SECTION TM
TRANSAXLE & TRANSMISSION

CONTENTS

FEATURES OF NEW MODEL

APPLICATION NOTICE

How to Check Vehicle Type

INFOID:0000000004548423

Check the vehicle type to confirm the service information in TM section.

Vehicle type	Service information
For Hong Kong and China	With OBD
Except for Hong Kong and China	Without OBD

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

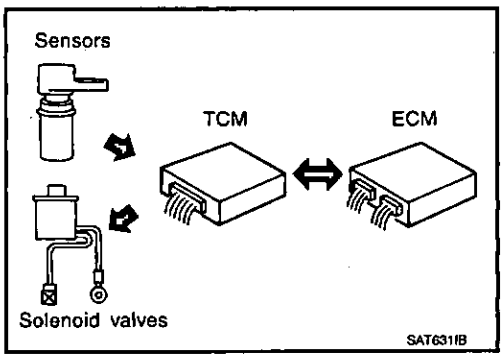
INFOID:0000000004548424

INTRODUCTION

The TCM receives signals from the vehicle speed sensor and PNP switch. Then it provides shift control or lock-up control via CVT solenoid valves.

The TCM also communicates with the ECM by means of signals sent from sensing elements used with the OBD-related parts of the CVT system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory. (With OBD)

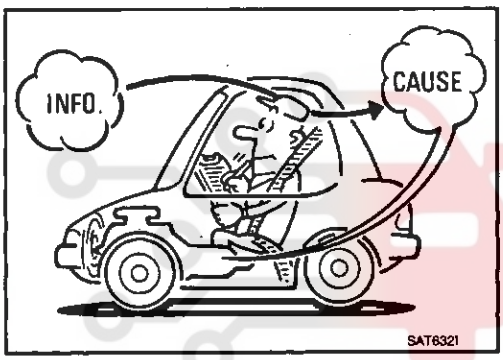
Input and output signals must always be correct and stable in the operation of the CVT system. The CVT system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.



It is much more difficult to diagnose a malfunction that occurs intermittently rather than continuously. Most intermittent malfunctions are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the malfunctions. A road test with a circuit tester connected should be performed.

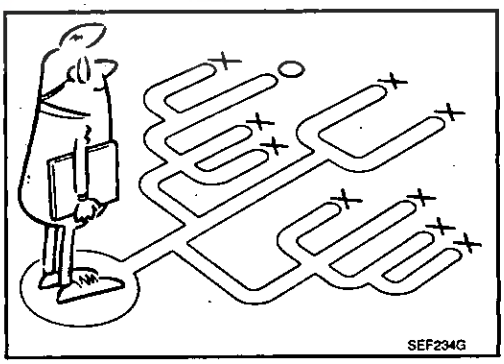
*: With OBD



Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such malfunctions, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Work Sheet" as shown on the example (Refer to TM-5) should be used.

Start your diagnosis by looking for "conventional" malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.

Also check related Service Bulletins.



Diagnostic Work Sheet

INFOID:0000000004548425

INFORMATION FROM CUSTOMER

KEY POINTS

- **WHAT**..... Vehicle & CVT model
- **WHEN**..... Date, Frequencies
- **WHERE**..... Road conditions
- **HOW**..... Operating conditions, Symptoms

Customer name MR/MS	Model & Year	VIN
Trans. Model	Engine	Mileage
Malfunction Date	Manuf. Date	In Service Date

Frequency	☐ Continuous ☐ Intermittent (times a day)	
Symptoms	☐ Vehicle does not move. (☐ Any position ☐ Particular position)	
	☐ No shift	
	☐ Lock-up malfunction	
	☐ Shift shock or slip (☐ N → D ☐ N → R ☐ Lock-up ☐ Any drive position)	
	☐ Noise or vibration	
	☐ No pattern select	
	☐ Others ( )	
Malfunction Indicator Lamp (MIL)*	☐ Continuously lit	☐ Not lit

*: With OBD

DIAGNOSTIC WORK SHEET

1	☐ Read the item on cautions concerning fail-safe and understand the customer's complaint.			TM-50
2	☐ CVT fluid inspection, stall test and line pressure test			
		☐ CVT fluid inspection		
			☐ Leak (Repair leak location.) ☐ State ☐ Amount	TM-69
		☐ Stall test		
			☐ Torque converter one-way clutch ☐ Reverse brake ☐ Forward clutch ☐ Steel belt ☐ Engine ☐ Line pressure low ☐ Primary pulley ☐ Secondary pulley	TM-71, TM-73
		☐ Line pressure inspection - Suspected part:		
3	☐ Perform road test.			TM-75
	3-1.	Check before engine is started		TM-75
	3-2.	Check at idle		TM-75
	3-3.	Cruise test		TM-76
	☐ Check malfunction phenomena to repair or replace malfunctioning part after completing all road tests. Refer to TM-52, "Symptom Table".			
4	☐ Drive vehicle to check that the malfunction phenomenon has been resolved.			
5	☐ Erase the results of the self-diagnosis from the TCM and the ECM*.			TM-35, EC-102

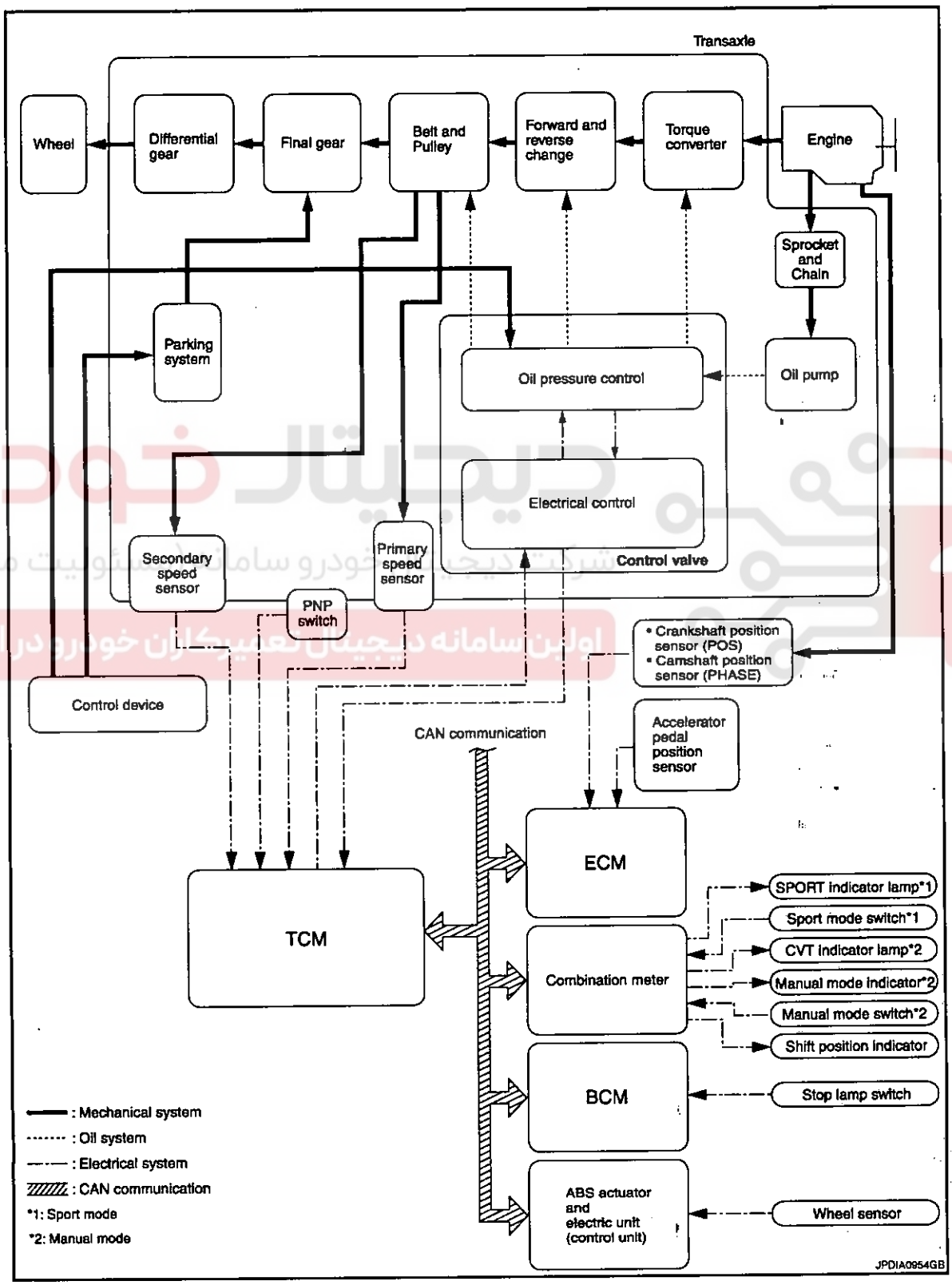
*: Only vehicles with OBD are capable of erasing results of ECM self-diagnosis.

FUNCTION DIAGNOSIS

CVT SYSTEM

System Diagram

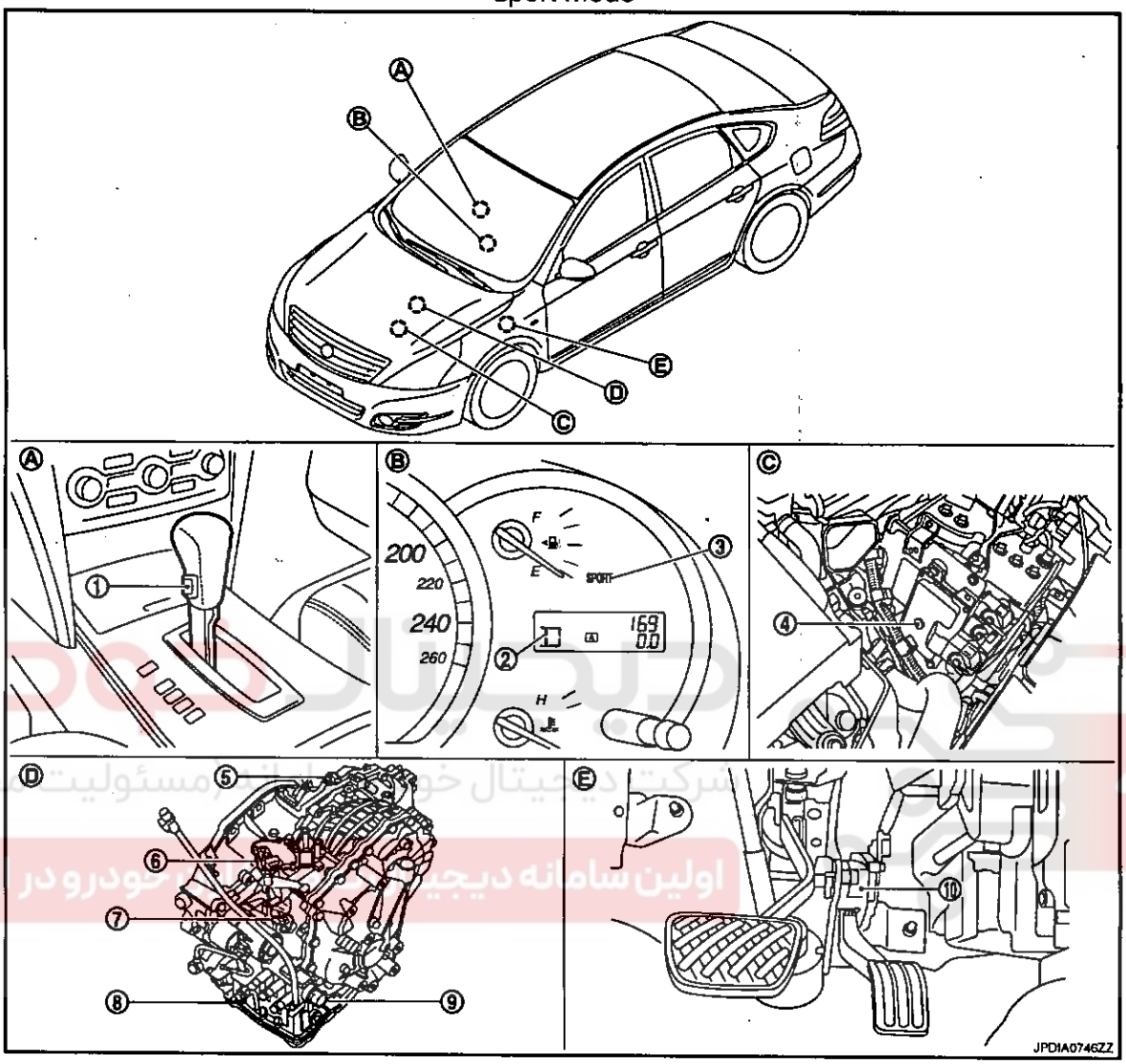
INFOID:0000000004548427



Component Parts Location

INFOID:0000000004548426

Sport mode



1.	Sport mode switch	2.	Shift position indicator	3.	SPORT indicator lamp
4.	TCM	5.	Secondary speed sensor	6.	PNP switch
7.	Primary speed sensor	8.	Control valve assembly*	9.	CVT unit connector
10.	Accelerator pedal position sensor				
A.	Center console	B.	Combination meter	C.	Engine room LH
D.	CVT assembly	E.	Accelerator pedal, upper		

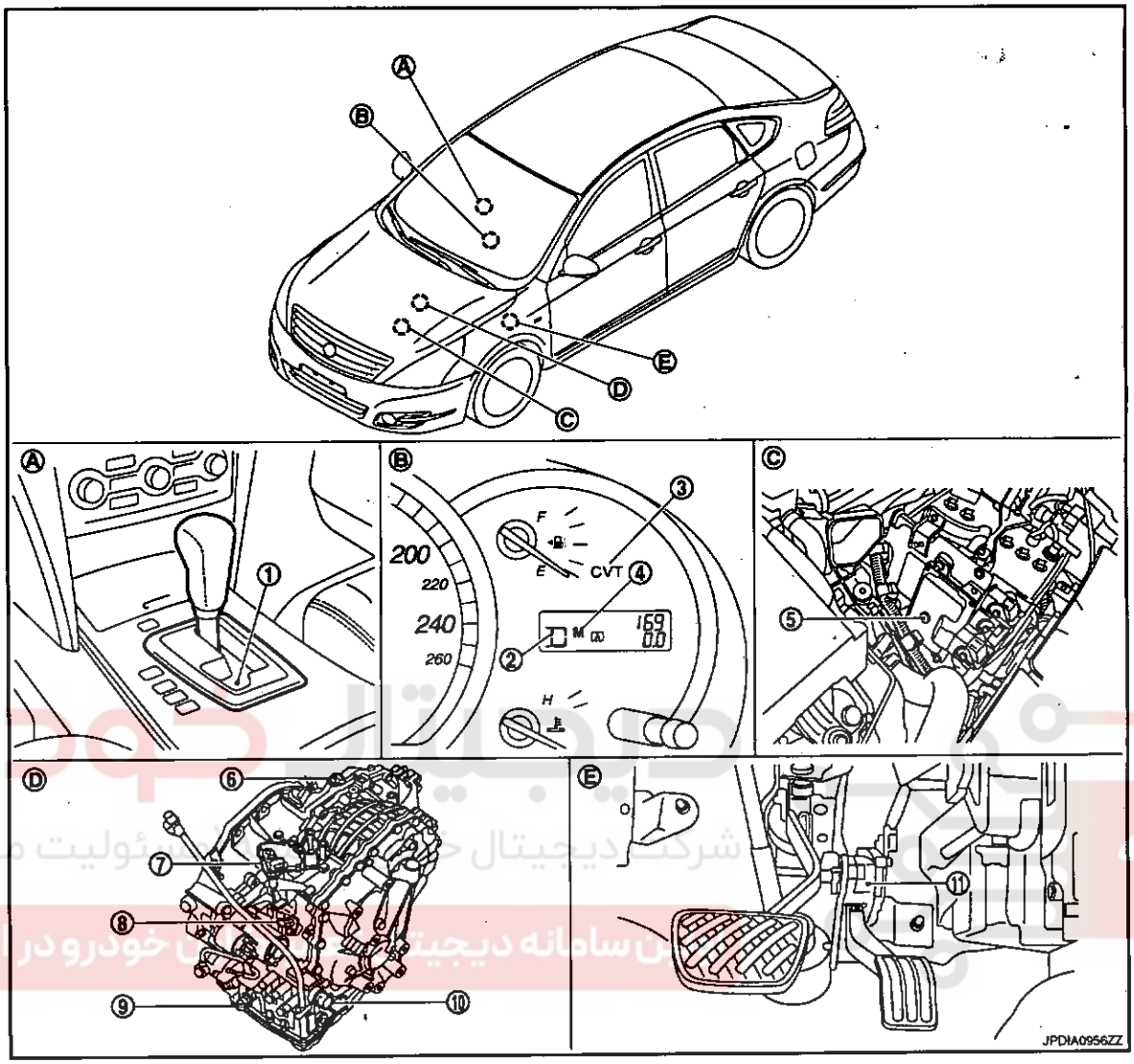
*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control valve assembly (8).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Manual mode



1.	Control device	2.	Shift position indicator	3.	CVT indicator lamp
4.	Manual mode indicator	5.	TCM	6.	Secondary speed sensor
7.	PNP switch	8.	Primary speed sensor	9.	Control valve assembly*
10.	CVT unit connector	11.	Accelerator pedal position sensor		
A.	Center console	B.	Combination meter	C.	Engine room LH
D.	CVT assembly	E.	Accelerator pedal, upper		

*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control device (1).

- Manual mode select switch
- Manual mode position select switch

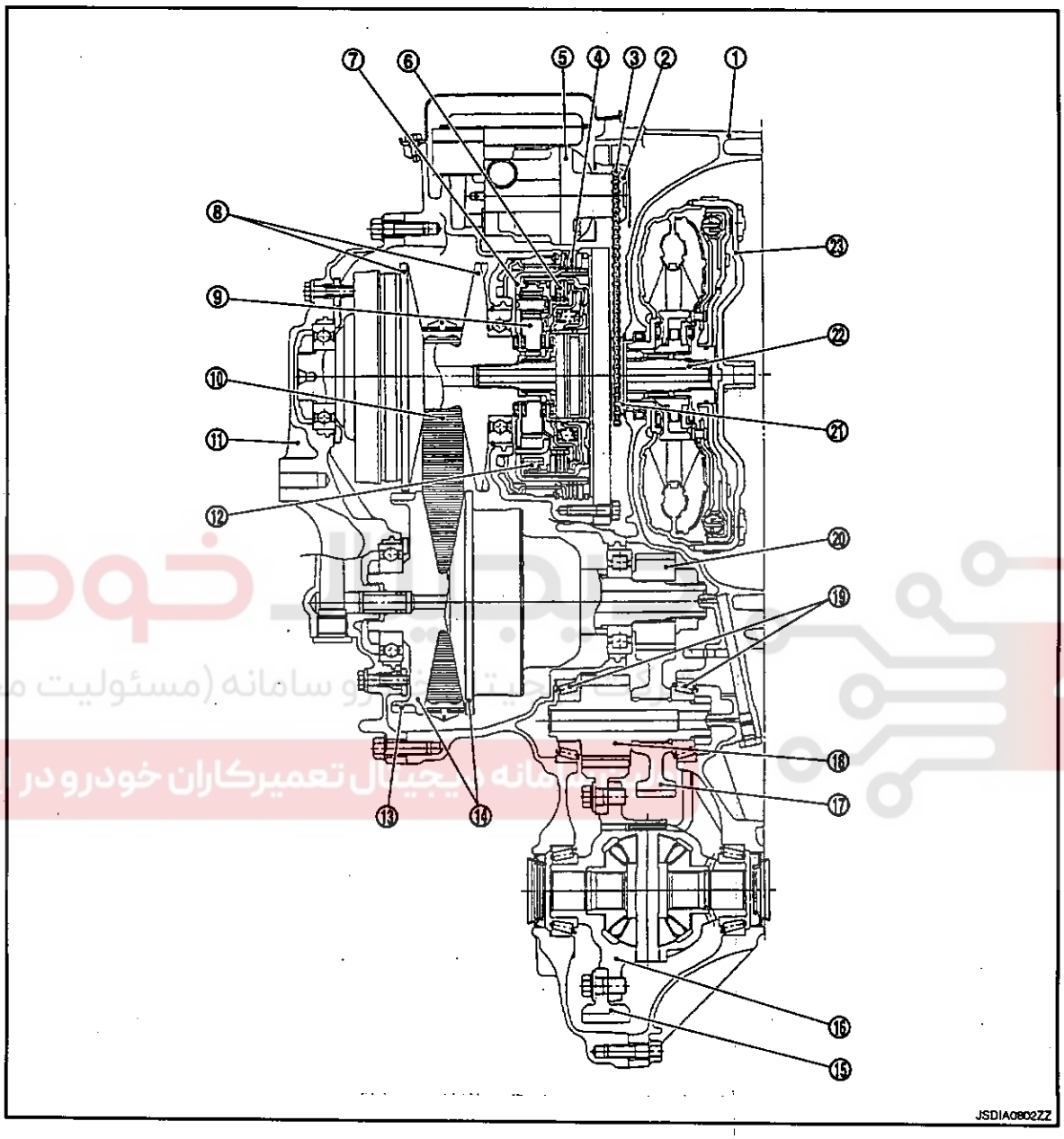
The following components are included in control valve assembly (9).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

MECHANICAL SYSTEM

Cross-Sectional View

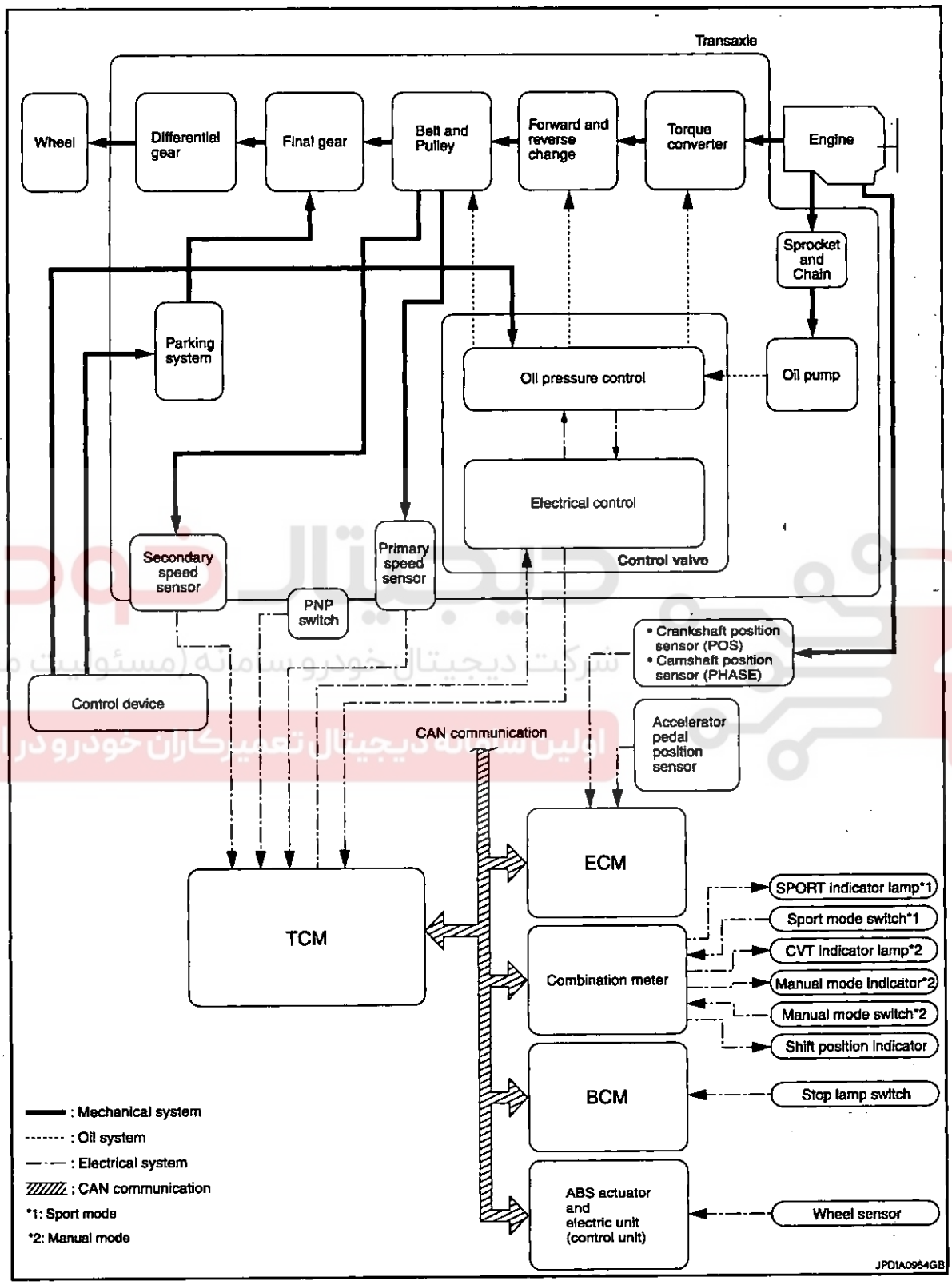
INFOID:0000000004548429



1. Converter housing
2. Driven sprocket
3. Chain
4. Reverse brake
5. Oil pump
6. Forward clutch
7. Planetary carrier
8. Primary pulley
9. Sun gear
10. Steel belt
11. Side cover
12. Internal gear
13. Parking gear
14. Secondary pulley
15. Final gear
16. Differential case
17. Idler gear
18. Reduction gear
19. Taper roller bearing
20. Output gear
21. Drive sprocket
22. Input shaft
23. Torque converter

System Diagram

INFOID:0000000004548430



System Description

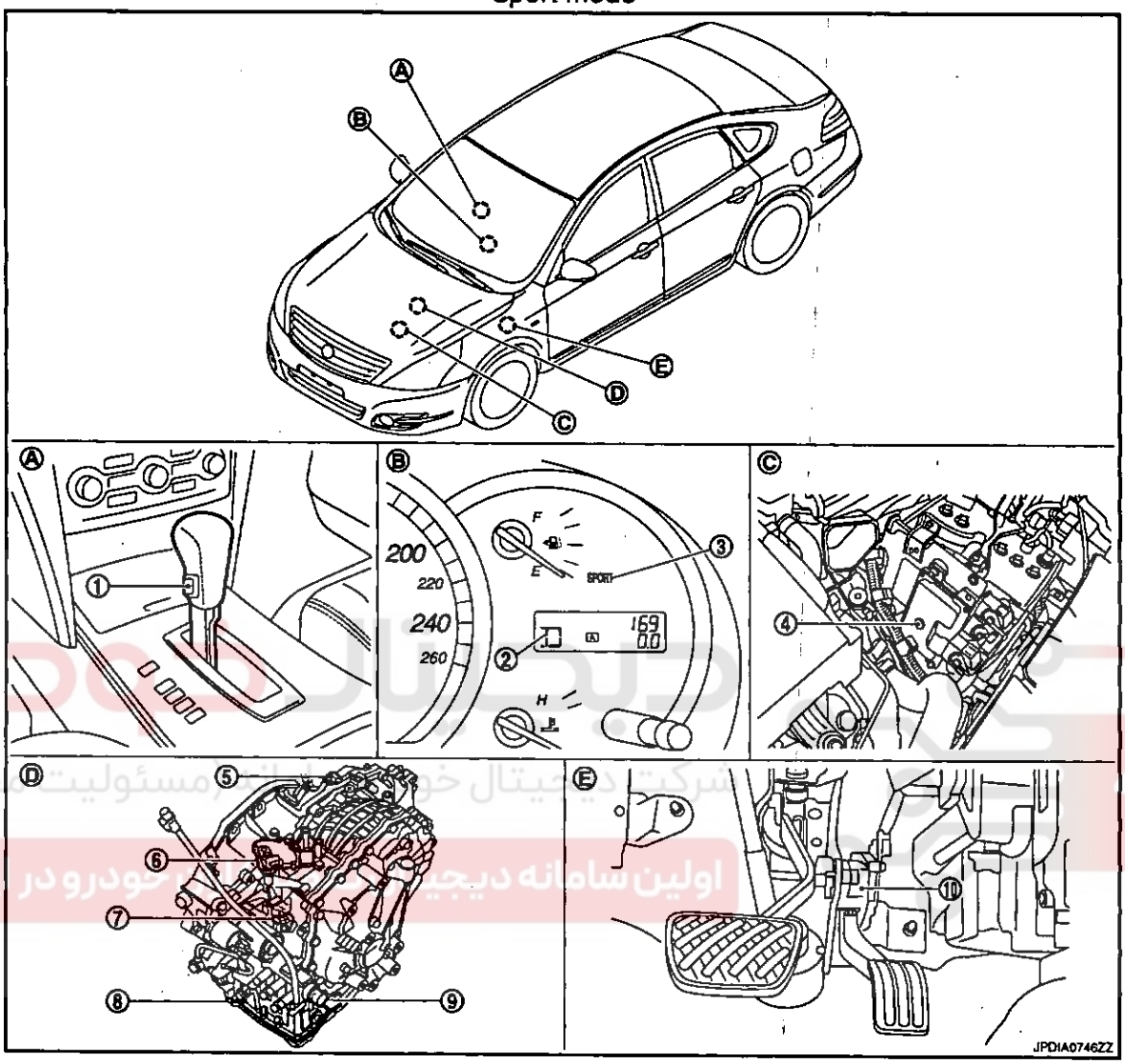
INFOID:0000000004548431

Transmits the power from the engine to the drive wheel.

Component Parts Location

INFOID:0000000004548432

Sport mode



1.	Sport mode switch	2.	Shift position indicator	3.	SPORT indicator lamp
4.	TCM	5.	Secondary speed sensor	6.	PNP switch
7.	Primary speed sensor	8.	Control valve assembly*	9.	CVT unit connector
10.	Accelerator pedal position sensor				
A.	Center console	B.	Combination meter	C.	Engine room LH
D.	CVT assembly	E.	Accelerator pedal, upper		

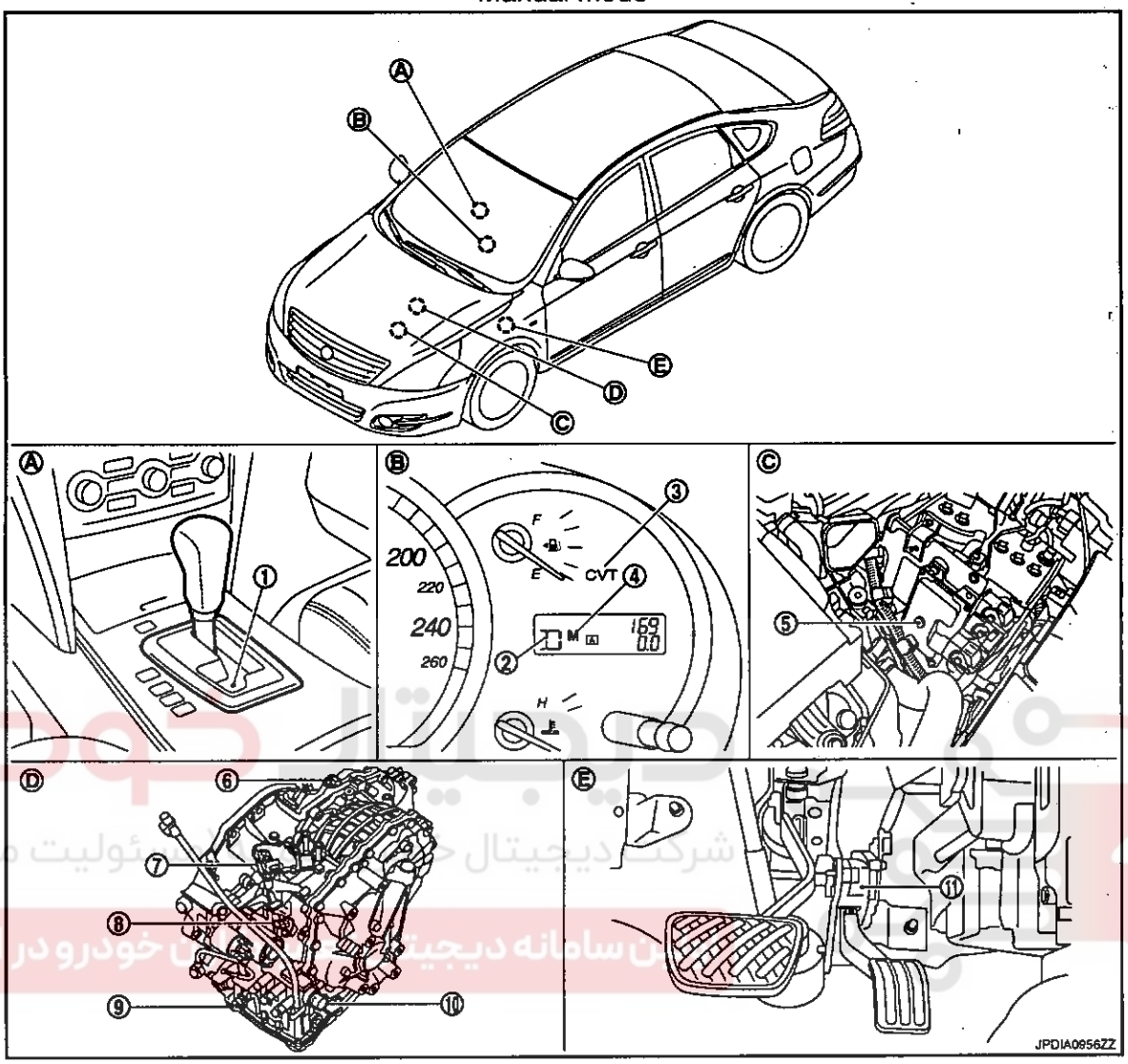
*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control valve assembly (8).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Manual mode



1. Control device	2. Shift position indicator	3. CVT indicator lamp
4. Manual mode indicator	5. TCM	6. Secondary speed sensor
7. PNP switch	8. Primary speed sensor	9. Control valve assembly*
10. CVT unit connector	11. Accelerator pedal position sensor	
A. Center console	B. Combination meter	C. Engine room LH
D. CVT assembly	E. Accelerator pedal, upper	

*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control device (1).

