearing (front side)
㉓ Collapsible spacer
㉔ Drive pinion bearing (rear side)
㉕ Drive pinion oil seal
㉖ Companion flange
㉗ Lock nut
Ⓐ Oil seal lip

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

★: Select with proper thickness.

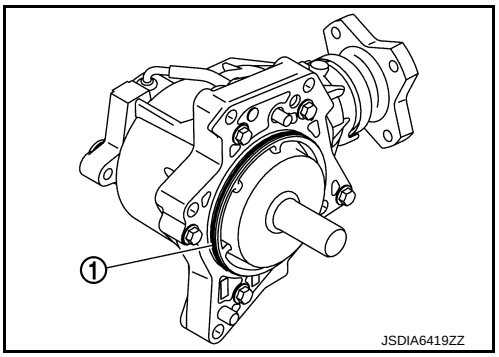
: Apply Genuine Liquid Gasket, Three Bond 1217 or equivalent.

Disassembly and Assembly

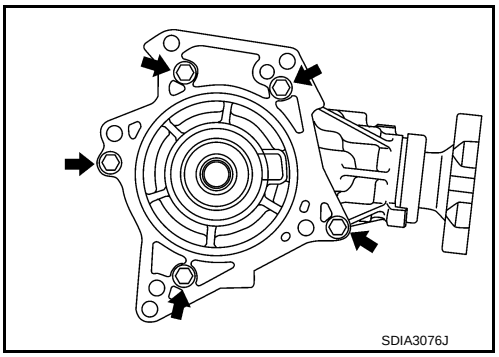
INFOID:0000000011005044

DISASSEMBLY

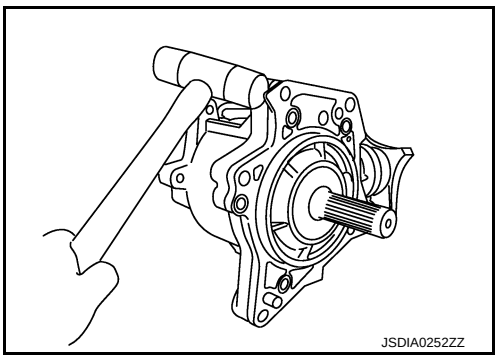
1. Remove O-ring (outer) ① from adapter case.
   CAUTION:
   - **Never use a tool.**
   - **Never damage adapter case.**



2. Remove adapter case mounting bolts (⬅).



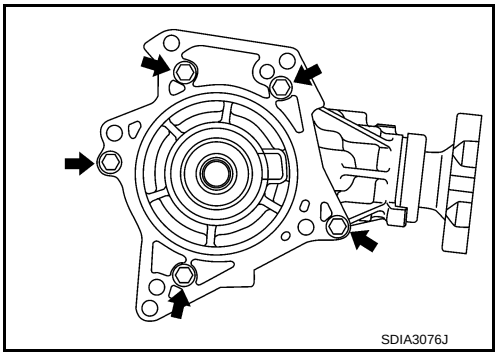
3. Lightly tap adapter case with a plastic hammer to remove adapter case.
4. Remove O-ring (inner) from adapter case.
   CAUTION:
   - **Never use a tool.**
   - **Never damage adapter case.**
5. Lightly tap the metal part of adapter case oil seal with punch from back side of adapter case to remove adapter case oil seal.
   CAUTION:
   When removing oil seal, never damage adapter case by scooping it out with a tool.



ASSEMBLY

1. Install O-ring (inner) to adapter case.
   CAUTION:
   - **Never reuse O-ring (inner).**
   - **When installing O-ring (inner), never use a tool.**
   - **Never damage adapter case.**
   - **Apply multi-purpose grease to O-ring (inner).**
2. Install adapter case to the transfer case.

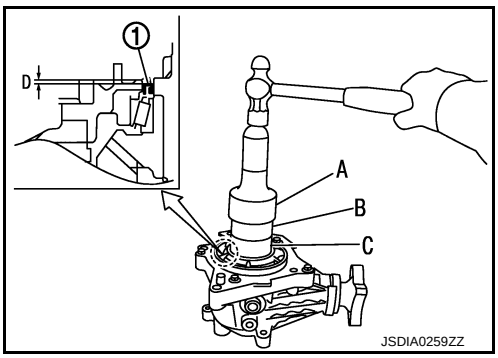
3. Apply anti-corrosive oil onto threads and seats of bolts (⬅), and tighten with the specified torque.
4. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-195, "Adjustment".
   CAUTION:
   Measure the total preload without the adapter case oil seal (outer/inner).


SDIA3076J

5. Install adapter case oil seal (inner) ① to the adapter case with drifts.

   A : Drift (SST: ST30720000)
   B : Drift (SST: ST27861000)
   C : Drift (commercial service tool)

   Dimension "D" : 0 – 1.0 mm

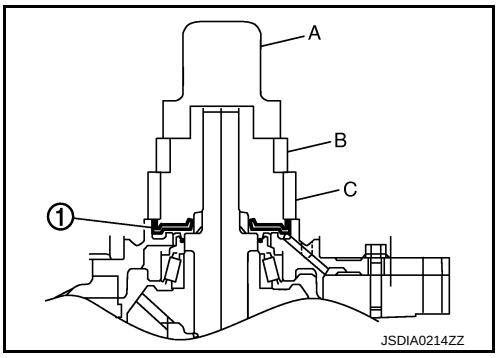


JSDIA0259ZZ

   CAUTION:
   - **Never reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.**
   - **Install adapter case oil seal (inner) in the direction shown in the figure.**

6. Install adapter case oil seal (outer) ① to the adapter case with drifts so that it becomes flush with adapter case end surface.

   A : Drift (SST: ST30720000)
   B : Drift (SST: ST27861000)
   C : Drift (commercial service tool)



JSDIA0214ZZ

   CAUTION:
   - **Never reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.**
   - **Install adapter case oil seal (outer) in the direction shown in the figure.**
7. Install O-ring (outer) to the adapter case.
   CAUTION:
   - **Never reuse O-ring (outer).**
   - **When installing O-ring (outer), never use a tool.**
   - **Never damage adapter case.**
   - **Apply multi-purpose grease to O-ring (outer).**

Inspection

INFOID:0000000011005046

INSPECTION AFTER DISASSEMBLY

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

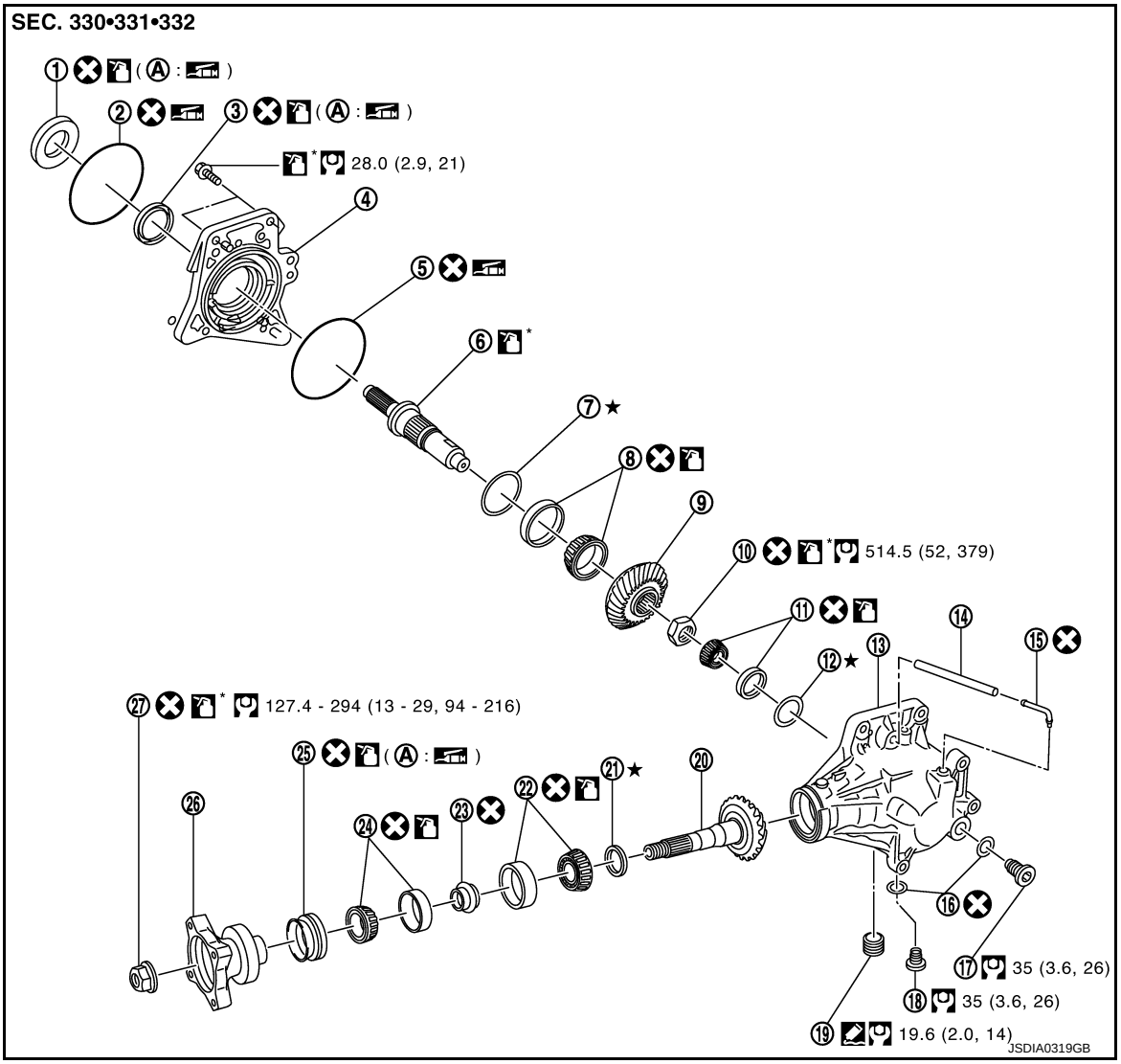
Case

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

RING GEAR SHAFT

Exploded View

INFOID:0000000011005109



① Adapter case oil seal (outer)	② O-ring (outer)	③ Adapter case oil seal (inner)
④ Adapter case	⑤ O-ring (inner)	⑥ Ring gear shaft
⑦ Ring gear adjusting shim (adapter case side)	⑧ Ring gear shaft bearing (adapter case side)	⑨ Ring gear
⑩ Ring gear nut	⑪ Ring gear shaft bearing (transfer case side)	⑫ Ring gear adjusting shim (transfer case side)
⑬ Transfer case	⑭ Air breather hose	⑮ Air breather tube
⑯ Gasket	⑰ Filler plug	⑱ Drain plug
⑲ Plug	⑳ Drive pinion	㉑ Drive pinion adjusting shim
㉒ Drive pinion bearing (front side)	㉓ Collapsible spacer	㉔ Drive pinion bearing (rear side)
㉕ Drive pinion oil seal	㉖ Companion flange	㉗ Lock nut
Ⓐ Oil seal lip		

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

★: Select with proper thickness.

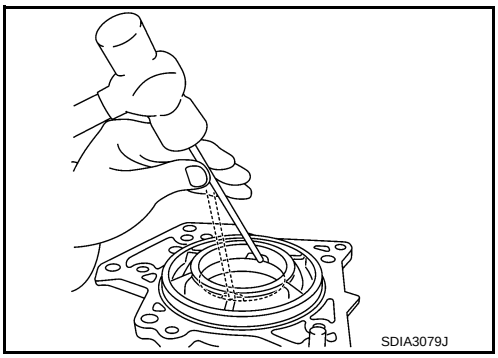
: Apply Genuine Liquid Gasket, Three Bond 1217 or equivalent.

Disassembly and Assembly

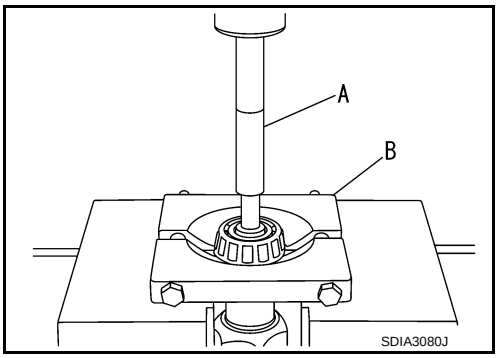
INFOID:0000000011005052

DISASSEMBLY

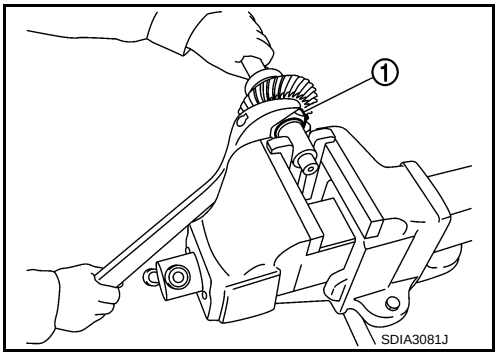
1. Remove adapter case. Refer to DLN-185, "Disassembly and Assembly".
2. Remove adapter case oil seal (outer/inner) from the adapter case. Refer to DLN-185, "Disassembly and Assembly".
3. Tap the ring gear adjusting shim from the cutout on the adapter case with a brass rod to remove ring gear shaft bearing outer race (adapter case side) and ring gear adjusting shim (adapter case side).
   CAUTION:
   Be careful not to damage adapter case.



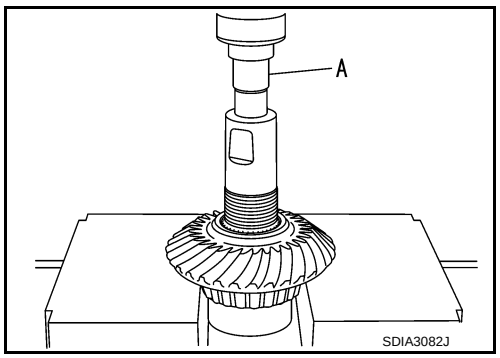
4. Remove ring gear shaft assembly from the transfer case.
5. Remove outer race of ring gear shaft bearing (transfer case side) and ring gear adjusting shim (transfer case side) from the transfer case.
6. Remove inner race of ring gear shaft bearing (transfer case side) from ring gear shaft with drift (A) (commercial service tool) and replacer (B) (SST: ST22730000).



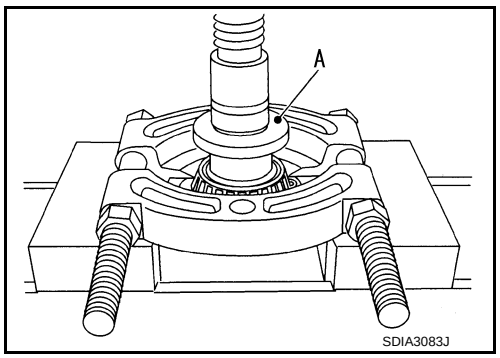
7. Remove ring gear nut ①.
   CAUTION:
   Never damage ring gear shaft.



8. Remove ring gear from ring gear shaft with a drift (A) (SST: ST33052000).

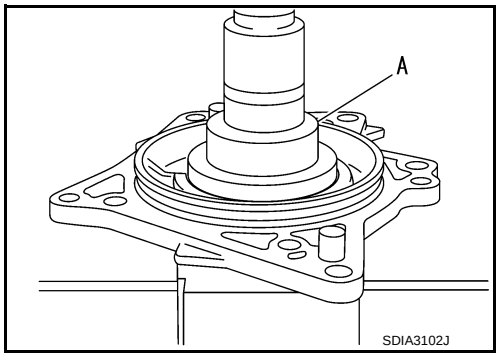


9. Remove inner race of ring gear shaft bearing (adapter case side) from ring gear with a drift (A) (commercial service tool) and separator.



ASSEMBLY

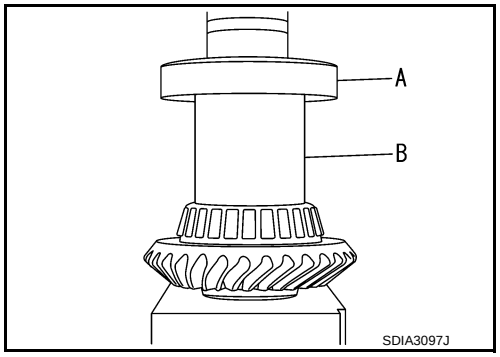
1. Select ring gear adjusting shim (transfer case side). Refer to DLN-195, "Adjustment".
2. Assemble the selected ring gear adjusting shim (transfer case side) and outer races of ring gear shaft bearing (transfer case side) to the transfer case.
   CAUTION:
   - **Never reuse ring gear shaft bearing (transfer case side).**
   - **Apply gear oil to the ring gear shaft bearing (transfer case side).**
3. Select ring gear adjusting shim (adapter case side). Refer to DLN-195, "Adjustment".
4. Install the selected ring gear adjusting shim (adapter case side) to the adapter case.
5. Install outer race of ring gear shaft bearing (adapter case side) to the adapter case with a drift (A) (commercial service tool).
   CAUTION:
   - **Never reuse ring gear shaft bearing (adapter case side).**
   - **Apply gear oil to the ring gear shaft bearing (adapter case side).**



6. Install inner race of ring gear shaft bearing (adapter case side) to the ring gear with drifts.

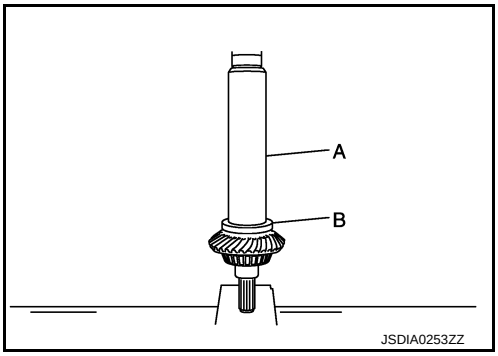
   A : Press adapter (If necessary)
   B : Drift (commercial service tool)

   CAUTION:
   - **Never reuse ring gear shaft bearing (adapter case side).**
   - **Apply gear oil to the ring gear shaft bearing (adapter case side).**

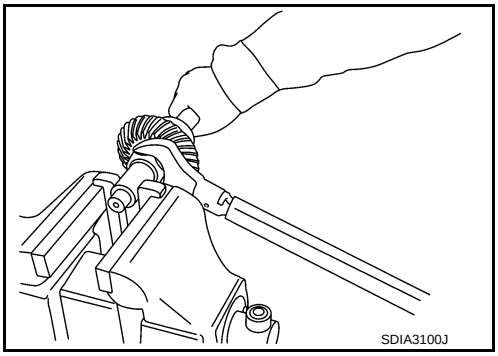


7. Apply anti-corrosive oil to the spline of ring gear shaft. Install the ring gear to ring gear shaft with drifts.

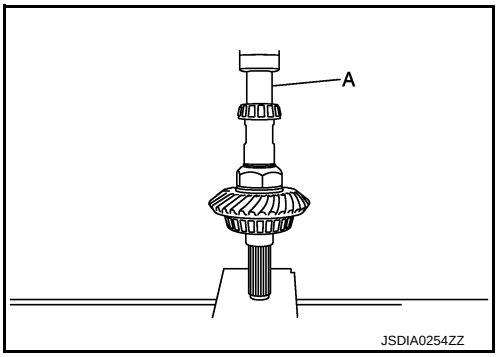
   A : Drift (SST: ST01530000)
   B : Drift (SST: ST35272000)



8. Apply anti-corrosive oil to threads and seats of ring gear nut. Tighten the ring gear nut with the specified torque by using a torque wrench.
   CAUTION:
   - **Never reuse ring gear nut.**
   - **Never damage ring gear shaft.**



9. Install inner race of ring gear shaft bearing (transfer case side) to the ring gear shaft with a drift (A) (SST: KV10111400).
   CAUTION:
   - **Never reuse ring gear shaft bearing (transfer case side).**
   - **Apply gear oil to the ring gear shaft bearing (transfer race side).**
10. Assemble the ring gear shaft assembly to the transfer case.
11. Install adapter case. Refer to DLN-185, "Disassembly and Assembly".
12. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-195, "Adjustment".
    CAUTION:
    Measure the total preload without the adapter case oil seal.
13. Install adapter case oil seal (outer/inner) to the adapter case. Refer to DLN-185, "Disassembly and Assembly".



Inspection

INFOID:0000000011005054

INSPECTION AFTER DISASSEMBLY

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

Gear and Shaft

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

CAUTION:

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

Bearing

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

CAUTION:

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

Shim

Check for seizure, damage, and unusual wear.

Case

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

DRIVE PINION

Exploded View

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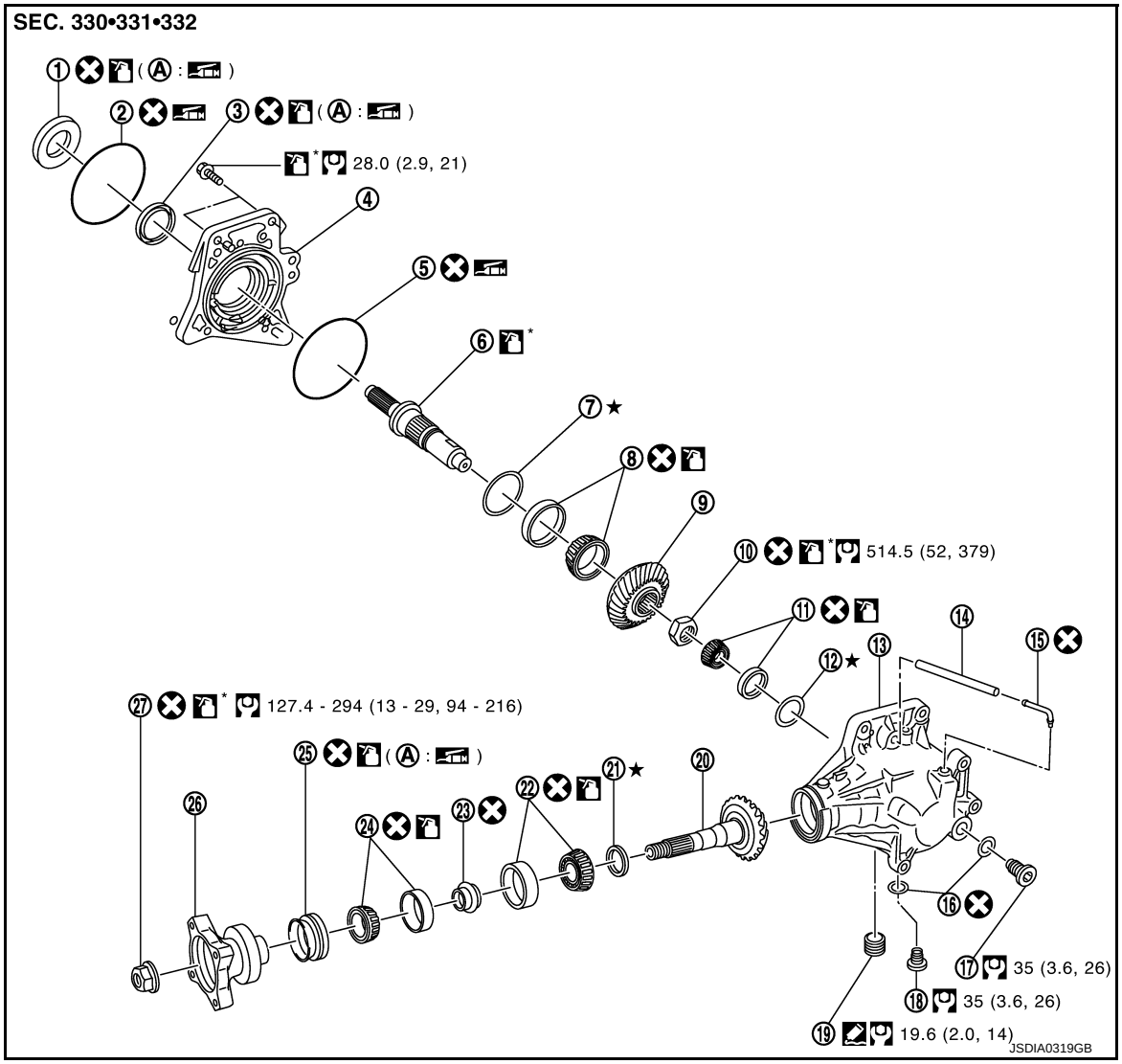

① Adapter case oil seal (outer)
② O-ring (outer)
③ Adapter case oil seal (inner)
④ Adapter case
⑤ O-ring (inner)
⑥ Ring gear shaft
⑦ Ring gear adjusting shim (adapter case side)
⑧ Ring gear shaft bearing (adapter case side)
⑨ Ring gear
⑩ Ring gear nut
⑪ Ring gear shaft bearing (transfer case side)
⑫ Ring gear adjusting shim (transfer case side)
⑬ Transfer case
⑭ Air breather hose
⑮ Air breather tube
⑯ Gasket
⑰ Filler plug
⑱ Drain plug
⑲ Plug
⑳ Drive pinion
㉑ Drive pinion adjusting shim
㉒ Drive pinion bearing (front side)
㉓ Collapsible spacer
㉔ Drive pinion bearing (rear side)
㉕ Drive pinion oil seal
㉖ Companion flange
㉗ Lock nut
Ⓐ Oil seal lip

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

★: Select with proper thickness.

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

Disassembly and Assembly

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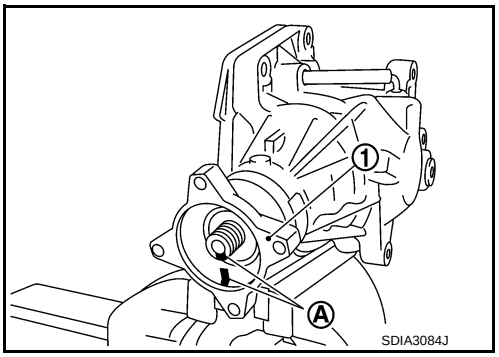
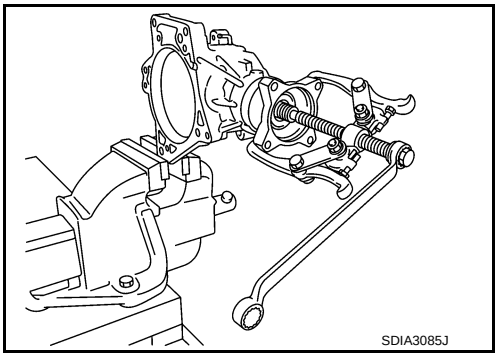
DISASSEMBLY

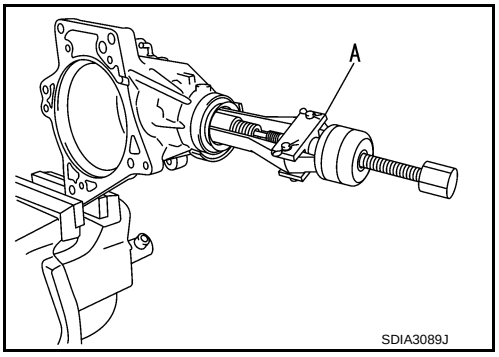
1. Remove adapter case. Refer to DLN-185, "Disassembly and Assembly".
2. Remove ring gear shaft assembly. Refer to DLN-188, "Disassembly and Assembly".
3. Remove lock nut from the drive pinion.
4. Put matching marks (A) on screw ends of companion flange ① and drive pinion.
   CAUTION:
   Use paint to avoid scratching the surface.



