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PRECAUTIONS

PRECAUTIONS

PFP:00001

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

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

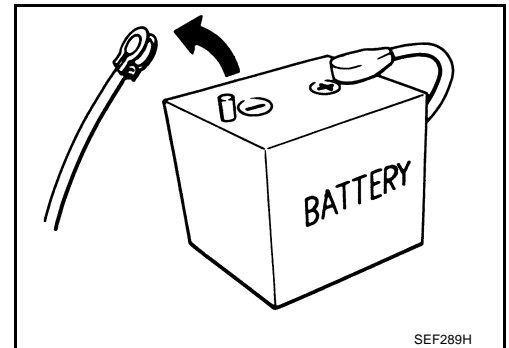
WARNING:

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

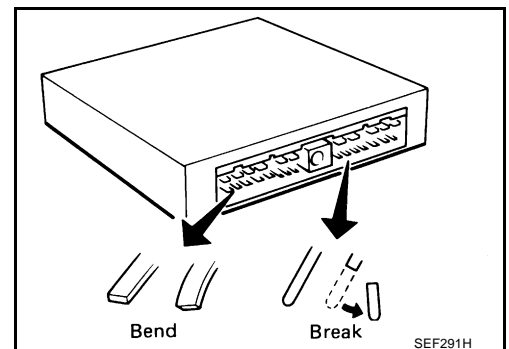
Precautions

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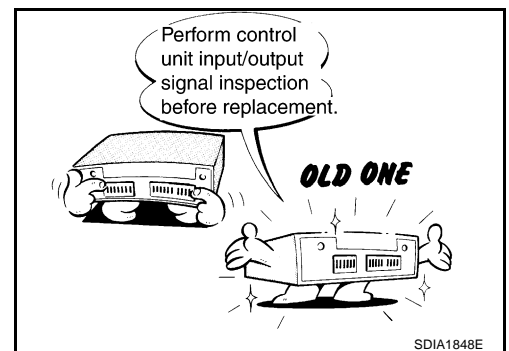
- Before connecting or disconnecting the AWD control unit harness connector, turn ignition switch "OFF" and disconnect negative battery cable. Because battery voltage is applied to AWD control unit even if ignition switch is turned "OFF".



- When connecting or disconnecting pin connectors into or from AWD control unit, take care not to damage pin terminals (bend or break). When connecting pin connectors make sure that there are not any bends or breaks on AWD control unit pin terminal.



- Before replacing AWD control unit, perform AWD control unit input/output signal inspection and make sure whether AWD control unit functions properly or not. [TF-51, "AWD Control Unit Input/Output Signal Reference Value"](#).



PRECAUTIONS

Service Notice

ADS000GI

- Be fore proceeding with disassembly, thoroughly clean the transfer. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint -free cloth or towels for wiping parts clean. Common shop regs can leave fibers that could interfere with the operation of the transfer.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should replaced any time the transfer is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- Before assembly, apply a coat of recommended transfer oil to all parts. Apply petroleum jelly to protect O-rings and seals, and to hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- After overhaul refill the transfer with new transfer oil.

Wiring Diagrams and Trouble Diagnosis

ADS000KU

When you read wiring diagrams, refer to the following:

- [GI-14, "How to Read Wiring Diagrams"](#).
- [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

When you perform trouble diagnosis, refer to the following:

- [GI-10, "How to Follow Trouble Diagnoses"](#).
- [GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"](#).

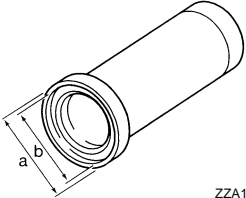
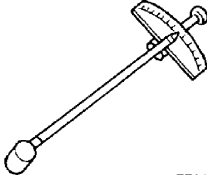
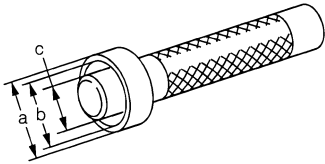
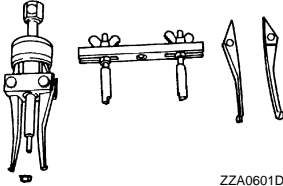
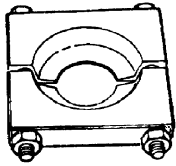
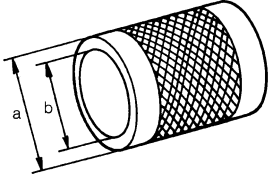
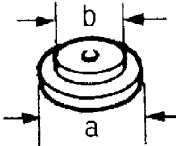
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PREPARATION

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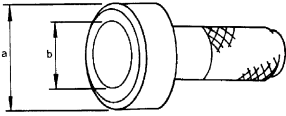
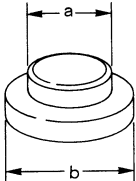
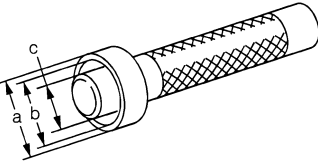
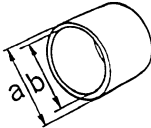
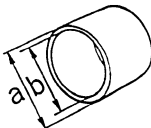
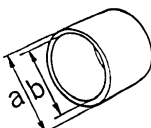
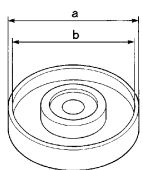
Special Service Tools

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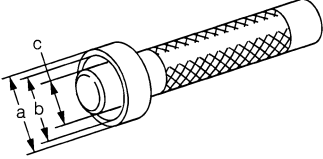
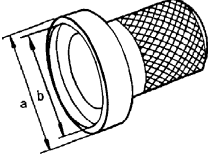
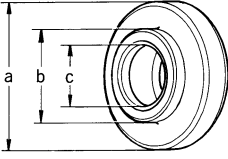
| Tool number (Kent-Moore No.) Tool name | Description |
|---|--|
| KV38101700 (—) a: 82 mm (3.23 in) dia. b: 78 mm (3.07 in) dia. Drift  ZZA1149D | Installing side oil seal (installing adapter case oil seal) |
| ST3127S000 (J25765-A) Preload gauge  ZZA0503D | Measuring preload torque |
| ST33220000 (J25804-01) a: 37 mm (1.46 in) dia. b: 31 mm (1.22 in) dia. c: 22 mm (0.87 in) dia. Drift  ZZA1046D | Removing drive pinion |
| KV381054S0 (J34286) Puller  ZZA0601D | <ul style="list-style-type: none"> ● Removing pinion bearing outer race ● Removing gear ring oil seal |
| ST30031000 (J22912-01) Replacer  ZZA0700D | Removing pinion bearing inner race |
| ST33200000 (J26082) a: 60 mm (2.36 in) dia. b: 44.5 mm (1.75 in) dia. Drift  ZZA1002D | <ul style="list-style-type: none"> ● Removing gear ring bearing inner race on adapter case ● Installing companion flange |
| ST33061000 (J8107-2) a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia. Drift  ZZA0810D | Removing gear ring bearing inner race on gear ring |

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PREPARATION

| Tool number (Kent-Moore No.) Tool name | Description |
|---|---|
| <p>ST30720000 (J25405) a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA0811D</p> | <ul style="list-style-type: none"> ● Installing gear ring bearing outer race on transfer case ● Installing transfer case oil seal ● Installing gear ring bearing inner race on transfer case ● Installing gear ring bearing inner race on adapter case ● Installing gear ring bearing outer race on adapter case |
| <p>KV40101840 (—) a: 77 mm (3.03 in) dia. b: 85 mm (3.35 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA0881D</p> | <p>Installing gear ring bearing outer race on transfer case</p> |
| <p>ST33230000 (J25805-01) a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA1046D</p> | <p>Installing gear ring oil seals</p> |
| <p>ST27863000 (—) a: 74.5 mm (2.933 in) dia. b: 62.5 mm (2.461 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA1003D</p> | <p>Installing gear ring bearing inner race on transfer case</p> |
| <p>KV40101630 (J35870) a: 68 mm (2.68 in) dia. b: 60 mm (2.36 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA1003D</p> | <p>Installing gear bearing inner race on transfer case</p> |
| <p>KV38102510 (—) a: 71 mm (2.80 in) dia. b: 65 mm (2.56 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA1003D</p> | <p>Installing gear ring bearing inner race on adapter case</p> |
| <p>KV40105230 (—) a: 92 mm (3.62 in) dia. b: 86 mm (3.39 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA1141D</p> | <p>Installing gear ring bearing outer race on adapter case</p> |

PREPARATION

| Tool number (Kent-Moore No.) Tool name | Description | |
|---|--|------------------------|
| <p>KV38100300 (J25523) a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA1046D</p> | <p>Installing pinion rear bearing outer race on adapter case</p> | <p>A B C</p> |
| <p>ST33400001 (J26082) a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA0814D</p> | <ul style="list-style-type: none"> ● Installing pinion front bearing outer race on adapter case ● Installing pinion sleeve oil seals on adapter case | <p>TF E</p> |
| <p>ST30901000 (J26010-01) a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia. Drift</p>  <p style="text-align: right; font-size: small;">ZZA0978D</p> | <ul style="list-style-type: none"> ● Installing pinion front bearing outer race on adapter case ● Installing pinion front bearing inner race on adapter case | <p>F G H</p> |

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS000GK

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

| Reference page | | TF-9 | | | TF-13 | TF-13 | TF-22 | TF-22 |
|------------------------------------|----------------------|--------------------------|----------------------|-------------------------------|-------------------------|----------------------------|------------------------|---------------------------|
| Possible cause and Suspected parts | | TRANSFER OIL (Level low) | TRANSFER OIL (Wrong) | TRANSFER OIL (Level too high) | LIQUID GASKET (Damaged) | OIL SEAL (Worn or damaged) | GEAR (Worn or damaged) | BEARING (Worn or damaged) |
| Symptom | Noise | 1 | 2 | | | | 3 | 3 |
| | Transfer oil leakage | | 3 | 1 | 2 | 2 | | |

TRANSFER OIL

TRANSFER OIL

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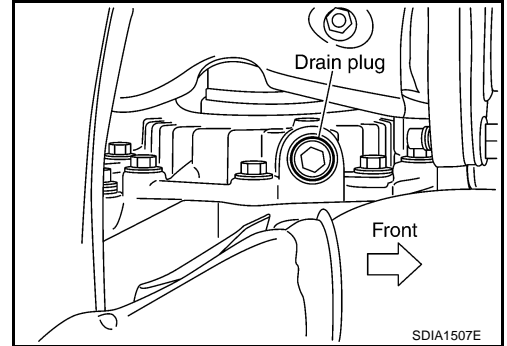
Replacement DRAINING

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CAUTION:

When draining oil, protect exhaust tube flange with cover.

1. Run the vehicle to warm up the transfer body sufficiently.
2. Stop the engine, and remove the drain plug to drain the transfer oil.
3. Apply recommended sealant to drain plug. Install drain plug on transfer and tighten to the specified torque. Refer to [TF-13, "Components"](#).



FILLING

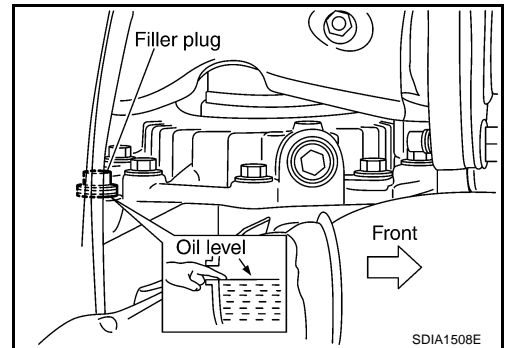
1. Remove filler plug and add gear oil until oil level reaches the specified limit near filler plug mounting hole.

Oil capacity : Approx. 0.31 ℓ (5/8 US pt, 1/2 Imp pt)

CAUTION:

Carefully fill the oil. (Fill up for approx. 3 minutes)

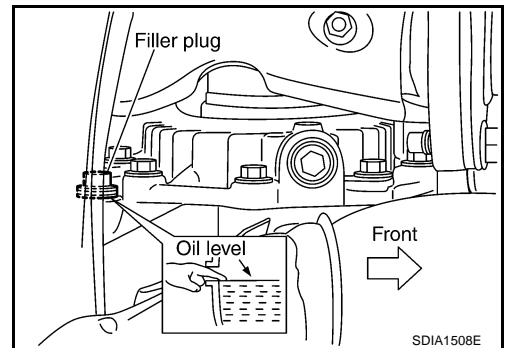
2. Leave the vehicle for 3 minutes, and check the oil level again.
3. Apply recommended sealant to filler plug. Install filler plug on transfer and tighten to the specified torque. Refer to [TF-13, "Components"](#).



Inspection

OIL LEAKAGE AND OIL LEVEL

1. Check oil level from filler plug mounting hole as shown in the figure.
2. Before installing filler plug, apply recommended sealant. Install filler plug on transfer and tighten to the specified torque. Refer to [TF-13, "Components"](#).



SIDE OIL SEAL

SIDE OIL SEAL

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Removal and Installation

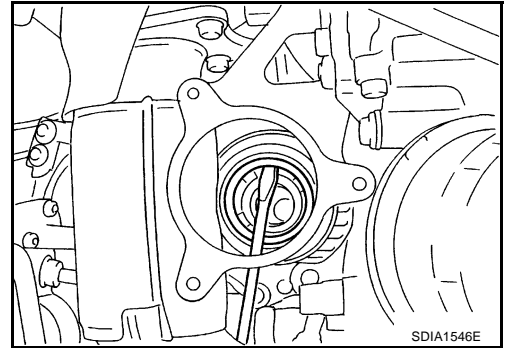
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REMOVAL

1. Remove the drive shaft. Refer to [FAX-8, "Removal and Installation \(Right Side\)"](#) , [FAX-7, "Removal and Installation \(Left Side\)"](#) .
2. Remove oil seal with a flat-bladed screwdriver.

CAUTION:

Be careful not to damage the adapter case.



INSTALLATION

1. Apply multi-purpose grease to oil seal lips. As shown in the figure, using a drift, install the oil seal so that it becomes flush with the case end surface.

Tool number : KV38101700 (—)

CAUTION:

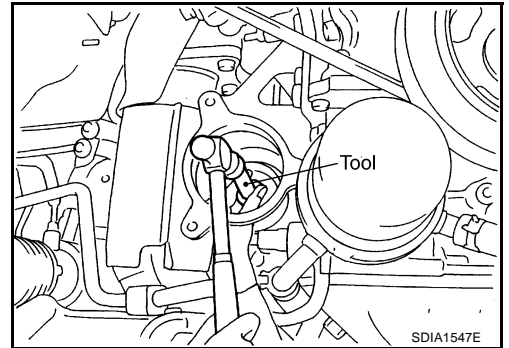
- Discard old oil seals, replace with new ones.
- When installing, do not incline the oil seal.

2. Install the drive shaft. Refer to [FAX-8, "Removal and Installation \(Right Side\)"](#) , [FAX-7, "Removal and Installation \(Left Side\)"](#) .

CAUTION:

Be careful not to damage the oil seals.

3. Check oil level. Refer to [TF-9, "TRANSFER OIL"](#) .



AIR BREATHER HOSE

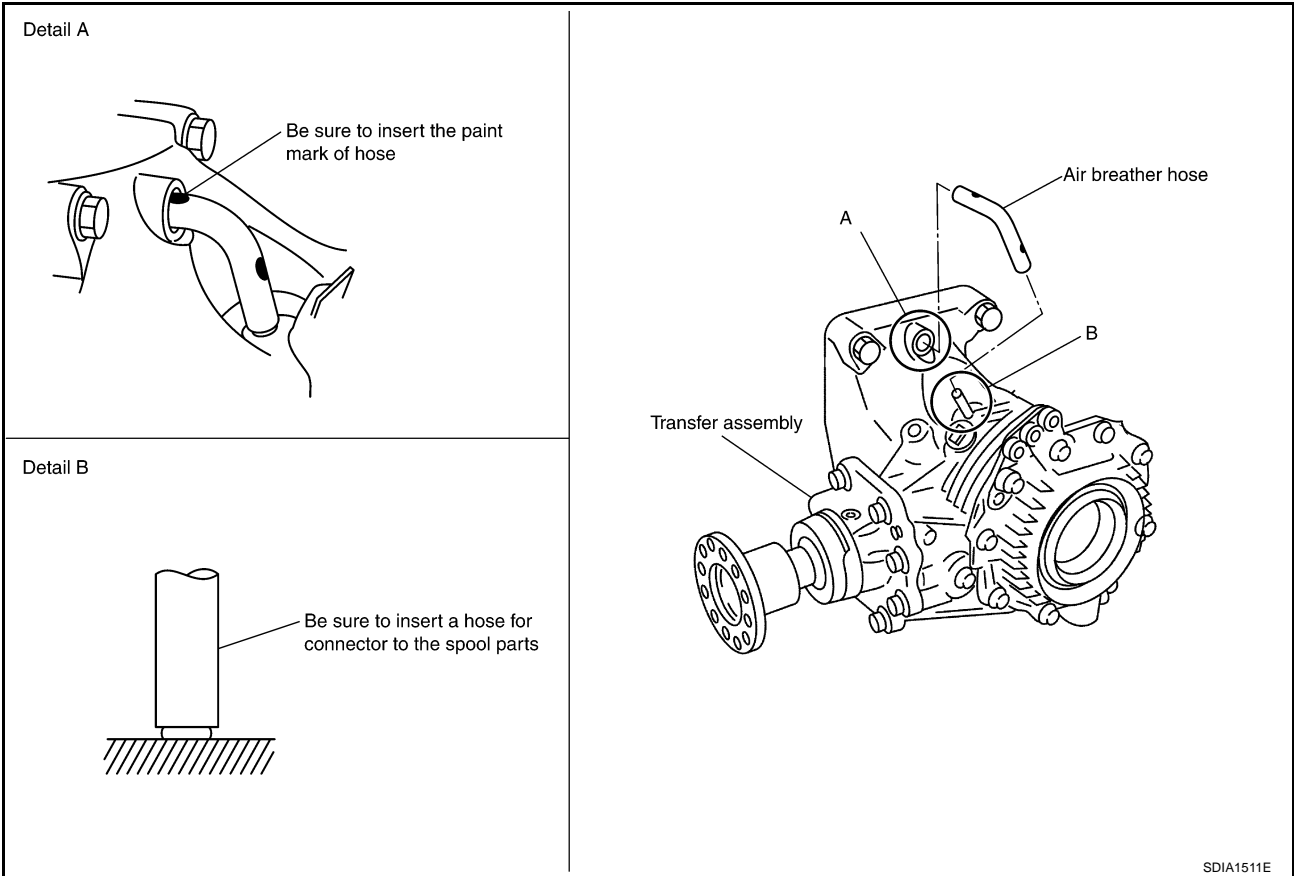
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AIR BREATHER HOSE

Removal and Installation

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- Refer to the figure for air breather hose removal and installation information.



CAUTION:

- Be sure to insert air breather hose into transfer tube (metal connector) until hose end reaches the tube's base.
- Make sure there are no pinched or restricted areas on the air breather hose caused by bending or winding when installing it.

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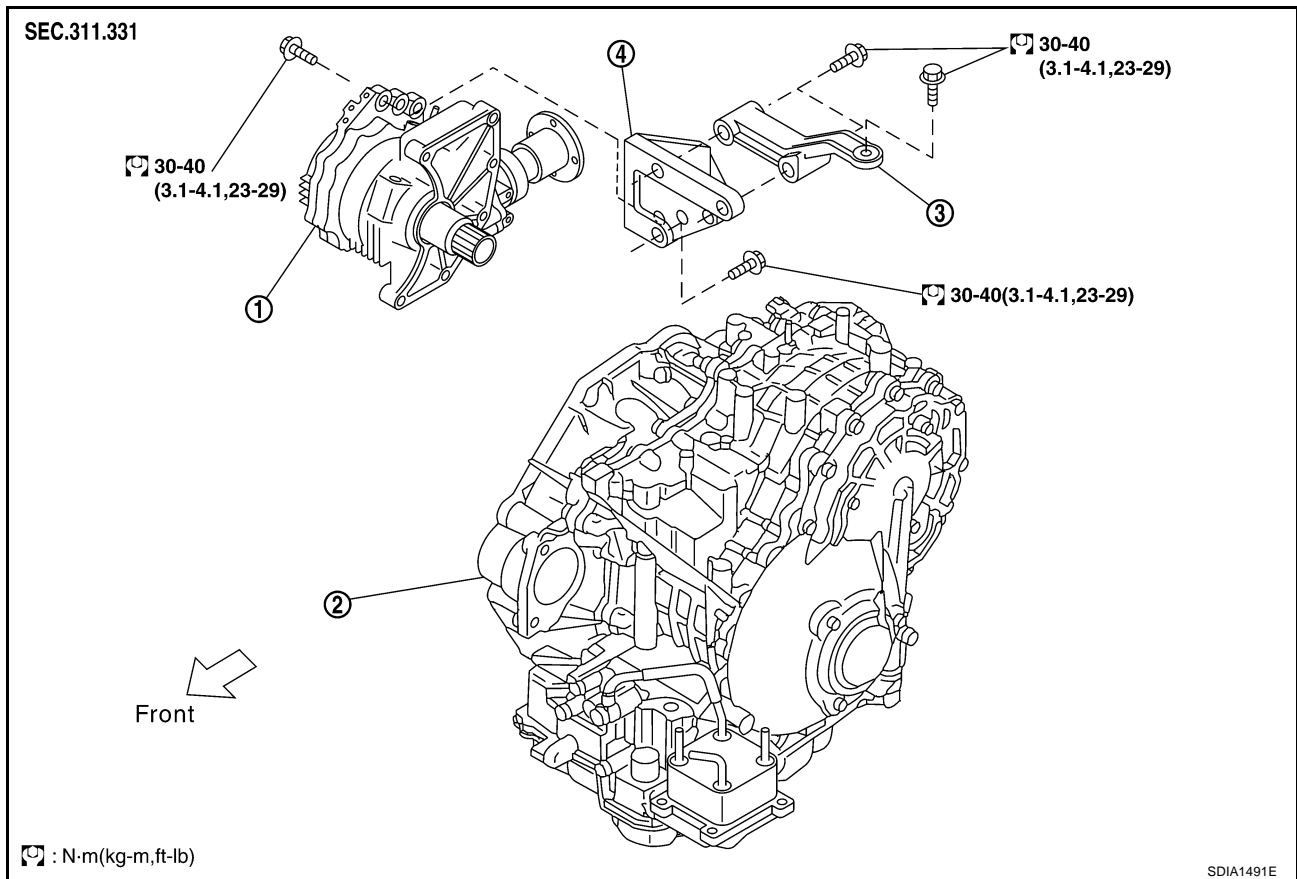
TRANSFER ASSEMBLY

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TRANSFER ASSEMBLY

Removal and Installation



1. Transfer assembly
4. Transfer gusset

2. Transaxle assembly

3. Rear gusset

REMOVAL

Remove the engine assembly. Refer to [EM-95, "ENGINE ASSEMBLY"](#) .

1. Remove gusset mounting bolts, and then remove gusset from engine and transaxle.
2. Remove transfer mounting bolts and separate transfer from transaxle.

CAUTION:

After removing transfer from transaxle, be sure to replace differential side oil seal of the transaxle side with new one. Refer to [CVT-191, "DIFFERENTIAL SIDE OIL SEAL"](#) .

INSTALLATION

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

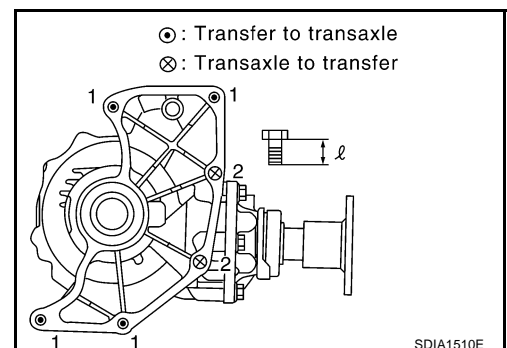
- When installing the transfer to the transaxle, install the mounting bolts following the standard below.

| Bolt No. | 1 | 2 |
|--|----------------------------------|-----------|
| Quantity | 4 | 2 |
| Nominal length mm (in) | 65 (2.56) | 40 (1.57) |
| Tightening torque [N·m (kg·m, ft·lb.)] | 29.4 - 39.2 (3.0 - 3.9, 22 - 28) | |

CAUTION:

When installing the transfer to the transaxle, be careful not to damage the oil seals.

- After the installation, check the oil level and for oil leakage. Refer to [TF-9, "TRANSFER OIL"](#) .



TRANSFER ASSEMBLY

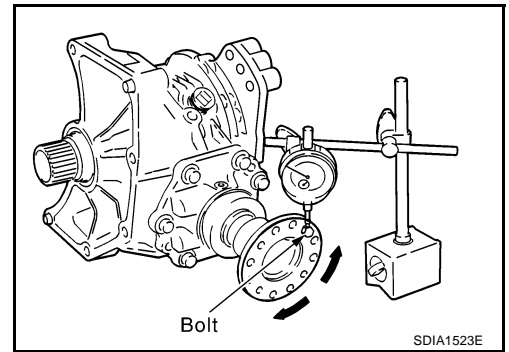
ADS000GR

Pre- Inspection BACKLASH

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

Backlash : 0.13 - 0.19 mm (0.0051 - 0.0075 in)

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



TOOTH CONTACT

1. Remove the pinion sleeve assembly. Refer to [TF-18, "Pinion Sleeve Assembly"](#).
2. Apply red lead to the drive gear.

CAUTION:

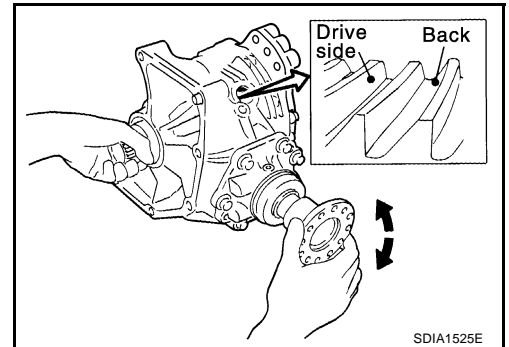
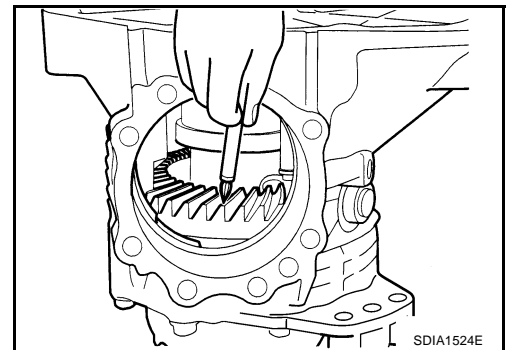
Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on the drive gear.

3. Install the pinion sleeve shims and pinion sleeve assembly.
4. Remove the plug on the upper side of the transfer case. When installing plug, apply recommended sealant on screw part, and tighten it at the specified torque.