- Manual mode select switch
- Manual mode position select switch

The following components are included in control valve assembly (9).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Component Description

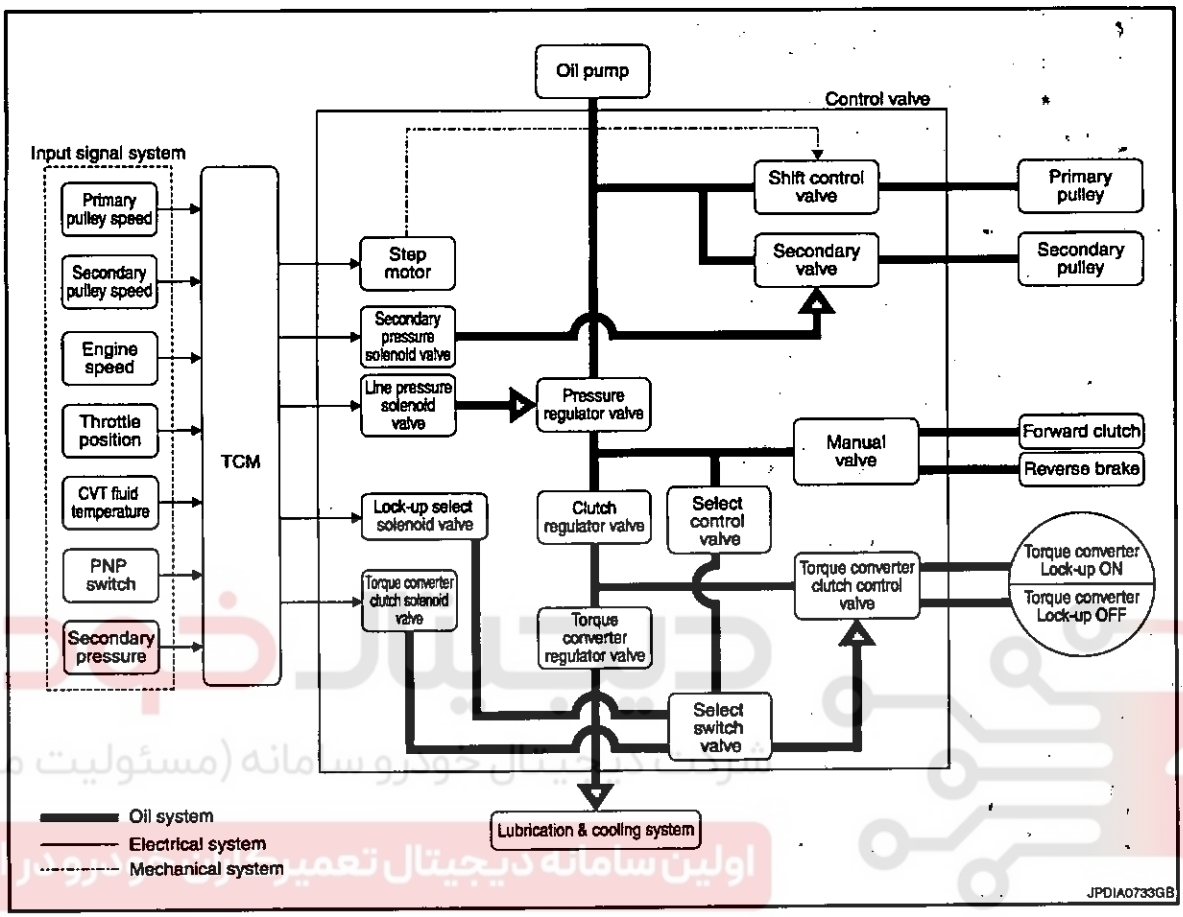
INFOID:0000000004548433

Item	Function
Torque converter	The torque converter is the device that increases the engine torque as well as the conventional CVT and transmits it to the transaxle.
Oil pump	The efficiency of pump discharge rate has been increased at low-rpm and optimized at high-rpm by adopting a vane-type oil pump controlled by the engine. Discharged oil from oil pump is transmitted to the control valve. It is used as the oil of primary and secondary pulley operation and the oil of clutch operation and the lubricant for each part.
Planetary gear	Perform the transmission of drive power and the switching of forward/backward movement.
Forward clutch	
Reverse brake	
Primary pulley	It is composed of a pair of pulleys (the groove width is changed freely in the axial direction) and the steel belt (the steel star wheels are placed continuously and the belt is guided with the multilayer steel rings on both sides). The groove width changes according to wrapping radius of steel belt and pulley from low status to overdrive status continuously with non-step. It is controlled with the oil pressures of primary pulley and secondary pulley.
Secondary pulley	
Steel belt	
Output gear	Reduction gear consists of primary deceleration (output gear and idler gear in pair) and secondary deceleration (reduction gear and final gear in pair). Each of them uses a helical gear.
Idler gear	
Reduction gear	
Final gear	
Differential	
Manual shaft	The parking rod rotates the parking pole and the parking pole engages with the parking gear when the manual shaft is in "P" position. As a result the parking gear and the output axis are fixed.
Parking rod	
Parking pawl	
Parking gear	

HYDRAULIC CONTROL SYSTEM

System Diagram

INFOID:0000000004548434



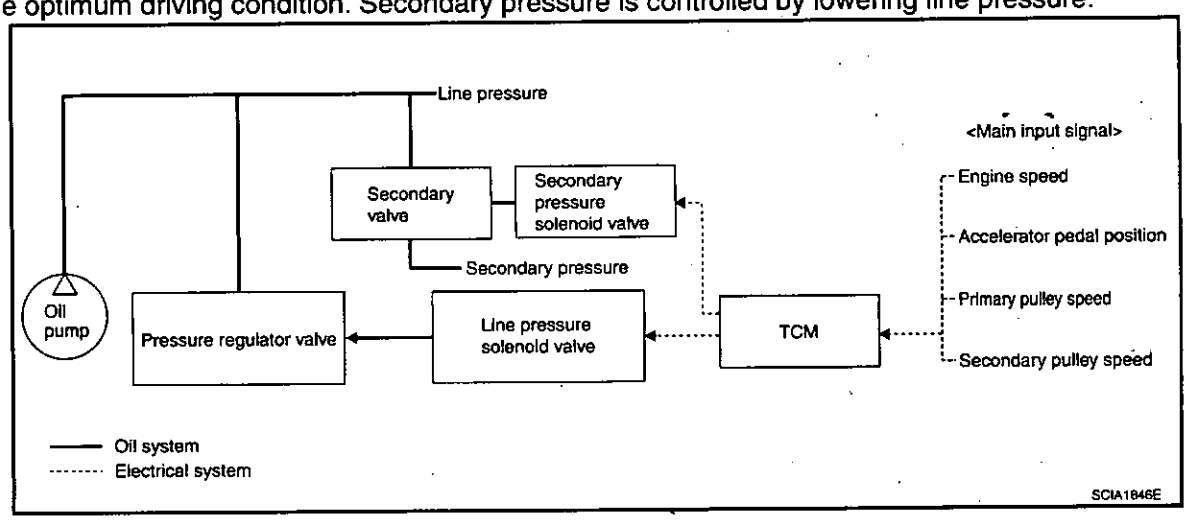
System Description

INFOID:0000000004548435

The hydraulic control mechanism consists of the oil pump directly driven by the engine, the hydraulic control valve that controls line pressure and transmission, and the input signal line.

LINE PRESSURE AND SECONDARY PRESSURE CONTROL

- When an input torque signal equivalent to the engine driving force is transmitted from the ECM to the TCM, the TCM controls the line pressure solenoid valve and secondary pressure solenoid valve.
- Line pressure solenoid valve activates pressure regulator valve, and line pressure from oil pump is adjusted for the optimum driving condition. Secondary pressure is controlled by lowering line pressure.



Normal Control

Optimize the line pressure and secondary pressure, depending on driving conditions, on the basis of the throttle position, the engine speed, the primary pulley (input) revolution speed, the secondary pulley (output) revolution speed, the brake signal, the PNP switch signal, the lock-up signal, the voltage, the target gear ratio, the fluid temperature, and the fluid pressure.

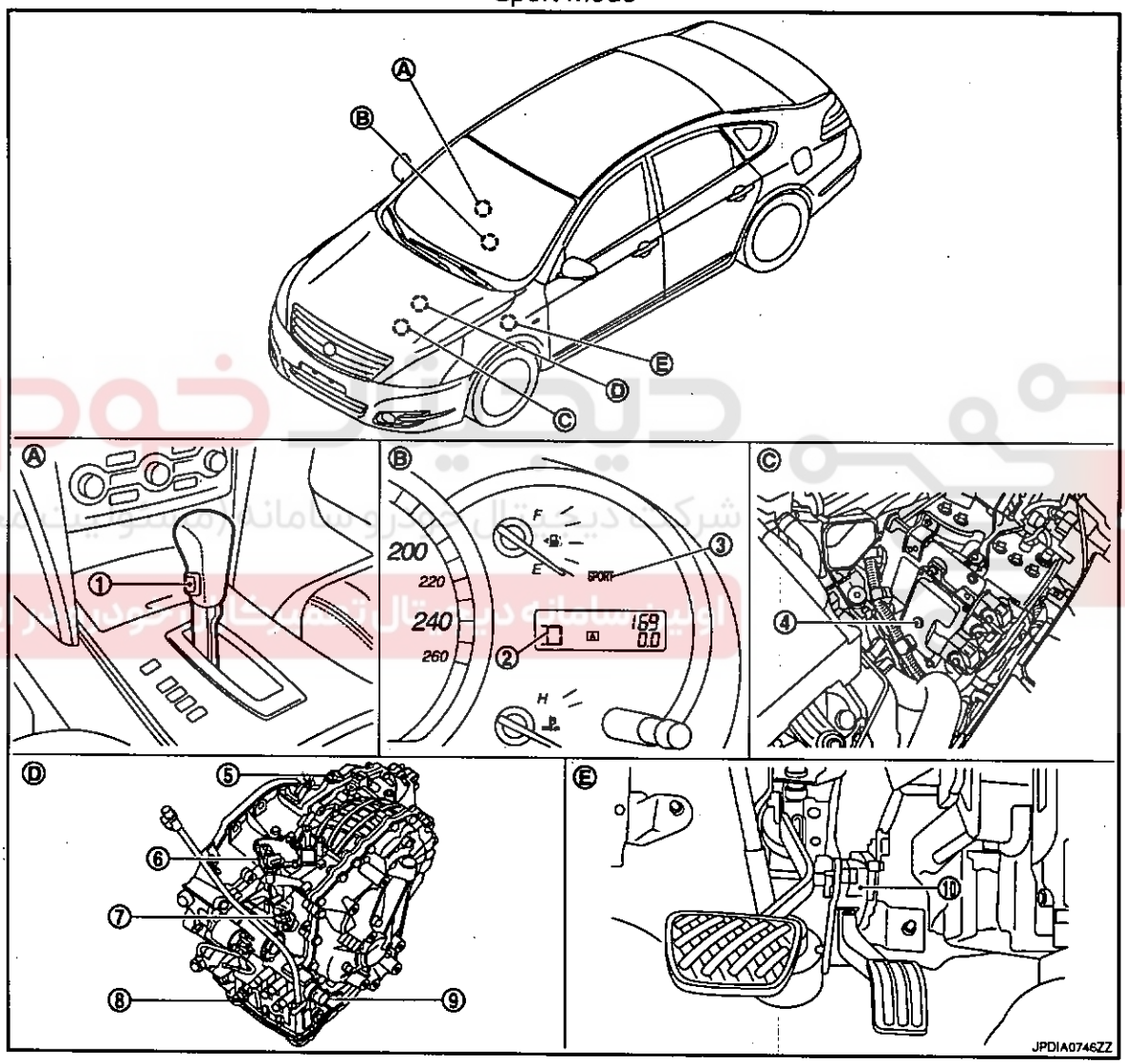
Feedback Control

For the normal fluid control and the select fluid control, secondary pressure is detected for feedback control by using a secondary pressure sensor to set a high-precision secondary pressure.

Component Parts Location

INFOID:0000000004548436

Sport mode



1.	Sport mode switch	2.	Shift position indicator	3.	SPORT indicator lamp
4.	TCM	5.	Secondary speed sensor	6.	PNP switch
7.	Primary speed sensor	8.	Control valve assembly*	9.	CVT unit connector
10.	Accelerator pedal position sensor				
A.	Center console	B.	Combination meter	C.	Engine room LH
D.	CVT assembly	E.	Accelerator pedal, upper		

*: Control valve assembly is included in CVT assembly.

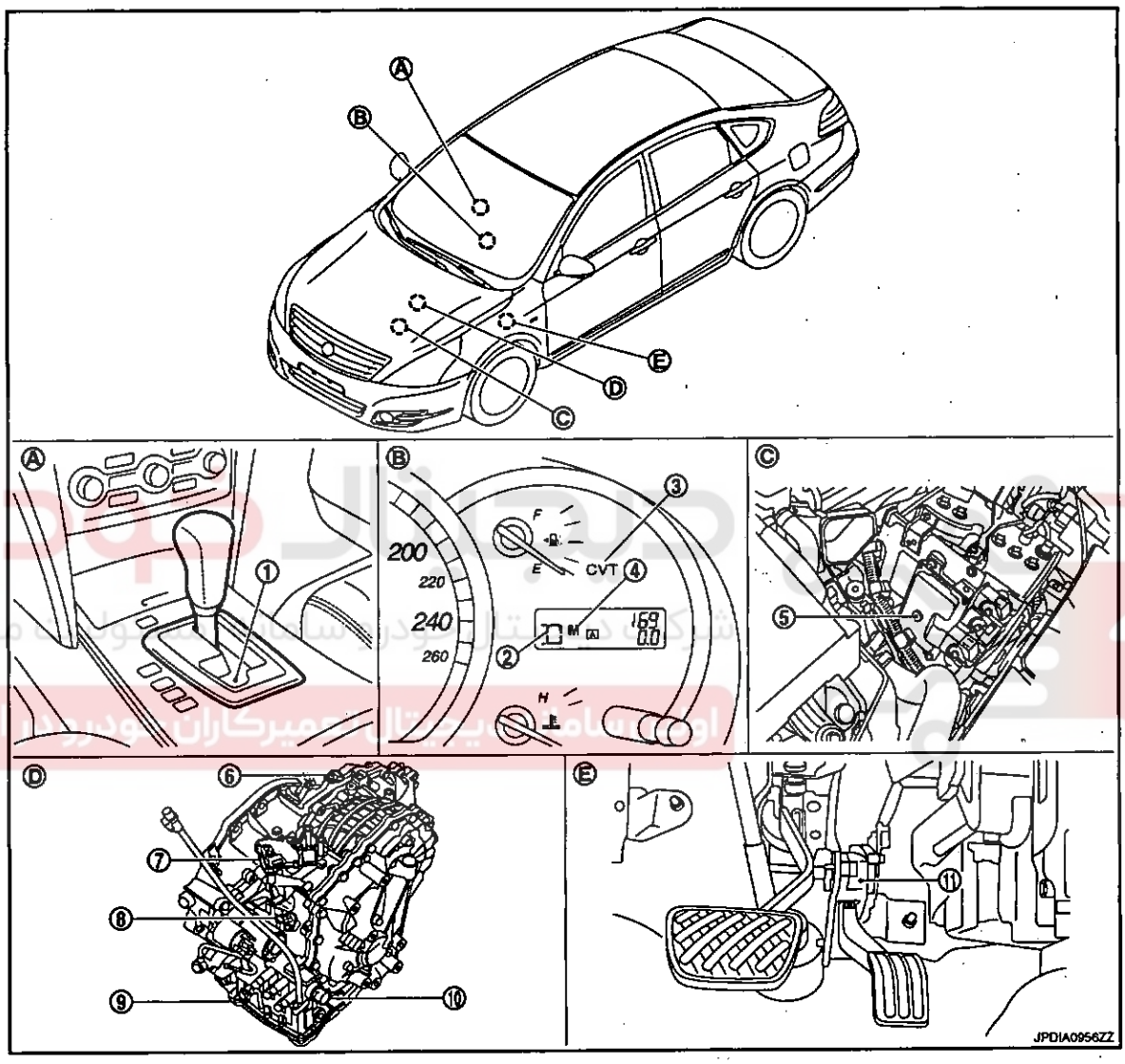
NOTE:

The following components are included in control valve assembly (8).

- CVT fluid temperature sensor

- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Manual mode



1.	Control device	2.	Shift position indicator	3.	CVT indicator lamp
4.	Manual mode indicator	5.	TCM	6.	Secondary speed sensor
7.	PNP switch	8.	Primary speed sensor	9.	Control valve assembly*
10.	CVT unit connector	11.	Accelerator pedal position sensor		
A.	Center console	B.	Combination meter	C.	Engine room LH
D.	CVT assembly	E.	Accelerator pedal, upper		

*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control device (1).
- Manual mode select switch
- Manual mode position select switch

The following components are included in control valve assembly (9).
- CVT fluid temperature sensor
- Torque converter clutch solenoid valve

- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Component Description

INFOID:0000000004548437

TRANSAXLE ASSEMBLY

Name	Function
Torque converter regulator valve	Optimizes the supply pressure for the torque converter depending on driving conditions.
Pressure regulator valve	Optimizes the discharge pressure from the oil pump depending on driving conditions.
TCC control valve	• Activates or deactivates the lock-up. • Locks-up smoothly by opening lock-up operation excessively.
Shift control valve	Controls inflow/outflow of line pressure from the primary pulley depending on the stroke difference between the stepping motor and the primary pulley.
Secondary valve	Controls the line pressure from the secondary pulley depending on operating conditions.
Clutch regulator valve	Adjusts the clutch operating pressure depending on operating conditions.
Manual valve	Transmits the clutch operating pressure to each circuit in accordance with the selected position.
Select control valve	Engages forward clutch, reverse brake smoothly depending on select operation.
Select switch valve	The select switch valve enables to select engagement/disengagement of lock-up clutch and that of forward clutch and reverse clutch.
TCC solenoid valve	• The torque converter clutch solenoid valve is activated by the TCM in response to signals sent from the vehicle speed and accelerator pedal position sensors. Lock-up piston operation will then be controlled. • Lock-up operation, however, is prohibited when CVT fluid temperature is too low. • When the accelerator pedal is depressed (less than 2.0/8) in lock-up condition, the engine speed shall not change abruptly. If there is a big jump in engine speed, there is no lock-up.
Secondary pressure solenoid valve	The pressure control solenoid valve B (secondary pressure solenoid valve) regulates the oil pump discharge pressure to suit the driving condition in response to the signal sent from the TCM.
Line pressure solenoid valve	The pressure control solenoid valve A (line pressure solenoid valve) regulates the oil pump discharge pressure to suit the driving condition in response to the signal transmitted from the TCM.
Step motor	The step motor changes the step by turning 4 coils ON/OFF according to the signal from TCM. As a result, the flow of line pressure to primary pulley is changed and pulley ratio is controlled.
Lock-up select solenoid valve	• The lock-up select solenoid valve controls lock-up clutch pressure or forward clutch pressure (reverse brake pressure). • When controlling lock-up clutch, the valve is turned OFF. When controlling forward clutch, it is turned ON.
Primary speed sensor	The input speed sensor (primary speed sensor) detects the primary pulley revolution speed and sends the signal to the TCM.
Secondary speed sensor	The vehicle speed sensor CVT [output speed sensor (secondary speed sensor)] detects the revolution of the CVT output shaft and emits a pulse signal. The pulse signal is transmitted to the TCM, which converts it into vehicle speed.
PNP switch	The PNP switch detects the selector lever position and sends a signal to the TCM.
Primary pulley	TM-14, "Component Description"
Secondary pulley	
Forward clutch	
Torque converter	

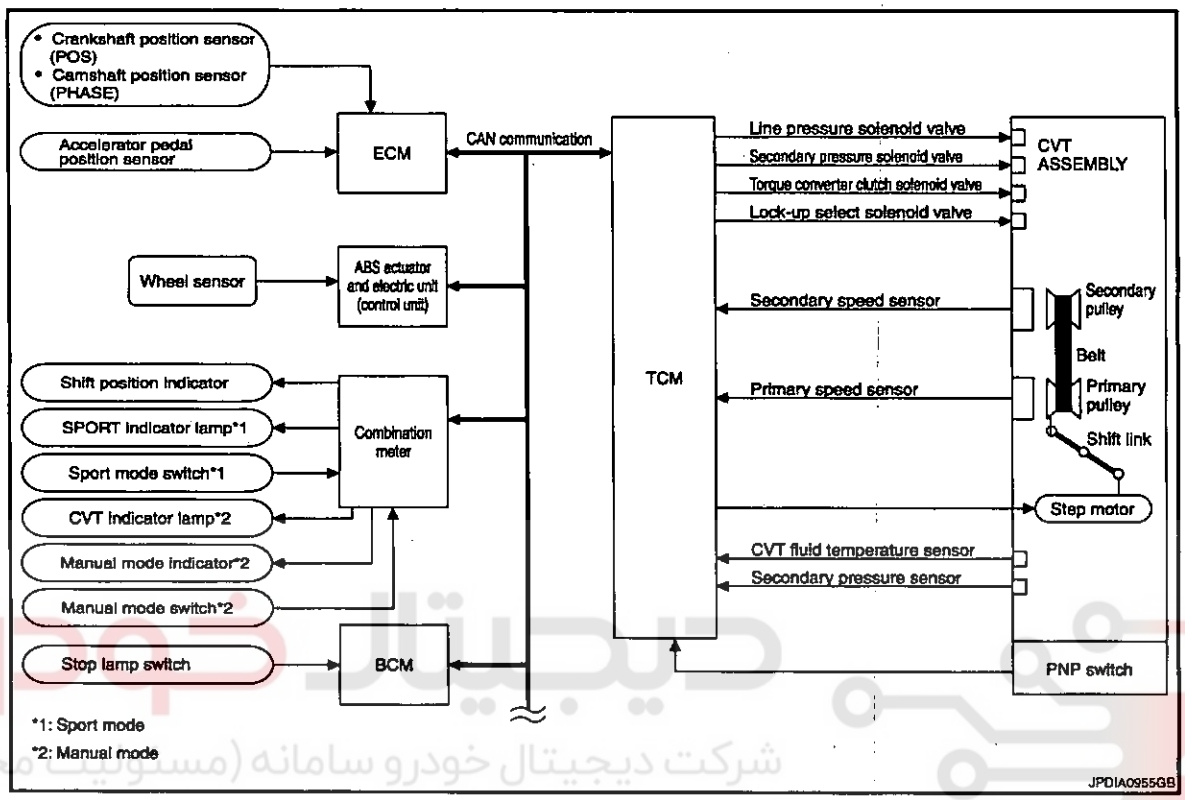
EXCEPT TRANSAXLE ASSEMBLY

Name	Function
TCM	Judges the vehicle driving status according to the signal from each sensor and controls the non-step transmission mechanism properly.
Accelerator pedal position sensor	The electric throttle control actuator consists of throttle control motor, accelerator pedal position sensor, throttle position sensor, etc. The actuator sends the signal to the ECM, and ECM sends the signal to TCM via CAN communication.

CONTROL SYSTEM

System Diagram

INFOID:0000000004548438



System Description

INFOID:0000000004548439

The CVT senses vehicle operating conditions through various sensors. It always controls the optimum shift position and reduces shifting and lock-up shocks.

TCM FUNCTION

The function of the TCM is to:

- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, and lock-up operation.
- Send required output signals to the step motor and the respective solenoids.

SENSORS (or SIGNALS)		TCM		ACTUATORS
PNP switch Accelerator pedal position signal Closed throttle position signal Engine speed signal CVT fluid temperature sensor Vehicle speed signal Sport mode switch signal*1 Manual mode switch*2 Stop lamp switch signal Primary speed sensor Secondary speed sensor Secondary pressure sensor	⇒	Shift control Line pressure control Primary pressure control Secondary pressure control Lock-up control Engine brake control Vehicle speed control Fail-safe control Self-diagnosis Duet-EA control CAN system On board diagnosis	⇒	Step motor Torque converter clutch solenoid valve Lock-up select solenoid valve Line pressure solenoid valve Secondary pressure solenoid valve SPORT indicator lamp*1 Manual mode indicator*2 Shift position indicator

*1: Sport mode

*2: Manual mode

INPUT/OUTPUT SIGNAL OF TCM

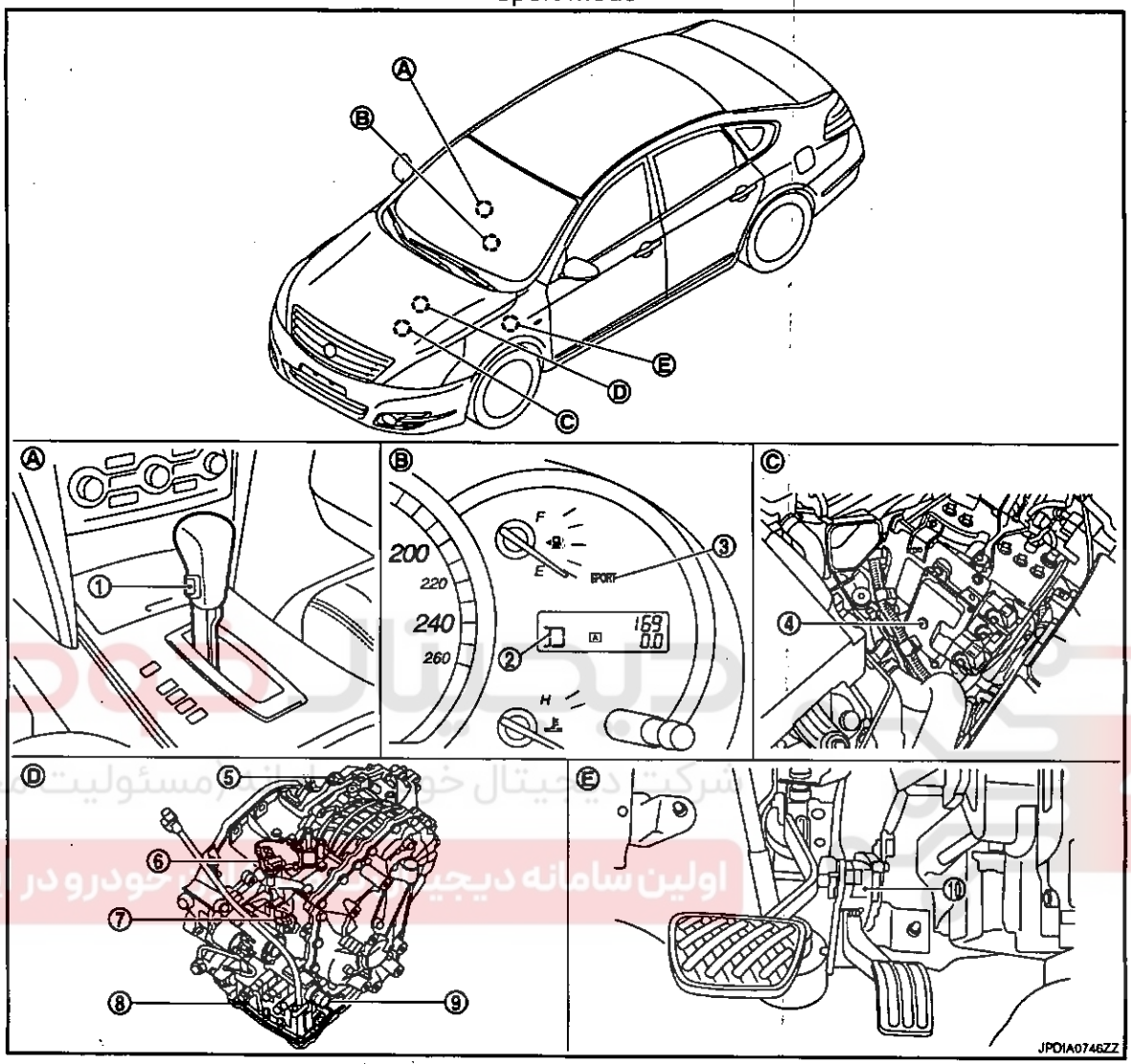
	Control item	Fluid pressure control	Select control	Shift control	Lock-up control	CAN communication control	Fail-safe function*3
Input	PNP switch	X	X	X	X	X	X
	Accelerator pedal position signal *1	X	X	X	X	X	X
	Closed throttle position signal*1	X		X	X	X	
	Engine speed signal*1	X	X		X	X	X
	CVT fluid temperature sensor	X	X	X	X		X
	Sport mode switch signal*1, *4	X		X	X	X	
	Manual mode signal*1, *5	X		X	X	X	X
	Stop lamp switch signal*1	X		X	X	X	
	Primary speed sensor	X		X	X	X	X
	Secondary speed sensor	X	X	X	X	X	X
	Secondary pressure sensor	X		X			X
Output	Step motor			X			X
	TCC solenoid valve		X		X		X
	Lock-up select solenoid valve		X		X		X
	Line pressure solenoid valve	X	X	X			X
	Secondary pressure solenoid valve	X		X			X
	SPORT indicator signal*2, *4			X		X	

*1: Input via CAN communications.
*2: Output via CAN communications.
*3: If these input and output signals are different, the TCM triggers the fail-safe function.
*4: Sport mode
*5: Manual mode

Component Parts Location

INFOID:0000000004548440

Sport mode



1. Sport mode switch	2. Shift position indicator	3. SPORT indicator lamp
4. TCM	5. Secondary speed sensor	6. PNP switch
7. Primary speed sensor	8. Control valve assembly*	9. CVT unit connector
10. Accelerator pedal position sensor		
A. Center console	B. Combination meter	C. Engine room LH
D. CVT assembly	E. Accelerator pedal, upper	

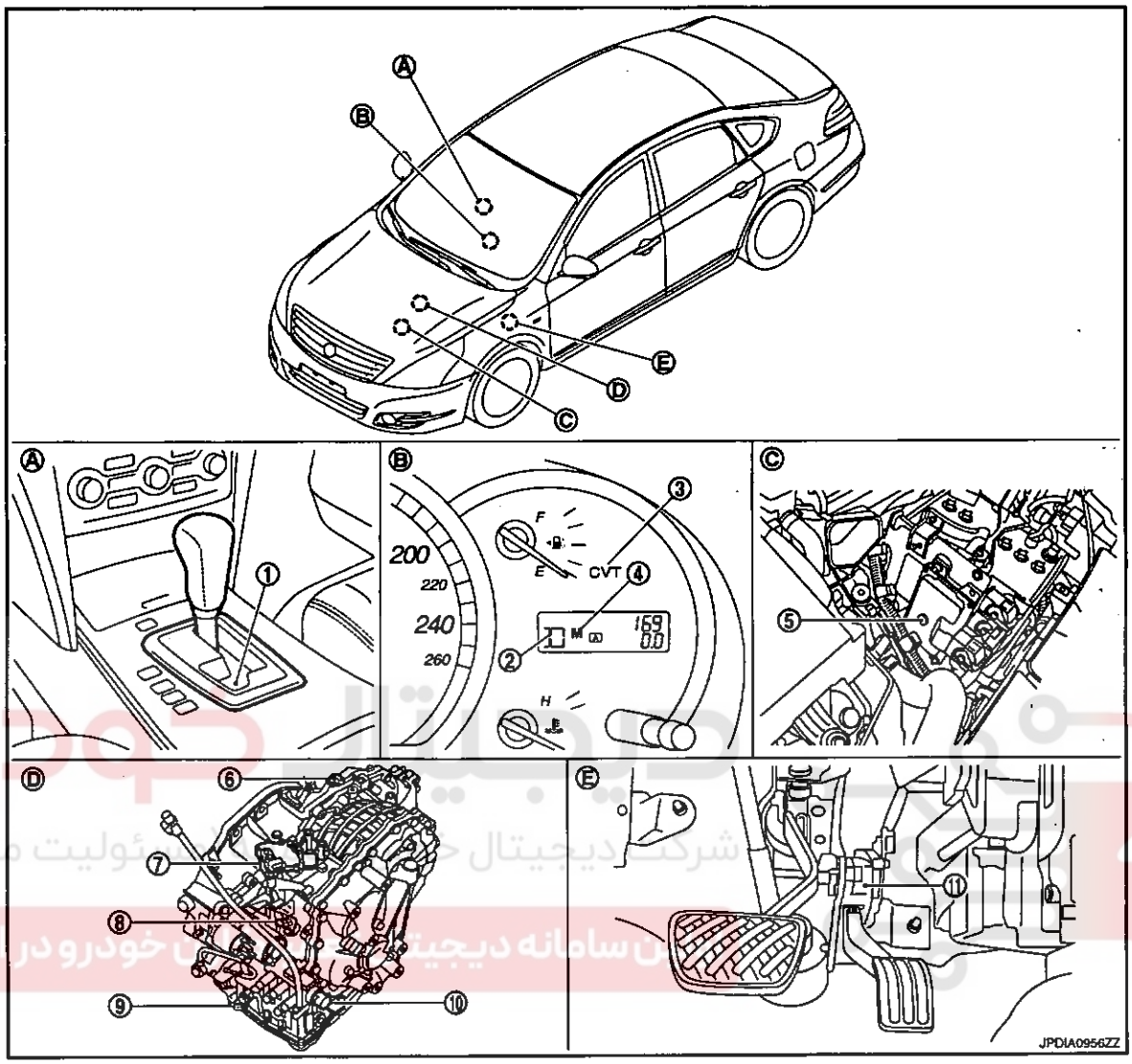
*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control valve assembly (8).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Manual mode



1.	Control device	2.	Shift position indicator	3.	CVT indicator lamp
4.	Manual mode indicator	5.	TCM	6.	Secondary speed sensor
7.	PNP switch	8.	Primary speed sensor	9.	Control valve assembly*
10.	CVT unit connector	11.	Accelerator pedal position sensor		
A.	Center console	B.	Combination meter	C.	Engine room LH
D.	CVT assembly	E.	Accelerator pedal, upper		

*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control device (1).

- Manual mode select switch
- Manual mode position select switch

The following components are included in control valve assembly (9).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Component Description

INFOID:0000000004548441

TRANSAXLE ASSEMBLY

Name	Function
CVT fluid temperature sensor	The CVT fluid temperature sensor detects the CVT fluid temperature and sends the signal to the TCM.
Secondary pressure sensor	The transmission fluid pressure sensor A (secondary pressure sensor) detects secondary pressure of CVT and sends the signal to the TCM.
PNP switch	TM-18, "Component Description"
Primary speed sensor	
Secondary speed sensor	
Step motor	
TCC solenoid valve	
Lock-up select solenoid valve	
Line pressure solenoid valve	
Secondary pressure solenoid valve	

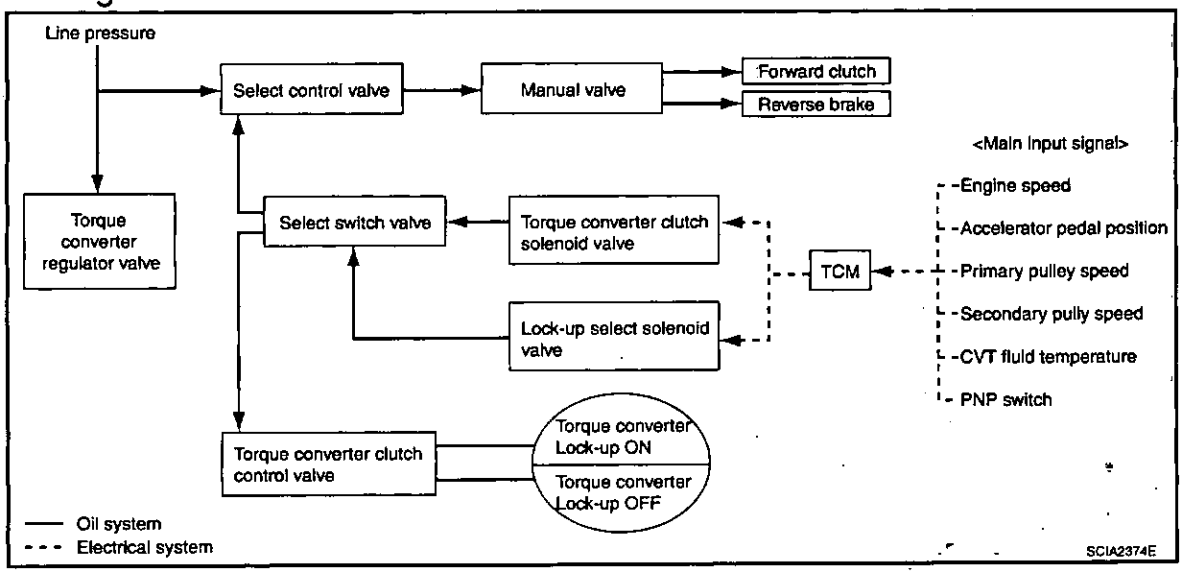
EXCEPT TRANSAXLE ASSEMBLY

Name	Function
TCM	Optimally controls continuously variable transmission system by judging driving conditions based on signals from each sensor.
Stop lamp switch	BCM detects ON/OFF state of the stop lamp switch and transmits the data to the CVT control unit via CAN communication by converting the data to a signal.

