SECTION TRANSAXLE & TRANSMISSION

TM

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[7AT: RE7R01A (VQ37VHR)]

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow INFOID:0000000010578834

OBTAIN INFORMATION ABOUT SYMPTOM

Refer to TM-10, "Diagnostic Work Sheet" and interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings in the vehicle.

>> GO TO 2.

2.CHECK DTC

- 1. Before checking the malfunction, check whether any DTC exists.
- 2. If DTC exists, perform the following operations.
- Record the DTC and freeze frame data. (Print out the data using CONSULT and affix to the Work Order Sheet.)
- Erase DTCs.
- Check the relationship between the cause that is clarified with DTC and the malfunction information described by the customer. <u>TM-159</u>, "Symptom Table" is effective.
- Check the information of related service bulletins and others also.

Do malfunction information and DTC exist?

Malfunction information and DTC exists. >>GO TO 3.

Malfunction information exists, but no DTC. >>GO TO 4.

No malfunction information, but DTC exists. >>GO TO 5.

3.REPRODUCE MALFUNCTION SYMPTOM

Check any malfunction described by a customer, except those with DTC on the vehicle.

Also investigate whether the symptom is a fail-safe or normal operation. Refer to TM-152, "Fail-Safe".

When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-10, "Diagnostic Work

Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 5.

4. REPRODUCE MALFUNCTION SYMPTOM

Check the malfunction described by the customer on the vehicle.

Also investigate whether the symptom is a fail-safe or normal operation. Refer to TM-152, "Fail-Safe".

When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-10, "Diagnostic Work

Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 6.

${f 5}$.PERFORM "DTC CONFIRMATION PROCEDURE"

Perform "DTC CONFIRMATION PROCEDURE" of the appropriate DTC to check if DTC is detected again. Refer to TM-156, "DTC Inspection Priority Chart" when multiple DTCs are detected, and then determine the order for performing the diagnosis.

NOTE:

If no DTC is detected, refer to the freeze frame data.

Is any DTC detected?

YES >> GO TO 7.

NO >> Check according to GI-47, "Intermittent Incident".

$oldsymbol{oldsymbol{0}}$. IDENTIFY MALFUNCTIONING SYSTEM WITH "DIAGNOSIS CHART BY SYMPTOM"

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[7AT: RE7R01A (VQ37VHR)]

Use <u>TM-159</u>. "Symptom Table" from the symptom inspection result in step 4. Then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 8.

7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the detected malfunctioning parts.

Reconnect parts or connector after repairing or replacing, and then erase DTC if necessary.

>> GO TO 8.

8. FINAL CHECK

Perform "DTC CONFIRMATION PROCEDURE" again to make sure that the repair is correctly performed. Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 3 or 4.

Is DTC or malfunction symptom reproduced?

YES-1 >> DTC is reproduced: GO TO 5.

YES-2 >> Malfunction symptom is reproduced: GO TO 6.

NO >> Before delivering the vehicle to the customer, make sure that DTC is erased.

Diagnostic Work Sheet

INFOID:0000000010578835

DESCRIPTION

There are many operating conditions that may cause a malfunction of the transmission parts. By understanding those conditions properly, a quick and exact diagnosis can be achieved.

In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about the concerns carefully. In order to systemize all the information for the diagnosis, prepare the question sheet referring to the question points.

KEY POINTS

WHAT Vehicle & engine model
WHEN Date, Frequencies
WHERE.... Road conditions
HOW Operating conditions,
Weather conditions,

Symptoms

SEF907L

WORKSHEET SAMPLE

| Question Sheet | | | | |
|----------------|-------|---------------|------------|---------|
| Customer name | MR/MS | Engine # | Manuf. Dat | е |
| | | Incident Date | VIN | |
| | | Model & Year | In Service | Date |
| | | Trans. | Mileage | km/Mile |

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[7AT: RE7R01A (VQ37VHR)]

| No down-shift (□ 7GR → 6GR □ 6GR → 5GR □ 5GR → 4GR □ 4GR → 3GR □ 3GR → 2GR □ 2GR → 1GR) □ Lock-up malfunction □ Shift point too high or too low □ Shift shock or slip □ Noise or vibration □ No kick down □ No pattern select □ Others TN Trequency □ All the time □ Under certain conditions □ Sometimes (times a day) For the conditions Sometimes (times a day) For the conditions □ Not affected Sometimes □ Sometimes □ Clouding □ Raining □ Snowing □ Other () Temp. □ Hot □ Warm □ Cool □ Cold □ Temp. (Approx. °C/°F) Humidity □ High □ Middle □ Low Cool □ Cold □ Temp. (Approx. °C/°F) Cool □ Cold □ Cold □ Temp. (Approx. °C/°F) Cool □ Cold □ |
|--|
| 6GR |
| No down-shift (□ 7GR → 6GR □ 6GR → 5GR □ 5GR → 4GR □ 4GR → 3GR □ 3GR → 2GR □ 2GR → 1GR) □ Lock-up malfunction □ Shift point too high or too low □ Shift shock or slip □ Noise or vibration □ No kick down □ No pattern select □ Others TN Trequency □ All the time □ Under certain conditions □ Sometimes (times a day) Feather conditions Not affected Weather □ Fine □ Clouding □ Raining □ Snowing □ Other () Temp. □ Hot □ Warm □ Cool □ Cold □ Temp. (Approx. °C/°F) Humidity □ High □ Middle □ Low |
| Shift point too high or too low Shift shock or slip Noise or vibration No kick down No pattern select Others Sometimes (times a day) Fixed the conditions Sometimes (times a day |
| Shift shock or slip |
| Noise or vibration |
| No kick down |
| No pattern select |
| requency |
| requency |
| Veather conditions Weather Fine Clouding Raining Snowing Other () Temp. Hot Warm Cool Cold Temp. (Approx. °C/°F) Humidity High Middle Low |
| Veather conditions Weather Fine Clouding Raining Snowing Other () Temp. Hot Warm Cool Cold Temp. (Approx. °C/°F) Humidity High Middle Low |
| Weather □ Fine □ Clouding □ Raining □ Snowing □ Other () Temp. □ Hot □ Warm □ Cool □ Cold □ Temp. (Approx. °C/°F) Humidity □ High □ Middle □ Low |
| Temp. ☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Temp. (Approx. °C/°F) Humidity ☐ High ☐ Middle ☐ Low |
| Humidity ☐ High ☐ Middle ☐ Low |
| |
| ransmission conditions |
| |
| □ Cold □ During warm-up □ After warm-up |
| ☐ Engine speed (rpm) |
| oad conditions |
| ☐ In town ☐ In suburbs ☐ Freeway ☐ Off road (Up/Down) |
| riving conditions Not affected |
| ☐ At starting ☐ While idling ☐ While engine racing ☐ At racing ing ☐ While cruis- |
| □ While accelerating □ While decelerating □ While turning (Right/Left) K |
| □ Vehicle speed [km/h (MPH)] |
| ther conditions |
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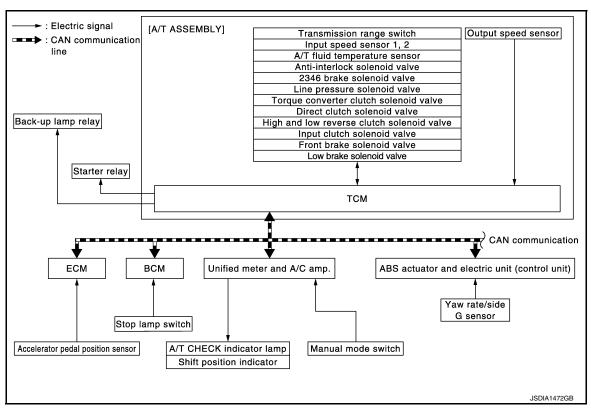
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SYSTEM DESCRIPTION

A/T CONTROL SYSTEM

System Diagram

INFOID:0000000010578838



System Description

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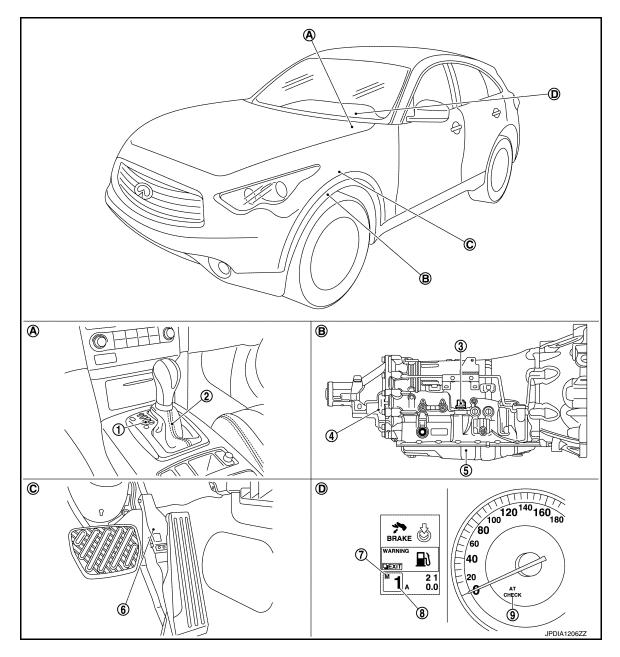
INPUT/OUTPUT SIGNAL CHART

SYSTEM DESCRIPTION

- The A/T senses vehicle operating conditions through various sensors or signals. It always controls the optimum shift position and reduces shifting and lock-up shocks.
- Receive input signals transmitted from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, etc.
- · Transmit required output signals to the respective solenoids.

Component Parts Location

INFOID:0000000010578840



- 1. Selector lever position indicator
- 4. Control valve & TCM*
- 7. Manual mode indicator
- A. Center console
- D. Combination meter

- 2. A/T shift selector assembly
- 5. Output speed sensor
- 8. Shift position indicator
- B. A/T assembly

- 3. Joint connector
- Accelerator pedal position sensor A/T CHECK indicator lamp
- C. Accelerator pedal

NOTE:

- · The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- · The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2
- A/T fluid temperature sensor

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A/T CONTROL SYSTEM

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *: Control valve & TCM is included in A/T assembly.

Component Description

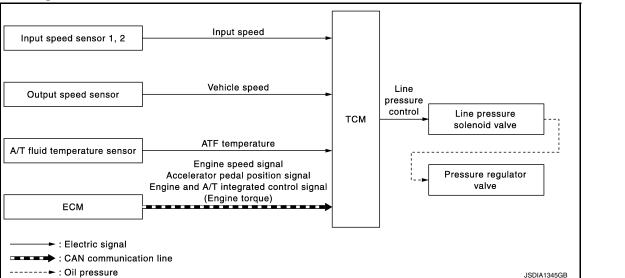
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| Name | Function |
|---|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. |
| Transmission range switch | TM-75, "Description" |
| Output speed sensor | TM-81, "Description" |
| Input speed sensor 1 | TM 70 IID consisting II |
| Input speed sensor 2 | TM-79, "Description" |
| A/T fluid temperature sensor | TM-76, "Description" |
| Input clutch solenoid valve | TM-105, "Description" |
| Front brake solenoid valve | TM-108, "Description" |
| Direct clutch solenoid valve | TM-123, "Description" |
| High and low reverse clutch solenoid valve | TM-120, "Description" |
| Low brake solenoid valve | TM-121, "Description" |
| Anti-interlock solenoid valve | TM-104, "Description" |
| 2346 brake solenoid valve | TM-122, "Description" |
| Line pressure solenoid valve | TM-103, "Description" |
| Torque converter clutch solenoid valve | TM-99, "Description" |
| Accelerator pedal position sensor | TM-109, "Description" |
| Manual mode switch | TM-117, "Description" |
| Starter relay | TM-73, "Description" |
| A/T CHECK indicator lamp | When the ignition switch is pushed to the ON position, the light comes on for 2 seconds. |
| Stop lamp switch | TM-129, "Description" |
| ECM | EC-51, "System Description" |
| BCM | BCS-9, "System Description" |
| Unified meter and A/C amp. | MWI-6, "METER SYSTEM : System Description" |
| ABS actuator and electric unit (control unit) | BRC-22, "System Description" |
| Yaw rate/side G sensor | BRC-73, "Description" |

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LINE PRESSURE CONTROL

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator | | |
|------------------------------|---|-----------------------|------------------------------|--|--|
| Input speed sensor 1, 2 | Input speed | | | | |
| Output speed sensor | Vehicle speed | | | | |
| A/T fluid temperature sensor | ATF temperature | | Line pressure solenoid valve | | |
| ECM | Engine speed signal* | Line pressure control | ↓ | | |
| | Accelerator pedal position signal* | | Pressure regulator valve | | |
| LOW | Engine and A/T integrated control signal (Engine torque)* | | | | |

^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

- When an engine and A/T integrated control signal (engine torque) equivalent to the engine drive force is transmitted from the ECM to the TCM, the TCM controls the line pressure solenoid valve.

 This line pressure solenoid controls the pressure regulator valve as the signal pressure and adjusts the pres
 - sure of the operating oil discharged from the oil pump to the line pressure most appropriate to the driving state.
- The TCM has stored in memory a number of patterns for the optimum line pressure characteristic for the driving state.
- In order to obtain the most appropriate line pressure characteristic to meet the current driving state, the TCM
 controls the line pressure solenoid current value and thus controls the line pressure.

Normal Control

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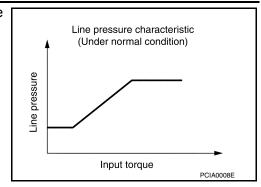
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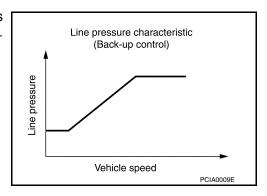
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Each clutch is adjusted to the necessary pressure to match the engine drive force.



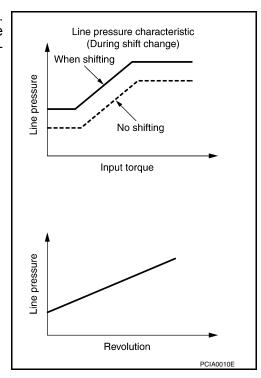
Back-up Control (Engine Brake)

When the select operation is performed during driving and the A/T is shifted down, the line pressure is set according to the vehicle speed.



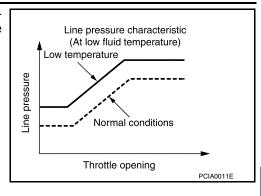
During Shift Change

The necessary and adequate line pressure for shift change is set. For this reason, line pressure pattern setting corresponds to engine torque and gearshift selection. Also, line pressure characteristic corresponds to engine speed, during engine brake operation.



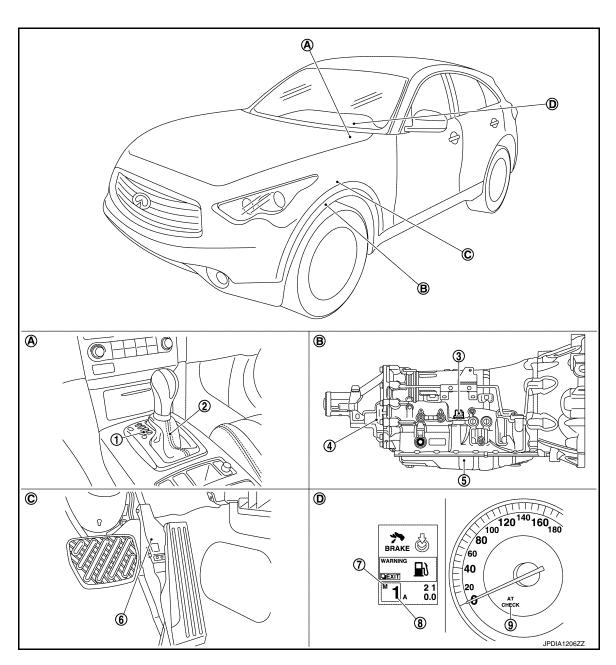
At Low Fluid Temperature

When the A/T fluid temperature drops below the prescribed temperature, in order to speed up the action of each friction element, the line pressure is set higher than the normal line pressure characteristic.



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Component Parts Location



- 1. Selector lever position indicator
- Control valve & TCM*
- Manual mode indicator
- A/T shift selector assembly
- 5. Output speed sensor
- 8. Shift position indicator
- Joint connector
- Accelerator pedal position sensor A/T CHECK indicator lamp

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LINE PRESSURE CONTROL

< SYSTEM DESCRIPTION >

Combination meter

[7AT: RE7R01A (VQ37VHR)]

A. Center console

B. A/T assembly

C. Accelerator pedal

NOTE:

D.

- · The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2
- A/T fluid temperature sensor
- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *: Control valve & TCM is included in A/T assembly.

Component Description

INFOID:0000000010578845

| Name | Function | | | |
|------------------------------|--|--|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output for power supply. The TCM controls the A/T. | | | |
| Output speed sensor | TM-81, "Description" | | | |
| Input speed sensor 1 | TM 70 "Description" | | | |
| Input speed sensor 2 | TM-79, "Description" | | | |
| A/T fluid temperature sensor | TM-76, "Description" | | | |
| Line pressure solenoid valve | TM-103, "Description" | | | |
| Pressure regulator valve | Adjusts the oil discharged from the oil pump to the optimum pressure (line pressure) for the driving state. | | | |
| ECM | EC-51, "System Description" | | | |

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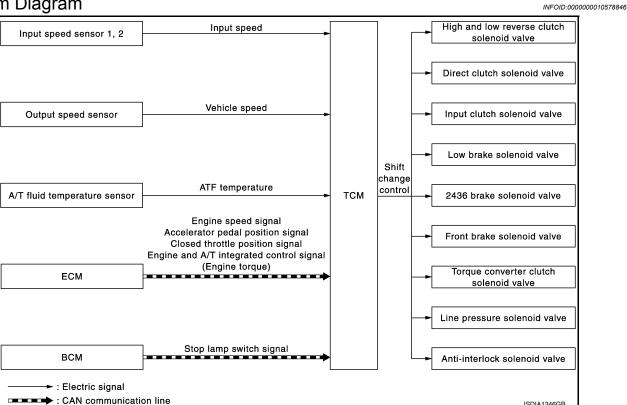
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SHIFT CHANGE CONTROL

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

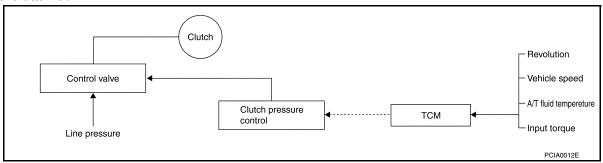
| Sensor | Input signal to TCM | TCM function | Actuator | |
|--|--|----------------------|--|--|
| Input speed sensor 1, 2 Output speed sensor A/T fluid temperature sensor | Input speed Vehicle speed ATF temperature | | High and low reverse clutch solenoid valve Direct clutch solenoid valve | |
| ECM | Engine speed signal* Accelerator pedal position signal* Closed throttle position signal* | Shift change control | Input clutch solenoid valve Low brake solenoid valve 2346 brake solenoid valve Front brake solenoid valve | |
| | Engine and A/T integrated control signal (Engine torque)* | | Torque converter clutch so lenoid valve Line pressure solenoid valve | |
| ВСМ | Stop lamp switch signal* | | Anti-interlock solenoid valve | |

^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

The clutch pressure control solenoid is controlled by the signals from the switches and sensors. Thus, the clutch pressure is adjusted to be appropriate to the engine load state and vehicle driving state. It becomes

possible to finely control the clutch hydraulic pressure with high precision and a smoother shift change characteristic is attained.



Shift Change

The clutch is controlled with the optimum timing and oil pressure by the engine speed, engine torque information, etc.

Shift Change System Diagram Shift-down Shift-up Gear ratio Output shaft torque Line pressure Gear ratio (For engaging clutch) Line pressure (For engaging clutch) Line pressure (For releasing clutch) Line pressure (For releasing clutch) Full phase real-time feedback *1 Change of line pressure is controlled depending on input torque and vehicle speed. Change of line pressure is controlled depending on input torque. *1: Full phase real-time feedback control monitors movement of gear ratio at gear change, and controls oil

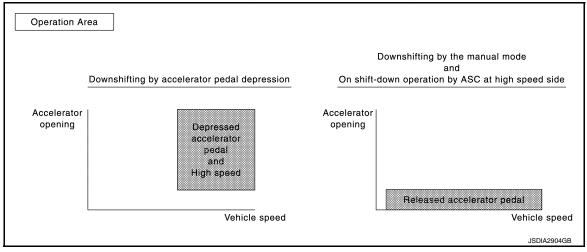
Blipping Control

It controls (synchronizes) engine speed to have a quick shift clutch coupling, by calculating engine speed after downshifting and by cooperating with ASC (Adaptive Shift Control).

- "BLIPPING CONTROL" functions.
- When downshifting by accelerator pedal depression.

pressure in real-time to achieve the best gear ratio.

- When downshifting by the manual mode.
- It works on shift-down operation by ASC at high speed side when driving at D position or in DS mode.



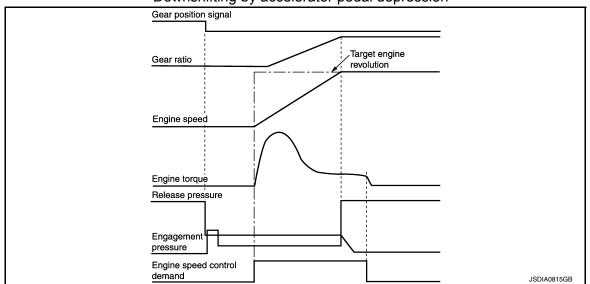
SHIFT CHANGE CONTROL

< SYSTEM DESCRIPTION >

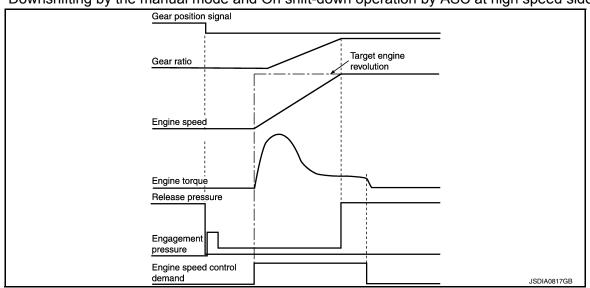
[7AT: RE7R01A (VQ37VHR)]

- TCM selects "BLIPPING CONTROL" or "NORMAL SHIFT CONTROL" according to the gear position, the selector lever position, the engine torque and the speed when accelerating by pedal depression.
- Engine speed control demand signal is transmitted from TCM to ECM under "BLIPPING CONTROL".
- ECM synchronizes the engine speed according to the engine speed control demand signal.

Downshifting by accelerator pedal depression



Downshifting by the manual mode and On shift-down operation by ASC at high speed side



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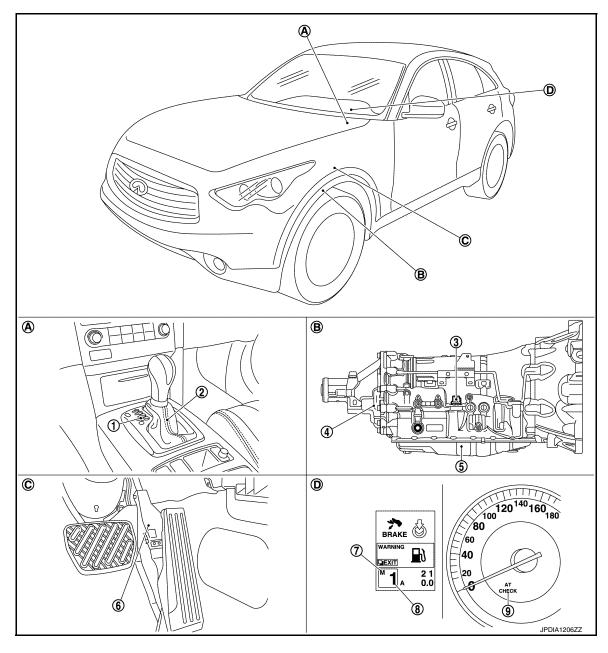
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Component Parts Location

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- 1. Selector lever position indicator
- 4. Control valve & TCM*
- 7. Manual mode indicator
- A. Center console
- D. Combination meter

- 2. A/T shift selector assembly
- 5. Output speed sensor
- 8. Shift position indicator
- B. A/T assembly

- Joint connector
- Accelerator pedal position sensor
 A/T CHECK indicator lamp
- C. Accelerator pedal

NOTE:

- The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- · The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2
- A/T fluid temperature sensor

SHIFT CHANGE CONTROL

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *: Control valve & TCM is included in A/T assembly.

Component Description

INFOID:0000000010578849

| Name | Function | | | |
|--|--|--|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. | | | |
| Output speed sensor | TM-81, "Description" | | | |
| Input speed sensor 1 | TM 70 "Description" | | | |
| Input speed sensor 2 | TM-79, "Description" | | | |
| A/T fluid temperature sensor | TM-76, "Description" | | | |
| Input clutch solenoid valve | TM-105, "Description" | | | |
| Front brake solenoid valve | TM-108, "Description" | | | |
| Direct clutch solenoid valve | TM-123, "Description" | | | |
| High and low reverse clutch solenoid valve | TM-120, "Description" | | | |
| Low brake solenoid valve | TM-121, "Description" | | | |
| Anti-interlock solenoid valve | TM-104, "Description" | | | |
| 2346 brake solenoid valve | TM-122, "Description" | | | |
| Line pressure solenoid valve | TM-103, "Description" | | | |
| Torque converter clutch solenoid valve | TM-99. "Description" | | | |
| ECM | EC-51, "System Description" | | | |
| BCM | BCS-9, "System Description" | | | |

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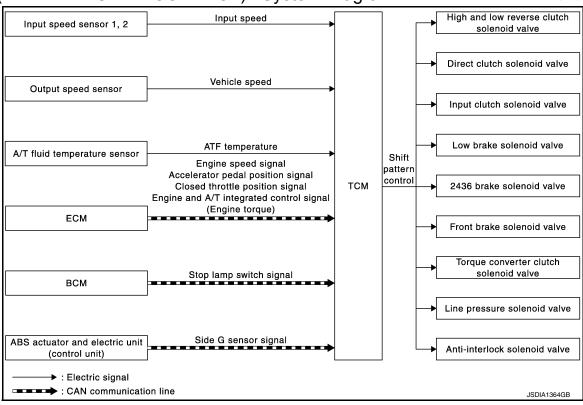
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SHIFT PATTERN CONTROL ASC (ADAPTIVE SHIFT CONTROL)

ASC (ADAPTIVE SHIFT CONTROL): System Diagram

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ASC (ADAPTIVE SHIFT CONTROL): System Description

INFOID:0000000010578851

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator | | |
|---|---|-----------------------|--|--|--|
| Input speed sensor 1, 2 | Input speed | | High and low reverse | | |
| Output speed sensor | Vehicle speed | | clutch solenoid valve | | |
| A/T fluid temperature sensor | ATF temperature | | Direct clutch solenoid valve | | |
| ECM | Engine speed signal* | | Input clutch solenoid valveLow brake solenoid valve2346 brake solenoid valve | | |
| | Accelerator pedal position signal* | 01:6 # # # 1 | | | |
| | Closed throttle position signal* | Shift pattern control | Front brake solenoid valve | | |
| | Engine and A/T integrated control signal (engine torque)* | | Torque converter clutch so- lenoid valve Line pressure solenoid | | |
| ABS actuator and electric unit (control unit) | Side G sensor signal* | | valve • Anti-interlock solenoid | | |
| BCM | Stop lamp switch signal* | | valve | | |

^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

It automatically selects the shift pattern (such as road environment and driving style) suitable for the various situations so as to allow the vehicle to be driven efficiently and smoothly.

When Driving on an Up/Down Slope

ASC judges up/down slope according to engine torque data transmitted from the ECM and vehicle speed.
 Fixing at 4GR, 5GR or 6GR on an up-slope prevents shift hunting and controls the vehicle to gain optimum

SHIFT PATTERN CONTROL

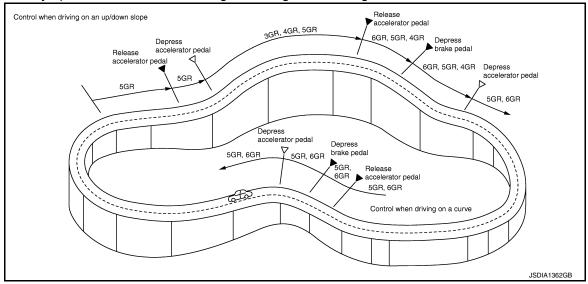
< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

driving force. On a down-slope, automatic shift-down to 4GR, 5GR or 6GR gear controls to gain optimum engine brake.

When Driving on a Curve

- In driving condition where acceleration, deceleration, or lateral acceleration continues, it corrects gear selection in order to keep a smooth vehicle speed during the curve and to give an adequate driving force at the curve end.
- When acceleration pedal is quickly released at curve entrance etc, it prevents an unnecessary shift-up.
- On braking operation at curve entrance, it gives an early shift-down according to the deceleration.
- In a sporty driving condition, it selects lower gear early even on a light braking operation, giving greater importance on driving force.
- TCM receives the side G sensor signal from the ABS actuator and electric unit (control unit). It locks to 4GR, 5GR or 6GR position in moderate cornering or to 3GR position in sharp cornering based on this signal. This prevents any upshift and kick down during cornering, maintaining smooth vehicle travel.



DS Mode

- Changes to the shift schedule that mainly utilizes the high engine speed zone when ASC is active.
- DS mode can be switched according to the following method.
- When the selector lever is in the "D" position, shifting the selector lever to manual shift gate enables switching to DS mode.
- When in DS mode, shifting the selector lever to the main gate enables to cancel DS mode.
- After switching to manual mode with paddle shifter, switching to DS mode can not be enabled even when the selector lever is shifted to the manual gate. (With paddle shifter)

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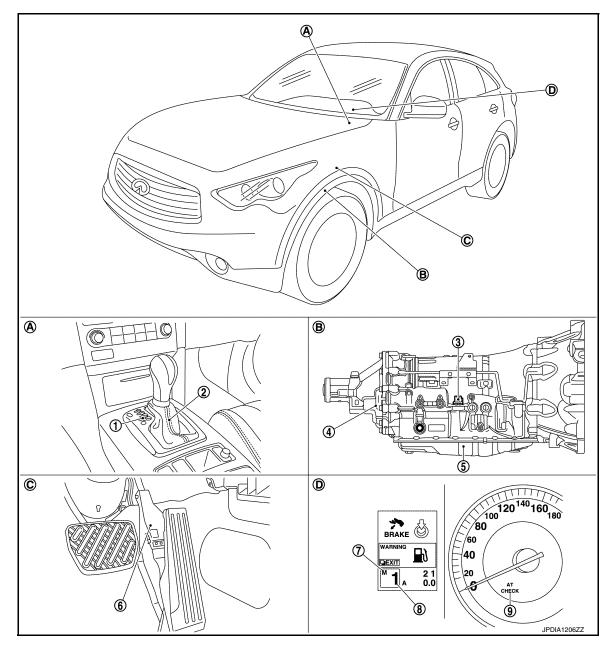
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ASC (ADAPTIVE SHIFT CONTROL): Component Parts Location

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- 1. Selector lever position indicator
- 4. Control valve & TCM*
- 7. Manual mode indicator
- A. Center console
- D. Combination meter

- A/T shift selector assembly
- Output speed sensor
- 8. Shift position indicator
- B. A/T assembly

- Joint connector
- Accelerator pedal position sensor A/T CHECK indicator lamp
- C. Accelerator pedal

NOTE:

- · The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- · The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2
- A/T fluid temperature sensor

SHIFT PATTERN CONTROL

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *: Control valve & TCM is included in A/T assembly.

ASC (ADAPTIVE SHIFT CONTROL): Component Description

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| Name | Function | | | |
|---|--|--|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. | | | |
| Output speed sensor | TM-81, "Description" | | | |
| Input speed sensor 1 | TM 70 "Description" | | | |
| Input speed sensor 2 | TM-79, "Description" | | | |
| A/T fluid temperature sensor | TM-76, "Description" | | | |
| Input clutch solenoid valve | TM-105, "Description" | | | |
| Front brake solenoid valve | TM-108, "Description" | | | |
| Direct clutch solenoid valve | TM-123, "Description" | | | |
| High and low reverse clutch solenoid valve | TM-120, "Description" | | | |
| Low brake solenoid valve | TM-121, "Description" | | | |
| Anti-interlock solenoid valve | TM-104, "Description" | | | |
| 2346 brake solenoid valve | TM-122, "Description" | | | |
| Line pressure solenoid valve | TM-103, "Description" | | | |
| Torque converter clutch solenoid valve | TM-99, "Description" | | | |
| ECM | EC-51, "System Description" | | | |
| BCM | BCS-9, "System Description" | | | |
| ABS actuator and electric unit (control unit) | BRC-22, "System Description" | | | |

MANUAL MODE

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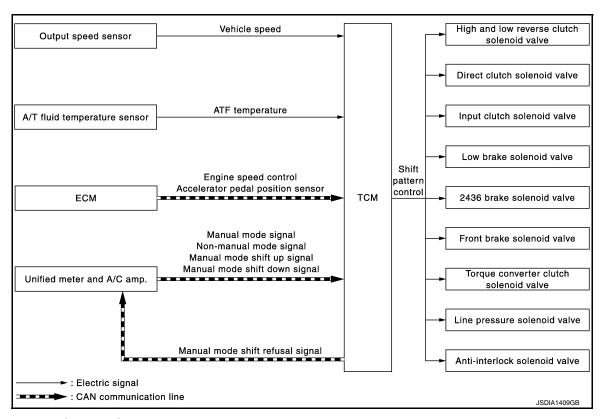
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Revision: 2015 February TM-27 2015 QX70

MANUAL MODE: System Diagram

INFOID:0000000010578854



MANUAL MODE: System Description

INFOID:0000000010578855

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator | | |
|--------------------------------|------------------------------------|-----------------------|---|--|--|
| Output speed sensor | Vehicle speed | | High and low reverse clutch | | |
| A/T fluid temperature sensor | ATF temperature | | solenoid valveDirect clutch solenoid valve | | |
| ECM Unified meter and A/C amp. | Engine speed signal* | | Input clutch solenoid valve | | |
| | Accelerator pedal position signal* | Shift pattern control | Low brake solenoid valve2346 brake solenoid valveFront brake solenoid valve | | |
| | Manual mode signal* | Shiit pattern control | | | |
| | Non-manual mode signal* | | Torque converter clutch sole- | | |
| | Manual mode shift up signal* | | noid valveLine pressure solenoid valve | | |
| | Manual mode shift down signal* | | Anti-interlock solenoid valve | | |

^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

Manual Mode

- The TCM receives the manual mode signal, non-manual mode signal, manual mode shift up signal and
 manual mode shift down signal from unified meter and A/C amp. via CAN communication line. The TCM
 shifts shift pattern control to the manual mode based on these signals, and then shifts the A/T by operating
 each solenoid valve according to the shift operation of the driver.
- The TCM prohibits the manual mode while being in fail-safe mode due to an A/T malfunction, etc. Refer to TM-152, "Fail-Safe".
- The TCM transmits the manual mode shift refusal signal to the unified meter and A/C amp. if the TCM refuses the transmission from the driving status of vehicle when the selector lever shifts to UP or DOWN side. The unified meter and A/C amp. blinks shift indicator on the combination meter and sounds the buzzer to indicate the driver that the shifting is not performed when receiving this signal. However, the TCM does not transmit the manual mode shift refusal signal in the conditions as per the following.

- When the selector lever shifts to DOWN side while driving in 1GR.
- When the selector lever shifts to UP side while driving in 7GR.

MANUAL MODE: Component Parts Location

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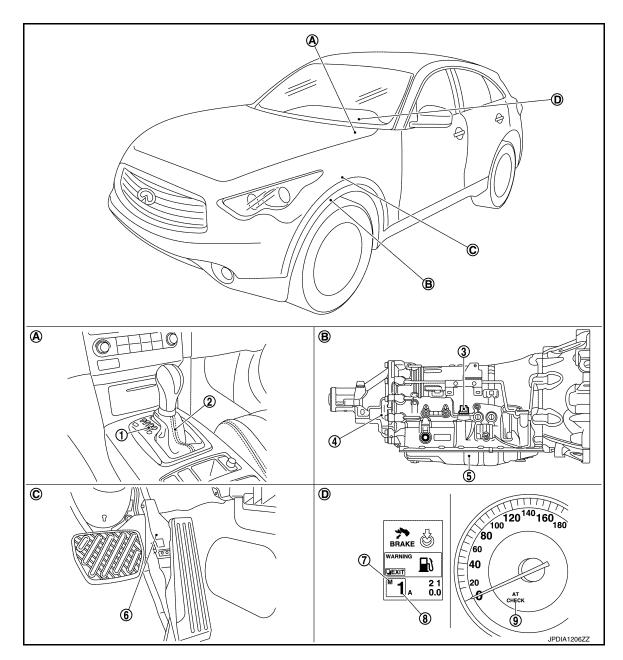
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- Selector lever position indicator
- 4. Control valve & TCM*
- 7. Manual mode indicator
- A. Center console
- D. Combination meter

- 2. A/T shift selector assembly
- 5. Output speed sensor
- 8. Shift position indicator
- B. A/T assembly

- 3. Joint connector
- Accelerator pedal position sensor
 A/T CHECK indicator lamp
- C. Accelerator pedal

NOTE:

- The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- The following components are included in control valve & TCM.
- TCM

SHIFT PATTERN CONTROL

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

- Input speed sensor 1, 2
- A/T fluid temperature sensor
- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *: Control valve & TCM is included in A/T assembly.

MANUAL MODE: Component Description

INFOID:0000000010578857

| Name | Function | | | | |
|--|--|--|--|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. | | | | |
| Output speed sensor | TM-81, "Description" | | | | |
| A/T fluid temperature sensor | TM-76, "Description" | | | | |
| Input clutch solenoid valve | TM-105, "Description" | | | | |
| Front brake solenoid valve | TM-108, "Description" | | | | |
| Direct clutch solenoid valve | TM-123, "Description" | | | | |
| High and low reverse clutch solenoid valve | TM-120, "Description" | | | | |
| Low brake solenoid valve | TM-121, "Description" | | | | |
| Anti-interlock solenoid valve | TM-104, "Description" | | | | |
| 2346 brake solenoid valve | TM-122, "Description" | | | | |
| Line pressure solenoid valve | TM-103, "Description" | | | | |
| Torque converter clutch solenoid valve | TM-99, "Description" | | | | |
| ECM | EC-51, "System Description" | | | | |
| BCM | BCS-9. "System Description" | | | | |
| Unified meter and A/C amp. | MWI-6, "METER SYSTEM : System Description" | | | | |

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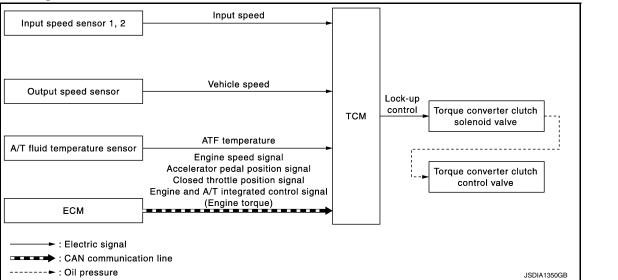
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LOCK-UP CONTROL

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator | | |
|------------------------------|---|-----------------|-------------------------------|--|--|
| Input speed sensor 1, 2 | Input speed | | | | |
| Output speed sensor | Vehicle speed | | | | |
| A/T fluid temperature sensor | ATF temperature | | Torque converter clutch sole- | | |
| ECM | Engine speed signal* | Lock-up control | noid valve ↓ | | |
| | Accelerator pedal position signal* | Look up control | Torque converter clutch con- | | |
| | Closed throttle position signal* | | trol valve | | |
| | Engine and A/T integrated control signal (Engine torque)* | | | | |

^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

The torque converter clutch piston in the torque converter is engaged to eliminate torque converter slip to increase power transmission efficiency.

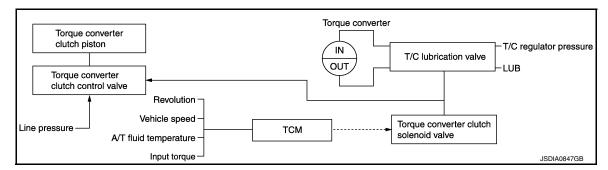
The torque converter clutch control valve operation is controlled by the torque converter clutch solenoid valve, which is controlled by a signal from TCM, and the torque converter clutch control valve engages or releases the torque converter clutch piston.

Lock-up operation condition table

| Selector lever | ver "D" position "M" position | | | | "D" position | | | | | | | |
|----------------|-------------------------------|---|---|---|--------------|---|---|---|---|---|---|---|
| Gear position | 7 | 6 | 5 | 4 | 3 | 2 | 7 | 6 | 5 | 4 | 3 | 2 |
| Lock-up | × | _ | _ | _ | _ | _ | × | × | × | × | × | × |
| Slip lock-up | × | × | × | × | × | × | × | × | × | × | × | × |

Torque Converter Clutch Control Valve Control

Lock-up control system diagram



Lock-up released

 In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by the torque converter clutch solenoid and the lock-up apply pressure is drained.
 in this way, the torque converter clutch piston is not coupled.

Lock-up Applied

 In the lock-up applied state, the torque converter clutch control valve is set into the locked state by the torque converter clutch solenoid and lock-up apply pressure is generated.
 In this way, the torque converter clutch piston is pressed and coupled.

Smooth Lock-up Control

When shifting from the lock-up released state to the lock-up applied state, the current output to the torque converter clutch solenoid is controlled with the TCM. In this way, when shifting to the lock-up applied state, the torque converter clutch is temporarily set to the half-clutched state to reduce the shock.

Half-clutched State

The current output from the TCM to the torque converter clutch solenoid is varied to steadily increase the
torque converter clutch solenoid pressure.
 In this way, the lock-up apply pressure gradually rises and while the torque converter clutch piston is put into
half-clutched states, the torque converter clutch piston operating pressure is increased and the coupling is
completed smoothly.

Slip Lock-up Control

 In the slip region, the torque converter clutch solenoid current is controlled with the TCM to put it into the half-clutched state. This absorbs the engine torque fluctuation and lock-up operates from low speed.
 This raises the fuel efficiency for 2GR, 3GR, 4GR, 5GR, 6GR and 7GR.

Component Parts Location

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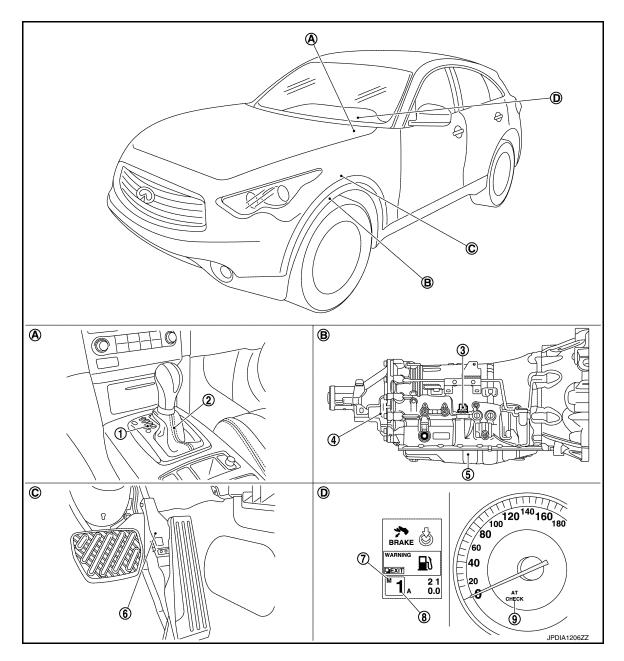
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- 1. Selector lever position indicator
- 4. Control valve & TCM*
- 7. Manual mode indicator
- A. Center console
- D. Combination meter

- 2. A/T shift selector assembly
- 5. Output speed sensor
- 8. Shift position indicator
- B. A/T assembly

- 3. Joint connector
- Accelerator pedal position sensor
 A/T CHECK indicator lamp
- C. Accelerator pedal

NOTE:

- · The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- · The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2
- A/T fluid temperature sensor

LOCK-UP CONTROL

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *: Control valve & TCM is included in A/T assembly.

Component Description

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| Name | Function | | | |
|--|--|--|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. | | | |
| Output speed sensor | TM-81, "Description" | | | |
| Input speed sensor 1 | TM 70 "Description" | | | |
| Input speed sensor 2 | TM-79, "Description" | | | |
| A/T fluid temperature sensor | TM-76, "Description" | | | |
| Torque converter clutch solenoid valve | TM-99, "Description" | | | |
| Torque converter clutch control valve Switches the lock-up to operating or released. Also, by performing the lot transiently, lock-up smoothly. | | | | |
| ECM | EC-51, "System Description" | | | |

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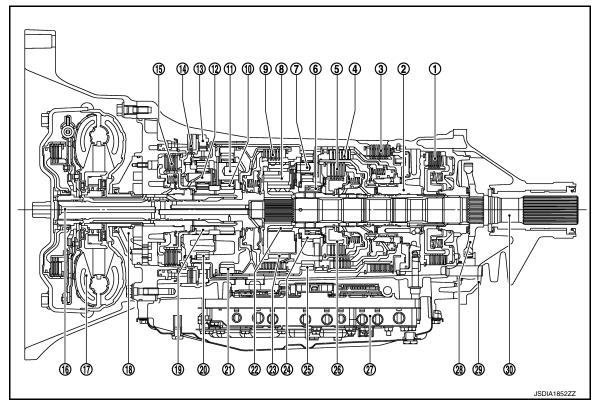
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SHIFT MECHANISM

Cross-Sectional View

2WD MODELS

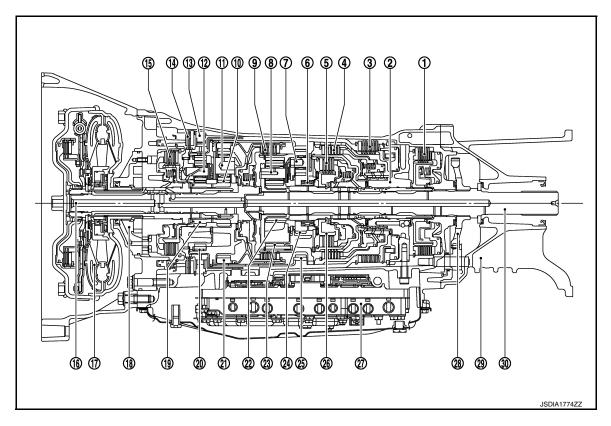


- 1. Low brake
- 4. Direct clutch
- 7.*1 Rear carrier
- 10.*2 Front sun gear
- 13. 1st one-way clutch
- 16.*4 Input shaft
- 19.*2 Under drive sun gear
- 22. Mid sun gear
- 25. Rear internal gear
- 28. Parking gear
- *1: 7 and 23 are one unit.
- *2: 10 and 19 are one unit.
- *3: 11 and 20 are one unit.
- *4: 16 and 21 are one unit.

- 2. Drum support
- 5. High and low reverse clutch
- 8. Mid carrier
- 11.*3 Front carrier
- 14. Front brake
- 17. Torque converter
- 20.*3 Under drive internal gear
- 23.*1 Mid internal gear
- 26. High and low reverse clutch hub
- 29. Rear extension

- 3. Reverse brake
- 6. 2nd one-way clutch
- 9. Input clutch
- 12. Under drive carrier
- 15. 2346 brake
- 18. Oil pump
- 21.*4 Front internal gear
- 24. Rear sun gear
- 27. Control valve & TCM
- 30. Output shaft

AWD MODELS



- 1. Low brake
- 4. Direct clutch
- 7.*1 Rear carrier
- 10.*2 Front sun gear
- 13. 1st one-way clutch
- 16.*4 Input shaft
- 19.*2 Under drive sun gear
- 22. Mid sun gear
- 25. Rear internal gear
- 28. Parking gear
- *1: 7 and 23 are one unit.
- *2: 10 and 19 are one unit.
- *3: 11 and 20 are one unit.
- *4: 16 and 21 are one unit.

- 2. Drum support
- 5. High and low reverse clutch
- 8. Mid carrier
- 11.*3 Front carrier
- 14. Front brake
- 17. Torque converter
- 20.*3 Under drive internal gear
- 23.*1 Mid internal gear
- 26. High and low reverse clutch hub
- 29. Adapter case

- 3. Reverse brake
- 6. 2nd one-way clutch
- 9. Input clutch
- 12. Under drive carrier
- 15. 2346 brake
- 18. Oil pump
- 21.*4 Front internal gear
- 24. Rear sun gear
- 27. Control valve & TCM
- 30. Output shaft

System Diagram INFOID:0000000010578863 Α В Parking pawl С Low brake TM Е Output shaft F Rear internal gear Rear carrier Rear sun gear G Н Mid internal gear Mid carrier Mid sun gear Input Front internal gear Front sun gear Front carrier K Under drive internal gear Under drive carrier Under drive sun gear Input shaft M Ν 0 2346 brake Р

System Description

INFOID:0000000010578864

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DESCRIPTION

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

With the use of 4 sets of planetary gears, A/T enables 7-speed transmission for forward and 1-speed transmission for backward, depending on the combination of 3 sets of multiple-disc clutches, 4 sets of multiple-disc brakes and 2 sets of one-way clutches.

CLUTCH AND BAND CHART

| | ame of ne part | | D, | ′C | | | L | /B | | | | | |
|-------|-------------------|-----|-------|------|------------|------------|-------|-------|--------|-------|------------|------------|------------------------------------|
| Shift | \ | I/C | FRONT | REAR | H&LR/C | F/B | INNER | OUTER | 2346/B | REV/B | 1st OWC | 2nd OWC | Remarks |
| F |) | | | | Δ | Δ | | | | | | | Park position |
| F | 7 | | | | \Diamond | \Diamond | | | | 0 | 0 | 0 | Reverse position |
| 1 | N | | | | Δ | Δ | | | | | | | Neutral position |
| | 1st | | | | ☆ | ☆ | 0 | 0 | | | 0 | 0 | |
| | 2nd | | | | | | 0 | 0 | 0 | | | 0 | |
| | 3rd | | 0 | 0 | | | 0 | | 0 | | | | Automatic shift |
| D, DS | 4th | | 0 | 0 | 0 | | | | 0 | | | | 1⇔2⇔3⇔4⇔5⇔6⇔7 |
| | 5th | 0 | | 0 | 0 | | | | | | | | |
| | 6th | 0 | | | 0 | | | | 0 | | | | |
| | 7th | 0 | | | 0 | 0 | | | | | | | |
| 7M | 7th | 0 | | | 0 | 0 | | | | | | | Locks* (held stationary) in 7GR |
| 6M | 6th | 0 | | | 0 | | | | 0 | | | | Locks* (held stationary) in 6GR |
| 5M | 5th | 0 | | 0 | 0 | | | | | | | | Locks* (held stationary) in 5GR |
| 4M | 4th | | 0 | 0 | 0 | | | | 0 | | | | Locks* (held stationary) in 4GR |
| зм | 3rd | | 0 | 0 | | | 0 | | 0 | | | | Locks* (held stationary) in 3GR |
| 2M | 2nd | | | | \Diamond | | 0 | 0 | 0 | | | 0 | Locks* (held stationary) in 2GR |
| 1M | 1st | | | | \Diamond | \Diamond | 0 | 0 | | | 0 | 0 | Locks (held stationary) in 1GR |

O - Operates

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*: Down shift automatically according to the vehicle speed.

POWER TRANSMISSION

"N" Position

O – Operates during "progressive" acceleration.

Operates and affects power transmission while coasting.

 $[\]triangle$ – Line pressure is applied but does not affect power transmission.

 ^{☆ -} Operates at the fixed speed or less.

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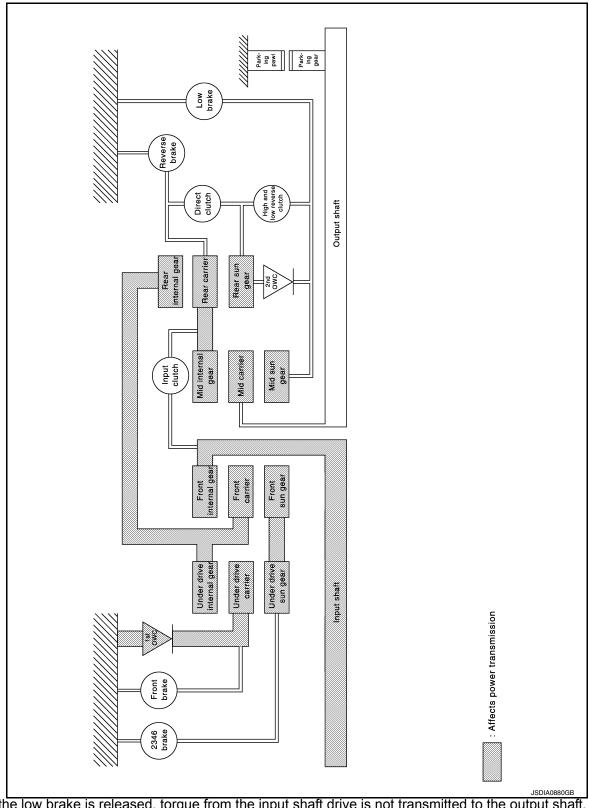
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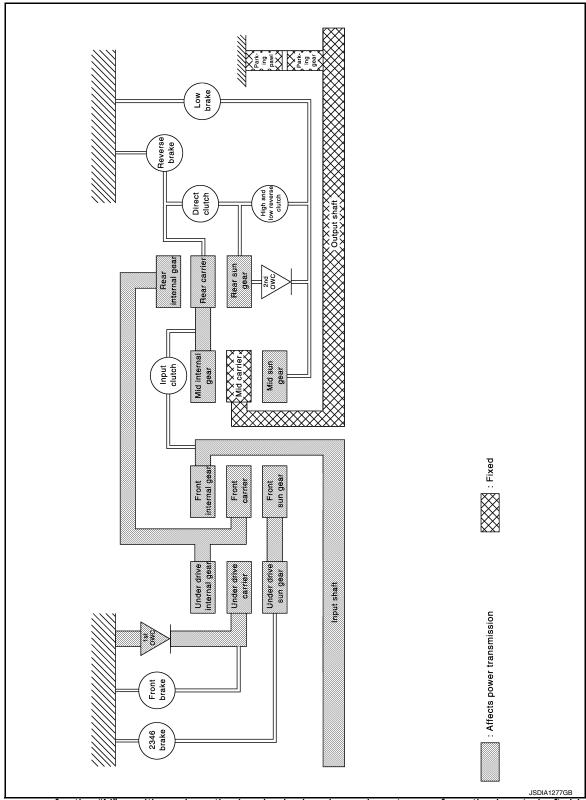
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Since the low brake is released, torque from the input shaft drive is not transmitted to the output shaft. "P" Position

Revision: 2015 February TM-39 2015 QX70



- The same as for the "N" position, since the low brake is released, so torque from the input shaft drive is not transmitted to the output shaft.
- The parking pawl linked with the selector lever meshes with the parking gear and fastens the output shaft mechanically.

"D1" and "DS1" Positions

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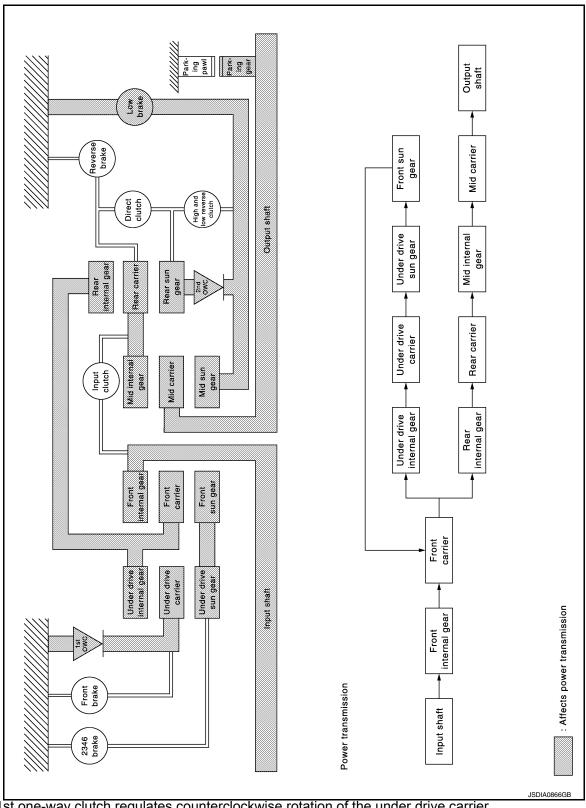
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• The 1st one-way clutch regulates counterclockwise rotation of the under drive carrier.

The 2nd one-way clutch regulates counterclockwise rotation of the rear sun gear.

· The mid sun gear is fixed by the low brake.

Each planetary gear enters the state described below.

TM-41 **Revision: 2015 February** 2015 QX70

< SYSTEM DESCRIPTION >

| Front planetary gear | | | |
|-------------------------|---|---------------------------------------|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Counterclockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Deceleration from front internal gear | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary g | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | _ | Fixed | Input/Output |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution |
| Number of revolutions | Acceleration from under drive internal gear | _ | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;M1" Position

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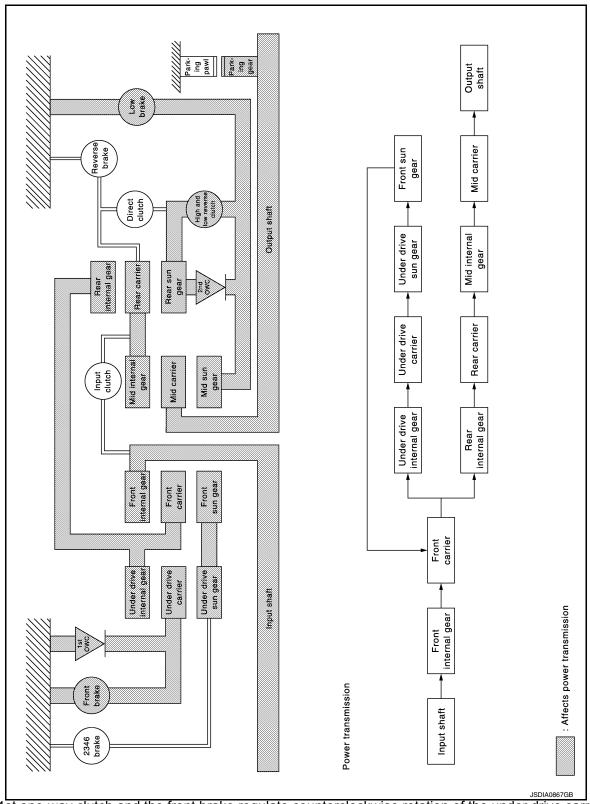
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The 1st one-way clutch and the front brake regulate counterclockwise rotation of the under drive carrier.
 NOTE:

The front brake operates only while coasting.

• The 2nd one-way clutch and the high and low reverses clutch regulate counterclockwise rotation of the rear sun gear.

NOTE:

The high and low reverse clutch operates only while coasting.

The mid sun gear is fixed by the low brake.

Revision: 2015 February TM-43 2015 QX70

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

• Each planetary gear enters the state described below.

| Front planetary gear | | | |
|--------------------------|---|---------------------------------------|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Counterclockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Deceleration from front internal gear | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary ge | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | _ | Fixed | Input/Output |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution |
| Number of revolutions | Acceleration from under drive internal gear | _ | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;D2" and "DS2" Positions

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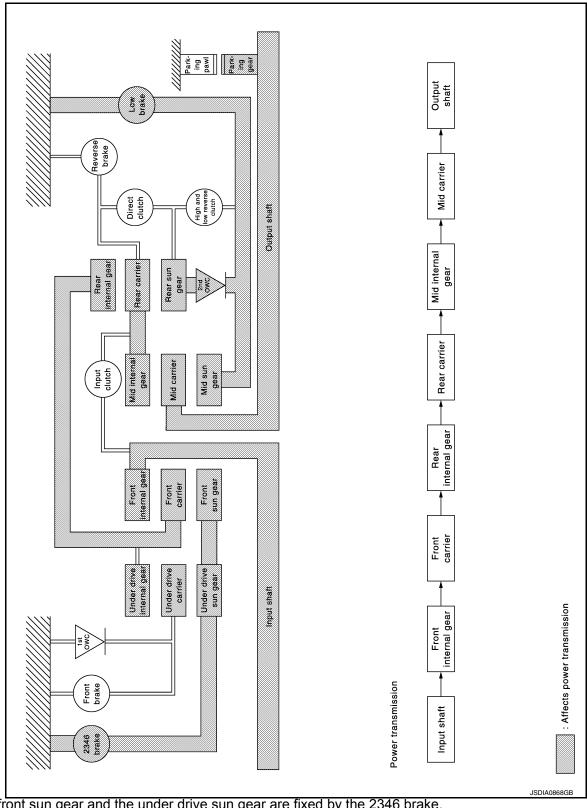
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The front sun gear and the under drive sun gear are fixed by the 2346 brake.

• The 2nd one-way clutch regulates counterclockwise rotation of the rear sun gear.

· The mid sun gear is fixed by the low brake.

Each planetary gear enters the state described below.

TM-45 Revision: 2015 February 2015 QX70

< SYSTEM DESCRIPTION >

| Front planetary gear | | | |
|---------------------------|----------------------|---|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary gea | ar | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | Fixed | _ | Input/Output |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from under drive internal gear | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;M2" Position

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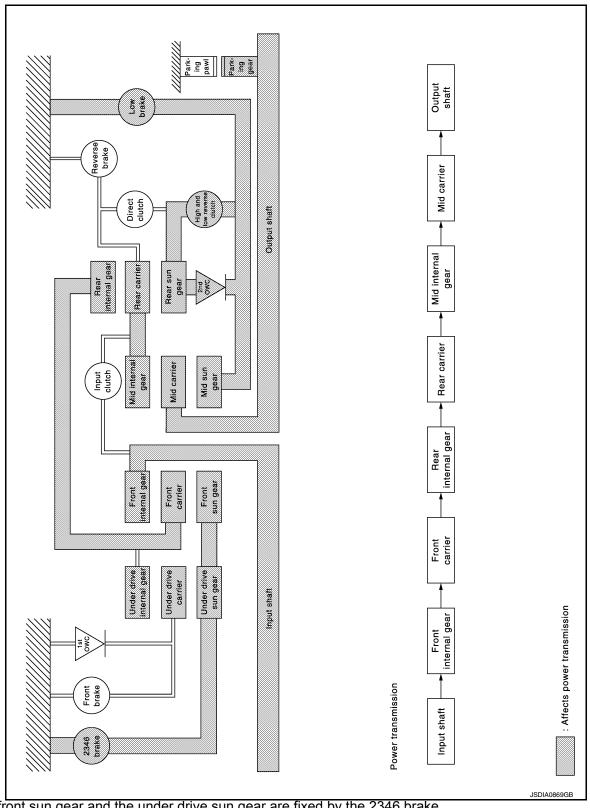
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- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- · The 2nd one-way clutch and the high and low reverse clutch regulate counterclockwise rotation of the rear sun gear.

NOTE:

The high and low reverse clutch operates only while coasting.

- The mid sun gear is fixed by the low brake.
- · Each planetary gear enters the state described below.

TM-47 **Revision: 2015 February** 2015 QX70

< SYSTEM DESCRIPTION >

| Front planetary gear | | | |
|---------------------------|----------------------|---|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary gea | ar | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | Fixed | _ | Input/Output |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from under drive internal gear | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;D3", "DS3" and "M3" Positions

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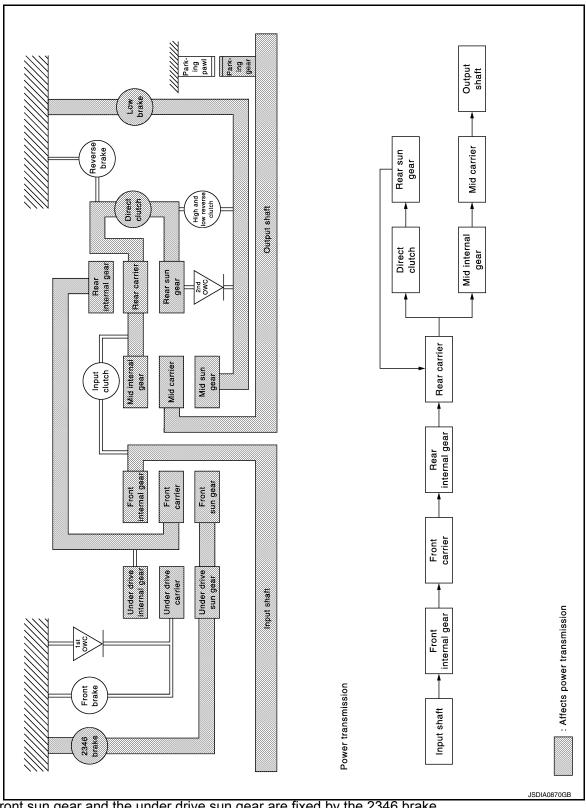
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The front sun gear and the under drive sun gear are fixed by the 2346 brake.

• The direct clutch gets engaged and connects the rear sun gear with the rear carrier.

The mid sun gear is fixed by the low brake.

Each planetary gear enters the state described below.

TM-49 Revision: 2015 February 2015 QX70

< SYSTEM DESCRIPTION >

| Front planetary gear | | | |
|-------------------------|---|---|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary g | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | Fixed | _ | Input/Output |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from under drive in- ternal gear | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Same number of revolution as the rear internal gear | Same number of revolution as the rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;D4", "DS4" and "M4" Positions

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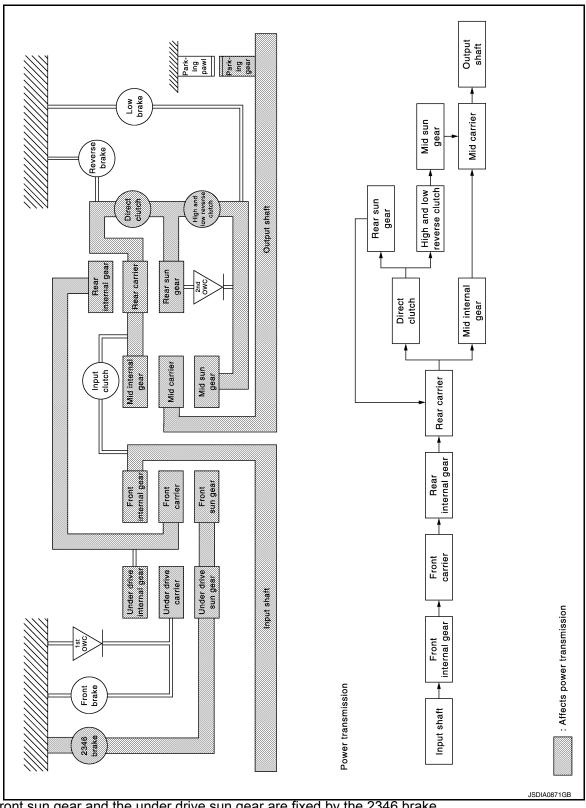
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The front sun gear and the under drive sun gear are fixed by the 2346 brake.

The direct clutch gets engaged and connects the rear sun gear with the rear carrier.

• The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.

Each planetary gear enters the state described below.

TM-51 **Revision: 2015 February** 2015 QX70

< SYSTEM DESCRIPTION >

| Front planetary gear | | | |
|-------------------------|---|---|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary g | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | Fixed | _ | Input/Output |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from under drive in- ternal gear | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Same number of revolution as the rear internal gear | Same number of revolution as the rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Same number of revolution as the mid internal gear | Same number of revolution as the mid internal gear | Same number of revolution as the rear carrier |

[&]quot;D5", "DS5" and "M5" Positions

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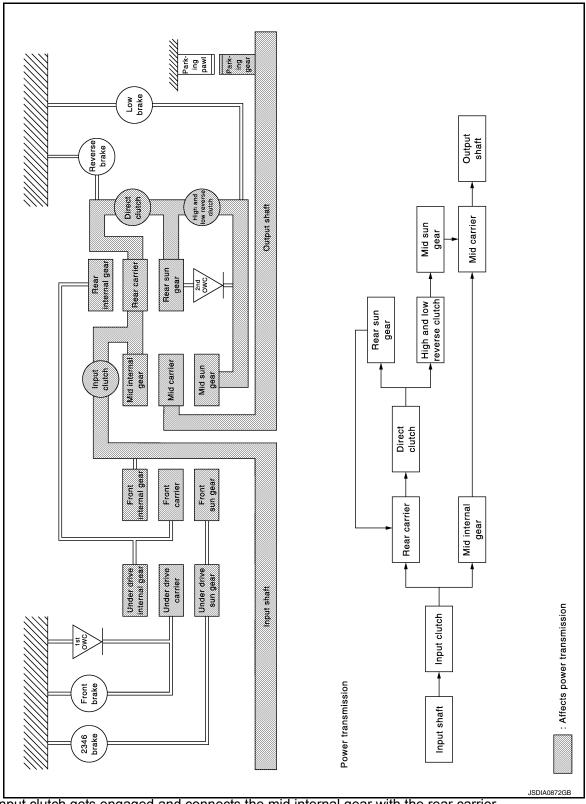
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• The input clutch gets engaged and connects the mid internal gear with the rear carrier.

• The direct clutch gets engaged and connects the rear sun gear with the rear carrier.

• The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.

Each planetary gear enters the state described below.

Revision: 2015 February TM-53 2015 QX70

< SYSTEM DESCRIPTION >

| Rear planetary gear | | | |
|-----------------------|--|--|---|
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | _ | input/Output | _ |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Same number of revolution as the rear carrier | Same number of revolution as the input shaft | Same number of revolution as the rear carrier |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Same number of revolution as the mid internal gear | Same number of revolution as the mid internal gear | Same number of revolution as the input shaft |

[&]quot;D6", "DS6" and "M6" Positions

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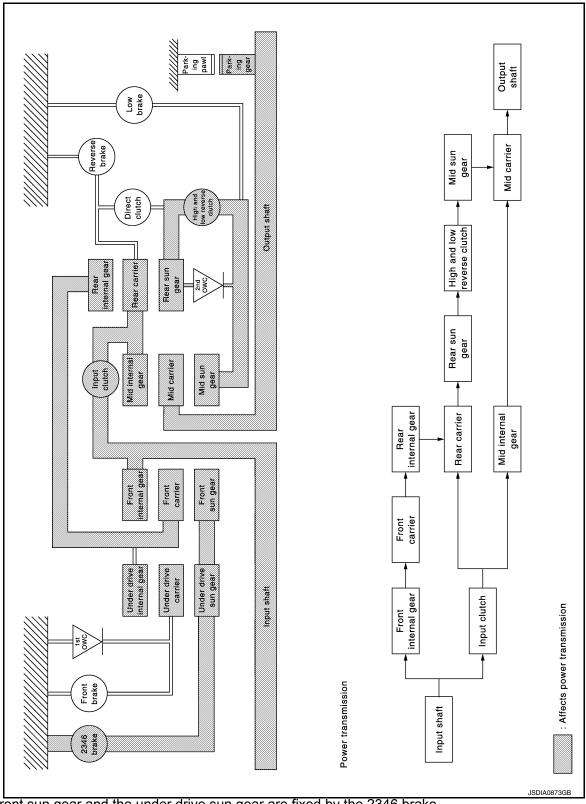
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The front sun gear and the under drive sun gear are fixed by the 2346 brake.

• The input clutch gets engaged and connects the mid internal gear with the rear carrier.

• The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.

Each planetary gear enters the state described below.

Revision: 2015 February TM-55 2015 QX70

< SYSTEM DESCRIPTION >

| Front planetary gear | | | |
|-----------------------|-------------------------------------|--|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | _ | Input/Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Acceleration from rear carrier | Same number of revolution as the input shaft | Same number of revolution as the front carrier |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Acceleration from mid internal gear | Acceleration from mid internal gear | Same number of revolution as the input shaft |

[&]quot;D7", "DS7" and "M7" Positions

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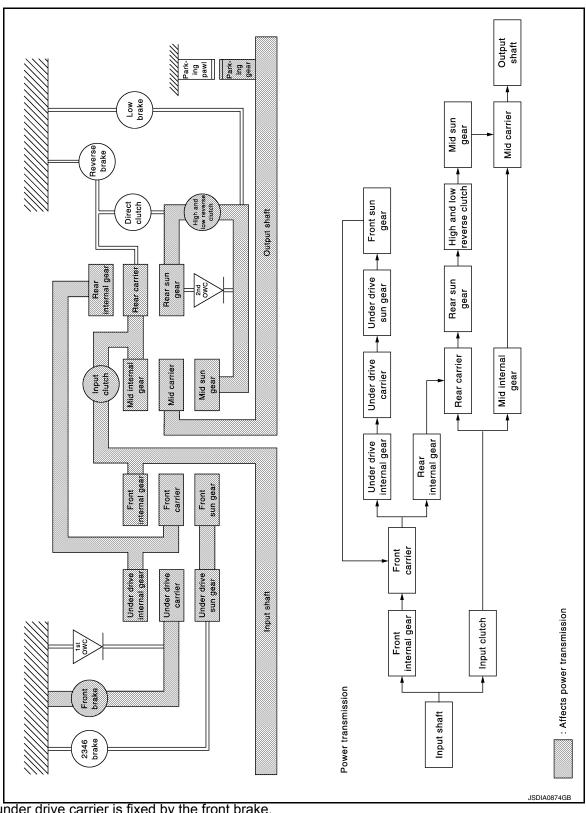
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The under drive carrier is fixed by the front brake.

- The input clutch gets engaged and connects the mid internal gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters state described below.

TM-57 Revision: 2015 February 2015 QX70

< SYSTEM DESCRIPTION >

| Front planetary gear | | | |
|-------------------------|--|--|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Counterclockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Deceleration from front internal gear | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary g | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | _ | Fixed | Input/Output |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution |
| Number of revolutions | Acceleration from under drive inter- nal gear | _ | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | _ | Input/Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Acceleration from rear carrier | Same number of revolution as the input shaft | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Acceleration from mid internal gear | Acceleration from mid internal gear | Same number of revolution as the input shaft |

[&]quot;R" Position

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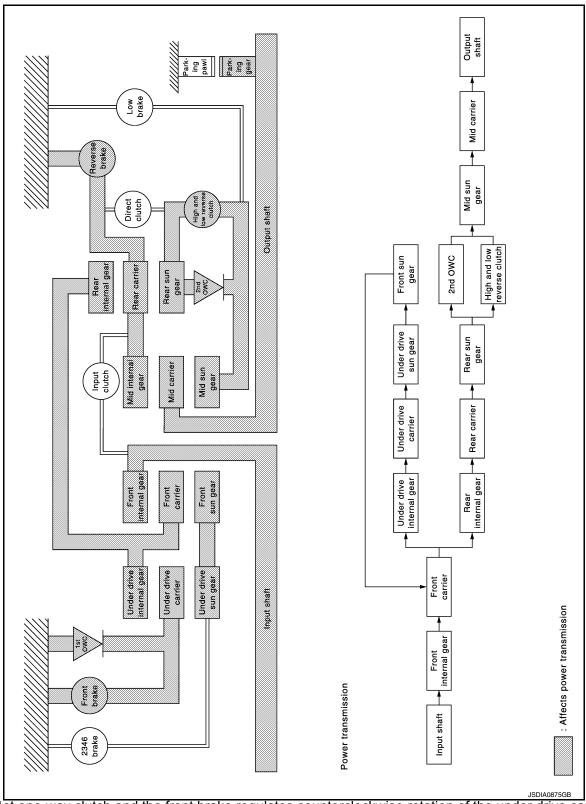
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The 1st one-way clutch and the front brake regulates counterclockwise rotation of the under drive carrier.
 NOTE:

The front brake operates at the fixed speed or less.

- The rear carrier and the mid internal gear are fixed by the reverse brake.
- The mid sun gear rotates at the same speed as the rear sun gear by operation of the 2nd one-way clutch and the high and low reverse clutch.

NOTE:

The high and low reverse clutch operates at the fixed speed or less.

Revision: 2015 February TM-59 2015 QX70

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

• Each planetary gear enters the state described below.

| Front planetary gear | | | |
|-------------------------|--|---------------------------------------|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Counterclockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Deceleration from front internal gear | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary g | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | _ | Fixed | Input/Output |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution |
| Number of revolutions | Acceleration from under drive inter- nal gear | _ | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Output | Fixed | Input |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution |
| Number of revolutions | Acceleration from rear internal gear | _ | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Input | Output | Fixed |
| Direction of rotation | Counterclockwise revolution | Counterclockwise revolution | _ |
| Number of revolutions | Same number of revolution as the rear sun gear | Deceleration from mid sun gear | _ |

Component Parts Location

INFOID:0000000010578865

Refer to TM-35, "Cross-Sectional View".

Component Description

INFOID:0000000010578866

| Name of the Part (Abbreviation) | Function |
|-------------------------------------|---|
| Front brake (FR/B) | Fastens the under drive carrier. |
| Input clutch (I/C) | Connects the mid internal gear and the rear carrier. |
| Direct clutch (D/C) | Connects the rear carrier and the rear sun gear. |
| High and low reverse clutch (HLR/C) | Connects the rear sun gear and the mid sun gear. |
| Reverse brake (R/B) | Fastens the rear carrier. |
| Low brake (L/B) | Fastens the mid sun gear. |
| 2346 brake (2346/B) | Fastens the under drive sun gear. |
| 1st one-way clutch (1st OWC) | Allows the under drive carrier to turn freely in the forward direction but fastens it for reverse rotation. |
| 2nd one-way clutch (2nd OWC) | Allows the rear sun gear to turn freely in the forward direction but fastens it for reverse rotation. |
| Torque converter | Amplifies driving force the engine, and transmits it to transmission input shaft. |
| Oil pump | Driven by the engine, oil pump supplies oil to torque converter, control valve assembly, and each lubricating system. |

[7AT: RE7R01A (VQ37VHR)]

INFOID:0000000010578867

SHIFT LOCK SYSTEM

System Description

• Shift lock prevents an unintentional start of the vehicle that may be caused by an incorrect operation while selector lever is in the "P" position.

Selector lever can be shifted from the "P" position to another position when the following conditions are satisfied.

- Ignition switch ON
- Stop lamp switch is ON (brake pedal is depressed)
- Selector lever knob button is pressed

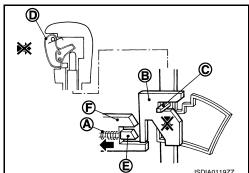
SHIFT LOCK OPERATION AT "P" POSITION

When Brake Pedal Is Not Depressed (No Shift Operation Allowed)

The shift lock solenoid (A) inside the shift lock unit is not energized if the brake pedal is not depressed while the ignition switch is ON.

The lock plate (B) lowers according to the downward movement of the position pin (C) when the selector button (D) is pressed, and presses only slider B (E) into the shift lock unit. Slider A (F) located below the lock plate prevents the downward movement of the lock plate with the spring force. The selector lever cannot be shifted from the "P" position for this reason.

However, slider A is forcibly pressed into the shift lock unit, allowing the selector lever to shift if the shift lock release button is pressed.

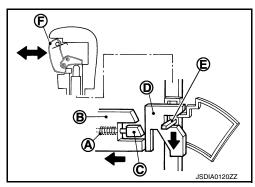


When Brake Pedal Is Depressed (Shift Operation Allowed)

The shift lock solenoid (A) inside the shift lock unit is energized and the relative positions of sliders A (B) and B (C) are maintained when the brake pedal is depressed while the ignition switch is ON.

The lock plate (D) lowers according to the downward movement of the position pin (E), thrusting away sliders A and B, when the selector button (F) is pressed.

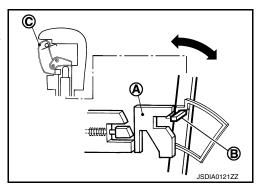
The position pin lowers to the position that allows shift operation for this reason. As a result, the selector lever can be shifted out of the P position.



OPERATION AT OTHER THAN "P" POSITION

The shift lock function will not operate at any position other than "P" because the lock plate (A) is only set for the "P" position. Accordingly, the selector lever can be shifted to any position regardless of the brake operation.

The position pin (B) enters the "P" position thrusting away the lock plate when the selector lever is shifted to the "P" position. Then, the shift mechanism is locked when the selector button (C) is released.



"P" POSITION RETAINING MECHANISM (IGNITION SWITCH LOCK)

When ignition switch is not in the ON position, power is not applied to the shift lock solenoid in the shift lock unit. This causes shift lock state, and then "P" position is retained.

When an actuating system in the shift lock unit has a malfunction, selector lever is unable to operate from the "P" position even when pressing the brake pedal with the ignition switch ON. However, when pressing the shift lock release button, slider A is forcibly pressed into the shift lock unit. This allows shift lock to be released and select operation from the "P" position.

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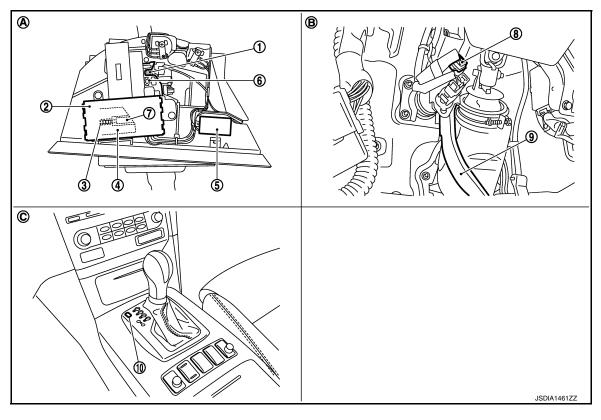
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[7AT: RE7R01A (VQ37VHR)]

Never use the shift lock release button except when the select lever is inoperative even when pressing the brake pedal with the ignition switch ON.

Component Parts Location

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- 1. Position pin
- 4. Slider A
- 7. Slider B
- 10. Shift lock cover *
- A. A/T shift selector assembly
- 2. Shift lock unit
- 5. A/T shift selector connector

Brake pedal, upper

8. Stop lamp switch

B.

- Shift lock solenoid
- 6. Lock plate
- 9. Brake pedal
- C. Center console

Component Description

INFOID:0000000010578869

| | Component | Function | | |
|------------------|---------------------------|--|--|--|
| | Shift lock solenoid | Activated by the ignition switch and stop lamp signals, it holds the relative positions of sliders A and B. | | |
| Shift lock unit | Lock plate | Restricts position pin moving. | | |
| | Shift lock release button | Pressing the shift lock release button cancels the shift lock forcibly. | | |
| Position pin | <u> </u> | Links with selector knob button and restricts selector lever shift operation. | | |
| Stop lamp switch | | When brake pedal is depressed, stop lamp switch turns ON. When stop lamp switch turns ON, power is supplied to shift lock unit. | | |

^{*:} Shift lock release button becomes operative by removing shift lock cover.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000010578870

The A/T system has two self-diagnostic systems.

The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM in combination with the ECM. A malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory and in the TCM memory.

The second is the TCM original self-diagnosis indicated by the TCM. A malfunction history is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For details, refer to TM-157, "DTC Index".

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OBD FUNCTION

The ECM provides emission-related on board diagnostic (OBD-II) functions for the A/T system.

One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part.

The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.

The MIL automatically illuminates in "One or Two Trip Detection Logic" when a malfunction is sensed in relation to A/T system parts. For details, refer to <u>EC-147</u>, "<u>DIAGNOSIS DESCRIPTION</u>: 1st Trip Detection Logic and Two Trip Detection Logic".

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DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (TCM)

CONSULT Function (TRANSMISSION)

INFOID:0000000010578871

[7AT: RE7R01A (VQ37VHR)]

CONSULT APPLICATION ITEMS

| Diagnostic test mode | Function |
|-----------------------------------|--|
| Self Diagnostic Results | Retrieve DTC from ECU and display diagnostic items. |
| Data Monitor | Monitor the input/output signal of the control unit in real time. |
| CAN Diagnosis | This mode displays a network diagnosis result about CAN by a diagram. |
| CAN Diagnostic Support Monitor | It monitors the status of CAN communication. |
| DTC work support | DTC reproduction procedure can be performed speedily and precisely. |
| ECU Identification | Display the ECU identification number (part number etc.) of the selected system. |
| CALIB DATA* | The calibration data status of TCM can be checked. |

^{*:} Although "CALIB DATA" is selectable, do not use its.

SELF-DIAGNOSTIC RESULTS

Refer to TM-157, "DTC Index".

IGN Counter

The IGN counter is indicated in Freeze frame data (FFD) and indicates the number of times that the ignition switch is turned ON after returning to the normal state from DTC.

- CAN malfunction
- The number is 0 when a malfunction is detected now.
- The number increases like 1 \rightarrow 2 \rightarrow 3...38 \rightarrow 39 after returning to the normal condition whenever ignition switch OFF \rightarrow ON.
- The number is fixed to 39 until the self-diagnosis results are erased if it is over 39.
- · Other than CAN malfunction
- The number is 0 when a malfunction is detected now.
- The number increases like 1 \rightarrow 2 \rightarrow 3...254 \rightarrow 255 after returning to the normal condition whenever ignition switch OFF \rightarrow ON.
- The number is fixed to 255 until the self-diagnosis results are erased if it is over 255.

DATA MONITOR

NOTE:

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

Display Items List

X: Standard, —: Not applicable, ▼: Option

| | | Mon | itor Item Sele | ection | |
|-----------------------|---------------|-----------------------------|-----------------|--------------------------------|---|
| Monitored item (Unit) | | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| VHCL/S SE-A/T | (km/h or mph) | Х | х | • | Displays the vehicle speed calculated by the TCM from the output shaft revolution. |
| ESTM VSP SIG | (km/h or mph) | Х | _ | • | Displays the vehicle speed signal received via CAN communication. |
| OUTPUT REV | (rpm) | Х | Х | ▼ | Displays the output shaft revolution calculated from the pulse signal of output speed sensor. |
| INPUT SPEED | (rpm) | Х | Х | ▼ | Displays the input shaft revolution calculated from front sun gear revolution and front carrier revolution. |
| F SUN GR REV | (rpm) | _ | _ | • | Displays the front sun gear revolution calculated from the pulse signal of input speed sensor 1. |

DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

| | | Mon | itor Item Sele | ction | |
|----------------|------------|-----------------------------|-----------------|--------------------------------|---|
| Monitored item | (Unit) | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| F CARR GR REV | (rpm) | _ | _ | ▼ | Displays the front carrier gear revolution calculated from the pulse signal of input speed sensor 2. |
| ENGINE SPEED | (rpm) | Х | Х | • | Displays the engine speed received via CAN communication. |
| TC SLIP SPEED | (rpm) | _ | х | ▼ | Displays the revolution difference between input speed and engine speed. |
| ACCELE POSI | (0.0/8) | Х | _ | ▼ | Displays the accelerator position estimated value received via CAN communication. |
| THROTTLE POSI | (0.0/8) | Х | х | ▼ | Displays the throttle position received via CAN communication. |
| ATF TEMP 1 | (°C or °F) | Х | х | • | Displays the ATF temperature of oil pan calculated from the signal voltage of A/T fluid temperature sensor. |
| ATF TEMP 2 | (°C or °F) | Х | х | ▼ | Displays the ATF temperature estimated value of torque converter outlet calculated from the signal voltage of A/T fluid temperature sensor. |
| ATF TEMP SE 1 | (V) | _ | _ | ▼ | Displays the signal voltage of A/T fluid temperature sensor. |
| BATTERY VOLT | (V) | Х | _ | ▼ | Displays the power supply voltage of TCM. |
| LINE PRES SOL | (A) | _ | Х | • | Displays the command current from TCM to the line pressure solenoid. |
| TCC SOLENOID | (A) | _ | х | ▼ | Displays the command current from TCM to the torque converter clutch solenoid. |
| L/B SOLENOID | (A) | _ | х | ▼ | Displays the command current from TCM to the low brake solenoid. |
| FR/B SOLENOID | (A) | _ | х | ▼ | Displays the command current from TCM to the front brake solenoid. |
| HLR/C SOL | (A) | _ | х | ▼ | Displays the command current from TCM to the high and low reverse clutch solenoid. |
| I/C SOLENOID | (A) | _ | х | ▼ | Displays the command current from TCM to the input clutch solenoid. |
| D/C SOLENOID | (A) | _ | х | ▼ | Displays the command current from TCM to the direct clutch solenoid. |
| 2346/B SOL | (A) | _ | х | ▼ | Displays the command current from TCM to the 2346 brake solenoid. |
| L/P SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the line pressure solenoid, and displays the monitor value. |
| TCC SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the torque converter clutch solenoid, and displays the monitor value. |
| L/B SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the low brake solenoid, and displays the monitor value. |
| FR/B SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the front brake solenoid, and displays the monitor value. |
| HLR/C SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the high and low reverse clutch solenoid, and displays the monitor value. |

| | | Mon | itor Item Sele | ection | |
|----------------|----------------------------------|-----------------------------|-----------------|--------------------------------|--|
| Monitored it | tem (Unit) | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| I/C SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the input clutch solenoid, and displays the monitor value. |
| D/C SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the direct clutch solenoid, and displays the monitor value. |
| 2346/B SOL MON | (A) | _ | _ | ▼ | Monitors the command current from TCM to the 2346 brake solenoid, and displays the monitor value. |
| GEAR RATIO | | _ | Х | ▼ | Displays the gear ratio calculated from input revolution and output revolution. |
| ENGINE TORQUE | (Nm) | _ | _ | ▼ | Displays the engine torque estimated value received via CAN communication. |
| ENG TORQUE D | (Nm) | _ | _ | ▼ | Displays the engine torque estimated value reflected the requested torque of each control unit received via CAN communication. |
| INPUT TRQ S | (Nm) | _ | _ | ▼ | Displays the input torque using for the oil pressure calculation process of shift change control. |
| INPUT TRQ L/P | (Nm) | _ | _ | • | Displays the input torque using for the oil pressure calculation process of line pressure control. |
| TRGT PRES L/P | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of torque converter clutch solenoid valve calculated by the oil pressure calculation process of lock-up control. |
| TRGT PRES TCC | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of torque converter clutch solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRGT PRES L/B | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of low brake solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRGT PRE FR/B | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of front brake solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRG PRE HLR/C | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of high and low reverse clutch solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRGT PRES I/C | (kPa, kg/cm² or psi) | _ | _ | ▼ | Displays the target oil pressure value of input clutch solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRGT PRES D/C | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of direct clutch solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRG PRE 2346/B | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of 2346 brake solenoid valve calculated by the oil pressure calculation process of shift change control. |
| SHIFT PATTERN | | _ | _ | ▼ | Displays the gear change data using the shift pattern control. |
| VEHICLE SPEED | (km/h or mph) | _ | _ | ▼ | Displays the vehicle speed for control using the control of TCM. |

DIAGNOSIS SYSTEM (TCM)

| | | Mon | itor Item Sele | ection | |
|----------------|----------|-----------------------------|-----------------|--------------------------------|---|
| Monitored item | (Unit) | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| RANGE SW 4 | (ON/OFF) | Х | _ | ▼ | Displays the operation status of transmission range switch 4. |
| RANGE SW 3 | (ON/OFF) | Х | _ | ▼ | Displays the operation status of transmission range switch 3. |
| RANGE SW 2 | (ON/OFF) | Х | _ | ▼ | Displays the operation status of transmission range switch 2. |
| RANGE SW 1 | (ON/OFF) | Х | _ | ▼ | Displays the operation status of transmission range switch 1. |
| SFT DWN ST SW | (ON/OFF) | Х | _ | • | Displays the operation status of paddle shifter (down switch). Not mounted but displayed. |
| SFT UP ST SW | (ON/OFF) | Х | _ | ▼ | Displays the operation status of paddle shifter (up switch). Not mounted but displayed. |
| DOWN SW LEVER | (ON/OFF) | Х | _ | • | Displays the operation status of selector lever (down switch). |
| UP SW LEVER | (ON/OFF) | Х | _ | • | Displays the operation status of selector lever (up switch). |
| NON M-MODE SW | (ON/OFF) | Х | _ | • | Displays whether the selector lever is in any position other than manual shift gate position. |
| MANU MODE SW | (ON/OFF) | Х | _ | ▼ | Displays whether the selector lever is in the manual shift gate position. |
| TOW MODE SW | (ON/OFF) | _ | _ | • | Displays the reception status of tow mode switch signal received via CAN communica- tion. Not mounted but displayed. |
| DS RANGE | (ON/OFF) | _ | _ | ▼ | Displays whether it is the DS mode. |
| 1 POSITION SW | (ON/OFF) | Х | _ | • | Displays the reception status of 1 position switch signal received via CAN communica- tion. Not mounted but displayed. |
| OD CONT SW | (ON/OFF) | х | _ | • | Displays the reception status of overdrive control switch signal received via CAN communication. Not mounted but displayed. |
| BRAKESW | (ON/OFF) | Х | _ | ▼ | Displays the reception status of stop lamp switch signal received via CAN communication. |
| POWERSHIFT SW | (ON/OFF) | Х | _ | ▼ | Displays the reception status of POWER mode signal received via CAN communication. Not mounted but displayed. |
| ASCD-OD CUT | (ON/OFF) | Х | _ | • | Displays the reception status of ASCD OD cancel request signal received via CAN communication. |
| ASCD-CRUISE | (ON/OFF) | Х | _ | • | Displays the reception status of ASCD operation signal received via CAN communication. |
| ABS SIGNAL | (ON/OFF) | Х | _ | ▼ | Displays the reception status of ABS operation signal received via CAN communication. |
| ГСS GR/P KEEP | (ON/OFF) | Х | _ | ▼ | Displays the reception status of TCS gear keep request signal received via CAN communication. |
| TCS SIGNAL 2 | (ON/OFF) | Х | _ | • | Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is "cold". |

| | | Mon | itor Item Sele | ection | |
|-----------------------|----------------|-----------------------------|-----------------|--------------------------------|---|
| Monitored item (Unit) | | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| TCS SIGNAL 1 | (ON/OFF) | Х | _ | ▼ | Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is "warm". |
| LOW/B PARTS | (FAIL/NOTFAIL) | _ | _ | ▼ | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of low brake. |
| HC/IC/FRB PARTS | (FAIL/NOTFAIL) | _ | _ | V | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of high and low reversed clutch, input clutch or front brake. |
| IC/FRB PARTS | (FAIL/NOTFAIL) | _ | _ | ▼ | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of input clutch or front brake. |
| HLR/C PARTS | (FAIL/NOTFAIL) | _ | _ | ▼ | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of high and low reversed clutch. |
| W/O THL POS | (ON/OFF) | Х | _ | • | Displays the kickdown condition signal status received via CAN communication. |
| CLSD THL POS | (ON/OFF) | Х | _ | ▼ | Displays the idling status signal status received via CAN communication. |
| DRV CST JUDGE | (DRIVE/COAST) | _ | _ | ▼ | Displays the judgment results of "driving" or "coasting" judged by TCM. |
| SHIFT IND SIGNAL | | _ | _ | ▼ | Displays the transmission value of shift position signal transmitted via CAN communication. |
| STARTER RELAY | (ON/OFF) | _ | _ | ▼ | Displays the command status from TCM to starter relay. |
| F-SAFE IND/L | (ON/OFF) | - | _ | • | Displays the transmission status of A/T CHECK indicator lamp signal transmitted via CAN communication. |
| ATF WARN LAMP | (ON/OFF) | _ | _ | • | Displays the transmission status of ATF temperature signal transmitted via CAN communication. Not mounted but displayed. |
| MANU MODE IND | (ON/OFF) | _ | _ | ▼ | Displays the transmission status of manual mode signal transmitted via CAN communication. |
| ON OFF SOL MON | (ON/OFF) | _ | _ | • | Monitors the command value from TCM to the anti-interlock solenoid, and displays the monitor status. |
| START RLY MON | (ON/OFF) | _ | _ | ▼ | Monitors the command value from TCM to the starter relay, and displays the monitor status. |
| ON OFF SOL | (ON/OFF) | _ | _ | ▼ | Displays the command status from TCM to anti- interlock solenoid. |
| SLCT LVR POSI | | _ | Х | ▼ | Displays the shift positions recognized by TCM. |
| GEAR | | _ | Х | ▼ | Displays the current transmission gear position recognized by TCM. |
| NEXT GR POSI | | _ | _ | • | Displays the target gear position of gear change that is calculated based on the vehicle speed information and throttle information. |
| SHIFT MODE | | _ | _ | ▼ | Displays the transmission driving mode recognized by TCM. |

DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

[7AT: RE7R01A (VQ37VHR)]

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| | | | itor Item Sele | ection | | |
|-----------------------|----------------|-----------------------------|-----------------|--------------------------------|---|--|
| Monitored item (Unit) | | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks | |
| D/C PARTS | (FAIL/NOTFAIL) | _ | _ | ▼ | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of direct clutch. | |
| FR/B PARTS | (FAIL/NOTFAIL) | _ | _ | ▼ | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of front brake. | |
| 2346/B PARTS | (FAIL/NOTFAIL) | _ | _ | ▼ | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of 2346 brake. | |
| 2346B/DC PARTS | (FAIL/NOTFAIL) | _ | _ | ▼ | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of 2346 brake or direct clutch. | |

DTC WORK SUPPORT

| Item | Description | Check item | |
|---------------------|--|---|--|
| 1ST GR FNCTN P0731 | Following items for "1GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | Input clutch solenoid | |
| 2ND GR FNCTN P0732 | Following items for "2GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | valve • Front brake solenoid valve • Direct clutch solenoid | |
| 3RD GR FNCTN P0733 | Following items for "3GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | valve • High and low reverse clutch solenoid valve | |
| 4TH GR FNCTN P0734 | Following items for "4GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Output speed sensor Input speed sensor 1, 2 Each clutch and brake Hydraulic control cir- | |
| 5TH GR FNCTN P0735 | Following items for "5GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | | |
| 6TH GR FNCTN P0729 | Following items for "6GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | | |
| 7TH GR FNCTN P1734 | Following items for "7GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | cuit | |
| TCC SOL FNCTN CHECK | Following items for "TCC solenoid function" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | Harness or connectors Torque converter clutch solenoid valve Torque converter Input speed sensor 1, 2 Hydraulic control circuit | |

U0100 LOST COMMUNICATION (ECM A)

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

DTC/CIRCUIT DIAGNOSIS

U0100 LOST COMMUNICATION (ECM A)

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible causes |
|-------|-----------------------------------|---|--|
| U0100 | Lost Communication With ECM/PCM A | When the ignition switch is ON, TCM is unable to receive the CAN communications signal from ECM continuously for 2 seconds or more. | ECM Harness or connector (CAN communication line is open or shorted) |

DTC CONFIRMATION PROCEDURE

1. PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, turn ignition switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P) With CONSULT

- 1. Start the engine and wait for at least 5 seconds.
- 2. Check DTC.
- With GST

Follow the procedure "With CONSULT".

Is "U0100" detected?

YES >> Go to TM-70, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

For the diagnosis procedure, refer to LAN-25, "Trouble Diagnosis Flow Chart".

INFOID:0000000010578873

U0300 CAN COMMUNICATION DATA

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

U0300 CAN COMMUNICATION DATA

Description INFOID:0000000010578874

The amount of data transmitted from each control unit is read.

DTC Logic INFOID:0000000010578875

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|---|--|-------------------------------|
| U0300 | Internal Control Module Soft- ware Incompatibility | When the amount of data transmitted from each control unit is smaller than the specified amount. | Control units other than TCM. |

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

(P) With CONSULT

- Turn ignition switch ON and wait 2 seconds or more.
- Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "U0300" detected?

YES >> Go to TM-71, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK CONTROL UNIT

Check the number of control units replaced before detecting "U0300".

Is the number of replaced control units one?

>> Since the replaced control unit may be out of specifications, check the part number and specifica-YES tions.

NO >> GO TO 2.

2.INSPECTION CONTROL UNIT

(P) With CONSULT

- Remove one of the replaced control units.
- Install the previous control unit mounted before replacement.
- Turn ignition switch ON and wait 2 seconds or more.
- Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "U0300" detected?

YES >> Turn OFF the ignition switch to check the other control units in the same method.

>> Since the removed control unit may be out of specifications, check the part number and specifica-NO tions.

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INFOID:0000000010578876

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U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

U1000 CAN COMM CIRCUIT

Description INFOID:000000010578877

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 malfunction 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 independently). 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.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| U1000 | CAN Communication Line | TCM cannot transmit or receive CAN communication signals continuously for 2 seconds or more when the ignition switch is ON. | Harness or connectors (CAN communication line is open or shorted.) TCM |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(II) With CONSULT

- 1. Start the engine.
- 2. Run engine for at least 2 consecutive seconds at idle speed.
- 3. Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "U1000" detected?

YES >> Go to TM-72, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

Go to LAN-25, "Trouble Diagnosis Flow Chart".

INFOID:0000000010578879

P0615 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0615 STARTER RELAY

Description INFOID:000000010578880

TCM prohibits cranking other than at "P" or "N" position.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| P0615 | Starter Relay Circuit | The starter monitor value is OFF when the ignition switch is ON at the "P" and "N" positions. | Harness or connectors (Starter relay and TCM circuit is open or shorted.) Starter relay circuit |

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- 1. Shift the selector lever to "P" and "N" positions.
- 2. Turn ignition switch ON and wait 2 seconds or more.
- Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P0615" detected?

YES >> Go to TM-73, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK STARTER RELAY SIGNAL

Turn ignition switch ON.

Check voltage between IPDM E/R connector terminal and ground.

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INFOID:0000000010578882

| IPDM E/R connector | | | Condition | Voltage (Approx.) |
|--------------------|----------|---------|--|-------------------|
| Connector | Terminal | | Condition | voitage (Approx.) |
| E5 | 20 | Giodila | Selector lever in "P" and "N" positions. | Battery voltage |
| | 30 | | Selector lever in other positions. | 0 V |

Is the inspection result normal?

YES >> Check starter relay circuit. Refer to STR-12, "Wiring Diagram - STARTING SYSTEM -".

NO >> GO TO 2.

2. CHECK HARNESS BETWEEN A/T ASSEMBLY AND IPDM E/R (PART 1)

- Turn ignition switch OFF.
- Disconnect A/T assembly connector and IPDM E/R connector.
- Check the continuity between A/T assembly vehicle side harness connector terminal and IPDM E/R vehicle side harness connector terminal.

P0615 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

| A/T assembly vehicle side harness connector | | IPDM E/R vehicle side harness connector | | Continuity |
|---|----------|---|----------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| F51 | 9 | E5 | 30 | Existed |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

$3. {\sf CHECK}$ HARNESS BETWEEN A/T ASSEMBLY AND IPDM E/R (PART 2)

Check the continuity between A/T assembly vehicle side harness connector terminal and ground.

| A/T assembly vehicle side harness connector | | | Continuity |
|---|---|--------|-------------|
| Connector Terminal | | Ground | Continuity |
| F51 | 9 | | Not existed |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK JOINT CONNECTOR

- 1. Remove joint connector. Refer to TM-186, "Exploded View".
- 2. Check the continuity between joint connector terminals.

| A/T assembly harness connector side | TCM harness connector side | Continuity | |
|-------------------------------------|----------------------------|------------|--|
| Terminal | Terminal | Continuity | |
| 9 | 9 | Existed | |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0705 TRANSMISSION RANGE SWITCH A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0705 TRANSMISSION RANGE SWITCH A

Description INFOID:0000000010578883

The transmission range switch detects the selector lever position and transmits a signal to the TCM.

DTC Logic INFOID:0000000010578884

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|--|--|---|
| P0705 | Transmission Range Sensor A Circuit (PRNDL Input) | Transmission range switch signals input with impossible pattern. | Harness or connectors (Transmission range switches 1, 2, 3, 4 and TCM circuit is open or shorted.) Transmission range switches 1, 2, 3 and 4 |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

(II) With CONSULT

- Start the engine.
- Select "ACCELE POSI" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Shift the selector lever throughout the entire shift position from "P" to "D". (Hold the selector lever at each position for 2 seconds or more)
- Drive vehicle and maintain the following conditions for 2 seconds or more.

ACCELE POSI : More than 1.0/8

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0705" detected?

YES >> Go to TM-75, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

TM-75 Revision: 2015 February 2015 QX70 TΜ

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P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

[7AT: RE7R01A (VQ37VHR)]

< DTC/CIRCUIT DIAGNOSIS >

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

Description INFOID:0000000010578886

The A/T fluid temperature sensor detects the A/T fluid temperature and transmits a signal to the TCM.

DTC Logic INFOID:0000000010578887

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|---|--|---|
| | | TCM judges that the A/T fluid temperature is -40 °C (-40 °F) or less continuously for 5 seconds while driving at 10 km/h (7 MPH) or more. | Harness or connectors (Sensor circuit is open.) A/T fluid temperature sensor |
| | P0710 Transmission Fluid Temperature Sensor A Circuit | TCM judges that the A/T fluid temperature is 180°C (356°F) or more continuously for 5 seconds while driving at 10 km/h (7 MPH) or more. | Harness or connectors (Sensor circuit is short.) A/T fluid temperature sensor |
| P0710 | | A/T fluid temperature does not rise to the specified temperature after driving for a certain period of time with the TCM-received fluid temperature sensor value between -40°C (-40°F) and 20°C (68°F). | Harness or connectors (Sensor circuit is stuck.) A/T fluid temperature sensor |
| | | The following conditions are maintained for 5 minutes after the completion of engine diagnosis P0111, P0116, and P0196: • A/T fluid temperature – Engine coolant temperature > 33°C (91.4°F) • A/T fluid temperature – Engine coolant temperature < -19°C (-2.2°F) | A/T fluid temperature sensor |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION (PART 1)

With CONSULTTurn ignition sw

- Turn ignition switch ON.
- Select "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Start the engine and maintain the following condition for 10 seconds or more.

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

With GST

Follow the procedure "With CONSULT".

Is "P0710" detected?

>> Go to TM-77, "Diagnosis Procedure". YES

>> GO TO 3. NO

3.check a/t fluid temperature sensor function

(P) With CONSULT

- Turn ignition switch OFF and cool the engine.
- Turn ignition switch ON.

CAUTION:

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

Never start the engine.

- Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- 4. Select "COOLANT TEMP/S" in "Data Monitor" in "ENGINE".
- 5. Check temperature difference between A/T fluid and engine coolant.

With GST

- 1. Complete engine diagnoses P0111, P0116, and P0196.
- After starting the engine start, run the engine at idle for 5 minutes.
- Check the DTC.

Is the temperature calculated by subtracting engine coolant temperature from A/T fluid temperature more than 33°C (91.4°F) or is it less than -19°C (-2.2°F)? (With CONSULT)/Is "P0710" detected? (With GST)

>> Go to TM-77, "Diagnosis Procedure".

NO-1 [With CONSULT: "ATF TEMP 1" is 20°C (68°F) or more]>>INSPECTION END

NO-2 [With CONSULT: "ATF TEMP 1" is 19°C (66°F) or less]>>GO TO 4.

NO-3 (With GST)>>GO TO 4.

4.CHECK DTC DETECTION (PART 2)

(II) With CONSULT

- Select "SLCT LVR POSI", "VHCL/S SE-A/T", "ACCELE POSI", "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Record A/T fluid temperature.
- Start the engine and wait for at least 3 minutes.
- 4. Drive the vehicle for the total minuets specified in the Driving time column below with the following conditions satisfied.

SLCT LVR POSI : D

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

ACCELE POSI : 0.5/8 or more

| A/T fluid temperature before engine start | Driving time |
|---|--------------------|
| -40°C (-40°F) − -31°C (-23.8°F) | 21 minutes or more |
| -30°C (-22°F) − -21°C (-5.8°F) | 18 minutes or more |
| –20°C (−4°F) – −11°C (12.2°F) | 15 minutes or more |
| -10°C (14°F)1°C (30.2°F) | 12 minutes or more |
| 0°C (32°F) – 9°C (48.2°F) | 9 minutes or more |
| 10°C (50°F) – 19°C (66.2°F) | 6 minutes or more |

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

- Turn ignition switch OFF and cool the engine.
- Start the engine and wait for at least 3 minutes.
- Drive the vehicle and maintain the following conditions for 21 minutes or more.

Selector lever : D position

: 10 km/h (7 MPH) or more Vehicle speed

Accelerator pedal opening : 0.5/8 or more

4. Check the DTC.

Is "P0710" detected?

YES >> Go to TM-77, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

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[7AT: RE7R01A (VQ37VHR)]

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INFOID:0000000010578888

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

YES >> Replace control valve & TCM. Refer to <u>TM-186</u>, "Exploded View".

P0717 INPUT SPEED SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0717 INPUT SPEED SENSOR A

Description INFOID:0000000010578889

The input speed sensor detects input shaft rpm (revolutions per minute). It is located on the input side of the A/ T. Monitors revolution of sensor 1 and sensor 2 for non-standard conditions.

DTC Logic INFOID:0000000010578890

DTC DETECTION LOGIC

| | | T | |
|-------|---|---|---|
| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
| P0717 | Input/Turbine Speed Sensor A Circuit No Signal | The revolution of input speed sensor 1 and/or 2 is 270 rpm or less. | Harness or connectors (Sensor circuit is open.) Input speed sensor 1 and/or 2 |

DTC CONFIRMATION PROCEDURE

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

(II) With CONSULT

- Start the engine.
- Select "SLCT LVR POSI", "GEAR", "VHCL/S SE-A/T", "CLSD THL POS" and "ENGINE SPEED" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

CAUTION:

Keep the same gear position.

NOTE:

Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

SLCT LVR POSI : D

GEAR : 2nd, 3rd, 4th, 5th or 6th VHCL/S SE-A/T : More than 40 km/h (25 MPH)

CLSD THL POS

ENGINE SPEED : More than 1,500 rpm

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0717" detected?

YES >> Go to TM-79, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

 ${f 1}$.CHECK INTERMITTENT INCIDENT Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

>> Replace control valve & TCM. Refer to TM-186, "Exploded View". YES

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INFOID:0000000010578891

P0717 INPUT SPEED SENSOR A



[7AT: RE7R01A (VQ37VHR)]

P0720 OUTPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

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P0720 OUTPUT SPEED SENSOR

Description INFOID:0000000010578892

The output speed sensor detects the revolution of the parking gear and emits a pulse signal. The pulse signal is transmitted to the TCM which converts it into vehicle speed.