Tightening torque

: 15 - 19 N·m (1.6 - 1.9 kg·m, 11 - 14 ft·lb)

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

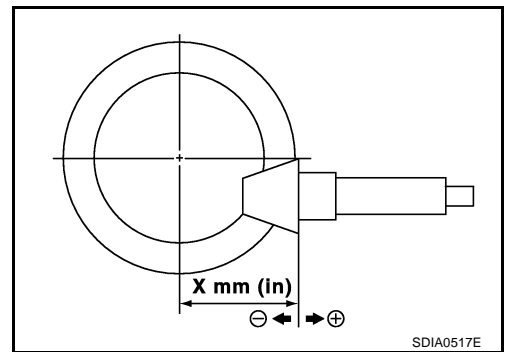


TRANSFER ASSEMBLY

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

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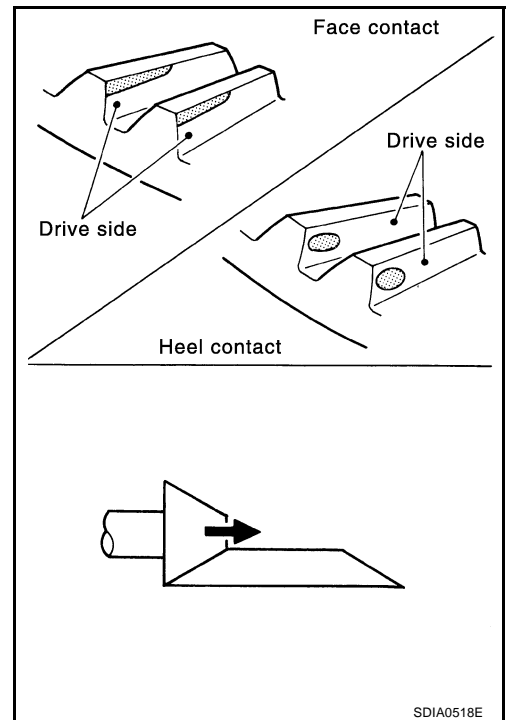
6. If tooth contact is poorly adjusted, adjust pinion height (dimension X) in the following manner.



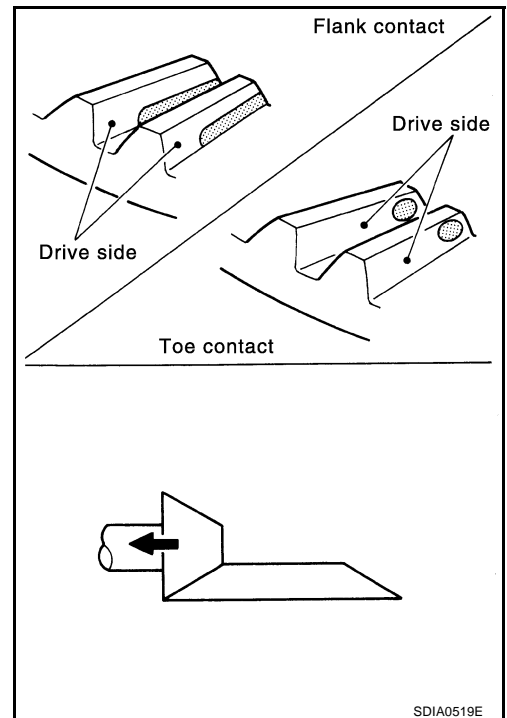
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TRANSFER ASSEMBLY

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



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



PRELOAD TORQUE

Pinion Bearing Preload Torque

1. Remove the pinion sleeve assembly. Refer to [TF-18, "Pinion Sleeve Assembly"](#).
2. Rotate the companion flange back and forth 2 to 3 times. Check for unusual noise, rotation malfunction, and other malfunctions.
3. Rotate the companion flange at least 20 times to check for smooth operation of the bearing.

TRANSFER ASSEMBLY

- Using a preload gauge, measure the preload torque of the pinion bearing.

Tool number : ST3127S000 (J25765-A)

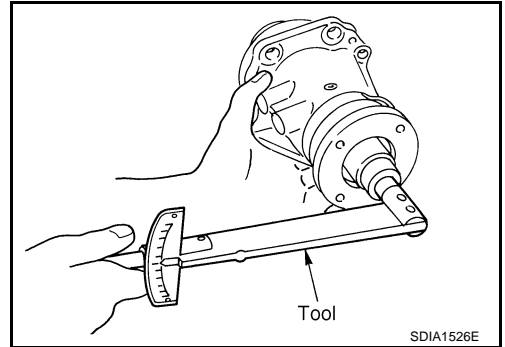
Preload torque

: 0.10 - 0.39 N·m (0.01 - 0.04 kg·m, 1 - 3 in·lb)

CAUTION:

Every rotational part shall rotate smoothly with the specified gear oil.

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



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Total Preload Torque

- Measure pinion bearing preload torque (P1).

Pinion bearing preload torque (P1)

: 0.10 - 0.39 N·m (0.01 - 0.04 kg·m, 1 - 3 in·lb)

- Install the pinion sleeve shims and pinion sleeve assembly.
- Rotate the companion flange at least 20 times to check for smooth operation of the bearing.
- Using a preload gauge, measure the Total preload torque.

Tool number : ST3127S000 (J25765-A)

Total preload torque

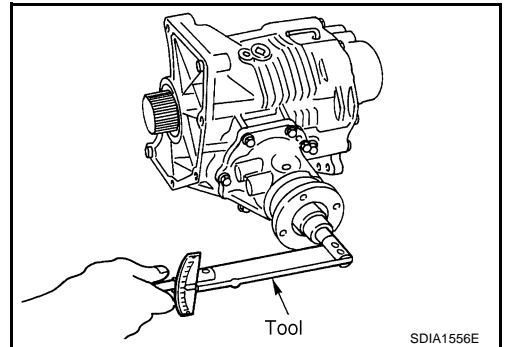
When all oil seals are installed

: P1 + 0.16 - 0.22 N·m (0.016 - 0.023 kg·m, 1.4 - 1.9 in·lb)

Without transfer case oil seal and gear ring oil seal

: P1 + 0.06 - 0.12 N·m (0.006 - 0.013 kg·m, 0.6 - 1.1 in·lb)

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



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COMPANION FLANGE RUNOUT

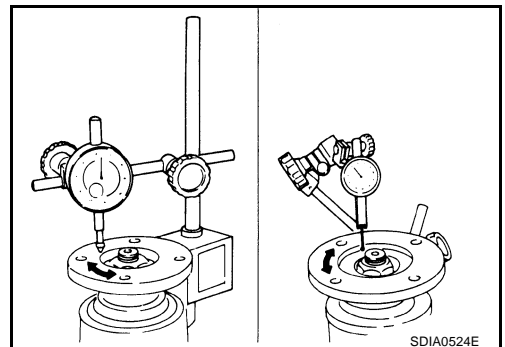
- Fit a dial gauge onto the companion flange face (inner side of the propeller shaft mounting bolt holes).
- Rotate the companion flange to check for runout.

Runout limit : 0.1 mm (0.004 in)

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

Runout limit : 0.1 mm (0.004 in)

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



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TRANSFER ASSEMBLY

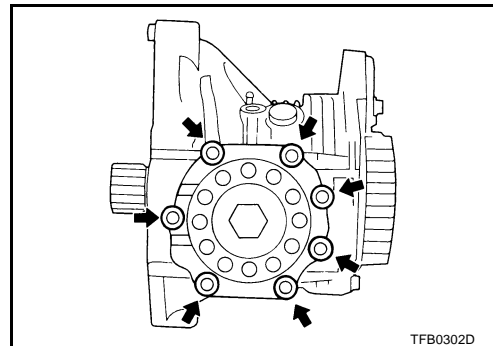
ADS000GS

Disassembly and Assembly

DISASSEMBLY

Pinion Sleeve Assembly

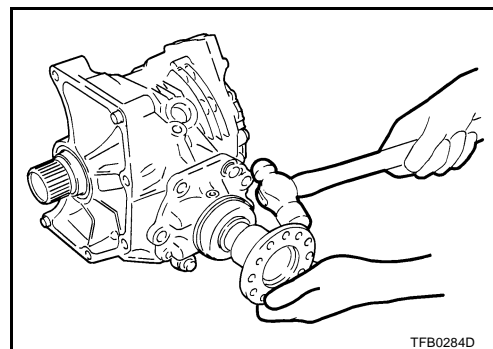
1. Remove pinion sleeve mounting bolts.



2. Temporarily tighten 2 bolts. Using a plastic hammer, tap companion flange to remove pinion sleeve assembly.

3. Remove the pinion sleeve shim.

4. Remove the pinion nut.

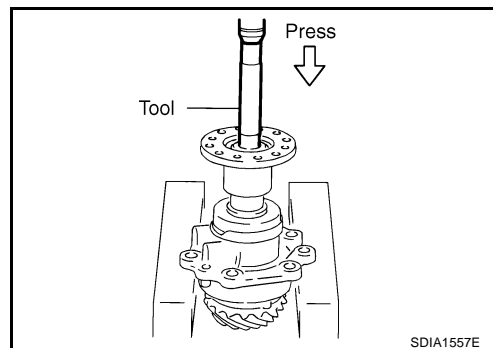


5. Using a drift, remove drive pinion from pinion sleeve with a press.

Tool number : ST33220000 (J25804-01)

6. Remove drive pinion assembly.

7. Remove the O-ring from pinion sleeve.

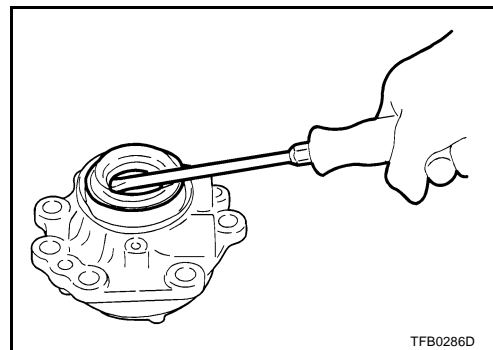


8. Using a flat-bladed screwdriver, remove the oil seal.

CAUTION:

Be careful not to damage the pinion sleeve.

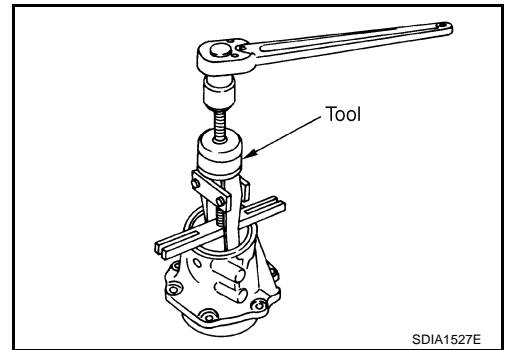
9. Remove the pinion rear bearing inner race.



TRANSFER ASSEMBLY

10. Using a puller, remove the pinion rear bearing outer race.

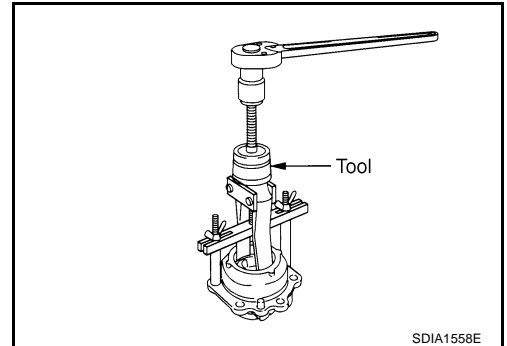
Tool number : KV381054S0 (J34286)



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11. Using a puller, remove the pinion front bearing outer race.

Tool number : KV381054S0 (J34286)

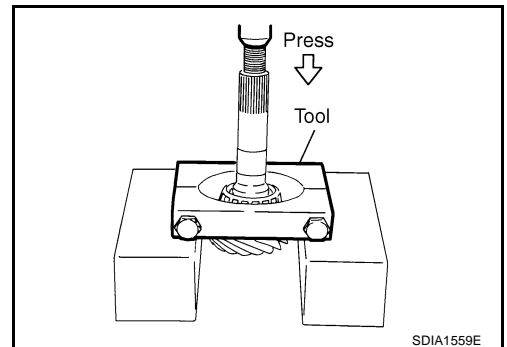


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12. Remove the collapsible spacer from the drive pinion gear.

13. Using a replacer, press the pinion front bearing inner race out of the drive pinion gear.

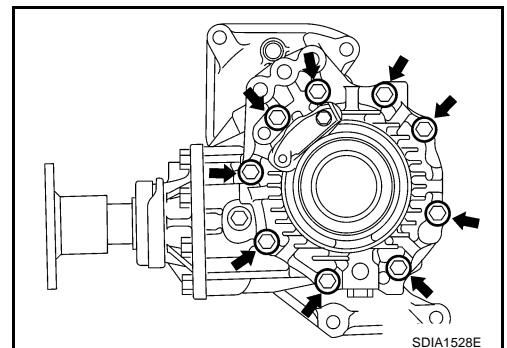
Tool number : ST30031000 (J22912-01)



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Adapter Case

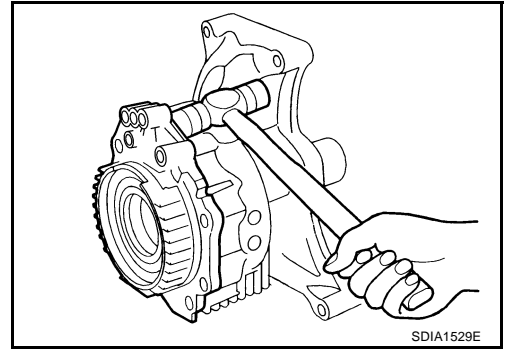
1. Remove the adapter case mounting bolts.



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TRANSFER ASSEMBLY

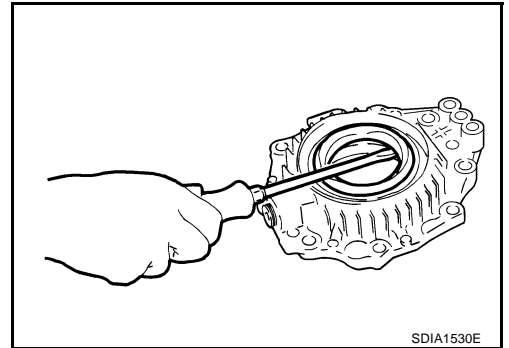
- Using a plastic hammer, tap the adapter case to remove.
- Remove the O-ring.



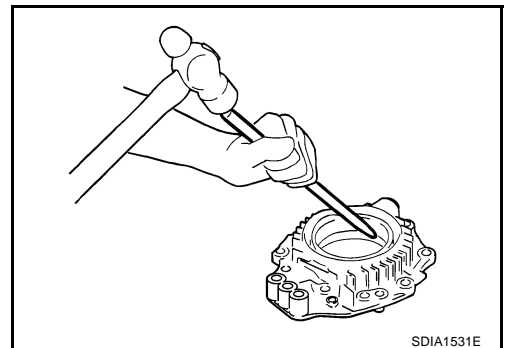
- Using a flat-bladed screwdriver, remove the oil seal.

CAUTION:

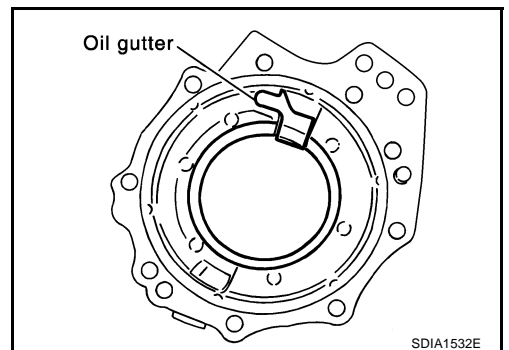
Be careful not to damage the adapter case.



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



- Remove the oil gutter.
- Remove the drain plug.



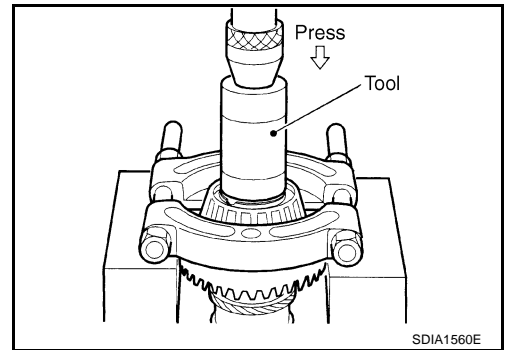
Drive Gear Assembly

- Remove the adapter case.
- Remove the drive gear assembly from the transfer case.

TRANSFER ASSEMBLY

3. Using a drift and replacer, remove the gear ring bearing inner race on the adapter case.

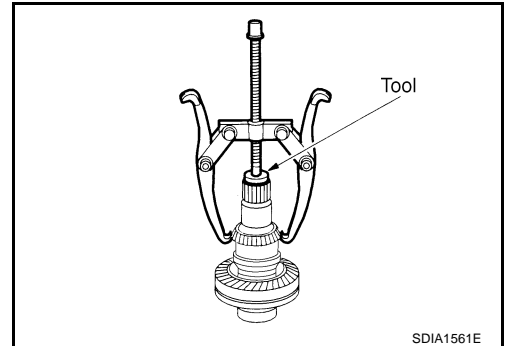
Tool number : ST33200000 (J26082)



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4. Using a drift and puller, remove the gear ring bearing inner race on the gear ring.

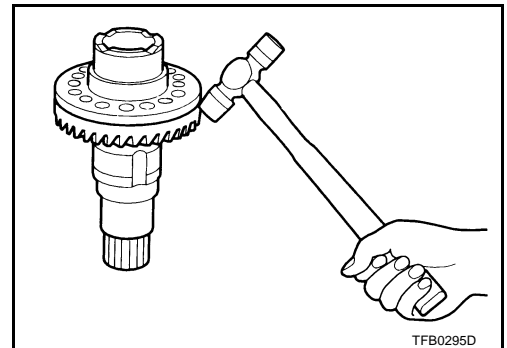
Tool number : ST33061000 (J8107-2)



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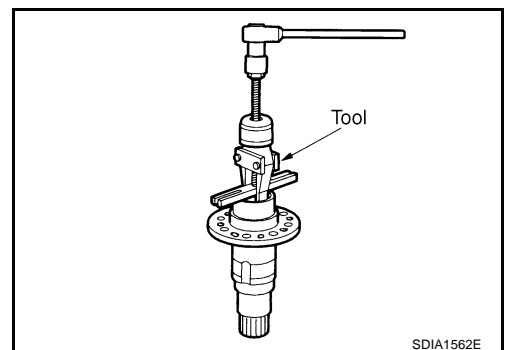
5. Remove the drive gear mounting bolts.
6. Using a plastic hammer, tap the drive gear to remove the drive gear from the gear ring.



H
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7. Using a puller, remove the oil seal from the gear ring.

Tool number : KV381054S0 (J34286)



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Transfer Case

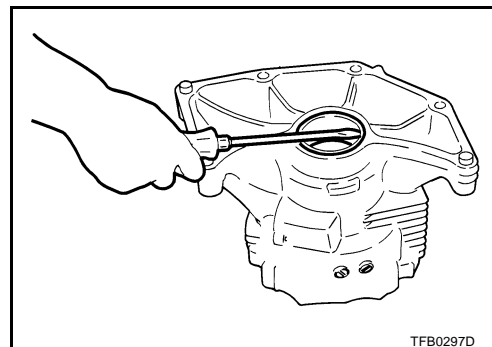
1. Remove the pinion sleeve assembly.
2. Remove the adapter case.
3. Remove the drive gear assembly from the transfer case.

TRANSFER ASSEMBLY

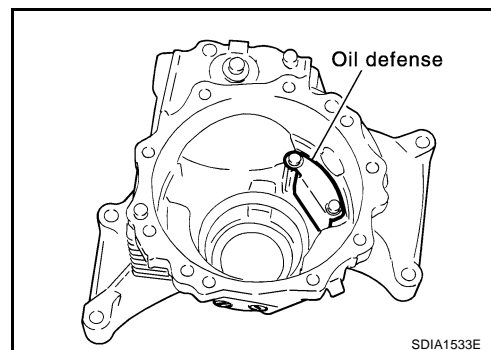
- Using a flat-bladed screwdriver, remove the oil seal.

CAUTION:

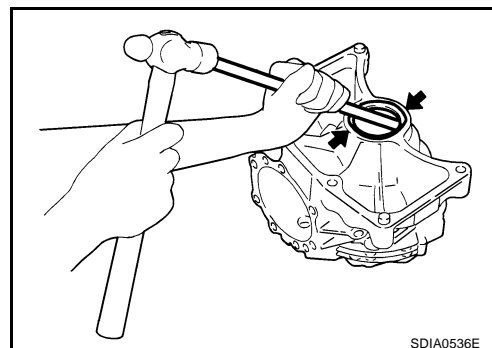
Be careful not to damage the transfer case.



- Remove the oil defense.



- Using a brass rod, tap the adjusting shim evenly from the 2 cut-outs on the transfer case to remove the adjusting shim and gear ring bearing outer race.
- Remove the filler plug, and breather tube.



INSPECTION

Gears

- Check the gear faces and shaft for wear, cracks, damage, and seizure.

CAUTION:

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

Bearings

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

CAUTION:

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

Washers and Shims

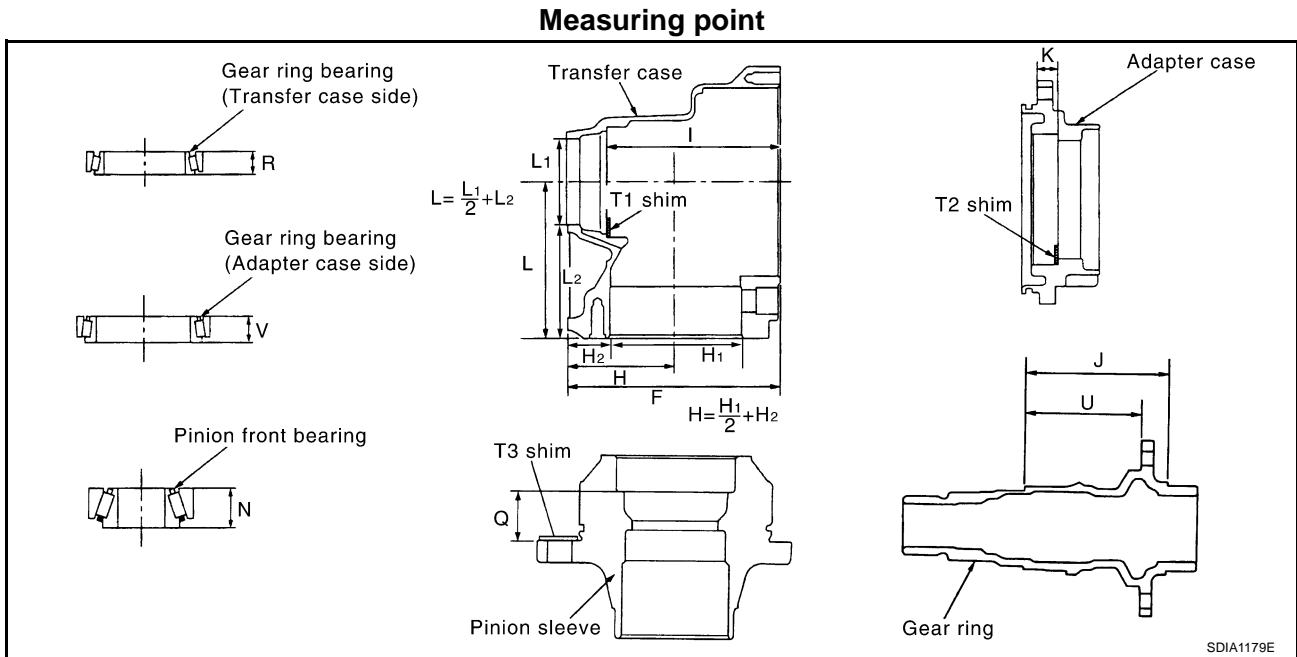
- Check for seizure, damage, and unusual wear.

Oil Seals

- Discard old oil seals, replace with new ones.
- If wear, deterioration of adherence (sealing force of lips), or damage is detected on the lips, replace them.

TRANSFER ASSEMBLY

SELECTING ADJUSTING SHIMS



At Gear Ring Bearing on Transfer Case

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

F : Value obtained by subtracting 163.00 mm (6.42 in) from the reading [in increments of 0.01 mm (0.0004 in)].

H : Value obtained by subtracting 83.00 mm (3.27 in) from the reading [in increments of 0.01 mm (0.0004 in)].

I : Value obtained by subtracting 131.90 mm (5.19 in) from the reading [in increments of 0.01 mm (0.0004 in)].

R : Value obtained by subtracting 17.00 mm (0.67 in) from the reading [in increments of 0.01 mm (0.0004 in)].

U : Value obtained by subtracting 89.50 mm (3.524 in) from the reading [in increments of 0.01 mm (0.0004 in)].

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

NOTE:

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

4. Use the formula below to calculate adjusting shim thickness T₁ at the gear ring bearing on the transfer case.

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

5. Select the adjusting shim.

- For information on selecting an adjusting shim, refer to [TF-72. "Gear Ring Bearing Adjusting Shim"](#).

CAUTION:

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

TRANSFER ASSEMBLY

At the Gear Ring Bearing on the Adapter Case

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

F : Value obtained by subtracting 163.00 mm (6.42 in) from the reading [in increments of 0.01 mm (0.0004 in)].

H : Value obtained by subtracting 83.00 mm (3.27 in) from the reading [in increments of 0.01 mm (0.0004 in)].

J : Value obtained by subtracting 109.50 mm (4.31 in) from the reading [in increments of 0.01 mm (0.0004 in)].

K : Value obtained by subtracting 14.40 mm (0.5669 in) from the reading [in increments of 0.01 mm (0.0004 in)].

U : Value obtained by subtracting 89.50 mm (3.524 in) from the reading [in increments of 0.01 mm (0.0004 in)].

V : Value obtained by subtracting 17.00 mm (0.67 in) from the reading [in increments of 0.01 mm (0.0004 in)].

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

NOTE:

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

4. Use the formula below to calculate the thickness of adjusting shim T₂ at the gear ring bearing on the adapter case.

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

5. Select the adjusting shim.

- For information on selecting an adjusting shim, refer to [TF-72, "Gear Ring Bearing Adjusting Shim"](#) .

CAUTION:

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

Pinion Sleeve Shim

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

NOTE:

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

3. Use the formula below to calculate pinion sleeve shim thickness T₃ .

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

4. Select the pinion sleeve shim.

- For information on selecting a pinion sleeve shim, refer to [TF-73, "Pinion Sleeve Shim"](#) .

CAUTION:

- Only one pinion sleeve shim can be selected.

ASSEMBLY

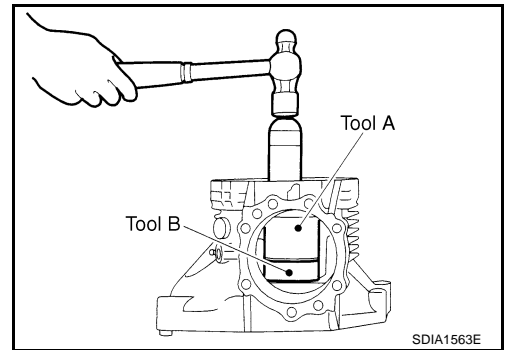
Transfer Case

1. Select the adjusting shim on the gear ring bearing. Refer to [TF-72, "Gear Ring Bearing Adjusting Shim"](#) .

TRANSFER ASSEMBLY


2. Using a drift, install the selected adjusting shim and gear ring bearing outer race.

Tool number **A: ST30720000 (J25405)**
 B: KV40101840 (—)



3. Install the oil defense, and tighten the mounting bolts to the specified torque. The clearance between the oil defense and transfer case (dimension A) should be the following.