LOCK-UP AND SELECT CONTROL SYSTEM

System Diagram

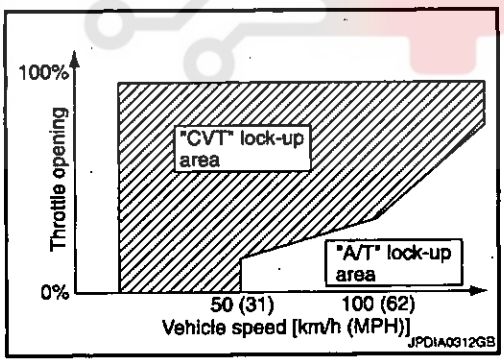
INFOID:0000000004548442



System Description

INFOID:0000000004548443

- 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. The torque converter clutch control valve engages or releases the torque converter clutch piston.
- When shifting between "N" ("P") ⇔"D" ("R"), torque converter clutch solenoid valve controls engagement power of forward clutch and reverse brake.
- The lock-up applied gear range was expanded by locking up the torque converter at a lower vehicle speed than conventional CVT models.



TORQUE CONVERTER CLUTCH AND SELECT CONTROL VALVE CONTROL

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 valve 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 valve and lock-up apply pressure is generated.
In this way, the torque converter clutch piston is pressed and coupled.

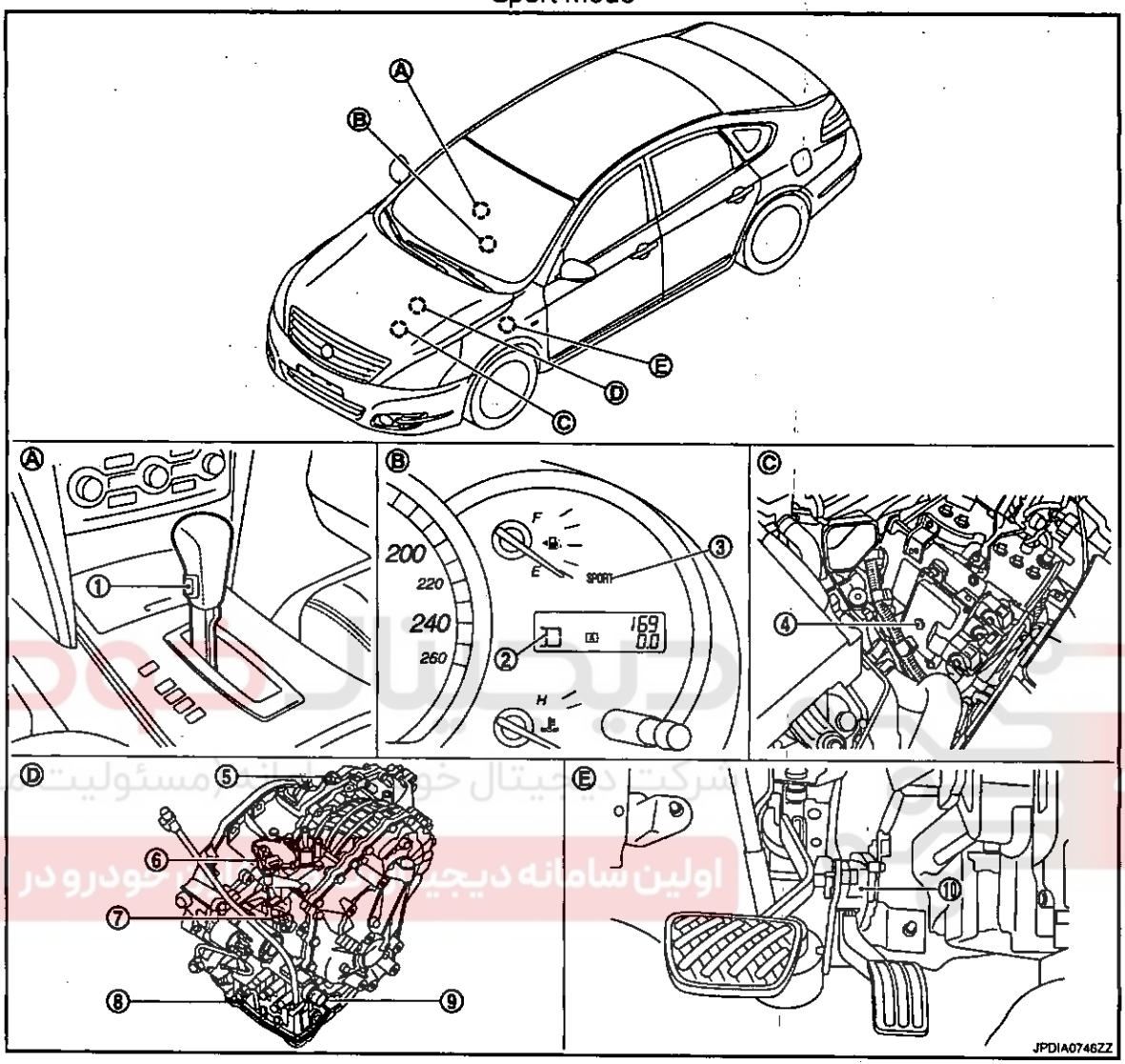
Select Control

When shifting between "N" ("P") ⇔"D" ("R"), optimize the operating pressure on the basis of the throttle position, the engine speed, and the secondary pulley (output) revolution speed to lessen the shift shock.

Component Parts Location

INFOID:0000000004548444

Sport mode



1.	Sport mode switch	2.	Shift position indicator	3.	SPORT indicator lamp
4.	TCM	5.	Secondary speed sensor	6.	PNP switch
7.	Primary speed sensor	8.	Control valve assembly*	9.	CVT unit connector
10.	Accelerator pedal position sensor				
A.	Center console	B.	Combination meter	C.	Engine room LH
D.	CVT assembly	E.	Accelerator pedal, upper		

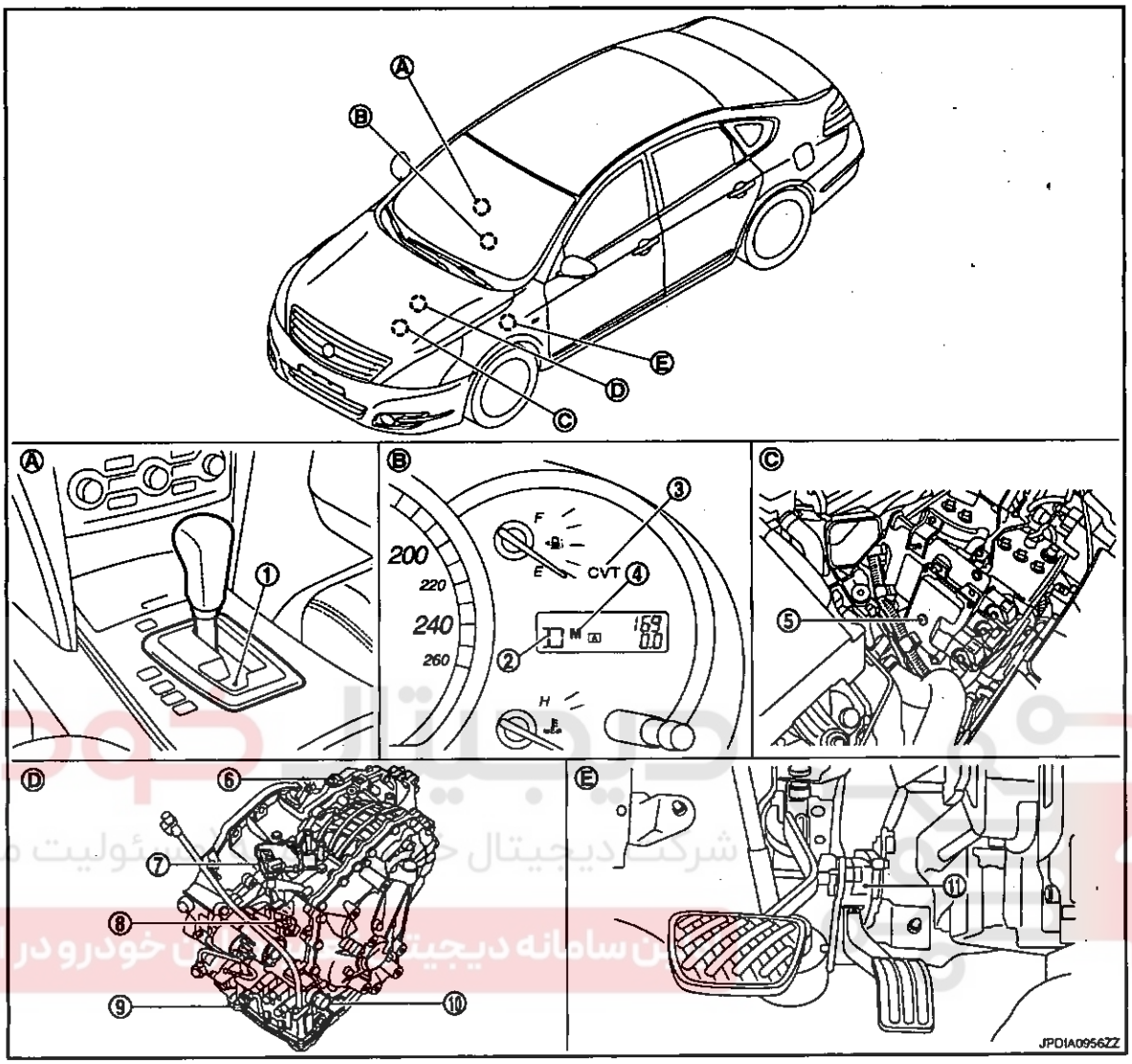
*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control valve assembly (8).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Manual mode



1. Control device	2. Shift position indicator	3. CVT indicator lamp
4. Manual mode indicator	5. TCM	6. Secondary speed sensor
7. PNP switch	8. Primary speed sensor	9. Control valve assembly*
10. CVT unit connector	11. Accelerator pedal position sensor	
A. Center console	B. Combination meter	C. Engine room LH
D. CVT assembly	E. Accelerator pedal, upper	

*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control device (1).

- Manual mode select switch
- Manual mode position select switch

The following components are included in control valve assembly (9).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Component Description

INFOID:0000000004548445

TRANSAXLE ASSEMBLY

Name	Function
Torque converter regulator valve	TM-18, "Component Description"
TCC control valve	
Select control valve	
Select switch valve	
Manual valve	
TCC solenoid valve	
Lock-up select solenoid valve	
Primary speed sensor	
Secondary speed sensor	
PNP switch	
CVT fluid temperature sensor	TM-24, "Component Description"
Forward clutch	TM-14, "Component Description"
Reverse brake	
Torque converter	

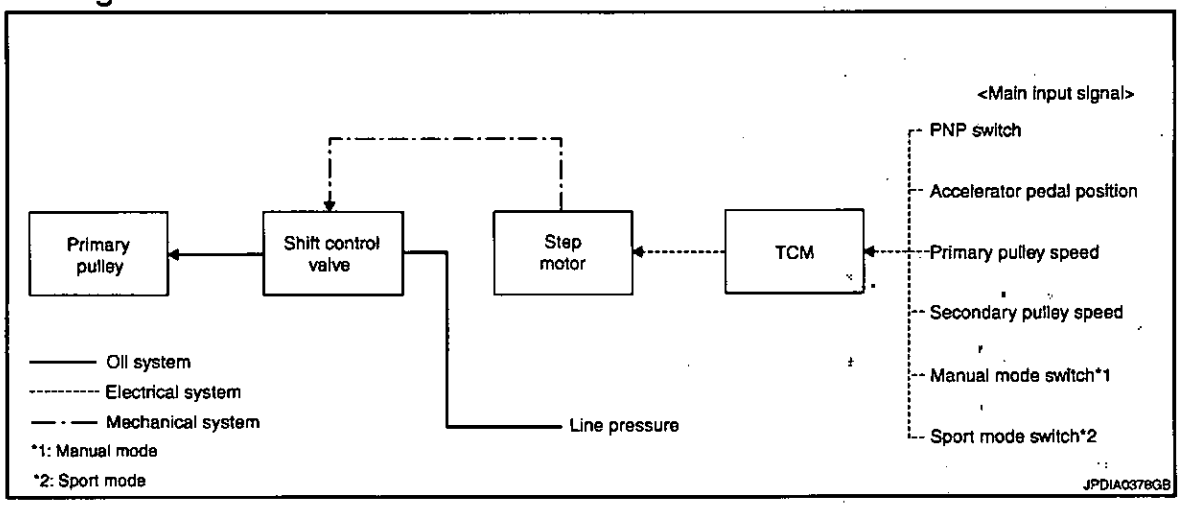
EXCEPT TRANSAXLE ASSEMBLY

Name	Function
TCM	TM-24, "Component Description"
Accelerator pedal position sensor	TM-18, "Component Description"

SHIFT CONTROL SYSTEM

System Diagram

INFOID:0000000004548446



NOTE:
The gear ratio is set for each position separately.

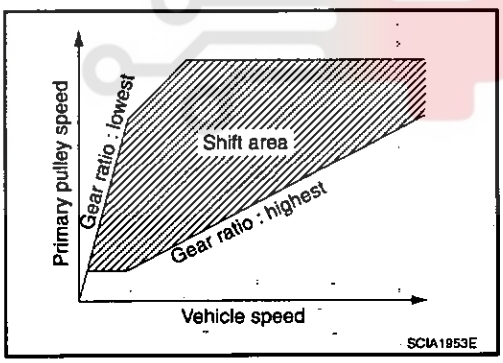
System Description

INFOID:0000000004548447

In order to select the gear ratio that can obtain the driving force in accordance with driver's intention and the vehicle condition, TCM monitors the driving conditions, such as the vehicle speed and the throttle position and selects the optimum gear ratio, and determines the gear change steps to the gear ratio. Then TCM sends the command to the step motor, controls the inflow/outflow of line pressure from the primary pulley to determine the position of the moving-pulley and controls the gear ratio.

"D" POSITION

Shifting over all the ranges of gear ratios from the lowest to the highest.

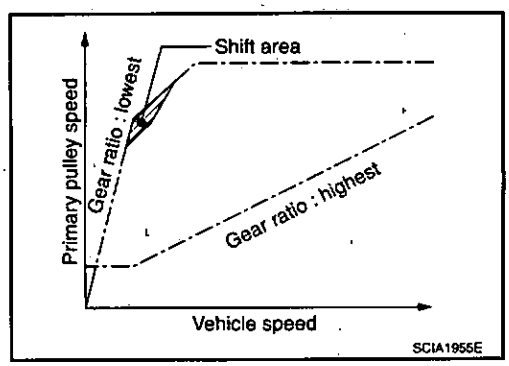


SPORT MODE

Use this position for the improved engine braking.

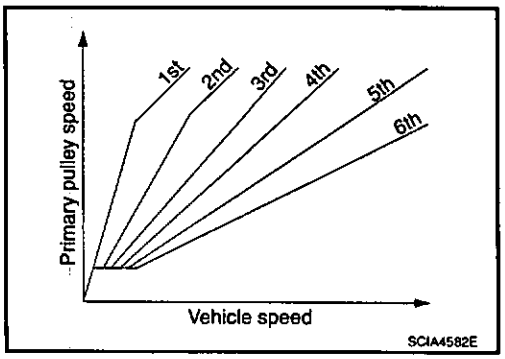
"L" POSITION (SPORT MODE)

By limiting gear range to the lowest position, the strong driving force and the engine brake can be secured.



"M" POSITION (MANUAL MODE)

When the selector lever is put in the manual shift gate side, the fixed changing gear line is set. By moving the selector lever to + side or – side, the manual mode switch is changed over, and shift change like M/T becomes possible following the changing gear set line step by step.



DOWNHILL ENGINE BRAKE CONTROL (AUTO ENGINE BRAKE CONTROL)

When a downhill slope is detected with the accelerator pedal released, the engine brake will be strengthened up by downshifting so as not to accelerate the vehicle more than necessary.

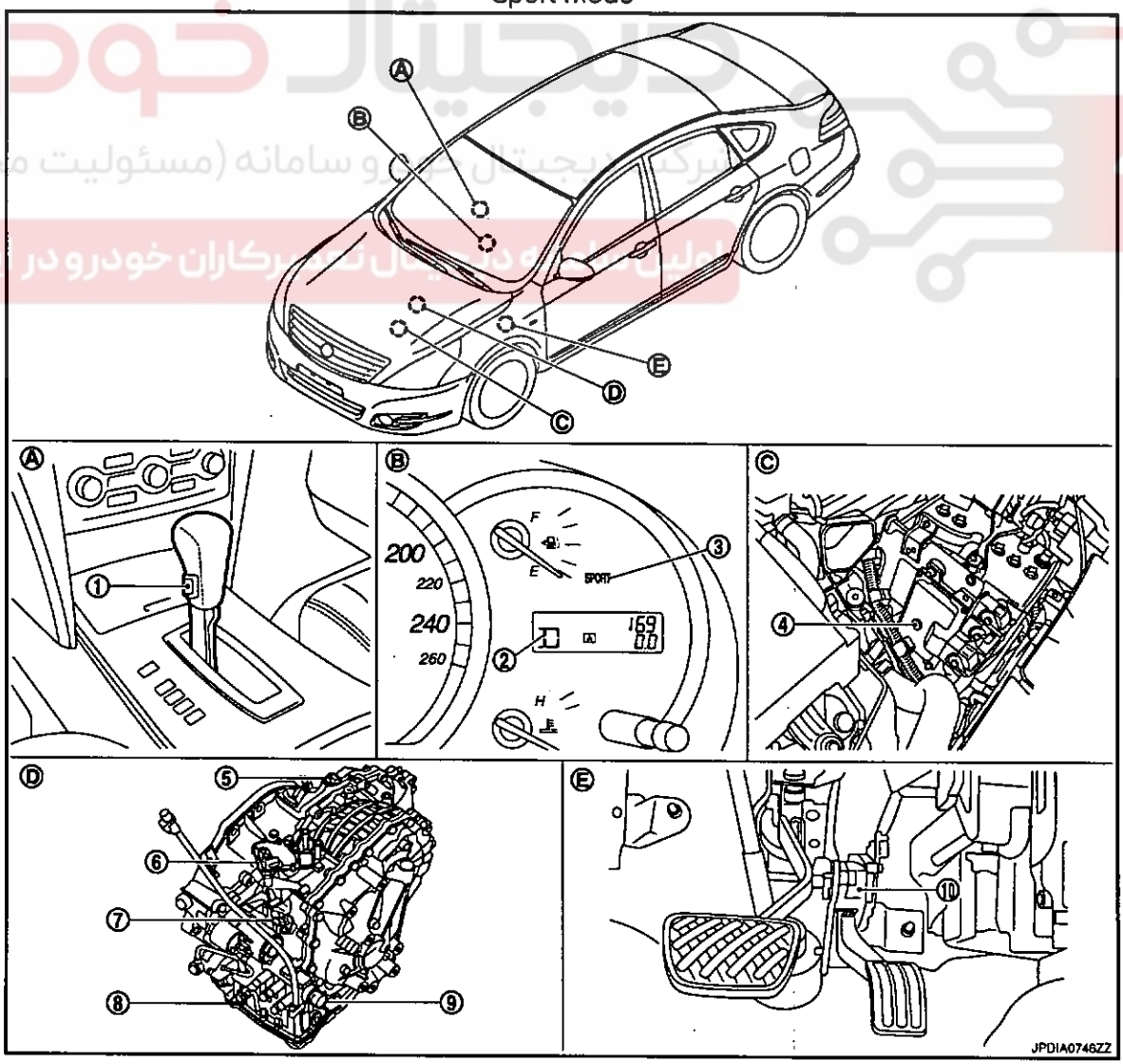
ACCELERATION CONTROL

According to vehicle speed and a change of accelerator pedal angle, driver's request for acceleration and driving scene are judged. This function assists improvement in the acceleration feeling by making the engine speed proportionate to the vehicle speed. And a shift map that can gain a larger driving force is available for compatibility of mileage with driveability.

Component Parts Location

INFOID:0000000004548448

Sport mode

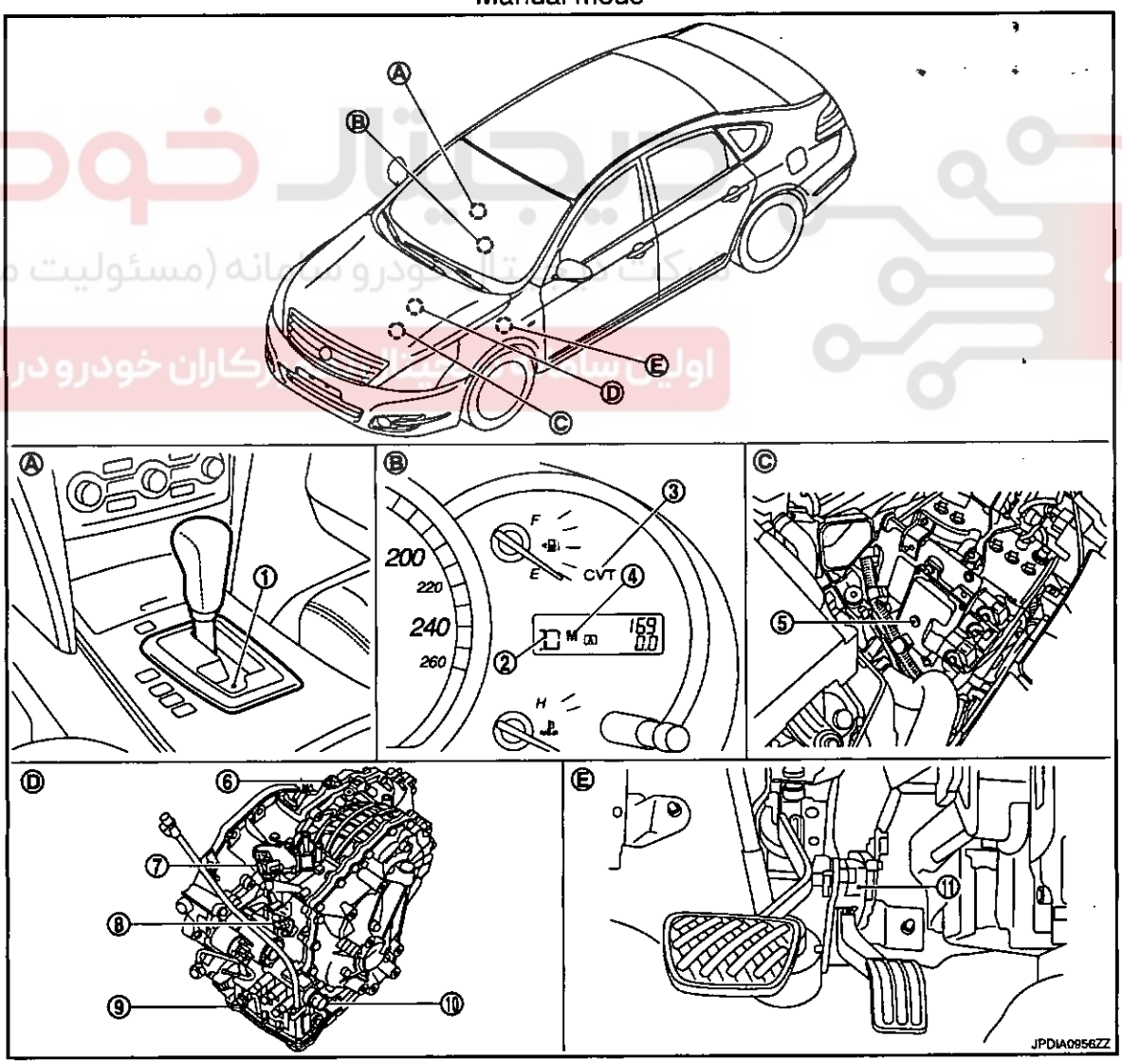


1. Sport mode switch	2. Shift position indicator	3. SPORT indicator lamp
4. TCM	5. Secondary speed sensor	6. PNP switch
7. Primary speed sensor	8. Control valve assembly*	9. CVT unit connector
10. Accelerator pedal position sensor		
A. Center console	B. Combination meter	C. Engine room LH
D. CVT assembly	E. Accelerator pedal, upper	

*: Control valve assembly is included in CVT assembly.

NOTE:
The following components are included in control valve assembly (8).
- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Manual mode



1. Control device	2. Shift position indicator	3. CVT indicator lamp
4. Manual mode indicator	5. TCM	6. Secondary speed sensor
7. PNP switch	8. Primary speed sensor	9. Control valve assembly*

10. CVT unit connector
11. Accelerator pedal position sensor
A. Center console
B. Combination meter
C. Engine room LH
D. CVT assembly
E. Accelerator pedal, upper

*: Control valve assembly is included in CVT assembly.

NOTE:

The following components are included in control device (1).

- Manual mode select switch
- Manual mode position select switch

The following components are included in control valve assembly (9).

- CVT fluid temperature sensor
- Torque converter clutch solenoid valve
- Line pressure solenoid valve
- Step motor
- ROM assembly
- Secondary pressure sensor
- Secondary pressure solenoid valve
- Lock-up select solenoid valve

Component Description

INFOID:0000000004548449

TRANSAXLE ASSEMBLY

Item	Function
PNP switch	TM-18, "Component Description"
Primary speed sensor	
Secondary speed sensor	
Step motor	
Shift control valve	
Primary pulley	TM-14, "Component Description"
Secondary pulley	

EXCEPT TRANSAXLE ASSEMBLY

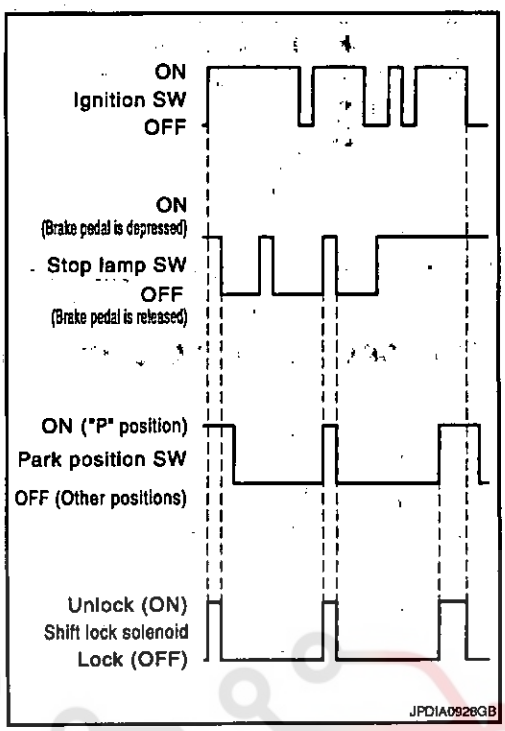
Item	Function
TCM	TM-24, "Component Description"

SHIFT LOCK SYSTEM

System Description

INFOID:0000000004548450

The shift lever cannot be shifted from the "P" position unless the brake pedal is depressed while the ignition switch is set to ON. The shift lock is unlocked by turning the shift lock solenoid ON when the ignition switch is set to ON, the park position switch is turned ON (selector lever is in "P" position), and the stop lamp switch is turned ON (brake pedal is depressed) as shown in the operation chart in the figure. Therefore, the shift lock solenoid receives no ON signal and the shift lock remains locked if all of the above conditions are not fulfilled. (However, selector operation is allowed if the shift lock release button is pressed.)

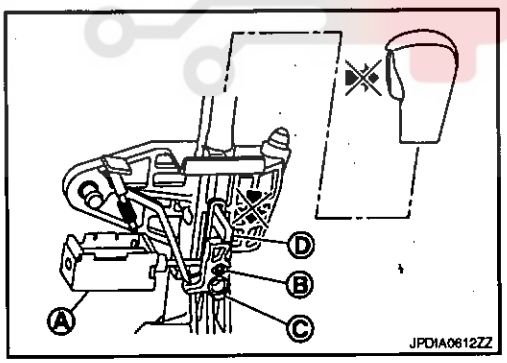


SHIFT LOCK OPERATION AT "P" POSITION

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

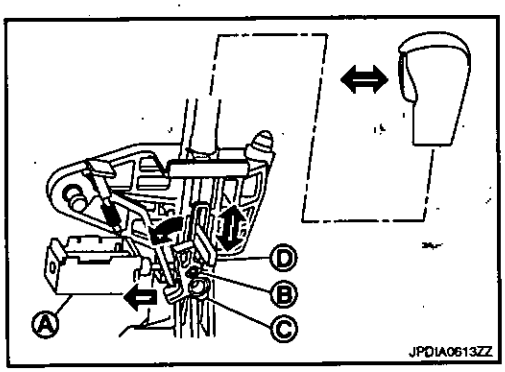
The shift lock solenoid (A) is turned OFF (not energized) and the solenoid rod (B) is extended with the spring when the brake pedal is not depressed (no selector operation allowed) with the ignition switch ON.

The connecting lock lever (C) is located at the position shown in the figure when the solenoid rod is extended. It prevents the movement of the detent rod (D). For these reasons, the selector lever cannot be shifted from the "P" position.



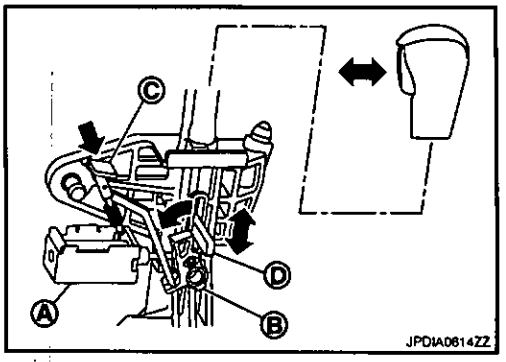
When Brake Pedal Is Depressed (Shift Operation Allowed)

The shift lock solenoid (A) is turned ON (energized) when the brake pedal is depressed with the ignition switch ON. The solenoid rod (B) is compressed by the electromagnetic force. The connecting lock lever (C) rotates when the solenoid is activated. Therefore, the detent rod (D) can be moved. For these reasons, the selector lever can be shifted to other positions.



"P" POSITION HOLD MECHANISM (IGNITION SWITCH LOCK)

The shift lock solenoid (A) is not energized when the ignition switch is in any position other than ON. In this condition, the shift mechanism is locked and "P" position is held. The operation cannot be performed from "P" position if the brake pedal is depressed with the ignition switch ON when the operation system of shift lock solenoid is malfunctioning. However, the lock lever (B) is forcibly rotated and the shift lock is released when the shift lock release button (C) is pressed from above. Then the selector operation from "P" position can be performed.

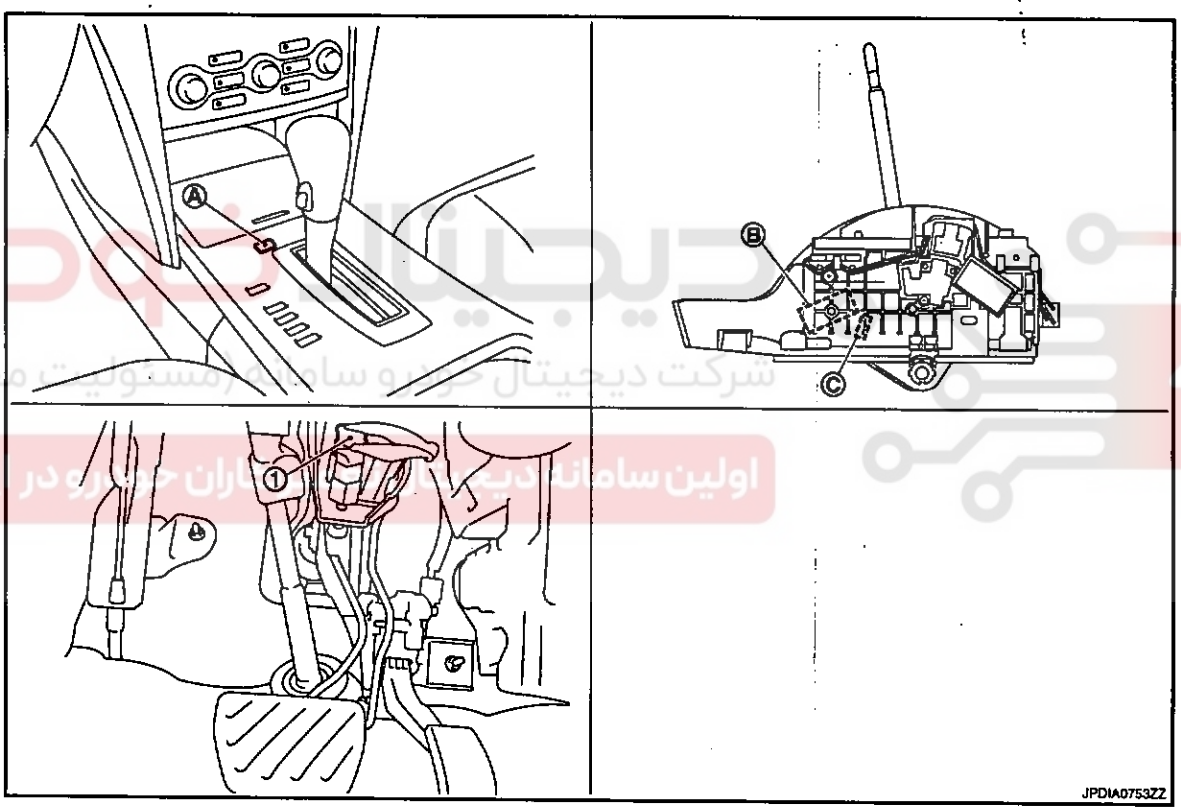


D : Detent rod

CAUTION:
Use the shift lock release button only when the selector lever cannot be operated even if the brake pedal is depressed with the ignition switch ON.

Component Parts Location

INFOID:0000000004548451



1. Stop lamp switch
A. Shift lock release button
B. Shift lock solenoid
C. Park position switch

Component Description

INFOID:0000000004548452

SHIFT LOCK

Component	Function
Shift lock solenoid	TM-37
Lock lever	
Detent rod	
Park position switch	
Shift lock release button	

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000004548453

DESCRIPTION

The CVT system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD) 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 performed by the TCM. A malfunction history is stored in the TCM memory. The detected items are overlapped with OBD self-diagnostic items.

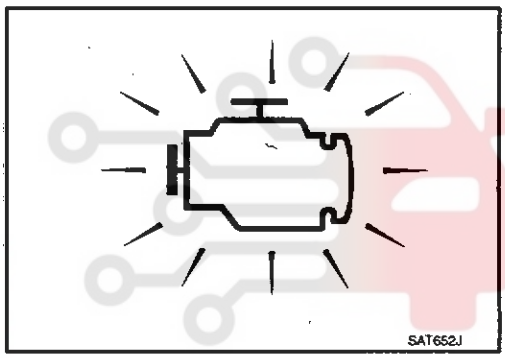
OBD FUNCTION

The ECM provides emission-related on board diagnostic (OBD) functions for the CVT system. One function is to receive a signal from the TCM used with OBD-related parts of the CVT 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 CVT system parts.

MALFUNCTION INDICATOR LAMP (MIL)

Description
The MIL is located on the instrument panel.

1. The MIL is turned ON when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MIL is not turned ON, refer to EC-316, "Component Function Check".
2. The MIL is turned OFF when the engine is started. If the MIL remains ON, the on board diagnostic system has detected an engine system malfunction.



COMPONENT DIAGNOSIS

SHIFT POSITION INDICATOR CIRCUIT

SPORT MODE

SPORT MODE : Description

INFOID:0000000004548558

TCM sends position indicator signals to combination meter via CAN communication line.

MANUAL MODE

MANUAL MODE : Description

INFOID:0000000004548561

- TCM sends position indicator signals to combination meter via CAN communication line.
- The selector lever position is indicated on the shift position indicator.