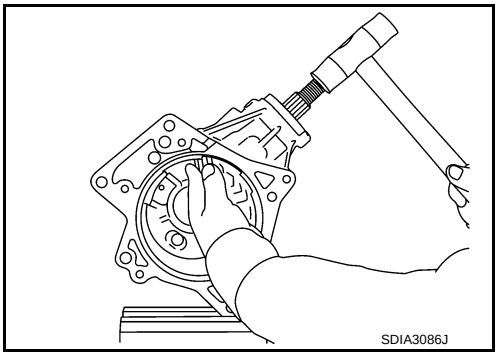
5. Remove companion flange from drive pinion with a puller.



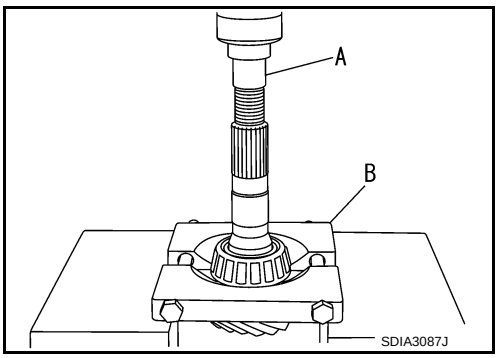
6. Remove drive pinion oil seal from the transfer case with a puller (A) (SST: KV381054S0).
   CAUTION:
   Never damage transfer case.



7. Remove drive pinion assembly from transfer case while tapping the drive pinion lightly with a plastic hammer.
   CAUTION:
   Never drop the drive pinion assembly.
8. Remove collapsible spacer from the drive pinion.
9. Remove inner race of drive pinion bearing (rear side) from transfer case.

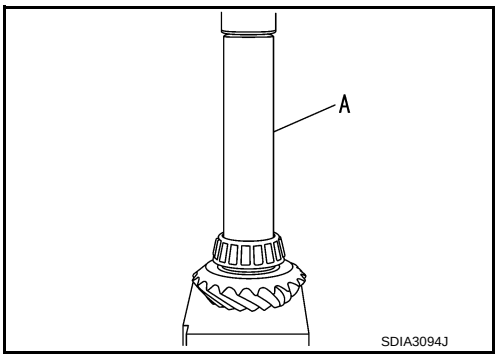


10. Remove inner race of drive pinion bearing (front side) from drive pinion with a drift (A) (SST: ST33052000) and replacer (B) (SST: ST22730000).
11. Remove drive pinion adjusting shim from the drive pinion.



ASSEMBLY

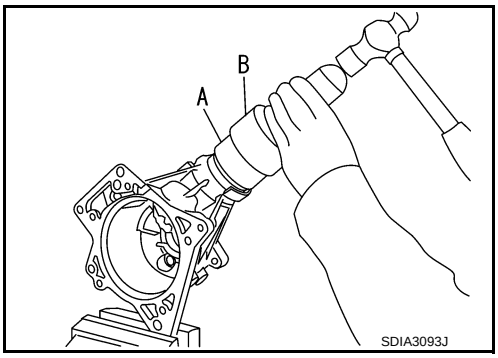
1. Select drive pinion adjusting shim. Refer to DLN-195, "Adjustment".
2. Install selected drive pinion adjusting shim to drive pinion.
3. Install inner race of drive pinion bearing (front side) to drive pinion with a drift (A) (SST: ST23860000).
   CAUTION:
   - **Never reuse drive pinion bearing (front side).**
   - **Apply gear oil to the drive pinion bearing (front side).**
4. Assemble the inner race of drive pinion bearing (rear side) into the transfer case.
   CAUTION:
   - **Never reuse drive pinion bearing (rear side).**
   - **Apply gear oil to the drive pinion bearing (rear side).**



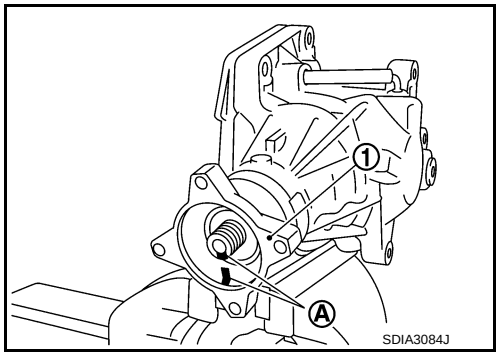
5. Install drive pinion oil seal to transfer case with drifts so that it becomes flush with case end surface.

   A : Drift (SST: ST27861000)
   B : Drift (SST: ST30720000)

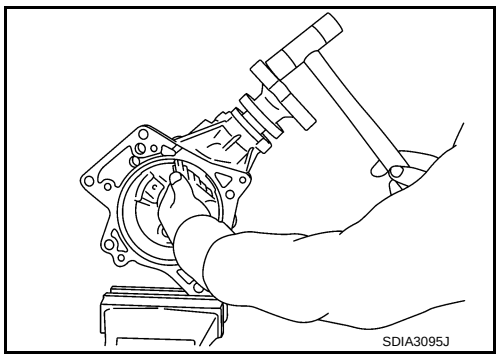
   CAUTION:
   - **Never reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference.**
6. Assemble a collapsible spacer onto the drive pinion.
   CAUTION:
   Never reuse the collapsible spacer.



7. Assemble drive pinion assembly into the transfer case, and then install companion flange ① to drive pinion.
NOTE:
Align matching marks Ⓐ on the thread edge of companion flange and drive pinion and install companion flange if drive pinion is reused.

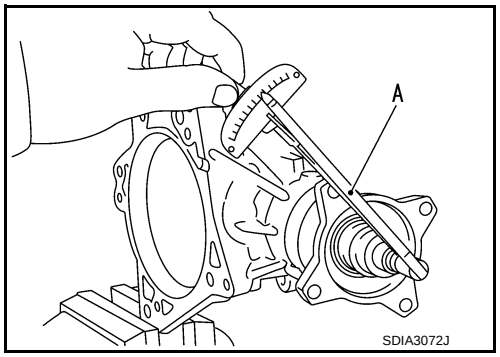


8. Tap the companion flange with a plastic hammer as far as the lock nut can be tightened.
CAUTION:
Never damage drive pinion oil seal.
9. Apply anti-corrosive oil to the thread and seat of the lock nut, and temporarily tighten lock nut to the drive pinion.
CAUTION:
Never reuse lock nut.



10. Tighten lock nut within the specified torque range with a preload gauge (A) (SST: ST3127S000) so that the drive pinion bearing preload is within standard.

Drive pinion bearing preload : Refer to DLN-208, "Preload Torque".



CAUTION:
- **Start the tightening of lock nut from lower limit of the specified torque. Check the preload every 5° to 10° while tightening the lock nut.**
- **Replace the collapsible spacer and tighten it again to adjust if preload exceeds the specified value. Never loosen lock nut to adjust preload.**
- **After adjustment, rotate the drive pinion back and forth from 2 to 3 times to check for unusual noise, sticking, binding, and so on.**

11. Install ring gear shaft assembly. Refer to DLN-188, "Disassembly and Assembly".
12. Install adapter case. Refer to DLN-185, "Disassembly and Assembly".
13. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-195, "Adjustment".
CAUTION:
Measure the total preload without the adapter case oil seal.

Adjustment

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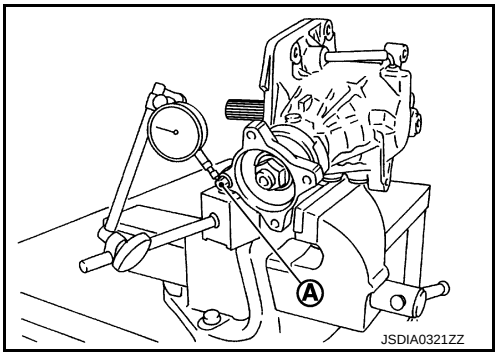
BACKLASH

1. Install the bolt to the companion flange.

2. Fit a dial indicator onto the bolt Ⓐ.
3. Measure the circumference backlash of the companion flange.

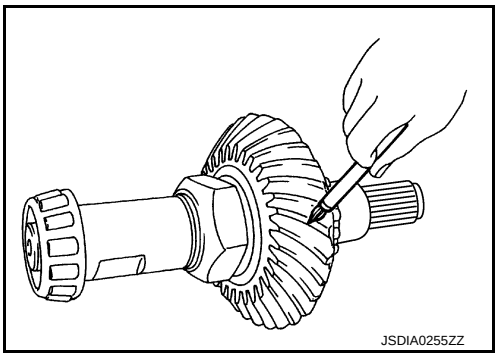
Backlash : Refer to DLN-208, "Backlash".

Disassemble the transfer assembly to check and adjust each part if outside the standard.



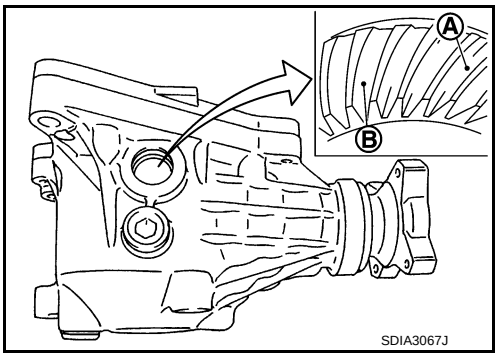
TOOTH CONTACT

1. Remove adapter case. Refer to DLN-185, "Disassembly and Assembly".
2. Remove ring gear shaft assembly from transfer case. Then apply red lead or equivalent onto the ring gear.
   CAUTION:
   Apply red lead or equivalent to both faces of 3 to 4 gears at 4 locations evenly spaced on the ring gear.
3. Assemble the ring gear shaft assembly to the transfer case.
4. Install adapter case. Refer to DLN-185, "Disassembly and Assembly".
5. Remove plug on the lower side of the transfer case.



6. Rotate the companion flange back and forth several times. Then check drive pinion to ring gear tooth contact by viewing from the tooth contact test hole.

Ⓐ : Drive side
Ⓑ : Reverse side



Tooth Contact Judgment Guide

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

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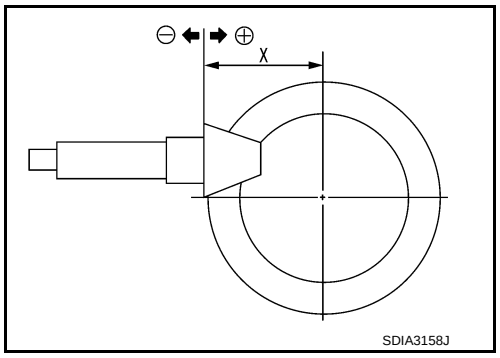
7. Follow the procedure below to adjust pinion height (dimension X) if tooth contact is improper.
For selecting adjusting shims, refer to the latest parts information.
CAUTION:
If no adjusting shim with the calculated value is available, select the thicker and closest one.



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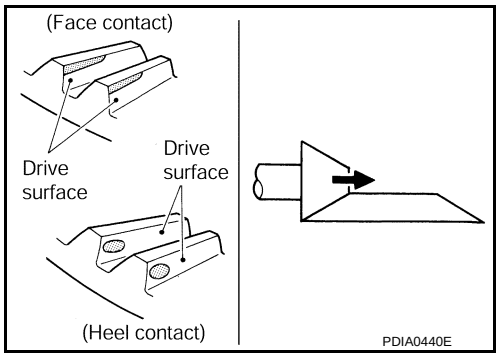
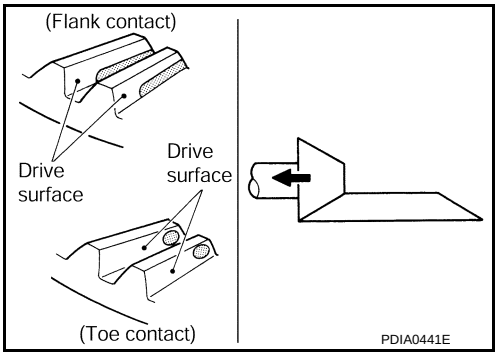
- Thicken the drive pinion adjusting shim to move the drive pinion closer to the ring gear in case of face contact or heel contact.
CAUTION:
Only one adjusting shim can be selected.



PDIA0440E

- Thin the drive pinion adjusting shim to move the drive pinion farther from the ring gear in case of flank contact or toe contact.

CAUTION:
Only one adjusting shim can be selected.



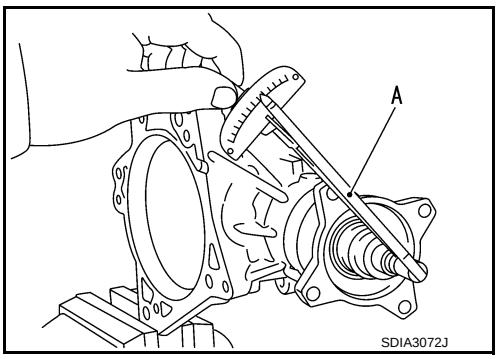
8. Assemble the plug to the transfer case.

CAUTION:
- **Remove old gasket on mounting surface, then remove any moisture, oil, and foreign material on the application and mounting surfaces.**
- **Apply liquid gasket to the thread, and tighten to the specified torque when installing plug.**

DRIVE PINION BEARING PRELOAD

1. Remove adapter case. Refer to DLN-185, "Disassembly and Assembly".
2. Remove ring gear shaft assembly from the transfer case.
3. Rotate the companion flange back and forth from 2 to 3 times to check for unusual noise, binding, sticking, and so on.
4. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
5. Measure the drive pinion bearing preload with a preload gauge (A) (SST: ST3127S000).

Drive pinion bearing preload : Refer to DLN-208, "Preload Torque".



CAUTION:
Each rotational part should rotate smoothly with the specified gear oil.
- Disassemble the drive pinion assembly to check and adjust each part if outside the standard.

TOTAL PRELOAD

1. Measure drive pinion bearing preload (P_1). Refer to “DRIVE PINION BEARING PRELOAD”.

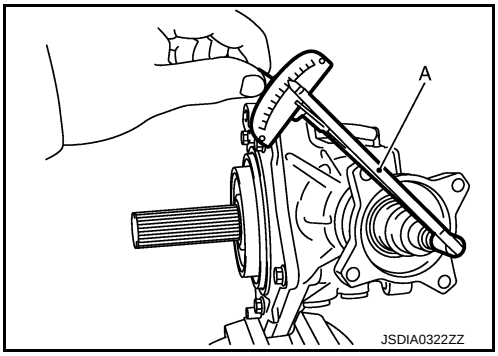
CAUTION:
Check that the drive pinion bearing preload is within the standard.

2. Assemble the ring gear shaft assembly to the transfer case.
3. Install adapter case. Refer to DLN-185, "Disassembly and Assembly".
4. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
5. Measure the total preload with a preload gauge (A) (SST: ST3127S000).

Total preload

All oil seals are installed : Refer to DLN-208, "Preload Torque".

Without adapter case oil seals : Refer to DLN-208, "Preload Torque".

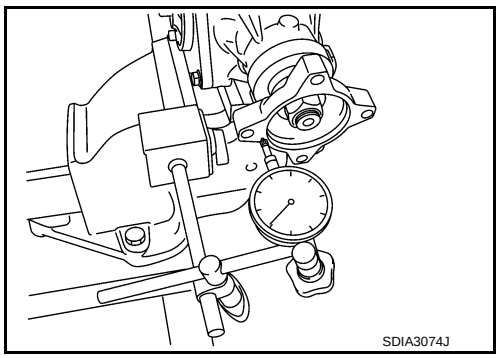


CAUTION:
- **Each rotational part should rotate smoothly with the specified gear oil.**
- **Disassemble the transfer assembly to check and adjust each part if outside the standard. Measure it with the adapter case oil seals removed when measuring total preload after disassembly. Then install adapter case oil seals.**

COMPANION FLANGE RUNOUT

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

Companion flange face runout : Refer to DLN-208, "Companion Flange Runout".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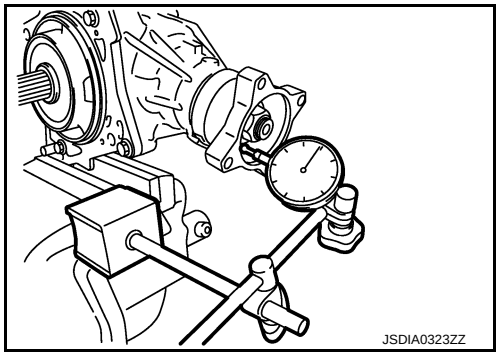
3. Fit a test indicator to the inner side of the companion flange (socket diameter).
4. Rotate the companion flange to check for runout.

Inner side of the companion flange runout : Refer to DLN-208, "Companion Flange Runout".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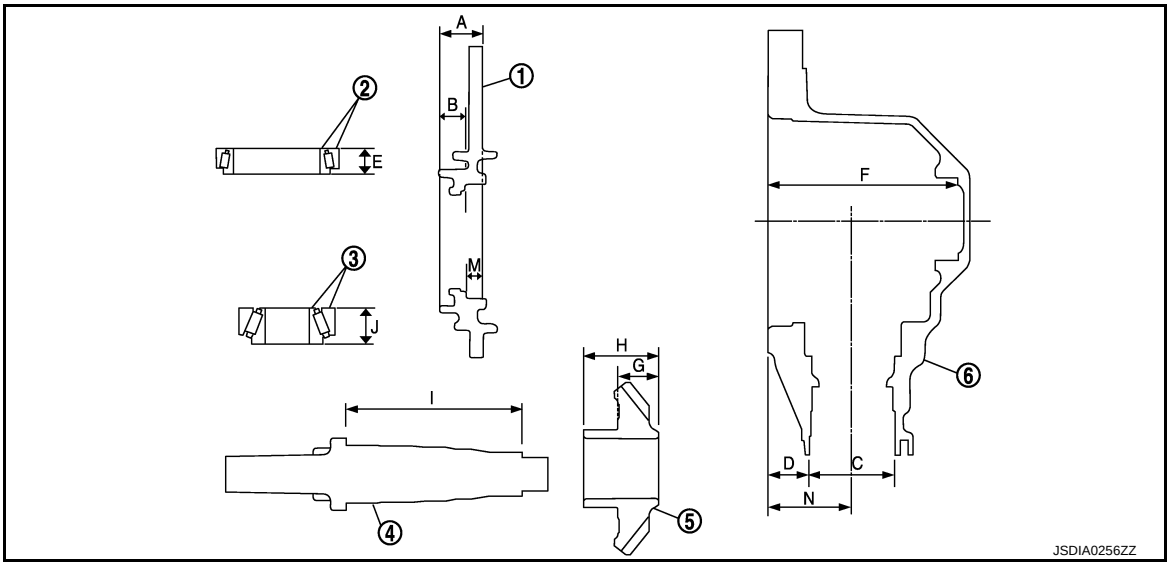
5. Follow the procedure below to adjust if runout value is outside the repair limit.

CAUTION:
Replace collapsible spacer to check and adjust each part when companion flange is adjusted or replaced.

a. Check for runout while changing the phase between companion flange and drive pinion in 90° steps. Then search for the minimum point.
b. Replace companion flange if runout value is still outside the limit after the phase has been changed.
c. Adjust assembly status of the drive pinion bearings and drive pinion, or replace drive pinion bearings if runout is outside the standard after the companion flange is replaced.

ADJUSTING SHIM SELECTION

Measuring Point



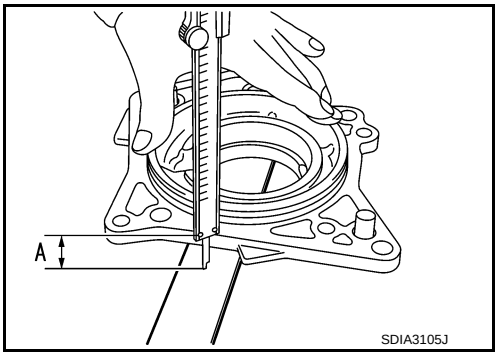
① Adapter case
② Ring gear shaft bearing (Adapter case side)
③ Ring gear shaft bearing (Transfer case side)
④ Ring gear shaft
⑤ Ring gear
⑥ Transfer case

Ring Gear Adjusting Shim (Adapter Case Side)

1. Measure the dimensions of each measuring point with the following procedure:

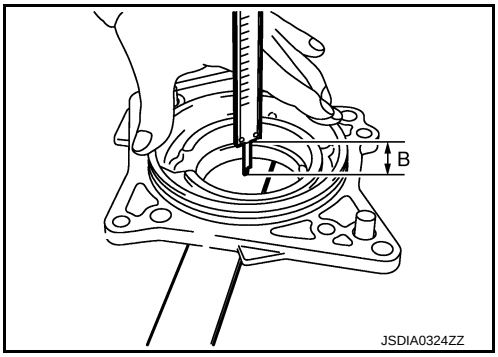
Dimension “A” measurement

- Measure dimension from transfer case mounting surface of adapter case to adapter case edge surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.



Dimension “B” measurement

- Measure dimension from ring gear adjusting shim mounting surface of adapter case to adapter case edge surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.

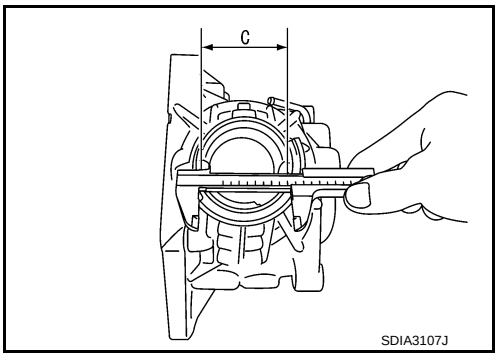


Dimension “C” measurement

- Measure the diameter of drive pinion bearing (rear side) mounting area of transfer case with a pair of vernier calipers. Refer to “Measuring point”.

  CAUTION:

  Never damage transfer case.

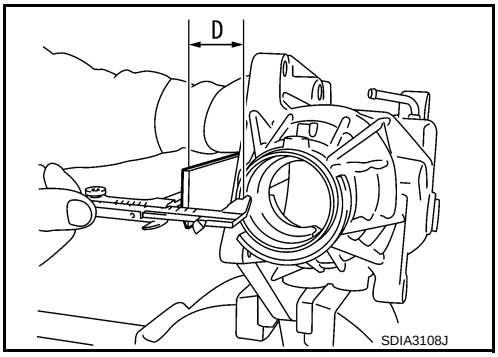


Dimension “D” measurement

- Measure dimension from adapter case mounting surface of transfer case to drive pinion bearing (rear side) mounting surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.

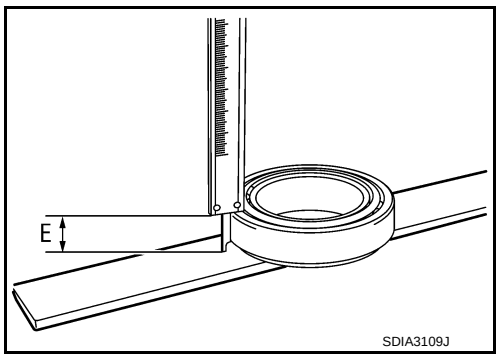
  CAUTION:

  - **Never damage transfer case.**
  - **Consider the thickness of a straightedge.**



Dimension “E” measurement

- Measure dimension from outer race edge surface of ring gear shaft bearing (adapter case side) to inner race edge surface with a pair of vernier calipers. Refer to “Measuring point”.



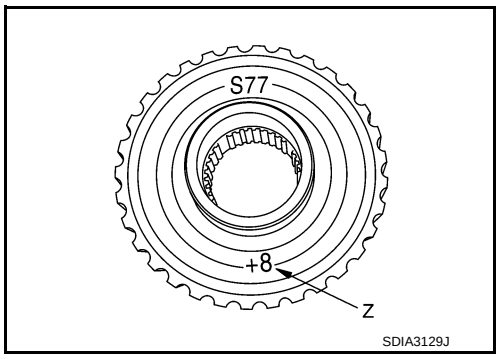
2. Calculate dimensions “M” and “N” by the formula below.

Dimension “M” = “A” – “B”
Dimension “N” = “C” × 0.5 mm (0.020 in) + “D”

3. Convert the dimensions “E”, “M” and “N” according to the standards below.

“E” : Actual value regarding 20.00 mm (0.7874 in) as 0 in increments of 0.01 mm (0.0004 in).
“M” : Actual value regarding 13.90 mm (0.5472 in) as 0 in increments of 0.01 mm (0.0004 in).
“N” : Actual value regarding 55.00 mm (2.1654 in) as 0 in increments of 0.01 mm (0.0004 in).

4. Check dimension “Z” (machining difference) on the ring gear back surface.
NOTE:
Dimension “Z” indicates difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the ring gear back surface.



5. Calculate the thickness of the ring gear adjusting shim (adapter case side) “T_1” by the formula below.

“T_1” = (“M” + “N” – “E” – “Z”) × 0.01 mm (0.0004 in) + 1.40 mm (0.0551 in)

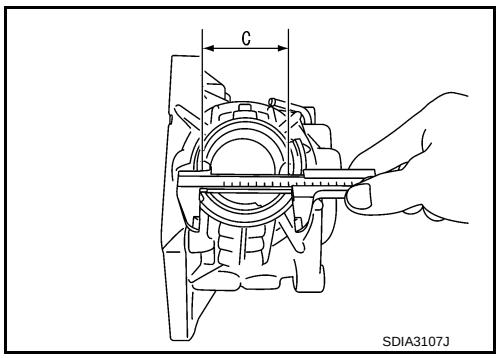
6. Select ring gear adjusting shim (adapter case side). For selecting adjusting shim, refer to the latest parts information.
CAUTION:
- **Only one adjusting shim can be selected.**
- **Select the closest one, favoring thicker over thinner when necessary if no adjusting shim with the calculated value is available.**

Ring Gear Adjusting Shim (Transfer Case Side)

1. Measure the dimensions of each measuring point with the following procedure:

Dimension “C” measurement

- Measure the diameter of drive pinion bearing (rear side) mounting area of transfer case with a pair of vernier calipers. Refer to “Measuring point”.
CAUTION:
Never damage transfer case.

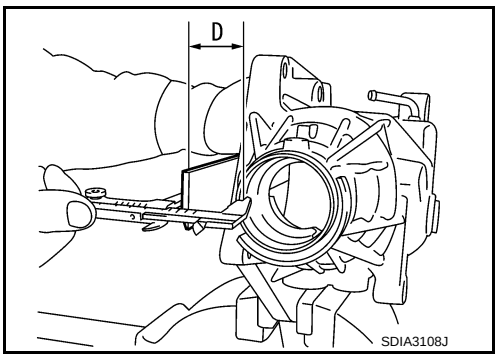


Dimension “D” measurement

- Measure dimension from adapter case mounting surface of transfer case to drive pinion bearing (rear side) mounting surface with a pair of vernier calipers and straightedge. Refer to “Measuring point”.