Tightening torque

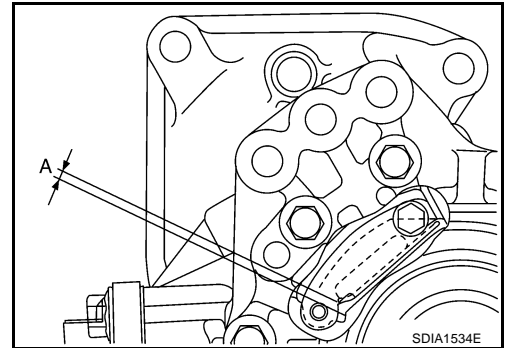
 : 6.9 - 8.8 N·m (0.71 - 0.89 kg·m, 61 - 77 in·lb)

Clearance between oil defense and transfer case

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

CAUTION:

Do not reuse the mounting bolts.




4. Using a drift, drive the oil seal until it becomes flush with the case end.

Tool number : **ST30720000 (J25405)**

CAUTION:

- When checking the Total preload torque, measure it without the oil seal, then install the oil seal.
- Discard old oil seals, replace with new ones.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of the oil seal.

5. Apply recommended sealant to plug before installing it to the transfer case.

Plug tightening torque  : 15 - 19 N·m (1.6 - 1.9 kg·m, 11 - 14 ft·lb)

6. Apply recommended sealant to breather tube and install it to the transfer case.

7. Install the drive gear assembly.

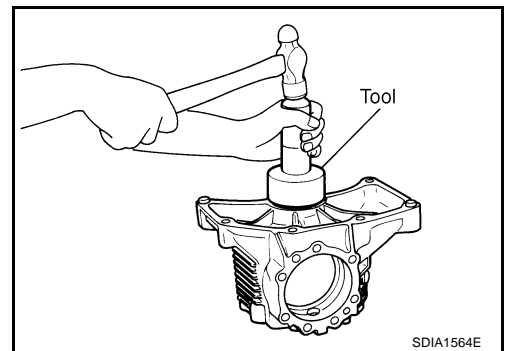
8. Install the adapter case.

9. Install the pinion sleeve assembly.

10. Check backlash, preload torque, tooth contact, and companion flange runout. Refer to [TF-14, "Pre-Inspection"](#).

CAUTION:

Measure the Total preload torque without the oil seal.



TRANSFER ASSEMBLY

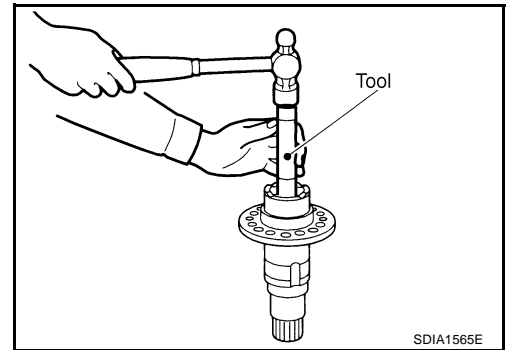
Drive Gear Assembly

- Using a drift, drive the oil seal into the gear ring.

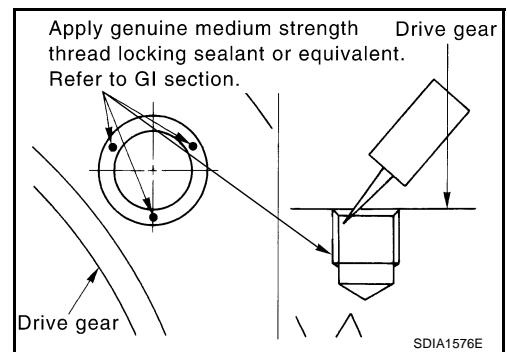
Tool number : ST33230000 (J25805-01)

CAUTION:

- When checking the Total preload torque, measure it without the oil seal, then install the oil seal.
- Discard old oil seals, replace with new ones.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of the oil seal.
- The oil seal back position after the installation shall be 56.5 mm (2.22 in) from the gear ring end.



- Apply a thread locking adhesive into the thread hole for the drive gear.
 - Completely clean and de grease the drive gear back face, thread holes, and drive gear mounting bolts. (Use a gasket remover to remove the thread locking adhesive.)
 - Apply a thread locking adhesive onto the first and second threads under the thread hole chamfering of the drive gear on 3 or more different points.
- Install the drive gear to gear ring, and apply anti-corrosive oil onto threads and seats on the mounting bolts, and then tighten to the specified torque.



Tightening torque

First (temporary tightening) : 25 - 29 N·m (2.5 - 3.0 kg·m, 18 - 21 ft·lb)

Second (final tightening) : 82 - 115 N·m (8.3 - 11.7 kg·m, 60 - 84 ft·lb)

CAUTION:

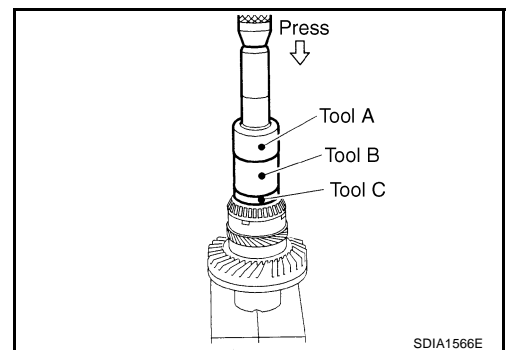
- Temporary installation before tightening the bolts through to the completion of the tightening should be within 90 seconds.
- If the thread locking adhesive is applied aside, quickly wipe it off.

- Apply gear oil to gear ring bearing inner race on the transfer case. Using a drift, install gear ring bearing inner race.

Tool number A: ST30720000 (J25405)

B: ST27863000 (—)

C: KV40101630 (J35870)



- Apply gear oil to gear ring bearing inner race on the adapter case. Using a drift, install gear ring bearing inner race.

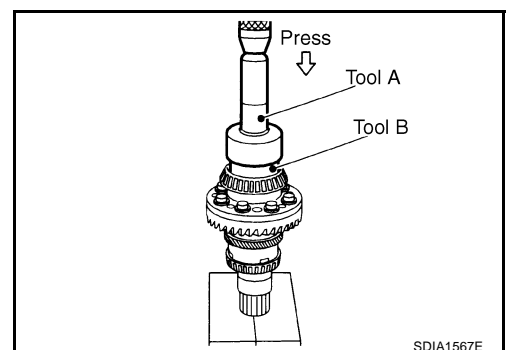
Tool number A: ST30720000 (J25405)

B: KV38102510 (—)

- Install the drive gear assembly to the transfer case.
- Install the adapter case.
- Check backlash, preload torque, tooth contact, and companion flange runout. Refer to [TF-14, "Pre- Inspection"](#).

CAUTION:

Measure the Total preload torque without the oil seal.

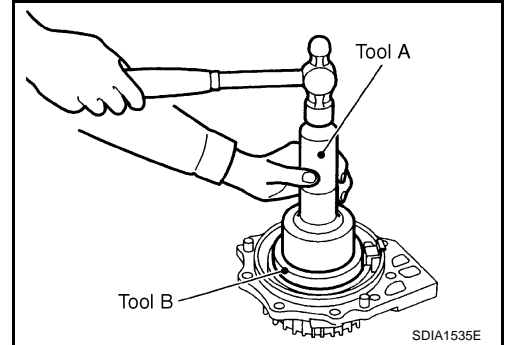


TRANSFER ASSEMBLY

Adapter Case

1. Select the adjusting shim on the gear ring bearing. Refer to [TF-72, "Gear Ring Bearing Adjusting Shim"](#).
2. Install the oil gutter.
3. Using a drift, install the selected adjusting shim and gear ring bearing outer race to the adapter case.

Tool number **A: ST30720000 (J25405)**
 B: KV40105230 (—)



4. Using a drift, drive the oil seal until it becomes flush with the case end.

Tool number **: KV38101700 (—)**

CAUTION:

- When checking the Total preload torque, measure it without the oil seal, then install the oil seal.
- Discard old oil seals, replace with new ones.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of the oil seal.

5. Apply recommended sealant on drain plug and install it to the adapter case.

Drain plug tightening torque

: **9.8 - 19.6 N·m (1.0 -1.9 kg·m, 87 - 173 in·lb)**

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

CAUTION:

Do not reuse the O-ring.

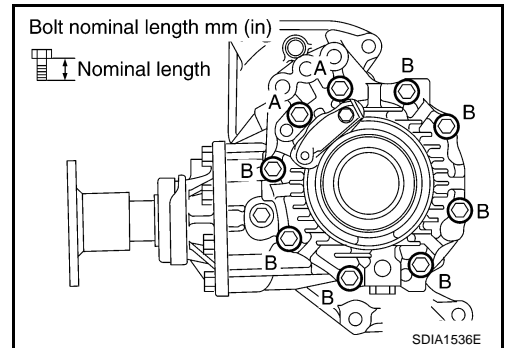
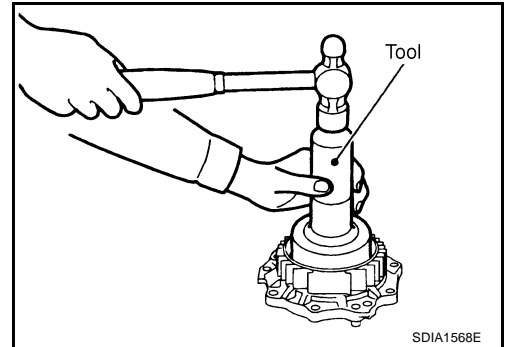
7. Install the adapter case to the transfer case, and apply anti-corrosive oil onto threads and seats on the mounting bolts. Tighten to the specified torque.

| | Bolt nominal length | Tightening torque |
|---|---------------------|--|
| A | 45 mm (1.77 in) | 14 - 16 N·m (1.5 - 1.6 kg·m, 10.4 - 11.8 ft·lb) |
| B | 30 mm (1.18 in) | |

8. Check backlash, preload torque, tooth contact, and companion flange runout. Refer to [TF-14, "Pre- Inspection"](#).

CAUTION:

Measure the Total preload torque without the oil seal.

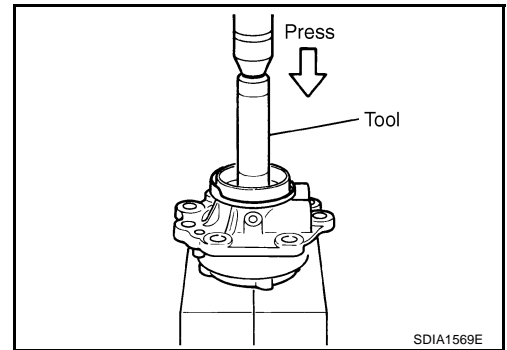


TRANSFER ASSEMBLY

Pinion Sleeve Assembly

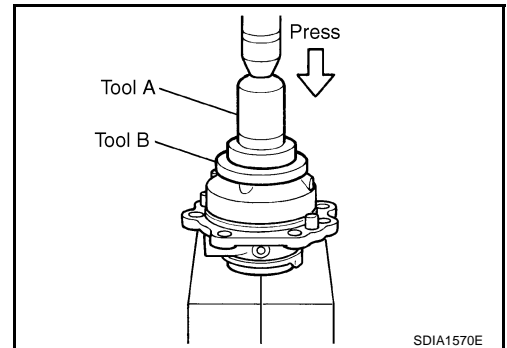
1. Select the pinion sleeve shim. Refer to [TF-73, "Pinion Sleeve Shim"](#) .
2. Using a drift, install the pinion rear bearing outer race.

Tool number : KV38100300 (J25523)



3. Using a drift, install the pinion front bearing outer race.

Tool number A: ST33400001 (J26082)
B: ST30901000 (J26010-01)



4. Apply gear oil to pinion front bearing inner race and mating position on the drive pinion gear. Using a drift, install pinion front bearing inner race to the drive pinion gear.

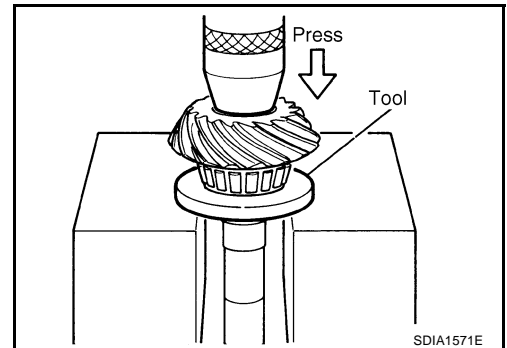
Tool number : ST30901000 (J26010-01)

5. Install a collapsible spacer to the drive pinion gear.

CAUTION:

Do not reuse the collapsible spacer.

6. Apply gear oil to pinion rear bearing inner race and install it to the pinion sleeve.

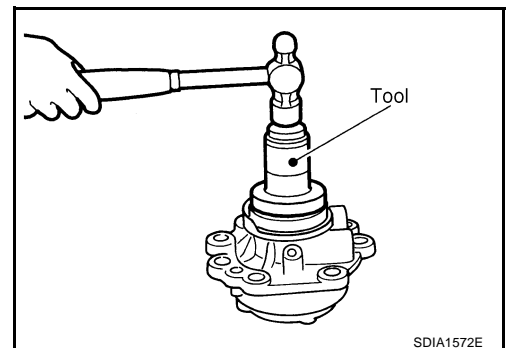


7. Using a drift, install an oil seal to the pinion sleeve.

Tool number : ST33400001 (J26082)

CAUTION:

- Discard old oil seals, replace with new ones.
- Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of the oil seal.




TRANSFER ASSEMBLY

8. Using a drift and press in the companion flange.

Tool number : ST33200000 (J26082)

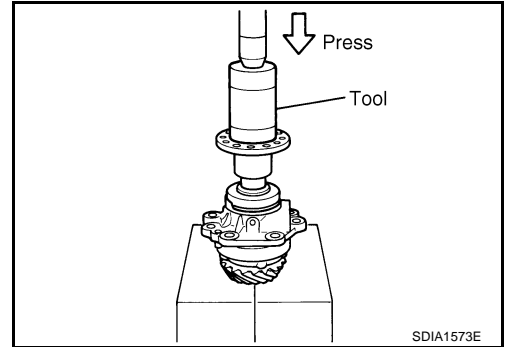
9. Apply anti-corrosion oil onto threads and seat of the pinion nut and adjust the pinion nut tightening torque and pinion bearing preload torque (P'1).

Pinion nut tightening torque

 : 128 - 294 N·m (13 - 29 kg·m, 95 - 216 ft·lb)

Pinion bearing preload torque (P'1)

: 0.40 - 0.78 N·m (0.04 - 0.08 kg·m, 4 - 6 in·lb)



CAUTION:

- Discard the old pinion nut, replace with new ones.
- Adjust the lower limit of the pinion nut tightening torque first.
- If specified preload torque is exceeded, replace the collapsible spacer and tighten again. Never loosen the pinion nut for further preload torque adjustment.
- After the adjustment, rotate the companion flange back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.

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

CAUTION:

Discard the old O-ring, replace with new one.

11. Assemble the selected pinion sleeve shim.

12. Install the pinion sleeve assembly, and apply anti-corrosive oil onto threads and seats on the mounting bolts. Tighten to the specified torque.

Tightening torque : 26 - 33 N·m (2.7 - 3.3 kg·m, 20 - 24 ft·lb)

13. Check backlash, preload torque, tooth contact, and companion flange runout. Refer to [TF-14, "Pre-Inspection"](#).

The Total preload torque is as follows:

Total preload torque

With all oil seals installed : P'1 + 0.45 - 0.47 N·m (0.045 - 0.048 kg·m, 3.9 - 4.1 in·lb)

Without transfer case oil seal and gear ring oil seal

: P'1 + 0.35 - 0.37 N·m (0.035 - 0.038 kg·m, 3.1 - 3.2 in·lb)

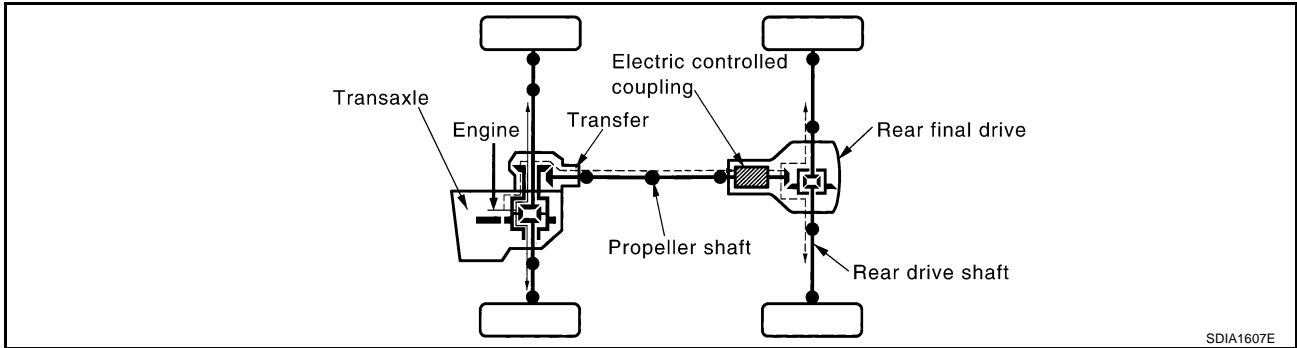
AWD SYSTEM

AWD SYSTEM

PFP:41650

System Component

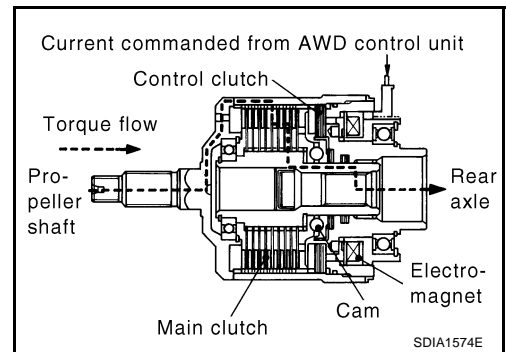
ADS000KV



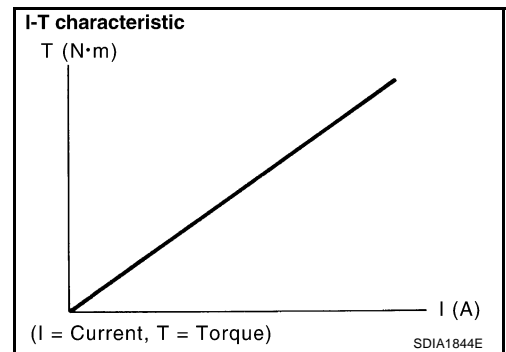
System Description ELECTRIC CONTROLLED COUPLING

ADS000KW

- In response to command current from AWD control unit, control clutch pull-in force is generated at the electromagnet and torque is generated at the control clutch.
- The cam operates in response to control clutch torque and applies pressure to main clutch.
- Main clutch transmits torque from input shaft to output shaft, according to the amount of pressure.

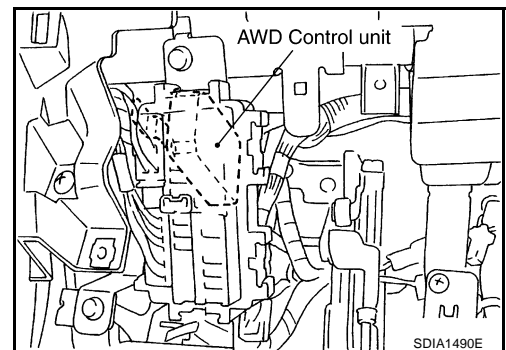


- The actual amount of torque transfer is determined by control current as shown in figure.



AWD CONTROL UNIT

- Controls distribution of drive power between front-wheel drive (100:0) and AWD (50:50) conditions circuit according to signals from sensors.
- If malfunction occurs in AWD system, AWD warning lamp turns ON and vehicle changes to front-wheel drive.
- Self-diagnosis can be done with CONSULT-II.



AWD LOCK SWITCH

AUTO Mode

- Electronic control allows optimal distribution of torque to front/rear wheels to match road conditions.
- Makes possible stable driving, with no wheel spin, on snowy roads or other slippery surfaces.

AWD SYSTEM

- On roads which do not require AWD, it contributes to improved fuel economy by driving in conditions close to front-wheel drive.
- Sensors determine the vehicle's turning condition, and in response tight cornering/braking are controlled by distributing optimum torque to rear wheels.

NOTE:

- When driving in AUTO mode or LOCK mode, if there is a large difference between front and rear wheel speed which continues for a long time, oil temperature of drive system parts becomes too high and AWD warning lamp flashes rapidly. (When AWD warning lamp flashes, vehicle changes to front-wheel drive conditions.)
- When driving in AUTO mode, AWD warning lamp may flash slowly if there is a significant difference in pressure or wear between tires. At this time, vehicle performance is not fully available and cautious driving is required. (Continues until engine is turned OFF.)
- If AWD warning lamp is flashing rapidly, stop vehicle and allow it to idle for some time. Flashing will stop and AUTO mode will be restored.
- If the warning lamp flashes slowly during driving but remains OFF after engine is restarted, the system is normal. If it again flashes slowly after driving for some time, vehicle must be inspected.
- When the difference of revolution speed between the front and rear wheel with AUTO mode the shift occasionally changes to LOCK mode automatically. This is not malfunction.

LOCK Mode (AWD LOCK Indicator Lamp ON)

- Front/rear wheel torque distribution is fixed, ensuring stable driving when climbing slopes.
- When LOCK mode is selected, vehicle will switch automatically to AUTO mode if vehicle speed increases. If vehicle speed then decreases, the vehicle automatically returns to direct 4-wheel driving conditions.

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.

AWD WARNING LAMP

Turns ON when there is a malfunction in AWD system. It indicates that fail-safe mode is engaged and vehicle change to front-wheel drive.

Also turns ON when ignition switch is turned ON, for purpose of bulb check. Turns OFF approximately for 1 seconds after the engine starts if system is normal.

AWD Warning Lamp Indication

| Condition | Display | AWD warning lamp |
|---|--|---|
| Lamp check | Turns ON when engine is started to check for burned-out lamps. | Turns ON when ignition switch is turned ON. Turns OFF approximately 1 seconds after engine start. |
| AWD system malfunction | Turns ON if there is malfunction in AWD system. | ON |
| Large difference in diameter of front/rear tires | AWD warning lamp flashes slowly. | Flashes once every 2 seconds. |
| Difference in front/rear wheel speed continues and oil temperature of drive system has increased. | AWD warning lamp flashes rapidly. | Flashes twice each second. |
| Other than above (system normal) | OFF | OFF |

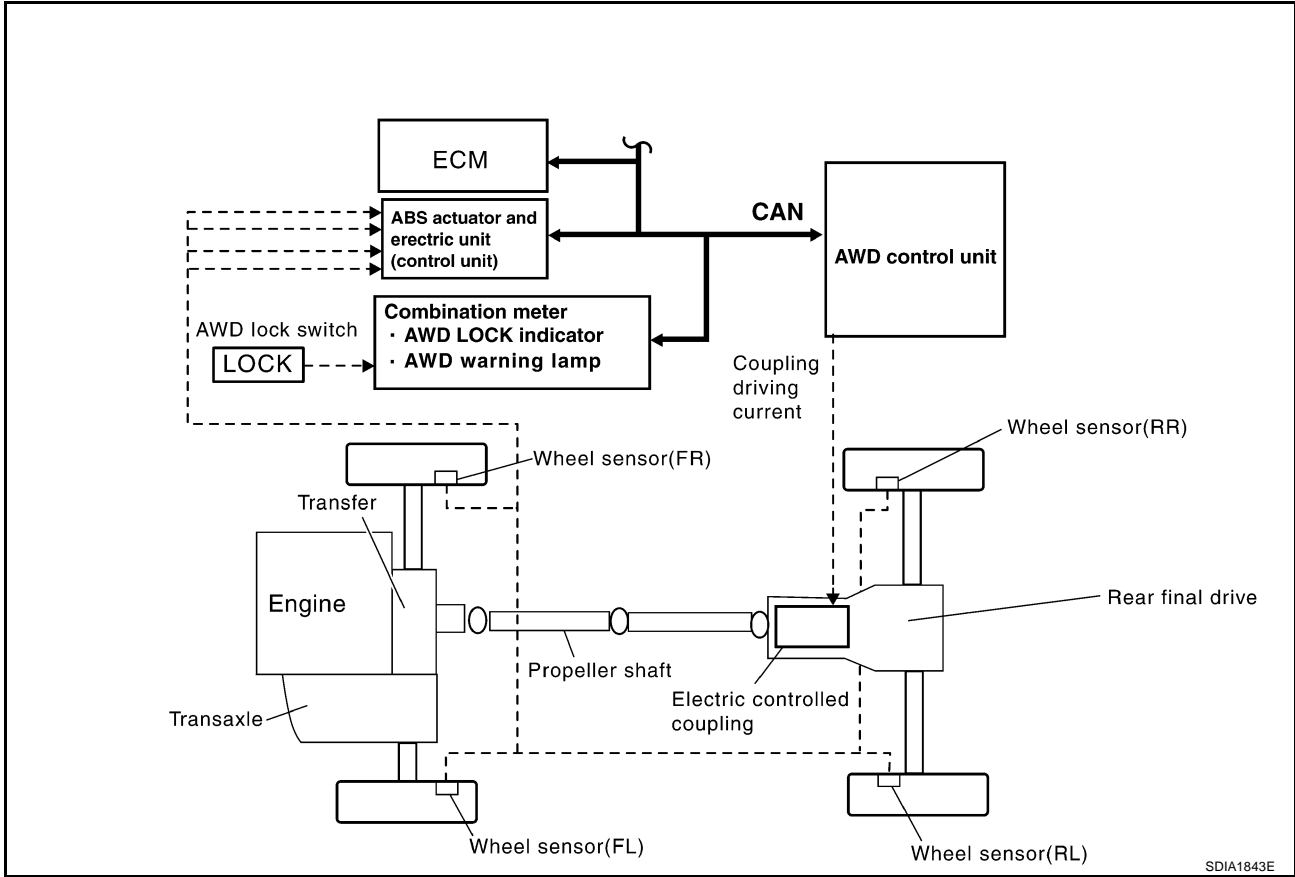
FAIL- SAFE FUNCTION

- If a malfunction occurs in AWD system, and control unit detects the malfunction, AWD warning lamp turns ON to indicate of system malfunction.
- When AWD warning lamp is ON, vehicle change to front-wheel drive.