SHIFT LOCK SYSTEM

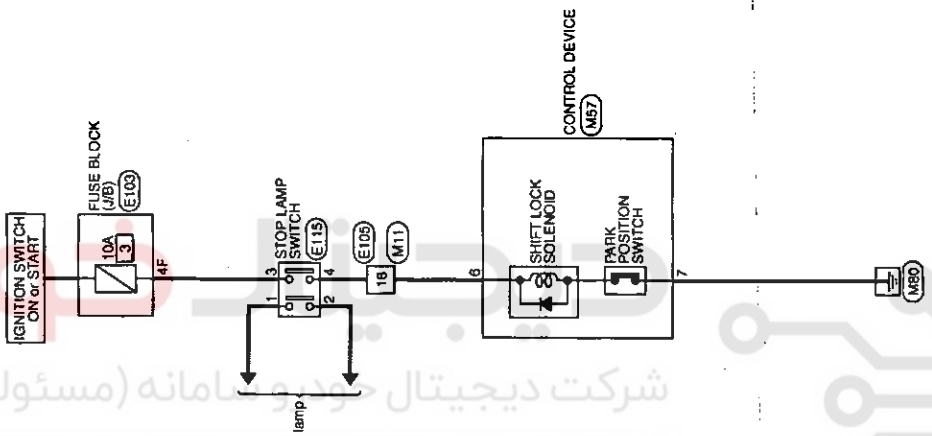
Description

INFOID:0000000004548564

Component	Function
Shift lock solenoid	It operates according to the signal from the stop lamp switch and moves the lock lever.
Lock lever	It moves according to the operation of the shift lock solenoid and performs the release of the shift lock.
Detent rod	It links with the selector button and restricts the selector lever movement.
Park position switch	It detects that the selector lever is in "P" position.
Shift lock release button	It moves the lock lever forcibly.

Wiring Diagram - CVT SHIFT LOCK SYSTEM -

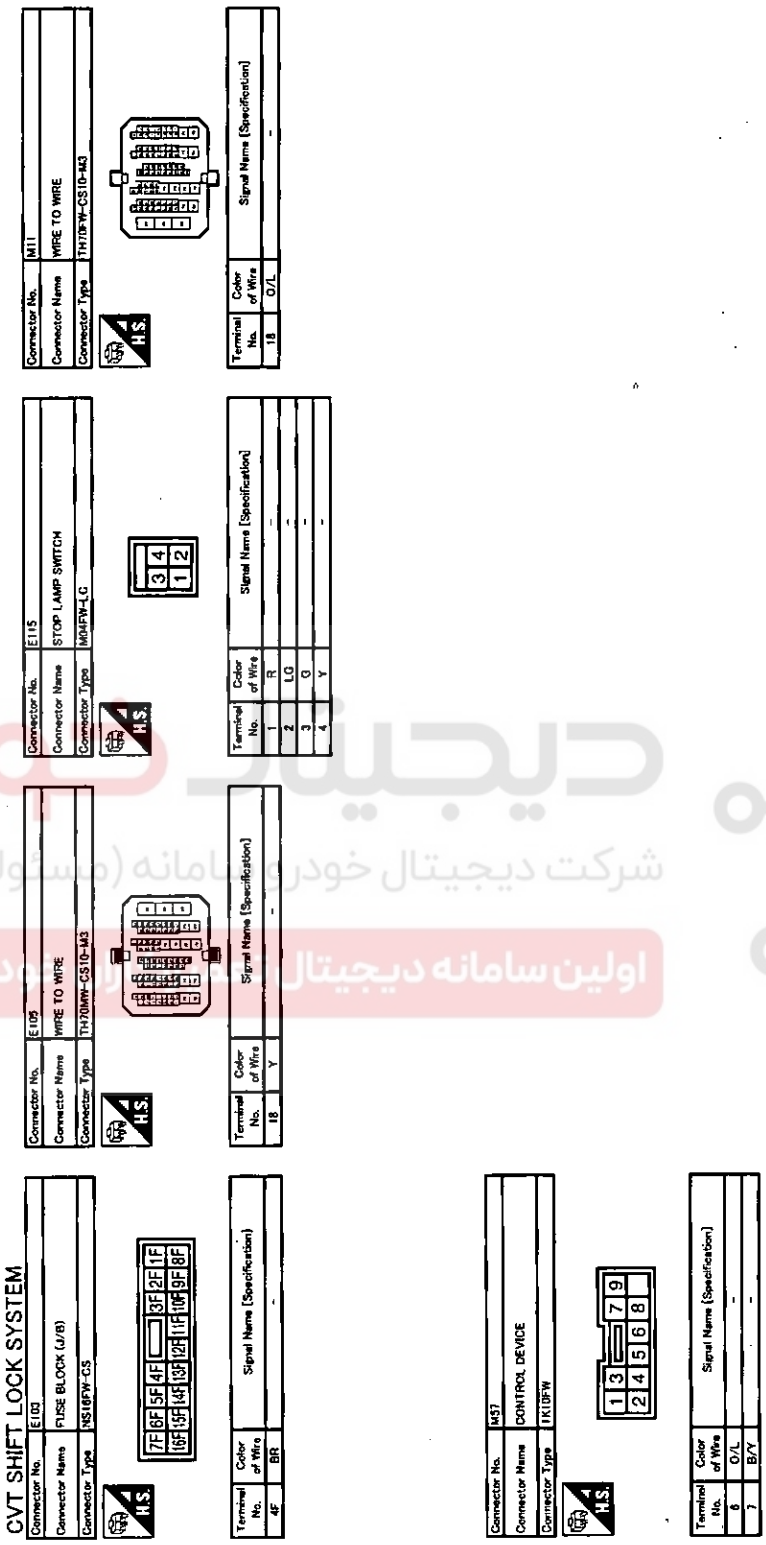
INFOID:0000000004548565



CVT SHIFT LOCK SYSTEM

2008/05/28

JCDWM0389GI



JCDWM0390GI

Component Function Check

INFOID:0000000004548566

1. CHECK CVT SHIFT LOCK OPERATION

1. Turn ignition switch ON.
2. Shift the selector lever to the “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?

YES >> Go to TM-40, "Diagnosis Procedure".
NO >> GO TO 2.

2. CHECK CVT SHIFT LOCK OPERATION

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-40, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000004548567

1. CHECK POWER SOURCE

1. Turn ignition switch ON.
2. Check voltage between stop lamp switch vehicle side harness connector and ground.

Stop lamp switch vehicle side harness connector		Ground	Voltage (Approx.)
Connector	Terminal		
E115	3		Battery Voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check the following.
- Harness for short or open between fuse block (J/B) connector terminal 4F and stop lamp switch harness connector terminal 3
- 10A fuse [No. 3, located in the fuse block (J/B)]
- Ignition switch

2. CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to TM-41, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace stop lamp switch. Refer to BR-18, "Exploded View" (LHD), BR-60, "Exploded View" (RHD).

3. CHECK HARNESS BETWEEN STOP LAMP SWITCH AND CONTROL DEVICE (PART 1)

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch vehicle side harness connector and control device vehicle side harness connector.
3. Check continuity between stop lamp switch vehicle side harness connector terminal and control devices vehicle side harness connector terminal.

Stop lamp switch vehicle side harness connector		Control device vehicle side harness connector		Continuity
Connector	Terminal	Connector	Terminal	
E115	4	M57	6	Existed

Is the inspection result normal?

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

4. CHECK HARNESS BETWEEN STOP LAMP SWITCH AND CONTROL DEVICE (PART 2)

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

Stop lamp switch vehicle side harness connector		Ground	Continuity
Connector	Terminal		
E115	4		Not existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts

5.CHECK GROUND CIRCUIT

Check continuity between control device vehicle side harness connector and ground.

Control device vehicle side harness connector		Ground	Continuity
Connector	Terminal		
M57	7		Existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace damaged parts

6.CHECK CONTROL DEVICE

1. Shift selector lever to "P" position.
2. Check continuity between control device connector.

Control device connector			Continuity
Connector	Terminal		
M57	6	7	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace shift lock unit. Refer to TM-83, "SPORT MODE : Exploded View" (Sport mode), TM-85, "MANUAL MODE : Exploded View" (Manual mode).

Component Inspection (Stop Lamp Switch)

INFOID:0000000004548568

1.CHECK STOP LAMP SWITCH

Check continuity between stop lamp switch connector terminals 3 and 4.

Stop lamp switch connector			Condition	Continuity
Connector	Terminal			
E115	3	4	Depressed brake pedal	Existed
			Released brake pedal	Not existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to BR-18, "Exploded View" (LHD), BR-60, "Exploded View" (RHD).

SPORT MODE SWITCH

Description

INFOID:0000000004548569

- The sport mode switch is installed to the selector lever knob.
- When pushing the sport mode switch (SPORT indicator lamp turns ON), the driving condition becomes sport mode. When pushing again the sport mode switch (SPORT indicator lamp turns OFF), the driving condition changes to D range.

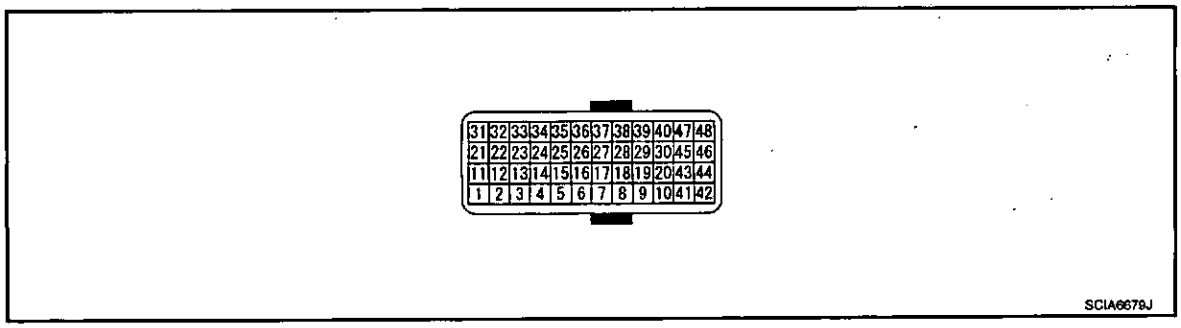
ECU DIAGNOSIS

TCM

Reference Value

INFOID:0000000004548572

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/Output			
1 (P/B)	Ground	R RANGE SW	Input	Ignition switch ON	Selector lever in "R" position	Battery voltage
					Other than the above position	0 V
2 (P/L)	Ground	N RANGE SW	Input		Selector lever in "N" position	Battery voltage
					Other than the above position	0 V
3 (G/O)	Ground	D RANGE SW	Input		Selector lever in "D" positions	Battery voltage
					Other than the above position	0 V
4 (GR)	Ground	L RANGE SW	Input		Selector lever in "L" position	Battery voltage
					Other than the above position	0 V
5 (B)	Ground	Ground	Output	Always		0 V
6 (O)	Ground	K-LINE	Input/Output	—		—
7 (W)	Ground	Sensor ground	Input	Always		0 V
8 (G/W)	—	CLOCK (SEL2)	—	—		—
9 (L/R)	—	CHIP SELECT (SEL1)	—	—		—
10 (BR/R)	—	DATA I/O (SEL3)	—	—		—
11 (BR/W)	Ground	P RANGE SW	Input	Ignition switch ON	Selector lever in "P" position	Battery voltage
					Other than the above position	0 V
13 (V)	Ground	CVT fluid temperature sensor	Input	Ignition switch ON	When CVT fluid temperature is 20°C (68°F)	2.0 V
					When CVT fluid temperature is 80°C (176°F)	1.0 V

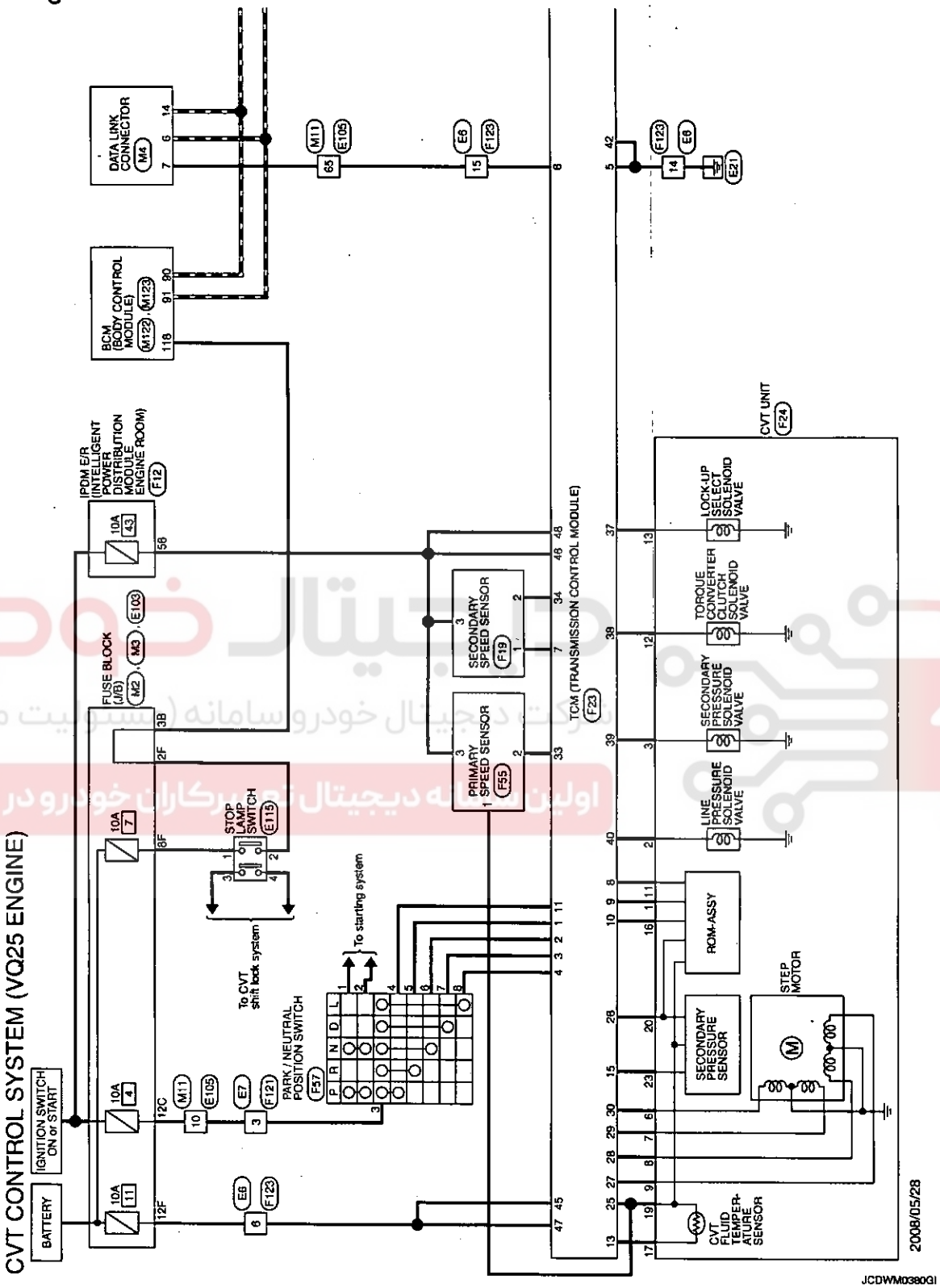
Terminal No. (wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/Output			
15 (V/W)	Ground	Transmission fluid pressure sensor A (Secondary pressure sensor)	Input	"N" position idle		1.0 V
25 (W/R)	Ground	Sensor ground	Input	Always		0 V
26 (L/O)	Ground	Sensor power	Output	Ignition switch ON		5.0 V
				Ignition switch OFF		0 V
27 (R/G)	Ground	Step motor D	Output	Within 2 seconds after ignition switch ON		10.0 msec
28 (R)	Ground	Step motor C	Output			30.0 msec
29 (O/B)	Ground	Step motor B	Output			10.0 msec
30 (G/R)	Ground	Step motor A	Output			30.0 msec
31 (P)	—	CAN-L	Input/Output	—		—
32 (L)	—	CAN-H	Input/Output	—		—
33 (SB)	Ground	Input speed sensor (Primary speed sensor)	Input	Sport mode	When driving at 20 km/h (12 MPH) in "L" position	950 Hz
				Manual mode	When driving at 20 km/h (12 MPH) in "M1" position	
34 (LG/R)	Ground	Output speed sensor (Secondary speed sensor)	Input	When driving at 20 km/h (12 MPH) in "D" position		490 Hz
37 (V/R)	Ground	Lock-up select solenoid valve	Output	Ignition switch ON	Selector lever in "P" and "N" positions	Battery voltage
					Wait at least for 5 seconds with the selector lever in "R", "D" and "L" positions	0 V
38 (L/W)	Ground	Torque converter clutch solenoid valve	Output	When vehicle cruises in "D" position	When CVT performs lock-up	6.0 V
					When CVT does not perform lock-up	1.5 V
39 (W/B)	Ground	Pressure control solenoid valve B (Secondary pressure solenoid valve)	Output	"P" or "N" position idle	Release your foot from the accelerator pedal	5.0 – 7.0 V
					Press the accelerator pedal all the way down	3.0 – 4.0 V
40 (R/Y)	Ground	Pressure control solenoid valve A (Line pressure solenoid valve)	Output		Release your foot from the accelerator pedal	5.0 – 7.0 V
					Press the accelerator pedal all the way down	1.0 V
42 (B)	Ground	Ground	Output	Always		0 V
45 (L/R)	Ground	Power supply (memory back-up)	Input	Always		Battery voltage
46 (Y)	Ground	Power supply	Input	Ignition switch ON		Battery voltage
				Ignition switch OFF		0 V
47 (L/R)	Ground	Power supply (memory back-up)	Input	Always		Battery voltage

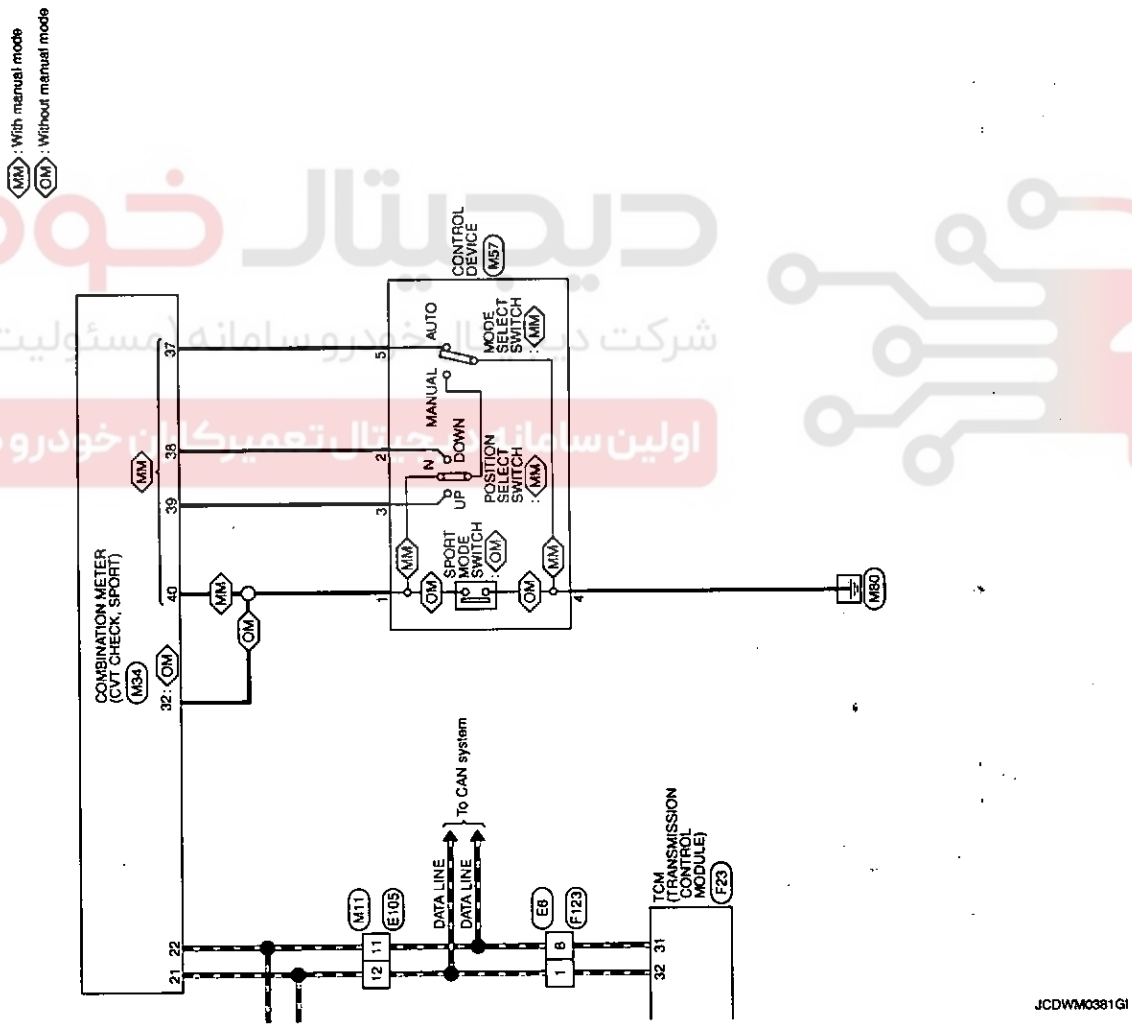
Terminal No. (wire color)		Description		Condition	Value (Approx.)
+	−	Signal name	Input/Output		
48 (Y)	Ground	Power supply	Input	Ignition switch ON	Battery voltage
				Ignition switch OFF	0 V

*: Sport mode

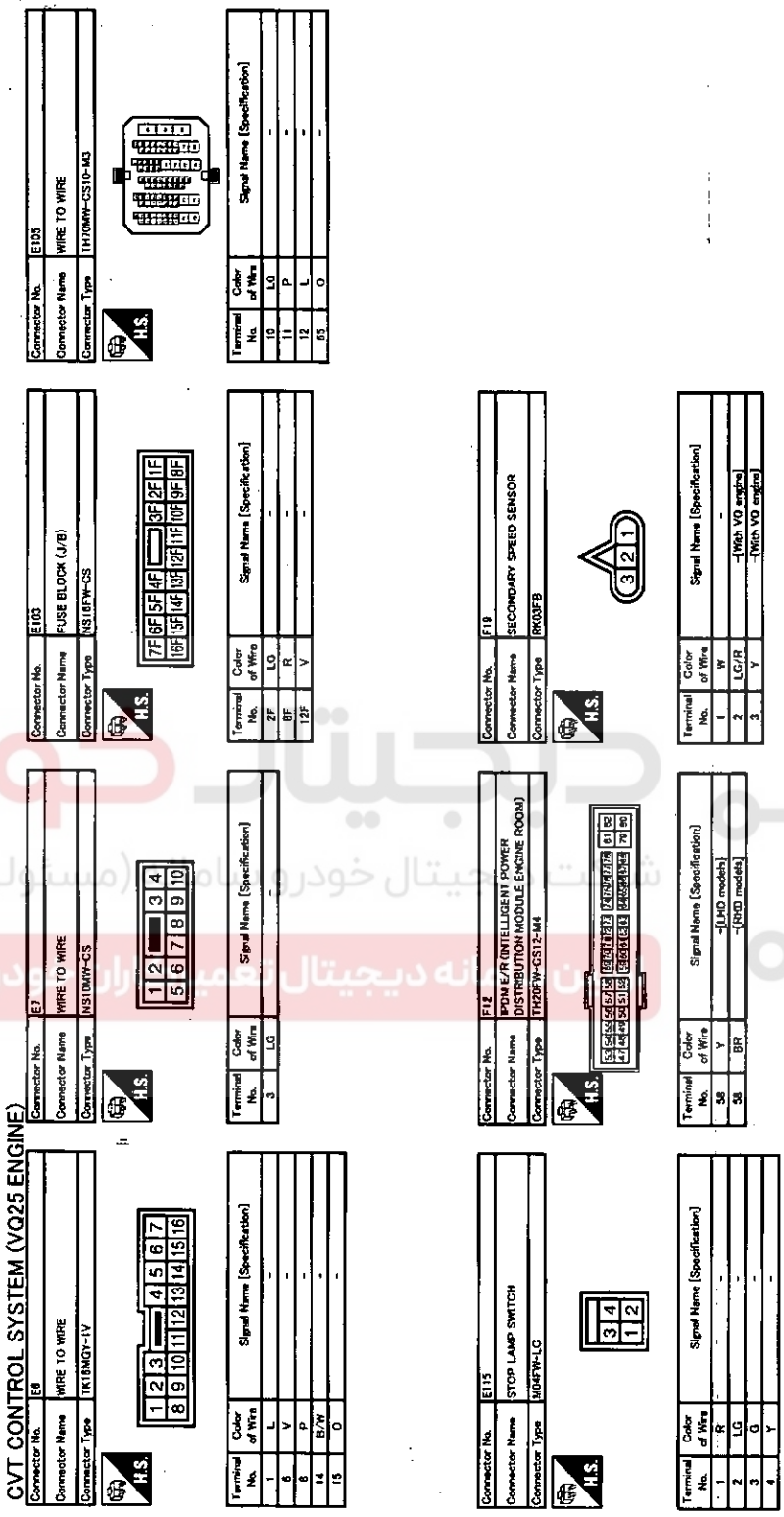
Wiring Diagram - CVT CONTROL SYSTEM -

INFOID:0000000004548573





CVT CONTROL SYSTEM (VQ25 ENGINE)



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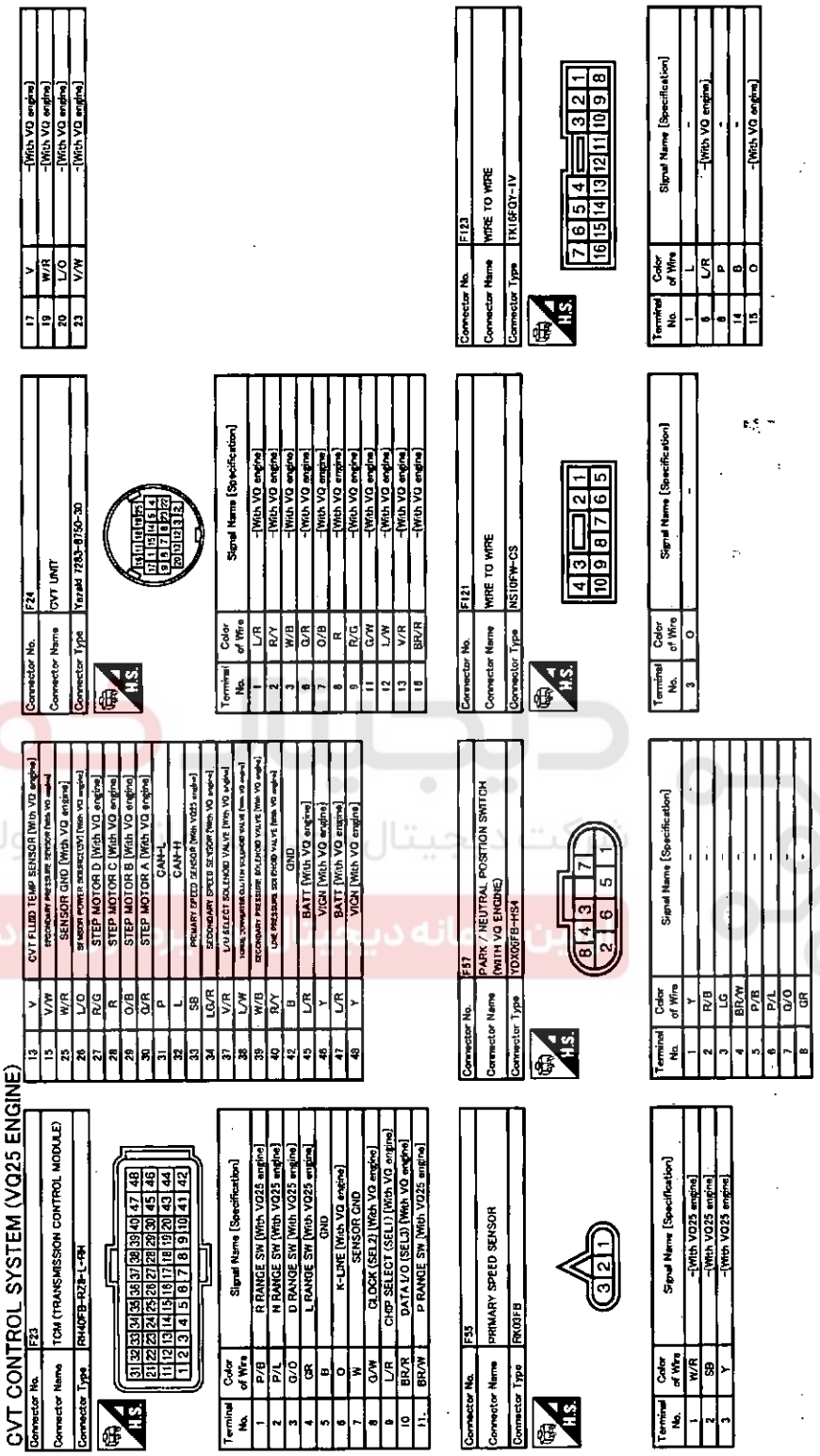
CVT CONTROL SYSTEM (VQ25 ENGINE)



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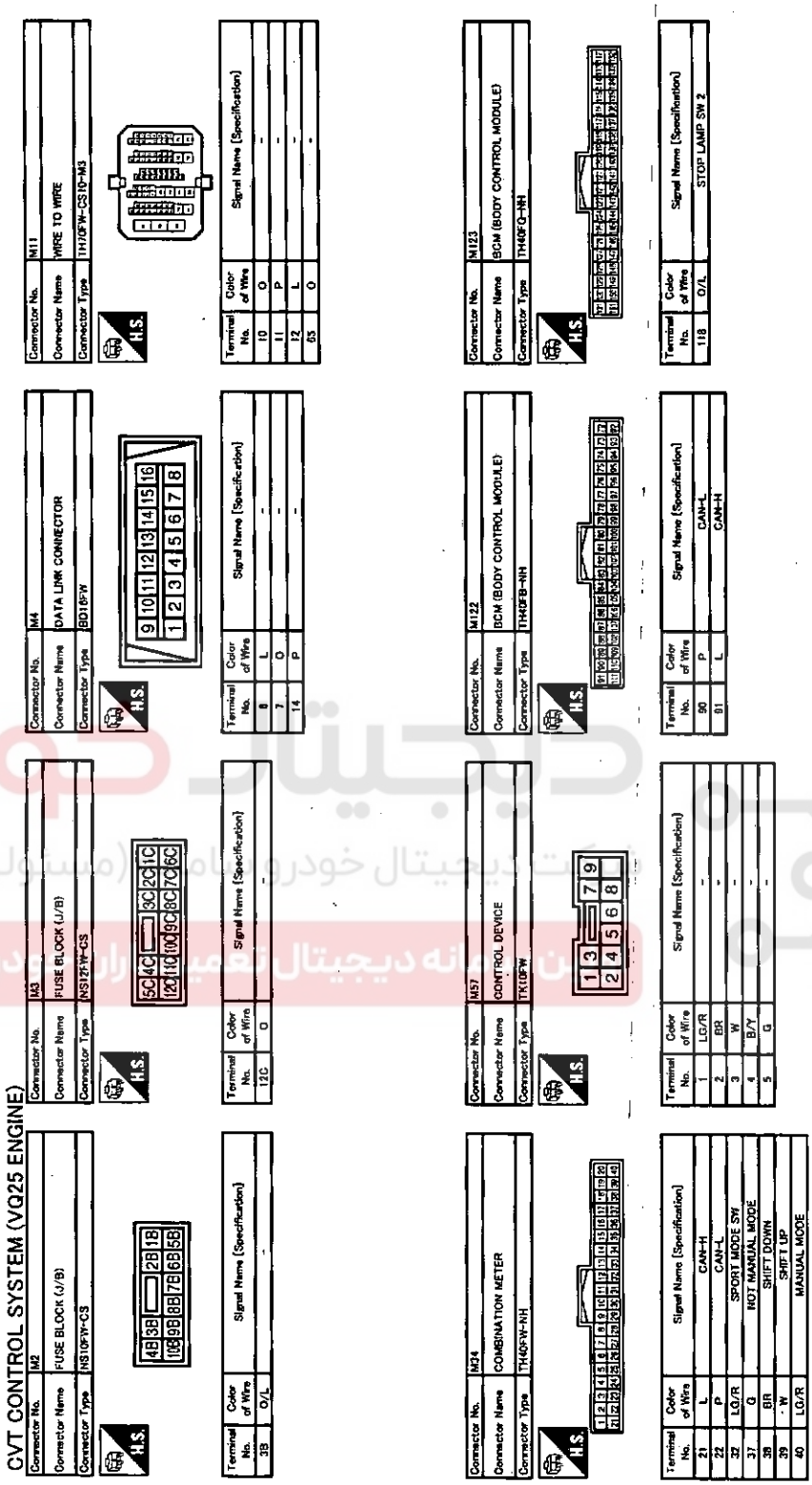

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Fail-safe

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The TCM has an electrical fail-safe mode. In this mode TCM is operates even if there is an error in a main electronic control input/output signal circuit.

FAIL-SAFE FUNCTION

If any malfunction occurs in a sensor or solenoid, this function controls the CVT to make driving possible.

Output Speed Sensor (Secondary Speed Sensor)

The shift pattern is changed in accordance with throttle position when an unexpected signal is sent from the output speed sensor (secondary speed sensor) to the TCM. The sport mode and manual mode are inhibited, and the transaxle is put in "D".

Input Speed Sensor (Primary Speed Sensor)
The shift pattern is changed in accordance with throttle position and secondary speed (vehicle speed) when an unexpected signal is sent from the input speed sensor (primary speed sensor) to the TCM. The sport mode and manual mode are inhibited, and the transaxle is put in "D".

PNP Switch
If an unexpected signal is sent from the PNP switch to the TCM, the transaxle is put in "D".

CVT Fluid Temperature Sensor
If an unexpected signal is sent from the CVT fluid temperature sensor to the TCM, the gear ratio in use before receiving the unexpected signal is maintained or the gear ratio is controlled to keep engine speed under 5000 rpm.

Transmission Fluid Pressure Sensor A (Secondary Pressure Sensor)
- If an unexpected signal is sent from the transmission fluid pressure sensor A (secondary pressure sensor) to the TCM, the secondary pressure feedback control is stopped and the offset value obtained before the non-standard condition occurs is used to control line pressure.
- If transmission fluid pressure sensor A (secondary pressure sensor) error signal is input to TCM, secondary pressure feedback control stops, but line pressure is controlled normally.

Pressure Control Solenoid A (Line Pressure Solenoid valve)
If an unexpected signal is sent from the solenoid to the TCM, the pressure control solenoid A (line pressure solenoid valve) is turned OFF to achieve the maximum fluid pressure.

Pressure Control Solenoid B (Secondary Pressure Solenoid valve)
If an unexpected signal is sent from the solenoid to the TCM, the pressure control solenoid B (secondary pressure solenoid valve) is turned OFF to achieve the maximum fluid pressure.

Torque Converter Clutch Solenoid valve
If an unexpected signal is sent from the solenoid to the TCM, the torque converter clutch solenoid valve is turned OFF to cancel the lock-up.

Step Motor
If an unexpected signal is sent from the step motor to the TCM, the step motor coil phases "A" through "D" are all turned OFF to hold the gear ratio used just before the non-standard condition occurred.

CVT Lock-up Select Solenoid valve
If an unexpected signal is sent from the solenoid to the TCM, the CVT lock-up select solenoid valve is turned OFF to cancel the lock-up.

TCM Power Supply (Memory Back-up)
Transaxle assembly is protected by limiting the engine torque when the memory back-up power supply (for controlling) from the battery is not supplied to TCM. Normal status is restored when turning the ignition switch OFF to ON after the normal power supply.

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Table

INFOID:0000000004548577

The diagnostics item numbers show the sequence for inspection. Inspect in order from item 1.