CAUTION:

- **Never damage transfer case.**
- **Consider the thickness of a straightedge.**

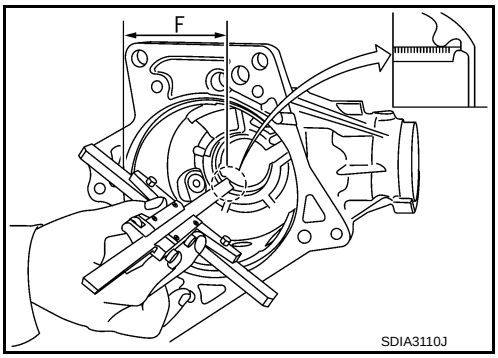


Dimension “F” measurement

- Measure dimension from adapter case mounting surface of transfer case to ring gear adjusting shim mounting surface with a depth gauge. Refer to “Measuring point”.

CAUTION:

Never damage transfer case.

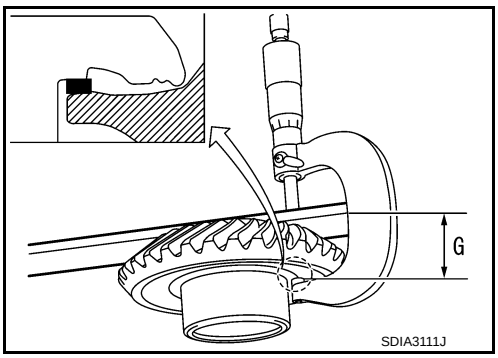


Dimension “G” measurement

- Measure dimension from ring gear shaft bearing mounting surface of ring gear to transfer case side edge surface with a micrometer and straightedge. Refer to “Measuring point”.

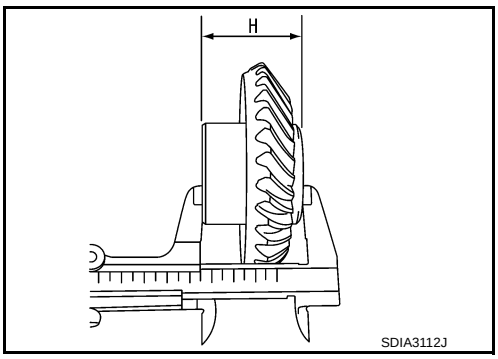
CAUTION:

Consider the thickness of a straightedge.



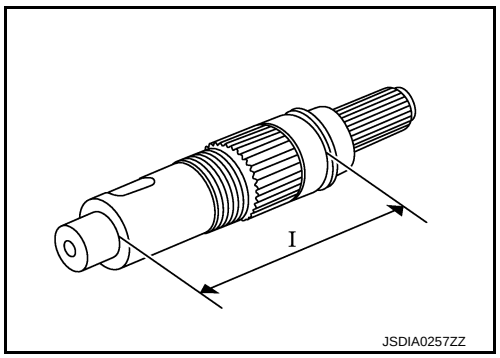
Dimension “H” measurement

- Measure dimension from transfer case side edge surface of ring gear to adapter case side edge surface with a pair of vernier calipers. Refer to “Measuring point”.



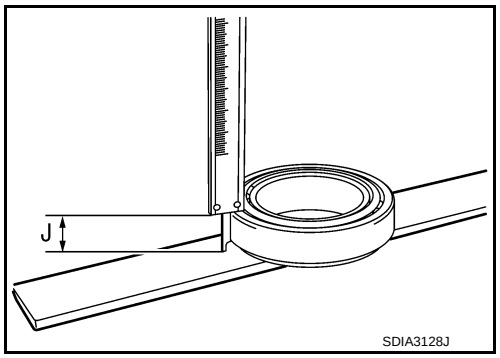
Dimension “I” measurement

- Measure dimension from ring gear mounting surface of ring gear shaft to ring gear shaft bearing (transfer case side) mounting surface with a pair of vernier calipers. Refer to “Measuring point”.



Dimension “J” measurement

- Measure dimension from outer race edge surface of ring gear shaft bearing (transfer case side) to inner race edge surface with a pair of vernier calipers. Refer to “Measuring point”.



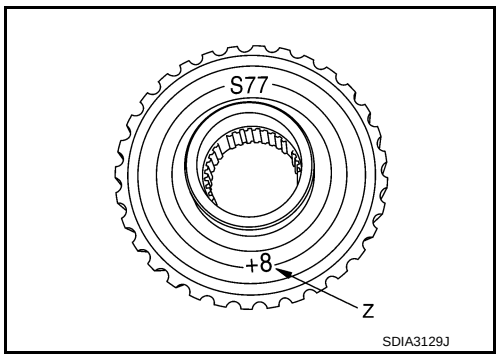
2. Calculate dimension “N” by the formula below.

Dimension “N” = “C” × 0.5 mm (0.020 in) + “D”

3. Convert the dimensions “F”, “G”, “H”, “I”, “J” and “N” according to the standards below.

“F” : Actual value regarding 122.60 mm (4.83 in) as 0 in increments of 0.01 mm (0.0004 in).
“G” : Actual value regarding 26.60 mm (1.0472 in) as 0 in increments of 0.01 mm (0.0004 in).
“H” : Actual value regarding 48.60 mm (1.9134 in) as 0 in increments of 0.01 mm (0.0004 in).
“I” : Actual value regarding 119.40 mm (4.70 in) as 0 in increments of 0.01 mm (0.0004 in).
“J” : Actual value regarding 16.25 mm (0.6398 in) as 0 in increments of 0.01 mm (0.0004 in).
“N” : Actual value regarding 55.00 mm (2.1654 in) as 0 in increments of 0.01 mm (0.0004 in).

4. Check dimension “Z” (machining difference) on the ring gear back surface.
NOTE:
Dimension “Z” indicates difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the ring gear back surface.
5. Calculate the thickness of the ring gear adjusting shim (transfer case side) “T_2” by the formula below.

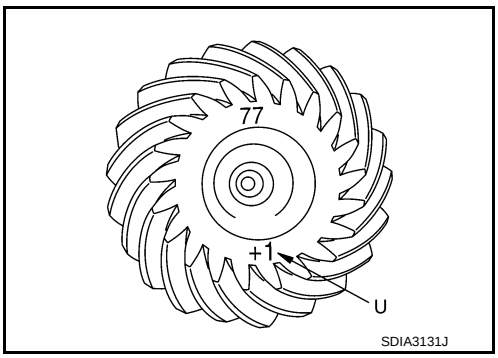


“T_2” = (“F” – “G” + “H” – “I” – “J” – “N” + “Z”) × 0.01 mm (0.0004 in) + 1.65 mm (0.0650 in)

6. Select ring gear adjusting shim (transfer case side). For selecting adjusting shim, refer to the latest parts information.
CAUTION:
- **Only one adjusting shim can be selected.**
- **Select the closest one, favoring thicker over thinner when necessary if no adjusting shim with the calculated value is available.**

Drive Pinion Adjusting Shim

1. Check the dimension “U” (machining difference) between old and new drive pinions when hypoid gear set (drive pinion and ring gear) has been replaced.
(Assemble new drive pinion adjusting shims with the same thickness as the ones removed prior to disassembly or removed drive pinion adjusting shims when reusing the hypoid gear set.)
NOTE:
Dimension “U” indicates the difference between optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in). It is written on the gear end of the drive pinion for reference.



2. Calculate the thickness of the drive pinion adjusting shim “T” by the formula below.

“T” = T_0 + [(t_1 – t_2) × 0.01 mm (0.0004 in)]

“T” : Thickness of new shim

T_0 : Thickness of old shim

t_1 : Dimension “U” displayed on the gear end of old drive pinion

t_2 : Dimension “U” displayed on the gear end of new drive pinion

[Example]

“T” = 3.21 + [(2 + 1) × 0.01 mm (0.0004 in)]

T_0 : 3.21

t_1 : +2

t_2 : −1

3. Select drive pinion adjusting shim. For selecting adjusting shim, refer to the latest parts information.
CAUTION:
- **Only one adjusting shim can be selected.**
- **Select the closest one, if no adjusting shim with the calculated value is available.**

Inspection

INFOID:0000000011005063

INSPECTION AFTER DISASSEMBLY

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

Gear and Shaft

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

CAUTION:

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

Bearing

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

CAUTION:

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

Shim

Check for seizure, damage, and unusual wear.

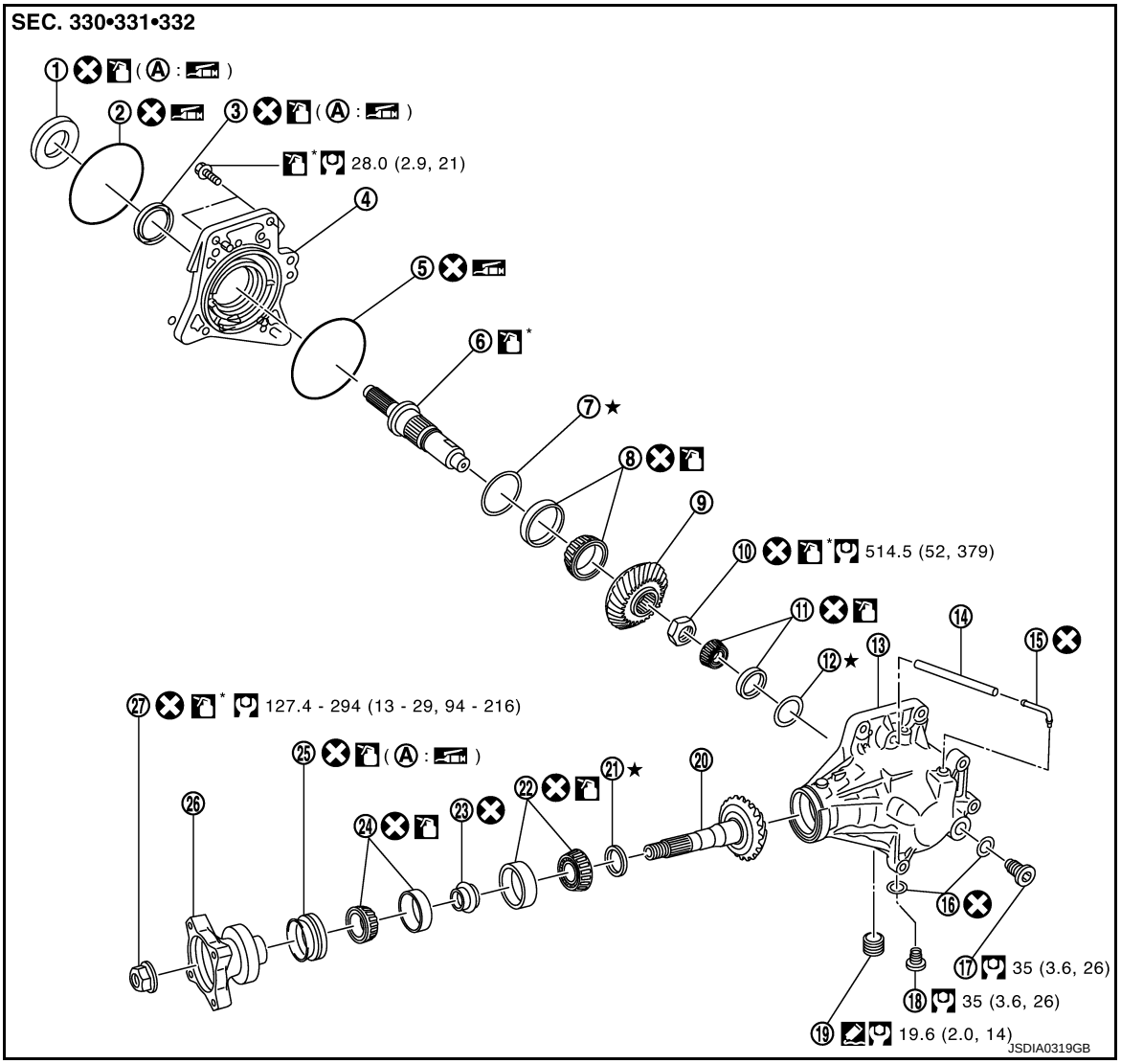
Case

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

TRANSFER CASE

Exploded View

INFOID:0000000011005111



① Adapter case oil seal (outer)	② O-ring (outer)	③ Adapter case oil seal (inner)
④ Adapter case	⑤ O-ring (inner)	⑥ Ring gear shaft
⑦ Ring gear adjusting shim (adapter case side)	⑧ Ring gear shaft bearing (adapter case side)	⑨ Ring gear
⑩ Ring gear nut	⑪ Ring gear shaft bearing (transfer case side)	⑫ Ring gear adjusting shim (transfer case side)
⑬ Transfer case	⑭ Air breather hose	⑮ Air breather tube
⑯ Gasket	⑰ Filler plug	⑱ Drain plug
⑲ Plug	⑳ Drive pinion	㉑ Drive pinion adjusting shim
㉒ Drive pinion bearing (front side)	㉓ Collapsible spacer	㉔ Drive pinion bearing (rear side)
㉕ Drive pinion oil seal	㉖ Companion flange	㉗ Lock nut
Ⓐ Oil seal lip		

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

: Apply transfer oil.

*: Apply anti-corrosive oil.

: Apply multi-purpose grease.

★: Select with proper thickness.

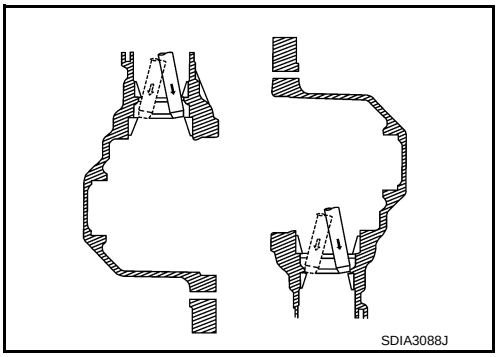
: Apply Genuine Liquid Gasket, Three Bond 1217 or equivalent.

Disassembly and Assembly

INFOID:0000000011005070

DISASSEMBLY

1. Remove adapter case. Refer to DLN-185, "Disassembly and Assembly".
2. Remove ring gear shaft assembly. Refer to DLN-188, "Disassembly and Assembly".
3. Remove drive pinion assembly. Refer to DLN-193, "Disassembly and Assembly".
4. Tap the outer race of drive pinion bearing from transfer case with a brass rod to remove outer race of drive pinion bearing (front side and rear side).
   CAUTION:
   Never damage transfer case.
5. Remove air breather hose from transfer case.
   CAUTION:
   Never damage air breather hose.
6. Remove air breather tube from transfer case.
7. Remove the filler plug and drain plug from the transfer case, and then remove each gasket.
8. Remove plug from transfer case.

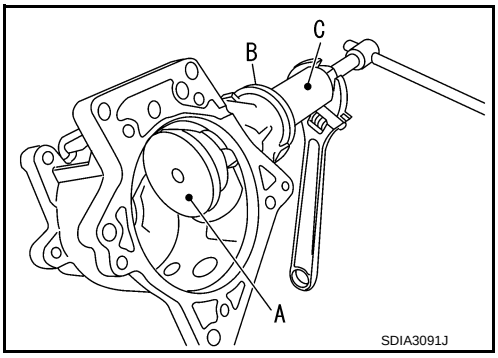

SDIA3088J

ASSEMBLY

1. Install outer race of drive pinion bearing (front side) to the transfer case with drifts and bushing remover.

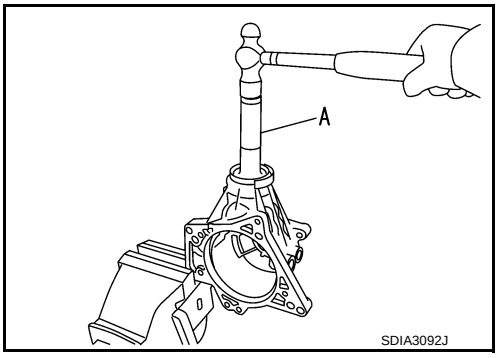
   A : Drift (commercial service tool)
   B : Drift (SST: ST35272000)
   C : Bushing remover (SST: ST38280000)

   CAUTION:
   - **Never reuse drive pinion bearing (front side).**
   - **Apply gear oil to the drive pinion bearing (front side)**



SDIA3091J

2. Install outer race of drive pinion bearing (rear side) to transfer case with a drift (A) (SST: ST33230000).
   CAUTION:
   - **Never reuse drive pinion bearing (rear side).**
   - **Apply gear oil to the drive pinion bearing (rear side).**
3. Install drive pinion assembly. Refer to DLN-193, "Disassembly and Assembly".
4. Install ring gear shaft assembly. Refer to DLN-188, "Disassembly and Assembly".
5. Install adapter case. Refer to DLN-185, "Disassembly and Assembly".

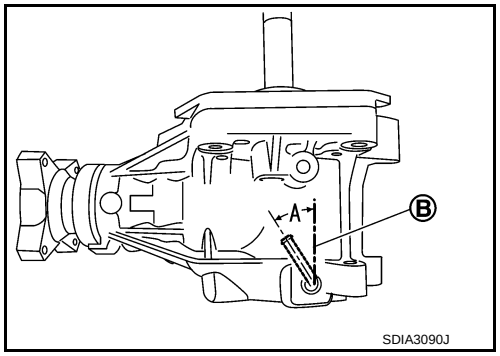


SDIA3092J

6. Install the air breather tube to the transfer case with its opening facing (A) rearward from transfer input shaft direction (B).

Angle "A" : 25° – 45 °

CAUTION:
Never reuse air breather tube.



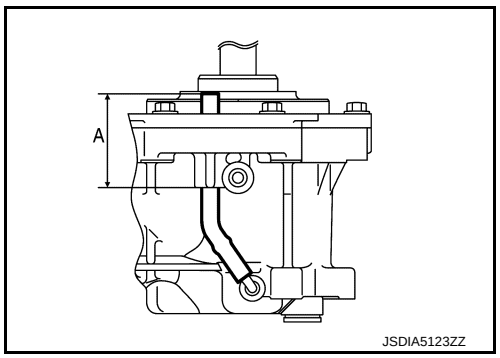
SDIA3090J

7. Install air breather hose.

CAUTION:
- **Measure hose standard insertion length (A) and put marking on it before installation, then install hose to the marked position.**

Insertion length (A) : 59 – 69 mm (2.32 – 2.72 in)

- **For marking, use paint.**
- **Never damage air breather hose.**



JSDIA5123ZZ

8. Check backlash, tooth contact, total preload and companion flange runout. Refer to DLN-195, "Adjustment".

CAUTION:
Measure the total preload without the adapter case oil seals.

9. Assemble the plug to the transfer case.

CAUTION:
- **Remove old gasket on mounting surface, then remove any moisture, oil, and foreign material on the application and mounting surfaces.**
- **Apply liquid gasket to the threads of plug.**

10. Install gaskets onto filler plug and drain plug and install them into transfer case.

CAUTION:
- **Never reuse gaskets.**
- **Install filler plug after oil is filled.**

Inspection

INFOID:0000000011005072

INSPECTION AFTER DISASSEMBLY

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

Case

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

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000011004074

Applied model	Axle	4WD
	Engine	R9M
	Transaxle	M/T
Transfer model		TY30A
Gear ratio		0.656
Number of teeth	Ring gear	32
	Drive pinion	21
Oil capacity		Refer to MA-23, "Fluids and Lubricants".

Preload Torque

INFOID:0000000011004075

Unit: N·m (kg-m, in-lb)

Item		Standard
Drive pinion bearing preload (P_1)		0.52 – 1.01 (0.06 – 0.10, 5 – 8)
Total preload	With all oil seals	P_1 + 0.76 – 0.96 (0.08 – 0.09, 7 – 8)
	Without adapter case oil seals	P_1 + 0.55 – 0.75 (0.06 – 0.07, 5 – 6)

Backlash

INFOID:0000000011004076

Unit: mm (in)

Item	Standard
Ring gear to drive pinion	0.13 – 0.19 (0.0051 – 0.0075)

Companion Flange Runout

INFOID:0000000011004077

Unit: mm (in)

Item	Standard
Companion flange face runout	0.1 (0.004) or less
Inner side of the companion flange runout	0.1 (0.004) or less

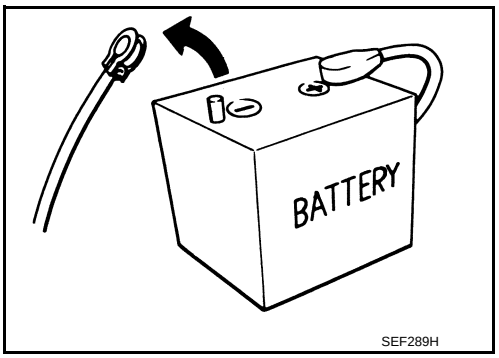
PRECAUTION

PRECAUTIONS

Precautions for Removing Battery Terminal

INFOID:0000000010822387

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.



- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
  NOTE:
  If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
  NOTE:
  The removal of 12V battery may cause a DTC detection error.

HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
   NOTE:
   At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

6. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Service Notice or Precautions for Propeller Shaft

INFOID:0000000010822155

- Replace the propeller shaft assembly if there is a breakage or deflection on tube.
- Never hit the tube or apply an impact on it during repair service. Never damage the tube as well.
- The joint cannot be disassembled. Never disassemble it.
- 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.

SYSTEM DESCRIPTION

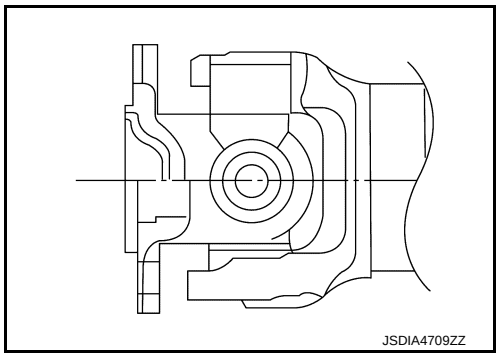
STRUCTURE AND OPERATION

Sectional View

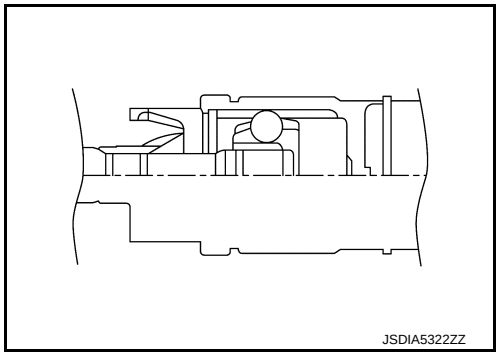
INFOID:0000000010822156

PART OF JOINT

Universal Type (Shell Type)



CVJ Type



SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000010822157

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

Reference		DLN-213, "Inspection"	DLN-214, "Exploded View"	DLN-213, "Inspection"	DLN-217, "Inspection"	DLN-213, "Inspection"	DLN-213, "Inspection"	DLN-213, "Inspection"	NVH of REAR FINAL DRIVE in this section.	NVH in FAX, RAX, FSU, and RSU section.	NVH in WT section.	NVH in WT section.	NVH in FAX and RAX section.	NVH in BR section.	NVH in ST section.
Possible cause and SUSPECTED PARTS		Uneven rotating torque	Center bearing improper installation	Excessive center bearing axial end play	Center bearing mounting (insulator) cracks, damage or deterioration	Excessive joint angle	Rotation imbalance	Excessive runout	DIFFERENTIAL	AXLE AND SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	BRAKE	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	Shake		×			×				×	×	×	×	×	×
	Vibration	×	×	×	×	×	×	×		×	×		×		×

×: Applicable

PERIODIC MAINTENANCE

REAR PROPELLER SHAFT

Inspection

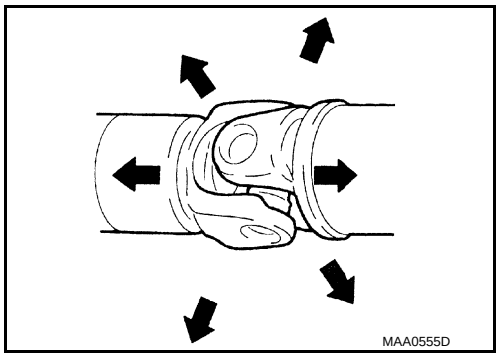
INFOID:0000000010822158

LOOSENESS OF CONNECTED PART

Check each fixing bolt and nut for looseness using torque wrench. For each tightening torque, refer to DLN-214, "Exploded View".

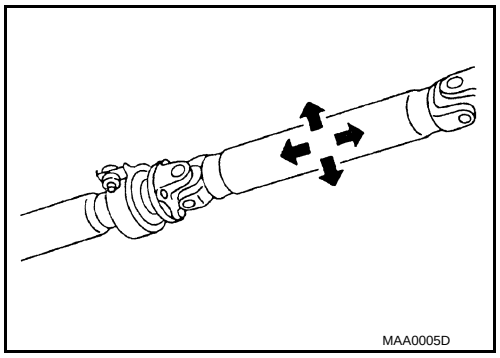
BACKLASH OF JOINT PART

Move the joint of propeller shaft up and down and from side to side (axial direction of shaft and right angle to shaft) to check that the joint has no backlash. If the joint has a malfunction, remove propeller shaft and perform inspection.



BACKLASH OF CENTER BEARING

Move the shaft near center bearing up and down and from side to side (axial direction of shaft and right angle to shaft) to check that the bearing has no backlash. If the bearing has a malfunction, remove propeller shaft and perform inspection.



APPEARANCE AND NOISE

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

VIBRATION

If vibration is present at high speed, adjust the propeller shaft phase first.

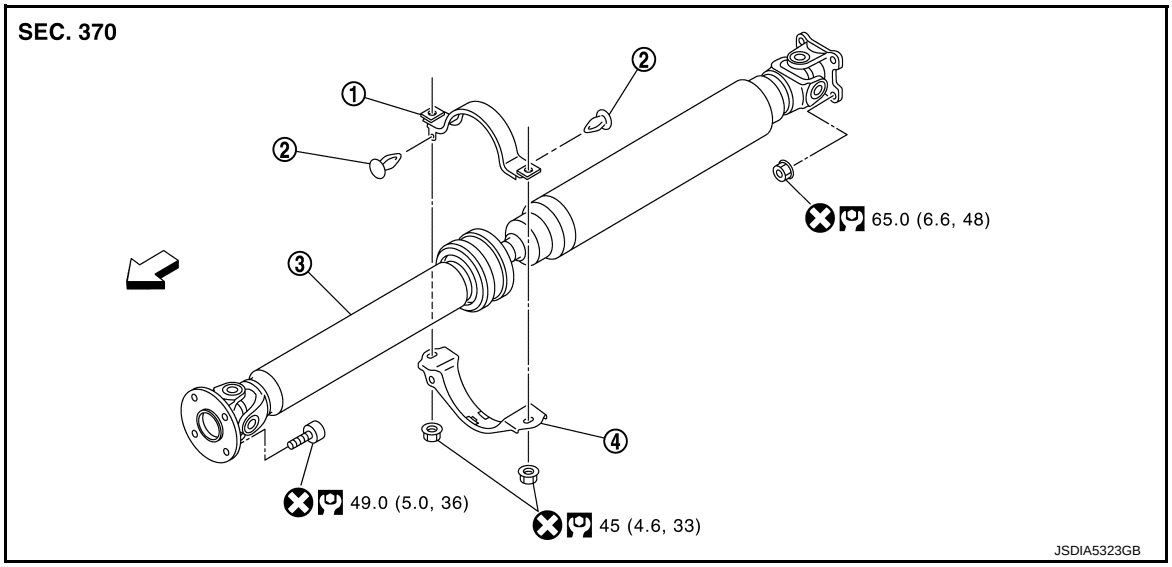
1. Check the propeller shaft for bend and damage. If damaged, replace propeller shaft assembly.
2. Perform a cruise test drive to check the propeller shaft for runout. If vibration occurs, separate propeller shaft at final drive companion flange; then change the phase between electric controlled coupling stud bolt and propeller shaft by the one bolt hole at a time and install propeller shaft.
3. If vibration is still detected, measure propeller shaft runout after removing it. Refer to DLN-217, "Inspection".