AWD SYSTEM

System Diagram

ADS000KX



AWD SYSTEM

ADS000LS

CAN Communication SYSTEM DESCRIPTION

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

CAN COMMUNICATION UNIT

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Body type | Wagon | | | | | | | | | | | | | | | |
| Axle | AWD | | | | | | | | | | | | | | | |
| Engine | VQ35DE | | | | | | | | | | | | | | | |
| Transmission | CVT | | | | | | | | | | | | | | | |
| Brake control | ABS | | | | | | | | VDC | | | | | | | |
| Low tire pressure warning system | | × | | | × | × | | × | | × | | | × | × | | × |
| Navigation system | | | × | | × | | × | × | | | × | | × | | × | × |
| Automatic drive positioner | | | | × | | × | × | × | | | | × | | × | × | × |
| CAN communication unit | | | | | | | | | | | | | | | | |
| ECM | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| TCM | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| Low tire pressure warning control unit | | × | | | × | × | | × | | × | | | × | × | | × |
| Display unit | × | × | | × | | × | | | × | × | | × | | × | | |
| Display control unit | | | × | | × | | × | × | | | × | | × | | × | × |
| Data link connector | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| BCM | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| Unified meter and A/C amp. | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| Steering angle sensor | | | | | | | | | × | × | × | × | × | × | × | × |
| Driver seat control unit | | | | × | | × | × | × | | | | × | | × | × | × |
| AWD control unit | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| ABS actuator and electric unit (control unit) | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| IPDM E/R | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × | × |
| CAN communication type | <u>TF-34. "Type 17/Type 18/Type 19/Type 20/Type 21/Type 22/Type 23/Type 24"</u> | | | | | | | | <u>TF-38. "Type 25/Type 26/Type 27/Type 28/Type 29/Type 30/Type 31/Type 32"</u> | | | | | | | |

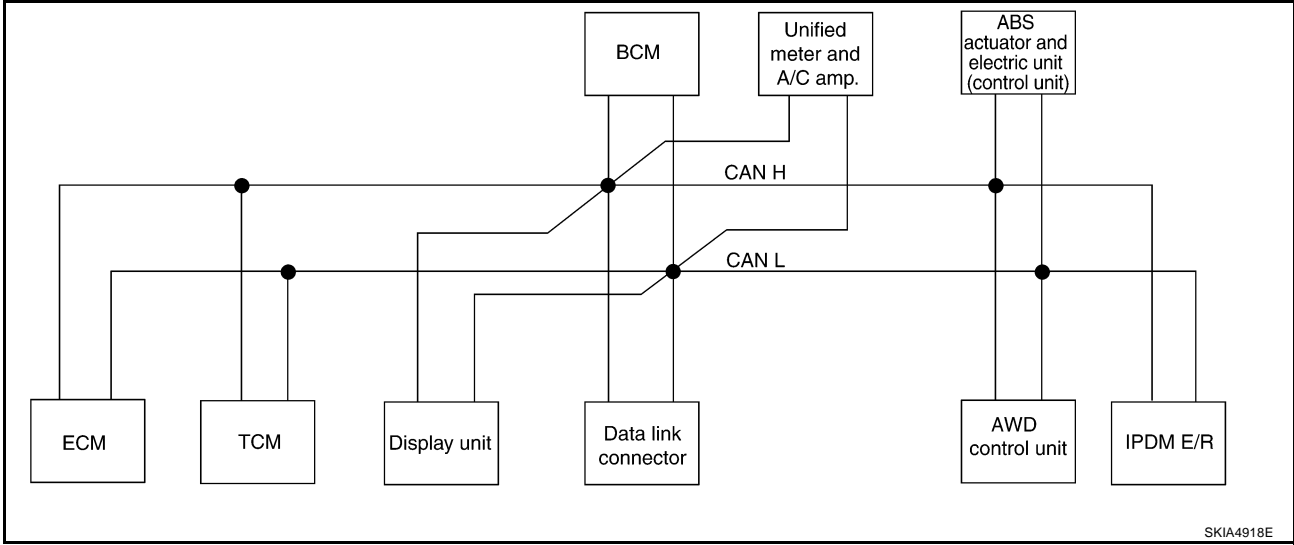
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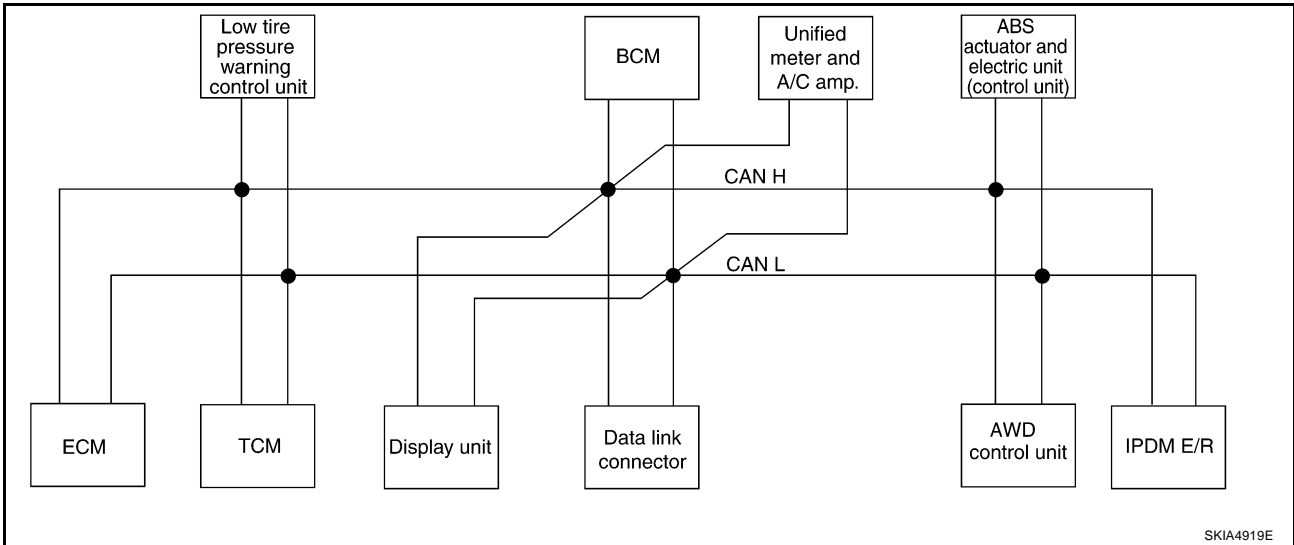
AWD SYSTEM

Type 17/Type 18/Type 19/Type 20/Type 21/Type 22/Type 23/Type 24 SYSTEM DIAGRAM

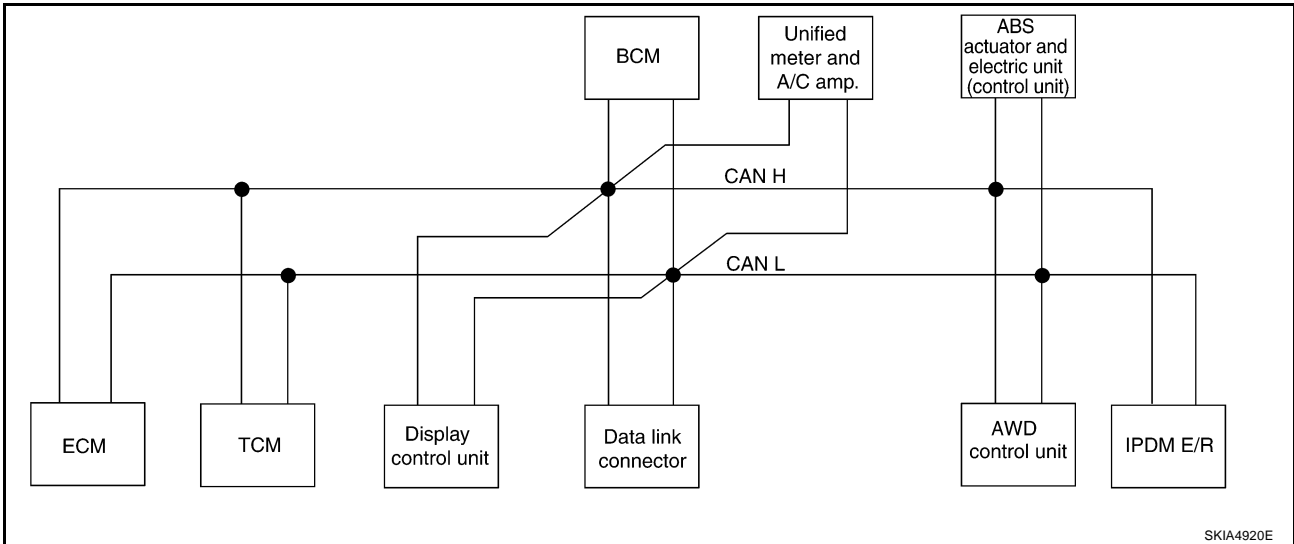
- Type 17



- Type 18

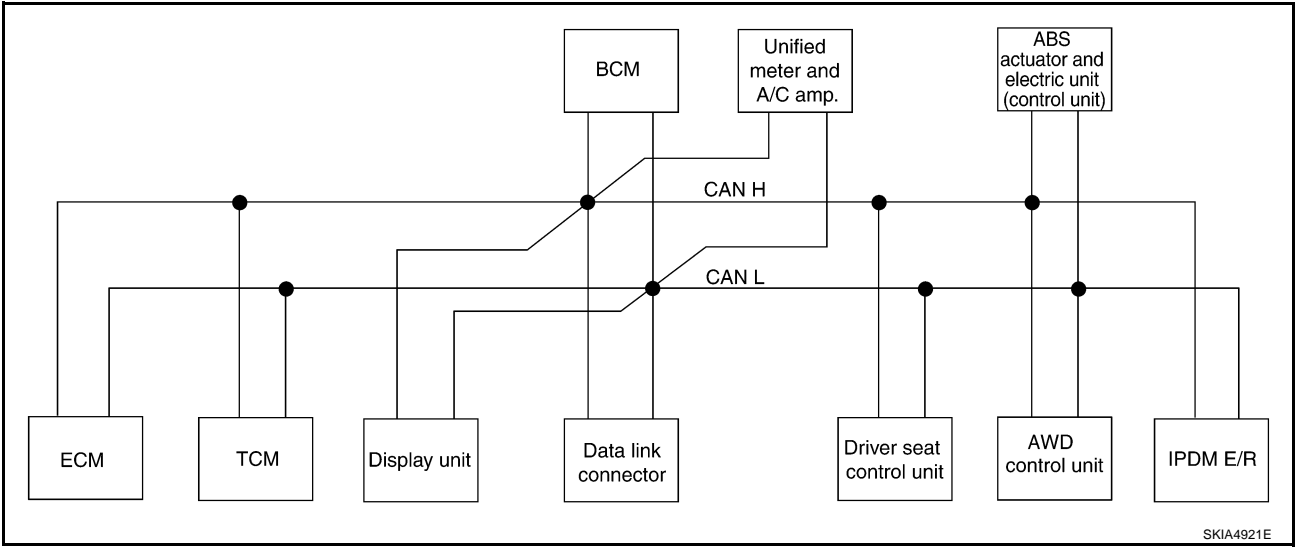


- Type 19

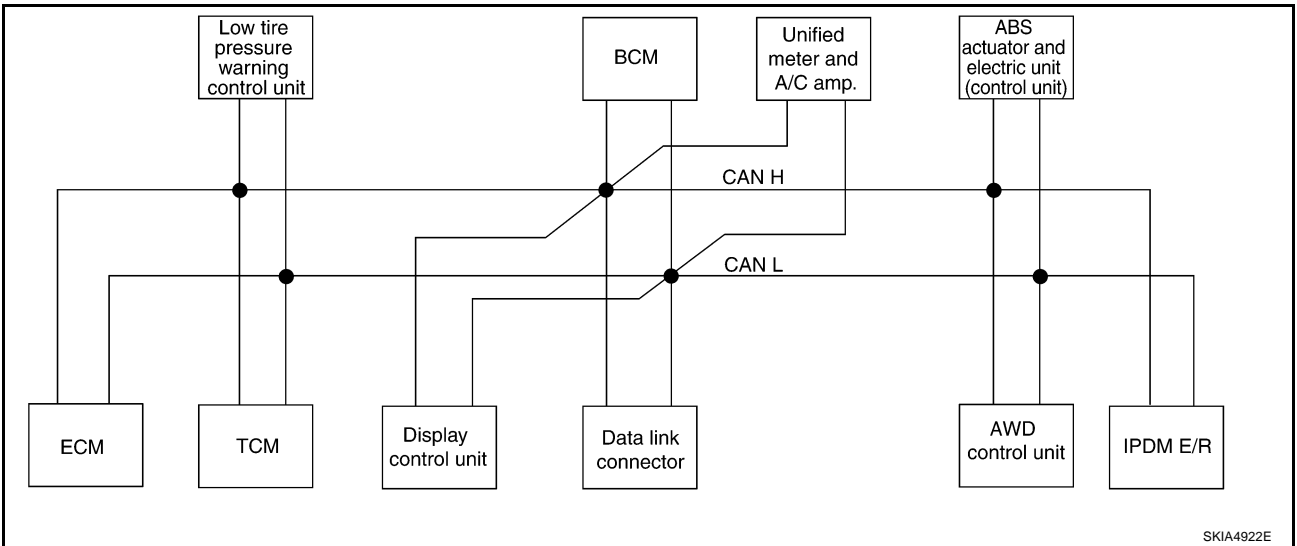


AWD SYSTEM

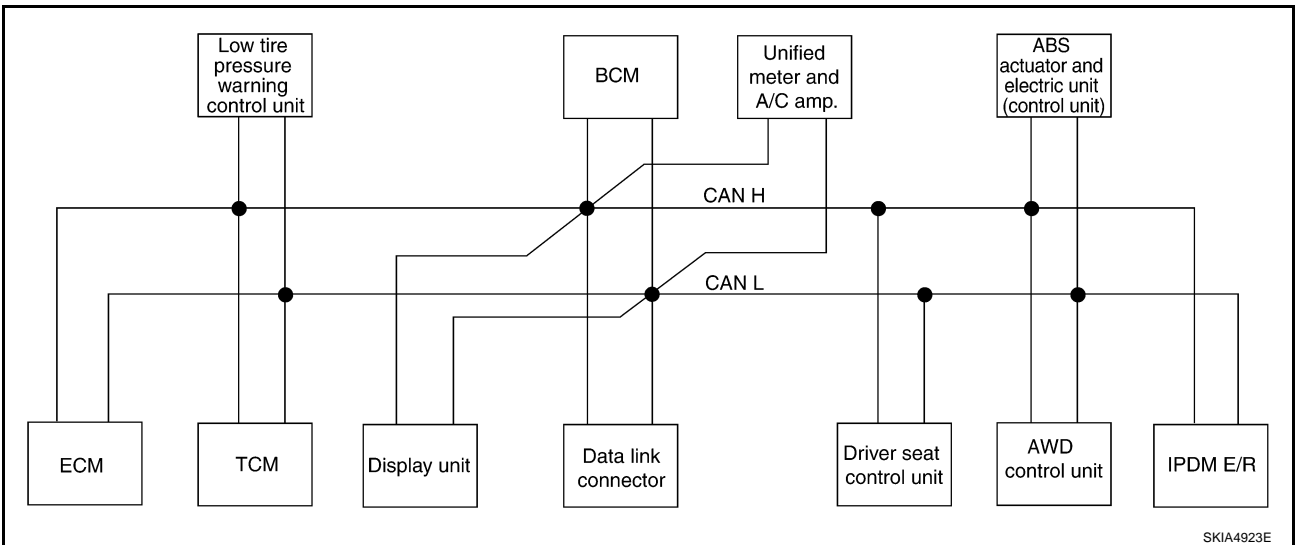
- Type20



- Type21



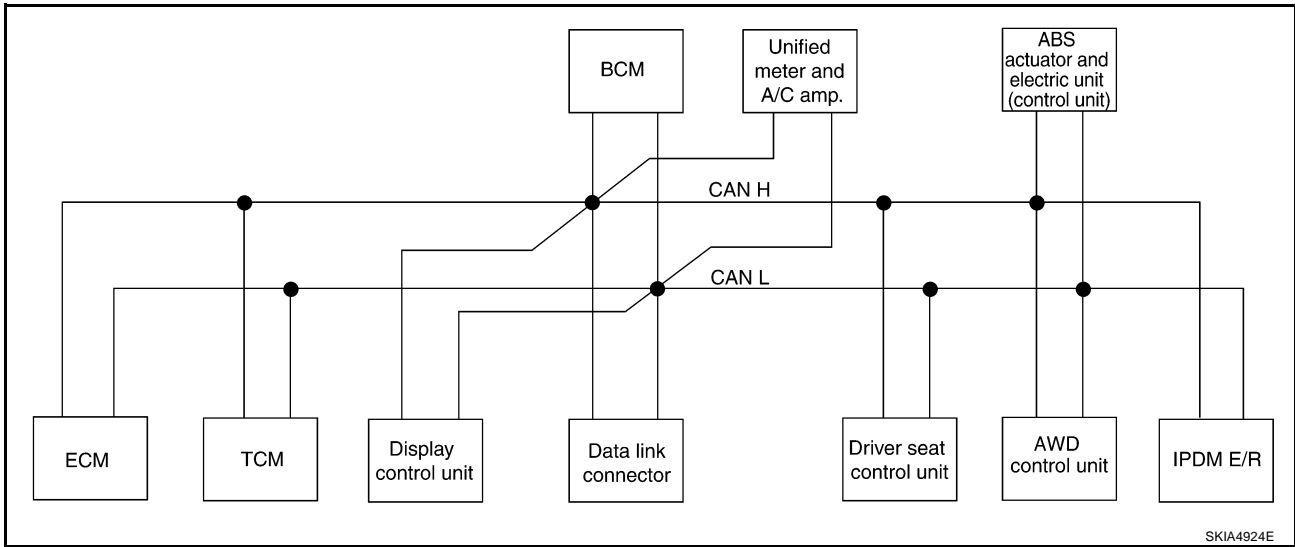
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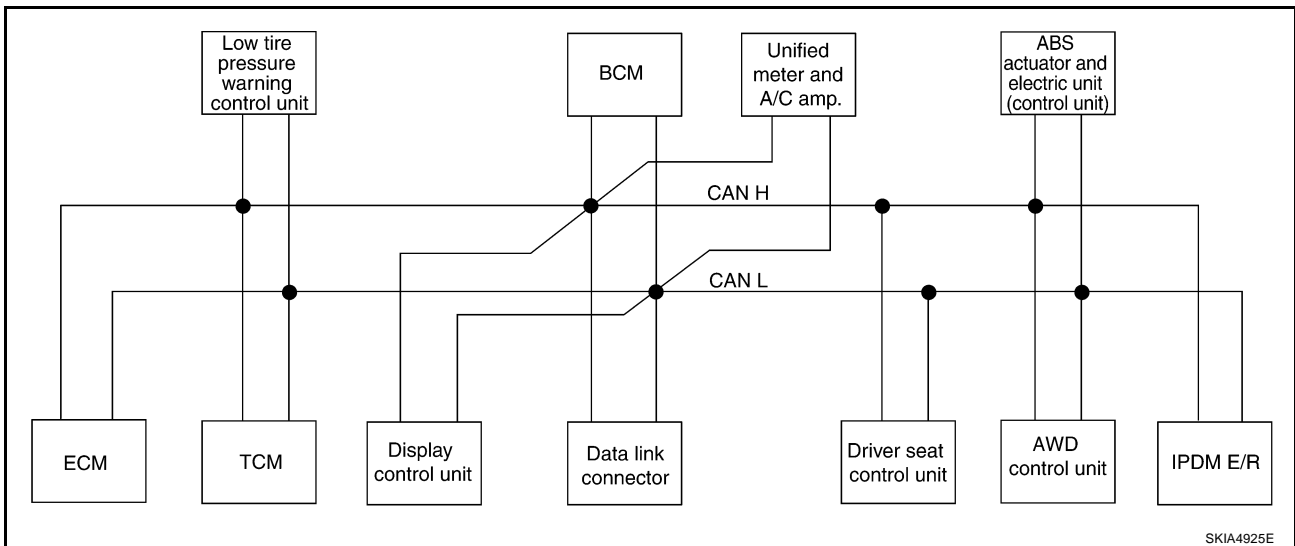
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AWD SYSTEM

● Type23



● Type24



INPUT/OUTPUT SIGNAL CHART

T: Transmit R: Receive

| Signals | ECM | TCM | Low tire pressure warning control unit | Display unit | Display control unit | BCM | Unified meter and A/C amp. | Driver seat control unit | AWD control unit | ABS actuator and electric unit (control unit) | IPDM E/R |
|-----------------------------------|-----|-----|--|--------------|----------------------|-----|----------------------------|--------------------------|------------------|---|----------|
| CVT position indicator signal | | T | | | | | R | | | | |
| Second position signal | | R | | | | | T | | | | |
| Second position indicator signal | | T | | | | | R | | | | |
| Engine speed signal | T | R | R | | R | R | R | | R | | |
| Engine status signal | T | | | | | R | | | | | |
| Engine coolant temperature signal | T | | | | | | R | | | | |
| Accelerator pedal position signal | T | R | | | | | | | R | | |
| Closed throttle position signal | T | R | | | | | | | | | |

AWD SYSTEM

| Signals | ECM | TCM | Low tire pressure warning control unit | Display unit | Display control unit | BCM | Unified meter and A/C amp. | Driver seat control unit | AWD control unit | ABS actuator and electric unit (control unit) | IPDM E/R |
|------------------------------------|-----|-----|--|--------------|----------------------|-----|----------------------------|--------------------------|------------------|---|----------|
| Wide open throttle position signal | T | R | | | | | | | | | |
| Key switch signal | | | | | | T | | R | | | |
| Ignition switch signal | | | | | | T | | R | | | R |
| P range signal | | T | | | | | | R | | | |
| Stop lamp switch signal | | R | | | | | T | | R | | |
| Fuel consumption monitor signal | T | | | | | | R | | | | |
| CVT self-diagnosis signal | R | T | | | | | | | | | |
| ABS operation signal | | R | | | | | | | R | T | |
| Air conditioner switch signal | R | | | | | T | | | | | |
| A/C compressor request signal | T | | | | | | | | | | R |
| A/C compressor feedback signal | T | | | | | | R | | | | |
| Blower fan motor switch signal | R | | | | | T | | | | | |
| A/C control signal | | | | T | T | | R | | | | |
| | | | | R | R | | T | | | | |
| Cooling fan speed request signal | T | | | | | | | | | | R |
| Position lights request signal | | | | | | T | R | | | | R |
| Low beam request signal | | | | | | T | | | | | R |
| Low beam status signal | R | | | | | | | | | | T |
| High beam request signal | | | | | | T | R | | | | R |
| High beam status signal | R | | | | | | | | | | T |
| Front fog lights request signal | | | | | | T | | | | | R |
| Vehicle speed signal | | R | | | | | R | | R | T | |
| | R | | R | | R | R | T | R | | | |
| Sleep request 1 signal | | | | | | T | R | | | | |
| Sleep request 2 signal | | | | | | T | | | | | R |
| Door switch signal | | | | | | R | T | | | | |
| | | | | R | R | T | R | R | | | R |
| Key fob ID signal | | | | | | T | | R | | | |
| Key fob door unlock signal | | | | | | T | | R | | | |
| Turn indicator signal | | | | | | T | R | | | | |
| Seat belt buckle switch signal | | | | | | R | T | | | | |
| Oil pressure switch signal | | | | | | R | | | | | T |
| | | | | | | T | R | | | | |
| Buzzer output signal | | | | | | T | R | | | | |
| Fuel level sensor signal | R | | | | | | T | | | | |
| Fuel level low warning signal | | | | R | R | | T | | | | |
| Malfunction indicator lamp signal | T | | | | | | R | | | | |
| ASCD SET lamp signal | T | | | | | | R | | | | |

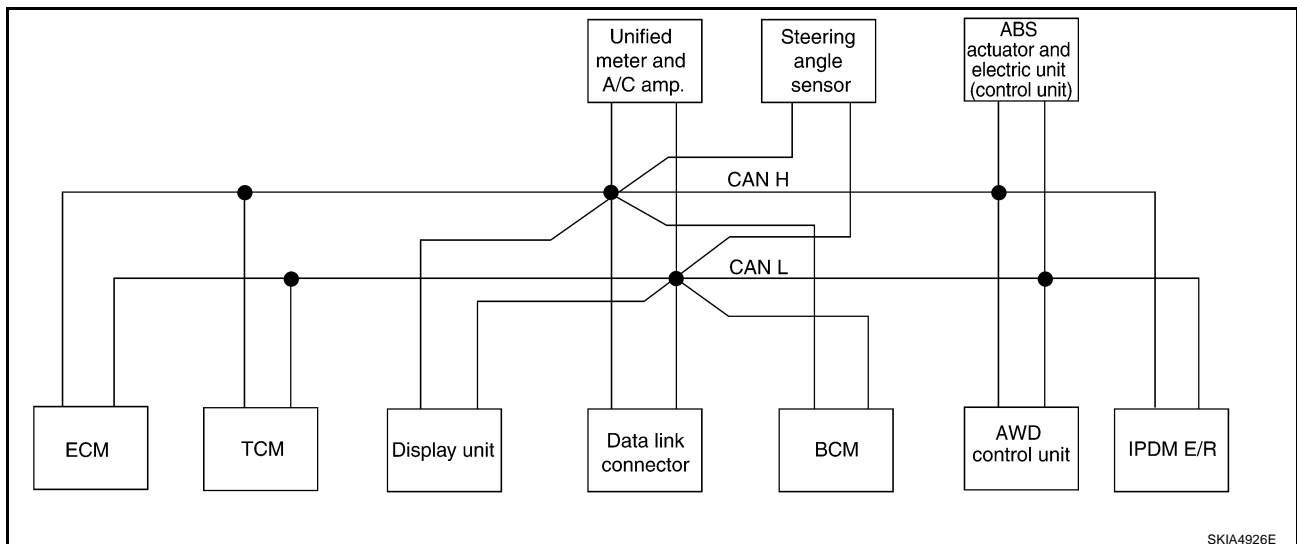
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AWD SYSTEM

| Signals | ECM | TCM | Low tire pressure warning control unit | Display unit | Display control unit | BCM | Unified meter and A/C amp. | Driver seat control unit | AWD control unit | ABS actuator and electric unit (control unit) | IPDM E/R |
|--|-----|-----|--|--------------|----------------------|-----|----------------------------|--------------------------|------------------|---|----------|
| ASCD CRUISE lamp signal | T | | | | | | R | | | | |
| Input shaft revolution signal | R | T | | | | | | | | | |
| Output shaft revolution signal | R | T | | | | | | | | | |
| Front wiper request signal | | | | | | T | | | | | R |
| Front wiper stop position signal | | | | | | R | | | | | T |
| Rear window defogger switch signal | | | | | | T | | | | | R |
| Rear window defogger control signal | R | | | R | R | | | | | | T |
| Engine and CVT integrated control signal | T | R | | | | | | | | | |
| | R | T | | | | | | | | | |
| Hood switch signal | | | | | | R | | | | | T |
| Theft warning horn request signal | | | | | | T | | | | | R |
| Horn chirp signal | | | | | | T | | | | | R |
| Tire pressure signal | | | T | | | | R | | | | |
| Tire pressure data signal | | | T | R | R | | | | | | |
| ABS warning lamp signal | | | | | | | R | | | T | |
| Brake warning lamp signal | | | | | | | R | | | T | |
| System setting signal | | | | T | T | | | R | | | |
| AWD warning lamp signal | | | | | | | R | | T | | |
| AWD lock indicator lamp signal | | | | | | | R | | T | | |
| AWD lock switch signal | | | | | | | T | | R | | |
| Parking brake switch signal | | | | | | R | T | | R | | |