No.	Item	Symptom	Condition	Diagnostic Item
1	Shift Shock	Large shock. ("N"→"D" position)	ON vehicle	1. Engine idle speed
				2. Engine speed signal
				3. Accelerator pedal position sensor
				4. CVT position
				5. CVT fluid temperature sensor
				6. CAN communication line
				7. CVT fluid level and state
				8. Line pressure test
				9. Torque converter clutch solenoid valve
				10. Lock-up select solenoid valve
				11. PNP switch
			OFF vehicle	12. Forward clutch
				13. Control valve
2		Large shock. ("N"→"R" position)	ON vehicle	1. Engine idle speed
				2. Engine speed signal
				3. Accelerator pedal position sensor
				4. CVT position
				5. CVT fluid temperature sensor
				6. CAN communication line
				7. CVT fluid level and state
				8. Line pressure test
				9. Torque converter clutch solenoid valve
				10. Lock-up select solenoid valve
				11. PNP switch
			OFF vehicle	12. Reverse brake
				13. Control valve
3		Shock is too large for lock-up.	ON vehicle	1. CVT position
				2. Engine speed signal
				3. CAN communication line
				4. CVT fluid level and state
			OFF vehicle	5. Torque converter
				6. Control valve

No.	Item	Symptom	Condition	Diagnostic Item
4	Slips/Will Not Engage	Vehicle cannot be started from "D" position.	ON vehicle	1. CVT fluid level and state
				2. CVT position
				3. CAN communication line
				4. Line pressure test
				5. Stall test
				6. Step motor
				7. Primary speed sensor
				8. Secondary speed sensor
				9. Accelerator pedal position sensor
				10. CVT fluid temperature sensor
				11. Secondary pressure sensor
				12. Power supply
			OFF vehicle	13. Oil pump assembly
				14. Forward clutch
				15. Control valve
				16. Parking components
5		Vehicle cannot be started from "R" position.	ON vehicle	1. CVT fluid level and state
				2. CVT position
				3. CAN communication line
				4. Line pressure test
				5. Stall test
				6. Step motor
				7. Primary speed sensor
				8. Secondary speed sensor
				9. Accelerator pedal position sensor
				10. CVT fluid temperature sensor
				11. Secondary pressure sensor
				12. Power supply
			OFF vehicle	13. Oil pump assembly
				14. Reverse brake
				15. Control valve
				16. Parking components

No.	Item	Symptom	Condition	Diagnostic Item
6	Slips/Will Not Engage	Does not lock-up.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. Engine speed signal
				4. Primary speed sensor
				5. Torque converter clutch solenoid valve
				6. CAN communication line
				7. Stall test
				8. Step motor
				9. PNP switch
				10. Lock-up select solenoid valve
				11. CVT fluid temperature sensor
				12. Secondary speed sensor
				13. Secondary pressure sensor
			OFF vehicle	14. Torque converter
				15. Oil pump assembly
				16. Control valve
7		Does not hold lock-up condition.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. Engine speed signal
				4. Primary speed sensor
				5. Torque converter clutch solenoid valve
				6. CAN communication line
				7. Stall test
				8. Step motor
				9. PNP switch
				10. Lock-up select solenoid valve
				11. CVT fluid temperature sensor
				12. Secondary speed sensor
				13. Secondary pressure sensor
			OFF vehicle	14. Torque converter
				15. Oil pump assembly
				16. Control valve

No.	Item	Symptom	Condition	Diagnostic Item
8	Slips/Will Not Engage	Lock-up is not released.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. Engine speed signal
				4. Primary speed sensor
				5. Torque converter clutch solenoid valve
				6. CAN communication line
				7. Stall test
			OFF vehicle	8. Torque converter
				9. Oil pump assembly
				10. Control valve
9		With selector lever in "D" position, acceleration is extremely poor.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. Stall test
				4. Accelerator pedal position sensor
				5. CAN communication line
				6. PNP switch
				7. CVT position
				8. Step motor
				9. Primary speed sensor
				10. Secondary speed sensor
				11. Accelerator pedal position sensor
				12. Secondary pressure sensor
				13. CVT fluid temperature sensor
				14. Power supply
			OFF vehicle	15. Torque converter
				16. Oil pump assembly
				17. Forward clutch
				18. Control valve

No.	Item	Symptom	Condition	Diagnostic Item
10	Slips/Will Not Engage	With selector lever in "R" position, acceleration is extremely poor.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. Stall test
				4. Accelerator pedal position sensor
				5. CAN communication line
				6. PNP switch
				7. CVT position
				8. Step motor
				9. Primary speed sensor
				10. Secondary speed sensor
				11. Accelerator pedal position sensor
				12. Secondary pressure sensor
				13. CVT fluid temperature sensor
				14. Power supply
			OFF vehicle	15. Torque converter
				16. Oil pump assembly
				17. Reverse brake
				18. Control valve
11		Slips at lock-up.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. Engine speed signal
				4. Primary speed sensor
				5. Torque converter clutch solenoid valve
				6. CAN communication line
				7. Stall test
				8. Step motor
				9. PNP switch
				10. Lock-up select solenoid valve
				11. CVT fluid temperature sensor
				12. Secondary speed sensor
				13. Secondary pressure sensor
			OFF vehicle	14. Torque converter
				15. Oil pump assembly
				16. Control valve

No.	Item	Symptom	Condition	Diagnostic Item
12	Others	No creep at all.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. Accelerator pedal position sensor
				4. PNP switch
				5. CAN communication line
				6. Stall test
				7. CVT position
				8. Step motor
				9. Primary speed sensor
				10. Secondary speed sensor
				11. Accelerator pedal position sensor
				12. CVT fluid temperature sensor
				13. Secondary pressure sensor
				14. Power supply
			OFF vehicle	15. Torque converter
				16. Oil pump assembly
				17. Gear system
				18. Forward clutch
				19. Reverse brake
				20. Control valve
13		Vehicle cannot run in all positions.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. PNP switch
				4. Stall test
				5. CVT position
				6. Step motor
				7. Primary speed sensor
				8. Secondary speed sensor
				9. Accelerator pedal position sensor
				10. CVT fluid temperature sensor
				11. Secondary pressure sensor
				12. Power supply
			OFF vehicle	13. Torque converter
				14. Oil pump assembly
				15. Gear system
				16. Forward clutch
				17. Reverse brake
				18. Control valve
				19. Parking components

No.	Item	Symptom	Condition	Diagnostic Item
14	Others	With selector lever in "D" position, driving is not possible.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. PNP switch
				4. Stall test
				5. CVT position
				6. Step motor
				7. Primary speed sensor
				8. Secondary speed sensor
				9. Accelerator pedal position sensor
				10. CVT fluid temperature sensor
				11. Secondary pressure sensor
				12. Power supply
			OFF vehicle	13. Torque converter
				14. Oil pump assembly
				15. Gear system
				16. Forward clutch
				17. Control valve
				18. Parking components
15		With selector lever in "R" position, driving is not possible.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. PNP switch
				4. Stall test
				5. CVT position
				6. Step motor
				7. Primary speed sensor
				8. Secondary speed sensor
				9. Accelerator pedal position sensor
				10. CVT fluid temperature sensor
				11. Secondary pressure sensor
				12. Power supply
			OFF vehicle	13. Torque converter
				14. Oil pump assembly
				15. Gear system
				16. Reverse brake
				17. Control valve
				18. Parking components

No.	Item	Symptom	Condition	Diagnostic Item
16	Others	Judder occurs during lock-up.	ON vehicle	1. CVT fluid level and state
				2. Engine speed signal
				3. Primary speed sensor
				4. Secondary speed sensor
				5. Accelerator pedal position sensor
				6. CAN communication line
				7. Torque converter clutch solenoid valve
			OFF vehicle	8. Torque converter
				9. Control valve
17		Strange noise in "D" position.	ON vehicle	1. CVT fluid level and state
				2. Engine speed signal
				3. CAN communication line
			OFF vehicle	4. Torque converter
				5. Oil pump assembly
				6. Gear system
				7. Forward clutch
				8. Control valve
				9. Bearing
18		Strange noise in "R" position.	ON vehicle	1. CVT fluid level and state
				2. Engine speed signal
				3. CAN communication line
			OFF vehicle	4. Torque converter
				5. Oil pump assembly
				6. Gear system
				7. Reverse brake
				8. Control valve
19		Strange noise in "N" position.	ON vehicle	1. CVT fluid level and state
				2. Engine speed signal
				3. CAN communication line
			OFF vehicle	4. Torque converter
				5. Oil pump assembly
				6. Gear system
				7. Control valve

No.	Item	Symptom	Condition	Diagnostic Item
20	Others	Vehicle does not decelerate by engine brake.	ON vehicle	1. CVT fluid level and state
				2. CVT position
				3. CAN communication line
				4. Step motor
				5. Primary speed sensor
				6. Secondary speed sensor
				7. Line pressure test
				8. Engine speed signal
				9. Accelerator pedal position sensor
			OFF vehicle	10. Control valve
21		Maximum speed low.	ON vehicle	1. CVT fluid level and state
				2. Line pressure test
				3. Accelerator pedal position sensor
				4. CAN communication line
				5. Stall test
				6. Step motor
				7. Primary speed sensor
				8. Secondary speed sensor
				9. Secondary pressure sensor
				10. CVT fluid temperature sensor
			OFF vehicle	11. Torque converter
				12. Oil pump assembly
				13. Gear system
				14. Forward clutch
				15. Control valve
22		With selector lever in "P" position, vehicle does not enter parking condition or, with selector lever in another position, parking condition is not cancelled.	ON vehicle	1. PNP switch
				2. CVT position
			OFF vehicle	3. Parking components
23		Vehicle runs with CVT in "P" position.	ON vehicle	1. PNP switch
				2. CVT fluid level and state
				3. CVT position
			OFF vehicle	4. Parking components
				5. Gear system
				6. Control valve

No.	Item	Symptom	Condition	Diagnostic Item
24	Others	Vehicle runs with CVT in "N" position.	ON vehicle	1. PNP switch
				2. CVT fluid level and state
				3. CVT position
			OFF vehicle	4. Gear system
				5. Forward clutch
				6. Reverse brake
				7. Control valve
25		Engine stall.	ON vehicle	1. CVT fluid level and state
				2. Engine speed signal
				3. Primary speed sensor
				4. Torque converter clutch solenoid valve
				5. CAN communication line
				6. Stall test
				7. Secondary pressure sensor
			OFF vehicle	8. Torque converter
				9. Control valve
26		Engine stalls when selector lever is shifted "N"→"D" or "R".	ON vehicle	1. CVT fluid level and state
				2. Engine speed signal
				3. Primary speed sensor
				4. Torque converter clutch solenoid valve
				5. CAN communication line
				6. Stall test
			OFF vehicle	7. Torque converter
				8. Control valve
27		Engine speed does not return to idle.	ON vehicle	1. CVT fluid level and state
				2. Accelerator pedal position sensor
				3. Secondary speed sensor
				4. CAN communication line
			OFF vehicle	5. Control valve

No.	Item	Symptom	Condition	Diagnostic Item
28	Others	CVT does not shift.	ON vehicle	1. CVT fluid level and state
				2. CVT position
				3. Line pressure test
				4. Engine speed signal
				5. Accelerator pedal position sensor
				6. CAN communication line
				7. Primary speed sensor
				8. Secondary speed sensor
				9. Step motor
			OFF vehicle	10. Control valve
				11. Oil pump assembly
29		Engine does not start in "N" or "P" position.	ON vehicle	1. Ignition switch and starter
				2. CVT position
				3. PNP switch
30		Engine starts in positions other than "N" or "P".	ON vehicle	1. Ignition switch and starter
				2. CVT position
				3. PNP switch
31		When brake pedal is depressed with ignition switch ON, selector lever cannot be shifted from "P" position to other position.	ON vehicle	1. Stop lamp switch
				2. Shift lock solenoid
				3. Control device
32		When brake pedal is not depressed with ignition switch ON, selector lever can be shifted from "P" position to other position.	ON vehicle	1. Stop lamp switch
				2. Shift lock solenoid
				3. Control device
33		Cannot be changed to sport mode.	ON vehicle	1. Sport mode switch
				2. CAN communication line
				3. Combination meters
34		Cannot be changed to manual mode.	ON vehicle	1. manual mode switch
				2. CAN communication line
				3. Combination meters
35		SPORT indicator lamp is not turned ON.	ON vehicle	1. CAN communication line
				2. Combination meters
				3. TCM power supply and ground

PRECAUTION

PRECAUTIONS

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

INFOID:0000000004548578

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

WARNING:

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

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:0000000004779565

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.

This vehicle is equipped with a push-button ignition switch and a steering lock unit.
If the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.
If turning the steering wheel is required with the battery disconnected or discharged, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Turn the push-button ignition switch to ACC position.
   (At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)

Precaution for Procedure without Cowl Top Cover

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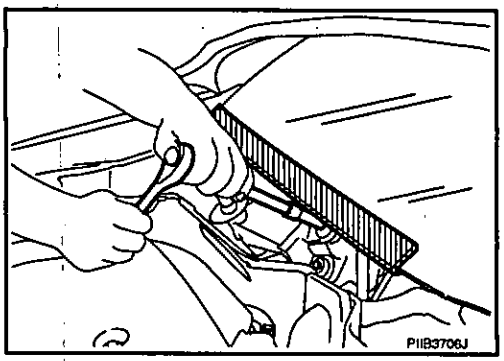
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution for On Board Diagnosis (OBD) System of CVT and Engine

INFOID:0000000004548581

The ECM has an on board diagnostic system. It will light up the Malfunction Indicator Lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the battery cable from the negative terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to an open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. may cause the MIL to light up due to a short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to a malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.**

Removal and Installation Procedure for CVT Unit Connector

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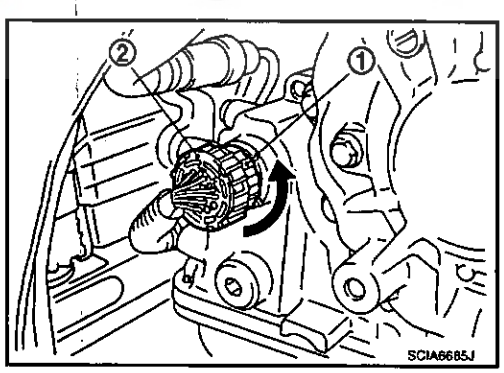
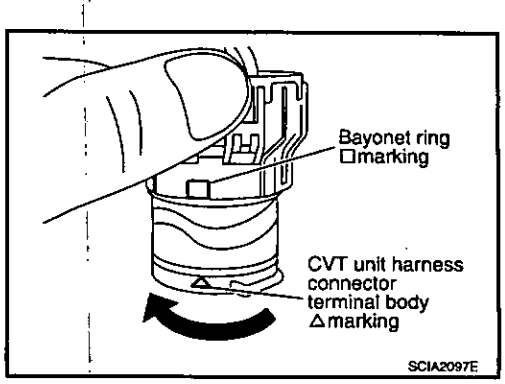
REMOVAL

Rotate bayonet ring (1) counterclockwise. Pull out CVT unit harness connector (2) upward and remove it.

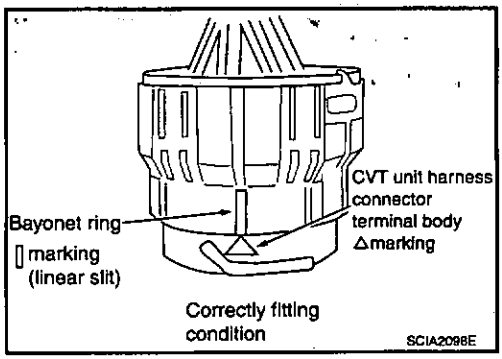


INSTALLATION

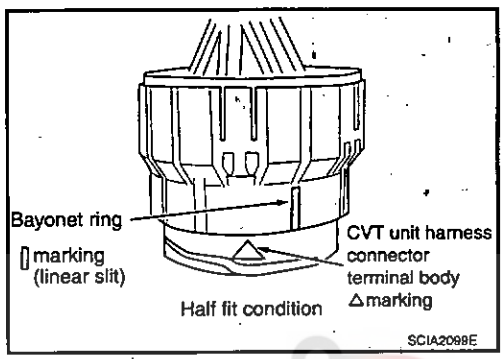
1. Align Δ marking on CVT unit harness connector terminal body with □ marking on bayonet ring. Insert CVT unit harness connector. Then rotate bayonet ring clockwise.



2. Rotate bayonet ring clockwise until Δ marking on CVT unit harness connector terminal body is aligned with the slit on bayonet ring as shown in the figure (correctly fitting condition). Install CVT unit harness connector to CVT unit harness connector terminal body.



CAUTION:
- **Securely align Δ marking on CVT unit harness connector terminal body with bayonet ring slit. Then, be careful not to make a half fit condition as shown in the figure.**
- **Never mistake the slit of bayonet ring for other dent portion.**

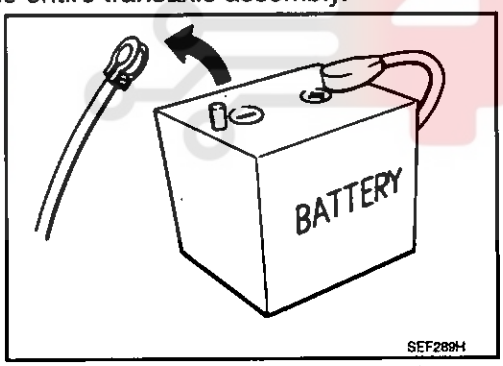


Precaution

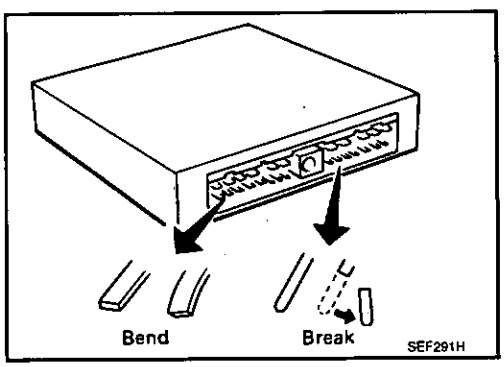
INFOID:0000000004548584

NOTE:
If any malfunction occurs in the RE0F10A model transaxle, replace the entire transaxle assembly.

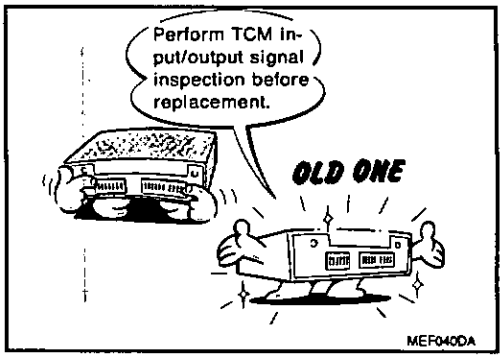
- **Turn ignition switch OFF and disconnect negative battery cable before connecting or disconnecting the TCM harness connector. Because battery voltage is applied to TCM even if ignition switch is turned OFF.**



- **When connecting or disconnecting pin connectors into or from TCM, do not damage pin terminals (bend or break).**
  Check that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- **Perform TCM input/output signal inspection and check whether TCM functions normally or not before replacing TCM. Refer to TM-43, "Reference Value".**



- Always use the specified brand of CVT fluid. Refer to MA-8, "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 CVT fluid.

Service Notice or Precaution

INFOID:0000000004548585

OBD SELF-DIAGNOSIS (WITH OBD)

- CVT self diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the Malfunction Indicator Lamp (MIL).
- The self diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.
  Always perform the procedure on TM-35, "Diagnosis Description" to complete the repair and avoid unnecessary blinking of the MIL.

For details of OBD, refer to EC-102, "Diagnosis Description".

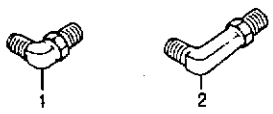
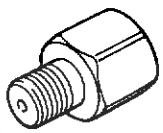
- **Certain systems and components, especially those related to OBD, may use the new style slide-locking type harness connector. For description and how to disconnect, refer to PG-121.**

PREPARATION

PREPARATION

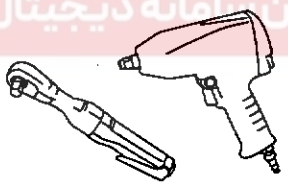
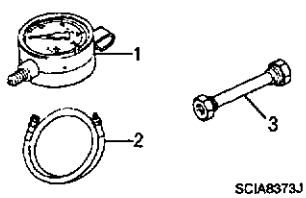
Special Service Tools

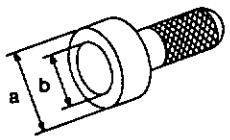
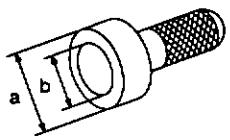
INFOID:0000000004548587

Tool number Tool name	Description
1. ST25054000 Adapter 2. ST25055000 Adapter  SCIA8372J	Measuring line pressure
KV31103600 Joint pipe adapter (With ST25054000)  ZZA1227D	Measuring line pressure

Commercial Service Tools

INFOID:0000000004548588

Tool number Tool name	Description
Power tool  PBIC0190E	Loosening nuts and bolts
Oil pressure gauge set 1. Oil pressure gauge 2. Hose 3. Joint pipe  SCIA8373J	Measuring line pressure

Tool number Tool name	Description
Drift a: 54 mm (2.13 in) dia. b: 47 mm (1.85 in) dia.  NT115	Installing differential side oil seal
Drift a: 65 mm (2.56 in) dia. b: 60 mm (2.36 in) dia.  NT115	Installing converter housing oil seal

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ON-VEHICLE MAINTENANCE

CVT FLUID

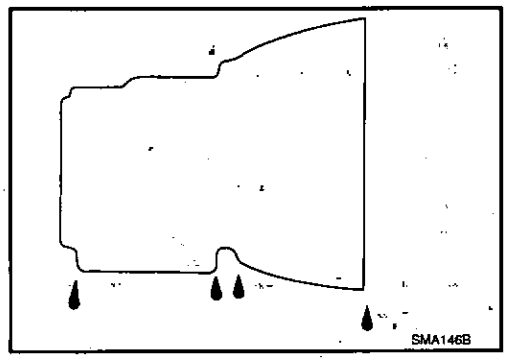
Inspection

INFOID:0000000004548589

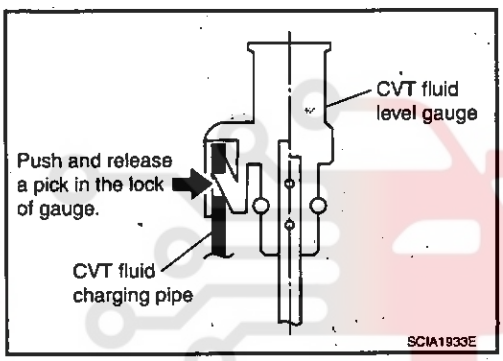
CHECKING CVT FLUID

The fluid level should be checked with the fluid warmed up to 50 to 80°C (122 to 176°F). The fluid level check procedure is as follows:

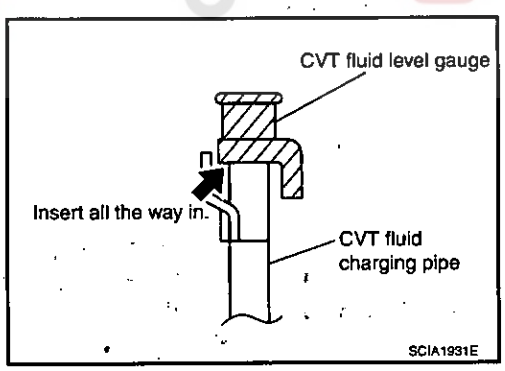
1. Check for fluid leakage.
2. With the engine warmed up, drive the vehicle in an urban area. When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50 to 80°C (122 to 176°F).
3. Park the vehicle on a level surface.
4. Apply parking brake firmly.
5. With engine at idle, while depressing brake pedal, move shift selector throughout the entire shift range.



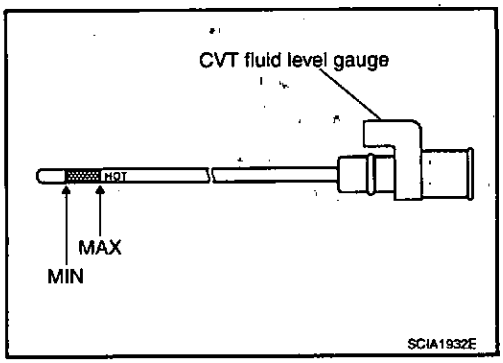
6. Pull out the CVT fluid level gauge from the CVT fluid charging pipe after pressing the tab on the CVT fluid level gauge to release the lock.



7. Wipe fluid off the CVT fluid level gauge. Insert the CVT fluid level gauge rotating 180° from the originally installed position, then securely push the CVT fluid level gauge until it meets the top end of the CVT fluid charging pipe.
CAUTION:
When wiping away the CVT fluid level gauge, always use lint-free paper, not a cloth rag.



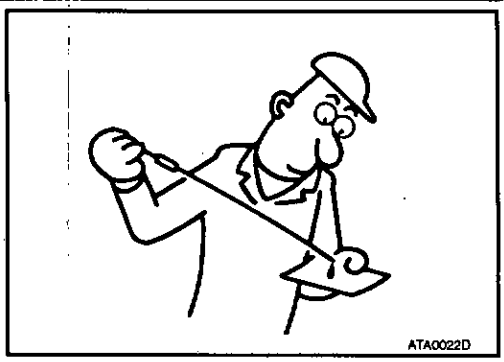
8. Place the selector lever in "P" or "N" and check that the fluid level is within the specified range.
CAUTION:
When reinstalling CVT fluid level gauge, insert it into the CVT fluid charging pipe and rotate it to the original installation position until securely locked.



CVT FLUID CONDITION

Check CVT fluid condition.

- If CVT fluid is very dark or smells burned, check operation of CVT. Flush cooling system after repair of CVT.
- If CVT fluid contains frictional material (clutches, brakes, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of CVT. Refer to CO-12, "Exploded View".



Fluid status	Conceivable cause	Required operation
Varnished (viscous varnish state)	CVT fluid become degraded due to high temperatures.	Replace the CVT fluid and check the CVT main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the CVT fluid and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within CVT	Replace the CVT fluid and check for improper operation of the CVT.

Changing

INFOID:0000000004548590

CAUTION:
Replace O-ring with new ones at the final stage of the operation when installing.

1. Remove drain plug from oil pan.
2. Remove drain plug gasket from drain plug.
3. Install drain plug gasket to drain plug.
   CAUTION:
   Never reuse drain plug gasket.
4. Install drain plug to oil pan.

Drain plug – tightening torque : Refer to TM-89, "Exploded View".

5. Fill CVT fluid from CVT fluid charging pipe to the specified level.

CVT fluid : Refer to TM-108, "General Specification".

Fluid capacity : Refer to TM-108, "General Specification".

CAUTION:
- **Use only Genuine NISSAN CVT Fluid NS-2. Never mix with other fluid.**
- **Using CVT fluid other than Genuine NISSAN CVT Fluid NS-2 will deteriorate in driveability and CVT durability, and may damage the CVT, which is not covered by the warranty.**
- **When filling CVT fluid, take care not to scatter heat generating parts such as exhaust.**
- **Sufficiently shake the container of CVT fluid before using.**

6. With the engine warmed up, drive the vehicle in an urban area.
   NOTE:
   When ambient temperature is 20°C (68°F), it takes about 10 minutes for the CVT fluid to warm up to 50 to 80°C (122 to 176°F).
7. Check CVT fluid level and condition.
8. Repeat steps 1 to 5 if CVT fluid has been contaminated.

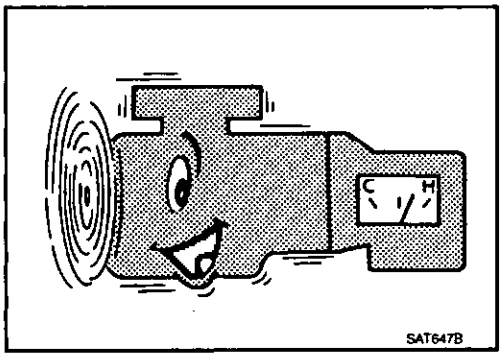
STALL TEST

Inspection and Judgment

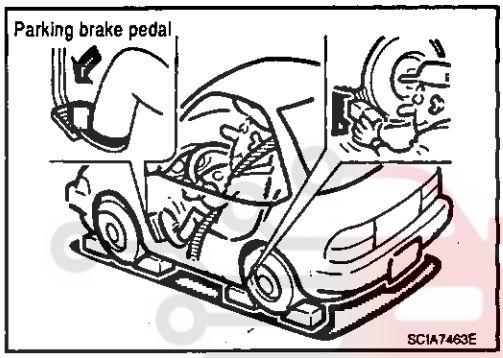
INFOID:0000000004548591

INSPECTION

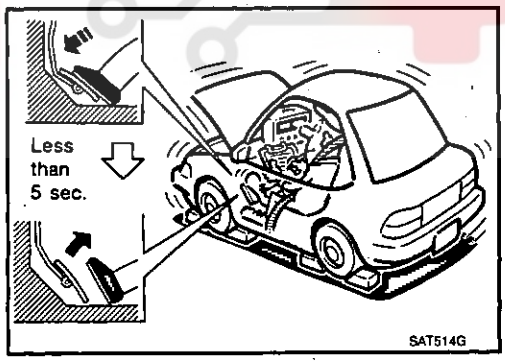
1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
2. Drive for about 10 minutes to warm up the vehicle so that the CVT fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of CVT fluid. Replenish if necessary.



3. Securely engage the parking brake so that the tires do not turn.
4. Install a tachometer where it can be seen by driver during test.
   NOTE:
   It is good practice to mark the point of specified engine rpm on indicator.
5. Start engine, apply foot brake, and place selector lever in "D" position.



6. While holding down the foot brake, gradually press down the accelerator pedal.
7. Quickly read off the stall speed, and then quickly remove your foot from the accelerator pedal.
   CAUTION:
   Never hold down the accelerator pedal for more than 5 seconds during this test.



Stall speed : **Refer to TM-108, "Stall Speed".**

8. Move the selector lever to the "N" position.
9. Cool down the CVT fluid.
   CAUTION:
   Run the engine at idle for at least 1 minute.
10. Repeat steps 6 through 9 with selector lever in "R" position.

JUDGMENT

	Selector lever position		Expected problem location
	"D"	"R"	
Stall rotation	H	O	• Forward clutch
	O	H	• Reverse brake
	L	L	• Engine and torque converter one-way clutch
	H	H	• Line pressure low • Primary pulley • Secondary pulley • Steel belt

O: Stall speed within standard value position.

H: Stall speed is higher than standard value.

L: Stall speed is lower than standard value.

LINE PRESSURE TEST

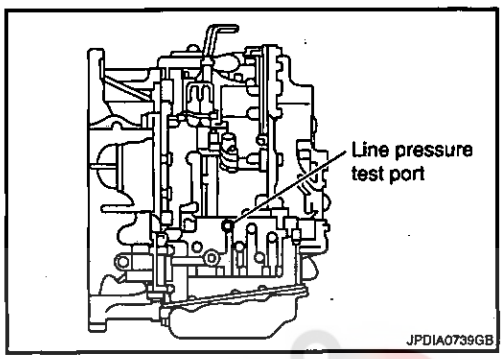
Inspection and Judgment

INFOID:0000000004548592

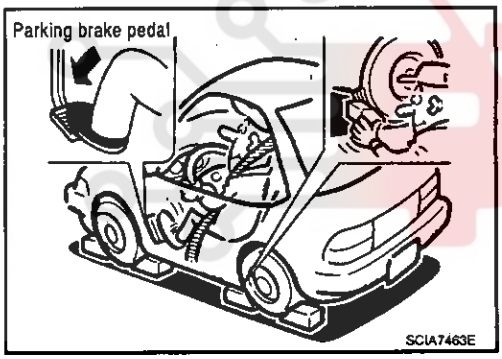
INSPECTION

Line Pressure Test Procedure

1. Inspect the amount of engine oil and replenish if necessary.
2. Drive the car for about 10 minutes to warm it up so that the CVT fluid reaches in the range of 50 to 80°C (122 to 176°F), then inspect the amount of CVT fluid and replenish if necessary.
   NOTE:
   The CVT fluid temperature rises in the range of 50 to 80°C (122 to 176°F) during 10 minutes of driving.
3. After warming up CVT, remove the oil pressure detection plug and install the joint pipe adapter (SST: KV31103600), adapter (SST: 25055000), oil pressure gauge set (commercial service tool).
   CAUTION:
   When using the oil pressure gauge, be sure to use the O-ring attached to the oil pressure detection plug.

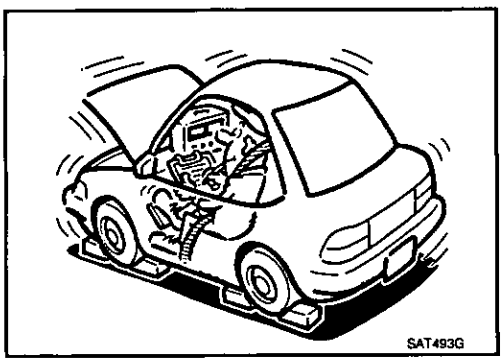


4. Securely engage the parking brake so that the tires do not turn.



5. Start the engine, and then measure the line pressure at both idle and the stall speed.
   CAUTION:
   - **Keep the brake pedal pressed all the way down during measurement.**
   - **When measuring the line pressure at the stall speed, refer to** TM-71, "Inspection and Judgment"**.**

   Line pressure : Refer to TM-108, "Line Pressure"**.**



6. After the measurements are complete, install the oil pressure detection plug and tighten to the specified torque below.

   : 7.5 N·m (0.77 kg-m, 66 in-lb)

   CAUTION:
   - **Never reuse O-ring.**
   - **Apply CVT fluid to O-ring.**

JUDGMENT

Judgment		Possible cause
Idle speed	Low for all positions ("P", "R", "N", "D", "L"*)	Possible causes include malfunctions in the pressure supply system and low oil pump output. For example • Oil pump wear • Pressure regulator valve or plug sticking or spring fatigue • Oil strainer ⇒ oil pump ⇒ pressure regulator valve passage oil leak • Engine idle speed too low
	Only low for a specific position	Possible causes include an oil pressure leak in a passage or device related to the position after the pressure is distributed by the manual valve.
	High	Possible causes include a sensor malfunction or malfunction in the line pressure adjustment function. For example • Accelerator pedal position signal malfunction • CVT fluid temperature sensor malfunction • Pressure control solenoid A (line pressure solenoid) malfunction (sticking in OFF state, filter clog, cut line) • Pressure regulator valve or plug sticking
Stall speed	Line pressure does not rise higher than the line pressure for idle.	Possible causes include a sensor malfunction or malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • TCM malfunction • Pressure control solenoid A (line pressure solenoid) malfunction (shorting, sticking in ON state) • Pressure regulator valve or plug sticking
	The pressure rises, but does not enter the standard position.	Possible causes include malfunctions in the pressure supply system and malfunction in the pressure adjustment function. For example • Accelerator pedal position signal malfunction • Pressure control solenoid A (line pressure solenoid) malfunction (sticking, filter clog) • Pressure regulator valve or plug sticking
	Only low for a specific position	Possible causes include an oil pressure leak in a passage or device related to the position after the pressure is distributed by the manual valve.

*: Sport mode

ROAD TEST

Description

INFOID:0000000004548593

DESCRIPTION

- The purpose of the test is to determine the overall performance of CVT and analyze causes of problems.
- The road test consists of the following three parts:

1. "Check Before Engine Is Started" TM-75.
2. "Check at Idle" TM-75.
3. "Cruise Test" TM-76.

ROAD TEST PROCEDURE

1. Check before engine is started.
2. Check at idle.
3. Cruise test.

SAT786A

- Before the road test, familiarize yourself with all test procedures and items to check.
- Perform tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test.