DTC Logic INFOID:0000000010578893

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause | TM | |
|-------|-----------------------------|--|--|----|---|
| | | The vehicle speed detected by the output speed sensor is 5 km/h (3 MPH) or less when the vehicle speed transmitted from the unified meter and A/ | by the output speed sensor is 5 km/h (3 MPH) or less when | | E |
| | | C amp. to TCM is 20 km/h (12 MPH) or more. (Only when starts after the ignition switch is turned ON.) | | F | |
| P0720 | Output Speed Sensor Circuit | The vehicle speed transmit- ted from the unified meter and A/C amp. to TCM does not decrease despite the 36 | Harness or connectors (Sensor circuit is open.) Output speed sensor. | G | |
| | | km/h (23 MPH) or more of de- celeration in vehicle speed detected by the output speed sensor, when the vehicle | Output speed sensor | Н | |
| | | speed detected by the output speed sensor is 36 km/h (23 MPH) or more and the vehicle speed transmitted from the | | I | |
| | | unified meter and A/C amp. to TCM is 24 km/h (15 MPH) or more. | | J | |

DTC CONFIRMATION PROCEDURE

CAUTION:

- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(II) With CONSULT

- Start the engine.
- Select "ESTM VSP SIG" in "Data Monitor" in "TRANSMISSION"
- Drive vehicle and maintain the following conditions for 60 seconds or more.

ESTM VSP SIG : 40 km/h (25 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0720" detected?

>> Go to TM-82. "Diagnosis Procedure". YES

NO >> INSPECTION END

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P0720 OUTPUT SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

Diagnosis Procedure

INFOID:0000000010578894

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

$2.\mathsf{REPLACE}$ OUTPUT SPEED SENSOR AND CHECK DTC

- 1. Replace output speed sensor. Refer to <u>TM-199, "2WD : Exploded View"</u> (2WD) or <u>TM-217, "Exploded View"</u> (AWD).
- Perform "DTC CONFIRMATION PROCEDURE". Refer to <u>TM-81, "DTC Logic"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace control valve & TCM. Refer to TM-186, "Exploded View"...

P0725 ENGINE SPEED

< DTC/CIRCUIT DIAGNOSIS >

P0725 ENGINE SPEED

Description INFOID:0000000010578895

The engine speed signal is transmitted from the ECM to the TCM with CAN communication line.

DTC Logic INFOID:0000000010578896

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|----------------------------|---|--|
| P0725 | Engine Speed Input Circuit | TCM does not receive the CAN communication signal from the ECM. The engine speed is more less 150 rpm even if the vehicle speed is more than 10 km/h (7 MPH). | Harness or connectors (ECM to TCM circuit is open or shorted.) |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

(P) With CONSULT

- Start the engine. 1.
- Select "SLCT LVR POSI" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

SLCT LVR POSI : D

: More than 10km/h (7 MPH) VHCL/S SE-A/T

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P0725" detected?

YES >> Go to TM-83, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

${f 1}$.CHECK DTC OF ECM

(II) With CONSULT

- Turn ignition switch ON.
- Perform "Self Diagnostic Results" in "ENGINE".

Is the inspection result normal?

YES >> GO TO 2.

>> Check DTC detected item. Refer to EC-574, "DTC Index" (For USA and Canada) or EC-1072, NO "DTC Index" (For Mexico).

2.CHECK DTC OF TCM

(P) With CONSULT

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is any DTC other than "P0725" detected?

YES >> GO TO 3.

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[7AT: RE7R01A (VQ37VHR)]

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INFOID:0000000010578897

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P0725 ENGINE SPEED

[7AT: RE7R01A (VQ37VHR)]

< DTC/CIRCUIT DIAGNOSIS >

NO

>> Check DTC detected item. Refer to TM-157, "DTC Index".

3. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0729 6GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0729 6GR INCORRECT RATIO

Description

This malfunction is detected when the A/T does not shift into 6GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0729 | Gear 6 Incorrect Ratio | The gear ratio is: • 0.914 or more • 0.810 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-86, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- 2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- 1. Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "6TH GR FNCTN P0729" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

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P0729 6GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

GEAR : 6th

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0729" is detected, check the DTC. Refer to TM-157, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position Gear position : 6th

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

2. Check DTC.

<u>Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0729" detected?</u>

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-86, "Diagnosis Procedure".

YES-4 >> "P0729" is detected: Go to TM-86, "Diagnosis Procedure".

NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578900

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232. "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-85, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0730 INCORRECT GEAR RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0730 INCORRECT GEAR RATIO

Description INFOID:0000000010578901

- TCM detects a high-rpm state of the under drive sun gear.
- The number of revolutions of the under drive sun gear is calculated with the input speed sensor 1 and 2.

DTC Logic INFOID:0000000010578902

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| P0730 | Incorrect Gear Ratio | The revolution of under drive sun gear is 8,000 rpm or more. NOTE: Not detected when in "P" or "N" position and during a shift to "P" or "N" position. | 2346 brake solenoid valve Front brake solenoid valve Input speed sensor 1, 2 |

DTC CONFIRMATION PROCEDURE

- "TM-87, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

CHECK DTC DETECTION

(P) With CONSULT

- 1. Start the engine.
- Select "Self Diagnostic Results" in "ENGINE".
- Drive vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.

Hold the accelerator pedal as steady as possible.

| ENGINE SPEED | Same value as the Freeze Frame Data. |
|---------------|--------------------------------------|
| VEHICLE SPEED | Same value as the Freeze Frame Data. |
| B/FUEL SCHDL | Same value as the Freeze Frame Data. |

With GST

Follow the procedure "With CONSULT".

Is "P0730" detected?

YES >> Go to TM-87, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

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INFOID:0000000010578903

P0730 INCORRECT GEAR RATIO

[7AT: RE7R01A (VQ37VHR)]

< DTC/CIRCUIT DIAGNOSIS >

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232, "Disassembly". **NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to <u>TM-87.</u> "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0731 1GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0731 1GR INCORRECT RATIO

Description INFOID:000000010578904

This malfunction is detected when the A/T does not shift into 1GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|--|
| P0731 | Gear 1 Incorrect Ratio | The gear ratio is: • 5.219 or more • 4.629 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-90, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- 2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "1ST GR FNCTN P0731" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

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P0731 1GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

GEAR : 1st

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0731" is detected, check the DTC. Refer to TM-157, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position Gear position : 1st

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

2. Check DTC.

<u>Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0731" detected?</u>

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-90, "Diagnosis Procedure".

YES-4 >> "P0731" is detected: Go to TM-90, "Diagnosis Procedure".

NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578906

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-89, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0732 2GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0732 2GR INCORRECT RATIO

Description

This malfunction is detected when the A/T does not shift into 2GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0732 | Gear 2 Incorrect Ratio | The gear ratio is: • 3.386 or more • 3.002 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-92, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- 2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- 3. Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- 1. Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "2ND GR FNCTN P0732" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

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P0732 2GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

GEAR : 2nd

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0732" is detected, check the DTC. Refer to TM-157, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position Gear position : 2nd

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

2. Check DTC.

<u>Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0732" detected?</u>

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-92, "Diagnosis Procedure".

YES-4 >> "P0732" is detected: Go to TM-92, "Diagnosis Procedure".

NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578909

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-91, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0733 3GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0733 3GR INCORRECT RATIO

Description INFOID:0000000010578910

This malfunction is detected when the A/T does not shift into 3GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic INFOID:0000000010578911

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|--|
| P0733 | Gear 3 Incorrect Ratio | The gear ratio is: • 2.166 or more • 1.920 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-94, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) - 140°C (284°F)

With GST

- Start the engine.
- Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YFS >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "3RD GR FNCTN P0733" in "DTC Work Support" in "TRANSMISSION".
- Drive vehicle with manual mode and maintain the following conditions.

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P0733 3GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

GEAR : 3rd

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0733" is detected, check the DTC. Refer to TM-157, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position
Gear position : 3rd

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

2. Check DTC.

<u>Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0733" detected?</u>

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-94, "Diagnosis Procedure".

YES-4 >> "P0733" is detected: Go to TM-94, "Diagnosis Procedure".

NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

- 1. Stop vehicle.
- 2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578912

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232. "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-93, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0734 4GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0734 4GR INCORRECT RATIO

Description INFOID:0000000010578913

This malfunction is detected when the A/T does not shift into 4GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|--|
| P0734 | Gear 4 Incorrect Ratio | The gear ratio is: • 1.497 or more • 1.327 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-96, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- 2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- 1. Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "4TH GR FNCTN P0734" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

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P0734 4GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

GEAR : 4th

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0734" is detected, check the DTC. Refer to TM-157, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position Gear position : 4th

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

2. Check DTC.

<u>Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0734" detected?</u>

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-96, "Diagnosis Procedure".

YES-4 >> "P0734" is detected: Go to TM-96, "Diagnosis Procedure".

NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578915

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232. "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-95, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0735 5GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0735 5GR INCORRECT RATIO

Description INFOID:0000000010578916

This malfunction is detected when the A/T does not shift into 5GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic INFOID:0000000010578917

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0735 | Gear 5 Incorrect Ratio | The gear ratio is: • 1.060 or more • 0.940 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-98, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) - 140°C (284°F)

With GST

- Start the engine.
- Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YFS >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "5TH GR FNCTN P0735" in "DTC Work Support" in "TRANSMISSION".
- Drive vehicle with manual mode and maintain the following conditions.

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P0735 5GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

GEAR : 5th

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0735" is detected, check the DTC. Refer to TM-157, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position Gear position : 5th

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

2. Check DTC.

<u>Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0735" detected?</u>

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-98, "Diagnosis Procedure".

YES-4 >> "P0735" is detected: Go to TM-98, "Diagnosis Procedure".

NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578918

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232. "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-97, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P0740 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0740 TORQUE CONVERTER

Description INFOID:0000000010578919

 The torque converter clutch solenoid valve is activated, with the gear in D2, D3, D4, D5, D6, D7, M2, M3, M4, M5, M6 and M7 by the TCM in response to signals transmitted from the vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Torque converter clutch piston operation will then be controlled.

- Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
- When the accelerator pedal is depressed (less than 1.0/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.

DTC Logic INFOID:0000000010578920

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|--------------------------------------|--|---|
| P0740 | Torque Converter Clutch Circuit/Open | The torque converter clutch solenoid valve monitor value is 0.2 A or less when the torque converter clutch solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Torque converter clutch solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

(P) With CONSULT

- 1. Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VEHICLE SPEED" in "Data Monitor" in "TRANSMISSION"
- 3. Drive vehicle and maintain the following conditions for 10 seconds or more.

Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON **GEAR** : 2nd

VEHICLE SPEED : 40 km/h (25 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

Follow the procedure "With CONSULT".

Is "P0740" detected?

YES >> Go to TM-99, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

 ${f 1}$.CHECK INTERMITTENT INCIDENT

TM-99 **Revision: 2015 February** 2015 QX70 TM

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INFOID:0000000010578921

P0740 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to <u>TM-186, "Exploded View"</u>.

P0744 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0744 TORQUE CONVERTER

Description INFOID:0000000010578922

This malfunction is detected when the A/T does not lock-up as instructed by the TCM. This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic INFOID:0000000010578923

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause | |
|-------|---|---|---|--|
| P0744 | Torque Converter Clutch Circuit Intermittent | The lock-up is not performed in spite of within the lock-up area. | Harness or connectors Torque converter clutch solenoid valve Torque converter Input speed sensor 1, 2 Hydraulic control circuit | |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

(II) With CONSULT

- Start the engine.
- Select "MANU MODE SW", "GEAR" and "VEHICLE SPEED" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 10 seconds or more.

NOTE:

Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this

MANU MODE SW : ON **GEAR** : 2nd

VEHICLE SPEED : 40 km/h (25 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0744" detected?

>> Go to TM-101, "Diagnosis Procedure". YES

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident". Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

TM-101 **Revision: 2015 February** 2015 QX70

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P0744 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

Disassemble the A/T assembly to check component parts. Refer to TM-232, "Disassembly". **NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to <u>TM-101</u>, <u>"DTC Logic"</u>.

<u>Is the inspection result normal?</u>

- YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".
- NO >> Repair or replace damaged parts.

P0745 PRESSURE CONTROL SOLENOID A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

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INFOID:0000000010578927

P0745 PRESSURE CONTROL SOLENOID A

Description

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|---|
| P0745 | Pressure Control Solenoid A | The line pressure solenoid valve monitor value is 0.2 A or less when the line pressure solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Line pressure solenoid valve |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

- With CONSULTStart the engine.
- Select "BATTERY VOLT" and "SLCT LVR POSI" in "Data Monitor" in "TRANSMISSION".
- 3. Shift the selector lever to "N" position.
- 4. Maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more SLCT LVR POSI : N/P

5. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0745" detected?

YES >> Go to TM-103, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to <u>TM-186, "Exploded View"</u>.

NO >> Repair or replace damaged parts.

Revision: 2015 February TM-103 2015 QX70

[7AT: RE7R01A (VQ37VHR)]

P0750 SHIFT SOLENOID A

Description INFOID:0000000010578928

- Anti-interlock solenoid valve prevents the simultaneous activation of the input clutch and the low brake.
- The anti-interlock solenoid valve is an ON/OFF type solenoid valve.

DTC Logic INFOID:0000000010578929

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|---|
| P0750 | Shift Solenoid A | The anti-interlock solenoid valve monitor value is ON when the anti-interlock solenoid valve command value is OFF. The anti-interlock solenoid valve monitor value is OFF when the anti-interlock solenoid valve command value is ON. | Harness or connectors (Solenoid valve circuit is open or shorted.) Anti-interlock solenoid valve |

DTC CONFIRMATION PROCEDURE

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

- With CONSULT

 1. Start the engine Start the engine
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW: ON **GEAR** : 1st

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0750" detected?

YES >> Go to TM-104, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

INFOID:0000000010578930 1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

TM-104 **Revision: 2015 February** 2015 QX70

P0775 PRESSURE CONTROL SOLENOID B

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P0775 PRESSURE CONTROL SOLENOID B

DescriptionINFOID:000000010578931

• The Input clutch solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.

 The Input clutch solenoid valve controls the input clutch control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|--|
| P0775 | Pressure Control Solenoid B | The input clutch solenoid valve monitor value is 0.2 A or less when the input clutch solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Input clutch solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- 2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 1st

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0775" detected?

YES >> Go to TM-105, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

Revision: 2015 February TM-105 2015 QX70

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INFOID:0000000010578933

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P0780 SHIFT

Description INFOID:000000010578934

The TCM detects the malfunction of low brake solenoid valve. This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| P0780 | Shift Error | TCM judges that the gear ratio is not switched to that of 4GR (1.412) while shifting from 3GR to 4GR in "D" position. TCM judges that the engine speed is more than the specified one while shifting from 5GR to 6GR or from 6GR to 7GR in "D" position. | Anti-interlock solenoid valve Low brake solenoid valve Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(II) With CONSULT

- Start the engine.
- Select "SLCT LVR POSI", "ACCELE POSI" and "GEAR" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions.

SLCT LVR POSI : D

ACCELE POSI : More than 1.0/8

GEAR : $3rd \rightarrow 4th \rightarrow 5th \rightarrow 6th \rightarrow 7th$

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0780" detected?

YES >> Go to TM-106, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578936

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

P0780 SHIFT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

$\overline{2}$.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to $\underline{\text{TM-232}}$, "Disassembly". **NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to <u>TM-106.</u> "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

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P0795 PRESSURE CONTROL SOLENOID C

< DTC/CIRCUIT DIAGNOSIS >

P0795 PRESSURE CONTROL SOLENOID C

Description INFOID:000000010578937

 The front brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.

 The front brake solenoid valve controls the front brake control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|---|
| P0795 | Pressure Control Solenoid C | The front brake solenoid valve monitor value is 0.2 A or less when the front brake solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Front brake solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 7th

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0795" detected?

YES >> Go to TM-108, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578939

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

P1705 TP SENSOR

Description INFOID:0000000010578940

- The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly.
- The accelerator pedal position sensor detects the accelerator position.
- The accelerator pedal position sensor transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM.
- The TCM receives accelerator pedal position signal from the ECM via CAN communication.

DTC Logic INFOID:0000000010578941

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|--|---|---|
| P1705 | Accelerator Pedal Position Sensor Signal | TCM detects the difference be- tween two accelerator pedal po- sition signals received from ECM via CAN communication. | Harness or connectors (Sensor circuit is open or shorted.) |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

(P) With CONSULT

- Start the engine.
- Select "SLCT LVR POSI" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 5 seconds or more.

SLCT LVR POSI : D

VHCL/S SE-A/T : 5 km/h (3 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P1705" detected?

YES >> Go to TM-109, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK DTC OF ECM

(P) With CONSULT

- Turn ignition switch ON.
- Perform "Self Diagnostic Results" in "ENGINE".

Is any DTC detected?

>> Check DTC detected item. Refer to EC-574, "DTC Index" (For USA and Canada) or EC-1072, YES "DTC Index" (For Mexico).

NO >> GO TO 2.

$\mathbf{2}.$ CHECK DTC OF TCM

(P) With CONSULT

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is any DTC other than "P1705" detected?

TM-109 **Revision: 2015 February** 2015 QX70 TM

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INFOID:0000000010578942

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P1705 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

YES >> Check DTC detected item. Refer to TM-157, "DTC Index".

NO >> GO TO 3.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

P1721 VEHICLE SPEED SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

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P1721 VEHICLE SPEED SIGNAL

Description INFOID:000000010578943

The vehicle speed signal is transmitted from unified meter and A/C amp. to TCM by CAN communication line. The signal functions as an auxiliary device to the output speed sensor when it is malfunctioning. The TCM will then use the vehicle speed signal.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause | TM |
|-------|------------------------|--|--------------------------------------|----|
| | | The vehicle speed transmit- ted from the unified meter and A/C amp. to TCM is 5 km/ h (3MPH) or less when the | | Е |
| | | vehicle speed detected by the output speed sensor is 20 km/h (12 MPH) or more. (Only when starts after the ig- | | F |
| | | nition switch is turned ON.) The vehicle speed detected by the output speed sensor does not decrease despite | Harness or connectors | G |
| P1721 | Vehicle Speed Signal | the 36 km/h (23 MPH) or more of deceleration in vehi- cle speed received from the | (Sensor circuit is open or shorted.) | Н |
| | | unified meter and A/C amp. when the vehicle speed transmitted from the unified meter and A/C amp. to TCM | | I |
| | | is 36 km/h (23 MPH) or more and the vehicle speed detect- ed by the output speed sen- sor is 24 km/h (15 MPH) or more. | | J |

DTC CONFIRMATION PROCEDURE

CAUTION:

- · Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

(II) With CONSULT

- Start the engine.
- Select "ESTM VSP SIG" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 60 seconds or more.

ESTM VSP SIG : 40 km/h (25 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P1721" detected?

YES >> Go to TM-112, "Diagnosis Procedure".

NO >> INSPECTION END

Revision: 2015 February TM-111 2015 QX70

P1721 VEHICLE SPEED SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

Diagnosis Procedure

INFOID:0000000010578945

1. CHECK DTC OF UNIFIED METER AND A/C AMP.

(P) With CONSULT

Perform "Self Diagnostic Results" in "METER/M&A".

Is any DTC detected?

YES >> Check DTC detected item. Refer to MWI-117, "DTC Index".

NO >> GO TO 2.

2. CHECK DTC OF TCM

(P) With CONSULT

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is any DTC other than "P1721" detected?

YES >> Check DTC detected item. Refer to TM-157, "DTC Index".

NO >> GO TO 3.

3.CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

P1730 INTERLOCK

Description INFOID:0000000010578946

Fail-safe function to detect interlock conditions.

DTC Logic INFOID:0000000010578947

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| P1730 | Interlock | The output speed sensor detects the deceleration of 12 km/h (7 MPH) or more for 1 second. | Harness or connectors (Solenoid valve circuit is open or shorted.) Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Hydraulic control circuit |

NOTE:

When the vehicle is driven fixed in second gear, a input speed sensor malfunction is displayed, but this is not a input speed sensor malfunction.

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-114, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- Select "SLCT LVR POSI" and "GEAR" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle the following condition.

SLCT LVR POSI : D

GEAR : 1st through 7th

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P1730" detected?

>> Go to TM-114, "Diagnosis Procedure". YES

NO >> INSPECTION END

Judgment of A/T Interlock

Refer to TM-152, "Fail-Safe".

TM-113 **Revision: 2015 February** 2015 QX70

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INFOID:0000000010578948

P1730 INTERLOCK

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

INFOID:0000000010578949

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-113, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

P1734 7GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P1734 7GR INCORRECT RATIO

Description INFOID:0000000010578950

This malfunction is detected when the A/T does not shift into 7GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic INFOID:0000000010578951

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|--|
| P1734 | Gear 7 Incorrect Ratio | The gear ratio is: • 0.818 or more • 0.728 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-116, "Diagnosis Procedure"" must be performed before starting "DTC CONFIRMATION PROCE-DURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) - 140°C (284°F)

With GST

- Start the engine.
- Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YFS >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "7TH GR FNCTN P1734" of "DTC Work Support" in "TRANSMISSION".
- Drive vehicle with manual mode and maintain the following conditions.

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P1734 7GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

GEAR : 7th

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P1734" is detected, check the DTC. Refer to TM-157, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position Gear position : 7th

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

2. Check DTC.

<u>Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P1734" detected?</u>

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-116, "Diagnosis Procedure".

YES-4 >> "P1734" is detected: Go to TM-116, "Diagnosis Procedure".

NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.

Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578952

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-232, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-115, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

P1815 M-MODE SWITCH

Description INFOID:0000000010578953

- The manual mode switch [manual mode select switch and manual mode position select switch (shift-up/shiftdown)] is installed in the A/T shift selector assembly. It transmits manual mode switch, shift up and shift down switch signals to unified meter and A/C amp. Then unified meter and A/C amp. transmits signals to TCM via CAN communication.
- · Manual mode select switch transmits manual mode switch signal or non-manual mode switch signal to unified meter and A/C amp. Then TCM receives signals from unified meter and A/C amp. via CAN communication.
- The manual mode position select switch (shift-up) transmits manual mode shift up signal to the unified meter and A/C amp. Then TCM receives signal from the unified meter and A/C amp. via CAN communication.
- The manual mode position select switch (shift-down) transmits manual mode shift down signal to the unified meter and A/C amp. Then TCM receives signal from the unified meter and A/C amp. via CAN communica-
- The TCM transmits manual mode indicator signal to the unified meter and A/C amp. via CAN communication line.

DTC Logic INFOID:0000000010578954

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|----------------------------|--|---|
| P1815 | Manual Mode Switch Circuit | TCM monitors manual mode, non manual mode, up or down switch signal, and detects as irregular when impossible input pattern occurs 2 second or more. | Harness or connectors (These switches circuit is open or shorted.) Manual mode select switch (Into A/T shift selector) Manual mode position select switch (Into A/T shift selector) |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

(P) With CONSULT

- Turn ignition switch ON.
- Select "SLCT LVR POSI" and "MANU MODE SW" in "Data Monitor" in "TRANSMISSION".
- Maintain the following each conditions more than 2 seconds.

SLCT LVR POSI : D MANU MODE SW: ON

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P1815" detected?

>> Go to TM-117, "Diagnosis Procedure". YES

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK MANUAL MODE SWITCH CIRCUIT

- Turn ignition switch OFF.
- 2. Disconnect A/T shift selector connector.
- Turn ignition switch ON.

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INFOID:0000000010578955

P1815 M-MODE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

4. Check voltage between A/T shift selector vehicle side harness connector terminals.

| A/T sh | | | |
|-----------|----------|---|-------------------|
| Connector | Terminal | | Voltage (Approx.) |
| Connector | + | _ | |
| | 1 | 4 | Battery voltage |
| M137 | 2 | | |
| IVI 137 | 3 | | |
| | 5 | | |

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 3.

2. CHECK MANUAL MODE SWITCH

- 1. Turn ignition switch OFF.
- 2. Check manual mode switch. Refer to TM-119, "Component Inspection (Manual Mode Switch)".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts.

3. CHECK GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle | e side harness connector | | Continuity | |
|----------------------------|--------------------------|--------|------------|--|
| Connector | Terminal | Ground | Continuity | |
| M137 | 4 | | Existed | |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND UNIFIED METER AND A/C AMP. (STEP 1)

- 1. Disconnect unified meter and A/C amp. connector.
- 2. Check continuity between A/T shift selector vehicle side harness connector terminals and unified meter and A/C amp. vehicle side harness connector terminals.

| A/T shift selector vehic | A/T shift selector vehicle side harness connector | | Unified meter and A/C amp. vehicle side harness connector | |
|--------------------------|---|-----------|---|---------|
| Connector | Terminal | Connector | Terminal | |
| | 1 | | 10 | |
| M137 | 2 | M66 | 25 | Existed |
| IVI 137 | 3 | | 5 | Existeu |
| | 5 | | 11 | |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND UNIFIED METER AND A/C AMP. (STEP 2)

Check continuity between A/T shift selector vehicle side harness connector terminals and ground.

P1815 M-MODE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

| A/T shift selector vehicle | A/T shift selector vehicle side harness connector | | Continuity | Α |
|----------------------------|---|--------|-------------|---|
| Connector | Terminal | | Continuity | |
| | 1 | Ground | | |
| M137 | 2 | Ground | Not existed | В |
| WI137 | 3 | | Not existed | |
| | 5 | | | С |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts.

6. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

<u>Is the inspection result normal?</u>

YES >> GO TO 7.

NO >> Repair or replace damaged parts.

7.CHECK UNIFIED METER AND A/C AMP.

- Reconnect all the connectors.
- 2. Turn ignition switch ON.
- Select "M RANGE SW", "NM RANGE SW", "AT SFT UP SW" and "AT SFT DWN SW" in "Data Monitor" in "METER/M&A".
- Check the On/Off operations of each monitor item. Refer to MWI-96, "Reference Value".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Replace unified meter and A/C amp. Refer to MWI-145, "Exploded View".

Component Inspection (Manual Mode Switch)

INFOID:0000000010578956

1. CHECK MANUAL MODE SWITCH

Check continuity between A/T shift selector connector terminals.

| A/T shift selector connector | | Condition | Continuity | | |
|------------------------------|------|-----------|---|-------------|--|
| Connector | Terr | minal | Condition | Continuity | |
| | 1 | | Selector lever is shifted to manual shift gate side | Existed | |
| | | | Other than the above | Not existed | |
| | 2 | | Selector lever is shifted to – side | Existed | |
| M427 | 2 | 4 | Other than the above | Not existed | |
| M137 | 2 | 4 | Selector lever is shifted to + side | Existed | |
| | 3 | | Other than the above | Not existed | |
| | 5 | | Selector lever is shifted to manual shift gate side | Not existed | |
| | | | Other than the above | Existed | |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace damaged parts. Refer to TM-182, "Exploded View".

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P2713 PRESSURE CONTROL SOLENOID D

< DTC/CIRCUIT DIAGNOSIS >

P2713 PRESSURE CONTROL SOLENOID D

Description INFOID.000000010578957

The high and low reverse clutch solenoid valve is controlled by the TCM in response to signals transmitted
from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will
then be shifted to the optimum position.

• The high and low reverse clutch solenoid valve controls the high and low reverse clutch control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|--|
| P2713 | Pressure Control Solenoid D | A DTC is set if the high and low reverse clutch solenoid valve monitor value is 0.2 A or less when the high and low reverse clutch solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) High and low reverse clutch solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- 1. Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive the vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 3rd

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P2713" detected?

YES >> Go to TM-120, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010578959

[7AT: RE7R01A (VQ37VHR)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

P2722 PRESSURE CONTROL SOLENOID E

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P2722 PRESSURE CONTROL SOLENOID E

Description INFOID:000000010578960

- The low brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The low brake solenoid valve controls the low brake control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|---|
| P2722 | Pressure Control Solenoid E | A DTC is set if the low brake solenoid valve monitor value is 0.2 A or less when the low brake solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Low brake solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- 2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 1st

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P2722" detected?

YES >> Go to TM-121, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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1. CHECK INTERMITTENT INCIDENT Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

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INFOID:0000000010578962

P2731 PRESSURE CONTROL SOLENOID F

< DTC/CIRCUIT DIAGNOSIS >

P2731 PRESSURE CONTROL SOLENOID F

Description INFOID.000000010578963

The 2346 brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.

 The 2346 brake solenoid valve controls the 2346 brake control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|--|
| P2731 | Pressure Control Solenoid F | A DTC is set if the 2346 brake solenoid valve monitor value is 0.2 A or less when the 2346 brake solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) 2346 brake solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 2nd

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P2731" detected?

YES >> Go to TM-122, "Diagnosis Procedure".

NO >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to <u>GI-47</u>, "<u>Intermittent Incident</u>". <u>Is the inspection result normal?</u>

YES >> Replace control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

INFOID:0000000010578965

P2807 PRESSURE CONTROL SOLENOID G

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

P2807 PRESSURE CONTROL SOLENOID G

Description INFOID:0000000010578966

- The direct clutch solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- · The direct clutch solenoid valve controls the direct clutch control valve in response to a signal transmitted from the TCM.

DTC Logic INFOID:0000000010578967

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|---|
| P2807 | Pressure Control Solenoid G | A DTC is set if the direct clutch solenoid valve monitor value is 0.2 A or less when the direct clutch solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Direct clutch solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF. Then wait at least 10 seconds before performing the next test.

1.PRECONDITIONING

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

>> GO TO 2.

$\mathbf{2}.$ CHECK DTC DETECTION

- (P) With CONSULT
- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW: ON **GEAR** : 1st

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P2807" detected?

>> Go to TM-123, "Diagnosis Procedure". YES

>> INSPECTION END NO

Diagnosis Procedure

>> Replace control valve & TCM. Refer to TM-186, "Exploded View"

TM-123 **Revision: 2015 February** 2015 QX70 TM

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INFOID:0000000010578968

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47. "Intermittent Incident".

Is the inspection result normal?

P2807 PRESSURE CONTROL SOLENOID G



[7AT: RE7R01A (VQ37VHR)]

NO >> Repair or replace damaged parts.

MAIN POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

MAIN POWER SUPPLY AND GROUND CIRCUIT

Terminal

2

Description INFOID:000000010578989

Supply power to TCM.

Diagnosis Procedure

INFOID:0000000010578970

1. CHECK TCM POWER SOURCE (PART 1)

A/T assembly vehicle side harness connector

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T assembly connector.
- 3. Check voltage between A/T assembly vehicle side harness connector terminal and ground.

Ground

| Condition | Voltage (Approx.) | Е |
|-----------|-------------------|----|
| Always | Battery voltage | ₹' |

Is the inspection result normal?

YES >> GO TO 2.

Connector

F51

NO >> GO TO 6.

2.CHECK TCM POWER SOURCE (PART 2)

Check voltage between A/T assembly vehicle side harness connector terminals and ground.

| A/T assembly vehicle | side harness connector | | Condition | Voltago (Approx.) |
|----------------------|------------------------|--------|--------------------------|-------------------|
| Connector | Terminal | | Condition | Voltage (Approx.) |
| | 1 | Ground | Turn ignition switch ON | Battery voltage |
| F51 | ı | Ground | Turn ignition switch OFF | 0 V |
| F31 | G | | Turn ignition switch ON | Battery voltage |
| | 6 | | Turn ignition switch OFF | 0 V |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 7.

3.CHECK TCM GROUND CIRCUIT

Check continuity between A/T assembly vehicle side harness connector terminals and ground.

| A/T assembly vehicle | side harness connector | | Continuity |
|----------------------|------------------------|--------|------------|
| Connector | Terminal | Ground | Continuity |
| F51 | 5 | Ground | Existed |
| 1-31 | 10 | | LAISIEU |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK JOINT CONNECTOR

- 1. Remove joint connector. Refer to TM-186, "Exploded View".
- 2. Check the continuity between joint connector terminals.

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MAIN POWER SUPPLY AND GROUND CIRCUIT

[7AT: RE7R01A (VQ37VHR)]

< DTC/CIRCUIT DIAGNOSIS >

| A/T assembly harness connector side | TCM harness connector side | |
|--------------------------------------|-------------------------------|------------|
| A/ I assembly harness connector side | 1 Civi flamess connector side | Continuity |
| Terminal | Terminal | Continuity |
| 1 | 1 | |
| 2 | 2 | |
| 5 | 5 | Existed |
| 6 | 6 | |
| 10 | 10 | |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK INTERMITTENT INCIDENT

Refer to GI-47. "Intermittent Incident".

Is the inspection result normal?

YES >> Replace the control valve & TCM. Refer to TM-186, "Exploded View".

NO >> Repair or replace damaged parts.

6.DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between battery positive terminal and A/T assembly vehicle side harness connector terminal 2. Refer to PG-7, "Wiring Diagram BATTERY POWER SUPPLY -".
- Battery
- 10A fuse (No.36, located in the fuse, fusible link and relay box). Refer to <u>PG-121, "Fuse and Fusible Link Arrangement".</u>

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Repair or replace damaged parts.

7. CHECK HARNESS BETWEEN IPDM E/R AND A/T ASSEMBLY (PART 1)

- 1. Turn ignition switch OFF.
- 2. Disconnect IPDM E/R connector.
- Check continuity between IPDM E/R vehicle side harness connector terminal and A/T assembly vehicle side harness connector terminals.

| IPDM E/R vehicle sign | de harness connector | A/T assembly vehicle | side harness connector | Continuity |
|-----------------------|----------------------|----------------------|------------------------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| E7 | 58 | F51 | 1 | Existed |
| | 30 | 131 | 6 | LXISIEU |

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace damaged parts.

8.CHECK HARNESS BETWEEN IPDM E/R AND A/T ASSEMBLY (PART 2)

Check continuity between A/T assembly vehicle side harness connector terminal and ground.

| A/T assembly vehicle | side harness connector | | Continuity |
|----------------------|------------------------|--------|-------------|
| Connector | Terminal | Ground | Continuity |
| F51 | 1 | Ground | Not existed |
| | 6 | | NOT EXISTED |

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace damaged parts.

MAIN POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

$9. \mathsf{DETECT}$ MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and IPDM E/R. Refer to PG-50, "Wiring Diagram IGNI-TION POWER SUPPLY -".
- · Ignition switch
- 10A fuse (No.43, located in the IPDM E/R). Refer to PG-122, "Fuse, Connector and Terminal Arrangement".
- IPDM E/R

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".
- NO >> Repair or replace damaged parts.

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SHIFT POSITION INDICATOR CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

SHIFT POSITION INDICATOR CIRCUIT

Description INFOID:000000010578971

TCM transmit the switch signals to unified meter and A/C amp. by CAN communication line. Then manual mode switch position is indicated on the shift position indicator.

Component Function Check

INFOID:0000000010578972

[7AT: RE7R01A (VQ37VHR)]

1. CHECK A/T INDICATOR

- 1. Start the engine.
- Check the actual selector lever position ("P", "R", "N" and "D") and the indication of the shift position indicator mutually coincide.
- Drive vehicle in the manual mode, and then check that the actual gear position and the indication of the
 position indicator mutually coincide when the selector lever is shifted to "UP (+ side)" or "DOWN (− side)"
 side (1GR ⇔ 7GR).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to TM-128, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000010578973

1. CHECK INPUT SIGNALS

(II) With CONSULT

- Start the engine.
- Select "SLCT LVR POSI" in "Data Monitor" in "TRANSMISSION".
- Check the actual selector lever position ("P", "R", "N" and "D") and the indication of the "SLCT LVR POSI" mutually coincide. Refer to <u>TM-140</u>, "<u>Reference Value</u>".
- 4. Drive vehicle in the manual mode, and then check that the actual gear position and the indication of the "SLCT LVR POSI" mutually coincide when the selector lever is shifted to the "UP (+ side)" or "DOWN (− side)" side (1GR ⇔ 7GR). Refer to TM-140, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END

NO-1 [The actual gear position does not change, or shifting into the manual mode is not possible (no gear shifting in the manual mode possible). Or the shift position indicator is not indicated.]>>•Check manual mode switch. Refer to TM-119, "Component Inspection (Manual Mode Switch)".

- Check A/T main system (Fail-safe function actuated).
- Perform "Self Diagnostic Results" mode for "TRANSMISSION". Refer to TM-157, "DTC Index".
- NO-2 (The actual gear position changes, but the shift position indicator is not indicated.)>>•Perform "Self Diagnostic Results" mode for "TRANSMISSION". Refer to TM-157, "DTC Index".
- NO-3 (The actual gear position and the indication on the shift position indicator do not coincide.)>>•Perform "Self Diagnostic Results" mode for "TRANSMISSION". Refer to TM-157, "DTC Index".
- NO-4 (Only a specific position or positions is/are not indicated on the shift position indicator.)>>•Check the unified meter and A/C amp. Refer to MWI-4, "Work flow".

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

SHIFT LOCK SYSTEM

Description INFOID:000000010578974

Refer to TM-61, "System Description".

Wiring Diagram - A/T SHIFT LOCK SYSTEM -

INFOID:0000000010578975

SINDON SWITCH

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| Connect | Connector Name | FUSE BLOCK (J/B) | 13 | œ | | 69 | _ | | Connect | Connector Name W | WIRE TO WIRE |
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| | | 3 | 50 | Υ | - [Without ICC] | 78 | ٨ | | | | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 |
| | | | 21 | æ | | 80 | SB | | | | |
| | | | 22 | œ | - [With ICC] | 8 | _ | | | | |
| Termina | Terminal Color Of | Of Simulation | 22 | > | - [Without ICC] | 82 | × | | Termina | Ferminal Color Of | Control of the Contro |
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| 11 | SB | | 24 | а | - [Without ICC] | 85 | 9 | | 2 | BG | |
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| Æ | > | | 25 | > | - [With ICC] | 87 | Μ | | m | SB | - [With Auto aircon seat] |
| 4F | Ø | | 56 | SHIELD | | 88 | BG | | 4 | 91 | |
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| | | | 47 | _ | | Connec | Connector Type | M04FW-LC | 8 | £ | - [Without ICC] |
| | | | 48 | ۵ | | ą | | | 50 | > | - [With ICC] |
| Termina | Terminal Color Of | Of Signal Name [Specification] | 49 | g | | B | _ | | 51 | BR | - [With ICC] |
| ġ | Wire | | 20 | Ж | | Ę | e | ŀ | 21 | ď | - [Without ICC] |
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| 2 | BG | • | 52 | Υ | • | | | \ \ \ | 22 | ď | - [With ICC] |
| 3 | SB | | 23 | BG | | | | 7 | 23 | 9 | |
| 4 | PI | - | 24 | œ | - | | |] | 24 | ٦ | - [With ICC] |
| 2 | ٨ | - | 22 | SB | - | | | | 24 | Ь | - [Without ICC] |
| 9 | ۸ | | 28 | ۵ | - | Terminal | 0 | Cional Mamo Concidentical | 25 | Μ | - [Without ICC] |
| 7 | g | • | 9 | SB | | ž | Wire | orginal reality [opeomoration] | 25 | \ | - [With ICC] |
| 8 | ^ | | 61 | ^ | | - | ٦ | | 56 | SHIELD | |
| 6 | æ | • | 62 | ۵ | • | 2 | W | • | 28 | GR | |
| 10 | BR | | 63 | 97 | | 3 | Э | | 59 | ^ | |
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INFOID:000000010578976

Component Function Check

SHIFT LOCK SYSTEM

${\bf 1}.{\sf CHECK\ A/T\ SHIFT\ LOCK\ OPERATION\ (PART\ 1)}$

A/T SHIFT SELECTOR

- 1. Turn ignition switch ON.
- 2. Shift the selector lever to "P" position.
- 3. Attempt to shift the selector lever to any other position with the brake pedal released.

Can the selector lever be shifted to any other position?

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YES >> Go to TM-132, "Diagnosis Procedure".

NO >> GO TO 2.

2.CHECK A/T SHIFT LOCK OPERATION (PART 2)

Attempt to shift the selector lever to any other position with the brake pedal depressed.

Can the selector lever be shifted to any other position?

YES >> INSPECTION END

NO >> Go to TM-132, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000010578977

[7AT: RE7R01A (VQ37VHR)]

1. CHECK POWER SOURCE (PART 1)

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T shift selector connector.
- 3. Turn ignition switch ON.
- 4. Check voltage between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicl | e side harness connector | | Condition | Voltage (Approx.) |
|---------------------------|--------------------------|---------|------------------------|-------------------|
| Connector | Terminal | Ground | Condition | voltage (Approx.) |
| M137 | Q | Giodila | Depressed brake pedal. | Battery voltage |
| IVI 137 | 0 | | Released brake pedal. | 0 V |

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 5.

2. CHECK GROUND CIRCUIT

Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle | e side harness connector | | Continuity |
|----------------------------|--------------------------|--------|------------|
| Connector | Terminal | Ground | Continuity |
| M137 | 4 | | Existed |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

3.CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND SHIFT LOCK UNIT

- 1. Disconnect shift lock unit connector.
- Check continuity between A/T shift selector connector terminals and shift lock unit A/T shift selector side connector terminals.

| A/T shift sele | ctor connector | Shift lock unit A/T shift | selector side connector | Continuity |
|----------------|----------------|---------------------------|-------------------------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| M137 | 8 | M222 | 3 | Existed |
| IVI 137 | 4 | IVIZZZ | 4 | LAISIEU |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK SHIFT LOCK UNIT

- 1. Remove shift lock unit. Refer to TM-182, "Exploded View".
- Check shift lock unit. Refer to TM-134, "Component Inspection (Shift Lock Solenoid)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Replace shift lock unit. Refer to TM-182, "Exploded View".

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

5. CHECK POWER SOURCE (PART 2)

- Turn ignition switch OFF.
- Disconnect stop lamp switch connector.
- Turn ignition switch ON.
- Check voltage between stop lamp switch vehicle side harness connector terminal and ground.

| Stop lamp switch vehicle | e side harness connector | | Voltage (Approx.) | |
|--------------------------|--------------------------|--------|-------------------|--|
| Connector Terminal | | Ground | voitage (Approx.) | |
| E110 | E110 3 | | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 9.

O.CHECK STOP LAMP SWITCH (PART 1)

Check stop lamp switch. Refer to TM-134, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 12.

7.CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT SELECTOR (PART 1)

Check continuity between stop lamp switch vehicle side harness connector terminal and A/T shift selector vehicle side harness connector terminal.

| Stop lamp switch vehicle side harness connector | | A/T shift selector vehicle side harness connector | | Continuity |
|---|----------|---|---|------------|
| Connector | Terminal | Connector Terminal | | Continuity |
| E110 | 4 | M137 | 8 | Existed |

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace damaged parts.

8.CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT SELECTOR (PART 2)

Check continuity between stop lamp switch vehicle side harness connector terminal and ground.

| Stop lamp switch vehicle side harness connector | | | Continuity |
|---|----------|--------|-------------|
| Connector | Terminal | Ground | Continuity |
| E110 | 4 | | Not existed |

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Repair or replace damaged parts.

$9.\mathsf{check}$ harness between fuse block (J/B) and stop Lamp switch (part 1)

- Turn ignition switch OFF.
- Disconnect fuse block (J/B) connector.
- Check continuity between fuse block (J/B) vehicle side harness connector terminal and stop lamp switch vehicle side harness connector terminal.

| Fuse block (J/B) vehicle | e side harness connector | connector Stop lamp switch vehicle side harness connector | | Continuity |
|--------------------------|--------------------------|---|---|------------|
| Connector | Terminal | Connector Terminal | | |
| E103 | 4F | E110 | 3 | Existed |

YES >> GO TO 10.

10.CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH (PART 2)

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<u>Is the inspection result normal?</u>

NO >> Repair or replace damaged parts.

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Check continuity between fuse block (J/B) vehicle side harness connector terminal and ground.

| Fuse block (J/B) vehicle | e side harness connector | | Continuity |
|--------------------------|--------------------------|--|-------------|
| Connector | Connector Terminal | | Continuity |
| E103 | 4F | | Not existed |

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace damaged parts.

11. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and fuse block (J/B). Refer to <u>PG-50, "Wiring Diagram IGNITION POWER SUPPLY -"</u>.
- Ignition switch
- 10A fuse [No.3, located in the fuse block (J/B)]. Refer to PG-120, "Fuse, Connector and Terminal Arrangement".
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Repair or replace damaged parts.

12. CHECK INSTALLATION POSITION OF STOP LAMP SWITCH

Adjust stop lamp switch position. Refer to BR-9, "Inspection and Adjustment".

>> GO TO 13.

13. CHECK STOP LAMP SWITCH (PART 2)

Check stop lamp switch. Refer to TM-134, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to BR-20, "Exploded View".

Component Inspection (Shift Lock Solenoid)

INFOID:0000000010578978

[7AT: RE7R01A (VQ37VHR)]

1. CHECK SHIFT LOCK SOLENOID

Apply voltage to terminals 3 and 4 of shift lock unit connector, and then check that shift lock solenoid is activated.

CAUTION:

Connect the fuse between the terminals when applying the voltage.

| | Shift lock unit connector | | | |
|-----------|---------------------------|---|--|------------------------------|
| Connector | Terminal | | Condition | Status |
| Connector | + (fuse) | _ | | |
| M222 | 3 | 4 | Apply 12 V direct current between terminals 3 and 4. | Shift lock solenoid operates |

Can the lock plate be moved up and down?

YES >> INSPECTION END

NO >> Replace shift lock unit. Refer to TM-182, "Exploded View".

Component Inspection (Stop Lamp Switch)

INFOID:0000000010578979

1. CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

| Stop lamp switch connector | | | Condition | Continuity |
|----------------------------|----------|---|------------------------|-------------|
| Connector | Terminal | | Condition | Continuity |
| E110 | 3 | 4 | Depressed brake pedal. | Existed |
| LIIU | 3 | 4 | Released brake pedal. | Not existed |

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Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-20, "Exploded View"</u>.

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< DTC/CIRCUIT DIAGNOSIS >

SELECTOR LEVER POSITION INDICATOR

Description INFOID:0000000010578980

Indicates selector lever position.

Component Function Check

INFOID:0000000010578981

[7AT: RE7R01A (VQ37VHR)]

1.CHECK SELECTOR LEVER POSITION INDICATOR (PART 1)

- Turn ignition switch ON.
- Check that each position indicator lamp of the selector lever position indicator turns on when shifting the selector lever from "P" to "M" position.

Is the inspection result normal?

YFS >> GO TO 2.

NO >> Go to TM-136, "Diagnosis Procedure".

2.CHECK SELECTOR LEVER POSITION INDICATOR (PART 2)

Check that the night illumination of the selector lever position indicator turns on when setting the lighting switch in 1st position.

Is the inspection result normal?

YES >> INSPECTION END

>> Go to TM-136, "Diagnosis Procedure". NO

Diagnosis Procedure

INFOID:0000000010578982

1. CHECK MALFUNCTIONING ITEM

Which item is abnormal?

Position indicator lamp>> GO TO 2.

Illumination lamp>> GO TO 11.

2.CHECK POWER SOURCE

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T shift selector connector.
- Turn ignition switch ON.
- Check voltage between A/T shift selector vehicle side harness connector terminals.

| A/T shift selector vehicle | e side harness connector | | Voltage (Approx.) | |
|----------------------------|--------------------------|--------|-------------------|--|
| Connector Terminal | | Ground | Voltage (Approx.) | |
| M137 | M137 10 | | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 8.

3.CHECK GROUND CIRCUIT

Turn ignition switch OFF.

Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle | e side harness connector | | Continuity | |
|----------------------------|--------------------------|--------|------------|--|
| Connector Terminal | | Ground | Continuity | |
| M137 | 4 | | Existed | |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

f 4.CHECK SHIFT POSITION SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01A (VQ37VHR)]

- Disconnect shift position switch connector.
- Check continuity between A/T shift selector harness connector terminals and shift position switch connector terminals.

| A/T shift selector h | narness connector | Shift position | switch connector | Condition | Continuity |
|----------------------|-------------------|--------------------------|---------------------------------|---------------------------------|------------|
| Connector | Terminal | Connector | Terminal | Condition | Continuity |
| | | | 7 | Selector lever in "D" | Existed |
| 4 | | 2, 3, 4, 5, 6, 9, 10, 11 | position. | No existed | |
| | 4 | 4 | 9 | Selector lever in "M" | Existed |
| | | 2, 3, 4, 5, 6, 7, 10, 11 | position. | No existed | |
| | | 2, 6 | Selector lever in "N" | Existed | |
| M137 | | M221 | 3, 4, 5, 7, 9, 10, 11 | and "M" position. | No existed |
| WITST | | | 3, 6 | Selector lever in "D" position. | Existed |
| 10 | 10 | | 2, 4, 5, 7, 9, 10, 11 | | No existed |
| | | 4, 6 | Selector lever in "R" position. | Existed | |
| | | 2, 3, 5, 7, 9, 10, 11 | | No existed | |
| | | | 5, 6 | Selector lever in "P" | Existed |
| | | | 2, 3, 4, 7, 9, 10, 11 | position. | No existed |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts. Refer to TM-182, "Exploded View".

 ${f 5}.$ CHECK HARNESS BETWEEN SHIFT POSITION SWITCH AND SELECTOR LEVER POSITION INDICA-TOR (PART 1)

- Disconnect selector lever position indicator connector.
- Check continuity between shift position switch harness connector terminals and selector lever position indicator connector terminals.

| Shift position switch | h harness connector | Selector lever position indicator harness connector | | Continuity |
|-----------------------|---------------------|---|---|------------|
| Connector | Terminal | Connector Terminal | | Continuity |
| | 2 | | 3 | |
| | 3 | | 4 | |
| | 4 | | 5 | |
| M221 | 5 | M223 | 7 | Existed |
| | 6 | | 6 | |
| | 7 | | 8 | |
| | 9 | | 2 | |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts. Refer to TM-182, "Exploded View".

6.CHECK HARNESS BETWEEN SHIFT POSITION SWITCH AND SELECTOR LEVER POSITION INDICA-TOR (PART 2)

Check harness cladding between shift position switch connector and selector lever position indicator connector for damage.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace damaged parts. Refer to TM-182, "Exploded View".

.CHECK SELECTOR LEVER POSITION INDICATOR

Check selector lever position indicator. Refer to TM-139, "Component Inspection (Selector Lever Position Indicator)".

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< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Replace damaged parts.

$8.\mathsf{CHECK}$ HARNESS BETWEEN A/T SHIFT SELECTOR AND BCM (PART 1)

- Turn ignition switch OFF.
- Disconnect BCM connector.
- Check continuity between A/T shift selector vehicle side harness connector terminal and BCM vehicle side harness connector terminal.

| A/T shift selector vehicle | A/T shift selector vehicle side harness connector | | BCM vehicle side harness connector | |
|----------------------------|---|--------------------|------------------------------------|------------|
| Connector | Terminal | Connector Terminal | | Continuity |
| M137 | 10 | M122 | 96 | Existed |

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace damaged parts.

9.CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND BCM (PART 2)

Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle side harness connector | | | Continuity |
|---|----------|--------|-------------|
| Connector | Terminal | Ground | Continuity |
| M137 | 10 | | Not existed |

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace damaged parts.

10.CHECK BCM INPUT/OUTPUT SIGNAL

Check BCM input/output signal. Refer to BCS-49, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Repair or replace damaged parts.

11. CHECK POWER SOURCE

- 1. Turn ignition switch OFF.
- Disconnect A/T shift selector connector.
- 3. Turn ignition switch ON.
- 4. Check voltage between A/T shift selector vehicle side harness connector terminals.

| A/T shift selector vehicle side harness connector | | | | |
|---|---|---|---------------------|-------------------|
| Connector | | | Condition | Voltage (Approx.) |
| Connector | + | _ | | |
| M137 | 7 | 9 | Lighting switch 1ST | Battery voltage |

Is the inspection result normal?

YES >> GO TO 12.

NO >> Check illumination circuit. Refer to INL-90, "Wiring Diagram - ILLUMINATION -".

12. CHECK SHIFT POSITION SWITCH

- 1. Disconnect shift position switch connector.
- Check continuity between A/T shift selector harness connector terminals and shift position switch connector terminals.

< DTC/CIRCUIT DIAGNOSIS >

A/T shift selector harness connector Shift position switch connector Continuity Connector **Terminal Terminal** Connector 10 Existed 7 2, 3, 4, 5, 6, 7, 9, 11 No existed M221 Existed 11 9

2, 3, 4, 5, 6, 7, 9, 10

Is the inspection result normal?

YES >> GO TO 13.

M137

NO >> Repair or replace damaged parts. Refer to TM-182, "Exploded View".

13. CHECK HARNESS BETWEEN SHIFT POSITION SWITCH AND SELECTOR LEVER POSITION INDI-CATOR (PART 3)

- Disconnect selector lever position indicator connector.
- Check continuity between shift position switch harness connector terminals and selector lever position indicator connector terminals.

| Shift position switch harness connector | | Selector lever position indicator harness connector | | Continuity | |
|---|----------|---|----------|------------|--|
| Connector | Terminal | Connector | Terminal | Continuity | |
| M221 | 10 | M223 | 1 | Existed | |
| IVIZZ I | 11 | IVIZZS | 9 | Existed | |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts. Refer to TM-182, "Exploded View".

Component Inspection (Selector Lever Position Indicator)

1. CHECK SELECTOR LEVER POSITION INDICATOR

Check that selector lever position indicator lamps turn on.

CAUTION:

Connect the fuse between the terminals when applying the voltage.

| Selector lever position indicator connector | | | | | |
|---|----------|------|--|---------------------------------------|--|
| Connector | Termi | inal | Condition | Status | |
| Connector - | + (fuse) | _ | | | |
| | 1 | 9 | Apply 12 V direct current between terminals 1 and 9. | Illumination lamp turns on | |
| 3 4 M223 5 | 3 | | Apply 12 V direct current between terminals 3 and 8. | "N" position indicator lamp turns on. | |
| | 4 | 8 | Apply 12 V direct current between terminals 4 and 8. | "D" position indicator lamp turns on. | |
| | 5 | 0 | Apply 12 V direct current between terminals 5 and 8. | "R" position indicator lamp turns on. | |
| | 7 | | Apply 12 V direct current between terminals 7 and 8. | "P" position indicator lamp turns on. | |
| | 6 | 2 | Apply 12 V direct current between terminals 6 and 2. | "M" mode indicator lamp turns on. | |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the selector lever position indicator. Refer to <u>TM-182</u>, "Exploded View". TM

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ECU DIAGNOSIS INFORMATION

TCM

Reference Value

VALUES ON DIAGNOSIS TOOL

- The CONSULT electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
 - Check for time difference between actual shift timing and the CONSULT display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
- Shift schedule (which implies gear position) displayed on CONSULT and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:
- Actual shift schedule has more or less tolerance or allowance
- Shift schedule indicated in Service Manual refers to the point where shifts start
- Gear position displayed on CONSULT indicates the point where shifts are completed
- Display of solenoid valves on CONSULT changes at the start of shifting, while gear position is displayed upon completion of shifting (which is computed by TCM).

NOTE:

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

| Item name | Condition | Value / Status (Approx.) |
|---------------|--|---|
| VHCL/S SE-A/T | During driving | Approximately matches the speed- ometer reading. |
| ESTM VSP SIG | During driving | Approximately matches the speed- ometer reading. |
| OUTPUT REV | During driving (lock-up ON) | Tachometer/Gear ratio |
| INPUT SPEED | During driving (lock-up ON) | Approximately matches the engine speed. |
| F SUN GR REV | During driving | Revolution of front sun gear is indicated. |
| F CARR GR REV | During driving | Revolution of front carrier is indicated. |
| ENGINE SPEED | Engine running | Closely matches the tachometer reading. |
| TC SLIP SPEED | During driving | Engine speed – Input speed |
| ACCELE POSI | Released accelerator pedal | 0.0/8 |
| ACCELE POSI | Fully depressed accelerator pedal | 8.0/8 |
| THROTTLE POSI | Released accelerator pedal | 0.0/8 |
| THROTTLE POSI | Fully depressed accelerator pedal | 8.0/8 |
| ATF TEMP 1 | Ignition switch ON | Temperature of ATF in the oil pan is indicated. |
| ATF TEMP 2 | Ignition switch ON | Temperature of ATF at the exit of torque converter. |
| ATF TEMP SE 1 | 0°C (32° F) – 20°C (68°F) – 80°C (176°F) | 3.3 – 2.7 – 0.9 V |
| BATTERY VOLT | Ignition switch ON | Battery voltage (11 V – 14 V) |
| LINE PRES SOL | _ | _ |
| TCC SOLENOID | _ | _ |
| L/B SOLENOID | _ | _ |
| FR/B SOLENOID | _ | _ |
| HLR/C SOL | | |

| Item name | Condition | Value / Status (Approx.) | Α. |
|----------------|---|--|----|
| I/C SOLENOID | - | _ | Δ |
| D/C SOLENOID | _ | _ | |
| 2346/B SOL | _ | _ | Е |
| L/P SOL MON | _ | _ | |
| TCC SOL MON | _ | _ | |
| L/B SOL MON | _ | _ | C |
| FR/B SOL MON | _ | | |
| HLR/C SOL MON | _ | _ | ΤN |
| I/C SOL MON | _ | _ | |
| D/C SOL MON | _ | _ | |
| 2346/B SOL MON | - | _ | Е |
| | Driving with 1GR | 4.924 | |
| | Driving with 2GR | 3.194 | г |
| | Driving with 3GR | 2.043 | Г |
| GEAR RATIO | Driving with 4GR | 1.412 | |
| | Driving with 5GR | 1.000 | C |
| | Driving with 6GR | 0.862 | |
| | Driving with 7GR | 0.772 | |
| ENGINE TORQUE | During driving | Changes the value according to the acceleration or deceleration. | H |
| ENG TORQUE D | During driving | Changes the value according to the acceleration or deceleration. | I |
| INPUT TRQ S | During driving | Changes the value according to the acceleration or deceleration. | |
| INPUT TRQ L/P | During driving | Changes the value according to the acceleration or deceleration. | J |
| TDOT DDEC L/D | Selector lever in "P" and "N" positions | 490 kPa | L |
| TRGT PRES L/P | Other than the above | 490 – 1370 kPa | K |
| | Slip lock-up is active | 0 – 600 kPa | |
| TRGT PRES TCC | Lock-up is active | 600 kPa | L |
| | Other than the above | 0 kPa | |
| TRGT PRES L/B | Low brake engaged | 1370 kPa | |
| INGI FILO LIB | Low brake disengaged | 0 kPa | N |
| TRGT PRES FR/B | Front brake engaged | 1370 kPa | |
| IRGI PRES PR/B | Front brake disengaged | 0 kPa | N |
| TRG PRE HLR/C | High and low reverse clutch engaged | 1370 kPa | |
| TRO FRE HENC | High and low reverse clutch disengaged | 0 kPa | |
| TRGT PRES I/C | Input clutch engaged | 1370 kPa | C |
| INGI PRES I/C | Input clutch disengaged | 0 kPa | |
| TDCT DDES D/C | Direct clutch engaged | 1370 kPa | P |
| TRGT PRES D/C | Direct clutch disengaged | 0 kPa | 1 |
| TDC DDE 2246/D | 2346 brake engaged | 1370 kPa | |
| TRG PRE 2346/B | 2346 brake disengaged | 0 kPa | |
| SHIFT PATTERN | During normal driving (without shift changes) | FF | |
| VEHICLE SPEED | During driving | Approximately matches the speed-ometer reading. | |

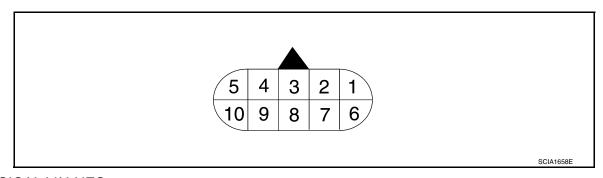
| Item name | Condition | Value / Status (Approx.) |
|--------------------|---|--------------------------|
| DANCE SW 4 | Selector lever in "P" and "N" positions | OFF |
| RANGE SW 4 | Other than the above | ON |
| RANGE SW 3 | Selector lever in "P", "R" and "N" positions | OFF |
| | Other than the above | ON |
| | Selector lever in "P" and "R" positions | OFF |
| RANGE SW 2 | Other than the above | ON |
| DANGE OWA | Selector lever in "P" position | OFF |
| RANGE SW 1 | Other than the above | ON |
| OFT DIAM OT CLAR | Paddle shifter (shift-down) is pulled | ON |
| SFT DWN ST SW* | Other than the above | OFF |
| 057.115.07.0144 | Paddle shifter (shift-up) is pulled | ON |
| SFT UP ST SW* | Other than the above | OFF |
| | Selector lever is shifted to – side | ON |
| DOWN SW LEVER | Other than the above | OFF |
| LID OW LEVES | Selector lever is shifted to + side | ON |
| UP SW LEVER | Other than the above | OFF |
| | Selector lever is shifted to manual shift gate side | OFF |
| NON M-MODE SW | Other than the above | ON |
| | Selector lever is shifted to manual shift gate side | ON |
| MANU MODE SW | Other than the above | OFF |
| TOW 110 D T 0 1111 | Tow mode | ON |
| TOW MODE SW* | Other than the above | OFF |
| | Driving with DS mode | ON |
| DS RANGE | Other than the above | OFF |
| | Selector lever in "1" position | ON |
| 1 POSITION SW* | Other than the above | OFF |
| | When overdrive control switch is depressed | ON |
| OD CONT SW* | When overdrive control switch is released | OFF |
| | Depressed brake pedal | ON |
| BRAKESW | Released brake pedal | OFF |
| | Power mode | ON |
| POWERSHIFT SW* | Other than the above | OFF |
| | When TCM receives ASCD OD cancel request signal | ON |
| ASCD-OD CUT | Other than the above | OFF |
| ACCD OBUSE | ASCD operate | ON |
| ASCD-CRUISE | Other than the above | OFF |
| | ABS operate | ON |
| ABS SIGNAL | Other than the above | OFF |
| | When TCM receives TCS gear keep request signal | ON |
| TCS GR/P KEEP | Other than the above | OFF |
| TCS SIGNAL 2 | When the reception value of A/T shift schedule change demand signal is "cold" | ON |
| 100 OTOTAL Z | Other than the above | OFF |

| Item name | Condition | Value / Status (Approx.) | |
|-----------------|---|--------------------------|---|
| ГСS SIGNAL 1 | When the reception value of A/T shift schedule change demand signal is "warm" | ON | |
| OC CICITAL I | Other than the above | OFF | - |
| | At 4GR - 5GR - 6GR shift control | FAIL | _ |
| OW/B PARTS | Other than the above | NOTFAIL | _ |
| | At 1GR - 2GR - 3GR shift control | FAIL | — |
| C/IC/FRB PARTS | Other than the above | NOTFAIL | |
| | At 4GR - 5GR - 6GR shift control | FAIL | _ |
| :/FRB PARTS | Other than the above | NOTFAIL | _ |
| | At 4GR - 5GR - 6GR shift control | FAIL | _ |
| _R/C PARTS | Other than the above | NOTFAIL | _ |
| | Fully depressed accelerator pedal | ON | _ |
| O THL POS | Released accelerator pedal | OFF | _ |
| | Released accelerator pedal | ON | |
| LSD THL POS | Fully depressed accelerator pedal | OFF | |
| | Depressed accelerator pedal | DRIVE | |
| RV CST JUDGE | Released accelerator pedal | COAST | _ |
| | When the selector lever is positioned in between each position | OFF | _ |
| | Selector lever in "P" position | Р | |
| | Selector lever in "R" position | R | _ |
| | Selector lever in "N" position | N | |
| | Selector lever in "D" position | D. | |
| | Selector lever in "D" position: 7GR | D | |
| | Selector lever in "D" position: 6GR | 6 | |
| | Selector lever in "D" position: 5GR | 5 | |
| | Selector lever in "D" position: 4GR | 4 | |
| HIFT IND SIGNAL | Selector lever in "D" position: 3GR | 3 | |
| | Selector lever in "D" position: 2GR | 2 | _ |
| | Selector lever in "D" position: 1GR | 1 | _ |
| | Selector lever in "M" position: 1GR | M1 | _ |
| | Selector lever in "M" position: 2GR | M2 | _ |
| | Selector lever in "M" position: 3GR | M3 | _ |
| | Selector lever in "M" position: 4GR | M4 | |
| | Selector lever in "M" position: 5GR | M5 | _ |
| | Selector lever in "M" position: 6GR | M6 | _ |
| | Selector lever in "M" position: 7GR | M7 | |
| | Driving with DS mode | DS | _ |
| | Selector lever in "P" and "N" positions | ON | _ |
| TARTER RELAY | Other than the above | OFF | _ |
| | For 2 seconds after the ignition switch is turned ON | ON | _ |
| SAFE IND/L | Other than the above | OFF | _ |
| | When TCM transmits the A/T fluid warning lamp signal | ON | _ |
| ATF WARN LAMP* | Other than the above | OFF | _ |

| Item name | Condition | Value / Status (Approx.) |
|------------------|--|--------------------------|
| MANUL MODE IND | Driving with manual mode | ON |
| MANU MODE IND | Other than the above | OFF |
| | Selector lever in "P" and "N" positions | ON |
| ON OFF SOL MON | Driving with 1GR to 3GR | ON |
| | Other than the above | OFF |
| CTART RIVINON | Selector lever in "P" and "N" positions | ON |
| START RLY MON | Other than the above | OFF |
| | Selector lever in "P" and "N" positions | ON |
| ON OFF SOL | Driving with 1GR to 3GR | ON |
| | Other than the above | OFF |
| | Selector lever in "N" and "P" positions | N/P |
| | Selector lever in "R" position | R |
| | Selector lever in "D" and "DS" positions | 5 |
| | Selector lever in "M" position: 7GR | D |
| OLOT LVD DOOL | Selector lever in "M" position: 6GR | 6 |
| SLCT LVR POSI | Selector lever in "M" position: 5GR | 5 |
| | Selector lever in "M" position: 4GR | 4 |
| | Selector lever in "M" position: 3GR | 3 |
| | Selector lever in "M" position: 2GR | 2 |
| | Selector lever in "M" position: 1GR | 1 |
| GEAR | During driving | 1, 2, 3, 4, 5, 6, 7 |
| NEXT GR POSI | During driving | 1, 2, 3, 4, 5, 6, 7 |
| CUIET MODE | Driving with the D position | 0 or 3 |
| SHIFT MODE | Driving with the manual mode | 4 or 8 |
| D/O DADTO | At 1GR - 2GR shift control | FAIL |
| D/C PARTS | Other than the above | NOTFAIL |
| FR/B PARTS | At control fixed to 1GR | FAIL |
| | Other than the above | NOTFAIL |
| 2246/D DADTO | At control fixed to 1GR | FAIL |
| 2346/B PARTS | Other than the above | NOTFAIL |
| 00.4CD/DC DA.DTC | At 2GR - 3GR - 4GR shift control | FAIL |
| 2346B/DC PARTS | Other than the above | NOTFAIL |

^{*:} Not mounted but always display as OFF.

TERMINAL LAYOUT



PHYSICAL VALUES

| | minal color) | Description | ı | | Condition | Value (Approx.) |
|-----------|-----------------|---|------------------|--------------------|--|-----------------|
| + | _ | Signal name | Input/ Output | | Condition | value (Appiox.) |
| 1 | Ground | Ignition power sup- | Input | lgr | nition switch ON | Battery voltage |
| (Y) | Giodila | ply | прис | lgn | ition switch OFF | 0 V |
| 2 (BR) | Ground | Battery power sup- ply (Memory back-up) | Input | | Always | Battery voltage |
| 3 (L) | _ | CAN-H | Input/ Output | | _ | _ |
| 4 (V) | _ | K-line | Input/ Output | | _ | _ |
| 5 (B) | Ground | Ground | Output | | Always | 0 V |
| 6 | Ground | Ignition power sup- | Innut | lgr | nition switch ON | Battery voltage |
| (Y) | Ground | ply | Input | lgn | ition switch OFF | 0 V |
| 7 | Ground | Back-up lamp relay | Input | Ignition switch ON | Selector lever in "R" position. | 0 V |
| (R) | Giodila | Back-up lamp relay | прис | ignition switch ON | Selector lever in other positions. | Battery voltage |
| 8 (P) | _ | CAN-L | Input/ Output | | _ | _ |
| 9 (GR) | Ground | Starter relay | Output | Ignition switch ON | Selector lever in "N" and "P" positions. | Battery voltage |
| (GIV) | | | | | Selector lever in other positions. | 0 V |
| 10 (B) | Ground | Ground | Output | | Always | 0 V |

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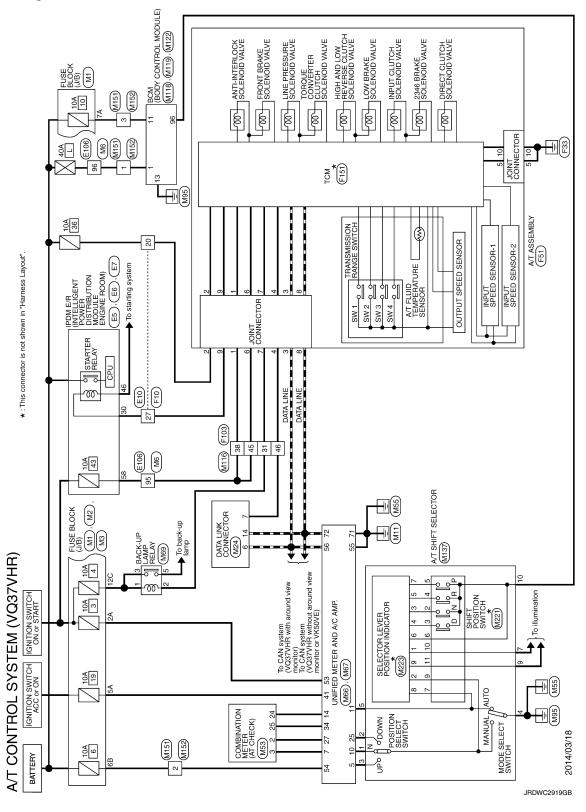
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Wiring Diagram - A/T CONTROL SYSTEM -

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| Connector No. E5 | 4 | × | - | Connector No. | П | E10 | 21 | > | - [With VQ engine] |
|--|----------|-----------------|--|---------------|-------------------|--|----|--------|--------------------|
| IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODILIE | 45 | O | | | _ | | 22 | 9 | - IWith VQ engine |
| Connector Name Ensine Room) | 46 | F | | Connec | Connector Name W | WIRE TO WIRE | 22 | * | - [With VK engine] |
| Connector Type THZ0FW-CS12-M4-1V | | | | Connect | Connector Type S/ | SAA36MB-RS8-SHZ8 | 23 | œ | - [With VQ engine] |
| | | | | <u>ן</u> | | | 23 | > | - [With VK engine] |
| | Conne | Connector No. | E7 | | _ | | 24 | o | - [With VQ engine] |
| | 0 | Connector Morne | PDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE | • | | 12 13 14 15 16 | 24 | > | - [With VK engine] |
| 2526272 | 3 | acion regime | | ė. | Ą. | 2 a a a a a a a a a a a a a a a a a a a | 25 | Pl | |
| 4 5 7 16 19 36 | Conne | Connector Type | TH20FW-CS12-M4 | | | # 11 10 3/4/2 2/4/2 9/4/2 # 12 10 3/4/2 12/12/3 12/13/3/4 | 26 | 97 | |
| | | | | | | | 27 | 9 | - [With VK engine] |
| | 1 | - | [| | | ्र १ ० वर्ष व्हिक्ता व्हित्रहर्मा हु | 27 | GR | - [With VQ engine] |
| | + | | | | | | 28 | GR | - [With VK engine] |
| Cinni Nama [Candination] | 1 | é | 535455565758 6870 74757677 | Termine | Terminal Color Of | Signal Name [Secondination] | 28 | ^ | - [With VQ engine] |
| orginal realite [openingatori] | | | 4849 5152 80 | ō N | Wire | orginal varie [opeomoatori] | 29 | Ь | |
| • | | | | - | 9 | - [With VQ engine] | 30 | 7 | - [With VQ engine] |
| | | | | - | SHIELD | - [With VK engine] | 30 | M | - [With VK engine] |
| | | | | 2 | ٦ | - [With VK engine] | 31 | 9 | - [With VK engine] |
| | Terminal | nal Color Of | | 2 | SHIELD | - [With VQ engine] | 31 | Μ | - [With VQ engine] |
| | Š | Wire | Signal Name [Specification] | က | BR | - [With VQ engine] | 32 | _ | - [With VK engine] |
| , | 48 | _ | , | က | ŋ | - [With VK engine] | 32 | > | - [With VQ engine] |
| | 49 | SB | - [With VQ engine] | 4 | BR | - [With VK engine] | 33 | 8 | - [With VK engine] |
| | 49 | H | - [With VK engine] | 4 | C IIII | - With VO engine | 8 | 3 | - With VO engine |
| , | 5 | H | | S | BR | - [With VQ engine] | 8 | BG | |
| | 55 | ŀ | | ď | c | - (With VK engine) | 35 | α | |
| | 52 | - | | 9 | 8 | - [With VK engine] | 98 | SHELD | |
| | 54 | H | | မ | ď | - [With VO engine] | 37 | SHELD | - [With VO engine] |
| | 22 | H | | _ | U | - [With VQ engine] | 37 | > | - [With VK engine] |
| | 26 | H | - [With VK engine] | _ | * | - [With VK engine] | 38 | _ | - [With VQ engine] |
| | 29 | ┝ | - [With VQ engine] | ω | SHIELD | - [With VK engine] | 38 | SHELD | - [With VK engine] |
| | 22 | 97 | | ω | Α | - [With VQ engine] | 39 | ۵ | - IWith VQ engine] |
| E6 | 28 | \vdash | | 6 | 3 | | 36 | > | - [With VK engine] |
| PDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE | 69 | > | , | 10 | ŋ | - [With VQ engine] | 40 | œ | - [With VQ engine] |
| ENGINE ROOM) | 70 | BG | | 10 | × | - [With VK engine] | 40 | SHIELD | - [With VK engine] |
| TH08FW-NH | 74 | | , | 7 | œ | - [With VQ engine] | 41 | × | - [With VQ engine] |
| | 75 | > | | = | * | - [With VK engine] | 41 | > | - [With VK engine] |
| Ē | 92 | ۵ | - [With VK engine] | 12 | H | - [With VQ engine] | 45 | 9 | - [With VQ engine] |
| <u>_</u> | 9/ | ^ | - [With VQ engine] | 12 | W | - [With VK engine] | 42 | SHIELD | - [With VK engine] |
| Ş | 77 | В | - [With VK engine] | 13 | 7 | - [With VQ engine] | 43 | Ø | - [With VQ engine] |
| 42 41 40 38 | 77 | _ | - [With VQ engine] | 13 | ď | - [With VK engine] | 43 | × | - [With VK engine] |
| 46 45 44 43 | 80 | Α | | 14 | 97 | | 44 | 9 | |
| | | | | 15 | BG | - [With VK engine] | 45 | _ | |
| | | | | 15 | BR | - [With VQ engine] | 46 | g | - [With VK engine] |
| Constitution Of constitution | | | | 16 | > | - [With VQ engine] | 46 | SHIELD | - [With VQ engine] |
| oighai raine [opecincation] | | | | 16 | W | - [With VK engine] | 47 | В | - [With VK engine] |
| | | | | 17 | ۵ | | 47 | > | - [With VQ engine] |
| | | | | 18 | × | | 48 | æ | - [With VQ engine] |
| | | | | 19 | × | | 48 | œ | - [With VK engine] |
| - | | | | 20 | BR | | 49 | 9 | - [With VQ engine] |
| | | | | | | | | | , |

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| | 4 L - [With VK engine] | 4 LG - [With VQ engine] | | α | œ | > | GR | Н | | œ | > | > | В | Ø | 97 | > ! | 4 LG - [With VQ engine] | - > | + | F | 88 | BR | 97 | 7 | Ь | GR | œ | BR | a. | 9 | Μ | 7 | | + | 7 | SHIELD | SHIELD | 7 Y - [With VK engine] | 8 SHIELD - [With VK engine] | | W | У | 9 | SHIELD | В | ٨ | GR | SHIELD | 3 R - [With VQ engine] |
|------------------------------|------------------------|-------------------------|--------------------|--------------------|----|-----|------|---------------|-----------------------------|-------------|--------------------------------|----|---------------|------------------|----|--|-------------------------|----------|-------------------|---|-------|--|----|-----------------------------|---------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------------------------|-----------------------------|--------------------|--------------------|----|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|------------------------|
| | 14 | 14 | 15 | 15 | 16 | 16 | 17 | 18 | 19 | 20 | 21 | 21 | 22 | 22 | 23 | 23 | 24 | #7 | 62 86 | 27 | 27 | 28 | 28 | 29 | 29 | 30 | 8 | 31 | 31 | 32 | 33 | 33 | 33 | 34 | 35 | 36 | 37 | 37 | 38 | 38 | 38 | 39 | 40 | 40 | 41 | 41 | 45 | 45 | 43 |
| | | | | | | | | | | • | | | F10 | WIRE TO WIRE | | SAA36FB-RS8-SHZ8 | | 2 1 | 16 15 14 13 3 | 2024 2022 20 10 10 10 10 10 10 10 10 10 10 10 10 10 | 1 298 | ्रहार श्री का स्वति वर्ष पत्र पत्र स्वति होता । । । | | Signal Nama [Consideration] | orginal realite [opecification] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VQ engine] | - [With VK engine] | [With VQ engine] | - [With VK engine] | - [With VK engine] | - [With VQ engine] | - | | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] |
| | PI | HR | GR | æ | gg | > | Μ | W | SHIELD | > | | ١ | | Connector Name V | Т | Connector Type S | | | ~ | 1 | | | | Terminal Color Of | Wire | 9 | SHIELD | SHELD | > | H | v | R | SHIELD | <u>_</u> | æ | œ | ≯ | g | ж | SHIELD | Μ | W | G | œ | > | а | > | _ | ۵ |
| | 88 | 90 | 91 | 92 | 93 | 98 | 96 | 97 | 88 | 100 | | | Connector No. | Connect | | Connect | Ą. | 季 | S | | | | | Termina | ģ | 1 | - | 2 | 2 | 3 | က | 4 | 4 | 2 | 2 | 9 | 9 | 7 | 7 | 8 | 8 | 6 | 10 | Ξ | 1 | 12 | 12 | 13 | 13 |
| | SHIELD - | . 9 | | BG . | | · · | BG . | Υ | GR . | 91 | . 91 | | | | | M . | | - 3 | 000 | | | . BB | | | | SB . | ^ | | LG . | - · | BG . | ٠. ا | SHIELD - | | 9 | | BR | | | Υ . | SB | | | | GR . | | ٠. | W | BG . |
| | 26 SF | 28 | 59 | 30 | | 33 | 34 | Н | \vdash | \vdash | \dashv | 42 | 43 | + | + | 46 | 4/ | 2 | + | + | 25 | H | H | 55 | 59 | 09 | 61 | 62 | 63 | \dashv | + | T | T | 7 | 72 | 73 | 74 | 92 | 77 | 78 | 80 | 81 | 82 | Н | Н | 85 | 98 | 87 | _ |
| A/T CONTROL SYSTEM (VQ37VHR) | - [With VQ engine] | - [With VK engine] | - [With VK engine] | - [With VQ engine] | | | | E106 | Connector Name WIRE TO WIRE | | Connector Type TH80FW-CS16-TM4 | | | | | 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | | | | Signal Name [Specification] | | | | | | | | | | | | | | | | | | | | - [With ICC] | - [Without ICC] | | - [With ICC] | - [Without ICC] | | - [With ICC] | - [Without ICC] | - [Without ICC] | - [With ICC] |
| CONT | В | 9 | В | SB | ď | | | | or Name | DI RAILIO | or Type | | _ | 7 | 5 | | | | Terminal Color Of | Wire | U | BG | SB | 97 | \ | W | O | > | œ | æ | <u>а</u> | O | œ | ≥ | SHELD | SB | _ | Ь | 9 | W | ٨ | BR | ď | > | ŋ | ٦ | Ъ | _ | > |
| Α̈́ | 20 | 20 | 21 | 51 | 52 | | | Connector No. | Connect | 5 | Connect | 4 | 厚 | | 4 | | | | Termine | g | - | 2 | 6 | 4 | 2 | 9 | 7 | 80 | 6 | 10 | 7 | 15 | 13 | 4 | 15 | 16 | 17 | 18 | 19 | 20 | 20 | 21 | 22 | 22 | 23 | 24 | 24 | 25 | 52 |

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|-----|--------------------|---------------------------------|----|--------------------------|--------------------|--------------------|--------------------|--|--|--------------------|--------------------|--------------------|--|----------------------------------|-----------------------|---------------------------------------|--------------------|--------------------|--------------------|--|--------------------------------|---------------------------|--------------------|--------------------|--------------------|----|-----------------------------------|----------------|-----------------------------------|----------------|-------------------|-----------------------------|-----------------------|---------------------------------------|----------------|-------------|----------------------------|----------------------------|--|-----------------------------|--------------------------------|--------------------------------|--------|----|----|----|----|---|
| | | Connector Name FUSE BLOCK (J/B) | () | 10FW-CS | | | 20 47 | 4838 | 9R 8R 7R 6R | | | | G emply leading | ognal value jopecilication | = | | 1 | | | | | | | | | | Connector Name FUSE BLOCK (J/B) | NS12FW-CS | | | _ _ _ |] | 70 M W W | 7 | | | soitootioo O omol A long O | ognal Name [opecification] | | · | | | | - | | | | |
| | . No. | . Name FU | | Connector Type NS10FW-CS | | | | | | | | | Color Of | Wire | PT | d. | 9 | 88 | > | _ | œ | æ | | | No. | | Name FU | | | | | | | | | | Color Of | Wire | _ | PI | œ | ۵ | В | BG | | | | |
| | Connector No. | Connecto | | Connecto | (| | • | Ν̈́ | | | | | Terminal | S. | 18 | 38 | 4B | 2B | 6B | 78 | 88 | 86 8 | | | Connector No. | | Connecto | Connector Type | | 13 | | Ϋ́ | | | | | Terminal | S. | 10C | 11C | 12C | 29 | 7C | ЭG | | | | |
| | F151 | TCM | | SP10FG | * | ≪ | | - | (12345) | (18 9 10) | | | 300000000000000000000000000000000000000 | olgitat i varire [opecification] | IGNITION POWER SUPPLY | BATTERY POWER SUPPLY (MEMORY BACK-UP) | CAN-H | K-LINE | GROUND | IGNITION POWER SUPPLY | BACK-UP LAMP RELAY | CAN-L | STARTER RELAY | GROUND | | | M1 | | Connector Name FUSE BLUCK (J/B) | NS06FW-M2 | | | | JA ZA 1A | OA 74 64 54 44 | | | | C. C | Signal Name [Specification] | | | | | | | • | |
| | Connector No. | Connector Name | | Connector Type SP10FG | • | _ | | Ž. | | | | | al Color Of | Wire | W | В | ď | 0 | O | æ | ٦ | HR | > | W/B | | | Connector No. | | tor Name | Connector Type | | _ | | 'n | | | | | Terminal Color Of | Wire | BG | 9 | ٦ | В | ۸ | Υ | œ | |
| | Connec | Connec | | Connec | (| | • | 7 | | | | | Terminal | Ž | - | 2 | 9 | 4 | 22 | 9 | 7 | ω | 6 | 19 | | | Connec | , | Connec | Connec | [| | _ | 15 | | | | | Termin | ġ | 4 | ZA ZA | 3A | 4A | 5A | 6A | 7A | 3 |
| | F103 | WIRE TO WIRE | | TK36FW-NS10 | | | | 3月13日 日本 | 독독독대학리대학(영 [2] [2] [2] [2] [2] [2] [2] [2] [2] [2] | | | | Grand Street Str | Signal Name [Specification] | | | - [With VK engine] | - [With VQ engine] | - [With VQ engine] | - [With VK engine] | , | - [With VK engine] | - [With VQ engine] | - [With VQ engine] | - [With VK engine] | | | • | , | | | | | | | | | | | | | | | | | | | |
| | | Connector Name | П | Connector Type | _ | _ | | <i>7</i> | | | | | al Color Of | Wire | Э | Μ | GR | œ | В | œ | В | Μ | \ | GR | _ | 0 | ۲ | ٦ | В | PΠ | ď | 97 | BR | Μ | \ | > | Ь | ٦ | Υ | > | | | | | | | | |
| ' | Connector No. | Connec | | Connec | (| | • | 13 | | | | | Termina | Ŋ. | 2 | 3 | 4 | 4 | 2 | 2 | 7 | o | თ | 9 | 9 | 19 | 20 | 27 | 78 | 59 | 31 | 8 | 35 | 98 | 37 | 38 | 43 | 44 | 45 | 46 | | | | | | | | |
| | - [With VK engine] | | | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VK engine] | - [With VQ engine] | | | | F51 | , and a second of the second o | Connector Name A/ ASSEMBLY | Connector Type RK10FG-DGY | | ≪ | | | (2 4 3 2 1) | 10 9 8 7 8 | -11 | | 0.00 | Signal Name [Specification] | IGNITION POWER SUPPLY | BATTERY POWER SUPPLY (MEMORY BACK-UP) | CAN-H | K-LINE | GROUND | IGNITION POWER SUPPLY | BACK-UP LAMP RELAY | CAN-L | STARTER RELAY [With VQ engine] | STARTER RELAY [With VK engine] | GROUND | | | | | |
| SON | ≥ | ၅ . | - | \neg | SHIELD | œ | W | 97 | œ | O | - | ۵ | ŋ | В | W | ď | | | Connector No. | : | stor Name | tor Type | | • | | S. | | | | | Terminal Color Of | Wire | > | œ | _ | > | В | > | ď | ۵ | GR | FG | В | | | | | |
| 7 | 43 | 4 | 42 | 46 | 46 | 47 | 47 | 48 | 48 | 49 | 49 | 20 | 20 | 51 | 21 | 25 | | | Connec | | Connec | Connec | | Œ | 手 | HS | | | | | Termin | Š | - | 2 | က | 4 | 2 | 9 | 7 | 80 | ō | 6 | 10 | | | | | |

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| Cornector Name COMBINATION METER |
|--|
| |
| 78 Y 80 BG 81 L 82 W 83 Y 84 L 85 P |
| Construction Cons |
| 20 W 21 BR 21 R 22 L 22 R 23 G |

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| - | 11 R BAT (FUSE) | 13 B GROUND | 15 Y ACC IND | | UL. | 19 SB ROOM LAMP TIMER | | Connector No M122 | 1 9 | DOM (BODT CONTROL MODULE) | Connector Type TH40FB-NH | | | | 101 102 103 103 101 101 101 101 101 103 | | Ferminal Color Of Signal Name [Specification] | \pm | Ha Ha | 76 V DRIVER DOOR ANT- | LG DRI | Υ. | + | ¥ :: | 81 W NAIS ANI AMP. 82 P IGN RELAY (F/B) CONT | GR KFYLF | HB. | 88 V COMBI SW INPUT 3 | 90 P CAN-L | 7 | LG | > | BG | 96 GR A/T SHIFT SELECTOR POWER SUPPLY | ĸ | G B | SB | BG | BR KEYLESS | PT | œ | O | 110 G HAZARD SW | |
|---------------|-------------------|---|------------------------------------|-----------------------------|-----------------------|-----------------------|-----|---|-----|---------------------------|--------------------------|---|--------------------------|---|---|----------------------|---|-----------------------------|----------------------------|--------------------------------------|---------------|--------|---|--------|--|----------|--|--------------------------------------|------------|-------|----|---|------------------------|---------------------------------------|-------|------------------------|------------|----------|---|----------------------------------|---|----------------------------------|---------------------------------------|-------------------------------|
| ŀ | 34 LG | 35 BR - | 36 W - | 37 Y - | 38 BG · | 43 P - | + | 45 G | | 3 | Connector No. M118 | Connector Name BCM (BODY CONTROL MODULE) | Connector Type M03FB-LC | 1 | | H.S. | | | Terminal Color Of | No. Wire Signal Name [Specification] | 1 W BAT (F/L) | > | 3 BG POWER WINDOW POWER SUPPLY (RAP) | | Connector No. M119 | | Connector Name BCM (BODY CONTROL MODULE) | Connector Type NS16FW-CS | 4 | | | 7 | 11 13 15 17 18 19 | | | | nal C | | 4 P INT ROOM LAMP PWR SUPPLY (BAT SAVE) | 5 V PASSENGER DOOR UNLOCK OUTPUT | > | V ALL DOOR, FUEL LID LOCK OUTPUT | G DRIVER DOOR, FUEL LID UNLOCK OUTPUT | 10 BR REAR DOOR UNLOCK OUTPUT |
| | Connector No. M69 | Commence Months DAVI DI AMAD DIS AN | | Connector Type MS02FL-M2-LC | 4 | · B | | | | 1 W 7 | | Terminal Color Of Signal Name [Specification] No. | 1 R | + | 3 R | | Connector No. M116 | Connector Name WIRE TO WIRE | Connector Type TK36MW-NS10 | (| | | 12345 12日本高級の開発の開発の開発の関係の関係の関係の対象の対象の対象の対象を対象を表現し、12日本の対象を対象を対象を表現を表現を表現を表現を表現を表現を表現を表現を表現を表現を表現を表現を表現を | | | | Terminal Color Of | No. Wire Signal Name [Specification] | 2 W - | 3 г | | œ | 5 B - [With VQ engine] | 5 R - [With VK engine] | 7 B . | 9 L - [With VK engine] | \dashv | \dashv | 19 BG - | 20 Y - | | + | + | 31 W |
| CONTROL SYSTE | L ION SENSO | 23 Y AT SNOW SWITCH SIGNAL | 25 V MANUAL MODE SHIFT DOWN SIGNAL | 9 | LG COMMUNICATION SIGN | R VEHICLE SPEED S | > : | 34 Y COMMUNICATION SIGNAL (AMP.:->LCD) 38 I RIOWER MOTOR CONTROL SIGNAL | , | | Connector No. M67 | Connector Name UNIFIED METER AND A/C AMP. | Connector Type TH32FW-NH | 8 | | 41 42 43 44 45 46 47 | [57] 58[59 63 63 69 70 71 72 | | Ferminal Color Of | | V ACC POWER | \ } | + | ا ا | 45 P AMBIENI SENSOR SIGNAL 46 BG SUNLOAD SENSOR SIGNAL | > | G IGNITION POW | BG | В | L CAN | W | 8 | GR | _ | BR | SB SUNI | R ION MODE | BG | 69 L A/C LAN SIGNAL | R EACH DOOR MOTOR | В | 72 P CAN-L | | |

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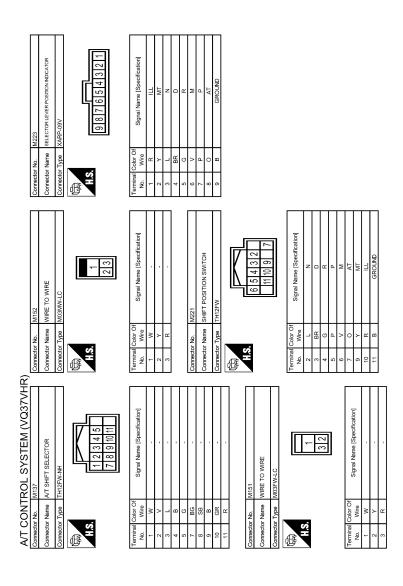
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Fail-Safe

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TCM has the electrical fail-safe mode. The mode is divided into a maximum of 3 phases (1st Fail-Safe, 2nd Fail-Safe and Final Fail-Safe) and functions so that the operation can be continued even if the signal circuit of the main electronically controlled input/output parts is damaged.

Even if the electronic circuit is normal, the fail-safe mode may start under special conditions (such as when the brake pedal is depressed suddenly from a hard wheel spin status to stop the rotation of wheels). In this case, turn the ignition switch OFF and back to ON after 5 seconds to resume the normal shift pattern.

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Consequently, the customer's vehicle may already return to the normal condition. Refer to TM-9, "Work Flow".

| 1st fail-safe | The mode that the vehicle can stop safely, to prompt the driver to stop if the malfunction occurs and to shift to 2nd Fail-Safe early. It shifts to 2nd Fail-Safe or Final Fail-Safe after the vehicle stopped. |
|-----------------|---|
| 2nd fail-safe | The mode that the vehicle shifts to Final Fail-Safe without changing the behavior, by identifying the malfunctioning parts in the condition that the driving force required for the driving is secured. |
| Final fail-safe | Selects the shifting pattern that the malfunctioning parts identified at 1st and 2nd Fail-Safe are not used, and then secure the driving force that is required for the driving. The mode that the shifting performance does not decrease by normal shift control. |

FAIL-SAFE FUNCTION

| | | Vehicle behavior for 1st fail- | Vehicle behavior for 2nd fail- | Vehicle behavior for final fail- |
|-------|------------------------------------|--|--------------------------------|---|
| DTC | Vehicle condition | safe | safe | safe |
| P0615 | | Starter is disabled | _ | Starter is disabled |
| P0705 | _ | Fixed in the "D" position (The shifting can be performed) Lock-up is prohibited when 30 km/h (19 MPH) or less The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed Manual mode is prohibited Shift position indicator is switched OFF Starter relay is switched OFF (starter is disabled) Back-up lamp is OFF Large shift shock | _ | Fixed in the "D" position (The shifting can be performed) Lock-up is prohibited when 30 km/h (19 MPH) or less The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed Manual mode is prohibited Shift position indicator is switched OFF Starter relay is switched OFF (starter is disabled) Back-up lamp is OFF Large shift shock |
| P0710 | Between the gears of 1 - 2 - 3 | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | _ | The shifting between the gears of 1 - 2 - 3 can be performed |
| | Between the gears of 4 - 5 - 6 - 7 | Fix the gear while drivingManual mode is prohibited | _ | Manual mode is prohibited |
| P0717 | Between the gears of 1 - 2 - 3 | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | _ | The shifting between the gears of 1 - 2 - 3 can be performed |
| | Between the gears of 4 - 5 - 6 - 7 | Fix the gear while drivingManual mode is prohibited | _ | Manual mode is prohibited |
| P0720 | Between the gears of 1 - 2 - 3 | Only downshift can be performed Manual mode is prohibited A vehicle speed signal from the unified meter and A/C amp. is regarded as an effective signal | _ | The shifting between the gears of 1 - 2 - 3 can be performed |
| | Between the gears of 4 - 5 - 6 - 7 | Fix the gear at driving Manual mode is prohibited A vehicle speed signal from the unified meter and A/C amp. is regarded as an effective signal | _ | Manual mode is prohibited |

| DTC | Vehicle | condition | Vehicle behavior for 1st fail- safe | Vehicle behavior for 2nd fail- safe | Vehicle behavior for final fail- safe |
|---|-------------------------------------|--|--|---|---|
| | Small gear ra | atio difference | Engine torque limit: Max 150Nm | _ | Engine torque limit: Max 150Nm |
| P0729 P0731 | | Neutral mal- function be- tween the gears of 1 - 2 - 3 and 7 | Locks in 2GR, 3GR or 4GR Manual mode is prohibited | _ | Locks in 1GR The shifting between the gears of 1 - 2 can be performed The shifting between the gears of 1 - 2 - 3 can be performed The shifting between the gears of 4 - 5 - 6 can be performed Manual mode is prohibited |
| P0732 P0733 P0734 P0735 P1734 | Great gear ratio differ- ence | Other than the above | Locks in 1GR, 2GR, 3GR, 4GR, 5GR or 6GR Fix the gear while driving Manual mode is prohibited | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | Locks in 1GR The shifting between the gears of 1 - 2 can be performed The shifting between the gears of 1 - 2 - 3 can be performed The shifting between the gears of 2 - 3 - 4 can be performed The shifting between the gears of 3 - 4 can be performed The shifting between the gears of 3 - 4 can be performed The shifting between the gears of 4 - 5 - 6 can be performed Manual mode is prohibited |
| P0730 | | _ | Locks in 5GR, 6GR or 7GR Manual mode is prohibited | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | Locks in 1GR The shifting between the gears of 1 - 2 can be performed The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited |
| P0740 | | _ | Lock-up is prohibitedSlip lock-up is prohibited | _ | Lock-up is prohibited Slip lock-up is prohibited |
| P0744 | | _ | Lock-up is prohibitedSlip lock-up is prohibited | _ | Lock-up is prohibited Slip lock-up is prohibited |
| P0750 P0775 P0795 P2713 P2722 P2731 P2807 | | _ | Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 7GR Manual mode is prohibited | _ | Locks in 1GR The shifting between the gears of 1 - 2 - 3 can be performed The shifting between the gears of 3 - 4 - 5 can be performed The shifting between the gears of 4 - 5 - 6 can be performed The shifting between the gears of 1 - 2 - 3 - 4 - 5 - 6 can be performed Manual mode is prohibited |
| P0780 | | _ | Locks in 3GR Manual mode is prohibited | _ | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited |

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| DTC | Vehicle condition | Vehicle behavior for 1st fail- safe | Vehicle behavior for 2nd fail- safe | Vehicle behavior for final fail- safe |
|-----------------------|------------------------------------|--|--|---|
| P1705 | _ | Downshift when accelerator pedal is depressed is prohibited Upshift when accelerator pedal is released is prohibited Manual mode is prohibited | Downshift when accelerator pedal is depressed is prohibited Upshift when accelerator pedal is released is prohibited Manual mode is prohibited | Downshift when accelerator pedal is depressed is prohibited Upshift when accelerator pedal is released is prohibited Manual mode is prohibited |
| P1730 | _ | Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR Manual mode is prohibited | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | Locks in 1GR The shifting between the gears of 2 - 3 - 4 can be performed The shifting between the gears of 3 - 4 can be performed The shifting between the gears of 4 - 5 - 6 can be performed Manual mode is prohibited |
| P1815 | _ | Manual mode is prohibited | _ | Manual mode is prohibited |
| U0100 U0300 | Between the gears of 1 - 2 - 3 | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | _ | The shifting between the gears of 1 - 2 - 3 can be performed Line pressure is set to the |
| U1000 | Between the gears of 4 - 5 - 6 - 7 | Fix the gear at driving Manual mode is prohibited | _ | maximum hydraulic pres- sure • Manual mode is prohibited |
| P0720 and P1721 | _ | Locks in 5GR | _ | Locks in 5GR |

Protection Control

The TCM becomes the protection control status temporarily to protect the safety when the safety of TCM and transmission is lost. It automatically returns to the normal status if the safety is secured. The TCM has the following protection control.

REVERSE INHIBIT CONTROL

Intercepts the torque transmission and shift to the neutral status if the selector lever is shifted to "R" position while the vehicle moves forward at the vehicle speed 10 km/h (7 MPH) or more.

| Malfunction detection condition | Vehicle speed: 10 km/h (7 MPH) or more |
|---------------------------------|--|
| Control at malfunction | Neutral |
| Normal return condition | Vehicle speed: 8 km/h (5 MPH) or less |
| Normal return condition | Engine speed: 2,200 rpm or less |
| Vehicle behavior | The torque transmission cannot be performed There is a shock just before a vehicle stop |

1ST ENGINE BRAKE PROTECTION CONTROL

Controls the engine brake so as not to make effective by turning the front brake solenoid output to OFF when each solenoid becomes the electricity pattern of 1st engine brake during driving at the vehicle speed 25 km/h or more in any positions other than "R" position or 1GR.

| Malfunction detection condition | Select lever and gear: Except for "R" position and 1GR and Vehicle speed: More than 25 km/h (16 MPH) |
|---------------------------------|--|
| Control at malfunction | Front brake solenoid output signal; OFF |

| Normal return condition | Other than malfunction detection condition |
|-------------------------|--|
| Vehicle behavior | Does not exist |

TCM HIGH TEMPERATURE PROTECTION CONTROL

Limit the accelerator opening and forcibly control the vehicle to the low torque driving when the electronic substrate in TCM reaches the high temperature.

| Malfunction detection condition | TCM electronic substrate temperature • 145°C (293°F) and 120 seconds or • 150°C (302°F) |
|---------------------------------|---|
| Control at malfunction | Accelerator opening: 0.5/8 or less |
| Normal return condition | TCM electronic substrate temperature: Less than 140°C (284°F) and Vehicle speed: 5 km/h (3 MPH) or less |
| Vehicle behavior | Accelerator opening: output torque of approximately 0.5/8 |

DTC Inspection Priority Chart

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

| Priority | Detected items (DTC) | Reference |
|----------|----------------------------|---------------------|
| 1 | U0100 LOST COMM (ECM A) | TM-70, "DTC Logic" |
| ı | U1000 CAN COMM CIRCUIT | TM-72, "DTC Logic" |
| | P0615 STARTER RELAY | TM-73, "DTC Logic" |
| | P0705 T/M RANGE SWITCH A | TM-75, "DTC Logic" |
| | P0710 FLUID TEMP SENSOR A | TM-76, "DTC Logic" |
| | P0717 INPUT SPEED SENSOR A | TM-79, "DTC Logic" |
| | P0720 OUTPUT SPEED SENSOR | TM-81, "DTC Logic" |
| | P0740 TORQUE CONVERTER | TM-99, "DTC Logic" |
| 0 | P0745 PC SOLENOID A | TM-103, "DTC Logic" |
| 2 | P0750 SHIFT SOLENOID A | TM-104, "DTC Logic" |
| | P0775 PC SOLENOID B | TM-105, "DTC Logic" |
| | P0795 PC SOLENOID C | TM-108, "DTC Logic" |
| | P2713 PC SOLENOID D | TM-120, "DTC Logic" |
| | P2722 PC SOLENOID E | TM-121, "DTC Logic" |
| | P2731 PC SOLENOID F | TM-122, "DTC Logic" |
| | P2807 PC SOLENOID G | TM-123, "DTC Logic" |
| | P0729 6GR INCORRECT RATIO | TM-85, "DTC Logic" |
| | P0730 INCORRECT GR RATIO | TM-87, "DTC Logic" |
| | P0731 1GR INCORRECT RATIO | TM-89, "DTC Logic" |
| | P0732 2GR INCORRECT RATIO | TM-91, "DTC Logic" |
| | P0733 3GR INCORRECT RATIO | TM-93, "DTC Logic" |
| 3 | P0734 4GR INCORRECT RATIO | TM-95, "DTC Logic" |
| | P0735 5GR INCORRECT RATIO | TM-97, "DTC Logic" |
| | P0744 TORQUE CONVERTER | TM-101, "DTC Logic" |
| | P0780 SHIFT | TM-106, "DTC Logic" |
| | P1730 INTERLOCK | TM-113, "DTC Logic" |
| | P1734 7GR INCORRECT RATIO | TM-115, "DTC Logic" |

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| Priority | Detected items (DTC) | Reference |
|----------|----------------------------|---------------------|
| | U0300 CAN COMM DATA | TM-71, "DTC Logic" |
| | P0725 ENGINE SPEED | TM-83, "DTC Logic" |
| 4 | P1705 TP SENSOR | TM-109, "DTC Logic" |
| | P1721 VEHICLE SPEED SIGNAL | TM-111, "DTC Logic" |
| | P1815 M-MODE SWITCH | TM-117, "DTC Logic" |

DTC Index

NOTE:

If some DTCs are displayed at the same time, perform inspections one by one based on the priority as per the following list. Refer to TM-156, "DTC Inspection Priority Chart".

| ltomo | D | TC ^{*2} | |
|---------------------------------|--|----------------------------------|---------------|
| Items (CONSULT screen terms) | MIL*1, "ENGINE" with CONSULT or GST | CONSULT only "TRANS- MISSION" | Reference |
| STARTER RELAY | _ | P0615 | <u>TM-73</u> |
| T/M RANGE SWITCH A | P0705 | P0705 | <u>TM-75</u> |
| FLUID TEMP SENSOR A | P0710 | P0710 | <u>TM-76</u> |
| INPUT SPEED SENSOR A | P0717 | P0717 | <u>TM-79</u> |
| OUTPUT SPEED SENSOR | P0720 | P0720 | <u>TM-81</u> |
| ENGINE SPEED | _ | P0725 | <u>TM-83</u> |
| 6GR INCORRECT RATIO | P0729 | P0729 | <u>TM-85</u> |
| INCORRECT GR RATIO | P0730 | P0730 | <u>TM-87</u> |
| 1GR INCORRECT RATIO | P0731 | P0731 | TM-89 |
| 2GR INCORRECT RATIO | P0732 | P0732 | <u>TM-91</u> |
| 3GR INCORRECT RATIO | P0733 | P0733 | <u>TM-93</u> |
| 4GR INCORRECT RATIO | P0734 | P0734 | <u>TM-95</u> |
| 5GR INCORRECT RATIO | P0735 | P0735 | <u>TM-97</u> |
| TORQUE CONVERTER | P0740 | P0740 | <u>TM-99</u> |
| TORQUE CONVERTER | P0744 | P0744 | <u>TM-101</u> |
| PC SOLENOID A | P0745 | P0745 | <u>TM-103</u> |
| SHIFT SOLENOID A | P0750 | P0750 | <u>TM-104</u> |
| PC SOLENOID B | P0775 | P0775 | <u>TM-105</u> |
| SHIFT | P0780 | P0780 | <u>TM-106</u> |
| PC SOLENOID C | P0795 | P0795 | <u>TM-108</u> |
| TP SENSOR | _ | P1705 | <u>TM-109</u> |
| VEHICLE SPEED SIGNAL | _ | P1721 | <u>TM-111</u> |
| INTERLOCK | P1730 | P1730 | <u>TM-113</u> |
| 7GR INCORRECT RATIO | P1734 | P1734 | <u>TM-115</u> |
| M-MODE SWITCH | _ | P1815 | <u>TM-117</u> |
| PC SOLENOID D | P2713 | P2713 | <u>TM-120</u> |
| PC SOLENOID E | P2722 | P2722 | <u>TM-121</u> |
| PC SOLENOID F | P2731 | P2731 | <u>TM-122</u> |
| PC SOLENOID G | P2807 | P2807 | <u>TM-123</u> |
| LOST COMM (ECM A) | U0100 | U0100 | <u>TM-70</u> |

| | DT | C*2 | |
|------------------------|--|----------------------------------|--------------|
| (CONSULT screen terms) | MIL*1, "ENGINE" with CONSULT or GST | CONSULT only "TRANS- MISSION" | Reference |
| CAN COMM DATA | _ | U0300 | <u>TM-71</u> |
| CAN COMM CIRCUIT | _ | U1000 | <u>TM-72</u> |

^{*1:} Refer to TM-63, "Diagnosis Description".

^{*2:} These numbers are prescribed by SAE J2012.

SYSTEM SYMPTOM

[7AT: RE7R01A (VQ37VHR)]

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< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Table INFOID:0000000010578990

- The diagnostics item numbers show the sequence for inspection. Inspect in order from item 1.
- Perform diagnoses of symptom table 1 before symptom table 2.