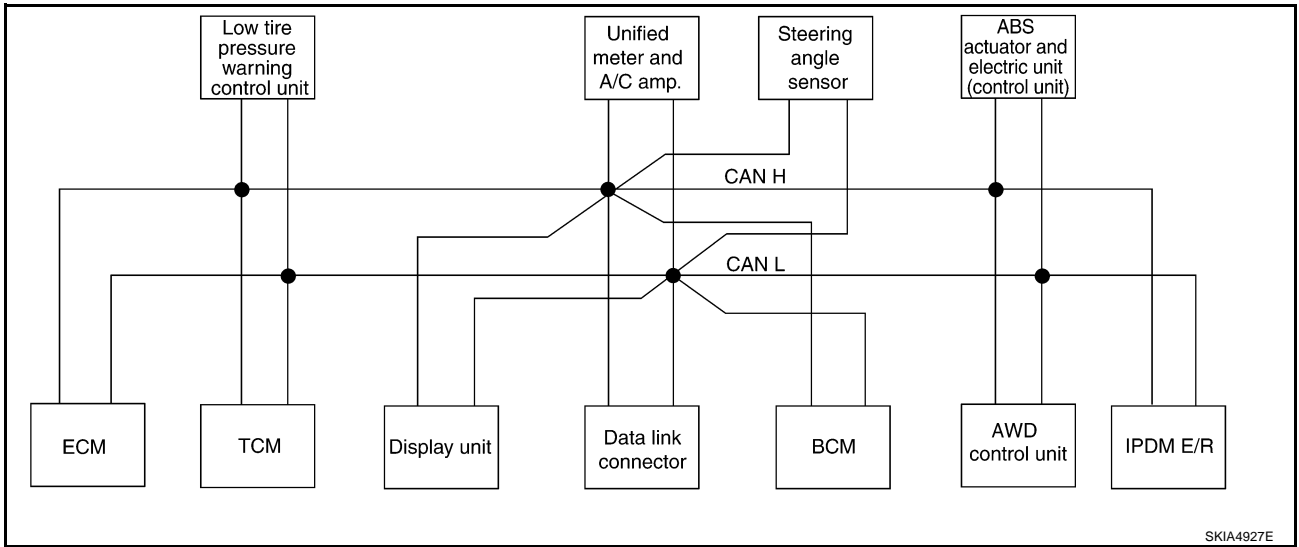
Type 25/Type 26/Type 27/Type 28/Type 29/Type 30/Type 31/Type 32 SYSTEM DIAGRAM

- Type25

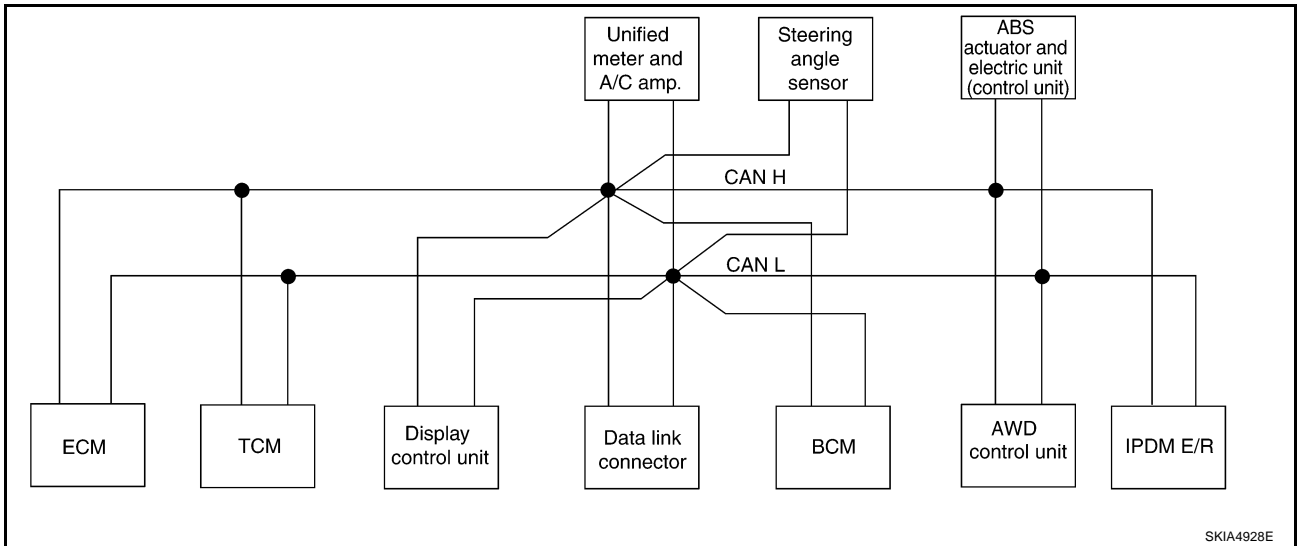


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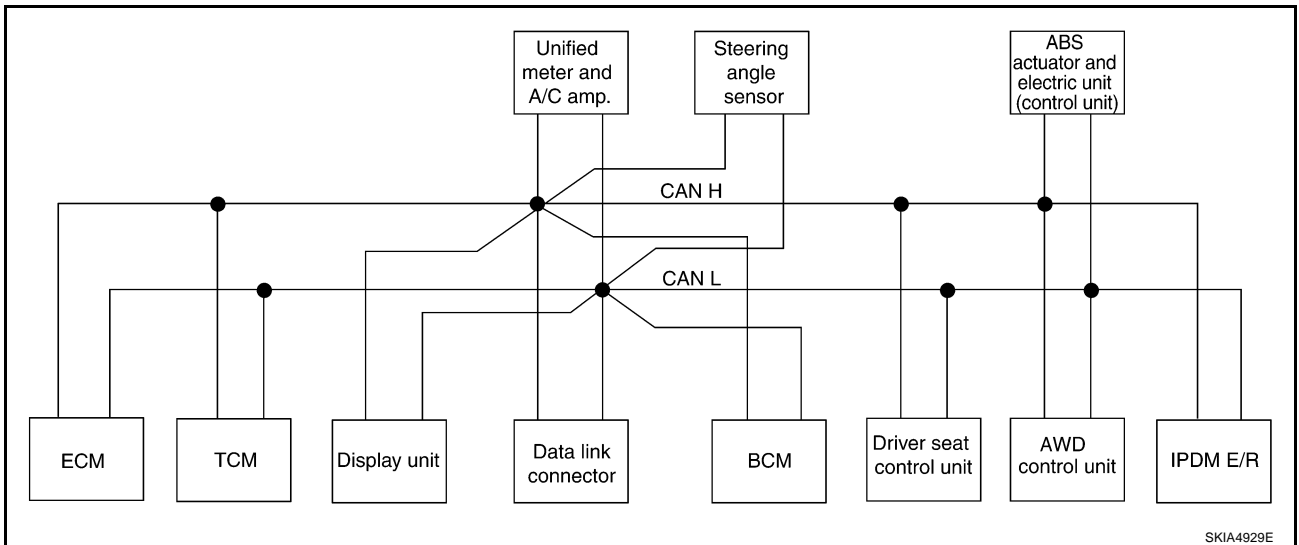
- Type26



- Type27



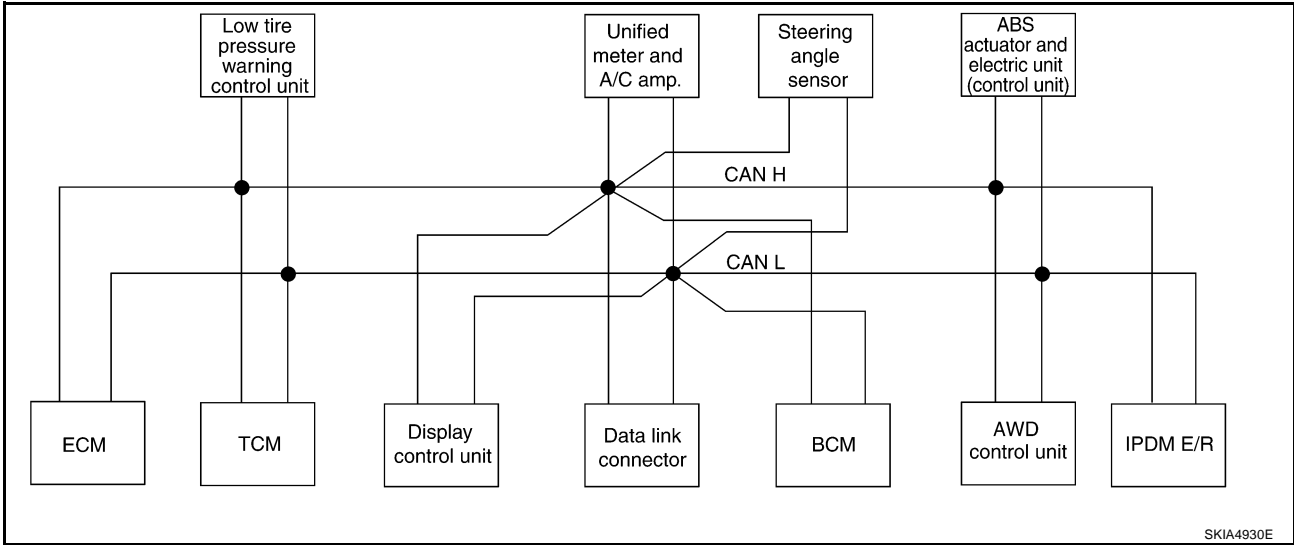
- Type28



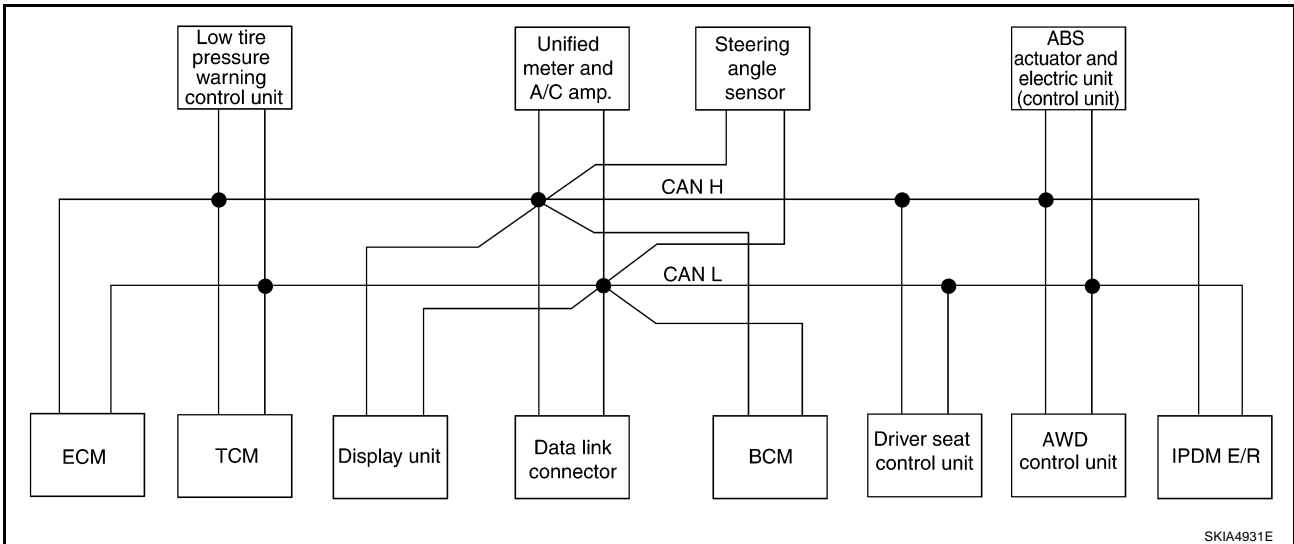
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AWD SYSTEM

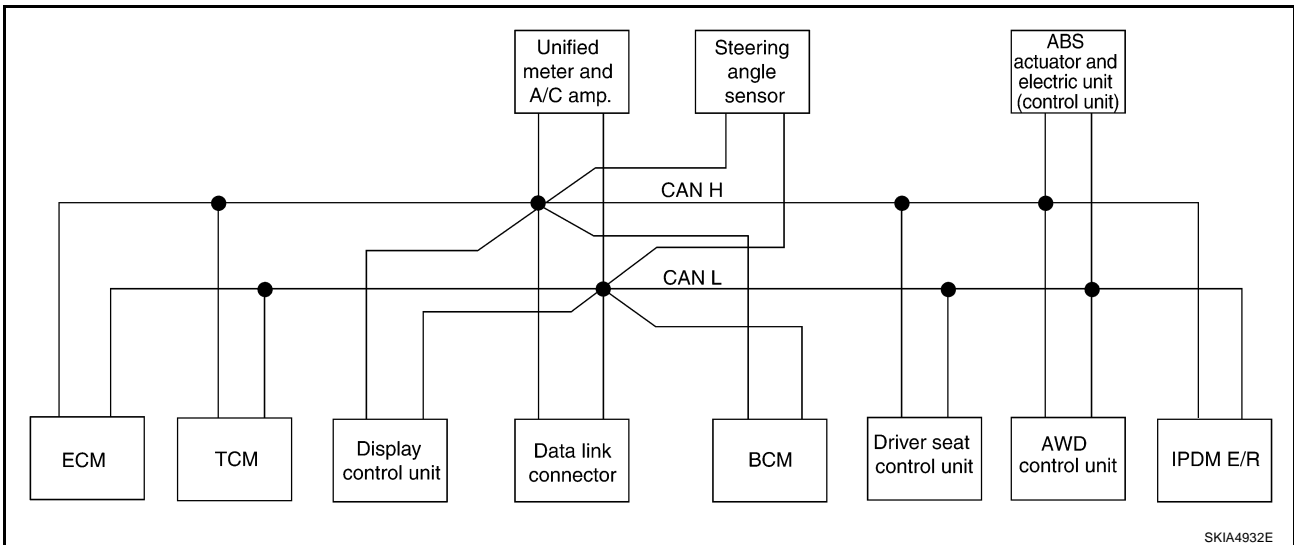
- Type29



- Type30

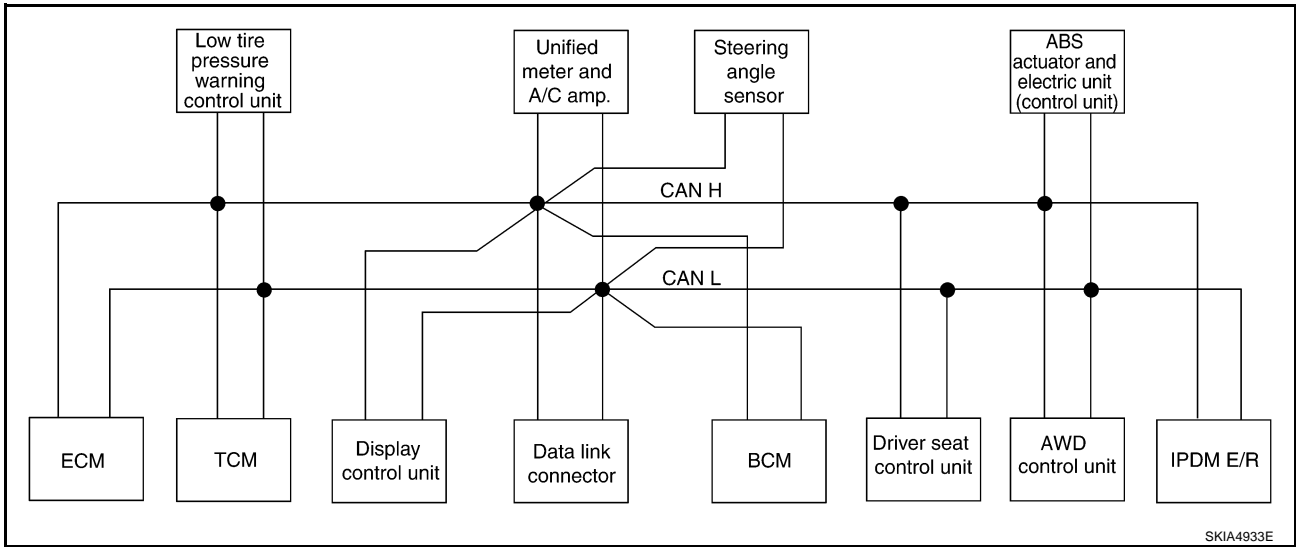


- Type31



AWD SYSTEM

● Type32



INPUT/OUTPUT SIGNAL CHART

T: Transmit R: Receive

| Signals | ECM | TCM | Low tire pressure warning control unit | Display unit | Display control unit | BCM | Unified meter and A/C amp. | Steering angle sensor | Driver seat control unit | AWD control unit | ABS actuator and electric unit (control unit) | IPDM E/R |
|--|-----|-----|--|--------------|----------------------|-----|----------------------------|-----------------------|--------------------------|------------------|---|----------|
| Engine and CVT integrated control signal | T | R | | | | | | | | | | |
| | R | T | | | | | | | | | | |
| Second position signal | | R | | | | | T | | | | | |
| VDC operation signal | | R | | | | | | | | R | T | |
| Stop lamp switch signal | | R | | | | | T | | | R | | |
| Key switch signal | | | | | | T | | | R | | | |
| Ignition switch signal | | | | | | T | | | R | | | R |
| P range signal | | T | | | | | | | R | | R | |
| Closed throttle position signal | T | R | | | | | | | | | | |
| Wide open throttle position signal | T | R | | | | | | | | | | |
| Second position indicator signal | | T | | | | | R | | | | R | |
| Engine speed signal | T | R | | | R | R | R | | | R | R | |
| Engine status signal | T | | | | | R | | | | | | |
| Engine coolant temperature signal | T | | | | | | R | | | | | |
| Accelerator pedal position signal | T | R | | | | | | | | R | R | |
| Fuel consumption monitor signal | T | | | | | | R | | | | | |
| CVT self-diagnosis signal | R | T | | | | | | | | | | |
| Input shaft revolution signal | R | T | | | | | | | | | R | |
| Output shaft revolution signal | R | T | | | | | | | | | R | |
| Air conditioner switch signal | R | | | | | T | | | | | | |
| A/C compressor request signal | T | | | | | | | | | | | R |
| A/C compressor feedback signal | T | | | | | | R | | | | | T |

AWD SYSTEM

| Signals | ECM | TCM | Low tire pressure warning control unit | Display unit | Display control unit | BCM | Unified meter and A/C amp. | Steering angle sensor | Driver seat control unit | AWD control unit | ABS actuator and electric unit (control unit) | IPDM E/R |
|-------------------------------------|-----|-----|--|--------------|----------------------|-----|----------------------------|-----------------------|--------------------------|------------------|---|----------|
| Blower fan motor switch signal | R | | | | | T | | | | | | |
| A/C control signal | | | | T | T | | R | | | | | |
| | | | | R | R | | T | | | | | |
| Cooling fan speed request signal | T | | | | | | | | | | | R |
| Position lights request signal | | | | | | T | R | | | | | R |
| Low beam request signal | | | | | | T | | | | | | R |
| Low beam status signal | R | | | | | | | | | | | T |
| High beam request signal | | | | | | T | R | | | | | R |
| High beam status signal | R | | | | | | | | | | | T |
| Front fog lights request signal | | | | | | T | | | | | | R |
| Vehicle speed signal | | R | | | | | R | | | R | T | |
| | R | | R | | R | R | T | | R | | | |
| Sleep request 1 signal | | | | | | T | R | | | | | |
| Sleep request 2 signal | | | | | | T | | | | | | R |
| Door switch signal | | | | | | R | T | | | | | |
| | | | | R | R | T | R | | R | | | R |
| Turn indicator signal | | | | | | T | R | | | | | |
| Key fob ID signal | | | | | | T | | | R | | | |
| Key fob door unlock signal | | | | | | T | | | R | | | |
| Seat belt buckle switch signal | | | | | | R | T | | | | | |
| Oil pressure switch signal | | | | | | R | | | | | | T |
| | | | | | | T | R | | | | | |
| Buzzer output signal | | | | | | T | R | | | | | |
| Fuel level sensor signal | R | | | | | | T | | | | | |
| Fuel level low warning signal | | | | R | R | | T | | | | | |
| Malfunction indicator signal | T | | | | | | R | | | | | |
| ASCD SET lamp signal | T | | | | | | R | | | | | |
| ASCD CRUISE lamp signal | T | | | | | | R | | | | | |
| Front wiper request signal | | | | | | T | | | | | | R |
| Front wiper stop position signal | | | | | | R | | | | | | T |
| Rear window defogger switch signal | | | | | | T | | | | | | R |
| Rear window defogger control signal | R | | | R | R | | | | | | | T |
| Hood switch signal | | | | | | R | | | | | | T |
| Theft warning horn request signal | | | | | | T | | | | | | R |
| Horn chirp signal | | | | | | T | | | | | | R |
| Steering angle sensor signal | | | | | | | | T | | | R | |
| Tire pressure signal | | | T | | | | R | | | | | |
| Tire pressure data signal | | | T | R | R | | | | | | | |

AWD SYSTEM

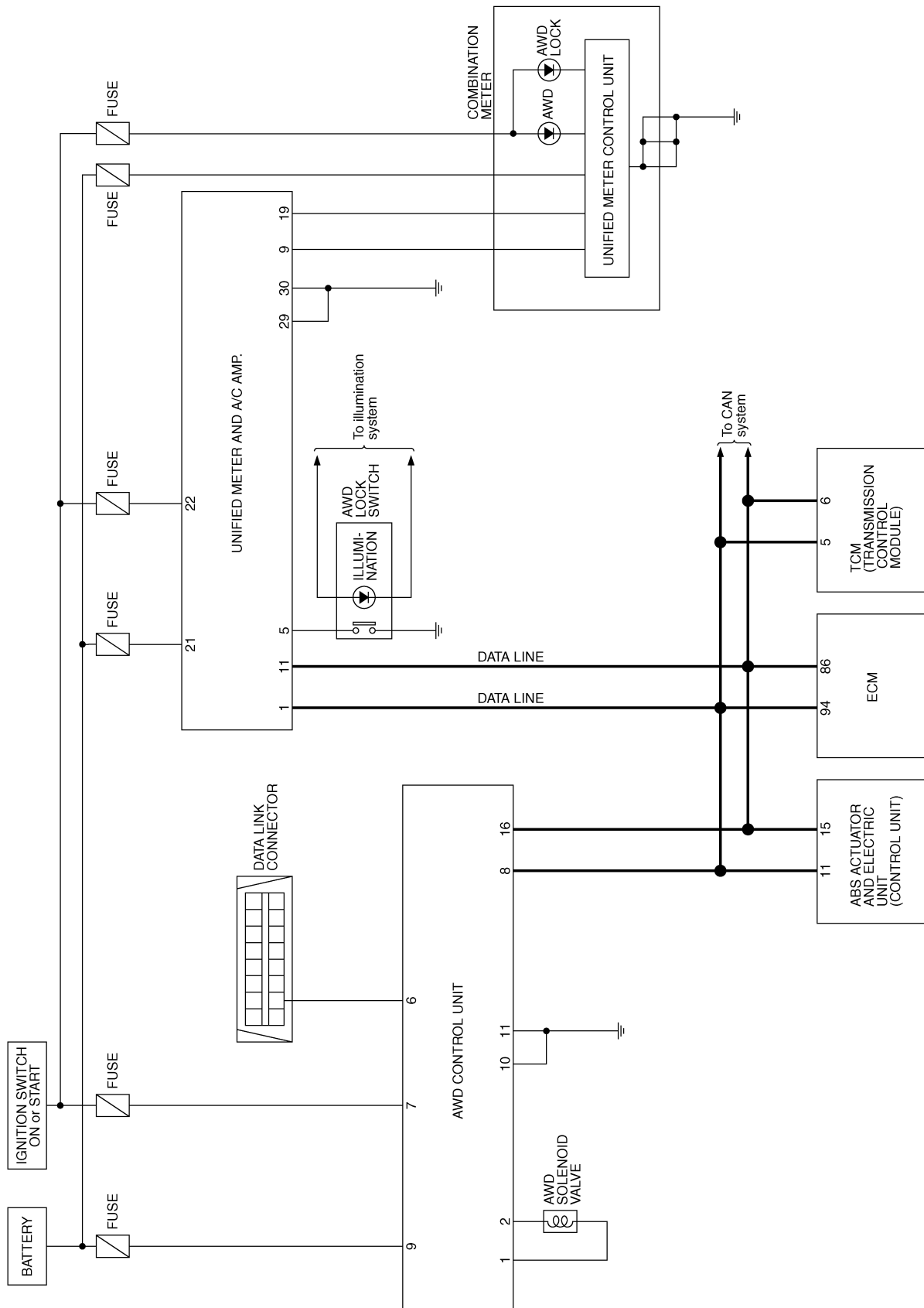
| Signals | ECM | TCM | Low tire pressure warning control unit | Display unit | Display control unit | BCM | Unified meter and A/C amp. | Steering angle sensor | Driver seat control unit | AWD control unit | ABS actuator and electric unit (control unit) | IPDM E/R |
|--------------------------------|-----|-----|--|--------------|----------------------|-----|----------------------------|-----------------------|--------------------------|------------------|---|----------|
| CVT position indicator signal | | T | | | | | R | | | | R | |
| ABS warning lamp signal | | | | | | | R | | | | T | |
| VDC OFF indicator lamp signal | | | | | | | R | | | | T | |
| SLIP indicator lamp signal | | | | | | | R | | | | T | |
| Brake warning lamp signal | | | | | | | R | | | | T | |
| System setting signal | | | | T | T | | | | R | | | |
| AWD warning lamp signal | | | | | | | R | | | T | | |
| AWD lock indicator lamp signal | | | | | | | R | | | T | | |
| AWD lock switch signal | | | | | | | T | | | R | | |
| Parking brake switch signal | | | | | | R | T | | | R | | |