SAT496G

Check before Engine Is Started

INFOID:0000000004548594

1.CHECK SHIFT POSITION INDICATOR

1. Park vehicle on flat surface.
2. Shift the selector lever to "P" position.
3. Turn ignition switch OFF. Wait at least 5 seconds.
4. Turn ignition switch ON. (Do not start engine.)

Has shift position indicator been turned ON for about 2 seconds?

YES >> 1. Turn ignition switch OFF.
2. Go to TM-75, "Check at Idle".

NO >> Stop "Road Test". Refer to TM-52, "Symptom Table".

Check at Idle

INFOID:0000000004548595

1.CHECK STARTING THE ENGINE (PART 1)

1. Park vehicle on flat surface.
2. Shift the selector lever to "P" or "N" position.
3. Turn ignition switch OFF.
4. Turn ignition switch to "START" position.

Is engine started?

YES >> GO TO 2.

NO >> Stop "Road Test". Refer to TM-52, "Symptom Table".

2.CHECK STARTING THE ENGINE (PART 2)

Sport mode

1. Turn ignition switch ON.
2. Shift the selector lever to "D", "L" or "R" position.
3. Turn ignition switch to "START" position.

Manual mode

1. Turn ignition switch ON.
2. Shift the selector lever to "D", "M" or "R" position.
3. Turn ignition switch to "START" position.

Is engine started?

YES >> Stop "Road Test". Refer to TM-52, "Symptom Table".
NO >> GO TO 3.

3.CHECK "P" POSITION FUNCTION

1. Shift the selector lever to "P" position.
2. Turn ignition switch OFF.
3. Release parking brake.
4. Push vehicle forward or backward.
5. Apply parking brake.

Does vehicle move forward or backward?

YES >> Refer to TM-52, "Symptom Table". GO TO 4.
NO >> GO TO 4.

4.CHECK "N" POSITION FUNCTION

1. Start engine.
2. Shift the selector lever to "N" position.
3. Release parking brake.

Does vehicle move forward or backward?

YES >> Refer to TM-52, "Symptom Table". GO TO 5.
NO >> GO TO 5.

5.CHECK SHIFT SHOCK

1. Apply foot brake.
2. Shift the selector lever to "R" position.

Is there large shock when changing from "N" to "R" position?

YES >> Refer to TM-52, "Symptom Table". GO TO 6.
NO >> GO TO 6.

6.CHECK "R" POSITION FUNCTION

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

YES >> GO TO 7.
NO >> Refer to TM-52, "Symptom Table". GO TO 7.

7.CHECK "D" POSITION FUNCTION

Shift the selector lever to "D" position and check if vehicle creeps forward.

Does vehicle creep forward in "D" position?

YES >> Go to TM-76, "Cruise Test".
NO >> Stop "Road Test". Refer to TM-52, "Symptom Table".

Cruise Test

INFOID:0000000004548596

1.CHECK VEHICLE SPEED WHEN SHIFTING GEARS (PART 1)

1. Drive vehicle for approximately 10 minutes to warm engine oil and CVT fluid up to operating temperature.

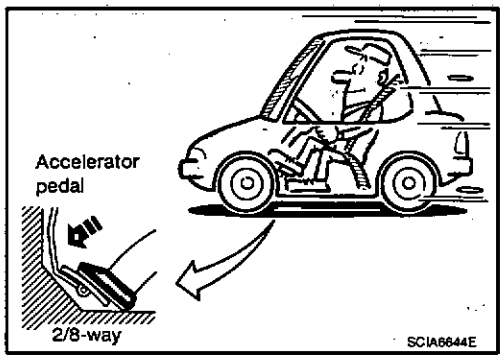
CVT fluid operating temperature : 50 – 80°C (122 – 176°F)

2. Park vehicle on flat surface.
3. Shift the selector lever to "P" position.
4. Start engine.
5. Shift the selector lever to "D" position.

6. Accelerate vehicle at 2/8 throttle opening and check "Vehicle Speed When Shifting Gears".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refer to TM-52, "Symptom Table". GO TO 2.

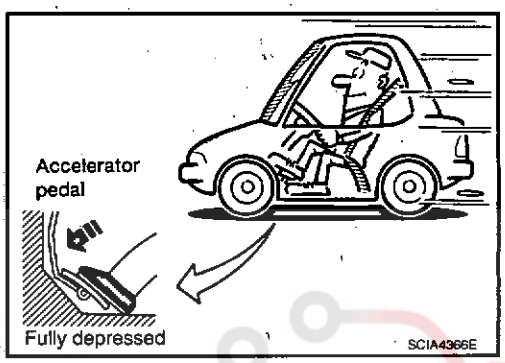


2. CHECK VEHICLE SPEED WHEN SHIFTING GEARS (PART 2)

1. Park vehicle on flat surface.
2. Shift the selector lever to "D" position.
3. Accelerate vehicle at 8/8 throttle opening and check "Vehicle Speed When Shifting Gears".

Is the inspection result normal?

YES-1 (Sport mode)>>GO TO 3.
YES-2 (Manual mode)>>GO TO 8.
NO-1 (Sport mode)>>Refer to TM-52, "Symptom Table". GO TO 3.
NO-2 (Manual mode)>>Refer to TM-52, "Symptom Table". GO TO 8.

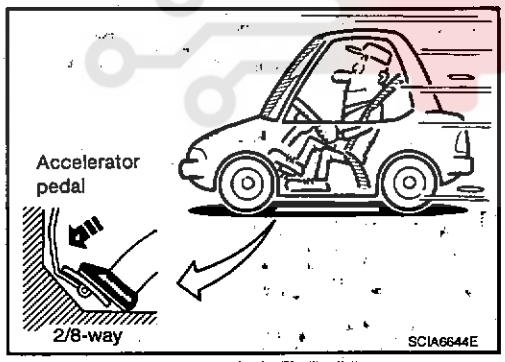


3. CHECK SPORT MODE FUNCTION (PART 1)

1. Park vehicle on flat surface.
2. Press sport mode switch.
3. Accelerate vehicle at 2/8 throttle opening and check "Vehicle Speed When Shifting Gears".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Refer to TM-52, "Symptom Table". GO TO 4.

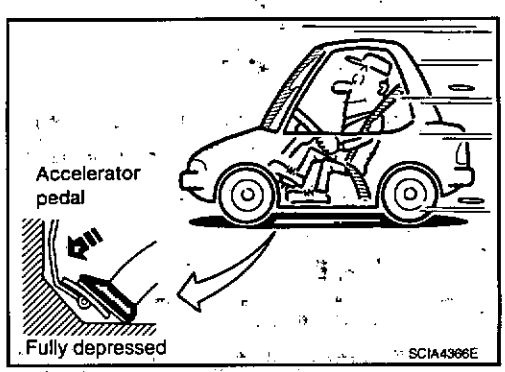


4. CHECK SPORT MODE FUNCTION (PART 2)

1. Park vehicle on flat surface.
2. Press sport mode switch.
3. Accelerate vehicle at 8/8 throttle opening and check "Vehicle Speed When Shifting Gears".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Refer to TM-52, "Symptom Table". GO TO 5.



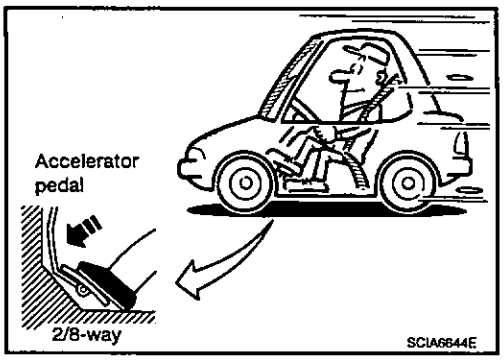
5. CHECK "L" POSITION FUNCTION (PART 1)

1. Park vehicle on flat surface.
2. Shift the selector lever to "L" position.

3. Accelerate vehicle at 2/8 throttle opening and check "Vehicle Speed When Shifting Gears".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Refer to TM-52, "Symptom Table". GO TO 6.

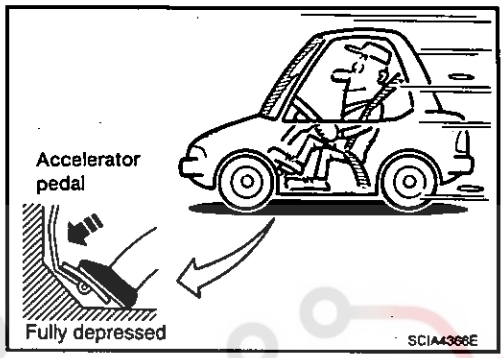


6. CHECK "L" POSITION FUNCTION (PART 2)

1. Park vehicle on flat surface.
2. Shift the selector lever to "L" position.
3. Accelerate vehicle at 8/8 throttle opening and check "Vehicle Speed When Shifting Gears".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Refer to TM-52, "Symptom Table". GO TO 7.



7. CHECK ENGINE BRAKE FUNCTION

Check engine brake.

Does engine braking effectively reduce vehicle speed in "L" position?

YES >> 1. Stop the vehicle.
2. End of "Road Test".
NO >> Refer to TM-52, "Symptom Table". Then continue trouble diagnosis.

8. CHECK MANUAL MODE FUNCTION

Shift to manual mode from "D" position.

Does it switch to manual mode?

YES >> GO TO 9.
NO >> Refer to TM-52, "Symptom Table". GO TO 9.

9. CHECK SHIFT-UP FUNCTION

During manual mode driving, is upshift from M1 → M2 → M3 → M4 → M5 → M6 performed?

Is upshifting correctly performed?

YES >> GO TO 10.
NO >> Refer to TM-52, "Symptom Table". GO TO 10.

10. CHECK SHIFT-DOWN FUNCTION

During manual mode driving, is downshift from M6 → M5 → M4 → M3 → M2 → M1 performed?

Is downshifting correctly performed?

YES >> GO TO 11.
NO >> Refer to TM-52, "Symptom Table". GO TO 11.

11. CHECK ENGINE BRAKE FUNCTION

Check engine brake.

Does engine braking effectively reduce vehicle speed in M1 position?

YES >> 1. Stop the vehicle.
2. End of "Road Test".
NO >> Refer to TM-52, "Symptom Table". Then continue trouble diagnosis.

CVT POSITION

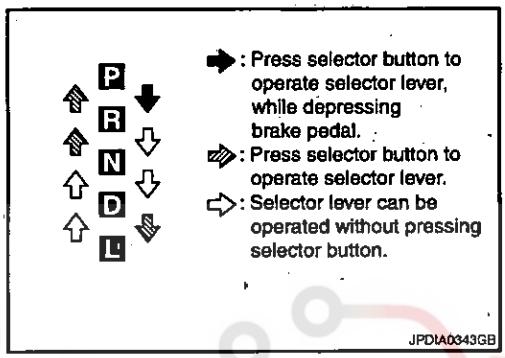
SPORT MODE

SPORT MODE : Inspection and Adjustment

INFOID:0000000004548597

INSPECTION

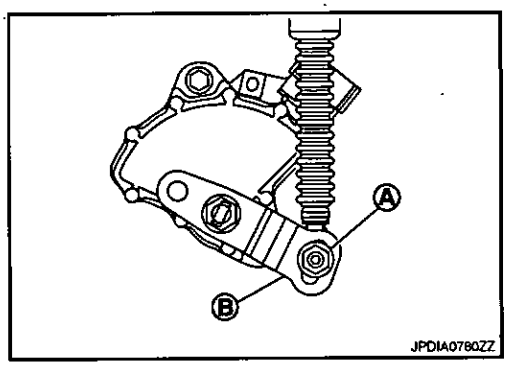
1. Place selector lever in "P" position, and turn ignition switch ON (engine stop).
2. Check that selector lever can be shifted to other than "P" position when brake pedal is depressed. Also check that selector lever can be shifted from "P" position only when brake pedal is depressed.
3. Move the selector lever and check for excessive effort, sticking, noise or rattle.
4. Check that selector lever stops at each position with the feel of engagement when it is moved through all the positions. Check that the actual position of the selector lever matches the position shown by the shift position indicator and the manual lever on the transaxle.
5. The method of operating the selector lever to individual positions correctly should be as shown.
6. When selector button is pressed in "P", "R", "N", "D" or "L" position without applying forward/backward force to selector lever, check button operation for sticking.
7. Check that back-up lamps illuminate only when selector lever is placed in the "R" position.
8. When in "R" position, check that back-up lamps illuminate even when the selector lever is pushed toward the "P" position.
   CAUTION:
   Check the lighting without pressing shift button.



9. Check that the back-up lamps do not illuminate when selector lever is pushed toward the "R" position when in the "P" or "N" position.
   CAUTION:
   Check the lighting without pressing shift button.
10. Check that the engine can only be started with the selector lever in the "P" and "N" positions.
11. Check that transaxle is locked completely in "P" position.

ADJUSTMENT

1. Place selector lever in " P" position.
   CAUTION:
   Turn wheels more than 1/4 rotations and apply the park lock.
2. Loosen nut (A) and place manual lever (B) in "P" position.
   CAUTION:
   Never apply any force to the manual lever.
3. Tighten nut. Refer to TM-87, "Exploded View".
   CAUTION:
   Fix the manual lever when tightening.



MANUAL MODE

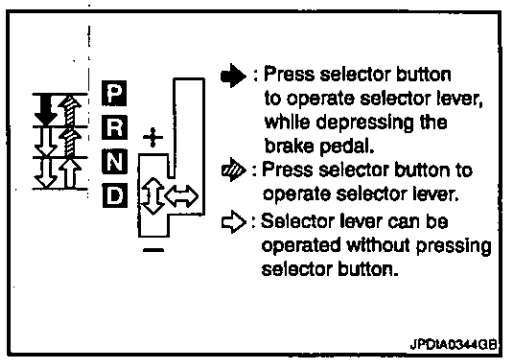
MANUAL MODE : Inspection and Adjustment

INFOID:0000000004548598

INSPECTION

1. Move selector lever to "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.
3. Move selector lever and check for excessive effort, sticking, noise or rattle.

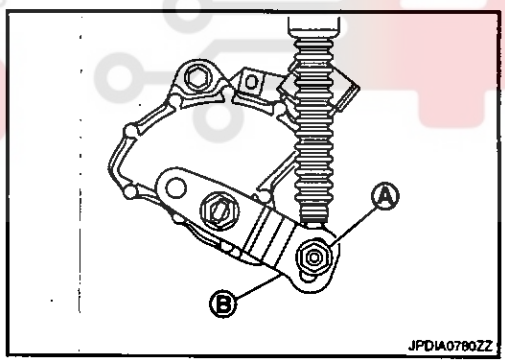
4. Check that selector lever stops at each position with the feel of engagement when it is moved through all the positions. Check that the actual position of selector lever matches the position shown by shift position indicator and manual lever on the transaxle.
5. The method of operating selector lever to individual positions correctly should be as shown.
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. Check that back-up lamps illuminate only when selector lever is placed in the "R" position.
8. When in "R" position, check that back-up lamps illuminate even when the selector lever is in the "P" position.
   CAUTION:
   Check the lighting without pressing shift button.



9. Check that back-up lamps do not illuminate when selector lever is pushed toward the "R" position when in the "P" or "N" position.
   CAUTION:
   Check the lighting without pressing shift button.
10. Check that the engine can only be started with selector lever in the "P" and "N" positions.
11. Check that transaxle is locked completely in "P" position.
12. When selector lever is set to manual shift gate, check that manual mode is displayed on combination meter.
    Shift selector lever to "+" and "−" sides, and check that set shift position changes.

ADJUSTMENT

1. Place selector lever in " P" position.
   CAUTION:
   Turn wheels more than 1/4 rotations and apply the park lock.
2. Loosen nut (A) and place manual lever (B) in "P" position.
   CAUTION:
   Never apply any force to the manual lever.
3. Tighten nut. Refer to TM-87, "Exploded View".
   CAUTION:
   Fix the manual lever when tightening.

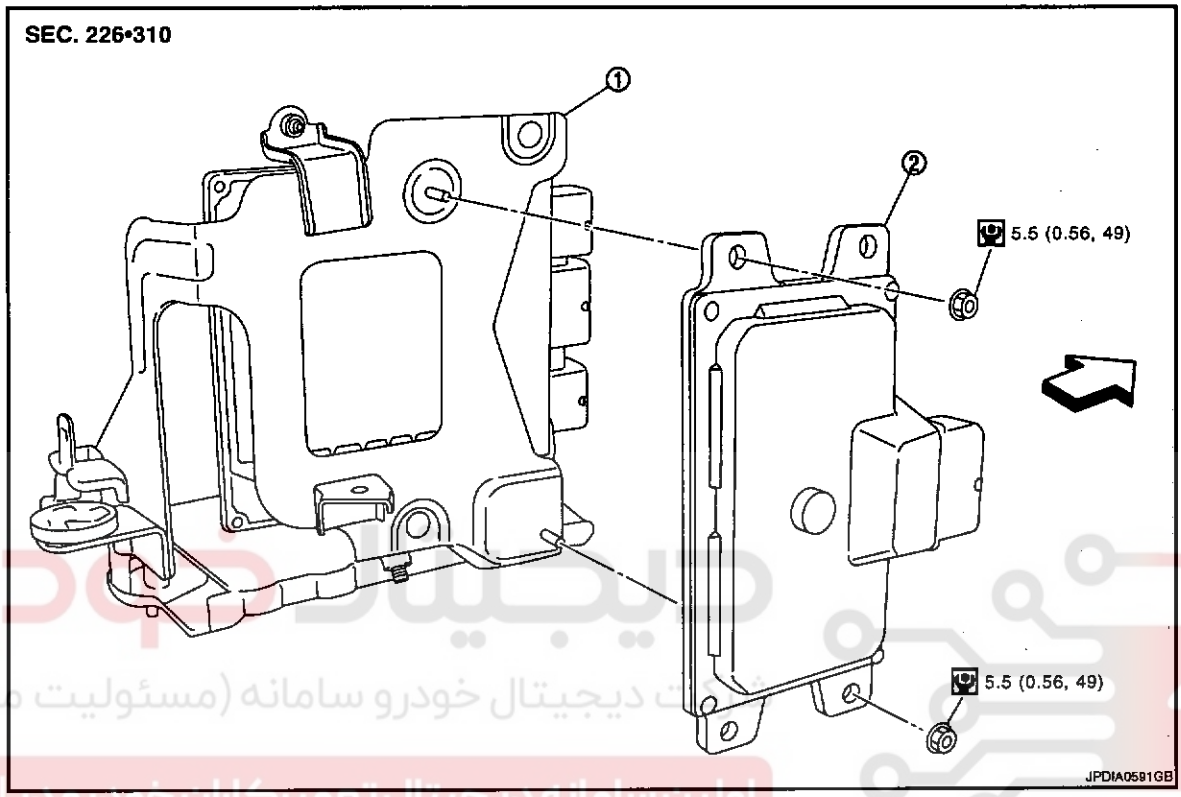


ON-VEHICLE REPAIR

TRANSMISSION CONTROL MODULE

Exploded View

INFOID:0000000004548599



1. Bracket
2. TCM

⇦ : Vehicle front

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

Removal and Installation

INFOID:0000000004548600

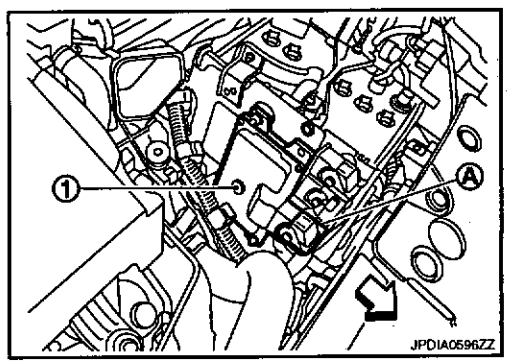
REMOVAL

CAUTION:
Never impact on TCM when removing or installing TCM.

1. Disconnect the battery cable from the negative terminal.
2. Remove the air duct (inlet). Refer to EM-26, "Exploded View".
3. Disconnect the TCM connector (A).

⇦ : Vehicle front

4. Remove the TCM (1) from the bracket.



INSTALLATION

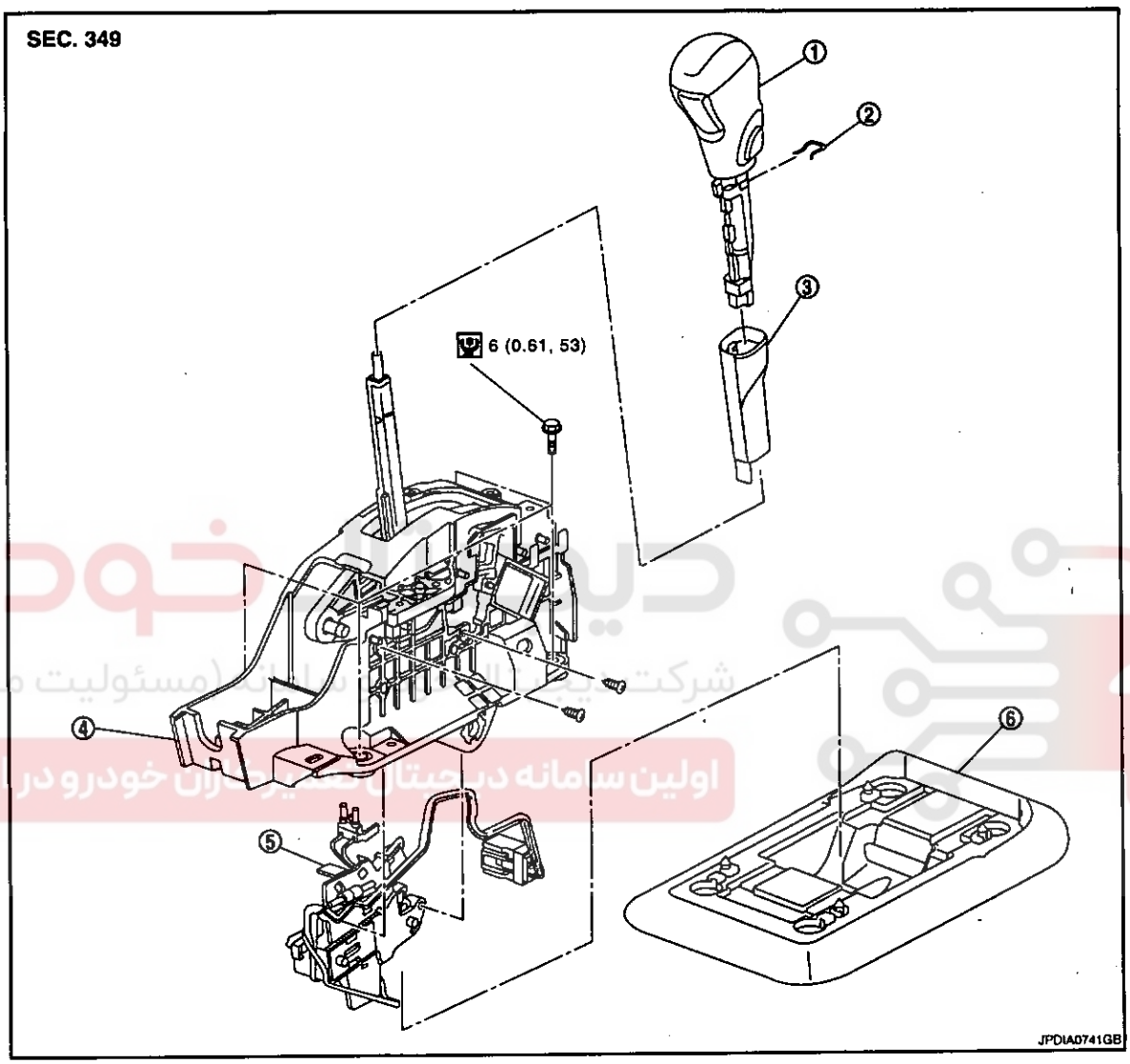
Install in the reverse order of removal.

CONTROL DEVICE

SPORT MODE

SPORT MODE : Exploded View

INFOID:0000000004548601



1. Selector lever knob
2. Lock pin
3. Knob cover
4. Control device assembly
5. Shift lock unit
6. Dust cover

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

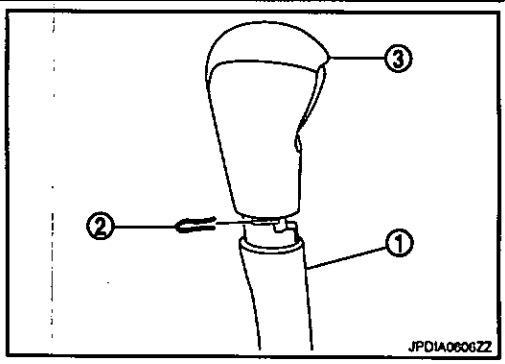
SPORT MODE : Removal and Installation

INFOID:0000000004548602

REMOVAL

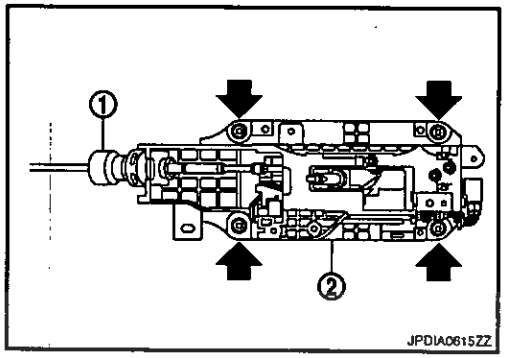
1. Disconnect the battery cable from the negative terminal.

2. Slide knob cover (1) below selector lever downward.
CAUTION:
Be careful not to damage the knob cover.
3. Pull lock pin (2) out of selector lever knob (3).
4. Remove selector lever knob and knob cover.
5. Remove center console assembly. Refer to IP-22, "Exploded View".

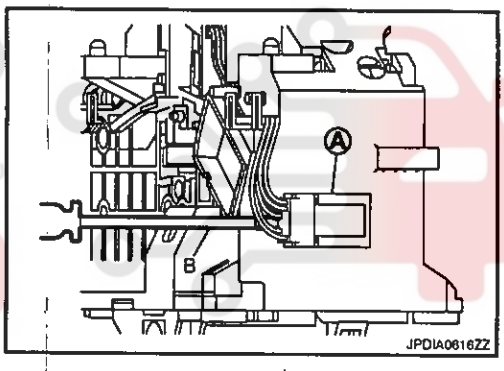


6. Remove control cable (1) from control device assembly. Refer to TM-87, "Exploded View".
7. Remove control device assembly (2).

⬅ : Bolt

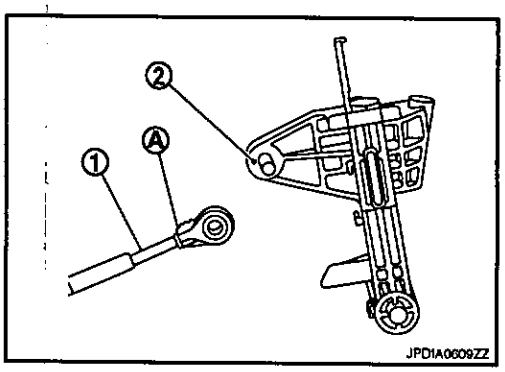


8. Remove control device connector (A) using a flat-bladed screwdriver (B).
CAUTION:
Be careful not to damage control device connector.
9. Remove shift lock unit from control device assembly.



INSTALLATION

Note the following, and install in the reverse order of removal.
When installing the control cable (1) to the control device assembly (2), check that the control cable is fully pressed in with the ribbed (A) surface facing upward.



SPORT MODE : Inspection and Adjustment

INFOID:0000000004548603

ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing the control device. Refer to TM-79, "SPORT MODE : Inspection and Adjustment".

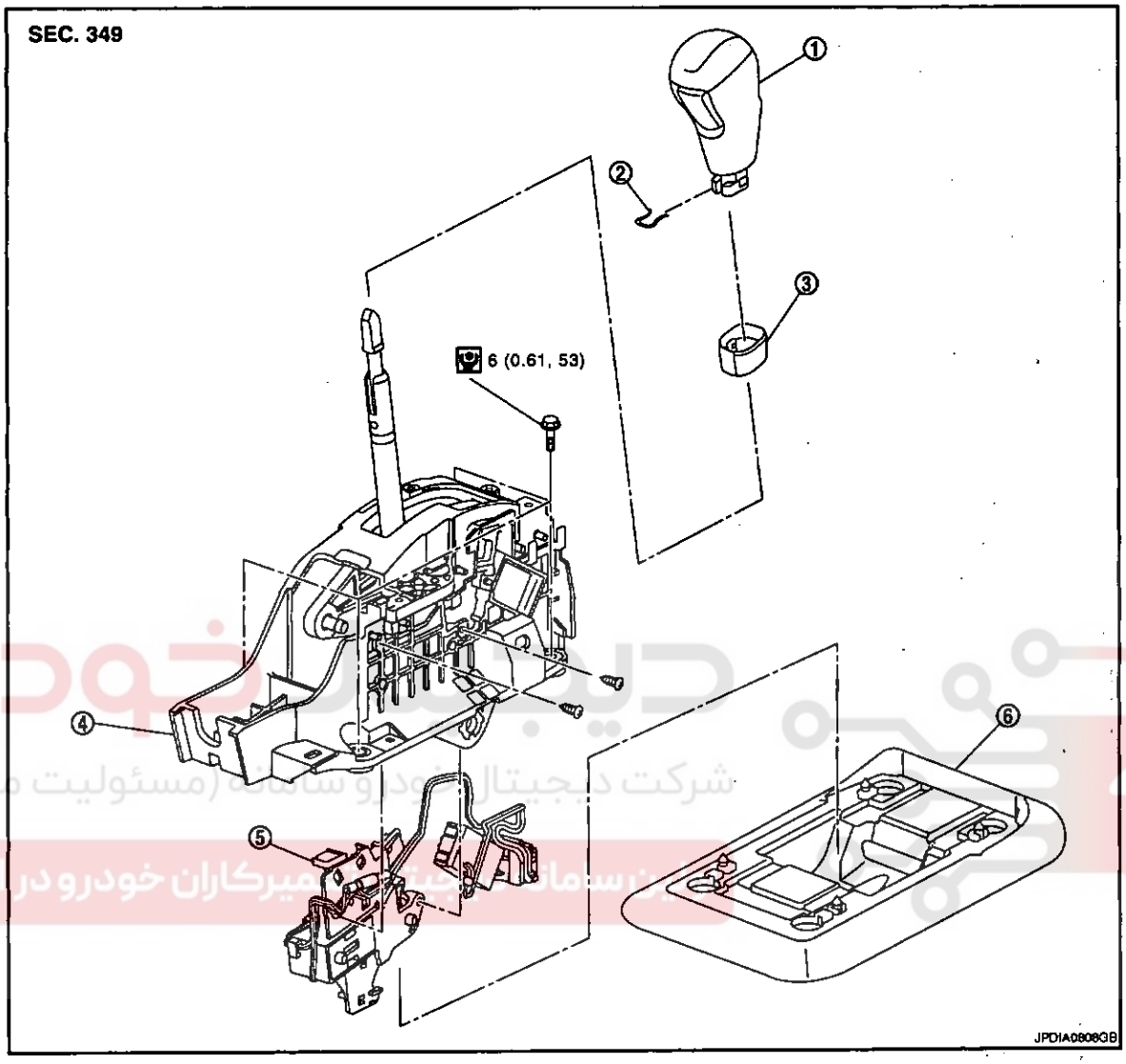
INSPECTION AFTER INSTALLATION

Check the CVT positions after adjusting the CVT positions. Refer to TM-79, "SPORT MODE : Inspection and Adjustment".

MANUAL MODE

MANUAL MODE : Exploded View

INFOID:0000000004548604



1. Selector lever knob
2. Lock pin
3. Knob cover
4. Control device assembly
5. Shift lock unit
6. Dust cover

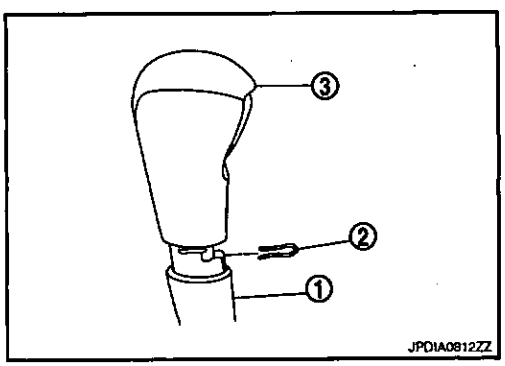
Refer to GI-4, "Components" for symbols in the figure.

MANUAL MODE : Removal and Installation

INFOID:0000000004548605

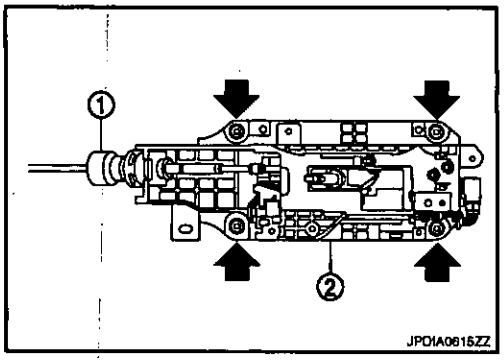
REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Slide knob cover (1) below selector lever downward.
   CAUTION:
   Be careful not to damage knob cover.
3. Pull lock pin (2) out of selector lever knob (3).
4. Remove selector lever knob and knob cover.
5. Remove center console assembly. Refer to IP-22, "Exploded View".

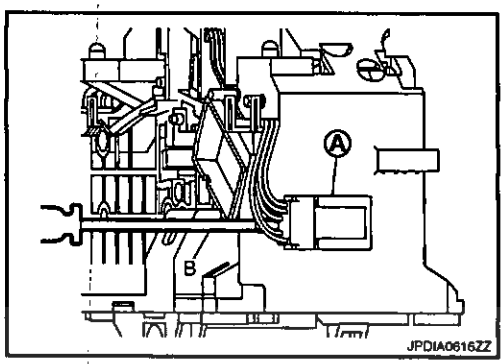


6. Remove control cable (1) from control device assembly. Refer to TM-87, "Exploded View".
7. Remove control device assembly (2).

⬅ : Bolt

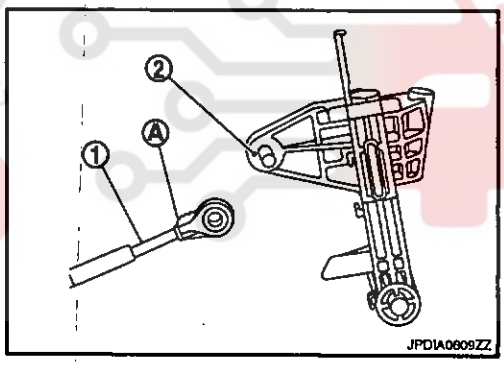


8. Remove control device connector (A) using a flat-bladed screwdriver (B).
CAUTION:
Be careful not to damage control device connector.
9. Remove shift lock unit from control device assembly.



INSTALLATION

Note the following, and install in the reverse order of removal.
When installing control cable (1) to control device assembly (2), check that control cable is fully pressed in with the ribbed (A) surface facing upward.



MANUAL MODE : Inspection and Adjustment

INFOID:0000000004548606

ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing control device. Refer to TM-79, "MANUAL MODE : Inspection and Adjustment".