SYMPTOM TABLE 1

| | | | | | | | | | | | | | [| Diag | gnos | stic | iten | n | | | | | | | | _ | TM |
|------------------|------------------|----------|--------------|--|-----------------|---------------------|----------------------|-----------------------------------|---------------------|--------------------|------------------------------|-----------------|---------------------------|--------------------|------------------|------------------------------|---------------------------------|--------------------------|----------------------------|--|-----------------------------|------------------------------|---------------------------|-------------------------------|---------------|-------------------|-------------|
| | | Sym | ptom | | Control linkage | Output speed sensor | Vehicle speed signal | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | Line pressure solenoid valve | Torque converter solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | CAN communication | E F G |
| | | | | | TM-181 | 18-MT | TM-111 | TM-109 | TM-75 | TM-79 | 92-MT | TM-125 | TM-75 | Z11-MT | SEC-55 | TM-103 | 66-ML | TM-121 | TM-108 | TM-120 | TM-105 | TM-123 | TM-122 | TM-104 | EZ-MT | TM-72 | I |
| | | Shift po | int is high | in "D" position. | | 1 | | 2 | | | 3 | | | | | | | | | | | | | | | | |
| | | Shift po | int is low i | n "D" position. | | 1 | | 2 | | | | | | | | | | | | | | | | | | | J |
| | | | | → "D" position | 4 | | | 7 | 6 | | 6 | | 5 | | | 3 | | 2 | | | | | | 3 | | 1 | |
| | | | | → "R" position | 4 | | | 7 | 6 | | 6 | | 5 | | | 3 | | | | | | 2 | | | | 1 | K |
| | | | | 1GR ⇔ 2GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | | | | | | 3 | | | 1 | 1 |
| | | | | 2GR ⇔ 3GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | | | | | 3 | | | | 1 | |
| | | | | 3GR ⇔ 4GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | 3 | | 3 | | | | | | 1 | L |
| | Driving | | When | 4GR ⇔ 5GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | | | | 3 | | 3 | | | 1 | |
| | perfor- mance | Large | shifting | 5GR ⇔ 6GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | | | | | 3 | 3 | | | 1 | В. Л |
| Poor | manoo | shock | gears | 6GR ⇔ 7GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | | 3 | | | | 3 | | | 1 | M |
| perfor- mance | | | | Downshift when accelerator ped- al is depressed | | 3 | | 2 | 4 | 3 | 3 | | | | | | | | | | | | | | | 1 | Ν |
| | | | | Upshift when accelerator pedal is released | | 3 | | 2 | 4 | 3 | 3 | | | | | | | | | | | | | | | 1 | 0 |
| | | | | Lock-up | | 4 | | 2 | 4 | 4 | 4 | | | | | | 3 | | | | | | | | | 1 | |
| | | Judder | | Lock-up | | | | 2 | 1 | 1 | 4 | | | | | | 3 | | | | | | | | | | |
| | | • | | In "R" position | | 2 | | | 1 | | | | | | | | | | | | | | | | | | Р |
| | Strange | noise | | In "N" position | | 2 | | | 1 | | | | | | | | | | | | | | | | | | |
| | Suange | 110156 | | In "D" position | | 2 | | | 1 | | | | | | | | | | | | | | | | | | |
| | | | | Engine at idle | | 2 | | | 1 | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | Dia | gno | stic | ite | m | | | | | | | | |
|---------------|-----------------|--------------|------------------|-----------------|---------------------|----------------------|-----------------------------------|---------------------|--------------------|------------------------------|-----------------|---------------------------|--------------------|------------------|------------------------------|---------------------------------|--------------------------|----------------------------|--|-----------------------------|------------------------------|---------------------------|-------------------------------|---------------|-------------------|
| | | Symptom | | Control linkage | Output speed sensor | Vehicle speed signal | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | Line pressure solenoid valve | Torque converter solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | CAN communication |
| | | | | TM-181 | TM-81 | TM-111 | TM-109 | TM-75 | 6Z-MT | TM-76 | TM-125 | TM-75 | TM-117 | SEC-55 | TM-103 | TM-99 | TM-121 | TM-108 | TM-120 | TM-105 | TM-123 | TM-122 | TM-104 | TM-73 | TM-72 |
| | | | Locks in 1GR | | 1 | | | | | | | | | | | | | 1 | | 1 | | 1 | | | |
| | | | Locks in 2GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | Locks in 3GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | Locks in 4GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | Locks in 5GR | | | | | | | | 1 | | | | | | | | | | | | | | |
| | | | Locks in 6GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | Locks in 7GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1GR → 2GR | | 1 | | | | | | | | | | | | | 1 | | 1 | | 1 | | | |
| | | "D" position | 2GR → 3GR | | | | | | | | | | | | | | | | | | 1 | | | | ı |
| | | D position | 3GR → 4GR | | 2 | | | | 2 | 2 | | | | | | | 2 | 2 | 2 | 2 | | | | | 1 |
| | | | 4GR → 5GR | | | | | | | | | | | | | | | | | | 1 | 1 | | | ļ |
| Func- tion | Gear does no | | 5GR → 6GR | | | | | | | | | | | | | | | | | | 1 | | | | ļ |
| trouble | change | | 6GR → 7GR | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | | | 1 | | |
| | | | 5GR → 4GR | | | | | | | | | | | | | | | | | 1 | | | | | ļ |
| | | | 4GR → 3GR | | | | | | | | | | | | | | 1 | | 1 | | | | 1 | | ļ |
| | | | 3GR → 2GR | | | | | | | | | 1 | | | | | | | | | 1 | | | | |
| | | | 2GR → 1GR | | | | | | | | | 1 | | | | | | | | | 1 | 1 | | | ļ |
| | | | Does not lock-up | | 2 | | | 2 | 2 | | 4 | 5 | | 3 | 2 | 2 | 2 | 2 | | 2 | 2 | 2 | | | 1 |
| | | | 1GR ⇔ 2GR | | 3 | | | | 3 | 3 | | 3 | | | 3 | 3 | 3 | 3 | | 3 | | 3 | 3 | | 1 |
| | | | 2GR ⇔ 3GR | | 3 | | | | 3 | 3 | | 3 | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 1 |
| | | "M" posi- | 3GR ⇔ 4GR | | 3 | | | | 3 | 3 | | 3 | | | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | 3 | | 1 |
| | | tion | 4GR ⇔ 5GR | | 3 | | | | 3 | 3 | | 3 | 2 | | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | 3 | | 1 |
| | | | 5GR ⇔ 6GR | | 3 | | | | 3 | 3 | | 3 | 2 | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 1 |
| | | | 6GR ⇔ 7GR | | 3 | | | | 3 | 3 | | 3 | 2 | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 1 |

| | | | | | | | | | | | | | [| Diag | gnos | stic | iten | n | | | | | | | | _ |
|----------------------------|------------------|---------------|--------------|--------------------|-----------------|---------------------|----------------------|-----------------------------------|---------------------|--------------------|------------------------------|-----------------|---------------------------|--------------------|------------------|------------------------------|--|--------------------------|----------------------------|--|-----------------------------|------------------------------|---------------------------|-------------------------------|---------------|-------------------|
| | | Symp | tom | | Control linkage | Output speed sensor | Vehicle speed signal | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | Line pressure solenoid valve | Torque converter clutch solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | CAN communication |
| | | | | | TM-181 | TM-81 | TM-111 | TM-109 | TM-75 | EV-W | TM-76 | TM-125 | TM-75 | TM-117 | SEC-55 | TM-103 | 1M-99 | TM-121 | TM-108 | TM-120 | TM-105 | TM-123 | TM-122 | TM-104 | TM-73 | TM-72 |
| | | | | 1GR ⇔ 2GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | | | 2 | | | 1 |
| | | | When | 2GR ⇔ 3GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | | 2 | | | | 1 |
| | | Slip | shift- | 3GR ⇔ 4GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | 2 | | | | 2 | | 1 |
| | | Silp | ing gears | 4GR ⇔ 5GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | 2 | | 2 | | | 1 |
| | | | years | 5GR ⇔ 6GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | | 2 | 2 | | | 1 |
| _ | | | | 6GR ⇔ 7GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | 2 | | | | 2 | | | 1 |
| Func- tion trou- ble | Poor shifting | | "D" pos | sition → "M" posi- | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | 3 | 3 | | | | | | 1 |
| 5.0 | | En- | | 7GR → 6GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | 3 | | | | 3 | | | 1 |
| | | gine | | 6GR → 5GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | | | | 3 | 3 | | | 1 |
| | | brake does | "M" posi- | 5GR → 4GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | | | 3 | | 3 | | | 1 |
| | | not | tion | 4GR → 3GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | 3 | | 3 | | | | 3 | | 1 |
| | | work | | 3GR → 2GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | | 3 | | 3 | | | | 1 |
| | | | | 2GR → 1GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | 3 | | | | 3 | | | 1 |

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|----------------------------|------------------------------------|---------|--|-----------------|---------------------|----------------------|-----------------------------------|---------------------|--------------------|------------------------------|-----------------|---------------------------|--------------------|------------------|------------------------------|--|--------------------------|----------------------------|--|-----------------------------|------------------------------|---------------------------|-------------------------------|---------------|-------------------|
| | | Symptom | | Control linkage | Output speed sensor | Vehicle speed signal | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | Line pressure solenoid valve | Torque converter clutch solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | CAN communication |
| | | | | TM-181 | TM-81 | TM-111 | TM-109 | TM-75 | 6Z-MT | 92-M1 | TM-125 | TM-75 | TM-117 | SEC-55 | TM-103 | TM-99 | TM-121 | TM-108 | TM-120 | TM-105 | TM-123 | TM-122 | TM-104 | TM-73 | TM-72 |
| | | | With selector lever in "D" position, acceleration is extremely poor. | 5 | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | | | | | 2 | | 1 |
| | | | With selector lever in "R" position, acceleration is extremely poor. | 5 | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | | 2 | | 2 | | 1 |
| | | | While starting off by accelerating in 1GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | | | | | 2 | | 1 |
| | | | While accelerating in 2GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | | | | 2 | 2 | | 1 |
| Func- tion trou- ble | Poor power trans- mission | Slip | While accelerating in 3GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | | | 2 | 2 | | | 1 |
| | | | While accelerating in 4GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | 2 | | 2 | 2 | | | 1 |
| | | | While accelerating in 5GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | 2 | 2 | 2 | | 2 | | 1 |
| | | | While accelerating in 6GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | 2 | 2 | | 2 | 2 | | 1 |
| | | | While accelerating in 7GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | 2 | 2 | 2 | | | 2 | | 1 |
| | | | Lock-up | | 3 | | | 3 | 3 | 4 | | | | | 2 | 2 | | | | | | | | | 1 |
| | | | No creep at all. Extremely large creep. | | | | | 1 | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |

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|------------------|-----------------------------------|---|-----------------|---------------------|----------------------|-----------------------------------|---------------------|--------------------|------------------------------|-----------------|---------------------------|--------------------|------------------|------------------------------|--|--------------------------|----------------------------|--|-----------------------------|------------------------------|---------------------------|-------------------------------|---------------|-------------------|
| | Sympt | om | Control linkage | Output speed sensor | Vehicle speed signal | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | Line pressure solenoid valve | Torque converter clutch solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | CAN communication |
| | | | TM-181 | TM-81 | TM-111 | TM-109 | TM-75 | 62-MT | TM-76 | TM-125 | TM-75 | TM-117 | SEC-55 | TM-103 | TM-99 | TM-121 | TM-108 | TM-120 | TM-105 | TM-123 | TM-122 | TM-104 | TM-73 | TM-72 |
| | | Vehicle cannot run in all position. | 3 | | | | | | | | 2 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Driving is not possible in "D" position. | 3 | | | | | | | | 2 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Driving is not possible in "R" position. | 3 | | | | | | | | 2 | | | 1 | | | | | | 1 | | 1 | | |
| | Power transmis- sion cannot be | Engine stall | | 4 | | 5 | 5 | | | 6 | | | 3 | | 2 | | | | | | | | 1 | |
| | performed | Engine stalls when selector lever shifted "N" \rightarrow "D" or "R". | | 4 | | 5 | 5 | | | | 3 | | | | 2 | | | | | | | | 1 | |
| | | Engine does not start in "N" or "P" position. | 3 | | | | | | | 1 | 2 | | | | | | | | | | | | 1 | |
| Function trouble | | Engine starts in position other than "N" or "P". | 3 | | | | | | | | 2 | | | | | | | | | | | | 1 | |
| | | Vehicle does not enter parking condition. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | | Parking condition is not cancelled. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | | Vehicle runs with A/T in "P" position. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | Poor operation | Vehicle moves forward with the "R" position. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | | Vehicle runs with A/T in "N" position. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | | Vehicle moves backward with the "D" position. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |

SYMPTOM TABLE 2

| | | | | | | | | | | Diag | nosti | c iten | n | | | | | |
|------------------|-----------------|----------------|---------------|---|----------|------------------|------------|-------------|-----------------------------|--------------|---------------|------------|---------------|--------------------|--------------------|--------|---------------|------------------------------|
| | | S | Symptom | | Oil pump | Torque converter | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | 1st one-way clutch | 2nd one-way clutch | gear | control valve | Parking component |
| | | | | | TM-276 | TM-217 | TM-217 | TM-217 | TM-298 | TM-288 | TM-300 | TM-276 | TM-217 | TM-217 | TM-293 | TM-217 | TM-186 | TM-191 (2WD) TM-217 (AWD) |
| | | Shift po | oint is high | in "D" position. | | | | | | | | | | | | | | |
| | | Shift po | int is low | in "D" position. | | | | | | | | | | | | | | |
| | | | | → "D" position | 1 | | 2 | | | | | | | | | | 2 | |
| | | | | → "R" position | 1 | | | | | | | | 1 | | | | 2 | |
| | | | | 1GR ⇔ 2GR | | | | | | | | 1 | | | | | 2 | |
| | | | | 2GR ⇔ 3GR | | | | | | | 1 | | | | | | 2 | |
| | | | | 3GR ⇔ 4GR | | | 2 | | 1 | | | | | | | | 2 | |
| | Driving perfor- | | When | 4GR ⇔ 5GR | | | | | | 1 | | 1 | | | | | 2 | |
| | mance | Large shock | shift- ing | 5GR ⇔ 6GR | | | | | | | 1 | 1 | | | | | 2 | |
| Poor | | OHOOK | gears | 6GR ⇔ 7GR | | | | 1 | | | | 1 | | | | | 2 | |
| perfor- mance | | | | Downshift when accelerator pedal is depressed | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |
| | | | | Upshift when accelerator pedal is released | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |
| | | | | Lock-up | | 1 | | | | | | | | | | | 2 | |
| | | Judder | | Lock-up | | 1 | | | | | | | | | | | 2 | |
| | | | | In "R" position | 1 | 1 | | | | | | | 1 | | | 1 | 2 | |
| | Strange | noise | | In "N" position | 1 | 1 | | | | | | | | | | 1 | 2 | |
| | Stratige | 110136 | | In "D" position | 1 | 1 | 1 | | | | | | | | | 1 | 2 | |
| | | | | Engine at idle | 1 | 1 | | | | | | | | | | 1 | 2 | |

^{*:} Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-35. "Cross-Sectional View".

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| Symptom | | | | Oil pump | Torque converter | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | 1st one-way clutch | 2nd one-way clutch | gear | control valve | Parking component | | |
| | | | | TM-276 | TM-217 | TM-217 | TM-217 | TM-298 | TM-288 | TM-300 | TM-276 | TM-217 | TM-217 | TM-293 | TM-217 | TM-186 | TM-191 (2WD) TM-217 (AWD) | | |
| | | | Locks in 1GR | | | | 1 | | 1 | | 1 | | | | | 2 | | | |
| | | | Locks in 2GR | | | | | | | | | | | | | 1 | | | |
| | | | | Locks in 3GR | | | | | | | | | | | | | 1 | | |
| | | | Locks in 4GR | | | | | | | | | | | | | 1 | | | |
| | | | Locks in 5GR | | | | | | | | | | | | | 1 | | | |
| | | | Locks in 6GR | | | | | | | | | | | | | 1 | | | |
| | | "D" posi- | | | Locks in 7GR | | | | | | | | | | | | | 1 | |
| | | | | | 1GR → 2GR | | | | 1 | | 1 | | 1 | | | | | 2 | |
| | | | | 2GR → 3GR | | | | | | | 1 | | | | | | 2 | | |
| | | tion | 3GR → 4GR | | | 2 | 1 | 1 | 1 | | | | | | | 2 | | | |
| | | | 4GR → 5GR | | | | | | | 1 | 1 | | | | | 2 | | | |
| Func- tion | Gear does no | | 5GR → 6GR | | | | | | | 1 | | | | | | 2 | | | |
| trouble | change | | 6GR → 7GR | | | 2 | 1 | 1 | 1 | | | | | | | 2 | | | |
| | | | 5GR → 4GR | | | | | | 1 | | | | | | | 2 | | | |
| | | | 4GR → 3GR | | | 2 | | 1 | | | | | | | | 2 | | | |
| | | | 3GR → 2GR | | | | | | | 1 | | | | 1 | | 2 | | | |
| | | | 2GR → 1GR | | | | | | | 1 | 1 | | 1 | | | 2 | | | |
| | | | Does not lock-up | | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | | | |
| | | | 1GR ⇔ 2GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | | | |
| | | | 2GR ⇔ 3GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | | | |
| | | "M" posi- | 3GR ⇔ 4GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | | | |
| | | tion | 4GR ⇔ 5GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | | | |
| | | | 5GR ⇔ 6GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | | | |
| | | | 6GR ⇔ 7GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | | | |

 $[\]hbox{*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to $\underline{$TM$-35, $"Cross-Sectional View"}$.}$

| | | | | | | | | Diagnostic item | | | | | | | | | | | | |
|---------|--------|-------------|---------------------|----------------|----------|------------------|------------|-----------------|-----------------------------|--------------|---------------|------------|---------------|--------------------|--------------------|--------|---------------|------------------------------|---|--|
| Symptom | | | | | Oil pump | Torque converter | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | 1st one-way clutch | 2nd one-way clutch | gear | control valve | Parking component | | |
| | | | | | TM-276 | TM-217 | TM-217 | TM-217 | TM-298 | TM-288 | TM-300 | TM-276 | TM-217 | TM-217 | TM-293 | TM-217 | TM-186 | TM-191 (2WD) TM-217 (AWD) | | |
| | | | | 1GR ⇔ 2GR | 1 | | | | | | | 1 | | 1 | | | 2 | | | |
| | | | When shifting gears | | | 2GR ⇔ 3GR | 1 | | | | | | 1 | | | | | | 2 | |
| | | Slip | | 3GR ⇔ 4GR | 1 | | 2 | | 1 | | | | | | | | 2 | | | |
| | | Slip | | 4GR ⇔ 5GR | 1 | | | | | 1 | | 1 | | | | | 2 | | | |
| | | | | 5GR ⇔ 6GR | 1 | | | | | | 1 | 1 | | | | | 2 | | | |
| Func- | Poor | | | 6GR ⇔ 7GR | 1 | | | 1 | | | | 1 | | | | | 2 | | | |
| tion | shift- | | "D" position | → "M" position | 1 | | | 1 | 1 | | | | | 1 | 1 | | 2 | | | |
| trouble | ing | | | 7GR → 6GR | 1 | | | 1 | | | | 1 | | | | | 2 | | | |
| | | En- gine | | 6GR → 5GR | 1 | | | | | | 1 | 1 | | | | | 2 | | | |
| | | brake | "M" posi- | 5GR → 4GR | 1 | | | | | 1 | | 1 | | | | | 2 | | | |
| | | does not | tion | 4GR → 3GR | 1 | | 2 | | 1 | | | | | | | | 2 | | | |
| | | work | | 3GR → 2GR | 1 | | | | 1 | | 1 | | | 1 | 1 | | 2 | | | |
| | | | | 2GR → 1GR | 1 | | | 1 | | | | 1 | | 1 | | | 2 | | | |

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|---------------|------------------------------|----------------|--|---|------------------|------------|-------------|-----------------------------|--------------|---------------|------------|---------------|--------------------|--------------------|--------|---------------|------------------------------|
| | Symptom | | | | Torque converter | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | 1st one-way clutch | 2nd one-way clutch | gear | control valve | Parking component |
| | | | | | TM-217 | TM-217 | TM-217 | TM-298 | TM-288 | TM-300 | TM-276 | TM-217 | TM-217 | TM-293 | TM-217 | TM-186 | TM-191 (2WD) TM-217 (AWD) |
| | | | With selector lever in "D" position, acceleration is extremely poor. | 1 | 1 | 2 | | | | | | | 1 | | 1 | 2 | |
| | | | With selector lever in "R" position, acceleration is extremely poor. | 1 | 1 | | | | | | | 1 | 1 | 1 | 1 | 2 | |
| | | | While starting off by accelerating in 1GR, engine races. | 1 | 1 | 2 | | | | | | | 1 | 1 | 1 | 2 | |
| | | | While accelerating in 2GR, engine races. | 1 | | 2 | | | | | 1 | | | 1 | 1 | 2 | |
| Func- tion | Poor pow- er trans- | Slip | While accelerating in 3GR, engine races. | 1 | | 2 | | | | 1 | 1 | | | | 1 | 2 | |
| trouble | mis- sion | | While accelerating in 4GR, engine races. | 1 | | | | 1 | | 1 | 1 | | | | 1 | 2 | |
| | | | While accelerating in 5GR, engine races. | 1 | | | | 1 | 1 | 1 | | | | | 1 | 2 | |
| | | | While accelerating in 6GR, engine races. | 1 | | | | 1 | 1 | | 1 | | | | 1 | 2 | |
| | | | While accelerating in 7GR, engine races. | 1 | | | 1 | 1 | 1 | | | | | | | 2 | |
| | | | Lock-up | 1 | 1 | | | | | | | | | | 1 | 2 | |
| | | | No creep at all. Extremely large creep. | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 2 | 1 |

^{*:} Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-35. "Cross-Sectional View".

| | | | | | | | | С | iagn | ostic | item |) | | | | |
|----------|--------------------------------|---|--------|------------------|------------|-------------|-----------------------------|--------------|---------------|------------|---------------|--------|--------------------|--------------------|---------------|------------------------------|
| Symptom | | | | Torque converter | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | gear | 1st one-way clutch | 2nd one-way clutch | control valve | Parking component |
| | | | TM-276 | TM-217 | TM-217 | TM-217 | TM-298 | TM-288 | TM-300 | TM-276 | TM-217 | TM-217 | TM-293 | TM-217 | TM-186 | TM-191 (2WD) TM-217 (AWD) |
| | | Vehicle cannot run in all position. | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | | | 1 | 2 | 1 |
| | | Driving is not possible in "D" position. | | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 2 | 1 |
| | | Driving is not possible in "R" position. | | | | | | | | | 1 | 1 | 1 | 1 | 2 | 1 |
| | Power trans- mission cannot | Engine stall | | 1 | | | | | | | | | | | | |
| | be performed | Engine stalls when selector lever shifted "N" \rightarrow "D" or "R". | | 1 | | | | | | | | | | | | |
| | | Engine does not start in "N" or "P" position. | | 1 | | | | | | | | | | | | |
| Function | | Engine starts in position other than "N" or "P". | | | | | | | | | | | | | | |
| trouble | | Vehicle does not enter parking condition. | | | | | | | | | | | | | | 1 |
| | | Parking condition is not can- celled. | | | | | | | | | | | | | | 1 |
| | Poor operation | Vehicle runs with A/T in "P" position. | | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | | | | 2 | 1 |
| | Poor operation | Vehicle moves forward with the "R" position. | | | 2 | 1 | 1 | 1 | 1 | 1 | | | | | 2 | |
| | | Vehicle runs with A/T in "N" position. | | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | | | | 2 | |
| | | Vehicle moves backward with the "D" position. | | | | | | | | | 1 | | | | 2 | |

^{*:} Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-35, "Cross-Sectional View".

PRECAUTION

PRECAUTIONS

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

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

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

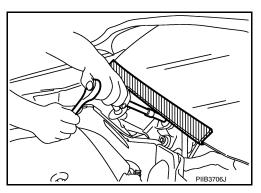
WARNING:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the
 ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with
 a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing
 serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

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



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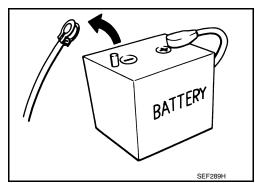
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General Precautions

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• Turn ignition switch OFF and disconnect the battery cable from the negative terminal before connecting or disconnecting the A/T assembly harness connector. Because battery voltage is applied to TCM even if ignition switch is turned OFF.



ENGINE

SOON

- Perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE" after performing each TROUBLE DIAGNOSIS. If the repair is completed DTC should not be displayed in the "DTC CONFIRMATION PROCEDURE".
- Always use the specified brand of ATF. Refer to MA-17, "FOR NORTH AMERICA: Fluids and Lubricants" (For North America), MA-18, "FOR MEXICO: Fluids and Lubricants" (For Mexico).
- Use lint-free paper not cloth rags during work.
- Dispose of the waste oil using the methods prescribed by law, ordinance, etc. after replacing the ATF.
- · Before proceeding with disassembly, thoroughly clean the outside of the transmission. 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 paper or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transmission.
- 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 be replaced any time the A/T is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Never use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Clean or replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to TM-170, "Service Notice or Precaution".
- · When the A/T drain plug is removed, only some of the ATF is drained. Old ATF will remain in torque converter and ATF cooling system.
 - Always follow the procedures under "Changing" when changing ATF. Refer to TM-174, "Changing".
- Occasionally, the parking gear may be locked with the torque insufficiently released, when stopping the vehicle by shifting the selector lever from "D" or "R" to "P" position with the brake pedal depressed. In this case, the shock with a thud caused by the abrupt release of torque may occur when shifting the selector lever from "P" position to other positions.

However, this symptom is not a malfunction which results in the damage of parts.

Service Notice or Precaution

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ATF COOLER SERVICE

If ATF contains frictional material (clutches, bands, etc.), or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T fluid cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. For A/T fluid cooler cleaning procedure, refer to TM-177, "Cleaning". For radiator replacement, refer to CO-16, "Exploded View".

PRECAUTIONS

< PRECAUTION > [7AT: RE7R01A (VQ37VHR)]

Precautions for Removing Battery Terminal

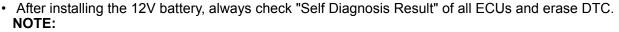
 When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

NOTE:

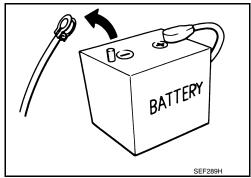
ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
 NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.



The removal of 12V battery may cause a DTC detection error.



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PREPARATION

PREPARATION

Special Service Tool

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| ne actual shapes of TechMate tools m | nay differ from those of special service tools il | lustrated here. |
|--|---|---|
| Tool number (TechMate No.) Tool name | | Description |
| ST33400001 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia. | a b NT086 | Installing rear oil seal (2WD) Installing oil pump housing oil seal |
| KV31102400 (J-34285 and J-34285-87) Clutch spring compressor a: 320 mm (12.60 in) b: 174 mm (6.85 in) | a a b b b c NT428 | Installing reverse brake return spring retainer Removing and installing 2346 brake spring retainer er |
| KV31103800 Clutch spring compressor 1. M12×1.75P | JSDIA1749ZZ | Removing and installing front brake spring retainer |
| ST25850000 (J-25721-A) Sliding hammer a: 179 mm (7.05 in) b: 70 mm (2.76 in) c: 40 mm (1.57 in) d: M12X1.75P | a d d d d d d d d d d d d d d d d d d d | Remove oil pump assembly |

Commercial Service Tool

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| Tool name | | Description | |
|----------------------------------|-------------|-----------------------------------|--|
| Power tool | | Loosening bolts and nuts | |
| | | | |
| | | | |
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| | 13 | | |
| | | | |
| | PBIC0190E | | |
| Orift a: 22 mm (0.87 in) dia. | | Installing manual shaft oil seals | |
| 1. 22 mm (0.07 m) dia. | | | |
| | | | |
| | | | |
| | a | | |
| | NT083 | | |
| Drift | | Installing rear oil seal (AWD) | |
| a: 64 mm (2.52 in) dia. | _ | , , | |
| | | | |
| | | | |
| | a | | |
| | | | |
| | SCIA5338E | | |
| Pin punch | | Remove retaining pin | |
| a: 4 mm (0.16 in) dia. | | | |
| | | | |
| | a | | |
| | | | |
| | NT410 | | |
| . 315268E000* | | A/T fluid changing and adjustment | |
| O-ring | 1 | | |
| 2. 310811EA5A* Charging pipe | 2\ | | |
| Charging pipe | | | |
| | | | |
| | | | |
| | JSDIA1332ZZ | | |

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

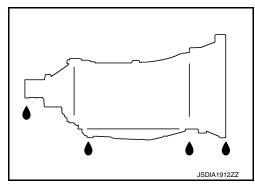
PERIODIC MAINTENANCE

A/T FLUID

Inspection INFOID:000000010578997

FLUID LEAKAGE

- Check transmission surrounding area (oil seal and plug etc.) for fluid leakage.
- If anything is found, repair or replace damaged parts and adjust A/ T fluid level. Refer to TM-176, "Adjustment".



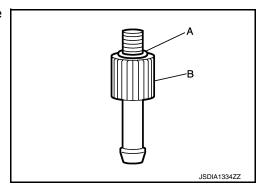
Changing

Recommended ATF and fluid capacity

: Refer to MA-17, "FOR NORTH AMERICA: Fluids and Lubricants" (For North America), MA-18, "FOR MEXICO: Fluids and Lubricants" (For Mexico).

CAUTION:

- Use only recommended ATF. Never mix with other ATF.
- Using ATF other than recommended ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.
- When filling ATF, be careful not to scatter heat generating parts such as exhaust.
- 1. Step 1
- a. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).



- 2. Step 2
- a. Use CONSULT to check that the ATF temperature is 40°C (104°F) or less.
- b. Lift up the vehicle.
- c. Remove the drain plug from the oil pan, and then drain the ATF.
- d. When the ATF starts to drip, temporarily tighten the drain plug to the oil pan.
 NOTE:
 - Never replace drain plug and drain plug gasket with new ones yet.
- e. Remove overflow plug from oil pan.

Install the charging pipe (A) to the overflow plug hole. **CAUTION:**

Tighten the charging pipe by hand.

Install the bucket pump hose (B) to the charging pipe. CAUTION:

Insert the bucket pump hose all the way to the end of the charging pipe.

- h. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.
- Remove the bucket pump hose to remove the charging pipe. and then temporarily tighten the overflow plug to the oil pan. CAUTION:

Quickly perform the procedure to avoid ATF leakage from the oil pan.

- Lift down the vehicle. į.
- k. Start the engine and wait for approximately 3 minutes.
- I. Stop the engine.
- 3. Step 3
- Repeat "Step 2". a.
- Final Step
- a. Use CONSULT to check that the ATF temperature is 40°C (104°F) or less.
- b. Lift up the vehicle.
- Remove the drain plug from the oil pan, and then drain the ATF.
- d. When the ATF starts to drip, tighten the drain plug to the oil pan to the specified torque. Refer to TM-186, "Exploded View".

CAUTION:

Never reuse drain plug and drain plug gasket.

- e. Remove overflow plug from oil pan.
- Install the charging pipe (A) to the overflow plug hole.

CAUTION:

Tighten the charging pipe by hand.

g. Install the bucket pump hose (B) to the charging pipe.

CAUTION:

Insert the bucket pump hose all the way to the end of the charging pipe.

- h. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.
- Remove the bucket pump hose to remove the charging pipe, and then temporarily tighten the overflow plug to the oil pan.

CAUTION:

Quickly perform the procedure to avoid ATF leakage from the oil pan.

- Lift down the vehicle. j.
- k. Start the engine.
- Make the ATF temperature approximately 40°C (104°F).

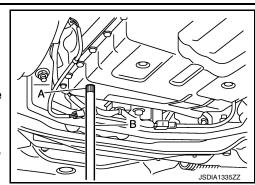
NOTE:

The ATF level is greatly affected by the temperature. Always check the ATF temperature on "ATF TEMP 1" of "Data Monitor" using CONSULT.

- m. Park vehicle on level surface and set parking brake.
- Shift the selector lever through each gear position. Leave selector lever in "P" position.
- o. Lift up the vehicle when the ATF temperature reaches 40°C (104°F), and then remove the overflow plug from the oil pan.
- p. When the ATF starts to drip, tighten the overflow plug to the oil pan to the specified torque. Refer to TM-186, "Exploded View".

CAUTION:

Never reuse overflow plug.



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2015 QX70

TM-175 Revision: 2015 February

Adjustment

Recommended ATF and fluid capacity

: Refer to MA-17, "FOR NORTH AMERICA: Fluids and Lubricants" (For North America), MA-18, "FOR MEXICO: Fluids and Lubricants" (For Mexico).

CAUTION:

- Use only recommended ATF. Never mix with other ATF.
- Using ATF other than recommended ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.
- When filling ATF, be careful not to scatter heat generating parts such as exhaust.
- Always maintain the ATF temperature within between 35°C (95°F) and 45°C (113°F) while checking with CONSULT when the ATF level adjustment is performed.
- 1. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).
- 2. Start the engine.
- 3. Make the ATF temperature approximately 40°C (104°F). **NOTE:**

The ATF level is greatly affected by the temperature. Always check the ATF temperature on "ATF TEMP 1" of "Data Monitor" using CONSULT.

- 4. Park vehicle on level surface and set parking brake.
- 5. Shift the selector lever through each gear position. Leave selector lever in "P" position.
- 6. Lift up the vehicle.
- 7. Check the ATF leakage from transmission.
- 8. Remove overflow plug from oil pan.
- 9. Install the charging pipe (A) to the overflow plug hole. **CAUTION:**

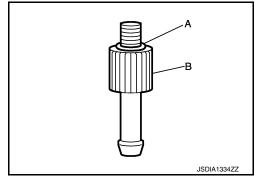
Tighten the charging pipe by hand.

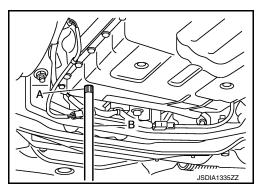
Install the bucket pump hose (B) to the charging pipe.CAUTION:

Insert the bucket pump hose all the way to the end of the charging pipe.

- 11. Fill approximately 0.5 liters (1/2 US qt, 1/2 lmp qt) of the ATF.
- 12. Check that the ATF leaks when removing the charging pipe and the bucket pump hose. If the ATF does not leak, refill the ATF.
- 13. When the ATF starts to drip, tighten the overflow plug to the oil pan to the specified torque. Refer to <u>TM-186, "Exploded View"</u>. CAUTION:

Never reuse overflow plug.





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A/T FLUID COOLER

Cleaning INFOID:0000000010579000

Whenever an A/T is replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned. Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of ATF. In either case, malfunction of the newly serviced A/T may result.

Debris, if present, may build up as ATF enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

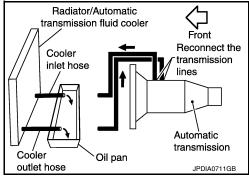
CLEANING PROCEDURE

- 1. Position an oil pan under the A/T inlet and outlet cooler hoses.
- 2. Identify the inlet and outlet fluid cooler hoses.
- 3. Disconnect the A/T fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or by-pass valve.

NOTE:

Replace the cooler hoses if rubber material from the hose remains on the tube fitting.

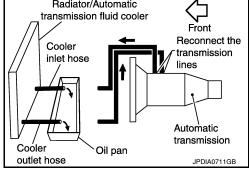
4. Allow any ATF that remains in the cooler hoses to drain into the oil pan.

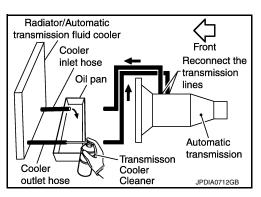


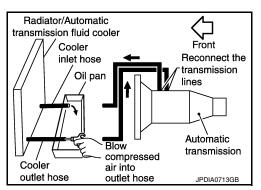
5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

CAUTION:

- Wear safety glasses and rubber gloves when spraying the **Transmission Cooler Cleaner.**
- Spray Transmission Cooler Cleaner only with adequate ventilation.
- · Avoid contact with eyes and skin.
- Never breath vapors or spray mist.
- 6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until ATF flows out of the cooler inlet hose for 5 seconds.
- Insert the tip of an air gun into the end of the cooler outlet hose.
- 8. Wrap a shop rag around the air gun tip and of the cooler outlet hose.
- 9. Blow compressed air regulated to 5 to 9 kg/cm² (71 to 128 psi) through the cooler outlet hose for 10 seconds to force out any remaining ATF.
- 10. Repeat steps 5 through 9 three additional times.
- 11. Position an oil pan under the banjo bolts that connect the A/T fluid cooler steel lines to the A/T.
- 12. Remove the banjo bolts.
- 13. Flush each steel line from the cooler side back toward the A/T by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
- 14. Blow compressed air regulated to 5 to 9 kg/cm² (71 to 128 psi) through each steel line from the cooler side back toward the A/T for 10 seconds to force out any remaining ATF.
- 15. Ensure all debris is removed from the steel cooler lines.
- 16. Ensure all debris is removed from the banjo bolts and fittings.
- Perform "DIAGNOSIS PROCEDURE".







TM-177 **Revision: 2015 February** 2015 QX70

DIAGNOSIS PROCEDURE

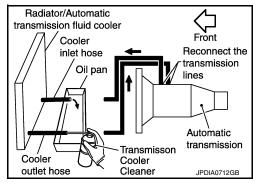
NOTE:

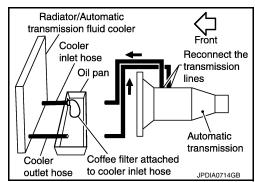
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

- 1. Position an oil pan under the A/T inlet and outlet cooler hoses.
- 2. Clean the exterior and tip of the cooler inlet hose.
- Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

CAUTION:

- Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.
- Spray Transmission Cooler Cleaner only with adequate ventilation.
- · Avoid contact with eyes and skin.
- · Never breath vapors or spray mist.
- 4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until ATF flows out of the cooler inlet hose for 5 seconds.
- 5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.

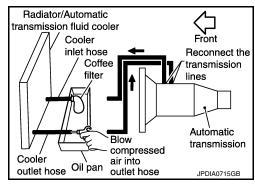


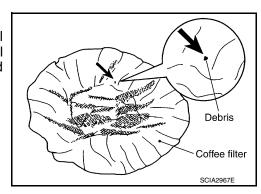


- 6. Insert the tip of an air gun into the end of the cooler outlet hose.
- Wrap a shop rag around the air gun tip and end of cooler outlet hose.
- 8. Blow compressed air regulated to 5 to 9 kg/cm² (71 to 128 psi) through the cooler outlet hose to force any remaining ATF into the coffee filter.
- Remove the coffee filter from the end of the cooler inlet hose.
- 10. Perform "INSPECTION PROCEDURE".

INSPECTION PROCEDURE

- 1. Inspect the coffee filter for debris.
- a. If small metal debris less than 1 mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.





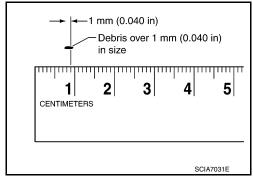
A/T FLUID COOLER

< PERIODIC MAINTENANCE >

Inspection

[7AT: RE7R01A (VQ37VHR)]

b. If one or more pieces of debris are found that are over 1 mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the A/T fluid cooler is not serviceable. The A/T fluid cooler/radiator must be replaced and the inspection procedure is ended. Refer to <u>CO-16</u>, "<u>Exploded View</u>".



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After performing all procedures, ensure that all remaining oil is cleaned from all components.

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STALL TEST

Inspection and Judgment

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[7AT: RE7R01A (VQ37VHR)]

INSPECTION

- 1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
- Drive for about 10 minutes to warm up the vehicle so that the A/T fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of ATF. Replenish if necessary.
- 3. Securely engage the parking brake so that the tires do not turn.
- 4. Start the engine, apply foot brake, and place selector lever in "D" position.
- 5. Gradually press down the accelerator pedal while holding down the foot brake.
- Quickly read off the stall speed, and then quickly release the accelerator pedal. CAUTION:

Never hold down the accelerator pedal for more than 5 seconds during this test.

Stall speed: Refer to TM-303, "Stall Speed".

- 7. Shift the selector lever to "N" position.
- 8. Cool down the ATF.

CAUTION:

Run the engine at idle for at least 1 minute.

9. Repeat steps 5 through 8 with selector lever in "R" position.

JUDGMENT OF STALL TEST

| | Selector le | ver position | Possible location of malfunction | | | | | | |
|-------------|-------------|--------------|---|--|--|--|--|--|--|
| | "D" and "M" | "R" | i ossible location of manufaction | | | | | | |
| | Н | 0 | Low brake 1st one-way clutch 2nd one-way clutch | | | | | | |
| Stall speed | 0 | Н | Reverse brake 1st one-way clutch 2nd one-way clutch | | | | | | |
| | L L • E | | Engine and torque converter one-way clutch | | | | | | |
| | Н | Н | Line pressure low | | | | | | |

O: Stall speed within standard value position

Stall test standard value position

| Does not shift-up "D" or "M" position $1 \rightarrow 2$ | Slipping in 2GR, 3GR 4GR or 6GR | 2346 brake slippage |
|---|----------------------------------|--------------------------------------|
| Does not shift-up "D" or "M" position $2 \rightarrow 3$ | Slipping in 3GR, 4GR or 5GR | Direct clutch slippage |
| Does not shift-up "D" or "M" position $3 \rightarrow 4$ | Slipping in 4GR, 5GR, 6GR or 7GR | High and low reverse clutch slippage |
| Does not shift-up "D" or "M" position $4 \rightarrow 5$ | Slipping in 5GR, 6GR or 7GR | Input clutch slippage |
| Does not shift-up "D" or "M" position $5 \rightarrow 6$ | Slipping in 2GR, 3GR, 4GR or 6GR | 2346 brake slippage |
| Does not shift-up "D" or "M" position $6 \rightarrow 7$ | Slipping in 7GR | Front brake slippage |

H: Stall speed higher than standard value

L: Stall speed lower than standard value

A/T POSITION

Inspection and Adjustment

INFOID:0000000010579003

INSPECTION

- 1. Place selector lever in "P" position, and turn ignition switch ON (engine stop).
- 2. Check that selector lever can be shifted to other than "P" position when brake pedal is depressed. Also check that selector lever can be shifted from "P" position only when brake pedal is depressed.
- Shift the selector lever and check for excessive effort, sticking, noise or rattle.
- 4. Confirm that the selector lever stops at each position by feeling the engagement when it is moved through all the positions. Check whether or not the actual position the selector lever matches the position shown by the shift position indicator and the A/T body.
- The method of operating the lever to individual positions correctly is shown in the figure.
- 6. When selector button is pressed in "P", "R", or "N" position without applying forward/backward force to selector lever, check button operation for sticking.
- Confirm that the back-up lamps illuminate only when lever is placed in the "R" position. Confirm that the back-up lamps do not illuminate when selector lever is pushed against "R" position in the "P" or "N" position.
- Confirm that the engine can only be started with the selector lever in the "P" and "N" positions. (With selector lever in the "P" position, engine can be started even when selector lever is moved forward and backward.)
- to operate selector lever, while depressing the brake pedal.

 Press selector button to operate selector lever.

 Selector lever can be operated without pressing selector button.

: Press selector button

9. Make sure that A/T is locked completely in "P" position.

10. DS mode must be indicated on the combination meter when the selector lever is shifted to the manual shift gate. When the selector lever is shifted to the "+" or "-" side in the DS mode, manual mode should be indicated on the combination meter.

In addition, a set shift position must be changed when the selector lever is shifted to the "+" or "-" side in the manual mode. (Only while driving.)

ADJUSTMENT

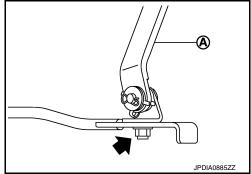
- Loosen nut (←).
- 2. Place manual lever and selector lever in "P" position.
- 3. While pressing lower lever (A) toward rear of vehicle (in "P" position direction), tighten nut to specified torque. Refer to TM-182, "Exploded View".

CAUTION:

Be careful not to touch the control rod while pressing lower lever of A/T shift selector assembly.

NOTE:

Press lower lever of A/T shift selector assembly with a force of approximately 1 kg (9.8 N).



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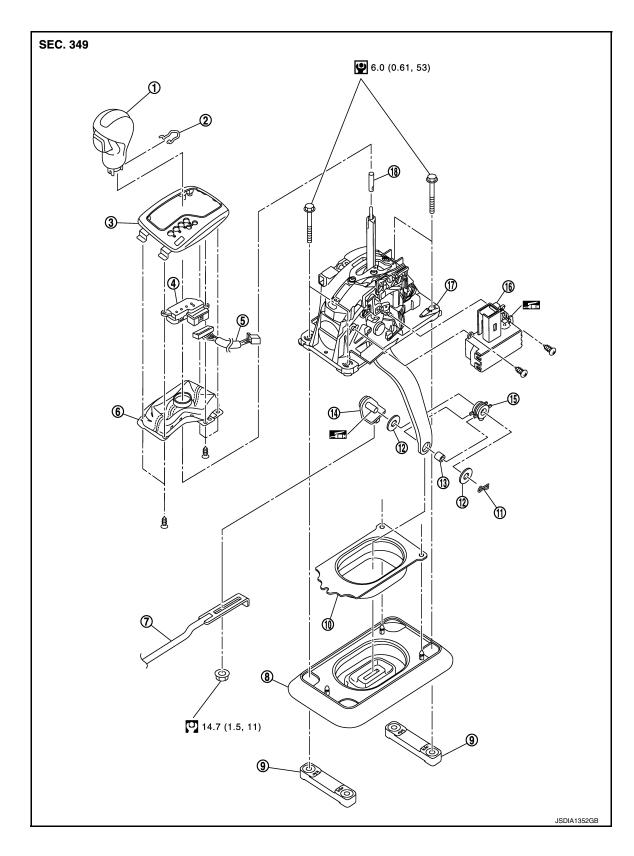
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REMOVAL AND INSTALLATION

A/T SHIFT SELECTOR

Exploded View



A/T SHIFT SELECTOR

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

| 1. | Selector lever knob | 2. | Lock pin | 3. | Indicator plate | Α |
|-----|-----------------------------------|-----|-----------------------------|-----|-----------------|---|
| 4. | Selector lever position indicator | 5. | Harness connector | 6. | Insert finisher | |
| 7. | Control rod | 8. | Dust cover | 9. | Bracket | |
| 10. | Dust cover plate | 11. | Snap pin | 12. | Washer | В |
| 13. | Collar | 14. | Pivot pin | 15. | Insulator | |
| 16. | Shift lock unit | 17. | A/T shift selector assembly | 18. | Adapter | |
| | | | | | | |

Apply multi-purpose grease.

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

Removal and Installation

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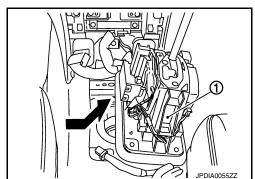
REMOVAL

- 1. Shift the selector lever to "P" position.
- Remove control rod from A/T shift selector.
- 3. Shift the selector lever to "N" position.
- 4. Remove knob cover (A) below selector lever downward.
- 5. Pull lock pin (1) out of selector lever knob (2).
- Remove selector lever knob.
- Remove center console assembly. Refer to <u>IP-23, "Exploded</u> View".

CAUTION:

When disconnecting selector lever position indicator connector from shift position switch, never twist or apply an excessive load to the connector.

- Remove rear ventilator duct 1. Refer to <u>VTL-10, "Exploded View"</u>.
- 9. Disconnect A/T shift selector harness connector.
- 10. Remove harness clips from A/T shift selector assembly.
- 11. Shift the selector lever to "P" position.
- 12. Remove A/T shift selector assembly mounting bolts.
- 13. Slightly lift the A/T shift selector assembly (1) and slide it rightward. Then pull it out in the diagonally right direction.
- 14. Remove adapter from A/T shift selector assembly.
- 15. Remove dust cover and dust cover plate from A/T shift selector assembly.
- 16. Remove dust cover from dust cover plate.
- 17. Remove shift lock unit from A/T shift selector assembly.
- 18. Remove brackets from vehicle floor panel.
- 19. Remove selector lever position indicator from console finisher assembly.
- a. Remove indicator assembly from console finisher assembly. Refer to IP-23, "Exploded View".
- b. Remove insert finisher from indicator assembly.
- Remove selector lever position indicator.



INSTALLATION

CAUTION:

Apply multi-purpose grease on the pin surface (that slides after installing a collar) of the pivot pin. Note the following, and Install in the reverse order of removal.

- Refer to the followings when installing selector lever knob to A/T shift selector assembly.
- 1. Insert lock pin to selector lever knob.
- Install selector lever knob over selector lever until a click is felt. CAUTION:

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A/T SHIFT SELECTOR

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

- Install it straight, and never tap or apply any shock to install it.
- Never press selector button.
- When installing control rod to A/T shift selector assembly, refer to "ADJUSTMENT". Refer to <u>TM-181,</u> "Inspection and Adjustment".

Inspection and Adjustment

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INSPECTION AFTER INSTALLATION

Check A/T position after adjusting A/T position. Refer to TM-181, "Inspection and Adjustment".

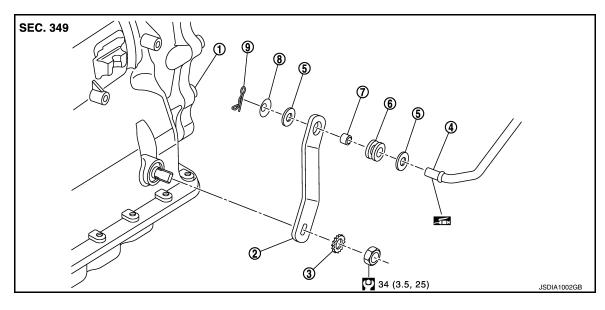
ADJUSTMENT AFTER INSTALLATION

Adjust A/T position. Refer to TM-181, "Inspection and Adjustment".

INFOID:0000000010579007

CONTROL ROD

Exploded View



- 1. A/T assembly
- 4. Control rod
- 7. Collar

- 2. Manual lever
- 5. Washer
- 8. Conical washer

- 3. Lock washer
- 6. Insulator
- 9. Snap pin

: Apply multi-purpose grease.

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

Removal and Installation

REMOVAL

- 1. Shift the selector lever to "P" position.
- Disconnect A/T shift selector and control rod. Refer to <u>TM-182</u>, "Exploded View".
- Remove manual lever from A/T assembly.
- 4. Remove control rod from manual lever.

INSTALLATION

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

CAUTION:

Apply multi-purpose grease on the pin surface (that slides after installing collar) of the tip of the control rod.

When installing control rod to A/T shift selector assembly, refer to "ADJUSTMENT". Refer to <u>TM-181</u>.
 "Inspection and Adjustment".

Inspection and Adjustment

INSPECTION AFTER INSTALLATION

Check A/T position after adjusting A/T position. Refer to TM-181, "Inspection and Adjustment".

ADJUSTMENT AFTER INSTALLATION

Adjust A/T position. Refer to TM-181, "Inspection and Adjustment".

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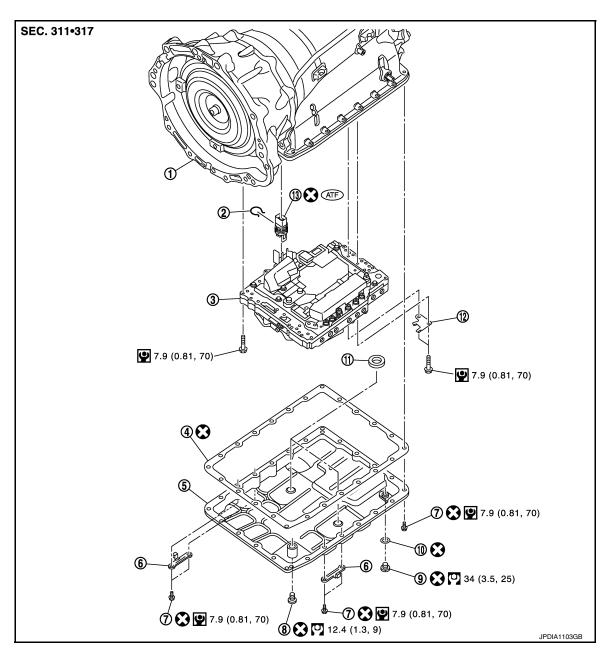
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Revision: 2015 February TM-185 2015 QX70

CONTROL VALVE & TCM

Exploded View



- 1. A/T assembly
- 4. Oil pan gasket
- 7. Oil pan mounting bolt
- 10. Drain plug gasket
- 13. Joint connector

- 2. Snap ring
- 5. Oil pan
- 8. Overflow plug
- 11. Magnet

3. Control valve & TCM

INFOID:0000000010579011

- 6. Clip
- 9. Drain plug
- 12. Clip

Removal and Installation

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

REMOVAL

- Drain ATF through drain plug.
- Remove exhaust mounting bracket with power tool. Refer to <u>EX-5, "Exploded View"</u>.

CONTROL VALVE & TCM

< REMOVAL AND INSTALLATION >

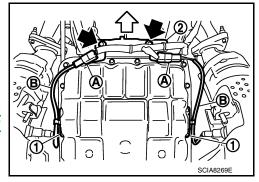
[7AT: RE7R01A (VQ37VHR)]

3. Disconnect heated oxygen sensor 2 connectors (A).

: Vehicle front

: Bolt

- 4. Remove heated oxygen sensor 2 harness (B) from clips (1).
- Remove bracket (2) from A/T assembly. Refer to <u>TM-211, "2WD : Exploded View"</u> (2WD) or <u>TM-214, "AWD : Exploded View"</u> (AWD).

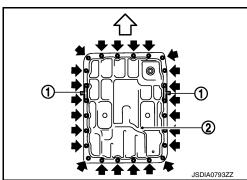


6. Remove clips (1).

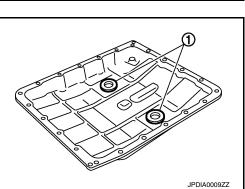
: Vehicle front

: Oil pan mounting bolt

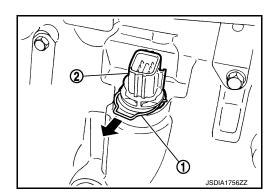
7. Remove oil pan (2) and oil pan gasket.



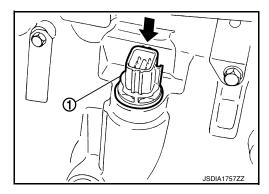
8. Remove magnets (1) from oil pan.



9. Remove snap ring (1) from joint connector (2).



10. Push joint connector (1).



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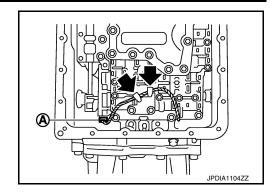
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Disconnect output speed sensor connector (A).
 CAUTION:

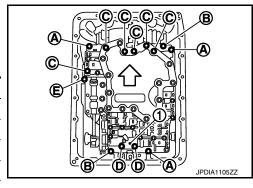
Be careful not to damage connector.

12. Disengage terminal clip (←).



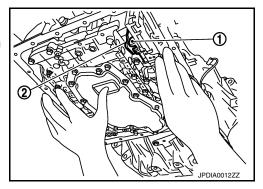
13. Remove bolts and clip (1) from the control valve & TCM.

| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| Α | 43 (1.69) | 3 |
| В | 40 (1.57) | 2 |
| С | 54 (2.13) | 6 |
| D | 50 (1.97) | 2 |
| E* | 50 (1.97) | 1 |



14. Remove the control valve & TCM from transmission case.
CAUTION:

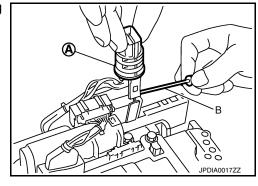
When removing, be careful with the manual valve (1) notch and manual plate (2) height. Remove it vertically.



- 15. Remove joint connector (A) from the control valve & TCM using a flat-bladed screwdriver (B).
- 16. Disconnect TCM harness connector.

CAUTION:

Be careful not to damage connector.



INSTALLATION

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

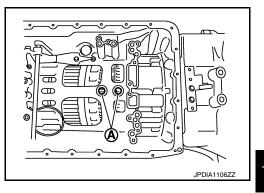
CAUTION:

- · Be careful not to damage connector when installing any connector.
- · Never reuse joint connector.
- Apply ATF to O-ring of joint connector.
- Never reuse drain plug and drain plug gasket. In addition, install new drain plug and drain plug gasket after adjustment of A/T fluid filling.
- Refer to the following when installing the control valve & TCM to transmission case.

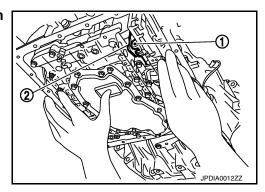
^{*:} Reamer bolt

CAUTION:

- Make sure that turbine revolution sensor securely installs input speed sensor holes (A).
- Hang down output speed sensor harness toward outside so as not to disturb installation of the control valve & TCM.
- Adjust joint connector of the control valve & TCM to terminal hole of transmission case.

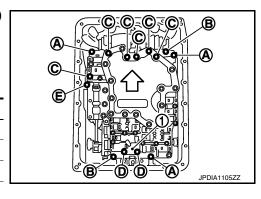


 Assemble it so that manual valve (1) cutout is engaged with manual plate (2) projection.



- Install bolts and clip (1) to the control valve & TCM. Tighten bolt (E) to the specified torque before tightening the other than bolts.

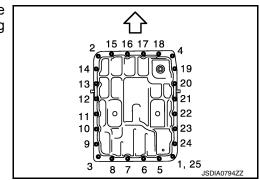
| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| A | 43 (1.69) | 3 |
| В | 40 (1.57) | 2 |
| С | 54 (2.13) | 6 |
| D | 50 (1.97) | 2 |
| E* | 50 (1.97) | 1 |



- *: Reamer bolt
- Refer to the following when installing oil pan to transmission case.

CAUTION:

- Clean foreign materials (gear wear particles) that adhere on the inside of the oil pan and on the magnet, and then assembly.
- Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface of transmission case and oil pan.
- · Never reuse oil pan gasket and oil pan mounting bolts.
- Install oil pan gasket in the direction to align hole position.
- Tighten the oil pan mounting bolts to the specified torque in the numerical order as shown in the figure after temporarily tightening them.
 - : Vehicle front
- Fill ATF after installation. Refer to <u>TM-174, "Changing"</u>.



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CONTROL VALVE & TCM

< REMOVAL AND INSTALLATION >

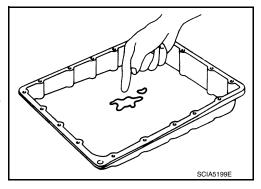
[7AT: RE7R01A (VQ37VHR)]

Inspection INFOID:000000010579012

INSPECTION AFTER REMOVAL

Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.

 If frictional material is detected, perform A/T fluid cooler cleaning. Refer to TM-177, "Cleaning".



INSPECTION AFTER INSTALLATION

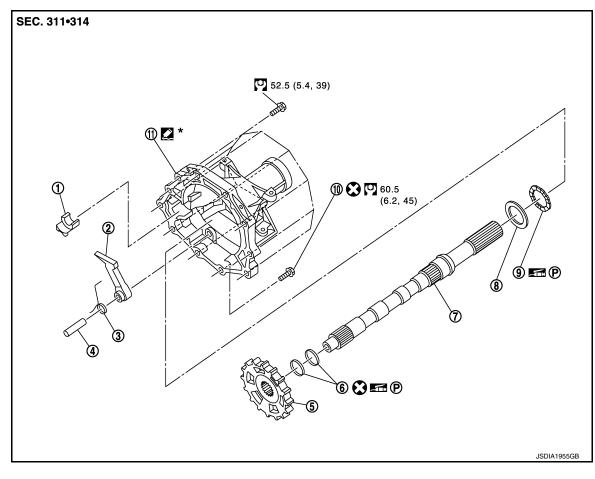
Start the engine and check visually that there is no leakage of ATF.

PARKING COMPONENTS

2WD

2WD : Exploded View

INFOID:0000000010579013



- 1. Parking actuator support
- 4. Pawl shaft
- 7. Output shaft
- 10. Self-sealing bolt
- 2. Parking pawl
- 5. Parking gear
- 8. Bearing race
- 11. Rear extension

- 3. Return spring
- 6. Seal ring
- 9. Needle bearing

*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants". Refer to GI-4, "Components" for symbols not described on the above.

2WD : Removal and Installation

REMOVAL

- 1. Drain ATF through drain plug.
- Remove exhaust front tube and center muffler with power tool. Refer to <u>EX-5. "Exploded View"</u>.
- Remove propeller shaft assembly. Refer to <u>DLN-120, "Exploded View"</u>.
- 4. Remove control rod. Refer to TM-185. "Exploded View".
- Support A/T assembly with a transmission jack. CAUTION:

When setting transmission jack, be careful not to allow it to collide against the drain plug.

- Remove rear engine mounting member with power tool. Refer to <u>EM-73, "2WD : Exploded View"</u>.
- 7. Remove engine mounting insulator (rear). Refer to EM-73, "2WD: Exploded View".

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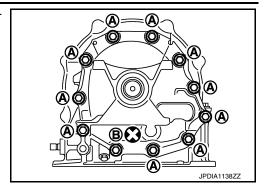
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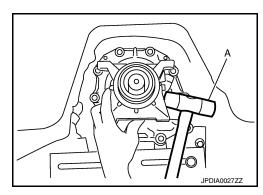
8. Remove tightening bolts for rear extension assembly and transmission case.

A : Bolt

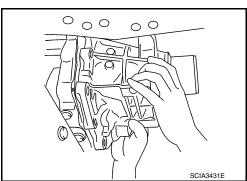
B : Self-sealing bolt



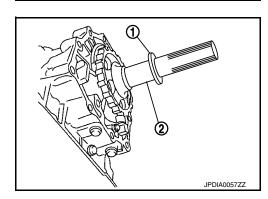
9. Tap rear extension assembly with a soft hammer (A).



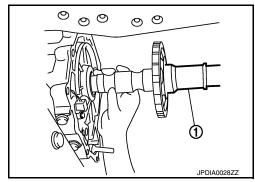
10. Remove rear extension assembly (with needle bearing) from transmission case.



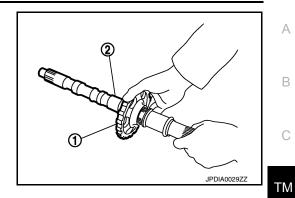
11. Remove bearing race (1) from output shaft (2).



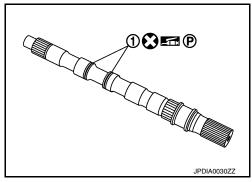
12. Remove output shaft (1) from transmission case by rotating left/right.



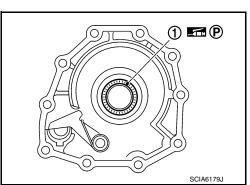
13. Remove parking gear (1) from output shaft (2).



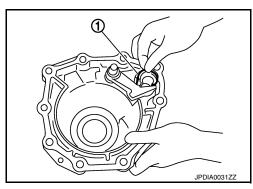
14. Remove seal rings (1) from output shaft.



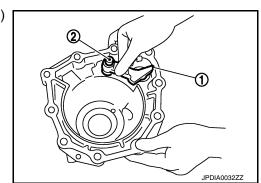
15. Remove needle bearing (1) from rear extension.



16. Remove parking actuator support (1) from rear extension.



17. Remove parking pawl (with return spring) (1) and pawl shaft (2) from rear extension.



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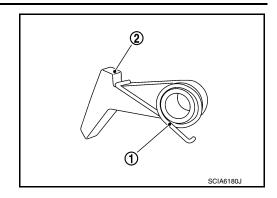
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18. Remove return spring (1) from parking pawl (2).



INSTALLATION

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

CAUTION:

- · Never reuse seal rings and drain plug gasket.
- Apply petroleum jelly to needle bearing and seal rings.
- Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear extension assembly.
- Refer to the followings installing rear extension assembly.
- Apply recommended sealant to rear extension assembly as shown in the figure.

<u>*</u>

: Genuine Anaerobic Liquid Gasket or equivalent. Refer to Gl-24, "Recommended Chemical Products and Sealants".)

Sealant starting point and endpoint (A) : Start and finish point shall be in the center of two bolts.

Overlap width of sealant starting

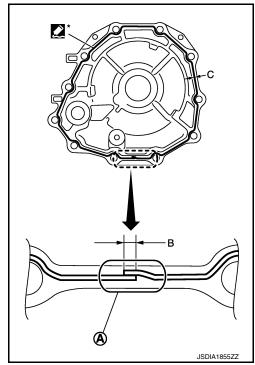
earant starting solution in the starting searant starting solution in the starting searant starting solution in the starting searant starting solution in the starting solu

point (B)

Sealant width (C) : 1.0 - 2.0 mm (0.04 - 0.08 in)Sealant height (C) : 0.4 - 1.0 mm (0.016 - 0.04 in)

CAUTION:

Completely remove all moisture, oil and old sealant, etc. from transmission case and rear extension assembly mounting surfaces.

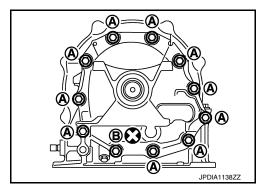


- Tighten rear extension assembly bolts to the specified torque.

A : Bolt

B : Self-sealing bolt

Fill ATF after installation. Refer to <u>TM-174</u>, "Changing".



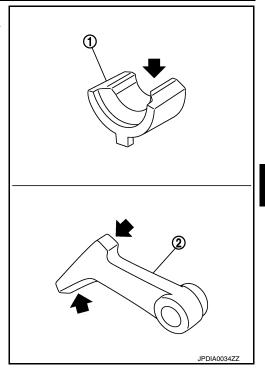
2WD: Inspection

PARKING COMPONENTS

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

If the contact surface on parking actuator support (1), parking pawl (2) and etc. has excessive wear, abrasion, bend, or any other damage, replace the components.



INSPECTION AFTER INSTALLATION

- Start the engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T position. Refer to TM-181, "Inspection and Adjustment".

ADJUSTMENT AFTER INSTALLATION

Adjust A/T position. Refer to TM-181, "Inspection and Adjustment".

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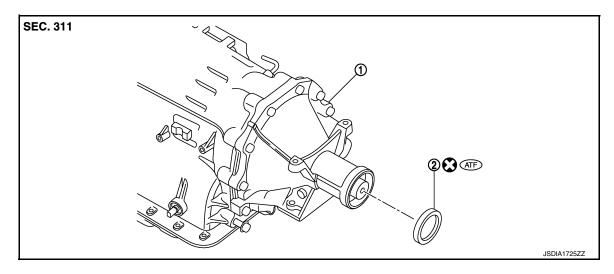
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REAR OIL SEAL

2WD

2WD: Exploded View

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1. A/T assembly

2. Rear oil seal

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

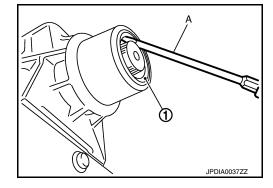
2WD: Removal and Installation

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REMOVAL

- 1. Separate propeller shaft assembly. Refer to DLN-120, "Exploded View".
- Remove rear oil seal (1) using a flat-bladed screwdriver (A). CAUTION:

Be careful not to scratch rear extension assembly.



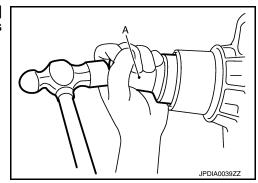
INSTALLATION

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

As shown in the figure, use the drift [SST: ST33400001 (J-26082)]
 (A) to drive rear oil seal into rear extension assembly until it is flush.

CAUTION:

- Never reuse rear oil seal.
- Apply ATF to rear oil seal.



INSPECTION AFTER INSTALLATION

Drive the vehicle and check visually that there is no leakage of ATF.

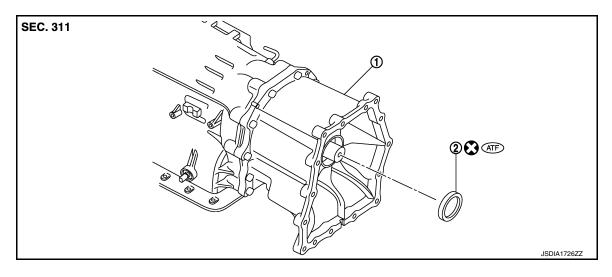
AWD

AWD: Exploded View

2WD: Inspection

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1. A/T assembly

2. Rear oil seal

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

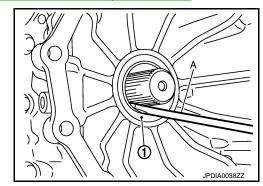
AWD: Removal and Installation

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REMOVAL

- 1. Remove transfer assembly from A/T assembly. Refer to DLN-65, "VQ37VHR: Exploded View".
- Remove rear oil seal (1) using a flat-bladed screwdriver (A). CAUTION:

Be careful not to scratch adapter case assembly.



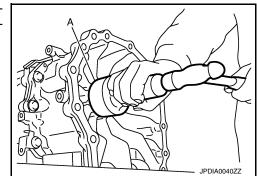
INSTALLATION

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

As shown in the figure, use the drift [64 mm (2.52 in) dia. commercial service tool] (A) to drive rear oil seal into adapter case assembly until it is flush.

CAUTION:

- · Never reuse rear oil seal.
- · Apply ATF to rear oil seal.



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REAR OIL SEAL

[7AT: RE7R01A (VQ37VHR)]

< REMOVAL AND INSTALLATION >

AWD: Inspection

INSPECTION AFTER INSTALLATION

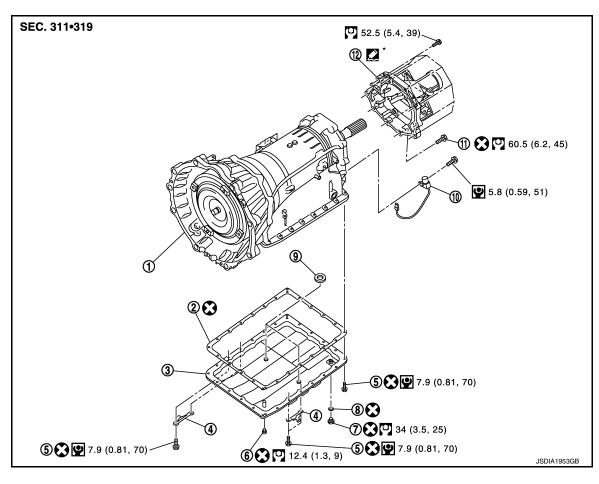
Drive the vehicle and check visually that there is no leakage of ATF.

OUTPUT SPEED SENSOR

2WD

2WD : Exploded View

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- 1. A/T
- 4. Overflow plug
- 7. Oil pan mounting bolt
- 10. Rear extension

- 2. Oil pan gasket
- 5. Drain plug
- 8. Magnet
- 11. Self-sealing bolt

- 3. Oil pan
- 6. Drain plug gasket
- 9. Output speed sensor

*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants".

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

2WD: Removal and Installation

REMOVAL

- 1. Disconnect the battery cable from the negative terminal.
- 2. Drain ATF through drain plug.
- 3. Remove exhaust front tube and center muffler with power tool. Refer to EX-5, "Exploded View".
- 4. Separate propeller shaft assembly. Refer to DLN-120, "Exploded View".
- 5. Remove control rod. Refer to TM-185, "Exploded View".
- Remove exhaust mounting bracket. Refer to <u>EX-5</u>, "<u>Exploded View</u>".

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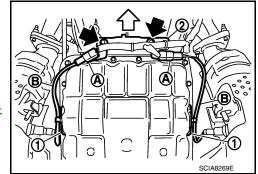
< REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

7. Disconnect heated oxygen sensor 2 harness connectors (A).

= : Bolt

- 8. Remove heated oxygen sensor 2 harness (B) from clips (1).
- Remove bracket (2) from transmission assembly. Refer to <u>TM-211</u>, "2WD: Exploded View".

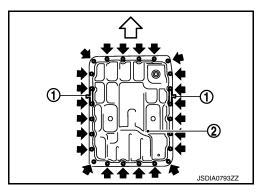


10. Remove clips (1).

: Oil pan mounting bolt

- 11. Remove oil pan (2) and oil pan gasket.
- Support A/T assembly with a transmission jack.
 CAUTION:

When setting transmission jack, place wooden blocks to prevent from damaging control valve & TCM and transmission case.



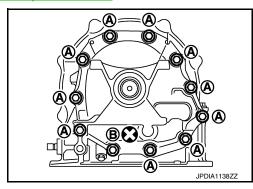
13. Remove rear engine mounting member with power tool. Refer to EM-73, "2WD: Exploded View".

14. Remove engine mounting insulator (rear). Refer to EM-73, "2WD: Exploded View".

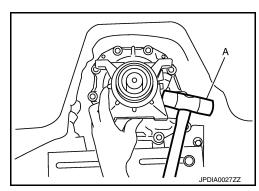
15. Remove tightening bolts for rear extension assembly and transmission case.

A : Bolt

B : Self-sealing bolt



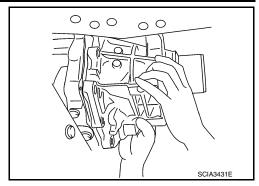
16. Tap rear extension assembly with a soft hammer (A).



< REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

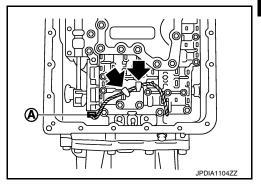
17. Remove rear extension assembly (with needle bearing) from transmission case.



18. Disconnect output speed sensor connector (A). CAUTION:

Be careful not to damage connector

19. Disengage terminal clips (←).

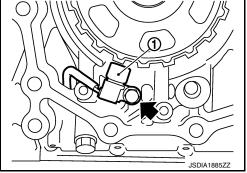


20. Remove output speed sensor (1) from transmission case.

= : Bolt

CAUTION:

- · Never subject it to impact by dropping or hitting it.
- · Never disassemble.
- · Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
- Never place in an area affected by magnetism.



INSTALLATION

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

CAUTION:

- Insert the tip of parking rod between the parking pole and the parking actuator support when assembling the rear extension assembly.
- Never reuse drain plug gasket.
- Refer to the followings when installing output speed sensor.

CAUTION:

- Never subject it to impact by dropping or hitting it.
- · Never disassemble.
- Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
- Never place in an area affected by magnetism.
- Refer to the followings when installing rear extension assembly.

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< REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

 Apply recommended sealant (Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants".) to rear extension assembly as shown in the figure.

Sealant starting point and endpoint (A) : Start and finish point shall be in the center of two bolts.

Overlap width of sealant starting

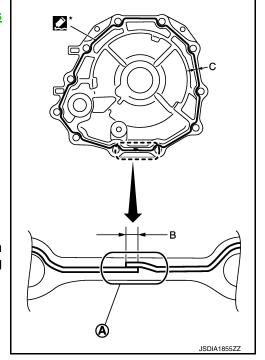
point and end- : 3 – 5 mm (0.12 – 0.20 in)

point (B)

Sealant width (C) : 1.0 - 2.0 mm (0.04 - 0.08 in)Sealant height (C) : 0.4 - 1.0 mm (0.016 - 0.04 in)

CAUTION:

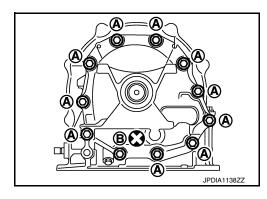
Completely remove all moisture, oil and old sealant, etc. from transmission case and rear extension assembly mounting surfaces.



- Tighten rear extension assembly bolts to the specified torque.

A : Bolt

B : Self-sealing bolt

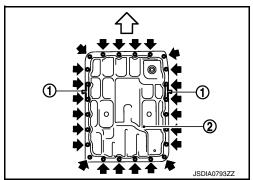


 Refer to the followings when installing oil pan (2) (with oil pan gasket) and clips (1) to transmission case.

: Oil pan mounting bolt

CAUTION:

- Never reuse oil pan gasket and oil pan mounting bolts.
- Install oil pan gasket in the direction to align hole position.
- Install it so that drain plug comes to the position as shown in the figure.
- · Be careful not to pinch harnesses.
- Completely remove all moisture, oil and old gasket, etc. from oil pan mounting surface.



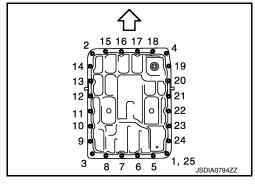
< REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

- Tighten oil pan mounting bolts to the specified torque in numerical order shown in the figure after temporarily tightening them. Tighten necessary oil pan mounting bolts with specified torque.

⟨⇒ : Vehicle front

Fill ATF after installation. Refer to <u>TM-174, "Changing"</u>.



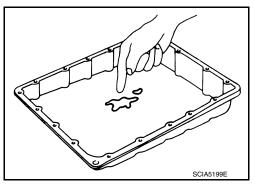
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2WD : Inspection and Adjustment

INSPECTION AFTER REMOVAL

Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.

 If frictional material is detected, perform A/T fluid cooler cleaning. Refer to <u>TM-177</u>, "Cleaning".



INSPECTION AFTER INSTALLATION

- Start the engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T position. Refer to <u>TM-181, "Inspection and Adjustment"</u>.

ADJUSTMENT AFTER INSTALLATION

Adjust A/T position. Refer to TM-181, "Inspection and Adjustment".

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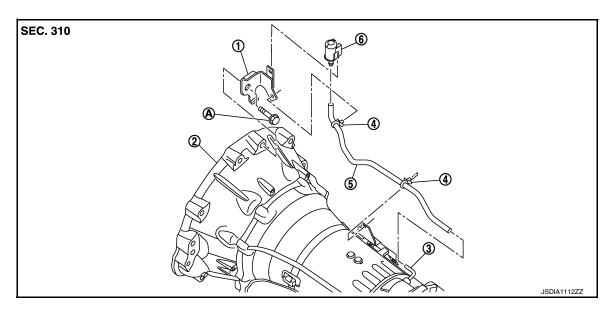
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AIR BREATHER HOSE

2WD

2WD: Exploded View

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1. Bracket

2. A/T assembly

3. Air breather tube

Clip

5. Air breather hose

- Air breather box
- A. Tightening must be done following the installation procedure. Refer to TM-204, "2WD: Removal and Installation".

2WD : Removal and Installation

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REMOVAL

- 1. Remove clips of air breather hose from brackets.
- 2. Remove air breather box from bracket.
- 3. Remove air breather box from air breather hose.
- 4. Remove air breather hose.
- Separate propeller shaft assembly. Refer to DLN-120, "Exploded View".
- 6. Remove control rod from A/T shift selector assembly. Refer to TM-182, "Exploded View".
- 7. Support A/T assembly with a transmission jack.

CAUTION:

When setting the transmission jack, be careful not to allow it to collide against the drain plug and overflow plug.

- 8. Remove rear engine mounting member with a power tool. Refer to EM-73, "2WD: Exploded View".
- 9. Remove bolt fixing A/T assembly to engine with a power tool.
- 10. Remove bracket.

INSTALLATION

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

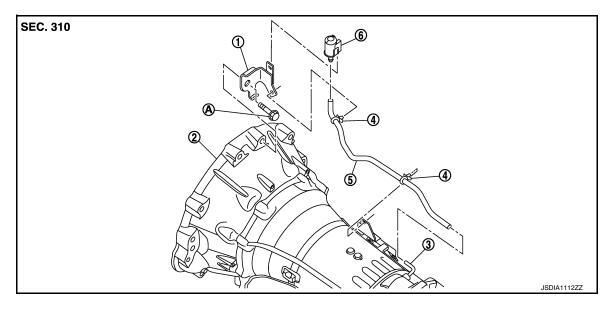
CAUTION:

- When installing air breather hose, be careful not to crushed or blocked by folding or bending the hose.
- When inserting air breather hose to air breather tube, be sure to insert it fully until its end reaches the radius curve end.
- When inserting air breather hose to air breather box, be sure to insert it fully until its end reaches the
- Install air breather hose to air breather box so that the paint mark is facing backward.
- Ensure clips are securely installed to brackets when installing air breather hose to brackets.

AWD

AWD: Exploded View

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1. Bracket

2. A/T assembly

3. Air breather tube

4. Clip

- Air breather hose
- Air breather box
- A. Tightening must be done following the installation procedure. Refer to <u>TM-205, "AWD : Removal and Installation"</u>.

AWD: Removal and Installation

REMOVAL

- 1. Remove propeller shaft assembly (front). Refer to DLN-110, "VQ37VHR: Exploded View".
- Remove clips of air breather hose from brackets.
- 3. Remove air breather box from bracket.
- 4. Remove air breather box from air breather hose.
- Remove air breather hose.
- Remove propeller shaft assembly (rear). Refer to <u>DLN-130</u>, "Exploded View".
- 7. Remove control rod from A/T shift selector assembly. Refer to TM-182, "Exploded View".
- 8. Support A/T assembly with a transmission jack.

CAUTION:

Be careful not to allow it to collide against the drain plug and overflow plug when setting the transmission jack.

- Remove rear engine mounting member with a power tool. Refer to EM-77, "AWD: Exploded View".
- 10. Remove bolt fixing A/T assembly to engine assembly with power tool.
- 11. Remove bracket.

INSTALLATION

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

CAUTION:

- When installing air breather hose, be careful not to crushed or blocked by folding or bending the hose.
- When inserting air breather hose to air breather tube, be sure to insert it fully until its end reaches the radius curve end.
- When inserting air breather hose to air breather box, be sure to insert it fully until its end reaches the stop.
- Install air breather hose to air breather box so that the paint mark is facing backward.
- Ensure clips are securely installed to brackets when installing air breather hose to brackets.

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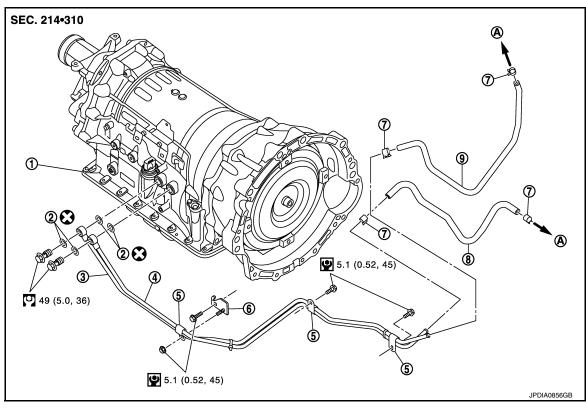
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FLUID COOLER SYSTEM

2WD

2WD : Exploded View

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- 1. A/T assembly
- 4. A/T fluid cooler tube
- 7. Hose clamp
- A. To radiator

- 2. Copper washer
- Clip
- 8. A/T fluid cooler hose B
- 3. A/T fluid cooler tube
- 6. Bracket
- A/T fluid cooler hose A

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

2WD : Removal and Installation

REMOVAL

- 1. Remove air duct (inlet). Refer to EM-29, "Exploded View".
- 2. Remove engine lower cover with power tool. Refer to EXT-31, "Exploded View".
- 3. Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
- 4. Remove A/T fluid cooler tubes from A/T assembly and engine.
- 5. Plug up opening such as the A/T fluid cooler tube hole.
- Remove A/T fluid cooler tubes from the vehicle. CAUTION:

Be careful not to bend A/T fluid cooler tubes.

7. Remove clips and bracket.

INSTALLATION

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

Never reuse copper washer.

• Refer to the following when installing A/T fluid cooler hoses.

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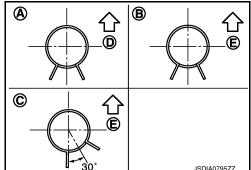
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| Hose name | Hose end | Paint mark | Position of hose clamp* |
|--------------------------|----------------------------|-----------------|-------------------------|
| A/T fluid cooler hose A | Radiator assembly side | Facing backward | A |
| A/T IIUIU COOIEI IIOSE A | A/T fluid cooler tube side | Facing downward | В |
| A/T fluid cooler hose B | Radiator assembly side | Facing downward | С |
| A/T IIUIU COOIEI IIOSE B | A/T fluid cooler tube side | Facing downward | В |

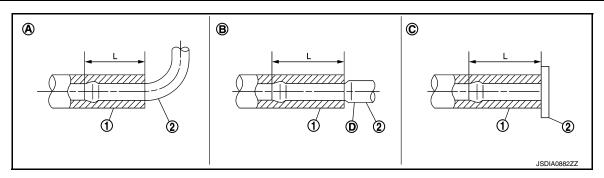
- *: Refer to the illustrations for the specific position each hose clamp tab.
- The illustrations indicate the view from the hose ends.

- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.



- Insert A/T fluid cooler hoses according to dimension "L" described below.

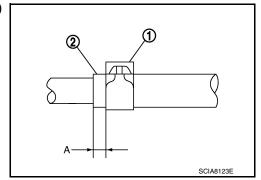
| (1) | (2) | Tube type | Dimension "L" |
|-------------------------|----------------------------|-----------|--|
| | Radiator assembly side | Α | End reaches the radius curve end. |
| A/T fluid cooler hose A | A/T fluid cooler tube side | В | 30 mm (1.18 in) [End reaches the 2-stage bulge (D).] |
| | Radiator assembly side | С | Insert the hose until the hose touches the radiator. |
| A/T fluid cooler hose B | A/T fluid cooler tube side | В | 30 mm (1.18 in) [End reaches the 2-stage bulge (D).] |



- Set hose clamps (1) at the both ends of A/T fluid cooler hoses (2) with dimension "A" from the hose edge.

Dimension "A" : 5 - 9 mm (0.20 - 0.35 in)

- Hose clamp should not interfere with the bulge of fluid cooler tube.



2WD: Inspection and Adjustment

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INSPECTION AFTER INSTALLATION

Start the engine and Check visually that there is no leakage of ATF.

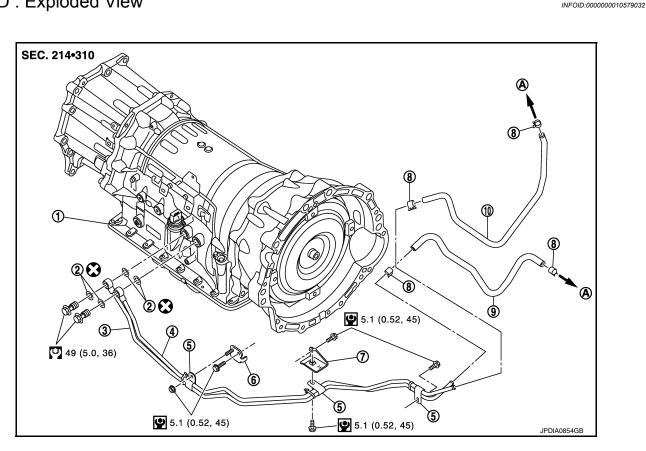
Revision: 2015 February TM-207 2015 QX70

ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to TM-176, "Adjustment".

AWD

AWD: Exploded View



- 1. A/T assembly
- 4. A/T fluid cooler tube
- 7. Bracket
- 10. A/T fluid cooler hose A
- A. To radiator
- Refer to GI-4, "Components" for symbols in the figure.
- 2. Copper washer
- 5. Clip
- 8. Hose clamp

- 3. A/T fluid cooler tube
- 6. Bracket
- 9. A/T fluid cooler hose B

AWD: Removal and Installation

INFOID:0000000010579033

REMOVAL

- 1. Remove air duct (inlet). Refer to EM-29, "Exploded View".
- 2. Remove engine under cover with a power tool. Refer to EXT-31, "Exploded View".
- 3. Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
- 4. Remove control rod from A/T shift selector. Refer to TM-182, "Exploded View".
- 5. Remove exhaust mounting bracket. Refer to EX-5, "Exploded View".

FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

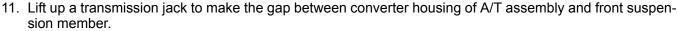
[7AT: RE7R01A (VQ37VHR)]

Disconnect heated oxygen sensor 2 connectors (A).

: Vehicle front

: Bolt

- 7. Remove heated oxygen sensor 2 harness (B) from clips (1).
- Remove harness bracket (2) from A/T assembly. Refer to EX-5. "Exploded View".
- Remove propeller shaft assembly (rear). Refer to <u>DLN-130</u>, "Exploded View".
- 10. Remove propeller shaft assembly (front). Refer to DLN-110, "VQ37VHR: Exploded View".



CAUTION:

Never contact the A/T and transfer assembly with the lower lever of A/T shift selector when lifting up a transmission jack.

- 12. Remove A/T fluid cooler tubes from A/T assembly and engine.
- 13. Plug up opening such as the A/T fluid cooler tube hole.
- 14. Remove clips and brackets.
- 15. Remove A/T fluid cooler tubes from the vehicle.

CAUTION:

Be careful not to bend A/T fluid cooler tubes.

INSTALLATION

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

CAUTION:

Never reuse copper washer.

Refer to the following when installing A/T fluid cooler hoses.

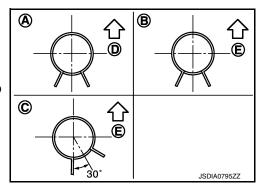
| Hose name | Hose end | Paint mark | Position of hose clamp* |
|--------------------------|----------------------------|-----------------|-------------------------|
| A/T fluid cooler hose A | Radiator assembly side | Facing backward | A |
| A I liulu coolei liose A | A/T fluid cooler tube side | Facing downward | В |
| A/T fluid cooler hose B | Radiator assembly side | Facing downward | С |
| A/T IIulu coolei Ilose B | A/T fluid cooler tube side | Facing downward | В |

*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

<>D <> : Vehicle front

- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.



- Insert A/T fluid cooler hoses according to dimension "L" described below.

| (1) | (2) | Tube type | Dimension "L" | |
|-------------------------|----------------------------|-----------|--|--|
| | Radiator assembly side | Α | End reaches the radius curve end. | |
| A/T fluid cooler hose A | A/T fluid cooler tube side | В | 30 mm (1.18 in) [End reaches the 2-stage bulge (D).] | |

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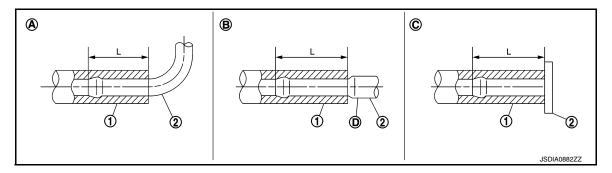
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FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

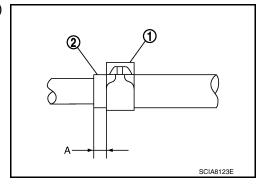
| (1) | (2) | Tube type | Dimension "L" |
|-------------------------|----------------------------|-----------|--|
| | Radiator assembly side | С | Insert the hose until the hose touches the radiator. |
| A/T fluid cooler hose B | A/T fluid cooler tube side | В | 30 mm (1.18 in) [End reaches the 2-stage bulge (D).] |



- Set hose clamps (1) at the both ends of A/T fluid cooler hoses (2) with dimension "A" from the hose edge.

Dimension "A" : 5 - 9 mm (0.20 - 0.35 in)

- Hose clamp should not interfere with the bulge of fluid cooler tube.



AWD: Inspection and Adjustment

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INSPECTION AFTER INSTALLATION

Start the engine and check visually that there is no leakage of ATF.

ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to TM-176, "Adjustment".

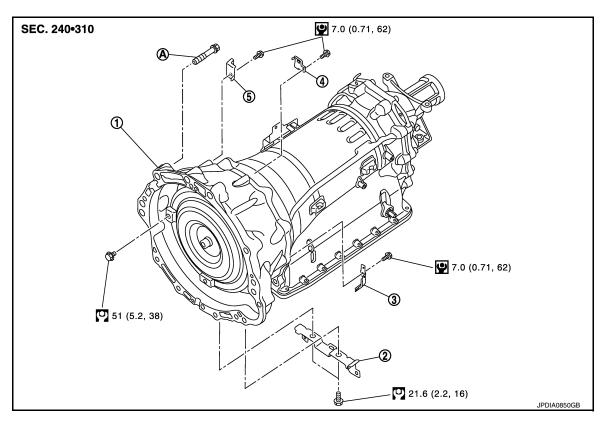
UNIT REMOVAL AND INSTALLATION

TRANSMISSION ASSEMBLY

2WD

2WD: Exploded View

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1. A/T assembly

2. Bracket

Bracket

Bracket

Bracket

A. Tightening must be done following the installation procedure. Refer to <u>TM-211, "2WD : Removal and Installation"</u>. Refer to <u>GI-4, "Components"</u> for symbols in the figure.

2WD : Removal and Installation

INFOID:0000000010579036

REMOVAL

CAUTION:

- When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.
- Be careful not to damage sensor edge.
- 1. Shift the selector lever to "P" position, and then release the parking brake.
- Disconnect the battery cable from the negative terminal.
- 3. Remove control rod from A/T shift selector assembly. Refer to TM-182, "Exploded View".
- 4. Remove propeller shaft assembly (rear). Refer to DLN-120, "Exploded View".
- 5. Remove engine lower cover with a power tool. Refer to EXT-31, "Exploded View".
- Remove front cross bar. Refer to FSU-14, "Exploded View".
- 7. Remove exhaust mounting bracket. Refer to EX-5, "Exploded View".
- 8. Remove three way catalyst (right bank). Refer to EX-5, "Exploded View".
- Remove crankshaft position sensor (POS) from A/T assembly. Refer to <u>EM-125, "Exploded View"</u>.
 - · Never subject it to impact by dropping or hitting it.

Revision: 2015 February TM-211 2015 QX70

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TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

- Never disassemble.
- Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
- · Never place in an area affected by magnetism.
- Remove starter motor. Refer to <u>STR-21, "VQ37VHR: Exploded View"</u>.
- 11. Remove rear plate cover. Refer to EM-47, "Exploded View".
- 12. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter. **CAUTION:**

When turning the crankshaft, turn it clockwise as viewed from the front of the engine.

- 13. Remove A/T fluid cooler tubes from A/T assembly and engine. Refer to TM-206, "2WD: Exploded View".
- 14. Plug up openings such as the A/T fluid cooler tube hole.
- 15. Support A/T assembly with a transmission jack.

CAUTION:

When setting the transmission jack, be careful not to allow it to collide against the drain plug and overflow plug.

- 16. Remove rear engine mounting member and engine mounting insulator (rear) with a power tool. Refer to EM-73, "2WD: Exploded View".
- 17. Disconnect A/T assembly connector.
- 18. Remove harness and brackets.
- 19. Remove bolts fixing A/T assembly to engine with a power tool.
- 20. Remove A/T assembly from vehicle.

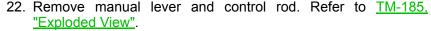
CAUTION:

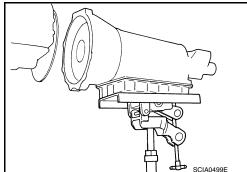
- Secure torque converter to prevent it from dropping.
- Secure A/T assembly to a transmission jack.

NOTE:

Be placing wooden block between oil pan (upper) and front suspension member, the removal of A/T assembly from engine becomes easier.



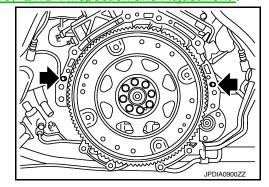




INSTALLATION

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

- Perform inspection before installing A/T assembly. Refer to TM-213, "2WD: Inspection and Adjustment"
- Check fitting of dowel pin (



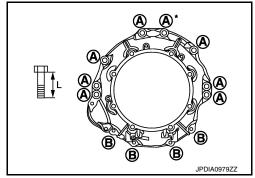
TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

 Install the fixing bolts of A/T assembly and engine according to the following standards.

| Bolt symbol | Α | В | |
|-------------------------------------|------------------------|------------------------|--|
| Insertion direction | A/T assembly to engine | Engine to A/T assembly | |
| Number of bolts 8 | | 4 | |
| Bolt length "L" 65 (2.56) mm (in) | | 35 (1.38) | |
| Tightening torque N·m (kg-m, ft-lb) | 75 (7.7, 55) | 46.6 (4.8, 34) | |



- *: Tightening the bolt with bracket. Refer to TM-204, "2WD: Exploded View".
- Align the positions of tightening bolts for drive plate with those of the torque converter, and temporarily tighten the bolts. Then, tighten the bolts with the specified torque.
 CAUTION:
 - When turning crankshaft, turn it clockwise as viewed from the front of the engine.
 - When tightening the tightening bolts for the torque converter after fixing the crankshaft pulley bolts, be sure to confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-55, "Removal and Installation".
 - Rotate crankshaft several turns and check to be sure that A/T rotates freely without binding after converter is installed to drive plate.

2WD : Inspection and Adjustment

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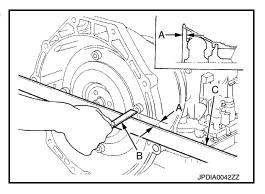
INSPECTION BEFORE INSTALLATION

Check dimension (A) between the converter housing and torque converter.

B : ScaleC : Straightedge

Dimension (A) : Refer to TM-303, "Torque Convert-

<u>er"</u>.



INSPECTION AFTER INSTALLATION

- Start engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T positions. Refer to TM-181, "Inspection and Adjustment".

ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to <u>TM-176</u>, "Adjustment".
- Adjust A/T position. Refer to <u>TM-181, "Inspection and Adjustment"</u>.
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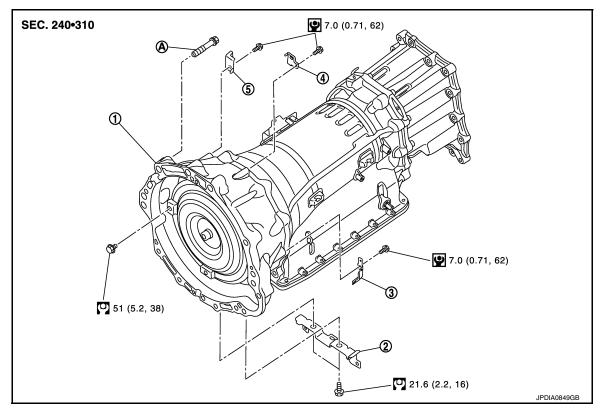
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AWD: Exploded View

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A/T assembly

2. Bracket

Bracket

4. Bracket

- 5. Bracket
- A. Tightening must be done following the installation procedure. Refer to <u>TM-214, "AWD : Removal and Installation"</u>. Refer to <u>GI-4, "Components"</u> for symbols in the figure.

AWD : Removal and Installation

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REMOVAL

CAUTION:

- When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.
- Be careful not to damage sensor edge.
- 1. Shift the selector lever to "P" position, and then release the parking brake.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Remove control rod from A/T shift selector assembly. Refer to TM-182, "Exploded View".
- Remove propeller shaft assembly (rear). Refer to <u>DLN-130, "Exploded View"</u>.
- Remove propeller shaft assembly (front). Refer to <u>DLN-110, "VQ37VHR: Exploded View"</u>.
- Support A/T assembly with a transmission jack. CAUTION:

When setting the transmission jack, be careful not to allow it to collide against the drain plug and overflow plug.

- Remove crankshaft position sensor (POS) from A/T assembly. Refer to <u>EM-125, "Exploded View"</u>.
 CAUTION:
 - Never subject it to impact by dropping or hitting it.
 - · Never disassemble.
 - · Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
 - Never place in an area affected by magnetism.
- 8. Remove starter motor. Refer to STR-21, "VQ37VHR: Exploded View".

TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

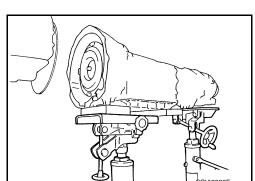
- 9. Remove rear plate cover. Refer to EM-47, "Exploded View".
- 10. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter. **CAUTION:**

When turning the crankshaft, turn it clockwise as viewed from the front of the engine.

- 11. Remove A/T fluid cooler tubes. Refer to TM-208, "AWD: Exploded View".
- 12. Plug up openings such as the A/T fluid cooler tube hole.
- 13. Disconnect A/T assembly harness connector and AWD solenoid harness connector.
- 14. Remove harness and brackets.
- 15. Remove bolts fixing A/T assembly to engine with a power tool.
- 16. Remove A/T assembly with transfer assembly from vehicle. CAUTION:
 - Secure torque converter to prevent it from dropping.
 - Secure A/T assembly to a transmission jack.
 NOTE:

Be placing wooden block between oil pan (upper) and front suspension member, the removal of A/T assembly from engine becomes easier.

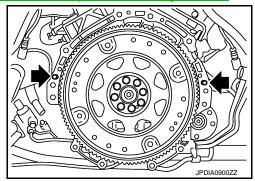
- 17. Remove air breather hose, air breather box, and bracket. Refer to TM-205, "AWD : Exploded View".
- 18. Remove manual lever and control rod. Refer to TM-185, "Exploded View".
- Remove transfer assembly from A/T assembly with a power tool. Refer to <u>DLN-65</u>, "VQ37VHR: Exploded <u>View</u>".



INSTALLATION

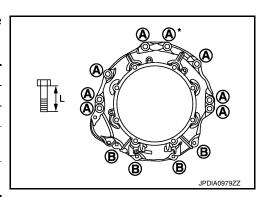
Note the following, and Install in the reverse order of removal.

- Perform inspection before installing A/T assembly. Refer to TM-216, "AWD: Inspection and Adjustment".
- Check fitting of dowel pin (←).



 Install the fixing bolts of A/T assembly and engine according to the following standards.

| Bolt symbol | Α | В | |
|--|--------------|------------------------|--|
| Insertion direction A/T assembly to engine | | Engine to A/T assembly | |
| Number of bolts | 8 | 4 | |
| Bolt length "L" mm (in) | 65 (2.56) | 35 (1.38) | |
| Tightening torque N·m (kg-m, ft-lb) | 75 (7.7, 55) | 46.6 (4.8, 34) | |



*: Tightening the bolt with bracket. Refer to TM-205, "AWD: Exploded View".

- Align the positions of tightening bolts for drive plate with those of the torque converter, and temporarily tighten the bolts. Then, tighten the bolts with the specified torque.

 CAUTION:
 - When turning crankshaft, turn it clockwise as viewed from the front of the engine.

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TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01A (VQ37VHR)]

- When tightening the tightening bolts for the torque converter after fixing the crankshaft pulley bolts, be sure to confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-55, "Removal and Installation".
- Rotate crankshaft several turns and check to be sure that A/T rotates freely without binding after converter is installed to drive plate.

AWD: Inspection and Adjustment

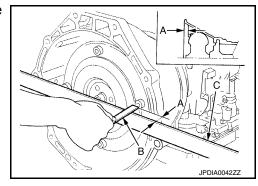
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INSPECTION BEFORE INSTALLATION

Check dimension (A) between the converter housing and torque converter.

B : ScaleC : Straightedge

Dimension (A) : Refer to TM-303, "Torque Converter".



INSPECTION AFTER INSTALLATION

- Start engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T positions. Refer to TM-181, "Inspection and Adjustment".

ADJUSTMENT AFTER INSTALLATION

- · Adjust A/T fluid level. Refer to TM-176, "Adjustment".
- Adjust A/T position. Refer to <u>TM-181, "Inspection and Adjustment"</u>.

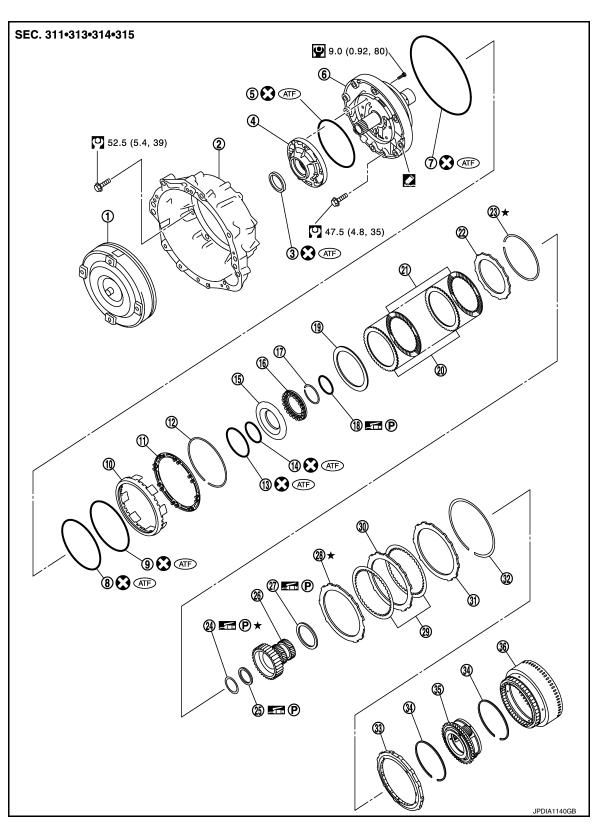
[7AT: RE7R01A (VQ37VHR)]

UNIT DISASSEMBLY AND ASSEMBLY

TRANSMISSION ASSEMBLY

Exploded View

2WD MODELS



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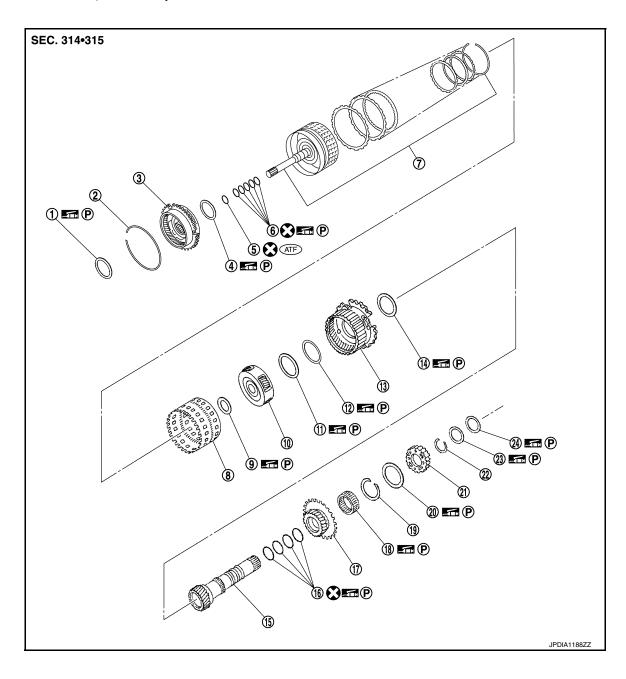
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< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

| 1. | Torque converter | 2. | Converter housing | 3. | Oil pump housing oil seal |
|-----|-----------------------------|-----|------------------------------|-----|---------------------------|
| 4. | Oil pump housing | 5. | O-ring | 6. | Oil pump cover |
| 7. | O-ring | 8. | D-ring | 9. | D-ring |
| 10. | Front brake piston | 11. | Front brake spring retainer | 12. | Snap ring |
| 13. | D-ring | 14. | D-ring | 15. | 2346 brake piston |
| 16. | 2346 brake spring retainer | 17. | Snap ring | 18. | Seal ring |
| 19. | 2346 brake dish plate | 20. | 2346 brake driven plate | 21. | 2346 brake drive plate |
| 22. | 2346 brake retaining plate | 23. | Snap ring | 24. | Bearing race |
| 25. | Needle bearing | 26. | Under drive sun gear | 27. | Needle bearing |
| 28. | Front brake retaining plate | 29. | Front brake drive plate | 30. | Front brake driven plate |
| 31. | Front brake retaining plate | 32. | Snap ring | 33. | 1st one-way clutch |
| 34. | Snap ring | 35. | Under drive carrier assembly | 36. | Front brake hub assembly |

Apply Genuine RTV silicone sealant or equivalent. Refer to <u>GI-24, "Recommended Chemical Products and Sealants"</u>. Refer to <u>GI-4, "Components"</u> for symbols not described on the above.



< UNIT DISASSEMBLY AND ASSEMBLY >

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

[7AT: RE7R01A (VQ37VHR)]

| 1. | Needle bearing | 2. | Snap ring | 3. | Front carrier assembly | Α |
|-----|-----------------------|-----|--------------------|-----|---------------------------------|---|
| 4. | Needle bearing | 5. | O-ring | 6. | Seal ring | |
| 7. | Input clutch assembly | 8. | Rear internal gear | 9. | Needle bearing | |
| 10. | Mid carrier assembly | 11. | Needle bearing | 12. | Bearing race | В |
| 13. | Rear carrier assembly | 14. | Needle bearing | 15. | Mid sun gear | |
| 16. | Seal ring | 17. | Rear sun gear | 18. | 2nd one-way clutch | |
| 19. | Snap ring | 20. | Needle bearing | 21. | High and low reverse clutch hub | С |
| 22. | Snap ring | 23. | Bearing race | 24. | Needle bearing | |

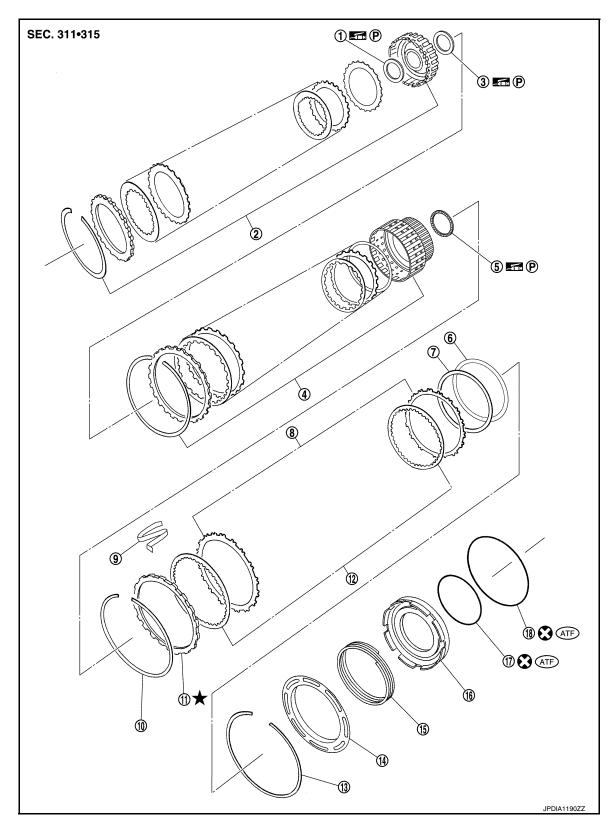
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- 1. Bearing race
- 4. Direct clutch assembly
- 7. Reverse brake dish plate
- 10. Snap ring
- 13. Snap ring

- High and low reverse clutch assembly
- 5. Needle bearing
- 8. Reverse brake driven plate
- 11. Reverse brake retaining plate
- 14. Reverse brake spring retainer
- Needle bearing
- 6. Reverse brake dish plate
- 9. N-spring
- 12. Reverse brake drive plate
- 15. Reverse brake return spring

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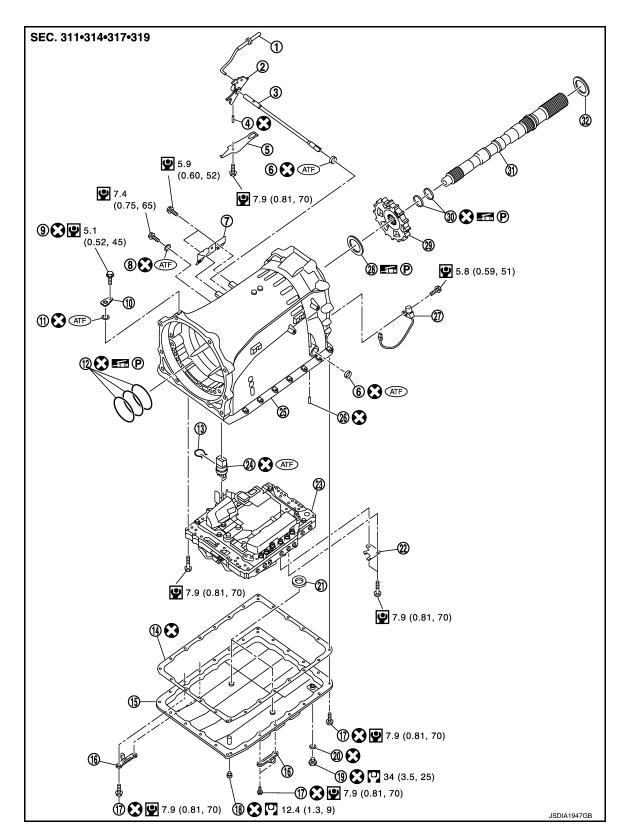
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16. Reverse brake piston

17. D-ring

18. D-ring

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



- 1. Parking rod
- Retaining pin
- 7. Bracket
- 10. Baffle plate

- 2. Manual plate
- 5. Detent spring
- 8. O-ring
- 11. O-ring

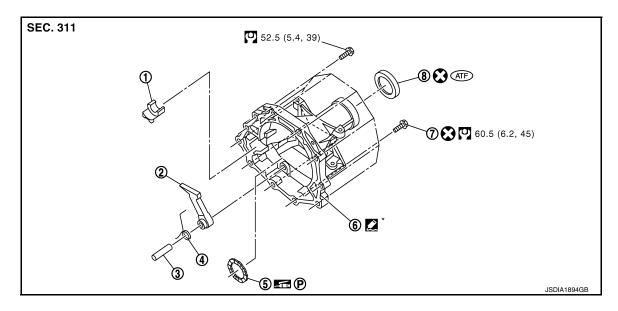
- 3. Manual shaft
- 6. Oil seal
- 9. Self-sealing bolt
- 12. Seal ring

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

| 13. Snap ring 14. Oil pan gasket 15. Oil pa | an |
|--|-----------------|
| pg | |
| 16. Clip 17. Oil pan mounting bolt 18. Over | flow plug |
| 19. Drain plug 20. Drain plug gasket 21. Magr | net |
| 22. Clip 23. Control valve & TCM 24. Joint | connector |
| 25. Transmission case 26. Retaining pin 27. Outp | ut speed sensor |
| 28. Needle bearing 29. Parking gear 30. Seal | ring |
| 31. Output shaft 32. Bearing race | |

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

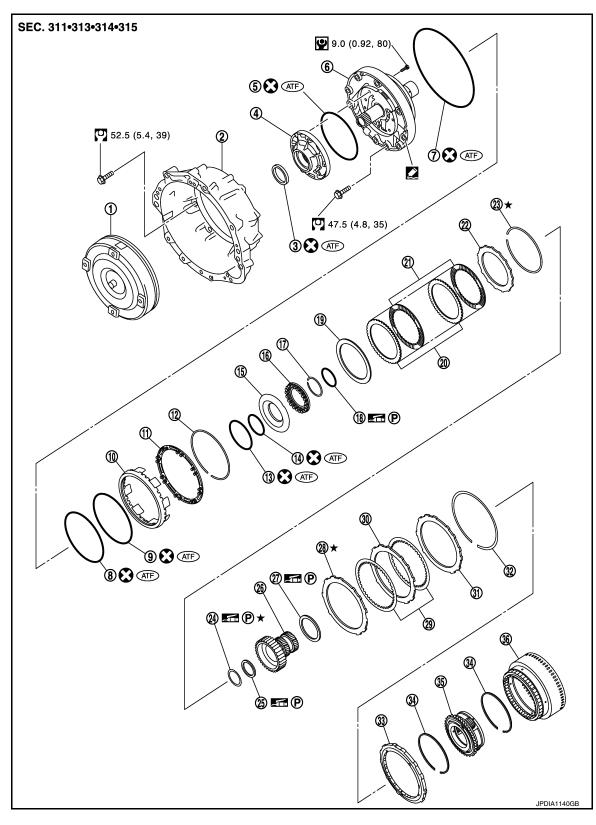


- 1. Parking actuator support
- 4. Return spring
- 7. Self-sealing bolt
- 2. Parking pawl
- 5. Needle bearing
- 8. Rear oil seal

- 3. Pawl shaft
- 6. Rear extension

*: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants". Refer to GI-4, "Components" for symbols in the figure.