REMOVAL AND INSTALLATION

REAR PROPELLER SHAFT

Exploded View

INFOID:0000000010822159



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

④ Center bearing mounting bracket (lower)

⇦: Vehicle front

: N·m (kg-m, ft-lb)

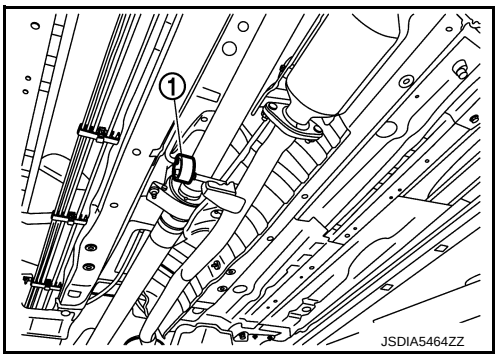
: Always replace after every disassembly.

Removal and Installation

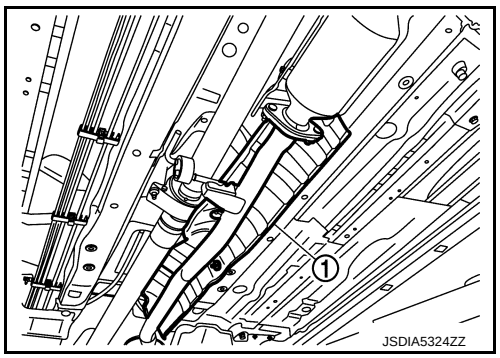
INFOID:0000000010822160

REMOVAL

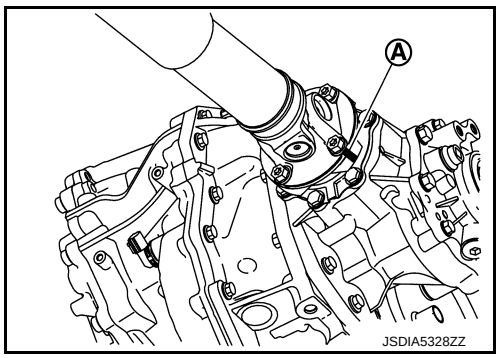
1. Shift transaxle to the neutral position, and then release parking brake.
2. Remove mounting rubber ① of main muffler. Refer to EX-6, "Removal and Installation" (MR20DD), EX-12, "Removal and Installation" (QR25DE), EX-18, "Removal and Installation" (R9M).
   CAUTION:
   Remove only near the center bearing mounting bracket of propeller shaft.



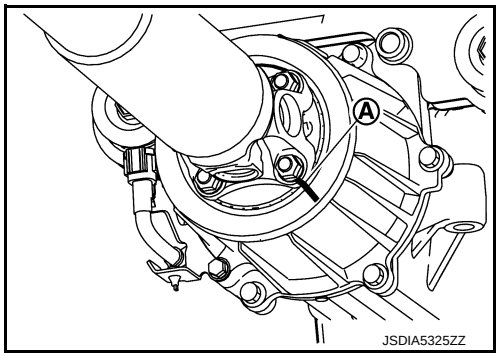
3. Remove heat insulator ①.



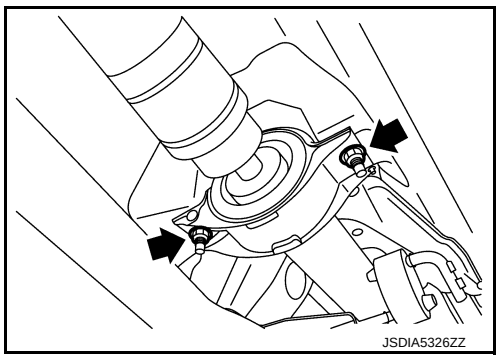
4. Put matching marks Ⓐ on propeller shaft flange yoke and transfer companion flange.
CAUTION:
For matching mark, use paint. Never damage propeller shaft flange yoke and transfer companion flange.



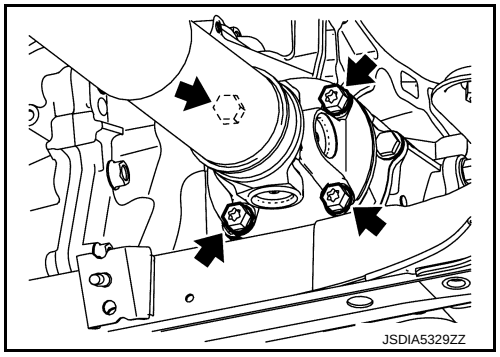
5. Put matching marks Ⓐ on propeller shaft flange yoke and electric controlled coupling.
CAUTION:
- **For matching mark, use paint. Never damage propeller shaft flange yoke and electric controlled coupling.**
- **If the tip of stud bolt of electric controlled coupling has a paint mark, place a matching mark for identification of the position of applicable stud bolt.**



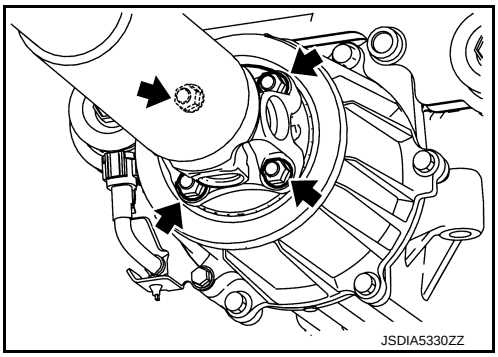
6. Loosen mounting nuts of center bearing mounting bracket.
NOTE:
Tighten mounting nuts temporarily to prevent drop of propeller shaft.



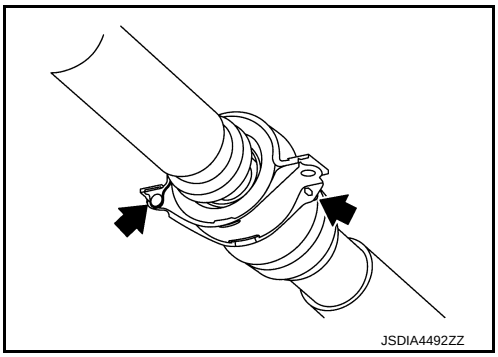
7. Remove propeller shaft assembly fixing bolts, and separate propeller shaft assembly from transfer companion flange.



8. Remove propeller shaft assembly fixing nuts, and separate propeller shaft assembly from electric controlled coupling of final drive.
9. Remove center bearing mounting bracket mounting nuts.
10. Remove propeller shaft assembly.


JSDIA5330ZZ

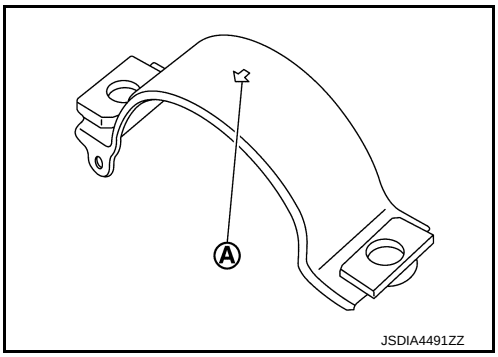
11. Remove clips and then remove center bearing mounting bracket (upper/lower).
12. Perform inspection after removal. Refer to DLN-217, "Inspection".


JSDIA4492ZZ

INSTALLATION

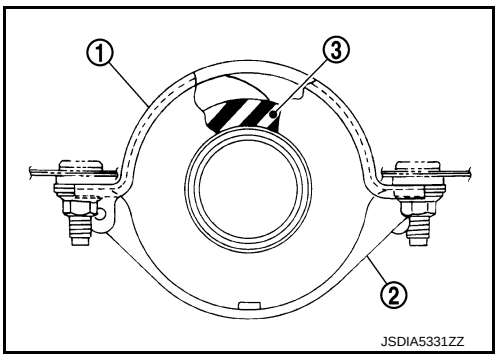
Note the following, and install in the reverse order of removal.

- For non-reusable parts, refer to DLN-214, "Exploded View".
- For each tightening torque, refer to DLN-214, "Exploded View".
- After removing propeller shaft, replace stud bolts on electric controlled coupling. Refer to DLN-231, "Removal and Installation".
- Remove any moisture, oil, or foreign material from matching surface on transfer companion flange, electric controlled coupling and propeller shaft flange.
- Install center bearing mounting bracket (upper) with its arrow mark Ⓐ facing forward.



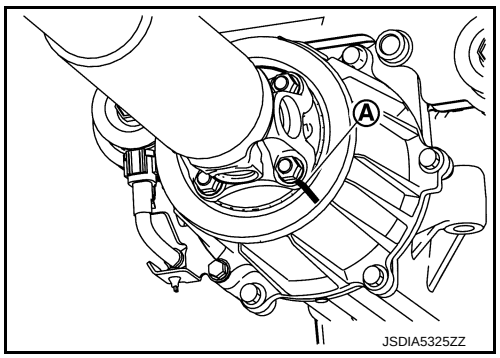
JSDIA4491ZZ

- Adjust position of center bearing mounting bracket (upper) ①, 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.
- Center bearing mounting bracket fixing nuts must be tightened in the order from left to right.

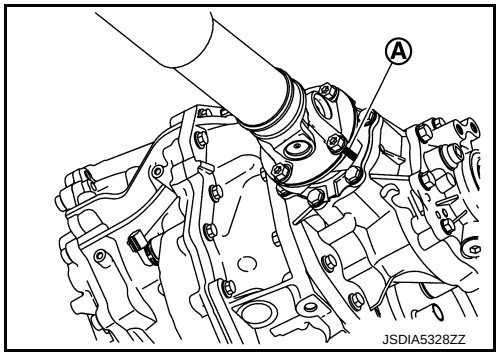


JSDIA5331ZZ

- Align matching marks Ⓐ to install propeller shaft flange yoke and electric controlled coupling of final drive.

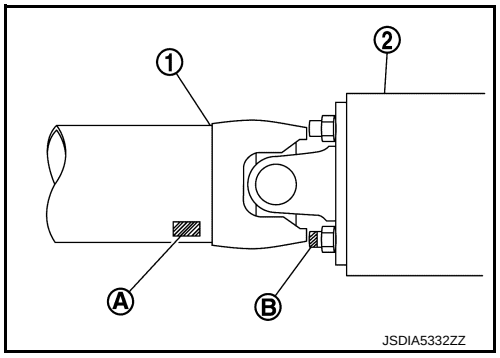


- Align matching marks Ⓐ to install propeller shaft flange yoke and transfer companion flange.



- If propeller shaft assembly, final drive assembly or electric controlled coupling has been replaced, connect propeller shaft assembly and electric controlled coupling of final drive as follows:

- Install propeller shaft ① while aligning its matching mark Ⓐ of propeller shaft with matching mark Ⓑ on stud bolt of electric controlled coupling ② as close as possible.
  CAUTION:
  When replaced stud bolt, use the painted matching mark in removal as a guide.
- Perform inspection after installation. Refer to DLN-217, "Inspection".



Inspection

INFOID:0000000010822161

INSPECTION AFTER REMOVAL

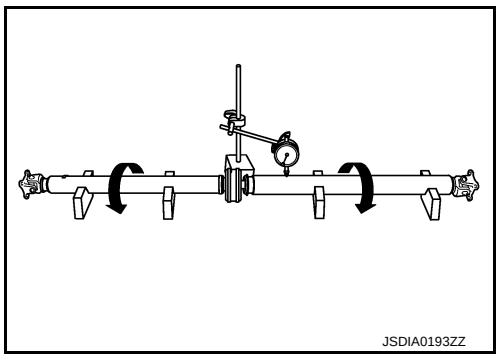
Appearance

Check propeller shaft tube surface for dents or cracks. If malfunction is detected, replace propeller shaft assembly.

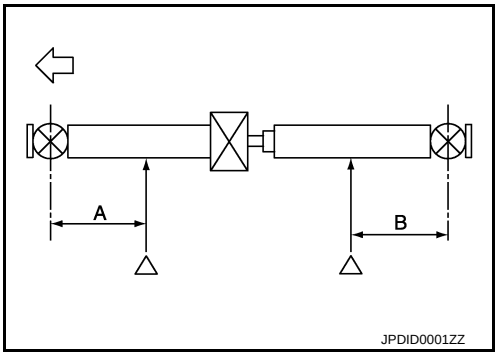
Propeller Shaft Runout

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

Propeller shaft runout : Refer to DLN-219, "Propeller Shaft Runout".



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



⇦ : Front side

Dimension

MR20DD models

A : 533.5 mm (21.00 in)

B : 492.0 mm (19.37 in)

QR25DE models

A : 540.5 mm (21.28 in)

B : 492.0 mm (19.37 in)

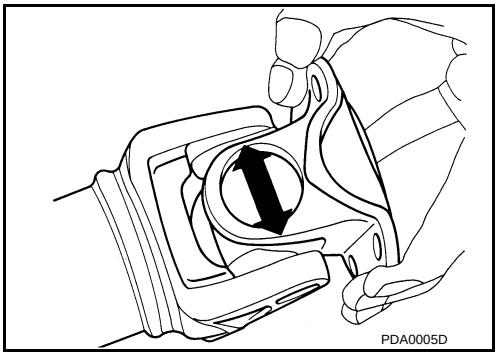
R9M models

A : 474.5 mm (18.68 in)

B : 492.0 mm (19.37 in)

Journal Axial Play

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



Journal axial play : Refer to DLN-219, "Journal Axial Play".

CAUTION:
Never disassemble joints.

Center Bearing

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

CAUTION:
Never disassemble center bearing.

INSPECTION AFTER INSTALLATION

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

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000010822162

Applied model	Axle	4WD		
	Engine	MR20DD	QR25DE	R9M
	Transaxle	CVT		M/T
Propeller shaft model		C-CVJ-C		
Number of joints		3		
Joint type	1st joint	Universal (Shell type)		
	2nd joint	CVJ type		
	3rd joint	Universal (Shell type)		
Coupling method	Transfer side	Flange type		
	Rear final drive side	Flange type		
Shaft length	1st (Spider to CVJ joint center)	1181.5 mm (46.52 in)	1195.5 mm (47.07 in)	1057.5 mm (41.63 in)
	2nd (CVJ joint center to spider)	983.4 mm (38.72 in)	983.4 mm (38.72 in)	983.4 mm (38.72 in)
Shaft outer diameter	1st shaft	63.5 mm (2.500 in)	63.5 mm (2.500 in)	57.0 mm (2.244 in)
	2nd shaft	70.0 mm (2.756 in)	70.0 mm (2.756 in)	70.0 mm (2.756 in)

Propeller Shaft Runout

INFOID:0000000010822163

Unit: mm (in)

Item	Standard
Propeller shaft runout	0.6 (0.024) or less

Journal Axial Play

INFOID:0000000010822164

Unit: mm (in)

Item	Standard
Journal axial play	0 (0)

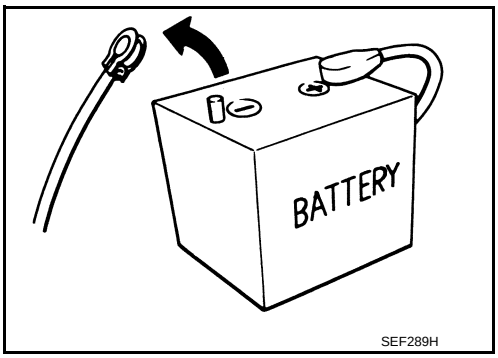
PRECAUTION

PRECAUTIONS

Precautions for Removing Battery Terminal

INFOID:0000000011008652

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
  NOTE:
  If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
  NOTE:
  The removal of 12V battery may cause a DTC detection error.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
   NOTE:
   At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

6. Remove 12V battery terminal.

CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Service Notice or Precautions for Rear Final Drive

INFOID:0000000011008601

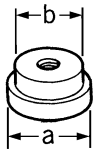
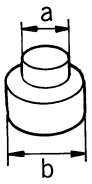
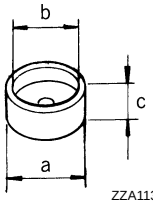
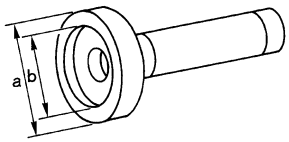
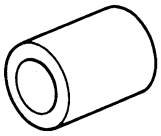
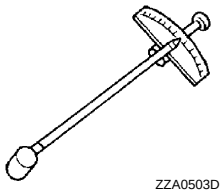
- Use recommended gear oil only, refer to MA-23, "Fluids and Lubricants".
- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they never interfere with the function of the parts when applied.
- Overhaul should be done in a clean work area, it is preferable to work in dustproof area.
- Before disassembly, using steam or white gasoline, completely remove sand and mud from the exterior of the unit, preventing them from entering into the unit during disassembly or assembly.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new ones if necessary.
- Gaskets, seals and O-rings should be replaced any time when the unit is disassembled.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.
- Clean and flush the parts sufficiently and blow-dry them.
- Be careful not to damage sliding surfaces and mating surfaces.
- When applying sealant, remove the old sealant from the mounting surface; then remove any moisture, oil, and foreign materials from the application and mounting surfaces.
- Always use shop paper for cleaning the inside of components.
- Never use cotton gloves or shop rags to prevent entering of lint.
- During assembly, observe the specified tightening torque, and apply new gear oil, petroleum jelly, or multi-purpose grease as specified for each vehicle, if necessary.

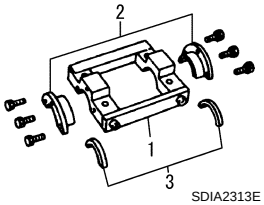
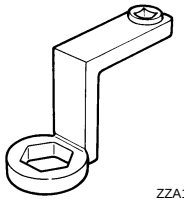
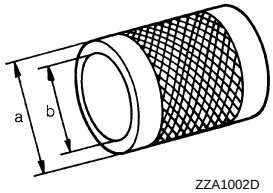
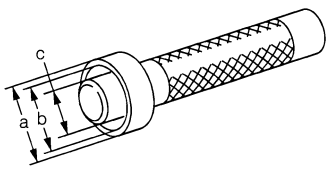
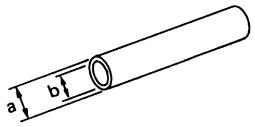
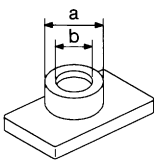
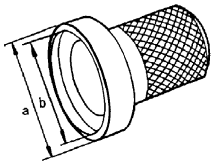
PREPARATION

PREPARATION

Special Service Tools

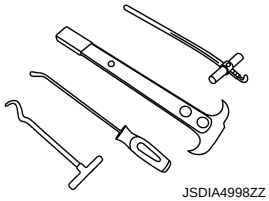
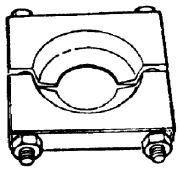
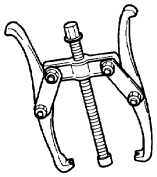
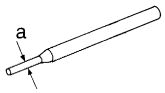
INFOID:0000000011008602

Tool number Tool name	Description
KV40100610 Drift a: 63 mm (2.48 in) dia. b: 54.3 mm (2.138 in) dia.  ZZA1000D	• Removing and Installing rear cover (2 pieces are used.) • Removing and Installing differential assembly (2 pieces are used.) • Installing pinion front bearing inner race
ST33052000 Adaptor a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.  ZZA1023D	Removing side bearing inner race
KV40105020 Drift a: 39.7 mm (1.563 in) dia. b: 35 mm (1.38 in) dia. c: 15 mm (0.59 in)  ZZA1133D	Installing side bearing inner race
KV38100200 Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.  ZZA1143D	Installing side oil seal
KV38109500 Drive pinion socket  ZZA1205D	• Measuring pinion bearing preload and total preload • Removing and installing drive pinion lock nut
ST3127S000 Preload gauge  ZZA0503D	Measuring pinion bearing preload and total preload

Tool number Tool name		Description
KV389L0010 Dummy cover set 1: Dummy cover 2: Dummy cover spacer 3: Dummy cover shim	 SDIA2313E	• Checking drive gear runout • Checking tooth contact • Checking backlash
KV38109400 Pinion nut wrench	 ZZA1206D	Removing and installing drive pinion lock nut
ST33200000 Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.	 ZZA1002D	Installing pinion rear bearing outer race
ST33230000 Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.	 ZZA1046D	Installing pinion front bearing outer race
ST23860000 Drift a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.	 ZZA0534D	• Installing pinion rear bearing inner race • Installing pinion front bearing inner race
ST38220000 Press stand a: 75 mm (2.95 in) dia. b: 63 mm (2.48 in) dia.	 S-NT509	Installing pinion front bearing inner race
ST35271000 Drift a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.	 ZZA0814D	Installing drive pinion oil seal

Commercial Service Tools

INFOID:0000000011008603

Tool name	Description
Oil seal remover  JSDIA4998ZZ	• Removing side oil seal • Removing drive pinion oil seal
Separator  ZZA0700D	• Removing side bearing inner race • Removing pinion rear bearing inner race
Puller  ZZA0119D	• Removing side bearing inner race • Removing pinion rear bearing inner race
Pin punch a: 4.5 mm (0.177 in) dia.  NT410	Removing and installing lock pin

Lubricant or/and Sealant

INFOID:0000000011008604

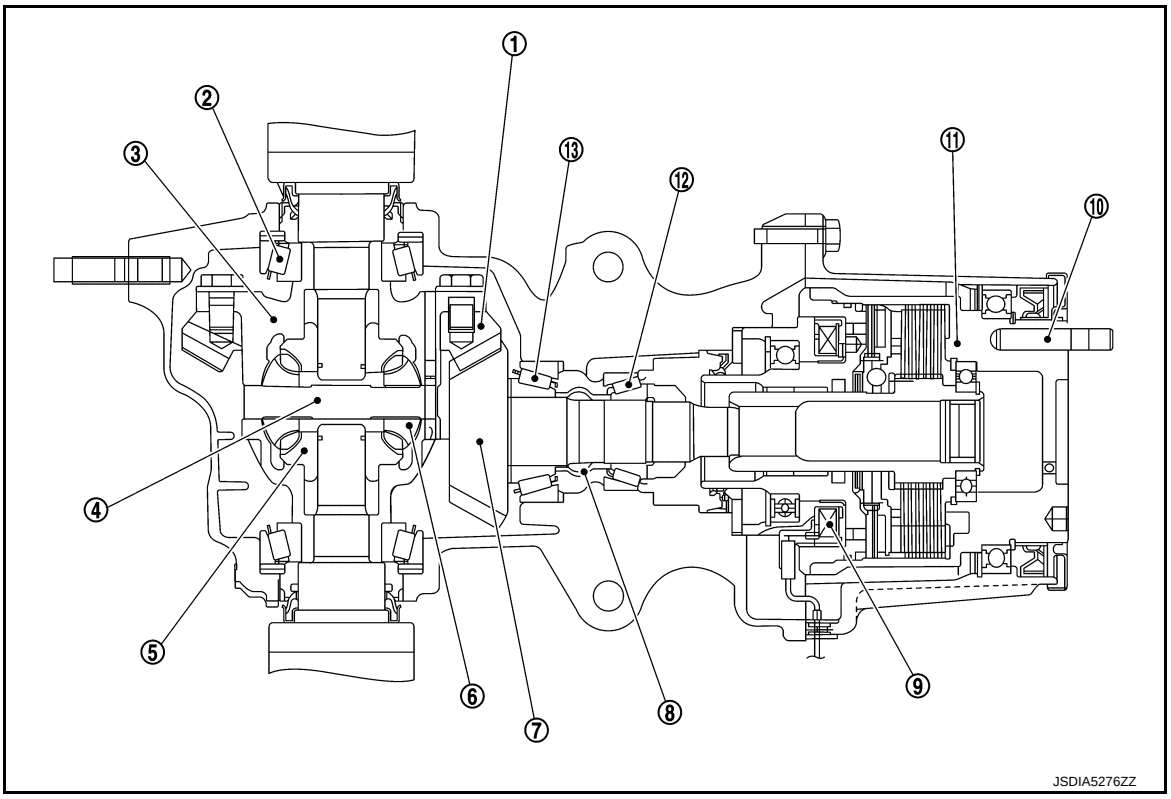
Item	Use
Genuine Liquid Gasket (Three Bond 1217 or equivalent)	• Application to mating surface of electric controlled coupling assembly • Application to mating surface of rear cover
Genuine High Strength Thread Locking Sealant (Loctite 270 or equivalent)	Application into the thread hole of drive gear
Red lead or equivalent	Checking tooth contact

SYSTEM DESCRIPTION

STRUCTURE AND OPERATION

Sectional View

INFOID:0000000011008605



① Drive gear	② Side bearing	③ Differential case
④ Pinion mate shaft	⑤ Side gear	⑥ Pinion mate gear
⑦ Drive pinion	⑧ Collapsible spacer	⑨ 4WD solenoid
⑩ Stud bolt	⑪ Electric controlled coupling	⑫ Pinion front bearing
⑬ Pinion rear bearing		

Electric Controlled Coupling

INFOID:0000000011008606

The electric controlled coupling operates as the 4WD system. For the operation, refer to DLN-17, "Operation Description" (TY21C transfer models), DLN-121, "Operation Description" (TY30A transfer models).

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000011008607

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

Reference		DLN-255, "Inspection"	DLN-252, "Adjustment"	DLN-255, "Inspection"	DLN-252, "Adjustment"	—	DLN-227, "Inspection"	NVH of REAR PROPELLER SHAFT in this section.	NVH in FAX, RAX, FSU and RSU sections.	NVH in WT section.	NVH in WT section.	NVH in FAX and RAX section.	NVH in BR section.	NVH in ST section.
Possible cause and SUSPECTED PARTS		Gear tooth rough	Gear contact improper	Tooth surfaces worn	Backlash incorrect	Companion flange excessive runout	Gear oil improper	PROPELLER SHAFT	AXLE AND SUSPENSION	TIRE	ROAD WHEEL	DRIVE SHAFT	BRAKE	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×

×: Applicable

PERIODIC MAINTENANCE

REAR DIFFERENTIAL GEAR OIL

Inspection

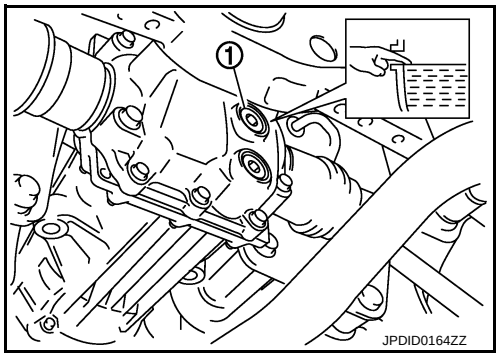
INFOID:0000000011008670

OIL LEAKAGE

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

OIL LEVEL

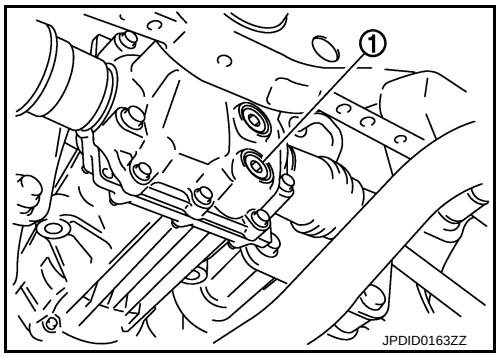
1. Check oil level from filler plug mounting hole as shown in the figure after removing filler plug ① and gasket from final drive assembly.
   CAUTION:
   Turn the ignition switch OFF while checking oil level.
   - Oil level should be level with bottom of filler plug mounting hole. Add gear oil if necessary. Refer to DLN-227, "Refilling".
2. Set a gasket on filler plug and install it on final drive assembly.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque. Refer to DLN-246, "Exploded View".