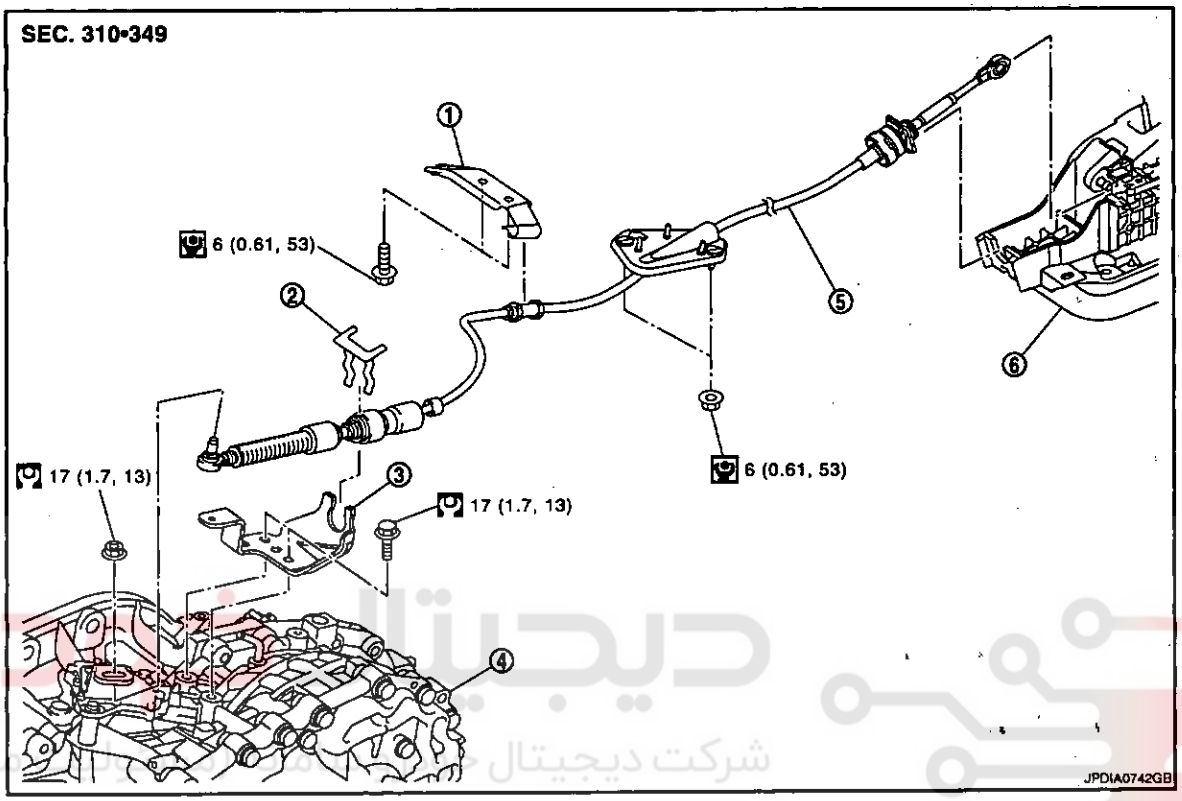
INSPECTION AFTER INSTALLATION

Check the CVT positions after adjusting the CVT positions. Refer to TM-79, "MANUAL MODE : Inspection and Adjustment".

CONTROL CABLE

Exploded View

INFOID:0000000004548607



1. Bracket 1
2. Lock plate
3. Bracket 2
4. Transaxle assembly
5. Control cable
6. Control device assembly

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

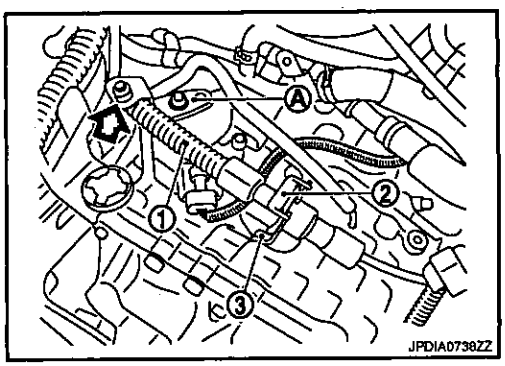
Removal and Installation

INFOID:0000000004548608

REMOVAL

CAUTION:
Check that parking brake is applied before removal/installation.

1. Disconnect control cable from control device assembly. Refer to TM-83, "SPORT MODE : Exploded View" (Sport mode), TM-85, "MANUAL MODE : Exploded View" (Manual mode).
2. Remove the air duct (inlet) and air cleaner case. Refer to EM-26, "Exploded View".
3. Remove control cable (1) from manual lever (A).



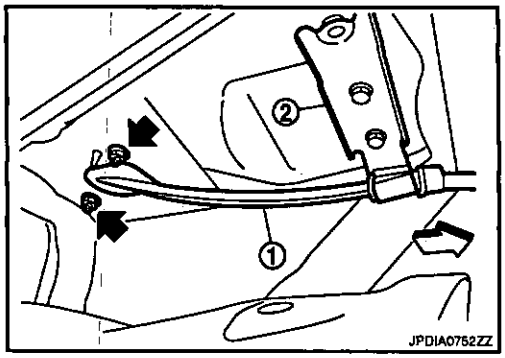
⬅ : Nut

4. Remove lock plate (2) from control cable.
5. Remove control cable from bracket 2 (3).
6. Remove exhaust front tube. Refer to EX-5, "Exploded View".
7. Remove heat plate.

8. Remove control cable (1) from bracket 1 (2).
9. Remove nuts (⬅).

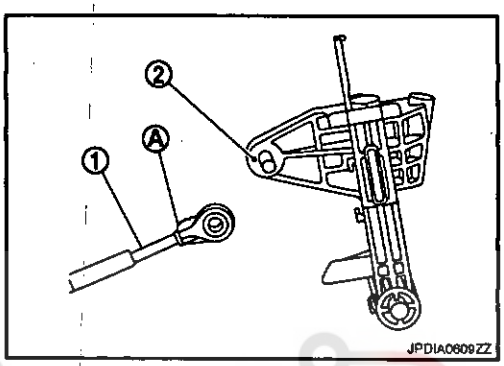
⇦ : Vehicle front

10. Remove rear foot duct 1 (right). Refer to VTL-13, "Exploded View".
11. Remove the control cable from the vehicle.



INSTALLATION

Note the following, and install in the reverse order of removal.
When installing the control cable (1) to the control device assembly (2), check that the control cable is fully pressed in with the ribbed (A) surface facing upward.



Inspection and Adjustment

INFOID:0000000004548609

ADJUSTMENT AFTER INSTALLATION

Adjust the CVT positions after installing control cable. Refer to TM-79, "SPORT MODE : Inspection and Adjustment" (Sport mode), TM-79, "MANUAL MODE : Inspection and Adjustment" (Manual mode).

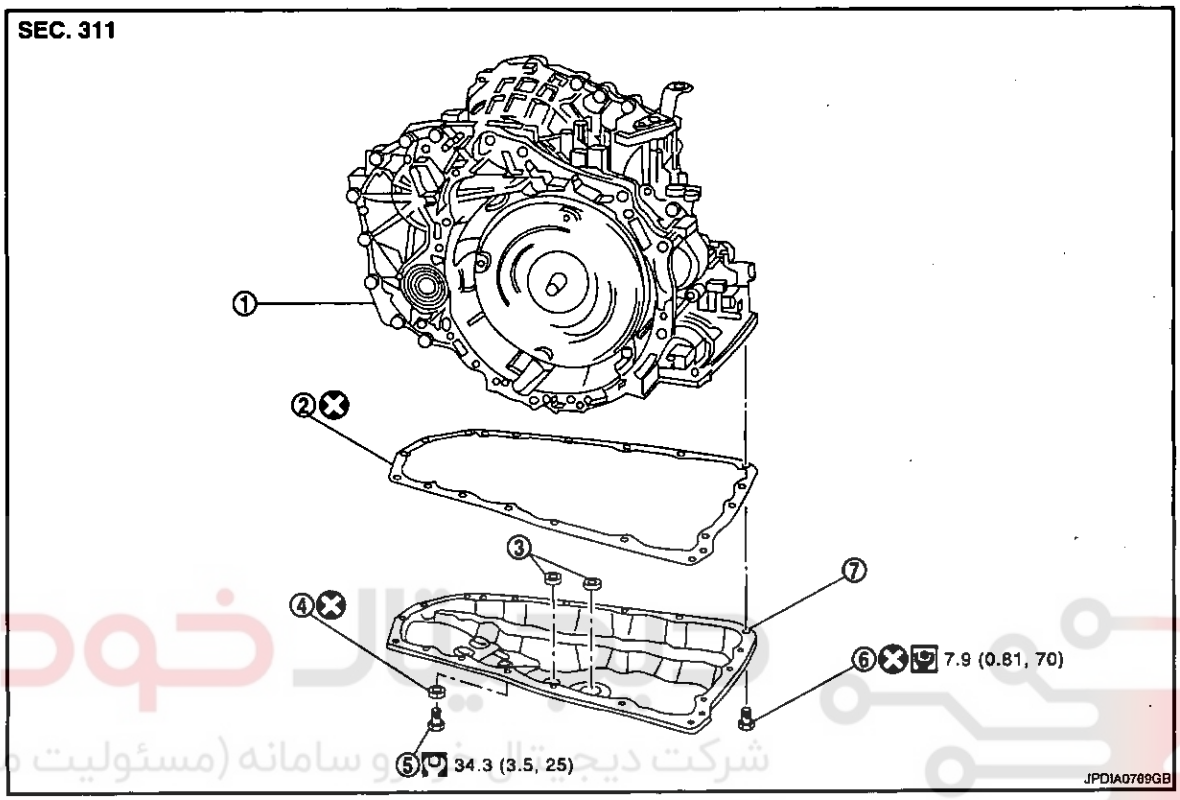
INSPECTION AFTER INSTALLATION

Check the CVT positions after adjusting the CVT positions. Refer to TM-79, "SPORT MODE : Inspection and Adjustment" (Sport mode), TM-79, "MANUAL MODE : Inspection and Adjustment" (Manual mode).

OIL PAN

Exploded View

INFOID:0000000004548610



1. Transaxle assembly
2. Oil pan gasket
3. Magnet
4. Drain plug gasket
5. Drain plug
6. Oil pan fitting bolt
7. Oil pan

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

Removal and Installation

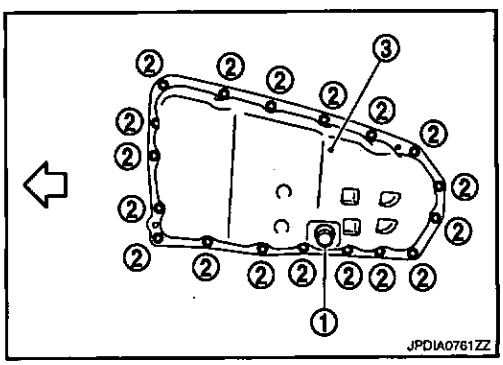
INFOID:0000000004548611

REMOVAL

1. Remove drain plug (1), and then drain CVT fluid from oil pan.

⇦ : Vehicle front

2. Remove oil pan fitting bolts (2).
3. Remove oil pan (3).
4. Remove oil pan gasket from oil pan.
5. Remove magnet from oil pan.



INSTALLATION

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

CAUTION:

- **Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mounting surface of transaxle case and oil pan.**
- **Never reuse oil pan gasket, drain plug gasket and oil pan fitting bolts.**

Inspection

INFOID:0000000004548612

Check foreign materials in oil pan to help determine causes of malfunction. If the CVT fluid is very dark, smells burned, or contains foreign particles, frictional material (clutches) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves and clutches to stick and can inhibit pump pressure.

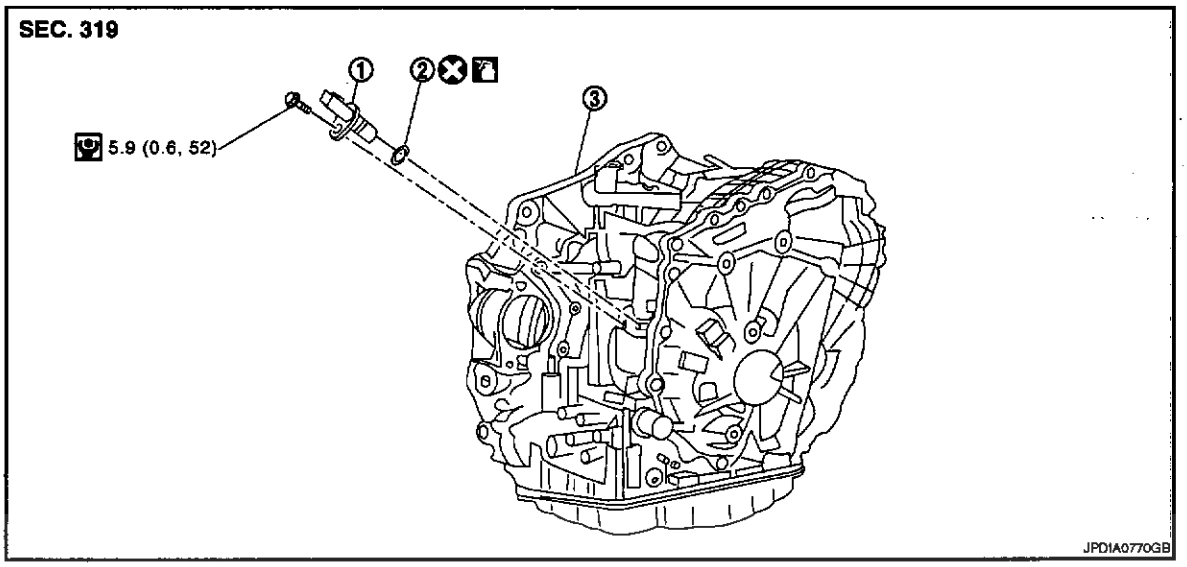
INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and check CVT fluid level. Refer to TM-69, "Inspection".

PRIMARY SPEED SENSOR

Exploded View

INFOID:0000000004548613



1. Primary speed sensor
2. O-ring
3. Transaxle assembly

: Apply CVT Fluid NS-2.

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

Removal and Installation

INFOID:0000000004548614

REMOVAL

1. Remove the air duct (inlet) and air cleaner case. Refer to EM-26, "Exploded View".
2. Remove the battery.
3. Disconnect ECM connector and TCM connector.
4. Remove battery bracket.
5. Remove CVT fluid level gauge and CVT fluid charging pipe. Refer to TM-103, "Exploded View".
6. Disconnect primary speed sensor connector.
7. Remove primary speed sensor.
8. Remove O-ring from primary speed sensor.

INSTALLATION

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

CAUTION:

- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

Inspection

INFOID:0000000004548615

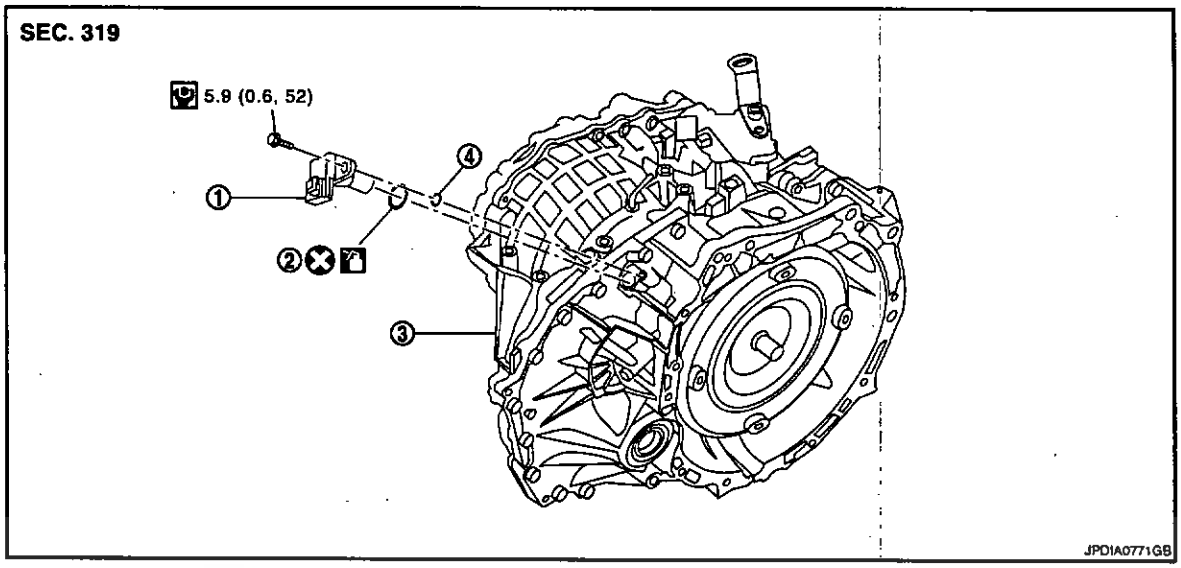
INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and check CVT fluid level. Refer to TM-69, "Inspection".

SECONDARY SPEED SENSOR

Exploded View

INFOID:0000000004548616



1. Secondary speed sensor
2. O-ring
3. Transaxle assembly
4. Shim

: Apply CVT Fluid NS-2.

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

Removal and Installation

INFOID:0000000004548617

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air duct (inlet) and air cleaner case. Refer to EM-26, "Exploded View".
3. Disconnect secondary speed sensor connector.
4. Remove secondary speed sensor and shim.
5. Remove O-ring from secondary speed sensor.

INSTALLATION

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

CAUTION:

- **Never reuse O-ring.**
- **Apply CVT fluid to O-ring.**

Inspection

INFOID:0000000004548618

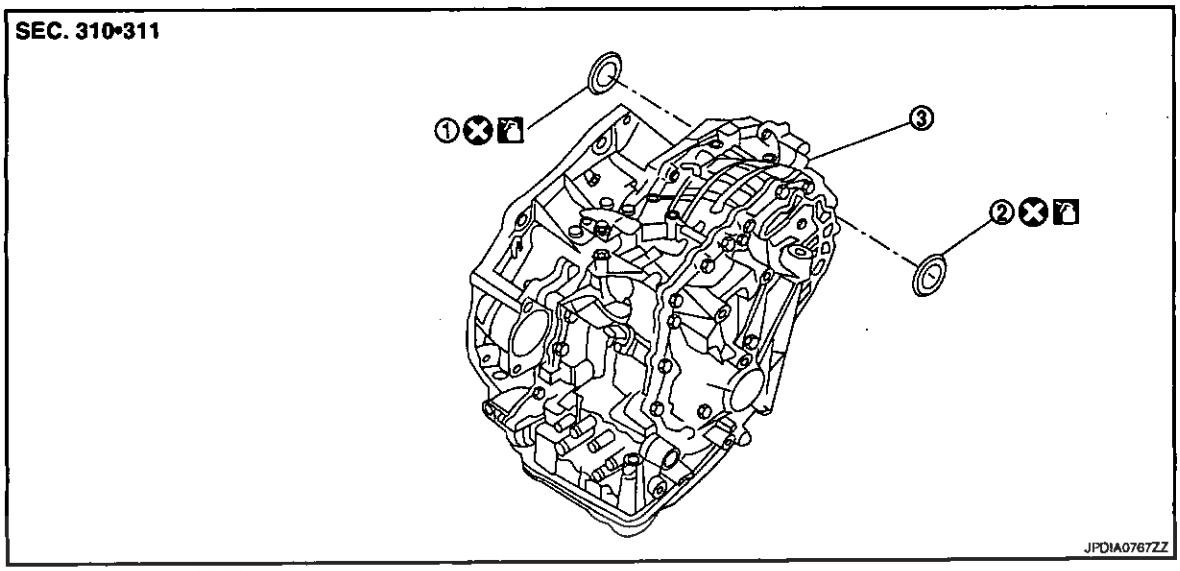
INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and check CVT fluid level. Refer to TM-69, "Inspection".

DIFFERENTIAL SIDE OIL SEAL

Exploded View

INFOID:0000000004548619



1. RH differential side oil seal
2. LH differential side oil seal
3. Transaxle assembly

: Apply CVT Fluid NS-2.

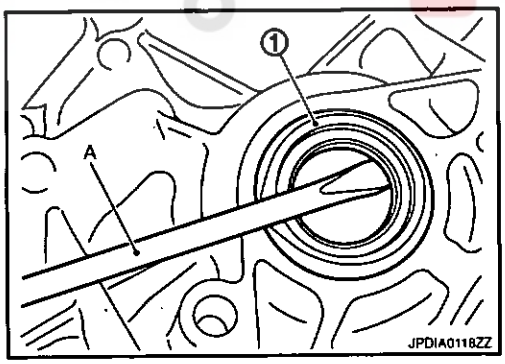
Refer to GI-4, "Components" for symbols not described above.

Removal and Installation

INFOID:0000000004548620

REMOVAL

1. Remove drive shaft assembly. Refer to FAX-17, "Exploded View".
2. Remove differential side oil seals (1) using a flat-bladed screwdriver (A).
   CAUTION:
   Be careful not to scratch transaxle case and converter housing.



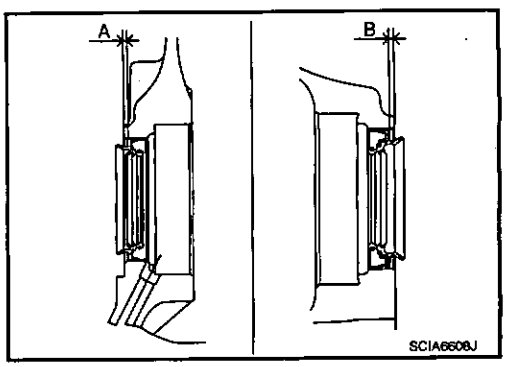
INSTALLATION

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

- Drive each differential side oil seal evenly using a commercial service tool so that differential side oil seal protrudes by the dimension (A) or (B) respectively.

Unit: mm (in)

Dimension A (transaxle case side)	1.8 ± 0.5 (0.071 ± 0.020)
Dimension B (converter housing side)	2.2 ± 0.5 (0.087 ± 0.020)



NOTE:
Differential side oil seal pulling direction is used as the reference.
CAUTION:

- **Never reuse differential side oil seals.**
- **Apply CVT fluid to differential side oil seals.**

Drift to be used:

Location	Tool number
Transaxle case side	Commercial service tool [Outer diameter: 54 mm (2.13 in), inner diameter: 47 mm (1.85 in)]
Converter housing side	

Inspection

INFOID:0000000004548621

INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and check CVT fluid level. Refer to TM-69, "Inspection".

OIL PUMP FITTING BOLT

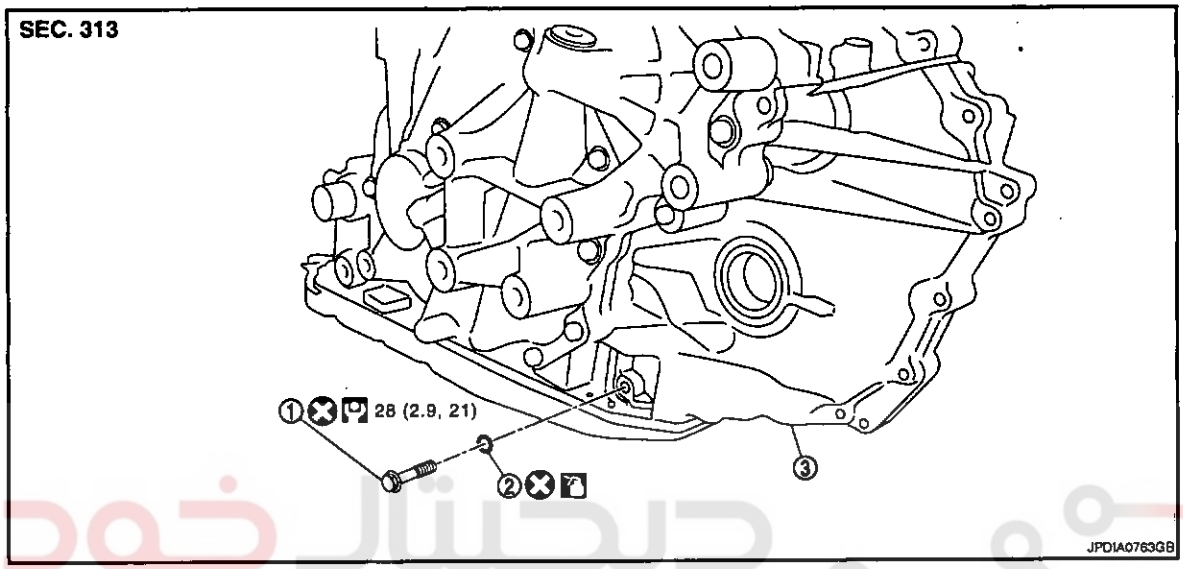
Description

INFOID:0000000004548622

Replace the oil pump fitting bolt and the O-ring if oil leakage or exudes from the oil pump fitting bolt.

Exploded View

INFOID:0000000004548623



1. Oil pump fitting bolt
2. O-ring
3. Transaxle assembly

: Apply CVT Fluid NS-2.

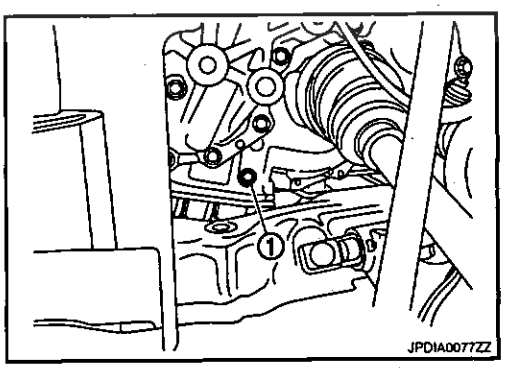
Refer to GI-4, "Components" for symbols not described above.

Removal and Installation

INFOID:0000000004548624

REMOVAL

1. Remove Oil pump fitting bolt (1) from transaxle assembly.
2. Remove O-ring from oil pump fitting bolt.



INSTALLATION

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

CAUTION:

- **Never reuse oil pump fitting bolt and O-ring.**
- **Apply CVT fluid to O-ring.**

Inspection

INFOID:0000000004548625

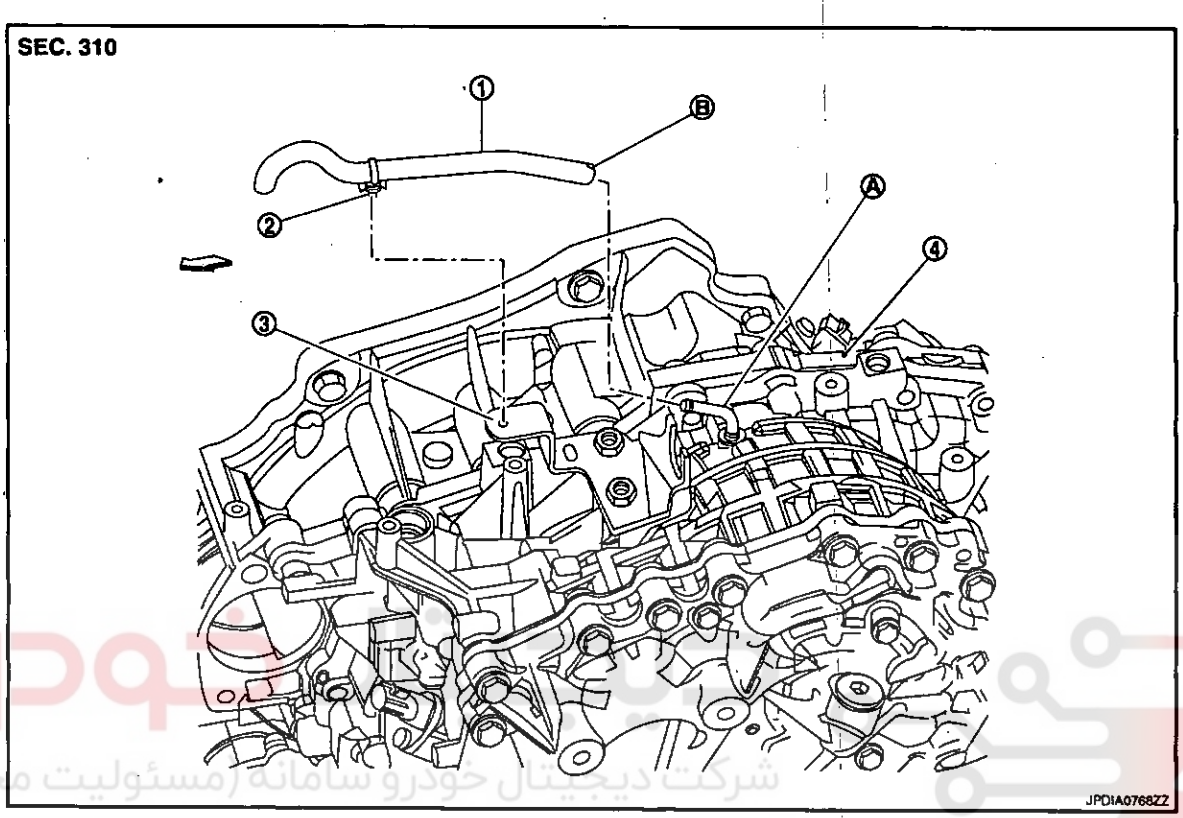
INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and check CVT fluid level. Refer to TM-69, "Inspection".

AIR BREATHER HOSE

Exploded View

INFOID:0000000004548626



1. Air breather hose
2. Clip
3. Bracket
4. Transaxle assembly
A. Air breather tube
B. Paint mark
⇦ : Vehicle front

Removal and Installation

INFOID:0000000004548627

REMOVAL

1. Remove air duct (inlet) and air cleaner case. Refer to EM-26. "Exploded View".
1. Remove clip from the bracket.
2. Remove air breather hose from transaxle assembly.

INSTALLATION

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

CAUTION:

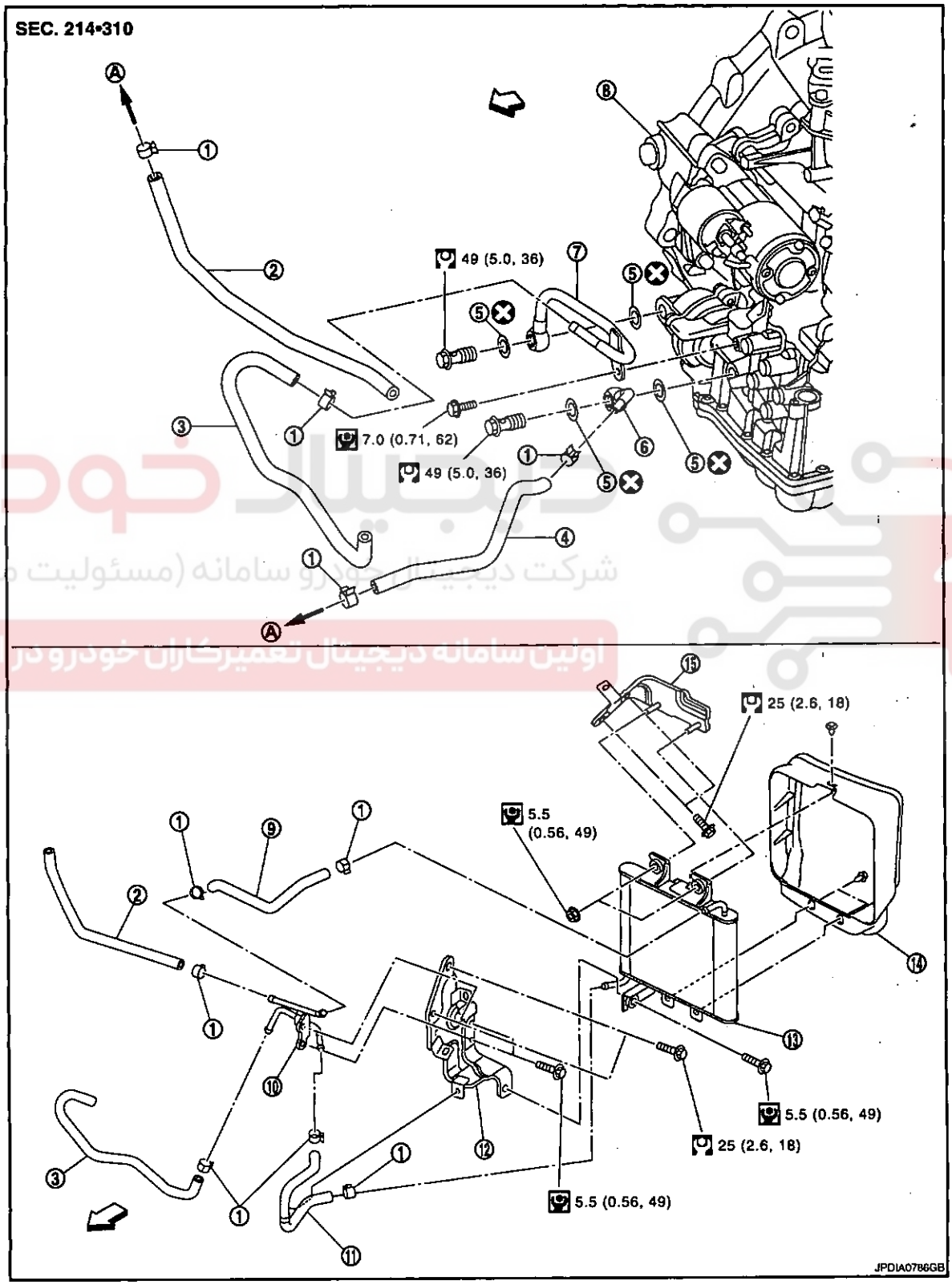
- **Install air breather hose with paint mark facing upward.**
- **Insert air breather hose a minimum of 17 mm (0.67 in) onto air breather tube (to end of air breather tubes radius end).**
- **Install air breather hose to bracket by fully inserting the clip.**
- **Check there are no pinched or restricted areas on air breather hose caused by bending or winding when installing it.**

FLUID COOLER SYSTEM

WITH FLUID COOLER

WITH FLUID COOLER : Exploded View

INFOID:0000000004548628



1. Hose clamp
2. Fluid cooler hose A
3. Fluid cooler hose B
4. Fluid cooler hose C
5. Copper washer
6. CVT fluid cooler tube
7. CVT fluid cooler tube
8. Transaxle assembly
9. Fluid cooler hose D
10. Fluid cooler tube
11. Fluid cooler hose E
12. Bracket A
13. Fluid cooler
14. Air guide
15. Bracket B

A. To radiator

⇦: Vehicle side

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

WITH FLUID COOLER : Removal and Installation

INFOID:0000000004548629

REMOVAL

1. Remove engine under cover. Refer to EXT-30, "Exploded View".
2. Remove fender protector (left side). Refer to EXT-24, "FENDER PROTECTOR : Exploded View".
3. Remove air guide from fluid cooler.
4. Remove fluid cooler hose D and fluid cooler hose E.
5. Remove fluid cooler.
6. Remove air duct (inlet). Refer to EM-26, "Exploded View".
7. Remove fluid cooler hose A, fluid cooler hose B and fluid cooler hose C.
8. Remove fluid cooler tube from bracket A.
9. Remove bracket A and bracket B.
10. Remove CVT fluid cooler tube from transaxle assembly.

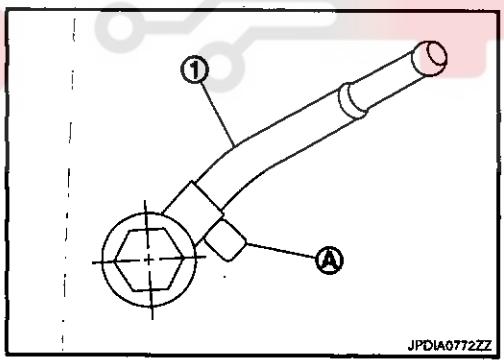
INSTALLATION

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

CAUTION:

Never reuse copper washer.

- When installing CVT fluid cooler tube (1) to transaxle assembly:
  - Contact CVT fluid cooler tube a boss portion (A) of the transaxle case.
  - Tighten the bolt of CVT fluid cooler tube without moving the CVT fluid cooler tube



- Refer to the followings when installing fluid cooler hose.