AWD MODELS



- 1. Torque converter
- 4. Oil pump housing
- 7. O-ring
- 10. Front brake piston
- 13. D-ring
- 16. 2346 brake spring retainer
- 2. Converter housing
- 5. O-ring
- 8. D-ring
- 11. Front brake spring retainer
- 14. D-ring
- 17. Snap ring

- 3. Oil pump housing oil seal
- 6. Oil pump cover
- 9. D-ring
- 12. Snap ring
- 15. 2346 brake piston
- 18. Seal ring

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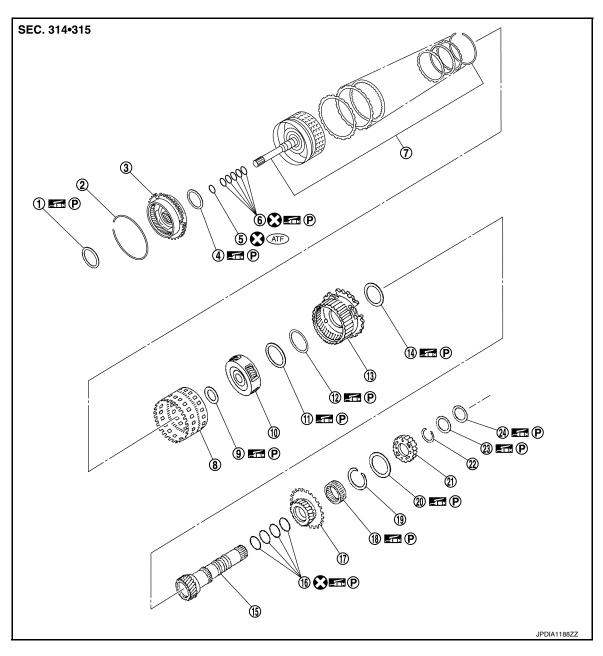
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< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

| 19. | 2346 brake dish plate | 20. | 2346 brake driven plate | 21. | 2346 brake drive plate |
|-----|-----------------------------|-----|------------------------------|-----|--------------------------|
| 22. | 2346 brake retaining plate | 23. | Snap ring | 24. | Bearing race |
| 25. | Needle bearing | 26. | Under drive sun gear | 27. | Needle bearing |
| 28. | Front brake retaining plate | 29. | Front brake drive plate | 30. | Front brake driven plate |
| 31. | Front brake retaining plate | 32. | Snap ring | 33. | 1st one-way clutch |
| 34. | Snap ring | 35. | Under drive carrier assembly | 36. | Front brake hub assembly |

Apply Genuine RTV silicone sealant or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants". Refer to GI-4, "Components" for symbols not described on the above.



| 1 | Needle | bearing |
|----|---------|---------|
| 1. | INCCUIC | Dearing |

4. Needle bearing

7. Input clutch assembly

10. Mid carrier assembly

13. Rear carrier assembly

16. Seal ring

19. Snap ring

2. Snap ring

5. O-ring

8. Rear internal gear

11. Needle bearing

Needle bearing

17. Rear sun gear

Needle bearing

3. Front carrier assembly

6. Seal ring

9. Needle bearing

12. Bearing race

15. Mid sun gear

18. 2nd one-way clutch

21. High and low reverse clutch hub

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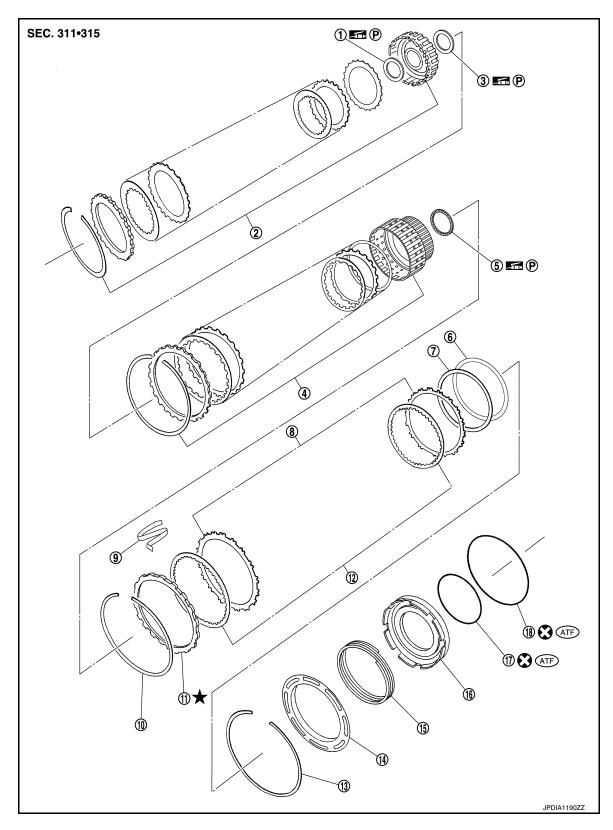
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22. Snap ring

23. Bearing race

24. Needle bearing

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



- Bearing race
- 4. Direct clutch assembly
- 7. Reverse brake dish plate
- 2. High and low reverse clutch assembly
- 5. Needle bearing
- 8. Reverse brake driven plate
- 3. Needle bearing
- 6. Reverse brake dish plate
- N-spring

10. Snap ring

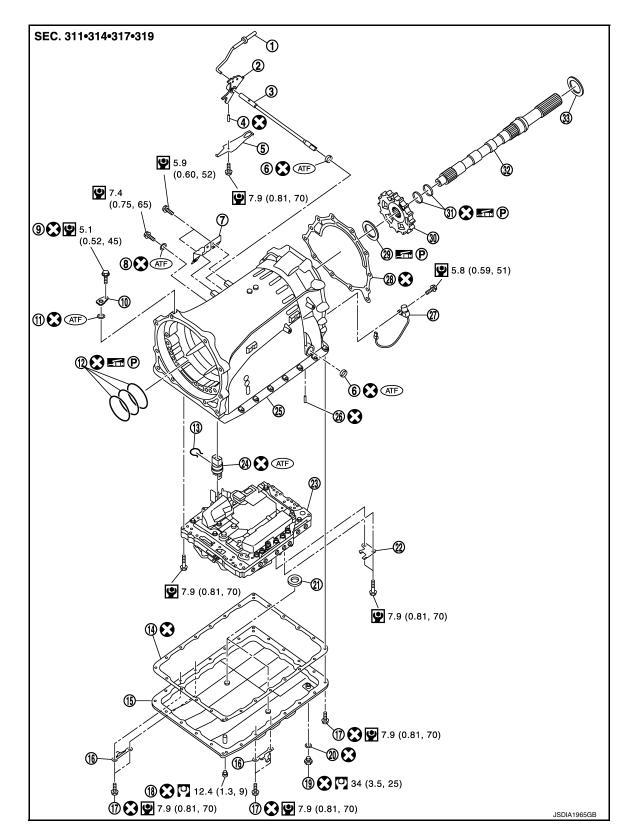
- 11. Reverse brake retaining plate
- 13. Snap ring 14. Reverse brake spring retainer

17. D-ring

16. Reverse brake piston

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

- 12. Reverse brake drive plate
- 15. Reverse brake return spring
- 18. D-ring



- 1. Parking rod
- 4. Retaining pin

- 2. Manual plate
- 5. Detent spring

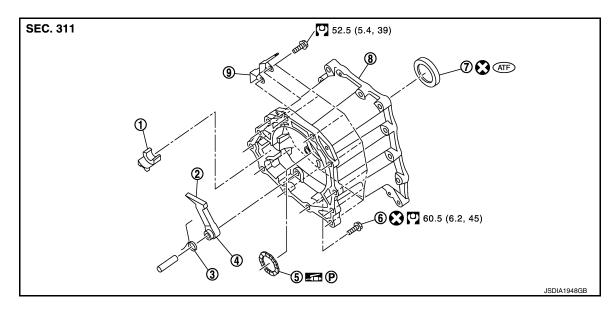
- 3. Manual shaft
- Oil seal

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

| 7. | Bracket | 8. | O-ring | 9. | Self-sealing bolt |
|-----|-------------------|-----|-----------------------|-----|---------------------|
| 10. | Baffle plate | 11. | O-ring | 12. | Seal ring |
| 13. | Snap ring | 14. | Oil pan gasket | 15. | Oil pan |
| 16. | Clip | 17. | Oil pan mounting bolt | 18. | Overflow plug |
| 19. | Drain plug | 20. | Drain plug gasket | 21. | Magnet |
| 22. | Clip | 23. | Control valve & TCM | 24. | Joint connector |
| 25. | Transmission case | 26. | Retaining pin | 27. | Output speed sensor |
| 28. | Gasket | 29. | Needle bearing | 30. | Parking gear |
| 31. | Seal ring | 32. | Output shaft | 33. | Bearing race |

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



1. Parking actuator support

2. Parking pawl

Return spring

Rear oil seal

7.

5. Needle bearing

8. Adapter case

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

3. Pawl shaft

6. Self-sealing bolt

9. Bracket

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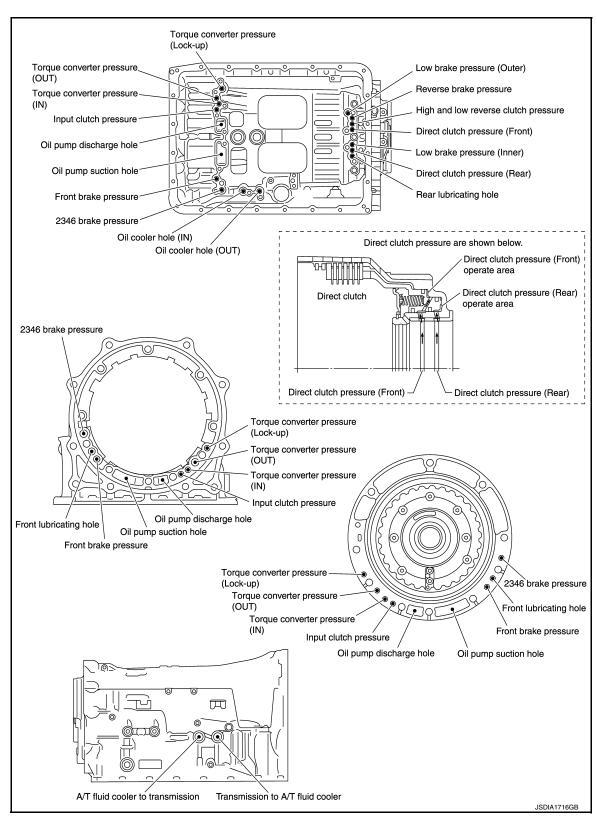
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Oil Channel



Location of Needle Bearings and Bearing Races

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2WD MODELS

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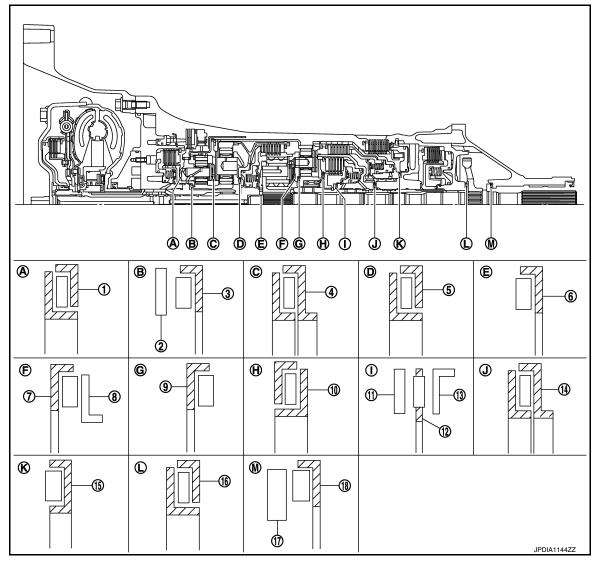
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| Location | Item | Outer diameter mm (in) |
|----------|---------------------|------------------------|
| Α | (1) Needle bearing | 94 (3.701) |
| D | (2) Bearing race | 58.6 (2.307) |
| В | (3) Needle bearing | 60 (2.362) |
| С | (4) Needle bearing | 84.6 (3.331) |
| D | (5) Needle bearing | 77 (3.031) |
| Е | (6) Needle bearing | 47 (1.850) |
| F | (7) Needle bearing | 84 (3.307) |
| F | (8) Bearing race | 82 (3.228) |
| G | (9) Needle bearing | 80 (3.150) |
| Н | (10) Needle bearing | 92 (3.622) |
| | (11) Bearing race | 61.1 (2.406) |
| I | (12) Needle bearing | 60 (2.362) |
| | (13) Bearing race | 61.9 (2.437) |
| J | (14) Needle bearing | 62.8 (2.472) |
| K | (15) Needle bearing | 92 (3.622) |
| L | (16) Needle bearing | 65 (2.559) |

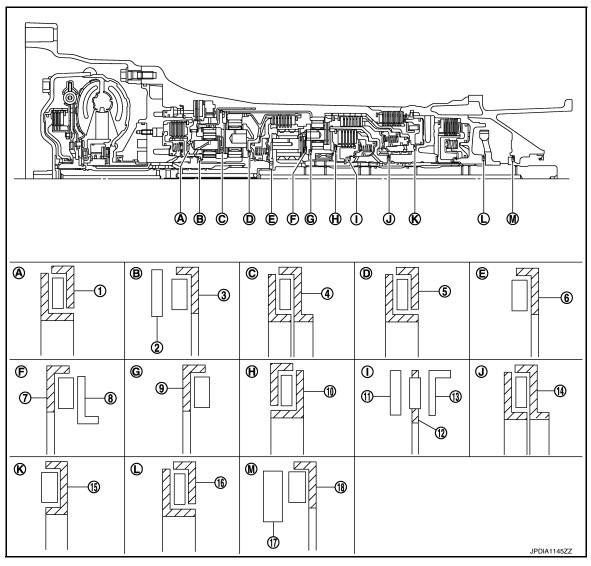
Revision: 2015 February TM-229 2015 QX70

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

| Location | Item | Outer diameter mm (in) | | |
|----------|---------------------|------------------------|--|--|
| M | (17) Bearing race | 58 (2.283) | | |
| М | (18) Needle bearing | 60 (2.362) | | |

AWD MODELS



| Location | Item | Outer diameter mm (in) |
|----------|---------------------|------------------------|
| А | (1) Needle bearing | 94 (3.701) |
| D | (2) Bearing race | 58.6 (2.307) |
| В | (3) Needle bearing | 60 (2.362) |
| С | (4) Needle bearing | 84.6 (3.331) |
| D | (5) Needle bearing | 77 (3.031) |
| Е | (6) Needle bearing | 47 (1.850) |
| F | (7) Needle bearing | 84 (3.307) |
| F | (8) Bearing race | 82 (3.228) |
| G | (9) Needle bearing | 80 (3.150) |
| Н | (10) Needle bearing | 92 (3.622) |

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

| Location | Item | Outer diameter mm (in) |
|----------|---------------------|------------------------|
| | (11) Bearing race | 61.1 (2.406) |
| 1 | (12) Needle bearing | 60 (2.362) |
| | (13) Bearing race | 61.9 (2.437) |
| J | (14) Needle bearing | 62.8 (2.472) |
| K | (15) Needle bearing | 92 (3.622) |
| L | (16) Needle bearing | 65 (2.559) |
| NA | (17) Bearing race | 58 (2.283) |
| М | (18) Needle bearing | 60 (2.362) |

Location of Snap Rings

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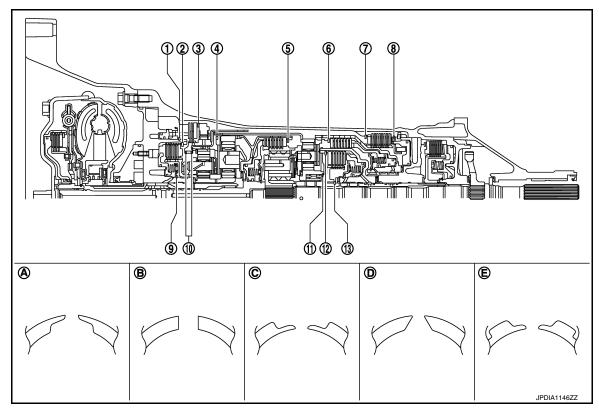
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2WD MODELS



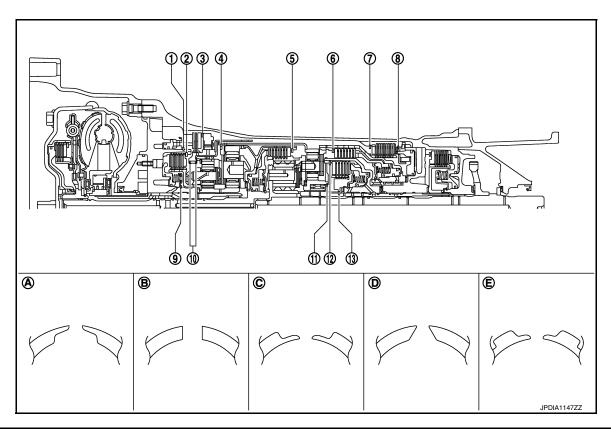
| Location | Shape of snap ring | Outer diameter mm (in) |
|----------|--------------------|------------------------|
| 1 | A | 159.9 (6.295) |
| 2 | В | 159 (6.260) |
| 3 | В | 216 (8.504) |
| 4 | В | 180.4 (7.102) |
| 5 | С | 171.5 (6.752) |
| 6 | В | 169 (6.654) |
| 7 | В | 180.5 (7.106) |
| 8 | В | 181.0 (7.126) |
| 9 | D | 64.6 (2.543) |
| 10 | В | 136 (5.354) |
| 11 | E | 70.5 (2.776) |

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

| Location | Shape of snap ring | Outer diameter mm (in) |
|----------|--------------------|------------------------|
| 12 | В | 135 (5.315) |
| 13 | А | 48.4 (1.906) |

AWD MODELS



| Location | Shape of snap ring | Outer diameter mm (in) |
|----------|--------------------|------------------------|
| 1 | A | 159.9 (6.295) |
| 2 | В | 159 (6.260) |
| 3 | В | 216 (8.504) |
| 4 | В | 180.4 (7.102) |
| 5 | С | 171.5 (6.752) |
| 6 | В | 169 (6.654) |
| 7 | В | 180.5 (7.106) |
| 8 | В | 181.0 (7.126) |
| 9 | D | 64.6 (2.543) |
| 10 | В | 136 (5.354) |
| 11 | E | 70.5 (2.776) |
| 12 | В | 135 (5.315) |
| 13 | Α | 48.4 (1.906) |

Disassembly

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CAUTION:

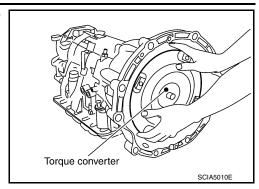
Never disassemble parts behind drum support. Refer to TM-35, "Cross-Sectional View".

1. Drain ATF through drain plug.

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

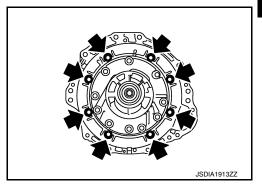
2. Remove torque converter by holding it firmly and turning while pulling straight out.



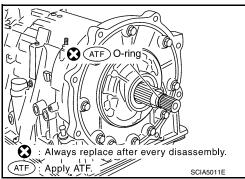
3. Remove tightening bolts () for converter housing and transmission case.

4. Remove converter housing from transmission case. **CAUTION:**

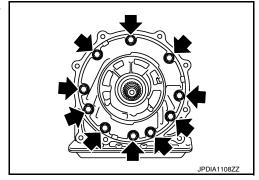
Be careful not to scratch converter housing.



5. Remove O-ring from input clutch assembly.



Remove tightening bolts (←) for oil pump assembly and transmission case.



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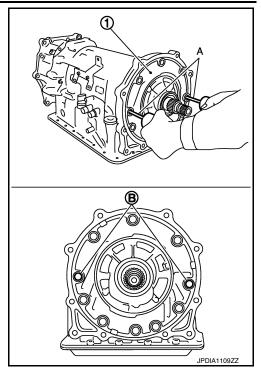
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

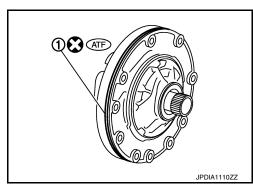
- Attach the sliding hammers [SST: ST25850000 (J-25721-A)] (A) to oil pump assembly (1) and extract it evenly from transmission case.
 - B : Sliding hammer attachment position

CAUTION:

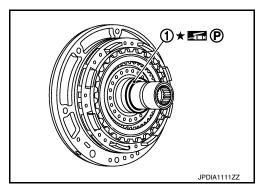
- Fully tighten the sliding hammer screws.
- Make sure that bearing race is installed to the oil pump assembly edge surface.



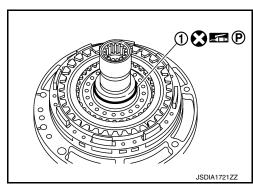
8. Remove O-ring (1) from oil pump assembly.



9. Remove bearing race (1) from oil pump assembly.



10. Remove seal ring (1) from oil pump assembly.



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

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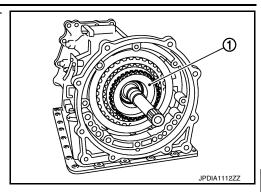
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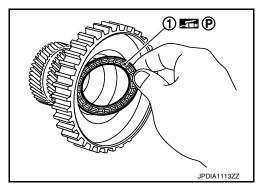
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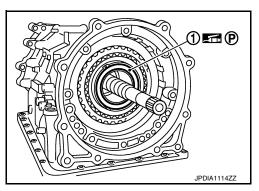
11. Remove under drive sun gear (1) from under drive carrier assembly.



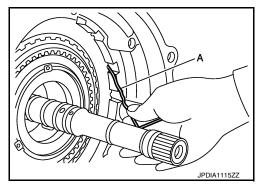
12. Remove needle bearing (1) from under drive sun gear.



13. Remove needle bearing (1) from under drive carrier assembly.



14. Remove front brake component part (retaining plates, drive plates and driven plate) from transmission case by using a wire (A) with its tip bent like a hook.

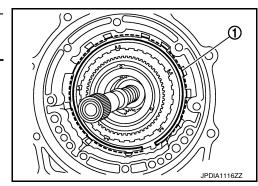


15. Remove snap ring (1) from transmission case using a flat-bladed screwdriver.

CAUTION:

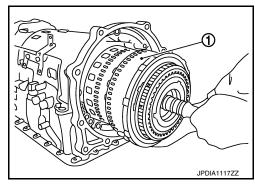
Revision: 2015 February

- Be careful not to scratch transmission case and 1st oneway clutch.
- · Be careful not to damage snap ring.

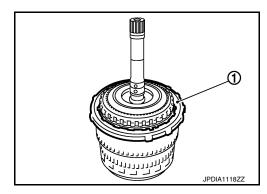


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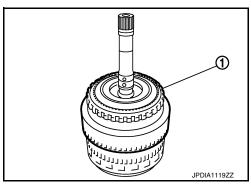
16. Remove input clutch assembly (with 1st one-way clutch, under drive carrier assembly, front brake hub, front carrier assembly, and rear internal gear) (1) from transmission case.



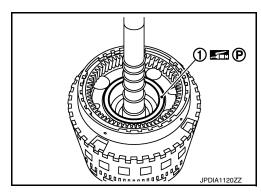
17. Remove 1st one-way clutch (1) from front brake hub.



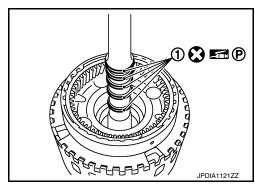
18. Remove under drive carrier assembly (with front brake hub) (1) from front carrier assembly.



19. Remove needle bearing (1) from front carrier assembly.



20. Remove seal rings (1) from input clutch assembly.



[7AT: RE7R01A (VQ37VHR)]

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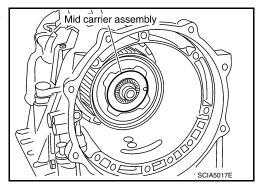
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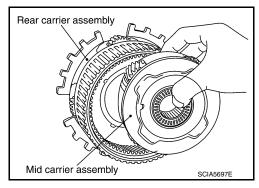
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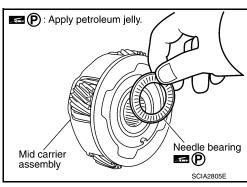
21. Remove mid carrier assembly and rear carrier assembly as a unit.



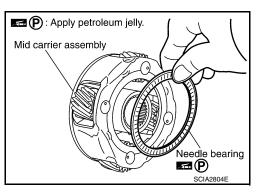
22. Remove mid carrier assembly from rear carrier assembly.



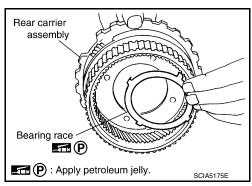
23. Remove needle bearing (front side) from mid carrier assembly.



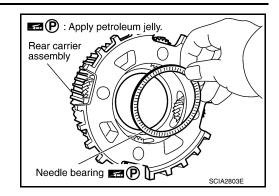
24. Remove needle bearing (rear side) from mid carrier assembly.



25. Remove bearing race from rear carrier assembly.



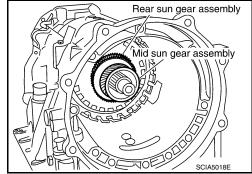
26. Remove needle bearing from rear carrier assembly.



27. Remove mid sun gear assembly, rear sun gear assembly, and high and low reverse clutch hub as a unit.

CAUTION:

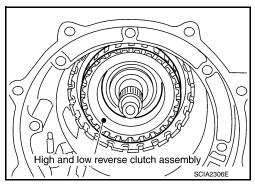
Be careful to remove then with bearing race and needle bearing.



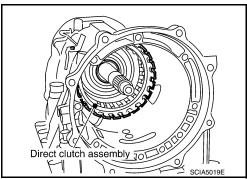
28. Remove high and low reverse clutch assembly from direct clutch assembly.

CAUTION:

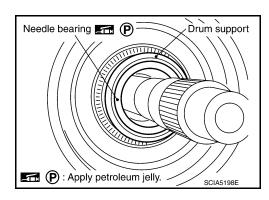
Make sure that needle bearing is installed to the high and low reverse clutch assembly edge surface.



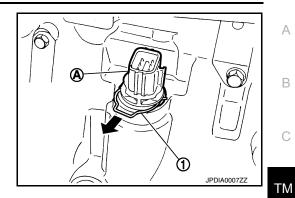
29. Remove direct clutch assembly from reverse brake.



30. Remove needle bearing from drum support.



31. Remove snap ring (1) from joint connector (A).



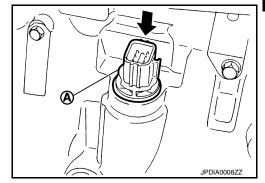
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32. Push joint connector (A).

CAUTION:

Be careful not to damage connector.



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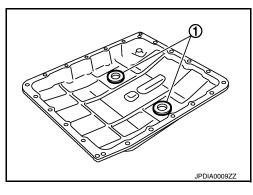
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33. Remove oil pan mounting bolts ().

34. Remove oil pan (2) and oil pan gasket.

1 : Clip ⟨⇒ : Front

35. Remove magnets (1) from oil pan.



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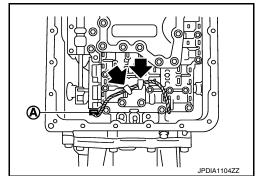
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36. Disconnect output speed sensor connector (A).

CAUTION:

Be careful not to damage connector.

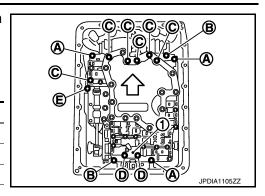
37. Disengage terminal clips (←).



38. Remove control valve & TCM mounting bolts and clip (1) from the control valve & TCM.

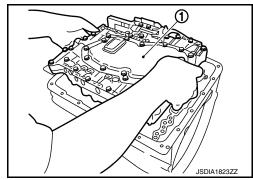
<□ : Front

| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| А | 43 (1.69) | 3 |
| В | 40 (1.57) | 2 |
| С | 54 (2.13) | 6 |
| D | 50 (1.97) | 2 |
| E* | 50 (1.97) | 1 |

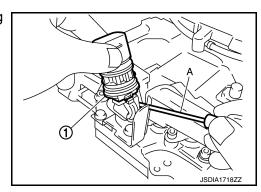


39. Remove the control valve & TCM (1) from transmission case. **CAUTION:**

When removing, never with the manual valve notch and manual plate height. Remove it vertically.



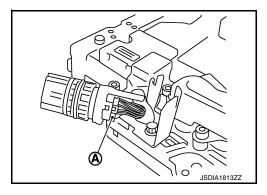
40. Remove joint connector (1) from the control valve & TCM using a flat-bladed screwdriver (A).



41. Disconnect TCM connector (A).

CAUTION:

Be careful not to damage connector.



- 42. Remove rear extension assembly (2WD) or adapter case assembly (AWD) according to the following procedures.
- a. **2WD**

^{*:} Reamer bolt

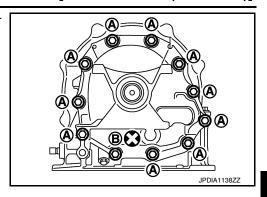
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

 Remove tightening bolts for rear extension assembly and transmission case.

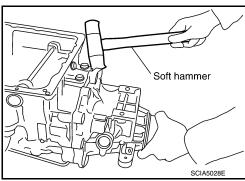
A : Bolt

B : Self-sealing bolt

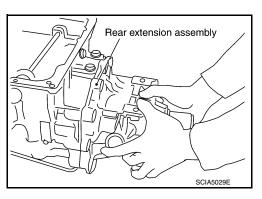


Tap rear extension assembly using a soft hammer. CAUTION:

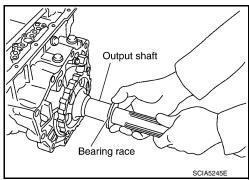
Be careful not to damage adapter case.



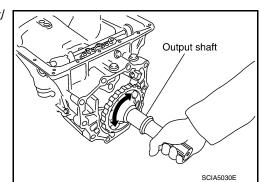
iii. Remove rear extension assembly from transmission case. (With needle bearing.)



iv. Remove bearing race from output shaft.



v. Remove output shaft from transmission case by rotating left/ right.



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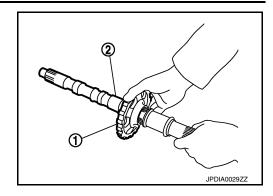
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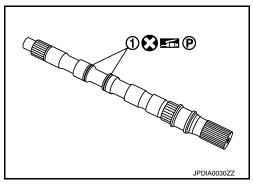
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[7AT: RE7R01A (VQ37VHR)]

vi. Remove parking gear (1) from output shaft (2).



vii. Remove seal rings (1) from output shaft.

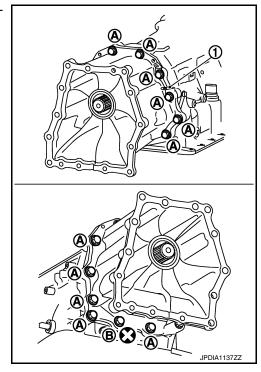


b. **AWD**

i. Remove tightening bolts for adapter case assembly and transmission case.

1 : Bracket A : Bolt

B : Self-sealing bolt

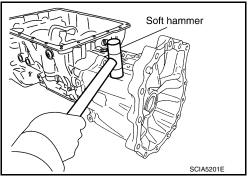


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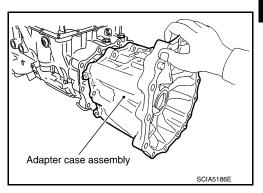
[7AT: RE7R01A (VQ37VHR)]

Tap adapter case assembly using a soft hammer. **CAUTION:**

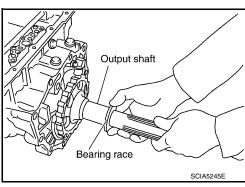
Be careful not to damage adapter case.



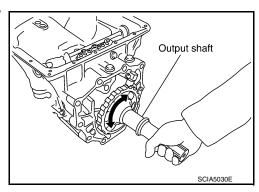
iii. Remove adapter case assembly from transmission case. (With needle bearing)



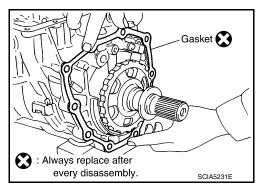
iv. Remove bearing race from output shaft.



Remove output shaft from transmission case by rotating left/ right.



vi. Remove gasket from transmission case.



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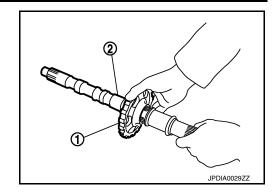
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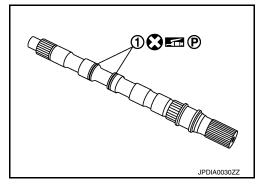
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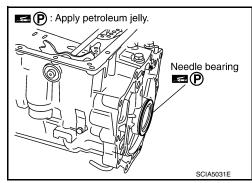
vii. Remove parking gear (1) from output shaft (2).



viii. Remove seal rings (1) from output shaft.



43. Remove needle bearing from transmission case.



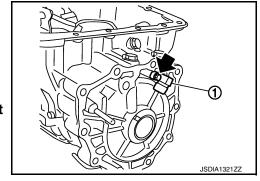
44. Remove output speed sensor (1) from transmission case.



: Bolt

CAUTION:

- · Never subject it to impact by dropping or hitting it.
- Never disassemble.
- Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
- · Never place in an area affected by magnetism.



45. Remove reverse brake snap ring (fixing plate) with 2 flat-bladed screwdrivers.

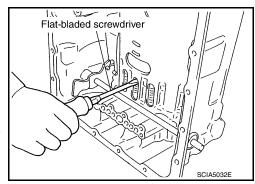
CAUTION:

- Be careful not to scratch transmission case and reverse brake retaining plate.
- Be careful not to damage snap ring.

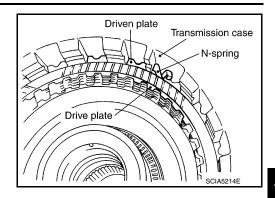
NOTE:

Press out snap ring from the transmission case oil pan side gap with a flat-bladed screwdriver, and remove it using a another screwdriver.

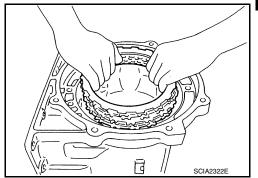
46. Remove reverse brake retaining plate from transmission case.



47. Remove N-spring from transmission case.



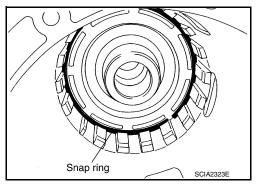
48. Remove reverse brake component part (drive plates, driven plates, and dish plates) from transmission case.



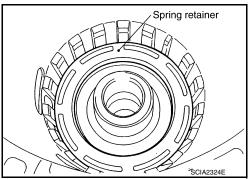
49. Remove snap ring (fixing spring retainer) using a flat-bladed screwdriver.

CAUTION:

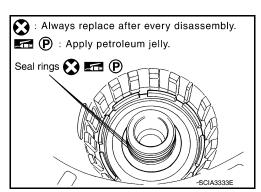
- Be careful not to scratch transmission case and spring retainer.
- Be careful not to damage snap ring.



50. Remove reverse brake spring retainer and reverse brake return spring from transmission case.



51. Remove seal rings from drum support.



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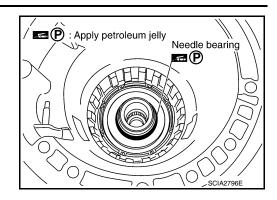
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52. Remove needle bearing from drum support edge surface.

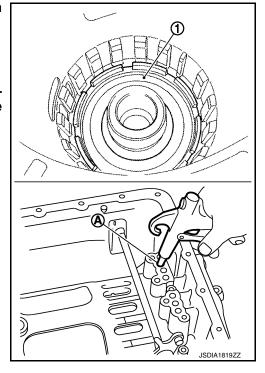


53. Remove reverse brake piston (1) from transmission case with compressed air. Refer to TM-228, "Oil Channel".

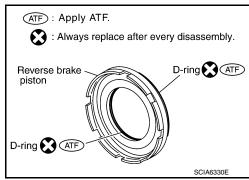
A : Reverse brake pressure hole

CAUTION:

Care should be taken not to abruptly blow air. It makes pistons incline, as the result, it becomes hard to disassemble the pistons.

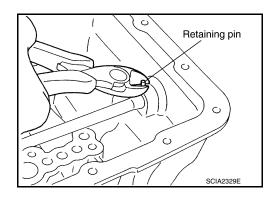


54. Remove D-rings from reverse brake piston.



55. Remove manual shaft retaining pin with pair of nippers. **CAUTION:**

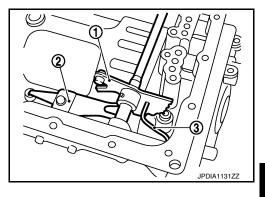
Be careful not to cut retaining pin.



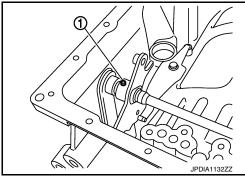
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

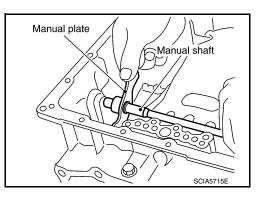
- 56. Remove manual plate (1) from detent spring (2).
- 57. Remove parking rod (3) from manual plate.
- 58. Install manual plate to detent spring.



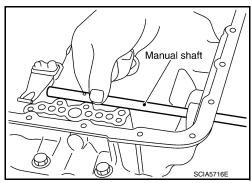
59. Use a pin punch [4 mm (0.16 in) dia. commercial service tool] to knock out retaining pin (1).



60. Remove manual plate from manual shaft.

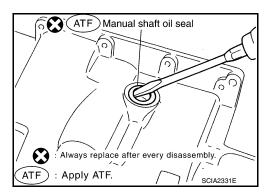


61. Remove manual shaft from transmission case.



62. Remove manual shaft oil seals using a flat-bladed screwdriver. **CAUTION:**

Be careful not to scratch transmission case.



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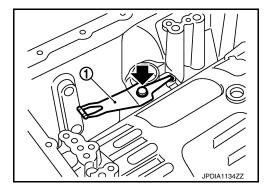
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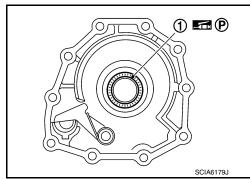
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63. Remove detent spring (1) from transmission case.

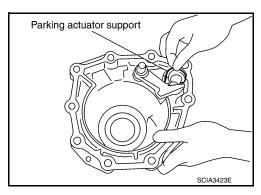




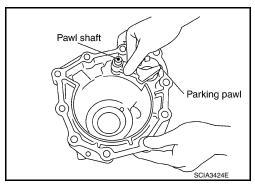
64. Remove needle bearing (1) from rear extension (2WD) or adapter case (AWD).



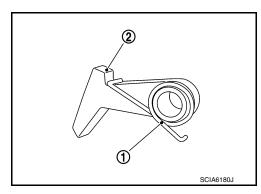
65. Remove parking actuator support from rear extension (2WD) or adapter case (AWD).



66. Remove parking pawl (with return spring) and pawl shaft from rear extension (2WD) or adapter case (AWD).



67. Remove return spring (1) from parking pawl (2).



< UNIT DISASSEMBLY AND ASSEMBLY >

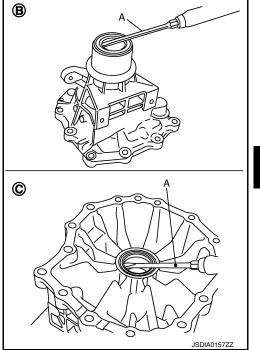
[7AT: RE7R01A (VQ37VHR)]

68. Remove rear oil seal from rear extension (B) or adapter case (C) using a flat-bladed screwdriver (A).

B : 2WD C : AWD

CAUTION:

Be careful not to scratch rear extension (2WD) or adapter case (AWD).

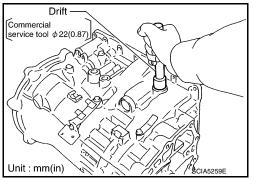


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1. As shown in the figure, use a drift [22 mm (0.87 in) dia. commercial service tool] to drive manual shaft oil seals into the transmission case until it is flush.

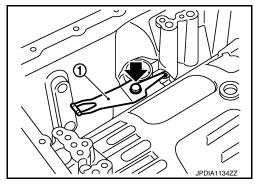
CAUTION:

- Never reuse manual shaft oil seals.
- Apply ATF to manual shaft oil seals.



2. Install detent spring to transmission case. Tighten detent spring bolt to the specified torque.

Bolt :



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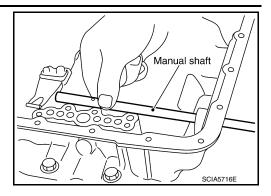
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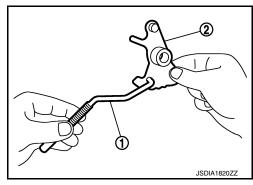
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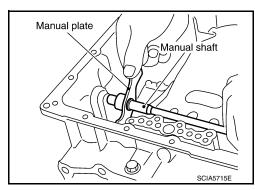
3. Install manual shaft to transmission case.



4. Install parking rod (1) to manual plate (2).



5. Install manual plate (with parking rod) to manual shaft.

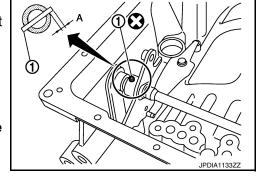


- 6. Install retaining pin (1) into the manual plate and manual shaft.
- a. Fit pinhole of the manual plate to pinhole of the manual shaft with a pin punch.
- b. Use a hammer to tap the retaining pin into the manual plate.

A : Approx. 2 mm (0.08in)

CAUTION:

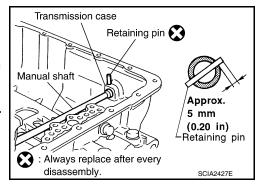
Drive retaining pin to 2±0.5 mm (0.08±0.020 in) over the manual plate.



- 7. Install retaining pin into the transmission case and manual shaft.
- a. Fit pinhole of the transmission case to pinhole of the manual shaft with a pin punch.
- b. Use a hammer to tap the retaining pin into the transmission case.

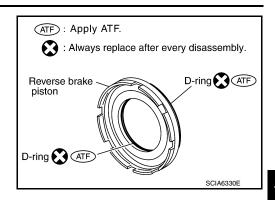
CAUTION:

Drive retaining pin to 5 ± 1 mm (0.20 ±0.04 in) over the transmission case.

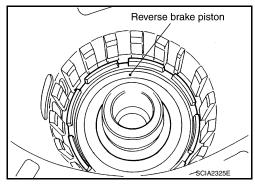


[7AT: RE7R01A (VQ37VHR)]

8. Install D-rings to reverse brake piston.

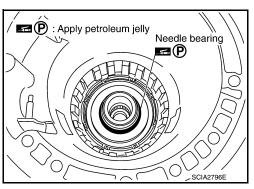


Install reverse brake piston to transmission case.



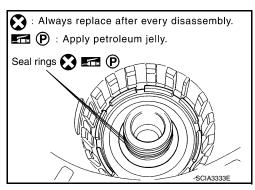
10. Install needle bearing to drum support edge surface. **CAUTION:**

Check the direction of needle bearing. Refer to TM-228. "Location of Needle Bearings and Bearing Races".

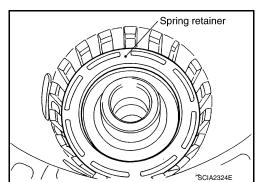


11. Install seal rings to drum support.

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12. Install reverse brake spring retainer and reverse brake return spring to transmission case.



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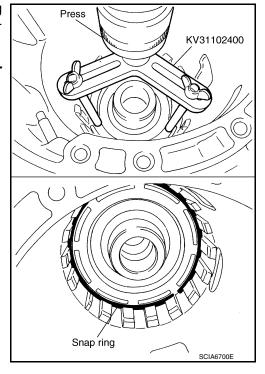
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- 13. Set the clutch spring compressor on reverse brake spring retainer and install snap ring (fixing spring retainer) to transmission case while compressing return spring.
 - **CAUTION:**
 - Securely assemble them using a flat-bladed screwdriver so that snap ring tension is slightly weak.
 - · Be careful not to damage snap ring.



14. Install reverse brake component part (drive plates, driven plates, and dish plates) to transmission case.

1 : Snap ring

2 : Retaining plate

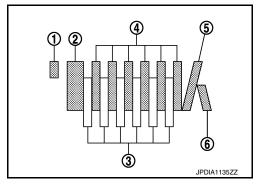
3 : Drive plate (six pieces)4 : Driven plate (six pieces)

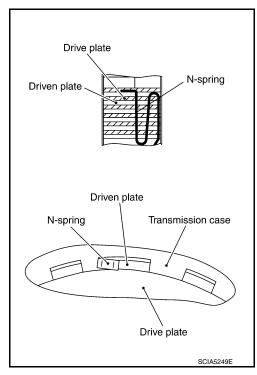
5 : Dish plate 6 : Dish plate

CAUTION:

Check order of plates.

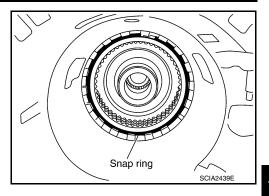
- 15. Assemble N-spring.
- 16. Install reverse brake retaining plate to transmission case.





17. Install snap ring to transmission case. **CAUTION:**

Be careful not to damage snap ring.

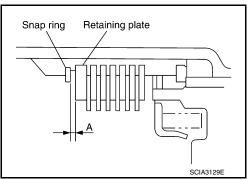


18. Measure clearance between retaining plate and snap ring. If not within specified clearance, select proper retaining plate.

Specified clearance "A"

Standard: Refer to TM-304, "Reverse Brake Clear-ance".

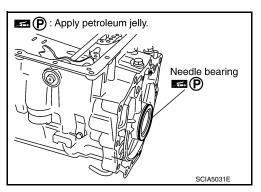
Retaining plate: Refer to TM-304, "Reverse Brake Clearance"



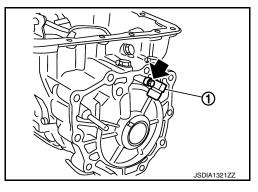
19. Install needle bearing to transmission case.

CAUTION:

Check the direction of needle bearing. Refer to TM-228, "Location of Needle Bearings and Bearing Races".



- 20. Install output speed sensor (1) to transmission case and tighten output speed sensor mounting bolt (←) to the specified torque. CAUTION:
 - · Never subject it to impact by dropping or hitting it.
 - · Never disassemble.
 - Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
 - Never place in an area affected by magnetism.



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< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

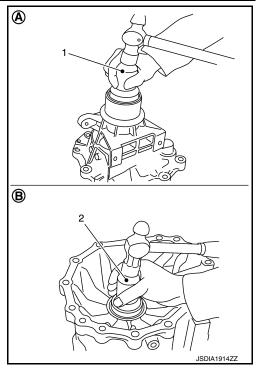
21. As shown in the figure, use the drift to drive rear oil seal into the rear extension (2WD) (A) or adapter case (AWD) (B) until it is flush.

1 : Drift [SST: 33400001 (J-26082)]

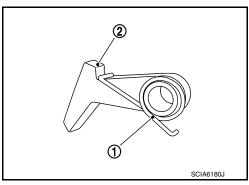
2 : Drift [Commercial service tool Ø64 mm (2.52 in)]

CAUTION:

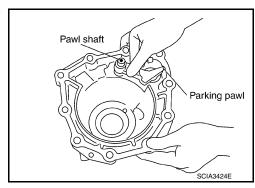
- Never reuse rear oil seal.
- Apply ATF to rear oil seal.



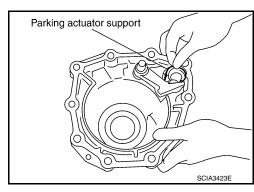
22. Install return spring (1) to parking pawl (2).



23. Install parking pawl (with return spring) and pawl shaft to rear extension (2WD) or adapter case (AWD).



24. Install parking actuator support to rear extension (2WD) or adapter case (AWD).



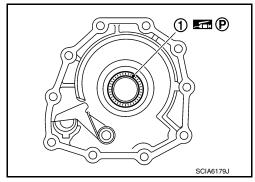
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

25. Install needle bearing (1) to rear extension (2WD) or adapter case (AWD).

CAUTION:

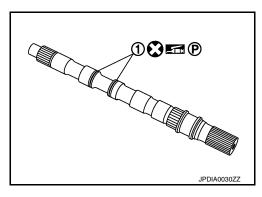
Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



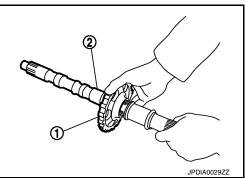
26. Install rear extension assembly (2WD) or adapter case assembly (AWD) according to the following procedures.

a. **2WD**

Install seal rings (1) to output shaft.

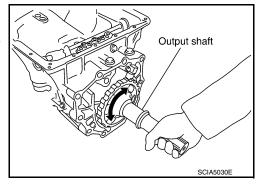


ii. Install parking gear (1) to output shaft (2).



iii. Install output shaft to transmission case. **CAUTION:**

Be careful not to mistake front for rear because both sides looks similar. (Thinner end is front side.)



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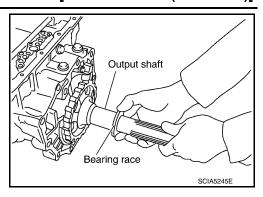
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iv. Install bearing race to output shaft.



v. Apply recommended sealant (Genuine Anaerobic Liquid Gasket or equivalent. Refer to <u>GI-24</u>, "<u>Recommended Chemical Products and Sealants</u>".) to rear extension assembly as shown in the figure.

Sealant starting point and endpoint (A) : Start and finish point shall be in the center of two bolts.

Overlap width of

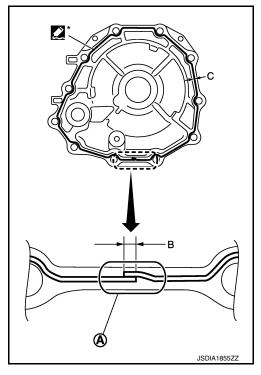
sealant starting point and end- : 3 – 5 mm (0.12 – 0.20 in)

point (B)

Sealant width (C) : 1.0 - 2.0 mm (0.04 - 0.08 in)Sealant height (C) : 0.4 - 1.0 mm (0.016 - 0.04 in)

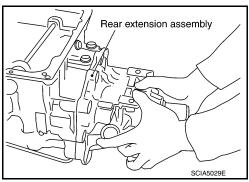
CAUTION:

Completely remove all moisture, oil and old sealant, etc. from the transmission case and rear extension assembly mounting surfaces.



vi. Install rear extension assembly to transmission case. **CAUTION**:

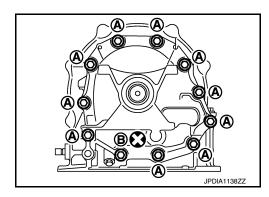
Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the rear extension assembly.



vii. Tighten rear extension assembly bolts to the specified torque.

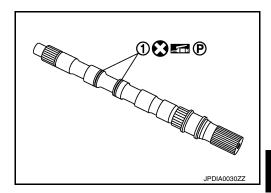
A : Bolt

B : Self-sealing bolt



[7AT: RE7R01A (VQ37VHR)]

- **AWD**
- i. Install seal rings (1) to output shaft.



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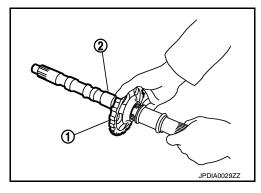
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Install parking gear (1) to output shaft (2).



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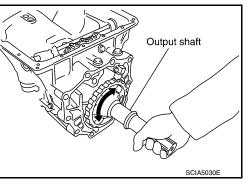
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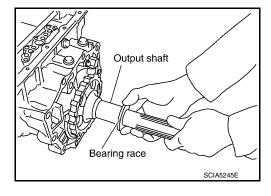
iii. Install output shaft to transmission case.

CAUTION:

Be careful not to mistake front for rear because both sides looks similar. (Thinner end is front side.)



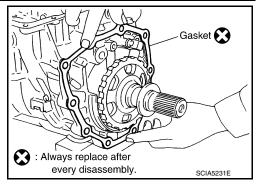
iv. Install bearing race to output shaft.



< UNIT DISASSEMBLY AND ASSEMBLY >

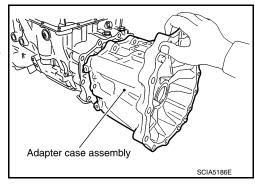
[7AT: RE7R01A (VQ37VHR)]

- v. Install gasket onto transmission case. **CAUTION:**
 - Completely remove all moisture, oil and old gasket, etc. from the transmission case and adapter case assembly mounting surfaces.
 - · Never reuse gasket.



vi. Install adapter case assembly to transmission case. **CAUTION:**

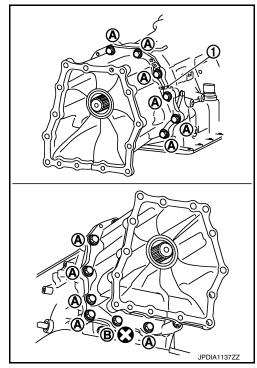
Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the adapter case assembly.



vii. Tighten adapter case assembly bolts to the specified torque.

1 : Bracket A : Bolt

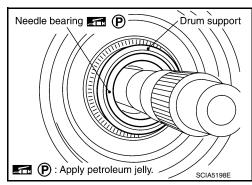
B : Self-sealing bolt



27. Install needle bearing to drum support.

CAUTION:

Check the direction of needle bearing. Refer to TM-228, "Location of Needle Bearings and Bearing Races".



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

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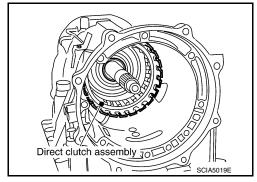
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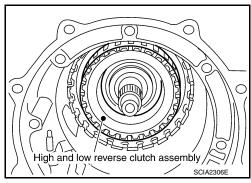
28. Install direct clutch assembly to reverse brake.

CAUTION:

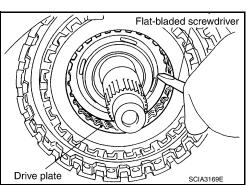
Make sure that drum support edge surface and direct clutch inner boss edge surface come to almost same place.



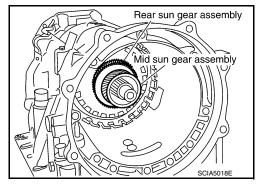
29. Install high and low reverse clutch assembly to direct clutch.



30. Align the drive plate using a flat-bladed screwdriver.



31. Install high and low reverse clutch hub, mid sun gear assembly, and rear sun gear assembly as a unit.



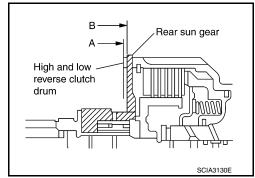
CAUTION:

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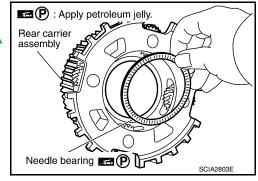
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Make sure that portion "A" of high and low reverse clutch drum protrudes approximately 2 mm (0.08 in) beyond portion "B" of rear sun gear.



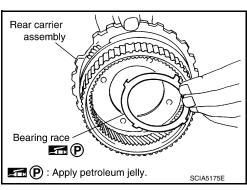
Install needle bearing to rear carrier assembly.
 CAUTION:

Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

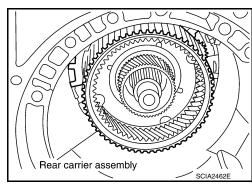


Install bearing race to rear carrier assembly.
 CAUTION:

Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

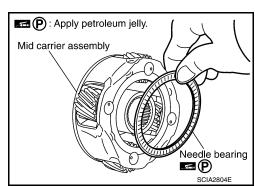


34. Install rear carrier assembly to direct clutch drum.



Install needle bearing (rear side) to mid carrier assembly.
 CAUTION:

Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

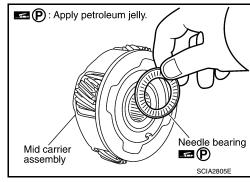


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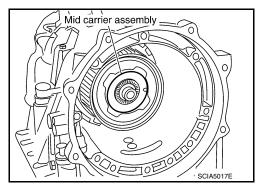
[7AT: RE7R01A (VQ37VHR)]

36. Install needle bearing (front side) to mid carrier assembly. **CAUTION:**

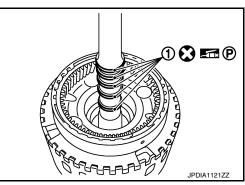
Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



37. Install mid carrier assembly to rear carrier assembly.

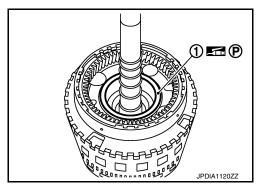


38. Install seal rings (1) to input clutch assembly.



Install needle bearing (1) to front carrier assembly.
 CAUTION:

Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



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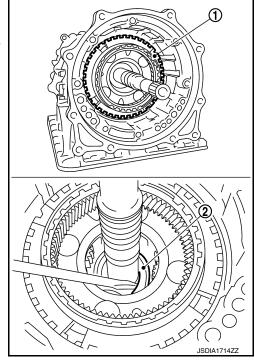
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

40. Install input clutch assembly (with front carrier assembly and rear internal gear) (1) to transmission case.

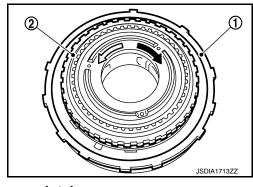
CAUTION:

Check that the needle bearing (2) is securely positioned. If the needle bearing position is misaligned, adjust it to the specified position.



- 41. Install 1st one-way clutch (1) to front brake hub (with under drive carrier) (2).
- 42. Check operation of 1st one-way clutch.
- a. Hold 1st one-way clutch.
- b. Check front brake hub for correct locking and unlocking directions.

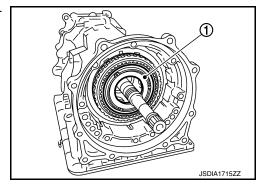
: Unlocked



CAUTION:

If not shown in figure, check installation direction of 1st one-way clutch.

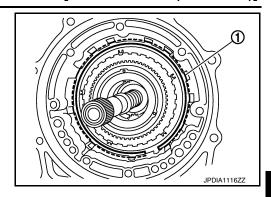
43. Install under drive carrier (with 1st one-way clutch) (1) to transmission case.



44. Install snap ring (1) to transmission case.

CAUTION:

Be careful not to damage snap ring.



45. Install front brake component part (retaining plates, drive plates, and driven plate) to transmission case.

1 : Retaining plate (thin)

2 : Drive plate3 : Driven plate

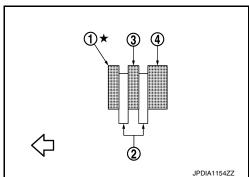
4 : Retaining plate (thick)

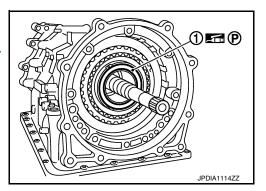
CAUTION:

Check order of plates.

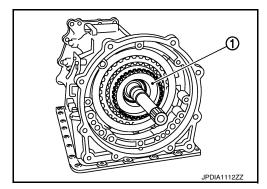
Install needle bearing (1) to under drive carrier assembly.
 CAUTION:

Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

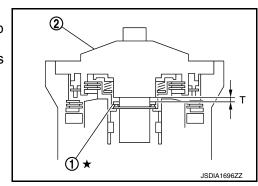




47. Install under drive sun gear (1) to under drive carrier assembly.



- 48. Adjustment of total end play "T".
 - Measure clearance between bearing race (1) and oil pump cover (2).
 - Select proper thickness of bearing race so that end play is within specifications.



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Measure dimensions "K" and "L", and calculate dimension "J".

1 : Transmission case2 : Under drive sun gear

A : Straightedge

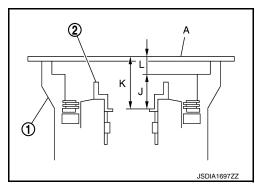
"J" : Distance between the oil pump fitting surface of transmission case and the needle bearing mating surface of under drive sun gear.

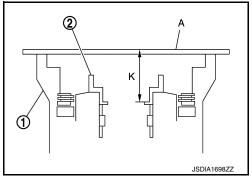
$$J = K - L$$

 Measure dimension "K" between the converter housing fitting surface of transmission case and the needle bearing mating surface of under drive sun gear.

CAUTION:

- Never change the straightedge (A) installation position before the completion of "L" measurement.
- Measure dimension "K" in at least three places, and take the average.





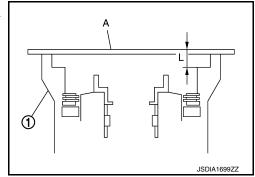
ii. Measure dimension "L" between the converter housing fitting surface of transmission case and the oil pump fitting surface of transmission case.

CAUTION:

Measure dimension "L" in at least three places, and take the average.

iii. Calculate dimension "J".

$$J = K - L$$

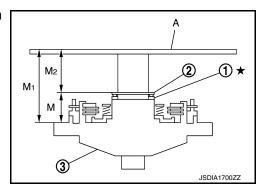


b. Measure dimensions "M1" and "M2", and calculate dimension "M".

: Bearing race
 : Needle bearing
 : Oil pump assembly
 : Straightedge

"M" : Distance between the transmission case fitting surface of oil pump and the needle bearing on oil pump.

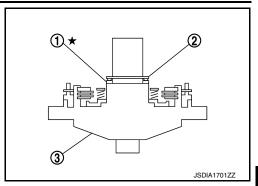
$$M = M_1 - M_2$$



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

i. Place bearing race (1) and needle bearing (2) on oil pump assembly (3).

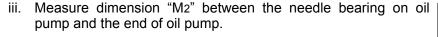


ii. Measure dimension "M1" between the transmission case fitting surface of oil pump and the end of oil pump.

: Bearing race
 : Needle bearing
 : Oil pump assembly
 : Straightedge



Measure dimension " M_1 " in at least three places, and take the average.



: Bearing race
 : Needle bearing
 : Oil pump assembly
 : Straightedge

CAUTION:

Measure dimension " M_2 " in at least three places, and take the average.

iv. Calculate dimension "M".



c. Adjust total end play "T".

1 : Bearing race2 : Oil pump assembly

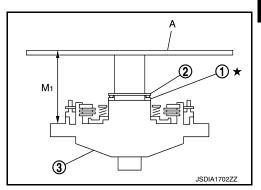
T = J - M

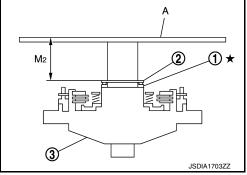
Revision: 2015 February

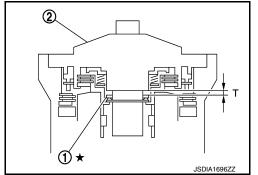
Total end play "T" : Refer to TM-303, "Total End Play".

• Select proper thickness of bearing race so that total end play is within specifications.

Bearing races : Refer to TM-303, "Total End Play".







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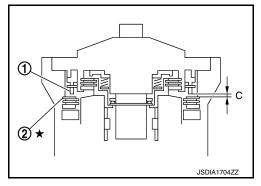
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< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

49. Adjustment of front brake clearance "C".

- Measure clearance between front brake piston (1) and front brake retaining plate (2).
- Select proper thickness of front brake retaining plat so that clearance is within specifications.



a. Measure dimensions "O" and "P", and calculate dimension "N".

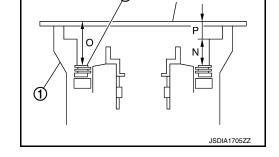
1 : Transmission case

2 : Front brake retaining plate

A : Straightedge

"N" : Distance between the oil pump fitting surface of transmission case and the front brake retaining plate.

$$N = O - P$$



i. Measure dimension "O" between the converter housing fitting surface of transmission case and the front brake retaining plate.

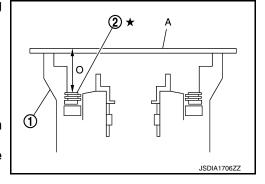
1 : Transmission case

2 : Front brake retaining plate

A : Straightedge

CAUTION:

- Never change the straightedge (A) installation position before the completion of "P" measurement.
- Measure dimension "O" in at least three places, and take the average.



 Measure dimension "P" between the converter housing fitting surface of transmission case and the oil pump fitting surface of transmission case.

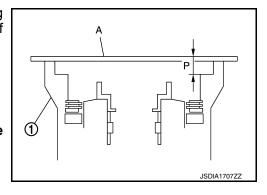
1 : Transmission caseA : Straightedge

CAUTION:

Measure dimension "P" in at least three places, and take the average.

iii. Calculate dimension "N".





< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

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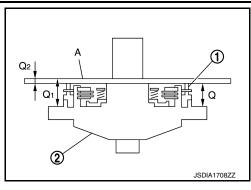
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b. Measure dimensions "Q1" and "Q2", and calculate dimension "Q".

: Front brake piston
 : Oil pump assembly
 : Straightedge

"Q" : Distance between the transmission case fitting surface of oil pump and the front brake piston.

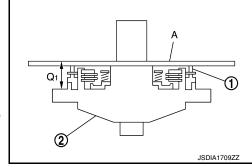
 $Q = Q_1 - Q_2$



i. Measure dimension "Q1" between the transmission case fitting surface of oil pump and the straightedge on front brake piston.

: Front brake piston
 : Oil pump assembly
 : Straightedge

CAUTION:

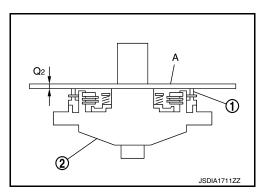


ii. Measure dimension "Q2" of the straightedge.

: Front brake piston
 : Oil pump assembly
 : Straightedge

iii. Calculate dimension "Q".

 $Q = Q_1 - Q_2$



c. Adjust front brake clearance "C".

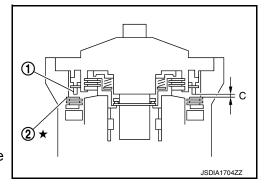
1 : Front brake piston

2 : Front brake retaining plate

C = N - Q

Front brake clearance "C" : Refer to TM-304, "Front Brake Clearance".

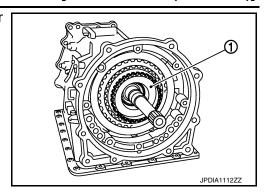
• Select proper thickness of retaining plate so that front brake clearance is within specifications.



Retaining plate : Refer to TM-304, "Front Brake Clearance".

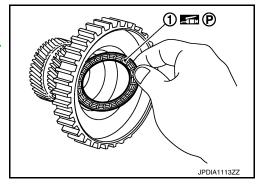
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50. Remove under drive sun gear (1) from under drive carrier assembly.

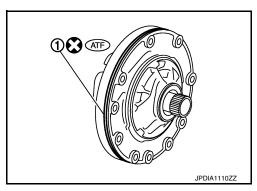


51. Install needle bearing (1) to under drive sun gear. **CAUTION:**

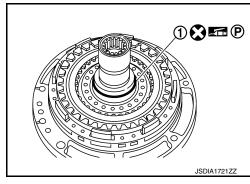
Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



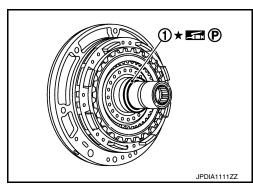
52. Install O-ring (1) to oil pump assembly.



53. Install seal ring (1) to oil pump assembly.



54. Install bearing race (1) to oil pump assembly.



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

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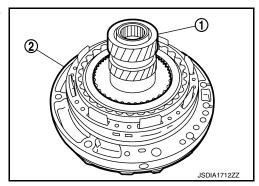
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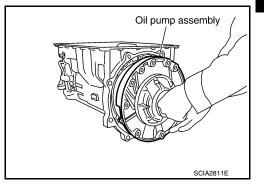
55. Install under drive sun gear (with needle bearing) (1) to oil pump assembly (2).



56. Install oil pump assembly (with under drive sun gear) to transmission case.

CAUTION:

Apply ATF to oil pump bearing.



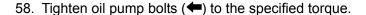
57. Apply recommended sealant to oil pump assembly as shown in the figure.

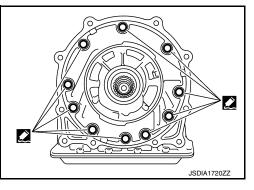


: Genuine RTV silicone sealant or equivalent. Refer to GI-24. "Recommended Chemical Products and Sealants".

CAUTION:

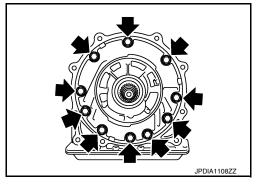
Completely remove all moisture, oil and old sealant, etc. from the oil pump mounting bolts and oil pump mounting bolt mounting surfaces.

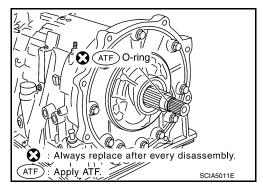




59. Install O-ring to input clutch assembly.

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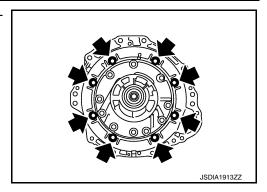
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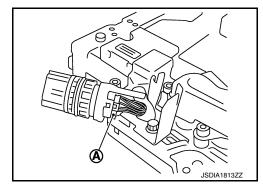
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60. Install converter housing to transmission case, and tighten converter housing bolts (←) to the specified torque.



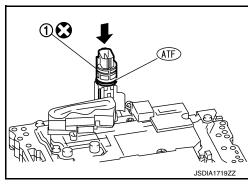
61. Connect TCM connector (A) to joint connector.



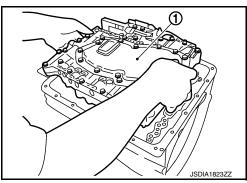
62. Install joint connector (1) to the control valve & TCM.

CAUTION:

Apply ATF to O-ring of joint connector.



63. Install the control valve & TCM (1) to transmission case.

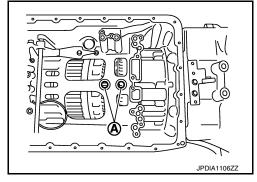


CAUTION:

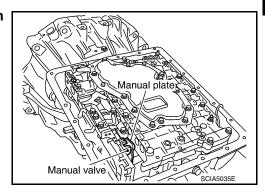
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

- Make sure that input speed sensor securely installs input speed sensor holes (A).
- Hang down output speed sensor harness toward outside so as not to disturb installation of the control valve & TCM
- Adjust joint connector of the control valve & TCM to terminal hole of transmission case.



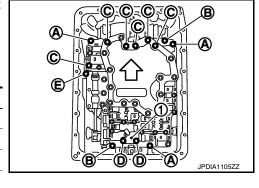
 Assemble it so that manual valve cutout is engaged with manual plate projection.



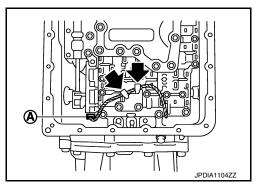
64. Install bolts and clip (1) to the control valve & TCM. Tighten bolt (E) to the specified torque before tightening the other than bolts.

⟨⇒ : Front

| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| A | 43 (1.69) | 3 |
| В | 40 (1.57) | 2 |
| С | 54 (2.13) | 6 |
| D | 50 (1.97) | 2 |
| E* | 50 (1.97) | 1 |



- *: Reamer bolt
- 65. Connect output speed sensor connector (A).
- 66. Engage output speed sensor harness with terminal clips ().



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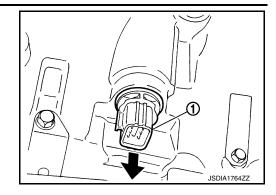
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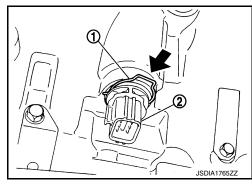
67. Pull down joint connector (1).

CAUTION:

Be careful not to damage connector.



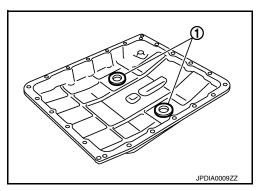
68. Install snap ring (1) to joint connector (2).



- 69. Install magnets (1) to oil pan.
- 70. Install oil pan gasket to transmission case.

CAUTION:

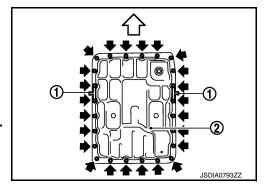
- Never reuse oil pan gasket.
- Install it in the direction to align hole positions.
- Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface.



- 71. Install oil pan (2) and clips (1) to transmission case.
 - <□ : Front
 - : Oil pan mounting bolt

CAUTION:

- · Be careful not to pinch harnesses.
- Completely remove all moisture, oil and old gasket, etc. from oil pan mounting surface.



- 72. Tighten oil pan mounting bolts to the specified torque in numerical order shown in the figure after temporarily tightening them. Tighten oil pan mounting bolts to the specified torque.
 - ⟨□ : Front

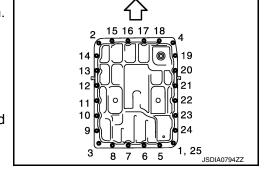
CAUTION:

Never reuse oil pan mounting bolts.

73. Install drain plug to oil pan. Tighten drain plug to the specified torque.

CAUTION:

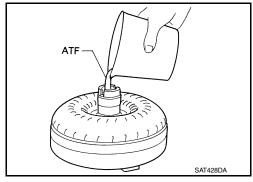
Never reuse drain plug gasket.



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

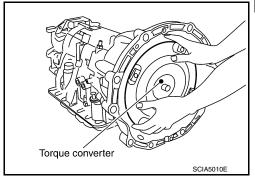
- 74. Pour ATF into torque converter.
 - Approximately 2 liter (2-1/8 US qt, 1-3/4 Imp qt) of ATF is required for a new torque converter.
 - When reusing old torque converter, add the same amount of ATF as was drained.



75. Install torque converter while aligning notches of torque converter with notches of oil pump.

CAUTION:

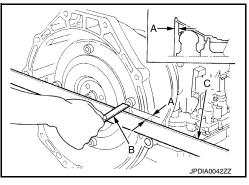
Install torque converter while rotating it.



76. Measure dimension "A" to make sure that torque converter is in proper position.

B : ScaleC : Straightedge

Dimension "A" : Refer to TM-303, "Torque Converter".



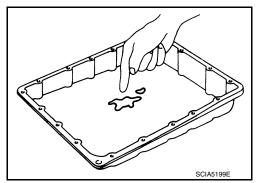
Inspection INFOID:000000010579047

INSPECTION AFTER DISASSEMBLY

Oil Pan

Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.

 If frictional material is detected, perform A/T fluid cooler cleaning. Refer to <u>TM-177</u>, "Cleaning".



Torque Converter

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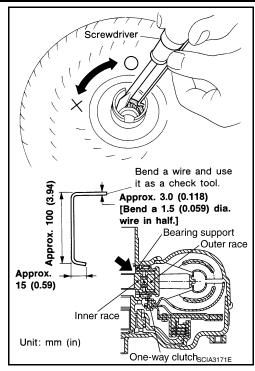
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< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

Check torque converter one-way clutch using a check tool as shown at figure.

- 1. Insert a check tool into the groove of bearing support built into one-way clutch outer race.
- 2. When fixing bearing support with a check tool, rotate one-way clutch spline using a screwdriver.
- Make sure that inner race rotates clockwise only. If not, replace torque converter assembly.

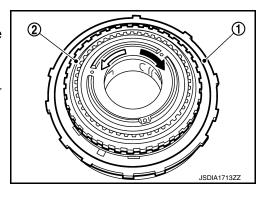


1st One-way Clutch

Check operation of 1st one-way clutch.

- 1. Install 1st one-way clutch (1) to front brake hub (with under drive carrier).
- 2. Hold 1st one-way clutch.
- 3. Check front brake hub for correct locking and unlocking directions. If necessary, replace 1st one-way clutch.

← : Unlocked< : Locked



Under Drive Sun Gear

Check for deformation, fatigue or damage. If necessary, replace the under drive sun gear.

Mid Carrier Assembly

Check for deformation, fatigue or damage. If necessary, replace the mid carrier assembly.

Rear Carrier Assembly

Check for deformation, fatigue or damage. If necessary, replace the rear carrier assembly.

Reverse Brake Retaining Plate/Drive Plates/Driven Plates/Dish Plates

Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

Front Brake Retaining Plates/Drive Plates/Driven Plate

Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

Each Snap Ring

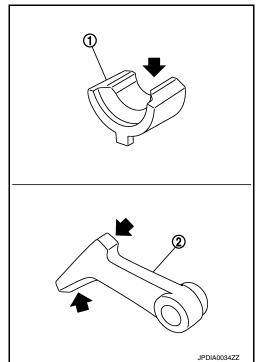
Check for deformation, fatigue or damage. If necessary, replace the snap ring.

Parking Actuator Support and Parking Pawl

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

If the contact surface on parking actuator support (1) and parking pawl (2) has excessive wear, abrasion, bend or any other damage, replace the components.



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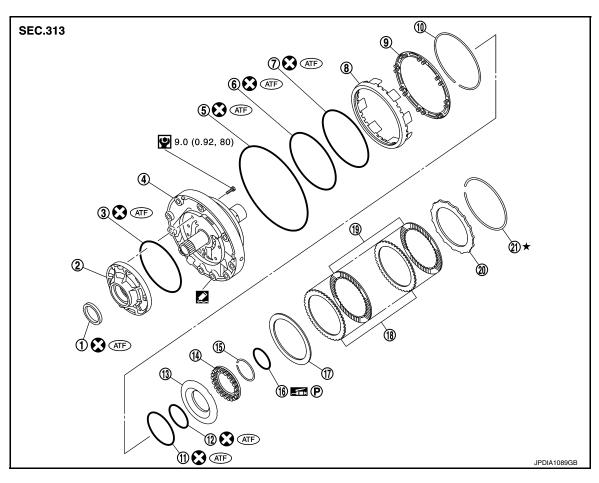
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Exploded View



- 1. Oil pump housing oil seal
- 4. Oil pump cover
- 7. D-ring
- 10. Snap ring
- 13. 2346 brake piston
- 16. Seal ring
- 19. 2346 brake drive plate

- 2. Oil pump housing
- 5. O-ring
- 8. Front brake piston
- 11. D-ring
- 14. 2346 brake spring retainer
- 17. 2346 brake dish plate
- 20. 2346 brake retaining plate

- 3. O-ring
- 6. D-ring
- 9. Front brake spring retainer

[7AT: RE7R01A (VQ37VHR)]

- 12. D-ring
- 15. Snap ring
- 18. 2346 brake driven plate
- 21. Snap ring

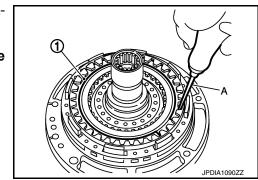
Apply Genuine RTV silicone sealant or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants". Refer to GI-4, "Components" for symbols not described on the above.

Disassembly

 Remove snap ring (1) from oil pump assembly using a flatbladed screwdriver (A).

CAUTION:

- Be careful not to scratch oil pump cover and 2346 brake retaining plate.
- · Be careful not to damage snap ring.

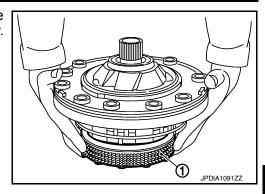


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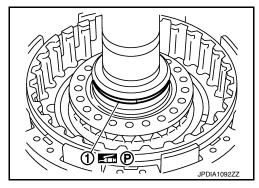
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

Remove 2346 brake component part (retaining plate, drive plates, driven plates, and dish plate) (1) from oil pump assembly.



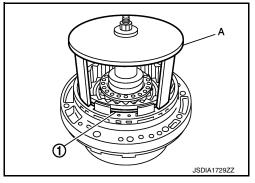
3. Remove seal ring (1) from oil pump assembly.



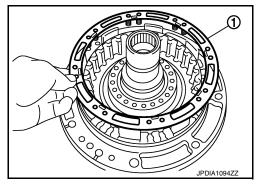
4. Set the clutch spring compressor (SST: KV31103800) (A) on front brake spring retainer and remove snap ring (fixing front brake spring retainer) (1) from oil pump assembly while compressing return spring.

CAUTION:

Be careful not to expand snap ring excessively.



5. Remove front brake spring retainer (1) from oil pump assembly.

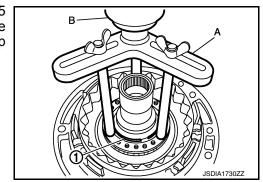


6. Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on 2346 brake spring retainer and remove snap ring (fixing 2346 brake spring retainer) (1) from oil pump assembly while compressing return spring.

> В : Press

CAUTION:

Be careful not to expand snap ring excessively.



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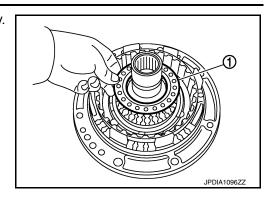
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< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

7. Remove 2346 brake spring retainer (1) from oil pump assembly.

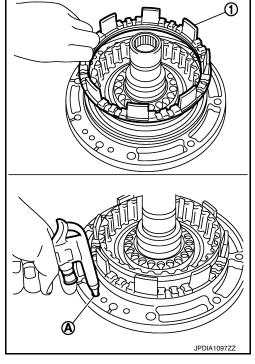


8. Remove front brake piston (1) from oil pump assembly with compressed air. Refer to TM-228, "Oil Channel".

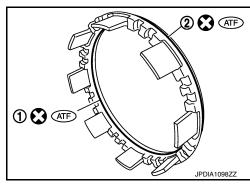
A : Front brake pressure hole

CAUTION:

Care should be taken not to abruptly blow air. It makes piston incline, as the result, it becomes hard to disassemble the piston.



9. Remove D-ring (inner) (1) and D-ring (outer) (2) from front brake piston.



< UNIT DISASSEMBLY AND ASSEMBLY >

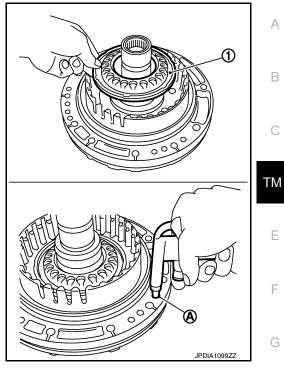
[7AT: RE7R01A (VQ37VHR)]

10. Remove 2346 brake piston (1) from oil pump assembly with compressed air. Refer to TM-228, "Oil Channel".

: 2346 brake pressure hole

CAUTION:

Care should be taken not to abruptly blow air. It makes piston incline, as the result, it becomes hard to disassemble the piston.



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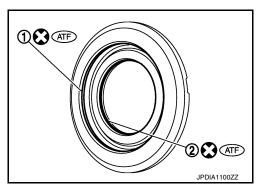
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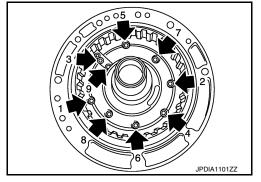
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11. Remove D-ring (large) (1) and D-ring (small) (2) from 2346 brake piston.



12. loosen bolts in numerical order shown in the figure and remove oil pump housing from oil pump cover.

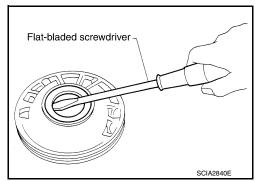




13. Remove oil pump housing oil seal using a flat-bladed screwdriver.

CAUTION:

Be careful not to scratch oil pump housing.

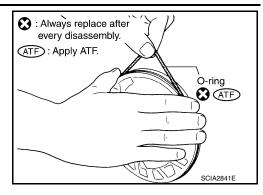


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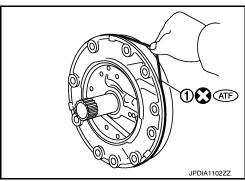
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

14. Remove O-ring from oil pump housing.

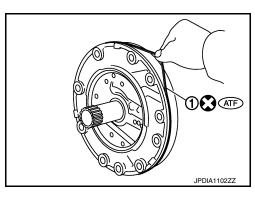


15. Remove O-ring (1) from oil pump cover.

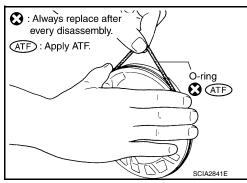


Assembly INFOID:000000010579050

1. Install O-ring (1) to oil pump cover.



2. Install O-ring to oil pump housing.



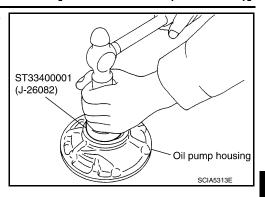
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

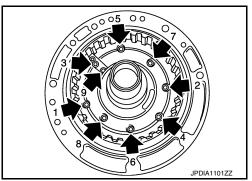
3. Using the drift, install oil pump housing oil seal to the oil pump housing until it is flush.

CAUTION:

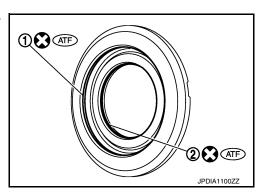
- Never reuse oil seal.
- Apply ATF to oil seal.



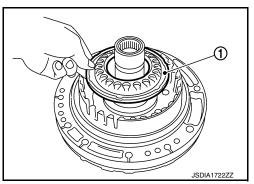
Install oil pump housing to oil pump cover and tighten bolts (←)
to the specified torque in numerical order shown in the figure
after temporarily tightening them.



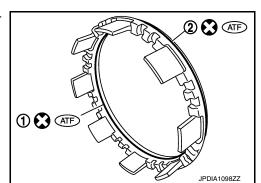
5. Install D-ring (large) (1) and D-ring (small) (2) to 2346 brake piston.



6. Install 2346 brake piston (1) to oil pump assembly.



Install D-ring (inner) (1) and D-ring (outer) (2) to front brake piston.



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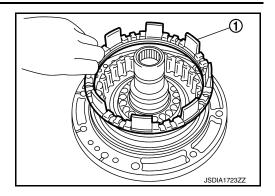
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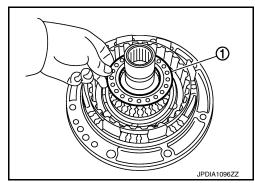
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

8. Install front brake piston (1) to oil pump assembly.



9. Install 2346 brake spring retainer (1) to oil pump assembly.

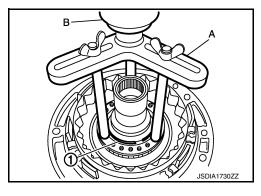


Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on 2346 brake spring retainer and install snap ring (fixing 2346 brake spring retainer) (1) to oil pump assembly while compressing return spring.

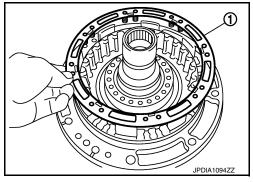
B : Press

CAUTION:

Be careful not to expand snap ring excessively.



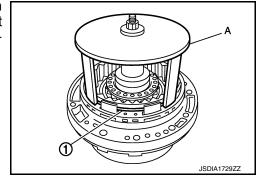
11. Install front brake spring retainer (1) to oil pump assembly.



12. Set the clutch spring compressor (SST: KV31103800) (A) on front brake spring retainer and install snap ring (fixing front brake spring retainer) (1) to oil pump assembly while compressing return spring.

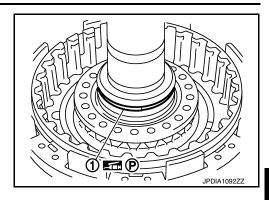
CAUTION:

Be careful not to expand snap ring excessively.



< UNIT DISASSEMBLY AND ASSEMBLY >

13. Install seal ring (1) to oil pump assembly.



[7AT: RE7R01A (VQ37VHR)]

14. Install 2346 brake component part (retaining plate, drive plates, driven plates, and dish plate) to oil pump assembly.

> 1 : Dish plate

2 : Driven plate (four pieces)

3 : Drive plate (four pieces)

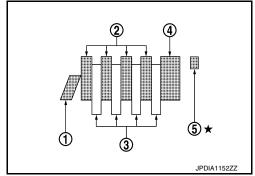
: Retaining plate

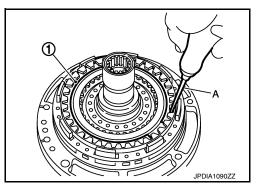
5 : Snap ring

CAUTION:

Check the order of plates.

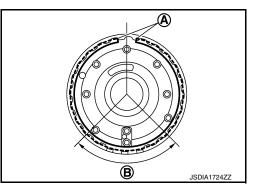
15. Install snap ring (1) to oil pump assembly using a flat-bladed screwdriver (A).





CAUTION:

Never install snap ring mating part (A) to the clearance groove [(B) shown in the figure] of oil pump cover.



Inspection and Adjustment

INSPECTION AFTER DISASSEMBLY

Each Snap Ring

Check for deformation, fatigue or damage. If necessary, replace snap ring.

Each Spring Retainer

Check for deformation, fatigue or damage. If necessary, replace spring retainer.

2346 Brake Retaining Plate/Drive Plates/Driven Plate/Dish Plate

TM-283 **Revision: 2015 February** 2015 QX70 Α

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[7AT: RE7R01A (VQ37VHR)]

Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

INSPECTION AFTER ASSEMBLY

2346 Brake Clearance

Set a dial indicator (A) as shown in the figure. Blow air into 2346 brake oil pressure hole (B), and measure 2346 brake clearance. If clearance is outside the specified value, adjust clearance by selecting an appropriate snap ring (1). Refer to TM-228, "Oil Channel".

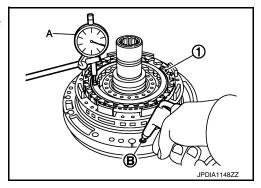
Air pressure : 300kPa (3.06 kg/cm², 43.5 psi)

2346 brake : Refer to TM-304, "2346 Brake Clear-

clearance <u>ance"</u>.

CAUTION:

Never exceed the specified air pressure value.



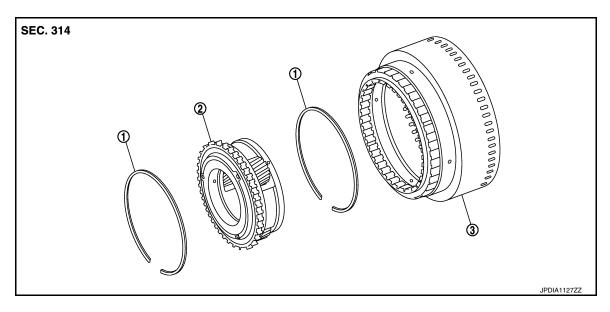
UNDER DRIVE CARRIER, FRONT BRAKE HUB

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

UNDER DRIVE CARRIER, FRONT BRAKE HUB

Exploded View



1. Snap ring

- 2. Under drive carrier assembly
- 3. Front brake hub

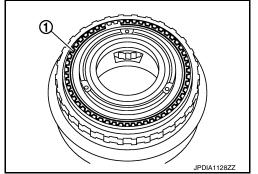
Disassembly

1. Remove snap ring (1) from front brake hub using a flat-bladed screwdriver.

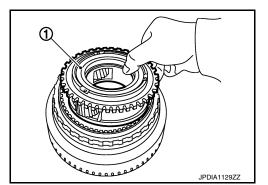
CAUTION:

- Be careful not to scratch front brake hub and under drive carrier assembly.
- Be careful not to damage snap ring.

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



2. Remove under drive carrier assembly (1) from front brake hub.



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UNDER DRIVE CARRIER, FRONT BRAKE HUB

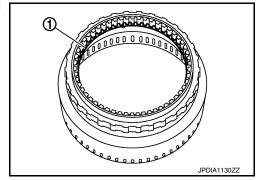
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

3. Remove snap ring (1) from front brake hub using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch front brake hub.
- Be careful not to damage snap ring.

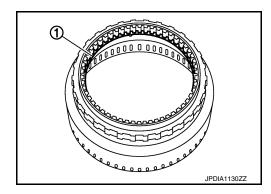


Assembly

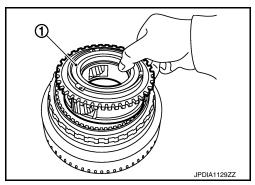
1. Install snap ring (1) to front brake hub.

CAUTION:

Be careful not to damage snap ring.



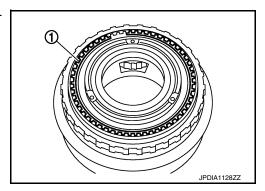
2. Install under drive carrier assembly (1) to front brake hub.



Install snap ring (1) to front brake hub using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch front brake hub.
- Be careful not to damage snap ring.



Inspection

INSPECTION AFTER DISASSEMBLY

- Each Snap Ring
 - Check for deformation, fatigue or damage. If necessary, replace snap ring.
- Under Drive Carrier Assembly
 - Check for deformation, fatigue or damage. If necessary, replace under drive carrier assembly.
- · Front Brake Hub

UNDER DRIVE CARRIER, FRONT BRAKE HUB

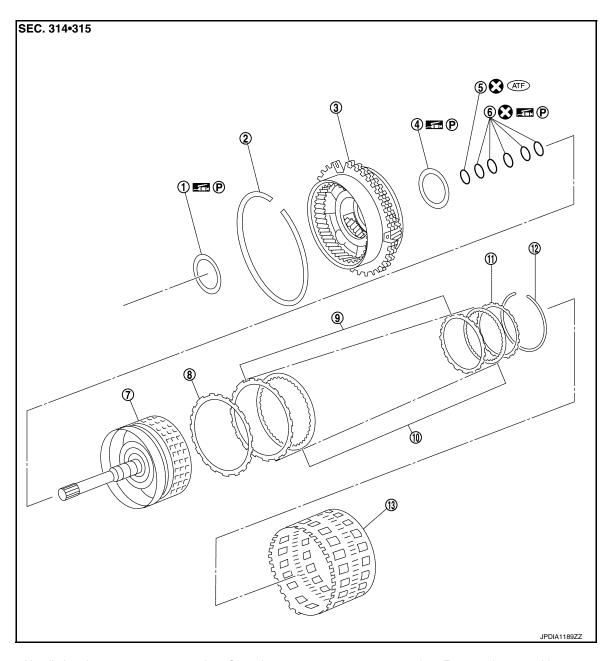
[7AT: RE7R01A (VQ37VHR)] < UNIT DISASSEMBLY AND ASSEMBLY > Check for deformation, fatigue or damage. If necessary, replace front brake hub. Α В С TM Е F G Н J Κ L M Ν

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FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

Exploded View



- 1. Needle bearing
- 4. Needle bearing
- 7. Input clutch drum
- 10. Input clutch drive plate
- 13. Rear internal gear
- 2. Snap ring
- 5. O-ring
- 8. Input clutch dish plate
- 11. Input clutch retaining plate
- 3. Front carrier assembly

[7AT: RE7R01A (VQ37VHR)]

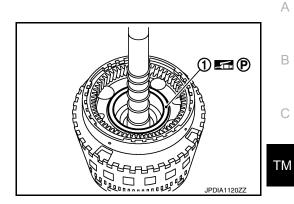
- 6. Seal ring
- 9. Input clutch driven plate
- 12. Snap ring

Refer to $\underline{\mbox{GI-4.}\mbox{"Components"}}$ for symbols in the figure.

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)] Disassembly

1. Remove needle bearing (1) from front carrier assembly.



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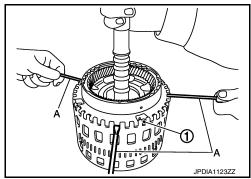
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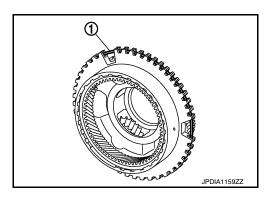
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- 2. Compress snap ring (1) using flat-bladed screwdrivers (A). **CAUTION:**
 - · Be careful not to scratch rear internal gear.
 - · Be careful not to damage snap ring.
- 3. Remove front carrier assembly and input clutch assembly from rear internal gear.
- 4. Remove front carrier assembly from input clutch assembly.

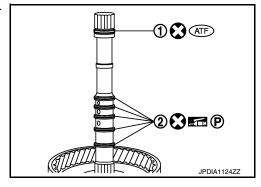


6. Remove snap ring (1) from front carrier assembly. **CAUTION:**

Be careful not to expand snap ring excessively.



Remove O-ring (1) and seal rings (2) from input clutch assembly.



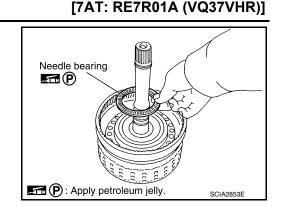
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< UNIT DISASSEMBLY AND ASSEMBLY >

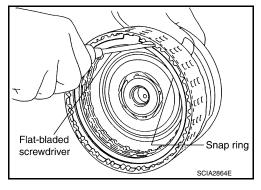
8. Remove needle bearing from input clutch assembly.



9. Remove snap ring from input clutch drum using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch rear input clutch drum and input clutch retaining plate.
- Be careful not to damage snap ring.
- 10. Remove input clutch component part (drive plates, driven plates, retaining plate, and dish plate) from input clutch drum.



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Assembly

1. Install input clutch component part (dish plate, drive plates, driven plates, and retaining plate) to input clutch drum.

1 : Snap ring

2 : Retaining plate

3 : Drive plate (six pieces)

4 : Driven plate (six pieces)

5 : Dish plate

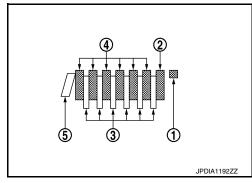
CAUTION:

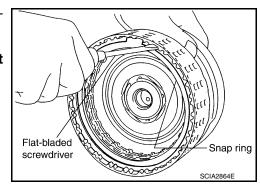
Check order of plates.

Install snap ring to input clutch drum using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch input clutch drum and input clutch retaining plate.
- Be careful not to damage snap ring.

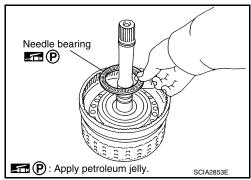




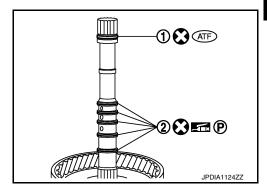
[7AT: RE7R01A (VQ37VHR)] < UNIT DISASSEMBLY AND ASSEMBLY >

Install needle bearing to input clutch assembly. **CAUTION:**

Check the direction of needle bearing. Refer to TM-228. "Location of Needle Bearings and Bearing Races".

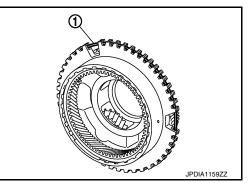


Install O-ring (1) and seal rings (2) to input clutch assembly.

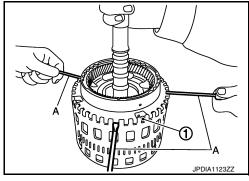


Install snap ring (1) to front carrier assembly.

Be careful not to expand snap ring excessively.

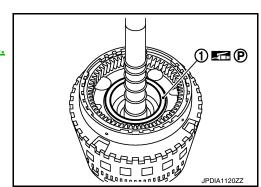


- Compress snap ring (1) using flat-bladed screwdrivers (A).
 - Be careful not to scratch rear internal gear.
 - · Be careful not to damage snap ring.
- 7. Install front carrier assembly and input clutch assembly to rear internal gear.



8. Install needle bearing (1) to front carrier assembly. **CAUTION:**

Check the direction of needle bearing. Refer to TM-228, "Location of Needle Bearings and Bearing Races".



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[7AT: RE7R01A (VQ37VHR)]

< UNIT DISASSEMBLY AND ASSEMBLY >

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INSPECTION AFTER DISASSEMBLY

Front Carrier Snap Ring

Check for deformation, fatigue or damage. If necessary, replace the snap ring.

Input Clutch Snap Ring

Check for deformation, fatigue or damage. If necessary, replace input clutch assembly.

Input Clutch Drum

Check for deformation, fatigue or damage or burns. If necessary, replace input clutch assembly.

Input Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate

Check facing for burns, cracks or damage. If necessary, replace input clutch assembly.

Front Carrier

Check for deformation, fatigue or damage. If necessary, replace front carrier assembly.

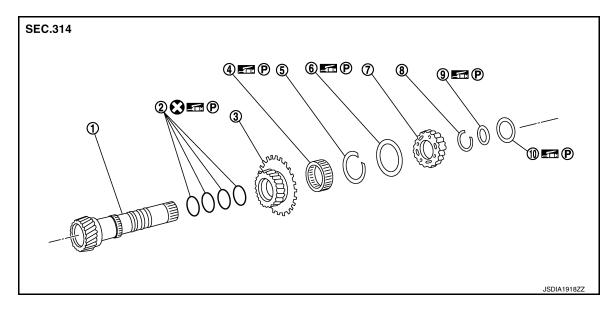
Rear Internal Gear

Check for deformation, fatigue or damage. If necessary, replace rear internal gear.

< UNIT DISASSEMBLY AND ASSEMBLY >

MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

Exploded View INFOID:0000000010579060



- Mid sun gear 1.
- 4. 2nd one-way clutch

reverse clutch hub.

- High and low reverse clutch hub 7.
- 10. Needle bearing

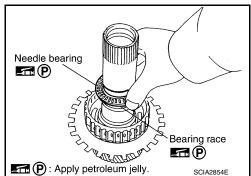
Disassembly

- 2. Seal ring
 - 5. Snap ring
- Snap ring

- 3. Rear sun gear
- 6. Needle bearing
- 9. Bearing race

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

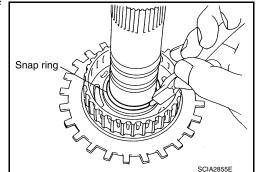
1. Remove needle bearing and bearing race from high and low



2. Remove snap ring from mid sun gear assembly using pair of snap ring pliers.

CAUTION:

Be careful not to expand snap ring excessively.



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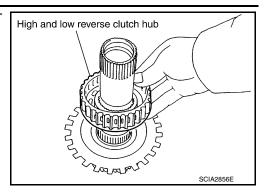
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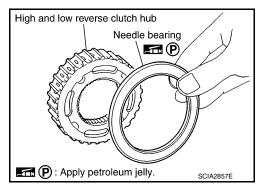
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< UNIT DISASSEMBLY AND ASSEMBLY >

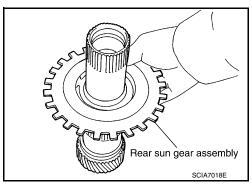
Remove high and low reverse clutch hub from mid sun gear assembly.



Remove needle bearing from high and low reverse clutch hub.



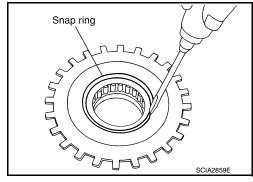
Remove rear sun gear assembly from mid sun gear assembly.



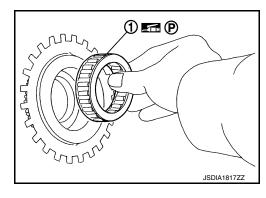
Remove snap ring from rear sun gear using a flat-bladed screw-

CAUTION:

- · Be careful not to scratch rear sun gear and 2nd one-way
- · Be careful not to damage snap ring.

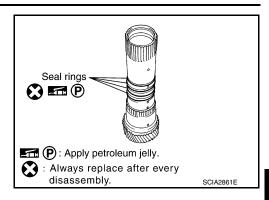


7. Remove 2nd one-way clutch from rear sun gear.



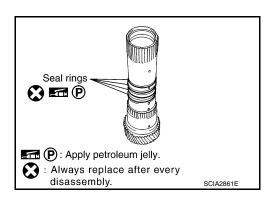
< UNIT DISASSEMBLY AND ASSEMBLY >

8. Remove seal rings from mid sun gear.

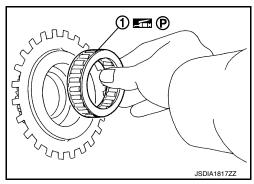


Assembly INFOID:0000000010579062

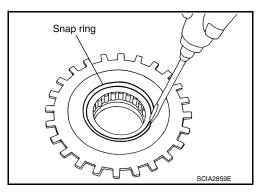
1. Install seal rings to mid sun gear.



Install 2nd one-way clutch to rear sun gear.



- 3. Install snap ring to rear sun gear using a flat-bladed screwdriver. **CAUTION:**
 - Be careful not to scratch rear sun gear and 2nd one-way clutch.
 - · Be careful not to damage snap ring.



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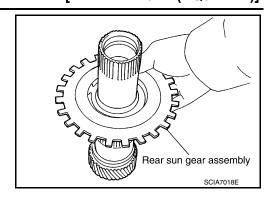
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Revision: 2015 February

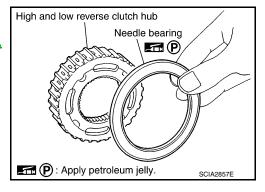
< UNIT DISASSEMBLY AND ASSEMBLY >

Install rear sun gear assembly to mid sun gear assembly.

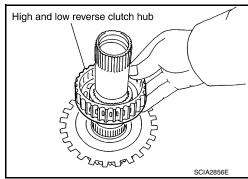


Install needle bearing to high and low reverse clutch hub. **CAUTION:**

Check the direction of needle bearing. Refer to TM-228, "Location of Needle Bearings and Bearing Races".



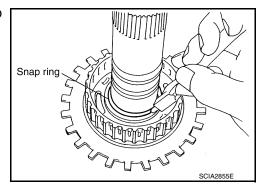
Install high and low reverse clutch hub to mid sun gear assembly.



7. Install snap ring to mid sun gear assembly using pair of snap ring pliers.

CAUTION:

Be careful not to expand snap ring excessively.



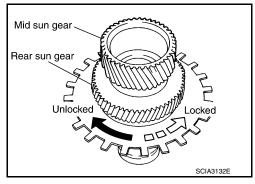
Check operation of 2nd one-way clutch.

< UNIT DISASSEMBLY AND ASSEMBLY >

- Hold mid sun gear and turn rear sun gear.
- b. Check 2nd one-way clutch for correct locking and unlocking directions.

CAUTION:

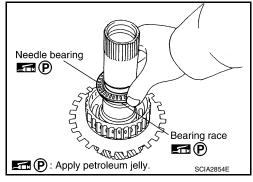
If not as shown in the figure, check installation direction of 2nd one-way clutch.



9. Install needle bearing and bearing race to high and low reverse clutch hub.

CAUTION:

Check the direction of needle bearing. Refer to TM-228, "Location of Needle Bearings and Bearing Races".

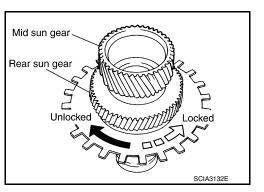


Inspection INFOID:0000000010579063

INSPECTION AFTER DISASSEMBLY

2nd One-way Clutch

- 1. Hold mid sun gear and turn rear sun gear.
- 2. Check 2nd one-way clutch for correct locking and unlocking directions. If necessary, replace 2nd one-way clutch.



High and Low Reverse Clutch Hub Snap Ring, Rear Sun Gear Snap Ring Check for deformation, fatigue or damage. If necessary, replace the snap ring.

2nd One-way Clutch

Check frictional surface for wear or damage. If necessary, replace the 2nd one-way clutch.

Mid Sun Gear

Check for deformation, fatigue or damage. If necessary, replace the mid sun gear.

Rear Sun Gear

Check for deformation, fatigue or damage. If necessary, replace the rear sun gear.

High and Low Reverse Clutch Hub

Check for deformation, fatigue or damage. If necessary, replace the high and low reverse clutch hub.

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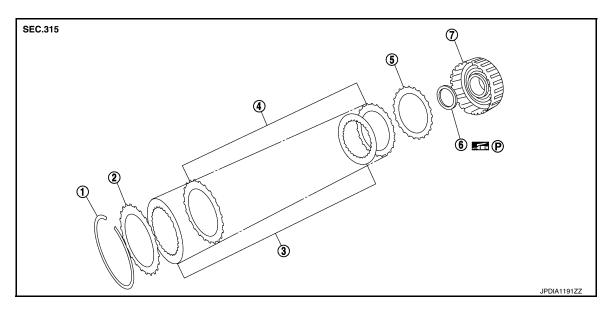
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[7AT: RE7R01A (VQ37VHR)]

HIGH AND LOW REVERSE CLUTCH

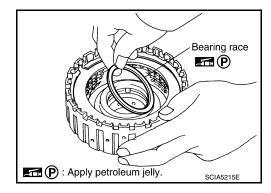
Exploded View



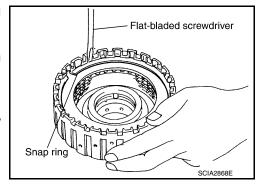
- Snap ring
- 4. High and low reverse clutch driven plate
- 7. High and low reverse clutch drum
- 2. High and low reverse clutch retaining plate
- 5. High and low reverse clutch dish plate
- High and low reverse clutch drive plate
- Bearing race

Disassembly INFOID:000000010579065

Remove bearing race from high and low reverse clutch drum.



- 2. Remove snap ring from high and low reverse clutch drum using a flat-bladed screwdriver.
 - **CAUTION:**
 - Be careful not to scratch high and low reverse clutch drum.
 - Be careful not to damage snap ring.
- 3. Remove high and low reverse clutch component (drive plates, driven plates, retaining plate, and dish plate) from high and low reverse clutch drum.



Assembly

HIGH AND LOW REVERSE CLUTCH

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

1. Install high and low reverse clutch component part (dish plate, drive plates, driven plates, and retaining plate) to high and low reverse clutch drum.

: Snap ring
 : Retaining plate

3 : Drive plate (four pieces)4 : Driven plate (four pieces)

5 : Dish plate

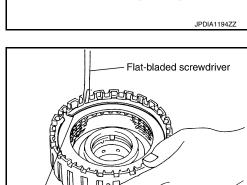
CAUTION:

Check the order of plates.

2. Install snap ring to high and low reverse clutch drum using a flatbladed screwdriver.

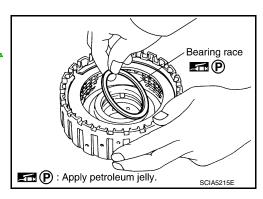
CAUTION:

- Be careful not to scratch high and low reverse clutch drum.
- Be careful not to damage snap ring.