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AWD SYSTEM

Circuit Diagram

ADS000KZ



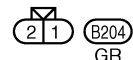
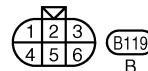
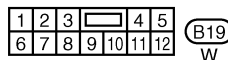
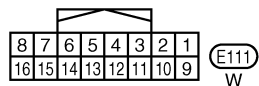
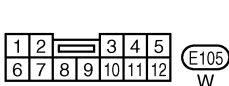
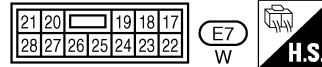
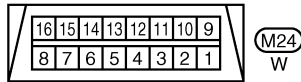
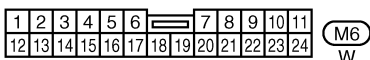
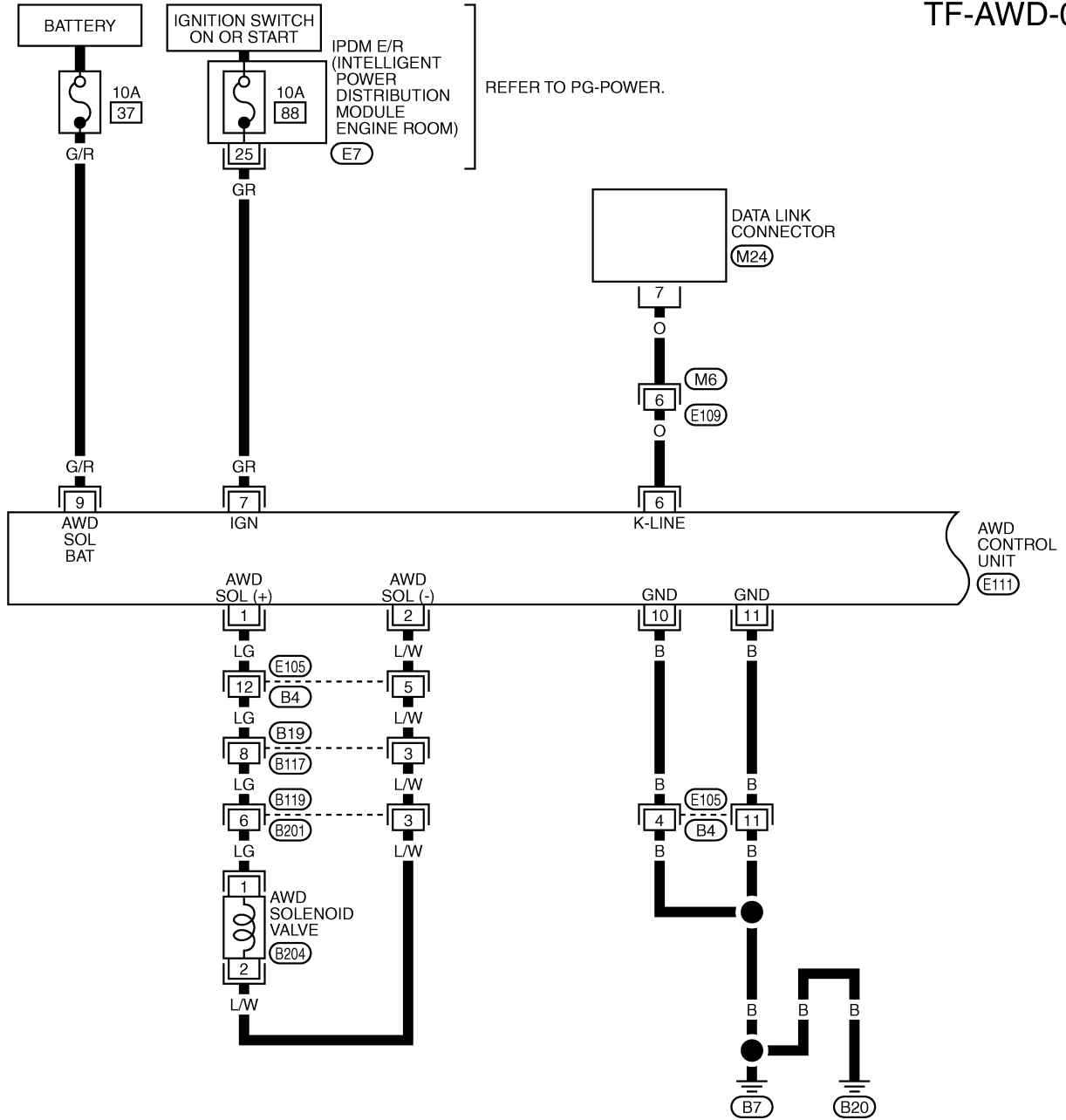
TDWA0009E

AWD SYSTEM

Wiring Diagram

ADS000L0

TF-AWD-01

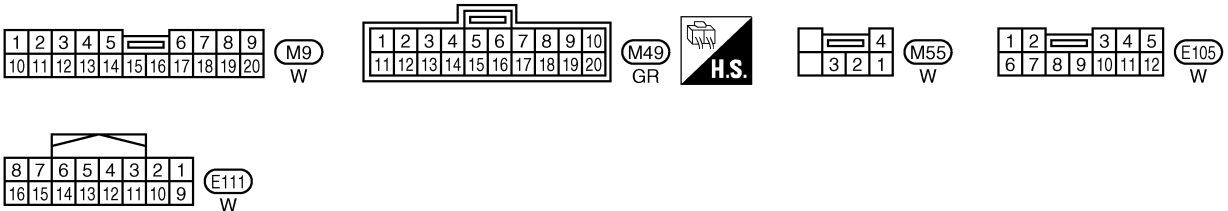
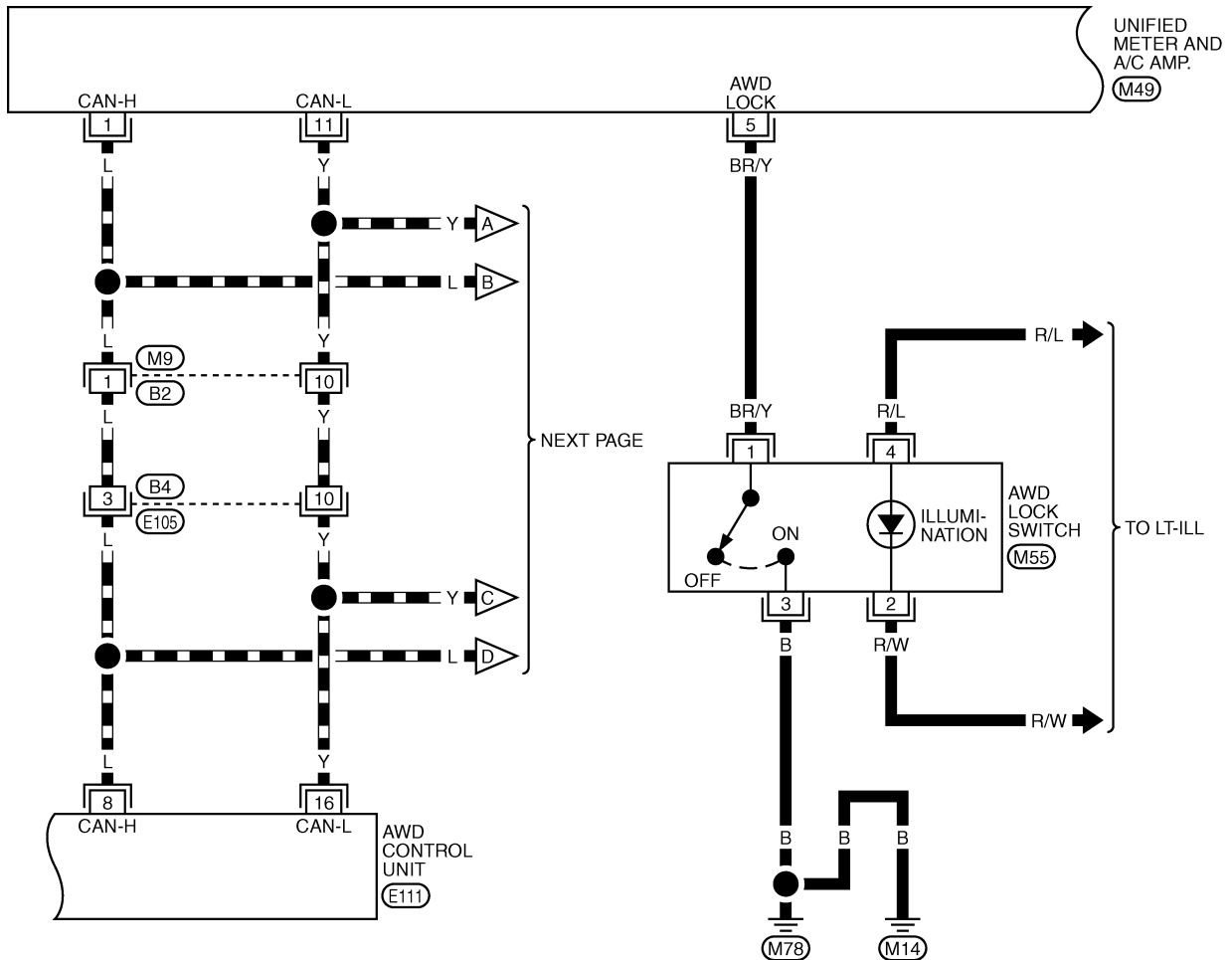


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AWD SYSTEM

TF-AWD-02

▬▬▬▬ : DATA LINE

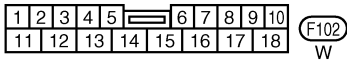
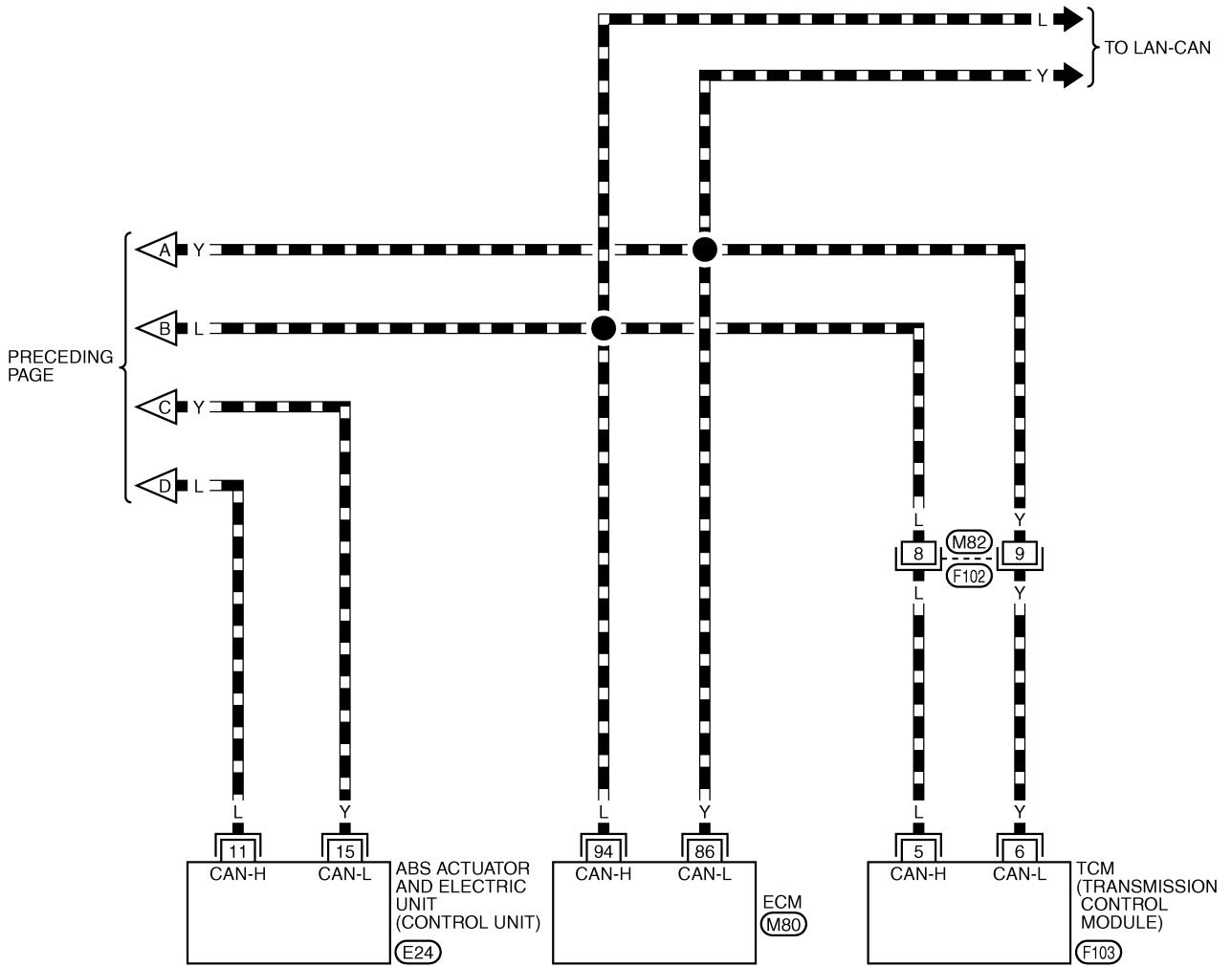


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AWD SYSTEM

TF-AWD-03

▬ : DATA LINE



REFER TO THE FOLLOWING.

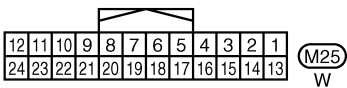
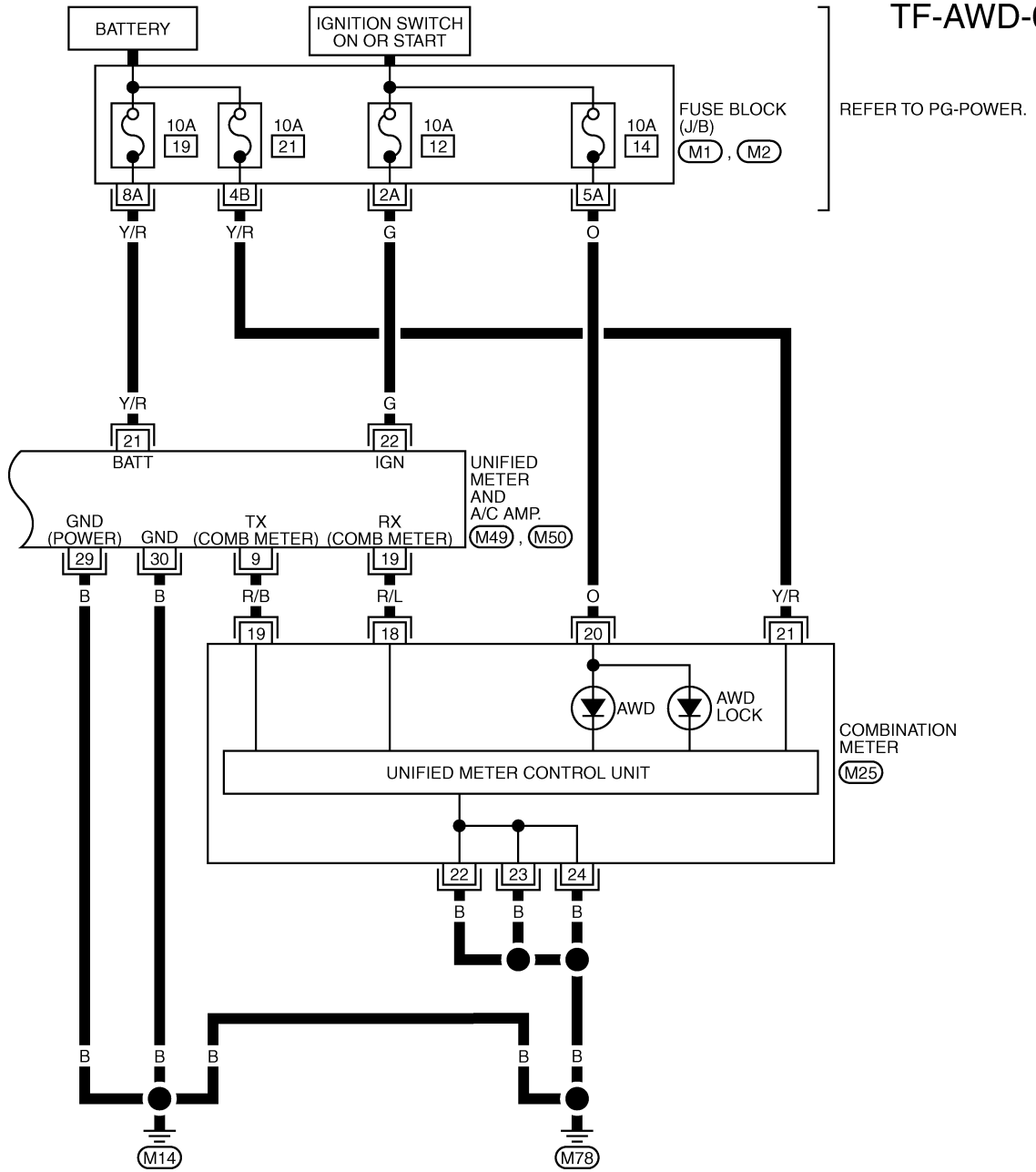
(M80), (E24), (F103)

-ELECTRICAL UNITS

TDWA0012E

AWD SYSTEM

TF-AWD-04



REFER TO THE FOLLOWING.
(M1), (M2) - FUSE BLOCK-JUNCTION BOX (J/B)

TDWA0013E

TROUBLE DIAGNOSIS

PFP:00004

Fail-Safe Function

ADS000H0

- If any malfunction occurs in AWD electrical system, and control unit detects the malfunction, AWD warning lamp on combination meter turns ON to indicate system malfunction.
- When AWD warning lamp is ON, vehicle changes to front-wheel drive.

How to Proceed with Trouble Diagnosis

ADS000H1

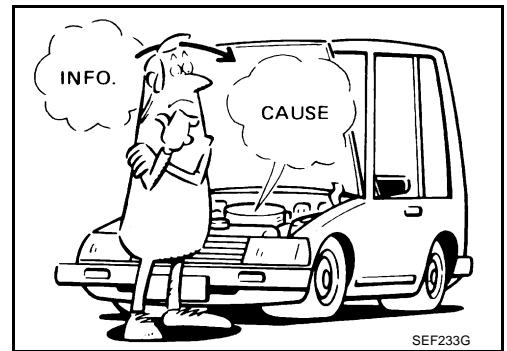
BASIC CONCEPT

- To perform trouble diagnosis, it is the most important to have understanding about vehicle systems (control and mechanism) thoroughly.
- It is also important to clarify customer complaints before inspection.

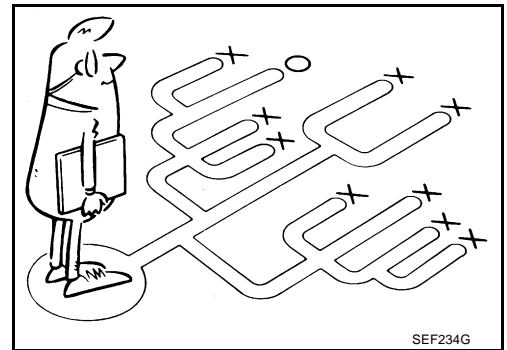
First of all, reproduce symptoms, and understand them fully. Ask customer about his/her complaints carefully. In some cases, it will be necessary to check symptoms by driving vehicle with customer.

CAUTION:

Customers are not professional. It is dangerous to make an easy guess like "maybe the customer means that...," or "maybe the customer mentions this symptom".



- It is essential to check symptoms right from the beginning in order to repair malfunctions completely. For intermittent malfunctions, reproduce symptoms based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairing without any symptom diagnosis, you cannot judge if malfunctions have actually been eliminated.
- After completing diagnosis, always erase diagnostic memory. Refer to [TF-53, "Operation Procedure"](#).
- For intermittent malfunctions, move harness or harness connector by hand. Then check for poor contact or false open circuit.



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TROUBLE DIAGNOSIS

Trouble Diagnosis Chart for Symptoms

ADS000H2

| Symptom | Condition | Check items | Reference page |
|--|--|--|---|
| When ignition switch is turned ON, AWD LOCK indicator lamp does not illuminate for approx. 1 second. (AWD LOCK lamp check) | IGN-ON | <ul style="list-style-type: none"> ● Malfunction AWD LOCK indicator lamp circuit. ● Fuse between ignition and AWD LOCK indicator lamp is blown out. ● Open circuit between ignition and AWD LOCK indicator lamp. ● Malfunction of unified meter control unit. ● AWD control unit does not receive the CAN Communication signal from the unified meter and A/C amp.. | TF-64. "AWD LOCK INDICATOR LAMP DOES NOT COME ON FOR APPROXIMATELY 1 SECOND WHEN THE IGNITION SWITCH IS TURNED TO ON." |
| AWD warning lamp does not illuminate with ignition switch ON. (AWD warning lamp check) | IGN-ON | <ul style="list-style-type: none"> ● Malfunction of AWD warning lamp circuit. ● Fuse between ignition and AWD warning lamp blown out. ● Open circuit between ignition and AWD warning lamp. ● Malfunction of unified meter control unit. ● AWD control unit does not receive the CAN Communication signal from the unified meter and A/C amp.. | TF-65. "AWD WARNING LAMP DOES NOT ILLUMINATE WITH IGNITION SWITCH ON." |
| AWD warning lamp does not go out several seconds after engine is started. (AWD LOCK indicator lamp goes out) | Engine running | <ul style="list-style-type: none"> ● AWD control unit connector disconnected ● Malfunction in AWD system. ● Malfunction of unified meter control unit. ● AWD control unit does not receive the CAN Communication signal from the unified meter and A/C amp.. | TF-66. "AWD WARNING LAMP DOES NOT GO OUT SEVERAL SECONDS AFTER ENGINE STARTED.(AWD LOCK INDICATOR LAMP GOES OUT.)" |
| Heavy tight-corner braking symptom occurs when vehicle is driven in the following conditions: AUTO mode and steering wheel is turned fully to either sides after engine is started. (Note 1, Note 2) | <ul style="list-style-type: none"> ● Engine running ● AUTO mode ● Steering wheel fully turned | <ul style="list-style-type: none"> ● AUTO mode does not operate. (LOCK mode operate.) ● Throttle position signal error. ● Mechanical malfunction of electric controlled coupling. ● Malfunction in AWD system. | TF-66. "HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS WHEN THE VEHICLE IS DRIVEN IN AUTO MODE AND THE STEERING WHEEL IS TURNED FULLY TO EITHER SIDE AFTER THE ENGINE IS STARTED." |
| AWD mode cannot be switched after engine is started.(Note 3) | Engine running | <ul style="list-style-type: none"> ● AWD lock switch disconnected ● Open circuit between AWD lock switch and unified meter and A/C amp.. ● Open circuit between AWD lock switch and ground. ● Malfunction of unified meter control unit. ● AWD control unit does not receive the CAN Communication signal from the unified meter and A/C amp.. | TF-68. "AWD MODE CANNOT BE SWITCHED AFTER ENGINE IS STARTED." |
| While driving, AWD warning lamp flashes rapidly. (When it flashes for approximately 1 minute, then does not illuminate) Rapid flashing: Two times flashing per 1 second. | Engine running | Protection function was activated due to heavy load to electric controlled coupling. (AWD system is not malfunctioning) | TF-68. "WHILE DRIVING, AWD WARNING LAMP FLASHES RAPIDLY. (WHEN IT FLASHES FOR APPROX. ONE MINUTE, THEN DOES NOT ILLUMINATE.)" |

TROUBLE DIAGNOSIS

| Symptom | Condition | Check items | Reference page |
|--|---|--|--|
| While driving, AWD warning lamp flashes slowly. (when it continues flashing until engine stop) Slow flashing: One flashing per 2 seconds. | <ul style="list-style-type: none"> Engine running Driving at vehicle speed 20 km/h (12 MPH) | Tire size is different between front and rear of vehicle. | TF-68. "WHILE DRIVING, AWD WARNING LAMP FLASHES SLOWLY. (WHEN IT CONTINUES TO ILLUMINATE UNTIL ENGINE TURNS OFF.)" |
| Vehicle does not enter AWD mode cannot be switched even though AWD warning lamp is OFF. | Engine running | Mechanical malfunction of electric controlled coupling. (Mechanical engagement of clutch is not possible.) | TF-69. "VEHICLE DOES NOT ENTER AWD MODE EVEN THOUGH AWD WARNING LAMP IS OFF." |

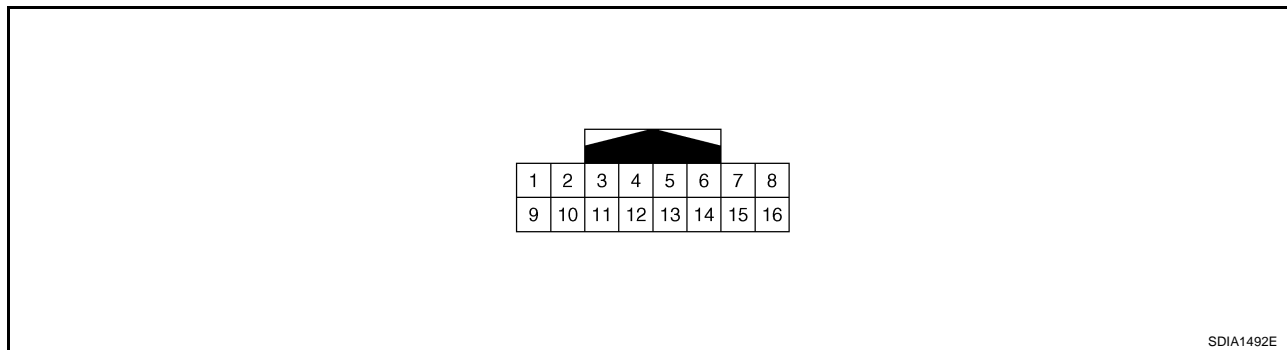
NOTE:

- Light tight-corner braking symptom may occur depending on driving conditions in AUTO mode. This is not malfunction.
- Heavy tight-corner braking symptom occurs when vehicle is driven in the following conditions: LOCK mode, steering wheel is turned fully to either sides, and accelerator pedal was depressed.
- When the difference of revolution speed between the front and rear wheel with AUTO mode the shift occasionally changes to LOCK mode automatically. This is not malfunction.