Fluid cooler hose	Hose end	Paint mark	Position of hose clamp*
A	Radiator assembly side	Facing backward	A
	Fluid cooler tube side	Facing backward	B
B	CVT fluid cooler tube side	Facing upward	C
	Fluid cooler tube side	Facing backward	D
C	Radiator assembly side	Facing upward	E
	CVT fluid cooler tube side	Facing upward	F
D	Fluid cooler tube side	Facing to the left of the vehicle	F
	Fluid cooler side	Facing to the left of the vehicle	F
E	Fluid cooler tube side	Facing to the left of the vehicle	F
	Fluid cooler side	Facing to the right of the vehicle	G

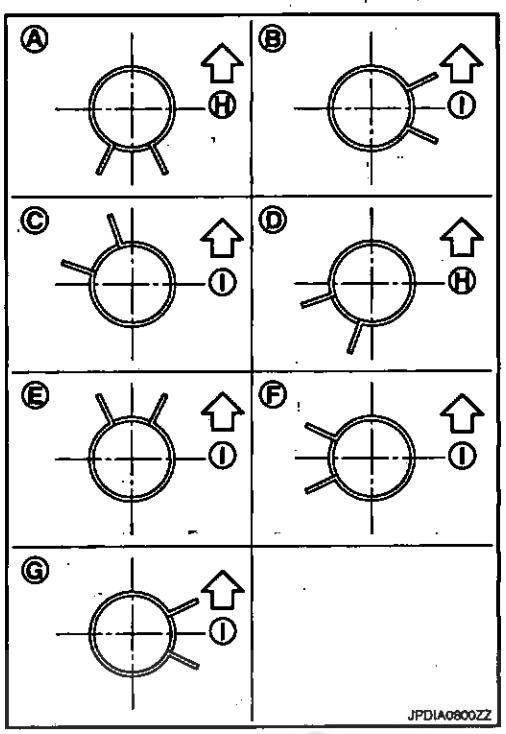
*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

⇦H : Vehicle front

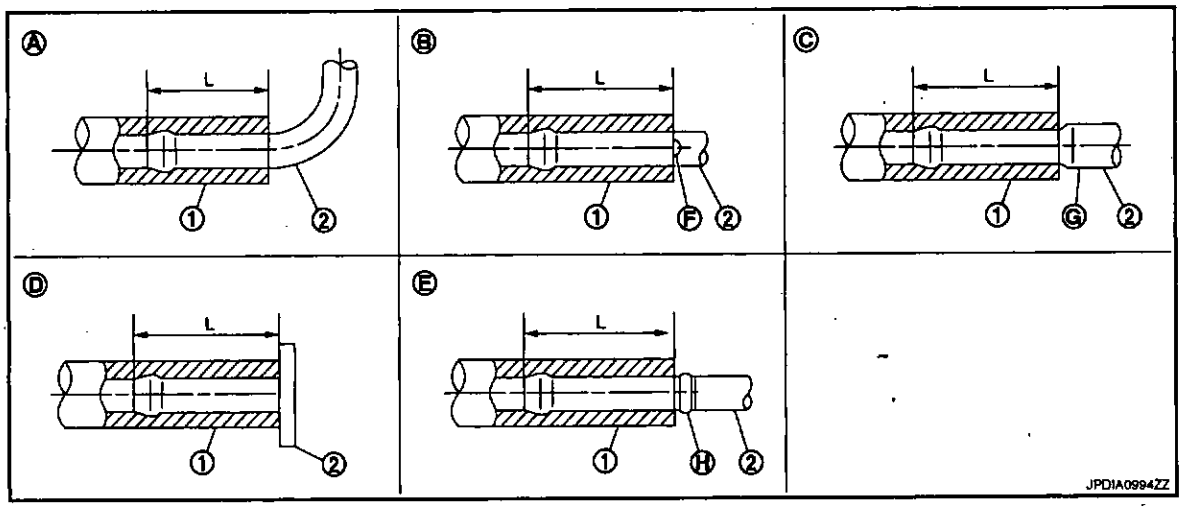
⇦I : Vehicle upper

- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.

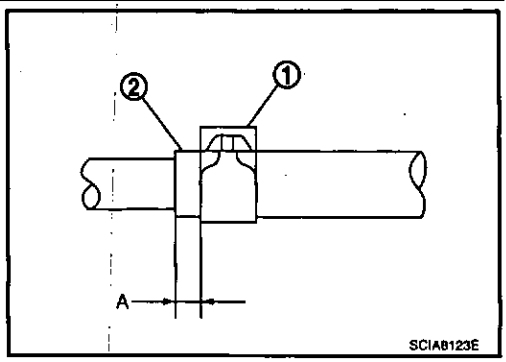


- Insert fluid cooler hose according to dimension (L) described below.

(1)	(2)	Tube type	Dimension L
Fluid cooler hose A	Radiator assembly side	A	End reaches the radius curve end.
	Fluid cooler tube side	B	Insert the hose until it overlaps the paint mark (F).
Fluid cooler hose B	CVT fluid cooler tube side	C	33 mm (1.30 in) [End reaches the 2-stage bulge (G).]
	Fluid cooler tube side	B	Insert the hose until it overlaps the paint mark (F).
Fluid cooler hose C	Radiator assembly side	D	Insert the hose until the hose touches the radiator.
	CVT fluid cooler tube side	C	33 mm (1.30 in) [End reaches the 2-stage bulge (G).]
Fluid cooler hose D	Fluid cooler tube side	E	28 mm (1.10 in) [End reaches the spool portion (H).]
	Fluid cooler side	A	End reaches the radius curve end.
Fluid cooler hose E	Fluid cooler tube side	E	28 mm (1.10 in) (End reaches the spool portion.)
	Fluid cooler side	A	End reaches the radius curve end.



- Set hose clamps (1) at the both ends of fluid cooler hose (2) with dimension (A) from the hose edge.



(1)	(2)	Dimension A
Fluid cooler hose A	Radiator assembly side	5 – 9 mm (0.20 – 0.35 in)
	Fluid cooler tube side	
Fluid cooler hose B	CVT fluid cooler tube side	
	Fluid cooler tube side	
Fluid cooler hose C	Radiator assembly side	
	CVT fluid cooler tube side	
Fluid cooler hose D	Fluid cooler tube side	
	Fluid cooler side	5 mm (0.20 in)
Fluid cooler hose E	Fluid cooler tube side	5 – 9 mm (0.20 – 0.35 in)
	Fluid cooler side	5 mm (0.20 in)

- Hose clamp should not interfere with the bulge of fluid cooler tube.

WITH FLUID COOLER : Inspection

INFOID:0000000004548630

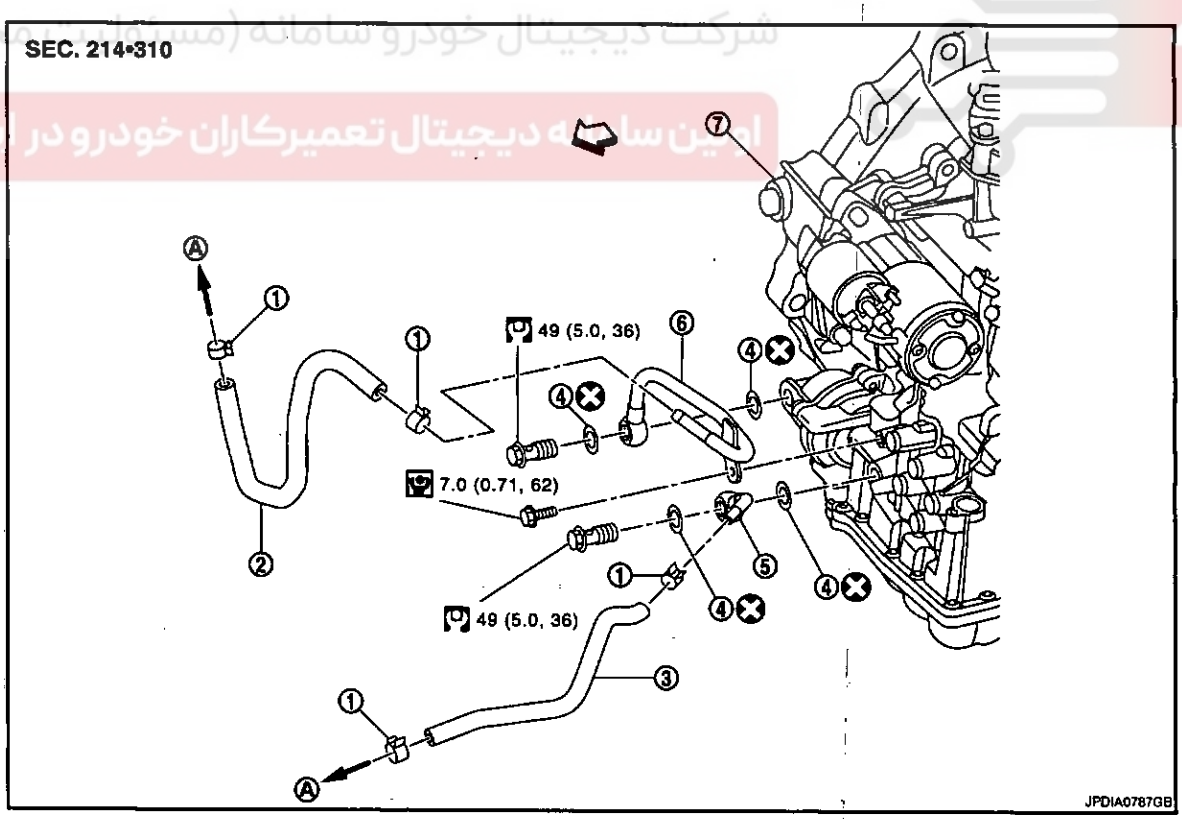
INSPECTION AFTER INSTALLATION

Check for CVT fluid leakage and CVT fluid level. Refer to TM-69, "Inspection".

WITHOUT FLUID COOLER

WITHOUT FLUID COOLER : Exploded View

INFOID:0000000004548631



1. Hose clamp
2. Fluid cooler hose A
3. Fluid cooler hose B
4. Copper washer
5. CVT fluid cooler tube
6. CVT fluid cooler tube
7. Transaxle assembly
A. To radiator

⇦: Vehicle front
Refer to GI-4, "Components" for symbols in the figure.

WITHOUT FLUID COOLER : Removal and Installation

INFOID:0000000004548632

REMOVAL

1. Remove air duct (inlet). Refer to EM-26, "Exploded View".
2. Remove engine under cover. Refer to EXT-30, "Exploded View".
3. Remove fender protector (left side). Refer to EXT-24, "FENDER PROTECTOR : Exploded View".
4. Remove fluid cooler hose A and fluid cooler hose B.
5. Remove CVT fluid cooler tube from transaxle assembly.

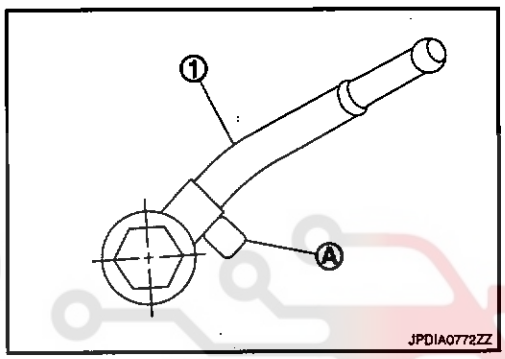
INSTALLATION

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

CAUTION:

Never reuse copper washer.

- When installing CVT fluid cooler tube (1) to transaxle assembly:
- Contact CVT fluid cooler tube a boss portion (A) of the transaxle case.
- Tighten the bolt of CVT fluid cooler tube without moving the CVT fluid cooler tube



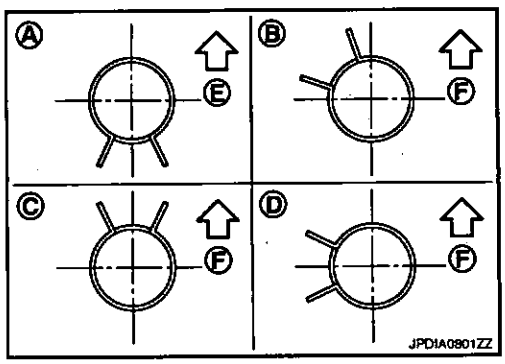
- Refer to the followings when installing fluid cooler hose.

Fluid cooler hose	Hose end	Paint mark	Position of hose clamp*
A	Radiator assembly side	Facing backward	A
	CVT fluid cooler tube side	Facing upward	B
B	Radiator assembly side	Facing upward	C
	CVT fluid cooler tube side	Facing upward	D

*: Refer to the illustrations for the specific position each hose clamp tab.

- The illustrations indicate the view from the hose ends.

⇦E : Vehicle front
⇦F : Vehicle upper

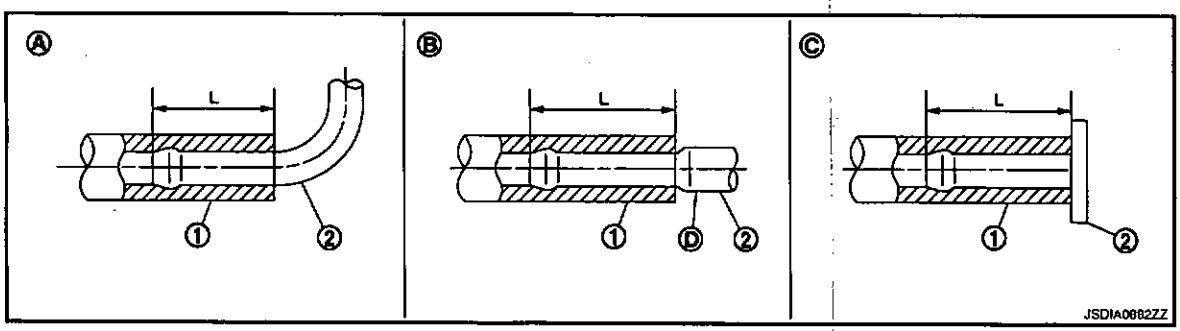


- When installing hose clamps center line of each hose clamp tab should be positioned as shown in the figure.

- Insert fluid cooler hose according to dimension (L) described below.

(1)	(2)	Tube type	Dimension L
Fluid cooler hose A	Radiator side	A	End reaches the radius curve end.
	CVT fluid cooler tube side	B	33 mm (1.30 in) [End reaches the 2-stage bulge (D).]

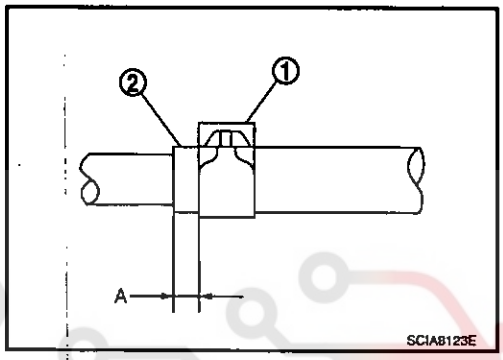
(1)	(2)	Tube type	Dimension L
Fluid cooler hose B	Radiator side	C	Insert the hose until the hose touches the radiator.
	CVT fluid cooler tube side	B	33 mm (1.30 in) [End reaches the 2-stage bulge (D).]



- Set hose clamps (1) at the both ends of fluid cooler hose (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.



WITHOUT FLUID COOLER : Inspection

INFOID:0000000004548633

INSPECTION AFTER INSTALLATION

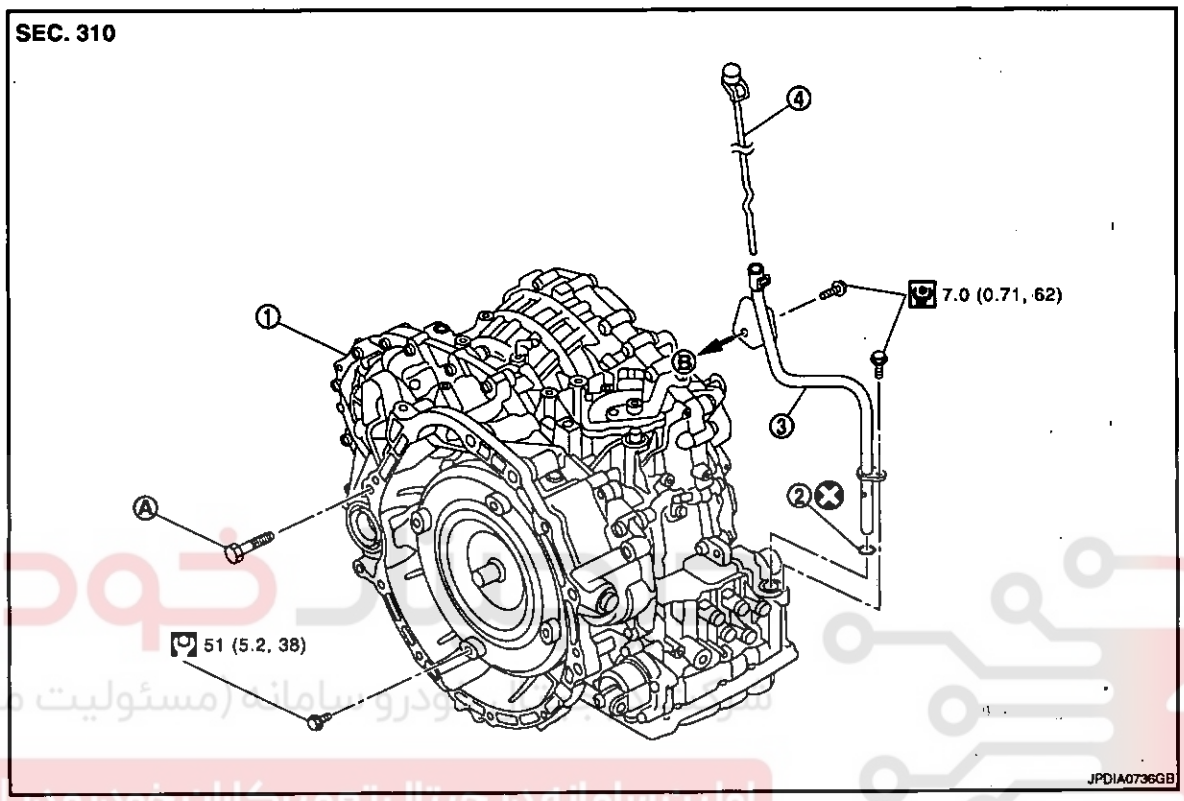
Check for CVT fluid leakage and CVT fluid level. Refer to TM-69, "Inspection".

REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000004548634



1. Transaxle assembly
2. O-ring
3. CVT fluid charging pipe
4. CVT fluid level gauge

A. For tightening torque, refer to TM-103, "Removal and Installation".

B. To water outlet

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

Removal and Installation

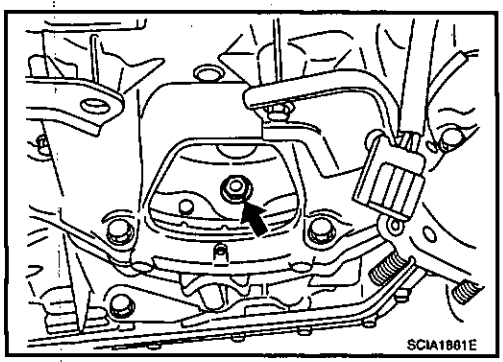
INFOID:0000000004548635

WARNING:
Never remove the reservoir tank cap when the engine is hot. Serious burns could occur from high pressure engine coolant escaping from the reservoir tank.

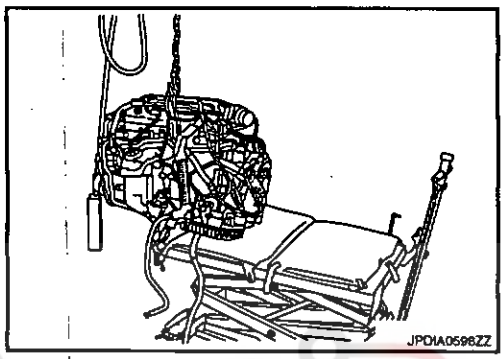
REMOVAL

1. Remove the engine, the transaxle assembly and front suspension member. Refer to EM-67, "Exploded View".
2. Lift with hoist and separate engine, transaxle assembly from front suspension member. Refer to EM-67, "Exploded View".
3. Remove air breather hose. Refer to TM-96, "Exploded View".
4. Remove CVT fluid level gauge and CVT fluid charging pipe.
5. Disconnect the following connectors:
   - Primary speed sensor connector
   - Secondary speed sensor connector
   - PNP switch connector
   - CVT unit connector
6. Remove crankshaft position sensor (POS). Refer to EM-38, "Exploded View".

7. Remove rear plate. Refer to EM-38, "Exploded View".
8. Turn crankshaft, and remove the four tightening bolts (⬅) for drive plate and torque converter.
   CAUTION:
   When turning crankshaft, turn it clockwise as viewed from the front of the engine.
9. Remove transaxle assembly fixing bolts with power tool.



10. Remove transaxle assembly from engine assembly with a hoist.
11. Remove CVT fluid cooler tube from transaxle assembly. Refer to TM-97, "WITH FLUID COOLER : Exploded View" (With fluid cooler), TM-100, "WITHOUT FLUID COOLER : Exploded View" (Without fluid cooler).

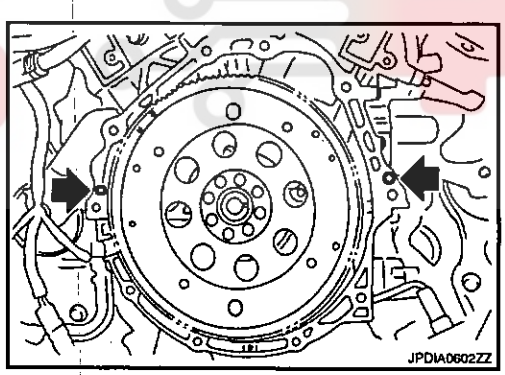


INSTALLATION

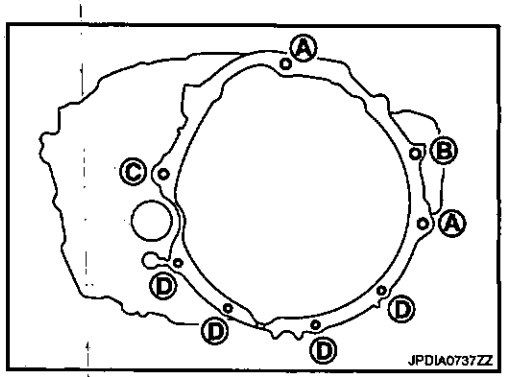
Note following, and install in the reverse order of removal.

CAUTION:

- **Never reuse O-ring.**
- **Apply petroleum jelly to O-ring.**
- **Check fitting of dowel pin (⬅) when installing transaxle assembly to engine assembly.**

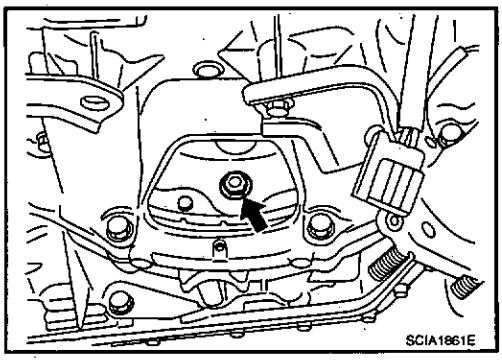


- When installing transaxle assembly to the engine assembly, attach the fixing bolts in accordance with the following.



Insertion direction	Transaxle assembly to engine assembly		Engine assembly to transaxle assembly	
Bolt position	A	B	C	D
Number of bolts	2	1	1	4
Bolt length mm (in)	55 (2.17)	35 (1.38)	55 (2.17)	40 (1.57)
Tightening torque N·m (kg-m, ft-lb)	75 (7.7, 55)			50 (5.1, 37)

- Align the position of tightening bolts (⬅) for drive plate with those of the torque converter, and temporarily tighten the bolts. Then, tighten the bolts to the specified torque.


SCIA1861E

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, confirm the tightening torque of the crankshaft pulley mounting bolts. Refer to EM-53, "Removal and Installation".**
- **After converter is installed to drive plate, rotate crankshaft several turns and check that transaxle rotates freely without binding.**

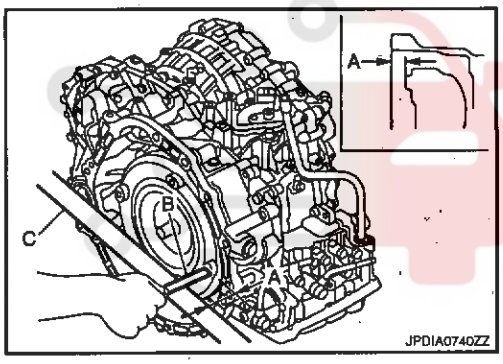
Inspection

INFOID:0000000004548636

INSPECTION BE FORE INSTALLATION

- After inserting a torque converter to the CVT, check that distance (A) within the reference value limit.

B : Scale
C : Straightedge



Distance A : Refer to TM-109, "Torque Converter".

INSPECTION AFTER INSTALLATION

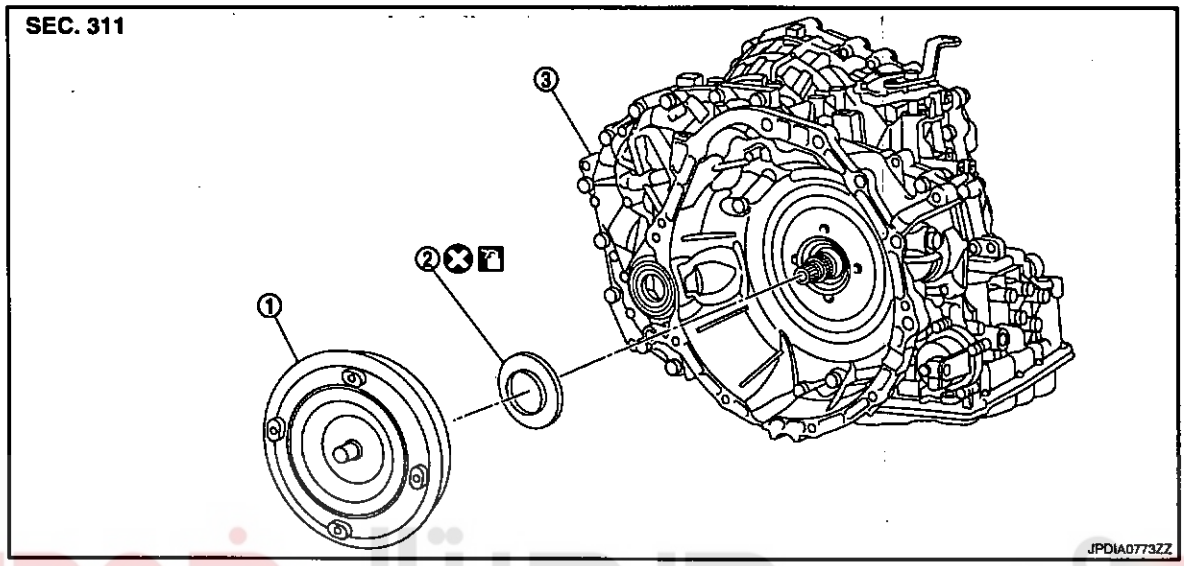
- After completing installation, check the following item.
- CVT fluid leakage and CVT fluid level. Refer to TM-69, "Inspection".
- CVT position. Refer to TM-79, "SPORT MODE : Inspection and Adjustment" (Sport mode), TM-79, "MANUAL MODE : Inspection and Adjustment" (Manual mode).

DISASSEMBLY AND ASSEMBLY

TORQUE CONVERTER AND CONVERTER HOUSING OIL SEAL

Exploded View

INFOID:0000000004548637



1. Torque converter
2. Converter housing oil seal
3. Transaxle assembly

: Apply CVT Fluid NS-2.

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

Disassembly

INFOID:0000000004548638

1. Remove transaxle assembly. Refer to TM-103, "Exploded View".
2. Remove torque converter from transaxle assembly.
   CAUTION:
   Never damage bushing inside of torque converter sleeve when removing torque converter.
3. Remove converter housing oil seal using a flat-bladed screwdriver.
   CAUTION:
   Be careful not to scratch converter housing.

Assembly

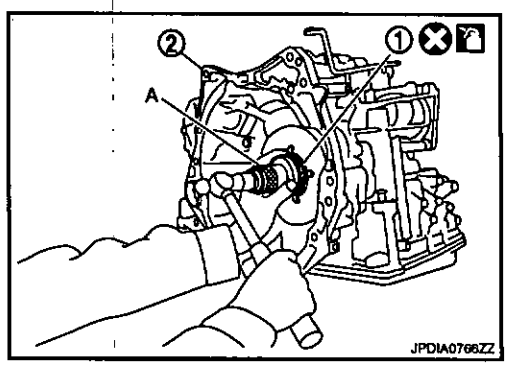
INFOID:0000000004548639

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

- Drive converter housing oil seal (1) evenly using a drift (commercial service tool) (A) so that converter housing oil seal protrudes by the dimension (B) respectively.

Unit: mm (in)

Commercial service tool: A	Outer diameter: 65 (2.56)
	Inner diameter: 60 (2.36)



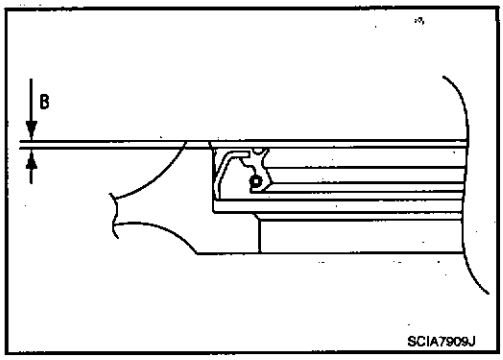
2 : Transaxle assembly

Unit: mm (in)

Dimension B	1.0 ± 0.5 (0.039 ± 0.020)

NOTE:
Converter housing oil seal pulling direction is used as the reference.

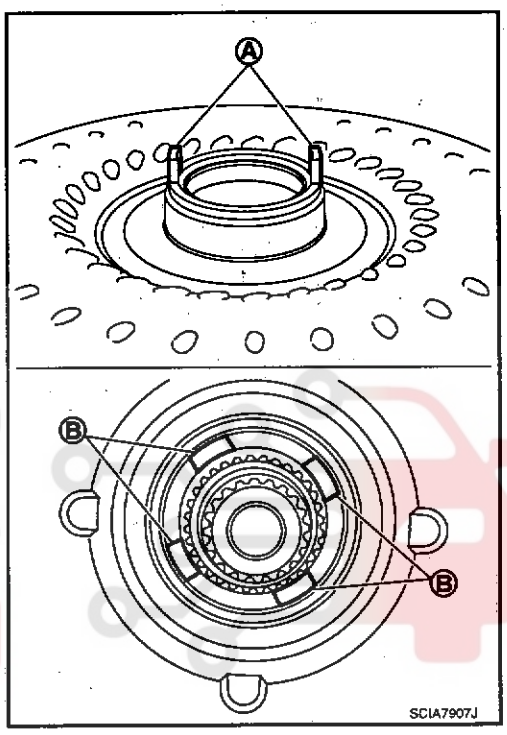
- After completing installation, check for CVT fluid leakage and CVT fluid level. Refer to TM-69, "Inspection".



- Attach the pawl (A) of the torque converter to the drive sprocket hole (B) on the transaxle assembly side.

CAUTION:

- **Rotate the torque converter for installing torque converter.**
- **Never damage the bushing inside the torque converter sleeve when installing the converter housing oil seal.**
- **Never reuse converter housing oil seal.**
- **Apply CVT fluid to converter housing oil seal.**



Inspection

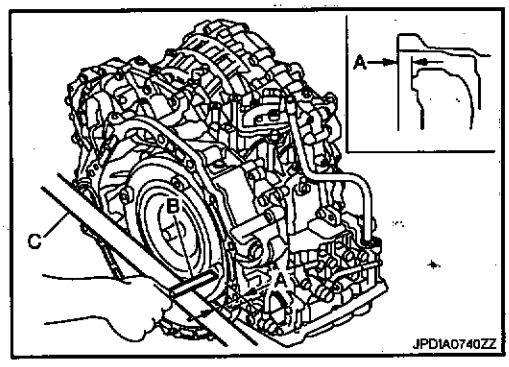
INFOID:0000000004548640

INSPECTION AFTER INSTALLATION

- After inserting a torque converter to the CVT, check distance (A) within the reference value limit.

B : Scale
C : Straightedge

Distance A : Refer to TM-109, "Torque Converter".



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000004548641

Applied model		VQ25DE	
CVT model		RE0F10A	
CVT assembly	Model code number	1XF8D	1XF8E
Transmission gear ratio	D range	2.349 – 0.394	
	Reverse	1.750	
	Final drive	6.120	
Recommended fluid		NISSAN CVT Fluid NS-2*1	
Fluid capacity		7.3 liter (6-3/8 Imp qt)*2	

CAUTION:
- **Use only Genuine NISSAN CVT Fluid NS-2. Never mix with other fluid.**
- **Using CVT fluid other than Genuine NISSAN CVT Fluid NS-2 will deteriorate in driveability and CVT durability, and may damage the CVT, which is not covered by the warranty.**

*1: Refer to MA-8, "Fluids and Lubricants".

*2: The fluid capacity is the reference value. Check the fluid level with CVT fluid level gauge.

Vehicle Speed When Shifting Gears

INFOID:0000000004548642

Numerical value data are reference values.

Unit: rpm

Throttle position	Shift pattern	Engine speed	
		At 40 km/h (25 MPH)	At 60 km/h (37 MPH)
8/8	"D" position	3,500 – 4,400	4,700 – 5,600
	Sport mode*	3,500 – 4,400	4,700 – 5,600
	"L" position*	3,500 – 4,400	4,700 – 5,600
2/8	"D" position	1,300 – 3,100	1,400 – 3,400
	Sport mode*	2,200 – 3,000	2,800 – 3,600
	"L" position*	3,300 – 4,200	4,200 – 5,000

*: Sport mode

CAUTION:

Lock-up clutch is engaged when vehicle speed is approximately 18 km/h (11 MPH) to 90 km/h (56 MPH).

Stall Speed

INFOID:0000000004548643

Stall speed	2,500 – 2,970 rpm

Line Pressure

INFOID:0000000004548644

Unit: kPa (bar, kg/cm^2, psi)

Engine speed	Line pressure
	"R", "D" and "L"*1 positions
At idle	750 (7.50, 7.65, 108.8)
At stall	5,700 (57.00, 58.14, 826.5)*2

*1: Sport mode

*2: Reference values

Solenoid Valves

INFOID:0000000004548645

Name	Resistance (Approx.)
Pressure control solenoid valve B (secondary pressure solenoid valve)	3.0 – 9.0 Ω
Pressure control solenoid valve A (line pressure solenoid valve)	
Torque converter clutch solenoid valve	
Lock-up select solenoid valve	17.0 – 38.0 Ω

CVT Fluid Temperature Sensor

INFOID:0000000004548646

Name	Condition	Voltage (Approx.)	Resistance (Approx.)
CVT fluid temperature sensor	20°C (68°F)	2.0 V	6.5 kΩ
	80°C (176°F)	1.0 V	0.9 kΩ

Primary Speed Sensor

INFOID:0000000004548647

Name	Condition		Data (Approx.)
Primary speed sensor	Sport mode	When driving at 20 km/h (12 MPH) in "L" position	950 Hz
	Manual mode	When driving at 20 km/h (12 MPH) in "M1" position	

Secondary Speed Sensor

INFOID:0000000004548648

Name	Condition	Data (Approx.)
Secondary speed sensor	When driving at 20 km/h (12 MPH) in "D" position	490 Hz

Step Motor

INFOID:0000000004548649

Name	Resistance (Approx.)
Step motor A	15.0 Ω
Step motor B	15.0 Ω
Step motor C	15.0 Ω
Step motor D	15.0 Ω

Torque Converter

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Distance between end of converter housing and torque converter	14.4 mm (0.567 in)