Install bearing race to high and low reverse clutch drum. CAUTION:

Check the direction of needle bearing. Refer to <u>TM-228</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



Inspection Infoid:000000010579067

INSPECTION AFTER DISASSEMBLY

Check the following items. If necessary, replace high and low reverse clutch assembly.

Snap Ring

Check for deformation, fatigue or damage.

High and Low Reverse Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate Check facing for burns, cracks or damage.

High and Low Reverse Clutch Drum

Check for deformation, fatigue or damage or burns.

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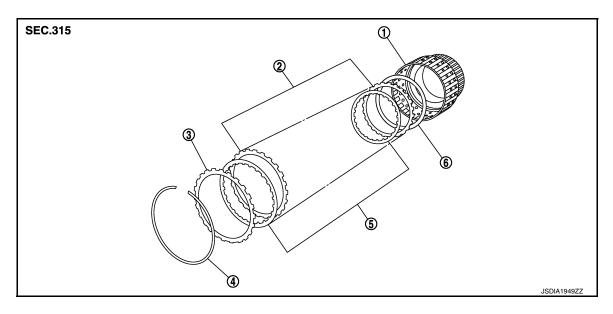
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[7AT: RE7R01A (VQ37VHR)]

DIRECT CLUTCH

Exploded View



- 1. Direct clutch drum
- 4. Snap ring

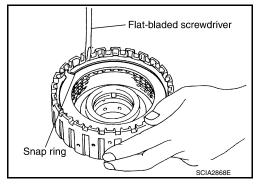
- 2. Direct clutch driven plate
- 5. Direct clutch drive plate
- 3. Direct clutch retaining plate
- 6. Direct clutch dish plate

Disassembly

 Remove snap rings from direct clutch drum using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch direct clutch drum and direct clutch retaining plate.
- Be careful not to damage snap ring.
- 2. Remove direct clutch component part (drive plates, driven plates, retaining plate, and dish plate) from direct clutch drum.



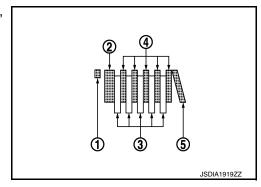
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Assembly

- 1. Install direct clutch component part (drive plates, driven plates, retaining plate, and dish plate) to direct clutch drum.
 - 1 : Snap ring
 - 2 : Retaining plate
 - 3 : Drive plate (five pieces)
 - 4 : Driven plate (five pieces)
 - 5 : Dish plate

CAUTION:

Check the order of plates.



DIRECT CLUTCH

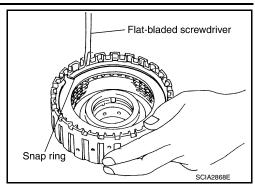
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01A (VQ37VHR)]

2. Install snap rings to direct clutch drum using a flat-bladed screw-driver.

CAUTION:

- Be careful not to scratch direct clutch drum and direct clutch retaining plate.
- Be careful not to damage snap ring.



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Inspection

INSPECTION AFTER DISASSEMBLY

Check the following items. If necessary, replace direct clutch assembly.

Snap Ring

Check for deformation, fatigue or damage.

Direct Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate

Check facing for burns, cracks or damage.

Direct Clutch Drum

Check for deformation, fatigue or damage or burns.

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SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01A (VQ37VHR)]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000010579072

| Applied models | Engine | VQ37VHR |
|---------------------------------|---------|---|
| | Axle | 2WD/AWD |
| Transmission model | + | RE7R01A |
| Stall torque ratio | | 1.92 : 1 |
| | 1st | 4.924 |
| | 2nd | 3.194 |
| | 3rd | 2.043 |
| Transmission goor ratio | 4th | 1.412 |
| Transmission gear ratio | 5th | 1.000 |
| | 6th | 0.862 |
| | 7th | 0.772 |
| | Reverse | 3.972 |
| Recommended fluid and fluid cap | pacity | For North America: Refer to MA-17, "FOR NORTH AMERICA: Fluids and Lubricants". For Mexico: Refer to MA-18, "FOR MEXICO: Fluids and Lubricants". |

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000010579073

2WD MODELS

Unit: km/h (MPH)

| Coor position | Throttle position | | |
|---------------------|-----------------------|-----------------------|--|
| Gear position | Full throttle | Half throttle | |
| $D1 \rightarrow D2$ | 58 – 62 (36 – 38) | 45 – 49 (28 – 30) | |
| $D2 \rightarrow D3$ | 91 – 99 (57 – 61) | 71 – 79 (44 – 49) | |
| D3 → D4 | 143 – 153 (89 – 95) | 106 – 116 (66 – 72) | |
| D4 → D5 | 209 – 219 (130 – 136) | 152 – 162 (94 – 101) | |
| D5 → D6 | 251 – 261 (156 – 162) | 184 – 194 (114 – 121) | |
| D6 → D7 | 251 – 261 (156 – 162) | 251 – 261 (156 – 162) | |
| D7 → D6 | 240 – 250 (150 – 155) | 127 – 137 (79 – 85) | |
| $D6 \rightarrow D5$ | 240 – 250 (150 – 155) | 127 – 137 (79 – 85) | |
| $D5 \rightarrow D4$ | 180 – 190 (112 – 118) | 105 – 115 (65 – 71) | |
| $D4 \rightarrow D3$ | 119 – 129 (74 – 80) | 61 – 71 (38 – 44) | |
| D3 → D2 | 62 – 70 (39 – 43) | 36 – 44 (22 – 27) | |
| D2 → D1 | 19 – 23 (12 – 14) | 6 – 10 (4 – 6) | |

[•] At half throttle, the accelerator opening is 4/8 of the full opening.

AWD MODELS

Unit: km/h (MPH)

| Gear position | Throttle | position |
|---------------------|-------------------|-------------------|
| Geal position | Full throttle | Half throttle |
| D1 → D2 | 52 – 56 (33 – 34) | 41 – 45 (25 – 28) |
| $D2 \rightarrow D3$ | 82 – 90 (51 – 55) | 64 – 72 (40 – 45) |

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

| $D3 \rightarrow D4$ | 129 – 139 (81 – 86) | 96 – 106 (60 – 66) |
|---------------------|-----------------------|-----------------------|
| $D4 \rightarrow D5$ | 189 – 199 (118 – 123) | 138 – 148 (86 – 92) |
| $D5 \rightarrow D6$ | 251 – 261 (156 – 162) | 176 – 186 (109 – 116) |
| $D6 \rightarrow D7$ | 251 – 261 (156 – 162) | 251 – 261 (156 – 162) |
| D7 → D6 | 240 – 250 (150 – 155) | 115 – 125 (71 – 78) |
| $D6 \rightarrow D5$ | 240 – 250 (150 – 155) | 115 – 125 (72 – 77) |
| $D5 \rightarrow D4$ | 163 – 173 (101 – 108) | 95 – 105 (59 – 65) |
| $D4 \rightarrow D3$ | 108 – 118 (67 – 73) | 55 – 65 (34 – 40) |
| $D3 \rightarrow D2$ | 56 – 64 (35 – 40) | 33 – 41 (21 – 25) |
| $D2 \rightarrow D1$ | 17 – 21 (11 – 13) | 5 – 9 (3 – 6) |

At half throttle, the accelerator opening is 4/8 of the full opening.

Vehicle Speed at Which Lock-up Occurs/Releases

·

2WD MODELS

| Throttle position | Vehicle speed km/h (MPH) | |
|-------------------|--------------------------|---------------------|
| Throttle position | Lock-up ON | Lock-up OFF |
| Closed throttle | 54 - 62 (34 - 38) | 54 - 62 (34 - 38) |
| Half throttle | 153 – 161 (95 – 100) | 106 – 114 (66 – 71) |

- Vehicle speed with D5 position.
- At closed throttle, the accelerator opening is less than 1/8 condition. (Closed throttle position signal OFF)
- At half throttle, the accelerator opening is 4/8 of the full opening.

AWD MODELS

| Throttle position | Vehicle speed km/h (MPH) | |
|-------------------|--------------------------|--------------------|
| Throttle position | Lock-up ON | Lock-up OFF |
| Closed throttle | 49 – 57 (31 – 35) | 46 – 54 (29 – 33) |
| Half throttle | 139 – 147 (86 – 91) | 96 – 104 (60 – 65) |

- Vehicle speed with D₅ position.
- At closed throttle, the accelerator opening is less than 1/8 condition. (Closed throttle position signal OFF)
- At half throttle, the accelerator opening is 4/8 of the full opening.

Stall Speed

| Stall speed | 2.050 – 2.350 rpm |
|-------------|-------------------|

Torque Converter

| Dimension between end of converter housing and torque converter | 25.0 mm (0.98 in) |
|---|-------------------|

Total End Play

Unit: mm (in)

INFOID:0000000010579075

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| Total end play Standard | | 0.25 – 0.55 (0.0098 – 0.0217) | |
|--|--|-------------------------------|--|
| | | 1.0 (0.039) | |
| Thickness of bearing race for adjusting total end play | | 1.2 (0.047) | |
| | | 1.4 (0.055) | |
| | | 1.6 (0.063) | |
| | | 1.8 (0.071) | |
| | | 2.0 (0.079) | |
| | | 2.2 (0.087) | |

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SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: ŔE7R01A (VQ37VHR)]

| Dovorco | Droko | Clearance |
|---------|-------|-----------|
| REVEISE | DIAKE | |

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Unit: mm (in)

| Reverse brake clearance | Standard | 0.8 - 1.2 (0.031 - 0.047) | |
|-------------------------------------|----------------------------------|---------------------------|--|
| | | 4.8 (0.189) | |
| | | 5.0 (0.197) | |
| | | 5.2 (0.205) | |
| Thickness of retaining plate for ad | ljusting reverse brake clearance | 5.4 (0.213) | |
| 3, | | 5.6 (0.220) | |
| | | 5.8 (0.228) | |
| | | 6.0 (0.236) | |

Front Brake Clearance

INFOID:0000000010579079

Unit: mm (in)

| Front brake clearance | Standard | 0.7 – 1.1 (0.028 – 0.043) |
|--|----------|---|
| | | 2.0 (0.079) 2.2 (0.087) |
| Thickness of retaining plate for adjusting front brake clearance | | 2.4 (0.094) 2.6 (0.102) 2.8 (0.110) |

2346 Brake Clearance

INFOID:0000000010579080

Unit: mm (in)

| 2346 brake clearance | Standard | 1.5 – 1.9 (0.059 – 0.075) |
|---|-----------------|--|
| Thickness of snap ring for adjusting 2346 | brake clearance | 2.0 (0.079) 2.2 (0.087) 2.4 (0.094) 2.6 (0.102) 2.8 (0.110) 3.0 (0.118) |

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[7AT: RE7R01B (VK50VE)]

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow INFOID:0000000010579081

1.0BTAIN INFORMATION ABOUT SYMPTOM

Refer to TM-306, "Diagnostic Work Sheet" and interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings in the vehicle.

>> GO TO 2.

2.CHECK DTC

- 1. Before checking the malfunction, check whether any DTC exists.
- 2. If DTC exists, perform the following operations.
- Record the DTC and freeze frame data. (Print out the data using CONSULT and affix to the Work Order Sheet.)
- Erase DTCs.
- Check the relationship between the cause that is clarified with DTC and the malfunction information described by the customer. <u>TM-457</u>, "Symptom Table" is effective.
- Check the information of related service bulletins and others also.

Do malfunction information and DTC exists?

Malfunction information and DTC exists. >>GO TO 3.

Malfunction information exists, but no DTC. >>GO TO 4.

No malfunction information, but DTC exists. >>GO TO 5.

3.REPRODUCE MALFUNCTION SYMPTOM

Check any malfunction described by a customer, except those with DTC on the vehicle.

Also investigate whether the symptom is a fail-safe or normal operation. Refer to TM-450, "Fail-Safe".

When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-306, "Diagnostic Work Sheet".

Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 5.

4. REPRODUCE MALFUNCTION SYMPTOM

Check the malfunction described by the customer on the vehicle.

Also investigate whether the symptom is a fail-safe or normal operation. Refer to TM-450, "Fail-Safe".

When a malfunction symptom is reproduced, the question sheet is effective. Refer to TM-306, "Diagnostic Work Sheet".

Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 6.

${f 5}$.PERFORM "DTC CONFIRMATION PROCEDURE"

Perform "DTC CONFIRMATION PROCEDURE" of the appropriate DTC to check if DTC is detected again. Refer to TM-454, "DTC Inspection Priority Chart" when multiple DTCs are detected, and then determine the order for performing the diagnosis.

NOTE:

If no DTC is detected, refer to the freeze frame data.

Is any DTC detected?

YES >> GO TO 7.

NO >> Check according to GI-47, "Intermittent Incident".

$oldsymbol{oldsymbol{0}}$. IDENTIFY MALFUNCTIONING SYSTEM WITH "DIAGNOSIS CHART BY SYMPTOM"

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[7AT: RE7R01B (VK50VE)]

Use <u>TM-457</u>, "<u>Symptom Table</u>" from the symptom inspection result in step 4. Then identify where to start performing the diagnosis based on possible causes and symptoms.

>> GO TO 8.

7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the detected malfunctioning parts.

Reconnect parts or connector after repairing or replacing, and then erase DTC if necessary.

>> GO TO 8.

8. FINAL CHECK

Perform "DTC CONFIRMATION PROCEDURE" again to make sure that the repair is correctly performed. Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 3 or 4.

Is DTC or malfunction symptom reproduced?

YES-1 >> DTC is reproduced: GO TO 5.

YES-2 >> Malfunction symptom is reproduced: GO TO 6.

NO >> Before delivering the vehicle to the customer, make sure that DTC is erased.

Diagnostic Work Sheet

INFOID:0000000010579082

DESCRIPTION

There are many operating conditions that may cause a malfunction of the transmission parts. By understanding those conditions properly, a quick and exact diagnosis can be achieved.

In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about the concerns carefully. In order to systemize all the information for the diagnosis, prepare the question sheet referring to the question points.

KEY POINTS

WHAT Vehicle & engine model
WHEN Date, Frequencies
WHERE..... Road conditions
HOW Operating conditions,
Weather conditions

Weather conditions,

Symptoms

SEF907L

WORKSHEET SAMPLE

| Question Sheet | | | | |
|----------------|-------|---------------|------------|---------|
| Customer name | MR/MS | Engine # | Manuf. Da | te |
| | | Incident Date | VIN | |
| | | Model & Year | In Service | Date |
| | | Trans. | Mileage | km/Mile |

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[7AT: RE7R01B (VK50VE)]

| | | | Questi | on Sheet | | | |
|------------------------|----------|-------------------------------|-----------------|------------------|---------------------|--------------------|--------------|
| Symptoms | | ☐ Vehicle does | not move (□ A | Any position ☐ F | Particular position | |) |
| | i | □ No up-shift 6GR □ 6GR - | | □ 2GR → 3GF | R □ 3GR → 4GF | R □ 4GR → 5GR | □ 5GR → |
| | | □ No down-shif 2GR □ 2GR - | | GR □ 6GR → 50 | GR □ 5GR → 40 | GR □ 4GR → 3GR | |
| | Ī | ☐ Lock-up malf | unction | | | | |
| | | ☐ Shift point to | high or too low | | | | |
| | | ☐ Shift shock o | r slip | | | | |
| | | ☐ Noise or vibr | ation | | | | TN |
| | | ☐ No kick dowr | 1 | | | | |
| | | ☐ No pattern se | elect | | | | F |
| | | ☐ Others | | | | | _ |
| | | | | | | | |
| Frequency | | ☐ All the time | ☐ Under certain | conditions | ☐ Sometimes (| times a day) | F |
| Weather conditions | | ☐ Not affected | | | | | |
| \ | Weather | ☐ Fine | ☐ Clouding | ☐ Raining | ☐ Snowing | ☐ Other (|) |
| | Temp. | □ Hot | □ Warm | □ Cool | □ Cold | ☐ Temp. (Approx. | °C/°F) |
| ŀ | Humidity | ☐ High | ☐ Middle | □ Low | | | |
| Transmission condition | ns | ☐ Not affected | | | | | H |
| | | □ Cold | ☐ During warm- | -up | ☐ After warm-up |) | |
| | | ☐ Engine speed | d (| rpm) | | | |
| Road conditions | | ☐ Not affected | | | | | I |
| | | ☐ In town | ☐ In suburbs | ☐ Freeway | ☐ Off road (Up/I | Down) | |
| Driving conditions | | ☐ Not affected | | | | | |
| | | ☐ At starting | ☐ While idling | ☐ While engine | racing | ☐ At racing ☐ ing | While cruis- |
| | | ☐ While accele | rating | ☐ While deceler | rating | ☐ While turning (R | kight/Left) |
| | | ☐ Vehicle spee | d [| km/h (| MPH)] | | |
| Other conditions | | | | | | | L |

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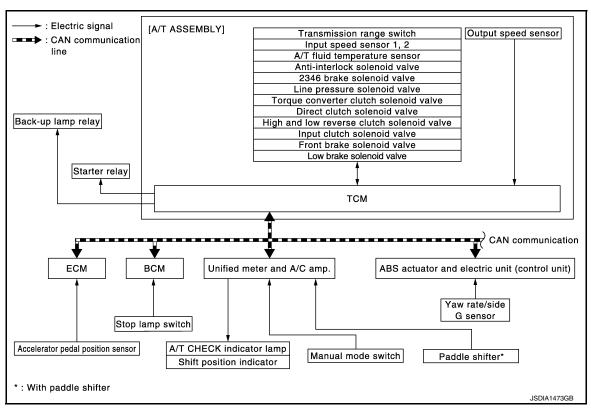
[7AT: RE7R01B (VK50VE)]

SYSTEM DESCRIPTION

A/T CONTROL SYSTEM

System Diagram

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System Description

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INPUT/OUTPUT SIGNAL CHART

| Switch, Sensor or Signal | | TCM function | | Actuator |
|--|---|--|---------------|--|
| Transmission range switch Accelerator pedal position signal Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Output speed sensor Vehicle speed signal Manual mode switch signal Stop lamp switch signal Side G sensor signal Input speed sensor 1, 2 | ⇒ | Line pressure control (TM-311) Shift change control (TM-315) Shift pattern control Shift pattern (TM-320) Manual mode (TM-324) Lock-up control (TM-327) Fail-safe control (TM-450) Self-diagnosis (TM-359) CONSULT communication line (TM-359) CAN communication line (TM-367) | \Rightarrow | Input clutch solenoid valve Direct clutch solenoid valve Front brake solenoid valve High and low reverse clutch solenoid valve Low brake solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve Anti-interlock solenoid valve 2346 brake solenoid valve A/T CHECK indicator lamp Back-up lamp relay Starter relay |

SYSTEM DESCRIPTION

- The A/T senses vehicle operating conditions through various sensors or signals. It always controls the optimum shift position and reduces shifting and lock-up shocks.
- Receive input signals transmitted from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, etc.
- · Transmit required output signals to the respective solenoids.

[7AT: RE7R01B (VK50VE)]

Component Parts Location

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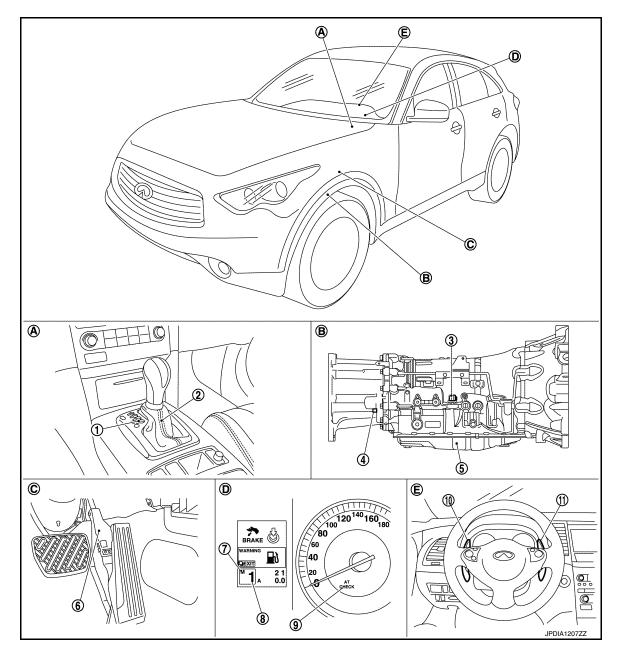
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- Selector lever position indicator
- 4. Control valve & TCM*1
- Manual mode indicator 7.
- 10. Paddle shifter (shift-down)*2
- A. Center console
- D. Combination meter

- A/T shift selector assembly
- 5. Output speed sensor
- Shift position indicator Paddle shifter (shift-up)*2
- B. A/T assembly
- Steering wheel

- Joint connector
- 6. Accelerator pedal position sensor
- A/T CHECK indicator lamp
- Accelerator pedal

NOTE:

- The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- · The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2

A/T CONTROL SYSTEM

< SYSTEM DESCRIPTION >

- A/T fluid temperature sensor
- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *1: Control valve & TCM is included in A/T assembly.
- *2: With paddle shifter

Component Description

INFOID:0000000010579088

[7AT: RE7R01B (VK50VE)]

| Name | Function | |
|---|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. | |
| Transmission range switch | TM-370, "Description" | |
| Output speed sensor | TM-376, "Description" | |
| Input speed sensor 1 | TM 274 IIDaaarinkianii | |
| Input speed sensor 2 | TM-374, "Description" | |
| A/T fluid temperature sensor | TM-371, "Description" | |
| Input clutch solenoid valve | TM-400, "Description" | |
| Front brake solenoid valve | TM-403, "Description" | |
| Direct clutch solenoid valve | TM-421, "Description" | |
| High and low reverse clutch solenoid valve | TM-418, "Description" | |
| Low brake solenoid valve | TM-419, "Description" | |
| Anti-interlock solenoid valve | TM-399, "Description" | |
| 2346 brake solenoid valve | TM-420. "Description" | |
| Line pressure solenoid valve | TM-398, "Description" | |
| Torque converter clutch solenoid valve | TM-394, "Description" | |
| Accelerator pedal position sensor | TM-404, "Description" | |
| Manual mode switch | | |
| Paddle shifter* | TM-412, "Description" | |
| Starter relay | TM-368, "Description" | |
| A/T CHECK indicator lamp | When the ignition switch is pushed to the ON position, the light comes on for 2 seconds | |
| Stop lamp switch | TM-129, "Description" | |
| ECM | EC-1148, "System Description" | |
| BCM | BCS-9, "System Description" | |
| Unified meter and A/C amp. | MWI-6, "METER SYSTEM: System Description" | |
| ABS actuator and electric unit (control unit) | BRC-22, "System Description" | |
| Yaw rate/side G sensor | BRC-73, "Description" | |

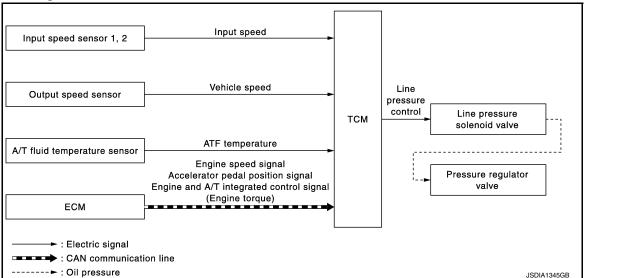
^{*:} With paddle shifter

Revision: 2015 February TM-310 2015 QX70

INFOID:0000000010579089

LINE PRESSURE CONTROL

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator | |
|------------------------------|---|-----------------------|------------------------------|--|
| Input speed sensor 1, 2 | Input speed | | | |
| Output speed sensor | Vehicle speed | | | |
| A/T fluid temperature sensor | ATF temperature | | Line pressure solenoid valve | |
| ECM | Engine speed signal* | Line pressure control | . ↓ | |
| | Accelerator pedal position signal* | | Pressure regulator valve | |
| LOW | Engine and A/T integrated control signal (Engine torque)* | | | |

^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

- When an engine and A/T integrated control signal (engine torque) equivalent to the engine drive force is transmitted from the ECM to the TCM, the TCM controls the line pressure solenoid valve.

 This line pressure solenoid controls the pressure regulator valve as the signal pressure and adjusts the pres
 - sure of the operating oil discharged from the oil pump to the line pressure most appropriate to the driving state.
- The TCM has stored in memory a number of patterns for the optimum line pressure characteristic for the driving state.
- In order to obtain the most appropriate line pressure characteristic to meet the current driving state, the TCM
 controls the line pressure solenoid current value and thus controls the line pressure.

Normal Control

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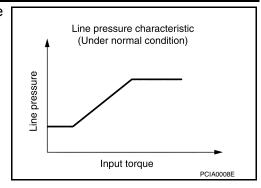
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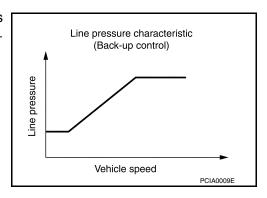
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Each clutch is adjusted to the necessary pressure to match the engine drive force.



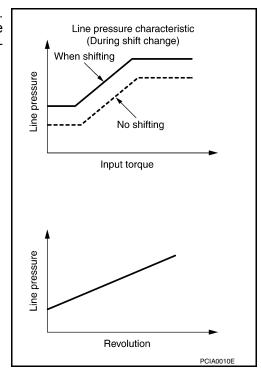
Back-up Control (Engine Brake)

When the select operation is performed during driving and the A/T is shifted down, the line pressure is set according to the vehicle speed.



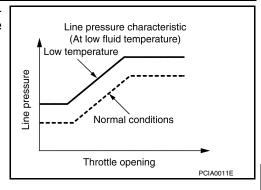
During Shift Change

The necessary and adequate line pressure for shift change is set. For this reason, line pressure pattern setting corresponds to engine torque and gearshift selection. Also, line pressure characteristic corresponds to engine speed, during engine brake operation.



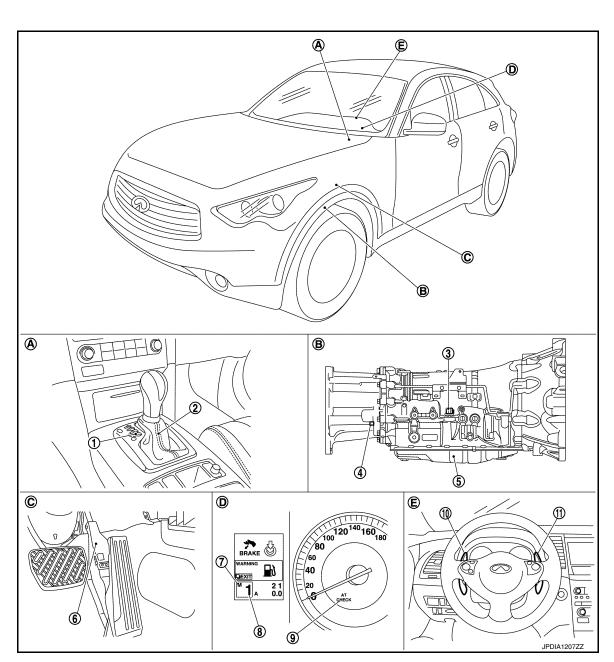
At Low Fluid Temperature

When the A/T fluid temperature drops below the prescribed temperature, in order to speed up the action of each friction element, the line pressure is set higher than the normal line pressure characteristic.



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Component Parts Location



- 1. Selector lever position indicator
- 4. Control valve & TCM*1
- 7. Manual mode indicator
- A/T shift selector assembly
- 5. Output speed sensor
- 8. Shift position indicator
- Joint connector
- 6. Accelerator pedal position sensor
- 9. A/T CHECK indicator lamp

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LINE PRESSURE CONTROL

< SYSTEM DESCRIPTION >

Combination meter

[7AT: RE7R01B (VK50VE)]

C. Accelerator pedal

10. Paddle shifter (shift-down)*2

Paddle shifter (shift-up)*2

A. Center console

B. A/T assembly

E. Steering wheel

D.
NOTE:

• The following components are included in A/T shift selector assembly.

- Manual mode select switch

- Manual mode position select switch

- Shift position switch

• The following components are included in control valve & TCM.

TCM

- Input speed sensor 1, 2

- A/T fluid temperature sensor

- Transmission range switch

- Direct clutch solenoid valve

- High and low reverse clutch solenoid valve

- Input clutch solenoid valve

- Front brake solenoid valve

- Low brake solenoid valve

- Anti-interlock solenoid valve

- 2346 brake solenoid valve

- Line pressure solenoid valve

- Torque converter clutch solenoid valve

*1: Control valve & TCM is included in A/T assembly.

*2: With paddle shifter

Component Description

INFOID:0000000010579092

| Name | Function |
|------------------------------|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. |
| Output speed sensor | TM-376, "Description" |
| Input speed sensor 1 | TM-374, "Description" |
| Input speed sensor 2 | TW-574, Description |
| A/T fluid temperature sensor | TM-371, "Description" |
| Line pressure solenoid valve | TM-398, "Description" |
| Pressure regulator valve | Adjusts the oil discharged from the oil pump to the optimum pressure (line pressure) for the driving state. |
| ECM | EC-1148, "System Description" |

[7AT: RE7R01B (VK50VE)]

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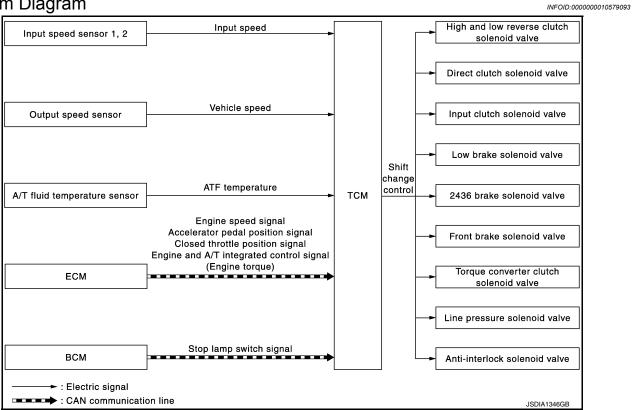
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SHIFT CHANGE CONTROL

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator | |
|------------------------------|---|----------------------|---|--|
| Input speed sensor 1, 2 | Input speed | | High and low reverse clutch solenoid valve | |
| Output speed sensor | Vehicle speed | | Direct clutch solenoid | |
| A/T fluid temperature sensor | ATF temperature | | valve Input clutch solenoid valve Low brake solenoid valve 2346 brake solenoid valve Front brake solenoid valve Torque converter clutch so- | |
| | Engine speed signal* | Shift change control | | |
| | Accelerator pedal position signal* | | | |
| ECM | Closed throttle position signal* | | | |
| | Engine and A/T integrated control signal (Engine torque)* | | lenoid valve • Line pressure solenoid | |
| ВСМ | Stop lamp switch signal* | | valveAnti-interlock solenoid valve | |

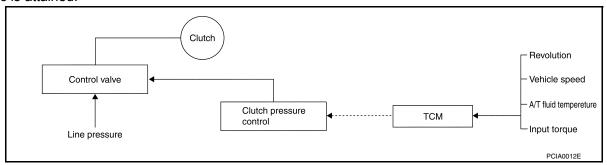
^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

The clutch pressure control solenoid is controlled by the signals from the switches and sensors. Thus, the clutch pressure is adjusted to be appropriate to the engine load state and vehicle driving state. It becomes

Revision: 2015 February TM-315 2015 QX70

possible to finely control the clutch hydraulic pressure with high precision and a smoother shift change characteristic is attained.



Shift Change

The clutch is controlled with the optimum timing and oil pressure by the engine speed, engine torque information, etc.

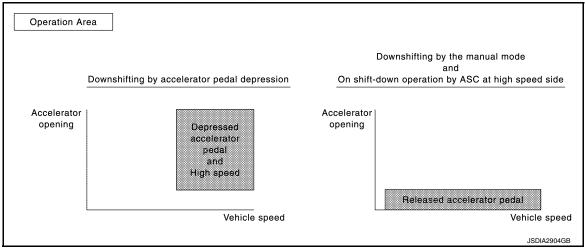
Shift Change System Diagram Shift-down Shift-up Gear ratio Output shaft torque Line pressure Gear ratio (For engaging clutch) Line pressure (For engaging clutch) Line pressure (For releasing clutch) Line pressure (For releasing clutch) Full phase real-time feedback *1 Change of line pressure is controlled depending on input torque and vehicle speed. Change of line pressure is controlled depending on input torque.

*1: Full phase real-time feedback control monitors movement of gear ratio at gear change, and controls oil pressure in real-time to achieve the best gear ratio.

Blipping Control

It controls (synchronizes) engine speed to have a quick shift clutch coupling, by calculating engine speed after downshifting and by cooperating with ASC (Adaptive Shift Control).

- "BLIPPING CONTROL" functions.
- When downshifting by accelerator pedal depression.
- When downshifting by the manual mode.
- It works on shift-down operation by ASC at high speed side when driving at D position or in DS mode.



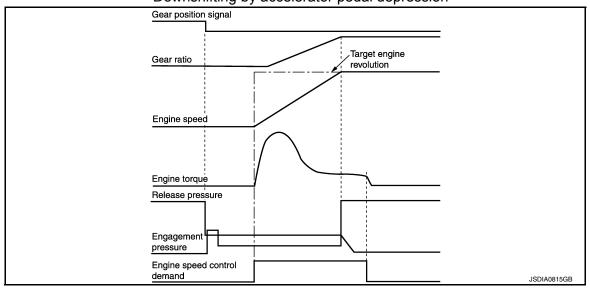
SHIFT CHANGE CONTROL

< SYSTEM DESCRIPTION >

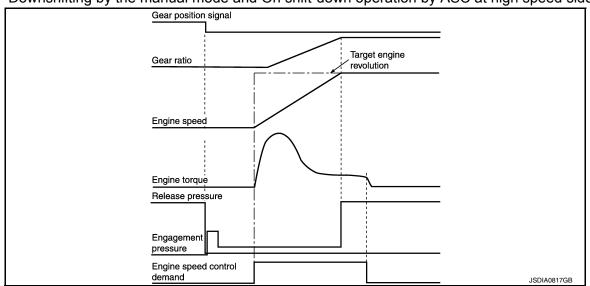
[7AT: RE7R01B (VK50VE)]

- TCM selects "BLIPPING CONTROL" or "NORMAL SHIFT CONTROL" according to the gear position, the selector lever position, the engine torque and the speed when accelerating by pedal depression.
- Engine speed control demand signal is transmitted from TCM to ECM under "BLIPPING CONTROL".
- ECM synchronizes the engine speed according to the engine speed control demand signal.

Downshifting by accelerator pedal depression



Downshifting by the manual mode and On shift-down operation by ASC at high speed side



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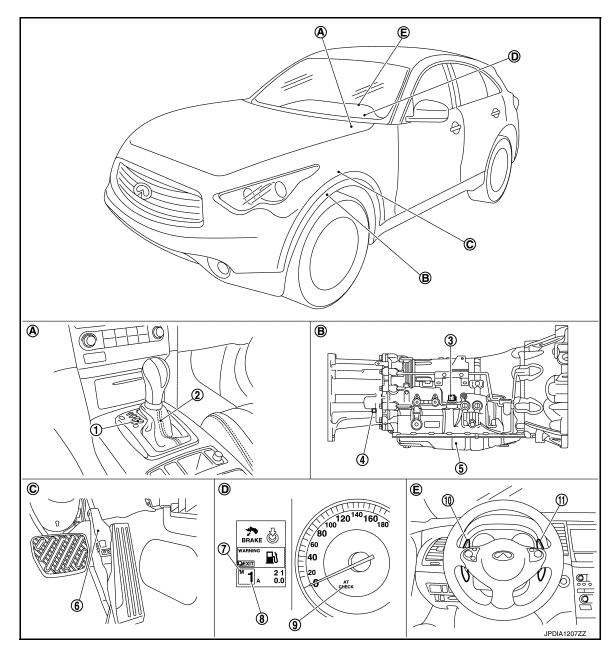
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[7AT: RE7R01B (VK50VE)]

Component Parts Location

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- 1. Selector lever position indicator
- 4. Control valve & TCM*1
- 7. Manual mode indicator
- 10. Paddle shifter (shift-down)*2
- A. Center console
- D. Combination meter

- 2. A/T shift selector assembly
- 5. Output speed sensor
- Shift position indicator
 Paddle shifter (shift-up)*2
- B. A/T assembly
- E. Steering wheel

- Joint connector
- 6. Accelerator pedal position sensor
- 9. A/T CHECK indicator lamp
- C. Accelerator pedal

NOTE:

- · The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2

SHIFT CHANGE CONTROL

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

- A/T fluid temperature sensor
- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *1: Control valve & TCM is included in A/T assembly.
- *2: With paddle shifter

Component Description

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| Name | Function |
|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. |
| Output speed sensor | TM-376, "Description" |
| Input speed sensor 1 | TM 274 "Description" |
| Input speed sensor 2 | TM-374, "Description" |
| A/T fluid temperature sensor | TM-371, "Description" |
| Input clutch solenoid valve | TM-400, "Description" |
| Front brake solenoid valve | TM-403, "Description" |
| Direct clutch solenoid valve | TM-421, "Description" |
| High and low reverse clutch solenoid valve | TM-418, "Description" |
| Low brake solenoid valve | TM-419, "Description" |
| Anti-interlock solenoid valve | TM-399, "Description" |
| 2346 brake solenoid valve | TM-420, "Description" |
| Line pressure solenoid valve | TM-398, "Description" |
| Torque converter clutch solenoid valve | TM-394, "Description" |
| ECM | EC-1148, "System Description" |
| BCM | BCS-9, "System Description" |

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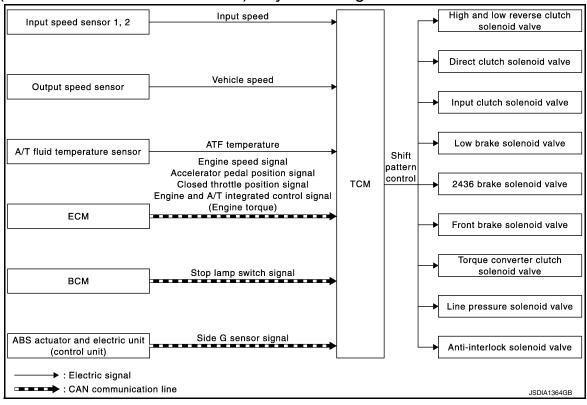
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[7AT: RE7R01B (VK50VE)]

SHIFT PATTERN CONTROL ASC (ADAPTIVE SHIFT CONTROL)

ASC (ADAPTIVE SHIFT CONTROL) : System Diagram

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ASC (ADAPTIVE SHIFT CONTROL): System Description

INFOID:0000000010579098

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator | |
|---|---|-----------------------|--|--|
| Input speed sensor 1, 2 | Input speed | | High and low reverse | |
| Output speed sensor | Vehicle speed | | clutch solenoid valve | |
| A/T fluid temperature sensor | ATF temperature | | Direct clutch solenoid valve Input clutch solenoid valve Low brake solenoid valve 2346 brake solenoid valve Front brake solenoid valve | |
| | Engine speed signal* | | | |
| ECM | Accelerator pedal position signal* | 0.15 | | |
| | Closed throttle position signal* | Shift pattern control | | |
| | Engine and A/T integrated control signal (engine torque)* | | Torque converter clutch solenoid valve Line pressure solenoid | |
| ABS actuator and electric unit (control unit) | Side G sensor signal* | | valve • Anti-interlock solenoid | |
| BCM | Stop lamp switch signal* | | valve | |

^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

It automatically selects the shift pattern (such as road environment and driving style) suitable for the various situations so as to allow the vehicle to be driven efficiently and smoothly.

When Driving on an Up/Down Slope

ASC judges up/down slope according to engine torque data transmitted from the ECM and vehicle speed.
 Fixing at 4GR, 5GR or 6GR on an up-slope prevents shift hunting and controls the vehicle to gain optimum

SHIFT PATTERN CONTROL

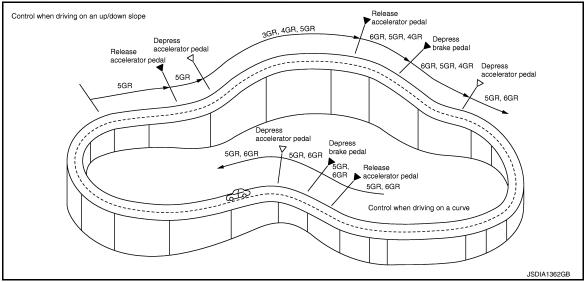
< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

driving force. On a down-slope, automatic shift-down to 4GR, 5GR or 6GR gear controls to gain optimum engine brake.

When Driving on a Curve

- In driving condition where acceleration, deceleration, or lateral acceleration continues, it corrects gear selection in order to keep a smooth vehicle speed during the curve and to give an adequate driving force at the curve end.
- When acceleration pedal is quickly released at curve entrance etc., it prevents an unnecessary shift-up.
- On braking operation at curve entrance, it gives an early shift-down according to the deceleration.
- In a sporty driving condition, it selects lower gear early even on a light braking operation, giving greater importance on driving force.
- TCM receives the side G sensor signal from the ABS actuator and electric unit (control unit). It locks to 4GR, 5GR or 6GR position in moderate cornering or to 3GR position in sharp cornering based on this signal. This prevents any upshift and kick down during cornering, maintaining smooth vehicle travel.



DS Mode

- Changes to the shift schedule that mainly utilizes the high engine speed zone when ASC is active.
- DS mode can be switched according to the following method.
- When the selector lever is in the "D" position, shifting the selector lever to manual shift gate enables switching to DS mode.
- When in DS mode, shifting the selector lever to the main gate enables to cancel DS mode.
- After switching to manual mode with paddle shifter, switching to DS mode can not be enabled even when the selector lever is shifted to the manual gate. (With paddle shifter)

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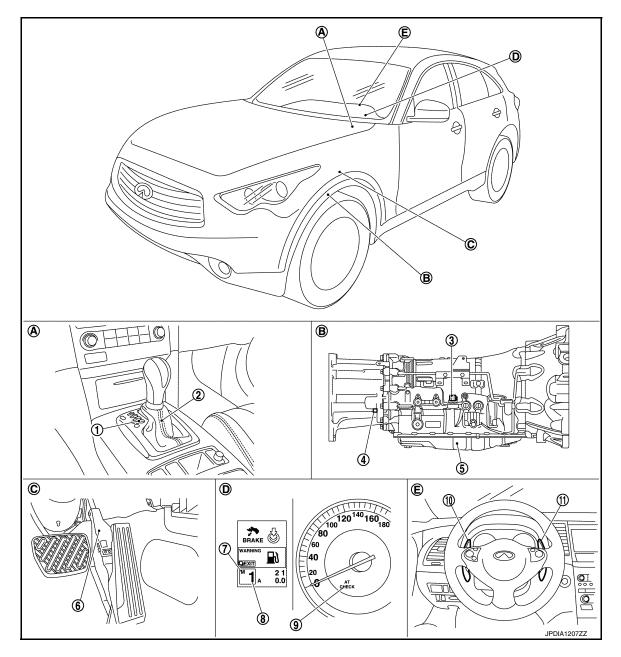
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ASC (ADAPTIVE SHIFT CONTROL): Component Parts Location

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- 1. Selector lever position indicator
- 4. Control valve & TCM*1
- 7. Manual mode indicator
- 10. Paddle shifter (shift-down)*2
- A. Center console
- D. Combination meter

- 2. A/T shift selector assembly
- 5. Output speed sensor
- Shift position indicator
 Paddle shifter (shift-up)*2
- B. A/T assembly
- E. Steering wheel

- Joint connector
- 6. Accelerator pedal position sensor
- 9. A/T CHECK indicator lamp
- C. Accelerator pedal

NOTE:

- · The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2

SHIFT PATTERN CONTROL

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

- A/T fluid temperature sensor
- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *1: Control valve & TCM is included in A/T assembly.
- *2: With paddle shifter

ASC (ADAPTIVE SHIFT CONTROL) : Component Description

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| Name | Function |
|---|--|
| ТСМ | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. |
| Output speed sensor | TM-81, "Description" |
| Input speed sensor 1 | TM 70 "Description" |
| Input speed sensor 2 | TM-79, "Description" |
| A/T fluid temperature sensor | TM-76, "Description" |
| Input clutch solenoid valve | TM-105, "Description" |
| Front brake solenoid valve | TM-108, "Description" |
| Direct clutch solenoid valve | TM-123, "Description" |
| High and low reverse clutch solenoid valve | TM-120, "Description" |
| Low brake solenoid valve | TM-121, "Description" |
| Anti-interlock solenoid valve | TM-104, "Description" |
| 2346 brake solenoid valve | TM-122, "Description" |
| Line pressure solenoid valve | TM-103, "Description" |
| Torque converter clutch solenoid valve | TM-99, "Description" |
| ECM | EC-1148, "System Description" |
| всм | BCS-9, "System Description" |
| ABS actuator and electric unit (control unit) | BRC-22, "System Description" |

MANUAL MODE

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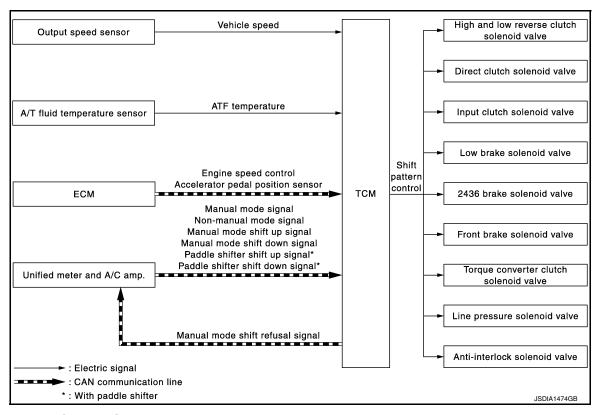
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[7AT: RE7R01B (VK50VE)]

MANUAL MODE: System Diagram

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MANUAL MODE: System Description

INFOID:0000000010579102

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator |
|------------------------------|--|-----------------------|---|
| Output speed sensor | Vehicle speed | Shift pattern control | High and low reverse clutch solenoid valve Direct clutch solenoid valve Input clutch solenoid valve Low brake solenoid valve 2346 brake solenoid valve Front brake solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve Anti-interlock solenoid valve |
| A/T fluid temperature sensor | ATF temperature | | |
| ECM | Engine speed signal* | | |
| | Accelerator pedal position signal* | | |
| Unified meter and A/C amp. | Manual mode signal* | | |
| | Non-manual mode signal* | | |
| | Manual mode shift up signal* | | |
| | Manual mode shift down signal* | | |
| | Paddle shifter shift up signal*1, *2 | | |
| | Paddle shifter shift down signal*1, *2 | | |

^{*1:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

Manual Mode

The TCM receives the manual mode signal, non-manual mode signal, manual mode shift up signal, manual
mode shift down signal, paddle shifter shift up signal* and paddle shifter shift down signal* from unified meter
and A/C amp. via CAN communication line. The TCM shifts shift pattern control to the manual mode based
on these signals, and then shifts the A/T by operating each solenoid valve according to the shift operation of
the driver.

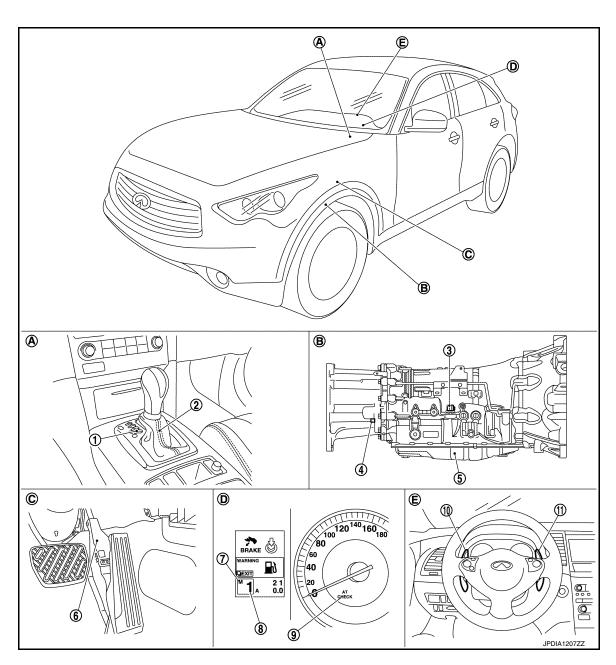
^{*2:} With paddle shifter

^{*:} With paddle shifter

- The TCM prohibits the manual mode while being in fail-safe mode due to an A/T malfunction, etc. Refer to TM-450, "Fail-Safe".
- The TCM transmits the manual mode shift refusal signal to the unified meter and A/C amp. if the TCM refuses the transmission from the driving status of vehicle when the selector lever shifts to UP or DOWN side. The unified meter and A/C amp. blinks shift indicator on the combination meter and sounds the buzzer to indicate the driver that the shifting is not performed when receiving this signal. However, the TCM does not transmit the manual mode shift refusal signal in the conditions as per the following.
- When the selector lever shifts to DOWN side while driving in 1GR.
- When the selector lever shifts to UP side while driving in 7GR.

MANUAL MODE: Component Parts Location

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- Selector lever position indicator
- 4. Control valve & TCM*1
- Manual mode indicator 7.
- 10. Paddle shifter (shift-down)*2
- A. Center console
- Combination meter

- A/T shift selector assembly 2.
- 5. Output speed sensor
- Shift position indicator Paddle shifter (shift-up)*2
- B. A/T assembly
- E. Steering wheel

- 3. Joint connector
- 6. Accelerator pedal position sensor
- q A/T CHECK indicator lamp

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C. Accelerator pedal

SHIFT PATTERN CONTROL

< SYSTEM DESCRIPTION >

NOTE:

- The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- · The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2
- A/T fluid temperature sensor
- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *1: Control valve & TCM is included in A/T assembly.
- *2: With paddle shifter

MANUAL MODE: Component Description

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[7AT: RE7R01B (VK50VE)]

| Name | Function | | |
|--|---|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output ar for power supply. The TCM controls the A/T. | | |
| Output speed sensor | TM-376, "Description" | | |
| A/T fluid temperature sensor | TM-371, "Description" | | |
| Input clutch solenoid valve | TM-374, "Description" | | |
| Front brake solenoid valve | TM-403. "Description" | | |
| Direct clutch solenoid valve | TM-421, "Description" | | |
| High and low reverse clutch solenoid valve | TM-418, "Description" | | |
| Low brake solenoid valve | TM-419. "Description" | | |
| Anti-interlock solenoid valve | TM-399, "Description" | | |
| 2346 brake solenoid valve | TM-420, "Description" | | |
| Line pressure solenoid valve | TM-398. "Description" | | |
| Torque converter clutch solenoid valve | TM-394, "Description" | | |
| ECM | EC-1148, "System Description" | | |
| Unified meter and A/C amp. | MWI-6, "METER SYSTEM : System Description" | | |

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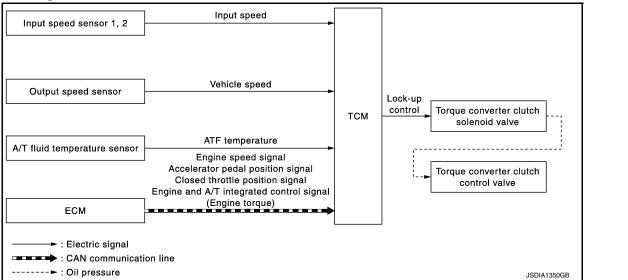
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LOCK-UP CONTROL

System Diagram



System Description

INPUT/OUTPUT SIGNAL CHART

| Sensor | Input signal to TCM | TCM function | Actuator |
|------------------------------|---|-----------------|---|
| Input speed sensor 1, 2 | Input speed | | |
| Output speed sensor | Vehicle speed | | |
| A/T fluid temperature sensor | ATF temperature | Lock-up control | Torque converter clutch sole- noid valve ↓ Torque converter clutch con- |
| | Engine speed signal* | | |
| | Accelerator pedal position signal* | | |
| ECM | Closed throttle position signal* | | trol valve |
| | Engine and A/T integrated control signal (Engine torque)* | | |

^{*:} This signal is transmitted via CAN communication line.

SYSTEM DESCRIPTION

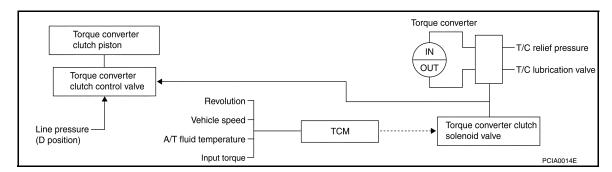
The torque converter clutch piston in the torque converter is engaged to eliminate torque converter slip to increase power transmission efficiency.

The torque converter clutch control valve operation is controlled by the torque converter clutch solenoid valve, which is controlled by a signal from TCM, and the torque converter clutch control valve engages or releases the torque converter clutch piston.

Lock-up operation condition table

| Selector lever | "D" position | | | "M" position | | | | | | | | |
|----------------|--------------|---|---|--------------|---|---|---|---|---|---|---|---|
| Gear position | 7 | 6 | 5 | 4 | 3 | 2 | 7 | 6 | 5 | 4 | 3 | 2 |
| Lock-up | × | _ | _ | _ | _ | _ | × | × | × | × | × | × |
| Slip lock-up | × | × | × | × | × | × | × | × | × | × | × | × |

Torque Converter Clutch Control Valve Control Lock-up control system diagram



Lock-up released

 In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by the torque converter clutch solenoid and the lock-up apply pressure is drained.
 in this way, the torque converter clutch piston is not coupled.

Lock-up Applied

 In the lock-up applied state, the torque converter clutch control valve is set into the locked state by the torque converter clutch solenoid and lock-up apply pressure is generated.
 In this way, the torque converter clutch piston is pressed and coupled.

Smooth Lock-up Control

When shifting from the lock-up released state to the lock-up applied state, the current output to the torque converter clutch solenoid is controlled with the TCM. In this way, when shifting to the lock-up applied state, the torque converter clutch is temporarily set to the half-clutched state to reduce the shock.

Half-clutched State

The current output from the TCM to the torque converter clutch solenoid is varied to steadily increase the
torque converter clutch solenoid pressure.
 In this way, the lock-up apply pressure gradually rises and while the torque converter clutch piston is put into
half-clutched states, the torque converter clutch piston operating pressure is increased and the coupling is
completed smoothly.

Slip Lock-up Control

 In the slip region, the torque converter clutch solenoid current is controlled with the TCM to put it into the half-clutched state. This absorbs the engine torque fluctuation and lock-up operates from low speed. This raises the fuel efficiency for 2GR, 3GR, 4GR, 5GR, 6GR and 7GR.

Component Parts Location

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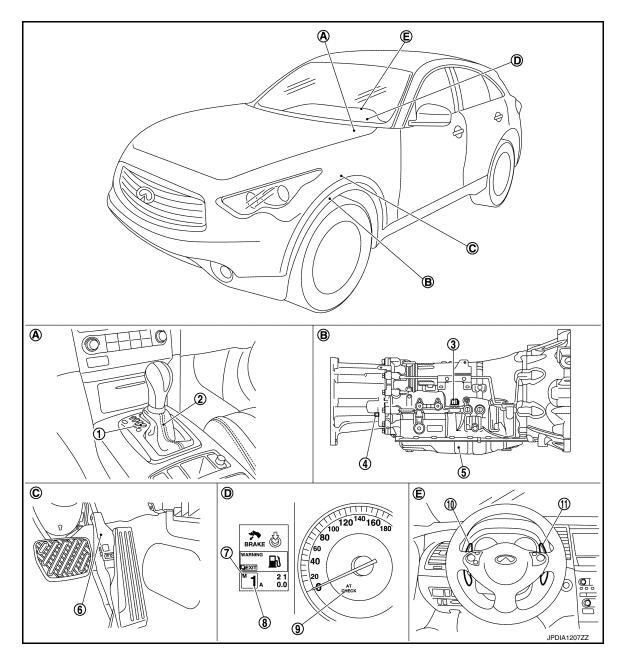
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- Selector lever position indicator
- 4. Control valve & TCM*1
- Manual mode indicator 7.
- 10. Paddle shifter (shift-down)*2
- A. Center console
- D. Combination meter

- A/T shift selector assembly
- 5. Output speed sensor
- Shift position indicator Paddle shifter (shift-up)*2
- B. A/T assembly
- Steering wheel

- Joint connector
- 6. Accelerator pedal position sensor
- A/T CHECK indicator lamp
- Accelerator pedal

NOTE:

- The following components are included in A/T shift selector assembly.
- Manual mode select switch
- Manual mode position select switch
- Shift position switch
- · The following components are included in control valve & TCM.
- TCM
- Input speed sensor 1, 2

2015 QX70

LOCK-UP CONTROL

< SYSTEM DESCRIPTION >

- A/T fluid temperature sensor
- Transmission range switch
- Direct clutch solenoid valve
- High and low reverse clutch solenoid valve
- Input clutch solenoid valve
- Front brake solenoid valve
- Low brake solenoid valve
- Anti-interlock solenoid valve
- 2346 brake solenoid valve
- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- *1: Control valve & TCM is included in A/T assembly.
- *2: With paddle shifter

Component Description

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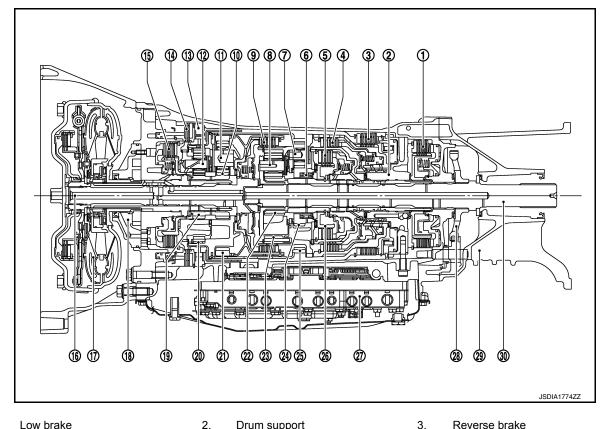
[7AT: RE7R01B (VK50VE)]

| Name | Function | | |
|--|--|--|--|
| TCM | The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The TCM controls the A/T. | | |
| Output speed sensor | TM-376, "Description" | | |
| Input speed sensor 1 | TM 274 "Description" | | |
| Input speed sensor 2 | TM-374, "Description" | | |
| A/T fluid temperature sensor | TM-371, "Description" | | |
| Torque converter clutch solenoid valve | TM-394, "Description" | | |
| Torque converter clutch control valve | Switches the lock-up to operating or released. Also, by performing the lock-up operation transiently, lock-up smoothly. | | |
| ECM <u>EC-1148, "System Description"</u> | | | |

INFOID:0000000010579109

SHIFT MECHANISM

Cross-Sectional View



- Low brake 1.
- Direct clutch 4.
- Rear carrier 7.*1
- Front sun gear 10.*2
- 13. 1st one-way clutch
- Input shaft 16.*4
- 19.^{*2} Under drive sun gear
- 22. Mid sun gear
- 25. Rear internal gear
- 28. Parking gear
- *1: 7 and 23 are one unit.
- *2: 10 and 19 are one unit.
- *3: 11 and 20 are one unit.
- *4: 16 and 21 are one unit.

- Drum support
- 5. High and low reverse clutch
- 8. Mid carrier
- Front carrier 11.^{*3}
- 14. Front brake
- Torque converter 17.
- Under drive internal gear 20.*3
- 23.*1 Mid internal gear
- 26. High and low reverse clutch hub
- 29. Adapter case

- Reverse brake
- 6. 2nd one-way clutch
- 9. Input clutch
- 12. Under drive carrier
- 2346 brake 15.
- 18. Oil pump
- Front internal gear 21.*4
- 24. Rear sun gear
- 27 Control valve & TCM
- 30. Output shaft

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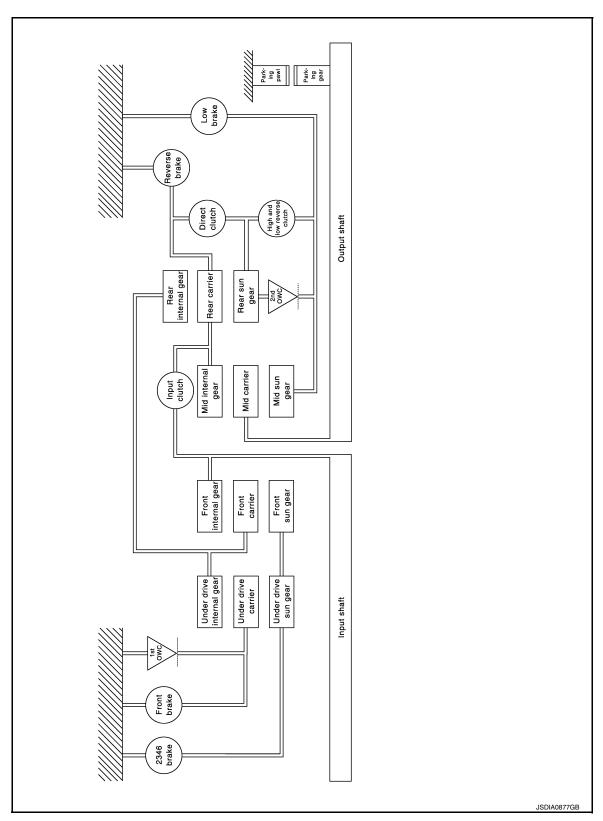
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System Diagram

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System Description

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DESCRIPTION

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

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With the use of 4 sets of planetary gears, A/T enables 7-speed transmission for forward and 1-speed transmission for backward, depending on the combination of 3 sets of multiple-disc clutches, 4 sets of multiple-disc brakes and 2 sets of one-way clutches.

CLUTCH AND BAND CHART

| | ame of ne part | | D, | /C | | | L, | /B | | | | | |
|-------------------|-------------------|-----|-------|------|------------|------------|-------|-------|--------|-------|------------|------------|------------------------------------|
| Shift position | \ | I/C | FRONT | REAR | H&LR/C | F/B | INNER | OUTER | 2346/B | REV/B | 1st OWC | 2nd OWC | Remarks |
| F | • | | | | Δ | Δ | | | | | | | Park position |
| F | 3 | | | | \Diamond | \Diamond | | | | 0 | 0 | 0 | Reverse position |
| 1 | ١ | | | | Δ | Δ | | | | | | | Neutral position |
| | 1st | | | | ☆ | ☆ | 0 | 0 | | | 0 | 0 | |
| | 2nd | | | | | | 0 | 0 | 0 | | | 0 | |
| | 3rd | | 0 | 0 | | | 0 | | 0 | | | | Automatic shift |
| D, DS | 4th | | 0 | 0 | 0 | | | | 0 | | | | 1⇔2⇔3⇔4⇔5⇔6⇔7 |
| | 5th | 0 | | 0 | 0 | | | | | | | | |
| | 6th | 0 | | | 0 | | | | 0 | | | | |
| | 7th | 0 | | | 0 | 0 | | | | | | | |
| 7M | 7th | 0 | | | 0 | 0 | | | | | | | Locks* (held stationary) in 7GR |
| 6M | 6th | 0 | | | 0 | | | | 0 | | | | Locks* (held stationary) in 6GR |
| 5M | 5th | 0 | | 0 | 0 | | | | | | | | Locks* (held stationary) in 5GR |
| 4M | 4th | | 0 | 0 | 0 | | | | 0 | | | | Locks* (held stationary) in 4GR |
| 3M | 3rd | | 0 | 0 | | | 0 | | 0 | | | | Locks* (held stationary) in 3GR |
| 2M | 2nd | | | | \Diamond | | 0 | 0 | 0 | | | 0 | Locks* (held stationary) in 2GR |
| 1M | 1st | | | | \Diamond | \Diamond | 0 | 0 | | | 0 | 0 | Locks (held stationary) in 1GR |

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POWER TRANSMISSION

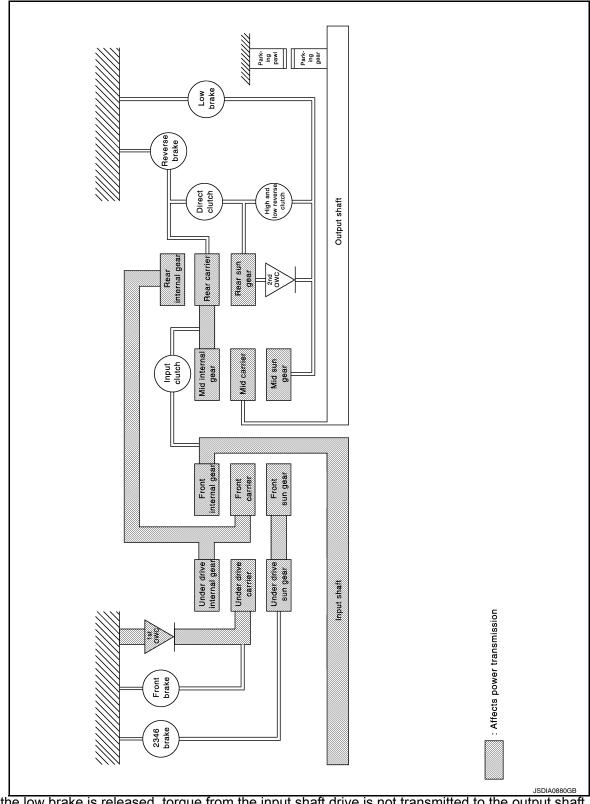
"N" Position

TM-333 **Revision: 2015 February** 2015 QX70

^{*:} Down shift automatically according to the vehicle speed.

O - Operates during "progressive" acceleration.

 $[\]triangle$ - Line pressure is applied but does not affect power transmission.



Since the low brake is released, torque from the input shaft drive is not transmitted to the output shaft. "P" Position

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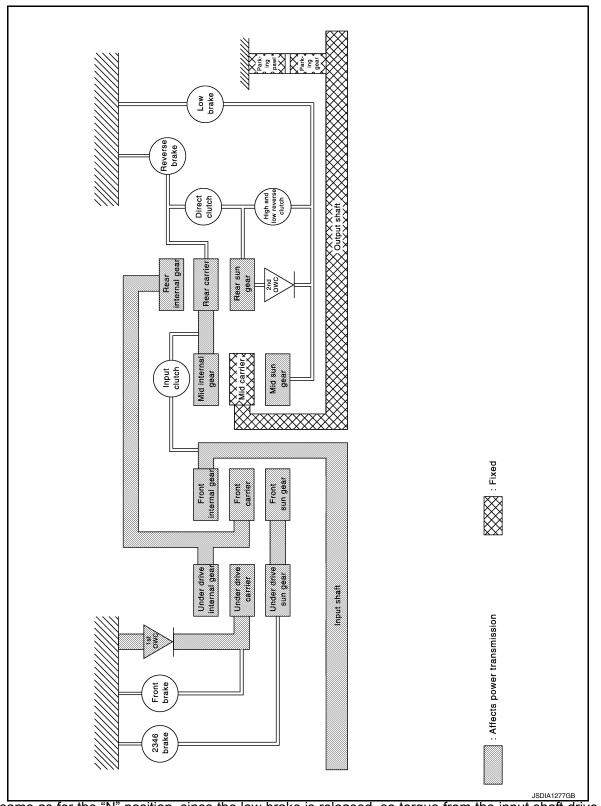
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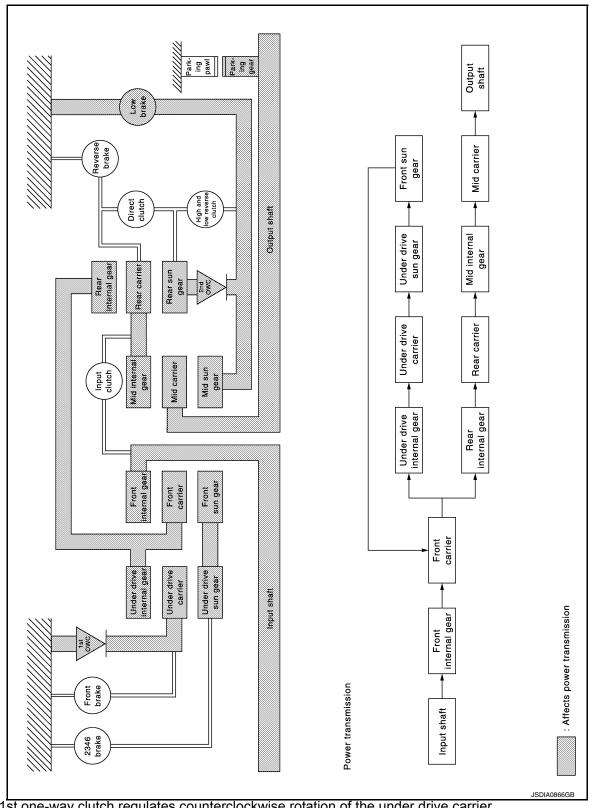
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• The same as for the "N" position, since the low brake is released, so torque from the input shaft drive is not transmitted to the output shaft.

• The parking pawl linked with the selector lever meshes with the parking gear and fastens the output shaft mechanically.

"D1" and "DS1" Positions



- The 1st one-way clutch regulates counterclockwise rotation of the under drive carrier.
- The 2nd one-way clutch regulates counterclockwise rotation of the rear sun gear.
- · The mid sun gear is fixed by the low brake.
- Each planetary gear enters the state described below.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Front planetary gear | | | |
|--------------------------|--|---------------------------------------|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Counterclockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Deceleration from front internal gear | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary go | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | _ | Fixed | Input/Output |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution |
| Number of revolutions | Acceleration from under drive in- ternal gear | _ | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | - | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;M1" Position

TM-337 **Revision: 2015 February** 2015 QX70 J

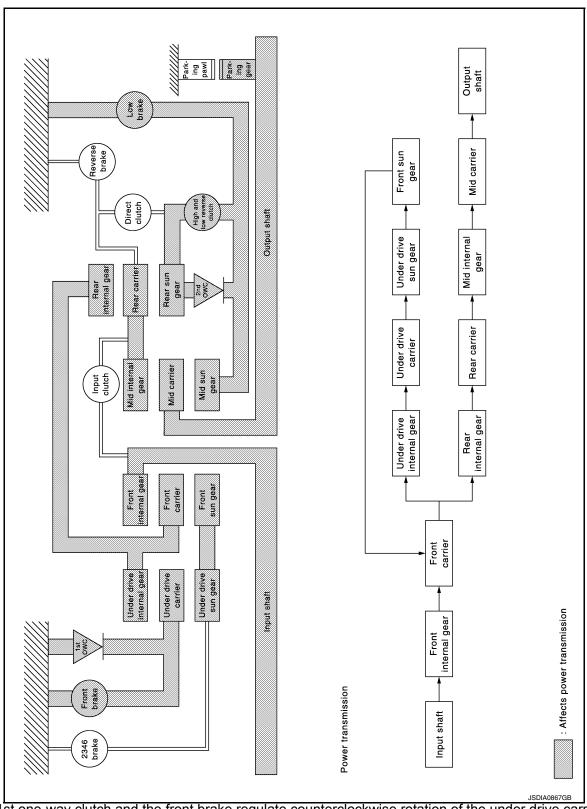
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The 1st one-way clutch and the front brake regulate counterclockwise rotation of the under drive carrier.
 NOTE:

The front brake operates only while coasting.

• The 2nd one-way clutch and the high and low reverses clutch regulate counterclockwise rotation of the rear sun gear.

NOTE:

The high and low reverse clutch operates only while coasting.

The mid sun gear is fixed by the low brake.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

• Each planetary gear enters the state described below.

| Front planetary gear | | | |
|--------------------------|---|---------------------------------------|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Counterclockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Deceleration from front internal gear | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary ge | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | _ | Fixed | Input/Output |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution |
| Number of revolutions | Acceleration from under drive internal gear | _ | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;D2" and "DS2" Positions

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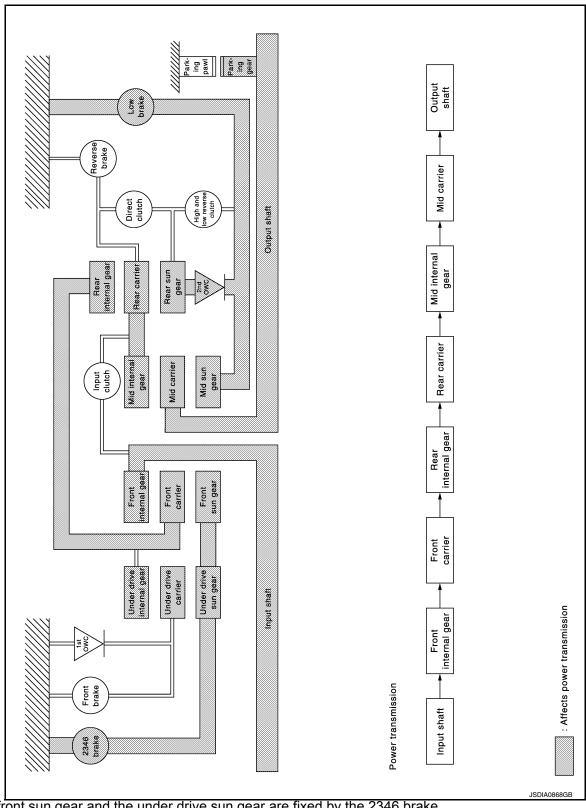
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- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The 2nd one-way clutch regulates counterclockwise rotation of the rear sun gear.
- The mid sun gear is fixed by the low brake.
- Each planetary gear enters the state described below.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Front planetary gear | | | _ |
|--------------------------|----------------------|---|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary ge | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | Fixed | _ | Input/Output |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from under drive internal gear | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;M2" Position

TM-341 **Revision: 2015 February** 2015 QX70 J

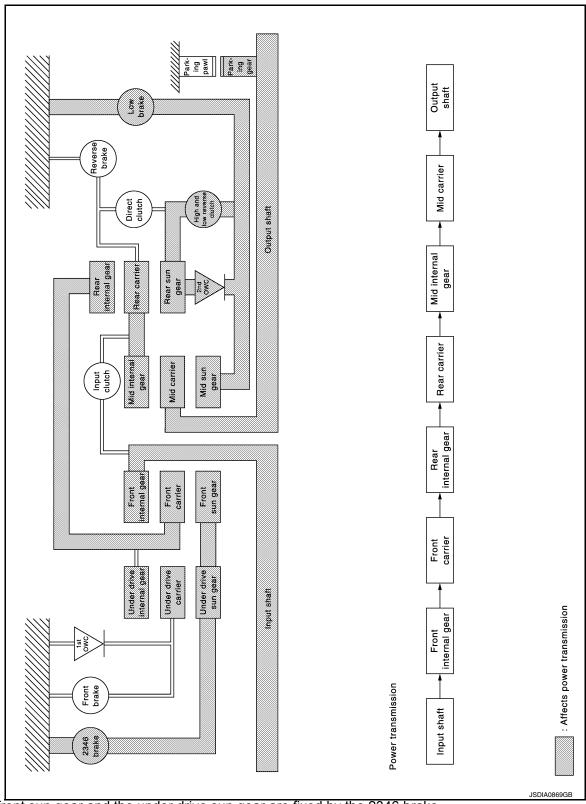
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- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The 2nd one-way clutch and the high and low reverse clutch regulate counterclockwise rotation of the rear sun gear.

NOTE:

The high and low reverse clutch operates only while coasting.

- The mid sun gear is fixed by the low brake.
- · Each planetary gear enters the state described below.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Front planetary gear | | | |
|--------------------------|----------------------|---|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary ge | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | Fixed | _ | Input/Output |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from under drive internal gear | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;D3", "DS3" and "M3" Positions

TM-343 **Revision: 2015 February** 2015 QX70

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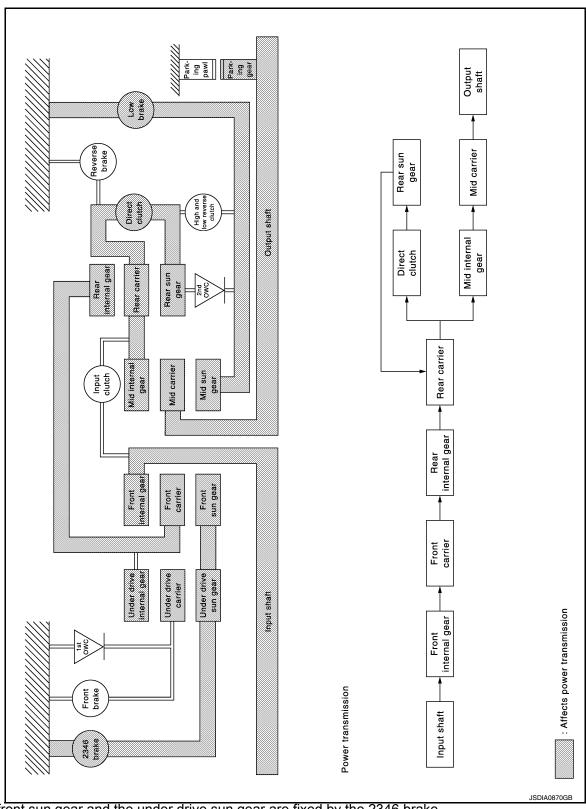
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- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The direct clutch gets engaged and connects the rear sun gear with the rear carrier.
- The mid sun gear is fixed by the low brake.
- Each planetary gear enters the state described below.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Front planetary gear | | | |
|-------------------------|---|---|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary g | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | Fixed | _ | Input/Output |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from under drive in- ternal gear | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Same number of revolution as the rear internal gear | Same number of revolution as the rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from mid internal gear | Same number of revolution as the rear carrier |

[&]quot;D4", "DS4" and "M4" Positions

Revision: 2015 February TM-345 2015 QX70 J

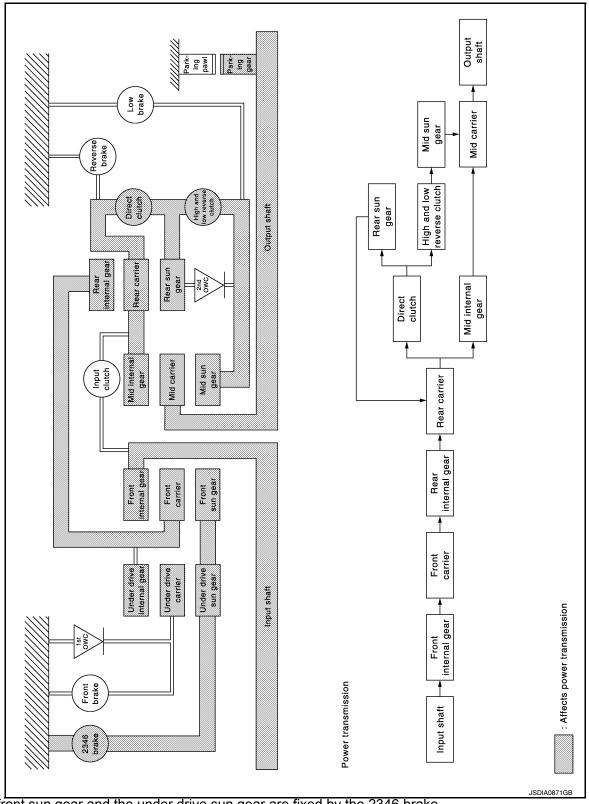
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- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The direct clutch gets engaged and connects the rear sun gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters the state described below.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Front planetary gear | | | |
|-------------------------|---|---|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | Fixed | Output | Input |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary g | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | Fixed | _ | Input/Output |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution |
| Number of revolutions | _ | Deceleration from under drive in- ternal gear | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Same number of revolution as the rear internal gear | Same number of revolution as the rear internal gear | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Same number of revolution as the mid internal gear | Same number of revolution as the mid internal gear | Same number of revolution as the rear carrier |

[&]quot;D5", "DS5" and "M5" Positions

TM-347 **Revision: 2015 February** 2015 QX70 J

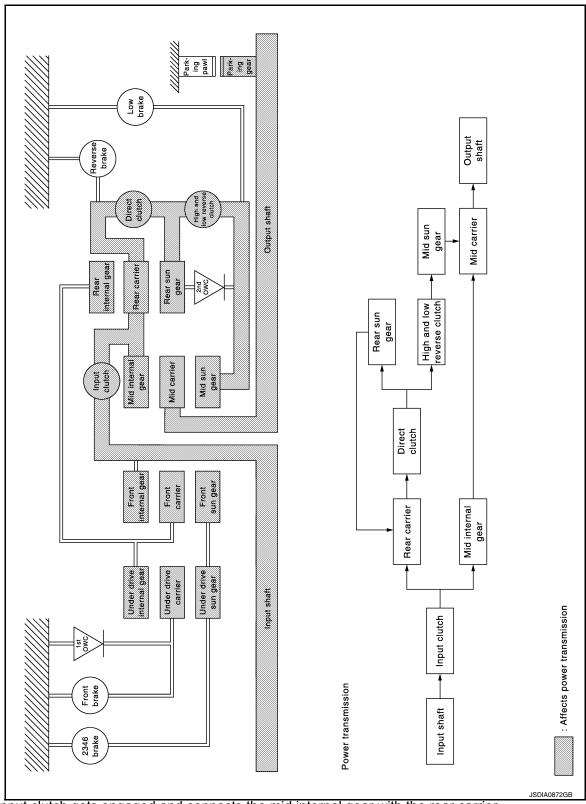
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- The input clutch gets engaged and connects the mid internal gear with the rear carrier.
- The direct clutch gets engaged and connects the rear sun gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters the state described below.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Rear planetary gear | | | | |
|--|---|--|---|--|
| Name | Rear sun gear | Rear carrier | Rear internal gear | |
| Condition | _ | input/Output | _ | |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution | |
| Number of revolutions | Same number of revolution as the rear carrier | Same number of revolution as the input shaft | Same number of revolution as the rear carrier | |
| Mid planetary gear | | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear | |
| Condition | _ | Output | Input | |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution | |
| Number of revolutions Same number of revolution as the mid internal gear | | Same number of revolution as the mid internal gear | Same number of revolution as the input shaft | |

[&]quot;D6", "DS6" and "M6" Positions

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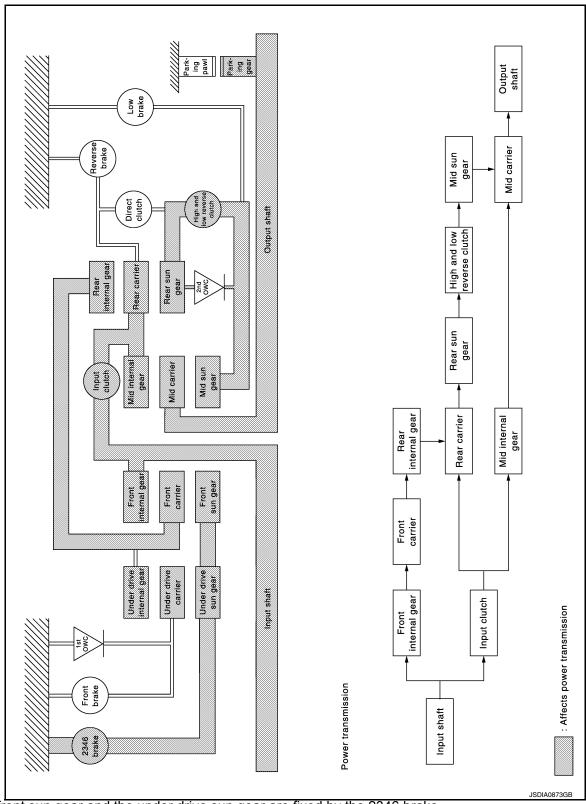
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- The front sun gear and the under drive sun gear are fixed by the 2346 brake.
- The input clutch gets engaged and connects the mid internal gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters the state described below.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Front planetary gear | | | | |
|-----------------------|-------------------------------------|--|--|--|
| Name | Front sun gear | Front carrier | Front internal gear | |
| Condition | Fixed | Output | Input | |
| Direction of rotation | _ | Clockwise revolution | Clockwise revolution | |
| Number of revolutions | _ | Deceleration from front internal gear | Same number of revolution as the input shaft | |
| Rear planetary gear | | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear | |
| Condition | _ | Input/Output | Input | |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution | |
| Number of revolutions | Acceleration from rear carrier | Same number of revolution as the input shaft | Same number of revolution as the front carrier | |
| Mid planetary gear | | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear | |
| Condition | _ | Output | Input | |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution | |
| Number of revolutions | Acceleration from mid internal gear | Acceleration from mid internal gear | Same number of revolution as the input shaft | |

[&]quot;D7", "DS7" and "M7" Positions

Revision: 2015 February

TM-351

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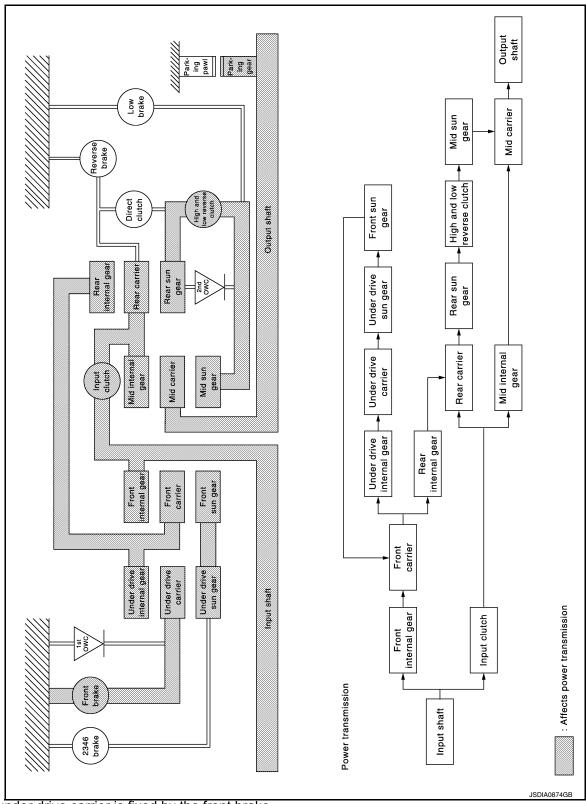
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- The under drive carrier is fixed by the front brake.
- The input clutch gets engaged and connects the mid internal gear with the rear carrier.
- The high and low reverse clutch gets engaged and connects the rear sun gear with the mid sun gear.
- Each planetary gear enters state described below.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Front planetary gear | | | | |
|-------------------------|--|--|--|--|
| Name | Front sun gear | Front carrier | Front internal gear | |
| Condition | _ | Output | Input | |
| Direction of rotation | Counterclockwise revolution | Clockwise revolution | Clockwise revolution | |
| Number of revolutions | Deceleration from front internal gear | Deceleration from front internal gear | Same number of revolution as the input shaft | |
| Under drive planetary g | ear | | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear | |
| Condition | _ | Fixed | Input/Output | |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution | |
| Number of revolutions | Acceleration from under drive inter- nal gear | _ | Same number of revolution as th front carrier | |
| Rear planetary gear | | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear | |
| Condition | _ | Input/Output | Input | |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution | |
| Number of revolutions | Acceleration from rear carrier | Same number of revolution as the input shaft | Same number of revolution as th under drive internal gear | |
| Mid planetary gear | | | | |
| Name | Mid sun gear | Mid carrier | Mid internal gear | |
| Condition | _ | Output | Input | |
| Direction of rotation | Clockwise revolution | Clockwise revolution | Clockwise revolution | |
| Number of revolutions | Acceleration from mid internal gear | Acceleration from mid internal gear | Same number of revolution as the input shaft | |

[&]quot;R" Position

Revision: 2015 February TM-353 2015 QX70

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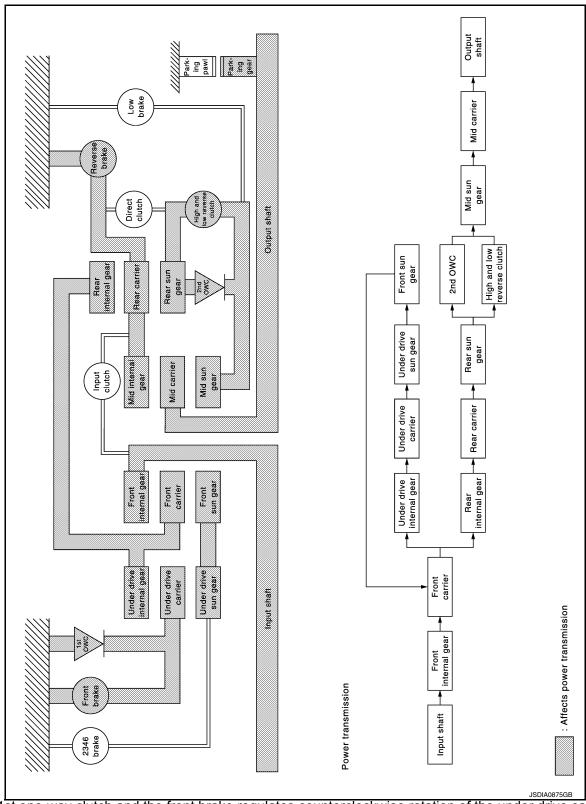
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The 1st one-way clutch and the front brake regulates counterclockwise rotation of the under drive carrier.
 NOTE:

The front brake operates at the fixed speed or less.

- The rear carrier and the mid internal gear are fixed by the reverse brake.
- The mid sun gear rotates at the same speed as the rear sun gear by operation of the 2nd one-way clutch and the high and low reverse clutch.

NOTE:

The high and low reverse clutch operates at the fixed speed or less.

< SYSTEM DESCRIPTION >

[7AT: RE7R01B (VK50VE)]

| Front planetary gear | | | |
|---|---|---------------------------------------|--|
| Name | Front sun gear | Front carrier | Front internal gear |
| Condition | _ | Output | Input |
| Direction of rotation | Counterclockwise revolution | Clockwise revolution | Clockwise revolution |
| Number of revolutions | Deceleration from front internal gear | Deceleration from front internal gear | Same number of revolution as the input shaft |
| Under drive planetary g | ear | | |
| Name | Under drive sun gear | Under drive carrier | Under drive internal gear |
| Condition | _ | Fixed | Input/Output |
| Direction of rotation | Counterclockwise revolution — | | Clockwise revolution |
| Number of revolutions Acceleration from under drive internal gear | | _ | Same number of revolution as the front carrier |
| Rear planetary gear | | | |
| Name | Rear sun gear | Rear carrier | Rear internal gear |
| Condition | Output | Fixed | Input |
| Direction of rotation | Counterclockwise revolution | _ | Clockwise revolution |
| Number of revolutions Acceleration from rear internal gear | | _ | Same number of revolution as the under drive internal gear |
| Mid planetary gear | | | |
| Name Mid sun gear | | Mid carrier | Mid internal gear |
| Condition | Input | Output | Fixed |
| Direction of rotation | Counterclockwise revolution Counterclockwise revolution — | | _ |
| Number of revolutions | Same number of revolution as the rear sun gear | Deceleration from mid sun gear | _ |

Component Parts Location

INFOID:0000000010579112

Refer to TM-331, "Cross-Sectional View".

Component Description

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| Name of the Part (Abbreviation) | Function | | |
|-------------------------------------|---|--|--|
| Front brake (FR/B) | Fastens the under drive carrier. | | |
| Input clutch (I/C) | Connects the mid internal gear and the rear carrier. | | |
| Direct clutch (D/C) | Connects the rear carrier and the rear sun gear. | | |
| High and low reverse clutch (HLR/C) | Connects the rear sun gear and the mid sun gear. | | |
| Reverse brake (R/B) | Fastens the rear carrier. | | |
| Low brake (L/B) | Fastens the mid sun gear. | | |
| 2346 brake (2346/B) | Fastens the under drive sun gear. | | |
| 1st one-way clutch (1st OWC) | Allows the under drive carrier to turn freely in the forward direction but fastens it for reverse rotation. | | |
| 2nd one-way clutch (2nd OWC) | Allows the rear sun gear to turn freely in the forward direction but fastens it for reverse rotation. | | |
| Torque converter | Amplifies driving force the engine, and transmits it to transmission input shaft. | | |
| Oil pump | Driven by the engine, oil pump supplies oil to torque converter, control valve assembly, and each lubricating system. | | |

INFOID:0000000010579114

SHIFT LOCK SYSTEM

System Description

 Shift lock prevents an unintentional start of the vehicle that may be caused by an incorrect operation while selector lever is in the "P" position.

- Selector lever can be shifted from the "P" position to another position when the following conditions are satisfied.
- Ignition switch ON
- Stop lamp switch is ON (brake pedal is depressed)
- Selector lever knob button is pressed

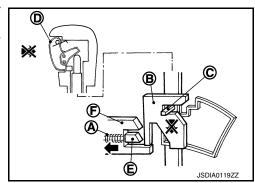
SHIFT LOCK OPERATION AT "P" POSITION

When Brake Pedal Is Not Depressed (No Shift Operation Allowed)

The shift lock solenoid (A) inside the shift lock unit is not energized if the brake pedal is not depressed while the ignition switch is ON.

The lock plate (B) lowers according to the downward movement of the position pin (C) when the selector button (D) is pressed, and presses only slider B (E) into the shift lock unit. Slider A (F) located below the lock plate prevents the downward movement of the lock plate with the spring force. The selector lever cannot be shifted from the "P" position for this reason.

However, slider A is forcibly pressed into the shift lock unit, allowing the selector lever to shift if the shift lock release button is pressed.

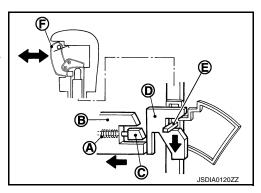


When Brake Pedal Is Depressed (Shift Operation Allowed)

The shift lock solenoid (A) inside the shift lock unit is energized and the relative positions of sliders A (B) and B (C) are maintained when the brake pedal is depressed while the ignition switch is ON.

The lock plate (D) lowers according to the downward movement of the position pin (E), thrusting away sliders A and B, when the selector button (F) is pressed.

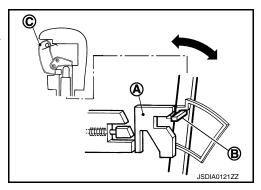
The position pin lowers to the position that allows shift operation for this reason. As a result, the selector lever can be shifted out of the P position.



OPERATION AT OTHER THAN "P" POSITION

The shift lock function will not operate at any position other than "P" because the lock plate (A) is only set for the "P" position. Accordingly, the selector lever can be shifted to any position regardless of the brake operation.

The position pin (B) enters the "P" position thrusting away the lock plate when the selector lever is shifted to the "P" position. Then, the shift mechanism is locked when the selector button (C) is released.



"P" POSITION RETAINING MECHANISM (IGNITION SWITCH LOCK)

When ignition switch is not in the ON position, power is not applied to the shift lock solenoid in the shift lock unit. This causes shift lock state, and then "P" position is retained.

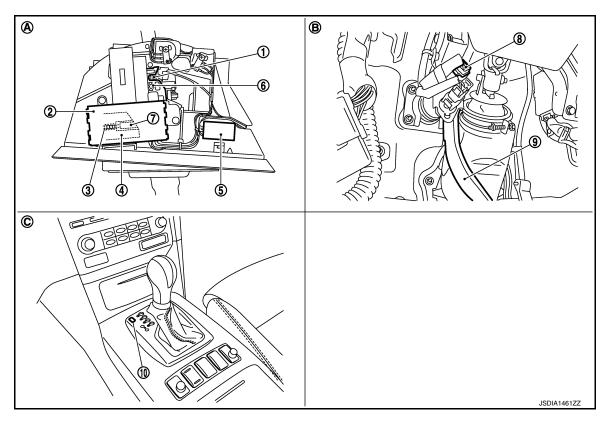
When an actuating system in the shift lock unit has a malfunction, selector lever is unable to operate from the "P" position even when pressing the brake pedal with the ignition switch ON. However, when pressing the shift lock release button, slider A is forcibly pressed into the shift lock unit. This allows shift lock to be released and selector lever enables the select operation from the "P" position.

CAUTION:

Never use the shift lock release button except when the select lever is inoperative even when pressing the brake pedal with the ignition switch ON.

Component Parts Location

INFOID:0000000010579115



- 1. Position pin
- 4. Slider A
- 7. Slider B
- 10. Shift lock cover *
- A. A/T shift selector assembly
- 2. Shift lock unit
- 5. A/T shift selector connector
- 8. Stop lamp switch
- B. Brake pedal, upper

- 3. Shift lock solenoid
- 6. Lock plate
- 9. Brake pedal
- C. Center console

Component Description

INFOID:0000000010579116

| Component | | Function |
|------------------|---------------------------|--|
| | Shift lock solenoid | Activated by the ignition switch and stop lamp signals, it holds the relative positions of sliders A and B. |
| Shift lock unit | Lock plate | Restricts position pin moving. |
| | Shift lock release button | Pressing the shift lock release button cancels the shift lock forcibly. |
| Position pin | | Links with selector knob button and restricts selector lever shift operation. |
| Stop lamp switch | | When brake pedal is depressed, stop lamp switch turns ON. When stop lamp switch turns ON, power is supplied to shift lock unit. |

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^{*:} Shift lock release button becomes operative by removing shift lock cover.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SYSTEM DESCRIPTION >

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000010579117

[7AT: RE7R01B (VK50VE)]

The A/T system has two self-diagnostic systems.

The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM in combination with the ECM. A malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory and in the TCM memory.

The second is the TCM original self-diagnosis indicated by the TCM. A malfunction history is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For details, refer to TM-455, "DTC Index".

OBD FUNCTION

The ECM provides emission-related on board diagnostic (OBD-II) functions for the A/T system.

One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part.

The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.

The MIL automatically illuminates in "One or Two Trip Detection Logic" when a malfunction is sensed in relation to A/T system parts. For details, refer to <u>EC-1254. "DIAGNOSIS DESCRIPTION: 1st Trip Detection Logic"</u> and Two Trip Detection Logic".

DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (TCM)

CONSULT Function (TRANSMISSION)

INFOID:0000000010579118

[7AT: RE7R01B (VK50VE)]

CONSULT APPLICATION ITEMS

| Mode | Function |
|-------------------------------|--|
| All DTC Reading | Display all DTCs or diagnostic items that all ECUs are recording and judging. |
| Self Diagnostic Results | Retrieve DTC from ECU and display diagnostic items. |
| Data Monitor | Monitor the input/output signal of the control unit in real time. |
| CAN Diagnosis | This mode displays a network diagnosis result about CAN by diagram. |
| CAN Diagnosis Support Monitor | It monitors the status of CAN communication. |
| DTC work support | DTC reproduction procedure can be performed speedily and precisely. |
| ECU Identification | Display the ECU identification number (part number etc.) of the selected system. |
| CALIB DATA* | The calibration data status of TCM can be checked. |

^{*:} Although "CALIB DATA" is selectable, do not use its.

SELF-DIAGNOSTIC RESULTS

Refer to TM-455, "DTC Index".

IGN Counter

The IGN counter is indicated in Freeze frame data (FFD) and indicates the number of times that the ignition switch is turned ON after returning to the normal state from DTC.

- CAN malfunction
- The number is 0 when a malfunction is detected now.
- The number increases like 1 \rightarrow 2 \rightarrow 3...38 \rightarrow 39 after returning to the normal condition whenever ignition switch OFF \rightarrow ON.
- The number is fixed to 39 until the self-diagnosis results are erased if it is over 39.
- Other than CAN malfunction
- The number is 0 when a malfunction is detected now.
- The number increases like 1 \rightarrow 2 \rightarrow 3...254 \rightarrow 255 after returning to the normal condition whenever ignition switch OFF \rightarrow ON.
- The number is fixed to 255 until the self-diagnosis results are erased if it is over 255.

DATA MONITOR

NOTE:

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

Display Items List

X: Standard —: Not applicable ▼: Option

| | | | | | A. Staridard, —. Not applicable, • . Option | |
|-----------------------|---------------|-----------------------------|-----------------|--------------------------------|---|--|
| Monitored item (Unit) | | Monitor Item Selection | | | | |
| | | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks | |
| VHCL/S SE-A/T | (km/h or mph) | Х | Х | ▼ | Displays the vehicle speed calculated by the TCM from the output shaft revolution. | |
| ESTM VSP SIG | (km/h or mph) | Х | _ | ▼ | Displays the vehicle speed signal received via CAN communication. | |
| OUTPUT REV | (rpm) | Х | Х | ▼ | Displays the output shaft revolution calculated from the pulse signal of output speed sensor. | |
| INPUT SPEED | (rpm) | Х | Х | • | Displays the input shaft revolution calculated from front sun gear revolution and front carrier revolution. | |
| F SUN GR REV | (rpm) | _ | _ | ▼ | Displays the front sun gear revolution calculated from the pulse signal of input speed sensor 1. | |

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| | | Mon | itor Item Sele | ection | |
|----------------|------------|-----------------------------|-----------------|--------------------------------|---|
| Monitored item | n (Unit) | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| F CARR GR REV | (rpm) | _ | _ | • | Displays the front carrier gear revolution calculat ed from the pulse signal of input speed sensor 2 |
| ENGINE SPEED | (rpm) | Х | Х | ▼ | Displays the engine speed received via CAN communication. |
| TC SLIP SPEED | (rpm) | _ | х | • | Displays the revolution difference between input speed and engine speed. |
| ACCELE POSI | (0.0/8) | Х | _ | ▼ | Displays the accelerator position estimated value received via CAN communication. |
| THROTTLE POSI | (0.0/8) | Х | х | ▼ | Displays the throttle position received via CAN communication. |
| ATF TEMP 1 | (°C or °F) | Х | Х | ▼ | Displays the ATF temperature of oil pan calculat ed from the signal voltage of A/T fluid temperature sensor. |
| ATF TEMP 2 | (°C or °F) | Х | х | • | Displays the ATF temperature estimated value o torque converter outlet calculated from the signa voltage of A/T fluid temperature sensor. |
| ATF TEMP SE 1 | (V) | _ | _ | ▼ | Displays the signal voltage of A/T fluid temperature sensor. |
| BATTERY VOLT | (V) | Х | _ | ▼ | Displays the power supply voltage of TCM. |
| LINE PRES SOL | (A) | _ | Х | ▼ | Displays the command current from TCM to the line pressure solenoid. |
| TCC SOLENOID | (A) | _ | Х | ▼ | Displays the command current from TCM to the torque converter clutch solenoid. |
| L/B SOLENOID | (A) | _ | Х | ▼ | Displays the command current from TCM to the low brake solenoid. |
| FR/B SOLENOID | (A) | _ | х | ▼ | Displays the command current from TCM to the front brake solenoid. |
| HLR/C SOL | (A) | _ | х | • | Displays the command current from TCM to the high and low reverse clutch solenoid. |
| I/C SOLENOID | (A) | _ | х | • | Displays the command current from TCM to the input clutch solenoid. |
| D/C SOLENOID | (A) | _ | х | ▼ | Displays the command current from TCM to the direct clutch solenoid. |
| 2346/B SOL | (A) | _ | х | • | Displays the command current from TCM to the 2346 brake solenoid. |
| L/P SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the line pressure solenoid, and displays the monitor value. |
| TCC SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the torque converter clutch solenoid, and displays the monitor value. |
| L/B SOL MON | (A) | | _ | ▼ | Monitors the command current from TCM to the low brake solenoid, and displays the monitor value. |
| FR/B SOL MON | (A) | _ | _ | ▼ | Monitors the command current from TCM to the front brake solenoid, and displays the monitor value. |
| HLR/C SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the high and low reverse clutch solenoid, and displays the monitor value. |

DIAGNOSIS SYSTEM (TCM)

< SYSTEM DESCRIPTION >

| | | Mon | itor Item Sele | ction | |
|----------------|----------------------------------|-----------------------------|-----------------|--------------------------------|--|
| Monitored | item (Unit) | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| I/C SOL MON | (A) | _ | _ | • | Monitors the command current from TCM to the input clutch solenoid, and displays the monitor value. |
| D/C SOL MON | (A) | _ | _ | ▼ | Monitors the command current from TCM to the direct clutch solenoid, and displays the monitor value. |
| 2346/B SOL MON | (A) | _ | _ | ▼ | Monitors the command current from TCM to the 2346 brake solenoid, and displays the monitor value. |
| GEAR RATIO | | _ | Х | • | Displays the gear ratio calculated from input revolution and output revolution. |
| ENGINE TORQUE | (Nm) | _ | _ | • | Displays the engine torque estimated value received via CAN communication. |
| ENG TORQUE D | (Nm) | _ | _ | ▼ | Displays the engine torque estimated value re- flected the requested torque of each control unit received via CAN communication. |
| INPUT TRQ S | (Nm) | _ | _ | ▼ | Displays the input torque using for the oil pressure calculation process of shift change control. |
| INPUT TRQ L/P | (Nm) | _ | _ | ▼ | Displays the input torque using for the oil pressure calculation process of line pressure control. |
| TRGT PRES L/P | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of torque converter clutch solenoid valve calculated by the oil pressure calculation process of lock-up control. |
| TRGT PRES TCC | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of torque converter clutch solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRGT PRES L/B | (kPa, kg/cm ² or psi) | _ | _ | ▼ | Displays the target oil pressure value of low brake solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRGT PRE FR/B | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of front brake solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRG PRE HLR/C | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of high and low reverse clutch solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRGT PRES I/C | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of input clutch solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRGT PRES D/C | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of direct clutch solenoid valve calculated by the oil pressure calculation process of shift change control. |
| TRG PRE 2346/B | (kPa, kg/cm ² or psi) | _ | _ | • | Displays the target oil pressure value of 2346 brake solenoid valve calculated by the oil pressure calculation process of shift change control. |
| SHIFT PATTERN | | _ | _ | • | Displays the gear change data using the shift pattern control. |
| VEHICLE SPEED | (km/h or mph) | _ | _ | ▼ | Displays the vehicle speed for control using the control of TCM. |

| | | Mon | itor Item Sele | ection | |
|---------------|-----------|-----------------------------|-----------------|--------------------------------|---|
| Monitored it | em (Unit) | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| RANGE SW 4 | (ON/OFF) | Х | _ | ▼ | Displays the operation status of transmission range switch 4. |
| RANGE SW 3 | (ON/OFF) | Х | _ | ▼ | Displays the operation status of transmission range switch 3. |
| RANGE SW 2 | (ON/OFF) | Х | _ | ▼ | Displays the operation status of transmission range switch 2. |
| RANGE SW 1 | (ON/OFF) | Х | _ | ▼ | Displays the operation status of transmission range switch 1. |
| SFT DWN ST SW | (ON/OFF) | Х | _ | ▼ | Displays the operation status of paddle shifter (down switch). |
| SFT UP ST SW | (ON/OFF) | Х | _ | • | Displays the operation status of paddle shifter (up switch). |
| DOWN SW LEVER | (ON/OFF) | Х | _ | • | Displays the operation status of selector lever (down switch). |
| UP SW LEVER | (ON/OFF) | Х | _ | ▼ | Displays the operation status of selector lever (up switch). |
| NON M-MODE SW | (ON/OFF) | Х | _ | ▼ | Displays whether the selector lever is in any position other than manual shift gate position. |
| MANU MODE SW | (ON/OFF) | Х | _ | ▼ | Displays whether the selector lever is in the mar ual shift gate position. |
| TOW MODE SW | (ON/OFF) | _ | _ | • | Displays the reception status of tow mode switch signal received via CAN communica- tion. Not mounted but displayed. |
| DS RANGE | (ON/OFF) | _ | _ | ▼ | Displays whether it is the DS mode. |
| 1 POSITION SW | (ON/OFF) | Х | _ | • | Displays the reception status of 1 position switch signal received via CAN communica- tion. Not mounted but displayed. |
| OD CONT SW | (ON/OFF) | × | _ | • | Displays the reception status of overdrive control switch signal received via CAN communication. Not mounted but displayed. |
| BRAKESW | (ON/OFF) | Х | _ | ▼ | Displays the reception status of stop lamp switch signal received via CAN communication. |
| POWERSHIFT SW | (ON/OFF) | Х | _ | • | Displays the reception status of POWER mode signal received via CAN communication. Not mounted but displayed. |
| ASCD-OD CUT | (ON/OFF) | Х | _ | ▼ | Displays the reception status of ASCD OD cance request signal received via CAN communication |
| ASCD-CRUISE | (ON/OFF) | Х | _ | ▼ | Displays the reception status of ASCD operation signal received via CAN communication. |
| ABS SIGNAL | (ON/OFF) | Х | _ | ▼ | Displays the reception status of ABS operation signal received via CAN communication. |
| TCS GR/P KEEP | (ON/OFF) | Х | _ | ▼ | Displays the reception status of TCS gear keep request signal received via CAN communication |
| TCS SIGNAL 2 | (ON/OFF) | Х | _ | ▼ | Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is "cold". |

DIAGNOSIS SYSTEM (TCM)

| | | Mon | itor Item Sele | ection | |
|------------------|----------------|-----------------------------|-----------------|--------------------------------|---|
| Monitored ite | em (Unit) | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks |
| TCS SIGNAL 1 | (ON/OFF) | Х | _ | • | Displays whether the reception value of A/T shift schedule change demand signal received via CAN communication is "warm". |
| LOW/B PARTS | (FAIL/NOTFAIL) | _ | _ | • | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of low brake. |
| HC/IC/FRB PARTS | (FAIL/NOTFAIL) | _ | _ | • | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of high and low reversed clutch, input clutch or front brake. |
| IC/FRB PARTS | (FAIL/NOTFAIL) | _ | _ | • | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of input clutch or front brake. |
| HLR/C PARTS | (FAIL/NOTFAIL) | _ | _ | • | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of high and low reversed clutch. |
| W/O THL POS | (ON/OFF) | Х | _ | ▼ | Displays the kickdown condition signal status received via CAN communication. |
| CLSD THL POS | (ON/OFF) | Х | _ | ▼ | Displays the idling status signal status received via CAN communication. |
| DRV CST JUDGE | (DRIVE/COAST) | _ | _ | ▼ | Displays the judgment results of "driving" or "coasting" judged by TCM. |
| SHIFT IND SIGNAL | | _ | _ | ▼ | Displays the transmission value of shift position signal transmitted via CAN communication. |
| STARTER RELAY | (ON/OFF) | _ | _ | ▼ | Displays the command status from TCM to starter relay. |
| F-SAFE IND/L | (ON/OFF) | _ | _ | • | Displays the transmission status of A/T CHECK indicator lamp signal transmitted via CAN communication. |
| ATF WARN LAMP | (ON/OFF) | _ | _ | • | Displays the transmission status of ATF temperature signal transmitted via CAN communication. Not mounted but displayed. |
| MANU MODE IND | (ON/OFF) | _ | _ | • | Displays the transmission status of manual mode signal transmitted via CAN communication. |
| ON OFF SOL MON | (ON/OFF) | _ | _ | • | Monitors the command value from TCM to the anti-interlock solenoid, and displays the monitor status. |
| START RLY MON | (ON/OFF) | _ | _ | ▼ | Monitors the command value from TCM to the starter relay, and displays the monitor status. |
| ON OFF SOL | (ON/OFF) | _ | _ | ▼ | Displays the command status from TCM to anti- interlock solenoid. |
| SLCT LVR POSI | | _ | Х | ▼ | Displays the shift positions recognized by TCM. |
| GEAR | | _ | Х | ▼ | Displays the current transmission gear position recognized by TCM. |
| NEXT GR POSI | | _ | _ | • | Displays the target gear position of gear change that is calculated based on the vehicle speed information and throttle information. |
| SHIFT MODE | | _ | _ | • | Displays the transmission driving mode recognized by TCM. |

DIAGNOSIS SYSTEM (TCM)

[7AT: RE7R01B (VK50VE)]

| | | Mon | itor Item Sele | ection | | |
|----------------|----------------|-----------------------------|-----------------|--------------------------------|---|--|
| Monitored ite | em (Unit) | ECU IN- PUT SIG- NALS | MAIN SIGNALS | SELEC- TION FROM ITEM | Remarks | |
| D/C PARTS | (FAIL/NOTFAIL) | _ | _ | • | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of direct clutch. | |
| FR/B PARTS | (FAIL/NOTFAIL) | _ | _ | • | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of front brake. | |
| 2346/B PARTS | (FAIL/NOTFAIL) | _ | _ | • | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of 2346 brake. | |
| 2346B/DC PARTS | (FAIL/NOTFAIL) | _ | _ | • | In "Final fail-safe" mode, displays whether the identified malfunction point judged by TCM is the related parts of 2346 brake or direct clutch. | |

DTC WORK SUPPORT

| Item | Description | Check item |
|---------------------|--|---|
| 1ST GR FNCTN P0731 | Following items for "1GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | Input clutch solenoid |
| 2ND GR FNCTN P0732 | Following items for "2GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | valve • Front brake solenoid valve • Direct clutch solenoid |
| 3RD GR FNCTN P0733 | Following items for "3GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | valve • High and low reverse clutch solenoid valve |
| 4TH GR FNCTN P0734 | Following items for "4GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | Low brake solenoid valve 2346 brake solenoid valve |
| 5TH GR FNCTN P0735 | Following items for "5GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | Anti-interlock sole- |
| 6TH GR FNCTN P0729 | Following items for "6GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | |
| 7TH GR FNCTN P1734 | Following items for "7GR incorrect ratio" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | cuit |
| TCC SOL FNCTN CHECK | Following items for "TCC solenoid function" can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG) | Harness or connectors Torque converter clutch solenoid valve Torque converter Input speed sensor 1, 2 Hydraulic control circuit |

U0100 LOST COMMUNICATION (ECM A)

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

DTC/CIRCUIT DIAGNOSIS

U0100 LOST COMMUNICATION (ECM A)

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible causes |
|-------|-----------------------------------|---|--|
| U0100 | Lost Communication With ECM/PCM A | When the ignition switch is ON, TCM is unable to receive the CAN communications signal from ECM continuously for 2 seconds or more. | ECM Harness or connector (CAN communication line is open or shorted) |

DTC CONFIRMATION PROCEDURE

1. PREPARATION BEFORE WORK

If another "DTC CONFIRMATION PROCEDURE" occurs just before, turn ignition switch OFF and wait for at least 10 seconds, then perform the next test.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P) With CONSULT

- 1. Start the engine and wait for at least 5 seconds.
- Check DTC.