Draining

INFOID:0000000011008671

1. Turn the ignition switch OFF.
2. Remove drain plug ① and gasket.
3. Drain gear oil.
4. Set a gasket on drain plug and install it to final drive assembly.
   CAUTION:
   Never reuse gasket.
5. Tighten drain plug to the specified torque. Refer to DLN-246, "Exploded View".



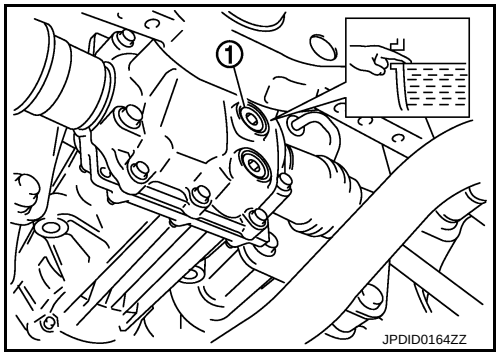
Refilling

INFOID:0000000011008672

1. Remove filler plug ① and gasket. Then fill with new gear oil until oil level reaches the specified level near filler plug mounting hole.

   Recommended oil and capacity : **Refer to MA-23, "Fluids and Lubricants".**

2. Set a gasket on filler plug, and install it to final drive assembly.
   CAUTION:
   Never reuse gasket.
3. Tighten filler plug to the specified torque. Refer to DLN-246, "Exploded View".

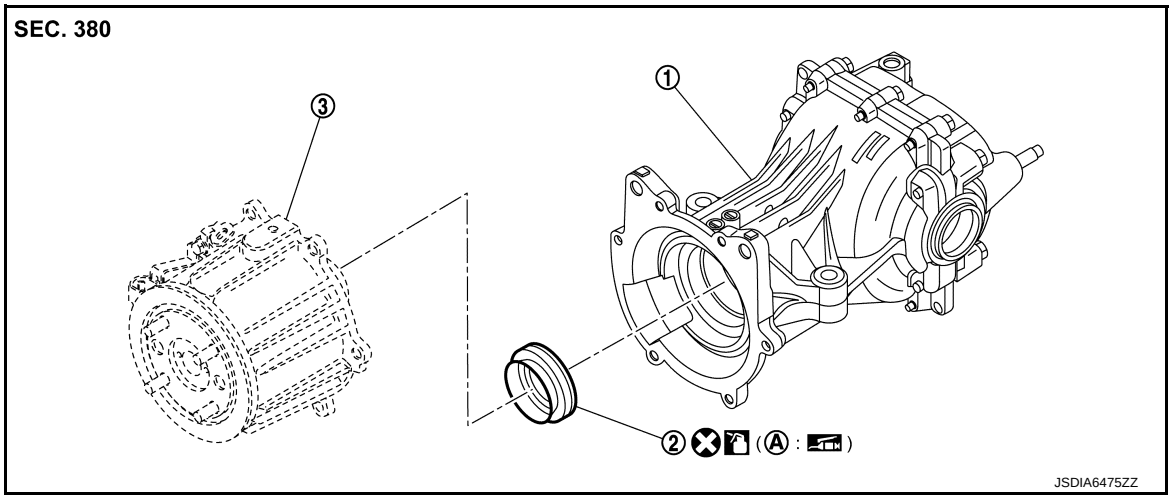


REMOVAL AND INSTALLATION

DRIVE PINION OIL SEAL

Exploded View

INFOID:0000000011008611



① Rear final drive assembly ② Drive pinion oil seal ③ Electric controlled coupling assembly

Ⓐ Oil seal lip

: Always replace after every disassembly.

: Apply gear oil.

: Apply multi-purpose grease.

Removal and Installation

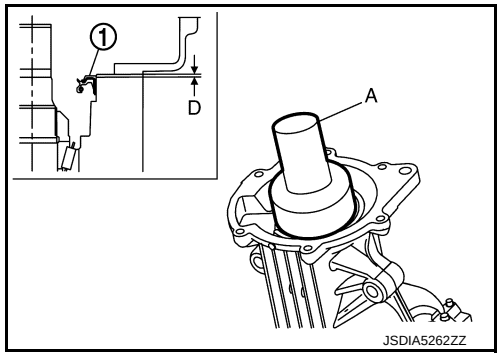
INFOID:0000000011008612

REMOVAL

1. Drain gear oil. Refer to DLN-227, "Draining".
2. Remove electric controlled coupling assembly. Refer to DLN-231, "Removal and Installation".
3. Remove drive pinion oil seal using oil seal remover (commercial service tool).

INSTALLATION

1. Using the drift (A) (SST: ST35271000), install drive pinion oil seal ① within the dimension (D) shown as follows.



D : 0.8 – 1.2 mm (0.031 – 0.047 in)

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

2. Install electric controlled coupling assembly. Refer to DLN-231, "Removal and Installation".
3. Refill gear oil to the final drive. Refer to DLN-227, "Refilling".
4. Perform inspection after installation. Refer to DLN-228, "Inspection".

Inspection

INFOID:0000000011008613

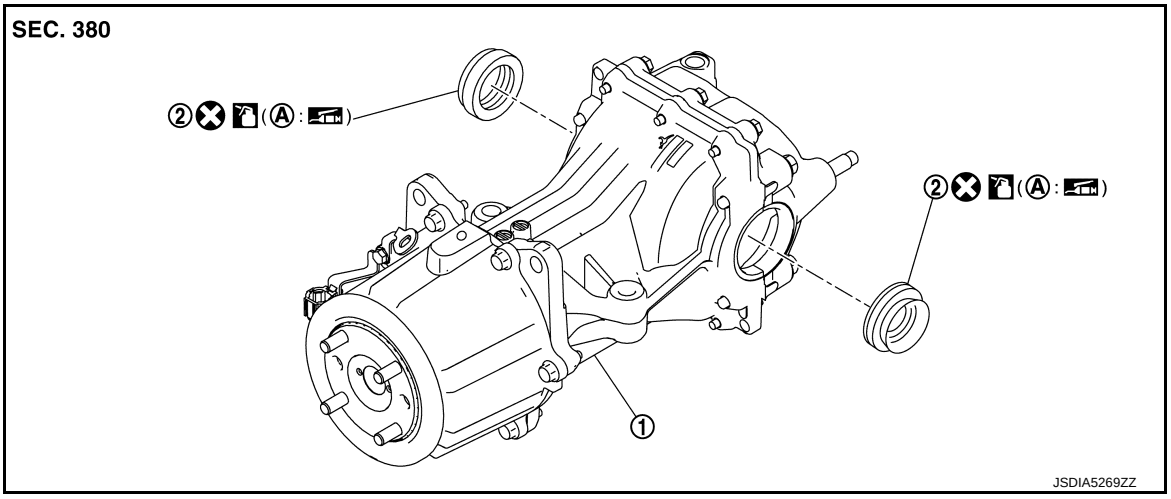
INSPECTION AFTER INSTALLATION

Check oil level and final drive for oil leakage. Refer to DLN-227, "Inspection".

SIDE OIL SEAL

Exploded View

INFOID:0000000011008614



① Rear final drive assembly ② Side oil seal

Ⓐ Oil seal lip

: Always replace after every disassembly.

: Apply gear oil.

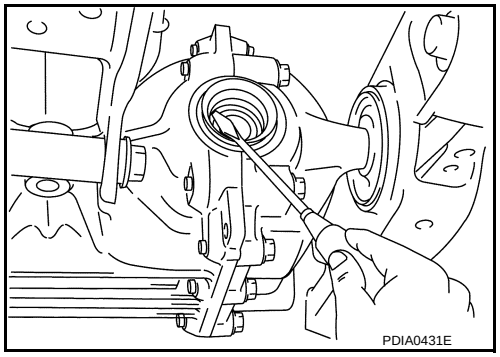
: Apply multi-purpose grease.

Removal and Installation

INFOID:0000000011008615

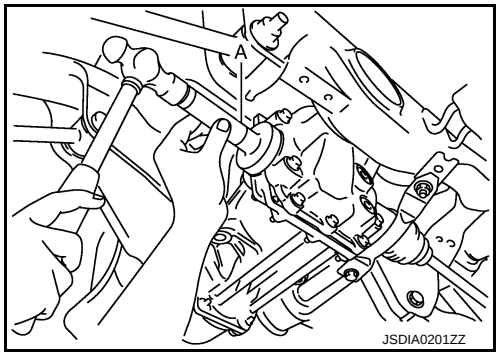
REMOVAL

1. Drain gear oil. Refer to DLN-227, "Draining".
2. Remove rear drive shafts. Refer to RAX-22, "Removal and Installation".
3. Remove side oil seal, using oil seal remover (commercial service tool).
   CAUTION:
   Never damage gear carrier and rear cover.



INSTALLATION

1. Using the drift (A) (SST: KV38100200), drive side oil seal until it becomes flush with the gear carrier end.
   CAUTION:
   - **Never reuse oil seal.**
   - **When installing, never incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lip, and gear oil onto the circumference of oil seal.**
2. Install rear drive shafts. Refer to RAX-22, "Removal and Installation".
3. Refill gear oil to the final drive. Refer to DLN-227, "Refilling".



4. Perform inspection after installation. Refer to DLN-230, "Inspection".

Inspection

INFOID:0000000011008616

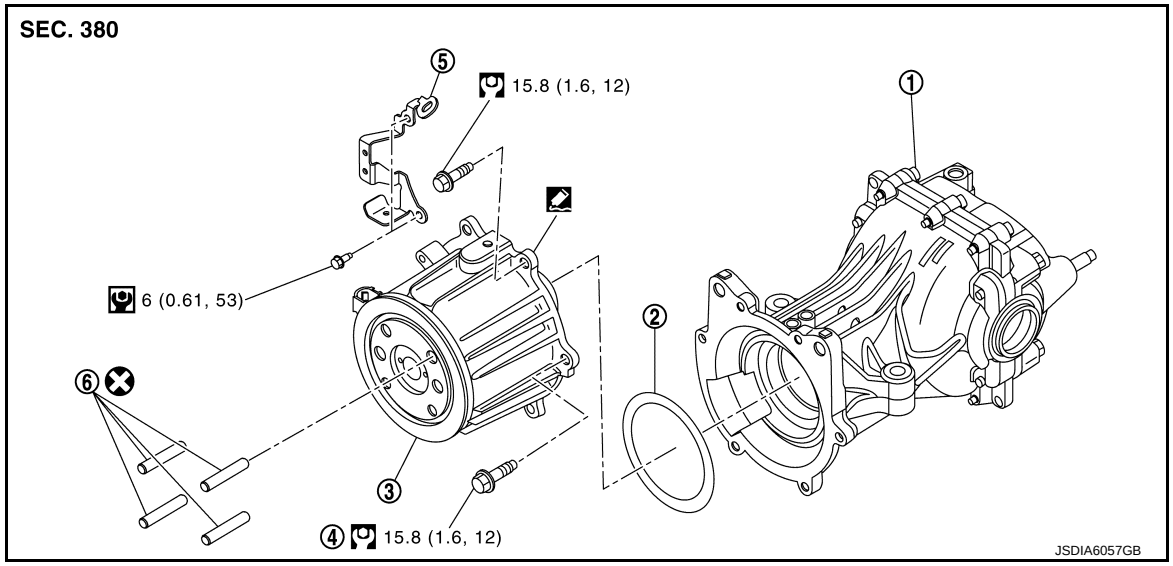
INSPECTION AFTER INSTALLATION

Check oil level and final drive for oil leakage. Refer to DLN-227, "Inspection".

ELECTRIC CONTROLLED COUPLING

Exploded View

INFOID:0000000011008617



① Rear final drive assembly ② Wave spring ③ Electric controlled coupling assembly
④ Reamer bolt ⑤ Connector bracket ⑥ Stud bolt

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

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

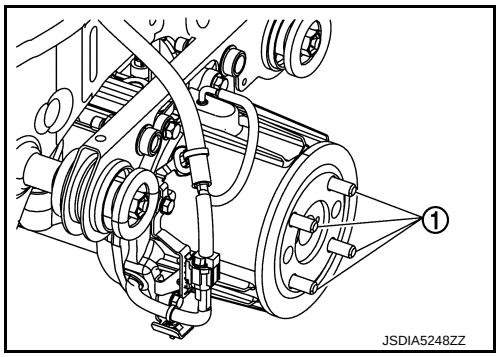
Removal and Installation

INFOID:0000000011008618

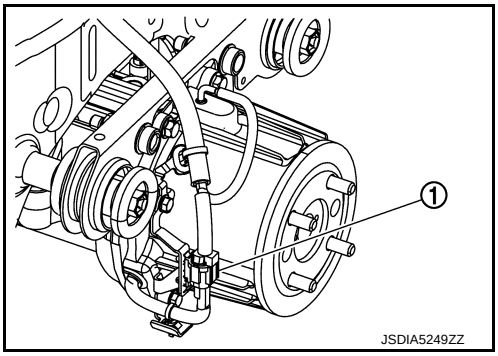
REMOVAL

1. Drain gear oil. Refer to DLN-227, "Draining".
2. Remove propeller shaft from rear final drive assembly. Refer to DLN-214, "Removal and Installation".
3. Remove stud bolts ①.

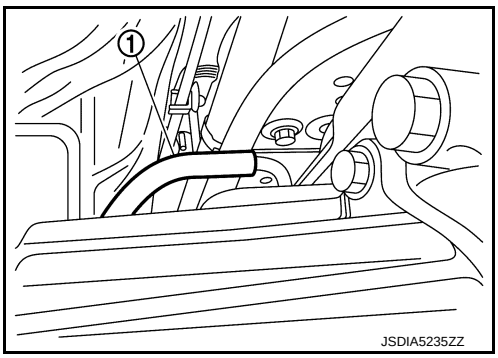
CAUTION:
After removing propeller shaft, replace stud bolt.
NOTE:
When replacing electric controlled coupling assembly, stud bolts are not required to be removed.



4. Disconnect 4WD solenoid harness connector ①.

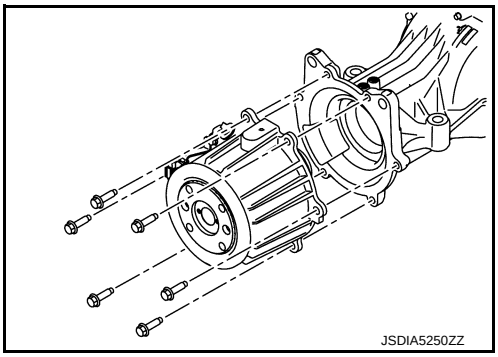


5. Remove air breather hose ① from electric controlled coupling assembly. Refer to DLN-236, "Removal and Installation".

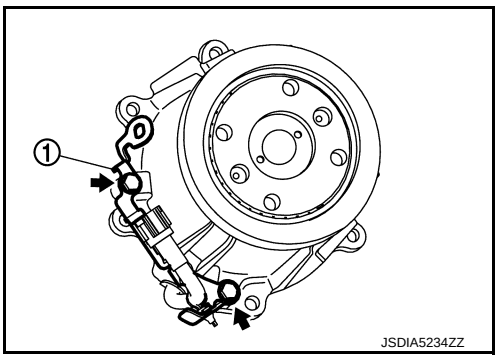


6. Remove electric controlled coupling assembly from final drive assembly.
7. Remove wave spring.
8. Remove drive pinion oil seal from the inside of gear carrier. Refer to DLN-228, "Removal and Installation".

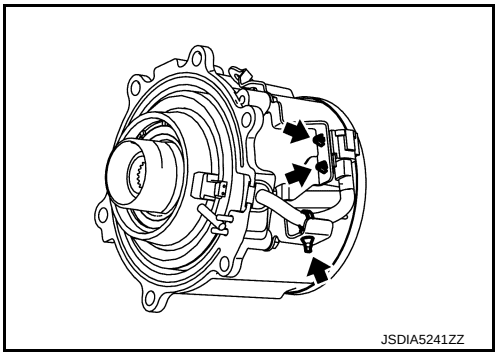
CAUTION:
When removing electric controlled coupling, replace drive pinion oil seal.



9. Remove connector bracket ① from electric controlled coupling.

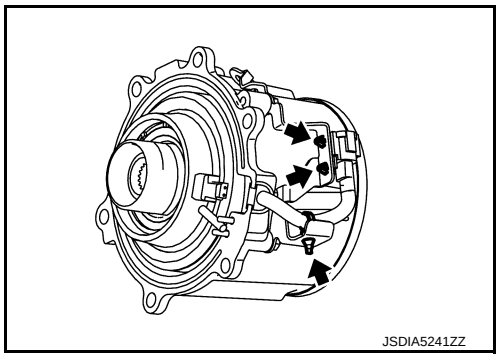


10. Remove band clip and connector clip to disconnect connector bracket from 4WD solenoid harness connector.

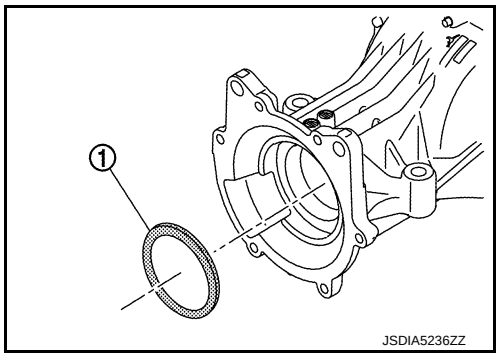


INSTALLATION

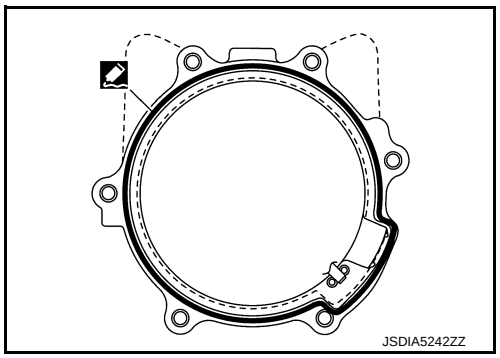
1. Install connector bracket to electric controlled coupling.
   • For tightening torque, refer to DLN-231, "Exploded View".
2. Lock 4WD solenoid harness with band clip and connector clip.
3. Install drive pinion oil seal to the inside of gear carrier. Refer to DLN-228, "Removal and Installation".
   CAUTION:
   When removing electric controlled coupling, replace drive pinion oil seal.



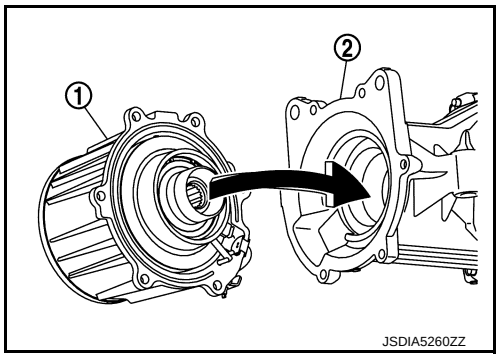
4. Install wave spring ① to the inside of gear carrier.



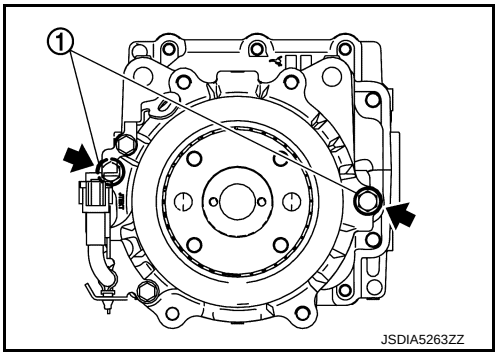
5. Apply liquid gasket to mating surface of electric controlled coupling assembly.
   • For applying liquid gasket, refer to DLN-231, "Exploded View".
   CAUTION:
   • **Remove old gasket adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.**
   • **The width of sealant bead is approximately 3 mm (0.12 in). Apply sealant evenly.**



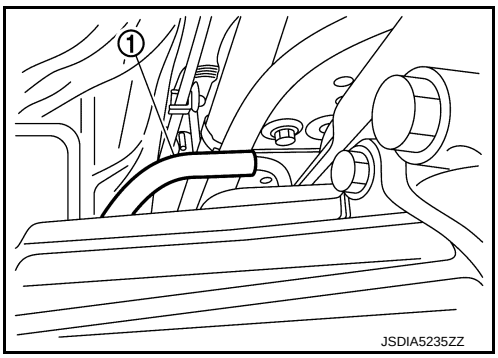
6. Join electric controlled coupling assembly ① to spline of drive pinion, then install it to final drive assembly ②.
   CAUTION:
   Be careful not to damage drive pinion oil seal.



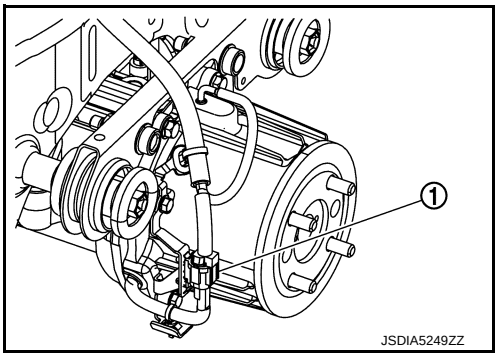
7. Temporarily tighten reamer bolts ① to the positions shown in the figure.
8. Tighten reamer bolts and electric controlled coupling assembly mounting bolts to the specified torque.
   - For tightening torque, refer to DLN-231, "Exploded View".



9. Install air breather hose ① to electric controlled coupling assembly. Refer to DLN-236, "Removal and Installation".



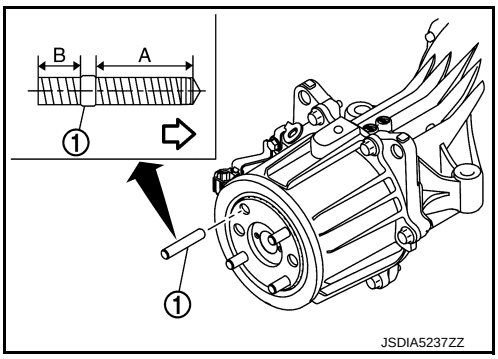
10. Connect 4WD solenoid harness connector ①.



11. Install stud bolts ①.

⇦ : Electric controlled coupling side

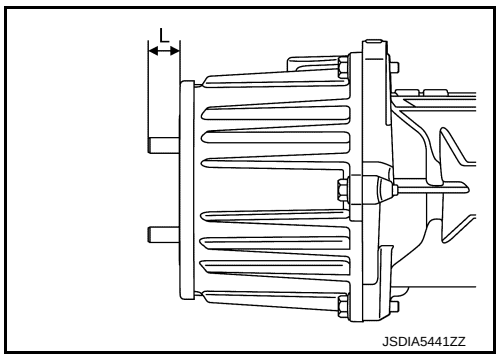
Thread length
A : Long
B : Short



CAUTION:
- **Never reuse stud bolt.**
- **After removing propeller shaft, replace stud bolt.**
- **Screw long thread side of stud bolt to electric controlled coupling.**
- **Screw the stud bolt until the stop by applying a torque of 15 N·m (1.5 kg-m, 11 ft-lb) ±20%.**

- **After installing stud bolt, the length of the protrusion from electric controlled coupling must be as described below.**

Length (L) : 19.8 mm (0.780 in) ±1.4 mm (0.055 in)



NOTE:
When replacing electric controlled coupling assembly, stud bolts are not required to be installed.

12. Install propeller shaft. Refer to DLN-214, "Removal and Installation".
13. Refill gear oil to the final drive. Refer to DLN-227, "Refilling".
14. Perform inspection and adjustment after installation. Refer to DLN-235, "Inspection and Adjustment".

Inspection and Adjustment

INFOID:0000000011008619

INSPECTION AFTER INSTALLATION

Check oil level and final drive for oil leakage. Refer to DLN-227, "Inspection".

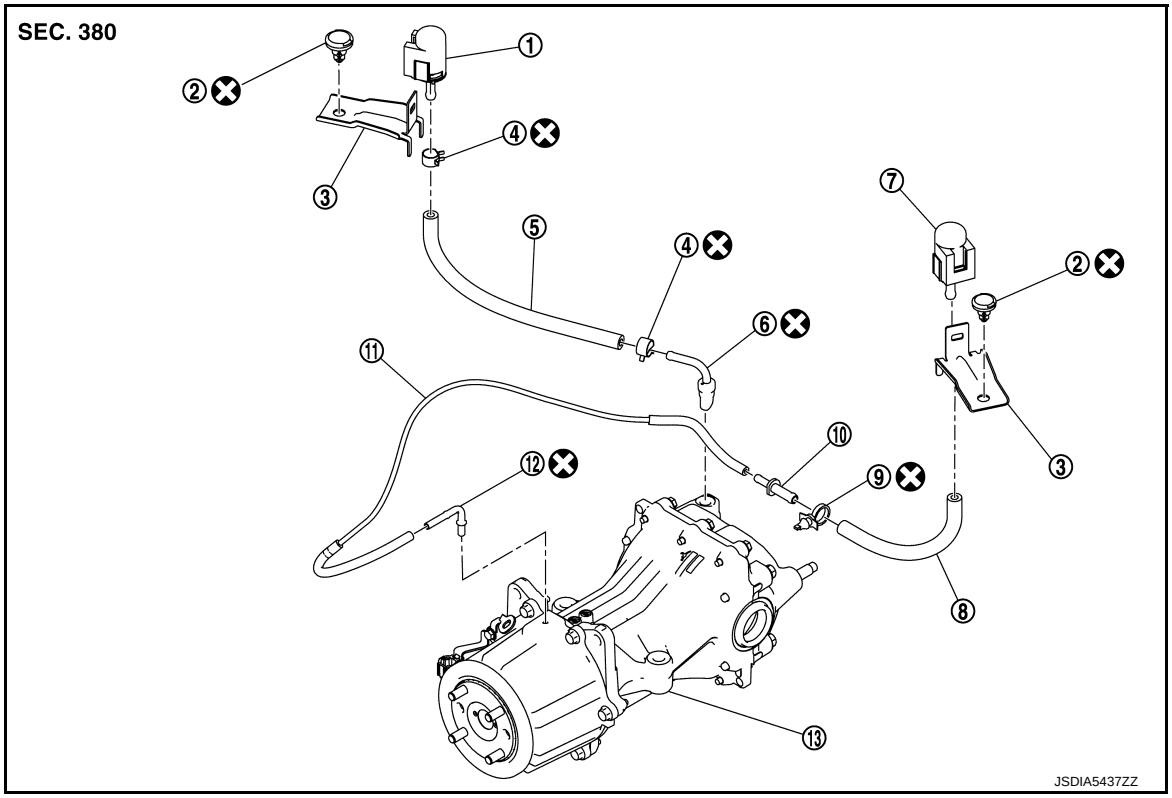
ADJUSTMENT AFTER INSTALLATION

When replaced electric controlled coupling, perform writing unit characteristics. Refer to DLN-41, "Work Procedure" (TY21C transfer models), DLN-145, "Work Procedure" (TY30A transfer models).