AWD Control Unit Input/Output Signal Reference Value

AWD CONTROL UNIT CONNECTOR TERMINAL LAYOUT

ADS000H3



REFERENCE STANDARD TABLE

Specifications Between AWD Control Unit Terminals

Data are reference value and are measured between each terminal and ground.

| Terminal | Wire color | Item | Condition | Data (Approx.) | |
|----------|------------|----------------------------|---|--|---|
| 1 | LG | AWD solenoid (+) | <ul style="list-style-type: none"> Engine running LOCK mode | When releasing accelerator pedal. | 0V |
| | | | | After warming up engine, depress accelerator pedal slowly. | Voltage rises gradually in response to throttle position. |
| 2 | LW | AWD solenoid (-) | Engine idling | 0V | |
| 6 | O | K-LINE (CONSULT-II signal) | — | — | |
| 7 | GR | Power supply | Ignition switch: "ON" | Battery voltage | |
| | | | Ignition switch: "OFF" | 0V | |
| 8 | L | CAN communication H line | — | — | |
| 9 | G/R | Solenoid battery | Ignition switch: "ON" | Battery voltage | |
| | | | Ignition switch: "OFF" | Battery voltage | |
| 10 | B | Ground | Always | 0V | |
| 11 | B | | | | |
| 16 | Y | CAN communication L line | — | — | |

CAUTION:

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

TROUBLE DIAGNOSIS

Specifications with CONSULT-II

| Items to be monitored | Contents | Data monitor | |
|---------------------------|--|--|---|
| | | Condition | Reference values |
| FR RH SENSOR (km/h) | Right front wheel speed | When stopping | 0 km/h |
| | | When running *1 | Almost the same as speed meter indication |
| FR LH SENSOR (km/h) | Left front wheel speed | When stopping | 0 km/h |
| | | When running *1 | Almost the same as speed meter indication |
| RR RH SENSOR (km/h) | Right rear wheel speed | When stopping | 0 km/h |
| | | When running *1 | Almost the same as speed meter indication |
| RR LH SENSOR (km/h) | Left rear wheel speed | When stopping | 0 km/h |
| | | When running *1 | Almost the same as speed meter indication |
| BATTERY VOLT (V) | Battery voltage supplied to control unit | Ignition switch ON | Approx. 10 - 16 V |
| THRTL POS SEN (%) | Throttle valve open/close condition | When depressing accelerator pedal | 0 - 100% (Value rises gradually in response to throttle position.) |
| ETS SOLENOID (A) *2 | AWD solenoid valve condition of electric current value monitor | LOCK mode, when engine running (Accelerator pedal depressed) | Approx. 2.0 A |
| STOP LAMP SW (ON/OFF) | Condition of brake pedal operation | Brake pedal depressed | ON |
| | | Brake pedal without depressed | OFF |
| ENG SPEED SIG (STOP/RUN) | With engine running | Engine speed below 400 rpm | STOP |
| | | Engine speed 400 rpm or higher | RUN |
| ETS ACTUATOR (ON/OFF) | AWD actuator relay (integrated in AWD control unit) activation condition | Engine stop (Ignition switch ON) | OFF |
| | | Engine running | ON |
| 4WD WARN LAMP (ON/OFF) | AWD warning lamp condition | AWD warning lamp ON | ON |
| | | AWD warning lamp OFF | OFF |
| 4WD MODE SW (AUTO, LOCK) | Input condition of AWD lock switch | Engine running, vehicle stopped, AWD lock switch ON | LOCK |
| | | Engine running, vehicle stopped, AWD lock switch OFF | AUTO |
| 4WD MODE MON (AUTO, LOCK) | Input condition of AWD LOCK indicator lamp signal | Engine running, vehicle stopped | Using AWD lock switch |
| DIS-TIRE MONI (mm) | Improper size tire installed condition | Normal size tire installed | 0 - 4 mm |
| | | Front/rear tire size difference, wear condition | 4 - 8 mm, 8 - mm |
| P BRAKE SW (ON/OFF) | Parking brake switch operating condition | Parking brake operated | ON |
| | | Parking brake not operated | OFF |

*1: Check air pressure of tire under normal condition.

*2: Unit name is indicated by the one used in circuit diagram (AWD solenoid valve). However, it is "ETS SOLENOID" in CONSULT-II data.

TROUBLE DIAGNOSIS

CONSULT-II Functions FUNCTION

ADS000H4

| Diagnostic test mode | Function | Reference page |
|--------------------------------|--|-----------------------|
| Self-diagnostic results | ● Self-diagnostic results can be read and erased quickly. | TF-53 |
| Data monitor | ● Input/Output data in the AWD control unit can be read. | TF-54 |
| CAN diagnostic support monitor | ● The results of transmit/receive diagnosis of CAN communication can be read. | — |
| Active test | ● Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the AWD control unit and also shifts some parameters in a specified range. | TF-56 |
| ECU part number | ● AWD control unit part number can be read. | TF-56 |

CONSULT-II FUNCTION APPLICATION TABLE

| Item | Self-diagnosis | Data monitor |
|---------------|----------------|--------------|
| FR RH SENSOR | X | X |
| FR LH SENSOR | X | X |
| RR RH SENSOR | X | X |
| RR LH SENSOR | X | X |
| BATTERY VOLT | X | X |
| THRTL POS SEN | X | X |
| ETS SOLENOID | X | X |
| STOP LAMP SW | X | X |
| ENG SPEED SIG | X | X |
| ETS ACTUATOR | - | X |
| 4WD WARN LAMP | - | X |
| 4WD MODE SW | X | X |
| 4WD MODE MON | - | X |
| DIS-TIRE MONI | - | X |
| P BRAKE SW | - | X |

SELF-DIAGNOSIS

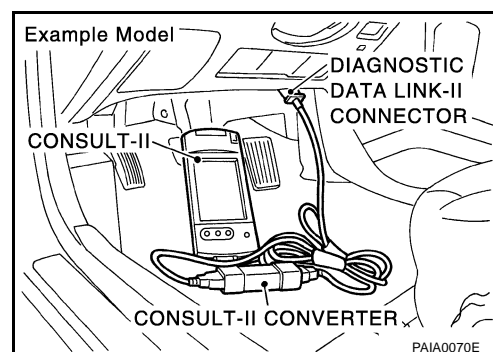
Operation Procedure

- For details, refer to the separate "CONSULT-II OPERATION MANUAL".

CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

1. Turn the ignition switch to OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector on vehicle.
3. Start engine and drive at approx. 30 km/h(19MPH) for approx. 1 minute.
4. Stop vehicle. With engine at idle, touch "START (NISSAN BASED VHCL)", "ALL MODE AWD/4WD*" and "SELF-DIAG RESULTS" on CONSULT-II screen in this order.
*: System may be indicated as "ALL MODE AWD/4WD" depending on the version of CONSULT-II software.



CAUTION:

"ALL MODE AWD/4WD" may not be displayed on the system selection screen in the following case: When "START (NISSAN BASED VHCL)" was touched just after engine is started or ignition switch is turned to ON. In this case, repeat procedure from step 1.

If "ALL MODE AWD/4WD" is not detected, go to [GI-38, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).

TROUBLE DIAGNOSIS

5. "DTC RESULT" is displayed. (If necessary, touch "PRINT" to print self-diagnostic results.)
 - If "NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED." is displayed. Check AWD warning lamp.
6. Check the malfunctioning part indicated by the chart to repair or replace. Refer to [TF-54, "Display Item List"](#).
7. Start engine and drive at approx. 30 km/h (19 MPH) for approx. 1 minute.

| SELF-DIAG RESULTS | | | |
|--|------|-------|------|
| DTC RESULTS | | TIME | |
| NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED. | | | |
| | | | |
| | | | |
| ERASE | | PRINT | |
| MODE | BACK | LIGHT | COPY |

SDIA1497E

CAUTION:

- Check again to make sure that there is "NO FAILURE" on other parts.
 - If AWD warning lamp is turned ON because of "ABS SYSTEM" incident, AWD warning lamp may not be turned OFF. In this case, turn OFF the key switch, restart engine, run vehicle at 30 km/h (19 MPH) for 1 minute.
8. Turn the ignition switch to OFF prepare for erasing memory.
 9. Start engine. Touch "START (NISSAN BASED VHCL)", "ALL MODE AWD/4WD", "SELF-DIAG RESULTS," and "ERASE" on CONSULT-II screen in this order to erase fault memory.

CAUTION:

If memory cannot be erased, proceed to 6.

10. Drive at approx. 30 km/h (19 MPH) for approx. 1 minute. Be sure AWD warning lamp is OFF. And turn ON-OFF AWD lock switch, make sure that AWD LOCK indicator lamp in the meter changes properly.

Display Item List

| Item | Malfunction detecting condition | Check parts |
|--------------------|---|---|
| CONTROLLER FAILURE | Malfunction of AWD control unit | Check or replace AWD control unit. |
| ABS SYSTEM | Non-standard condition of wheel speed signal | <ul style="list-style-type: none"> ● Check ABS actuator and electric unit (control unit) connector. ● Check wheel sensor connector. ● Check wheel sensor harness. ● Check or replace ABS actuator and electric unit (control unit). |
| 4WD SOLENOID | <ul style="list-style-type: none"> ● Malfunction AWD solenoid, or open or short circuit in harness ● Malfunction of AWD control unit | <ul style="list-style-type: none"> ● Check AWD control unit connector. ● Check AWD solenoid harness. ● Check or replace AWD control unit. |
| 4WD ACTUATOR RLY | Malfunction of AWD actuator relay (integrated in AWD control unit) | <ul style="list-style-type: none"> ● Check AWD control unit connector. ● Check or replace AWD control unit. |
| CAN COMM CIRCUIT | <ul style="list-style-type: none"> ● Malfunction of CAN communication line ● Malfunction of AWD control unit ● Malfunction of ECM ● Malfunction of ABS actuator and electric unit (control unit) ● Malfunction of unified meter and A/C amp. | <ul style="list-style-type: none"> ● Check connector and harness of each control unit. ● Check each control unit. |

CAUTION:

- If "ALL MODE AWD/4WD" is not displayed on system selection screen, check the following: AWD CONTROL UNIT, data link connector harness, and No. of CONSULT-II program card.
- When several systems including CAN communication system indicates troubles, perform trouble diagnosis of the CAN communication primarily.

DATA MONITOR

Operation Procedure

- For details, refer to the separate "CONSULT-II OPERATION MANUAL".

CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

TROUBLE DIAGNOSIS

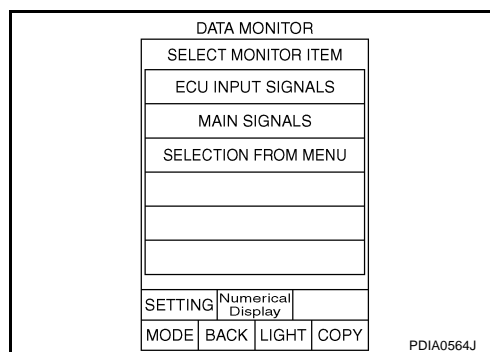
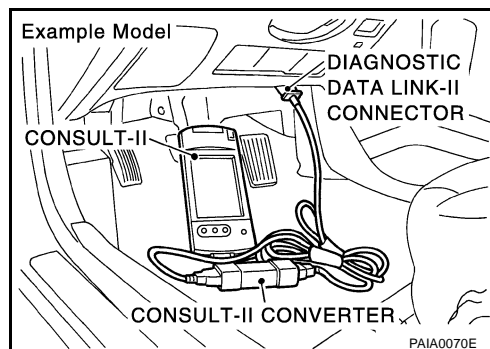
1. Turn the ignition switch to OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector on vehicle.
3. Turn ignition switch ON.
4. Touch "START" on the display.
5. Touch "ALL MODE AWD/4WD*" on the display.
*: System may be indicated as "ALL MODE AWD/4WD" depending on the version of CONSULT-II software.

CAUTION:

"ALL MODE AWD/4WD" may not be displayed on the system selection screen in the following case: When "START (NISSAN BASED VHCL)" was touched just after engine is started or ignition switch is turned to ON. In this case, repeat procedure from step 1.

If "ALL MODE AWD/4WD" is not detected, go to [GI-38, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#) .

6. Touch "DATA MONITOR".
7. Return to monitor item selection screen. Touch any of "ECU INPUT SIGNALS," "MAIN SIGNALS," or "SELECTION FROM MENU".
Refer to [TF-55, "Display Item List"](#) .
8. Touch "START".
9. Screen of data monitor is displayed.



Display Item List

×: Standard -: Not applicable

| Monitored item (Unit) | Monitor item selection | | | Remarks |
|------------------------------|------------------------|--------------|---------------------|--|
| | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | |
| FR RH SENSOR [km/h] or [mph] | × | × | × | Wheel speed calculated by front wheel sensor RH signal is displayed. |
| FR LH SENSOR [km/h] or [mph] | × | × | × | Wheel speed calculated by front wheel sensor LH signal is displayed. |
| RR RH SENSOR [km/h] or [mph] | × | × | × | Wheel speed calculated by rear wheel sensor RH signal is displayed. |
| RR LH SENSOR [km/h] or [mph] | × | × | × | Wheel speed calculated by rear wheel sensor LH signal is displayed. |
| BATTERY VOLT [V] | - | - | × | Power supply voltage for AWD control unit. |
| THRTL POS SEN [%] | - | - | × | Throttle opening status is displayed. |
| ETS SOLENOID [A] | - | - | × | Monitored value of current at AWD solenoid. |
| STOP LAMP SW [ON/OFF] | - | - | × | Stop lamp switch signal status via CAN communication line is displayed. |
| ENG SPEED SIG [RUN/STOP] | - | - | × | Engine status is displayed. |
| ETS ACTUATOR [ON/OFF] | - | - | × | Operating condition of AWD actuator relay (integrated in AWD control unit) is displayed. |
| 4WD WARN LAMP [ON/OFF] | - | - | × | Control status of AWD warning lamp is displayed. |
| 4WD MODE SW [AUTO/LOCK] | - | - | × | AWD lock switch signal status via CAN communication line is displayed. |

TROUBLE DIAGNOSIS

| Monitored item (Unit) | Monitor item selection | | | Remarks |
|--------------------------|------------------------|--------------|---------------------|--|
| | ECU INPUT SIGNALS | MAIN SIGNALS | SELECTION FROM MENU | |
| 4WD MODE MON [AUTO/LOCK] | – | – | × | Control status of AWD is displayed. (Output condition of AWD LOCK indicator lamp signal) |
| DIS-TIRE MONI [mm] | – | – | × | Improper size tire installed condition is displayed. |
| P BRAKE SW [ON/OFF] | – | – | × | Parking switch signal status via CAN communication line is displayed. |
| Voltage [V] | – | – | × | The value measured by the voltage probe is displayed. |
| Frequency [Hz] | – | – | × | The value measured by the pulse probe is displayed. |
| DUTY-HI (high) [%] | – | – | × | |
| DUTY-LOW (low) [%] | – | – | × | |
| PLS WIDTH-HI [msec] | – | – | × | |
| PLS WIDTH-LOW [msec] | – | – | × | |

ACTIVE TEST MODE

Description

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

Test Item

| Test item | Condition | Description |
|---|--|---|
| ETS S/V (Detects AWD solenoid valve) | <ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● No DTC detected | <ul style="list-style-type: none"> ● Change command current value to AWD solenoid, and then change driving mode. (Monitor value is normal if it is within approximately $\pm 10\%$ of command value.) <p>Qu: Increase current value in increments of 0.20A Qd: Decrease current value in increments of 0.20A UP: Increase current value in increments of 0.02A DOWN: Decrease current value in increments of 0.02A</p> |

CAUTION:

Do not continuously energize for a long time.

AWD CONTROL UNIT PART NUMBER

Ignore the AWD control unit part number displayed in the “ECU PART NUMBER”. Refer to parts catalog to order the AWD control unit.

Component Inspection

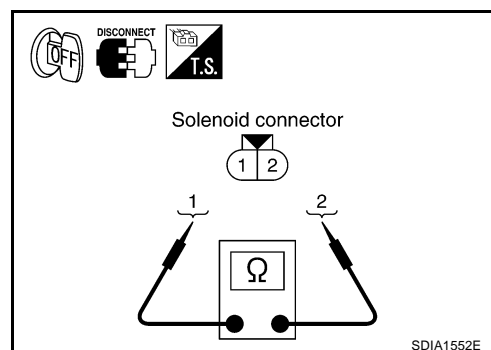
AWD SOLENOID VALVE

ADS000H5

- Disconnect connector B204 and measure resistance between terminals 1 (LG) and 2 (L/W).

1 (LG) - 2 (L/W)

: Approx. 2.45Ω



TROUBLE DIAGNOSIS

ADS000H6

System Inspection

CAUTION:

- After inspection, be sure to perform self-diagnosis again and make sure that there is no incident in the result.
- After diagnosis, be sure to erase the memory. When erasing the memory, make sure that AWD Lock Indicator Lamp in the Meter Panel changes according to the switch position by operating AWD Lock Switch.

CONTROL UNIT POWER SUPPLY AND GROUND

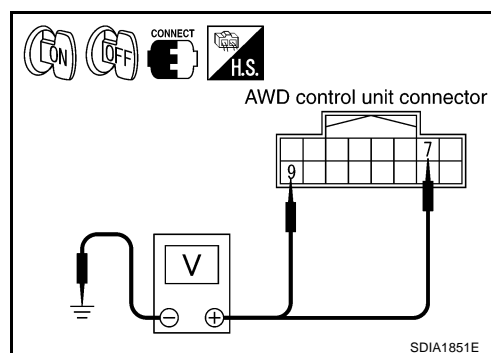
1. CHECK POWER SUPPLY

1. Turn ignition switch "ON". (Do not start engine.)
2. Check voltage between AWD control unit terminals and ground.

| Connector | Terminal (Wire color) | Voltage (Approx.) |
|-----------|-----------------------|-------------------|
| E111 | 7 (G/R) - Ground | Battery voltage |
| | 9 (G/R) - Ground | |

3. Turn ignition switch "OFF".
4. Check voltage between AWD control unit terminals and ground.

| Connector | Terminal (Wire color) | Voltage (Approx.) |
|-----------|-----------------------|-------------------|
| E111 | 7 (G/R) - Ground | 0V |
| | 9 (G/R) - Ground | Battery voltage |



OK or NG

- OK >> GO TO 3.
 NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following:

- 10A fuse [No. 37, located in the fuse and fusible link block or No. 88, located in the IPDM E/R]
- Harness for short or open between battery and AWD control unit terminal 9
- Harness for short or open between ignition switch and AWD control unit terminal 7
- Ignition switch. Refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#).

OK or NG

- OK >> GO TO 3.
 NG >> Repair or replace damaged parts.

3. CHECK GROUND CIRCUIT

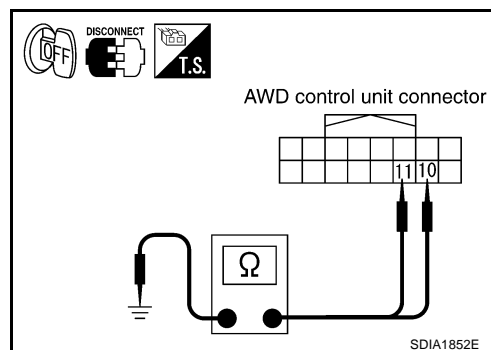
1. Turn ignition switch "OFF".
2. Disconnect AWD control unit harness connector.
3. Check continuity between AWD control unit E111 terminals 10 (B), 11 (B) and ground.

Continuity should exist.

If OK, check harness for short to ground and short to power.

OK or NG

- OK >> **INSPECTION END**
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



TROUBLE DIAGNOSIS

AWD CONTROL UNIT SYSTEM

1. PERFORM SELF-DIAGNOSIS

Ⓜ WITH CONSULT-II

Perform the self-diagnosis. Is a malfunction in the "CONTROLLER FAILREN" indication in the results?

YES or NO

YES >> GO TO 2.

NO >> 1. Drive vehicle at 30 km/h (19 MPH) for at least 1 minute. Make sure AWD warning lamp does not turn ON.

2. INSPECTION END

2. AWD CONTROL UNIT CONNECTOR INSPECTION

1. Disconnect the AWD control unit connector.
2. Check that terminals are not deformed and the connectors were connected properly.

OK or NG

OK >> Replace AWD control unit.

NG >> Repair or replace the connectors.

ABS SYSTEM

1. PERFORM SELF-DIAGNOSIS

Ⓜ WITH CONSULT-II

Perform the self-diagnosis. Is a malfunction in the "ABS SYSTEM" indication in the results?

YES or NO

YES >> GO TO 2.

NO >> 1. Drive vehicle at 30 km/h (19 MPH) for at least 1 minute. Make sure AWD warning lamp does not turn ON.

2. INSPECTION END

2. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Refer to [BRC-31, "TROUBLE DIAGNOSIS"](#) (ABS SYSTEM) or [BRC-98, "TROUBLE DIAGNOSIS"](#) (VDC/TCS/ABS SYSTEM).

OK or NG

OK >> GO TO 3.

NG >> Check the malfunctioning system.

3. AWD CONTROL UNIT CONNECTOR INSPECTION

1. Disconnect the AWD control unit connector.
2. Check that terminals are not deformed and the connectors were connected properly.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace the connectors.

TROUBLE DIAGNOSIS

AWD ACTUATOR SYSTEM

1. PERFORM SELF-DIAGNOSIS

Ⓟ WITH CONSULT-II

Perform the self-diagnosis. Is a malfunction in the "4WD ACTUATOR RLY" indication in the results?

YES or NO

YES >> GO TO 2.

NO >> 1. Drive vehicle at 30 km/h (19 MPH) for at least 1 minute. Make sure AWD warning lamp does not turn ON.

2. INSPECTION END

2. AWD CONTROL UNIT CONNECTOR INSPECTION

1. Disconnect the AWD control unit connector.

2. Check that terminals are not deformed and the connectors were connected properly.

OK or NG

OK >> Replace AWD control unit.

NG >> Repair or replace the connectors.

AWD WARNING LAMP SYSTEM

1. CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Is a malfunction in the "CAN COMM CIRCUIT" indication in the results?

YES or NO

YES >> Check the CAN communication line. Refer to [TF-63, "CAN COMMUNICATION SYSTEM"](#) .

NO >> GO TO 2.

2. CHECK AWD WARNING LAMP

1. Check if AWD warning lamp turns on when ignition switch is turned on.

OK or NG

OK >> **INSPECTION END**

NG >> Check the combination meters. Refer to [DI-4, "COMBINATION METERS"](#) .

AWD LOCK SWITCH SIGNAL CIRCUIT

1. CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Is a malfunction in the "CAN COMM CIRCUIT" indication in the results?

YES or NO

YES >> Check the CAN communication line. Refer to [TF-63, "CAN COMMUNICATION SYSTEM"](#) .

NO >> GO TO 2.

TROUBLE DIAGNOSIS

2. CHECK AWD LOCK SWITCH SIGNAL

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "ALL MODE AWD/4WD" with "DATA MONITOR" mode in CONSULT-II.
3. Is it the same as "4WD MODE SW" indication when operating switch?

YES or NO

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

| DATA MONITOR | | | |
|---------------|--------|---------------|------|
| MONITOR | | NO DTC | |
| ETS ACTUATOR | OFF | 4WD WARN LAMP | ON |
| 4WD MODE SW | AUTO | 4WD MODE MON | AUTO |
| DIS-TIRE MONI | 0-4 mm | P BRAKE SW | OFF |
| | | RECORD | |
| MODE | BACK | LIGHT | COPY |

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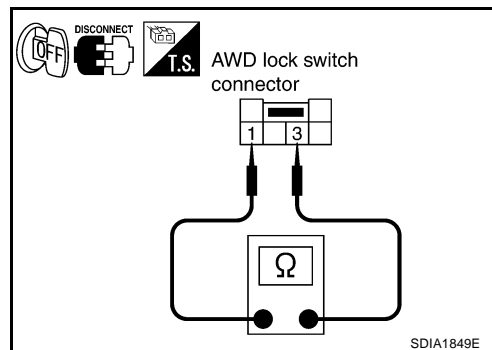
3. CHECK AWD LOCK SWITCH

1. Turn ignition switch "OFF".
2. Disconnect AWD lock switch connector.
3. Check continuity between AWD lock switch connector M55 terminals 1 and 3.

| Switch position | Continuity |
|-----------------|------------|
| LOCK | Yes |
| AUTO | No |

OK or NG

- OK >> GO TO 4.
 NG >> Repair AWD lock switch.



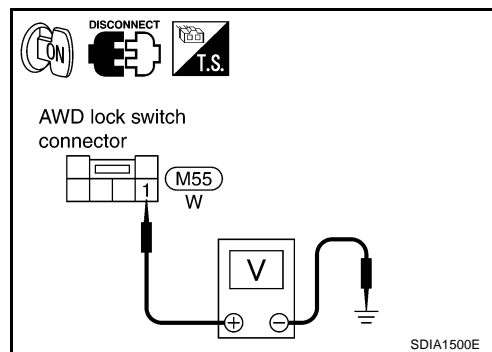
4. CHECK AWD LOCK SWITCH POWER SUPPLY

1. Turn ignition switch "ON".
2. Check the voltage between the AWD lock switch connector M55 terminal 1 (BR/Y) and ground.

1 (BR/Y) - Ground : Approx. 4V

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 6.



TROUBLE DIAGNOSIS

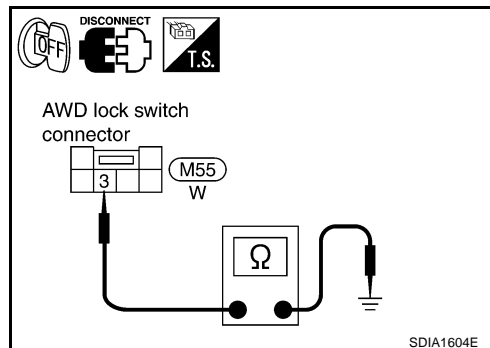
5. CHECK GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Check continuity between the AWD lock switch connector M55 terminal 3 (B) and ground.

3 (B) - Ground : Continuity should exist.

OK or NO

- OK >> Check the unified meter and A/C amp. Refer to [DI-32](#), "[UNIFIED METER AND A/C AMP](#)".
- NG >> Repair or replace the harness or connectors.

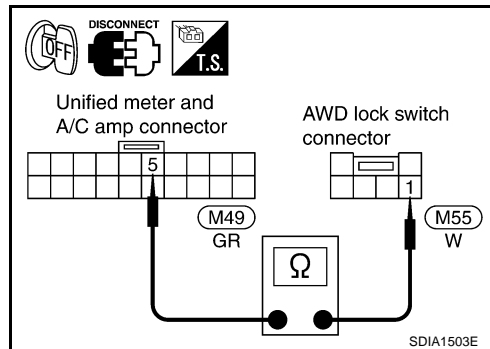


6. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect unified meter and A/C amp. connector.
3. Check the continuity between the following terminals.
 - Unified meter and A/C amp. harness connector M49 terminal 5 (BR/Y) and AWD lock switch harness connector M55 terminal 1 (BR/Y).

5 (BR/Y) - 1 (BR/Y) : Continuity should exist.

- OK >> Check the unified meter and A/C amp. Refer to [DI-32](#), "[UNIFIED METER AND A/C AMP](#)".
- NG >> Repair or replace the harness or connectors.



AWD SOLENOID SYSTEM

1. PERFORM SELF-DIAGNOSIS

Ⓜ WITH CONSULT-II

Perform the self-diagnosis. Is a malfunction in the "AWD SOLENOID" indication in the results?

YES or NO

- YES >> GO TO 2.
- NO >> 1. Drive vehicle at 30 km/h (19 MPH) for at least 1 minute. Make sure AWD warning lamp does not turn ON.

2. INSPECTION END

TROUBLE DIAGNOSIS

2. CHECK INPUT SIGNAL

WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "ALL MODE AWD/4WD" with "DATA MONITOR" mode in CONSULT-II.
3. While monitoring the AWD solenoid items "ETS SOLENOID".

| Condition | | | Specification |
|-----------------|-----------------|-----------------------------|---------------|
| Ignition switch | AWD lock switch | Accelerator pedal | |
| ON | LOCK | Accelerator pedal depressed | Approx.2.0A |

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 3.

| DATA MONITOR | |
|---------------|-----------------|
| MONITOR | NO DTC |
| FR RH SENSOR | 0.00 km/h |
| FR LH SENSOR | 0.00 km/h |
| RR RH SENSOR | 0.00 km/h |
| RR LH SENSOR | 0.00 km/h |
| BATTERY VOLT | 11.04 V |
| THRTL POS SEN | 0.0 % |
| ETS SOLENOID | 0.000 A |
| STOP LAMP SW | OFF |
| ENG SPEED SIG | STOP |
| RECORD | |
| MODE | BACK LIGHT COPY |

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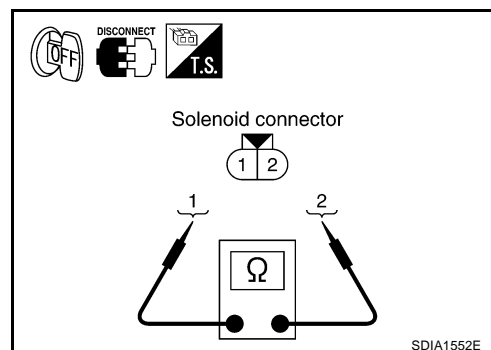
3. CHECK AWD SOLENOID

1. Turn ignition switch "OFF".
2. Disconnect the AWD solenoid valve connector B204.
3. Measure resistance between terminals 1 and 2.