With GST

Follow the procedure "With CONSULT".

Is "U0100" detected?

YES >> Go to TM-365, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

For the diagnosis procedure, refer to LAN-25, "Trouble Diagnosis Flow Chart".

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U0300 CAN COMMUNICATION DATA

< DTC/CIRCUIT DIAGNOSIS >

U0300 CAN COMMUNICATION DATA

Description INFOID:000000010579121

The amount of data transmitted from each control unit is read.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|---|--|-------------------------------|
| U0300 | Internal Control Module Soft- ware Incompatibility | When the amount of data transmitted from each control unit is smaller than the specified amount. | Control units other than TCM. |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

(P) With CONSULT

- 1. Turn ignition switch ON and wait 2 seconds or more.
- Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "U0300" detected?

YES >> Go to TM-366, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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[7AT: RE7R01B (VK50VE)]

1. CHECK CONTROL UNIT

Check the number of control units replaced before detecting "U0300".

Is the number of replaced control units one?

YES >> Since the replaced control unit may be out of specifications, check the part number and specifications.

NO >> GO TO 2.

2.INSPECTION CONTROL UNIT

(I) With CONSULT

- 1. Remove one of the replaced control units.
- Install the previous control unit mounted before replacement.
- 3. Turn ignition switch ON and wait 2 seconds or more.
- Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "U0300" detected?

YES >> Turn OFF the ignition switch to check the other control units in the same method.

NO >> Since the removed control unit may be out of specifications, check the part number and specifications.

U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

U1000 CAN COMM CIRCUIT

Description INFOID:000000010579124

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 malfunction 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 independently). 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.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| U1000 | CAN Communication Line | TCM is not transmitting or receiving CAN communication signal for 2 seconds or more when the ignition switch is ON. | Harness or connectors (CAN communication line is open or shorted.) TCM |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- 1. Start the engine.
- 2. Run engine for at least 2 consecutive seconds at idle speed.
- 3. Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "U1000" detected?

YES >> Go to TM-367, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

Go to LAN-25, "Trouble Diagnosis Flow Chart".

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INFOID:0000000010579126

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P0615 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

P0615 STARTER RELAY

Description INFOID:000000010579127

TCM prohibits cranking other than at "P" or "N" position.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|---|
| P0615 | Starter Relay Circuit | The starter monitor value is OFF when the ignition switch is ON at the "P" and "N" positions. | Harness or connectors (Starter relay and TCM circuit is open or shorted.) Starter relay circuit |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

(P) With CONSULT

- 1. Shift the selector lever to "P" and "N" positions.
- Turn ignition switch ON and wait 2 seconds or more.
- Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P0615" detected?

YES >> Go to TM-368, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579129

[7AT: RE7R01B (VK50VE)]

1. CHECK STARTER RELAY SIGNAL

- 1. Turn ignition switch ON.
- 2. Check voltage between IPDM E/R connector terminal and ground.

| IPDM E/R connector | | | Condition | Voltage (Approx.) |
|--------------------|----------|--------|--|-------------------|
| Connector | Terminal | | | voltage (Approx.) |
| E5 | FF 20 | Ground | Selector lever in "P" and "N" positions. | Battery voltage |
| | E5 30 | | Selector lever in other positions. | 0 V |

Is the inspection result normal?

YES >> Check starter relay circuit. Refer to <u>STR-12, "Wiring Diagram - STARTING SYSTEM -"</u>.

NO >> GO TO 2.

$2. \ \mathsf{CHECK} \ \mathsf{HARNESS} \ \mathsf{BETWEEN} \ \mathsf{A/T} \ \mathsf{ASSEMBLY} \ \mathsf{AND} \ \mathsf{IPDM} \ \mathsf{E/R} \ (\mathsf{PART} \ \mathsf{1})$

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T assembly connector and IPDM E/R connector.
- Check the continuity between A/T assembly vehicle side harness connector terminal and IPDM E/R vehicle side harness connector terminal.

P0615 STARTER RELAY

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

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| A/I assembly vehicle s | side harness connect | tor IPDM E | E/R vehicle side ha | rness connector | Continuity |
|---|---|---|---------------------|-----------------|-------------|
| Connector | Terminal | Conr | nector | Terminal | Continuity |
| F51 | 9 | E | 5 | 30 | Existed |
| he inspection resulES >> GO TO 3. O >> Repair or CHECK HARNESS eck the continuity b | replace damage B BETWEEN A/T | ASSEMBLY AN | | | and ground. |
| A/T assembly v | ehicle side harness o | connector | | | |
| Connector | | Terminal | Grou | nd | Continuity |
| F51 | | 9 | | | Not existed |
| he inspection resul ES >> GO TO 4. | | | | | |
| IO >> Repair or | replace damage | d parts. | | | |
| .CHECK JOINT CO | NNECTOR | | | | |
| Check the continu | connector side | | connector side | | Continuity |
| <u> </u> | | | Terminal | | |
| Terminal | | | | | |
| Terminal 9 | | | ninal 9 | | Existed |
| Terminal 9 the inspection resul ES >> GO TO 5. O >> Repair or CHECK INTERMIT | t normal? replace damage | d parts. | | | Existed |
| Terminal 9 the inspection resul (ES >> GO TO 5. IO >> Repair or CHECK INTERMIT efer to GI-47. "Intern | t normal? replace damage TENT INCIDENT nittent Incident". t normal? | d parts. T | 9 | | Existed |
| Terminal 9 the inspection resul ES >> GO TO 5. O >> Repair or CHECK INTERMIT fer to GI-47, "Intern the inspection resul ES >> Replace of | replace damage TENT INCIDENT nittent Incident". t normal? | d parts. T CM. Refer to <u>TM</u> | 9 | d View". | Existed |
| Terminal 9 he inspection resul ES >> GO TO 5. O >> Repair or CHECK INTERMIT fer to GI-47. "Intern he inspection resul ES >> Replace of | t normal? replace damage TENT INCIDENT nittent Incident". t normal? | d parts. T CM. Refer to <u>TM</u> | 9 | d View". | Existed |
| Terminal 9 ne inspection resul ES >> GO TO 5. O >> Repair or CHECK INTERMIT er to GI-47, "Intern ne inspection resul ES >> Replace of | replace damage TENT INCIDENT nittent Incident". t normal? | d parts. T CM. Refer to <u>TM</u> | 9 | d View". | Existed |
| Terminal 9 he inspection resul ES >> GO TO 5. O >> Repair or CHECK INTERMIT fer to GI-47. "Intern he inspection resul ES >> Replace of | replace damage TENT INCIDENT nittent Incident". t normal? | d parts. T CM. Refer to <u>TM</u> | 9 | d View". | Existed |
| Terminal 9 he inspection resul ES >> GO TO 5. O >> Repair or CHECK INTERMIT fer to GI-47, "Intern he inspection resul ES >> Replace of | replace damage TENT INCIDENT nittent Incident". t normal? | d parts. T CM. Refer to <u>TM</u> | 9 | d View". | Existed |
| Terminal 9 he inspection resul ES >> GO TO 5. O >> Repair or CHECK INTERMIT fer to GI-47. "Intern he inspection resul ES >> Replace of | replace damage TENT INCIDENT nittent Incident". t normal? | d parts. T CM. Refer to <u>TM</u> | 9 | d View". | Existed |

P0705 TRANSMISSION RANGE SWITCH A

< DTC/CIRCUIT DIAGNOSIS >

P0705 TRANSMISSION RANGE SWITCH A

Description INFOID:000000010579130

The transmission range switch detects the selector lever position and transmits a signal to the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|--|--|---|
| P0705 | Transmission Range Sensor A Circuit (PRNDL Input) | Transmission range switch signals input with impossible pattern. | Harness or connectors (Transmission range switches 1, 2, 3, 4 and TCM circuit is open or shorted.) Transmission range switches 1, 2, 3 and 4 |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(A) With CONSULT

- Start the engine.
- Select "ACCELE POSI" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Shift the selector lever throughout the entire shift position from "P" to "D". (Hold the selector lever at each position for 2 seconds or more)
- 4. Drive vehicle and maintain the following conditions for 2 seconds or more.

ACCELE POSI : More than 1.0/8

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

5. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0705" detected?

YES >> Go to TM-370, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579132

[7AT: RE7R01B (VK50VE)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

Description INFOID:0000000010579133

The A/T fluid temperature sensor detects the A/T fluid temperature and transmits a signal to the TCM.

DTC Logic INFOID:0000000010579134

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|---|
| | | TCM judges that the A/T fluid temperature is -40 °C (-40 °F) or less continuously for 5 seconds while driving at 10 km/h (7 MPH) or more. | Harness or connectors (Sensor circuit is open.) A/T fluid temperature sensor |
| | | TCM judges that the A/T fluid temperature is 180°C (356°F) or more continuously for 5 seconds while driving at 10 km/h (7 MPH) or more. | Harness or connectors (Sensor circuit is short.) A/T fluid temperature sensor |
| P0710 | ture Sensor A Circuit | A/T fluid temperature does not rise to the specified temperature after driving for a certain period of time with the TCM-received fluid temperature sensor value between -40°C (-40°F) and 20°C (68°F). | Harness or connectors (Sensor circuit is stuck.) A/T fluid temperature sensor |
| | | The following conditions are maintained for 5 minutes after the completion of engine diagnosis P0111, P0116, and P0196: • A/T fluid temperature – Engine coolant temperature > 33°C (91.4°F) | A/T fluid temperature sensor |
| | | A/T fluid temperature – Engine coolant temperature < -19°C (-2.2°F) | |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION (PART 1)

(II) With CONSULT

- Turn ignition switch ON.
- Select "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Start the engine and maintain the following condition for 10 seconds or more.

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

With GST

Follow the procedure "With CONSULT".

Is "P0710" detected?

YES >> Go to TM-372, "Diagnosis Procedure".

NO >> GO TO 3.

3.CHECK A/T FLUID TEMPERATURE SENSOR FUNCTION

(P) With CONSULT

- Turn ignition switch OFF and cool the engine.
- Turn ignition switch ON.

CAUTION:

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[7AT: RE7R01B (VK50VE)]

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P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

Never start the engine.

- Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- 4. Select "COOLANT TEMP/S" in "Data Monitor" in "ENGINE".
- 5. Check temperature difference between A/T fluid and engine coolant.

With GST

- 1. Complete engine diagnoses P0111, P0116, and P0196.
- After starting the engine start, run the engine at idle for 5 minutes.
- 3. Check the DTC.

Is the temperature calculated by subtracting engine coolant temperature from A/T fluid temperature more than 33°C (91.4°F) or is it less than –19°C (–2.2°F)? (With CONSULT)/Is "P0710" detected? (With GST)

YES >> Go to TM-372, "Diagnosis Procedure".

NO-1 [With CONSULT: "ATF TEMP 1" is 20°C (68°F) or more]>>INSPECTION END

NO-2 [With CONSULT: "ATF TEMP 1" is 19°C (66°F) or less]>>GO TO 4.

NO-3 (With GST)>>GO TO 4.

4.CHECK DTC DETECTION (PART 2)

(I) With CONSULT

- Select "SLCT LVR POSI", "VHCL/S SE-A/T", "ACCELE POSI", "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Record A/T fluid temperature.
- 3. Start the engine and wait for at least 3 minutes.
- Drive the vehicle for the total minuets specified in the Driving time column below with the following conditions satisfied.

SLCT LVR POSI : D

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

ACCELE POSI : 0.5/8 or more

| A/T fluid temperature before engine start | Driving time |
|---|--------------------|
| -40°C (-40°F) − -31°C (-23.8°F) | 21 minutes or more |
| -30°C (-22°F) − -21°C (-5.8°F) | 18 minutes or more |
| –20°C (–4°F) – −11°C (12.2°F) | 15 minutes or more |
| -10°C (14°F)1°C (30.2°F) | 12 minutes or more |
| 0°C (32°F) – 9°C (48.2°F) | 9 minutes or more |
| 10°C (50°F) – 19°C (66.2°F) | 6 minutes or more |

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

- Turn ignition switch OFF and cool the engine.
- Start the engine and wait for at least 3 minutes.
- 3. Drive the vehicle and maintain the following conditions for 21 minutes or more.

Selector lever : D position

Vehicle speed : 10 km/h (7 MPH) or more

Accelerator pedal opening : 0.5/8 or more

4. Check the DTC.

Is "P0710" detected?

YES >> Go to TM-372, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579135

[7AT: RE7R01B (VK50VE)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

P0710 TRANSMISSION FLUID TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts. Α

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P0717 INPUT SPEED SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

P0717 INPUT SPEED SENSOR A

Description INFOID:000000010579136

The input speed sensor detects input shaft rpm (revolutions per minute). It is located on the input side of the A/T. Monitors revolution of sensor 1 and sensor 2 for non-standard conditions.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|---|---|---|
| P0717 | Input/Turbine Speed Sensor A Circuit No Signal | The revolution of input speed sensor 1 and/or 2 is 270 rpm or less. | Harness or connectors (Sensor circuit is open.) Input speed sensor 1 and/or 2 |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

- 1. Start the engine
- Select "SLCT LVR POSI", "GEAR", "VHCL/S SE-A/T", "CLSD THL POS" and "ENGINE SPEED" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 5 seconds or more.

CAUTION:

Keep the same gear position.

NOTE:

Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

SLCT LVR POSI : D

GEAR : 2nd, 3rd, 4th, 5th or 6th

VHCL/S SE-A/T : More than 40 km/h (25 MPH)

CLSD THL POS : OFF

ENGINE SPEED : More than 1,500 rpm

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0717" detected?

YES >> Go to TM-374, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579138

[7AT: RE7R01B (VK50VE)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

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P0717 INPUT SPEED SENSOR A

[7AT: RE7R01B (VK50VE)] < DTC/CIRCUIT DIAGNOSIS > >> Repair or replace damaged parts. NO Α В С TM Е F G Н J K L M Ν

TM-375 **Revision: 2015 February** 2015 QX70 0

P0720 OUTPUT SPEED SENSOR

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P0720 OUTPUT SPEED SENSOR

Description INFOID:0000000010579139

The output speed sensor detects the revolution of the parking gear and emits a pulse signal. The pulse signal is transmitted to the TCM which converts it into vehicle speed.

DTC Logic INFOID:0000000010579140

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|--|
| P0720 | Output Speed Sensor Circuit | The vehicle speed detected by the output speed sensor is 5 km/h (3 MPH) or less when the vehicle speed transmitted from the unified meter and A/C amp. to TCM is 20 km/h (12 MPH) or more. (Only when starts after the ignition switch is turned ON.) The vehicle speed transmitted from the unified meter and A/C amp. to TCM does not decrease despite the 36 km/h (23 MPH) or more of deceleration in vehicle speed detected by the output speed sensor. when the vehicle speed detected by the output speed sensor is 36 km/h (23 MPH) or more and the vehicle speed transmitted from the unified meter and A/C amp. to TCM is 24 km/h (15 MPH) or more. | Harness or connectors (Sensor circuit is open.) Output speed sensor |

DTC CONFIRMATION PROCEDURE

CAUTION:

- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

- With CONSULT

 1. Start the engine Start the engine.
- Select "ESTM VSP SIG" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 60 seconds or more.

ESTM VSP SIG : 40 km/h (25 MPH) or more

- Perform "Self Diagnostic Results" in "TRANSMISSION".
- With GST

Follow the procedure "With CONSULT".

Is "P0720" detected?

>> Go to TM-377, "Diagnosis Procedure". YES

NO >> INSPECTION END

TM-376 **Revision: 2015 February** 2015 QX70

| CHECK INTERMITTENT INCIDENT efer to GI-47, "Intermittent Incident". the inspection result normal? YES >> GO TO 2. NO >> Repair or replace damaged parts. REPLACE OUTPUT SPEED SENSOR AND CHECK DTC Replace output speed sensor. Refer to TM-499, "Exploded View". Perform "DTC CONFIRMATION PROCEDURE". Refer to TM-376, "DTC Logic". the inspection result normal? YES >> INSPECTION END | P0720 OUTPUT SPEED SENSOR | |
|---|---|----------|
| check intermittent incident". the inspection result normal? YES >> GO TO 2. NO >> Repair or replace damaged parts. REPLACE OUTPUT SPEED SENSOR AND CHECK DTC Replace output speed sensor. Refer to TM-499. "Exploded View". Perform "DTC CONFIRMATION PROCEDURE". Refer to TM-376, "DTC Logic". the inspection result normal? YES >> INSPECTION END | < DTC/CIRCUIT DIAGNOSIS > Diagnosis Procedure | <u> </u> |
| efer to GI-47, "Intermittent Incident". the inspection result normal? YES >> GO TO 2. NO >> Repair or replace damaged parts. REPLACE OUTPUT SPEED SENSOR AND CHECK DTC Replace output speed sensor. Refer to TM-499, "Exploded View". Perform "DTC CONFIRMATION PROCEDURE". Refer to TM-376, "DTC Logic". the inspection result normal? YES >> INSPECTION END | | |
| YES >> GO TO 2. NO >> Repair or replace damaged parts. REPLACE OUTPUT SPEED SENSOR AND CHECK DTC Replace output speed sensor. Refer to TM-499, "Exploded View". Perform "DTC CONFIRMATION PROCEDURE". Refer to TM-376, "DTC Logic". the inspection result normal? YES >> INSPECTION END | Refer to GI-47, "Intermittent Incident". | |
| NO >> Repair or replace damaged parts. REPLACE OUTPUT SPEED SENSOR AND CHECK DTC Replace output speed sensor. Refer to TM-499, "Exploded View". Perform "DTC CONFIRMATION PROCEDURE". Refer to TM-376, "DTC Logic". the inspection result normal? YES >> INSPECTION END | Is the inspection result normal? | |
| Replace output speed sensor. Refer to <u>TM-499, "Exploded View"</u> . Perform "DTC CONFIRMATION PROCEDURE". Refer to <u>TM-376, "DTC Logic"</u> . the inspection result normal? YES >> INSPECTION END | NO >> Repair or replace damaged parts. | |
| Perform "DTC CONFIRMATION PROCEDURE". Refer to <u>TM-376, "DTC Logic".</u> the inspection result normal? YES >> INSPECTION END | | |
| YES >> INSPECTION END | Replace output speed sensor. Refer to <u>TM-499</u>, <u>"Exploded View"</u>. Perform "DTC CONFIRMATION PROCEDURE". Refer to <u>TM-376</u>, <u>"DTC</u> | Logic". |
| | Is the inspection result normal? | |
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P0725 ENGINE SPEED

< DTC/CIRCUIT DIAGNOSIS >

P0725 ENGINE SPEED

Description INFOID:000000010579142

The engine speed signal is transmitted from the ECM to the TCM with CAN communication line.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|----------------------------|---|----------------|
| P0725 | Engine Speed Input Circuit | TCM does not receive the CAN communication signal from the ECM. The engine speed is more less 150 rpm even if the vehicle speed is more than 10 km/h (7 MPH). | • |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

(II) With CONSULT

- 1. Start the engine.
- Select "SLCT LVR POSI" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 5 seconds or more.

SLCT LVR POSI : D

VHCL/S SE-A/T : More than 10km/h (7 MPH)

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P0725" detected?

YES >> Go to TM-378, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579144

[7AT: RE7R01B (VK50VE)]

1. CHECK DTC OF ECM

(II) With CONSULT

- 1. Turn ignition switch ON.
- Perform "Self Diagnostic Results" in "ENGINE".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check DTC detected item. Refer to EC-1611, "DTC Index".

2.CHECK DTC OF TCM

(P) With CONSULT

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is any DTC other than "P0725" detected?

YES >> GO TO 3.

NO >> Check DTC detected item. Refer to TM-455, "DTC Index".

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P0725 ENGINE SPEED

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

3.CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

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P0729 6GR INCORRECT RATIO

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P0729 6GR INCORRECT RATIO

Description INFOID:000000010579145

This malfunction is detected when the A/T does not shift into 6GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0729 | Gear 6 Incorrect Ratio | The gear ratio is: • 0.916 or more • 0.812 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-381, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- · Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- 2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- 1. Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "6TH GR FNCTN P0729" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

P0729 6GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

GEAR : 6th

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0729" is detected, check the DTC. Refer to TM-455. "DTC Index".

With GST

Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position

Gear position : 6th

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

Check DTC.

Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0729" detected?

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-381, "Diagnosis Procedure".

YES-4 >> "P0729" is detected: Go to TM-381, "Diagnosis Procedure".

>> GO TO 4. NO

4.CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579147

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-507, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-380, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

TM-381 **Revision: 2015 February** 2015 QX70 TM

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P0730 INCORRECT GEAR RATIO

< DTC/CIRCUIT DIAGNOSIS >

P0730 INCORRECT GEAR RATIO

Description INFOID:000000010579148

- TCM detects a high-rpm state of the under drive sun gear.
- The number of revolutions of the under drive sun gear is calculated with the input speed sensor 1 and 2.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| P0730 | Incorrect Gear Ratio | The revolution of under drive sun gear is 8,000 rpm or more. NOTE: Not detected when in "P" or "N" position and during a shift to "P" or "N" position. | 2346 brake solenoid valve Front brake solenoid valve Input speed sensor 1, 2 |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-382, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- · Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

- 1. Start the engine.
- Select "Self Diagnostic Results" in "ENGINE".
- Drive vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.

Hold the accelerator pedal as steady as possible.

| ENGINE SPEED | Same value as the Freeze Frame Data. |
|---------------|--------------------------------------|
| VEHICLE SPEED | Same value as the Freeze Frame Data. |
| B/FUEL SCHDL | Same value as the Freeze Frame Data. |

With GST

Follow the procedure "With CONSULT".

Is "P0730" detected?

YES >> Go to TM-382, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579150

[7AT: RE7R01B (VK50VE)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

Revision: 2015 February TM-382 2015 QX70

P0730 INCORRECT GEAR RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

$\overline{2}$. DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to $\underline{\mathsf{TM-507}}$, "Disassembly". **NOTE:**

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to <u>TM-382.</u> "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

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P0731 1GR INCORRECT RATIO

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P0731 1GR INCORRECT RATIO

Description INFOID:000000010579151

This malfunction is detected when the A/T does not shift into 1GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0731 | Gear 1 Incorrect Ratio | The gear ratio is: • 5.180 or more • 4.594 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-385, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- · Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- 2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- 1. Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(I) With CONSULT

- 1. Select "1ST GR FNCTN P0731" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

P0731 1GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

GEAR : 1st

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0731" is detected, check the DTC. Refer to TM-455. "DTC Index".

With GST

Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position

Gear position : 1st

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

Check DTC.

Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0731" detected?

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-385, "Diagnosis Procedure".

YES-4 >> "P0731" is detected: Go to TM-385, "Diagnosis Procedure".

>> GO TO 4. NO

4.CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579153

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-507, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-384, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

TM-385 **Revision: 2015 February** 2015 QX70 TM

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P0732 2GR INCORRECT RATIO

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P0732 2GR INCORRECT RATIO

Description INFOID:000000010579154

This malfunction is detected when the A/T does not shift into 2GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0732 | Gear 2 Incorrect Ratio | The gear ratio is: • 3.360 or more • 2.980 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-387, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- · Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- 1. Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "2ND GR FNCTN P0732" ins "DTC Work Support" in "TRANSMISSION".
- Drive vehicle with manual mode and maintain the following conditions.

P0732 2GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

GEAR : 2nd

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0732" is detected, check the DTC. Refer to TM-455. "DTC Index".

With GST

Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position

Gear position : 2nd

: 0.7/8 or more Accelerator pedal opening

Vehicle speed : 10 km/h (7 MPH) or more

Check DTC.

Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0732" detected?

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-387, "Diagnosis Procedure".

YES-4 >> "P0732" is detected: Go to TM-387, "Diagnosis Procedure".

>> GO TO 4. NO

4.CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579156

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-507, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-386, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

TM-387 **Revision: 2015 February** 2015 QX70 TM

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P0733 3GR INCORRECT RATIO

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P0733 3GR INCORRECT RATIO

Description INFOID:000000010579157

This malfunction is detected when the A/T does not shift into 3GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0733 | Gear 3 Incorrect Ratio | The gear ratio is: • 2.149 or more • 1.905 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-389, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- · Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK ATF TEMPERATURE

(P) With CONSULT

- 1. Start the engine.
- Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "3RD GR FNCTN P0733" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

P0733 3GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

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GEAR : 3rd

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0733" is detected, check the DTC. Refer to TM-455, "DTC Index".

With GST

1. Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position

Gear position : 3rd

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

2. Check DTC.

<u>Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0733" detected?</u>

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-389, "Diagnosis Procedure".

YES-4 >> "P0733" is detected: Go to TM-389, "Diagnosis Procedure".

NO >> GO TO 4.

4. CHECK SYMPTOM (PART 2)

1. Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR gear and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to <u>GI-47</u>, "<u>Intermittent Incident"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-507, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to
"DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

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INFOID:0000000010579159

Revision: 2015 February TM-389 2015 QX70

P0734 4GR INCORRECT RATIO

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P0734 4GR INCORRECT RATIO

Description INFOID:000000010579160

This malfunction is detected when the A/T does not shift into 4GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0734 | Gear 4 Incorrect Ratio | The gear ratio is: • 1.497 or more • 1.327 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-391, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- · Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- Select "ATF TEMP 1" with "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- 1. Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- 1. Select "4TH GR FNCTN P0734" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

P0734 4GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

GEAR : 4th

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detect on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0734" is detected, check the DTC. Refer to TM-455. "DTC Index".

With GST

Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position

: 4th Gear position

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

Check DTC.

Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0734" detected?

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-391, "Diagnosis Procedure".

YES-4 >> "P0734" is detected: Go to TM-391, "Diagnosis Procedure".

>> GO TO 4. NO

4.CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579162

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-507, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-390, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

TM-391 **Revision: 2015 February** 2015 QX70 TM

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P0735 5GR INCORRECT RATIO

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P0735 5GR INCORRECT RATIO

Description INFOID:000000010579163

This malfunction is detected when the A/T does not shift into 5GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P0735 | Gear 5 Incorrect Ratio | The gear ratio is: • 1.060 or more • 0.940 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-393, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- 2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- 1. Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "5TH GR FNCTN P0735" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

P0735 5GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

GEAR : 5th

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P0735" is detected, check the DTC. Refer to TM-455. "DTC Index".

With GST

Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position

Gear position : 5th

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

Check DTC.

Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P0735" detected?

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-393, "Diagnosis Procedure".

YES-4 >> "P0735" is detected: Go to TM-393, "Diagnosis Procedure".

>> GO TO 4. NO

4.CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579165

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to TM-507, "Disassembly".

NOTE:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-392, "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

TM-393 **Revision: 2015 February** 2015 QX70 TM

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[7AT: RE7R01B (VK50VE)]

P0740 TORQUE CONVERTER

Description INFOID:000000010579166

The torque converter clutch solenoid valve is activated, with the gear in D2, D3, D4, D5, D6, D7, M2, M3, M4, M5, M6 and M7 by the TCM in response to signals transmitted from the vehicle speed sensor and accelerator pedal position sensor (throttle position sensor). Torque converter clutch piston operation will then be controlled.

- Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
- When the accelerator pedal is depressed (less than 1.0/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|--------------------------------------|--|--|
| P0740 | Torque Converter Clutch Circuit/Open | The torque converter clutch solenoid valve monitor value is 0.2 A or less when the torque converter clutch solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Torque converter clutch sole- noid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VEHICLE SPEED" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 10 seconds or more.

NOTE:

Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 2nd

VEHICLE SPEED : 40 km/h (25 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0740" detected?

YES >> Go to TM-394, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579168

1. CHECK INTERMITTENT INCIDENT

P0740 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

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P0744 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

P0744 TORQUE CONVERTER

Description INFOID.000000010579169

This malfunction is detected when the A/T does not lock-up as instructed by the TCM. This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|---|---|--|
| P0744 | Torque Converter Clutch Circuit Intermittent | The lock-up is not performed in spite of within the lock-up area. | Harness or connectors Torque converter clutch sole- noid valve Torque converter Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(II) With CONSULT

- 1. Start the engine.
- 2. Select "MANU MODE SW", "GEAR" and "VEHICLE SPEED" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 10 seconds or more.

NOTE:

Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

MANU MODE SW : ON GEAR : 2nd

VEHICLE SPEED : 40 km/h (25 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0744" detected?

YES >> Go to TM-396, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2.DETECT MALFUNCTIONING ITEM

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INFOID:0000000010579171

P0744 TORQUE CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

Disassemble the A/T assembly to check component parts. Refer to <u>TM-507</u>, <u>"Disassembly"</u>. **NOTE**:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-396, "DTC Logic".

Is the inspection result normal?

- YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".
- NO >> Repair or replace damaged parts.

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P0745 PRESSURE CONTROL SOLENOID A

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P0745 PRESSURE CONTROL SOLENOID A

Description INFOID:0000000010579172

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal transmitted from the TCM.

DTC Logic INFOID:0000000010579173

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|---|
| P0745 | Pressure Control Solenoid A | The line pressure solenoid valve monitor value is 0.2 A or less when the line pressure solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Line pressure solenoid valve |

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

(P) With CONSULT

- 1. Start the engine.
- Select "BATTERY VOLT" and "SLCT LVR POSI" in "Data Monitor" in "TRANSMISSION".
- Shift the selector lever to "N" position.
- Maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more SLCT LVR POSI : N/P

5. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0745" detected?

>> Go to TM-398, "Diagnosis Procedure". YES

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579174

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

P0750 SHIFT SOLENOID A

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

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P0750 SHIFT SOLENOID A

Description INFOID:0000000010579175

- Anti-interlock solenoid valve prevents the simultaneous activation of the input clutch and the low brake.
- The anti-interlock solenoid valve is an ON/OFF type solenoid valve.

DTC Logic INFOID:0000000010579176

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| P0750 | Shift Solenoid A | The anti-interlock solenoid valve monitor value is ON when the anti-interlock solenoid valve command value is OFF. The anti-interlock solenoid valve monitor value is OFF when the anti-interlock solenoid valve command value is ON. | Harness or connectors (Solenoid valve circuit is open or shorted.) Anti-interlock solenoid valve |

DTC CONFIRMATION PROCEDURE

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2.CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW: ON **GEAR** : 1st

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0750" detected?

YES >> Go to TM-399, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

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INFOID:0000000010579177

P0775 PRESSURE CONTROL SOLENOID B

< DTC/CIRCUIT DIAGNOSIS >

P0775 PRESSURE CONTROL SOLENOID B

Description INFOID.000000010579178

The Input clutch solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.

 The Input clutch solenoid valve controls the input clutch control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|--|
| P0775 | Pressure Control Solenoid B | The input clutch solenoid valve monitor value is 0.2 A or less when the input clutch solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Input clutch solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 1st

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0775" detected?

YES >> Go to TM-400, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579180

[7AT: RE7R01B (VK50VE)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

[7AT: RE7R01B (VK50VE)]

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INFOID:0000000010579183

P0780 SHIFT

Description INFOID:000000010579181

The TCM detects the malfunction of low brake solenoid valve. This is not only caused by electrical malfunction (circuits open or shorted) but also by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| P0780 | Shift Error | TCM judges that the gear ratio is not switched to that of 4GR (1.412) while shifting from 3GR to 4GR in "D" position. TCM judges that the engine speed is more than the specified one while shifting from 5GR to 6GR or from 6GR to 7GR in "D" position. | Anti-interlock solenoid valve Low brake solenoid valve Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(II) With CONSULT

- Start the engine.
- 2. Select "SLCT LVR POSI", "ACCELE POSI" and "GEAR" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions.

SLCT LVR POSI : D

ACCELE POSI : More than 1.0/8

GEAR : $3rd \rightarrow 4th \rightarrow 5th \rightarrow 6th \rightarrow 7th$

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0780" detected?

YES >> Go to TM-401, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

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P0780 SHIFT

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

$\overline{2}$.DETECT MALFUNCTIONING ITEM

Disassemble the A/T assembly to check component parts. Refer to <u>TM-507</u>, <u>"Disassembly"</u>. **NOTE**:

Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to <u>TM-401.</u> "DTC Logic".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

P0795 PRESSURE CONTROL SOLENOID C

< DTC/CIRCUIT DIAGNOSIS >

P0795 PRESSURE CONTROL SOLENOID C

Description INFOID:0000000010579184

- The front brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.
- The front brake solenoid valve controls the front brake control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|---|
| P0795 | Pressure Control Solenoid C | The front brake solenoid valve monitor value is 0.2 A or less when the front brake solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Front brake solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- 2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 7th

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P0795" detected?

YES >> Go to TM-403, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to <u>TM-485</u>, "Exploded View".

NO >> Repair or replace damaged parts.

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[7AT: RE7R01B (VK50VE)]

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INFOID:0000000010579186

P1705 TP SENSOR

Description INFOID:000000010579187

- The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly.
- The accelerator pedal position sensor detects the accelerator position.
- The accelerator pedal position sensor transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM.
- The TCM receives accelerator pedal position signal from the ECM via CAN communication.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|--|--|---|
| P1705 | Accelerator Pedal Position Sensor Signal | TCM detects the difference between two accelerator pedal position signals received from ECM via CAN communication. | Harness or connectors (Sensor circuit is open or shorted.) |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

- Start the engine.
- Select "SLCT LVR POSI" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 5 seconds or more.

SLCT LVR POSI : D

VHCL/S SE-A/T : 5 km/h (3 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P1705" detected?

YES >> Go to TM-404, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579189

[7AT: RE7R01B (VK50VE)]

1. CHECK DTC OF ECM

(P) With CONSULT

- Turn ignition switch ON.
- Perform "Self Diagnostic Results" in "ENGINE".

Is any DTC detected?

YES >> Check DTC detected item. Refer to EC-1611, "DTC Index".

NO >> GO TO 2.

2.CHECK DTC OF TCM

(P) With CONSULT

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is any DTC other than "P1705" detected?

P1705 TP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

YES >> Check DTC detected item. Refer to <u>TM-455, "DTC Index"</u>. NO >> GO TO 3.

3. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

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P1721 VEHICLE SPEED SIGNAL

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P1721 VEHICLE SPEED SIGNAL

Description INFOID:0000000010579190

The vehicle speed signal is transmitted from unified meter and A/C amp. to TCM by CAN communication line. The signal functions as an auxiliary device to the output speed sensor when it is malfunctioning. The TCM will then use the vehicle speed signal.

DTC Logic INFOID:0000000010579191

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P1721 | Vehicle Speed Signal | The vehicle speed transmitted from the unified meter and A/C amp. to TCM is 5 km/h (3MPH) or less when the vehicle speed detected by the output speed sensor is 20 km/h (12 MPH) or more. (Only when starts after the ignition switch is turned ON.) The vehicle speed detected by the output speed sensor does not decrease despite the 36 km/h (23 MPH) or more of deceleration in vehicle speed received from the unified meter and A/C amp. when the vehicle speed transmitted from the unified meter and A/C amp. to TCM is 36 km/h (23 MPH) or more and the vehicle speed detected by the output speed sensor is 24 km/h (15 MPH) or more. | Harness or connectors (Sensor circuit is open or shorted.) |

DTC CONFIRMATION PROCEDURE

CAUTION:

- · Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

1.PRECONDITIONING

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

>> GO TO 2.

2.check dtc detection

With CONSULT Start the engine

- Start the engine.
- Select "ESTM VSP SIG" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 60 seconds or more.

ESTM VSP SIG : 40 km/h (25 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P1721" detected?

YES >> Go to TM-407, "Diagnosis Procedure".

NO >> INSPECTION END

| P1721 VEHICLE SPEED SIGNAL | |
|--|-------------------------|
| < DTC/CIRCUIT DIAGNOSIS > | [7AT: RE7R01B (VK50VE)] |
| Diagnosis Procedure | INFOID:000000010579192 |
| 1. CHECK DTC OF UNIFIED METER AND A/C AMP. | |
| With CONSULT Perform "Self Diagnostic Results" in "METER/M&A". | |
| Is any DTC detected? | |
| YES >> Check DTC detected item. Refer to MWI-117, "DTC Index". NO >> GO TO 2. | |
| 2.check dtc of tcm | |
| With CONSULT | |
| Perform "Self Diagnostic Results" in "TRANSMISSION". | |
| Is any DTC other than "P1721" detected? | |
| YES >> Check DTC detected item. Refer to <u>TM-455, "DTC Index"</u> . NO >> GO TO 3. | |
| 3. CHECK INTERMITTENT INCIDENT | |
| Refer to GI-47, "Intermittent Incident". | |
| Is the inspection result normal? | |
| YES >> Replace control valve & TCM. Refer to <u>TM-485, "Exploded View"</u> . | |
| NO >> Repair or replace damaged parts. | |
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P1730 INTERLOCK

Description INFOID.000000010579193

Fail-safe function to detect interlock conditions.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|---|--|
| P1730 | Interlock | The output speed sensor detects the deceleration of 12 km/h (7 MPH) or more for 1 second. | Harness or connectors (Solenoid valve circuit is open or shorted.) Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Hydraulic control circuit |

NOTE:

When the vehicle is driven fixed in second gear, a input speed sensor malfunction is displayed, but this is not a input speed sensor malfunction.

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-409, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- 1. Start the engine.
- Select "SLCT LVR POSI" and "GEAR" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle the following condition.

SLCT LVR POSI : D

GEAR : 1st through 7th

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P1730" detected?

YES >> Go to TM-409, "Diagnosis Procedure".

NO >> INSPECTION END

Judgment of A/T Interlock

Refer to TM-450, "Fail-Safe".

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INFOID:0000000010579195

[7AT: RE7R01B (VK50VE)]

P1730 INTERLOCK [7AT: RE7R01B (VK50VE)] < DTC/CIRCUIT DIAGNOSIS > Diagnosis Procedure INFOID:0000000010579196 Α 1. CHECK INTERMITTENT INCIDENT Refer to GI-47, "Intermittent Incident". В Is the inspection result normal? YES >> GO TO 2. NO >> Repair or replace damaged parts. C 2. DETECT MALFUNCTIONING ITEM Disassemble the A/T assembly to check component parts. Refer to TM-507, "Disassembly". NOTE: TM Check the component parts, referring to "Possible cause" in "DTC DETECTION LOGIC". Refer to TM-408, "DTC Logic". Is the inspection result normal? Е YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View". NO >> Repair or replace damaged parts. F Н J K

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Revision: 2015 February TM-409 2015 QX70

P1734 7GR INCORRECT RATIO

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

P1734 7GR INCORRECT RATIO

Description INFOID:000000010579197

This malfunction is detected when the A/T does not shift into 7GR position as instructed by TCM. This is not only caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|------------------------|--|---|
| P1734 | Gear 7 Incorrect Ratio | The gear ratio is: • 0.822 or more • 0.729 or less | Input clutch solenoid valve Direct clutch solenoid valve High and low reverse clutch solenoid valve Front brake solenoid valve Low brake solenoid valve 2346 brake solenoid valve Anti-interlock solenoid valve Each clutch and brake Output speed sensor Input speed sensor 1, 2 Hydraulic control circuit |

DTC CONFIRMATION PROCEDURE

CAUTION:

- "TM-411, "Diagnosis Procedure" must be performed before starting "DTC CONFIRMATION PROCEDURE".
- Never perform "DTC CONFIRMATION PROCEDURE" before completing the repair, which may cause secondary malfunction.
- · Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK ATF TEMPERATURE

(P) With CONSULT

- Start the engine.
- 2. Select "ATF TEMP 1" in "Data Monitor" in "TRANSMISSION".
- Check ATF temperature is in the following range.

ATF TEMP 1 : 20°C (68°F) – 140°C (284°F)

With GST

- Start the engine.
- 2. Drive vehicle for approximately 5 minutes in urban areas.

Is ATF temperature within specified range?

YES >> GO TO 3.

NO >> Drive vehicle to warm ATF or stop engine to cool ATF.

3.CHECK SYMPTOM (PART 1)

(II) With CONSULT

- Select "7TH GR FNCTN P1734" in "DTC Work Support" in "TRANSMISSION".
- 2. Drive vehicle with manual mode and maintain the following conditions.

P1734 7GR INCORRECT RATIO

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

GEAR : 7th

ACCELE POSI : 0.7/8 or more

VEHICLE SPEED : 10 km/h (7 MPH) or more

Keep the current driving status for 2 seconds or more if CONSULT screen changes from "OUT OF CON-DITION" to "TESTING".

CAUTION:

When "TESTING" is not detected on CONSULT for a long time, check "Self Diagnostic Results" in "TRANSMISSION". When a DTC other than "P1734" is detected, check the DTC. Refer to TM-455. "DTC Index".

With GST

Drive vehicle and maintain the following conditions for 2 seconds or more.

Selector lever : "M" position

Gear position : 7th

Accelerator pedal opening : 0.7/8 or more

Vehicle speed : 10 km/h (7 MPH) or more

Check DTC.

Is "OUT OF CONDITION", "STOP VEHICLE" or "COMPLETED RESULT NG" displayed? / Is "P1734" detected?

YES-1 >> "OUT OF CONDITION": Perform "Step 3" again.

YES-2 >> "STOP VEHICLE": GO TO 4.

YES-3 >> "COMPLETED RESULT NG": Go to TM-411, "Diagnosis Procedure".

YES-4 >> "P1734" is detected: Go to TM-411, "Diagnosis Procedure".

>> GO TO 4. NO

4.CHECK SYMPTOM (PART 2)

Stop vehicle.

2. Drive vehicle in "D" position allowing it to shift from 1GR to 7GR and check shift timing and shift shock.

>> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579199

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace A/T assembly. Refer to TM-496, "Exploded View".

NO >> Repair or replace damaged parts.

TM-411 2015 QX70 TM

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[7AT: RE7R01B (VK50VE)]

P1815 M-MODE SWITCH

Description INFOID:000000010579200

• The manual mode switch [manual mode select switch and manual mode position select switch (shift-up/shift-down)] is installed in the A/T shift selector assembly. It transmits manual mode switch, shift up and shift down switch signals to unified meter and A/C amp. Then unified meter and A/C amp. transmits signals to TCM via CAN communication.

- Manual mode select switch transmits manual mode switch signal or non-manual mode switch signal to unified meter and A/C amp. Then TCM receives signals from unified meter and A/C amp. via CAN communication
- The manual mode position select switch (shift-up) transmits manual mode shift up signal to the unified meter and A/C amp. Then TCM receives signal from the unified meter and A/C amp. via CAN communication.
- The manual mode position select switch (shift-down) transmits manual mode shift down signal to the unified meter and A/C amp. Then TCM receives signal from the unified meter and A/C amp. via CAN communication.
- The paddle shifter transmits shift up and shift down switch signals to unified meter and A/C amp. Then TCM receives signals from the unified meter and A/C amp. via CAN communication. (With paddle shifter)
- The TCM transmits manual mode indicator signal to the unified meter and A/C amp. via CAN communication line.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|----------------------------|---|--|
| P1815 | Manual Mode Switch Circuit | TCM monitors manual mode, non manual mode, up or down switch signal, and detects as irregular when impossible input pattern occurs 2 second or more. When shift up/down signal of paddle shifter continuously remains ON for 60 seconds*. | Harness or connectors (These switches circuit is open or shorted.) Manual mode select switch (Into A/T shift selector) Manual mode position select switch (Into A/T shift selector) Paddle shifter* |

^{*:} With paddle shifter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- 1. Turn ignition switch ON.
- Select "SLCT LVR POSI" and "MANU MODE SW" in "Data Monitor" in "TRANSMISSION".
- 3. Maintain the following each conditions more than 60 seconds.

SLCT LVR POSI : D MANU MODE SW : ON

Perform "Self Diagnostic Results" in "TRANSMISSION".

Is "P1815" detected?

YES >> Go to TM-413, "Diagnosis Procedure".

NO >> INSPECTION END

[7AT: RE7R01B (VK50VE)]

Diagnosis Procedure

INFOID:0000000010579202

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1. CHECK MANUAL MODE SWITCH CIRCUIT

(P) With CONSULT

1. Turn ignition switch ON.

2. Select "MANU MODE SW", "NON M MODE SW", "UP SW LEVER", "DOWN SW LEVER", "SFT UP ST SW"* and "SFT DWN ST SW"* in "Data Monitor" in "TRANSMISSION".

3. Check the ON/OFF operations of each monitor item.

| Item | Monitor Item | Condition | Status |
|--------------------|---------------|----------------------------------|--------|
| | MANU MODE SW | Manual shift gate side (neutral) | ON |
| | MANU MODE 5W | Other than the above | OFF |
| | NON M-MODE SW | Manual shift gate side | OFF |
| Manual mode switch | NON M-MODE 5W | Other than the above | ON |
| UP SW LEVER | LID SW LEVED | Selector lever: UP (+ side) | ON |
| | OF SW LEVER | Other than the above | OFF |
| | DOWN SWIEVED | Selector lever: DOWN (- side) | ON |
| DOWN SW LEVER | DOWN SW LEVER | Other than the above | OFF |
| | SFT UP ST SW | Paddle shifter: UP (+ side) | ON |
| Paddle shifter* | 3F1 UP 31 3W | Other than the above | OFF |
| | SFT DWN ST SW | Paddle shifter: DOWN (- side) | ON |
| SFI DWN ST SW | | Other than the above | OFF |

^{*:} With paddle shifter

(R) Without CONSULT

Drive the vehicle in the manual mode, and then check that the indication of the shift position indicator matches with the actual gear position.

- Shift the selector lever to UP side, and then accelerate from 1GR to 7GR.
- 2. Shift the selector lever to DOWN side, and then decelerate from 7GR to 1GR.
- 3. *Shift the paddle shifter to UP side, and then accelerate from 1GR to 7GR.
- 4. *Shift the paddle shifter to DOWN side, and then decelerate from 7GR to 1GR.
- *: With paddle shifter

Which item is abnormal?

Manual mode switch>>GO TO 2.

Paddle shifter>>GO TO 7.

2.CHECK MANUAL MODE SWITCH CIRCUIT

- Turn ignition switch OFF.
- Disconnect A/T shift selector connector.
- Turn ignition switch ON.
- 4. Check voltage between A/T shift selector vehicle side harness connector terminals.

| A/T sh | A/T shift selector vehicle side harness connector | | | |
|-----------|---|---|-------------------|---|
| Connector | Terminal | | Voltage (Approx.) | |
| Connector | + | _ | | |
| | 1 | 4 | Battery voltage | • |
| M137 | 2 | | | |
| IVI 137 | 3 | | | |
| | 5 | | | |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 4.

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK MANUAL MODE SWITCH

- 1. Turn ignition switch OFF.
- 2. Check manual mode switch. Refer to TM-416, "Component Inspection (Manual Mode Switch)".

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace damaged parts.

4. CHECK GROUND CIRCUIT (MANUAL MODE SWITCH CIRCUIT)

- 1. Turn ignition switch OFF.
- 2. Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle | e side harness connector | | Continuity |
|----------------------------|--------------------------|--------|------------|
| Connector Terminal | | Ground | Continuity |
| M137 | 4 | | Existed |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND UNIFIED METER AND A/C AMP. (STEP 1)

- 1. Disconnect unified meter and A/C amp. connector.
- 2. Check continuity between A/T shift selector vehicle side harness connector terminals and unified meter and A/C amp. vehicle side harness connector terminals.

| A/T shift selector vehicle side harness connector | | Unified meter and A/C amp. vehicle side harness connector | | Continuity |
|---|----------|---|----------|------------|
| Connector | Terminal | Connector | Terminal | |
| | 1 | M66 | 10 | |
| M137 | 2 | | 25 | Existed |
| WIST | 3 | | 5 | EXISIEU |
| | 5 | | 11 | |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts.

6.CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND UNIFIED METER AND A/C AMP. (STEP 2)

Check continuity between A/T shift selector vehicle side harness connector terminals and ground.

| A/T shift selector vehicl | A/T shift selector vehicle side harness connector | | Continuity | |
|---------------------------|---|--------|-------------|--|
| Connector | Terminal | | Continuity | |
| | 1 | Ground | | |
| M137 | 2 | Ground | Not existed | |
| WITO | 3 | | Not existed | |
| | 5 | 1 | | |

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace damaged parts.

.CHECK PADDLE SHIFTER CIRCUIT

- 1. Turn ignition switch OFF.
- Disconnect paddle shifter connectors.
- Turn ignition switch ON.
- Check voltage between paddle shifter vehicle side harness connector terminals.

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

| Padd | | | | |
|-----------|-----------|-----------------|-----------------|--|
| Connector | Connector | | | |
| Connector | + - | | | |
| M38 | 2 | Battery voltage | | |
| M39 | 3 | ' | Ballery Vollage | |

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 9.

8. CHECK PADDLE SHIFTER

Check paddle shifter. Refer to TM-416, "Component Inspection [Paddle Shifter (Shift-up)]", TM-417, "Component Inspection [Paddle Shifter (Shift-down)]".

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace damaged parts.

9. CHECK GROUND CIRCUIT (PADDLE SHIFTER CIRCUIT)

- 1. Turn ignition switch OFF.
- 2. Check continuity between paddle shifter vehicle side harness connector terminal and ground.

| Paddle shifter vehicle side harness connector | | | Continuity |
|---|----------|--------|------------|
| Connector | Terminal | Ground | Continuity |
| M38 | 1 | Ground | Existed |
| M39 | I | | Existed |

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace damaged parts.

$10. \mathsf{CHECK}$ HARNESS BETWEEN PADDLE SHIFTER AND UNIFIED METER AND A/C AMP. (PART 1)

- Disconnect unified meter and A/C amp. connector.
- 2. Check continuity between paddle shifter vehicle side harness connector terminals and unified meter and A/C amp. vehicle side harness connector terminals.

| Paddle shifter vehicle s | side harness connector | | mp. vehicle side harness nector | Continuity |
|--------------------------|------------------------|-----------|------------------------------------|------------|
| Connector | Terminal | Connector | Terminal | |
| M38 | 3 | M66 | 6 | Existed |
| M39 | 3 | IVIOO | 26 | LAISIEU |

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace damaged parts.

11.CHECK HARNESS BETWEEN PADDLE SHIFTER AND UNIFIED METER AND A/C AMP. (PART 2)

Check continuity between paddle shifter vehicle side harness connector terminals and ground.

| Paddle shifter vehicle side harness connector | | | Continuity |
|---|----------|--------|-------------|
| Connector | Terminal | Ground | Continuity |
| M38 | 3 | Ground | Not existed |
| M39 | | | NOI GAISIGU |

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace damaged parts.

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< DTC/CIRCUIT DIAGNOSIS >

12. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace damaged parts.

13. CHECK UNIFIED METER AND A/C AMP.

- 1. Reconnect all the connectors.
- 2. Turn ignition switch ON.
- 3. Select "M RANGE SW", "NM RANGE SW", "AT SFT UP SW", "AT SFT DWN SW", "ST SFT UP SW"* and "ST SFT DWN SW"* on "Data Monitor" in "METER/M&A".
 - *: With paddle shifter
- 4. Check the ON/OFF operations of each monitor item. Refer to MWI-96, "Reference Value".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Replace unified meter and A/C amp. Refer to MWI-145, "Exploded View".

Component Inspection (Manual Mode Switch)

INFOID:0000000010579203

[7AT: RE7R01B (VK50VE)]

1. CHECK MANUAL MODE SWITCH

Check continuity between A/T shift selector connector terminals.

| A/T shift selector connector | | Condition | Continuity | |
|------------------------------|------|-----------|---|-------------|
| Connector | Term | ninal | Condition | Continuity |
| | 1 | | Selector lever is shifted to manual shift gate side | Existed |
| | | | Other than the above | Not existed |
| | 2 | 4 | Selector lever is shifted to – side | Existed |
| M137 | 2 | | Other than the above | Not existed |
| IVI 137 | 2 | | Selector lever is shifted to + side | Existed |
| | 3 | | Other than the above | Not existed |
| | 5 | | Selector lever is shifted to manual shift gate side | Not existed |
| | | | Other than the above | Existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace A/T shift selector assembly. Refer to TM-480, "Exploded View".

Component Inspection [Paddle Shifter (Shift-up)]

INFOID:0000000010579204

1. CHECK PADDLE SHIFTER (SHIFT-UP)

Check continuity between paddle shifter (shift-up) connector terminals.

| Paddle shifter (shift-up) connector | | | Condition | Continuity |
|-------------------------------------|----------|---|--------------------------------------|-------------|
| Connector | Terminal | | Condition | Continuity |
| M38 | 1 | 3 | Paddle shifter (shift-up) is pulled. | Existed |
| | | | Other than the above | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace paddle shifter (shift-up). Refer to TM-484. "Exploded View".

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

Component Inspection [Paddle Shifter (Shift-down)]

INFOID:0000000010579205

1. CHECK PADDLE SHIFTER (SHIFT-DOWN)

Check continuity between paddle shifter (shift-down) connector terminals.

| Pado | Paddle shifter (shift-down) connector | | | Continuity |
|-----------|---------------------------------------|---|--|-------------|
| Connector | Terminal | | Condition | Continuity |
| M39 | 1 | 3 | Paddle shifter (shift-down) is pulled. | Existed |
| l | | | Other than the above | Not existed |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace paddle shifter (shift-down). Refer to TM-484, "Exploded View".

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P2713 PRESSURE CONTROL SOLENOID D

< DTC/CIRCUIT DIAGNOSIS >

P2713 PRESSURE CONTROL SOLENOID D

Description INFOID:000000010579206

The high and low reverse clutch solenoid valve is controlled by the TCM in response to signals transmitted
from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will
then be shifted to the optimum position.

• The high and low reverse clutch solenoid valve controls the high and low reverse clutch control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|---|
| P2713 | Pressure Control Solenoid D | The high and low reverse clutch solenoid valve monitor value is 0.2 A or less when the high and low reverse clutch solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) High and low reverse clutch solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- 1. Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive the vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 3rd

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P2713" detected?

YES >> Go to TM-418, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000010579208

[7AT: RE7R01B (VK50VE)]

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

P2722 PRESSURE CONTROL SOLENOID E

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

P2722 PRESSURE CONTROL SOLENOID E

Description INFOID:000000010579209

• The low brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.

 The low brake solenoid valve controls the low brake control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|---|
| P2722 | Pressure Control Solenoid E | The low brake solenoid valve monitor value is 0.2 A or less when the low brake solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Low brake solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- 2. Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".

TM-419

Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 1st

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P2722" detected?

YES >> Go to TM-419, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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1. CHECK INTERMITTENT INCIDENT Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

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INFOID:0000000010579211

P2731 PRESSURE CONTROL SOLENOID F

[7AT: RE7R01B (VK50VE)]

INFOID:0000000010579214

< DTC/CIRCUIT DIAGNOSIS >

P2731 PRESSURE CONTROL SOLENOID F

Description INFOID.000000010579212

The 2346 brake solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.

 The 2346 brake solenoid valve controls the 2346 brake control valve in response to a signal transmitted from the TCM.

DTC Logic

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|--|
| P2731 | Pressure Control Solenoid F | The 2346 brake solenoid valve monitor value is 0.2 A or less when the 2346 brake solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) 2346 brake solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

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

>> GO TO 2.

2. CHECK DTC DETECTION

(I) With CONSULT

- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- 3. Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW : ON GEAR : 2nd

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

4. Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P2731" detected?

YES >> Go to TM-420, "Diagnosis Procedure".

NO >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

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P2807 PRESSURE CONTROL SOLENOID G

< DTC/CIRCUIT DIAGNOSIS >

P2807 PRESSURE CONTROL SOLENOID G

Description INFOID:0000000010579215

 The direct clutch solenoid valve is controlled by the TCM in response to signals transmitted from the transmission range switch, output speed sensor and accelerator pedal position sensor. Gears will then be shifted to the optimum position.

· The direct clutch solenoid valve controls the direct clutch control valve in response to a signal transmitted from the TCM.

DTC Logic INFOID:0000000010579216

DTC DETECTION LOGIC

| DTC | Trouble diagnosis name | DTC is detected if | Possible cause |
|-------|-----------------------------|--|--|
| P2807 | Pressure Control Solenoid G | The direct clutch solenoid valve monitor value is 0.2 A or less when the direct clutch solenoid valve command value is more than 0.75 A. | Harness or connectors (Solenoid valve circuit is open or shorted.) Direct clutch solenoid valve |

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

If "DTC CONFIRMATION PROCEDURE" has been previously performed, always turn ignition switch OFF. Then wait at least 10 seconds before performing the next test.

1.PRECONDITIONING

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

>> GO TO 2.

$\mathbf{2}.$ CHECK DTC DETECTION

(P) With CONSULT

- Start the engine.
- Select "BATTERY VOLT", "MANU MODE SW", "GEAR" and "VHCL/S SE-A/T" in "Data Monitor" in "TRANSMISSION".
- Drive vehicle and maintain the following conditions for 5 seconds or more.

BATTERY VOLT : 9 V or more

MANU MODE SW: ON **GEAR** : 1st

VHCL/S SE-A/T : 10 km/h (7 MPH) or more

Perform "Self Diagnostic Results" in "TRANSMISSION".

With GST

Follow the procedure "With CONSULT".

Is "P2807" detected?

>> Go to TM-421, "Diagnosis Procedure". YES

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK INTERMITTENT INCIDENT

Refer to GI-47. "Intermittent Incident".

Is the inspection result normal?

>> Replace control valve & TCM. Refer to TM-485, "Exploded View".

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[7AT: RE7R01B (VK50VE)]

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INFOID:0000000010579217

P2807 PRESSURE CONTROL SOLENOID G

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

NO >> Repair or replace damaged parts.

MAIN POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

| [7 | AT: | RE7 | R01B | (VK5 | 0VE)] |
|----|-----|-----|------|------|-------|
|----|-----|-----|------|------|-------|

MAIN POWER SUPPLY AND GROUND CIRCUIT

Description INFOID:000000010579218

Supply power to TCM.

Diagnosis Procedure

INFOID:0000000010579219

1. CHECK TCM POWER SOURCE (PART 1)

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T assembly connector.
- 3. Check voltage between A/T assembly vehicle side harness connector terminal and ground.

| A/T assembly vehicle | side harness connector | | Condition | Voltage (Approx.) |
|----------------------|------------------------|--------|-----------|-------------------|
| Connector | Terminal | Ground | Condition | voltage (Approx.) |
| F51 | 2 | | Always | Battery voltage |

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 6.

2.CHECK TCM POWER SOURCE (PART 2)

Check voltage between A/T assembly vehicle side harness connector terminals and ground.

| A/T assembly vehicle s | side harness connector | | Condition | Voltage (Approx.) |
|------------------------|------------------------|--------|--------------------------|-------------------|
| Connector | Terminal | | Condition | Voltage (Approx.) |
| | 4 | Cround | Turn ignition switch ON | Battery voltage |
| E51 | ı | Ground | Turn ignition switch OFF | 0 V |
| F51 | 6 | | Turn ignition switch ON | Battery voltage |
| | 0 | | Turn ignition switch OFF | 0 V |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 7.

3.CHECK TCM GROUND CIRCUIT

Check continuity between A/T assembly vehicle side harness connector terminals and ground.

| A/T assembly vehicle | side harness connector | | Continuity |
|----------------------|------------------------|--------|------------|
| Connector | Terminal | Ground | Continuity |
| F51 | 5 | Ground | Existed |
| F31 | 10 | | LAISIEU |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK JOINT CONNECTOR

- 1. Remove joint connector. Refer to TM-485, "Exploded View".
- 2. Check the continuity between joint connector terminals.

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MAIN POWER SUPPLY AND GROUND CIRCUIT

[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

| A/T assembly harness connector side | TCM harness connector side | Continuity |
|-------------------------------------|----------------------------|--------------|
| Terminal | Terminal | - Continuity |
| 1 | 1 | |
| 2 | 2 | |
| 5 | 5 | Existed |
| 6 | 6 | - |
| 10 | 10 | - |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK INTERMITTENT INCIDENT

Refer to GI-47. "Intermittent Incident".

Is the inspection result normal?

YES >> Replace the control valve & TCM. Refer to TM-485, "Exploded View".

NO >> Repair or replace damaged parts.

6.DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between battery positive terminal and A/T assembly vehicle side harness connector terminal 2. Refer to PG-7, "Wiring Diagram BATTERY POWER SUPPLY -".
- Battery
- 10A fuse (No.36, located in the fuse, fusible link and relay box). Refer to <u>PG-121, "Fuse and Fusible Link Arrangement".</u>

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Repair or replace damaged parts.

7. CHECK HARNESS BETWEEN IPDM E/R AND A/T ASSEMBLY (PART 1)

- 1. Turn ignition switch OFF.
- 2. Disconnect IPDM E/R connector.
- Check continuity between IPDM E/R vehicle side harness connector terminal and A/T assembly vehicle side harness connector terminals.

| IPDM E/R vehicle sign | de harness connector | A/T assembly vehicle | side harness connector | Continuity |
|-----------------------|----------------------|----------------------|------------------------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| E7 | 58 | F51 | 1 | Existed |
| | 30 | 131 | 6 | LXISIEU |

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace damaged parts.

8.CHECK HARNESS BETWEEN IPDM E/R AND A/T ASSEMBLY (PART 2)

Check continuity between A/T assembly vehicle side harness connector terminal and ground.

| A/T assembly vehicle | side harness connector | | Continuity |
|----------------------|------------------------|---------|-------------|
| Connector | Terminal | Ground | Continuity |
| F51 | 1 | Giodila | Not existed |
| | 6 | | Not existed |

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace damaged parts.

MAIN POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

$9. \mathsf{DETECT}$ MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and IPDM E/R. Refer to PG-50, "Wiring Diagram IGNI-TION POWER SUPPLY -".
- · Ignition switch
- 10A fuse (No.43, located in the IPDM E/R). Refer to PG-122, "Fuse, Connector and Terminal Arrangement".
- IPDM E/R

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".
- NO >> Repair or replace damaged parts.

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SHIFT POSITION INDICATOR CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

SHIFT POSITION INDICATOR CIRCUIT

Description INFOID:000000010579220

TCM transmit the switch signals to unified meter and A/C amp. by CAN communication line. Then manual mode switch position is indicated on the shift position indicator.

Component Function Check

INFOID:0000000010579221

[7AT: RE7R01B (VK50VE)]

1. CHECK A/T INDICATOR

- Start the engine.
- 2. Check the actual selector lever position ("P", "R", "N" and "D") and the indication of the shift position indicator mutually coincide.
- Drive vehicle in the manual mode, and then check that the actual gear position and the indication of the
 position indicator mutually coincide when the selector lever is shifted to "UP (+ side)" or "DOWN (− side)"
 side (1GR ⇔ 7GR).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to TM-426, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000010579222

1. CHECK INPUT SIGNALS

(II) With CONSULT

- 1. Start the engine.
- Select "SLCT LVR POSI" in "Data Monitor" in "TRANSMISSION".
- Check the actual selector lever position ("P", "R", "N" and "D") and the indication of the "SLCT LVR POSI" mutually coincide. Refer to <u>TM-438</u>, "<u>Reference Value</u>".
- 4. Drive vehicle in the manual mode, and then check that the actual gear position and the indication of the "SLCT LVR POSI" mutually coincide when the selector lever is shifted to the "UP (+ side)" or "DOWN (− side)" side (1GR ⇔ 7GR). Refer to TM-438, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END

NO-1 [The actual gear position does not change, or shifting into the manual mode is not possible (no gear shifting in the manual mode possible). Or the shift position indicator is not indicated.]>>•Check manual mode switch. Refer to TM-416, "Component Inspection (Manual Mode Switch)".

- Check A/T main system (Fail-safe function actuated).
- Perform "Self Diagnostic Results" mode for "TRANSMISSION". Refer to TM-455, "DTC Index".
- NO-2 (The actual gear position changes, but the shift position indicator is not indicated.)>>•Perform "Self-under "Self-under"."
- NO-3 (The actual gear position and the indication on the shift position indicator do not coincide.)>>•Perform "Self Diagnostic Results" mode for "TRANSMISSION". Refer to TM-455, "DTC Index".
- NO-4 (Only a specific position or positions is/are not indicated on the shift position indicator.)>>•Check the unified meter and A/C amp. Refer to MWI-4, "Work flow".

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

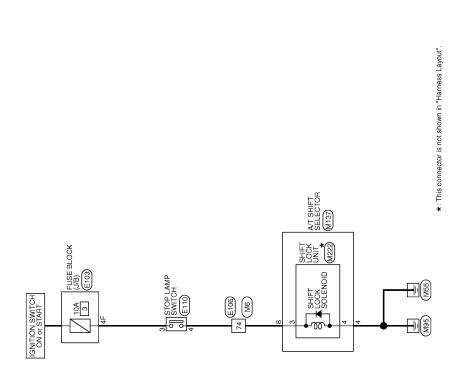
SHIFT LOCK SYSTEM

Description INFOID:000000010579223

Refer to TM-356, "System Description".

Wiring Diagram - A/T SHIFT LOCK SYSTEM -

INFOID:000000010579224



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| []≽ | | A/I SHIFT LOCK SYSTEM | | | | | | | | Γ |
|---------------|-------------------|--|----------|----------------|-----------------|----------|----------------|--|----------------|---------------------------------------|
| Connector No. | tor No. | E103 | 15 | ŋ | | 92 | BB | | Connector No. | ir No. M6 |
| Connec | Connector Name | EUSE BLOCK (J/B) | 13 | œ | | 69 | _ | | Connector Name | IN Name WIRE TO WIRE |
|]. | | Т | 4 | > | | 0 i | SHELD | | | _ |
| Connec | Connector Type | NS16FW-CS | 15 | SHIELD | | ۶ | 9 | | Connector Type | r Type TH80MW-CS16-TM4 |
| ģ | | | 16 | g | | 72 | G | | ģ | |
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| ŧ | r | ֡֝֟֝֟֝֟֝֟֝֟֝֟֝֟֟֟֝֟֟֟֟֟֟ | 18 | Ь | | 74 | BR | | ť | |
| 5 | ń | 41 | 19 | 9 | • | 9/ | ٦ | • | Ϋ́ | M M M M M M M M M M |
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| | | 5 | 20 | Υ | - [Without ICC] | 78 | ٨ | | | |
| | | | 21 | BR | | 80 | SB | | | |
| | | | 22 | œ | - [With ICC] | 8 | _ | | | |
| Termin | Terminal Color Of | JO Jones Jon | 22 | > | - [Without ICC] | 82 | × | | Terminal | Color Of Simulation (Simulation) |
| No | Wire | Olginal Ivallic | 23 | 9 | | 83 | 97 | | o N | Wire Signal Name [Specification] |
| 10F | _ | - | 24 | _ | - [With ICC] | 84 | GR | • | - | - 9 |
| 11 | SB | | 24 | Ь | - [Without ICC] | 85 | 9 | | 2 | |
| 2F | Μ | • | 25 | _ | - [Without ICC] | 98 | Ь | | 3 | LG - [Without Auto aircon seat] |
| 3F | > | | 52 | \ | - [With ICC] | 87 | W | | е | SB - [With Auto aircon seat] |
| 4F | Ø | | 56 | SHIELD | | 88 | | | 4 | |
| P9 | BG | | 78 | ŋ | | 88 | ┝ | | 2 | GR . |
| ₩. | - | | 59 | 97 | | 06 | H | | 9 | |
| <u>1</u> 6 | ~ | | 8 | 8 | | 9 | g. | | _ | |
| | | | 32 | Α | | 6 | BR | | œ | |
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| Connector No | N rot | E106 | 32 | ď | | 8 | $^{+}$ | | , £ | |
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| Connec | Connector Type | THB0FW-CS16-TM4 | <u> </u> | 2 | | 86 | 馸 | | 2 | |
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| 厚 | • | 8171 8151 4121 | 45 | > | | | | | 15 | SHIELD . |
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| | | F (5) | 47 | ٦ | | Conne | Connector Type | M04FW-LC | 20 | GR - [Without ICC] |
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| Termin | Terminal Color Of | Of Signal Name [Specification] | 49 | SB | | ß | • | | 21 | |
| o N | Wire | o de la composição | 20 | æ | - | + | e | Ī | 21 | R - [Without ICC] |
| 1 | ŋ | | 51 | В | | 2 | 2 | 3 4 | 22 | L - [Without ICC] |
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| 3 | SB | | 53 | BG | | | | 7 | 23 | . 9 |
| 4 | PI | - | 24 | ď | • | | |] | 24 | L - [With ICC] |
| 2 | Υ | - | 22 | SB | - | | | | 24 | P - [Without ICC] |
| 9 | Μ | | 29 | Ь | | Terminal | nal Color Of | 91 191 191 191 191 191 191 191 191 191 | 25 | W - [Without ICC] |
| 7 | Ø | | 09 | SB | | ž | Wire | olgital ivame [opecification] | 52 | Y - [With ICC] |
| 8 | ^ | | 61 | ۸ | | - | _ | | 56 | SHIELD . |
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[7AT: RE7R01B (VK50VE)]

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JRDWC2934GB

$1. {\sf CHECK\ A/T\ SHIFT\ LOCK\ OPERATION\ (PART\ 1)}$

Turn ignition switch ON.

A/T SHIFT LOCK SYSTEM

2. Shift the selector lever to "P" position.

Component Function Check

3. Attempt to shift the selector lever to any other position with the brake pedal released.

Can the selector lever be shifted to any other position?

Revision: 2015 February TM-429 2015 QX70

INFOID:0000000010579225

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< DTC/CIRCUIT DIAGNOSIS >

YES >> Go to TM-430, "Diagnosis Procedure".

NO >> GO TO 2.

2.CHECK A/T SHIFT LOCK OPERATION (PART 2)

Attempt to shift the selector lever to any other position with the brake pedal depressed.

Can the selector lever be shifted to any other position?

YES >> INSPECTION END

NO >> Go to TM-430, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000010579226

[7AT: RE7R01B (VK50VE)]

1. CHECK POWER SOURCE (PART 1)

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T shift selector connector.
- 3. Turn ignition switch ON.
- 4. Check voltage between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle side harness connector | | | Condition | Voltage (Approx.) |
|---|----------|---------|------------------------|-------------------|
| Connector | Terminal | Ground | Condition | voilage (Approx.) |
| M137 | Q | Giodila | Depressed brake pedal. | Battery voltage |
| | 0 | | Released brake pedal. | 0 V |

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 5.

2. CHECK GROUND CIRCUIT

Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle side harness connector | | | Continuity | |
|---|----------|--------|------------|--|
| Connector | Terminal | Ground | Continuity | |
| M137 | 4 | | Existed | |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

$3. \mathsf{CHECK}$ HARNESS BETWEEN A/T SHIFT SELECTOR AND SHIFT LOCK UNIT

- Disconnect shift lock unit connector.
- 2. Check continuity between A/T shift selector connector terminals and shift lock unit A/T shift selector side connector terminals.

| A/T shift selector connector | | Shift lock unit A/T shift selector side connector | | Continuity |
|------------------------------|----------|---|---|------------|
| Connector | Terminal | Connector Terminal | | Continuity |
| M137 | 8 | M222 | 3 | Existed |
| | 4 | IVIZZZ | 4 | Existed |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK SHIFT LOCK UNIT

- 1. Remove shift lock unit. Refer to TM-480, "Exploded View".
- Check shift lock unit. Refer to TM-432, "Component Inspection (Shift Lock Solenoid)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Replace shift lock unit. Refer to TM-480, "Exploded View".

< DTC/CIRCUIT DIAGNOSIS >

5. CHECK POWER SOURCE (PART 2)

Turn ignition switch OFF.

- Disconnect stop lamp switch connector.
- Turn ignition switch ON.
- Check voltage between stop lamp switch vehicle side harness connector terminal and ground.

| Stop lamp switch vehicle side harness connector | | | Voltage (Approx.) | |
|---|---|--------|-------------------|--|
| Connector Terminal | | Ground | voitage (Approx.) | |
| E110 | 3 | | Battery voltage | |

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 9.

O.CHECK STOP LAMP SWITCH (PART 1)

Check stop lamp switch. Refer to TM-432, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 12.

7.CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT SELECTOR (PART 1)

Check continuity between stop lamp switch vehicle side harness connector terminal and A/T shift selector vehicle side harness connector terminal.

| Stop lamp switch vehicle side harness connector | | A/T shift selector vehicle side harness connector | | Continuity |
|---|----------|---|---|------------|
| Connector | Terminal | Connector Terminal | | Continuity |
| E110 | 4 | M137 | 8 | Existed |

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace damaged parts.

8.CHECK HARNESS BETWEEN STOP LAMP SWITCH AND SHIFT SELECTOR (PART 2)

Check continuity between stop lamp switch vehicle side harness connector terminal and ground.

| Stop lamp switch vehicle side harness connector | | | Continuity | |
|---|---|--------|-------------|--|
| Connector Terminal | | Ground | Continuity | |
| E110 | 4 | | Not existed | |

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Repair or replace damaged parts.

$9.\mathsf{check}$ harness between fuse block (J/B) and stop Lamp switch (part 1)

- Turn ignition switch OFF.
- Disconnect fuse block (J/B) connector.
- Check continuity between fuse block (J/B) vehicle side harness connector terminal and stop lamp switch vehicle side harness connector terminal.

| Fuse block (J/B) vehicle side harness connector | | Stop lamp switch vehicle side harness connector | | Continuity |
|---|----------|---|---|------------|
| Connector | Terminal | Connector Terminal | | Continuity |
| E103 | 4F | E110 | 3 | Existed |

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace damaged parts.

10.CHECK HARNESS BETWEEN FUSE BLOCK (J/B) AND STOP LAMP SWITCH (PART 2)

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[7AT: RE7R01B (VK50VE)]

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< DTC/CIRCUIT DIAGNOSIS >

Check continuity between fuse block (J/B) vehicle side harness connector terminal and ground.

| Fuse block (J/B) vehicle | side harness connector | | Continuity | |
|--------------------------|------------------------|--------|-------------|--|
| Connector Terminal | | Ground | Continuity | |
| E103 4F | | | Not existed | |

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace damaged parts.

11. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and fuse block (J/B). Refer to <u>PG-50, "Wiring Diagram IGNITION POWER SUPPLY -"</u>.
- Ignition switch
- 10A fuse [No.3, located in the fuse block (J/B)]. Refer to PG-120, "Fuse, Connector and Terminal Arrangement".
- Fuse block (J/B)

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Repair or replace damaged parts.

12. CHECK INSTALLATION POSITION OF STOP LAMP SWITCH

Adjust stop lamp switch position. Refer to BR-9, "Inspection and Adjustment".

>> GO TO 13.

13. CHECK STOP LAMP SWITCH (PART 2)

Check stop lamp switch. Refer to TM-432, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to BR-20, "Exploded View".

Component Inspection (Shift Lock Solenoid)

INFOID:0000000010579227

[7AT: RE7R01B (VK50VE)]

1. CHECK SHIFT LOCK SOLENOID

Apply voltage to terminals 3 and 4 of shift lock unit connector, and then check that shift lock solenoid is activated.

CAUTION:

Connect the fuse between the terminals when applying the voltage.

| Shift lock unit connector | | | | |
|---------------------------|----------|---|--|------------------------------|
| Connector | Terminal | | Condition | Status |
| Connector | + (fuse) | _ | | |
| M222 | 3 | 4 | Apply 12 V direct current between terminals 3 and 4. | Shift lock solenoid operates |

Can the lock plate be moved up and down?

YES >> INSPECTION END

NO >> Replace shift lock unit. Refer to TM-480, "Exploded View".

Component Inspection (Stop Lamp Switch)

INFOID:0000000010579228

1. CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals.

SHIFT LOCK SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

| | Stop lamp switch connector | | | Continuity |
|-----------|----------------------------|----------|------------------------|-------------|
| Connector | Ter | Terminal | | Continuity |
| E110 | 3 | 4 | Depressed brake pedal. | Existed |
| LIIU | 3 | 4 | Released brake pedal. | Not existed |

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Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-20, "Exploded View"</u>.

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< DTC/CIRCUIT DIAGNOSIS >

SELECTOR LEVER POSITION INDICATOR

Description

Indicates selector lever position.

Component Function Check

INFOID:0000000010579230

[7AT: RE7R01B (VK50VE)]

1.CHECK SELECTOR LEVER POSITION INDICATOR (PART 1)

- 1. Turn ignition switch ON.
- 2. Check that each position indicator lamp of the selector lever position indicator turns on when shifting the selector lever from "P" to "M" position.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Go to TM-434, "Diagnosis Procedure".

2.CHECK SELECTOR LEVER POSITION INDICATOR (PART 2)

Check that the night illumination of the selector lever position indicator turns on when setting the lighting switch in 1st position.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to TM-434, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000010579231

1. CHECK MALFUNCTIONING ITEM

Which item is abnormal?

Position indicator lamp>> GO TO 2. Illumination lamp>> GO TO 11.

2.CHECK POWER SOURCE

- 1. Turn ignition switch OFF.
- Disconnect A/T shift selector connector.
- 3. Turn ignition switch ON.
- 4. Check voltage between A/T shift selector vehicle side harness connector terminals.

| A/T shift selector vehicle side harness connector | | | Voltage (Approx.) |
|---|----------|--------|-------------------|
| Connector | Terminal | Ground | Voltage (Approx.) |
| M137 | 10 | | Battery voltage |

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 8.

3. CHECK GROUND CIRCUIT

Turn ignition switch OFF.

2. Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle | e side harness connector | | Continuity |
|----------------------------|--------------------------|--------|------------|
| Connector | Terminal | Ground | Continuity |
| M137 | 4 | | Existed |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK SHIFT POSITION SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[7AT: RE7R01B (VK50VE)]

- Disconnect shift position switch connector.
- Check continuity between A/T shift selector harness connector terminals and shift position switch connector terminals.

| A/T shift selector h | narness connector | Shift position | switch connector | Condition | Continuity | | | | | | | | | | | | | | | | | |
|----------------------|-------------------|-----------------------|--------------------------|-----------------------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|--------|--------|--------|--------|------|-----------------------|---------|
| Connector | Terminal | Connector | Terminal | Condition | Continuity | | | | | | | | | | | | | | | | | |
| | | | 7 | Selector lever in "D" | Existed | | | | | | | | | | | | | | | | | |
| | 4 | | 2, 3, 4, 5, 6, 9, 10, 11 | position. | No existed | | | | | | | | | | | | | | | | | |
| | 4 | | 9 | Selector lever in "M" | Existed | | | | | | | | | | | | | | | | | |
| | | 2, 3 | 2, 3, 4, 5, 6, 7, 10, 11 | position. | No existed | | | | | | | | | | | | | | | | | |
| | | | 2, 6 | Selector lever in "N" | Existed | | | | | | | | | | | | | | | | | |
| M137 | M221 | 3, 4, 5, 7, 9, 10, 11 | and "M" position. | No existed | | | | | | | | | | | | | | | | | | |
| WITST | | IVIZZI | IVIZZI | IVIZZI | IVIZZI | IVIZZI | IVIZZI | IVIZZI | IVIZZI | IVIZZI | IVIZZI | IVIZZI | 101221 | 101221 | | IVIZZI | 101221 | 101221 | 141221 | 3, 6 | Selector lever in "D" | Existed |
| | 10 | | 2, 4, 5, 7, 9, 10, 11 | position. | No existed | | | | | | | | | | | | | | | | | |
| 10 | 10 | | 4, 6 | Selector lever in "R" | Existed | | | | | | | | | | | | | | | | | |
| | | 2, 3, 5, 7, 9, 10, 11 | position. | No existed | | | | | | | | | | | | | | | | | | |
| | | | 5, 6 | Selector lever in "P" | Existed | | | | | | | | | | | | | | | | | |
| | | | 2, 3, 4, 7, 9, 10, 11 | position. | No existed | | | | | | | | | | | | | | | | | |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts. Refer to TM-480, "Exploded View".

 ${f 5}.$ CHECK HARNESS BETWEEN SHIFT POSITION SWITCH AND SELECTOR LEVER POSITION INDICA-TOR (PART 1)

- Disconnect selector lever position indicator connector.
- Check continuity between shift position switch harness connector terminals and selector lever position indicator connector terminals.

| Shift position switch | h harness connector | Selector lever position indicator harness connector | | Continuity | |
|-----------------------|---------------------|---|----------|------------|--|
| Connector | Terminal | Connector | Terminal | Continuity | |
| | 2 | | 3 | | |
| | 3 | | 4 | | |
| | 4 | | 5 | | |
| M221 | 5 | M223 | 7 | Existed | |
| | 6 | | 6 | | |
| | 7 | _ | 8 | | |
| | 9 | _ | 2 | | |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts. Refer to TM-480, "Exploded View".

6.CHECK HARNESS BETWEEN SHIFT POSITION SWITCH AND SELECTOR LEVER POSITION INDICA-TOR (PART 2)

Check harness cladding between shift position switch connector and selector lever position indicator connector for damage.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace damaged parts. Refer to TM-480, "Exploded View".

.CHECK SELECTOR LEVER POSITION INDICATOR

Check selector lever position indicator. Refer to TM-437, "Component Inspection (Selector Lever Position Indicator)".

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[7AT: RE7R01B (VK50VE)]

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Replace damaged parts.

$8.\mathsf{CHECK}$ HARNESS BETWEEN A/T SHIFT SELECTOR AND BCM (PART 1)

- Turn ignition switch OFF.
- 2. Disconnect BCM connector.
- Check continuity between A/T shift selector vehicle side harness connector terminal and BCM vehicle side harness connector terminal.

| A/T shift selector vehicle | A/T shift selector vehicle side harness connector | | BCM vehicle side harness connector | |
|----------------------------|---|--------------------|------------------------------------|------------|
| Connector | Terminal | Connector Terminal | | Continuity |
| M137 | 10 | M122 | 96 | Existed |

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace damaged parts.

9.CHECK HARNESS BETWEEN A/T SHIFT SELECTOR AND BCM (PART 2)

Check continuity between A/T shift selector vehicle side harness connector terminal and ground.

| A/T shift selector vehicle side harness connector | | | Continuity |
|---|----|--------|-------------|
| Connector Terminal | | Ground | Continuity |
| M137 | 10 | | Not existed |

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace damaged parts.

10.CHECK BCM INPUT/OUTPUT SIGNAL

Check BCM input/output signal. Refer to BCS-49, "Reference Value".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".

NO >> Repair or replace damaged parts.

11. CHECK POWER SOURCE

- 1. Turn ignition switch OFF.
- 2. Disconnect A/T shift selector connector.
- 3. Turn ignition switch ON.
- 4. Check voltage between A/T shift selector vehicle side harness connector terminals.

| A/T shift selector vehicle side harness connector | | | | |
|---|----------|---|---------------------|-------------------|
| Connector | Terminal | | Condition | Voltage (Approx.) |
| Connector | + | _ | | |
| M137 | 7 | 9 | Lighting switch 1ST | Battery voltage |

Is the inspection result normal?

YES >> GO TO 12.

NO >> Check illumination circuit. Refer to INL-90, "Wiring Diagram - ILLUMINATION -".

12. CHECK SHIFT POSITION SWITCH

- 1. Disconnect shift position switch connector.
- Check continuity between A/T shift selector harness connector terminals and shift position switch connector terminals.

< DTC/CIRCUIT DIAGNOSIS >

A/T shift selector harness connector Shift position switch connector Continuity Connector Terminal Connector **Terminal** 10 Existed 7 2, 3, 4, 5, 6, 7, 9, 11 No existed M221 M137 Existed 11 9 2, 3, 4, 5, 6, 7, 9, 10 No existed

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace damaged parts. Refer to <u>TM-480. "Exploded View"</u>.

13. Check harness between shift position switch and selector lever position indicator (part 3)

- 1. Disconnect selector lever position indicator connector.
- 2. Check continuity between shift position switch harness connector terminals and selector lever position indicator connector terminals.

| Shift position switch | n harness connector | Selector lever position indicator harness connector | | Continuity |
|-----------------------|---------------------|---|----------|------------|
| Connector | Terminal | Connector | Terminal | Continuity |
| M221 | 10 | M223 | 1 | Existed |
| IVIZZ I | 11 | IVIZZS | 9 | Existed |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace damaged parts. Refer to TM-480, "Exploded View".

Component Inspection (Selector Lever Position Indicator)

INFOID:0000000010579232

[7AT: RE7R01B (VK50VE)]

1. CHECK SELECTOR LEVER POSITION INDICATOR

Check that selector lever position indicator lamps turn on.

CAUTION:

Connect the fuse between the terminals when applying the voltage.

| Selector lever position indicator connector | | | | |
|---|----------|-------|--|---------------------------------------|
| Connector | Ter | minal | Condition | Status |
| Connector | + (fuse) | - | | |
| | 1 | 9 | Apply 12 V direct current between terminals 1 and 9. | Illumination lamp turns on |
| | 3 | | Apply 12 V direct current between terminals 3 and 8. | "N" position indicator lamp turns on. |
| M223 | 4 | 8 | Apply 12 V direct current between terminals 4 and 8. | "D" position indicator lamp turns on. |
| IVIZZS | 5 | 0 | Apply 12 V direct current between terminals 5 and 8. | "R" position indicator lamp turns on. |
| | 7 | | Apply 12 V direct current between terminals 7 and 8. | "P" position indicator lamp turns on. |
| | 6 | 2 | Apply 12 V direct current between terminals 6 and 2. | "M" mode indicator lamp turns on. |

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the selector lever position indicator. Refer to <u>TM-480, "Exploded View"</u>.

Revision: 2015 February TM-437 2015 QX70

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ECU DIAGNOSIS INFORMATION

TCM

Reference Value

VALUES ON DIAGNOSIS TOOL

- The CONSULT electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
 - Check for time difference between actual shift timing and the CONSULT display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
- Shift schedule (which implies gear position) displayed on CONSULT and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:
- Actual shift schedule has more or less tolerance or allowance
- Shift schedule indicated in Service Manual refers to the point where shifts start
- Gear position displayed on CONSULT indicates the point where shifts are completed
- Display of solenoid valves on CONSULT changes at the start of shifting, while gear position is displayed upon completion of shifting (which is computed by TCM).

NOTE:

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

| Item name | Condition | Value / Status (Approx.) |
|---------------|--|---|
| VHCL/S SE-A/T | During driving | Approximately matches the speed-ometer reading. |
| ESTM VSP SIG | During driving | Approximately matches the speed- ometer reading. |
| OUTPUT REV | During driving (lock-up ON) | Tachometer/Gear ratio |
| INPUT SPEED | During driving (lock-up ON) | Approximately matches the engine speed. |
| F SUN GR REV | During driving | Revolution of front sun gear is indicated. |
| F CARR GR REV | During driving | Revolution of front carrier is indicated. |
| ENGINE SPEED | Engine running | Closely matches the tachometer reading. |
| TC SLIP SPEED | During driving | Engine speed – Input speed |
| ACCELE POSI | Released accelerator pedal | 0.0/8 |
| ACCELE POSI | Fully depressed accelerator pedal | 8.0/8 |
| THROTTLE POSI | Released accelerator pedal | 0.0/8 |
| THROTTLE POSI | Fully depressed accelerator pedal | 8.0/8 |
| ATF TEMP 1 | Ignition switch ON | Temperature of ATF in the oil pan is indicated. |
| ATF TEMP 2 | Ignition switch ON | Temperature of ATF at the exit of torque converter. |
| ATF TEMP SE 1 | 0°C (32° F) – 20°C (68°F) – 80°C (176°F) | 3.3 – 2.7 – 0.9 V |
| BATTERY VOLT | Ignition switch ON | Battery voltage (11 V – 14 V) |
| LINE PRES SOL | _ | _ |
| TCC SOLENOID | _ | _ |
| L/B SOLENOID | _ | _ |
| FR/B SOLENOID | _ | _ |
| HLR/C SOL | _ | _ |

| Item name | Condition | Value / Status (Approx.) |
|----------------|---|--|
| I/C SOLENOID | - | _ |
| D/C SOLENOID | _ | _ |
| 2346/B SOL | _ | _ |
| L/P SOL MON | _ | _ |
| TCC SOL MON | _ | _ |
| L/B SOL MON | _ | _ |
| FR/B SOL MON | _ | |
| HLR/C SOL MON | _ | _ |
| I/C SOL MON | _ | _ |
| D/C SOL MON | _ | _ |
| 2346/B SOL MON | _ | _ |
| | Driving with 1GR | 4.887 |
| | Driving with 2GR | 3.170 |
| | Driving with 3GR | 2.027 |
| GEAR RATIO | Driving with 4GR | 1.412 |
| | Driving with 5GR | 1.000 |
| | Driving with 6GR | 0.864 |
| | Driving with 7GR | 0.775 |
| ENGINE TORQUE | During driving | Changes the value according to the acceleration or deceleration. |
| ENG TORQUE D | During driving | Changes the value according to the acceleration or deceleration. |
| INPUT TRQ S | During driving | Changes the value according to the acceleration or deceleration. |
| INPUT TRQ L/P | During driving | Changes the value according to the acceleration or deceleration. |
| TDOT DDEC L/D | Selector lever in "P" and "N" positions | 490 kPa |
| TRGT PRES L/P | Other than the above | 490 – 1370 kPa |
| | Slip lock-up is active | 0 – 600 kPa |
| TRGT PRES TCC | Lock-up is active | 600 kPa |
| | Other than the above | 0 kPa |
| TRGT PRES L/B | Low brake engaged | 1370 kPa |
| INGI FINES L/B | Low brake disengaged | 0 kPa |
| TRGT PRES FR/B | Front brake engaged | 1370 kPa |
| INGI PRES PRID | Front brake disengaged | 0 kPa |
| TRG PRE HLR/C | High and low reverse clutch engaged | 1370 kPa |
| ING FRE FILMC | High and low reverse clutch disengaged | 0 kPa |
| TRGT PRES I/C | Input clutch engaged | 1370 kPa |
| INGI FRES I/C | Input clutch disengaged | 0 kPa |
| TDCT DDEC D/C | Direct clutch engaged | 1370 kPa |
| TRGT PRES D/C | Direct clutch disengaged | 0 kPa |
| TDC DDE 2246/D | 2346 brake engaged | 1370 kPa |
| TRG PRE 2346/B | 2346 brake disengaged | 0 kPa |
| SHIFT PATTERN | During normal driving (without shift changes) | FF |
| VEHICLE SPEED | During driving | Approximately matches the speed- ometer reading. |

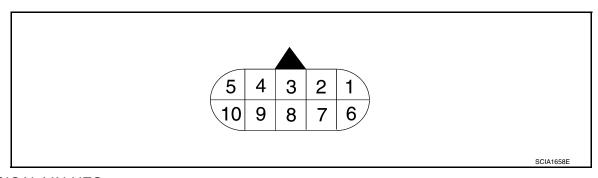
| Item name | Condition | Value / Status (Approx.) |
|------------------|---|--------------------------|
| RANGE SW 4 | Selector lever in "P" and "N" positions | OFF |
| RANGE SW 4 | Other than the above | ON |
| RANGE SW 3 | Selector lever in "P", "R" and "N" positions | OFF |
| RANGE SW 3 | Other than the above | ON |
| RANGE SW 2 | Selector lever in "P" and "R" positions | OFF |
| RANGE SW 2 | Other than the above | ON |
| DANCE CVA/A | Selector lever in "P" position | OFF |
| RANGE SW 1 | Other than the above | ON |
| OFT DIAME OF ONE | Paddle shifter (shift-down) is pulled | ON |
| SFT DWN ST SW | Other than the above | OFF |
| DET LID OT OW | Paddle shifter (shift-up) is pulled | ON |
| SFT UP ST SW | Other than the above | OFF |
| | Selector lever is shifted to – side | ON |
| DOWN SW LEVER | Other than the above | OFF |
| ID CM LEVED | Selector lever is shifted to + side | ON |
| JP SW LEVER | Other than the above | OFF |
| JON M MODE OW | Selector lever is shifted to manual shift gate side | OFF |
| NON M-MODE SW | Other than the above | ON |
| | Selector lever is shifted to manual shift gate side | ON |
| MANU MODE SW | Other than the above | OFF |
| 5014/140DE 014# | Tow mode | ON |
| FOW MODE SW* | Other than the above | OFF |
| 20 54405 | Driving with DS mode | ON |
| DS RANGE | Other than the above | OFF |
| | Selector lever in "1" position | ON |
| 1 POSITION SW* | Other than the above | OFF |
| | When overdrive control switch is depressed | ON |
| OD CONT SW* | When overdrive control switch is released | OFF |
| | Depressed brake pedal | ON |
| BRAKESW | Released brake pedal | OFF |
| | Power mode | ON |
| POWERSHIFT SW* | Other than the above | OFF |
| | When TCM receives ASCD OD cancel request signal | ON |
| ASCD-OD CUT | Other than the above | OFF |
| | ASCD operate | ON |
| ASCD-CRUISE | Other than the above | OFF |
| | ABS operate | ON |
| ABS SIGNAL | Other than the above | OFF |
| | When TCM receives TCS gear keep request signal | ON |
| CS GR/P KEEP | Other than the above | OFF |
| TCS SIGNAL 2 | When the reception value of A/T shift schedule change demand signal is "cold" | ON |
| | Other than the above | OFF |

| Item name | Condition | Value / Status (Approx.) |
|----------------------|---|--------------------------|
| FCS SIGNAL 1 | When the reception value of A/T shift schedule change demand signal is "warm" | ON |
| | Other than the above | OFF |
| OW/D DARTO | At 4 - 5 - 6 gear shift control | FAIL |
| OW/B PARTS | Other than the above | NOTFAIL |
| 0.11.0.1555 54.555 | At 1 - 2 - 3 gear shift control | FAIL |
| C/IC/FRB PARTS | Other than the above | NOTFAIL |
| VEDD DADTO | At 4 - 5 - 6 gear shift control | FAIL |
| C/FRB PARTS | Other than the above | NOTFAIL |
| L D/O DA DTO | At 4 - 5 - 6 gear shift control | FAIL |
| LR/C PARTS | Other than the above | NOTFAIL |
| | Fully depressed accelerator pedal | ON |
| WO THL POS | Released accelerator pedal | OFF |
| LOD THE DOO | Released accelerator pedal | ON |
| LSD THL POS | Fully depressed accelerator pedal | OFF |
| ADV COT ILIBOR | Depressed accelerator pedal | DRIVE |
| RV CST JUDGE | Released accelerator pedal | COAST |
| | When the selector lever is positioned in between each position | OFF |
| | Selector lever in "P" position | Р |
| | Selector lever in "R" position | R |
| | Selector lever in "N" position | N |
| | Selector lever in "D" position | D |
| | Selector lever in "D" position: 7GR | D |
| | Selector lever in "D" position: 6GR | 6 |
| | Selector lever in "D" position: 5GR | 5 |
| | Selector lever in "D" position: 4GR | 4 |
| HIFT IND SIGNAL | Selector lever in "D" position: 3GR | 3 |
| | Selector lever in "D" position: 2GR | 2 |
| | Selector lever in "D" position: 1GR | 1 |
| | Selector lever in "M" position: 1GR | M1 |
| | Selector lever in "M" position: 2GR | M2 |
| | Selector lever in "M" position: 3GR | M3 |
| | Selector lever in "M" position: 4GR | M4 |
| | Selector lever in "M" position: 5GR | M5 |
| | Selector lever in "M" position: 6GR | M6 |
| | Selector lever in "M" position: 7GR | M7 |
| | Driving with DS mode | DS |
| ADTED DELAY | Selector lever in "P" and "N" positions | ON |
| ARTER RELAY | Other than the above | OFF |
| CAEE IND/I | For 2 seconds after the ignition switch is turned ON | ON |
| SAFE IND/L | Other than the above | OFF |
| TE \A/A DALL A \$40* | When TCM transmits the ATF indicator lamp signal | ON |
| TF WARN LAMP* | Other than the above | OFF |

| Item name | Condition | Value / Status (Approx.) |
|----------------|--|-----------------------------------|
| MANU MODE IND | Driving with manual mode | ON |
| MANU MODE IND | Other than the above | OFF |
| | Selector lever in "P" and "N" positions | ON |
| ON OFF SOL MON | Driving with 1GR to 3GR | |
| | Other than the above | OFF |
| START RLY MON | Selector lever in "P" and "N" positions | ON |
| START REF WION | Other than the above | OFF |
| | Selector lever in "P" and "N" positions | ON |
| ON OFF SOL | Driving with 1GR to 3GR | ON |
| | Other than the above | OFF |
| | Selector lever in "N" and "P" positions | N/P |
| | Selector lever in "R" position | R |
| | Selector lever in "D" and "DS" positions | D |
| | Selector lever in "M" position: 7GR | D |
| CLOT LVD DOOL | Selector lever in "M" position: 6GR | 6 |
| SLCT LVR POSI | Selector lever in "M" position: 5GR | 5 |
| | Selector lever in "M" position: 4GR | 4 |
| | Selector lever in "M" position: 3GR | 3 |
| | Selector lever in "M" position: 2GR | 2 |
| | Selector lever in "M" position: 1GR | 1 |
| GEAR | During driving | 1st, 2nd, 3rd, 4th, 5th, 6th, 7th |
| NEXT GR POSI | During driving | 1st, 2nd, 3rd, 4th, 5th, 6th, 7th |
| CLUET MODE | Driving with the D position | 0 or 3 |
| SHIFT MODE | Driving with the manual mode | 4 or 8 |
| D/C DADTC | At 1 - 2 gear shift control | FAIL |
| D/C PARTS | Other than the above | NOTFAIL |
| FR/B PARTS | At control fixed to 1GR | FAIL |
| FIND PARIS | Other than the above | NOTFAIL |
| 22.46/D DADTS | At control fixed to 1GR | FAIL |
| 2346/B PARTS | Other than the above | NOTFAIL |
| 2246D/DC DADTS | At 2 - 3 - 4 gear shift control | FAIL |
| 2346B/DC PARTS | Other than the above | NOTFAIL |

^{*:} Not mounted but always display as OFF.