AIR BREATHER

Exploded View

INFOID:0000000011008620



① Breather connector (resin)	② Trim clip	③ Bracket
④ Hose clamp	⑤ Air breather hose	⑥ Breather connector (metal)
⑦ Breather connector (resin)	⑧ Air breather hose	⑨ Clip
⑩ Hose connector	⑪ Air breather hose assembly	⑫ Breather connector (metal)
⑬ Rear final drive assembly		

: Always replace after every disassembly.

Removal and Installation

INFOID:0000000011008621

REMOVAL

Final Drive Side

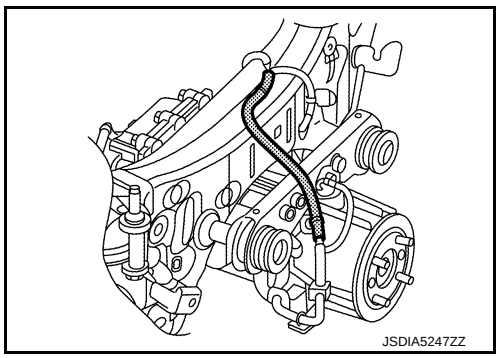
1. Remove hose clamp, and remove air breather hose from breather connector (metal) on rear final drive assembly.
2. Remove breather connector (resin) together with air breather hose from bracket.
3. Remove hose clamp, and remove air breather hose from breather connector (resin).
4. Remove trim clip and remove bracket.
5. Remove breather connector (metal) from rear final drive assembly.
   - When removing/installing breather connector (metal), remove rear final drive assembly from the vehicle. Refer to DLN-239, "Removal and Installation".

Electric Controlled Coupling Side

1. Remove air breather hose assembly from breather connector (metal) on electric controlled coupling assembly.
2. Remove air breather hose assembly from hose connector.
   NOTE:

The air breather hose assembly and the protective tube of electrical wiring harness are integrated.

3. Remove clip from suspension member.
4. Remove breather connector (resin) together with air breather hose and hose connector from bracket.
5. Remove trim clip and remove bracket.
6. Remove breather connector (metal) from electric controlled coupling assembly.
   - When removing/installing breather connector (metal), remove electric controlled coupling assembly from rear final drive assembly. Refer to DLN-231, "Removal and Installation".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INSTALLATION

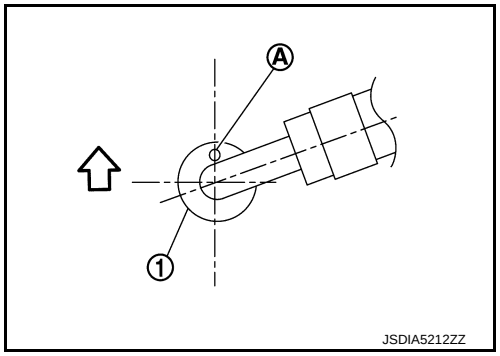
Note the following, and install in the reverse order of removal.

- For non-reusable parts, refer to DLN-236, "Exploded View".
- When installing air breather hose, make sure there are no pinched or restricted areas on air breather hose caused by bending or winding.

Final Drive Side

- Set breather connector (metal) ① to rear final drive assembly with the paint mark Ⓐ facing vehicle front.

⇦ : Vehicle front



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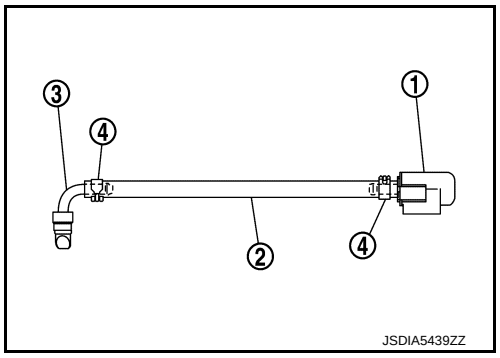
- Observe the following instructions to install breather connector (resin) ①, air breather hose ②, breather connector (metal) ③, and hose clamp ④ as shown in the figure.

CAUTION:

- **Be careful with insert dimension of breather connector and set position of hose clamp.**

Insert dimension of breather connector (resin/metal)	**: 20 mm (0.79 in) from breather connector end (air breather hose side)**
Set position of hose clamp	**: 5 mm (0.20 in) from breather hose end**



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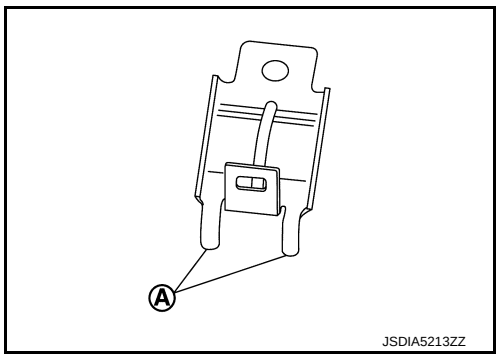
- **Be careful with orientation of hose clamp tab.**
- Set bracket with the stopper Ⓐ facing vehicle inside.



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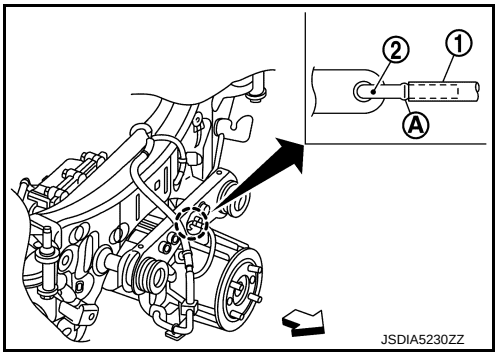
Electric Controlled Coupling Side

- Securely install breather connector (metal) to the electric controlled coupling assembly with the tip of tube faced in the vehicle front direction. In addition, insert air breather hose ① to tube spool part Ⓐ of breather connector (metal) ②.

  ⇦ : Vehicle front



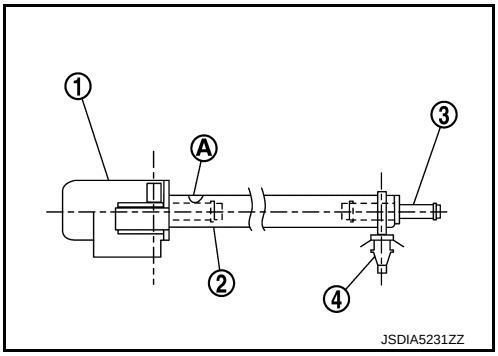
- Install breather connector (resin) ①, air breather hose ②, hose connector ③, and clip ④ based on hose paint mark Ⓐ as shown in the figure, complying with the directions below.

  CAUTION:

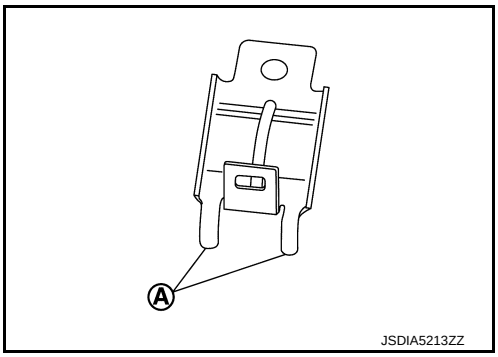
  - **Be careful with insert dimension of breather connector (resin) and hose connector, and set position of clip.**

Insert dimension of breather connector (resin) and hose connector	**: 20 mm (0.79 in) from breather connector end (air breather hose side) and hose connector end (air breather hose side)**
Set position of clip	**: 5 mm (0.20 in) from breather hose end**

  - **Cut extra band of clip.**



- Set bracket with the stopper Ⓐ facing vehicle inside.

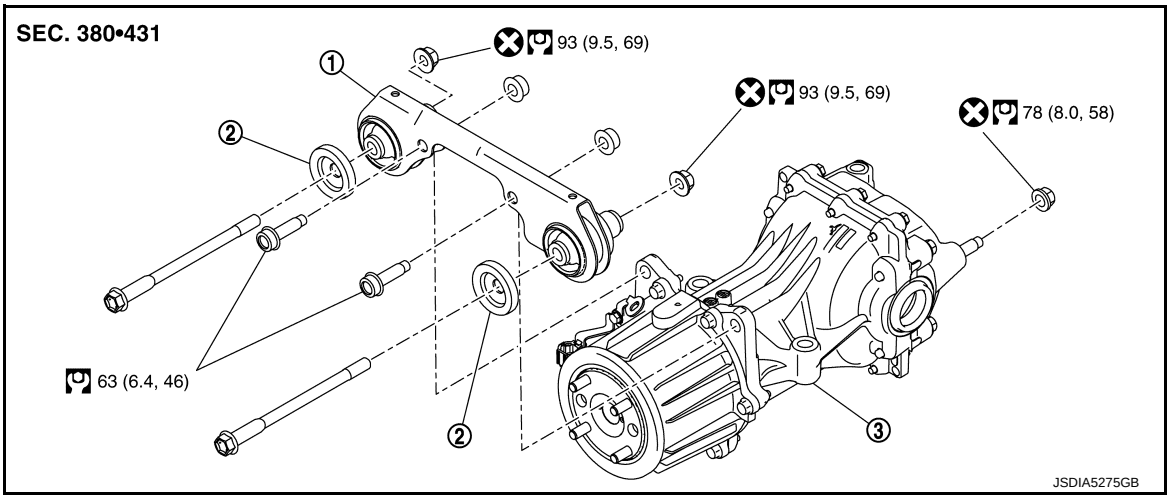


UNIT REMOVAL AND INSTALLATION

REAR FINAL DRIVE ASSEMBLY

Exploded View

INFOID:0000000011008622



① Final drive mounting bracket ② Mounting stopper ③ Rear final drive assembly

: N·m (kg-m, ft-lb)

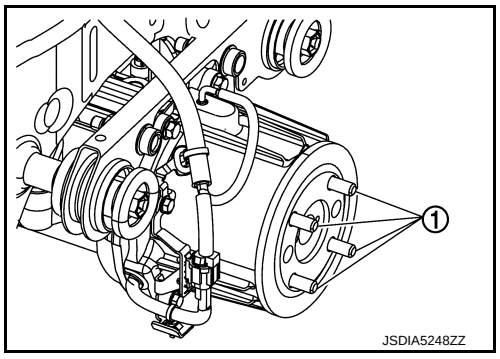
: Always replace after every disassembly.

Removal and Installation

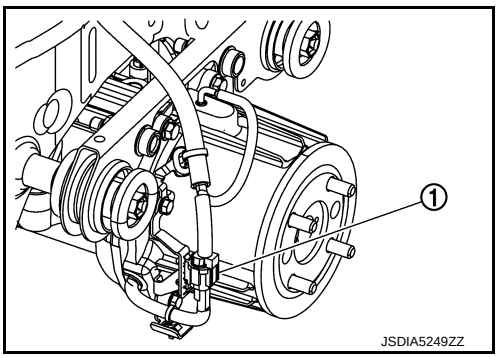
INFOID:0000000011008623

REMOVAL

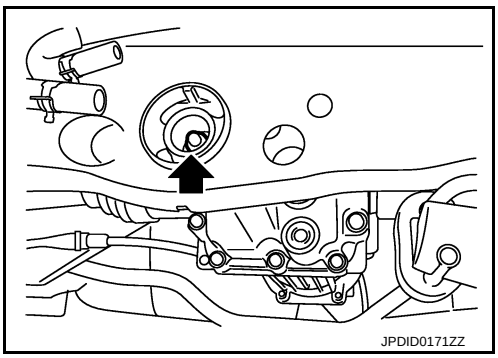
1. Remove rear drive shaft. Refer to RAX-22, "Removal and Installation".
   CAUTION:
   Oil may leak from the opening. Use cap and/or plug to prevent leakage.
2. Remove propeller shaft from rear final drive assembly. Refer to DLN-214, "Removal and Installation".
   CAUTION:
   After removing propeller shaft, replace stud bolt ①.
   NOTE:
   When replacing rear final drive assembly, stud bolts are not required to be removed.



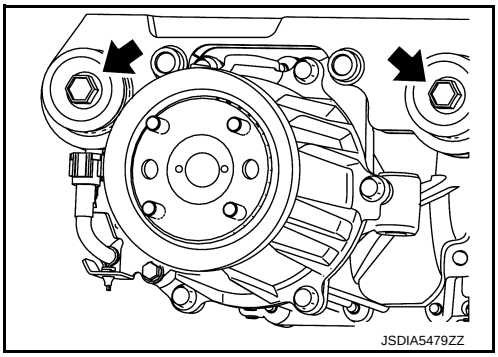
3. Disconnect 4WD solenoid harness connector ①.
4. Remove air breather hoses from rear final drive and electric controlled coupling assembly. Refer to DLN-231, "Removal and Installation".
5. Remove fuel tank protector. Refer to FL-21, "Exploded View" (Gasoline engine models), FL-49, "Exploded View" (Diesel engine models).
6. Set a suitable jack to rear final drive assembly.



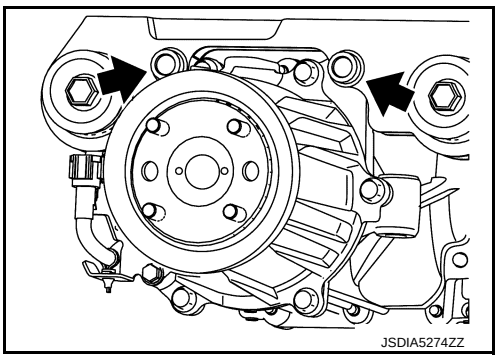
7. Remove rear final drive assembly mounting nut at rear suspension member.



8. Remove bolts and nuts engaging final drive mounting bracket with rear suspension member.
   CAUTION:
   Secure rear final drive assembly to suitable jack.
9. Remove mounting stoppers.
10. Remove rear final drive assembly.
    CAUTION:
    Secure rear final drive assembly to suitable jack while removing it.



11. Remove bolts and nuts engaging final drive mounting bracket with rear final drive assembly.
12. Remove final drive mounting bracket.

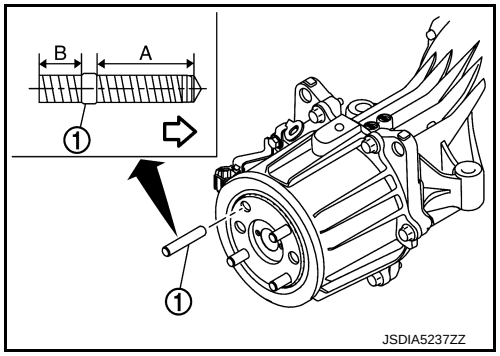


INSTALLATION

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

- For non-reusable parts, refer to DLN-239, "Exploded View".
- For each tightening torque, refer to DLN-239, "Exploded View".

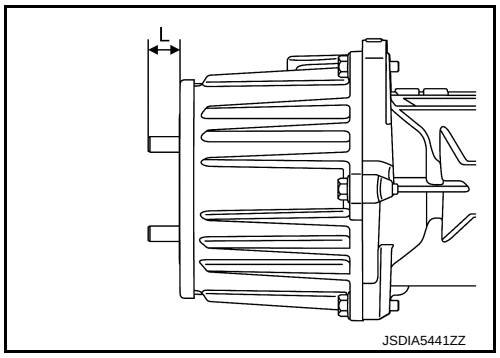
- Be careful not to install wrong stud bolt ① mounting direction.



⇦ : Electric controlled coupling side

Thread length
A : Long
B : Short

CAUTION:
- **After removing propeller shaft, replace stud bolt.**
- **Screw long thread side of stud bolt to electric controlled coupling.**
- **Screw the stud bolt until the stop by applying a torque of 15 N·m (1.5 kg-m, 11 ft-lb) ±20%.**
- **After installing stud bolt, the length of the protrusion from electric controlled coupling must be as described below.**



Length (L) : 19.8 mm (0.780 in) ±1.4 mm (0.055 in)

NOTE:
When replacing rear final drive assembly, stud bolts are not required to be installed.

- Perform inspection and adjustment after installation. Refer to DLN-241, "Inspection and Adjustment".

Inspection and Adjustment

INFOID:0000000011008624

INSPECTION AFTER INSTALLATION

When oil leaks while removing/installing final drive assembly, check oil level after the installation. Refer to DLN-227, "Inspection".

ADJUSTMENT AFTER INSTALLATION

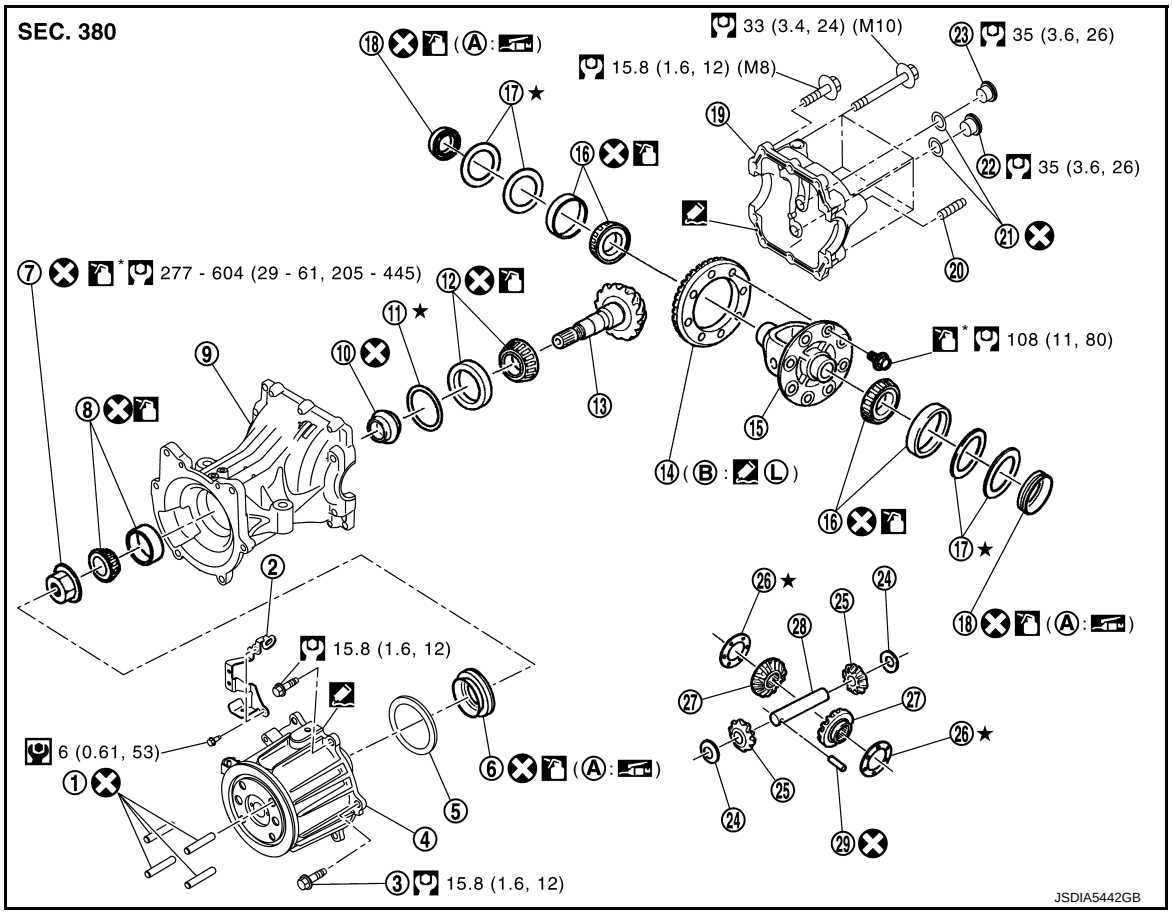
When replaced rear final drive assembly or electric controlled coupling was changed, perform writing unit characteristics. Refer to DLN-41, "Work Procedure" (TY21C transfer models), DLN-145, "Work Procedure" (TY30A transfer models).

UNIT DISASSEMBLY AND ASSEMBLY

ELECTRIC CONTROLLED COUPLING

Exploded View

INFOID:0000000011008625



① Stud bolt	② Connector bracket	③ Reamer bolt
④ Electric controlled coupling assembly	⑤ Wave spring	⑥ Drive pinion oil seal
⑦ Drive pinion lock nut	⑧ Pinion front bearing	⑨ Gear carrier
⑩ Collapsible spacer	⑪ Drive pinion adjusting shim	⑫ Pinion rear bearing
⑬ Drive pinion	⑭ Drive gear	⑮ Differential case
⑯ Side bearing	⑰ Side bearing adjusting shim	⑱ Side oil seal
⑲ Rear cover	⑳ Stud bolt	㉑ Gasket
㉒ Drain plug	㉓ Filler plug	㉔ Pinion mate thrust washer
㉕ Pinion mate gear	㉖ Side gear thrust washer	㉗ Side gear
㉘ Pinion mate shaft	㉙ Lock pin	
Ⓐ Oil seal lip	Ⓑ Screw hole	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

★: Select with proper thickness.

: Apply gear oil.

*: Apply anti-corrosion oil.

: Apply multi purpose grease.

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

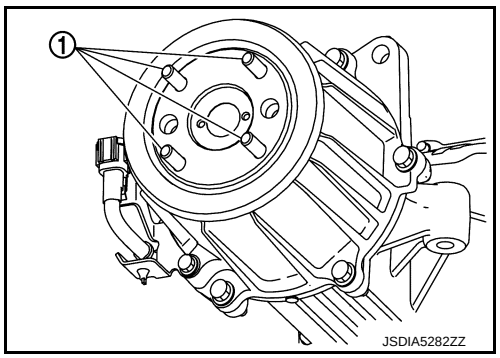
L: Apply Genuine High Strength Thread Locking Sealant, Loctite 270 or equivalent.

Disassembly and Assembly

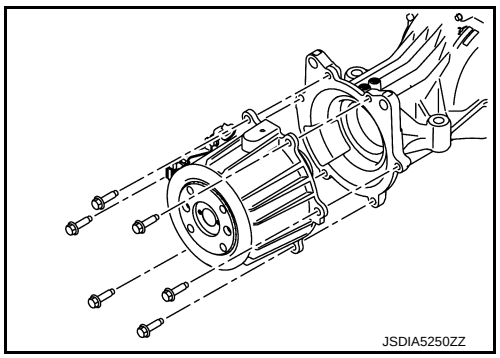
INFOID:0000000011008626

DISASSEMBLY

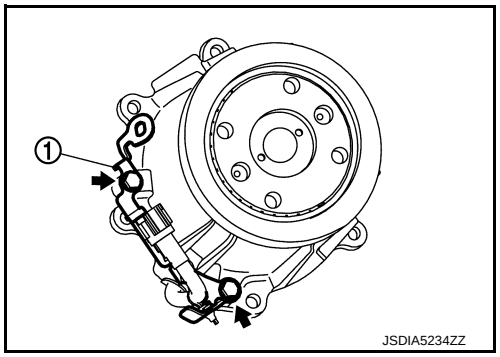
1. Remove stud bolts ①.



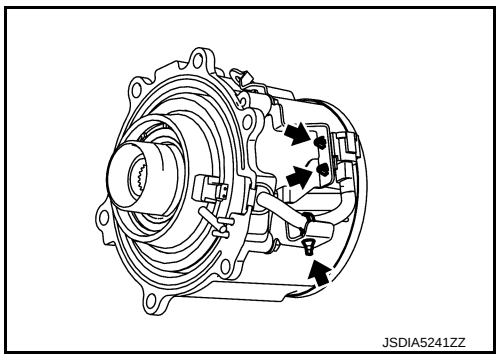
2. Remove electric controlled coupling assembly from final drive assembly.
3. Remove wave spring.
4. Remove drive pinion oil seal from the inside of gear carrier. Refer to DLN-258, "Disassembly and Assembly".
CAUTION:
When removing electric controlled coupling, replace drive pinion oil seal.



5. Remove connector bracket ① from electric controlled coupling.

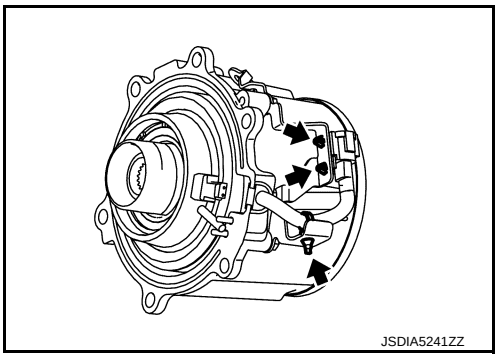


6. Separate band clip and connector clip from connector bracket.

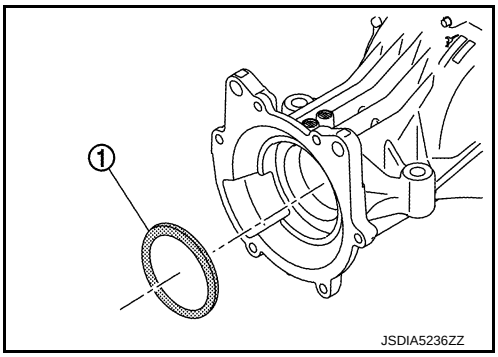


ASSEMBLY

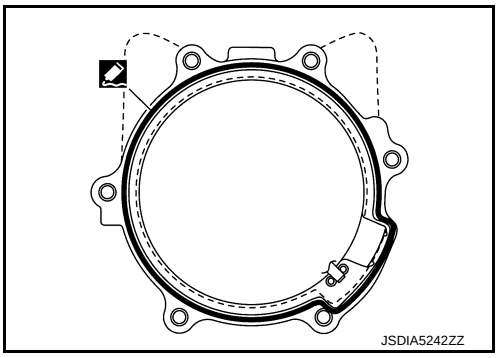
1. Install connector bracket to electric controlled coupling.
   • For tightening torque, refer to DLN-242, "Exploded View".
2. Join 4WD solenoid harness with band clip and connector clip.
3. Install drive pinion oil seal to the inside of gear carrier. Refer to DLN-258, "Disassembly and Assembly".
   CAUTION:
   When removing electric controlled coupling, replace drive pinion oil seal.



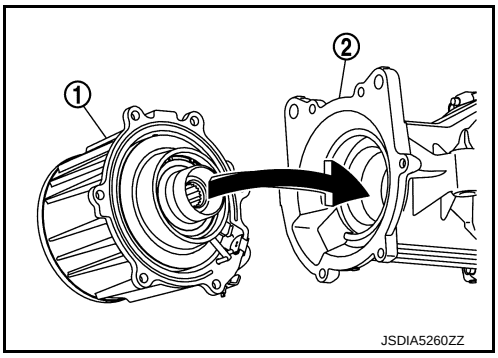
4. Install wave spring ① to the inside of gear carrier.