1 - 2 : Approx. 2.45Ω

OK or NG

- OK >> GO TO 4.
 NG >> Replace AWD solenoid.



4. CHECK AWD SOLENOID CIRCUIT

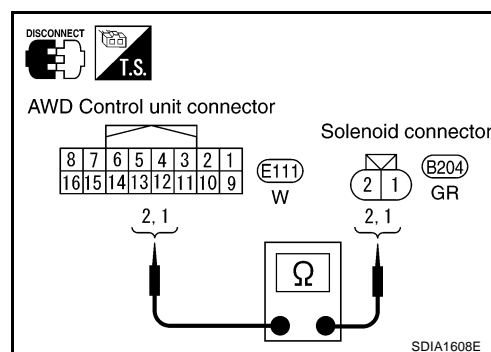
1. Disconnect the AWD control unit connector and the AWD solenoid valve connector.
2. Check the continuity between the following terminals.

- AWD control unit harness connector E111 terminal 1 (LG) and AWD solenoid valve harness connector B204 terminal 1 (LG).
- AWD control unit harness connector E111 terminal 2 (L/W) and AWD solenoid valve harness connector B204 terminal 2 (L/W).

1 (LG) - 1 (LG), 2 (L/W) - 2 (L/W)
: Continuity should exist.

OK or NG

- OK >> Check Battery and AWD control unit harness connector E111 terminal No. 9 (G/R). If NG, Repair or replace the parts.
 NG >> Repair or replace the harness or connectors.



TROUBLE DIAGNOSIS

CAN COMMUNICATION SYSTEM

1. CHECK CAN COMMUNICATION CIRCUIT

Ⓟ With CONSULT-II

1. Turn ignition switch "ON" and start engine.
2. Select "ALL MODE AWD/4WD" with "SELF-DIAG RESULTS" mode in CONSULT-II.
3. The "CAN COMM CIRCUIT" is detected.

YES or NO?

YES >> Refer to [LAN-10, "Precautions When Using CONSULT-II"](#).

NO >> **INSPECTION END**

| SELF-DIAG RESULTS | |
|--------------------------|-------|
| DTC RESULTS | TIME |
| CAN COMM CIRCUIT [U1000] | 0 |
| | |
| | |
| | |
| | |
| ERASE | PRINT |

SDIA1850E

A
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TROUBLE DIAGNOSIS

Trouble Diagnosis for Symptoms

ADS000H7

AWD LOCK INDICATOR LAMP DOES NOT COME ON FOR APPROXIMATELY 1 SECOND WHEN THE IGNITION SWITCH IS TURNED TO ON.

1. CHECK CAN COMMUNICATION LINE

WITH CONSULT-II

Perform the self-diagnosis. Is a malfunction in the "CAN COMM CIRCUIT" indicated in the results?

NOTE:

If self-diagnosis is not carried out, check power supply and ground. Refer to [TF-57, "CONTROL UNIT POWER SUPPLY AND GROUND"](#) .

YES or NO

- YES >> Check the CAN communication line. Refer to [TF-63, "CAN COMMUNICATION SYSTEM"](#) .
NO >> GO TO 2.

2. CHECK AWD LOCK INDICATOR LAMP CIRCUIT

1. Turn ignition switch "OFF".
2. Check the combination meter.
Refer to [DI-4, "COMBINATION METERS"](#) .

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

Check the following:

- 10A fuse [No. 14, located in the fuse block (J/B)]
- Harness for short or open between ignition switch and combination meter M25 terminal 20 (O)
- Ignition switch. Refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#) .

OK or NG

- OK >> Replace the combination meter. Refer to [DI-29, "Removal and Installation of Combination Meter"](#) .
NG >> Repair or replace damaged parts.

4. SYMPTOM CHECK

Check again.

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK AWD CONTROL UNIT

1. Check AWD control unit input/output signal.
2. If NG, recheck AWD control unit pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS

AWD WARNING LAMP DOES NOT ILLUMINATE WITH IGNITION SWITCH ON.

1. CHECK CAN COMMUNICATION LINE

ⓑ WITH CONSULT-II

Perform the self-diagnosis. Is a malfunction in the CAN communication indicated in the results?

NOTE:

If self-diagnosis is not carried out, check power supply and ground. Refer to [TF-57, "CONTROL UNIT POWER SUPPLY AND GROUND"](#) .

YES or NO

- YES >> Check the CAN communication line. Refer to [TF-63, "CAN COMMUNICATION SYSTEM"](#) .
NO >> GO TO 2.

2. CHECK AWD WARNING LAMP CIRCUIT

1. Turn ignition switch "OFF".
2. Check the combination meter.
Refer to [DI-4, "COMBINATION METERS"](#) .

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

Check the following:

- 10A fuse [No. 14, located in the fuse block (J/B)]
- Harness for short or open between ignition switch and combination meter M25 terminal 20 (O)
- Ignition switch. Refer to [PG-3, "POWER SUPPLY ROUTING CIRCUIT"](#) .

OK or NG

- OK >> Replace the combination meter. Refer to [DI-29, "Removal and Installation of Combination Meter"](#) .
NG >> Repair or replace damaged parts.

4. SYMPTOM CHECK

Check again.

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK AWD CONTROL UNIT

1. Check AWD control unit input/output signal.
2. If NG, recheck AWD control unit pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS

AWD WARNING LAMP DOES NOT GO OUT SEVERAL SECONDS AFTER ENGINE STARTED.(AWD LOCK INDICATOR LAMP GOES OUT.)

1. CHECK SELF-DIAGNOSTIC RESULTS

WITH CONSULT-II

Perform the self-diagnosis.

NOTE:

If self-diagnosis is not carried out, check power supply and ground. Refer to [TF-57, "CONTROL UNIT POWER SUPPLY AND GROUND"](#) .

Is any malfunction detected by self-diagnostic?

- YES >> Check the malfunctioning system.
- NO >> GO TO 2.

2. CHECK AWD WARNING LAMP CIRCUIT

1. Turn ignition switch "OFF".
2. Check the combination meter.
Refer to [DI-4, "COMBINATION METERS"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Replace the combination meter. Refer to [DI-29, "Removal and Installation of Combination Meter"](#) .

3. SYMPTOM CHECK

Check again.

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.

4. CHECK AWD CONTROL UNIT

1. Check AWD control unit input/output signal.
2. If NG, recheck AWD control unit pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

HEAVY TIGHT-CORNER BRAKING SYMPTOM OCCURS WHEN THE VEHICLE IS DRIVEN IN AUTO MODE AND THE STEERING WHEEL IS TURNED FULLY TO EITHER SIDE AFTER THE ENGINE IS STARTED.

1. CHECK SELF-DIAGNOSTIC RESULTS

WITH CONSULT-II

Perform the self-diagnosis.

NOTE:

If self-diagnosis is not carried out, check power supply and ground. Refer to [TF-57, "CONTROL UNIT POWER SUPPLY AND GROUND"](#) .

Is any malfunction detected by self-diagnostic?

- YES >> Check the malfunctioning system.
- NO >> GO TO 2.

TROUBLE DIAGNOSIS

2. CHECK INPUT SIGNAL STEP 1

WITH CONSULT-II

Check indication of "4WD MODE SW" with CONSULT data monitor.

- Operating AWD lock switch, check if "LOCK" is indicated when AWD lock switch is turned "ON", and "AUTO" when "OFF".

OK or NG

- OK >> GO TO 3.
 NG >> Check switch. If there is an incident, replace the switch with new one and check again. If there is no incident, perform trouble diagnosis for combination meter, and repair incident or replace combination meter. Refer to [DI-4, "COMBINATION METERS"](#).

| DATA MONITOR | | | |
|---------------|--------|--------|------|
| MONITOR | | NO DTC | |
| ETS ACTUATOR | OFF | | |
| 4WD WARN LAMP | ON | | |
| 4WD MODE SW | AUTO | | |
| 4WD MODE MON | AUTO | | |
| DIS-TIRE MONI | 0-4 mm | | |
| P BRAKE SW | OFF | | |
| | | | |
| RECORD | | | |
| MODE | BACK | LIGHT | COPY |

SDIA1499E

3. CHECK INPUT SIGNAL STEP 2

WITH CONSULT-II

Check "ETS SOLENOID" value with CONSULT data monitor.

- Check if AWD solenoid electric current is "0.000 A" when releasing accelerator pedal.

OK or NG

- OK >> GO TO 4.
 NG >> Check AWD control unit connector. If there is an incident, repair the part or replace it. If there is no incident, replace AWD control unit.

| DATA MONITOR | | | |
|---------------|-----------|--------|------|
| MONITOR | | NO DTC | |
| FR RH SENSOR | 0.00 km/h | | |
| FR LH SENSOR | 0.00 km/h | | |
| RR RH SENSOR | 0.00 km/h | | |
| RR LH SENSOR | 0.00 km/h | | |
| BATTERY VOLT | 11.04 V | | |
| THRTL POS SEN | 0.0 % | | |
| ETS SOLENOID | 0.000 A | | |
| STOP LAMP SW | OFF | | |
| ENG SPEED SIG | STOP | | |
| | | | |
| RECORD | | | |
| MODE | BACK | LIGHT | COPY |

SDIA1553E

4. CHECK INPUT SIGNAL STEP 3

WITH CONSULT-II

Check "THRTL POS SEN" value with CONSULT data monitor.

- Check if accelerator position sensor is "0%" when releasing accelerator pedal.

OK or NG

- OK >> GO TO 5.
 NG >> Perform trouble diagnosis for ECM.

| DATA MONITOR | | | |
|---------------|-----------|--------|------|
| MONITOR | | NO DTC | |
| FR RH SENSOR | 0.00 km/h | | |
| FR LH SENSOR | 0.00 km/h | | |
| RR RH SENSOR | 0.00 km/h | | |
| RR LH SENSOR | 0.00 km/h | | |
| BATTERY VOLT | 11.04 V | | |
| THRTL POS SEN | 0.0 % | | |
| ETS SOLENOID | 0.000 A | | |
| STOP LAMP SW | OFF | | |
| ENG SPEED SIG | STOP | | |
| | | | |
| RECORD | | | |
| MODE | BACK | LIGHT | COPY |

SDIA1553E

5. SYMPTOM CHECK

Check again.

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 6.

6. CHECK AWD CONTROL UNIT

- Check AWD control unit input/output signal.
- If NG, recheck AWD control unit pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
 NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS

AWD MODE CANNOT BE SWITCHED AFTER ENGINE IS STARTED.

1. CHECK INPUT SIGNAL

Ⓜ WITH CONSULT-II

Check "4WD MODE SW" indications with CONSULT data monitor.

- Operating 4WD lock switch, check if "LOCK" is indicated when 4WD lock switch is turned "ON", and "AUTO" when "OFF".

OK or NG

OK >> GO TO 2.

NG >> Check switch. If there is an incident, replace the switch with new one and check again. If there is no incident, perform trouble diagnosis for combination meter. Refer to [DI-4, "COMBINATION METERS"](#).

| DATA MONITOR | | | |
|---------------|------|--------|------|
| MONITOR | | NO DTC | |
| ETS ACTUATOR | | OFF | |
| 4WD WARN LAMP | | ON | |
| 4WD MODE SW | | AUTO | |
| 4WD MODE MON | | AUTO | |
| DIS-TIRE MONI | | 0-4 mm | |
| P BRAKE SW | | OFF | |
| | | RECORD | |
| MODE | BACK | LIGHT | COPY |

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2. SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 3.

3. CHECK AWD CONTROL UNIT

- Check AWD control unit input/output signal.
- If NG, recheck AWD control unit pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

WHILE DRIVING, AWD WARNING LAMP FLASHES RAPIDLY. (WHEN IT FLASHES FOR APPROX. ONE MINUTE, THEN DOES NOT ILLUMINATE.)

- While driving, AWD warning lamp flashes rapidly. (when it flashes for approximately 1 minute, then does not illuminate.)

Rapid flashing: 2 times/second

This phenomenon protects drivetrain parts when a heavy load is applied to the electric controlled coupling and multiple disc clutch temperature increases. It is not a malfunction.

When the difference of revolution speed between the front and rear wheel with AUTO mode, the shift switch occasionally changes to LOCK mode automatically. This is not a malfunction.

WHILE DRIVING, AWD WARNING LAMP FLASHES SLOWLY. (WHEN IT CONTINUES TO ILLUMINATE UNTIL ENGINE TURNS OFF.)

1. CHECK SELF-DIAGNOSTIC RESULTS

Ⓜ WITH CONSULT-II

Perform the self-diagnosis.

NOTE:

If self-diagnosis is not carried out, check power supply and ground. Refer to [TF-57, "CONTROL UNIT POWER SUPPLY AND GROUND"](#).

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.

NO >> GO TO 2.

TROUBLE DIAGNOSIS

2. CHECK INPUT SIGNAL

WITH CONSULT-II

Check "DIS-TIRE MONI" value with CONSULT data monitor.

- Check if "DIS-TIRE MONI" value is "0-4 mm".

NOTE:

When tire diameter difference has no incident, and when running vehicle at about 20 km/h (12 MPH) or more for approximately 5 seconds, "DIS-TIRE MONI" value becomes "0-4 mm". (Becomes normal condition.)

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 3.

| DATA MONITOR | |
|---------------|--------|
| MONITOR | NO DTC |
| ETS ACTUATOR | OFF |
| 4WD WARN LAMP | ON |
| 4WD MODE SW | AUTO |
| 4WD MODE MON | AUTO |
| DIS-TIRE MONI | 0-4 mm |
| P BRAKE SW | OFF |

| | |
|-------|--------|
| | |
| | RECORD |
| MODE | BACK |
| LIGHT | COPY |

SDIA1499E

3. TIRE DIFFERENTIAL CHECK

- Check if front and rear tires have different diameter.

OK or NG

- OK >> GO TO 4.
- NG >> Set specified tires.

4. TIRE ABRASION CONDITION CHECK

- Check that tires do not have marked difference on abrasion condition.

OK or NG

- OK >> GO TO 5.
- NG >> Replace the tires.

5. TIRE PRESSURE CHECK

- Check if tire pressure has specified value.

OK or NG

- OK >> GO TO 6.
- NG >> Make the value to the specified tire pressure.

6. CHECK AWD WARNING LAMP WITH RUNNING VEHICLE

1. Stop engine. Restart engine and run at 20 km/h (12 MPH) or more for about 200 seconds.
2. Check if AWD warning lamp indication.

OK or NG

- OK >> **INSPECTION END**
- NG >> Check step 1-2 again.

VEHICLE DOES NOT ENTER AWD MODE EVEN THOUGH AWD WARNING LAMP IS OFF.

1. CHECK AWD WARNING LAMP

Check if AWD warning lamp indicate with ignition ON.

OK or NG

- OK >> GO TO 2.
- NG >> Refer to [TF-65, "AWD WARNING LAMP DOES NOT ILLUMINATE WITH IGNITION SWITCH ON."](#)

TROUBLE DIAGNOSIS

2. PARKING BRAKE CHECK

Does brake warning lamp keeps "OFF" with parking brake inoperative?

YES or NO

YES >> GO TO 3.

NO >> Cancel parking brake. (No AWD with parking switch "ON")

3. CHECK SELF-DIAGNOSTIC RESULTS

WITH CONSULT-II

Perform the self-diagnosis.

NOTE:

If self-diagnosis is not carried out, check power supply and ground. Refer to [TF-57, "CONTROL UNIT POWER SUPPLY AND GROUND"](#) .

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.

NO >> GO TO 4.

4. CHECK SELF-DIAGNOSTIC RESULTS WITH ABS

WITH CONSULT-II

Perform the self-diagnosis for ABS actuator and electric unit (control unit). Refer to [BRC-31, "TROUBLE DIAGNOSIS"](#) (ABS SYSTEM) or [BRC-98, "TROUBLE DIAGNOSIS"](#) (VDC/TCS/ABS SYSTEM).

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.

NO >> GO TO 5.

5. CHECK INPUT SIGNAL

WITH CONSULT-II

Check "ETS SOLENOID" value with CONSULT data monitor.

1. LOCK mode with AWD lock switch.
2. Check that AWD LOCK indicator is turned ON.
3. Check "ETS SOLENOID" with CONSULT data monitor.

| Condition | | | Specification |
|-----------------|-----------------|-----------------------------|---------------|
| Ignition switch | AWD lock switch | Accelerator pedal | |
| ON | LOCK | Accelerator pedal depressed | Approx.2.0A |

OK or NG

OK >> Repair or replace electric controlled coupling. Refer to [RFD-20, "Disassembly and Assembly"](#) .

NG >> GO TO 6.

| DATA MONITOR | | | |
|---------------|--------|-------|------|
| MONITOR | NO DTC | | |
| FR RH SENSOR | 0.00 | km/h | |
| FR LH SENSOR | 0.00 | km/h | |
| RR RH SENSOR | 0.00 | km/h | |
| RR LH SENSOR | 0.00 | km/h | |
| BATTERY VOLT | 11.04 | V | |
| THRTL POS SEN | 0.0 | % | |
| ETS SOLENOID | 0.000 | A | |
| STOP LAMP SW | OFF | | |
| ENG SPEED SIG | STOP | | |
| RECORD | | | |
| MODE | BACK | LIGHT | COPY |

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TROUBLE DIAGNOSIS

6. CHECK AWD SOLENOID VALVE

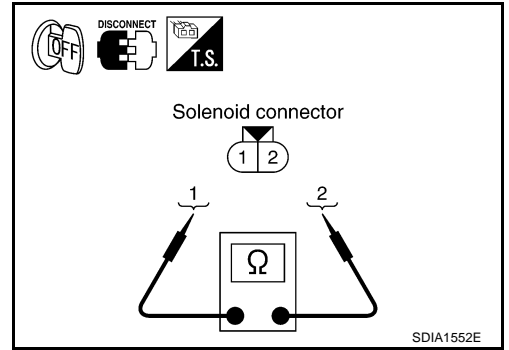
1. Turn ignition switch "OFF".
2. Disconnect the AWD solenoid valve connector B204.
3. Measure resistance between terminals 1 and 2.

1 - 2 : Approx. 2.45Ω

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.



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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00030

General Specifications

ADS000H8

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

Inspection and Adjustment PRELOAD TORQUE BEFORE DISASSEMBLY

ADS000H9

| Item | | Specification [N·m (kg·m, in·lb)] |
|--|---|---|
| Pinion bearing (P1) | | 0.10 - 0.39 (0.01 - 0.04, 1 - 3) |
| Gear ring bearing to pinion bearing (Overall preload) | When all oil seals are installed | P1 + 0.16 - 0.22 (0.016 - 0.023, 1.4 - 1.9) |
| | Without transfer case oil seal and gear ring oil seal | P1 + 0.06 - 0.12 (0.006 - 0.013, 0.6 - 1.1) |

PRELOAD TORQUE AFTER DISASSEMBLY AND REASSEMBLY

| Item | | Specification [N·m (kg·m, in·lb)] |
|--|---|--|
| Pinion bearing (P'1) | | 0.40 - 0.78 (0.04 - 0.08, 4 - 6) |
| Gear ring bearing to pinion bearing (Overall preload) | When all oil seals are installed | P'1 + 0.45 - 0.47 (0.045 - 0.048, 3.9 - 4.1) |
| | Without transfer case oil seal and gear ring oil seal | P'1 + 0.35 - 0.37 (0.035 - 0.038, 3.1 - 3.2) |

BACKLASH

Unit: mm (in)

| Item | Standard |
|---------------------------------|-------------------------------|
| Drive gear to drive pinion gear | 0.13 - 0.19 (0.0051 - 0.0075) |

COMPANION FLANGE RUNOUT

Unit: mm (in)

| Item | Runout limit |
|------------------------------------|--------------|
| Companion flange face | 0.1 (0.004) |
| Inner side of the companion flange | 0.1 (0.004) |

SELECTIVE PARTS

Gear Ring Bearing Adjusting Shim

Unit: mm (in)

| Selection parts | | Transfer case side | | | |
|-----------------|--------------|--------------------|--------------|---------------|--------------|
| Thickness | Part number* | Thickness | Part number* | Thickness | Part number* |
| 0.80 (0.0315) | 33147 AD300 | 1.22 (0.0480) | 33147 AD314 | 1.64 (0.0646) | 33147 AD363 |
| 0.83 (0.0327) | 33147 AD301 | 1.25 (0.0492) | 33147 AD315 | 1.67 (0.0657) | 33147 AD364 |
| 0.86 (0.0339) | 33147 AD302 | 1.28 (0.0504) | 33147 AD316 | 1.70 (0.0669) | 33147 AD365 |
| 0.89 (0.0350) | 33147 AD303 | 1.31 (0.0516) | 33147 AD317 | 1.73 (0.0681) | 33147 AD366 |
| 0.92 (0.0362) | 33147 AD304 | 1.34 (0.0528) | 33147 AD318 | 1.76 (0.0693) | 33147 AD367 |
| 0.95 (0.0374) | 33147 AD305 | 1.37 (0.0539) | 33147 AD319 | 1.79 (0.0705) | 33147 AD368 |
| 0.98 (0.0386) | 33147 AD306 | 1.40 (0.0551) | 33147 AD320 | 1.82 (0.0717) | 33147 AD369 |
| 1.01 (0.0398) | 33147 AD307 | 1.43 (0.0563) | 33147 AD321 | 1.85 (0.0728) | 33147 AD370 |
| 1.04 (0.0409) | 33147 AD308 | 1.46 (0.0575) | 33147 AD322 | 1.88 (0.0740) | 33147 AD371 |
| 1.07 (0.0421) | 33147 AD309 | 1.49 (0.0587) | 33147 AD323 | 1.91 (0.0752) | 33147 AD372 |
| 1.10 (0.0433) | 33147 AD310 | 1.52 (0.0598) | 33147 AD324 | 1.94 (0.0764) | 33147 AD373 |
| 1.13 (0.0445) | 33147 AD311 | 1.55 (0.0610) | 33147 AD360 | 1.97 (0.0776) | 33147 AD374 |
| 1.16 (0.0457) | 33147 AD312 | 1.58 (0.0622) | 33147 AD361 | 2.00 (0.0787) | 33147 AD375 |
| 1.19 (0.0469) | 33147 AD313 | 1.61 (0.0634) | 33147 AD362 | 2.03 (0.0799) | 33147 AD376 |

*: Always check with the Parts Department for the latest parts information.

SERVICE DATA AND SPECIFICATIONS (SDS)

Unit: mm (in)

| Selection parts | | Adapter case side | | | |
|-----------------|--------------|-------------------|--------------|---------------|--------------|
| Thickness | Part number* | Thickness | Part number* | Thickness | Part number* |
| 0.80 (0.0315) | 33147 5V200 | 1.25 (0.0492) | 33147 5V215 | 1.70 (0.0669) | 33123 5V265 |
| 0.83 (0.0327) | 33147 5V201 | 1.28 (0.0504) | 33147 5V216 | 1.73 (0.0681) | 33123 5V266 |
| 0.86 (0.0339) | 33147 5V202 | 1.31 (0.0516) | 33147 5V217 | 1.76 (0.0693) | 33123 5V267 |
| 0.89 (0.0350) | 33147 5V203 | 1.34 (0.0528) | 33123 5V218 | 1.79 (0.0705) | 33123 5V268 |
| 0.92 (0.0362) | 33147 5V204 | 1.37 (0.0539) | 33123 5V219 | 1.82 (0.0717) | 33123 5V269 |
| 0.95 (0.0374) | 33147 5V205 | 1.40 (0.0551) | 33123 5V220 | 1.85 (0.0728) | 33123 5V270 |
| 0.98 (0.0386) | 33147 5V206 | 1.43 (0.0563) | 33123 5V221 | 1.88 (0.0740) | 33123 5V271 |
| 1.01 (0.0398) | 33147 5V207 | 1.46 (0.0575) | 33123 5V222 | 1.91 (0.0752) | 33123 5V272 |
| 1.04 (0.0409) | 33147 5V208 | 1.49 (0.0587) | 33123 5V223 | 1.94 (0.0764) | 33123 5V273 |
| 1.07 (0.0421) | 33147 5V209 | 1.52 (0.0598) | 33123 5V224 | 1.97 (0.0776) | 33123 5V274 |
| 1.10 (0.0433) | 33147 5V210 | 1.55 (0.0610) | 33123 5V260 | 2.00 (0.0787) | 33123 5V275 |
| 1.13 (0.0445) | 33147 5V211 | 1.58 (0.0622) | 33123 5V261 | 2.03 (0.0799) | 33123 5V276 |
| 1.16 (0.0457) | 33147 5V212 | 1.61 (0.0634) | 33123 5V262 | 2.06 (0.0811) | 33123 5V277 |
| 1.19 (0.0469) | 33147 5V213 | 1.64 (0.0646) | 33123 5V263 | 2.09 (0.0811) | 33123 5V278 |
| 1.22 (0.0480) | 33147 5V214 | 1.67 (0.0657) | 33123 5V264 | | |

*: Always check with the Parts Department for the latest parts information.

Pinion Sleeve Shim

Unit: mm (in)

| Thickness | Part number* | Thickness | Part number* | Thickness | Part number* |
|---------------|--------------|---------------|--------------|---------------|--------------|
| 0.77 (0.0303) | 33155 5V214 | 0.98 (0.0386) | 33155 5V206 | 1.19 (0.0469) | 33155 5V213 |
| 0.80 (0.0315) | 33155 5V200 | 1.01 (0.0398) | 33155 5V207 | 1.22 (0.0480) | 33155 5V215 |
| 0.83 (0.0327) | 33155 5V201 | 1.04 (0.0409) | 33155 5V208 | 1.25 (0.0492) | 33155 5V216 |
| 0.86 (0.0339) | 33155 5V202 | 1.07 (0.0421) | 33155 5V209 | 1.28 (0.0504) | 33155 5V217 |
| 0.89 (0.0350) | 33155 5V203 | 1.10 (0.0433) | 33155 5V210 | 1.31 (0.0516) | 33155 5V218 |
| 0.92 (0.0362) | 33155 5V204 | 1.13 (0.0445) | 33155 5V211 | 1.34 (0.0528) | 33155 5V219 |
| 0.95 (0.0374) | 33155 5V205 | 1.16 (0.0457) | 33155 5V212 | | |

*: Always check with the Parts Department for the latest parts information.

SERVICE DATA AND SPECIFICATIONS (SDS)