TERMINAL LAYOUT



| | minal color) | Description | n | | Condition | Value (Approx.) | Α |
|-----------|-----------------|---|------------------|--------------------|--|-----------------|-----|
| + | _ | Signal name | Input/ Output | | Condition | value (Approx.) | В |
| 1 | Ground | Ignition power sup- | Input | lgr | nition switch ON | Battery voltage | _ |
| (Y) | Oround | ply | input | lgn | ition switch OFF | 0 V | _ |
| 2 (R) | Ground | Battery power sup- ply (Memory back-up) | Input | | Always | Battery voltage | С |
| 3 (L) | _ | CAN-H | Input/ Output | | _ | _ | TM |
| 4 (V) | _ | K-line | Input/ Output | | _ | _ | E |
| 5 (B) | Ground | Ground | Output | | Always | 0 V | _ |
| 6 | Ground | Ignition power sup- | lpput | lgr | nition switch ON | Battery voltage | F |
| (Y) | Ground | ply | Input | lgn | ition switch OFF | 0 V | _ |
| 7 | Ground | Book up lamp rolay | Innut | lanition quitab ON | Selector lever in "R" position. | 0 V | _ |
| (R) | Ground | Back-up lamp relay | Input | Ignition switch ON | Selector lever in other positions. | Battery voltage | G |
| 8 (P) | _ | CAN-L | Input/ Output | | _ | _ | - |
| 9 (LG) | Ground | Starter relay | Output | Ignition switch ON | Selector lever in "N" and "P" positions. | Battery voltage | - H |
| (LO) | | | | | Selector lever in other positions. | 0 V | ı |
| 10 (B) | Ground | Ground | Output | | Always | 0 V | - |

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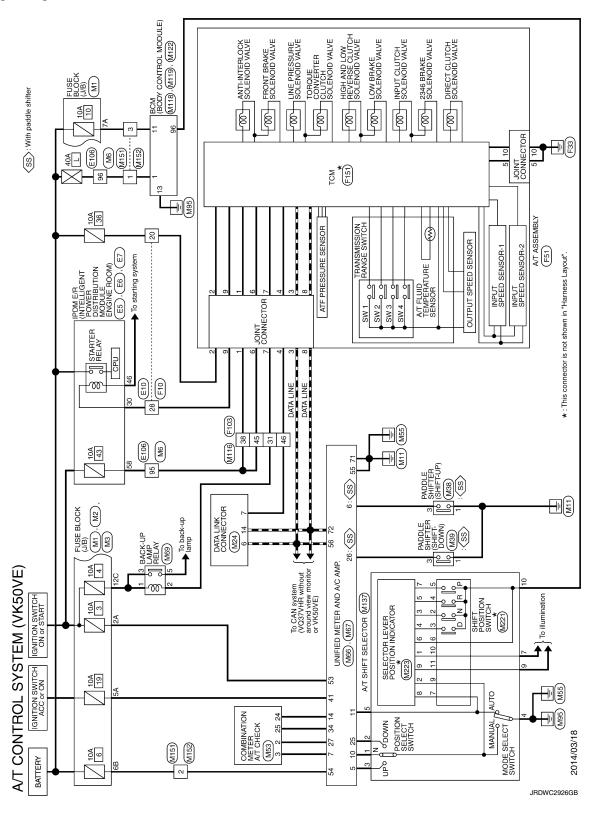
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Wiring Diagram - A/T CONTROL SYSTEM -

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|--|----------------|-------------------|--|-------------|-------------------|---|-----|--------|------------------------|---|
| Name power remitteen review destination inductie | | l | | | İ | 2 | 1 | | - [vviii] voc digilie] | T |
| Type TH20FW-CS12-M4-1V | 45 | ŋ | | Connec | Connector Name | WIRE TO WIRE | 22 | ŋ | - [With VQ engine] | 1 |
| Type TH20FW-CS12-M4-1V | 46 | BR | | | | | 22 | W | - [With VK engine] | |
| | | | | Connec | Connector Type S | SAA36MB-RS8-SHZ8 | 23 | ď | - [With VQ engine] | |
| | | | | | | | 23 | ^ | - [With VK engine] | |
| | Connector No. | or No. | | Œ | _ | 9 10 11 12 | 54 | Ø | - [With VQ engine] | Γ |
| | | Т | A CLD ANTELL SCENT BOUND OF DOMINOR MODILE | 1 | _ | 2 2 2 2 2 2 | 24 | > | - [With VK engine] | Γ |
| 10 1213 [25282728 30 | Connector Name | | ENGINE ROOM) | \ \ \ | c _i | 3 | 25 | | [] | Τ |
| 4 5 7 | Connector Type | Т | TH20FW-CS12-M4 | | ı | 4 17118 1820[21[22]23[2425 | 28 | 2 5 | | Τ |
| | | 1 | | | | 5 6 60000000000000000000000000000000000 | 27 | ď | - [With VK engine] | Ι |
| | Œ | | | | | 7 8 2528373837414243 | 27 | 9 8 | - IWith VO engine | Γ |
| | 手 | L | | | | | , % | 8 | - [With VK engine] | Ι |
| Terminal Color Of | Si | <u> </u> | 35455565758 6870 74757877 | Terming | Terminal Color Of | | 8 | > | - IWith VO engine | Τ |
| Wire Signal Name [Specification] | | <u>-</u> | 4849 5152 | 2 | Wire | Signal Name [Specification] | 29 | . a. | | Γ |
| ^ | | | | - | g | - [With VQ engine] | 98 | _ | - [With VQ engine] | Γ |
| | | | | - | SHELD | - [With VK engine] | 30 | Α | - [With VK engine] | |
| | | | | 2 | _ | - [With VK engine] | 34 | g | - [With VK engine] | |
| SB - | Terminal | Terminal Color Of | 9 | 2 | SHELD | - [With VQ engine] | 31 | W | - [With VQ engine] | |
| | Š | Wire | Signal Name [Specification] | e | BR | - [With VQ engine] | 32 | 7 | - [With VK engine] | |
| · . | 48 | _ | | 9 | U | - [With VK engine] | 32 | > | - [With VQ engine] | Г |
| - · 91 | 49 | SB | - [With VQ engine] | 4 | BR | - [With VK engine] | 33 | BG | - [With VK engine] | |
| - M | 49 | > | - [With VK engine] | 4 | SHELD | - [With VQ engine] | 33 | × | - [With VQ engine] | Γ |
| 9 | 51 | 9 | | 2 | BR | - [With VQ engine] | 34 | BG | | |
| | 52 | > | | 2 | O | - [With VK engine] | 32 | α | | Γ |
| , | 53 | × | | 9 | 8 | - [With VK engine] | 36 | SHELD | | |
| BG . | 54 | α | | 9 | α | - [With VQ engine] | 37 | SHIELD | - [With VQ engine] | |
| GR - | 22 | H | | 7 | U | - [With VQ engine] | 37 | >- | - [With VK engine] | Г |
| | 26 | BG | - [With VK engine] | 7 | Μ | - [With VK engine] | 38 | ٦ | - [With VQ engine] | |
| | 26 | ^ | - [With VQ engine] | 8 | SHIELD | - [With VK engine] | 38 | SHIELD | - [With VK engine] | |
| | 22 | 16 | | 8 | W | - [With VQ engine] | 39 | Ь | - [With VQ engine] | |
| Connector No. E6 | 58 | Υ | • | 6 | W | • | 39 | W | - [With VK engine] | П |
| IPDM EIR (INTELLIGENT POWER DISTRIBUTION MODULE | 69 | W | | 10 | 9 | - [With VQ engine] | 40 | ď | - [With VQ engine] | |
| ENGINE ROOM) | 70 | BG | | 10 | W | - [With VK engine] | 40 | SHIELD | - [With VK engine] | |
| Connector Type TH08FW-NH | 74 | 9 | | 1 | ч | - [With VQ engine] | 41 | W | - [With VQ engine] | |
| | 75 | \ | | 1 | Μ | - [With VK engine] | 41 | Υ | - [With VK engine] | 1 |
| E | 9/ | Ъ | - [With VK engine] | 12 | BR | - [With VQ engine] | 42 | PC | - [With VQ engine] | 1 |
| <u>_</u> | 9/ | > | - [With VQ engine] | 12 | ^ | - [With VK engine] | 42 | SHIELD | - [With VK engine] | |
| 00 07 77 07 | 77 | В | - [With VK engine] | 13 | 7 | - [With VQ engine] | 43 | 9 | - [With VQ engine] | |
| ⊋I | 2.2 | 7 | - [With VQ engine] | 13 | ď | - [With VK engine] | 43 | W | - [With VK engine] | |
| 46 45 44 43 | 80 | Α | | 14 | 97 | | 44 | Ø | | Γ |
| 2 | | | | 15 | BG | - [With VK engine] | 45 | _ | | |
| | | | | 15 | Ж | - [With VQ engine] | 46 | ŋ | - [With VK engine] | |
| Terminal Color Of | | | | 16 | > | - [With VQ engine] | 46 | SHIELD | - [With VQ engine] | Γ |
| | | | | 16 | Μ | - [With VK engine] | 47 | В | - [With VK engine] | |
| | | | | 17 | ۵ | | 47 | × | - [With VQ engine] | Γ |
| - 1 | | | | 18 | Α | | 48 | BR | - [With VQ engine] | |
| - 8 | | | | 19 | * | | 48 | œ | - [With VK engine] | Γ |
| - | | | | 20 | BR | | 49 | 9 | - [With VQ engine] | |
| as. | | | | 2 | g; | - [With VK engine] | 49 | - | - [With VK engine] | Г |

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| - IWith VK engine | DARRY VO conjust | - [with VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | | | | | - [With W engine] | DAZA VA engine | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VQ engine] | - [With VK engine] | | - | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [with vk engine] | - [With VQ engine] | | | - IWith VQ enginel | - [With VK engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] |
|--|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------|---------------|----------------|---------------|-------------------|----------------|--------------------|-------------------------------|----------------------------------|--------------------|--------------------|-------------|--------------------------|--------------------------------|--------------------|--------------------|--------------------|-----------------------------|----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| - | , , | 2 , | 0 | œ | ď | Y | GR | g | 0 1 | Υ > | > > | - a | a (5) | 97 | \ | Pl | Y | ^ | 0 | GR | SB | BR | PC | 7 | Д | GR | œ | BR | <u>a</u> | ဖ | ≱ . | - | 9 0 | | L IHE | SHELD | >- | SHIELD | * | × | > | 9 | SHIELD | В | \ | GR | SHIELD |
| 14 | 7 | ‡ ; | 12 | 15 | 16 | 16 | 17 | 18 | 19 | 20 20 | 7 6 | 2 6 | 22 22 | 23 | 23 | 54 | 24 | 22 | 56 | 27 | 27 | 28 | 28 | 29 | 59 | 30 | 30 | 34 | 34 | 32 | 35 | 33 | 88 8 | ŧ, | 38 | 37 | 37 | 38 | 38 | 38 | 39 | 40 | 40 | 41 | 41 | 42 | 45 |
| | | | • | | | | | | | | | 100 | 2 | Connector Name WIRE IO WIRE | SAA36FB-RS8-SHZ8 | | 12 11 10 9 2 1 | 16 15 14 13 | 04504042010430144444 | 34333331303323738 | | | | Signal Name [Specification] | dalian ranco Cobconicación | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [with VK engine] | - [With VQ engine] | - [with We english | - [With VC engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VK engine] | - [With VQ engine] | | | - [With VQ engine] | - [With VK engine] | - [With VQ engine] | - [With VK engine] | - [With VQ engine] |
| <u>e</u> | 3 8 | ¥ 8 | SR. | æ | SB | \ | W | ^ | SHIELD | <u></u> | | ı | | v Name | | | | | | | | | | Ferminal Color Of | Wire | ŋ | SHIELD | SHIELD | > | # # | υ <u>ξ</u> | ž | SHELD | 0 6 | é œ | > | O | œ | SHELD | × | Α | 9 | ď | > | Ь | ^ | ŀ |
| 80 | 8 8 | 98 | 6 | 95 | 93 | 96 | 96 | 26 | 86 | 001 | | Compactor No | COLLING | Connect | Connector Type | ¢ | E | ŧ | ~ | | | | | Terminal | ġ Ž | - | - | 2 | 2 | က | е , | 4 | 4 4 | n u | 0 4 | 9 | 7 | 7 | 80 | 80 | 6 | 10 | 1 | 11 | 12 | 12 | 13 |
| | | | | | | - | | | | | | | | | | | | | | | - | | - | | | - | | | | | | | - | | | | | | | | | | | | | | |
| SHIFLD | T | + | + | 30 BG | 32 W | 33 Y | 34 BG | \dashv | 7 | 33 | + | ╀ | + | Ľ | Н | 7 L | 48 P | 49 SB | 50 BR | 1 B | | \dashv | | 55 SB | + | 60 SB | \dashv | + | 63 E9 | + | 65 BG | T | ή | 5 6 | - | F | - | W | 78 Y | 80 SB | 1 | 2 W | H | 4 GR | 85 G | 86 P | ŀ |
| 28 | 2 8 | 7 | 7 | ຕ | 3 | 3 | 3 | 37 | e . | 38 | ‡ ç | 7 5 | 3 4 | 45 | 4 | 47 | 4 | 4 | 5 | 51 | 52 | 2 | 54 | 2 | 2 | 9 | 61 | 62 | 9 | 8 | 9 | ° | 3 9 | | 73 | 74 | _ | 77 | 7 | 8 | 81 | 82 | 83 | 8 | 8 | 8 | 87 |
| 50 B - : : : : : : : : : : : : : : : : : : | DANIER VIC COSING | - [With VK engine] | - [With VK engine] | - [With VQ engine] | - | | | E106 | WIRE TO WIRE | TURNE OF STAN | 1001W-C310-1W4 | · | | | 9 8 9 9 8 9 9 8 9 9 8 9 | 88 | | | Circul Nama [Conditional | orginal realite [openineation] | , | | , | | | - | | | | | | , | | | | , | | | - [With ICC] | - [Without ICC] | | - [With ICC] | - [Without ICC] | | - [With ICC] | - [Without ICC] | - [Without ICC] |
| 5 " | ٥ | 9 1 | | SB | ď | | | Connector No. | Connector Name | Tours Time | | • | | N. N. | | | | | Terminal Color Of | Wire | ŋ | BG | SB | ΓG | >- | Μ | O | > | œ | æ | a (| 9 | ¥ 3 | A 10 | SB | - | ۵ | 9 | × | > | BR | Я | ^ | 9 | ٦ | Ь | ŀ |
| ៸⊢ | | | | | | | | 75 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | _ | | | | | | | |

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| | lal | No. Wire | 3 BG | | Connector No. M39 | ١, | | Connector Type A03FW | K | | H.S. | | Ī | 20 | | la O | No. Wire cignal value [openingation] | - B | 3 6 | | ١ | Connector No. M53 | Connector Name COMBINATION METER | | Connector Type TH40FW-NH | đ | 10000000000000000000000000000000000000 | | 123 567 10 156 | 21 24 25 25 27 28 29 30 31 34 35 37 38 39 40 | | | Terminal Color Of | No. Wire Signal Name [Specification] | 1 BG BATTERY POWER SUPPLY | Н | 3 GR COMMUNICATION SIGNAL (AMP.:>METER) | 5 B GROUND | 6 W ALTERNATOR SIGNAL | 7 P AIR BAG SIGNAL | 10 G SECURITY INDICATOR SIGNAL | 15 B GROUND | B METER C | œ | BR | 25 Y COMMUNICATION SIGNAL (AMP>LCD) |
|-----------------------------|---------------|----------------|-----------------|-------|--|-------------------|--|----------------------|-------------------------|-------------------|-----------------------------|------|-------------|------------------------------|---------------------------|---------|--------------------------------------|----------|----------|-----|-----|-------------------|----------------------------------|----------|--------------------------|----------|--|------|----------------|--|------------------|---------------|--|--------------------------------------|---------------------------|--------------|---|--------------|-----------------------|--------------------|--------------------------------|-------------|-----------|----|----|-------------------------------------|
| | Н | . M 96 | 동 | 100 Y | | Connector No. M24 | Connector Name DATA LINK CONNECTOR | Т | Connector Type BD16FW | | 44 40 40 44 | 1.05 | 3 / 5 8 7 8 | 7 | | | D D | 4 | 3 LG - | 4 B | 5 B | | 7 GR | | 4 | 12 P | \dashv | + | 16 BG - | | Connector No M38 | $\overline{}$ | Connector Name PADDLE SHIFTER (SHIFT-UP) | Connector Type A04FW | (| | K | | 6. | | | | | | | |
| | | | | . 9 | | | . 91 | GR - | | | BG . | - 91 | SB · | γ . | BG . | BR - | SB | SB . | SB - | | ٠. | | ٠ . | BG . | ^ | SHIELD - | BG . | GR - | | 35 | >>> | | BG . | | | γ . | | | BR - | ٠. | ۰ . | 9 | | | | GR . |
| | 33 | 34 34 | 38 | 39 | 42 | 43 | H | + | 46 | j a | + | H | 51 | 52 | \dashv | - | | \dashv | \dashv | 61 | 62 | 63 | \dashv | \vdash | ヿ | П | \dashv | + | + | 4/ | 2.4 | . 82 | H | H | 82 | 83 | 84 | 85 | 98 | 87 | 88 | 88 | 06 | 91 | Н | 93 |
| A/T CONTROL SYSTEM (VK50VE) | M6 | WIRE TO WIRE | TH80MW-CS16-TM4 | | 20 14 15 15 15 15 15 15 15 15 15 15 15 15 15 | | \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | | | | Signal Name [Specification] | | | - [Without Auto aircon seat] | - [With Auto aircon seat] | | | | | | | | | | | | | | | | - IWithout ICCI | - [With ICC] | - [With ICC] | - [Without ICC] | - [Without ICC] | - [With ICC] | | - [With ICC] | - [Without ICC] | - [Without ICC] | - [With ICC] | | - | | | |
| CONT | П | Connector Name | Connector Type | | | á | | | | Terminal Color Of | Wire | ŋ | BG | FIG | SB | FG | GR | * | ŋ | ≯ | ۵ | æ | В | ტ | œ | * | SHELD | B. | - | ٥ (| 9 8 | 3 | H | ď | 7 | ч | ŋ | 7 | Ь | Μ | > | SHIELD | GR | > | BG | 3 |
| Ā | Connector No. | Connect | Connect | þ | 事 | HS. | | | | Termino | S S | - | 2 | 3 | 3 | 4 | 2 | 9 | 7 | ∞ | 6 | 10 | = | 12 | 13 | 14 | 15 | 16 | 1 | \$ 6 | 2 2 | 200 | 21 | 21 | 22 | 22 | 23 | 24 | 24 | 25 | 22 | 26 | 28 | 59 | 30 | 32 |

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| | + | 36 W S | Н | 7 | 43 P | 45 G | H | | Connected No. M440 | Т | Connector Name BCM (BODY CONTROL MODULE) | Connector Type M03FB-LC | d. | THE PARTY NAMED IN COLUMN TO SERVICE AND S | 1.3 | | 7 | | Terminal Color Of | No. Wire Signal Name [Specification] | > | 2 Y POWER WINDOW POWER SUPPLY (BAT) 3 BG POWER WINDOW POWER SUPPLY (RAP) | | ſ | | Connector Name BCM (BODY CONTROL MODULE) | Connector Type NS16FW-CS | ú | | H.S. 4 5 7 8 9 10 | 11 13 15 17 18 19 | 21 | | Tarminal Color Of | | $^{+}$ | τ > | > > | A ALL DOOR FIEL LID OCK OFFEIT | > (| 40 DE DESENDOR, FUEL LID UNLOCK DU PUI | ¥ | | | |
|-----------------------------|-------------------------------------|---|---|----|---|----------------|----------------------|-------------------------|---|-------------------------|--|-------------------------|---|--|----------------------------|-------|--------------------|-----------------------------|----------------------------|--------------------------------------|----------|--|------------|---------------|---------------------------------------|--|--------------------------|-----------------------------------|--|---------------------------|--------------------|---------------------------------|-----------------------|-------------------------------------|---|--------|-----|-----|---|-----|--|------|--|--|--|
| | | Connector Name BACK-UP LAMP RELAY | Connector Type MS02FL-M2-LC | 1 | Unhy) | T. | | | | Terminal Color Of | Nic. | œ | + | 5 BG | | I | Connector No. M116 | Connector Name WIRE TO WIRE | Connector Type TK36MW-NS10 | ú | [| H.S. | 6 7 8 9 10 | | | Tarminal Color Of | Nire Vire | 2 W - | 3 L | 0 00 | : 00 | 5 R - [With VK engine] | ω. | 9 L - [With VK engine] | < a | + | | + | 3 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | Ŧ | + | 31 W | | | |
| | Connector No. M67 | Connector Name UNIFIED METER AND A/C AMP. | Connector Type TH32FW-NH | 4 | THE PARTY NAMED IN COLUMN TO SERVICE AND THE PARTY NAMED IN COLUMN TO SERVICE | | 41 42 43 44 49 46 47 | 26 29 60 61 62 63 69 69 | | Terminal Color Of | | > | ≻ " | 45 LG IN-VEHICLE SENSOR SIGNAL | 45 P AMBIENT SENSOR SIGNAL | BG St | > (| 54 RG RATTERY POWER SUPPLY | | ٦ | W | 58 B FUEL LEVEL SENSOR GROUND 59 GR INTAKE SENSOR GROUND | - | BR | 62 SB SUNLOAD SENSOR GROUND | χ 🖁 | N A | 70 R EACH DOOR MOTOR POWER SUPPLY | 71 B GROUND | <u>.</u> | | | | | | | | | | | | | | | |
| A/T CONTROL SYSTEM (VK50VE) | 26 R VEHICLE SPEED SIGNAL (8-PULSE) | BRAKE FLUID LEVE | SB SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE) | O. | 31 L WASHER LEVEL SWITCH SIGNAL | LG SELECT SWIT | SB ENTER SWITC | L TRIP A/B RESET S' | 39 P ILLUMINATION CONTROL SWITCH SIGNAL (-) | BG ILLUMINATION CONTROL | | Connector No. M66 | Connector Name UNIFIED METER AND A/C AMP. | Connector Type TH40FW-NH | 1 | 修 | | 5 6 7 | 23 25/26/27/28 30 34 34 38 | | | Terminal Color Of Signal Name [Specification] No. Wire | | PADDLE SHIFTE | 7 GR COMMUNICATION SIGNAL (AMP>METER) | | W MANUAL MOI | 11 G NON-MANUAL MODE SIGNAL | 14 BR COMMUNICATION SIGNAL (LCD->AMP.) | Y AT SNOW SWI | V MANUAL MODE SHIF | 26 G PADDLE SHIFTER DOWN SIGNAL | LG COMMUNICATION SIGN | 28 R VEHICLE SPEED SIGNAL (8-PULSE) | IS NOTE A CHARLES IN THE PARTY OF THE PARTY | - | 1 | | | | | | | | |

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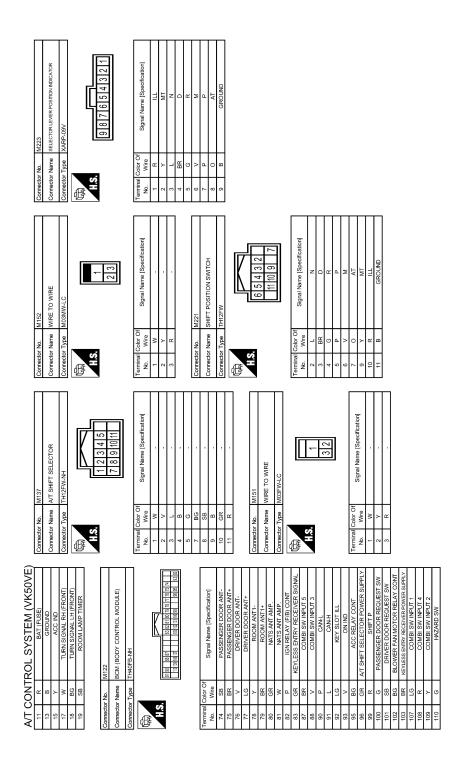
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Fail-Safe

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TCM has the electrical fail-safe mode. The mode is divided into a maximum of 3 phases (1st Fail-Safe, 2nd Fail-Safe and Final Fail-Safe) and functions so that the operation can be continued even if the signal circuit of the main electronically controlled input/output parts is damaged.

Even if the electronic circuit is normal, the fail-safe mode may start under special conditions (such as when the brake pedal is depressed suddenly from a hard wheel spin status to stop the rotation of wheels). In this case, turn the ignition switch OFF and back to ON after 5 seconds to resume the normal shift pattern.

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Consequently, the customer's vehicle may already return to the normal condition. Refer to TM-305, "Work Flow".

| 1st fail-safe | The mode that the vehicle can stop safely, to prompt the driver to stop if the malfunction occurs and to shift to 2nd Fail-Safe early. It shifts to 2nd Fail-Safe or Final Fail-Safe after the vehicle stopped. |
|-----------------|---|
| 2nd fail-safe | The mode that the vehicle shifts to Final Fail-Safe without changing the behavior, by identifying the malfunctioning parts in the condition that the driving force required for the driving is secured. |
| Final fail-safe | Selects the shifting pattern that the malfunctioning parts identified at 1st and 2nd Fail-Safe are not used, and then secure the driving force that is required for the driving. The mode that the shifting performance does not decrease by normal shift control. |

FAIL-SAFE FUNCTION

| DTC | Vehicle condition | Vehicle behavior for 1st fail- safe | Vehicle behavior for 2nd fail- safe | Vehicle behavior for final fail- safe |
|-------------|------------------------------------|--|--|--|
| P0615 | _ | Starter is disabled | _ | Starter is disabled |
| P0705 | _ | Fixed in the "D" position (The shifting can be performed) Lock-up is prohibited when 30 km/h (19 MPH) or less The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed Manual mode is prohibited Shift position indicator is switched OFF Starter relay is switched OFF (starter is disabled) Back-up lamp is OFF Large shift shock | _ | Fixed in the "D" position (The shifting can be performed) Lock-up is prohibited when 30 km/h (19 MPH) or less The shifting between the gears of 3 - 4 - 5 - 6 - 7 can be performed Manual mode is prohibited Shift position indicator is switched OFF Starter relay is switched OFF (starter is disabled) Back-up lamp is OFF Large shift shock |
| P0710 | Between the gears of 1 - 2 - 3 | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | _ | The shifting between the gears of 1 - 2 - 3 can be performed |
| | Between the gears of 4 - 5 - 6 - 7 | Fix the gear while drivingManual mode is prohibited | _ | Manual mode is prohibited |
| P0717 | Between the gears of 1 - 2 - 3 | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | _ | The shifting between the gears of 1 - 2 - 3 can be performed |
| | Between the gears of 4 - 5 - 6 - 7 | Fix the gear while drivingManual mode is prohibited | _ | Manual mode is prohibited |
| P0720 | Between the gears of 1 - 2 - 3 | Only downshift can be performed Manual mode is prohibited A vehicle speed signal from the unified meter and A/C amp. is regarded as an effective signal | _ | The shifting between the gears of 1 - 2 - 3 can be |
| | Between the gears of 4 - 5 - 6 - 7 | Fix the gear at driving Manual mode is prohibited A vehicle speed signal from the unified meter and A/C amp. is regarded as an effective signal | _ | performed • Manual mode is prohibited |

| DTC | Vehicle | condition | Vehicle behavior for 1st fail- safe | Vehicle behavior for 2nd fail- safe | Vehicle behavior for final fail- safe |
|---|-------------------------------------|--|--|---|---|
| | Small gear ra | atio difference | Engine torque limit: Max 150Nm | _ | Engine torque limit: Max 150Nm |
| P0729 P0731 | | Neutral mal- function be- tween the gears of 1 - 2 - 3 and 7 | Locks in 2GR, 3GR or 4GR Manual mode is prohibited | _ | Locks in 1GR The shifting between the gears of 1 - 2 can be performed The shifting between the gears of 1 - 2 - 3 can be performed The shifting between the gears of 4 - 5 - 6 can be performed Manual mode is prohibited |
| P0732 P0733 P0734 P0735 P1734 | Great gear ratio differ- ence | Other than the above | Locks in 1GR, 2GR, 3GR, 4GR, 5GR or 6GR Fix the gear while driving Manual mode is prohibited | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | Locks in 1GR The shifting between the gears of 1 - 2 can be performed The shifting between the gears of 1 - 2 - 3 can be performed The shifting between the gears of 2 - 3 - 4 can be performed The shifting between the gears of 3 - 4 can be performed The shifting between the gears of 4 - 5 - 6 can be performed Manual mode is prohibited |
| P0730 | | _ | Locks in 5GR, 6GR or 7GR Manual mode is prohibited | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | Locks in 1GR The shifting between the gears of 1 - 2 can be performed The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited |
| P0740 | | _ | Lock-up is prohibitedSlip lock-up is prohibited | _ | Lock-up is prohibited Slip lock-up is prohibited |
| P0744 | | _ | Lock-up is prohibitedSlip lock-up is prohibited | _ | Lock-up is prohibitedSlip lock-up is prohibited |
| P0750 P0775 P0795 P2713 P2722 P2731 P2807 | | _ | Locks in 2GR, 3GR, 4GR, 5GR, 6GR or 7GR Manual mode is prohibited | _ | Locks in 1GR The shifting between the gears of 1 - 2 - 3 can be performed The shifting between the gears of 3 - 4 - 5 can be performed The shifting between the gears of 4 - 5 - 6 can be performed The shifting between the gears of 1 - 2 - 3 - 4 - 5 - 6 can be performed Manual mode is prohibited |
| P0780 | | _ | Locks in 3GR Manual mode is prohibited | _ | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited |

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| DTC | Vehicle condition | Vehicle behavior for 1st fail- safe | Vehicle behavior for 2nd fail- safe | Vehicle behavior for final fail- safe |
|-----------------------|------------------------------------|--|--|---|
| P1705 | _ | Downshift when accelerator pedal is depressed is prohibited Upshift when accelerator pedal is released is prohibited Manual mode is prohibited | Downshift when accelerator pedal is depressed is prohibited Upshift when accelerator pedal is released is prohibited Manual mode is prohibited | Downshift when accelerator pedal is depressed is prohibited Upshift when accelerator pedal is released is prohibited Manual mode is prohibited |
| P1730 | _ | Locks in 1GR, 2GR, 3GR, 4GR, 5GR, 6GR or 7GR Manual mode is prohibited | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | Locks in 1GR The shifting between the gears of 2 - 3 - 4 can be performed The shifting between the gears of 3 - 4 can be performed The shifting between the gears of 4 - 5 - 6 can be performed Manual mode is prohibited |
| | Gate switch malfunction | Only the gate switch is pro- hibited | _ | Only the gate switch is pro- hibited |
| P1815 | Paddle switch malfunction | Only the paddle switch is prohibited | _ | Only the paddle switch is prohibited |
| | Malfunction of both switches | Manual mode is prohibited | _ | Manual mode is prohibited |
| U0100 U0300 | Between the gears of 1 - 2 - 3 | The shifting between the gears of 1 - 2 - 3 can be performed Manual mode is prohibited | _ | The shifting between the gears of 1 - 2 - 3 can be performed Line pressure is set to the |
| U1000 | Between the gears of 4 - 5 - 6 - 7 | Fix the gear at driving Manual mode is prohibited | _ | maximum hydraulic pres- sure • Manual mode is prohibited |
| P0720 and P1721 | _ | Locks in 5GR | _ | Locks in 5GR |

Protection Control

INFOID:0000000010579236

The TCM becomes the protection control status temporarily to protect the safety when the safety of TCM and transmission is lost. It automatically returns to the normal status if the safety is secured. The TCM has the following protection control.

REVERSE INHIBIT CONTROL

Intercepts the torque transmission and shift to the neutral status if the selector lever is shifted to "R" position while the vehicle moves forward at the vehicle speed 10 km/h (7 MPH) or more.

| Malfunction detection condition | Vehicle speed: 10 km/h (7 MPH) or more |
|---------------------------------|--|
| Control at malfunction | Neutral |
| Normal return condition | Vehicle speed: 8 km/h (5 MPH) or less |
| Normal return condition | Engine speed: 2,200 rpm or less |
| Vehicle behavior | The torque transmission cannot be performed There is a shock just before a vehicle stop |

1ST ENGINE BRAKE PROTECTION CONTROL

Controls the engine brake so as not to make effective by turning the front brake solenoid output to OFF when each solenoid becomes the electricity pattern of 1st engine brake during driving at the vehicle speed 25 km/h or more in any positions other than "R" position or 1GR.

| Malfunction detection condition | Select lever and gear: Except for "R" position and 1GR and Vehicle speed: More than 25 km/h (16 MPH) |
|---------------------------------|--|
| Control at malfunction | Front brake solenoid output signal; OFF |
| Normal return condition | Other than malfunction detection condition |
| Vehicle behavior | Does not exist |

TCM HIGH TEMPERATURE PROTECTION CONTROL

Limit the accelerator opening and forcibly control the vehicle to the low torque driving when the electronic substrate in TCM reaches the high temperature.

| Malfunction detection condition | TCM electronic substrate temperature • 145°C (293°F) and 120 seconds or • 150°C (302°F) |
|---------------------------------|---|
| Control at malfunction | Accelerator opening: 0.5/8 or less |
| Normal return condition | TCM electronic substrate temperature: Less than 140°C (284°F) and Vehicle speed: 5 km/h (3 MPH) or less |
| Vehicle behavior | Accelerator opening: output torque of approximately 0.5/8 |

DTC Inspection Priority Chart

INFOID:0000000010579237

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

| Priority | Detected items (DTC) | Reference |
|----------|----------------------------|---------------------|
| 1 | U0100 LOST COMM (ECM A) | TM-365, "DTC Logic" |
| ı | U1000 CAN COMM CIRCUIT | TM-367, "DTC Logic" |
| | P0615 STARTER RELAY | TM-368, "DTC Logic" |
| | P0705 T/M RANGE SWITCH A | TM-370, "DTC Logic" |
| | P0710 FLUID TEMP SENSOR A | TM-371, "DTC Logic" |
| | P0717 INPUT SPEED SENSOR A | TM-374, "DTC Logic" |
| | P0720 OUTPUT SPEED SENSOR | TM-376, "DTC Logic" |
| | P0740 TORQUE CONVERTER | TM-394, "DTC Logic" |
| 2 | P0745 PC SOLENOID A | TM-398, "DTC Logic" |
| 2 | P0750 SHIFT SOLENOID A | TM-399, "DTC Logic" |
| | P0775 PC SOLENOID B | TM-400, "DTC Logic" |
| | P0795 PC SOLENOID C | TM-403, "DTC Logic" |
| | P2713 PC SOLENOID D | TM-418, "DTC Logic" |
| | P2722 PC SOLENOID E | TM-419, "DTC Logic" |
| | P2731 PC SOLENOID F | TM-420, "DTC Logic" |
| | P2807 PC SOLENOID G | TM-421, "DTC Logic" |

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| Priority | Detected items (DTC) | Reference |
|----------|----------------------------|---------------------|
| | P0729 6GR INCORRECT RATIO | TM-380, "DTC Logic" |
| | P0730 INCORRECT GR RATIO | TM-382, "DTC Logic" |
| | P0731 1GR INCORRECT RATIO | TM-384, "DTC Logic" |
| | P0732 2GR INCORRECT RATIO | TM-386, "DTC Logic" |
| | P0733 3GR INCORRECT RATIO | TM-388, "DTC Logic" |
| 3 | P0734 4GR INCORRECT RATIO | TM-390, "DTC Logic" |
| | P0735 5GR INCORRECT RATIO | TM-392, "DTC Logic" |
| | P0744 TORQUE CONVERTER | TM-396, "DTC Logic" |
| | P0780 SHIFT | TM-401, "DTC Logic" |
| | P1730 INTERLOCK | TM-408, "DTC Logic" |
| | P1734 7GR INCORRECT RATIO | TM-410, "DTC Logic" |
| | U0300 CAN COMM DATA | TM-366, "DTC Logic" |
| | P0725 ENGINE SPEED | TM-378, "DTC Logic" |
| 4 | P1705 TP SENSOR | TM-404, "DTC Logic" |
| | P1721 VEHICLE SPEED SIGNAL | TM-406, "DTC Logic" |
| | P1815 M-MODE SWITCH | TM-412, "DTC Logic" |

DTC Index

NOTE:

If some DTCs are displayed at the same time, perform inspections one by one based on the priority as per the following list. Refer to <a href="https://dx.ncbi.nlm.nc

| Itama | D. | TC ^{*2} | |
|---------------------------------|--|----------------------------------|---------------|
| Items (CONSULT screen terms) | MIL*1, "ENGINE" with CONSULT or GST | CONSULT only "TRANS- MISSION" | Reference |
| STARTER RELAY | _ | P0615 | <u>TM-368</u> |
| T/M RANGE SWITCH A | P0705 | P0705 | <u>TM-370</u> |
| FLUID TEMP SENSOR A | P0710 | P0710 | <u>TM-371</u> |
| INPUT SPEED SENSOR A | P0717 | P0717 | <u>TM-374</u> |
| OUTPUT SPEED SENSOR | P0720 | P0720 | <u>TM-376</u> |
| ENGINE SPEED | _ | P0725 | <u>TM-378</u> |
| 6GR INCORRECT RATIO | P0729 | P0729 | <u>TM-380</u> |
| INCORRECT GR RATIO | P0730 | P0730 | <u>TM-382</u> |
| 1GR INCORRECT RATIO | P0731 | P0731 | <u>TM-384</u> |
| 2GR INCORRECT RATIO | P0732 | P0732 | <u>TM-386</u> |
| 3GR INCORRECT RATIO | P0733 | P0733 | <u>TM-388</u> |
| 4GR INCORRECT RATIO | P0734 | P0734 | <u>TM-390</u> |
| 5GR INCORRECT RATIO | P0735 | P0735 | <u>TM-392</u> |
| TORQUE CONVERTER | P0740 | P0740 | <u>TM-394</u> |
| TORQUE CONVERTER | P0744 | P0744 | <u>TM-396</u> |
| PC SOLENOID A | P0745 | P0745 | <u>TM-398</u> |
| SHIFT SOLENOID A | P0750 | P0750 | <u>TM-399</u> |
| PC SOLENOID B | P0775 | P0775 | <u>TM-400</u> |
| SHIFT | P0780 | P0780 | <u>TM-401</u> |
| PC SOLENOID C | P0795 | P0795 | TM-403 |

| Items | DI | TC*2 | |
|------------------------|--|----------------------------------|---------------|
| (CONSULT screen terms) | MIL*1, "ENGINE" with CONSULT or GST | CONSULT only "TRANS- MISSION" | Reference |
| TP SENSOR | _ | P1705 | <u>TM-404</u> |
| VEHICLE SPEED SIGNAL | _ | P1721 | <u>TM-406</u> |
| INTERLOCK | P1730 | P1730 | <u>TM-408</u> |
| 7GR INCORRECT RATIO | P1734 | P1734 | <u>TM-410</u> |
| M-MODE SWITCH | _ | P1815 | <u>TM-412</u> |
| PC SOLENOID D | P2713 | P2713 | <u>TM-418</u> |
| PC SOLENOID E | P2722 | P2722 | <u>TM-419</u> |
| PC SOLENOID F | P2731 | P2731 | <u>TM-420</u> |
| PC SOLENOID G | P2807 | P2807 | <u>TM-421</u> |
| LOST COMM (ECM A) | U0100 | U0100 | <u>TM-367</u> |
| CAN COMM DATA | _ | U0300 | <u>TM-366</u> |
| CAN COMM CIRCUIT | _ | U1000 | <u>TM-367</u> |

^{*1:} Refer to TM-358, "Diagnosis Description".

^{*2:} These numbers are prescribed by SAE J2012.

SYSTEM SYMPTOM

[7AT: RE7R01B (VK50VE)]

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< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Table INFOID:0000000010579239

- The diagnostics item numbers show the sequence for inspection. Inspect in order from item 1.
- Perform diagnoses of symptom table 1 before symptom table 2.

SYMPTOM TABLE 1

| | | | | | | | | | | | | | [| Diag | gnos | stic | iten | n | | | | | | | | | TM |
|--------------------------|-----------------|----------------|--------------|--|-----------------|---------------------|----------------------|-----------------------------------|---------------------|--------------------|------------------------------|-----------------|---------------------------|--------------------|------------------|--------|---------------------------------|--------------------------|----------------------------|--|-----------------------------|------------------------------|---------------------------|-------------------------------|---------------|--------|-------------|
| | | Sym | ptom | | Oontrol linkage | Output speed sensor | Vehicle speed signal | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | | Torque converter solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | | E F G |
| | | | | | TM-479 | TM-376 | TM-406 | TM-404 | TM-378 | TM-374 | TM-371 | TM-423 | TM-370 | TM-412 | SEC-55 | TM-398 | TM-394 | TM-403 | TM-403 | TM-418 | TM-400 | TM-421 | TM-420 | TM-399 | TM-368 | TM-367 | I |
| | | | | in "D" position. | | 1 | | 2 | | | 3 | | | | | | | | | | | | | | | | |
| | | Shift po | int is low i | n "D" position. | | 1 | | 2 | | | | | | | | | | | | | | | | | | | J |
| | | | | → "D" position | 4 | | | 7 | 6 | | 6 | | 5 | | | 3 | | 2 | | | | _ | | 3 | | 1 | |
| | | | | → "R" position | 4 | | | 7 | 6 | | 6 | | 5 | | | 3 | | | | | | 2 | _ | | | 1 | K |
| | | | | 1GR ⇔ 2GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | | | | | | 3 | | | 1 | |
| | | | | 2GR ⇔ 3GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | • | | • | | 3 | | | | 1 | |
| | | | | 3GR ⇔ 4GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | 3 | | 3 | 2 | | _ | | | 1 | L |
| | Driving perfor- | | When | 4GR ⇔ 5GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | | | | 3 | _ | 3 | | | 1 | |
| | mance | Large shock | shifting | 5GR ⇔ 6GR | | 4 | | 2 | 5 | 4 | 4 | | | | | | | | • | | | 3 | | | | 1 | M |
| Poor perfor- mance | | | gears | 6GR ⇔ 7GR Downshift when accelerator pedal is depressed | | 3 | | 2 | 4 | 3 | 3 | | | | | | | | 3 | | | | 3 | | | 1 | N |
| | | | | Upshift when accelerator pedal is released | | 3 | | 2 | 4 | 3 | 3 | | | | | | | | | | | | | | | 1 | 0 |
| | | | | Lock-up | | 4 | | 2 | 4 | 4 | 4 | | | | | | 3 | | | | | | | | | 1 | |
| | | Judder | | Lock-up | | | | 2 | 1 | 1 | 4 | | | | | | 3 | | | | | | <u></u> | | | - | П |
| | | | | In "R" position | | 2 | | | 1 | | | | | | | | | | | | | | | | | | Р |
| | Strange | noise | | In "N" position | | 2 | | | 1 | | | | | | | | | | | | | | | | | | |
| | Change | | | In "D" position | | 2 | | | 1 | | | | | | | | | | | | | | | | | | |
| | | | | Engine at idle | | 2 | | | 1 | | | | | | | | | | | | | | | | | _ | |

| | | | | | | | | | | | | | Dia | gno | stic | ite | m | | | | | | | | |
|---------------|-----------------|--------------|------------------|--------|--------|----------------------|-----------------------------------|---------------------|--------------------|------------------------------|-----------------|---------------------------|--------------------|------------------|------------------------------|---------------------------------|--------------------------|----------------------------|--|-----------------------------|------------------------------|---------------------------|-------------------------------|---------------|-------------------|
| | Symptom | | | | | Vehicle speed signal | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | Line pressure solenoid valve | Torque converter solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | CAN communication |
| | | | | TM-479 | TM-376 | TM-406 | TM-404 | TM-378 | TM-374 | TM-371 | TM-423 | TM-370 | TM-412 | SEC-55 | TM-398 | TM-394 | TM-403 | TM-403 | TM-418 | TM-400 | TM-421 | TM-420 | TM-399 | TM-368 | TM-367 |
| | | | Locks in 1GR | | 1 | | | | | | | | | | | | | 1 | | 1 | | 1 | | | |
| | | | Locks in 2GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | Locks in 3GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | Locks in 4GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | Locks in 5GR | | | | | | | | 1 | | | | | | | | | | | | | | |
| | | | Locks in 6GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | Locks in 7GR | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1GR → 2GR | | 1 | | | | | | | | | | | | | 1 | | 1 | | 1 | | | |
| | | "D" position | 2GR → 3GR | | | | | | | | | | | | | | | | | | 1 | | | | |
| | | D position | 3GR → 4GR | | 2 | | | | 2 | 2 | | | | | | | 2 | 2 | 2 | 2 | | | | | 1 |
| | | | 4GR → 5GR | | | | | | | | | | | | | | | | | | 1 | 1 | | | |
| Func- tion | Gear does no | | 5GR → 6GR | | | | | | | | | | | | | | | | | | 1 | | | | |
| trouble | change | | 6GR → 7GR | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | | | 1 | | |
| | | | 5GR → 4GR | | | | | | | | | | | | | | | | | 1 | | | | | |
| | | | 4GR → 3GR | | | | | | | | | | | | | | 1 | | 1 | | | | 1 | | |
| | | | 3GR → 2GR | | | | | | | | | 1 | | | | | | | | | 1 | | | | |
| | | | 2GR → 1GR | | | | | | | | | 1 | | | | | | | | | 1 | 1 | | | |
| | | | Does not lock-up | | 2 | | | 2 | 2 | 2 | 4 | 5 | | 3 | 2 | 2 | 2 | 2 | 2 | 2 | | 2 | 2 | | 1 |
| | | | 1GR ⇔ 2GR | | 3 | | | | 3 | 3 | | 3 | | | 3 | 3 | 3 | 3 | | 3 | | 3 | 3 | | 1 |
| | | | 2GR ⇔ 3GR | | 3 | | | | 3 | 3 | | 3 | | | 3 | 3 | 3 | 3 | | 3 | | 3 | 3 | | 1 |
| | | "M" posi- | 3GR ⇔ 4GR | | 3 | | | | 3 | 3 | | 3 | 2 | | 3 | 3 | 3 | 3 | | 3 | | 3 | 3 | | 1 |
| | | tion | 4GR ⇔ 5GR | | 3 | | | | 3 | 3 | | 3 | | | 3 | 3 | 3 | 3 | | 3 | | 3 | | | 1 |
| | | | 5GR ⇔ 6GR | | 3 | | | | 3 | 3 | | 3 | | | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | | | 1 |
| | | | 6GR ⇔ 7GR | | 3 | | | | 3 | 3 | | 3 | 2 | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 1 |

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| | | Symp | tom | | Control linkage | Output speed sensor | Vehicle speed signal | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | Line pressure solenoid valve | Torque converter clutch solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | CAN communication |
| | | | | | TM-479 | TM-376 | TM-406 | TM-404 | TM-378 | TM-374 | TM-371 | TM-423 | TM-370 | TM-412 | SEC-55 | TM-398 | TM-394 | TM-403 | TM-403 | TM-418 | TM-400 | TM-421 | TM-420 | TM-399 | TM-368 | TM-367 |
| | | | | 1GR ⇔ 2GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | | | 2 | | | 1 |
| | | | When | 2GR ⇔ 3GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | | 2 | | | | 1 |
| | | Slip | shift- | 3GR ⇔ 4GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | 2 | | | | 2 | | 1 |
| | | Olip | ing gears | 4GR ⇔ 5GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | 2 | | 2 | | | 1 |
| | | | gcars | 5GR ⇔ 6GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | | 2 | 2 | | | 1 |
| Func- | | | | 6GR ⇔ 7GR | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | 2 | | | | 2 | | | 1 |
| tion trou- ble | Poor shifting | | "D" pos | sition \rightarrow "M" posi- | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | 3 | 3 | | | | | | 1 |
| 2.0 | | En- | | 7GR → 6GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | 3 | | | | 3 | | | 1 |
| | | gine | | 6GR → 5GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | | | | 3 | 3 | | | 1 |
| | | brake does | "M" posi- | 5GR → 4GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | | | 3 | | 3 | | | 1 |
| | | not | tion | 4GR → 3GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | 3 | | 3 | | | | 3 | | 1 |
| | | work | | 3GR → 2GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | | 3 | | 3 | | | | 1 |
| | | | | 2GR → 1GR | | 5 | | | 5 | 5 | 6 | | 4 | 2 | | 3 | | | 3 | | | | 3 | | | 1 |

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|----------------------------|------------------------------------|------|--|--------|--------|--------|-----------------------------------|---------------------|--------------------|------------------------------|-----------------|---------------------------|--------------------|------------------|--|--|--------------------------|----------------------------|--|-----------------------------|------------------------------|---------------------------|-------------------------------|---------------|-------------------|--|---|--|--|--|---|---|---|--|---|--|---|
| | Symptom | | | | | | Accelerator pedal position sensor | Engine speed signal | Input speed sensor | A/T fluid temperature sensor | Battery voltage | Transmission range switch | Manual mode switch | Stop lamp switch | Line pressure solenoid valve | Torque converter clutch solenoid valve | Low brake solenoid valve | Front brake solenoid valve | High and low reverse clutch solenoid valve | Input clutch solenoid valve | Direct clutch solenoid valve | 2346 brake solenoid valve | Anti-interlock solenoid valve | Starter relay | CAN communication | | | | | | | | | | | | |
| | | | TM-479 | TM-376 | TM-406 | TM-404 | TM-378 | TM-374 | TM-371 | TM-423 | TM-370 | TM-412 | SEC-55 | TM-398 | TM-394 | TM-403 | TM-403 | TM-418 | TM-400 | TM-421 | TM-420 | TM-399 | TM-368 | TM-367 | | | | | | | | | | | | | |
| | | | With selector lever in "D" position, acceleration is extremely poor. | 5 | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | | | | | 2 | | 1 | | | | | | | | | | | | |
| | | | With selector lever in "R" position, acceleration is extremely poor. | 5 | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | | | 2 | | 2 | | 1 | | | | | | | | | | | | |
| | | | While starting off by accelerating in 1GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | | | | | 2 | | 1 | | | | | | | | | | | | |
| | | | While accelerating in 2GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | | | | 2 | 2 | | 1 | | | | | | | | | | | | |
| Func- tion trou- ble | Poor power trans- mission | Slip | While accelerating in 3GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | 2 | | | | 2 | 2 | | | 1 | | | | | | | | | | | | |
| | 1111331011 | | While accelerating in 4GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | 2 | | 2 | 2 | | | 1 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | While accelerating in 5GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | 2 | 2 | 2 | | 2 | | 1 |
| | | | While accelerating in 6GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | | 2 | 2 | | 2 | 2 | | 1 | | | | | | | | | | | | |
| | | | While accelerating in 7GR, engine races. | | 3 | | | 3 | 3 | 4 | | | | | 2 | | | 2 | 2 | 2 | | | 2 | | 1 | | | | | | | | | | | | |
| | | | Lock-up | | 3 | | | 3 | 3 | 4 | | | | | 2 | 2 | | | | | | | | | 1 | | | | | | | | | | | | |
| | | | No creep at all. Extremely large creep. | | | | | 1 | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | |

| | | | | | | | | | | | Di | agn | ost | ic it | em | | | | | | | | | _ |
|------------------|--|---|---|---|-----------------------------|----|----------------------------|---------------------------|-------------------------------------|------------------------|----------------------------------|---------------------------|-------------------------|-------------------------------------|---|---------------------------------|-----------------------------------|---|------------------------------------|-------------------------------------|----------------------------------|--------------------------------------|----------------------|--------------------------|
| Symptom | | | | | TM-406 Vehicle speed signal | | TM-378 Engine speed signal | TM-374 Input speed sensor | TM-371 A/T fluid temperature sensor | TM-423 Battery voltage | TM-370 Transmission range switch | TM-412 Manual mode switch | SEC-55 Stop lamp switch | TM-398 Line pressure solenoid valve | TM-394 Torque converter clutch solenoid valve | TM-403 Low brake solenoid valve | TM-403 Front brake solenoid valve | TM-418 High and low reverse clutch solenoid valve | TM-400 Input clutch solenoid valve | TM-421 Direct clutch solenoid valve | TM-420 2346 brake solenoid valve | TM-399 Anti-interlock solenoid valve | TM-368 Starter relay | TM-367 CAN communication |
| | | | | | M | TM | M | Σ | Σ | Σ | TM | TM | SE | M | Σ | Σ | Σ | ₽ | T | M | TM | Σ | M | |
| | Power transmission cannot be performed | Vehicle cannot run in all position. | 3 | | | | | | | | 2 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Driving is not possible in "D" position. | 3 | | | | | | | | 2 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | | Driving is not possible in "R" position. | 3 | | | | | | | | 2 | | | 1 | | | | | | 1 | | 1 | | |
| | | Engine stall | | 4 | | 5 | 5 | | | 6 | | | 3 | | 2 | | | | | | | | 1 | |
| | | Engine stalls when selector lever shifted "N" \rightarrow "D" or "R". | | 4 | | 5 | 5 | | | | 3 | | | | 2 | | | | | | | | 1 | |
| | | Engine does not start in "N" or "P" position. | 3 | | | | | | | 1 | 2 | | | | | | | | | | | | 1 | |
| Function trouble | | Engine starts in position other than "N" or "P". | 3 | | | | | | | | 2 | | | | | | | | | | | | 1 | |
| | | Vehicle does not enter parking condition. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | | Parking condition is not cancelled. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | D | Vehicle runs with A/T in "P" position. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | Poor operation | Vehicle moves forward with the "R" position. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | | Vehicle runs with A/T in "N" position. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |
| | | Vehicle moves backward with the "D" position. | 1 | | | | | | | | 2 | | | | | | | | | | | | | |

SYMPTOM TABLE 2

Revision: 2015 February **TM-461** 2015 QX70

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| | Symptom | | | | | | | | | Diag | nosti | c iten | n | | | | | | | | | | | | | | | |
|-----------------|-----------------|--------------------------------------|---------------|---|---|--------|------------|-------------|-----------------------------|--------------|---------------|------------|---------------|--|--------------------|--------|---------------|-------------------|---|---|---|---|--|---|---|--|---|--|
| | | | | | | | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | 1st one-way clutch | 2nd one-way clutch | gear | control valve | Parking component | | | | | | | | | | |
| | | | | | | TM-499 | TM-499 | TM-499 | E95-WL | TM-559 | TM-571 | TM-547 | TM-499 | TM-499 | TM-564 | TM-499 | TM-485 | TM-499 | | | | | | | | | | |
| | | Shift point is high in "D" position. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Shift po | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | → "D" position | 1 | | 2 | | | | | | | | | | 2 | | | | | | | | | | | |
| | | | | → "R" position | 1 | | | | | | | | 1 | | | | 2 | | | | | | | | | | | |
| | Driving perfor- | | | 1GR ⇔ 2GR | | | | | | | | 1 | | | | | 2 | | | | | | | | | | | |
| | | | | 2GR ⇔ 3GR | | | | | | | 1 | | | | | | 2 | | | | | | | | | | | |
| | | | When | 3GR ⇔ 4GR | | | 2 | | 1 | | | | | | | | 2 | | | | | | | | | | | |
| | | | | 4GR ⇔ 5GR | | | | | | 1 | | 1 | | | | | 2 | | | | | | | | | | | |
| | mance | Large shock | shift- ing | 5GR ⇔ 6GR | | | | | | | 1 | 1 | | | | | 2 | | | | | | | | | | | |
| Poor perfor- | | | gears | 6GR ⇔ 7GR | | | | 1 | | | | 1 | | | | | 2 | | | | | | | | | | | |
| mance | | | | Downshift when accelerator pedal is depressed | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | | | | | | | | | | | |
| | | | | | | | | | | | | | | Upshift when accelerator pedal is released | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |
| | | | | Lock-up | | 1 | | | | | | | | | | | 2 | | | | | | | | | | | |
| | | Judder | | Lock-up | | 1 | | | | | | | | | | | 2 | | | | | | | | | | | |
| | | | | In "R" position | 1 | 1 | | | | | | | 1 | | | 1 | 2 | | | | | | | | | | | |
| | Strange | noise | | In "N" position | 1 | 1 | | | | | | | | | | 1 | 2 | | | | | | | | | | | |
| | Suange | Strange noise | | In "D" position | 1 | 1 | 1 | | | | | | | | | 1 | 2 | | | | | | | | | | | |
| | | | | Engine at idle | 1 | 1 | | | | | | | | | | 1 | 2 | | | | | | | | | | | |

^{*:} Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-331, "Cross-Sectional View".

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|---------|---------|-------------------|------------------------|--------|-------------------------|-------------------|--------------------|------------------------------------|---------------------|----------------------|-------------------|----------------------|---------------------------|---------------------------|-------------|----------------------|--------------------------|
| Symptom | | | | | TM-499 Torque converter | TM-499 Low brake* | TM-499 Front brake | TM-569 High and low reverse clutch | TM-559 Input clutch | TM-571 Direct clutch | TM-547 2346 brake | TM-499 Reverse brake | TM-499 1st one-way clutch | TM-564 2nd one-way clutch | TM-499 gear | TM-485 control valve | TM-499 Parking component |
| | T | 1 | 1 | TM-547 | F | F | F | F | Ħ | F | Ħ | F | F | F | Ħ | | \exists |
| | | | Locks in 1GR | | | | 1 | | 1 | | 1 | | | | | 2 | |
| | | | Locks in 2GR | | | | | | | | | | | | | 1 | |
| | | | Locks in 3GR | | | | | | | | | | | | | 1 | |
| | | | Locks in 4GR | | | | | | | | | | | | | 1 | |
| | | | Locks in 5GR | | | | | | | | | | | | | 1 | |
| | | "D" posi- | Locks in 6GR | | | | | | | | | | | | | 1 | |
| | | | Locks in 7GR | | | | | | | | | | | | | 1 | |
| | | | 1GR → 2GR | | | | 1 | | 1 | | 1 | | | | | 2 | |
| | | | 2GR → 3GR | | | | | | | 1 | | | | | | 2 | |
| | | | 3GR → 4GR | | | 2 | 1 | 1 | 1 | | | | | | | 2 | |
| Func- | Gear | | 4GR → 5GR | | | | | | | 1 | 1 | | | | | 2 | |
| tion | does no | | 5GR → 6GR | | | | | | | 1 | | | | | | 2 | |
| trouble | change | | 6GR → 7GR | | | 2 | 1 | 1 | 1 | | | | | | | 2 | |
| | | | 5GR → 4GR | | | | | | 1 | | | | | | | 2 | |
| | | | 4GR → 3GR | | | 2 | | 1 | | 4 | | | | _ | | 2 | |
| | | | 3GR → 2GR | | | | | | | 1 | 4 | | 4 | 1 | | 2 | |
| | | | 2GR → 1GR | | 4 | _ | 4 | 4 | 4 | 1 | 1 | | 1 | | | 2 | |
| | | | Does not lock-up | | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |
| | | | 1GR ⇔ 2GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |
| | | | 2GR ⇔ 3GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |
| | | "M" posi- tion | 3GR ⇔ 4GR 4GR ⇔ 5GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |
| | | 2 | 4GR ⇔ 5GR 5GR ⇔ 6GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |
| | | | 6GR ⇔ 7GR | | | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 2 | |

 $[\]hbox{*: Parts behind drum support is impossible to perform inspection by disassembly. Refer to $$\underline{TM-331, $$"Cross-Sectional View"}$.}$

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|---------|---------|-------------|---------------------|----------------|---|------------------|------------|-------------|-----------------------------|--------------|---------------|------------|---------------|--------------------|--------------------|--------|---------------|-------------------|
| | Symptom | | | | | Torque converter | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | 1st one-way clutch | 2nd one-way clutch | gear | control valve | Parking component |
| | | | | | | TM-499 | TM-499 | TM-499 | TM-569 | TM-559 | TM-571 | TM-547 | TM-499 | TM-499 | TM-564 | TM-499 | TM-485 | TM-499 |
| | | | When shifting gears | 1GR ⇔ 2GR | 1 | | | | | | | 1 | | 1 | | | 2 | |
| | | | | 2GR ⇔ 3GR | 1 | | | | | | 1 | | | | | | 2 | |
| | | Slip | | 3GR ⇔ 4GR | 1 | | 2 | | 1 | | | | | | | | 2 | |
| | | Slip | | 4GR ⇔ 5GR | 1 | | | | | 1 | | 1 | | | | | 2 | |
| | | | | 5GR ⇔ 6GR | 1 | | | | | | 1 | 1 | | | | | 2 | |
| Func- | Poor | | | 6GR ⇔ 7GR | 1 | | | 1 | | | | 1 | | | | | 2 | |
| tion | shift- | | "D" position | → "M" position | 1 | | | 1 | 1 | | | | | 1 | 1 | | 2 | |
| trouble | ing | _ | | 7GR → 6GR | 1 | | | 1 | | | | 1 | | | | | 2 | |
| | | En- gine | | 6GR → 5GR | 1 | | | | | | 1 | 1 | | | | | 2 | |
| | | brake | "M" posi- | 5GR → 4GR | 1 | | | | | 1 | | 1 | | | | | 2 | |
| | | does not | tion | 4GR → 3GR | 1 | | 2 | | 1 | | | | | | | | 2 | |
| | | work | | 3GR → 2GR | 1 | | | | 1 | | 1 | | | 1 | 1 | | 2 | |
| | | | | 2GR → 1GR | 1 | | | 1 | | | | 1 | | 1 | | | 2 | |

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| Symptom | | | | | | | | | С | Diagno | ostic | item | | | | | |
|---------------|------------------------------|------|---|--------|--------|------------|-------------|-----------------------------|--------------|---------------|------------|---------------|--------------------|--------------------|--------|---------------|-------------------|
| | | | | | | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | 1st one-way clutch | 2nd one-way clutch | gear | control valve | Parking component |
| | | | | TM-547 | TM-499 | TM-499 | TM-499 | TM-569 | TM-559 | TM-571 | TM-547 | TM-499 | TM-499 | TM-564 | TM-499 | TM-485 | TM-499 |
| | | | With selector lever in "D" position, acceleration is extremely poor. | 1 | 1 | 2 | | | | | | | 1 | | 1 | 2 | |
| | | | With selector lever in "R" position, ac- celeration is ex- tremely poor. | 1 | 1 | | | | | | | 1 | 1 | 1 | 1 | 2 | |
| | | | While starting off by accelerating in 1GR, engine races. | 1 | 1 | 2 | | | | | | | 1 | 1 | 1 | 2 | |
| | | | While accelerating in 2GR, engine races. | 1 | | 2 | | | | | 1 | | | 1 | 1 | 2 | |
| Func- tion | Poor pow- er trans- | Slip | While accelerating in 3GR, engine races. | 1 | | 2 | | | | 1 | 1 | | | | 1 | 2 | |
| trouble | mis- sion | | While accelerating in 4GR, engine races. | 1 | | | | 1 | | 1 | 1 | | | | 1 | 2 | |
| | | | While accelerating in 5GR, engine races. | 1 | | | | 1 | 1 | 1 | | | | | 1 | 2 | |
| | | | While accelerating in 6GR, engine races. | 1 | | | | 1 | 1 | | 1 | | | | 1 | 2 | |
| | | | While accelerating in 7GR, engine races. | 1 | | | 1 | 1 | 1 | | | | | | | 2 | |
| | | | Lock-up | 1 | 1 | | | | | | | | | | 1 | 2 | |
| | | | No creep at all. Extremely large creep. | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 2 | 1 |

^{*:} Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-331, "Cross-Sectional View".

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| | | | | | | С | iagn | ostic | item | l | | | | | | |
|----------|--|---|---|---|------------|-------------|-----------------------------|--------------|---------------|------------|---------------|--------|--------------------|--------------------|---------------|-------------------|
| Symptom | | | | | Low brake* | Front brake | High and low reverse clutch | Input clutch | Direct clutch | 2346 brake | Reverse brake | gear | 1st one-way clutch | 2nd one-way clutch | control valve | Parking component |
| | | | | | TM-499 | TM-499 | TM-569 | TM-559 | TM-571 | TM-547 | TM-499 | TM-499 | TM-564 | TM-499 | TM-485 | TM-499 |
| | | Vehicle cannot run in all position. | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | | | 1 | 2 | 1 |
| | Power trans- mission cannot be performed | Driving is not possible in "D" position. | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 2 | 1 |
| | | Driving is not possible in "R" position. | 1 | | | | | | | | 1 | 1 | 1 | 1 | 2 | 1 |
| | | Engine stall | | 1 | | | | | | | | | | | | |
| | | Engine stalls when selector lever shifted "N" \rightarrow "D" or "R". | | 1 | | | | | | | | | | | | |
| | | Engine does not start in "N" or "P" position. | | 1 | | | | | | | | | | | | |
| Function | | Engine starts in position other than "N" or "P". | | | | | | | | | | | | | | |
| trouble | | Vehicle does not enter parking condition. | | | | | | | | | | | | | | 1 |
| | | Parking condition is not can- celled. | | | | | | | | | | | | | | 1 |
| | Poor operation | Vehicle runs with A/T in "P" position. | | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | | | | 2 | 1 |
| | Fooi operation | Vehicle moves forward with the "R" position. | | | 2 | 1 | 1 | 1 | 1 | 1 | | | | | 2 | |
| | | Vehicle runs with A/T in "N" position. | | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | | | | 2 | |
| | | Vehicle moves backward with the "D" position. | | | | | | | | | 1 | | | | 2 | |

^{*:} Parts behind drum support is impossible to perform inspection by disassembly. Refer to TM-331, "Cross-Sectional View".

PRECAUTION

PRECAUTIONS

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

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

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

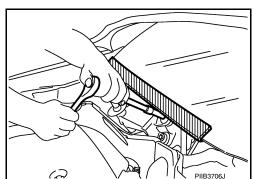
WARNING:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the
 ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with
 a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing
 serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

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



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[7AT: RE7R01B (VK50VE)]

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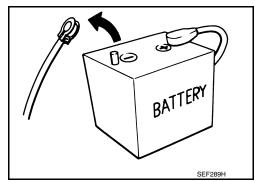
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General Precautions

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 Turn ignition switch OFF and disconnect the battery cable from the negative terminal before connecting or disconnecting the A/T assembly harness connector. Because battery voltage is applied to TCM even if ignition switch is turned OFF.



- Perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE" after performing each TROUBLE DIAGNOSIS.
 If the repair is completed DTC should not be displayed in the "DTC CONFIRMATION PROCEDURE".
- Always use the specified brand of ATF. Refer to MA-18, "FOR MEXICO: Fluids and Lubricants".
- Use lint-free paper not cloth rags during work.
- Dispose of the waste oil using the methods prescribed by law, ordinance, etc. after replacing the ATF.
- Before proceeding with disassembly, thoroughly clean the outside of the transmission. 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 paper or towels for wiping parts clean. Common shop rags can leave fibers that could interfere
 with the operation of the transmission.
- 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 be replaced any time the A/T is disassembled.
- · It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced.
 Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Never use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Clean or replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to TM-468, "Service Notice or Precaution".
- When the A/T drain plug is removed, only some of the ATF is drained. Old ATF will remain in torque converter and ATF cooling system.
 - Always follow the procedures under "Changing" when changing ATF. Refer to TM-472, "Changing".
- Occasionally, the parking gear may be locked with the torque insufficiently released, when stopping the vehicle by shifting the selector lever from "D" or "R" to "P" position with the brake pedal depressed.
 In this case, the shock with a thud caused by the abrupt release of torque may occur when shifting the selector lever from "P" position to other positions.

However, this symptom is not a malfunction resulting the damage of parts.

Service Notice or Precaution

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ATF COOLER SERVICE

If ATF contains frictional material (clutches, bands, etc.), or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T fluid cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. For A/T fluid cooler cleaning procedure, refer to TM-177. "Exploded View".

PRECAUTIONS

< PRECAUTION > [7AT: RE7R01B (VK50VE)]

Precautions for Removing Battery Terminal

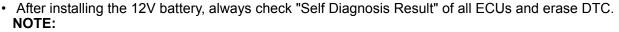
 When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

NOTE:

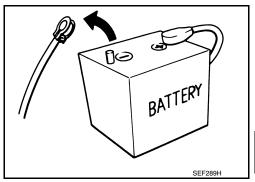
ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
 NOTE:

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.



The removal of 12V battery may cause a DTC detection error.



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PREPARATION

PREPARATION

Special Service Tool

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| The actual shapes of TechMate tools n | nay differ from those of special service tools il | lustrated here. |
|--|---|---|
| Tool number (TechMate No.) Tool name | | Description |
| ST33400001 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia. | a b NT086 | Installing oil pump housing oil seal |
| KV31102400 (J-34285 and J-34285-87) Clutch spring compressor a: 320 mm (12.60 in) b: 174 mm (6.85 in) | a a b b b c NT428 | Installing reverse brake return spring retainer Removing and installing 2346 brake spring retainer er |
| KV31103800 Clutch spring compressor 1. M12×1.75P | JSDIA1749ZZ | Removing and installing front brake spring retainer |
| ST25850000 (J-25721-A) Sliding hammer a: 179 mm (7.05 in) b: 70 mm (2.76 in) c: 40 mm (1.57 in) d: M12X1.75P | a d d d NT422 | Remove oil pump assembly |

Commercial Service Tool

INFOID:0000000010579245

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| Tool name | | Description | |
|-------------------------------------|-------------|-----------------------------------|--|
| Power tool | | Loosening bolts and nuts | |
| | | | |
| | | | |
| | | | |
| | | | |
| | PBIC0190E | | |
| Orift | | Installing manual shaft oil seals | |
| a: 22 mm (0.87 in) dia. | | | |
| | | | |
| | | | |
| | a | | |
| | NT083 | | |
| Orift | | Installing rear oil seal | |
| a: 64 mm (2.52 in) dia. | | | |
| | | | |
| | a | | |
| | | | |
| | SCIA5338E | | |
| Pin punch a: 4 mm (0.16 in) dia. | | Remove retaining pin | |
| a. 4 mm (0. 16 m) dia. | | | |
| | a | | |
| | | | |
| | \ | | |
| | NT410 | | |
| 1. 315268E000* O-ring | | A/T fluid changing and adjustment | |
| 0-ring 2. 310811EA5A* | 2 1 | | |
| Charging pipe | | | |
| | | | |
| | | | |
| | JSDIA1332ZZ | | |

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

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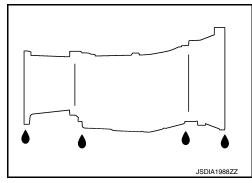
PERIODIC MAINTENANCE

A/T FLUID

Inspection INFOID:000000010579246

FLUID LEAKAGE

- Check transmission surrounding area (oil seal and plug etc.) for fluid leakage.
- If anything is found, repair or replace damaged parts and adjust A/ T fluid level. Refer to TM-474, "Adjustment".



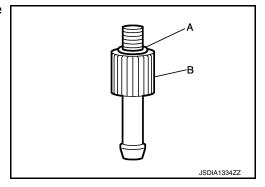
Changing

INFOID:0000000010579247

Recommended fluid and fluid capacity : Refer to MA-18, "FOR MEXICO: Fluids and Lubricants".

CAUTION:

- Use only recommended ATF. Never mix with other ATF.
- Using ATF other than recommended ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.
- When filling ATF, be careful not to scatter heat generating parts such as exhaust.
- 1. Step 1
- a. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).



- 2. Step 2
- a. Use CONSULT to check that the ATF temperature is 40°C (104°F) or less.
- b. Lift up the vehicle.
- c. Remove the drain plug from the oil pan, and then drain the ATF.
- d. When the ATF starts to drip, temporarily tighten the drain plug to the oil pan.
 - Never replace drain plug and drain plug gasket with new ones yet.
- e. Remove overflow plug from oil pan.

Install the charging pipe (A) to the overflow plug hole. **CAUTION:**

Tighten the charging pipe by hand.

Install the bucket pump hose (B) to the charging pipe. CAUTION:

Insert the bucket pump hose all the way to the end of the charging pipe.

- h. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.
- Remove the bucket pump hose to remove the charging pipe. and then temporarily tighten the overflow plug to the oil pan. CAUTION:

Quickly perform the procedure to avoid ATF leakage from the oil pan.

- Lift down the vehicle. į.
- k. Start the engine and wait for approximately 3 minutes.
- I. Stop the engine.
- 3. Step 3
- Repeat "Step 2". a.
- Final Step
- a. Use CONSULT to check that the ATF temperature is 40°C (104°F) or less.
- b. Lift up the vehicle.
- Remove the drain plug from the oil pan, and then drain the ATF.
- d. When the ATF starts to drip, tighten the drain plug to the oil pan to the specified torque. Refer to TM-485, "Exploded View".

CAUTION:

Never reuse drain plug and drain plug gasket.

- e. Remove overflow plug from oil pan.
- Install the charging pipe (A) to the overflow plug hole.

CAUTION:

Tighten the charging pipe by hand.

g. Install the bucket pump hose (B) to the charging pipe.

CAUTION:

Insert the bucket pump hose all the way to the end of the charging pipe.

- h. Fill approximately 3 liters (3-1/8 US qt, 2-5/8 lmp qt) of the ATF.
- Remove the bucket pump hose to remove the charging pipe, and then temporarily tighten the overflow plug to the oil pan.

CAUTION:

Quickly perform the procedure to avoid ATF leakage from the oil pan.

- Lift down the vehicle. j.
- k. Start the engine.
- Make the ATF temperature approximately 40°C (104°F).

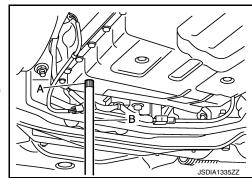
NOTE:

The ATF level is greatly affected by the temperature. Always check the ATF temperature on "ATF TEMP 1" of "Data Monitor" using CONSULT.

- m. Park vehicle on level surface and set parking brake.
- Shift the selector lever through each gear position. Leave selector lever in "P" position.
- o. Lift up the vehicle when the ATF temperature reaches 40°C (104°F), and then remove the overflow plug from the oil pan.
- p. When the ATF starts to drip, tighten the overflow plug to the oil pan to the specified torque. Refer to TM-485, "Exploded View".

CAUTION:

Never reuse overflow plug.



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TM-473 Revision: 2015 February 2015 QX70 Adjustment

Recommended fluid and fluid capacity : Refer to MA-18. "FOR MEXICO: Fluids and Lubricants".

CAUTION:

- Use only recommended ATF. Never mix with other ATF.
- Using ATF other than recommended ATF will cause deterioration in driveability and A/T durability, and may damage the A/T, which is not covered by the INFINITI new vehicle limited warranty.
- When filling ATF, be careful not to scatter heat generating parts such as exhaust.
- Always maintain the ATF temperature within between 35°C (95°F) and 45°C (113°F) while checking with CONSULT when the ATF level adjustment is performed.
- 1. Install the O-ring (315268E000) (A) to the charging pipe (310811EA5A) (B).
- Start the engine.
- Make the ATF temperature approximately 40°C (104°F).
 NOTE:

The ATF level is greatly affected by the temperature. Always check the ATF temperature on "ATF TEMP 1" of "Data Monitor" using CONSULT.

- 4. Park vehicle on level surface and set parking brake.
- 5. Shift the selector lever through each gear position. Leave selector lever in "P" position.
- Lift up the vehicle.
- 7. Check the ATF leakage from transmission.
- 8. Remove overflow plug from oil pan.
- Install the charging pipe (A) to the overflow plug hole. CAUTION:

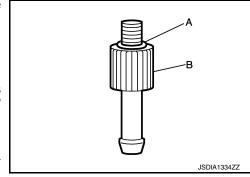
Tighten the charging pipe by hand.

Install the bucket pump hose (B) to the charging pipe.CAUTION:

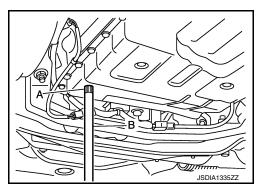
Insert the bucket pump hose all the way to the end of the charging pipe.

- 11. Fill approximately 0.5 liters (1/2 US qt, 1/2 lmp qt) of the ATF.
- 12. Check that the ATF leaks when removing the charging pipe and the bucket pump hose. If the ATF does not leak, refill the ATF.
- 13. When the ATF starts to drip, tighten the overflow plug to the oil pan to the specified torque. Refer to <u>TM-485</u>, "Exploded View". CAUTION:

Never reuse overflow plug.



[7AT: RE7R01B (VK50VE)]



A/T FLUID COOLER

Cleaning

Whenever an A/T is replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned. Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of ATF. In either case, malfunction of the newly serviced A/T may result.

Debris, if present, may build up as ATF enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

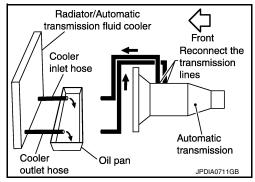
CLEANING PROCEDURE

- 1. Position an oil pan under the A/T inlet and outlet cooler hoses.
- 2. Identify the inlet and outlet fluid cooler hoses.
- 3. Disconnect the A/T fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or by-pass valve.

NOTE:

Replace the cooler hoses if rubber material from the hose remains on the tube fitting.

4. Allow any ATF that remains in the cooler hoses to drain into the oil pan.



[7AT: RE7R01B (VK50VE)]

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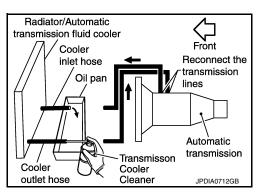
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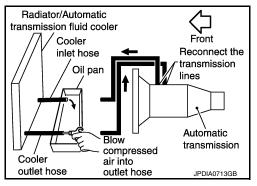
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 Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

CAUTION:

- Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.
- Spray Transmission Cooler Cleaner only with adequate ventilation.
- · Avoid contact with eyes and skin.
- Never breath vapors or spray mist.
- Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until ATF flows out of the cooler inlet hose for 5 seconds.
- Insert the tip of an air gun into the end of the cooler outlet hose.
- 8. Wrap a shop rag around the air gun tip and of the cooler outlet hose.
- 9. Blow compressed air regulated to 5 to 9 kg/cm² (71 to 128 psi) through the cooler outlet hose for 10 seconds to force out any remaining ATF.
- 10. Repeat steps 5 through 9 three additional times.
- 11. Position an oil pan under the banjo bolts that connect the A/T fluid cooler steel lines to the A/T.
- 12. Remove the banjo bolts.
- 13. Flush each steel line from the cooler side back toward the A/T by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
- 14. Blow compressed air regulated to 5 to 9 kg/cm² (71 to 128 psi) through each steel line from the cooler side back toward the A/T for 10 seconds to force out any remaining ATF.
- 15. Ensure all debris is removed from the steel cooler lines.
- 16. Ensure all debris is removed from the banjo bolts and fittings.
- Perform "DIAGNOSIS PROCEDURE".





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DIAGNOSIS PROCEDURE

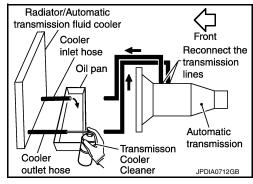
NOTE:

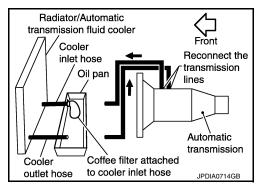
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

- 1. Position an oil pan under the A/T inlet and outlet cooler hoses.
- 2. Clean the exterior and tip of the cooler inlet hose.
- Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

CAUTION:

- Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.
- Spray Transmission Cooler Cleaner only with adequate ventilation.
- · Avoid contact with eyes and skin.
- · Never breath vapors or spray mist.
- 4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until ATF flows out of the cooler inlet hose for 5 seconds.
- 5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.

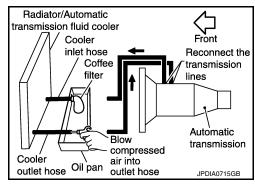


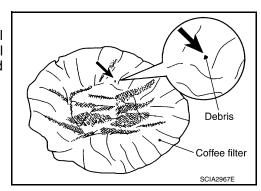


- 6. Insert the tip of an air gun into the end of the cooler outlet hose.
- Wrap a shop rag around the air gun tip and end of cooler outlet hose.
- 8. Blow compressed air regulated to 5 to 9 kg/cm² (71 to 128 psi) through the cooler outlet hose to force any remaining ATF into the coffee filter.
- Remove the coffee filter from the end of the cooler inlet hose.
- 10. Perform "INSPECTION PROCEDURE".

INSPECTION PROCEDURE

- 1. Inspect the coffee filter for debris.
- a. If small metal debris less than 1 mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.





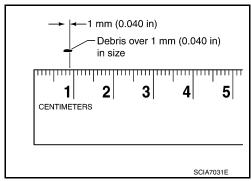
A/T FLUID COOLER

< PERIODIC MAINTENANCE >

Inspection

[7AT: RE7R01B (VK50VE)]

b. If one or more pieces of debris are found that are over 1 mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the A/T fluid cooler is not serviceable. The A/T fluid cooler/radiator must be replaced and the inspection procedure is ended. Refer to <u>CO-43</u>, "<u>Exploded View</u>".



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After performing all procedures, ensure that all remaining oil is cleaned from all components.

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STALL TEST

Inspection and Judgment

INFOID:0000000010579251

[7AT: RE7R01B (VK50VE)]

INSPECTION

- 1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
- Drive for about 10 minutes to warm up the vehicle so that the A/T fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of ATF. Replenish if necessary.
- 3. Securely engage the parking brake so that the tires do not turn.
- 4. Start the engine, apply foot brake, and place selector lever in "D" position.
- 5. Gradually press down the accelerator pedal while holding down the foot brake.
- Quickly read off the stall speed, and then quickly release the accelerator pedal. CAUTION:

Never hold down the accelerator pedal for more than 5 seconds during this test.

Stall speed: Refer to TM-574, "Stall Speed".

- 7. Shift the selector lever to "N" position.
- 8. Cool down the ATF.

CAUTION:

Run the engine at idle for at least 1 minute.

9. Repeat steps 5 through 8 with selector lever in "R" position.

JUDGMENT OF STALL TEST

| | Selector le | ver position | Possible location of malfunction | | | |
|-------------|-------------|--------------|---|--|--|--|
| | "D" and "M" | "R" | Possible location of mailunction | | | |
| | Н | 0 | Low brake 1st one-way clutch 2nd one-way clutch | | | |
| Stall speed | 0 | Н | Reverse brake 1st one-way clutch 2nd one-way clutch | | | |
| | L | L | Engine and torque converter one-way clutch | | | |
| | Н | Н | Line pressure low | | | |

O: Stall speed within standard value position

Stall test standard value position

| Stail test standard value position | | |
|---|----------------------------------|--------------------------------------|
| Does not shift-up "D" or "M" position $1 \rightarrow 2$ | Slipping in 2GR, 3GR 4GR or 6GR | 2346 brake slippage |
| Does not shift-up "D" or "M" position $2 \rightarrow 3$ | Slipping in 3GR, 4GR or 5GR | Direct clutch slippage |
| Does not shift-up "D" or "M" position $3 \rightarrow 4$ | Slipping in 4GR, 5GR, 6GR or 7GR | High and low reverse clutch slippage |
| Does not shift-up "D" or "M" position $4 \rightarrow 5$ | Slipping in 5GR, 6GR or 7GR | Input clutch slippage |
| Does not shift-up "D" or "M" position $5 \rightarrow 6$ | Slipping in 2GR, 3GR, 4GR or 6GR | 2346 brake slippage |
| Does not shift-up "D" or "M" position $6 \rightarrow 7$ | Slipping in 7GR | Front brake slippage |

H: Stall speed higher than standard value

L: Stall speed lower than standard value

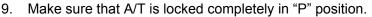
[7AT: RE7R01B (VK50VE)] A/T POSITION

Inspection and Adjustment

INSPECTION В

1. Place selector lever in "P" position, and turn ignition switch ON (engine stop).

- 2. Check that selector lever can be shifted to other than "P" position when brake pedal is depressed. Also check that selector lever can be shifted from "P" position only when brake pedal is depressed.
- Shift the selector lever and check for excessive effort, sticking, noise or rattle.
- 4. Confirm that the selector lever stops at each position by feeling the engagement when it is moved through all the positions. Check whether or not the actual position the selector lever matches the position shown by the shift position indicator and the A/T body.
- 5. The method of operating the lever to individual positions correctly is shown in the figure.
- 6. When selector button is pressed in "P", "R", or "N" position without applying forward/backward force to selector lever, check button operation for sticking.
- 7. Confirm that the back-up lamps illuminate only when lever is placed in the "R" position. Confirm that the back-up lamps do not illuminate when selector lever is pushed against "R" position in the "P" or "N" position.
- 8. Confirm that the engine can only be started with the selector lever in the "P" and "N" positions. (With selector lever in the "P" position, engine can be started even when selector lever is moved forward and backward.)



10. DS mode must be indicated on the combination meter when the selector lever is shifted to the manual shift gate. When the selector lever is shifted to the "+" or "-" side in the DS mode, manual mode should be indicated on the combination meter.

In addition, a set shift position must be changed when the selector lever is shifted to the "+" or "-" side in the manual mode. (Only while driving.)

ADJUSTMENT

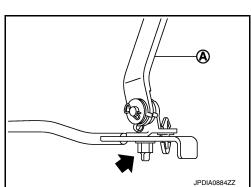
- Loosen nut (←).
- 2. Place manual lever and selector lever in "P" position.
- 3. While pressing lower lever (A) toward rear of vehicle (in "P" position direction), tighten nut to specified torque. Refer to TM-483. "Exploded View".

CAUTION:

Be careful not to touch the control rod while pressing lower lever of A/T shift selector assembly.

NOTE:

Press lower lever of A/T shift selector assembly with a force of approximately 1 kg (9.8 N).



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: Press selector button

to operate selector lever,

while depressing the brake pedal.

: Press selector button to

⇒: Selector lever can be operated without pressing

selector button.

operate selector lever.

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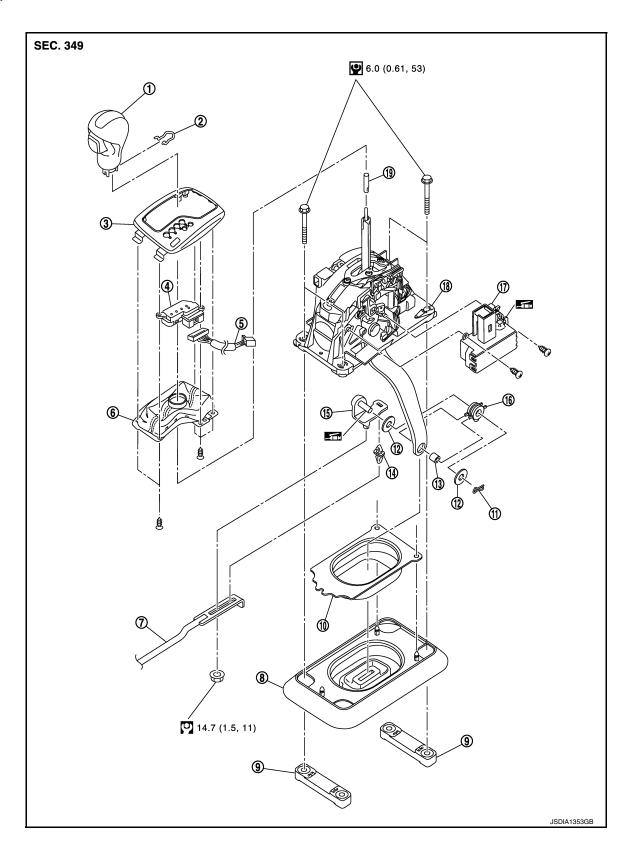
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REMOVAL AND INSTALLATION

A/T SHIFT SELECTOR

Exploded View



A/T SHIFT SELECTOR

< REMOVAL AND INSTALLATION >

[7AT: RE7R01B (VK50VE)]

- Selector lever knob
- 4. Selector lever position indicator
- 7. Control rod
- 10. Dust cover plate
- 13. Collar
- 16. Insulator
- 19. Adapter

- 2. Lock pin
- 5. Harness connector
- 8. Dust cover
- 11. Snap pin
- 14. Clip
- 17. Shift lock unit

- Indicator plate
- 6. Insert finisher
- 9. Bracket
- 12. Washer
- Pivot pin
- 18. A/T shift selector assembly

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Removal and Installation

Apply multi-purpose grease.

REMOVAL

- 1. Shift the selector lever to "P" position.
- Remove control rod from A/T shift selector.
- 3. Shift the selector lever to "N" position.
- 4. Remove knob cover (A) below selector lever downward.

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

- 5. Pull lock pin (1) out of selector lever knob (2).
- Remove selector lever knob.
- Remove center console assembly. Refer to <u>IP-23, "Exploded View"</u>.

CAUTION:

When disconnecting selector lever position indicator connector from shift position switch, never twist or apply an excessive load to the connector.

- Remove the rear ventilator duct 1. Refer to <u>VTL-10, "Exploded View"</u>.
- 9. Disconnect A/T shift selector connector.
- 10. Remove harness clips from A/T shift selector assembly.
- 11. Shift the selector lever to "P" position.
- 12. Remove A/T shift selector assembly mounting bolts.
- 13. Slightly lift the A/T shift selector assembly (1) and slide it rightward. Then pull it out in the diagonally right direction.
- 14. Remove adapter from A/T shift selector assembly.
- 15. Remove dust cover and dust cover plate from A/T shift selector assembly.
- 16. Remove dust cover from dust cover plate.
- 17. Remove shift lock unit from A/T shift selector assembly.
- 18. Remove brackets from vehicle floor panel.
- 19. Remove selector lever position indicator from console finisher assembly:
- Remove indicator assembly from console finisher assembly.
 Refer to <u>IP-23</u>, "<u>Exploded View</u>".
- Remove insert finisher from indicator assembly.
- Remove selector lever position indicator.

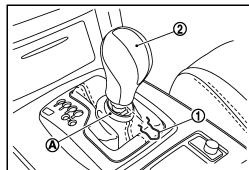
INSTALLATION

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

CAUTION:

Apply multi-purpose grease on the pin surface (that slides after installing a collar) of the pivot pin.

- Refer to the followings when installing selector lever knob to A/T shift selector assembly.
- Insert lock pin to selector lever knob.
- Install selector lever knob over selector lever until a click is felt.



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A/T SHIFT SELECTOR

< REMOVAL AND INSTALLATION >

CAUTION:

- Install it straight, and never tap or apply any shock to install it.
- Never push selector button.
- When installing control rod to A/T shift selector assembly, refer to "ADJUSTMENT". Refer to <u>TM-479.</u> "Inspection and Adjustment".

Inspection and Adjustment

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[7AT: RE7R01B (VK50VE)]

INSPECTION AFTER INSTALLATION

Check A/T position after adjusting A/T position. Refer to TM-479, "Inspection and Adjustment".

ADJUSTMENT AFTER INSTALLATION

Adjust A/T position. Refer to TM-479, "Inspection and Adjustment".

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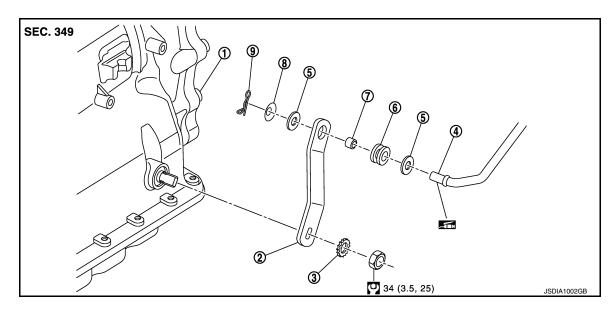
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CONTROL ROD

Exploded View



- 1. A/T assembly
- 4. Control rod
- 7. Collar

- 2. Manual lever
- 5. Washer
- 8. Conical washer

- Lock washer
- 6. Insulator
- 9. Snap pin

: Apply multi-purpose grease.

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

Removal and Installation

REMOVAL

- 1. Shift the selector lever to "P" position.
- Disconnect A/T shift selector and control rod. Refer to <u>TM-480, "Exploded View"</u>.
- 3. Remove manual lever from A/T assembly.
- 4. Remove control rod from manual lever.

INSTALLATION

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

CAUTION:

Apply multi-purpose grease on the pin surface (that slides after installing collar) of the tip of the control rod.

When installing control rod to A/T shift selector assembly, refer to "ADJUSTMENT". Refer to <u>TM-479.</u>
 "Inspection and Adjustment".

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INSPECTION AFTER INSTALLATION

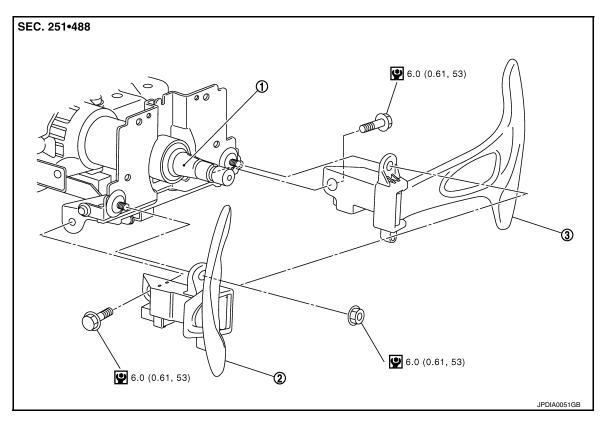
Check A/T position after adjusting A/T position. Refer to TM-479, "Inspection and Adjustment".

ADJUSTMENT AFTER INSTALLATION

Adjust A/T position. Refer to TM-479, "Inspection and Adjustment".

PADDLE SHIFTER

Exploded View



- Steering column assembly
 Paddle Refer to GI-4. "Components" for symbols in the figure.
- 2. Paddle shifter (shift-down)
- 3. Paddle shifter (shift-up)

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Removal and Installation

REMOVAL

- 1. Remove steering column cover. Refer to IP-12, "Exploded View".
- 2. Disconnect paddle shifter connectors from each paddle shifter.
- 3. Remove paddle shifter mounting bolts and nuts.
- 4. Remove each paddle shifter from steering column assembly.

INSTALLATION

Install in the reverse order of removal.

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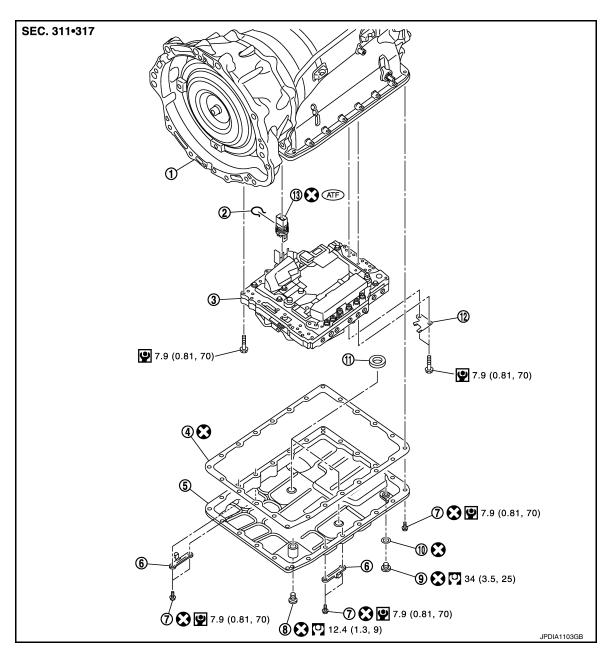
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CONTROL VALVE & TCM

Exploded View



- 1. A/T assembly
- 4. Oil pan gasket
- 7. Oil pan mounting bolt
- 10. Drain plug gasket
- 13. Joint connector

- 2. Snap ring
- 5. Oil pan
- 8. Overflow plug
- 11. Magnet
- 44 14----

- 3. Control valve & TCM
- 6. Clip
- 9. Drain plug
- 12. Clip

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

Removal and Installation

REMOVAL

1. Drain ATF through drain plug.

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CONTROL VALVE & TCM

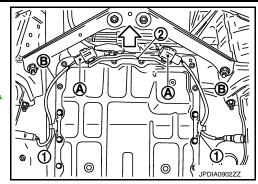
< REMOVAL AND INSTALLATION >

[7AT: RE7R01B (VK50VE)]

2. Disconnect heated oxygen sensor 2 connectors (A).

: Vehicle front

- 3. Remove heated oxygen sensor 2 harness (B) from clips (1).
- 4. Remove bracket (2) from A/T assembly. Refer to <u>TM-496</u>, <u>"Exploded View"</u>.

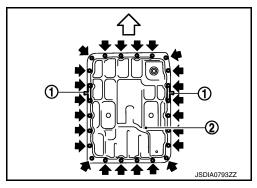


5. Remove clips (1).

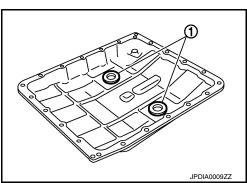
: Vehicle front

: Oil pan mounting bolt

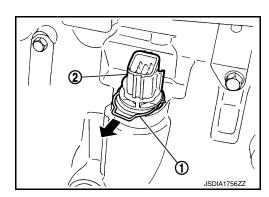
6. Remove oil pan (2) and oil pan gasket.



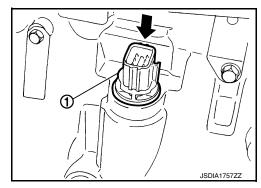
7. Remove magnets (1) from oil pan.



8. Remove snap ring (1) from joint connector (2).



9. Push joint connector (1).



CONTROL VALVE & TCM

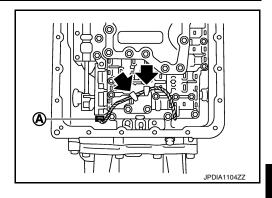
< REMOVAL AND INSTALLATION >

[7AT: RE7R01B (VK50VE)]

Disconnect output speed sensor connector (A).
 CAUTION:

Be careful not to damage connector.

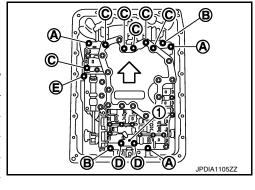
11. Disengage terminal clip (←).



12. Remove bolts and clip (1) from the control valve & TCM.

⟨⇒ : Vehicle front

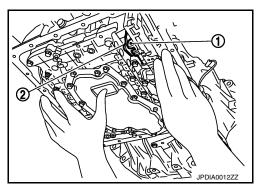
| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| Α | 43 (1.69) | 3 |
| В | 40 (1.57) | 2 |
| С | 54 (2.13) | 6 |
| D | 50 (1.97) | 2 |
| E* | 50 (1.97) | 1 |



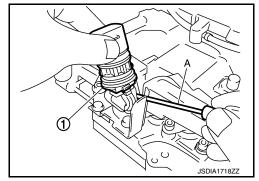
*: Reamer bolt

13. Remove the control valve & TCM from transmission case. **CAUTION:**

When removing, be careful with the manual valve (1) notch and manual plate (2) height. Remove it vertically.



14. Remove joint connector (1) from the control valve & TCM using a flat-bladed screwdriver (A).



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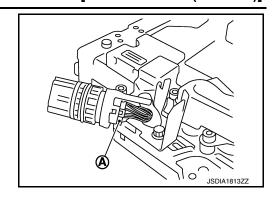
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15. Disconnect TCM connector (A).

CAUTION:

Be careful not to damage connector.



INSTALLATION

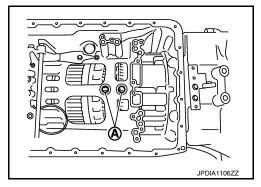
Note the following, and install in the reverse order of removal.

CAUTION:

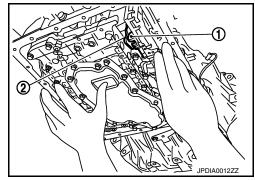
- Be careful not to damage connector when installing any connector.
- · Never reuse joint connector.
- Apply ATF to O-ring of joint connector.
- Never reuse drain plug and drain plug gasket. In addition, install new drain plug and drain plug gasket after adjustment of A/T fluid filling.
- Refer to the following when installing the control valve & TCM to transmission case.

CAUTION:

- Make sure that turbine revolution sensor securely installs input speed sensor holes (A).
- Hang down output speed sensor harness toward outside so as not to disturb installation of the control valve & TCM.
- Adjust joint connector of the control valve & TCM to terminal hole of transmission case.



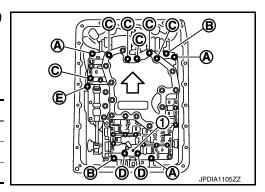
• Assemble it so that manual valve (1) cutout is engaged with manual plate (2) projection.



- Install bolts and clip (1) to the control valve & TCM. Tighten bolt (E) to the specified torque before tightening the other than bolts.

< ; Vehicle front

| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| А | 43 (1.69) | 3 |
| В | 40 (1.57) | 2 |
| С | 54 (2.13) | 6 |



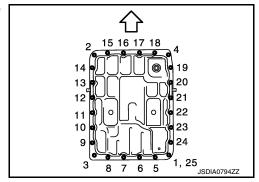
CONTROL VALVE & TCM

< REMOVAL AND INSTALLATION >

[7AT: RE7R01B (VK50VE)]

| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| D | 50 (1.97) | 2 |
| E* | 50 (1.97) | 1 |

- *: Reamer bolt
- Refer to the following when installing oil pan to transmission case.
 CAUTION:
 - Clean foreign materials (gear wear particles) that adhere on the inside of the oil pan and on the magnet, and then assembly.
 - Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface of transmission case and oil pan.
 - Never reuse oil pan gasket and oil pan mounting bolts.
 - Install oil pan gasket in the direction to align hole position.
- Tighten the oil pan mounting bolts to the specified torque in the numerical order as shown in the figure after temporarily tightening them.
 - : Vehicle front
- Fill ATF after installation. Refer to TM-472, "Changing".

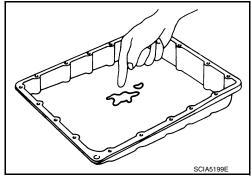


Inspection H

INSPECTION AFTER REMOVAL

Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.

 If frictional material is detected, perform A/T fluid cooler cleaning. Refer to TM-475, "Cleaning".



INSPECTION AFTER INSTALLATION

Start the engine and check visually that there is no leakage of ATF.

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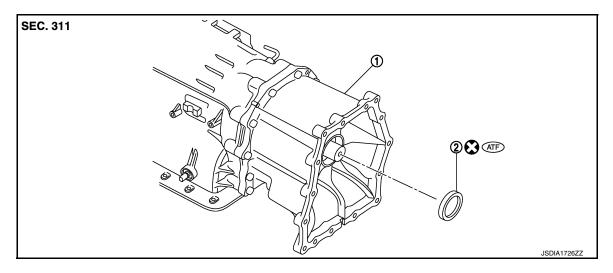
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REAR OIL SEAL

Exploded View



A/T assembly

2. Rear oil seal

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

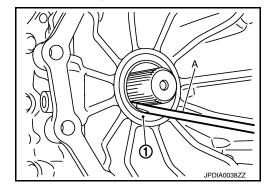
Removal and Installation

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REMOVAL

- Remove transfer assembly from A/T assembly. Refer to <u>DLN-66, "VK50VE: Exploded View"</u>.
- 2. Remove rear oil seal (1) with a flat-bladed screwdriver (A). CAUTION:

Never scratch adapter case assembly.



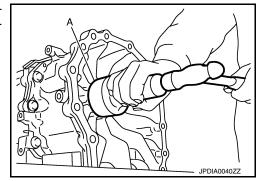
INSTALLATION

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

As shown in the figure, use the drift [64 mm (2.52 in) dia. commercial service tool] (A) to drive rear oil seal into adapter case assembly until it is flush.

CAUTION:

- · Never reuse rear oil seal.
- Apply ATF to rear oil seal.



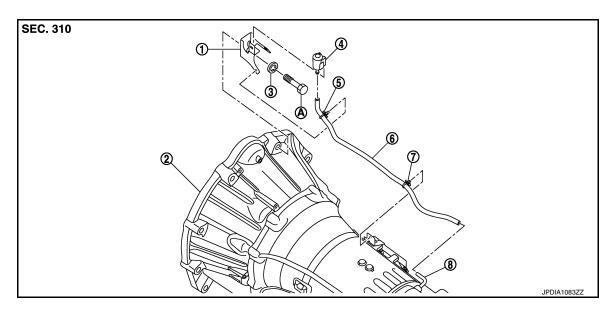
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INSPECTION AFTER INSTALLATION

Drive the vehicle and check visually that there is no leakage of ATF.

AIR BREATHER HOSE

Exploded View



- 1. Bracket
- 4. Air breather box
- 7. Clip

- 2. A/T assembly
- 5. Clip
- 8. A/T breather tube
- Spring washer
- Air breather hose

A. Tightening must be done following the installation procedure. Refer to TM-496, "Removal and Installation".

Removal and Installation

REMOVAL

- Remove propeller shaft assembly (front). Refer to <u>DLN-112, "VK50VE: Exploded View"</u>.
- 2. Remove clips of air breather hose from brackets.
- 3. Remove air breather box from bracket.
- 4. Remove air breather box from air breather hose.
- 5. Remove air breather hose from A/T breather tube.
- 6. Remove propeller shaft assembly (rear). Refer to <u>DLN-140, "Exploded View"</u>.
- 7. Remove control rod from A/T shift selector. Refer to TM-480, "Exploded View".
- 8. Support A/T assembly with a transmission jack.

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AIR BREATHER HOSE

< REMOVAL AND INSTALLATION >

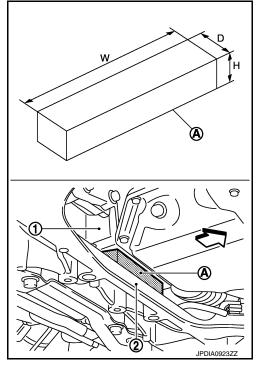
[7AT: RE7R01B (VK50VE)]

9. Insert a wooden block (A) between oil pan (upper) (1) of engine and front suspension member (2).

W : 150 mm (5.91 in)
D : 30 mm (1.18 in)
H : 20 mm (0.79 in)
<□ : Vehicle front

CAUTION:

- Always insert a wooden block between oil pan (upper) of engine and front suspension member when removing air breather vent. (Because VVEL control shaft position sensor may be damaged by the interference between VVEL control shaft position sensor and dash panel if the operation is performed without the wooden block inserted.)
- After inserting wooden block, check it does not fall out easily.
- Remove rear engine mounting member with a power tool. Refer to <u>EM-207</u>, "<u>Exploded View</u>".
- 11. Remove bolt fixing A/T assembly to engine with power tool.
- 12. Remove bracket.



INSTALLATION

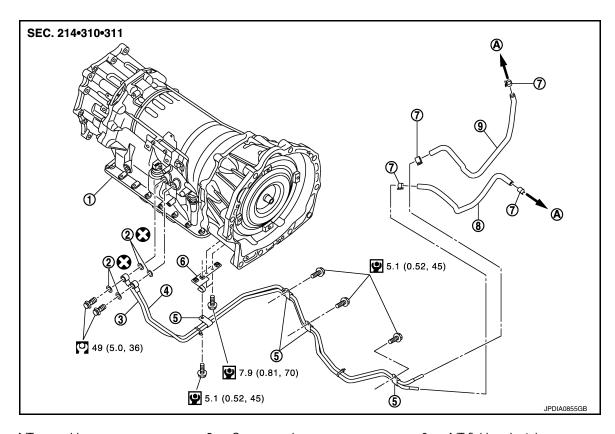
Note the following, and install in the reverse order of removal.

CAUTION:

- Never bend the air breather hose to prevent damage to the hose.
- Insert air breather hose to A/T breather tube all the way to the curve of the tube.
- Be sure to insert it fully until its end reaches the stop when inserting air breather hose to air breather box.
- Install air breather hose to air breather box so that the paint mark is facing backward.
- Securely install the clips to the brackets when installing air breather hose to the brackets.

FLUID COOLER SYSTEM

Exploded View



- A/T assembly
- 4. A/T fluid cooler tube
- 7. Hose clamp
- A. To radiator

- 2. Copper washer
- 5. Clip
- 8. A/T fluid cooler hose B
- A/T fluid cooler tube
- 6. Bracket
- 9. A/T fluid cooler hose A

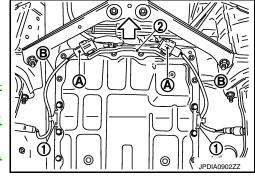
Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

REMOVAL

- 1. Shift the selector lever to "N" position, and release the parking brake.
- Remove air duct (inlet). Refer to <u>EM-187</u>, "Exploded View".
- Remove engine under cover with a power tool. Refer to EXT-31, "Exploded View".
- 4. Remove A/T fluid cooler hose A and A/T fluid cooler hose B.
- 5. Disconnect heated oxygen sensor 2 connectors (A).

- 6. Remove heated oxygen sensor 2 harness (B) from clips (1).
- Remove harness bracket (2) from A/T assembly. Refer to TM-496, "Exploded View".
- 8. Remove front propeller shaft. Refer to <u>DLN-112</u>, "VK50VE : <u>Exploded View"</u>.
- Remove front drive shaft (right side). Refer to <u>FAX-27</u>, <u>"Exploded View"</u>.
- 10. Remove A/T fluid cooler tubes from A/T assembly and engine assembly.
- 11. Plug up opening such as the A/T fluid cooler tube hole.



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FLUID COOLER SYSTEM

< REMOVAL AND INSTALLATION >

- 12. Remove clips and bracket.
- 13. Remove A/T fluid cooler tubes from the vehicle.

CAUTION:

Be careful not to bend A/T fluid cooler tubes.

INSTALLATION

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

CAUTION:

Never reuse copper washer.

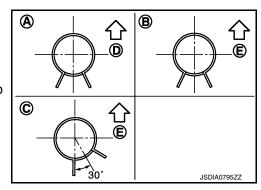
• Refer to the following when installing A/T fluid cooler hoses.

| Hose name | Hose end | Paint mark | Position of hose clamp* |
|--------------------------|----------------------------|-----------------|-------------------------|
| A/T fluid cooler hose A | Radiator assembly side | Facing backward | А |
| | A/T fluid cooler tube side | Facing downward | В |
| A/T fluid cooler hose B | Radiator assembly side | Facing downward | С |
| A/ I fluid cooler nose B | A/T fluid cooler tube side | Facing downward | В |

^{*:} Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

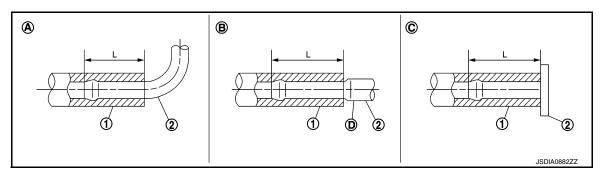
- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.



[7AT: RE7R01B (VK50VE)]

- Insert A/T fluid cooler hoses according to dimension "L" described below.

| (1) | (2) | Tube type | Dimension "L" |
|-------------------------|----------------------------|--|--|
| | Radiator assembly side | А | End reaches the radius curve end. |
| A/T fluid cooler hose A | A/T fluid cooler tube side | poler tube side B 30 mm (1.18 in) [End reach (D).] | |
| | Radiator assembly side | С | Insert the hose until the hose touches the radiator. |
| A/T fluid cooler hose B | A/T fluid cooler tube side | В | 30 mm (1.18 in) [End reaches the 2-stage bulge (D).] |



FLUID COOLER SYSTEM

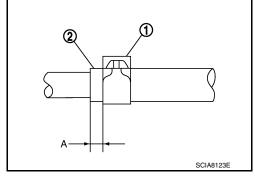
< REMOVAL AND INSTALLATION >

[7AT: RE7R01B (VK50VE)]

- Set hose clamps (1) at the both ends of A/T fluid cooler hoses (2) with dimension "A" from the hose edge.

Dimension "A" : 5 - 9 mm (0.20 - 0.35 in)

- Hose clamp should not interfere with the bulge of fluid cooler tube.



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Inspection and Adjustment

INSPECTION AFTER INSTALLATION

Start the engine and check visually that there is no leakage of ATF.

ADJUSTMENT AFTER INSTALLATION

Adjust A/T fluid level. Refer to TM-474, "Adjustment".

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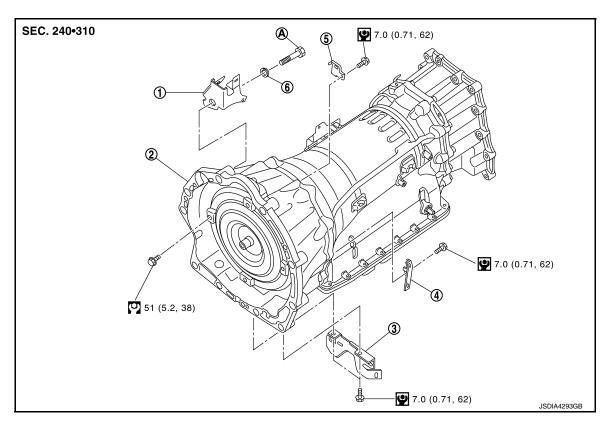
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UNIT REMOVAL AND INSTALLATION

TRANSMISSION ASSEMBLY

Exploded View



1. Bracket

2. A/T assembly

Bracket

Bracket

Bracket

- Bracket
- A. Tightening must be done following the installation procedure. Refer to TM-496, "Removal and Installation".

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

Removal and Installation

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REMOVAL

CAUTION:

- When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.
- Be careful not to damage sensor edge.
- Always insert a wooden block between oil pan (upper) of engine and front suspension member when removing A/T assembly from the engine. (Because VVEL control shaft position sensor may be damaged by the interference between VVEL control shaft position sensor and dash panel if the operation is performed without the wooden block inserted.)
- 1. Shift the selector lever to "P" position, and then release the parking brake.
- 2. Disconnect the battery cable from the negative terminal.
- Remove control rod from A/T shift selector. Refer to TM-480, "Exploded View".
- 4. Remove propeller shaft assembly (rear). Refer to DLN-140, "Exploded View".
- 5. Remove propeller shaft assembly (front). Refer to DLN-112, "VK50VE: Exploded View".
- Remove crankshaft position sensor (POS) from A/T assembly. Refer to <u>EM-198, "Exploded View"</u>.
 - · Never subject it to impact by dropping or hitting it.
 - Never disassemble.

TRANSMISSION ASSEMBLY

< UNIT REMOVAL AND INSTALLATION >

[7AT: RE7R01B (VK50VE)]

- Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
- Never place in an area affected by magnetism.
- 7. Remove rear plate cover. Refer to EM-198, "Exploded View".
- 8. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter. **CAUTION:**

When turning the crankshaft, turn it clockwise as viewed from the front of the engine.

- 9. Remove A/T fluid cooler tube from the A/T assembly and engine. Refer to TM-493, "Exploded View".
- 10. Plug up openings such as the A/T fluid cooler tube hole.
- 11. Support A/T assembly with a transmission jack. **CAUTION:**

When setting the transmission jack, be careful not to allow it to collide against the drain plug.

12. Insert a wooden block (A) between oil pan (upper) (1) of engine and front suspension member (2).

W : 150 mm (5.91 in)
D : 30 mm (1.18 in)
H : 20 mm (0.79 in)

<□ : Vehicle front

CAUTION:

- Always insert a wooden block between oil pan (upper) of engine and front suspension member when removing A/T assembly from the engine. (Because VVEL control shaft position sensor may be damaged by the interference between VVEL control shaft position sensor and dash panel if the operation is performed without the wooden block inserted.)
- After inserting wooden block, check it does not fall out easily.
- 13. Remove rear engine mounting member with power tool. Refer to <u>EM-207</u>, "Exploded View".
- Disconnect A/T assembly connector and AWD solenoid connector.
- Remove harness and brackets.
- 16. Remove bolts fixing A/T assembly to engine with power tool.
- Remove A/T assembly with transfer assembly from vehicle.
 CAUTION:
 - Secure torque converter to prevent it from dropping.
 - Secure A/T assembly to a transmission jack.
- 18. Remove air breather hose, air breather box, and bracket. Refer to TM-491, "Exploded View".
- 19. Remove manual lever and control rod. Refer to <u>TM-483</u>, "Exploded View".
- 20. Remove transfer assembly from A/T assembly with power tool. Refer to <u>DLN-66</u>, "VK50VE: Exploded View".

INSTALLATION

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

Perform inspection before installing A/T assembly. Refer to <u>TM-498</u>, "Inspection and Adjustment".

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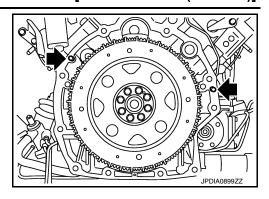
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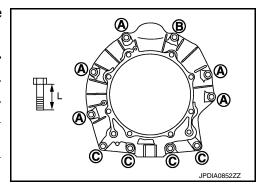
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Check fitting of dowel pin (



 Install the fixing bolts of A/T assembly and engine according to the following standards.

| Bolt symbol | Α | B [*] | С |
|-------------------------------------|--------------|----------------|--------------|
| Insertion direction | | ne | |
| Number of bolts | 5 | 1 | 4 |
| Bolt length (L) mm (in) | 70 (2.76) | | 65 (2.56) |
| Tightening torque N⋅m (kg-m, ft-lb) | 113 (12, 83) | | 74 (7.5, 55) |



- *: Tightening the bolt with bracket and spring washer. Refer to TM-491, "Exploded View".
- Align the positions of tightening bolts for drive plate with those of the torque converter, and temporarily tighten the bolts. Then, tighten the bolts with the specified torque.
 CAUTION:
 - When turning crankshaft, turn it clockwise as viewed from the front of the engine.
 - When tightening the tightening bolts for the torque converter after fixing the crankshaft pulley bolts, be sure to confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-223, "Exploded View".
 - Rotate crankshaft several turns and check to be sure that A/T rotates freely without binding after converter is installed to drive plate.

Inspection and Adjustment

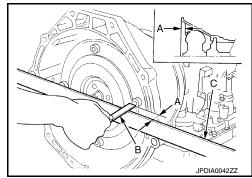
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INSPECTION BEFORE INSTALLATION

Check dimension (A) between the converter housing and torque converter.

B : ScaleC : Straightedge

Dimension (A) : Refer to <u>TM-574, "Torque Converter"</u>.



INSPECTION AFTER INSTALLATION

- Start the engine and check visually that there is no leakage of ATF.
- Check A/T position after adjusting A/T positions. Refer to TM-479, "Inspection and Adjustment".

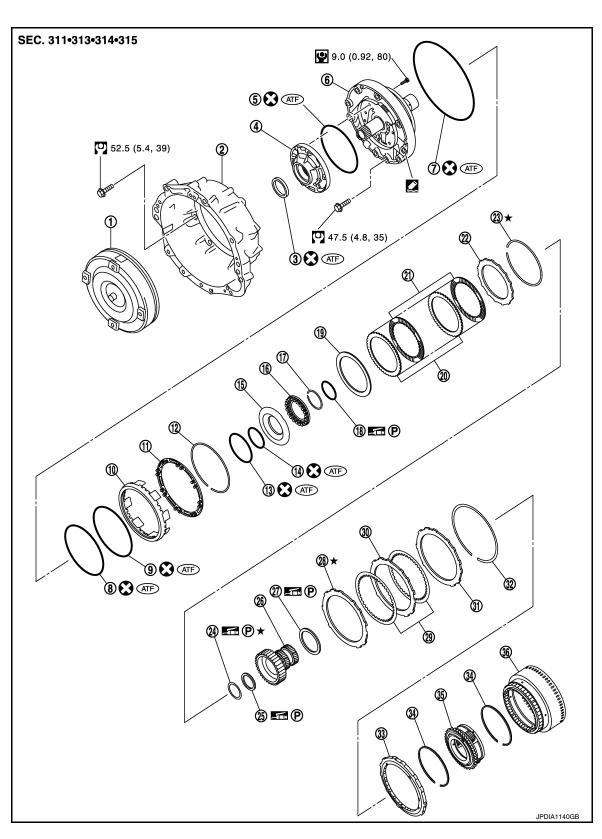
ADJUSTMENT AFTER INSTALLATION

- Adjust A/T fluid level. Refer to <u>TM-474</u>, "Adjustment".
- Adjust A/T position. Refer to TM-479, "Inspection and Adjustment".