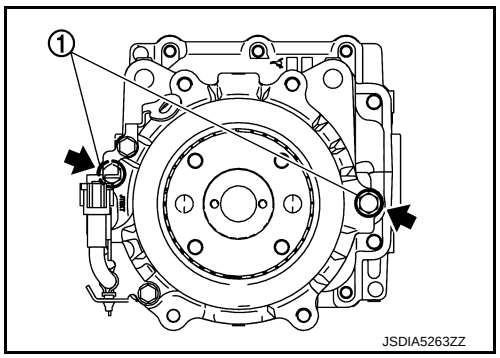
5. Apply liquid gasket to mating surface of electric controlled coupling assembly.
   • For applying liquid gasket, refer to DLN-242, "Exploded View".
   CAUTION:
   • **Remove old gasket adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.**
   • **The width of sealant bead is approximately 3 mm (0.12 in). Apply sealant evenly.**



6. Match electric controlled coupling assembly ① to spline of drive pinion, then install it to final drive assembly ②.
   CAUTION:
   Be careful not to damage drive pinion oil seal.

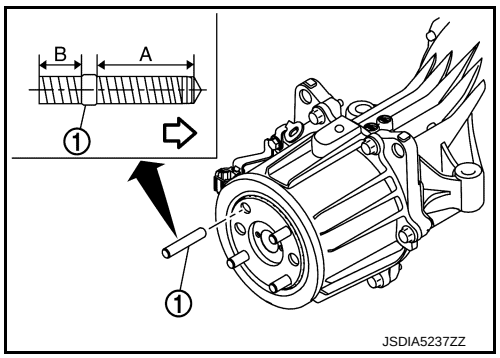


7. Temporarily tighten reamer bolts ① to the positions shown in the figure.



8. Tighten reamer bolts and electric controlled coupling assembly mounting bolts to the specified torque.
   - For tightening torque, refer to DLN-242, "Exploded View".

9. Install stud bolts ①.



⇦ : Electric controlled coupling side

Thread length

A : Long

B : Short

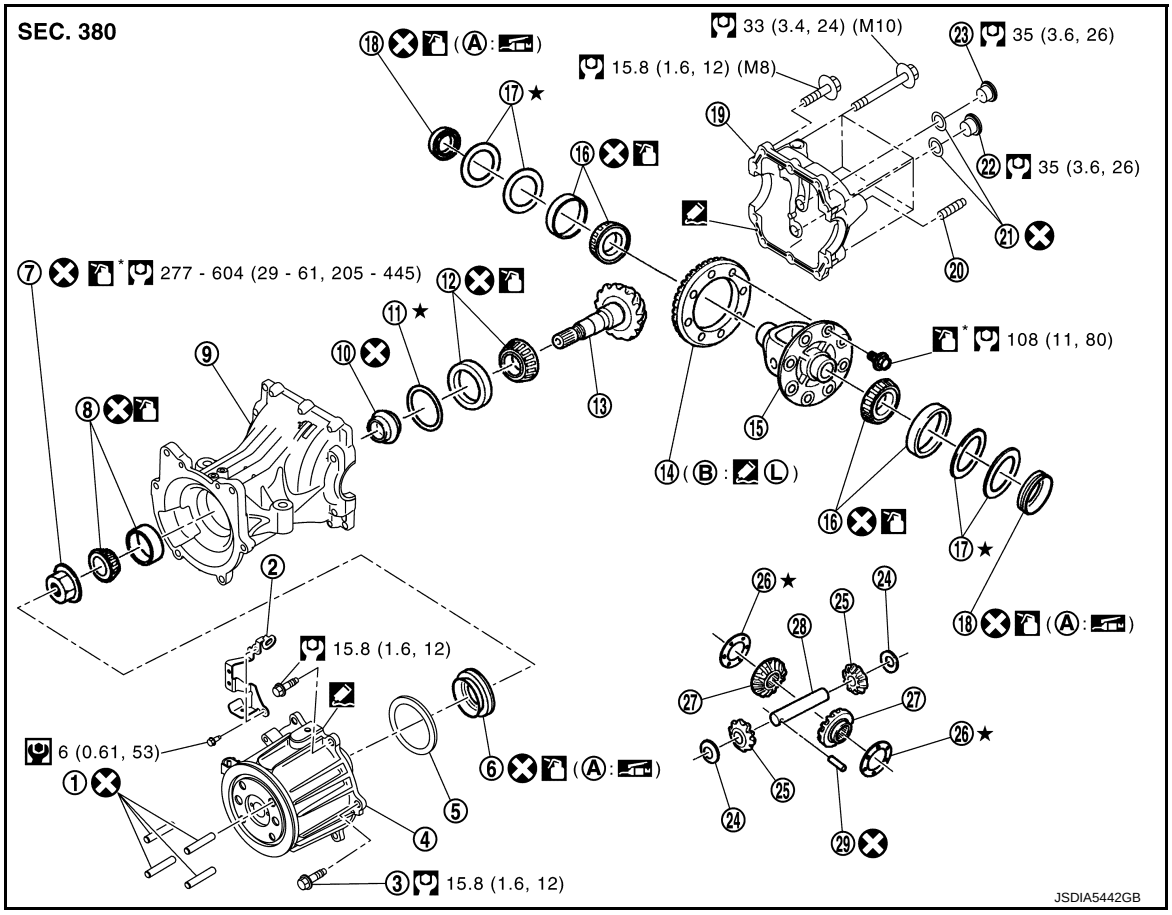
CAUTION:

- **Never reuse stud bolt.**
- **Screw long thread side of stud bolt to electric controlled coupling.**
- **Screw the stud bolt until the stop by applying a torque of 15 N·m (1.5 kg-m, 11 ft-lb) ±20%.**
- **After installing stud bolt, the length of the protrusion from electric controlled coupling must be 19.8 mm (0.780 in) ±1.4 mm (0.055 in).**

DIFFERENTIAL ASSEMBLY

Exploded View

INFOID:0000000011008627



① Stud bolt	② Connector bracket	③ Reamer bolt
④ Electric controlled coupling assembly	⑤ Wave spring	⑥ Drive pinion oil seal
⑦ Drive pinion lock nut	⑧ Pinion front bearing	⑨ Gear carrier
⑩ Collapsible spacer	⑪ Drive pinion adjusting shim	⑫ Pinion rear bearing
⑬ Drive pinion	⑭ Drive gear	⑮ Differential case
⑯ Side bearing	⑰ Side bearing adjusting shim	⑱ Side oil seal
⑲ Rear cover	⑳ Stud bolt	㉑ Gasket
㉒ Drain plug	㉓ Filler plug	㉔ Pinion mate thrust washer
㉕ Pinion mate gear	㉖ Side gear thrust washer	㉗ Side gear
㉘ Pinion mate shaft	㉙ Lock pin	
Ⓐ Oil seal lip	Ⓑ Screw hole	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

★: Select with proper thickness.

: Apply gear oil.

*: Apply anti-corrosion oil.

: Apply multi purpose grease.

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

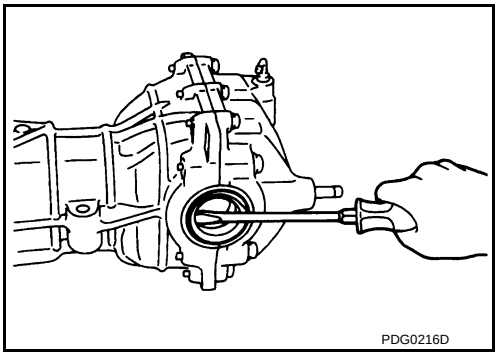
Ⓛ: Apply Genuine High Strength Thread Locking Sealant, Loctite 270 or equivalent.

Disassembly and Assembly

INFOID:0000000011008628

DISASSEMBLY

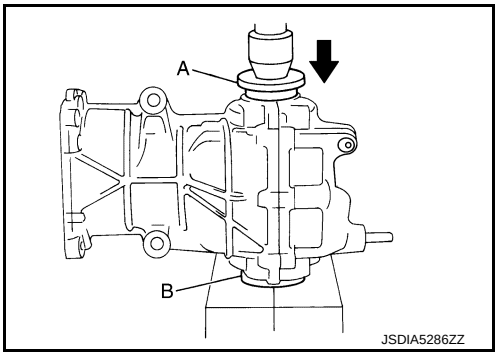
1. Remove drain plug, filler plug and gaskets.
2. Remove the side oil seal, using oil seal remover (commercial service tool).
   CAUTION:
   Never damage gear carrier and rear cover.
3. Remove rear cover mounting bolts.


PDG0216D

4. Set drifts (A and B) to the right and left side bearing adjusting shims individually. Press differential assembly with side bearing to remove gear carrier assembly and rear cover assembly.

   A : Drift (SST: KV40100610)
   B : Drift (SST: KV40100610)

   CAUTION:
   The pressure shall be as low as possible to remove gear carrier assembly and rear cover assembly. The maximum pressure shall be 10 kN (1 ton, 1.0 Imp ton).
   NOTE:
   Differential assembly, side bearings, and adjusting washers are compressed and integrated in gear carrier and rear cover.

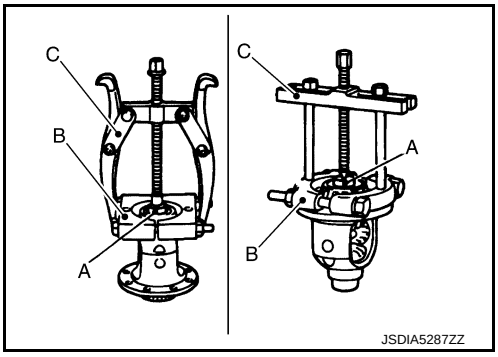


JSDIA5286ZZ

5. Remove stud bolt from rear cover.
   NOTE:
   It is not necessary to remove stud bolt except when it is replaced.
6. Remove side bearing adjusting shims and side bearing outer races.
   CAUTION:
   Mark the side bearing adjusting shims so that the original mounting positions (right/left) can be identified later.
7. Remove side bearing inner races, using adaptor (A), separator (B) and puller (C).

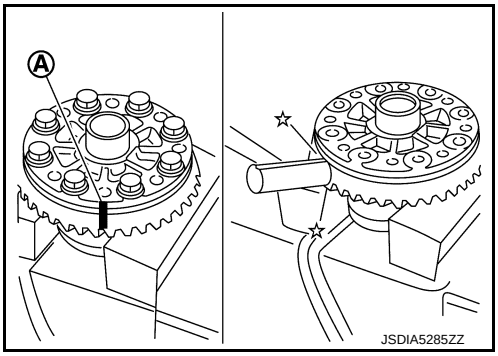
   A : Adaptor (SST: ST33052000)
   B : Separator (commercial service tool)
   C : Puller (commercial service tool)

   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.**

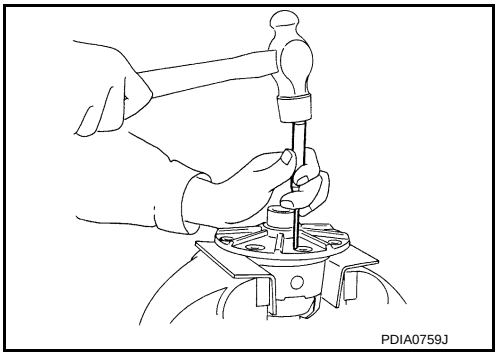


JSDIA5287ZZ

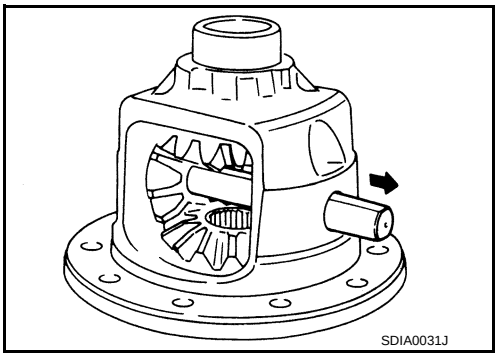
8. For proper reinstallation, paint matching marks Ⓐ on one differential assembly and drive gear.
CAUTION:
For matching marks, use paint. Never damage differential assembly and drive gear.
9. Remove drive gear mounting bolts and then remove drive gear from differential assembly.



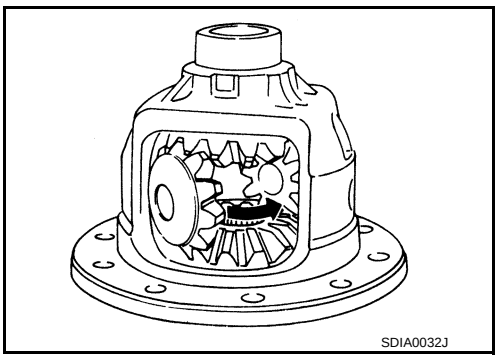
10. Remove lock pin of pinion mate shaft, using the pin punch (commercial service tool).



11. Remove pinion mate shaft.

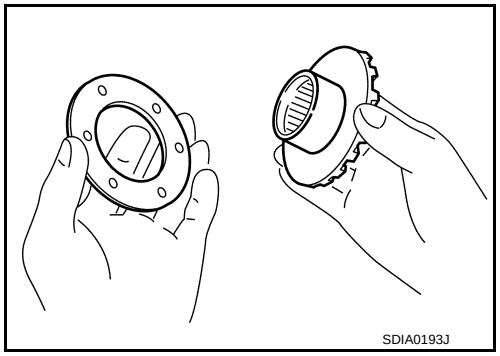


12. Remove pinion mate gears, pinion mate thrust washers, side gears, side gear thrust washers from differential case.
13. Perform inspection after disassembly. Refer to DLN-255, "Inspection".

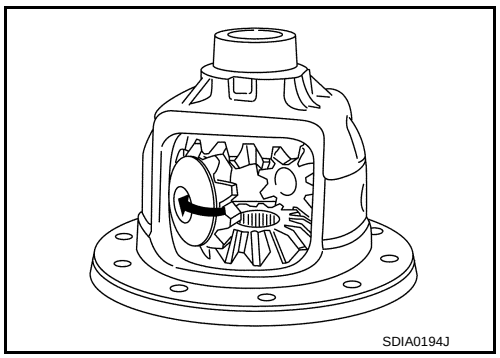


ASSEMBLY

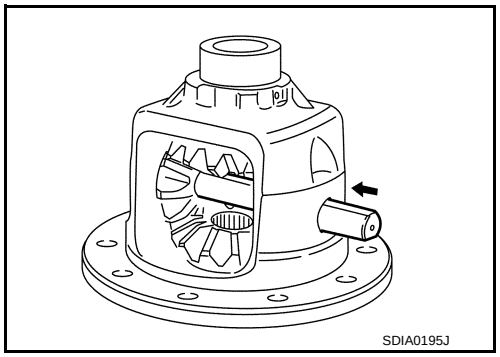
1. Install side gear thrust washers with the same thickness as the ones installed prior to disassembly or reinstall the old ones on the side gears.
2. Install side gears and side gear thrust washers into differential case.


SDIA0193J

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.

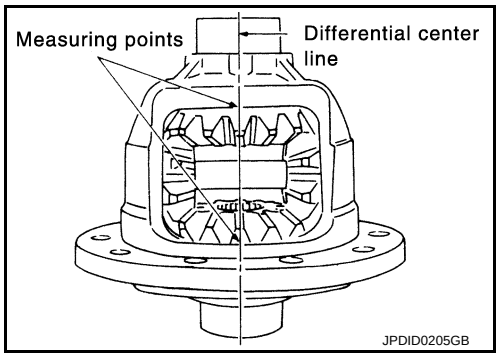

SDIA0194J

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


SDIA0195J

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

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



JPDID0205GB

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.

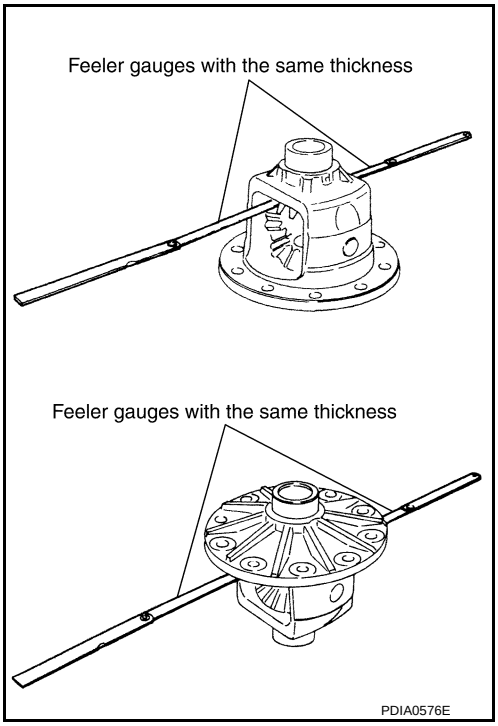
Side gear back clearance	**: Refer to DLN-263, "Differential Side Gear Clearance".**

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/thinner side gear thrust washer to adjust. For selecting thrust washer, refer to the latest parts information.

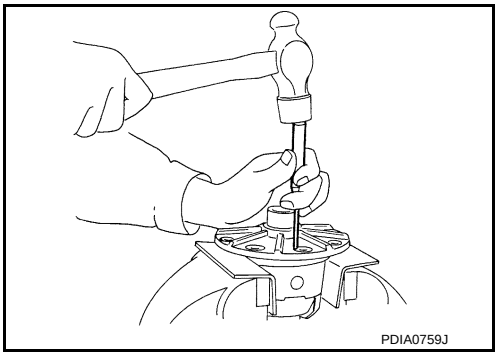
When the back clearance is large	**: Use a thicker thrust washer.**
When the back clearance is small	**: Use a thinner thrust washer.**

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



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

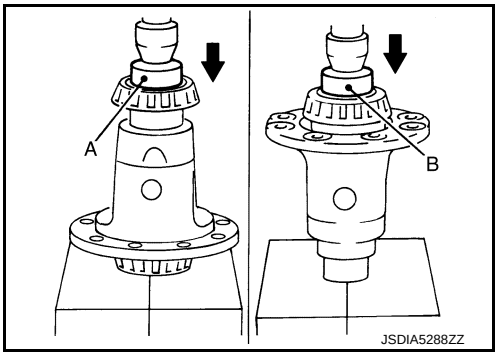
CAUTION:
Never reuse lock pin.



7. Press side bearing inner races to differential assembly, using the drifts (A and B).

A : Drift (SST: KV40105020)
B : Drift (SST: KV40105020)

CAUTION:
- **Never reuse side bearing inner race.**
- **Apply gear oil to side bearing.**

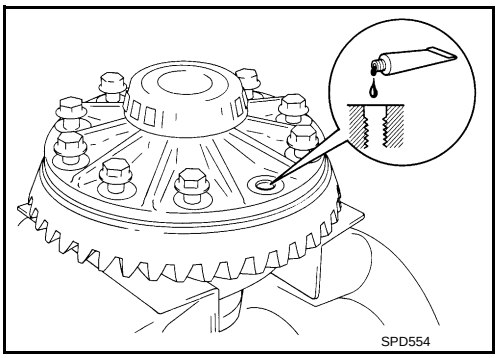


8. Apply thread locking sealant into the thread hole of drive gear.
   - For applying thread locking sealant, refer to DLN-246, "Exploded View".

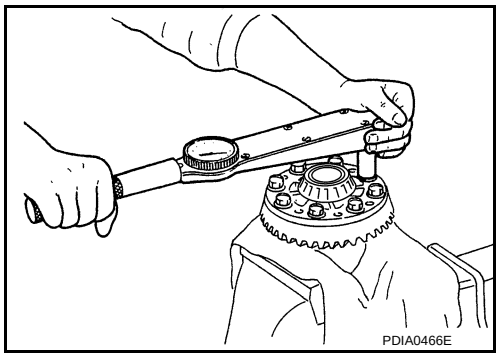
CAUTION:
Clean and degrees drive gear back and threaded holes sufficiently.

9. Install the drive gear to differential assembly.

CAUTION:
Align the matching mark of differential assembly and drive gear.

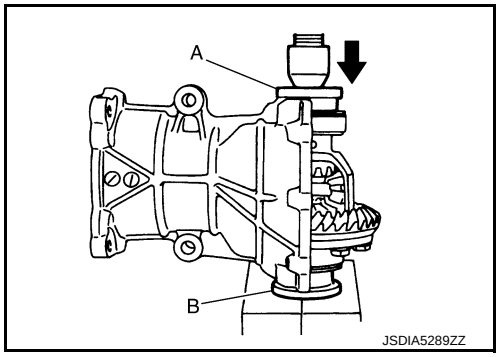


10. Tighten the bolts in a crisscross fashion to the specified torque.
    • For tightening torque, refer to DLN-246, "Exploded View".
    CAUTION:
    Apply anti-corrosion oil to the thread and seat of mounting bolts.

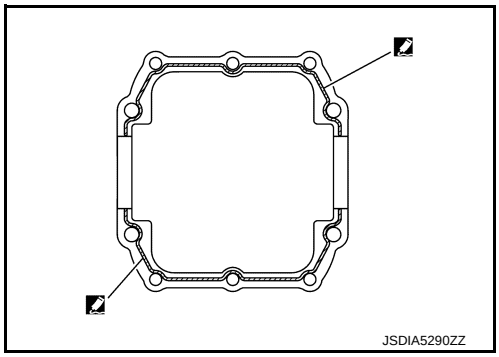


11. Assemble side bearing outer races to inner races.
    CAUTION:
    - **Never reuse side bearing outer race.**
    - **Apply gear oil to side bearing.**
12. Install new side bearing adjusting shims (2 pieces for one side) with the same thickness as the ones installed prior to disassembly or re-install the old ones, on side bearing outer race of differential assembly.
    If side bearing adjusting shims have been already selected, use them.
13. Set the drifts (A and B) to the right and left side bearing adjusting shims individually. Compress differential assembly and side bearing to gear carrier assembly to install differential assembly.

    A : Drift (SST: KV40100610)
    B : Drift (SST: KV40100610)

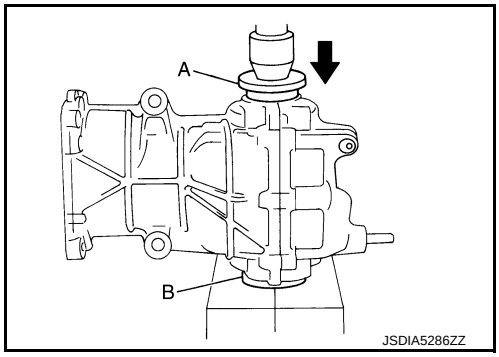


    CAUTION:
    - **The drift shall be placed on the center of the adjusting shims.**
    - **The pressure shall be as low as possible to install differential assembly into gear carrier assembly. The maximum pressure shall be 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**
    - **If the adjusting shims are installed by tapping, the gear carrier may be damaged. Avoid tapping.**
14. Install dummy cover set, check and adjust drive gear runout, tooth contact, backlash, and total preload torque. Refer to DLN-252, "Adjustment".
15. Remove dummy cover set.
16. Install stud bolt to rear cover.
    CAUTION:
    Screw the stud bolt until the thread becomes invisible by applying a torque of 20 N·m (2.0 kg-m, 15 ft-lb) or less.
17. Apply liquid gasket to mating surface of rear cover.
    • For applying liquid gasket, refer to DLN-246, "Exploded View".
    CAUTION:
    - **Remove old gasket adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.**
    - **The width of sealant bead is approximately 3 mm (0.12 in). Apply sealant evenly.**



18. Set the drifts (A and B) to the right and left side bearing adjusting shims individually. Compress differential assembly and side bearing to install rear cover.

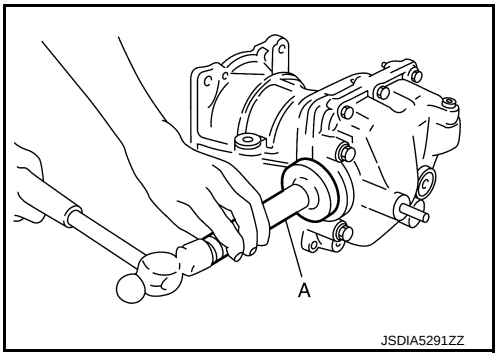
    A : Drift (SST: KV40100610)
    B : Drift (SST: KV40100610)



    CAUTION:
    - **The drift shall be placed on the center of the adjusting shims.**

- **The pressure shall be as low as possible to install differential assembly into gear carrier assembly. The maximum pressure shall be 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**
- **If the adjusting shims are installed by tapping, the gear carrier may be damaged. Avoid tapping.**

19. Tighten rear cover mounting bolts to the specified torque.
    - For tightening torque, refer to DLN-246, "Exploded View".
20. Using the drift (A) (SST: KV38100200), drive side oil seals until it becomes flush with the gear carrier 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.**
21. Check total preload torque. Refer to DLN-252, "Adjustment".



Adjustment

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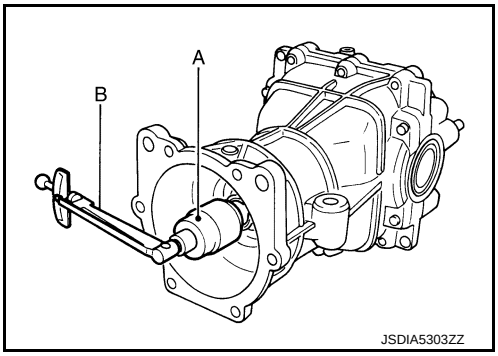
TOTAL PRELOAD TORQUE

1. Remove electric controlled coupling assembly. Refer to DLN-243, "Disassembly and Assembly".
2. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
3. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
4. Fit drive pinion socket onto drive pinion spline. Measure the total preload, using the preload gauge and drive pinion socket.

A : Drive pinion socket (SST: KV38109500)
B : Preload gauge (SST: ST3127S000)



Standard

Total preload torque	**: Refer to DLN-263, "Preload Torque".**

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

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

When the preload torque is large

On pinion bearings:	**Replace the collapsible spacer.**
On side bearings:	**Use thinner side bearing adjusting shims. For selecting adjusting shim, refer to the latest parts information.**

When the preload is small

On pinion bearings:	**Tighten the drive pinion nut.**
On side bearings:	**Use thicker side bearing adjusting shims. For selecting adjusting shim, refer to the latest parts information.**

DRIVE GEAR RUNOUT

1. Remove rear cover. Refer to DLN-247, "Disassembly and Assembly".
2. Following the procedure below, install the dummy cover set (SST: KV389L0010) to gear carrier.