UNIT DISASSEMBLY AND ASSEMBLY

TRANSMISSION ASSEMBLY

Exploded View



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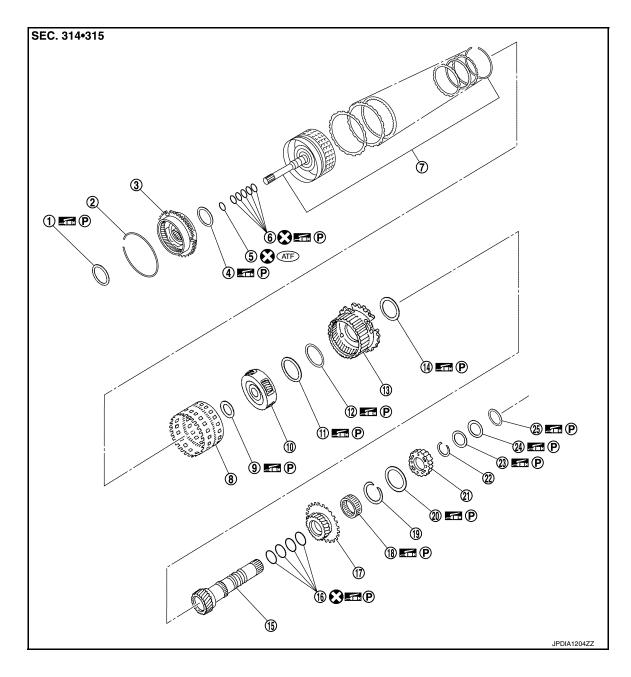
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| 1. | Torque converter | 2. | Converter housing | 3. | Oil pump housing oil seal |
|-----|-----------------------------|-----|------------------------------|-----|---------------------------|
| 4. | Oil pump housing | 5. | O-ring | 6. | Oil pump cover |
| 7. | O-ring | 8. | D-ring | 9. | D-ring |
| 10. | Front brake piston | 11. | Front brake spring retainer | 12. | Snap ring |
| 13. | D-ring | 14. | D-ring | 15. | 2346 brake piston |
| 16. | 2346 brake spring retainer | 17. | Snap ring | 18. | Seal ring |
| 19. | 2346 brake dish plate | 20. | 2346 brake driven plate | 21. | 2346 brake drive plate |
| 22. | 2346 brake retaining plate | 23. | Snap ring | 24. | Bearing race |
| 25. | Needle bearing | 26. | Under drive sun gear | 27. | Needle bearing |
| 28. | Front brake retaining plate | 29. | Front brake drive plate | 30. | Front brake driven plate |
| 31. | Front brake retaining plate | 32. | Snap ring | 33. | 1st one-way clutch |
| 34. | Snap ring | 35. | Under drive carrier assembly | 36. | Front brake hub assembly |

Apply Genuine RTV silicone sealant or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants". Refer to GI-4, "Components" for symbols not described on the above.



TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

25. Needle bearing

[7AT: RE7R01B (VK50VE)]

| 1. | Needle bearing | 2. | Snap ring | 3. | Front carrier assembly | Α |
|-----|-----------------------|-----|--------------------|-----|---------------------------------|---|
| 4. | Needle bearing | 5. | O-ring | 6. | Seal ring | |
| 7. | Input clutch assembly | 8. | Rear internal gear | 9. | Needle bearing | |
| 10. | Mid carrier assembly | 11. | Needle bearing | 12. | Bearing race | В |
| 13. | Rear carrier assembly | 14. | Needle bearing | 15. | Mid sun gear | |
| 16. | Seal ring | 17. | Rear sun gear | 18. | 2nd one-way clutch | |
| 19. | Snap ring | 20. | Needle bearing | 21. | High and low reverse clutch hub | С |
| 22. | Snap ring | 23. | Bearing race | 24. | Bearing race | |
| | | | | | | |

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

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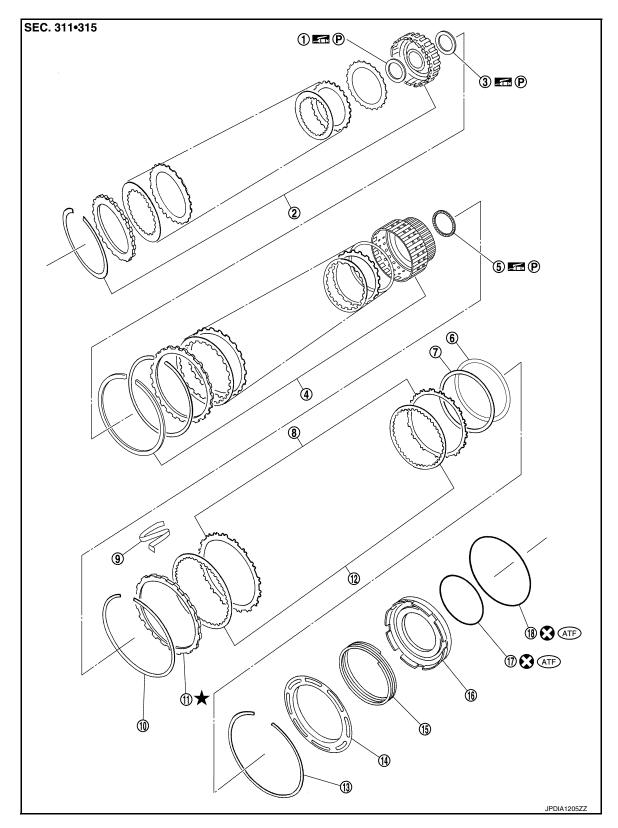
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- 1. Bearing race
- 4. Direct clutch assembly
- 7. Reverse brake dish plate
- 10. Snap ring
- 13. Snap ring

- High and low reverse clutch assembly
- 5. Needle bearing
- 8. Reverse brake driven plate
- 11. Reverse brake retaining plate
- 14. Reverse brake spring retainer
- Needle bearing
- 6. Reverse brake dish plate
- 9. N-spring
- 12. Reverse brake drive plate
- 15. Reverse brake return spring

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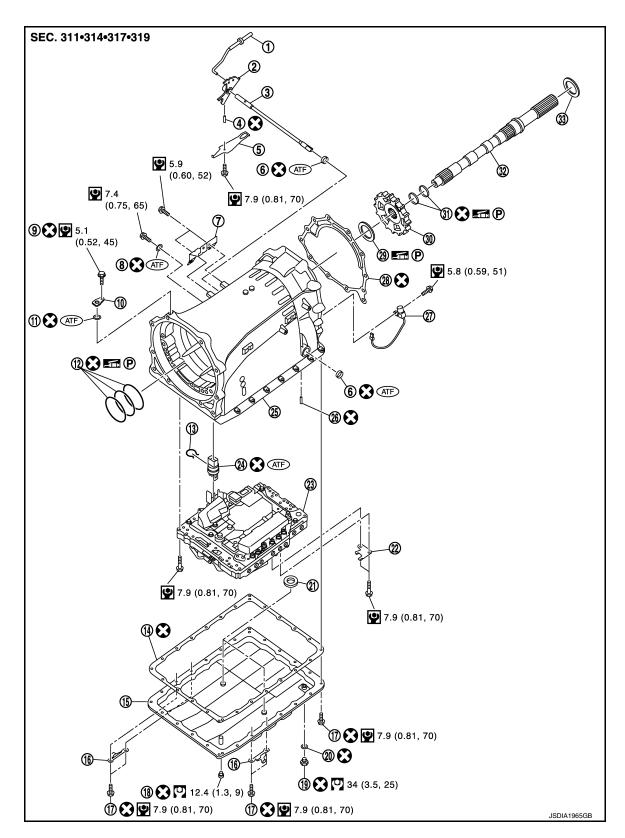
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16. Reverse brake piston

17. D-ring

18. D-ring

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



- 1. Parking rod
- 4. Retaining pin
- 7. Bracket
- 10. Baffle plate

- 2. Manual plate
- 5. Detent spring
- 8. O-ring
- 11. O-ring

- 3. Manual shaft
- Oil seal
- 9. Self-sealing bolt
- Seal ring

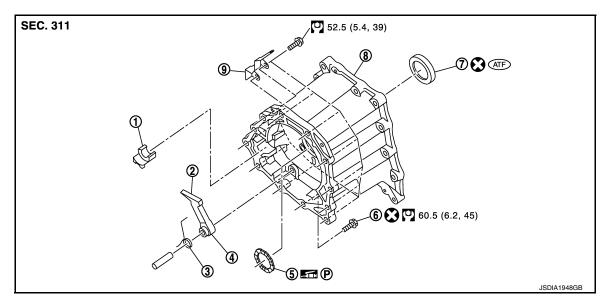
TRANSMISSION ASSEMBLY

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

| 13. | Snap ring | 14. | Oil pan gasket | 15. | Oil pan |
|-----|-------------------|-----|-----------------------|-----|---------------------|
| 16. | Clip | 17. | Oil pan mounting bolt | 18. | Overflow plug |
| 19. | Drain plug | 20. | Drain plug gasket | 21. | Magnet |
| 22. | Clip | 23. | Control valve & TCM | 24. | Joint connector |
| 25. | Transmission case | 26. | Retaining pin | 27. | Output speed sensor |
| 28. | Gasket | 29. | Needle bearing | 30. | Parking gear |
| 31. | Seal ring | 32. | Output shaft | 33. | Bearing race |

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



- 1. Parking actuator support
- 4. Return spring
- 7. Rear oil seal

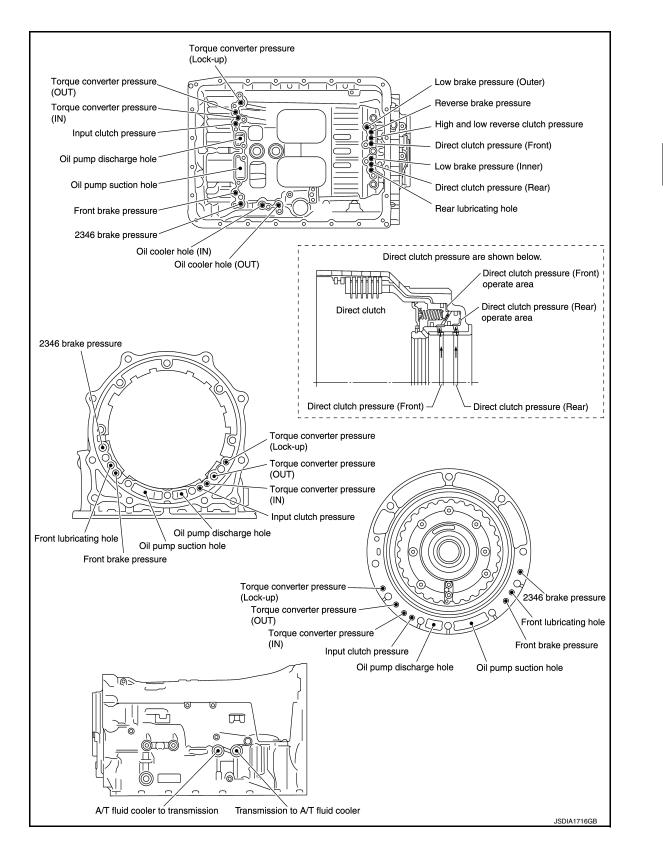
- 2. Parking pawl
- 5. Needle bearing
- 8. Adapter case

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

- 3. Pawl shaft
- 6. Self-sealing bolt
- 9. Bracket

[7AT: RE7R01B (VK50VE)]

Oil Channel



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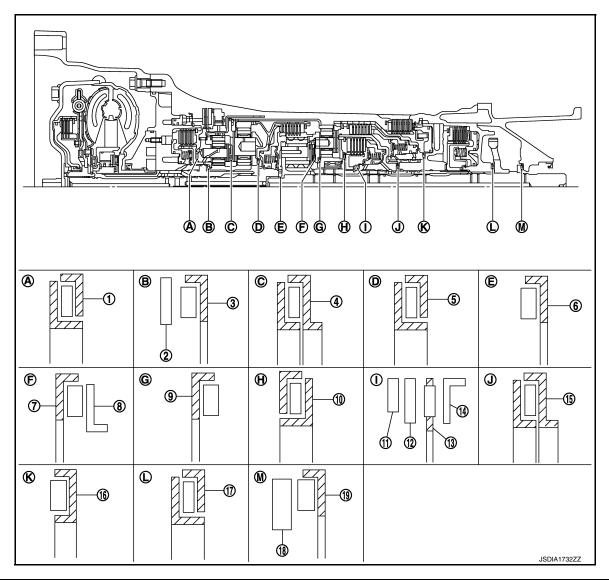
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[7AT: RE7R01B (VK50VE)]

Location of Needle Bearings and Bearing Races





| Location | Item | Outer diameter mm (in) |
|----------|---------------------|------------------------|
| A | (1) Needle bearing | 94 (3.701) |
| В | (2) Bearing race | 58.6 (2.307) |
| | (3) Needle bearing | 60 (2.362) |
| С | (4) Needle bearing | 84.6 (3.331) |
| D | (5) Needle bearing | 77 (3.031) |
| E | (6) Needle bearing | 47 (1.850) |
| F | (7) Needle bearing | 84 (3.307) |
| | (8) Bearing race | 82 (3.228) |
| G | (9) Needle bearing | 80 (3.150) |
| Н | (10) Needle bearing | 92 (3.622) |
| ı | (11) Bearing race | 60.0 (2.362) |
| | (12) Bearing race | 61.1 (2.406) |
| | (13) Needle bearing | 60 (2.362) |
| | (14) Bearing race | 61.9 (2.437) |
| J | (15) Needle bearing | 62.8 (2.472) |

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

| Location | Item | Outer diameter mm (in) |
|----------|---------------------|------------------------|
| K | (16) Needle bearing | 92 (3.622) |
| L | (17) Needle bearing | 65 (2.559) |
| M | (18) Bearing race | 58 (2.283) |
| IVI | (19) Needle bearing | 60 (2.362) |

Location of Snap Rings

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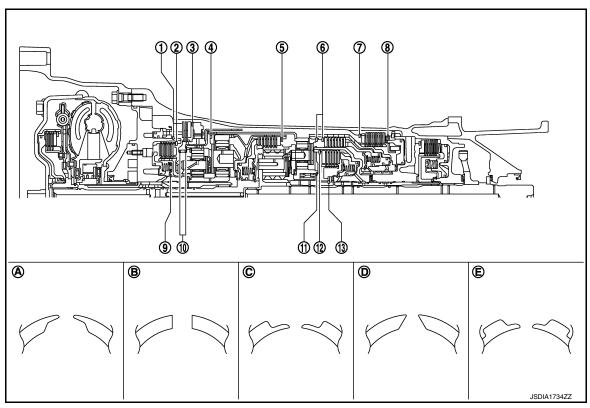
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| Location | Shape of snap ring | Outer diameter mm (in) |
|----------|--------------------|------------------------|
| 1 | A | 159.9 (6.295) |
| 2 | В | 159 (6.260) |
| 3 | В | 216 (8.504) |
| 4 | В | 180.4 (7.102) |
| 5 | С | 171.5 (6.752) |
| 6 | В | 169 (6.654) |
| 7 | В | 180.5 (7.106) |
| 8 | В | 181.0 (7.126) |
| 9 | D | 64.6 (2.543) |
| 10 | В | 136 (5.354) |
| 11 | E | 70.5 (2.776) |
| 12 | В | 135 (5.315) |
| 13 | A | 48.4 (1.906) |

Disassembly

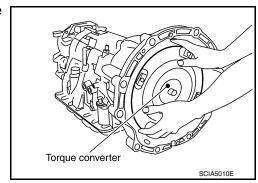
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CAUTION:

Never disassemble parts behind drum support. Refer to TM-331, "Cross-Sectional View".

[7AT: RE7R01B (VK50VE)]

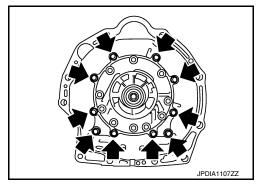
- 1. Drain ATF through drain plug.
- 2. Remove torque converter by holding it firmly and turning while pulling straight out.



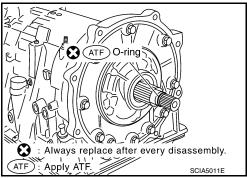
- 3. Remove tightening bolts (←) for converter housing and transmission case.
- 4. Remove converter housing from transmission case.

CAUTION:

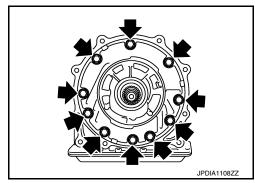
Be careful not to scratch converter housing.



5. Remove O-ring from input clutch assembly.



6. Remove tightening bolts (←) for oil pump assembly and transmission case.



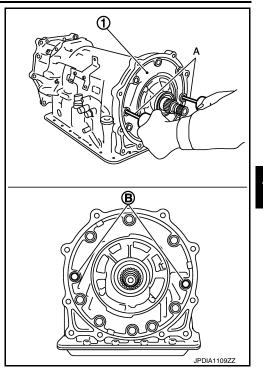
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

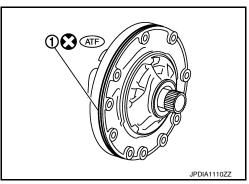
- 7. Attach the sliding hammers (SST: ST25850000) (A) to oil pump assembly (1) and extract it evenly from transmission case.
 - B : Sliding hammer attachment position

CAUTION:

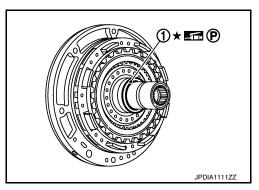
- Fully tighten the sliding hammer screws.
- Make sure that bearing race is installed to the oil pump assembly edge surface.



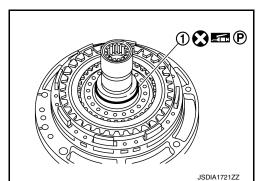
8. Remove O-ring (1) from oil pump assembly.



9. Remove bearing race (1) from oil pump assembly.



10. Remove seal ring (1) from oil pump assembly.



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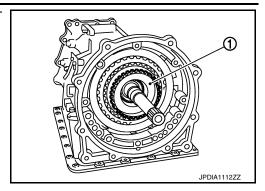
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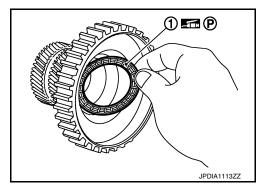
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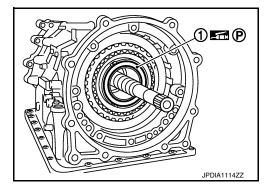
11. Remove under drive sun gear (1) from under drive carrier assembly.



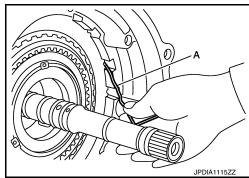
12. Remove needle bearing (1) from under drive sun gear.



13. Remove needle bearing (1) from under drive carrier assembly.



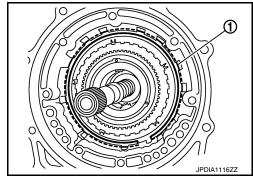
14. Remove front brake component part (retaining plates, drive plates, and driven plate) from transmission case by using a wire (A) with its tip bent like a hook.



15. Remove snap ring (1) from transmission case using a flat-bladed screwdriver.

CAUTION:

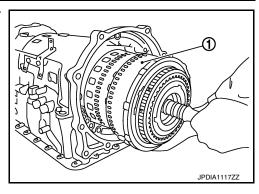
- Be careful not to scratch transmission case and 1st oneway clutch.
- Be careful not to damage snap ring.



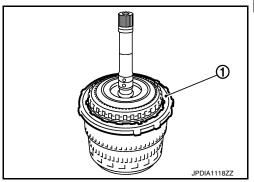
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

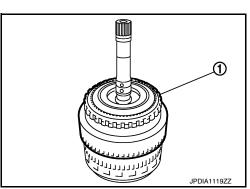
16. Remove input clutch assembly (with 1st one-way clutch, under drive carrier assembly, front brake hub, front carrier assembly, and rear internal gear) (1) from transmission case.



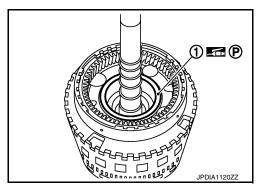
17. Remove 1st one-way clutch (1) from front brake hub.



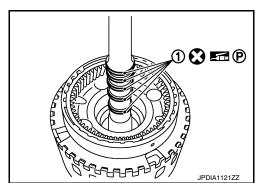
18. Remove under drive carrier assembly (with front brake hub) (1) from front carrier assembly.



19. Remove needle bearing (1) from front carrier assembly.



20. Remove seal rings (1) from input clutch assembly.



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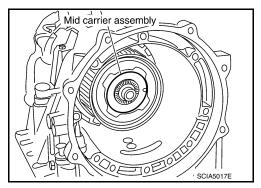
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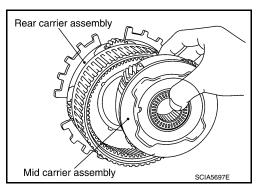
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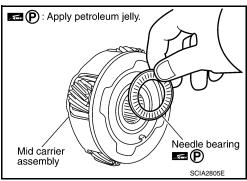
21. Remove mid carrier assembly and rear carrier assembly as a unit



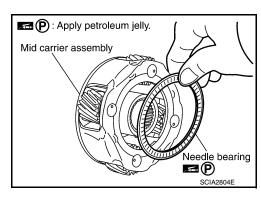
22. Remove mid carrier assembly from rear carrier assembly.



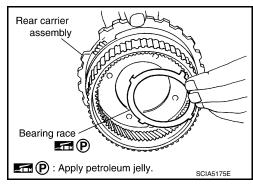
23. Remove needle bearing (front side) from mid carrier assembly.



24. Remove needle bearing (rear side) from mid carrier assembly.



25. Remove bearing race from rear carrier assembly.



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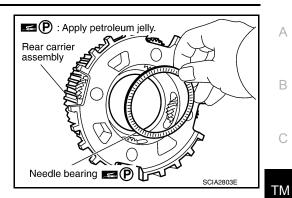
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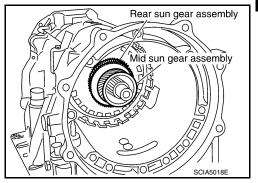
26. Remove needle bearing from rear carrier assembly.



27. Remove mid sun gear assembly, rear sun gear assembly, and high and low reverse clutch hub as a unit.

CAUTION:

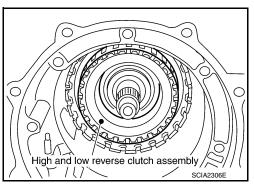
Be careful to remove then with bearing race and needle bearing.



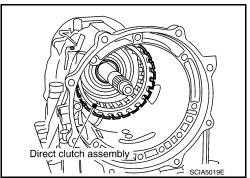
28. Remove high and low reverse clutch assembly from direct clutch assembly.

CAUTION:

Make sure that needle bearing is installed to the high and low reverse clutch assembly edge surface.

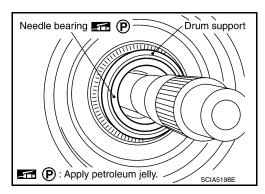


29. Remove direct clutch assembly from reverse brake.

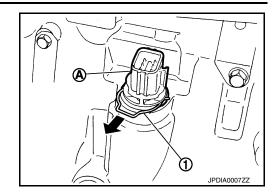


30. Remove needle bearing from drum support.

Revision: 2015 February



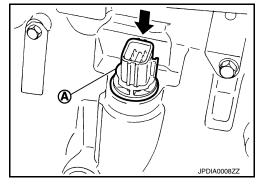
TM-513 2015 QX70 31. Remove snap ring (1) from joint connector (A).



32. Push joint connector (A).

CAUTION:

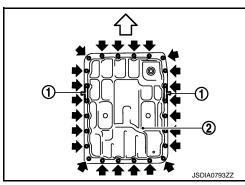
Be careful not to damage connector.



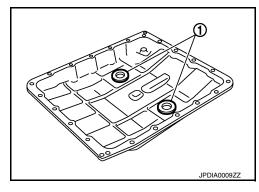
33. Remove clips (1) and oil pan mounting bolts (←).

<□ : Front

34. Remove oil pan (2) and oil pan gasket.



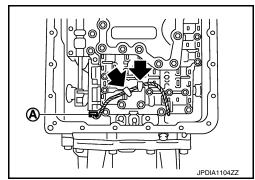
35. Remove magnets (1) from oil pan.



36. Disconnect output speed sensor connector (A). **CAUTION:**

Be careful not to damage connector.

37. Disengage terminal clips (←).



TM-515

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

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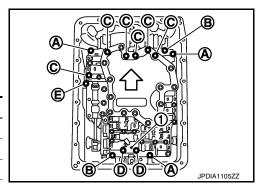
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38. Remove control valve & TCM mounting bolts and clip (1) from the control valve & TCM.

⟨⇒ : Front

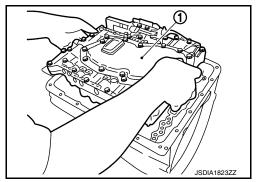
| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| A | 43 (1.69) | 3 |
| В | 40 (1.57) | 2 |
| С | 54 (2.13) | 6 |
| D | 50 (1.97) | 2 |
| E* | 50 (1.97) | 1 |



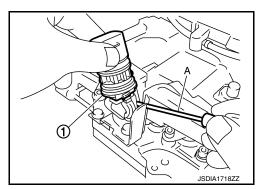
*: Reamer bolt

39. Remove the control valve & TCM (1) from transmission case. **CAUTION:**

When removing, never with the manual valve notch and manual plate height. Remove it vertically.



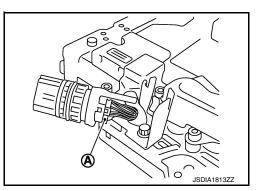
40. Remove joint connector (1) from the control valve & TCM using a flat-bladed screwdriver (A).



41. Disconnect TCM connector (A).

CAUTION:

Be careful not to damage connector.



2015 QX70

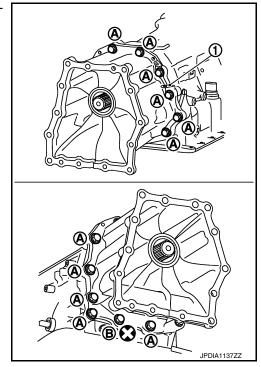
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

42. Remove tightening bolts for adapter case assembly and transmission case.

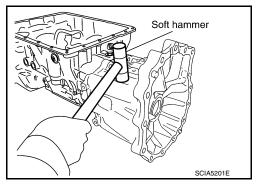
1 : Bracket A : Bolt

B : Self-sealing bolt

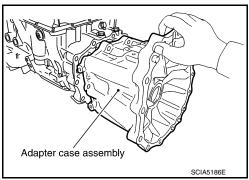


43. Tap adapter case assembly using a soft hammer. **CAUTION:**

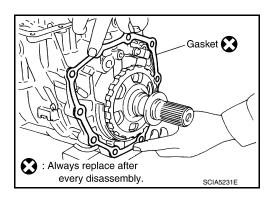
Be careful not to damage adapter case.



44. Remove adapter case assembly from transmission case. (With needle bearing)



45. Remove gasket from transmission case.



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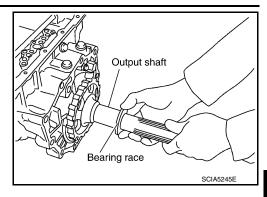
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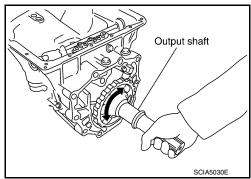
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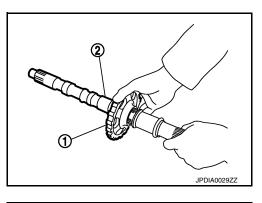
46. Remove bearing race from output shaft.



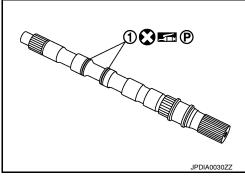
47. Remove output shaft from transmission case by rotating left/ right.



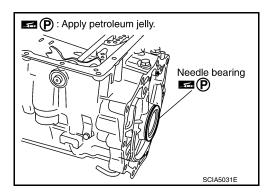
48. Remove parking gear (1) from output shaft (2).



49. Remove seal rings (1) from output shaft.



50. Remove needle bearing from transmission case.

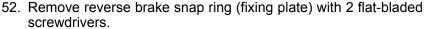


51. Remove output speed sensor (1) from transmission case.



CALITION:

- · Never subject it to impact by dropping or hitting it.
- Never disassemble.
- Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
- · Never place in an area affected by magnetism.



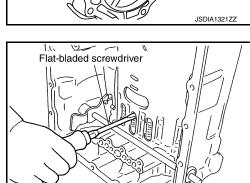
CAUTION:

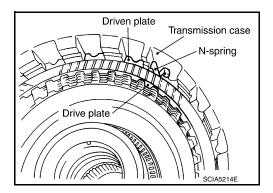
- Be careful not to scratch transmission case and reverse brake retaining plate.
- · Be careful not to damage snap ring.

NOTE:

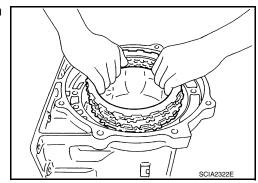
Press out snap ring from the transmission case oil pan side gap with a flat-bladed screwdriver, and remove it using a another screwdriver.

- 53. Remove reverse brake retaining plate from transmission case.
- 54. Remove N-spring from transmission case.





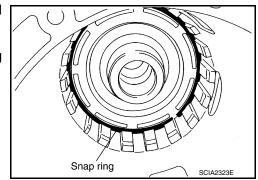
55. Remove reverse brake component part (drive plates, driven plates, and dish plates) from transmission case.

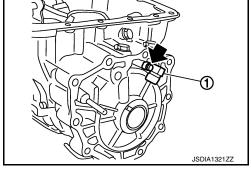


56. Remove snap ring (fixing spring retainer) using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch transmission case and spring retainer
- · Be careful not to damage snap ring.





< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

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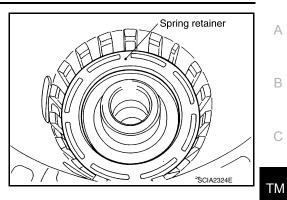
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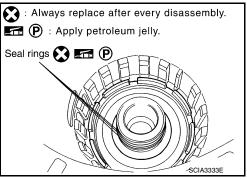
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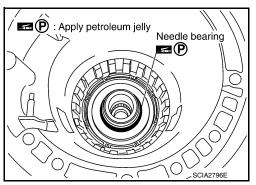
57. Remove reverse brake spring retainer and reverse brake return spring from transmission case.



58. Remove seal rings from drum support.



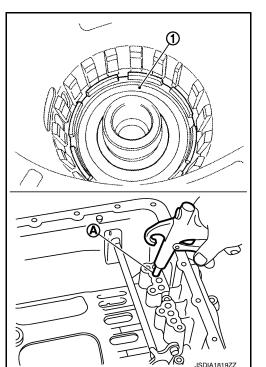
59. Remove needle bearing from drum support edge surface.



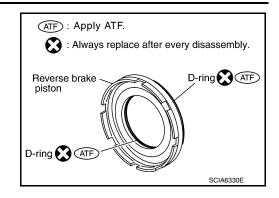
60. Remove reverse brake piston (1) from transmission case with compressed air. Refer to TM-505, "Oil Channel".

: Reverse brake pressure hole

Care should be taken not to abruptly blow air. It makes pistons incline, as the result, it becomes hard to disassemble the pistons.

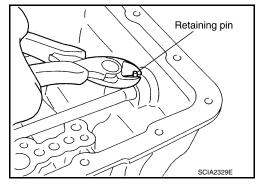


61. Remove D-rings from reverse brake piston.

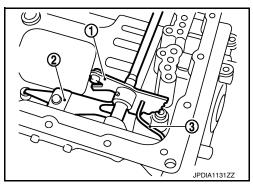


62. Remove manual shaft retaining pin with pair of nippers. **CAUTION:**

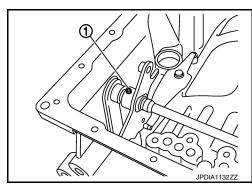
Be careful not to cut retaining pin.



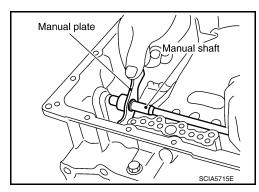
- 63. Remove manual plate (1) from detent spring (2).
- 64. Remove parking rod (3) from manual plate.
- 65. Install manual plate to detent spring.



66. Use a pin punch [4 mm (0.16 in) dia. commercial service tool] to knock out retaining pin (1).



67. Remove manual plate from manual shaft.



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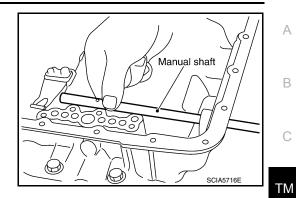
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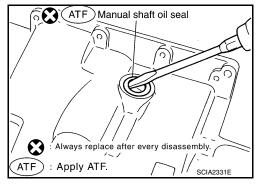
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68. Remove manual shaft from transmission case.



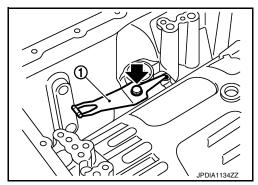
69. Remove manual shaft oil seals using a flat-bladed screwdriver. **CAUTION:**

Be careful not to scratch transmission case.

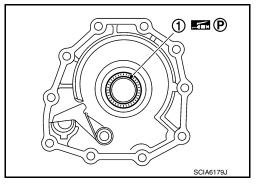


70. Remove detent spring (1) from transmission case.

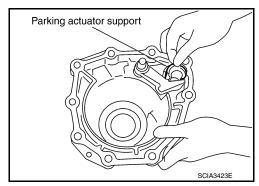
: Bolt



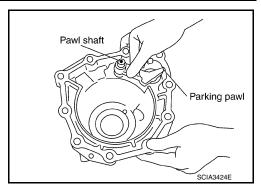
71. Remove needle bearing (1) from adapter case.



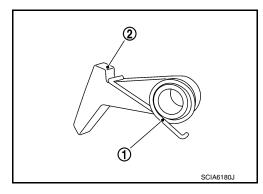
72. Remove parking actuator support from adapter case.



73. Remove parking pawl (with return spring) and pawl shaft from adapter case.



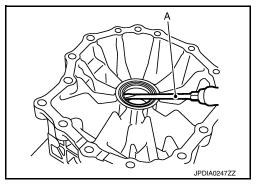
74. Remove return spring (1) from parking pawl (2).



75. Remove rear oil seal from adapter case using a flat-bladed screwdriver (A).

CAUTION:

Be careful not to scratch adapter case.

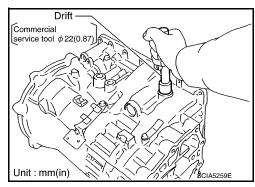


Assembly INFOID:000000010579280

As shown in the figure, use a drift [22 mm (0.87 in) dia. commercial service tool] to drive manual shaft oil seals into the transmission case until it is flush.

CAUTION:

- Never reuse manual shaft oil seals.
- Apply ATF to manual shaft oil seals.



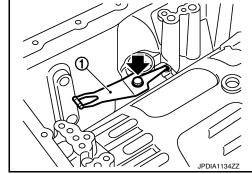
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

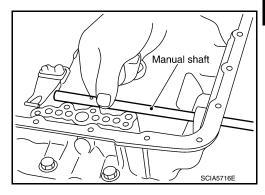
Install detent spring to transmission case. Tighten detent spring bolt to the specified torque.



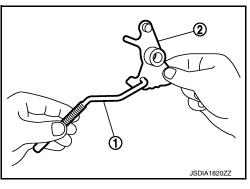
: Bolt



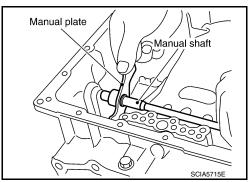
3. Install manual shaft to transmission case.



4. Install parking rod (1) to manual plate (2).



5. Install manual plate (with parking rod) to manual shaft.

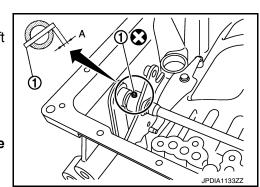


- 6. Install retaining pin (1) into the manual plate and manual shaft.
- a. Fit pinhole of the manual plate to pinhole of the manual shaft with a pin punch.
- b. Use a hammer to tap the retaining pin into the manual plate.

A : Approx. 2 mm (0.08in)

CAUTION:

Drive retaining pin to 2 ± 0.5 mm (0.08 ±0.020 in) over the manual plate.



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< UNIT DISASSEMBLY AND ASSEMBLY >

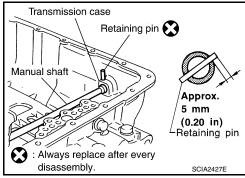
[7AT: RE7R01B (VK50VE)]

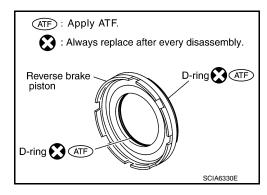
- 7. Install retaining pin into the transmission case and manual shaft.
- a. Fit pinhole of the transmission case to pinhole of the manual shaft with a pin punch.
- b. Use a hammer to tap the retaining pin into the transmission case.

CAUTION:

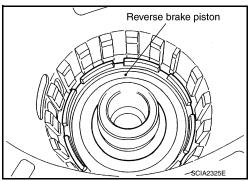
Drive retaining pin to 5 ± 1 mm (0.20 ±0.04 in) over the transmission case.

8. Install D-rings to reverse brake piston.



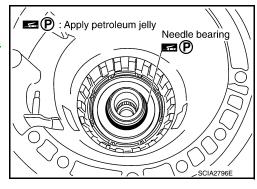


9. Install reverse brake piston to transmission case.

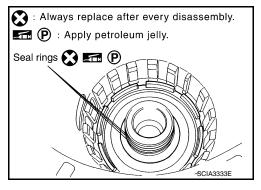


10. Install needle bearing to drum support edge surface.

Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



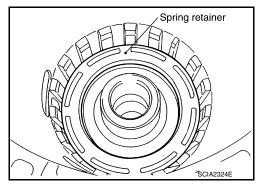
11. Install seal rings to drum support.



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

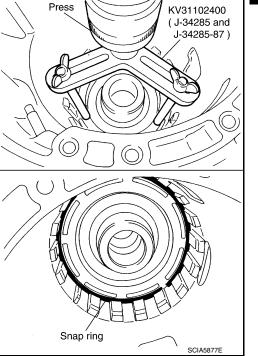
12. Install reverse brake spring retainer and reverse brake return spring to transmission case.



13. Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)]on reverse brake spring retainer and install snap ring (fixing spring retainer) to transmission case while compressing return spring.

CAUTION:

- Securely assemble them using a flat-bladed screwdriver so that snap ring tension is slightly weak.
- · Be careful not to damage snap ring.



14. Install reverse brake component part (drive plates, driven plates, and dish plates) to transmission case.

1 : Snap ring

2 : Retaining plate

3 : Drive plate (eight pieces)

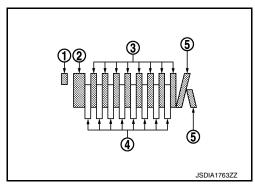
4 : Driven plate (eight pieces)

5 : Dish plate

6 : Dish plate

CAUTION:

Check order of plates.



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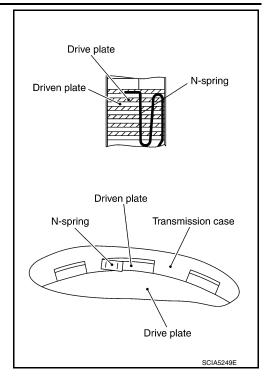
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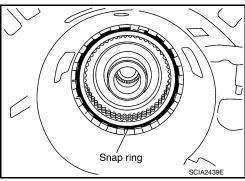
- 15. Assemble N-spring.
- 16. Install reverse brake retaining plate to transmission case.



17. Install snap ring to transmission case.

CAUTION:

Be careful not to damage snap ring.

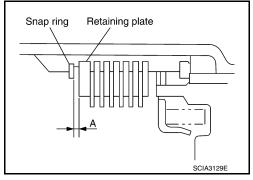


18. Measure clearance between retaining plate and snap ring. If not within specified clearance, select proper retaining plate.

Specified clearance "A"

Standard: <u>TM-574, "Reverse Brake Clearance"</u>.

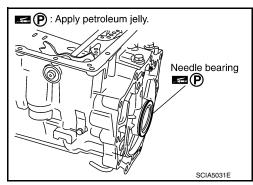
Retaining plate: Refer to <u>TM-574, "Reverse Brake Clearance"</u>



19. Install needle bearing to transmission case.

CAUTION:

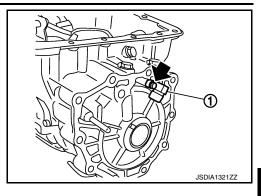
Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

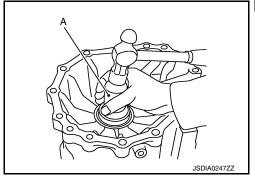
- 20. Install output speed sensor (1) to transmission case and tighten output speed sensor mounting bolt (←) to the specified torque. CAUTION:
 - · Never subject it to impact by dropping or hitting it.
 - · Never disassemble.
 - Never allow metal filings, etc. to get on the sensor's front edge magnetic area.
 - · Never place in an area affected by magnetism.



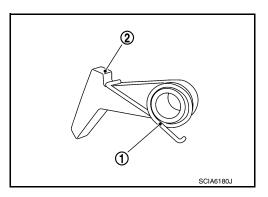
21. As shown in the figure, use the drift [64 mm (2.52 in) dia. commercial service tool] (A) to drive rear oil seal into adapter case until it is flush.

CAUTION:

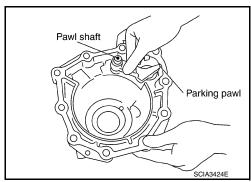
- · Never reuse rear oil seal.
- Apply ATF to rear oil seal.



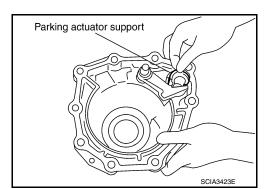
22. Install return spring (1) to parking pawl (2).



 Install parking pawl (with return spring) and pawl shaft to adapter case.



24. Install parking actuator support to adapter case.



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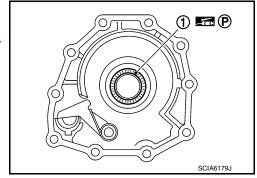
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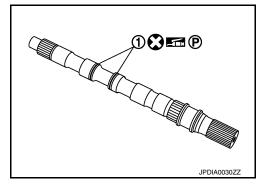
[7AT: RE7R01B (VK50VE)]

25. Install needle bearing (1) to adapter case. **CAUTION:**

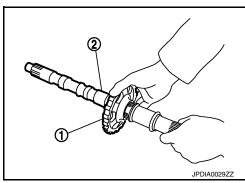
Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



26. Install seal rings (1) to output shaft.



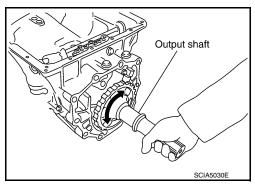
27. Install parking gear (1) to output shaft (2).



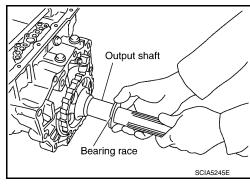
28. Install output shaft to transmission case.

CAUTION:

Be careful not to mistake front for rear because both sides looks similar. (Thinner end is front side.)



29. Install bearing race to output shaft.



[7AT: RE7R01B (VK50VE)]

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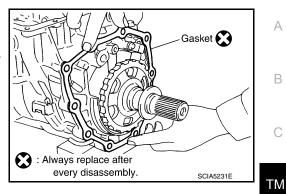
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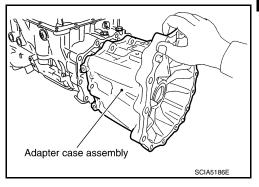
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- Install gasket onto transmission case. **CAUTION:**
 - · Completely remove all moisture, oil and old gasket, etc. from the transmission case and adapter case assembly mounting surfaces.
 - · Never reuse gasket.



31. Install adapter case assembly to transmission case. **CAUTION:**

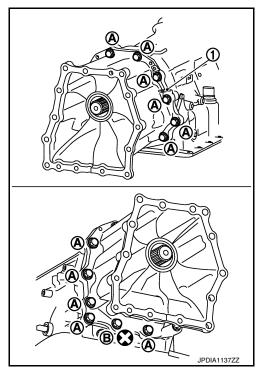
Insert the tip of parking rod between the parking pawl and the parking actuator support when assembling the adapter case assembly.



32. Tighten adapter case assembly bolts to the specified torque.

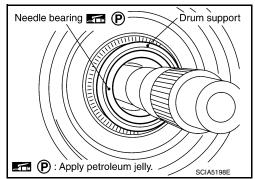
: Bracket Α : Bolt

: Self-sealing bolt



33. Install needle bearing to drum support. **CAUTION:**

Check the direction of needle bearing. Refer to TM-506. "Location of Needle Bearings and Bearing Races".



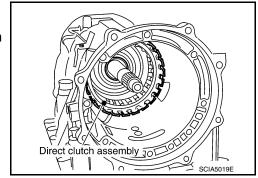
TM-529 **Revision: 2015 February** 2015 QX70

< UNIT DISASSEMBLY AND ASSEMBLY >

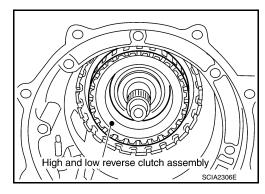
[7AT: RE7R01B (VK50VE)]

34. Install direct clutch assembly to reverse brake. **CAUTION:**

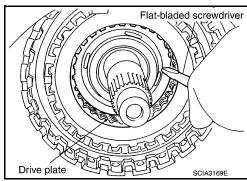
Make sure that drum support edge surface and direct clutch inner boss edge surface come to almost same place.



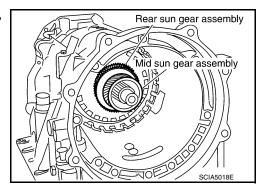
35. Install high and low reverse clutch assembly to direct clutch.



36. Align the drive plate using a flat-bladed screwdriver.



37. Install high and low reverse clutch hub, mid sun gear assembly, and rear sun gear assembly as a unit.



CAUTION:

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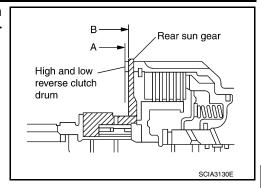
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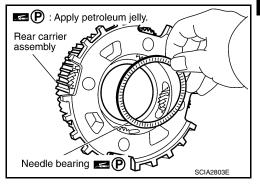
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Make sure that portion "A" of high and low reverse clutch drum protrudes approximately 2 mm (0.08 in) beyond portion "B" of rear sun gear.



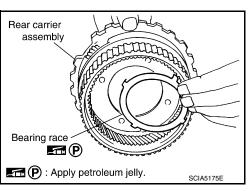
Install needle bearing to rear carrier assembly.
 CAUTION:

Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

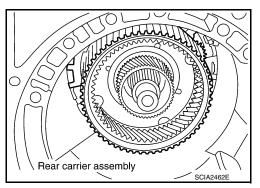


Install bearing race to rear carrier assembly.
 CAUTION:

Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

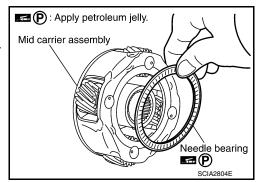


40. Install rear carrier assembly to direct clutch drum.



41. Install needle bearing (rear side) to mid carrier assembly. **CAUTION:**

Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



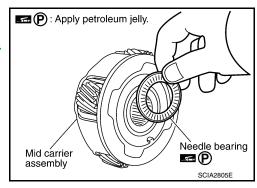
Revision: 2015 February TM-531 2015 QX70

< UNIT DISASSEMBLY AND ASSEMBLY >

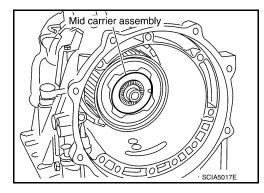
[7AT: RE7R01B (VK50VE)]

42. Install needle bearing (front side) to mid carrier assembly. **CAUTION:**

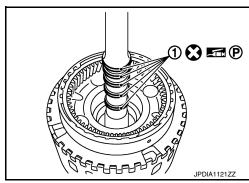
Check the direction of needle bearing. Refer to <u>TM-506</u>. "Location of Needle Bearings and Bearing Races".



43. Install mid carrier assembly to rear carrier assembly.

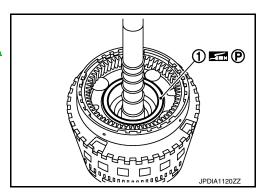


44. Install seal rings (1) to input clutch assembly.



45. Install needle bearing (1) to front carrier assembly. CAUTION:

Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

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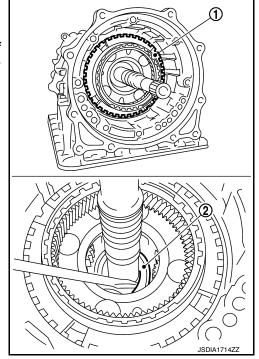
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46. Install input clutch assembly (with front carrier assembly and rear internal gear) (1) to transmission case.

CAUTION:

Check that the needle bearing (2) is securely positioned. If the needle bearing position is misaligned, adjust it to the specified position.



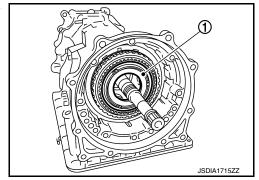
- 47. Install 1st one-way clutch (1) to front brake hub (with under drive carrier) (2).
- 48. Check operation of 1st one-way clutch.
- a. Hold 1st one-way clutch.
- b. Check front brake hub for correct locking and unlocking directions.
 - ← : Unlocked< : Locked

2 JSDIA1713ZZ

CAUTION:

If not shown in figure, check installation direction of 1st one-way clutch.

49. Install under drive carrier (with 1st one-way clutch) (1) to transmission case.



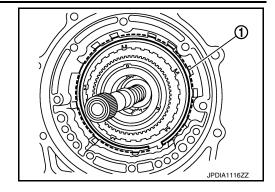
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Revision: 2015 February TM-533 2015 QX70

50. Install snap ring (1) to transmission case. **CAUTION:**

Be careful not to damage snap ring.



51. Install front brake component part (retaining plates, drive plates, and driven plate) to transmission case.

1 : Retaining plate (thin)

2 : Drive plate3 : Driven plate

4 : Retaining plate (thick)

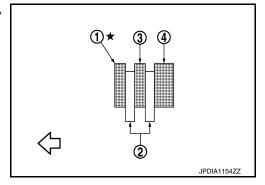
<□ : Front

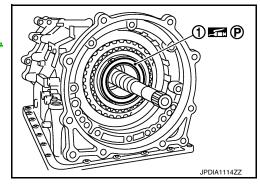
CAUTION:

Check order of plates.

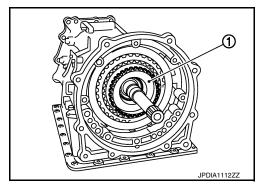
52. Install needle bearing (1) to under drive carrier assembly. **CAUTION:**

Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.

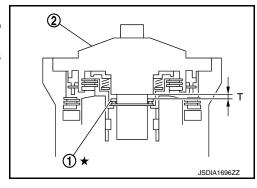




53. Install under drive sun gear (1) to under drive carrier assembly.



- 54. Adjustment of total end play "T".
 - Measure clearance between bearing race (1) and oil pump cover (2).
 - Select proper thickness of bearing race so that end play is within specifications.



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< UNIT DISASSEMBLY AND ASSEMBLY >

a. Measure dimensions "K" and "L", and calculate dimension "J".

: Transmission case
 : Under drive sun gear

A : Straightedge

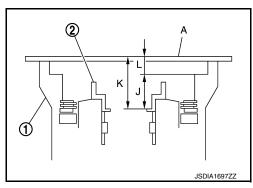
"J" : Distance between the oil pump fitting surface of transmission case and the needle bearing mating surface of under drive sun gear.

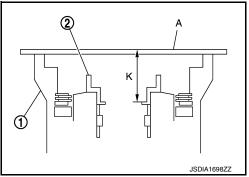
$$J = K - L$$

 Measure dimension "K" between the converter housing fitting surface of transmission case and the needle bearing mating surface of under drive sun gear.

CAUTION:

- Never change the straightedge (A) installation position before the completion of "L" measurement.
- Measure dimension "K" in at least three places, and take the average.





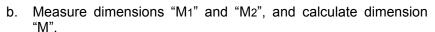
 Measure dimension "L" between the converter housing fitting surface of transmission case and the oil pump fitting surface of transmission case.

CAUTION:

Measure dimension "L" in at least three places, and take the average.

iii. Calculate dimension "J".

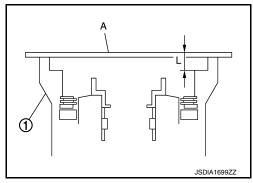
$$J = K - L$$

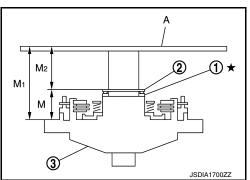


: Bearing race
 : Needle bearing
 : Oil pump assembly
 : Straightedge

"M" : Distance between the transmission case fitting surface of oil pump and the needle bearing on oil pump.

$$M = M_1 - M_2$$





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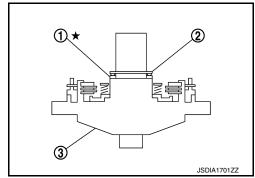
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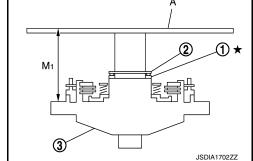
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i. Place bearing race (1) and needle bearing (2) on oil pump assembly (3).



ii. Measure dimension "M1" between the transmission case fitting surface of oil pump and the end of oil pump.

: Bearing race
 : Needle bearing
 : Oil pump assembly
 : Straightedge

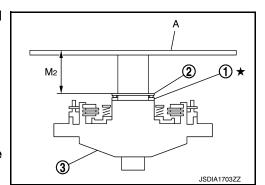


CAUTION:

Measure dimension "M1" in at least three places, and take the average.

iii. Measure dimension "M2" between the needle bearing on oil pump and the end of oil pump.

: Bearing race
 : Needle bearing
 : Oil pump assembly
 : Straightedge



CAUTION:

Measure dimension "M2" in at least three places, and take the average.

iv. Calculate dimension "M".

 $M = M_1 - M_2$

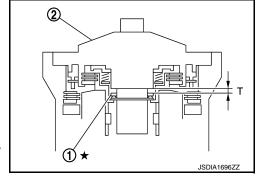
c. Adjust total end play "T".

1 : Bearing race2 : Oil pump assembly

T = J - M

Total end play "T" : Refer to TM-574, "Total End Play".

• Select proper thickness of bearing race so that total end play is within specifications.

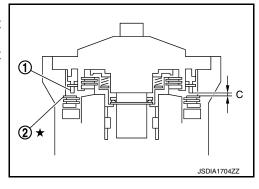


Bearing races : Refer to TM-574, "Total End Play".

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

- 55. Adjustment of front brake clearance "C".
 - Measure clearance between front brake piston (1) and front brake retaining plate (2).
 - Select proper thickness of front brake retaining plat so that clearance is within specifications.



Measure dimensions "O" and "P", and calculate dimension "N".

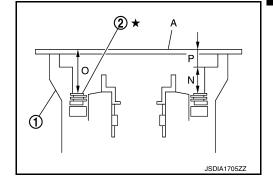
1 : Transmission case

2 : Front brake retaining plate

A : Straightedge

"N" : Distance between the oil pump fitting surface of transmission case and the front brake retaining plate.

$$N = O - P$$



i. Measure dimension "O" between the converter housing fitting surface of transmission case and the front brake retaining plate.

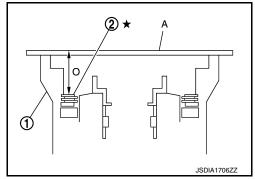
1 : Transmission case

2 : Front brake retaining plate

A : Straightedge



- Never change the straightedge (A) installation position before the completion of "P" measurement.
- Measure dimension "O" in at least three places, and take the average.



 Measure dimension "P" between the converter housing fitting surface of transmission case and the oil pump fitting surface of transmission case.

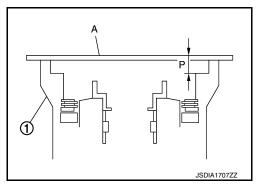
1 : Transmission caseA : Straightedge

CAUTION:

Measure dimension "P" in at least three places, and take the average.

iii. Calculate dimension "N".





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< UNIT DISASSEMBLY AND ASSEMBLY >

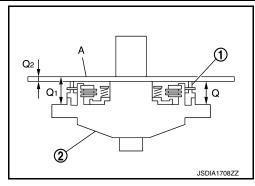
[7AT: RE7R01B (VK50VE)]

b. Measure dimensions "Q1" and "Q2", and calculate dimension "Q".

: Front brake piston
 : Oil pump assembly
 : Straightedge

"Q" : Distance between the transmission case fitting surface of oil pump and the front brake piston.

 $Q = Q_1 - Q_2$

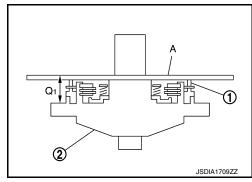


i. Measure dimension "Q1" between the transmission case fitting surface of oil pump and the straightedge on front brake piston.

: Front brake piston
 : Oil pump assembly
 : Straightedge

CAUTION:

Measure dimension "Q1" in at least three places, and take the average.

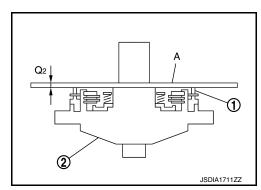


ii. Measure dimension "Q2" of the straightedge.

: Front brake piston
 : Oil pump assembly
 : Straightedge

iii. Calculate dimension "Q".

$$Q = Q_1 - Q_2$$



c. Adjust front brake clearance "C".

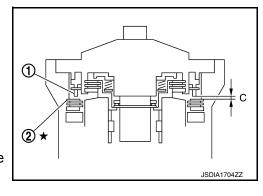
1 : Front brake piston

2 : Front brake retaining plate

$$C = N - Q$$

Front brake clearance "C" : Refer to TM-574, "Front Brake Clearance".

• Select proper thickness of retaining plate so that front brake clearance is within specifications.



Retaining plate : Refer to TM-574, "Front Brake Clearance".

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

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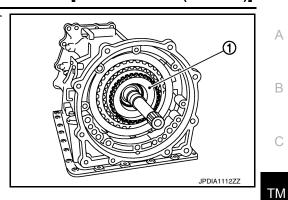
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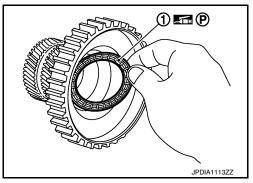
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56. Remove under drive sun gear (1) from under drive carrier assembly.

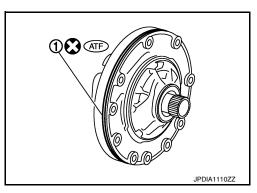


57. Install needle bearing (1) to under drive sun gear. **CAUTION:**

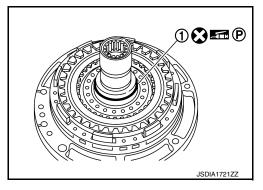
Check the direction of needle bearing. Refer to TM-506. "Location of Needle Bearings and Bearing Races".



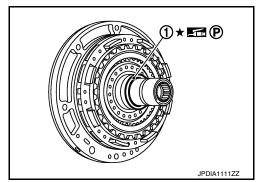
58. Install O-ring (1) to oil pump assembly.



59. Install seal ring (1) to oil pump assembly.



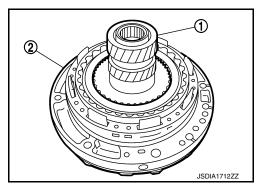
60. Install bearing race (1) to oil pump assembly.



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[7AT: RE7R01B (VK50VE)]

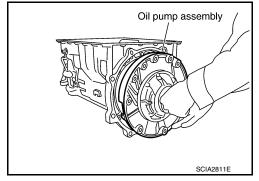
61. Install under drive sun gear (with needle bearing) (1) to oil pump assembly (2).



62. Install oil pump assembly (with under drive sun gear) to transmission case.

CAUTION:

Apply ATF to oil pump bearing.



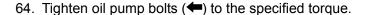
63. Apply recommended sealant to oil pump assembly as shown in the figure.

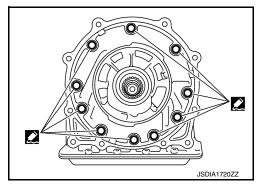


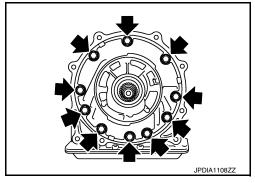
: Genuine RTV silicone sealant or equivalent. Refer to GI-24. "Recommended Chemical Products and Sealants".

CAUTION:

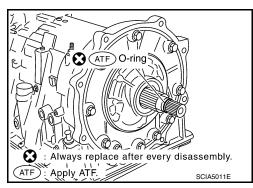
Completely remove all moisture, oil and old sealant, etc. from the oil pump mounting bolts and oil pump mounting bolt mounting surfaces.







65. Install O-ring to input clutch assembly.



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

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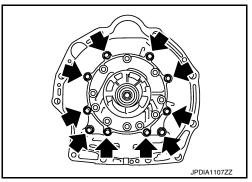
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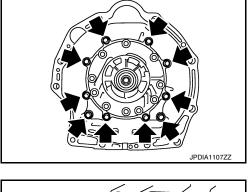
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66. Install converter housing to transmission case, and tighten converter housing bolts (to the specified torque.

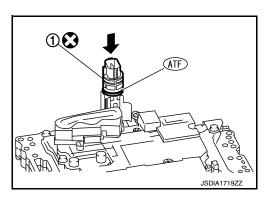


67. Connect TCM connector (A).

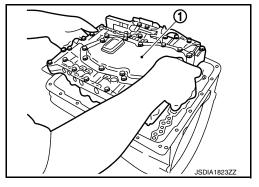


68. Install joint connector (1) to the control valve & TCM. **CAUTION:**

Apply ATF to O-ring of joint connector.



69. Install the control valve & TCM (1) to transmission case.



CAUTION:

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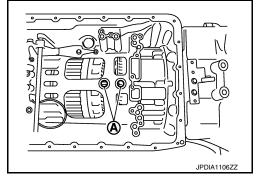
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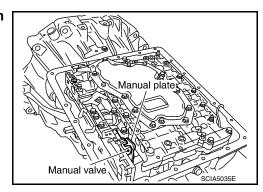
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[7AT: RE7R01B (VK50VE)]

- Make sure that input speed sensor securely installs input speed sensor holes (A).
- Hang down output speed sensor harness toward outside so as not to disturb installation of the control valve & TCM
- Adjust A/T assembly harness connector of the control valve & TCM to terminal hole of transmission case.



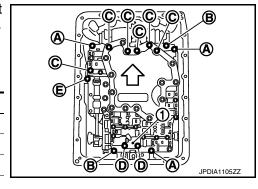
 Assemble it so that manual valve cutout is engaged with manual plate projection.



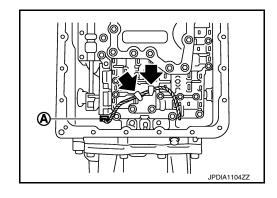
70. Install bolts and clip (1) to the control valve & TCM. Tighten bolt (E) to the specified torque before tightening the other than bolts.



| Bolt symbol | Length mm (in) | Number of bolts |
|-------------|----------------|-----------------|
| A | 43 (1.69) | 3 |
| В | 40 (1.57) | 2 |
| С | 54 (2.13) | 6 |
| D | 50 (1.97) | 2 |
| E* | 50 (1.97) | 1 |



- *: Reamer bolt
- 71. Connect output speed sensor connector (A).
- 72. Engage output speed sensor harness with terminal clips ().



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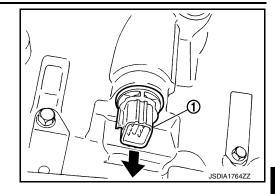
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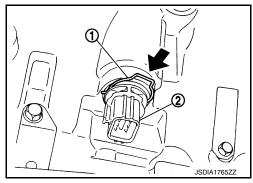
73. Pull down joint connector (1).

CAUTION:

Be careful not to damage connector.



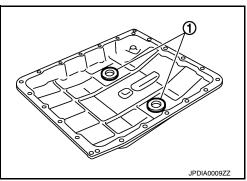
74. Install snap ring (1) to joint connector (2).



- 75. Install magnets (1) to oil pan.
- 76. Install oil pan gasket to transmission case.

CAUTION:

- Never reuse oil pan gasket.
- Install it in the direction to align hole positions.
- · Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface.



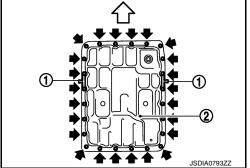
77. Install oil pan (2) and clips (1) to transmission case.

⟨⇒ : Front

: Oil pan mounting bolt

CAUTION:

- Be careful not to pinch harnesses.
- Completely remove all moisture, oil and old gasket, etc. from oil pan mounting surface.



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78. Tighten oil pan mounting bolts to the specified torque in numerical order shown in the figure after temporarily tightening them. Tighten oil pan mounting bolts to the specified torque.

⟨
⇒ : Front

CAUTION:

Never reuse oil pan mounting bolts.

79. Install drain plug to oil pan. Tighten drain plug to the specified torque.

TM-543

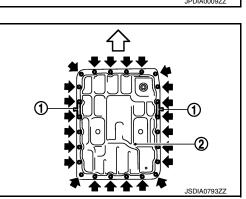
CAUTION:

Revision: 2015 February

Never reuse drain plug gasket.

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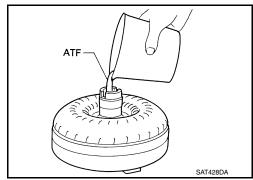
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< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

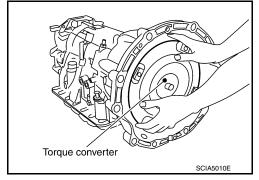
- 80. Pour ATF into torque converter.
 - Approximately 2 liter (2-1/8 US qt, 1-3/4 Imp qt) of ATF is required for a new torque converter.
 - When reusing old torque converter, add the same amount of ATF as was drained.



81. Install torque converter while aligning notches of torque converter with notches of oil pump.

CAUTION:

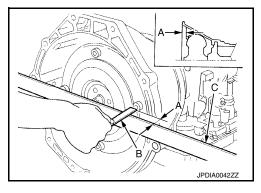
Install torque converter while rotating it.



82. Measure dimension "A" to make sure that torque converter is in proper position.

B : ScaleC : Straightedge

Dimension "A" : Refer to TM-574, "Torque Converter".



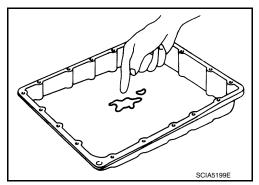
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INSPECTION AFTER DISASSEMBLY

Oil Pan

Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.

 If frictional material is detected, perform A/T fluid cooler cleaning. Refer to TM-475, "Cleaning".



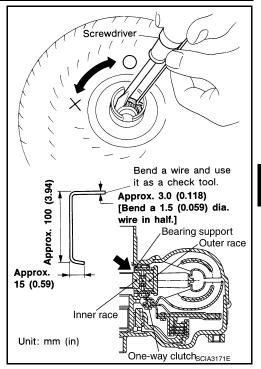
Torque Converter

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

Check torque converter one-way clutch using a check tool as shown at figure.

- 1. Insert a check tool into the groove of bearing support built into one-way clutch outer race.
- 2. When fixing bearing support with a check tool, rotate one-way clutch spline using a screwdriver.
- Make sure that inner race rotates clockwise only. If not, replace torque converter assembly.

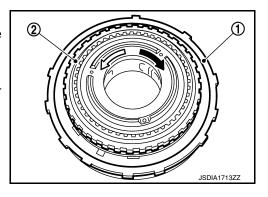


1st One-way Clutch

Check operation of 1st one-way clutch.

- 1. Install 1st one-way clutch (1) to front brake hub (with under drive carrier).
- 2. Hold 1st one-way clutch.
- 3. Check front brake hub for correct locking and unlocking directions. If necessary, replace 1st one-way clutch.

: Unlocked



Under Drive Sun Gear

Check for deformation, fatigue or damage. If necessary, replace the under drive sun gear.

Mid Carrier Assembly

Check for deformation, fatigue or damage. If necessary, replace the mid carrier assembly.

Rear Carrier Assembly

Check for deformation, fatigue or damage. If necessary, replace the rear carrier assembly.

Reverse Brake Retaining Plate/Drive Plates/Driven Plates/Dish Plates

Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

Front Brake Retaining Plates/Drive Plates/Driven Plate

Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

Each Snap Ring

Check for deformation, fatigue or damage. If necessary, replace the snap ring.

Parking Actuator Support and Parking Pawl

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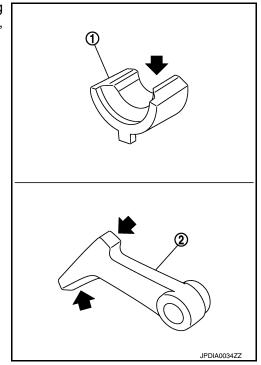
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< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

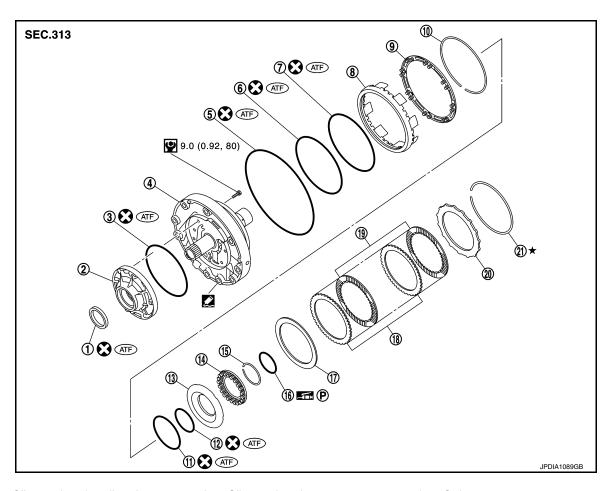
If the contact surface on parking actuator support (1) and parking pawl (2) has excessive wear, abrasion, bend or any other damage, replace the components.



[7AT: RE7R01B (VK50VE)]

OIL PUMP, 2346 BRAKE, FRONT BRAKE PISTON

Exploded View INFOID:0000000010579282



- Oil pump housing oil seal
- Oil pump cover
- D-ring 7.
- 10. Snap ring
- 13. 2346 brake piston
- 16. Seal ring
- 19. 2346 brake drive plate

- 2. Oil pump housing
- O-ring
- Front brake piston
- 11. D-ring
- 14. 2346 brake spring retainer
- 17. 2346 brake dish plate
- 20. 2346 brake retaining plate

- 3. O-ring
- 6. D-ring
- Front brake spring retainer
- 12. D-ring
- 15. Snap ring
- 18. 2346 brake driven plate
- 21. Snap ring

Apply Genuine RTV silicone sealant or equivalent. Refer to GI-24, "Recommended Chemical Products and Sealants".

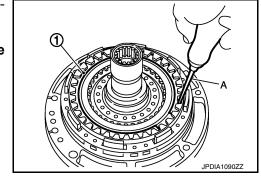
Refer to GI-4, "Components" for symbols not described on the above.

Disassembly

1. Remove snap ring (1) from oil pump assembly using a flatbladed screwdriver (A).

CAUTION:

- · Be careful not to scratch oil pump cover and 2346 brake retaining plate.
- · Be careful not to damage snap ring.



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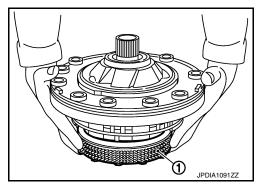
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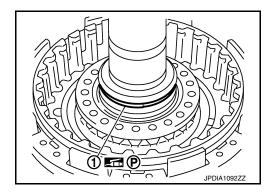
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

2. Remove 2346 brake component part (retaining plate, drive plates, driven plates, and dish plate) (1) from oil pump assembly.



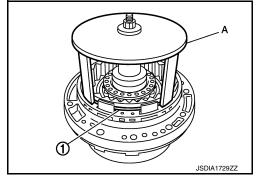
3. Remove seal ring (1) from oil pump assembly.



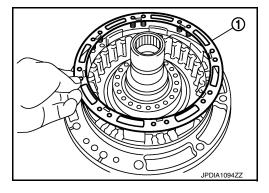
 Set the clutch spring compressor (SST: KV31103800) (A) on front brake spring retainer and remove snap ring (fixing front brake spring retainer) (1) from oil pump assembly while compressing return spring.

CAUTION:

Be careful not to expand snap ring excessively.



5. Remove front brake spring retainer (1) from oil pump assembly.

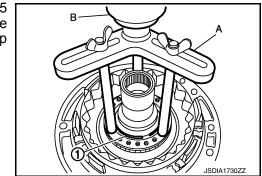


6. Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on 2346 brake spring retainer and remove snap ring (fixing 2346 brake spring retainer) (1) from oil pump assembly while compressing return spring.

B : Press

CAUTION:

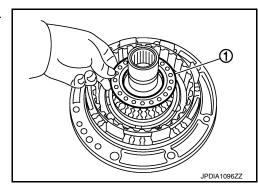
Be careful not to expand snap ring excessively.



< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

7. Remove 2346 brake spring retainer (1) from oil pump assembly.

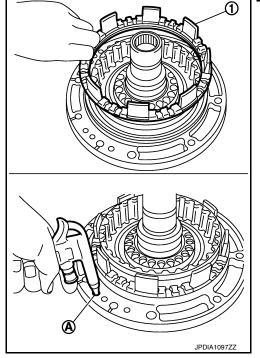


8. Remove front brake piston (1) from oil pump assembly with compressed air. Refer to TM-505, "Oil Channel".

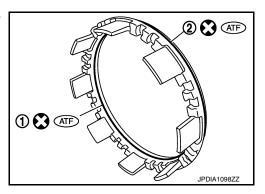
A : Front brake pressure hole

CAUTION:

Care should be taken not to abruptly blow air. It makes piston incline, as the result, it becomes hard to disassemble the piston.



9. Remove D-ring (inner) (1) and D-ring (outer) (2) from front brake piston.



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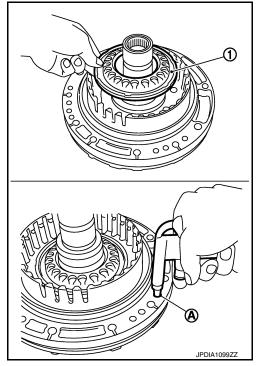
< UNIT DISASSEMBLY AND ASSEMBLY >

10. Remove 2346 brake piston (1) from oil pump assembly with compressed air. Refer to TM-505, "Oil Channel".

A : 2346 brake pressure hole

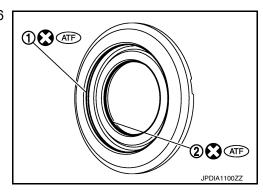
CAUTION:

Care should be taken not to abruptly blow air. It makes piston incline, as the result, it becomes hard to disassemble the piston.



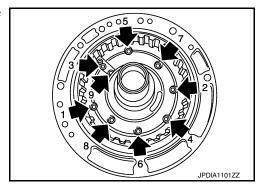
[7AT: RE7R01B (VK50VE)]

11. Remove D-ring (large) (1) and D-ring (small) (2) from 2346 brake piston.



12. loosen bolts in numerical order shown in the figure and remove oil pump housing from oil pump cover.

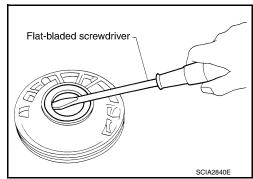




13. Remove oil pump housing oil seal using a flat-bladed screw-driver.

CAUTION:

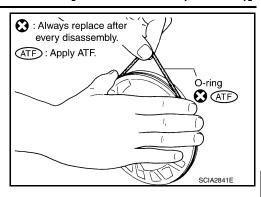
Be careful not to scratch oil pump housing.



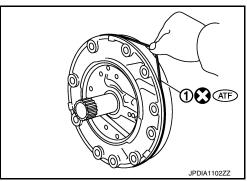
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

14. Remove O-ring from oil pump housing.

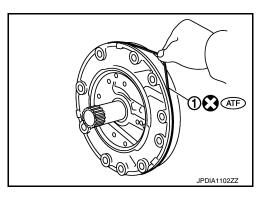


15. Remove O-ring (1) from oil pump cover.

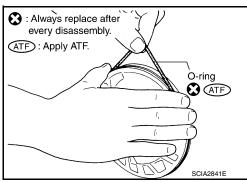


Assembly HPOID:000000010579284

1. Install O-ring (1) to oil pump cover.



2. Install O-ring to oil pump housing.



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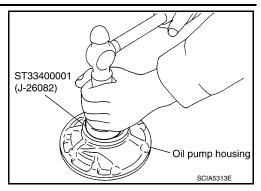
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

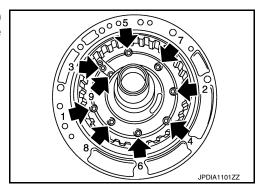
3. Using the drift, install oil pump housing oil seal to the oil pump housing until it is flush.

CAUTION:

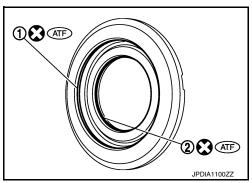
- · Never reuse oil seal.
- Apply ATF to oil seal.



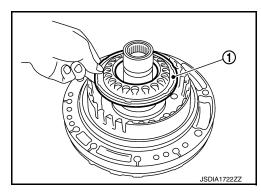
Install oil pump housing to oil pump cover and tighten bolts (←)
to the specified torque in numerical order shown in the figure
after temporarily tightening them.



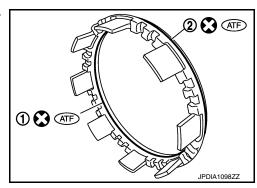
Install D-ring (large) (1) and D-ring (small) (2) to 2346 brake piston.



6. Install 2346 brake piston (1) to oil pump assembly.

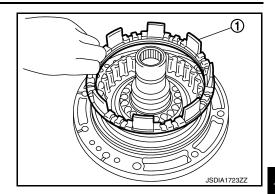


7. Install D-ring (inner) (1) and D-ring (outer) (2) to front brake piston



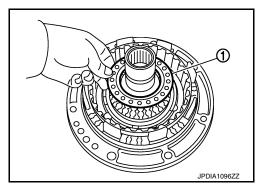
< UNIT DISASSEMBLY AND ASSEMBLY >

8. Install front brake piston (1) to oil pump assembly.



[7AT: RE7R01B (VK50VE)]

9. Install 2346 brake spring retainer (1) to oil pump assembly.

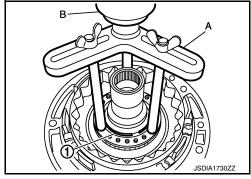


Set the clutch spring compressor [SST: KV31102400 (J-34285 and J-34285-87)] (A) on 2346 brake spring retainer and install snap ring (fixing 2346 brake spring retainer) (1) to oil pump assembly while compressing return spring.

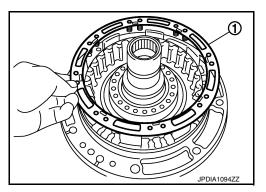
B : Press

CAUTION:

Be careful not to expand snap ring excessively.



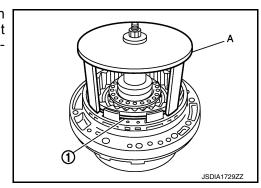
11. Install front brake spring retainer (1) to oil pump assembly.



12. Set the clutch spring compressor (SST: KV31103800) (A) on front brake spring retainer and install snap ring (fixing front brake spring retainer) (1) to oil pump assembly while compressing return spring.

CAUTION:

Be careful not to expand snap ring excessively.



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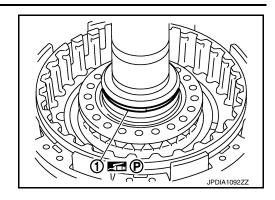
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< UNIT DISASSEMBLY AND ASSEMBLY >

13. Install seal ring (1) to oil pump assembly.



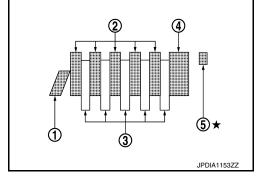
[7AT: RE7R01B (VK50VE)]

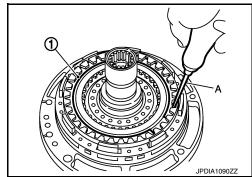
- 14. Install 2346 brake component part (retaining plate, drive plates, driven plates, and dish plate) to oil pump assembly.
 - 1 : Dish plate
 - 2 : Driven plate (five pieces)
 - 3 : Drive plate (five pieces)
 - 4 : Retaining plate
 - 5 : Snap ring

CAUTION:

Check the order of plates.

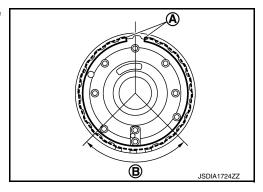
15. Install snap ring (1) to oil pump assembly using a flat-bladed screwdriver (A).





CAUTION:

Never install snap ring mating part (A) to the clearance groove [(B) shown in the figure] of oil pump cover.



Inspection and Adjustment

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INSPECTION AFTER DISASSEMBLY

Each Snap Ring

Check for deformation, fatigue or damage. If necessary, replace snap ring.

Each Spring Retainer

Check for deformation, fatigue or damage. If necessary, replace spring retainer.

2346 Brake Retaining Plate/Drive Plates/Driven Plates/Dish Plate

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

Check facing for burns, cracks or damage. If necessary, replace the damaged plate.

INSPECTION AFTER ASSEMBLY

2346 Brake Clearance

Set a dial indicator (A) as shown in the figure. Blow air into 2346 brake oil pressure hole (B), and measure 2346 brake clearance. If clearance is outside the specified value, adjust clearance by selecting an appropriate snap ring (1). Refer to TM-505, "Oil Channel".

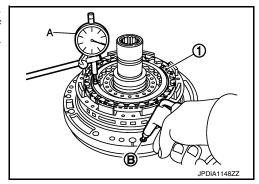
Air pressure : 300kPa (3.06 kg/cm², 43.5 psi)

2346 brake : Refer to TM-574, "2346 Brake Clear-

clearance <u>ance"</u>.

CAUTION:

Never exceed the specified air pressure value.



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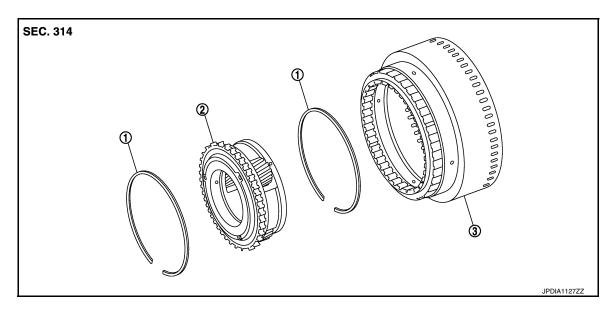
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[7AT: RE7R01B (VK50VE)]

UNDER DRIVE CARRIER, FRONT BRAKE HUB

Exploded View INFOID:0000000010579286



Snap ring

- Under drive carrier assembly
- 3. Front brake hub

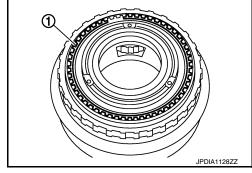
Disassembly

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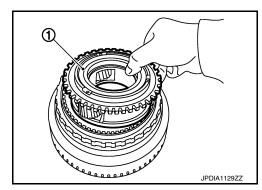
Remove snap ring (1) from front brake hub using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch front brake hub and under drive carrier assembly.
- · Be careful not to damage snap ring.



2. Remove under drive carrier assembly (1) from front brake hub.



UNDER DRIVE CARRIER, FRONT BRAKE HUB

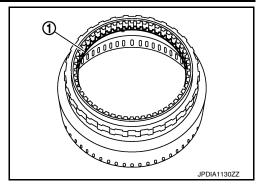
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

Remove snap ring (1) from front brake hub using a flat-bladed screwdriver.

CAUTION:

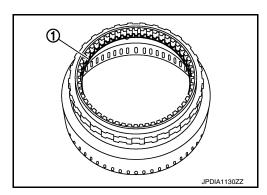
- · Be careful not to scratch front brake hub.
- Be careful not to damage snap ring.



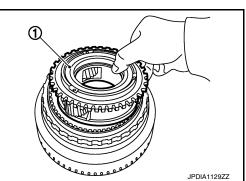
Assembly

Install snap ring (1) to front brake hub. **CAUTION:**

Be careful not to damage snap ring.



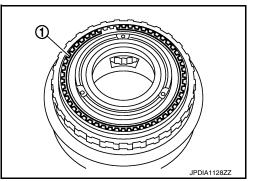
2. Install under drive carrier assembly (1) to front brake hub.



3. Install snap ring (1) to front brake hub using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch front brake hub.
- · Be careful not to damage snap ring.



Inspection INFOID:0000000010579289

INSPECTION AFTER DISASSEMBLY

- Each Snap Ring
 - Check for deformation, fatigue or damage. If necessary, replace snap ring.
- Under Drive Carrier Assembly Check for deformation, fatigue or damage. If necessary, replace under drive carrier assembly.
- Front Brake Hub

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UNDER DRIVE CARRIER, FRONT BRAKE HUB

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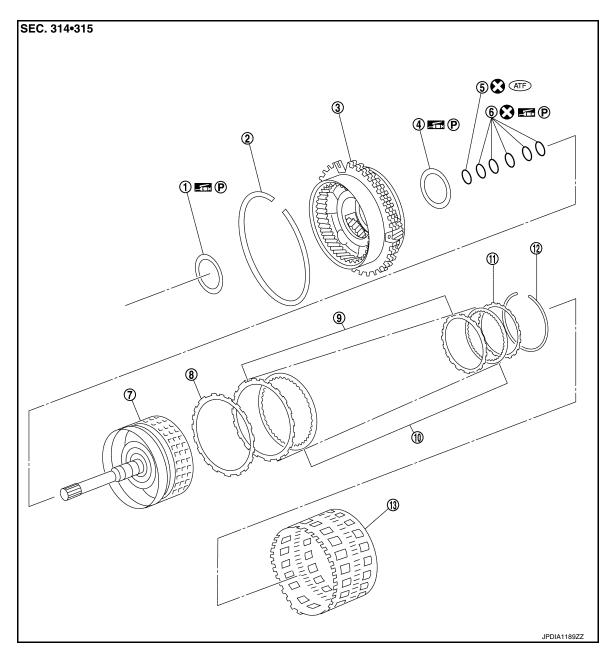
[7AT: RE7R01B (VK50VE)]

Check for deformation, fatigue or damage. If necessary, replace front brake hub.

< UNIT DISASSEMBLY AND ASSEMBLY >

FRONT CARRIER, INPUT CLUTCH, REAR INTERNAL GEAR

Exploded View



- 1. Needle bearing
- 4. Needle bearing
- 7. Input clutch drum
- 10. Input clutch drive plate
- 13. Rear internal gear
- 2. Snap ring
- 5. O-ring
- 8. Input clutch dish plate
- 11. Input clutch retaining plate
- 3. Front carrier assembly
- 6. Seal ring
- 9. Input clutch driven plate
- 12. Snap ring

Refer to $\underline{\mbox{GI-4.}\mbox{"}\mbox{Components"}}$ for symbols in the figure.

Revision: 2015 February TM-559 2015 QX70

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[7AT: RE7R01B (VK50VE)]

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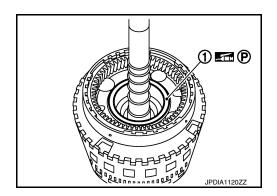
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< UNIT DISASSEMBLY AND ASSEMBLY >

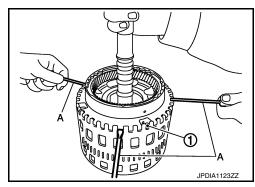
Disassembly INFOID:000000010579291

1. Remove needle bearing (1) from front carrier assembly.



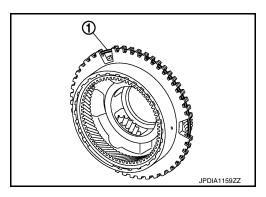
[7AT: RE7R01B (VK50VE)]

- 2. Compress snap ring (1) using flat-bladed screwdrivers (A). **CAUTION:**
 - · Be careful not to scratch rear internal gear.
 - · Be careful not to damage snap ring.
- 3. Remove front carrier assembly and input clutch assembly from rear internal gear.
- 4. Remove front carrier assembly from input clutch assembly.

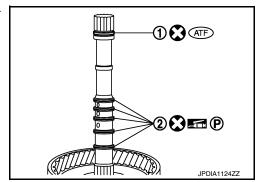


6. Remove snap ring (1) from front carrier assembly. **CAUTION:**

Be careful not to expand snap ring excessively.

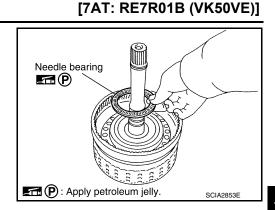


7. Remove O-ring (1) and seal rings (2) from input clutch assembly.



< UNIT DISASSEMBLY AND ASSEMBLY >

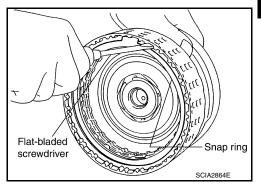
8. Remove needle bearing from input clutch assembly.



Remove snap ring from input clutch drum using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch rear input clutch drum and input clutch retaining plate.
- Be careful not to damage snap ring.
- 10. Remove input clutch component part (drive plates, driven plates, retaining plate, and dish plate) from input clutch drum.



Assembly INFOID:000000010579292

- 1. Install input clutch component part (dish plate, drive plates, driven plates, and retaining plate) to input clutch drum.
 - 1 : Snap ring
 - 2 : Retaining plate
 - 3 : Drive plate (seven pieces)
 - 4 : Driven plate (seven pieces)
 - 5 : Dish plate

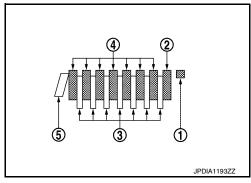
CAUTION:

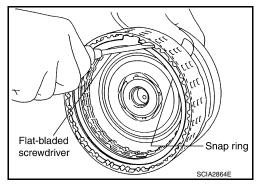
Check order of plates.

2. Install snap ring to input clutch drum using a flat-bladed screw-driver.

CAUTION:

- Be careful not to scratch input clutch drum and input clutch retaining plate.
- Be careful not to damage snap ring.





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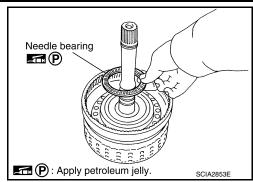
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< UNIT DISASSEMBLY AND ASSEMBLY >

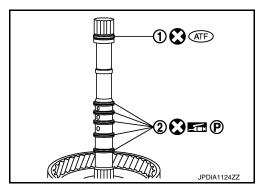
Install needle bearing to input clutch assembly. CAUTION:

Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



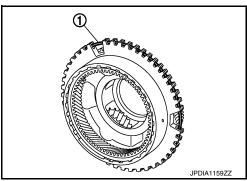
[7AT: RE7R01B (VK50VE)]

4. Install O-ring (1) and seal rings (2) to input clutch assembly.

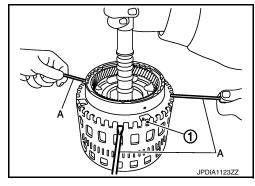


Install snap ring (1) to front carrier assembly. CAUTION:

Be careful not to expand snap ring excessively.

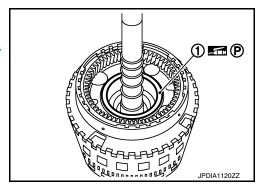


- Compress snap ring (1) using flat-bladed screwdrivers (A).
 - · Be careful not to scratch rear internal gear.
 - · Be careful not to damage snap ring.
- 7. Install front carrier assembly and input clutch assembly to rear internal gear.



Install needle bearing (1) to front carrier assembly.

Check the direction of needle bearing. Refer to <u>TM-506</u>, <u>"Location of Needle Bearings and Bearing Races"</u>.



[7AT: RE7R01B (VK50VE)] < UNIT DISASSEMBLY AND ASSEMBLY > Inspection INFOID:0000000010579293 Α INSPECTION AFTER DISASSEMBLY Front Carrier Snap Ring В Check for deformation, fatigue or damage. If necessary, replace the snap ring. Input Clutch Snap Ring Check for deformation, fatigue or damage. If necessary, replace input clutch assembly. C Input Clutch Drum Check for deformation, fatigue or damage or burns. If necessary, replace input clutch assembly. TM Input Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate Check facing for burns, cracks or damage. If necessary, replace input clutch assembly. Front Carrier Е Check for deformation, fatigue or damage. If necessary, replace front carrier assembly. Rear Internal Gear Check for deformation, fatigue or damage. If necessary, replace rear internal gear. F Н K L M

TM-563 **Revision: 2015 February** 2015 QX70 Ν

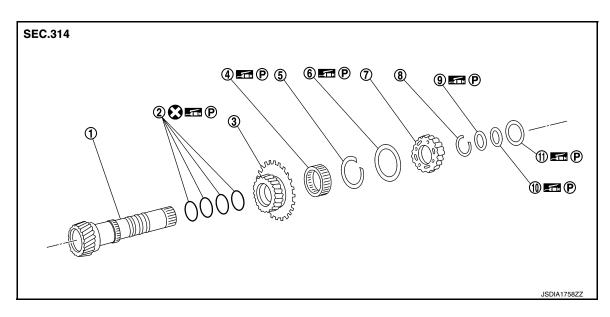
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MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

< UNIT DISASSEMBLY AND ASSEMBLY >

MID SUN GEAR, REAR SUN GEAR, HIGH AND LOW REVERSE CLUTCH HUB

Exploded View



- 1. Mid sun gear
- 4. 2nd one-way clutch
- 7. High and low reverse clutch hub
- 10. Bearing race

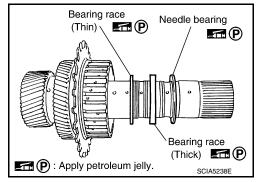
- 2. Seal ring
- 5. Snap ring
- 8. Snap ring
- 11. Needle bearing

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

- 3. Rear sun gear
- 6. Needle bearing
- Bearing race

Disassembly INFOID:000000010579295

1. Remove needle bearing and bearing races from high and low reverse clutch hub.

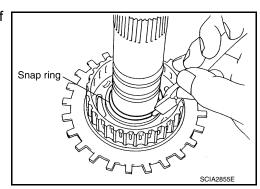


[7AT: RE7R01B (VK50VE)]

2. Remove snap ring from mid sun gear assembly using pair of snap ring pliers.

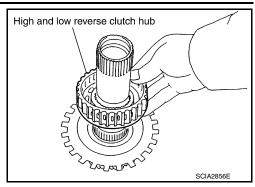
CAUTION:

Be careful not to expand snap ring excessively.



< UNIT DISASSEMBLY AND ASSEMBLY >

Remove high and low reverse clutch hub from mid sun gear assembly.



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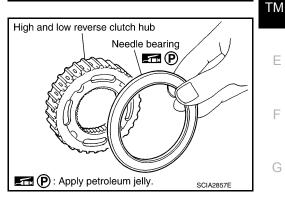
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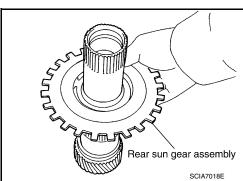
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Remove needle bearing from high and low reverse clutch hub.



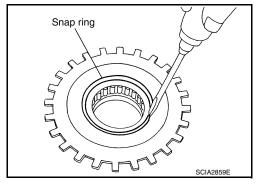
Remove rear sun gear assembly from mid sun gear assembly.



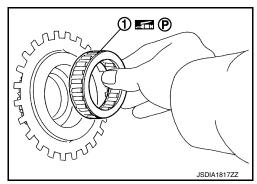
6. Remove snap ring from rear sun gear using a flat-bladed screw-

CAUTION:

- · Be careful not to scratch rear sun gear and 2nd one-way clutch.
- · Be careful not to damage snap ring.



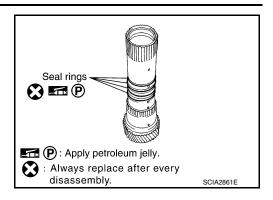
Remove 2nd one-way clutch from rear sun gear.



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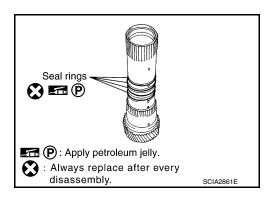
< UNIT DISASSEMBLY AND ASSEMBLY >

Remove seal rings from mid sun gear.

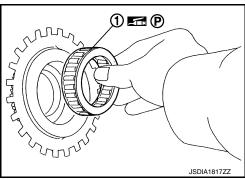


Assembly INFOID:0000000010579296

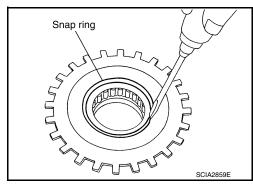
Install seal rings to mid sun gear.



Install 2nd one-way clutch to rear sun gear.

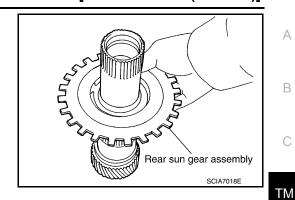


- 3. Install snap ring to rear sun gear using a flat-bladed screwdriver. **CAUTION:**
 - · Be careful not to scratch rear sun gear and 2nd one-way clutch.
 - · Be careful not to damage snap ring.



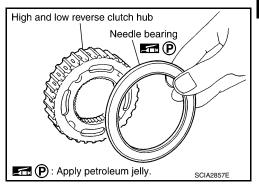
< UNIT DISASSEMBLY AND ASSEMBLY >

Install rear sun gear assembly to mid sun gear assembly.

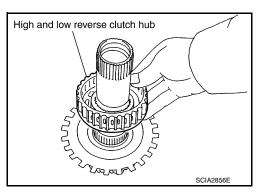


Install needle bearing to high and low reverse clutch hub. **CAUTION:**

Check the direction of needle bearing. Refer to TM-506, "Location of Needle Bearings and Bearing Races".



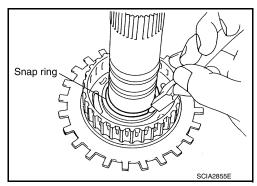
Install high and low reverse clutch hub to mid sun gear assembly.



Install snap ring to mid sun gear assembly using pair of snap ring pliers.

CAUTION:

Be careful not to expand snap ring excessively.



Check operation of 2nd one-way clutch.

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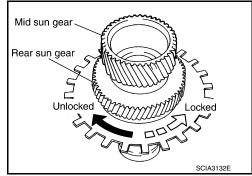
TM-567 **Revision: 2015 February** 2015 QX70

< UNIT DISASSEMBLY AND ASSEMBLY >

- Hold mid sun gear and turn rear sun gear.
- b. Check 2nd one-way clutch for correct locking and unlocking directions.

CAUTION:

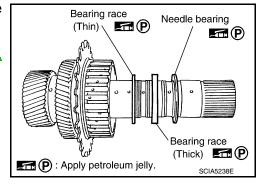
If not as shown in the figure, check installation direction of 2nd one-way clutch.



Install needle bearing and bearing races to high and low reverse clutch hub.

CAUTION:

Check the direction of needle bearing. Refer to TM-506, "Location of Needle Bearings and Bearing Races".

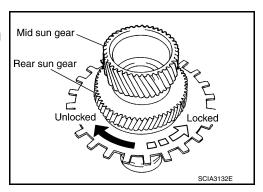


Inspection INFOID:0000000010579297

INSPECTION AFTER DISASSEMBLY

2nd One-way Clutch

- 1. Hold mid sun gear and turn rear sun gear.
- Check 2nd one-way clutch for correct locking and unlocking directions. If necessary, replace 2nd one-way clutch.



High and Low Reverse Clutch Hub Snap Ring, Rear Sun Gear Snap Ring Check for deformation, fatigue or damage. If necessary, replace the snap ring.

2nd One-way Clutch

Check frictional surface for wear or damage. If necessary, replace the 2nd one-way clutch.

Mid Sun Gear

Check for deformation, fatigue or damage. If necessary, replace the mid sun gear.

Rear Sun Gear

Check for deformation, fatigue or damage. If necessary, replace the rear sun gear.

High and Low Reverse Clutch Hub

Check for deformation, fatigue or damage. If necessary, replace the high and low reverse clutch hub.

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[7AT: RE7R01B (VK50VE)]

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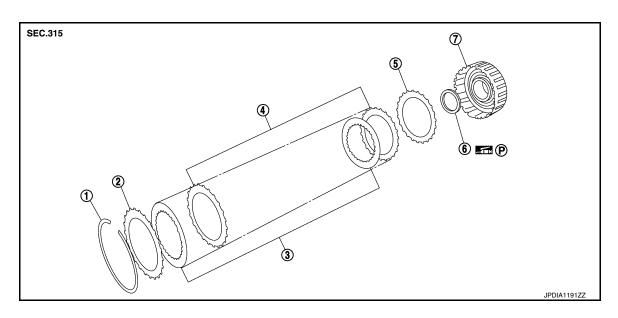
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INFOID:0000000010579299

HIGH AND LOW REVERSE CLUTCH

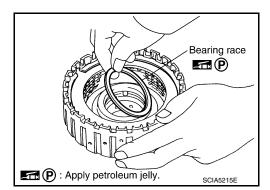
Exploded View



- 1. Snap ring
- 4. High and low reverse clutch driven plate
- 7. High and low reverse clutch drum
- 2. High and low reverse clutch retaining 3. plate
- 5. High and low reverse clutch dish plate
- High and low reverse clutch drive plate
- Bearing race

Disassembly

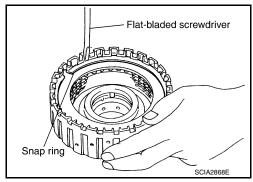
1. Remove bearing race from high and low reverse clutch drum.



Remove snap ring from high and low reverse clutch drum using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch high and low reverse clutch drum.
- Be careful not to damage snap ring.
- 3. Remove high and low reverse clutch component (drive plates, driven plates, retaining plate, and dish plate) from high and low reverse clutch drum.



Assembly INFOID:000000010579300

Revision: 2015 February TM-569 2015 QX70

HIGH AND LOW REVERSE CLUTCH

< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

 Install high and low reverse clutch component part (dish plate, drive plates, driven plates, and retaining plate) to high and low reverse clutch drum.

: Snap ring
 : Retaining plate

3 : Drive plate (five pieces)4 : Driven plate (five pieces)

5 : Dish plate

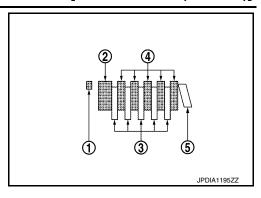
CAUTION:

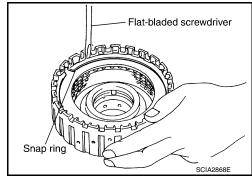
Check the order of plates.

2. Install snap ring to high and low reverse clutch drum using a flatbladed screwdriver.

CAUTION:

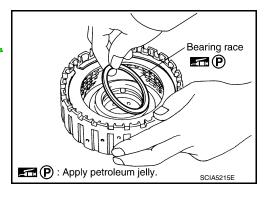
- Be careful not to scratch high and low reverse clutch drum.
- Be careful not to damage snap ring.





Install bearing race to high and low reverse clutch drum. CAUTION:

Check the direction of needle bearing. Refer to <u>TM-506</u>. "Location of Needle Bearings and Bearing Races".



Inspection INFOID:000000010579301

INSPECTION AFTER DISASSEMBLY

Check the following items. If necessary, replace high and low reverse clutch assembly.

High and Low Reverse Clutch Snap Ring

Check for deformation, fatigue or damage.

High and Low Reverse Clutch Drum

Check for deformation, fatigue or damage or burns.

High and Low Reverse Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate Check facing for burns, cracks or damage.

[7AT: RE7R01B (VK50VE)]

INFOID:0000000010579302

DIRECT CLUTCH

Exploded View

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- 1. Direct clutch drum
- 4. Snap ring

- 2. Direct clutch driven plate
- 5. Direct clutch drive plate
- 3. Direct clutch retaining plate

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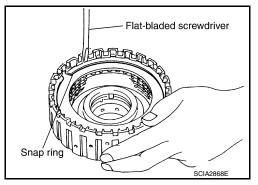
6. Direct clutch dish plate

Disassembly

1. Remove snap rings from direct clutch drum using a flat-bladed screwdriver.

CAUTION:

- Be careful not to scratch direct clutch drum and direct clutch retaining plate.
- Be careful not to damage snap ring.
- 2. Remove direct clutch component part (drive plates, driven plates, retaining plate, and dish plate) from direct clutch drum.

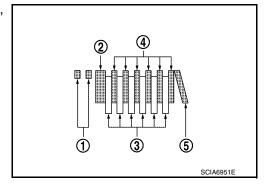


Assembly INFOID:000000010579304

- 1. Install direct clutch component part (drive plates, driven plates, retaining plate, and dish plate) to direct clutch drum.
 - 1 : Snap ring
 - 2 : Retaining plate
 - 3 : Drive plate (six pieces)
 - 4 : Driven plate (six pieces)
 - 5 : Dish plate

CAUTION:

Check the order of plates.



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DIRECT CLUTCH

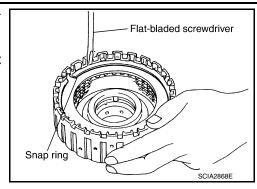
< UNIT DISASSEMBLY AND ASSEMBLY >

[7AT: RE7R01B (VK50VE)]

2. Install snap rings to direct clutch drum using a flat-bladed screw-driver.

CAUTION:

- Be careful not to scratch direct clutch drum and direct clutch retaining plate.
- · Be careful not to damage snap ring.



Inspection INFOID:000000010579305

INSPECTION AFTER DISASSEMBLY

Check the following items. If necessary, replace direct clutch assembly.

Direct Clutch Snap Ring

Check for deformation, fatigue or damage.

Direct Clutch Drum

Check for deformation, fatigue or damage or burns.

Direct Clutch Retaining Plate/Drive Plates/Driven Plates/Dish Plate

Check facing for burns, cracks or damage.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01B (VK50VE)]

INFOID:0000000010579306

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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

| Applied models | Engine | VK50VE |
|--------------------------------------|---------|---|
| | Axle | AWD |
| Transmission model | | RE7R01B |
| Stall torque ratio | | 1.93 : 1 |
| Transmission gear ratio | 1st | 4.887 |
| | 2nd | 3.170 |
| | 3rd | 2.027 |
| | 4th | 1.412 |
| | 5th | 1.000 |
| | 6th | 0.864 |
| | 7th | 0.775 |
| | Reverse | 4.041 |
| Recommended fluid and fluid capacity | | For North America: Refer to MA-17, "FOR NORTH AMERICA: Fluids and Lubricants". For Mexico: Refer to MA-18, "FOR MEXICO: Fluids and Lubricants". |

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000010579307

| Gear position | Throttle position | |
|---------------------|-----------------------|-----------------------|
| | Full throttle | Half throttle |
| $D1 \rightarrow D2$ | 50 – 54 (32 – 33) | 19 – 23 (12 – 14) |
| $D2 \rightarrow D3$ | 79 – 87 (50 – 54) | 41 – 49 (26 – 30) |
| $D3 \rightarrow D4$ | 126 – 136 (79 – 84) | 68 – 78 (43 – 48) |
| $D4 \rightarrow D5$ | 181 – 191 (113 – 118) | 99 – 109 (62 – 67) |
| $D5 \rightarrow D6$ | 235 – 245 (147 – 152) | 155 – 165 (97 – 102) |
| $D6 \rightarrow D7$ | 250 – 260 (156 – 161) | 206 – 216 (129 – 134) |
| D7 → D6 | 240 – 250 (150 – 155) | 162 – 172 (101 – 106) |
| $D6 \rightarrow D5$ | 219 – 229 (137 – 142) | 105 – 115 (66 – 71) |
| $D5 \rightarrow D4$ | 165 – 175 (103 – 108) | 53 – 63 (33 – 39) |
| $D4 \rightarrow D3$ | 110 – 120 (69 – 74) | 31 – 41 (20 – 25) |
| $D3 \rightarrow D2$ | 40 – 48 (25 – 29) | 16 – 24 (10 – 14) |
| $D2 \rightarrow D1$ | 16 – 20 (10 – 12) | 7 – 11 (5 – 6) |

At half throttle, the accelerator opening is 4/8 of the full opening.

Vehicle Speed at Which Lock-up Occurs/Releases

 Vehicle speed km/h (MPH)

 Lock-up ON
 Lock-up OFF

 Closed throttle
 47 – 55 (30 – 34)
 44 – 52 (28 – 32)

 Half throttle
 60 – 68 (38 – 42)
 57 – 65 (36 – 40)

Revision: 2015 February TM-573 2015 QX70

[·] At closed throttle, the accelerator opening is less than 1/8 condition. (Closed throttle position signal OFF)

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

[7AT: RE7R01B (VK50VE)]

[•] At half throttle, the accelerator opening is 4/8 of the full opening.

| Stall Speed | | INFOID:0000000105793 | |
|--|------------------------------------|---|--|
| Stall speed | | 2,467 – 2,767 rpm | |
| Torque Converter | 1 | INFOID:0000000105793 | |
| Dimension between end of conv | erter housing and torque converter | 24.0 mm (0.94 in) | |
| Total End Play | | INFOID:0000000105793 | |
| | | Unit: mm (ir | |
| Total end play | Standard | 0.25 - 0.55 (0.0098 - 0.0217) | |
| Thickness of bearing race for adjusting total end play | | 1.0 (0.039) 1.2 (0.047) 1.4 (0.055) 1.6 (0.063) 1.8 (0.071) 2.0 (0.079) 2.2 (0.087) | |
| Reverse Brake Clear | ance | INFOID:0000000105793 | |
| | | Unit: mm (ir | |
| Reverse brake clearance | Standard | 0.8 – 1.2 (0.031 – 0.047) | |
| Thickness of retaining plate for adjusting reverse brake clearance | | 4.8 (0.189) 5.0 (0.197) 5.2 (0.205) 5.4 (0.213) 5.6 (0.220) 5.8 (0.228) 6.0 (0.236) | |
| Front Brake Clearance | e | INFOID:0000000105793 | |
| | | Unit: mm (ir | |
| Front brake clearance | Standard | 0.7 – 1.1 (0.028 – 0.043) | |
| Thickness of retaining plate for adjusting front brake clearance | | 2.0 (0.079) 2.2 (0.087) 2.4 (0.094) 2.6 (0.102) 2.8 (0.110) | |
| 2346 Brake Clearanc | e | INFOID:0000000105793 | |
| | | Unit: mm (ir | |
| 2346 brake clearance | Standard | 1.5 – 1.9 (0.059 – 0.075) | |
| Thickness of snap ring for adjusting 2346 brake clearance | | 2.0 (0.079) 2.2 (0.087) 2.4 (0.094) 2.6 (0.102) 2.8 (0.110) 3.0 (0.118) | |