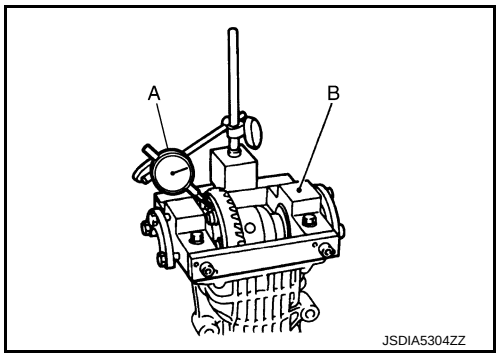
a. Set dummy cover shims to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover to gear carrier.

c. Position dummy cover spacers to dummy cover.
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-246, "Exploded View".
e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

3. Fit a dial indicator (A) to the drive gear back face.

B : Dummy cover set (SST: KV389L0010)



4. Rotate the drive gear to measure runout.

Limit

Drive gear back face runout	**: Refer to DLN-263, "Drive Gear Runout".**

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

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

TOOTH CONTACT

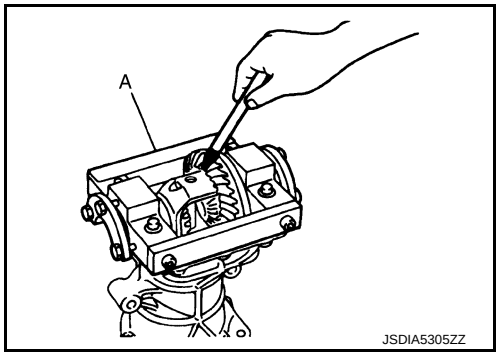
1. Remove rear cover. Refer to DLN-247, "Disassembly and Assembly".
2. Following the procedure below, install the dummy cover set (SST: KV389L0010) to gear carrier.
a. Set dummy cover shims to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover to gear carrier.
c. Position dummy cover spacers to dummy cover.
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-246, "Exploded View".
e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

3. Apply red lead or equivalent to drive gear.

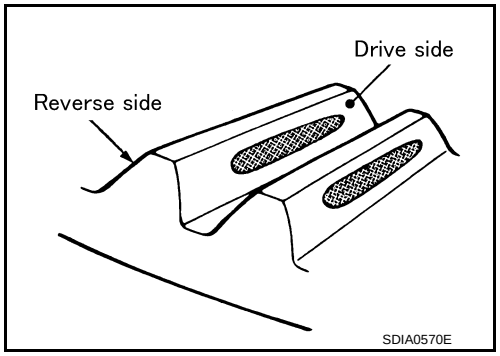
A : Dummy cover set (SST: KV389L0010)

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



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

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

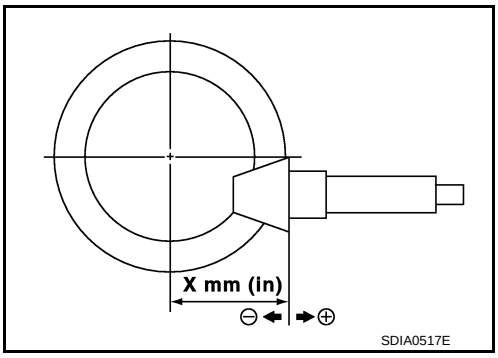


Tooth Contact Judgment Guide

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

SDIA2549E

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



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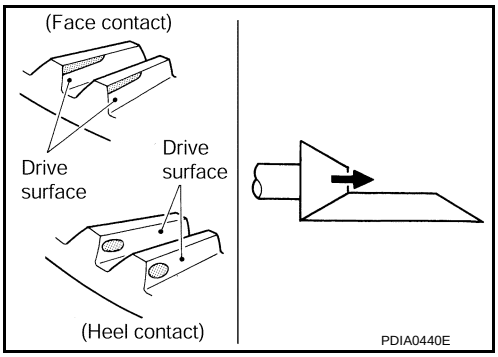
- If the tooth contact is near the face (face contact), or near the heel (heel contact), thicken drive pinion gear adjusting shim to move drive pinion closer to drive gear.
  For selecting adjusting shim, refer to the latest parts information.



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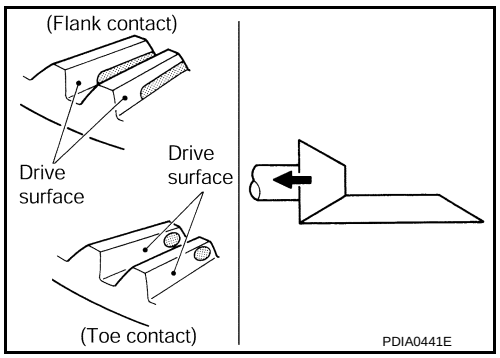
- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thin drive pinion gear adjusting shim to move drive pinion farther from drive gear.
  For selecting adjusting shim, refer to the latest parts information.



BACKLASH

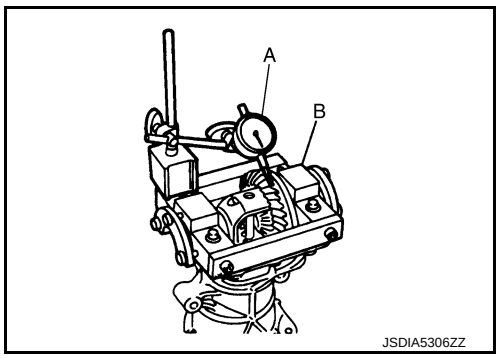
1. Remove rear cover. Refer to DLN-247, "Disassembly and Assembly".
2. Following the procedure below, install the dummy cover set (SST: KV389L0010) to gear carrier.

a. Set dummy cover shims to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover to gear carrier.
c. Position dummy cover spacers to dummy cover.
d. Tighten rear cover mounting bolts to the specified torque. Refer to DLN-246, "Exploded View".
e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

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

B : Dummy cover set (SST: KV389L0010)



Standard

Backlash : Refer to DLN-263, "Backlash".

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

When the backlash is large:

Make drive gear back adjusting shims thicker, and drive gear front adjusting shims thinner. For selecting adjusting shim, refer to the latest parts information.

When the backlash is small:

Make drive gear back adjusting shims thinner, and drive gear front adjusting shims thicker. For selecting adjusting shim, refer to the latest parts information.

Inspection

INFOID:0000000011008630

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).

Oil Seal

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

Differential Assembly

DIFFERENTIAL CASE

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

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.

DRIVE PINION

Exploded View

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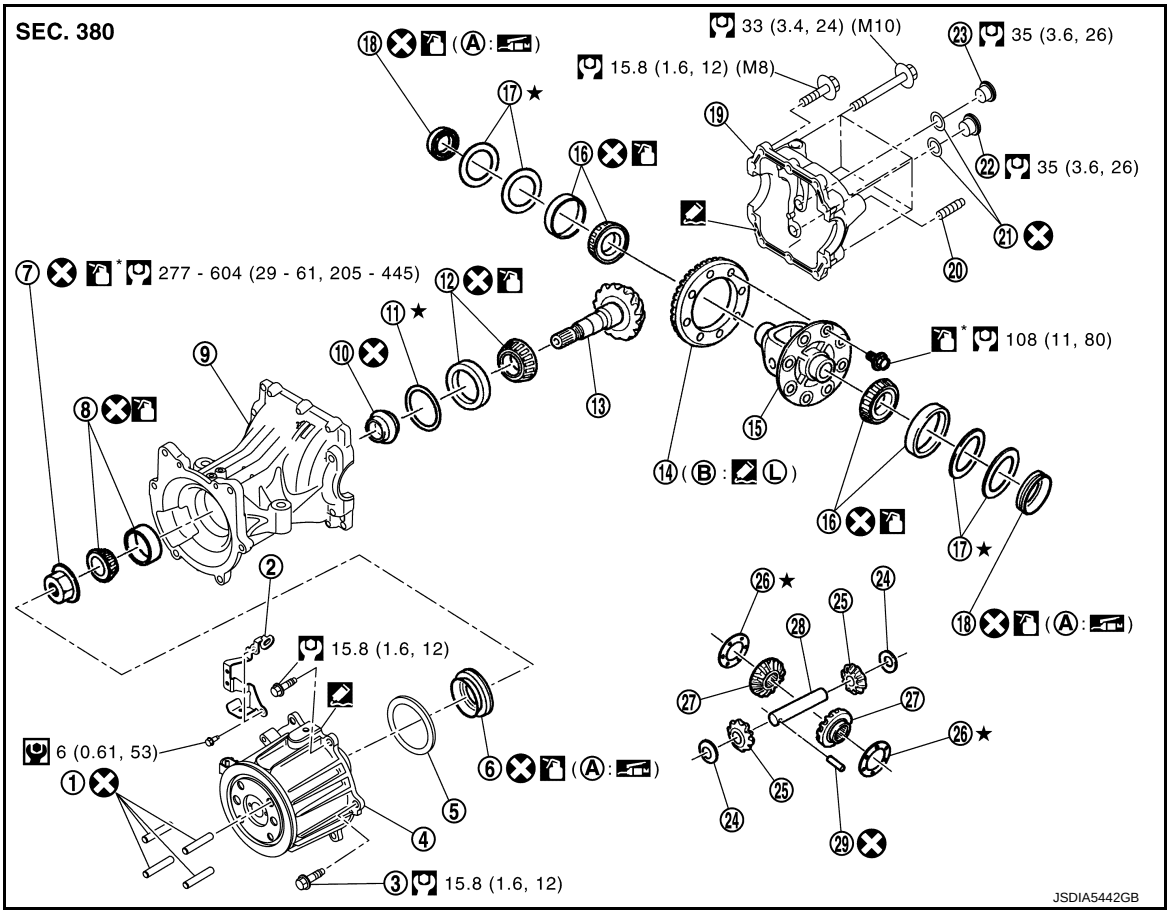

① Stud bolt	② Connector bracket	③ Reamer bolt
④ Electric controlled coupling assembly	⑤ Wave spring	⑥ Drive pinion oil seal
⑦ Drive pinion lock nut	⑧ Pinion front bearing	⑨ Gear carrier
⑩ Collapsible spacer	⑪ Drive pinion adjusting shim	⑫ Pinion rear bearing
⑬ Drive pinion	⑭ Drive gear	⑮ Differential case
⑯ Side bearing	⑰ Side bearing adjusting shim	⑱ Side oil seal
⑲ Rear cover	⑳ Stud bolt	㉑ Gasket
㉒ Drain plug	㉓ Filler plug	㉔ Pinion mate thrust washer
㉕ Pinion mate gear	㉖ Side gear thrust washer	㉗ Side gear
㉘ Pinion mate shaft	㉙ Lock pin	
Ⓐ Oil seal lip	Ⓑ Screw hole	

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

: Always replace after every disassembly.

★: Select with proper thickness.

: Apply gear oil.

*: Apply anti-corrosion oil.

: Apply multi purpose grease.

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

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

Disassembly and Assembly

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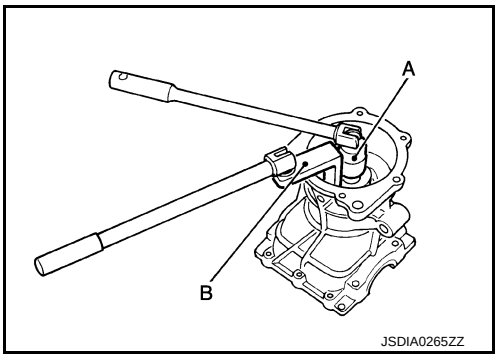
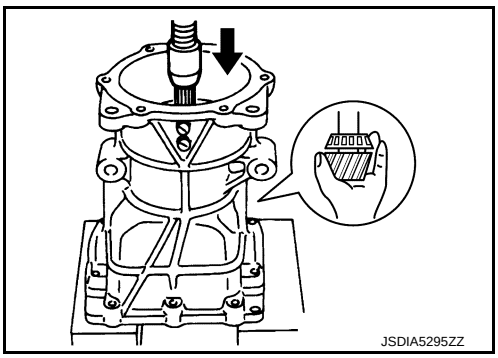
DISASSEMBLY

1. Remove electric controlled coupling assembly. Refer to DLN-243, "Disassembly and Assembly".
2. Remove differential assembly. Refer to DLN-247, "Disassembly and Assembly".
3. Remove drive pinion oil seal, using oil seal remover (commercial service tool).
4. Fit drive pinion socket (A) onto drive pinion spline. Remove drive pinion lock nut, using the pinion nut wrench (B).

   A : Drive pinion socket (SST: KV38109500)
   B : Pinion nut wrench (SST: KV38109400)

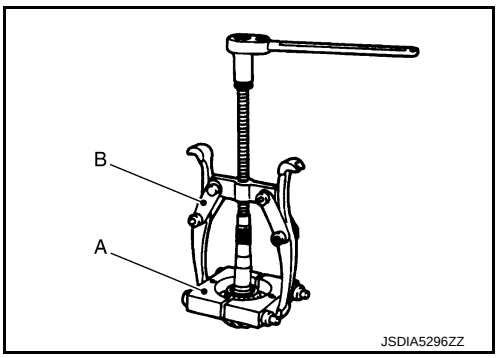


5. Press drive pinion assembly out of gear carrier.
   CAUTION:
   Never drop drive pinion assembly.
6. Remove pinion front bearing inner race.
7. Remove collapsible spacer.

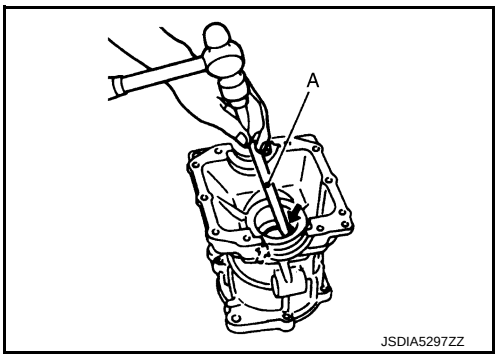


8. Remove pinion rear bearing inner race from drive pinion, using the separator (A) and the puller (B).

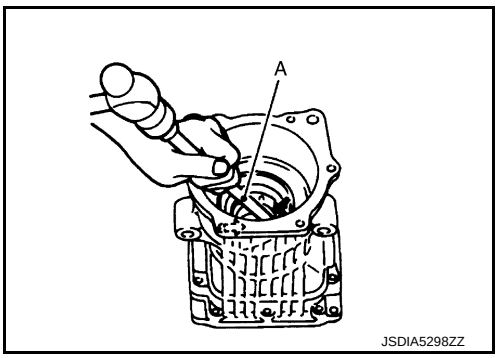
   A : Separator (commercial service tool)
   B : Puller (commercial service tool)



9. Using a brass rod or equivalent (A), tap pinion front bearing outer race evenly from the 2 cutouts on gear carrier and remove pinion front bearing outer race.
   CAUTION:
   Be careful not to damage gear carrier.

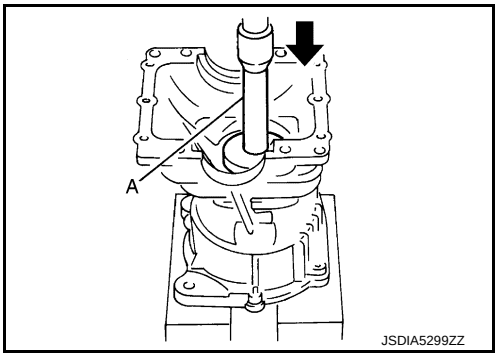


10. Using a brass rod or equivalent (A), tap drive pinion adjusting shim evenly from the 2 cutouts on gear carrier and remove drive pinion adjusting shim and pinion rear bearing outer race.
CAUTION:
Be careful not to damage gear carrier.
11. Perform inspection after disassembly. Refer to DLN-262, "Inspection".

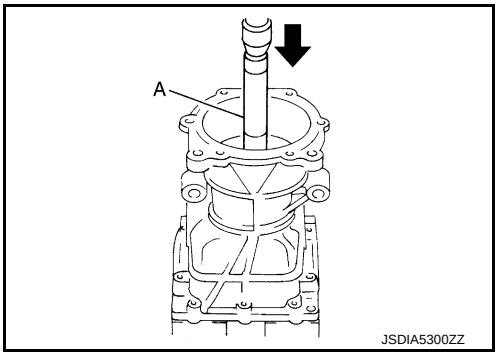


ASSEMBLY

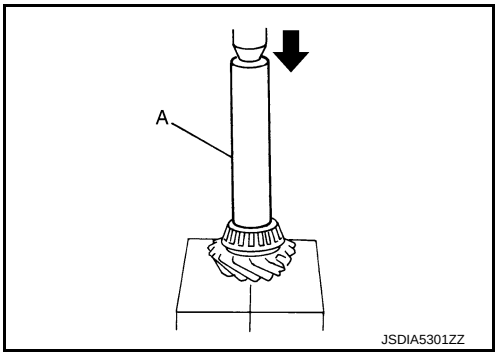
1. Install a drive pinion adjusting shim of the same thickness as was installed prior to disassembly. Press pinion rear bearing outer race into gear carrier, using the drift (A) (SST: ST33200000).
CAUTION:
- **At first, using a hammer, tap bearing outer race until it becomes flush to gear carrier.**
- **Never reuse pinion rear bearing outer race.**



2. Press pinion front bearing outer race into gear carrier, using the drift (A) (SST: ST33230000).
CAUTION:
- **At first, using a hammer, tap bearing outer race until it becomes flush to gear carrier.**
- **Never reuse pinion front bearing outer race.**



3. Press pinion rear bearing inner race to drive pinion, using the drift (A) (SST: ST23860000).
CAUTION:
Never reuse pinion rear bearing inner race.

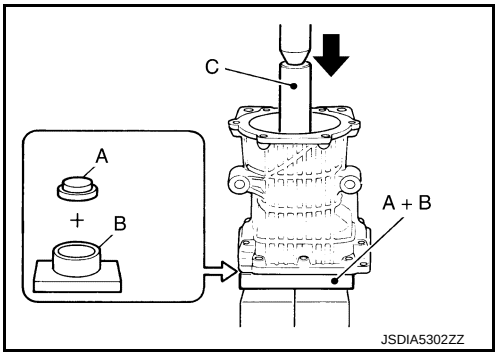


4. Check and adjust the tooth contact and back lash of drive gear and drive pinion following the procedure below.

a. Assemble drive pinion into gear carrier.
CAUTION:
- **Never assemble collapsible spacer.**
- **Apply gear oil to pinion rear bearing.**

b. Assemble pinion front bearing inner race to drive pinion assembly.
CAUTION:
- **Never reuse pinion front bearing inner race.**
- **Apply gear oil to pinion front bearing.**

c. Using the drifts (A and C) and press stand (B), press pinion front bearing inner race to drive pinion as far as drive pinion lock nut can be tightened.

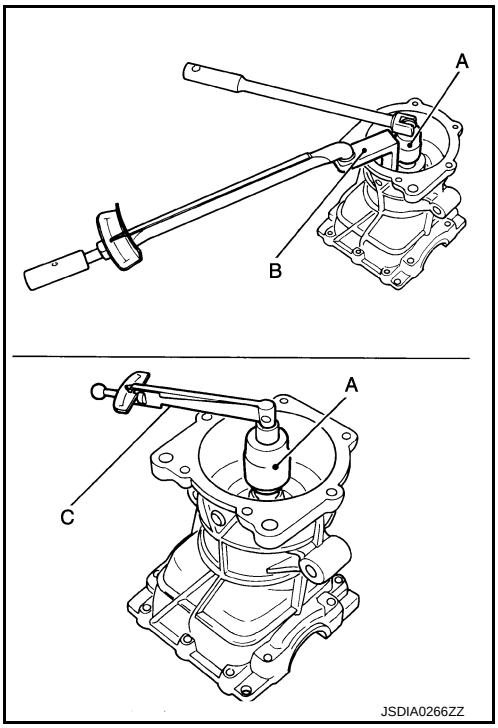


A : Drift (SST: KV40100610)
B : Press stand (SST: ST38220000)
C : Drift (SST: ST23860000)

d. Temporarily tighten removed drive pinion lock nut to drive pinion.
NOTE:
Use removed drive pinion lock nut only for the preload measurement.

e. Rotate drive pinion more than 20 times to adjust bearing.

f. Fit the drive pinion socket (A) onto the drive pinion. Using the pinion nut wrench (B), tighten drive pinion lock nut holding drive pinion, while adjusting pinion bearing preload torque using preload gauge (C).



A : Drive pinion socket (SST: KV38109500)
B : Pinion nut wrench (SST: KV38109400)
C : Preload gauge (SST: ST3127S000)

Pinion bearing preload **: Refer to DLN-263, "Preload Torque".**

CAUTION:
Drive pinion lock nut is tightened with no collapsible spacer. Be careful not to overtighten it. While measuring the preload, tighten it by 5° to 10°.

g. Install new side bearing adjusting shims (2 pieces for one side) with the same thickness or re-install the old ones to the same mounting position they were in prior to disassembly. Install differential assembly to gear carrier. Refer to DLN-247, "Disassembly and Assembly".
CAUTION:
Apply differential gear oil to the side bearings.

h. Check and adjust tooth contact, drive gear to drive pinion backlash. Refer to DLN-252, "Adjustment".

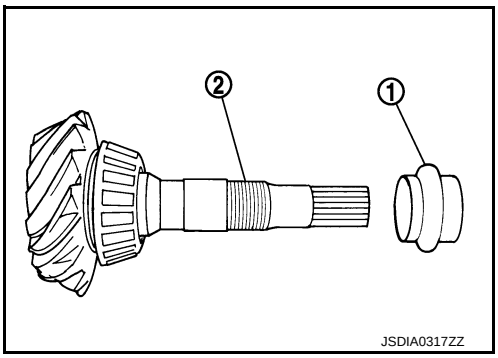
i. Remove differential assembly.

j. Remove drive pinion assembly from gear carrier

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

l. Remove pinion front bearing inner race.

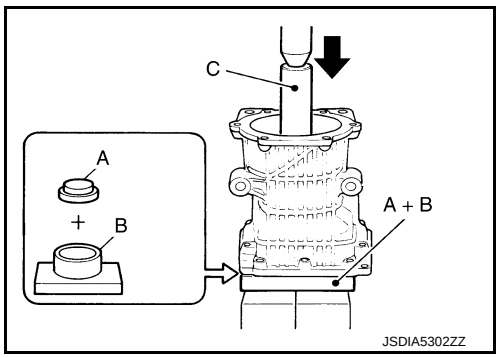
5. Assemble collapsible spacer ① to drive pinion ②.
CAUTION:
- **Be careful of the mounting direction of collapsible spacer.**
- **Never reuse collapsible spacer.**



6. Assemble drive pinion into gear carrier.
CAUTION:
Apply gear oil to pinion rear bearing.

7. Assemble pinion front bearing inner race to drive pinion assembly.
CAUTION:
- **Never reuse pinion front bearing inner race.**
- **Apply gear oil to pinion front bearing.**

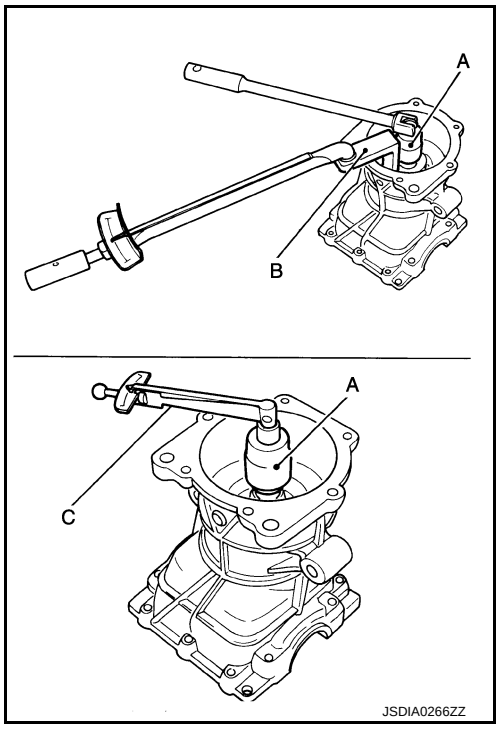
8. Using the drifts (A and C) and press stand (B), press pinion front bearing inner race to drive pinion as far as drive pinion lock nut can be tightened.



A : Drift (SST: KV40100610)
B : Press stand (SST: ST38220000)
C : Drift (SST: ST23860000)

9. 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.

10. Fit the drive pinion socket (A) onto the drive pinion. While holding drive pinion, tighten drive pinion lock nut within the limits of specified torque so as to keep the pinion bearing preload within a standard values, using the pinion nut wrench (B) and the preload gauge (C).



A : Drive pinion socket (SST: KV38109500)
B : Pinion nut wrench (SST: KV38109400)
C : Preload gauge (SST: ST3127S000)

Drive pinion lock nut tightening torque	**: Refer to DLN-257, "Exploded View".**
Pinion bearing preload	**: Refer to DLN-263, "Preload Torque".**

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

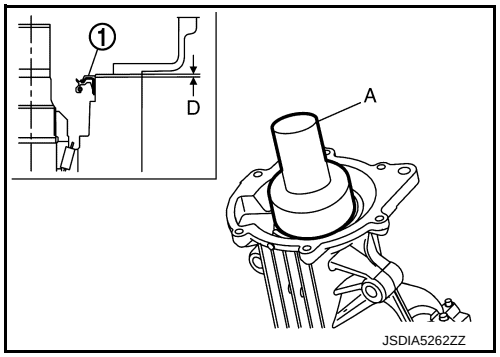
11. Install differential assembly. Refer to DLN-247, "Disassembly and Assembly".
CAUTION:
Never install rear cover at this timing.

12. Check and adjust drive gear runout, tooth contact, and drive gear to drive pinion backlash. Refer to DLN-252, "Adjustment".

13. Remove dummy cover set, then install rear cover, and side oil seal. Refer to DLN-247, "Disassembly and Assembly".

14. Check total preload torque. Refer to DLN-252, "Adjustment".

15. Using the drift (A) (SST: ST35271000), install drive pinion oil seal ① within the dimension (D) shown as follows.



D : 0.8 – 1.2 mm (0.031 – 0.047 in)

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

16. Install electric controlled coupling assembly. Refer to DLN-243, "Disassembly and Assembly".

Inspection

INFOID:0000000011008633

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).

Oil Seal

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

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

INFOID:0000000011008634

Applied model	Axle	4WD		
	Engine	MR20DD	QR25DE	R9M
	Transaxle	CVT		M/T
Final drive model		R145		
Gear ratio		2.466		
Number of teeth (Drive gear/Drive pinion)		37/15		
Number of pinion gears		2		
Drive pinion adjustment spacer type		Collapsible		
Oil capacity		Refer to MA-23, "Fluids and Lubricants".		

Preload Torque

INFOID:0000000011008635

Unit: N·m (kg-m, in-lb)

Item	Standard
Pinion bearing (P_1)	0.69 – 1.18 (0.07 – 0.12, 7 – 10)
Side bearing (P_2)	0.66 – 1.00 (0.07 – 0.10, 6 – 8)
Side bearing to pinion bearing (Total preload) (Total preload = P_1 + P_2)	1.35 – 2.18 (0.14 – 0.22, 12 – 19)

Drive Gear Runout

INFOID:0000000011008636

Unit: mm (in)

Item	Standard
Drive gear back face runout	0.05 (0.0020) or less

Backlash

INFOID:0000000011008637

Unit: mm (in)

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

Differential Side Gear Clearance

INFOID:0000000011008638

Unit: mm (in)

Item	Standard
Side gear backlash (Clearance between side gear and differential case)	0.10 (0.004) or less (Each gear should rotate smoothly without excessive resistance during differential motion.)